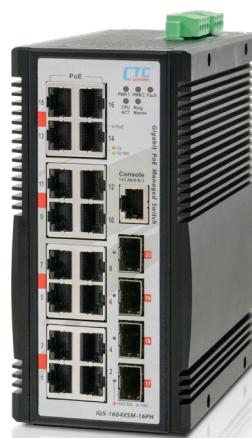


# IGS-1604XSM-16PH

16x GbE RJ45 + 4x 1G/2.5G/10G SFP+ with 16x PoE 300W

- ▲ Supports u-Ring, ERPS, EPS, MSTP, RSTP, STP for redundant cabling
- ▲ Auto checking and auto reset when PoE PD fail
- ▲ EN62368-1, EN50121-4, EN61000-6-2, EN61000-6-4, CE and FCC certified



An Industrial 16-port PoE Gigabit Ethernet switch with 4-port 10 Gigabit SFP+ slot, supporting various types of 10 and 2.5 Gigabit optical small form-factor pluggable transceivers for long-distance and wide-bandwidth transmission, each PoE port support IEEE802.3af/at standard of the maximum 30W power output, each switch has a total power budget of up to 300Watts, used to connect and feed various types of Ethernet power devices, such as smoke sensors, Wi-Fi access points, femtocells, alarm centers, and IP cameras. the din-rail and fan less 20-port switch adopts an enhanced and hardened design for high surge protection, wide operating temperature and safety certified to meet critical and centralize strict requirements.

## Features

- 48VDC (46~57VDC) redundant dual input power
- Provides 16-port IEEE 802.3af / 802.3at PoE+ output (30W per port. total 300W)
- Cable diagnostics, identifies opens/shorts distance
- Provides 5 ring instances that each can support  $\mu$ -Ring,  $\mu$ -Chain or Sub-Ring type for flexible uses. Supports up to 5 rings in one device (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
- Supports EMS Management

## 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 802.3ae          | 10G bit/s Ethernet over Fiber                                                    |
|          | IEEE 802.3af          | PoE (Power over Ethernet)                                                        |
|          | IEEE 802.3at          | PoE+ (Power over Ethernet enhancements)                                          |
|          | 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)                                        |
|          | ITU-T G.8031 / Y.1342 | EPS (Ethernet 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                                             |
|          | 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)                                                  |

