

# T(P)ES-3216MGT

16 FE + 2 2.5G M12 (PoE) NAT Router Switch



## OVERVIEW

The Lantech T(P)ES-3216MGT (OS2 Pro platform) is a compact router switch with a PoE budget of up to 120W, designed for rail, metro, and vehicle 24V input Ethernet switch systems. It features 16 10/100TX ports + 2x1G/2.5G ports, along with 16 PoE 802.3af/at Ethernet ports. The switch offers Layer 2 management, NAT, Ignition PoE timer off, unique AUTO-FEED configuration, MQTT, advanced security functions and Health diagnostic snapshot maintenance to ensure reliable and easy onboard network deployment. It's WebGUI and complete CLI interface make configuration straightforward for all skill levels. Additionally, the OPEN API document format enhances central management efficiency, making it ideal for fleet management and AIoT applications. Compliance with EN50155\*, ITxPT\*, and E-marking\* certifications rest assured the product meets world-class standards for vehicle, rail onboard performance and reliability.

### ***Redundant dual power input design; EN50155\* verification with high ESD and inrush current prevention and polarity reverse protection; E-marking\* & ITxPT\* certificate; ISO 16750-2 compliant***

T(P)ES-3216MGT is designed with dual power inputs that accept 9V~36VDC for vehicle use, and 16.8V-56VDC for 24TVI train model and is capable of withstanding EMI/RFI interference in the onboard network as well as environmental shocks and vibrations. The redundant power input design integrates inrush current protection also protect against polarity reversal. Additionally, the galvanic isolation feature shields the system from power transients often present in onboard networks. The switch complies with ITxPT\* public transport standards and E-marking\*. It also meets the requirements of ISO 16750-2 P5A, reducing the impact of high-frequency pulse voltage that could be incurred by motor applications.

### ***Ignition timer function on IGN model, ITxPT Xstatus protocol***

The IGN model features a programmed timer that allows users to shut down individual PoE ports with customizable intervals ranging from 30 seconds to 60 minutes. (system off timer default: 60 minutes) This design eliminates the need for additional relay wiring, facilitating remote configuration to adjust the PoE timer at any time and from anywhere. The switch supports the ITxPT Xstatus protocol, which enables detailed monitoring of Ethernet switches.

***PoE budget up to 120W for 16 Ports with PD detection, auto PD reboot, scheduling and PoE & Ethernet galvanic isolation***

TPES-3216MGT supports maximum PoE budget of 120W with advanced PoE management features, including PoE auto-detection and scheduling. The PoE detection function can identify if a connected Powered Device (PD) becomes unresponsive and then auto-restart the PD. Moreover, PoE scheduling allows for a pre-set power feeding schedule based on a routine timetable. Each PoE port can be enabled or disabled, and it provides information on voltage, current, power (W), and temperature.

There is galvanic isolation between the power input and the Ethernet power system. The PoE galvanic isolation on PoE at/af ports provides insulation between the power input and the PoE Ethernet ports, preventing cabling and grounding incidents from damaging the Ethernet switch.

***DDoS security to protect switch and server; Optional IEC 62443 compliance with physical tamper resistance and detection for integrity and authenticity of the boot process***

The switch is designed with a high standard of security methods to prevent network threats, such as prevention of DDoS attacks, 802.1X security authentication, Dynamic ARP Inspection, IP Source Guard and Port Security. The optional cybersecurity features compliant with IEC 62443-4-2 include vulnerability checking, encrypted files, public key management, strong password enforcement, account management, and penetration and stress testing, among many others, totaling up to 90 security measures. The compliance of IEC 62443-4-2 employs roots of trust to verify the integrity and authenticity of the firmware, software, and configuration data needed for the switch's boot process.

***Lantech OS2 PRO Platform with advanced L2 management and L3 routing protocols incl. OSPF and RIP V1&V2***

The switch developed on Lantech OS2 Pro platform is equipped with Layer 2 management and some Layer 3 routing protocols, including OSPF and RIP V1,V2. Engineered for diverse vehicle applications, this platform also supports a range of features such as NAT, Port forwarding, multiple Static IP address, DHCP server/option/client/port based, VLAN, IGMP, RSTP/ G.8032 enhanced ring recovery, LACP etc

***Support Open API document for Restful API for better switch performance***

The switch supports an OPEN API that uses JSON format to access and manipulate data using GET, PUT, POST, and DELETE methods, thereby avoiding the CPU utilization associated with traditional SNMP management.

