# L3 Industrial 16-Port 10/100/1000-T 802.3at PoE + 4-Port 1G/2.5G SFP Managed Ethernet Switch

Advanced Manageable PoE Solution for Hardened Environment

PLANET IGS-6325-16P4S L3 Industrial Managed PoE+ Switch, featuring **16 10/100/1000BASE-T 802.3at PoE+ ports** with each port powering up to 36 watts, and **4 100/1000/2500BASE-X fiber 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**.
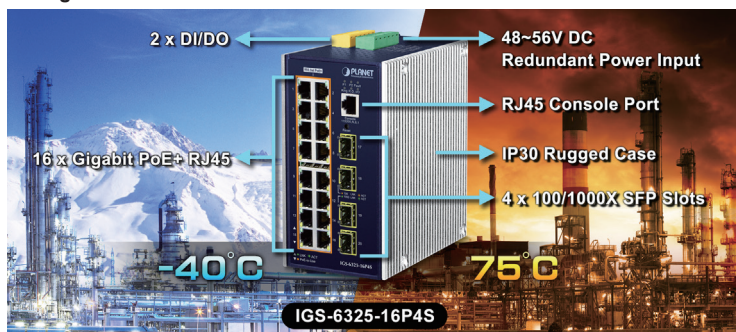
Cybersecurity Network Solution to Minimize Security Risks

The IGS-6325 Series supports SSHv2, TLS and SSL 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.

Redundant Ring, Fast Recovery for Critical Network Applications

The IGS-6325-16P4S supports redundant ring technology and features strong, rapid self-recovery capability to prevent interruptions and external intrusions.

Physical Port

- **16 10/100/1000BASE-T** Gigabit Ethernet RJ45 ports with **IEEE 802.3at PoE+** Injector function
- **4 100/1000/2500BASE-X mini-GBIC/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
- PoE management features
  - Total PoE power budget control
  - Per port PoE function enable/disable
  - PoE admin-mode control
  - PoE port power feeding priority
  - Per PoE port power limit
  - PD classification detection
- Intelligent PoE features
  - Temperature threshold control
  - PoE usage threshold control
  - PD alive check
  - PoE schedule

Industrial Protocol

- Modbus TCP for real-time monitoring in the SCADA system
- IEEE 1588v2 PTP (Precision Time Protocol)

Industrial Case and Installation

- IP30 aluminum case
- DIN-rail or wall-mount design
- 48~56V DC, redundant power with reverse polarity protection
- 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

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.
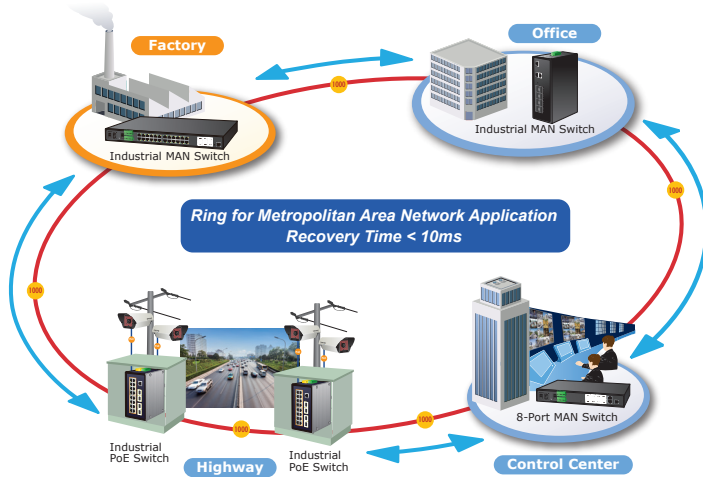
High Power PoE for Security and Public Service Applications

As the whole system comes with a total 320-watt PoE budget, the IGS-6325-16P4S 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.

Convenient and Smart ONVIF Devices with Detection Feature

PLANET has newly developed an awesome feature -- ONVIF Support -- which is specifically designed for co-operating with video IP surveillances. From the IGS-6325-16P4S 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 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.

