IPGS-6416XSFP-16

16 10/100/1000T PoE at/af + 4 1G/2.5G/10G SFP+ L2+ Industrial Managed Ethernet Switch w/ Enhanced G.8032 Ring; 12V/48V input models & LTDP**

- *Auto-sensing triple speed1G/2.5G/10G SFP+ Uplink Cage*
- *Support IEEE802.3at/af up to 30W per port PoE management incl. Detection and Scheduling*
- *Enhanced G.8032 ring protection < 20ms for single ring. Supports auto mode**, enhanced mode, train mode**, multi-VLAN** and basic mode; Enhanced G.8032 ring covers multicast packets; MSTP 8/16*MSTI /RSTP ; support MRP ring***
- *LTDP** (Link Train Discovery Protocol) to auto-assign IP as well as inherit the configuration in replaced switch*
- *Support IEEE 1588 v2 one-step PTP w/transparent clock*
- *Miss-wiring avoidance & node failure protection*
- *User friendly UI, including auto topology drawing and DDM threshold monitoring with dB values***; Complete CLI*
- *Support LACP link aggregation, IGMP v3/router port, DHCP server & DHCP Option82; Port based DHCP distribution, Mac based DHCP server, QoS by VLAN**, SSH/SSL, HTTPS, INGRESS/EGRESS ACL L2/L3,TACACS+, QinQ**, SMS***
- *Optional InstaView** for centralized backup, editing the configuration file and upgrade firmware*
- *Environmental Monitoring for temp., voltage & current*
- *Wide range operation temperature (-E model):-40~75C/-40~167F; Fan-less design*

OVERVIEW

Lantech IPGS-6416XSFP-16 is a high performance L2+ (All Gigabit) Ethernet switch with 16 100/1000T + 4 1G/2.5G/10G auto sensing SFP+ w/16 PoE 802.3af/at Injectors which provides L2 wire speed and advanced security function for network aggregation deployment. It delivers ITU G.8032 enhanced ring recovery less than 20ms in single ring. It also supports train ring, enhanced mode with easy configuration, comprehensive QoS, QoS by VLAN, advanced security including INGRESS/EGRESS ACL L2/L3, TACACS+, SSH/SSL, Mac based DHCP server, DHCP Option 82, DHCP server, IGMPv1/v2/v3/router port, QinQ** which are important features required in large network. The Cisco Discovery Protocol (CDP) and LLDP are supported for Ciscoworks to detect the switch info and show on L2 map topology. The enhanced platform allows quick booting up time under 50 seconds.

Innovative LTDP** (Link Train Discovery Protocol) to assign proper IP address as well as inherit configuration for replaced switch

With port-based DHCP server, LTDP** allows Lantech Ethernet switch series in single ring to discover the current IP addresses and to assign the same IP address and configuration. Furthermore, LTDP** can inherit the same configuration to new replaced switch for zero-touch maintenance.

Up to 16 Poe at/af ports w/advanced PoE management

Compliant with 802.3af/at standard, the Lantech IPGS-6416XSFP-16 is able to feed each PoE port up to 30 Watt. Lantech IPGS-6416XSFP-16 supports advanced PoE management including PoE detection and scheduling. PoE

detection can detect if the connected PD hangs then restart the PD; PoE scheduling is to allow pre-set power feeding schedule upon routine time table. Each PoE ports can be Enabled/disabled, get the voltage, current, Watt, and temperature info displayed on WebUI.

Miss-wiring avoidance, Loop protection, Repowered auto ring restore

The IPGS-6416XSFP-16 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 IPGS-6416XSFP-16 is able to alert with the LED indicator and disable ring automatically. Repowered auto ring restore function (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. 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, IPv6 DHCP server**

DHCP option 82 and Port based DHCP function can offer the same IP address on port base or VLAN base where there is need to replace the new device connecting to Lantech switches to avoid any network disruption.

The built-in DHCP Option 82 server offers the convenience of policy setting on the switch. Mac based DHCP server function assigns an IP address according to its MAC address to include dumb switches in DHCP network. DHCP option 66 is also supported. Optional IPv6 address resolution for DHCP server can be supported.

User friendly GUI, Auto topology drawing

The user friendly UI, innovative auto topology drawing and topology demo makes IPGS-6416XSFP-16 much easier to get hands-on. The complete CLI enables professional engineer to configure setting by command line.

