TN-5816A/5818A Series

EN 50155 16/16+2G-port layer 3 Gigabit managed Ethernet switches

> Layer 3 routing interconnects multiple LAN segments
> 4 Fast Ethernet ports and 2 optional Gigabit ports with bypass relay function
> Isolated power with 24 to 110 VDC power supply range
> Essential compliance with EN 50155*
> -40 to 75°C operating temperature range
> Turbo Ring and Turbo Chain (recovery time < 20 ms with 250 switches), and STP/RSTP/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 Ring

EN 50155   EN 50121   CE FC

: Introduction

The ToughNet TN-5816A/5818A switches are high performance M12 Layer 3 Ethernet switches that support Layer 3 routing to facilitate the deployment of applications across networks. By using M12 and other circular connectors, the TN-5516A/5518A series ensures tight, robust connections and reliability against environmental disturbances, such as vibration and shock. TN-5816A/5818A switches provide isolated power with 24 to 110 VDC power input range, which allows you to use the same model at different sites around the globe. In addition, TN-5816A/5818A switches provide up to 16 Fast Ethernet M12 ports

with 4 bypass relay ports, and 2 Gigabit Ethernet ports with bypass relay function. Furthermore, the -40 to 75°C operating temperature and IP54-rated water and dust resistant enclosure allow deployment in harsh environments. The TN-5816A/5818A series Ethernet switches are compliant with essential 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.

Features and Benefits

- Layer 3 switching functionality to divide a large network into hierarchical subnets and allow data and information to communicate across networks
- Leading EN 50155-compliant L3 Ethernet switches for rolling stock applications
- DHCP Option 82 for IP address assignment with different policies
- Turbo Ring, Turbo Chain, and STP/RSTP/MSTP for network redundancy
- IGMP snooping and GMRP for filtering multicast traffic
- IEEE 802.1Q VLAN, and GVRP to ease network planning
- EtherNet/IP and Modbus/TCP industrial Ethernet protocols supported
- QoS (IEEE 802.1p/1Q and ToS/DiffServ) allows real-time traffic classification and prioritization
- 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
- LLDP for automatic topology discovery in network management software
- Configurable by web browser, Telnet/serial console, and Windows utility
- Panel mounting or DIN-rail mounting installation capability
- Loop protection to prevent network loops

: Specifications

Technology

Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X)
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3x for Flow Control
IEEE 802.1D-2004 for Spanning Tree Protocol
IEEE 802.1w for Rapid Spanning Tree Protocol
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

Software Features

Management: IPv4, SNMP v1/v2c/v3, Telnet, LLDP, Port Mirror, Syslog, RMON, BootP, DHCP Server/Client, DHCP Option 66/67/82, TFTP, SMTP, RARP, HTTP, HTTPS, SNMP inform, Flow Control, Back pressure flow control
Filter: 802.1Q VLAN, Q-in-Q VLAN, GVRP, IGMPv1/v2/v3, GMRP, Static Multicast
Redundancy Protocols: STP/RSTP, MSTP, Turbo Ring v1/v2, Turbo Chain, Link Aggregation
Security: RADIUS, TACACS+, SSL, SSH, Port Lock, Broadcast Storm Protection, Rate Limit
Multicast Routing: DVMRP, PIM-DM

Time Management: SNTP, NTP Server/Client, IEEE 1588v2 PTP (software-based)
Industrial Protocols: EtherNet/IP, Modbus/TCP
MIB: MIB-II, Ethernet-like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Group 1, 2, 3, 9
Routing Redundancy: VRRP

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

Interface
Fast Ethernet: Front cabling, M12 D-coded 4-pin female connector, 10/100BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection
Gigabit Ethernet: M12 X-coded 8-pin female connectors, 10/100/1000BaseT(X) auto negotiation speed, F/H duplex mode, auto MDI/MDI-X connection, with bypass relay function
Console Port: M12 A-coded 5-pin male connector
Alarm Contact: 2 relay outputs in one M12 A-coded 5-pin male connector with current carrying capacity of 1 A @ 30 VDC

