



### IGS-404SM

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

### IGS-803SM

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

### IGS-812SM

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

### IGS-1604SM

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

The series models are managed industrial grade Gigabit switches with 4~16 ports 10/100/1000Base-T ports and 3~12 ports SFP Gigabit/Fast Ethernet ports that provide stable and reliable Ethernet transmission. The Ethernet switches support a variety of management functions, including STP/RSTP/MSTP/ ITU-T G.8032 Ring and multiple u-Ring for redundant cabling, layer 2 Ethernet IGMP, VLAN, QoS, Security, IPv6, bandwidth control, port mirroring, cable diagnostic and Green Ethernet. Housed in rugged DIN rail or wall mountable enclosures, these switches are designed for harsh environments, such as industrial networking, security automation applications, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special needs of industrial automation applications.

## Features

- 4x 10/100/1000Base-T RJ-45 and 4x 100/1000Base-X SFP Fiber (IGS-404SM)
- 8x 10/100/1000Base-T RJ-45 and 3x 100/1000Base-X SFP Fiber (IGS-803SM)
- 8x 10/100/1000Base-T RJ-45 and 12x 100/1000Base-X SFP Fiber (IGS-812SM)
- 16x 10/100/1000Base-T RJ-45 and 4x 100/1000Base-X SFP Fiber (IGS-1604SM)
- UL60950-1, CE, FCC, Rail Traffic EN50121-4 certified
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Cable diagnostic, Measuring cable normal or broken point distance
- Supports Green Ethernet IEEE802.3az EEE (Energy Efficient Ethernet) management to optimize the power consumption
- STP, RSTP, MSTP, ITU-T G.8032 Ethernet Ring Protection Switching (ERPS) for redundant cabling
- Provides 5 instances that each can support u-Ring, u-Chain or Sub-Ring type for flexible uses (see Figure 3). Supports up to 5 rings in one device (see Figure 2).
- u-Ring for Redundant Cabling, recovery time < 10ms in 250 devices
- DHCP 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
- Security : Port based and MAC based IEEE802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
- Support IEEE1588 PTP V2 for precise time synchronization to operate in Master, Boundary, Slave mode by each port
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP/SNTP, IEEE802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/V2c/v3, Telnet server for management
- Provides SmartConfig for quick and easy mass configuration
- Supports SmartView for Centralized Management

## Specifications

<b>Standard</b>	IEEE 802.3	10Base-T 10Mbit/s Ethernet
	IEEE 802.3u	100Base-TX, 100Base-FX, Fast Ethernet
	IEEE 802.3ab	1000Base-T Gbit/s Ethernet over twisted pair
	IEEE 802.3z	1000Base-X Gbit/s Ethernet over Fiber-Optic
	IEEE 802.1d	STP (Spanning Tree Protocol)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)
	ITU-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)
	IEEE 802.1Q	Virtual LANs (VLAN)
	IEEE 802.1X	Port based and MAC based Network Access Control, Authentication
	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)
	IEEE 802.3x	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)	
<b>VLAN ID</b>	4094 IEEE802.1Q VLAN VID	
<b>Switch Architecture</b>	Back-plane (Switching Fabric): 16Gbps (IGS-404SM) 22Gbps (IGS-803SM) 40Gbps (IGS-812SM, IGS-1604SM)	
<b>Data Processing</b>	Store and Forward	
<b>Flow Control</b>	IEEE 802.3x for full duplex mode Back pressure for half duplex mode	

<b>Network Connector</b>	4x 10/100/1000Base-T RJ-45 + 4x 100/1000Base-X SFP connector (IGS-404SM) 8x 10/100/1000Base-T RJ-45 + 3x 100/1000Base-X SFP connector (IGS-803SM) 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				
<b>Console</b>	RS-232 (RJ-45)				
<b>Network Cable</b>	UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m)				
<b>Protocols</b>	CSMA/CD				
<b>Reverse Polarity Protection</b>	Present				
<b>Overload Current Protection</b>	Present				
<b>CPU Watch Dog</b>	Present				
<b>Power Supply</b>	Redundant Dual DC 12/24/48V (9.6~60VDC) Input power (Removable Terminal Block)				
<b>Power Consumption</b>	<b>Input Voltage</b>	<b>IGS-404SM</b>	<b>IGS-803SM</b>	<b>IGS-812SM</b>	<b>IGS-1604SM</b>
	12VDC	8.2W	8.5W	14.3W	14.5W
	24VDC	8.1W	9.1W	14.2W	14.4W
	48VDC	9.6W	10.6W	15.8W	16.3W
<b>LED</b>	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)				
<b>Jumbo Frame</b>	9.6KB				

