T(P)ES-3216MGT

16 FE + 2 2.5G M12 (PoE) Vehicle and EN50155 M12 NAT Router Switch



OVERVIEW

Lantech T(P)ES-3216MGT (OS2 PRO generation) is a compact router switch for rail, metro, and vehicle systems, offering a PoE budget up to 96W. It provides 16 × 10/100TX ports + 2 × 1G/2.5G ports, all supporting 802.3af/at PoE. The switch features Layer 2 management, NAT, Ignition PoE timer, AUTO-FEED, MQTT, advanced security, and Health diagnostic snapshots to ensure reliable onboard deployment. A user-friendly WebGUI and complete CLI simplify configuration, while OPEN API streamlines central management for fleet and AIoT applications. Certified with EN50155, ITxPT*, and E-marking***, it delivers world-class reliability and performance in vehicle and rail environments.

Redundant dual power input design; EN50155* verification with high ESD and inrush current prevention and reverse polarity protection; E-marking* & ITxPT* certificate; ISO 16750-2 P5A compliant

T(P)ES-3216MGT is designed with dual power inputs that accept 14V~36VDC for 24VI vehicle use, and 14V-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.

Embedded Inner-lock push-pull connectors ensure fast installation and connection reliability (-PP model)

The built-in inner-lock push-pull connectors give the switch small-footprint design and for space-saving cabling installation. They ensure quick, tool-free installation with a simple push. Most importantly, their secure locking mechanism provides unwavering reliability, preventing accidental disconnections crucial for network uptime.

Support Perpetual/Fast PoE*; PoE budget up to 96W for 16 Ports with PD detection, auto PD reboot, scheduling and PoE & Ethernet galvanic isolation*

Fast PoE* and Perpetual PoE* combined provide uninterrupted power delivery for critical devices. Fast PoE instantly supplies power after startup, while Perpetual PoE maintains power during switch reboots or upgrades. Together, they ensure continuous, reliable operation of Powered devices (PD) in mission-critical environments.

TPES-3216MGT supports maximum PoE budget of 96W 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.

Galvanic isolation between the power input and Ethernet power system enhances safety. Extra PoE galvanic isolation on 802.3at/af ports insulates the power input from PoE Ethernet ports, preventing damage from cabling and grounding incidents to the Ethernet switch.

Sleep Mode & efficient PoE timer under Ignition-Off State on IGN model

The PoE-IGN model supports network operation for up to 60 minutes before entering Sleep Mode (0.048W), preventing unnecessary reboots when power is restored. It also includes a configurable PoE timer, with a default delay of 10 minutes after ignition-off.

The Ignition timer allows flexible configuration of both individual PoE port shutdown delays and system shutdown (Sleep Mode), ranging from 30 seconds to 60 minutes (default: 60 minutes). This design eliminates the need for additional relay wiring and enables remote PoE timer configuration anytime, from anywhere.

mDNS (Multicast DNS) and DNS server/client feature and MQTT-role of Publisher or Broker, ITxPT Inventory service, X status

T(P)ES-3216MGT supports mDNS (Multicast DNS), enabling hosts within the LAN to discover and communicate with each other following DNS protocol, without the need for a traditional DNS server.
The switch also functions as an MQTT Publisher or Broker, sending data to the broker which then distributes the “payload” to subscribers efficiently using a lightweight protocol.
In addition, the switch supports ITxPT Inventory service, X status, DNS-SD, and MQTT protocols for comprehensive remote monitoring of Ethernet switch status.

Reliable eMMC for better power efficiency and reliability

T(P)ES-3216MGT utilizes eMMC for firmware storage, enhancing product reliability and effectively extending its lifespan under frequent power on/off conditions.

Comprehensive Network Protection Against DDoS and Layer 2 Threats

Lantech OS2Pro generation integrates advanced security mechanisms to safeguard both switches and networks. Key features include DDoS attack mitigation, 802.1X port-based authentication, Dynamic ARP Inspection (DAI), IP Source Guard, and Port Security, providing multi-layer protection against spoofing, unauthorized access, and traffic floods. These security capabilities ensure stable, resilient network operation.

Lantech OS2 PRO Generation with L2 management and routing protocols incl. OSPF and RIP V1&V2

T(P)ES-3216MGT developed on the Lantech OS2 Pro generation, is equipped with comprehensive Layer 2 management and routing protocols, including inter-VLAN routing, OSPF, and RIP v1/v2. Designed for versatile vehicle applications, the generation further supports advanced networking functions such as NAT, port forwarding, multiple static IP addresses, DHCP (server/option/client/port-based), VLAN, DHCP over VLAN, IGMP, RSTP/G.8032 enhanced ring recovery, LACP, and more.

