# T(P)GR-3208T

## 10 10/100/1000T L2+ (w/8 PoE at/af) Vehicle and EN50155 NAT Router switch w/ Enhanced G.8032 Ring


- *EN61373*, E-mark * certificate for vehicle*
- *EN50155 certificate* (TVI model)*
- *ITxPT* labeled w/ignition function, delay shut down, standby green mode, Inventory service (-IGN model)*
- *ISO16750-2 P5A compliant*
- *WAN port supports routing firewall, basic network interface*
- *Galvanic PoE isolation; Support IEEE802.3at/af up to 30W per port; PoE budget 65W*
- *PoE management incl. detection and scheduling*
- *Efficient POE configuration when ignition off (-IGN model)*
- *RTC feature powered from golden capacitor; firmware stored in eMMC*
- *Inrush current prevention; polarity reverse protection*
- *Enhanced G.8032 ring protection < 20ms for single ring. Supports enhanced mode and basic mode; Enhanced G.8032 ring covers multicast packets; MSTP 8 MSTI /RSTP*
- *Miss-wiring avoidance & node failure protection*
- *User-friendly UI, including auto topology drawing; Complete CLI*
- *Support LACP link aggregation, IGMP v3/router port, DHCP server & DHCP Option82; DHCP Snooping; Port-based DHCP distribution, Mac based DHCP server, SSH v2/SSL, HTTPS, INGRESS ACL L2/L3*
- *Optional bypass in case of power failure (-BT model)*

## OVERVIEW

Lantech T(P)GR-3208T is a high-performance L2+ all Gigabit switch with 10 10/100/1000T (w/8 PoE 802.3af/at) which provides L2 wire speed and advanced security function for network aggregation deployment. It delivers ITU G.8032 enhanced ring recovery less than 20ms for single ring, comprehensive QoS, VLAN, GVRP, advanced security SSH v2/SSL, INGRESS ACL L2/L3, IGMPv1/v2/v3/router port, DHCP server/relay, jumbo frame which are important features required in mid and large network. It also supports Cisco Discovery Protocol (CDP) and LLDP for Ciscoworks to detect the switch info and to be shown on L2 map topology.

***PoE at/af up to 8 Ports with detection and scheduling***

Lantech TPGR-3208T supports advanced PoE management including PoE detection and scheduling. PoE detection can detect if the connected PD hangs then restart the PD; PoE scheduling is to allow pre-set power feeding schedule upon routine time table. Each PoE ports can be Enabled/disabled, get the voltage, current, Watt, and temperature info displayed on WebUI.

***Support RTC (Real Time Clock) with longevity Golden Capacitor***

Our switch supports RTC which is powered by a golden capacitor, ensuring accurate real-time event logs. Unlike traditional batteries, golden capacitors offer superior reliability, and longevity, without a need to change battery.

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

The T(P)GR-3208T utilizes eMMC for firmware storage. The eMMC with integrated controller that offloads and simplifies the task for the main processor. Its standard interface simplifies the design process while delivering improved power efficiency and enhanced reliability, thereby extending the storage's lifespan. increasing the lifespan of the storage.

***Miss-wiring avoidance, Node failure protection, Loop protection***

The T(P)GR-3208T 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 T(P)GR-3208T is able to alert with the LED indicator and disable ring automatically. 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.

***User-friendly GUI, Auto topology drawing, Enhanced Environmental Monitoring***

The user-friendly UI, innovative auto topology drawing and topology demo makes T(P)GR-3208T much easier to get hands-on. The complete CLI enables professional engineer to configure setting by command line. It supports enhanced environmental monitoring for actual input voltage, current, ambient temperature and total power load.

***Enhanced G.8032 ring, 8 MSTI MSTP***

Lantech T(P)GR-3208T 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 enhanced ring and basic ring by easy setup than others. It supports MSTP that allows each spanning tree for each VLAN for redundant links with 8 MSTI.

***DHCP option 82 & Port based, Mac based DHCP, Option66, DHCP Snooping***

DHCP server can assign dedicated IP address by MAC or by port (Port based for single switch), it also can assign IP address by port for multiple switches with single DHCP option82 server. DHCP Snooping is supported. DHCP Option66 server can offer IP address of TFTP server to DHCP client for VOIP application.

