IPES-5416T-8-X (IP67)

16 10/100TX + 4 10/100/1000T X-coded L2+ 8 PoE at/af Industrial Managed Switch w/ enhanced G.8032 Ring & PTP

- *EN50155/61373/45545-2 certified*
- *IEEE802.3at/af up to 30W per port; PoE management incl. detection and scheduling*
- *Optional 12V input boost to 48V output for IEEE802.3at/af max.80W*
- *Optional 72V input steps down to 48V output for IEEE 802.3at/af max.80W*
- *Optional 110V input to 48V output for IEEE 802.3at/af max.80W*
- *Enhanced G.8032 ring protection < 20ms with easy configuration; Train ring for dynamic coupling ring; Aggregation ring**
- *Support PTPv2 <1us, relay contact & environmental monitoring*
- *Miss-wiring avoidance; Repowered auto ring restore (node failure protection)*
- *IP67/ IP43 housing; User friendly UI, including auto topology drawing; 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, TACAS+*, HTTPS, ACL, IPv6, SMS*
- *N-key configurator** for upgrading, auto/editable configuration back up and restoration without computer*

FCC CE IPv6 PoE AT 30W ITU G.8032 EN50155 Boost 12v~48V Power Input EN 45545-2

OVERVIEW

Lantech IPES-5416T-8-X (IP67) is a high performance L2+ (Gigabit uplink) switch with 16 10/100TX(d-coded) + 4 10/100/1000T(x-coded) w/8 PoE 802.3af/at Injectors by M12 provides L2 wire speed and advanced security function for network aggregation deployment. It delivers ITU G.8032 enhanced ring recovery less than 20ms including train coupling 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.

Lantech IPES-5416T-8-X (IP67) features hardware-based PTP IEEE1588 v2 function which can allow 4 10/100/1000T uplinks to synchronize the network with precise accuracy (under 1μs).

Lantech IPES-5416T-8-X (IP67) supports IEEE802.3at/af standard which can feed HI-power up to 30W at each PoE port for big power consumption devices like PTZ IP camera, High power wireless AP etc. The advanced PoE management includes PoE detection and scheduling besides the regular PoE per port status. 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. Per port PoE status can remotely On/Off the power and display information of voltage, current, watt and PoE temperature.

The Lantech IPES-5416T-8-X (IP67) series is designed with various dual power input at 12/24/48VDC input (12V model), 72V input to feed 48V PoE (72V model). The 110V model can accept dual 110V to feed 48V POE and feed PoE power 48V at PoE budget max 80W. Featured with relay contact alarm function, the IPES-5416T-8-X (IP67) is able to connect with alarm system in case of power failure or port disconnection events. The IPES-5416T-8-X (IP67) also provides ±2000V EFT and ±6000V ESD protection, which can reduce unstable situation caused by power line and Ethernet.

The IPES-5416T-8-X (IP67) 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-5416T-8-X (IP67) 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 police 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.

Lantech InstaConfig software** provides easy configuration for mass deployment. The configuration file can also be exported in text file so that it can be edited and configured back to switch with ease for mass deployment. The built-in watchdog design can automatically reboot the switch when cpu is found dead.

The user friendly UI, innovative auto topology drawing and topology demo makes IPES-5416T-8-X (IP67) much easier to get hands-on. The switch also equips the RTC (real time clock) which can keep track of time always. The complete CLI enables professional engineer to configure setting by command line.

Lantech IPES-5416T-8-X (IP67) features enhanced G.8032 ring which can be self-healed in less than 20ms for ring/chain topologies which covers dynamic coupling ring & aggregation ring* protection. The innovative auto-Ring configurator (auto mode) can calculate owner and neighbor in one step. The enhanced mode and train mode ring configuration have never been easier. It supports MSTP that allows RSTP over Vlan for redundant links. The train ring is specially designed for auto coupling topology that is required in train car interchange application. The ITU G.8032 Ring and RSTP can be co-existed in the same switch with different ports for the most flexible protection.

