This series models are managed industrial grade gigabit switches with 4~16 10/100Base-TX ports and 2~4 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 needs of industrial automation applications.

**Feature**

- 4x 10/100Base-TX RJ-45 and 2 x 100/1000Base-X SFP Fiber (IFS-402GSM)
- 8x 10/100Base-TX RJ-45 and 3 x 100/1000Base-X SFP Fiber (IFS-803GSM)
- 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, u-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 case of upgrade failure
- Supports IEEE1988 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 SmartConf 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 devices (Figure 2)

**Specifications**

**Standard**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEEE 802.3</td>
<td>10Base-T 10Mbit/s Ethernet</td>
</tr>
<tr>
<td>IEEE 802.3u</td>
<td>100Base-TX, 10Base-FX, Fast Ethernet</td>
</tr>
<tr>
<td>IEEE 802.3z</td>
<td>1000Base-X Gigabit Ethernet over Fiber-Optic</td>
</tr>
<tr>
<td>IEEE 802.1d</td>
<td>STP (Spanning Tree Protocol)</td>
</tr>
<tr>
<td>IEEE 802.1w</td>
<td>RSTP (Rapid Spanning Tree Protocol)</td>
</tr>
<tr>
<td>IEEE 802.1s</td>
<td>MSTP (Multiple Spanning Tree Protocol)</td>
</tr>
<tr>
<td>ITU-T G.8032</td>
<td>ERPS (Ethernet Ring Protection Switching)</td>
</tr>
<tr>
<td>IEEE 802.1Q</td>
<td>Virtual LANs (VLAN)</td>
</tr>
<tr>
<td>IEEE 802.1X</td>
<td>Port based and MAC based Network Access Control, Authentication</td>
</tr>
<tr>
<td>IEEE802.3ac</td>
<td>Max frame size extended to 1522Bytes</td>
</tr>
<tr>
<td>IEEE 802.3ad</td>
<td>Link-aggregation for parallel links with LACP (Link Aggregation Control Protocol)</td>
</tr>
<tr>
<td>IEEE 802.3x</td>
<td>Flow control for Full Duplex</td>
</tr>
<tr>
<td>IEEE 802.1ad</td>
<td>Stacked VLANs, Q-in-Q</td>
</tr>
<tr>
<td>IEEE 802.1ab</td>
<td>Link Layer Discovery Protocol (LLDP)</td>
</tr>
<tr>
<td>IEEE 802.3az</td>
<td>EEE (Energy Efficient Ethernet)</td>
</tr>
</tbody>
</table>

**Switch Architecture**

- Back-plane (Switching Fabric): 4.8Gbps (IFS-402GSM), 7.6Gbps (IFS-803GSM), 11.2Gbps (IFS-1604GSM)
- Full wire-speed

**Data Processing**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Store and Forward</td>
<td>IEEE 802.3x for full duplex mode Back pressure for half duplex mode</td>
</tr>
</tbody>
</table>

**Network Connector**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4x 10/100Base-TX RJ-45 + 2x 100/1000Base-X SFP connector (IFS-402GSM)</td>
<td>8x 10/100Base-TX RJ-45 + 3x 100/1000Base-X SFP connector (IFS-803GSM)</td>
</tr>
<tr>
<td>16x 10/100Base-TX RJ-45 + 4x 100/1000Base-X SFP connector (IFS-1604GSM)</td>
<td>RJ-45 UTP port support Auto negotiation speed, Auto MDI/MDI-X function, SFP port support dual speed with DDMI</td>
</tr>
</tbody>
</table>

**Console**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS-232 RJ-45</td>
<td>UTP/STP above Cat. 5e cable</td>
</tr>
</tbody>
</table>

**Network Cable**

EIA/TIA-568 100-ohm (100m)

**Protocols**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSMA/CD</td>
<td>Present</td>
</tr>
</tbody>
</table>

**Reverse Polarity Protection**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present</td>
<td></td>
</tr>
</tbody>
</table>

**Overload Current Protection**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present</td>
<td></td>
</tr>
</tbody>
</table>

**CPU Watch Dog**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present</td>
<td></td>
</tr>
</tbody>
</table>

**Power Supply**

- Redundant Dual DC 12/24/48V (9.6~60VDC) Input power (Removable Terminal Block)
- Provide DC Power J ACK adapter cable for external power supply
# Industrial Managed FE Switch

## Power Consumption

<table>
<thead>
<tr>
<th>Voltage</th>
<th>IFS-402GSM</th>
<th>IFS-803GSM</th>
<th>IFS-1604GSM</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12VDC</td>
<td>2.5W</td>
<td>6.5W</td>
<td>10.8W</td>
</tr>
<tr>
<td>24VDC</td>
<td>5.8W</td>
<td>7W</td>
<td>10.6W</td>
</tr>
<tr>
<td>48VDC</td>
<td>8.5W</td>
<td>8.6W</td>
<td>12.5W</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)
- SPF Fiber Per port: Link/Active (Green)

**Jumbo Frame**

9.6KB

**IEEE802.3ac**

Max frame size extended to 1522Bytes (allow Q-tag
5% to 95% (Non-condensing)

**MAC Address Table**

8K

**Memory Buffer**

512K Bytes for packet buffer

**Warning Message**

System Syslog, SNMP e-mail event message, alarm relay

**Alarm Relay Contact**

Relay outputs with current carrying capacity of 1 A @24/DC

**Removable Terminal Block**

Provide 2 redundant power, alarm relay contact, 6 Pin

**Operating Temperature**

-10 ~ 60°C (IFS-402GSM, IFS-803GSM, IFS-1604GSM)

