

IEC 61850-3 Managed GbE Switch



IPS-G803SM

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

This series of managed industrial grade gigabit Ethernet switches 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 provide 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, 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 networking. The series product can be managed centrally and conveniently by CTC Union's SmartView™ Element Management System or other third party SNMP managers.

Feature

- 8x 10/100/1000Base-T RJ-45 and 3x 100/1000Base-X SFP Fiber
- UL60950-1, CE, FCC, and EN50121-4, certification
- IEC 61850-3, IEEE1613 certified for power substation
- Industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Redundancy isolated low voltage 24/48VDC, or/and isolated High voltage AC/DC (110/220VAC/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
- Support GOOSE Message that complies with IEC61850 standard to achieve zero packet loss
- 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 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), and μ -Ring for cabling redundant
- Provides 5 instances that each can support μ -Ring, u-Chain or Sub-Ring type for flexible uses (see Figure 7). Supports up to 5 rings in one device (see Figure 5).
- μ -Ring for Redundant Ethernet Ring, recovery time<10ms in 250 units
- 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
- Supports DHCP Server / Client /Relay/Snooping/Snooping option 82/Relay option 82
- Supports RMON, MIB II, Private MIB, 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 tool (Figure 4)
- Supports SmartView for Centralized Management (Figure 2)
- Supporting Central EMS for management of upto 50 SmartView Server ,and maximum upto 25,000 device (Figure 3)

Specifications

IEEE 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
	IEEE802.3ac Max frame size extended to 1522Bytes
	IEEE 802.3ad Link aggregation for parallel links with LACP(Link Aggregation Control Protocol)
	IEEE802.3x Flow Control and Back Pressure
	ITU-T G.8032/ Y.1344 ERPS (Ethernet Ring Protection Switching)
	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): 22 Gbps Full wire-speed
Data Processing	Store and Forward
Flow Control:	IEEE 802.3x flow control, back pressure flow control
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
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 above Cat. 5e cable EIA/TIA-568 100-ohm (100m)
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	Present for Power Input
Overload Current Protection	Present
CPU Watch Dog	Present
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)

Power Input	Isolated Low Voltage DC : Isolated 24/48V (18~72VDC), Removable Terminal Block High voltage AC/DC : isolated 110/220VAC (88VAC~264VAC) or 110/220VDC (85~300VDC), Removable Terminal Block	
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	
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	

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 (Ethernt, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries MVR (Multiple VLAN Registration) GVRP (GARP VLAN Registration Protocol)
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, u-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings (see Figure 5, 6, 7, 8) Recovery time <10ms Maximum 250 devices in a Ring
Loop Protection	Present
ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Convergence time <50ms Single Ring, Sub-Ring, Multiple ring topology network
QoS Feature	
Class of Service	IEEE802.1p 8 active priorities queues for per port
GOOSE Message	Complies with IEC61850 standard to achieve zero packet loss
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	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

Warranty	5 years
Certification	
EMC/EMS	CE, FCC
EMI	FCC Part 15 Subpart B Class A EN 55022 Class A
EMS	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	UL60950-1
Power Substation	IEC 61850-3, IEEE 1613
Immunity for Heavy Industrial Environment	EN61000-6-2
Emission for Heavy Industrial Environment	EN61000-6-4
Railway Traffic	EN50121-4
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

IGMP / MLD Snooping	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

RADIUS authentication & accounting
TACACS+ authentication & accounting, TACACS+ 3.0
HTTPS, HTTP
SSL / SSH v2

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
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	
DHCP	Server Client Relay Snooping Snooping option 82 Relay option 82

IP Source Guard	
Port Mirroring	
Event Syslog	Syslog server (RFC3164) (Support 1 server)
Warning Message	System Syslog, SMTP/ e-mail event message, 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

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IPv6 Features

IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	
HTTP over IPv6	
SSH over IPv6	
IPv6 Telnet Support	
IPv6 NTP / SNTP Support	
IPv6 TFTP Support	
IPv6 QoS	