# Industrial Managed 10G PoE Switch

|                                     |                                                                                                                                                                                                                                                 |                         |                          |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------------------|
| Switch Architecture                 | Back-Plane (Switching Fabric): 112Gbps (Full Wire-Speed)                                                                                                                                                                                        |                         |                          |
| Data Processing                     | Store and Forward                                                                                                                                                                                                                               |                         |                          |
| Flow Control                        | IEEE 802.3x for full duplex mode back pressure for half duplex mode                                                                                                                                                                             |                         |                          |
| Network Connector                   | 16x 10/100/1000Base-T RJ-45 + 4x 100/1000/2.5G/5G/10GBase-X SFP<br>RJ-45 UTP port supports Auto-negotiation speed, Auto MDI/MDI-X function<br>SFP port supports 1G/2.5G/5G/10G speed with DDMI                                                  |                         |                          |
| Console                             | RS-232 (RJ-45)                                                                                                                                                                                                                                  |                         |                          |
| PoE standard & RJ-45 Pin Assignment | 16x IEEE 802.3af /IEEE 802.3at<br>2 pairs PoE, PoE+, 30W/port<br>End-Span, Alternative A mode.<br>Positive (V+) : RJ-45 pin 1, 2.<br>Negative (V-) : RJ-45 pin 3, 6.                                                                            |                         |                          |
| Network Cable                       | UTP/STP Cat. 5e cable or above<br>EIA/TIA-568 100-ohm (100meter)                                                                                                                                                                                |                         |                          |
| Protocols                           | CSMA/CD                                                                                                                                                                                                                                         |                         |                          |
| Reverse Polarity Protection         | Supported for power input                                                                                                                                                                                                                       |                         |                          |
| Overload Current Protection         | Supported                                                                                                                                                                                                                                       |                         |                          |
| CPU Watch Dog                       | Supported                                                                                                                                                                                                                                       |                         |                          |
| Power Supply                        | Redundant Dual DC 48V (46~57VDC) input power, (Removable terminal block )<br>(50~57V input is recommended for IEEE802.3at PoE+ applications)                                                                                                    |                         |                          |
| Power Consumption                   | Input Voltage                                                                                                                                                                                                                                   | Total Power Consumption | Device Power Consumption |
|                                     | 50VDC                                                                                                                                                                                                                                           | 337W                    | 28.5W                    |
| PoE Budget                          | Maximum PoE Output power budget 30W / Per Port Total 300W                                                                                                                                                                                       |                         |                          |
| LED                                 | System: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow)<br>UTP: 10/100 Link/Active (Green), 1000 Link/Active (Amber)<br>SFP Slot: 1G/2.5G Link/Active (Amber), 10G Link/Active (Blue)<br>PoE: ON (Green) |                         |                          |
| Jumbo Frame                         | 10KB                                                                                                                                                                                                                                            |                         |                          |
| IEEE802.3ac                         | Max frame size extended to 1522Bytes (allow Q-tag in packet)                                                                                                                                                                                    |                         |                          |
| MAC Address Table                   | 32K                                                                                                                                                                                                                                             |                         |                          |
| Memory Buffer                       | 4M Bytes for packet buffer                                                                                                                                                                                                                      |                         |                          |
| Device Memory                       | 128M Bytes Flash ROM, 2G Bytes RAM                                                                                                                                                                                                              |                         |                          |
| Warning Message                     | System Syslog, SMTP/ e-mail event message, alarm relay                                                                                                                                                                                          |                         |                          |
| DO(Alarm Relay Contact)             | Relay outputs with current carrying capacity of 1 A @24VDC                                                                                                                                                                                      |                         |                          |
| DI Input                            | DI 17 to 30 V for state 1, 0 to 15 V for state 0                                                                                                                                                                                                |                         |                          |
| Removable Terminal Block            | Provides 2 terminal block for DO (Alarm Relay), DI, redundant power PWR1 and PWR2                                                                                                                                                               |                         |                          |
| Operating Temperature               | -40 ~ 60°C                                                                                                                                                                                                                                      |                         |                          |
| Operating Humidity                  | 5% to 95% (Non-condensing)                                                                                                                                                                                                                      |                         |                          |
| Storage Temperature                 | -40 ~ 85°C                                                                                                                                                                                                                                      |                         |                          |
| Housing                             | Rugged Metal, IP30 Protection, Fanless                                                                                                                                                                                                          |                         |                          |
| Dimensions                          | 155.6 x 77 x 160mm (D x W x H)                                                                                                                                                                                                                  |                         |                          |
| Weight                              | 2.065kg                                                                                                                                                                                                                                         |                         |                          |
| Installation Mounting               | DIN Rail mounting, or wall mounting (Optional)                                                                                                                                                                                                  |                         |                          |
| MTBF                                | 224,776 Hours (MIL-HDBK-217)                                                                                                                                                                                                                    |                         |                          |
| Warranty                            | 5 years                                                                                                                                                                                                                                         |                         |                          |

## Certification

|                                           |                                   |
|-------------------------------------------|-----------------------------------|
| EMC                                       | CE (EN55032, EN55035)             |
| EMI (Electromagnetic Interference)        | FCC Part 15 Subpart B Class A, CE |
| Railway Traffic                           | EN50121-4                         |
| Immunity for Heavy Industrial Environment | EN61000-6-2                       |
| Emission for Heavy Industrial Environment | EN61000-6-4                       |

|                                                       |                                                                       |
|-------------------------------------------------------|-----------------------------------------------------------------------|
| EMS (Electromagnetic Susceptibility) Protection Level | 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 |
| Safety                                                | EN62368-1                                                             |
| Shock                                                 | IEC 60068-2-27                                                        |
| Freefall                                              | IEC 60068-2-31                                                        |
| Vibration                                             | IEC 60068-2-6                                                         |

## Software Specifications

### Topology

|                                                           |                                                                                                                                                                                                                      |
|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VLAN                                                      | 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 )                                                                                                                                                                                  |
|                                                           | Voice VLAN                                                                                                                                                                                                           |
| 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 $\mu$ -Ring                                      | Up to 5 instances that each supports $\mu$ -Ring, $\mu$ -Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings<br>Recovery time <10ms<br>The maximum number of devices in the ring supports 250 nodes. |
| Loop Protection                                           | Supported                                                                                                                                                                                                            |
| ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection )    | Recovery time <50ms                                                                                                                                                                                                  |
|                                                           | Single Ring, Sub-Ring, Multiple ring topology network                                                                                                                                                                |
| ITU-T G.8031 / Y.1342 EPS (Ethernet Protection Switching) | Supported                                                                                                                                                                                                            |

