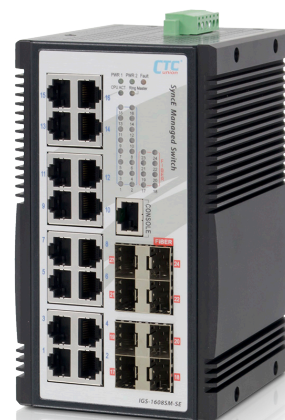


# IGS-1608SM-SE

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
- ▲ UL60950-1, EN60950-1, EN62368-1, EN50121-4, EN61000-6-2, EN61000-6-4, CE and FCC certified



The industrial grade of synchronization Ethernet switch IGS-1608SM-SE with 16 Gigabit UTP ports and 8 100/1000 SFP slots, supports timing synchronization features of SyncE and IEEE1588 PTP that allow operators to deliver services with optimal stability and continuity in end to end connectivity. It provides a variety of functions of power input redundancy, link redundancy of STP/RSTP/MSTP/ERPS and a proprietary ring protocol, it features IGMP, VLAN QoS, ACL bandwidth control and port mirroring. Fanless and rugged enclosure specifically designed for harsh network environments.

## 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 EMS Management

## Specifications

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

# Industrial GbE Switch with SyncE

Standard	IEEE 802.1ad	Stacked VLANs, Q-in-Q								
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization								
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)								
	IEEE 802.3az	EEE (Energy Efficient Ethernet)								
VLAN ID	4094	IEEE 802.1Q VLAN VID								
Switch Architecture	Back-plane (Switching Fabric): 48Gbps (Full wire-speed)									
Data Processing	Store and Forward									
Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode									
Network Connector	16x 10/100/1000Base-T RJ-45+ 8x 100/1000Base-X SFP									
	RJ-45 UTP port supports Auto negotiation speed, Auto MDI/MDI-X function									
	SFP port supports 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									
Reverse Polarity Protection	Supported									
Overload Current Protection	Supported									
CPU Watch Dog	Supported									
Power Consumption	<table border="1"> <thead> <tr> <th>Input Voltage</th> <th>IGS-1608SM-SE</th> </tr> </thead> <tbody> <tr> <td>12 VDC</td> <td>17W</td> </tr> <tr> <td>24 VDC</td> <td>17.8W</td> </tr> <tr> <td>48 VDC</td> <td>20.2W</td> </tr> </tbody> </table>		Input Voltage	IGS-1608SM-SE	12 VDC	17W	24 VDC	17.8W	48 VDC	20.2W
	Input Voltage	IGS-1608SM-SE								
	12 VDC	17W								
	24 VDC	17.8W								
48 VDC	20.2W									
Power Supply	Redundant Dual DC 12/24/48V (9.6~60VDC) Input power									
	Removable Terminal Block for input power connector									
LED	System: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow)									
	UTP: 10/100 Link/Active (Green), 1000 Link/Active (Amber)									
	SFP Slot: Link/Active (Green)									
Jumbo Frame	9.6KB									
IEEE 802.3ac	Max frame size extended to 1522Bytes (allow Q-tag in packet)									
MAC Address Table	8K									
Memory Buffer	512K Bytes for packet buffer									
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-1608SM-SE)									
	-40 ~ 75°C (IGS-1608SM-SE-E)									
Operating Humidity	5% to 95% (Non-condensing)									
Storage Temperature	-40 ~ 85°C									
Housing	Rugged Metal, IP30 Protection, Fanless									
Dimensions	116 x 92 x 160 mm (Dx Wx H)									
Weight	1.35kg									
Installation Mounting	DIN Rail mounting, or wall mounting (optional)									
MTBF	431,610 Hours (MIL-HDBK-217)									
Warranty	5 years									

## Certification

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

EMS (Electromagnetic Susceptibility) Protection Level	EN61000-4-2 (ESD) Level 3, Criteria B
	EN61000-4-3 (RS) Level 3, Criteria A
	EN61000-4-4 (Burst) Level 3, Criteria A
	EN61000-4-5 (Surge) Level 3, Criteria B
	EN61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Hipot	DC 2.25KV for power to chassis ground, Ethernet ports to chassis ground
Surge Protection	4KV for UTP and Fiber ports
Safety	UL60950-1, EN60950-1, 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 Aggregation Trunk)	Static (Hash with SA, DA, IP, TCP/UDP port), Maximum trunk group : 12group
	Dynamic (IEEE 802.3ad LACP), Maximum trunk group : 12group
	Per group up-to 8 port
Spanning Tree	IEEE 802.1d STP
	IEEE 802.1w RSTP
	IEEE 802.1s MSTP
Multiple $\mu$ -Ring	Up to 5 instances that each supports $\mu$ -Ring, $\mu$ -Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings.
	Recovery time <10ms
	The maximum number of devices in the ring supports 250 nodes.
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	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
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## 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
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 UI	Supported
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	Supports 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master and Slave
NTP, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol LLDP-MED

## IPv6 Features

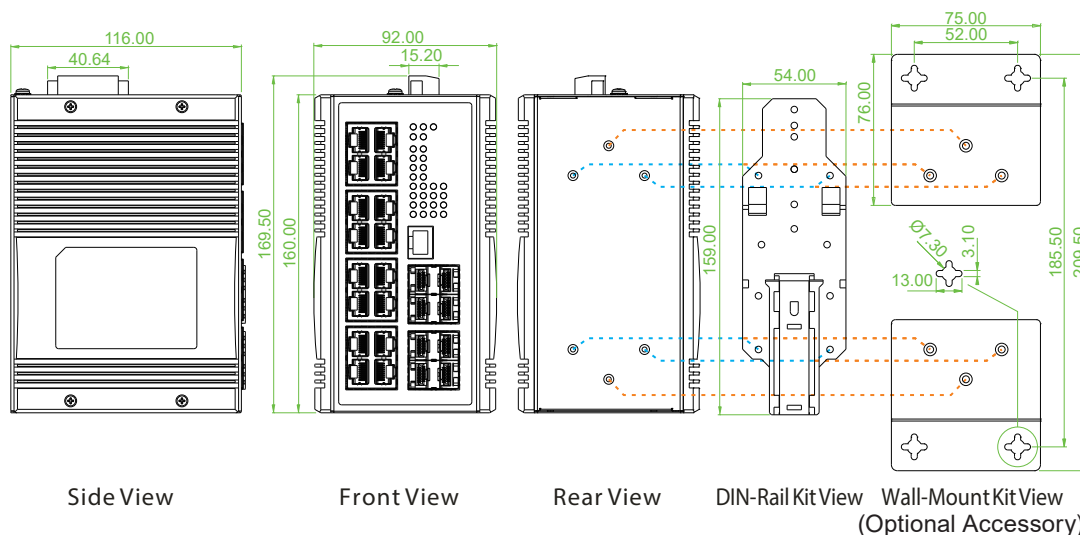
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported

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

## Dimensions



## Ordering Information

Model Name	Managed	Total Port	UTP Port	Fiber Port	Certification			Operating Temperature	
			10/100/1000 Base-T	100/1000 Base-X	UL60950-1, EN60950-1, EN62368-1	EN50121-4	EN61000-6-2, EN61000-6-4		CE, FCC
IGS-1608SM-SE	V	24	16	8 SFP	V	V	V	V	-10~60°C
IGS-1608SM-SE-E	V	24	16	8 SFP	V	V	V	V	-40~75°C

## Optional Accessories

### Wall Mount Kit

IND-WMK04 Wall Mount kit for Industrial product (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 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