



Chapter 1 Management Software

NEW SmartView™ WEB EMS

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Chapter 2 Rackmount Switch

Layer 3 Ethernet Switch

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NEW L3, 24x GbE RJ45 + 4x FE/GbE SFP + 4x 1G/2.5G/10G SFP+ with 24x PoE 400W.	IXR-G24044X-24PH	2-4
NEW L3, 24x GbE RJ45 + 4x FE/GbE SFP + 4x 1G/2.5G/10G SFP+	IXR-G24044X	2-7
L3, 48x GbE RJ45 + 4x 1G/2.5G/10G SFP+	IXR-G4804X	2-7
NEW L3, 24x GbE RJ45 + 8x FE/GbE SFP with 24x PoE 400W	IGR-2408SM-24PH	2-11
NEW L3, 24x GbE RJ45 + 8x FE/GbE SFP	IGR-2408SM	2-14
L3, 48x GbE RJ45 + 4x 1G SFP	IGR-4804SM	2-14

10G Ethernet Switch

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24x GbE RJ45 + 4x FE/GbE SFP + 4x 1G/2.5G/10G SFP+ with 24x PoE 400W	ICS-G24044X-24PH	2-22
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24x FE/GbE SFP with 4x Combo (RJ45/SFP) + 4x 1G/10G SFP+	ICS-G24S4X	2-26
24x GbE RJ45 + 4x FE/GbE SFP + 4x 1G/2.5G/10G SFP+	ICS-G24044X	2-30
48x GbE RJ45 + 4x 1G/2.5G/10G SFP+	ICS-G4804X	2-30

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Chapter 3 EN50155 Ethernet Switch

Managed PoE Switch

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10x GbE M12 with 8x PoE 180W, 24/48VDC, IP67	ITP-G802TM-8PH24	3-1
8x FE M12 + 2x FE/GbE SFP with 8x PoE 180W, 24/48VDC, IP67	ITP-802GSM-8PH24	3-6
8x FE M12 + 2x GbE M12 with 8x PoE 180W, 24/48VDC, IP67	ITP-802GTM-8PH24	3-6
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Unmanaged PoE Switch

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8x FE M12 with 8x PoE 120W, 24/48VDC, IP56	ITP-800-8PH24	3-17

Managed Ethernet Switch

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Chapter 5 IEC61850-3 Ethernet Switch

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Chapter 7 PoE Switch

Managed PoE Switch

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4x GbE RJ45 + 1x FE/GbE SFP + 1x FE/1G/2.5G SFP with 4x PoE 120W, 24/48VDC.....	IGS+402SM-4PH24	7-8
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16x GbE RJ45 + 8x FE/GbE SFP with 8x PoE 240W, 48VDC.....	IGS-1608SM-8PH	7-21
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8x FE RJ45 + 3x FE/GbE SFP with 8x PoE 240W, 48VDC.....	IFS+803GSM-8PH	7-32
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Unmanaged PoE Switch

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Chapter 8 Ethernet Switch

Managed Ethernet Switch

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4x GbE RJ45 + 2x FE/GbE SFP, Compact Size	IGS-402CSW	8-4
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8x GbE RJ45 + 3x FE/GbE SFP	IGS+803SM	8-7
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16x FE RJ45 + 4x FE/GbE SFP	IFS-1604GSM	8-24

Unmanaged Ethernet Switch

4x GbE RJ45 + 2x FE/GbE SFP, Compact Size	IGS-402CS	8-31
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Unmanaged Media Converter

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Chapter 12 Ethernet Extender, Injector, Splitter & Converter

Ethernet Extender

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Chapter 13 Industrial SFP Transceiver

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Chapter 14 Industrial Power Supply

SmartView™ WEB EMS

NEW

- Web-based User Interface
- Remote Access and Centralized Device Management
- Real-time visual representations & processing of alarms
- Long term event storage (up to 1 year)

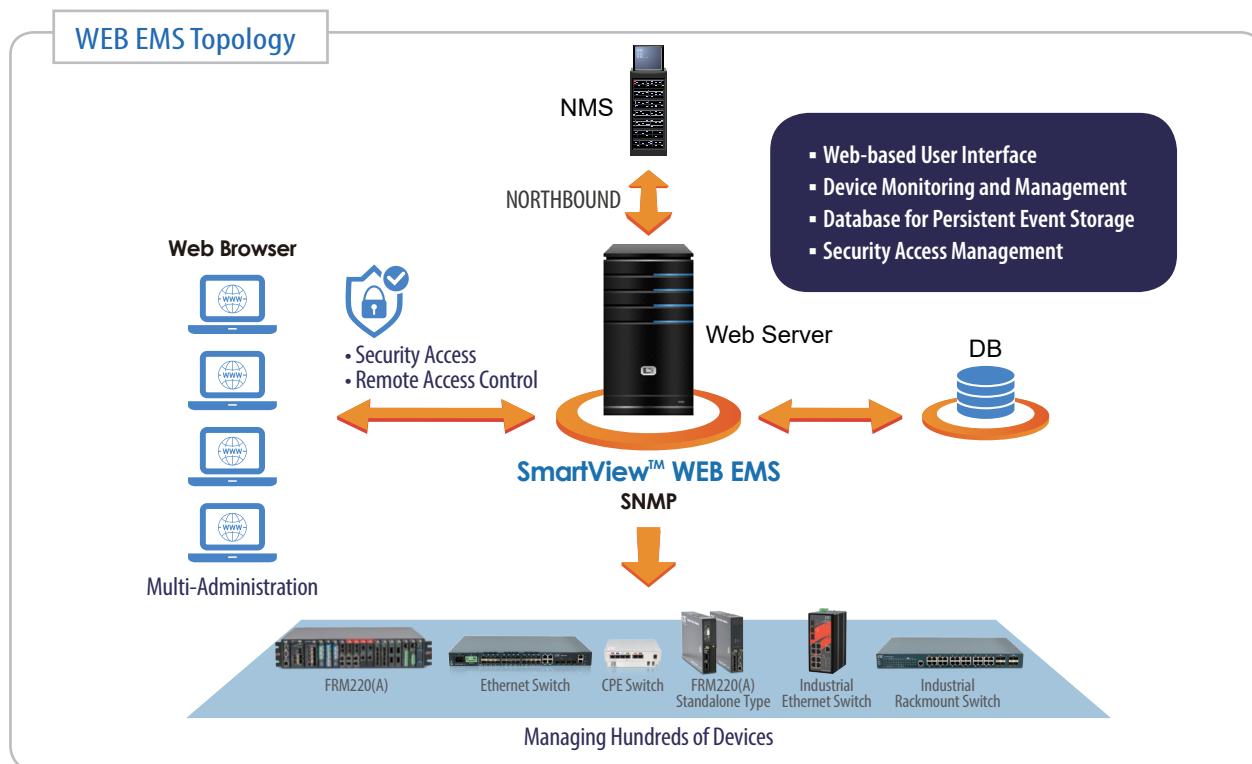


CTC Union's **SmartView™WEB EMS** (Element Management System) is a comprehensive device management solution that monitors performance, enables remote configuration and provisioning and provides fault notification status for CTC Union network devices. Built on the Open JAVA platform, Smartview™ Web EMS uses the Database Server for long term storage along with Web Server to provide a Web based management experience for device administrators. By utilizing a Web based platform, administrators are free to use their favorite Web browser on personal computers or on mobile devices anywhere. All devices under Smartview™ Web EMS management are accessed via the Simple Network Management Protocol or SNMP, as they are constantly polled and monitored for alarm traps. A single Smartview™ Web EMS server is capable of managing hundreds of devices.

Functions

- Main Functions (**FCAPS**):
- Fault Management,
- Configuration Management,
- Accounting Management,
- Performance Management,
- Security Management

- Remote access control for efficient configuration
- Network element performance monitoring
- Alarm event and notification
- Auto discovery and device viewer
- Allow multiple concurrent operation users



SmartView™ WEB EMS Server

The server handles connection with the network devices using SNMP protocol, and is responsible for HTTP requests from management clients. Smartview™ Web EMS Server collects the information data from specific SNMP agents, stores the information into a persistent database and sends commands to control network elements.

Microsoft SQL Server Database

SQL Server is the place where Smartview™ Web EMS stores collected data, such as alarms, traps and user actions, for long term retrieval. Smartview™ Web EMS supports the free Microsoft SQL Server Express Edition for data storage.

Multi-Administrators

Management clients use web browser to monitor and control the devices at far end. Multiple operating connections are allowed, up to the limit of hardware and network.

Features at a Glance

▪ Fault Management

Alarm Detection

SmartView™ WEB EMS 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 and be cleared when alarm condition recovered.

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.

Alarm Notification

The SmartView™ WEB EMS is capable of sending emails 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 Collection and Forwarding

When an SNMP agent experiences an abnormal condition, it will send a SNMP trap message to SmartView™ WEB EMS which then receives the message, and records it in the database. The SmartView™ WEB EMS is capable of forwarding received traps to upper network management.

▪ Configuration Management

Network Element Configuration

SmartView™ WEB EMS 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.

Firmware Upgrade

SmartView™ WEB EMS is able to download firmware to device elements and perform configuration backup/restore.

Network Element Discovery

SmartView™ WEB EMS 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 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) can be generated on an XY 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.

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.

System Requirements

▪ Operating System:

Windows Server 2016, Win 10 Pro 64bit.

▪ Hardware:

Intel Core i5 or Xeon E5 2.4GHz 4 cores Processors, 8GB RAM, 100GB HD

Ordering Information

Model Name	Description
SVW2-AGT-50	SmartView™ WEB EMS management software with 50 nodes
SVW2-AGT-100	SmartView™ WEB EMS management software with 100 nodes
SVW2-AGT-200	SmartView™ WEB EMS management software with 200 nodes
SVW2-AGT-500	SmartView™ WEB EMS management software with 500 nodes

IXR-MG2404XS

Layer 3 3x Modular Slots + 4x 10G/GbE SFP+



- Static Routing, RIP v1, RIP v2, BGP v4, OSPF v2, PIM-SM, PIM-DM, PIM-SSM, DVMRP, VRRP v2
- Supports IEEE802.1AE MACsec network security (IRM-4GS-SEC, IRM-4GT-SEC)
- Supports ERPS, MRP, MSTP, RSTP, STP for redundant cabling
- EN62368-1, CE, FCC certified
- Modular design for flexible application



IEEE 1588v2

The industrial layer 3 switches adopt an enhanced and hardened design to meet critical and centralized strict requirements. It provides up to 24 Gigabit Ethernet ports, which can be implemented by 3 types of Ethernet module of Gigabit copper, PoE port and SFP slot, and come with 4 ports of 10 Gigabit SFP+ slot for uplink. Its redundant power input can improve system reliability and uninterrupted availability of the network backbone. The switch is ideal for smart city, surveillance, intelligent traffic control systems and production automation applications.

Features

- Redundant 48VDC, or 110/220VAC power inputs
- Rugged metal, IP30 protection & Fanless design
- Supports IEEE 1588 PTP V2 for precise time synchronization to operate in BC, End-End mode for each port

Specifications

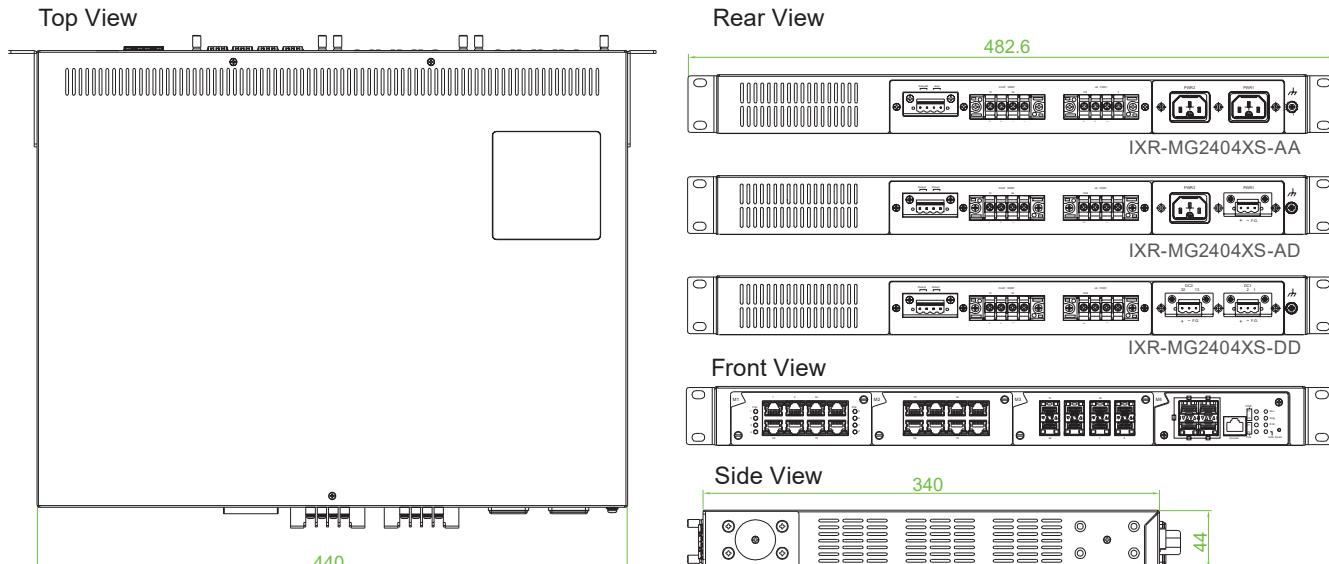
Standard	IEEE 802.3 IEEE 802.3u IEEE 802.3ab IEEE 802.3z IEEE802.3ae IEEE802.3af IEEE802.3at IEEE 802.1d IEEE 802.1w IEEE 802.1s IEC62439-2 ITU-T G.8032 / Y.1344 IEEE 802.1Q IEEE 802.1X IEEE802.1AE IEEE 802.3ac IEEE 802.3ad IEEE 802.3X IEEE 802.1ad IEEE 802.1p IEEE 802.1ab	10Base-T 10Mbps Ethernet 100Base-TX, 100Base-FX, Fast Ethernet 1000Base-T Gbit/s Ethernet over twisted pair 1000Base-X Gbit/s Ethernet over Fiber-Optic 10Gbit/s Ethernet over fiber PoE (Power over Ethernet) PoE+ (Power over Ethernet enhancement) STP (Spanning Tree Protocol) RSTP (Rapid Spanning Tree Protocol) MSTP (Multiple Spanning Tree Protocol) Media Redundancy Protocol (MRP) ERPS (Ethernet Ring Protection Switching) Virtual LANs (VLAN) Port based and MAC based Network Access Control, Authentication MACsec, Local and metropolitan area networks-Media Access Control (MAC) Security Max frame size extended to 1522Bytes Link aggregation for parallel links with LACP(Link Aggregation Control Protocol) Flow control for full duplex Stacked VLANs, Q-in-Q LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization Link Layer Discovery Protocol (LLDP)	Protocols	CSMA/CD
Power Supply (For Device)		Redundant 2x AC input power (-AA model) Redundant 1x AC + 1xDC input power (-AD model) Redundant 2x DC input power (-DD model) AC input power (A) : 110/220VAC (85VAC~264VAC) IEC320 C-16 type connector DC input power (D) : 48VDC (48~57VDC) Removable Terminal Block	Power Supply (For PoE)	Dual 48VDC for PoE (45~57VDC, For IEEE802.3af) (51~57VDC, For IEEE802.3at) Terminal Block
Power Consumption		Maximum 64W@110-220VAC (Not include PoE) Maximum 32.7W@48VDC (Not include PoE) Maximum 370W for PoE	PoE Power Budget	360W (In full PoE Module)
LED (System)		Power 1 (Green), Power 2 (Green) for Device Power 1 (Green), Power 2(Green) for PoE Sys (Green) Blinking: Normally operate OFF: Not ready Ring (Green) ON: Rings in normal Blinking: port link down in Ring OFF: Ring is disabled Master (Green) ON: The device is a Master of the Ring OFF: Slave of the ERPS Ring Alarm (Red) ON: Alarm is triggered by user defined OFF: Alarm is not triggered	LED (Module)	Per RJ-45 port Amber: ON 1000M Link Blink 100M Link OFF 10M Green: ON Link Blink Link & Active OFF No Link
Network Connector		Provide various type of module for modular slot: 8x 10/100/1000Base-T RJ45 module 8x 10/100/1000Base-T RJ45 with IEEE802.3af/at PoE module 8x 100/1000Base-X SFP module 4x 10/100/1000Base-T RJ45 MACsec module 4x 100/1000Base-X SFP MACsec module PoE: Supports 3x PoE module/24x PoE ports maximum Maximum 30W/port, maximum total 720W/per device All SFP support DDMI All RJ45 support auto negotiation speed, auto MDI/MDI-X function	Per SFP Fiber port Amber : ON 1000M Link Blink 100M Link OFF No Link Green: ON Link Blink Link & Active OFF No Link	Per SFP Fiber port Amber : ON 1000M Link Blink 100M Link OFF No Link Green: ON PoE Active OFF PoE Inactive
Console Port	RS232 (RJ45)		Jumbo Frame	9216 Byte
Network Cable	UTP/STP Cat.5e cable or above EIA/TIA-568 100-ohm (100meter)		MAC Address Table	16K
			Memory Buffer	1.5M 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 ~ 60°C	EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Operating Humidity	5% to 95% (Non-condensing)	EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
Storage Temperature	-40 ~ 85°C		EN61000-4-3 (RS) Level 3, Criteria A
Housing	Rugged Metal, IP30 Protection, Fanless		EN61000-4-4 (Burst) Level 3, Criteria A
Dimensions	340 x 440 x 44mm (Dx W x H)		EN61000-4-5 (Surge) Level 3, Criteria B
Weight	5kg (Not include module)		EN61000-4-6 (CS) Level 3, Criteria A
Installation Mounting	19" rack mount		EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
MTBF	106,872 Hours (MIL-HDBK-217)	Safety	EN62368-1
Warranty	5 years	Shock	IEC 60068-2-27
Certification		Freefall	IEC 60068-2-31
EMC	CE (EN55032, EN55024)	Vibration	IEC 60068-2-6

Software Specifications

Topology		TACACS+ authentication & accounting
Layer 3 Routing	Static routing, RIP v1/v2, OSPFv2, DVMRP, PIM-DM, PIM-SM, PIM-SSM	HTTPS, HTTP Supported
Layer 3 redundancy		SSH Supported
VLAN	IEEE 802.1q VLAN, up to 4094 802.1Q VLAN VID MAC-based VLAN GARP GVRP (GARP VLAN Registration Protocol) GMRP	Management Interface Access Filtering
Link Aggregation (Port Trunk)	Static, Dynamic (IEEE 802.3ad LACP)	Management Features
Spanning Tree	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP, IEC62439-2 MRP(Client)	CLI Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms	Web Based Management
	Single Ring	Telnet Server
QoS		SNMP V1, V2c, V3
QoS	Supported	sFlow Supported
IP Multicasting Features		SMTP SMTP, SMTP (Gmail)
IGMP	IGMP v1, v2, v3 / IGMP Snooping	Automation Profile Profinet v2 conformance Modbus/TCP status registers
Security Features		SW & Configuration Upgrade TFTP
IEEE802.1AE	Support IEEE802.1AE MACsec network security Provide by IRM-4GS-SEC, IRM-4GT-SEC optional module	RMON RMON 1 (1, 2, 3, 9 group)
IEEE 802.1X	Port-Based	MIB RFC1213 MIB II, Private MIB
ACL	Supported	DHCP Server, Client, Relay, DHCP option 66/67/82
RADIUS authentication & accounting		BootP Supported
		RARP Supported
		Mirroring Supported
		Event Syslog Client
		Warning Message System syslog, SMTP e-mail, alarm relay
		IEEE 1588 PTP V2 BC, End-End mode for each port
		NTP V4.0, SNTP NTP (server/ Client), SNTP (Client)
		LLDP (IEEE 802.1ab) Link Layer Discovery Protocol

Dimensions



Ordering Information

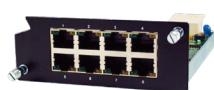
Model Name	Managed	Total Ports (Max)	Extension port	Modular Slot	Input Power	Certification		Operating Temperature
			1000/10GBase-X	See Module selection table for Optional	Device and PoE	Safety EN62368-1	CE, FCC	
IXR-MG2404XS-AA	V	28	4x SFP	3	Dual 110/220VAC Dual 48VDC for PoE	V	V	-40 ~ 60°C
IXR-MG2404XS-AD	V	28	4x SFP	3	110/220VAC and 48VDC Dual 48VDC for PoE	V	V	-40 ~ 60°C
IXR-MG2404XS-DD	V	28	4x SFP	3	Dual 48VDC Dual 48VDC for PoE	V	V	-40 ~ 60°C

Module Selection

Model Name	100/1000 Base-X SFP	10/100/1000 Base-TX RJ45	IEEE802.3 af/at PoE	MACsec
IRM-8GS	8			
IRM-8GT		8		
IRM-8GP		8	8	
IRM-4GS-SEC	4			V
IRM-4GT-SEC		4		V



IRM-8GS



IRM-8GT



IRM-8GP



IRM-4GS-SEC



IRM-4GT-SEC

Optional Accessories

■ Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

■ Industrial Power Supply

NDR-120-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 120W, -20 ~ +70°C (For DC input type, Non PoE)

NDR-480-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 480W, -20 ~ +70°C (For PoE application)

IXR-G24044X-24PH

Layer 3 24x GbE RJ45 + 4x 100/1000Base SFP + 4x 1G/2.5G/10G SFP with 24x PoE 400W, 48VDC

NEW

4KV Surge protection



- L3 IPv4/IPv6 Static Routing, RIP v2 Dynamic Routing, OSPF v2/v3 Dynamic Routing
- Supports IEEE 1588 PTP V2
- Support u-Ring, ERPS, EPS, MSTP, RSTP, STP for redundant cabling
- EN62368-1, CE, FCC certified
- 4KV surge protection for PoE, RJ45 and SFP ports



As an Industrial Layer 3 Ethernet switch for process automation and transportation automation applications, the IXR-G24044X-24PH combines data, voice, and video transmissions with high performance and high reliability. The IXR Series has 4x 10G SFP+ slots and 24x RJ45 GbE ports with PoE features and supports Layer 3 routing functionality to facilitate the deployment of applications across networks, making them ideal for large-scale industrial network backbones.

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
- Supports SmartView™ for Centralized Management*

*Please see Chapter 1- Software Management for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet	Switch Architecture	Back-plane (Switching Fabric): 136Gbps (Full wire-speed)
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet	Data Processing	Store and Forward
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair	Network Connector	10GbE SFP+: 4x 1G/2.5G/10G SFP socket Supports DDMI
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic		SFP: 4x 100/1000Base-X SFP socket Support DDMI
	IEEE 802.3ae	10 Gbit/s Ethernet over fiber		
	IEEE 802.1d	STP (Spanning Tree Protocol)	RJ45:	24x 10/100/1000Base-T RJ-45 Support Auto negotiation speed, Auto MDI/MDI-X function
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)		
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)	PoE:	24x IEEE 802.3af / IEEE 802.3at PoE+ End-Span, Alternative A mode. Maximum 30W per port, 400W PoE power budget in total
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)		
	ITU-T G.8031 / Y.1342	EPS (Ethernet Protection Switching)	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)
	IEEE 802.1Q	Virtual LANs (VLAN)	Console	RS-232 (RJ-45)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication	Network Cable	UTP/STP Cat.5e cable or above EIA/TIA-568 100-ohm (100meter)
	IEEE 802.3ac	Max frame size extended to 1522Bytes	Protocols	CSMA/CD
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)	Reverse Polarity Protection	For input power
	IEEE 802.3af	PoE (Power over Ethernet)	Overload Current Protection	Supported
	IEEE 802.3at	PoE+ (Power over Ethernet enhancement)	CPU Watch Dog	Supported
	IEEE 802.3X	Flow control for full duplex	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)
	IEEE 802.1ad	Stacked VLANs, Q-in-Q		
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization	Power Consumption	< 33W @50VDC without PoE load < 449W @50VDC with 400W PoE load
	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			

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)	Weight	4.26kg
Jumbo Frame	10K Byte	Installation Mounting	19" rack mount
MAC Address Table	32K	MTBF	97,078 Hours (MIL-HDBK-217)
Memory Buffer	4M Bytes for packet buffer	Warranty	5 years
Device Memory	16M Bytes Flash ROM, 1G Bytes RAM	Certification	
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay	EMC	CE (EN55032, EN55035)
Alarm Relay Contact	Relay outputs with current carrying capacity of 1A @24VDC, 2-Pin removable terminal block	EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Operating Temperature	-40 ~ 60°C	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
Operating Humidity	5% to 95% (Non-condensing)	Safety	EN62368-1
Storage Temperature	-40 ~ 85°C	Surge protection	4KV for PoE, RJ45 and SFP
Housing	Rugged Metal, IP30 Protection, Fanless	Shock	IEC 60068-2-27
Dimensions	280x 440 x 44mm (D x W x H)	Freefall	IEC 60068-2-32
		Vibration	IEC 60068-2-6

Software Specifications

L3 Routing		Storm Control	for Unicast, Broadcast, Multicast
IPv4/v6 Static Routing	Supported	IP Multicasting Features	
RIP v2 Dynamic Routing	Supported	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
OSPF v2/v3 Dynamic Routing	Supported		
Topology		Security Features	
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 Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN	IEEE 802.1X	Port-Based MAC-Based Number of rules : up to 256 entries
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	ACL	for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3 : IP address SA/DA, Subnet L4 : TCP/UDP
Spanning Tree	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP	RADIUS authentication & accounting	
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.	TACACS+ authentication & accounting, TACACS+ 3.0	
Loop Protection	Supported	HTTPS, HTTP	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <20ms	SSL / SSH v2	Supported
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Single Ring, Sub-Ring, Multiple ring topology	sFlow	Supported
QoS Features		User Name Password Authentication	Local Authentication Remote Authentication (via RADIUS / TACACS+)
Class of Service	IEEE 802.1p 8 active priorities queues per port	Management Interface Access Filtering	Web, Telnet / SSH , CLI RS-232 console
Traffic Classification QoS	IEEE 802.1p based CoS IP Precedence based CoS IP DSCP based CoS	Management Features	
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	CLI	Cisco® like CLI
Bandwidth Control for Ingress	Per port based	Web Based Management	
Bandwidth Control for Egress	Per port based Per queue / Per port shaper	Telnet	Server
DiffServ (RF 2474) Remarking		SNMP	V1, V2c, V3
		sFlow	Supported
		Modbus/TCP	Support for management and monitoring
		SW & Configuration Upgrade	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	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
IPv6 Features		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
IPv6 Management	Telnet Server/ICMP v6		Cable Diagnostic Measuring UTP cable normal or broken point distance
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 SIP, Subnet (32bit) L4 : TCP/UDP		

Dimensions

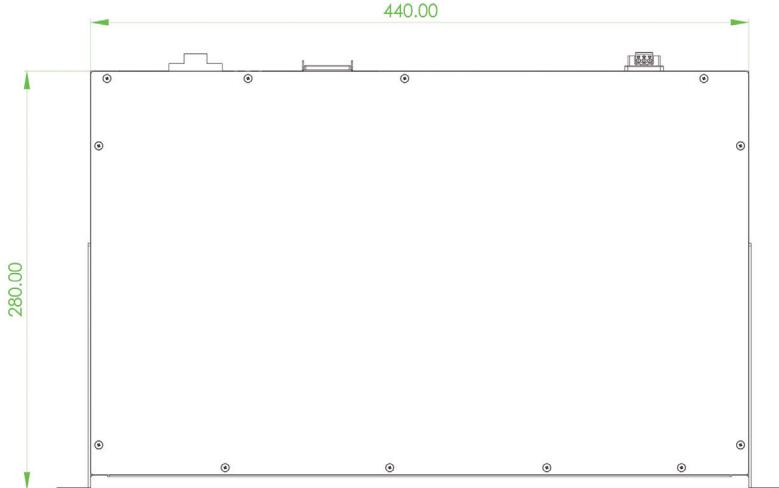
Rear View



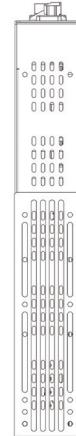
Front View



Top View



Side View



Ordering Information

Model Name	Total Port	GbE Port		10GbE	PoE Port		Input Power	Certification		Operating Temperature
		10/100/1000 Base-T(X) RJ45	100/1000 Base-X SFP		IEEE 802.3at/af	Power Budget		Safety EN62368-1	CE, FCC	
IXR-G24044X-24PH	32	24	4	4	24	400W	2	V	V	-40 ~ 60°C

■ Package List

- IXR-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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

■ Industrial Power Supply

NDR-480-48	Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 480W, -20 ~ +70°C
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IXR-G24044X & IXR-G4804X

◀ Layer 3 24x GbE RJ45 +4x FE/GbE SFP + 4x 1G/2.5G/10G SFP+

▶ Layer 3 48x GbE RJ45 + 4x 1G/2.5G/10G SFP+

NEW



- L3 IPv4/IPv6 Static Routing, RIP v2 Dynamic Routing, OSPF v2/v3 Dynamic Routing
- Supports u-Ring, ERPS, EPS, MSTP, RSTP, STP for redundant cabling
- Supports maximum up to 14 u-rings in one device
- EN62368-1, CE, FCC certified
- 4KV surge protection for RJ45 and SFP ports
- Supports negative voltage power input



IXR-G24044X & IXR-G4804X are industrial grade, hardened design, Layer 3 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. The 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. The 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 24/48/-48VDC (18~60VDC), 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, G.8031 EPS, 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 (IXR-G24044X)
- Supports SmartView™ for Centralized Management*

*Please see Chapter 1- Software Management for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet	Network Cable	UTP/STP Cat.5e cable or above	
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet		EIA/TIA-568 100-ohm (100meter)	
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair.	Protocols	CSMA/CD	
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic	Reverse Polarity	Protection for input power	
	IEEE 802.3ae	10 Gbit/s Ethernet over fiber	Overload Current	Protection Supported	
	IEEE 802.1d	STP (Spanning Tree Protocol)	CPU Watch Dog	Supported	
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)	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 24/48/-48VDC (18~60VDC), Removable Terminal Block Supports negative voltage power input	
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)		Consumption: <33W (IXR-G24044X) TBD (IXR-G4804X)	
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)	Power Consumption	Per unit: Power 1 (Green), Power 2 (Green), Act /Alarm (Green/Amber), Ring Master (Green)	
	ITU-T G.8031 / Y.1342	EPS (Ethernet Protection Switching)		P1~P24 (IXR-G24044X) Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber)	
	IEEE 802.1Q	Virtual LANs (VLAN)	LED	P25~P32 (IXR-G24044X) Per SFP Fiber port: Link/Active (Amber) TBD (IXR-G4804X)	
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication		Jumbo Frame	10K Byte
	IEEE 802.3ac	Max frame size extended to 1522Bytes		MAC Address Table	32K
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)		Memory Buffer	4M Bytes for packet buffer
	IEEE 802.3X	Flow control for full duplex		Device Memory	16M Bytes Flash ROM, 1G Bytes RAM
	IEEE 802.1ad	Stacked VLANs, Q-in-Q		Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization		Alarm Relay Contact	Relay outputs with current carrying capacity of 1A @24VDC, 2-Pin removable terminal block
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)		Operating Temperature	-40 ~ 60°C
	IEEE 802.3az	EEE (Energy Efficient Ethernet)		Operating Humidity	5% to 95% (Non-condensing)
VLAN ID	4094 IEEE 802.1Q VLAN VID			Storage Temperature	-40 ~ 85°C
Switch Architecture	Back-plane (Switching Fabric): 136Gbps (IXR-G24044X) 176Gbps (IXR-G4804X) (Full wire-speed)			Housing	Rugged Metal, IP30 Protection, Fanless
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 (IXR-G24044X) Support DDMI RJ45: 24x 10/100/1000Base-T RJ-45 (IXR-G24044X) 48x 10/100/1000Base-T RJ-45 (IXR-G4804X) Support Auto negotiation speed, Auto MDI/MDI-X function				
Console	RS-232 (RJ-45)				

Dimensions	280x 440 x 44mm (D x W x H)	EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
Weight	4,755kg (IXR-G24044X-AA) 4,51kg (IXR-G24044X-AD) 4,26kg (IXR-G24044X-DD) TBD (IXR-G4804X)		EN61000-4-3 (RS) Level 3, Criteria A
Installation Mounting	19" rack mount		EN61000-4-4 (Burst) Level 3, Criteria A
MTBF	103,057 Hours (IXR-G24044X-AA) 103,451 Hours (IXR-G24044X-AD) 103,447 Hours (IXR-G24044X-DD) TBD (IXR-G4804X) (MIL-HDBK-217)		EN61000-4-5 (Surge) Level 3, Criteria B
Warranty	5 years		EN61000-4-6 (CS) Level 3, Criteria A
Certification			EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
EMC	CE (EN55032, EN55035)		
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE		

Software Specifications

L3 Routing		IP Multicasting Features	
IPv4/v6 Static Routing	Supported	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
RIP v2 Dynamic Routing	Supported		
OSPF v2/v3 Dynamic Routing	Supported		
Topology		Security Features	
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 Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN	IEEE 802.1X	Port-Based MAC-Based
Link Aggregation (Port Trunk)	Static (IEEE 802.3ad LACP), Maximum trunk group : 16group (IXR-G24044X) 26group (IXR-G4804X) Dynamic (IEEE 802.3ad LACP), Maximum trunk group : 16group (IXR-G24044X) 26group (IXR-G4804X) Per group up-to 8 port	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
Spanning Tree	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP	RADIUS authentication & accounting	
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.	TACACS+ authentication & accounting, TACACS+ 3.0	
Loop Protection	Supported Recovery time <50ms	HTTPS, HTTP	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Single Ring, Sub-Ring, Multiple ring topology	SSL / SSH v2	Supported
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Supported	User Name Password Authentication	Local Authentication
QoS Features		Management Interface Access Filtering	Remote Authentication (via RADIUS / TACACS+)
Class of Service	IEEE 802.1p 8 active priorities queues per port	Management Features	Web, Telnet / SSH, CLI RS-232 console
Traffic Classification QoS	IEEE 802.1p based CoS IP Precedence based CoS IP DSCP based CoS	CLI	Cisco® like CLI
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	Web Based Management	
Bandwidth Control for Ingress	Per port based	Telnet	Server
Bandwidth Control for Egress	Per port based Per queue / Per port shaper	SNMP	V1, V2c, V3
DiffServ (RF 2474) Remarking		sFlow	Supported
Storm Control	for Unicast, Broadcast, Multicast	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)
		Warning Message	System syslog, e-mail, alarm relay
		DNS	Client, Proxy
		IEEE 1588 PTP V2 (IXR-G24044X)	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	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
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 SIP, Subnet (32bit) L4 : TCP/UDP	

Application

Figure 1 : 10G Backbone application



 10G Fiber
 Giga Fiber
 UTP

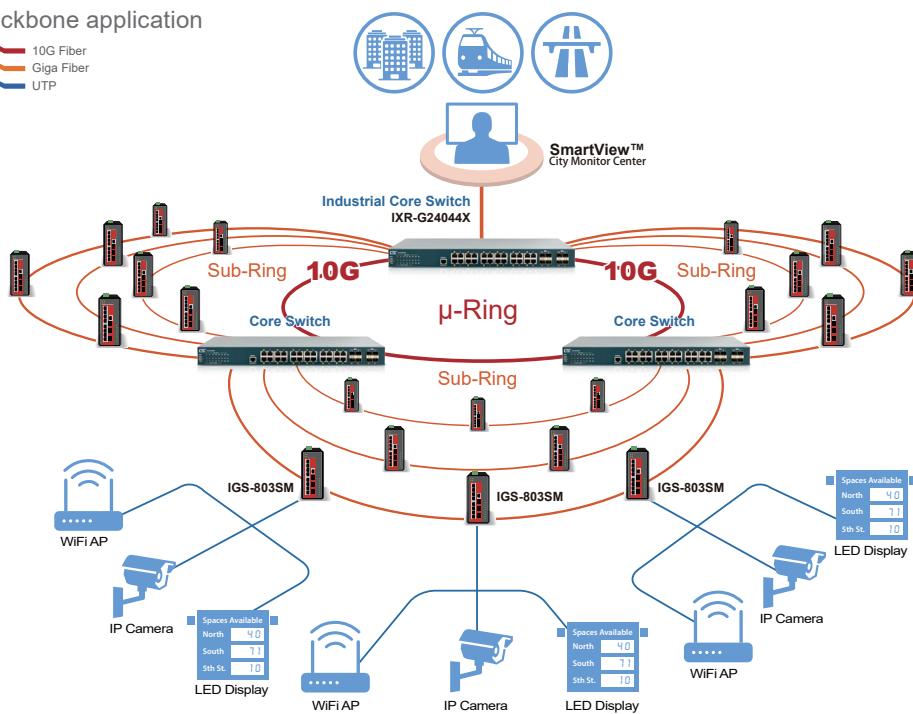
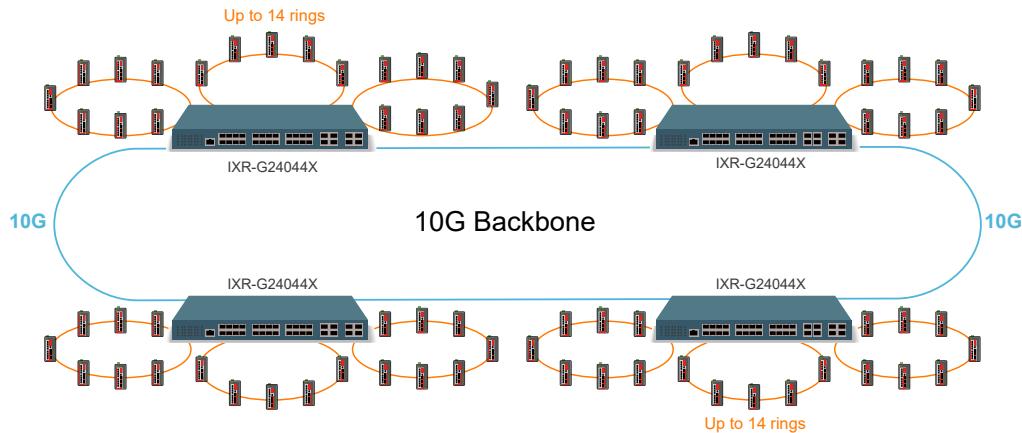
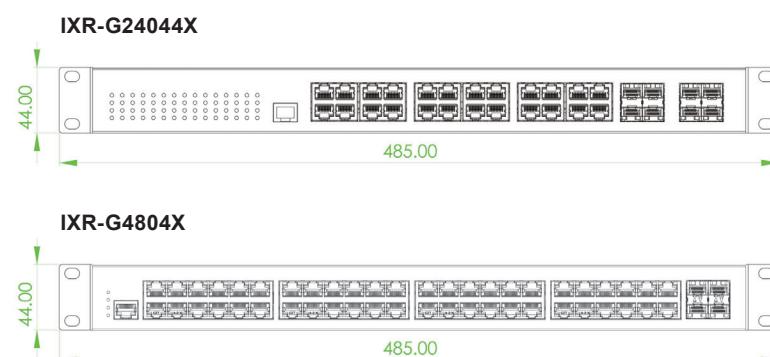


Figure 2 : 10G Backbone with μ-Ring topology



Dimensions

Front View

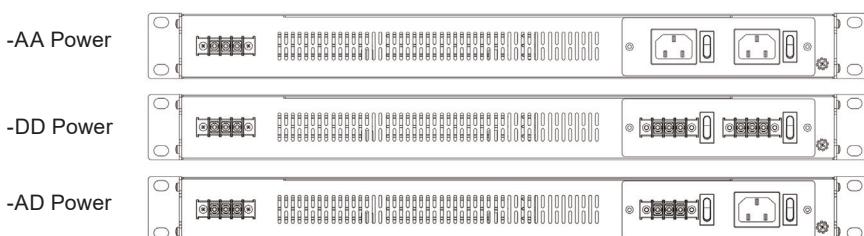


Rear View

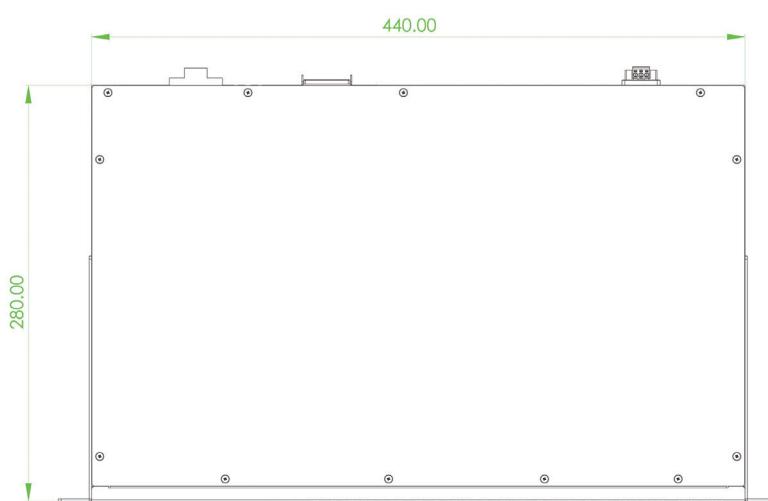
IXR-G24044X



IXR-G4804X



Top View



Side 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		24/48/48VDC	110/220VAC	Safety EN62368-1	CE, FCC
IXR-G24044X-AA	V	32	24	4	4		2	V	V
IXR-G24044X-AD	V	32	24	4	4	1	1	V	V
IXR-G24044X-DD	V	32	24	4	4	2		V	V
IXR-G4804X-AA	V	52	48		4		2	V	V
IXR-G4804X-AD	V	52	48		4	1	1	V	V
IXR-G4804X-DD	V	52	48		4	2		V	V

■ Package List

- IXR-G4804X or IXR-G24044X device
- 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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

■ Industrial Power Supply

NDR-120-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 120W, -20 ~ +70°C (For DC type)

IGR-2408SM-24PH

Layer 3 24x GbE RJ45 + 8x 100/1000Base SFP with 24x PoE 400W 48VDC

NEW

4KV Surge protection



- L3 IPv4/IPv6 Static Routing, RIP v2 Dynamic Routing, OSPF v2/v3 Dynamic Routing
- Supports IEEE 1588 PTP V2
- Supports u-Ring, ERPS, EPS, MSTP, RSTP, STP for redundant cabling
- EN62368-1, CE, FCC certified
- 4KV surge protection for PoE, RJ45 and SFP ports



As an Industrial grade Layer 3 Ethernet switch, the IGR-2408SM-24PH provides full Gigabit capability with high performance and the ability to quickly transfer large amounts of video, voice, and data across a network. IGR series has 8x Gigabit SFP slots and 24x Gigabit RJ45 Ethernet ports with PoE. They support Layer 3 routing function, ERPS ring, RSTP/STP and u-Ring redundancy technologies, support wide operating temperature, fanless design, to increase system reliability and the availability of your network.

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
- 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 ERPS (Ethernet Ring Protection Switching) /Y.1344 ITU-T G.8031 /Y.1342 EPS (Ethernet 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)	Console RS-232 (RJ-45) Network Cable UTP/STP Cat.5e cable or above EIA/TIA-568 100-ohm (100meter) 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 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 Device Memory 16M Bytes Flash ROM, 1G Bytes RAM 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
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 10/100/1000Base-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)	

Certification	
EMC	CE (EN55032, EN55035)
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
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
Surge protection	4KV for PoE, RJ45 and SFP ports
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Software Specifications

L3 Routing	
IPv4/v6 Static Routing	Supported
RIP v2 Dynamic Routing	Supported
OSPF v2/v3 Dynamic Routing	Supported
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(Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN
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
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Single Ring, Sub-Ring, Multiple ring topology
QoS Features	
Class of Service	IEEE 802.1p 8 active priorities queues 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
SSL / SSH v2
sFlow
User Name Authentication
Management Interface Access
Filtering
Management Features
CLI
Web Based Management
Telnet
SNMP
sFlow
Modbus/TCP
SW & Configuration Upgrade
RMON
MIB
UPnP
DHCP
IP Source Guard
Mirroring
Event Syslog
Warning Message
DNS
IEEE1588 PTP V2
NTP V4.0, SNTP
LLDP (IEEE 802.1ab)
IPv6 Features
IPv6 Management
SNMP over IPv6
HTTP over IPv6
SSH over IPv6
IPv6 Telnet
IPv6 NTP, SNTP
IPv6 TFTP
IPv6 QoS
IPv6 ACL
Advanced PoE Management
Other Features

Dimensions

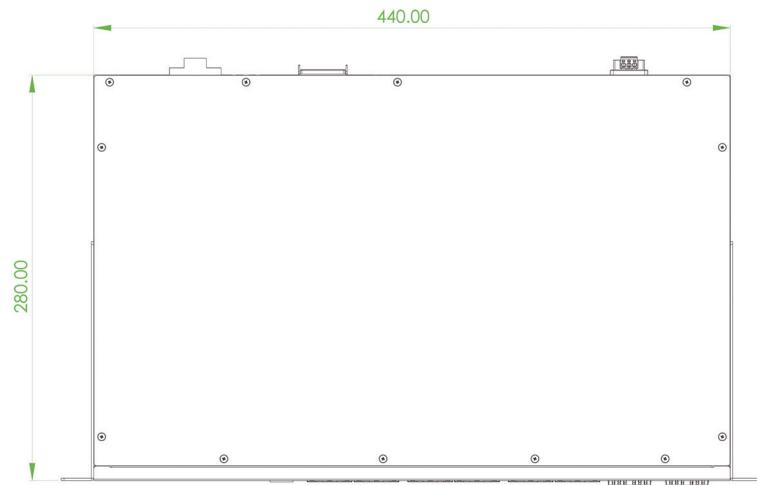
Rear View



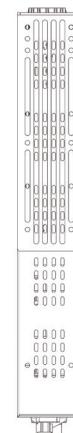
Front View



Top View



Side View



Ordering Information

Model Name	Managed	Total Port	RJ45 Port	SFP Port	PoE Port		Input Power	Certification		Operating Temperature
			10/100/1000 Base-T(X)	100/1000 Base-X	IEEE 802.3at	Power Budget		Safety EN62368-1	CE, FCC	
IGR-2408SM-24PHE	V	32	24	8	24	400W	2	V	V	-40~75°C

■ Package List

- IGR-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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

■ Industrial Power Supply

NDR-480-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 480W, -20 ~ +70°C

IGR-2408SM & IGR-4804SM

◀ Layer 3 24x GbE RJ45 + 8x 100/1000Base SFP

▶ Layer 3 48x GbE RJ45 + 4x GbE SFP

NEW



- L3 IPv4/IPv6 Static Routing, RIP v2 Dynamic Routing, OSPF v2/v3 Dynamic Routing
- Support u-Ring, ERPS, EPS, MSTP, RSTP, STP for redundant cabling
- Supports maximum up to 14 u-rings in one device
- EN62368-1, CE, FCC certified
- 4KV surge protection for RJ45 and SFP ports
- Supports negative voltage power input



IGR-2408SM & IGR-4804SM are industrial grade, hardened design, Layer 3 switches, built for the rigorous demands of centralized and critical applications. The switch supports 4 or 8 GbE SFP slot and 24 / 48 GbE (10/100/1000BaseTX) RJ-45 ports. The 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. The 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 24/48/-48VDC (18~60VDC), 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, G.8031 EPS, 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 (IGR-2408SM)
- Supports SmartView™ for Centralized Management*

*Please see Chapter 1- Software Management for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet	CPU Watch Dog	Supported
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet	Power Supply	Redundant 2x AC input power (-AA model)
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair		Redundant 1x AC and 1x DC input power (-AD model)
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic		Redundant 2x DC input power (-DD model)
	IEEE 802.3ae	10 Gbit/s Ethernet over fiber		AC input power (A) : Isolated 110/220VAC (85VAC~264VAC)
	IEEE 802.1d	STP (Spanning Tree Protocol)		DC input power (D) : Isolated 24/48/-48VDC (18~60VDC),
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)		Removable Terminal Block
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)		Supports negative voltage power input
ITU-T G.8032 / Y.1344	ITU-T G.8031	ERPS (Ethernet Ring Protection Switching)		Consumption: <33W (IGR-2408SM) TBD (IGR-4804SM)
/Y.1342	EPS (Ethernet Protection Switching)		Power Consumption	Per unit: Power 1 (Green), Power 2 (Green), Act /Alarm (Green/Amber), Ring Master (Green)
IEEE 802.1Q	Virtual LANs (VLAN)			P1~P24 (IGR-2408SM)
IEEE 802.1X	Port based and MAC based Network Access Control, Authentication			Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber)
IEEE 802.3ac	Max frame size extended to 1522Bytes			P25~P32 (IGR-2408SM)
	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)			Per SFP Fiber port: Link/Active (Amber)
IEEE 802.3ad			LED	TBD (IGR-4804SM)
IEEE 802.3X	Flow control for full duplex			
IEEE 802.1ad	Stacked VLANs, Q-in-Q		Jumbo Frame	10K Byte
IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization		MAC Address Table	32K
IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)		Memory Buffer	4M Bytes for packet buffer
IEEE 802.3az	EEE (Energy Efficient Ethernet)		Device Memory	16M Bytes Flash ROM, 1G Bytes RAM
VLAN ID	4094 IEEE 802.1Q VLAN VID		Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
Switch Architecture	Back-plane (Switching Fabric): 64 Gbps (IGR-2408SM) (Full wire-speed)		Alarm Relay Contact	Relay outputs with current carrying capacity of 1A @24VDC, 2-Pin removable terminal block
Data Processing	Store and Forward		Operating Temperature	-40 ~ 75°C
Network Connector	GbE SFP: 8x 10/100/1000Base-X SFP socket (IGR-2408SM) 4x 1000Base-X SFP socket (IGR-4804SM) Support DDMI RJ45: 24x 10/100/1000Base-T RJ-45 (IGR-2408SM) 48x 10/100/1000Base-T RJ-45 (IGR-4804SM) Support Auto negotiation speed, Auto MDI/MDI-X function		Operating Humidity	5% to 95% (Non-condensing)
Console	RS-232 (RJ-45)		Storage Temperature	-40 ~ 85°C
Network Cable	UTP/STP Cat.5e cable or above EIA/TIA-568 100-ohm (100meter)		Housing	Rugged Metal, IP30 Protection, Fanless
Protocols	CSMA/CD		Dimensions	280x 440 x 44mm (D x W x H)
Reverse Polarity	Protection for input power		Weight	4.75kg (IGR-2408SM-AA) 4.51kg (IGR-2408SM-AD) 4.26kg (IGR-2408SM-DD) TBD (IGR-4804SM)
Overload Current	Protection Supported		Installation Mounting	19" rack mount
			MTBF	103,057 Hours (IGR-2408SM-AA) 103,451 Hours (IGR-2408SM-AD) 103,447 Hours (IGR-2408SM-DD) TBD (IGR-4804SM) (MIL-HDBK-217)
			Warranty	5 years

Certification	
EMC	CE (EN55032, EN55035)
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
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
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

L3 Routing	
IPv4/v6 Static Routing	Supported
RIP v2 Dynamic Routing	Supported
OSPF v2/v3 Dynamic Routing	Supported
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 (Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN
Link Aggregation (Port Trunk)	Static (IEEE 802.3ad LACP), Maximum trunk group : 16group (IGR-2408SM) 26group (IGR-4804SM) Dynamic (IEEE 802.3ad LACP), Maximum trunk group : 16group (IGR-2408SM) 26group (IGR-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 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
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Single Ring, Sub-Ring, Multiple ring topology
QoS Features	
Class of Service	IEEE 802.1p 8 active priorities queues 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
sFlow	Supported
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)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
IEEE 1588 PTP V2 (IGR-2408SM)	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 SIP, Subnet (32bit) 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 : μ-Ring Topology

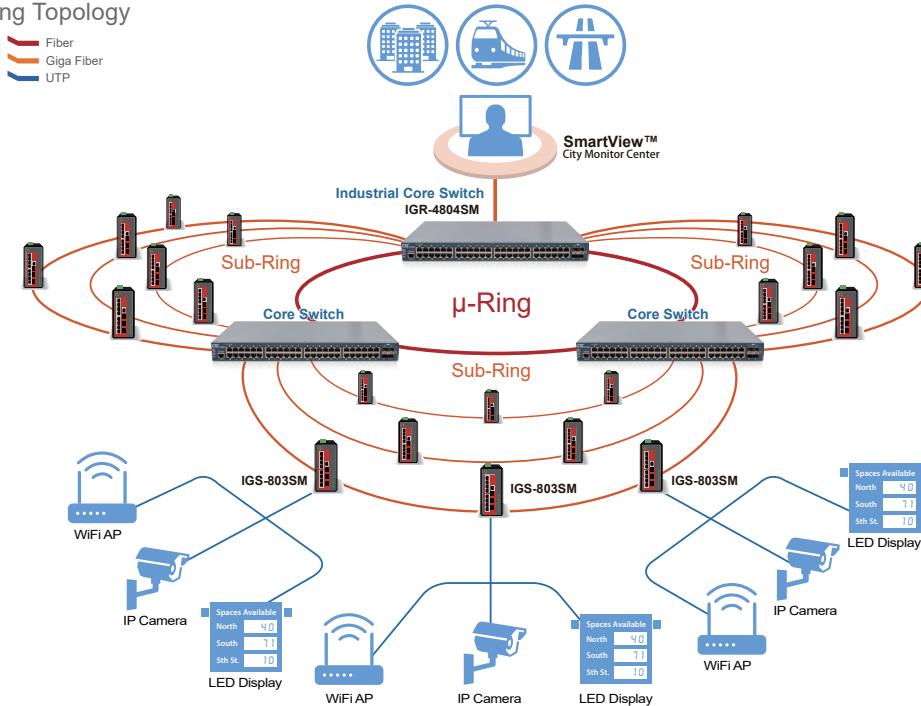
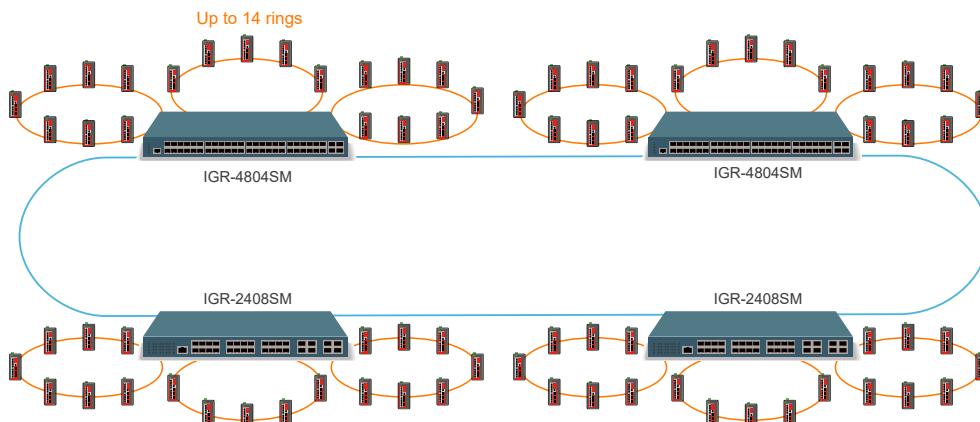
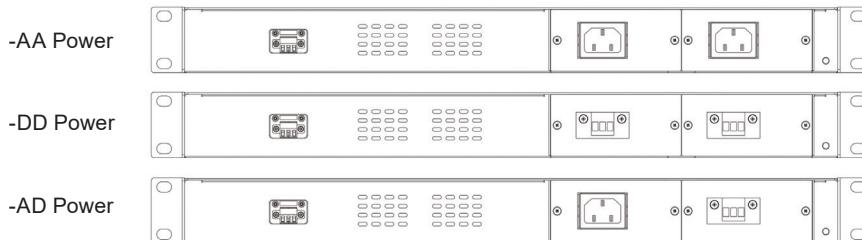
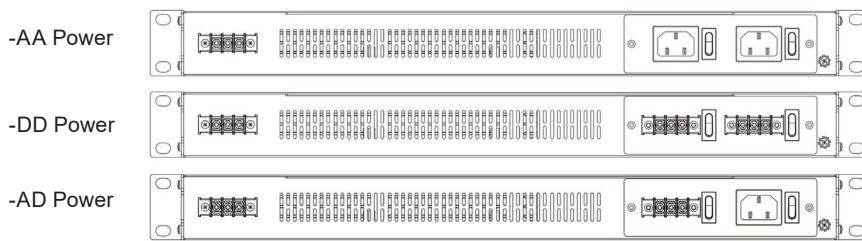


Figure 2 : Backbone Application

**Dimensions**

Rear View

IGR-2408SM**IGR-4804SM**

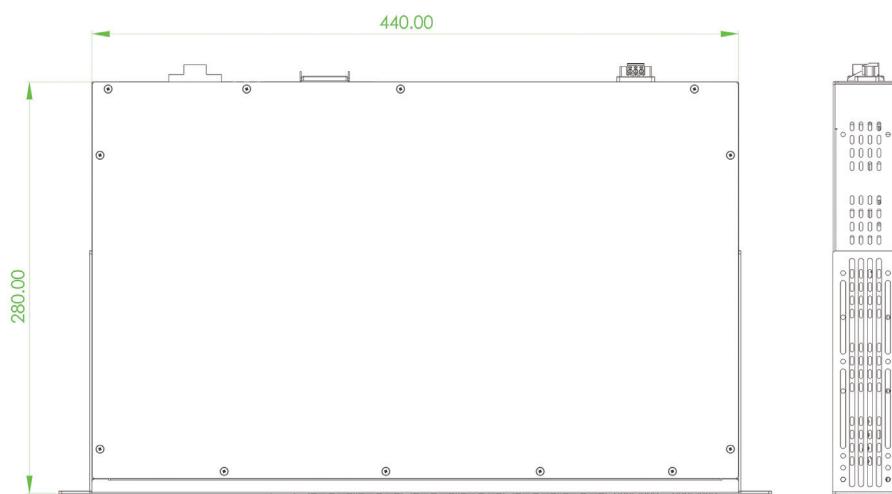
Front View



IGR-2408SM



Top View



Side View

Ordering Information

Model Name	Managed	Total Ports (Maximum)	GbE		Input Power		Certification	
			10/100/1000 Base-T(X) RJ45	GbESFP	24/48-/48VDC	110/220VAC	Safety EN62368-1	CE, FCC
IGR-2408SM-E-AA	V	32	24	8		2	V	V
IGR-2408SM-E-AD	V	32	24	8	1	1	V	V
IGR-2408SM-E-DD	V	32	24	8	2		V	V
IGR-4804SM-E-AA	V	52	48	4		2	V	V
IGR-4804SM-E-AD	V	52	48	4	1	1	V	V
IGR-4804SM-E-DD	V	52	48	4	2		V	V

■ Package List

- IGR-4804SM or IGR-2408SM device
- 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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

■ Industrial Power Supply

NDR-120-48

Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 120W, -20 ~ +70°C (For DC type)

ICS-G24044X-24PH-AA

24x GbE RJ45 + 4x 100/1000Base SFP + 4x 1G/2.5G/10G SFP with 24x PoE 150W, 110/240VAC

NEW

4KV Surge protection



- Supports IEEE 1588 PTP V2
- Support u-Ring, ERPS, EPS, MSTP, RSTP, STP for redundant cabling
- Support maximum up to 14 u-rings in one device
- 4KV surge protection for PoE, RJ45 and SFP ports



ICS-G24044X-24PH-AA is a hardened L2 managed core switch which also supports PoE+/PSE for rigorous demands of centralize and critical applications. ICS-G24044X-24PH-AA 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-AA 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-AA 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, 150W PoE power budget in total
- Redundant dual input power 110/240VAC
- 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
- Supports SmartView™ for Centralized Management*

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

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet	Data Processing	Store and Forward
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet	Network Connector	10GbE SFP+: 4x 1G/2.5G/10G SFP socket Supports DDMI
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair		
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic	SFP:	4x 100/1000Base-X SFP socket Support DDMI
	IEEE 802.3ae	10 Gbit/s Ethernet over fiber		
	IEEE 802.1d	STP (Spanning Tree Protocol)	RJ45:	24x 10/100/1000Base-T RJ-45 Support Auto negotiation speed, Auto MDI/MDI-X function
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)		
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)	PoE:	24x IEEE 802.3af /IEEE 802.3at PoE+ End-Span, Alternative A mode. Maximum 30W per port, 150W PoE power budget in total
ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)			
ITU-T G.8031 /Y.1342	EPS (Ethernet Protection Switching)		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)
IEEE 802.1Q	Virtual LANs (VLAN)			RS-232 (RJ-45)
IEEE 802.1X	Port based and MAC based Network Access Control, Authentication		Network Cable	UTP/STP Cat.5e cable or above EIA/TIA-568 100-ohm (100meter)
IEEE 802.3ac	Max frame size extended to 1522Bytes		Protocols	CSMA/CD
	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)		Reverse Polarity Protection	For input power
IEEE 802.3ad			Overload Current Protection	Supported
IEEE 802.3af	PoE (Power over Ethernet)		CPU Watch Dog	Supported
IEEE 802.3at	PoE+ (Power over Ethernet enhancement)		Power Supply	Redundant dual input power 110/240VAC (Built in 2x 450W AC to DC power supply inside)
IEEE 802.3X	Flow control for full duplex		Power	< 33W without PoE load
IEEE 802.1ad	Stacked VLANs, Q-in-Q		Consumption	< 209W with 150W PoE load
IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization		PoE Power Budget	150W
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)			

2

Industrial 10G Core Switch ICS-G24044X-24PH-AA

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)	Dimensions	330 x 440 x 44mm (D x W x H)
Jumbo Frame	10K Byte	Weight	5.2kg
MAC Address Table	32K	Installation Mounting	19" rack mount
Memory Buffer	4M Bytes for packet buffer	MTBF	43,259 Hours (MIL-HDBK-217)
Device Memory	16M Bytes Flash ROM, 1G Bytes RAM	Warranty	5 years
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay	Certification	
Alarm Relay Contact	Relay outputs with current carrying capacity of 1A @24VDC, 2-Pin removable terminal block	EMC	CE (EN55032, EN55035)
Operating Temperature	-40 ~ 60°C	EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Operating Humidity	5% to 95% (Non-condensing)	EMS (Electromagnetic Susceptibility)	EN61000-4-2 (ESD) Level 3, Criteria B
Storage Temperature	-40 ~ 85°C	Protection Level	EN61000-4-3 (RS) Level 3, Criteria A
Housing	Rugged Metal, IP30 Protection, Fanless	EN61000-4-4 (Burst)	EN61000-4-4 (Burst) Level 3, Criteria A
		EN61000-4-5 (Surge)	EN61000-4-5 (Surge) Level 3, Criteria B
		EN61000-4-6 (CS)	EN61000-4-6 (CS) Level 3, Criteria A
		EN61000-4-8 (PFMF, Magnetic Field)	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
		Safety	EN62368-1
		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		Security Features	
VLAN	IEEE 802.1q VLAN, up to 4094 IEEE 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(Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN	IEEE 802.1X	Port-Based MAC-Based
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	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
Spanning Tree	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP	RADIUS authentication & accounting	
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.	TACACS+ authentication & accounting, TACACS+ 3.0	
Loop Protection	Supported	HTTPS, HTTP	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <20ms	SSL / SSH v2	Supported
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Single Ring, Sub-Ring, Multiple ring topology	sFlow	Supported
QoS Features	Supported	User Name Password Authentication	Local Authentication Remote Authentication (via RADIUS / TACACS+)
Class of Service	IEEE 802.1p 8 active priorities queues per port	Management Interface Access Filtering	Web, Telnet / SSH , CLI RS-232 console
Traffic Classification QoS	IEEE 802.1p based CoS IP Precedence based CoS IP DSCP based CoS	Management Features	
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	CLI	Cisco® like CLI
Bandwidth Control for Ingress	Per port based	Web Based Management	
Bandwidth Control for Egress	Per port based	Telnet	Server
DiffServ (RF 2474) Remarking	Per queue / Per port shaper	SNMP	V1, V2c, V3
Storm Control	for Unicast, Broadcast, Multicast	sFlow	Supported
IP Multicasting Features		Modbus/TCP	Support for management and monitoring
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	SW & Configuration Upgrade	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	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 150W power budget Power feeding priority
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 SIP, Subnet (32bit) 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 1 : 10G Backbone application

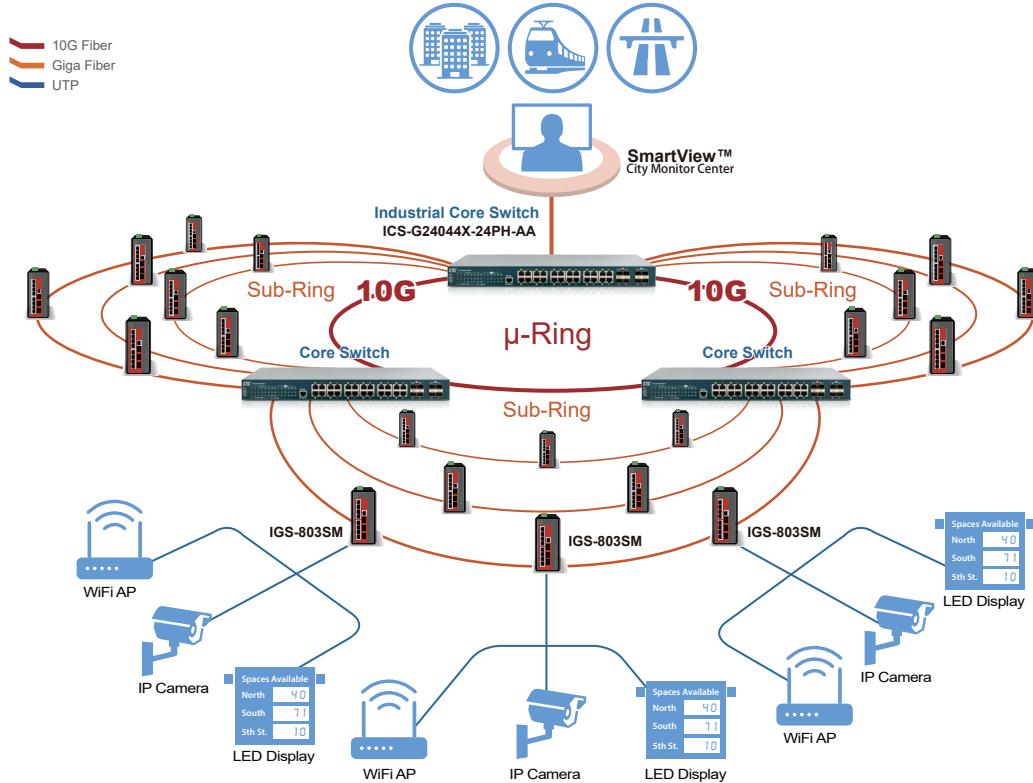
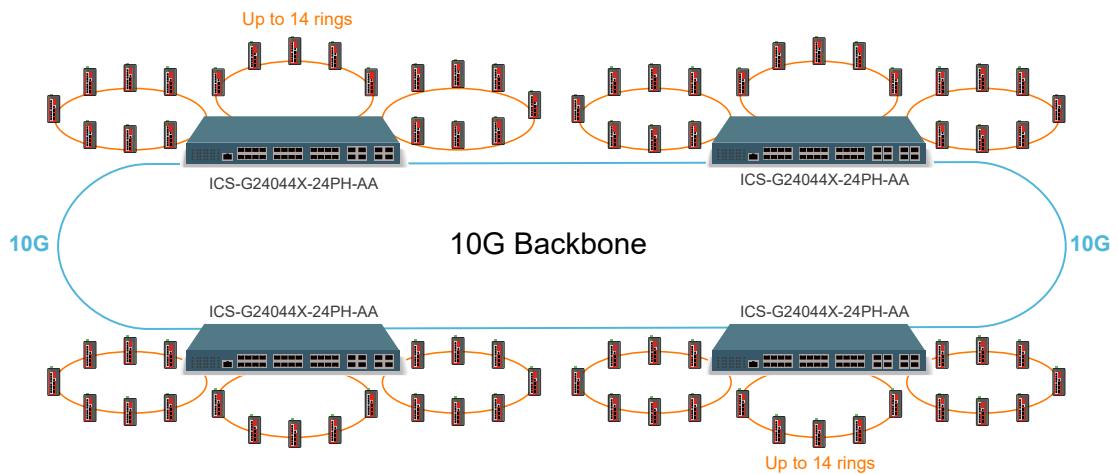


Figure 2 : 10G Backbone with μ -Ring topology



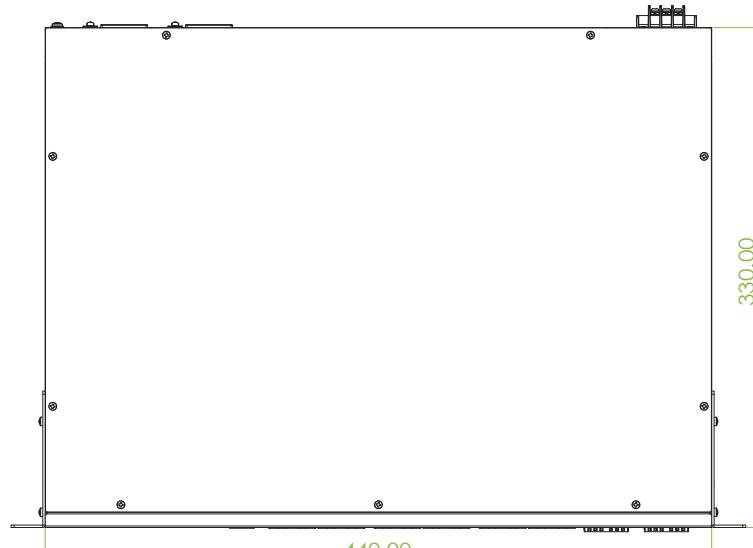
Dimensions

Rear View



Side View

Top View



Front View



Ordering Information

Model Name	Total Port	GbE Port		10GbE	PoE Port		Input Power	Certification			Operating Temperature
		10/100/1000 Base-T(X) RJ45	100/1000 Base-X SFP	1G/2.5G/10GBase-X SFP+	IEEE 802.3at/af	Power Budget	110/240VAC	Safety EN62368-1	CE	FCC	
ICS-G24044X-24PH-AA	32	24	4	4	24	150W	2	V	V	V	-40~60°C

Package List

- ICS-G24044X-24PH-AA 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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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-T/T00-00-(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)

ICS-G24044X-24PH

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

4KV Surge protection



- Supports IEEE 1588 PTP V2
- Support u-Ring, ERPS, EPS, MSTP, RSTP, STP for redundant cabling
- Support maximum up to 14 u-rings in one device
- EN62368-1, CE, FCC certified
- 4KV surge protection for PoE, RJ45 and SFP ports



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
- Supports SmartView™ for Centralized Management*

*Please see Chapter 1- Software Management for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet	Data Processing	Store and Forward
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet	Network Connector	10GbE SFP⁺: 4x 1G/2.5G/10G SFP socket Supports DDMI
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair		SFP: 4x 100/1000Base-X SFP socket Support DDMI
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic		RJ45: 24x 10/100/1000Base-T RJ-45 Support Auto negotiation speed, Auto MDI/MDI-X function
	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)		
	ITU-T G.8031 /Y.1342	EPS (Ethernet 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		Console	RS-232 (RJ-45)
VLAN ID	4094 IEEE 802.1Q VLAN VID		Network Cable	UTP/STP Cat.5e cable or above EIA/TIA-568 100-ohm (100meter)
Switch Architecture	Back-plane (Switching Fabric): 136Gbps (Full wire-speed)		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)	Weight 4.26kg Installation Mounting 19" rack mount MTBF 97,078 Hours (MIL-HDBK-217) Warranty 5 years Certification
Jumbo Frame	10K Byte	EMC CE (EN55032, EN55035)
MAC Address Table	32K	EMI (Electromagnetic Interference) FCC Part 15 Subpart B Class A, CE
Memory Buffer	4M Bytes for packet buffer	EMS (Electromagnetic Susceptibility) EN61000-4-2 (ESD) Level 3, Criteria B
Device Memory	16M Bytes Flash ROM, 1G Bytes RAM	Protection Level EN61000-4-3 (RS) Level 3, Criteria A
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay	EN61000-4-4 (Burst) Level 3, Criteria A
Alarm Relay Contact	Relay outputs with current carrying capacity of 1A @24VDC, 2-Pin removable terminal block	EN61000-4-5 (Surge) Level 3, Criteria B
Operating Temperature	-40 ~ 60°C	EN61000-4-6 (CS) Level 3, Criteria A
Operating Humidity	5% to 95% (Non-condensing)	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Storage Temperature	-40 ~ 85°C	Safety EN62368-1
Housing	Rugged Metal, IP30 Protection, Fanless	Surge protection 4kV for PoE, RJ45 and SFP
Dimensions	280x 440 x 44mm (D x W x H)	Shock IEC 60068-2-27
		Freefall IEC 60068-2-32
		Vibration IEC 60068-2-6

Software Specifications

Topology		Security Features
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(Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN	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
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	RADIUS authentication & accounting TACACS+ authentication & accounting, TACACS+ 3.0
Spanning Tree	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP	HTTPS, HTTP Supported
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.	SSL / SSH v2 Supported sFlow Supported User Name Password Authentication Local Authentication Management Interface Access Filtering Remote Authentication (via RADIUS / TACACS+)
Loop Protection	Supported	Management Features
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <20ms	CLI Cisco® like CLI
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Single Ring, Sub-Ring, Multiple ring topology	Web Based Management
QoS Features	Supported	Telnet Server
Class of Service	IEEE 802.1p 8 active priorities queues per port	SNMP V1, V2c, V3
Traffic Classification QoS	IEEE 802.1p based CoS IP Precedence based CoS IP DSCP based CoS	sFlow Supported
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	Modbus/TCP Support for management and monitoring
Bandwidth Control for Ingress	Per port based	SW & Configuration Upgrade Redundant firmware in case of upgrade failure
Bandwidth Control for Egress	Per port based Per queue / Per port shaper	RMON RMON I (1, 2, 3, 9 group), RMON II
DiffServ (RF 2474) Remarking		MIB RFC1213 MIB II, Private MIB
Storm Control	for Unicast, Broadcast, Multicast	UPnP Supported
IP Multicasting Features		DHCP Server/Client/Relay/Relay option 82/Snooping
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	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	Advanced PoE Management	PoE PD failure auto checking, and auto reset when PD fail
IPv6 Telnet	Supported	PoE port on/off weekly scheduling	
IPv6 NTP, SNTP	Client	PoE Configuration	
IPv6 TFTP	Supported	PoE Enable/Disable	
IPv6 QoS	Supported	Power limit by classification	
IPv6 ACL	Number of rules: up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3 : IP address SIP, Subnet (32bit) L4 : TCP/UDP	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

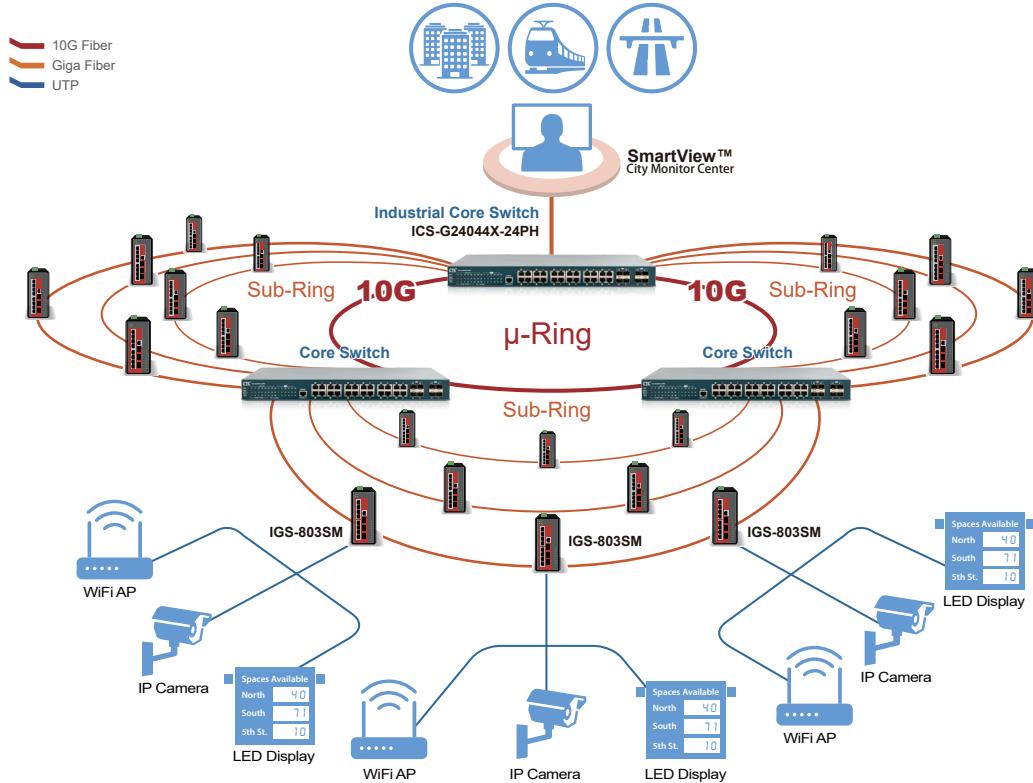
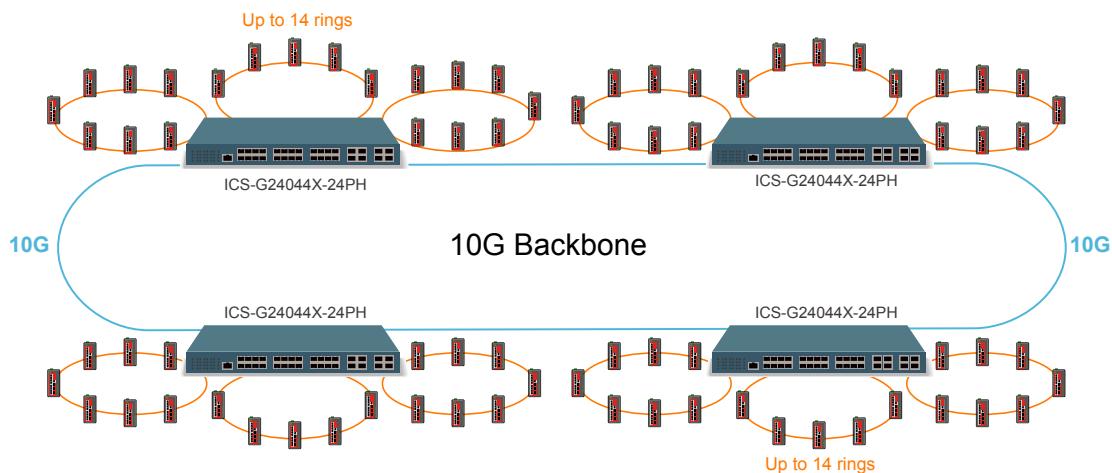


Figure 2 : 10G Backbone with μ-Ring topology

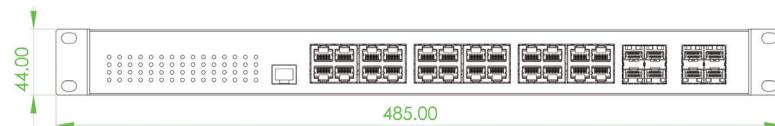


Dimensions

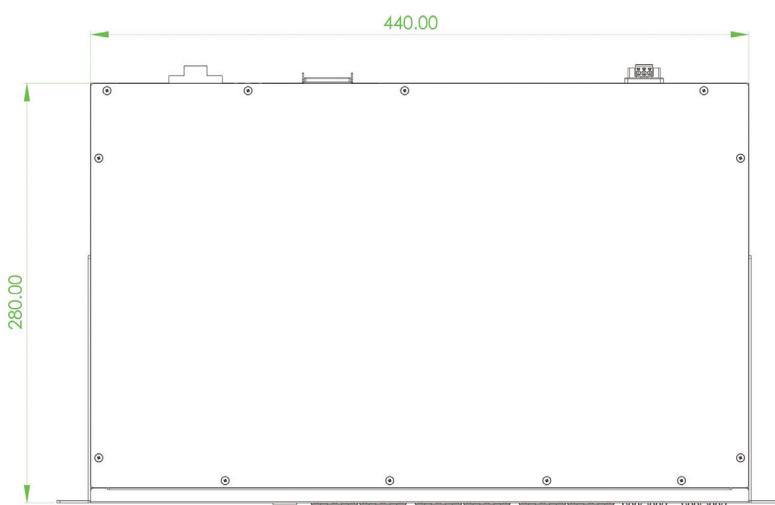
Rear View



Front View



Top View



Side View



Ordering Information

Model Name	Total Port	GbE Port		10GbE	PoE Port		Input Power	Certification		Operating Temperature
		10/100/1000 Base-T(X) RJ45	100/1000 Base-X SFP		IEEE 802.3at/af	Power Budget		Safety EN62368-1	CE, FCC	
ICS-G24044X-24PH	32	24	4	4	24	400W	2	V	V	-40 ~ 60°C

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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

Industrial Power Supply

NDR-480-48	Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 480W, -20 ~ +70°C
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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, EPS, MSTP, RSTP, STP for redundant cabling
- Supports maximum up to 14 u-rings in one device
- CE, FCC, EN62368-1 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 24/48/-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
- Supports SmartView™ for Centralized Management*

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

Specifications

Standard	IEEE 802.3 IEEE 802.3u IEEE 802.3ab IEEE 802.3z IEEE 802.3ae IEEE 802.1d IEEE 802.1w IEEE 802.1s ITU-T G.8032 / Y.1344 ITU-T G.8031 / Y.1342 IEEE 802.1Q IEEE 802.1X IEEE 802.3ad IEEE 802.1ad IEEE 802.1p IEEE 802.ab	10Base-T 10Mbit/s Ethernet 100Base-TX, 100Base-FX, Fast Ethernet 1000Base-T Gbit/s Ethernet over twisted pair 1000Base-X Gbit/s Ethernet over Fiber-Optic 10 Gbit/s Ethernet over fiber STP (Spanning Tree Protocol) RSTP (Rapid Spanning Tree Protocol) MSTP (Multiple Spanning Tree Protocol) ERPS (Ethernet Ring Protection Switching) EPS (Ethernet Protection Switching) Virtual LANs (VLAN) Port based and MAC based Network Access Control, Authentication Link aggregation for parallel links with LACP(Link Aggregation Control Protocol) Stacked VLANs, Q-in-Q LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization Link Layer Discovery Protocol (LLDP)	Network Cable UTP/STP Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)															
VLAN ID	4094 IEEE 802.1Q VLAN VID	Protocols CSMA/CD																
Switch Architecture	Back-plane (Switching Fabric): 128Gbps (ICS-G24S4X) (Full wire-speed)	Reverse Polarity Protection Supported																
Data Processing	Store and Forward	Overload Current Protection Supported																
Network Connector	24x 100/1000Base-X SFP with 4x GbE Combo (UTP/SFP)+ 4x 10GbE SFP ⁺ (ICS-G24S4X) 24x 100/1000Base-X SFP with 4x GbE Combo (UTP/SFP)+ 2x 10GbE X SFP ⁺ (ICS-G24S2X)	CPU Watch Dog Supported																
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	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 24/48/-48VDC (18~60VDC), Removable Terminal Block High voltage AC (A): Isolated 110/220VAC (85VAC~264VAC)																
		Supports negative voltage power input (for example in telecom system)																
Console	RS-232 (RJ-45)	Power Consumption	<table border="1"> <thead> <tr> <th>Input Voltage</th><th>ICS-G24S4X</th><th>ICS-G24S2X</th></tr> </thead> <tbody> <tr> <td>24VDC</td><td>33.1W</td><td>29.8W</td></tr> <tr> <td>48VDC</td><td>33.4</td><td>30.1W</td></tr> <tr> <td>110VAC</td><td>34.4W</td><td>31.1W</td></tr> <tr> <td>220VAC</td><td>34.4W</td><td>31.1W</td></tr> </tbody> </table>	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
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: 100Base-X Link/Active (Amber) 10GbBase-X Link/Active (Blue)															
Jumbo Frame	10K																	
MAC Address Table	32K																	
Memory Buffer	4M Bytes for packet buffer																	
Device Memory	16M Bytes Flash ROM, 1G Bytes RAM																	

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	-40 ~ 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) 4.51kg (ICS-G24S4X-AD) 4.2kg (ICS-G24S2X-DD)	4.26kg (ICS-G24S4X-DD) 4.695kg (ICS-G24S2X-AA) 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)	

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(Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN	
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	
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Supported	
QoS Features		
Class of Service	IEEE 802.1p 8 active priorities queues 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	
sFlow	Supported	
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)	
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 TFTP	Supported
IPv6 Management	Telnet Server/ICMP v6	IPv6 QoS	Supported
SNMP over IPv6	Supported	IPv6 ACL	Number of rules: up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SIP/Subnet (32bit) L4: TCP/UDP
HTTP over IPv6	Supported		
SSH over IPv6	Supported		
IPv6 Telnet	Supported		
IPv6 NTP, SNTP	Client		

Application

Figure 1 : 10G Backbone application

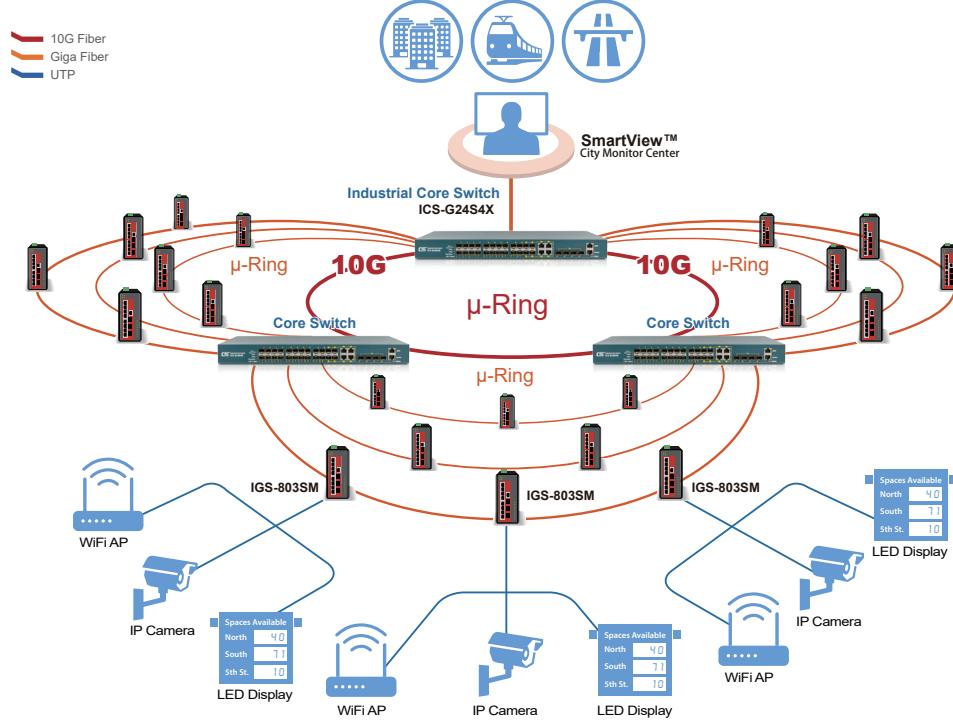
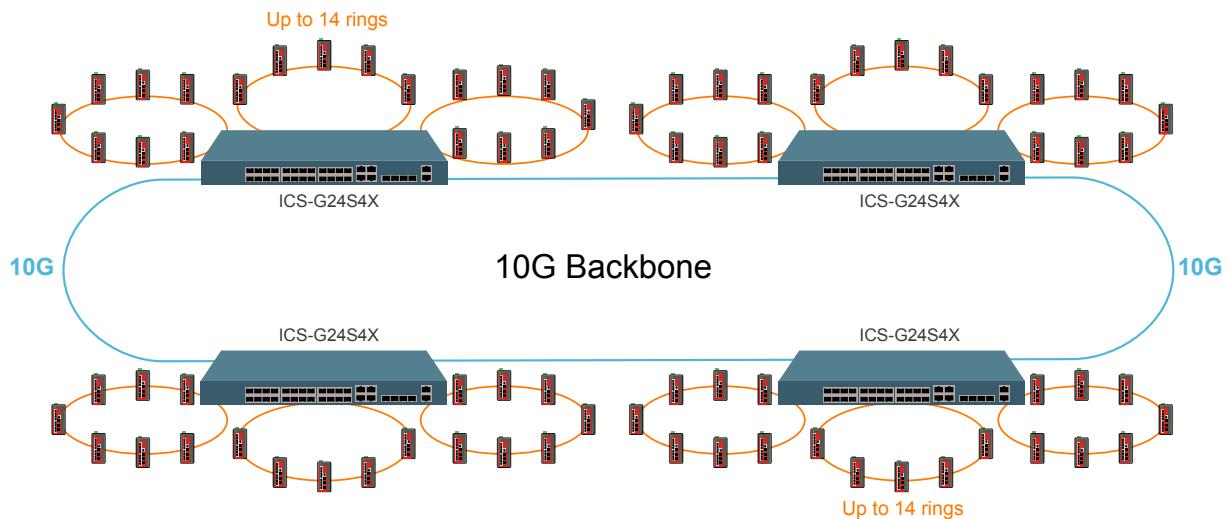
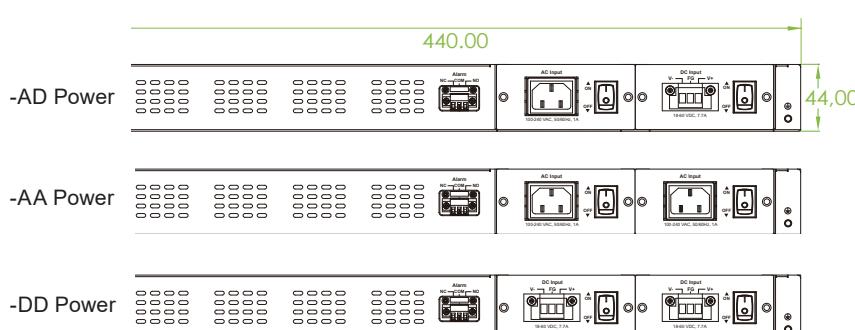


Figure 2 : 10G Backbone with μ-Ring topology

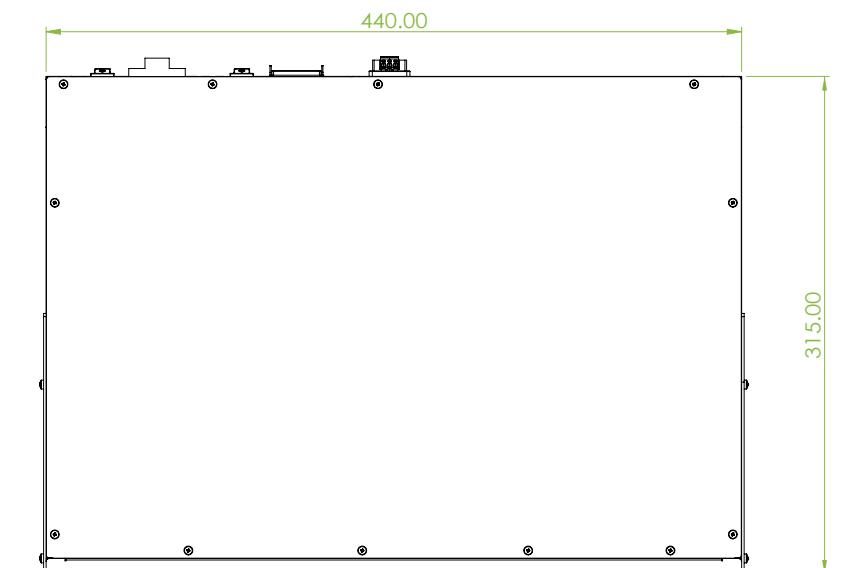


Dimensions

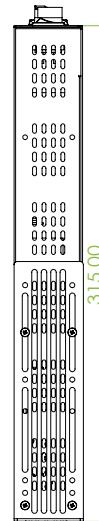
Rear View



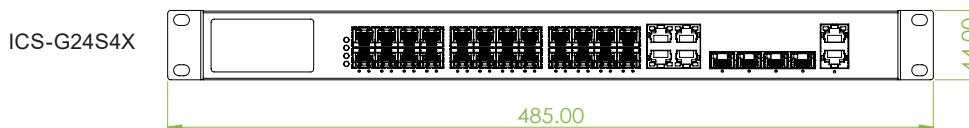
Top View



Side View



Front View



Ordering Information

Model Name	Managed	Total Port	GbE Port		10GbE	Input Power		Certification	
			100/1000 Base-XSFP	10/100/1000 Base-T/UTP or 100/1000Base-XSFP		DC(Low Volt) 24/48~48VDC	High Volt 110/220VAC	Safety EN62368-1	CE FCC
ICS-G24S4X-AA	V	28	20	4 Combo	4	2		V	V
ICS-G24S4X-DD	V	28	20	4 Combo	4	2		V	V
ICS-G24S4X-AD	V	28	20	4 Combo	4	1	1	V	V
ICS-G24S2X-AA	V	26	20	4 Combo	2		2	V	V
ICS-G24S2X-DD	V	26	20	4 Combo	2	2		V	V
ICS-G24S2X-AD	V	26	20	4 Combo	2	1	1	V	V

■ Package List

- ICS-G24S4X or ICS-G24S2X device
- AC Power cord (for AC power -A model)
- Console cable (RJ-45 to DB9)
- Rack mount ear with screws

Optional Accessories

■ Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

■ Industrial Power Supply

NDR-120-48	Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 120W, -20 ~ +70°C (For DC type)
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ICS-G24044X & ICS-G4804X

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

▶ 48x GbE RJ45 + 4x 1G/2.5G/10G SFP+



- Support u-Ring, ERPS, EPS, MSTP, RSTP, STP for redundant cabling
- Supports maximum up to 14 u-rings in one device
- EN62368-1, CE, FCC certified
- 4KV surge protection for RJ45 and SFP ports
- Supports negative voltage power input



ICS-G24044X and ICS-G4804X 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 24/48/-48VDC (18~60VDC), 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 (ICS-G24044X)
- Supports SmartView™ for Centralized Management*

*Please see Chapter 1- Software Management for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet	Network Cable	UTP/STP Cat.5e cable or above
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet		EIA/TIA-568 100-ohm (100meter)
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair	Protocols	CSMA/CD
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic	Reverse Polarity	Protection for input power
	IEEE 802.3ae	10 Gbit/s Ethernet over fiber	Overload Current	Protection Supported
	IEEE 802.1d	STP (Spanning Tree Protocol)	CPU Watch Dog	Supported
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)	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 24/48/-48VDC (18~60VDC), Removable Terminal Block Supports negative voltage power input
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)		Consumption: <33W (ICS-G24044X) TBD (ICS-G4804X)
ITU-T G.8032 / Y.1344	ITU-T G.8031 / Y.1342	ERPS (Ethernet Ring Protection Switching)	LED	Per unit: Power 1 (Green), Power 2 (Green), Act/Alarm (Green/Amber), Ring Master (Green)
	IEEE 802.1Q	EPS (Ethernet Protection Switching)		P1~P24 (ICS-G24044X) Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber)
	IEEE 802.1Q	Virtual LANs (VLAN)		P25~P32 (ICS-G24044X) Per SFP Fiber port: Link/Active (Amber)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication		TBD (ICS-G4804X)
	IEEE 802.3ac	Max frame size extended to 1522Bytes	Jumbo Frame	10K Byte
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)	MAC Address Table	32K
	IEEE 802.3X	Flow control for full duplex	Memory Buffer	4M Bytes for packet buffer
	IEEE 802.1ad	Stacked VLANs, Q-in-Q	Device Memory	16M Bytes Flash ROM, 1G Bytes RAM
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization	Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)	Alarm Relay Contact	Relay outputs with current carrying capacity of 1A @24VDC, 2-Pin removable terminal block
	IEEE 802.3az	EEE (Energy Efficient Ethernet)	Operating Temperature	-40 ~ 60°C
VLAN ID	4094	IEEE 802.1Q VLAN VID	Operating Humidity	5% to 95% (Non-condensing)
Switch Architecture	Back-plane (Switching Fabric): 136Gbps (ICS-G24044X) 156Gbps (ICS-G4804X)	(Full wire-speed)	Storage Temperature	-40 ~ 85°C
Data Processing	Store and Forward		Housing	Rugged Metal, IP30 Protection, Fanless
Network Connector	10GbE SFP+ : 4x 1G/2.5G/10G SFP socket Supports DDMI GbE SFP: 4x 100/1000Base-X SFP socket (ICS-G24044X) Support DDMI RJ45: 24x 10/100/1000Base-T RJ-45 (ICS-G24044X) 48x 10/100/1000Base-T RJ-45 (ICS-G4804X) Support Auto negotiation speed, Auto MDI/MDI-X function			
Console	RS-232 (RJ-45)			

Dimensions	280x 440 x 44mm (D x W x H)
Weight	4,755kg (ICS-G24044X-AA) 4,51kg (ICS-G24044X-AD) 4,26kg (ICS-G24044X-DD) TBD (ICS-G4804X)
Installation Mounting	19" rack mount
MTBF	103,057 Hours (ICS-G24044X-AA) 103,451 Hours (ICS-G24044X-AD) 103,447 Hours (ICS-G24044X-DD) TBD (ICS-G4804X) (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE (EN55032, EN55035)
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE

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
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(Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN
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
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Supported
QoS Features	
Class of Service	IEEE 802.1p 8 active priorities queues 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 Authentication
Local Authentication
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
sFlow
Supported
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)
Warning Message
System syslog, e-mail, alarm relay
DNS
Client, Proxy
IEEE 1588 PTP V2
(ICS-G24044X) 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 (32bit) 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

