Product Specifications

Industrial L3 16-Port 10/100/1000T + 4-Port 100/1000X SFP Managed Ethernet Switch

IGS-6325-16T4S

Version 1.0

Change History:

Revision:	Date:	Author:	Change List
Version 1.0	2020/5/25	Marc Liao	Initial Release

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Reviewed By:		**Approved By:**	Kent Kang

PRODUCT DESCRIPTION

High-capacity Unit for Factory and Metropolitan Long-reach Networking

PLANET IGS-6325-16T4S is the smallest yet high-capacity, industrial-grade Layer 3 managed switch with high-density hybrid copper and fiber optic interfaces. It features 16 10/100/1000BASE-T RJ45 ports and 4 100/1000BASE-X SFP slots in a DIN-rail type rugged case and can operate stably under the temperature range from -40 to 75 degrees C.

It is designed to be installed in any space-limited cabinets as it is small in size. Its connection distance can be flexibly extended via its powerful ports.

Layer 3 Routing Support

The IGS-6325-16T4S 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.

Redundant Ring, Fast Recovery for Critical Network Applications

The IGS-6325-16T4S 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.

Network with Cybersecurity Helps Minimize Security Risks

The IGS-6325-16T4S comes with enhanced cybersecurity to fend off cyberthreats and cyberattacks. It supports SSHv2, TLS v1.2 and SSL protocols to provide strong protection against advanced threats. Served as a key point to transmit data over multiple long distance fiber optic connections to customer's critical equipment in a business network, the cybersecurity feature of the IGS-6325-16T4S protects the switch management and enhances the security of the mission-critical network without any extra deployment cost and effort.

Modbus TCP Provides Flexible Network Connectivity for Factory Automation

With the supported Modbus TCP/IP protocol, the IGS-6325-16T4S 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, communication status, and DI and DO status, thus easily achieving enhanced monitoring and maintenance of the entire factory.

1588 Time Protocol for Industrial Computing Networks

The IGS-6325-16T4S is ideal for telecom and carrier Ethernet applications, supporting MEF service delivery and timing over packet solutions for IEEE 1588 and synchronous Ethernet.

Redundant Power to Ensure Continuous Operation

The IGS-6325-16T4S possesses dual DC 9~48V and AC 24V power supply utilized as redundant power supply to ensure its continuous operation. Its redundant power system is specifically designed to handle the demands of high-tech facilities requiring the highest power integrity.

SMTP/SNMP Trap Event Alert

The IGS-6325-16T4S 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-6325-16T4S 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 to find where the problem is. It will help to save time and human resource.

Digital Input and Digital Output for External Alarm

The IGS-6325-16T4S 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-6325-16T4S port shows link down, link up or power failure.

IPv6/IPv4 Dual Stack

Supporting both IPv6 and IPv4 protocols, the IGS-6325-16T4S helps data centers, campuses, telecoms, and more to experience the IPv6 era with the lowest investment as its network facilities need not be replaced or overhauled if the IPv6 FTTx edge network is set up.

Robust Layer 2 Features

The IGS-6325-16T4S can be programmed for advanced Layer 2 switch management functions such as dynamic port link aggregation, 802.1Q tagged VLAN, Q-in-Q VLAN, private VLAN, Multiple Spanning Tree Protocol (MSTP), Layer 2 to Layer 4 QoS, bandwidth control, IGMP snooping and MLD snooping. Via the aggregation of supporting ports, the IGS-6325-16T4S allows the operation of a high-speed trunk group that comes with multiple ports and supports fail-over as well.

Efficient Management

For efficient management, the IGS-6325-16T4S is equipped with console, Web and SNMP management interfaces.

- With the built-in **Web-based** management interface, the IGS-6325-16T4S offers an easy-to-use, platform-independent management and configuration facility.
- For **text-based** management, it can be accessed via Telnet and the console port.
- For standard-based monitor and management software, it offers SNMPv3 connection which encrypts the packet content at each session for secure remote management.

Powerful Network Security

The IGS-6325-16T4S 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.

Advanced IP Network Protection

The IGS-6325-16T4S also provides DHCP Snooping, IP Source Guard and Dynamic ARP Inspection functions to prevent IP snooping from attack and discard ARP packets with invalid MAC address. The network administrators can now construct highly-secure corporate networks with considerably less time and effort than before.

