TN-G4500 Series

EN 50155 Layer 2 multi-Gigabit switches

Features and Benefits

- 4 10G ports and 12 Gigabit ports with M12 connectors

- Isolated power with 24 to 110 VDC power supply range

- Complies with all EN 50155 mandatory test items[1]

- -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

EN 50155   EN 50121-4   CE   FC

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 combines a 24 to 110 VDC wide power input range that allows you to use the same type of power source at different sites around the globe, with an isolated dual power input design to 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
- 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

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

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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

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	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 DHCP Filter GMRP GVRP IGMP Snooping v1/v2/v3 IGMP Querier Port-based VLAN Static Multicast
Industrial Protocols	SNMPv1/v2c/v3
Management	Account Management Back Pressure Flow Control DHCP Client (options 1/3/50/51/53/54/55/57/66/67) DHCP option 82 (relay agent) DHCP Server (options 1/3/12/15/42/50/55) DNS Server Flow control HTTP ICMP IPv4/IPv6 Loop Protection LLDP Port-based DHCP Server Port Mirroring 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	LACP MSTP

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	RSTP
	STP
	Static Port Trunk
	Turbo Chain
	Turbo Ring v2
	Turbo Ring with DRC
Security	Access control list
	TACACS+
	Broadcast storm protection
	HTTPS/SSL
	Local Account Accessibility
	Port Lock
	RADIUS
	Rate Limit
	SSH
	Trust access control
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

Serial Interface

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

Power Parameters

No. of Power Inputs	2
Input Voltage	24/36/48/72/96/110 VDC
Operating Voltage	16.8 to 137.5 VDC
Input Current	7.5 A @ 24 VDC
Power Consumption (Max.)	With PoE disabled:
	21.9 W @ 24 VDC
	21.8 W @ 110 VDC
	With PoE enabled:
	49.1 W @ 24 VDC
	38.2 W @ 110 VDC
Total PoE Power Budget	120 W
Overload Current Protection	Supported
Reverse Polarity Protection	Supported
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: 2,780g(6.13lb) TN-G4516 with bypass: 2,790g(6.15lb)
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 55032/35
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

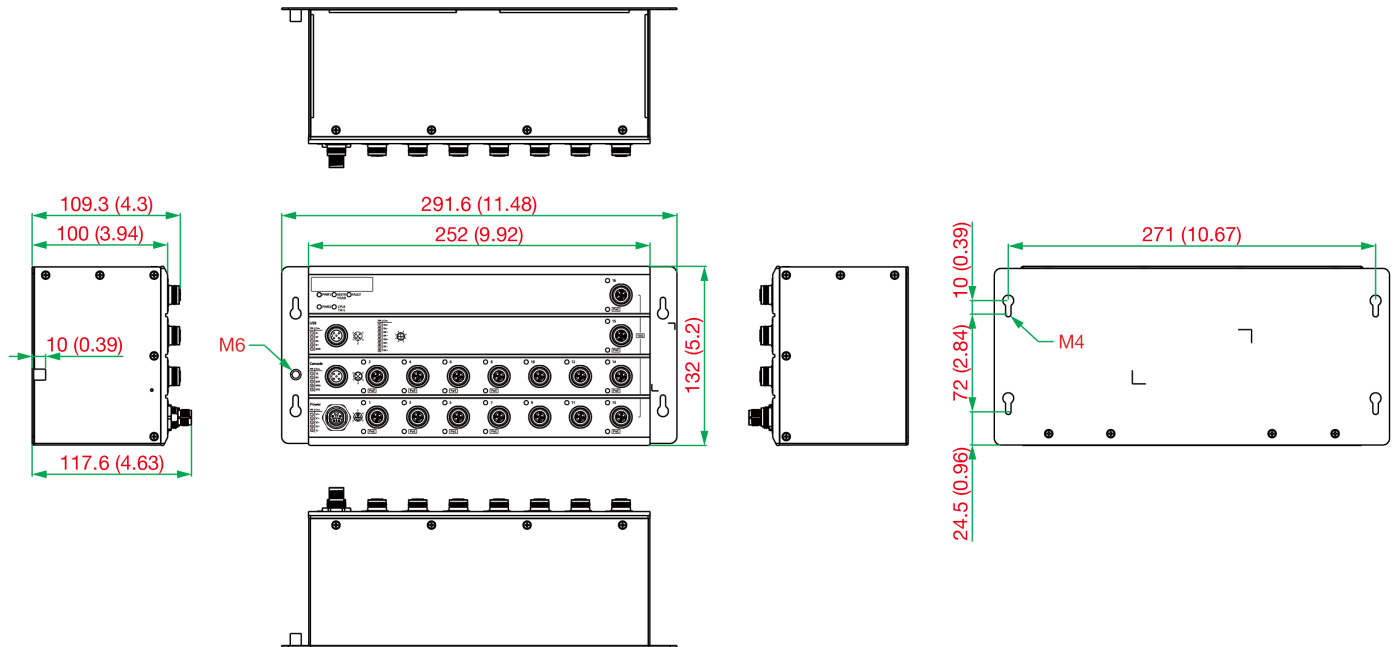|	
Time	TN-G4516 without bypass: 436,136 hrs TN-G4516 with bypass: 435,764 hrs
Standards	Telcordia Standard SR-332

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

Connectors

M12X-8PMM-IP67-HTG	Crimp type M12 connector, male 8-pin, X-coded, IP67-rated

Cables

CBL-M12XMM8P-Y-300-IP67	X-coded male M12-to-8-pin open wire cable, yellow, IP67-rated, 3 m
CBL-M12XMM8PRJ45-Y-200-IP67	X-coded male M12-to-RJ45 Ethernet cable, yellow, IP67-rated, 2 m
CBL-M12XMM8P-Y-100-IP67	X-coded male M12-to-8-pin open wire cable, yellow, IP67-rated, 1 m
CBL-M12KFF5POPEN-O-150-IP67	K-coded female M12-to-5-pin open wire power cable, orange, IP67-rated, 1.5 m
CBL-M12BMM5PF9-BK-150-IP68	B-coded male M12-to-5-pin DB9 console cable, black, IP68-rated, 1.5 m

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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