

Industrial L3 16-Port 10/100/1000T 802.3at PoE + 2-Port 10/100/1000T + 2-Port 1G/2.5G SFP Managed Ethernet Switch



Advanced Manageable PoE Solution for Hardened Environment

PLANET IGS-20160HPT L3 Industrial Managed PoE+ Switch, featuring **16 10/100/1000BASE-T 802.3at PoE+ ports** with each port powering up to 36 watts, **2 10/100/1000BASE-T RJ45 ports**, and **2 100/1000/2500BASE-X SFP ports** in an IP30 rugged metal case, can be installed in any difficult environment. It provides user-friendly yet advanced **IPv6/IPv4 management** interfaces, abundant **L2/L4 switching functions**, **Layer 3 OSPFv2 dynamic routing** capability, and advanced **ITU-G.8032 ERPS Ring** technology to improve the rapid self-recovery capability and PLANET **intelligent PoE** functions for controlling the PoE outdoor IP surveillance and wireless network applications. It is able to operate reliably, stably and quietly in the temperature range from **-40 to 75 degrees C**.



High Power PoE for Security and Public Service Applications

As the whole system comes with a total **360-watt** PoE budget, the IGS-20160HPT is designed specifically to satisfy the growing demand of higher power consuming network PDs (powered devices) such as multi-channel (802.11a/b/g/n) wireless LAN access points, PTZ (pan, tilt, zoom) speed dome network cameras and other PoE network devices.

Intelligent Alive Check for Powered Device

The IGS-20160HPT can be configured to monitor connected PD's status in real time via ping action. Once the PD stops working and responding, the IGS-20160HPT will recycle the PoE port power and bring the PD back to work. It also greatly

Physical Port

- **16 10/100/1000BASE-T** Gigabit Ethernet RJ45 ports with **IEEE 802.3at PoE+ Injector**
- **2 10/100/1000BASE-T** Gigabit Ethernet RJ45 ports
- **2 100/1000/2500BASE-X SFP** slots for SFP type auto detection
- One RJ45 console interface for basic management and setup

Power over Ethernet

- Complies with IEEE 802.3at Power over Ethernet Plus/end-span PSE
- Up to 16 IEEE 802.3af/802.3at devices powered
- Supports PoE power up to 36 watts for each PoE port
- Auto detects powered device (PD)
- Circuit protection prevents power interference between ports
- Remote power feeding up to 100m in standard mode; 250m in extended mode at speed of 10Mbps
- PoE management features
 - PoE admin-mode control
 - PoE management mode selection
 - PoE Legacy mode selection
 - PoE Budget setup option
 - Per port PoE function enable/disable
 - PoE port power feeding priority
 - Per PoE port power limit
 - PoE Port Status monitoring
 - PD classification detection
 - Sequence port PoE
- Intelligent PoE features
 - Temperature threshold control
 - PoE usage threshold control
 - PoE extension
 - PoE schedule
 - PD alive check
 - LLDP PoE Neighbors
- Industrial Protocol
- Modbus TCP for real-time monitoring in the SCADA system
- IEEE 1588v2 PTP (Precision Time Protocol) transparent clock mode
- Industrial Case and Installation
- IP30 aluminum case
- DIN-rail or wall-mount design
- 48-54V DC, redundant power with reverse polarity protection

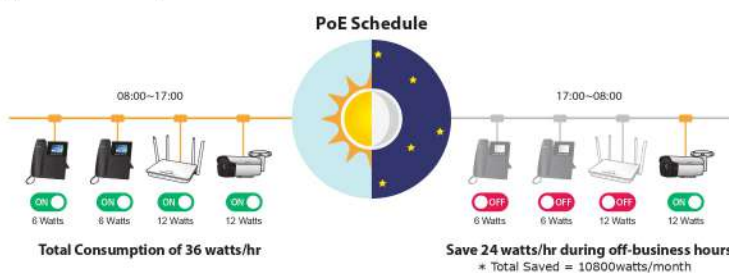
enhances the reliability in that the PoE port will reset the PD power, thus reducing administrator's management burden.

PD Alive Check



PoE Schedule for Energy Savings

Under the trend of energy savings worldwide and contributing to environmental protection on the Earth, the IGS-20160HPT can effectively control the power supply besides its capability of giving high watts power. The built-in "PoE schedule" function helps you to enable or disable PoE power feeding for each PoE port during specified time intervals and it is a powerful function to help SMBs or enterprises save power and money.



Scheduled Power Recycling

The IGS-20160HPT allows each of the connected PoE IP cameras or PoE wireless access points to reboot at a specific time each week. Therefore, it will reduce the chance of IP camera or AP crash resulting from buffer overflow.



Convenient and Smart ONVIF Devices with Detection Feature

PLANET has developed an awesome feature -- ONVIF Support -- which is specifically designed for co-operating with video IP surveillances. From the IGS-20160HPT GUI, clients just need one click to search and show all of the ONVIF devices via network application. In addition, clients can upload floor images to the switch series, making the deployments of surveillance and other devices easy for

- Supports 6KV DC Ethernet ESD protection
- -40 to 75 degrees C operating temperature

Digital Input and Digital Output

- 2 digital input (DI)
- 2 digital output (DO)
- Integrate sensors into auto alarm system
- Transfer alarm to IP network via email and SNMP trap

Layer 3 IP Routing Features

- IPv4 dynamic routing protocol supports RIPv2 and OSPFv2.
- IPv6 dynamic routing protocol supports OSPFv3
- IPv4/IPv6 hardware static routing
- Routing interface provides per VLAN routing mode