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

Lantech IPGS-6416XSFP-16 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 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 each spanning tree for each VLAN for redundant links with 8/16* MSTI.

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

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 QinQ** and GVRP supported

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

IGMPv3, GMRP, router port, 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 and static multicast forwarding binding by ports for video surveillance application.

Hardware one-step PTP < 1us, transparent clock

Lantech IPGS-6416XSFP-16 features hardware-based one step PTP IEEE1588 v2 transparent clock function (end to end, peer to peer) which can allow all Gigabit TX ports to synchronize the network with precise accuracy

Editable configuration file; InstaView** for mass deployment

The configuration file of Lantech IPGS-6416XSFP-16 can be exported and edited with word processor for the other switches configuration with ease.

The built-in watchdog design can automatically reboot the switch when CPU is found dead.

With optional InstaView, the configuration files can be mass backup, mass-editable deployed and auto upgrading firmware in batch make maintenance easy.

2DI/2DO for relay contact and event alerting by email & traps

In case of event, the IPGS-6416XSFP-16 is able to send an email & SMS** text message 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.

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, email and SMS** alert when abnormal.

Dual power 12V/48V input, high PoE budget

The Lantech IPGS-6416XSFP-16 is designed with dual power supply at 48VDC(48V model) or 9.5V~56VDC input(12V model). The 48V model can have 480W PoE budget while 12V model can have 80W (12V input) or 120W (24V input) budget.

Industrial hardened design with high EFT and ESD protection

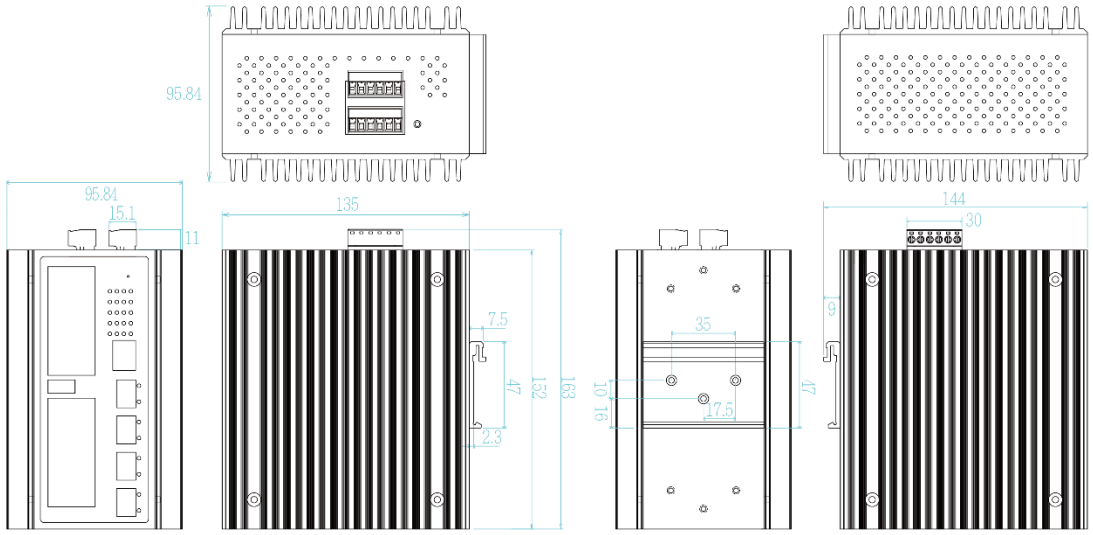
Lantech IPGS-6416XSFP-16 features high reliability and robustness coping with extensive EMI/RFI phenomenon, environmental vibration and shocks usually found in factory, substation, steel automation, aviation, mining and process control. Featured with relay contact alarm function, the IPGS-6416XSFP-16 is able to connect with alarm system in case of power failure or port disconnection. The IPGS-6416XSFP-16 also provides ±2000V EFT and ±6000V ESD protection, which can reduce unstable situation caused by power line and Ethernet.

It is the best solution for Automation, transportation, surveillance, Wireless backhaul, Semi-conductor factory applications. The -E model can be used in extreme environments with an operating temperature range of -40°C to 75°C.

