

## ICS-G24S4X & ICS-G24S2X

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



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



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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
  - Provides SmartConfig for quick and easy mass Configuration\*
  - Supports SmartView™ for Centralized Management\*
- \*Please see Chapter 1- **Software Management** for more details

### 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 802.3ae 10 Gbit/s Ethernet over fiber IEEE 802.1d STP (Spanning Tree Protocol) IEEE 802.1w RSTP (Rapid Spanning Tree Protocol ) IEEE 802.1s MSTP (Multiple Spanning Tree Protocol) ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection Switching) IEEE 802.1Q Virtual LANs (VLAN) IEEE 802.1X Port based and MAC based Network Access Control, Authentication IEEE 802.3ad Link aggregation for parallel links with LACP(Link Aggregation Control Protocol) IEEE 802.1ad Stacked VLANs, Q-in-Q IEEE 802.1p LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization IEEE 802.ab Link Layer Discovery Protocol (LLDP)	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) 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)														
<b>VLAN ID</b>	4094 IEEE 802.1Q VLAN VID															
<b>Switch Architecture</b>	Back-plane (Switching Fabric): 128Gbps (ICS-G24S4X) 88Gbps (ICS-G24S2X) (Full wire-speed)															
<b>Data Processing</b>	Store and Forward															
<b>Network Connector</b>	24x 100/1000Base-X SFP with 4x GbE Combo (UTP/SFP)+ 4x 10GBase-X SFP+ (ICS-G24S4X) 24x 100/1000Base-X SFP with 4x GbE Combo (UTP/SFP)+ 2x 10GBase-X SFP+ (ICS-G24S2X)															
<b>Network Connector</b>	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															
<b>Console</b>	RS-232 (RJ-45)															
<b>Network Cable</b>	UTP/STP Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)															
<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 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) <b>Supports negative voltage power input (for example in telecom system)</b>															
<b>Power Consumption</b>	<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														
<b>LED</b>	Per unit: Power 1 (Green), Power 2 (Green), Act/Alarm (Green/ Amber), Ring Master (Green) Per RJ-45 port: 10/100 Link/Active (Green) 1000 Link/Active (Yellow) SFP (P1~24) Fiber Per port: 100Base-X Link/Active (Green) 1000Base-X Link/Active (Yellow) SFP+ (P25~P28) Fiber Per port: 1000Base-X Link/Active (Amber) 10GBase-X Link/Active (Blue)															
<b>Jumbo Frame</b>	10K															

3 Industrial 10G Core Switch ICS-G24S4X & ICS-G24S2X

<b>MAC Address Table</b>	32K
<b>Memory Buffer</b>	4M Bytes for packet buffer
<b>Device Memory</b>	16M Bytes Flash ROM, 1G Bytes RAM
<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, 2-Pin removable terminal block
<b>Operating Temperature</b>	-40 ~ 60°C
<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>	315 x 440 x 44 mm (D x W x H)
<b>Weight</b>	4.755kg (ICS-G24S4X-AA) 4.26kg (ICS-G24S4X-DD) 4.51kg (ICS-G24S4X-AD) 4.695kg (ICS-G24S2X-AA) 4.2kg (ICS-G24S2X-DD) 4.45kg (ICS-G24S2X-AD)
<b>Installation Mounting</b>	19" rack mount
<b>MTBF</b>	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

<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 Private VLAN for port isolation GVRP (GARP VLAN Registration Protocol) MVR ( Multicast VLAN Registration)
<b>Link Aggregation (Port Trunk)</b>	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
<b>Spanning Tree</b>	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP
<b>Multiple μ-Ring</b>	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)
<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 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>	Per port based
<b>Bandwidth Control for Egress</b>	Per port based Per queue / Per port shaper
<b>DiffServ (RF 2474) Remarking</b>	
<b>Storm Control</b>	for Unicast, Broadcast, Multicast

<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
<b>Shock</b>	IEC 60068-2-27
<b>Freefall</b>	IEC 60068-2-32
<b>Vibration</b>	IEC 60068-2-6

<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>	
<b>HTTPS, HTTP</b>	Supported
<b>SSL / SSH v2</b>	Supported
<b>User Name Password Authentication</b>	Local Authentication Remote Authentication (via RADIUS / TACACS+)
<b>Management Interface Access Filtering</b>	Web, Telnet / SSH , CLI RS-232 console
<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>Modbus/TCP</b>	Supports for management and monitoring
<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>UPnP</b>	Supported
<b>DHCP</b>	Server/Client/Relay/Relay option 82/Snooping
<b>IP Source Guard</b>	Supported
<b>Port Mirroring</b>	Supported
<b>Event Syslog</b>	Syslog server (RFC3164)
<b>Warning Message</b>	System syslog, e-mail, alarm relay
<b>DNS</b>	Client, Proxy
<b>IEEE 1588 PTP V2</b>	Supports 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

