IPS-G803SM

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

UL60950-1 CE FC IEC 61850-3 EN50121-4 IPv6 SmartView µ-Ring IEEE 1588v2 GOOSE

IPS-G803SM is a managed industrial grade Gigabit Ethernet switch that 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 provides 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, ACL, 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 networks (See Figure). The series product can be managed centrally and conveniently by CTC Union's SmartView™ Element Management System or other third party SNMP managers.

Features

- 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, IEEE 1613 certified for power substation
- Heavy industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Redundant isolated low voltage 24/48VDC, or/and isolated High voltage AC/DC (110/220 VAC/VDC) power inputs
- Isolated RS-232 console port
- 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 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 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), and µ-Ring for cabling redundant
- Provides 5 instances that each can support µ-Ring, µ-Chain or Sub-Ring type for flexible uses.
  (Please see CTC Union µ-Ring white paper for more details and more topology application)
- 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
- 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
- DHCP Server/Client/ Relay/ Relay option 82/ Snooping
- Supports RMON, MIB II, Private MIB, 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
- Supports Modbus/TCP protocols for management
- Provides SmartConfig for quick and easy mass Configuration Tool*
- Supported by 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)
	IEEE 802.1Q for VLAN Tagging
	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)

Standard	
	IEEE 802.3x 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

2019 v1.1
www.ctcu.com / sales@ctcu.com
Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

10-2

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
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	Supported for Power Input
Overload Current Protection	Supported
CPU Watch Dog	Supported
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)
	Isolated Low Voltage DC : Isolated 24/48V (18~72VDC), Removable Terminal Block High voltage AC/DC : isolated 110/220VAC (85VAC~264VAC) or 110/220VDC (88~300VDC), 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℃ ~ 85℃
Operating Humidity	5% to 95% (Non-condensing)
Storage Temperature	-40℃ ~ 85℃
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 (Optional)
MTBF	535,335 Hours (IPS-G803SM-LL) 143,943 Hours (IPS-G803SM-HL) (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC/EMS	CE (EN55024, EN55032)
EMI	FCC Part 15 Subpart B Class A
	EN55032 Class A
EMS (Electromagnetic Susceptibility) Protection Level	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

Software Specifications

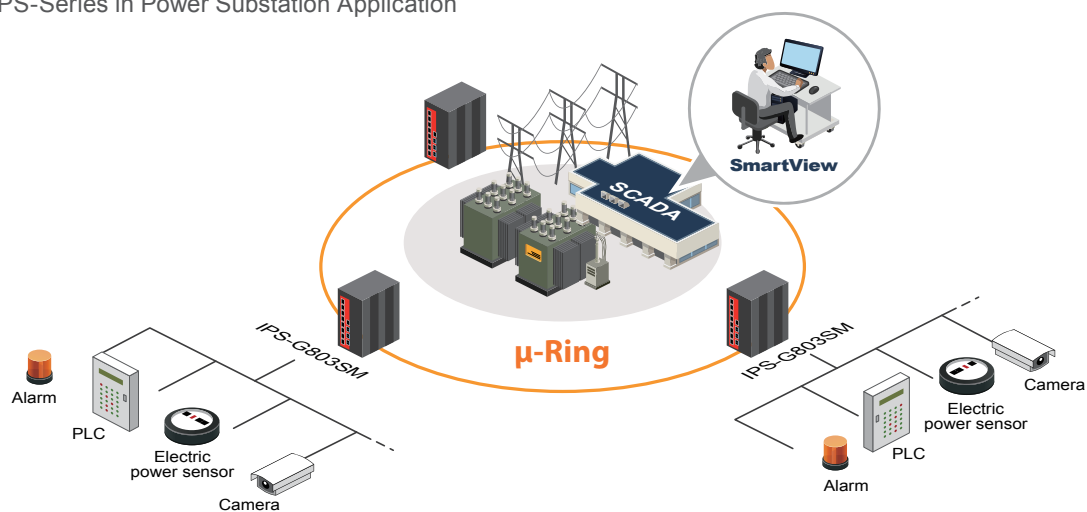| **Topology**	
VLAN	IEEE 802.1q VLAN,up to 4094 ID
	IEEE 802.1q VLAN,up to 4094 Groups
	IEEE 802.1ad Q-in-Q
	MAC-based VLAN,up to 256 entries
	IP Subnet-based VLAN, up to 128 entries
	Protocol-based VLAN (Ethernt, SNAP, LLC), up to 128 entries
	VLAN Translation, up to 256 entries
	MVR (Multiple VLAN 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	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP
Multiple u-Ring	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 Maximum 250 devices in a Ring (Please see CTC Union μ-Ring white paper for more details and more topology application)
Loop Protection	Supported
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	IEEE 802.1p 8 active priorities queues for per port
GOOSE Message	Complies with IEC61850 standard to achieve zero packet loss
Traffic Classification QoS	IEEE 802.1p based CoS
	IP Precedence based CoS
	IP DSCP based CoS

