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)**
- **16x 10/100Base-TX RJ-45 and 4 x 100/1000Base-X SFP Fiber (IFS-1604GSM)**
- 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 IEEE802.3ad 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 in case of 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
- CII/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 devices (Figure 2)

### Specifications

#### Standard

- IEEE 802.3 10Base-T 10Mbit/s Ethernet
- IEEE 802.3u 100Base-TX, 100Base-FX, Fast Ethernet
- IEEE 802.3z 1000Base-X Gbit/s Ethernet over Fiber-Optic
- IEEE 802.3d 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 Ethernet Ring Protection Switching
- IEEE 802.1Q Virtual LANs (VLAN)
- IEEE 802.1X Port based and MAC based Network Access Control, Authentication
- IEEE802.3ac 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)

<table>
<thead>
<tr>
<th>VLAN ID</th>
<th>4094</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch Architecture</td>
<td>Back-plane (Switching Fabric): 4.8Gbps (IFS-402GSM), 7.6Gbps (IFS-803GSM) 11.2Gbps (IFS-1604GSM) Full wire-speed</td>
</tr>
</tbody>
</table>

### Data Processing

- Store and Forward

### Flow Control

- IEEE 802.3x for full duplex mode Back pressure for half duplex mode

### Network Connector

- 4x10/100Base-TX RJ-45 + 2x100/1000Base-X SFP connector (IFS-402GSM)
- 8x10/100Base-TX RJ-45 + 3x100/1000Base-X SFP connector (IFS-803GSM)
- 16x10/100Base-TX RJ-45 + 4x100/1000Base-X SFP connector (IFS-1604GSM)
- RJ-45 UTP port support Auto negotiation speed, Auto MDI/MDI-X function, SFP port support dual speed with DDMI

### Console

- RS-232 (RJ-45)

### 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

### Power Supply

- Redundant Dual DC 12/24/48V (9.6~60VDC) Input power (Removable Terminal Block) Provide DC Power J/P 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>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), SFP Fibre Port: Link/Active (Green)

**Jumbo Frame** 9.6KB

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

**MAC Address Table**

- 8K

**Memory Buffer**

- 512K Bytes for packet buffer

**Warning Message**

- System Syslog, SMTP e-mail 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 ~ 75°C (IFS-402GSM, IFS-803GSM, IFS-1604GSM-E)
- -40 ~ 75°C (IFS-402GSM-E, IFS-803GSM-E, IFS-1604GSM-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) (IFS-402GSM)
- 106 x 72 x 152 mm (D x W x H) (IFS-803GSM, IFS-1604GSM)

**Software Specifications**

**Topoogy**

- 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)

**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 3, 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
- Single Ring, Sub-Ring, Multiple ring topology network

**QoS Features**

<table>
<thead>
<tr>
<th>Class of Service</th>
<th>IEEE802.1p 8 active priorities queues for per port</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traffic Classification QoS</td>
<td>IEEE802.1p based CoS</td>
</tr>
<tr>
<td>IP Precedence based CoS</td>
<td>IP DSCP based CoS</td>
</tr>
<tr>
<td>QCL/QoS Control List: Frame Type, Source/ Destination MAC, VLAN ID, PCP DEI</td>
<td>QCL/QoS Control List: Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number</td>
</tr>
<tr>
<td>Bandwidth Control for Ingress</td>
<td>Rate in steps: 1 kbps / Mbps / fps / kfps</td>
</tr>
<tr>
<td>Range</td>
<td>100 kbps to 1Gbps / 1fps to 3300fps</td>
</tr>
<tr>
<td>Rate Unit</td>
<td>bit or frame</td>
</tr>
<tr>
<td>Bandwidth Control for Egress</td>
<td>Rate in steps: 1 kbps / Mbps</td>
</tr>
<tr>
<td>Range</td>
<td>100 kbps to 1Gbps</td>
</tr>
<tr>
<td>Rate Unit</td>
<td>bit</td>
</tr>
<tr>
<td>DiffServ (RFC 2474) Remarking</td>
<td>Per queue / Per port shaper</td>
</tr>
<tr>
<td>Storm Control</td>
<td>for Unicast, Broadcast, Multicast</td>
</tr>
</tbody>
</table>

**Weight**

- 0.715kg (IFS-402GSM), 0.79kg (IFS-803GSM), 0.82kg (IFS-1604GSM)

**Installation Mounting**

- DIN Rail mounting or wall mounting

**MTBF**

- 321,556hrs (IFS-402GSM), 409,312hrs (IFS-803GSM), 415,967hrs (IFS-1604GSM)

**Warranty**

- 5 years

**Certification**

- CE

**EMI (Electromagnetic Interference)**

- FCC Part 15 Subpart B Class A, CE EN50022 Class A

**Railway Traffic**

- EN50121-4

**Traffic control**

- NEMA TS2 (IFS-402GSM, IFS-803GSM)

**Heavy Industrial Environment Protection Level**

- EN60060-6-2

**Safety**

- UL60950-1

**Shock**

- IEC 60068-2-7

**Freefall**

- IEC 60068-2-32

**Vibration**

- IEC 60068-2-6

**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
  - MAC-Based

- ACL
  - Number of rules: up to 256 entries for L2 / L3 / L4

**RADIUS authentication & accounting**

- TACACS+ authentication & accounting, TACACS+ 3.0
- HTTPS, HTTP
- SSL / SSH v2
- User Name Password Authentication
  - Remote Authentication (via RADIUS / TACACS+)

