

IPES-3424DSFP-2P-PT

24 10/100TX PoE + 4 DualSpeed SFP Industrial L2⁺ Switch w/ enhanced G.8032 Ring

- IEC61850-3 & IEEE1613 compliance
- Goose monitoring; Built-in MMS server for power SCADA
- 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 and basic mode; Enhanced G.8032 ring covers multicast packets; MSTP 8/16* MSTI /RSTP
- Miss-wiring avoidance & Repowered auto ring restore (node failure protection)
- User friendly UI, including auto topology drawing and DDM threshold with dB values***; Complete CLI
- Support LACP link aggregation, IGMP v3/router port, DHCP server & DHCP Option82 for Port/Vlan based DHCP distribution, Mac based DHCP server, QoS by VLAN, SSH/SSL, HTTPS, ACL, IPv6, SMS
- USB slot for edited restoration and auto backup



OVERVIEW

Lantech IPES-3424DSFP-2P-PT is a high performance L2 + PoE managed industrial IEC61850-3 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 including train ring, enhanced mode for easy configuration and aggregation ring*, comprehensive QoS, QoS by VLAN, advanced security including ACL L2/L3, SSH/SSL, Mac based DHCP server, DHCP Option 82, DHCP server, IGMPv1/v2/v3/router port, QinQ* (double tag VLAN) which are important features required in train and large network. It also supports Cisco Discovery Protocol (CDP) and LLDP for Ciscoworks to detect the switch info and show on L2 map topology.

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 status explicit voltage, current, watt and poe temperature information.

The exclusive GOOSE 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 power SCADA to monitor and control switch by data modeling.

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 send out an email, traps or a SMS text. 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.

DHCP option 82 and relay agent function (Port/Vlan based DHCP distribution) 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.

The user friendly UI, innovative auto topology drawing and topology demo makes IPES-3424DSFP-2P-PT much easier to

get hands-on. The switch also equips the RTC (real time clock) which can keep track of time always. 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.

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 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 8/16* MSTI.

The configuration file of Lantech IPES-3424DSFP-2P-PT can be exported in text file so that it can be edited and configured back to switch with ease for mass deployment. 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 USB slot allows user to backup/ restore

configuration.

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.

The IPES-3424DSFP-2P-PT DIDO function can support additional open/close physical contact for designate applications besides Port / Power events, for example, DIDO function can trigger alarm if the switch was moved or stolen. In case of events, the IPES-3424DSFP-2P-PT will immediately send an email & SMS text message to pre-defined addresses as well as SNMP Traps out. It provides 2DI and 2DO while 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.

Lantech IPES-3424DSFP-2P-PT supports PoE power inputs from DC45~56V with dual system power. It features high reliability and robustness withstanding extensive EMI/RFI phenomenon, lighting surge, inductive load switching, high ESD, high fault current environment usually found in Substation, Steel automation, Mining and Process control etc. IPES-3424DSFP-2P-PT can run under widely operational temperature (-40°C~75°C) in the harsh environment.

FEATURES & BENEFITS

■ System Interface/Performance

- IEC-61850 & IEEE1613 Compliance
- 24x10/100TX PoE at/af+ 4 100M/1000M SFP L2+
- 16K MAC Address Table
- Dual Power Supply Design for DC(9.5V~60VDC), AC(85V~265VAC) or 100V~370VDC
- PoE power input with budget up to 720W
- -40to 75C operation temperature(-E model)
- FAN less design

■ Goose for port counter of Goose message(IEC packets)

■ MMS server built-in for SCADA monitoring/control

■ User friendly UI, Auto topology drawing, topology demo, Complete CLI for professional setting

■ IP v6/v4 supported

■ Enhanced G.8032 Ring protection in 20ms < 256 switches

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

■ Aggregation ring for ring redundancy and bandwidth combination*

■ 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/ACL L2&L3
- Port Security: 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

■ Miss-wiring avoidance

- LED indicator
- Email, traps, or SMS notification

■ Repowered auto ring restore(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

■ IGMP v1,v2,v3 and Proxy** for Multimedia Application; 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