Layer 2 Features

- Prevents packet loss with back pressure (half-duplex) and IEEE 802.3x pause frame flow control (full-duplex)
- High performance of Store-and-Forward architecture, and runt/CRC filtering eliminates erroneous packets to optimize the network bandwidth
- Storm Control support
 - Broadcast/Multicast/Unicast
- Supports **VLAN**
 - IEEE 802.1Q tagged VLAN
 - Up to 4K VLANs groups, out of 4094 VLAN IDs
 - Supports provider bridging (VLAN Q-in-Q, IEEE 802.1ad)
 - Private VLAN Edge (PVE)
 - Port Isolation
 - MAC-based VLAN
 - IP Subnet-based VLAN
 - Protocol-based VLAN
 - VLAN Translation
 - Voice VLAN
 - GVRP
- Supports **Spanning Tree Protocol**
 - IEEE 802.1D Spanning Tree Protocol (STP)
 - IEEE 802.1w Rapid Spanning Tree Protocol (RSTP)
 - IEEE 802.1s Multiple Spanning Tree Protocol (MSTP), spanning tree by VLAN
 - BPDU Filtering/BPDU Guard
- Supports **Link Aggregation**
 - 802.3ad Link Aggregation Control Protocol (LACP)
 - Cisco ether-channel (static trunk)
 - Maximum 10 trunk groups with 16 ports per trunk group
 - Up to 32Gbps bandwidth (duplex mode)
- Provides port mirror (many-to-1)

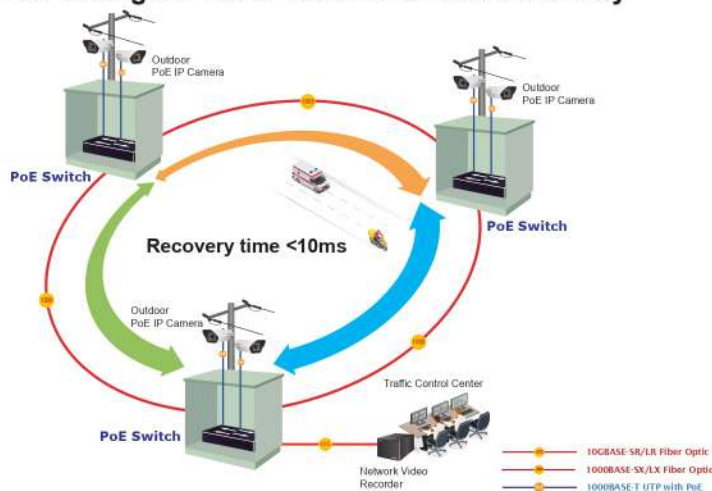
planning and inspection purposes. Moreover, clients can get real-time surveillance's information and online/offline status; the PoE reboot can be controlled from the GUI.



Redundant Ring, Fast Recovery for Critical Network Applications

The IGS-20160HPT supports redundant ring technology and features strong, rapid self-recovery capability to prevent interruptions and external intrusions. It incorporates advanced ITU-T G.8032 ERPS (Ethernet Ring Protection Switching) technology, Spanning Tree Protocol (802.1s MSTP), and **redundant power** input system into customer's industrial automation network to enhance system reliability and uptime in harsh factory environments. In a simple Ring network, the recovery time of data link can be as fast as 10ms.

ERPS Ring for Video Transmission Redundancy



1588 Time Protocol for Industrial Computing Networks

The IGS-20160HPT is ideal for telecom and Carrier Ethernet applications, supporting MEF service delivery and timing over packet solutions for IEEE 1588 and synchronous Ethernet.

- Port mirroring to monitor the incoming or outgoing traffic on a particular port
- Loop protection to avoid broadcast loops
- Supports ERPS (Ethernet Ring Protection Switching)
- Compatible with Cisco **Uni-directional link detection** (UDLD) that monitors a link between two switches and blocks the ports on both ends of the link if the link fails at any point between the two devices
- Link Layer Discovery Protocol (LLDP)
- Provides ONVIF for co-operating with PLANET video IP surveillances

Quality of Service

- Ingress Shaper and Egress Rate Limit per port bandwidth control
- 8 priority queues on all switch ports
- Traffic classification
 - IEEE 802.1p CoS
 - IP TOS/DSCP/IP precedence
 - IP TCP/UDP port number
 - Typical network application
- Strict priority and Weighted Round Robin (WRR) CoS policies
- Supports QoS and In/Out bandwidth control on each port
- Traffic-policing on the switch port
- DSCP remarking

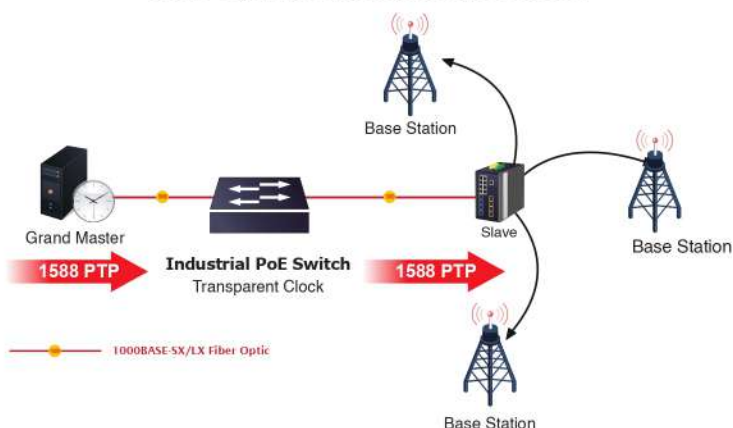
Multicast

- Supports IPv4 IGMP snooping v1, v2 and v3
- Supports IPv6 MLD snooping v1 and v2
- Querier mode support
- IPv4 IGMP snooping port filtering
- IPv6 MLD snooping port filtering
- MVR (Multicast VLAN Registration)

Security

- Authentication
 - IEEE 802.1x port-based / MAC-based network access authentication
 - Built-in RADIUS client to co-operate with the RADIUS servers
 - TACACS+ login users access authentication
 - RADIUS / TACACS+ users access authentication
 - Guest VLAN assigns clients to a restricted VLAN with limited services
- Access Control List
 - IP-based Access Control List (ACL)

Time Synchronization in Network



Layer 3 Dynamic Routing Support

The IGS-20160HPT allows administrators to boost network efficiency by configuring Layer 3 IPv4/IPv6 VLAN static routing manually or automatically through the **Routing Information Protocol (RIP)** or **Open Shortest Path First (OSPF)** settings.

- The **RIP** uses hop count as a routing metric and prevents routing loops by setting a limit on the number of hops allowed in a path from source to destination.
- The **OSPF** is an interior dynamic routing protocol for autonomous systems based on link state. The protocol creates a database of link states by exchanging link states among Layer 3 switches and then uses the Shortest Path First algorithm to generate a route table based on that database.