***mDNS (Multicast DNS) and DNS server/client feature and MQTT-role of Publisher or Broker***

It supports mDNS (Multicast DNS) which enables hosts in the LAN to discover and communicate with devices each other in compliance with the DNS protocol, without requiring a traditional DNS server. The switch can act as MQTT Publisher or Broker that can send data to the broker then broker distributors the "payload" to the subscribers all in a very lightweight protocol.

***Reliable eMMC for better power efficiency and reliability***

The switch utilizes eMMC for firmware storage. The eMMC's standard interface streamlines the design process while delivering improved power efficiency and enhanced reliability, thereby extending the storage's lifespan.

***Auto feed configuration\* for swapped new switches for Seamless Network Maintenance, USB port for backup, restoring configuration and upgrading firmware***

The switch supports auto-feed configuration\* features that revolutionize network switch setup and management. It ensures that new and replacement switches automatically receive the correct configurations without manual intervention. Additionally, it supports the traditional way of uploading or downloading the firmware / configuration through a USB dongle.

***User-friendly GUI, Auto topology drawing, Editable configuration text file, Enhanced Environmental Monitoring, CPU watchdog, Snapshot switch information for trouble-shooting analysis***

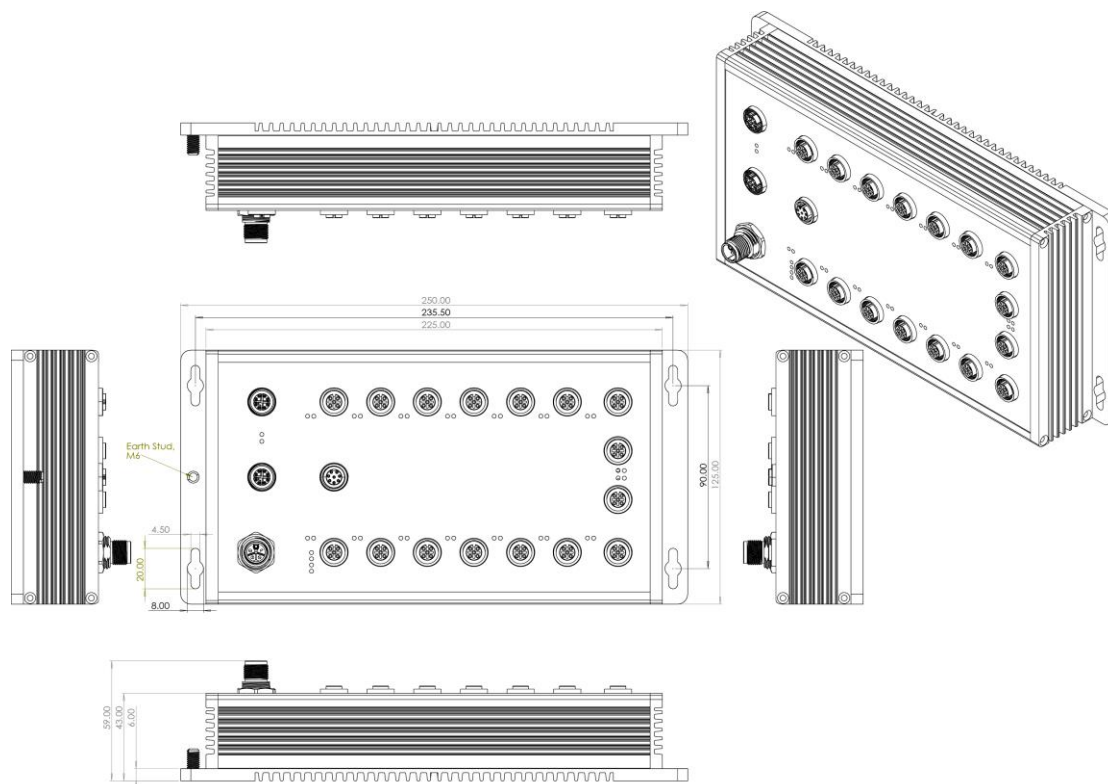
The user-friendly UI, innovative auto topology drawing, and topology demo make the Lantech switch much easier to use. The complete CLI enables professional engineers to configure settings via the command line. The configuration file can be exported as a text file, allowing it to be easily edited and reconfigured for mass deployment. It supports enhanced environmental monitoring of actual input voltage, current, ambient temperature, and total power load where user can set threshold to trigger an alert or event log. The built-in watchdog design can automatically reboot the switch if the CPU becomes unresponsive. With the distinctive Snapshot feature, the switch can gather data, including port statistics, system core information, configuration, and event logs, either at a specific point in time or by scheduling, to address switch issues and analyze the root cause promptly.

