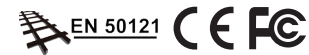# TN-5816/5818 Series

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
> Wide power input range from 12 to 110 VDC (LV-MV model)
> Isolated redundant power inputs with universal 12/24/36/48 VDC, 72/96/110 VDC, or 110/220 VDC/VAC power supply range
> Complies with a portion of EN 50155 specifications
> -40 to 75°C operating temperature range (T models)
> Turbo Ring, Turbo Chain, RSTP/STP for network redundancy

Turbo Ring — Self-Healing Ethernet

Turbo Chain — Beyond Redundant Ring

EN 50121 CE FC

: Introduction

The ToughNet TN-5816/5818 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-5516/5518 series ensures tight, robust connections and guarantees reliable reslience against environmental disturbances, such as vibration and shock. Besides providing a wide power input range of 12/24/36/48 VDC, 72/96/110 VDC, or 110/220 VDC/VAC, the TN-5816/5818 series' dual, isolated redundant power supply increases the reliability of your communications system and saves on cabling/wiring costs. In addition, TN-5816/5818 switches provide up to 16 Fast Ethernet M12 ports with 4 bypass relay ports, and 2 gigabit Ethernet ports with an optional bypass relay function. Models with an extended operating temperature range of -40 to 75°C are also available. The TN-5816/5818 series Ethernet switches comply with a portion of EN 50155 specifications, covering operating temperature, power input voltage, surge, ESD, and vibration, 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 EN50155-compliant L3 Ethernet switches for rolling stock applications
- DHCP Option 82 for IP address assignment with different policies
- Turbo Ring, Turbo Chain, and RSTP/STP for network redundancy
- IGMP snooping and GMRP for filtering multicast traffic
- 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
- 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, and Windows utility
- Panel mounting or DIN-Rail mounting installation capability

: 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 for Spanning Tree Protocol
IEEE 802.1w for Rapid STP
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, Telent, SSH, Syslog, LLDP, IEEE 1588 PTP, NTP Server/Client
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
Layer 3 Switching: Static routing, RIP V1/V2, OSPF, VRRP for routing redundancy

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: Down cabling, M12 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-coding 5-pin male connector
System LED Indicators: PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL
Port LED Indicators: 10/100M (Fast Ethernet port), 10/100/1000M (Gigabit Ethernet port)
Alarm Contact: 2 relay outputs in one M12 A-coding 5-pin male connector with current carrying capacity of 3 A @ 30 VDC
Rotary Switches: For setting the last 3 digits of the IP address

Power Requirements

Input Voltage:
• LV: 12/24/36/48 VDC (8.4 to 60 VDC)
• MV: 72/96/110 VDC (50.4 to 154 VDC)
• HV: 110/220 VDC/VAC (88 to 300 VDC, 85 to 264 VAC)
Input Current:
• TN-5816BP Series:
 0.793 A @ 24 VDC, 0.302 A @ 72 VDC,
 0.203 A @ 110 VDC, 0.465 A @ 110 VAC
 0.286 A @ 220 VAC
• TN-5818 Series:
 1.016 A @ 24 VDC, 0.39 A @ 72 VDC,
 0.253 A @ 110 VDC, 0.569 A @ 110 VAC,
 0.338 A @ 220VAC
Overload Current Protection: Present
Connection: M23 connector
Reverse Polarity Protection: Present

Physical Characteristics

Housing: Metal, IP54 protection (optional protective caps available for unused ports)

Dimensions:
TN-5816BP Series: 250 x 175.8 x 115 mm (9.84 x 6.92 x 4.53 in)
TN-5818 Series: 250 x 181.4 x 115 mm (9.84 x 7.14 x 4.53 in)
Weight:
TN-5816 Series: 2900 g
TN-5818 Series: 3002 g
Installation: Panel mounting, DIN-Rail mounting (with optional kit: DK-DC50131)