Cybersecurity Network Solution to Minimize Security Risks

The IGS-20160HPT supports SSHv2 and TLSv1.2 protocols to provide strong protection against advanced threats. It includes a range of cybersecurity features such as **DHCP Snooping**, **IP Source Guard**, **ARP Inspection** Protection, **802.1x port-based** and **MAC-based** network access control, **RADIUS** and **TACACS+** user accounts management, **SNMPv3** authentication, and so on to complement it as an all-security solution.



SMTP/SNMP Trap Event Alert

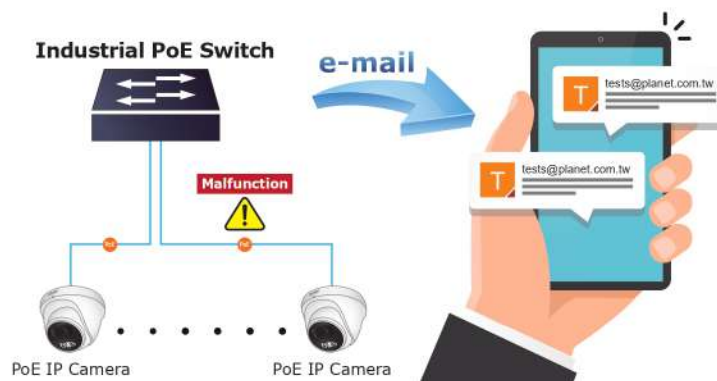
The IGS-20160HPT provides event alert function to help to diagnose the abnormal device owing to whether or not there is a break of the network connection, or the rebooting response.

- MAC-based Access Control List
- Source MAC / IP address binding
- **DHCP Snooping** to filter un-trusted DHCP messages
- **Dynamic ARP Inspection** discards ARP packets with invalid MAC address to IP address binding
- **IP Source Guard** prevents IP spoofing attacks
- IP address access management to prevent unauthorized intruder

Management

- IPv4 and IPv6 dual stack management
- Switch Management Interfaces
 - Web switch management
 - Console/Telnet Command Line Interface
 - SNMP v1 and v2c switch management
 - SSHv2, TLSv1.2 and SNMP v3 secure access
- SNMP Management
 - Four RMON groups (history, statistics, alarms and events)
 - SNMP trap for interface Linkup and Linkdown notification
- **IPv6** IP Address/NTP/DNS management
- Built-in Trivial File Transfer Protocol (TFTP) client
- BOOTP and DHCP for IP address assignment
- System Maintenance
 - Firmware upload/download via HTTP
 - Reset button for system reboot or reset to factory default
 - Dual Images
- DHCP Functions:
 - DHCP Relay
 - DHCP Option82
 - DHCP Server
- User Privilege levels control
- NTP (Network Time Protocol)
- UPnP
- Link Layer Discovery Protocol (LLDP) and LLDP-MED
- IEEE 802.3ah OAM
- Network Diagnostic
 - SFP-DDM (Digital Diagnostic Monitor)
 - ICMPv6/ICMPv4 Remote Ping
 - Cable Diagnostic technology provides the mechanism to detect and report potential cabling issues
- SMTP/Syslog remote alarm
- System Log
- PLANET NMS system and CloudViewer/CloudViewerPro for deployment management

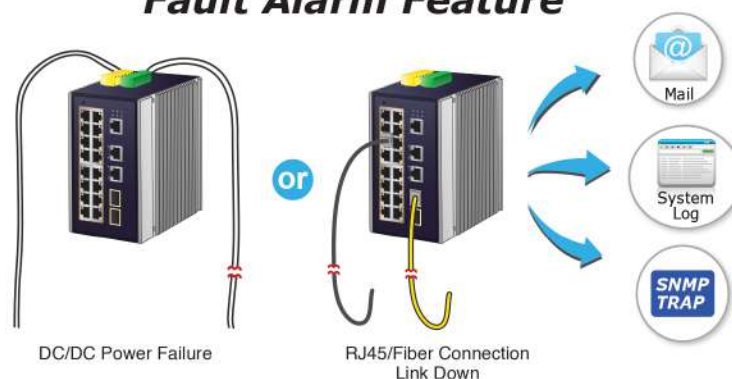
SMTP/SNMP Trap Event Alert



Effective Alarm Alert for Better Protection

The IGS-20160HPT supports a Fault Alarm feature which can alert the users when there is something wrong with the switches. With this ideal feature, the users would not have to waste time finding where the problem is. It will help to save time and human resource.

Fault Alarm Feature



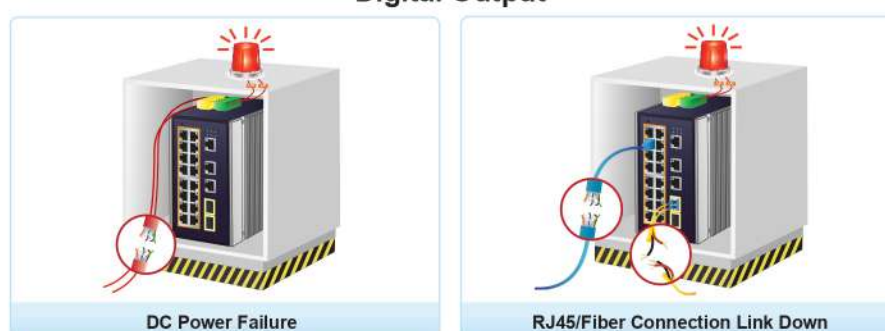
Digital Input and Digital Output for External Alarm

The IGS-20160HPT supports Digital Input and Digital Output on its front panel. This external alarm enables users to use Digital Input to detect and log external device status (such as door intrusion detector), and send event alarm to the administrators. The Digital Output could be used to alarm the administrators if the IGS-20160HPT port shows link down, link up or power failure.

