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Product Specifications

Industrial 8-Port 10/100/1000T + 4-Port 100/1000X SFP Managed Switch

IGS-12040MT

Version 2.0

Change History:

Revision:	Date:	Author:	Change List
Version 2.0	2020/4/15	Marc Liao	Initial Release - Release for new CIS housing printing. - New Firmware SDK Initial Release. - Upgrade NOR flash to 32MB
Version 1.0	2015/3/19	Neo Tsai	Initial Release.

Author:	Marc Liao	Editor:	Marc Liao
Reviewed By:		Approved By:	Kent Kang

1. PRODUCT DESCRIPTION

PLANET IGS-12040MT is a fully-managed Gigabit fiber switch usually designed for the industrial network. It features 8 10/100/1000BASE-T copper ports, 4 100/1000BASE-X SFP ports and redundant power system in an IP30 rugged but compact-sized case that can be installed in any difficult environment without space limitation. Within such favorable enclosure, it provides user-friendly yet advanced IPv6/IPv4 management interfaces, abundant L2/L4 switching functions and Layer 3 static routing capability. The IGS-12040MT can operate stably under the temperature range from -40 to 75 degrees C and allows either DIN-rail or wall mounting for efficient use of cabinet space. With 4 dual-speed SFP fiber slots, it can be flexibly applied to extend the connection distance.

Network with Cybersecurity Helps Minimize Security Risks

The IGS-12040MT comes with enhanced cybersecurity to fend off cyberthreats and cyberattacks. It supports SSHv2, TLS and SSL protocols to provide strong protection against advanced threats. Served as a key point to transmit data to customer's critical equipment in a business network, the cybersecurity feature of the IGS-12040MT protects the switch management and enhances the security of the mission-critical network without any extra deployment cost and effort.

Redundant Ring, Fast Recovery for Surveillance System

The IGS-12040MT 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 certain simple Ring network, the recovery time of data link can be as fast as 10ms.

Modbus TCP Provides Flexible Network Connectivity for Factory Automation

With the supported Modbus TCP/IP protocol, the IGS-12040MT 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-12040MT is ideal for telecom and Carrier Ethernet applications, supporting MEF service delivery and timing over packet solutions for IEEE 1588 and synchronous Ethernet.

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SMTP/SNMP Trap Event Alert

The IGS-12040MT 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-12040MT 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.

Digital Input and Digital Output for External Alarm

The IGS-12040MT supports Digital Input and Digital Output on its upper panel. The external alarm enables users to use Digital Input to detect external device's 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-12040MT port is link-down, link-up or power-dead.

Layer 3 IPv4 and IPv6 Software VLAN Routing for Secure and Flexible Management

To help customers stay on top of their businesses, the IGS-12040MT not only provides high transmission performance and excellent Layer 2 technologies, but also IPv4/IPv6 software VLAN routing feature which allows to cross over different VLANs and different IP addresses for the purpose of having a highly-secure, flexible management and simpler networking application.

Robust Layer 2 Features

The IGS-12040MT 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-12040MT provides 802.1Q tagged VLAN, and the VLAN groups allowed will be maximally up to 255. Via aggregation of supporting ports, the IGS-12040MT allows the operation of a high-speed trunk combining multiple ports. It enables a maximum of up to 6 trunk groups with 8 ports per trunk group, and supports fail-over as well.

Efficient Management

For efficient management, the IGS-12040MT is equipped with console, Web and SNMP management interfaces.

- With the built-in Web-based management interface, the IGS-12040MT 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 Security from Layer 2 to Layer 4

The IGS-12040MT 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-12040MT 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.

Flexibility and Extension Solution

The additional four mini-GBIC slots built in the IGS-12040MT support dual speed, 100BASE-FX and 1000BASE-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 550 meters to 2 kilometers (multi-mode fiber) and up to above 10/20/40/60/80/120 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-12040MT 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.

Environmentally-hardened Design

With IP30 aluminum industrial case, the IGS-12040MT provides a high level of immunity against electromagnetic interference and heavy electrical surges which are usually found on plant floors or in curb side traffic control cabinets. It also possesses an integrated power supply source with wide range of voltages (12 to 72V DC or 24V AC) for worldwide high availability applications requiring dual or backup power inputs. Being able to operate under the temperature range from -40 to 75 degrees C, the IGS-12040MT can be placed in almost any difficult environment.