***WAN supported***

Static IP address, PPPoE (V4&V6), DHCP client
L3 routing functions, Default routing, Static route, dynamic route
Firewall, Port forwarding, DMZ, Filtering,
Remote admin, DDoS protection, NAT (V4)

***GVRP supported***

It supports the GVRP for large VLAN segmentation.

***IGMPv3, MLD snooping, query, GMRP, router port, static multicast forwarding and multicast Ring protection***

The unique multicast protection under enhanced G.8032 ring can offer immediate self-recovery instead of waiting for IGMP table timeout. It also supports IGMP v3 with Query mode for multimedia;, GMRP, router port, MLD snooping and static multicast forwarding binding by ports for video surveillance applications.

***802.1X security by MAC address***

MAC-based port authentication is an alternative approach to 802.1x for authenticating hosts connected to a port. By authenticating based on the host's source MAC address, the host is not required to run a user for the 802.1x protocol. The RADIUS server that performs the authentication will inform the switch if this MAC can be registered in the MAC address table of switch.

***Editable configuration text file; Factory reset pin; CPU watchdog***

The configuration file of Lantech T(P)GR-3208T can be exported in text file so that it can be edited and configured back to switch with ease for mass deployment. Factory reset pin can restore the setting back to factory default and built-in watchdog design can automatically reboot the switch when CPU is found dead.

***USB port for backup, restore configuration and upgrade firmware***

The built-in USB port can upload/download the firmware, export and import configuration

***Redundant dual power input design (24VI-24TVI model); inrush current prevention and polarity reverse protection***

The Lantech T(P)GR-3208T is designed with dual power which can accept 9V~36VDC for bus with galvanic PoE isolation, 24TVI for train use which is 16.8-56VDC with galvanic PoE isolation. The redundant power input design prevents inrush current and safeguards against polarity reversal.

The built-in PoE galvanic isolation up to 1.5KVDC can provide power input to PoE port insulation to prevent cable short, spike, and surge flooding through PoE cabling from damaging the POE port or connected device.

***Optional bypass relay prevents from power lost***

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 lost. Smart bypass can be activated when switch encounters power failure. (-BT model)

***E-marking certificate*; ISO 16750-2 compliant***

The T(P)GR-3208T is designed to meet with critical network environment with IP65/IP54 enclosure and M12 connectors for protection against dust and water. It has passed harsh environmental testing to comply with Industrial EMI and Safety standards as well as stability testing such as Free fall, Shock, and vibration. It is labeled with ITxPT public transport standards and also compliant with ISO 16750-2 P5A (12V system DC14V 87V/0.5Ω/400ms; 24V system DC28V 174V/2Ω/350ms) which protects the switch from being damaged by high voltage that could be found at vehicle cranky start.

***ITXPT label* for delay shut down, inventory service, standby green mode***

When the engine of vehicle turns off, the switch is able to extend the work from 30sec to 60mins (Management mode)
The switch must be able to provide SRV and TXT record to back office, and exports the data in xml file format
The consumption power under sleep mode meets the standard of ITxPT. (-IGN model)

***Efficient PoE configuration when ignition off***

Pre-configured per port PoE ON/OFF at ignition off mode to prevent batter drain out. (-IGN model)