***Optional bypass relay prevents power loss***

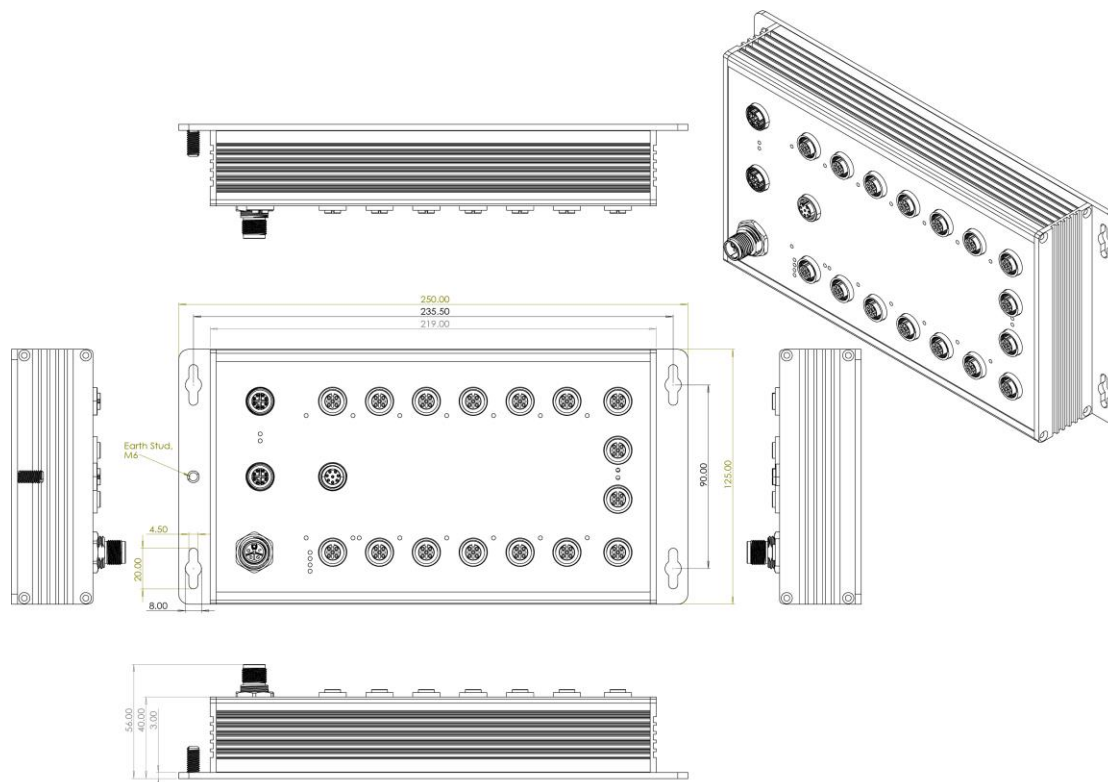
The optional bypass relay is set to bypass the switch to the next one when power is off in order to protect the network from crashing. Lantech bypass caters to remain in bypass mode until the switch is completely booting up when power is back to avoid another network loss. Smart bypass can be activated when switch encounters power failure. (-BT model) (only for 24TVI models)

## DIMENSIONS (unit=mm)

### PoE model



### Non-PoE model



## SPECIFICATIONS

### Hardware Specification

Standards	IEEE802.3 10Base-T Ethernet IEEE802.3u 100Base-TX IEEE802.3ab 1000Base-T Ethernet 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 (PoE model)
Switch Architecture	Back-plane (Switching Fabric): 13.2Gbps
Transfer Rate	14,880pps for Ethernet port 148,800pps for Fast Ethernet port 1,488,000pps for Gigabit Ethernet port
Mac Address	16K MAC address table
Jumbo frame	10KB
Connectors	10/100TX: 16 x M12 4-pole D-coded (Router/LAN configurable) 1G/2.5G: 2 x M12 8-pole X-coded (Router/LAN configurable) Power Input connector: 1 x M12 5-pole Male K-coded Reset/Console/USB: 1 x M12 8-pole A-code
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)
LED	Per unit: Power 1 (Green), Power 2 (Green), FAULT (Red); RM(Green)