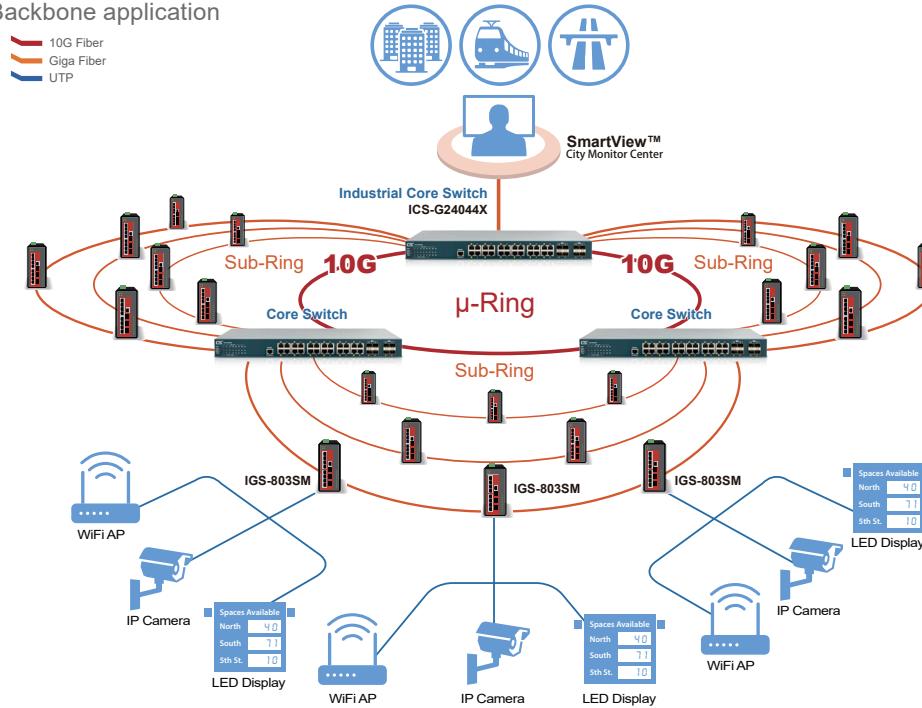
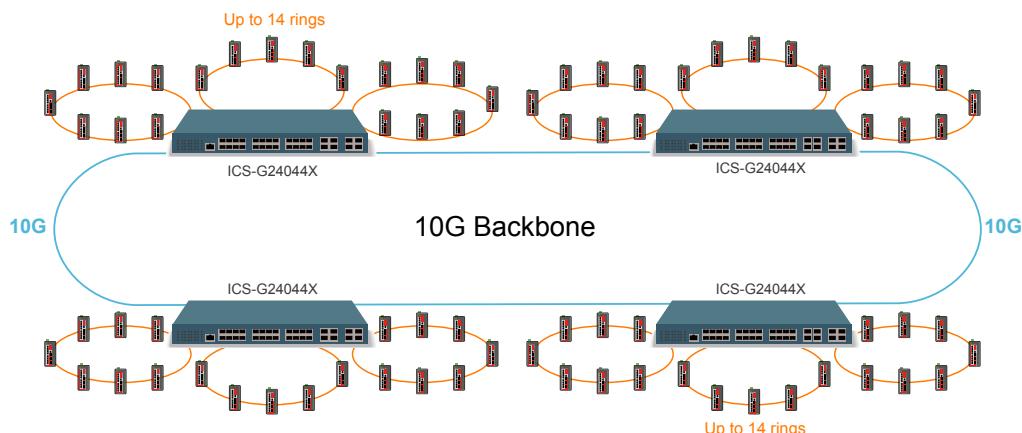
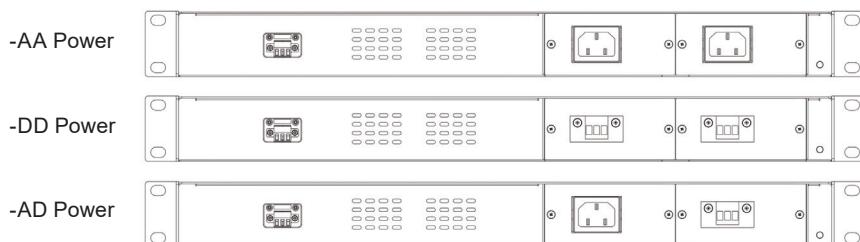


Figure 2 : 10G Backbone with μ-Ring topology

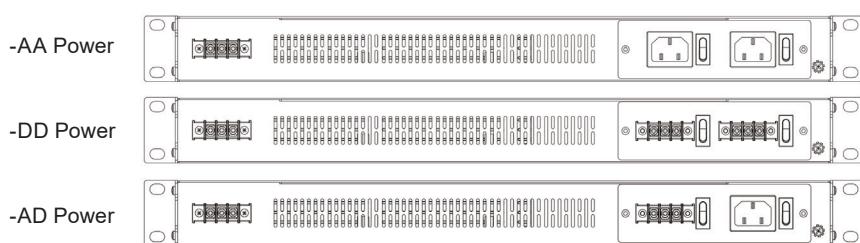
**Dimensions**

Rear View

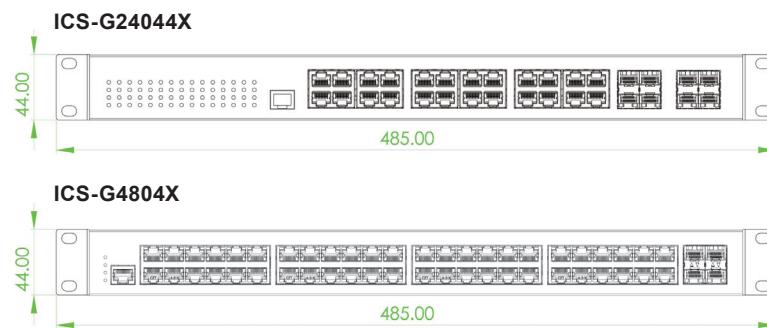
ICS-G24044X



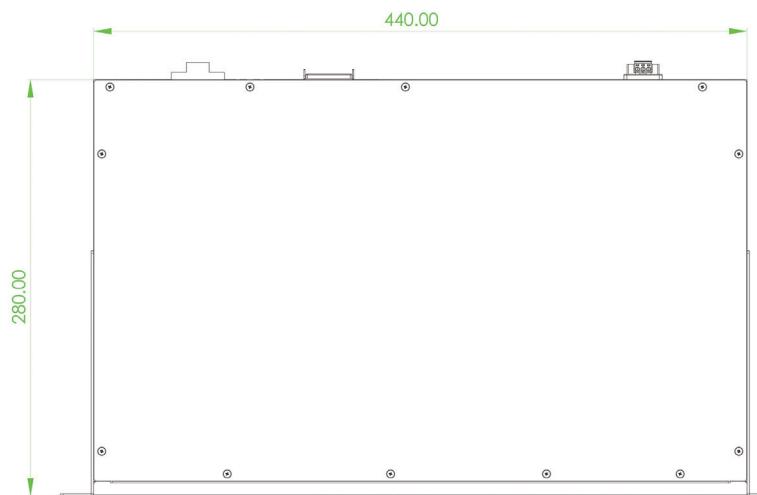
ICS-G4804X



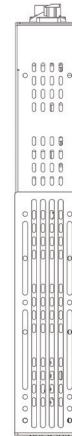
Front View



Top View



Side View



Ordering Information

Model Name	Managed	Total Ports (Maximum)	GbE		10GbE 1G/2.5G/ 10GbE-X SFP+	Input Power		Certification	
			10/100/1000 Base-T(X) RJ45	100/1000 Base-XSFP		24/48VDC	110/220VAC	Safety EN62368-1	CE, FCC
ICS-G24044X-AA	V	32	24	4	4	2		V	V
ICS-G24044X-AD	V	32	24	4	4	1	1	V	V
ICS-G24044X-DD	V	32	24	4	4	2		V	V
ICS-G4804X-AA	V	52	48		4	2		V	V
ICS-G4804X-AD	V	52	48		4	1	1	V	V
ICS-G4804X-DD	V	52	48		4	2		V	V

■ Package List

- ICS-G4804X or ICS-G24044X device
- 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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

■ Industrial Power Supply

NDR-120-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 120W, -20 ~ +70°C (For DC type)

IGS-2408SM-24PH-AA

24x GbE RJ45 + 8x 100/1000Base SFP with 24x PoE 150W, 110/220VAC

NEW

4KV Surge protection



- Supports IEEE 1588 PTP V2
- Supports u-Ring, ERPS, EPS, MSTP, RSTP, STP for redundant cabling
- 4KV surge protection for PoE, RJ45 and SFP ports



IGS-2408SM-24PH-AA 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-AA is an ideal solution for applications in Smart City, surveillance, Intelligent traffic control systems (ITS) and production automation applications. The IGS-2408SM-24PH-AA 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, 150W PoE power budget in total
- Redundant dual input power 110/240VAC
- 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
- Supports SmartView™ for Centralized Management*

*Please see Chapter 1- Software Management for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet	Network Connector	SFP: 8x 100/1000Base-X SFP socket Support DDMI
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet	RJ45:	24x 10/100/1000Base-T RJ-45 Support Auto negotiation speed, Auto MDI/MDI-X function
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair	PoE:	24x IEEE 802.3af / IEEE 802.3at PoE+ End-Span, Alternative A mode. Maximum 30W per port, 150W PoE power budget in total
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic	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)
	IEEE 802.1d	STP (Spanning Tree Protocol)	Console	RS-232 (RJ-45)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)	Network Cable	UTP/STP Cat.5e cable or above EIA/TIA-568 100-ohm (100meter)
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)	Protocols	CSMA/CD
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)	Reverse Polarity Protection	For input power
	ITU-T G.8031 / Y.1342	EPS (Ethernet Protection Switching)	Overload Current Protection	Supported
	IEEE 802.1Q	Virtual LANs (VLAN)	CPU Watch Dog	Supported
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication	Power Supply	Redundant dual input power 110/240VAC (Built in 2x 450W AC to DC power supply inside)
	IEEE 802.3ac	Max frame size extended to 1522Bytes	Power Consumption	< 33W without PoE load < 206W with 150W PoE load
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)	PoE Power Budget	150W
	IEEE 802.3af	PoE (Power over Ethernet)	LED	Per unit: Power 1 (Green), Power 2 (Green), Act/Alarm (Green/Amber), Ring Master (Green)
	IEEE 802.3at	PoE+ (Power over Ethernet enhancement)		P1~P24 Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber)
	IEEE 802.3X	Flow control for full duplex		P25~P32 Per SFP Fiber port: Link/Active (Amber)
	IEEE 802.1ad	Stacked VLANs, Q-in-Q		PoE port (P1~P24): PoE ON (Green)
	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			

2

Industrial Managed GbE PoE Switch | IGS-2408SM-24PH-AA

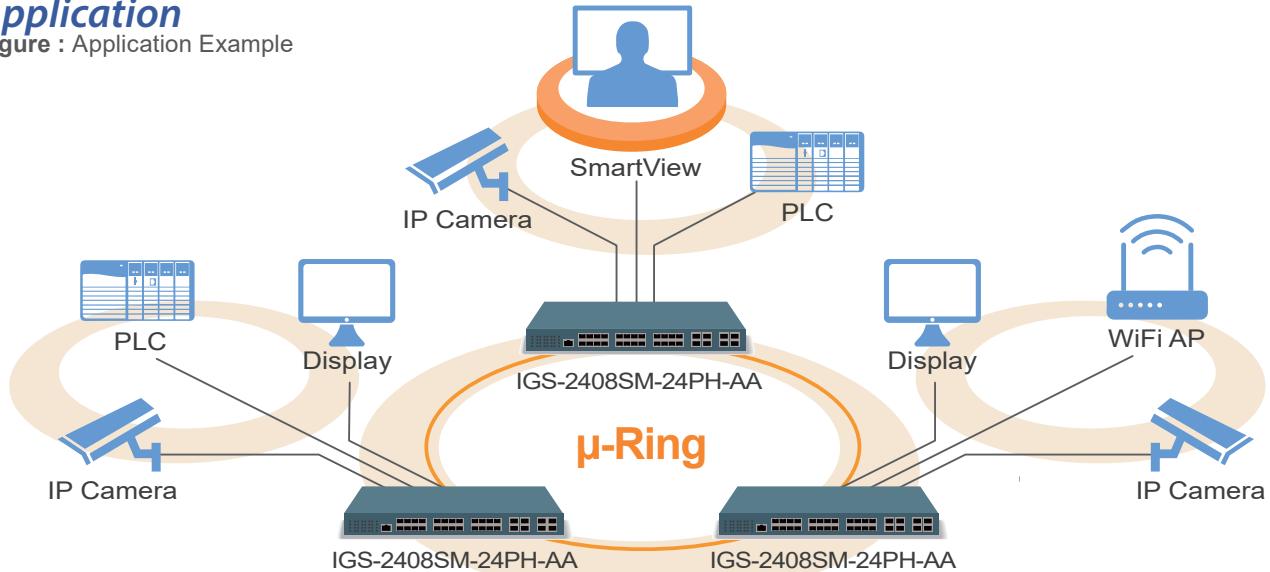
Jumbo Frame	10K Byte	Warranty	5 years
MAC Address Table	32K	Certification	
Memory Buffer	4M Bytes for packet buffer	EMC	CE (EN55032, EN55035)
Device Memory	16M Bytes Flash ROM, 1G Bytes RAM	EMI	FCC Part 15 Subpart B Class A, CE
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay	(Electromagnetic Interference) Protection Level	
Alarm Relay Contact	Relay outputs with current carrying capacity of 1A @24VDC, 2-Pin removable terminal block	EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
Operating Temperature	-40 ~ 60°C		EN61000-4-3 (RS) Level 3, Criteria A
Operating Humidity	5% to 95% (Non-condensing)		EN61000-4-4 (Burst) Level 3, Criteria A
Storage Temperature	-40 ~ 85°C		EN61000-4-5 (Surge) Level 3, Criteria B
Housing	Rugged Metal, IP30 Protection, Fanless		EN61000-4-6 (CS) Level 3, Criteria A
Dimensions	330 x 440 x 44mm (D x W x H)		EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Weight	5.2kg	Safety	EN62368-1
Installation Mounting	19" rack mount	Surge protection	4KV for PoE, RJ45 and SFP ports
MTBF	43,259 Hours (MIL-HDBK-217)	Shock	IEC 60068-2-27
		Freefall	IEC 60068-2-32
		Vibration	IEC 60068-2-6

Software Specifications

Topology		SSL / SSH v2	Supported
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 Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN	User Name Password Authentication	Local Authentication
		Management Interface Access Filtering	Remote Authentication (via RADIUS / TACACS+)
		Management Features	Web, Telnet / SSH , CLI RS-232 console
		CLI	Cisco® like CLI
		Web Based Management	
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	Telnet	Server
Spanning Tree	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP	SNMP	V1, V2c, V3
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.	sFlow	Supported
Loop Protection	Supported	Modbus/TCP	Support for management and monitoring
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms	SW & Configuration Upgrade	Redundant firmware in case of upgrade failure
	Single Ring, Sub-Ring, Multiple ring topology	RMON	RMON I (1, 2, 3, 9 group), RMON II
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Supported	MIB	RFC1213 MIB II, Private MIB
QoS Features		UPnP	Supported
Class of Service	IEEE 802.1p 8 active priorities queues per port	DHCP	Server, Client, Relay, Relay option 82 , Snooping
Traffic Classification QoS	IEEE 802.1p based CoS IP Precedence based CoS IP DSCP based CoS	IP Source Guard	Supported
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	Mirroring	Local and Remote
Bandwidth Control for Ingress	Per port based	Event Syslog	Syslog server (RFC3164)
Bandwidth Control for Egress	Per port based	Warning Message	System syslog, e-mail, alarm relay
DiffServ (RF 2474) Remarkng	Per queue / Per port shaper	DNS	Client, Proxy
Storm Control	for Unicast, Broadcast, Multicast	IEEE1588 PTP V2	Supports 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
IP Multicasting Features		NTP V4.0, SNTP	Client
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	LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol LLDP-MED
Security Features		IPv6 Features	
IEEE 802.1X	Port-Based MAC-Based	IPv6 Management	Telnet Server/ICMP v6
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	SNMP over IPv6	Supported
RADIUS authentication & accounting		HTTP over IPv6	Supported
TACACS+ authentication & accounting, TACACS+ 3.0		SSH over IPv6	Supported
HTTPS, HTTP	Supported	IPv6 Telnet	Supported
		IPv6 NTP, SNTP	Client
		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 SIP, Subnet (32bit) 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 budget limitation management: Maximum 150W 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

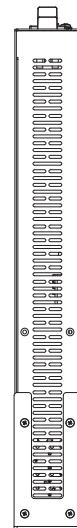


Dimensions

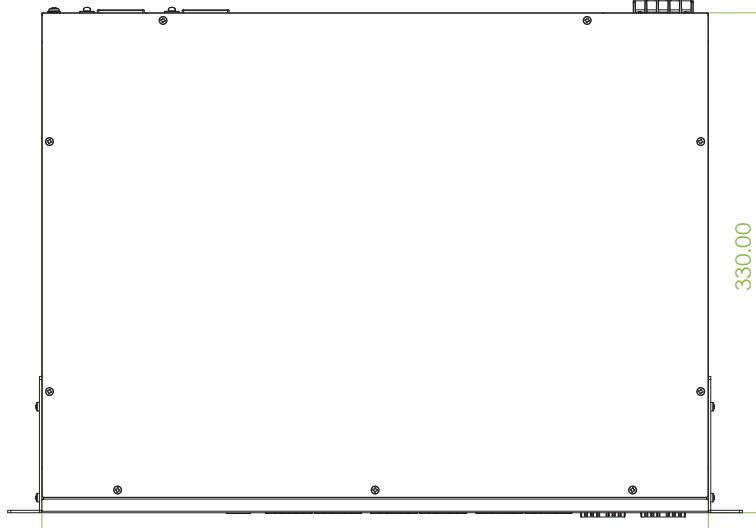
Rear View



Side View



Top View



Front 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		Safety EN62368-1	CE	FCC	
IGS-2408SM-24PH-AA	V	32	24	8	24	150W	2	V	V	V	-40~60°C

Package List

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

Optional Accessories

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

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, EPS, MSTP, RSTP, STP for redundant cabling
- EN62368-1, CE, FCC 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
- Supports SmartView™ for Centralized Management*

*Please see Chapter 1- Software Management for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet	Network Connector	SFP:
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet		8x 100/1000Base-X SFP socket
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair		Support DDMI
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic		
	IEEE 802.1d	STP (Spanning Tree Protocol)	RJ45:	24x 10/100/1000Base-T RJ-45
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)		Support Auto negotiation speed, Auto MDI/MDI-X function
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)	PoE:	24x IEEE 802.3af / IEEE 802.3at PoE+
ITU-T G.8032 / Y.1344	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)		End-Span, Alternative A mode.
	ITU-T G.8031 / Y.1342	EPS (Ethernet Protection Switching)		Maximum 30W per port, 400W PoE power budget in total
	IEEE 802.1Q	Virtual LANs (VLAN)	RJ45 Pin Assignment:	PoE Positive (V+): RJ-45 pin 1, 2. PoE Negative (V-): RJ-45 pin 3, 6. Data (1,2,3,4,5,7,8)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication	Console	RS-232 (RJ-45)
	IEEE 802.3ac	Max frame size extended to 1522Bytes	Network Cable	UTP/STP Cat.5e cable or above
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)		EIA/TIA-568 100-ohm (100meter)
	IEEE 802.3af	PoE (Power over Ethernet)	Protocols	CSMA/CD
	IEEE 802.3at	PoE+ (Power over Ethernet enhancement)	Reverse Polarity Protection	For input power
	IEEE 802.3X	Flow control for full duplex	Overload Current Protection	Supported
	IEEE 802.1ad	Stacked VLANs, Q-in-Q	CPU Watch Dog	Supported
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization	Power Supply	Redundant dual input power 48VDC (44~57VDC) (Removable terminal block) (50~57VDC input is recommended for IEEE802.3at PoE+ in 30W applications)
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)	Power Consumption	<30W @50VDC without PoE load <445W @50VDC with 400W PoE load
VLAN ID	4094 IEEE802.1Q VLAN VID	LED	Per unit: Power 1 (Green), Power 2 (Green), Act /Alarm (Green/Amber), Ring Master (Green)	
Switch Architecture	Back-plane (Switching Fabric): 64Gbps (Full wire-speed)	P1~P24	Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber)	
Data Processing	Store and Forward	P25~P32	Per SFP Fiber port: Link/Active (Amber)	
			PoE port (P1~P24): PoE ON (Green)	

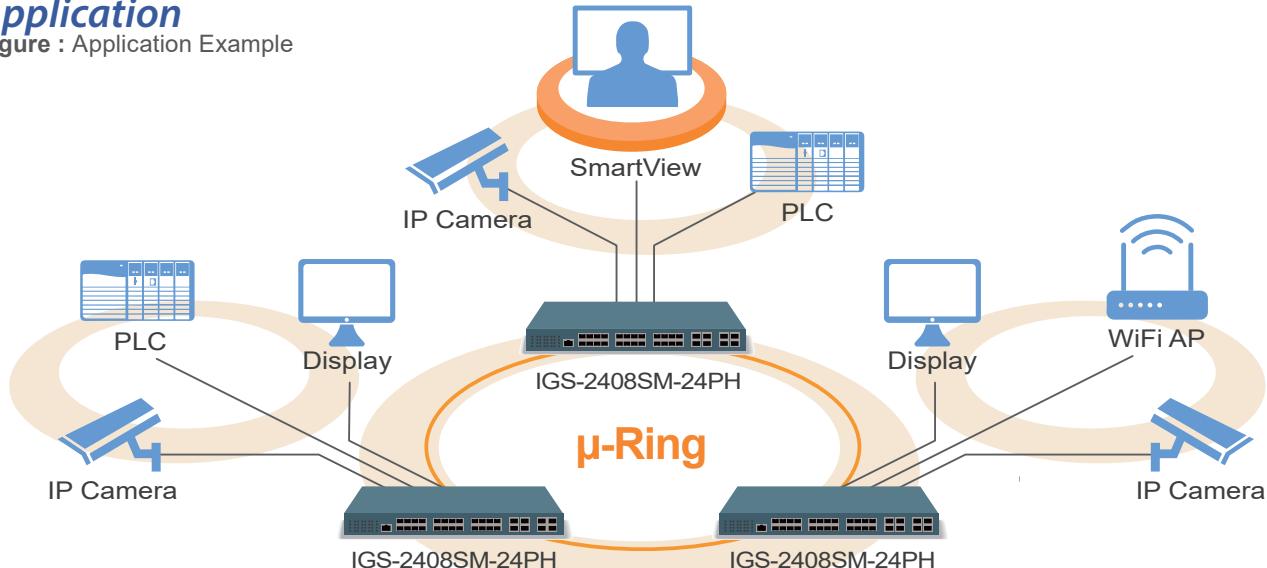
Jumbo Frame	10K Byte	Warranty	5 years
MAC Address Table	32K	Certification	
Memory Buffer	4M Bytes for packet buffer	EMC	CE (EN55032, EN55035)
Device Memory	16M Bytes Flash ROM, 1G Bytes RAM	EMI	FCC Part 15 Subpart B Class A, CE
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay	(Electromagnetic Interference)	
Alarm Relay Contact	Relay outputs with current carrying capacity of 1A @24VDC, 2-Pin removable terminal block	EMS (Electromagnetic Susceptibility)	EN61000-4-2 (ESD) Level 3, Criteria B
Operating Temperature	-40 ~ 75°C	Protection Level	EN61000-4-3 (RS) Level 3, Criteria A
Operating Humidity	5% to 95% (Non-condensing)		EN61000-4-4 (Burst) Level 3, Criteria A
Storage Temperature	-40 ~ 85°C		EN61000-4-5 (Surge) Level 3, Criteria B
Housing	Rugged Metal, IP30 Protection, Fanless		EN61000-4-6 (CS) Level 3, Criteria A
Dimensions	280x 440 x 44mm (D x W x H)		EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Weight	4.26kg	Safety	EN62368-1
Installation Mounting	19" rack mount	Surge protection	4KV for PoE, RJ45 and SFP ports
MTBF	97,078 Hours (MIL-HDBK-217)	Shock	IEC 60068-2-27
		Freefall	IEC 60068-2-32
		Vibration	IEC 60068-2-6

Software Specifications

Topology		User Name	Local Authentication
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 (Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN	Password Authentication	Remote Authentication (via RADIUS / TACACS+)
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	Management Interface Access Filtering	Web, Telnet / SSH , CLI RS-232 console
Spanning Tree	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP	Management Features	
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.	CLI	Cisco® like CLI
Loop Protection	Supported	Web Based Management	
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms	Telnet	Server
	Single Ring, Sub-Ring, Multiple ring topology	SNMP	V1, V2c, V3
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Supported	sFlow	Supported
QoS Features		Modbus/TCP	Support for management and monitoring
Class of Service	IEEE 802.1p 8 active priorities queues per port	SW & Configuration Upgrade	TFTP, HTTP
Traffic Classification QoS	IEEE 802.1p based CoS IP Precedence based CoS IP DSCP based CoS	RMON	Redundant firmware in case of upgrade failure
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	MIB	RMON I (1, 2, 3, 9 group), RMON II
Bandwidth Control for Ingress	Per port based	UPnP	RFC1213 MIB II, Private MIB
Bandwidth Control for Egress	Per port based	DHCP	Supported
DiffServ (RF 2474) Remarkng	Per queue / Per port shaper	IP Source Guard	Server, Client, Relay, Relay option 82 , Snooping
Storm Control	for Unicast, Broadcast, Multicast	Mirroring	Supported
IP Multicasting Features		Event Syslog	Local and Remote
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	Warning Message	Syslog server (RFC3164)
Security Features		DNS	System syslog, e-mail, alarm relay
IEEE 802.1X	Port-Based MAC-Based	IEEE1588 PTP V2	Client
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	NTP V4.0, SNTP	Supports 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
RADIUS authentication & accounting		LLDP (IEEE 802.1ab)	Client
TACACS+ authentication & accounting, TACACS+ 3.0		IPv6 Features	
HTTPS, HTTP	Supported	IPv6 Management	Telnet Server/ICMP v6
SSL / SSH v2	Supported	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 SIP, Subnet (32bit) 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 budget 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

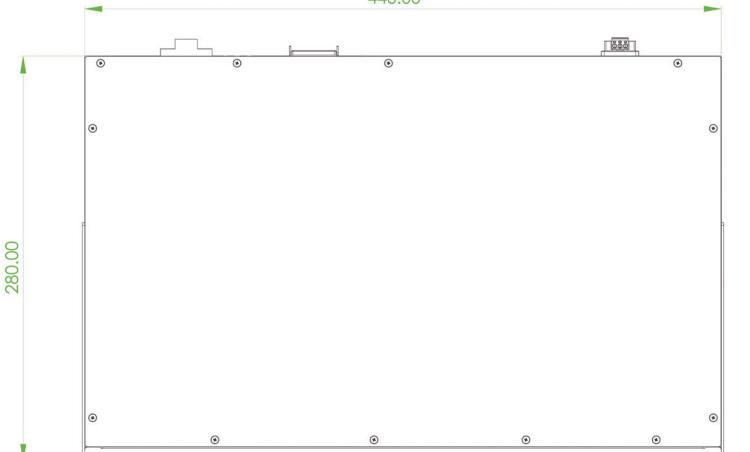
Rear View



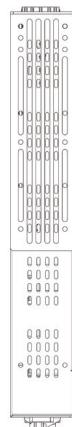
Front View



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		Safety EN62368-1	CE, FCC	
IGS-2408SM-24PHE	V	32	24	8	24	400W	2	V	V	-40~75°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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

Industrial Power Supply

NDR-480-48

Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 480W, -20 ~ +70°C

IGS-2408SM & IGS-4804SM

► 24x GbE RJ45 + 8x 100/1000Base-X SFP

► 48x GbE RJ45 + 4x 1000Base-X SFP



- Supports u-Ring, ERPS, EPS, MSTP, RSTP, STP for redundant cabling
- EN62368-1, CE, FCC 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-2408SM & IGS-4804SM 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 and 52 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 24/48/-48VDC (18~60VDC), 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 (IGS-2408SM)
- Supports SmartView™ for Centralized Management*

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

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet	Console	RS-232 (RJ-45)
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet	Network Cable	UTP/STP Cat.5e cable or above
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair		EIA/TIA-568 100-ohm (100meter)
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic	Protocols	CSMA/CD
	IEEE 802.1d	STP (Spanning Tree Protocol)	Reverse Polarity Protection	For input power
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)	Overload Current Protection	Supported
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)	CPU Watch Dog	Supported
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)	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)
	ITU-T G.8031 /Y.1342	EPS (Ethernet Protection Switching)		AC input power (A) : Isolated 110/220VAC (85VAC~264VAC) DC input power (D) : Isolated 24/48/-48VDC (18~60VDC), Removable Terminal Block Supports negative voltage power input
	IEEE 802.1Q	Virtual LANs (VLAN)	Power Consumption	< 30W @24/48VDC, 110/220VAC (IGS-2408SM) TBD (IGS-4804SM)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication	LED	Per unit: Power 1 (Green), Power 2 (Green), Act/Alarm (Green/Amber), Ring Master (Green)
	IEEE 802.3ac	Max frame size extended to 1522Bytes		P1~P24 (IGS-2408SM) P1~P48 (IGS-4804SM)
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)		Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber)
	IEEE 802.3X	Flow control for full duplex		P25~P32 (IGS-2408SM) P49~P52 (IGS-4804SM)
	IEEE 802.1ad	Stacked VLANs, Q-in-Q		Per SFP Fiber port: 100 /1000Base-X Link/Active (Amber)
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization	Jumbo Frame	10K Byte
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)	MAC Address Table	32K
	IEEE 802.3az	EEE (Energy Efficient Ethernet)	Memory Buffer	4M Bytes for packet buffer
VLAN ID	4094	IEEE 802.1Q VLAN VID	Device Memory	16M Bytes Flash ROM, 1G Bytes RAM
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 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			

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

Software Specifications

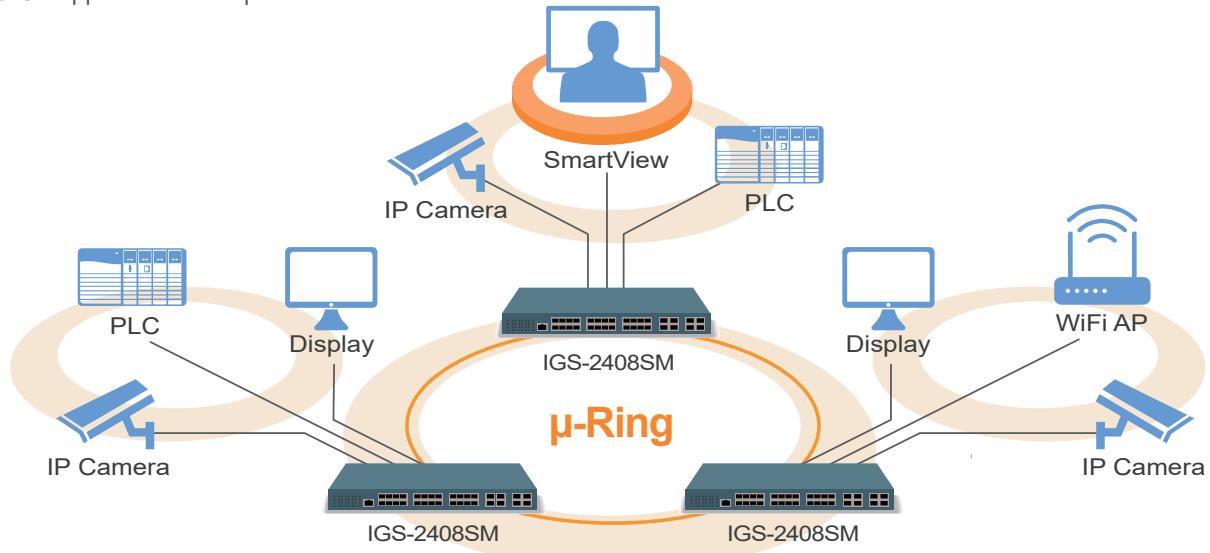
Topology	
VLAN	IEEE 802.1q VLAN, up to 4094 802.1Q VLAN VID IEEE 802.1q VLAN, up to 4094 Groups IEEE 802.1ad Q-in-Q MAC-based VLAN, up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN (Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN
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 Recovery time <20ms
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Single Ring, Sub-Ring, Multiple ring topology
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Supported
QoS Features	
Class of Service	IEEE 802.1p 8 active priorities queues 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
Certification	
EMC	CE (EN55032, EN55035)
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
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
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
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
sFlow	Supported
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)
IEEE 1588 PTP V2 (IGS-2408SM)	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

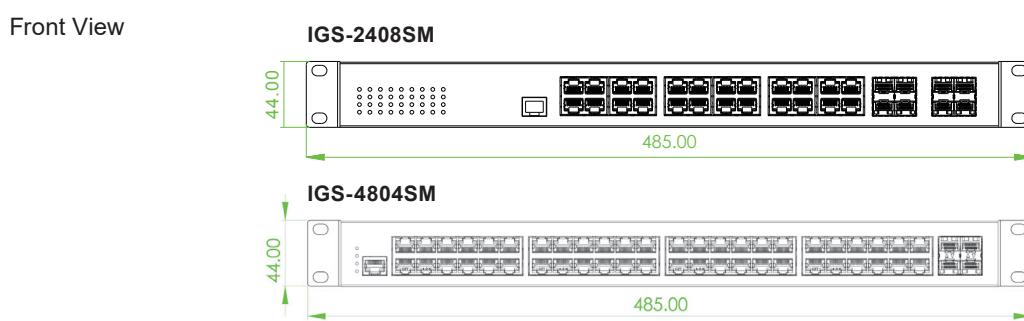
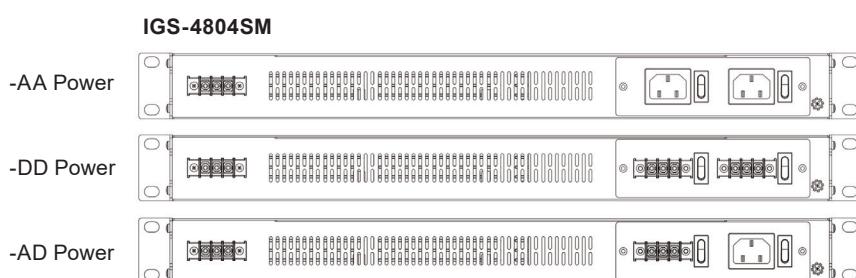
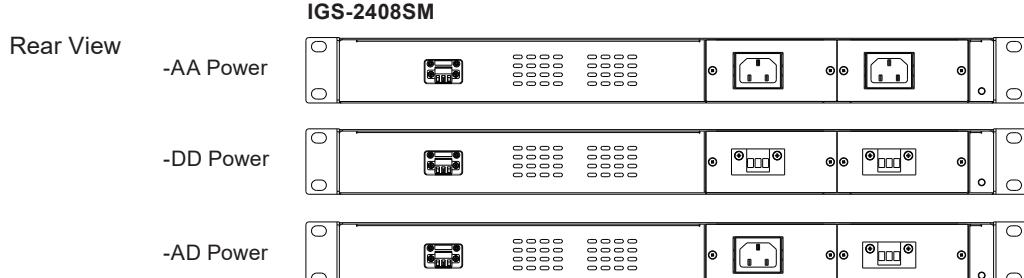
IPv6 ACL	Number of rules: up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3 : IP address SIP, Subnet (32bit) L4 : TCP/UDP
Other Features	
Green Ethernet	Supports IEEE 802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering 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

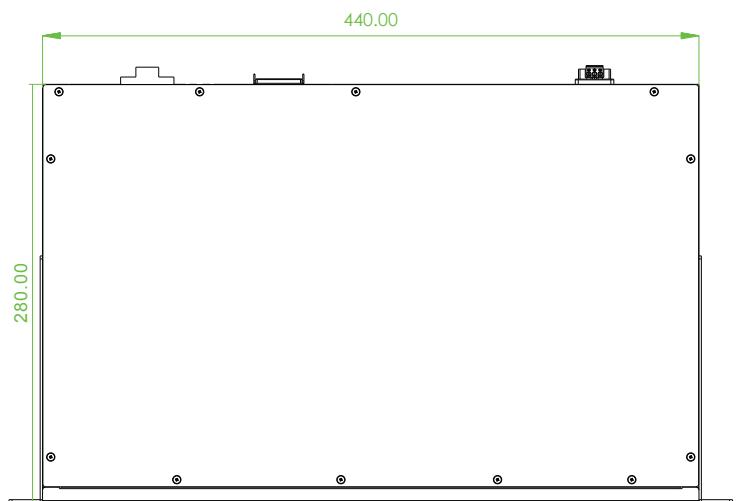
Figure : Application Example



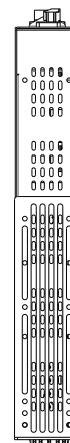
Dimensions



Top View



Side View



Ordering Information

Model Name	Managed	Total Port	UTP		Fiber		Input Power		Certification		Operating Temperature
			10/100/1000 Base-T	1000Base-X	1000Base-X	24/48/48VDC	110/220V AC	Safety EN62368-1	CE, FCC		
IGS-2408SM-E-AA	V	32	24	8			2	V	V		-40~75°C
IGS-2408SM-E-AD	V	32	24	8	1	2	1	V	V		-40~75°C
IGS-2408SM-E-DD	V	32	24	8				V	V		-40~75°C
IGS-4804SM-E-AA	V	52	48	4			2	V	V		-40~75°C
IGS-4804SM-E-AD	V	52	48	4	1	1	1	V	V		-40~75°C
IGS-4804SM-E-DD	V	52	48	4			2	V	V		-40~75°C

■ Package List

- IGS-4804SM or IGS-2408SM device
- 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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

■ Industrial Power Supply

NDR-120-48	Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 120W, -20 ~ +70°C (For DC type)
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IGS-S2804TM

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



- Supports IEEE1588 PTP v2
- Supports u-Ring, ERPS, EPS, MSTP, RSTP, STP for redundant cabling
- CE, FCC, EN62368-1 certified
- Supports negative voltage power input



IGS-S2804TM is an industrial grade, hardened design, L2 switch, equipped with 28x GbE SFP ports with 4x 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 24/48/-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
- Supports SmartView™ for Centralized Management*

*Please see Chapter 1- Software Management for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet	Power Supply	Redundant 2x isolated High Voltage AC/DC input power (-AA model) Redundant 2x Isolated Low Voltage DC Input power (-DD model)										
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet		Redundant 1x isolated Low Voltage DC and 1x High Voltage AC/DC input power (-AD model)										
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair		Low Voltage DC (D): Isolated 24/48/-48VDC (18~60VDC), Removable Terminal Block										
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic		High voltage AC/DC (A): Isolated 110/220VAC (85VAC~264VAC)										
	IEEE 802.1d	STP (Spanning Tree Protocol)		Supports negative voltage power input (for example in telecom system)										
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)	Power Consumption	<table border="1"> <thead> <tr> <th>Input Voltage</th> <th>IGS-S2804TM</th> </tr> </thead> <tbody> <tr> <td>24VDC</td> <td>33.1W</td> </tr> <tr> <td>48VDC</td> <td>33.4</td> </tr> <tr> <td>110VAC</td> <td>34.4W</td> </tr> <tr> <td>220VAC</td> <td>34.4W</td> </tr> </tbody> </table>	Input Voltage	IGS-S2804TM	24VDC	33.1W	48VDC	33.4	110VAC	34.4W	220VAC	34.4W
Input Voltage	IGS-S2804TM													
24VDC	33.1W													
48VDC	33.4													
110VAC	34.4W													
220VAC	34.4W													
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)												
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)	LED	Per unit: Power 1 (Green), Power 2 (Green), Act /Alarm (Green/Red), Ring Master (Green)										
	ITU-T G.8031 / Y.1342	EPS (Ethernet Protection Switching)		Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Yellow)										
	IEEE 802.1Q	Virtual LANs (VLAN)		SFP (P1~24) Fiber Per port: 100Base-TX Link/Active (Green) 1000Base-X Link/Active (Yellow)										
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication		SFP (P25~P28) Fiber Per port: 1000Base-X Link/Active (Amber)										
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)	Jumbo Frame	10K										
	IEEE 802.1ad	Stacked VLANs, Q-in-Q	MAC Address Table	32K										
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization	Memory Buffer	4M Bytes for packet buffer										
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)	Device Memory	16M Bytes Flash ROM, 1G Bytes RAM										
VLAN ID	4094	IEEE 802.1Q VLAN VID	Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay										
Switch Architecture	Back-plane (Switching Fabric): 56Gbps (Full wire-speed)		Alarm Relay	Relay outputs with current carrying capacity of 1 A @24VDC, 2-Pin removable terminal block										
Data Processing	Store and Forward		Contact											
Network Connector	28x 100/1000Base-X SFP with 4x GbE Combo (UTP/ SFP)		Operating Temperature	-10 ~ 60°C (IGS-S2804TM) -40 ~ 75°C (IGS-S2804TM-E)										
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		Operating Humidity	5% to 95% (Non-condensing)										
Console	RS-232 (RJ-45)		Storage Temperature	-40 ~ 85°C										
Network Cable	UTP/STP Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)		Housing	Rugged Metal, IP30 Protection, Fanless										
Protocols	CSMA/CD		Dimensions	315 x 440 x 44 mm (D x W x H)										
Reverse Polarity Protection	Supported		Weight	4.755kg (IGS-S2804TM-AA) 4.26kg (IGS-S2804TM-DD) 4.51kg (IGS-S2804TM-AD)										
Overload Current Protection	Supported		Installation Mounting	19" rack mount										
CPU Watch Dog	Supported		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										

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
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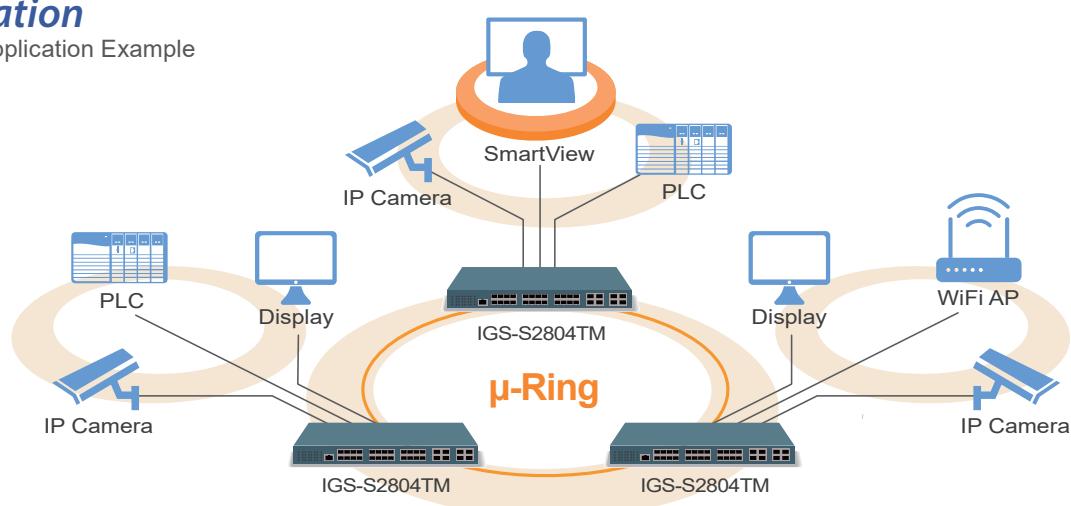
Safety	EN62368-1
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

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 (Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN
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
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Single Ring, Sub-Ring, Multiple ring topology network Supported
QoS Features	
Class of Service	IEEE 802.1p 8 active priorities queues 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
sFlow	Supported
SW & Configuration Upgrade	TFTP, HTTP
RMON	Redundant firmware in case of upgrade failure
MIB	RMON I (1, 2, 3, 9 group), RMON II
UPnP	RFC1213 MIB II, Private MIB
DHCP	Supported
IP Source Guard	Server, Client, Relay, Relay option 82 , Snooping
Port Mirroring	Supported
Event Syslog	Syslog server (RFC3164)
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
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 SIP, Subnet (32bit) L4: TCP/UDP

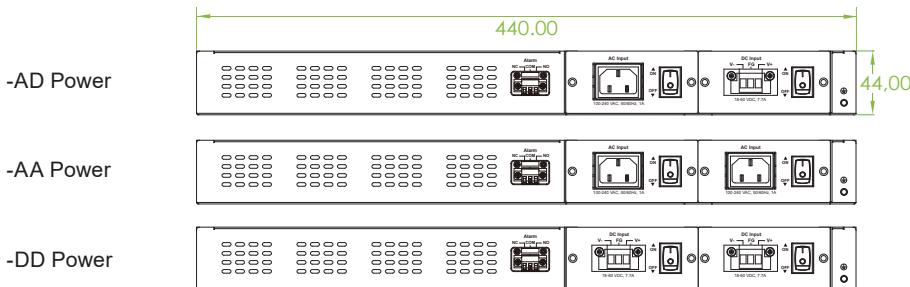
Application

Figure : Application Example

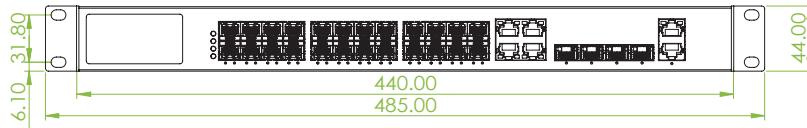


Dimensions

Rear View



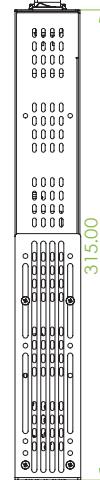
Front View



Top View



Side 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) 24/48/48VDC	High Volt 110/240VAC	Safety EN62368-1	CE FCC	
IGS-S2804TM-AA	V	28	20	4	4 SFP		2	V	V	-10~60°C
IGS-S2804TM-DD	V	28	20	4	4 SFP	2		V	V	-10~60°C
IGS-S2804TM-AD	V	28	20	4	4 SFP	1	1	V	V	-10~60°C
IGS-S2804TM-EAA	V	28	20	4	4 SFP		2	V	V	-40~75°C
IGS-S2804TM-EDD	V	28	20	4	4 SFP	2		V	V	-40~75°C
IGS-S2804TM-EAD	V	28	20	4	4 SFP	1	1	V	V	-40~75°C

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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

Industrial Power Supply

NDR-120-48	Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 120W, -20 ~ +70°C (For DC type)
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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, 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, 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
- Supports SmartView™ for Centralized Management*

*Please see Chapter 1- Software Management for more details

Specifications

Standard	IEEE 802.3 IEEE 802.3u IEEE 802.3ab IEEE 802.3z IEEE 802.1d IEEE 802.1w IEEE 802.1s ITU-T G.8032 / Y.1344 ITU-T G.8031 /Y.1342 IEEE 802.1Q IEEE 802.1X IEEE802.3ac IEEE 802.3ad IEEE 802.3x IEEE 802.3af IEEE 802.3at IEEE 802.1ad IEEE 802.1p IEEE 802.1ab IEEE 802.3az	10Base-T 10Mbit/s Ethernet 100Base-TX, 100Base-FX, Fast Ethernet 1000Base-TGbit/s Ethernet over twisted pair 1000Base-X Gbit/s Ethernet over Fiber-Optic STP (Spanning Tree Protocol) RSTP (Rapid Spanning Tree Protocol) MSTP (Multiple Spanning Tree Protocol) ERPS (Ethernet Ring Protection Switching) EPS (Ethernet Protection Switching) Virtual LANs (VLAN) Port based and MAC based Network Access Control, Authentication Max frame size extended to 1522Bytes Link aggregation for parallel links with LACP(Link Aggregation Control Protocol) Flow control for Full Duplex PoE (Power over Ethernet) PoE+ (Power over Ethernet enhancements) Stacked VLANs, Q-in-Q LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization Link Layer Discovery Protocol (LLDP) EEE (Energy Efficient Ethernet)	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 Female) ports support IEEE 802.3af / IEEE 802.3at End-Span, Alternative A mode.
			Network Connector 10x M12 (8-Pin, Female, A-Code) 10/100/1000Base-T UTP (ITP-G802TM-8PH24) 8x M12(8-Pin, Female, A-Code) 10/100/1000Base-X + 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 Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)
			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)
VLAN ID	4094 IEEE802.1Q VLAN VID		Jumbo Frame 9.6KB
Switch Architecture	Back-plane (Switching Fabric): 20Gbps (Full wire-speed)		
Data Processing	Store and Forward		

MAC Address Table	8K	Housing	Rugged Metal, Fanless , IP67 grade housing for against water, dust, and oil																														
Memory Buffer	512K Bytes for packet buffer	Dimensions	69 x 240 x 168mm (D x W x H)																														
Device Memory	16M Bytes Flash ROM, 128M Bytes RAM	Weight	2.170kg (ITP-G802SM-8PH24) 2.15kg (ITP-G802TM-8PH24)																														
PoE Standard	IEEE802.3af, IEEE802.3at	Installation Mounting	Wall mounting, or DIN Rail mounting (Optional)																														
PoE Power Output	Maximum PoE output power budget 180W (30W/per port) Regulated PoE output voltage at 50VDC (Figure 2)	MTBF	371,857 Hours (ITP-G802SM-8PH24) 362,429 Hours (ITP-G802TM-8PH24) (MIL-HDBK-217)																														
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)	Warranty	5 years																														
Power Consumption	ITP-G802TM-8PH24 <table border="1"><tr><th>Input Voltage</th><th>Total Power Consumption</th><th>Device Power Consumption</th><th>PoE Budget</th><th>Boost Efficiency</th></tr><tr><td>24 VDC</td><td>200.4W</td><td>11.7W</td><td>180W</td><td>95.6%</td></tr><tr><td>48 VDC</td><td>200.2W</td><td>12.5W</td><td>180W</td><td>95.9%</td></tr></table> ITP-G802SM-8PH24 <table border="1"><tr><th>Input Voltage</th><th>Total Power Consumption</th><th>Device Power Consumption</th><th>PoE Budget</th><th>Boost Efficiency</th></tr><tr><td>24 VDC</td><td>198.5W</td><td>9.8W</td><td>180W</td><td>95.30%</td></tr><tr><td>48 VDC</td><td>199.2W</td><td>11.5W</td><td>180W</td><td>95.80%</td></tr></table>	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%	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%	Certification	CE
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%																													
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%																													
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE	EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE																														
Railway Traffic	EN50155	Railway Traffic	EN50155																														
Fire protection of railway vehicles	EN45545-2	Fire protection of railway vehicles	EN45545-2																														
EMS (Electromagnetic Susceptibility)	EN61000-4-2 (ESD) Level 3, Criteria B	EMS (Electromagnetic Susceptibility)	EN61000-4-2 (ESD) Level 3, Criteria B																														
Protection Level	EN61000-4-3 (RS) Level 3, Criteria A	Protection Level	EN61000-4-3 (RS) Level 3, Criteria A																														
	EN61000-4-4 (Burst) Level 3, Criteria A		EN61000-4-4 (Burst) Level 3, Criteria A																														
	EN61000-4-5 (Surge) Level 3, Criteria B		EN61000-4-5 (Surge) Level 3, Criteria B																														
	EN61000-4-6 (CS) Level 3, Criteria A		EN61000-4-6 (CS) Level 3, Criteria A																														
	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A		EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A																														
Shock	IEC-61373	Shock	IEC-61373																														
Freefall	IEC 60068-2-32	Freefall	IEC 60068-2-32																														
Vibration	IEC-61373	Vibration	IEC-61373																														

Software Specifications

Topology		DiffServ (RF 2474) Remarking	
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(Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN	Storm Control	for Unicast, Broadcast, Multicast
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	IP Multicasting Feature	
Spanning Tree	IEEE802.1d STP, IEEE802.1w RSTP, IEEE802.1s MSTP	IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 Port Filtering Profile, Throttling
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)	IGMP / MLD Snooping	Fast Leave Maximum Multicast Group : up to 1022 entries Query / Static Router Port
Loop Protection	Supported	Security Features	
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms Single Ring, Sub-Ring, Multiple ring topology network	IEEE 802.1X	Port-Based, MAC-Based
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Supported	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
QoS Feature		RADIUS authentication & accounting	
Class of Service	IEEE802.1p 8 active priorities queues per port	TACACS+ authentication & accounting, TACACS+ 3.0	
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	HTTPS, HTTP	Supported
		SSL / SSH v2	Supported
Bandwidth Control for Ingress	100~1,000,000 when the "Unit" is "Mbps" and 1~1,000 when the "Unit" is "Mbps"	User Name Password Authentication	Local Authentication
Bandwidth Control for Egress	100~1,000,000 when the "Unit" is "Mbps" and 1~1,000 when the "Unit" is "Mbps" Per queue / Per port shaper	Management Interface Access Filtering	Remote Authentication (via RADIUS / TACACS+)
		Management Features	
		CLI	Cisco® like CLI
		Web Based Management	
		Telnet	Server
		SNMP	V1, V2c, V3
		sFlow	Supported
		Modbus/TCP	Supports for management and monitoring
		SW & Configuration Upgrade	TFTP, HTTP
		FTP client	Redundant firmware in case of upgrade failure
		RMON	Supports for upload/download configuration
		MIB II	RMON I (1, 2, 3, 9 group), RMON II
		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 Syslog server (RFC3164)	Others Features	
Warning Message	System syslog, e-mail, alarm relay	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
DNS	Client, Proxy		Lower the power for a port when there is no link
IEEE1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, Master, Slave		LED Power Management :Adjustment LEDs intensity
NTP, SNTP	Client	Cable Diagnostic	Measuring UTP cable OK or broken point distance
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol LLDP-MED	Advanced PoE Management	PoE PD Failure Auto Checking, and Auto reset when PD fail PoE Scheduling (On/Off schedule weekly)
IPv6 Features			PoE Configuration PoE Enable/Disable Power limit by classification Power limit by management Total PoE Power budge (maximum 180W) limitation Power feeding priority
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 SIP, Subnet (32bit) L4: TCP/UDP		

Application

Figure 1 : ITP Series in Onboard Train Application

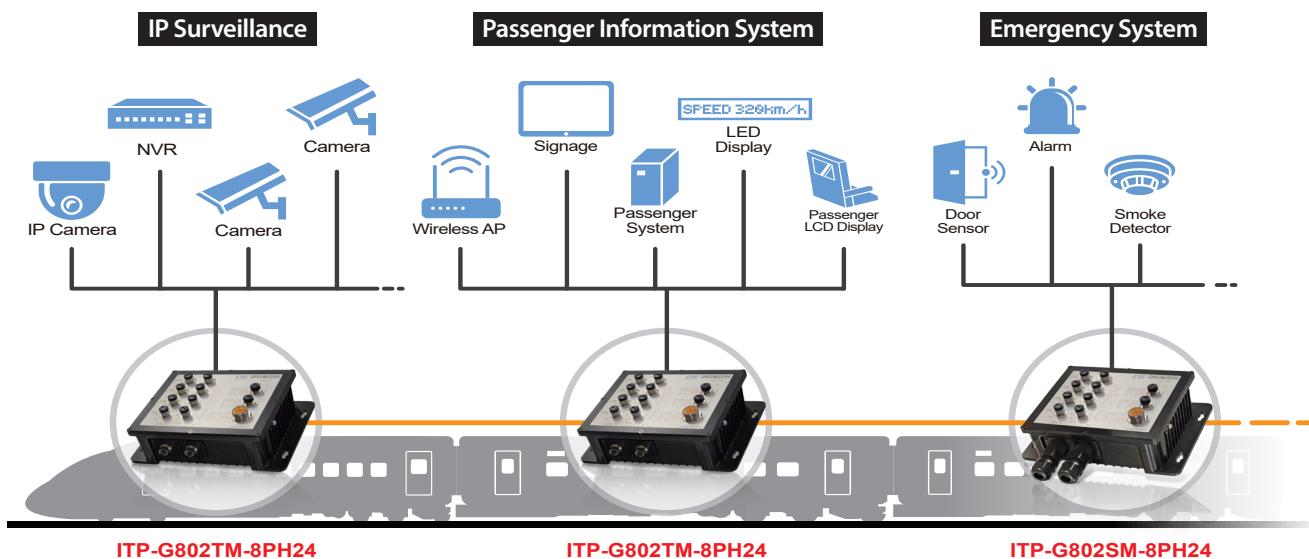
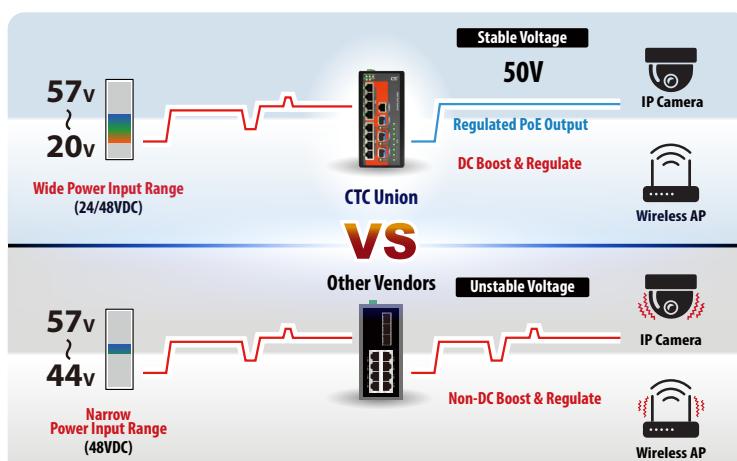


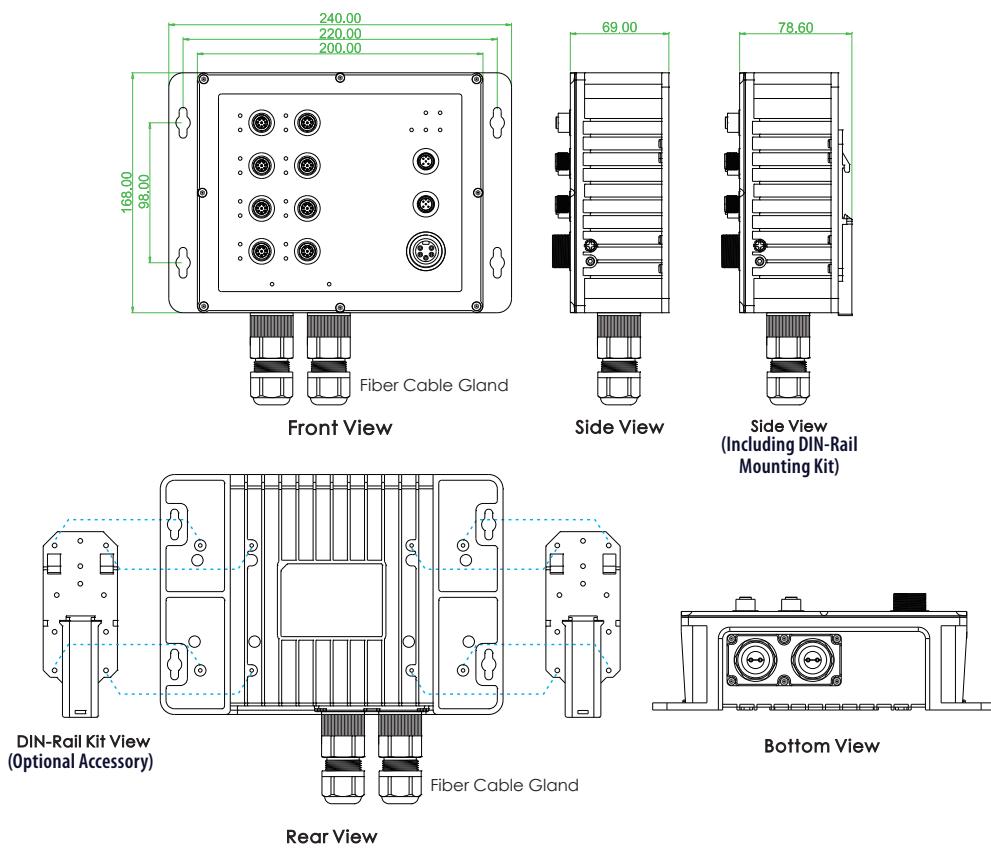
Figure 2 : High Efficiency Boost Technology for PoE



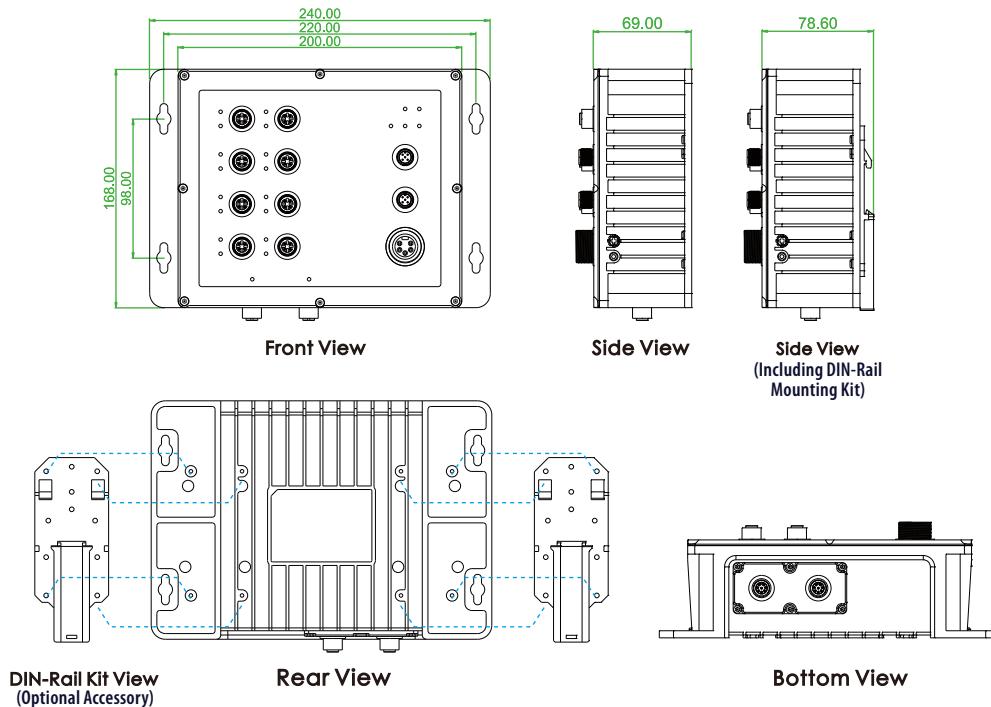
- Regulated PoE output voltage (50VDC) to stabilize PoE device
- Guarantee delivery PoE power distance to 100 meters
- Wide range input power 24/48VDC (20~57VDC)
- Built-in very high efficiency (94~97%) to boost PoE output voltage

Dimensions

► ITP-G802SM-8PH24



► ITP-G802TM-8PH24



Ordering Information

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

■ Package List

- ITP-G802TM-8PH24 or ITP-G802SM-8PH24 device
- 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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

■ Optional Cable/Connector & Din-Rail Kit

P/N: CAB-M12AM8-RJ45 M12 A-code Male (8-Pin) to RJ-45, AWG 24 ,IP67, 1 meter	P/N: CAB-M12AF5-OPEN M12 A-code Female (5-Pin) to open wire , AWG 22 , IP67, 1 meter	P/N: CAB-M23F5-OPEN M23 Female (5-Pin) to open wire, (AWG 16) , IP67, 1 meter
 For GbE UTP (A-code model)	 For Alarm	 For Power
P/N: M12A-M8 M12 A-code Male (8-Pin) connector, IP67	P/N: M12A-F5 M12 A-code Female (5-Pin) connector, IP67	P/N: IND-DNK04 Din Rail Kit for Industrial, Wide: 52mm (130 X52mm / 4 Screws) (2pcs/set)
 For GbE UTP (A-code model)	 For Alarm	

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, 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, 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
- Supports SmartView™ for Centralized Management*

*Please see Chapter 1- Software Management for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet	VLAN ID	4094 IEEE802.1Q VLAN VID
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet	Switch	Back-plane (Switching Fabric): 5.6Gbps
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair	Architecture	(Full wire-speed)
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic	Data Processing	Store and Forward
	IEEE 802.1d	STP (Spanning Tree Protocol)	Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)	PoE Port	8x M12 (4-Pin D-code Female) ports support IEEE 802.3af / IEEE 802.3at End-Span, Alternative A mode.
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)		8x M12 (4-Pin, Female,D-Code) 10/100Base-TX UTP + 2x M12 (8-Pin, female,A-code) 10/100/1000Base-T UTP (ITP-802GTM-8PH24)
ITU-T G.8032 / Y.1344	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)		8x M12 (4-Pin, Female,D-Code) 10/100Base-TX UTP + 2x 100/1000Base-X SFP (ITP-802GSM-8PH24)
ITU-T G.8031 / Y.1342	ITU-T G.8031 / Y.1342	EPS (Ethernet Protection Switching)		UTP port provide auto negotiation speed, Auto MDI/MDI-X, Full/Half duplex function
IEEE 802.1Q	IEEE 802.1Q	Virtual LANs (VLAN)		Build-in 2x bypass GbE UTP ports (ITP-802GTM-8PH24)
IEEE 802.1X	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication		2x Water-proof cable connector 2x 100/1000Base-X SFP slot, with DDMI (ITP-802GSM-8PH24)
IEEE802.3ac	IEEE802.3ac	Max frame size extended to 1522Bytes	Console	RS-232 (5-pin A-Code M12 male)
IEEE 802.3ad	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)	Network Cable	UTP/STP Cat. 5e cable or above
IEEE 802.3x	IEEE 802.3x	Flow control for Full Duplex		EIA/TIA-568 100-ohm (100meter)
IEEE 802.3af	IEEE 802.3af	PoE (Power over Ethernet)	Protocols	CSMA/CD
IEEE 802.3at	IEEE 802.3at	PoE+ (Power over Ethernet enhancements)	Reverse Polarity Protection	Supported
IEEE 802.1ad	IEEE 802.1ad	Stacked VLANs, Q-in-Q	Overload Current Protection	Supported
IEEE 802.1p	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization	CPU Watch Dog	Supported
IEEE 802.1ab	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)		
IEEE 802.3az	IEEE 802.3az	EEE (Energy Efficient Ethernet)		

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)	Operating Temperature -40 ~ 75°C																														
Jumbo Frame	9.6KB	Operating Humidity 5% to 95% (Non-condensing)																														
MAC Address Table	8K	Storage Temperature -40 ~ 85°C																														
Memory Buffer	512K Bytes for packet buffer	Housing Rugged Metal, Fanless , IP67 grade housing for against water, dust, and oil																														
Device Memory	16M Bytes Flash ROM, 128M Bytes RAM	Dimensions 69 x 240 x 168mm (D x W x H)																														
PoE Standard	IEEE 802.3af, IEEE 802.3at	Weight 2.170kg (ITP-802GSM-8PH24) 2.15kg (ITP-802GTM-8PH24)																														
PoE Power Output	Maximum PoE output power budget 180W (30W/per port) Regulated PoE output voltage at 50VDC (Figure 2)	Installation Mounting Wall mounting, or DIN Rail mounting (Optional)																														
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)	MTBF 371,961 Hours (ITP-802GSM-8PH24) 362,429 Hours (ITP-802GTM-8PH24) (ML-HDBK-217)																														
Power Consumption	ITP-802GSM-8PH24 <table border="1"><tr><th>Input Voltage</th><th>Total Power Consumption</th><th>Device Power Consumption</th><th>PoE Budget</th><th>Boost Efficiency</th></tr><tr><td>24 VDC</td><td>196.4W</td><td>8.1W</td><td>180W</td><td>95.50%</td></tr><tr><td>48 VDC</td><td>197.8W</td><td>9.6W</td><td>180W</td><td>95.60%</td></tr></table> ITP-802GTM-8PH24 <table border="1"><tr><th>Input Voltage</th><th>Total Power Consumption</th><th>Device Power Consumption</th><th>PoE Budget</th><th>Boost Efficiency</th></tr><tr><td>24 VDC</td><td>198.3W</td><td>8.9W</td><td>180W</td><td>95.00%</td></tr><tr><td>48 VDC</td><td>198.8W</td><td>10.1W</td><td>180W</td><td>95.30%</td></tr></table>	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%	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%	Warranty 5 years
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%																												
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	Certification																														
Alarm	5-pin A-code M12 male	EMC CE																														
Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC	EMI (Electromagnetic Interference) FCC Part 15 Subpart B Class A, CE																														
		Railway Traffic EN50155																														
		Fire protection of railway vehicles EN45545-2																														
		EMS (Electromagnetic Susceptibility) EN61000-4-2 (ESD) Level 3, Criteria B																														
		Protection Level 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-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 Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN	Bandwidth Control for Ingress 100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps" Bandwidth Control for Egress 100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps" 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
		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
		sFlow Supported
		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	IPv6 NTP, SNTP	Client
MIB II	RFC 1213	IPv6 TFTP	Supported
UPnP	Supported	IPv6 QoS	Supported
BOOTP	Supported	IPv6 ACL	Number of rules: up to 256 entries for L2 / L3 / L4 L2: Mac address SA/DA/VLAN L3: IP address SIP, Subnet (32bit) L4: TCP/UDP
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)		
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	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		

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**Advanced PoE Management**

Measuring UTP cable OK or broken point distance

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 budget (maximum 180W) limitation

Power feeding priority

Application

Figure 1 : ITP Series in Onboard Train Application

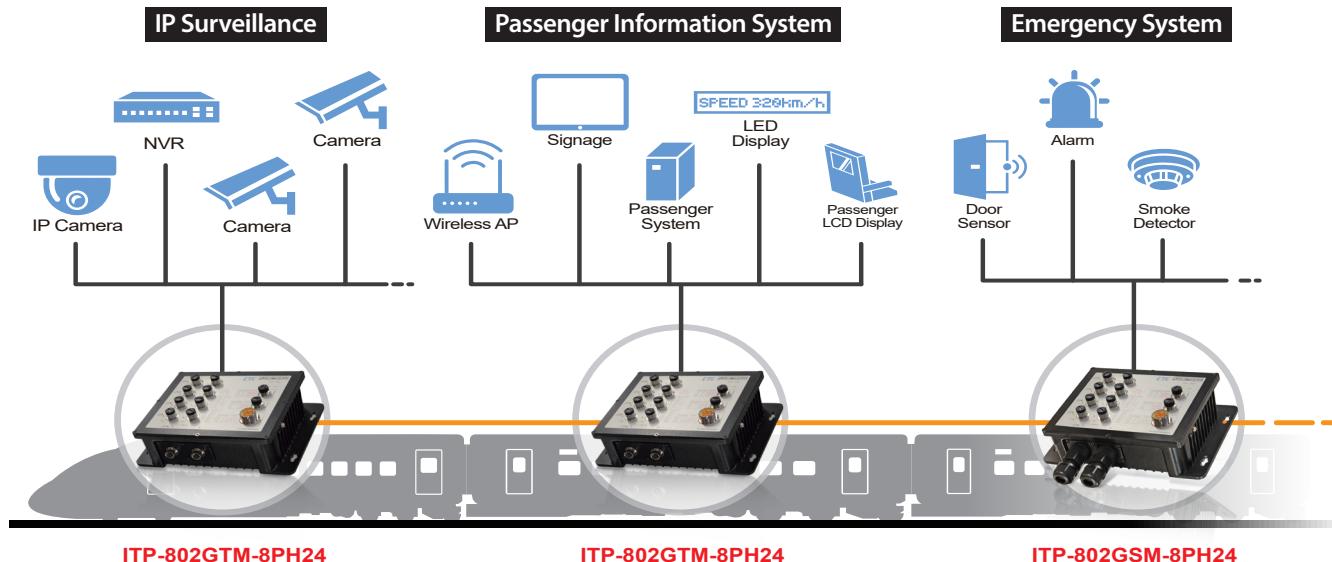
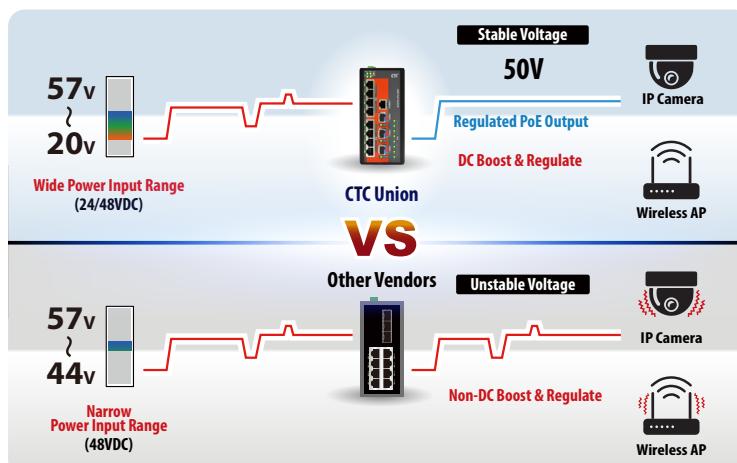


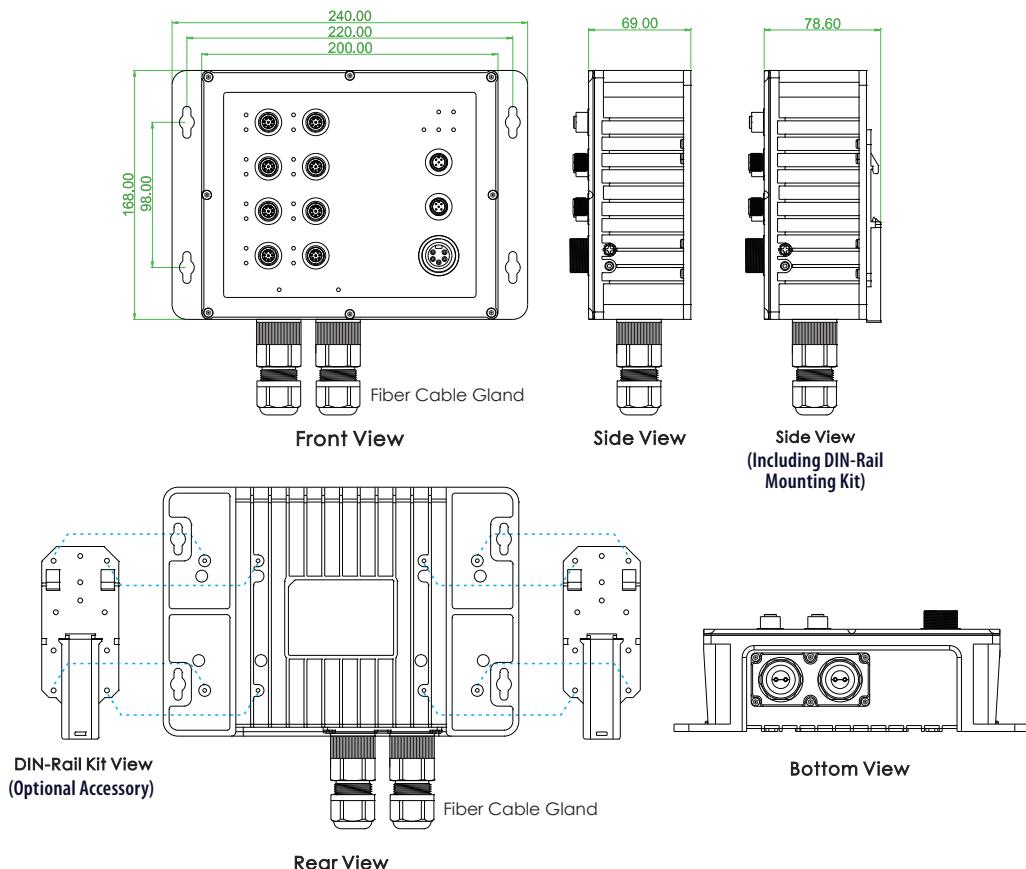
Figure 2 : High Efficiency Boost Technology for PoE



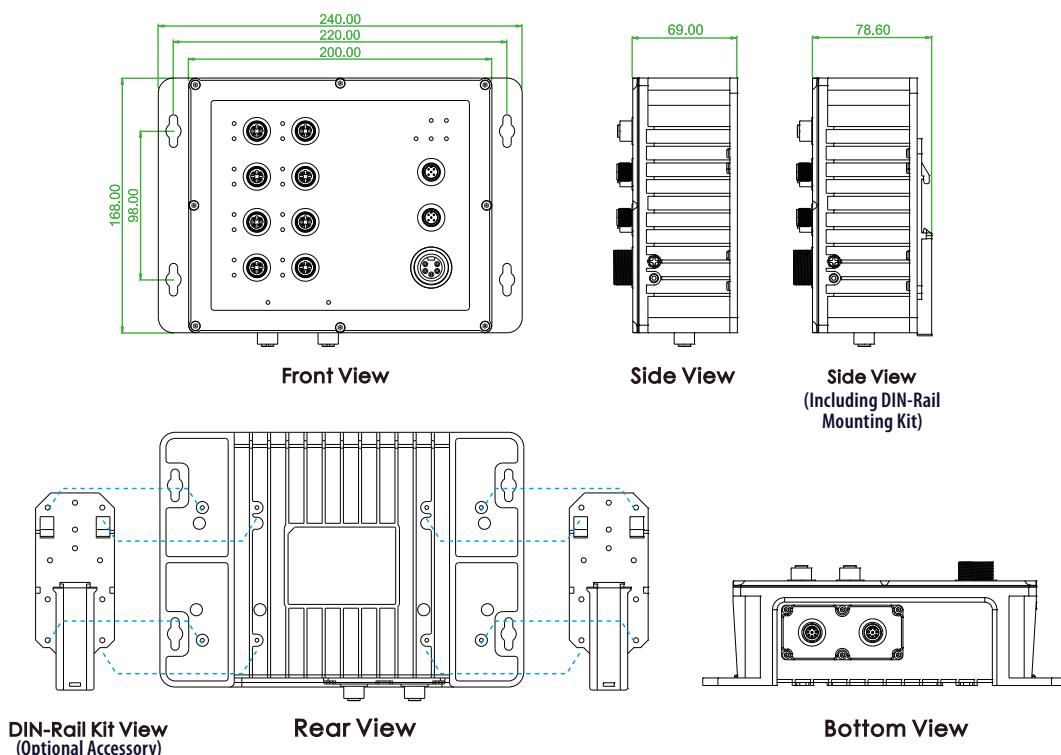
- Regulated PoE output voltage (50VDC) to stabilize PoE device
- Guarantee delivery PoE power distance to 100 meters
- Wide range input power 24/48VDC (20~57VDC)
- Built-in very high efficiency (94~97%) to boost PoE output voltage

Dimensions

► ITP-802GSM-8PH24



► ITP-802GTM-8PH24



Ordering Information

Model Name	Managed	IP67	Total Port	UTP Port M12	UTP or SFP	PoE Port	PoE Total Power Budget	Power Input	Certification		Shock Vibration	Operating Temperature
				10/100 Base-TX	100/1000 Base-X	IEEE 802.3at		Redundant	EN50155 EN45545-2	CE FCC	IEC61373	
ITP-802GTM-8PH24	V	V	10	8	2 (A-code)	8	180W	24/48VDC	V	V	V	-40~75°C
ITP-802GSM-8PH24	V	V	10	8	2 SFP	8	180W	24/48VDC	V	V	V	-40~75°C

■ Package List

- ITP-802GTM-8PH24 or ITP-802GSM-8PH24 device
- 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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

■ Optional Cable/Connector & Din-Rail Kit

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 X 52mm / 4 Screws) (2pcs/set)

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

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

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



- EN50155, EN45545-2, EN50121-4, EN62368-1 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.8031 ERP, 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
- Supports SmartView™ for Centralized Management*

*Please see Chapter 1- Software Management for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet	Data Processing	Store and Forward
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet	Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair	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)
	IEEE 802.1d	STP (Spanning Tree Protocol)		Maximum PoE output power budget 120W (30W/per port), Regulated PoE output voltage at 52VDC
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)		IEEE 802.3af / IEEE 802.3at End-Span, Alternative A mode
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)	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)
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)		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)
	ITU-T G.8031 /Y.1342	EPS (Ethernet Protection Switching)		UTP port provide auto negotiation speed, Auto MDI/MDI-X, Full/Half duplex function
	IEEE 802.1Q	Virtual LANs (VLAN)		Build-in 2x bypass GbE UTP ports (For -BP model optional)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication	Console	RS-232 (5-pin A-Code M12 male)
	IEEE802.3ac	Max frame size extended to 1522Bytes	Network Cable	UTP/STP Cat. 5e cable or above
	IEEE 802.3ad	Link aggregation for parallel links with LACP (Link Aggregation Control Protocol)		EIA/TIA-568 100-ohm (100meter)
	IEEE 802.1AX	Link aggregation for parallel links with LACP (Link Aggregation Control Protocol)	Protocols	CSMA/CD
	IEEE 802.3x	Flow control for Full Duplex	Reverse Polarity Protection	Supported
	IEEE 802.3af	PoE (Power over Ethernet)	Overload Current Protection	Supported
	IEEE 802.3at	PoE+ (Power over Ethernet enhancements)	CPU Watch Dog	Supported
	IEEE 802.1ad	Stacked VLANs, Q-in-Q	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)
	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)			

LED	PoE Port LED 1 LED /per Port : • PoE Output Power On : ON (Green)	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)																															
Jumbo Frame	9.6KB	Weight	2.8kg (ITP-1204GTM-12PH) 3.9kg (ITP-2204GTM-16PH)																															
MAC Address Table	8K	Installation Mounting	Wall mounting																															
Memory Buffer	512K Bytes for packet buffer	MTBF	238,600 Hours (ITP-1204GTM-12PH) 227,899 Hours (ITP-2204GTM-16PH) (MIL-HDBK-217)																															
Device Memory	16M Bytes Flash ROM, 128M Bytes RAM	Warranty	5 years																															
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	Certification																																
Power Consumption	ITP-1204GTM-12PH <table border="1"><thead><tr><th>Input Voltage</th><th>Total Power Consumption</th><th>Device Power Consumption</th><th>PoE Budget</th></tr></thead><tbody><tr><td>24 VDC</td><td>141.4W</td><td>13W</td><td>120W</td></tr><tr><td>48 VDC</td><td>137.9W</td><td>14W</td><td>120W</td></tr><tr><td>110VDC</td><td>136.4W</td><td>16.5W</td><td>120W</td></tr></tbody></table> ITP-2204GTM-16PH <table border="1"><thead><tr><th>Input Voltage</th><th>Total Power Consumption</th><th>Device Power Consumption</th><th>PoE Budget</th></tr></thead><tbody><tr><td>24 VDC</td><td>149W</td><td>17.1W</td><td>120W</td></tr><tr><td>48 VDC</td><td>141.1W</td><td>17.8W</td><td>120W</td></tr><tr><td>110VDC</td><td>140.8W</td><td>19.8</td><td>120W</td></tr></tbody></table>	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	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	EMC CE (EN55024, EN55032) EMI (Electromagnetic Interference) FCC Part 15 Subpart B Class A, CE Railway Traffic EN50155, and EN50121-4 (ITP-2204GTM-16PH) Fire protection of railway vehicles EN 45545-2 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 4KV surge protection Supported for PoE and UTP port Safety EN62368-1 Shock IEC-61373 Freefall IEC 60068-2-32 Vibration IEC-61373
Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget																															
24 VDC	141.4W	13W	120W																															
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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																																	

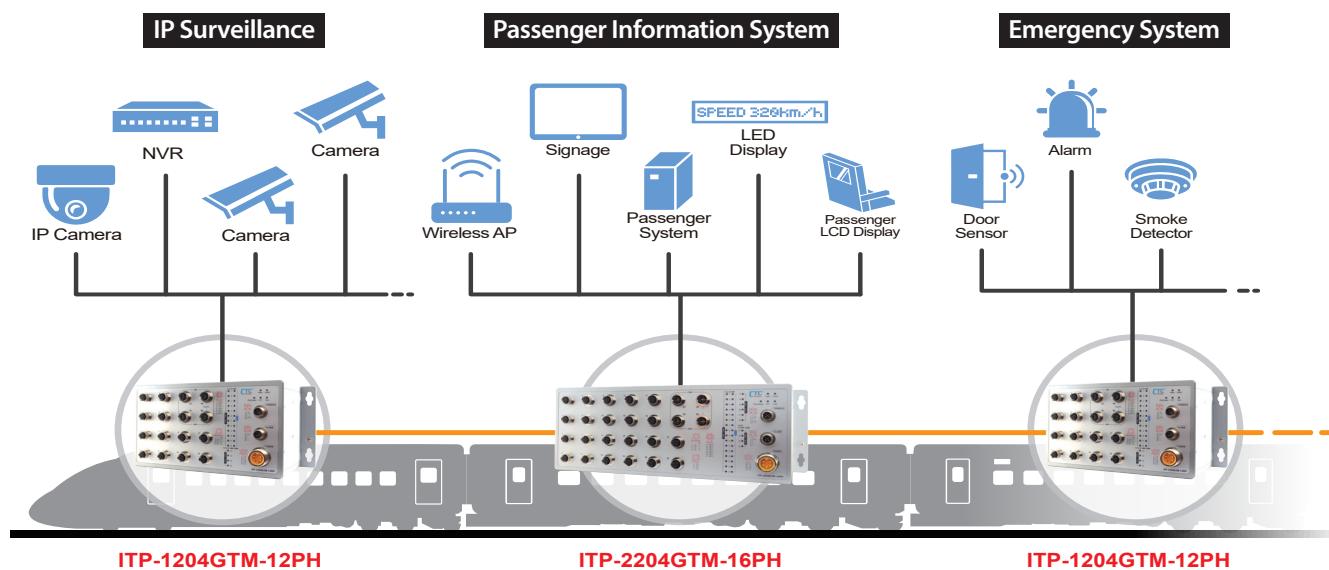
Software Specifications

Topology		Bandwidth Control for Egress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps" Rate Unit : bit Per queue / Per port shaper
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 Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN	DiffServ (RF 2474) Remarking	for Unicast, Broadcast, Multicast
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 Support IEEE802.1AX passive and active mode	IP Multicasting Feature	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 Port Filtering Profile, Throttling
Spanning Tree	IEEE802.1d STP, IEEE802.1w RSTP, IEEE802.1s MSTP	IGMP / MLD Snooping	Fast Leave Maximum Multicast Group : up to 1022 entries Query / Static Router Port
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)	Security Features	Port-Based, MAC-Based
Loop Protection	Supported	IEEE 802.1X	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
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <10ms Single Ring, Sub-Ring, Multiple ring topology network	RADIUS authentication & accounting	TACACS+ authentication & accounting, TACACS+ 3.0
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Supported	HTTPS, HTTP	Supported
QoS Feature		SSL / SSH v2	Supported
Class of Service	IEEE802.1p 8 active priorities queues per port	User Name Password Authentication	Local Authentication
Traffic Classification QoS	IEEE802.1p based CoS IP Precedence based CoS IP DSCL 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	Management Interface Access Filtering	Remote Authentication (via RADIUS / TACACS+)
Bandwidth Control for Ingress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps"	Management Features	
		CLI	Cisco® like CLI
		Web Based Management	
		Telnet	Server
		SNMP	V1, V2c, V3
		sFlow	Supported
		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 II	RFC 1213
		UPnP	Supported
		BOOTP	Supported
		DHCP	Server, Client, Relay, Relay option 82 , Snooping

RARP	Supported	IPv6 TFTP	Supported
TTDP	Supported (Train Topology Discovery Protocol)	IPv6 QoS	Supported
IP Source Guard	Supported	IPv6 ACL	Number of rules: up to 256 entries for L2 / L3 / L4 L2: Mac address SA/DA/VLAN L3: IP address SIP, Subnet (32bit) L4: TCP/UDP
Port Mirroring	Supported		
Event Syslog	Syslog server (RFC3164)	Others Features	
Warning Message	System syslog, e-mail, alarm relay	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
DNS	Client, Proxy		Lower the power for a port when there is no link LED Power Management :Adjustment LEDs intensity
IEEE1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave		Measuring UTP cable OK or broken point distance
NTP, SNTP	Client	Cable Diagnostic	PoE PD Failure Auto Checking, and Auto reset when PD fail
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol	Advanced PoE Management	PoE Scheduling (On/Off schedule weekly)
IPv6 Features			PoE Configuration
IPv6 Management	Telnet Server/ICMP v6		PoE Enable/Disable
SNMP over IPv6	Supported		Power limit by classification
HTTP over IPv6	Supported		Power limit by management
SSH over IPv6	Supported		Total PoE Power budge (maximum 120W) limitation
IPv6 Telnet	Supported		Power feeding priority
IPv6 NTP, SNTP	Client		

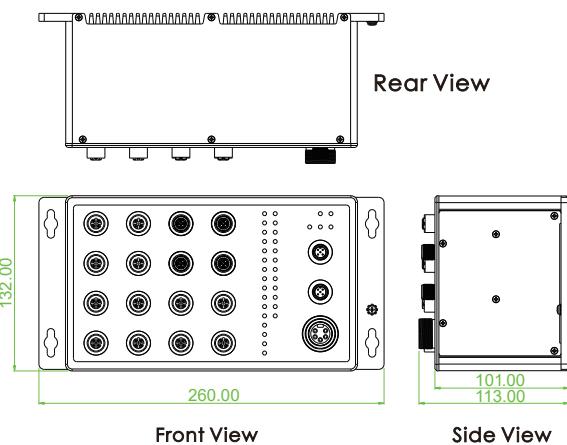
Application

Figure : ITP Series in Onboard Train Application

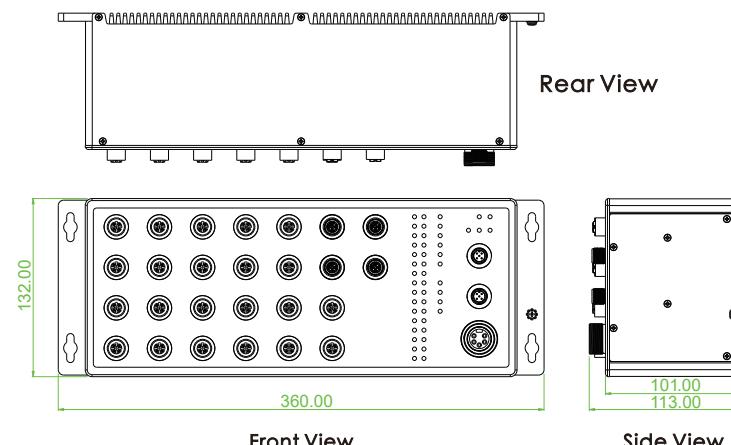


Dimensions

► ITP-1204GTM-12PH



► ITP-2204GTM-16PH



Ordering Information

Model Name	Managed	Protection	Total Port	FE Port	GbE Port		PoE Port		Redundant Dual Input Power (24/48/72/96/110VDC (16.8~137.5VDC)	
					D-code M12	GbE X-code M12 UTP	GbE X-code M12 UTP Bypass	IEEE802.3at		
ITP-1204GTM-12PHE-BP	V	IP54	16	12	2	2	2	12	120W	V
ITP-2204GTM-16PHE-BP	V	IP54	26	22	2	2	2	16	120W	V

Model Name	Certification					
	EN45545-2	EN50155	Safety EN62368-1	EEN50121-4	CE, FCC	IEC61373
ITP-1204GTM-12PHE-BP	V	V	V		V	V
ITP-2204GTM-16PHE-BP	V	V	V	V	V	V

■ Package List

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



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, EN62368-1, 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	UTP/STP Cat. 5e cable above EIA/TIA-568 100-ohm (100meter)
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 Dimensions	Rugged metal, IP40 protection housing, and fanless 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 Certification	5 years				
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				
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 EN61000-4-11 Voltage Dips				
Shock	IEC 61373				
Freefall	IEC 60068-2-32				
Vibration	IEC 61373				

Application

Figure 1 : EN50155 PoE switch in smart Bus application

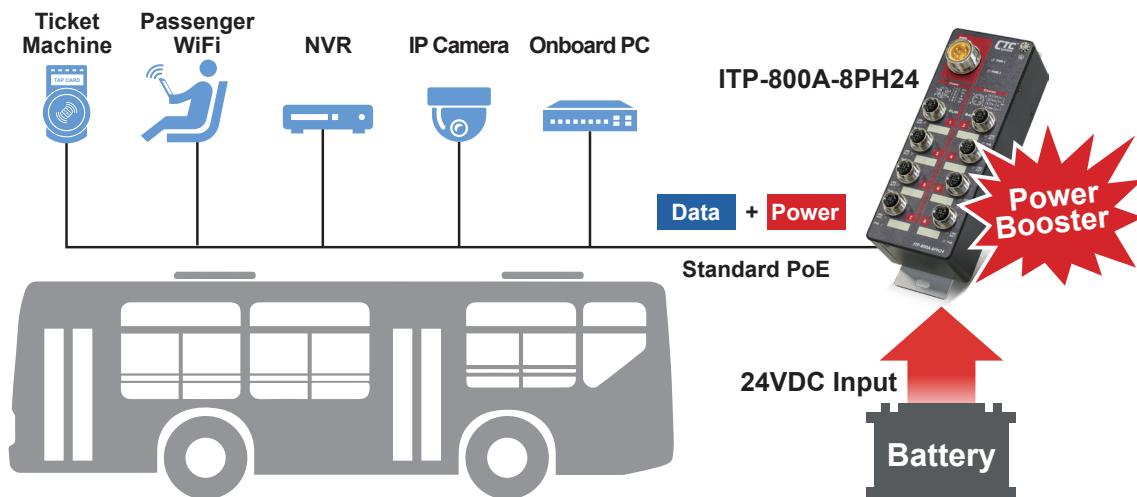
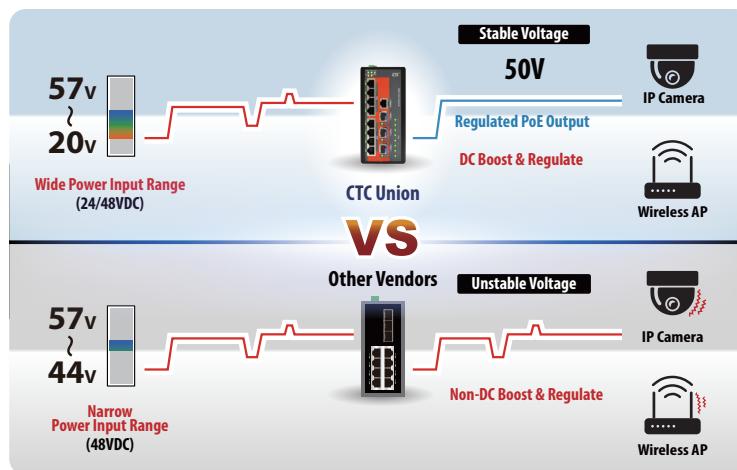
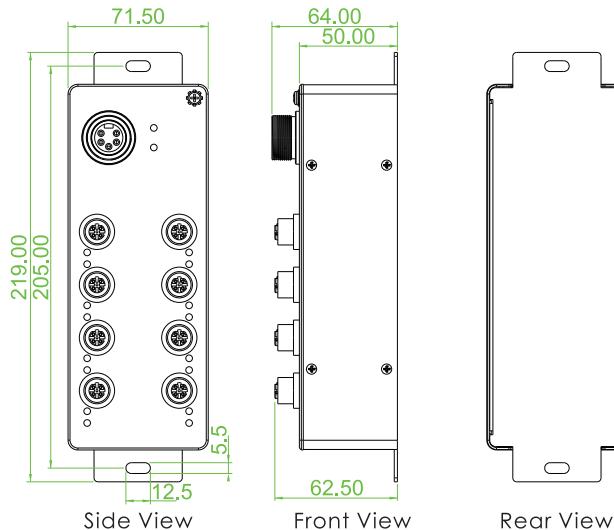


Figure 2 : High efficiency boost technology for PoE



- 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



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

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	EN50121-4	EN50155	CE, FCC	
ITP-800A-8PH24	8	8	8	120W	24/48VDC	V	V	V	V	V	-10~60°C
ITP-800A-8PH24	8	8	8	120W	24/48VDC	V	V	V	V	V	-40~75°C

■ Package List

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

ITP-800-8PH24

IP56, 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 for railway certified
- IP56 protection for water and dust



The ITP-800-8PH24 is an unmanaged PoE switch, that provides 8x 10/100Base-TX PoE+ Ethernet ports. The 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-800-8PH24 Ethernet switch is compliant with EN50155, covering operating temperature, power input voltage, surge, ESD, vibration, and shock, thus making the switch 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)
- CE, FCC, EN62368-1, EN50155 and EN50121-4 for railway certified
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified

Specifications

IEEE Standard	IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX Fast Ethernet IEEE 802.3x Flow Control and Back Pressure IEEE 802.3af PoE (Power over Ethernet) IEEE 802.3at PoE+ (Power over Ethernet enhancements)
Switch Architecture	Back-plane (Switching Fabric): 1.6Gbps (Full wire-speed)
Data Processing	Store and Forward
Flow Control	IEEE 802.3x flow control, back pressure flow control
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	UTP/STP Cat. 5e cable above EIA/TIA-568 100-ohm (100meter)
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) 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-800-8PH24) -40°C~75°C (ITP-800-8PHE24)				
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				
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				
Railway Traffic	CE				
EMS (Electromagnetic Susceptibility) Protection Level	EN50155 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 EN61000-4-11 Voltage Dips				
Shock	IEC 61373				
Freefall	IEC 60068-2-32				
Vibration	IEC 61373				

Application

Figure 1 : EN50155 PoE switch in Smart Bus application

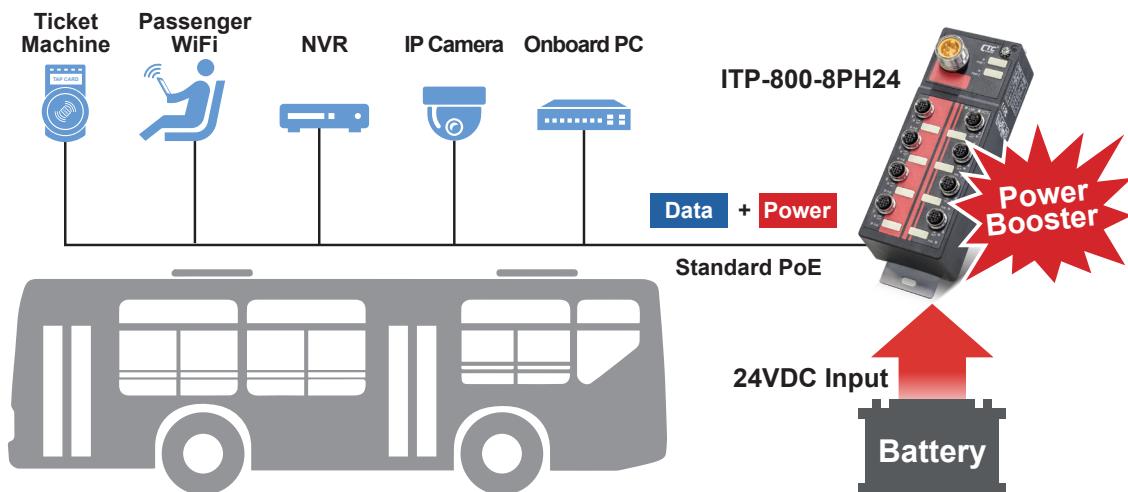
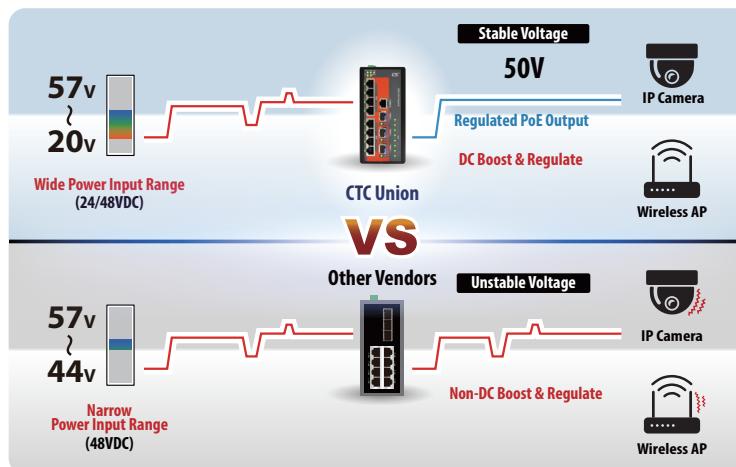
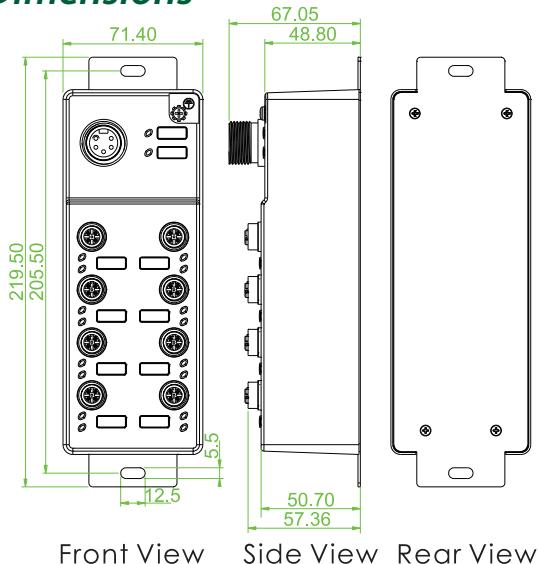