***EN61373* verification; High ESD protection***

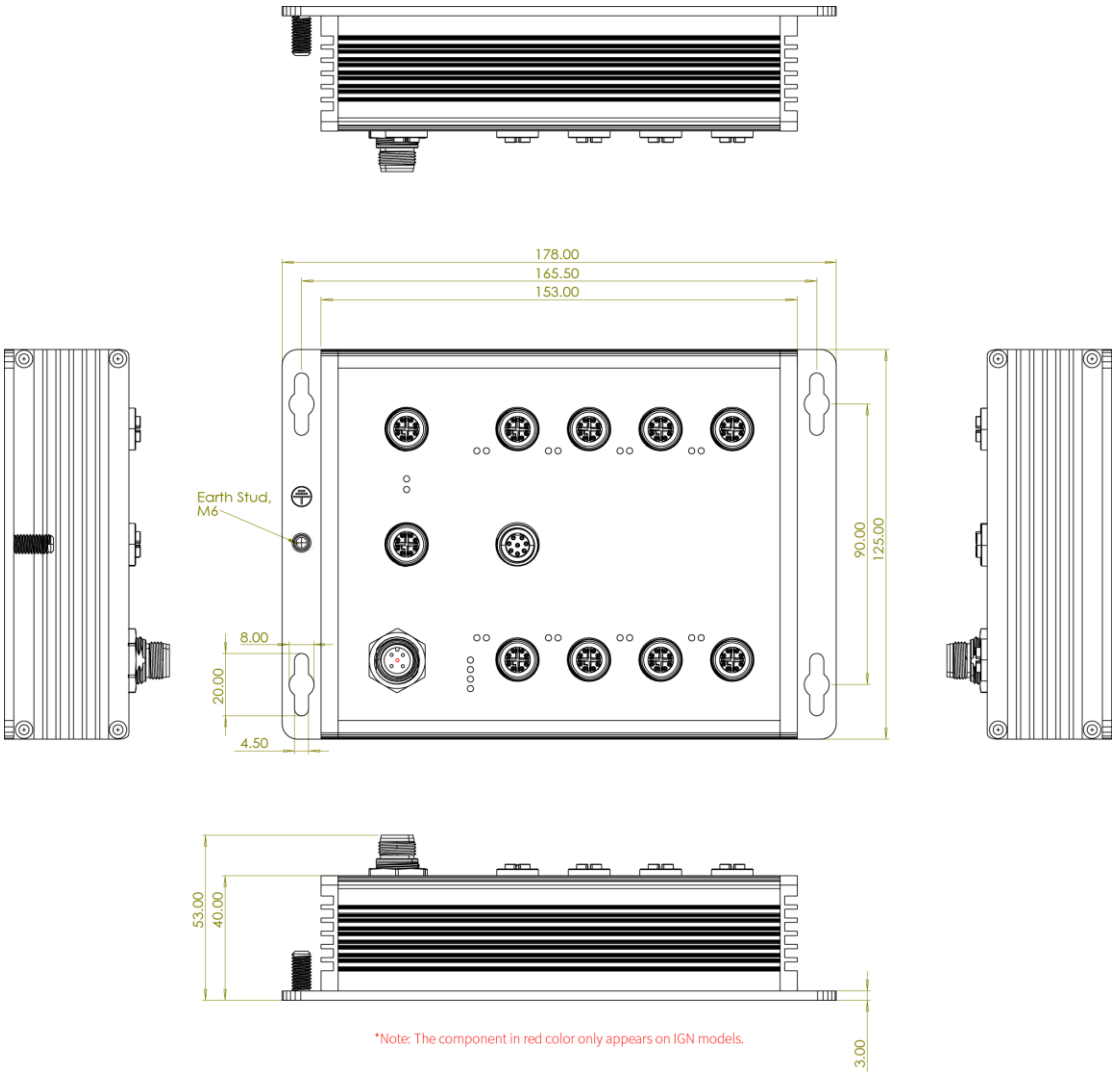
Lantech T(P)GR-3208T features high reliability and robustness

coping with extensive EMI/RFI phenomenon, environmental vibration and shocks usually found in factory, substation, steel automation, aviation, mining and process control. It is the best solution for Automation, transportation, surveillance, Wireless backhaul, Semi-conductor factory and assembly lines.