FEATURES & BENEFITS

- **16 100/1000T + 4 1G/2.5G/10G auto sensing SFP+ w/16 PoE 802.3af/at Injectors (Total 20 Ports Switch)**
- **Embedded 16 PoE Injectors IEEE802.3af/at function to feed power up to 30W for active mode operation**
- **48V input for PoE budget 480W; 12V input for PoE budget 80W/ 24V input for PoE budget 120W**
- **PoE management including PoE detection and scheduling for PD (power devices)**
- **Back-plane (Switching Fabric): 112Gbps**
- **16K MAC address table**
- **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*
- **10KB Jumbo frame**
- **User friendly UI, auto topology drawing, topology demo, complete CLI for professional setting**
- **Enhanced G.8032 Ring protection in 20ms for single ring**
  - *Support various ring/chain topologies, including train ring**, enhanced ring, basic ring, auto ring** & multiple VLAN ring***
  - *Enhanced G.8032 ring configuration with ease*
  - *Auto ring** configuration(auto mode**) for single ring*
  - *Cover multicast and data packets protection*
- **Support one-step PTP, End to End, Peer to Peer w/transparent clock on all GigaTX**
- **LTDP** (Link Train Discovery Protocol) with Port based DHCP can assign the same IP address and configuration to replaced switch in a single ring**
- **Provides EFT protection ±2000 VDC for power line.**
- **Supports ±6000 VDC Ethernet ESD protection**
- **Supports IEEE 802.1p Class of Service, per port provides 8 priority queues Port base, Tag Base and Type of Service Priority**
- **QoS by VLAN** to prioritize all devices in the network**
- **IEEE 802.1d STP, IEEE 802.1w RSTP,802.1s MSTP VLAN redundancy with 8/16* MSTI**
- **4K 802.1Q VLAN, Port based VLAN, GVRP, QinQ**, QoS QinQ****
- **Supports IEEE 802.1ab LLDP, Cisco CDP; LLDP info can be viewed via Web/ Console/ Lantech™ InstaView****
- **DHCP server / client / DHCP Option 82 relay / DHCP Option 82 server; Port based DHCP server; DHCP Option 66; IPv6 address resolution for DHCP server****
- **Mac based DHCP server to assign IP address that includes dumb switches in DHCP network**
- **Bandwidth Control**
  - *Ingress packet filter and egress rate limit*
  - *Broadcast/multicast packet filter control*
- **Relay alarm output system events**
- **Miss-wiring avoidance**
  - *LED indicator*
- **Repowered auto ring** restore**
  - *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*
- **TFTP/SFTP**/HTTP firmware upgrade; Lantech™ InstaView** for multiple upgrade**
- **System Event Log, SMTP Email alert, SMS** mobile (text) and SNMP Trap for alarm support; 32 RMON counters**
- **Security**
  - *SSL/SSH/INGRESS/EGRESS ACL L2/L3*
  - *Port Security: MAC address entries/Filter/static MAC-Port binding*
  - *IP Security: IP address security management to prevent unauthorized intruder.*
  - *TACACS+*
  - *Login Security: IEEE802.1X/RADIUS*
  - *HTTPS for secure access to the web interface*
- **Static multicast forwarding forward reversed IGMP flow with multicast packets binding with ports for IP surveillance application**
- **Multicast static route for non- IGMP camera to prevent flooding; IGMP router port to assign query in ring for reversed multicast video flow**
- **IGMPv1,v2,v3 with Query mode for multimedia; GMRP**
- **Dual image firmware support***
- **Factory reset button to restore setting to factory default**
- **Watchdog design to auto reboot switch when CPU is found dead**
- **Quick system booting up time under 50 seconds**
- **Environmental monitoring for system input voltage, current, ambient temperature and total PoE load**
- **Supports DIDO (Digital Input/Digital Output)**
- **Configuration backup and restoration**
  - *Supports editable configuration file for system quick installation*
  - *InstaView** for centralized configuration deployment, backup & upgrade*
  - *USB port to upload/download firmware by USB dongle*
- **Wide operation temperature (-E model): -40C~75C/-40F~167F; Fan-less design**
- **IP30 metal housing with DIN rail and Wall-mount** design**

DIMENSIONS (unit=mm)