Figure 2 : High efficiency boost technology for PoE



- 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



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

Ordering Information

Model Name	Total Port	UTP Port M12 10/100Base-TX	PoE Port IEEE802.3at	PoE Total Power Budget	Power Input Redundant	Certification EN50155	Certification CE, FCC	Shock/Vibration IEC61373	Operating Temperature
ITP-800-8PH24	8	8	8	120W	24/48VDC	V	V	V	-10~60°C
ITP-800-8PHE24	8	8	8	120W	24/48VDC	V	V	V	-40~75°C

■ Package List

- ITP-800-8PH24 device
- Protective caps for UTP port
- Wall mount

ITP-G802SM & ITP-G802TM

◀ IP67, 8x GbE + 2x 100/1000Base SFP

▶ IP67, 8x GbE M12 + 2x GbE M12



- EN50155, EN45545-2, 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, 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
- Supports SmartView™ for Centralized Management*

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

Specifications

Standard	IEEE 802.3 IEEE 802.3u IEEE 802.3ab IEEE 802.3z IEEE 802.1d IEEE 802.1w IEEE 802.1s ITU-T G.8032 / Y.1344 ITU-T G.8031 / Y.1342 IEEE 802.1Q IEEE 802.1X IEEE 802.3ac IEEE 802.3ad IEEE 802.3x IEEE 802.3ac IEEE 802.1ad IEEE 802.1p IEEE 802.1ab IEEE 802.3az	10Base-T 10Mbit/s Ethernet 100Base-TX, 100Base-FX, Fast Ethernet 1000Base-T Gbit/s Ethernet over twisted pair 1000Base-X Gbit/s Ethernet over Fiber-Optic STP (Spanning Tree Protocol) RSTP (Rapid Spanning Tree Protocol) MSTP (Multiple Spanning Tree Protocol) ERPS (Ethernet Ring Protection Switching) EPS (Ethernet Protection Switching) Virtual LANs (VLAN) Port based and MAC based Network Access Control, Authentication Max frame size extended to 1522Bytes Link aggregation for parallel links with LACP(Link Aggregation Control Protocol) Flow control for Full Duplex Max frame size extended to 1522Bytes Stacked VLANs, Q-in-Q LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization Link Layer Discovery Protocol (LLDP) EEE (Energy Efficient Ethernet)	Network Connector	10x M12 (8-Pin, Female, A-Code) 10/100/1000Base-T UTP (ITP-G802TM) 8x M12(8-Pin, Female, A-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 Cat. 5e cable or above			EIA/TIA-568 100-ohm (100meter)
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			
Device Memory	16M Bytes Flash ROM, 128M Bytes RAM			
Power Supply	Provides 1x M23 (5-Pin, male) for redundant dual input, optional Low (L) Low voltage (L) : 12/24/48V (8.4~60VDC)			
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			

Power Consumption	ITP-G802SM-LL	ITP-G802TM-LL	Warranty	5 years
12VDC	8.5W	10.1W	Certification	
24VDC	9.2W	10.9W	EMC	CE
48VDC	11W	13.1W	EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay		Railway Traffic	EN50155
Alarm Relay Contact	5-pin A-code M12 male Relay outputs with current carrying capacity of 1 A @24VDC		Fire protection of railway vehicles	EN45545-2
Operating Temperature	-40 ~ 75°C		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
Operating Humidity	5% to 95% (Non-condensing)		Shock	IEC-61373
Storage Temperature	-40 ~ 85°C		Freefall	IEC 60068-2-32
Housing	Rugged Metal, Fanless , IP67 grade housing for against water, dust, and oil		Vibration	IEC-61373
Dimensions	69 x 240 x 168mm (D x W x H)			
Weight	2.645kg (ITP-G802SM-LL) 2.625kg (ITP-G802TM-LL)			
Installation Mounting	Wall mounting, or DIN Rail mounting (Optional)			
MTBF	443,868 Hours (ITP-G802SM-LL) 423,602 Hours (ITP-G802TM-LL) (MIL-HDBK-217)			

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(Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN
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
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Supported
QoS Feature	
Class of Service	IEEE802.1p 8 active priorities queues 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	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps"
Bandwidth Control for Egress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps" 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
Management Interface Access Filtering	Remote Authentication (via RADIUS / TACACS+)
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	TFTP, HTTP
sFlow	Supported
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 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)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
IEEE1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol LLDP-MED

IPv6 Features

IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries

for L2 / L3 / L4

L2: Mac address SA/DA/VLAN

L3: IP address SIP, Subnet (32bit)

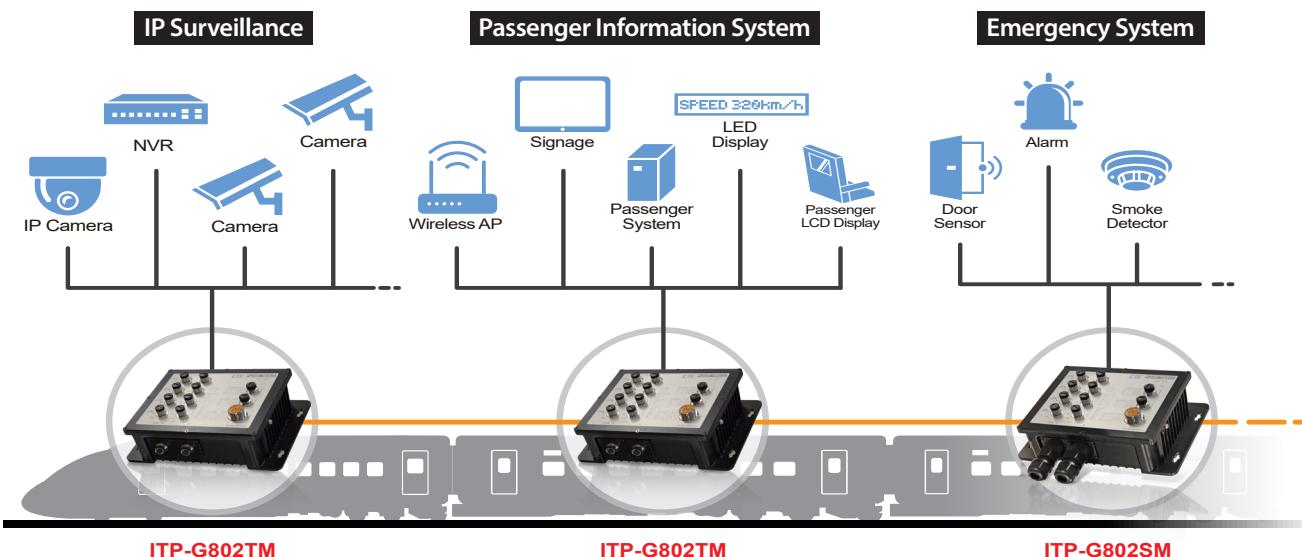
L4: TCP/UDP

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

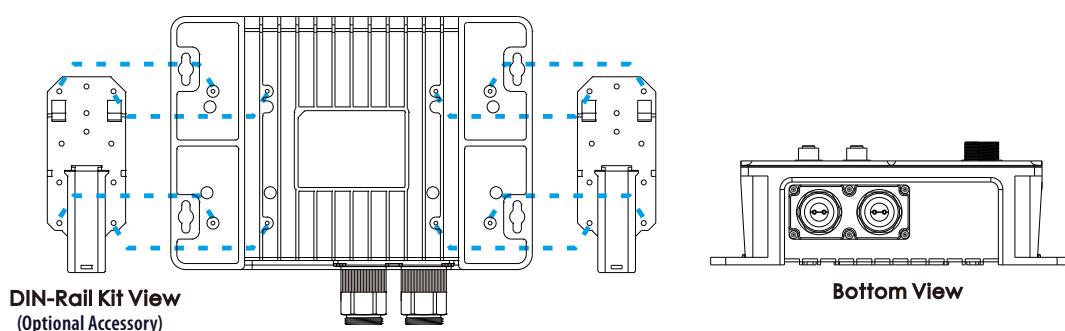
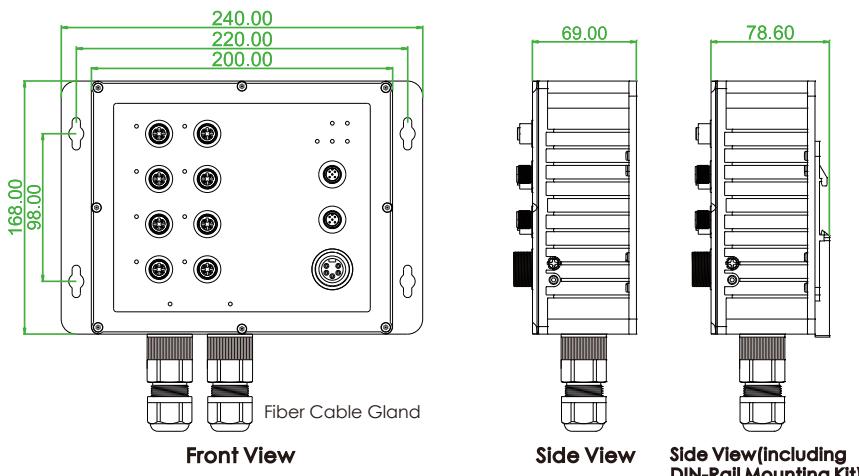
Application

Figure 1 : ITP Series in Onboard Train Application

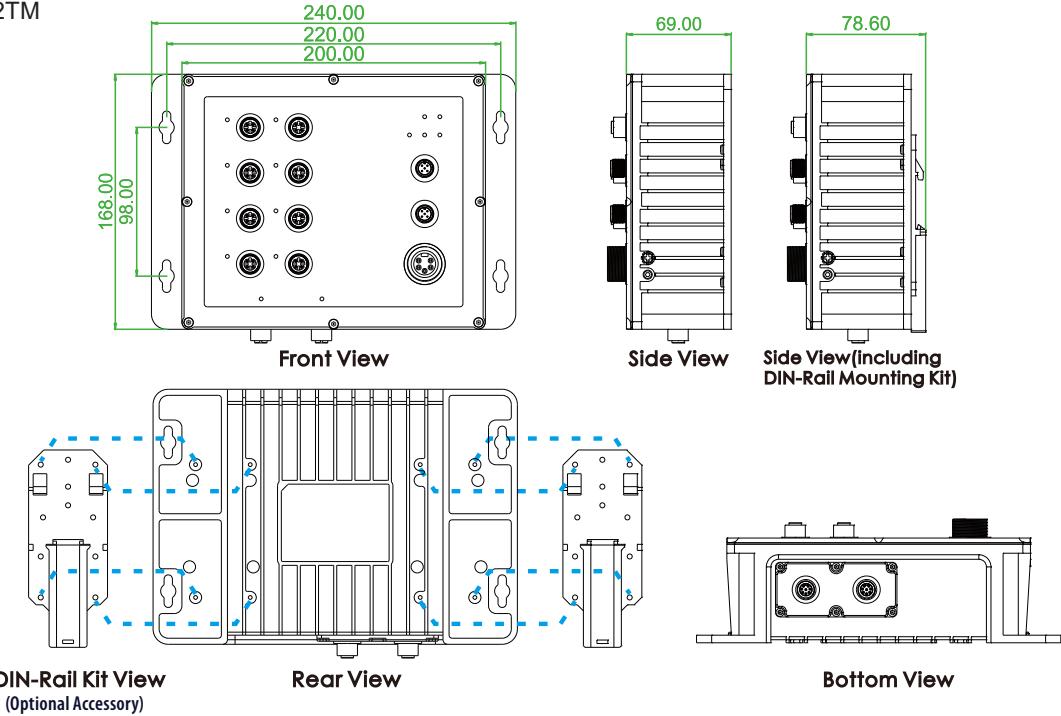


Dimensions

► ITP-G802SM



► ITP-G802TM

**Ordering Information**

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

Package List

- ITP-G802SM or ITP-G802TM device
- 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)

Optional Accessories**Industrial SFP Transceiver**

The ISFP series of industrial grade SFP modules have been fully tested with all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

Optional Cable/Connector & Din-Rail Kit

P/N: CAB-M12AM8-RJ45 M12 A-code Male (8-Pin) to RJ-45, AWG 24, IP67, 1 meter	P/N: CAB-M12AF5-OPEN M12 A-code Female (5-Pin) to open wire, AWG 22, IP67, 1 meter	P/N: CAB-M23F5-OPEN M23 Female (5-Pin) to open wire, (AWG 16), IP67, 1 meter
For GbE UTP (A-code model)	For Alarm	For Power
P/N: M12A-M8 M12 A-code Male (8-Pin) connector, IP67	P/N: M12A-F5 M12 A-code Female (5-Pin) connector, IP67	P/N: IND-DNK04 Din Rail Kit for Industrial, Wide: 52mm (130 X 52mm / 4 Screws) (2pcs/set)
For GbE UTP (A-code model)	For Alarm	For Power

ITP-802GSM & ITP-802GTM

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

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



- EN50155, EN45545-2, 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, 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
- Supports SmartView™ for Centralized Management*

*Please see Chapter 1- Software Management for more details

Specifications

Standard	IEEE 802.3 IEEE 802.3u IEEE 802.3ab IEEE 802.3z IEEE 802.1d IEEE 802.1w IEEE 802.1s ITU-T G.8032 / Y.1344 ITU-T G.8031 / Y.1342 IEEE 802.1Q IEEE 802.1X IEEE 802.3ac IEEE 802.3ad IEEE 802.3x IEEE 802.1ad IEEE 802.1p IEEE 802.1ab IEEE 802.3az	10Base-T 10Mbit/s Ethernet 100Base-TX, 100Base-FX, Fast Ethernet 1000Base-T/Gbit/s Ethernet over twisted pair 1000Base-X Gbit/s Ethernet over Fiber-Optic STP (Spanning Tree Protocol) RSTP (Rapid Spanning Tree Protocol) MSTP (Multiple Spanning Tree Protocol) ERPS (Ethernet Ring Protection Switching) EPS (Ethernet Protection Switching) Virtual LANs (VLAN) Port based and MAC based Network Access Control, Authentication Max frame size extended to 1522Bytes Link aggregation for parallel links with LACP(Link Aggregation Control Protocol) Flow control for Full Duplex Stacked VLANs, Q-in-Q LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization Link Layer Discovery Protocol (LLDP) 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) 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 Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)	
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	
Device Memory	16M Bytes Flash ROM, 128M Bytes RAM	
Power Supply	Provides 1x M23 (5-Pin, male) for redundant dual input, optional Low (L) Low voltage (L) : 12/24/48V (8.4~60VDC)	
Power Consumption		ITP-802GSM-LL ITP-802GTM-LL
	12VDC	6.9W
	24VDC	8.3W
	48VDC	9.8W
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay	
Alarm	5-pin A-code M12 male	
Relay Contact	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)	

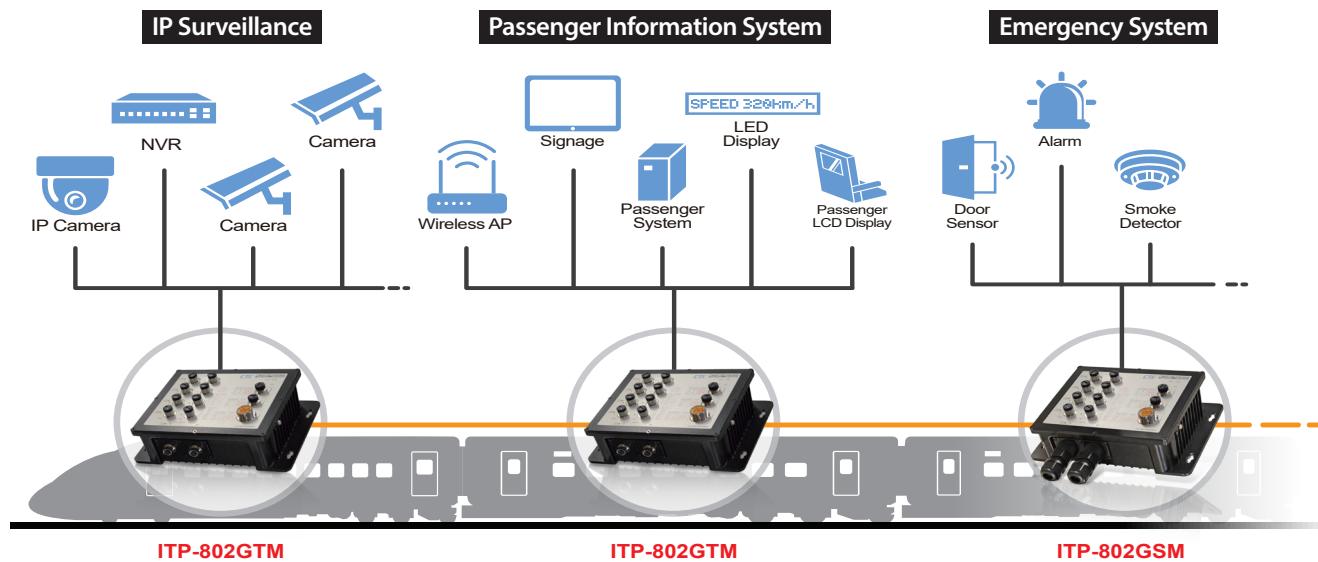
Weight	2.645kg (ITP-802GSM-LL) 2.625kg (ITP-802GTM-LL)	Fire protection of railway vehicles	EN45545-2
Installation Mounting	Wall mounting, or DIN Rail mounting (Optional)	EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
MTBF	443,868 Hours (ITP-802GSM-LL) 335,823 Hours (ITP-802GTM-LL) (MIL-HDBK-217)		EN61000-4-3 (RS) Level 3, Criteria A
Warranty	5 years		EN61000-4-4 (Burst) Level 3, Criteria A
Certification			EN61000-4-5 (Surge) Level 3, Criteria B
EMC	CE		EN61000-4-6 (CS) Level 3, Criteria A
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE		EN61000-4-8 (PFM, Magnetic Field) Field Strength: 300A/m, Criteria A
Railway Traffic	EN50155	Shock	IEC-61373
		Freefall	IEC 60068-2-32
		Vibration	IEC-61373

Software Specifications

Topology		RADIUS authentication & accounting	
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(Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN	TACACS+ authentication & accounting, TACACS+ 3.0	
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	HTTPS, HTTP	Supported
Spanning Tree	IEEE802.1d STP, IEEE802.1w RSTP, IEEE802.1s MSTP	SSL / SSH v2	Supported
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)	User Name Password Authentication	Local Authentication
Loop Protection	Supported	Management Interface Access Filtering	Remote Authentication (via RADIUS / TACACS+)
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms Single Ring, Sub-Ring, Multiple ring topology network	Management Features	Web, Telnet / SSH , CLI RS-232 console
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Supported	CLI	Cisco® like CLI
QoS Feature		Web Based Management	
Class of Service	IEEE 802.1p 8 active priorities queues per port	Telnet	Server
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	SNMP	TFTP, HTTP
Bandwidth Control for Ingress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps"	sFlow	Supported
Bandwidth Control for Egress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps" Rate Unit : bit Per queue / Per port shaper	Modbus/TCP	Supports for management and monitoring
DiffServ (RF 2474) Remarking		SW & Configuration Upgrade	TFTP, HTTP
Storm Control	for Unicast, Broadcast, Multicast	FTP client	Redundant firmware in case of upgrade failure
IP Multicasting Feature		RMON	Supports for upload/download configuration
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 Port Filtering Profile, Throttling	MIB II	RMON I (1, 2, 3, 9 group), RMON II
IGMP / MLD Snooping	Fast Leave Maximum Multicast Group : up to 1022 entries Query / Static Router Port	UPnP	
Security Features		BOOTP	
IEEE 802.1X	Port-Based, MAC-Based	DHCP	Server, Client, Relay, Relay option 82 , Snooping
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	RARP	Supported
		TTDP	Supported (Train Topology Discovery Protocol)
		IP Source Guard	Supported
		Port Mirroring	Supported
		Event Syslog	Syslog server (RFC3164)
		Warning Message	System syslog, e-mail, alarm relay
		DNS	Client, Proxy
		IEEE1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
		NTP, SNTP	Client
		LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol
		IPv6 Features	
		IPv6 Management	LLDP-MED
		SNMP over IPv6	
		HTTP over IPv6	
		SSH over IPv6	
		IPv6 Telnet	
		IPv6 NTP, SNTP	
		IPv6 TFTP	
		IPv6 QoS	
		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 (32bit) 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
		Cable Diagnostic	LED Power Management :Adjustment LEDs intensity Measuring UTP Cable OK or broken point distance

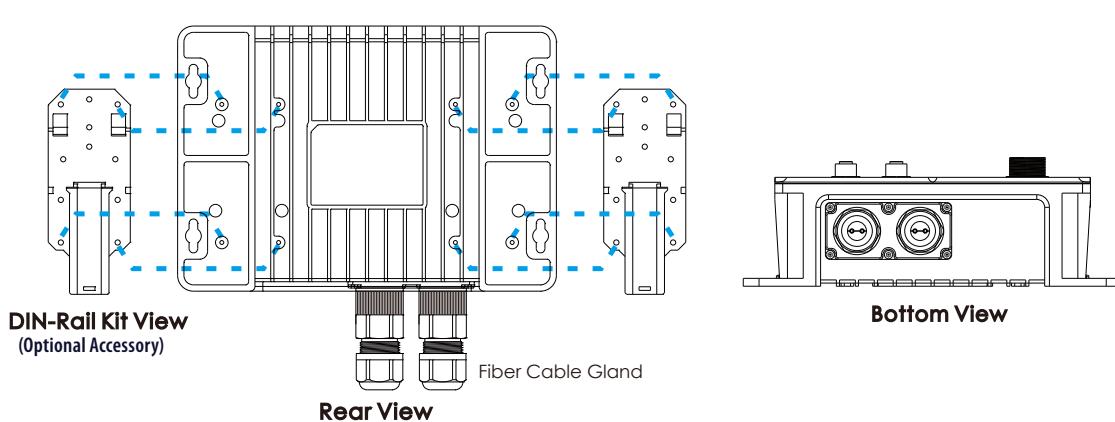
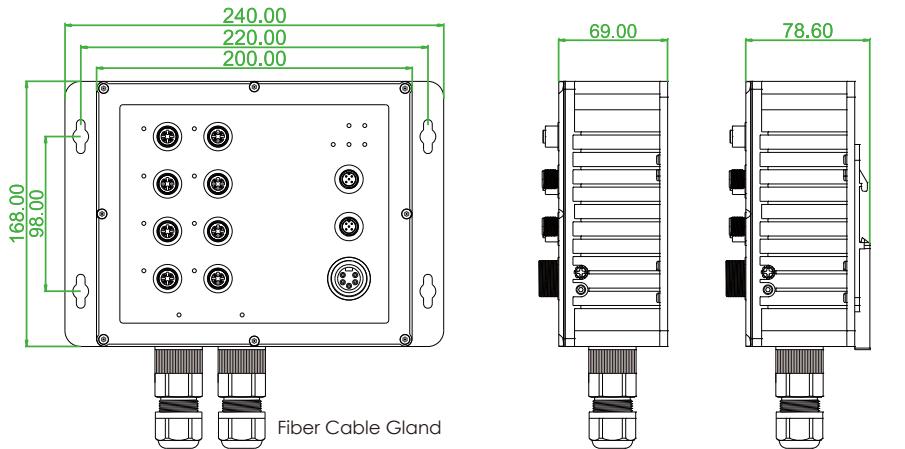
Application

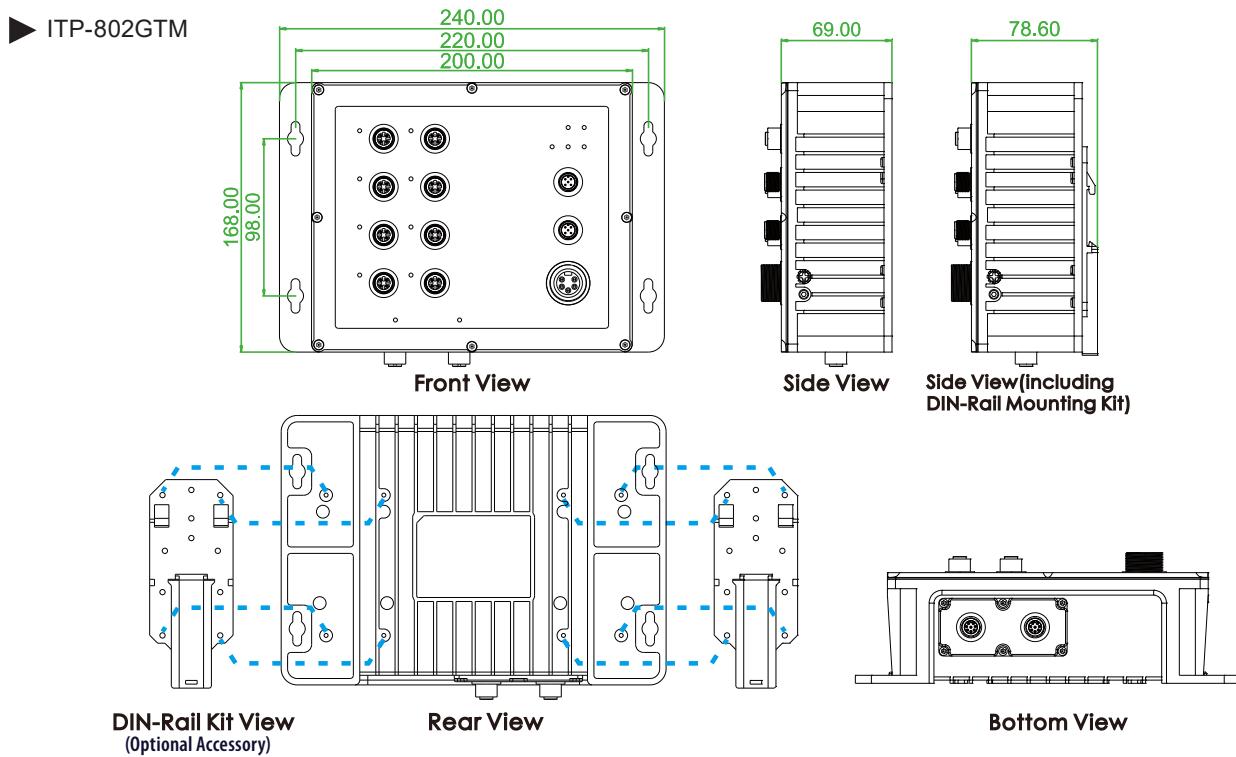
Figure 1 : ITP Series in Onboard Train Application



Dimensions

► ITP-802GSM





Ordering Information

Model Name	Managed	IP67	Total Port	UTP Port M12	SFP or UTP	Redundant Power Supply	Certification		Shock/Vibration	Operating Temperature
				10/100M Base-TX	100/1000M Base-X		EN50155	CE FCC		
ITP-802GSM-ELL	V	V	10	8	2 SFP	2	V	V	V	-40~75°C
ITP-802GTM-ELL	V	V	10	8	2 UTP (A-code)	2	V	V	V	-40~75°C

Package List

- ITP-802GSM or ITP-802GTM device
- 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)

Optional Accessories

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

Optional Cable/Connector & Din-Rail Kit

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 X 52mm / 4 Screws) (2pcs/set)

ITP-1204GTM & ITP-2204GTM

◀ 12x 10/100Base M12+ 4x GbE M12

▶ 22x 10/100Base M12+ 4x GbE M12



- EN50155, EN45545-2, EN62368-1 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.8031 ERP, 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
- Supports SmartView™ for Centralized Management*

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

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet	Data Processing	Store and Forward
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet	Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode
	IEEE 802.3ab	1000Base-TGb/s Ethernet over twisted pair	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)
	IEEE 802.1d	STP (Spanning Tree Protocol)	Console	RS-232 (5-pin A-Code M12 male)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)	Network Cable	UTP/STP Cat. 5e cable or above
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)		EIA/TIA-568 100-ohm (100meter)
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)	Protocols	CSMA/CD
	ITU-T G.8031 / Y.1342	EPS (Ethernet Protection Switching)	Reverse Polarity Protection	Supported
	IEEE 802.1Q	Virtual LANs (VLAN)	Overload Current Protection	Supported
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication	CPU Watch Dog	Supported
	IEEE 802.3ac	Max frame size extended to 1522Bytes	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)
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)	Jumbo Frame	9.6KB
	IEEE 802.1AX	Link aggregation for parallel links with LACP (Link Aggregation Control Protocol)	MAC Address Table	8K
	IEEE 802.3x	Flow control for Full Duplex	Memory Buffer	512K Bytes for packet buffer
	IEEE802.3ac	Max frame size extended to 1522Bytes	Device Memory	16M Bytes Flash ROM, 128M Bytes RAM
	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)		

Power Supply	Provides 1x M23 (5-Pin, male) for redundant dual DC 24/48/72/96/110VDC (16.8~137.5VDC) wide input power	Warranty	5 years																
Power Consumption	ITP-1204GTM ITP-2204GTM	Certification																	
	<table border="1"> <thead> <tr> <th>Input Voltage</th> <th>Device Power Consumption</th> </tr> </thead> <tbody> <tr> <td>24VDC</td> <td>13W</td> </tr> <tr> <td>48VDC</td> <td>14W</td> </tr> <tr> <td>110VDC</td> <td>16.5W</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Input Voltage</th> <th>Device Power Consumption</th> </tr> </thead> <tbody> <tr> <td>24VDC</td> <td>17.1W</td> </tr> <tr> <td>48VDC</td> <td>17.8W</td> </tr> <tr> <td>110VDC</td> <td>19.8</td> </tr> </tbody> </table>	Input Voltage	Device Power Consumption	24VDC	13W	48VDC	14W	110VDC	16.5W	Input Voltage	Device Power Consumption	24VDC	17.1W	48VDC	17.8W	110VDC	19.8	CE (EN55024, EN55032)	
Input Voltage	Device Power Consumption																		
24VDC	13W																		
48VDC	14W																		
110VDC	16.5W																		
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	EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE																
Alarm Relay Contact	5-pin A-code M12 male Relay outputs with current carrying capacity of 1 A @24VDC	Railway Traffic	EN50155																
Operating Temperature	-40 ~ 75°C	Fire protection of railway vehicles	EN 45545-2																
Operating Humidity	5% to 95% (Non-condensing)	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																
Storage Temperature	-40 ~ 85°C																		
Housing	Rugged Metal, Fanless, IP54 grade housing protection	Hi pot protection	DC 2.25KV for power to chassis ground, Ethernet port to chassis ground																
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)	4KV surge protection	Supported for UTP port																
Weight	2.8kg (ITP-1204GTM) 3.9kg (ITP-2204GTM)	Safety	EN62368-1																
Installation Mounting	Wall mounting	Shock	IEC-61373																
MTBF	290,905 Hours (ITP-1204GTM) 230,352 Hours (ITP-2204GTM) (MIL-HDBK-217)	Freefall	IEC 60068-2-32																
		Vibration	IEC-61373																

Software Specifications

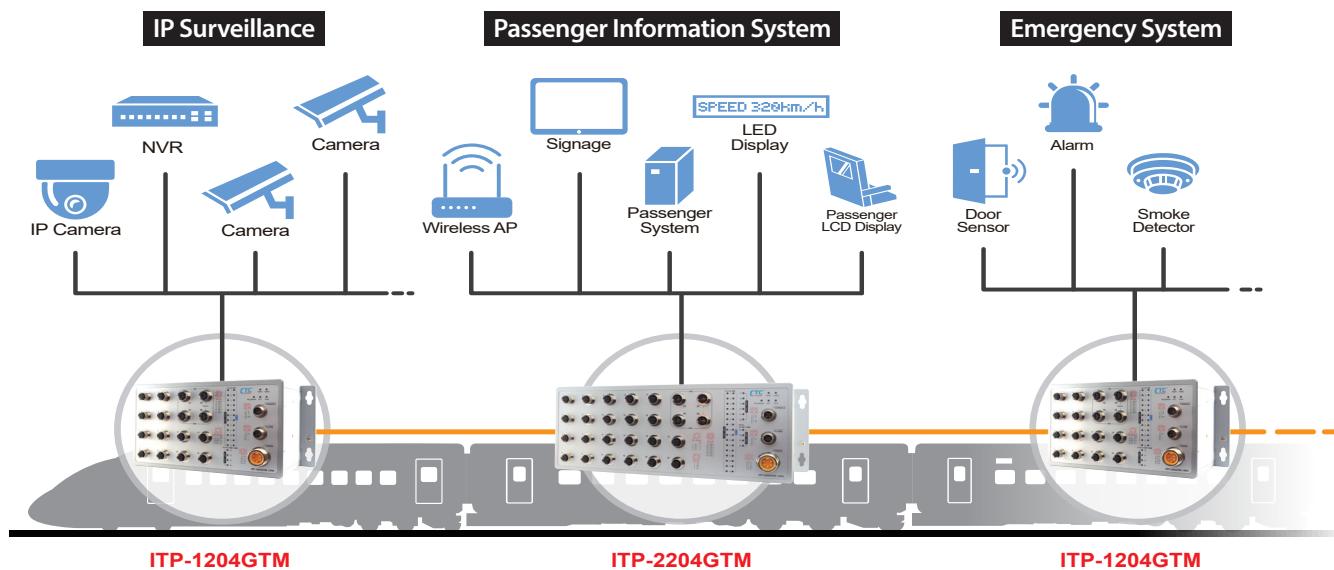
Topology		IP Multicasting Feature	
VLAN	IEEE 802.1q VLAN, up to 4094 802.1Q VLAN VID IEEE 802.1q VLAN, up to 4094 Groups IEEE 802.1ad Q-in-Q MAC-based VLAN, up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN(Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN	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
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 Support IEEE802.1AX passive and active mode	Security Features	Port-Based, MAC-Based
Spanning Tree	IEEE802.1d STP, IEEE802.1w RSTP, IEEE802.1s MSTP	IEEE 802.1X	Number of rules : up to 256 entries
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)	ACL	for L2 / L3 / L4 L2: Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
Loop Protection	Supported	RADIUS authentication & accounting	TACACS+ authentication & accounting, TACACS+ 3.0
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <10ms Single Ring, Sub-Ring, Multiple ring topology network	HTTPS, HTTP	Supported
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Supported	SSL / SSH v2	Supported
QoS Feature		User Name Password Authentication	Local Authentication
Class of Service	IEEE802.1p 8 active priorities queues per port	Management Interface Access Filtering	Remote Authentication (via RADIUS / TACACS+)
Traffic Classification QoS	IEEE802.1p based CoS IP Precedence based CoS IP DSCP based CoS	Management Features	Web, Telnet / SSH, CLI, RS-232 console
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	CLI	Cisco® like CLI
Bandwidth Control for Ingress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps"	Web Based Management	
Bandwidth Control for Egress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps" Rate Unit : bit Per queue / Per port shaper	Telnet	Server
DiffServ (RF 2474) Remarking		SNMP	V1, V2c, V3
Storm Control	for Unicast, Broadcast, Multicast	sFlow	Supported
		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 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)
		Warning Message	System syslog, e-mail, alarm relay
		DNS	Client, Proxy
		IEEE1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
		NTP, SNTP	Client
		LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol LLDP-MED

IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries for L2 / L3 / L4 L2: Mac address SA/DA/VLAN L3: IP address SIP, Subnet (32bit) L4: TCP/UDP

Others Features	
Green Ethernet	Supports IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering the power for ports with short cables
	Lower the power for a port when there is no link LED Power Management :Adjustment LEDs intensity
Cable Diagnostic	Measuring UTP cable OK or broken point distance

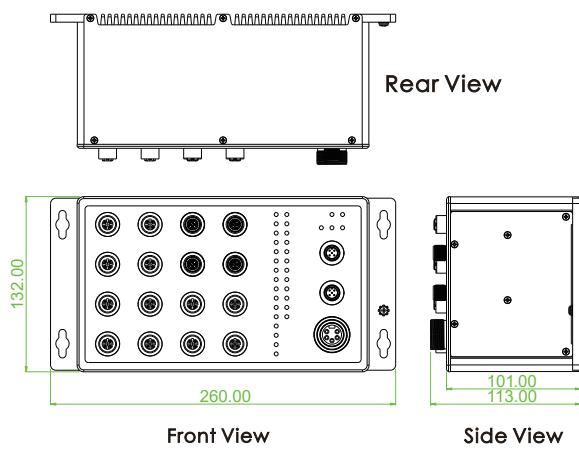
Application

Figure : ITP Series in Onboard Train Application

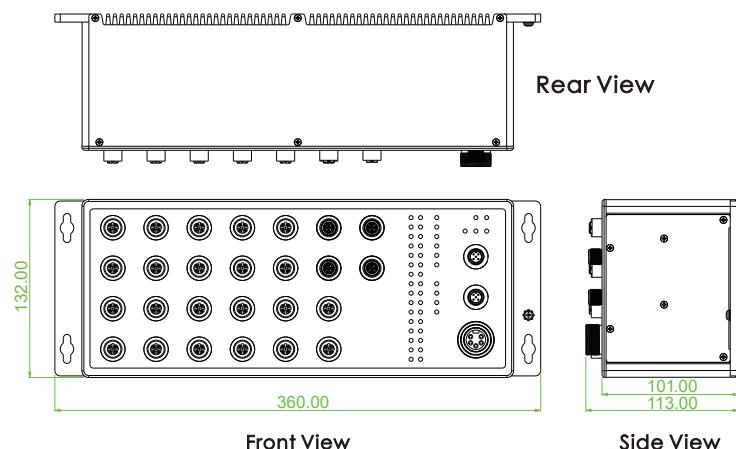


Dimensions

► ITP-1204GTM



► ITP-2204GTM



Ordering Information

Model Name	Managed	Protection	Total Port	FE Port	GbE Port		Redundant Dual Input Power
				D-Code M12	GbE X-code M12 UTP	GbE X-code M12 UTP Bypass	24/48/72/96/110VDC (16.8~137.5VDC)
ITP-1204GTM-E-BP	V	IP54	16	12	2	2	V
ITP-2204GTM-E-BP	V	IP54	26	22	2	2	V

Model Name	Certification				
	EN45545-2	EN50155	Safety EN62368-1	CE, FCC	IEC61373
ITP-1204GTM-E-BP	V	V	V	V	V
ITP-2204GTM-E-BP	V	V	V	V	V

■ Package List

- ITP-1204GTM or ITP-2204GTM 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-500 & ITP-800

IP56, 5/8x 10/100Base M12



- M12 connector for Ethernet and Power
- Slim and Fanless Design
- Build-in 2 bypass port (ITP-800)
- EN50155 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

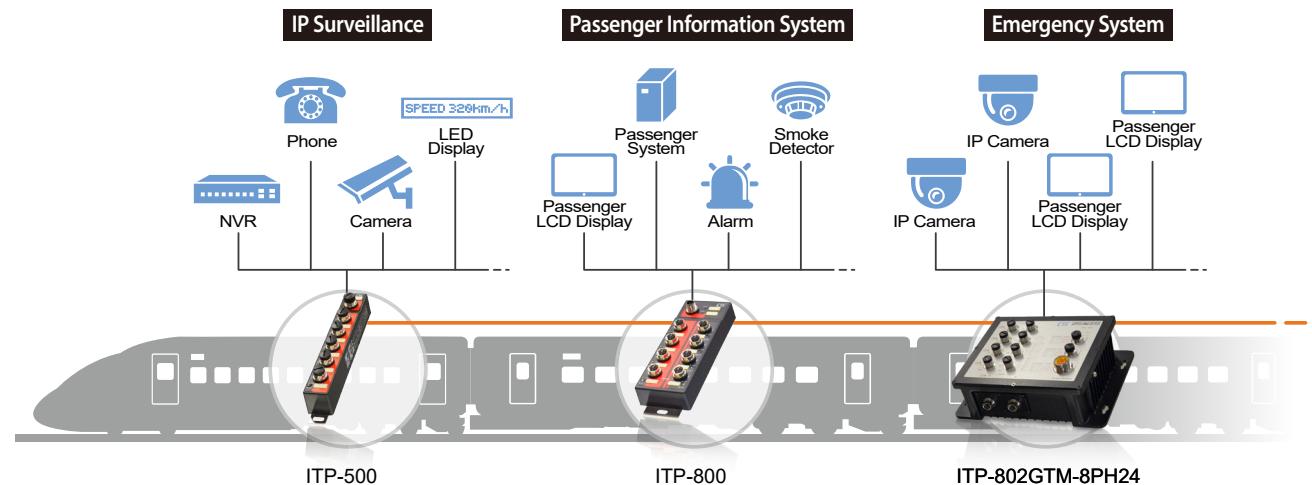
- Use M12 connector anti vibration and shock for vehicle, rolling stock, and railway applications
- Slim design
- Build-in 2 bypass port to avoid one or more nodes power fail in a bus structure to collapse the network (ITP-800)
- Redundant dual DC input power 12/24/48VDC (8.4~60VDC) (ITP-800)
- DC input 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	Operating Temperature	-40°C~75°C												
Switch Architecture	Back-plane (Switching Fabric): 1Gbps (ITP-500) Back-plane (Switching Fabric): 1.6Gbps (ITP-800) (Full wire-speed)	Operating Humidity	5% to 95% (Non-condensing)												
Data Processing	Store and Forward	Storage Temperature	-40°C~85°C												
Flow Control	IEEE 802.3x flow control, back pressure flow control	Housing	IP56 Rugged housing, and fanless												
MAC Address Table	1 K	Dimensions	44.3 x 33 x 213 mm (D x W x H) (ITP-500) 40.3 x 68 x 198 mm (D x W x H) (ITP-800)												
Packet Buffer Size	448Kbits	Weight	150g (ITP-500) 300g (ITP-800)												
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)	Installation Mounting	Wall mounting												
Network Cable	UTP/STP Cat. 5e cable above EIA/TIA-568 100-ohm (100meter)	MTBF	2,315,383 Hours (ITP-500) 1,492,660 Hours (ITP-800) (MIL-HDBK-217)												
Protocols	CSMA/CD	Warranty	5 years												
LED	Per unit: Power 1 (Green), Power 2 (Green) (ITP-800) Per unit: Power (Green) (ITP-500) Per port: Link/Active (Green)	Certification													
Reverse Polarity Protection	Present for power input	EMC	CE												
Overload Current Protection	Supported	EMI	FCC, FCC Part 15 Subpart B Class A, CE												
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)	Railway Traffic	EN50155												
Power Connector	5 Pin Male A-Code M12	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												
Power Consumption	<table border="1"> <thead> <tr> <th>Input Voltage</th> <th>ITP-500</th> <th>ITP-800</th> </tr> </thead> <tbody> <tr> <td>12VDC</td> <td>0.8W</td> <td>1.8W</td> </tr> <tr> <td>24VDC</td> <td>1.0W</td> <td>2.2W</td> </tr> <tr> <td>48VDC</td> <td>1.9W</td> <td>3.4W</td> </tr> </tbody> </table>	Input Voltage	ITP-500	ITP-800	12VDC	0.8W	1.8W	24VDC	1.0W	2.2W	48VDC	1.9W	3.4W	Shock	EN 61000-4-11 Voltage Dips
Input Voltage	ITP-500	ITP-800													
12VDC	0.8W	1.8W													
24VDC	1.0W	2.2W													
48VDC	1.9W	3.4W													
		Freefall	IEC 60068-2-32												
		Vibration	IEC 61373												

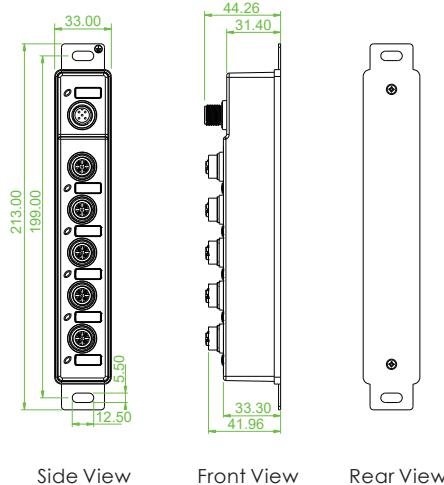
Application

Figure 1 : ITP Series in Onboard Train Application



Dimensions

► ITP-500

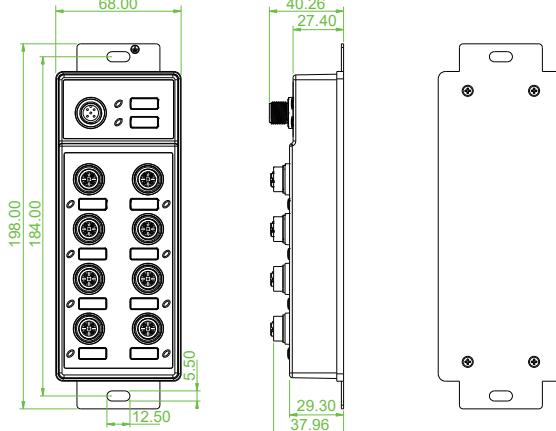


Side View

Front View

Rear View

► ITP-800



Side View

Front View

Rear View

Ordering Information

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

■ 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

ITP-800A

8x 10/100Base M12



- M12 connector for Ethernet and Power
- EN50155, 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

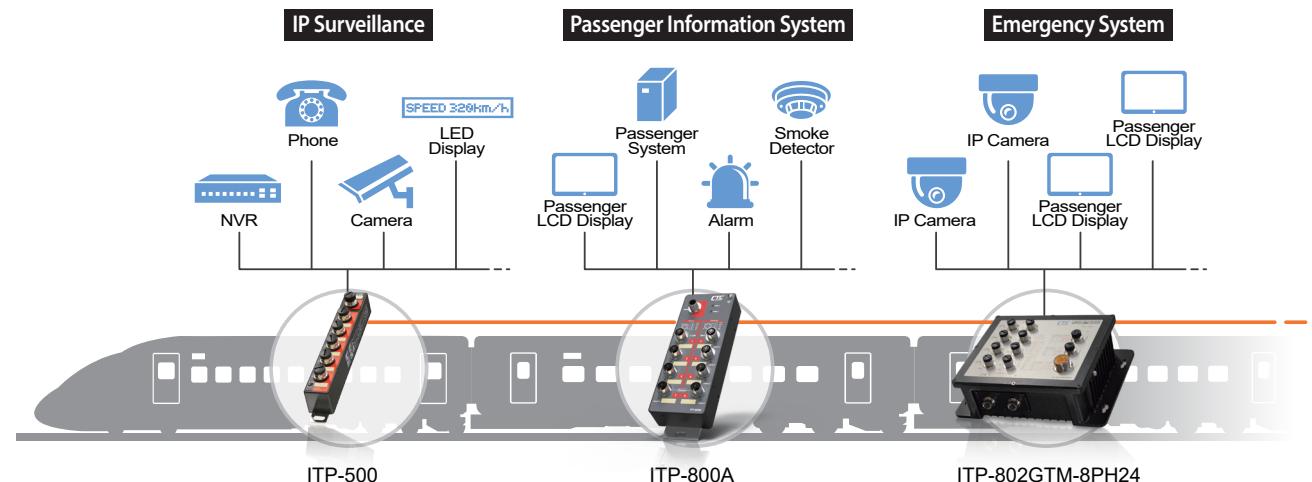
- Use M12 connector anti vibration and shock for vehicle, rolling stock, and railway applications
- Build-in 2 bypass port to avoid one or more nodes power fail in a bus structure to collapse the network
- Redundant dual DC input power 12/24/48VDC (8.4~60VDC)
- Rugged metal, IP40 protection and fanless 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

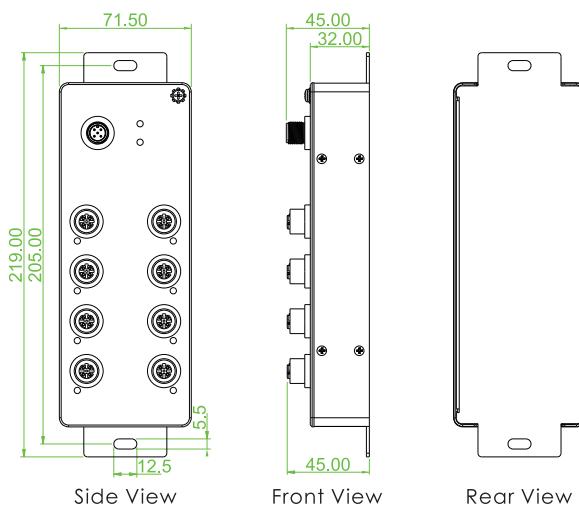
IEEE Standard	IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX Fast Ethernet IEEE 802.3x Flow Control and Back Pressure	Operating Temperature	-40°C~75°C								
Switch Architecture	Back-plane (Switching Fabric): 1.6Gbps (Full wire-speed)	Operating Humidity	5% to 95% (Non-condensing)								
Data Processing	Store and Forward	Storage Temperature	-40°C~85°C								
Flow Control	IEEE 802.3x flow control, back pressure flow control	Housing	Rugged metal housing, IP40 protection and fanless								
MAC Address Table	1 K	Dimensions	45x 71.5x 219 mm (D x W x H)								
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	Weight	420g								
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)	Installation Mounting	Wall mounting								
Protocols	CSMA/CD	MTBF	1,492,660 Hours (MIL-HDBK-217)								
LED	Per unit: Power 1 (Green), Power 2 (Green) Per port: Link/Active (Green)	Warranty	5 years								
Reverse Polarity Protection	Present for power input	Certification	CE (EN55024, EN55032) FCC, FCC Part 15 Subpart B Class A, CE EN50155 EN45545-2								
Overload Current Protection	Supported	EMC	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								
Power Supply	Redundant Dual DC 12/24/48V (8.4~60VDC) Input power	Railway Traffic	EN 61000-4-11 Voltage Dips								
Power Connector	5 Pin Male A-Code M12	Fire Protection of Railway Vehicles	IEC 61373								
Power Consumption	<table border="1"> <thead> <tr> <th>Input Voltage</th> <th>ITP-800A</th> </tr> </thead> <tbody> <tr> <td>12VDC</td> <td>1.8W</td> </tr> <tr> <td>24VDC</td> <td>2.2W</td> </tr> <tr> <td>48VDC</td> <td>3.4W</td> </tr> </tbody> </table>	Input Voltage	ITP-800A	12VDC	1.8W	24VDC	2.2W	48VDC	3.4W	Shock	IEC 60068-2-32
Input Voltage	ITP-800A										
12VDC	1.8W										
24VDC	2.2W										
48VDC	3.4W										
		Vibration	IEC 61373								

Application

Figure 1 : ITP Series in Onboard Train Application



Dimensions



Ordering Information

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

Package List

- ITP-800A-E device
- Protective caps for UTP port and power
- Wall mount

Optional Accessories

Optional Cable/Connector

P/N: CAB-M12DM4-RJ45 M12 D-code Male (4-Pin) to RJ-45, AWG 24, IP67, 1 meter	P/N: CAB-M12AF5-OPEN M12 A-code Female (5-Pin) to open wire, AWG 22, 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
For FE UTP	For Power	For FE UTP	For Power

IVS-802GT-8PH24

8x FE RJ45 with 8x PoE + 2x GbE RJ45, 12/24/48VDC , E-Mark

NEW



- **E-Mark**, CE, FCC certified
- 12/24/48VDC 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



The E-Mark or e-Mark is a European conformity mark that certifies that a vehicle or vehicle component complies with EU regulations, laws and directives. CTC IVS-802GT-8PH24 Ethernet switch supports 8x 10/100Mbps PoE+ ports plus 2x 1GbE non PoE ports. With an input power range of 12/24/48VDC, this switch is suitable for vehicle battery power supplies and is e-Mark certified to ensure adequate safety, meeting all environmental requirements for installation in vehicles.

4

Features

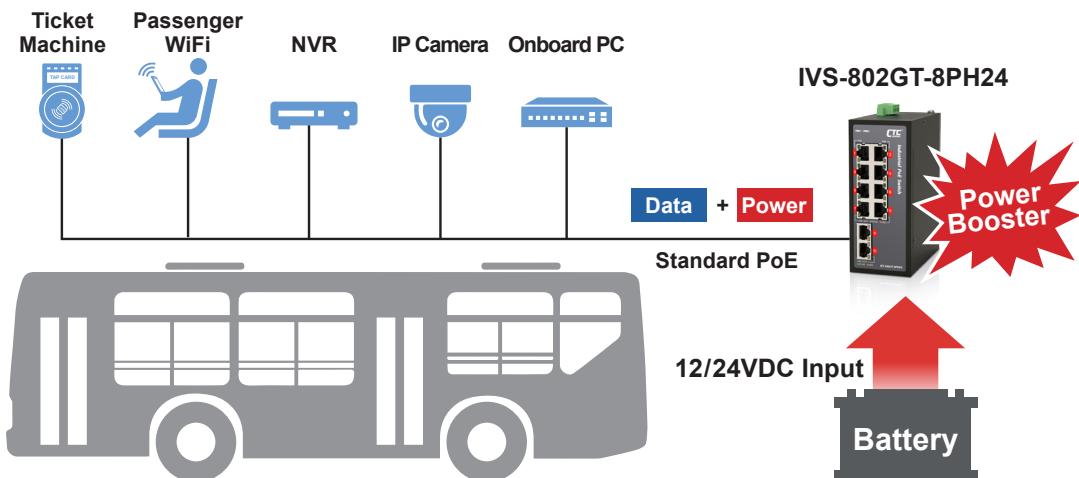
- Provides 8x IEEE 802.3at/af PoE+ output, 30W/per port
- Supports flow control
- Jumbo frame support
- IP30 rugged metal housing and fanless
- Wide operating temperature -40 ~ 75°C ("E" model)

Specifications

IEEE Standard	IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX Fast Ethernet IEEE 802.3ab 1000Base-T Gigabit Ethernet IEEE 802.3x Flow Control and Back Pressure IEEE 802.3af PoE (Power over Ethernet) IEEE 802.3at PoE+ (Power over Ethernet enhancements)	PoE Power Budget	Total 180W @48VDC Input, 30W/port Total 120W @24VDC input, 30W/port Total 60W @12VDC input, 30W/port
Switch Architecture	Back-plane (Switching Fabric): 5.6Gbps Full wire-speed	Removable Terminal Block	Provides 2 Redundant power, 4 pin
Data Processing	Store and Forward	Operating Temperature	-10 ~ 60°C (IVS-802GT-8PH24) -40 ~ 75°C (IVS-802GT-8PHE24)
Flow Control	IEEE 802.3x flow control, back pressure flow control	Operating Humidity	5% to 95% (Non-condensing)
Jumbo Frame	9K Bytes	Dimensions	106 x 55.5 x 135mm (D x W x H)
MAC Address Table	4K	Housing	Rugged Metal, IP30 Protection, Fanless
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)	Weight	TBD
Network Connector	8x 10/100Base-TX RJ45, and 2x 10/100/1000Base-T(X) RJ45 auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex	Installation Mounting	DIN Rail mounting, or wall mounting (Optional accessories)
Network Cable	UTP/STP Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)	MTBF	TBD (MIL-HDBK-217)
Protocols	CSMA/CD	Warranty	5 years
LED	Per unit: Power 1 (Green), Power 2 (Green) Per port: 10/100 Link/Active (Green) 1000 Link/Active (Amber) Per Port PoE LED • Active : ON • Inactive : OFF	Certification	CE (EN55032, EN55035)
Reverse Polarity Protection	Supported for Power Input	EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE EN55022 Class A
Overload Current Protection	Supported	Vehicle	E-Mark @ 24VDC
Power Supply	Redundant Dual DC 12/24/48VDC (9.6~57VDC) 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)	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
Power Consumption	TBD	Shock	IEC 60068-2-27
		Freefall	IEC 60068-2-32
		Vibration	IEC 60068-2-6

Application

Figure 1 : PoE switch in smart Bus application



Dimensions

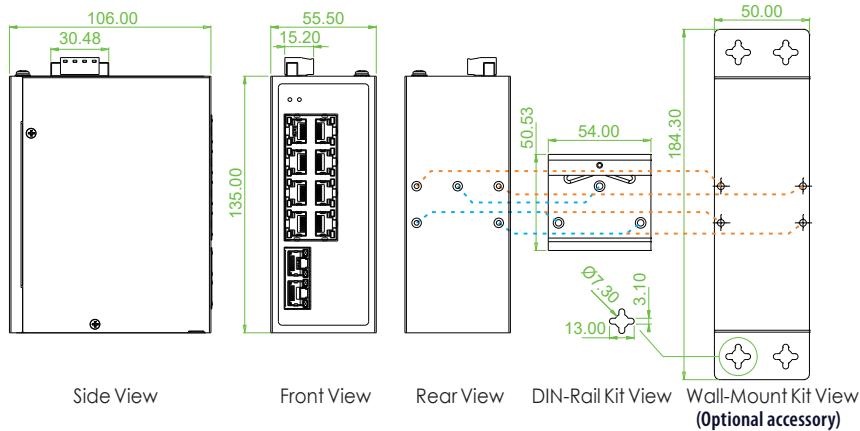
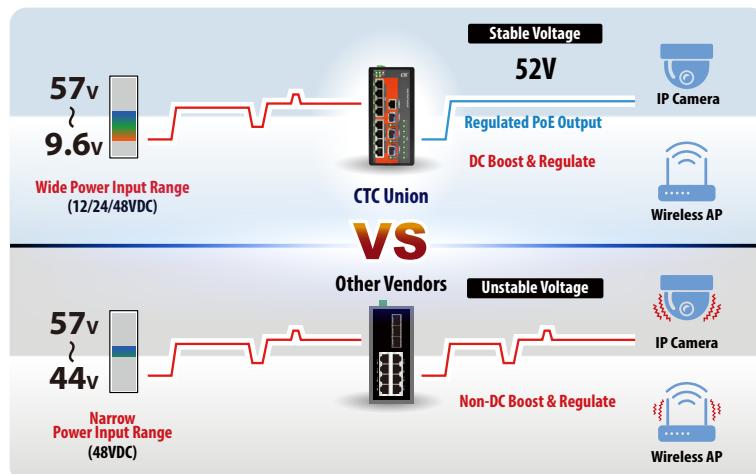


Figure 2 : High efficiency boost technology for PoE



- Regulated PoE output voltage (52VDC) to stabilize PoE device
- Guarantee delivery PoE power distance to 100 meters
- Wide range input power 12/24/48VDC (9.6~57VDC)
- Built-in very high efficiency (94~97%) to boost PoE output voltage

Ordering Information

Model Name	Total Port	RJ45 UTP Port		PoE Port		Input Power	Certification		Operating Temperature
		10/100/1000 Base-T(X)	10/100Base-TX	IEEE802.3at	PowerBudget		Redundant	EMark	
IVS-802GT-8PH24	10	2	8	8	180W @48VDC 120W @24VDC 60W @12VDC	12/24/48VDC	V	V	-10~60°C
IVS-802GT-8PHE24	10	2	8	8	180W @48VDC 120W @24VDC 60W @12VDC	12/24/48VDC	V	V	-40~75°C

Package List

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

Optional Accessories

Industrial Power Supply

NDR-240-48

Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 240W, -20 ~ +70°C

IVS-G802T-8PH24

10x GbE RJ45 with 8x PoE ,12/24/48VDC , E-Mark

NEW



- **E-Mark**, CE, FCC certified
- 12/24/48VDC 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



The E-Mark or e-Mark is a European conformity mark that certifies that a vehicle or vehicle component complies with EU regulations, laws and directives. CTC IVS-G802T-8PH24 Ethernet switch supports 8 x 1GbE PoE+ ports plus 2 x 1GbE non-PoE ports. With an input power range of 12/24/48VDC, this switch is suitable for vehicle battery power supplies and is e-Mark certified to ensure adequate safety, meeting all environmental requirements for installation in vehicles.

4

E-Mark Certified PoE Switch

IVS-G802T-8PH24

Features

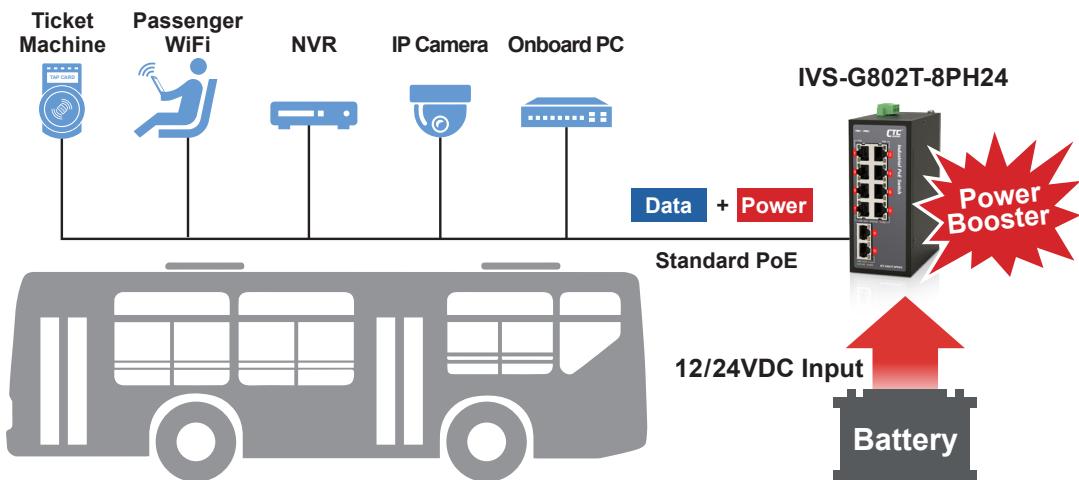
- Provides 8x IEEE 802.3at/af PoE+ output, 30W/per port
- Supports flow control
- Jumbo frame support
- IP30 rugged metal housing and fanless
- Wide operating temperature -40 ~ 75°C ("E" model)

Specifications

IEEE Standard	IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX Fast Ethernet IEEE 802.3ab 1000Base-T Gigabit Ethernet IEEE 802.3x Flow Control and Back Pressure IEEE 802.3af PoE (Power over Ethernet) IEEE 802.3at PoE+ (Power over Ethernet enhancements)	PoE Power Budget	Total 180W @48VDC, 30W/port Total 120W @24VDC, 30W/port Total 60W @12VDC, 30W/port
Switch Architecture	Back-plane (Switching Fabric): 20Gbps Full wire-speed	Removable Terminal Block	Provides 2 Redundant power, 4 pin
Data Processing	Store and Forward	Operating Temperature	-10 ~ 60°C (IVS-G802T-8PH24) -40 ~ 75°C (IVS-G802T-8PHE24)
Flow Control	IEEE 802.3x flow control, back pressure flow control	Operating Humidity	5% to 95% (Non-condensing)
Jumbo Frame	9K Bytes	Dimensions	106 x 55.5 x 135mm (D x W x H)
MAC Address Table	4K	Housing	Rugged Metal, IP30 Protection, Fanless
PoE standard & RJ-45 Pin Assignment	8xIEEE 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)	Weight	TBD
Network Connector	10x RJ-45 10/100/1000Base-T auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex	Installation Mounting	DIN Rail mounting, or wall mounting (Optional accessories)
Network Cable	UTP/STP Cat. 5e cable or above	MTBF	TBD (MIL-HDBK-217)
Protocols	EIA/TIA-568 100-ohm (100meter)	Warranty	5 years
LED	CSMA/CD Per unit: Power 1 (Green), Power 2 (Green) Per port: 10/100 Link/Active (Green) 1000 Link/Active (Amber) Per Port PoE LED • Active : ON • Inactive : OFF	Certification	
Reverse Polarity Protection	Supported for Power Input	EMC	CE (EN55032, EN55035)
Overload Current Protection	Supported	EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE EN55022 Class A
Power Supply	Redundant Dual DC 12/24/48VDC (9.6~57VDC) 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)	Vehicle	E-Mark @ 24VDC
Power Consumption	TBD	EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (Burst) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
		Shock	IEC 60068-2-27
		Freefall	IEC 60068-2-32
		Vibration	IEC 60068-2-6

Application

Figure 1 : PoE switch in smart Bus application



Dimensions

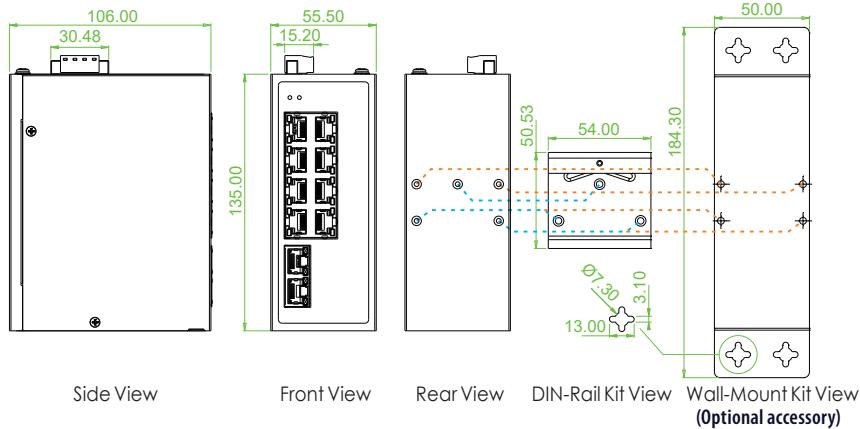
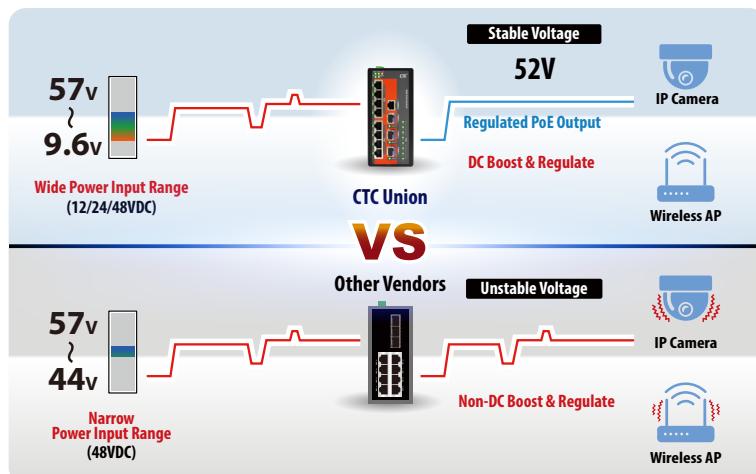


Figure 2 : High efficiency boost technology for PoE



- Regulated PoE output voltage (52VDC) to stabilize PoE device
- Guarantee delivery PoE power distance to 100 meters
- Wide range input power 12/24/48VDC (9.6~57VDC)
- Built-in very high efficiency (94~97%) to boost PoE output voltage

Ordering Information

Model Name	Total Port	RJ45 UTP Port		PoE Port		Input Power	Certification		Operating Temperature
		10/100/1000 Base-T(X)	IEEE802.3at	Power Budget	Redundant		E Mark	CE, FCC	
IVS-G802T-8PH24	10	10	8	180W @48VDC 120W @24VDC 60W @12VDC	12/24/48VDC	V	V		-10~60°C
IVS-G802T-8PHE24	10	10	8	180W @48VDC 120W @24VDC 60W @12VDC	12/24/48VDC	V	V		-40~75°C

Package List

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

Optional Accessories

Industrial Power Supply

NDR-240-48

Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 240W, -20 ~ +70°C

IVS-802GT

8x FE RJ45 and 2x GbE RJ45, E-Mark

NEW



- **E-Mark**, CE, FCC certified
- 12/24/48VDC redundant dual input power



The E-Mark or e-Mark is a European conformity mark that certifies that a vehicle or vehicle component complies with EU regulations, laws and directives. CTC IVS-802GT Ethernet switch support 2 x 1GbE ports plus 8 x 10/100Mbps Fast Ethernet ports and has a wide -40~75°C operating temperature range. With an input power range of 12/24/48VDC, this switch is suitable for vehicle battery power supplies and is e-Mark certified to ensure adequate safety, meeting all environmental requirements for installation in vehicles.

4

E-Mark Certified FE Switch IVS-802GT

Features

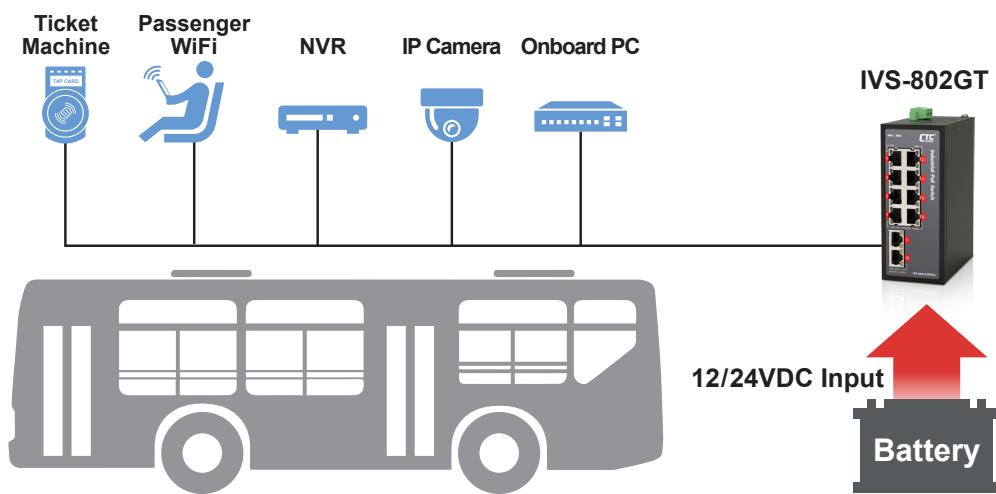
- Supports flow control
- Jumbo frame support
- IP30 rugged metal housing and fanless
- Wide operating temperature -40 ~ 75°C ("E" model)

Specifications

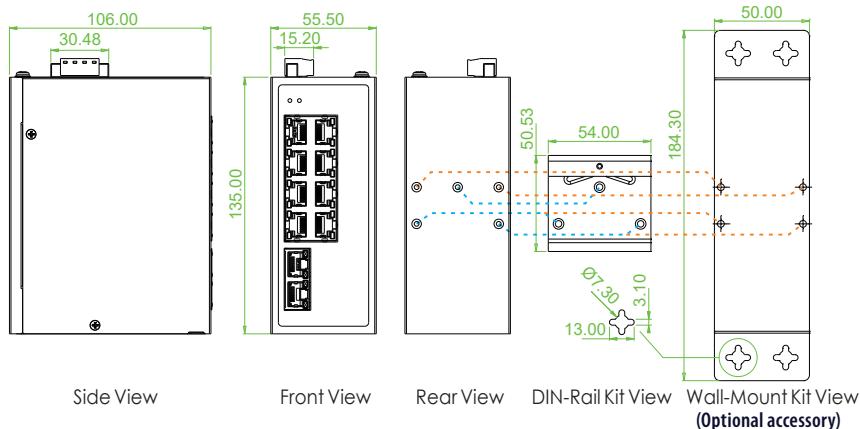
IEEE Standard	IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX Fast Ethernet IEEE 802.3ab 1000Base-T Gigabit Ethernet IEEE 802.3x Flow Control and Back Pressure	Operating Humidity 5% to 95% (Non-condensing)
Switch Architecture	Back-plane (Switching Fabric): 5.6Gbps Full wire-speed	Dimensions 106 x 55.5 x 135mm (D x W x H)
Data Processing	Store and Forward	Housing Rugged Metal, IP30 Protection, Fanless
Flow Control	IEEE 802.3x flow control, back pressure flow control	Weight TBD
Jumbo Frame	9K Bytes	Installation Mounting DIN Rail mounting, or wall mounting (Optional accessories)
MAC Address Table	4K	MTBF TBD (MIL-HDBK-217)
Network Connector	8x 10/100Base-TX RJ45, and 2x 10/100/1000Base-T(X) RJ45 auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex	Warranty 5 years
Network Cable	UTP/STP Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)	Certification
Protocols	CSMA/CD	EMC CE (EN55032, EN55035)
LED	Per unit: Power 1 (Green), Power 2 (Green) Per port: 10/100 Link/Active (Green) 1000 Link/Active (Amber)	EMI (Electromagnetic Interference) FCC Part 15 Subpart B Class A, CE EN55022 Class A
Reverse Polarity Protection	Supported for Power Input	Vehicle E-Mark @ 24VDC
Overload Current Protection	Supported	EMS (Electromagnetic Susceptibility) EN61000-4-2 (ESD) Level 3, Criteria B
Power Supply	Redundant Dual DC 12/24/48VDC (9.6~60VDC) input power (Removable Terminal Block)	EN61000-4-3 (RS) Level 3, Criteria A
Power Consumption	TBD	EN61000-4-4 (Burst) Level 3, Criteria A
Removable Terminal Block	Provides 2 Redundant power, 4 pin	EN61000-4-5 (Surge) Level 3, Criteria B
Operating Temperature	-10 ~ 60°C (IVS-802GT) -40 ~ 75°C (IVS-802GT-E)	EN61000-4-6 (CS) Level 3, Criteria A
		EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Shock		IEC 60068-2-27
Freefall		IEC 60068-2-32
Vibration		IEC 60068-2-6

Application

Figure 1 : The switch in smart Bus application



Dimensions



Ordering Information

Model Name	Total Port	RJ45 UTP Port		Input Power	Certification		Operating Temperature
		10/100/1000 Base-T(X)	10/100Base-TX		EMark	CE, FCC	
IVS-802GT	10	2	8	12/24/48VDC	V	V	-10~60°C
IVS-802GT-E	10	2	8	12/24/48VDC	V	V	-40~75°C

Package List

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

Optional Accessories

Industrial Power Supply

MDR-20-24	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 24VDC, 24W, -20 ~ +70°C
MDR-40-48	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C

IVS-G802T

10x GbE RJ45, E-Mark

NEW



- **E-Mark**, CE, FCC certified
- 12/24/48VDC redundant dual input power



The E-Mark or e-Mark is a European conformity mark that certifies that a vehicle or vehicle component complies with EU regulations, laws and directives. CTC IVS-G802T Ethernet switch supports 10 x 1GbE ports and has a wide -40~75°C operating temperature range. With an input power range of 12/24/48VDC, this switch is suitable for vehicle battery power supplies and is e-Mark certified to ensure adequate safety, meeting all environmental requirements for installation in vehicles.

4

E-Mark Certified GbE Switch IVS-G802T

Features

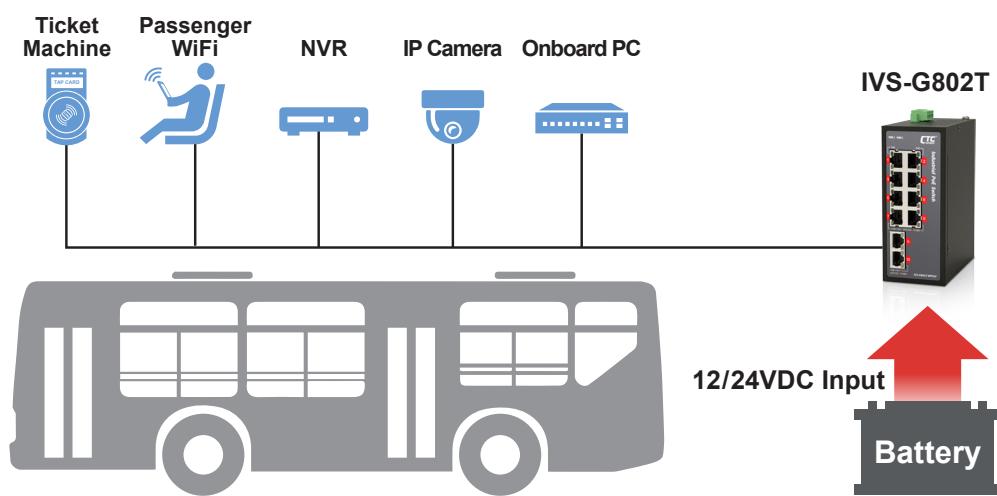
- Supports flow control
- Jumbo frame support
- IP30 rugged metal housing and fanless
- Wide operating temperature -40 ~ 75°C ("E" model)

Specifications

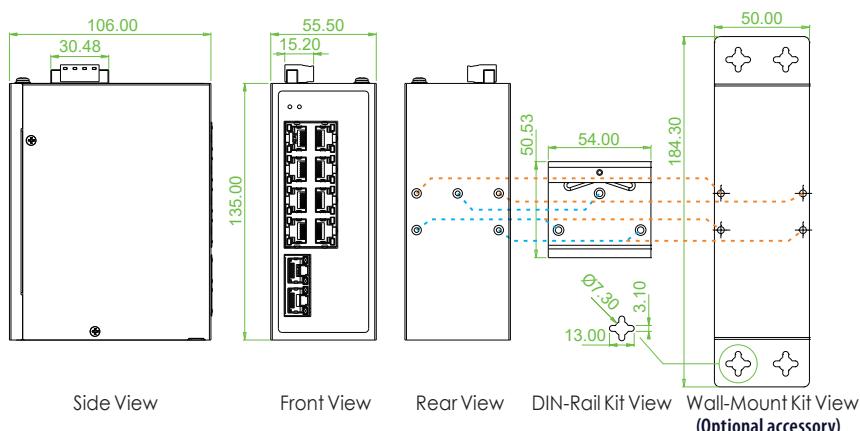
IEEE Standard	IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX Fast Ethernet IEEE 802.3ab 1000Base-T Gigabit Ethernet IEEE 802.3x Flow Control and Back Pressure	Operating Humidity 5% to 95% (Non-condensing)
Switch Architecture	Back-plane (Switching Fabric): 20Gbps Full wire-speed	Dimensions 106 x 55.5 x 135mm (D x W x H)
Data Processing	Store and Forward	Housing Rugged Metal, IP30 Protection, Fanless
Flow Control	IEEE 802.3x flow control, back pressure flow control	Weight TBD
Jumbo Frame	9K Bytes	Installation Mounting DIN Rail mounting, or wall mounting (Optional accessories)
MAC Address Table	4K	MTBF TBD (MIL-HDBK-217)
Network Connector	10x RJ-45 10/100/1000Base-T auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex	Warranty 5 years
Network Cable	UTP/STP Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)	Certification
Protocols	CSMA/CD	EMC CE (EN55032, EN55035)
LED	Per unit: Power 1 (Green), Power 2 (Green) Per port: 10/100 Link/Active (Green) 1000 Link/Active (Amber)	EMI (Electromagnetic Interference) Vehicle FCC Part 15 Subpart B Class A, CE EN55022 Class A
Reverse Polarity Protection	Supported for Power Input	EMS (Electromagnetic Susceptibility) Protection Level EN61000-4-2 (ESD) Level 3, Criteria B
Overload Current Protection	Supported	EN61000-4-3 (RS) Level 3, Criteria A
Power Supply	Redundant Dual DC 12/24/48VDC (9.6~60VDC) input power (Removable Terminal Block)	EN61000-4-4 (Burst) Level 3, Criteria A
Power Consumption	TBD	EN61000-4-5 (Surge) Level 3, Criteria B
Removable Terminal Block	Provides 2 Redundant power, 4 pin	EN61000-4-6 (CS) Level 3, Criteria A
Operating Temperature	-10 ~ 60°C (IVS-G802T) -40 ~ 75°C (IVS-G802T-E)	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Shock	IEC 60068-2-27	
Freefall	IEC 60068-2-32	
Vibration	IEC 60068-2-6	

Application

Figure 1 : The switch in smart Bus application



Dimensions



Ordering Information

Model Name	Total Port	RJ45 UTP Port		Input Power	Certification		Operating Temperature
		10/100/1000Base-T(X)			EMark	CE, FCC	
IVS-G802T	10	10		12/24/48VDC	V	V	-10~60°C
IVS-G802T-E	10	10		12/24/48VDC	V	V	-40~75°C

■ Package List

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

Optional Accessories

■ Industrial Power Supply

MDR-20-24	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 24VDC, 24W, -20 ~ +70°C
MDR-40-48	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C

IPS-G803SM

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



- IEC 61850-3, IEEE 1613 certified for power substation
- EN60950-1, EN62368-1, 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
- 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 Flow Control and Back Pressure IEEE 802.3ad Link aggregation for parallel links with LACP(Link Aggregation Control Protocol) IEEE 802.3x Flow Control and Back Pressure ITU-T G.8032/ Y.1344 ERPS (Ethernet Ring Protection Switching) ITU-T G.8031 EPS (Ethernet Protection Switching) /Y.1342 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)	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 Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)										
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	Reverse Polarity Protection										
Overload Current Protection	Supported	Overload Current Protection										
CPU Watch Dog	Supported	CPU Watch Dog										
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 Input										
Power consumption	<table border="1"><thead><tr><th>Input Voltage</th><th>IPS-G803SM</th></tr></thead><tbody><tr><td>110VAC</td><td>9.3 W</td></tr><tr><td>220VAC</td><td>9.2 W</td></tr><tr><td>24VDC</td><td>9.6 W</td></tr><tr><td>48VDC</td><td>11.1 W</td></tr></tbody></table>	Input Voltage	IPS-G803SM	110VAC	9.3 W	220VAC	9.2 W	24VDC	9.6 W	48VDC	11.1 W	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	Alarm Relay Contact										

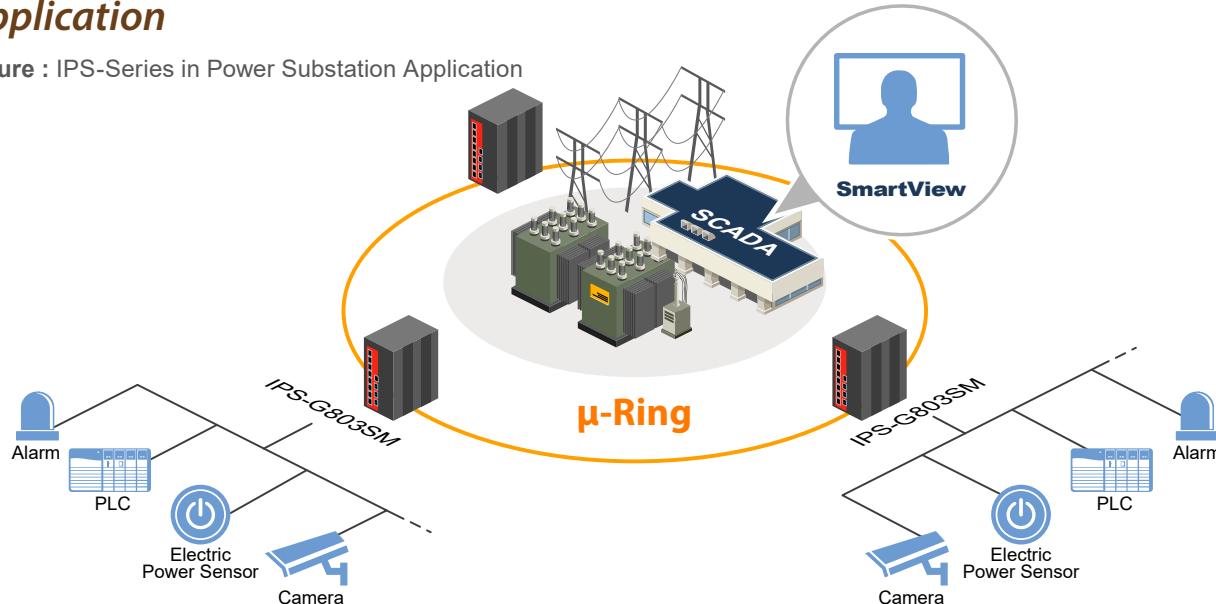
Removable Terminal Block	Provide 2 redundant low volt power, alarm relay contact (6 Pin) (-LL model) Provide 2 redundant low volt power, alarm relay contact (6 Pin) , and High volt Power (2 Pin) (-HL model)
Operating Temperature	-40°C ~ 85°C
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-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	EN60950-1
Power Substation	IEC 61850-3, IEEE 1613
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6
Shock	IEC-60068-2-27

Software Specifications

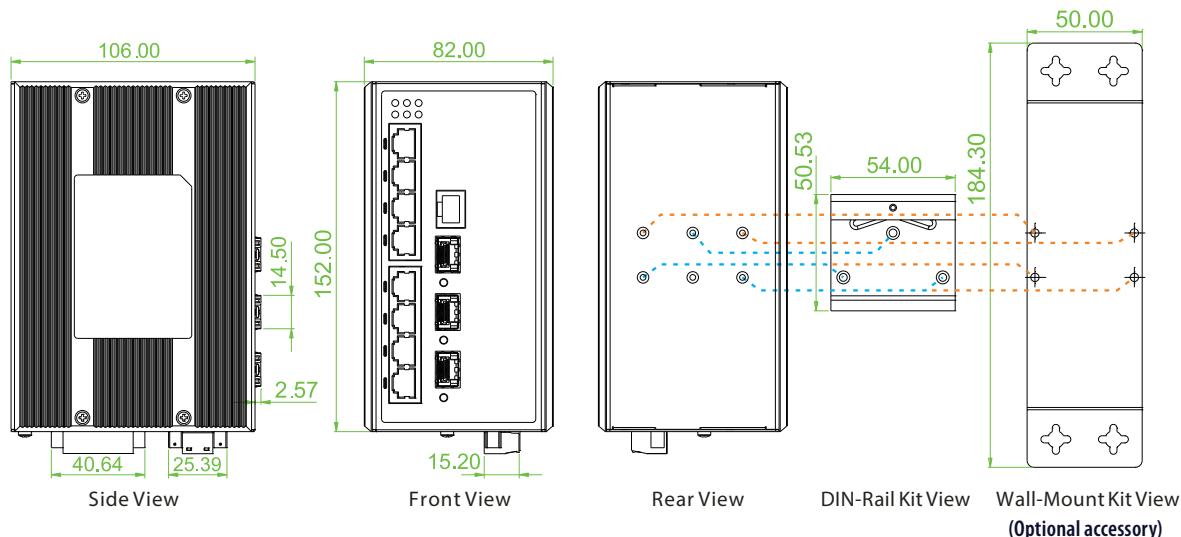
Topology	
Static Route	IPv4/ IPv6, 32 entries
VLAN	<ul style="list-style-type: none"> IEEE 802.1q VLAN, up to 4094 ID IEEE 802.1q VLAN, up to 4094 Groups IEEE 802.1ad Q-in-Q MAC-based VLAN, up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN (Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries MVR (Multiple VLAN Registration) GVRP (GARP VLAN Registration Protocol) Voice VLAN
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 Multiple u-Ring	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP 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 ITU-T G.8032 / Y.1344	Supported
ERPS (Ethernet Ring Protection)	Convergence time <50ms
ITU-T G.8031 / Y.1342	Single Ring, Sub-Ring, Multiple ring topology network
EPS (Ethernet Protection Switching)	Supported
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	<ul style="list-style-type: none"> IEEE 802.1p based CoS IP Precedence based CoS IP DSCP based CoS
Traffic Classification QoS	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2 support 1022 IGMP groups Port Filtering Profile
IGMP / MLD Snooping	<ul style="list-style-type: none"> Throttling Fast Leave Maximum Multicast Group : up to 1022 entries Query / Static Router Port
Security Features	
IEEE 802.1X	<ul style="list-style-type: none"> 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	Local Authentication
Password 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
sFlow	Supported
Modbus/TCP	Support for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP Redundant firmware in case of upgrade failure
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	MIB II RFC1213, Private MIB
UPnP	Supported
DHCP	Server, Client, Relay, Relay option 82 , Snooping
IP Source Guard	Supported
Port Mirroring	Supported
Event Syslog	Syslog server (RFC3164) (Support 1 server)
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay
DNS	Client, Proxy
IEEE 1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP /SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP / SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
Others Features	
Green Ethernet	Supports IEEE 802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering the power for ports with short cables
Green Ethernet	Lower the power for a port when there is no link LED Power Management: Adjustment LEDs intensity
Cable Diagnostic	Measuring UTP cable is normal or broken point distance

Application

Figure : IPS-Series in Power Substation Application



Dimensions



Ordering Information

Model Name	Managed	Total Port	RJ45 UTP Port	Fiber	Redundant Input Power	Certification			
			10/100/1000 Base-T	100/1000 Base-X	Low Voltage 24/48VDC	High Voltage 110/220V DC/AC	IEC61850-3 IEEE 1613	Safety EN62368-1	CE, FCC
IPS-G803SM-LL	V	11	8	3 SFP	2		V	V	V
IPS-G803SM-HL	V	11	8	3 SFP	2	1	V	V	V

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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

IPS-803GSM

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



- IEC 61850-3, IEEE 1613 certified for power substation
- EN62368-1, 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
- 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)	Console Network Cable RS-232 (RJ-45) UTP/STP Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)										
Standard	IEEE 802.3x Flow Control and Back Pressure ITU-T G.8032/ ERPS (Ethernet Ring Protection Switching) /Y.1344 ITU-T G.8031 EPS (Ethernet Protection Switching) /Y.1342 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)	Protocols 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)										
Switch Architecture	Back-plane (Switching Fabric): 7.6 Gbps Full wire-speed	Reverse Polarity Protection Supported for Power Input										
Data Processing Flow Control:	Store and Forward	Overload Current Protection Supported										
Jumbo Frame	IEEE 802.3x flow control, back pressure flow control 9.6KB	CPU Watch Dog Supported										
IEEE 802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)	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										
MAC Address Table	8K	Power consumption										
Memory Buffer	512K Bytes for packet buffer	<table border="1"> <tr> <th>Input Voltage</th> <th>IPS-803GSM</th> </tr> <tr> <td>110VAC</td> <td>7.3 W</td> </tr> <tr> <td>220VAC</td> <td>7 W</td> </tr> <tr> <td>24VDC</td> <td>8W</td> </tr> <tr> <td>48VDC</td> <td>9.2 W</td> </tr> </table>	Input Voltage	IPS-803GSM	110VAC	7.3 W	220VAC	7 W	24VDC	8W	48VDC	9.2 W
Input Voltage	IPS-803GSM											
110VAC	7.3 W											
220VAC	7 W											
24VDC	8W											
48VDC	9.2 W											
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	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-803GSM-LL) 1.085kg (IPS-803GSM-HL)
Installation mounting	DIN Rail mounting, or wall mounting (Optional)
MTBF	535,335 Hours (IPS-803GSM-LL) 143,943 Hours (IPS-803GSM-HL) (MIL-HDBK-217)
Warranty	5 years

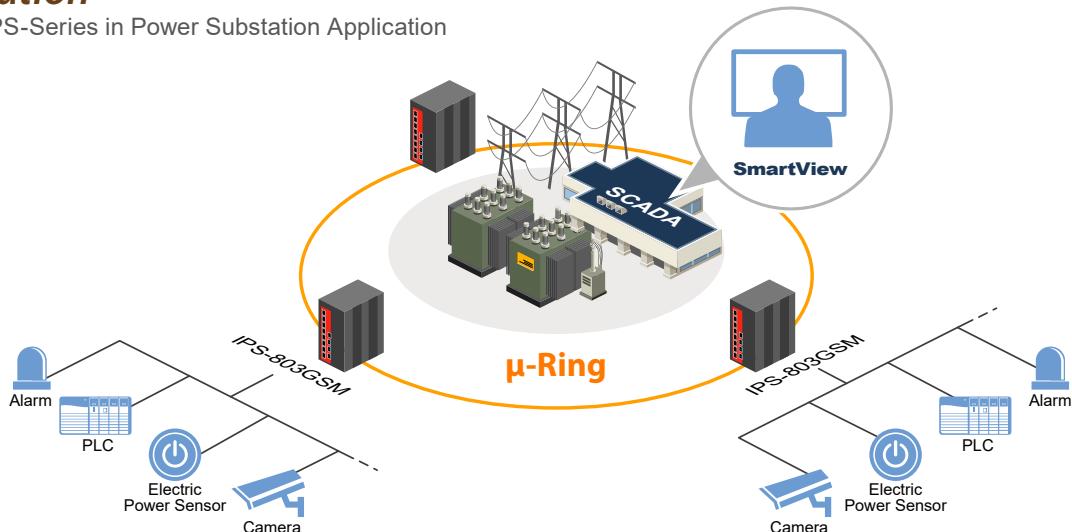
Certification	
EMC/EMS	CE (EN55024, EN55032)
EMI	FCC Part 15 Subpart B Class A EN55032 Class A
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 4, Criteria B EN61000-4-3 (RS) Level 4, Criteria A EN61000-4-4 (EFT) Level 4, Criteria A EN61000-4-5 (Surge) Level 4, Criteria B EN61000-4-6 (CS) Level 4, Criteria A EN61000-4-8 (Magnetic Field) Level 5, Criteria A
Safety	EN62368-1
Power Substation	IEC 61850-3, IEEE 1613
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6
Shock	IEC 60068-2-27

Software Specifications

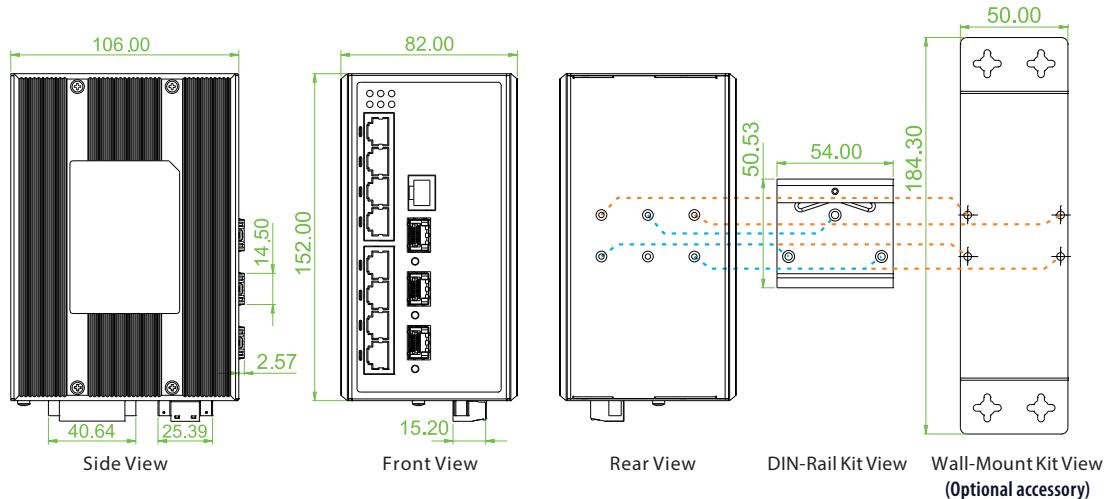
Topology	
VLAN	IEEE 802.1q VLAN, up to 4094 ID IEEE 802.1q VLAN, up to 4094 Groups IEEE 802.1ad Q-in-Q MAC-based VLAN, up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN (Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries MVR (Multiple VLAN Registration) GVRP (GARP VLAN Registration Protocol) Voice VLAN
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 u-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
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Single Ring, Sub-Ring, Multiple ring topology network
QoS Feature	Supported
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	OCL(QoS Control List): Frame Type, Source/Destination MAC, VLAN ID, PCP, DEI OCE(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
sFlow	Supported
Modbus/TCP	Support for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP
RMON	Redundant firmware in case of upgrade failure 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 IEEE1613	Safety EN62368-1	CE, FCC
IPS-803GSM-LL	V	11	8	3 SFP	2	1	V	V	V
IPS-803GSM-HL	V	11	8	3 SFP	2	1	V	V	V

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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

IPS-G2404SM-8C

24x GbE RJ45 with 8x Combo (RJ45/SFP) + 4x 100/1000Base-X SFP

NEW



- Supports, ERPS, MSTP, RSTP, STP for redundant cabling
- IEC61850-3, IEEE1613, EN62368-1, CE, FCC certified
- Wide Operating Temperature -40~85°C
- Supports IEEE1588 PTP v2



IEC 61850-3 defines general requirements for the construction, design and environmental conditions of utility communications and intelligent electronic equipment in the power plant and substation environment. IPS-G2404SM-8C is an IEC61850 and IEEE1613 certified 28-port full Gigabit Ethernet switch and comes with 8 combo-ports that provide flexible port usage of up to 24 RJ45 copper interfaces or up to 16 SFP slots for fiber optic module connections. It is an ideal solution for substation Ethernet communication deployments.

