I(P)GS-5400-2P-PT

4 Modular Slots Industrial L2+ IEC61850-3 Managed (PoE) Switch

- *IEC 61850-3 & IEEE1613 compliance*
- *High-density 28 x Gigabit Ethernet L2+ managed (PoE at/af) switch*
- *Support dual power redundancy AC&DC*
- *Enhanced G.8032 ring protection < 20ms for single ring. Supports auto mode, enhanced mode, train mode and basic mode; Enhanced G.8032 ring covers multicast packets; MSTP 16MSTI /RSTP; support MRP ring*
- *Support LACP link aggregation, IGMP v3/router port, MLD snooping, DHCP server & DHCP Option82; DHCP Snooping, Port based DHCP distribution, Mac based DHCP server, QoS by VLAN, SSH v2/SSL, HTTPS, INGRESS/EGRESS ACL L2/L3,TACACS+**, QinQ*
- *Protocol based VLAN ; IPv4 Subnet based VLAN*
- *Support relay contact & environmental monitoring*
- *Miss-wiring avoidance & Node failure protection(node failure protection)*
- *User friendly UI, including auto topology drawing and DDM threshold monitoring with dB values****
- *MMS built-in*
- *Support USB dongle for automatic backup configuration*

OVERVIEW

Lantech I(P)GS-5400-2P-PT is a high performance L2 + managed industrial Ethernet switch which provides L2 wire speed and advanced security function for network aggregation and backbone deployment. It delivers ITU G.8032 enhanced ring recovery less than 20ms in single ring while also supports train ring, enhanced mode, multiple VLAN mode with easy configuration. The comprehensive QoS, QoS by VLAN, advanced security including INGRESS/EGRESS ACL L2/L3, TACACS+**, SSH v2/SSL, Mac based DHCP server, DHCP Option 82, DHCP server, IGMPv1/v2/v3/router port, QinQ are supported and also required in large network. It also supports Cisco Discovery Protocol (CDP) for Ciscoworks to detect the switch info and show on L2 map topology.

The highly flexible modular design consisting of maximum 24x Gigabit T+4xDual SFP,24x Giga PoE at/af (IPGS-5400-2P-PT)+4xDual SFP, 28xGigabit/100M SFP, 18x100M ST/SC + 4 Gigabit SFP covers the widest deployment of applications.

The built-in MMS server allows SCADA to control & monitor switch for data modeling.

Built-in MMS server for IEC61850 data modeling for monitoring and control

The built-in MMS (Manufacturing Messaging Specification) server can help SCADA to monitor and control switch by data modeling. It covers system, power, port status, network configuration.

Enhanced G.8032 ring, 16 MSTI MSTP; MRP ring

Lantech I(P)GS-5400-2P-PT features enhanced G.8032 ring which can be self-healed in less than 20ms for single ring topology protection covering Multicast packets. It also supports various ring topologies that covers double ring, multi-chain (under enhanced ring), train ring, basic ring, multiple-VLAN ring and auto-ring by easy setup than others. The innovative auto-Ring configurator (auto mode) can calculate owner and neighbor in one step. It supports MSTP that allows RSTP over VLAN for redundant links with 16 MSTI.

MRP (Media Redundancy Protocol) can be supported for industrial automation networks.

Miss-wiring avoidance, Loop protection, Node failure protection

The I(P)GS-5400-2P-PT also embedded several features for stronger and reliable network protection in an easy and intuitive way. When the pre-set ring configuration failed or looped by miss-wiring, Lantech I(P)GS-5400-2P-PT is able to alert with the LED indicator and disable ring automatically. Node failure protection ensures the switches in a ring to survive after power breakout is back. The status can be shown in NMS when each switch is back. This feature prevents the broken ring and keep ring alive without any re-configuration needed. Loop protection

is also available to prevent the generation of broadcast storm when a dumb switch is inserted in a closed loop connection.

QoS by VLAN for legacy device
QoS by VLAN can allow switch to tag QoS by VLAN regardless the devices acknowledge QoS or not in which greatly enhance the bandwidth management in a network.

QinQ, QoS and GVRP supported
It supports the QinQ, QoS and GVRP for large VLAN segmentation.