- Transfer alarm to IP network via email and SNMP trap

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
  – Provider Bridging (VLAN Q-in-Q) support (IEEE 802.1ad)
  – Private VLAN Edge (PVE)
  – Protocol-based VLAN
  – MAC-based VLAN
  – Voice VLAN
  – GVRP (GARP VLAN Registration Protocol)
- 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 Guard
- Supports **Link Aggregation**
  – 802.3ad Link Aggregation Control Protocol (LACP)
  – Cisco ether-channel (static trunk)
  – Maximum 10 trunk groups with 4 ports per trunk group
  – Up to 8Gbps bandwidth (duplex mode)
- Provides port mirror (many-to-1)
- 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
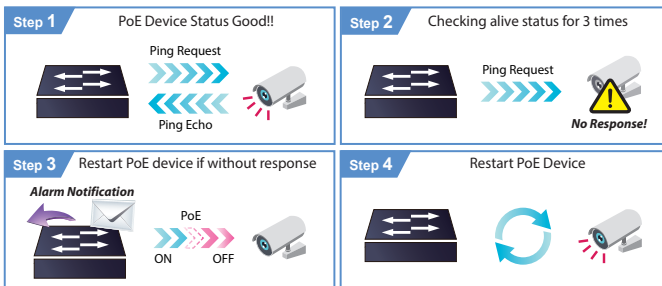- Link Layer Discovery Protocol (LLDP)

Layer 3 IP Routing Features

- Supports maximum 128 static routes and route summarization
- IPv4 dynamic routing protocol supports OSPFv2
- IPv4/IPv6 hardware static routing
- Routing interface provides per VLAN routing mode
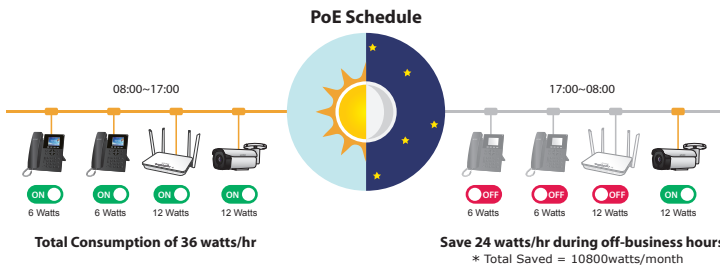
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Intelligent Alive Check for Powered Device

The IGS-6325-16P4S PoE Switch can be configured to monitor connected PD's status in real time via ping action. Once the PD stops working and responding, the IGS-6325-16P4S will recycle the PoE port power and bring the PD back to work. It also greatly enhances the reliability in that the PoE port will reset the PD power, thus reducing administrator's management burden.

PD Alive Check

Step 1 — PoE Device Status Good!!
Ping Request
Ping Echo

Step 2 — Checking alive status for 3 times
Ping Request
No Response!

Step 3 — Restart PoE device if without response
Alarm Notification
PoE
ON   OFF

Step 4 — Restart PoE Device

PoE Schedule for Energy Saving

Under the trend of energy saving worldwide and contributing to environmental protection on the Earth, the IGS-6325-16P4S 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.

PoE Schedule

08:00~17:00

ON 6 Watts   ON 6 Watts   ON 12 Watts   ON 12 Watts

Total Consumption of 36 watts/hr

17:00~08:00

OFF 6 Watts   OFF 6 Watts   OFF 12 Watts   ON 12 Watts

Save 24 watts/hr during off-business hours
∗ Total Saved = 10800watts/month

Scheduled Power Recycling

The IGS-6325-16P4S 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.

IP Camera

AP Router

IP Phone

S M T W T F S

PoE lighting

Door Phone

Automatically Reboot
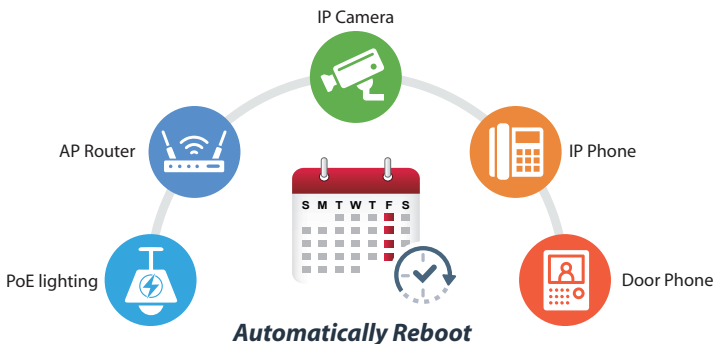
Quality of Service

- 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
- Access Control List
  - IP-based Access Control List (ACL)
  - 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
  - Console/Telnet Command Line Interface
 - Web switch management

SMTP/SNMP Trap Event Alert

The IGS-6325-16P4S 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.