■ IEEE 1588 PTP v2 two-step for gigabit ports; SNTP, NTP supported

■ Supports IEEE802.1ab LLDP, Cisco CDP

■ DHCP server / client / DHCP Option 82 relay / DHCP

Option 82 server for Port/Vlan based DHCP distribution

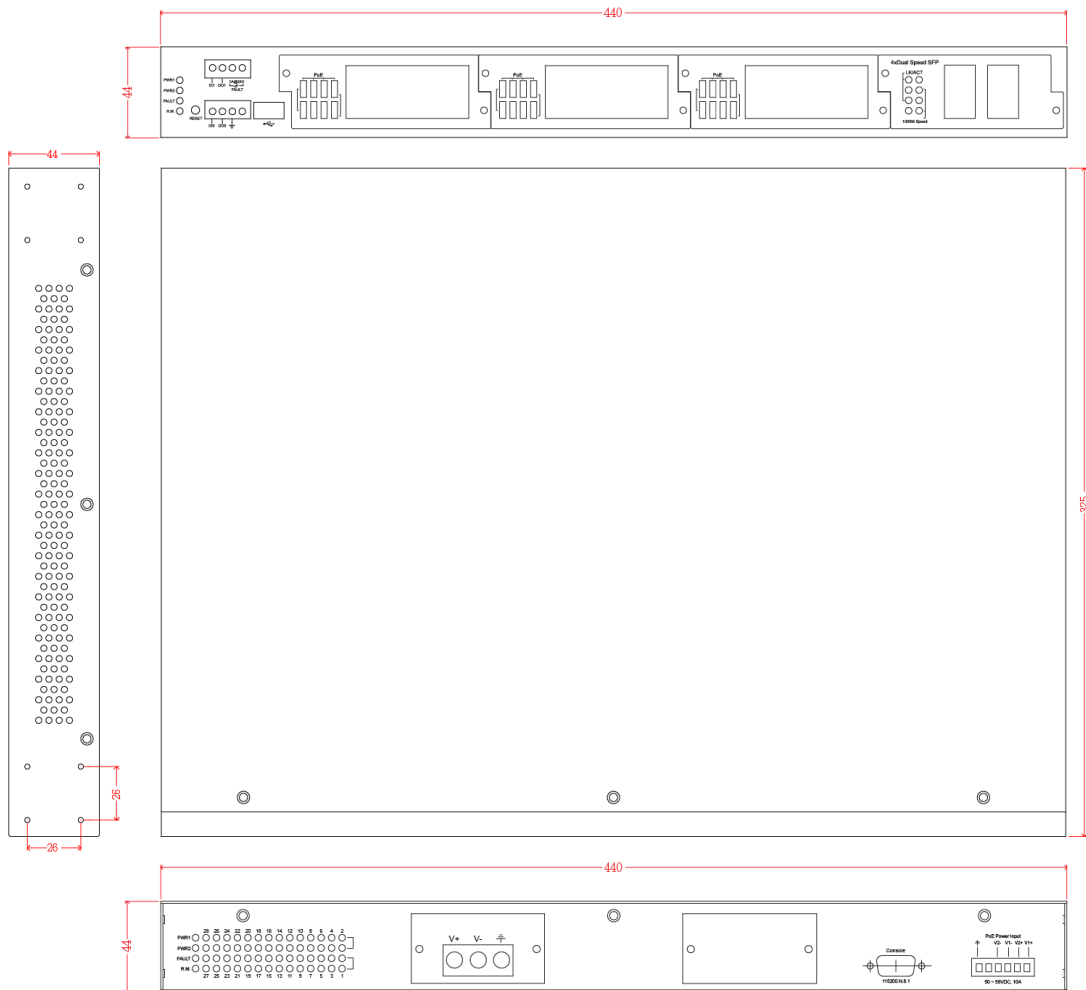
■ Mac based DHCP server to assign IP address that