	Ethernet port: Link/Activity (Green), Speed (Amber) PoE: Link/Act (Green)
Operating Humidity	5% ~ 95% (Non-condensing)
Operating Temperature	-20°C~60°C / -4°F~140°F -40°C~70°C / -40°F~167°F (-E; -24TVI models)
Storage Temperature	-40°C~85°C / -40°F~185°F
Power Supply	9-36VDC (24VI) 16.8-56VDC (24TVI)
PoE Budget (PoE model)	120W at 24VDC
PoE pin assignment (PoE model)	M12 port #1-#16 supports IEEE 802. 3at/af End-point. Per port provides up to 30W
Power Consumption	10W (w/o PoE load)
Case Dimension	IP54: Aluminum case 250mm(W)x125mm(H)x59mm(D) (PoE model) 250mm(W)x125mm(H)x56mm(D) (Non-PoE model)
Weight	TBC
Installation	Wall Mount
EMI & EMS	FCC Class A, CE EN55032 Class A, 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 EN61000-6-2, CE EN61000-6-4
Verifications	EN50155*/EN50121-3-2/EN50121-4 EN45545-1, EN 45545-2 Fire & Smoke
Stability Testing	EN61373* (Shock and Vibration)
Vehicle Certificate	E24 marking* (UN ECE R10) ITxPT labeled*
MTBF	292,282 hrs (standards: IEC 62380)
Warranty	5 years
Bypass**	One pair bypass module on uplink ports to pass to next switch in case of power failure and CPU hang (-BT model) (only for 24TVI models)

### Software Specification

Lantech OS2 PRO Platform	<a href="#">Download Software Datasheet</a>
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\*Future release

\*\*Optional

## ORDERING INFORMATION

All model packages include M12 caps. For coating add -C to model name; for optional bypass add -BT (one pair) to end of model names. (only for 24TVI models)

- **TPES-3216MGT-16-54-24VI-IGN-E ..... P/N: 8361-044**  
16 10/100TX + 2 1G/2.5G Copper w/16 PoE at/af L2+ NAT router Switch w/PoE & Ethernet galvanic isolation; 9~36VDC dual input; -40°C to 70°C; IP54 rated; w/ignition
- **TES-3216MGT-54-24VI-IGN-E ..... P/N: 8361-0441**  
16 10/100TX + 2 1G/2.5G Copper L2+ NAT router Switch w/Ethernet galvanic isolation; 9~36VDC dual input; -40°C to 70°C; IP54 rated; w/ignition
- **TPES-3216MGT-16-54-24VI-IGN ..... P/N: 8361-0444**  
16 10/100TX + 2 1G/2.5G Copper w/16 PoE at/af L2+ NAT router Switch w/PoE & Ethernet galvanic isolation; 9~36VDC dual input; -20°C to 60°C; IP54 rated; w/ignition
- **TES-3216MGT-54-24VI-IGN ..... P/N: 8361-0445**  
16 10/100TX + 2 1G/2.5G Copper L2+ NAT router Switch w/Ethernet galvanic isolation; 9~36VDC dual input; -20°C to 60°C; IP54 rated; w/ignition
- **TPES-3216MGT-16-54-24TVI ..... P/N: 8361-0446**  
16 10/100TX + 2 1G/2.5G Copper w/16 PoE at/af L2+ NAT router Switch w/PoE & Ethernet galvanic isolation; 16.8~56VDC dual input; -40°C to 70°C; IP54 rated
- **TES-3216MGT-54-24TVI ..... P/N: 8361-0447**

Datasheet Version 1.7

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RP-001-26 A0

16 10/100TX + 2 1G/2.5G Copper L2+ NAT router Switch w/Ethernet galvanic isolation; 16.8~56VDC dual input; -40°C to 70°C; IP54 rated

## OPTIONAL ACCESSORIES

### Software package

Please refer to the [software datasheet](#)

### M12 Connector & Cable

#### Connector

■ 4106-00000097-001 ECONM12-05K(F)-S-180	5 pin M12 (Female) K-coded 180 degrees screw type connector for power supply
■ ECONM12-08A(M)-180	8 pin M12 (Male) A-coded 180 degree crimp type connector for reset/console/USB
■ ECONM12-04D(M)-C-180	4 pin M12 (Male) D-coded 180 degree crimp type connector for data
■ ECONM12-08X(M)-SPEEDCON	8 pin M12 (Male) X-coded 180 degree crimp type connector for data, Ethernet CAT6A (10G), shielded, SPEEDCON

#### Cable

■ 4106-00000096-001 ECABM12-05K(F)-90-1.5M	5 pin M12 (Female) K-coded 90 degrees 1.5M cable for power supply
■ ECAB124030MJS	4 pin M12 (Male) D-coded 180 degree RJ45 STP cable for data, 300cm
■ ECABM12X83MSTP	8 pin M12 (Male) X-coded 180 degree RJ45 STP cable for data, shielded, 300cm
■ ECONM12-08(M) TO DB9+USB2.0-1.5M CABLE	8 pin M12 (Male) A-coded 180 degree M12 to USB2.0 to DB9 (Female) cable, 150cm

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