Features

- Redundant isolated High voltage 110/220VAC/DC (90~264VAC or 88~370VDC) power inputs
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Ring Protection Switching (ERPS) for network redundancy
- Supports SmartView™ for Centralized Management*

*Please see Chapter 1- Software Management for more details

Specifications

Standard	IEEE 802.3 IEEE 802.3u IEEE 802.3ab IEEE 802.3z IEEE 802.1d IEEE 802.1w IEEE 802.1s ITU-T G.8032 / Y.1344 IEEE 802.1Q IEEE 802.1X IEEE 802.3ad IEEE 802.3X IEEE 802.1ad IEEE 802.1p IEEE 802.1ab	10Base-T 10Mbit/s Ethernet 100Base-TX, 100Base-FX, Fast Ethernet 1000Base-T Gbit/s Ethernet over twisted pair 1000Base-X Gbit/s Ethernet over Fiber-Optic STP (Spanning Tree Protocol) RSTP (Rapid Spanning Tree Protocol) MSTP (Multiple Spanning Tree Protocol) ERPS (Ethernet Ring Protection Switching) Virtual LANs (VLAN) Port based and MAC based Network Access Control, Authentication Link aggregation for parallel links with LACP(Link Aggregation Control Protocol) Flow control for full duplex Stacked VLANs, Q-in-Q LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization 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	SFP: 12x 100/1000Base-X SFP socket Support DDMI RJ45: 24x 10/100/1000Base-T RJ-45 Support Auto negotiation speed, Auto MDI/MDI-X function	
Console	RS-232 (RJ-45)	
USB	1x USB 2.0 For storage to update firmware, Configuration back, Configuration restore, boot up and syslog	
Push button	For reset and multiple function	
Network Cable	UTP/STP Cat.5e cable or above EIA/TIA-568 100-ohm (100meter)	
Protocols	CSMA/CD	
Reverse Polarity Protection	For input power	
Overload Current Protection	Supported	
Power Supply	Redundant High voltage AC/DC : isolated 110/220V AC/DC (90VAC~264VAC) or (88~370VDC)	
Power Consumption	<50.6W @ 110/220V AC/DC	
Certification		
EMC	CE	
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE	
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 4, Criteria B EN61000-4-3 (RS) Level 4, Criteria A EN61000-4-4 (Burst) Level 4, Criteria A EN61000-4-5 (Surge) Level 4, Criteria B EN61000-4-6 (CS) Level 4, Criteria A	
Power Substation Safety	IEC 61850-3, IEEE 1613 EN62368-1	
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	
Link Aggregation (Port Trunk)	Support IEEE802.1AB LLDP port trunking	
Spanning Tree	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP	
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 per port	
Traffic Classification QoS	IEEE 802.1p based CoS	
	IP DSCP based CoS	
Bandwidth Control for Ingress	Per port based	
Bandwidth Control for Egress	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	
Security Features		
IEEE 802.1X	Port-Based	
	MAC-Based	
ACL		Number of rules : up to 512 entries
RADIUS authentication & accounting		
TACACS+ authentication & accounting, TACACS+ 3.0		
SSL / SSH v2	Supported	
Management Interface Access		Web, Telnet / SSH , CLI RS-232 console
Filtering		
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, USB	
RMON	RMON I (1, 2, 3, 9 group), RMON II	
MIB	RFC1213 MIB II, Private MIB	
DHCP	Server/Client/Relay/Relay option 82/Snooping	
Warning Message	System syslog, e-mail, alarm relay	
Mirroring	Supported	
Event Syslog	Syslog server (RFC3164)	
IEEE 1588 PTP V2	Supports OC (Ordinary Clock)	
NTP	Client	
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol	
	LLDP-MED	

Dimensions

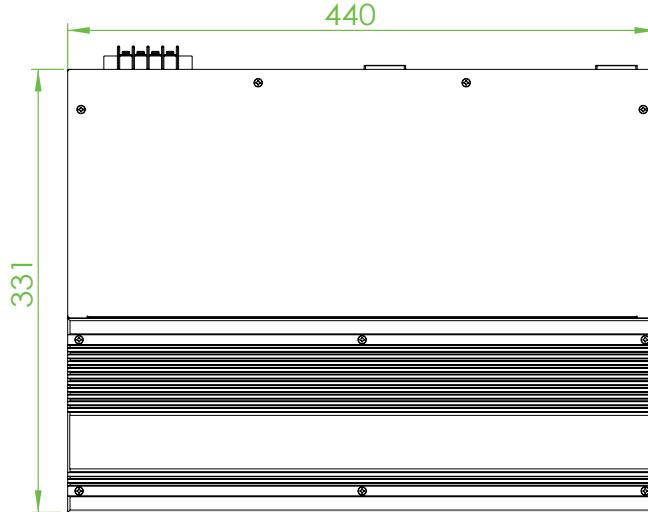
Rear View



Front View



Top View



Side View



Ordering Information

Model Name	Managed	Total Port	UTP	Combo UTP/ SFP	Fiber	Input Power	Certification				Operating Temperature
			10/100/1000 Base-T				100/1000 Base-X	110/220V AC/DC	IEC61850-3	IEEE1613	
IPS-G2404SM-8C-HH	V	28	16	8 (RJ45/SFP)	4 SFP	2	V	V	V	V	-40 ~ 85°C

Package List

- IPS-G2404SM-8C device
- Protective caps for SFP, RJ45, USB, Console
- 19" rack-mount kit (brackets and screws)
- AC Power cord
- Console cable (RJ-45 to DB-9)

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

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

- ◀ 8x GbE RJ45 + 4x 100/1000Base SFP with SyncE
- ▶ 16x GbE RJ45 + 8x 100/1000Base SFP with SyncE



- Supports Sync Ethernet & IEEE1588 PTP v2
- Utilizes a DPLL & TCXO for accurate clock recovery.
- Timing accuracy of <20ns for SyncE & IEEE1588 v2
- 2.25K VDC Hi-pot isolation protection for Ethernet ports and power
- 4KV surge protection for UTP and fiber ports



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 & IEEE1588 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
- u-Ring, STP, RSTP, MSTP, EPS, 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
- Supports SmartView™ for Centralized Management*

*Please see Chapter 1- Software Management for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet	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-1608SM-SE)												
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet	RJ-45 UTP port support Auto negotiation speed, Auto MDI/MDI-X function, SFP port support dual speed with DDMI													
	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)	Console Network Cable	RS-232 (RJ-45)												
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)	UTP/STP Cat. 5e cable or above													
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)	EIA/TIA-568 100-ohm (100meter)													
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)	Protocols	CSMA/CD												
	ITU-T G.8031 / Y.1342	EPS (Ethernet Protection Switching)	Reverse Polarity Protection	Supported												
	IEEE 802.1Q	Virtual LANs (VLAN)	Overload Current Protection	Supported												
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication	CPU Watch Dog	Supported												
	IEEE 802.3ac	Max frame size extended to 1522Bytes.	Power Consumption	<table border="1"> <thead> <tr> <th>Input Voltage</th> <th>IGS-804SM-SE</th> <th>IGS-1608SM-SE</th> </tr> </thead> <tbody> <tr> <td>12VDC</td> <td>11W</td> <td>17W</td> </tr> <tr> <td>24VDC</td> <td>12.4W</td> <td>17.8W</td> </tr> <tr> <td>48VDC</td> <td>12.9W</td> <td>20.2W</td> </tr> </tbody> </table>	Input Voltage	IGS-804SM-SE	IGS-1608SM-SE	12VDC	11W	17W	24VDC	12.4W	17.8W	48VDC	12.9W	20.2W
Input Voltage	IGS-804SM-SE	IGS-1608SM-SE														
12VDC	11W	17W														
24VDC	12.4W	17.8W														
48VDC	12.9W	20.2W														
Standard	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)	Power Supply	Redundant Dual DC 12/24/48V (9.6~60VDC) Input power Removable Terminal Block for input power connector												
	IEEE 802.3x	Flow control for Full Duplex	LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow)												
	IEEE 802.1ad	Stacked VLANs, Q-in-Q		Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber)												
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization		SFP Fiber Per port: Link/Active (Green)												
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)	Jumbo Frame	9.6KB												
	IEEE 802.3az	EEE (Energy Efficient Ethernet)	IEEE 802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)												
VLAN ID	4094	IEEE 802.1Q VLAN VID	MAC Address Table	8K												
Switch Architecture	Back-plane (Switching Fabric): 24Gbps (IGS-804SM-SE) 48Gbps (IGS-1608SM-SE)	Full wire-speed														
Data Processing Flow Control	Store and Forward	IEEE 802.3x for full duplex mode Back pressure for half duplex mode														

Memory Buffer	512K Bytes for packet buffer	Warranty	5 years
Device Memory	16M Bytes Flash ROM, 128M Bytes RAM	Certification	
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay	EMC	CE (EN55024, EN55032)
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC	EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Removable Terminal Block	Provide 2 redundant power, alarm relay contact, 6 Pin	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
Operating Temperature	-10 ~ 60°C (IGS-804SM-SE, IGS-1608SM-SE)	Hipot	DC 2.25KV for power to chassis ground, Ethernet ports to chassis ground
Operating Humidity	40 ~ 75°C (IGS-804SM-SE-E, IGS-1608SM-SE-E)	Surge protection	4KV for UTP and Fiber ports
Storage Temperature	5% to 95% (Non-condensing)	Shock	IEC 60068-2-27
Housing	-40 ~ 85°C	Freefall	IEC 60068-2-32
Dimensions	Rugged Metal, IP30 Protection, Fanless	Vibration	IEC 60068-2-6
Weight	106 x 72 x 152 mm (D x W x H) (IGS-804SM-SE) 116 x 92 x 160 mm (Dx Wx H) (IGS-1608SM-SE)		
Installation Mounting	0.74kg (IGS-804SM-SE) 1.35kg (IGS-1608SM-SE)		
MTBF	DIN Rail mounting, or wall mounting (optional)		
	593,726 Hours (IGS-804SM-SE) 431,610 Hours (IGS-1608SM-SE) (MIL-HDBK-217)		

Software Specifications

Topology		DiffServ (RF 2474) Remarking	
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(Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN	Storm Control	for Unicast, Broadcast, Multicast
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	IP Multicasting Features	
Spanning Tree	IEEE 802.1d STP IEEE 802.1w RSTP IEEE 802.1s MSTP	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
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)	Security Features	
Loop Protection	Supported	IEEE 802.1X	Port-Based MAC-Based
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms	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
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Single Ring, Sub-Ring, Multiple ring topology network Supported	RADIUS authentication & accounting	
QoS Features		TACACS+ authentication & accounting, TACACS+ 3.0	
Class of Service	IEEE 802.1p 8 active priorities queues per port	HTTPS, HTTP	Supported
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	SSL / SSH v2	Supported
Bandwidth Control for Ingress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps"	User Name	Local Authentication
Bandwidth Control for Egress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps" Per queue / Per port shaper	Password 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
		sFlow	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)
		Warning Message	System syslog, e-mail, alarm relay
		DNS	Client, Proxy
		SyncE	ITU-T G.8262 Sync Ethernet
		IEEE 1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
		NTP, SNTP	Client
		LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol LLDP-MED

IPv6 Features

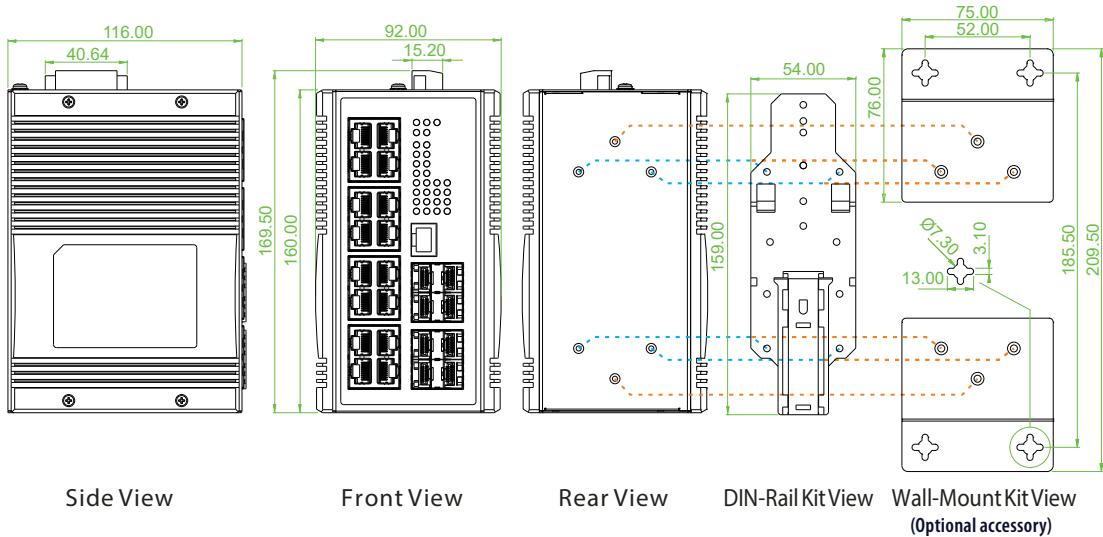
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SIP, Subnet (32bit) L4: TCP/UDP

Others Features

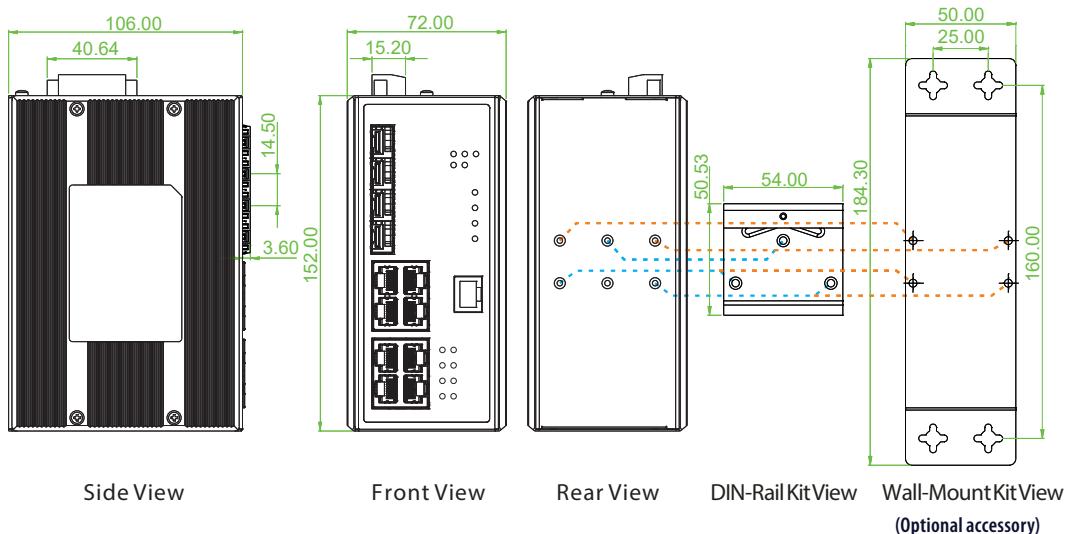
Green Ethernet	Supports IEEE 802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering the power for ports with short cables
Cable Diagnostic	Lower the power for a port when there is no link LED Power Management :Adjustment LEDs intensity
	Measuring UTP cable normal or broken point distance

Dimensions

► IGS-1608SM-SE



► IGS-804SM-SE



Ordering Information

Model Name	Managed	Total Port	UTP Port	Fiber Port	Certification	Operating Temperature
			10/100/1000 Base-T	100/1000 Base-X	CE, FCC	
IGS-804SM-SE	V	12	8	4 SFP	V	-10~60°C
IGS-804SM-SE-E	V	12	8	4 SFP	V	-40~75°C
IGS-1608SM-SE	V	24	16	8 SFP	V	-10~60°C
IGS-1608SM-SE-E	V	24	16	8 SFP	V	-40~75°C

■ Package List

- IGS-1608SM-SE or IGS-804SM-SE device
- 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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

■ Industrial Power Supply

MDR-40-48	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C
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IQS-402XSM-4PH

4x 2.5G N-Base-TX + 2x 10G Base-X SFP+ with 4x PoE 120W, Compact Size



- Advanced PoE Management, PoE PD Failure Auto Checking and auto reset when PD fail, PoE port on/off weekly scheduling
- Redundant 48VDC power input
- Supports μ-Ring, ERPS, EPS, MSTP, RSTP, STP for redundant cabling



IQS-402XSM-4PH is an 1G/2.5G/10G managed Layer 2 Ethernet switch that supports power over Ethernet functions. It provides 4 ports of electrical 10M/100M/1G/2.5GBase-T via RJ-45s and with IEEE802.3at 30 watts per port, plus 2 ports SFP slots of 100M/1G/2.5G/10G Base-X which provide stable and reliable long-distance Ethernet transmission over optical fiber. Built to Industrial grade standards, the FANLESS design provides high MTBF in indoor environments of operating temperature from -10 to 60°C (14 to 160°F), and incorporates redundant 48VDC power input. With Din-Rail or wall mounting metal housings, these switches are perfect choices for heavy duty use in harsh environments, such as Industrial Factory Automation, Data Center Networking, Intelligent Transportation Systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications.

These managed switches also support a wide variety of Ethernet Layer 2 functions, including CTC Union proprietary μ-Ring, ERPS, MSTP, RSTP and STP. They also support Layer 2 IGMP, VLAN, QoS, ACL, Security, IPv6, bandwidth control, and port mirroring. Additionally, these switches can also be managed by CTC Union's SmartView™ Element Management System, which offers a user-friendly and centralized device management platform and provides administrators the ability to monitor and configure these connected switches remotely.

Features

- 4x 10/100/1G/2.5G Base-T RJ-45 + 2x 1G/2.5G/10G Base-X SFP+ with 4x PoE, total 120W power budget
- Provides 3 ring instances that each can support μ-Ring, μ-Chain or Sub-Ring type for flexible uses.
- Supports up to 3 rings in one device (Please see CTC μ-Ring white paper for more details and more topology application)
- DHCP Server/Client/Relay/Snooping/Snooping option 82/Relay option 82
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Flexibility security: Port based and MAC based IEEE802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid upgrade failure
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP, SNTP, IEEE802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet	Standard	IEEE 802.3x	Flow control for Full Duplex
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet		IEEE 802.1ad	Stacked VLANs, Q-in-Q
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair		IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.3bz	2.5GBase-T		IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic		IEEE 802.3af	PoE (Power over Ethernet)
	IEEE802.3ae	10G bit/s Ethernet over Fiber		IEEE 802.3at	PoE+ (Enhance Power over Ethernet)
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)	Switch Architecture	Back-plane (Switching Fabric): 60Gbps	
	ITU-T G.8031 / Y.1342	EPS (Ethernet Protection Switching)	Data Processing	Full wire-speed	
	IEEE 802.1d	STP (Spanning Tree Protocol)	Flow Control	Store and Forward	
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)		IEEE 802.3x for full duplex mode Back pressure for half duplex mode	
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)	Network Connector	4x 10M/100M/1G/2.5GBase-T RJ-45 + 2x 1G/2.5G/10GBase-X SFP	
	IEEE 802.1Q	Virtual LANs (VLAN)		RJ-45 UTP port supports auto-negotiation	
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication		Auto MDI/MDI-X function	
	IEEE802.3ac	Max frame size extended to 1522Bytes	PoE standard & RJ-45 pin assignment	SFP port supports 1G/2.5G/10G speed with DDMI	
		Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)		4x IEEE 802.3af/at PoE+ 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)	

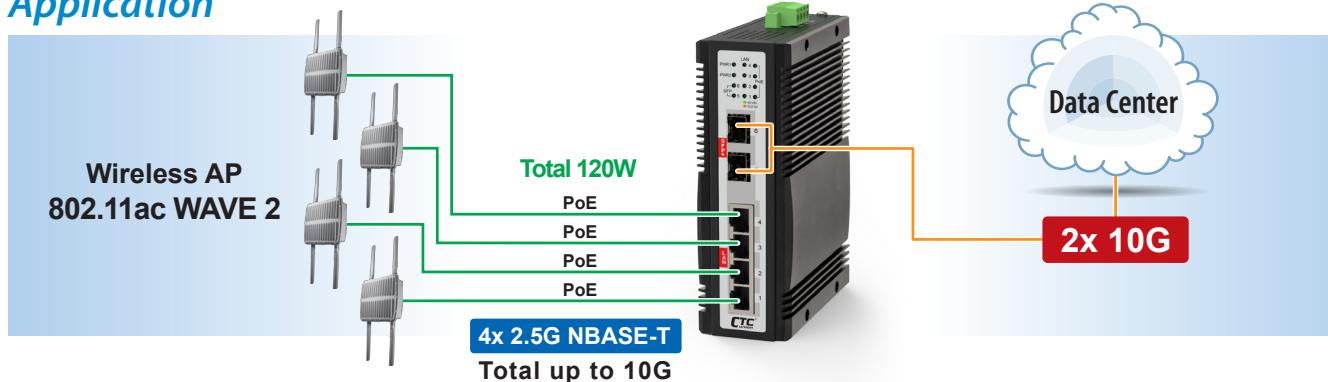
Network Cable	UTP/STP Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)			
Protocols	CSMA/CD			
Overload Current Protection	Supported			
CPU Watch Dog	Supported			
Power Supply	Redundant dual power input 48VDC (44~57VDC) (Removable terminal block) (50~57VDC input is recommended for IEEE 802.3at PoE+ in 30W applications)			
Power Consumption	Input Voltage 50VDC	Total Power Consumption 139.4W	Device Power Consumption 14W	PoE Budget 120W
PoE Power Budget	Maximum PoE Output power budget 30W / Per Port Total 120W			
LED	Per unit: PWR 1, PWR 2 (Green) Per RJ-45 port: 10/100 Link/Active (Green) 1G/2.5G 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	9.6K Byte			
IEEE802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)			
MAC Address Table	8K			
Memory Buffer	512K Bytes for packet buffer			
Device Memory	128M Bytes Flash ROM, 256M Bytes RAM			
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	Provides redundant power PWR1, PWR2 and Alarm Relay, 6 pin			
Operating Temperature	-10 ~ 60°C			
Operating Humidity	5% to 95% (Non-condensing)			
Storage Temperature	-40 ~ 85°C			
Housing	Rugged Metal, IP30 Protection, Fanless			
Dimensions	127.6x 48.6x 160mm (Dx W x H)			
Weight	1,535g			
Installation Mounting	DIN Rail mounting, or wall mounting (Optional)			
MTBF	531,055 Hours (MIL-HDBK-217)			
Warranty	5 Years			
Certification				
EMC	CE (EN55032, EN55035)			
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A,CE			
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 60068-2-31			
Vibration	IEC 60068-2-6			

Software Specifications

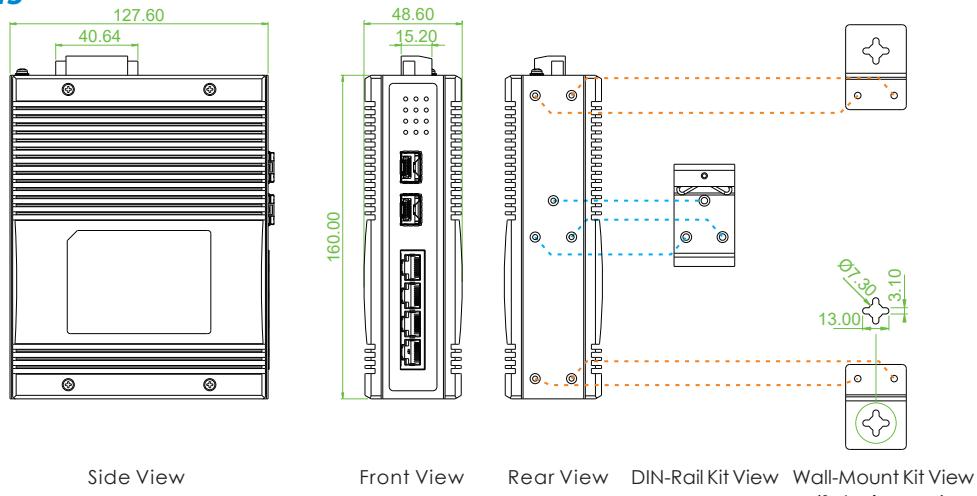
Topology				
VLAN	IEEE 802.1q VLAN, up to 4094 802.1Q VLAN VID IEEE 802.1q VLAN, up to 4094 Groups IEEE 802.1ad Q-in-Q MAC-based VLAN, up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN(Ethernt, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN			
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 Union μ-Ring white paper for more details and more topology application)			
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms Single Ring, Sub-Ring, Multiple ring topology network			
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Supported			
Loop Protection	Supported			
QoS Features				
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	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps"			
Bandwidth Control for Egress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps" 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			
Management Features				
CLI	Cisco® like CLI			
Web Based Management				
Telnet	Server			
SNMP	V1, V2c, V3			
sFlow	Supported			
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	IPv6 Telnet	Supported
UPnP	Supported	IPv6 NTP, SNTP	Client
DHCP	Server, Client, Relay, Relay option 82, Snooping	IPv6 TFTP	Supported
IP Source Guard	Supported	IPv6 QoS	Supported
Port Mirroring	Supported	IPv6 ACL	Number of rules: up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3 : IP address SIP, Subnet (32bit) L4 : TCP/UDP
Event Syslog	Syslog server (RFC3164) (Supports 4 servers)		
Warning Message	System syslog, SMTP/e-mail event message, alarm relay		
DNS	Client, Proxy		
NTP, SNTP	Client		
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol LLDP-MED		
IPv6 Features		Advanced PoE	
IPv6 Management	Telnet Server/ICMP v6	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 Power feeding priority
SNMP over IPv6	Supported		
HTTP over IPv6	Supported		
SSH over IPv6	Supported		

Application



Dimensions



Ordering Information

Model Name	Total Ports	UTP (RJ45)	Fiber	PoE Port		Redundant Power Input	Certification
		10/100/1G/2.5G Base-T	1G/2.5G/10G	IEEE802.3af/at	Power Budget		
IQS-402XSM-4PH	6	4	2 SFP	4	120W	48VDC	V

Package List

- IQS-402XSM-4PH device
- Protective caps for SFP ports

Optional Accessories

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

ISFP-M9000-85-D(E) Industrial SFP 10GBase-SR MM, 300meter, wave length 850nm LC, DDMI, -10~70°C (-40~85°C)

ISFP-S9010-31-D(E) Industrial SFP 10GBase-LR SM, 10km, 1310nm, 6.4dB, LC, 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)

Industrial Power Supply

NDR-120-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 120W, -20 ~ +70°C (IQS-402XSM-4PH)

NDR-240-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 240W, -20 ~ +70°C (For more ref.)

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

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

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



- Supports IEEE 1588 PTP V2
- Supports u-Ring, ERPS, EPS, MSTP, RSTP, STP for redundant cabling
- 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 8/4x 10/100/1000M Base-T ports and 3/2x 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
- Supports SmartView™ for Centralized Management*

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

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet	Data Processing	Store and Forward
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet	Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair	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)
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic		RJ-45 UTP port support Auto negotiation speed, Auto MDI/MDI-X function, SFP ports support 100/1000 or 2.5G with DDMI
	IEEE 802.3cb	2.5GBase-X	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)
	IEEE 802.3af	PoE (Power over Ethernet)	Console	RS-232 (RJ-45)
	IEEE 802.3at	PoE+ (Power over Ethernet enhancements)	Network Cable	UTP/STP Cat. 5e cable or above
	IEEE 802.1d	STP (Spanning Tree Protocol)		EIA/TIA-568 100-ohm (100meter)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)	Protocols	CSMA/CD
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)	Reverse Polarity Protection	Supported for power input
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)	Overload Current Protection	Supported
	ITU-T G.8031 / Y.1342	EPS (Ethernet Protection Switching)	CPU Watch Dog	Supported
	IEEE 802.1Q	Virtual LANs (VLAN)	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)
	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			

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				
Device Memory	16M Bytes Flash ROM, 128M Bytes RAM				
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	Provides 2 redundant power, alarm relay contact, 6 Pin				
Operating Temperature	-10 ~ 60°C (IGS-402SM-4PH24, IGS-803SM-8PH24)				
Operating Humidity	-40 ~ 75°C (IGS-402SM-4PHE24, IGS-803SM-8PHE24)				
Storage Temperature	5% to 95% (Non-condensing)				
Housing	-40 ~ 85°C				
Dimensions	Rugged Metal, IP30 Protection, Fanless				
Weight	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				
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				
Railway Traffic	EN50121-4 (IGS-803SM-8PH24)				
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 IEEE 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(Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN				
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				
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms				
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	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	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps"				
Bandwidth Control for Egress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps" Per queue / Per port shaper				
DiffServ (RF 2474) Remark					
Storm Control	for Unicast, Broadcast, Multicast				
IP Multicasting Features					
IGMP / MLDP 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				
Management Interface Access Filtering	Remote Authentication (via RADIUS / TACACS+)				
Management Features					
CLI	Cisco® like CLI				
Web Based Management					
Telnet	Supports for management and monitoring				
SNMP	V1, V2c, V3				
sFlow	Supported				
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				

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)
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 SIP, Subnet (32bit) 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

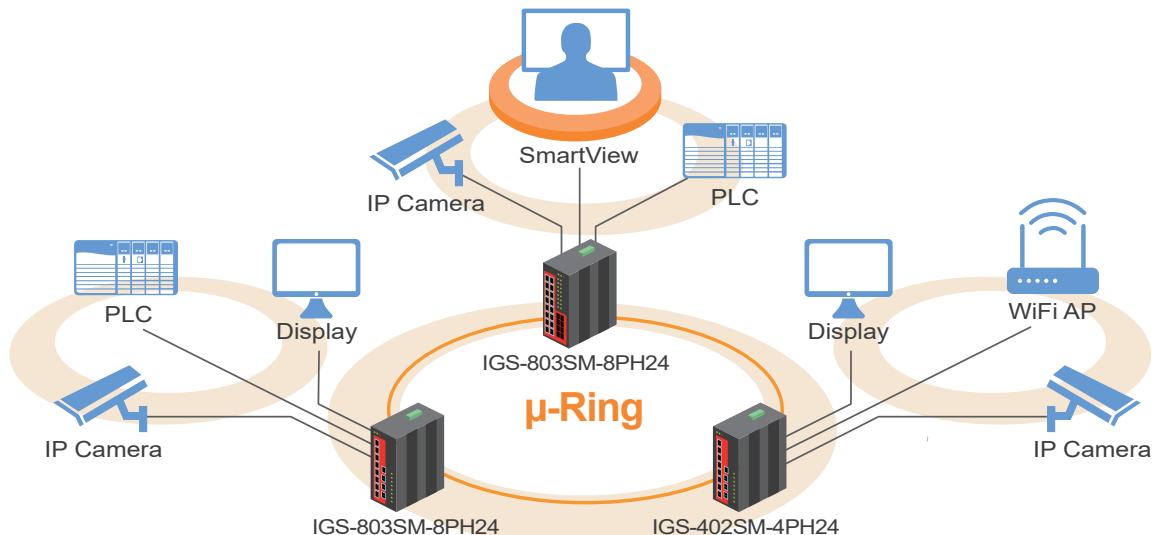
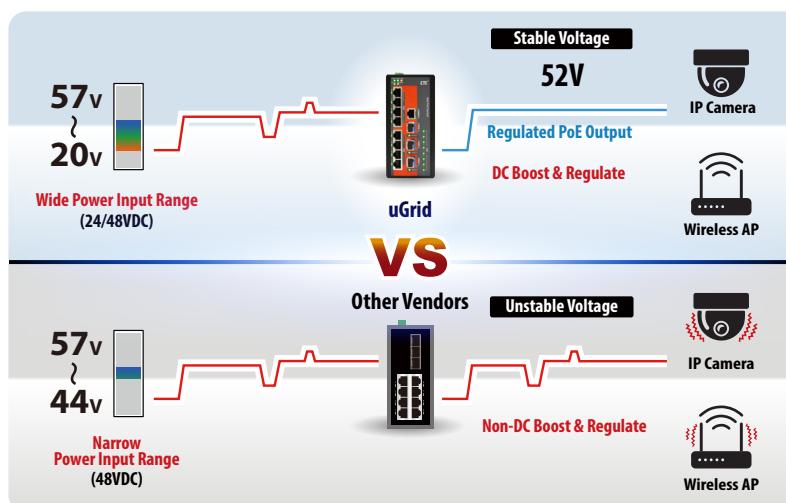


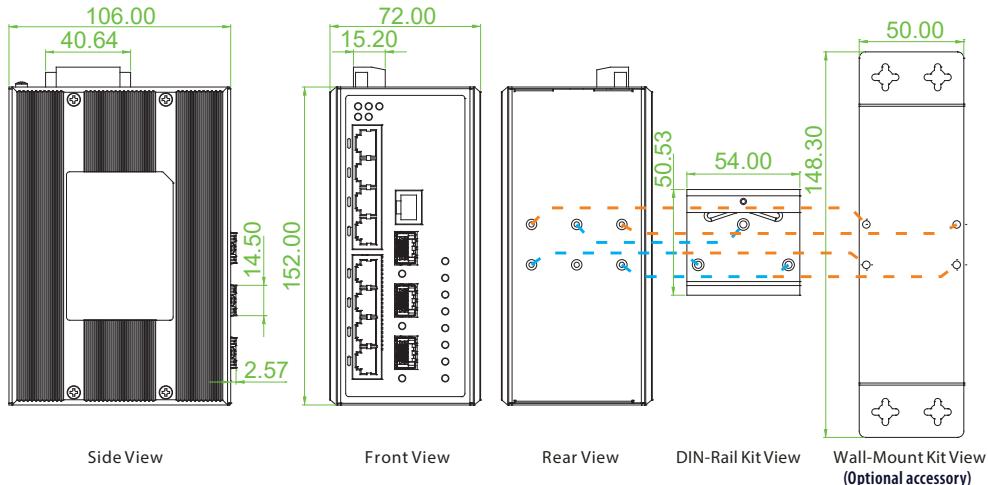
Figure 2 : High Efficiency Boost Technology for PoE



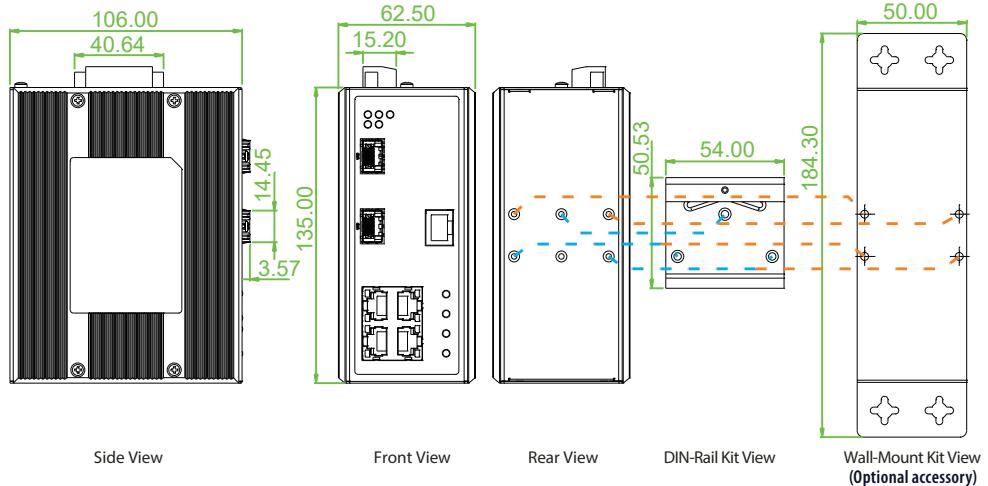
- Regulated PoE output voltage (52VDC) to stabilize PoE device
- Guarantee delivery PoE power distance to 100 meters
- Wide range input power 24/48VDC (20~57VDC)
- Built-in very high efficiency (94~97%) to boost PoE output voltage

Dimensions

► IGS-803SM-8PH24



► IGS-402SM-4PH24



Ordering Information

Model Name	Total Port	UTP		Fiber		PoE Port		Input Power	Certification		Operating Temperature
		10/100/1000 Base-T	100/1000 Base-X	100/1000/2.5G Base-X	IEEE802.3at	Power Budget	Redundant		EN50121-4	CE, FCC	
IGS-803SM-8PH24	11	8	1 SFP	2 SFP		8	180W	24/48VDC	V	V	-10~60°C
IGS-803SM-8PHE24	11	8	1 SFP	2 SFP		8	180W	24/48VDC	V	V	-40~75°C
IGS-402SM-4PH24	6	4	1 SFP	1 SFP		4	120W	24/48VDC	V	V	-10~60°C
IGS-402SM-4PHE24	6	4	1 SFP	1 SFP		4	120W	24/48VDC	V	V	-40~75°C

■ Package List

- IGS-803SM-8PH24 or IGS-402SM-4PH24 device
- 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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP data sheets for more items and detailed information.)

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)

■ Industrial Power Supply

NDR-120-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 120W, -20 ~ +70°C (For IGS-402SM-4PH24)

NDR-240-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 240W, -20 ~ +70°C (For IGS-803SM-8PH24)

IGS+402SM-4PH24

4x GbE RJ45 + 2x 100/1000 SFP with 4x PoE 120W, 24/48VDC



- Supports IEEE 1588 PTP V2
- Supports u-Ring, ERPS, EPS, MSTP, RSTP, STP for redundant cabling
- 24/48VDC (20~57VDC) redundant dual input power with built-in very high efficiency booster
- Auto checking and auto reset when PoE PD fail
- 4KV surge protection for PoE, RJ45 and SFP ports



The Gigabit Ethernet switch models are managed industrial grade L2 switches with 4x 10/100/1000Base-T ports and 2x 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 4x 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 4x 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
- Supports SmartView™ for Centralized Management*

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

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet	Data Processing	Store and Forward
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet	Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair	Network Connector	4x 10/100/1000Base-T RJ-45 + 2x FE/GbE SFP slot
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic		RJ-45 UTP port support Auto negotiation speed, Auto MDI/MDI-X function, SFP ports support 100/1000M with DDMI
	IEEE 802.3cb	2.5GBase-X	PoE standard & RJ-45 pin assignment	4x IEEE 802.3af /IEEE 802.3at PoE+ 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)
	IEEE 802.3af	PoE (Power over Ethernet)	Console	RS-232 (RJ-45)
	IEEE 802.3at	PoE+ (Power over Ethernet enhancements)	Network Cable	UTP/STP Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)
	IEEE 802.1d	STP (Spanning Tree Protocol)	Protocols	CSMA/CD
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)	Reverse Polarity Protection	Supported for power input
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)	Overload Current Protection	Supported
ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)		CPU Watch Dog	Supported
ITU-T G.8031 / Y.1342	EPS (Ethernet Protection Switching)		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)
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			

Power Consumption	Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	Boost Efficiency	Housing	Rugged Metal, IP30 Protection, Fanless
	24VDC	132W	7.2W	120W	96%	Dimensions	106 x 62.5 x 135 mm (D x W x H)
	48VDC	133.4W	7.2W	120W	95%	Weight	0.69kg
PoE Power Budget	Maximum PoE Output power budget 30W / Per Port 120W					Installation Mounting	DIN Rail mounting, or wall mounting (Optional)
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					MTBF	626,632 Hours (MIL-HDBK-217)
Jumbo Frame	9.6KB					Warranty	5 years
IEEE802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)					Certification	
MAC Address Table	8K					EMC	CE (EN55032, EN55024)
Memory Buffer	512K Bytes for packet buffer					EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A,CE
Device Memory	16M Bytes Flash ROM, 128M Bytes RAM					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
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay					Hi pot protection DC 2.25KV	For power to chassis ground, Ethernet port to chassis ground
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC					4KV surge protection Supported	For PoE, UTP and Fiber ports
Removable Terminal Block	Provides 2 redundant power, alarm relay contact, 6 Pin					Shock	IEC 60068-2-27
Operating Temperature	-10 ~ 60°C (IGS+402SM-4PH24) -40 ~ 75°C (IGS+402SM-4PHE24)					Freefall	IEC 60068-2-32
Operating Humidity	5% to 95% (Non-condensing)					Vibration	IEC 60068-2-6
Storage Temperature	-40 ~ 85°C						

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	Bandwidth Control for Egress	100~1,000,000 when the "Unit" is "Mbps" and 1~1,000 when the "Unit" is "Mbps" Per queue / Per port shaper
	Protocol-based VLAN(Ethernet, SNAP, LLC), up to 128 entries	VLAN Translation, up to 256 entries	Private VLAN for port isolation	IGRP (GARP VLAN Registration Protocol)	MVR (Multicast VLAN Registration)	DiffServ (RF 2474) Remarking	
	Voice VLAN					Storm Control	for Unicast, Broadcast, Multicast
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	IP Multicasting Features			IP Multicasting Features	
Spanning Tree	IEEE 802.1d STP	IEEE 802.1w RSTP	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2			IGMP / MLD Snooping	Port Filtering Profile
	IEEE 802.1s MSTP		Throttling, Fast Leave				Maximum Multicast Group : up to 1022 entries
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	Query / Static Router Port			Security Features	
		The maximum number of devices allowed in a Ring supported ring is 250.				IEEE 802.1X	Port-Based MAC-Based
Loop Protection	Supported	Recovery time <50ms				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
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Single Ring, Sub-Ring, Multiple ring topology network		RADIUS authentication & accounting			TACACS+ authentication & accounting	TACACS+ 3.0
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)			HTTPS, HTTP	Supported		HTTPS, HTTP	Supported
QoS Features			SSL / SSH v2	Supported		User Name Password Authentication	Local Authentication
Class of Service	IEEE 802.1p 8 active priorities queues for per port					Management Interface Access Filtering	Remote Authentication (via RADIUS / TACACS+)
Traffic Classification QoS	IEEE 802.1p based CoS					Management Features	
	IP Precedence based CoS					CLI	Cisco® like CLI
	IP DSCP based CoS					Web Based Management	
	QCL(QoS Control List): Frame Type, Source/Destination MAC, VLAN ID, PCP, DEI					Telnet	Supports for management and monitoring
	QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number					SNMP	V1, V2c, V3
Bandwidth Control for Ingress	100~1,000,000 when the "Unit" is "Mbps" and 1~1,000 when the "Unit" is "Mbps"					sFlow	Supported

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)
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 SIP, Subnet (32bit) 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 budget limitation (maximum 120W)	

Application

Figure 1 : Application Example

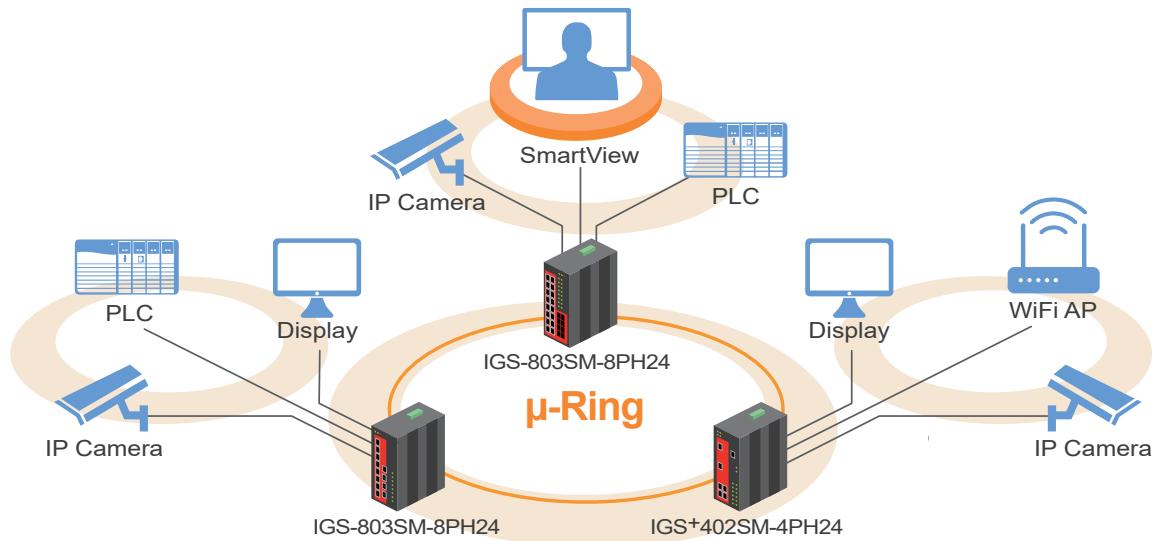
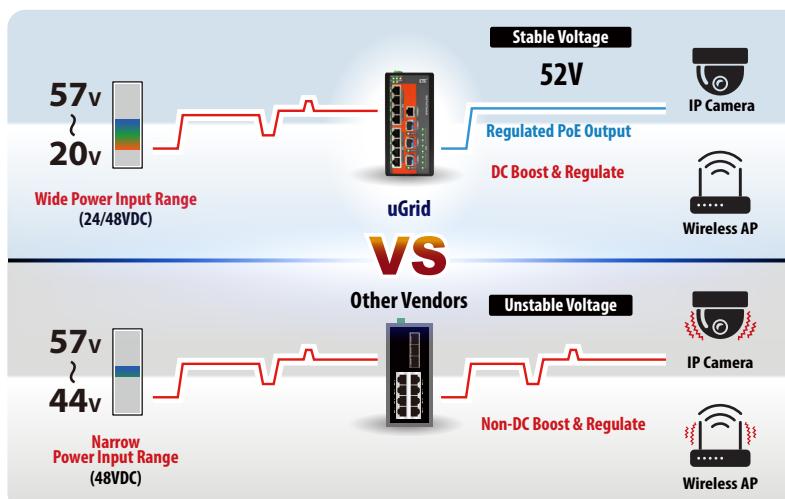
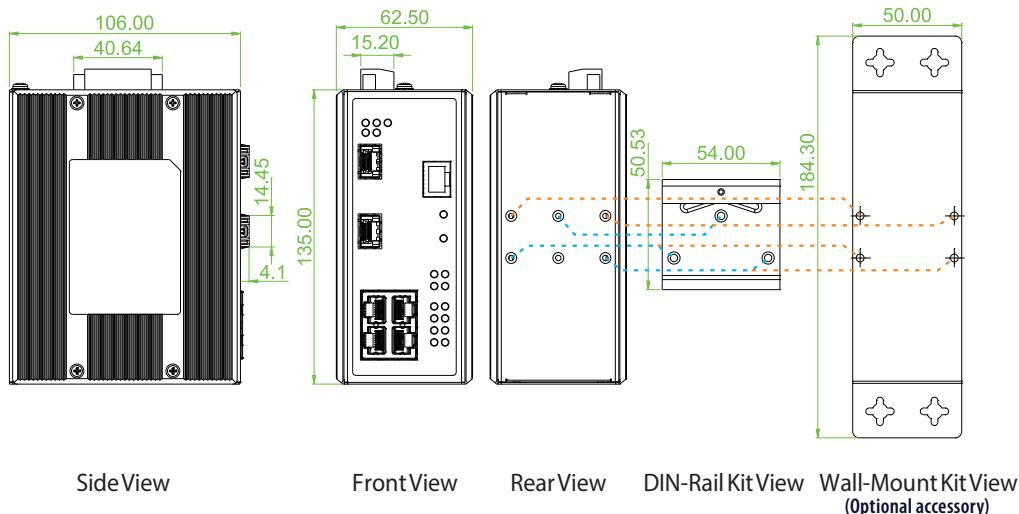


Figure 2 : High Efficiency Boost Technology for PoE



- 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



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			
IGS+402SM-4PH24	6	4	2 SFP	4	120W	24/48VDC	V	-10~60°C
IGS+402SM-4PHE24	6	4	2 SFP	4	120W	24/48VDC	V	-40~75°C

■ Package List

- IGS+402SM-4PH24 device
- 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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP data sheets for more items and detailed information.)

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)

■ Industrial Power Supply

NDR-120-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 120W, -20 ~ +70°C (For IGS-402SM-4PH24)

NDR-240-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 240W, -20 ~ +70°C (For more ref)

IGS-402SW-4PB

4x GbE RJ45 + 2x 100/1000Base-X SFP with 4x IEEE802.3bt PoE++ 240W, 48VDC

NEW



- Supports MSTP, RSTP, STP for redundant cabling
- Auto checking and auto reset when PoE PD fail
- 4KV surge protection for PoE, RJ45 and SFP ports



IGS-402SW-4PB 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 IEEE802.3bt 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 IEEE802.3bt PoE++ output, 90W per port, total 240W
- Cable diagnostics, identifies opens/shorts distance
- Supports SmartView™ for Centralized Management*

*Please see Chapter 1- Software Management for more details

Specifications

Standard	IEEE 802.3 IEEE 802.3u IEEE 802.3ab IEEE 802.3z IEEE 802.3af IEEE 802.3at IEEE802.3bt IEEE 802.1d IEEE 802.1w IEEE 802.1s IEEE 802.1Q IEEE 802.1X IEEE802.3ac IEEE 802.3ad IEEE 802.3x IEEE 802.1ad IEEE 802.1p IEEE 802.1ab IEEE 802.3az	10Base-T 10Mbit/s Ethernet 100Base-TX, 100Base-FX, Fast Ethernet 1000Base-T Gbit/s Ethernet over twisted pair 1000Base-X Gbit/s Ethernet over Fiber-Optic PoE (Power over Ethernet) PoE+ (Power over Ethernet enhancements) PoE++ STP (Spanning Tree Protocol) RSTP (Rapid Spanning Tree Protocol) MSTP (Multiple Spanning Tree Protocol) Virtual LANs (VLAN) Port based and MAC based Network Access Control, Authentication Max frame size extended to 1522Bytes Link aggregation for parallel links with LACP(Link Aggregation Control Protocol) Flow control for Full Duplex Stacked VLANs, Q-in-Q LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization Link Layer Discovery Protocol (LLDP) EEE (Energy Efficient Ethernet)	PoE standard & RJ-45 Pin Assignment	4x IEEE 802.3af/at/bt PoE++ 4 pairs PoE, 90W/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 UTP/STP Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)
Network Cable			Protocols	CSMA/CD
Reverse Polarity Protection			Reverse Polarity Protection	Supported for power input
Overload Current Protection			Overload Current Protection	Supported
CPU Watch Dog			CPU Watch Dog	Supported
Power Supply			Power Supply	Redundant Dual DC 48V (44~57VDC) input power, (Removable terminal block) Below recommended is for different PoE application 54~57VDC VDC for 90W (4 Pairs) PoE application 52~57VDC for 60W (4 Pairs) PoE application 52~57VDC for 30W (2 Pairs) PoE application 44~57VDC for 15.4W (2 Pairs) PoE application
Power Consumption			Power Consumption	TBD
PoE Power Budget			PoE Power Budget	Maximum PoE Output power budget 90W / Per Port Total 240W
LED			LED	Per unit: Power 1 (Green), Power 2 (Green), CPU Act (Green) 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 (Green) per port ON : PoE on Off : PoE off
Jumbo Frame			Jumbo Frame	10K
IEEE802.3ac			IEEE802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)
MAC Address Table			MAC Address Table	4K
Memory Buffer			Memory Buffer	220K Bytes for packet buffer
Device Memory			Device Memory	128M Bytes Flash ROM, 256M Bytes RAM
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	USB Type C			
Auxiliary port	USB type A For Firmware upgrade, Configuration file Upload/ Download			

Warning Message	System Syslog, SMTP/ e-mail event message
Removable Terminal Block	Provide 2 redundant power, 4 Pin
Operating Temperature	-10 ~ 60°C (IGS-402SW-4PB)
Operating Humidity	-40 ~ 75°C (IGS-402SW-4PBE)
Storage Temperature	5% to 95% (Non-condensing)
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	106 x 38.6 x 152mm (D x W x H)
Weight	TBD
Installation Mounting	DIN Rail mounting, or wall mounting (Optional)
MTBF	TBD (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE (EN55032, EN55035)
EMI	
(Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE

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
Surge protection	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Shock	4KV for PoE, UTP and Fiber ports
Freefall	IEC 60068-2-27
Vibration	IEC 60068-2-32
	IEC 60068-2-6

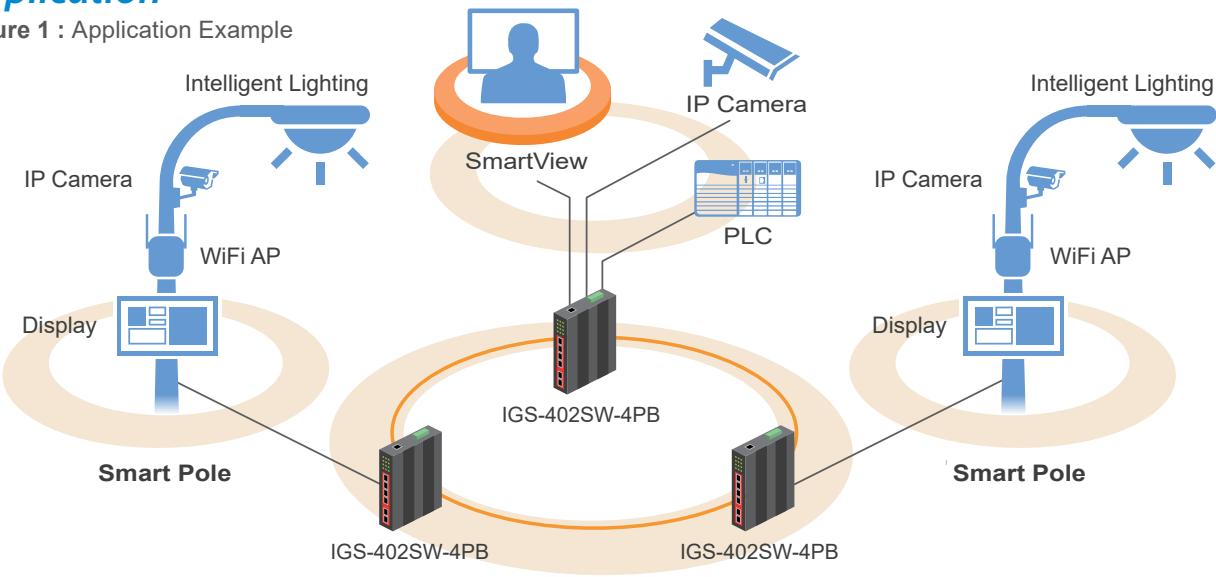
Software Specifications

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(Ethernet, SNAP, LLC), up to 128 entries
	VLAN Translation, up to 256 entries
	Private VLAN for port isolation
	GVRP (GARP VLAN Registration Protocol)
	MVR (Multicast VLAN Registration)
	Voice VLAN
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 Loop Protection	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP
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	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps"
Bandwidth Control for Egress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps" 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, Console

Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3
sFlow	Supported
Modbus/TCP	Supports for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP
FTP client	Redundant firmware in case of upgrade failure
RMON	Supports for upload/download configuration
MIB	RMON I (1, 2, 3, 9 group), RMON II
UPnP	RFC1213 MIB II, Private MIB
BOOTP	Supported
DHCP	Supported
RARP	Server, Client, Relay, Relay option 82 , Snooping
IP Source Guard	Supported
Port Mirroring	Supported
Event Syslog	Syslog server (RFC3164)
Warning Message	System syslog, e-mail
DNS	Client, Proxy
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 SIP, Subnet (32bit) 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 Measuring UTP cable normal or broken point distance
Cable Diagnostic	
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

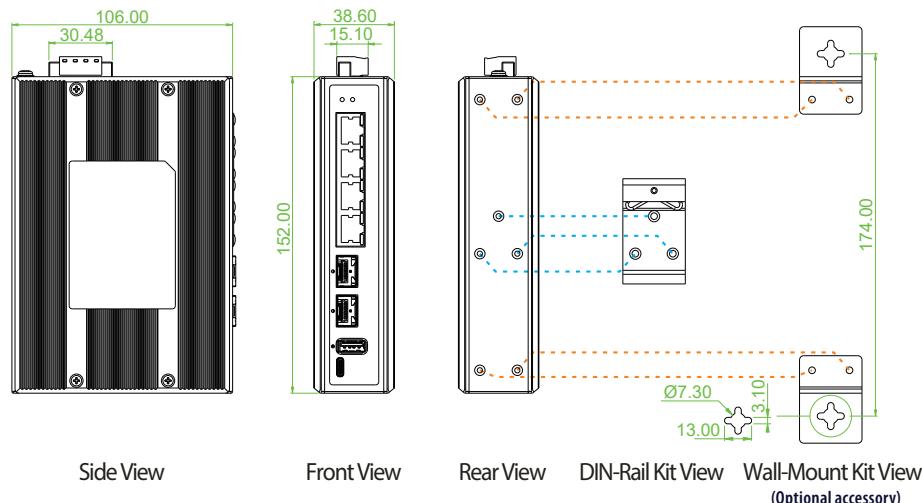
Application

Figure 1 : Application Example



7

Dimensions



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 802.3bt 90W	Power Budget			
IGS-402SW-4PB	6	4	2 SFP	4	240W	48VDC	V	-10~60°C
IGS-402SW-4PBE	6	4	2 SFP	4	240W	48VDC	V	-40~75°C

Package List

- IGS-402SW-4PB device
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Optional Accessories

Wall Mount Kit

IND-WMK05 Wall Mount kit for Industrial product (2pcs in 1 set, 42 x 30mm)

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP data sheets for more items and detailed information.)

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)

Industrial Power Supply

NDR-240-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 240W, -20 ~ +70°C

NDR-480-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 480W, -20 ~ +70°C (For more ref.)

IGS+803SM-8PH

8x GbE RJ45 + 3x 100/1000Base SFP with 8x PoE 240W, 48VDC



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



The models are managed, industrial grade, L2 Gigabit PoE (Power over Ethernet) switches that provide 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. 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 (46~57VDC) redundant dual input power
- Provides 8 port IEEE 802.3af / 802.3at PoE+ output ,30W 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
- 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) ITU-T G.8031 /Y.1342 EPS (Ethernet 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)	PoE standard & RJ-45 Pin Assignment 8x IEEE 802.3af /IEEE 802.3a 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 Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)								
Protocols	CSMA/CD								
Reverse Polarity Protection	Supported for power input								
Overload Current Protection	Supported								
CPU Watch Dog	Supported								
Power Supply	Redundant Dual input power (Removable terminal block) 48VDC (44~57VDC) (50~57V input is recommended for IEEE802.3at PoE+ applications)								
Power Consumption	Power consumption & Booser efficiency <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Input Voltage</th> <th style="text-align: center;">Total Power Consumption</th> <th style="text-align: center;">Device Power Consumption</th> <th style="text-align: center;">PoE Budget</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">50VDC</td> <td style="text-align: center;">255.5W</td> <td style="text-align: center;">15.5W</td> <td style="text-align: center;">240W</td> </tr> </tbody> </table>	Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	50VDC	255.5W	15.5W	240W
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								
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								
Device Memory	16M Bytes Flash ROM, 128M Bytes RAM								
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	Provides 1 terminal block for Alarm relay, redundant power PWR1 and PWR2
Operating Temperature	-10 ~ 60°C (IGS+803SM-8PH)
Operating Humidity	-40 ~ 75°C (IGS+803SM-8PHE)
Storage Temperature	5% to 95% (Non-condensing)
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	106 x 72 x 152 mm (D x W x H)
Weight	0.85kg
Installation Mounting	DIN Rail mounting, or wall mounting (Optional)
MTBF	487,189 Hours (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE (EN55024, EN55032)
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE

Traffic control	NEMA TS2
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
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

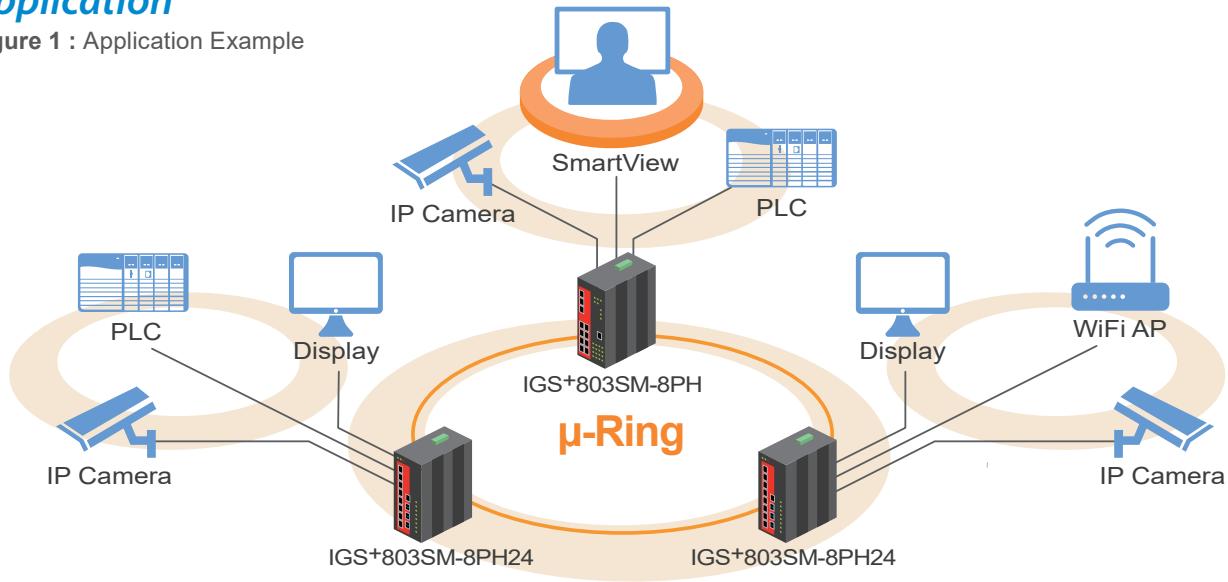
Topology	
VLAN	IEEE 802.1q VLAN, up to 4094 802.1Q VLAN VID IEEE 802.1q VLAN, up to 4094 Groups IEEE 802.1ad Q-in-Q MAC-based VLAN, up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN(Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN
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
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms Single Ring, Sub-Ring, Multiple ring topology network
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Supported
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	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps"
Bandwidth Control for Egress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps" 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
sFlow	Supported
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)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
IEEE1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol
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 SIP, Subnet (32bit) 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	

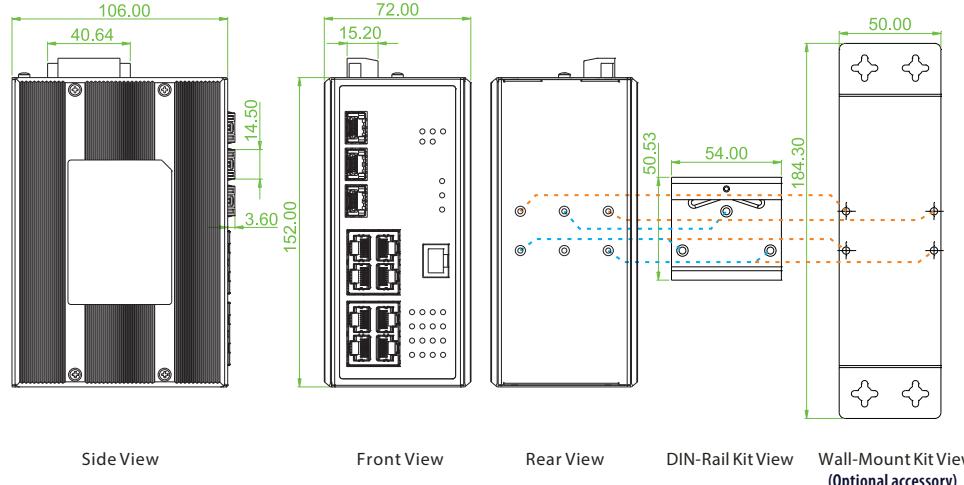
PoE PD failure auto checking, and auto reset when PD fail
PoE port on/off weekly scheduling
PoE Configuration
PoE Enable/Disable
Power limit by classification
Power feeding priority
Total PoE Power budge limitation: maximum 240W

Application

Figure 1 : Application Example



Dimensions



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		NEMA TS2	Safety EN62368-1	CE, FCC	
IGS+803SM-8PH	11	8	3 SFP	8	240W	48VDC	V	V	V	-10~60°C
IGS+803SM-8PHE	11	8	3 SFP	8	240W	48VDC	V	V	V	-40~75°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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP data sheets for more items and detailed information.)

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)

■ Industrial Power Supply

NDR-240-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 240W, -20 ~ +70°C

IGS-1604XSM-16PH

16x 10/100/1000Base-T + 4x GbE/2.5G/5G/10GBase-X SFP⁺ with 16x PoE 300W



- Supports u-Ring, ERPS, EPS, MSTP, RSTP, STP for redundant cabling
- Auto checking and auto reset when PoE PD fail
- EN62368-1, CE, FCC certified



An Industrial 16-port PoE Gigabit Ethernet switch with 4-port 10 Gigabit SFP+ slot, supporting various types of 10 and 2.5 Gigabit optical small form-factor pluggable transceivers for long-distance and wide-bandwidth transmission, each PoE port support IEEE802.3af/at standard of the maximum 30W power output, each switch has a total power budget of up to 300Watts, used to connect and feed various types of Ethernet power devices, such as smoke sensors, Wi-Fi access points, femtocells, alarm centers, and IP cameras. the din-rail and fan less 20-port switch adopts an enhanced and hardened design for high surge protection, wide operating temperature and safety certified to meet critical and centralize strict requirements.

Features

- 48VDC (46~57VDC) redundant dual input power
- Provides 16 port IEEE 802.3af / 802.3at PoE+ output ,30W per port, total 300W
- 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 SmartView™ for Centralized Management*

*Please see Chapter 1- Software Management for more details

Specifications

Standard	IEEE 802.3 IEEE 802.3u IEEE 802.3ab IEEE 802.3z IEEE802.3ae IEEE 802.3af IEEE 802.3at IEEE 802.1d IEEE 802.1w IEEE 802.1s ITU-T G.8032 / Y.1344 ITU-T G.8031 /Y.1342 IEEE 802.1Q IEEE 802.1X IEEE802.3ac IEEE 802.3ad IEEE 802.3x IEEE 802.1ad IEEE 802.1p IEEE 802.1ab IEEE 802.3az	10Base-T 10Mbit/s Ethernet 100Base-TX, 100Base-FX, Fast Ethernet 1000Base-T Gbit/s Ethernet over twisted pair 1000Base-X Gbit/s Ethernet over Fiber-Optic 10G bit/s Ethernet over Fiber PoE (Power over Ethernet) PoE+ (Power over Ethernet enhancements) STP (Spanning Tree Protocol) RSTP (Rapid Spanning Tree Protocol) MSTP (Multiple Spanning Tree Protocol) ERPS (Ethernet Ring Protection Switching) EPS (Ethernet Protection Switching) Virtual LANs (VLAN) Port based and MAC based Network Access Control, Authentication Max frame size extended to 1522Bytes Link aggregation for parallel links with LACP(Link Aggregation Control Protocol) Flow control for Full Duplex Stacked VLANs, Q-in-Q LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization Link Layer Discovery Protocol (LLDP) EEE (Energy Efficient Ethernet)	Console RS-232 (RJ-45)								
PoE standard & RJ-45 Pin Assignment	16x 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 Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)	Protocols CSMA/CD								
Reverse Polarity Protection	Supported for power input	Overload Current Protection Supported	CPU Watch Dog Supported								
Power Supply	Redundant Dual DC 48V (46~57VDC) input power, (Removable terminal block) (50~57V input is recommended for IEEE802.3at PoE+ applications)	Power Consumption <table border="1"><tr><th>Input Voltage</th><th>Total Power Consumption</th><th>Device Power Consumption</th><th>PoE Power Budget</th></tr><tr><td>50 VDC</td><td>337W</td><td>28.5W</td><td>300W</td></tr></table>	Input Voltage	Total Power Consumption	Device Power Consumption	PoE Power Budget	50 VDC	337W	28.5W	300W	PoE Power Budget Maximum PoE Output power budget 30W / Per Port Total 300W
Input Voltage	Total Power Consumption	Device Power Consumption	PoE Power Budget								
50 VDC	337W	28.5W	300W								
LED	Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber)	Per SFP Fiber port: 1G/2.5G Link/Active (Amber) 10G Link/Active (Blue)	Per PoE Port LED 1 LED /per Port : • PoE Output Power On : ON (Green) • PoE Output Power Off : Off								
Jumbo Frame	10KB	IEEE802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)								
MAC Address Table	32K	Memory Buffer	4M Bytes for packet buffer								
Device Memory	128M Bytes Flash ROM, 2G Bytes RAM	Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay								
DO(Alarm Relay Contact)	Relay outputs with current carrying capacity of 1 A @24VDC										

DI Input	DI 17 to 30 V for state 1 0 to 15 V for state 0
Removable Terminal Block	Provides 2 terminal block for DO (Alarm Relay), DI, redundant power PWR1 and PWR2
Operating Temperature	-40 ~ 60°C
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	155.6 x 77 x 160mm (D x W x H)
Weight	2.065kg
Installation Mounting	DIN Rail mounting, or wall mounting (Optional)
MTBF	224,776 Hours (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE (EN55032, EN55035)

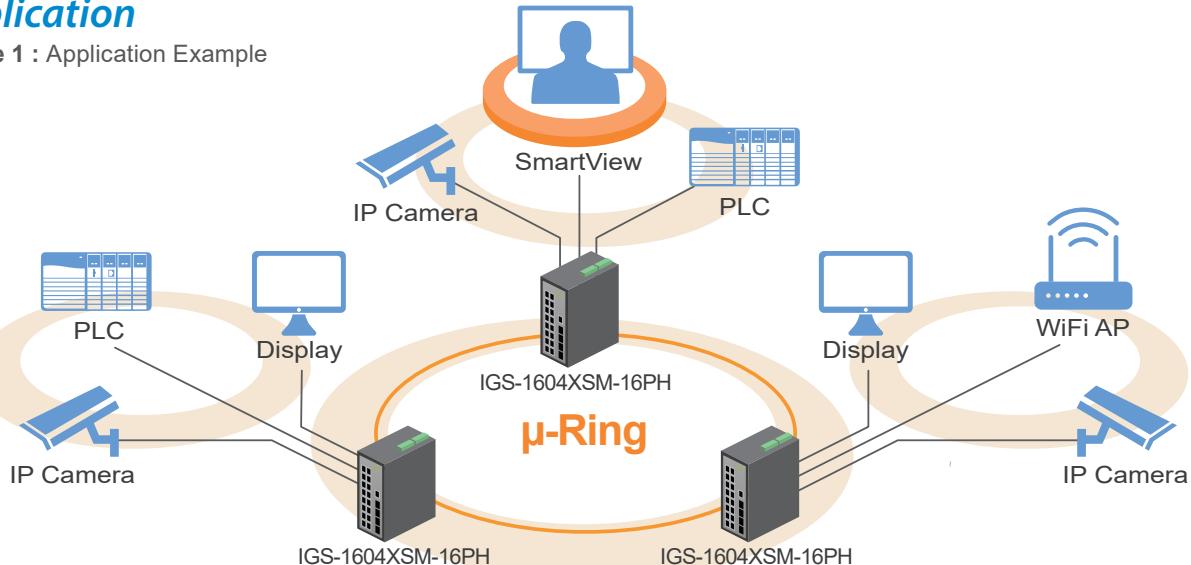
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (Burst) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	EN62368-1
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-31
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(Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN
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
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Single Ring, Sub-Ring, Multiple ring topology network Supported
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	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps"
Bandwidth Control for Egress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps" 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	Local Authentication
Password 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
sFlow	Supported
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)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
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 SIP, Subnet (32bit) 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 300W

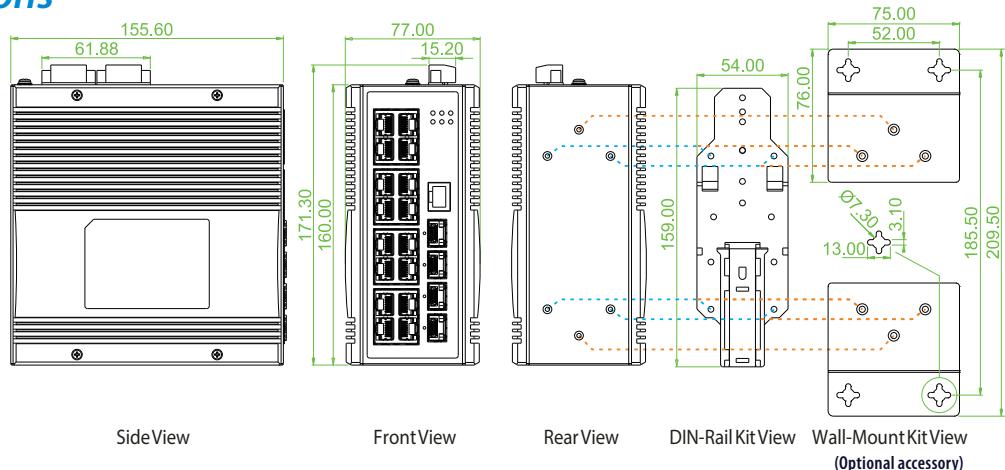
Application

Figure 1 : Application Example



7

Dimensions



Ordering Information

Model Name	Total Port	UTP	Fiber	PoE Port		Input Power	Certification		Operating Temperature
		10/100/1000 Base-T	1000/2.5G/5G/10G Base-X	IEEE802.3at	Power Budget		Railway EN62368-1	CE, FCC	
IGS-1604XSM-16PH	20	16	4 SFP	16	300W	48VDC	V	V	-40~60°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-WMK04 Wall Mount kit for Industrial product (Wide) (2 pcs in 1 set, 76mm x 75mm x 2pcs)

■ Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP data sheets for more items and detailed information.)

ISFP-M9000-85-D(E) Industrial SFP 10GBase-SR MM, 300meter, wave length 850nm LC, DDMI, -10~70°C (-40~85°C)

ISFP-S9010-31-D(E) Industrial SFP 10GBase-LR SM, 10km, 1310nm, 6.4dB, LC, 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)

■ Industrial Power Supply

NDR-480-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 480W, -20 ~ +70°C

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

- ◀ 16x GbE RJ45 + 8x 100/1000Base SFP with 8x PoE 240W, 48VDC
- ▶ 16x GbE RJ45 + 8x 100/1000Base SFP with 16x PoE 360W, 48VDC



- Supports IEEE 1588 PTP V2
- Supports u-Ring, ERPS, EPS, MSTP, RSTP, STP for redundant cabling
- Auto checking and auto reset when PoE PD fail
- EN62368-1, EN50121-4, 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 16x 10/100/1000Base-T 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, 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 (46~57VDC) redundant dual input power
- Provides 8 port IEEE 802.3af / 802.3at PoE+ output ,30W per port , total 240W (IGS-1608SM-8PH)
- Provides 16 port IEEE 802.3af / 802.3at PoE+ output ,30W per port, total 360W (IGS-1608SM-16PH)
- 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 SmartView™ for Centralized Management*

*Please see Chapter 1- Software Management for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet	Switch Architecture	Back-plane (Switching Fabric): 48Gbps
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet	Data Processing	Full wire-speed
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair	Flow Control	Store and Forward
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic		IEEE 802.3x for full duplex mode Back pressure for half duplex mode
	IEEE 802.3af	PoE (Power over Ethernet)	Network Connector	16x 10/100/1000Base-T RJ-45 + 8x 100/1000Base-X SFP connector
	IEEE 802.3at	PoE+ (Power over Ethernet enhancements)		RJ-45 UTP port supports Auto negotiation speed, Auto MDI/MDI-X function, SFP port supports 100/1000 dual speed with DDMI
	IEEE 802.1d	STP (Spanning Tree Protocol)	Console	RS-232 (RJ-45)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)	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)
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)		2 pairs PoE, PoE+, 30W/port
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)		End-Span, Alternative A mode.
	ITU-T G.8031 / Y.1342	EPS (Ethernet Protection Switching)		Positive (V+) : RJ-45 pin 1, 2. Negative (V-) : RJ-45 pin 3, 6.
	IEEE 802.1Q	Virtual LANs (VLAN)	Network Cable	UTP/STP Cat. 5e cable or above
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication		EIA/TIA-568 100-ohm (100meter)
	IEEE802.3ac	Max frame size extended to 1522Bytes	Protocols	CSMA/CD
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)	Reverse Polarity Protection	Supported for power input
	IEEE 802.3x	Flow control for Full Duplex	Overload Current Protection	Supported
	IEEE 802.1ad	Stacked VLANs, Q-in-Q	CPU Watch Dog	Supported
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization	Power Supply	Redundant Dual input power (Removable terminal block) 48VDC (44~57VDC) (50~57V input is recommended for IEEE802.3at PoE+ applications)
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)		
	IEEE 802.3az	EEE (Energy Efficient Ethernet)		

Power Consumption	IGS-1608SM-16PH	Operating Temperature	-10 ~ 60°C (IGS-1608SM-16PH, IGS-1608SM-8PH)								
	<table border="1"> <tr> <th>Input Voltage</th> <th>Total Power Consumption</th> <th>Device Power Consumption</th> <th>PoE Budget</th> </tr> <tr> <td>52VDC</td> <td>387W</td> <td>20W</td> <td>360W</td> </tr> </table>	Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	52VDC	387W	20W	360W	Operating Humidity	-40 ~ 75°C (IGS-1608SM-16PHE, IGS-1608SM-8PHE)
Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget								
52VDC	387W	20W	360W								
	IGS-1608SM-8PH Power consumption	Storage Temperature	5% to 95% (Non-condensing)								
	<table border="1"> <tr> <th>Input Voltage</th> <th>Total Power Consumption</th> <th>Device Power Consumption</th> <th>PoE Budget</th> </tr> <tr> <td>50VDC</td> <td>255.2W</td> <td>15.2W</td> <td>240W</td> </tr> </table>	Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	50VDC	255.2W	15.2W	240W	Housing	Rugged Metal, IP30 Protection, Fanless
Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget								
50VDC	255.2W	15.2W	240W								
PoE Power Budget	Maximum PoE Output power budget 30W / Per Port Total 240W (IGS-1608SM-8PH) Total 360W (IGS-1608SM-16PH)	Dimensions	135.6x 99x 160mm (Dx Wx H) (IGS-1608SM-16PH) 116 x 92 x 160mm (Dx Wx H) (IGS-1608SM-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) 1000 Link/Active (Amber)	Weight	2.5kg (IGS-1608SM-16PH) 1.375kg (IGS-1608SM-8PH)								
	SFP Fiber Per port: Link/Active (Green)	Installation Mounting	DIN Rail mounting, or wall mounting (Optional)								
	PoE Port LED 1 LED /per Port : • PoE Output Power On : ON (Green) • PoE Output Power Off : Off	MTBF	436,353 Hours (IGS-1608SM-16PH) 439,881 Hours (IGS-1608SM-8PH) (MIL-HDBK-217)								
Jumbo Frame	9.6KB	Warranty	5 years								
IEEE802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)	Certification									
MAC Address Table	8K	EMC	CE (EN55024, EN55032)								
Memory Buffer	512K Bytes for packet buffer	EMI									
Device Memory	16M Bytes Flash ROM, 128M Bytes RAM	(Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE								
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay	EMS (Electromagnetic Susceptibility)	EN61000-4-2 (ESD) Level 3, Criteria B								
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC	Protection Level	EN61000-4-3 (RS) Level 3, Criteria A								
DI Input	DI 17 to 30 V for state 1 (IGS-1608SM-16PH) 0 to 15 V for state 0		EN61000-4-4 (Burst) Level 3, Criteria A								
Removable Terminal Block	Provides 2 terminal block for Alarm relay, DI, redundant power PWR1 and PWR2 (IGS-1608SM-16PH) Provides 1 terminal block for Alarm relay, redundant power PWR1 and PWR2 (IGS-1608SM-8PH)		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								
		Railway Traffic	EN50121-4 (IGS-1608SM-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(Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN	Bandwidth Control for Ingress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps"
		Bandwidth Control for Egress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps" 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
		Management Interface Access	Remote Authentication (via RADIUS / TACACS+)
		Filtering	Web, Telnet / SSH , CLI RS-232 console
		Management Features	
		CLI	Cisco® like CLI
		Web Based Management	
		Telnet	Server
		SNMP	V1, V2c, V3
		sFlow	Supported
		Modbus/TCP	Supports for management and monitoring

SW & Configuration Upgrade	TFTP, HTTP	IPv6 Telnet	Supported
Redundant firmware in case of upgrade failure		IPv6 NTP, SNTP	Client
FTP client	Supports for upload/download configuration	IPv6 TFTP	Supported
RMON	RMON I (1, 2, 3, 9 group), RMON II	IPv6 QoS	Supported
MIB	RFC1213 MIB II, Private MIB	IPv6 ACL	Number of rules: up to 256 entries for L2 / L3 / L4
UPnP	Supported		L2 : Mac address SA/DA/VLAN
BOOTP	Supported		L3: IP address SIP, Subnet (32bit)
DHCP	Server, Client, Relay, Relay option 82 , Snooping		L4: TCP/UDP
RARP	Supported		
IP Source Guard	Supported		
Port Mirroring	Supported		
Event Syslog	Syslog server (RFC3164)		
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			
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		

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

Measuring UTP cable normal or broken point distance

Cable Diagnostic

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

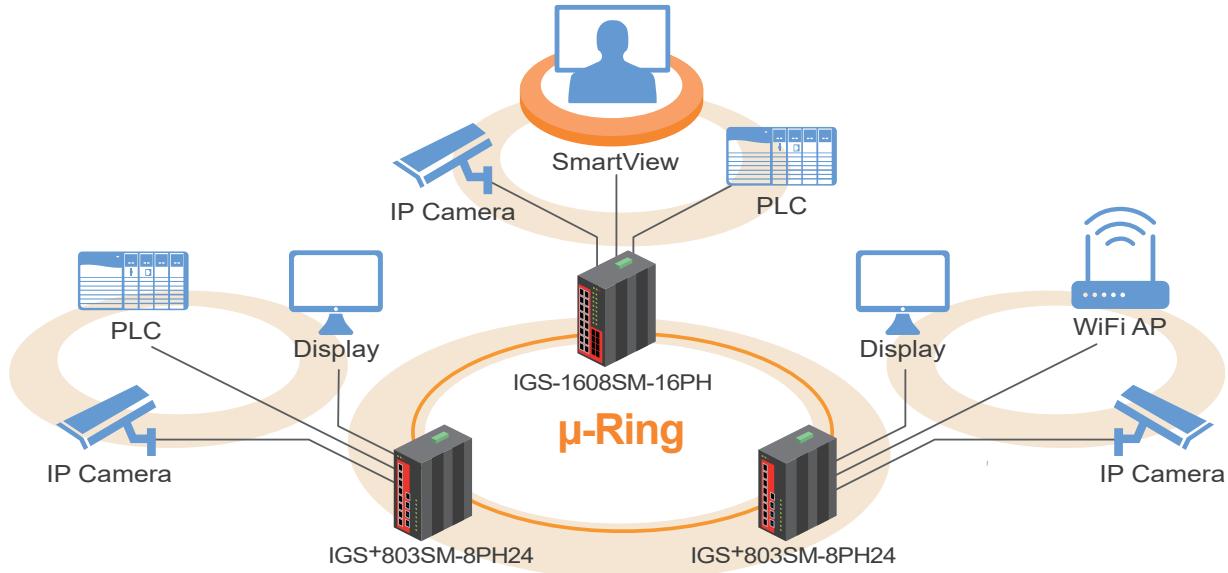
Power limit by classification

Power feeding priority

Total PoE Power budget limitation: maximum 360W for IGS-1608SM-16PH, 240W for IGS-1608SM-8PH

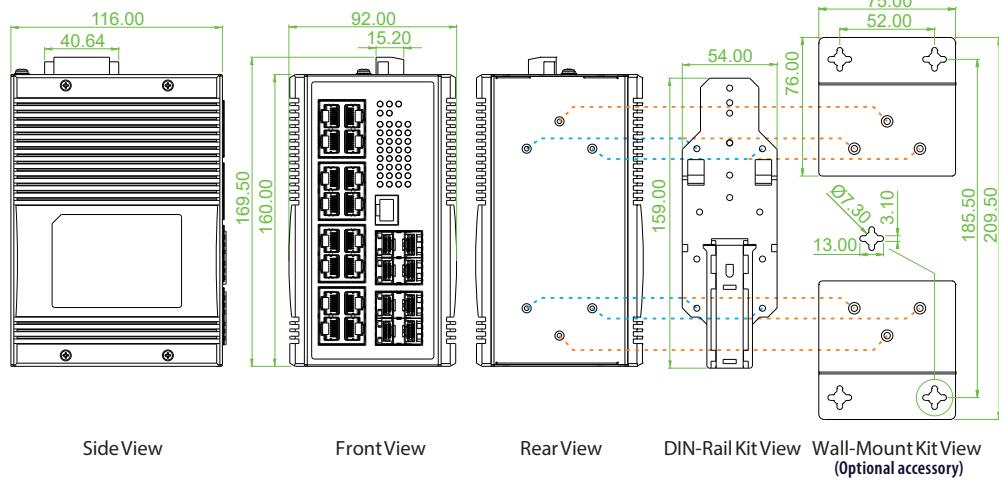
Application

Figure 1 : Application Example

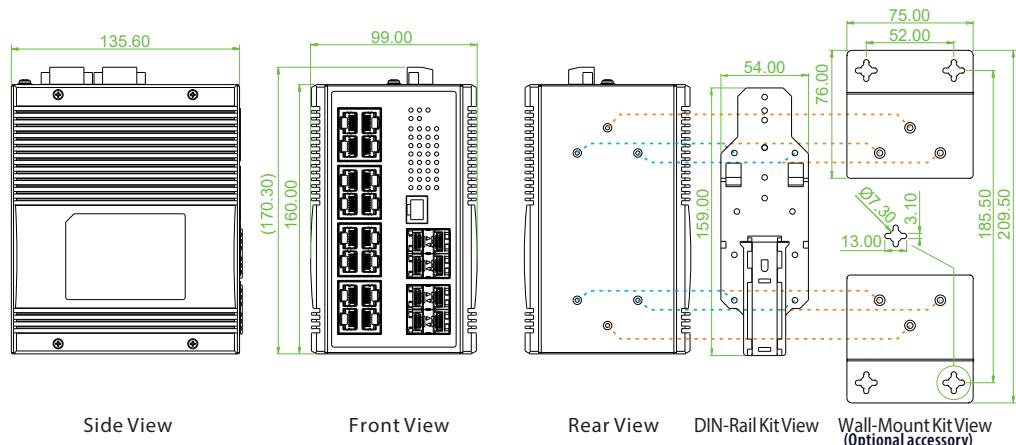


Dimensions

IGS-1608SM-8PH



► IGS-1608SM-16PH

**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	Safety EN62368-1		EN50121-4	CE, FCC		
IGS-1608SM-8PH	24	16	8 SFP	8	240W	48VDC	V	V	V	V	-10~60°C
IGS-1608SM-8PHE	24	16	8 SFP	8	240W	48VDC	V	V	V	V	-40~75°C
IGS-1608SM-16PH	24	16	8 SFP	16	360W	48VDC	V	V	V	V	-10~60°C
IGS-1608SM-16PHE	24	16	8 SFP	16	360W	48VDC	V	V	V	V	-40~75°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-WMK04 Wall Mount kit for Industrial product (Wide) (2 pcs in 1 set, 76mm x 75mm x 2pcs)

■ Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP data sheets for more items and detailed information.)

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)

■ Industrial Power Supply

NDR-480-48	Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 480W, -20 ~ +70°C (For IGS-1608SM-16PH)
NDR-240-48	Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 240W, -20 ~ +70°C (For IGS-1608SM-8PH)

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

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

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



- Supports IEEE 1588 PTP V2
- Supports u-Ring, ERPS, EPS, MSTP, RSTP, STP for redundant cabling
- 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 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
- 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	Data Processing	Store and Forward
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet	Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair	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)
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic		RJ-45 UTP port support Auto negotiation speed, Auto MDI/MDI-X function, SFP ports support 100/1000M with DDMI
	IEEE 802.3af	PoE (Power over Ethernet)	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)
	IEEE 802.3at	PoE+ (Power over Ethernet enhancements)	Console	RS-232 (RJ-45)
	IEEE 802.1d	STP (Spanning Tree Protocol)	Network Cable	UTP/STP Cat. 5e cable or above
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)	Protocols	EIA/TIA-568 100-ohm (100meter)
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)	Reverse Polarity Protection	CSMA/CD
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)	Overload Current Protection	Supported for power input
	ITU-T G.8031 / Y.1342	EPS (Ethernet Protection Switching)	CPU Watch Dog	Supported
	IEEE 802.1Q	Virtual LANs (VLAN)	Power Supply	Supported
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication		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)
	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			

Power Consumption	IFS-402GSM-4PH24 Power consumption & Booser efficiency																
	<table border="1"> <thead> <tr> <th>Input Voltage</th><th>Total Power Consumption</th><th>Device Power Consumption</th><th>PoE Budget</th><th>Boost Efficiency</th></tr> </thead> <tbody> <tr> <td>24VDC</td><td>134.8W</td><td>7.1W</td><td>120W</td><td>94.0%</td></tr> <tr> <td>48VDC</td><td>132.2W</td><td>8.5W</td><td>120W</td><td>97.2%</td></tr> </tbody> </table>	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%	
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																
	<table border="1"> <thead> <tr> <th>Input Voltage</th><th>Total Power Consumption</th><th>Device Power Consumption</th><th>PoE Budget</th><th>Boost Efficiency</th></tr> </thead> <tbody> <tr> <td>24VDC</td><td>198.3W</td><td>7.3W</td><td>180W</td><td>94%</td></tr> <tr> <td>48VDC</td><td>193.2W</td><td>7.9W</td><td>180W</td><td>97%</td></tr> </tbody> </table>	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%	
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 : <ul style="list-style-type: none">• 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																
Device Memory	16M Bytes Flash ROM, 128M Bytes RAM																
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	Provides 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																
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																

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(Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN
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
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms Single Ring, Sub-Ring, Multiple ring topology network
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Supported
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	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps"
Bandwidth Control for Egress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps" 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
Management Interface Access Filtering	Remote Authentication (via RADIUS / TACACS+) Web, Telnet / SSH, CLI RS-232 console
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3
sFlow	Supported
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	IPv6 TFTP	Supported
RMON	RMON I (1, 2, 3, 9 group), RMON II	IPv6 QoS	Supported
MIB	RFC1213 MIB II, Private MIB	IPv6 ACL	Number of rules: up to 256 entries
UPnP	Supported		for L2 / L3 / L4
BOOTP	Supported		L2: Mac address SA/DA/VLAN
DHCP	Server, Client, Relay, Relay option 82 , Snooping		L3: IP address SIP, Subnet (32bit)
RARP	Supported		L4: TCP/UDP
IP Source Guard	Supported		
Port Mirroring	Supported		
Event Syslog	Syslog server (RFC3164)		
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	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		

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

Measuring UTP cable normal or broken point distance

Cable Diagnostic

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 budget limitation (Maximum 120W for IFS-402GSM-4PH24, 180W for IFS-803GSM- 8PH24)

Power feeding priority

Application

Figure 1 : Application Example

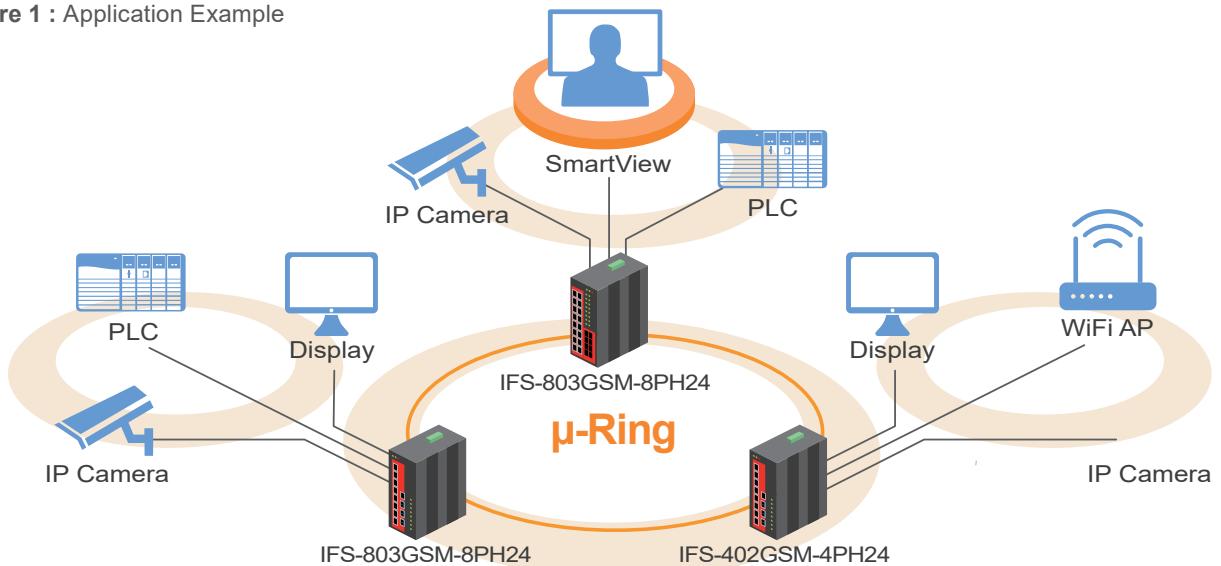
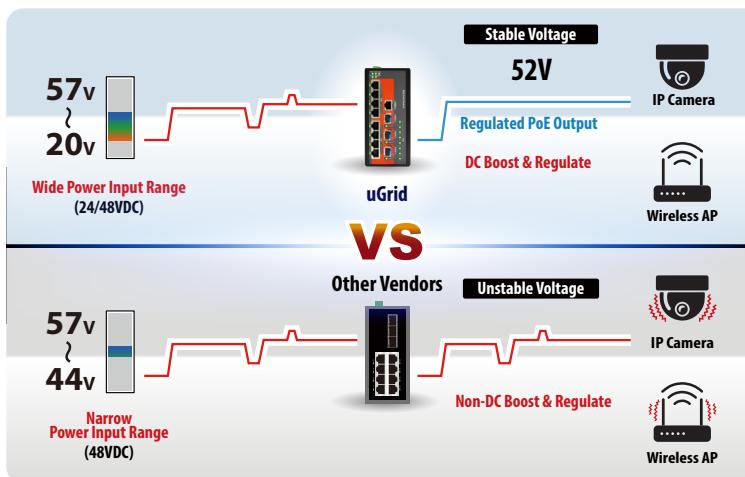


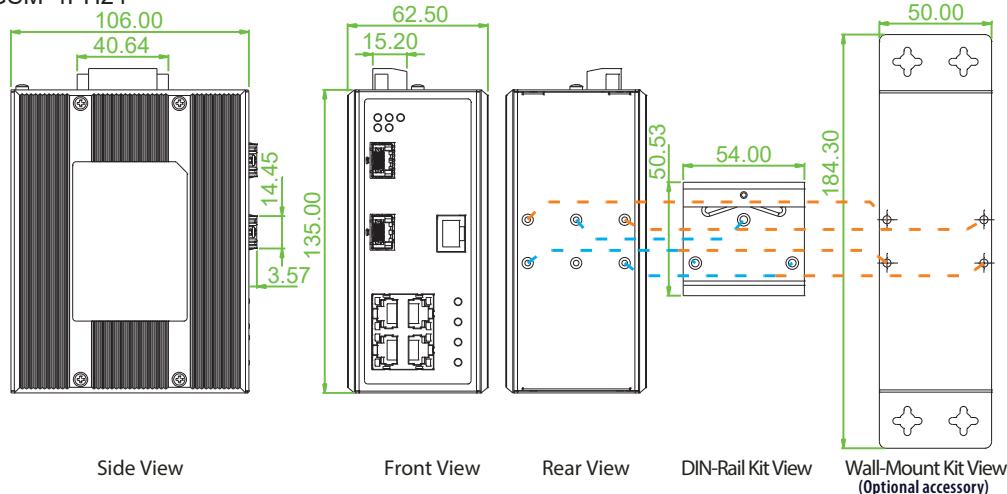
Figure 2 : High Efficiency Boost Technology for PoE



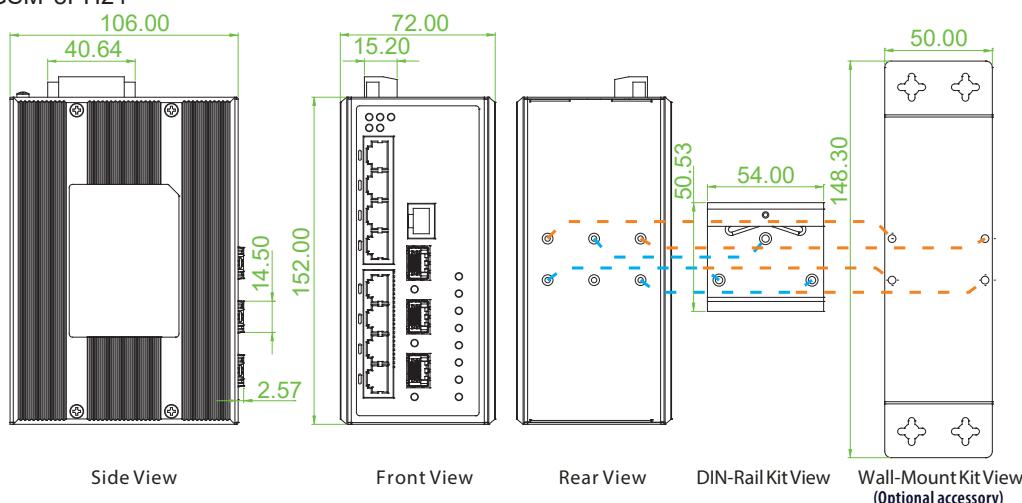
- Regulated PoE output voltage (52VDC) to stabilize PoE device
- Guarantee delivery PoE power distance to 100 meters
- Wide range input power 24/48VDC (20~57VDC)
- Built-in very high efficiency (94~97%) to boost PoE output voltage

Dimensions

IFS-402GSM-4PH24



IFS-803GSM-8PH24



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			
IFS-402GSM-4PH24	6	4	2 SFP	4	120W	24/48VDC	V	-10~60°C
IFS-402GSM-4PHE24	6	4	2 SFP	4	120W	24/48VDC	V	-40~75°C
IFS-803GSM-8PH24	11	8	3 SFP	8	180W	24/48VDC	V	-10~60°C
IFS-803GSM-8PHE24	11	8	3 SFP	8	180W	24/48VDC	V	-40~75°C

Package List

- IFS-803GSM-8PH24 or IFS-402GSM-4PH24 device
- Console cable (RJ-45 to DB9)
- Din Rail with screws
- Protective caps for SFP ports
- Terminal block

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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP data sheets for more items and detailed information.)

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)

Industrial Power Supply

NDR-120-48	Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 120W, -20 ~ +70°C (For IFS-402GSM-4PH24)
NDR-240-48	Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 240W, -20 ~ +70°C (For IFS-803GSM-8PH24)
NDR-480-48	Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 480W, -20 ~ +70°C (For more ref)

IFS-402CGSW-4PH

4x FE RJ45 + 2x 100/1000 SFP with 4x PoE 120W, Compact size



- 4KV surge protection for PoE, UTP and SFP ports
- Compact size for easy installation
- Auto checking and auto reset when PoE PD fail



These Gigabit Ethernet switch models are managed industrial grade L2 switches with 4 10/100Base-TX ports and 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. 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 power input
- Provides 4 port IEEE 802.3af / 802.3at PoE output
- Cable diagnostics
- Supports SmartView™ for Centralized Management*

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

Specifications

Standard	IEEE 802.3 IEEE 802.3u IEEE 802.3z IEEE 802.3af IEEE 802.3at IEEE 802.1d IEEE 802.1w IEEE 802.1s IEEE 802.1Q IEEE 802.1X IEEE802.3ac IEEE 802.3ad IEEE 802.3x IEEE 802.1ad IEEE 802.1p IEEE 802.1ab IEEE 802.3az	10Base-T 10Mbit/s Ethernet 100Base-TX, 100Base-FX, Fast Ethernet 1000Base-X Gbit/s Ethernet over Fiber-Optic PoE (Power over Ethernet) PoE+ (Power over Ethernet enhancements) STP (Spanning Tree Protocol) RSTP (Rapid Spanning Tree Protocol) MSTP (Multiple Spanning Tree Protocol) Virtual LANs (VLAN) Port based and MAC based Network Access Control, Authentication Max frame size extended to 1522Bytes Link aggregation for parallel links with LACP(Link Aggregation Control Protocol) Flow control for Full Duplex Stacked VLANs, Q-in-Q LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization Link Layer Discovery Protocol (LLDP) EEE (Energy Efficient Ethernet)	Network Cable	UTP/STP Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)								
Protocols			Protocols	CSMA/CD								
Reverse Polarity Protection			Reverse Polarity Protection	Supported for power input								
Overload Current Protection			Overload Current Protection	Supported								
CPU Watch Dog			CPU Watch Dog	Supported								
Power Supply			Power Supply	Redundant Dual DC48V (44~57VDC) Input power (Removable Terminal Block) (50~57V input is recommended for IEEE 802.3at PoE+ application)								
Power Consumption			Power Consumption	<table border="1"> <thead> <tr> <th>Input Voltage</th><th>Total Power Consumption</th><th>Device Power Consumption</th><th>Power Budget</th></tr> </thead> <tbody> <tr> <td>50 VDC</td><td>127.5W</td><td>5.3W</td><td>120W</td></tr> </tbody> </table>	Input Voltage	Total Power Consumption	Device Power Consumption	Power Budget	50 VDC	127.5W	5.3W	120W
Input Voltage	Total Power Consumption	Device Power Consumption	Power Budget									
50 VDC	127.5W	5.3W	120W									
PoE Power Budget			PoE Power Budget	Maximum PoE Output power budget 120W, (30W/per port)								
LED			LED	<p>Per unit: Power 1 (Green), Power 2 (Green) Per RJ-45 port: 100 Link/Active (Green) 10 Link/Active (Amber)</p> <p>SFP Fiber Per port: 100 Link/Active (Green) 1000 Link/Active (Amber)</p> <p>PoE Port LED 1 LED /per Port : • PoE Output Power On : ON (Green) • PoE Output Power Off : Off</p>								
Jumbo Frame			Jumbo Frame	10K								
IEEE802.3ac			IEEE802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)								
MAC Address Table			MAC Address Table	4K								
Memory Buffer			Memory Buffer	1.75M bits for packet buffer								
Device Memory			Device Memory	128M Bytes Flash ROM, 256M Bytes RAM								
Warning Message			Warning Message	System Syslog, SMTP/ e-mail event message								
Removable Terminal Block			Removable Terminal Block	Provides 2 redundant power, 4 Pin								
Operating Temperature			Operating Temperature	-10 ~ 60°C (IFS-402CGSW-4PH) -40 ~ 75°C (IFS-402CGSW-4PHE)								
Operating Humidity			Operating Humidity	5% to 95% (Non-condensing)								

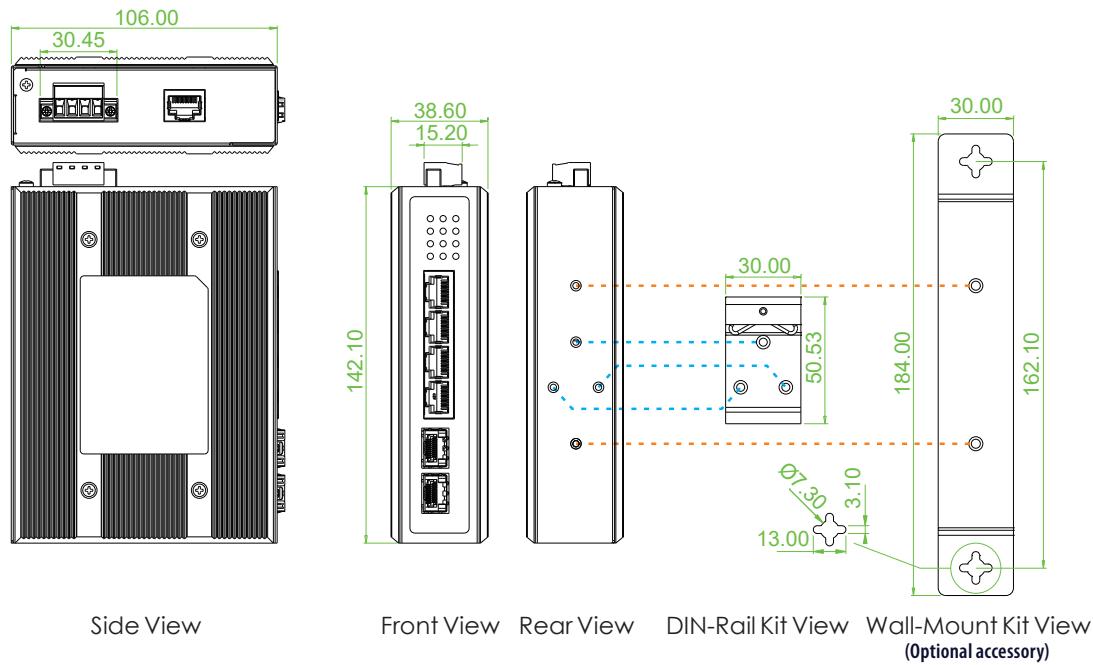
Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	106x 38.6x 142mm (Dx Wx H)
Weight	820g
Installation Mounting	DIN Rail mounting, or wall mounting (Optional)
MTBF	897,992 Hours (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE (EN55032, EN55035)
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE

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
Surge protection	4KV for PoE, UTP and Fiber ports
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-31
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 Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN
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
Loop Protection	Supported
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	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps"
Bandwidth Control for Egress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps" 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	Local Authentication
Password	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
sFlow	Supported
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
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)
Warning Message	System syslog, e-mail
DNS	Client, Proxy
NTP	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	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 SIP ,Subnet (32bit) 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 Measuring UTP cable normal or broken point distance
Cable Diagnostic	
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)

Dimensions



Ordering Information

Model Name	Total Port	RJ45	Fiber	PoE Port		Input Power	Certification	Operating 10/100Base-TX
IFS-402CGSW-4PH	6	4	2 SFP	4	120W	48VDC	V	-10~60°C
IFS-402CGSW-4PHE	6	4	2 SFP	4	120W	48VDC	V	-40~75°C

■ Package List

- IFS-402CGSW-4PH device
- Console cable (RJ-45 to DB9)
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Optional Accessories

■ Wall Mount Kit

IND-WMK01 Wall Mount kit for Industrial product (184x30mm) (Narrow)

■ Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP data sheets for more items and detailed information.)

