Industry-specific Ethernet Switches

M12 Ethernet Switches







	TN-5508 Series	TN-5510 Series	TN-5516 Series	TN-5518 Series	TN-5308 Series	TN-5308-PoE Series	EDS-305-M12 Series
Number of Ports							
Max. Number of Ports	8	10	16	18	8	8	5
Gigabit Ethernet, 10/100/1000 Mbps	---	2	---	2	---	---	---
Fast Ethernet, 10/100 Mbps	8	8	16	16	8	8 (4 PoE)	5
Power Supply							
12/24/36/48 VDC	√	√	√	√	√ (LV Model)	---	---
72/96/110 VDC	√	√	√	√	√ (MV Model)	---	---
80-300 VDC, 85-264 VAC	√	√	√	√	---	---	---
24 VDC	---	---	---	---	---	---	√
48 VDC	---	---	---	---	---	√	---
24 VAC	---	---	---	---	---	---	√
Installation Options							
DIN-Rail Mounting	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit	w/ optional kit
Panel Mounting	√	√	√	√	√	√	√
Operating Temperature							
0 to 60°C	√	√	√	√	√	√	√
-40 to 75°C	√	√	√	√	√	√	√
Redundancy and Backup Options							
Turbo Ring (Recovery Time < 20 ms)	√	√	√	√	---	---	---
STP/RSTP	√	√	√	√	---	---	---
Network Management and Control							
IPv6	√	√	√	√	---	---	---
DHCP Option 66/67/82	√	√	√	√	---	---	---
IEEE 1588 PTP	√	√	√	√	---	---	---
LLDP	√	√	√	√	---	---	---
Modbus/TCP	√	√	√	√	---	---	---
IGMP/GMRP	√	√	√	√	---	---	---
Port Trunking	√	√	√	√	---	---	---
IEEE 802.1X	√	√	√	√	---	---	---
Port Lock	√	√	√	√	---	---	---
SNMP/RMON	√	√	√	√	---	---	---
VLAN	√	√	√	√	---	---	---
QoS	√	√	√	√	---	---	---
Relay Warning	√	√	√	√	---	---	---
Regulatory Approvals							
CE/FCC	√	√	√	√	√	√	√
UL508	Pending	Pending	Pending	Pending	Pending	Pending	√
Traffic Control Systems: NEMA TS2 e1	 Pending Pending	 Pending Pending	 Pending Pending	 Pending Pending	 Pending Pending	 Pending Pending	 --- ---
Railway Applications: EN50155 EN50121-3-2 EN50121-4	 Pending Pending Pending	 Pending Pending Pending	 Pending Pending Pending	 Pending Pending Pending	 Pending Pending Pending	 Pending Pending Pending	 √ Pending Pending
DNV/GL	---	---	---	---	---	---	Pending

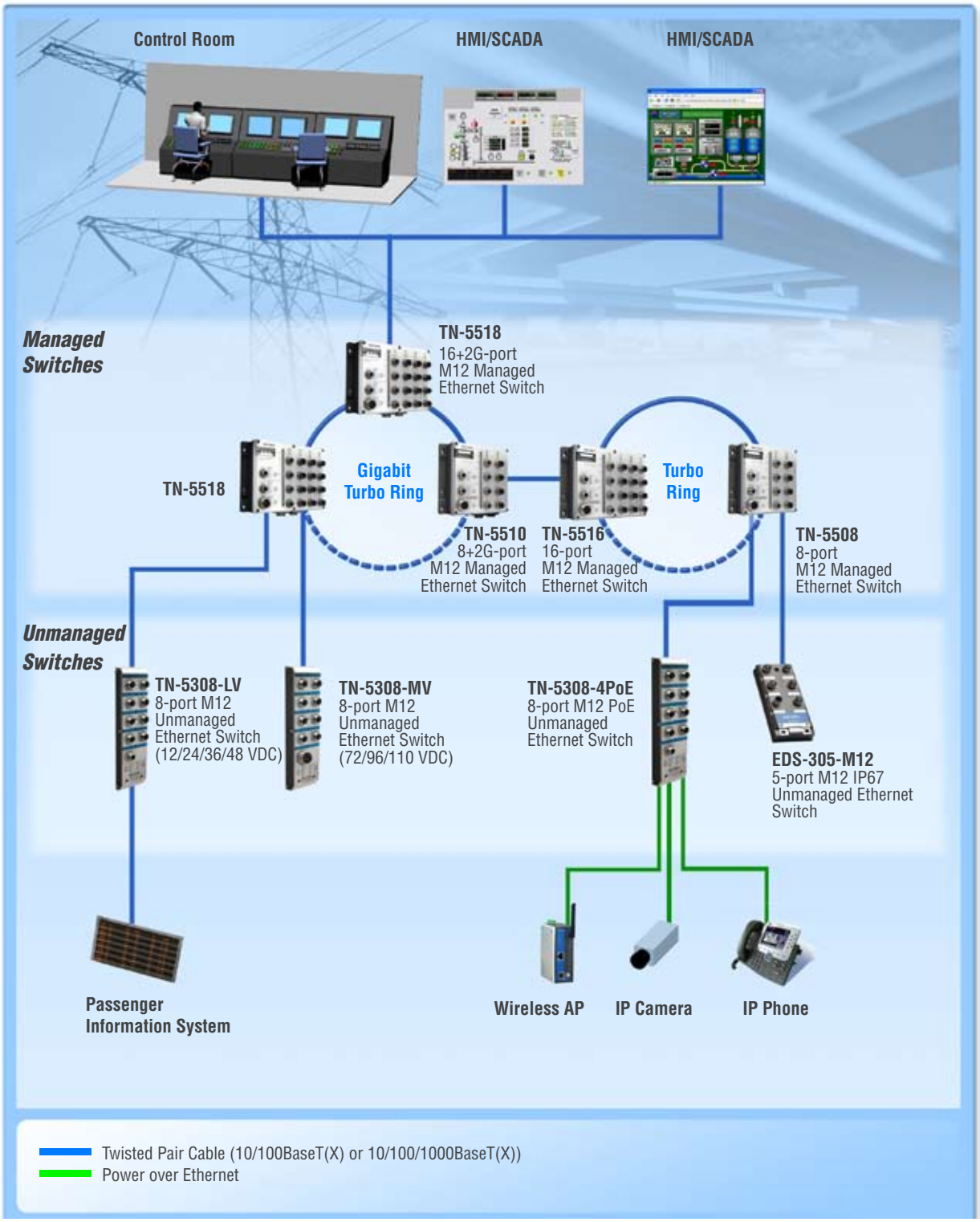
IEC 61850-3 Rackmount Ethernet Switches




	PT-7828	PT-7728	PT-7710	PT-7324
Supported Modules				
Gigabit Ethernet Modules	√	√	√	√
Fast Ethernet Modules	√	√	√	√
SFP Gigabit Ethernet Modules	√	√	√	√
SFP Fast Ethernet Modules	√	√	√	---
Number of Ports				
Max. Number of Ports	28	28	10	24
Gigabit Ethernet, 10/100/1000 Mbps	Up to 4	Up to 4	Up to 2	Up to 2
Fast Ethernet, 10/100 Mbps	Up to 24	Up to 24	Up to 10	Up to 24
Power Supply				
24 VDC, isolated	√	√	---	---
48 VDC, isolated	√	√	---	---
12/24/48 VDC	---	---	√	√
88-300 VDC or 85-264 VAC, isolated	√	√	√	√
Installation Options				
Rack Mounting	√	√	√	√
Panel Mounting	---	---	√	---
Operating Temperature				
-40 to 85°C	√	√	√	√
Redundancy and Backup Options				
Turbo Ring (Recovery Time < 20 ms)	√	√	√	---
STP/RSTP	√	√	√	---
Automatic Backup Configurator (ABC-01)	√	√	√	---
Network Management and Control				
Layer 3 Switching	√	---	---	---
IPv6	---	√	√	---
DHCP Option 66/67/82	√	√	√	---
IEEE 1588 PTP	√	√	√	---
LLDP	√	√	√	---
Modbus/TCP	√	√	√	---
IGMP/GMRP	√	√	√	---
Port Trunking	√	√	√	---
IEEE 802.1X	√	√	√	---
Port Lock	√	√	√	---
SNMP/RMON	√	√	√	---
VLAN	√	√	√	√
QoS	√	√	√	√
Relay Warning	√	√	√	√
Regulatory Approvals				
CE/FCC	√	√	√	√
UL/cUL 60950-1	Pending	Pending	Pending	Pending
IEC 61850-3 (Power Substation)	√	√	√	√
IEEE 1613 (Power Substation)	√	√	√	√
NEMA TS2 (Traffic Control System)	√	√	√	√
EN50155/EN50121-4 (Railway Applications)	√	√	√	√
DNV/GL	Pending	Pending	Pending	Pending

Introduction to M12 Shielded Ethernet Switches

Building Tough Networks for any Harsh Industrial Environment



Robust M12 Solution for Industry-specific Applications

Ethernet devices used in harsh industrial environments must be able to withstand extreme environmental conditions and provide robust data communication. Industrial settings are often subject to vibration, shock, dust, fluid, and extreme temperatures. Moxa's ToughNet TN series of M12 Ethernet switches can be used to ensure stable and tough network connections. With ToughNet switches, you can rest assured that your network will meet the stringent design requirements needed for applications in factories, trains, buses, ships, and other moving vehicles.

M12 Connectors | M23 Connector | Circular RJ45 Connector

M12 and Circular Connectors

Moxa's ToughNet series of Ethernet switches use tight M12 connectors and other types of circular connectors to ensure robust connections and reliable operation when subjected to environmental disturbances such as vibration and shock. The M12 4-pin connector with D-coding has already been defined as an Industrial Ethernet standard according to IEC 61067-2-101 Amendment 1. The ToughNet switches support fast Ethernet twisted-pair cables with M12 connectors or Gigabit Ethernet twisted-pair cables with circular RJ45 connectors.

Rugged Metal Housing

Moxa's ToughNet series of Ethernet switches have a metal housing that can sustain mechanical stress and protects the switches against electromagnetic disturbances.

Fanless Operation in a Wide (-40 to 75°C) Temperature Range

The wide temperature (T) models of the TN series of M12 Ethernet switches are guaranteed to operate reliably in extreme temperatures ranging from -40 to 75°C, and the switches' fanless design is suitable for harsh environments.

Suitable for Diverse Requirements

Reliable Gigabit Ethernet Bypasses Device Failure

The TN-5510/5518 series of M12 Ethernet switches provide 2 Gigabit Ethernet ports with relay bypass function. The bypass function ensures reliable data communication even if the device fails to work due to a power failure. This avoids SPOF (single point of failure) to assure continuous system operation. The Gigabit ports are suitable for the Ethernet backbone of an industrial network, and the large bandwidth allows applications such as video surveillance and VoIP (Voice-over-Internet-Protocol).

Large Choice of Power Input Ranges

To satisfy global power requirements for various industrial applications, the TN-5500 series managed switches provide isolated dual redundant power inputs with universal 12/24/36/48 VDC, 72/96/110 VDC, or 110/220 VDC/VAC power supply range. For example, the TN-5516-LV-MV switches support the wide power input range of 12/24/36/48/72/96/110 VDC that fit most railway applications. In addition, the TN-5308-LV switches provide a 7 to 60 VDC power supply range that allows stable operations, even when using a 12 VDC battery. The TN-5308-MV switches provide a 72/96/110 VDC (50.4 to 154 VDC) power supply range that is suitable for different applications.

Robust M12 Power-over-Ethernet Solution

The TN-5308-4PoE switches have M12 IEEE 802.3af compliant PoE ports that make the devices act as power source equipment (PSE), which means that the switches can transmit data and power through the same cable to IEEE 802.3af compliant powered devices (PD), such as IP cameras and wireless access points, making it easier to wire your applications.

Hardware-based IP Address Configuration for Faulty Device Replacement

The rapid replacement of faulty devices is critical for systems that must continue operating around the clock. One way to achieve this is to make it much easier to configure the new device that replaces the faulty one. The TN-5500 series switches, for example, have rotary switches for configuring the IP address built right into the switch's housing, allowing you to recover your network communication in no time.

Moxa's Products are Certified to Meet Industrial Standards

Railway Application Standards

EN50155

EN50155 addresses the conditions of operation, design, construction, and testing of electronic equipment used on rail vehicles (rolling stock) in railway applications. The ToughNet series of M12 Ethernet switches are compliant with both the performance tests and environmental tests dictated by EN50155. Reliable performance can be assured under different power supply conditions, such as voltage variations, power interruption, supply change over, and other conditions. The switches can also withstand environmental disturbances such as vibration, shock, and temperature variations.

EN50121-3-2

EN50121-3-2 defines the electromagnetic compatibility (EMC) of an apparatus installed on rolling stock in railway applications. The TN series switches are compliant with this standard.

EN50121-4

EN50121-4 defines the emission and immunity standards for a signaling and telecommunications apparatus. The TN series switches are EN50121-4 compliant.

Road Traffic Control System Standards

NEMA TS2

The National Electrical Manufacturers Association (NEMA) established the TS1 standard to define technically adequate and safe traffic control equipment. The TS2 standard was later introduced to overcome the limitations of TS1. Section 2 contains the environmental and testing requirements, including guidelines for temperature, humidity, voltage, vibration, and shock. The TN series switches are compliant with the NEMA TS2 traffic control system standards.

e1

Compliance with the EU's Automotive EMC Directive (95/54/EC) is indicated by the "e" mark, which is fitted to a vehicle's sub-assembly. Moxa's TN series switches meet the EMC requirements of this directive.

