



### IGS-1608SM-8PH

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

### IGS<sup>+</sup>803SM-8PH24

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

### IGS<sup>+</sup>803SM-8PH

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

### IGS-402SM-4PU

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



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 industrial networks, 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

- 16x 10/100/1000Base-T RJ-45+ 8x 100/1000Base-X SFP with 8x PoE+, total 240W power budget (IGS-1608SM-8PH)
- 8x 10/100/1000Base-T RJ-45+ 3x 100/1000Base-X SFP with 8x PoE+, total 180W power budget (IGS<sup>+</sup>803SM-8PH24)
- 8x 10/100/1000Base-T RJ-45+ 3x 100/1000Base-X SFP with 8x PoE+, total 240W power budget (IGS<sup>+</sup>803SM-8PH)
- 4x 10/100/1000Base-T RJ-45 + 2x 100/1000Base-X SFP with 4x PoE+, total 240W power budget (IGS-402SM-4PU)
- 48VDC (44~57VDC) redundant dual input power (IGS-1608SM-8PH , IGS<sup>+</sup>803SM-8PH, IGS-402SM-4PU)
- 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<sup>+</sup>803SM-8PH24)
- **Isolated RS-232 console port**
- Regulated PoE output voltage (55VDC) to stabilize PoE device, and guarantee delivery PoE power distance to 100meter (Figure 2) (IGS<sup>+</sup>803SM-8PH24)
- Provides 8 port IEEE 802.3af / 802.3at PoE+ output ,30W per port ( IGS-1608SM-8PH, IGS<sup>+</sup>803SM-8PH24, IGS<sup>+</sup>803SM-8PH)
- Provides 4 port IEEE 802.3af / 802.3at 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, EN60950-1, CE, FCC, Rail Traffic EN50121-4, traffic control NEMA TS2 certified
- Heavy Industrial grade EMS, EMI, EN61000-6-2, EN61000-6-4 certified
- **4KV surge protection for PoE, UTP and Fiber ports**
- Cable diagnostics, Measuring cable OK or broken point distance
- Supports Green Ethernet IEEE 802.3az 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/ Relay option 82/ Snooping
- QoS, Traffic classification QoS, CoS, bandwidth control for Ingress and Egress, Storm Control, DiffServ
- IEEE 802.1q 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 proxy reporting, MLD snooping V1/V2
- Flexibility security: Port based and MAC based IEEE 802.1X, RADIUS, ACL, TACACS+, HTTP/HTTPS, SSL/SSH v2
- Software upgrade via TFTP and HTTP, redundant firmware to avoid upgrade failure
- Supports IEEE 1588 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, SNTP, IEEE 802.1ab LLDP
- Supports IPv6 Telnet server /ICMP v6
- CLI, Web based management, SNMP v1/v2c/v3, Telnet/SSH server for management
- Supports Modbus/TCP protocols for management
- Provides SmartConfig for quick and easy mass Configuration\*
- Supports SmartView for Centralized Management\*

\*Please see Chapter 1- **Software Management** for more details

## Specifications

<b>Standard</b>	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)
	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)
	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)	
<b>Switch Architecture</b>	Back-plane (Switching Fabric): 48Gbps (IGS-1608SM-8PH) 22Gbps (IGS+803SM-8PH24, IGS+803SM-8PH) 12Gbps (IGS-402SM-4PU) Full wire-speed	
<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 + 8x 100/1000Base-X SFP connector (IGS-1608SM-8PH) 8x 10/100/1000Base-T RJ-45 + 3x 100/1000Base-X SFP connector (IGS+803SM-8PH24, IGS+803SM-8PH) 4x 10/100/1000Base-T RJ-45 + 2x 100/1000Base-X SFP connector (IGS-402SM-4PU) RJ-45 UTP port support Auto negotiation speed, Auto MDI/MDI-X function, SFP port support 100/1000 dual speed with DDMI	
<b>Console</b>	RS-232 (RJ-45)	
<b>PoE standard &amp; RJ-45 Pin Assignment</b>	IGS-1608SM-8PH, IGS+803SM-8PH24, IGS+803SM-8PH: 8x IEEE 802.3at /IEEE 802.3af PoE+ 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.  IGS-402SM-4PU: 4x IEEE 802.3at/ 802.3af PoE+ 4 pairs PoE, 60W/port End-Span, Alternative A and B mode. Positive (V+): RJ-45 pin 1, 2, 4, 5 Negative (V-): RJ-45 pin 3, 6, 7, 8	
<b>Network Cable</b>	UTP/STP above Cat. 5e cable EIA/TIA-568 100-ohm (100m)	
<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>	<b>IGS-1608SM-8PH, IGS+803SM-8PH, IGS-402SM-4PU :</b> Redundant Dual DC 48V (44~57VDC) input power, (Removable terminal block) (50~57V input is recommended for IEEE802.3at PoE+ in 30W/ 60W applications)	