Traffic Classification QoS	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
IGMP / MLD Snooping	Throttling
	Fast Leave
	Maximum Multicast Group : up to 1022 entries
	Query / Static Router Port
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 & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported

10-3

2019 v1.1
www.ctcu.com / sales@ctcu.com
Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

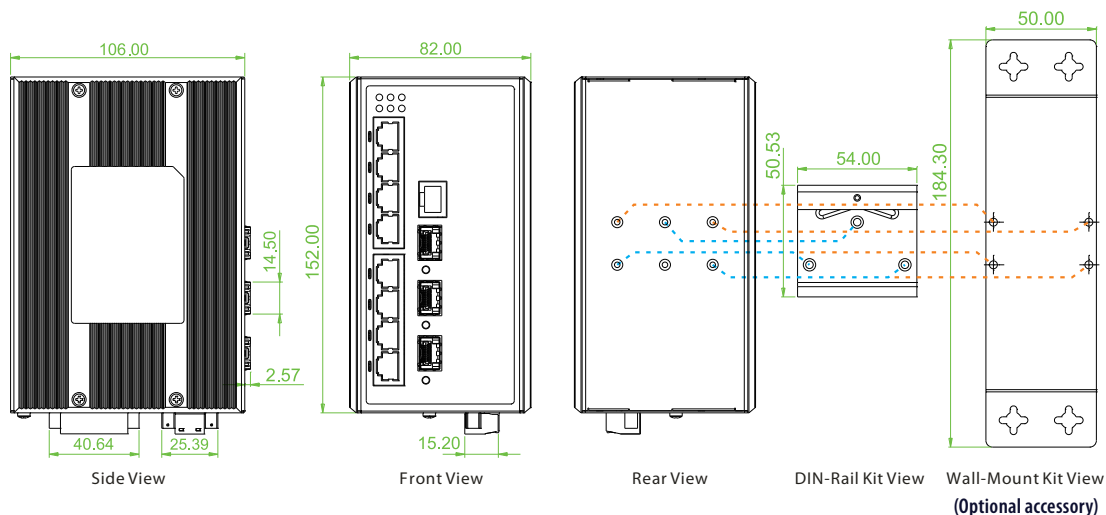|				
SSL / SSH v2	Supported		**NTP /SNTP**	Client
User Name	Local Authentication		**LLDP (IEEE 802.1ab)**	Link Layer Discovery Protocol
Password				LLDP-MED
Authentication	Remote Authentication (via RADIUS/ TACACS+)		**IPv6 Features**	
Management Interface Access Filtering	Web, Telnet / SSH , CLI RS-232 console		**IPv6 Management**	Telnet Server/ICMP v6
Management Features			**SNMP over IPv6**	Supported
CLI	Cisco® like CLI		**HTTP over IPv6**	Supported
Web Based Management			**SSH over IPv6**	Supported
Telnet	Server		**IPv6 Telnet**	Supported
SNMP	V1, V2c, V3		**IPv6 NTP / SNTP**	Client
Modbus/TCP	Support for management and monitoring		**IPv6 TFTP**	Supported
SW &	TFTP, HTTP		**IPv6 QoS**	Supported
Configuration Upgrade	Redundant firmware in case of upgrade failure		**IPv6 ACL**	Number of rules: up to 256 entries
RMON	RMON I (1, 2, 3, 9 group), RMON II			for L2 / L3 / L4
MIB	MIB II RFC1213, Private MIB			L2 : Mac address SA/DA/VLAN
UPnP	Supported			L3: IP address SA/DA, Subnet
DHCP	Server, Client, Relay, Relay option 82 , Snooping			L4: TCP/UDP
IP Source Guard	Supported		**Others Features**	
Port Mirroring	Supported		**Green Ethernet**	Supports IEEE 802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption
Event Syslog	Syslog server (RFC3164) (Support 1 server)			Determine the cable length and lowering the power for ports with short cables
Warning Message	System Syslog, SMTP/ e-mail event message, alarm relay		**Green Ethernet**	Lower the power for a port when there is no link LED Power Management: Adjustment LEDs intensity
DNS	Client, Proxy		**Cable Diagnostic**	Measuring UTP cable is normal or broken point distance
IEEE 1588 PTP V2	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave			