Digital Input

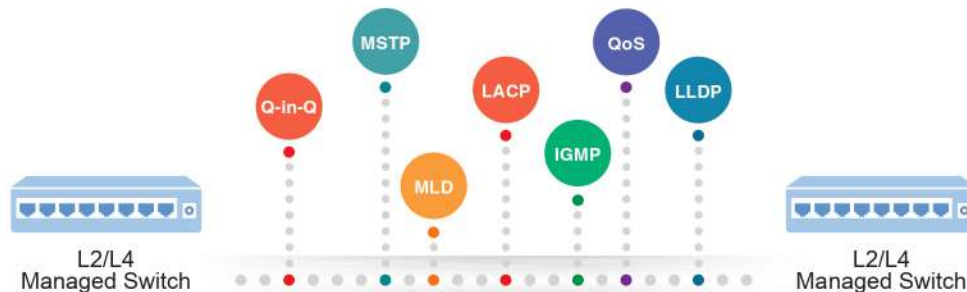


Digital Output



Robust Layer 2 Features

The IGS-20160HPT can be programmed for advanced switch management functions such as dynamic port link aggregation, Q-in-Q VLAN, private VLAN, Rapid Spanning Tree Protocol, Layer 2 to Layer 4 QoS, bandwidth control and IGMP snooping. The IGS-20160HPT provides 802.1Q tagged VLAN, and the VLAN groups allowed will be maximally up to 4K. Via aggregation of supporting ports, the IGS-20160HPT allows the operation of a high-speed trunk combining multiple ports. It enables a maximum of up to 10 trunk groups with 16 ports per trunk group, and supports fail-over as well.



Powerful Security

The IGS-20160HPT offers comprehensive Layer 2 to Layer 4 Access Control List (ACL) for enforcing security to the edge. It can be used to restrict network access by denying packets based on source and destination IP address, TCP/UDP ports or defined typical network applications. Its protection mechanism also comprises 802.1x Port-based and MAC-based user and device authentication. With the private VLAN function, communication between edge ports can be prevented to ensure user privacy. The network administrators can now construct highly-secure corporate networks with considerably less time and effort than before.

Efficient Management

For efficient management, the IGS-20160HPT Managed Ethernet Switch is equipped with console, Web and SNMP management interfaces. With the built-in Web-based management interface, the IGS-20160HPT offers an easy-to-use, platform-independent management and configuration facility. For text-based management, the IGS-20160HPT can be accessed via Telnet and the console port. Moreover, it also offers secure remote management via any standard-based management software by supporting SNMPv3 connection which encrypts the packet content at each session.



Remote Management Solution

PLANET's **Universal Network Management System (UNI-NMS)** and CloudViewer/CloudViewerPro app support IT staff by remotely managing all network devices and monitoring PDs' operational statuses. Thus, they're designed for both the enterprises and industries where deployments of PDs can be as remote as possible, without having to go to the actual location once a bug or faulty condition is found. With the UNI-NMS or CloudViewer/CloudViewerPro app, all kinds of businesses can now be speedily and efficiently managed from one platform.



Modbus TCP Provides Flexible Network Connectivity for Factory Automation

With the supported Modbus TCP/IP protocol, the IGS-20160HPT can easily integrate with **SCADA** systems, **HMI** systems and other data acquisition systems in factory floors. It enables administrators to remotely monitor the industrial Ethernet switch's **operating information**, **port information** and **communication status**, thus easily achieving enhanced monitoring and maintenance of the entire factory.

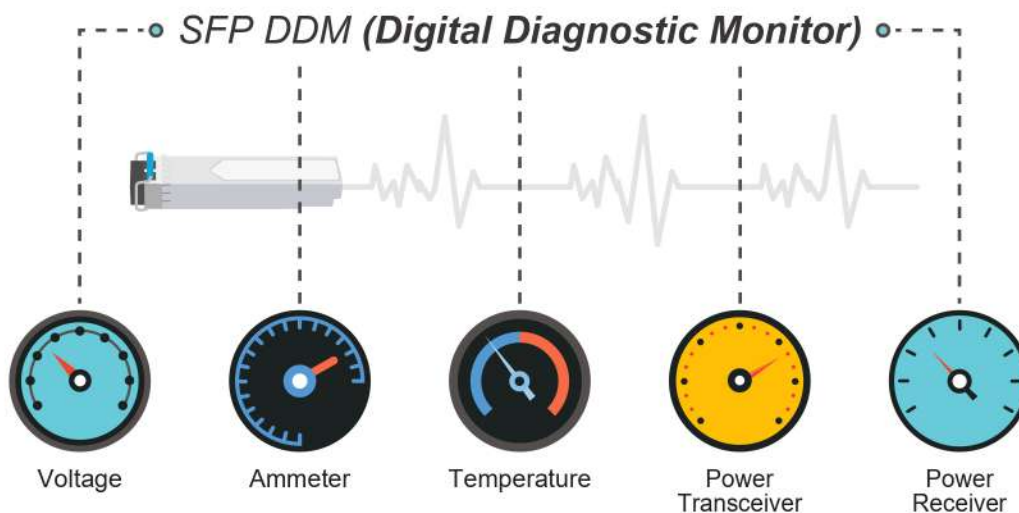
Flexibility and Extension Solution

The two mini-GBIC slots built in the IGS-20160HPT support triple speed, 100BASE-FX, 1000BASE-SX/LX and 2500BASE-SX/LX SFP (Small Form-factor Pluggable) fiber-optic modules, meaning the administrator now can flexibly choose the suitable SFP transceiver according to not only the transmission distance but also the transmission speed required. The distance can be extended from 300 meters to 2km (multi-mode fiber) and up to 10/20/30/40/60/70/80/120 kilometers (single-mode fiber or WDM fiber). They are well suited for applications within the enterprise data centers and distributions.



Intelligent SFP Diagnosis Mechanism

The IGS-20160HPT supports SFP-DDM (Digital Diagnostic Monitor) function that greatly helps network administrator to easily monitor real-time parameters of the SFP, such as optical output power, optical input power, temperature, laser bias current, and transceiver supply voltage.