2. PRODUCT FEATURES

➢ **Physical Port**
- **8-Port 10/100/1000BASE-T** RJ45 copper
- **4 100/1000BASE-X mini-GBIC/SFP** slots, SFP type auto detection
- One RJ45 console interface for basic management and setup

➢ **Industrial Hardened Design**
- Dual power input, redundant power with reverse polarity protection
  - DC 12 to 72 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 6000V DC Ethernet ESD protection
- -40 to 75 degrees C operating temperature

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

➢ **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 32 static routes and route summarization

➢ **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
  - 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

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- −IEEE 802.1w Rapid Spanning Tree Protocol
- −IEEE 802.1s Multiple Spanning Tree Protocol by VLAN
- −BPDU Guard
- Supports **Link Aggregation**
  - −802.3ad Link Aggregation Control Protocol (LACP)
  - −Cisco ether-channel (static trunk)
  - −Maximum 6 trunk groups, up to 8 ports per trunk group
  - −Up to 16Gbps bandwidth (duplex mode)
- Provides port mirror (many-to-1)
- Port Mirroring of the incoming or outgoing traffic on a particular port
- Loop protection to avoid broadcast loops
- Supports E.R.P.S. **(Ethernet Ring Protection Switching)**
- IEEE 1588 and Synchronous Ethernet network timing
- 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)

➢ **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/DSC /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 policies 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 cooperate 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
- Auto DoS rule to defend DoS attack
- 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
    - SNMP v1, v2c, and v3 switch management
    - SSH, TLS 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)
- Network Diagnositc
    - ICMPv6/ICMPv4 Remote Ping
    - Cable diagnostic technology provides the mechanism to detect and report potential cabling issues
    - SFP-DDM (Digital Diagnostic Monitor)
- SMTP/Syslog remote alarm
- System Log
- PLANET UNI-NMS (Universal Network Management) and Smart Discovery Utility for deployment management

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3. PRODUCT SPECIFICATIONS

3.1 MAIN COMPONENTS

Switch ASIC:	Vitesse VSC7429	x 1
CPU:	MIPS 416MHz (integrated with VSC7429)	x 1
DRAM Size	128MB	x 1

3.2 FUNCTION SPECIFICATIONS

Model Name	IGS-12040MT	
Hardware Specifications		
Copper Ports	8 10/100/1000BASE-T RJ45 Auto-MDI/MDI-X ports	
SFP Slots	4 1000BASE-SX/LX/BX SFP interfaces (Port-9 to Port-12) Compatible with 100BASE-FX SFP	
Console	1 x RJ45 serial port (115200, 8, N, 1)	
Switch Architecture	Store-and-Forward	
Switch Fabric	24Gbps /non-blocking	
Throughput (packet per second)	17.85Mpps@64Bytes	
Address Table	8K entries, automatic source address learning and ageing	
Shared Data Buffer	4Mbits	
Flow Control	IEEE 802.3x pause frame for full duplex Back pressure for half duplex	
Jumbo Frame	9Kbytes	
DRAM	128MB	
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 0 & DI 1; Pin 3/4 for DO 0 & DO 1; Pin 5/6 for GND	
Alarm	One relay output for power failure. Alarm Relay current carry ability: 1A @ 24V AC	

Digital Input (DI)	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.	

Digital Output (DO)	2 digital output: Open collector to 24VDC, 100mA	
Enclosure	IP30 aluminum case	
Installation	DIN-rail kit and wall-mount kit	
Dimensions (W x D x H)	76.8 x 107.3 x 152 mm	
Weight	1010g	
Power Requirements	DC 12V to 72V	
	AC 24V	
Power Consumption	6 watts/20BTU (System on) 11.4 watts/38BTU (Full loading)	
ESD Protection	6KV DC	

LED Indicator	System:
	    Power 1 (Green)
	    Power 2 (Green)
	    Fault Alarm (Green)
	    Ring (Green)
		Per 10/100/1000T RJ45 Port:
		    1000 LNK/ACT (Green)
		    10/100 LNK/ACT (Orange)
		Per SFP Interface:
		    1000 LNK/ACT (Green)

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	R.O. (Green)	100 LNK/ACT (Orange)
Layer 2 Management Functions		
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 and trunk status.	
Port Mirroring	TX/RX/Both Many to 1 monitor	
VLAN	802.1Q tag-based VLAN, up to 255 VLAN groups Q-in-Q tunneling Private VLAN Edge (PVE) MAC-based VLAN Protocol-based VLAN Voice VLAN MVR (Multicast VLAN Registration) Up to 255 VLAN groups, out of 4095 VLAN IDs	
Link Aggregation	IEEE 802.3ad LACP/Static Trunk Support 6 groups of 8-port trunk support	
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 Up to 255 multicast Groups	
MLD Snooping	IPv6 MLD (v1/v2) Snooping IPv6 MLD Querier mode support Up to 255 multicast 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: 500 Mbps ~1000Mbps
	  Egress: 500 Mbps ~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. 8 VLAN interfaces	
Routing Table	Max. 32 routing entries	