Application

Figure : IPS-Series in Power Substation Application

Dimensions

Side View   Front View   Rear View   DIN-Rail Kit View   Wall-Mount Kit View
(Optional accessory)

2019 v1.1
www.ctcu.com / sales@ctcu.com
Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

10-4

Ordering Information

Model Name	Managed	Total Port	RJ45 UTP port 10/100/1000 Base-T	Fiber 100/1000 Base-X	Redundant Input Power Low Voltage 24/48VDC	Redundant Input Power High Voltage 110/220V DC/AC	Certification IEC61850-3 IEEE 1613	Railway EN50121-4	Safety UL60950-1	EN61000-6-2 EN61000-6-4	CE, FCC
IPS-G803SM-LL	V	11	8	3 SFP	2		V	V	V	V	V
IPS-G803SM-HL	V	11	8	3 SFP	2	1	V	V	V	V	V

Model Naming Rule

IPS	–	G	8	03S	M	–	HL

Industrial **P**ower **S**ubstation

G: **G**igabit Switch

8: 8x GbE UTP

03S: 3x GbE SFP

M: **M**anaged

LL: Dual isolated Low voltage Input power

HL: High voltage & Low voltage Input power
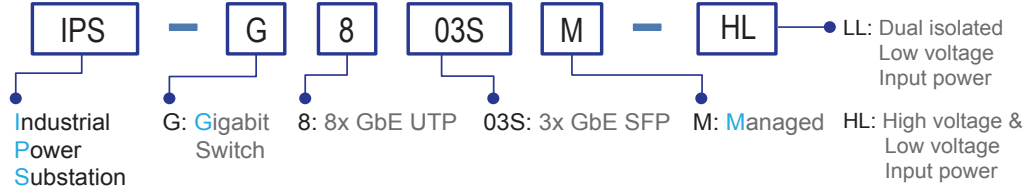
■ Package List

- IPS-G803SM device
- Console cable (RJ45 to DB9)
- CD (SmartConfig, MIB file, Manual)
- Quick installation guide
- Din Rail with Screws
- Terminal blocks
- Protective caps for SFP ports

Optional Accessories

■ Wall mount kit

IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm)

■ 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, DDMI, -10~70℃ (-40~85℃)
ISFP-S7020-31-D(E)	Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70℃ (-40~85℃)
ISFP-T7T00-00-(E)	Industrial SFP 10/100/1000Base-T UTP 100meter, -10~70℃ (-40~85℃)
ISFP-M5002-31-D(E)	Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70℃ (-40~85℃)
ISFP-S5030-31-D(E)	Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70℃ (-40~85℃)

SFP Naming Rule

ISFP	–	S	7	040	–	31	–	D	E

Industrial SFP Transceiver

M: Multi Mode
S: Single Mode
T: UTP

9: 10G
7: GbE
5: FE

Distance
T00: (UTP)
000: (500m)
002: (2km)
020: (20km)
040: (40km)

Wavelength
00: UTP
85: 850nm
31:1310nm
55:1550nm
WA: TX/1310nm (Bidi mode A)
WB: TX/1550nm (Bidi Mode B)

D: DDMI
Blank: Non DDMI

E:-40~85°C
Blank:0~70°C

10-5

2019 v1.1
www.ctcu.com / sales@ctcu.com
Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.