# Viper 008

## Ultra slim M12 switch platform

The Viper 008 is a rugged unmanaged Ethernet switch designed for applications with severe operating conditions and extreme environments. The Viper 008 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.

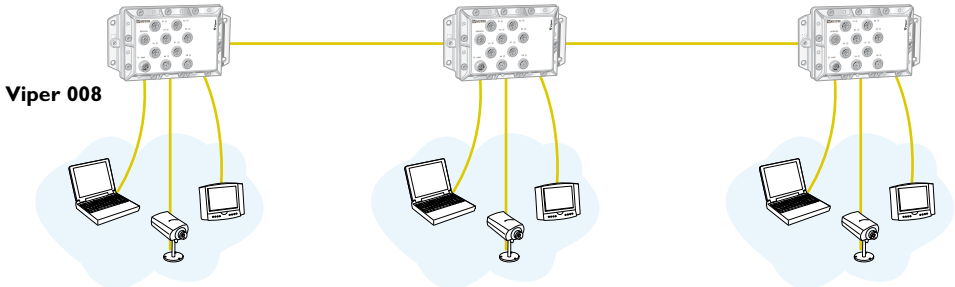
## Harsh industrial environment

The unit is 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°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 ±40%.

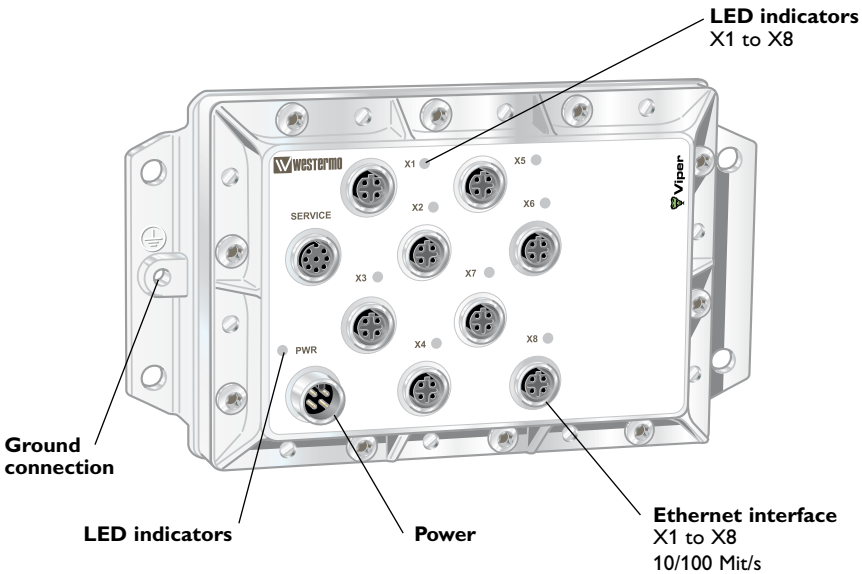
## Approvals

The construction of the units has gone through extensive testing by Westermo and approved test houses. The Viper 008 have worldwide on-board approvals for rolling stock applications.

## Application




## Interfaces



# Technical Data

| Power port PWR | |
|---|---|
| Rated voltage | 24 to 110 VDC |
| Operating voltage | 24 to 110 VDC ±40% |
| Rated current | 30 mA @ 110 VDC<br>90 mA @ 24 VDC |
| Rated frequency | DC |
| Inrush current, $I^2t$ | Max 0.02 $A^2s$ @ 24 – 110 VDC |
| Polarity | Reverse polarity protected |
| Redundant power input | No |
| Isolation to | Connections X1 – X8 and to ground, 1500 VAC.<br>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 port PWR** | |
| Fault relay resistance | < 10 Ω |
| Operating voltage | Up to 110 VDC |

| 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<br>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),<br>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<br>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 50155 | DC power ports | 10 ms, interruption (crit A)<br>100 ms +- 40 % above/below<br>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-C217F2 | Operating | Ground Benign:<br>150 years @ 20 °C<br>147 years @ 40 °C<br>135 years @ 60 °C<br>Ground Mobile:<br>9,87 years @ 20 °C<br>9,85 years @ 40 °C<br>9,79 years @ 60 °C<br>Ground Fix:<br>28,54 years @ 20 °C<br>28,43 years @ 40 °C<br>27,95 years @ 60 °C |
| Service life | | Operating | 10 year |
| Vibration, random simulated long life | IEC 60068-2-64,<br>Cat. 1 class B<br>(EN 61373) | Not Operating | Vertical: 7.9 $m/s^2$<br>Transverse: 7.9 $m/s^2$<br>Longitudinal: 7.9 $m/s^2$<br>3 x 5 h |
| Vibration, random functional | IEC 60068-2-64,<br>Cat. 1 class B<br>(EN 61373) | Operating | Vertical: 1.0 $m/s^2$<br>Transverse: 1.0 $m/s^2$<br>Longitudinal: 1.0 $m/s^2$<br>3 x 10 min |
| Shock, half sine pulses | IEC 60068-2-27,<br>Cat. 1 class B<br>(EN 61373) | Operating | Vertical: 50 $m/s^2$<br>Transverse: 50 $m/s^2$<br>Longitudinal: 50 $m/s^2$<br>30 ms, 3 x 6 shocks |

| Phenomena | Test | Description | Test levels |
|---|---|---|---|
| Shock, sawtooth | IEC 60068-2-27, Cat. 1 class B (IEEE1478-2001) | Operating | Vertical: 100 m/s²<br>Transverse: 100 m/s²<br>Longitudinal: 100 m/s²<br>11 ms, 3 x 6 shocks |
| Enclosure | UL 94 | Nickel coated zinc | Flammability class V-1 |
| Dimension W x H x D | | | 175 x 100 x 53,4 mm |
| Weight | | | 1 kg |
| Degree of protection | IEC 529 | Enclosure | IP 65 when all ports are protected/ connected else IP 40 |
| Cooling | | | Convection |
| Mounting | | | Wall mounted |

## Approvals

CE FC Part 15 EN 61000-6-2 Industrial Immunity EN 61000-6-3 Residential Emission 50121-4 Railway Trackside EN 50155 On Board Rail