IGMPv3 ,GMRP, router port, MLD Snooping, static multicast forwarding and multicast Ring protection
The unique multicast protection under enhanced G.8032 ring can offer immediate self-recovery instead of waiting for IGMP table timeout. It also supports IGMPv3, GMRP, router port, MLD snooping and static multicast forwarding binding by ports for video surveillance application.

802.1X security by MAC address
MAC-based port authentication is an alternative approach to 802.1x for authenticating hosts connected to a port. By authenticating based on the host's source MAC address, the host is not required to run a user for the 802.1x protocol. The RADIUS server that performs the authentication will inform the switch if this MAC can be registered in the MAC address table of switch.

Reliable network protection, node failure protection
The I(P)GS-5400-2P-PT also embedded several features for stronger and reliable network protection in an easy and intuitive way. When the pre-set ring configuration failed or looped by miss-wiring, Lantech I(P)GS-5400-2P-PT is able to alert with the LED indicator and send out an email or traps. Node failure protection ensures the switches in a ring to survive after power breakout is back. The status can be shown in NMS when each switch is back. This feature prevents the broken ring and keep ring alive without any re-configuration needed. Loop protection is also available to prevent the generation of broadcast storm when a dumb switch is inserted in a closed loop connection.

DHCP option 82 & Port based, Mac based DHCP, Option66, DHCP Snooping, IPv6 DHCP server
DHCP server can assign dedicated IP address by MAC or by port (Port based for single switch), it also can assign IP address by port for multiple switches with single DHCP option82 server. DHCP Snooping is supported. For the ending device which need to download file from TFTP server, DHCP Option66 server can offer IP address of TFTP server to DHCP client. Basic IPv6 DHCP service can be supported.

Auto-provisioning for firmware/configuration update
The switch supports auto-provisioning for switch to auto-check the latest software image and configuration through TFTP server.

User friendly GUI, Auto topology drawing
The user friendly UI, innovative auto topology drawing and topology demo makes I I(P)GS-5400-2P-PT much easier to get hands-on. The complete CLI enables professional engineer to configure setting by command line.

Editable configuration file
The configuration file of Lantech I(P)GS-5400-2P-PT can be exported and edited with word processor for the other switches configuration with ease. The factory reset button can restore the setting back to factory default. The built-in watchdog design can automatically reboot the switch when CPU is found dead.

Environmental monitoring for switch inside information
The environmental monitoring can detect switch overall temperature, total PoE load, voltage and current where can send the SNMP traps and email when abnormal.

The PoE modules support advanced PoE management including PoE detection and scheduling. PoE detection can detect if the connected PD is hang up then restart the PD; PoE scheduling is to allow pre-set power feeding schedule upon routine time table. It also supports per-port PoE status including current, voltage, watt and temperature information.

Event log & message; 2 DI + 2DO
In case of event, the I(P)GS-5400-2P-PT is able to send an email to pre-defined addresses as well as SNMP Traps out immediately. It provides 2DI and 2DO. When disconnection of the specific port was detected; DO will activate the signal LED to alarm. DI can integrate the sensors for events and DO will trigger the alarm while sending alert information to IP network with email and traps.

Various dual power conversions redundancy, high ESD protection
Lantech I(P)GS-5400-2P-PT chassis and modules are designed for easy maintenance and installation; It also supports dual power redundancies with isolated 85~264VAC/100~370VDC power conversion and isolated 36~75VDC power conversion or with non-isolated 12~56VDC power module to increase the network reliability. It also supports terminal block for connecting DC 48V PoE power source (IPGS-5400-2P-PT).

Lantech I(P)GS-5400-2P-PT features high reliability and robustness compliant with IEC-61850-3 & IEEE 1613 withstanding extensive EMI/RFI phenomenon, ±4kV surge, inductive load switching, high ESD (±8kV contact/ ±15kV air), 4kV EFT, high fault current environment usually found in Substation, Steel automation, Mining and Process control etc. IGS-5400-2P-E can run under operational temperature ranging from -40°C~75°C in the harsh and critical environment.