Environmental Limits

Operating Temperature:
Standard Models: -25 to 60°C (-13 to 140°F)
Wide Temp. Models: -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
Note: 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
EN 61000-4-11
Rail Traffic: (for panel mounting installations)
EN 50155*, EN 50121-4
*Complies with a portion of EN 50155 specifications. Please contact Moxa or a Moxa distributor for details.
Shock: IEC 61373
Freefall: IEC 60068-2-32
Vibration: IEC 61373
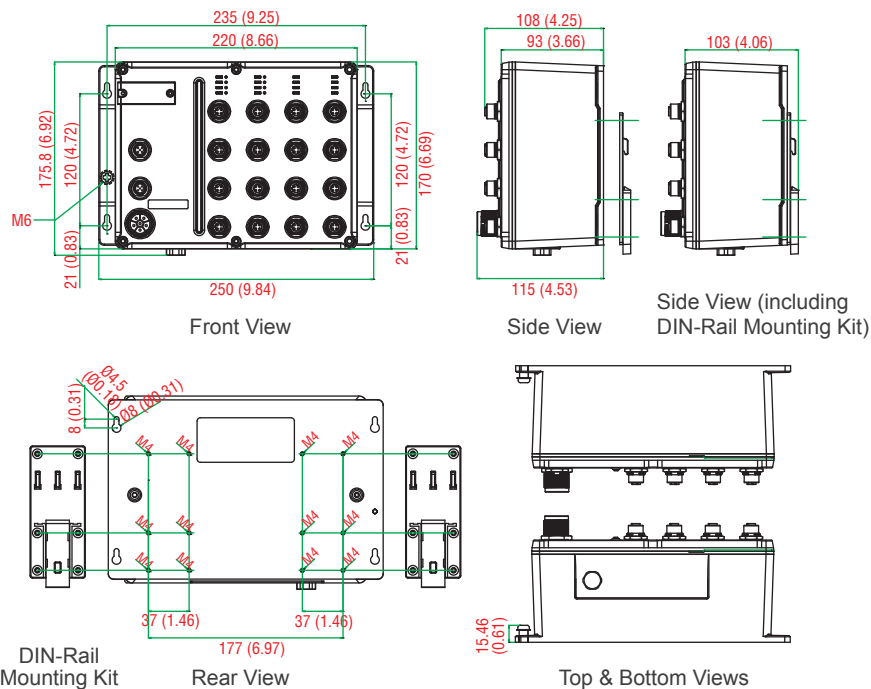Note: Please check Moxa's website for the most up-to-date certification status.

Warranty

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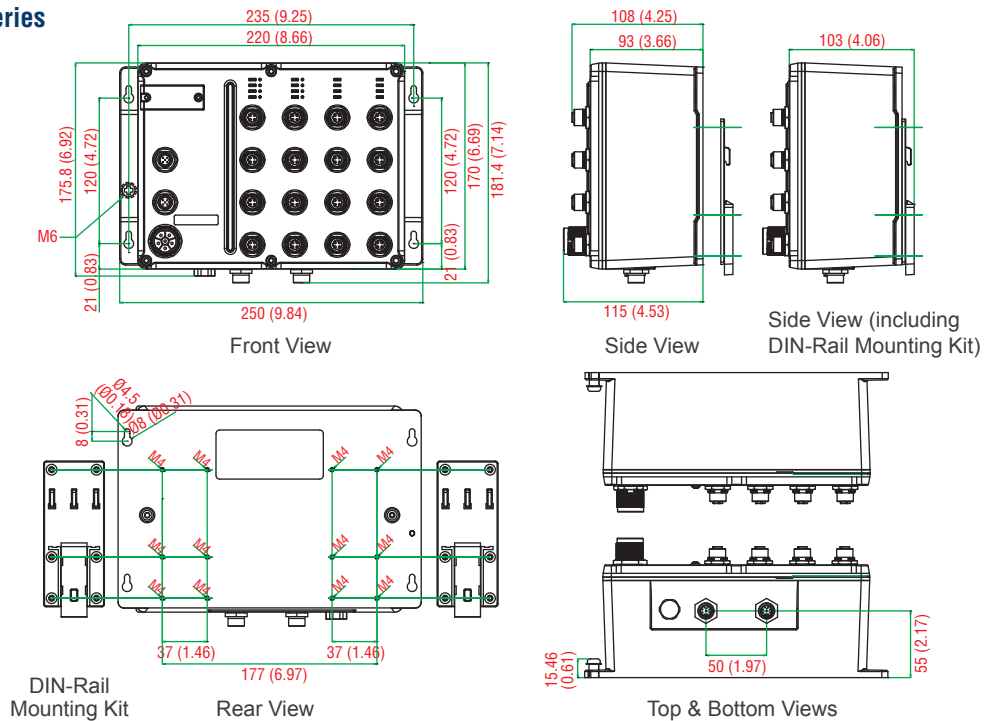**Details:** See www.moxa.com/warranty