M12 Ethernet Switches Comparison Chart

	Port Interfaces					Features													Certifications			
Model	Total Number of Ports	Gigabit Ethernet (10/100/1000 Mbps)	Fast Ethernet (10/100 Mbps)	PoE, Fast Ethernet (10/100 Mbps)	Isolated Redundant Power	IPv6	IEEE 1588 PTP	DHCP Option 82	Turbo Ring and RSTP/STP	IGMP Snooping/GMRP	VLAN/GVRP	QoS	Port Trunking/LACP	IEEE 802.1X/HTTPS/SSH	SNMP/RMON	Port Lock	IP67	UL508	EN50155/EN50121-3-2/EN50121-4	NEMA TS2	e1
TN-5508	8	---	8	---	√	√	√	√	√	√	√	√	√	√	√	√	---	P	P	P	P
TN-5510	10	2	8	---	√	√	√	√	√	√	√	√	√	√	√	√	---	P	P	P	P
TN-5516	16	---	16	---	√	√	√	√	√	√	√	√	√	√	√	√	---	P	P	P	P
TN-5518	18	2	16	---	√	√	√	√	√	√	√	√	√	√	√	√	---	P	P	P	P
TN-5308-LV	8	---	8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	P	P	P	P
TN-5308-MV	8	---	8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	P	P	P	P
TN-5308-4PoE	8	---	4	4	---	---	---	---	---	---	---	---	---	---	---	---	---	P	P	P	P
EDS-305-M12	5	---	5	---	---	---	---	---	---	---	---	---	---	---	---	---	√	P	√	P	P

√ = Available P = Pending

Coming Soon

TN-5508/5510/5516/5518 Series

Preliminary

8, 8+2G, 16, 16+2G-port M12 managed Ethernet switches

- M12 connectors for robust links
- 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
- 2-port flexibility of Gigabit Ethernet ports with relay bypass function
- EN50155/50121-3-2/50121-4, NEMA TS2, and e1 compliant
- -40 to 75°C operating temperature range (T models)

The certification logos shown here apply to some or all of the products in this section. For details, see "Regulatory Approvals" under "Specifications" below.

Introduction

The ToughNet TN-5500 series M12 managed Ethernet switches are designed for industrial applications in harsh environments. 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-5500-LV-MV switches provide the wide power input range of 12/24/36/48/72/96/110 VDC that allows you to use only one model in global applications. In addition, the 12/24/36/48 VDC, 72/96/110 VDC, or 110/220 VDC/VAC dual, isolated redundant power supply increases the reliability of your communications and saves on cabling/wiring costs. The TN-5500 switches provide up to 8 or 16 fast Ethernet M12 ports, and TN-5510/5518 switches provide 2 ports on the down side to provide the Gigabit Ethernet RJ45 interface with a relay bypass function. Models with an extended operating temperature range of -40 to 75°C are also available. The TN-5500 series Ethernet switches are compliant with EN50155/50121-3-2/50121-4 (railway applications), NEMA TS2 (traffic control systems), and e1 (vehicles) requirements, making the switches suitable for a variety of industrial applications.

Features and Benefits

- Relay bypass function on the 2 Gigabit Ethernet RJ45 ports to ensure data communication even if the device fails to work due to a power failure
- Three rotary switches for setting the last 3 digits of the IP address makes maintenance even easier
- IPv6 Ready logo awarded (IPv6 Logo Committee certified)
- IEEE 1588 PTP (Precision Time Protocol) for precise time synchronization of networks
- DHCP Option 82 for IP address assignment with different policies
- Modbus/TCP industrial Ethernet protocol supported
- Turbo Ring and RSTP/STP (IEEE802.1w/D)
- 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
- 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
- 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 device, 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, Modbus/TCP, IPv6

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: Down cabling, circular field connector (RJ45 inside), 10/100/1000BaseT(X) auto negotiation speed, F/H duplex mode, auto MDI/MDI-X connection, with relay bypass function

Console Port: M12 A-coding 5-pin male connector

System LED Indicators: PWR1, PWR2, FAULT, MASTER, COUPLER

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 or 3 A @ 240 VAC

Rotary Switches: For setting the last 3 digits of the IP address

Power Requirements

Input Voltage:
- 12/24/36/48 VDC (8.4 to 60 VDC)
- 72/96/110 VDC (50.4 to 154 VDC)
- 110/220 VDC/VAC (88 to 300 VDC, 85 to 264 VAC)

Overload Current Protection: Present

Connection: M23 A-coding, 5-pin male connector

Reverse Polarity Protection: Present

Physical Characteristics

Housing: Metal, IP54 protection

Dimensions:
TN-5508 Series: 185 x 170 x 69.8 mm (7.28 x 6.69 x 2.75 in)
TN-5510 Series: 185 x 183 x 69.8 mm (7.28 x 7.20 x 2.75 in)
TN-5516 Series: 250 x 170 x 69.8 mm (9.84 x 6.69 x 2.75 in)
TN-5518 Series: 250 x 183 x 69.8 mm (9.84 x 7.20 x 2.75 in)

Installation: Panal mounting, DIN-Rail mounting (with optional kit)

Environmental Limits

Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)

Storage Temperature: -40 to 85°C (-40 to 185°F)

Operating Humidity: 5 to 95% RH (non-condensing)

Regulatory Approvals

Safety: UL508 (Pending)

EMI: FCC Part 15, CISPR (EN55022) class A

EMS:
EN61000-4-2 (ESD), Level 3
EN61000-4-3 (RS), Level 4
EN61000-4-4 (EFT), Level 3
EN61000-4-5 (Surge), Level 3
EN61000-4-6 (CS), Level 3
EN61000-4-8
EN61000-4-11
EN61000-4-12

Traffic Control: NEMA TS2 (Pending), e1 (Pending)

Rail Traffic: EN50155 (Environmental, Pending), EN50121-3-2 (Pending), EN50121-4 (Pending)

Shock: IEC61373

Freefall: IEC60068-2-32

Vibration: IEC61373

Note: Please check Moxa's website for the most up-to-date certification status.

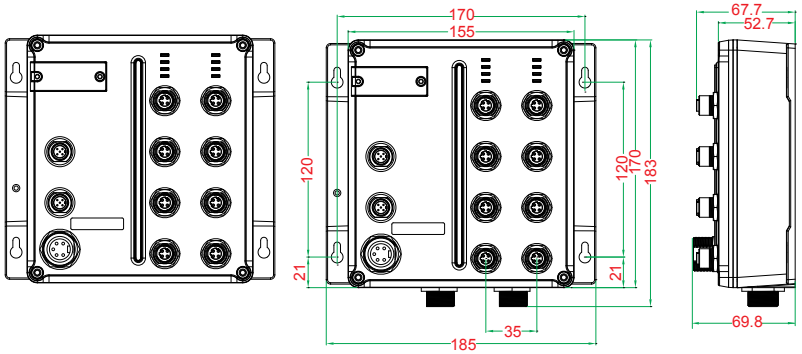
Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

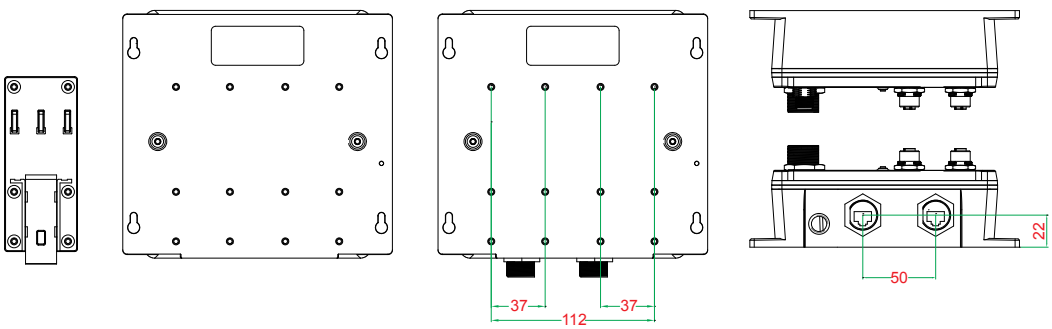
Dimensions (unit = mm)

TN-5508/5510 Series



Front View

Side View



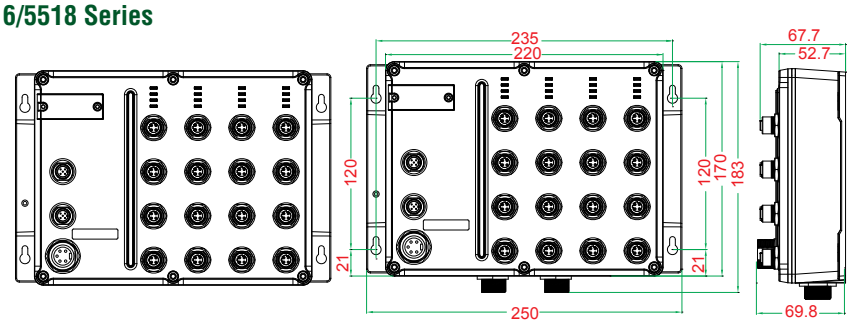
DIN-Rail Mounting Kit

Rear View

Top & Bottom Views

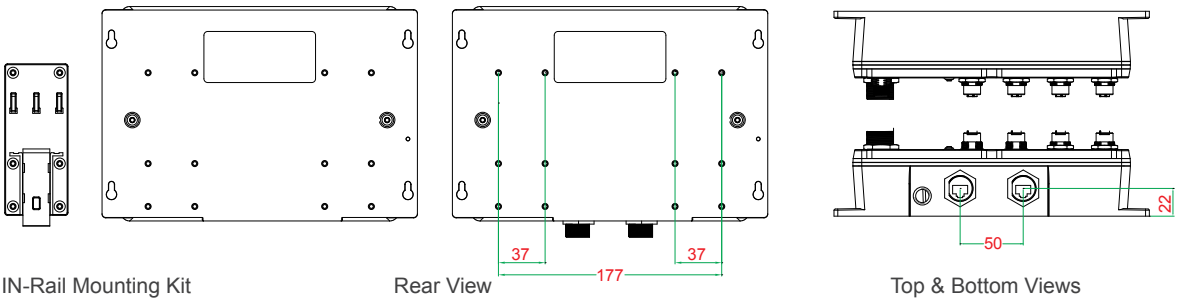
Dimensions (unit = mm)

TN-5516/5518 Series



Front View

Side View



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 (0 to 60°C)	Wide Temperature (-40 to 75°C)	10/100 BaseT(X) M12 connector	10/100/1000 BaseT(X) Circular RJ45 connector Relay bypass function	LV 12/24/36/48 VDC (8.4 to 60 V), non-isolated	MV 72/96/110 VDC (50.4 to 54 V), isolated	HV 88 to 300 VDC and 85 to 264 VAC, isolated	LV 12/24/36/48 VDC (8.4 to 60 V), non-isolated	MV 72/96/110 VDC (50.4 to 154 V), isolated	HV 88 to 300 VDC and 85 to 264 VAC, isolated
TN-5508 Series									
TN-5508-LV-LV	TN-5508-LV-LV-T	8	---	1	---	---	1	---	---
TN-5508-LV-MV	TN-5508-LV-MV-T	8	---	1	---	---	---	1	---
TN-5508-LV-HV	TN-5508-LV-HV-T	8	---	1	---	---	---	---	1
TN-5510 Series									
TN-5510-2GTX-LV-LV	TN-5510-2GTX-LV-LV-T	8	2	1	---	---	1	---	---
TN-5510-2GTX-LV-MV	TN-5510-2GTX-LV-MV-T	8	2	1	---	---	---	1	---
TN-5510-2GTX-LV-HV	TN-5510-2GTX-LV-HV-T	8	2	1	---	---	---	---	1
TN-5516 Series									
TN-5516-LV-LV	TN-5516-LV-LV-T	16	---	1	---	---	1	---	---
TN-5516-LV-MV	TN-5516-LV-MV-T	16	---	1	---	---	---	1	---
TN-5516-LV-HV	TN-5516-LV-HV-T	16	---	1	---	---	---	---	1
TN-5516-MV-MV	TN-5516-MV-MV-T	16	---	---	1	---	---	1	---
TN-5516-MV-HV	TN-5516-MV-HV-T	16	---	---	1	---	---	---	1
TN-5516-HV-HV	TN-5516-HV-HV-T	16	---	---	---	1	---	---	1
TN-5518 Series									
TN-5518-2GTX-LV-LV	TN-5518-2GTX-LV-LV-T	16	2	1	---	---	1	---	---
TN-5518-2GTX-LV-MV	TN-5518-2GTX-LV-MV-T	16	2	1	---	---	---	1	---
TN-5518-2GTX-LV-HV	TN-5518-2GTX-LV-HV-T	16	2	1	---	---	---	---	1
TN-5518-2GTX-MV-MV	TN-5518-2GTX-MV-MV-T	16	2	---	1	---	---	1	---
TN-5518-2GTX-MV-HV	TN-5518-2GTX-MV-HV-T	16	2	---	1	---	---	---	1
TN-5518-2GTX-HV-HV	TN-5518-2GTX-HV-HV-T	16	2	---	---	1	---	---	1

Optional Accessories (must be purchased separately)

DK-DC50131: DIN-Rail mounting kit, 50 x 131 mm

M-type Connectors and Patch Cords:

- M12 connectors and patch cords
- M23 connectors and patch cords

Circular-type Connectors and Patch Cords:

- Circular RJ45 connectors and patch cords

Coming Soon

TN-5308 Series

Preliminary

8-port M12 unmanaged Ethernet switches

- Universal 12/24/36/48 or 72/96/110 VDC power supply range
- M12 connectors and IP40 metal housing
- Supports IEEE 802.3/802.3u/802.3x
- EN50155/50121-3-2/50121-4, NEMA TS2, and e1 compliant
- -40 to 75°C operating temperature range (T models)

The certification logos shown here apply to some or all of the products in this section. For details, see "Regulatory Approvals" under "Specifications" below.