Open RESTful API for Seamless Integration and High-Performance Network Management

The switch features a lightweight and efficient Open RESTful API designed for seamless integration with centralized network management software. Using standard HTTP methods (GET, PUT, POST, DELETE) and JSON data structures, the API enables real-time access to configuration and operational data.
By leveraging modern web technologies, the switch minimizes CPU overhead typically associated with traditional SNMP polling, delivering faster response times, reduced system load, and improved scalability for high-performance network environments.

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

T(P)ES-3216MGT offers a user-friendly UI complemented by innovative auto topology drawing and topology demo features, simplifying network management. Configuration files can be exported as editable text files, facilitating easy modification and mass deployment. Its built-in watchdog function automatically reboots the switch if the CPU becomes unresponsive. 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. Additionally, the unique Snapshot feature enables data collection—including port statistics, system core info, configurations, and event logs—either on-demand or scheduled, helping quickly identify and resolve network issues.

OPTIONAL FEATURES

Optional bypass relay prevents power loss

T(P)ES-3216MGT offers an optional bypass relay (-BT model) that ensures network continuity during power loss by bypassing traffic to the next device. The Lantech smart bypass remains active until the switch has fully rebooted after power restoration, preventing additional network interruptions.

Optional LantechView for Lantech devices maintenance

LantechView software automatically detects Lantech devices across the network, enabling seamless configuration management over multiple IP subnets and VLANs—both for individual devices and batch operations. It also offers comprehensive firmware management, supporting single or group verification and simultaneous upgrades to the latest versions.
For more details on LantechView software solutions, please visit:
https://www.lantechcom.tw/global/eng/download/datasheet/D-LantechView.pdf

Optional IEC 62443-4-2 Model with Physical Tamper Resistance and a Variety of Security Measures

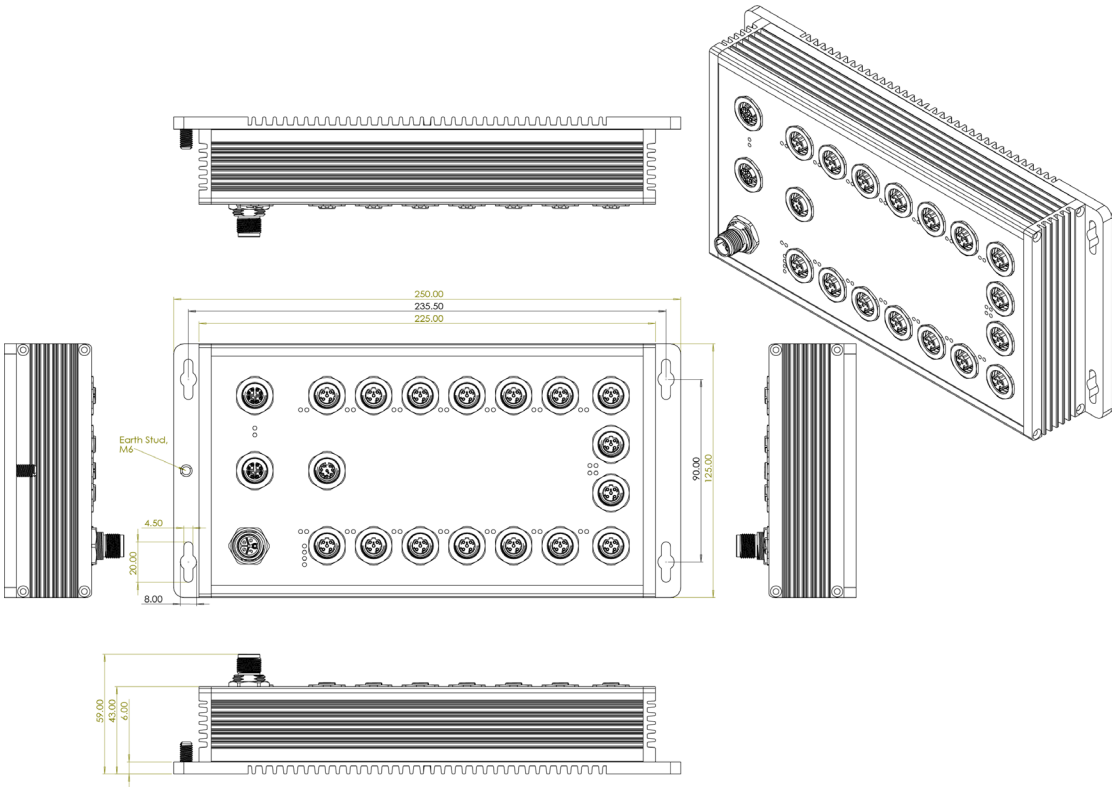
For enhanced cybersecurity, the optional IEC 62443-4-2 is available on -SEC model. This includes over 90 security measures such as vulnerability checking, encrypted files, public key management, strong password enforcement, account management, and both penetration and stress testing. It emphasizes protection against unauthorized access, tampering, and malware through detailed log events and roots of trust security IC. To learn more about Lantech cybersecurity software solutions, please refer to
https://www.lantechcom.tw/global/eng/download/datasheet/D-OS2PRO.pdf

