

## IPS-803GSM

8x 10/100Base RJ45 + 3x 100/1000Base SFP, Managed Ethernet Switch



- IEC 61850-3, IEEE 1613 certified for power substation
- UL60950-1, EN60950-1, EN50121-4, EN61000-6-2, EN61000-6-4, CE, FCC certified
- Supports IEEE 1588 PTP V2
- Supports GOOSE Message that complies with IEC61850 standard to achieve zero packet loss
- Supports u-Ring, ERPS, MSTP, RSTP, STP for redundant cabling



IPS-803GSM is a managed industrial grade 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  $\mu$ -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

- Redundant isolated low voltage 24/48VDC, or/and isolated High voltage AC/DC (110/220 VAC/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
- 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 5 instances that each can support  $\mu$ -Ring,  $\mu$ -Chain or Sub-Ring type for flexible uses. (Please see CTC Union  $\mu$ -Ring white paper for more details and more topology application)
- $\mu$ -Ring for Redundant Ethernet Ring, recovery time<10ms in 250 units
- 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

|                            |   |
|----------------------------|---|
| <b>Standard</b>            | IEEE 802.3 10Base-T 10Mbit/s Ethernet<br>IEEE 802.3u 100Base-TX, 100Base-FX, Fast Ethernet<br>IEEE 802.3z 1000Base-X Gbit/s Ethernet over Fiber-Optic<br>IEEE 802.1d STP (Spanning Tree Protocol)<br>IEEE 802.1w RSTP (Rapid Spanning Tree Protocol)<br>IEEE 802.1s MSTP (Multiple Spanning Tree Protocol)<br>IEEE 802.1Q for VLAN Tagging<br>IEEE 802.1X Port based and MAC based Network Access Control, Authentication<br>IEEE 802.3ac Max frame size extended to 1522Bytes<br>IEEE 802.3ad Link aggregation for parallel links with LACP(Link Aggregation Control Protocol) |
| <b>Standard</b>            | IEEE 802.3x Flow Control and Back Pressure<br>ITU-T G.8032/ Y.1344 ERPS (Ethernet Ring Protection Switching)<br>IEEE 802.1ad Stacked VLANs, Q-in-Q<br>IEEE 802.1p LAN Layer 2 QoS/CoS Protocol for Traffic Prioritization<br>IEEE 802.1ab Link Layer Discovery Protocol (LLDP)<br>IEEE 802.3az EEE (Energy Efficient Ethernet)  |
| <b>Switch Architecture</b> | Back-plane (Switching Fabric): 7.6 Gbps<br>Full wire-speed  |
| <b>Data Processing</b>     | Store and Forward   |
| <b>Flow Control:</b>       | IEEE 802.3x flow control, back pressure flow control  |
| <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>Network Connector</b>   | 8x 10/100Base-TX RJ-45 auto negotiation speed<br>Auto MDI/MDI-X function, Full/Half duplex<br>3x 100/1000Base-X dual speed mode SFP slot, with DDMI   |
| <b>Console</b>             | RS-232 (RJ-45)  |

| <b>Network Cable</b>               | UTP/STP above Cat. 5e cable<br>EIA/TIA-568 100-ohm (100m)  |               |            |        |       |        |     |       |    |       |       |
|------------------------------------|--|---------------|------------|--------|-------|--------|-----|-------|----|-------|-------|
| <b>Protocols</b>                   | CSMA/CD  |               |            |        |       |        |     |       |    |       |       |
| <b>LED</b>                         | Per unit : Power 1 (Green), Power 2 (Green), Fault (Amber) (-LL model)<br>Per unit : Power 1 (Green), Power 2 (Green), Power 3(Green), Fault (Amber) (-HL model)<br>Per RJ-45 port :10/100Link/Act: Green<br>SFP Fiber Per port : Link/Active (Green)  |               |            |        |       |        |     |       |    |       |       |
| <b>Reverse Polarity Protection</b> | Supported for Power Input  |               |            |        |       |        |     |       |    |       |       |
| <b>Overload Current Protection</b> | Supported  |               |            |        |       |        |     |       |    |       |       |
| <b>CPU Watch Dog</b>               | Supported  |               |            |        |       |        |     |       |    |       |       |
| <b>Power Input</b>                 | Redundant 2x Isolated Low Voltage DC Input power (-LL model)<br>Redundant 2x isolated Low Voltage DC and 1 High Voltage AC/DC input power (-HL model)<br>Isolated Low Voltage DC : Isolated 24/48V (18~72VDC), Removable Terminal Block<br>High voltage AC/DC : isolated 110/220VAC (85VAC~264VAC) or 110/220VDC (88~300VDC), Removable Terminal Block |               |            |        |       |        |     |       |    |       |       |
| <b>Power consumption</b>           | <table border="1"> <thead> <tr> <th>Input Voltage</th> <th>IPS-803GSM</th> </tr> </thead> <tbody> <tr> <td>110VAC</td> <td>7.3 W</td> </tr> <tr> <td>220VAC</td> <td>7 W</td> </tr> <tr> <td>24VDC</td> <td>8W</td> </tr> <tr> <td>48VDC</td> <td>9.2 W</td> </tr> </tbody> </table>   | Input Voltage | IPS-803GSM | 110VAC | 7.3 W | 220VAC | 7 W | 24VDC | 8W | 48VDC | 9.2 W |
| Input Voltage                      | IPS-803GSM   |               |            |        |       |        |     |       |    |       |       |
| 110VAC                             | 7.3 W  |               |            |        |       |        |     |       |    |       |       |
| 220VAC                             | 7 W  |               |            |        |       |        |     |       |    |       |       |
| 24VDC                              | 8W   |               |            |        |       |        |     |       |    |       |       |
| 48VDC                              | 9.2 W  |               |            |        |       |        |     |       |    |       |       |
| <b>Alarm Relay Contact</b>         | Relay outputs with current carrying capacity of 1 A @24VDC   |               |            |        |       |        |     |       |    |       |       |

