This series models are managed industrial grade gigabit switches with 4~16 10/100/1000Base-T ports and 3~12 Gigabit/Fast Ethernet SFP ports that provide stable and reliable Ethernet transmission. The switches support a variety of Ethernet functions, including 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 industrial networking, security automation applications, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications. Standard operating temperature range models (-10 to 60°C) and wide operating temperature range models (-40 to 75°C) fulfill the special requirements of many military and utility market applications where environmental conditions exceed commercial product specifications.

### Specifications

#### Feature

- 4x 10/100/1000Base-T RJ-45 and 4x 100/1000Base-X SFP Fiber (IGS-404SM)
- 8x 10/100/1000Base-T RJ-45 and 3x 100/1000Base-X SFP Fiber (IGS-803SM)
- UL60950-1, CE, FCC, Rail Traffic EN50121-4, Traffic control NEMA TS2 certified
- Industrial Grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- Cable diagnostic, Measuring cable normal or broken point distance
- 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) for redundant cabling
- Provides 5 instances that each can support μ-Ring, μ-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 Cabling, recovery time<10ms in 250 devices
- DHCP Server/Client/Relay/Snooping/Snooping option 82/Relay option 82
- 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 failure
- 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
- RMON, MIB II, Port mirroring, Event syslog, DNS, NTP, IEEE802.1abLLDP
- 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 3)
- Supporting Central EMS for management of up to 50 SmartView Server, and maximum up to 25,000 device (Figure 2)

#### Specifications

<table>
<thead>
<tr>
<th>Standard</th>
<th>10Base-T, 1000Base-T RJ-45, 1000Base-X SFP Fiber (IGS-404SM)</th>
<th>8x 10/100/1000Base-T RJ-45, 3x 100/1000Base-X SFP Fiber (IGS-803SM)</th>
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<tbody>
<tr>
<td>IEEE 802.3</td>
<td>100Base-T, 1000Base-T RJ-45, 1000Base-X SFP Fiber (IGS-404SM)</td>
<td>8x 10/100/1000Base-T RJ-45, 3x 100/1000Base-X SFP Fiber (IGS-803SM)</td>
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<td>IEEE 802.3u</td>
<td>1000Base-X SFP Fiber (IGS-404SM)</td>
<td>Over 25,000 device (Figure 2)</td>
</tr>
<tr>
<td>IEEE 802.3z</td>
<td>1000Base-X GbE/10G SFP Fiber (IGS-404SM)</td>
<td>Over 25,000 device (Figure 2)</td>
</tr>
<tr>
<td>IEEE 802.1d</td>
<td>STP (Spanning Tree Protocol)</td>
<td>STP (Spanning Tree Protocol)</td>
</tr>
<tr>
<td>IEEE 802.1w</td>
<td>RSTP (Rapid Spanning Tree Protocol)</td>
<td>RSTP (Rapid Spanning Tree Protocol)</td>
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<tr>
<td>IEEE 802.1s</td>
<td>MSTP (Multiple Spanning Tree Protocol)</td>
<td>MSTP (Multiple Spanning Tree Protocol)</td>
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<tr>
<td>ITU-T G.8032</td>
<td>ERPS (Ethernet Ring Protection Switching)</td>
<td>ERPS (Ethernet Ring Protection Switching)</td>
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<td>IEEE 802.1Q</td>
<td>VLANs (VLAN)</td>
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<td>IEEE 802.1Q</td>
<td>Port based and MAC based Network Access Control, Authentication</td>
<td>Port based and MAC based Network Access Control, Authentication</td>
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<tr>
<td>IEEE802.3ac</td>
<td>Max frame size extended to 1522Bytes.</td>
<td>Max frame size extended to 1522Bytes.</td>
</tr>
<tr>
<td>IEEE 802.3ad</td>
<td>Link-aggregation for parallel links with LACPLink Aggregation Control Protocol (IGS-404SM)</td>
<td>Link-aggregation for parallel links with LACPLink Aggregation Control Protocol (IGS-803SM)</td>
</tr>
<tr>
<td>IEEE 802.3x</td>
<td>Flow control for Full Duplex</td>
<td>Flow control for Full Duplex</td>
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<tr>
<td>IEEE 802.3ad</td>
<td>Stacked VLANs, Q-in-Q</td>
<td>Stacked VLANs, Q-in-Q</td>
</tr>
<tr>
<td>IEEE 802.1ab</td>
<td>Link Layer Discovery Protocol (LLDP)</td>
<td>Link Layer Discovery Protocol (LLDP)</td>
</tr>
<tr>
<td>IEEE 802.3az</td>
<td>EEE (Energy Efficient Ethernet)</td>
<td>EEE (Energy Efficient Ethernet)</td>
</tr>
</tbody>
</table>

#### VLAN ID

- 4094: IEEE802.1Q VLAN VID

#### Switch Architecture

- Back-plane (Switching Fabric): 16Gbps (IGS-404SM), 22Gbps (IGS-803SM)
- Full wire-speed

#### Data Processing

- Flow Control: Store and Forward
- IEEE 802.3x for full duplex mode
- Back pressure for half duplex mode