Introduction

The ToughNet TN-5308 series M12 unmanaged Ethernet switches are designed for industrial applications in harsh environments. The TN series switches use M12 connectors to ensure tight, robust connections, and guarantee reliable operation against environmental disturbances, such as vibration and shock. The TN-5308 series Ethernet switches provide 8 fast Ethernet M12 ports, support IEEE 802.3/802.3u/802/3x with 10/100M, full/half-duplex, MDI/MDI-X auto-sensing, and provide an economical solution for your industrial Ethernet network. Models with an extended operating temperature range of -40 to 75°C are also available. The TN-5308 series Ethernet switches are compliant with EN50155/50121-3-2/50121-4 (railway applications), NEMA TS2 (traffic control systems), and e1 (vehicles) requirements, making the switches suitable for a variety of industrial applications.

Specifications

Technology

Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X)
IEEE 802.3x for Flow Control

Processing Type: Store and Forward

Flow Control: IEEE802.3x flow control, back pressure flow control

Interface

M12 Ports: 10/100BaseT(X) auto negotiation speed, F/H duplex mode and auto MDI/MDI-X connection

LED Indicators: PWR, LNK/ACT

Power Requirements

Input Voltage:
• TN-5308-LV: 12/24/36/48 VDC (7 to 60 VDC)
• TN-5308-MV: 72/96/110 VDC (50.4 to 154 VDC)

Overload Current Protection: Present

Connection:
• TN-5308-LV: M12 A-coding, 5-pin male connector
• TN-5308-MV: M23 A-coding, 5-pin male connector

Reverse Polarity Protection: Present

Physical Characteristics

Housing: Metal, IP40 protection

Dimensions:
TN-5308-LV: 60 x 216.6 x 36.1 mm (2.36 x 8.53 x 1.42 in)
TN-5308-MV: 60 x 216.6 x 53.7 mm (2.36 x 8.53 x 2.11 in)

Installation: Panal mounting, DIN-Rail mounting (with optional kit)

Environmental Limits

Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)

Storage Temperature: -40 to 85°C (-40 to 185°F)

Operating Humidity: 5 to 95% RH (non-condensing)

Regulatory Approvals

Safety: UL508 (Pending)

EMI: FCC Part 15, CISPR (EN55022) class A

EMS:
EN61000-4-2 (ESD), level 3
EN61000-4-3 (RS), level 4
EN61000-4-4 (EFT), level 3
EN61000-4-5 (Surge), level 3
EN61000-4-6 (CS), level 3
EN61000-4-8
EN61000-4-11
EN61000-4-12

Traffic Control: NEMA TS2 (Pending), e1 (Pending)

Rail Traffic: EN50155 (Environmental, Pending), EN50121-3-2 (Pending), EN50121-4 (Pending)

Shock: IEC61373

Freefall: IEC60068-2-32

Vibration: IEC61373

Note: Please check Moxa's website for the most up-to-date certification status.

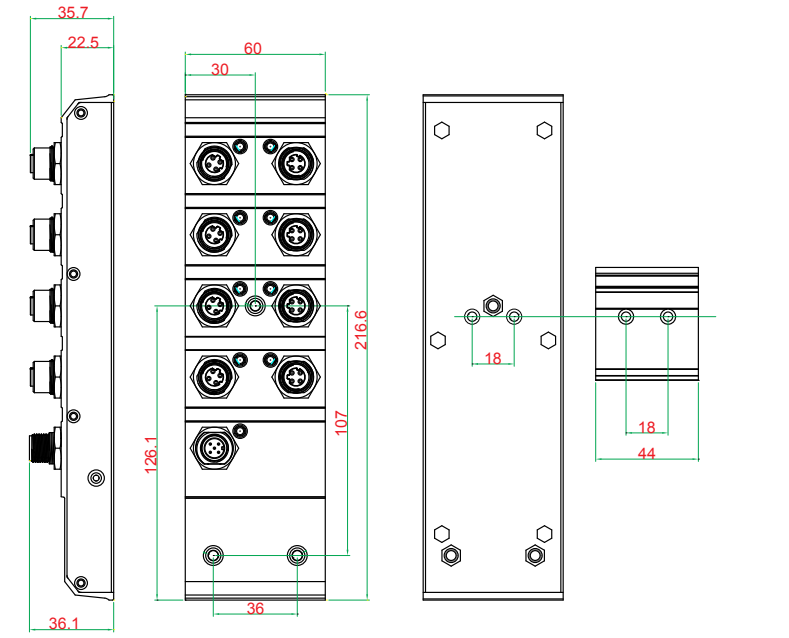
Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

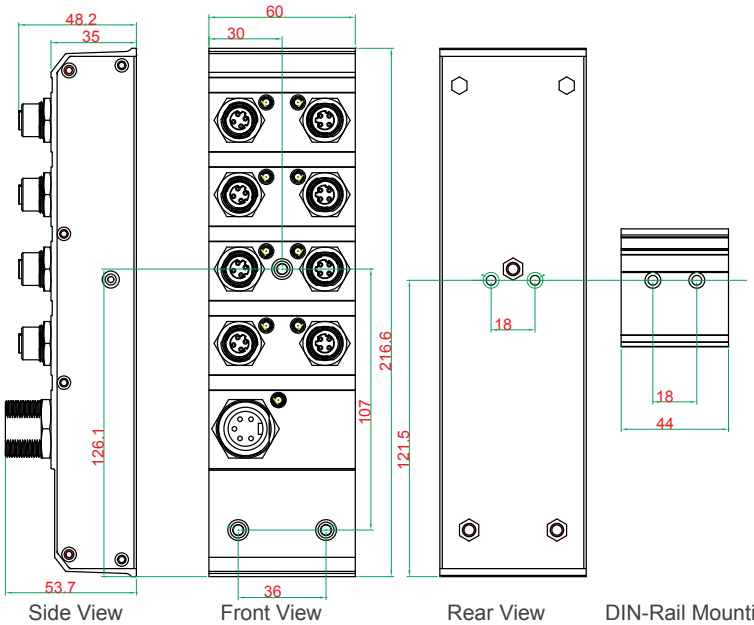
Dimensions (unit = mm)

TN-5308-LV Series



Side View Front View Rear View DIN-Rail Mounting Kit

TN-5308-MV Series



Side View Front View Rear View DIN-Rail Mounting Kit

Ordering Information

Available Models		Power Supply	
Standard Temperature (0 to 60°C)	Wide Temperature (-40 to 75°C)	LV	MV
		12/24/36/48 VDC (7 to 60 V)	72/96/110 VDC (50.4 to 154V)
TN-5308-LV	TN-5308-LV-T	√	---
TN-5308-MV	TN-5308-MV-T	---	√

Optional Accessories (must be purchased separately)

DK-44: DIN-Rail mounting kit, 44 x 48.3 mm

Connectors and Patch Cords: M12-type and M23-type

Coming Soon

TN-5308-4PoE Series

Preliminary

8-port M12 IEEE 802.3af PoE unmanaged Ethernet switches

- M12 connectors and IP40 metal housing
- 4 IEEE 802.3af compliant PoE and Ethernet combo ports
- Provides up to 15.4 watts at 48 VDC per PoE port
- EN50155/50121-3-2/50121-4, NEMA TS2, and e1 compliant
- -40 to 75°C operating temperature range (T models)

The certification logos shown here apply to some or all of the products in this section. For details, see "Regulatory Approvals" under "Specifications" below.

Introduction

The ToughNet TN-5308-4PoE series M12 unmanaged Ethernet switches are designed for industrial applications in harsh environments. The M12 connectors ensure tight, robust connections, and guarantee reliable operation, even for applications that are subject to high vibration and shock. The TN-5308-4PoE series Ethernet switches provide 8 fast Ethernet M12 ports with 4 IEEE 802.3af compliant PoE (Power-over-Ethernet) ports. The switches are classified as power source equipment (PSE) and provide up to 15.4 watts of power per port.

The TN-5308-4PoE switches can be used to power IEEE 802.3af compliant powered devices (PDs), eliminating the need for additional wiring. The switches support IEEE 802.3/802.3u/802/3x with 10/100M, full/half-duplex, MDI/MDI-X auto-sensing, and provide an economical solution for your industrial Ethernet network. Models with an extended operating temperature range of -40 to 75°C are also available. The TN-5308-4PoE switches are compliant with EN50155/50121-3-2/50121-4 (railway applications), NEMA TS2 (traffic control systems), and e1 (vehicles) requirements, making them suitable for a variety of industrial applications.

Specifications

Technology

Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X)
IEEE 802.3x for Flow Control
IEEE 802.3af for Power-over-Ethernet

Processing Type: Store and Forward

Flow Control: IEEE802.3x flow control, back pressure flow control

Interface

M12 Ports: 10/100BaseT(X) auto negotiation speed, F/H duplex mode and auto MDI/MDI-X connection

LED Indicators: PWR, LNK/ACT, PoE

Power Requirements

Input Voltage: 48 VDC (46 to 50 V)

Overload Current Protection: Present

Connection: M12 A-coding, 5-pin male connector

Reverse Polarity Protection: Present

PoE (per port)

Max. Output Power: 15.4 W

Output Voltage: 44 to 48.5 VDC

Max. Output Current: 350 mA

Max. Overload Protection: 400 mA

Physical Characteristics

Housing: Metal, IP40 protection

Dimensions: 60 x 216.6 x 48.6 mm (2.36 x 8.53 x 1.91 in)

Installation: Panal mounting, DIN-Rail mounting (with optional kit)

Environmental Limits

Operating Temperature:
Standard Models: 0 to 60°C (32 to 140°F)
Wide Temp. Models: -40 to 75°C (-40 to 167°F)

Storage Temperature: -40 to 85°C (-40 to 185°F)

Operating Humidity: 5 to 95% RH (non-condensing)

Regulatory Approvals

Safety: UL508 (Pending)

EMI: FCC Part 15, CISPR (EN55022) class A

EMS:
EN61000-4-2 (ESD), level 3
EN61000-4-3 (RS), level 4
EN61000-4-4 (EFT), level 3
EN61000-4-5 (Surge), level 3
EN61000-4-6 (CS), level 3
EN61000-4-8
EN61000-4-11
EN61000-4-12

Traffic Control: NEMA TS2 (Pending), e1 (Pending)

Rail Traffic: EN50155 (Environmental, Pending), EN50121-3-2 (Pending), EN50121-4 (Pending)

Shock: IEC61373

Freefall: IEC60068-2-32

Vibration: IEC61373

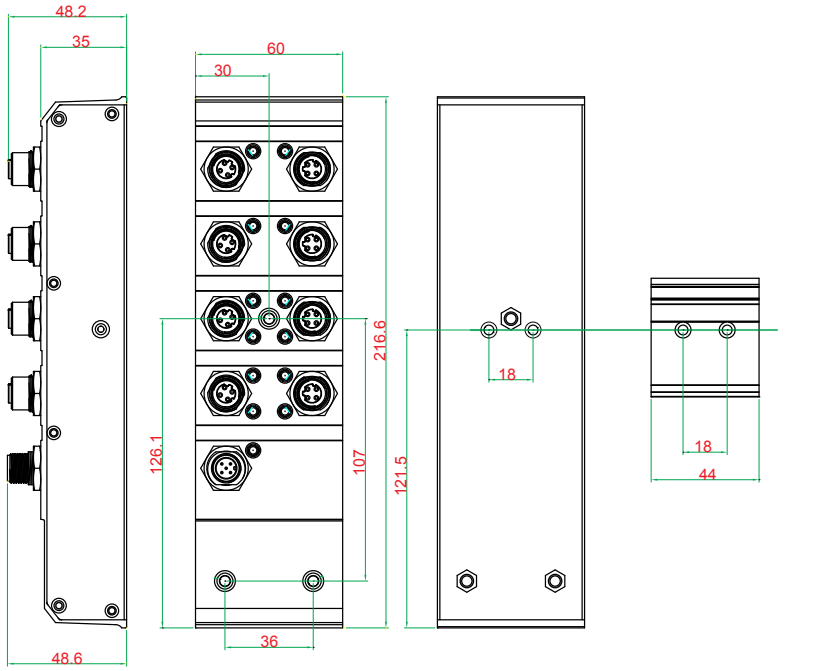
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

Dimensions (unit = mm)



Ordering Information

Available Models		Port Interface	
Standard Temperature (0 to 60°C)	Wide Temperature (-40 to 75°C)	PoE, 10/100BaseT(X)	10/100BaseT(X)
TN-5308-4PoE	TN-5308-4PoE-T	4	4

Optional Accessories (must be purchased separately)

DK-44: DIN-Rail mounting kit, 44 x 48.3 mm
DR-75-48/DR-120-48: 75/120 W DIN-Rail 48 VDC power supplies
Connectors and Patch Cords: M12-type

EDS-305-M12 Series

5-port M12/IP67 unmanaged Ethernet switches

- M12 connectors and IP67 rated case
- 10/100BaseT(X), 4-pin M12 (D-coding), F/H duplex mode, and auto MDI/MDI-X connection
- Power input: 12 to 45 VDC, 18 to 30 VAC
- -40 to 75°C operating temperature range (T models)

The certification logos shown here apply to some or all of the products in this section. For details, see "Regulatory Approvals" under "Specifications" below.