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 1 : 10G Backbone application

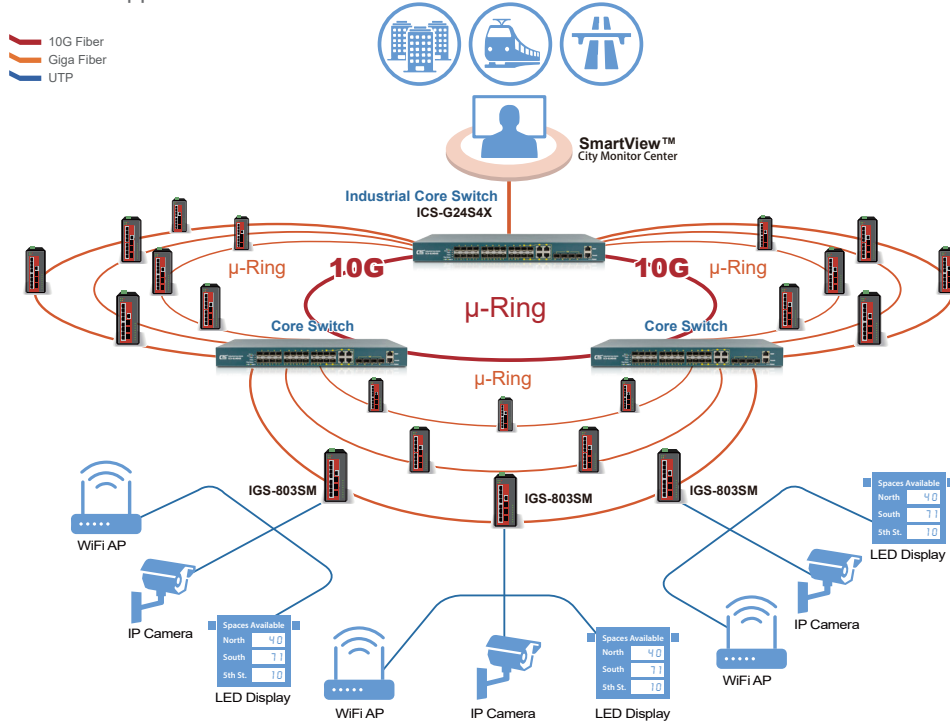
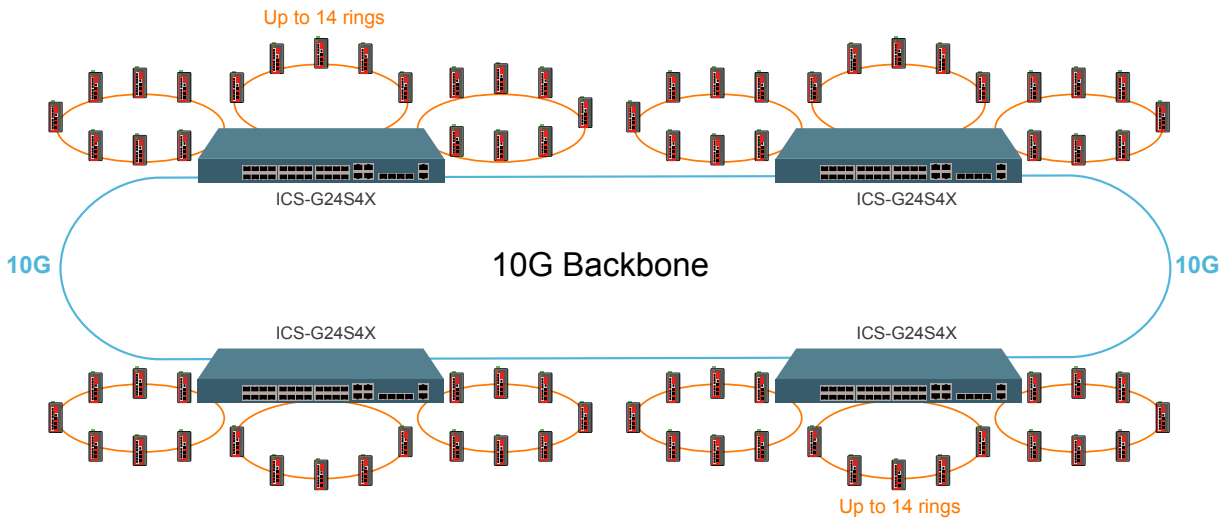
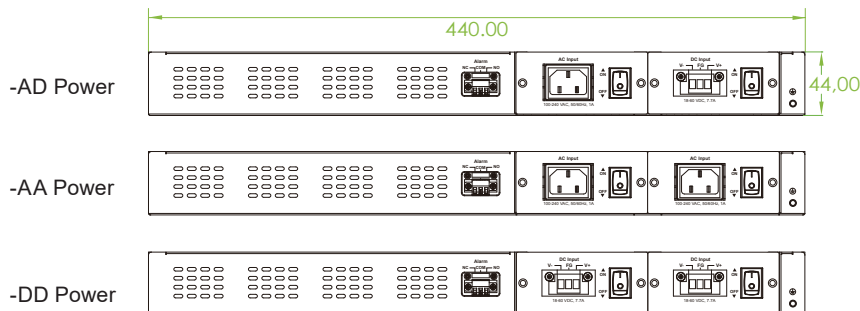


