



NEW
IGS+ 402SM-4PH24

4x 10/100/1000Base-T +
2x 100/1000Base-X SFP w/ 4x PoE+

NEW
IGS-402SM-4PU

4x 10/100/1000Base-T + 2x
100/1000Base-X SFP w/ 4x **PoE++**, 60W

NEW
IGS+ 803SM-8PH24

8x 10/100/1000Base-T +
3x 100/1000Base-X SFP w/ 8x PoE+

IGS-1608SM-8PH

16x 10/100/1000Base-T +
8x 100/1000Base-X SFP w/ 8xPoE+



These models are managed industrial grade Gigabit PoE (Power over Ethernet) switches that provide 4/8/16x GbE UTP plus 2/3/8 GbE SFP with 4/8x PoE Ports. The PoE features enable power and data to be transferred via a single cable, thereby considerably reducing cabling and electrical wiring expenses. With dual power input design, these 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 telecom network, industrial network, 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/ ITM-T G.8032 ERPS and multiple μ -Ring for redundant cabling, advanced PoE management functions such as weekly 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 (see figure 1).

Features

- 4x 10/100/1000Base-T RJ-45+ 2x 100/1000Base-X SFP with 4x PoE+, total 120W power budget (IGS+402SM-4PH24)
- 4x10/100/1000Base-T RJ-45 + 2x 100/1000Base-X SFP with 4x **PoE++**, total 240W power budget (IGS-402SM-4PU)
- 8x10/100/1000Base-T RJ-45+ 3x100/1000Base-X SFP with 8xPoE+, total 180W power budget (IGS+803SM-8PH24)
- 16x10/100/1000Base-T RJ-45+ 8x100/1000Base-X SFP with 8x PoE+, total 240W power budget (IGS-1608SM-8PH)
- 48VDC (44~57VDC) redundant dual input power (IGS-402SM-4PU, IGS-1608SM-8PH)
- 24/48VDC (20~57VDC) redundant dual input power with built-in very high efficiency booster (94~97%) to rise up 55 VDC for PoE output (Figure 2) (IGS+402SM-4PH24, IGS+803SM-8PH24)
- **Supports negative voltage power input with isolated RS-232 console port (for example in telecom system)**
- Regulated PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 2) (IGS+402SM-4PH24, IGS+803SM-8PH24)
- Provides 4/8 port IEEE802.3af / 802.3at PoE+ output ,30W per port (IGS+402SM-4PH24, IGS+803SM-8PH24, IGS-1608SM-8PH)
- Provides 4 port IEEE802.3af / 802.3at/802.3bt **PoE++ output, 60W** per port (IGS-402SM-4PU)
- 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
- Rugged metal, IP30 protection & Fan-less design
- UL60950-1, CE, FCC, Rail Traffic EN50121-4, Traffic control NEMA TS2 certified
- Heavy Industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- **2.25KVDC Hi-pot isolation protection for Ethernet ports and power**
- 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, ITM-T G.8032 Ethernet Ring Protection Switching

- (ERPS) for redundant cabling
- Provides 5 ring instances that each can support μ -Ring, μ -Chain or Sub-Ring type for flexible uses. Supports up to 5 rings in one device (Please see CTC μ -Ring white paper for more details and more topology application)
- 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, SNMP, 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 tool (Please see Catalog chapter 1- Software Management for more details)
- Supports SmartView for centralized management tool (Please see Catalog chapter 1- Software Management for more details)
- Supporting Central EMS for management of up to 50 SmartView Server, and maximum up to 25,000 device tool (Please see Catalog chapter 1- Software Management for more details)

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 802.3af	PoE (Power over Ethernet)
	IEEE 802.3at	PoE+ (Power over Ethernet enhancements)

Standard	IEEE 802.3bt	PoE++(4 pairs Power over Ethernet)
	IEEE 802.1d	STP (Spanning Tree Protocol)
	IEEE 802.1w	RSTP (Rapid Spanning Tree Protocol)
	IEEE 802.1s	MSTP (Multiple Spanning Tree Protocol)
	ITM-T G.8032 / Y.1344	ERPS (Ethernet Ring Protection Switching)
	IEEE 802.1Q	Virtual LANs (VLAN)