Introduction

The EDS-305-M12 series Ethernet switches are IP67 rated for the toughest industrial applications, which means that the rugged housing and connectors guard against dust, water, and oil. By using M12 connectors, you can rest assured that Ethernet cables will connect tightly to the switch, and will be robust enough to protect your applications from external disturbances, such as the vibration and shock encountered in the transportation industry. The space-saving EDS-305-M12 switches can be mounted virtually anywhere, and wide operating temperature (-40 to 75°C) models are also available for use in the extremest of conditions.

Specifications

Technology

Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X)
IEEE 802.3x for Flow Control

Processing Type: Store and Forward

Flow Control: IEEE 802.3x full duplex, back pressure flow control

Interface

M12 Ports: 10/100BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection

LED Indicators: Power, LNK/ACT

Power Requirements

Input Voltage:
• 12 to 45 VDC
• 18 to 30 VAC (47 to 63 Hz)

Input Current:
• 0.12A @ 24 VDC
• 0.28A @ 24 VAC

Overload Current Protection: 1.1 A (Limited Current)

Connection: 1 M12 socket (A-coding), single power input

Reverse Polarity Protection: Present

Physical Characteristics

Housing: Plastic, IP67 protection

Dimensions: 60 x 125 x 29.6 mm (2.36 x 4.92 x 1.17 in)

Weight: 250 g

Installation: Field-style mounting, DIN-Rail mounting (with optional kit)

Environmental Limits

Operating Temperature:
Standard Models: 0 to 60°C (32 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)

Regulatory Approvals

Safety: UL508

EMI: FCC Part 15, CISPR (EN55022) class A

EMS:
EN61000-4-2 (ESD), level 3
EN61000-4-3 (RS), level 4
EN61000-4-4 (EFT), level 3
EN61000-4-5 (Surge), level 3
EN61000-4-6 (CS), level 2
EN61000-4-8
EN61000-4-11

Maritime: DNV (Pending), GL (Pending)

Rail Traffic: EN50155 (Environmental), EN50121-4 (Pending), EN50121-3-2 (Pending)

Shock: IEC 60068-2-27

Freefall: IEC 60068-2-32

Vibration: IEC 60068-2-6

Note: Please check Moxa's website for the most up-to-date certification status.

MTBF (meantime between failures)

Time: 636,000 hrs

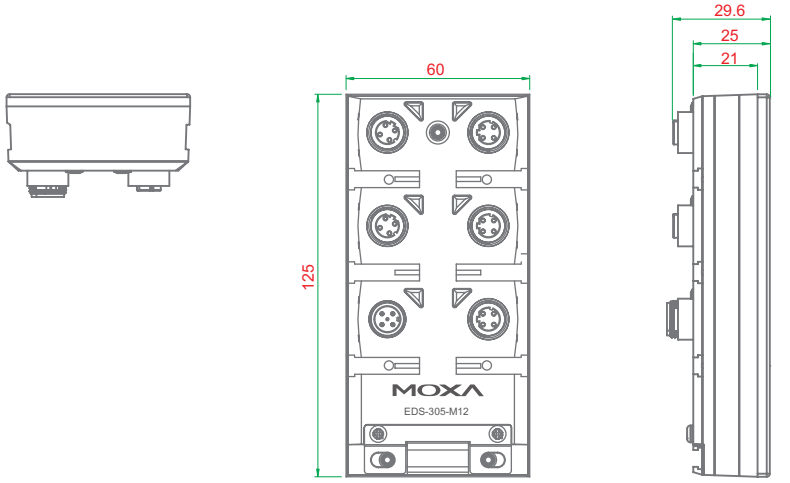
Database: Telcordia (Bellcore), GB

Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

Dimensions (unit = mm)



Top View | Front View | Side View

Ordering Information

Available Models

EDS-305-M12: Industrial M12/IP67 unmanaged Ethernet switch with 5 10/100BaseT(X) ports, 0 to 60°C operating temperature
EDS-305-M12-T: Industrial M12/IP67 unmanaged Ethernet switch with 5 10/100BaseT(X) ports, -40 to 75°C operating temperature

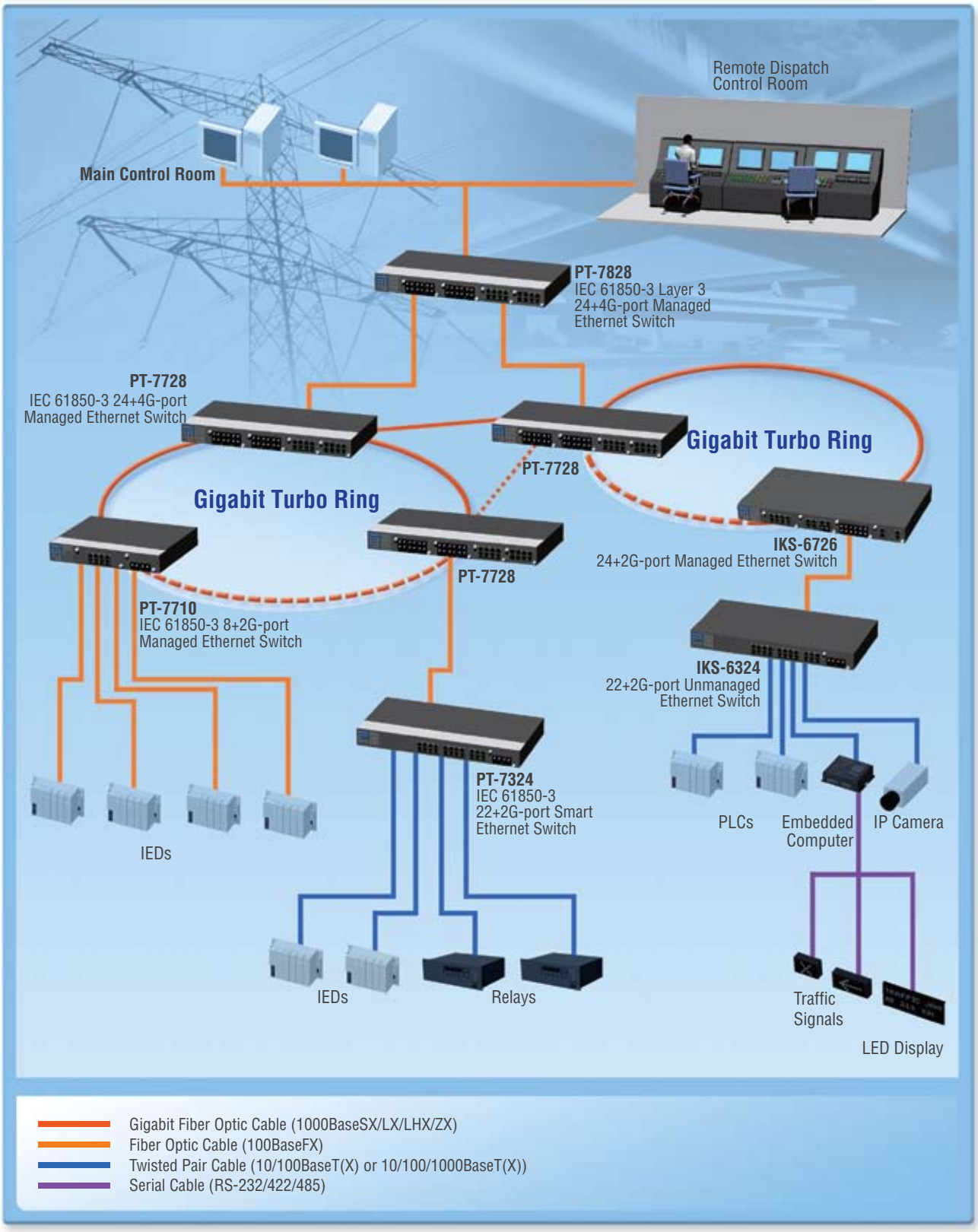
Optional Accessories (can be purchased separately)

DR-4524/75-24/120-24: 45/75/120 W DIN-Rail 24 VDC power supplies
DK-M12-305: DIN-Rail mounting kit for the EDS-305-M12 series
M12 Patch Cords and Sensor Connectors:

M12 Patch Cords		
	**CBL-M12D(MM4P)/RJ45-100 IP67**	1-meter M12-to-RJ45 Cat-5E UTP Ethernet cable with waterproof 4-pin D-coded M12 connector
	**CBL-M12(FF5P)/OPEN-100 IP67**	1-meter M12-to-5-pin power cable with waterproof 5-pin A-coded M12 connector
Sensor Connectors		
	**M12D-4P-IP68**	Field-installable D-coded screw-in sensor connector, male
	**M12A-5P-IP68**	Field-installable A-coded screw-in sensor connector, female

Introduction to IEC 61850-3 Rackmount Ethernet Switches

Suitable for All Demanding Power Utility Applications



Tailor-made Rackmount Solutions Fit for a Variety of Applications

Ethernet has already penetrated into the industrial environment, and is now used widely in control rooms, and for connecting controllers and devices on the shop floor. Industrial Ethernet is not only being used in a wide range of vertical markets, but is also finding uses in different facets of each market. For example, IEC 61850-3 industrial Ethernet networks are applied as the physical medium for power substation automation, which means that a host of legacy field buses must be connected to the Ethernet network. The bottom line is that Industrial Ethernet is now the future trend for automation communication systems.

Different vertical markets require different solutions, which is why Moxa developed two distinct rackmount Ethernet switch product lines. The new PowerTrans PT series of IEC 61850-3 rackmount Ethernet switches and the IKS industrial rackmount Ethernet switch series were developed to meet the needs of a variety of applications (see the table at the right).

Two Product Lines for Diverse Applications		
Applications	IEC 61850-3 Substation Rail traffic Road traffic	Power automation Traffic control center Marine & offshore
Certifications Required	IEC 61850-3/IEEE 1613 NEMA TS2 EN50121-4 /EN50155 DNV/GL	NEMA TS2 EN50121-4/EN50155 DNV/GL
Moxa's Solutions	PowerTrans PT series IEC 61850-3 rackmount Ethernet switches	IKS series industrial rack-mount Ethernet switch*

* See Chapter 3 for detailed information about Moxa's IKS series of rackmount Ethernet switches.

Scalable Network Infrastructure Capability

Substation and transportation automation networks can be extremely large and cover expansive territories. Moxa's rackmount Ethernet switches satisfy the scalable network requirements with long-haul fiber solutions from Layer 3 to Layer 2 Ethernet switches.

- The PT-7828 Layer 3 Ethernet switch can divide a large network into hierarchical sub-nets. Controlling network traffic on separate subnets can improve the performance of the entire network.
- The PT-7710, PT-7728, and IKS-6727 are Layer 2 modular managed Ethernet switches that support advanced network management and control functions, including VLAN, QOS, IGMP snooping, LACP, and GMRP to optimize and prioritize network communications.
- The Layer 2 PoE modular managed Ethernet switch IKS-6726-PoE, which supports max. 16 PoE (Power-over-Ethernet) ports. The PoE Ethernet switch provides up to 15.4 watts of power per PoE port, and allow power to be supplied to connected devices when AC power is not readily available or cost-prohibitive to provide locally.
- The PT-7324 is a smart Layer 2 Ethernet switch that offers web-smart functions, such as port-based VLAN and QoS, to make network management easier.
- The IKS-6324 series of unmanaged Layer 2 Ethernet switches are reliable plug-and-play Ethernet communication solutions that give users an easy and economical way to connect with end devices.

Note: Please check the "Comparison Chart for Rackmount Ethernet Switches" on page 4-19 for details of features that each product model supports.

Redundancy for Higher Network Availability

Moxa's rackmount Ethernet switches provide multiple levels of redundant features:

Media Redundancy

Managed rackmount Ethernet switches come with the world's fastest Turbo Ring redundancy (20 ms @ 250 switches), and standard STP or RSTP redundant protocol. In addition to a single ring redundancy structure, Turbo Ring also provides multiple ring-coupling functions, such as "Ring Coupling," "Dual Homing," and "Dual Ring."

Power Input Redundancy

Non-stop operation is the key criterion for mission-critical applications. The PT-7728/7828 and IKS-6726 support dual, isolated, redundant power supplies with different power sources (24/48 VDC or 110/220 VAC/VDC input voltage). For example, you can choose 110/200 VAC/VDC as your main power source, and 48 VDC from a battery as your back up power source.

Configuration Redundancy

The ABC-01 backup configuration tool can both save and load configurations automatically when connected to a Moxa managed Ethernet switch. This novel management tool helps reduce downtime, and can be used for fast configuration duplication of large-scale networks.

Rugged Design Suitable for Harsh Environments

The rugged design of the PowerTrans PT and IKS series Ethernet switches make them well-qualified for a diverse number of mission-critical communication applications in the power utility and transportation automation markets.

- 19-inch rack-mountable design to meet the installation needs of substation and traffic control rooms.
- To perform flawlessly in the uncontrolled climates found in utility substations and industrial environments, these rackmount Ethernet switches are designed for fan-less operation in a wide temperature range:
  - All PT series Ethernet switches are designed for use in a -40 to 85°C wide operating temperature range.
  - All IKS series Ethernet switches are designed for use in a -40 to 75°C wide operating temperature range.

Future-proof Flexibility

Up to 4 Gigabit Ports for Backbone and Uplink

As industry adopts bandwidth-hungry applications such as video surveillance, there is a greater need for high bandwidth and fault-tolerant solutions with Gigabit Ethernet equipment. Demand is growing for applications in industrial networks that comprise multiple, interconnected Gigabit backbones among different network centers. Moxa offers a range of Gigabit managed Ethernet solutions that can be used to form a Gigabit backbone that connects to control centers, video-over-IP servers, Ethernet-enabled devices, or other Ethernet switches. These Gigabit Ethernet switches support fault-tolerant rings with fiber-optic ports, allowing operation in the toughest industrial environments.

