This series models are managed industrial grade gigabit PoE (Power over Ethernet) switches with 4/8/16 10/100/1000Base-T PoE ports and 2/3/5 Gigabit/Fast SFP ports that provide stable and reliable Ethernet transmission. With dual power input design, the series models can provide redundant mechanisms for critical applications that need always-on connections. These switches can also operate either at standard operating temperature range (-10 to 60°C) or at wide operating temperature range (-40 to 75°C) so as to fulfill the special needs of industrial automation applications. Housed in rugged DIN rail or wall mountable IP-30 enclosures, these switches are perfect choices for harsh environments, such as industrial networking, intelligent transportation systems (ITS) and are also suitable for many military and utility market applications where environmental conditions exceed commercial product specifications.

These managed switches also support a wide variety of Ethernet functions, including STP/RSTP/MSTP/ ITU-T G.8032 ERPS and multiple μ-Ring for redundant cabling, advanced PoE management functions such as PoE power scheduling as well as device auto-checking and auto-reset. They also support layer 2 Ethernet IGMP, VLAN, QoS, Security, IPv6, bandwidth control, port mirroring, cable diagnostics and Green Ethernet. Additionally, these switches can also be managed by CTC Union’s SmartView™ Element Management System which offers a user-friendly and centralized device management platform and provides network administrators the ability to monitor and configure these connected switches remotely.

### Features

- **4x10/100/1000Base-T RJ-45 + 2x100/1000Base-X SFP with 4xPoE+**, total 120W power budget (IGS-402SM-4PH24)
- **8x10/100/1000Base-T RJ-45 + 3x100/1000Base-X SFP with 8xPoE+**, total 180W power budget (IGS-803SM-8PH24)
- **48/48VDC (44~57VDC) redundant dual input power (IGS-1608SM-8PH-248)**
- **24/48VDC (24~57VDC) redundant dual input power with built-in very high efficiency booster (94~97%) to rise up 55VDC for PoE output (Figure 9) (IGS-402SM-4PH24, IGS-803SM-8PH24)**
- **Regulated PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 9) (IGS-402SM-4PH24, IGS-803SM-8PH24)**
- **Provides 4/8 port IEEE802.3af / 802.3at PoE output (30W per Port)**
- **Advanced PoE Management, PoE PD Failure Auto Checking and auto reset when PD fail, PoE port on/off weekly scheduling, PoE configuration for power planning**
- **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 diagnostics, Measuring cable OK or broken point distance**
- **Supports Green Ethernet IEEE802.3az EEE (Energy Efficient Ethernet) management to optimize power consumption**
- **STP, RSTP, MSTP, ITU-T G.8032 Ethernet Ring Protection Switching (ERPS) for redundant cabling**
- **Provides 5 ring instances that each can support μ-Ring, ω-Chain or Sub-Ring type for flexible uses (Figure 7). Supports up to 5 rings in one device (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**
- **Flexibility 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 upgrade 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**
- **IEEE802.1ab 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 (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 5)**

### Specifications

<table>
<thead>
<tr>
<th>Standard</th>
<th>IEE802.3</th>
<th>10Base-T 10Mbit/s Ethernet</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEE802.3u</td>
<td>100Base-TX, 100Base-FX, Fast Ethernet</td>
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<tr>
<td>IEE802.3ab</td>
<td>1000Base-T Gigabit Ethernet twisted pair</td>
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<tr>
<td>IEE802.3z</td>
<td>1000Base-X Gbit/s Ethernet over Fiber-Optic</td>
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<tr>
<td>IEE802.3af</td>
<td>PoE (Power over Ethernet)</td>
<td></td>
</tr>
<tr>
<td>IEE802.3at</td>
<td>PoE+ (Power over Ethernet enhancements)</td>
<td></td>
</tr>
<tr>
<td>IEE802.1d</td>
<td>STP (Spanning Tree Protocol)</td>
<td></td>
</tr>
<tr>
<td>IEE802.1w</td>
<td>RSTP (Rapid Spanning Tree Protocol)</td>
<td></td>
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<tr>
<td>IEE802.1s</td>
<td>MSTP (Multiple Spanning Tree Protocol)</td>
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</tr>
<tr>
<td>ITU-T G8032 / Y1344</td>
<td>ERPS (Ethernet Ring Protection Switching)</td>
<td></td>
</tr>
<tr>
<td>IEE802.1Q</td>
<td>Virtual LANs (VLAN)</td>
<td></td>
</tr>
<tr>
<td>IEE802.1X</td>
<td>Port based and MAC based Network Access Control, Authentication</td>
<td></td>
</tr>
<tr>
<td>IEE802.3ac</td>
<td>Max frame size extended to 1522Bytes</td>
<td></td>
</tr>
<tr>
<td>IEE802.3ad</td>
<td>Link-aggregation for parallel links with LACP (Link Aggregation Control Protocol)</td>
<td></td>
</tr>
<tr>
<td>IEE802.3x</td>
<td>Flow control for Full Duplex</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Standard</th>
<th>IEE802.1ad</th>
<th>Stacked VLANs, Q-in-Q</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEE802.1ab</td>
<td>Link Layer Discovery Protocol (LLDP)</td>
<td></td>
</tr>
<tr>
<td>IEE802.3az</td>
<td>EEE (Energy Efficient Ethernet)</td>
<td></td>
</tr>
</tbody>
</table>