|                                 |  |
|---------------------------------|--|
| <b>Removable Terminal Block</b> | Provide 2 redundant low volt power, alarm relay contact (6 Pin) (-LL model)<br>Provide 2 redundant low volt power, alarm relay contact (6 Pin) , and High volt Power (2 Pin) (-HL model) |
| <b>Operating Temperature</b>    | -40°C ~ 85°C   |
| <b>Operating Humidity</b>       | 5% to 95% (Non-condensing)   |
| <b>Storage Temperature</b>      | -40°C ~ 85°C   |
| <b>Housing</b>                  | Rugged Metal, IP30 Protection, Fanless   |
| <b>Dimension</b>                | 106 x 82 x 152mm (D x W x H)   |
| <b>Weight</b>                   | 0.885kg (IPS-803GSM-LL) 1.085kg (IPS-803GSM-HL)  |
| <b>Installation mounting</b>    | DIN Rail mounting, or wall mounting (Optional)   |
| <b>MTBF</b>                     | 535,335 Hours (IPS-803GSM-LL)<br>143,943 Hours (IPS-803GSM-HL)<br>(MIL-HDBK-217)   |
| <b>Warranty</b>                 | 5 years  |
| <b>Certification</b>            |  |
| <b>EMC/EMS</b>                  | CE (EN55024, EN55032)  |

