

TN-4500B Series

EN 50155 8 to 28 ports Ethernet managed switches



Features and Benefits

- Up to 28 Ethernet ports with M12 inner push-pull connectors compliant with IEC 61076-010
- 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 items¹
- IEC 62443-4-2 Security Level 2 certified
- Powered by MX-NOS Rail Version, a comprehensive management firmware tailored to the unique demands of onboard railway networks

Certifications



EN 50155



EN 50121-4



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

- 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

IEC 62443-4-2 Security Level 2 Certified

TN-4500B Series models (firmware v2.0) are IEC 62443-4-2 Security Level 2 certified (<https://certificates.iecee.org/#/deliverables/CERT/1995073/view>), enhancing cybersecurity in industrial networks.

Specifications

Ethernet Interface

10/100BaseT(X) Ports (M12 D-coded 4-pin female connector)	TN-4508B-CT-T: 8 TN-4512B-CT-T: 12 TN-4516B-CT-T: 16 TN-4516B-8G-CT-T: 8
PoE Ports (10/100BaseT(X), M12 D-coded 4-pin female connector)	TN-4512B PoE models: 8 TN-4516B PoE models: 8 TN-4520B models: 12 TN-4524B models: 16 TN-4528B models: 20

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)	TN-4512B-8P-4G-CT-T: 4 TN-4516B-8G-CT-T: 8 TN-4516B-8P-4G-4GP-CT-T: 4 TN-4520B-12P-4G-4GP-CT-T: 4 TN-4524B-16P-4G-4GP-CT-T: 4 TN-4528B-20P-4G-4GP-CT-T: 4
PoE Ports (100/1000BaseT(X), M12 X-coded 8-pin female connector)	TN-4516B PoE models: 4 TN-4520B PoE models: 4 TN-4524B PoE models: 4 TN-4528B PoE models: 4
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) MXview One MXconfig
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 LLDP Port Mirroring 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 Access control list DHCP Snooping HTTPS/SSL Login and password policy MAC Security (MACsec) Port Lock RADIUS SSH Sticky MAC TACACS+ Trust access control
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
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Serial Interface

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

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

Input Current	TN-4508B models: 0.46 A @ 24 V TN-4512B non-PoE models: 0.56 A @ 24 V TN-4512B PoE models: 4.9 A @ 24 V TN-4516B non-PoE models: 0.83 A @ 24 V TN-4516/20/24/28B PoE models: 9.3 A @ 24 V
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
Power Consumption (Max.)	Non-PoE models: TN-4508B-CT-T: 11.3 W @ 24 VDC, 10.9 W @ 110 VDC TN-4512B-CT-T: 13.3 W @ 24 VDC, 12.7 W @ 110 VDC TN-4516B-CT-T: 15.9 W @ 24 VDC, 15.3 W @ 110 VDC TN-4516B-8G-CT-T: 19.9 W @ 24 VDC, 18.9 W @ 110 VDC PoE models (with PoE disabled): TN-4512B-4G-8GP-CT-T: 16.0 W @ 24 VDC, 17.0 W @ 110 VDC TN-4512B-8P-4G-CT-T: 16.0 W @ 24 VDC, 17.0 W @ 110 VDC TN-4516B-4G-12GP-CT-T: 24.6 W @ 24 VDC, 24.8 W @ 110 VDC TN-4516B-8P-4G-4GP-CT-T: 24.6 W @ 24 VDC, 24.8 W @ 110 VDC TN-4516B-12GP-4GBP-CT-T: 24.6 W @ 24 VDC, 24.8 W @ 110 VDC TN-4516B-8P-4GP-4GBP-CT-T: 24.6 W @ 24 VDC, 24.8 W @ 110 VDC TN-4520B-12P-4G-4GP-CT-T: 25.6 W @ 24 VDC, 25.9 W @ 110 VDC TN-4520B-12P-4GP-4GBP-CT-T: 25.6 W @ 24 VDC, 25.9 W @ 110 VDC TN-4524B-16P-4G-4GP-CT-T: 26.5 W @ 24 VDC, 27.0 W @ 110 VDC TN-4524B-16P-4GP-4GBP-CT-T: 26.5 W @ 24 VDC, 27.0 W @ 110 VDC TN-4528B-20P-4G-4GP-CT-T: 28.5 W @ 24 VDC, 28.7 W @ 110 VDC TN-4528B-20P-4GP-4GBP-CT-T: 28.5 W @ 24 VDC, 28.7 W @ 110 VDC PoE models (with PoE enabled): TN-4512B-4G-8GP-CT-T: 23.7 W @ 24 VDC, 22.8 W @ 110 VDC TN-4512B-8P-4G-CT-T: 23.7 W @ 24 VDC, 22.8 W @ 110 VDC TN-4516B-4G-12GP-CT-T: 54.8 W @ 24 VDC, 36.8 W @ 110 VDC TN-4516B-8P-4G-4GP-CT-T: 54.8 W @ 24 VDC, 36.8 W @ 110 VDC TN-4516B-8P-4GP-4GBP-CT-T: 54.8 W @ 24 VDC, 36.8 W @ 110 VDC TN-4516B-12GP-4GBP-CT-T: 54.8 W @ 24 VDC, 36.8 W @ 110 VDC TN-4520B-12P-4G-4GP-CT-T: 56.3 W @ 24 VDC, 36.8 W @ 110 VDC TN-4520B-12P-4GP-4GBP-CT-T: 56.3 W @ 24 VDC, 36.8 W @ 110 VDC TN-4524B-16P-4G-4GP-CT-T: 50.1 W @ 24 VDC, 36.8 W @ 110 VDC TN-4524B-16P-4GP-4GBP-CT-T: 50.1 W @ 24 VDC, 36.8 W @ 110 VDC TN-4528B-20P-4G-4GP-CT-T: 60.1 W @ 24 VDC, 39.6 W @ 110 VDC TN-4528B-20P-4GP-4GBP-CT-T: 60.1 W @ 24 VDC, 39.6 W @ 110 VDC
Total PoE Power Budget	TN-4512B PoE models: 80 W TN-4516B PoE models: 150 W TN-4516B/20B/28B PoE models: 150 W TN-4520B PoE models: 150 W TN-4524B PoE models: 150 W TN-4528B PoE models: 150 W

