

# IPES-3424DSFP-2P-PT

24 10/100TX PoE + 4 DualSpeed SFP IEC 61850-3

Managed Ethernet Switch w/ Enhanced Ring & MMS, PTPv2

- Compliant with IEC61850-3 & IEEE1613
- Supports PTP IEEE1588v2 two-step on Giga ports
- Built-in MMS server based on IEC61850-90-4 switch data modeling for SCADA with monitoring and control
- IEC packet counter for GOOSE monitoring
- QoS for GOOSE packet\*\*
- Support IEEE802.3at/af up to 30W per port
- 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 16MSTI /RSTP ; support MRP ring\*\*
- Miss-wiring avoidance & node failure protection
- User friendly UI, including auto topology drawing; 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\*\*
- Protocol based VLAN\*\* ; IPv4/IPv6 Subnet based VLAN\*\*
- Optional InstaView\*\* for centralized backup, editing the configuration file and upgrade firmware
- USB port to backup, restore the configuration file and upgrade firmware



## OVERVIEW

Lantech IPES-3424DSFP-2P-PT is a high performance L2+ (Gigabit uplink) switch with 24 10/100/1000T w/ 24 PoE 802.3af/802.3at + 4 Dual Speed SFP that complies with IEC 61850-3 & IEEE 1613. It delivers ITU G.8032 enhanced ring recovery less than 20ms in single ring while also supports train ring, enhanced mode, multiple VLAN model with easy configuration.

The built-in MMS server allows SCADA to control & monitor switch for data modeling, it also support hardware 2 step PTP (Precision Time Protocol) with IEEE 1588v2 standard.

Compliant with IEEE802.3at/af standard, the Lantech IPES-3424DSFP-2P-PT is able to feed each PoE port up to 30Watts@54VDC providing the connected PD devices at 10/100M speed. It also supports advanced PoE management including PoE detection and scheduling. PoE detection can detect if the connected PD still alive then sending power; PoE scheduling is to allow pre-set power feeding schedule upon routine time table. Per port PoE states explicit voltage, current, watt and PoE temperature information.

**GOOSE monitoring packet counter; Built-in MMS server for IEC61850 data modeling for monitoring and control;**

### Optional QoS for GOOSE packet

The exclusive GOOSE monitoring function (IEC packet) can display the counter of GOOSE message transmitted and received by port.

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.

Optional QoS scheme for Goose packet to ensure low latency in the data patch.

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

The IPES-3424DSFP-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 IPES-3424DSFP-2P-PT 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. 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.

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

Lantech IPES-3424DSFP-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 with easy setup. The innovative auto-Ring configurator (auto mode) can calculate owner and neighbor in one step. It supports MSTP that allows spanning tree over VLAN for redundant links with 16 MSTI.

#### **DHCP option 82 & Port based, Mac based DHCP, Option66, 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. 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. Optional IPv6 address resolution for DHCP service can be supported.

#### **QoS by VLAN for legacy devices**

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.

#### **User friendly GUI, Auto topology drawing**

The user friendly UI, innovative auto topology drawing and topology demo makes IPES-3424DSFP-2P-PT much easier to get hands-on. The IPES-3424DSFP-2P-PT supports DMI interface that can correspond with DDM SFPs (Digital diagnostic monitor) to display the five parameters in Lantech's UI, including optical output power, input power, temperature, laser bias current and transceiver supply voltage\*\*\*. The TX power/RX power raw data is automatically converted to dB values for installer, making it easier to calculate the fiber

distance. The complete CLI enables professional engineer to configure setting by command line.

#### **Editable configuration file; USB port for configuration upload & download; InstaView\*\* for mass deployment**

The configuration file of Lantech IPES-3424DSFP-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 and built-in watchdog design can automatically reboot the switch when CPU is found dead.

The built-in USB port can have configuration upload & download by USB dongle.