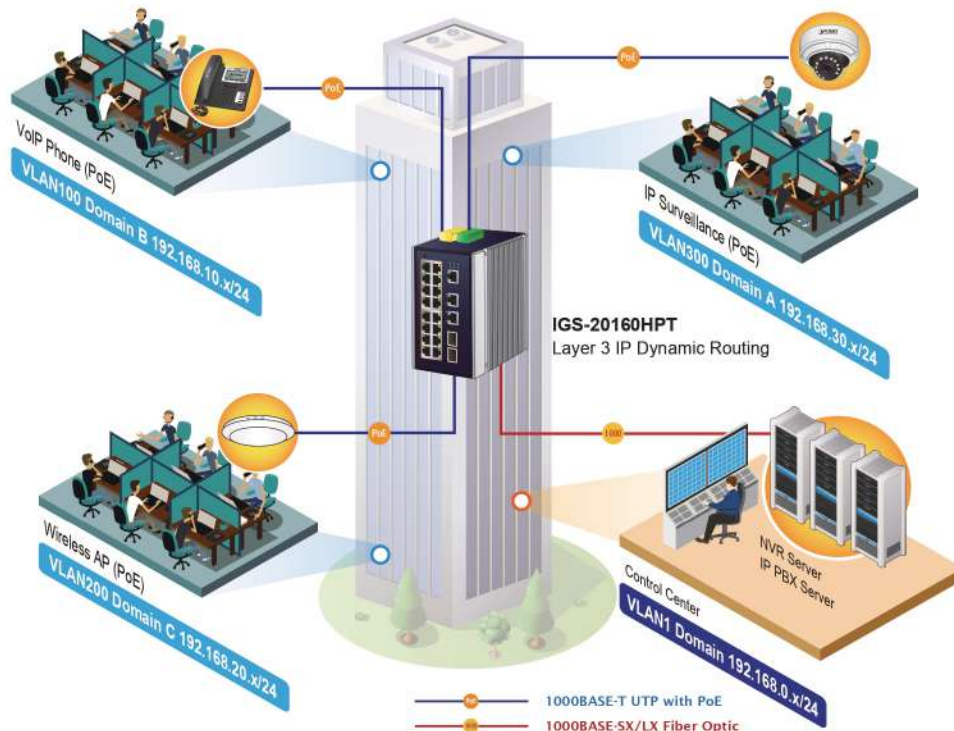
Applications

Layer 3 VLAN Dynamic Routing and PoE Application

With the built-in robust IPv4/IPv6 Layer 3 traffic routing protocols, the IGS-20160HPT ensures reliable routing between VLANs and network segments. The routing protocols can be applied by VLAN interface with up to 32 routing entries. The IGS-20160HPT is certainly a cost-effective and ideal solution for enterprises.

Providing up to 16 Gigabit PoE+ ports and in-line power interface, the IGS-20160HPT PoE+ Managed Switch can easily build a centrally-controlled power network shared by wireless Gigabit AP, IP phone system, or mega-pixel IP camera system group for the enterprises.

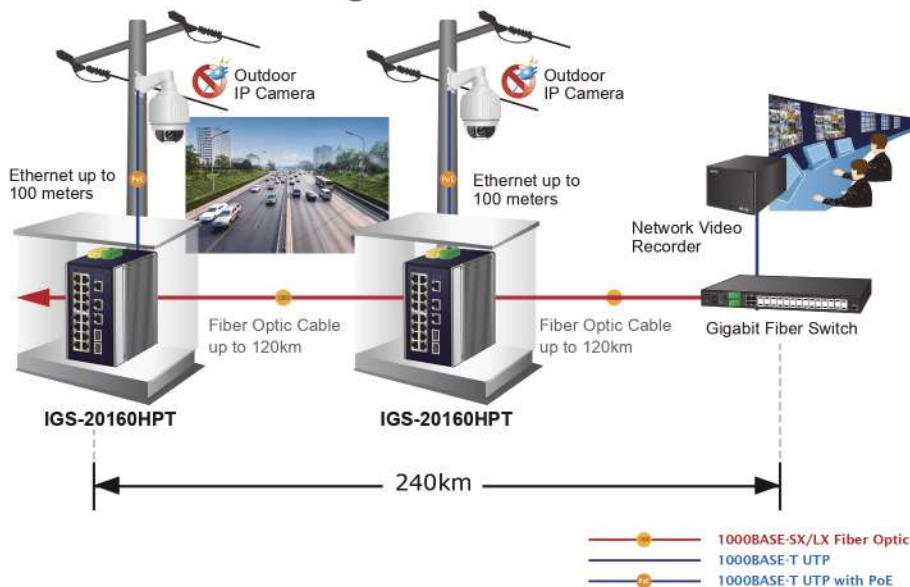
VLAN Routing + PoE Applications



Industrial Area Department/Workgroup PoE Switch

Providing up to 16 PoE+, in-line power interfaces, the IGS-20160HPT can easily build a power centrally controlled for IP phone system, IP camera system, or wireless AP group for Industrial network. For instance, 16 PoE IP cameras or wireless access points can be easily installed around the corner in the industrial environment for surveillance demands or for a wireless roaming network. Without the power-socket limitation, the IGS-20160HPT makes the installation of IP cameras or wireless AP easier and more efficient.