## FEATURES & BENEFITS

- **10 10/100/1000T (w/8 PoE 802.3af/at ports) (Total 10 Ports Switch)**
- **Support 10K bytes jumbo frames**
- **Dual 9-36VDC power input for 24VI model; dual 16.8~56VDC power input for 24TVI model; PoE budget 65W**
- **PoE management including PoE detection and scheduling for PD (power devices)**
- **Efficient POE configuration when ignition off (-IGN model)**
- **Back-plane (Switching Fabric): 20Gbps**
- **16K MAC address table**
- **User-friendly UI, auto topology drawing, topology demo, complete CLI for a professional setting**
- **Enhanced G.8032 Ring protection in 20ms for single ring**
  - *Support various ring/chain topologies, including enhanced ring and basic ring*
  - *Enhanced G.8032 ring configuration with ease*
  - *Cover multicast and data packets protection*
- **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 with 8 MSTI**
- **4K 802.1Q VLAN, port-based VLAN, GVRP**
- **Supports IEEE 802.1ab LLDP, Cisco CDP; LLDP info can be viewed via Web/ Console**
- **DHCP server / client / DHCP Option 82 relay / DHCP Option 82 server/relay Port based DHCP server; DHCP Snooping; DHCP option 66**
- **Bandwidth Control**
  - *Ingress packet filter*
  - *Broadcast/multicast packet filter control*
- **Miss-wiring avoidance**
  - *LED indicator*
- **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*
- **System Event Log, SNMP Trap for alarm support; 32 RMON counters**
- **Security**
  - *SSL/SSH v2/INGRESS ACL L2/L3*
  - *Port Security: MAC address entries/Filter/static MAC-Port binding*
  - *Remote Admin: IP address security management to prevent unauthorized intruder.*
  - *Login Security: IEEE802.1X/RADIUS*
  - *HTTPS for secure access to the web interface*
- **Static multicast forwarding forward reversed IGMP flow with multicast packets binding with ports for IP surveillance application**
- **IGMP router port to assign query in ring for reversed multicast video flow**
- **IGMPv1,v2,v3 with Query mode for multimedia; GMRP**
- **Configuration backup and restoration**
  - *Supports editable configuration file for system quick installation*
  - *USB port for upload/download configuration by USB dongle*
- **TFTP/ HTTP firmware upgrade**
- **Watchdog design to auto reboot switch CPU is found dead**
- **RTC (Real Time Clock) feature**
- **eMMC for firmware storage**
- **Inrush current prevention; polarity reverse protection**
- **IP65/IP54 with Wall-mount design**
- **E-marking certificate* for vehicle application**
- **Supports ±4000 VDC (Contact) and ±8000 VDC (Air) Ethernet ESD protection**
- **Bypass protection** - Bypass failed switch caused by power failure of switch to protect network intactness (-BT model)**

## DIMENSIONS (unit=mm)




## SPECIFICATION

### Hardware Specification

| | |
|---|---|
| Standards | IEEE802.3 10Base-T Ethernet<br>IEEE802.3u 100Base-TX<br>IEEE802.3ab 1000Base-T Ethernet<br>IEEE802.3x Flow Control and Back Pressure<br>IEEE802.3ad Port trunk with LACP<br>IEEE802.1d Spanning Tree<br>IEEE802.1w Rapid Spanning Tree<br>IEEE802.1s Multiple Spanning Tree<br>IEEE802.3ad Link Aggregation Control Protocol (LACP)<br>IEEE802.1AB Link Layer Discovery Protocol (LLDP)<br>IEEE802.1X User Authentication (Radius)<br>IEEE802.1p Class of Service<br>IEEE802.1Q VLAN Tag<br>IEEE802.3at/af Power over Ethernet |
| Switch Architecture | Back-plane (Switching Fabric): 20Gbps |
| Transfer Rate | 14,880pps for Ethernet port<br>148,800pps for Fast Ethernet port<br>1,488,000pps for Gigabit Ethernet port |
| Mac Address | 16K MAC address table |
| Jumbo frame | 10KB |
| Connectors | 10/100/1000T: 9 x M12 8-pole X-coded<br>10/100/1000T 1x WAN/LAN configurable |
| | Power Input connector: 1 x M12 4-pole Male A-coded (5-pole –IGN model)<br>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)<br>100Base-TX: 2-pair UTP/STP Cat. 5/ 5E/ 6 cable EIA/TIA-568 100-ohm (100m)<br>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)<br>Ethernet port: Link/Activity (Green), Speed (Amber);<br>PoE: Link/Act (Green); |
| Operating Humidity | 5% ~ 95% (Non-condensing) |
| Operating Temperature | -40°C~70°C / -40°F~167°F |
| Storage Temperature | -40°C~85°C / -40°F~185°F |
| Power Supply | 9-36VDC (24VI) 16.8-56VDC (24TVI) |
| PoE Budget | 65W at 24VDC<br>Higher PoE budget can be applied upon request. ** |
| PoE pin assignment | M12 port #1-#8 supports IEEE 802. 3at/af End-point.<br>Per port provides up to 30W |
| Power | 15.6W (w/o PoE load) |