FEATURES & BENEFITS

- **System Interface/Performance**
  - *IEC-61850 & IEEE1613 Compliance*
  - *maximum 24x Gigabit T+4xSFP,24x Giga PoE at/af+4xSFP (IPGS-5400-2P), 28xGigabit/100M SFP, 18x100M ST/SC + 4 Gigabit SFP*
  - *16K MAC Address Table*
  - *Backplane : 56Gbps*
  - *Dual isolated power conversions for 1600V DC(36V~75V)*
  - *Dual isolated power conversions for ±3000 V (85V~264VAC/100V~370VDC)*

- *Dual power supply terinal block for non-isolated power DC(12V~56V)*
- *Rear terminal block for PoE power source(DC48V) for IPGS-5400-2P-PT*
- *Various modules available incl. Gigabit/100M SFP ; Gigabit T ;PoE at/af Giga T(up to 30W@) ; 100MST/SC modules*
- *FAN less design*

- **MMS server built-in for SCADA monitoring/control**
- **10KB jumbo frame supported on all ports**
- **User friendly UI, Auto topology drawing, topology demo**
- **IP v6/v4 supported**
- **Enhanced G.8032 Ring protection in 20ms < 256 switches**

- *Support various ring/chain topologies, including train ring*
- *Enhanced G.8032 ring configuration with ease*
- *Auto ring configuration(auto mode) for single ring*
- *Ring covers multicast on different ports*

- **DDM to support SFP diagnostic function*****

- *Automatically convert the raw data into dB values for TX power/RX power, making it easier to measure the fiber distance*

- **256 groups MSTP over VLAN**
- **VLAN**

- *4K 802.1Q Vlan, Port Based VLAN, GVRP, QinQ*

- **Port Trunk with LACP 14 trunks with automatic link failover**
- **LACP link aggregation to add bandwidth**
- **QoS (Quality of Service)**

- *Supports IEEE 802.1p CoS*
- *Per port provides 8 priority queues*
- *Port-base,Tag-base and TOS Priority*
- *Strict priority and WRR*

- **Security**

- *SSL/SSH v2/ACL L2&L3*
- *MAC address table: MAC address entries/Filter/MAC-Port binding*
- *IP Security: IP address security management to prevent unauthorized intruder.*
- *Management access control with priority*
- *Login Security: IEEE802.1X/RADIUS*
- *HTTPS for secure access to the web interface*
- *TACACS+***

- **Miss-wiring avoidance**

- *LED indicator*
- *Email or traps notification*

- **Node failure protection**

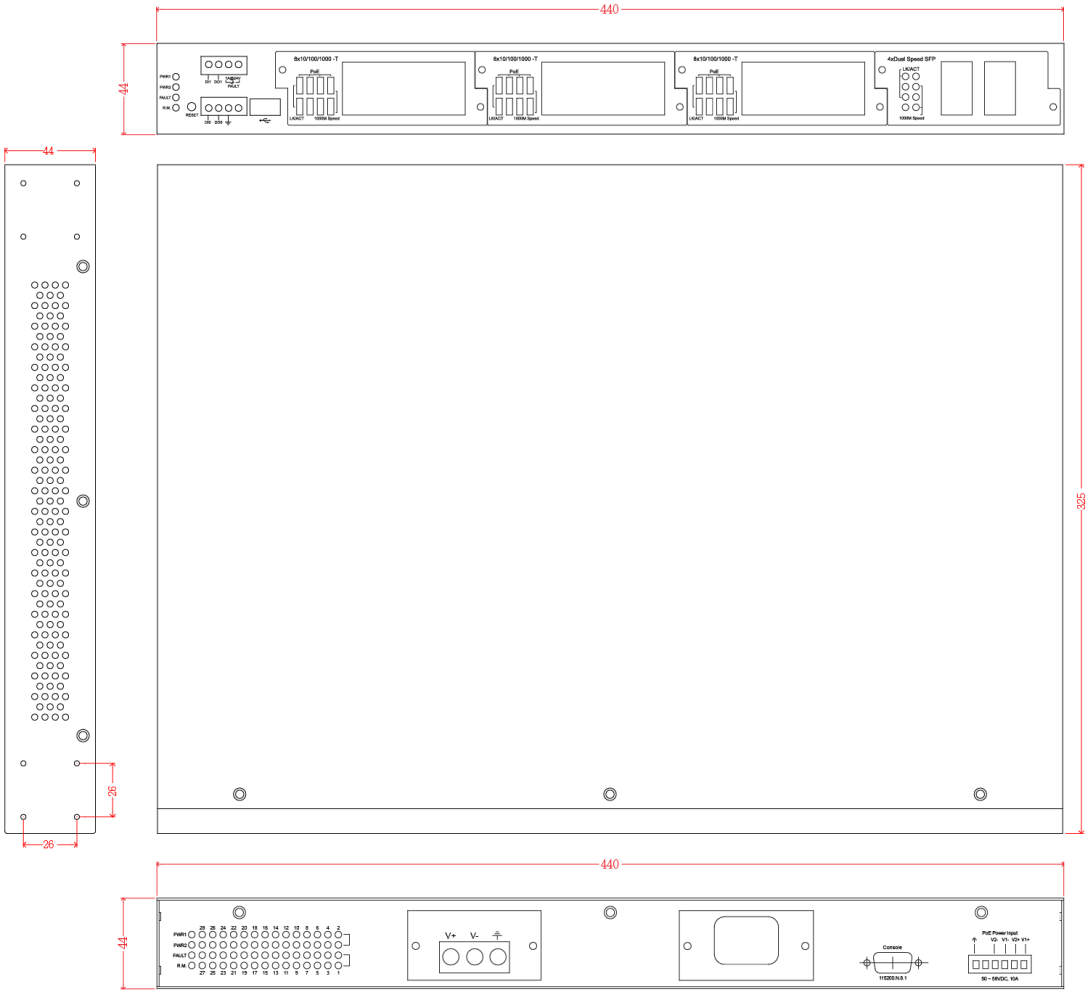
- *Ensure the switches in a ring to survive after power breakout is back*
- *The status can be shown in NMS when each switch is back*