Excellent Traffic Control

The IGS-6325-16T4S is loaded with powerful traffic management and QoS features to enhance connection services by telecoms and ISPs. The QoS features include wire-speed Layer 4 traffic classifiers and bandwidth limit that are particularly useful for multi-tenant units, multi-business units, Telco and network service providers' applications. It also empowers the industrial environment to take full advantage of the limited network resources and guarantees the best performance in VoIP and video conferencing transmission.

Intelligent SFP Diagnosis Mechanism

The IGS-6325-16T4S supports SFP-DDM (digital diagnostic monitor) function that greatly helps network administrator to easily monitor real-time parameters of the SFP transceivers, such as optical output power, optical input power, temperature, laser bias current, and transceiver supply voltage.

2. PRODUCT FEATURES

- **Physical Port**
  - 16 10/100/1000BASE-T RJ45 copper ports
  - 4 100/1000BASE-X SFP slots for SFP type auto detection
  - One RJ45-to-RS232 console interface for basic management and setup
- **Industrial Hardened Design**
  - Dual power input, redundant power with reverse polarity protection
    - DC 9 to 48V input or AC 24V input
    - Active-active redundant power failure protection
    - Backup of catastrophic power failure on one supply
    - Fault tolerance and resilience
  - DIN-rail and wall-mountable designs
  - IP30 aluminum case
  - 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)
  - Integrates sensors into auto alarm system
  - Transfers alarm to IP network via email and SNMP trap
- **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
- **Layer 2 Features**
  - High performance of Store-and-Forward architecture, and runt/CRC filtering eliminates erroneous packets to optimize the network bandwidth
  - Storm control support
    - Broadcast/Multicast/Unknown unicast
  - Supports **VLAN**
    - IEEE 802.1Q tagged VLAN
    - Up to 255 VLANs groups, out of 4095 VLAN IDs
    - Supports provider bridging (VLAN Q-in-Q 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 14 trunk groups, with 16 ports for each trunk
  - Up to 80Gbps bandwidth (full 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
- Link Layer Discovery Protocol (LLDP)
- 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
- Supports G.8032 ERPS (Ethernet Ring Protection Switching)
- IEEE 1588 and Synchronous Ethernet network timing

➢ **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
  - ToS/DSCP/IP Precedence of IPv4/IPv6 packets
  - IP TCP/UDP port number
  - Typical network application
- Strict priority and Weighted Round Robin (WRR) CoS policies
- Traffic-policing on the switch port
- DSCP remarking
- Voice VLAN

➢ **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
  - IEEE 802.1x authentication with guest VLAN

- Built-in RADIUS client to cooperate with the RADIUS servers
- 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)
- MAC-based Access Control List (ACL)

■ Source MAC/IP address binding
■ DHCP Snooping to filter distrusted 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 and Telnet Command Line Interface
- HTTP web switch management
- 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
- Reset button for system reboot or reset to factory default
- Dual images

■ DHCP Relay
■ DHCP Option 82
■ DHCP Server
■ User Privilege levels control
■ Network Time Protocol (NTP)
■ Network Diagnostic
- SFP-DDM (Digital Diagnostic Monitor)
- Cable diagnostic technology provides the mechanism to detect and report potential cabling issues
- ICMPv6/ICMPv4 remote ping

■ SMTP/Syslog remote alarm
■ System Log
■ PLANET NMS system and Smart Discovery Utility for deployment management

3. PRODUCT SPECIFICATIONS

3.1 MAIN COMPONENTS

Switch ASIC:	Microsemi VSC7442	x 1
CPU:	500MHz MIPS 24KEc CPU (integrated with VSC7442)	x 1
PHY:	Microsemi VSC8514	x 4
Flash	64Mbytes	x 1
SDRAM Size	512Mbytes	x 1