OS2 Pro vs. OS2 Pro - SEC models comparison

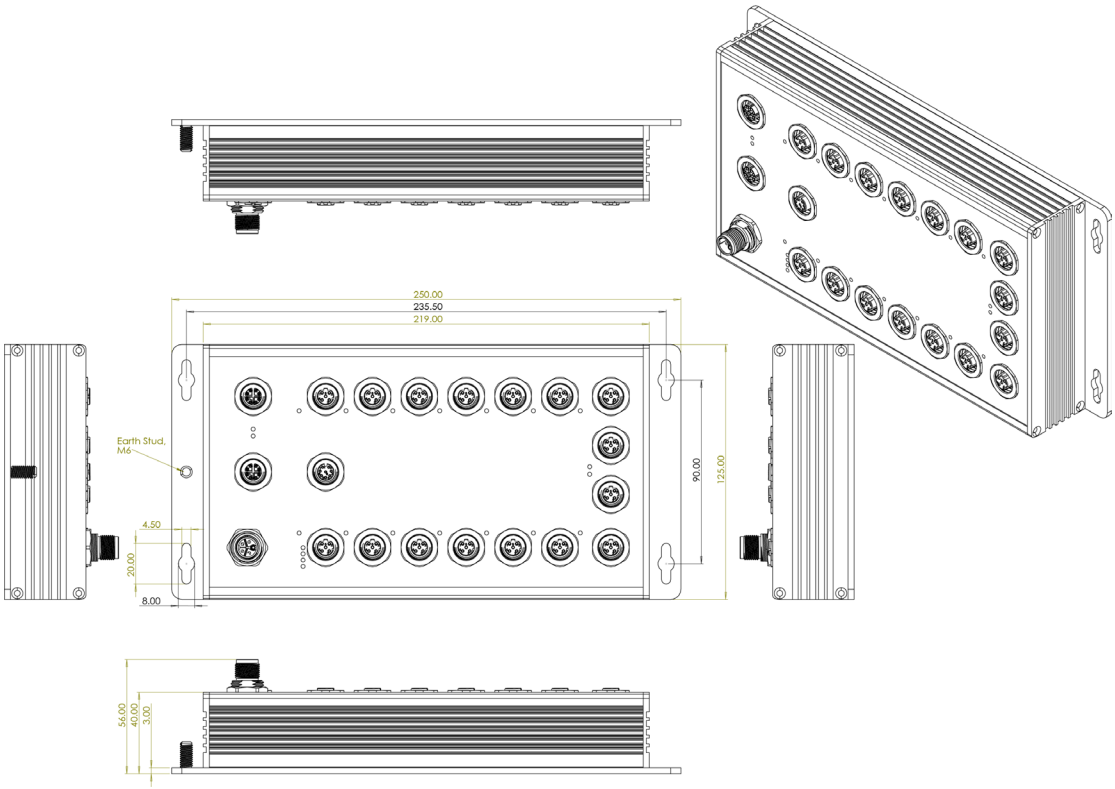
	OS2 Pro	OS2 Pro - SEC
Management	Web UI/Telnet complete CLI command line	Web UI/Telnet complete CLI command line
IEC 62443-4-2 Cyber Security	NA	Y, need optional license
Hardware Environmental Monitoring	Y	Y
Bypass	Optional	Optional
Boot up time	Within 60sec.	Around 90sec.

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
	Note: Push-pull connectors feature an inner lock and are suitable for push-pull and screw-type cabling.
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	-40°C~70°C / -40°F~167°F (-E; -24TVI models)
Storage Temperature	-40°C~85°C / -40°F~185°F
Power Supply	14-36VDC (24VI) 14~56VDC (24TVI)
PoE Budget (PoE model)	96W 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	IP54/67: 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),R118 ITxPT labeled*
MTBF	292,282 hrs (standards: IEC 62380)
Bypass**	One pair bypass module on uplink ports to pass to next switch in case of power failure and CPU hang (-BT model)
Software Specification	
Lantech OS2 PRO Generation	**Download Software Datasheet**

*Future release
**Optional

ORDERING INFORMATION

All model packages include M12 caps. For conformal coating add –C to P/N & model names; for optional bypass add –BT (one pair); for IEC 62443-4-2 add -SEC to model names
＊To support environmental sustainability, the console cable will not be included with each device by default, but partially when required.

