

Viper series

Ultra slim M12 switch platform

The Viper is a product family of rugged Ethernet switches designed for applications with severe operating conditions and extreme environments. The Viper meets the EN 50155 standard for electronic equipment used in railway applications. The super slim and extra robust housing is sealed to IP65 and together with an MTBF (Mean Time Between Failure) calculated to more than a



100 years makes these units ideal for situations where mechanical stress, moisture, condensation, dirt or continuous vibrations could adversely affect the function of standard Ethernet switches.

This line of products includes two eight-port managed Ethernet switches with or without ring functionality.

Redundancy and real-time Ethernet

Our unique FRNT (Fast Recovery of Network Topology) technology is the fastest protocol on the market to re-configure a large network in the event of any failure of a link or hardware. That is why the Viper-series is used in safety critical applications such as railway systems, tunnels and traffic signal control.

Real-time properties are implemented in order to achieve determinism for real time critical applications. The switches support QoS (Quality of Service) with four priority queues and strict priority scheduling as well as HoL (Head of Line Blocking Prevention). All to ensure that the data network is deterministic.

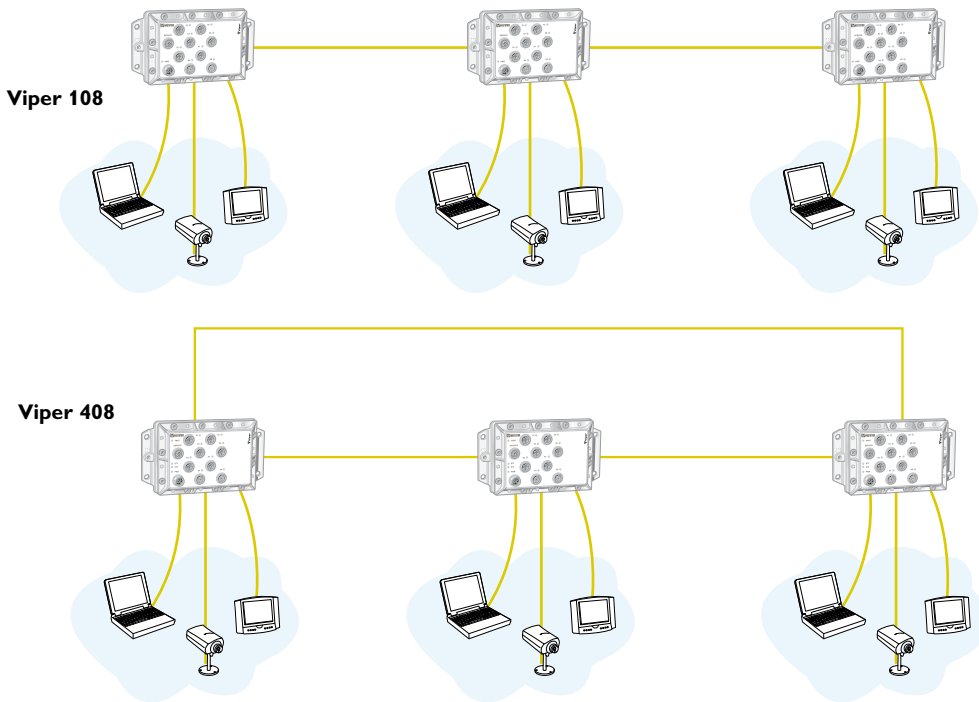
Harsh industrial environment

The units are well prepared for use in harsh industrial environments. The IP65 sealed metal case and rugged M12 front connectors of the unit makes it robust and allows for the surrounding air temperature to be between -40 to $+70^{\circ}\text{C}$. There are no sensitive or fragile components, hardening the product against shock and vibration making these units suitable for rolling stock usage. The power supply operates over a wide input range from 24 to 110 VDC.

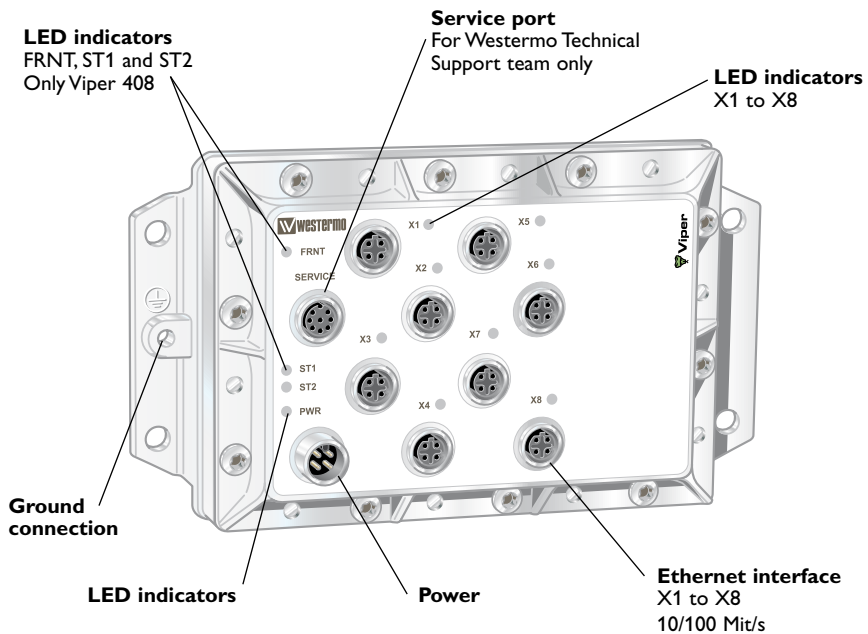
Approvals

The construction of the units has gone through extensive testing by Westermo and approved test houses. The Viper series have worldwide on-board approvals for rolling stock applications.