Standard	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)			
Switch Architecture	Back-plane (Switching Fabric): 12Gbps (IGS+402SM-4PH24, IGS-402SM-4PU) 22Gbps (IGS+803SM-8PH24) 48Gbps (IGS-1608SM-8PH) Full wire-speed				
Data Processing	Store and Forward				
Flow Control	IEEE 802.3x for full duplex mode Back pressure for half duplex mode				
Network Connector	4x 10/100/1000Base-T RJ-45 + 2x 100/1000Base-X SFP connector (IGS+402SM-4PH24, IGS-402SM-4PU) 8x 10/100/1000Base-T RJ-45 + 3x 100/1000Base-X SFP connector (IGS+803SM-8PH24) 16x 10/100/1000Base-T RJ-45 + 8x 100/1000Base-X SFP connector (IGS-1608SM-8PH) RJ-45 UTP port support Auto negotiation speed, Auto MDI/MDI-X function, SFP port support 100/1000 dual speed with DDMI				
Console	RS-232 (RJ-45) Isolated RS-232 port grounding for negative voltage power system, or telecom network application				
PoE standard & RJ-45 Pin Assignment	4x IEEE802.3at /802.3af PoE+ (IGS+402SM-4PH24) 4x IEEE 802.3bt /802.3at/ 802.3af PoE++ (IGS-402SM-4PU) 8x IEEE 802.3at /IEEE 802.3af PoE+ (IGS+803SM-8PH24, IGS-1608SM-8PH) End-Span, Alternative A mode. 2 pairs PoE, PoE+: (IGS+402SM-4PH24, IGS+803SM-8PH24, IGS-1608SM-8PH) Positive (V+): RJ-45 pin 1, 2. Negative (V-): RJ-45 pin 3, 6. 4 pairs PoE, PoE++ (IGS-402SM-4PU) Positive (V+): RJ-45 pin 1, 2, 4, 5 Negative (V-): RJ-45 pin 3, 6, 7, 8 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	Supported for power input				
Overload Current Protection	Supported				
CPU Watch Dog	Supported				
Power Supply	IGS-402SM-4PU, IGS-1608SM-8PH: Redundant Dual DC 48V (44~57VDC) input power, and support negative voltage input power for telecom (Removable terminal block) (50~57V input is recommended for IEEE802.3at PoE+ in 30W applications) (50~57V input is recommended for IEEE802.3bt PoE++ in 60W applications)				
Power Supply	IGS+402SM-4PH24, IGS+803SM-8PH24: Redundant Dual DC 24/48V (20~57VDC) input power, and support negative voltage input power for telecom network (Removable Terminal Block) Built-in very high efficiency booster(94~97%) to rise up 55 VDC for PoE output Regulated PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 2)				
Power Consumption	IGS+402SM-4PH24 Power consumption & Booser efficiency				
	Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	Boost Efficiency
	24VDC	132W	7.2W	120W	96%
	48VDC	133.4W	7.2W	120W	95%
	IGS-1608SM-8PH Power consumption				
	Input Voltage	Total Power Consumption	Device Power Consumption	PoE Budget	
	48VDC	255.2W	15.2W	240W	
	IGS-402SM-4PU: TBD IGS+803SM-8PH24: TBD				
PoE Power Budget	Maximum PoE Output power budget 30W / Per Port 120W (IGS+402SM-4PH24) 180W (IGS+803SM-8PH24) 240W (IGS-1608SM-8PH) Maximum PoE Output power budget 60W / Per Port 240W (IGS-402SM-4PU)				

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) PoE Port LED 1 LED /per Port : • PoE Output Power On : ON (Green) • PoE Fault (Over Load, Short Circuit,Port failed at Startup) : Flash 1times /sec (Green) • PoE Output Power Off : Off
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 event message, alarm relay
Alarm Relay Contact	Relay outputs with current carrying capacity of 1 A @24VDC
Removable Terminal Block	Provide 2 redundant power, alarm relay contact, 6 Pin
Operating Temperature	-10 ~ 60°C (IGS+402SM-4PH24, IGS-402SM-4PU, IGS+803SM-8PH24, IGS-1608SM-8PH) -40 ~ 75°C (IGS+402SM-4PHE24, IGS-402SM-4PUE, IGS+803SM-8PHE24, IGS-1608SM-8PHE)
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+402SM-4PH24, IGS-402SM-4PU) 106 x 72 x 152 mm (D x W x H) (IGS+803SM-8PH24) 116 x 91 x 157 mm (Dx Wx H) (IGS-1608SM-8PH)
Weight	0.69kg (IGS+402SM-4PH24) 1.375kg (IGS-1608SM-8PH) TBD (IGS-402SM-4PU) TBD (IGS+803SM-8PH24)
Installation Mounting	DIN Rail mounting, or wall mounting (Optional)
MTBF	626,632 Hours (IGS+402SM-4PH24) 528,753 Hours (IGS+803SM-8PH24) 439,881 Hours (IGS-1608SM-8PH) TBD (IGS-402SM-4PU) (MIL-HDBK-217)
Warranty	5 years
Certification	
EMC	CE
EMI (Electromagnetic Interference)	FCC Part 15 Subpart B Class A, CE
Railway Traffic	EN50121-4
Traffic control	NEMA TS2 (IFS+402GSM-4PH24, IFS+803GSM-8PH24)
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 (Burst) Level 3, Criteria A EN61000-4-5 (Surge) Level 3, Criteria B EN61000-4-6 (CS) Level 3, Criteria A EN61000-4-8 (PFMF, Magnetic Field) Field Strength: 300A/m, Criteria A
Safety	UL60950-1
Hi pot protection	DC 2.25KV for power to chassis ground, Ethernet port to chassis ground
Shock	IEC 60068-2-27
Freefall	IEC 60068-2-32
Vibration	IEC 60068-2-6