Physical Characteristics

Housing	Metal
Dimensions	TN-4508B models: 180 x 115 x 83.5 mm (7.09 x 4.53 x 3.29 in) TN-4512B non-PoE models: 200 x 115 x 83.5 mm (7.87 x 4.53 x 3.29 in) TN-4512B PoE models: 200 x 115 x 102 mm (8.46 x 4.53 x 4.02 in) TN-4512B-4G-8GP-CT-T model: 215 x 115 x 102 mm (7.87 x 4.53 x 3.29 in) 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-4516B-4G-12GP-CT-T model: 255 x 115 x 113 mm (10.04 x 4.53 x 4.45 in) TN-4516B-12GP-4GBP-CT-T model: 255 x 115 x 113 mm (10.04 x 4.53 x 4.45 in) TN-4520B models: 280 x 115 x 133 mm (11.02 x 4.53 x 5.24 in) TN-4524B models: 313 x 115 x 133 mm (12.32 x 4.53 x 5.24 in) TN-4528B models: 348 x 115 x 133 mm (13.70 x 4.53 x 5.24 in)
IP Rating	IP42
Weight	TN-4508B models: 1,002 g (2.21 lb) TN-4512B non-PoE models: 1,123 g (2.48 lb) TN-4512B PoE models: 1,459 g (3.22 lb) TN-4512B-4G-8GP-CT-T model: 1,579 g (3.48 lb) TN-4516B non-PoE models: 1,500 g (3.31 lb) TN-4516B PoE models: 2,310 g (5.10 lb) TN-4516B-4G-12GP-CT-T model: 2,087 g (4.60 lb) TN-4516B-12GP-4GBP-CT-T model: 2,138 g (4.71 lb) TN-4520B models: 2,419 g (5.33 lb) TN-4524B models: 2,651 g (5.84 lb)

	TN-4528B models: 2,802 g (6.18 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
Cybersecurity	IEC 62443-4-2 Security Level 2
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, CRoHS, WEEE

MTBF

Time	TN-4508B-CT-T: 1,964,461 hrs TN-4512B-CT-T: 1,447,268 hrs TN-4512B-4G-8GP-CT-T: 1,299,337 hrs TN-4512B-8P-4G-CT-T: 1,033,581 hrs TN-4516B-CT-T: 1,346,637 hrs TN-4516B-4G-12GP-CT-T: 1,097,547 hrs TN-4516B-8G-CT-T: 1,148,405 hrs TN-4516B-8P-4G-4GP-CT-T: 881,578 hrs TN-4516B-8P-4GP-4GBP-CT-T: 852,972 hrs TN-4516B-12GP-4GBP-CT-T: 1,042,142 hrs TN-4520B-12P-4G-4GP-CT-T: 851,025 hrs TN-4520B-12P-4GP-4GBP-CT-T: 824,348 hrs TN-4524B-16P-4GP-4G-CT-T: 772,151 hrs TN-4524B-16P-4GP-4GBP-CT-T: 747,294 hrs TN-4528B-20P-4G-4GP-CT-T: 693,572 hrs TN-4528B-20P-4GP-4GBP-CT-T: 581,667 hrs
Standards	Telcordia SR332 Issue 4