Extending Ethernet Distance



Specifications

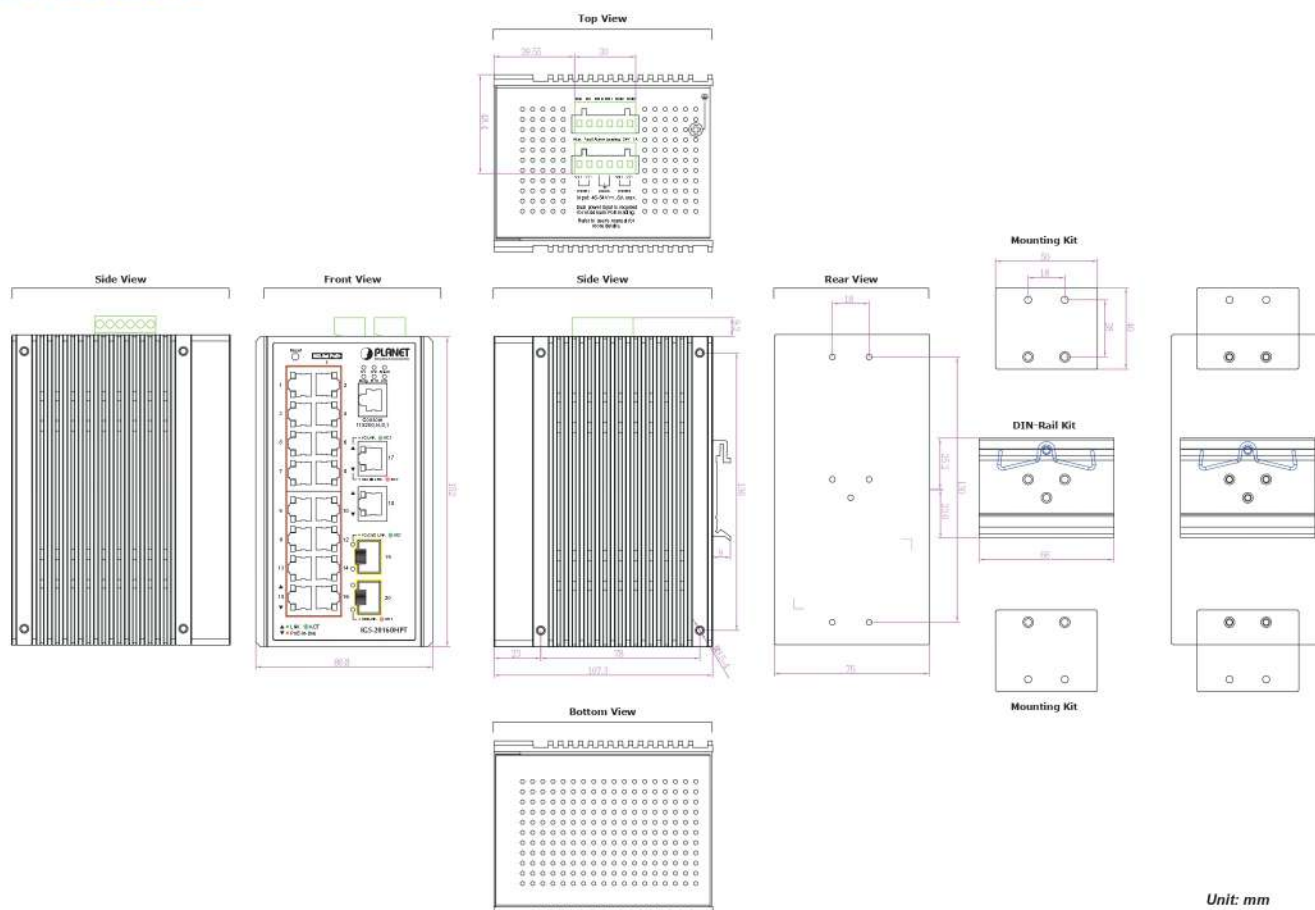
Product	IGS-20160HPT	
Hardware Specifications		
Version	4	
Copper Ports	18 10/100/1000BASE-T RJ45 auto-MDI/MDI-X ports	
SFP/mini-GBIC Slots	2 1000/2500BASE-X SFP interfaces (Port-19 and Port-20) Compatible with 100BASE-FX SFP	
PoE Injector Port	16 ports with 802.3at/af PoE injector function with Port-1 to Port-16	
Console	1 x RJ45-to-RS232 serial port (115200, 8, N, 1)	
Reset Button	< 5 sec: System reboot > 5 sec: Factory default	
ESD Protection	6KV DC	
Enclosure	IP30 aluminum case	
Installation	DIN-rail kit and wall-mount kit	
Connector	Removable 6-pin terminal block for power input Pin 1/2 for Power 1, Pin 3/4 for fault alarm, Pin 5/6 for Power 2 Removable 6-pin terminal block for DI/DO interface Pin 1/2 for DI 1 & 2, Pin 3/4 for DO 1 & 2, Pin 5/6 for GND	
Alarm	One relay output for power failure. Alarm relay current carry ability: 1A @ 24V DC	
DI, DO	2 digital input (DI)	Level 0: -24V~2.1V (±0.1V) Level 1: 2.1V~24V (±0.1V) Input load to 24V DC, 10mA max.
	2 digital output (DO)	Open collector to 24V DC, 100mA max.
Dimensions (W x D x H)	86 x 107 x 152 mm	
Weight	1548g	
Power Requirements	Dual 48~54V DC (>51V DC for PoE+ output recommended)	
Power Consumption	Max.18.8 watts/64BTU (Power on without any connection) Max. 413 watts/1409BTU (Full loading with PoE function)	
LED Indicator	System: Power 1 (Green) Power 2 (Green) Fault Alarm (Red) Ring (Green) Ring Owner (Green) DIDO (Red) Per 10/100/1000T RJ45 PoE+ Ports: PoE-in-Use (Amber) LNK/ACT (Green) Per 10/100/1000T RJ45 Ports: 1000 LNK/ACT (Green) 100 LNK/ACT (Amber) Per SFP Interface: 10/100 LNK/ACT (Amber) 1G/2.5G LNK/ACT (Green)	
Switching		
Switch Architecture	Store-and-Forward	
Switch Fabric	46Gbps/non-blocking	
Throughput (packet per second)	34.2Mpps@ 64 bytes packet	
Address Table	32K entries, automatic source address learning and aging	
Shared Data Buffer	32Mbits	
Flow Control	IEEE 802.3x pause frame for full duplex Back pressure for half duplex	
Jumbo Frame	10K bytes	
Power Over Ethernet		
PoE Standard	IEEE 802.3at Power over Ethernet Plus/PSE	
PoE Power Supply Type	End-span	
PoE Power Output	IEEE 802.3af Standard - Per port 48V~51V DC (depending on the power supply), max. 15.4 watts IEEE 802.3at Standard - Per port 51V~54V DC (depending on the power supply), max. 36 watts	
Power Pin Assianment	1/2(+), 3/6(-)	