Routing Protocols	IPv4 software static routing IPv6 software static routing
Switch Management	
Basic Management Interfaces	Console; Telnet; Web browser; SNMP v1, v2c
Secure Management Interfaces	SSHv2, TLS 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 Smart Discovery Utility
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	IEC 60068-2-32 (free fall) IEC 60068-2-27 (shock) IEC 60068-2-6 (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 802.3ah 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 FRC 3810 MLD version 2 ITU-T G.8032 ERPS Ring ITU-T Y.1731 Performance Monitoring
Environment	
Operating	Temperature: -40 ~ 75 degrees C Relative Humidity: 5 ~ 95% (non-condensing)
Storage	Temperature: -40 ~ 85 degrees C Relative Humidity: 5 ~ 95% (non-condensing)

3.3 PHYSICAL SPECIFICATIONS:

Dimensions:

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

Weight:

1010g

Diagram:

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

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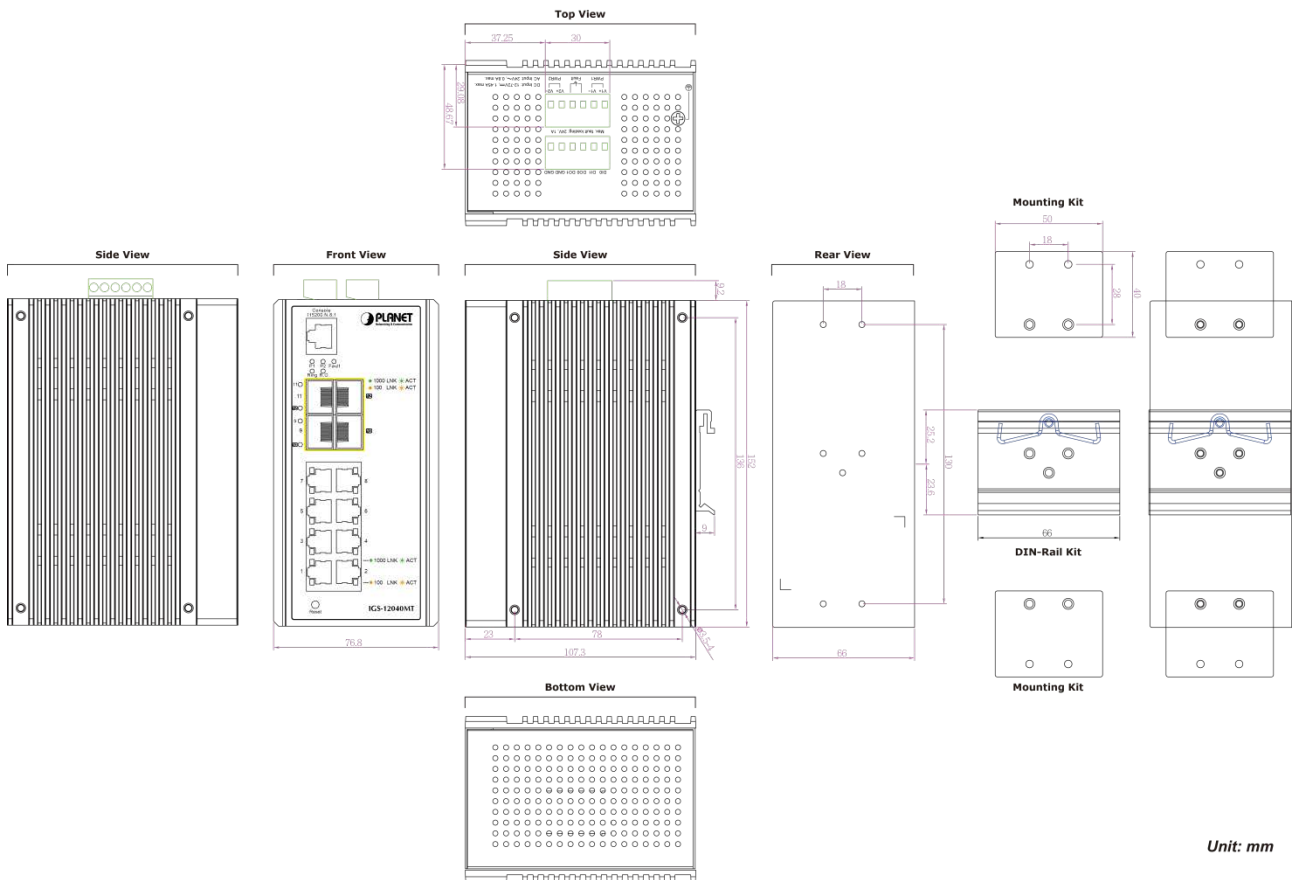
LED Definition:

■ **System**

LED	Color	Function
P1	**Green**	Indicates power 1 has power.
P2	**Green**	Indicates power 2 has power.
Fault	**Green**	Indicates either power 1 or power 2 has no power.
Ring	**Green**	Indicates that the ERPS Ring has been created successfully.
R.O.*	**Green**	Indicates that Switch has enabled Ring Owner.