Gigabit Ethernet is the trend, and we can already see a lot of work stations, HMI/SCADA equipment, and video monitoring panels in control rooms that come standard with a Gigabit Ethernet interface.

Moxa's modular rackmount Ethernet switches come with up to 4 Gigabit combo ports for the PT-7728/7828 series. Other modular Ethernet switches include the managed PT-7710 Ethernet switch, the IKS-6726 Ethernet switch, the smart PT-7324 Ethernet switch, and the unmanaged IKS-6324 Ethernet switch, all of which support 2 Gigabit combo ports. Any combination of twisted pair and fiber optic ports can be chosen to form a redundant Gigabit Turbo Ring or connected to a Gigabit HMI/SCADA in the control room.

Media Configuration Flexibility

The PT and IKS series of modular Ethernet switches supports different numbers of Gigabit and fast Ethernet interface modules, which allow users to choose from a variety of copper/fiber media combinations.

The modular design benefits users in three ways:

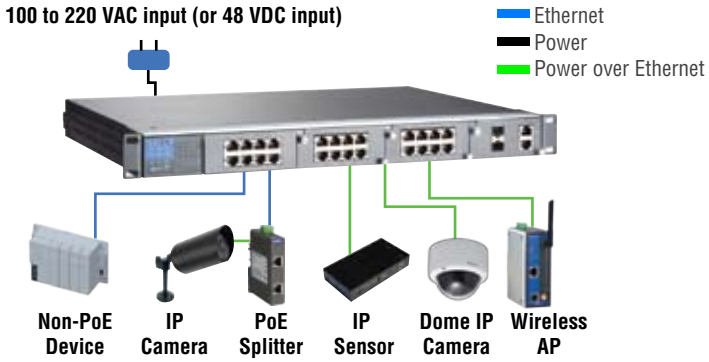
- Higher flexibility for system design and fast network changes
- Easy maintenance and lower cost of spare parts
- Reduced cost of future upgrade

Cabling Flexibility

Moxa's rackmount Ethernet switches provide two options of cabling direction. Front cabling is ideal for maintenance, whereas rear cabling is neater and results in an arrangement that is safer in the event that a cable gets disconnected.

Power-Over-Ethernet Solutions for Rackmount Applications

The IKS-6726-PoE switch comes standard with up to 16 10/100BaseT(X) PoE ports and 2 Gigabit Ethernet ports, making it suitable for applications such as power facility security, where up to 16 IP cameras or IO sensors can be connected to a single IKS-6726-PoE rackmount switch. Gigabit Ethernet and fiber optic ports are supported to secure remote, high bandwidth transmission to the control center. The unique combination of dual redundant power supplies, -40 to 75°C operating temperature range, and Moxa Turbo Ring redundancy ensures high network availability if a link or device fails.



Certifications to Ensure Reliable Operation

Power Substation Certifications

IEC 61850-3

IEC 61850-3 specifically addresses immunity from certain environmental conditions and electromagnetic interference (EMI) for communication networks and systems in substations. The EMI immunity requirements are based on IEC 61000-6-5, which establishes performance criteria for key functions within the substation. To be compliant with the standard, critical functions, such as protection relay

and control functions, on-line processing and regulation, as well as metering and network communication, must experience no delays or data loss when exposed to various EMI phenomena.

IEEE 1613

IEEE 1613 is another industry standard that establishes EMI immunity requirements for networking devices in electric power substations. Included in this standard are ratings, environmental performance requirements, and testing requirements for compliant communication devices.

According to the IEEE 1613 standard, compliant devices may not experience permanent damage under EMI stress. Two different classes of devices are defined in the standard according to how EMI stress affects performance.

Class 1

Compliant devices in this class may experience some data errors, losses, or delays under EMI stress conditions.

Class 2

Compliant devices in this class must not experience any data errors, delays, or losses under EMI stress conditions.

The PowerTrans PT series is compliant with IEC 61850-3 and IEEE 1613 certifications specifying a high level of EMC, shock, and vibration in power substations.

Road Traffic Control System Standard

NEMA TS2

The National Electrical Manufacturers Association (NEMA) established the TS1 standard to define technically adequate and safe traffic control equipment. The TS2 standard was later introduced to address some drawbacks of the original guidelines. NEMA TS2 defines controllers, cabinets, and systems more completely than TS1, promotes better interchangeability, and allows for future expansion. Section 2 contains the environmental and testing requirements, including guidelines for temperature, humidity, voltage, vibration, and shock. PT series and IKS series switches are compliant with the NEMA TS2 traffic control system standard.

Test	NEMA TS2
Temperature	-34 to 74°C
Humidity	18% to 90% RH, non-condensing
Voltage	120 to 135 VAC @ 57 to 63 Hz
Vibration	0.5 g @ 5 to 30 Hz
Shock	10 g's for 11 ms

Railway Control System Standards

EN50121-4

EN50121-4 defines emission and immunity standards for signaling and telecommunication apparatus.

EN50155

The complete PT and IKS series are certified according to the EN50155 ensuring safe deployment for railway applications.

Comparison Chart for Rackmount Ethernet Switches

	Port Interfaces				Certifications				Features											
Model	Total Number of Ports	Gigabit Ethernet (10/100/1000 Mbps)	Fast Ethernet (10/100 Mbps)	PoE, Fast Ethernet (10/100 Mbps)	IEC 61850-3, IEEE 1613	NEMA TS2	EN50155/EN50121-4	DNV/GL	Layer 3 Switching	Turbo Ring and RSTP/STP	IGMP snooping/GMRP	Port Trunking	IEEE 802.1X/HTTPS/SSH	Port Lock	SNMP/RMON	802.1Q VLAN	Port-based VLAN	QoS	Isolated Redundant Power	ABC-01*
PT-7828	28	4	24	---	√	√	√	P	√	√	√	√	√	√	√	√	---	√	√	√
PT-7728	28	4	24	---	√	√	√	P	---	√	√	√	√	√	√	√	---	√	√	√
PT-7710	10	2	8	---	√	√	√	P	---	√	√	√	√	√	√	√	√	√	---	√
PT-7324	24	2	22	---	√	√	√	P	---	---	---	---	---	---	---	---	√	√	---	---
IKS-6726	26	2	24	---	---	√	√	P	---	√	√	√	√	√	√	√	---	√	√	√
IKS-6726-PoE	26	2	8	16	---	√	√	P	---	√	√	√	√	√	√	√	---	√	√	√
IKS-6324	24	2	22	---	---	√	√	P	---	---	---	---	---	---	---	---	---	---	---	---

√ = Available P = Pending Note: Please check Moxa's website for the most up-to-date certification status.

(All products listed support a wide operating temperature range: -40 to 85°C for the PT series, and -40 to 75°C for the IKS series.)
*ABC-01 is an RS-232 RJ45-based automatic backup configurator for managed Ethernet Switches. See page 3-48 for details.

PT-7828 Series

IEC 61850-3 24+4G-port Layer 3 Gigabit modular managed rackmount Ethernet switches

- Layer 3 routing interconnects multiple LAN segments
- IEC 61850-3, IEEE 1613 (power substations), NEMA TS2 (traffic control systems), and EN50121-4 (railway applications) compliant
- Turbo Ring and RSTP/STP for Ethernet redundancy
- Isolated redundant power inputs with universal 24/48 VDC or 110/220 VDC/VAC power supply range
- Modular design for various media options: RJ45, fiber optic, M12, and SFP ports
- -40 to 85°C operating temperature range

The certification logos shown here apply to some or all of the products in this section. For details, see "Regulatory Approvals" under "Specifications" below.

Introduction

The PowerTrans PT-7828 switches are high performance Layer 3 Ethernet switches that support Layer 3 routing functionality to facilitate the deployment of applications across networks. The PT-7828 switches are also designed to meet the strict demands of power substation automation systems (IEC 61850-3, IEEE 1613), traffic control systems (NEMA TS2), and railway applications (EN50121-4).

The PT-7828's Gigabit and fast Ethernet backbone, redundant ring, and 24/48 VDC or 110/220 VDC/VAC dual isolated redundant power supplies increase the reliability of your communications and save on cabling and wiring costs. The modular design of the PT-7828 makes network planning easy, and allows greater flexibility by letting you install up to 4 Gigabit ports and 24 fast Ethernet ports. Optional front or rear wiring makes the PT-7828 switches suitable for a variety of 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
- IEEE 1588 PTP (Precision Time Protocol) for precise time synchronization of networks
- DHCP Option 82 for IP address assignment with different policies
- Modbus/TCP industrial Ethernet protocol supported
- Turbo Ring and RSTP/STP (IEEE 802.1w/D)
- IGMP snooping and GMRP for filtering multicast traffic from industrial Ethernet protocols
- IEEE 802.1Q VLAN and GVRP protocols to ease network planning
- QoS (IEEE802.1p/1Q) and TOS/DiffServ to increase determinism
- IEEE 802.3ad, LACP for optimum bandwidth utilization
- 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 to restrict access to authorized MAC addresses
- Port mirroring for online debugging
- Automatic warning by exception through email, relay output
- Automatic recovery of connected devices' IP addresses
- Line-swap fast recovery
- Configurable by web browser, Telnet/serial console, Windows utility, and ABC-01 automatic backup configurator

Specifications

Technology

Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100Base FX
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3z for 1000BaseSX/LX/LHX/ZX
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 device, GMRP, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, DHCP Option 66/67/82, BootP, TFTP, SNTP, SMTP, RARP, RMON, RIP V1/V2, HTTP, HTTPS, Telnet, SSH, Syslog, LLDP, Modbus/TCP, IEEE 1588 PTP

Layer 3 Modular Rackmount Ethernet Switch System, PT-7828

Layer 3 Switching: Static routing, RIP V1/V2, OSPF, DVMRP, PIM-DM, VRRP for router redundancy

MIB: MIB-II, Ethernet-like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Groups 1, 2, 3, 9

Flow Control: IEEE 802.3x 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: Slots 1, 2, and 3 for any combination of 4, 6, 7, or 8-port PM-7200 fast Ethernet modules with 10/100BaseT(X) (TP/M12 interface), 100BaseFX (SC/ST connector), or 100BaseSFP

Gigabit Ethernet: Slot 4 for 2 or 4-port PM-7200 Gigabit Ethernet combo module, 10/100/1000BaseT(X) or 1000BaseSFP

Console Port: RS-232 (RJ45)

System LED Indicators: STAT, PWR1, PWR2, FAULT, MASTER, COUPLER

Module LED Indicators: LNK/ACT, FDX/HDX, RING PORT, COUPLER PORT, SPEED

Alarm Contact: 1 relay output with current carrying capacity of 3 A @ 30 VDC or 3 A @ 240 VAC

Power Requirements

Input Voltage:
- 24 VDC (18 to 36 V)
- 48 VDC (36 to 72 V)
- 110/220 VDC/VAC (88 to 300 VDC, 85 to 264 VAC)

Input Current: (all ports are equipped with fiber)
- Max. 2.58 A @ 24 VDC
- Max. 1.21 A @ 48 VDC
- Max. 0.64/0.33 A @ 110/220 VDC
- Max. 0.53/0.28 A @ 110/220 VAC

Overload Current Protection: Present

Connection: 10-pin terminal blocks

Reverse Polarity Protection: Present

Physical Characteristics

Housing: IP30 protection

Dimensions: 440 x 44 x 325 mm (17.32 x 1.73 x 12.80 in)

Weight: 5900 g

Installation: 19" rack mounting

Environmental Limits

Operating Temperature: -40 to 85°C (-40 to 185°F), cold start requires min. of 100 VAC at -40°C

Storage Temperature: -40 to 85°C (-40 to 185°F)

Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

Safety: UL60950-1, CSA C22.2 No. 60950-1, EN60950-1 (Pending)

EMI: FCC Part 15, CISPR (EN55022) class A

Power Automation: IEC 61850-3, IEEE 1613

Maritime: DNV (Pending), GL (Pending)