- **SNTP,NTP supported**
- **IGMPv1,v2,v3 with Query mode for multimedia; GMRP**
- **IGMP router to select another Query mode and support IGMP static routing for reversed IGMP flow to bind with port for IP surveillance application**
- **Supports IEEE802.1ab LLDP, Cisco CDP**
- **DHCP server / client / DHCP Option 82 relay / DHCP Option 82 server; Port based DHCP server; DHCP Snooping, DHCP Option 66; basic IPv6 DHCP server**
- **Mac based DHCP server to assign IP address**
- **MLD Snooping for IPv6 Multicast stream**
- **Bandwidth Control**

- *Ingress Packet Filter and Egress Rate Limit*
- *Broadcast/Multicast Packet Filter Control*

- **System Event Log, Email alert and SNMP Trap for alarm support**
- **Diagnostic including Ping / DDM information**
- **Environmental sensor built-in to detect temperature, voltage, current and total PoE load(IPGS-5400-2P-PT) and send out SNMP traps and emails if there is abnormal events**
- **TFTP/FTP Firmware upgrade**
- **Reset / Factory default button to restore factory setting**
- **Watch dog design to reboot switch if CPU is found dead**
- **Provides 4kV EFT protection**
- **Provides ±8kV (Contact) and ±15kV (Air) ESD protection**
- **Provides ±4kV Surge protection**
- **2 DI/DO and 1 relay contact alarm**
- **Support USB dongle for automatic backup / easily write configuration**
- **Auto Provision to verify switch firmware with the latest or certain version**

DIMENSIONS (unit=mm)



SPECIFICATION

Hardware Specification	
IEEE Standards	IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX Ethernet IEEE 802.3ab 1000Base-T Ethernet IEEE 802.3z Gigabit Fiber IEEE 802.3x Flow Control Capability ANSI/IEEE 802.3 Auto-negotiation IEEE 802.1Q VLAN IEEE 802.1p Class of Service IEEE 802.1X Access Control IEEE 802.1D Spanning Tree IEEE 802.1w Rapid Spanning Tree IEEE 802.1s Multiple Spanning Tree IEEE 802.3ad Link Aggregation Control Protocol (LACP) IEEE 802.1AB Link Layer Discovery Protocol (LLDP) IEEE 802.1x User Authentication (Radius) IEEE 802.3af/at PoE(IPGS)
Switch Architecture	Back-plane (Switching Fabric): 56Gbps
Transfer Rate	14,880pps for Ethernet port 148,800pps for Fast Ethernet port 1,488,000pps for Gigabit Ethernet / Gigabit Fiber port
CPU	Marvell 800Mhz
RAM	256M Byte
Flash	128M Byte
MAC Address	16K MAC address table
Jumbo frame	10KB on all ports
Connectors	Max. 24 10/100/1000T RJ-45 with auto MDI/MDI-X+4 SFP sockets Max 28 100M Mini-GBIC : SFP sockets Max 28 1000M Mini-GBIC : SFP sockets RS-232 console: Female DB-9 USB for automatic backup and easy write up configuration
Protocol	CSMA/CD
LED	Per unit: Power 1 (Green), Power 2 (Green), Alarm (Red) ,R.M (Green) Link/Activity (Green), Full duplex/collision(Yellow)), MINI GBIC (Link/Activity)(Green)