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

<b>MAC Address Table</b>	8K
<b>Memory Buffer</b>	256K Bytes for packet buffer
<b>Warning Message</b>	System Syslog, SMTP/ e-mail event message, alarm relay
<b>Alarm Relay Contact</b>	Relay outputs with current carrying capacity of 1 A @24VDC
<b>Removable Terminal Block</b>	Provide 2 redundant power, alarm relay contact, 6 Pin
<b>Operating Temperature</b>	-10 ~ 60°C (IGS-404SM, IGS-803SM, IGS-812SM, IGS-1604SM) -40 ~ 75°C (IGS-404SM-E, IGS-803SM-E, IGS-812SM-E, IGS-1604SM-E)
<b>Operating Humidity</b>	5% to 95% (Non-condensing)
<b>Storage Temperature</b>	-40 ~ 85°C
<b>Housing</b>	Rugged Metal, IP30 Protection, Fanless
<b>Dimensions</b>	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, IGS-812SM, IGS-1604SM)
<b>Weight</b>	0.725kg (IGS-404SM) 0.78kg (IGS-803SM) 0.795kg (IGS-812SM) 0.82kg (IGS-1604SM)
<b>Installation Mounting</b>	DIN Rail mounting or wall mounting
<b>MTBF</b>	302,826hrs (IGS-404SM) 404,589hrs (IGS-803SM) 204,078hrs (IGS-812SM) 145,967hrs (IGS-1604SM) (MIL-HDBK-217)
<b>Warranty</b>	5 years

## Software Specifications

<b>Topology</b>	
<b>VLAN</b>	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)
<b>Link Aggregation (Port Trunk)</b>	Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group Dynamic (IEEE 802.3ad LACP), up to 5 trunk group
<b>Spanning Tree</b>	IEEE802.1d STP IEEE802.1w RSTP IEEE802.1s MSTP
<b>Multiple u-Ring</b>	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.
<b>Loop Protection</b>	Present
<b>ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)</b>	Recovery time <50ms Single Ring, Sub-Ring, Multiple ring topology network
<b>QoS Features</b>	
<b>Class of Service</b>	IEEE802.1p 8 active priorities queues for per port
<b>Traffic Classification QoS</b>	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
<b>Bandwidth Control for Ingress</b>	Rate in steps :1 kbps / Mbps / fps / kfps Range : 100 kbps to 1Gbps / 1fps to 3300kfps Rate Unit : bit or frame
<b>Bandwidth Control for Egress</b>	Rate in steps : 1 kbps / Mbps Range : 100 kbps to 1Gbps Rate Unit : bit Per queue / Per port shaper
<b>DiffServ (RF 2474) Remarking</b>	
<b>Storm Control</b>	for Unicast, Broadcast, Multicast
<b>IP Multicasting Features</b>	
<b>IGMP / MLD Snooping</b>	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

<b>Certification</b>	
<b>EMC</b>	CE
<b>EMI (Electromagnetic Interference)</b>	FCC Part 15 Subpart B Class A, CE EN55022 Class A
<b>Railway Traffic</b>	EN50121-4
<b>Immunity for Heavy Industrial Environment</b>	EN61000-6-2
<b>Emission for Heavy Industrial Environment</b>	EN61000-6-4
<b>EMS (Electromagnetic Susceptibility) Protection Level</b>	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
<b>Safety</b>	UL60950-1
<b>Shock</b>	IEC 60068-2-27
<b>Freefall</b>	IEC 60068-2-32
<b>Vibration</b>	IEC 60068-2-6

