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MOXA®
TN-4500B Series
Switch Ethernet
Industrial

MOXA TN-4500B Series Switch Ethernet Industrial Owner's Manual

Contents

MOXA®

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Product Information
The TN-4500B Series is a range of Ethernet-managed switches with 8 to 28 ports designed for rolling stock railway applications, compliant with the EN 50155 standard. The switches come with various port configurations

including PoE options and support for different Ethernet standards.

Product Usage Instructions

Ethernet Interface
The switch features 10/100BaseT(X) Ports with M12 D-coded 4-pin female connectors and 10/100/1000BaseT(X) Ports with M12 X-coded 8-pin female connectors. PoE Ports are also available for both types of interfaces.

Software Features
The switch supports various Ethernet software features including VLAN Tagging, Spanning Tree Protocols, Quality of Service (QoS), and more. It can be configured through Command Line Interface (CLI), Web Console, or Windows Utility.

Security and Management
Security features include HTTPS/SSL, SSH, RADIUS, TACACS+, access control lists, and more. The switch also supports time management protocols like SNTP and NTP.

Physical Characteristics
The switch comes in different models with varying dimensions and power requirements. It features LED indicators for status monitoring and supports multiple power inputs for redundancy.

Features and Benefits

- Developed according to the IEC 62443-4-1 and compliant with the IEC 62443-4-2 industrial cybersecurity standards
- Up to 28 Ethernet ports with M12 push-pull connectors
- Up to 8 Gigabit ports with optional dual relay bypass functionality
- Up to 24 PoE ports with a 150 W total PoE power budget
- Isolated power with 24 to 110 VDC power supply range
- -40 to 70°C system operating temperature range
- Complies with all EN 50155 mandatory test items

Certifications

Introduction

- The ToughNet TN-4500B Series M12 managed Ethernet switches are designed for railway applications, including rolling stock installations. The switches use M12 circular connectors to ensure tight, robust connections, and guarantee reliable operation in industrial environments where vibration and shock are commonplace. The TN-4500B Series Ethernet switches provide 8 to 28 Ethernet ports with or without IEEE 802.3at/af compliant PoE functionality. The
- Gigabit models further feature up to 8 Gigabit Ethernet ports.
- 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 communication

systems.

- Furthermore, the -40 to 70°C operating temperature range of the switches ensures they can be deployed in harsh environments. TN-4500B Series Ethernet switches are compliant with the mandatory sections of EN 50155, covering operating temperature, power input voltage, surge, ESD, and vibration, as well as conformal coating and power insulation, making the switches suitable for a variety of industrial applications.

Additional Features and Benefits

- IEC 62443-4-2:2019 compliant cybersecurity features
- Robust EN 50155 Ethernet switches for rolling stock applications
- Turbo Ring and RSTP/MSTP/STP/MRP for network redundancy
- Wall mounting installation
- Automatic recovery of the IP address of connected devices
- Configurable by web browser, Telnet/serial console, or Windows utility

Specifications

Ethernet Interface

10/100BaseT(X) Ports (M12 D-coded 4-pin female connector)	TN-4516B-CT-T: 16 TN-4516B-8G-CT-T: 8
PoE Ports (10/100BaseT(X), M12 D-coded 4-pin female connector)	TN-4516B PoE models: 8 TN-4520B models: 12
10/100/1000BaseT(X) Ports (M12 X-coded 8-pin female connector)	TN-4516B-8G-CT-T: 8 TN-4516B-8P-4G-4GP-CT-T: 4 TN-4520B-12P-4G-4GP-CT-T: 4
PoE Ports (100/1000BaseT(X), M12 X-coded 8-pin female connector)	16/20-port PoE models: 4

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**

10/100/1000BaseT(X) Ports (M12 X-coded 8-pin female connector with bypass relay)	-4GBP models: 4
Standards	IEEE 802.3 for 10BaseT IEEE 802.3u for 100BaseT(X) IEEE 802.3ab for 1000BaseT(X) IEEE 802.3af/at for PoE/PoE+ output IEEE 802.1D-2004 for Spanning Tree Protocol IEEE 802.1p for Class of Service IEEE 802.1Q for VLAN Tagging IEEE 802.1w for Rapid Spanning Tree Protocol IEEE 802.1X for authentication IEEE 802.3x for flow control