Power Supply	2 X VAC/VDC isolated 4000V 85V~265VAC/100~370VDC 2x DC isolated 1600V 36~75VDC Dual input for 12V~56VDC PoE power dual input for 48VDC(IPGS-5400-2P)
Power Consumption	17.5 W@DC, 21.5W @VAC
PoE Budget	Max. 720W at rear side with external dual 48VDC input (50-56VDC input is recommended for 802.3at 30W applications) Higher PoE budget can be applied upon request. **
Relay Alarm	Provides one relay output for port breakdown, power fail and alarm. Alarm Relay current carry ability: 1A @ DC24V
DI/DO	2 Digital Input (DI) : Level 0: -30~2V / Level 1: 10~30V Max. input current:8mA 2 Digital Output(DO): Open collector to 40 VDC, 200mA
Case Dimension	19" Metal case,IP-30; 440mm(W)x325mm(D)x44mm(H)
Weight	2.9 kgs
Operating Humidity	5%~95% (Non-condensing)
Operating Temperature	Standard: -20°C ~60°C -E model: -40°C ~75°C
Storage Temperature	-40°C ~85°C
EMI & EMS	FCC Class A, CE EN55032 Class A, CE EN55024,

	IEC 61850-3	IEEE 1613
IEC 61000-4-2 ESD	Contact: ± 6 kV; Air: ±8 kV	Contact: ± 8 kV; Air: ±15 kV
IEC 61000-4-3 RS	80 to 3000 MHz: 10 V/m	80 to 1000 MHz: 20 V/m
IEC 61000-4-4 EFT	220VAC: Power: 4 kV; Signal: 4 kV 48VDC: Power: 4 kV	
IEC 61000-4-5 Surge	DC power: Line to line: ± 1 kV; Line to earth: ±2 kV AC power: Line to line: ± 2 kV; Line to earth: ±4 kV Signal: Line to line: ±2 kV; Line to earth: ±4 kV	
IEC 61000-4-6 CS	220VAC: Power: 10V; Signal: 10V 48VDC: Power: 10V	

	IEC 61000-4-8 PFMF IEC 61000-4-11 DIPs CE EN61000-6-2 CE EN61000-6-4 CE EN61000-6-5
MTBF	572,361hrs
Stability Testing	IEC60068-2-32 (Free fall), IEC60068-2-27 (Shock), IEC60068-2-64 (Vibration), IEC60870-2-2, IEC60068-2-30
Safety	EN IEC 62368-1
Railway verification	EN50121-4
Power Automation	IEC 61850-3 , IEEE 1613 , IEC 60255-5
Warranty	5 years