Effective Alarm Alert for Better Protection

The IGS-6325 Series 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

DC/DC Power Failure   RJ45/Fiber Connection
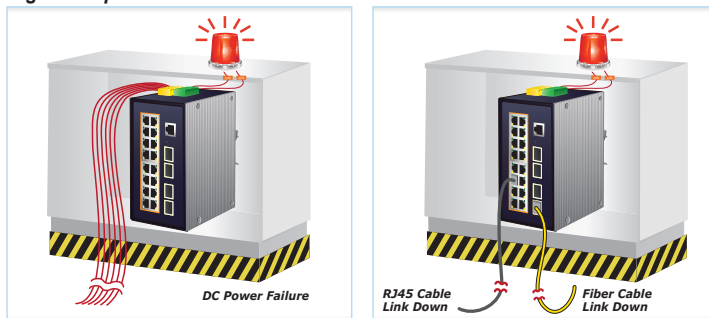   Link Down
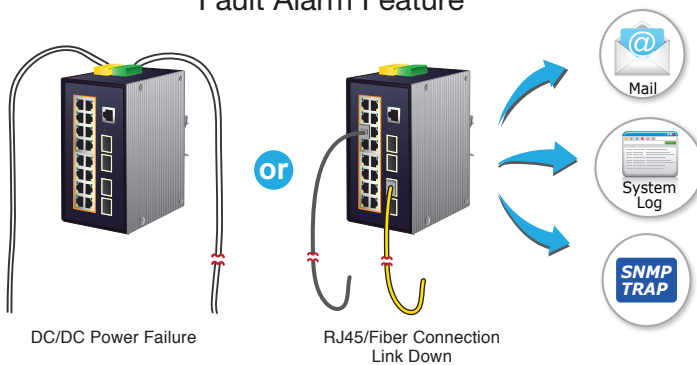
Digital Input and Digital Output for External Alarm

The IGS-6325 Series supports Digital Input and Digital Output on its upper 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-6325 Series' port shows link down, link up or power failure.

Digital Input
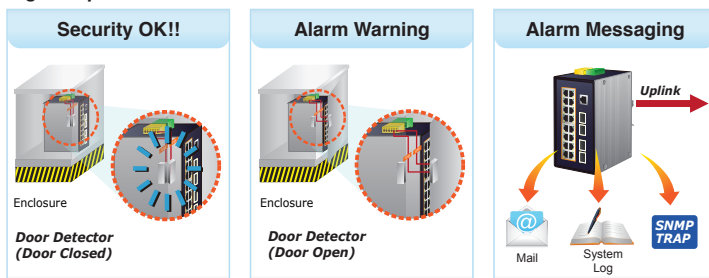
Digital Output

- – SNMP v1 and v2c switch management
- – SSH, TLS, SSL and SNMP v3 secure access
- • SNMP Management
  - – Four RMON groups (history, statistics, alarms, and events)
  - – SNMP trap for interface Link Up and Link Down 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/TFTP
  - – Reset button for system reboot or reset to factory default
  - – Dual Images
- • DHCP Relay and DHCP Option 82
- • DHCP Server
- • User Privilege levels control
- • Network Time Protocol (NTP)
- • SFP-DDM (Digital Diagnostic Monitor)
- • Network Diagnositc
  - – ICMPv6/ICMPv4 Remote Ping
  - – Cable diagnostic technology provides the mechanism to detect and report potential cabling issues
- • PLANET NMS System and Smart Discovery Utility for deployment management
- • SMTP/Syslog remote alarm
- • System Log

Layer 3 Routing Support

The IGS-6325-16P4S enables the administrator to conveniently boost network efficiency by configuring Layer 3 IPv4/IPv6 VLAN static routing manually, and the IPv4 OSPFv2 (Open Shortest Path First) settings automatically. The OSPF is an interior dynamic routing protocol for autonomous system based on link state. The protocol creates a database for link state 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.