## Software Specifications

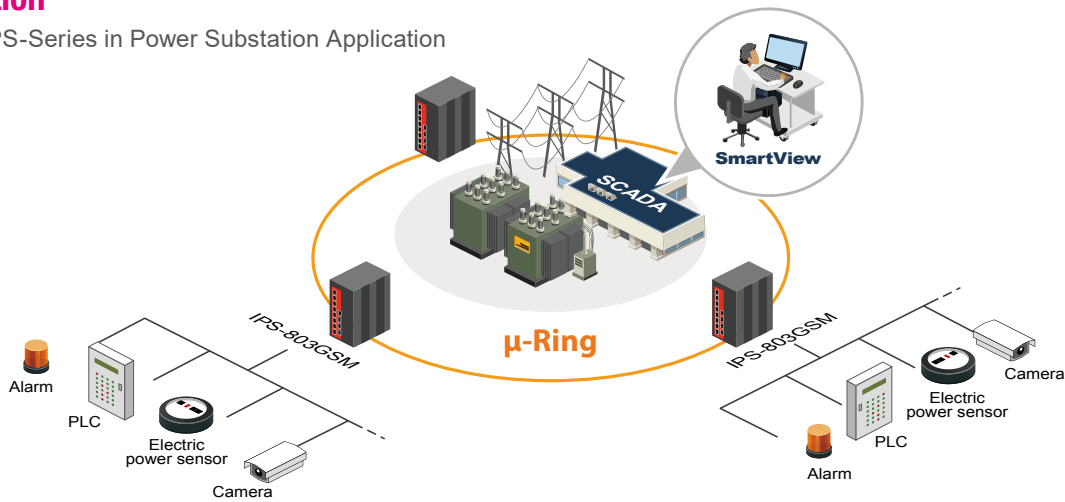
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| <b>Topology</b>  |  |
| <b>VLAN</b>  | IEEE 802.1q VLAN, up to 4094 ID<br>IEEE 802.1q VLAN, up to 4094 Groups<br>IEEE 802.1ad Q-in-Q<br>MAC-based VLAN, up to 256 entries<br>IP Subnet-based VLAN, up to 128 entries<br>Protocol-based VLAN (Ethernet, SNAP, LLC), up to 128 entries<br>VLAN Translation, up to 256 entries<br>MVR (Multiple VLAN Registration)<br>GVRP (GARP VLAN Registration Protocol) |
| <b>Link Aggregation (Port Trunk)</b>                         | Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group<br>Dynamic (IEEE 802.3ad LACP), up to 5 trunk group   |
| <b>Spanning Tree</b>   | IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s 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<br>Recovery time <10ms<br>Maximum 250 devices in a Ring<br>(Please see CTC Union u-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> | Convergence time <50ms<br>Single Ring, Sub-Ring, Multiple ring topology network  |
| <b>QoS Feature</b>   |  |
| <b>Class of Service</b>                                      | IEEE 802.1p 8 active priorities queues for per port  |
| <b>GOOSE Message</b>   | Complies with IEC61850 standard to achieve zero packet loss  |
| <b>Traffic Classification QoS</b>                            | IEEE 802.1p based CoS<br>IP Precedence based CoS<br>IP DSCP based CoS  |
| <b>Traffic Classification QoS</b>                            | QCL(QoS Control List): Frame Type, Source/Destination MAC, VLAN ID, PCP, DEI<br>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<br>Range : 100 kbps to 1Gbps / 1fps to 3300kfps<br>Rate Unit : bit or frame   |
| <b>Bandwidth Control for Egress</b>                          | Rate in steps : 1 kbps / Mbps<br>Range : 100 kbps to 1Gbps<br>Rate Unit : bit<br>Per queue / Per port shaper   |
| <b>DiffServ (RF 2474) Remarking</b>                          |  |
| <b>Storm Control</b>   | for Unicast, Broadcast, Multicast  |
| <b>IP Multicasting Feature</b>                               |  |
| <b>IGMP / MLD Snooping</b>                                   | IGMP Snooping v1, v2, v3 / MLD Snooping v1, v2<br>support 1022 IGMP groups<br>Port Filtering Profile   |
| <b>IGMP / MLD Snooping</b>                                   | Throttling<br>Fast Leave<br>Maximum Multicast Group : up to 1022 entries<br>Query / Static Router Port   |
| <b>Security Features</b>                                     |  |
| <b>IEEE 802.1X</b>   | Port-Based<br>MAC-Based  |
| <b>ACL</b>   | Number of rules : up to 256 entries<br>for L2 / L3 / L4<br>L2 : Mac address SA/DA/VLAN<br>L3 : IP address SA/DA, Subnet<br>L4 : TCP/UDP  |

|   |   |
|---|---|
| <b>EMI</b>  | FCC Part 15 Subpart B Class A<br>EN55032 Class A  |
| <b>EMS</b>  | EN61000-4-2 (ESD) Level 4, Criteria B<br>EN61000-4-3 (RS) Level 4, Criteria A<br>EN61000-4-4 (EFT) Level 4, Criteria A<br>EN61000-4-5 (Surge) Level 4, Criteria B<br>EN61000-4-6 (CS) Level 4, Criteria A<br>EN61000-4-8 (Magnetic Field) Level 5, Criteria A |
| <b>(Electromagnetic Susceptibility) Protection Level</b>          |   |
| <b>Safety</b>   | UL60950-1, EN60950-1  |
| <b>Power Substation Immunity for Heavy Industrial Environment</b> | IEC 61850-3, IEEE 1613  |
| <b>Emission for Heavy Industrial Environment</b>                  | EN61000-6-2   |
| <b>Railway Traffic</b>  | EN50121-4   |
| <b>Freefall</b>   | IEC 60068-2-32  |
| <b>Vibration</b>  | IEC 60068-2-6   |