Traffic Control: NEMA TS2

Rail Traffic: EN50155/EN50121-4

Shock: IEC 60068-2-27

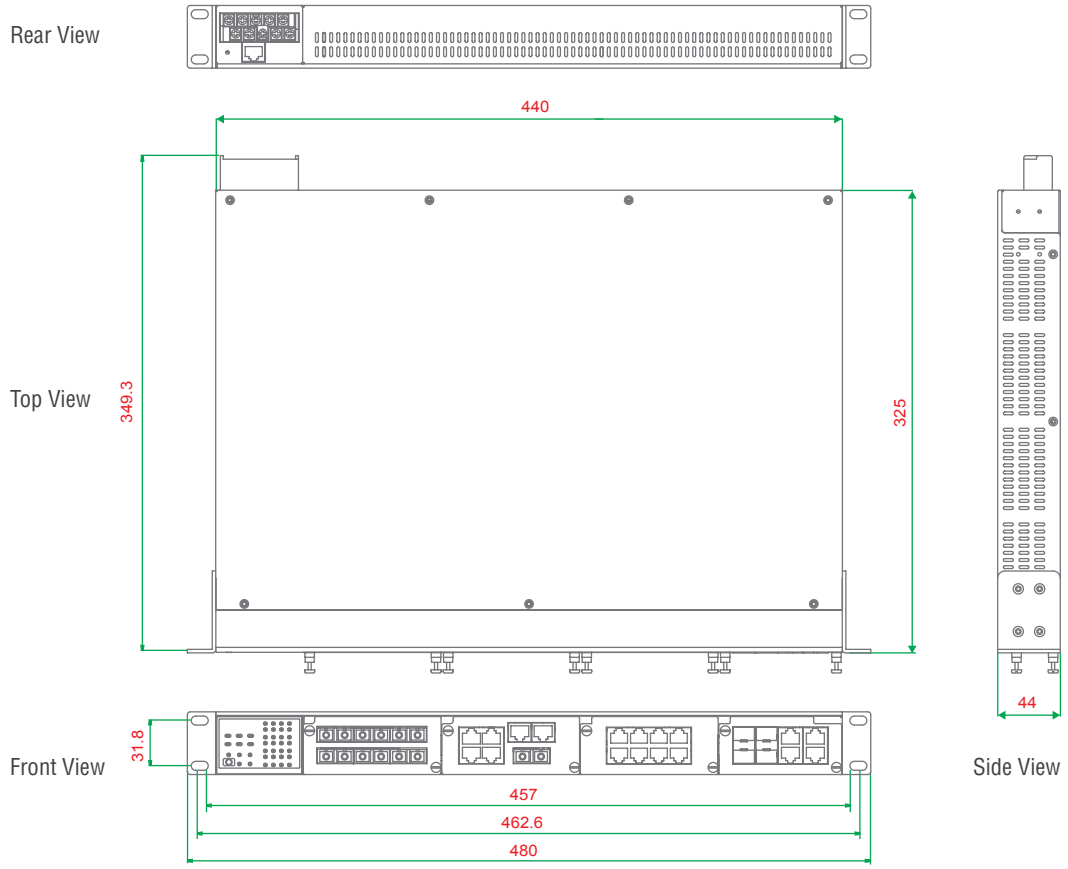
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

Dimensions (unit = mm)



Ordering Information

Step 1: Select Ethernet switch system → **PT-7828 with power supply**

Step 2: Select interface modules → **PM-7200 module (Gigabit or fast Ethernet)**

Note: The PT-7828 Ethernet switch system is delivered without interface modules. See page 4-31 to choose PM-7200 interface modules.

PT-7828 Layer 3 Modular Rackmount Ethernet Switch System

The PT-7828 switch system consists of 18 Layer 3 modular managed rackmount Ethernet switch systems, each with 3 slots for fast Ethernet modules and 1 slot for a Gigabit Ethernet module. A total of 24+4G ports can be installed, and the switch can be used in a temperature range from -40 to 85°C.

Available Models		Power Supply					
		Isolated Power Supply 1			Isolated Power Supply 2		
Front Cabling, Front Display	Rear Cabling, Front Display	24 VDC (18 to 36 V)	48 VDC (36 to 72 V)	HV: 88 to 300 VDC and 85 to 264 VAC	24 VDC (18 to 36 V)	48 VDC (36 to 72 V)	HV: 88 to 300 VDC and 85 to 264 VAC
PT-7828-F-24	PT-7828-R-24	1	---	---	---	---	---
PT-7828-F-24-24	PT-7828-R-24-24	1	---	---	1	---	---
PT-7828-F-24-48	PT-7828-R-24-48	1	---	---	---	1	---
PT-7828-F-24-HV	PT-7828-R-24-HV	1	---	---	---	---	1
PT-7828-F-48	PT-7828-R-48	---	1	---	---	---	---
PT-7828-F-48-48	PT-7828-R-48-48	---	1	---	---	1	---
PT-7828-F-48-HV	PT-7828-R-48-HV	---	1	---	---	---	1
PT-7828-F-HV	PT-7828-R-HV	---	---	1	---	---	---
PT-7828-F-HV-HV	PT-7828-R-HV-HV	---	---	1	---	---	1

Note: The PT-7828 Layer 3 Ethernet switch systems provide 1 slot for a Gigabit Ethernet interface module and 3 slots for fast Ethernet interface modules. See page 4-31 to select the PM-7200 Gigabit Ethernet and fast Ethernet interface modules for your own application.

PT-7828-F series
(Front Cabling, Front Display)

PT-7828-R series
(Rear Cabling, Front Display)

Gigabit/Fast Ethernet Modules for the PT-7828

	Interface Module																							
Product Model	PM-7200-4GTXSFP	PM-7200-2GTXSFP	PM-7200-1MSC	PM-7200-1MST	PM-7200-2MSC	PM-7200-2MST	PM-7200-1SSC	PM-7200-2SSC	PM-7200-8TX	PM-7200-2MSC4TX	PM-7200-2MST4TX	PM-7200-2SSC4TX	PM-7200-4MSC2TX	PM-7200-4MST2TX	PM-7200-4SSC2TX	PM-7200-6MSC	PM-7200-6MST	PM-7200-6SSC	PM-7200-1LSC6TX	PM-7200-1MST6TX	PM-7200-1SSC6TX	PM-7200-1MSC6TX	PM-7200-8PoE	PM-7200-8SFP	PM-7200-4M12
Slot 1	---	---	---	---	---	---	---	---	√	√	√	√	√	√	√	√	√	√	√	√	√	√	---	√	√
Slot 2	---	---	---	---	---	---	---	---	√	√	√	√	√	√	√	√	√	√	√	√	√	√	---	√	√
Slot 3	---	---	---	---	---	---	---	---	√	√	√	√	√	√	√	√	√	√	√	√	√	√	---	√	√
Slot 4	√	√	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Optional Accessories (can be purchased separately)

EDS-SNMP OPC Server Pro: OPC server software that works with all SNMP devices

ABC-01: Configuration backup and restoration tool for managed Ethernet switches, 0 to 60°C operating temperature

PT-7728 Series

IEC 61850-3 24+4G-port Gigabit modular managed rackmount Ethernet switches

- IEC 61850-3, IEEE 1613 (power substations), NEMA TS2 (traffic control systems), and EN50121-4 (railway applications) compliant
- Turbo Ring and RSTP/STP for Ethernet Redundancy
- Isolated redundant power inputs with universal 24/48 VDC or 110/220 VDC/VAC power supply range
- Modular design lets you choose from a variety of media combinations
- -40 to 85°C operating temperature range

The certification logos shown here apply to some or all of the products in this section. For details, see "Regulatory Approvals" under "Specifications" below.

Introduction

The PowerTrans PT-7728 is designed to meet the demands of power substation automation systems (IEC 61850-3, IEEE 1613), traffic control systems (NEMA TS2), and railway applications (EN50121-4). The PT-7728's Gigabit and fast Ethernet backbone, redundant ring, and 24/48 VDC or 110/220 VDC/VAC dual isolated redundant power supplies increase the reliability of your communications and save on cabling/wiring costs.

The modular design of the PT-7728 also makes network planning easy, and allows greater flexibility by letting you install up to 4 Gigabit ports and 24 fast Ethernet ports. Along with the optional front or rear wiring, these features together make the PT-7728 suitable for a variety of industrial applications.

Features and Benefits

- IPv6 Ready logo awarded (IPv6 Logo Committee certified)
- IEEE 1588 PTP (Precision Time Protocol) for precise time synchronization of networks
- DHCP Option 82 for IP address assignment with different policies
- Modbus/TCP industrial Ethernet protocol supported
- Turbo Ring and RSTP/STP (IEEE 802.1w/D)
- IGMP snooping and GMRP for filtering multicast traffic from industrial Ethernet protocols
- IEEE 802.1Q VLAN and GVRP protocols to ease network planning
- QoS (IEEE 802.1p/1Q) and TOS/DiffServ to increase determinism
- IEEE 802.3ad, LACP for optimum bandwidth utilization
- 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 limits access to authorized MAC addresses only
- Port mirroring for online debugging
- Automatic warning by exception through email, relay output
- Automatic recovery of connected device's IP addresses
- Line-swap fast recovery
- Configurable by Web browser, Telnet/Serial console, Windows utility, and ABC-01 automatic backup configurator

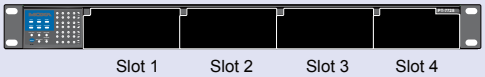
Specifications

Technology

Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100Base FX
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3z for 1000BaseSX/LX/LHX/ZX
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 device, GMRP, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, DHCP Option 66/67/82, BootP, TFTP, SNTP, SMTP, RARP, RMON, HTTP, HTTPS, Telnet, SSH, Syslog, LLDP, Modbus/TCP, IEEE 1588 PTP, IPv6

Modular Rackmount Ethernet Switch System, PT-7728



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: IEEE 802.3x 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: Slots 1, 2, and 3 for any combination of 4, 6, 7, or 8-port PM-7200 fast Ethernet modules with 10/100BaseT(X) (TP/M12 interface), 100BaseFX (SC/ST connector), or 100BaseSFP

Gigabit Ethernet: Slot 4 for 2 or 4-port PM-7200 Gigabit Ethernet combo module, 10/100/1000BaseT(X) or 1000BaseSFP

Console Port: RS-232 (RJ45)

System LED Indicators: STAT, PWR1, PWR2, FAULT, MASTER, COUPLER

Module LED Indicators: LNK/ACT, FDX/HDX, RING PORT, COUPLER PORT, SPEED

Alarm Contact: 1 relay output with current carrying capacity of 3 A @ 30 VDC or 3 A @ 240 VAC

Power Requirements

Input Voltage:
- 24 VDC (18 to 36 V)
- 48 VDC (36 to 72 V)
- 110/220 VDC/VAC (88 to 300 VDC, 85 to 264 VAC)

Input Current: (all ports are equipped with fiber)
- Max. 2.58 A @ 24 VDC
- Max. 1.21 A @ 48 VDC
- Max. 0.64/0.33 A @ 110/220 VDC
- Max. 0.53/0.28 A @ 110/220 VAC

Overload Current Protection: Present

Connection: 10-pin terminal blocks

Reverse Polarity Protection: Present

Physical Characteristics

Housing: IP30 protection

Dimensions: 440 x 44 x 325 mm (17.32 x 1.73 x 12.80 in)

Weight: 5900 g

Installation: 19" rack mounting

Environmental Limits

Operating Temperature: -40 to 85°C (-40 to 185°F), cold start requires min. of 100 VAC at -40°C

Storage Temperature: -40 to 85°C (-40 to 185°F)

Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

Safety: UL60950-1, CSA C22.2 No. 60950-1, EN60950-1 (Pending)

EMI: FCC Part 15, CISPR (EN55022) class A

Power Automation: IEC 61850-3, IEEE 1613

Maritime: DNV (Pending), GL (Pending)

Traffic Control: NEMA TS2

Rail Traffic: EN50155/EN50121-4

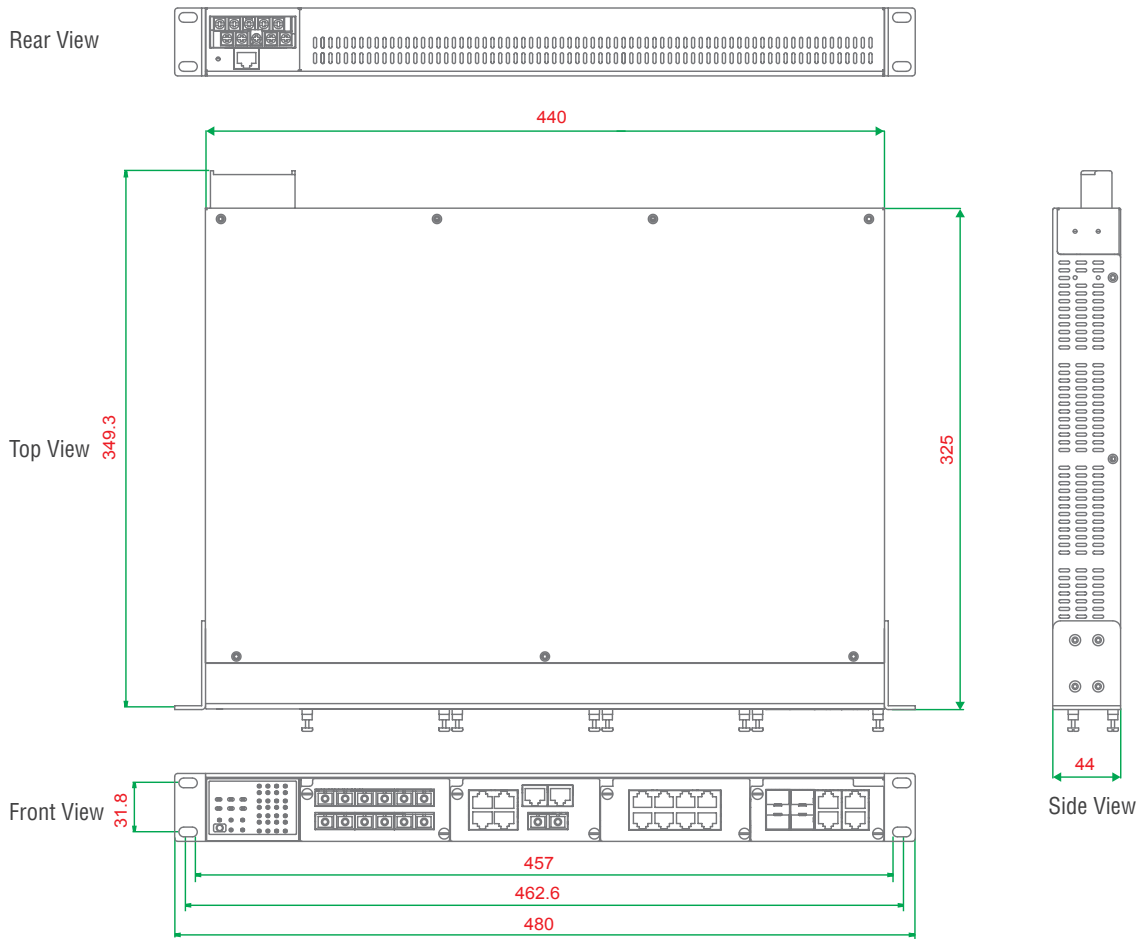
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

Dimensions (unit = mm)



Ordering Information

Step 1: Select Ethernet switch system

PT-7728 with power supply

Step 2: Select interface modules

PM-7200 modules
(Gigabit or fast Ethernet)

Note: The PT-7728 Ethernet switch system is delivered without interface module. See page 4-31 to choose PM-7200 interface modules.