includes dumb switches in DHCP network

■ Bandwidth Control

- Ingress Packet Filter and Egress Rate Limit
- Broadcast/Multicast Packet Filter Control
- **System Event Log, Email alert, SMS(mobile text) and SNMP Trap for alarm support**
- **Environmental sensor built-in to detect temperature, voltage, current and total PoE load and send out SNMP traps , SMS and emails if there is abnormal events**
- **TFTP/HTTP firmware upgrade; Lantech™ InstaConfig** for multiple upgrade; USB for edited restoration and auto backup**
- **Reset / Factory default button to restore factory setting**
- **Watch dog design to reboot switch if CPU is found dead**
- **Provides EFT protection ±4K VDC for power line**
- **Supports ±8KV contact & 15KV air Ethernet ESD protection**
- **2 DI/DO and 1 relay contact alarm**

DIMENSIONS (unit=mm)



SPECIFICATION

Hardware Specification

| IEEE Standards | IEEE Standards |
|-------------------------------------|-------------------------------------|
| IEEE 802.3 10Base-T Ethernet | IEEE 802.3 10Base-T Ethernet |
| IEEE 802.3u 100Base-TX Ethernet | IEEE 802.3u 100Base-TX Ethernet |
| IEEE 802.3ab 1000Base-T Ethernet | IEEE 802.3ab 1000Base-T Ethernet |
| IEEE 802.3z Gigabit Fiber | IEEE 802.3z Gigabit Fiber |
| IEEE 802.3x Flow Control Capability | IEEE 802.3x Flow Control Capability |
| ANSI/IEEE 802.3 Auto-negotiation | ANSI/IEEE 802.3 Auto-negotiation |
| IEEE 802.1Q VLAN | IEEE 802.1Q VLAN |
| IEEE 802.1p Class of Service | IEEE 802.1p Class of Service |
| IEEE 802.1X Access Control | IEEE 802.1X Access Control |

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|---|---|
| IEEE 802.1D Spanning Tree | IEEE 802.1D Spanning Tree |
| IEEE 802.1w Rapid Spanning Tree | IEEE 802.1w Rapid Spanning Tree |
| IEEE 802.1s Multiple Spanning Tree | IEEE 802.1s Multiple Spanning Tree |
| IEEE 802.3ad Link Aggregation Control Protocol (LACP) | IEEE 802.3ad Link Aggregation Control Protocol (LACP) |
| IEEE 802.1AB Link Layer Discovery Protocol (LLDP) | IEEE 802.1AB Link Layer Discovery Protocol (LLDP) |
| IEEE 802.1x User Authentication (Radius) | IEEE 802.1x User Authentication (Radius) |
| IEEE 1588 Precision Time Protocol v2 | IEEE 1588 Precision Time Protocol v2 |
| IEEE 802.3t/af Power Over Ethernet | IEEE 802.3t/af Power Over Ethernet |
| Switch Architecture | Back-plane (Switching Fabric): 12.8Gbps |

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|---|--|---------|-------------------------|------------|---------|------------|---------|
| 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 | | | | | | |
| 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. | | | | | | |
| PoE input voltage & Power feed voltage | <table border="1"> <tr> <td>Input V</td> <td>Active Mode A /Output V</td> </tr> <tr> <td>45~56V(af)</td> <td>48V@15W</td> </tr> <tr> <td>54~56V(at)</td> <td>54V@30W</td> </tr> </table> | Input V | Active Mode A /Output V | 45~56V(af) | 48V@15W | 54~56V(at) | 54V@30W |
| Input V | Active Mode A /Output V | | | | | | |
| 45~56V(af) | 48V@15W | | | | | | |
| 54~56V(at) | 54V@30W | | | | | | |
| 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 | | | | | | |
| DDM | Conform to SFF-8472 to show diagnostic SFP with temperature, current, voltage, input and output power | | | | | | |
| 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 | Two power sockets for switch system, 9.5~60VDC input IEC320 85~265VAC conversion (-AC model) AC/DC 85~265VAC/100V~370VDC conversion (-HV model) 48VDC for PoE | | | | | | |
| 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 | | | | | | |
| RTC | RTC(Real Time Clock) to keep track of time always | | | | | | |
| 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 | Standard: -20°C ~60°C Extended temperature : -40°C ~75°C | | | | | | |
| Storage Temperature | -40°C ~85°C | | | | | | |
| EMI | FCC Class A, CE EN61000-4-2 (ESD), CE EN61000-4-3 (RS), CE EN-61000-4-4 (EFT), CE EN61000-4-5 (Surge), CE EN61000-4-6 (CS), CE EN61000-4-8, CE EN61000-4-11, CE EN61000-4-12, CE EN55022 Class A, CE EN55024 | | | | | | |
| Stability Testing | IEC60068-2-32 (Free fall), IEC60068-2-27 (Shock), | | | | | | |