Per 10/100/1000BASE-T Port (Port 1 to Port 8)

| 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	**Orange**	**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.

■ **Per SFP Interface (Port 9 to Port 12)**

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	**Orange**	**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:
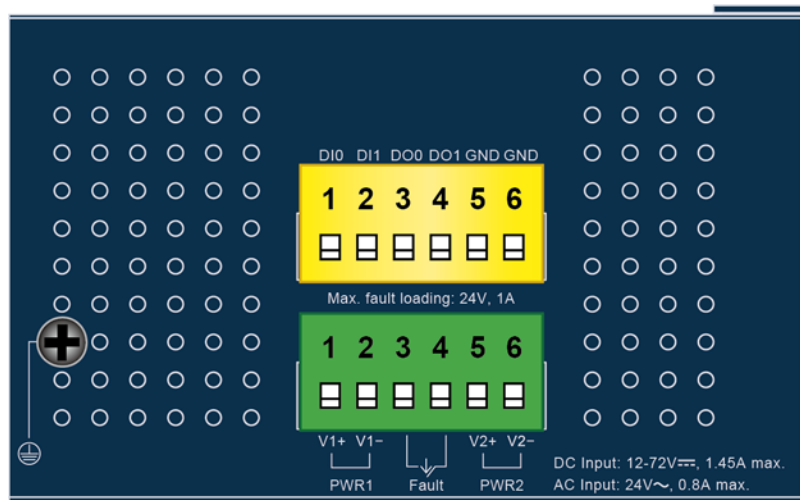
■ **DI/DO connector:**

Input Lv. 0: -30~2.1VDC
Input Lv. 1: 2.1~30VDC

Digital Input Wiring   Digital Output Wiring
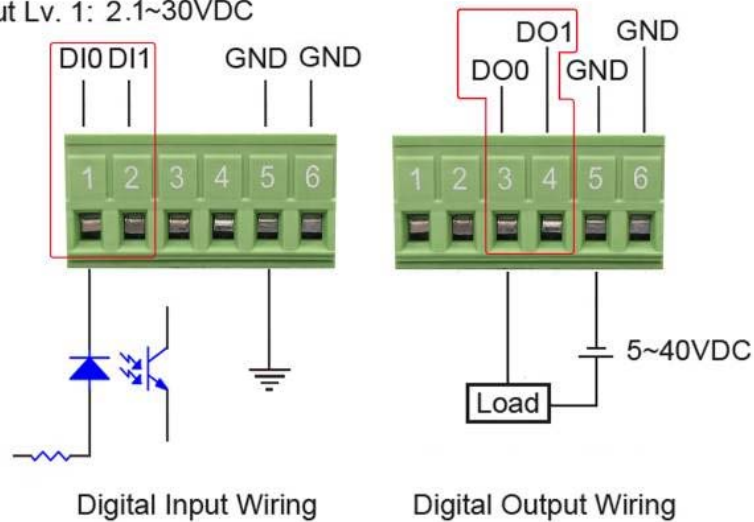
3.4 ENVIRONMENTAL SPECIFICATIONS

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)

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3.5 ELECTRICAL SPECIFICATIONS

Power Requirements: 12 to 72V DC, redundant power with reverse polarity protection

AC 24V power adapter

Power Consumption:

LOADING INPUT	System on without any devices attached	Full Loading
12V	4.92 watts/16BTU	11.04 watts/37BTU
24V	4.56 watts/15BTU	9.6 watts/32BTU
36V	5.04 watts/17BTU	10.08 watts/34BTU
48V	5.28 watts/18BTU	10.56 watts/36BTU
60V	6.0 watts/20BTU	11.4 watts/38BTU
72V	5.88 watts/20BTU	8.64 watts/29BTU

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 9

☑ SFP Dust Cap   x 4

3.9 PACKING INFORMATION

Box Dimensions (W x D x H)	300 x 170 x 90 mm
Gross Weight	1.4kg
Carton Dimensions (W x D x H)	370 x 325 x 470 mm
Total Carton Weight	14.7kg
Quantity	10pcs in one carton