SPECIFICATION

Hardware Specification

Standards	IEEE802.3 10Base-T Ethernet IEEE802.3u 100Base-TX IEEE802.3ab 1000Base-T IEEE802.3z Gigabit fiber IEEE802.3x Flow Control and Back Pressure IEEE802.3ad Port trunk with LACP IEEE802.1d Spanning Tree IEEE802.1w Rapid Spanning Tree IEEE802.1s Multiple Spanning Tree IEEE802.3ad Link Aggregation Control Protocol (LACP) IEEE802.1AB Link Layer Discovery Protocol (LLDP) IEEE802.1X User Authentication (Radius) IEEE802.1p Class of Service IEEE802.1Q VLAN Tag IEEE802.3at/af Power over Ethernet
Switch Architecture	Back-plane (Switching Fabric): 112Gbps
Mac Address	16K MAC address table
Jumbo frame	10KB
Connectors	10/100/1000T: 16 x ports RJ-45 with Auto MDI/MDI-X function Mini-GBIC: 4 x 1G/2.5G/10G SFP+ auto-sensing socket with DDMI RS-232 connector: RJ-45 type USB x 1 Power & Relay connector: 1 x 6-pole terminal block DIDO : 1 x 6-pole terminal block
Network Cable	10Base-T: 2-pair UTP/STP Cat. 3, 4, 5/ 5E/ 6 cable EIA/TIA-568 100-ohm (100m) 100Base-TX: 2-pair UTP/STP Cat. 5/ 5E/ 6 cable; EIA/TIA-568 100-ohm (100m) 1000Base-T: 4-pair UTP/STP Cat5E/6 cable; 10GBaseT:4-pair STP Cat6/6A/7 cable
Optical Cable	**1Gbps:** Multi mode: 0 to 550 m, 850 nm (50/125 µm); 0 to 2 km, 1310 nm (50/125 µm) Single mode: 0 to 10 km/ 30 km/ 40 km, 1310 nm (9/125 µm); 0 to 50 km/ 60 km/ 80km/ 120 km, 1550 nm (9/125 µm) **2.5Gbps** Multi mode: 0 to 300 m, 850 nm (50/125 µm); Single mode: 0 to 2 km/ 15 km/ 40 km, 1310 nm (9/125 µm); 0 to 40 km/ 80 km/ 100km, 1550 nm (9/125 µm) **WDM 1Gbps:** Single mode: 0 to 10 km/ 20 km/ 40 km/ 60 km, 1310 nm (9/125 µm); 0 to 80 km, 1490 nm (9/125 µm); 0 to 10 km/ 20 km/ 40 km/ 60 km/ 80 km, 1550 nm (9/125 µm) **WDM 2.5Gbps** Single mode: 0 to 5 km/ 20 km/ 40 km/ 60 km, 1310 /1550nm (9/125 µm); 0 to 80 km, 1490/1550 nm (9/125 µm) **10Gbps** Multi mode: 0 to 300 m, 850 nm (OM3 50/125 µm); Single mode: 0 to 10 km/ 20 km, 1310 nm (9/125 µm); 0 to 40 km/ 80km/ 100 km, 1550 nm (9/125 µm) **WDM 10Gbps** Single mode: 0 to 10 km/ 20 km/ 40 km/ 60 km, 1270/1330 nm (9/125 µm); 0 to 80km, 1490/1550 nm (9/125 µm)
LED	Per unit: Power 1 (Green), Power 2 (Green), FAULT (Red); RM(Green) Ethernet port: Link/Activity (Green), Speed (Green); PoE : Link/Act (Green); Mini-GBIC: Link/Activity (Green)
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
Operating Humidity	5% ~ 95% (Non-condensing)
Operating Temperature	-20°C~60°C / -4°F~140°F (Standard model) -40°C~75°C / -40°F~167°F(-E model)
Storage Temperature	-40°C~85°C / -40°F~185°F
Power Supply	44~56VDC(48V model); 9.5V~56VDC(12V model)
PoE Budget	480W for 44~56V input(48V model) (54V input is recommended for PTZ or heater applications 80W at 12V input; 120W at 24V input(12V model)
PoE pin assignment	RJ-45 port # 1~#16 support IEEE 802.3at/af End-point, Alternative A mode. Positive (VCC+): RJ-45 pin 1,2. Negative (VCC-): RJ-45 pin 3,6.
Power Consumption	18W
Case Dimension	Metal case. IP-30, 95.84 (W) x 135 (D) x 152 (H) mm
Weight	900 g
Installation	DIN Rail and Wall Mount** Design

