

## IGS-A1606SM-16PH

16x GbE RJ45 + 6x 100M/1G/2.5G SFP with 16x PoE 360W, 48VDC

NEW

- ◆ Compliant with the IEC 62443-4-2\* industrial cybersecurity standards
- ◆ Supports  $\mu$ -Ring, ERPS, APS, MRP, MSTP, RSTP, STP for Redundant Cabling
- ◆ Auto Checking and Auto Reset When PoE PD Fail
- ◆ 4KV Surge Protection for PoE, RJ45 and SFP Ports
- ◆ Supports Secure Boot



The industrial cyber-hardened managed PoE switch IGS-A1606SM-16PH is one of our new generation designs and comes with 16 gigabit UTP ports, each complies with IEEE802.3af/at up to 30W PoE+ standard. Equipped with 6 100M/1G/2.5G SFP slots for fiber optic connectivity meet the requirements for extended transmission distance, fanless design, high MTBF, 4KV surge protection and supports wide temperature operation, 48VDC redundant power input, and is designed to comply with cybersecurity regulations. Suitable for heavy-duty applications in harsh environments such as industrial factory automation, data centers, smart transportation systems, military and utility market applications beyond environmental conditions commercial product specifications.

### Features

- 48VDC (44~57VDC) redundant dual power input
- Provides 16-port IEEE 802.3af / 802.3at PoE+ output (30W per port, total 360W)
- 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<20ms 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 802.3cb	2.5GBase-X
	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	APS (Automatic 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

# Industrial Managed GbE PoE Switch



<b>Standard</b>	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)
<b>Switch Architecture</b>	Back-Plane (Switching Fabric): 44Gbps (Full Wire-Speed)	
<b>Forwarding Rate</b>	32.736Mpps	
<b>Data Processing</b>	Store and Forward	
<b>Flow Control</b>	IEEE 802.3x for full duplex mode Back pressure for half duplex mode	
<b>Network Connector</b>	16x 10/100/1000Base-T RJ-45 + 6x 100M/1G/2.5G SFP	
	RJ-45 UTP port supports Auto negotiation speed, Auto MDI/MDI-X function	
	SFP port supports 100M/1G/2.5G speed with DDMI	
<b>Storage Port</b>	USB type A	
<b>Console Port</b>	USB type C	
<b>PoE Standard &amp; RJ-45 Pin Assignment</b>	16x IEEE 802.3af /IEEE 802.3at 2 pairs PoE, PoE+, 30W/port End-Span, Alternative A mode. Positive (V+) : RJ-45 pin 1, 2. Negative (V-) : RJ-45 pin 3, 6.	
<b>Network Cable</b>	UTP/STP Cat. 5e cable or above EIA/TIA-568 100-ohm (100meter)	
<b>Protocols</b>	CSMA/CD	
<b>Reverse Polarity Protection</b>	Supported for power input	
<b>Overload Current Protection</b>	Supported	
<b>CPU Watch Dog</b>	Supported	
<b>Power Supply</b>	Redundant Dual power input (Removable terminal block) 48VDC (44~57VDC) (50~57V input is recommended for IEEE802.3at PoE+ applications)	
<b>Power Consumption</b>	TBD	
<b>PoE Power Budget</b>	Maximum PoE Output power budget 30W/port, Total 360W	
<b>LED</b>	System: Power 1 (Green), Power 2 (Green), Alarm (Amber), CPU Act (Green), Ring Master (Yellow) UTP: 10/100 Link/Active (Green), 1000 Link/Active (Amber) SFP Slot: 100M/1G Link/Active (Green), 2.5G Link/Active (Amber) PoE: ON (Green)	
<b>Jumbo Frame</b>	10KB	
<b>MAC Address Table</b>	16K	
<b>Memory Buffer</b>	12Mb for packet buffer	
<b>Device Memory</b>	4G Bytes eMMC, 2G Bytes RAM	
<b>Warning Message</b>	System Syslog, SMTP/ e-mail event message, alarm relay	
<b>Alarm Relay Contact</b>	Relay outputs with current carrying capacity of 1A @24VDC	
<b>Removable Terminal Block</b>	Provides 1 terminal block for Alarm relay, redundant power PWR1 and PWR2	
<b>Operating Temperature</b>	-10 ~ 60°C (IGS-1606SM-16PH) -40 ~ 75°C (IGS-1606SM-16PHE)	
<b>Operating Humidity</b>	5% to 95% (Non-condensing)	
<b>Storage Temperature</b>	-40 ~ 85°C	
<b>Housing</b>	Rugged Metal, IP30 Protection, Fanless	
<b>Dimensions</b>	135.6 x 100 x 160 mm (D x W x H)	
<b>Weight</b>	TBD	
<b>Installation Mounting</b>	DIN Rail mounting or wall mounting (Optional)	
<b>MTBF (MIL-HDBK-217)</b>	TBD	
<b>Warranty</b>	5 years	
<b>Certification</b>		
<b>Industrial Cybersecurity</b>	IEC 62443-4-1, IEC 62443-4-2*	
<b>EMC</b>	CE (EN55032, EN55035)	
<b>EMI (Electromagnetic Interference)</b>	FCC Part 15 Subpart B Class A, CE	
<b>Railway Traffic</b>	EN50121-4	
<b>EMS (Electromagnetic Susceptibility) Protection Level</b>	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	