IPv6 ACL

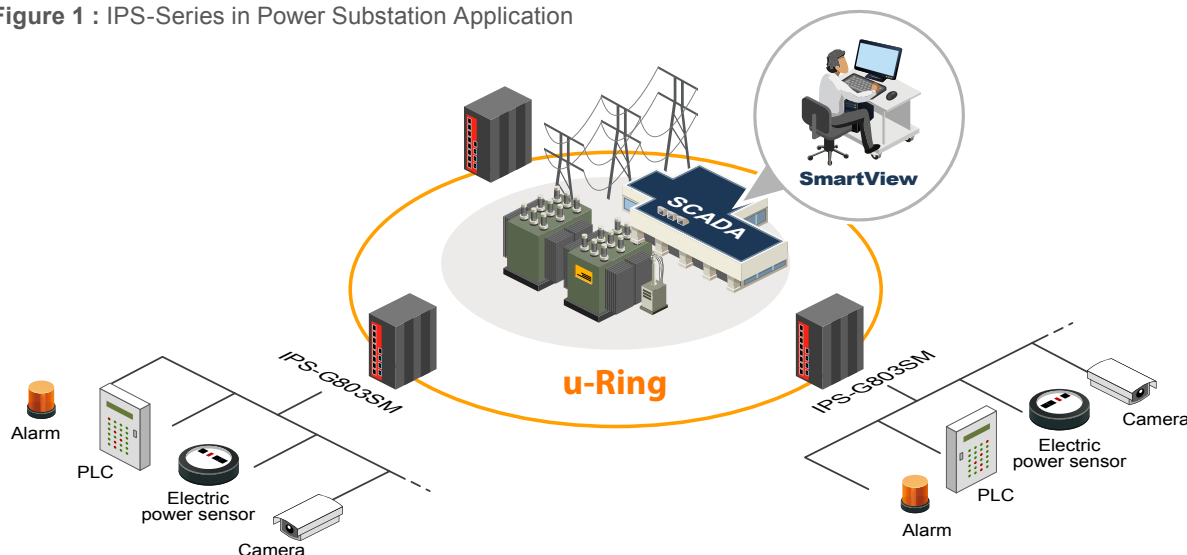
Number of rules: up to 256 entries
L2 / L3 / L4

Others Features

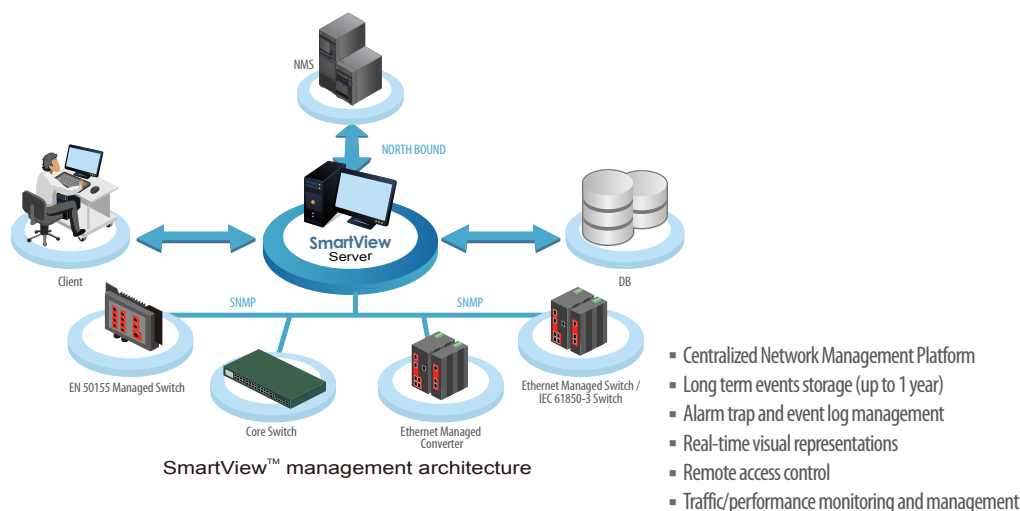
Green Ethernet	Supports IEEE802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption Determine the cable length and lowering the power for ports with short cables
Green Ethernet	Lower the power for a port when there is no link LED Power Management: Adjustment LEDs intensity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