EMI & EMS	FCC Class A, CE EN55022 Class A, CE EN55024, CE EN61000-4-2, CE EN61000-4-3, CE EN61000-4-4, CE EN61000-4-5 ED3, CE EN61000-4-6, CE N61000-4-8
Stability Testing	IEC60068-2-32 (Free fall), IEC60068-2-27 (Shock), IEC60068-2-6 (Vibration)
MTBF	586,082.5 Hrs (IEC 62830 standards)
Warranty	5 years

Software Specification

Management	SNMP v1 v2c, v3/ Web/Telnet/CLI
SNMP MIB	RFC 1215 Traps MIB*, RFC 1213 MIBII RFC 1158 MIBII RFC 1157 SNMP MIB, RFC 1493 Bridge MIB* RFC 1573 IF MIB RFC 2674 VLAN MIB*, Partial RFC 1757 RMON, RFC 2674 Q-Bridge MIB*; Bridge MIB, LLDP MIB RSTP 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 enhanced mode) Support various ring/chain topologies Includes train ring**, auto ring**, basic single ring, enhanced ring, multiple-VLAN ring** Enhanced G.8032 ring configuration with ease Cover multicast & data packets protection
LTDP**(optional)	Link Train Discovery Protocol with Port based DHCP server to assign the same IP address and to keep the config file when any switch changes
PoE Management	PoE Detection to check if PD hangs then restart the PD
Per Port PoE Status	On/ Off, voltage, current, watts, temperature
PTP v2	Support hardware-based IEEE1588 PTPv2, End to End (1-step) and Peer to Peer (1-step) modes in Transparent Clock, on all TX ports
User friendly UI	■ Auto topology drawing ■ Topology demo ■ Auto configuration for G.8032(auto mode**) for single ring ■ DDM threshold monitoring with dB values*** ■ Complete CLI for professional setting
Port Trunk with LACP	LACP Port Trunk: 10 Trunk groups
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 , total PoE load and ambient temperature to be shown in GUI and sent alerting if any abnormal status
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**, QoS QinQ**, Protocol based VLAN** ; IPv4/IPv6 Subnet based VLAN**
IPv6/4	Present
Spanning Tree	Supports IEEE802.1d Spanning Tree and IEEE802.1w Rapid Spanning Tree, IEEE802.1s Multiple Spanning Tree 8/16*MSTI
Quality of Service	The quality of service determined by port, Tag and IPv4 Type of service, IPv4 Differentiated Services Code Points - DSCP
Class of Service	Support IEEE802.1p class of service, per port provides 8 priority queues
QoS by VLAN**	Tagged QoS by VLAN** for all devices in the network
IP Security	Supports 10 IP addresses that have permission to access the switch management and to prevent unauthorized intruder.
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/static MAC-Port binding Ingress/Egress ACL L2/L3 SSL/ SSH for Management HTTPS for secure access to the web interface TACACS+ for Authentication
IGMP	Support IGMP snooping v1,v2,v3; Supports IGMP static route; 256 multicast groups; IGMP router port ; IGMP query; GMRP
Static multicast forwarding	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.
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
SMTP/Text SMS**	Supports SMTP Server and 8 e-mail accounts for receiving event alert; can send SMS** text alert via mobile
Relay Alarm	Provides one relay output for port breakdown, power fail and alarm. Alarm Relay current carry ability: 1A @ DC24V
Protection	■ Miss-wiring avoidance ■ Repowered auto ring** restore ■ 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 (Client & Server)/Port based DHCP; DHCP Option 66; IPv6 address resolution for DHCP server**
Mac based DHCP Server	Assign IP address by Mac that can include dumb switch in DHCP network
DNS	Provide DNS client feature and support Primary and Secondary DNS server.
SNTP	Supports SNTP to synchronize system clock in Internet
Firmware Update	Supports TFTP firmware update, TFTP backup and restore; HTTP firmware upgrade; Lantech™ InstaView** for multiple upgrade
Configuration upload and download	Supports text configuration file for system quick installation; Support factory reset button to restore all settings back to factory default; USB for auto restore/backup
Dual Image Firmware*	Support dual image firmware function