Robust Layer 2 Features

The IGS-6325 Series 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-6325 Series provides 802.1Q tagged VLAN, and the VLAN groups allowed will be maximally up to 255. Via aggregation of supporting ports, the IGS-6325 Series allows the operation of a high-speed trunk combining multiple ports. It enables a maximum of up to 6 trunk groups with 4 ports per trunk group, and supports fail-over as well.
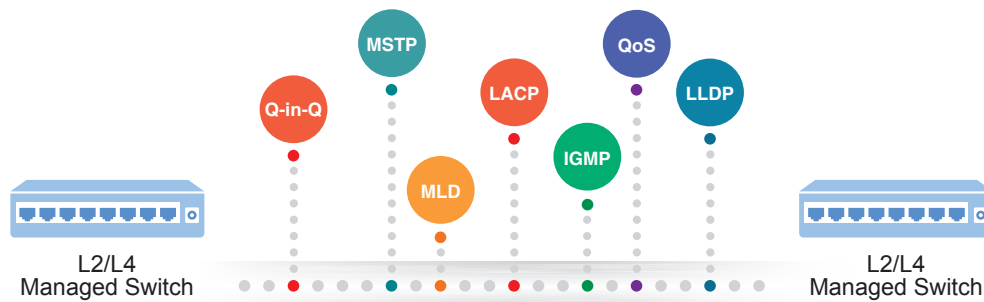
Efficient Management

For efficient management, the IGS-6325 Series is equipped with console, Web and SNMP management interfaces. With the built-in Web-based management interface, the IGS-6325 Series offers an easy-to-use, platform-independent management and configuration facility. For text-based management, the IGS-6325 Series 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.

Powerful Security

The IGS-6325 Series 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.

Modbus TCP Provides Flexible Network Connectivity for Factory Automation

With the supported Modbus TCP/IP protocol, the IGS-6325 Series 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.

1588 Time Protocol for Industrial Computing Networks

The IGS-6325 Series is ideal for telecom and Carrier Ethernet applications, supporting MEF service delivery and timing over packet solutions for IEEE 1588 and synchronous Ethernet.

Time Synchronization in Network

IGS-6325-16P4S
Transparent Clock

Grand Master Clock

Slave Clock

1588 PTP

1588 PTP

Base Station

1000 — 1000BASE-SX/LX Fiber-optic
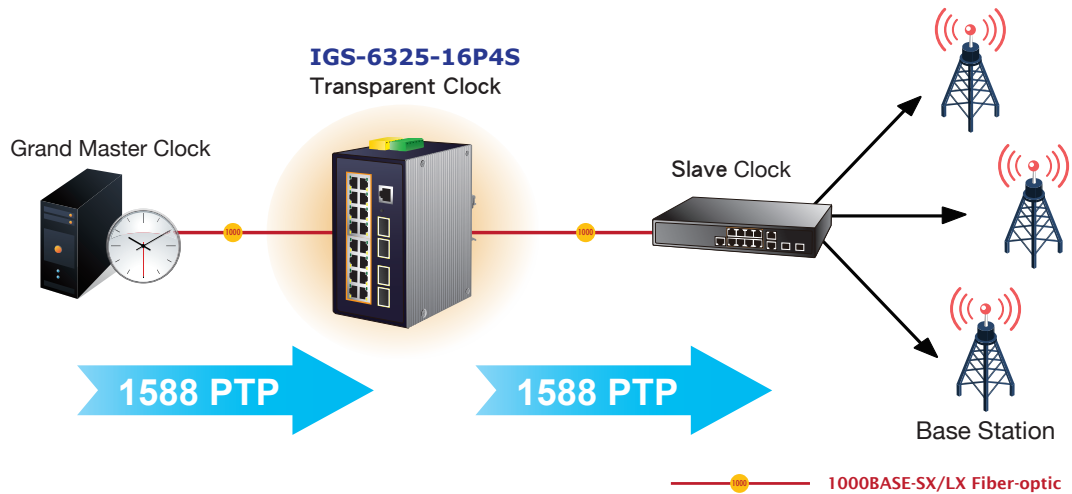
Flexibility and Extension Solution

The additional four mini-GBIC slots built in the IGS-6325-16P4S support triple-speed 100/1000/2500BASE-X 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 2 kilometers (multi-mode fiber) and 10/20/40/60/80/120 kilometers (single-mode fiber or WDM fiber). They are well suited for applications to uplink to backbone switch and monitoring center in long distance.