#### Network Connector

- 4x 10/100/1000Base-T RJ-45 + 4x 100/1000Base-X SFP connector (IGS-404SM)
- 8x 10/100/1000Base-T RJ-45 + 3x 100/1000Base-X SFP connector (IGS-803SM)
- RJ-45 UTP port support
- Auto negotiation speed, Auto MDI/MDI-X function, SFP port support dual speed with DOMI

#### Console

- RS-232 (RJ-45)
- EIA/TIA-568 100-ohm (100m)

#### Network Cable

- UTP/STP above Cat. 5e cable
- CSMA/CD

#### Protocols

- Reverse Polarity Protection: Present
- Overload Current Protection: Present

#### CPU Watch Dog

- Present
Industrial Managed GbE Switch

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**Power Supply**
- Redundant Dual DC 12/24/48V (9.6~60VDC) Input power (Removable Terminal Block)
- Provide DC Power JACK adapter cable for external power supply

**Power Consumption**

<table>
<thead>
<tr>
<th>Input Voltage</th>
<th>IGS-404SM</th>
<th>IGS-803SM</th>
</tr>
</thead>
<tbody>
<tr>
<td>12VDC</td>
<td>8.0W</td>
<td>8.0W</td>
</tr>
<tr>
<td>24VDC</td>
<td>8.1W</td>
<td>9.1W</td>
</tr>
<tr>
<td>48VDC</td>
<td>9.6W</td>
<td>10.6W</td>
</tr>
</tbody>
</table>

**LED**
- Per unit: Power 1 (Green), Power 2 (Green), Fault (Amber), CPU Act (Green), Ring Master (Yellow)
- Per RJ-45 port: 10/100 Link/Active (Green), 1000 Link/Active (Amber)
- SFP Fiber Per port: Link/Active (Green)

**Jumbo Frame**
- 9.6KB

**IEEE802.3ac**
- Max frame size extended to 1522Bytes (allow Q-tag in packet)

**MAC Address Table**
- Memory Buffer: 512K Bytes for packet buffer

**Warning Message**
- System syslog, SMTP e-mail event message, alarm relay

**Alarm Relay Contact**
- Provide 2 redundant power, alarm relay contact, 6 Pin

**Operating Temperature**
- -10 ~ 60°C (IGS-404SM, IGS-803SM)
- -40 ~ 75°C (IGS-804SM-E, IGS-803SM-E)

**Operating Humidity**
- 5% to 95% (Non-condensing)

**Storage Temperature**
- -40 ~ 85°C

**Housing**
- Rugged Metal, IP30 Protection, Fanless

**Dimensions**
- 106 x 62.5 x 135 mm (D x W x H) (IGS-404SM)
- 106 x 72 x 152 mm (D x W x H) (IGS-803SM)

**Service Specifications**

### Network Specifications

**Topology**
- 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)

**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, µ-Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings. (See figure 5, 6, 7)
- Recovery time <10ms
- The maximum number of devices allowed in a Ring supported ring is 250.

**Loop Protection**
- Present
- Recovery time <50ms

**ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)**
- Single Ring, Sub-Ring, Multiple ring topology network

**QoS Features**

**Class of Service**
- IEEE802.1p 8 active priorities queues for port

**Traffic Classification QoS**
- 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 Limit: bit or frame

**Weight**
- 0.725kg (IGS-404SM)
- 0.78kg (IGS-803SM)

**Installation Mounting**
- DIN Rail mounting or wall mounting

**MTBF**
- 302,826hrs (IGS-404SM)
- 404,589hrs (IGS-803SM)

**Warranty**
- 5 years

**Certification**
- EMC: CE
- EMI (Electromagnetic Interference): FCC Part 15 Subpart B Class A, CE EN50022 Class A
- Railway Traffic: TÜV EN50121-4
- Traffic control: NEMA TS2 (IGS-404SM, IGS-803SM)
- 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 (Surge) Level 3, Criteria A
- En61000-4-5 (Surge) Level 3, Criteria B
- En61000-4-6 (CS) Level 3, Criteria A
- En61000-4-8 (RPMF, Magnetic Field) Field Strength: 300A/m, Criteria A

**Safety**
- Shock: UL60950-1
- Freefall: IEC 60068-2-32
- Vibration: IEC 60068-2-6

**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+ & accounting, TACACS+ 3.0
- HTTPS, HTTP

**SSL / SSH v2**
- Local Authentication

**User Name Password Authentication**
- Remote Authentication (via RADIUS / TACACS+)

**Management Interface Access**
- 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: Redundant firmware in case of upgrade failure
- RMON: RMON 1, 2, 3, 9 group)
- MIB: RFC1213 MIB II, Private MIB
- UPnP: Yes

**Contact Information**
- www.ctcu.com
- sales@ctcu.com

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Industrial Managed GbE Switch

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- **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, e-mail, 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**

### IPv6 Features
- **IPv6 Management**: Telnet Server/ICMP v6
- **SNMP over IPv6**
- **HTTP over IPv6**
- **SSH over IPv6**
- **IPv6 Telnet Support**
- **IPv6 NTP Support**
- **IPv6 TFTP Support**
- **IPv6 ACL**: Number of rules: up to 256 entries
  - L2 / L3 / L4
- **LLDP (IEEE 802.1ab)**
- **LLDP-MED**