The configuration file of Lantech IPES-5416T-8-X (IP67) can be exported in text file so that it can be edited and configured back to switch with ease for mass deployment. The optional N-key configurator offers firmware upgrade, auto/editable configuration back up and restoration without computer by adjusting the DIP switch.

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.

In case of event alarm, the IPES-5416T-8-X (IP67) will immediately send an email & SMS text message to pre-defined addresses as well as SNMP Traps out. It provides 1DI and 1DO 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.

The built-in environmental monitoring can detect switch overall temperature, voltage and current where can send the SNMP traps, email and SMS alert when abnormal.

The IPES-5416T-8-X (IP67) is designed to meet with critical network environment with IP67 aluminum enclosure and M12 connectors for water proof. It passed serious tests under extensive Industrial EMI and Safety standards. With EN45545-2 Fire & Smoke, and EN50155 certification, the IPES-5416T-8-X (IP67) is best for railway in train/track side, vehicle and mining applications. For more usage flexibilities, IPES-5416T-8-X (IP67) supports wide operating temperature from -40°C to 75°C.

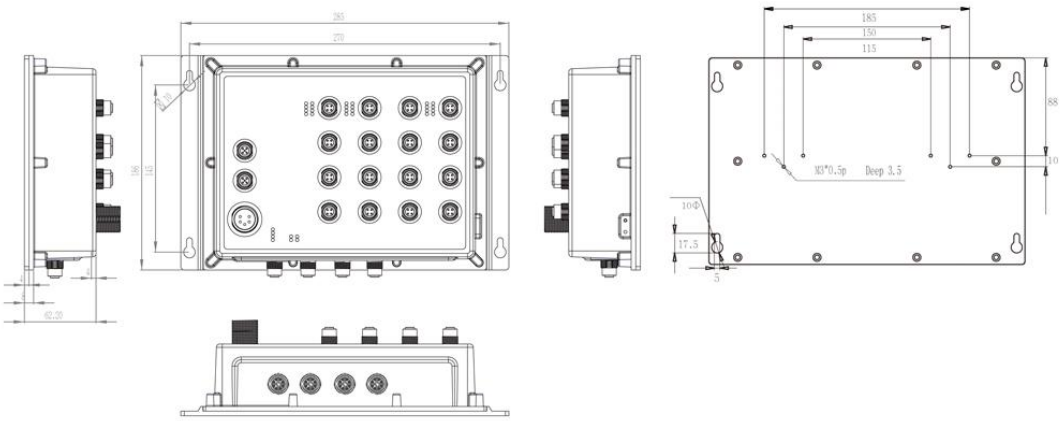
The optional bypass relay is set to bypass the switch to the next one in 4ms when power is off in order to protect the network from crashing. Lantech bypass caters to remain in bypass mode until the switch is completely booting up when power is back to avoid another network lost. The bypass is also activated when detecting the CPU watchdog is ON.