Warranty

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

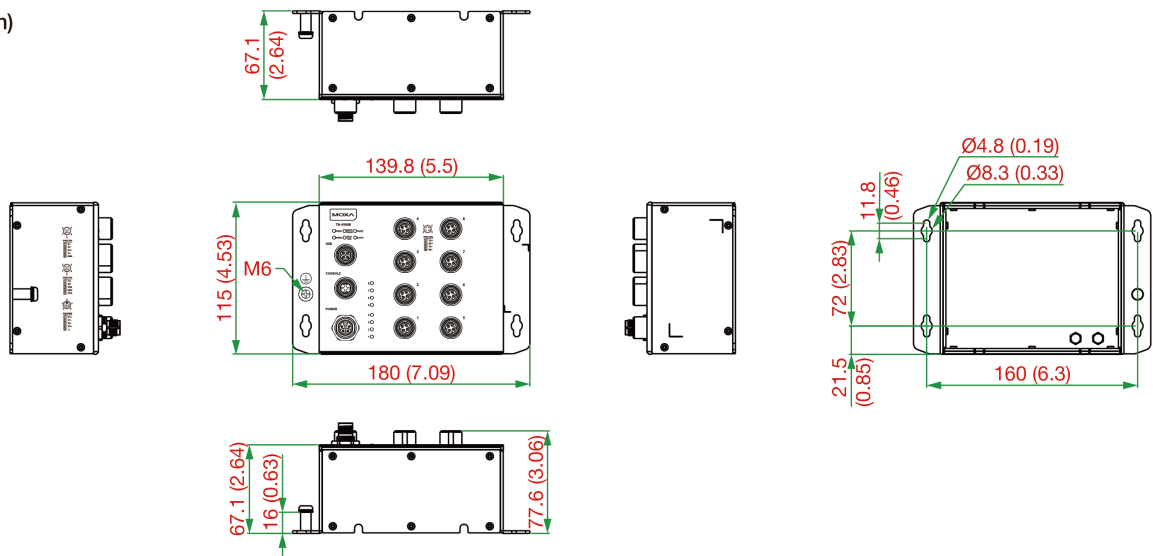
Package Contents

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

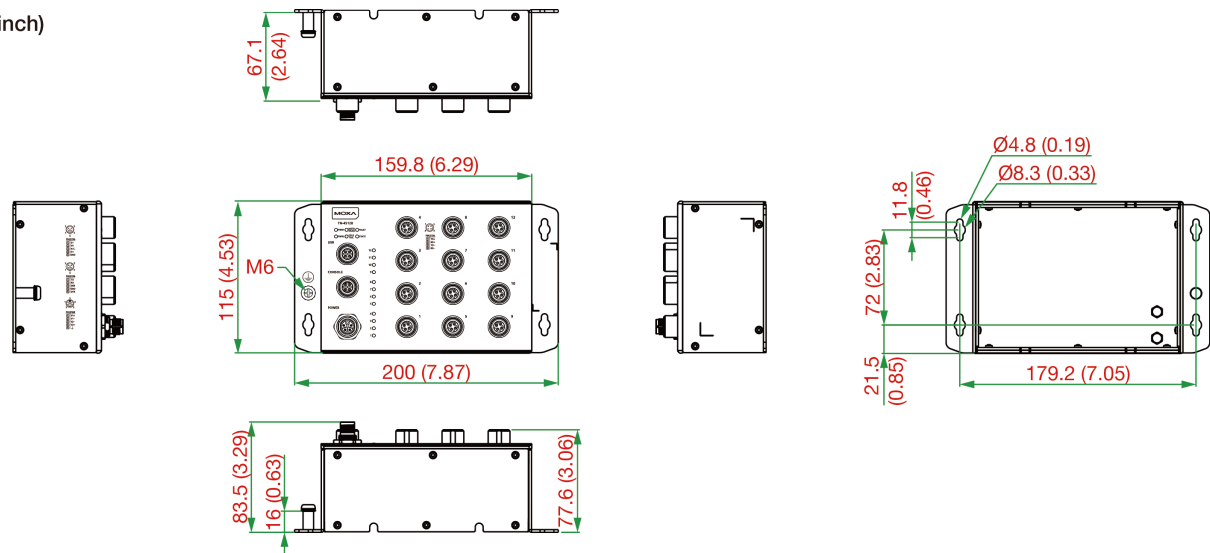
TN-4508B Models

Unit: mm (inch)