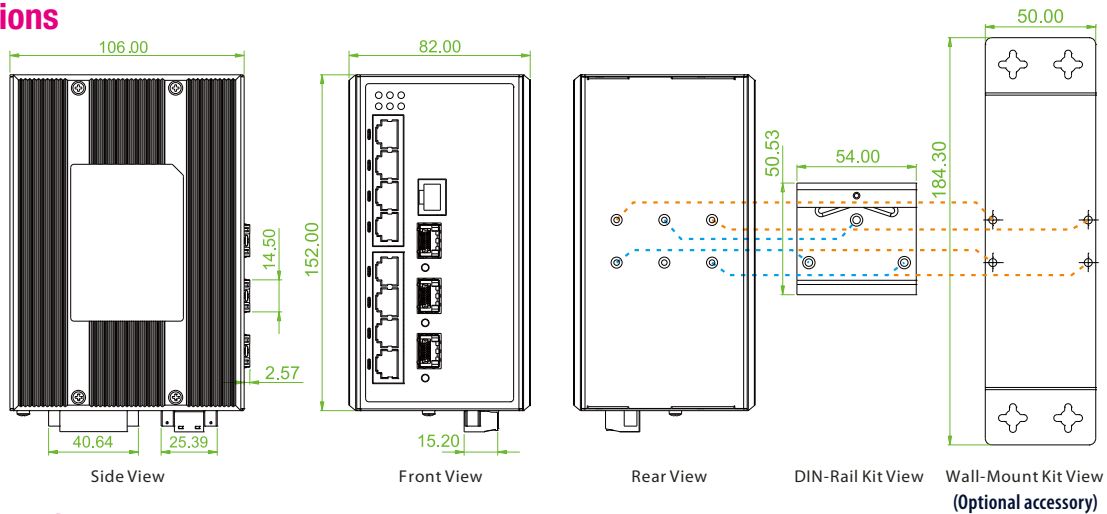
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|---|--|
| <b>RADIUS authentication &amp; accounting</b>               |  |
| <b>TACACS+ authentication &amp; accounting, TACACS+ 3.0</b> |  |
| <b>HTTPS, HTTP</b>  | Supported  |
| <b>SSL / SSH v2</b>   | Supported  |
| <b>User Name Password Authentication</b>                    | Local Authentication<br>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>   | Support for management and monitoring  |
| <b>SW &amp; Configuration Upgrade</b>                       | TFTP, HTTP<br>Redundant firmware in case of upgrade failure  |
| <b>RMON</b>   | RMON I (1, 2, 3, 9 group), RMON II   |
| <b>MIB</b>  | MIB II RFC1213, 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) (Support 1 server)   |
| <b>Warning Message</b>                                      | System Syslog, SMTP/ e-mail event message, alarm relay   |
| <b>DNS</b>  | Client, Proxy  |
| <b>IEEE 1588 PTP V2</b>                                     | Support 5 operating mode in each port :<br>Ordinary-Boundary,<br>Peer to Peer Transparent Clock,<br>End to End Transparent Clock,<br>Master, Slave                                     |
| <b>NTP /SNTP</b>  | Client   |
| <b>LLDP (IEEE 802.1ab)</b>                                  | Link Layer Discovery Protocol<br>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<br>for L2 / L3 / L4<br>L2 : Mac address SA/DA/VLAN<br>L3 : IP address SA/DA, Subnet<br>L4 : TCP/UDP   |
| <b>Others Features</b>                                      |  |
| <b>Green Ethernet</b>                                       | Supports IEEE 802.3az EEE (Energy Efficient Ethernet)<br>Management to optimize the power consumption<br>Determine the cable length and lowering the power for ports with short cables |
| <b>Green Ethernet</b>                                       | Lower the power for a port when there is no link<br>LED Power Management: Adjustment LEDs intensity  |
| <b>Cable Diagnostic</b>                                     | Measuring UTP cable is normal or broken point distance   |

## Application

Figure : IPS-Series in Power Substation Application



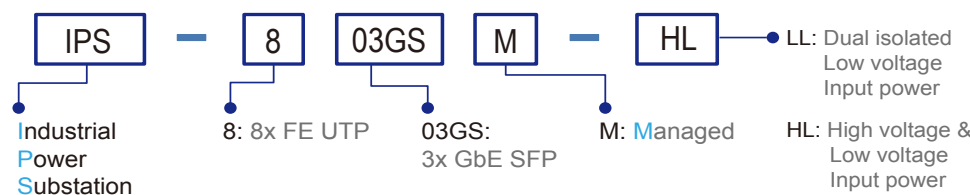
## Dimensions



## Ordering Information

| Model Name    | Managed | Total Port | RJ45 UTP port |                 | Fiber                |                             | Redundant Input Power |                   | Certification    |                  |         |  |
|---------------|---------|------------|---------------|-----------------|----------------------|-----------------------------|-----------------------|-------------------|------------------|------------------|---------|--|
|               |         |            | 10/100Base-TX | 100/1000 Base-X | Low Voltage 24/48VDC | High Voltage 110/220V DC/AC | IEC61850-3 IEEE 1613  | Railway EN50121-4 | Safety EN60950-1 | Safety UL60950-1 | CE, FCC |  |
| IPS-803GSM-LL | V       | 11         | 8             | 3 SFP           | 2                    |                             | V                     | V                 | V                | V                | V       |  |
| IPS-803GSM-HL | V       | 11         | 8             | 3 SFP           | 2                    | 1                           | V                     | V                 | V                | V                | V       |  |

### Model Naming Rule



### Package List

- IPS-803GSM device
- Console cable (RJ45 to DB9)
- 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-803GSM 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°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-T7T00-00-(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