FEATURES & BENEFITS

- **16 10/100TX (d-coded)+ 4 10/100/1000T(x-coded) w/8 PoE 802.3af/at Injectors Industrial Managed IP67 M12 Switch (Total 20 Ports Switch)**
- **EN45545-2 Fire & Smoke, EN50155 and EN61373 shock/vibration certified**
- **IEEE802.3at/af feeding power up to 30W per PoE port at 45~56VDC at port 1-8**
- **PoE management including PoE detection and scheduling for PD (power devices)**
- **12V model can accept dual 12V power input and boost to 48V for PoE 802.3at/af max 80W budget**
- **72V model can accept dual 50.4~90V power input and feed 48V for PoE at/af at max 80W budget**
- **110V model can accept dual 43V~160V input and feed 48V for PoE at/af at max 80W budget**
- **IEEE 1588 PTP v2 (under 1μs) at 4 Giga ports**
- **N-key** configurator for firmware upgrade, auto/editable configuration back up and restoration**
- **Back-plane (Switching Fabric): 11.2Gbps**
- **16K MAC address table**
- **9KB Jumbo frame supported on all ports**
- **User friendly UI, auto topology drawing, topology demo, complete CLI for professional setting**
- **Enhanced G.8032 Ring protection in 20ms < 256 switches**
  - *Support various ring/chain topologies, including train dynamic coupling ring& aggregation ring**
  - *Enhanced G.8032 ring configuration with ease*
  - *Auto ring configuration(auto mode) for single ring*
  - *Co-exist with RSTP on different ports*
  - *Train ring for auto coupling topology*
- **Aggregation ring for ring redundancy and bandwidth combination***
- **Provides EFT protection ±2000 VDC for power line.**
- **Supports ±6000 VDC Ethernet ESD protection**
- **Built-in RTC (Real Time Clock) to keep track of time**
- **Supports IEEE 802.1p Class of Service, per 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**
- **4K 802.1Q VLAN, Port based VLAN, GVRP**, QinQ***
- **QoS by VLAN to prioritize all devices in network**
- **Supports IEEE 802.1ab LLDP, Cisco CDP; LLDP info can be viewed via Web/ Console/ Lantech™ InstaConfig**/ Lantech™ InstaView****
- **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*
- **Relay alarm output system events**
- **Miss-wiring avoidance**
  - *LED indicator*
  - *Email, traps, or SMS notification*
- **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/HTTP firmware upgrade; Lantech™ InstaConfig** for multiple upgrade**
- **System Event Log, SMTP Email alert, SMS mobile (text) and SNMP Trap for alarm support; 32 RMON counters**
- **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*
- **Static multicast forwarding forward reversed IGMP flow (MVR) 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 and for reversed multicast video flow**
- **Multicast VLAN registration for metro video***
- **IGMPv1,v2,v3 with Query mode for multimedia; GMRP****
- **Watchdog design to auto reboot switch CPU is found dead**
- **Built-in environmental monitoring for system input voltage, current, ambient temperature**
- **Supports DIDO (Digital Input/Digital Output)**
- **IP67 aluminum housing with DIN rail** and wall mount design**
- **Bypass protection** - Bypass failed switch caused by power failure of switch to protect network intactness**

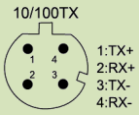
DIMENSIONS (unit=mm)



SPECIFICATION

Hardware Specification

Standards	IEEE 802.3 10Base-T Ethernet IEEE 802.3u 100Base-TX 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 IEEE 802.3ad Link Aggregation Control Protocol (LACP)
	IEEE 802.1AB Link Layer Discovery Protocol (LLDP) IEEE 802.1X User Authentication (Radius) IEEE802.1p Class of Service IEEE802.1Q VLAN Tag IEEE802.3at/af Power over Ethernet
Switch Architecture	Back-plane (Switching Fabric): 11.2Gbps Packet throughput ability (Full-Duplex): 23.8Mpps @64bytes
Transfer Rate	14,880pps for Ethernet port 148,800pps for Fast Ethernet port 1,488,000pps for Gigabit Fiber Ethernet port