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

#### **Event log & message; 2 DI / 2 DO**

In case of event, the IPES-3424DSFP-2P-PT is able to send an email & SMS\*\* text message to pre-defined addresses as well as SNMP Traps our immediately. It provides 2 DI and 2 DO. 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.

#### **Design with Dual powered input; Relay contact alarm**

Lantech IPES-3424DSFP-2P-PT supports dual power inputs from DC12~56V, 85~264VAC or 100V~370VDC. It supports PoE power inputs from DC45~56V with dual system power. Featured with relay contact alarm function, the IPES-3424DSFP-2P-PT is able to connect with alarm system in case of power failure. The IPES-3424DSFP-2P-PT also provides  $\pm 4000V$  EFT,  $\pm 4000V$  Surge and  $\pm 8000V$  ESD protection, which can reduce unstable situation caused by power line and Ethernet.

#### **Industrial hardened design for extended temperature operation**

Lantech IPES-3424DSFP-2P-PT features high reliability and robustness withstanding extensive EMI/RFI phenomenon, lighting surge, inductive load switching, high ESD, high fault current, environmental vibration and shocks usually found in factory, substation, steel automation, aviation, mining and process control. It is the best solution for Automation, transportation, surveillance, Wireless backhaul, Semi-conductor factory and assembly lines.

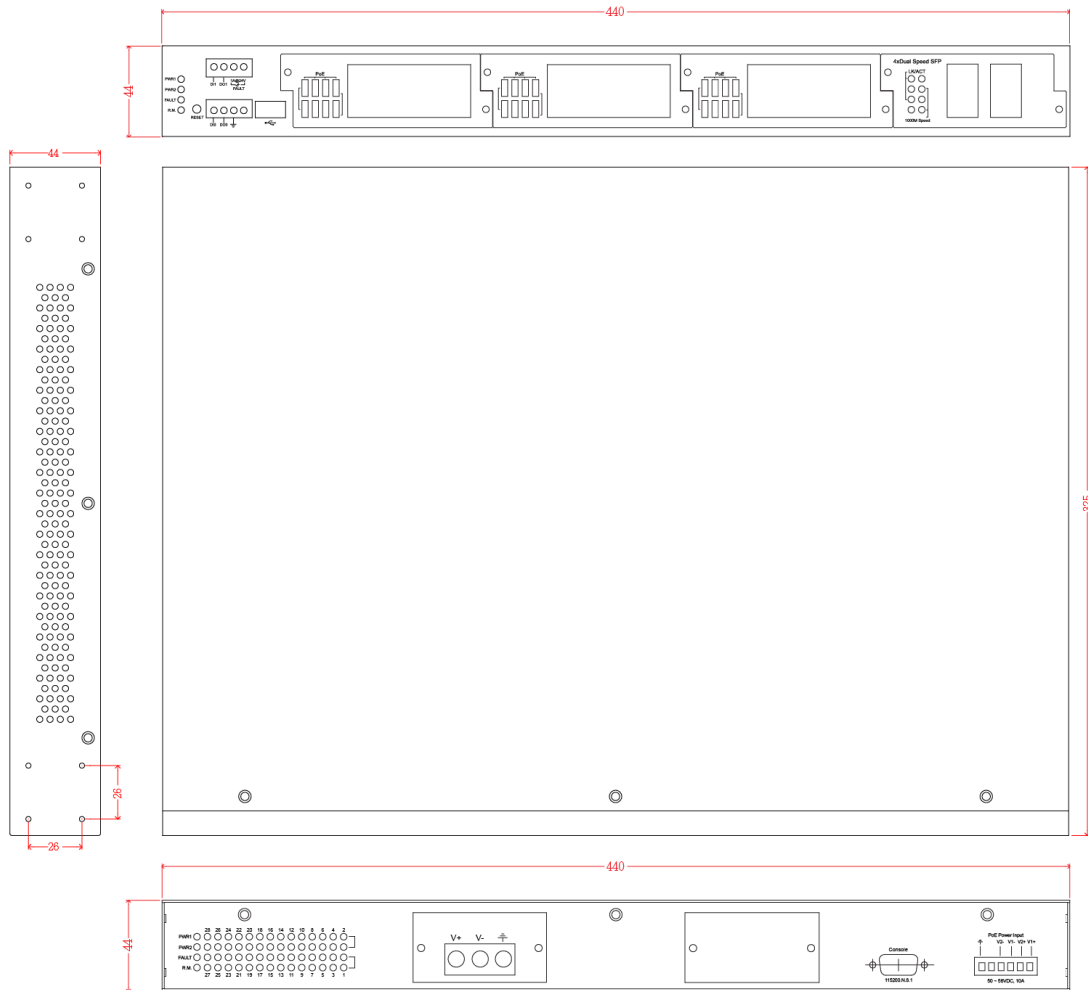
Lantech IPES-3424DSFP-2P-PT can run under widely operational temperature ( $-40^{\circ}C$ ~ $75^{\circ}C$ ) in the harsh environment.