Power Requirements
Input Voltage: 24/36/48/72/96/110 VDC
Operating Voltage: 16.8 to 137.5 VDC
Input Current:
• TN-5816ABP Series: 1.1 A @ 24 VDC, 0.23 A @ 110 VDC
• TN-5818A Series: 1.24 A @ 24 VDC, 0.26 A @ 110 VDC
Overload Current Protection: Present
Connection: M23 connector
Reverse Polarity Protection: Present

Physical Characteristics
Housing: Aluminium alloy
IP Rating: IP54 protection (optional protective caps available for unused ports)
Dimensions:
TN-5816ABP Series: 250 x 175.8 x 115 mm (9.84 x 6.92 x 4.53 in)
TN-5818A Series: 250 x 181.4 x 115 mm (9.84 x 7.14 x 4.53 in)

Weight:
TN-5816ABP Series: 2990 g (5.62 lb)
TN-5818A Series: 3160 g (6.97 lb)
Installation: Panel mounting, DIN-rail mounting (with optional kit: DK-DC50131)

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: 2000 m
Note: Please contact Moxa if you require products guaranteed to function at higher altitudes

Standards and Certifications
Safety: UL/cUL 508, EN 60950-1 (LVD)
EMI: FCC Part 15 Subpart B Class A, EN 55022 Class A
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
Rail Traffic: (for panel-mounting installations)
EN 50155 (essential compliance*), EN 50121-4, EN 45545-2
*Moxa defines "essential compliance" to include those EN 50155 requirements that make products more suitable for rolling stock railway applications.
Shock: EN 50155, IEC 61373
Freefall: IEC 60068-2-32
Vibration: EN 50155, IEC 61373
Note: Please check Moxa's website for the most up-to-date certification status.

MTBF (mean time between failures)
Time:
TN-5816ABP series: 577,026 hrs
TN-5818A-2GTXBP series: 525,091 hrs
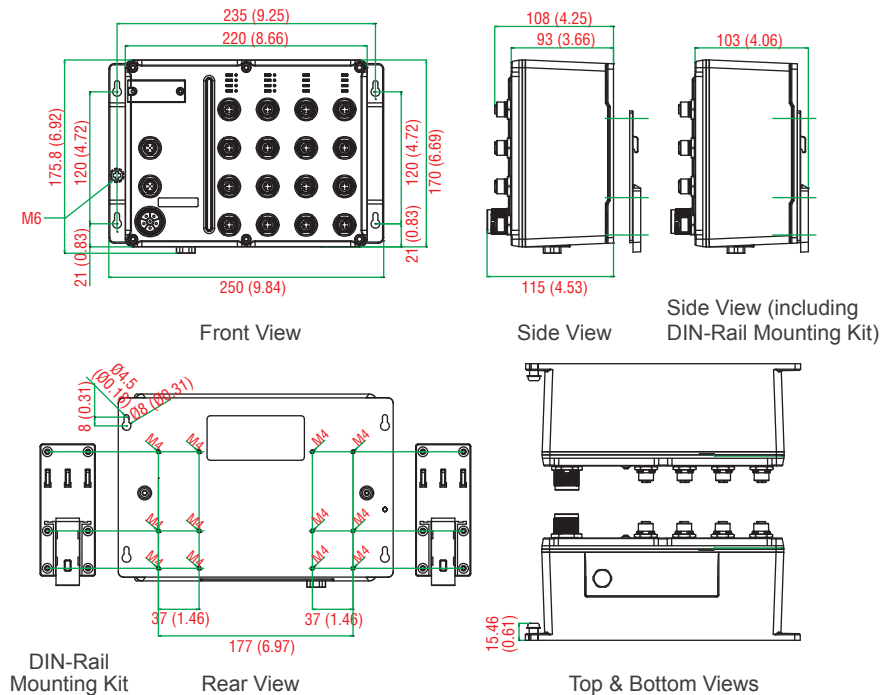**Standard:** Telcordia SR332

