TN-4516A-4GTX Series

EN 50155 16-port managed Ethernet switches

- Isolated power inputs with universal 24 to 110 VDC power supply
- Essential compliance with EN 50155*
- -40 to 75°C operating temperature range
- Turbo Ring and Turbo Chain (recovery time < 20 ms @ 250 switches), RSTP/STP, and MSTP for network redundancy

*Moxa defines "essential compliance" to include those EN 50155 requirements that make products more suitable for rolling stock railway applications.

Turbo Ring Self-Healing Ethernet | Turbo Chain Beyond Redundant Rings | IPv6 Ready | EN 50155 | CE | FC

Introduction

The ToughNet TN-4500A series M12 managed Ethernet switches are designed for railway applications, including rolling stock and wayside installations. The TN series switches use M12 and other circular connectors to ensure tight, robust connections, and guarantee reliable operation against environmental disturbances, such as vibration and shock. The TN-4516A-4GTX series Ethernet switches have 12 Fast Ethernet M12 ports and 4 Gigabit Ethernet ports, and have a wide power input range of 24 to 110 VDC, and a wide operating temperature range of -40 to 75°C. In addition, TN-4516A-4GTX switches are compliant with the essential sections of EN 50155, covering operating temperature, power input voltage, surge, ESD, and vibration, making the switches suitable for a variety of industrial applications.

Features and Benefits

- IPv6 Ready logo awarded (IPv6 Logo Committee certified)
- DHCP Option 82 for IP address assignment with different policies
- EtherNet/IP and Modbus/TCP industrial Ethernet protocol supported
- Turbo Ring and Turbo Chain (recovery time < 20 ms @ 250 switches), RSTP/STP, and MSTP for network redundancy
- IGMP snooping and GMRP for filtering multicast traffic
- Port-based VLAN, IEEE 802.1Q VLAN, and GVRP to ease network planning
- QoS (IEEE 802.1p/1Q and TOS/DiffServ) to increase determinism
- IEEE 802.3ad, LACP for optimum bandwidth utilization
- TACACS+, SNMPv3, IEEE 802.1X, HTTPS, and SSH to enhance network security
- SNMPv1/v2c/v3 for different levels of network management
- RMON for efficient network monitoring and proactive capability
- Bandwidth management prevents unpredictable network status
- Lock port allows access by only authorized MAC addresses
- Port mirroring for online debugging
- Automatic warning by exception through email, relay output
- Line-swap fast recovery
- Automatic recovery of connected device's IP addresses
- LLDP for automatic topology discovery in network management software
- Configurable by web browser, Telnet/serial console, CLI, and Windows utility
- Panel mounting installation capability

Specifications

Technology

Standards:
IEEE 802.3af for Power-over-Ethernet
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X)
IEEE 802.3x for Flow Control
IEEE 802.1D-2004 for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
IEEE 802.1s for Multiple Spanning Tree Protocol
IEEE 802.1Q for VLAN Tagging
IEEE 802.1p for Class of Service
IEEE 802.1X for Authentication
IEEE 802.3ad for Port Trunk with LACP

Protocols: IGMPv1/v2, GMRP, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, DHCP Option 66/67/82, BootP, TFTP, SNTP, SMTP, RARP, RMON, HTTP, HTTPS, Telnet, SSH, Syslog, EtherNet/IP, Modbus/TCP, SNMP Inform, LLDP, IEEE 1588 PTP V2, IPv6, NTP Server/Client, TACACS+
MIB: MIB-II, Ethernet-like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Group 1, 2, 3, 9
Flow Control: IEEE802.3x flow control, back pressure flow control

Switch Properties

Priority Queues: 4
Max. Number of Available VLANs: 64
VLAN ID Range: VID 1 to 4094
IGMP Groups: 256

Interface

Fast Ethernet: Front cabling, M12 connector, 10/100BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection
Gigabit Ethernet: Front cabling, M12 X-coded 8-pin connector, 10/100/1000BaseT(X) auto negotiation speed, F/H duplex mode, auto MDI/MDI-X connection
Console Port: M12 A-coding 5-pin male connector
System LED Indicators: PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL
Port LED Indicators: 10/100M (Fast Ethernet port)
Alarm Contact: 2 relay outputs in one M12 A-coding 5-pin male connector with current carrying capacity of 1 A @ 30 VDC

Power Requirements

Input Voltage: 24 to 110 VDC (16.8 to 137.5 VDC)
Input Current: Max. 0.7 A @ 24 VDC
Overload Current Protection: Present
Connection: M23 connector
Reverse Polarity Protection: Present

Physical Characteristics

Housing: Metal, IP40 protection (optional protective caps available for unused ports)
Dimensions: 229.8 x 132 x 122.3 mm (9.05 x 5.20 x 4.81 in)
Weight: TN-4516A-4GTX series: 2550 g
Installation: Panel mounting kit

Environmental Limits

Operating Temperature: -40 to 75°C (-40 to 167°F)
Storage Temperature: -40 to 85°C (-40 to 185°F)
Ambient Relative Humidity: 5 to 95% (non-condensing)
Altitude: Up to 2000 m
Please contact Moxa if you require products guaranteed to function at higher altitudes

