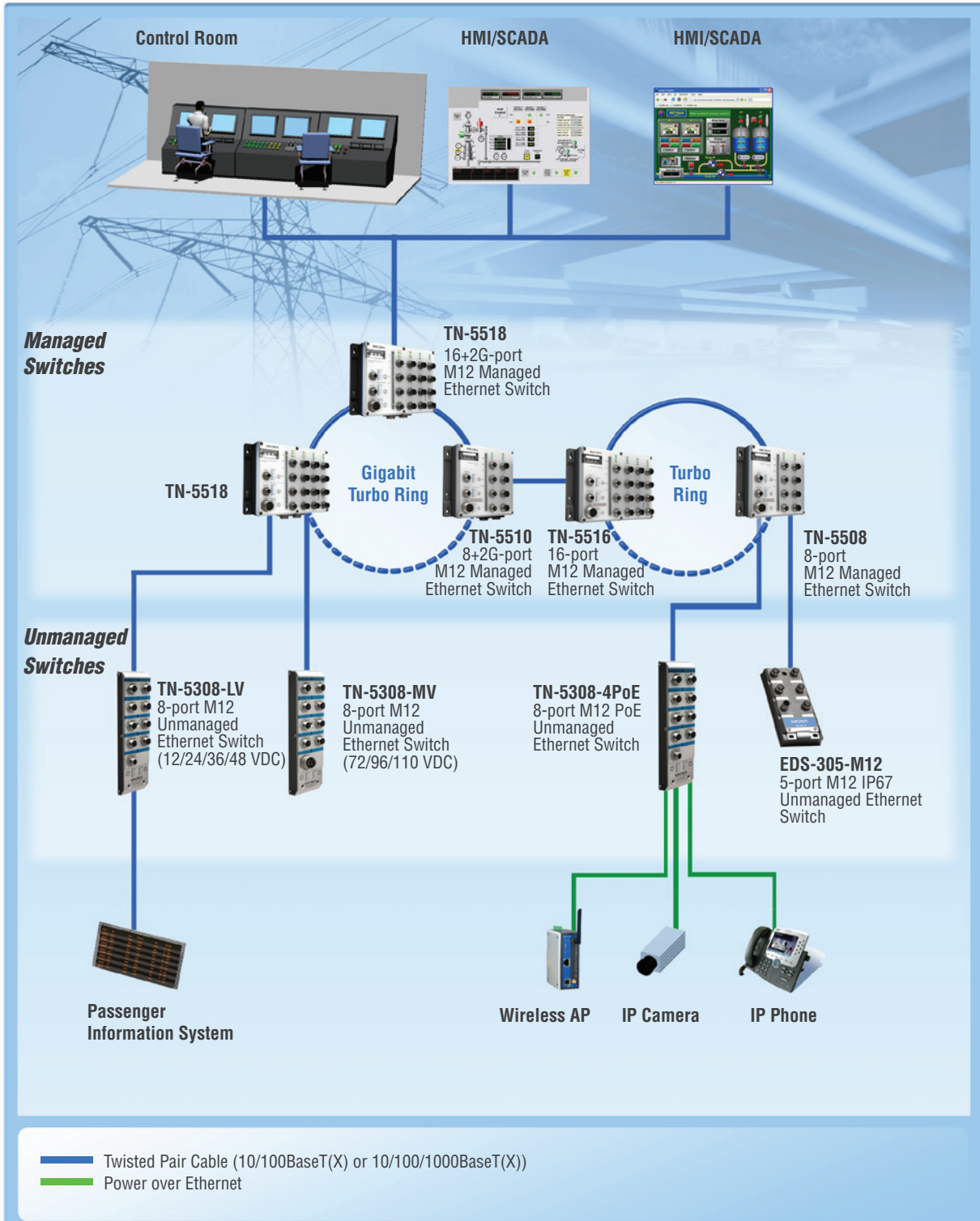


Introduction to M12 Shielded Ethernet Switches

Building Tough Networks for any Harsh Industrial Environment

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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 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.

Moja'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. Moja's TN series switches meet the EMC requirements of this directive.

M12 Ethernet Switches Comparison Chart

Model	Port Interfaces				Features												Certifications				
	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