Dimensions

TN-5816 Series

Unit: mm (inch)

Front View

Side View

Side View (including DIN-Rail Mounting Kit)

DIN-Rail Mounting Kit

Rear View

Top & Bottom Views

Dimensions

TN-5818 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					
		Front Cabling		Down Cabling	Power Supply 1			Power Supply 2		
Standard Temperature (-25 to 60°C)	Wide Temperature (-40 to 75°C)	10/100 BaseT(X) M12 connector	10/100 BaseT(X) M12 connector, bypass relay function	10/100/1000 BaseT(X) M12 connector, bypass relay function	LV	MV	HV	LV	MV	HV
					12/24/36/48 VDC (8.4 to 60 V), non-isolated	72/96/110 VDC (50.4 to 154 V), isolated	88 to 300 VDC and 85 to 264 VAC, isolated	12/24/36/48 VDC (8.4 to 60 V), non-isolated	72/96/110 VDC (50.4 to 154 V), isolated	88 to 300 VDC and 85 to 264 VAC, isolated
TN-5816 Series										
TN-5816BP-LV-LV	TN-5816BP-LV-LV-T	12	4	–	1	–	–	1	–	–
TN-5816BP-LV-MV	TN-5816BP-LV-MV-T	12	4	–	1	–	–	–	1	–
TN-5816BP-LV-HV	TN-5816BP-LV-HV-T	12	4	–	1	–	–	–	–	1
TN-5816BP-MV-MV	TN-5816BP-MV-MV-T	12	4	–	–	1	–	–	1	–
TN-5816BP-MV-HV	TN-5816BP-MV-HV-T	12	4	–	–	1	–	–	–	1
TN-5816BP-HV-HV	TN-5816BP-HV-HV-T	12	4	–	–	–	1	–	–	1
TN-5818 Series										
TN-5818-2GTXBP-LV-LV	TN-5818-2GTXBP-LV-LV-T	12	4	2	1	–	–	1	–	–
TN-5818-2GTXBP-LV-MV	TN-5818-2GTXBP-LV-MV-T	12	4	2	1	–	–	–	1	–
TN-5818-2GTXBP-LV-HV	TN-5818-2GTXBP-LV-HV-T	12	4	2	1	–	–	–	–	1
TN-5818-2GTXBP-MV-MV	TN-5818-2GTXBP-MV-MV-T	12	4	2	–	1	–	–	1	–
TN-5818-2GTXBP-MV-HV	TN-5818-2GTXBP-MV-HV-T	12	4	2	–	1	–	–	–	1
TN-5818-2GTXBP-HV-HV	TN-5818-2GTXBP-HV-HV-T	12	4	2	–	–	1	–	–	1

*GTXBP: Giga Ethernet Copper port with bypass relay
Note: Conformal coating is available on request.

Optional Accessories (must be purchased separately)

Power Cords, M12 Connectors, Protective Caps: See page 2-29
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-5816 or TN-5818 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 Power 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

: M12 Connectors

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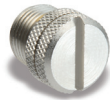sensor connector, 4-pin male, IP68-rated

M12A-5P-IP68
Field-installable M12 A-coded screw-in
sensor connector, 5-pin female, IP68-rated
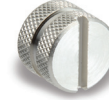
: M12 IP67 Protective Caps

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