### IPv6 Features

#### Application

**Figure 1**: Application Example

- **u-Ring**
- **IGS-803SM**
- **IGS-402SM**
- **PLC**
- **IP Camera**
- **WiFi AP**
- **Display**

**Figure 2**: Central EMS allows central management of up to 50 SmartView™ servers

- **Central EMS**
- **SmartView Server**
- **SNMP**
- **Area 48**
- **Area 49**
- **Area 50**
- **DB**
- **Area 1**
- **Area 2**

- **Allow central management of up to 50 SmartView™ servers**
- **Allow up to 25,000 devices management**
- **Hierarchical Network Management Architecture**
- **Easy and rapid expansion of SmartView™ EMS**

**Figure 3**: SmartView™

- **SmartView Server**
- **SNMP**
- **Area 1**
- **Area 2**
- **Area 3**
- **Area 4**
- **DB**

- **Centralized Network Management Platform**
- **Long term events storage (up to 1 year)**
- **Alarm trap and event log management**
- **Real-time visual representations**
- **Remote access control**
- **Traffic/performance monitoring and management**
Figure 5: Multiple µ-Ring

- Quick & Easy for mass configuration tool
- Multiple device auto discovery
- Group configuration, access
- Group firmware upgrade
- Export/Import Configuration

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

Figure 6: Friendly to set µ-Ring configuration in Web
Industrial Managed GbE Switch

Figure 7: µ-Ring Type

A major ring and a Sub-Ring topology

Determining the backup path (u-Chain type)

Figure 8: Ring Configuration Example

Ring Configuration Type
- µ-Ring
- Sub-Ring

Combination of a ring and four Sub-Ring

Combination of a ring and two Sub-Ring

Ring Configuration Type

Cable Redundancy
Industrial Managed GbE Switch

Dimensions

**IGS-404SM**

Side View

Front View

Rear View

DIN-Rail Kit View

Wall-Mount Kit View

**IGS-803SM**

Side View

Front View

Rear View

DIN-Rail Kit View

Wall-Mount Kit View

**IGS-812SM**

Side View

Front View

Rear View

DIN-Rail Kit View

Wall-Mount Kit View
# Industrial Managed GbE Switch

## IGS-1604SM

### Ordering Information

<table>
<thead>
<tr>
<th>Model/Name</th>
<th>Managed</th>
<th>Total Port</th>
<th>UTP Port</th>
<th>Fiber Port</th>
<th>Certification</th>
<th>Operating Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>IGS-404SM</td>
<td>V</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>SFP</td>
<td>-10~60°C</td>
</tr>
<tr>
<td>IGS-404SM-E</td>
<td>V</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>SFP</td>
<td>-40~75°C</td>
</tr>
<tr>
<td>IGS-803SM</td>
<td>V</td>
<td>11</td>
<td>8</td>
<td>3</td>
<td>SFP</td>
<td>-10~60°C</td>
</tr>
<tr>
<td>IGS-803SM-E</td>
<td>V</td>
<td>11</td>
<td>8</td>
<td>3</td>
<td>SFP</td>
<td>-40~75°C</td>
</tr>
<tr>
<td>IGS-812SM</td>
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<td>SFP</td>
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<tr>
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<td>20</td>
<td>8</td>
<td>12</td>
<td>SFP</td>
<td>-40~75°C</td>
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<td>IGS-1604SM</td>
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<td>20</td>
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<td>SFP</td>
<td>-10~60°C</td>
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<tr>
<td>IGS-1604SM-E</td>
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<td>20</td>
<td>16</td>
<td>4</td>
<td>SFP</td>
<td>-40~75°C</td>
</tr>
</tbody>
</table>

### Model Naming Rule

IGS-1604SM: Industrial Gigabit Switch 4 : 4x UTP 8 : 8x UTP 16 : 16x UTP

### Optional Accessories

#### Industrial Power Supply

- **DR-4524**: Industrial Power Supply, Input 85~264VAC, Output 24VDC, 48W, -10~+50°C
- **MDR-40-24**: Industrial Power Supply, 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 series product for guaranteed compatibility and performance. The best performance can be guaranteed even in mission-critical applications.)

- **ISFP-M7000-85-D(E)**: Industrial SFP GbE 1000Base-SX, M/M, 500 meter, wavelength 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-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

- ISFP: Industrial SFP Transceiver
  - M: Multi Mode
  - T: Single Mode
  - UTP
  - 10G: GigE
  - FE: Fast Ethernet
  - S: Long Reach UTP
  - Distance: T00 (UTP) 000 (500m) 002 (2km) 020 (20km) 040 (40km)
  - Wavelength: 00: 850nm 05: 1300nm 31: 1310nm 55: 1550nm 68: TX/1310nm (Bidi mode A) 75: TX/1550nm (Bidi Mode B)
  - MA: Master (for Long Reach UTP) SL: Slave (for Long Reach UTP)

### Package List

- One device of the series
- 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
- DC power jack adapter cable

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