*Future release
**Optional
***Optional DDM SFP required

ORDERING INFOMATION

- **IPGS-6416XSFP-16-48V…….....P/N: 8350-864**
  16 10/100/1000T PoE at/af up to 30W + 4 1G/2.5G/10G SFP+ L2+ Industrial PoE Managed Ethernet Switch; -20°C to 60°C; Environmental Monitoring; dual 44V~56V input PoE budget 480W
- **IPGS-6416XSFP-16-48V-E…….....P/N: 8350-865**
  16 10/100/1000T PoE at/af up to 30W + 4 1G/2.5G/10G SFP+ L2+ Industrial PoE Managed Ethernet Switch; -40°C to 75°C; Environmental Monitoring; dual 44V~56V input PoE budget 480W
- **IPGS-6416XSFP-16-12V…….....P/N: 8350-866**
  16 10/100/1000T PoE at/af up to 30W + 4 1G/2.5G/10G SFP+ L2+ Industrial PoE Managed Ethernet Switch; -20°C to 60°C; Environmental Monitoring; dual 9.5V~56V input, PoE budget 80W at 12V, 120W at 24V
- **IPGS-6416XSFP-16-12V-E…….....P/N: 8350-867**
  16 10/100/1000T PoE at/af up to 30W + 4 1G/2.5G/10G SFP+ L2+ Industrial PoE Managed Ethernet Switch; -40°C to 75°C; Environmental Monitoring; dual 9.5V~56V input, PoE budget 80W at 12V, 120W at 24V

OPTIONAL ACCESSORIES

DIN Rail Power for 802.3at Applications

- **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)

Mini GBIC (SFP)

- **8330-162X** MINI GBIC 1000SX (LC/0.5km) Transceiver
- **8330-163X** MINI GBIC 1000SX2 (LC/2km) Transceiver
- **8330-165X** MINI GBIC 1000LX (LC/10km) Transceiver
- **8340-0591** MINI GBIC 1000LHX (LC/40km) Transceiver
- **8330-166** MINI GBIC 1000XD (LC/50km) Transceiver
- **8330-169** MINI GBIC 1000XD (LC/60km) Transceiver
- **8330-167** MINI GBIC 1000ZX (LC/80km) Transceiver
- **8330-170** MINI GBIC 1000EZX (120km) Transceiver
- **8330-168** MINI GBIC 1000T (100m) Transceiver
- **8330-188** LTSFP-1000BX-10KM Transceiver (WDM 1310)
- **8330-189** LTSFP-1000BX-10KM Transceiver (WDM 1550)
- **8330-186** LTSFP-1000BX-20KM Transceiver (WDM 1310)
- **8330-187** LTSFP-1000BX-20KM Transceiver (WDM 1550)
- **8330-180** LTSFP-1000BX-40KM Transceiver (WDM 1310)
- **8330-182** LTSFP-1000BX-40KM Transceiver (WDM 1550)
- **8330-181** LTSFP-1000BX-60KM Transceiver (WDM 1310)
- **8330-183** LTSFP-1000BX-60KM Transceiver (WDM 1550)
- **8330-184** LTSFP-1000BX-80KM Transceiver (WDM 1490)
- **8330-185** LTSFP-1000BX-80KM Transceiver (WDM 1550)
- **8330-262D** MINI GBIC 2.5G 850nm VCSEL (LC/0.3km) Transceiver
- **8330-263D** MINI GBIC 2.5G 1310nm FP (LC/2km) Transceiver
- **8330-265D** MINI GBIC 2.5G 1310nm DFB (LC/15km) Transceiver
- **8330-193D** 10G Base SFP+ SR, Multi-mode (LC/300m) Transceiver
- **8330-194D** 10G Base SFP+ LR, Single-mode (LC/10km) Transceiver
- **8330-200D** 10G Base SFP+ , Single-mode(20km) Transceiver (WDM 1270)
- **8330-201D** 10G Base SFP+ , Single-mode(20km) Transceiver (WDM 1330)
- **8330-202D** 10G Base SFP+ , Single-mode(40km) Transceiver (WDM 1270)
- **8330-203D** 10G Base SFP+ , Single-mode(40km) Transceiver (WDM 1330)

All SFP ended with D are with Diagnostic function

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