Ethernet Software Features

Configuration Options	Command Line Interface (CLI) through Serial/Telnet/SSH Web Console (HTTP/HTTPS) Windows Utility
Filter	GMRP GVRP GARP 802.1Q VLAN IGMP Snooping v1/v2/v3 IGMP Querier Static Multicast
Management	IPv4/IPv6 Flow control Back Pressure Flow Control DHCP Server DHCP Client DHCP Relay Agent (Option 82) QoS/CoS/ToS ARP RARP LLLDPort Mirror Linkup Delay SMTP SNMP Trap SNMP Inform SNMPv1/v2c/v3 RMON TFTP SFTP HTTP HTTPS Telnet Syslog Private MIB Loop Protection
MIB	P-BRIDGE MIB Q-BRIDGE MIB Ethernet-like MIB IEEE8021-SPANNING-TREE-MIB IEEE8021-PAE-MIB IEEE8023-LAG-MIB LLDP-EXT-DOT1-MIB LLDP-EXT-DOT3-MIB SNMPv2-MIB RMON MIB Groups 1, 2, 3, 9
Redundancy Protocols	STP RSTP MSTP Turbo Ring v2 Link Aggregation Ring Coupling Static Port Trunk LACP

	MRP
Security	Rate Limit
	Trust access control Port Lock
	Sticky MAC HTTPS/SSL SSH RADIUS TACACS+
	Access control list
	Login and password policy DHCP Snooping
Time Management	SNTP Server/Client NTP Server/Client

Switch Properties

MAC Table Size	16 K
IGMP Groups	1024
Max. No. of VLANs	256
VLAN ID Range	VID 1 to 4094
Priority Queues	8

LED Interface

LED Indicators	PWR1, PWR2, FAULT, STATE, MSTR/HEAD, CPLR/TAIL, Ethernet ports, PoE ports

Serial Interface

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

USB Interface

M12 Connector	M12 A-coded 5-pin female (for ABC-02 USB storage)

Power Parameters

Input Current	TN-4516B non-PoE models: 0.83 A @ 24 VDC TN-4516B PoE models: 9.3 A @ 24 VDC TN-4520B PoE models: 9.3 A @ 24 VDC
Input Voltage	24/36/48/72/96/110 VDC Redundant dual inputs No. of power inputs: 2
Operating Voltage	16.8 to 137.5 VDC
Power Connector	M12 K-coded 5-pin male connector
Overload Current Protection	Supported
Reverse Polarity Protection	Supported
Total PoE Power Budget	TN-4516B/TN-4520B PoE models: 150 W

Physical Characteristics

Housing	Metal
Dimensions	TN-4516B non-PoE models: 230 x 115 x 98 mm (9.06 x 4.53 x 3.86 in) TN-4516B PoE models: 230 x 115 x 133 mm (9.06 x 4.53 x 5.24 in) TN-4520B models: 280 x 115 x 133 mm (11.02 x 4.53 x 5.24 in)
IP Rating	IP42

Weight	TN-4516B non-PoE models: 1,500 g (2.48 lb) TN-4516B PoE models: 2,310 g (5.10 lb) TN-4520B models: 2,419 g (5.33 lb)
Installation	Wall mounting
Protection	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	3000 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 1 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
Radio Frequency	FCC
Railway	IEC 60068-2-1, EN 50155
	IEC 60068-2-2, EN 50155
	IEC 60068-2-30, EN 50155
	IEC 60068-2-78
	EN 50121-4
	EN 50155
	IEC 60571
Railway Fire Protection	EN 45545-2
Safety	UL 62368-1
	IEC 62368-1
	EN 62368-1
	BSMI
Salt Spray Test	EN 50155
Shock	IEC 60068-2-27, IEC 61373, EN 50155
Vibration	IEC 60068-2-64, IEC 61373, EN 50155
Package Vibration Test	ISTA 1A
Package Drop Test	ISTA 1A