3.2 FUNCTION SPECIFICATIONS

Product	**IGS-6325-16T4S**
Hardware Specifications	
Copper Ports	16 10/100/1000BASE-T RJ45 auto-MDI/MDI-X ports
SFP Ports	4 100/1000BASE-X SFP slot interfaces (Port-17 to Port-20) Compatible with 100BASE-FX SFP transceiver
SFP+ Ports	N/A
Console	1 x RJ45-to-RS232 serial port (115200, 8, N, 1)
Switch Architecture	Store-and-Forward
Switch Fabric	40Gbps/non-blocking
Throughput	29.76Mpps@64Bytes
Address Table	16K entries, automatic source address learning and aging
Shared Data Buffer	32Mbits
Jumbo Frame	10K bytes
SDRAM	512Mbytes
Flash Memory	64Mbytes
Flow Control	IEEE 802.3x pause frame for full duplex Back pressure for half duplex
Reset Button	< 5 sec: System reboot > 5 sec: Factory default
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
Digital Input (DI)	2 digital input: Level 0: -24~2.1V (±0.1V) Level 1: 2.1~24V (±0.1V) Input load to 24V DC, 10mA max.
Digital Output (DO)	2 digital output: Open collector to 24VDC, 100mA
Enclosure	IP30 aluminum case
Installation	DIN-rail or wall mounting
Dimensions (W x D x H)	76.8 x 107.3 x 152 mm
Weight	1168g
Power Requirements	DC 9~48V, 3.3A max.
	AC 24V, 1.2A max.
Power Consumption	DC input: Max. 14.4 watts/49BTU (DC 9V input) (system on) Max. 27 watts/92 BTU (DC 9V input) (Full loading)
	AC 24V input: Max. 12 watts/41BTU (system on) Max. 29 watts/99 BTU (Full loading)
ESD Protection	6KV DC

Surge Protection	4KV DC
LED Indicators	**System:** Power 1 (**Green**), Power 2 (**Green**) Fault Alarm (**Red**) Ring (**Green**), Ring Owner (**Green**) DIDO (**Red**) **Per 10/100/1000T RJ45 Port:** 1000Mbps LNK/ACT (**Green**) 10/100Mbps LNK/ACT (**Amber**) **Per SFP Slot:** 1000Mbps LNK/ACT (**Green**) 100Mbps LNK/ACT (**Amber**)
Layer 2 Management Functions	
Port Configuration	Port disable/enable Auto-negotiation 10/100/1000Mbps full and half duplex mode selection Flow control disable/enable Port link capability 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	802.1Q tagged VLAN Q-in-Q tunneling Private VLAN Edge (PVE) MAC-based VLAN Protocol-based VLAN Voice VLAN IP Subnet-based VLAN MVR (Multicast VLAN registration) GVRP Up to 256 VLAN groups, out of 4095 VLAN IDs
Link Aggregation	IEEE 802.3ad LACP/static trunk 14 trunk groups with 16 port 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
IGMP Snooping	IPv4 IGMP (v1/v2/v3) snooping IPv4 IGMP querier mode support Supports 255 IGMP groups
MLD Snooping	IPv6 MLD (v1/v2) snooping, IPv6 MLD querier mode support Supports 255 MLD groups
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
Bandwidth Control	Per port bandwidth control Ingress: 100Kbps~1000Mbps Egress: 100Kbps~1000Mbps
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
Synchronization	IEEE 1588v2 PTP(Precision Time Protocol) - Peer-to-peer transparent clock - End-to-end transparent clock

Layer 3 Functions	
IP Interfaces	Max. 128 VLAN interfaces
Routing Table	Max. 128 routing entries
Routing Protocols	IPv4 OSPFv2 dynamic routing IPv4 hardware-based Layer 3 static routing IPv6 hardware-based Layer 3 static routing
Management	
Basic Management Interfaces	Console; Telnet; Web browser; SNMP v1, v2c
Secure Management Interfaces	SSHv2, TLS v1.1/v1.2, SSL, SNMPv3
System Management	Firmware upgrade by HTTP protocol through Ethernet network Configuration upload/download through HTTP Remote Syslog System log LLDP protocol NTP PLANET NMS system and Smart Discovery Utility
SNMP MIBs	RFC 1213 MIB-II RFC 1493 Bridge MIB RFC 1643 Ethernet MIB RFC 2863 Interface MIB RFC 2665 Ether-Like MIB RFC 2819 RMON MIB (Group 1, 2, 3 and 9) RFC 2737 Entity MIB RFC 2618 RADIUS Client MIB RFC 2863 IF-MIB RFC 2933 IGMP-STD-MIB RFC 3411 SNMP-Frameworks-MIB RFC 4292 IP Forward MIB RFC 4293 IP MIB RFC 4836 MAU-MIB IEEE 802.1X PAE LLDP
Standards Conformance	
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 802.1X Port Authentication Network Control IEEE 802.1ab LLDP IEEE 802.3ah OAM IEEE 802.1ag Connectivity Fault Management (CFM) 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 v3 RFC 2710 MLD v1 RFC 3810 MLD v2 RFC 2328 OSPF v2 ITU-T G.8032 ERPS Ring ITU-T Y.1731 Performance Monitoring