Application

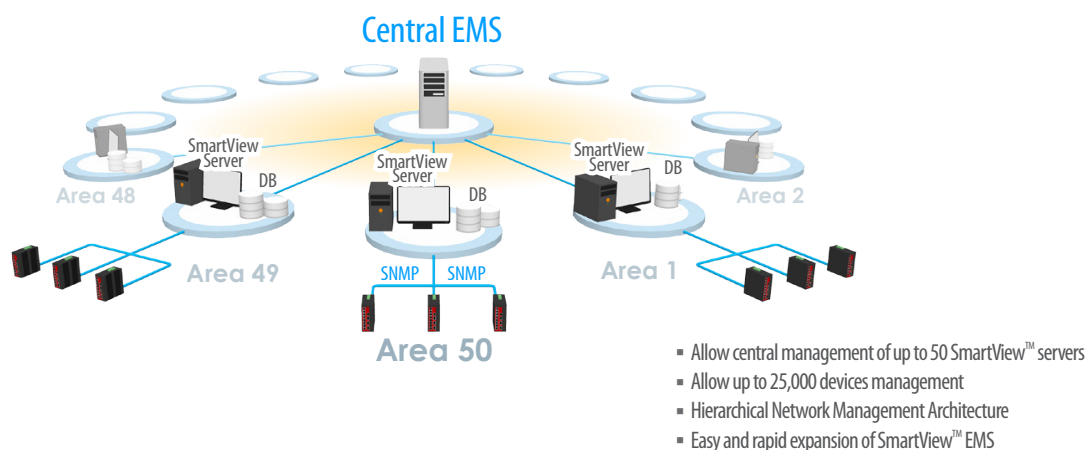
► Figure 1 : IPS-Series in Power Substation Application



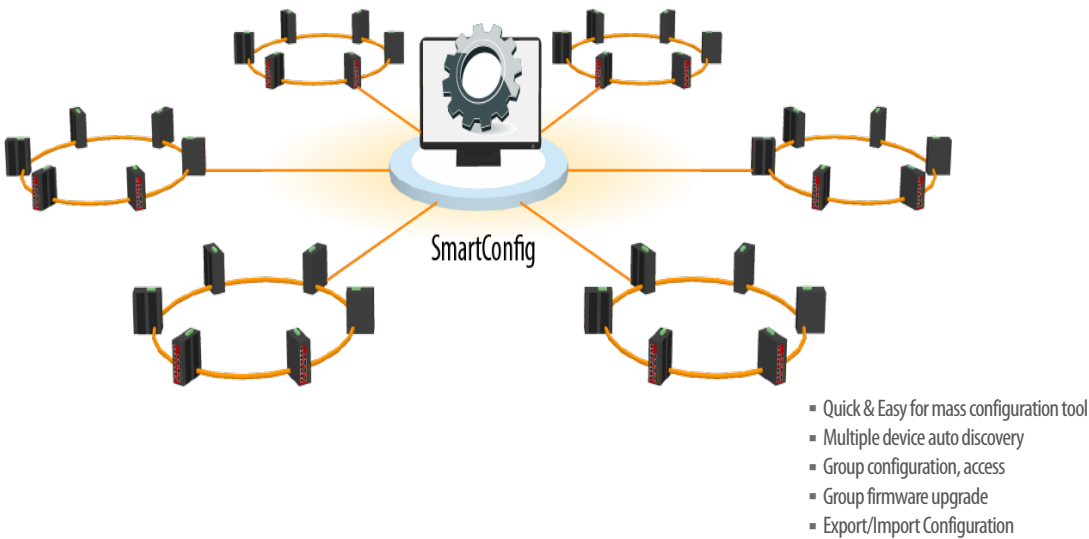
► Figure 2 : SmartView™



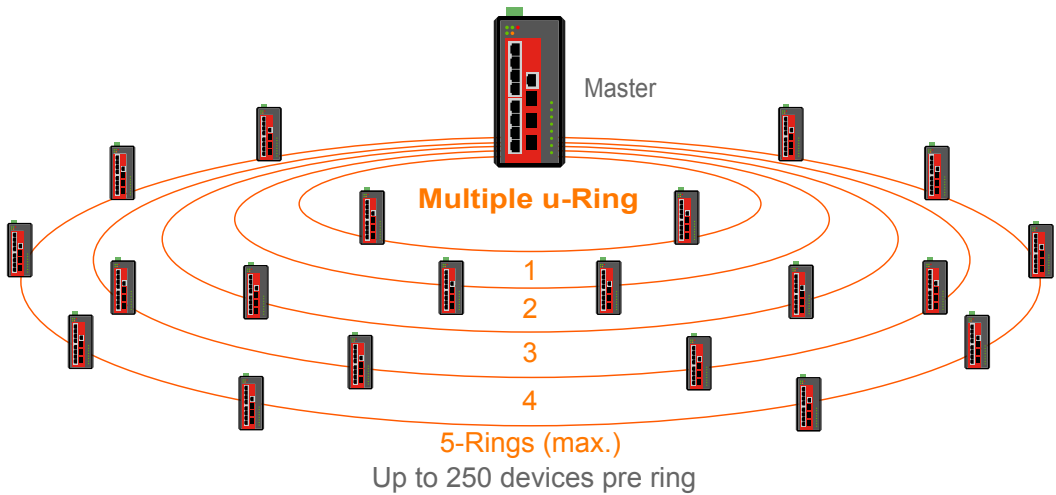
► Figure 3 : Central EMS allows central management of up to 50 SmartView™ servers