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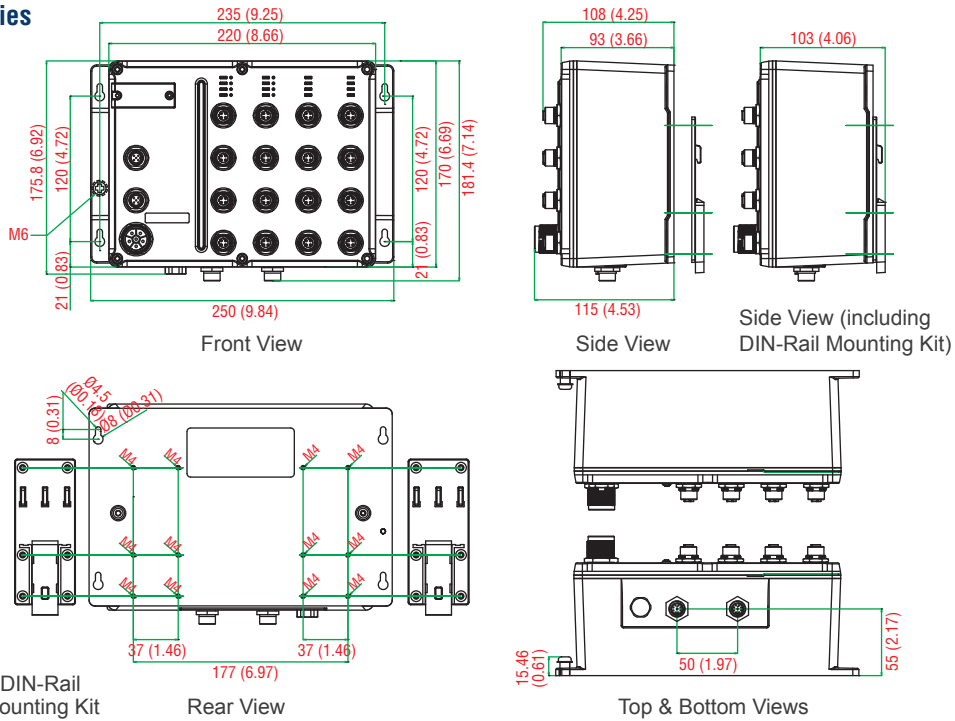**Details:** See www.moxa.com/warranty

Dimensions

TN-5816A Series

Front View

Side View

Side View (including DIN-Rail Mounting Kit)

DIN-Rail Mounting Kit

Rear View

Top & Bottom Views

Unit: mm (inch)

Dimensions

TN-5818A Series

Unit: mm (inch)

Front View

Side View

Side View (including DIN-Rail Mounting Kit)

DIN-Rail Mounting Kit

Rear View

Top & Bottom Views

:: Ordering Information

Available Models	Port Interface			Power Supply	Conformal Coating
	Front Cabling		Down Cabling		
Wide Temperature (-40 to 75°C)	10/100BaseT(X), M12 connector	10/100BaseT(X), M12 connector	10/100/1000BaseT(X), M12 connector, with bypass relay	WV: 24 to 110 VDC (16.8 to 137.5 VDC)	
TN-5816A Series					
TN-5816ABP-WV-T	12	4	–	1	–
TN-5816ABP-WV-CT-T	12	4	–	1	✓
TN-5818A Series					
TN-5818A-2GTXBP-WV-T	12	4	2	1	–
TN-5818A-2GTXBP-WV-CT-T	12	4	2	1	✓

Definitions:
1. GTXBP: Gigabit Ethernet copper port with bypass relay
2. WV: Wide Voltage
3. CT: Conformal Coating
Note: Conformal coating is available on request.

Optional Accessories (can be purchased separately)
Power Cords, M12/M23 Connectors, Protective Caps: See the EN 50155 Switch Accessories datasheet for details
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-M12: Configuration backup and restore tool for TN series managed Ethernet switches, 0 to 60°C operating temperature

Package Checklist

• TN-5816A or TN-5818A series 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-meter 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-meter 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

MOXA®

: 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