Software Specifications

Topology	
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 Recovery time <10ms The maximum number of devices allowed in a Ring supported ring is 250 (Please see CTC Union μ-Ring white paper for more details and more topology application)
Loop Protection	Supported
ITM-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)	Recovery time <50ms Single Ring, Sub-Ring, Multiple ring topology network
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): 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 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 (RF 2474) Remarking	
Storm Control	for Unicast, Broadcast, Multicast
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 L2 : Mac address SA/DA/VLAN L3: IP address SA/DA, Subnet L4: TCP/UDP
RADIUS authentication & accounting	
TACACS+ authentication & accounting, TACACS+ 3.0	
HTTPS, HTTP	Supported
SSL / SSH v2	Supported
User Name Password Authentication	Local 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	TFTP, HTTP Redundant firmware in case of upgrade failure
RMON	RMON I (1, 2, 3, 9 group), RMON II
MIB	RFC1213 MIB II, Private MIB
UPnP	Supported
DHCP	Server, Client, Relay, Snooping, Snooping option 82, Relay option 82
IP Source Guard	Supported
Port Mirroring	Supported
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, SNTP	Client
LLDP (IEEE 802.1ab)	Link Layer Discovery Protocol LLDP-MED
IPv6 Features	
IPv6 Management	Telnet Server/ICMP v6
SNMP over IPv6	Supported
HTTP over IPv6	Supported
SSH over IPv6	Supported
IPv6 Telnet	Supported
IPv6 NTP, SNTP	Client
IPv6 TFTP	Supported
IPv6 QoS	Supported
IPv6 ACL	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
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 :Adjustment LEDs intensity
Cable Diagnostic	Measuring UTP 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 PoE Enable/Disable Power limit by classification Power limit by management Total PoE Power budge limitation: maximum 120W for IGS+402SM-4PH24 , 240W for IGS-402SM-4PU, 180W for IGS+803SM-8PH24, 240W for IGS-1608SM-8PH Power feeding priority

Application

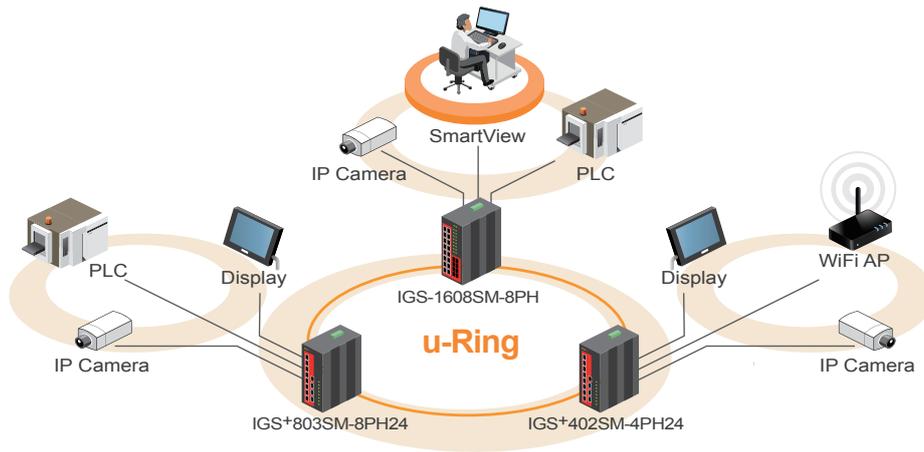
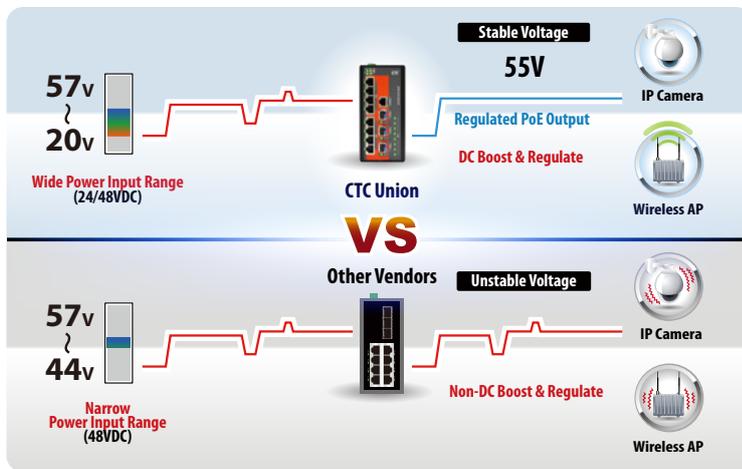