## FEATURES & BENEFITS

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|--|---|
| <ul style="list-style-type: none"> <li>■ <b>24 10/100TX 802.3af/at POE + 4 Dual Speed SFP (Total 28 Ports Switch)</b></li> <li>■ <b>Back-plane (Switching Fabric): 12.8Gbps</b></li> <li>■ <b>16K MAC address table</b></li> <li>■ <b>Built-in MMS server for SCADA data-modeling with control and monitoring</b></li> </ul> | <ul style="list-style-type: none"> <li>● System info</li> <li>● Power</li> <li>● Device event report</li> <li>● Port status</li> <li>● Port statistic</li> <li>● Port event report</li> </ul> |
|--|---|

- Firmware upgrade
- Network configuration
- **Two-step hardware PTP compliant with IEEE 1588 v2 for Gigabit ports**
- **Embedded 24 PoE Injectors IEEE802.3af/at function to feed power up to 30W@54V; 15W @ 48V per port for active operation**
- **PoE management including PoE detection and scheduling for PD (power devices)**
- **Optional QoS for Goose packet**
- **10KB Jumbo frame**
- **User friendly UI, Auto topology drawing, topology demo, Complete CLI for professional setting**
- **Enhanced G.8032 Ring recovery < 20ms in 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
  - Covers multi-cast and data packets
- **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
- **Provides EFT protection ±4000 VDC for power line.**
- **Supports ±8000 VDC ESD air protection**
- **±4000V Surge for signal port**
- **provides 8 priority queues Port base, Tag Base and Type of Service Priority**
- **IEEE 802.1d STP, IEEE 802.1w RSTP,802.1s MSTP VLAN redundancy with 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**
- **Configuration backup and restoration**
  - Supports text configuration file for system quick installation
  - USB port for upload / download configuration by USB dongle
  - InstaView\*\* for centralized configuration deployment, backup & 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/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\*\***
- **Factory reset button to restore setting to factory default**
- **Watchdog design to auto reboot switch CPU is found dead**
- **Supports DIDO (2 Digital Input / 2 Digital Output)**
- **Supports dual power inputs from DC12~56V, 85~264VAC or 100V~370VDC for system, and with independent PoE connector for 48~56VDC input for POE usage**
- **IP30 metal housing with DIN rail and Wall-mount\*\* design**

