

**2.25KV Hipot**  
**4KV Surge protection**



## IGS-804SM-SE

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

## IGS-1608SM-SE

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



These models are managed industrial grade Gigabit switches with 8/16 10/100/1000Base-T ports and 4/8 Gigabit/Fast SFP ports that provide stable and reliable Ethernet transmission. They also support timing synchronization features (SyncE & IEEE 1588 PTP v2) that allow operators to deliver services with optimal stability and continuity in end to end connectivity. SyncE and IEEE1588 PTP V2 are also increasingly applied in mobile backhaul application where many devices are placed in outdoor cabinets. The switches support a variety of Ethernet functions, including STP/RSTP/MSTP/ITU-T G.8032 ERPS and multiple  $\mu$ -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 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

- 8x 10/100/1000Base-T RJ-45 and 4x 100/1000Base-X SFP Fiber with SyncE (IGS-804SM-SE)
  - 16x 10/100/1000Base-T RJ-45 and 8x 100/1000Base-X SFP Fiber with SyncE (IGS-1608SM-SE)
  - Redundant dual DC input power 12/24/48VDC (9.6~60VDC)
  - Isolated RS-232 console port**
  - UL60950-1, EN60950-1, CE, FCC, Rail Traffic EN50121-4, certified
  - Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
  - 2.25K VDC Hi-pot isolation protection for Ethernet ports and power**
  - 4KV surge protection for UTP and Fiber ports**
  - Cable diagnostic, Measuring cable normal or broken point distance
  - Rugged Metal, IP30 Protection & Fanless design
  - Supports Green Ethernet IEEE 802.3az EEE (Energy Efficient Ethernet) management to optimize the power Consumption
  - STP, RSTP, MSTP, ITU-T G.8032 Ethernet Ring Protection Switching (ERPS) for redundant cabling
  - Provides 5 instances that each can support  $\mu$ -Ring,  $\mu$ -Chain or Sub-Ring type for flexible uses.  
(Please see CTC  $\mu$ -Ring white paper for more details and more topology application)
  - $\mu$ -Ring for Redundant Cabling, recovery time < 10ms in 250 devices
  - DHCP Server/Client/Relay /Relay option 82 /Snooping
  - QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
  - IEEE 802.1q VLAN, MAC based VLAN, IP subnet based VLAN, Protocol based VLAN, VLAN translation, GVRP, MVR
  - Dynamic IEEE 802.3ad LACP Link Aggregation, Static Link Aggregation
  - IGMP snooping V1/V2/V3, IGMP Filtering/ Throttling, IGMP query, IGMP proxy reporting, MLD snooping V1/V2
  - Security : Port based and MAC based IEEE 802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
  - Software upgrade via TFTP and HTTP, redundant firmware to avoid in case of upgrade failure
  - Supports Sync Ethernet allow operators to deliver service with optimal stability and continuity in end-to-end connectivity
  - Supports IEEE 1588 PTP V2 for precise time synchronization to operate in Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave mode by each port
  - RMON, MIB II, Port mirroring, Event syslog, DNS, NTP, SNTP, IEEE 802.1ab LLDP
  - Supports IPv6 Telnet server /ICMP v6
  - CLI, Web based management, SNMP v1/v2c/v3, Telnet/SSH server for management
  - Provides SmartConfig for quick and easy mass Configuration Tool\*
  - Supports SmartView for Centralized Management\*
- \*Please see Chapter 1- **Software Management** for more details