Figure 1 : Application Example

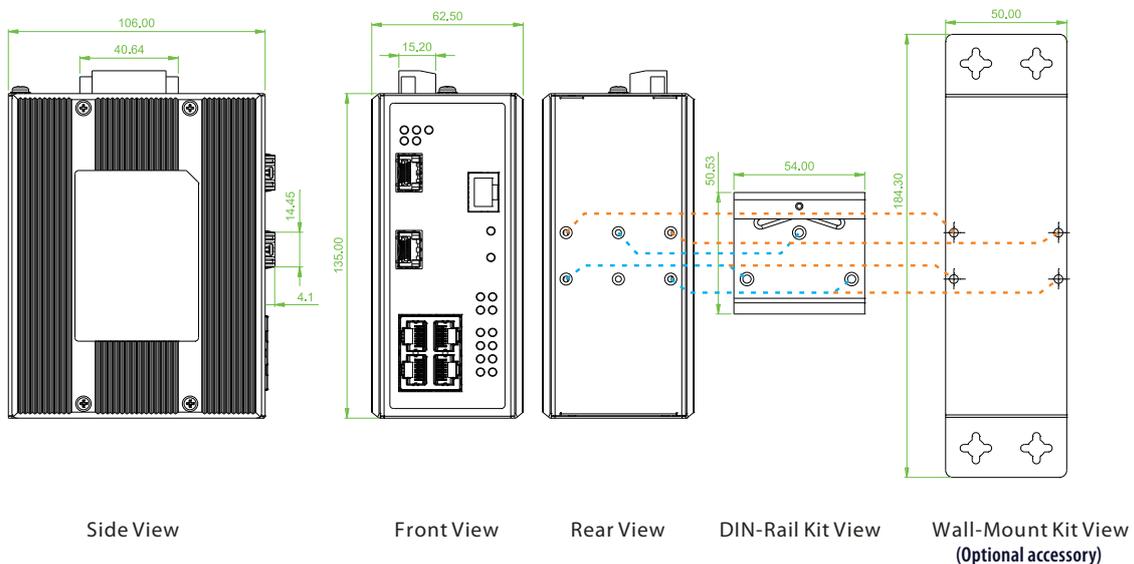


- Regulated PoE output voltage (55VDC) to stabilize PoE device
- Guarantee delivery PoE power distance to 100 meters
- Wide range input power 24/48VDC (20~57VDC)
- Built-in very high efficiency (94~97%) to boost PoE output voltage