Standards and Certifications

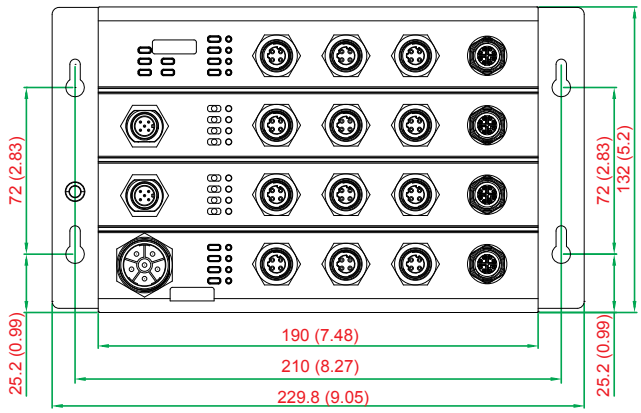
Safety: UL 508 (Pending)
EMI: FCC Part 15 Subpart B Class A, EN 55022 Class A
EMS:
EN 61000-4-2 (ESD) Level 3
EN 61000-4-3 (RS) exceeds Level 3
EN 61000-4-4 (EFT) Level 3
EN 61000-4-5 (Surge) Level 3
EN 61000-4-6 (CS) Level 3
EN 61000-4-8
Rail Traffic: (for panel mounting installations)
EN 50155 (essential compliance*)
*Please contact Moxa or a Moxa distributor for details.
Shock: IEC 61373
Freefall: IEC 60068-2-32
Vibration: IEC 61373
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty

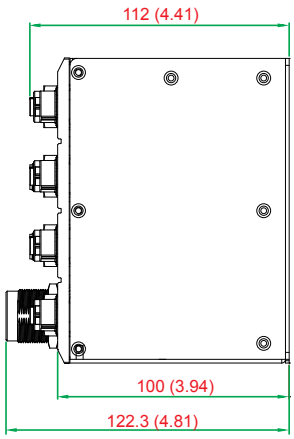
Warranty Period: 5 years
Details: See www.moxa.com/warranty

Dimensions

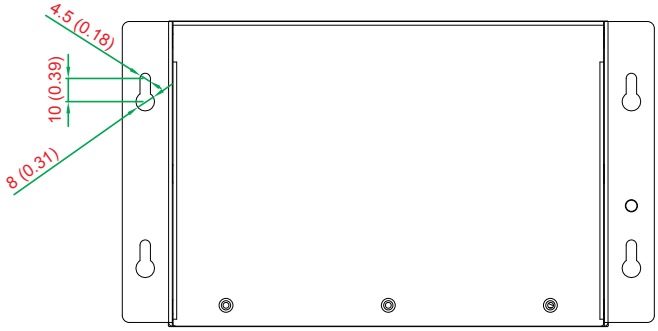
Unit: mm (inch)



Front View



Side View



Bottom View

Ordering Information

Available Models	Port Interface					Power Supply	Conformal Coating
Wide Temperature (-40 to 75°C)	PoE, 10/100 BaseT(X), M12 Connector	10/100 BaseT(X), M12 Connector	10/100/1000 BaseT(X), M12 Connector	10/100/1000 BaseT(X), M12 Connector with bypass relay	1000 Mbps Fiber Optic Q-ODC	WV: 24/36/48/ 72/96/110 VDC	
TN-4516A-4GTX-WV-T	–	12	4	–	–	✓	–
TN-4516A-4GTX-WV-CT-T	–	12	4	–	–	✓	✓
TN-4516A-4GTXBP-WV-T	–	12	–	4	–	✓	–
TN-4516A-4GTXBP-WV-CT-T	–	12	–	4	–	✓	✓

Optional Accessories (can be purchased separately)

Power Cords, M12/M23 Connectors, Protective Caps: See next page
MXview: Moxa industrial network management software with 50, 100, 250, 500, 1000, or 2000 nodes
EDS-SNMP OPC Server Pro: OPC server software that works with all SNMP devices
ABC-01: Configuration backup and restoration tool for TN series managed Ethernet switches, 0 to 60°C operating temperature

Package Checklist

- TN-4516A-4GTX switch
- M12-to-DB9 console port cable
- 2 protective caps for console and relay output ports
- Panel mounting kit
- Documentation and software CD
- Hardware installation guide
- Warranty card

EN 50155 Switch Accessories

M12/M23 Cords

CBL-M12D(MM4P)/RJ45-100 IP67
1-meter M12-to-RJ45 Cat-5C UTP Ethernet cable with
IP67-rated 4-pin male D-coded M12 connector

CBL-M12(FF5P)/OPEN-100 IP67
1-meter M12-to-5-pin power cable with IP67-rated
5-pin female A-coded M12 connector

CBL-M23(FF6P)/Open-BK-100 IP67
1-meter M23-to-6-pin power cable with
IP67-rated 6-pin female M23 connector

CBL-M12XMM8PRJ45-Y-200-IP67
2-meters M12-to-RJ45 Cat-5 UTP Ethernet cable with
IP67-rated 8-pin male X-coded crimp type M12 connector

CBL-M12XMM8P-Y-300-IP67
3-meters M12-to-M12 Cat-5 UTP Ethernet cable with
IP67-rated 8-pin male X-coded crimp type M12 connector

CBL-M12XMM8P-Y-100-IP67
1-meter M12-to-M12 Cat-5 UTP Ethernet cable with
IP67-rated 8-pin male X-coded crimp type M12 connector

M12 Connectors

M12D-4P-IP68
Field-installable M12 D-coded screw-in
sensor connector, 4-pin male, IP68-rated

M12A-5P-IP68
Field-installable M12 A-coded screw-in
sensor connector, 5-pin female, IP68-rated

M12X-8PMM-IP67-HTG
Field-installable M12 X-coded crimp type,
slim design connector, 8-pin male, IP67-rated

M12 IP67 Protective Caps

A-CAP-M12F-M

Metal cap for M12 female connector

A-CAP-M12M-M

Metal cap for M12 male connector

M23 Connectors

A-PLG-WPM23-01

M23 cable connector, 6-pin female, crimp type