**DIMENSIONS (unit=mm)**



**SPECIFICATION**

Hardware Specification				
IEEE Standards	IEEE 802.3 10Base-T Ethernet	1,488,000pps for Gigabit Ethernet / Gigabit Fiber port		
	IEEE 802.3u 100Base-TX Ethernet	MAC Address	16K MAC address table	
	IEEE 802.3ab 1000Base-T Ethernet	Jumbo frame	10KB	
	IEEE 802.3z Gigabit Fiber	PoE pin assignment	RJ-45 port # 1~# 24 support PoE at/af End-point, Alternative A mode. Per port provides up to 30W @54V capability. Positive (VCC+): RJ-45 pin 1,2. Negative (VCC-): RJ-45 pin 3,6.	
	IEEE 802.3x Flow Control Capability	PoE input voltage & Power feed voltage	Input V	Active Mode A /Output V
	ANSI/IEEE 802.3 Auto-negotiation		45~56V(af)	48V@15W
	IEEE 802.1Q VLAN		54~56V(at)	54V@30W
	IEEE 802.1p Class of Service	Connectors	24 10/100TX RJ-45 with auto MDI/MDI-X function 4 100M / 1000M Mini-GBIC : SFP sockets RS-232 console: Female DB-9 USB for configuration restore/backup	
	IEEE 802.1X Access Control	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)	
	IEEE 802.1D Spanning Tree	Power Supply	Two power sockets for switch system, 12~56VDC input	
	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 1588 Precision Time Protocol v2				
IEEE 802.3t/af Power Over Ethernet				
Switch Architecture	Back-plane (Switching Fabric): 12.8Gbps			
Transfer Rate	14,880pps for Ethernet port 148,800pps for Fast Ethernet port			

	IEC320 85~264VAC conversion (-AC model) AC/DC 85~264VAC/100V~370VDC conversion (-HV model) 48VDC for PoE		3. Per port PoE status including voltage, current, watt and PoE temperature
Power Consumption	Full load: 30W/ Unload: 13W		
PoE Power Budget	720W		
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		
Factory reset button & watch dog design	Factory reset button to restore back to factory default settings. Watch dog design can reboot switch automatically when CPU is found dead		
Case Dimension	19" Metal case, IP-30; 440mm(W)x325mm(D)x44mm(H)		
Operating Humidity	5%~95% (Non-condensing)		
Operating Temperature	Extended temperature : -40°C ~75°C		
Storage Temperature	-40°C ~85°C		
EMI & EMS	FCC Class A, CE EN55032, CE EN55024, CE EN61000-4-2, CE EN61000-4-3, CE EN61000-4-4, CE EN61000-4-5, CE EN61000-4-6, CE EN61000-4-8, CE EN61000-6-4, CE EN61000-6-2		
Stability Testing	IEC60068-2-32 (Free fall), IEC60068-2-27 (Shock), IEC60068-2-64 (Vibration)		
Railway verification	EN50121-4 , EN55022 (EMV), EN50125-3 (environmental conditions)		
Substation Verification	IEC 61375		
MTBF	529,901 Hrs (standards: IEC 62830)		
Warranty	5 years		
<b>Software Specification</b>			
Management	SNMP v1 v2c, v3/ Web/Telnet/CLI Management		
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 1643 EtherLike, Partial RFC 1757 RMON, RFC 2674 Q-Bridge MIB RFC 2790 Host Resource MIB LLDP MIB* RSTP MIB* Private MIB		
ITU G.8032	Support ITU G.8032 for Ring protection in less than 20ms for self-heal recovery (incl. multicast packets) Support various ring/chain topology IES Includes multi-ring & multi-VLAN ring* Enhanced G.8032 ring configuration with ease Ring covers multicast on different ports		
PoE Management	1. PoE Detection to check if PD hangs then restart the PD 2. PoE Scheduling to On/OFF PD upon routine time table		
MMS Data Modeling		<ul style="list-style-type: none"> <li>System info</li> <li>Power</li> <li>Device event report</li> <li>Port status</li> <li>Port statistic</li> <li>Port event report</li> <li>Firmware upgrade</li> <li>Network configuration</li> </ul>	
IEEE 1588 v2		Two step hardware based PTP on Gigabit ports	
QoS for Goose**		<ul style="list-style-type: none"> <li>Weighted fair queuing</li> <li>Strict priority</li> </ul>	
User friendly UI		<ul style="list-style-type: none"> <li>Auto topology drawing</li> <li>Topology demo</li> <li>Auto configuration for G.8032(auto mode) for single ring</li> <li>DDM threshold monitoring with dB values***</li> <li>Complete CLI for professional setting</li> </ul>	
Port Trunk with LACP		LACP Port Trunk: 8 Trunk groups	
LLDP		Supports LLDP to allow switch to advise its identification and capability on the LAN	
CDP		Cisco Discovery Protocol for topology mapping	
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/v4		Present	
RSTP/MSSTP		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, 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/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; 1024 multicast groups; IGMP router port ; IGMP query; GMRP**	
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.	