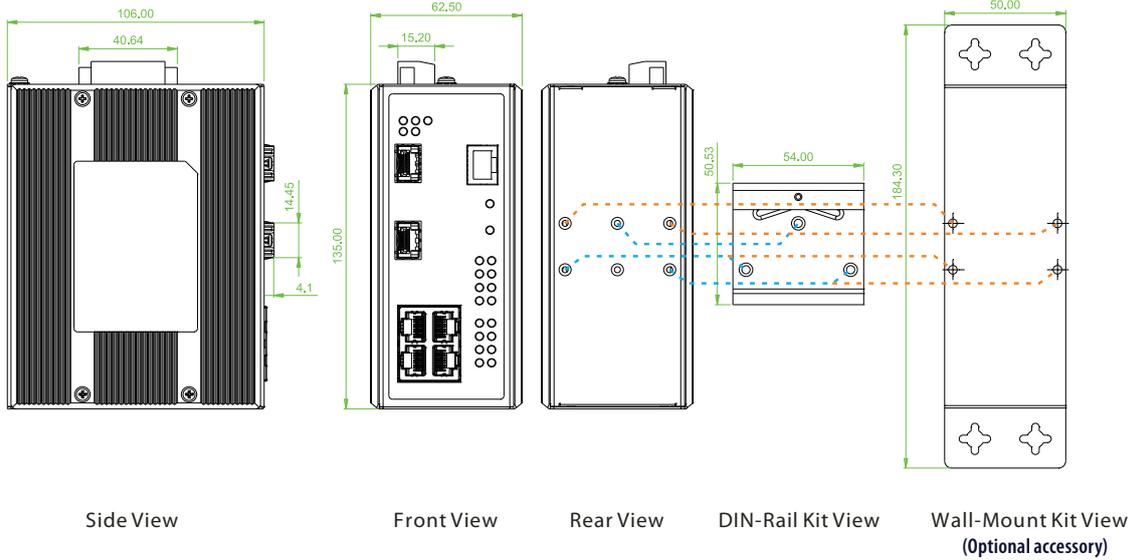
Figure 2 : High Efficiency Boost Technology for PoE

Dimensions

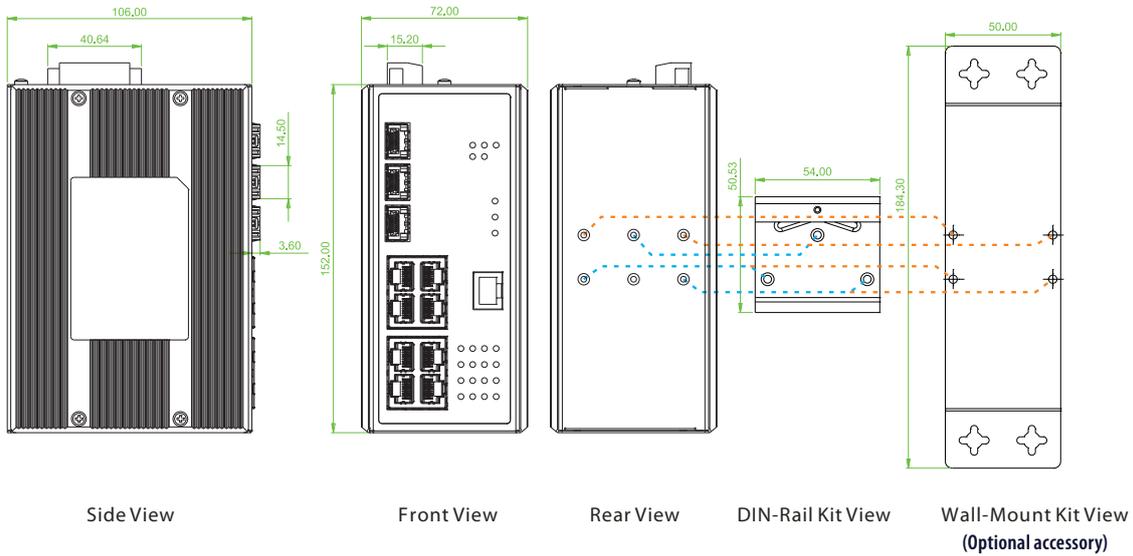
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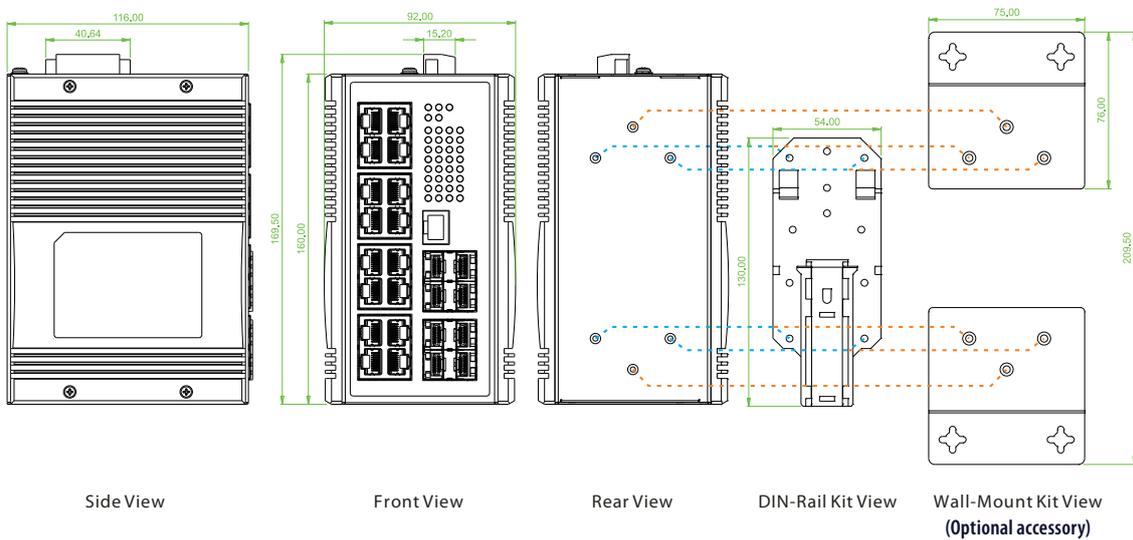
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► IGS+803SM-8PH24