Software Specification

Management	SNMP v1 v2c, v3/ Web/Telnet/CLI
SNMP MIB	MIB MIBII SNMP MIB Bridge MIB IF MIB RMON MIB Private MIB
ITU G.8032	Support ITU G.8032 v2/2012 for Ring protection in less than 20ms for self-heal recovery (single ring) Support various ring/chain topologies covering multi-cast and data packets Includes train ring & double ring 12 topologies etc Enhanced G.8032 ring configuration with ease Co-exist with RSTP on different ports
MMS Data Modeling	■ System info ■ Environmental monitoring ■ Power ■ Device event report ■ Port status ■ Port statistic ■ Port event report ■ Firmware upgrade ■ Network configuration
PoE Management	PoE Detection to check if PD hangs then restart the PD; PoE configuration; PoE monitoring; PoE Scheduling to On/OFF PD upon routine time table
Per Port PoE Status	Enable/Disable, voltage, current, watts, temperature
User friendly UI	■ Auto topology drawing ■ Topology demo ■ DDM threshold monitoring with dB values*** ■ Complete CLI for professional setting
Port Trunk with LACP	LACP Port Trunk: 8 Trunk groups/Maximum 8 trunk members
LLDP	Supports LLDP to allow switch to advise its identification and capability on the LAN
CDP	Cisco Discovery Protocol for topology mapping
Environmental Monitoring**	System status for input voltage, current and ambient temperature to be shown in GUI and sent alerting if any abnormal status(-M model)
VLAN	Port Based VLAN IEEE 802.1Q Tag VLAN (256 entries)/ VLAN ID (Up to 4K, VLAN ID can be assigned from 1 to 4096) GVRP, QinQ, Protocol based VLAN; IPv4 Subnet based VLAN
RSTP/MSTP	Supports IEEE802.1d Spanning Tree and IEEE802.1w Rapid Spanning Tree, IEEE802.1s Multiple Spanning Tree with 16 MSTI
Quality of Service	The quality of service determined by port / CoS / ToS / VLAN / 61375-3-4
Class of Service	Support IEEE802.1p class of service, per port provides 8 priority queues
MLD Snooping	Support IPv6 Multicast stream
Login Security	Supports IEEE802.1X Authentication/RADIUS
Port Mirror	Support 3 mirroring types: "RX, TX and Both packet"
Network Security	Support 10 IP addresses that have permission to access the switch management and to prevent unauthorized intruder. 802.1X access control for port based and MAC based authentication/MAC-Port binding Management access control with priority Ingress/Egress ACL L2/L3 SSL/ SSH v2 for Management HTTPS for secure access to the web interface TACACS+** for Authentication MAC filter
IGMP	Support IGMP snooping v1,v2,v3; Supports IGMP static route; 256 multicast groups; IGMP router port ; IGMP query; GMRP, QinQ, QOS by VLAN
Static MAC-Port bridge	Static multicast forwarding forward reversed IGMP flow with multicast packets binding with ports for IP surveillance application
Bandwidth Control	Support ingress packet filter and egress packet limit. The egress rate control supports all of packet type. Ingress filter packet type combination rules are Broadcast/Multicast/Flooded Unicast packet, Broadcast/Multicast packet, Broadcast packet only and all types of packet. The packet filter rate can be set an accurate value through the pull-down menu for the ingress packet filter and the egress packet limit.

RTC	Built-in Real Time Clock to keep track of time always
Flow Control	Supports Flow Control for Full-duplex and Back Pressure for Half-duplex
System Log	Supports System log record and remote system log server(RFC3164)
Relay Alarm	Provides one relay output for port breakdown, power fail and alarm. Alarm Relay current carry ability: 1A @ DC24V
Protection	■ Miss-wiring avoidance ■ Node failure protection ■ Loop protection
SNMP Trap	Up to 10 trap stations; trap types including: ■ Device cold start ■ Authorization failure ■ Port link up/link down ■ DI/DO open/close ■ Typology change(ITU ring) ■ Power failure ■ Environmental abnormal**
DHCP	Provide DHCP Client/ DHCP Server/DHCP Option 82/Port based DHCP; DHCP Option 66; DHCP Snooping, basic IPv6 DHCP server

Mac based DHCP Server	Assign IP address by Mac
DNS	Provide DNS client feature
Diagnostic	Support Ping and DDM information
SNTP	Supports Dual NTP server to synchronize system clock in Internet
Firmware Update	Supports TFTP firmware update, TFTP backup and restore; HTTP firmware upgrade
Configuration backup & restore	Supports text configuration file for system quick installation N-key** for mass firmware auto-backup, editable restoration and auto upgrade USB port to upload/download firmware by USB dongle
Auto Provision	To verify switch firmware with the latest or certain version

*Future Release

**Optional

***Optional DDM SFP required

ORDERING INFORMATION

For optional power supply, add +DC, +DCI, +AC, or +HV to the part number.