**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) (IFS-402GSM)

## Software Specifications

### Topology

**VLAN**

- IEEE 802.1q VLAN up to 4094
- 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 (Ether, 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 use, 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

**ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)**

Recovery time <50ms

**QoS Features**

**Class of Service**

IEEE802.1p 8 active priorities queues for per port

**Traffic Classification QoS**

IEEE802.1p based CoS

**IP Precedence based CoS**

IP DSCP based CoS

**QCL/QoS Control List (Interface Type): 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 / fps to 3300fps
- Rate Unit : bit or frame

**Bandwidth Control for Egress**

- Rate in steps : 1 kbps / Mbps
- Range : 100 kbps to 1Gbps
- Rate Unit : bit
- Per queue / Per port shaper

**DiffServ (RFC 2474) Remark**

- for Unicast, Broadcast, Multicast

**Storm Control**

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

- **NTP**
- **LLDP (IEEE 802.1ab)**
- **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
- IPv6 ACL
  - Number of rules: up to 256 entries
  - L2 / L3 / L4

### Application

#### Figure 1: Application Example

![Application Example Diagram](image)

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

![Central EMS Diagram](image)

- **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™ Diagram](image)

- **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**

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

www.ctcu.com

sales@ctcu.com
Industrial Managed FE Switch

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>Delete</th>
<th>Instance</th>
<th>Type</th>
<th>Master</th>
<th>East Port</th>
<th>East Edge</th>
<th>West Port</th>
<th>West Edge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delete</td>
<td>1</td>
<td>u-Ring</td>
<td></td>
<td>1</td>
<td></td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Delete</td>
<td>2</td>
<td>u-Ring</td>
<td></td>
<td>4</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Delete</td>
<td>3</td>
<td>u-Ring</td>
<td></td>
<td>10 (Fiber2)</td>
<td></td>
<td>11 (Fiber3)</td>
<td></td>
</tr>
<tr>
<td>Delete</td>
<td>4</td>
<td>Sub-Ring</td>
<td></td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delete</td>
<td>5</td>
<td>u-Chain</td>
<td></td>
<td>5</td>
<td></td>
<td>9 (Fiber1)</td>
<td></td>
</tr>
</tbody>
</table>

Add New Instance
Save | Reset
Industrial Managed FE Switch

Figure 7: µ-Ring 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 FE Switch

Dimensions

IFS-402GSM

IFS-803GSM

IFS-1604GSM
### 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>FIS-402GSM</td>
<td>V</td>
<td>6</td>
<td>4</td>
<td>2 SFP</td>
<td>V</td>
<td>-10~60°C</td>
</tr>
<tr>
<td>FIS-402GSM-E</td>
<td>V</td>
<td>6</td>
<td>4</td>
<td>2 SFP</td>
<td>V</td>
<td>-40~75°C</td>
</tr>
<tr>
<td>FIS-802GSM</td>
<td>V</td>
<td>11</td>
<td>8</td>
<td>3 SFP</td>
<td>V</td>
<td>-10~60°C</td>
</tr>
<tr>
<td>FIS-802GSM-E</td>
<td>V</td>
<td>11</td>
<td>8</td>
<td>3 SFP</td>
<td>V</td>
<td>-40~75°C</td>
</tr>
<tr>
<td>IFS-1604GSM</td>
<td>V</td>
<td>20</td>
<td>16</td>
<td>4 SFP</td>
<td>V</td>
<td>-10~60°C</td>
</tr>
<tr>
<td>IFS-1604GSM-E</td>
<td>V</td>
<td>20</td>
<td>16</td>
<td>4 SFP</td>
<td>V</td>
<td>-40~75°C</td>
</tr>
</tbody>
</table>

### Model Naming Rule

- **IFS**
  - Industrial Fast Ethernet Switch
  - **04GS**: 4x GBE SFP
  - **03GS**: 3x GbE SFP
  - **04GS**: 4x GbE SFP

- **M**: Managed
- **E**: -40~75°C
  - Blank: 0~70°C

### Optional Accessories

#### Industrial Power Supply

- **DR-4S24**: Industrial Power, Input 85~264VAC, Output 24VDC, 48W, -10~+50°C
- **MDR-40-24**: Industrial Power, 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-T7700-00-(E)**: Industrial SFP 1000Base-T UTP 100m, -10~70°C (-40~85°C)
- **ISFP-MS002-31-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)
- **ISFP-T3T00-MA-(E)**: Industrial SFP 100Mbps, long reach UTP (2 wire) (500m), Master, -10~70°C (-40~85°C)
- **ISFP-T3T00-SL-(E)**: Industrial SFP 100Mbps, long reach UTP (2 wire) (500m), Slave, -10~70°C (-40~85°C)

### SFP Naming Rule

- **ISFP**: Industrial SFP Transceiver
  - **M**: Multi Mode
  - **S**: Single Mode
  - **T**: UTP
  - **D**: DDMI
  - **E**: -40~85°C
    - Blank: 0~70°C

  - **10G**: 10Gbps
  - **7**: FE
  - **040**: 40km
  - **31**: 310m
  - **00**: (UTP)
  - **000**: (500m)
  - **002**: (2km)
  - **020**: (20km)
  - **040**: (40km)
  - **05**: 550m
  - **055**: 1550nm
  - **WA**: TX/1310nm (Bidi mode A)
  - **WB**: 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