

# TN-G4500 Series

## EN 50155 layer 2 multi-Gigabit switches



### Features and Benefits

- 4 10G ports and 12 Gigabit ports with push-pull M12 connectors
- Isolated power with 24 to 110 VDC power supply range
- Complies with all EN 50155 mandatory test items<sup>1</sup>
- -40 to 70°C operating temperature range
- Turbo Ring and Turbo Chain (recovery time < 50 ms @ 250 switches), and RSTP/STP for network redundancy
- 12 IEEE 802.3at/af compliant PoE and Ethernet combo ports
- Provides up to 30 W per PoE port

### Certifications



## Introduction

The ToughNet TN-G4500 Series M12 managed Ethernet switches are designed for railway applications, including rolling stock and wayside installations. These switches are equipped with M12 and similar circular connectors to ensure tight, robust connections, and guarantee reliable operation in industrial environments where vibrations and shock are commonplace. The TN-G4500 Series Ethernet switches provide 4 10G Ethernet M12 ports with PoE functionality, 16 Gigabit Ethernet M12 ports, and 8 ports with PoE functionality. These PoE switches are classified as power source equipment (PSE), capable of providing up to 30 watts of power per port to IEEE 802.3at/af-compliant powered devices (PDs), such as IP cameras and wireless access points.

The TN-G4500 Series has M12 connectors that are tailor-made for push-pull cables to facilitate quick installation and allow M12 rotary cables to be utilized. The 24 to 110 VDC wide power input range and isolated dual power inputs not only allow you to use the same type of power source at different sites around the globe, but also increase the reliability of your communications system. Furthermore, the -40 to 70°C wide operating temperature range allows deployment in harsh environments. The TN-G4500 Series complies with the essential sections of the EN 50155 standard, covering operating temperature, power input voltage, surge, ESD, vibration, power isolation, and features models with conformal coating to ensure suitability for a variety of industrial applications.

### Additional Features and Benefits

- Provides up to 30 watts per PoE port with a total power budget of 120 watts per switch
- DHCP Option 82 for IP address assignment with different policies
- IGMP snooping and GMRP for filtering multicast traffic
- Supports the EtherNet/IP and Modbus/TCP industrial Ethernet protocols
- Port-based VLAN, IEEE 802.1Q VLAN, and GVRP to ease network planning
- QoS (IEEE 802.1p/1Q and ToS/DiffServ) allows real-time traffic classification and prioritization
- IEEE 802.3ad LACP for optimal bandwidth utilization
- SNMPv1/v2c/v3 for different levels of network management
- TACACS+, SNMPv3, IEEE 802.1X, HTTPS, and SSH to enhance network security
- RMON for efficient network monitoring and proactive capability
- Bandwidth management prevents unpredictable network conditions
- Port locking to only allow access to authorized MAC addresses
- Port mirroring for online debugging
- Automatic warning notifications through email and relay output
- Line-swap fast recovery
- LLDP for automatic topology discovery in network management software
- Configurable by web browser, Telnet/serial console, CLI, and Windows utility
- Loop protection to prevent network loops
- Wall mounting installation

1. This product is suitable for rolling stock railway applications, as defined by the EN 50155 standard. For a more detailed statement, click here: [www.moxa.com/doc/specs/EN\\_50155\\_Compliance.pdf](http://www.moxa.com/doc/specs/EN_50155_Compliance.pdf)