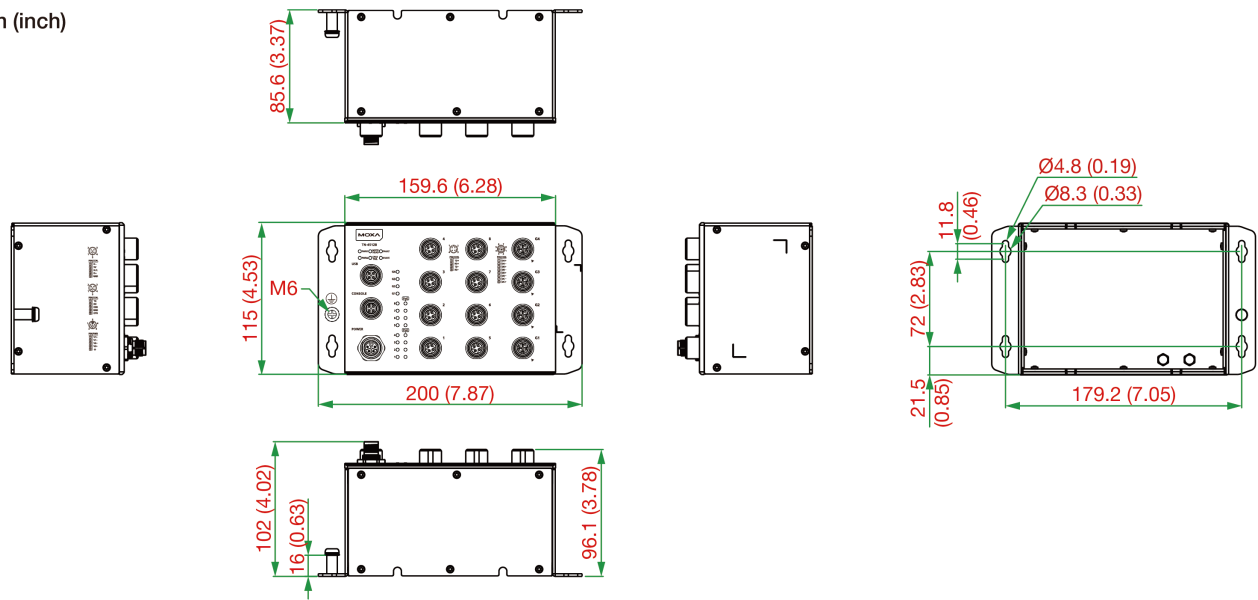
TN-4512B Non-PoE Models

Unit: mm (inch)



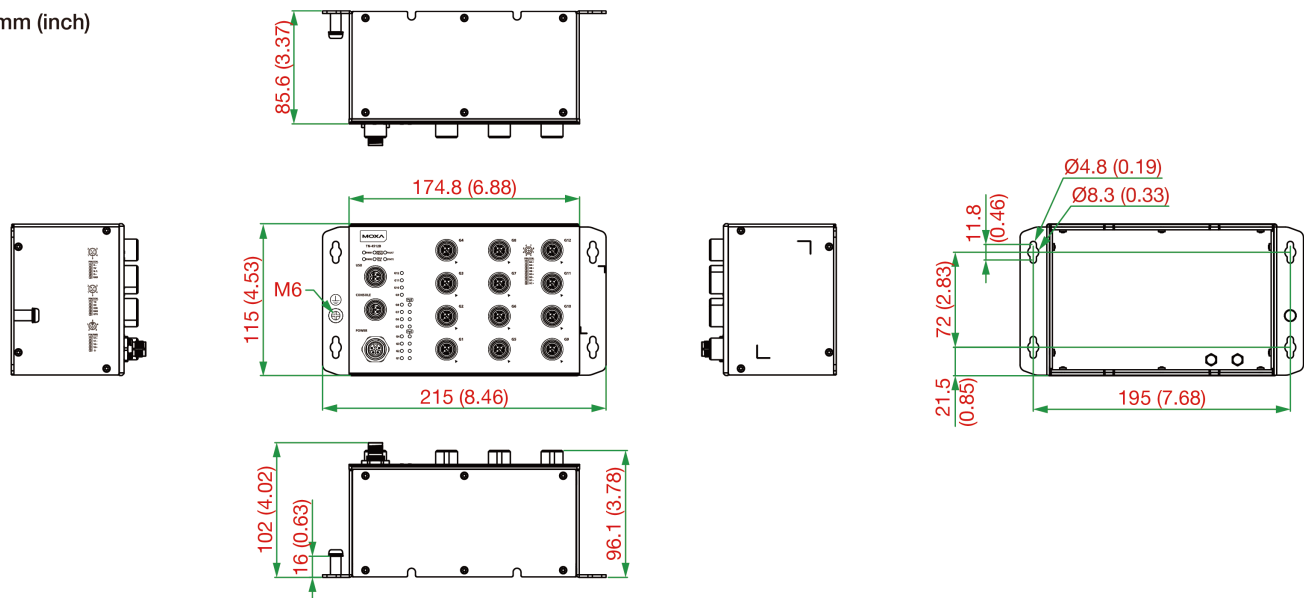
TN-4512B PoE Models

Unit: mm (inch)