<b>Security Features</b>	
<b>IEEE 802.1X</b>	Port-Based MAC-Based
<b>ACL</b>	Number of rules : up to 256 entries for L2 / L3 / L4
<b>RADIUS authentication &amp; accounting</b>	
<b>TACACS+ authentication &amp; accounting, TACACS+ 3.0</b>	
<b>HTTPS, HTTP</b>	
<b>SSL / SSH v2</b>	
<b>User Name</b>	Local Authentication
<b>Password</b>	
<b>Authentication</b>	Remote Authentication (via RADIUS / TACACS+)
<b>Management Interface Access Filtering</b>	
<b>Management Features</b>	
<b>CLI</b>	Cisco® like CLI
<b>Web Based Management</b>	
<b>Telnet</b>	Server
<b>SNMP</b>	V1, V2c, V3
<b>SW &amp; Configuration Upgrade</b>	TFTP, HTTP Redundant firmware in case of upgrade failure
<b>RMON</b>	RMON I (1, 2, 3, 9 group), RMON II
<b>MIB</b>	RFC1213 MIB II, Private MIB
<b>DHCP</b>	Client, Relay, Snooping Snooping option 82 Relay option 82
<b>IP Source Guard</b>	
<b>Port Mirroring</b>	
<b>Event Syslog</b>	Syslog server (RFC3164) (Support 1 server )
<b>Warning Message</b>	System syslog, e-mail, alarm relay
<b>DNS</b>	Client, Proxy
<b>IEEE1588 PTP V2</b>	Master, Boundary, Slave Operating mode Operating in each port of these switch
<b>NTP / SNTP</b>	
<b>LLDP (IEEE 802.1ab)</b>	Link Layer Discovery Protocol LLDP-MED
<b>IPv6 Features</b>	
<b>IPv6 Management</b>	Telnet Server/ICMP v6
<b>SNMP over IPv6</b>	
<b>HTTP over IPv6</b>	
<b>SSH over IPv6</b>	
<b>IPv6 Telnet Support</b>	
<b>IPv6 NTP / SNTP Support</b>	
<b>IPv6 TFTP Support</b>	
<b>IPv6 QoS</b>	
<b>IPv6 ACL</b>	Number of rules: up to 256 entries L2 / L3 / L4

## 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

### Green Ethernet

Lower the power for a port when there is no link  
LED Power Management :Adjustment LEDs intensity

### Cable Diagnostic

Measuring cable normal or broken point distance

## Application

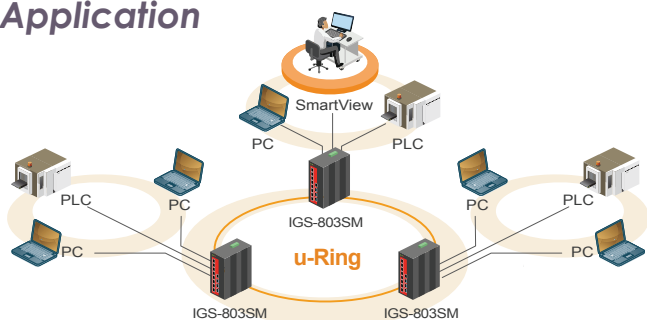


Figure 1 : Application Example

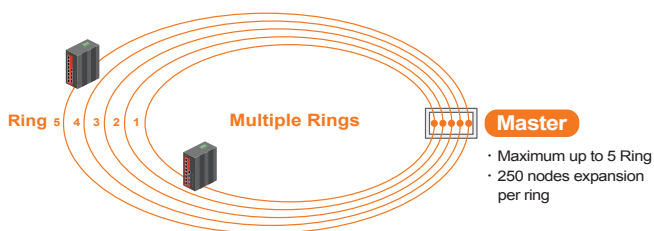


Figure 2 : Multiple Rings

u-Ring Configuration							
Delete	Instance	Type	Master	East		West	
				Port	Edge	Port	Edge
Delete	1	u-Ring	<input type="checkbox"/>	1		2	
Delete	2	u-Ring	<input type="checkbox"/>	4		3	
Delete	3	u-Ring	<input type="checkbox"/>	10 (Fiber2)		11 (Fiber3)	
Delete	4	Sub-Ring	<input type="checkbox"/>	6			
Delete	5	u-Chain	<input type="checkbox"/>	5	<input type="checkbox"/>	9 (Fiber1)	<input type="checkbox"/>