► **Figure 4 :** SmartConfig™ is a convenient configuration tool for mass deployment of switch products



► **Figure 5 :** Multiple μ -Ring



► **Figure 6 :** User-Friendly Configuration In Web Interface

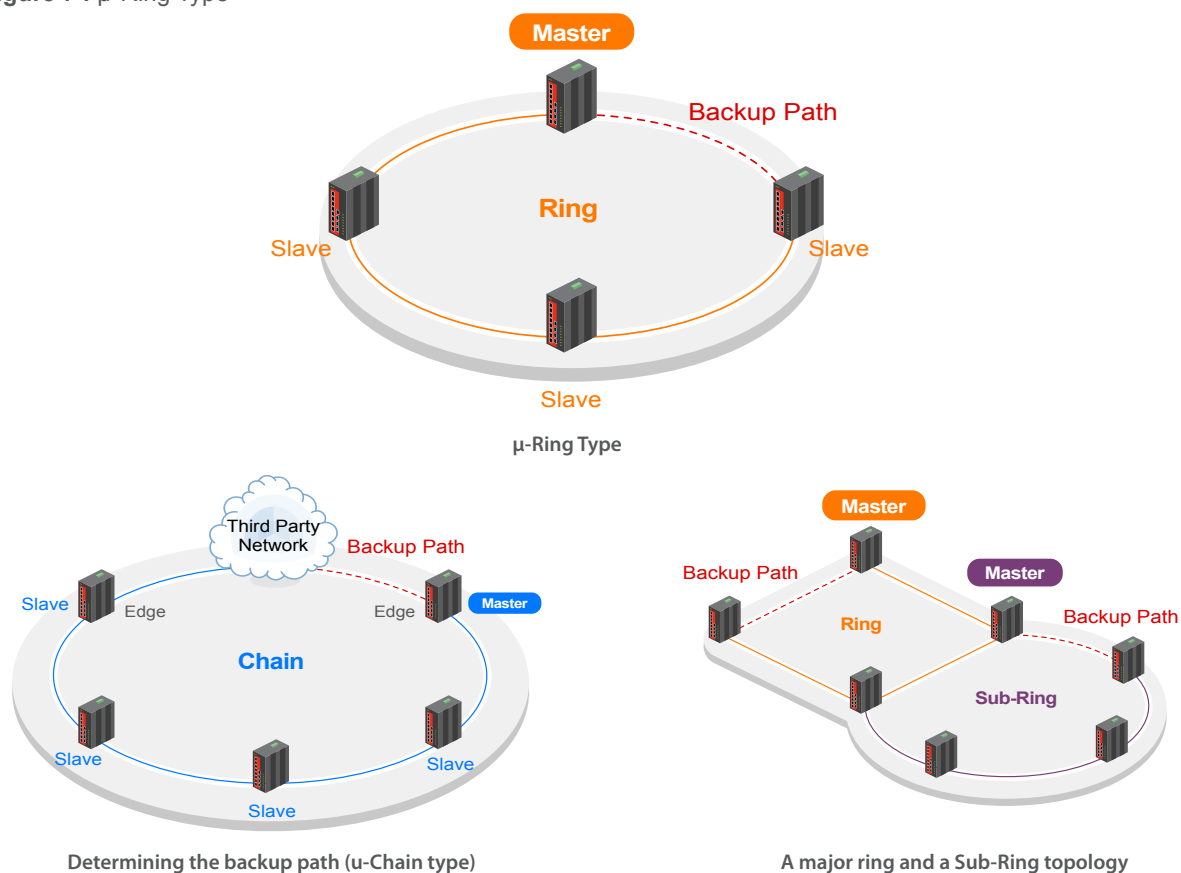
u-Ring Configuration Auto-refresh ☐ Refresh