| Switch Architecture | Back-plane (Switching Fabric): 12Gbps(IGS-402SM-4PH24) 22Gbps(IGS-803SM-8PH24) Full wire-speed |

<table>
<thead>
<tr>
<th>Data Processing</th>
<th>Store and Forward</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flow Control</td>
<td>IEEE 802.3x for full duplex mode Back pressure for half duplex mode</td>
</tr>
<tr>
<td>Network Connector</td>
<td>4x10/100/1000Base-T RJ-45 + 2x 100/1000Base-X SFP connector (IGS-402SM-4PH24) 8x 10/100/1000Base-T RJ-45 + 3x 100/1000Base-X SFP connector (IGS-803SM-8PH24)</td>
</tr>
<tr>
<td>RJ-45 UTP port support Auto negotiation speed, Auto MDI/MDI-X function, SFP port support 100/1000 dual speed with DDMI</td>
<td></td>
</tr>
</tbody>
</table>

**IGS-402SM-4PH24**

4x10/100/1000Base-T + 2x100/1000Base-X SFP w/ 4x PoE+

**IGS-803SM-8PH24**

8x10/100/1000Base-T + 3x100/1000Base-X SFP w/ 8x PoE+
Industrial Managed GbE PoE Switch

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.

**Console**
- RS-232 (RJ-45)

**PoE RJ-45 Pin Assignment**
- 4x IEEE 802.3af / IEEE 802.3at PoE+ (IGS-402SM-4PH24)
- 8x IEEE 802.3af / IEEE 802.3at PoE+ (IGS-803SM-8PH24), End-Span, Alternative A mode:
  - Positive (+): RJ-45 pin 1, 2
  - Negative (-): RJ-45 pin 3, 6
  - Data (1,2,3,6,4,5,7,8)

**Network Cable**
- UTP/STP above Cat. 5e cable
- EIA/TIA-568 100-ohm (100m)

**Protocols**
- CSMA/CD

**Reverse Polarity Protection**
- Present

**Overload Current Protection**
- Present

**CPU Watch Dog**
- Present

**Protection**
- Reverse Polarity
- CSMA/CD
- Protocols

**IGS-402SM-4PH24, IGS-803SM-8PH24:**
- 276,161Hrs (IGS-402SM-4PH24)
- 311,376Hrs (IGS-803SM-8PH24)
- Power Supply

**IGS-402SM-4PH24 Power consumption & Booster efficiency**
- **Input Voltage**
  - 24VDC: 135.2W
  - 48VDC: 135.2W
- **Total Power Consumption**
  - 120W
- **Device Power Consumption**
  - 120W
- **PoE Budget**
  - 94.0%
- **Boost Efficiency**
  - 97.2%

**IGS-803SM-8PH24 Power consumption & Booster efficiency**
- **Input Voltage**
  - 24VDC: 200.2W
  - 48VDC: 195.1W
- **Total Power Consumption**
  - 180W
- **Device Power Consumption**
  - 180W
- **PoE Budget**
  - 94%
- **Boost Efficiency**
  - 97%

**PoE Power Budget**
- Maximum PoE Output power budget 30W / Per Port
- 120W (IGS-402SM-4PH24)
- 180W (IGS-803SM-8PH24)

**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)
- SFP Fiber Per port: Link/Active (Green)
- PoE Port LED 1 LED /per port:
  - PoE Port On Power On : ON (Green)
  - PoE Port Fault (Over Load, Short Circuit,Port failed at Startup) : Flash 1times /sec (Green)
  - PoE Port Output Power Off : Off