3.3 PHYSICAL SPECIFICATIONS:

Dimensions:

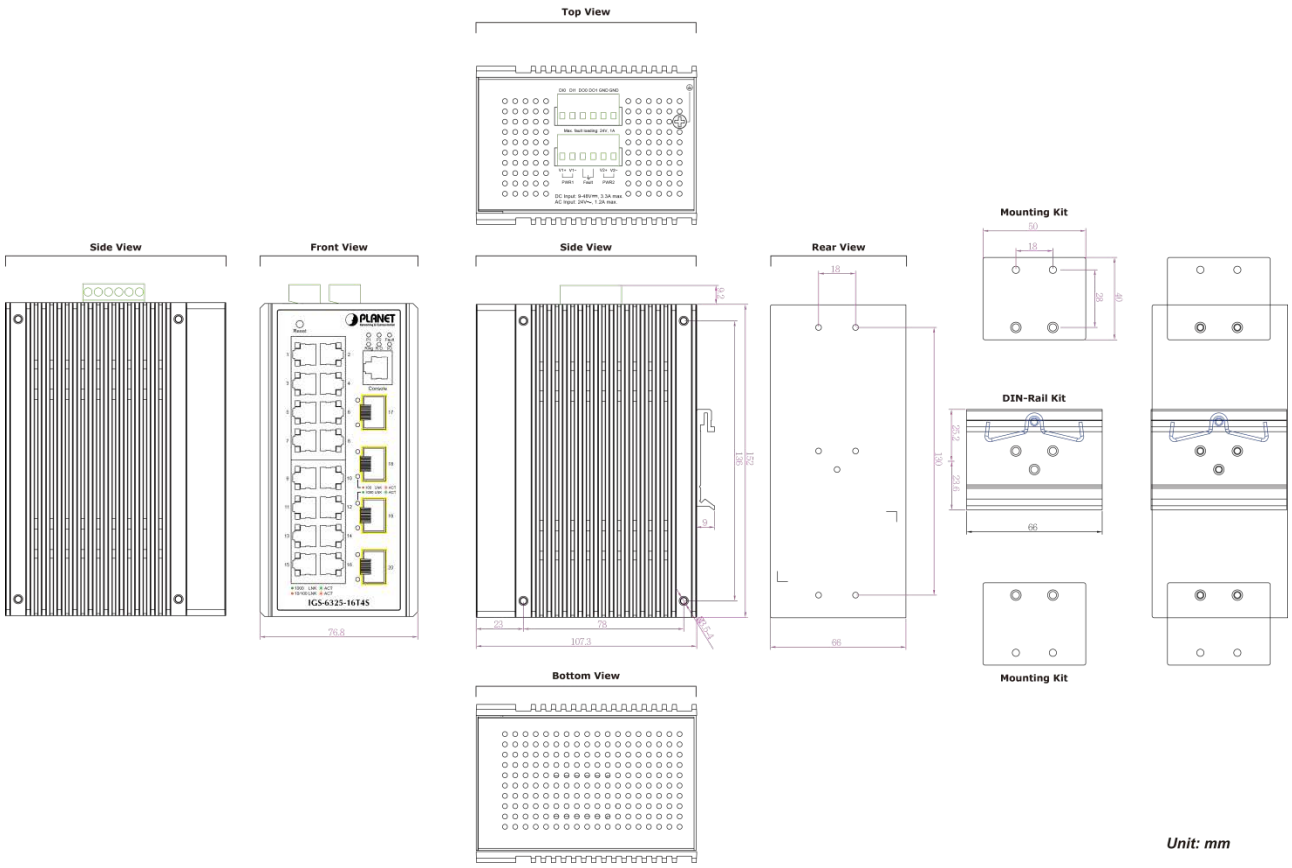
76 x 107 x 152 mm (W x D x H)