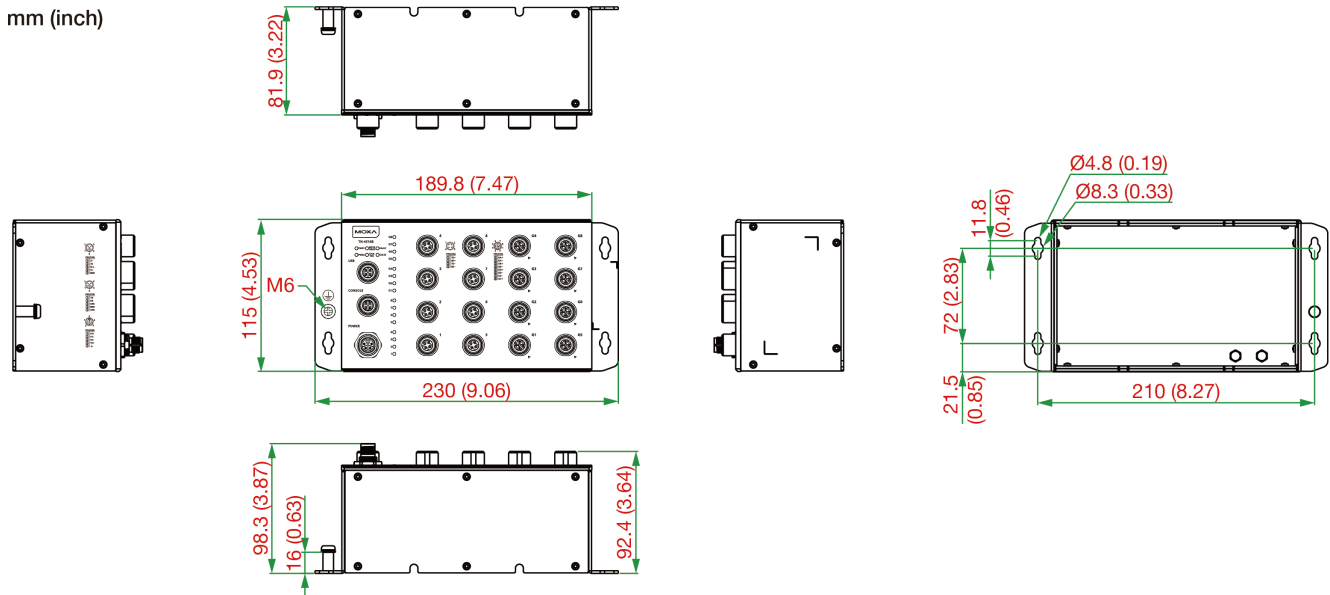
TN-4512B-4G-8GP-CT-T Model

Unit: mm (inch)