Application



Interfaces



Technical Data

Power and fault relay port PWR	
Rated voltage	24 to 110 VDC
Operating voltage	24 to 110 VDC $\pm 40\%$
Rated current	40 mA @ 110 VDC 140 mA @ 24 VDC
Rated frequency	DC
Inrush current, I_t	Max 0.02 A ² s @ 24 – 110 VDC
Startup current *	7 A _{peak} @ 24 – 110 VDC
Polarity	Reverse polarity protected
Redundant power input	No
Isolation to	Connections X1 – X8 and to ground, 1500 VAC. Fault relay belongs to the same isolation group as the power supply lines (fault relay signals are also contained within PWR).
Connection	4 pin male M12 connector with A-code
Connector size	M12, recommended cable area 0.5 mm ² recommended (minimum 0.25 mm ²), cable dimensions depend on choice of M12 connector
Shielded cable	Not required, twisted pair is recommended
Fault relay resistance	< 10 Ω
Operating voltage	Up to 110 VDC
Max continuous current	250 mA

* If external power supply is used it must meet specified startup current.

Ethernet TX port X1 to X8	
Electrical specification	IEEE std 802.3. 2000 Edition
Data rate	10 Mbit/s or 100 Mbit/s, manual or auto
Duplex	Full or half, manual or auto
Circuit type	TNV-1
Transmission range	150 m
Isolation to	Other Ethernet ports, 500 VAC PWR, 1500 VAC
Galvanic connection to	None, except for shielded contact to housing
Connection	4-pole M12 female with D-code
Shielded cable	Not required, twisted pair is recommended
Conductive housing	Nickel plated zinc, metal housings of X1-X8 also connected to the housing
Number of ports	8 Ethernet (X1-X8)

Type tests and environmental conditions

Phenomena	Test	Description	Test levels
ESD	EN 61000-4-2	Enclosure contact	± 6 kV (crit A)
		Enclosure air	± 8 kV (crit A)
RF field AM modulated	IEC 61000-4-3	Enclosure	20 V/m 80% AM (1 kHz), 80 – 2500 MHz (crit A)
Fast transient	EN 61000-4-4	Ethernet ports	± 2 kV (crit A)
		Power port	± 2 kV (crit A)
		Earth port	± 2 kV (crit A)
Surge	EN 61000-4-5	Fault port	± 2 kV line to earth (crit A)
		Ethernet ports	± 2 kV line to earth (crit A)
		Power port	± 2 kV line to earth, ± 2 kV line to line (crit A)
RF conducted	EN 61000-4-6	Ethernet ports	10 V 80% AM (1 kHz), 0.15 – 80 MHz (crit A)
		Power port	10 V 80% AM (1 kHz), 0.15 – 80 MHz (crit A)
Power frequency magnetic field	EN 61000-4-8	Enclosure	1000 A/m 50 Hz 300 A/m 16.7 Hz, 60 Hz, DC (crit A)
Pulse magnetic field	EN 61000-4-9	Enclosure	300 A/m (crit A)
Voltage dips and interruption	EN 61000-4-29	DC power ports	10 & 100 ms, interruption (crit A) 10 ms, 30% reduction (crit A) 10 ms, 60% reduction (crit A) +40% above & -40% below rated voltage (crit A)
Radiated emission	EN 55022	Enclosure	Class B
	FCC part 15		Class B
Conducted emission	EN 55022	DC power port & Ethernet ports	Class B
	FCC part 15	DC power port	Class B
Dielectric strength	EN 50155	Ethernet ports to other isolated ports	707 VDC 1 min
		Power & Fault port to other isolated ports	2121 VDC 1 min
Temperature		Operating	-40 to +70°C
		Storage & Transport	-40 to +70°C
Humidity		Operating	5 to 95% relative humidity
		Storage & Transport	5 to 95% relative humidity
Altitude		Operating	2000 m / 70 kPa
Reliability prediction (MTBF)	MIL-HDBK- 217F	Operating	Ground Benign: 103 years @ 20°C 100 years @ 40°C 90 years @ 60°C Ground Mobile: 5.92 years @ 20°C 5.91 years @ 40°C 5.88 years @ 60°C
Service life		Operating	10 year
Vibration, random simulated long life	IEC 60068-2-64, Cat. 1 class B (EN 61373)	Not Operating	Vertical: 7.9 m/s ² Transverse: 7.9 m/s ² Longitudinal: 7.9 m/s ² 3 x 5 h
Vibration, random functional	IEC 60068-2-64, Cat. 1 class B (EN 61373)	Operating	Vertical: 1.0 m/s ² Transverse: 1.0 m/s ² Longitudinal: 1.0 m/s ² 3 x 10 min
Shock, half sine pulses	IEC 60068-2-27, Cat. 1 class B (EN 61373)	Operating	Vertical: 50 m/s ² Transverse: 50 m/s ² Longitudinal: 50 m/s ² 30 ms, 3 x 6 shocks
Shock, sawtooth	IEC 60068-2-27, Cat. 1 class B (IEEE1478-2001)	Operating	Vertical: 100 m/s ² Transverse: 100 m/s ² Longitudinal: 100 m/s ² 11 ms, 3 x 6 shocks

Phenomena	Test	Description	Test levels
Enclosure	UL 94	Nickel coated zinc	Flammability class V-1
Dimension W x H x D			175 x 100 x 50 mm
Weight			0.8 kg
Degree of protection	IEC 529	Enclosure	IP 65 when all ports are protected/ connected else IP 40
Cooling			Convection
Mounting			Wall mounted

Approvals