PoE Power Budget	48V Power input - 240W maximum (depending on power input) 52~54V Power input - Single power input: 240W maximum (depending on power input) - Dual power input: 360W maximum (depending on power input) * Dual power input must be the same as DC voltage, like dual 54V
Max. Number of Class 2 PDs	16
Max. Number of Class 3 PDs	16
Max. Number of Class 4 PDs	10
Layer 3 Functions	
IP Interfaces	Max. 128 VLAN interfaces
Routing Table	Max. 128 routing entries Max. 4K H/W routing table entries
Routing Protocols	IPv4 RIPv1/v2 IPv4 OSPFv2 IPv4 hardware static routing IPv6 OSPFv3 hardware static routing IPv4 OSPFv2 dynamic routing
Layer 2 Function	
Port Configuration	Port disable/enable Auto-negotiation 10/100/1000Mbps full and half duplex mode selection Flow control disable/enable Power saving mode control
Port Status	Display each port's speed duplex mode, link status, flow control status, auto negotiation status, trunk status
Port Mirroring	TX / RX / Both Many-to-1 monitor RMirror – Remote Switched Port Analyzer (Cisco RSPAN) Supports up to 5 sessions
VLAN	IEEE 802.1Q tag-based VLAN IEEE Q-in-Q tunneling Private VLAN Edge (PVE) MAC-based VLAN Protocol-based VLAN VLAN Translation Voice VLAN MVR (Multicast VLAN Registration) GVRP Up to 4K VLAN groups, out of 4094 VLAN IDs
Link Aggregation	IEEE 802.3ad LACP/static trunk Supports 10 trunk groups with 16 ports per trunk group
Spanning Tree Protocol	IEEE 802.1D Spanning Tree Protocol IEEE 802.1w Rapid Spanning Tree Protocol IEEE 802.1s Multiple Spanning Tree Protocol Supports 7 MSTP instances BPDU Guard, BPDU filtering and BPDU transparent Root Guard
IGMP Snooping	IPv4 IGMP (v1/v2/v3) snooping IPv4 IGMP querier mode support Up to 255 multicast groups
MLD Snooping	IPv6 MLD (v1/v2) snooping IPv6 MLD querier mode support Up to 255 multicast groups
Bandwidth Control	Per port bandwidth control Ingress: 500Kb~1000Mbps Egress: 500Kb~1000Mbps
Ring	Supports ERPS, and complies with ITU-T G.8032 Recovery time < 10ms @ 3 nodes Recovery time < 50ms @ 16 nodes Supports Major ring and sub-ring
Synchronization	IEEE 1588v2 PTP (Precision Time Protocol) Peer-to-peer transparent clock End-to-end transparent clock

QoS	Traffic classification based, strict priority and WRR 8-level priority for switching - Port number - 802.1p priority - 802.1Q VLAN tag - DSCP/TOS field in IP packet
Security Functions	
Access Control List	IP-based ACL/MAC-based ACL ACL based on: - MAC Address - IP Address - Ethertype - Protocol Type - VLAN ID - DSCP - 802.1p Priority Up to 256 entries
Security	Port Security IP source guard, up to 512 entries Dynamic ARP inspection, up to 1K entries Command line authority control based on user level Static MAC address, up to 64 entries
AAA	RADIUS client TACACS+ client
Network Access Control	IEEE 802.1x port-based network access control MAC-based authentication Local/RADIUS authentication
Switch Management	
Basic Management Interfaces	Console; Telnet; Web browser; SNMP v1, v2c
Secure Management Interfaces	SSHv2, TLS v1.2, SNMP v3
System Management	Firmware upgrade by HTTP protocol through Ethernet network Configuration upload/download through HTTP Remote syslog System log LLDP protocol NTP PLANET Smart Discovery Utility PLANET NMS system PLANETCloudViewer/CloudViewerPro
Event Management	Remote syslog Local system log SMTP
ONVIF	ONVIF device discovery ONVIF device monitoring Floor Map
SNMP MIBs	RFC 1213 MIB-II RFC 2863 IF-MIB RFC 1493 Bridge MIB RFC 1643 Ethernet MIB RFC 2863 Interface MIB RFC 2665 Ether-Like MIB RFC 2737 Entity MIB RFC 2819 RMON MIB (Groups 1, 2, 3 and 9) RFC 2618 RADIUS Client MIB RFC 3411 SNMP-Frameworks-MIB RFC 4292 IP Forward MIB RFC 4293 IP MIB RFC 4836 MAU-MIB IEEE 802.1X PAE LLDP Power over Ethernet MIB
Standards Conformance	
Regulatory Compliance	FCC Part 15 Class A, CE

Stability Testing	IEC60068-2-32 (free fall) IEC60068-2-27 (shock) IEC60068-2-6 (vibration)	
Standards Compliance	IEEE 802.3 10BASE-T IEEE 802.3u 100BASE-TX/100BASE-FX IEEE 802.3z Gigabit SX/LX IEEE 802.3ab Gigabit 1000T IEEE 802.3x flow control and back pressure IEEE 802.3ad port trunk with LACP IEEE 802.1D Spanning Tree Protocol IEEE 802.1w Rapid Spanning Tree Protocol IEEE 802.1s Multiple Spanning Tree Protocol IEEE 802.1p Class of Service IEEE 802.1Q VLAN tagging IEEE 802.1ad Q-in-Q VLAN stacking IEEE 802.1X Port Authentication Network Control IEEE 802.1ab LLDP IEEE 802.3af Power over Ethernet IEEE 802.3at Power over Ethernet Plus IEEE 802.3ah OAM IEEE 802.1ag Connectivity Fault Management (CFM)	IEEE 1588 PTPv2 RFC 768 UDP RFC 783 TFTP RFC 791 IP RFC 792 ICMP RFC 2068 HTTP RFC 1058 RIP v1 RFC 2453 RIP v2 RFC 1112 IGMP v1 RFC 2236 IGMP v2 RFC 3376 IGMP version 3 RFC 2710 MLD version 1 RFC 3810 MLD version 2 RFC 2328 OSPF v2 RFC 2740 OSPF v3 ITU G.8032 ERPS Ring ITU-T Y.1731 Performance Monitoring
Standards Conformance		
Operating Temperature	-40 ~ 75 degrees C	
Storage Temperature	-40 ~ 85 degrees C	
Humidity	5 ~ 95% (non-condensing)	

Dimensions



Unit: mm

Ordering Information

IGS-20160HPT	Industrial L3 16-Port 10/100/1000T 802.3at PoE + 2-Port 10/100/1000T + 2-Port 1G/2.5G SFP Managed Ethernet Switch
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Related Products

IGS-6325-16P4S	L3 Industrial 16-Port 10/100/1000T 802.3at PoE + 4-Port 100/1000X SFP Managed Ethernet Switch (-40~75 degrees C)
IGS-5225-8P2T2S	L2+ Industrial 8-Port 10/100/1000T 802.3at PoE + 2-Port 10/100/1000T + 2-Port 100/1000X SFP Managed Ethernet Switch (-40~75 degrees C)
IGS-5225-8T2S2X	L3 Industrial 8-Port 10/100/1000T + 2-Port 100/1000X SFP + 2-Port 10G SFP+ Managed Ethernet Switch (-40~75 degrees C)
IGS-5225-8P2S2X	L3 Industrial 8-Port 10/100/1000T 802.3at PoE + 4-Port 100/1000X SFP + 2-Port 10G SFP+ Managed Ethernet Switch (-40~75 degrees C)
IGS-10020HPT	L2+ Industrial 8-Port 10/100/1000T 802.3at PoE + 2-Port 100/1000X SFP Managed Ethernet Switch (-40~75 degrees C)