- **IGS-5400-2P-PT-HV ……..P/N: 8388-100**
  4 Modular Slots L2 plus Industrial IEC-61850 Switch Chassis
  Built-in 1x isolated AC/DC 85~264VAC/100V~370VDC power conversion + 1x optional power socket; -20°C to 60°C
- **IGS-5400-2P-PT-DC ……..P/N: 8388-118**
  4 Modular Slots L2 plus Industrial Switch IEC 61850-3 Chassis
  Built-in 1x DC 12~56VDC power supply + 1x optional power socket; -20°C to 60°C
- **IPGS-5400-2P-PT-HV ……..P/N: 8388-130**
  4 Modular Slots L2 plus Industrial IEC 61853-3 PoE Switch Chassis
  Built-in 1x isolated AC/DC 85~264VAC/100V~370VDC power conversion + 1x optional power socket + 1x 48VDC PoE power input; -20°C to 60°C
- **IPGS-5400-2P-PT-DC ……..P/N: 8388-138**
  4 Modular Slots L2 plus Industrial Switch Chassis
  Built-in 1x DC 12~56VDC power supply + 1x optional power socket + 1x 48VDC PoE power input; -20°C to 60°C
- **IGS-5400-2P-PT-HV-E……..P/N: 8388-1001**
  4 Modular Slots L2 plus Industrial IEC-61850 Switch Chassis
  Built-in 1x isolated AC/DC 85~264VAC/100V~370VDC power conversion + 1x optional power socket; -40°C to 75°C
- **IGS-5400-2P-PT-DC-E……..P/N: 8388-1181**
  4 Modular Slots L2 plus Industrial Switch IEC 61850-3 Chassis
  Built-in 1x DC 12~56VDC power supply + 1x optional power socket; -40°C to 75°C
- **IPGS-5400-2P-PT-HV-E……..P/N: 8388-1301**
  4 Modular Slots L2 plus Industrial IEC 61853-3 PoE Switch Chassis
  Built-in 1x isolated AC/DC 85~264VAC/100V~370VDC power conversion + 1x optional power socket + 1x 48VDC PoE power input; -40°C to 75°C
- **IPGS-5400-2P-PT-DC-E……..P/N: 8388-1381**
  4 Modular Slots L2 plus Industrial Switch Chassis
  Built-in 1x DC 12~56VDC power supply + 1x optional power socket + 1x 48VDC PoE power input; -40°C to 75°C

Modules for Slot 1-3 Note: the modules will be factory pre-installed.

- **8xGIGA T Module……..P/N: 8380-1055**
  8x 10/100/1000T Module; -40°C to 75°C
- **8xGIGA T-PoE at/af Module……..P/N: 8380-1145**
  8x 10/100/1000T PoE at/af Module; -40°C to 75°C
- **8x SFP Module……..P/N: 8380-1065**
  8x Dual Speed SFP module for 100M SFP or Gigabit SFP; -40°C to 75°C
- **4x GIGA T + 4x SFP Module……..P/N: 8380-1075**
  4x 10/100/1000T + 4 x 100/1000M Dual Speed SFP Module ; -40°C to 75°C

Modules for Slot 4 Note: the modules will be factory pre-installed.

- **4x SFP Module……..P/N: 8380-1155**
  4x Dual Speed SFP module for 100M SFP or Gigabit SFP; -40°C to 75°C

OPTIONAL ACCESSORIES

Power

EOTH000701

Isolated Power HV 85-264VAC, 100-370VDC 1.5A , 47-63HZ

DIN Rail Power

- **NDR-480 Series** 480W Single Output Industrial Din Rail Power; 90-264VAC / 127-370VDC Input Range; Cooling by free air convection; RoHS2 ; Operating Temp. -20°C~70°C (ambient, derating each output at 2.5% per degree from 50°C ~ 70°C)
- **NDR-240 Series** 240W Single Output Industrial Din Rail Power; 90-264VAC / 127-370VDC Input Range; Cooling by free air convection; RoHS2 ; Operating Temp. -20°C~70°C (ambient, derating each output at 2.5% per degree from 50°C ~ 70°C)
- **NDR-120 Series** 120W Single Output Industrial Din Rail Power; 90-264VAC / 127-370VDC Input Range; Cooling by free air convection; RoHS2 ; Operating Temp. -20°C~70°C (ambient, derating each output at 2.5% per degree from 50°C ~ 70°C; For 115VAC, please refer to derating curve on NDR-120 Series datasheet)
- **NDR-75 Series** 75W Single Output Industrial Din Rail Power; 90-264VAC / 127-370VDC Input Range; Cooling by free air convection; RoHS2 ; Operating Temp. -20°C~70°C (ambient, derating each output at 2.5% per degree from 50°C ~ 70°C; For 115VAC, please refer to derating curve on NDR-120 Series datasheet)