## Specifications

### Ethernet Interface

|  |   |
|--|---|
| 10GBaseT(X) Ports (M12 X-coded 8-pin female connector with bypass relay) | TN-G4516 BP models: 2   |
| 10/100/1000BaseT(X) Ports (M12 X-coded 8-pin female connector)           | 4   |
| PoE Ports (10GBaseT(X), M12 X-coded 8-pin female connector)              | TN-G4516 non-BP models: 4<br>TN-G4516 BP models: 2  |
| PoE Ports (100/1000BaseT(X), M12 X-coded 8-pin female connector)         | 8   |
| Standards  | IEEE 802.1D-2004 for Spanning Tree Protocol<br>IEEE 802.1p for Class of Service<br>IEEE 802.1Q for VLAN Tagging<br>IEEE 802.1s for Multiple Spanning Tree Protocol<br>IEEE 802.1w for Rapid Spanning Tree Protocol<br>IEEE 802.1X for authentication<br>IEEE 802.3 for 10BaseT<br>IEEE 802.3ab for 1000BaseT(X)<br>IEEE 802.3u for 100BaseT(X)<br>IEEE 802.3bz for 5GBaseT and 2.5GBaseT<br>IEEE 802.3an for 10GBaseT<br>IEEE 802.3ad for Port Trunk with LACP<br>IEEE 802.3af/at for PoE/PoE+ output<br>IEEE 802.3x for flow control |

### Ethernet Software Features

|                       |   |
|-----------------------|---|
| Broadcast Forwarding  | IP directed broadcast, broadcast forwarding   |
| Configuration Options | Command Line Interface (CLI), Command Line Interface (CLI) through Serial/Telnet/SSH, Web Console (HTTP/HTTPS), Windows Utility   |
| Filter                | 802.1Q, GMRP, GVRP, IGMP v1/v2, Port-based VLAN, Static Multicast   |
| Industrial Protocols  | SNMPv1/v2c/v3   |
| Management            | Account Management, Back Pressure Flow Control, DHCP Option 66/67/82, DHCP Server/Client, Flow control, HTTP, IPv4/IPv6, LLDP, Port Mirror, QoS/CoS/ToS, RARP, RMON, SMTP, SNMP Inform, Syslog, Telnet, SNMP Trap |
| MIB                   | Bridge MIB, Ethernet-like MIB, MIB-II, P-BRIDGE MIB, Q-BRIDGE MIB, RMON MIB Groups 1, 2, 3, 9, RSTP MIB   |
| Redundancy Protocols  | Link Aggregation, MSTP, RSTP, STP, Turbo Chain, Turbo Ring v1/v2, Turbo Ring with DRC   |
| Security              | TACACS+, Broadcast storm protection, HTTPS/SSL, Local Account Accessibility, Port Lock, RADIUS, Rate Limit, SSH   |
| Time Management       | NTP Server/Client, SNTP   |

### Switch Properties

|                   |               |
|-------------------|---------------|
| IGMP Groups       | 256           |
| Max. No. of VLANs | 256           |
| Priority Queues   | 4             |
| VLAN ID Range     | VID 1 to 4094 |

### LED Interface

|                |  |
|----------------|--|
| LED Indicators | PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL, Ethernet, PoE |
|----------------|--|

## Serial Interface

|              |   |
|--------------|---|
| Console Port | RS-232 (M12 B-coded 5-pin female connector) |
|--------------|---|

## Power Parameters

|                             |                                  |
|-----------------------------|----------------------------------|
| Input Voltage               | 24/36/48/72/96/110 VDC           |
| No. of Power Inputs         | 2                                |
| Operating Voltage           | 16.8 to 137.5 VDC                |
| Overload Current Protection | Supported                        |
| Reverse Polarity Protection | Supported                        |
| Total PoE Power Budget      | 120 W                            |
| Input Current               | 7.5 A @ 24 VDC                   |
| Power Connector             | M12 K-coded 5-pin male connector |

## Physical Characteristics

|              |   |
|--------------|---|
| Housing      | Metal   |
| IP Rating    | IP40  |
| Dimensions   | 291.6 x 117.7 x 132.2 mm (11.48 x 4.63 x 5.20 in)                               |
| Weight       | TN-G4516 without bypass: 2,730g(6.02lb)<br>TN-G4516 with bypass: 2,740g(6.04lb) |
| Installation | Wall mounting   |
| Protection   | -CT model with PCB conformal coating  |

## Environmental Limits

|  |                            |
|--|----------------------------|
| Operating Temperature                  | -40 to 70°C (-40 to 158°F) |
| Storage Temperature (package included) | -40 to 85°C (-40 to 185°F) |
| Ambient Relative Humidity              | 5 to 95% (non-condensing)  |
| Altitude                               | 2000 m                     |