**Jumbo Frame**
- 9.6KB

---

### Software Specifications

#### Topology
- **VLAN**
  - IEEE 802.1q VLAN: up to 4094 8012.Q VLAN VID
  - IEEE 802.1q VLAN: up to 4094 Groups
  - IEEE 802.1Q in-Q
  - MAC-based VLAN: up to 256 entries
  - IP Subnet-based VLAN: up to 128 entries
  - Protocol-based VLAN (Etherent, SNAP, LLC): up to 128 entries
  - VLAN Translation: up to 256 entries
  - GVRP (GARP VLAN Registration Protocol):
    - Dynamic (IEEE 802.3ad LACP), up to 5 trunk group
  - Link Aggregation (Port Trunk):
    - Static: 8 port 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 (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
  - Single Ring, Sub-Ring, Multiple ring topology network

#### QoS Features
- **Class of Service**
  - IEEE802.1p based CoS, 802.1p 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

#### Traffic Classification QoS
- Rate in steps: 1 kbps / Mbps / fps / kfps
- Range: 100 kbps to 1Gbps / 1fps to 3300kfps
- Rate Unit: bit or frame

#### Bandwidth Control for Ingress
- Rate in steps: 1 kbps / Mbps
- Range: 100 kbps to 1Gbps
- Rate Unit: bit or frame

#### Bandwidth Control for Egress
- Rate in steps: 1 kbps / Mbps
- Range: 100 kbps to 1Gbps
- Rate Unit: bit or frame

#### DiffServ (RF 2474) Remark
- Fast Leave
- Maximum Multicast Group: up to 1022 entries
- Query / Static Router Port
Industrial Managed GbE PoE Switch

Security Features
IEEE 802.1X: Port-Based
ACL: Number of rules: up to 256 entries for L2 / L3 / L4
RADIUS authentication & accounting: Local Authentication
TACACS+: Remote Authentication (via RADIUS / TACACS+)
HTTPS, HTTP, SSL / SSH v2: Web, Telnet / SSH / CLI RS-232 console
User Name: Web-Based Access
Password: Web, Telnet / SSH / CLI RS-232 console
Management Interface Access: Web, Telnet / SSH, CLI RS-232 console
Filtering: Web, Telnet / SSH, CLI RS-232 console

Management Features
CLI: Cisco® like CLI
SNMP: V1, V2c, V3
SW & Configuration Upgrade: Redundant firmware in case of upgrade failure
RMON: RMON I (1, 2, 3, 9 group), RMON II
MIB: RFC1213 MIB II, Private MIB
UPnP: Server, Client, Relay
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: Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
NTP: Support 4 operating modes in each port:
LLDP (IEEE 802.1ab): Link Layer Discovery Protocol
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 QoS: Number of rules: up to 256 entries for 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
Lower the power for a port when there is no link
LED Power Management: Adjust LED intensity
Cable Diagnostic: Measuring cable normal or broken point distance
Advanced PoE Management: PoE PD failure auto checking and auto reset when PD fail
PoE port on/off weekly scheduling
PoE Configuration: Power limit by classification, Power limit by management
Total PoE Power budget limitation (maximum 120W for IGS-402SM-4PH24, 180W for IGS-803SM-8PH24, 240W for IGS-1608SM-8PH)

Application

Figure 1: Application Example

Figure 2: Central EMS allows central management of up to 50 SmartView™ servers
Industrial Managed GbE PoE Switch

**Figure 3**: SmartView™ management architecture

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

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

**Figure 5**: Multiple µ-Ring

- Up to 250 devices per ring

**Figure 6**: Friendly to set µ-Ring configuration in Web

<table>
<thead>
<tr>
<th>µ-Ring Configuration</th>
<th>Auto-refresh</th>
<th>Refresh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delete 1 Instance</td>
<td>u-Ring</td>
<td>□</td>
</tr>
<tr>
<td>Delete 2 Instance</td>
<td>u-Ring</td>
<td>□</td>
</tr>
<tr>
<td>Delete 3 Instance</td>
<td>u-Ring</td>
<td>□</td>
</tr>
<tr>
<td>Delete 4 Instance</td>
<td>u-Chains</td>
<td>□</td>
</tr>
<tr>
<td>Delete 5 Instance</td>
<td>u-Chain</td>
<td>□</td>
</tr>
</tbody>
</table>

Add New Instance

Save  Reset
Industrial Managed GbE PoE Switch

**Figure 7**: µ-Ring Type

- Master
- Backup Path
- Ring
- Slave
- Third Party Network

Determining the backup path (u-Chain type)

**Figure 8**: Ring Configuration Example

- Sub-Ring
- Ring
- Combination of a ring and four Sub-Ring
- Combination of a ring and two Sub-Ring