Declaration

Green Product	RoHS, RoHS, WEEE

MTBF

Time	TN-4516B-CT-T: 1,346,637 hrs
	TN-4516B-8G-CT-T: 1,148,405 hrs
	TN-4516B-8P-4G-4GP-CT-T: 881,578 hrs
	TN-4516B-8P-4GP-4GBPCT-T: 707,988 hrs
	TN-4520B-12P-4G-4GP-CT-T: 851,025 hrs
	TN-4520B-12P-4GP-4GBPCT-T: 688,231 hrs
Standards	Telcordia SR332 Issue 4

Warranty

Warranty Period	5 years
Details	See **www.moxa.com/warranty**

Package Contents

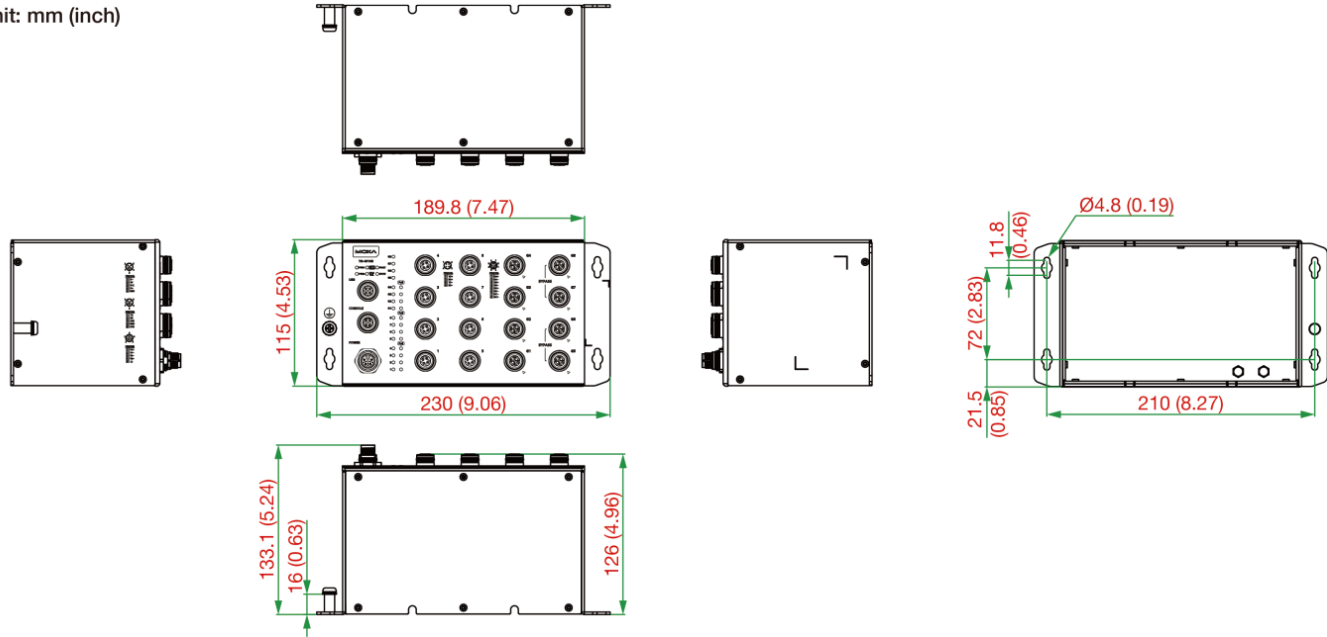| Device	1 x TN-4500B Series switch
Installation Kit	1 x wall-mounting kit
	2 x cap, male, metal, for M12 ports (console and USB storage ports, pre-installed on the switch)
	4/6/8/10/14 x cap, male, metal, for M12 ports (Ethernet ports, pre-installed on the switch)
Documentation	1 x quick installation guide 1 x warranty card