<b>Power Supply</b>	<b>IGS+803SM-8PH24:</b> Redundant Dual DC 24/48V (20~57VDC) input power, (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)				
<b>Power Consumption</b>	<b>IGS-1608SM-8PH Power consumption</b>				
	<b>Input Voltage</b>	<b>Total Power Consumption</b>	<b>Device Power Consumption</b>	<b>PoE Budget</b>	
	50VDC	255.2W	15.2W	240W	
	<b>IGS+803SM-8PH24 Power consumption &amp; Booser efficiency</b>				
	<b>Input Voltage</b>	<b>Total Power Consumption</b>	<b>Device Power Consumption</b>	<b>PoE Budget</b>	<b>Boost Efficiency</b>
	24VDC	194.2W	10.8W	180W	97%
	48VDC	196W	11.5W	180W	97%
	<b>IGS+803SM-8PH Power consumption &amp; Booser efficiency</b>				
	<b>Input Voltage</b>	<b>Total Power Consumption</b>	<b>Device Power Consumption</b>	<b>PoE Budget</b>	
	50VDC	255.5W	15.5W	240W	
	<b>IGS-402SM-4PU Power consumption</b>				
	<b>Input Voltage</b>	<b>Total Power Consumption</b>	<b>Device Power Consumption</b>	<b>PoE Budget</b>	
	50VDC	249.6W	9.6W	240W	
<b>PoE Power Budget</b>	Maximum PoE Output power budget 30W / Per Port 240W (IGS-1608SM-8PH, IGS+803SM-8PH) 180W (IGS+803SM-8PH24) Maximum PoE Output power budget <b>60W / Per Port 240W</b> (IGS-402SM-4PU)				
<b>LED</b>	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)				
<b>Jumbo Frame</b>	9.6KB				
<b>IEEE802.3ac</b>	Max frame size extended to 1522Bytes (allow Q-tag in packet)				
<b>MAC Address Table</b>	8K				
<b>Memory Buffer</b>	512K Bytes for packet buffer				
<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 1 A @24VDC				
<b>Removable Terminal Block</b>	Provide 2 redundant power, alarm relay contact, 6 Pin				
<b>Operating Temperature</b>	-10 ~ 60°C (IGS-1608SM-8PH , IGS+803SM-8PH24, IGS+803SM-8PH, IGS-402SM-4PU) -40 ~ 75°C (IGS-1608SM-8PHE , IGS+803SM-8PHE24, IGS+803SM-8PHE, IGS-402SM-4PUE)				
<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>	116 x 92 x 160 mm (Dx Wx H) (IGS-1608SM-8PH) 106 x 72 x 152 mm (D x W x H) (IGS+803SM-8PH24, IGS+803SM-8PH) 106 x 62.5 x 135 mm (D x W x H) (IGS-402SM-4PU)				
<b>Weight</b>	1.375kg (IGS-1608SM-8PH), 0.86kg (IGS+803SM-8PH24) 0.85kg (IGS+803SM-8PH) 0.7kg (IGS-402SM-4PU)				
<b>Installation Mounting</b>	DIN Rail mounting, or wall mounting (Optional)				
<b>MTBF</b>	439,881 Hours (IGS-1608SM-8PH) 528,753 Hours (IGS+803SM-8PH24) 487,189 Hours (IGS+803SM-8PH) 589,078 Hours (IGS-402SM-4PU) (MIL-HDBK-217)				
<b>Warranty</b>	5 years				
<b>Certification</b>					
<b>EMC</b>	CE (EN55024, EN55032)				
<b>EMI (Electromagnetic Interference)</b>	FCC Part 15 Subpart B Class A, CE				
<b>Railway Traffic</b>	EN50121-4				