Weight:

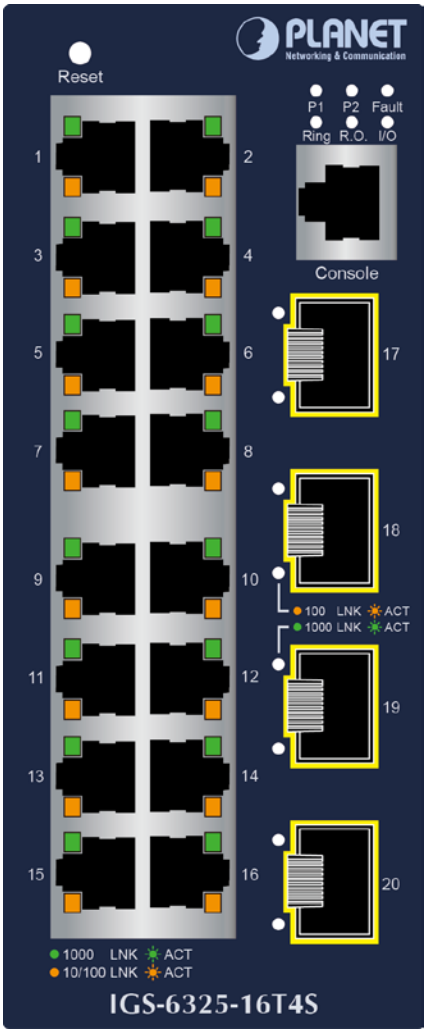
1168g

Diagram:

Dimensions (W x D x H): 76.8 x 107.3 x 152 mm



Front Panel:



LED Definition:

■ **System**

LED	Color	Function
DC1	**Green**	Lights to indicate DC power input 1 has power.
DC2	**Green**	Lights to indicate DC power input 2 has power.
Fault	**Red**	Lights to indicate that Switch DC or port has failed.
Ring	**Green**	Lights to indicate that the ERPS Ring has been created successfully.
R.O.	**Green**	Lights to indicate that Ring state is in idle mode.
		Blinks to indicate that the Ring state is in protected mode.
DI/DO	**Red**	Blinks to indicate that Switch DC or port has failed or DI has event.

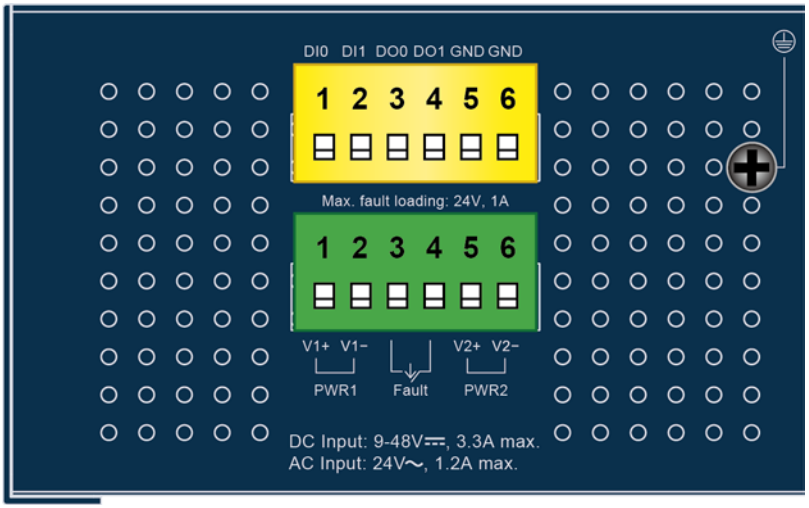
Per 10/100/1000BASE-T Port (Port 1 to Port 16)

LED	Color	Function	
1000 LNK/ACT	**Green**	**Light**	Indicates the port is running at **1000Mbps** and successfully established.
		Blink	Indicates that the switch is actively sending or receiving data over that port.
10/100 LNK/ACT	**Amber**	**Light**	Indicates the port is running at **10/100Mbps** and successfully established.
		Blink	Indicates that the switch is actively sending or receiving data over that port.