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|-------------------------------|---|
| | IEC60068-2-6 (Vibration), IEC60870-2-2, IEC60068-2-30 |
| Power Automation | IEC 61850-3, IEEE 1613 |
| Warranty | 5 years |
| Software Specification | |
| 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 |
| VLAN | Port based VLAN, up to 28 groups IEEE802.1Q Tag VLAN Static VLAN groups up to 256, Dynamic VLAN group up to 2048, VLAN ID from 1 to 4096 GVRP up to 256 groups** Multicast VLAN Registration*, QinQ*, QOS QinQ* |
| Port Trunk with LACP | LACP Port Trunk: 8 Trunk groups/Maximum 24 trunk members Aggregation ring for ring redundancy and bandwidth combination* |
| LLDP | Support LLDP to allow switch to advise its identification and capability on the LAN |
| CDP | Cisco Discovery protocol for topology mapping |
| Goose monitoring | Show individual Goose TX / RX counter(IEC packets) |
| IEC 61850-9-4 | Built in MMS server for data modeling for power SCADA |
| ITU G.8032 | Support ITU G.8032 v2/2012 for Ring protection in less than 20ms for self-heal recovery (basic mode) Support various ring/chain topologies Includes train ring & aggregation ring* Enhanced G.8032 ring configuration with ease Ring covers multicast on different ports |
| User friendly UI | <ul style="list-style-type: none"> ■ Auto topology drawing with detail node info ■ DDM threshold with dB values*** ■ Complete CLI for professional setting |
| IPv6/v4 | Present |
| Spanning Tree | Support IEEE802.1d Spanning Tree,IEEE802.1w Rapid Spanning Tree, IEEE 802.1s MSTP |
| 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. |
| Port Mirror | Support 3 mirroring types: "RX, TX and Both packet" |
| Multicast Filtering & IGMP | Support IGMP snooping v1,v2,v3; Supports IGMP static route IGMP query and router port 1024 multicast groups and IGMP query GMRP*, QinQ*, QOS QinQ* |
| Bandwidth Control | Support ingress packet filter and egress packet limit. The egress rate control supports all of packet type, the limit rates are 0~100Mbps. 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 from 0 to 100Mbps |

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|------------------|---|----------------------------------|--|
| | 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. | SMTP, SMS | Support SMTP Server and 6 e-mail accounts for receiving event alert; Can send alert via mobile SMS text |
| 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 256 Policy based Access Control List SSL/ SSH for Management HTTPS for secure access to the web interface TACACS+* for Authentication | SNMP Trap | Up to 3 Trap stations Cold start, Port link up, Port link down, Authentication Failure, Private Trap for power status, DI/DO open/close, PoE port event |
| | | DHCP | Provide DHCP Client/ DHCP Server/DHCP Option 82/Port based&VLAN based DHCP distribution (DHCP relay agent) |
| | | 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. |
| Protection | <ul style="list-style-type: none"> Miss-wiring avoidance Repowered auto ring restore (node failure protection) Loop protection | SNTP | Support SNTP to synchronize system clock in Internet |
| PoE Management | <ul style="list-style-type: none"> PoE Detection to check if PD hangs then restart the PD PoE Scheduling to On/OFF PD upon routine time table Per port PoE status including voltage, current, watt and PoE temperature | Firmware Update | Support TFTP /HTTP firmware update ; InstaConfig mass firmware upgrade** |
| Flow Control | Support Flow Control for Full-duplex and Back Pressure for Half-duplex | Configuration backup and restore | Support text backup and restore; USB dongle for firmware auto-backup and edited restoration |
| System Log | Support System log record and remote system log server | | |