CPU	Marvell 800Mhz
RAM	256M Byte
Flash	128M Byte
Mac Address	16K MAC address table
Jumbo frame	9KB on all ports
Connectors	10/100TX: 16 x ports M12 4-pole D-coded with Auto MDI/MDI-X function 10/100/1000T: 4 x ports M12 8-pole X-coded with Auto MDI/MDI-X function RS-232 connector: 1 x M12 5-pole A-coded Power Input connector : 1 x M23 5-pole A-coded Relay contact : 1 x M12 5-pole A-coded
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-TX: 2-pair UTP/STP Cat. 5/ 5E/ 6 cable EIA/TIA-568 100-ohm (100m)
Bypass Protection**	High-speed optical switching (<4ms) Minimal insertion loss (Max 1.6dB as Bypass Mode)
Protocol	CSMA/CD
LED	Per unit: Power 1 (Green), Power 2 (Green), P-Fail (Red) Ethernet port: Link/Activity (Green), Speed (Green); Optical fiber: Link/Activity (Green)
DI/DO	1 Digital Input (DI) : Level 0: -30~2V / Level 1: 10~30V Max. input current:8mA 1 Digital Output(DO): Open collector to 40 VDC, 200mA
Operating Humidity	5% ~ 95% (Non-condensing)
Operating Temperature	-40°C~75°C / -40°F~167°F (72V /110V model: -40°C~60°C / -40°F~140°F)
Storage Temperature	-40°C~85°C / -40°F~185°F
Power Supply	45~56VDC on standard model 9.5~56VDC on 12V model 50.4~90VDC on 72V model 43~160VDC on 110V model with input isolation
PoE Budget	240W for 45~56V input (55V input is recommended for 802.3at 30W applications) 80W for 12V input 120W for 24V input 80W for 72V Input 80W for 110V Input
PoE pin assignment	M12 port # 1~#8 support IEEE 802.3at/af End-point, Alternative A mode. Per port provides 30W PoE at/ 15W PoE af. 
Power Consumption	Max. 13W 12V~48VDC input Max. 16W 72VDC//110VDC input
Case Dimension	IP67 model: Aluminum case 285mm(W)x200mm(H)x84.4mm(D)
Weight	2.1kgs(IP67)
Installation	DIN Rail** and Wall Mount Design
EMI & EMS	FCC Class A, CE EN61000-6-2, CE EN61000-6-4, CE EN61000-4-2, CE EN61000-4-3, CE EN61000-4-4, CE EN61000-4-5, CE EN61000-4-6, CE N61000-4-8, EN61000-4-11
Stability Testing	IEC60068-2-32 (Free fall), EN61373 (Shock and Vibration)
MTBF	217,019 hrs
Certifications& report	EN50155/EN50121-3-2/EN50121-4 Certificate EN45545-2 R24/R25 (EN ISO 4589-2, EN ISO 5659-2, NF X70-100-1 & 2) Fire & Smoke Certificate
Safety	EN 60950-1 (Standard model and 110V model)
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 1643 EtherLike, Partial RFC 1757 RMON, RFC 2674 Q-Bridge MIB; Bridge MIB, RFC 2790 Host Resource 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 (basic mode) Support various ring/chain topologies Includes train dynamic coupling ring & aggregation ring* Enhanced G.8032 ring configuration with ease Co-exist with RSTP on different ports Train mode for auto coupling ring configuration
PoE Management	1. PoE Detection to check if PD is hang up then restart the PD 2. PoE Scheduling to On/OFF PD upon routine time table 3. On/ Off, voltage, current, watts, temperature
PTP v2	Support hardware-based IEEE1588 PTPv2 in 1μs, End to End (2-step) and Peer to Peer (2-step) modes in Transparent Clock, with 4 10/100/1000T
User friendly UI	■ Auto topology drawing ■ Topology demo ■ Auto configuration for G.8032(auto mode) for single ring ■ Complete CLI for professional setting
Port Trunk with LACP	LACP Port Trunk: 8 Trunk groups/Maximum 16 trunk members Aggregation ring for ring redundancy and bandwidth combination*
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
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** (256 Groups)**, QinQ*
IPv6/4	Present
Spanning Tree	Supports IEEE802.1d Spanning Tree and IEEE802.1w Rapid Spanning Tree, IEEE802.1s Multiple Spanning Tree
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 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 Management Authentication*
IGMP	Support IGMP snooping v1,v2,v3; Supports IGMP static route(MVR); 256 multicast groups; IGMP router port ; IGMP query; GMRP**
MVR	Static multicast forwarding forward reversed IGMP flow (MVR) 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
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) ● PoE ping failure ● Power failure ● Environmental abnormal
DHCP	Provide DHCP Client/ DHCP Server/DHCP Option 82/ DHCP Option 82 server for 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.
SNTP	Supports SNTP to synchronize system clock in Internet
Firmware Update	Supports TFTP firmware update, TFTP backup and restore; HTTP firmware upgrade; Lantech™ InstaConfig** for multiple upgrade
N-Key Configurator**	RJ45 dongle for firmware upgrade, auto / editable configuration backup/restoration
Configuration upload and download	Supports text configuration file for system quick installation
IfAlias	Each port allows an alphabetic string of 128-byte assigned as its own unique name via the SNMP or CLI interface

*Future release

**Optional

ORDERING INFOMATION

All model packages include M12 caps and wall mount bracket. All standard models are non-coating, optional coating models are available with –C model name.