Ring Configuration Type
- u-Ring
- Sub-Ring

Cable Redundancy
Figure 9: High efficiency boost technology for PoE

- Regulated PoE output voltage (55VDC) to stabilize PoE device
- Guarantee delivery PoE power distance to 100 meter
- Wide range input power 24/48VDC (20~57VDC)
- Built-in very high efficiency (94~97%) to boost PoE output voltage

Dimensions

IGS-402SM-4PH24

IGS-803SM-8PH24
### Ordering Information

<table>
<thead>
<tr>
<th>Model Name</th>
<th>Managed</th>
<th>Total Port</th>
<th>UTP</th>
<th>Fiber</th>
<th>PoE Port</th>
<th>Input Power</th>
<th>Certification</th>
<th>Operating Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>IGS-402SM-4PM824</td>
<td>V</td>
<td>4</td>
<td>2</td>
<td>SFP</td>
<td>4</td>
<td>1200W</td>
<td>24/48VDC or 48VDC</td>
<td>10-40°C</td>
</tr>
<tr>
<td>IGS-402SM-4PM824E24</td>
<td>V</td>
<td>4</td>
<td>2</td>
<td>SFP</td>
<td>4</td>
<td>1200W</td>
<td>24/48VDC or 48VDC</td>
<td>10-40°C</td>
</tr>
<tr>
<td>IGS-803SM-8PM824</td>
<td>V</td>
<td>8</td>
<td>2</td>
<td>SFP</td>
<td>6</td>
<td>1800W</td>
<td>24/48VDC or 48VDC</td>
<td>10-40°C</td>
</tr>
<tr>
<td>IGS-803SM-8PM824E24</td>
<td>V</td>
<td>8</td>
<td>2</td>
<td>SFP</td>
<td>6</td>
<td>1800W</td>
<td>24/48VDC or 48VDC</td>
<td>10-40°C</td>
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<tr>
<td>IGS-1608SM-8PH</td>
<td>V</td>
<td>24</td>
<td>16</td>
<td>SFP</td>
<td>8</td>
<td>240W</td>
<td>48VDC</td>
<td>10-40°C</td>
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<tr>
<td>IGS-1608SM-8PH24</td>
<td>V</td>
<td>24</td>
<td>16</td>
<td>SFP</td>
<td>8</td>
<td>240W</td>
<td>48VDC</td>
<td>10-40°C</td>
</tr>
</tbody>
</table>

### Model Naming Rule

- **IGS**: Industrial Gigabit Switch
- **8**: 8 Port
- **03S**: 3 SFP
- **M**: Managed
- **8PH**: 8 High Power PoE
- **E**: 24 24V Booster

### Optional Accessories

#### Industrial Power Supply
- **DR-120-24**: Industrial Power, Input 88 ~ 132VAC / 176 ~ 264VAC, Output 24VDC, 120W, -10 ~ +60°C
- **DRP-240-48**: Industrial Power, Input 85 ~ 264VAC, Output 48VDC, 240W, -10 ~ +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.)

(See CTC Union’s Industrial SFP datasheet for more details and more items.)

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Specification</th>
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<tbody>
<tr>
<td>ISFP-M7000-8S (E)</td>
<td>Industrial SFP GBE 1000Base-SX, M/M, 500 meter, wave length 850nm, 7.5dB, LC, DDMI, -10~+85°C</td>
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</tr>
<tr>
<td>ISFP-S7020-31 (E)</td>
<td>Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~+85°C</td>
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<tr>
<td>ISFP-T7700-00 (E)</td>
<td>Industrial SFP 1000Base-T UTP 100meter, -10~+70°C</td>
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</tr>
<tr>
<td>ISFP-M6502-31 (E)</td>
<td>Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~+85°C</td>
<td></td>
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<tr>
<td>ISFP-5030-31 (E)</td>
<td>Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~+70°C</td>
<td></td>
</tr>
<tr>
<td>ISFP-T3700-MA (E)</td>
<td>Industrial SFP 100Mbps, long reach UTP (2 wire) (500meter), Masters, -10~+70°C</td>
<td></td>
</tr>
<tr>
<td>ISFP-T3700-SL (E)</td>
<td>Industrial SFP 100Mbps, long reach UTP (2 wire) (500meter), Slave, -10~+70°C</td>
<td></td>
</tr>
</tbody>
</table>

### SFP Naming Rule

- **ISFP**: Industrial SFP Transceiver
- **M**: Multi Mode
- **7**: 7 GBE
- **040**: 40nm Distance
- **31**: T00: (UTP) 000 (500m), 002 (2km), 020 (20km), 040 (40km)
- **D**: DDMI
- **E**: -40~85°C

### Package List

- One of the series 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