<b>Traffic control</b>	NEMA TS2 (IGS+803SM-8PH24, IGS+803SM-8PH)
<b>Immunity for Heavy Industrial Environment</b>	EN61000-6-2
<b>Emission for Heavy Industrial Environment</b>	EN61000-6-4
<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>	UL60950-1, EN60950-1
<b>Surge protection</b>	4KV for PoE, UTP and Fiber ports
<b>Shock</b>	IEC 60068-2-27
<b>Freefall</b>	IEC 60068-2-32
<b>Vibration</b>	IEC 60068-2-6

## Software Specifications

<b>Topology</b>	
<b>VLAN</b>	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 (Ethernt, SNAP, LLC), up to 128 entries VLAN Translation, up to 256 entries GVRP (GARP VLAN Registration Protocol) MVR ( Multicast VLAN Registration )
<b>Link Aggregation (Port Trunk)</b>	Static (Hash with SA, DA, IP, TCP/UDP port), up to 5 trunk group Dynamic (IEEE 802.3ad LACP), up to 5 trunk group
<b>Spanning Tree Multiple μ-Ring</b>	IEEE 802.1d STP, IEEE 802.1w RSTP, IEEE 802.1s MSTP 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)
<b>Loop Protection</b>	Supported
<b>ITM-T G.8032 / Y.1344 ERPS (Ethernet Ring Protection)</b>	Recovery time <50ms Single Ring, Sub-Ring, Multiple ring topology network
<b>QoS Features</b>	
<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 QCE(QoS Control Entry): Protocol, Source IP, IP Fragment, DSCP, TCP/UDP port number
<b>Bandwidth Control for Ingress</b>	Rate in steps :1 kbps / Mbps / fps / kfps Range : 100 kbps to 1Gbps / 1fps to 3300kfps Rate Unit : bit or frame
<b>Bandwidth Control for Egress</b>	Rate in steps : 1 kbps / Mbps Range : 100 kbps to 1Gbps Rate Unit : bit Per queue / Per port shaper
<b>DiffServ (RF 2474) Remarking</b>	
<b>Storm Control</b>	for Unicast, Broadcast, Multicast
<b>IP Multicasting Features</b>	
<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
<b>Security Features</b>	
<b>IEEE 802.1X</b>	Port-Based MAC-Based
<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 authentication &amp; accounting</b>	
<b>TACACS+ authentication &amp; accounting, TACACS+ 3.0</b>	
<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 RS-232 console
<b>Management Features</b>	
<b>CLI</b>	Cisco® like CLI
<b>Web Based Management</b>	
<b>Telnet</b>	Server
<b>SNMP</b>	V1, V2c, V3
<b>Modbus/TCP</b>	Support for management and monitoring
<b>SW &amp; Configuration Upgrade</b>	TFTP, HTTP Redundant firmware in case of upgrade failure
<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</b>	Server, Client, Relay, Relay option 82 , Snooping
<b>IP Source Guard</b>	Supported
<b>Port Mirroring</b>	Supported
<b>Event Syslog</b>	Syslog server (RFC3164) (Support 1 server )
<b>Warning Message</b>	System syslog, e-mail, alarm relay
<b>DNS</b>	Client, Proxy
<b>IEEE1588 PTP V2</b>	Support 5 operating mode in each port : Ordinary-Boundary, Peer to Peer Transparent Clock, End to End Transparent Clock, Master, Slave
<b>NTP, 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 SA/DA, Subnet L4 : TCP/UDP
<b>Others Features</b>	
<b>Green Ethernet</b>	Supports IEEE 802.3az 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
<b>Cable Diagnostic</b>	Measuring UTP cable normal or broken point distance
<b>Advanced PoE Management</b>	
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 budge limitation: maximum 240W for IGS-1608SM-8PH, IGS+803SM-8PH, IGS-402SM-4PU, 180W for IGS+803SM-8PH24	