| | |
|---|---|
| Consumption | |
| Case Dimension | IP65/IP54: Aluminum case<br>178mm(W)x125mm(H)x53mm(D) |
| Weight | 880g |
| Installation | Wall Mount |
| EMI & EMS | FCC Class A,<br>CE EN55032 Class A, CE EN55024,<br>CE EN61000-4-2, CE EN61000-4-3,<br>CE EN61000-4-4, CE EN61000-4-5,<br>CE EN61000-4-6, CE EN61000-4-8,<br>CE EN61000-6-2, CE EN61000-6-4 |
| Verifications | EN50155/EN50121-3-2/EN50121-4*<br>EN45545-1, EN 45545-2 Fire & Smoke |
| Stability Testing | EN61373 (Shock and Vibration)* |
| Vehicle Certificate | E24 marking (UN ECE R10)*<br>ITxPT labeled* |
| Vehicle Compliance | UN ECE R118 |
| MTBF | 360,540 hrs |
| 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) |

## Software Specification

| | |
|---|---|
| Management | SNMP v1 v2c, v3/ Web/Telnet/CLI |
| SNMP MIB | MIBII<br>MIB<br>SNMP MIB,<br>IF MIB<br>RMON MIB,<br>Bridge MIB,<br>LLDP MIB<br>Private MIB |
| Enhanced G.8032 ring | Support ITU G.8032 v2/2012 for Ring protection in less than 20ms for self-heal recovery (single ring enhanced mode)<br>Support various ring/chain topologies<br>Includes basic single ring and enhanced ring<br>Enhanced G.8032 ring configuration with ease<br>Cover multicast & data packets protection |
| PoE Management | 1. PoE Detection to check if PD is hang up then restart the PD<br>2. PoE Scheduling to On/OFF PD upon routine time table |
| Per Port PoE Status | On/ Off, voltage, current, watts, temperature |
| User-friendly UI | ■ Auto topology drawing<br>■ Topology demo<br>■ Complete CLI for professional setting |
| Port Trunk with LACP | LACP Port Trunk: 8 Trunk groups |
| LLDP | Supports LLDP to allow switch to advise its identification and capability on the LAN |
| CDP | Cisco Discovery Protocol for topology mapping |
| VLAN | Port Based VLAN<br>IEEE 802.1Q Tag VLAN (256 entries)/ VLAN ID (Up to 4K, VLAN ID can be assigned from 1 to 4096.)<br>GVRP |
| IPv6/4 | Present |
| RSTP/MSTP | Supports IEEE802.1d Spanning Tree and IEEE802.1w Rapid Spanning Tree, IEEE802.1s Multiple Spanning Tree 8 MSTI |
| 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 |
| Remote Admin | 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.<br>802.1X access control/MAC-Port binding<br>INGRESS ACL L2/L3<br>SSL/ SSH v2 for Management<br>HTTPS for secure access to the web interface |
| IGMP | Support IGMP snooping v1,v2,v3; 1024 multicast groups; IGMP router port ; IGMP query; GMRP, MLD snooping |
| Static MAC-Port bridge | Static multicast forwarding forward reversed IGMP flow with multicast packets binding with ports for IP surveillance application |
| WAN Port | ■ PPPoE<br>■ DHCP client |
| L3 routing functions | Static route<br>RIP/OSPF |
| Firewall | Port forwarding<br>DMZ<br>Filtering<br>Remote admin<br>DDoS protection<br>NAT |
| Bandwidth Control | Support ingress packet filter.<br>Ingress filter packet type combination rules are Broadcast/Multicast/Flooded Unicast packet, Broadcast/Multicast packet, Broadcast packet only and all types of packet.<br>The packet filter rate can be set an accurate value through the pull-down menu for the ingress packet filter. |
| 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 |
| Protection | ■ Miss-wiring avoidance<br>■ Node failure protection<br>■ Loop protection |
| SNMP Trap | Up to 10 trap stations; trap types including:<br>● Device cold start<br>● Authorization failure<br>● Port link up/link down<br>● Topology change (ITU ring)<br>● Power failure<br>● Environmental abnormal |
| DHCP | Provide DHCP Client/ DHCP Server/DHCP Option 82 (Server and relay) /Port-based DHCP; DHCP Snooping; DHCP option 66 |
| 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 |
| Configuration upload and download | Supports editable configuration file for system quick installation<br>Support factory reset pin to restore all settings back to factory default<br>USB port for upload/download configuration by USB dongle |