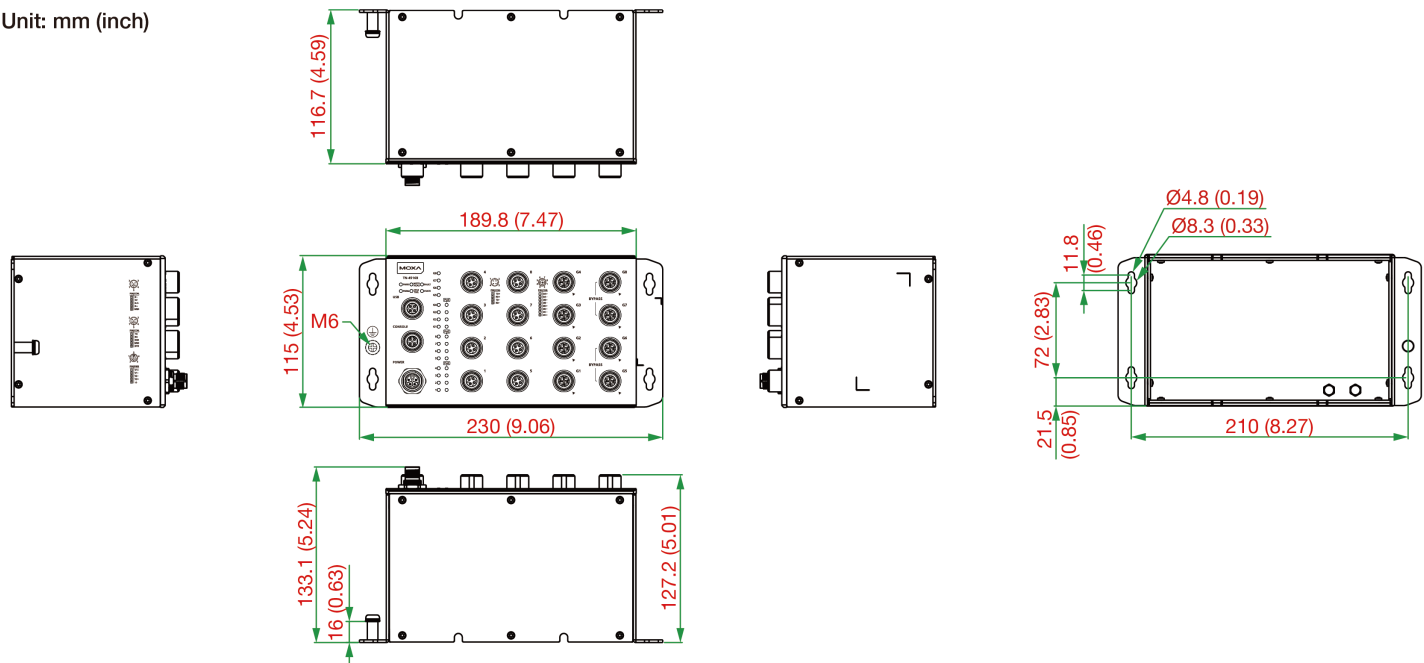
TN-4516B Non-PoE Models

Unit: mm (inch)



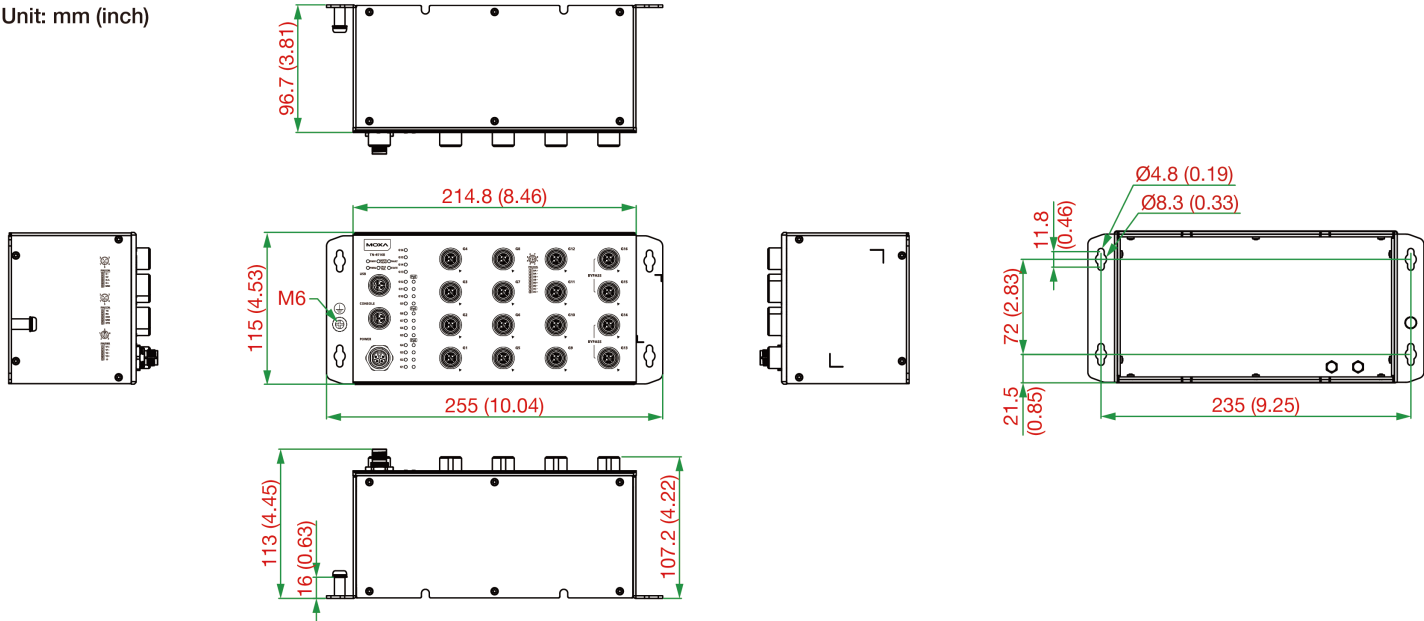
TN-4516B PoE Models

Unit: mm (inch)