Related Power Supply

PWR-480-48	48V, 480W Din-rail Power Supply (NDR-480-48, adjustable 48-56V DC Output)
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Available 100Mbps Modules

Fast Ethernet Transceiver (100BASE-X SFP)

Model	Speed (Mbps)	Connector Interface	Fiber Mode	Distance	Wavelength (nm)	Operating Temp.
MFB-TFX	100	LC	Multi-Mode	2km	1310nm	40 ~ 85 degrees C
MFB-TF20	100	LC	Single Mode	20km	1310nm	40 ~ 85 degrees C

Fast Ethernet Transceiver (100BASE-BX, Single Fiber Bi-directional SFP)

Model	Speed (Mbps)	Connector Interface	Fiber Mode	Distance	Wavelength (TX)	Wavelength (RX)	Operating Temp.
MFB-TFA20	100	WDM (LC)	Single Mode	20km	1310nm	1550nm	-40 ~ 85 degrees C
MFB-TFB20	100	WDM (LC)	Single Mode	20km	1550nm	1310nm	-40 ~ 85 degrees C
MFB-TFA40	100	WDM (LC)	Single Mode	40km	1310nm	1550nm	-40 ~ 85 degrees C
MFB-TFB40	100	WDM (LC)	Single Mode	40km	1550nm	1310nm	-40 ~ 85 degrees C
MFB-TSA	100	WDM (LC)	Multi- Mode	2km	1310nm	1550nm	-40 ~ 85 degrees C
MFB-TSB	100	WDM (LC)	Multi- Mode	2km	1550nm	1310nm	-40 ~ 85 degrees C

Available 1000Mbps Modules

Gigabit Ethernet Transceiver (1000BASE-X SFP)

Model	Speed (Mbps)	Connector Interface	Fiber Mode	Distance	Wavelength (nm)	Wavelength (nm)
MGB-TGT	1000	Copper	--	100m	--	-40 ~ 85 degrees C
MGB-TSX	1000	LC	Multi Mode	550m	850nm	-40 ~ 85 degrees C
MGB-TSX2	1000	LC	Multi Mode	2km	1310nm	-40 ~ 85 degrees C
MGB-TLX(V2)	1000	LC	Single Mode	20km	1310nm	-40 ~ 85 degrees C
MGB-TL30	1000	LC	Single Mode	30km	1310nm	-40 ~ 85 degrees C
MGB-TL40	1000	LC	Single Mode	40km	1310nm	-40 ~ 85 degrees C
MGB-TL70	1000	LC	Single Mode	70km	1550nm	-40 ~ 85 degrees C
MGB-TL80	1000	LC	Single Mode	80km	1550nm	-40 ~ 85 degrees C

Gigabit Ethernet Transceiver (1000BASE-BX, Single Fiber Bi-directional SFP)

Model	Speed (Mbps)	Connector Interface	Fiber Mode	Distance	Wavelength (TX)	Wavelength (RX)	Operating Temp.
MGB-TSA	1000	WDM(LC)	Single Mode	2km	1310nm	1550nm	-40 ~ 85 degrees C
MGB-TSB	1000	WDM(LC)	Single Mode	2km	1550nm	1490nm	-40 ~ 85 degrees C
MGB-TLA10(V2)	1000	WDM(LC)	Single Mode	10km	1310nm	1550nm	-40 ~ 85 degrees C
MGB-TLB10(V2)	1000	WDM(LC)	Single Mode	10km	1550nm	1310nm	-40 ~ 85 degrees C
MGB-TLA20	1000	WDM(LC)	Single Mode	20km	1310nm	1550nm	-40 ~ 85 degrees C
MGB-TLB20	1000	WDM(LC)	Single Mode	20km	1550nm	1310nm	-40 ~ 85 degrees C
MGB-TLA40	1000	WDM(LC)	Single Mode	40km	1310nm	1550nm	-40 ~ 85 degrees C
MGB-TLB40	1000	WDM(LC)	Single Mode	40km	1550nm	1310nm	-40 ~ 85 degrees C
MGB-TLA60	1000	WDM(LC)	Single Mode	60km	1310nm	1550nm	-40 ~ 85 degrees C
MGB-TLB60	1000	WDM(LC)	Single Mode	60km	1550nm	1310nm	-40 ~ 85 degrees C
MGB-TLA80	1000	WDM(LC)	Single Mode	80km	1490nm	1550nm	-40 ~ 85 degrees C
MGB-TLB80	1000	WDM(LC)	Single Mode	80km	1550nm	1490nm	-40 ~ 85 degrees C
MGB-TLA120	1000	WDM(LC)	Single Mode	120km	1490nm	1550nm	-40 ~ 85 degrees C
MGB-TLB120	1000	WDM(LC)	Single Mode	120km	1550nm	1490nm	-40 ~ 85 degrees C

Available 2500Mbps Modules

Gigabit Ethernet Transceiver (2500BASE-X SFP)

Model	Speed (Mbps)	Connector Interface	Fiber Mode	Distance	Wavelength (nm)	Operating Temp.
MGB-2GTSR	2500	LC	Multi Mode	300m	850nm	-40 ~ 85 degrees C
MGB-2GTLR2	2500	LC	Single Mode	2km	1310nm	-40 ~ 85 degrees C
MGB-2GTLR20	2500	LC	Single Mode	20km	1310nm	-40 ~ 85 degrees C

Gigabit Ethernet Transceiver (2500BASE-BX, Single Fiber Bi-directional SFP)

Model	Speed (Mbps)	Connector Interface	Fiber Mode	Distance	Wavelength (TX)	Wavelength (RX)	Operating Temp.
MGB-2GTLA20	2500	WDM(LC)	Single Mode	20km	1310nm	1550nm	-40 ~ 85 degrees C
MGB-2GTLB20	2500	WDM(LC)	Single Mode	20km	1550nm	1310nm	-40 ~ 85 degrees C

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