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)

■ Industrial Power Supply

NDR-120-48	Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 120W, -20 ~ +70°C (For IFS-402CGSW-4PH)
NDR-240-48	Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 240W, -20 ~ +70°C (For more ref)

IFS+803GSM-8PH

8x 10/100Base RJ45 + 3x 100/1000Base SFP with 8x PoE 240W, 48VDC



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



These models are managed, industrial grade, L2 PoE (Power over Ethernet) switches 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. 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 (46~57VDC) redundant dual input power
- Provides 8-port IEEE 802.3af / 802.3at PoE+ output ,30W 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
- Supports IEEE 1588 PTP V2 for precise time synchronization to operate in Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave mode by each port
- Supports SmartView™ for Centralized Management Tool*

*Please see Chapter 1- Software Management for more details

Specifications

Standard	IEEE 802.3 IEEE 802.3u IEEE 802.3z IEEE 802.3af IEEE 802.3at IEEE 802.1d IEEE 802.1w IEEE 802.1s ITU-T G.8032 / Y.1344 ITU-T G.8031 / Y.1342 IEEE 802.1Q IEEE 802.1X IEEE 802.3ac IEEE 802.3ad IEEE 802.3x IEEE 802.1ad IEEE 802.1p IEEE 802.1ab IEEE 802.3az	10Base-T 10Mbit/s Ethernet 100Base-TX, 100Base-FX, Fast Ethernet 1000Base-X Gbit/s Ethernet over Fiber-Optic PoE (Power over Ethernet) PoE+ (Power over Ethernet enhancements) STP (Spanning Tree Protocol) RSTP (Rapid Spanning Tree Protocol) MSTP (Multiple Spanning Tree Protocol) ERPS (Ethernet Ring Protection Switching) EPS (Ethernet Protection Switching) Virtual LANs (VLAN) Port based and MAC based Network Access Control, Authentication Max frame size extended to 1522Bytes Link aggregation for parallel links with LACP(Link Aggregation Control Protocol) Flow control for Full Duplex Stacked VLANs, Q-in-Q LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization Link Layer Discovery Protocol (LLDP) EEE (Energy Efficient Ethernet)	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			Console	RS-232 (RJ-45)								
PoE standard & RJ-45 Pin Assignment			PoE standard & RJ-45 Pin Assignment	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			Network Cable	UTP/STP Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)								
Protocols			Protocols	CSMA/CD								
Reverse Polarity Protection			Reverse Polarity Protection	Supported for power input								
Overload Current Protection			Overload Current Protection	Supported								
CPU Watch Dog			CPU Watch Dog	Supported								
Power Supply			Power Supply	Redundant Dual DC 48V (46~57VDC) input power, Removable terminal block (50~57V input is recommended for IEEE 802.3at PoE+)								
Power Consumption			Power Consumption	<table border="1"> <thead> <tr> <th>Input Voltage</th><th>Total Power Consumption</th><th>Device Power Consumption</th><th>PoE Budget</th></tr> </thead> <tbody> <tr> <td>50VDC</td><td>252.5W</td><td>12.9W</td><td>240W</td></tr> </tbody> </table>	Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	50VDC	252.5W	12.9W	240W
Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget									
50VDC	252.5W	12.9W	240W									
PoE Power Budget			PoE Power Budget	Maximum PoE Output power budget 30W / Per Port 240W for total								
Switch Architecture			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)								
Data Processing				PoE Port LED 1 LED /per Port : • PoE Output Power On : ON (Green) • PoE Output Power Off : Off								
Flow Control												

Jumbo Frame	9.6KB	MTBF	487,189 Hours (MIL-HDBK-217)
IEEE802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)	Warranty	5 years
MAC Address Table	8K	Certification	
Memory Buffer	512K Bytes for packet buffer	EMC	CE (EN55024, EN55032)
Device Memory	16M Bytes Flash ROM, 128M Bytes RAM	EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay	Traffic control	NEMA TS2
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC	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
Removable Terminal Block	Provides 1 terminal block for Alarm relay, redundant power PWR1 and PWR2	Safety	EN62368-1
Operating Temperature	-10 ~ 60°C (IFS+803GSM-8PH)	Surge protection	4KV for PoE, UTP and Fiber ports
Operating Humidity	-40 ~ 75°C (IFS+803GSM-8PHE)	Shock	IEC 60068-2-27
Storage Temperature	5% to 95% (Non-condensing)	Freefall	IEC 60068-2-32
Housing	Rugged Metal, IP30 Protection, Fanless	Vibration	IEC 60068-2-6
Dimensions	106 x 72 x 152mm (Dx Wx H)		
Weight	0.85kg		
Installation Mounting	DIN Rail mounting, or wall mounting (Optional)		

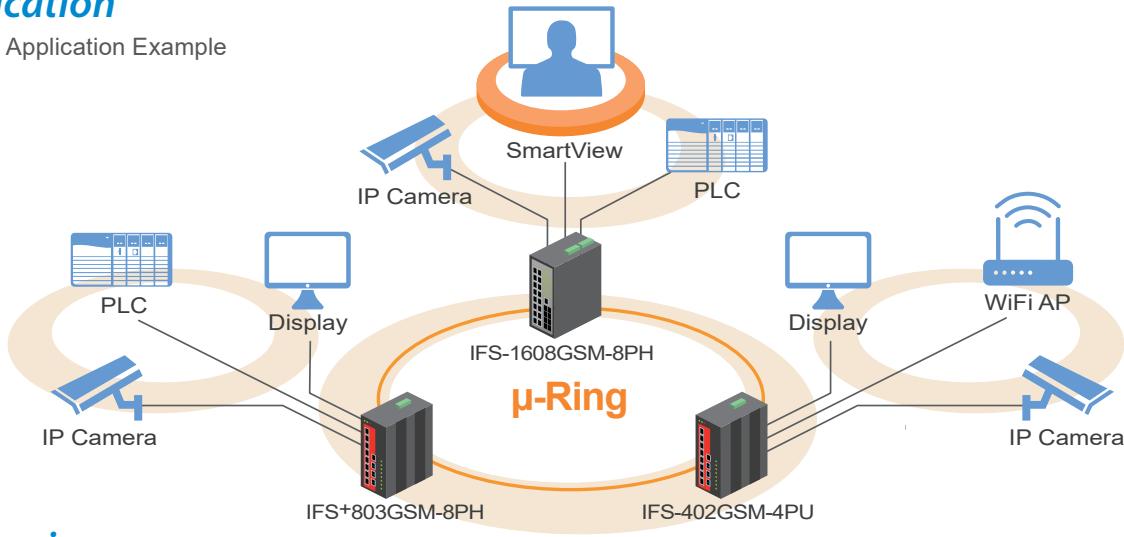
Software Specifications

Topology		Security Features	
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(Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN	IEEE 802.1X	Port-Based MAC-Based
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	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
Spanning Tree	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP	RADIUS authentication & accounting	TACACS+ authentication & accounting, TACACS+ 3.0
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)	HTTPS, HTTP	Supported
Loop Protection	Supported	SSL / SSH v2	Supported
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms	User Name	Local Authentication
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Single Ring, Sub-Ring, Multiple ring topology network	Password Authentication	Remote Authentication (via RADIUS / TACACS+)
QoS Features		Management Interface Access Filtering	Web, Telnet / SSH , CLI RS-232 console
Class of Service	IEEE 802.1p 8 active priorities queues for per port	Management Features	
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	CLI	Cisco® like CLI
Bandwidth Control for Ingress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps"	Web Based Management	
Bandwidth Control for Egress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps" Per queue / Per port shaper	Telnet	Server
DiffServ (RF 2474) Remarking		SNMP	V1, V2c, V3
Storm Control	for Unicast, Broadcast, Multicast	sFlow	Supported
IP Multicasting Features		Modbus/TCP	Supports for management and monitoring
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	SW & Configuration Upgrade	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)
		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	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

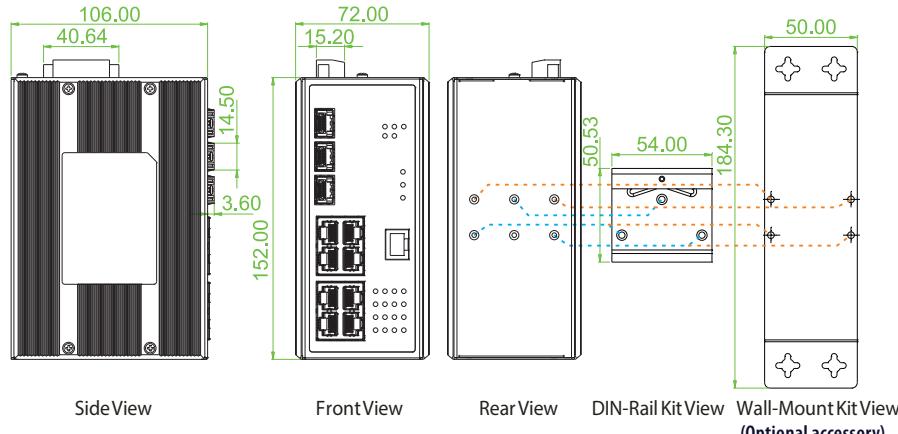
IPv6 Telnet	Supported	Others Features	
IPv6 NTP, SNTP	Client	Green Ethernet	Supports IEEE 802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering the power for ports with short cables
IPv6 TFTP	Supported		Lower the power for a port when there is no link
IPv6 QoS	Supported		LED Power Management :Adjustment LEDs intensity
IPv6 ACL	Number of rules: up to 256 entries for L2 / L3 / L4 L2: Mac address SA/DA/VLAN L3: IP address SIP, Subnet (32bit) L4: TCP/UDP	Cable Diagnostic Advanced PoE Management	Measuring UTP cable normal or broken point distance 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



Ordering Information

Model Name	Managed	Total Port	UTP 10/100 Base-TX	Fiber 100/1000 Base-X	PoE Port IEEE802.3at	Input Power	Certification			Operating Temperature
IFS+803GSM-8PH	V	11	8	3 SFP	8	240W	48VDC	V	V	-10~60°C
IFS+803GSM-8PHE	V	11	8	3 SFP	8	240W	48VDC	V	V	-40~75°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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP data sheets for more items and detailed information.)

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)

■ Industrial Power Supply

NDR-240-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 240W, -20 ~ +70°C

IFS-1608GSM-8PH & IFS-1608GSM-16PH

- ◀ 16x 10/100Base RJ45 + 8x 100/1000Base SFP with 8x PoE 240W, 48VDC
- ▶ 16x 10/100Base RJ45 + 8x 100/1000Base SFP with 16x PoE 360W, 48VDC



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



These models are managed, industrial grade, L2 PoE (Power over Ethernet) switches that provide 16x 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 (46~57VDC) redundant dual input power
- Provides 8-port IEEE 802.3af / 802.3at PoE+ output ,30W per port , total 240W (IFS-1608GSM-8PH)
- Provides 16-port IEEE 802.3af / 802.3at PoE+ output ,30W per port, total 360W (IFS-1608GSM-16PH)
- 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
- 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	Data Processing	Store and Forward
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet	Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic	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
	IEEE 802.3af	PoE (Power over Ethernet)	Console	RS-232 (RJ-45)
	IEEE 802.3at	PoE+ (Power over Ethernet enhancements)	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.
	IEEE 802.1d	STP (Spanning Tree Protocol)	Network Cable	UTP/STP Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)	Protocols	CSMA/CD
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)	Reverse Polarity Protection	Supported for power input
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)	Overload Current Protection	Supported
	ITU-T G.8031 / Y.1342	EPS (Ethernet Protection Switching)	CPU Watch Dog	Supported
	IEEE 802.1Q	Virtual LANs (VLAN)	Power Supply	Redundant Dual DC 48V (46~57VDC) input power, Removable terminal block (50~57V input is recommended for IEEE 802.3at PoE+)
	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			

Power Consumption	IFS-1608GSM-8PH	Operating Humidity	5% to 95% (Non-condensing)								
	<table border="1"> <thead> <tr> <th>Input Voltage</th> <th>Total Power Consumption</th> <th>Device Power Consumption</th> <th>PoE Budget</th> </tr> </thead> <tbody> <tr> <td>50VDC</td> <td>254.2W</td> <td>14.2W</td> <td>240W</td> </tr> </tbody> </table>	Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	50VDC	254.2W	14.2W	240W	Storage Temperature	-40 ~ 85°C
Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget								
50VDC	254.2W	14.2W	240W								
	IFS-1608GSM-16PH	Housing	Rugged Metal, IP30 Protection, Fanless								
	<table border="1"> <thead> <tr> <th>Input Voltage</th> <th>Total Power Consumption</th> <th>Device Power Consumption</th> <th>PoE Budget</th> </tr> </thead> <tbody> <tr> <td>52VDC</td> <td>382W</td> <td>16W</td> <td>360W</td> </tr> </tbody> </table>	Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	52VDC	382W	16W	360W	Dimensions	135.6x 99x 160mm (Dx Wx H) (IFS-1608GSM-16PH) 116 x 92 x 160mm (Dx Wx H) (IFS-1608GSM-8PH)
Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget								
52VDC	382W	16W	360W								
PoE Power Budget	Maximum PoE Output power budget 30W / Per Port 360W for total (IFS-1608GSM-16PH) Maximum PoE Output power budget 30W / Per Port 240W for total (IFS-1608GSM-8PH)	Weight	2.5kg (IFS-1608GSM-16PH) 1.375kg (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	Installation Mounting	DIN Rail mounting, or wall mounting (Optional)								
Jumbo Frame	9.6KB	MTBF	436,353 Hours (IFS-1608GSM-16PH) 439,881 Hours (IFS-1608GSM-8PH) (MIL-HDBK-217)								
IEEE802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)	Warranty	5 years								
MAC Address Table	8K	Certification									
Memory Buffer	512K Bytes for packet buffer	EMC	CE (EN55024, EN55032)								
Device Memory	16M Bytes Flash ROM, 128M Bytes RAM	EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE								
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay	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								
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC	EMS (Electromagnetic Susceptibility) Protection Level									
DI Input	DI 17 to 30 V for state 1 (IFS-1608GSM-16PH) 0 to 15 V for state 0	Safety	EN62368-1								
Removable Terminal Block	Provides 2 terminal block for Alarm relay, DI, redundant power PWR1 and PWR2 (IFS-1608GSM-16PH) Provides 1 terminal block for Alarm relay, redundant power PWR1 and PWR2 (IFS-1608GSM-8PH)	Surge protection	4KV for PoE, UTP and Fiber ports								
Operating Temperature	-10 ~ 60°C (IFS-1608GSM-16PH & IFS-1608GSM-8PH) -40 ~ 75°C (IFS-1608GSM-16PHE & IFS-1608GSM-8PHE)	Shock	IEC 60068-2-27								
		Freefall	IEC 60068-2-32								
		Vibration	IEC 60068-2-6								

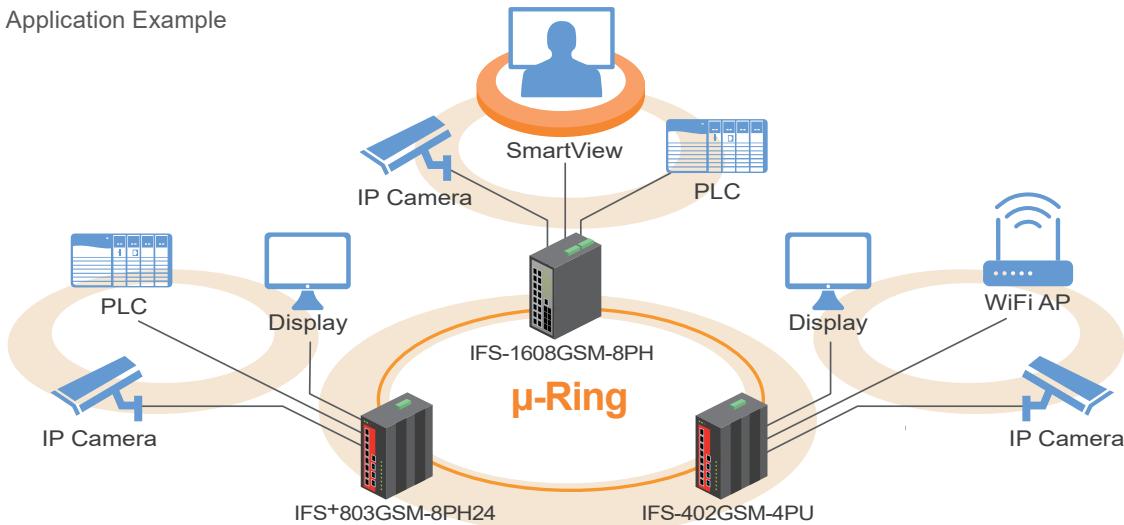
Software Specifications

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 Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN	Bandwidth Control for Ingress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps"
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	Bandwidth Control for Egress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps" Per queue / Per port shaper
Spanning Tree Multiple μ-Ring	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP 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)	DiffServ (RF 2474) Remark	for Unicast, Broadcast, Multicast
Loop Protection	Supported	IP Multicasting Features	
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms	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
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Single Ring, Sub-Ring, Multiple ring topology network	Security Features	
QoS Features Class of Service	IEEE 802.1p 8 active priorities queues for per port	IEEE 802.1X	Port-Based MAC-Based
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	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
		Management Interface Access Filtering	Remote Authentication (via RADIUS / TACACS+)
		Management Features	
		CLI	Cisco® like CLI
		Web Based Management	
		Telnet	Server
		SNMP	V1, V2c, V3
		sFlow	Supported
		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	IPv6 NTP, SNTP	Client
RMON	RMON I (1, 2, 3, 9 group), RMON II	IPv6 TFTP	Supported
MIB	RFC1213 MIB II, Private MIB	IPv6 QoS	Supported
UPnP	Supported	IPv6 ACL	Number of rules: up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SIP, Subnet (32bit) L4: TCP/UDP
BOOTP	Supported		
DHCP	Server, Client, Relay, Relay option 82 , Snooping		
RARP	Supported		
IP Source Guard	Supported		
Port Mirroring	Supported		
Event Syslog	Syslog server (RFC3164)		
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	Client		
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol LLDP-MED		
IPv6 Features			
IPv6 Management	Telnet Server/ICMP v6	Cable Diagnostic	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
SNMP over IPv6	Supported	Advanced PoE Management	Lower the power for a port when there is no link LED Power Management :Adjustment LEDs intensity
HTTP over IPv6	Supported		Measuring UTP cable normal or broken point distance
SSH over IPv6	Supported		
IPv6 Telnet	Supported		

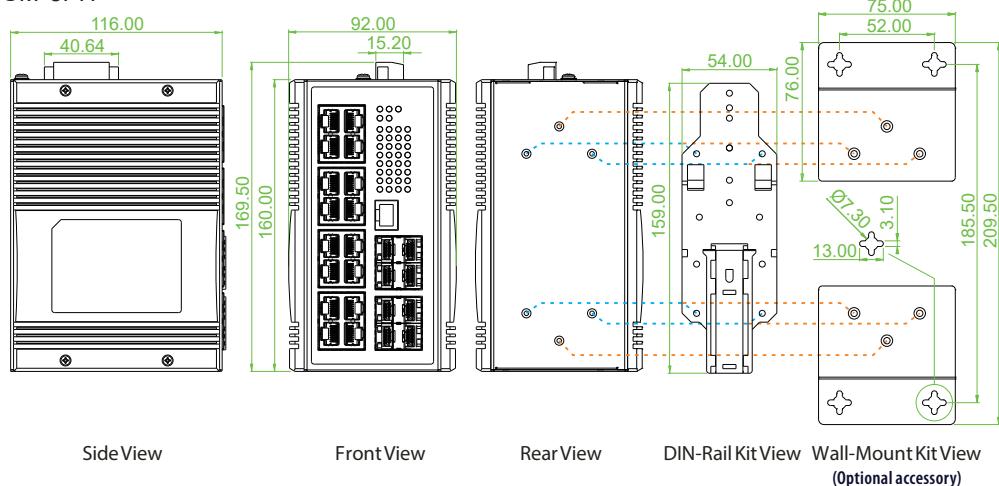
Application

Figure : Application Example

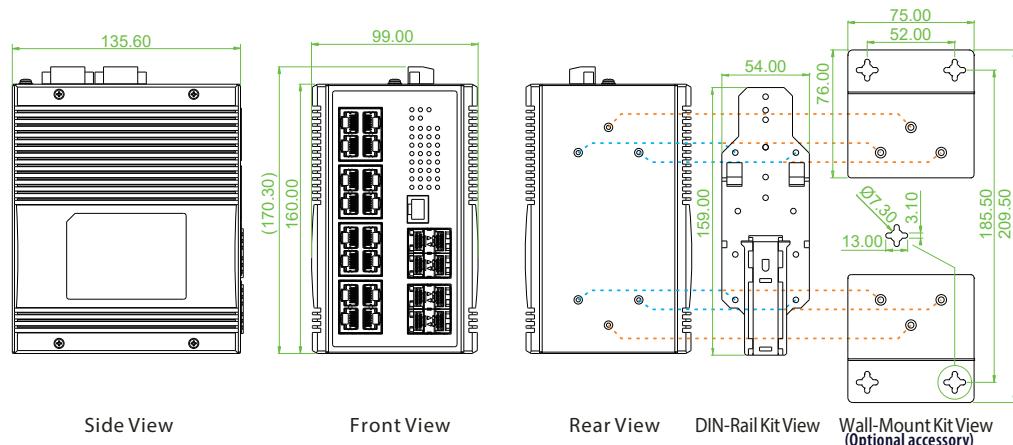


Dimensions

► IFS-1608GSM-8PH



► IFS-1608GSM-16PH

**Ordering Information**

Model Name	Managed	Total Port	UTP	Fiber	PoE Port		Input Power	Certification		Operating Temperature
			10/100 Base-TX	100/1000 Base-X	IEEE802.3at	Power Budget		Safety EN62368-1	CE, FCC	
IFS-1608GSM-8PH	V	24	16	8 SFP	8	240W	48VDC	V	V	-10~60°C
IFS-1608GSM-8PHE	V	24	16	8 SFP	8	240W	48VDC	V	V	-40~75°C
IFS-1608GSM-16PH	V	24	16	8 SFP	16	360W	48VDC	V	V	-10~60°C
IFS-1608GSM-16PHE	V	24	16	8 SFP	16	360W	48VDC	V	V	-40~75°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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP data sheets for more items and detailed information.)

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)

■ Industrial Power Supply

NDR-240-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 240W, -20 ~ +70°C (For IFS-1608GSM-8PH)

NDR-480-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 480W, -20 ~ +70°C (For IFS-1608GSM-16PH)

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

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



- 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, 30W/per port (IGS-402S-4PH24)
- Provides 4-port IEEE 802.3at/af PoE+ output, 60W/per port (IGS-402S-4PU)
- 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

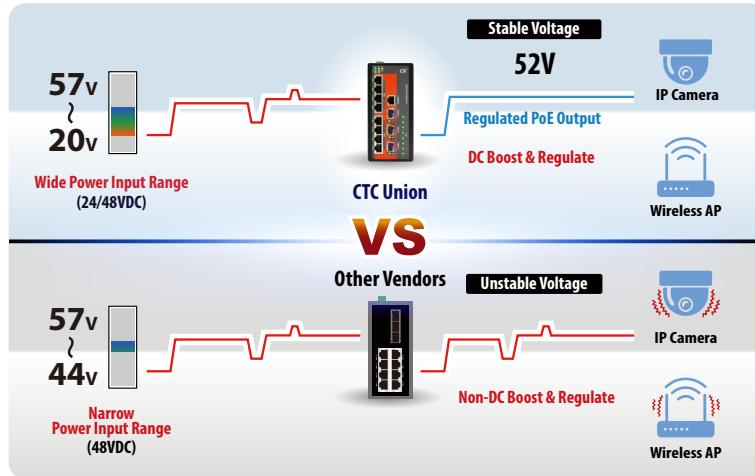
IEEE Standard	IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX Fast Ethernet IEEE 802.3ab 1000Base-T Gigabit Ethernet IEEE 802.3z 1000Base-X Gigabit Ethernet IEEE 802.3x Flow Control and Back Pressure IEEE 802.3af PoE (Power over Ethernet) IEEE 802.3at PoE+ (Power over Ethernet enhancements)	LED Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber) Fiber Per port: Link/Active (Green)								
Switch Architecture	Back-plane (Switching Fabric): 12Gbps Full wire-speed	DIP SW Per Port PoE LED • Active : ON • Inactive : OFF • Fault : Flash (Fault: Over Load, Short Circuit, Port failed at Startup)								
Data Processing	Store and Forward	DIP 1 ON : Disable power failure alarm OFF : Enable power failure alarm								
Flow Control	IEEE 802.3x flow control, back pressure flow control	DIP 2 ON : Disables broadcast storm protection OFF : Enables broadcast storm protection								
Provides Broadcast Storm Protection	Enable / Disable set by DIP SW	DIP 3 ON : Fiber 2 for 100Base-FX SFP OFF : Fiber 2 for Gigabit SFP (for IGS-402S-4PU, IGS-402S-4PH24)								
Jumbo Frame	10K Bytes	DIP 4 ON : Fiber 1 for 100Base-FX SFP OFF : Fiber 1 for Gigabit SFP (for IGS-402S-4PU, IGS-402S-4PH24)								
MAC Address Table	8K	Reverse Polarity Protection Supported for Power Input								
Packet Buffer Size	1MBits	Overload Current Protection Supported								
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: 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)	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: 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)								
Network Connector	4 x RJ-45 10/100/1000Base-T auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex 2x 100/1000Base-X SFP	Power Consumption <table border="1"> <thead> <tr> <th>Input Voltage</th> <th>IGS-402S-4PH24</th> </tr> </thead> <tbody> <tr> <td>24VDC</td> <td>143.3W</td> </tr> <tr> <td>48VDC</td> <td>138.2W</td> </tr> </tbody> </table> (Include full load 120W PoE output) IGS-402S-4PU Power consumption	Input Voltage	IGS-402S-4PH24	24VDC	143.3W	48VDC	138.2W		
Input Voltage	IGS-402S-4PH24									
24VDC	143.3W									
48VDC	138.2W									
Network Cable	UTP/STP Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter) Fiber Cable (Multi-mode): 50/125um, 62.5/125um Fiber Cable (Single-mode): 9/125um	<table border="1"> <thead> <tr> <th>Input Voltage</th> <th>Total Power Consumption</th> <th>Device Power Consumption</th> <th>PoE Budget</th> </tr> </thead> <tbody> <tr> <td>50VDC</td> <td>250.3W</td> <td>8W</td> <td>240W</td> </tr> </tbody> </table>	Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	50VDC	250.3W	8W	240W
Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget							
50VDC	250.3W	8W	240W							
Protocols	CSMA/CD									

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)
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) -40 ~ 75°C (IGS-402S-4PUE, IGS-402S-4PHE24)
Operating Humidity	5% to 95% (Non-condensing)
Dimensions (D x W x H)	106 x 62.5 x 134.8mm (IGS-402S-4PH24) 106 x 62.5 x 135mm (IGS-402S-4PU)
Housing	Rugged Metal, IP30 Protection, Fanless
Weight	0.84kg (IGS-402S-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) 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
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (Burst) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Application

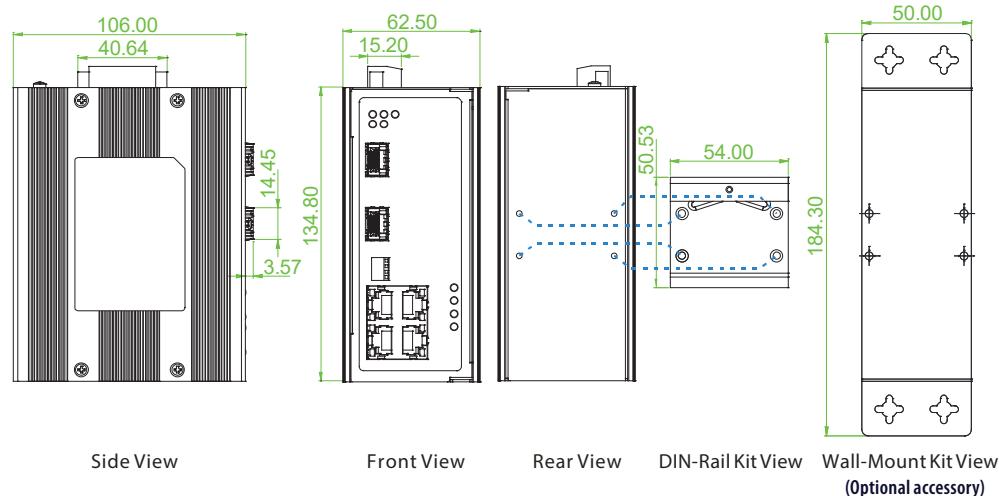
Figure : High efficiency boost technology for PoE



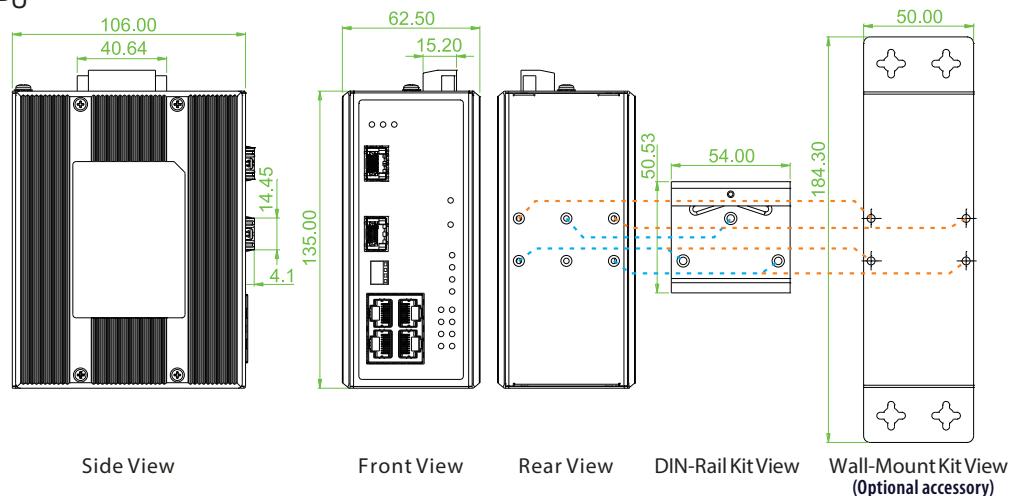
- Regulated PoE output voltage (52VDC) to stabilize PoE device
- Guarantee delivery PoE power distance to 100 meters
- Wide range input power 24/48VDC (20~57VDC)
- Built-in very high efficiency (94~97%) to boost PoE output voltage

Dimensions

► IGS-402S-4PH24



► IGS-402S-4PU

**Ordering Information**

Model Name	Total Port	RJ45 UTP Port	Fiber Port	PoE Port			Input Power	Certification	Operating Temperature
		10/100/1000 Base-T(X)	100/1000 Base-X	IEEE 802.3at	IEEE 802.3at 4Pairs PoE/60W	Power Budget			
IGS-402S-4PH24	6	4	2 SFP	4		120W	24/48VDC	V	-10~60°C
IGS-402S-4PHE24	6	4	2 SFP	4		120W	24/48VDC	V	-40~75°C
IGS-402S-4PU	6	4	2 SFP		4	240W	48VDC	V	-10~60°C
IGS-402S-4PUE	6	4	2 SFP		4	240W	48VDC	V	-40~75°C

Package List

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

Optional Accessories**Wall Mount Kit**

IND-WMK02 Wall Mount kit for Industrial product (Wide) (184x50mm)

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP data sheets for more items and detailed information.)

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)

Industrial Power Supply

NDR-120-48	Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 120W, -20 ~ +70°C (For IGS-402S-4PH24)
NDR-240-48	Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 240W, -20 ~ +70°C (For IGS-402S-4PU)
NDR-480-48	Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 480W, -20 ~ +70°C (For more ref.)

IGS-402CS-4PH

4x 10/100/1000Base-T RJ45 + 2x 100/1000M Base-X SFP with 4x PoE 120W, Compact size



- 4KV surge protection for PoE, UTP and SFP ports
- Wide operating temperature -40 ~ 75°C
- IP30 rugged metal housing and fanless



The IGS-402CS-4PH is 6 Ports unmanaged industrial grade Ethernet PoE switches with 4x 10/100/1000Base-T 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

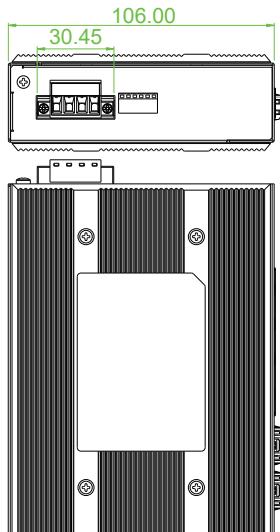
- Provides 4-port IEEE 802.3at/af PoE output (30W/Per Port)
- Maximum PoE output power budget 120W
- 48VDC (44~57VDC) redundant dual input power
- Supports DIP switch to set broadcast storm protection, SFP Auto/Force Mode, SFP 100M/1000M ; RJ45 Auto/force mode, 10M/100M, Full/half.
- Supports flow control
- Provides broadcast storm protection
- DIN Rail mounting or wall mounting

Specifications

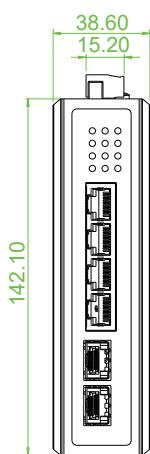
IEEE Standard	IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX and 100Base-FX Fast Ethernet IEEE 802.3ab 1000Base-T Gbit/s Ethernet over twisted pair IEEE 802.3z 1000Base-X Gigabit Ethernet over fiber-optic IEEE 802.3x Flow Control and Back Pressure IEEE 802.3at PoE+ (Power over Ethernet enhancements) IEEE 802.3af PoE (Power over Ethernet)	LED	Fiber Per port: 100 Link/Active (Green) 1000 Link/Active (Amber) Per PoE Port LED (Green) • Active : ON • Inactive : OFF								
Switch Architecture	Back-plane (Switching Fabric): 12 Gbps	DIP SW	DIP 1 Broadcast Protection OFF : Enable ON : Disable DIP 2 Off: Fiber Auto On: Fiber Force Mode DIP 3 SFP Fiber Speed OFF: Giga ON: 100M DIP 4 RJ45 Mode OFF: Auto ON: Force DIP 5 RJ45 Speed OFF: 100M ON: 10M DIP 6 RJ45 Duplex OFF: Full ON: Half								
Data Processing	Store and Forward	Reverse Polarity Protection	Supported for Power Input								
Flow Control	IEEE 802.3x flow control, back pressure flow control	Overload Current Protection	Supported								
MAC Address Table	4K	Power Supply	Redundant dual 48VDC (44~57VDC) input power (Removable terminal block) (50~57V input is recommended for IEEE802.3at in 30W applications)								
Packet Buffer Size	1.75Mbit	Power Consumption	<table border="1"> <thead> <tr> <th>Input Voltage</th> <th>Total Power Consumption</th> <th>Device Power Consumption</th> <th>Power Budget</th> </tr> </thead> <tbody> <tr> <td>50 VDC</td> <td>130W</td> <td>8.2W</td> <td>120W</td> </tr> </tbody> </table>	Input Voltage	Total Power Consumption	Device Power Consumption	Power Budget	50 VDC	130W	8.2W	120W
Input Voltage	Total Power Consumption	Device Power Consumption	Power Budget								
50 VDC	130W	8.2W	120W								
Max Frame Size	1522Bytes	PoE Power Budget	Maximum PoE Output power budget 120W (30W/ Per Port)								
Jumbo Frame	10K Byte	Removable Terminal Block	Provides 2 Redundant power, 4 Pin								
PoE standard	IEEE 802.3at/af	Operating Temperature	-10 ~ 60°C (IGS-402CS-4PH) -40 ~ 75°C (IGS-402CS-4PHE)								
PoE RJ-45 pin Assignment	RJ-45 port #1~#4 support IEEE 802.3at/af 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)	Operating Humidity	5% to 95% (Non-condensing)								
Network Connector	4x RJ-45 for 10/100/1000Base-T Auto Negotiation Speed or Force Mode, Auto MDI/MDI-X function, Full/Half duplex 2x 100/1000Base-X SFP, Auto or Force Mode	Storage Temperature	-40 ~ 85°C								
Network Cable	UTP/STP Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)	Housing	Rugged metal, IP30 Protection and fanless								
Network Cable	Fiber Cable (Multi-mode): 50/125um, 62.5/125um Fiber Cable (Single-mode): 9/125um	Dimensions	106x 38.6x 142mm (D X W X H)								
Protocols	CSMA/CD	Weight	705g								
LED	Per unit: Power 1 (Green), Power 2 (Green) Per RJ-45 port : 10/100M Link/Act (Green) 1000M Link/Act (Amber)	Installation Mounting	DIN Rail mounting, or wall mounting (Optional)								

MTBF	745,955Hours (MIL-HDBK-217)	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
Warranty	5 years		
Certification			
EMC	CE (EN55032, EN55035)		
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE		
		4KV surge protection	Supported for PoE, UTP and SFP port
		Shock	IEC 60068-2-27
		Freefall	IEC 60068-2-31
		Vibration	IEC 60068-2-6

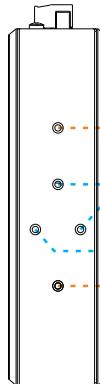
Dimensions



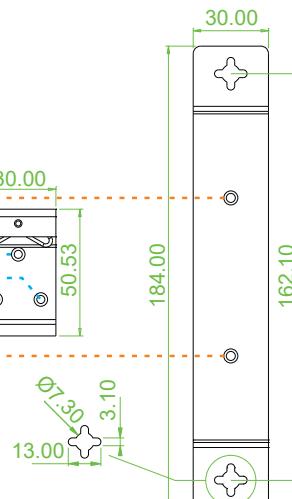
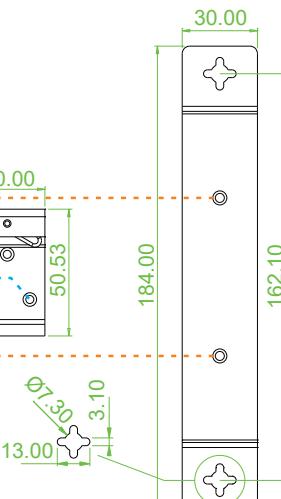
Side View



Front View



Rear View

DIN-Rail Kit View
(Optional accessory)

Ordering Information

Model Name	Total Port	RJ45 UTP Port	Fiber Port	PoE Port		Input Power	Certification	Operating Temperature
		10/100/1000 Base-T(X)		IEEE802.3at	Power Budget			
IGS-402CS-4PH	6	4	2 SFP	4	120W	48VDC	V	-10~60°C
IGS-402CS-4PHE	6	4	2 SFP	4	120W	48VDC	V	-40~75°C

Package List

- IGS-402CS-4PH device
- Protective caps for SFP ports
- Din Rail with screws
- Terminal block

Optional Accessories

■ Wall Mount Kit

IND-WMK01 Wall Mount kit for Industrial product (184x30mm) (Narrow)

■ Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP data sheets for more items and detailed information.)

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 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)

■ Industrial Power Supply

NDR-120-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 120W, -20 ~ +70°C (For IGS-402CS-4PH)

NDR-240-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 240W, -20 ~ +70°C (For more ref.)

IGS-800C-8PH

8x GbE RJ45 with 8x PoE, Low profile size 240W, 48VDC



- EN50121-4, CE, FCC certified
- 48VDC (44~57VDC) redundant dual input power
- IP30, rugged 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

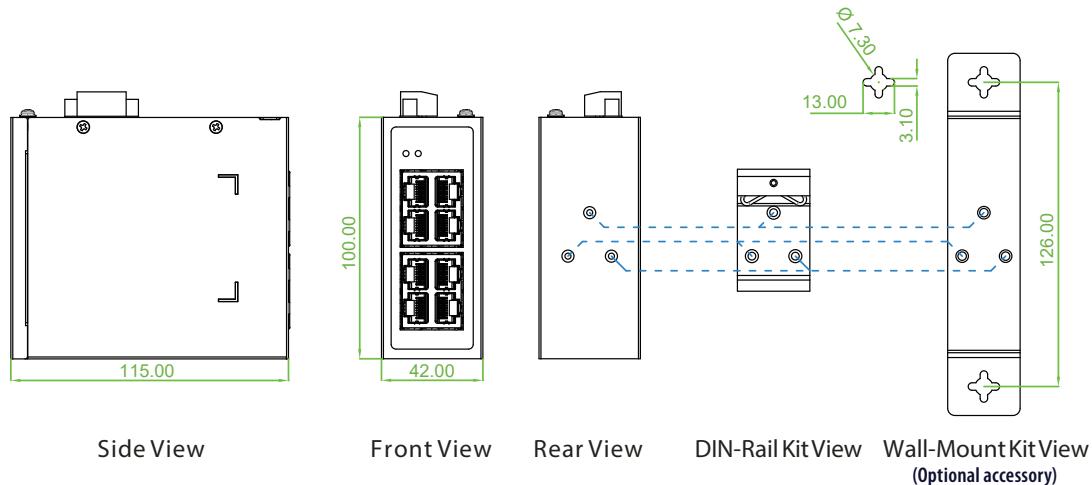
- Provides 8-port IEEE 802.3at/af PoE+ output, 30W/per port, total 240W
- 48VDC (44~57VDC) redundant dual input power
- Supports flow control
- Jumbo frame support
- Supports DIN Rail or wall mounting installation
- Wide operating temperature -40 ~ 70°C ("E" model)

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 Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)
Protocols	CSMA/CD
LED	Per unit: Power 1 (Green), Power 2 (Green) Per port: 10/100 Link/Active (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	0.95kg			
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			
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			
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	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

■ Package List

- IGS-800C-8PH device
- Terminal block
- Din Rail with screws

Optional Accessories

■ Wall Mount Kit

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

■ Industrial Power Supply

NDR-240-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 240W, -20 ~ +70°C (For IGS-800C-8PH)
 NDR-480-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 480W, -20 ~ +70°C (For more ref.)

IFS-402CGS-4PH

4x 10/100 Base-TX RJ45 + 2x 100/1000 Base-X SFP with 4x PoE 120W, Compact size



- 4KV surge protection for PoE, UTP and SFP ports
- Wide operating temperature -40 ~ 75°C
- IP30 rugged metal housing and fanless



The IFS-402CGS-4PH is a 6 ports unmanaged industrial grade Ethernet PoE switches with 4x 10/100 Base-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 4-port IEEE 802.3at/af PoE output (30W/Per Port)
- Maximum PoE output power budget 120W
- 48VDC (44~57VDC) redundant dual input power
- Supports DIP switch to set broadcast storm protection, SFP Auto/Force Mode, SFP 100M/1000M ; RJ45 Auto/force mode, 10M/100M, Full/half.
- Supports flow control
- Provides broadcast storm protection
- DIN Rail mounting or wall mounting

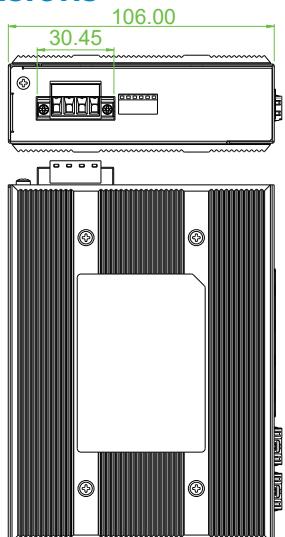
Specifications

IEEE Standard	IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX and 100Base-FX Fast Ethernet IEEE 802.3z 1000Base-X Gigabit Ethernet over fiber-optic IEEE 802.3x Flow Control and Back Pressure IEEE 802.3at PoE+ (Power over Ethernet enhancements) IEEE 802.3af PoE (Power over Ethernet)	DIP SW	DIP 1 Broadcast Protection OFF : Enable ON : Disable DIP 2 Off: Fiber Auto On: Fiber Force Mode DIP 3 SFP Fiber Speed OFF: Giga ON: 100M RJ45 Mode DIP 4 OFF: Auto ON: Force RJ45 Speed OFF: 100M ON: 10M DIP 5 RJ45 Duplex OFF: Full ON: Half								
Switch Architecture	Back-plane (Switching Fabric): 4.8 Gbps	Reverse Polarity Protection	Supported for Power Input								
Data Processing	Store and Forward	Overload Current Protection	Supported								
Flow Control	IEEE 802.3x flow control, back pressure flow control	Power Supply	Redundant dual 48VDC (44~57VDC) input power (Removable terminal block) (50~57V input is recommended for IEEE802.3at in 30W applications)								
MAC Address Table	4K	Power Consumption	<table border="1"> <thead> <tr> <th>Input Voltage</th><th>Total Power Consumption</th><th>Device Power Consumption</th><th>Power Budget</th></tr> </thead> <tbody> <tr> <td>50 VDC</td><td>127.5W</td><td>5.3W</td><td>120W</td></tr> </tbody> </table>	Input Voltage	Total Power Consumption	Device Power Consumption	Power Budget	50 VDC	127.5W	5.3W	120W
Input Voltage	Total Power Consumption	Device Power Consumption	Power Budget								
50 VDC	127.5W	5.3W	120W								
Packet Buffer Size	1.75Mbit	PoE Power Budget	Maximum PoE Output power budget 120W (30W/ Per Port)								
Max Frame Size	1522Bytes	Removable Terminal Block	Provides 2 Redundant power, 4 Pin								
Jumbo Frame	10K Byte	Operating Temperature	-10 ~ 60°C (IFS-402CGS-4PH) -40 ~ 75°C (IFS-402CGS-4PHE)								
PoE standard	IEEE 802.3at/af	Operating Humidity	5% to 95% (Non-condensing)								
PoE RJ-45 pin Assignment	RJ-45 port #1~#4 support IEEE 802.3at/af End-Span, Alternative A mode Positive (V+): RJ-45 pin 1, 2. Negative (V-): RJ-45 pin 3, 6. Data (1, 2, 3, 6)	Storage Temperature	-40 ~ 85°C								
Network Connector	4x RJ-45 for 10/100Base-TX Auto Negotiation Speed or Force Mode, Auto MDI/MDI-X function, Full/Half duplex 2x 100/1000Base-X SFP, Auto or Force Mode	Housing	Rugged metal, IP30 Protection and fanless								
Network Cable	UTP/STP Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)	Dimensions	106x 38.6x 142mm (D X W X H)								
Network Cable	Fiber Cable (Multi-mode): 50/125um, 62.5/125um Fiber Cable (Single-mode): 9/125um	Weight	705g								
Protocols	CSMA/CD	Installation Mounting	DIN Rail mounting, or wall mounting (Optional)								
LED	Per unit: Power 1 (Green), Power 2 (Green) Per RJ-45 port : 100M Link/Act (Green) 10M Link/Act (Amber) Fiber Per port: 100 Link/Active (Green) 1000 Link/Active (Amber) Per PoE Port LED (Green) • Active : ON • Inactive : OFF	MTBF	823,732Hours (MIL-HDBK-217)								
		Warranty	5 years								

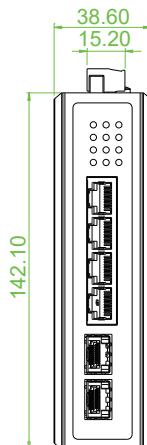
Certification	
EMC	CE (EN55032, EN55035)
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (Burst) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A

4KV surge protection	Supported for PoE, UTP and SFP port
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-31
Vibration	IEC 60068-2-6

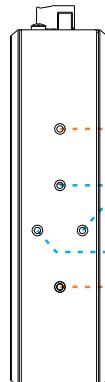
Dimensions



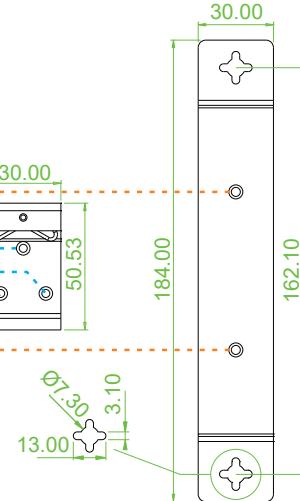
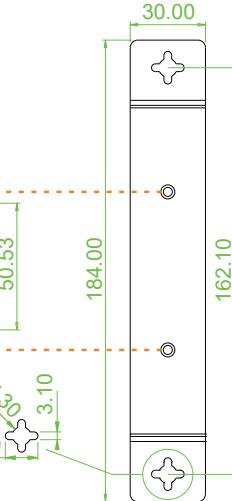
Side View



Front View



Rear View

DIN-Rail 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)	100/1000Base-X	IEEE802.3at	Power Budget			
IFS-402CGS-4PH	6	4	2 SFP	4	120W	48VDC	V	-10~60°C
IFS-402CGS-4PHE	6	4	2 SFP	4	120W	48VDC	V	-40~75°C

Package List

- IFS-402CGS-4PH device
- Protective caps for SFP ports
- Din Rail with screws
- Terminal block

Optional Accessories

Wall Mount Kit

IND-WMK01 Wall Mount kit for Industrial product (184x30mm) (Narrow)

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP data sheets for more items and detailed information.)

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 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)

Industrial Power Supply

NDR-120-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 120W, -20 ~ +70°C (For IFS-402CGS-4PH)

NDR-240-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 240W, -20 ~ +70°C (For more ref.)

IFS-802GS-8PH & IFS-1602GS-8PH

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



- 4KV surge protection for PoE UTP and PoE ports
- Wide operating temperature -40 ~ 75°C
- IP30 rugged metal housing and fanless



The IFS-802GS-8PH and IFS-1602GS-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 over fiber optical 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 Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)
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

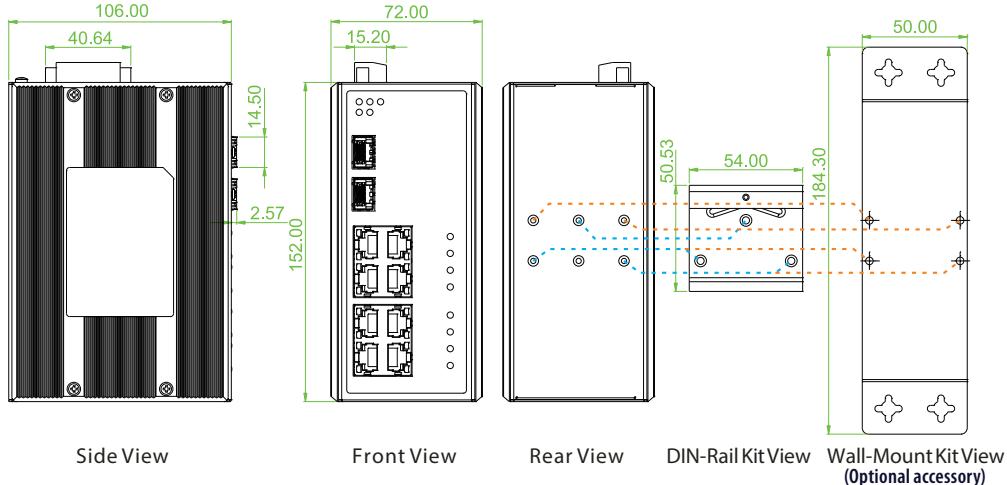
DIP SW	DIP 1 DIP 2	Power failure alarm OFF : Enable ON : Disable Broadcast Protection (IFS-1602GS-8PH) OFF : Enable ON : Disable								
Reverse Polarity Protection	Supported for Power Input									
Overload Current Protection	Supported									
Power Supply	Redundant dual 48VDC (44~57VDC) input power (Removable terminal block) (50~57V input is recommended for IEEE802.3at in 30W applications)									
Power Consumption		IFS-802GS-8PH power consumption								
		<table border="1"> <thead> <tr> <th>Input Voltage</th> <th>Total Power Consumption</th> <th>Device Power Consumption</th> <th>PoE Power Budget</th> </tr> </thead> <tbody> <tr> <td>50 VDC</td> <td>251W</td> <td>5.2W</td> <td>240W</td> </tr> </tbody> </table>	Input Voltage	Total Power Consumption	Device Power Consumption	PoE Power Budget	50 VDC	251W	5.2W	240W
Input Voltage	Total Power Consumption	Device Power Consumption	PoE Power Budget							
50 VDC	251W	5.2W	240W							
IFS-1602GS-8PH power consumption										
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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								
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									

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
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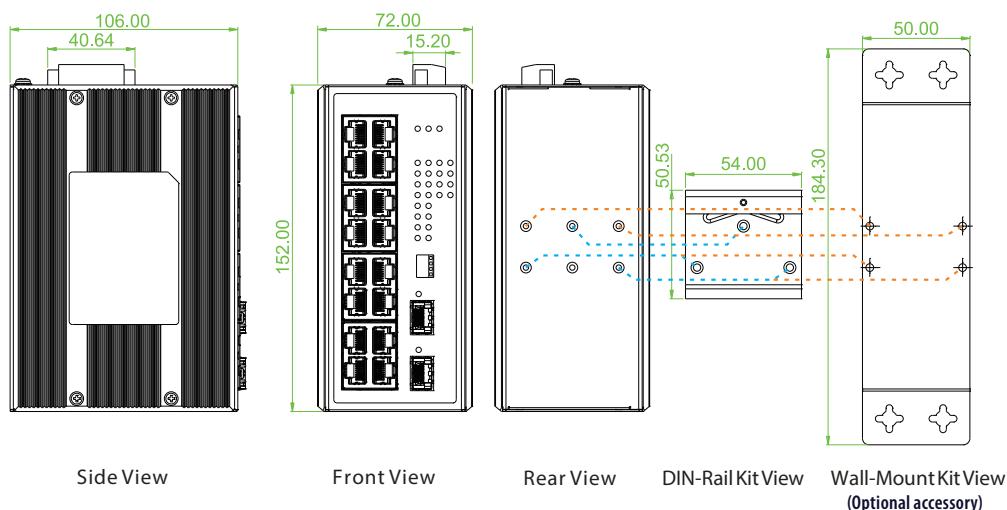
Railway Traffic	EN50121-4 (IFS-1602GS-8PH)
4KV surge protection	Supported for PoE, UTP and SFP port (IFS-1602GS-8PH)
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Dimensions

IFS-802GS-8PH



IFS-1602GS-8PH



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	EN50121-4	
IFS-802GS-8PH	10	8	2 SFP	8	240W	48VDC		V	-10~60°C
IFS-802GS-8PHE	10	8	2 SFP	8	240W	48VDC		V	-40~75°C
IFS-1602GS-8PH	18	16	2 SFP	8	240W	48VDC	V	V	-10~60°C
IFS-1602GS-8PHE	18	16	2 SFP	8	240W	48VDC	V	V	-40~75°C

Package List

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

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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP data sheets for more items and detailed information.)

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 10/100/1000Base-T UTP 100meter, -10~70°C (-40~85°C)

Industrial Power Supply

NDR-240-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 240W, -20 ~ +70°C (For IFS-1602GS-8PH, IFS-802GS-8PH)

NDR-480-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 480W, -20 ~ +70°C (For more ref.)

IQS-402XSM

4x 2.5G N-Base-TX + 2x 10G Base-X SFP+ Compact Size



- Redundant 12/24/48VDC power input
- Supports μ-Ring, ERPS, EPS, MSTP, RSTP, STP for redundant cabling



IQS-402XSM is an 1G/2.5G/10G managed Layer 2 Ethernet switch. It provides 4 port of electrical 10M/100M/1G/2.5GBase-T via RJ-45s plus 2 ports SFP slots of 100M/1G/2.5G/10GBase-X which provide stable and reliable long-distance Ethernet transmission over optical fiber. Built to Industrial grade standards, the FANLESS design provides high MTBF in indoor environments of operating temperature from -10 to 60°C (14 to 160°F), and incorporates redundant 12/24/48VDC power input. With Din-Rail or wall mounting metal housings, these switches are perfect choices for heavy duty use in harsh environments, such as Industrial Factory Automation, Data Center Networking, Intelligent Transportation Systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications.

These managed switches also support a wide variety of Ethernet Layer 2 functions, including CTC Union proprietary μ-Ring, ERPS, MSTP, RSTP and STP. They also support Layer 2 IGMP, VLAN, QoS, ACL, Security, IPv6, bandwidth control, and port mirroring. Additionally, these switches can also be managed by CTC Union's SmartView™ Element Management System, which offers a user-friendly and centralized device management platform and provides administrators the ability to monitor and configure these connected switches remotely.

Features

- 4x 10M/100M/1G/2.5GBase-T RJ-45+ 2x 1G/2.5G/10GBase-X SFP
- Provides 3 ring instances that each can support μ-Ring, μ-Chain or Sub-Ring type for flexible uses.
- Supports up to 3 rings in one device (Please see CTC μ-Ring white paper for more details and more topology application)
- DHCP Server/Client/Relay/Snooping/Snooping option 82/Relay option 82
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
- Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
- IGMP snooping V1/V2/V3, IGMP Filtering/Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
- Flexibility security: Port based and MAC based IEEE802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid upgrade failure
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP, SNTP, IEEE802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/v2c/v3, Telnet server for management

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet	Standard	IEEE 802.3x	Flow control for Full Duplex
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet		IEEE 802.1ad	Stacked VLANs, Q-in-Q
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair		IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.3bz	2.5GBase-T		IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic	Switch Architecture	Back-plane (Switching Fabric): 60Gbps Full wire-speed	
	IEEE 802.3ae	10G bit/s Ethernet over Fiber	Data Processing Flow Control	Store and Forward	
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)		IEEE 802.3x for full duplex mode Back pressure for half duplex mode	
	ITU-T G.8031 / Y.1342	EPS (Ethernet Protection Switching)	Network Connector	4x 10M/100M/1G/2.5GBase-T RJ-45 + 2x 1G/2.5G/10GBase-X SFP port	
	IEEE 802.1d	STP (Spanning Tree Protocol)		RJ45 port supports auto-negotiation	
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)		Auto MDI/MDI-X function	
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)		SFP port supports 1G/2.5G/10G speed with DDMI	
	IEEE 802.1Q	Virtual LANs (VLAN)	Network Cable	UTP/STP Cat. 5e cable or above	
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication		EIA/TIA-568 100-ohm (100meter)	
	IEEE802.3ac	Max frame size extended to 1522Bytes	Protocols	CSMA/CD	
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)	Overload Current Protection	Supported	

CPU Watch Dog	Supported	Storage Temperature	-40 ~ 85°C								
Power Supply	Redundant dual power input 12/24/48VDC(9.6~60VDC) (Removable terminal block)	Housing	Rugged Metal, IP30 Protection, Fanless								
Power Consumption	<table border="1"> <thead> <tr> <th>Input Voltage</th> <th>Power Consumption</th> </tr> </thead> <tbody> <tr> <td>12VDC</td> <td>11.7W</td> </tr> <tr> <td>24VDC</td> <td>12.3W</td> </tr> <tr> <td>48VDC</td> <td>14W</td> </tr> </tbody> </table>	Input Voltage	Power Consumption	12VDC	11.7W	24VDC	12.3W	48VDC	14W	Dimensions	127.6x 48.6x 160mm (D x W x H)
Input Voltage	Power Consumption										
12VDC	11.7W										
24VDC	12.3W										
48VDC	14W										
LED	Per unit: PWR 1, PWR 2 (Green) Per RJ-45 port: 10/100 Link/Active (Green) 1G/2.5G Link/Active (Amber) SFP Fiber Per port: Link/Active (Green)	Weight	1,530g								
Jumbo Frame	9.6K Byte	Installation Mounting	DIN Rail mounting, or wall mounting (Optional)								
IEEE802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)	MTBF	588,603 Hours (MIL-HDBK-217)								
MAC Address Table	8K	Warranty	5 Years								
Memory Buffer	512K Bytes for packet buffer	Certification									
Device Memory	128M Bytes Flash ROM, 256M Bytes RAM	EMC	CE (EN55032, EN55035)								
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay	EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A,CE								
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC	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								
Removable Terminal Block	Provides redundant power PWR1, PWR2 and Alarm Relay, 6 pin	Shock	IEC 60068-2-27								
Operating Temperature	-10 ~ 60°C	Freefall	IEC 60068-2-31								
Operating Humidity	5% to 95% (Non-condensing)	Vibration	IEC 60068-2-6								

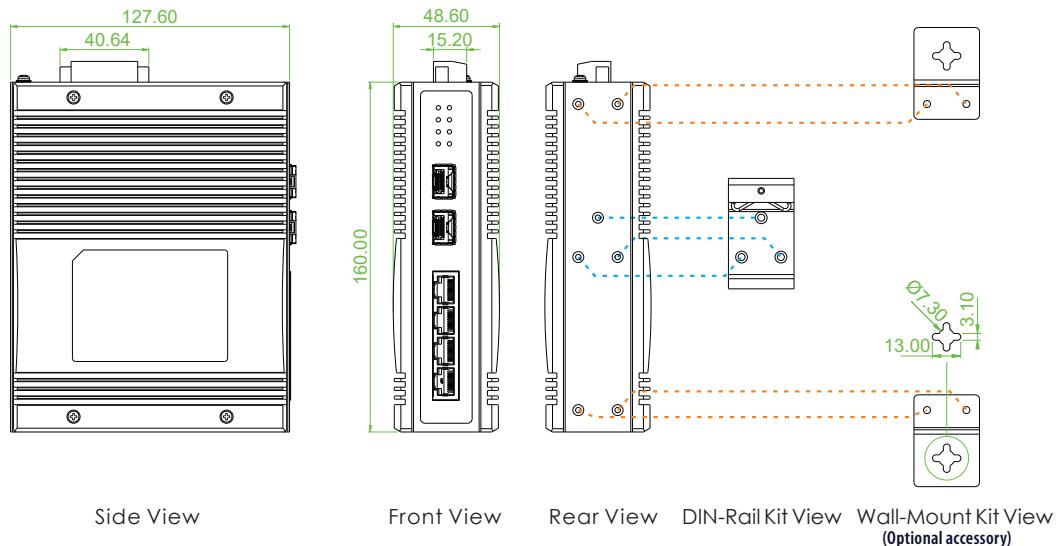
Software Specifications

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(Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN
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 3 instances that each supports μ-Ring, μ-Chain or Sub-Ring type for flexible uses, and maximum up to 3 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) Recovery time <50ms
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Single Ring, Sub-Ring, Multiple ring topology network
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Supported
Loop Protection	Supported
QoS Features	
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	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps"
Bandwidth Control for Egress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps" Per queue / Per port shaper
DiffServ (RF 2474) Remark	
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
Management Interface Access Filtering	Remote Authentication (via RADIUS / TACACS+)
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3
sFlow	Supported
Modbus/TCP	Support for management and monitoring
SW & Configuration Upgrade	TFTP, HTTP Redundant firmware in case of upgrade failure

RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
DHCP	Server, Client, Relay, Relay option 82, Snooping
IP Source Guard	Supported
Port Mirroring	Supported
Event Syslog	Syslog server (RFC3164) (Supports 4 servers)
Warning Message	System syslog, SMTP/e-mail event message, alarm relay
DNS	Client, Proxy
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 SIP, Subnet (32bit) L4 : TCP/UDP

Dimensions



Ordering Information

Model Name	Total Ports	UTP (RJ45)	Fiber	Redundant Power Input	Certification	
		10/100/1G/2.5G Base-T	1G/2.5G/10G		CE	FCC
IQS-402XSM	6	4	2 SFP	12/24/48VDC	V	V

Package List

- IQS-402XSM device
- Protective caps for SFP ports

Optional Accessories

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

ISFP-M9000-85-D(E)	Industrial SFP 10GBase-SR MM, 300meter, wave length 850nm LC, DDMI, -10~70°C (-40~85°C)
ISFP-S9010-31-D(E)	Industrial SFP 10GBase-LR SM, 10km, 1310nm, 6.4dB, LC, 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)

Industrial Power Supply

MDR-40-48	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C
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IGS-402CSW

4x GbE RJ45 + 2x 100/1000 SFP , Compact size



- 4KV surge protection for UTP and SFP ports
- Compact size for easy installation



The IGS-402CSW is a managed industrial grade L2 switch with 4 ports 10/100/1000Base-T and 2 ports 100M/GbE SFP. Housed in rugged DIN rail or wall mountable enclosures, the switch is designed for harsh environments, such as industrial networking. It is an ideal solution for Smart City, surveillance, Intelligent traffic control systems, production automation 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 industrial automation applications.

Features

- Redundant power input
- Cable diagnostics
- Supports SmartView™ for Centralized Management*

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

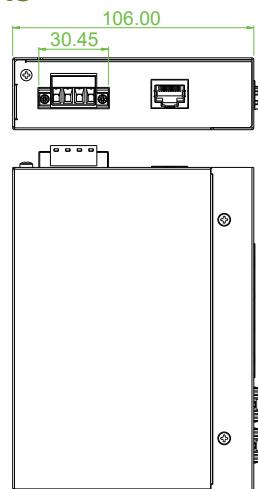
Specifications

Standard	IEEE 802.3 IEEE 802.3u IEEE 802.3ab IEEE 802.3z IEEE 802.1d IEEE 802.1w IEEE 802.1s IEEE 802.1Q IEEE 802.1X IEEE802.3ac IEEE 802.3ad IEEE 802.3x IEEE 802.1ad IEEE 802.1p IEEE 802.1ab IEEE 802.3az	10Base-T 10Mbit/s Ethernet 100Base-TX, 100Base-FX, Fast Ethernet 1000Base-T Gbit/s Ethernet over twisted pair 1000Base-X Gbit/s Ethernet over Fiber-Optic STP (Spanning Tree Protocol) RSTP (Rapid Spanning Tree Protocol) MSTP (Multiple Spanning Tree Protocol) Virtual LANs (VLAN) Port based and MAC based Network Access Control, Authentication Max frame size extended to 1522Bytes Link aggregation for parallel links with LACP(Link Aggregation Control Protocol) Flow control for Full Duplex Stacked VLANs, Q-in-Q LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization Link Layer Discovery Protocol (LLDP) EEE (Energy Efficient Ethernet)							
Switch Architecture	Back-plane (Switching Fabric): 12Gbps Full wire-speed								
Data Processing Flow Control	Store and Forward 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 RJ-45 UTP port support Auto negotiation speed, Auto MDI/MDI-X function, SFP ports support FE/GbE with DDMI								
Console	RS-232 (RJ-45)								
Network Cable	UTP/STP Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)								
Protocols	CSMA/CD								
Reverse Polarity Protection	Supported for power input								
Overload Current Protection	Supported								
CPU Watch Dog	Supported								
Power Supply	Redundant Dual 12/24/48VDC (9.6~60VDC) Input power (Removable Terminal Block)								
Power Consumption	<table border="1"> <thead> <tr> <th>Input Voltage</th> <th>Total Power Consumption</th> </tr> </thead> <tbody> <tr> <td>12VDC</td> <td>5.8W</td> </tr> <tr> <td>24VDC</td> <td>6.5W</td> </tr> <tr> <td>48VDC</td> <td>8.2W</td> </tr> </tbody> </table>	Input Voltage	Total Power Consumption	12VDC	5.8W	24VDC	6.5W	48VDC	8.2W
Input Voltage	Total Power Consumption								
12VDC	5.8W								
24VDC	6.5W								
48VDC	8.2W								
LED	Per unit: Power 1 (Green), Power 2 (Green) Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber) SFP Fiber port: 100 Link/Active (Green) 1000 Link/Active (Amber)								
Jumbo Frame	10K								
IEEE802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)								
MAC Address Table	4K								
Memory Buffer	1.75M bits for packet buffer								
Device Memory	128M Bytes Flash ROM, 256M Bytes RAM								
Warning Message	System Syslog, SMTP/ e-mail event message								
Removable	Provide 2 redundant power 4 Pin								
Terminal Block									
Operating Temperature	-10 ~ 60°C (IGS-402CSW) -40 ~ 75°C (IGS-402CSW-E)								
Operating Humidity	5% to 95% (Non-condensing)								
Storage Temperature	-40 ~ 85°C								
Housing	Rugged Metal, IP30 Protection, Fanless								
Dimensions	106x 31.6x 142mm (Dx Wx H)								
Weight	535g								
Installation Mounting	DIN Rail mounting, or wall mounting (Optional)								
MTBF	960,226Hours (MIL-HDBK-217)								
Warranty	5 years								
Certification									
EMC	CE (EN55032, EN55035)								
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A,CE								
EMS (Electromagnetic Susceptibility)	EN61000-4-2 (ESD) Level 3, Criteria B								
Protection Level	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								
Surge protection	4KV for UTP and Fiber ports								
Shock	IEC 60068-2-27								
Freefall	IEC 60068-2-31								
Vibration	IEC 60068-2-6								

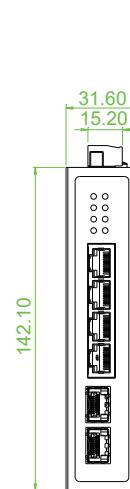
Software Specifications

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(Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN
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
Loop Protection	Supported
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	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps"
Bandwidth Control for Egress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps" 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 Authentication	Local Authentication
Management Interface Access Filtering	Remote Authentication (via RADIUS / TACACS+)
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Support for management and monitoring
SNMP	V1, V2c, V3
sFlow	Supported
ModBus/TCP	Supports management and monitoring
SW & Configuration Upgrade	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)
Warning Message	System syslog, e-mail
DNS	Client, Proxy
NTP	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	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 SIP, Subnet (32bit) 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
Cable Diagnostic	Measuring UTP cable normal or broken point distance

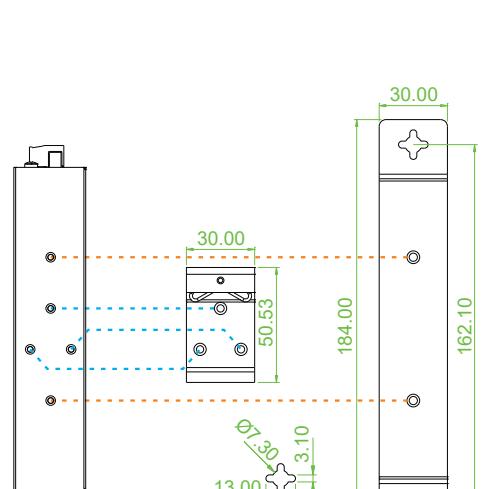
Dimensions



Side View



Front View Rear View

DIN-Rail Kit View Wall-Mount Kit View
(Optional accessory)

Ordering Information

Model Name	Total Port	RJ45	Fiber	Input Power	Certification		Operating Temperature
		10/100/1000 Base-T	100/1000 Base-X	Redundant	CE	FCC	
IGS-402CSW	6	4	2 SFP	12/24/48VDC	V	V	-10~60°C
IGS-402CSW-E	6	4	2 SFP	12/24/48VDC	V	V	-40~75°C

■ Package List

- IGS-402CSW device
- Console cable (RJ-45 to DB9)
- Protective caps for SFP ports
- Din Rail with screws

Optional Accessories

■ Wall Mount Kit

IND-WMK01	Wall Mount kit for Industrial product (184x30mm) (Narrow)
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■ Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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

MDR-20-24	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 24VDC, 24W, -20 ~ +70°C
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MDR-40-48	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C
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IGS+404SM & IGS+803SM

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



- EN62368-1, NEMA-TS2, CE, FCC certified
- Supports redundant negative voltage input power
- Supports IEEE 1588 PTP V2
- Supports u-Ring, ERPS, EPS, 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 12/24/48/-48VDC (9.6~60VDC)
- 2.25KVDC 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
- Supports SmartView™ for Centralized Management*

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

Specifications

Standard	IEEE 802.3	10Base-T 10Mbps Ethernet	Network Connector	4x 10/100/1000Base-T RJ-45 + 4x 100/1000Base-X SFP connector (IGS+404SM)			
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet		8x 10/100/1000Base-T RJ-45 + 3x 100/1000Base-X SFP connector (IGS+803SM)			
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair		RJ-45 UTP port support Auto negotiation speed, Auto MDI/MDI-X function, SFP port support dual speed with DDMI			
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic					
	IEEE 802.1d	STP (Spanning Tree Protocol)	Console	RS-232 (RJ-45)			
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)	Network Cable	UTP/STP Cat. 5e cable or above			
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)		EIA/TIA-568 100-ohm (100meter)			
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)	Protocols	CSMA/CD			
	ITU-T G.8031 / Y.1342	EPS (Ethernet Protection Switching)	Reverse Polarity Protection	Supported			
	IEEE 802.1Q	Virtual LANs (VLAN)	Overload Current Protection	Supported			
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication	CPU Watch Dog	Supported			
Standard	IEEE 802.3ac	Max frame size extended to 1522Bytes.	Power Supply	Redundant Dual DC 12/24/48/-48VDC (9.6~60VDC) Input power (Removable Terminal Block)			
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)	Power Consumption	IGS+404SM			
	IEEE 802.3x	Flow control for Full Duplex		Input Voltage	12VDC	24VDC	48VDC
	IEEE 802.1ad	Stacked VLANs, Q-in-Q		IGS+404SM	7.7W	8W	9.2W
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization		IGS+803SM			
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)		Input Voltage	12VDC	24VDC	48VDC
	IEEE 802.3az	EEE (Energy Efficient Ethernet)		IGS+803SM	8.6W	10.8W	11.5W
VLAN ID	4094 IEEE 802.1Q VLAN VID		LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow)			
Switch Architecture	Back-plane (Switching Fabric): 16Gbps (IGS+404SM) 22Gbps (IGS+803SM) Full wire-speed			Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Amber)			
Data Processing	Store and Forward			SFP Fiber Per port: Link/Active (Green)			
Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode		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
Device Memory	16M Bytes Flash ROM, 128M Bytes RAM
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 x 152 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
Traffic control	NEMA TS2 (IGS+803SM)
EMS (Electromagnetic Susceptibility)	EN61000-4-2 (ESD) Level 3, Criteria B
Protection Level	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 (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

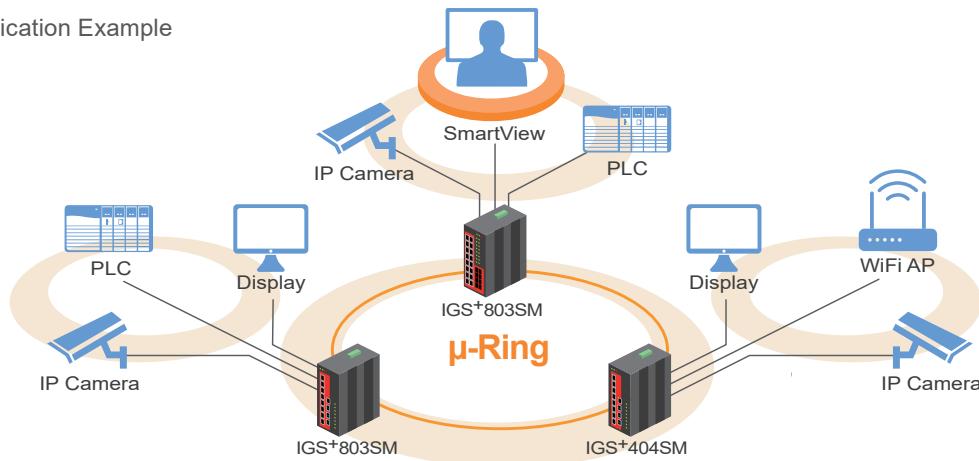
Topology	
VLAN	IEEE 802.1q VLAN, up to 4094 802.1Q VLAN VID IEEE 802.1q VLAN, up to 4094 Groups IEEE 802.1ad Q-in-Q MAC-based VLAN, up to 256 entries IP Subnet-based VLAN, up to 128 entries Protocol-based VLAN (Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN
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
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Supported
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	OCL(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	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps"
Bandwidth Control for Egress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps" Per queue / Per port shaper
DiffServ (RF 2474) Remarking	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
Management Interface Access	Remote Authentication (via RADIUS / TACACS+)
Management Filtering	Web, Telnet / SSH , CLI RS-232 console
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3
sFlow	Supported
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)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
IEEE 1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported

IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SIP, Subnet (32bit) 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
	Measuring UTP cable normal or broken point distance

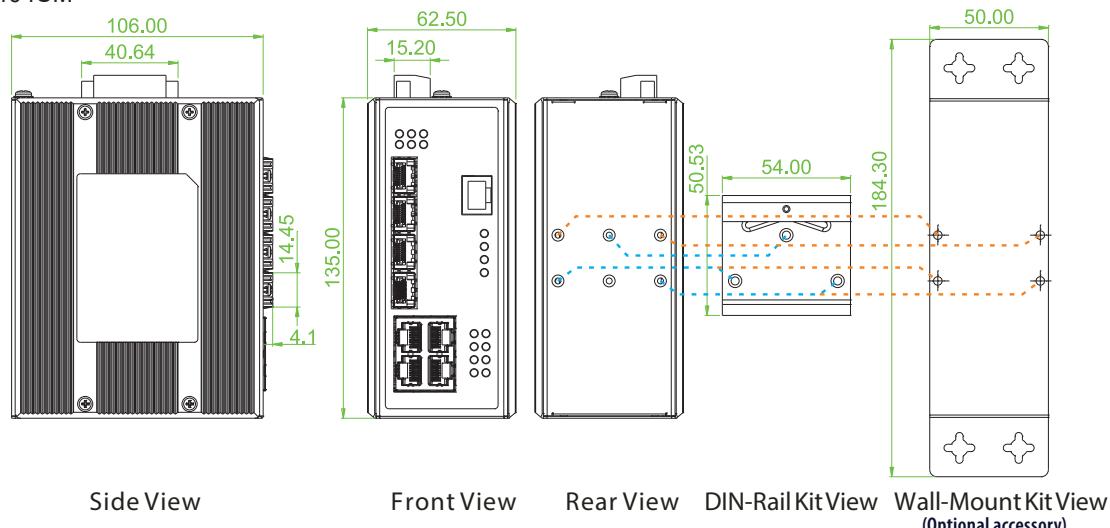
Application

Figure : Application Example

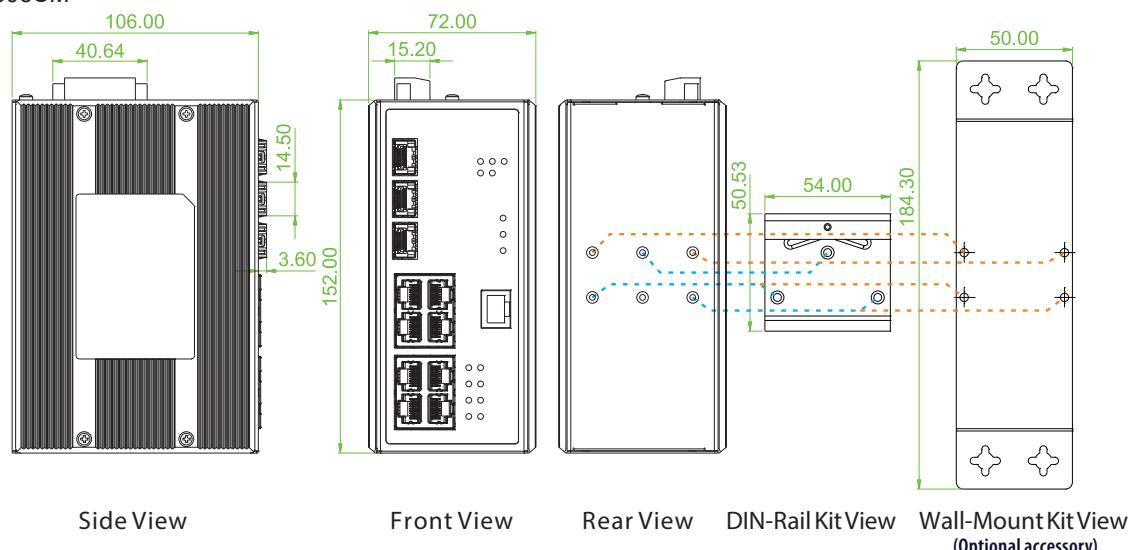


Dimensions

► IGS+404SM



► IGS+803SM



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	NEMA TS2	Safety EN62368-1	CE, FCC	
IGS+404SM	V	8	4	4 SFP	12/24/48/-48VDC			V	-10~60°C
IGS+404SM-E	V	8	4	4 SFP	12/24/48/-48VDC			V	-40~75°C
IGS+803SM	V	11	8	3 SFP	12/24/48/-48VDC	V	V	V	-10~60°C
IGS+803SM-E	V	11	8	3 SFP	12/24/48/-48VDC	V	V	V	-40~75°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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

■ Industrial Power Supply

MDR-20-24 Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 24VDC, 24W, -20 ~ +70°C

MDR-40-48 Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C

IGS-803SM

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



- NEMA-TS2, CE, FCC certified
- Supports IEEE 1588 PTP V2
- Supports u-Ring, ERPS, EPS, MSTP, RSTP, STP for redundant cabling
- Cable diagnostics, identifies opens/shorts distance



These models are managed industrial grade GbE L2+ switches with 8 10/100/1000Base-T ports and 3 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
- Supports SmartView™ for Centralized Management*

*Please see Chapter 1- Software Management for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet	Reverse Polarity Protection	Supported for power input								
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet	Overload Current Protection	Supported								
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair	CPU Watch Dog	Supported								
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic	Power Supply	Redundant Dual DC 12/24/48V (9.6~60VDC) Input power (Removable Terminal Block)								
	IEEE 802.3cb	2.5GBase-X	Power Consumption	<table border="1"> <thead> <tr> <th>Input Voltage</th> <th>12VDC</th> <th>24VDC</th> <th>48VDC</th> </tr> </thead> <tbody> <tr> <td>IGS-803SM</td> <td>8.6W</td> <td>10.8W</td> <td>11.5W</td> </tr> </tbody> </table>	Input Voltage	12VDC	24VDC	48VDC	IGS-803SM	8.6W	10.8W	11.5W
Input Voltage	12VDC	24VDC	48VDC									
IGS-803SM	8.6W	10.8W	11.5W									
	IEEE 802.1d	STP (Spanning Tree Protocol)	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)								
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)		SFP Fiber Per port: Link/Active (Green)								
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)	Jumbo Frame	9.6KB								
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)	IEEE 802.3ac	Max frame size extended to 1522Bytes in packet)								
	ITU-T G.8031 / Y.1342	EPS (Ethernet Protection Switching)	MAC Address Table	8K								
	IEEE 802.1Q	Virtual LANs (VLAN)	Memory Buffer	512K Bytes for packet buffer								
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication	Device Memory	16M Bytes Flash ROM, 128M Bytes RAM								
	IEEE 802.3ac	Max frame size extended to 1522Bytes.	Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay								
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)	Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC								
Standard	IEEE 802.3x	Flow control for Full Duplex	Removable Terminal Block	Provide 2 redundant power, alarm relay contact, 6 Pin								
	IEEE 802.1ad	Stacked VLANs, Q-in-Q	Operating Temperature	-10 ~ 60°C (IGS-803SM) -40 ~ 75°C (IGS-803SM-E)								
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization	Operating Humidity	5% to 95% (Non-condensing)								
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)	Storage Temperature	-40 ~ 85°C								
	IEEE 802.3az	EEE (Energy Efficient Ethernet)	Housing	Rugged Metal, IP30 Protection, Fanless								
VLAN ID	4094 IEEE 802.1Q VLAN VID		Dimensions	106 x 72 x 152 mm (D x W x H)								
Switch Architecture	Back-plane (Switching Fabric): 28Gbps Full wire-speed		Weight	0.78kg								
Data Processing	Store and Forward		Installation Mounting	DIN Rail mounting, or wall mounting (optional)								
Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode		MTBF	612,523 Hours (MIL-HDBK-217)								
Network Connector	8x 10/100/1000Base-T RJ-45 + 1x FE/GbE SFP slot + 2x FE/GbE/2.5GbE SFP slot		Warranty	5 years								
	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 Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)											
Protocols	CSMA/CD											

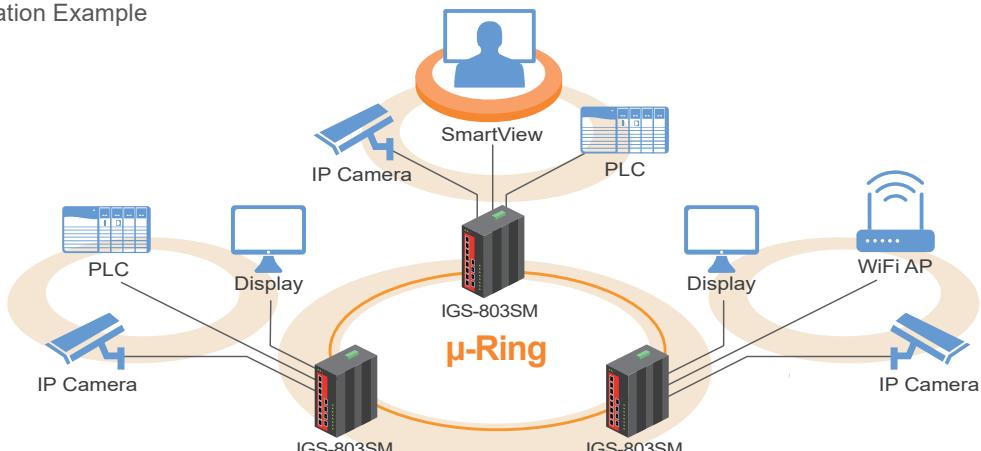
Certification		EMS (Electromagnetic Susceptibility) Protection Level	
EMC	CE	EN61000-4-2 (ESD) Level 3, Criteria B	
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE EN55022 Class A	EN61000-4-3 (RS) Level 3, Criteria A	
Traffic control	NEMA TS2	EN61000-4-4 (Burst) Level 3, Criteria 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	

Software Specifications

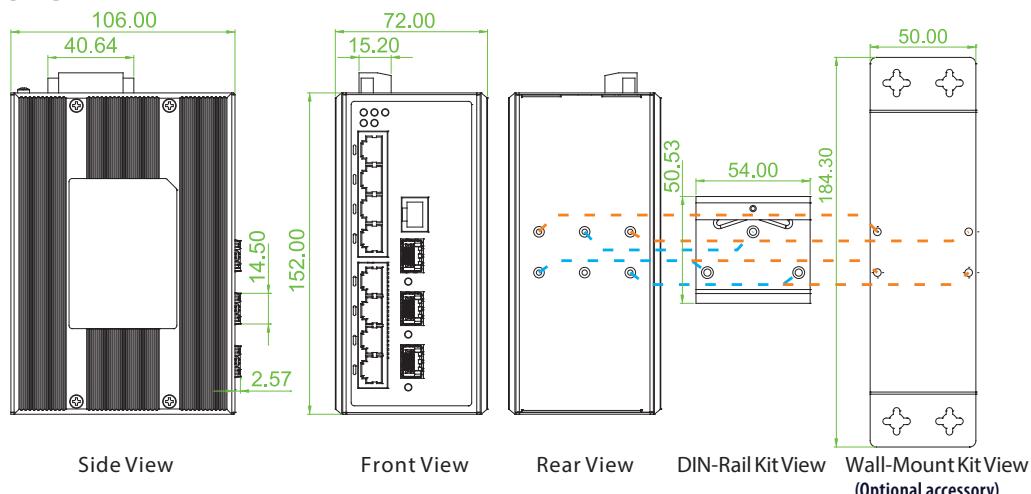
Topology		RADIUS authentication & accounting
VLAN	IEEE 802.1q VLAN, up to 4094 802.1Q VLAN VID	TACACS+ authentication & accounting, TACACS+ 3.0
	IEEE 802.1q VLAN, up to 4094 Groups	
	IEEE 802.1ad Q-in-Q	
	MAC-based VLAN, up to 256 entries	
	IP Subnet-based VLAN, up to 128 entries	
	Protocol-based VLAN (Ethernt, SNAP, LLC), up to 128 entries	
	VLAN Translation, up to 256 entries	
	Private VLAN for port isolation	
	GVRP (GARP VLAN Registration Protocol)	
	MVR (Multicast VLAN Registration)	
	Voice VLAN	
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	
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Supported	
QoS Features		Management Features
Class of Service	IEEE 802.1p 8 active priorities queues for per port	CLI Cisco® like CLI
Traffic Classification QoS	IEEE 802.1p based CoS	Web Based Management
	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	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps"	
Bandwidth Control for Egress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps" Per queue / Per port shaper	
DiffServ (RF 2474) Remarking		
Storm Control	for Unicast, Broadcast, Multicast	
IP Multicasting Features		Management Features
IGMP / MLD Snooping	IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2	Management
	Port Filtering Profile	
	Throttling, Fast Leave	
	Maximum Multicast Group : up to 1022 entries	
	Query / Static Router Port	
Security Features		Management
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	
Others Features		Management
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



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		Traffic Control NEMA TS2	CE, FCC	
IGS-803SM	11	8	1 SFP	2 SFP	12/24/48VDC	V	V	-10~60°C
IGS-803SM-E	11	8	1 SFP	2 SFP	12/24/48VDC	V	V	-40~75°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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

Industrial Power Supply

MDR-20-24	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 24VDC, 24W, -20 ~ +70°C
MDR-40-48	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C

IGS-812SM & IGS-1604SM

- ◀ 8x GbE RJ45 + 12x 100/1000Base-X SFP
- ▶ 16x GbE RJ45 + 4x 100/1000Base-X SFP



- EN62368-1, CE, FCC certified
- Supports redundant negative voltage input power
- Supports IEEE 1588 PTP V2
- Supports u-Ring, ERPS, EPS, 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
- Supports SmartView™ for Centralized Management*

*Please see Chapter 1- Software Management for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet	Network Cable	UTP/STP Cat. 5e cable or above												
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet		EIA/TIA-568 100-ohm (100meter)												
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair	Protocols	CSMA/CD												
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic	Reverse Polarity Protection	Supported for power input												
	IEEE 802.1d	STP (Spanning Tree Protocol)	Overload Current Protection	Supported												
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)	CPU Watch Dog	Supported												
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)	Power Supply	Redundant Dual DC 12/24/48V/-48 (9.6~60VDC) Input power (Removable Terminal Block)												
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)	Power Consumption	<table border="1"> <thead> <tr> <th>Input Voltage</th> <th>IGS-812SM</th> <th>IGS-1604SM</th> </tr> </thead> <tbody> <tr> <td>12VDC</td> <td>14.3W</td> <td>14.5W</td> </tr> <tr> <td>24VDC</td> <td>14.2W</td> <td>14.4W</td> </tr> <tr> <td>48VDC</td> <td>15.8W</td> <td>16.3W</td> </tr> </tbody> </table>	Input Voltage	IGS-812SM	IGS-1604SM	12VDC	14.3W	14.5W	24VDC	14.2W	14.4W	48VDC	15.8W	16.3W
Input Voltage	IGS-812SM	IGS-1604SM														
12VDC	14.3W	14.5W														
24VDC	14.2W	14.4W														
48VDC	15.8W	16.3W														
	ITU-T G.8031 / Y.1342	EPS (Ethernet Protection Switching)	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)												
	IEEE 802.1Q	Virtual LANs (VLAN)		SFP Fiber Per port: Link/Active (Green)												
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication	Jumbo Frame	9.6KB												
	IEEE 802.3ac	Max frame size extended to 1522Bytes.	IEEE 802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)												
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)	MAC Address Table	8K												
	IEEE 802.3x	Flow control for Full Duplex	Memory Buffer	512K Bytes for packet buffer												
Standard	IEEE 802.1ad	Stacked VLANs, Q-in-Q	Device Memory	16M Bytes Flash ROM, 128M Bytes RAM												
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization	Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay												
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)	Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC												
	IEEE 802.3az	EEE (Energy Efficient Ethernet)	Removable Terminal Block	Provide 2 redundant power, alarm relay contact, 6 Pin												
VLAN ID	4094	IEEE 802.1Q VLAN VID	Operating Temperature	-10 ~ 60°C (IGS-812SM, IGS-1604SM)												
Switch Architecture	Back-plane (Switching Fabric): 40Gbps (IGS-812SM, IGS-1604SM)	Full wire-speed		-40 ~ 75°C (IGS-812SM-E, IGS-1604SM-E)												
Data Processing	Store and Forward		Operating Humidity	5% to 95% (Non-condensing)												
Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode		Storage Temperature	-40 ~ 85°C												
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)															

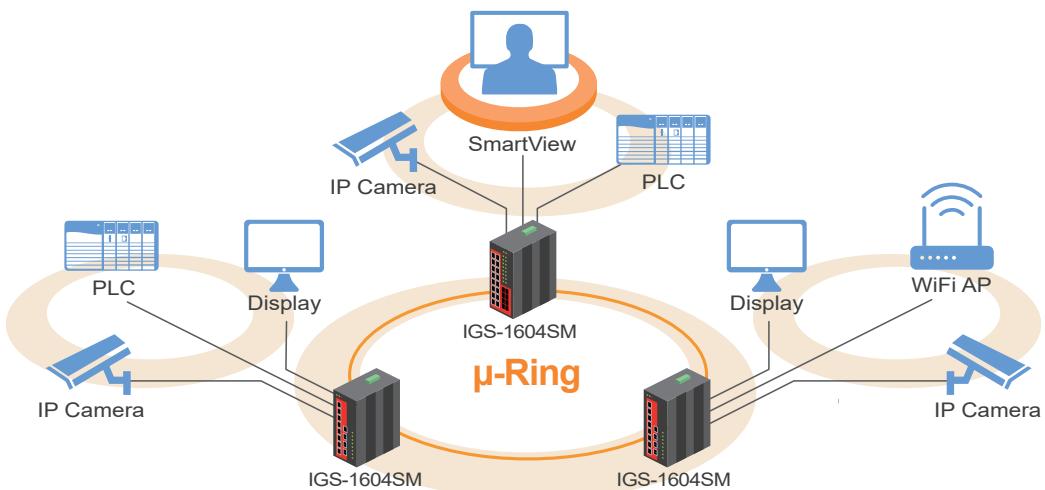
Housing	Rugged Metal, IP30 Protection, Fanless	EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
Dimensions	106 x 72 x152 mm (D x W x H) (IGS-812SM, IGS-1604SM)		EN61000-4-3 (RS) Level 3, Criteria A
Weight	0.795kg (IGS-812SM) 0.82kg (IGS-1604SM)		EN61000-4-4 (Burst) Level 3, Criteria A
Installation Mounting	DIN Rail mounting or wall mounting (optional)		EN61000-4-5 (Surge) Level 3, Criteria B
MTBF	517181 Hours (IGS-812SM) 412,015 Hours (IGS-1604SM) (MIL-HDBK-217)		EN61000-4-6 (CS) Level 3, Criteria A
Warranty	5 years		EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Certification			
EMC	CE (EN55032, EN55035)		
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A,CE EN55022 Class A		

Software Specifications

Topology		RADIUS authentication & accounting
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(Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN	TACACS+ authentication & accounting, TACACS+ 3.0
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	HTTPS, HTTP Supported
Spanning Tree	IEEE 802.1d STP IEEE 802.1w RSTP IEEE 802.1s MSTP	SSL / SSH v2 Supported
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)	User Name Authentication Local Authentication
Loop Protection	Supported	Management Interface Access Filtering Web, Telnet / SSH , CLI RS-232 console
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms	Management Features
	Single Ring, Sub-Ring, Multiple ring topology network	CLI Cisco® like CLI
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Supported	Web Based Management
QoS Features		Telnet Server
Class of Service	IEEE 802.1p 8 active priorities queues for per port	SNMP V1, V2c, V3
Traffic Classification QoS	IEEE 802.1p based CoS IP Precedence based CoS IP DSCP based CoS	sFlow Supported
Traffic Classification QoS	OCL(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	Modbus/TCP Supports for management and monitoring
Bandwidth Control for Ingress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps"	SW & Configuration Upgrade TFTP, HTTP
Bandwidth Control for Egress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps" Per queue / Per port shaper	Redundant firmware in case of upgrade failure
DiffServ (RF 2474) Remarking		FTP client Supports for upload/download configuration
Storm Control	for Unicast, Broadcast, Multicast	RMON RMON I (1, 2, 3, 9 group), RMON II
IP Multicasting Features		MIB RFC1213 MIB II, Private MIB
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	UPnP Supported
Security Features		BOOTP Supported
IEEE 802.1X	Port-Based MAC-Based	DHCP Server, Client, Relay, Relay option 82 , Snooping
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	RARP Supported
		IP Source Guard Supported
		Port Mirroring Supported
		Event Syslog Syslog server (RFC3164)
		Warning Message System syslog, e-mail, alarm relay
		DNS Client, Proxy
		IEEE 1588 PTP V2 Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
		NTP, SNTP Client
		LLDP (IEEE 802.1ab) Link Layer Discovery Protocol
		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 SIP, Subnet (32bit) L4: TCP/UDP
		Others Features
		Green Ethernet Supports IEEE 802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption
		Determine the cable length and lowering the power for ports with short cables
		Lower the power for a port when there is no link
		LED Power Management :Adjustment LEDs intensity
		Cable Diagnostic Measuring UTP cable normal or broken point distance

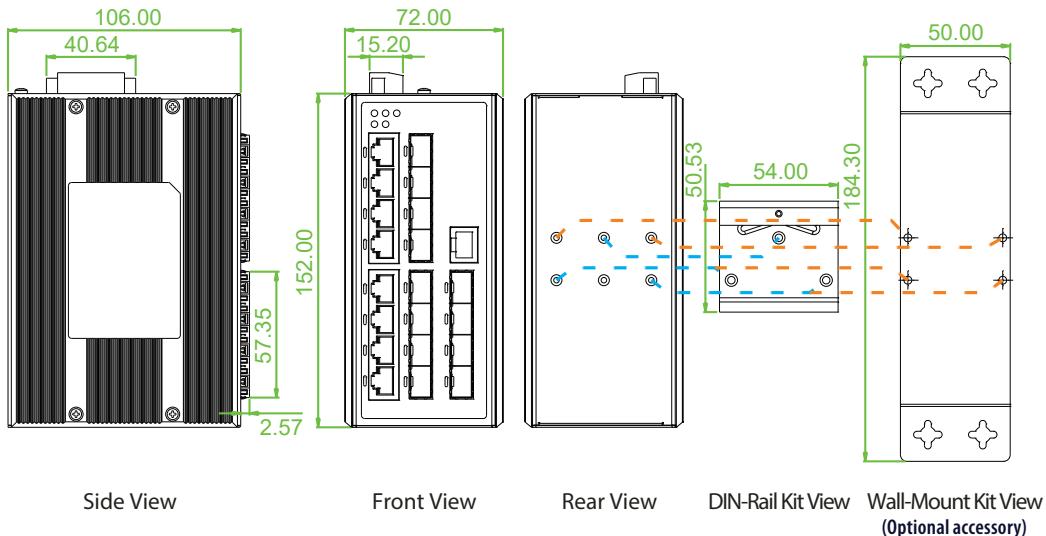
Application

Figure : Application Example

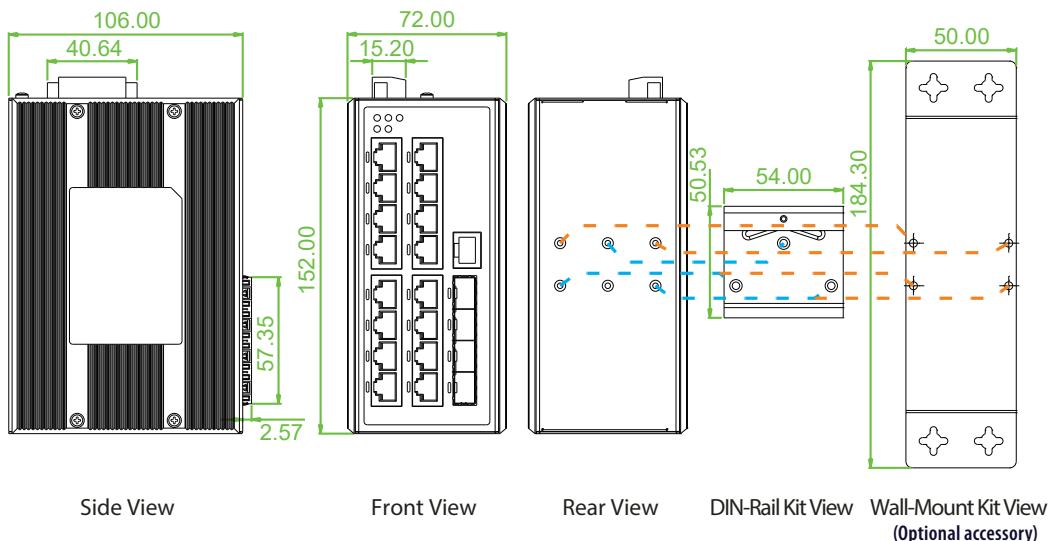


Dimensions

► IGS-812SM



► IGS-1604SM



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	Safety EN62368-1	CE, FCC	
IGS-812SM	V	20	8	12 SFP	12/24/48/-48VDC	V	V	-10~60°C
IGS-812SM-E	V	20	8	12 SFP	12/24/48/-48VDC	V	V	-40~75°C
IGS-1604SM	V	20	16	4 SFP	12/24/48/-48VDC	V	V	-10~60°C
IGS-1604SM-E	V	20	16	4 SFP	12/24/48/-48VDC	V	V	-40~75°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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

■ Industrial Power Supply

MDR-40-48 Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C

IGS-1604XSM

16x 10/100/1000Base-T + 4x GbE/2.5G/5G/10GBase-X SFP⁺



- Supports u-Ring, ERPS, EPS, MSTP, RSTP, STP for redundant cabling
- EN62368-1, CE, FCC certified



An Industrial 20-port Ethernet switch comes with 16 ports Gigabit copper interface and 4 ports 10 Gigabit SFP+ slots, supporting various types of 10 and 2.5Gigabit optical small form-factor pluggable transceivers for long-distance and wide-bandwidth transmission, supports STP, RSTP, MSTP, ITU-T G.8032 Ethernet Ring Protection Switching (ERPS) for link redundancy. Moreover, CTC proprietary μ-Ring supports recovery time<10ms in 250 devices to enhance a reliable non-stop network that used to connect various types of Ethernet devices. It adopts an enhanced and hardened design for high surge protection, wide operating temperature and safety certified to meet critical and centralize strict requirements.