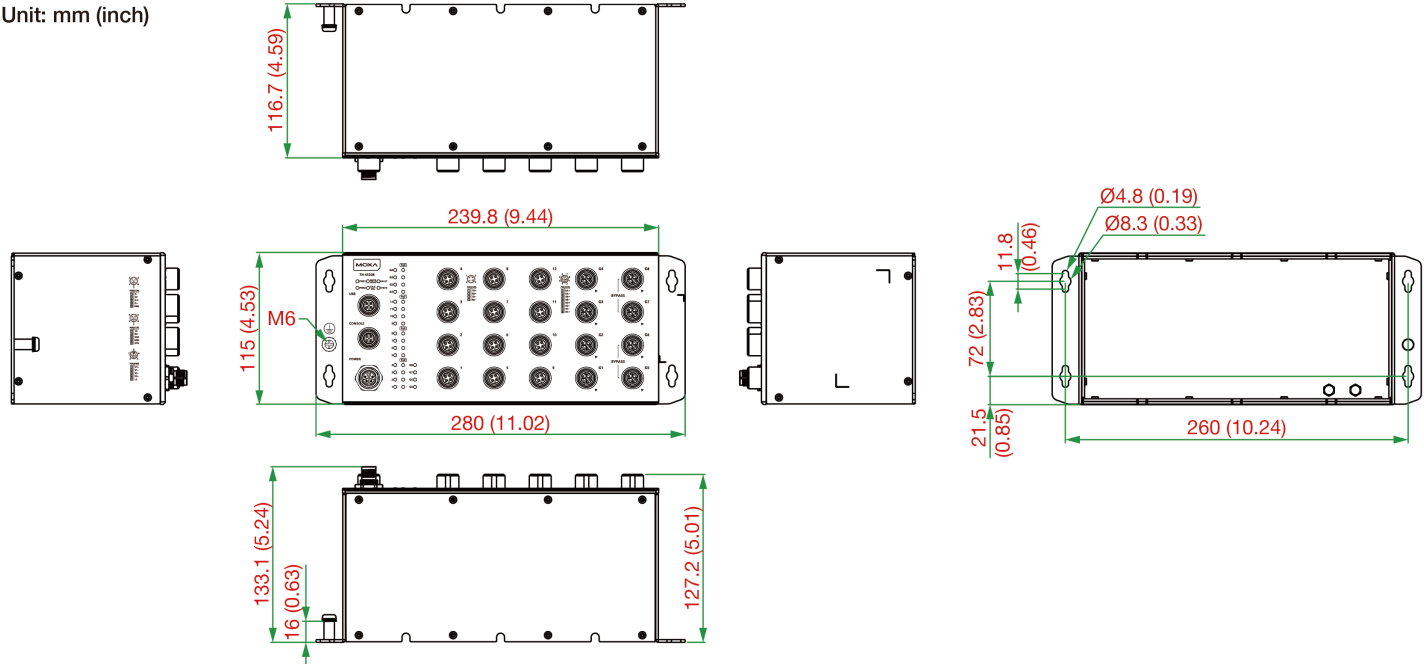
TN-4516B-4G-12GP-CT-T and TN-4516B-12GP-4GBP-CT-T Models

Unit: mm (inch)



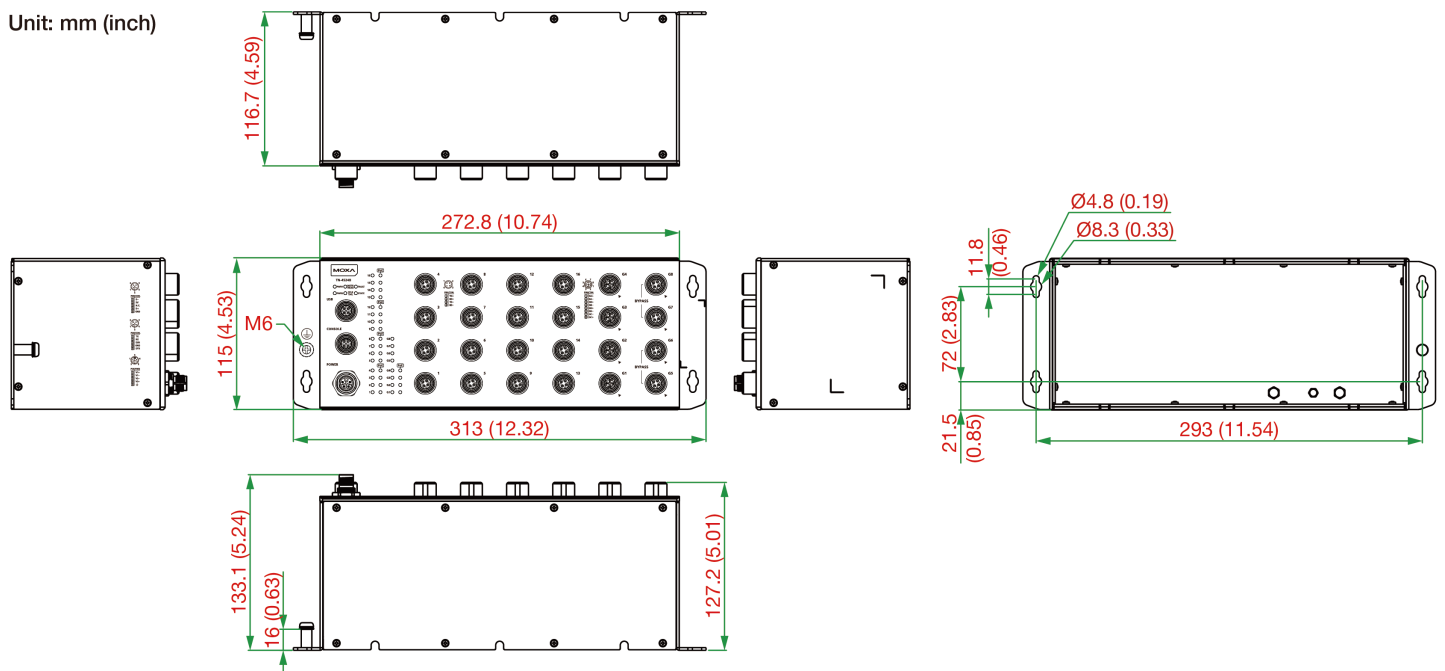
TN-4520B Models

Unit: mm (inch)