- **IPES-5416T-8-X-67……..P/N: 8360-6179**
  16 10/100TX 8 PoE at/af up to 30W + 4 10/100/1000T X-coded PTP L2+ Managed Industrial PoE M12 IP67 Switch; -40°C to 75°C
- **IPES-5416T-8-X-67-B……..P/N: 8361-6179**
  16 10/100TX 8 PoE at/af up to 30W + 4 10/100/1000T X-coded PTP L2+ Managed Industrial PoE M12 IP67 Switch; -40°C to 75°C; 1 pair bypass protection
- **IPES-5416T-8-X-67-BB……..P/N: 8361-6049**
  16 10/100TX 8 PoE at/af up to 30W + 4 10/100/1000T X-coded PTP L2+ Managed Industrial PoE M12 IP67 Switch; -40°C to 75°C; 2 pair bypass protection
- **IPES-5416T-8-X-67-12V……..P/N: 8360-6189**
  16 10/100TX 8 PoE at/af up to 30W + 4 10/100/1000T X-coded PTP L2+ Managed Industrial PoE M12 IP67 Switch; PoE 12V~48V dual input; 80W@12V; 120W@24V; -40°C to 75°C
- **IPES-5416T-8-X-67-12V-B……..P/N: 8361-6189**
  16 10/100TX 8 PoE at/af up to 30W + 4 10/100/1000T X-coded PTP L2+ Managed Industrial PoE M12 IP67 Switch; PoE 12V~48V dual input; 80W@12V; 120W@24V; -40°C to 75°C; 1 pair bypass protection
- **IPES-5416T-8-X-67-12V-BB……..P/N: 8361-6059**
  16 10/100TX 8 PoE at/af up to 30W + 4 10/100/1000T X-coded PTP L2+ Managed Industrial PoE M12 IP67 Switch; PoE 12V~48V dual input; 80W@12V; 120W@24V; -40°C to 75°C; 2 pair bypass protection
- **IPES-5416T-8-X-67-72V……..P/N: 8360-6159**
  16 10/100TX 8 PoE at/af up to 30W + 4 10/100/1000T X-coded PTP L2+ Managed Industrial PoE M12 IP67 Switch; 50.4~90V dual input 80W PoE; -40°C to 60°C

- **IPES-5416T-8-X-67-72V-B…..…….....P/N: 8361-6159**
  16 10/100TX 8 PoE at/af up to 30W + 4 10/100/1000T X-coded PTP L2+ Managed Industrial PoE M12 IP67 Switch; 50.4~90V dual input 80W PoE; -40°C to 60°C; 1 pair bypass protection
- **IPES-5416T-8-X-67-72V-BB...…….....P/N: 8361-6069**
  16 10/100TX 8 PoE at/af up to 30W + 4 10/100/1000T X-coded PTP L2+ Managed Industrial PoE M12 IP67 Switch; 50.4~90V dual input 80W PoE; -40°C to 60°C; 2 pair bypass protection
- **IPES-5416T-8-X-67-110V……...…....P/N: 8360-7379**
  16 10/100TX 8 PoE at/af up to 30W + 4 10/100/1000T X-coded PTP L2+ Managed Industrial PoE M12 IP67 Switch; 43~160V dual input 80W PoE; -40°C to 60°C
- **N-key Configurator……..P/N: 8850-100**
  RJ45 connector dongle for firmware upgrade, auto/editable configuration backup and restoration; -20°C to 60°

OPTIONAL ACCESSORIES

M12/M23 Connector & Cable

ECONM23-5P(F)70CM CABLE	M23 power cable 90 degree angle, 70cm, 5 pin
ECAB124030MJS	4 Pin M12 RJ45 Male 3 Meters; STP Cable
ECABM12X83MSTP	8 Pin M12 X-coded RJ45 Male 3 METER, STP CABLE w/ Shielding

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