### Specifications

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

Standard	IEEE 802.3ad	Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)
	IEEE 802.3x	Flow control for Full Duplex
	IEEE 802.1ad	Stacked VLANs, Q-in-Q
	IEEE 802.1p	LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization
	IEEE 802.1ab	Link Layer Discovery Protocol (LLDP)
	IEEE 802.3az	EEE (Energy Efficient Ethernet)
<b>VLAN ID</b>	4094	IEEE 802.1Q VLAN VID
<b>Switch Architecture</b>	Back-plane (Switching Fabric): 24Gbps (IGS-804SM-SE) 48Gbps (IGS-1608SM-SE) Full wire-speed	
<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>	8x 10/100/1000Base-T RJ-45 + 4x 100/1000Base-X SFP connector (IGS-804SM-SE) 16x 10/100/1000Base-T RJ-45+ 8x 100/1000Base-X SFP connector (IGS-1604SM-SE) RJ-45 UTP port support Auto negotiation speed, Auto MDI/MDI-X function, SFP port support dual speed with DDMI												
<b>Console</b>	RS-232 (RJ-45) Isolated RS-232 port grounding for negative power system, or telecom network application												
<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>	Supported												
<b>Overload Current Protection</b>	Supported												
<b>CPU Watch Dog</b>	Supported												
<b>Power Supply</b>	Redundant Dual DC 12/24/48V (9.6~60VDC) Input power Removable Terminal Block for input power connector												
<b>Power Consumption</b>	<table border="1"> <thead> <tr> <th>Input Voltage</th> <th>IGS-804SM-SE</th> <th>IGS-1608SM-SE</th> </tr> </thead> <tbody> <tr> <td>12 VDC</td> <td>11W</td> <td>17W</td> </tr> <tr> <td>24 VDC</td> <td>12.4W</td> <td>17.8W</td> </tr> <tr> <td>48 VDC</td> <td>12.9W</td> <td>20.2W</td> </tr> </tbody> </table>	Input Voltage	IGS-804SM-SE	IGS-1608SM-SE	12 VDC	11W	17W	24 VDC	12.4W	17.8W	48 VDC	12.9W	20.2W
	Input Voltage	IGS-804SM-SE	IGS-1608SM-SE										
	12 VDC	11W	17W										
	24 VDC	12.4W	17.8W										
48 VDC	12.9W	20.2W											
<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												
<b>IEEE 802.3ac</b>	Max frame size extended to 1522Bytes (allow Q-tag in packet)												
<b>MAC Address Table</b>	8K												
<b>Memory Buffer</b>	512K 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-804SM-SE, IGS-1608SM-SE) -40 ~ 75°C (IGS-804SM-SE-E, IGS-1608SM-SE-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 72 x152 mm (D x W x H) (IGS-804SM-SE) 116 x 91 x 157 mm (Dx Wx H) (IGS-1608SM-SE)
<b>Weight</b>	0.74kg (IGS-804SM-SE) 1.35kg (IGS-1608SM-SE)
<b>Installation Mounting</b>	DIN Rail mounting, or wall mounting (optional)
<b>MTBF</b>	593,726 Hours (IGS-803SM-SE) 431,610 Hours (IGS-1608SM-SE) (MIL-HDBK-217)
<b>Warranty</b>	5 years
<b>Certification</b>	
<b>EMC</b>	CE (EN55024, EN55032)
<b>EMI (Electromagnetic Interference)</b>	FCC Part 15 Subpart B Class A, CE
<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, EN60950-1 (IGS-1608SM-SE) EN60950-1 (IGS-804SM-SE)
<b>Hipot</b>	DC 2.25KV for power to chassis ground, Ethernet ports to chassis ground
<b>Surge protection</b>	4KV for UTP and Fiber ports
<b>Shock</b>	IEC 60068-2-27
<b>Freefall</b>	IEC 60068-2-32
<b>Vibration</b>	IEC 60068-2-6

## 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 Aggregation Trunk)</b>	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
<b>Spanning Tree</b>	IEEE 802.1d STP IEEE 802.1w RSTP IEEE 802.1s MSTP
<b>Multiple μ-Ring</b>	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)
<b>Loop Protection</b>	Supported
<b>ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)</b>	Recovery time <50ms Single Ring, Sub-Ring, Multiple ring topology network