Intelligent SFP Diagnosis Mechanism

The IGS-6325 Series 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.

SFP DDM **(Digital Diagnostic Monitor)**

Voltage   Ammeter   Temperature   Power Transceiver   Power Receiver
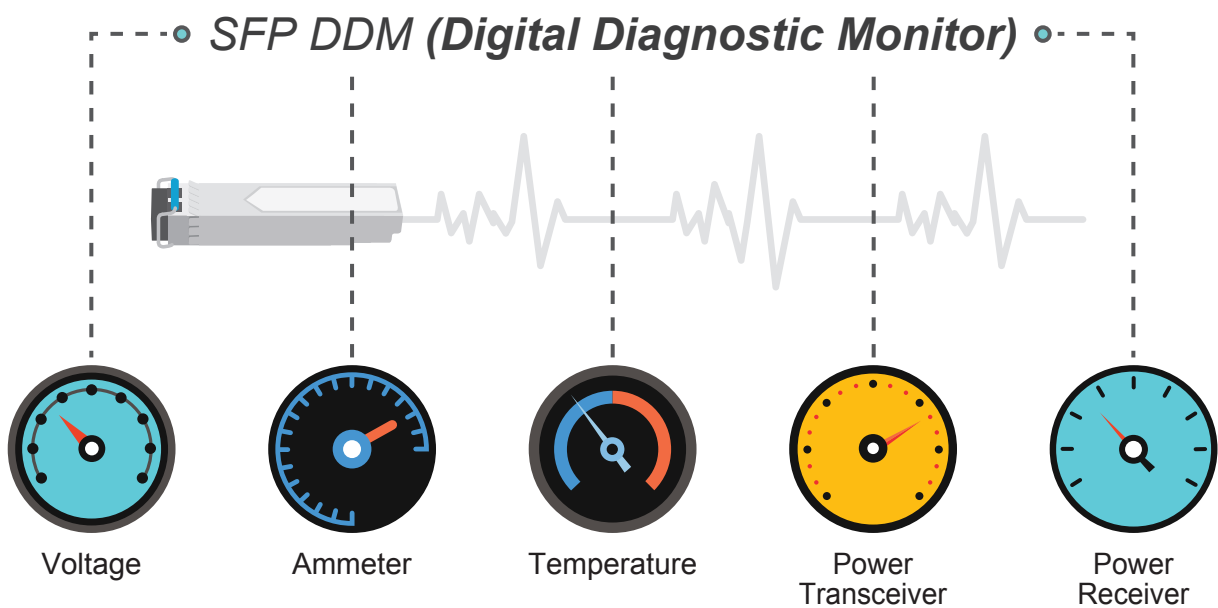
Applications

Industrial Area Department/Workgroup PoE Switch

Providing up to 16 PoE+, in-line power interfaces, the IGS-6325-16P4S 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-6325-16P4S makes the installation of IP cameras or wireless AP easier and more efficient.