Features

- 12/24/48VDC (9.6~60VDC) redundant dual input power
- 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 SmartView™ for Centralized Management*

*Please see Chapter 1- Software Management for more details

Specifications

Standard	IEEE 802.3 IEEE 802.3u IEEE 802.3ab IEEE 802.3z IEEE 802.3ae IEEE 802.1d IEEE 802.1w IEEE 802.1s ITU-T G.8032 / Y.1344 ITU-T G.8031 / Y.1342 IEEE 802.1Q IEEE 802.1X IEEE802.3ac IEEE 802.3ad IEEE 802.3x IEEE 802.1ad IEEE 802.1p IEEE 802.1ab IEEE 802.3az	10Base-T 10Mbit/s Ethernet 100Base-TX, 100Base-FX, Fast Ethernet 1000Base-T Gbit/s Ethernet over twisted pair 1000Base-X Gbit/s Ethernet over Fiber-Optic 10G bit/s Ethernet over Fiber STP (Spanning Tree Protocol) RSTP (Rapid Spanning Tree Protocol) MSTP (Multiple Spanning Tree Protocol) ERPS (Ethernet Ring Protection Switching) EPS (Ethernet Protection Switching) Virtual LANs (VLAN) Port based and MAC based Network Access Control, Authentication Max frame size extended to 1522Bytes Link aggregation for parallel links with LACP(Link Aggregation Control Protocol) Flow control for Full Duplex Stacked VLANs, Q-in-Q LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization Link Layer Discovery Protocol (LLDP) EEE (Energy Efficient Ethernet)	Console	RS-232 (RJ-45)								
Network Cable			Network Cable	UTP/STP Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)								
Protocols			Protocols	CSMA/CD								
Reverse Polarity Protection			Reverse Polarity Protection	Supported for power input								
Overload Current Protection			Overload Current Protection	Supported								
CPU Watch Dog			CPU Watch Dog	Supported								
Power Supply			Power Supply	Redundant Dual DC 12/24/48VDC (9.6~60VDC) input power, (Removable terminal block)								
Power Consumption			Power Consumption	<table border="1"> <thead> <tr> <th>Input Voltage</th><th>Power Consumption</th></tr> </thead> <tbody> <tr> <td>12VDC</td><td>22.7W</td></tr> <tr> <td>24VDC</td><td>24.3W</td></tr> <tr> <td>48VDC</td><td>28.5W</td></tr> </tbody> </table>	Input Voltage	Power Consumption	12VDC	22.7W	24VDC	24.3W	48VDC	28.5W
Input Voltage	Power Consumption											
12VDC	22.7W											
24VDC	24.3W											
48VDC	28.5W											
LED			LED	<p>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)</p> <p>Per SFP Fiber port: 1G/2.5G/5G Link/Active (Amber) 10G Link/Active (Blue)</p>								
Jumbo Frame			Jumbo Frame	10KB								
IEEE802.3ac			IEEE802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)								
MAC Address Table			MAC Address Table	32K								
Memory Buffer			Memory Buffer	4M Bytes for packet buffer								
Device Memory			Device Memory	128M Bytes Flash ROM, 2G Bytes RAM								
Warning Message			Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay								
DO (Alarm Relay Contact)			DO (Alarm Relay Contact)	Relay outputs with current carrying capacity of 1 A @24VDC								
DI Input			DI Input	DI 17 to 30 V for state 1 0 to 15 V for state 0								
Removable Terminal Block			Removable Terminal Block	Provides 2 terminal block for DO (Alarm Relay), DI, redundant power PWR1 and PWR2								
Operating Temperature			Operating Temperature	-40 ~ 60°C								
Operating Humidity			Operating Humidity	5% to 95% (Non-condensing)								

Storage Temperature	-40 ~ 85°C
Housing	Rugged Metal, IP30 Protection, Fanless
Dimensions	155.6 x 77 x 160mm (D x W x H)
Weight	2.035g
Installation Mounting	DIN Rail mounting, or wall mounting (Optional)
MTBF	251,400 (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE (EN55032, EN55035)
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
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
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-31
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 (Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN
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

ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)

ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Single Ring, Sub-Ring, Multiple ring topology network
	Supported

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	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps"
Bandwidth Control for Egress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps" 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
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name	Local Authentication
Password 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
sFlow	Supported
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 1 (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)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
NTP, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol LLDP-MED

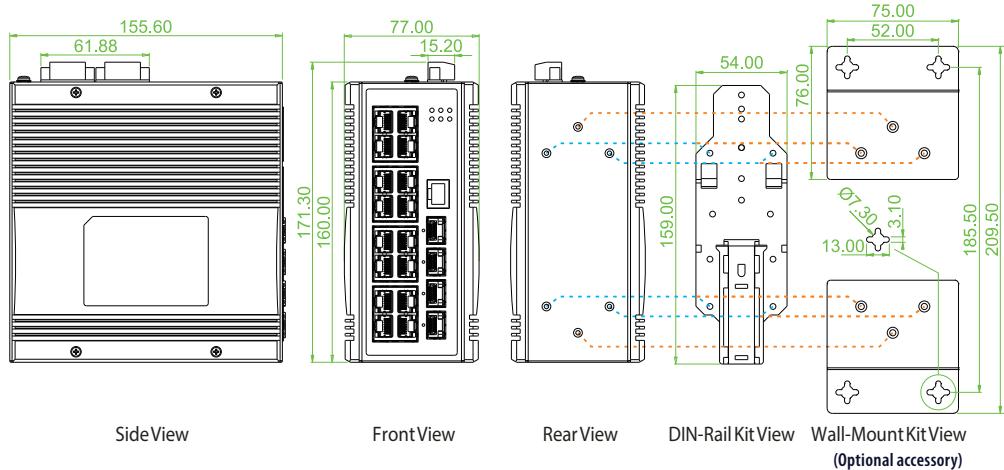
IPv6 Features

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 SIP, Subnet (32bit) L4 : TCP/UDP

Others Features

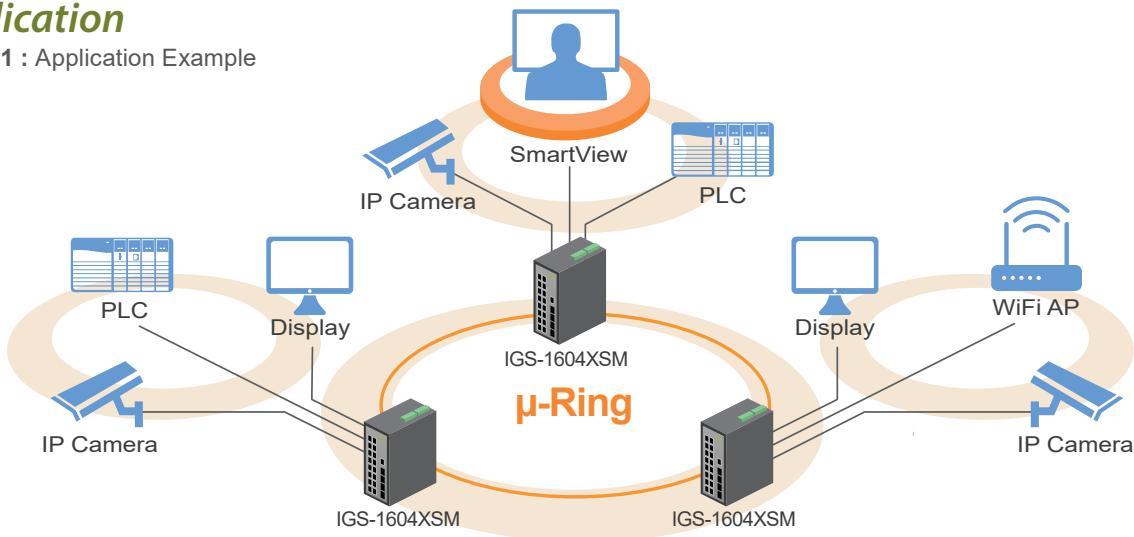
Green Ethernet	Supports IEEE 802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering the power for ports with short cables Lower the power for a port when there is no link LED Power Management :Adjustment LEDs intensity
Cable Diagnostic	Measuring UTP cable normal or broken point distance

Dimensions



Application

Figure 1 : Application Example



Ordering Information

Model Name	Total Port	UTP	Fiber	Input Power	Certification		Operating Temperature
		10/100/1000 Base-T	1000/2.5G/5G/10G Base-X	Redundant	Safety EN62368-1	CE, FCC	
IGS-1604XSM	20	16	4 SFP	12/24/48VDC	V	V	-40 ~ 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-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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

ISFP-M9000-85-(E)	Industrial SFP 10GBase-SR MM, 300meter, wave length 850nm LC, DDMI, -10~70°C (-40~85°C)
ISFP-S9010-31-D-(E)	Industrial SFP 10GBase-LR SM, 10km, 1310nm, 6.4dB, LC, 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)

■ Industrial Power Supply

MDR-40-48	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C
NDR-120-48	Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 120W -20 ~ +70°C

IFS-402CGSW

4x FE RJ45 + 2x 100/1000 SFP, Compact size



- 4KV surge protection for UTP and SFP ports
- Compact size for easy installation



The IFS-402CGSW is a managed industrial grade L2 switch with 4 10/100Base-TX ports and 2 GbE/100M SFP ports. Housed in rugged DIN rail or wall mountable enclosures, the switch is designed for harsh environments, such as industrial networking. It is an ideal solution for Smart City, surveillance, Intelligent traffic control systems, production automation 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 industrial automation applications.

Features

- Redundant power input
- Cable diagnostics
- Supports SmartView™ for Centralized Management*

*Please see Chapter 1- Software Management for more details

Specifications

Standard	IEEE 802.3 IEEE 802.3u IEEE 802.3z IEEE 802.1d IEEE 802.1w IEEE 802.1s IEEE 802.1Q IEEE 802.1X IEEE802.3ac IEEE 802.3ad IEEE 802.3x IEEE 802.1ad IEEE 802.1p IEEE 802.1ab IEEE 802.3az	10Base-T 10Mbit/s Ethernet 100Base-TX, 100Base-FX, Fast Ethernet 1000Base-X Gbit/s Ethernet over Fiber-Optic STP (Spanning Tree Protocol) RSTP (Rapid Spanning Tree Protocol) MSTP (Multiple Spanning Tree Protocol) Virtual LANs (VLAN) Port based and MAC based Network Access Control, Authentication Max frame size extended to 1522Bytes Link aggregation for parallel links with LACP(Link Aggregation Control Protocol) Flow control for Full Duplex Stacked VLANs, Q-in-Q LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization Link Layer Discovery Protocol (LLDP) EEE (Energy Efficient Ethernet)
Switch Architecture	Back-plane (Switching Fabric): 4.8Gbps Full wire-speed	
Data Processing Flow Control	Store and Forward IEEE 802.3x for full duplex mode Back pressure for half duplex mode	
Network Connector	4x 10/100Base-TX RJ-45 + 2x FE/GbE SFP slot RJ-45 UTP port support Auto negotiation speed, Auto MDI/MDI-X function, SFP ports support FE/GbE with DDMI	
Console	RS-232 (RJ-45)	
Network Cable	UTP/STP Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)	
Protocols	CSMA/CD	
Reverse Polarity Protection	Supported for power input	
Overload Current Protection	Supported	
CPU Watch Dog	Supported	
Power Supply	Redundant Dual 12/24/48VDC (9.6~60VDC) Input power (Removable Terminal Block)	

Power Consumption	Input Voltage	Total Power Consumption
	12VDC	4.7W
	24VDC	4.8W
	48VDC	5.3W
LED		Per unit: Power 1 (Green), Power 2 (Green) Per RJ-45 port: 100 Link/Active (Green) 10 Link/Active (Amber) SFP Fiber port: 100 Link/Active (Green) 1000 Link/Active (Amber)
Jumbo Frame	10K	
IEEE802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)	
MAC Address Table	4K	
Memory Buffer	1.75M bits for packet buffer	
Device Memory	128M Bytes Flash ROM, 256M Bytes RAM	
Warning Message	System Syslog, SMTP/ e-mail event message	
Removable Terminal Block	Provides 2 redundant power, 4 Pin	
Operating Temperature	-10 ~ 60°C (IFS-402CGSW) -40 ~ 75°C (IFS-402CGSW-E)	
Operating Humidity	5% to 95% (Non-condensing)	
Storage Temperature	-40 ~ 85°C	
Housing	Rugged Metal, IP30 Protection, Fanless	
Dimensions	106x 31.6x 142mm (Dx Wx H)	
Weight	535g	
Installation Mounting	DIN Rail mounting, or wall mounting (Optional)	
MTBF	1038,003Hours (MIL-HKBK-217)	
Warranty	5 years	
Certification		
EMC	CE (EN55032, EN55035)	
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A,CE	

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 (PFCM, Magnetic Field) Field Strength: 300A/m, Criteria A
Surge Protection	4KV for UTP and Fiber ports

Shock	IEC 60068-2-27
Freefall	IEC 60068-2-31
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(Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN
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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
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Loop Protection	Supported
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QoS Features	IEEE 802.1p 8 active priorities queues for per port
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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	100~1,000,000 when the "Unit" is "Mbps" and 1~1,000 when the "Unit" is "Mbps"
--------------------------------------	--

Bandwidth Control for Egress	100~1,000,000 when the "Unit" is "Mbps" and 1~1,000 when the "Unit" is "Mbps" Per queue / Per port shaper
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DiffServ (RF 2474) Remarkng	
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Storm Control	for Unicast, Broadcast, Multicast
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IP Multicasting Features	
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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	
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IEEE 802.1X	Port-Based MAC-Based
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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
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RADIUS authentication & accounting	
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TACACS+ authentication & accounting, TACACS+ 3.0	
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HTTPS, HTTP	Supported
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SSL / SSH v2	Supported
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User Name Password Authentication	Local Authentication
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Management Interface Access Filtering	Remote Authentication (via RADIUS / TACACS+)
--	--

Web, Telnet / SSH, CLI RS-232 console	
--	--

Management Features	
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CLI	Cisco® like CLI
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Web Based Management	
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Telnet	Supports for management and monitoring
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SNMP	V1, V2c, V3
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sFlow	Supported
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ModBus/TCP	Supports management and monitoring
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SW & Configuration Upgrade	TFTP, HTTP
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Redundant firmware in case of upgrade failure	
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FTP client	Supports for upload/download configuration
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RMON	RMON I (1, 2, 3, 9 group), RMON II
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MIB	RFC1213 MIB II, Private MIB
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UPnP	Supported
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BOOTP	Supported
--------------	-----------

DHCP	Server, Client, Relay, Relay option 82 , Snooping
-------------	---

RARP	Supported
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IP Source Guard	Supported
------------------------	-----------

Port Mirroring	Supported
-----------------------	-----------

Event Syslog	Syslog server (RFC3164)
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Warning Message	System syslog, e-mail
------------------------	-----------------------

DNS	Client, Proxy
------------	---------------

NTP	Client
------------	--------

LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol
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IPv6 Features	
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IPv6 Management	Telnet Server/ICMP v6
------------------------	-----------------------

SNMP over IPv6	Supported
-----------------------	-----------

HTTP over IPv6	Supported
-----------------------	-----------

SSH over IPv6	Supported
----------------------	-----------

IPv6 Telnet	Supported
--------------------	-----------

IPv6 NTP	Client
-----------------	--------

IPv6 TFTP	Supported
------------------	-----------

IPv6 QoS	Supported
-----------------	-----------

IPv6 ACL	Number of rules: up to 256 entries
-----------------	------------------------------------

	for L2 / L3 / L4
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	L2 : Mac address SA/DA/VLAN
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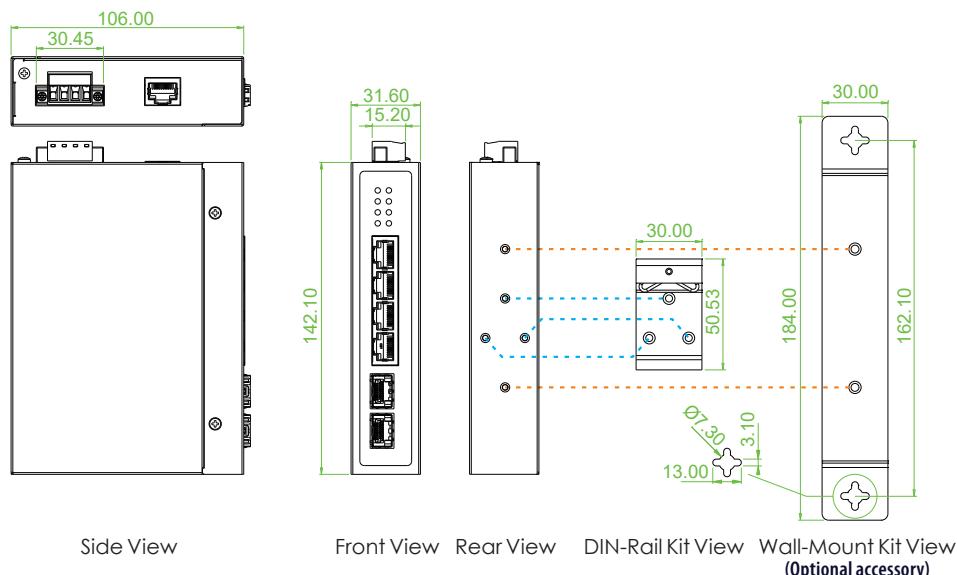
	L3: IP address SA/DA, Subnet (32bit)
--	--------------------------------------

	L4: TCP/UDP
--	-------------

Others Features	
------------------------	--

Green Ethernet	Supports IEEE 802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption
-----------------------	--

Dimensions



Ordering Information

Model Name	Total Port	RJ45	Fiber	Input Power	Certification	Operating 10/100Base-TX
IFS-402CGSW	6	4	2 SFP	12/24/48VDC	V	-10~60°C
IFS-402CGSW-E	6	4	2 SFP	12/24/48VDC	V	-40~75°C

■ Package List

- IFS-402CGSW device
- Console cable (RJ-45 to DB9)
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Optional Accessories

■ Wall Mount Kit

IND-WMK01 Wall Mount kit for Industrial product (184x30mm) (Narrow)

■ Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

■ Industrial Power Supply

MDR-20-24	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 24VDC, 24W, -20 ~ +70°C
MDR-40-48	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C

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

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



- EN62368-1, CE, FCC certified
- Supports redundant negative voltage input power (IFS-1604GSM)
- Supports IEEE 1588 PTP V2
- Supports u-Ring, ERPS, EPS, 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
- Supports SmartView™ for Centralized Management*

*Please see Chapter 1- Software Management for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet	Console	RS-232 (RJ-45)																
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet	Network Cable	UTP/STP Cat. 5e cable or above																
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic		EIA/TIA-568 100-ohm (100meter)																
	IEEE 802.1d	STP (Spanning Tree Protocol)	Protocols	CSMA/CD																
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)	Reverse Polarity Protection	Supported																
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)	Overload Current Protection	Supported																
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)	CPU Watch Dog	Supported																
	ITU-T G.8031 / Y.1342	EPS (Ethernet Protection Switching)	Power Supply	Redundant Dual Input power (Removable Terminal Block) 12/24/48V (9.6~60VDC) (IFS-803GSM & IFS-402GSM) 12/24/48/-48VDC (9.6~60VDC) (IFS-1604GSM)																
	IEEE 802.1Q	Virtual LANs (VLAN)	Power Consumption	<table border="1"> <thead> <tr> <th>Input Voltage</th> <th>IFS-402GSM</th> <th>IFS-803GSM</th> <th>IFS-1604GSM</th> </tr> </thead> <tbody> <tr> <td>12VDC</td> <td>5.7W</td> <td>6.5W</td> <td>10.8W</td> </tr> <tr> <td>24VDC</td> <td>5.8W</td> <td>7W</td> <td>10.6W</td> </tr> <tr> <td>48VDC</td> <td>8.5W</td> <td>8.6W</td> <td>12.5W</td> </tr> </tbody> </table>	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
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																	
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication	LED	Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow)																
	IEEE 802.3ac	Max frame size extended to 1522Bytes.		Per RJ-45 port: 10/100 Link/Active (Green)																
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)		SFP Fiber Per port: Link/Active (Green)																
	IEEE 802.3x	Flow control for Full Duplex																		
	IEEE 802.1ad	Stacked VLANs, Q-in-Q	Jumbo Frame	9.6KB																
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization	IEEE 802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)																
Standard	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)	MAC Address Table	8K																
	IEEE 802.3az	EEE (Energy Efficient Ethernet)	Memory Buffer	512K Bytes for packet buffer																
VLAN ID	4094	IEEE 802.1Q VLAN VID	Device Memory	16M Bytes Flash ROM, 128M Bytes RAM																
Switch Architecture	Back-plane (Switching Fabric): 4.8Gbps (IFS-402GSM), 7.6Gbps (IFS-803GSM) 11.2Gbps (IFS-1604GSM)	Full wire-speed	Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay																
Data Processing	Store and Forward		Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC																
Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode		Removable Terminal Block	Provide 2 redundant power, alarm relay contact, 6 Pin																
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)		Operating Temperature	-10 ~ 60°C (IFS-402GSM, IFS-803GSM, IFS-1604GSM)																
	RJ-45 UTP port support Auto negotiation speed, Auto MDI/MDI-X function, SFP port support 100/1000M dual speed with DDMI		Operating Humidity	-40 ~ 75°C (IFS-402GSM-E, IFS-803GSM-E, IFS-1604GSM-E)																
			Storage Temperature	5% to 95% (Non-condensing)																
				-40 ~ 85°C																

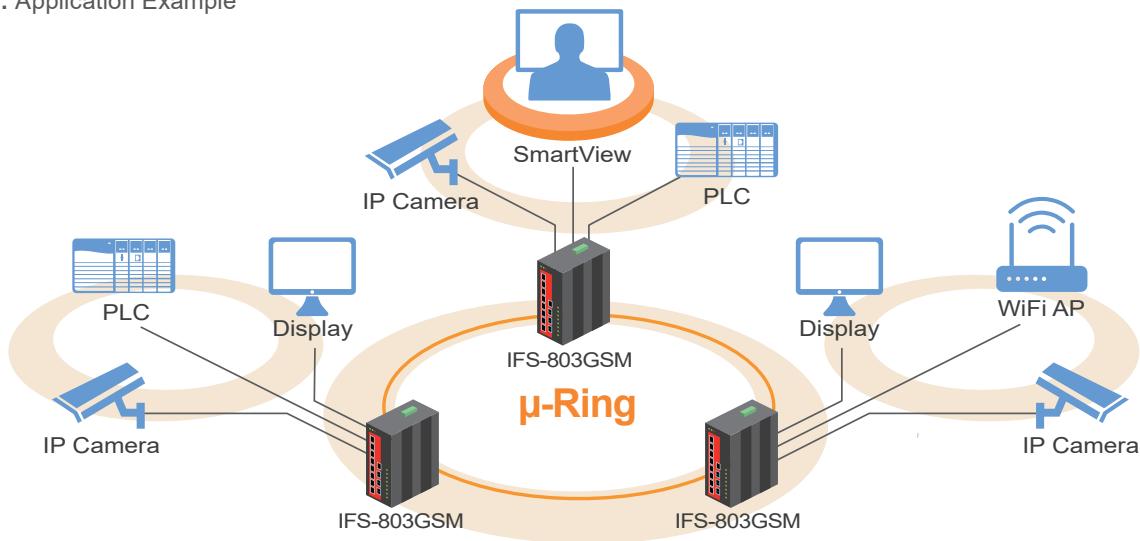
Housing	Rugged Metal, IP30 Protection, Fanless	EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
Dimensions	106 x 62.5 x 135 mm (D x W x H) (IFS-402GSM) 106 x 72 x 152 mm (D x W x H) (IFS-803GSM, IFS-1604GSM)		EN61000-4-3 (RS) Level 3, Criteria A
Weight	0.715kg (IFS-402GSM), 0.79kg (IFS-803GSM) 0.82kg (IFS-1604GSM)		EN61000-4-4 (Burst) Level 3, Criteria A
Installation Mounting	DIN Rail mounting or wall mounting (optional)		EN61000-4-5 (Surge) Level 3, Criteria B
MTBF	861,962hrs (IFS-402GSM) 612,523hrs (IFS-803GSM) 419,048hrs (IFS-1604GSM) (MIL-HDBK-217)		EN61000-4-8 (PBMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Warranty	5 years	Safety	EN62368-1 (IFS-1604GSM)
Certification		Shock	IEC 60068-2-27
EMC	CE	Freefall	IEC 60068-2-32
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE EN55022 Class A	Vibration	IEC 60068-2-6
Traffic control	NEMA TS2 (IFS-402GSM, IFS-803GSM)		

Software Specifications

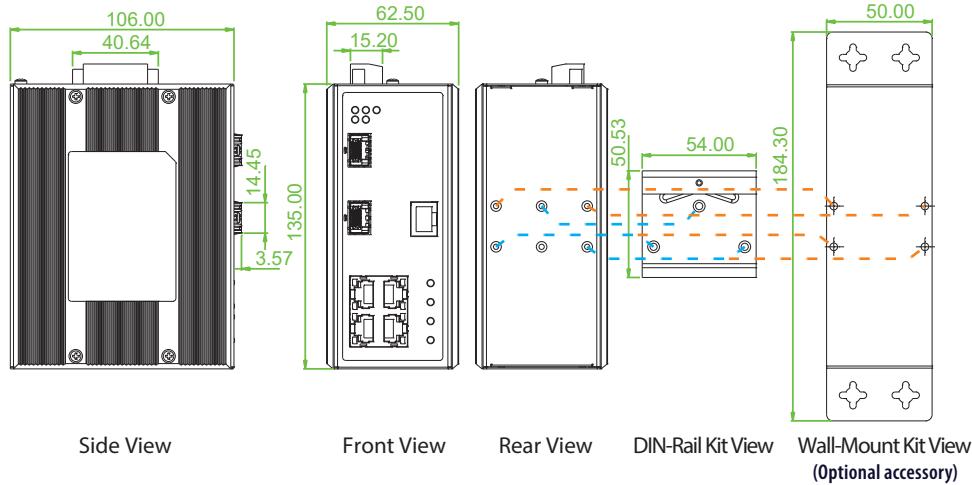
Topology	RADIUS authentication & accounting
VLAN	TACACS+ authentication & accounting, TACACS+ 3.0
	HTTPS, HTTP Supported
	SSL / SSH v2 Supported
	User Name Local Authentication
	Password Remote Authentication (via RADIUS / TACACS+)
	Authentication
Management Interface Access	Web, Telnet / SSH , CLI RS-232 console
Filtering	
Management Features	
CLI	Cisco® like CLI
Web Based Management	
Telnet	Server
SNMP	V1, V2c, V3
sFlow	Supported
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)
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
IEEE 1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol
	LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	Number of rules: up to 256 entries
	for L2 / L3 / L4
	L2 : Mac address SA/DA/VLAN
	L3: IP address SIP, Subnet (32bit)
	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

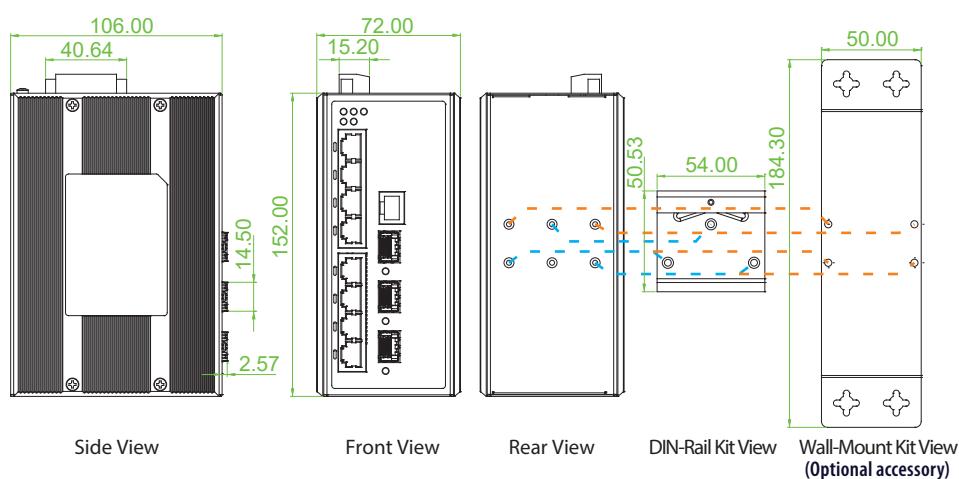
Figure : Application Example

**Dimensions**

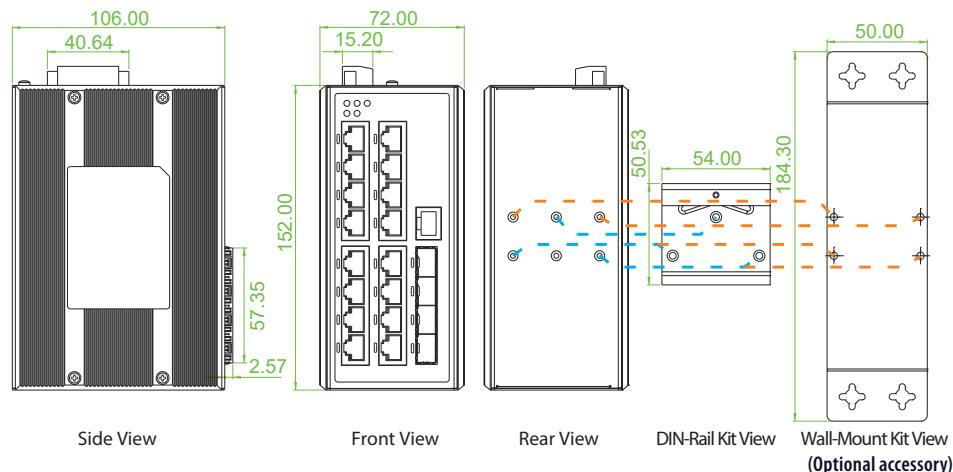
► IFS-402GSM



► IFS-803GSM



► IFS-1604GSM

*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	NEMA TS 2	EN62368-1	CE FCC	
IFS-402GSM	V	6	4	2 SFP	12/24/48VDC	V		V	-10~60°C
IFS-402GSM-E	V	6	4	2 SFP	12/24/48VDC	V		V	-40~75°C
IFS-803GSM	V	11	8	3 SFP	12/24/48VDC	V		V	-10~60°C
IFS-803GSM-E	V	11	8	3 SFP	12/24/48VDC	V		V	-40~75°C
IFS-1604GSM	V	20	16	4 SFP	12/24/48/48VDC		V	V	-10~60°C
IFS-1604GSM-E	V	20	16	4 SFP	12/24/48/48VDC		V	V	-40~75°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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

■ Industrial Power Supply

MDR-20-24 Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 24VDC, 24W, -20 ~ +70°C

MDR-40-48 Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C

IFS+402GSM & IFS+803GSM

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



- EN62368-1, NEMA-TS2, CE, FCC certified
- Supports IEEE 1588 PTP V2
- Supports u-Ring, ERPS, EPS, MSTP, RSTP, STP for redundant cabling
- Cable diagnostics, identifies opens/shorts distance



These models are managed industrial grade L2+ switch 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 is 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 12/24/48/-48VDC (9.6~60VDC)
- 2.25kVDC 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
- Supports SmartView™ for Centralized Management*

*Please see Chapter 1- Software Management for more details

Specifications

Standard	IEEE 802.3	10Base-T 10Mbit/s Ethernet	Console	RS-232 (RJ-45)												
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet	Network Cable	UTP/STP Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)												
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic	Protocols	CSMA/CD												
	IEEE 802.1d	STP (Spanning Tree Protocol)	Reverse Polarity Protection	Supported												
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)	Overload Current Protection	Supported												
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)	CPU Watch Dog	Supported												
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)	Power Supply	Redundant Dual 12/24/48/-48VDC (9.6~60VDC) Input power (Removable Terminal Block)												
	ITU-T G.8031 / Y.1342	EPS (Ethernet Protection Switching)	Power Consumption	<table border="1"> <thead> <tr> <th>Input Voltage</th> <th>IFS+803GSM</th> <th>IFS+402GSM</th> </tr> </thead> <tbody> <tr> <td>12VDC</td> <td>7.4W</td> <td>6.3W</td> </tr> <tr> <td>24VDC</td> <td>7.8W</td> <td>6.5W</td> </tr> <tr> <td>48VDC</td> <td>8.9W</td> <td>7.7W</td> </tr> </tbody> </table>	Input Voltage	IFS+803GSM	IFS+402GSM	12VDC	7.4W	6.3W	24VDC	7.8W	6.5W	48VDC	8.9W	7.7W
Input Voltage	IFS+803GSM	IFS+402GSM														
12VDC	7.4W	6.3W														
24VDC	7.8W	6.5W														
48VDC	8.9W	7.7W														
	IEEE 802.1Q	Virtual LANs (VLAN)	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)												
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication		SFP Fiber Per port: Link/Active (Green)												
	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 (IFS+803GSM) 4.8Gbps (IFS+402GSM) Full wire-speed															
Data Processing Flow Control	Store and Forward 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 (IFS+803GSM) 4x 10/100Base-TX RJ-45 and 2x 100/1000Base-X SFP Slot (IFS+402GSM)															
Network Connector	RJ-45 UTP port support Auto negotiation speed, Auto MDI/MDI-X function, SFP port support 100/1000M dual speed with DDMI															

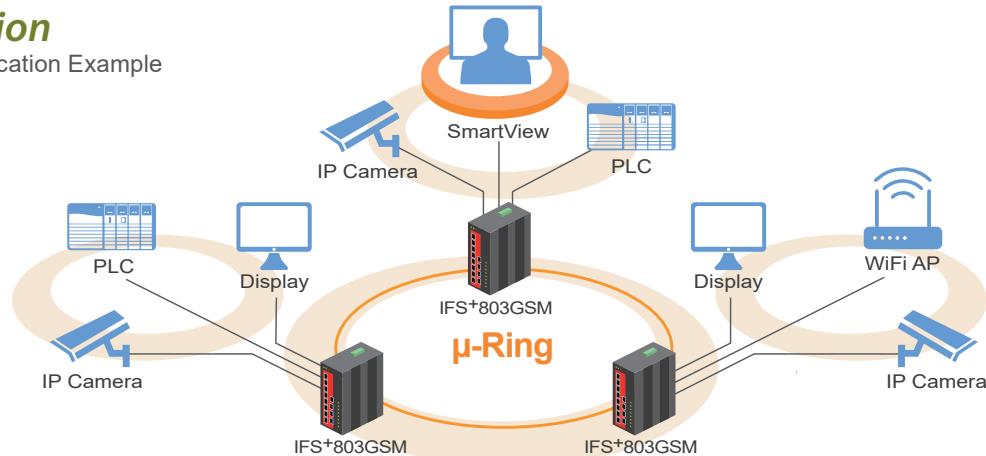
Dimensions	106 x 72 x 152 mm (D x W x H) (IFS+803GSM) 106 x 62.5 x 135 mm (D x W x H) (IFS+402GSM)	EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (Burst) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Weight	0.81kg (IFS+803GSM) 0.64kg (IFS+402GSM)	Safety	EN62368-1 (IFS+803GSM)
Installation Mounting	DIN Rail mounting or wall mounting (optional)	Hipot	DC 2.25KV for power to chassis ground, Ethernet ports to chassis ground
MTBF	688,248 hours (IFS+803GSM) 861,962 hours (IFS+402GSM) (MIL-HDBK-217)	Surge protection	4KV for UTP and Fiber port
Warranty	5 years	Shock	IEC 60068-2-27
Certification		Freefall	IEC 60068-2-32
EMC	CE (EN55032, EN55024)	Vibration	IEC 60068-2-6
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE EN55032 Class A		
Traffic control	NEMA TS2 (IFS+803GSM)		

Software Specifications

Topology		RADIUS authentication & accounting
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(Ethernet, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR (Multicast VLAN Registration) Voice VLAN	TACACS+ authentication & accounting, TACACS+ 3.0
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	HTTPS, HTTP Supported SSL / SSH v2 Supported
Spanning Tree	IEEE 802.1d STP IEEE 802.1w RSTP IEEE 802.1s MSTP	User Name Authentication Local Authentication Management Interface Access Filtering Web, Telnet / SSH , CLI RS-232 console
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)	Management Features
Loop Protection	Supported	CLI Cisco® like CLI
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms	Web Based Management
	Single Ring, Sub-Ring, Multiple ring topology network	Telnet Server
ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching)	Supported	SNMP V1, V2c, V3
QoS Features		sFlow Supported
Class of Service	IEEE 802.1p 8 active priorities queues for per port	Modbus/TCP Support for management and monitoring
Traffic Classification QoS	IEEE 802.1p based CoS IP Precedence based CoS IP DSCP based CoS	SW & Configuration Upgrade TFTP, HTTP
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	FTP client Redundant firmware in case of upgrade failure
Bandwidth Control for Ingress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps"	RMON Supports for upload/download configuration
Bandwidth Control for Egress	100~1,000,000 when the "Unit" is "kbps" and 1~1,000 when the "Unit" is "Mbps" Per queue / Per port shaper	MIB RMON I (1, 2, 3, 9 group), RMON II
DiffServ (RF 2474) Remarking		UPnP Supported
Storm Control	for Unicast, Broadcast, Multicast	BOOTP Supported
IP Multicasting Features		DHCP Server, Client, Relay, Relay option 82 , Snooping
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	RARP Supported
Security Features		IP Source Guard Supported
IEEE 802.1X	Port-Based MAC-Based	Port Mirroring Supported
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	Event Syslog Syslog server (RFC3164)
		Warning Message System syslog, e-mail, alarm relay
		DNS Client, Proxy
		IEEE 1588 PTP V2 Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
		NTP, SNTP Client
		LLDP (IEEE 802.1ab) Link Layer Discovery Protocol
		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 SIP, Subnet (32bit) 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

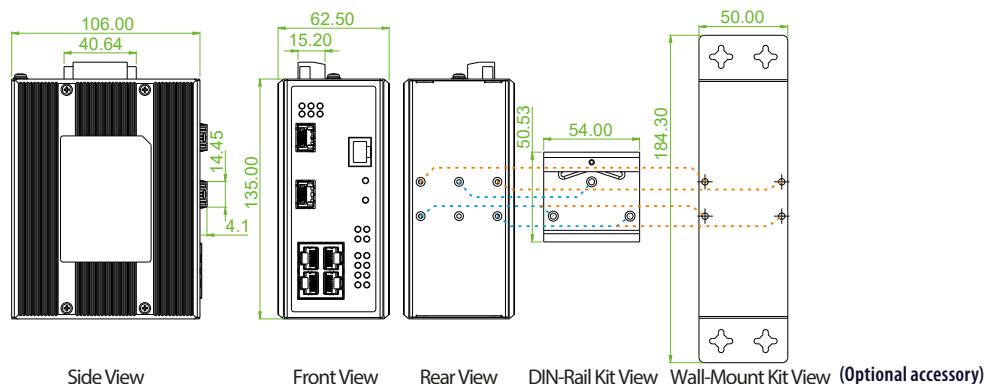
Application

Figure : Application Example

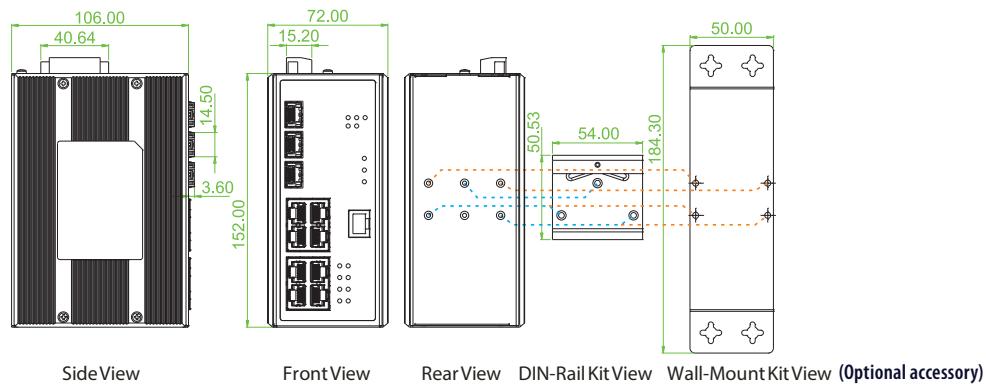


Dimensions

► IFS+402GSM



► IFS+803GSM



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	NEMA TS2	Safety EN62368-1	CE FCC	
IFS+402GSM	V	6	4	2 SFP	12/24/48-/48VDC				-10~60°C
IFS+402GSM-E	V	6	4	2 SFP	12/24/48-/48VDC				-40~75°C
IFS+803GSM	V	11	8	3 SFP	12/24/48-/48VDC	V	V	V	-10~60°C
IFS+803GSM-E	V	11	8	3 SFP	12/24/48-/48VDC	V	V	V	-40~75°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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

Industrial Power Supply

MDR-20-24 Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 24VDC, 24W, -20 ~ +70°C

MDR-40-48 Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C

IGS-402CS

4x 10/100/1000Base-T RJ45 + 2x 100/1000Base-X SFP, Compact size



- 4KV surge protection for UTP and SFP ports
- Wide operating temperature -40 ~ 75°C
- IP30 rugged metal housing and fanless



The IGS-402CS is a 6 Ports unmanaged industrial grade Ethernet switch 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, security automation applications, IP Surveillance, intelligent transportation systems (ITS) and is 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.

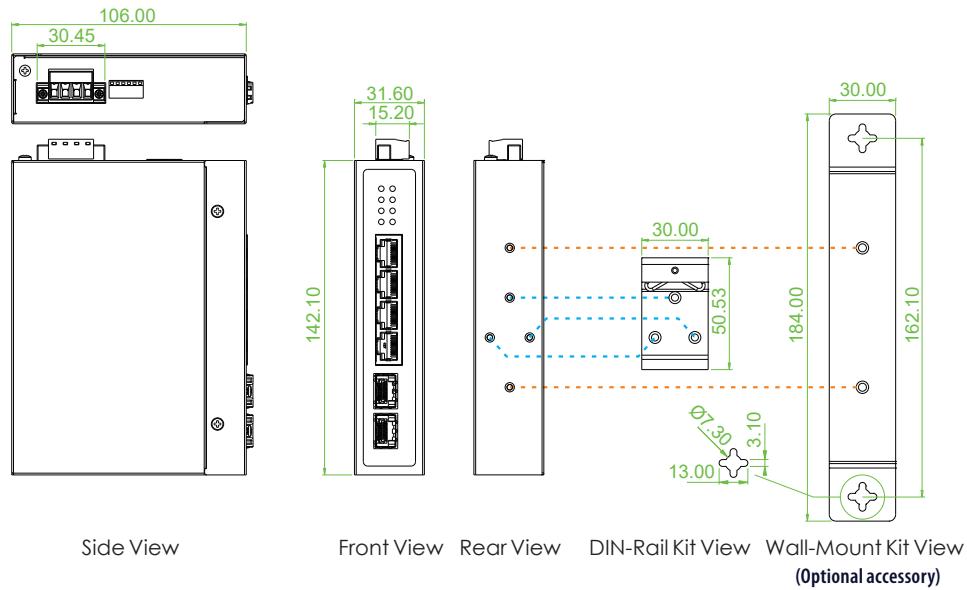
Features

- 12/24/48VDC (9.6~60VDC) redundant dual input power
- Supports DIP switch to set broadcast storm protection, SFP Auto/Force Mode, SFP 100M/1000M ; RJ45 Auto/force mode, 10M/100M, Full/half.
- Supports flow control
- Provides broadcast storm protection
- DIN Rail mounting or wall mounting

Specifications

IEEE Standard	IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX and 100Base-FX Fast Ethernet IEEE 802.3ab 1000Base-T Gbit/s Ethernet over twisted pair IEEE 802.3z 1000Base-X Gigabit Ethernet over fiber-optic IEEE 802.3x Flow Control and Back Pressure	Reverse Polarity Protection Supported for Power Input Overload Current Protection Supported Power Supply Redundant dual 12/24/48VDC (9.6~60VDC) input power (Removable terminal block)								
Switch Architecture	Back-plane (Switching Fabric): 12 Gbps	Power Consumption								
Data Processing	Store and Forward	<table border="1"> <thead> <tr> <th>Input Voltage</th><th>Total Power Consumption</th></tr> </thead> <tbody> <tr> <td>12VDC</td><td>5.8W</td></tr> <tr> <td>24VDC</td><td>6.5W</td></tr> <tr> <td>48VDC</td><td>8.2W</td></tr> </tbody> </table>	Input Voltage	Total Power Consumption	12VDC	5.8W	24VDC	6.5W	48VDC	8.2W
Input Voltage	Total Power Consumption									
12VDC	5.8W									
24VDC	6.5W									
48VDC	8.2W									
Flow Control	IEEE 802.3x flow control, back pressure flow control	Removable Terminal Block Provides 2 Redundant power, 4 Pin								
MAC Address Table	4K	Operating Temperature -10 ~ 60°C (IGS-402CS) -40 ~ 75°C (IGS-402CS-E)								
Packet Buffer Size	1.75Mbit	Operating Humidity 5% to 95% (Non-condensing)								
Max Frame Size	1522Bytes	Storage Temperature -40 ~ 85°C								
Jumbo Frame	10K Byte	Housing Rugged metal, IP30 Protection and fanless								
Network Connector	4x RJ-45 for 10/100/1000Base-T Auto Negotiation Speed or Force Mode, Auto MDI/MDI-X function, Full/Half duplex 2x 100/1000Base-X SFP, Auto or Force Mode	Dimensions 106x 31.6x 142mm (D X W X H)								
Network Cable	UTP/STP Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)	Weight 420g								
Network Cable	Fiber Cable (Multi-mode): 50/125um, 62.5/125um Fiber Cable (Single-mode): 9/125um	Installation Mounting DIN Rail mounting, or wall mounting (Optional)								
Protocols	CSMA/CD	MTBF 862,267Hours (MIL-HDBK-217)								
LED	Per unit: Power 1 (Green), Power 2 (Green) Per RJ-45 port : 10/100M Link/Act (Green) 1000M Link/Act (Amber) SFP Fiber port: 100 Link/Active (Green) 1000 Link/Active (Amber)	Warranty 5 years								
DIP SW	DIP 1 Broadcast Protection OFF : Enable ON : Disable DIP 2 Off: Fiber Auto On: Fiber Force Mode DIP 3 SFP Fiber Speed OFF: Giga ON: 100M DIP 4 RJ45 Mode OFF: Auto ON: Force DIP 5 RJ45 Speed OFF: 100M ON: 10M DIP 6 RJ45 Duplex OFF: Full ON: Half	Certification EMC CE (EN55032, EN55035) EMI (Electromagnetic Interference) FCC Part 15 Subpart B Class A, CE 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 4KV surge protection Supported for UTP and SFP port Shock IEC 60068-2-27 Freefall IEC 60068-2-31 Vibration IEC 60068-2-6								

Dimensions



Ordering Information

Model Name	Total Port	RJ45 UTP Port	Fiber Port	Input Power	Certification	Operating Temperature
		10/100/1000 Base-T(X)	100/1000Base-X	Redundant	CE, FCC	
IGS-402CS	6	4	2 SFP	12/24/48VDC	V	-10~60°C
IGS-402CS-E	6	4	2 SFP	12/24/48VDC	V	-40~75°C

■ Package List

- IGS-402CS device
- Protective caps for SFP ports
- Din Rail with screws
- Terminal block

Optional Accessories

■ Wall Mount Kit

IND-WMK01 Wall Mount kit for Industrial product (184x30mm) (Narrow)

■ Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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 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)

■ Industrial Power Supply

MDR-20-24	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 24VDC, 24W, -20 ~ +70°C
MDR-40-48	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C

IGS-402S & IGS-402F

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



- 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

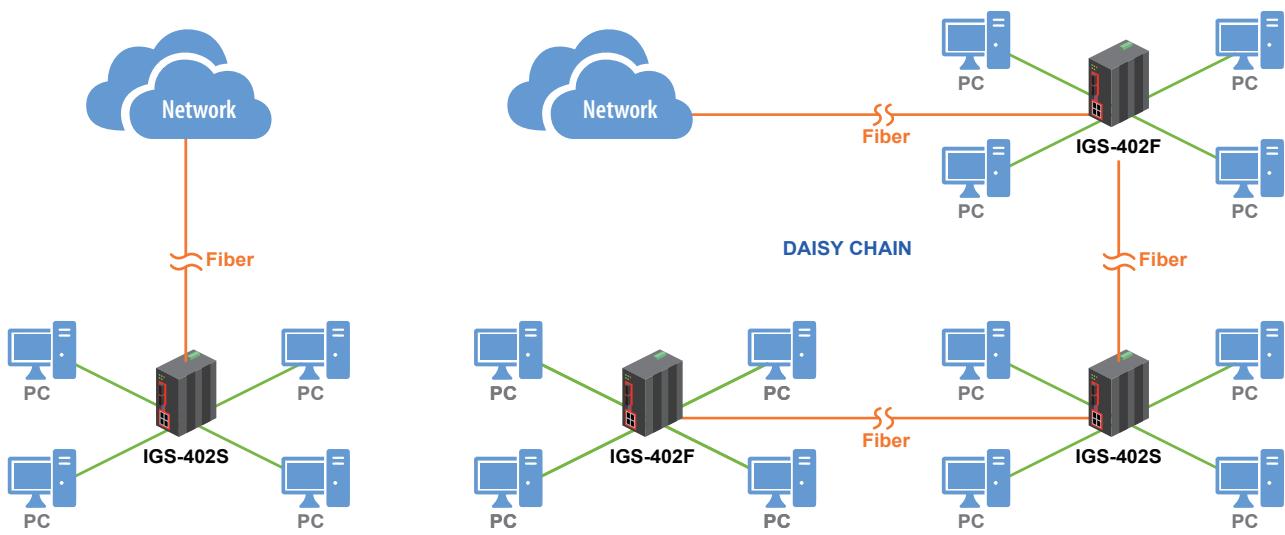
- Wide operating temperature -40 ~ 75°C ("E" model)
- Supports flow control
- Jumbo frame support

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	Power Supply Redundant Dual DC 12/24/48V (9.6~60VDC) Input power (Removable Terminal Block)
Switch Architecture	Back-plane (Switching Fabric): 12Gbps (IGS-402S, IGS-402F) Full wire-speed	Power Consumption 7.9W (IGS-402F) 7.9W (IGS-402S)
Data Processing	Store and Forward	Alarm Relay Contact Relay outputs with current carrying capacity of 1 A @24VDC
Flow Control	IEEE 802.3x flow control, back pressure flow control	Removable Terminal Block Provides 2 Redundant power, Alarm relay contact, 6 Pin
Provides Broadcast Storm Protection	Present, Enable / Disable set by DIP SW	Operating Temperature -10 ~ 60°C (IGS-402S, IGS-402F) -40 ~ 75°C (IGS-402S-E, IGS-402F-E)
Jumbo Frame	10K Bytes	Operating Humidity 5% to 95% (Non-condensing)
MAC Address Table	8K	Storage Temperature -40 ~ 85°C
Packet Buffer Size	1Mbits	Housing Rugged Metal, IP30 Protection, Fanless
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)	Dimensions 106 x 62.5 x 134.8 mm (D X W X H)
Network Cable	UTP/STP Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter) Fiber Cable (Multi-mode): 50/125um, 62.5/125um Fiber Cable (Single-mode): 9/125um	Weight 0.84kg (IGS-402S) 0.68kg (IGS-402F)
Protocols	CSMA/CD	Installation Mounting DIN Rail mounting, or wall mounting (Optional)
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)	MTBF 1,000,643 Hours (IGS-402S) 821,412 Hours (IGS-402F) (MIL-HDBK-217)
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	Warranty 5 years
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)	Certification CE
Reverse Polarity Protection	Supported for Power Input	EMI (Electromagnetic Interference) FCC Part 15 Subpart B Class A, CE
Overload current protection	Supported	EMS (Electromagnetic Susceptibility) Protection Level EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (Burst) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Shock	IEC 60068-2-27	
Freefall	IEC 60068-2-32	
Vibration	IEC 60068-2-6	

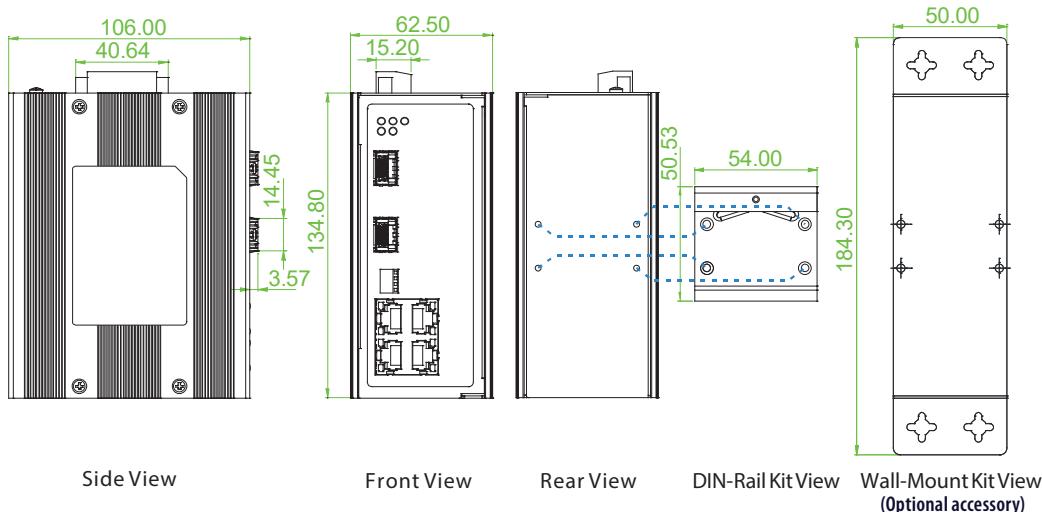
Application

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

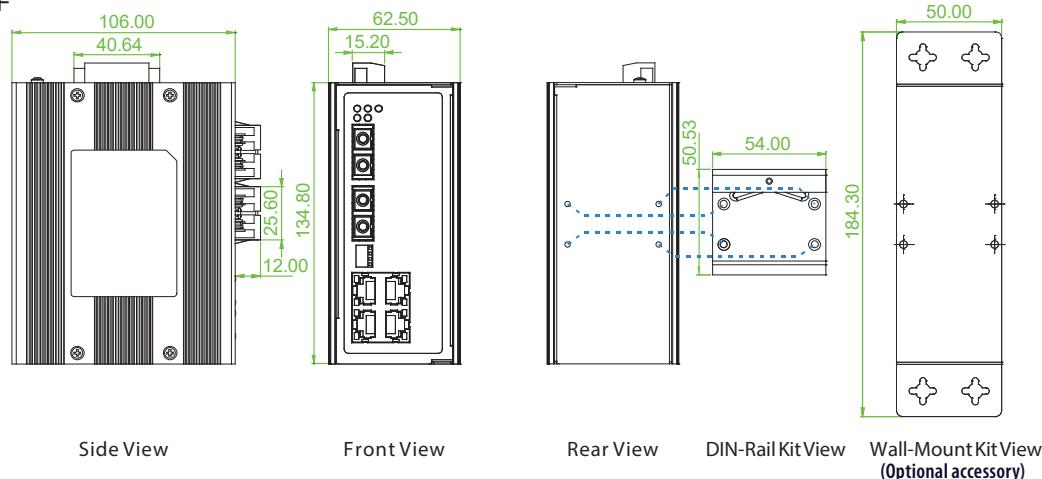


Dimensions

► IGS-402S



► IGS-402F



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		CE	FCC	
IGS-402S	6	4		2 SFP	12/24/48VDC	V	V	-10~60°C
IGS-402S-E	6	4		2 SFP	12/24/48VDC	V	V	-40~75°C
IGS-402F	6	4	2 SC		12/24/48VDC	V	V	-10~60°C
IGS-402F-E	6	4	2 SC		12/24/48VDC	V	V	-40~75°C

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)

■ 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

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

The ISFP series of industrial grade SFP modules have been fully tested with all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

■ Industrial Power Supply

MDR-20-24	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 24VDC, 24W, -20 ~ +70°C
MDR-40-48	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C

IGS-500 & IGS-800

◀ 5x GbE RJ45

▶ 8x GbE RJ45



- 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. 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)

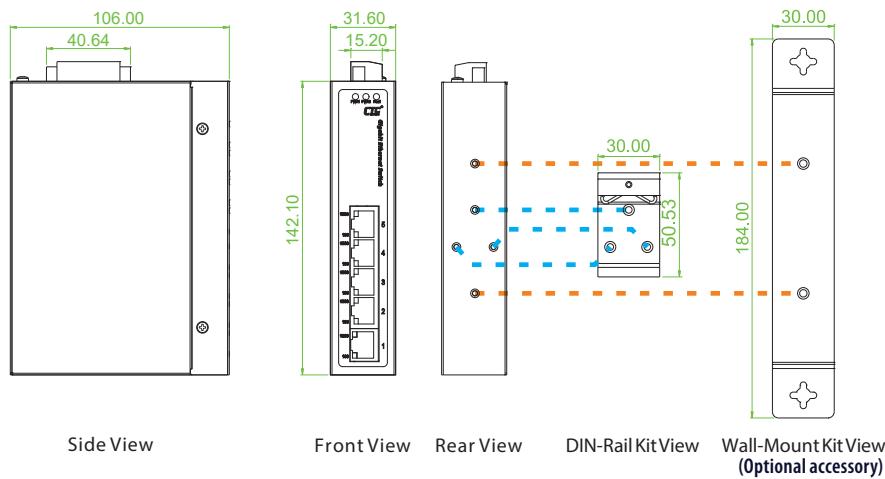
Specifications

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): 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) 512K Byte (IGS-800)
Network Connector	5 x 10/100/1000Base-T RJ-45 (IGS-500) 8 x 10/100/1000Base-T RJ-45 (IGS-800) 10/100/1000Base-TX auto negotiation speed, Auto MDI/MDI-X function, Full/Half duplex
Network Cable	UTP/STP Cat. 5 cable or above EIA/TIA-568 100-ohm (100meter)
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 Green Ethernet DIP 3 ON : Disable Green Ethernet OFF : Enable 802.3az Green Ethernet
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)

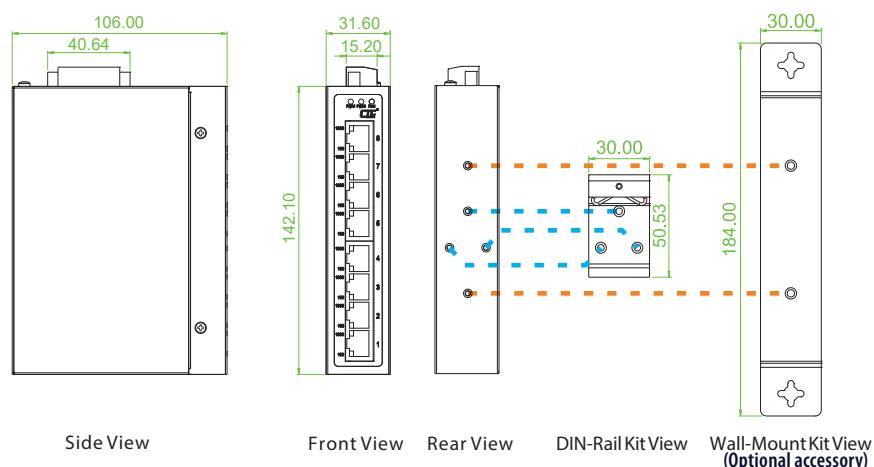
Power Consumption	Input	IGS-500	IGS-800
12VDC	3.3W	7.0W	
24VDC	3.4W	7.0W	
48VDC	4.8W	8.7W	
Alarm Relay Contact Relay outputs with current carrying capacity of 1 A @24VDC, NC			
Removable Terminal Block	Provides 2 redundant power, alarm relay contact, 6 Pin		
Operating Temperature	-10°C~60°C (IGS-500, IGS-800) -40°C~75°C (IGS-500-E, IGS-800-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 142 mm (D x W x H)		
Weight	0.41kg (IGS-500), 0.44kg (IGS-800)		
Installation Mounting	DIN Rail mounting, or wall mounting (Optional)		
MTBF	1,154,166hrs (IGS-500) 747,984hrs (IGS-800) (MIL-HDBK-217)		
Warranty	5 years		
Certification			
EMC/EMS	CE (EN55032, EN55035)		
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE		
EMS (Electromagnetic Susceptibility)	EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A		
Protection Level	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

► IGS-500



► IGS-800



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	CE	FCC	
IGS-500	5	5		12/24/48VDC	V	V	-10~60°C
IGS-500-E	5	5		12/24/48VDC	V	V	-40~75°C
IGS-800	8	8		12/24/48VDC	V	V	-10~60°C
IGS-800-E	8	8		12/24/48VDC	V	V	-40~75°C

■ Package List

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

Optional Accessories

■ Wall Mount Kit

IND-WMK01

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

■ Industrial Power Supply

MDR-20-24

Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 24VDC, 24W, -20 ~ +70°C

MDR-40-48

Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C

IFS-401F & IFS-402F & IFS-800

- ◀ 4x 10/100Base RJ45 + 1x (or 2x) 100Base Fiber (ST/SC)
- ▶ 8x 10/100Base RJ45

IFS-802GS & IFS-1602GS

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



- 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

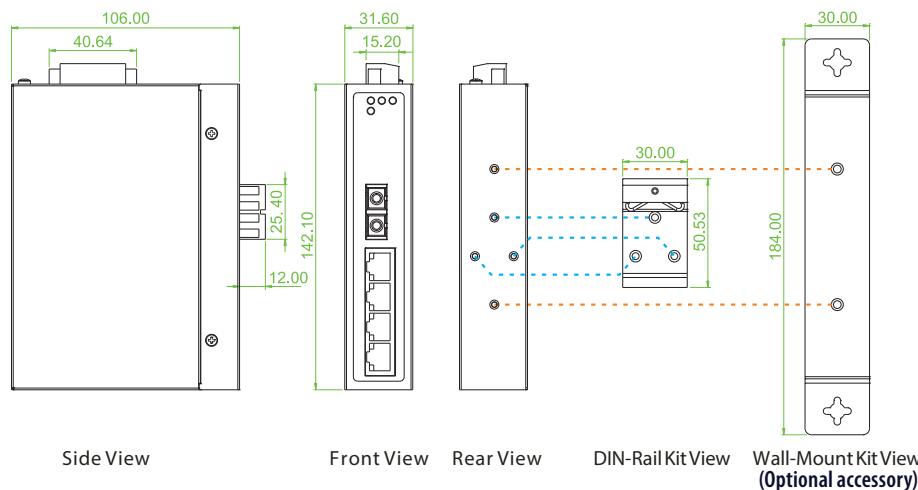
IEEE Standard	IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX and 100Base-FX Fast Ethernet IEEE 802.3x Flow Control and Back Pressure IEEE 802.3z 1000Base-X Gbit/s Ethernet over Fiber-Optic	LED Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber) RJ-45 Per port: Link/Active (Green), Speed 100 (Yellow) Fiber Per port: Link/Active (Green) (IFS-401F, IFS-402F) SFP Port : Link/Active (Green) (IFS-802GS, IFS-1602GS)
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	DIP SW DIP 1 OFF : Enable power failure alarm ON : Disable Broadcast storm protection (IFS-401F, IFS-402F, IFS-800, IFS-1602GS) DIP 2 OFF : Enable ON : Disables
Data Processing	Store and Forward	Reverse Polarity Protection Supported for Power Input
Transfer Rate	14,880pps for Ethernet port 148,800pps for Fast Ethernet port 1,488,000pps for Giga Ethernet port	Overload Current Protection Supported
Flow Control	IEEE 802.3x flow control, back pressure flow control	Power Supply Redundant Dual DC 12/24/48V (9.6~60VDC) Input power (Removable Terminal Block)
Jumbo Frame	16K Byte (IFS-1602GS)	Power Consumption 4.4W (IFS-401F) 5.8W (IFS-402F) 4.4W (IFS-802GS) 3.9W (IFS-800) 8.7W (IFS-1602GS)
Provides Broadcast Storm Protection	Present, Enable /Disable set by DIP SW (IFS-401F, IFS-402F, IFS-800, IFS-1602GS)	Alarm Relay Contact Relay outputs with current carrying capacity of 1 A @24VDC, NC
MAC Address Table	2K (IFS-401F, IFS-402F, IFS-800) 8K (IFS-802GS) 16K (IFS-1602GS)	Removable Terminal Block Provides 2 Redundant power, Alarm relay contact, 6 Pin
Packet Buffer Size	448Kbit (IFS-401F, IFS-402F, IFS-800) 1024Kbit (IFS-802GS) 4M bit (IFS-1602GS)	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)
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)	Operating Humidity 5% to 95% (Non-condensing)
	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)	Storage Temperature -40 ~ 85°C
Network Cable	UTP/STP Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter) Fiber Cable (Multi-mode): 50/125um~62.5/125um	Housing Rugged Metal, IP30 Protection and Fanless
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)	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)
Protocol	SFP: Distance depend on SFP Fiber Transceiver CSMA/CD	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 (EN55032, EN55035)
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
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

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

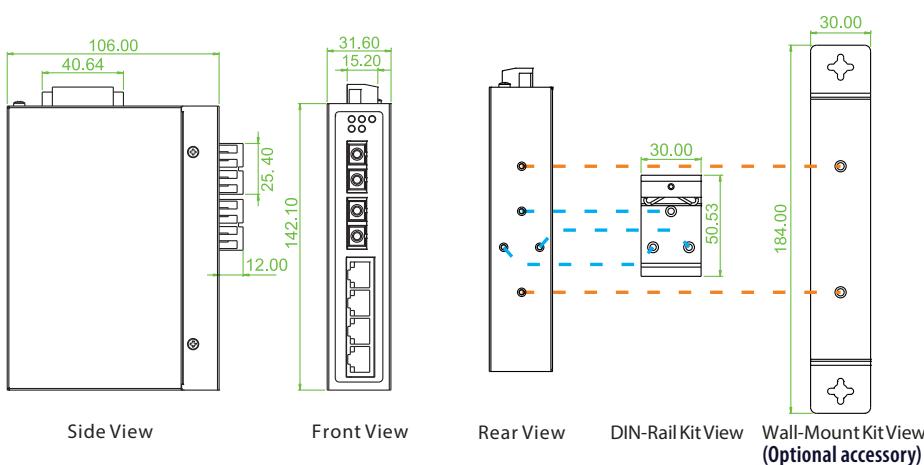
Front View

Rear View

DIN-Rail Kit View

Wall-Mount Kit View (Optional accessory)

► IFS-402F



Side View

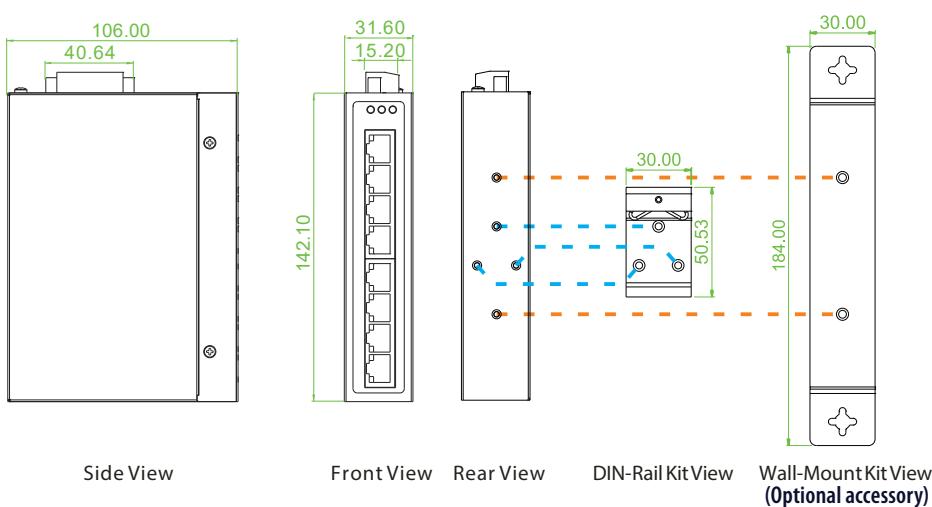
Front View

Rear View

DIN-Rail Kit View

Wall-Mount Kit View (Optional accessory)

► IFS-800



Side View

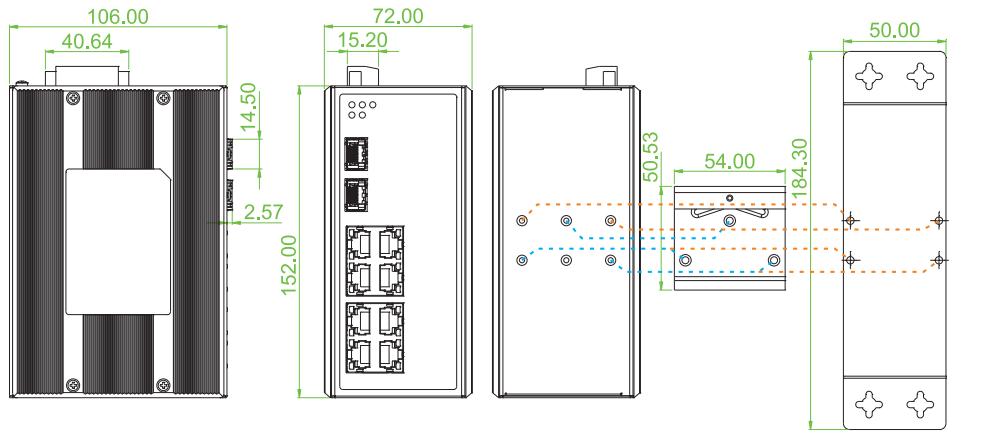
Front View

Rear View

DIN-Rail Kit View

Wall-Mount Kit View (Optional accessory)

► IFS-802GS



Side View

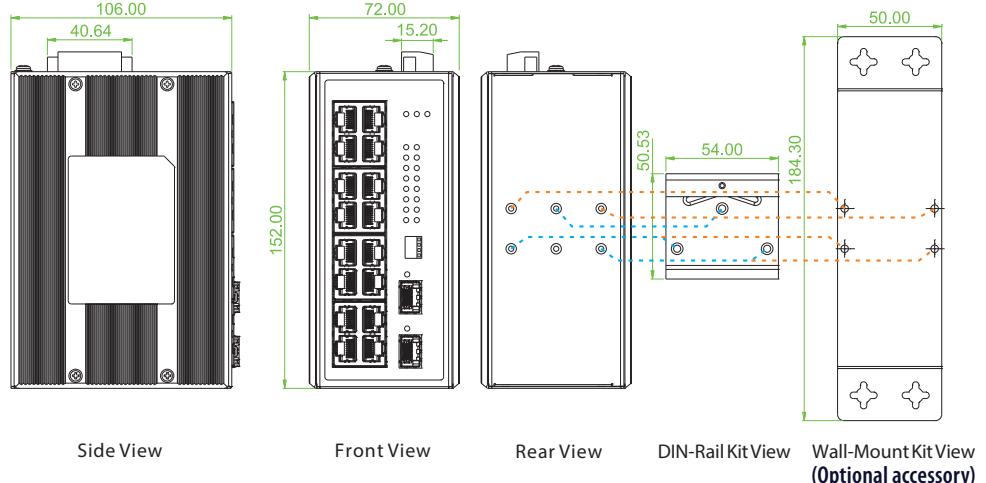
Front View

Rear View

DIN-Rail Kit View
(Optional accessory)

Wall-Mount Kit View

► IFS-1602GS



Side View

Front View

Rear View

DIN-Rail Kit View

Ordering Information

Model Name	Total Port	RJ45 UTP Port			Fiber Port		Certification		Operating Temperature
		10/100Base-TX	100Base-FX	1000Base-X	CE	FCC			
IFS-401F	5	4		1 SC/ST			V	V	-10~60°C
IFS-401F-E	5	4		1 SC/ST			V	V	-40~75°C
IFS-402F	6	4	2	SC/ST			V	V	-10~60°C
IFS-402F-E	6	4	2	SC/ST			V	V	-40~75°C
IFS-800	8	8					V	V	-10~60°C
IFS-800-E	8	8					V	V	-40~75°C
IFS-802GS	10	8		2 SFP			V	V	-10~60°C
IFS-802GS-E	10	8		2 SFP			V	V	-40~75°C
IFS-1602GS	18	16		2 SFP			V	V	-10~60°C
IFS-1602GS-E	18	16		2 SFP			V	V	-40~75°C

Package List

- One device of the series
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports (for IFS-802GS, IFS-1602GS)

Fiber Option Type

SC, ST
(for IFS-401F, IFS-402F)

Connectivity Distance

002: 2km 030: 30km 050: 50km
020A: WDM Bidi 20km A type (TX:1310nm)
020B: WDM Bidi 20km B type (TX: 1550nm)***Optional Accessories*****Wall Mount Kit**

- 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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

Industrial Power Supply

- MDR-20-24 Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 24VDC, 24W, -20 ~ +70°C
MDR-40-48 Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C

IFS-402CGS

4x 10/100Base-TX RJ45 + 2x 100/1000Base-X SFP, Compact size



- 4KV surge protection for UTP and SFP ports
- Wide operating temperature -40 ~ 75°C
- IP30 rugged metal housing and fanless



The IFS-402CGS is a 6 Ports unmanaged industrial grade Ethernet switch 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 networking, security automation applications, IP Surveillance, intelligent transportation systems (ITS) and is 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.

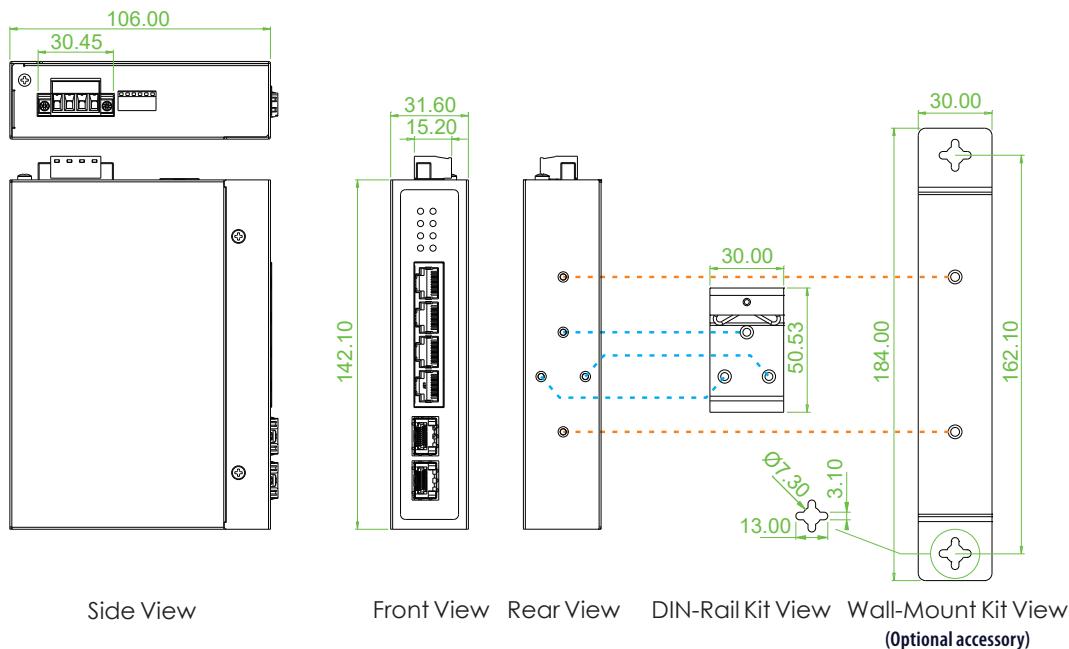
Features

- 12/24/48VDC (9.6~60VDC) redundant dual input power
- Supports DIP switch to set broadcast storm protection, SFP Auto/Force Mode, SFP 100M/1000M ; RJ45 Auto/force mode, 10M/100M, Full/half.
- Supports flow control
- Provides broadcast storm protection
- DIN Rail mounting or wall mounting

Specifications

IEEE Standard	IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX and 100Base-FX Fast Ethernet IEEE 802.3z 1000Base-X Gigabit Ethernet over fiber-optic IEEE 802.3x Flow Control and Back Pressure	Overload Current Protection Power Supply Supported Redundant dual 12/24/48VDC (9.6~60VDC) input power (Removable terminal block)								
Switch Architecture	Back-plane (Switching Fabric): 4.8 Gbps	Power Consumption								
Data Processing	Store and Forward	<table border="1"> <thead> <tr> <th>Input Voltage</th><th>Total Power Consumption</th></tr> </thead> <tbody> <tr> <td>12VDC</td><td>4.7W</td></tr> <tr> <td>24VDC</td><td>4.8W</td></tr> <tr> <td>48VDC</td><td>5.3W</td></tr> </tbody> </table>	Input Voltage	Total Power Consumption	12VDC	4.7W	24VDC	4.8W	48VDC	5.3W
Input Voltage	Total Power Consumption									
12VDC	4.7W									
24VDC	4.8W									
48VDC	5.3W									
Flow Control	IEEE 802.3x flow control, back pressure flow control	Removable Terminal Block Provides 2 Redundant power, 4 Pin								
MAC Address Table	4K	Operating Temperature -10 ~ 60°C (IFS-402CGS) -40 ~ 75°C (IFS-402CGS-E)								
Packet Buffer Size	1.75Mbit	Operating Humidity 5% to 95% (Non-condensing)								
Max Frame Size	1522Bytes	Storage Temperature -40 ~ 85°C								
Jumbo Frame	10K Byte	Housing Rugged metal, IP30 Protection and fanless								
Network Connector	4x RJ-45 for 10/100Base-TX Auto Negotiation Speed or Force Mode, Auto MDI/MDI-X function, Full/Half duplex 2x 100/1000Base-X SFP, Auto or Force Mode	Dimensions 106x 31.6x 142mm (D X W X H)								
Network Cable	UTP/STP Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)	Weight 420g								
Network Cable	Fiber Cable (Multi-mode): 50/125um, 62.5/125um Fiber Cable (Single-mode): 9/125um	Installation Mounting DIN Rail mounting, or wall mounting (Optional)								
Protocols	CSMA/CD	MTBF 940,044Hours (MIL-HDBK-217)								
LED	Per unit: Power 1 (Green), Power 2 (Green) Per RJ-45 port : 100M Link/Act (Green) 10M Link/Act (Amber) SFP Fiber port: 100 Link/Active (Green) 1000 Link/Active (Amber)	Warranty 5 years								
DIP SW	DIP 1 Broadcast Protection OFF : Enable ON : Disable DIP 2 Off: Fiber Auto On: Fiber Force Mode DIP 3 SFP Fiber Speed OFF: Giga ON: 100M DIP 4 RJ45 Mode OFF: Auto ON: Force DIP 5 RJ45 Speed OFF: 100M ON: 10M DIP 6 RJ45 Duplex OFF: Full ON: Half	Certification EMC CE (EN55032, EN55035) EMI (Electromagnetic Interference) FCC Part 15 Subpart B Class A, CE 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								
Reverse Polarity Protection	Supported for Power Input	4KV surge protection Supported for UTP and SFP port Shock IEC 60068-2-27 Freefall IEC 60068-2-31 Vibration IEC 60068-2-6								

Dimensions



Ordering Information

Model Name	Total Port	RJ45 UTP Port	Fiber Port	Input Power	Certification		Operating Temperature
		10/100Base-T(X)	100/1000Base-X		CE	FCC	
IFS-402CGS	6	4	2 SFP	12/24/48VDC	V	V	-10~60°C
IFS-402CGS-E	6	4	2 SFP	12/24/48VDC	V	V	-40~75°C

Package List

- IFS-402CGS device
- Protective caps for SFP ports
- Din Rail with screws
- Terminal block

Optional Accessories

Wall Mount Kit

IND-WMK01 Wall Mount kit for Industrial product (184x30mm) (Narrow)

Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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 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)

Industrial Power Supply

MDR-20-24	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 24VDC, 24W, -20 ~ +70°C
MDR-40-48	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C

IFS-500C

5x 10/100Base RJ45 (Compact Size)



- Compact size for easy installation
- IP30, rugged metal housing, fanless



The IFS-500C is a compact sized, unmanaged industrial grade Fast Ethernet switch with 5 10/100Base-TX 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 networking, intelligent transportation systems (ITS) and is 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.

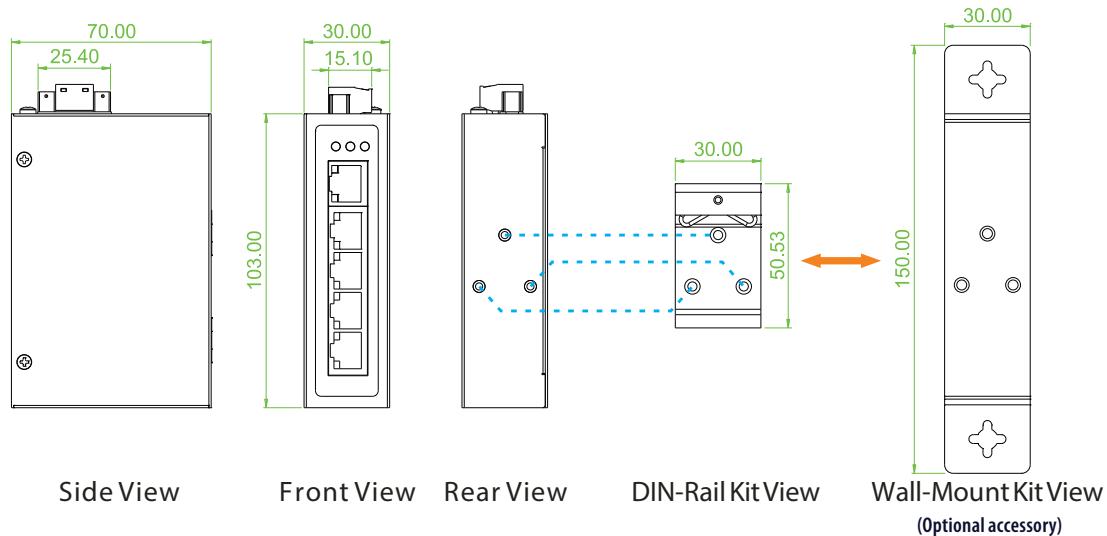
Features

- 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	Operating Humidity	5% to 95% (Non-condensing)								
Switch Architecture	Back-plane (Switching Fabric) : 1.0 Gbps Full wire-speed	Storage Temperature	-40 ~ 85°C								
Data Processing	Store and Forward	Housing	Rugged Metal, IP30 Protection and FanLess								
Transfer Rate	14,880pps for Ethernet port 148,800pps for Fast Ethernet port	Dimensions	70 x 30 x 103 mm (D x W x H)								
Flow Control	IEEE 802.3x flow control, back pressure flow control	Weight	220g								
MAC Address Table	1K	Installation Mounting	DIN Rail mounting, or wall mounting (optional)								
Packet Buffer Size	448Kbits	MTBF	1,738,327 Hours (MIL-HDBK-217)								
Network Connector	5x RJ-45 RJ-45 Port: Auto MDI/MDI-X function, 10/100Base-TX auto negotiation speed, Full/Half duplex	Warranty	5 years								
Network Cable	UTP/STP Cat. 5 cable or above EIA/TIA-568 100-ohm (100meter)	Certification	CE (EN55032, EN55035)								
Protocol	CSMA/CD	EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE								
LED	Per unit: Power (Green) RJ-45 Per port: Link/Active (Green), Speed 100 (Yellow)	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								
Reverse Polarity Protection	For DC input power protection	Shock	IEC 60068-2-27								
Overload Current Protection	Supported	Freefall	IEC 60068-2-32								
Power Supply	DC 12/24/48V (9.6~60VDC) or AC 24V (18~36VAC) input power (Removable Terminal Block)	Vibration	IEC 60068-2-6								
Power Consumption	<table border="1"> <thead> <tr> <th>Input Voltage</th> <th>Power Consumption(Watt)</th> </tr> </thead> <tbody> <tr> <td>DC 12V</td> <td>0.9W</td> </tr> <tr> <td>DC 24V</td> <td>1.2W</td> </tr> <tr> <td>DC 48V</td> <td>2W</td> </tr> </tbody> </table>	Input Voltage	Power Consumption(Watt)	DC 12V	0.9W	DC 24V	1.2W	DC 48V	2W		
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)										

Dimensions



Ordering Information

Model Name	Total Port	RJ45 UTP Port	Power Input	Certification		Operating Temperature
		10/100Base-TX	Single Power	CE	FCC	
IFS-500C	5	5	12/24/48VDC, 24VAC	V	V	-10~60°C
IFS-500C-E	5	5	12/24/48VDC, 24VAC	V	V	-40~75°C

■ Package List

- IFS-500C device
- Terminal block
- Din Rail with screws

Optional Accessories

■ Wall Mount Kit

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

■ Industrial Power Supply

MDR-20-24	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 24VDC, 24W, -20 ~ +70°C
MDR-40-48	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C

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)



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

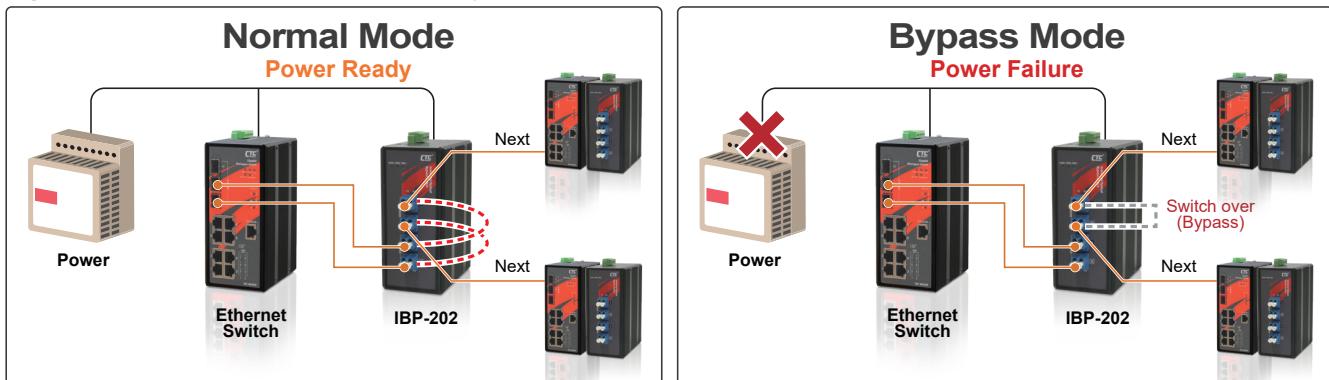
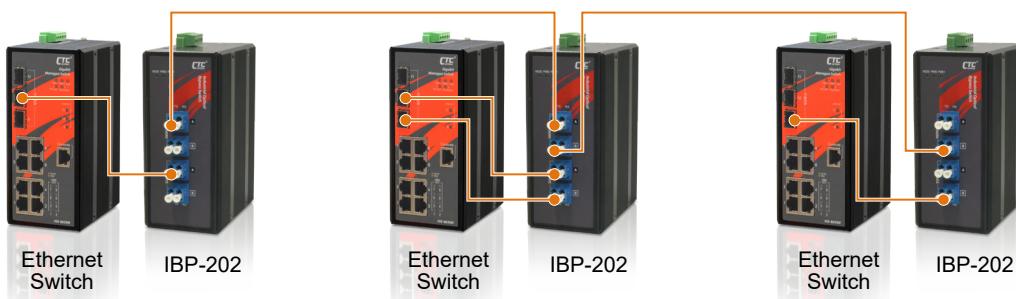
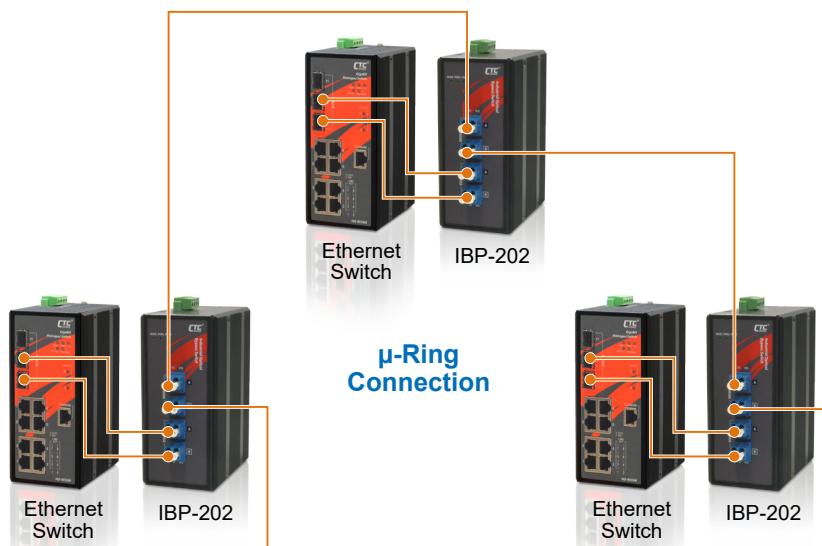
Specifications

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
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (EFT) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF) Field strength 300A/m Criteria A
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

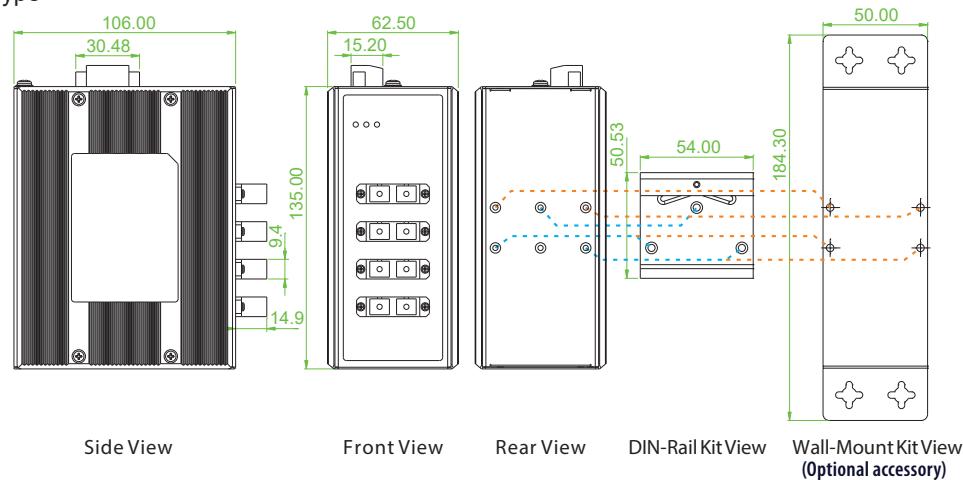
Application

The IBP-202 supports the function of optical path Normal mode and Bypass mode for fiber optical networks. It offers a simple mechanism to switch both of upload and down load fiber path when a power system failure occurs, and a path restores when power back. It offers a simple way to reduce the risk of optical network Node-Down which is caused by the power system.

