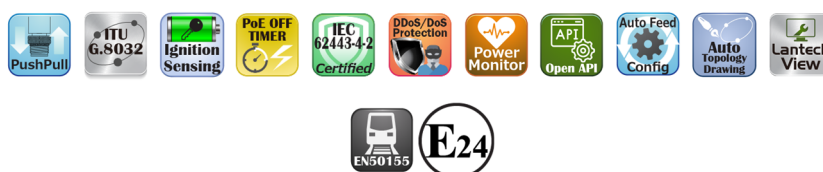# T(P)ES-3406T

6 FE + 4 GE L2+ (PoE) Vehicle and EN50155 (Push-Pull) NAT Router Switch

OVERVIEW

The Lantech T(P)ES-3406T (OS2 Pro platform) is a compact router switch with a PoE budget of 80W, designed for rail, metro, and vehicle 24V input Ethernet switch systems. It features 6 10/100TX M12 D-coded + 4 10/100/1000T M12 X-coded ports (Push-Pull** lock connectors IEC 61076-2010), along with 8 PoE 802.3af/at Ethernet ports (PoE model). 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 (24VI;24TVI model); EN50155* verification with high ESD and inrush current prevention and polarity reverse protection; E-marking* & ITxPT* certificate; ISO 16750-2 compliant

T(P)ES-3406T is designed with dual power inputs that accept 9V~36V DC for 24VI 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.

PoE budget up to 80W for 8 Ports with PD detection, auto PD reboot, scheduling and Ethernet power input galvanic isolation with partial ports for PoE galvanic isolation

TPES-3406T supports maximum PoE budget of 80W 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 Switches and Servers

The Lantech OS2Pro platform is designed with robust security methods to prevent network threats, such as DDoS attack prevention, 802.1X security authentication, Dynamic ARP Inspection, IP Source Guard, and Port Security.

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.

OPTIONAL FEATURES

Ignition timer function on IGN model, ITxPT Xstatus protocol

The IGN model features a programmed timer for each port 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. (-24VI-IGN models)

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)

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 standard models. 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
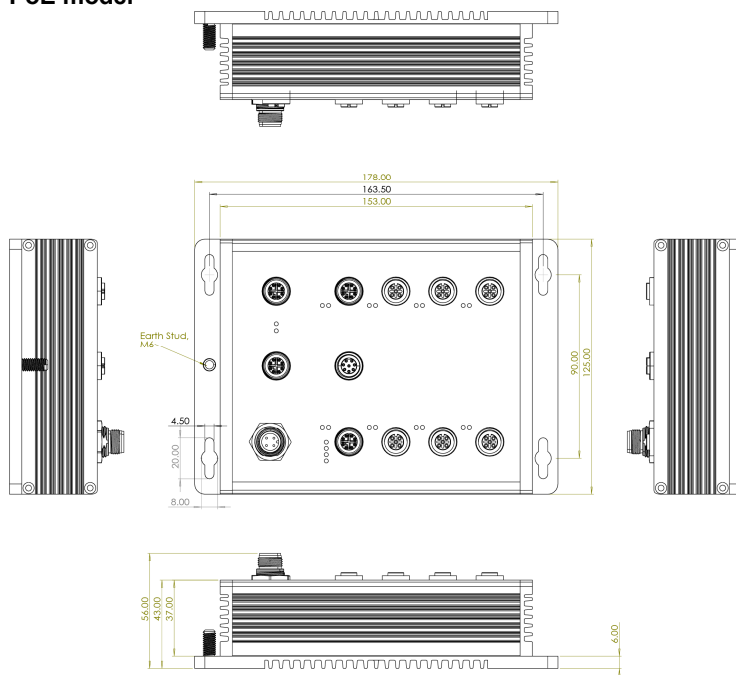**https://www.lantechcom.tw/global/eng/download/datasheet/D-OS2.pdf**

Optional LantechView for Lantech devices maintenance

LantechView** can automatically discover Lantech devices on the network, providing seamless configuration management across multiple IP subnets and VLAN areas (single device and batch). It also supports firmware management, allowing single and batch verification and simultaneous upgrades to the latest firmware versions.   To learn more about Lantech LantechView** software solutions, please refer to
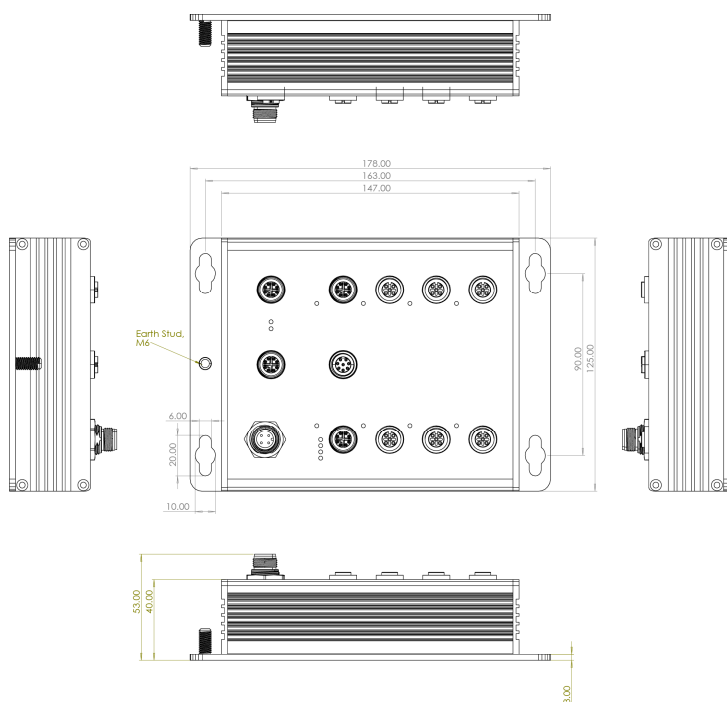
https://www.lantechcom.tw/global/eng/download/datasheet/D-LantechView.pdf