PT-7728 Modular Rackmount Ethernet Switch System

The PT-7728 switch system consists of 18 modular managed rackmount Ethernet switch systems with 3 slots for fast Ethernet modules, and 1 slot for a Gigabit Ethernet module. A total of 24+4G ports can be installed, and the switch can be used in a temperature range from -40 to 85°C.

Available Models		Power Supply					
		Isolated Power Supply 1			Isolated Power Supply 2		
Front Cabling, Front Display	Rear Cabling, Front Display	24 VDC (18 to 36 V)	48 VDC (36 to 72 V)	HV: 88 to 300 VDC and 85 to 264 VAC	24 VDC (18 to 36 V)	48 VDC (36 to 72 V)	HV: 88 to 300 VDC and 85 to 264 VAC
PT-7728-F-24	PT-7728-R-24	1	---	---	---	---	---
PT-7728-F-24-24	PT-7728-R-24-24	1	---	---	1	---	---
PT-7728-F-24-48	PT-7728-R-24-48	1	---	---	---	1	---
PT-7728-F-24-HV	PT-7728-R-24-HV	1	---	---	---	---	1
PT-7728-F-48	PT-7728-R-48	---	1	---	---	---	---
PT-7728-F-48-48	PT-7728-R-48-48	---	1	---	---	1	---
PT-7728-F-48-HV	PT-7728-R-48-HV	---	1	---	---	---	1
PT-7728-F-HV	PT-7728-R-HV	---	---	1	---	---	---
PT-7728-F-HV-HV	PT-7728-R-HV-HV	---	---	1	---	---	1

Note: The PT-7728 Ethernet switch systems provide 1 slot for a Gigabit Ethernet interface modules and 3 slots for fast Ethernet interface modules. See page 4-31 to select the PM-7200 Gigabit Ethernet and fast Ethernet interface modules that you need for your own application.

PT-7728-F series
(Front Cabling, Front Display)

PT-7728-R series
(Rear Cabling, Front Display)

Gigabit/Fast Ethernet Modules for the PT-7728

Product Model	Interface Module																								
	PM-7200-4GTXSFP	PM-7200-2GTXSFP	PM-7200-1MSC	PM-7200-1MST	PM-7200-2MSC	PM-7200-2MST	PM-7200-1SSC	PM-7200-2SSC	PM-7200-8TX	PM-7200-2MSC4TX	PM-7200-2MST4TX	PM-7200-2SSC4TX	PM-7200-4MSC2TX	PM-7200-4MST2TX	PM-7200-4SSC2TX	PM-7200-6MSC	PM-7200-6MST	PM-7200-6SSC	PM-7200-1LSC6TX	PM-7200-1MST6TX	PM-7200-1SSC6TX	PM-7200-1MSC6TX	PM-7200-8PoE	PM-7200-8SFP	PM-7200-4M12
Slot 1	---	---	---	---	---	---	---	---	√	√	√	√	√	√	√	√	√	√	√	√	√	√	---	√	√
Slot 2	---	---	---	---	---	---	---	---	√	√	√	√	√	√	√	√	√	√	√	√	√	√	---	√	√
Slot 3	---	---	---	---	---	---	---	---	√	√	√	√	√	√	√	√	√	√	√	√	√	√	---	√	√
Slot 4	√	√	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Optional Accessories (can be purchased separately)

EDS-SNMP OPC Server Pro: OPC server software that works with all SNMP devices

ABC-01: Configuration backup and restoration tool for managed Ethernet switches, 0 to 60°C operating temperature

PT-7710 Series

IEC 61850-3 8+2G-port Gigabit modular managed rackmount Ethernet switches

- IEC 61850-3, IEEE 1613 (power substations), NEMA TS2 (traffic control systems), and EN50121-4 (railway applications) compliant
- Turbo Ring and RSTP/STP for Ethernet redundancy
- Universal power supply range, 12/24/48 VDC or 110/220 VDC/VAC
- Modular design lets you choose from a variety of media combinations
- -40 to 85°C operating temperature range

The certification logos shown here apply to some or all of the products in this section. For details, see "Regulatory Approvals" under "Specifications" below.

Introduction

The PowerTrans PT-7710 is designed to meet the demands of power substation automation systems (IEC 61850-3, IEEE 1613), traffic control systems (NEMA TS2), and railway applications (EN50121-4). The PT-7710's Gigabit and fast Ethernet backbone, redundant ring, and 12/24/48 VDC dual redundant power supplies or 110/220 VDC/VAC power supplies increase the reliability of the communications and reduce cabling and wiring costs. The modular design of the PT-7710 makes network planning easy, and allows greater flexibility by letting you install up to 2 Gigabit ports and 8 fast Ethernet ports, or 10 fast Ethernet ports.

Features and Benefits

- IPv6 Ready logo awarded (IPv6 Logo Committee certified)
- IEEE 1588 PTP (Precision Time Protocol) for precise time synchronization of networks
- DHCP Option 82 for IP address assignment with different policies
- Modbus/TCP industrial Ethernet protocol supported
- Turbo Ring and RSTP/STP (IEEE 802.1w/D)
- IGMP snooping and GMRP for filtering multicast traffic from industrial Ethernet protocols
- Port-based VLAN, IEEE 802.1Q VLAN, and GVRP protocol to ease network planning
- QoS (IEEE 802.1p/1Q) and TOS/DiffServ to increase determinism
- IEEE 802.3ad, LACP for optimum bandwidth utilization
- 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 to limit access to authorized MAC addresses only
- Port mirroring for online debugging
- Automatic warning by exception through email, relay output
- Automatic recovery of connected device's IP addresses
- Line-swap fast recovery
- Configurable by web browser, Telnet/serial console, Windows utility, and ABC-01 automatic backup configurator

Specifications

Technology

Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100Base FX
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3z for 1000BaseSX/LX/LHX/ZX
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 device, GMRP, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, DHCP Option 66/67/82, BootP, TFTP, SNTP, SMTP, RARP, RMON, HTTP, HTTPS, Telnet, SSH, Syslog, LLDP, Modbus/TCP, IEEE 1588 PTP, IPv6

Modular Rackmount Ethernet Switch System, PT-7710

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: IEEE 802.3x 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: Slot 1 for any combination of 4, 6, 7, or 8-port PM-7200 fast Ethernet modules with 10/100BaseT(X) (TP/M12 interface), 100BaseFX (SC/ST connector), or 100BaseSFP; Slot 2 for 1 or 2-port interface modules with 100BaseFX (SC/ST connector)

Gigabit Ethernet: Slot 2 for 2-port PM-7200 Gigabit Ethernet combo module with 10/100/1000BaseT(X) or 1000BaseSFP slots

Console Port: RS-232 (RJ45)

System LED Indicators: STAT, PWR1, PWR2, FAULT, MASTER, COUPLER

Module LED Indicators: LNK/ACT, FDX/HDX, RING PORT, COUPLER PORT, SPEED

Alarm Contact: 1 relay output with current carrying capacity of 3 A @ 30 VDC or 3 A @ 240 VAC

Power Requirements

Input Voltage:
- 12/24/48 VDC (9 to 60 V)
- 110/220 VDC/VAC (88 to 300 VDC and 85 to 264 VAC)

Input Current: (all ports are equipped with fiber)
- Max. 0.81 A @ 24 VDC
- Max. 0.42 A @ 48 VDC
- Max. 0.17/0.10 A @ 110/220 VDC
- Max. 0.20/0.12 A @ 110/220 VAC

Overload Current Protection: Present

Connection: 10-pin terminal blocks

Reverse Polarity Protection: Present

Physical Characteristics

Housing: IP30 protection

Dimensions: 266.7 x 44 x 195 mm (10.5 x 1.73 x 7.68 in)

Weight: 2200 g

Installation: 19'' rack mounting

Environmental Limits

Operating Temperature: -40 to 85°C (-40 to 185°F)

Storage Temperature: -40 to 85°C (-40 to 185°F)

Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

Safety: UL60950-1, CSA C22.2 No. 60950-1, EN60950-1 (Pending)

EMI: FCC Part 15, CISPR (EN55022) class A

Power Automation: IEC 61850-3, IEEE 1613

Maritime: DNV (Pending), GL (Pending)

Traffic Control: NEMA TS2

Rail Traffic: EN50155/EN50121-4

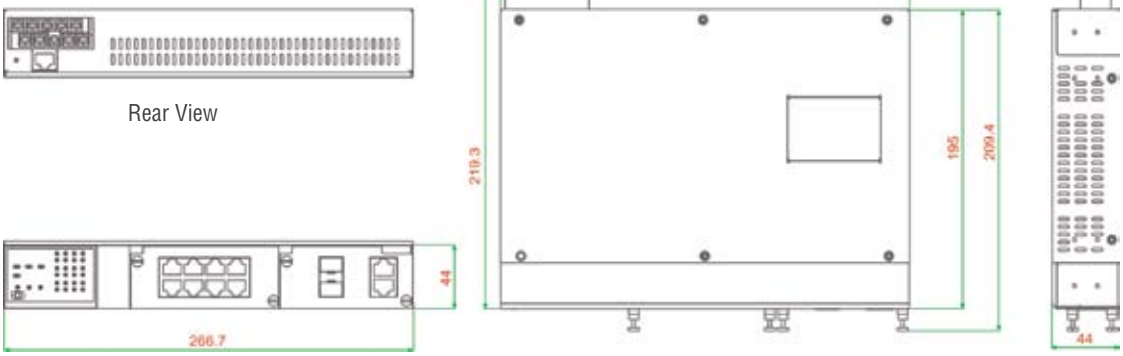
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

Dimensions (unit = mm)



Rear View | Front View | Top View | Side View

Ordering Information

Step 1: Select Ethernet switch system → **Step 2: Select interface modules**

PT-7710 with power supply → **PM-7200 modules (Gigabit or fast Ethernet)**

Note: The PT-7710 Ethernet switch system is delivered without interface module. See page 4-31 to choose PM-7200 interface modules.

PT-7710 Modular Rackmount Ethernet Switch System

The PT-7710 switch system consists of 4 modular managed rackmount Ethernet switch systems with 1 slot for a fast Ethernet module, and 1 slot for a fast Ethernet or Gigabit Ethernet module. A total of 10 or 8+2G ports can be installed, and the switch can be used in a temperature range from -40 to 85°C.

Available Models		Power Supply	
Rackmounting, Front Cabling, Front Display	Wall mounting, Down Cabling, Front Display	LV: 12/24/48 VDC (9 to 60 V) (Dual power inputs)	HV: 88 to 300 VDC and 85 to 264 VAC, isolated
PT-7710-F-LV	PT-7710-D-LV	1	---
PT-7710-F-HV	PT-7710-D-HV	---	1

Note: The PT-7710 Ethernet switch systems provide 1 slot for a Gigabit Ethernet interface module and 1 slot for a fast Ethernet interface module. See page 4-31 to select the PM-7200 Gigabit Ethernet and fast Ethernet interface modules that you need for your own application.

PT-7710-F series
(Rackmounting, Front Cabling, Front Display)

PT-7710-D series
(Wall mounting, Down Cabling, Front Display)

Gigabit/Fast Ethernet Modules for the PT-7710

	Interface Module																							
Product Model	PM-7200-4GTXSFP	PM-7200-2GTXSFP	PM-7200-1MSC	PM-7200-1MST	PM-7200-2MSC	PM-7200-2MST	PM-7200-1SSC	PM-7200-2SSC	PM-7200-8TX	PM-7200-2MSC4TX	PM-7200-2MST4TX	PM-7200-2SSC4TX	PM-7200-4MSC2TX	PM-7200-4MST2TX	PM-7200-4SSC2TX	PM-7200-6MSC	PM-7200-6MST	PM-7200-6SSC	PM-7200-1LSC6TX	PM-7200-1MST6TX	PM-7200-1SSC6TX	PM-7200-1MSC6TX	PM-7200-8PoE	PM-7200-8SFP	PM-7200-4M12
Slot 1	---	---	---	---	---	---	---	---	√	√	√	√	√	√	√	√	√	√	√	√	√	√	---	√	√
Slot 2	---	√	√	√	√	√	√	√	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Optional Accessories (can be purchased separately)

EDS-SNMP OPC Server Pro: OPC server software that works with all SNMP devices

ABC-01: Configuration backup and restoration tool for managed Ethernet switches, 0 to 60°C operating temperature

PT-7324 Series

IEC 61850-3 22+2G-port Gigabit smart rackmount Ethernet switches

- IEC 61850-3, IEEE 1613 (power substations), NEMA TS2 (traffic control systems), and EN50121-4 (railway applications) compliant
- Port-based VLAN to enhance security/network performance
- 802.1p priority queues, port-based QoS
- Smart web-based management makes configuration easy
- Universal power supply range, 12/24/48 VDC or 110/220 VDC/VAC
- -40 to 85°C operating temperature range

The certification logos shown here apply to some or all of the products in this section. For details, see "Regulatory Approvals" under "Specifications" below.