### QoS Features

|                               |                                                                                                               |
|-------------------------------|---------------------------------------------------------------------------------------------------------------|
| Class of Service              | IEEE 802.1p 8 active priorities queues for per port                                                           |
| Traffic Classification QoS    | 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                           |
| Bandwidth Control for Ingress | 100~1,000,000 when the "Unit" is "kbps", and 1~1,000 when the "Unit" is "Mbps"                                |
| Bandwidth Control for Egress  | 100~1,000,000 when the "Unit" is "kbps", and 1~1,000 when the "Unit" is "Mbps"<br>Per queue / Per port shaper |
| DiffServ (RF 2474) Remarking  |                                                                                                               |
| Storm Control                 | for Unicast, Broadcast, Multicast                                                                             |

### IP Multicasting Features

|                     |                                                |
|---------------------|------------------------------------------------|
| IGMP / MLD Snooping | 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                     |

## Security Features

|                                       |                                                                                                                                       |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| IEEE 802.1X                           | Port-Based<br>MAC-Based                                                                                                               |
| ACL                                   | 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 |
| RADIUS                                | Authentication & Accounting                                                                                                           |
| TACACS+                               | Authentication, Authorization, Accounting                                                                                             |
| HTTPS, HTTP                           | Supported                                                                                                                             |
| SSL / SSH v2                          | Supported                                                                                                                             |
| User Name Password Authentication     | Local Authentication<br>Remote Authentication (via RADIUS / TACACS+)                                                                  |
| Management Interface Access Filtering | Web, Telnet / SSH , CLI RS-232 console                                                                                                |

## Management Features

|                            |                                                                   |
|----------------------------|-------------------------------------------------------------------|
| CLI                        | Cisco® like CLI                                                   |
| Web UI                     | Supported                                                         |
| Telnet                     | Server                                                            |
| SNMP                       | V1, V2c, V3                                                       |
| sFlow                      | Supported                                                         |
| Modbus/TCP                 | Supports for management and monitoring                            |
| SW & Configuration Upgrade | SFTP, TFTP, HTTP<br>Redundant firmware in case of upgrade failure |
| FTP client                 | Supports for upload/download configuration                        |
| RMON                       | RMON I (1, 2, 3, 9 group), RMON II                                |
| MIB                        | RFC1213 MIB II, Private MIB                                       |
| UPnP                       | Supported                                                         |
| BOOTP                      | Supported                                                         |
| DHCP                       | Server, Client, Relay, Relay option 82 , Snooping                 |
| RARP                       | Supported                                                         |
| IP Source Guard            | Supported                                                         |
| Port Mirroring             | Supported                                                         |
| Event Syslog               | Syslog server (RFC3164)                                           |
| Warning Message            | System syslog, e-mail, alarm relay                                |
| DNS                        | Client, Proxy                                                     |
| NTP, SNTP                  | Client                                                            |
| LLDP (IEEE 802.1ab)        | Link Layer Discovery Protocol<br>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<br>for L2 / L3 / L4<br>L2 : Mac address SA/DA/VLAN<br>L3: IP address SIP, Subnet (32bit)<br>L4: TCP/UDP |