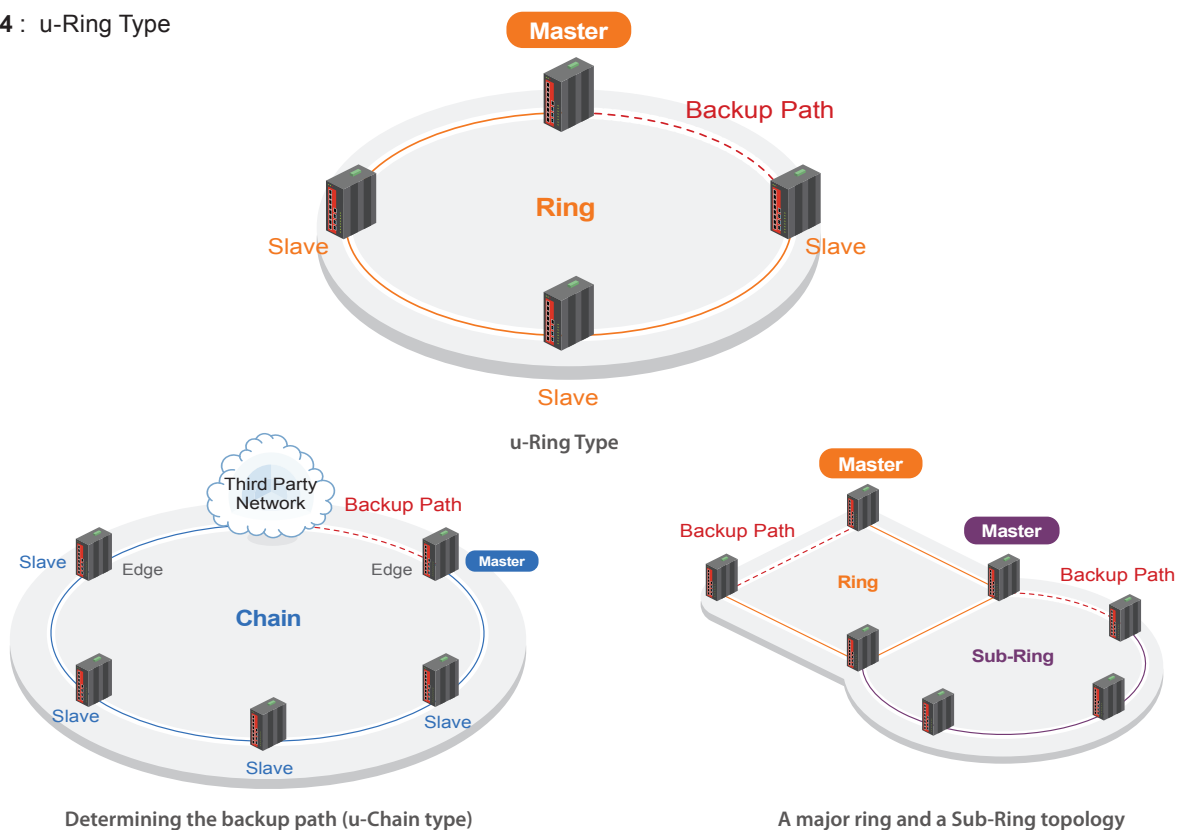
Auto-refresh  Refresh

Add New Instance

Save Reset

Figure 3 : User-Friendly Configuration In Web Interface

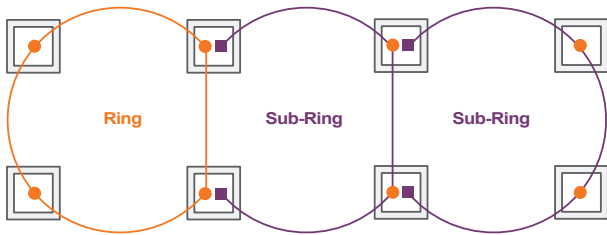
Figure 4 : u-Ring Type



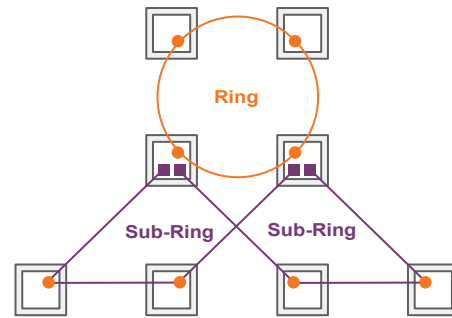
**Figure 5 : Ring Configuration Example**