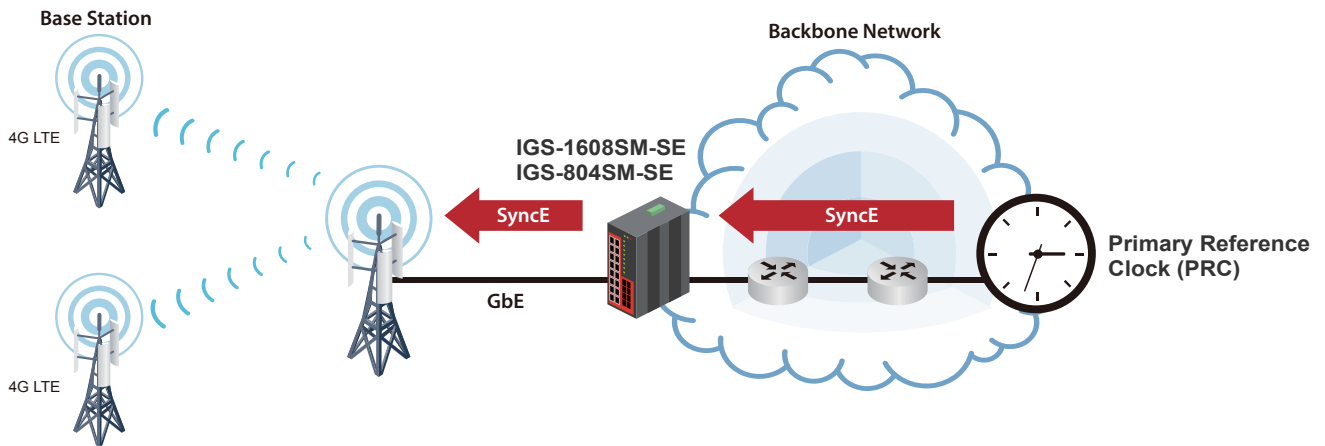
<b>QoS Features</b>	
<b>Class of Service</b>	IEEE 802.1p 8 active priorities queues for per port
<b>Traffic Classification QoS</b>	IEEE 802.1p based CoS IP Precedence based CoS IP DSCP based CoS QCL(QoS Control List): Frame Type, Source/ Destination MAC, VLAN ID, PCP, DEI QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
<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>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 L2 : Mac address SA/DA/VLAN L3 : IP address SA/DA, Subnet L4 : TCP/UDP

<b>RADIUS authentication &amp; accounting</b>	
<b>TACACS+ authentication &amp; accounting, TACACS+ 3.0</b>	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name	Local Authentication
Password	Remote Authentication (via RADIUS / TACACS+)
<b>Authentication</b>	
Management	
Interface Access	Web, Telnet / SSH , CLI RS-232 console
<b>Filtering</b>	
<b>Management Features</b>	
CLI	Cisco® like CLI
<b>Web Based Management</b>	
Telnet	Server
SNMP	V1, V2c, V3
SW & Configuration Upgrade	TFTP, HTTP
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
Port Mirroring	Supported
Event Syslog	Syslog server (RFC3164) (Support 1 server )
Warning Message	System syslog, e-mail, alarm relay
DNS	Client, Proxy
SyncE	ITU-T G.8262 Sync Ethernet

<b>IEEE 1588 PTP V2</b>	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
<b>NTP, SNTP</b>	Client
<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>	Supported
<b>HTTP over IPv6</b>	Supported
<b>SSH over IPv6</b>	Supported
<b>IPv6 Telnet</b>	Supported
<b>IPv6 NTP, SNTP</b>	Client
<b>IPv6 TFTP</b>	Supported
<b>IPv6 QoS</b>	Supported
<b>IPv6 ACL</b>	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
<b>Others Features</b>	
<b>Green Ethernet</b>	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
<b>Cable Diagnostic</b>	Measuring UTP cable normal or broken point distance