## Application

Figure 1 : Application Example

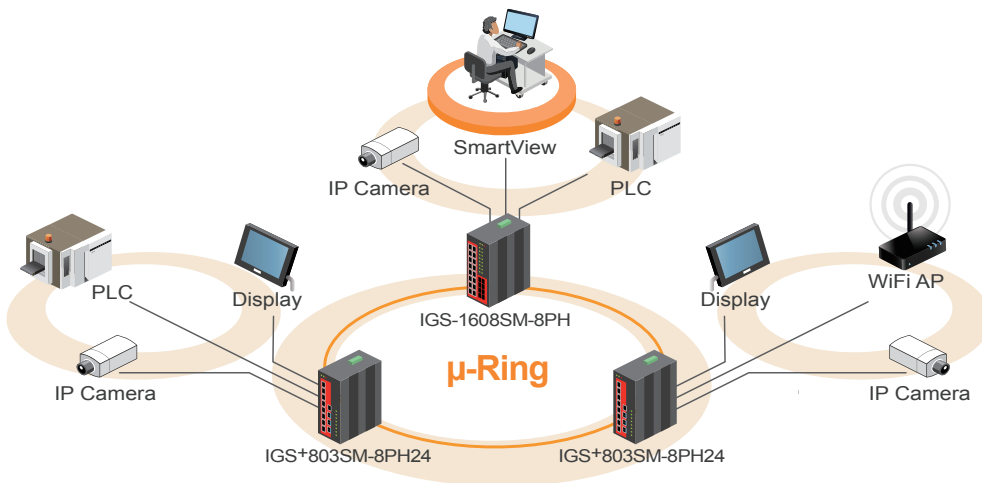
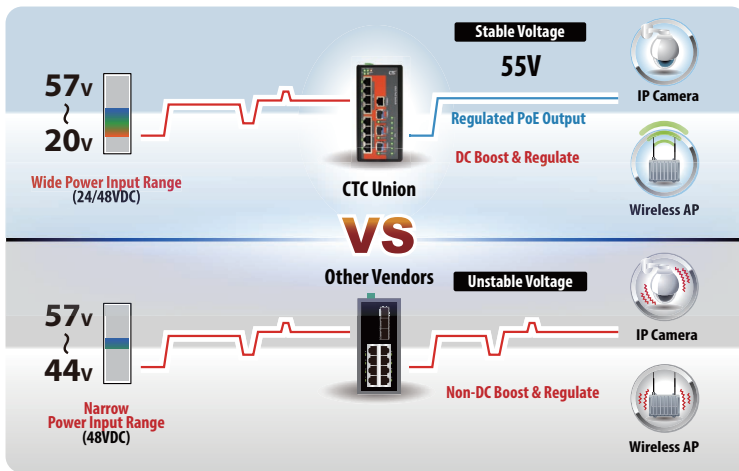


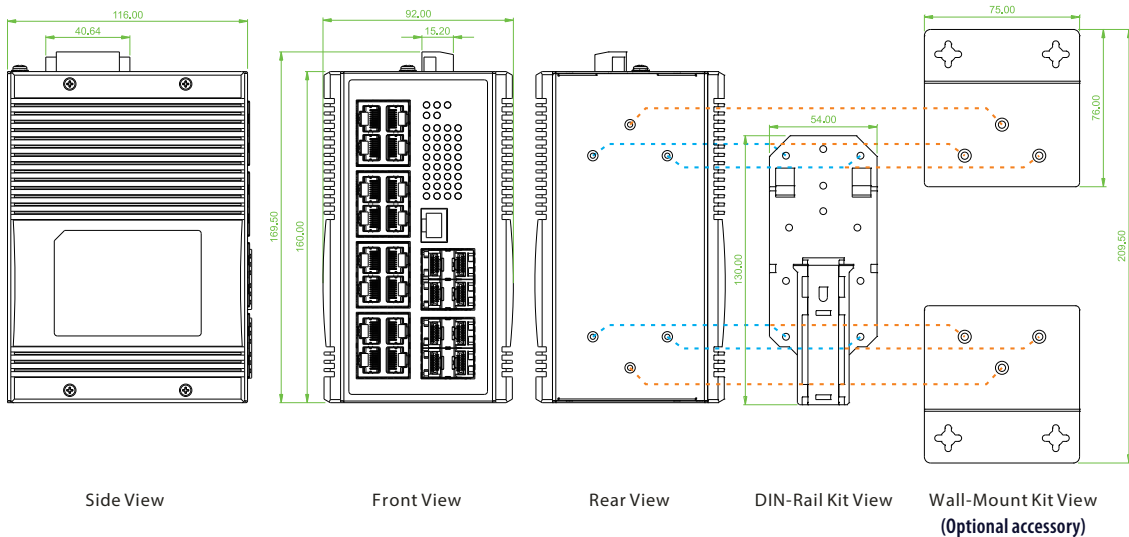
Figure 2 : High Efficiency Boost Technology for PoE