Dimensions
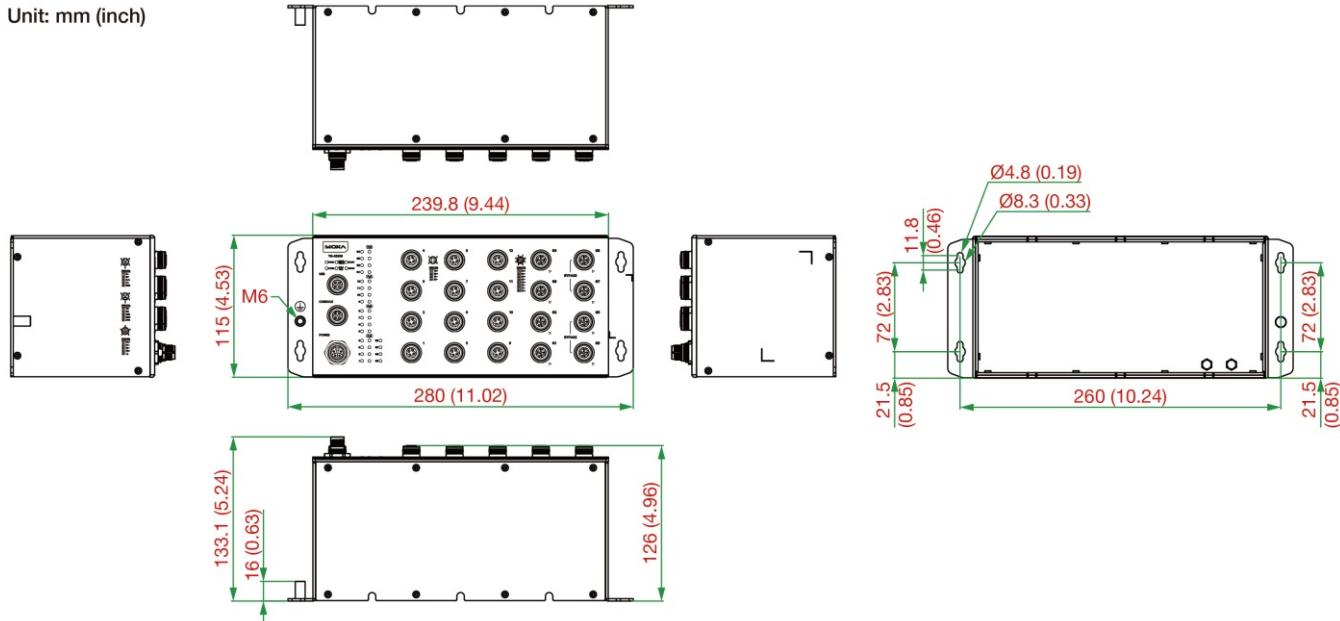
TN-4516B Non-PoE Models

Unit: mm (inch)

TN-4516B PoE Models

Unit: mm (inch)

189.8 (7.47)
115 (4.53)
230 (9.06)

Ø4.8 (0.19)
11.8 (0.46)
72 (2.83)
21.5 (0.85)
210 (8.27)

133.1 (5.24)
16 (0.63)
126 (4.96)

TN-4520B PoE Models

Unit: mm (inch)

239.8 (9.44)
115 (4.53)
M6
280 (11.02)

Ø4.8 (0.19)
Ø8.3 (0.33)
11.8 (0.46)
72 (2.83)
21.5 (0.85)
260 (10.24)
72 (2.83)
21.5 (0.85)