**Management Interface Access Filtering**

- 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
  - TFTP, HTTP
- RMON
  - RMON (1, 2, 3, 9 group), RMON II
- MIB
  - RFC1213 MIB II, Private MIB
- UPnP
- 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 System
  - System syslog, e-mail, alarm relay
- DNS
- Client, Proxy
- IEEE1588 PTP V2
  - Support 5 operating mode in each port:
    - Ordinary-Bounday, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave

**Warranty**

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**Certification**

- CE

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  - Redundant firmware in case of upgrade failure
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  - RMON (1, 2, 3, 9 group), RMON II
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  - RFC1213 MIB II, Private MIB
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  - Support 5 operating mode in each port:
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Industrial Managed FE Switch

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

IPv6 Features
- IPv6 Telnet Support
- IPv6 NTP Support
- IPv6 TFTP Support
- IPv6 QoS
- IPv6 ACL
  Number of rules: up to 256 entries
  L2 / L3 / L4

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

Industrial Managed FE Switch

NTP
LLDP (IEEE 802.1ab)
Link Layer Discovery Protocol
LLDP-MED

IPv6 Features
- IPv6 Management
- Telnet Server/ICMP v6
- SNMP over IPv6
- HTTP over IPv6
- SSH over IPv6

IPv6 Features
- IPv6 Management
- Telnet Server/ICMP v6
- SNMP over IPv6
- HTTP over IPv6
- SSH over IPv6

Application

Figure 1: Application Example

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

Figure 3: SmartView™

Specifications & design are subject to change without prior notice. Please visit CTC Union website for more details.
Figure 4: SmartConfig™ is a convenient configuration tool for mass deployment of switch products.

Figure 5: Multiple µ-Ring

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

<table>
<thead>
<tr>
<th>u-Ring Configuration</th>
<th>Auto-refresh</th>
<th>Refresh</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delete 1 Instance: u-Ring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Master: 1</td>
<td>East Port: 1</td>
<td>East Edge: 2</td>
</tr>
<tr>
<td>Delete 2 ] Instance: u-Ring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Master: 4</td>
<td>East Port:</td>
<td>East Edge: 3</td>
</tr>
<tr>
<td>Delete 3 ] Instance: u-Ring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Master: 10 (Fiber2)</td>
<td>East Port:</td>
<td>East Edge:</td>
</tr>
<tr>
<td>Delete 4 Instance: Sub-Ring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Master: 6</td>
<td>East Port:</td>
<td>East Edge:</td>
</tr>
<tr>
<td>Delete 5 ] Instance: u-Chain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Master: 5</td>
<td>East Port:</td>
<td>East Edge:</td>
</tr>
</tbody>
</table>
Industrial Managed FE Switch

Figure 7: µ-Ring Type

Determining the backup path (µ-Chain type)

Figure 8: Ring Configuration Example

Ring Configuration Type
- u-Ring
- Sub-Ring

Combination of a ring and four Sub-Ring

Combination of a ring and two Sub-Ring

Ring Configuration Type

Cable Redundancy
## 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 Temperture</th>
</tr>
</thead>
<tbody>
<tr>
<td>IFS-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>IFS-402GSM-E</td>
<td>V</td>
<td>6</td>
<td>4</td>
<td>2 SFP</td>
<td>V</td>
<td>-10~75°C</td>
</tr>
<tr>
<td>IFS-803GSM</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>IFS-803GSM-E</td>
<td>V</td>
<td>11</td>
<td>8</td>
<td>3 SFP</td>
<td>V</td>
<td>-10~75°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>-10~75°C</td>
</tr>
</tbody>
</table>

### Model Naming Rule

- **IFS**
- **M**
- **E**

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

- **M**
  - Managed

- **E**
  - Blank: -10~60°C
  - E: -40~75°C

### Optional Accessories

**Industrial Power Supply**

- DR-4524: 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(ES): Industrial SFP GbE 1000Base-SX, S/M, 500 meter, wave length 850nm, 7.5dB, LC, DDMI, -10~70°C (-40~85°C)
- ISFP-S7020-31-D(ES): Industrial SFP 1000Base-LX, S/M, 20km, wave length 1310nm, 15dB, LC, DDMI, -10~70°C (-40~85°C)
- ISFP-T7T00-00-(ES): Industrial SFP 1000Base-T UTP 100meter, -10~70°C (-40~85°C)
- ISFP-M5002-31-D(ES): Industrial SFP 155M 100Base-FX, MM, 2km, wave length 1310nm, 12dB, LC, DDMI, -10~70°C (-40~85°C)
- ISFP-S5030-31-D(ES): Industrial SFP 155M 100Base-FX, SM, 30km, 1310nm, 19dB, LC, DDMI, -10~70°C (-40~85°C)
- ISFP-T3T00-M(ES): Industrial SFP 100Mbps, long reach UTP (2 wire) (500meter), Master, -10~70°C (-40~85°C)
- ISFP-T3T00-SL-(ES): Industrial SFP 100Mbps, long reach UTP (2 wire) (500meter), Slave, -10~70°C (-40~85°C)

### SFP Naming Rule

- **ISFP**
- **M**
- **D**
- **E**

- **ISFP**
  - Industrial SFP Transceiver
  - M: Multi Mode
  - S: Single Mode
  - T: UTP

- **M**
  - 10G: T-GeE
  - 04: FE
  - 31: Long UTP

- **D**
  - Distance: T00 (UTP): (000) (500m) 002 (2km) 020 (20km) 040 (40km)
  - Wavelength: 00: UTP 05: 850nm 06: 1310nm 05: 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)

- **E**
  - Blank: 0~70°C
  - D: DDMI
  - E: -40~85°C

---

### 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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