Extending Ethernet Distance

Outdoor
IP Camera

Outdoor
IP Camera

Ethernet up to
100 meters

Ethernet up to
100 meters

Network Video
Recorder

Fiber Optic Cable
up to 120km

Fiber Optic Cable
up to 120km

Gigabit Fiber Switch

IGS-6325-16P4S

IGS-6325-16P4S

240km

1000BASE-SX/LX Fiber-optic
1000BASE-T UTP
1000BASE-T UTP with PoE

Specifications

Product	IGS-6325-16P4S
Hardware Specifications	
Copper Ports	16 10/100/1000BASE-T RJ45 auto-MDI/MDI-X ports
SFP/mini-GBIC Slots	4 1000BASE-SX/LX/BX SFP interfaces (Port-17 to Port-20) Compatible with 100BASE-FX and 2500BASE-X 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)
Switch Architecture	Store-and-Forward
Switch Fabric	52Gbps/non-blocking
Throughput (packet per second)	38.6Mpps@ 64 bytes packet
Address Table	16K 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
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.
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 SFP Interface: 100 LNK/ACT (Amber) 1G/2.5G LNK/ACT (Green)
Dimensions (W x D x H)	84 x 107 x 152 mm
Weight	1550g
Power Requirements	Dual 48~56V DC (>51V DC for PoE+ output recommended)
Power Consumption	Max. 15.68 watts/53.46BTU (Power on without any connection) Max. 344 watts/1173.04BTU (Full loading with PoE function)
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~56V DC (depending on the power supply), max. 36 watts
Power Pin Assignment	1/2(+), 3/6(-)
PoE Power Budget	48V Power input - 240W maximum (depending on power input) 52~56V Power input - Single power input: 240W maximum (depending on power input) - Dual power input: 320W maximum (depending on power input) * Dual power input must be the same as DC voltage, like dual 56V

Max. Number of Class 2 PDs	16
Max. Number of Class 3 PDs	16
Max. Number of Class 4 PDs	10
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
VLAN	IEEE 802.1Q tag-based VLAN, up to 255 VLAN groups IEEE 802.1ad Q-in-Q tunneling Private VLAN Edge (PVE) MAC-based VLAN Protocol-based VLAN Voice VLAN MVR (Multicast VLAN Registration) GVRP (GARP VLAN Registration Protocol) Up to 4K VLAN groups, out of 4094 VLAN IDs
Link Aggregation	IEEE 802.3ad LACP/static trunk Supports 10 trunk groups with 4 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

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

IGMP Snooping	IPv4 IGMP (v1/v2/v3) snooping, up to 255 multicast groups IPv4 IGMP querier mode support
MLD Snooping	IPv6 MLD (v1/v2) snooping, up to 255 multicast groups IPv6 MLD querier mode support
Access Control List	IP-based ACL/MAC-based ACL Up to 123 entries

Bandwidth Control	Per port bandwidth control
	  Ingress: 500Kb~1000Mbps
	  Egress: 500Kb~1000Mbps

Layer 3 Function	
IP Interfaces	Max. 128 VLAN interfaces
Routing Table	Max. 128 routing entries
Routing Protocols	IPv4 hardware static routing IPv6 hardware static routing IPv4 OSPFv2 dynamic routing
Management	
Basic Management Interfaces	Console; Telnet; Web browser; SNMP v1, v2c
Secure Management Interfaces	SSH, TLS, SSL, SNMP v3
SNMP MIBs	RFC 1213 MIB-II IF-MIB RFC 1493 Bridge MIB RFC 1643 Ethernet MIB RFC 2863 Interface MIB RFC 2665 Ether-Like MIB RFC 2819 RMON MIB (Groups 1, 2, 3 and 9) RFC 2737 Entity MIB RFC 2618 RADIUS Client MIB RFC 2933 IGMP-STD-MIB RFC 3411 SNMP-Frameworks-MIB IEEE 802.1X PAE LLDP MAU-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 793 TFTP RFC 791 IP RFC 792 ICMP RFC 2068 HTTP RFC 1112 IGMP v1 RFC 2236 IGMP v2 RFC 3376 IGMP version 3 RFC 2710 MLD version 1 RFC 3810 MLD version 2 ITU G.8032 ERPS Ring ITU-T G.8032 ERPS Ring ITU-T Y.1731 Performance Monitoring
Environment	
Operating Temperature	-40 ~ 75 degrees C
Storage Temperature	-40 ~ 85 degrees C
Humidity	5 ~ 95% (non-condensing)

Dimensions

Top View

Side View

Front View

IGS-6325-16P4S

Side View

Rear View

Mounting Kit

DIN-Rail Kit

Mounting Kit

Unit: mm

Bottom View

Ordering Information

IGS-6325-16P4S	Industrial L3 16-Port 10/100/1000T 802.3at PoE + 4-Port 1G/2.5G SFP Managed Ethernet Switch (-40~75 degrees C)

IGS-6325-16P4S