Flow Control	Support Flow Control for Full-duplex and Back Pressure for Half-duplex	relay/ server
System Log	Support System log record and remote system log server	Mac based DHCP Server Assign IP address by Mac that can include dumb switch in DHCP network
SMTP/Text SMS**	Supports SMTP Server and 8 e-mail accounts for receiving event alert; can send SMS** text alert via mobile	DNS Provide DNS client feature and support Primary and Secondary DNS server.
Relay Alarm	Provides one relay output for port breakdown, power fail and alarm. Alarm Relay current carry ability: 1A @ DC24V	SNTP Supports SNTP to synchronize system clock in Internet
Protection	<ul style="list-style-type: none"> <li>■ Miss-wiring avoidance</li> <li>■ Repowered auto ring restore</li> <li>■ Loop protection</li> </ul>	Firmware Update Supports TFTP/SFTP** firmware update, TFTP backup and restore; HTTP firmware upgrade; Lantech™ InstaView** for multiple upgrade
SNMP Trap	Up to 10 trap stations; trap types including: <ul style="list-style-type: none"> <li>● Device cold start</li> <li>● Authorization failure</li> <li>● Port link up/link down</li> <li>● DI/DO open/close</li> <li>● Typology change(ITU ring)</li> <li>● Power failure</li> <li>● Environmental abnormal**</li> </ul>	Configuration backup & restore Supports text configuration file for system quick installation USB port to upload/download firmware by USB dongle Optional InstaView for mass backup, editing configuration and upgrade
DHCP	Provide DHCP Client/ DHCP Server/DHCP Option 82	

\*Future Release

\*\*Optional

\*\*\*Optional DDM SFP required

## ORDERING INFORMATION

- **IPES-3424DSFP-2P-PT.....P/N: 8388-602**  
24 10/100TX POE at/af + 4 Dual SFP IEC61850-3 Managed Ethernet Switch w/ Enhanced Ring & MMS, PTP v2, w/ One isolated DC 12~56VDC power supply + 1x additional power socket + 1x 48VDC PoE power input; -40°C to 75°C
- **IPES-3424DSFP-2P-PT-AC.....P/N: 8388-604**  
24 10/100TX POE at/af + 4 Dual SFP IEC61850-3 Managed Ethernet Switch w/ Enhanced Ring & MMS, PTP v2, w/ One isolated AC85~264VAC IEC320 power conversion + 1x additional power socket + 1x 48VDC PoE power input; -40°C to 75°C
- **IPES-3424DSFP-2P-PT-HV.....P/N: 8388-605**  
24 10/100TX POE at/af + 4 Dual SFP IEC61850-3 Managed Ethernet Switch w/ Enhanced Ring & MMS, PTP v2, w/ One isolated AC/DC 85~264VAC/100V~370VDC power conversion + 1x additional power socket + 1x 48VDC PoE power input; -40°C to 75°C