*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 L2 plus Industrial IEC61850 Switch
Built-in 1x isolated DC 12~56VDC power supply + 1x additional power socket + 1x 48VDC PoE power input; -20°C to 60°C
- **IPES-3424DSFP-2P-PT-E.....P/N: 8388-603**
24 10/100TX POE at/af + 4 Dual SFP L2 plus Industrial IEC61850 Switch
Built-in 1x 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 L2 plus Industrial IEC61850 Switch
Built-in 1x isolated AC85~265VAC IEC320 power conversion + 1x additional power socket + 1x 48VDC PoE power input; -20°C to 60°C
- **IPES-3424DSFP-2P-PT-AC-E.....P/N: 8388-605**
24 10/100TX POE at/af + 4 Dual SFP L2 plus Industrial IEC61850 Switch
Built-in 1x isolated AC85~265VAC IEC320 power supply + 1x additional power socket + 1x 48VDC PoE power input; -40°C to 75°C
- **IPES-3424DSFP-2P-PT-HV.....P/N: 8388-606**
24 10/100TX POE at/af + 4 Dual SFP L2 plus Industrial IEC61850 Switch
Built-in 1x isolated AC/DC 85~265VAC/100V~370VDC power conversion + 1x additional power socket + 1x 48VDC PoE power input; -20°C to 60°C
- **IPES-3424DSFP-2P-PT-HV-E.....P/N: 8388-607**
24 10/100TX POE at/af + 4 Dual SFP L2 plus Industrial IEC61850 Switch
Built-in 1x isolated AC/DC 85~265VAC/100V~370VDC power conversion + 1x additional power socket + 1x 48VDC PoE power input; -40°C to 75°C

OPTIONAL ACCESSORIES

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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|--------------------|--|-------------------|--|
| ■ 8330-162X | MINI GBIC 1000SX (LC/0.5km) Transceiver | ■ 8330-061 | 100Base LX 30KM, Single-mode, LC Transceiver |
| ■ 8330-163X | MINI GBIC 1000SX2 (LC/2km) Transceiver | ■ 8330-188 | LTSFP-1000BX-10KM Transceiver (WDM 1310) |
| ■ 8330-165X | MINI GBIC 1000LX (LC/10km) Transceiver | ■ 8330-189 | LTSFP-1000BX-10KM Transceiver (WDM 1550) |
| ■ 8340-0591 | MINI GBIC 1000LHX (LC/40km) Transceiver | ■ 8330-186 | LTSFP-1000BX-20KM Transceiver (WDM 1310) |
| ■ 8330-166 | MINI GBIC 1000XD (LC/50km) Transceiver | ■ 8330-187 | LTSFP-1000BX-20KM Transceiver (WDM 1550) |
| ■ 8330-169 | MINI GBIC 1000XD (LC/60km) Transceiver | ■ 8330-180 | LTSFP-1000BX-40KM Transceiver (WDM 1310) |
| ■ 8330-167 | MINI GBIC 1000ZX (LC/80km) Transceiver | ■ 8330-182 | LTSFP-1000BX-40KM Transceiver (WDM 1550) |
| ■ 8330-170 | MINI GBIC 1000EZ (120km) Transceiver | ■ 8330-181 | LTSFP-1000BX-60KM Transceiver (WDM 1310) |
| ■ 8330-168 | MINI GBIC 10/100/1000T (100m) Transceiver | ■ 8330-183 | LTSFP-1000BX-60KM Transceiver (WDM 1550) |
| ■ 8330-060 | 100Base FX 2KM, Multi-mode, LC Transceiver | ■ 8330-184 | LTSFP-1000BX-80KM Transceiver (WDM 1490) |
| ■ 8330-065 | 100Base FX 5KM, Multi-mode, LC Transceiver | ■ 8330-185 | LTSFP-1000BX-80KM Transceiver (WDM 1550) |

All SFP with –D are with DDM function

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