Delete	Instance	Type	Master	East		West	
				Port	Edge	Port	Edge
Delete	1	u-Ring ▼	☐	1 ▼		2 ▼	
Delete	2	u-Ring ▼	☐	4 ▼		3 ▼	
Delete	3	u-Ring ▼	☐	10 (Fiber2) ▼		11 (Fiber3) ▼	
Delete	4	Sub-Ring ▼	☐	6 ▼			
Delete	5	u-Chain ▼	☐	5 ▼	☐	9 (Fiber1) ▼	☐

Add New Instance

Save Reset

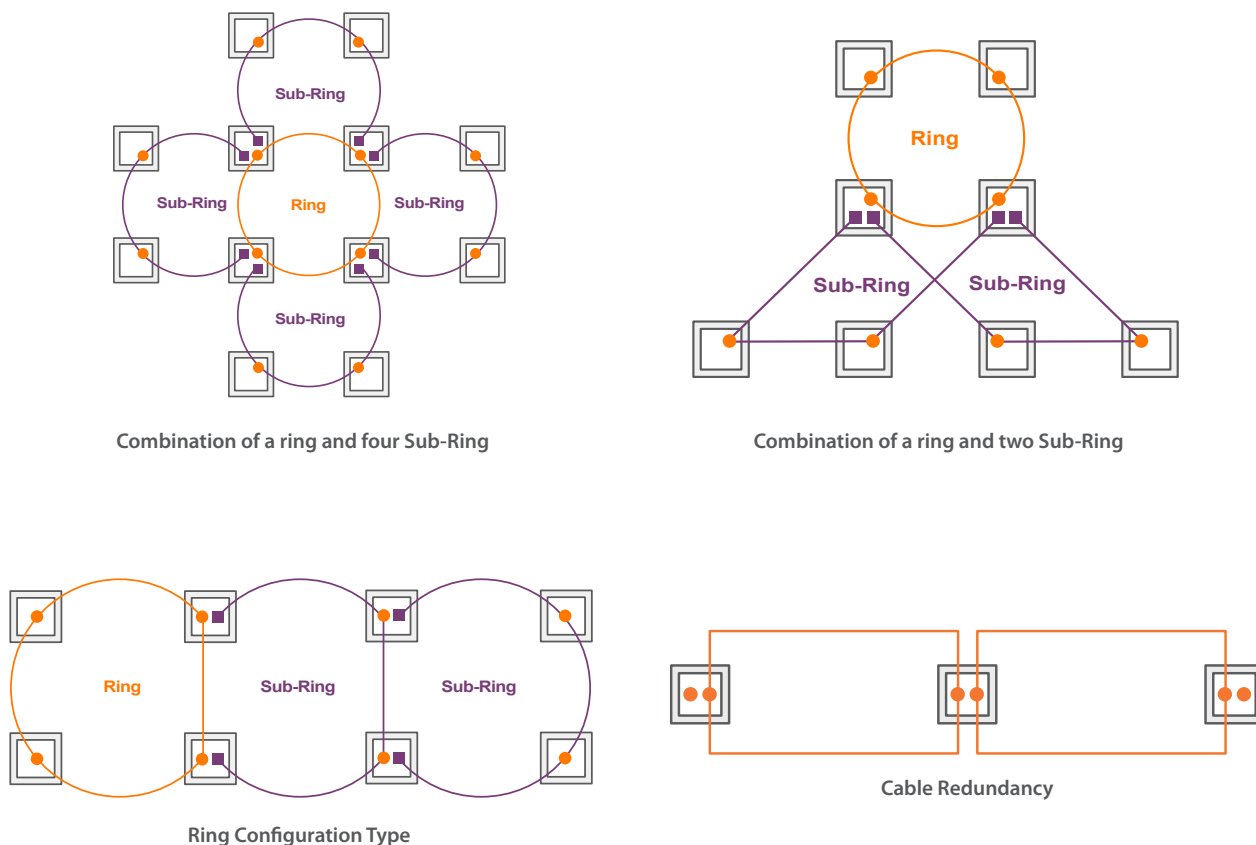
► **Figure 7 : μ -Ring Type**



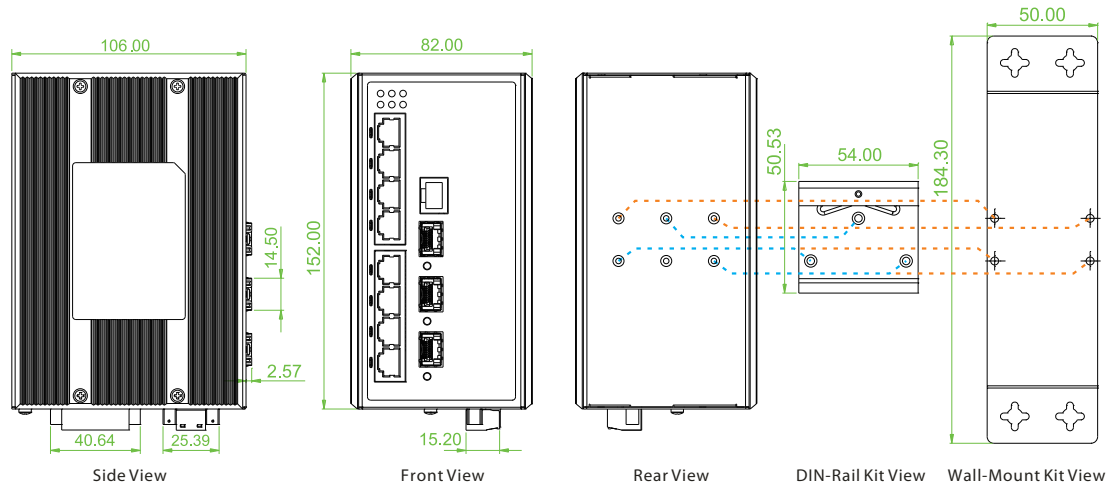
► **Figure 8 : Ring Configuration Example**

Ring Configuration Type

- u-Ring
- Sub-Ring



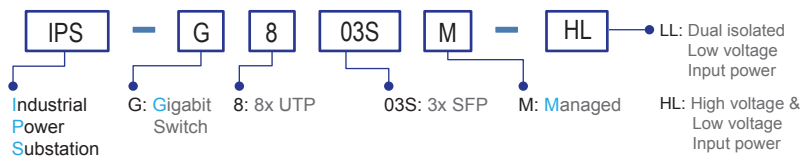
Dimensions



Ordering Information

Model Name	Managed	Total Port	UTP Port	Fiber	Input Power		Certification			
			10/100/1000 Base-T	100/1000 Base-X	Low Voltage isolated 24/48 VDC	High Voltage 110/220V DC/AC	IEC61850-3	EN50121-4	Safety UL60950-1	CE, FCC
IPS-G803SM-LL	V	11	8	3 SFP	2	—	V	V	V	V
IPS-G803SM-HL	V	11	8	3 SFP	2	1	V	V	V	V

Model Naming Rule



Optional Accessories

Industrial Power Supply

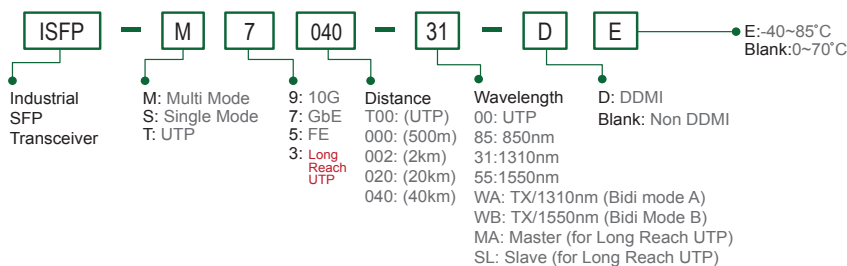
DR-4524	Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 48W, -10 ~ +50°C
MDR-40-24	Industrial Power, Input 85 ~ 264VAC, Output 24VDC, 40W, -20 ~ +70°C

Industrial SFP Transceiver

(The ISFP series of industrial grade SFP modules have been fully tested with the IPS-G803SM 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 detail and more items.)

ISFP-M7000-85-D(E)	Industrial SFP GbE 1000Base-SX, M/M, 500 meter, wave length 850nm, 7.5dB, LC, DDML, -10~70°C (-40~85°C)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDML, -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, DDML, -10~70°C (-40~85°C)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDML, -10~70°C (-40~85°C)
ISFP-T3T00-MA-(E)	Industrial SFP 100Mbps, long reach UTP (2 wire) (500meter), Master, -10~70°C (-40~85°C)
ISFP-T3T00-SL-(E)	Industrial SFP 100Mbps, long reach UTP (2 wire) (500meter), Slave, -10~70°C (-40~85°C)

SFP Naming Rule



Package List

- IPS-G803SM device
- Console cable (RJ-45 to DB9)
- CD (SmartConfig, MIB file, Manual)
- Quickly installation guide
- Din Rail with screws
- Wall mount bracket with screws
- Terminal block
- Protective caps for SFP ports