Ring Configuration Type

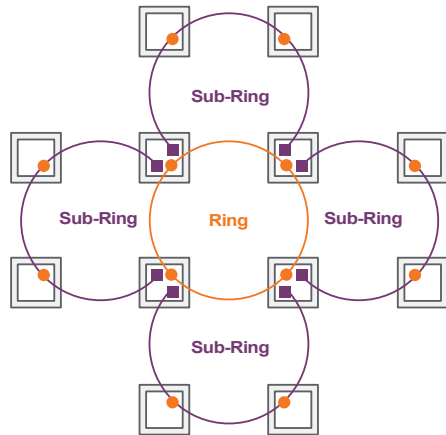
- u-Ring
- Sub-Ring



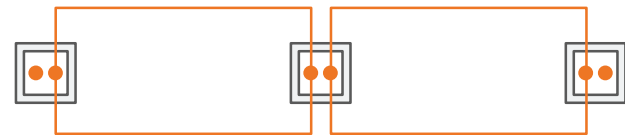
Ring Configuration Type



Combination of a ring and two Sub-Ring



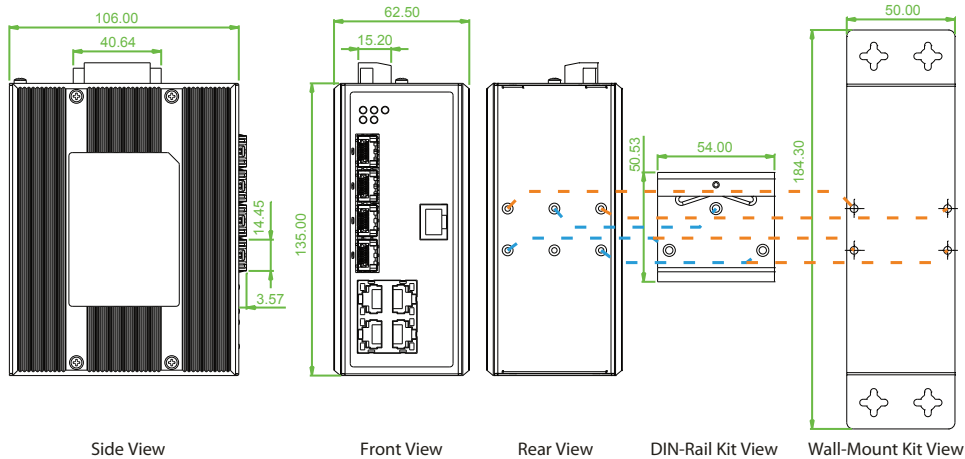
Combination of a ring and four Sub-Ring



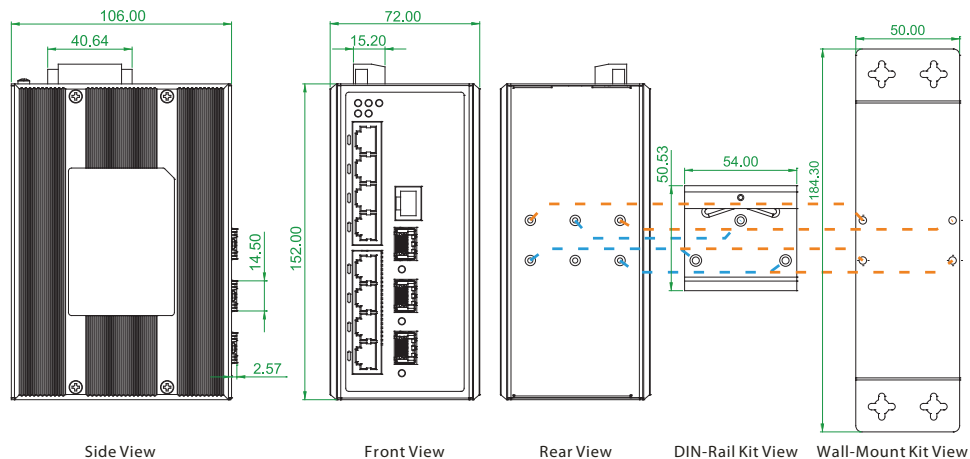
Cable Redundancy

## Dimensions

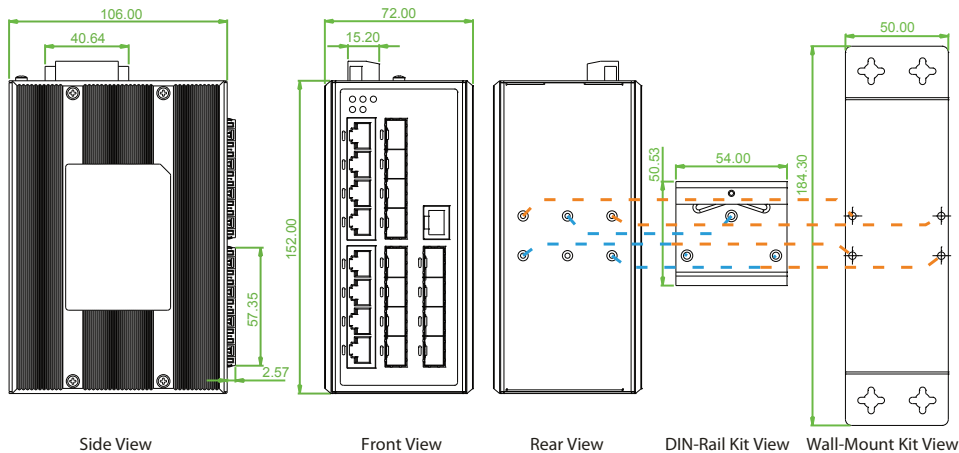
IGS-404SM



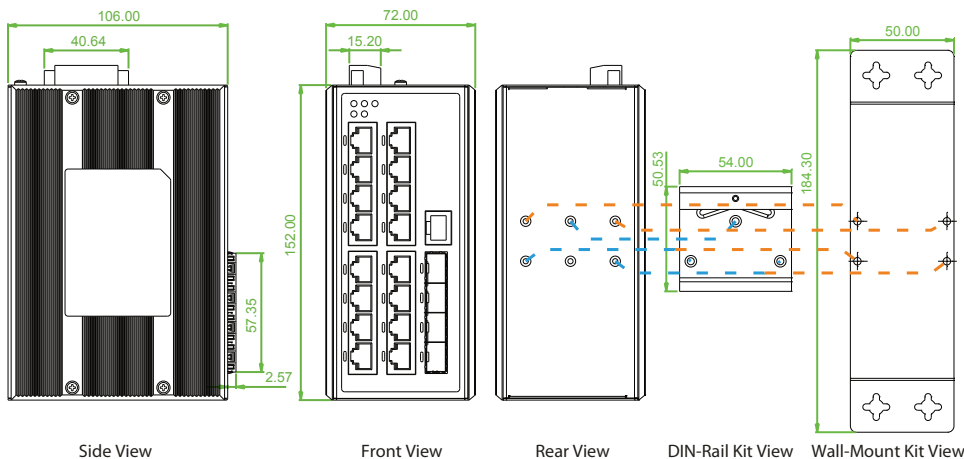
IGS-803SM



## IGS-812SM



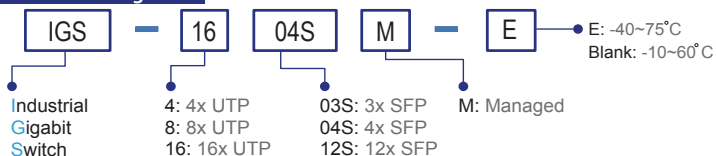
## IGS-1604SM



## Ordering Information

Model Name	Managed	Total Port	UTP Port		Fiber Port		Certification			Operating Temperature
			10/100/1000 Base-T		100/1000 Base-X		Railway EN50121-4	Safety UL60950-1	EN61000-6-2 EN61000-6-4	
IGS-404SM	V	8	4		4 SFP		V	V	V	-10~60°C
IGS-404SM-E	V	8	4		4 SFP		V	V	V	-40~75°C
IGS-803SM	V	11	8		3 SFP		V	V	V	-10~60°C
IGS-803SM-E	V	11	8		3 SFP		V	V	V	-40~75°C
IGS-812SM	V	20	8		12 SFP		V	V	V	-10~60°C
IGS-812SM-E	V	20	8		12 SFP		V	V	V	-40~75°C
IGS-1604SM	V	20	16		4 SFP		V	V	V	-10~60°C
IGS-1604SM-E	V	20	16		4 SFP		V	V	V	-40~75°C

### Model Naming Rule



### Accessories

DR-4524	Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 48W, -10 ~ +50°C
MDR-40-24	Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 40W, -20 ~ +70°C
SFP Transceiver	Compatible, Reliable, 5-year Warranty

### SFP Naming Rule