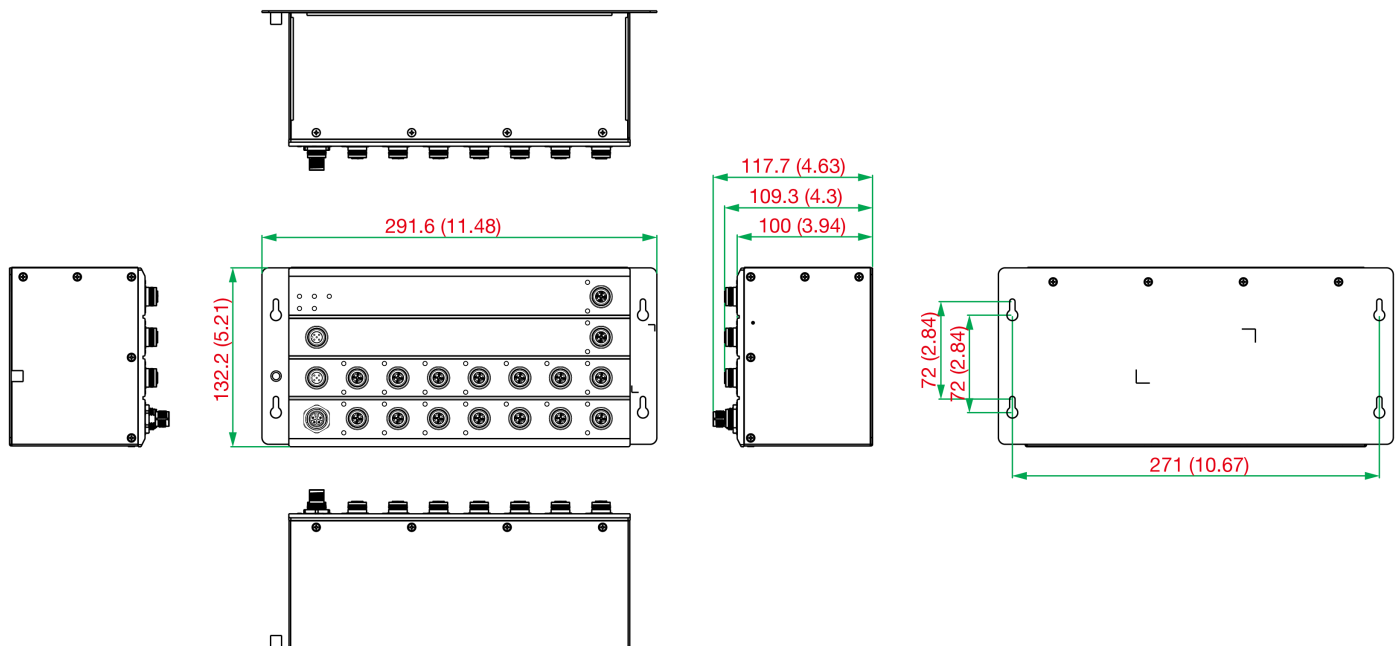
## Standards and Certifications

|                         |  |
|-------------------------|--|
| EMC                     | EN 55032/24  |
| EMS                     | IEC 61000-4-2 ESD: Contact: 6 kV; Air: 8 kV<br>IEC 61000-4-3 RS: 80 MHz to 6 GHz: 20 V/m<br>IEC 61000-4-4 EFT: Power: 2 kV; Signal: 2 kV<br>IEC 61000-4-5 Surge: Power: 2 kV; Signal: 2 kV<br>IEC 61000-4-6 CS: 10 V<br>IEC 61000-4-8 PFMF |
| Freefall                | IEC 60068-2-31   |
| Radio Frequency         | FCC  |
| Railway                 | EN 50121-4, EN 50155, IEC 60571  |
| Railway Fire Protection | EN 45545-2   |
| Safety                  | IEC 62368-1, UL 62368-1  |