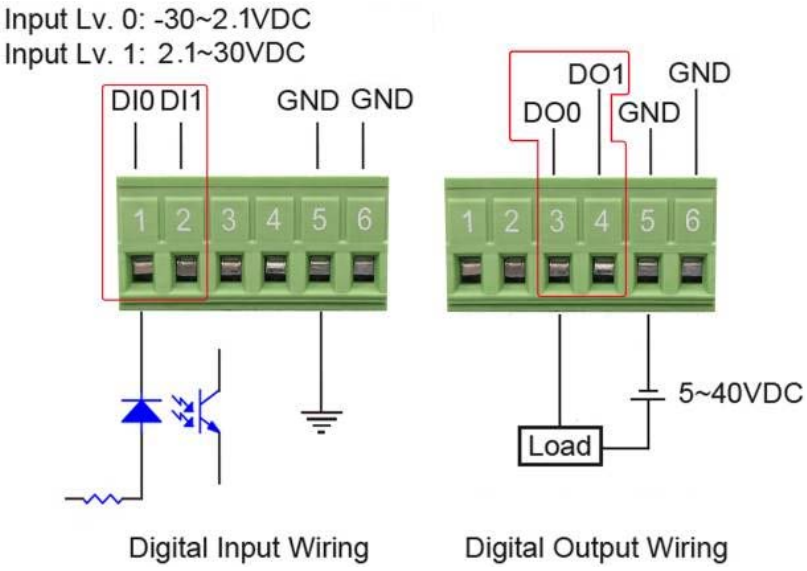
■ **SFP Interface (Port 17 to Port 20)**

LED	Color	Function	
1000 LNK/ACT	**Green**	**Light**	Indicates the port is running at **1000Mbps** and successfully established.
		Blink	Indicates that the switch is actively sending or receiving data over that port.
100 LNK/ACT	**Amber**	**Light**	Indicates the port is running at **100Mbps** and successfully established.
		Blink	Indicates that the switch is actively sending or receiving data over that port.

Top Panel:



DI/DO connector:



3.4 ENVIRONMENTAL SPECIFICATIONS

Operating:

Temperature: -40°C ~75 degrees C

Relative Humidity: 5% ~ 95% (non-condensing)

Storage:

Temperature: -40°C ~85 degrees C

Relative Humidity: 5% ~ 95% (non-condensing)

3.5 ELECTRICAL SPECIFICATIONS

Power Requirements: 9 to 48V DC, redundant power with reverse polarity protection

AC 24V power adapter

Power Consumption:

LOADING / INPUT	System on without any devices attached	Port-1~Port-20 Link Up with Full Loading
DC 9V	14.4 watts/49BTU	27 watts/92BTU
DC 24V	13.4 watts/45BTU	26.4 watts/90BTU
DC 48V	14.1 watts/48BTU	24watts/81BTU
AC 24V	12 watts/41BTU	29 watts/99BTU

3.6 REGULATORY COMPLIANCE

FCC Part 15 Class A, CE

Stability Testing:

- IEC60068-2-32 (Free Fall)
- IEC60068-2-27 (Shock)
- IEC60068-2-6 (Vibration)

3.7 RELIABILITY

MTBF > 100,000Hrs @ 25 degrees C

3.8 BASIC PACKAGING

☑ The Industrial Managed Switch x 1

☑ Quick Installation Guide x 1

☑ RJ45-to-DB9 RS232 cable x 1

☑ DIN-rail Kit x 1

☑ Wall Mounting Kit x 1

☑ RJ45 Dust Cap x 17

☑ SFP Dust Cap x 4

3.9 PACKING INFORMATION

Box Dimensions (W x D x H)	300 x 170 x 90 mm
Weight (gross weight)	TBD kg
Carton Dimensions (W x D x H)	385 x 340 x 490 mm
Carton Weight (total)	TBD kg
Quantity	10pcs in one carton