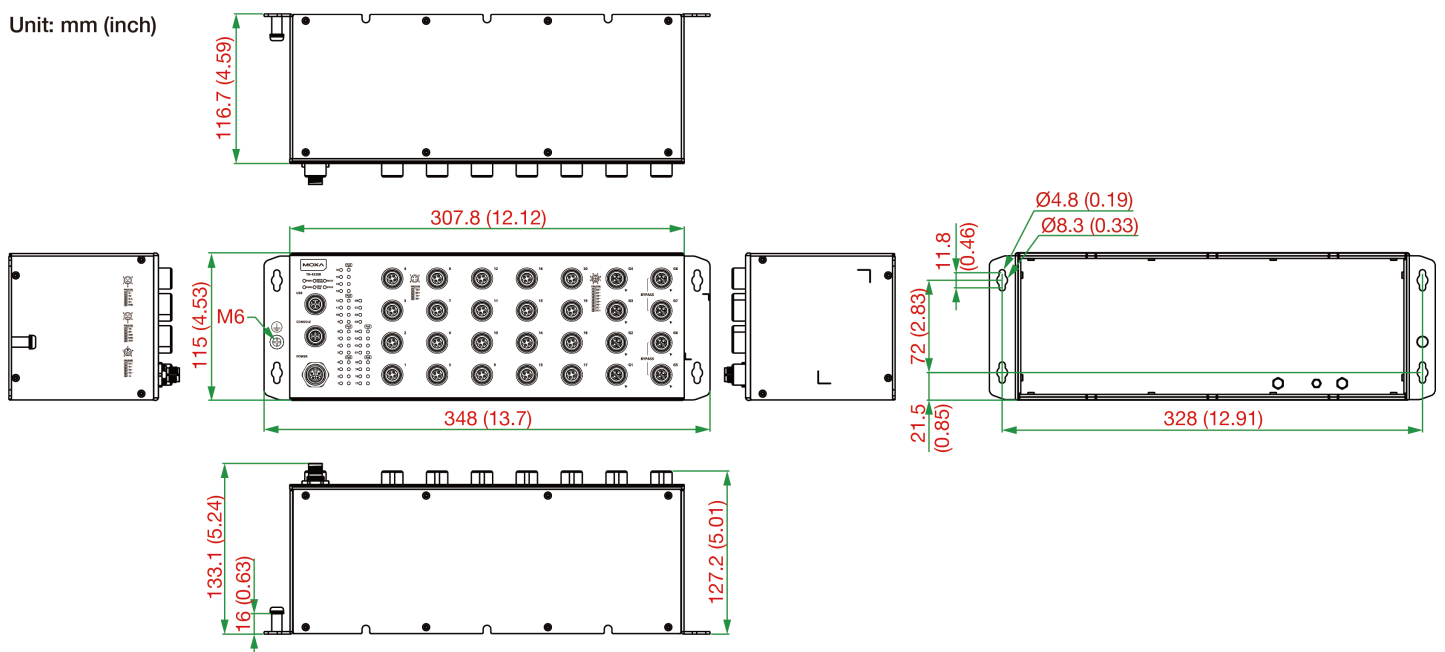
TN-4524B Models

Unit: mm (inch)



TN-4528B Models

Unit: mm (inch)



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-4508B-CT-T	-	-	-	8	-	-
TN-4512B-CT-T	-	-	-	12	-	-
TN-4512B-4G-8GP-CT-T	4	8	-	-	-	80 W
TN-4512B-8P-4G-CT-T	4	-	-	-	8	80 W
TN-4516B-CT-T	-	-	-	16	-	-

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-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-4516B-4G-12GP-CT-T	4	12	–	–	–	150 W
TN-4516B-12GP-4GBP-CT-T	–	12	4	–	–	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
TN-4524B-16P-4G-4GP-CT-T	4	4	–	–	16	150 W
TN-4524B-16P-4GP-4GBP-CT-T	–	4	4	–	16	150 W
TN-4528B-20P-4G-4GP-CT-T	4	4	–	–	20	150 W
TN-4528B-20P-4GP-4GBP-CT-T	–	4	4	–	20	150 W

Accessories (sold separately)

M12 Connector Caps

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