Mini GBIC (SFP)

- **8330-162-V1** MINI GBIC 1000SX (LC/MM/0.5KM) Transceiver
- **8330-163-V1** MINI GBIC 1000SX2 (LC/MM/2KM) Transceiver
- **8330-165-V1** MINI GBIC 1000LX (LC/SM/10KM) Transceiver
- **8340-0591-V1** MINI GBIC 1000LHX (LC/SM/40KM) Transceiver
- **8330-166-V1** MINI GBIC 1000XD (LC/SM/50KM) Transceiver
- **8330-169-V1** MINI GBIC 1000XD (LC/SM/60KM) Transceiver
- **8330-167-V1** MINI GBIC 1000ZX (LC/SM/80KM) Transceiver
- **8330-170-V1** MINI GBIC 1000EZX (LC/SM/120KM) Transceiver
- **8330-168-V1** MINI GBIC 10/100/1000T (100m) Transceiver
- **8330-060-V1** MINI GBIC 100Base (LC/MM/2KM) Transceiver
- **8330-065-V1** MINI GBIC 100Base (LC/MM/5KM) Transceiver
- **8330-061-V1** MINI GBIC 100Base (LC/SM/30KM) Transceiver
- **8330-197-V1** 1.25Gbps BiDi SFP 0.5KM Transceiver (WDM 1310)
- **8330-198-V1** 1.25Gbps BiDi SFP 0.5KM Transceiver (WDM 1550)
- **8330-195-V1** 1.25Gbps BiDi SFP 2KM Transceiver (WDM 1310)
- **8330-196-V1** 1.25Gbps BiDi SFP 2KM Transceiver (WDM 1550)
- **8330-188-V1** 1.25Gbps BiDi SFP 10KM Transceiver (WDM 1310)
- **8330-189-V1** 1.25Gbps BiDi SFP 10KM Transceiver (WDM 1550)
- **8330-186-V1** 1.25Gbps BiDi SFP 20KM Transceiver (WDM 1310)
- **8330-187-V1** 1.25Gbps BiDi SFP 20KM Transceiver (WDM 1550)
- **8330-180-V1** 1.25Gbps BiDi SFP 40KM Transceiver (WDM 1310)
- **8330-182-V1** 1.25Gbps BiDi SFP 40KM Transceiver (WDM 1550)
- **8330-181-V1** 1.25Gbps BiDi SFP 60KM Transceiver (WDM 1310)
- **8330-183-V1** 1.25Gbps BiDi SFP 60KM Transceiver (WDM 1550)
- **8330-184-V1** 1.25Gbps BiDi SFP 80KM Transceiver (WDM 1490)
- **8330-185-V1** 1.25Gbps BiDi SFP 80KM Transceiver (WDM 1550)
- **8330-071-V1** 125Mbps BiDi SFP 2KM (WDM 1310) Transceiver
- **8330-072-V1** 125Mbps BiDi SFP 2KM (WDM 1550) Transceiver
- **8330-069-V1** 125Mbps BiDi SFP 20KM (WDM 1310) Transceiver
- **8330-068-V1** 125Mbps BiDi SFP 20KM (WDM 1550) Transceiver
- **8330-080-V1** 125Mbps BiDi SFP 40KM (WDM 1310) Transceiver
- **8330-082-V1** 125Mbps BiDi SFP 40KM (WDM 1550) Transceiver
- **8330-081-V1** 125Mbps BiDi SFP 60KM (WDM 1310) Transceiver
- **8330-083-V1** 125Mbps BiDi SFP 60KM (WDM 1550) Transceiver
- **8330-084-V1** 125Mbps BiDi SFP 80KM (WDM 1310) Transceiver
- **8330-085-V1** 125Mbps BiDi SFP 80KM (WDM 1550) Transceiver
- **8330-191-V1** Dual Speed SFP 100M/1000M-LX 10KM Transceiver

All SFP# ended with D are with DDM function

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