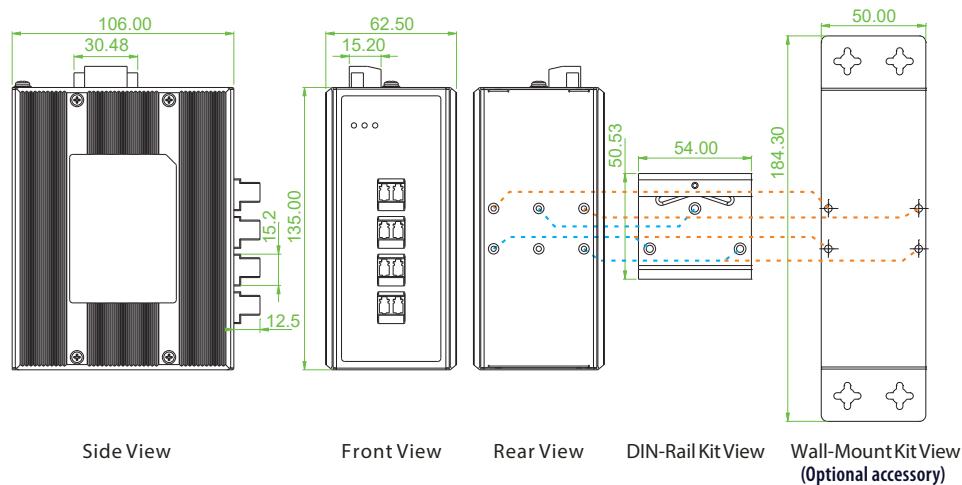
Figure 1 :IBP-202 Data flow in Normal or Bypass mode**Figure 2 : Application example in line connection****Figure 3 : Application example in ring connection**

Dimensions

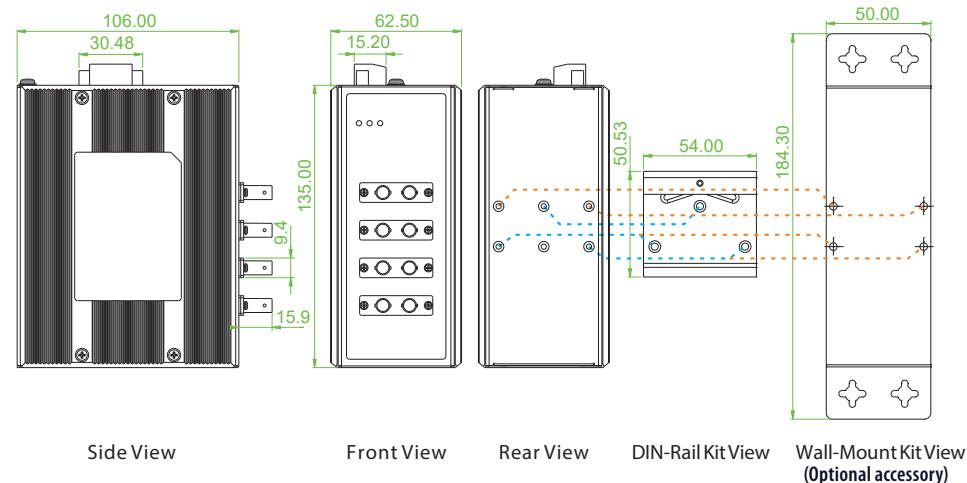
► IBP-202 SC Type



► IBP-202 LC Type



► IBP-202 ST Type

*Ordering Information*

Model Name	Fiber connector			Power Input	Certification		Operating Temperature
	Connector type	Connector Q'ty	Data Rate		Redundant	CE	
IBP-202-SSC	SM SC	4	100M/Giga/10G	12/24/48VDC	V	V	-20~70°C
IBP-202-SST	SM ST	4	100M/Giga/10G	12/24/48VDC	V	V	-20~70°C
IBP-202-SLC	SM LC	4	100M/Giga/10G	12/24/48VDC	V	V	-20~70°C
IBP-202-MSC	MM SC	4	100M/Giga/10G	12/24/48VDC	V	V	-20~70°C
IBP-202-MST	MM ST	4	100M/Giga/10G	12/24/48VDC	V	V	-20~70°C
IBP-202-MLC	MM LC	4	100M/Giga/10G	12/24/48VDC	V	V	-20~70°C

■ Package List

- IBP-202 device
- Terminal block
- Din Rail with screws

*Optional Accessories***■ Wall Mount Kit**

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

■ Industrial Power Supply

MDR-20-24 Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 24VDC, 24W, -20 ~ +70°C

MDR-40-48 Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C

ICR-W401

4G LTE, GPS, 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 size



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

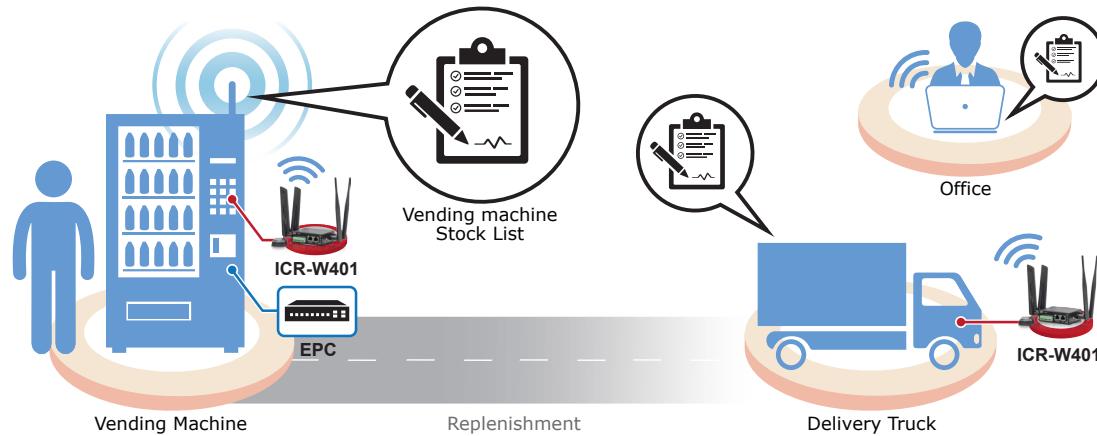
Standard	IEEE 802.3 10Base-T 10Mbit/s Ethernet IEEE 802.3u 100Base-TX Fast Ethernet IEEE 802.1Q Virtual LANs (VLAN) IEEE 802.3x Flow control for Full Duplex IEEE 802.1p LAN Layer 2 QoS for Traffic Prioritization IEEE 802.1X Port based and MAC based Network Access Control, Authentication	LED Display	1 x Power LED 2 x Ethernet LED for each port (LAN/WAN) 1x LTE LED 1 x Function LED (User define by Web)
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)	Power Supply	Power Consumption 7 Watt(Max) Power Input 12/24/48VDC (9.6~60VDC)
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	Operating Temperature	-30 ~ 70°C
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	Storage Temperature	-40 ~ 85°C
Housing	Rugged metal, Fanless, IP30 protection	Operating Humidity	10 ~ 95% (non-condensing)
Dimensions (D x W x H)	75x 92x 30mm	MTBF	271,952 Hours (MIL-HDBK-217)
Weight	400g	Warranty	5 Years
Installation	DIN Rail mounting, or wall mounting (optional)	Certification	CE (EN55032, EN55035) NCC (ICR-W401-TW) EN62311 RED ETSI EN301 489-1 RED ETSI EN301 489-17 RED ETSI EN301 489-19 RED ETSI EN301 489-52 RED ETSI EN301 511 RED ETSI EN301 908-1 RED ETSI EN301 908-2 RED ETSI EN301 908-13 RED ETSI EN300 328 RED ETSI EN303 413
		Safety	EN62368-1
		Shock	IEC 60068-2-27
		Freefall	IEC 60068-2-32
		Vibration	IEC 60068-2-6

Software Specifications

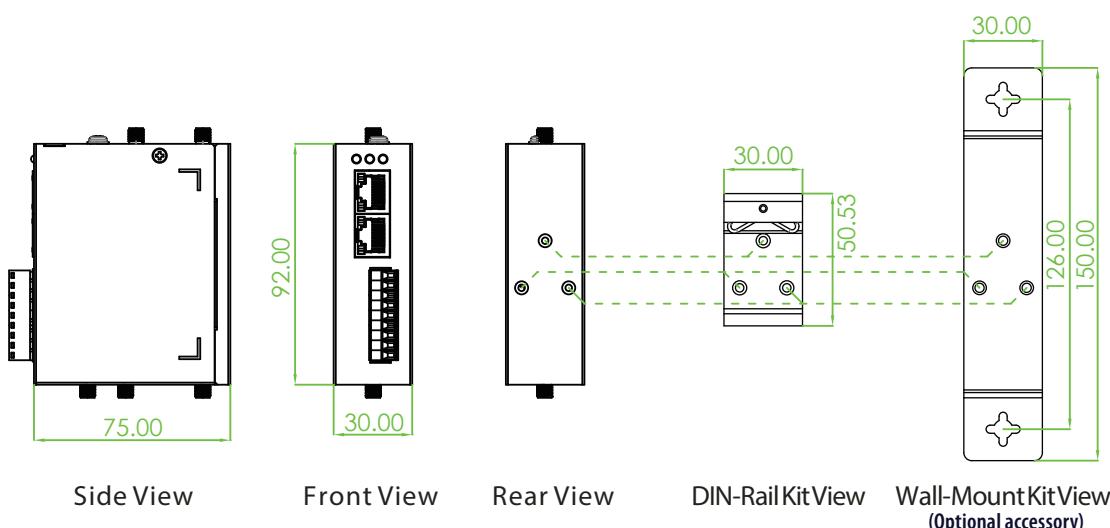
Network Protocols	IPv4, IPv6, IPv4/IPv6 dual stack, DHCP server and client, PPPoE, Static IP, SNTP, GPS sync time, DNS Proxy, VRRP, OSPF, Message Queue Telemetry Transport (MQTT Broker), BGP
Routing/Firewall	NAT, Virtual Server, DMZ, MAC Filter, URL Filter, IP Filter, VLAN, Static Routing, RIP 1, RIP 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



Ordering Information

Model Name	Managed	WAN		LAN			Safety EN62368-1	Certification			
		Cellular Mobile Band	10/100 Base-TX	WiFi IEEE802.11 b/g/n	10/100 Base-TX	DI/DO		CE	RED	NCC	Shock, Freefall, Vibration
ICR-W401-EU	V	see Region code table-EU	1	1	1	1	V	V	V	V	V
ICR-W401-A	V	see Region code table-A	1	1	1	1	V	V	V	V	V
ICR-W401-TW	V	see Region code table-TW	1	1	1	1	V	V	V	V	V

Region Code Table

Region Code	4G LTE		3G		2G		Region		
	FDD LTE	TDD LTE	WCDMA	GSM / EDGE					
EU	B1(2100), B3(1800), B5(850), B7(2600), B8(900), B20(800)	B3(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)		
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)			ANZ, South America, Taiwan		

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, 150x30mm)

■ Industrial Power Supply

MDR-40-48 Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C

ICR-W402

4G LTE, GPS, IEEE 802.11 b/g/n 2T2R Router



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



This compact, cost-effective, industrial grade 4G LTE router, ICR-W402, provides 2 LAN plus 1 WAN Fast Ethernet connections and supports uplink to 2G/3G/4G cellular mobile data networks. Built for harsh environments, the router is equipped with a DI/DO interface, has WiFi compliant with IEEE 802.11b/g/n and features VPN Tunneling with Firewall and management capability. The ICR-W402 is easy to configure through its embedded Web user interface. It provides highly secure authentication, encryption and management, to protect your data between public and private networks and simplifies your complicated solutions for smart city and industrial networking.

Features

- Highly reliable and secure for mission-critical cellular communications
- Compact and lightweight design with 2 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
- LED indicators for connection and data transmission status
- Industrial temperature rated from -30 ~ 70°C for use in harsh environments
- Enhance security and encryption for authentication and transmission

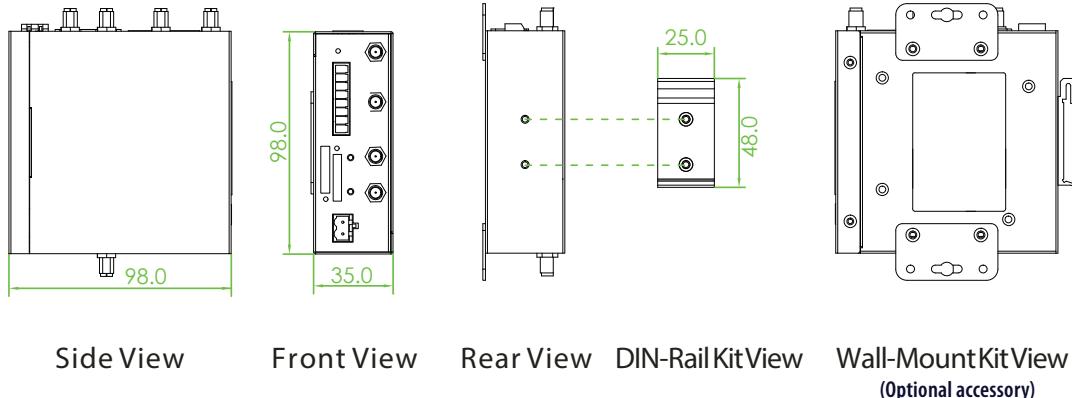
Specifications

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 802.1X Port based and MAC based Network Access Control, Authentication	Power Supply	Power Consumption 7 Watt(Max) Power Input 12/24VDC
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 LTE Data rate: Cat 4, 150Mbps (Down load) 50Mbps (up load) 2x SIM slots	Operating Temperature	-30 ~ 70°C
WiFi Interface	IEEE 802.11b/g/n WiFi Standards Support AP, Client	Storage Temperature	-40 ~ 85°C
Hardware Interface	2x SIM slots 2x LAN Fast Ethernet port 1x WAN Fast Ethernet port Reset Button for device reset 1xRS232 (TXD/RXD/GND) and 1xRS485 2x SMA connectors for detachable LTE Antenna 2x RP-SMA for WiFi Antenna 1x SMA for GPS detachable Antenna	Operating Humidity	10 ~ 95% (non-condensing)
Housing	Rugged metal, Fanless, IP30 protection	Warranty	5 Years
Dimensions (D x W x H)	98 x 98 x 32mm	Certification	CE (EN55032, EN55035) EN62311 RED ETSI EN301 489-1 RED ETSI EN301 489-17 RED ETSI EN301 489-19 RED ETSI EN301 489-52 RED ETSI EN301 511 RED ETSI EN301 908-1 RED ETSI EN301 908-2 RED ETSI EN301 908-13 RED ETSI EN300 328 RED ETSI EN303 413
Weight	400g		
Installation	DIN Rail mounting, or wall mounting (optional)		
LED Display	1x Power 1x System 2x LTE signal (Good/Poor) 3x Ethernet LED for each port (LINK/ACT)		

Software Specifications

Network Protocols	IPv4, DHCP server and client, PPPoE, Static IP, NTP, VRPP	Others Management	DDNS, UPnP, GPS TCP Push, MQTT Web GUI for remote and local management Syslog monitor Remote management via SSH v2, HTTPS Local management via Telnet, SSH v2, HTTP/HTTPS
Routing/Firewall	NAT, DMZ, MAC Filter, URL Filter, IP Filter, VLAN, Static Routing		
VPN	OpenVPN, IPSec, GRE, PPTP, L2TP		
WiFi	Multiple SSID Security with WEP, WPA, WPA2, WPA-PSK, WPA2-PSK Supports WiFi AP mode, Client mode		

Dimensions



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
ICR-W402-EUX	V	see Region code table-EUX		1	1	2	1	V V
ICR-W402-AUX	V	see Region code table-AUX		1	1	2	1	V V

Region Code Table

Region Code	4G LTE		3G		2G		Region
	FDD LTE	TDD LTE	WCDMA	GSM / EDGE			
EUX	B1(2100), B3(1800), B28A(700), B7(2600), B8(900), B20(800)	B38(2600), B40(2300), B41(2500)	B1(2100), B8(900)	B3(1800), B8(900)	Europe, Africa, Middle East, Korea, Thailand, India		
AUX	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), B4(1700)	B2(1900), B3(1800), B5(850), B8(900)	ANZ, South America, Taiwan		

Optional Accessories

■ Antenna Accessories

ANT-BASE-01	Antennas Base with Magnetic, SMA (Male) connector, 1.5meter for 4G LTE extension
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■ Industrial Power Supply

MDR-20-24	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 24VDC, 20W, -20 ~ +70°C
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ICR-GW404

4G LTE, GPS, IEEE802.11 b/g/n/ac 2T2R, 2x SIM, 4x GbE, DI/DO, RS232/485

NEW



- Multi-band connectivity with FDD 4G LTE/TDD, 3G WCDMA, 2G GSM
- Concurrent dual band WiFi 802.11n 2T2R (2.4GHz), and 802.11ac 2T2R (5GHz)
- 4G LTE and Ethernet WAN failover redundancy
- NAT/Port Forward/Routing are compatible with existing IP networks
- Various VPN protocols, Firewall and Authentication to enhance access security



This high-performance industrial grade 4G LTE router, ICR-GW404, combines IEEE 802.11b/g/n/ac WLAN and 4G LTE cellular technologies to provide flexible wireless network connectivity. With 4 Ethernet ports and dual SIM cards for failover redundancy to ensure uninterrupted connectivity, ICR-GW404 supports 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. It 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

- Highly reliable and secure for mission-critical cellular communications
- Compact and lightweight design with 3 LAN and 1 LAN/WAN Ethernet interfaces
- Supports multi-band connectivity with FDD LTE/TDD LTE/WCDMA/GSM/LTE Cat 4
- Provides IEEE 802.11b/g/n/ac 2T2R Wireless LAN
- Provides Dual SIM connector and DI/DO interfaces
- Industrial temperature rated from -30 ~ +70°C for use in harsh environments
- Enhance security and encryption for authentication and transmission

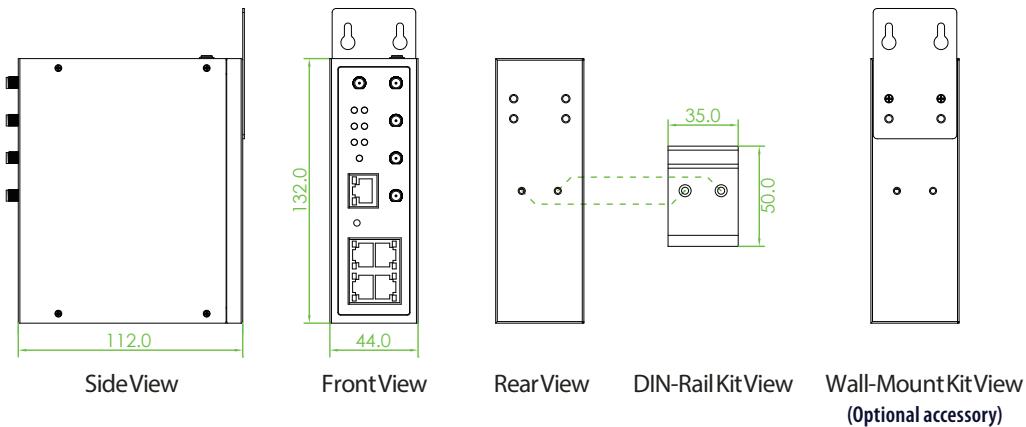
Specifications

Standard	IEEE 802.3 10Base-T 10Mbit/s Ethernet IEEE 802.3u 100Base-TX Fast Ethernet IEEE 802.3ab 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	Power Supply	Power Consumption 7 Watt(Max) Power Input 12/24VDC (9~36VDC)
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 LTE Data rate: Cat 4, 150Mbps (Down load) 50Mbps (up load) 2x SIM slots	Operating Temperature	-30 ~ 70°C
WiFi Interface	IEEE 802.11b/g/n/ac WiFi Standards Support AP, Client and bridge mode	Storage Temperature	-40 ~ 85°C
Hardware Interface	2x SIM slots 3x LAN GbE Ethernet port 1x LAN/WAN configurable GbE Ethernet port Reset Button for device reset 1x RS232 (TXD/RXD/GND) 2x DI (Non-Isolated), 1x DO (Non-Isolated) 2x SMA connectors for detachable LTE Antenna 2x RP-SMA for WiFi Antenna 1x SMA for GPS detachable Antenna	Operating Humidity	10 ~ 95% (non-condensing)
Housing	Rugged metal, Fanless, IP30 protection	Warranty	5 Years
Dimensions (D x W x H)	132 x 112 x 44mm	Certification	CE (EN55032, EN55035) EN62311 RED ETSI EN301 489-1 RED ETSI EN301 489-17 RED ETSI EN301 489-19 RED ETSI EN301 489-52 RED ETSI EN301 511 RED ETSI EN301 908-1 RED ETSI EN301 908-2 RED ETSI EN301 908-13 RED ETSI EN300 328 RED ETSI EN303 413
Weight	400g	EMC	
Installation	DIN Rail mounting, or wall mounting (optional)	Radio	
LED Display	1x Power (Green) 1x WLAN (Green) 3x LTE signal (Strong/Good/Weak) 1x ERR LED (RED) 4x Ethernet LED for each port (LINK/ACT)		

Software Specifications

Network Protocols	IPv4, DHCP server and client, PPPoE, Static IP, NTP, VRRP, OSPF	Others	DDNS, UPnP, SMS action, GPS TCP Push
Routing/Firewall	NAT, DMZ, MAC Filter, URL Filter, IP Filter, VLAN, Static Routing, RIP1/2	Management	Web GUI for remote and local management
VPN	OpenVPN, IPSec, GRE, PPTP, L2TP		Syslog monitor
WiFi	Multiple SSID Security with WEP, WPA, WPA2, WPA-PSK, WPA2-PSK Supports WiFi AP mode, Client mode, Bridge mode		Remote management via SSH, HTTPS Local management via Telnet, SSH, HTTP/HTTPS

Dimensions



Ordering Information

Model Name	Managed	WAN		LAN			Certification			
		Cellular	Mobile Band	10/100/1000 Base-T	WiFi IEEE 802.11 b/g/n/ac	10/100/1000 Base-T	DI/DO	CE	RED	Shock, Freefall, Vibration
ICR-GW404-EUX	V	see Region code table-EU		1	1	3	2/1	V	V	V
ICR-GW404-AUX	V	see Region code table-EU		1	1	3	2/1	V	V	V

Region Code Table

Region Code	4G LTE		3G	2G	Region
	FDD LTE	TDD LTE			
EUX	B1(2100), B3(1800), B28A(700), B7(2600), B8(900), B20(800)	B38(2600), B40(2300), B41(2500)	B1(2100), B8(900)	B3(1800), B8(900)	Europe, Africa, Middle East, Korea, Thailand, India
AUX	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), B4(1700)	B2(1900), B3(1800), B5(850), B8(900)	ANZ, South America, Taiwan

Optional Accessories

■ Antenna Accessories

ANT-BASE-01 Antennas Base with Magnetic, SMA (Male) connector, 1.5meter for 4G LTE extension



ANT-BASE-01

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 RS485, 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 RS485, 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), GRE, PPTP, L2TP
- 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		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
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			
			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
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
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 (ICR-4103-TW)
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, TCP, UDP, ARP
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), GRE, PPPTP, L2TP
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, TFTP Syslog monitor SNMP V1, V2c, V3 TR069: TR098 model Access Control list, SSH v2 Remote management via Telnet, SSH v2, HTTPS Local management via Telnet, SSH v2, HTTP/HTTPS

Application

Figure 1 : Application for Environmental Monitoring

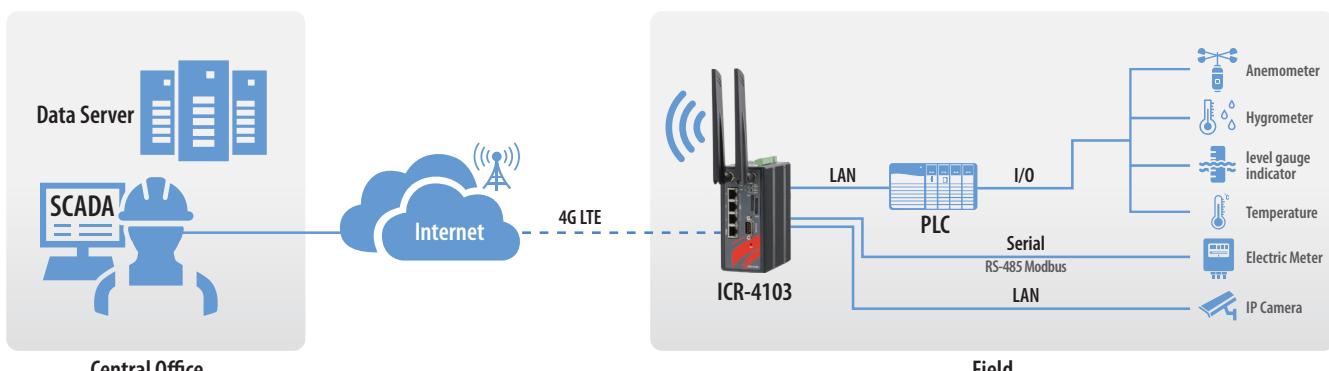
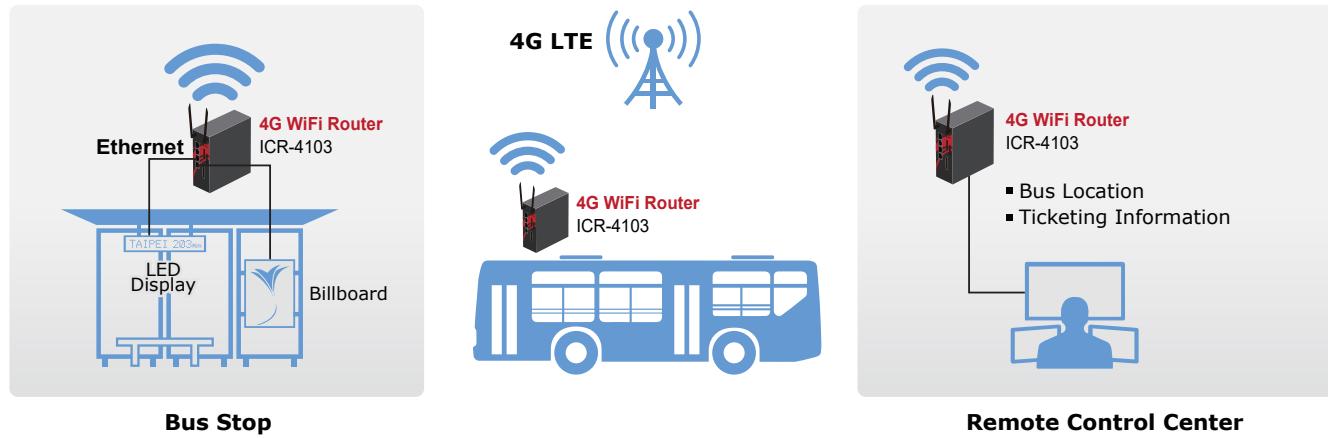
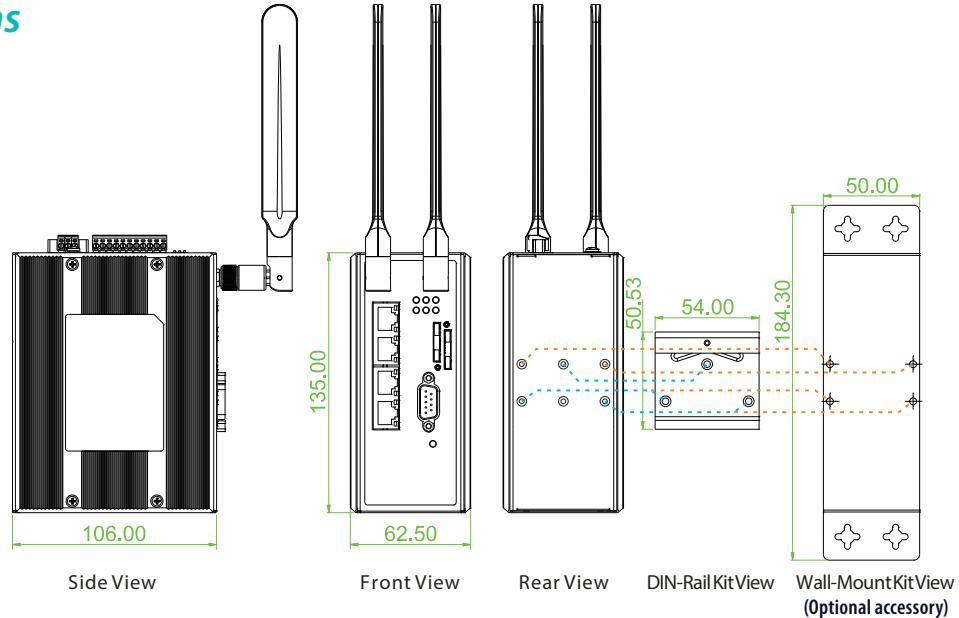


Figure 2 : Application for Transportation/Bus Communication

Dimensions



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	CE, FCC
ICR-4103-EU	V	see Region code table-EU	1	3	2	1	RED	V
ICR-4103-A	V	see Region code table-A	1	3	2	1	RED	V
ICR-4103-TW	V	see Region code table-TW	1	3	2	1	NCC, RED	V

Region Code Table

Region Code	4G LTE		3G		2G		Region
	FDD LTE	TDD LTE	WCDMA	GSM / EDGE			
EU	B1(2100), B3(1800), B5(850), B7(2600), B8(900), B20(800)	B3 8(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)
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)			ANZ, South America, Taiwan

Optional Accessories

■ Antenna Accessories

ANT-BASE-01 Antennas Base with Magnetic, SMA (Male) connector, 1.5meter for 4G LTE extension



■ Wall Mount Kit Accessories

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

■ Industrial Power Supply

MDR-20-24 Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 24VDC, 24W, -20 ~ +70°C

Industrial Media Converter Chassis - IRC200

NEW



- Fan-less ,Rugged and Harden design
- Wide operation temperature
- 2U 19", 20-slot & Rack-Mountable
- Line Card and Power supply Hot Swappable
- Network Management by NMC Card
- Optional Media Converter (Ethernet, Serial, Contact Closure Fiber)

This 20 slot, industrial grade, media converter chassis, the IRC200, is a 2U rack, fan-less design, that supports two hot swappable modular power supplies. The twenty slots support one management card and up to nineteen media converter cards. The chassis is able to operate temperature ranges (-10~65°C). The media converter cards available support conversion for Fast Ethernet, Gigabit Ethernet, serial communications or I/O Contact Closure over fiber media. This chassis may be deployed in Industrial Ethernet, automation, security, intelligent transportation systems (ITS) and utility market applications where environmental conditions exceed commercial product specifications.

Features

- 2U 19", 20-slot & Rack-Mountable
- Fan-less ,Rugged and Harden design
- Wide operation temperature
- Line Card and Power supply Hot Swappable
- Network Management by NMC Card
- Optional Media Converter (Ethernet, Serial, Contact Closure Fiber)

Specifications

Module Slot (Hotswap Modular)	1-slot for NMC Management Card 19-slot for Line Card 2-slot for Power Supply	Warranty	5 Years (Chassis) 2 Years (Power Supply)
Power Supply (Hotswap Modular)	AC Power Module AC Power 100-240VAC (88~264VAC) (IRC200-AC) Power on LED On/Off Switch IEC320 Power Connector DC Power Module DC Power 48VDC (36~60VDC) (IRC200-DC) Power on LED On/Off Switch Removable Terminal Block 2 pin	Certification	EMC CE (EN55032, EN55035) EMI FCC Safety EN62368-1 Shock IEC 60068-2-27 Freefall IEC 60068-2-31 Vibration IEC 60068-2-6
Power Consumption	2.5W @110VAC 44.5W @110VAC 4.5W @48VDC 43.5W @48VDC	Software (with IRC200-NMC Card)	Protocol IP, UDP, SNMP V1/V2c, TCP, ARP, ICMP, TFTP, HTTP MIB Support MIB II, Enterprise MIB Management Interface Web GUI, Telnet, Console, SNMP SNTP Supported Quick Configuration Configuration File Copy/Backup/Restore F/W Upgrade For Line Card and Chassis
Operation Temperature	-10~65°C		
Storage Temperature	-40~85°C		
Humidity	5%~90% (Non Condensing)		
Dimension	302 x 438 x 88mm (Dx Wx H)		
Housing	Fanless, Rack Mount 2U, Rugged Metal, IP30 Protection		
Weight	4.4 kg		
Installation Mounting	19" Rack Mounting		
MTBF	2,233,738 Hours (IRC200-CH20) 155,277 Hours (IRC200-AC) 1,636,753 Hours (IRC200-DC) (MIL-HDBK-217)		

Modular Converter Cards

IRC200-NMC

Network Management Control Card



- Configure, monitor and provide fault management for all installed line cards
- Provides upgrade feature for line card
- Running System log with time stamping for SNTP (time server)
- Quick configuration, configuration copy/backup/restore

Specification

Protocol	IP, UDP, SNMP V1/V2c, TCP, ARP, ICMP, TFTP, HTTP
MIB	Supported MIB II, Enterprise MIB
Management	Web GUI, Telnet, Console, SNMP
Ports	1x DB9-F for RS232 console, 1x RJ45 for 10/100Base-TX Ethernet
LED	PWR1, PWR2, ALM1, ALM2, STK, ACT, LAN LNK/SPD
Power Consumption	2W
Operation Temperature	-10°C~65°C
Storage Temperature	-40°C~85°C
Humidity	10 ~ 90% non-condensing
Chassis	IRC200-CH20 or IRC200-CH01M or IRC200-CH01
Dimensions	159.5 × 20.8 × 88mm (D × W × H)
Weight	120g
MTBF	1,337,311 Hours (MIL-HDBK-217)
Warranty	5 Year

IRC200-2000MS

Web Smart OAM Managed 10/100/1000Base-T to 100/1000Base-X GbE Switch



- 1x RJ45 10/100/1000Base-T to 1x 100/1000Base-X SFP converter
- Ingress/Egress bandwidth control
- Supports in-band IEEE 802.3ah OAM management
- Firmware upgrade via Web
- Dying gasp (remote power failure detection on stand-alone)
- Supports Link Fault Pass-Through (LFPT) Function
- DDMI diagnostic function for SFP fiber transceiver
- 16 Tag VLAN Group
- USB Console port, Telnet, SNMP, Web management
- Flow control enable or disable
- Jumbo Frame 16K Packet

Specification

Standards	IEEE 802.3, IEEE 802.3u IEEE 802.3ab, 802.3z, 802.3ah, 802.1Q
LED	Power, FX-Link, LAN Speed, LAN Link
Power Input	Powered from Chassis (12VDC)
Power Consumption	2.4W
Operation Temperature	-10°C~65°C
Storage Temperature	-40°C~85°C
Humidity	10 ~ 90% non-condensing
Chassis	IRC200-CH20 or IRC200-CH01M or IRC200-CH01
Dimension	159.5 × 20.8 × 88mm (D × W × H)
Weight	105g
MTBF	1,568,756 Hours (MIL-HDBK-217)
Warranty	5 Year

IRC200-1000DS

1G 2R Multi-rate Transponder



- Transparent FE or GbE fiber media converter/repeater
- Perform optical repeater function (Re-amplification & Reshaping)
- Digital diagnostic monitoring of SFP modules
- Supports Link Fault Pass-Through (LFTP) function
- 2x SFP slot for FE or GbE SFP transceiver

Specification

LED	Power, FX-Link1, FX-Link2
Power Input	Powered from Chassis (12VDC)
Power Consumption	1.5W
Operation Temperature	-10°C~65°C
Storage Temperature	-40°C~85°C
Humidity	10 ~ 90% non-condensing
Chassis	IRC200-CH20 or IRC200-CH01M or IRC200-CH01
Dimension	159.5 × 20.8 × 88mm (D × W × H)
Weight	130g
MTBF	4,054,842 Hours (MIL-HDBK-217)
Warranty	5 Year

IRC200-10/100i

10/100Base-TX to 100Base-FX In-Band Managed Converter



- 1x RJ45 10/100Base-TX to 1x SC/ST 100Base-FX Converter
- Auto-Negotiation / Auto MDI/MDIX in TP port
- Supports remote CPE power fail detect (dying gasp)
- Supports Link Fault Pass-Through (LFPT) and Far End Fault (FEF)
- Supports Loop Back Test
- Forward 2046 bytes (max.) packets in switch mode
- Forward 9K jumbo packets in converter mode
- Transparent Q in Q double tagged frame
- IEEE 802.1q Tag VLAN pass through
- Local / remote In-band management (Monitor and Configure) by the SNMP manager.
- Bandwidth control (Nx32Kbps or Nx512Kbps)
- IEEE 802.3x flow control
- Online local / remote f/w upgrade

Specification

Standards	IEEE 802.3, IEEE 802.3u, IEEE 802.3x
LED	Power, FEF, FX-Link, TX-SPD, TX-Duplex, TX-Link
Power Input	Powered from Chassis (12VDC)
Power Consumption	3W
Operation Temperature	-10°C~65°C
Storage Temperature	-40°C~85°C
Humidity	10 ~ 90% non-condensing
Chassis	IRC200-CH20 or IRC200-CH01M or IRC200-CH01
Dimension	159.5 × 20.8 × 88mm (D × W × H)
Weight	120g
MTBF	1,129,076 Hours (MIL-HDBK-217)
Warranty	5 Year

IRC200-Serial

RS232/485 over Fiber



- Extend RS232/422/485 serial transmission distance over fiber
- In-band network management via terminal, Web or SNMP
- Selectable data interface for RS-232/ 485
- RS232/Async. 3 wire or 5 wire up to 256Kbps
- RS485/Async. 2 wire (half duplex) or 4 wire (full duplex) up to 1Mbps
- Software selectable 2 wire (half duplex) or 4 wire (full duplex) RS-485

Specification

Standards	EIA/TIA RS-485, RS-232
LED	Power, FX Link, DI, DO, Test
Power Input	Powered from Chassis (12VDC)
Power Consumption	2.5W
Operation Temperature	-10°C~65°C
Storage Temperature	-40°C~85°C
Humidity	10 ~ 90% non-condensing
Chassis	IRC200-CH20 or IRC200-CH01M or IRC200-CH01
Dimension	159.5 × 20.8 × 88mm (D × W × H)
Weight	130g
MTBF	1,611,089Hours (MIL-HDBK-217)
Warranty	5 Year

IRC200-CCF40 & IRC200-CCF20

- ◀ 4 Channel Contact Closure Fiber Converter
- ▶ 2 Channel Contact Closure Fiber Converter



- 30 VDC, 0.5 amp relay N.O. (Normally Open)
- Point-to-Point transmission architecture
- Plug-and-play design ensures ease of installation requiring no electrical or optical adjustments
- Relay contact for Carrier Detect, N.C. (Normally Close)
- Indicating LEDs are provided for confirming equipment operating status

Specification

Optical Interface	1 x SFP, Data rate 155Mbps Duplex mode: Full duplex Distance 2KM (Multimode), 30KM (Single-mode), depend on SFP transceiver Point-to-Point transmission architecture
Contacts	4 Channel Contact Closure, 4x Open/close Input, 4xRelay for output (IRC200-CCF40) 2 Channel Contact Closure, 2x Open/close Input, 2xRelay for output (IRC200-CCF20) Input Dry Contact Closure Output SPST Relay, 30 VDC @ 0.5 A, Resistive loads only. 0.5 A Relay contact Rating - normally open
LED	Contact Relay, Carrier Detect
Power Input	Powered from Chassis (12VDC)
Power Consumption	2.1W (IRC200-CCF40) 1.5W (IRC200-CCF20)
Operation Temperature	-10°C~65°C
Storage Temperature	-40°C~85°C
Humidity	10 ~ 90% non-condensing
Chassis	IRC200-CH20 or IRC200-CH01M or IRC200-CH01
Dimension	159.5 × 20.8 × 88mm (D × W × H)
Weight	200g (IRC200-CCF40) 190g (IRC200-CCF20)
MTBF	1,043,016Hours (IRC200-CCF40) 1,204,602Hours (IRC200-CCF40) (MIL-HDBK-217)
Warranty	5 Year

Standalone Chassis

• IRC200-CH01M Chassis (Power Built-in)



• IRC200-CH01 Chassis (Power Built-in)



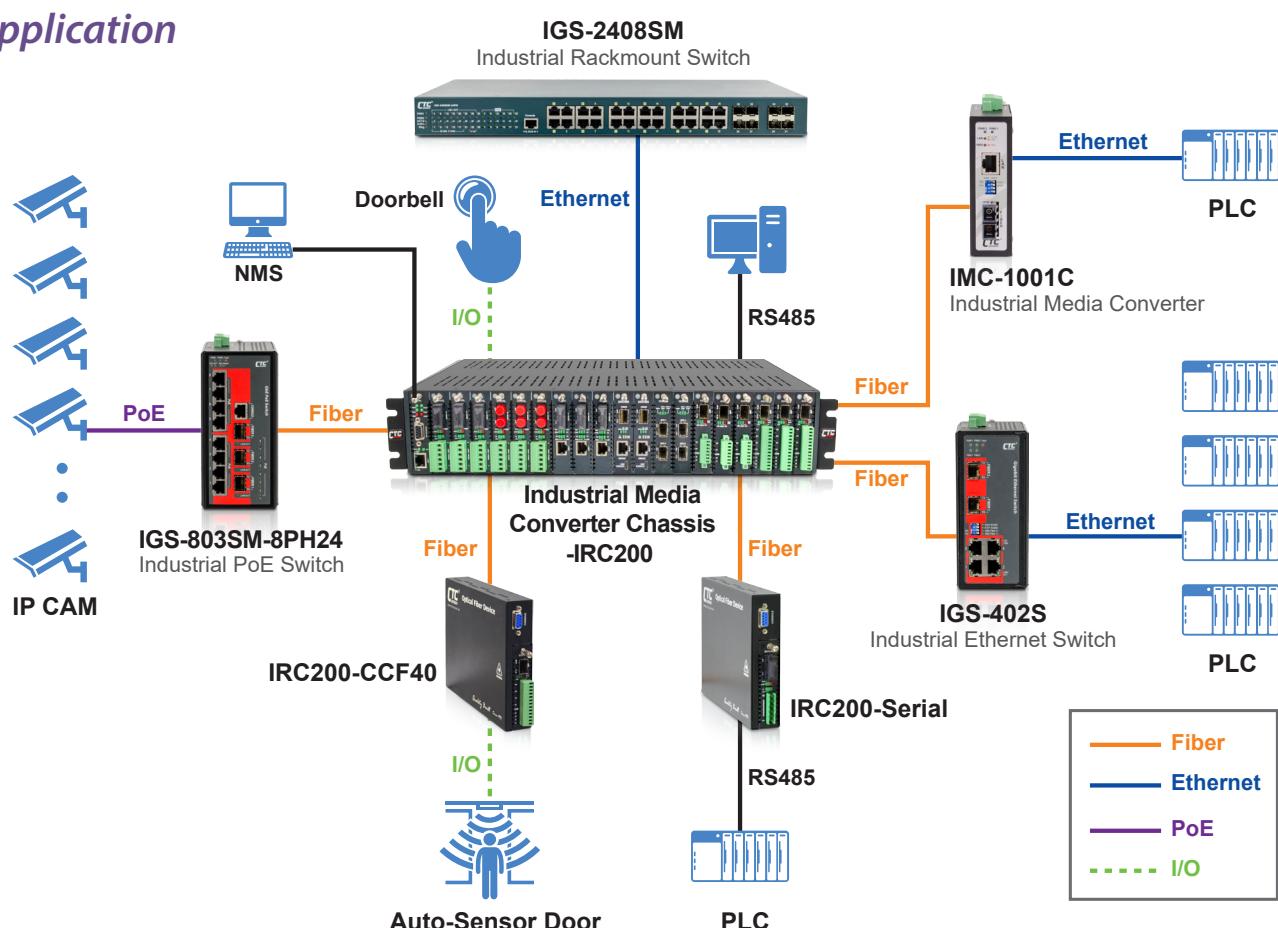
Specification

Slot	1 slot for insertion module card
Console	1x RS232 for configuration
Power Input	AC 100~240VAC (IRC200-CH01M-AC) DC 18~60VDC (IRC200-CH01M-DC)
Housing	IP30, Metal Case
Installation	Desktop
Dimension	185x30x135mm (D × W × H)
Operating Temperature	-10~65°C
Humidity	5%~90%
Weight	1.2kg
MTBF	97,968 Hours (IRC200-CH01M-AC) 282,218 Hours (IRC200-CH01M-DC) (MIL-HDBK-217)
Warranty	5 Year

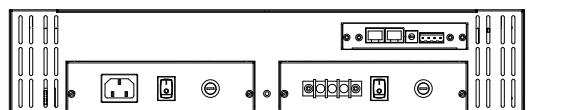
Specification

Slot	1 slot for insertion module card
Power Input	AC 100~240VAC (IRC200-CH01-AC, IRC200-CH01-AA) DC 18~60VDC (IRC200-CH01-DC, IRC200-CH01-DD)
Housing	IP30, Metal Case
Installation	Desktop
Dimension	185x30x135mm (D × W × H)
Operating Temperature	-10~65°C
Humidity	5%~90%
Weight	0.8kg
MTBF	98,967 Hours (IRC200-CH01-AC) 290,805 Hours (IRC200-CH01-DC) (MIL-HDBK-217)
Warranty	5 Year

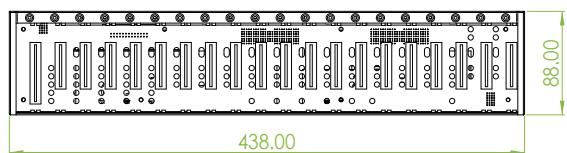
Application



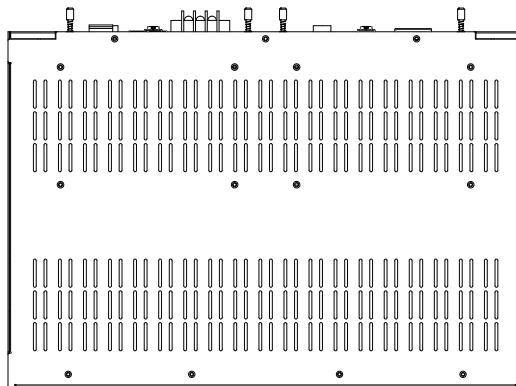
Dimensions



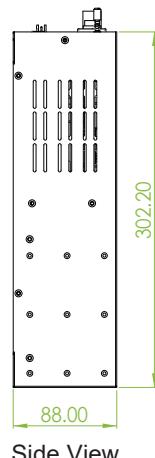
Rear View



Front View



Top View



Side View

Ordering Information

Model Name	Description
20 Slot Chassis	
IRC200-CH20	Industrial 19" 2U 20 slots Converter Chassis
Power Module for IRC200-CH20	
IRC200-AC	Power supply module 100~240VAC
IRC200-DC	Power supply module 36~60VDC
Module Cards	
IRC200-NMC	Network management control card
IRC200-10/100i	10/100Base-TX to 100Base-FX In-band management converter
IRC200-2000MS	Web managed OAM 10/100/1000Base-T to 100/1000Base-X converter
IRC200-1000DS	1000Base-X SFP to 1000Base-X SFP media converter
IRC200-Serial	RS-232/422/485 to fiber converter
IRC200-CCF40	4 channel contact closure Fiber (155M SFP) converter
IRC200-CCF20	2 channel contact closure Fiber (155M SFP) converter
1 Slot Standalone Chassis	
IRC200-CH01M-AC	Industrial 1 slot converter chassis with console, 100~240VAC input
IRC200-CH01M-AA	Industrial 1 slot converter chassis with console, dual 100~240VAC redundant power input
IRC200-CH01M-DC	Industrial 1 slot converter chassis with console, 18~60VDC input
IRC200-CH01M-DD	Industrial 1 slot converter chassis with console, dual 18~60VDC redundant power input
IRC200-CH01-AC	Industrial 1 slot converter chassis, 100~240VAC input
IRC200-CH01-AA	Industrial 1 slot converter chassis, dual 100~240VAC redundant power input
IRC200-CH01-DC	Industrial 1 slot converter chassis, 18~60VDC input
IRC200-CH01-DD	Industrial 1 slot converter chassis, dual 18~60VDC redundant power input

IMC-1000WS-PB

Web Managed 1x GbE RJ45 to 100/1000Base SFP with IEEE802.3bt PoE PSE (90W)



- SNMP, Web based, OAM, Remote Loop-Back test
- Supports LFPT (Link Fault Pass Through)
- Support IEEE802.3af/at/bt type 4 PoE upto 90W



Features

- Conversion between 10/100/1000Base-T and 100/1000Base-X fiber cable interface
- Redundant 48VDC power input
- IP30 rugged metal housing and fanless
- Supports Jumbo frame 16K bytes packet
- DHCP, Auto Provision, SNTP, VLAN, QoS, Dual firmware image
- PoE PD auto check and auto Reset, Weekly schedule

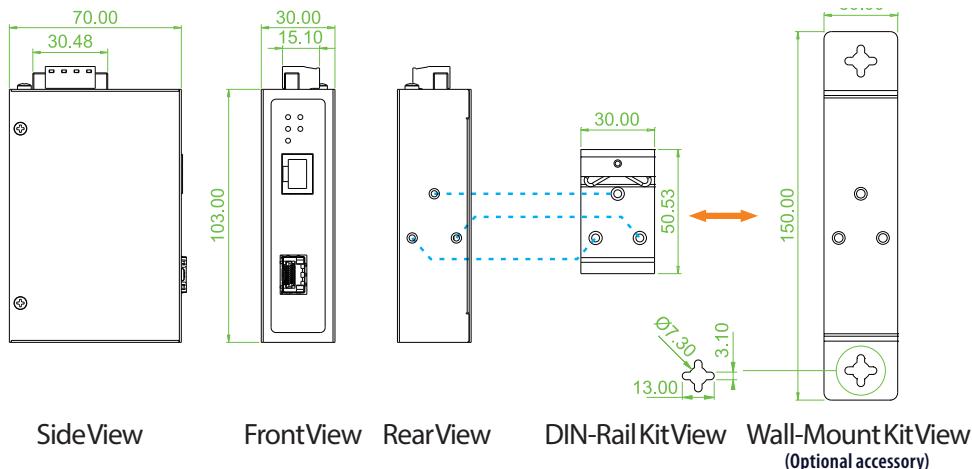
Specifications

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 802.3bt PoE++ IEEE 802.3at PoE+ (Power over Ethernet enhancement) IEEE 802.3af PoE (Power over Ethernet) IEEE 802.1Q Tag VLAN	Removable Terminal Block Provide for 2 Redundant power, 4 Pin Operating Humidity 5%~95% (Non-condensing) Operating Temperature -20°C ~ 70°C Storage Temperature -40°C ~ 85°C Housing Rugged Metal, IP30 Protection and fanless Dimensions 70 x 30 x 103 mm (D X W X H) Weight 245g Installation DIN Rail mounting, or wall mounting (Optional) Power Supply 48VDC (44~57VDC), Redundant power with polarity reverse protect function and removable terminal block Below recommend is for difference PoE application: 55~57VDC for 90W (4 Pairs) 52~57VDC for 60W (4 Pairs) 52~57VDC for 30W (2 Pairs) 44~57VDC for 15.4W (2 Pairs)
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 or Store and Forward mode	
Jumbo Frame	16K 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)	Fiber-TX: If Fiber port link down, the media converter will force TX port to link down	
Connector and Pin Assignment	SFP Slot RJ-45 Socket: Cat 5e (10/100/1000Mbps) Twisted Pair cable Auto MDI/MDI-X and Auto-Negotiation Function Support	
Connector and Pin Assignment	RJ-45 Port support IEEE802.3af/at/bt End-Span, Alternative A mode PoE (V+): RJ-45 pin 1, 2, 4, 5 PoE (V-): RJ-45 pin 3, 6, 7, 8 Data (1, 2, 3, 6, 4, 5, 7, 8)	
LED	Per Unit: Power 1 (Green), Power 2 (Green) Fiber LNK/ACT (Green): ON: Connected to network, OFF: Not connected to network, BLK : Receive /Transmit Data Fiber Speed: Amber: 1000Base-X, Green : 100Base-X RJ-45 port: Speed: 10 / 100 (Green), 1000 (Amber) LNK/ACT for RJ45(Green): ON: Connected to network, OFF: Not connected to network, BLK : Networking is active PoE Status (Green): ON : PoE normal working, OFF : PoE No Power output	
Reverse Polarity Protection	Supported for Power Input	
Overload Current Protection	Supported	

Software Specifications

Management	Support Web management Support IPv4/6 DHCP, Auto Provision Support OAM, Remote Loop-Back test Support SNTP, QoS, Firmware upgrade by TFTP or Web Dual firmware image Supports 802.1Q tag VLAN	Diagnostic & Monitor	Supports Link Fault Pass-Through (LFPT) Function Remote loop back test PoE Status
Configuration	IP configuration, password setting, converter configuration port configuration VLAN group configuration, alarm configuration PoE Configuration Download/Upload setting parameter	PoE	PoE Weekly schedule PoE PD auto checking and auto reset when PD fail. PoE Configuration Diagnostic PoE status

Dimensions



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	IEEE802.3af/at/bt (PSE)	Power Budget		Redundant	CE	
IMC-1000WS-PB	V	1	1 SFP	1	90W	48VDC	V	V	-20~70°C

Related Product

IRC200-CH20	Industrial Converter Chassis, 20 Module slot
IRC200-2000MS	Industrial Managed 10/100/1000Base-T RJ45 to 100/1000Base-X SFP Media Converter for IRC200 Chassis
IMC-1001MS	Managed 10/100/1000Base-T RJ45 to 100/1000Base-X SFP Media Converter
IMC-1001CS	10/100/1000Base-T RJ45 to 100/1000Base-X SFP Media Converter

Package List

- IMC-1000WS-PB device
- Din Rail bracket with screws
- Terminal block
- Protective caps for SFP ports

Optional Accessories

Wall Mount Kit

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

The ISFP series of industrial grade SFP modules have been fully tested with all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

Industrial Power Supply

NDR-120-48	Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 120W, -20 ~ +70°C (For IMC-1000WS-PB)
NDR-240-48	Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 240W, -20 ~ +70°C (For more reserve)

IMC-1000MS-PH12

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



- 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 converter is designed for harsh environments, such as IP surveillance, industrial networking, intelligent transportation systems (ITS) and is 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	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
Fiber Ports	SFP slot for 100Base-X or 1000Base-X, 100M/1000M speed set by Web	Reverse Polarity Protection	Supported for Power Input
RJ45 Ports	10/100/1000Base-T Auto MDI/MDI-X and Auto-Negotiation Function Supports UTP CAT.5e Twisted Pair cable	Overload Current Protection	Supported
Push Button	Reset, Load default setting	Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC
Data Process Architecture	Pass through mode	Removable Terminal Block	Provides 2 redundant power, alarm relay contact, 6 Pin
Jumbo Frame	9K bytes	Operating Humidity	5%~95% (Non-condensing)
Fiber Parameters	Fiber Cable (Multi-mode): 50/125um,62.5/125um Fiber Cable (Single-mode): 9/125um	Operating Temperature	-20°C ~ 75°C
	SFP, Distance depending on plugged-in Fiber Tranceiver	Storage Temperature	-40°C ~ 85°C
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	Housing	Rugged Metal, IP30 Protection and fanless
Far-End Fault (FEF)	Work with LFPT to prevents data loss	Dimensions	106 x 62.5 x 135 mm (D X W X H)
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	Weight	650g
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)	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																				
	<table border="1"> <thead> <tr> <th>Input Voltage</th> <th>Total Power Consumption</th> <th>Device Power Consumption</th> <th>PoE Budget</th> <th>Boost Efficiency</th> </tr> </thead> <tbody> <tr> <td>12VDC</td> <td>34.2W</td> <td>3.9W</td> <td>30W</td> <td>99.0%</td> </tr> <tr> <td>24VDC</td> <td>34.7W</td> <td>4.4W</td> <td>30W</td> <td>99.0%</td> </tr> <tr> <td>48VDC</td> <td>35.4W</td> <td>4.7W</td> <td>30W</td> <td>97.7%</td> </tr> </tbody> </table>	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%
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																				

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

Software Specifications

SNMP or Web Mode

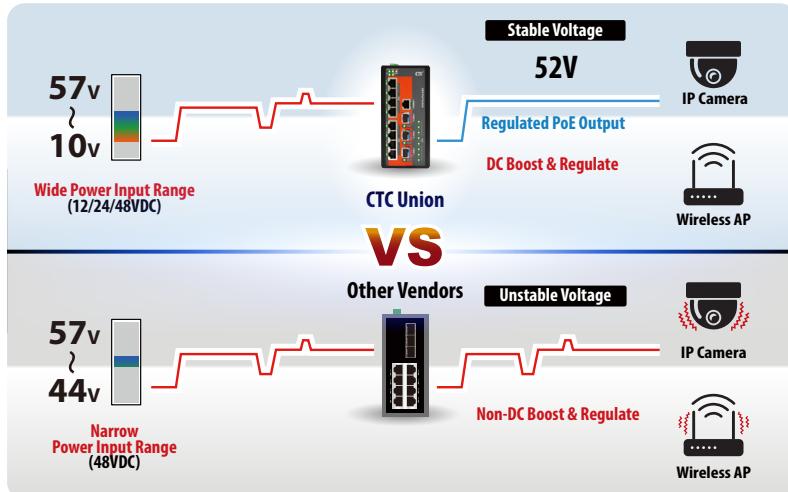
Management	Ingress/Egress bandwidth control with 64K granularity Web management, Firmware upgrade via Web Supports SNMP, MIB for management Supports 802.1Q tag VLAN, 16 Tag VLAN group, MIB counters display
Configuration	IP configuration, password setting, converter configuration port configuration, MIB 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 PoE Status

In-Band Remote mode

Management	Supports in-band management from FRM220 Chassis With FRM220-1000MS card (Figure 2)
Configuration	Ingress/Egress bandwidth control with 64K granularity 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

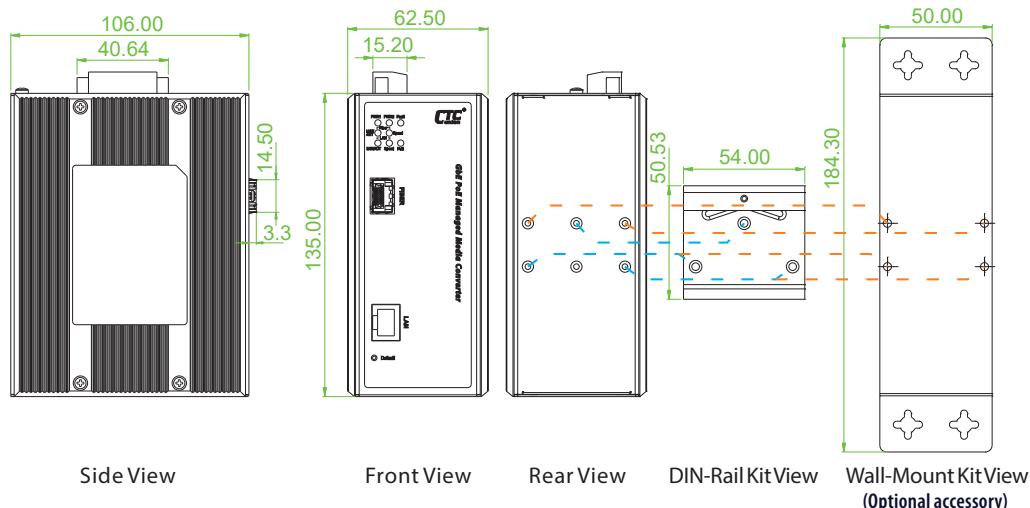


- Regulated PoE output voltage (52VDC) to stabilize PoE device
- Guarantee delivery PoE power distance to 100 meters
- Wide range input power 12/24/48VDC (9.6~57VDC)
- Built-in very high efficiency (94~97%) to boost PoE output voltage

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



Dimensions



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	CE	
IMC-1000MS-PHE12	V	1	1 SFP	1	30W	12/24/48VDC	V	V	-20~75°C

■ Package List

- IMC-1000MS-PH12 device
- Protective caps for SFP ports
- Din Rail bracket with screws
- Terminal block

Optional Accessories

■ Wall Mount Kit

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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

■ Industrial Power Supply

MDR-40-48 Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C

IMC-1000MS

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



- Supports LFPT (Link Fault Pass Through) and FEF (Far End Fault)
- 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, the converter is designed for harsh environments, such as industrial networking and intelligent transportation systems (ITS) and is 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	Overload Current Protection Supported
Fiber Ports	100Base-X or 1000Base-X set by Web Supports Auto Laser Shutdown (ALS) Supported DDMI for SFP diagnostic	Power Supply 12/24/48VDC (9.6~60VDC) , Redundant power with polarity Reverse protect function and removable terminal block
RJ45 Ports	10/100/1000Base-T Auto MDI/MDI-X and Auto-Negotiation Function Supports UTP CAT.5e Twisted Pair cable	Alarm Relay Contact Relay outputs with current carrying capacity of 1 A @24VDC Removable Terminal Block Relay alarm output for power fail or port link down Provides 2 redundant power, alarm relay contact, 7 Pin
CPU watch dog	Supported	Power Consumption 4.8 W
Push Button	Reset, Load default setting	Operating Humidity 5% ~ 95% (Non-condensing)
Jumbo Frame	9K bytes	Operating Temperature -20 ~ 75°C (IMC-1000MS-E)
Fiber Parameters	Fiber Cable (Multi-mode): 50/125um,62.5/125um Fiber Cable (Single-mode): 9/125um SFP, Distance depend on plug-in Fiber Tranceiver	Storage Temperature -40 ~ 85°C
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	Housing Rugged Metal, IP30 Protection and fanless
Far-End Fault (FEF)	Work with LFPT to prevents data loss	Dimensions 106 x 38.6 x 142.1mm (D x W x H)
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	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
Reverse Polarity Protection	Supported for power Input	

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

Software Specifications

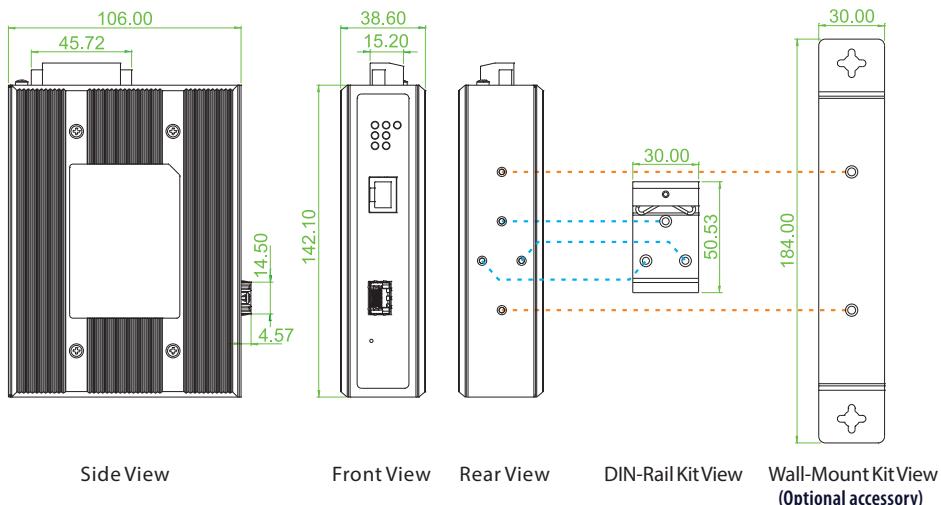
SNMP or Web Mode

Management	Ingress/Egress bandwidth control with 64K granularity Web management, Firmware upgrade via Web Supports SNMP, MIB for management Supports 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
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
Configuration	Ingress/Egress bandwidth control with 64K granularity 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



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	CE	FCC	
IMC-1000MS-E	V	1	1 SFP	12/24/48VDC	V	V	-20~75°C

■ Package List

- IMC-1000MS device
- Protective caps for SFP ports
- Din Rail with screws
- Terminal block

Optional Accessories

■ Wall Mount Kit

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

The ISFP series of industrial grade SFP modules have been fully tested with all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

■ Industrial Power Supply

MDR-20-24	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 24VDC, 24W, -20 ~ +70°C
MDR-40-48	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C

IMC-1001S-PH

1x GbE RJ45 to 1x 100/1000Base SFP with PoE PSE (30W)

NEW



- CE, FCC certified
- Supports LFPT (Link Fault Pass Through) and FEF (Far End Fault)



IMC-1001S-PH 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-1001S-PH utilizes an SFP cage for 100/1000Base-X compatible SFP modules. Housed in rugged DIN rail or wall mountable enclosures, the converter is designed for harsh environments, such as industrial networking, intelligent transportation systems (ITS) and is 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 -20~70°C (IMC-1001S-PHE)
- 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	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.
RJ45 Ports	10/100/1000Base-T Auto MDI/MDI-X and Auto-Negotiation Function Supports UTP CAT.5e Twisted Pair cable	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)
Fiber Ports	100Base-X or 1000Base-X SFP slot 100Base-X or 1000Base-X set by DIP SW	LED	Per Unit: Power 1 (Green), Power 2 (Green) Fiber Port LNK/ACT: 100 (Green), 1000 (Amber) ON: Connected to network / OFF: Not connected to network / BLK: Networking is active
Data Process Architecture	Store and Forward mode or Pass Through mode Set by DIP SW	RJ-45 port	RJ-45 port LNK/ACT: 10/100 (Green), 1000 (Amber) ON: Connected to network / OFF: Not connected to network / BLK: Networking is active
Jumbo Frame	16K bytes	PoE Status	ON: PoE normal working / OFF : PoE No Power output
Fiber Parameters	Fiber Cable (Multi-mode): 50/125um, 62.5/125um Fiber Cable (Single-mode): 9/125um Available distance: • SFP, Distance depend on plug-in Fiber Transceiver	Reverse Polarity Protection	Supported for Power Input
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	Overload Current Protection	Supported
Far-End Fault (FEF)	Work with LFPT to prevents data loss	Power Supply	48VDC (44~57VDC), Redundant power with polarity reverse protect function and removable terminal block
DIP Switch	SW1 Data Process Architecture Off : Store and Forward Switch Mode On : Pass Through Mode SW2 Off : LFPT Disable On: LFPT Enable SW3 SFP Fiber Speed Off: 1000BaseX On: 100Base X SW4 PoE Off: PoE Output Enable On: PoE Output Disable	PoE Power budget	30W
		Power Consumption	TBD
		Removable Terminal Block	Provides 2 redundant power, 4 Pin
		Operating Humidity	5%~95% (Non-condensing)
		Operating Temperature	-20~70°C (IMC-1001S-PHE)
		Storage Temperature	-40°C ~ 85°C
		Housing	Rugged Metal, IP30 Protection and fanless
		Dimensions	TBD

Weight	TBD
Installation	DIN Rail mounting, or wall mounting (Optional)
MTBF	TBD MIL-HDBK-217
Warranty	5 years
Certification	
EMC	CE (EN55032, EN55035)
EMI	FCC Part 15 Subpart B Class A, CE

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

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	CE	FCC	
IMC-1001S-PHE	1	1 SFP	1	30W	48VDC	V	V	-20~70°C

■ Package List

- IMC-1001S-PH device
- Protective caps for SFP ports
- Din Rail bracket with screws
- Terminal block

Optional Accessories

■ Wall Mount Kit

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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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(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)

■ Industrial Power Supply

MDR-40-48 Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C

IMC-1000S-PB

1x GbE RJ45 to 100/1000Base-X SFP with IEEE802.3bt PoE PSE (90W)



- Supports LFPT (Link Fault Pass Through)
- Support Store & Forward, or Pass through mode



IMC-1000S-PB is a 10/100/1000Base-T to 100/1000Base-X GbE media converter which not only offers dual-speed fixed fiber transceiver or SFP cage module options for the optical interface, but also injects IEEE802.3af/at/bt PoE++ power through the electrical RJ-45 port. Housed in rugged DIN rail or wall mountable enclosures, IMC-1000S-PB Converter is designed for harsh environments, such as IP surveillance, industrial networking, intelligent transportation systems (ITS) and is also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications.

Features

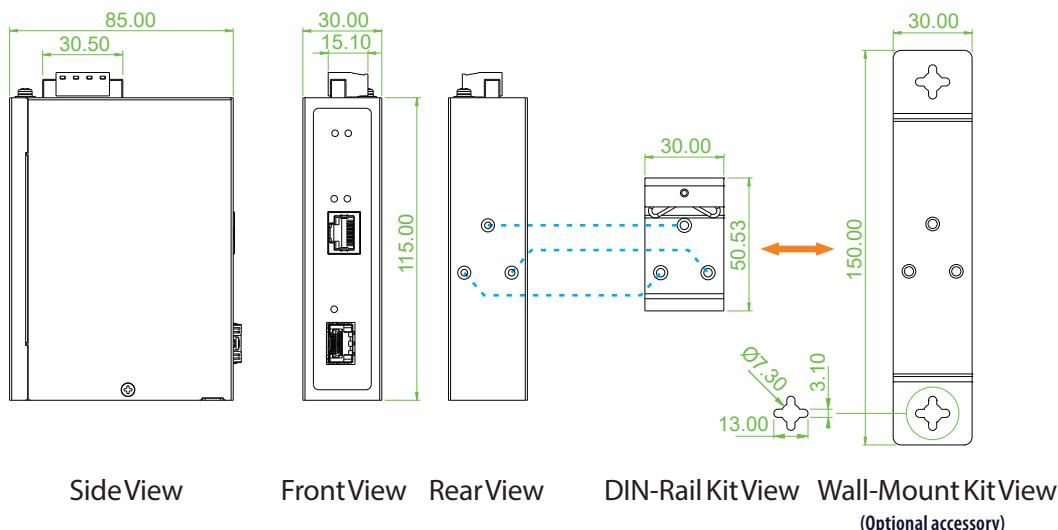
- Provides IEEE 802.3af/at/bt Type 4 PoE output (Up to 90W)
- Supports DIP SW for setting LFPT, Store & Forward or Pass through mode, and SFP speed

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 802.3bt PoE++ IEEE 802.3at PoE+ (Power over Ethernet enhancement) IEEE 802.3af PoE (Power over Ethernet)	LED Per Unit: Power 1 (Green), Power 2 (Green) Fiber LNK/ACT: 1000 Link/Act (Amber) 100 Link/Act (Green) Blk: Networking is active RJ-45 port: Speed: LNK/Act 1000 (Amber) LNK/Act 10/100 (Green) PoE Status (Green): ON : PoE normal working, Blink : PoE inative								
Fiber Ports	SFP slot for 100Base-X or 1000Base-X, 100M/1000M speed set by DIP SW	Reverse Polarity Protection Supported for Power Input								
RJ45 Ports	10/100/1000Base-T Auto MDI/MDI-X and Auto-Negotiation Function Supports UTP CAT.5e Twisted Pair cable	Overload Current Protection Supported								
Data Process Architecture	Store and Forward	Removable Terminal Block Provides 2 redundant power PWR1 and PWR2, 4 Pin								
Jumbo Frame	16K bytes	Operating Humidity 5%~95% (Non-condensing)								
Fiber Parameters	Fiber Cable (Multi-mode): 50/125um,62.5/125um Fiber Cable (Single-mode): 9/125um	Operating Temperature -20°C ~ 70°C								
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	Storage Temperature -40°C ~ 85°C								
DIP SW	SW1 LFPT Off: LFPT Disable On: LFPT Enable SW2 Data process Architecture Off : Store and Forward Switch mode On: Pass through mode SW3 Fiber Speed Off: 1000BaseX On: 100Base X SW4 Reserve	Housing Rugged Metal, IP30 Protection and fanless Dimensions 80 x 30 x 115mm (D x W x H) Weight 340g Installation DIN Rail mounting, or wall mounting (Optional) Power Supply 48VDC (44~57VDC), Redundant power with polarity reverse protect function and removable terminal block Below recommend is for difference PoE application: 55~57VDC VDC for 90W (4 Pairs) 52~57VDC for 60W (4 Pairs) 52~57VDC for 30W (2 Pairs) 44~57VDC for 15.4W (2 Pairs)								
Connector and Pin Assignment	SFP slot support 100/1000M SFP transceiver RJ-45 Socket: Cat 5e (10/100/1000Mbps) Twisted Pair cable Auto MDI/MDI-X and Auto-Negotiation Function Support IEEE 802.3at/at/bt End-Span, Alternative A mode PoE (V+): RJ-45 pin 1, 2, 4, 5 PoE (V-): RJ-45 pin 3, 6, 7, 8 Data (1,2,3,6,4,5,7,8)	PoE Power budget 90W Power Consumption <table border="1"><thead><tr><th>Input Voltage</th><th>Total Power Consumption</th><th>Device Power Consumption</th><th>PoE Budget</th></tr></thead><tbody><tr><td>54 VDC</td><td>94.5W</td><td>3.8W</td><td>90W</td></tr></tbody></table> MTBF 1,432,119 Hours MIL-HDBK-217 Warranty 5 years	Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	54 VDC	94.5W	3.8W	90W
Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget							
54 VDC	94.5W	3.8W	90W							

Certifications

EMC	CE (EN55035, EN55032)
EMI	FCC Part 15 Subpart B Class A, CE

Shock IEC 60068-2-27**Freefall** IEC 60068-2-31**Vibration** IEC 60068-2-6**Dimensions****Ordering Information**

Model Name	RJ45 UTP	Fiber	PoE Port		Power Input	Certification		Operating Temperature
	10/100/1000 Base-T	Dual Speed 100/1000Base-X	IEEE803.3af/at/bt	Power Budget	Redundant	CE	FCC	
IMC-1000S-PB-E	1	1 SFP	1	90W	48VDC	V	V	-20~70°C

■ Package List

- IMC-1000S-PB device
- Protective caps for SFP ports
- Din Rail bracket with screws
- Terminal block

Optional Accessories**■ Wall Mount Kit**

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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

■ Industrial Power Supply

NDR-120-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 120W, -20 ~ +70°C

IMC-100-PH12

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



- 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, the converter is designed for harsh environments, such as industrial networking, intelligent transportation systems (ITS) and is 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	Fiber Connector Fiber: SC / ST (Multi-mode, 2KM), SC / ST (Single-mode, 30KM, 50KM)
RJ45 Ports	10/100Base-TX Auto MDI/MDI-X and Auto-Negotiation Function Supports UTP CAT.5e Twisted Pair cable	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)
Fiber Ports	100Base-FX with SC or ST connector	LED Per Unit : Power 1 (Green), Power 2 (Green), Fault (Amber)
Data Process Architecture	Store and Forward mode or Pass Through mode (Set by DIP SW)	Fiber LNK/ACT (Green): ON: Connected to network OFF: Not connected to network BLK: Receive /Transmit Data
Jumbo Frame	9K bytes	Fiber Speed :Green : 100 Base- X
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)	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
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	PoE States (Green) Flash: PoE Fault (Over-load or short) ON: PoE normal working, OFF : PoE No Power output
Far-End Fault (FEF)	Work with LFPT to prevents data loss	Reverse Polarity Protection Supported for Power Input
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 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	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	34W	3.5W	30W	98.4%
		24VDC	34.4W	4.1W	30W	99.0%
		48VDC	34.9W	4.3W	30W	98.0%

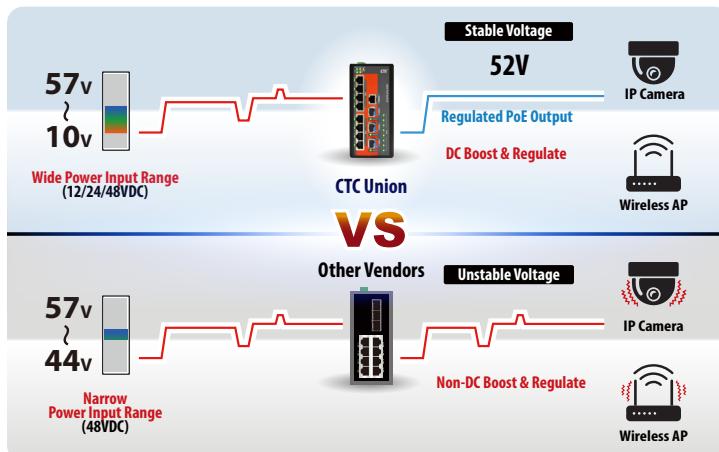
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC
Removable Terminal Block	Provide 2 redundant power, alarm relay contact, 6 Pin
Operating Humidity	5%~95% (Non-condensing)
Operating Temperature	-20°C ~ 75°C
Storage Temperature	-40°C ~ 85°C
Housing Dimensions	Rugged Metal, IP30 Protection and fanless
Weight	106 x 62.5 x 135 mm (D x W x H)
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
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

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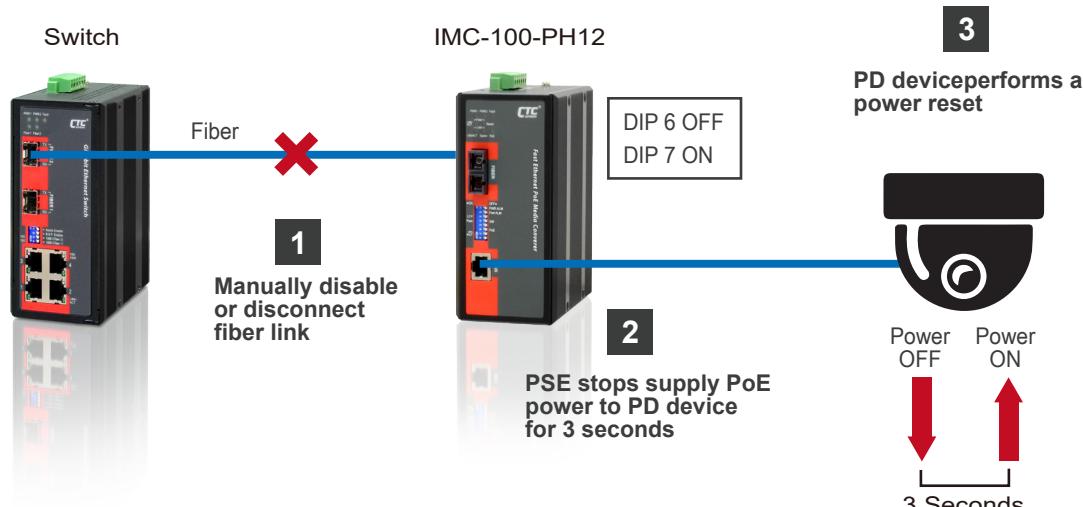
Application

Figure 1 : High efficiency boost technology for PoE

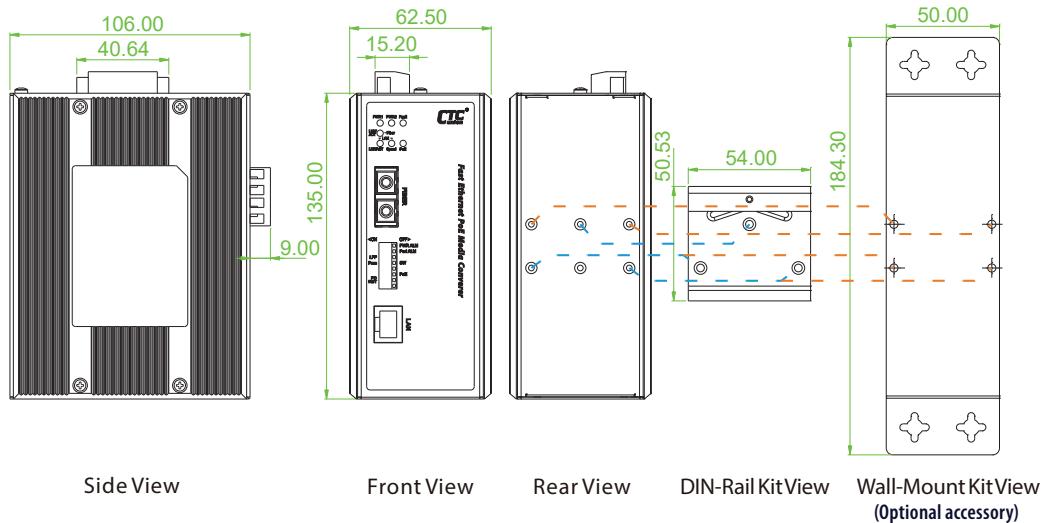


- Regulated PoE output voltage (52VDC) to stabilize PoE device
- Guarantee delivery PoE power distance to 100 meters
- Wide range input power 12/24/48VDC (9.6~57VDC)
- Built-in very high efficiency (94~97%) to boost PoE output voltage

Figure 2 : Remote PD Reset Application



Dimensions



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	CE	FCC	
IMC-100-PHE12	1	1 SC/ST	1	30W	12/24/48VDC	V	V	-20~75°C

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)

■ Package List

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

Optional Accessories

■ Wall Mount Kit

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

■ Industrial Power Supply

MDR-40-48 Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C

IMC-1001C & IMC-1001CS

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

NEW



- Supports LFPT (Link Fault Pass Through) and FEF (Far End Fault)
- Provides a DIP-Switch to set functions
- 12/24/48VDC (9.6~60VDC) Redundant input power



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

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Features

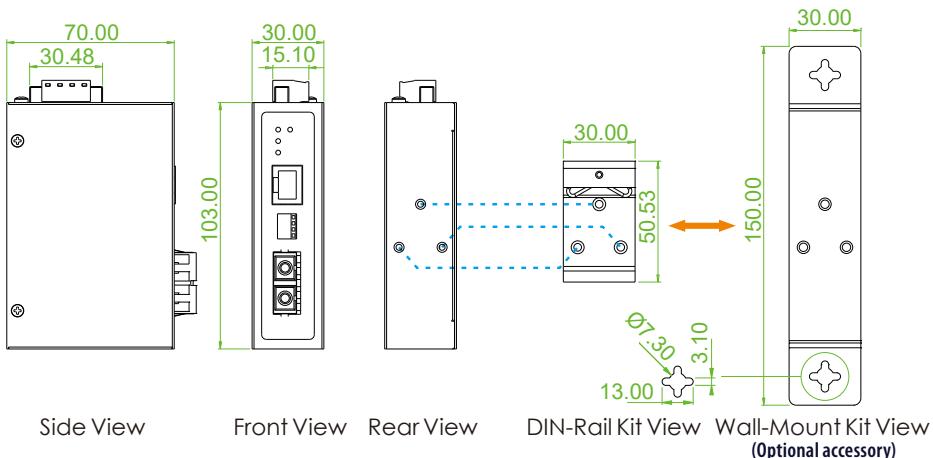
- IP30 rugged metal housing and fanless
- Wide operating temperature -20 ~ 70°C
- Store-and-Forward mode and Pass through mode (set by DIP SW)
- Conversion between 10/100/1000Base-T and 1000Base-X Fiber cable interface

Specifications

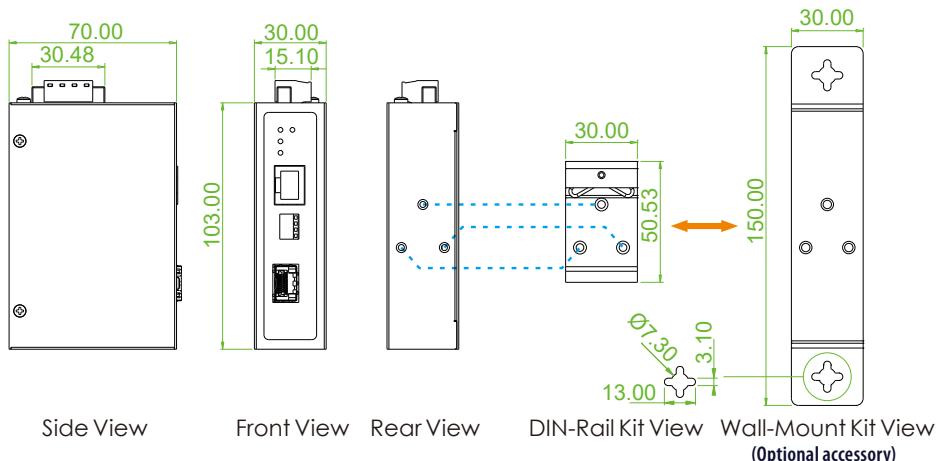
Standard	IEEE 802.3 10Base-T 10Mbit/s Ethernet IEEE 802.3u 100Base-TX, 100Base-FX, Fast Ethernet IEEE 802.3ab 1000Base-T Gbit/s Ethernet over twisted pair IEEE 802.3z 1000Base-X Gbit/s Ethernet over Fiber-Optic IEEE 802.3x Flow Control	Reverse Polarity Protection	Supported for power input												
RJ45 Ports	10/100/1000Base-T Auto MDI/MDI-X and Auto-Negotiation Function UTP/STP Cat.5e cable or above	Overload Current Protection	Supported												
Fiber Ports	1000Base-SX/LX SC (IMC-1001) 100/1000Base-X SFP Slot (IMC-1001CS)	Power Supply	12/24/48VDC (9.6~60VDC) Redundant input power with polarity reverse protect function and removable terminal block												
Data Process Architecture	Store and Forward Switch mode or Pass through mode set by DIP SW	Power Consumption	<table border="1"> <thead> <tr> <th>Input Voltage</th> <th>12V</th> <th>24V</th> <th>48V</th> </tr> </thead> <tbody> <tr> <td>IMC-1001CS</td> <td>1.8W</td> <td>2W</td> <td>2.4W</td> </tr> <tr> <td>IMC-1001C</td> <td>1.8W</td> <td>2W</td> <td>2.4W</td> </tr> </tbody> </table>	Input Voltage	12V	24V	48V	IMC-1001CS	1.8W	2W	2.4W	IMC-1001C	1.8W	2W	2.4W
Input Voltage	12V	24V	48V												
IMC-1001CS	1.8W	2W	2.4W												
IMC-1001C	1.8W	2W	2.4W												
Jumbo Frame	16K Bytes (For Store and Forward Switch mode)	Removable Terminal Block	Provides for dual input power, 4 Pin												
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-1001) 500M (Multi-mode SX) 20KM (Single-mode) 40KM (Single-mode) Distance depend on SFP Fiber Tranceiver (IMC-1001CS)	Operating Humidity	5% ~ 95% (Non-condensing)												
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	Operating Temperature	-20~70°C (IMC-1001C-E, IMC-1001CS-E)												
Far-End Fault (FEF)	Work with LFPT to prevents data loss	Storage Temperature	-40 ~ 85°C												
DIP Switch	Data process architecture Off: Store and Forward Switch mode On: Pass Through mode LFPT OFF: LFPT Disable ON: LFPT Enable SFP Fiber Speed OFF: 1000Base-X ON: 100Base-FX (for IMC-1001CS)	Housing	Rugged Metal, IP30 Protection and fanless												
Connector	Fiber: SC (Multi-mode, 500M), SC (Single-mode, 20KM, 40KM) (IMC-1001C) SFP Slot (IMC-1001CS) RJ-45 Socket: Auto MDI/MDI-X and Auto-Negotiation Function Supports	Dimensions	70x 30x 103 mm (D x W x H)												
LED	Per Unit: Power 1 (Green), Power 2 (Green), SFP Fiber port Speed & Link/Act: (For IMC-1001CS) 1000Base-X (Green), 1000Base-X (Amber) SC/ST Fiber port Speed & Link/Act: (For IMC-1001C) 1000Base-X (Amber) RJ-45 port: Speed & Link/Act 10/100 (Green), 1000 (Yellow)	Weight	230g (IMC-1001C), 225g (IMC-1001CS)												
		Installation	DIN Rail, or wall mounting (Optional)												
		MTBF	1,278,798 Hours (IMC-1001C), 1,940,623 Hours (IMC-1001CS) (MIL-HDBK-217)												
		Warranty	5 years												
		Certification	CE (EN55032, EN55035)												
		EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE												
		EMS (Electromagnetic Susceptibility) Protection Level	<table border="1"> <tr> <td>EN61000-4-2 (ESD) Level 3, Criteria B</td> </tr> <tr> <td>EN61000-4-3 (RS) Level 3, Criteria A</td> </tr> <tr> <td>EN61000-4-4 (Burst) Level 3, Criteria A</td> </tr> <tr> <td>EN61000-4-5 (Surge) Level 3, Criteria B</td> </tr> <tr> <td>EN61000-4-6 (CS) Level 3, Criteria A</td> </tr> <tr> <td>EN61000-4-8 (PMF, Magnetic Field) Field Strength: 300A/m, Criteria A</td> </tr> </table>	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 (PMF, Magnetic Field) Field Strength: 300A/m, Criteria A						
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		Shock	IEC 60068-2-27												
		Freefall	IEC 60068-2-32												
		Vibration	IEC 60068-2-6												

Dimensions

► IMC-1001C



► IMC-1001CS



Ordering Information

Model Name	RJ45 UTP Port		Fiber		Power Input		Certification		Operating Temperature
	10/100/1000Base-T	1000Base-X	Dual Speed 100/1000Base-X		Redundant Power	CE	FCC		
IMC-1001C-E	1	SC			12/24/48VDC	V	V		-20~70°C
IMC-1001CS-E	1		1 SFP		12/24/48VDC	V	V		-20~70°C
Connector Type	Connectivity Distance								
SC (IMC-1001C-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								

■ Package List

- IMC-1001C, or IMC-1001CS device
- Din Rail with screws
- Terminal block
- Protective caps for SFP ports

Optional Accessories

■ Wall Mount Kit

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 all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

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)

■ Industrial Power Supply

MDR-20-24	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 24VDC, 24W, -20 ~ +70°C
MDR-40-48	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C

IMC-100C

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



- 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, the converter is designed for harsh environments, such as industrial networking and intelligent transportation systems (ITS) and is also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. Wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

Features

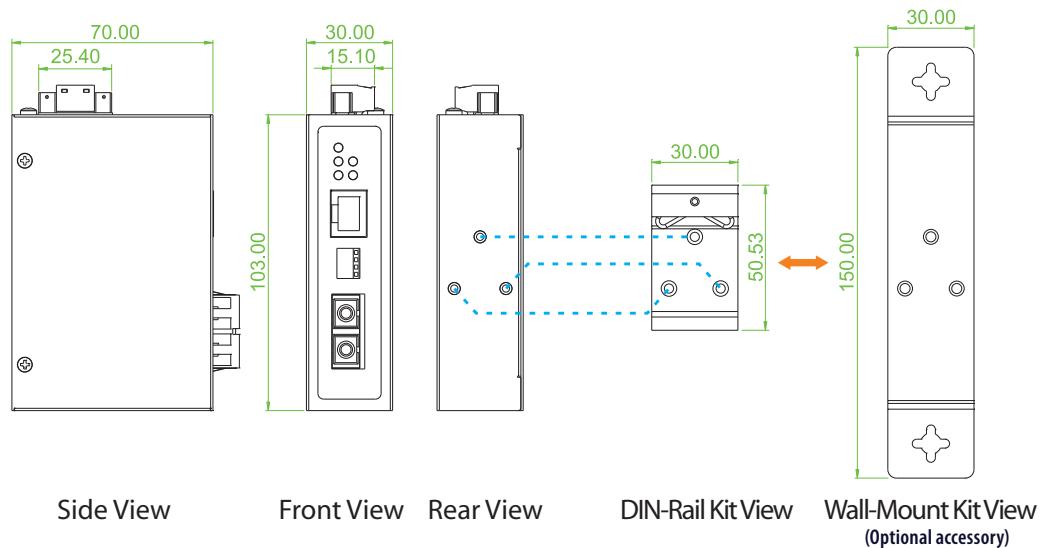
- DC input power 12/24/48VDC (9.6 ~ 60VDC) or 24VAC (18~36VAC)
- IP30 rugged metal housing, compact size and fanless
- Wide operating temperature -40 ~ 75°C
- Store-and-Forward mode and Pass Through mode (set by DIP SW)
- Conversion between 10/100Base-TX and 100Base-FX cable interface

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	<table border="1"> <thead> <tr> <th>Input Voltage</th> <th>Watt(W)</th> </tr> </thead> <tbody> <tr> <td>12VDC</td> <td>1.8W</td> </tr> <tr> <td>24VDC</td> <td>1.8W</td> </tr> <tr> <td>48VDC</td> <td>2.1W</td> </tr> </tbody> </table>	Input Voltage	Watt(W)	12VDC	1.8W	24VDC	1.8W	48VDC	2.1W
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								
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		Shock	IEC 60068-2-27
EMC	CE (EN55032, EN55035)	Freefall	IEC 60068-2-32
EMI	FCC Part 15 Subpart B Class A, CE	Vibration	IEC 60068-2-6
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		

Dimensions



Ordering Information

Model Name	RJ45 UTP Port	Fiber	Power Input	Certification		Operating Temperature
	10/100Base-TX	100Base-FX	Single power	CE	FCC	
IMC-100C-E	1	1 SC	12/24/48VDC	V	V	-40~75°C

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
- Terminal block
- Din Rail with screws

Optional Accessories

■ Wall Mount Kit

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

■ Industrial Power Supply

MDR-20-24 Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 24VDC, 24W, -20 ~ +70°C
 MDR-40-48 Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C

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
- Supports power failure alarm message by relay
- 12/24/48VDC (9.6~60VDC) redundant dual input power



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, the converter is designed for harsh environments, such as industrial networking and intelligent transportation systems (ITS) and is also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. 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
- Store-and-Forward mode and Pass Through mode (set by DIP SW)
- Conversion between 10/100Base-TX and 100Base-FX cable interface

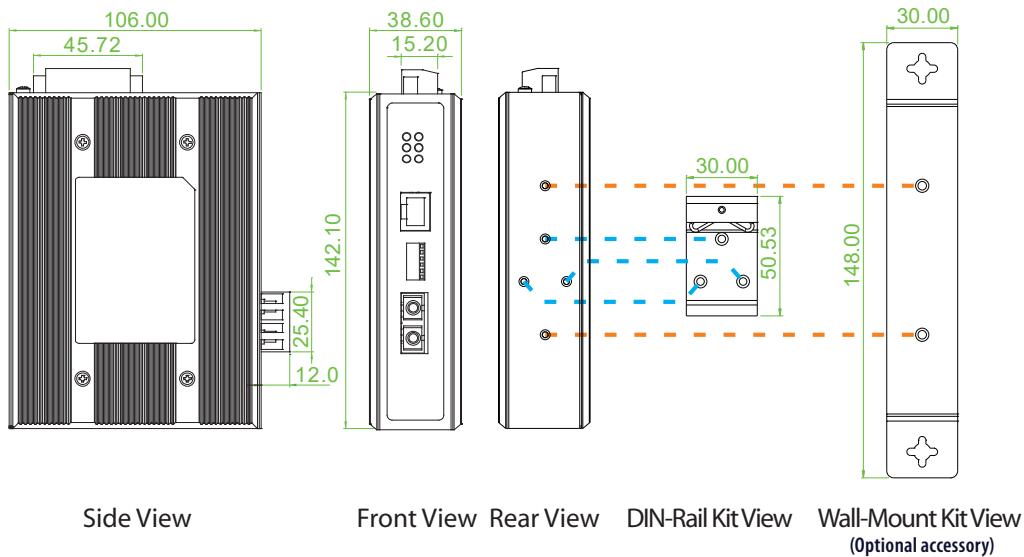
Specifications

Standard	IEEE 802.3 10Base-T 10Mbit/s Ethernet IEEE 802.3u 100Base-TX, 100Base-FX, Fast Ethernet IEEE 802.3x Flow Control	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 100 (Amber): ON: 100Mbps/ OFF: 10Mbps LAN (Green): ON : Connected to network OFF: Not connected to network/ BLK: Networking is active
RJ45 Ports	10/100Base-TX Auto MDI/MDI-X and Auto-Negotiation Function Supports UTP CAT.5e Twisted Pair cable	Reverse Polarity Protection Supported for power input
Fiber Ports	100Base-FX (SC/ST connectors)	Overload Current Protection Supported
Switch Architecture	Store and Forward in Switch mode Supports 1024 MAC addresses in Switch mode	Power Supply 12/24/48VDC(9.6~60VDC), Redundant power with polarity reverse protect function and removable terminal block
Ethernet Packet length	2046Byte (Max) in Switch mode	Alarm Relay Contact Relay outputs with current carrying capacity of 1 A @24VDC
Jumbo Frame	9K bytes in Pass through (Converter mode)	Removable Terminal Block Provides 2 redundant power, alarm relay contact
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)	Power Consumption 2.9 W
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	Operating Humidity 5% ~ 95% (Non-condensing)
Far-End Fault (FEF)	Work with LFPT to prevents data loss	Operating Temperature -40 ~ 75°C
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	Storage Temperature -40 ~ 85°C
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	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
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



Ordering Information

Model Name	RJ45 UTP Port	Fiber	Power Input	Certification		Operating Temperature
	10/100Base-TX	100Base-FX	Redundant	CE	FCC	
IMC-100-E	1	1 SC	12/24/48VDC	V	V	-40~75°C

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
- Terminal block
- Din Rail with screws

Optional Accessories

■ Wall Mount Kit

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

■ Industrial Power Supply

MDR-20-24 Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 24VDC, 24W, -20 ~ +70°C
MDR-40-48 Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C

GW211W-MQ

Modbus to MQTT Gateway

NEW



- Both Ethernet and WiFi for communication
- 15KV ESD protection for all signals
- RS422, RS485 surge protection
- High range operating temperature -20~70°C

The MQTT Wi-Fi / Ethernet / Serial Gateway, GW211W-MQ provides an easy to deploy device to send RS-232/RS-485 Serial Modbus RTU Data communications to MQTT TCP networks on hard-wired Ethernet or over wireless WiFi networks.. The MQTT Gateway works with standard Modbus Slave device, such as PLCs, IoT Sensors, Energy meters (AMRs), Solar Inverters, Wind Turbines, IO Modules, Flow Meters and more. The MQTT Gateway is built for use in light industrial environments and features a compact wall-mount design. It operates from 9-32VDC power supply voltages with terminal block connectors and is easy to configure through its web GUI interface.

Features

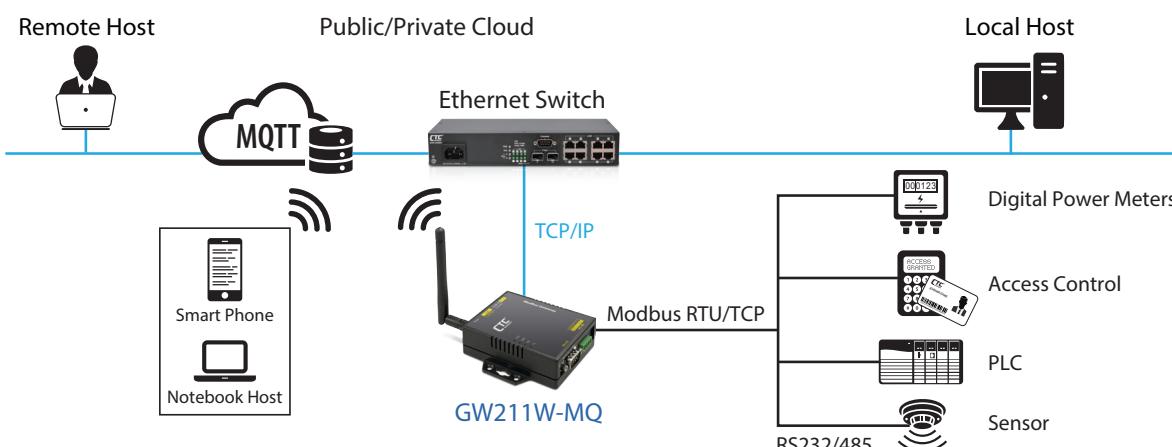
- Supports Modbus RTU to MQTT
- Supports 802.11b/g/n and Ethernet, 2 IPs
- Supports 32 Topics, register length adjustable
- Supports to query 4 remote TCP devices

- Easy MQTT settings by web browser configuration
- Easy installation with Windows IP utility
- On line F/W upgrade
- Watch Dog Function

Specifications

Ethernet	Port Type	RJ-45 Connector	WiFi	Standard	802.11b/g/n
	Speed	10/100 M bps (Auto Detecting)	Data Rate	11/54/72.2 Mbps @ 20Mhz Band Width	
	Protocol	ARP, IP, ICMP, UDP, TCP, HTTP, DHCP, DNS, NTP	Modulation	DSSS; OFDM	
	Mode	Modbus TCP	Frequency	2.4GHz	
	Setup	HTTP Browser Setup (IE, Chrome, Firefox)	Tx Power 11b	Max. 22dBm	
	Security	Setup Password	Tx Power 11g/n	Max. 19dBm	
	Protection	Built-in 1.5KV Magnetic Isolation	Rx Sensitivity	-76dBm@54Mbps; -89.5dBm@1Mbps	
Serial Ports *2	Port	RS-232	Tx Rate	Max. 54Mbps with auto fallback	
	Port	RS-422 / 485 (Surge Protect)	Tx Distance	Up to 100 Meters	
	Speed	300 bps ~ 921.6 K bps	Security	WEP 64-bit / 128-bit data encryption, WPA / WPA2	
	Parity	None, Odd, Even	Antenna	2 dBi ; RP-SMA connector	
	Data Bit	5, 6, 7, 8	Network Mode	Infrastructure; Soft AP (for Setup)	
	Stop Bit	1, 2	LED	SYS, WiFi, RX, TX, LAN	
	RS-232 Pins	Rx , Tx , GND	Power	DC 9~32V, supports DC Jack & Terminal Input	
	RS-422	Rx+, Rx-, Tx+, Tx- (Surge Protect)	Power Consumption	2W	
	RS-485	Data+, Data- (Surge Protect)	MTBF	60,000 hours (MIL-HDBK-217)	
	15KV ESD for all signals		Mechanical	Dimensions 110 x 90 x 26 mm (W x D x H)	
			Weight	110g	
			Housing	plastic	
			Installation Mounting	Wall Mounting	
			Environment	Operating Temperature -20°C ~ 70°C	
				Storage Temperature -25°C ~ 80°C	
			Certification	FCC, CE	

Application



Ordering Information

Model Name	Description
GW211W-MQ	1x RS232, 1x RS422/485 Modbus to MQTT Wireless Gateway with Power Adapter

GW211W-MB

Modbus RTU to Modbus TCP Gateway

NEW



- Both Ethernet and WiFi for communication
- 15KV ESD protection for all signals
- RS422, RS485 surge protection
- High range operating temperature -20~70°C

The Modbus Wi-Fi / Ethernet / Serial Gateway, GW211W-MB provides an easy to deploy device to send Modbus serial data communications over a packet network such as Ethernet or TCP/IP on a hard-wired network or via WiFi. The Modbus Gateway works with standard Modbus Slave devices, such as PLCs, IoT Sensors, Energy meters (AMRs), Solar Inverters, Wind Turbines, IO Modules, Flow Meters and more. The Modbus Gateway is built for use in light industrial environments and features a compact wall-mount design. It operates from 9-32VDC power supply voltages with terminal block connectors and each Modbus Gateway is easily configure through its web GUI interface.