## OPTIONAL ACCESSORIES

### Power

#### EOTH000701

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



#### EOTH000702

Isolation Power 36-75VDC, 2.5A



#### EOTH000703

Power 85-264VAC IEC320 socket, 1.5A , 47-63HZ



**EOTH000704**

Power Input Module 12-56VDC, 2.5A

**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)**

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| ■ <b>8330-162X</b> MINI GBIC 1000SX (LC/MM/0.5KM) Transceiver    | ■ <b>8330-187</b> 1.25Gbps BiDi SFP 20KM Transceiver (WDM 1550) |
| ■ <b>8330-163X</b> MINI GBIC 1000SX2 (LC/MM/2KM) Transceiver     | ■ <b>8330-180</b> 1.25Gbps BiDi SFP 40KM Transceiver (WDM 1310) |
| ■ <b>8330-165X</b> MINI GBIC 1000LX (LC/SM/10KM) Transceiver     | ■ <b>8330-182</b> 1.25Gbps BiDi SFP 40KM Transceiver (WDM 1550) |
| ■ <b>8340-0591</b> MINI GBIC 1000LHX (LC/SM/40KM) Transceiver    | ■ <b>8330-181</b> 1.25Gbps BiDi SFP 60KM Transceiver (WDM 1310) |
| ■ <b>8330-166</b> MINI GBIC 1000XD (LC/SM/50KM) Transceiver      | ■ <b>8330-183</b> 1.25Gbps BiDi SFP 60KM Transceiver (WDM 1550) |
| ■ <b>8330-169</b> MINI GBIC 1000XD (LC/SM/60KM) Transceiver      | ■ <b>8330-184</b> 1.25Gbps BiDi SFP 80KM Transceiver (WDM 1490) |
| ■ <b>8330-167</b> MINI GBIC 1000ZX (LC/SM/80KM) Transceiver      | ■ <b>8330-185</b> 1.25Gbps BiDi SFP 80KM Transceiver (WDM 1550) |
| ■ <b>8330-170</b> MINI GBIC 1000EZ (LC/SM/120KM) Transceiver     | ■ <b>8330-071</b> 125Mbps BiDi SFP 2KM (WDM 1310) Transceiver   |
| ■ <b>8330-168</b> MINI GBIC 10/100/1000T (100m) Transceiver      | ■ <b>8330-072</b> 125Mbps BiDi SFP 2KM (WDM 1550) Transceiver   |
| ■ <b>8330-060</b> MINI GBIC 100Base (LC/MM/2KM) Transceiver      | ■ <b>8330-069</b> 125Mbps BiDi SFP 20KM (WDM 1310) Transceiver  |
| ■ <b>8330-065</b> MINI GBIC 100Base (LC/MM/5KM) Transceiver      | ■ <b>8330-068</b> 125Mbps BiDi SFP 20KM (WDM 1550) Transceiver  |
| ■ <b>8330-061</b> MINI GBIC 100Base (LC/SM/30KM) Transceiver     | ■ <b>8330-080</b> 125Mbps BiDi SFP 40KM (WDM 1310) Transceiver  |
| ■ <b>8330-197</b> 1.25Gbps BiDi SFP 0.5KM Transceiver (WDM 1310) | ■ <b>8330-082</b> 125Mbps BiDi SFP 40KM (WDM 1550) Transceiver  |
| ■ <b>8330-198</b> 1.25Gbps BiDi SFP 0.5KM Transceiver (WDM 1550) | ■ <b>8330-081</b> 125Mbps BiDi SFP 60KM (WDM 1310) Transceiver  |
| ■ <b>8330-195</b> 1.25Gbps BiDi SFP 2KM Transceiver (WDM 1310)   | ■ <b>8330-083</b> 125Mbps BiDi SFP 60KM (WDM 1550) Transceiver  |
| ■ <b>8330-196</b> 1.25Gbps BiDi SFP 2KM Transceiver (WDM 1550)   | ■ <b>8330-084</b> 125Mbps BiDi SFP 80KM (WDM 1310) Transceiver  |
| ■ <b>8330-188</b> 1.25Gbps BiDi SFP 10KM Transceiver (WDM 1310)  | ■ <b>8330-085</b> 125Mbps BiDi SFP 80KM (WDM 1550) Transceiver  |
| ■ <b>8330-189</b> 1.25Gbps BiDi SFP 10KM Transceiver (WDM 1550)  | ■ <b>8330-191</b> Dual Speed SFP 100M/1000M-LX 10KM Transceiver |
| ■ <b>8330-186</b> 1.25Gbps BiDi SFP 20KM Transceiver (WDM1310)   |   |
- All SFP# ended with D are with DDM function

**Lantech Communications Global Inc.**

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