*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.

- **TPGR-3208T-65-24VI …….. P/N: 8351-14001**
  10 10/100/1000T L2+ (w/8 PoE at/af) w/galvanic isolation NAT IP65 router Switch; -40 to 70C; 9-36VDC input
- **TPGR-3208T-65-24VI-IGN ……..P/N: 8351-14011**
  10 10/100/1000T L2+ (w/8 PoE at/af) w/galvanic isolation NAT IP65 router Switch; -40 to 70C; 9-36VDC input w/ignition
- **TPGR-3208T-65-24TVI …….. P/N: 8351-14021**
  10 10/100/1000T L2+ (w/8 PoE at/af) w/galvanic isolation IP65 L2+ NAT EN50155 router Switch; -40 to 70C; 16.8-56VDC input
- **TGR-3208T-65-24VI …….. P/N: 8351-14031**
  10 10/100/1000T L2+ w/galvanic isolation NAT IP65 router Switch; -40 to 70C; 9-36VDC input
- **TGR-3208T-65-24VI-IGN ……..P/N: 8351-14041**
  10 10/100/1000T L2+ w/galvanic isolation NAT IP65 router Switch; -40 to 70C; 9-36VDC input w/ignition
- **TGR-3208T-65-24TVI …….. P/N: 8351-14051**
  10 10/100/1000T L2+ w/galvanic isolation IP65 L2+ NAT EN50155 router Switch; -40 to 70C; 16.8-56VDC input
- **TPGR-3208T-54-24VI …….. P/N: 8351-140**
  10 10/100/1000T L2+ (w/8 PoE at/af) w/galvanic isolation NAT IP54 router Switch; -40 to 70C; 9-36VDC input
- **TPGR-3208T-54-24VI-IGN ……..P/N: 8351-1401**
  10 10/100/1000T L2+ (w/8 PoE at/af) w/galvanic isolation NAT IP54 router Switch; -40 to 70C; 9-36VDC input w/ignition
- **TPGR-3208T-54-24TVI …….. P/N: 8351-1402**
  10 10/100/1000T L2+ (w/8 PoE at/af) w/galvanic isolation IP54 L2+ NAT EN50155 router Switch; -40 to 70C; 16.8-56VDC input
- **TGR-3208T-54-24VI …….. P/N: 8351-1403**
  10 10/100/1000T L2+ w/galvanic isolation NAT IP54 router Switch; -40 to 70C; 9-36VDC input
- **TGR-3208T-54-24VI-IGN ……..P/N: 8351-1404**
  10 10/100/1000T L2+ w/galvanic isolation NAT IP54 router Switch; -40 to 70C; 9-36VDC input w/ignition
- **TGR-3208T-54-24TVI …….. P/N: 8351-1405**
  10 10/100/1000T L2+ w/galvanic isolation IP54 L2+ NAT EN50155 router Switch; -40 to 70C; 16.8-56VDC input

## OPTIONAL ACCESSORIES

### M12 Connector & Cable

**Connector**

| | |
|---|---|
| **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**

| | |
|---|---|
| **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 |
| **ECONM12-5P(F)70CM CABLE** | 5 pin M12 (Female) A-coded 90 degree cable for power supply, 70cm |

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