- **TPES-3216MGT-16-54-24VI-E-PP ..... P/N: 8361-0444**
  16 10/100TX + 2 1G/2.5G Copper push-pull connector w/16 PoE at/af L2+ NAT router Switch w/PoE & Ethernet galvanic isolation; 14~36VDC dual input; -40°C to 70°C; IP54 rated
- **TPES-3216MGT-16-54-24VI-IGN-E-PP ..... P/N: 8361-04401**
  16 10/100TX + 2 1G/2.5G Copper push-pull connector w/16 PoE at/af L2+ NAT router Switch w/PoE & Ethernet galvanic isolation; 14~36VDC dual input; -40°C to 70°C; IP54 rated; w/ignition
- **TPES-3216MGT-16-54-24TVI-E-PP ..... P/N: 8361-04402**
  16 10/100TX + 2 1G/2.5G Copper push-pull connector w/16 PoE at/af L2+ NAT router Switch w/PoE & Ethernet galvanic isolation; 14~56VDC dual input; -40°C to 70°C; IP54 rated
- **TES-3216MGT-54-24VI-IGN-E-PP ..... P/N: 8361-04403**
  16 10/100TX + 2 1G/2.5G Copper push-pull connector L2+ NAT router Switch w/Ethernet galvanic isolation; 14~36VDC dual input; -40°C to 70°C; IP54 rated; w/ignition
- **TES-3216MGT-54-24VI-E-PP ..... P/N: 8361-04404**
  16 10/100TX + 2 1G/2.5G Copper push-pull connector L2+ NAT router Switch w/Ethernet galvanic isolation; 14~36VDC dual input; -40°C to 70°C; IP54 rated
- **TES-3216MGT-54-24TVI-E-PP ..... P/N: 8361-04405**
  16 10/100TX + 2 1G/2.5G Copper push-pull connector L2+ NAT router Switch w/Ethernet galvanic isolation; 14~56VDC dual input; -40°C to 70°C; IP54 rated
- **TPES-3216MGT-16-67-24VI-E-PP ..... P/N: 8361-04412**
  16 10/100TX + 2 1G/2.5G Copper push-pull connector w/16 PoE at/af L2+ NAT router Switch w/PoE & Ethernet galvanic isolation; 14~36VDC dual input; -40°C to 70°C; IP67 rated

*For all detailed part nos. and model names, please refer to the PN table

OPTIONAL ACCESSORIES

Software package

Please refer to the software datasheet

M12 Connector & Cable

Connector

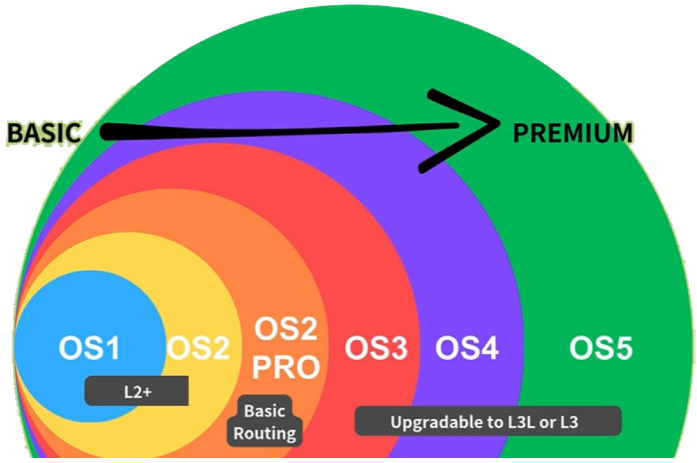
- **4106-00000097-001** 5 pin M12 (Female) K-coded 180 degrees screw type connector for power supply
  ECONM12-05K(F)-S-180
- **ECONM12-08A(M)-180** 8 pin M12 (Male) A-coded 180 degree crimp type connector for reset/console/USB
- **ECONM12-04D(M)-C-180** 4 pin M12 (Male) D-coded 180 degree crimp type 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

Managed Switch OS Generations

We offer a comprehensive range of managed switches, from OS1 and OS2 with rich L2+ management features, to OS2 PRO with basic routing functionality, and OS3, OS4, and OS5, which can be upgraded with optional Layer 3 Lite or Layer 3 capabilities to meet diverse customer needs. Note: Model differences include both software features and hardware specifications.



[LEARN MORE]

→ OS2PRO Generation

→ OS3/OS4 Generation

→ OS5 Generation

[CHECK THE DIFFERENCES]

→ Generation Comparison Table

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