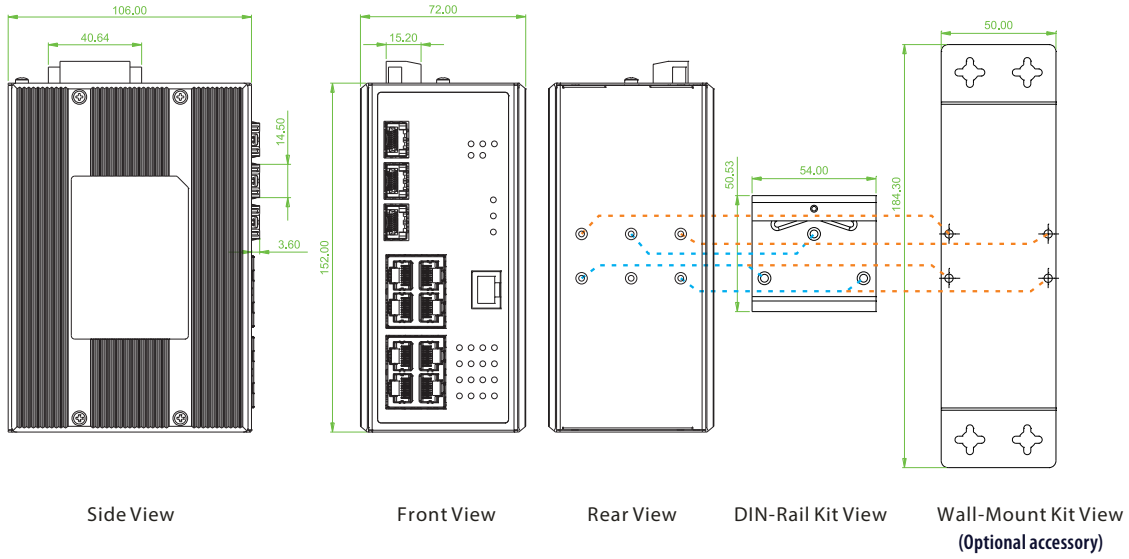
- Regulated PoE output voltage (55VDC) to stabilize PoE device
- Guarantee delivery PoE power distance to 100 meters
- Wide range input power 24/48VDC (20~57VDC)
- Built-in very high efficiency (94~97%) to boost PoE output voltage

## Dimensions

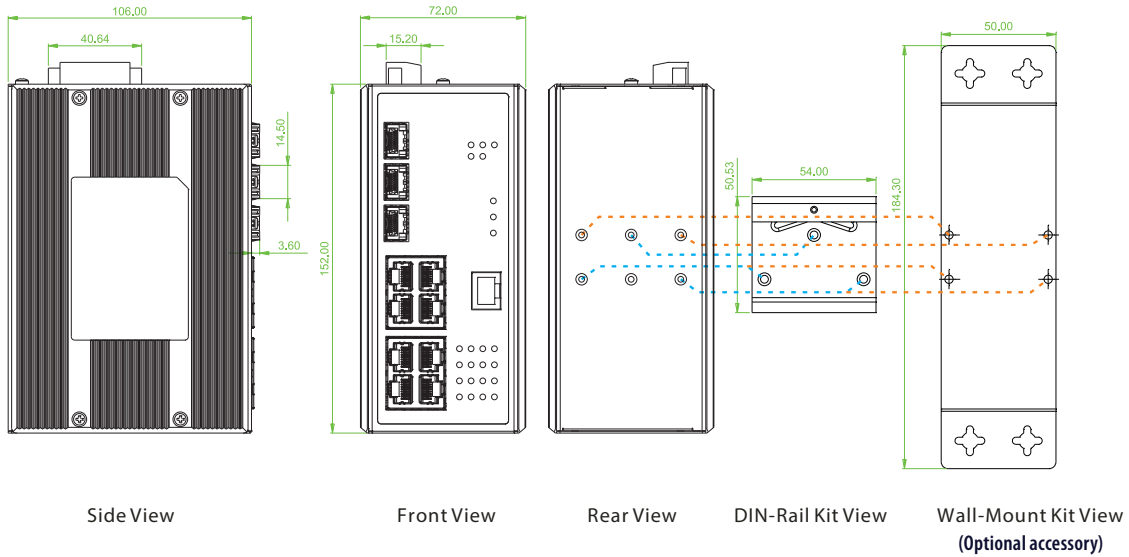
### ► IGS-1608SM-8PH



► IGS+803SM-8PH24



► IGS+803SM-8PH



► IGS-402SM-4PU