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): 9.2Gbps
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: 6 x M12 4-pole D-coded (PushPull** connector) (Router/LAN configurable) 10/100/1000T: 4 x M12 8-pole X-coded (PushPull** connector) (Router/LAN configurable) Power Input connector: 1 x M12 4-pole Male A-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	-40°C~70°C / -40°F~167°F (-E; -24TVI) -20°C~60°C / -4°F~140°F (-IGN)
Storage Temperature	-40°C~85°C / -40°F~185°F
Power Supply	9-36VDC (24VI) 16.8-56VDC (24TVI)
PoE Budget (PoE model)	80W at 24VDC
PoE pin assignment (PoE model)	M12 port #1-#6(FE) port#7-#8 (GE) supports IEEE 802. 3at/af End-point. Per port provides up to 30W
Power Consumption	7W (w/o PoE load)
Case Dimension	IP54/IP67: Aluminum case 178mm(W)x125mm(H)x56mm(D) (PoE models) 178mm(W)x125mm(H)x53mm(D) (Non-PoE models)
Weight	1.05kgs (PoE model) 885g (non-PoE model)
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	351,801 hrs
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	**Download Software Datasheet**

*Future release
**Optional

ORDERING INFORMATION

All model packages include M12 caps. For coating add –C to model names and part nos.; for optional bypass add –BT (one pair) to end of model names. (only for 24TVI models) -E for wide temp. models, -IGN for ignition models, -PP for push-pull connector models; -SEC for IEC62443-4-2 models

The maximal model: TPES-3406T-8-54-24VI-IGN-E-BT-PP-SEC-C

- **TPES-3406T-8-54-24VI-IGN-E** …...……..…….…,,,.... **P/N: 8351-153**
  6 10/100TX + 4 10/100/1000T w/8 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

- **TPES-3406T-8-54-24VI-IGN** …...……..…………...... **P/N: 8351-1531**
  6 10/100TX + 4 10/100/1000T w/8 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-3406T-54-24VI-IGN-E** …...……..…….….......... **P/N: 8351-1532**
  6 10/100TX + 4 10/100/1000T L2+ NAT router Switch w/ Ethernet galvanic isolation; 9~36VDC dual input; -40°C to 70°C; IP54 rated w/ignition

- **TES-3406T-54-24VI-IGN** …...……..…….…………....... **P/N: 8351-1533**
  6 10/100TX + 4 10/100/1000T L2+ NAT router Switch w/ Ethernet galvanic isolation; 9~36VDC dual input; -20°C to 60°C; IP54 rated w/ignition

- **TPES-3406T-8-54-24TVI** …...……..…….………......... **P/N: 8351-1534**

6 10/100TX + 4 10/100/1000T w/8 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-3406T-54-24TVI** …....…..……….….....……........ **P/N: 8351-1535**

  6 10/100TX + 4 10/100/1000T L2+ NAT router Switch w/ Ethernet galvanic isolation; 9~36VDC dual input; -40°C to 70°C; IP54 rated

- **TPES-3406T-8-67-24VI-IGN-E** …....……....…..…......... **P/N: 8351-1536**

  6 10/100TX + 4 10/100/1000T w/8 PoE at/af L2+ NAT router Switch w/PoE & Ethernet galvanic isolation; 9~36VDC dual input; -40°C to 70°C; IP67 rated w/ignition

- **TPES-3406T-8-67-24VI-IGN** …....……...………........ **P/N: 8351-1537**

  6 10/100TX + 4 10/100/1000T w/8 PoE at/af L2+ NAT router Switch w/PoE & Ethernet galvanic isolation; 9~36VDC dual input; -20°C to 60°C; IP67 rated w/ignition

- **TES-3406T-67-24VI-IGN-E** …..……….…..…............. **P/N: 8351-1538**

  6 10/100TX + 4 10/100/1000T L2+ NAT router Switch w/ Ethernet galvanic isolation; 9~36VDC dual input; -40°C to 70°C; IP67 rated w/ignition

- **TES-3406T-67-24VI-IGN** …....……..….…..……….......... **P/N: 8351-1539**

  6 10/100TX + 4 10/100/1000T L2+ NAT router Switch w/ Ethernet galvanic isolation; 9~36VDC dual input; -20°C to 60°C; IP54 rated w/ignition

- **TPES-3406T-8-67-24TVI** …....……..….…..……….......... **P/N: 8351-15341**

  6 10/100TX + 4 10/100/1000T w/8 PoE at/af L2+ NAT router Switch w/ PoE & Ethernet galvanic isolation; 16.8~56VDC dual input; -40°C to 70°C; IP67 rated

- **TES-3406T-67-24TVI** …....……..….……….…..….............. **P/N: 8351-15351**

  6 10/100TX + 4 10/100/1000T L2+ NAT router Switch w/ Ethernet galvanic isolation; 16.8~56VDC dual input; -40°C to 70°C; IP67 rated

OPTIONAL ACCESSORIES

Software package

Please refer to the **software datasheet**

M12 Connector & Cable

Connector

- **ECONM12-04A(F)-C-180**   4 pin M12 (Female) A-coded 180 degree crimp 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

- **ECONM12-4P(F)1.5M CABLE**   4 pin M12 (Female) A-coded 90 degree cable for power supply, 150cm
- **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**   8 pin M12 (Male) A-coded 180 degree M12 to USB2.0 to DB9 (Female) cable, 150cm
  DB9+USB2.0-1.5M CABLE