<b>EMS (Electromagnetic Susceptibility) Protection Level</b>	EN61000-4-6 (CS) Level 3, Criteria A
	EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
<b>Safety</b>	EN62368-1
<b>Surge Protection</b>	4KV for PoE, UTP and Fiber ports
<b>Shock</b>	IEC 60068-2-27
<b>Freefall</b>	IEC 60068-2-31
<b>Vibration</b>	IEC 60068-2-6

\*Future release

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## Software Specifications

### Topology

<b>VLAN</b>	IEEE 802.1q VLAN, up to 4094 802.1Q VLAN ID
	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
	Private VLAN for port isolation
	GVRP (GARP VLAN Registration Protocol)
	MVR (Multicast VLAN Registration )
Voice VLAN	
<b>Link Aggregation (Port Trunk)</b>	Static (Hash with SA, DA, IP, TCP/UDP port), up to 6 trunk group
	Dynamic (IEEE 802.3ad LACP), up to 6 trunk group
<b>Spanning Tree</b>	IEEE 802.1D STP, IEEE 802.1W RSTP, IEEE 802.1S MSTP
<b>MRP (IEC62439-2)</b>	Supported
<b>Multiple <math>\mu</math>-Ring</b>	Up to 5 instances that each supports $\mu$ -Ring, $\mu$ -Chain or Sub-Ring type for flexible uses, and maximum up to 5 Rings
	Recovery time <20ms The maximum number of device is allowed 250 nodes in a Ring.
<b>Loop Protection</b>	Supported
<b>ITU-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection )</b>	Recovery time <50ms
	Single Ring, Sub-Ring, Multiple ring topology network
<b>ITU-T G.8031 / Y.1342 APS (Automatic Protection Switching)</b>	Supported

### QoS Features

<b>Class of Service</b>	IEEE 802.1p 8 active priorities queues for per port
<b>Traffic Classification QoS</b>	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, Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
<b>Bandwidth Control for Ingress</b>	100~1,000,000 when the "Unit" is "kbps", and 1~1,000 when the "Unit" is "Mbps"
<b>Bandwidth Control for Egress</b>	100~1,000,000 when the "Unit" is "kbps", and 1~1,000 when the "Unit" is "Mbps"
	Per queue / Port shaper
<b>DiffServ (RF 2474) Remarking</b>	
<b>Storm Control</b>	For Unicast, Broadcast and Multicast