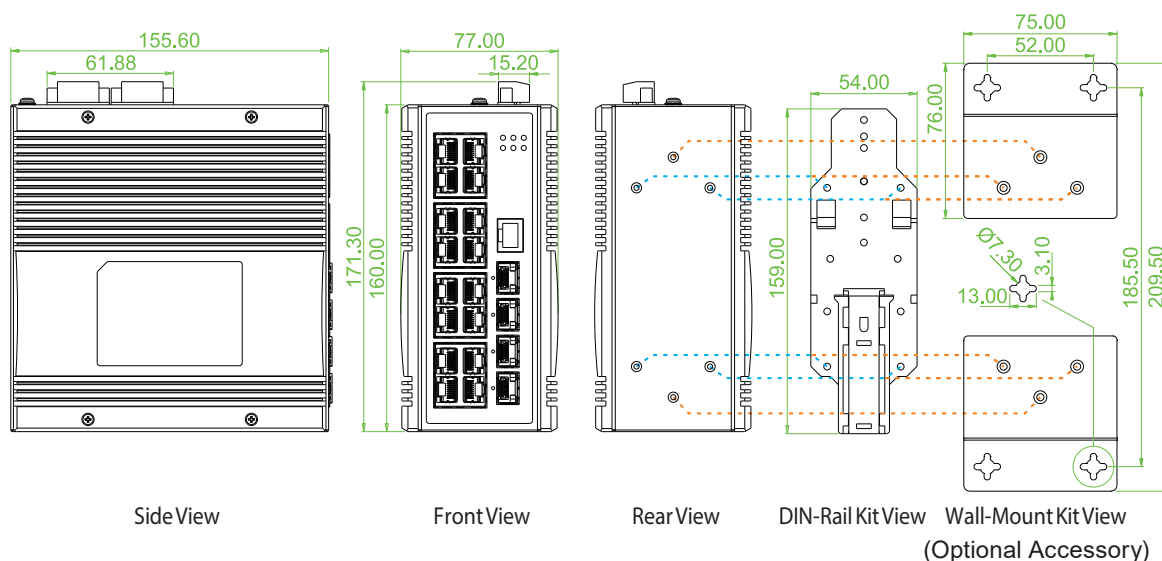
## Others Features

|                  |                                                                                                                                                                                                                                                                                            |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Green Ethernet   | Supports IEEE 802.3az EEE (Energy Efficient Ethernet) Management to optimize the power consumption<br>Determine the cable length and lowering the power for ports with short cables<br>Lower the power for a port when there is no link<br>LED Power Management :Adjustment LEDs intensity |
| Cable Diagnostic | Measuring UTP cable normal or broken point distance                                                                                                                                                                                                                                        |

## Advanced PoE

|            |                                                                                                                                                                                                                                                         |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Management | PoE PD failure auto checking, and auto reset when PD fail<br>PoE port on/off weekly scheduling<br>PoE Configuration<br>PoE Enable/Disable<br>Power limit by classification<br>Power feeding priority<br>Total PoE power budget limitation: maximum 300W |
|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

## Dimensions



## Ordering Information

| Model Name       | Total Port | UTP                | Fiber                   | PoE             |              | Input Power | Certification |           |                            |         | Operating Temperature |
|------------------|------------|--------------------|-------------------------|-----------------|--------------|-------------|---------------|-----------|----------------------------|---------|-----------------------|
|                  |            | 10/100/1000 Base-T | 1000/2.5G/5G/10G Base-X | IEEE802.3 at/af | Power Budget | Redundant   | EN62368-1     | EN50121-4 | EN61000-6-2<br>EN61000-6-4 | CE, FCC |                       |
| IGS-1604XSM-16PH | 20         | 16                 | 4 SFP                   | 16              | 300W         | 48VDC       | V             | V         | V                          | V       | -40~60°C              |

## Optional Accessories

### ■ Wall Mount Kit

IND-WMK04 Wall Mount kit for Industrial product (Wide) (2 pcs in 1 set, 76mm x 75mm x 2pcs)

### ■ Industrial SFP Transceiver

The ISFP series of industrial grade SFP modules have been fully tested with all CTC Union industrial grade Ethernet switches for guaranteed compatibility and performance. Best performance can be guaranteed, even in mission-critical applications. (Please see CTC Union's Industrial SFP datasheets for more items and detailed information.)

|                    |                                                                                                         |
|--------------------|---------------------------------------------------------------------------------------------------------|
| ISFP-M9000-85-D(E) | Industrial SFP 10GBase-SR MM, 300meter, wave length 850nm LC, DDMI, -10~70°C (-40~85°C)                 |
| ISFP-S9010-31-D(E) | Industrial SFP 10GBase-LR SM, 10km, 1310nm, 6.4dB, LC, DDMI, -10~70°C (-40~85°C)                        |
| 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)                   |

### ■ Industrial Power Supply

NDR-480-48 Industrial Power, Input 90 ~ 264VAC/127 ~ 370VDC, Output 48VDC, 480W, -20 ~ +70°C