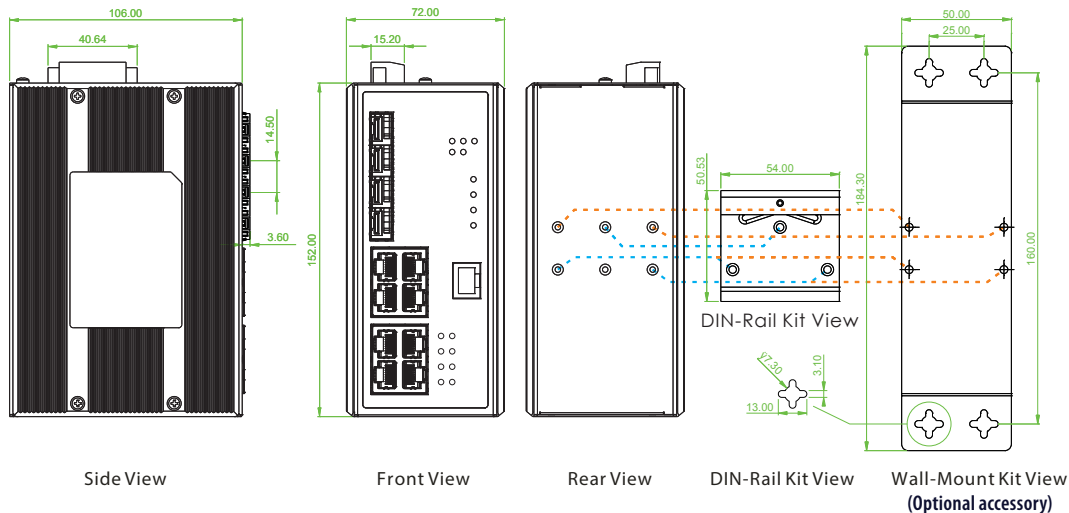
## Application

Figure : Application for mobile backhaul

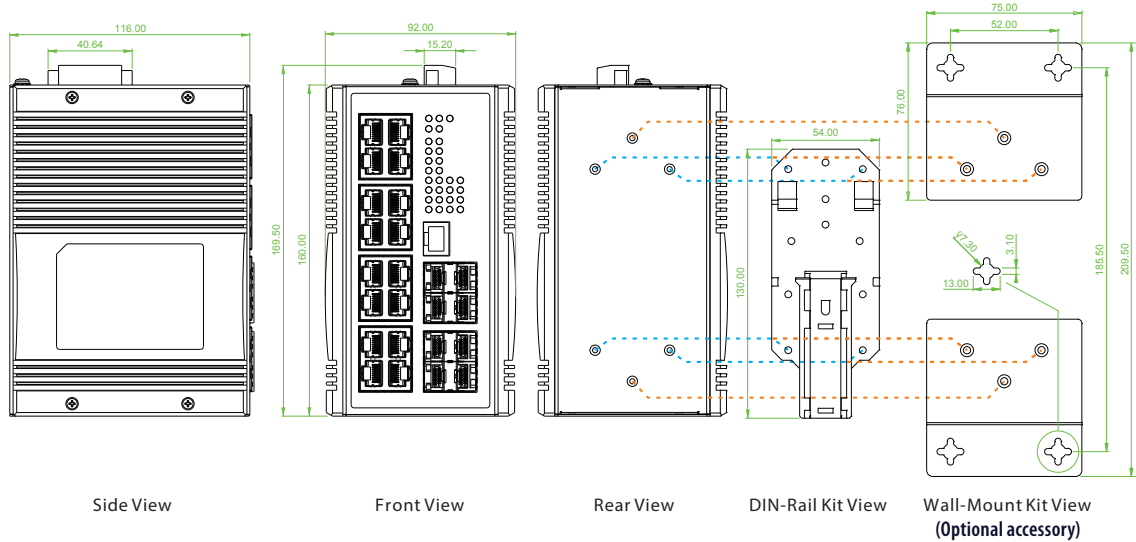


## Dimensions

### ► IGS-804SM-SE



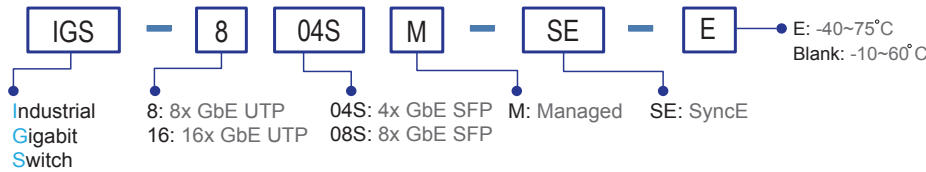
► IGS-1608SM-SE



**Ordering Information**

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

**Model Naming Rule**



**Package List**

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

**Optional Accessories**

**Wall mount kit accessories**

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

**Industrial SFP Transceiver**

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

ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter, wave length 850nm, 7.5dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-T7100-00-(E)	Industrial SFP 10/100/1000Base-T UTP 100meter, -10~70°C (-40~85°C)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70°C (-40~85°C)

**SFP Naming Rule**