Introduction

The PowerTrans PT-7324 smart Ethernet switch is designed to meet the demands of power substation automation systems (IEC 61850-3, IEEE 1613), traffic control systems (NEMA TS2), and railway applications (EN50121-4). The PT-7324 is also equipped with smart "Class of Service" features suitable for multimedia applications, and port-based VLAN features that can be used to segment your network without being restricted by physical connections. If you do not want to receive too many broadcast packets, the broadcast storm filtering feature will discard broadcast packets if the number of such packets exceeds a threshold in a preset period of time.

Features and Benefits

- Port-based VLAN to ease network planning
- 802.1p priority queues and port-based QoS to increase determinism
- Broadcast storm filtering

Specifications

Technology

Standards:
IEEE 802.3 for 10BaseT
IEEE 802.3u for 100BaseT(X) and 100Base FX
IEEE 802.3ab for 1000BaseT(X)
IEEE 802.3z for 1000BaseSX/LX/LHX/ZX
IEEE 802.3x for Flow Control
IEEE 802.1p for Class of Service

Flow Control: IEEE 802.3x flow control, back pressure flow control

Switch Properties

Priority Queues: 2

Max. Number of Available VLANs: 24

Interface

RJ45 Ports: 10/100BaseT(X) or 10/100/1000BaseT(X) auto negotiation speed, F/H duplex mode and auto MDI/MDI-X connection

Fiber Ports: 100BaseFX (SC/ST connector) or 1000BaseSFP slots

LED Indicators: STAT, PWR1, PWR2, FAULT, LNK/ACT, FDX/HDX, SPEED

Alarm Contact: 1 relay output with current carrying capacity of 3 A @ 30 VDC or 3 A @ 240 VAC

Note: Slot 1 for a 2-port PM-7200 Gigabit Ethernet combo module, or 1 or 2-port PM-7200 fast Ethernet module.

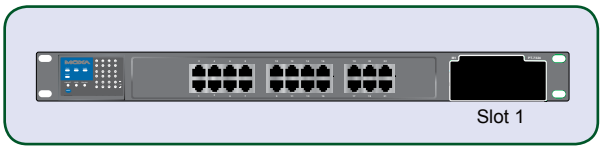
Power Requirements

Input Voltage:
• 12/24/48 VDC (9 to 60 V)
• 110/220 VDC/VAC (88 to 300 VDC and 85 to 264 VAC)

Input Current: (all ports are equipped with fiber)
• Max. 0.68 A @ 24 VDC
• Max. 0.35 A @ 48 VDC
• Max. 0.17/0.11 A @ 110/220 VDC
• Max. 0.33/0.23 A @ 110/220 VAC

Overload Current Protection: Present

Smart Rackmount Ethernet Switch System, PT-7324



Connection: 10-pin terminal blocks

Reverse Polarity Protection: Present

Physical Characteristics

Housing: IP30 protection

Dimensions: 440 x 44 x 254 mm (17.32 x 1.73 x 10.00 in)

Weight: 3300 g

Installation: 19" rack mounting

Environmental Limits

Operating Temperature: -40 to 85°C (-40 to 185°F)

Storage Temperature: -40 to 85°C (-40 to 185°F)

Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

Safety: UL60950-1, CSA C22.2 No. 60950-1, EN60950-1 (Pending)

EMI: FCC Part 15, CISPR (EN55022) class A

Power Automation: IEC 61850-3, IEEE 1613

Maritime: DNV (Pending), GL (Pending)

Traffic Control: NEMA TS2

Rail Traffic: EN50155/EN50121-4

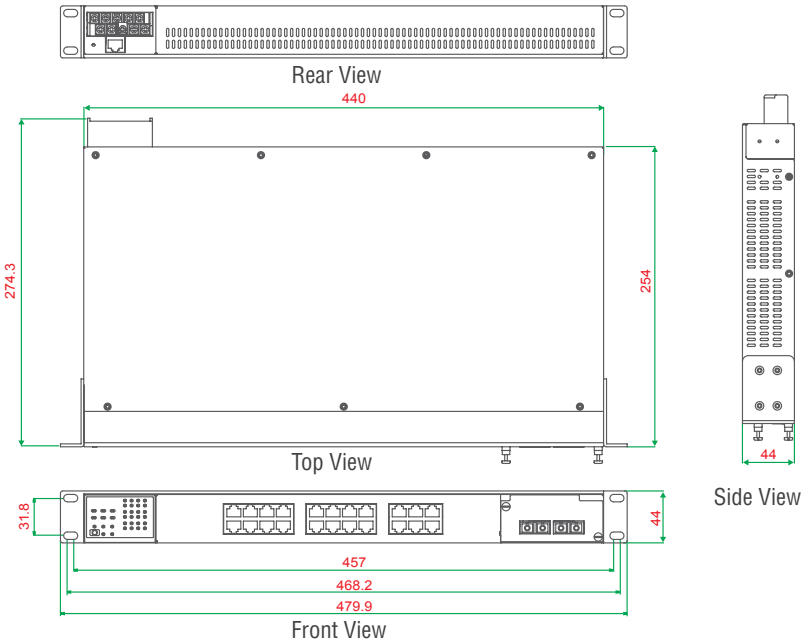
Note: Please check Moxa's website for the most up-to-date certification status.

Warranty

Warranty Period: 5 years

Details: See www.moxa.com/warranty

Dimensions (unit = mm)



Ordering Information

Step 1: Select Ethernet switch system **Step 2: Select interface modules**

PT-7324 with power supply → **PM-7200 modules (Gigabit or fast Ethernet)**

Note: The PT-7324 Ethernet switch system is delivered without interface module. See page 4-31 to choose PM-7200 interface modules.

PT-7324 Smart Rackmount Ethernet Switch System

The PT-7324 switch system consists of 4 smart rackmount Ethernet switch systems with 22 10/100BaseT(X) ports, and 1 slot for a fast Ethernet or Gigabit Ethernet module. A total of 24 or 22+2G ports can be installed, and the switch can be used in a temperature range from -40 to 85°C.

Available Models		Power Supply	
Front Cabling, Front Display	Rear Cabling, Front Display	LV: 12/24/48 VDC (9 to 60 V) (Dual power inputs)	HV: 88 to 300 VDC and 85 to 264 VAC, isolated
PT-7324-F-LV	PT-7324-R-LV	1	---
PT-7324-F-HV	PT-7324-R-HV	---	1

Note: The PT-7324 Ethernet switch systems provide 1 slot for a Gigabit Ethernet or fast Ethernet interface module. See page 4-31 to select the PM-7200 series Gigabit Ethernet and fast Ethernet interface modules that you need for your own application.

PT-7324-F series
(Front Cabling, Front Display)

PT-7324-R series
(Rear Cabling, Front Display)

Gigabit/Fast Ethernet Modules for the PT-7324

	Interface Modules						
	PM-7200-2GTXSFP	PM-7200-1MSC	PM-7200-1MST	PM-7200-1SSC	PM-7200-2MSC	PM-7200-2MST	PM-7200-2SSC
Slot 1	√	√	√	√	√	√	√

PM-7200 Series

Gigabit and fast Ethernet modules for PT and IKS series switches

Specifications

Gigabit Ethernet Interface Modules, PM-7200-2G/4G series


PM-7200-4GTXSFP


PM-7200-2GTXSFP

Interface

RJ45 Ports: 10/100/1000BaseT(X) auto negotiation speed, and auto MDI/MDI-X connection

Fiber Ports: 1000BaseSFP slots

Note: The PM-7200-2G/4G series Gigabit Ethernet combo modules support 2 or 4 SFP slots. See page 3-45 to select the SFP-1G series Gigabit Ethernet modules for your application.

Fast Ethernet Interface Modules, PM-7200 series


PM-7200-8TX


PM-7200-6MSC
PM-7200-6SSC


PM-7200-6MST


PM-7200-4MSC2TX
PM-7200-4SSC2TX


PM-7200-4MST2TX


PM-7200-2MSC4TX
PM-7200-2SSC4TX


PM-7200-2MST4TX


PM-7200-1LSC6TX


PM-7200-2MSC
PM-7200-2SSC


PM-7200-2MST


PM-7200-1MSC
PM-7200-1SSC


PM-7200-1MST


PM-7200-1MST6TX


PM-7200-1MSC6TX
PM-7200-1SSC6TX

NEW


PM-7200-8PoE

NEW


PM-7200-8SFP

NEW


PM-7200-4M12

Interface

RJ45 Ports: 10/100BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection

Fiber Ports: 100BaseFX ports (SC/ST or SFP LC connector)

PoE Ports: IEEE 802.3af Power-over-Ethernet Technology, provide up to 15.4 watts per port

M12 ports: 10/100BaseT(X) auto negotiation speed, and auto MDI/MDI-X connection

Optical Fiber

	100BaseFX		
	Multi-mode	Single-mode	Single-mode, 80 km
Wavelength	1300 nm	1310 nm	1550 nm
Max. TX	-10 dBm	0 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm	-34 dBm
Link Budget	12 dB	29 dB	29 dB
Typical Distance	5 km [a] 4 km [b]	40 km [c]	80 km [d]
Saturation	-6 dBm	-3 dBm	-3 dBm

a. 50/125 µm, 800 MHz*km fiber optic cable
b. 62.5/125 µm, 500 MHz*km fiber optic cable
c. 9/125 µm single-mode fiber optic cable
d. 9/125 µm single-mode fiber optic cable (80 km)

Ordering Information

Rackmount Ethernet Switch System and Interface Module Compatibility Chart

Product Model	Interface Modules																							
	PM-7200-4GTXSFP	PM-7200-2GTXSFP	PM-7200-1MSC	PM-7200-1MST	PM-7200-2MSC	PM-7200-2MST	PM-7200-1SSC	PM-7200-2SSC	PM-7200-8TX	PM-7200-2MSC4TX	PM-7200-2MST4TX	PM-7200-2SSC4TX	PM-7200-4MSC2TX	PM-7200-4MST2TX	PM-7200-4SSC2TX	PM-7200-6MSC	PM-7200-6MST	PM-7200-6SSC	PM-7200-1MSC6TX	PM-7200-1MST6TX	PM-7200-1SSC6TX	PM-7200-1LSC6TX	PM-7200-8PoE	PM-7200-8SFP*	PM-7200-4M12
PT-7828	√	√	---	---	---	---	---	---	√	√	√	√	√	√	√	√	√	√	√	√	√	√	---	√	√
PT-7728	√	√	---	---	---	---	---	---	√	√	√	√	√	√	√	√	√	√	√	√	√	√	---	√	√
PT-7710	---	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	---	√	√
PT-7324	---	√	√	√	√	√	√	√	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
IKS-6726	---	√	---	---	---	---	---	---	√	√	√	√	√	√	√	√	√	√	√	√	√	√	---	√	√
IKS-6726-PoE	---	√	---	---	---	---	---	---	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
IKS-6324	---	√	√	√	√	√	√	√	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

* If you are using an SFP-1FELLC module, the operating temperature is limited to -40 to 75°C (-40 to 167°F).

Gigabit Ethernet Modules for PT and IKS Series Rackmount Ethernet Switches, PM-7200-2G/4G Series

Available Models	Port Interface
	Combo Port, 10/100/1000BaseT(X) or 1000BaseSFP*
PM-7200-2GTXSFP	2
PM-7200-4GTXSFP	4

*The PM-7200-2G/4G series Gigabit Ethernet combo modules support 2 or 4 SFP slots. See page 3-45 for SFP-1G series Gigabit Ethernet SFP module information.

Fast Ethernet Modules for PT and IKS Series Rackmount Ethernet Switches, PM-7200 Series

Available Models	Port Interface							
	10/100BaseT(X)			100BaseFX				100BaseSFP
	TP	PoE	M12	Multi-mode, SC Connector	Multi-mode, ST Connector	Single-mode, SC Connector	Single-mode, SC Connector, 80 km	
PM-7200-8TX	8	---	---	---	---	---	---	---
PM-7200-6MSC	---	---	---	6	---	---	---	---
PM-7200-6MST	---	---	---	---	6	---	---	---
PM-7200-6SSC	---	---	---	---	---	6	---	---
PM-7200-4MSC2TX	2	---	---	4	---	---	---	---
PM-7200-4MST2TX	2	---	---	---	4	---	---	---
PM-7200-4SSC2TX	2	---	---	---	---	4	---	---
PM-7200-2MSC4TX	4	---	---	2	---	---	---	---
PM-7200-2MST4TX	4	---	---	---	2	---	---	---
PM-7200-2SSC4TX	4	---	---	---	---	2	---	---
PM-7200-1LSC6TX	6	---	---	---	---	---	1	---
PM-7200-2MSC	---	---	---	2	---	---	---	---
PM-7200-2MST	---	---	---	---	2	---	---	---
PM-7200-2SSC	---	---	---	---	---	2	---	---
PM-7200-1MSC	---	---	---	1	---	---	---	---
PM-7200-1MST	---	---	---	---	1	---	---	---
PM-7200-1SSC	---	---	---	---	---	1	---	---
PM-7200-1MSC6TX	6	---	---	1	---	---	---	---
PM-7200-1MST6TX	6	---	---	---	1	---	---	---
PM-7200-1SSC6TX	6	---	---	---	---	1	---	---
PM-7200-8PoE	---	8	---	---	---	---	---	---
PM-7200-8SFP	---	---	---	---	---	---	---	8
PM-7200-4M12	---	---	4	---	---	---	---	---