133.1 (5.24)
16 (0.63)
126 (4.96)
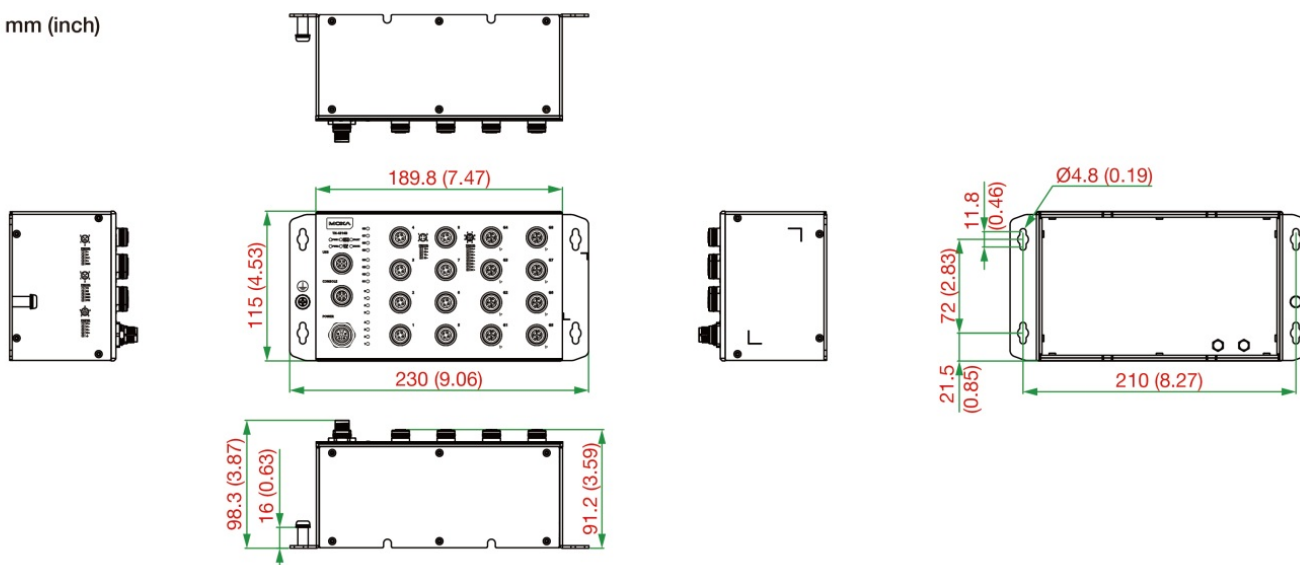
Ordering Information

Model Name	10/100/1000BaseT(X) Ports, M12 X-coded 8–pin Female Connector	10/100/1000BaseT(X) PoE Ports, M12 X-coded 8–pin Female Connector	10/100/1000BaseT(X) Ports, M12 X-coded 8–pin Female Connector With Bypass Relay	10/100BaseT(X) Ports, M12 D-coded 4-pin Female Connector	10/100BaseT(X) PoE PoE Ports, M12 D-coded 4-pin Female Connector	PoE Power Budget
TN-4516B-CT-T	–	–	–	16	–	–
TN-4516B-8G-CT-T	8	–	–	8	–	–
TN-4516B-8P-4G-4GP-CT- T	4	4	–	–	8	150 W
TN-4516B-8P-4GP-4GBP- CT-T	–	4	4	–	8	150 W
TN-4520B-12P-4G-4GP- CT-T	4	4	–	–	12	150 W
TN-4520B-12P-4GP-4GBP- CT-T	–	4	4	–	12	150 W

Accessories (sold separately)

M12 Connector Caps

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
M12K-5PFF-IP65-PxC	Crimp type M12 connector, female 5-pin, K-coded, IP65-rated
M12D-4PMM-IP67	IDC type M12 connector, male 4-pin, D-coded, IP67-rated
M12D-4P-IP68	Solder type M12 connector, male 4-pin, D-coded, IP68-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-M12BMM5PF9-BK-150-IP68	B-coded male M12-to-5-pin DB9 console cable, black, IP68-rated, 1.5 m
CBL-M12KFF5POPEN-O-150-IP67	K-coded female M12-to-5-pin open wire power cable, orange, IP67-rated, 1.5 m
CBL-M12D(MM4P)/RJ45-100 IP67	D-coded male M12-to-RJ45 Ethernet cable, black, IP67-rated, 1 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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FAQs

What certifications does the TN-4500B Series have?
The TN-4500B Series is certified under the EN 50155 standard for rolling stock railway applications.

How can I configure the switch?
You can configure the switch using the Command Line Interface (CLI), Web Console (HTTP/HTTPS), or the Windows Utility provided.

What security features are supported by the switch?
The switch supports security features such as HTTPS/SSL, SSH, RADIUS, TACACS+, access control lists, and more for secure network operations.

Documents / Resources

MOXA TN-4500B Series Switch Ethernet Industrial [pdf] Owner's Manual
TN-4520B-12P-4GP-4GBP-CT-T, TN-4516B-8P-4GP-4GBP-CT-T, TN-4516B-8G-CT-T, TN-4500B Series Switch Ethernet Industrial, TN-4500B Series, Switch Ethernet Industrial, Ethernet Industrial, Industrial

References

- ᵀᴹ **Moxa - Your Trusted Partner in Automation**
- ᵀᴹ **Moxa - Your Trusted Partner in Automation**
- **User Manual**