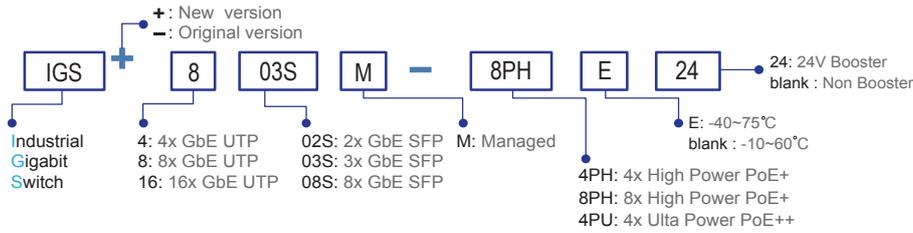
► IGS-1608SM-8PH



Ordering Information

Model Name	Managed	Total Port	UTP		Fiber	PoE Port			Input power	Certification				Operating Temperature
			10/100/1000 Base-T	100/1000 Base-X	IEEE802.3at	IEEE802.3bt	Power Budget	Redundant	Railway EN50121-4	Traffic Control NEMA TS2	Safety UL60950-1	CE,FCC EN61000-6-2 EN61000-6-4		
IGS ⁺ 402SM-4PH24	V	6	4	2 SFP		4		120W	24/48,-48VDC	V	V	V	V	-10~60°C
IGS ⁺ 402SM-4PHE24	V	6	4	2 SFP		4		120W	24/48,-48VDC	V	V	V	V	-40~75°C
IGS-402SM-4PU	V	6	4	2 SFP			4	240W	48,-48VDC	V		V	V	-10~60°C
IGS-402SM-4PUE	V	6	4	2 SFP			4	240W	48,-48VDC	V		V	V	-40~75°C
IGS ⁺ 803SM-8PH24	V	11	8	3 SFP		8		180W	24/48,-48VDC	V	V	V	V	-10~60°C
IGS ⁺ 803SM-8PHE24	V	11	8	3 SFP		8		180W	24/48,-48VDC	V	V	V	V	-40~75°C
IGS-1608SM-8PH	V	24	16	8 SFP		8		240W	48,-48VDC	V		V	V	-10~60°C
IGS-1608SM-8PHE	V	24	16	8 SFP		8		240W	48,-48VDC	V		V	V	-40~75°C

Model Naming Rule



Optional Accessories

Wall mount kit

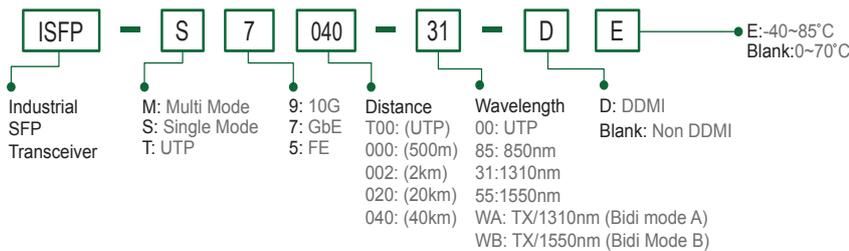
IND-WMK02	Wall Mount kit for Industrial product (Wide) (184 x 50mm) (For IGS ⁺ 402SM-4PH24, IGS-402SM-4PU, IGS ⁺ 803SM-8PH24)
IND-WMK04	Wall Mount kit for Industrial product (Wide) (2 pcs 184 x 50mm) (For IGS-1608SM-8PH)

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. (Please see CTC Union's Industrial SFP datasheet for more details and more items.)

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 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)

SFP Naming Rule



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
- Terminal block
- Protective caps for SFP ports