Features

- TCP to RTU support 8 simultaneous TCP Master
- RTU to TCP support 8 TCP Slaves on each port.
- Software support : TCP to RTU Slaves, RTU to TCP Slaves
TCP to ASCII Slaves, ASCII to TCP Slaves

- Supports 802.11b/g/n and Ethernet, 2 IPs
- Web browser configuration
- Easy installation Windows utility
- On line F/W upgrade
- Watch Dog Function

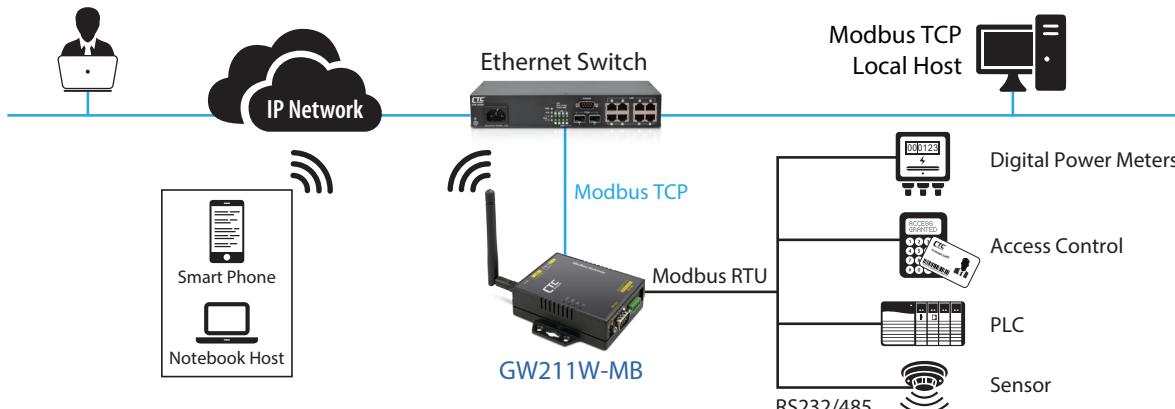
Specifications

Ethernet	Port Type	RJ-45 Connector
	Speed	10/100 M bps (Auto Detecting)
	Protocol	ARP, IP, ICMP, UDP, TCP, HTTP, DHCP, DNS, NTP
	Mode	Modbus TCP
	Setup	HTTP Browser Setup (IE, Chrome, Firefox)
	Security	Setup Password
	Protection	Built-in 1.5KV Magnetic Isolation
Serial Ports *2	Port	RS-232*1
	Port	RS-422 / 485*1 (Surge Protect)
	Speed	300 bps ~ 921.6 K bps
	Parity	None, Odd, Even
	Data Bit	5, 6, 7, 8
	Stop Bit	1, 2
	RS-232 Pins	Rx , Tx , GND
	RS-422	Rx+, Rx-, Tx+, Tx- (Surge Protect)
	RS-485	Data+, Data- (Surge Protect)
		15KV ESD for all signals

WiFi	Standard	802.11b/g/n
	Data Rate	11/54/72.2 Mbps @ 20Mhz Band Width
	Modulation	DSSS; OFDM
	Frequency	2.4GHz
	Tx Power 11b	Max. 22dBm
	Tx Power 11g/n	Max. 19dBm
	Rx Sensitivity	-76dBm@54Mbps; -89.5dBm@11Mbps
	Tx Rate	Max. 54Mbps with auto fallback
	Tx Distance	Up to 100 Meters
	Security	WEP 64-bit / 128-bit data encryption, WPA / WPA2
	Antenna	2 dBi ; RP-SMA connector
	Network Mode	Infrastructure; Soft AP (for Setup)
LED	SYS, WiFi, RX, TX, LAN	
Power	DC 9~32V, supports DC Jack & Terminal Input	
Power Consumption	2W	
MTBF	60,000 hours (MIL-HDBK-217)	
Mechanical	Dimensions	110 x 90 x 26 mm (W x D x H)
	Weight	110g
	Housing	plastic
Installation Mounting	Wall Mounting	
Environment	Operating Temperature	-20°C ~ 70°C
	Storage Temperature	-25°C ~ 80°C
Certification	FCC, CE	

Application

Remote Host



Ordering Information

Model Name	Description
GW211W-MB	1x RS232, 1x RS422/485 Modbus RTU to Modbus TCP Wireless Gateway with Power Adapter

STE211W

2-port Serial to Ethernet Device Server



- Both Ethernet and WiFi for communication
- 15KV ESD protection for all signals
- RS422, RS485 surge protection
- High range operating temperature -20~70°C

The Serial to Ethernet with Wi-Fi Converter, STE211W provides a bridging device to connect RS-232/RS-485 Serial Data communications to hardwired Ethernet networks or WiFi wireless networks. It connects serial devices such as PLC, alarm sensors and PTZ camera control to IP networks. Applications include industrial/factory automation, public safety, and surveillance systems. The Serial converter is built for use in light industrial environments, featuring a compact wall-mount design. It operates from 9-32VDC power supply voltages with terminal block connectors and is easy to configure through its web GUI interface.

Features

- 2-Port: RS-232 + RS-422/485
- As a Server, supports 4 TCP Clients connection simultaneously.
- As a Client, supports connecting with 4 TCP Servers.
- Easy installation with Windows IP Search utility

- Web browser configuration
- Supports 802.11b/g/n and Ethernet, 2 IPs
- Watch Dog Function

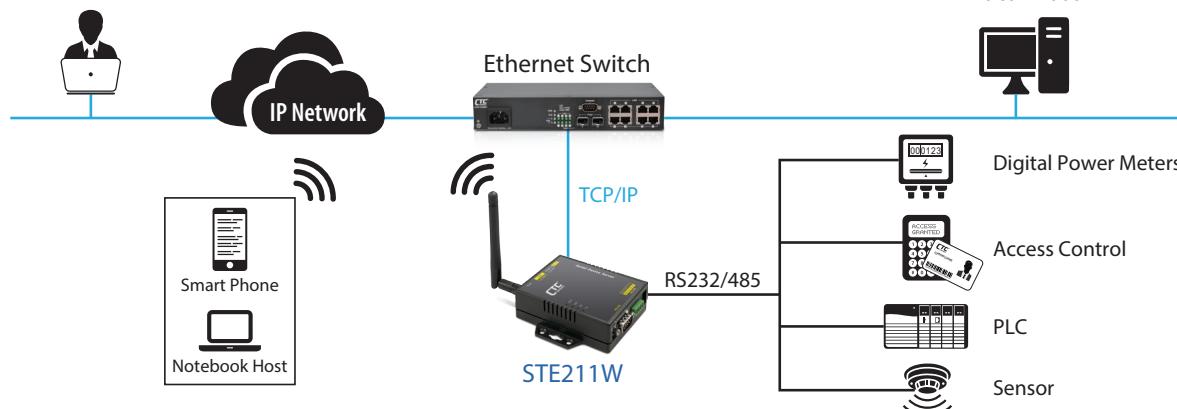
Specifications

Ethernet	Port Type	RJ-45 Connector
	Speed	10/100 M bps (Auto Detecting)
	Protocol	ARP, IP, ICMP, UDP, TCP, HTTP, DHCP, DNS, NTP
	Mode	TCP Server/TCP Client/UDP/Virtual Com
	Setup	HTTP Browser Setup (IE, Chrome, Firefox)
	Security	Setup Password
	Protection	Built-in 1.5KV Magnetic Isolation
Serial Ports *2	Port	RS-232 (RX/TX only)
	Port	RS-422 / 485 (Surge Protect)
	Speed	300 bps ~ 921.6 K bps
	Parity	None, Odd, Even
	Data Bit	5, 6, 7, 8
	Stop Bit	1, 2
	RS-232 Pins	Rx , Tx , GND
	RS-422	Rx+, Rx-, Tx+, Tx- (Surge Protect)
	RS-485	Data+, Data- (Surge Protect)
		15KV ESD for all signals

WiFi	Standard	802.11b/g/n
	Data Rate	11/54/72.2 Mbps @ 20Mhz Band Width
	Modulation	DSSS; OFDM
	Frequency	2.4GHz
	Tx Power 11b	Max. 22dBm
	Tx Power 11g/n	Max. 19dBm
	Rx Sensitivity	-76dBm@54Mbps; -89.5dBm@1Mbps
	Tx Rate	Max. 54Mbps with auto fallback
	Tx Distance	Up to 100 Meters
	Security	WEP 64-bit / 128-bit data encryption, WPA / WPA2
	Antenna	2 dBi ; RP-SMA connector
	Network Mode	Infrastructure; Soft AP (for Setup)
LED	SYS, WiFi, RX, TX, LAN	
Power	DC 9~32V, supports DC Jack & Terminal Input	
Power Consumption	2W	
MTBF	60,000 hours (MIL-HDBK-217)	
Mechanical	Dimensions	110 x 90 x 26 mm (W x D x H)
	Weight	110g
	Housing	plastic
Installation Mounting	Wall Mounting	
Environment	Operating Temperature	-20°C ~ 70°C
	Storage Temperature	-25°C ~ 80°C
Certification	FCC, CE	

Application

Remote Host



Ordering Information

Model Name	Description
STE211W	1x RS232, 1x RS422/485 Serial to Ethernet Wireless Server with Power Adapter

STE211

2-port Serial to Ethernet Device Server

NEW



- 15KV ESD protection for all signals
- RS422, RS485 surge protection
- High range operating temperature -20~70°C

The Serial to Ethernet Converter, STE211 provides a bridging device to connect RS-232/RS-485 Serial Data communications to hardwired Ethernet networks. It connects serial devices such as PLC, alarm sensors and PTZ camera control to IP networks. Applications include industrial/factory automation, public safety, and surveillance systems. The Serial converter is built for use in light industrial environments, featuring a compact wall-mount design. It operates from 9-32VDC power supply voltages with terminal block connectors and is easy to configure through its web GUI interface.

Features

- 1-Port RS-232 + 1-Port RS-422/485
- As a Server, supports 4 TCP Clients connection simultaneously.
- As a Client, supports connecting with 4 TCP Servers.

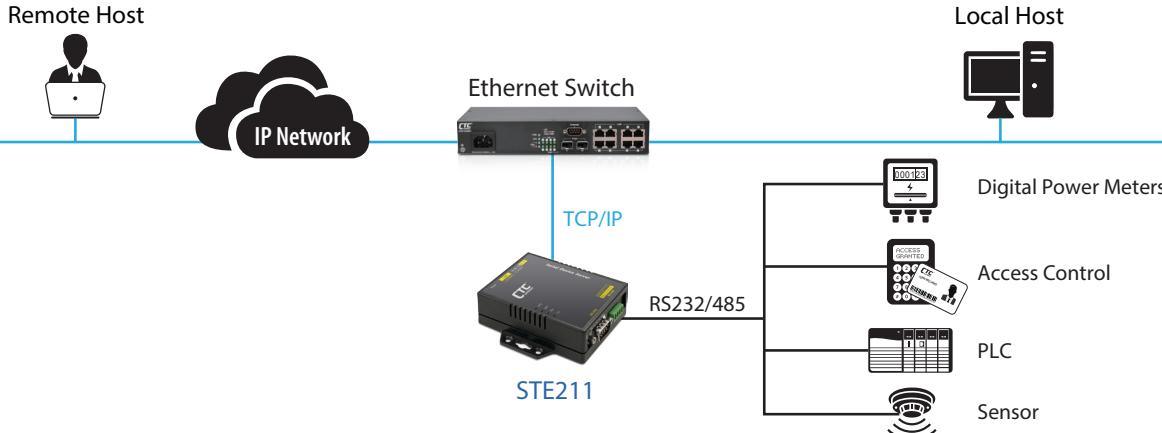
- Easy installation with Windows IP Search utility
- Web browser configuration
- Watch Dog Function

Specifications

Ethernet	Port Type	RJ-45 Connector
	Speed	10/100 M bps (Auto Detecting)
	Protocol	ARP, IP, ICMP, UDP, TCP, HTTP, DHCP, DNS, NTP
	Mode	TCP Server/TCP Client/UDP/Virtual Com
	Setup	HTTP Browser Setup (IE, Chrome, Firefox)
	Security	Setup Password
	Protection	Built-in 1.5KV Magnetic Isolation
Serial Ports *2	Port	RS-232 (RX/TX only)
	Port	RS-422 / 485 (Surge Protect)
	Speed	300 bps ~ 921.6 K bps
	Parity	None, Odd, Even
	Data Bit	5, 6, 7, 8
	Stop Bit	1, 2
	RS-232 Pins	Rx , Tx , GND
	RS-422	Rx+, Rx-, Tx+, Tx- (Surge Protect)
	RS-485	Data+, Data- (Surge Protect)
		15KV ESD for all signals

LED	SYS, RX, TX, LAN
Power	DC 9~32V, supports DC Jack & Terminal Input
Power Consumption	2W
MTBF	60,000 hours (MIL-HDBK-217)
Mechanical	Dimensions 110 x 90 x 26 mm (W x D x H) Weight 110g Housing plastic
Installation Mounting	Wall Mounting
Environment	Operating Temperature -20°C ~ 70°C Storage Temperature -25°C ~ 80°C
Certification	FCC, CE

Application



Ordering Information

Model Name	Description
STE211	1x RS232, 1x RS422/485 Serial to Ethernet Server with Power Adapter

IFC-Serial-PRO

1x RS485 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



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 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

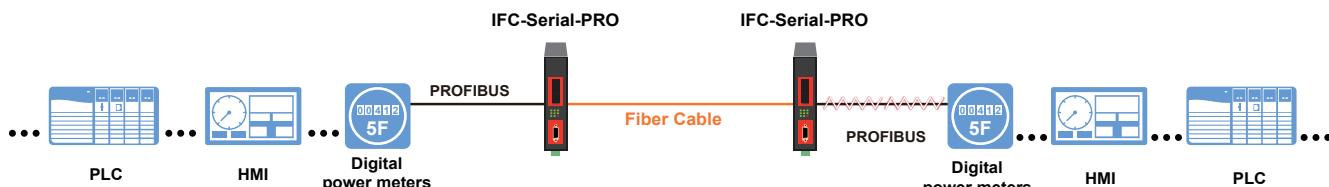
Specifications

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
	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)	
Certification	Weight	450g
EMC	CE (EN55032, EN55035)	
EMI	FCC Part 15 Subpart B Class A, CE (EN55032)	
EMS	EN61000-4-2 ESD Level 3	
(Electromagnetic Susceptibility)	EN61000-4-3 RS Level 3	
Protection Level	EN61000-4-4 EFT Level 3	
	EN61000-4-5 Surge Level 3	
	EN61000-4-6 CS Level 3	
Free Fall	IEC 60068-2-31	
Vibration	IEC 60068-2-6	
Shock	IEC 60068-2-27	
Green	RoHS	
MTBF	1,137,875 Hours (MIL-HDBK-217)	
Warranty	5 years	

Application & Topology

Figure 1 : IFC-Serial-PRO Application for PROFIBUS



Benefit:

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

Figure 2 : Isolate PROFIBUS Failure

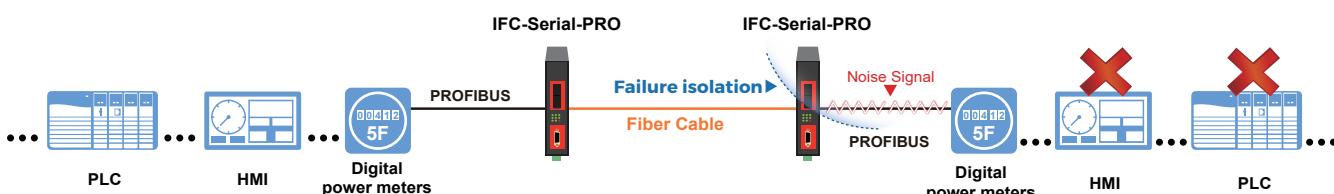
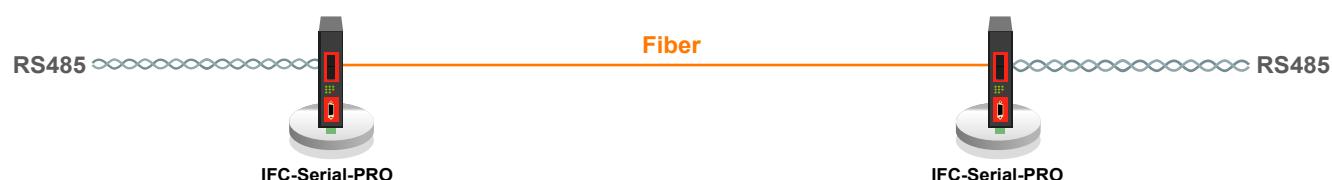
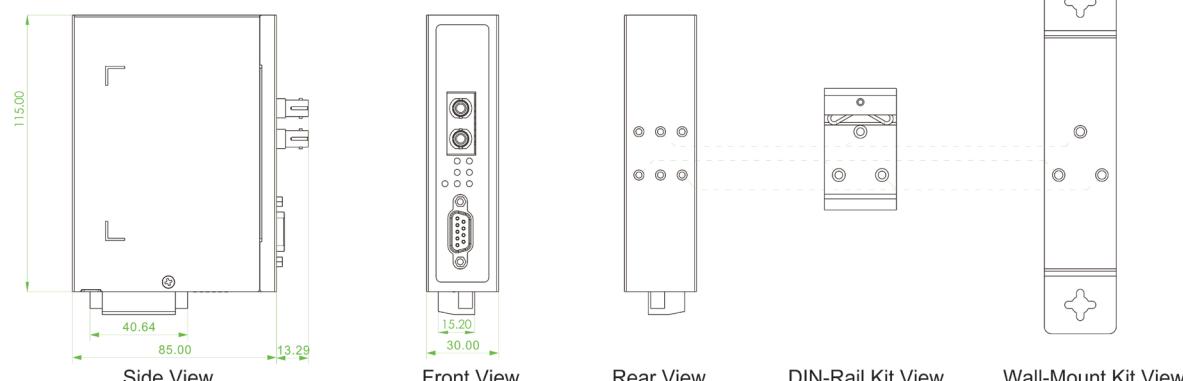


Figure 3 : Fiber Point to Point topology & application



Dimensions



Ordering Information

Model Name	Serial (ProfiBus)		Fiber	Power Input	Certification		Operating Temperature
	RS485	Isolation 2.5KV			CE	FCC	
IFC-Serial-PRO	1	V	1	12/24/48VDC	V	V	-10~60°C
IFC-Serial-PRO-E	1	V	1	12/24/48VDC	V	V	-40~75°C

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

■ Package List

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

Optional Accessories

■ Wall Mount Kit

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

■ Industrial Power Supply

MDR-20-24	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 24VDC, 24W, -20 ~ +70°C
MDR-40-48	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C

IFC-Serial

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



- 2.5KV isolation for serial port (RS485/422/232)
- 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 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 1024kbps 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 1024kbps 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 38.6 x 142.1mm (D x W x H)
	Mounting	DIN-Rail, or wall mounting (Optional)
	Weight	0.63kg
Certification		CE FCC Part 15 Subpart B Class A, CE 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 IEC 60068-2-32 IEC 60068-2-6 IEC 60068-2-27 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

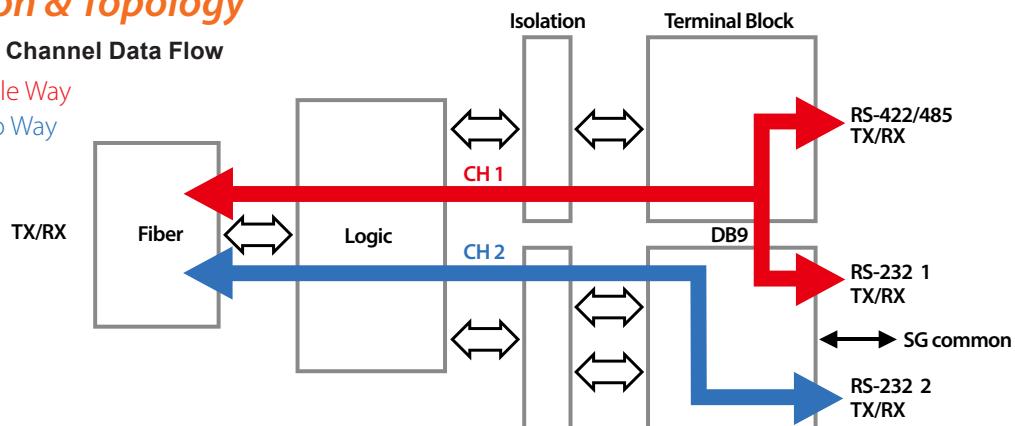
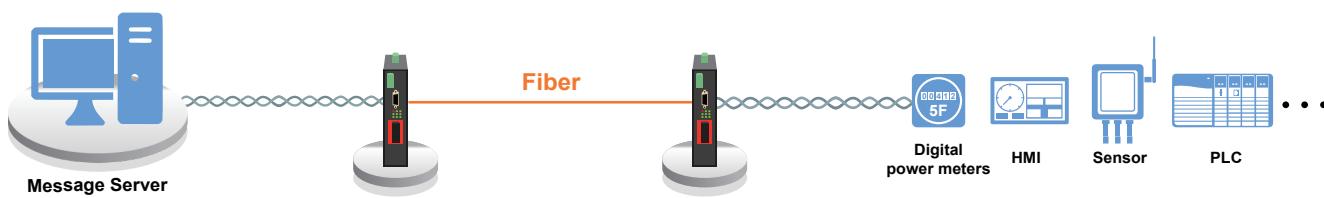


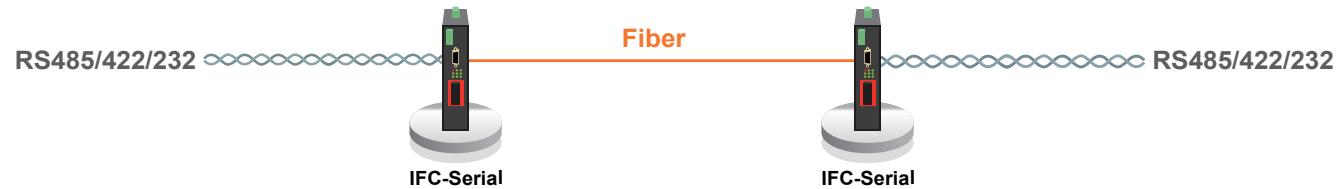
Figure 2 : Application for Modbus Network



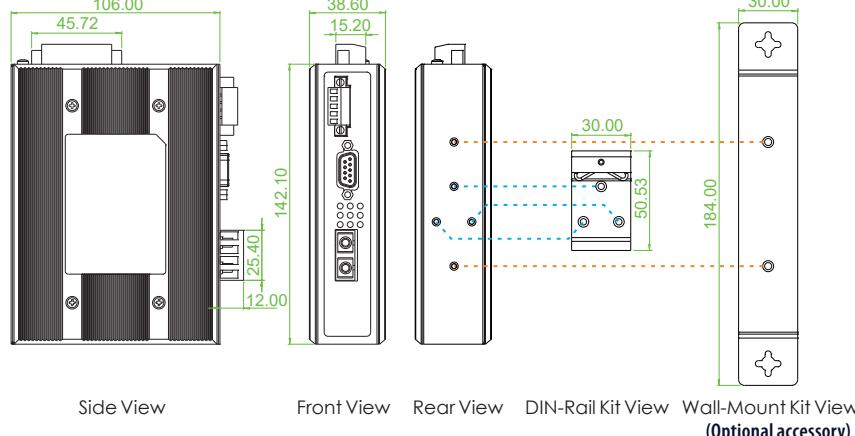
Benefit:

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



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			CE	FCC	
IFC-Serial	V	2	1	V	1	12/24/48VDC	V	V	-10~60°C
IFC-Serial-E	V	2	1	V	1	12/24/48VDC	V	V	-40~75°C

Package List

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

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

Optional Accessories

Wall Mount Kit

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

Industrial Power Supply

MDR-20-24	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 24VDC, 24W, -20 ~ +70°C
MDR-40-48	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C

IFC-FDC

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



- 2.5KV isolation for serial port (RS485/422/232)
- 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 1024kbps 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 1024kbps 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		
EMC CE		
EMI FCC Part 15 Subpart B Class A, CE		
EMS EN61000-4-2 ESD Level 3		
(Electromagnetic Susceptibility) EN61000-4-3 RS Level 3		
Protection Level 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		
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

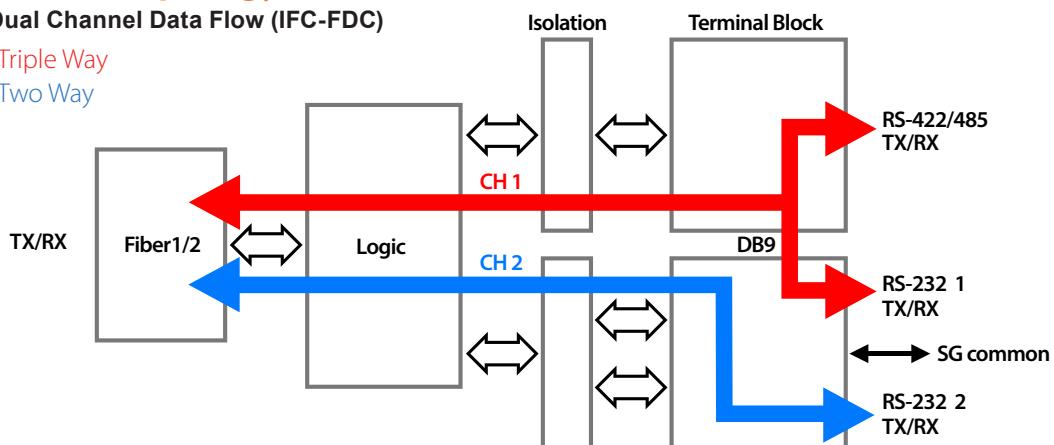


Figure 2 : Application for Modbus Network

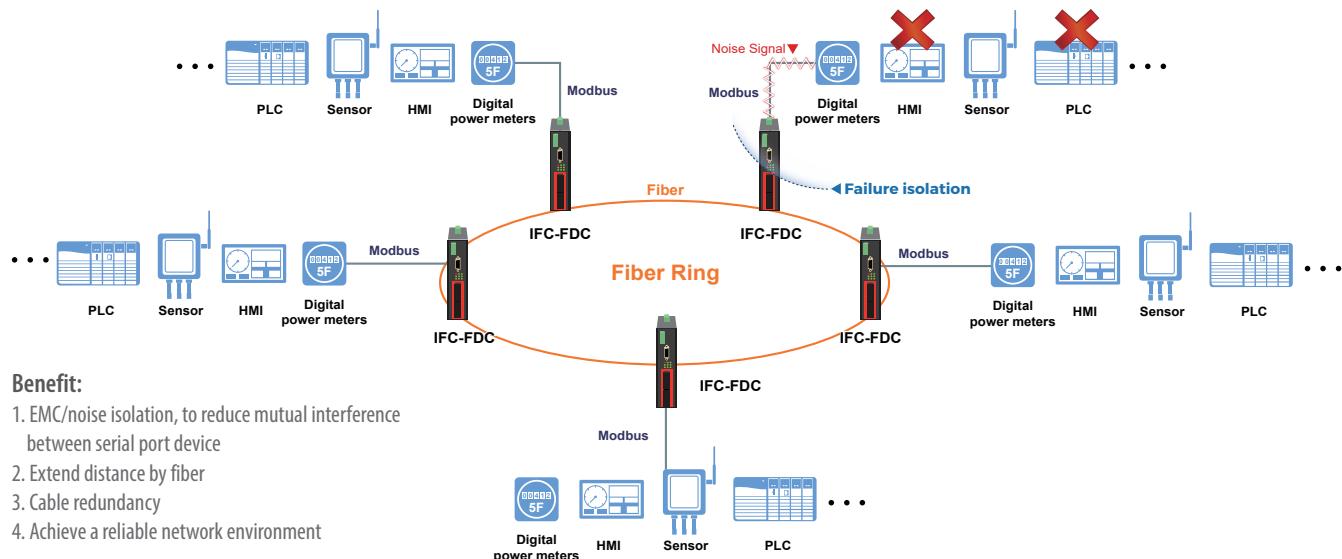


Figure 3 : Redundant Fiber Point to Point topology & application

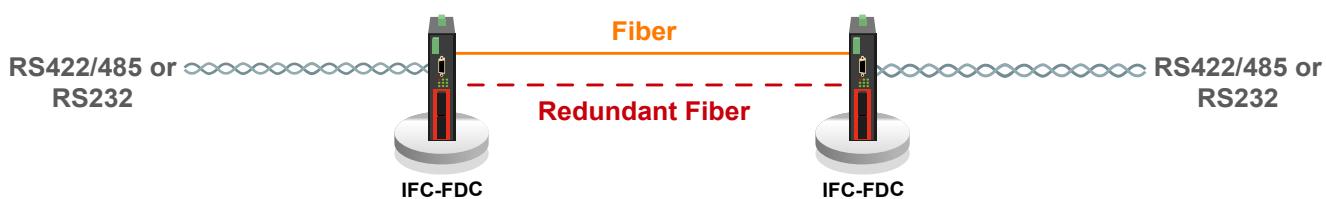


Figure 4 : Fiber Ring Redundancy topology & application

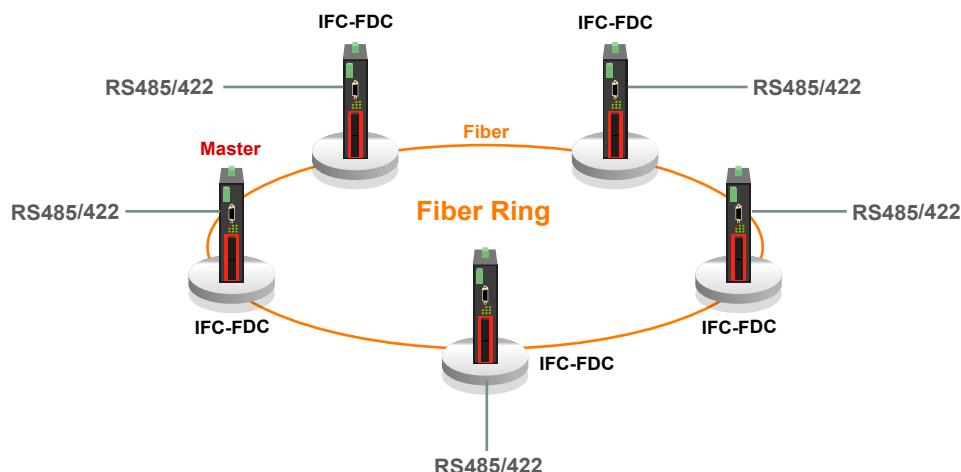
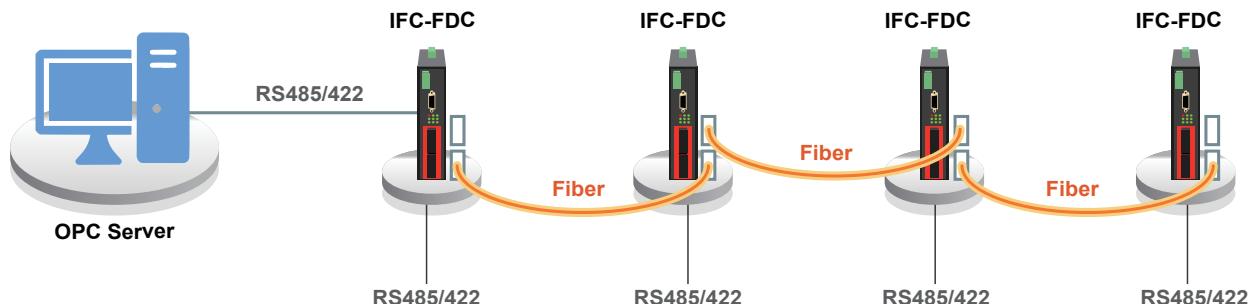
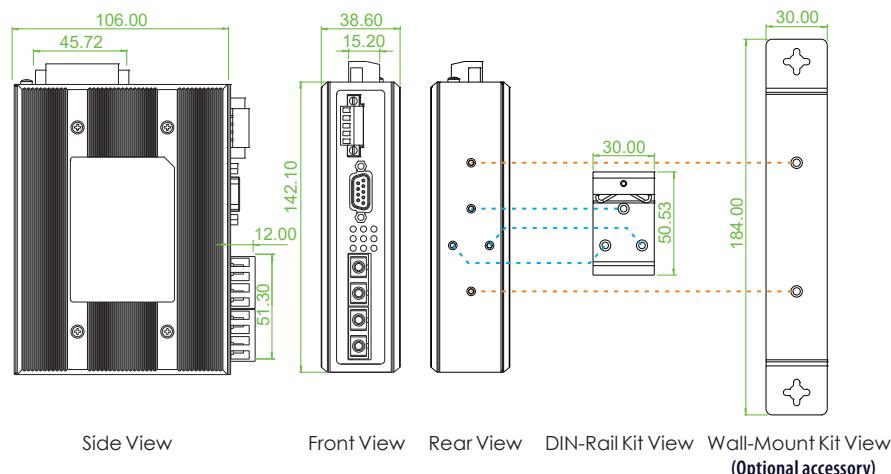


Figure 5 : Fiber Daisy Chain topology & application**Figure 6 : Fiber Point to Point topology & application**

Dimensions



Ordering Information

Model Name	Dual Channel	Serial (ModBus or others)			Fiber	Power Input	Certification	Operating Temperature
		RS232	RS422/485	Isolation 2.5KV				
IFC-FDC	V	2	1	V	2	12/24/48VDC	V	V
IFC-FDC-E	V	2	1	V	2	12/24/48VDC	V	V

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

■ Package List

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

Optional Accessories

■ Wall Mount Kit

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

■ Industrial Power Supply

MDR-20-24	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 24VDC, 24W, -20 ~ +70°C
MDR-40-48	Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C

IFC-BT40

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-BT40 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-BT40 is reliable and an ideal solution for keeping your industrial automation applications running smoothly and continuously even in harsh environments. The IFC-BT40 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)
	Max. DC Load Breaking Capacity
Fiber transmission	Connector type: ST/SC, M/M, S/M or Bidi Optional distance: 2KM (M/M) 30KM (S/M), 20KM (Bidi) Fiber cable M/M : Dual fiber 50/125um, 62.5/125um S/M: Dual fiber 9/125um, 10/125um Bidi: Single fiber cable 9/125um, 10/125um
Removable terminal block connector	Support for Binary input, MSR Relay output, Power input and Alarm
DIP Switch	SW1: BI-1, BI-2 threshold SW2: BI-3, BI-4 threshold SW3: Debounce SW4: Loopback test

Environmental	Operating Temperature -40 ~ 75°C Storage Temperature -40 ~ 85°C Humidity 5 ~ 95% RH
LED Indications	PWR (Green): Power on SYS (Green): Normal operation LNK (Green): Fiber link Test / Alarm: ON: Link down, system loss or Power Error Flash: Local loopback test OFF: Normal operation BI-1~BI-4 (Green): Active K-1~K-4 (Green) : Active
Alarm Relay	Alarm exists for power, fiber link Relay output with carry capacity 1A @ 24VDC
Power	Power Input AC or DC wide range input power 60~300VDC or 60~264VAC input range Power Consumption 3.6W Power Reversal Protection Supported for power input Removable terminal block connector for power input
Mechanical	Water & Dust Proof IP40 Protection, Fanless Dimensions 106 x 62.5 x 135mm (Dx Wx H) Mounting DIN-Rail, or wall mounting (Optional) Weight 815g
Certification	
EMC	CE (EN55032, EN55035)
EMI	FCC Part 15 Subpart B Class A, CE
EMS	EN61000-4-2 ESD Level 3
(Electromagnetic Susceptibility)	EN61000-4-3 RS Level 3
Protection Level	EN61000-4-4 EFT Level 3
Free Fall	EN61000-4-5 Surge Level 3
Vibration	EN61000-4-6 CS Level 3
Shock	IEC 60068-2-31
Green	IEC 60068-2-6
MTBF	IEC 60068-2-27
Warranty	165,680 Hours (MIL-HDBK-217)
	5 years

Application & Topology

Figure 1 : Application connection diagram

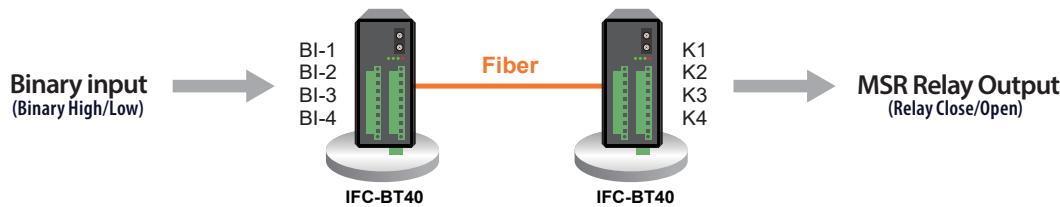
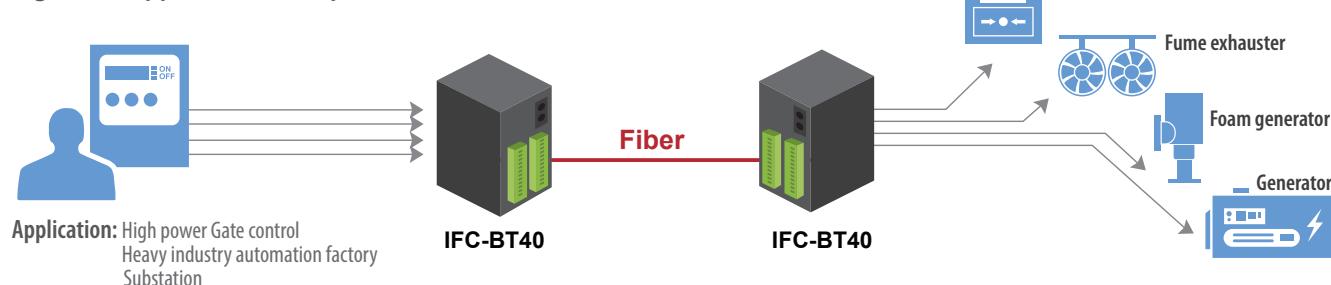
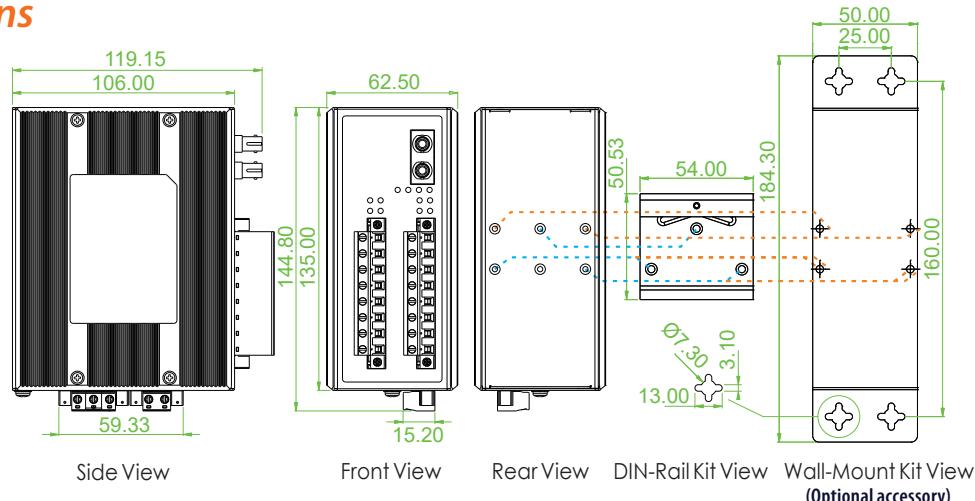


Figure 2 : Application example



Dimensions



Related Product



Ordering Information

Model Name	Input	Output	Fiber transmission	Power Input	Certification	
					CE	FCC
IFC-BT40	4x Channel Binary	4x MSR Contact Relay	1x SC/ST/Bidi	60~264VAC or 60~300VDC	V	V

Package List

- IFC-BT40 device
- Din Rail with screws
- Terminal block

Connector Type | Connectivity Distance

SC,ST	Dual fiber 002: M/M 2km Single fiber 020A: 20KM Bidi mode A 020B: 20KM Bidi mode B Mode A: TX 1310nm/RX1550nm Mode B: TX 1550nm/RX1310nm
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Optional Accessories

■ Wall Mount Kit

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

IEXT101-PH

Long Reach Ethernet & PoE Extender

NEW



- Transmission and remote power feeding up to 800 meters
- PoE power budget up to 30W
- 4KV surge protection for PoE, UTP
- Wide operating temperature range, -40~75°C, for use in harsh environments



CTC's Industrial Grade Ethernet & PoE Extender can extend data and IEEE802.3at PoE+ beyond the standard 100 meters limitation of standard Ethernet. The paired units work in a point-to-point topology over 2 or 4 pair unshielded twisted pair (UTP) cabling up to 800 meters.

The local unit is provided with 55-57VDC and feeds both power and data to the remote unit. The remote unit is then able to provide 10/100Base-TX Ethernet and up to 30 watts via 802.3af/at standard or may be provisioned for 'passive PoE' i.e., always on, for non-standard PoE applications. These devices are ideal when there is no power available at the remote side or where providing power at the remote is difficult or expensive. 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 or utility market applications where environmental conditions exceed commercial product specifications.

Features

- Long distance data transmission and remote power feeding up to 800 meter on 2/4 pair UTP cable (see figure 1)
- Supports standard IEEE802.3af/at or passive PoE devices
- Eliminates the need for any power supply at the remote side
- Quick deployment and easy maintenance

Specifications

Hardware Interfaces	Standard	IEEE 802.3 IEEE 802.3u IEEE 802.3af IEEE 802.3at	10Base-T 100Base-TX PoE PoE+
Network Connector	IEXT101-PH-L (Local unit)	2 pin Terminal Block for power input connector 1 RJ45 for LAN 10/100Base-TX Ethernet port 1 RJ-45 for extension distance and delivery power and communication data to remote unit	
	IEXT101-PH-R (Remote unit)	1 RJ45 for LAN 10/100Base-TX Ethernet and PoE PD, 1 RJ-45 for long distance receiving power and communication data from local unit	
Dip Switch	IEXT101-PH-L (Local unit)	SW 1: Power over line Off: Enable On: Disable SW 2 : Link Fault Pass Through (LFPT) Off: Disable On: Enable SW 3 : Line Speed Off: Auto On: 10M	
	IEXT101-PH-R (Remote unit)	SW 1: PoE for PD Off: Enable On: Disable SW 2 : Link Fault Pass Through (LFPT) Off: Disable On: Enable SW 3 : PoE PD mode Off: Standard PoE On: Passive PoE	
LED	IEXT101-PH-L (Local unit)	Power (Green) Delivery Power Range <15W (Amber), >15W (Green) LFPT (Amber) LAN Link active (Green) Line Speed/Link active 10M(Amber), 100M(Green)	
	IEXT101-PH-R (Remote unit)	Power (Green) PoE Power Range for PD <15W (Amber), >15W (Green) LFPT (Amber) LAN Link active (Green) Line Speed/Link active 10M(Amber), 100M(Green)	
Data rate			
The line speed between IEXT101-PH-L and IEXT101-PH-R will be 10M or 100M that depend on extension length or set by DIP SW.			
The Lan speed of IEXT101-PH-R is same with line speed (extension port). (Please ref figure 1)			
Cable			
2 or 4 pair UTP cable Cat.5e, Cat. 6 (See Table 1 for Transmitting rate and PoE power budget by difference length) (Please ref figure 1)			
Operating Temperature -40°C to 75°C			
Storage Temperature -40°C to 85°C			
Humidity 10% - 95% (non-condensing)			
Power Supply 55~57VDC Input power (2pin Removable Terminal Block)			
Power Consumption IEXT101-PH-L < 3W (Without PoE) 34.5W (With PoE @ 30W) IEXT101-PH-R < 1.5W (Without PoE) 32.5W (With PoE @ 30W)			
Housing Rugged Metal, IP30 Protection and fanless			
Dimensions 102.5 x 52 x 25 mm (D x W x H)			
Weight 175g			
Installation Mounting Wall Mounting			
MTBF 1,561,636Hours (IEXT101-PH-L) 1,591,281Hours (IEXT101-PH-R) (MIL-HDBK-217)			
Certification			
EMC CE (EN55032, EN55035)			
EMI (Electromagnetic Interference) FCC Part 15 Subpart B Class A,CE			
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			
4KV surge protection Supported for PoE, UTP			
Shock IEC 60068-2-27			
Freefall IEC 60068-2-31			
Vibration IEC 60068-2-6			

Extension Distance vs speed /PoE power budget

Cat5e UTP cable

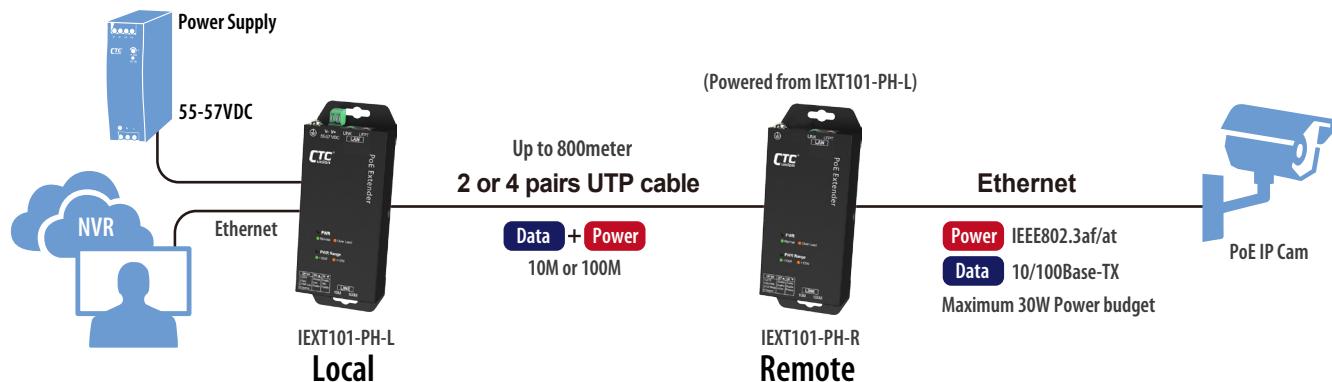
Extension Distance (Meter)	Link speed (Mbps)	Deliver PoE Power budget (maximum Watt)	
		4 Pair UTP	2 Pair UTP
100	100	31.4	28
200	100	29.6	22.4
300	100	27.6	15.2
400	100	24.7	12.2
500	100	20.3	9.8
600	100	17.2	7.9
700	10	15	7.1
800	10	13.2	6.1

Cat6 UTP cable

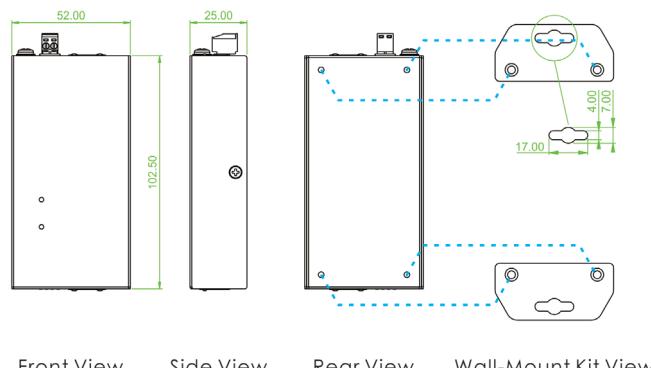
Extension Distance (Meter)	Link speed (Mbps)	Deliver PoE Power budget (maximum Watt)	
		4 Pair UTP	2 Pair UTP
100	100	32.2	28.8
200	100	30.5	25.5
300	100	28.7	16.7
400	100	27	14.7
500	100	24.1	11.8
600	100	20.5	9.9
700	10	17.7	8.7
800	10	16	7.5

Application

► Figure1 : PoE Extending Solution for IP Surveillance Systems

**Dimensions**

IEXT101-PH-L



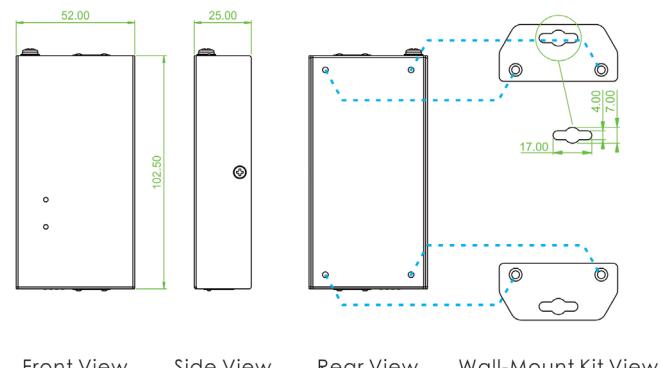
Front View

Side View

Rear View

Wall-Mount Kit View

IEXT101-PH-R



Front View

Side View

Rear View

Wall-Mount Kit View

Ordering Information

Model Name	Ethernet port (Local unit)	Line Port (Extension port)	Ethernet port With PoE (Remote unit)		Power input	Certification	
	10/100 Base-TX	10/100M (Upto 800meter)	10/100Base-TX	Power Budget for PD		CE	FCC
IEXT101-PH-L	1	1			55~57VDC	V	V
IEXT101-PH-R		1	1	5W~30W	Powered from IEXT101-PH-L	V	V

Package List

IEXT101-PH-L

- 1 local unit IEXT101-PH-L device
- 2 pin terminal block
- 2 pcs wall mount bracket and screw

IEXT101-PH-R

- 1 remote unit IEXT101-PH-R device
- 2 pcs wall mount bracket and screw

Note: A complete link requires an IEXT101-PH-L (local) unit and an IEXT101-PH-R (remote) unit.

Optional Accessories**Industrial Power Supply**

NDR-120-48 Industrial Power, Input 90 ~ 264VAC / 127 ~ 370VDC, Output 48 VDC, 120W, -20 ~ +70°C

Note: Please adjust the NDR-120-48 output voltage to 55VDC for better performance.

IEXT101

Long Reach Ethernet Extender

NEW



- Data transmission up to 800 meters
- 4KV surge protection for UTP
- Wide operating temperature range, -40~75°C, for use in harsh environments



CTC's Industrial Grade Ethernet Extender can extend data beyond the standard 100 meters limitation of standard Ethernet. The paired units work in a point-to-point topology over 1 or 2 pair unshielded twisted pair (UTP) cabling up to 800 meters.

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 or utility market applications where environmental conditions exceed commercial product specifications.

12

Features

- Long distance data transmission up to 800 meter on 1/2 pair UTP cable (see figure 1)
- Quick deployment and easy maintenance

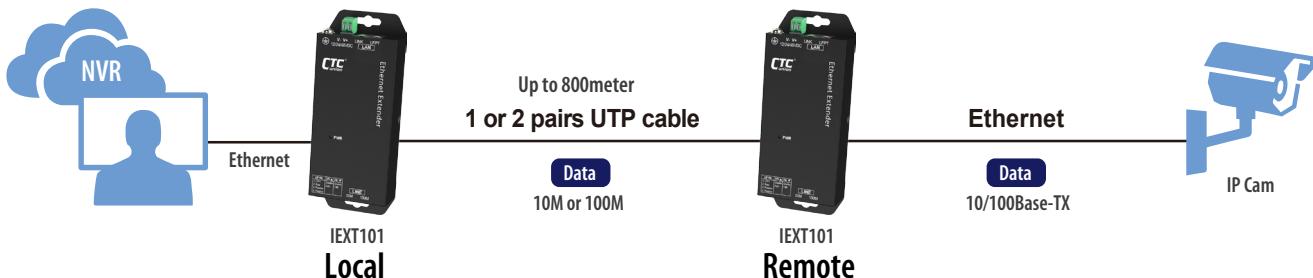
Specifications

Hardware Standard	IEEE 802.3	10Base-T
Interfaces	IEEE 802.3u	100Base-TX
Network Connector		
2 pin Terminal Block for power input connector		
1 RJ45 for LAN 10/100Base-TX Ethernet port		
1 RJ-45 for extension distance and communication data to remote unit		
Dip Switch	SW 1 : Link Fault Pass Through (LFPT)	Off: Disable On: Enable
	SW 2 : Line Speed	Off: Auto On: 10M
LED	Power (Green) LFPT (Amber) LAN Link active (Green) Line Speed/Link active 10M(Amber), 100M(Green)	
Data rate	The line speed between 2 IEXT101 will be 10M or 100M that depend on extension length or set by DIP SW. (Please ref figure 1)	
Cable	1 or 2 pair UTP cable Cat.5e, Cat. 6 (See Table 1 for Transmitting rate by difference length) (Please ref figure 1)	
Operating Temperature	-40°C to 75°C	
Storage Temperature	-40°C to 85°C	
Humidity	10% - 95% (non-condensing)	
Power Supply	12/24/48VDC (9.6~60VDC) Input power (2pin Removable Terminal Block)	
Power Consumption	< 3W	
Housing	Rugged Metal, IP30 Protection and fanless	
Dimensions	102.5 x 52 x 25 mm (D x W x H)	
Weight	170g	
Installation Mounting	Wall Mounting	
MTBF	2,016,859 Hours (MIL-HDBK-217)	

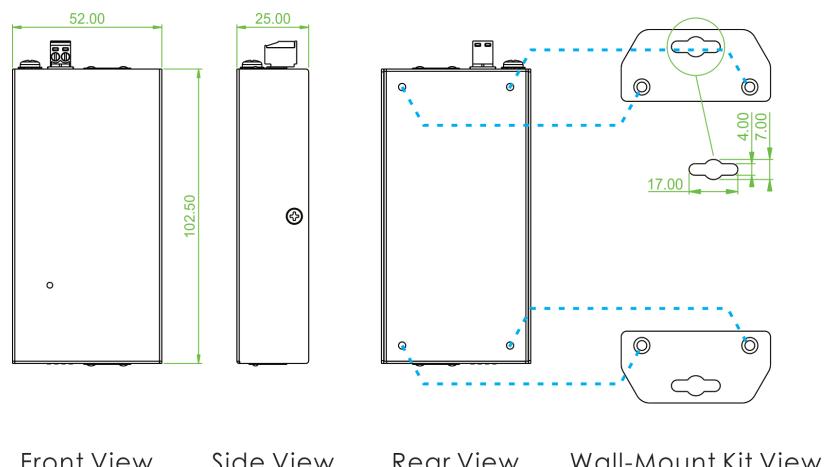
Certification		
EMC	CE (EN55032, EN55035)	
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A,CE	
EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B EN61000-4-3 (RS) Level 3, Criteria A EN61000-4-4 (Burst) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A	
4KV surge protection	Supported for UTP	
Shock	IEC 60068-2-27	
Freefall	IEC 60068-2-31	
Vibration	IEC 60068-2-6	
Extension Distance vs speed		
Cat5e /Cat6 UTP cable		
Extension Distance (Meter)	Link speed (Mbps)	
	2 pairs	1 pairs
100	100	100
200	100	100
300	100	100
400	100	10
500	100	10
600	100	10
700	10	10
800	10	10

Application

► Figure1 : Long distance data transmission application



Dimensions



Ordering Information

Model Name	Ethernet Port	Line Port (Extension port)	Power input	Certification	
	10/100 Base-TX	10/100M (Upto 800meter)		CE	FCC
IEXT101	1	1	12/24/48VDC	V	V

■ Package List

- 1 IEXT101 device
- 2 pin terminal block
- 2 pcs wall mount bracket and screw

Note: IEXT101 are individually packaged and sold. A complete link requires two IEXT101 units.

Optional Accessories

■ Industrial Power Supply

MDR-20-24	Industrial Power, Input 85~264VAC/120~370VDC, Output 48 VDC, 24W, -20 ~ +70°C
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INJ-IX01-PB & INJ-IX01-2PB

- ◀ 1x port Industrial 10M/100M/1G/2.5G/5G/10G IEEE802.3af/at/bt PoE type 4 Injector (90W/port)
- ▶ 2x port Industrial 10M/100M/1G/2.5G/5G/10G IEEE802.3af/at/bt PoE type 4 Injector (180W, 90W/port)



- PoE power budget maximum 90W/port
- Compliant with 10/100/1G/2.5G/5G/10GBase-T(X) & IEEE802.3af/at/bt type 4 PoE



These industrial grade PoE injectors, the INJ-IX01-PB and INJ-IX01-2PB, feature 1/2x port(s) PoE PSE over 10M/100M/1G/2.5G/5G/10G Ethernet. PoE describes a system to pass electrical power safely, along with data, on Ethernet cabling. These injectors support the IEEE802.3bt PoE standard, provides up to 90W of DC power to each PD device, while still maintaining backward compatibility with 802.3af/at PoE standards. 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. 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 1x port IEEE 802.3at/af/bt type 4 PoE Injector (INJ-IX01-PB)
- Provides 2x port IEEE 802.3at/af/bt type 4 PoE Injector (INJ-IX01-2PB)
- Wide operating temperature -40 ~ 75°C
- 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 802.3bz 2.5GBase-T, 5GBase-T IEEE 802.3an 10GBase-T	Operating Humidity	5% to 95% (Non-condensing)															
PoE Standard	IEEE803.3bt, IEEE 802.3at, IEEE802.3af	Storage Temperature	-40 ~ 85°C															
PoE & RJ-45 Pin Assignment	Provides 2/4 pairs PoE Positive (V+): RJ-45 pin 1, 2, 4, 5 Negative (V-): RJ-45 pin 3, 6, 7, 8 Ethernet Data (1, 2, 3, 6, 4, 5, 7, 8)	Housing	Rugged Metal, IP30 Protection and fanless															
Network Connector	Per port provide 1 RJ-45 for Ethernet data, and 1 RJ-45 for Ethernet data with PoE Output power	Dimensions	106 x 38.6 x 152 mm (D x W x H)															
Network Cable	Supports 100 meter for below cable, please see Figure: Above Cat.5e UTP/STP cable for 10/100/1G/2.5GBase-T Above Cat.6 UTP/STP cable for 5GBase-T Above Cat.6A UTP/STP cable for 10GBase-T	Weight	555g (INJ-IX01-PB(E)), 565g (INJ-IX01-2PB(E))															
LED	Per unit: PWR1, PWR2 (Green) for Power status PoE (Green) per port ON : PoE on Blinking : PoE off	Installation Mounting	DIN Rail mounting, and Wall Mounting (Optional)															
Reverse Polarity Protection	Supported for power input	MTBF	3,150,660 Hours (INJ-IX01-PB), 2,165,510 Hours (INJ-IX01-2PB) (MIL-HDBK-217)															
Overload Current Protection	Supported	Warranty	5 years															
Power Supply	Redundant Dual 48V (44~57VDC) Input Power (Removable Terminal Block) Below recommended is for different PoE application 54~57VDC VDC for 90W (4 Pairs) PoE application 52~57VDC for 60W (4 Pairs) PoE application 52~57VDC for 30W (2 Pairs) PoE application 44~57VDC for 15.4W(2 Pairs) PoE application	Certification	CE (EN55032, EN55035) FCC Part 15 Subpart B Class A, CE															
PoE Power Budget	90W/port, total 90W (INJ-IX01-PB) 90W/port, total 180W (INJ-IX01-2PB)	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															
Power Consumption	<table border="1"> <thead> <tr> <th>Model</th> <th>Input Voltage</th> <th>Total Power Consumption</th> <th>Device Power Consumption</th> <th>PoE Power Budget</th> </tr> </thead> <tbody> <tr> <td>INJ-IX01-PB</td> <td>54 VDC</td> <td>94.5W</td> <td>1.5W</td> <td>90W</td> </tr> <tr> <td>INJ-IX01-2PB</td> <td>54 VDC</td> <td>188W</td> <td>1.6W</td> <td>180W</td> </tr> </tbody> </table>	Model	Input Voltage	Total Power Consumption	Device Power Consumption	PoE Power Budget	INJ-IX01-PB	54 VDC	94.5W	1.5W	90W	INJ-IX01-2PB	54 VDC	188W	1.6W	180W	Surge Protection	4KV for PoE and UTP
Model	Input Voltage	Total Power Consumption	Device Power Consumption	PoE Power Budget														
INJ-IX01-PB	54 VDC	94.5W	1.5W	90W														
INJ-IX01-2PB	54 VDC	188W	1.6W	180W														
Removable Terminal Block	Provides 4 Pin for redundant power 1 and Power 2 input connection	Shock	IEC 60068-2-27															
Operating Temperature	-10 ~ 60°C (INJ-IX01-PB, INJ-IX01-2PB) -40 ~ 75°C (INJ-IX01-PBE, INJ-IX01-2PBE)	Freefall	IEC 60068-2-31															
		Vibration	IEC 60068-2-6															

Application

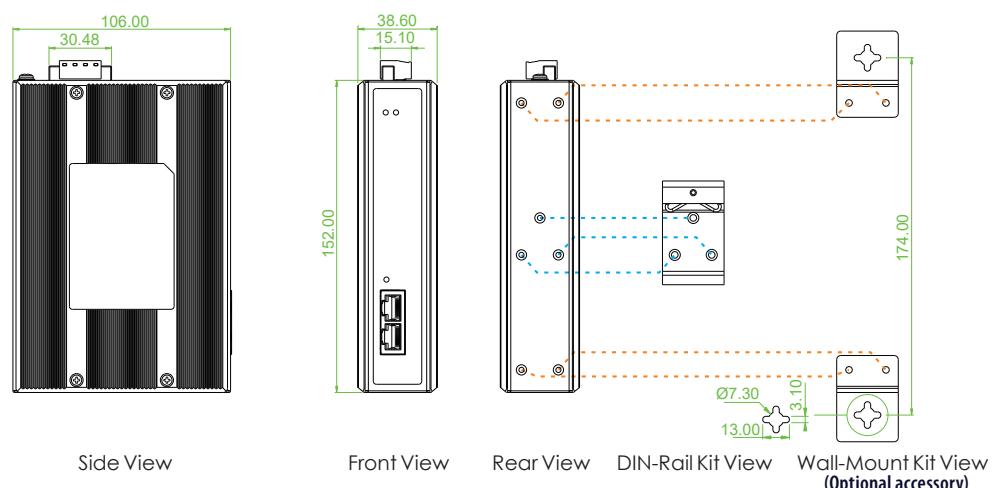
Figure : INJ-IX01-PB Ethernet PoE Injector

Up to 100 Meters

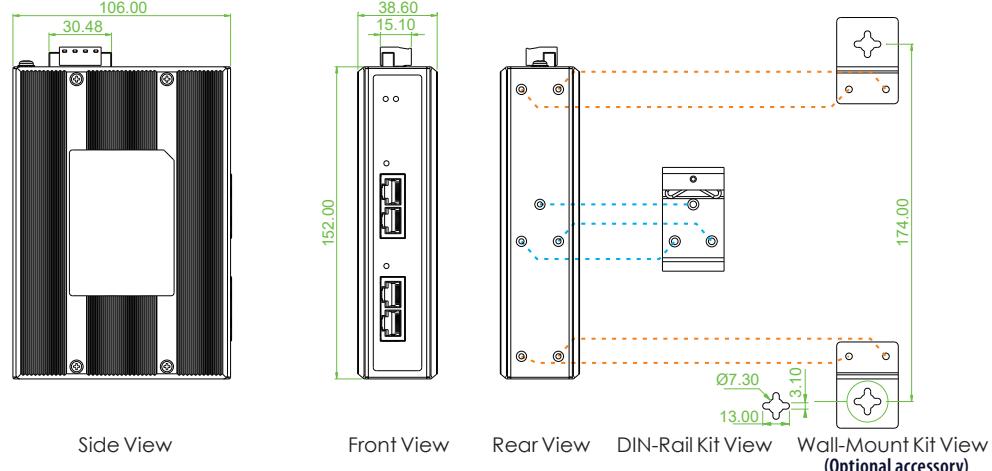


Dimensions

INJ-IX01-PB



INJ-IX01-2PB



Ordering Information

Model Name	Ethernet port	Ethernet with PoE port	Power Input	Certification		Operating Temperature
	10/100M/1G/2.5G/5G/10G Base-T(X)	IEEE802.3af/at/bt (PSE)		Redundant	CE	
INJ-IX01-PB	1	1	90W	48VDC	V	V
INJ-IX01-PBE	1	1	90W	48VDC	V	V
INJ-IX01-2PB	2	2	180W (90W/port)	48VDC	V	V
INJ-IX01-2PBE	2	2	180W (90W/port)	48VDC	V	V

Package List

- PoE injector device
- Terminal block
- Din Rail with screws

Optional Accessories

Wall Mount Kit

IND-WMK05

Wall Mount kit for Industrial product (2pcs in 1 set, 42x30mm)

Industrial Power Supply

NDR-240-48

Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 240W, -20 ~ +70°C (For INJ-IX01-2PB)

NDR-120-48

Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 120W, -20 ~ +70°C (For INJ-IX01-PB)

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



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	Overload Current Protection	Supported									
PoE Standard	IEEE 802.3at, IEEE802.3af	Power Supply	(44~57VDC) Input power (Removable Terminal Block)									
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)	PoE Power Output	Maximum Ultra High Power 60W, IEEE 802.3at 30W, IEEE 802.3at High power 36W, IEEE 802.3af 15.4W									
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	Power Consumption	<table border="1"> <thead> <tr> <th></th> <th>In 30W mode (2 Pairs)</th> <th>In 60W mode (4 Pairs)</th> </tr> </thead> <tbody> <tr> <td>Input Power Consumption (Input 48VDC)</td> <td>31.1W</td> <td>62.8W</td> </tr> <tr> <td>PoE Output Power</td> <td>30W</td> <td>60W</td> </tr> </tbody> </table>		In 30W mode (2 Pairs)	In 60W mode (4 Pairs)	Input Power Consumption (Input 48VDC)	31.1W	62.8W	PoE Output Power	30W	60W
	In 30W mode (2 Pairs)	In 60W mode (4 Pairs)										
Input Power Consumption (Input 48VDC)	31.1W	62.8W										
PoE Output Power	30W	60W										
Network Cable	UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m)	Removable Terminal Block	Provides 2 Pin for power input connectorn									
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.	Operating Temperature	-10 ~ 60°C (INJ-IG01-PH) -40 ~ 75°C (INJ-IG01-PHE)									
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 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 depend 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	Operating Humidity	5% to 95% (Non-condensing)									
Reverse Polarity Protection	Supported for power input	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 (EN55024, EN55032)									
		EMI	FCC Part 15 Subpart B Class A, CE									

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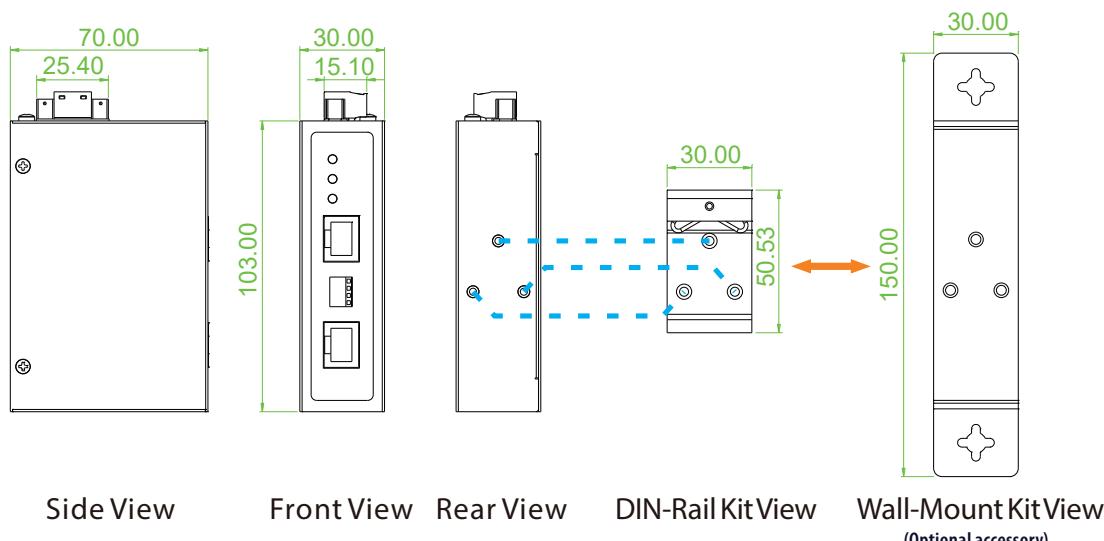
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Application

Figure : INJ-IG01-PH Gigabit Ethernet PoE Injector



Dimensions



Ordering Information

Model Name	Ethernet	PoE Port		Power Input	Certification		Operating Temperature
	10/100/1000 Base-T	IEEE 802.3at (PSE)	Power Budget		CE	FCC	
INJ-IG01-PH	1	1	15/30/36/60	48VDC	V	V	-10~60°C
INJ-IG01-PHE	1	1	15/30/36/60	48VDC	V	V	-40~75°C

Package List

- INJ-IG01-PH device
- Terminal block
- Din Rail with screws

Optional Accessories

Wall Mount Kit

IND-WMK03 Wall Mount kit for Industrial product (Compact, 150x30mm)

Industrial Power Supply

MDR-40-48 Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C (For 30W@2pair application)

NDR-120-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 120W, -20 ~ +70°C (For 60W@4pair application)

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)



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

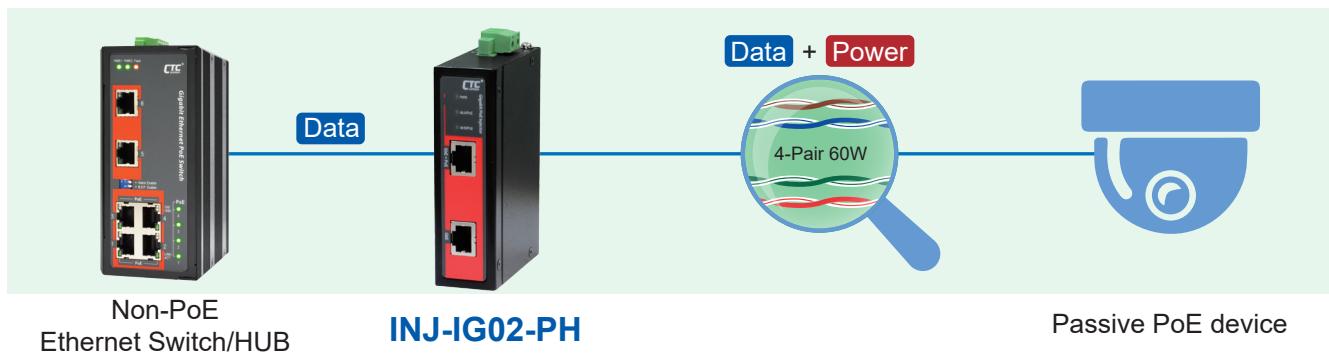
- 1 port Passive PoE Injector
- 24 or 48VDC Power input
- Maximum PoE budget 30W (2-pair), 60W (4-pair)
- Wide operating temperature -40 ~ 75°C (INJ-IG02-PHE)
- IP30 rugged metal housing and fanless

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 (EN55024, EN55032)
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A CE EN55022 Class A
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



Ordering Information

Model Name	Ethernet	PoE Port		Power Input	Certification		Operating Temperature
	10/100/1000Base-T	IEEE 802.3at	Power Budget	Single Power	CE	FCC	
INJ-IG02-PH	1	1	15/30/60W	24/48VDC	V	V	-10~60°C
INJ-IG02-PHE	1	1	15/30/60W	24/48VDC	V	V	-40~75°C

■ Package List

- INJ-IG02-PH device
- Terminal block
- Din Rail with screws

Optional Accessories

■ Wall Mount Kit

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

■ Industrial Power Supply

MDR-40-48 Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C (For 48VDC /30W output application)

NDR-120-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 120W, -20 ~ +70°C (For 48VDC /60W@4 pair output application)

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/60W/72W select by DIP SW
- Compliant with 10/100/1000Base-T(X) & IEEE802.3af/at PoE



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	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 Standard	IEEE 802.3at, IEEE 802.3af	PoE Power Budget	Maximum Ultra High Power 60W, IEEE 802.3at 30W, IEEE 802.3at High power 36W, IEEE 802.3af 15.4W INJ-IG60-24 in 30W mode (2 Pair)																					
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)	Power Consumption	<table border="1"> <thead> <tr> <th>Input Voltage</th><th>Input Power Consumption</th><th>Device Power Consumption</th><th>PoE Power Budget</th><th>Boost Efficiency</th></tr> </thead> <tbody> <tr> <td>12VDC</td><td>33.9W</td><td>1.1W</td><td>30W</td><td>91.46%</td></tr> <tr> <td>24VDC</td><td>33W</td><td>1.4W</td><td>30W</td><td>94.90%</td></tr> <tr> <td>48VDC</td><td>33.2W</td><td>1.9W</td><td>30W</td><td>95.80%</td></tr> </tbody> </table>	Input Voltage	Input Power Consumption	Device Power Consumption	PoE Power Budget	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%	
Input Voltage	Input Power Consumption	Device Power Consumption	PoE Power Budget	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%																				
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	INJ-IG60-24 in 60W mode (4 Pair)																						
Network Cable	UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m)	<table border="1"> <thead> <tr> <th>Input Voltage</th><th>Input Power Consumption</th><th>Device Power Consumption</th><th>PoE Power Budget</th><th>Boost Efficiency</th></tr> </thead> <tbody> <tr> <td>12VDC</td><td>67.1W</td><td>1.1W</td><td>60W</td><td>90.90%</td></tr> <tr> <td>24VDC</td><td>65.2W</td><td>1.4W</td><td>60W</td><td>94.10%</td></tr> <tr> <td>48VDC</td><td>64.7W</td><td>1.9W</td><td>60W</td><td>95.50%</td></tr> </tbody> </table>			Input Voltage	Input Power Consumption	Device Power Consumption	PoE Power Budget	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%
Input Voltage	Input Power Consumption	Device Power Consumption	PoE Power Budget	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%																				
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	Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC																					
DIP SW	<table border="1"> <tr> <td>SW1</td><td>ON: Alt B mode (4,5,7,8) OFF: Alt A mode (1,2,3,6)</td> </tr> <tr> <td>SW2</td><td>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)</td> </tr> <tr> <td>SW3</td><td>ON: 4 Pair PoE Pin Ultra-High Power 60W/72W PoE Output OFF: 2 Pair PoE Pin depend on DIP SW 1,2</td> </tr> <tr> <td>SW4</td><td>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</td> </tr> </table>	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 depend 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	Removable Terminal Block	Provides 2 redundant power, alarm relay contact, 6 Pin													
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 depend 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	Operating Temperature	-10 ~ 60°C (INJ-IG60-24) -40 ~ 75°C (INJ-IG60-E24)																					
Overload Current Protection	Supported	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																					

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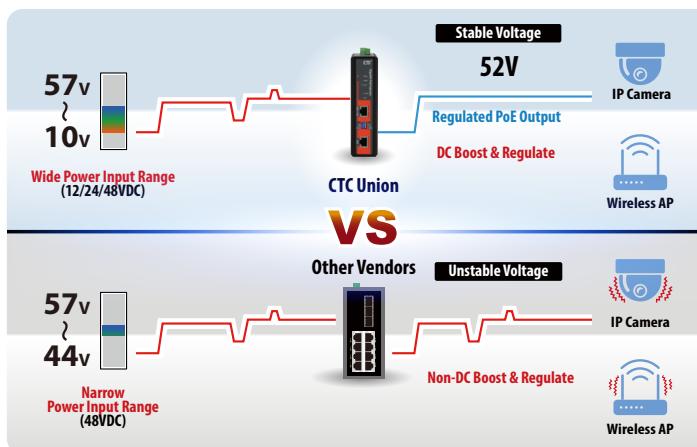
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Application

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

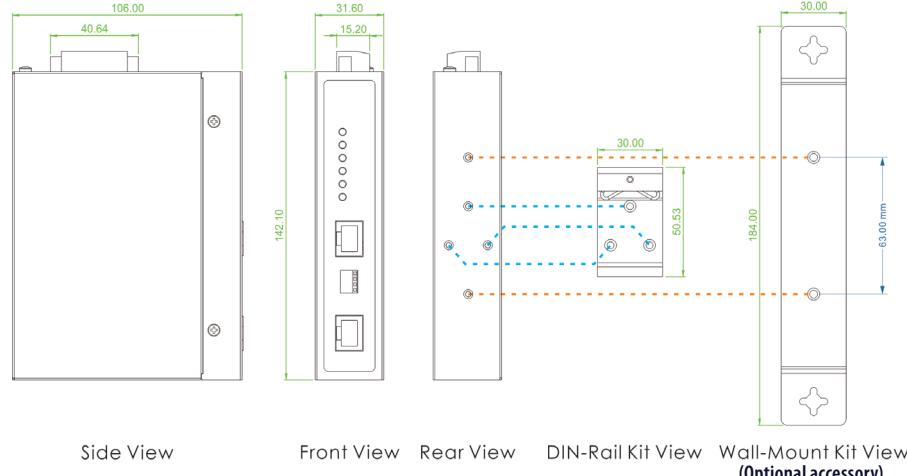


Figure 2 : Very high efficiency boost technology for PoE



- 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



Ordering Information

Model Name	Ethernet	PoE Port	Power Input	Certification	Operating Temperature	
INJ-IG60-24	10/100/1000Base-T	IEEE 802.3at (PSE)	Power Budget 15/30/36/60/72W	Redundant 12/24/48VDC	V V	-10~60°C
INJ-IG60-E24	1	1	15/30/36/60/72W	12/24/48VDC	V V	-40~75°C

Optional Accessories

■ Wall Mount Kit

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

■ Industrial Power Supply

MDR-40-48 Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 40W, -20 ~ +70°C (For 30W@2pair application)
NDR-120-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 120W, -20 ~ +70°C (For 60W@4pair application)

■ Package List

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

INJ-SPL01

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



- 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

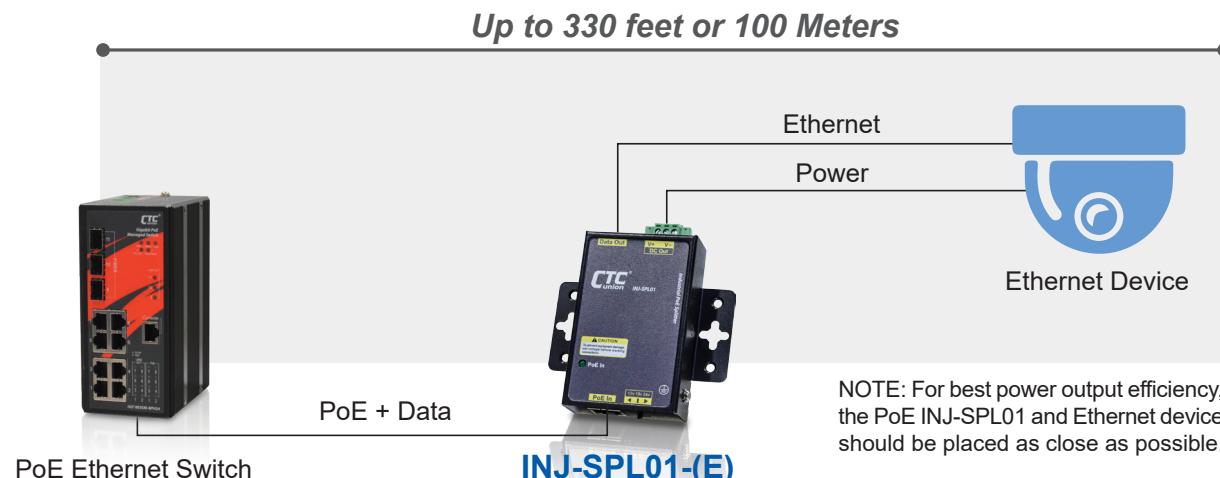
- Splits power and data from PoE Input
- Supports PoE IEEE802.3af/at A mode (1,2,3,6) or B mode (4,5,7,8)
- Selectable output voltage, 12/19/24VDC select by slide SW
- Supports output power upto 12VDC/1.4A, 19VDC/1.05A, or 24VDC/0.85A
- Compliant with 10/100/1000Base-T(X)
- CE, FCC, Railway traffic EN50121-4 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

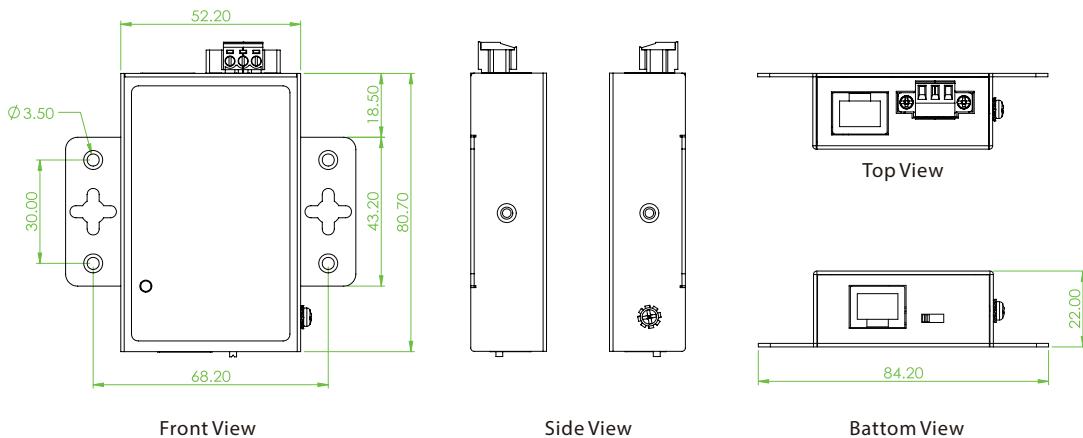
IEEE Standard	IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX Fast Ethernet IEEE 802.3ab 1000Base-T Gigabit Ethernet IEEE802.3af PoE (Power over Ethernet) IEEE802.3at PoE+ (Power over Ethernet enhancements)		Housing	Rugged Metal, IP30 Protection and fanless
PoE In	PoE Standard	PoE Standard IEEE 802.3af, IEEE802.3at	Dimensions	22 x 84.2 x 80.7 mm (D x W x H)
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)	Weight	85g
Output voltage & power	12, 19, 24VDC select by slide switch 12VDC: 1.4A, 19VDC: 1.05A, 24VDC: 0.85A with Removable terminal block		Installation Mounting	Wall Mounting
Data out	RJ45 10/100/1000Base-T(X)		MTBF	3,371,427 Hours (MIL-HDBK-217)
Network Cable	UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m)		Warranty	5 years
LED	PoE in (Green)		Certification	
Power Supply	Powered from PoE in, IEEE802.3af/at 44~57VDC, 30W Max		EMC	CE (EN55032, EN55035)
Output Power	12VDC, 1.4A (max) 19VDC, 1.05A (max) 24VDC, 0.85A (max)		EMI	FCC Part 15 Subpart B Class A, CE
Operating Temperature	-10 ~ 60°C (INJ-SPL01) -40 ~ 75°C (INJ-SPL01-E)		Railway Traffic	EN50121-4
Operating Humidity	5% to 95% (Non-condensing)		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
Storage Temperature	-40 ~ 85°C		Shock	IEC 60068-2-27
			Freefall	IEC 60068-2-31
			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	10/100/1000Base-T(X)	Output Voltage selectable 12/19/24VDC	EN50121-4	CE	FCC	
INJ-SPL01	1	1	1	V	V	V	V	-10~60°C
INJ-SPL01-E	1	1	1	V	V	V	V	-40~75°C

■ Package List

- INJ-SPL01 device
- Terminal block

INJ-IG03-PH

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



- 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 IEEE802.3af/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

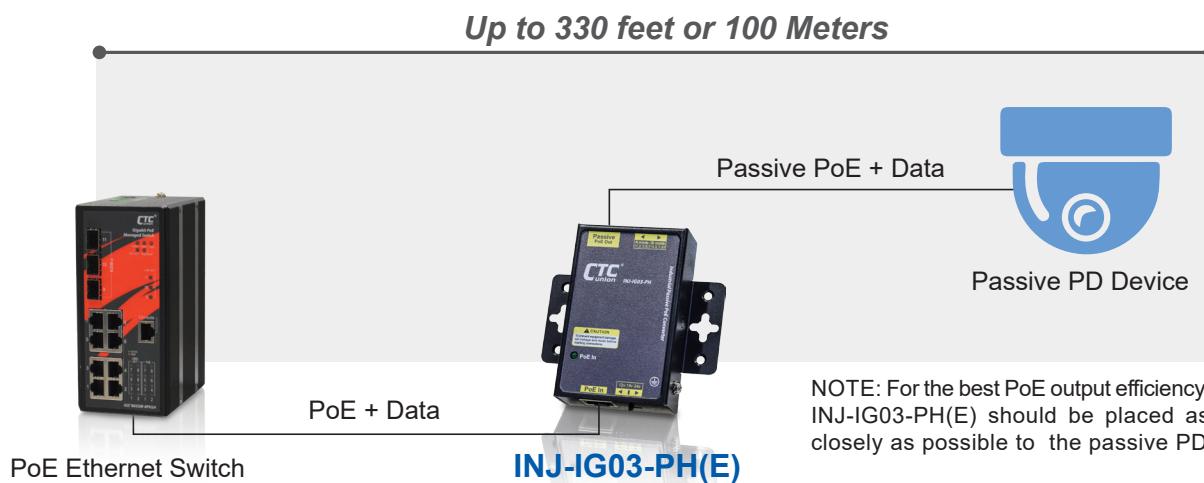
- Converts 48V IEEE802.3af/at PoE Input to 12/19/24V Passive PoE Output (Figure 1)
- Supports input PoE IEEE802.3af/at A mode (1,2,3,6) or B mode (4,5,7,8)
- Selectable passive PoE output voltage, 12/19/24VDC select by slide SW
- Selectable passive PoE output mode, A mode (1,2,3,6,) or B mode (4,5,7,8) 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 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 (EN55032, EN55035)	
EMI	FCC Part 15 Subpart B Class A, CE	
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 60068-2-31	
Vibration	IEC 60068-2-6	

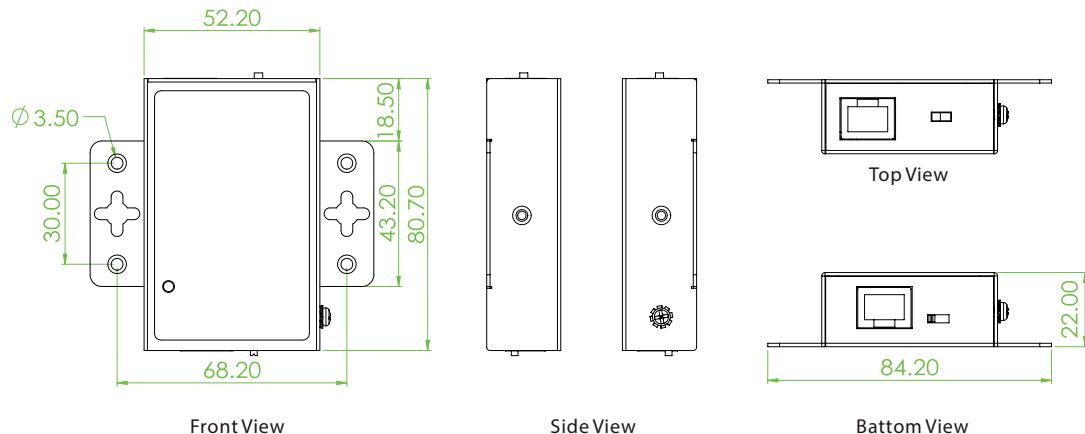
Application

Figure : INJ-IG03-PH application topology



NOTE: For the best PoE output efficiency, INJ-IG03-PH(E) should be placed as closely as possible to the passive PD.

Dimensions



Ordering Information

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

■ Package List

- INJ-IG03-PH device

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°C
ISFP-M9000-85-DE	MM	300m (OM3)	850	-6.5 ~ -1	-9.9	3.4	-1	1W	V	-40 ~ 85°C
ISFP-S9010-31-D	SM	10km	1310	-8 ~ 0.5	-14.4	6.4	0.5	1W	V	-10 ~ 70°C
ISFP-S9010-31-DE	SM	10km	1310	-8 ~ 0.5	-14.4	6.4	0.5	1W	V	-40 ~ 85°C
ISFP-S9040-31-D	SM	40km	1310	0.5 ~ 5	-15.5	16	0.5	1W	V	-10 ~ 70°C
ISFP-S9040-31-DE	SM	40km	1310	0.5 ~ 5	-15.5	16	0.5	1W	V	-40 ~ 85°C
ISFP-S9040-55-D	SM	40km	1550	-2 ~ 4	-15.8	13.8	0.5	1W	V	-10 ~ 70°C
ISFP-S9040-55-DE	SM	40km	1550	-2 ~ 4	-15.8	13.8	0.5	1W	V	-40 ~ 85°C

10Gbps 10GBase-T UTP SFP



Model Name	Cable Type	Typical Distance	Operating Temperature	Power Consumption
ISFP-T9T00-00-E	UTP Cat 6A	30m	-40 ~ 85°C	3.1W

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°C
ISFP-M7000-85-DE	MM	550m	850	-9.5 ~ -4	-17	7.5	-3	1W	V	-40 ~ 85°C
ISFP-M7002-31-D	MM	2km	1310	-9 ~ -1	-19	10	-1	1W	V	-10 ~ 70°C
ISFP-M7002-31-DE	MM	2km	1310	-9 ~ -1	-19	10	-1	1W	V	-40 ~ 85°C
ISFP-S7020-31-D	SM	20km	1310	-8 ~ -2	-23	15	-1	1W	V	-10 ~ 70°C
ISFP-S7020-31-DE	SM	20km	1310	-8 ~ -2	-23	15	-1	1W	V	-40 ~ 85°C
ISFP-S7040-31-D	SM	40km	1310	-2 ~ 3	-23	21	-3	1W	V	-10 ~ 70°C
ISFP-S7040-31-DE	SM	40km	1310	-2 ~ 3	-23	21	-3	1W	V	-40 ~ 85°C
ISFP-S7020-WA-D	SM (BiDi)	20km	T1310 / R1550	-8 ~ -2	-23	15	-2	1W	V	-10 ~ 70°C
ISFP-S7020-WB-D	SM (BiDi)	20km	T1550 / R1310	-8 ~ -2	-23	15	-2	1W	V	-10 ~ 70°C
ISFP-S7020-WA-DE	SM (BiDi)	20km	T1310 / R1550	-8 ~ -2	-23	15	-2	1W	V	-40 ~ 85°C
ISFP-S7020-WB-DE	SM (BiDi)	20km	T1550 / R1310	-8 ~ -2	-23	15	-2	1W	V	-40 ~ 85°C
ISFP-S7040-WA-D	SM (BiDi)	40km	T1310 / R1550	-3 ~ 2	-23	20	-3	1W	V	-10 ~ 70°C
ISFP-S7040-WB-D	SM (BiDi)	40km	T1550 / R1310	-3 ~ 2	-23	20	-3	1W	V	-10 ~ 70°C
ISFP-S7040-WA-DE	SM (BiDi)	40km	T1310 / R1550	-3 ~ 2	-23	20	-3	1W	V	-40 ~ 85°C
ISFP-S7040-WB-DE	SM (BiDi)	40km	T1550 / R1310	-3 ~ 2	-23	20	-3	1W	V	-40 ~ 85°C
ISFP-S7060-WA-D	SM (BiDi)	60km	T1310 / R1550	0 ~ 5	-24	24	-1	1W	V	-10 ~ 70°C
ISFP-S7060-WB-D	SM (BiDi)	60km	T1550 / R1310	0 ~ 5	-24	24	-1	1W	V	-10 ~ 70°C
ISFP-S7060-WA-DE	SM (BiDi)	60km	T1310 / R1550	0 ~ 5	-24	24	-1	1W	V	-40 ~ 85°C
ISFP-S7060-WB-DE	SM (BiDi)	60km	T1550 / R1310	0 ~ 5	-24	24	-1	1W	V	-40 ~ 85°C

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°C
ISFP-T7T00-00-E	UTP Cat 5e	100m	1.1W	-40 ~ 85°C

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

NDR-480-48

Output 48VDC, 480W

NDR-240-48

Output 48VDC, 240W

NDR-120-48

Output 48VDC, 120W

MDR-40-48

Output 48VDC, 40W

MDR-20-24

Output 24VDC, 20W



Having reliable and stable power for your industrial grade switches or converters is the best way to improve reliability and keep any down time to a minimum. CTC Union's safety certified AC to DC power supplies that are 100% compatible with all of our industrial grade switches and converters.

Features

- The series of industrial grade power supply have been fully tested with our industrial product for guaranteed compatibility and performance
- Universal AC input voltage range
- Protections: Short circuit / Overload / Over voltage/Over temperature
- Cooling by free air convection
- UL508, TUV, CB, CE safety approved
- Heavy industry grade EMS EN61000-6-2 approved
- 3 years warranty

Specifications

Model Name	NDR-480-48	NDR-240-48	NDR-120-48
Output	Dc Voltage	48V	48V
	Rated Current	10A	5A
	Current Range	0~5A	0~5A
	Rated Power	480W	240W
	Output Voltage Adj. Range	48~55VDC	48~55VDC
Input	Voltage Range	90 ~ 264VAC / 127 ~ 370VDC	90 ~ 264VAC / 127 ~ 370VDC
	Frequency Range	47 ~ 63Hz	47 ~ 63Hz
	Efficiency (Typ.)	92.5%	90%
Protection	Overload	105 ~ 130% rated output power Protection type : Constant current limiting, unit will shut down after 3 sec, re-power on to recover	105 ~ 130% rated output power Protection type : Constant current limiting, recovers automatically after fault condition is removed
	Over Voltage	56 ~ 65V Protection type : Shut down o/p voltage, re-power on to recover	56 ~ 65V Protection type : Shut down o/p voltage, re-power on to recover
	Over Temperature	Shut down o/p voltage, recovers automatically after temperature goes down	Shut down o/p voltage, recovers automatically after temperature goes down
Indicator	LED	DC OK	DC OK
Housing	Dimension	128.5 x 85.5 x 125.2mm (D x W x H)	113.5 x 63 x 125.2 mm (D x W x H)
	Installation Mounting	DIN Rail	DIN Rail
Environment	Working Temp	-20 ~ 70°C	-20 ~ 70°C
	Working Humidity	20 ~ 95% RH non-condensing	20 ~ 95% RH non-condensing
	Storage Temp., Humidity	-40 ~ 85°C , 10 ~ 95% RH	-40 ~ 85°C , 10 ~ 95% RH
	Vibration	Compliance to IEC60068-2-6	Compliance to IEC60068-2-6

Safety & EMC	Safety Standards	UI508, TUV BS EN/EN62368-1	UI508, TUV BS EN/EN62368-1	UI508, TUV BS EN/EN62368-1
	Withstand Voltage	I/P-O/P:3KVAC, I/P-FG:2KVAC, O/P-FG: 0.5KVAC	I/P-O/P:3KVAC, I/P-FG:2KVAC, O/P-FG: 0.5KVAC	I/P-O/P:3KVAC, I/P-FG:2KVAC, O/P-FG: 0.5KVAC
	Isolation Resistance	I/P-O/P, I/P-FG, O/P-FG >100M Ohm /500VD@25°C/ 70% RH	I/P-O/P, I/P-FG, O/P-FG >100M Ohm /500VD@25°C/ 70% RH	I/P-O/P, I/P-FG, O/P-FG >100M Ohm /500VD@25°C/ 70% RH
	EMC Emission	Compliance to EN55032 (CISPR32), EN61204-3 Class B, EN61000-3-2, -3	Compliance to EN55032 (CISPR32), EN61204-3 Class B, EN61000-3-2, -3	Compliance to EN55032 (CISPR32) Class B, EN61000-3-2,-3
	EMC Immunity	Compliance to EN61000-4-2, 3, 4, 5, 6, 8, 11, EN55035, EN61000-6-2, EN61204-3, heavy industry level, criteria A	Compliance to EN61000-4-2, 3, 4, 5, 6, 8, 11, EN55035, EN61000-6-2, EN61204-3, heavy industry level, criteria A	Compliance to EN61000-4-2, 3, 4, 5, 6, 8, 11, EN55035, EN61000-6-2, (EN50082-2), heavy industry level, criteria A
Others	PFC	PF>0.98/115VAC, PF>0.94/230VAC at full load	Built in Active PFC	
	MTBF	146.8K Hours MIL-HDBK-217F (25°C)	230.2K Hours MIL-HDBK-217F (25°C)	453.3K Hours MIL-HDBK-217F (25°C)
	Warranty	3 Years	3 Years	3 Years

	Model Name	MDR-40-48	MDR-20-24
Output	Dc Voltage	48V	24V
	Rated Current	0.83A	1A
	Current Range	0 ~ 0.83A	0~1A
	Rated Power	39.8W	24W
	Output Voltage Adj. Range	48 ~ 56VDC	21.6~26.4VDC
Input	Voltage Range	85 ~ 264VAC / 120 ~ 370VDC	85 ~ 264VAC / 120 ~ 370VDC
	Frequency Range	47 ~ 63Hz	47 ~ 63Hz
	Efficiency (Typ.)	88%	84%
Protection	Overload	105 ~ 150% rated output power Protection type : Constant current limiting, recovers automatically after fault condition is removed	105 ~ 160% rated output power Protection type : Constant current limiting, recovers automatically after fault condition is removed
	Over Voltage	57.6~64.8VDC Protection type : Shut off o/p voltage, re-power on to recover	27.6~32.4V Protection type : Shut down o/p voltage, re-power on to recover
Alarm Relay	DC OK Relay	DC OK Relay will Close In Normal, Relay contact rating(max.) : 30V/1A resistive	DC OK Relay will Close In Normal, Relay contact rating(max.) : 30V/1A resistive
Indicator	LED	DC OK	DC OK
Housing	Dimension	100 x 40 x 90mm (D x W x H)	100 x 22.5 x 90mm (D x W x H)
	Installation Mounting	DIN Rail	DIN Rail
Environment	Working Temp	-20 ~ 70°C	-20 ~ 70°C
	Working Humidity	20 ~ 90% RH non-condensing	20 ~ 90% RH non-condensing
	Storage Temp., Humidity	-20 ~ 85°C , 10 ~ 95% RH	-40 ~ 85°C , 10 ~ 95% RH
	Vibration	Compliance to IEC60068-2-6	Compliance to IEC60068-2-6
Safety & EMC	Safety Standards	UL508, UL62368-1, TUV EN62368-1,Class I, Div. 2 Group A, B, C, D Hazardous Locations T4	UL508, TUV EN62368-1
	Withstand Voltage	I/P-O/P:3KVAC, I/P-FG:2KVAC, O/P-FG:0.5KVAC	I/P-O/P:3KVAC, I/P-FG:2KVAC, O/P-FG:0.5KVAC
	Isolation Resistance	I/P-O/P, I/P-FG, O/P-FG >100M Ohm /500VD@25°C/ 70% RH	I/P-O/P, I/P-FG, O/P-FG >100M Ohm /500VD@25°C/ 70% RH
	EMC Emission	Compliance to EN55032 (CISPR32), EN61204-3 Class B, EN61000-3-2, -3	Compliance to EN55011, EN55032 (CISPR32), EN61204-3 Class B, EN61000-3-2,-3
	EMC Immunity	Compliance to EN61000-4-2, 3, 4, 5, 6, 8, 11, EN55035, EN61000-6-2 (EN50082-2), heavy industry level, criteria A	Compliance to EN61000-4-2, 3, 4, 5, 6, 8, 11, EN55035, EN61000-6-2, EN61204-3, heavy industry level, criteria A
Others	PFC		
	MTBF	301.7K hrs MIL-HDBK-217F (25°C)	236.9K Hours MIL-HDBK-217F (25°C)
	Warranty	3 Years	3 Years

Ordering Information

Model Name	Input Voltage Range	Output Voltage	Output Voltage Adj. Range	Output Power	Operating Temperature
NDR-480-48	90 ~ 264VAC / 127 ~ 370VDC	48VDC	48~55VDC	480W	-20 ~ 70°C
NDR-240-48	90 ~ 264VAC / 127 ~ 370VDC	48VDC	48~55VDC	240W	-20 ~ 70°C
NDR-120-48	90 ~ 264VAC / 127 ~ 370VDC	48VDC	48~55VDC	120W	-20 ~ 70°C
MDR-40-48	85 ~ 264VAC / 120 ~ 370VDC	48VDC	48~56VDC	40W	-20 ~ 70°C
MDR-20-24	85 ~ 264VAC / 120 ~ 370VDC	24VDC	21.6~26.4VDC	24W	-20 ~ 70°C