|                         |   |
|-------------------------|---|
| Shock                   | IEC 60068-2-27, IEC 61373, EN 50155                                       |
| Vibration               | IEC 60068-2-64, IEC 61373, EN 50155                                       |
| <b>Declaration</b>      |   |
| Green Product           | RoHS, CRoHS, WEEE   |
| <b>MTBF</b>             |   |
| Time                    | TN-G4516 without bypass: 436,136 hrs<br>TN-G4516 with bypass: 435,764 hrs |
| Standards               | Telcordia SR332   |
| <b>Warranty</b>         |   |
| Warranty Period         | 5 years   |
| Details                 | See <a href="http://www.moxa.com/warranty">www.moxa.com/warranty</a>      |
| <b>Package Contents</b> |   |
| Device                  | 1 x TN-G4500 Series switch  |
| Installation Kit        | 1 x wall-mounting kit   |
| Documentation           | 1 x quick installation guide<br>1 x warranty card                         |

## Dimensions

Unit: mm (inch)



## Ordering Information

| Model Name                    | 10/100/1000BaseT(X) Ports, M12 X-coded 8-pin Female Connector | 10G BaseT(X) Ports, M12 X-coded 8-pin Female Connector With Bypass Relay | 100/1000BaseT(X) PoE Ports, M12 X-coded 8-pin Female Connector | 10G BaseT(X) PoE Ports, M12 X-coded 8-pin Female Connector | Conformal Coating |
|-------------------------------|---|--|--|--|-------------------|
| TN-G4516-8GPoE-4XGPoE-WV-T    | 4   | -  | 8  | 4  | No                |
| TN-G4516-8GPoE-4XGPoE-WV-CT-T | 4   | -  | 8  | 4  | Yes               |

| Model Name                            | 10/100/1000BaseT(X) Ports, M12 X-coded 8-pin Female Connector | 10G BaseT(X) Ports, M12 X-coded 8-pin Female Connector With Bypass Relay | 100/1000BaseT(X) PoE Ports, M12 X-coded 8-pin Female Connector | 10G BaseT(X) PoE Ports, M12 X-coded 8-pin Female Connector | Conformal Coating |
|---------------------------------------|---|--|--|--|-------------------|
| TN-G4516-8GPoE-2XGPoE-2XGTXBP-WV-T    | 4   | 2  | 8  | 2  | No                |
| TN-G4516-8GPoE-2XGPoE-2XGTXBP-WV-CT-T | 4   | 2  | 8  | 2  | Yes               |

## Accessories (sold separately)

### Storage Kits

|                  |  |
|------------------|--|
| ABC-02-P-USB-M12 | Configuration backup and restoration tool with M12 connector for Moxa's ToughNet series of managed Ethernet switches and wireless AP/bridge/client, -40 to 75°C operating temperature, conformal coating |
|------------------|--|

### M12 Connector Caps

|                 |  |
|-----------------|--|
| A-CAP-M12M-M    | Metal cap for M12 male connector             |
| A-CAP-M12F-M-PP | Metal cap for M12 female push-pull connector |

### Connectors

|                    |   |
|--------------------|---|
| M12X-8PMM-IP67-HTG | X-coded screw-in Gigabit Ethernet connector, 8-pin male M12 connector, IP67 |
|--------------------|---|

### Cables

|                             |  |
|-----------------------------|--|
| CBL-M12XMM8P-Y-300-IP67     | M12-to-M12 Cat-5 UTP Ethernet cable, 8-pin male X-coded crimp type M12 connector, IP67, 3 m  |
| CBL-M12XMM8PRJ45-Y-200-IP67 | M12-to-RJ45 Cat-5 UTP Ethernet cable, 8-pin male X-coded crimp type M12 connector, IP67, 2 m |
| CBL-M12XMM8P-Y-100-IP67     | M12-to-M12 Cat-5 UTP Ethernet cable, 8-pin male X-coded crimp type M12 connector, IP67, 1 m  |

© Moxa Inc. All rights reserved. Updated May 22, 2020.

This document and any portion thereof may not be reproduced or used in any manner whatsoever without the express written permission of Moxa Inc. Product specifications subject to change without notice. Visit our website for the most up-to-date product information.