

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 items¹
- -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

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 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 IEEE 802.1p for Class of Service IEEE 802.1Q for VLAN Tagging IEEE 802.1s for Multiple Spanning Tree Protocol IEEE 802.1w for Rapid Spanning Tree Protocol IEEE 802.1X for authentication IEEE 802.3 for 10BaseT IEEE 802.3ab for 1000BaseT(X) IEEE 802.3u for 100BaseT(X) IEEE 802.3bz for 5GBaseT and 2.5GBaseT IEEE 802.3an for 10GBaseT IEEE 802.3ad for Port Trunk with LACP IEEE 802.3af/at for PoE/PoE+ output 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
Jumbo Frame Size	9.216 KB

LED Interface

LED Indicators	PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL, Ethernet, PoE
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Serial Interface

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

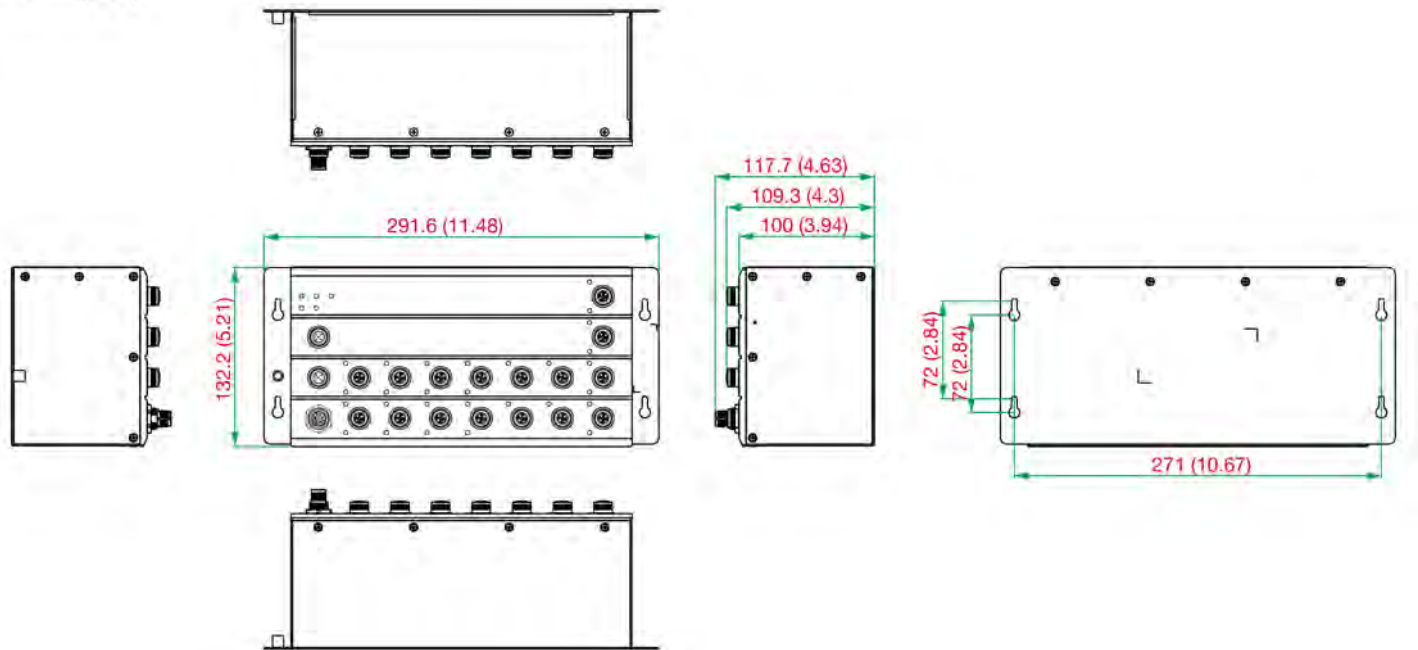
Physical Characteristics

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) 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 IEC 61000-4-3 RS: 80 MHz to 6 GHz: 20 V/m IEC 61000-4-4 EFT: Power: 2 kV; Signal: 2 kV IEC 61000-4-5 Surge: Power: 2 kV; Signal: 2 kV IEC 61000-4-6 CS: 10 V 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
Declaration	
Green Product	RoHS, CRoHS, WEEE
MTBF	
Time	TN-G4516 without bypass: 436,136 hrs TN-G4516 with bypass: 435,764 hrs
Standards	Telcordia SR332
Warranty	
Warranty Period	5 years
Details	See www.moxa.com/warranty
Package Contents	
Device	1 x TN-G4500 Series switch
Installation Kit	1 x wall-mounting kit
Documentation	1 x quick installation guide 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
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)

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
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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
CBL-M12KFF5POPEN-O-150-IP67	CBL-M12KFF5POPEN-O-150-IP67
CBL-M12BMM5PF9-BK-150-IP68	CBL-M12BMM5PF9-BK-150-IP68

Storage Kits

ABC-02-P-USB-M12-CT-T

USB-based configuration backup and restoration tool with M12 connector for Moxa's ToughNet series of managed Ethernet switches and wireless APs/bridges/clients, -40 to 75°C operating temperature, conformal coating

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