### IP Multicasting Features

<b>IGMP / MLD Snooping</b>	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

<b>IEEE 802.1X</b>	Port-Based
	MAC-Based

# Industrial Managed GbE PoE Switch

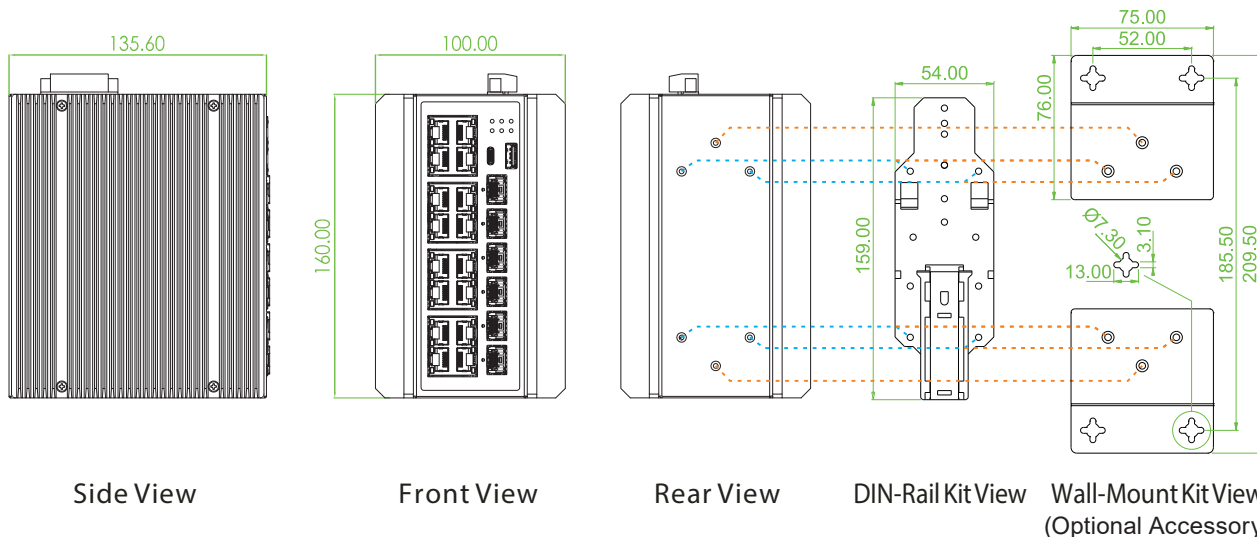


<b>ACL</b>	Number of rules : up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
<b>RADIUS</b>	Authentication & Accounting
<b>TACACS+</b>	Authentication, Authorization and Accounting
<b>HTTPS, HTTP</b>	Supported
<b>SSL / SSH v2</b>	Supported
<b>User Name Password Authentication</b>	Local Authentication Remote Authentication (via RADIUS / TACACS+)
<b>Management Interface Access Filtering</b>	Web, Telnet / SSH, CLI USB console
<b>Management Features</b>	
<b>CLI</b>	Cisco® like CLI
<b>Web UI</b>	Supported
<b>Telnet</b>	Server
<b>SNMP</b>	V1, V2c, V3
<b>sFlow</b>	Supported
<b>Modbus/TCP</b>	Supports for management and monitoring
<b>SW &amp; Configuration Upgrade</b>	SFTP, TFTP, HTTPS, HTTP, FTP Redundant firmware in case of upgrade failure
<b>FTP Client</b>	Supports for upload/download configuration
<b>RMON</b>	RMON I (1, 2, 3, 9 group), RMON II
<b>MIB</b>	RFC1213 MIB II, Private MIB
<b>UPnP</b>	Supported
<b>DHCP v4</b>	Server, Client, Relay, Relay option 82, Snooping
<b>ARP Inspection</b>	Supported
<b>IP Source Guard</b>	Supported
<b>Port Mirroring</b>	Supported
<b>Event Syslog</b>	Syslog server (RFC3164) (Support 4 server)
<b>Warning Message</b>	System syslog, e-mail, alarm relay
<b>DNS</b>	Client, Proxy
<b>NTP V4.0, SNTP</b>	Client
<b>LLDP (IEEE 802.1ab)</b>	Link Layer Discovery Protocol LLDP-MED
<b>IPv6 Features</b>	
<b>IPv6 Management</b>	Telnet Server/ICMP v6
<b>SNMP over IPv6</b>	Supported
<b>HTTP over IPv6</b>	Supported
<b>SSH over IPv6</b>	Supported
<b>IPv6 Telnet</b>	Supported
<b>IPv6 NTP, SNTP</b>	Client
<b>IPv6 TFTP</b>	Supported
<b>IPv6 QoS</b>	Supported
<b>IPv6 ACL</b>	Number of rules: up to 256 entries for L2 / L3 / L4 L2 : Mac address SA/DA/VLAN L3: IP address SIP, Subnet (32bit) L4: TCP/UDP
<b>IPv6 Source Guard</b>	Supported
<b>DHCP v6</b>	Relay, Snooping
<b>Others Features</b>	
<b>Green Ethernet</b>	Determine the cable length and lowering the power for ports with short cables Lower the power for a port when there is no link

## Advanced PoE

**Management** PoE PD failure auto checking, and auto reset when PD fail  
 PoE port on/off weekly scheduling  
 PoE Configuration  
 PoE Enable/Disable  
 Power limit by classification  
 Power feeding priority  
 Total PoE power budget limitation: maximum 360W

## Dimensions



## Ordering Information

Model Name	Total Port	RJ45	SFP	PoE		Power Input	Certification			Operating Temperature
		10/100/1000 Base-T(X)	100M/1G/2.5G	IEEE802.3 at/af	Power Budget	Redundant	EN50121-4	EN 62368-1	CE FCC	
IGS-A1606SM-16PH	22	16	6	16	360W	48VDC	V	V	V	-10~60°C
IGS-A1606SM-16PHE	22	16	6	16	360W	48VDC	V	V	V	-40~75°C

## Optional Accessories

### Auto Backup Kit

BUK1-USB Backup kit for USB Type-C Console Managed Switch

### 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-M8000-85-D(E)	Industrial SFP 2.5GbE, M/M, 300 meter, wavelength 850nm, 9dB, LC, DDMI, -10~70°C (-40~85°C)
ISFP-S8020-31-D(E)	Industrial SFP 2.5GbE, S/M, 20km, wavelength 1310nm, 13dB, 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

XDR-480E-48 Industrial Power, Input 85 ~ 264VAC/120 ~ 370VDC, Output 48VDC, 480W, -40 ~ 70°C