Figure 2 : 10G Backbone with μ-Ring topology

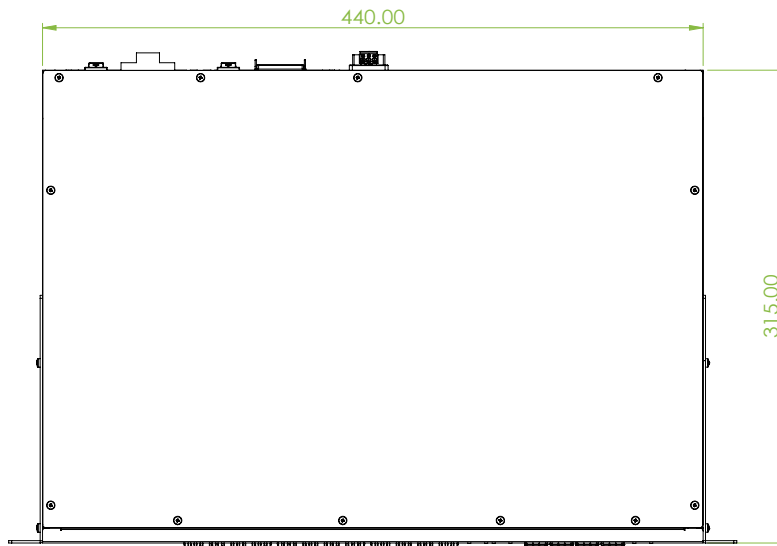


## Dimensions

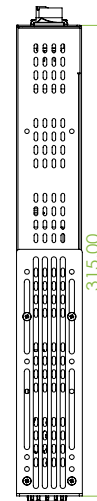
Rear View



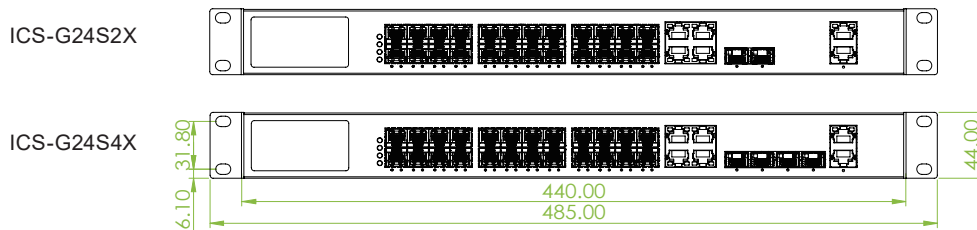
Top View



Side View



Front View



## Ordering Information

Model Name	Managed	Total Port	GbE Port		10GbE	Input Power		Certification			
			100/1000 Base-X SFP	10/100/1000 Base-T UTP or 100/1000Base-X SFP	IEEE 802.3ae SFP+	DC (Low Volt) 24/48/-48VDC	High Volt 110/220VAC	Safety UL60950-1 EN60950-1	EN50121-4	EN61000-6-2 EN61000-6-4	CE FCC
ICS-G24S4X-AA	V	28	20	4 Combo	4		2	V	V	V	V
ICS-G24S4X-DD	V	28	20	4 Combo	4	2		V	V	V	V
ICS-G24S4X-AD	V	28	20	4 Combo	4	1	1	V	V	V	V
ICS-G24S2X-AA	V	26	20	4 Combo	2		2	V	V	V	V
ICS-G24S2X-DD	V	26	20	4 Combo	2	2		V	V	V	V
ICS-G24S2X-AD	V	26	20	4 Combo	2	1	1	V	V	V	V

### Package List

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

## Optional Accessories

### Industrial SFP Transceiver

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

ISFP-M9000-85-D(E)	Industrial SFP 10GbE 10GBase-SR, M/M, 300 meter (OM3 fiber) ,wave length 850nm, DDMI, -10~70°C (-40~85°C)
ISFP-S9010-31-D(E)	Industrial SFP 10GbE 10GBase-LR, S/M, 10km, wave length 1310nm, DDMI, -10~70°C (-40~85°C)
ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter,wave length 850nm, DDMI, -10~70°C (-40~85°C)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-SX, S/M, 20km, wave length 1310nm, DDMI, -10~70°C (-40~85°C)
ISFP-T7700-00-(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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### Industrial Optical Fiber Bypass Switch

IBP-202	Optical Fiber Bypass Switch
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