

# TN-5900 Series

## EN 50155 16-port NAT routers



### Features and Benefits

- Designed for rolling stock backbone networks
- Dual bypass relay
- Isolated power input range from 24 to 110 VDC
- Complies with all EN 50155 mandatory test items<sup>1</sup>
- -40 to 75°C operating temperature range
- Turbo Ring and RSTP/STP for network redundancy

### Certifications



EN 50155



EN 50121-4



## Introduction

The ToughNet TN-5900 Series, designed for rolling stock backbone networks, are high-performance M12 routers with four bypass relay backbone ports. They support NAT and routing functionality to facilitate the deployment of applications across networks. The TN-5900 Series routers use M12 and other circular connectors to ensure tight, robust connections that guarantee reliability against environmental disturbances, such as vibration and shock.

The TN-5900 Series routers provide a wide power input range of 24 to 110 VDC. TN-5900 Series switches operate in an extended operating temperature range of -40 to 75°C and are compliant with the mandatory requirements of EN 50155/50121-4, making them suitable for a variety of industrial applications.

### Additional Features and Benefits

- Routing functionality to divide a large network into hierarchical subnets and allow data and information to communicate across networks
- NAT makes IP management easier, since end devices in different carriages can use the same IP addresses
- Leading EN 50155 Ethernet router for rolling stock applications
- Turbo Ring and RSTP/STP for network redundancy
- IGMP V1/V2 snooping for filtering multicast traffic
- IEEE 802.1Q VLAN to ease network planning
- QoS (IEEE 802.1p/1Q and TOS/DiffServ) to improve reliability
- Panel mounting or DIN-rail mounting installation capability
- SNMPv3, HTTPS, and SSH to enhance network security
- SNMP v1/v2c/v3 for different levels of network management
- Port mirroring for online debugging
- Automatic warning by exception through email and relay output
- Line-swap fast recovery
- Automatic recovery of connected device's IP addresses
- LLDP for automatic topology discovery in network management software
- Configurable by web browser, Telnet/serial console, and CLI Windows utility

## Specifications

### Input/Output Interface

#### Alarm Contact Channels

2 x relay output in one M12 A-coded 5-pin male connector with current carrying capacity of 1 A @ 30 VDC

1. This product is suitable for rolling stock railway applications, as defined by the EN 50155 standard. For a more detailed statement, click here: [www.moxa.com/doc/specs/EN\\_50155\\_Compliance.pdf](http://www.moxa.com/doc/specs/EN_50155_Compliance.pdf)

## Ethernet Interface

|                                                                             |                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 10/100BaseT(X) Ports (M12 D-coded 4-pin female connector)                   | 12                                                                                                                                                                                                                                                                                             |
| 10/100BaseT(X) Ports (M12 D-coded 4-pin female connector with bypass relay) | 4                                                                                                                                                                                                                                                                                              |
| Standards                                                                   | IEEE 802.1D-2004 for Spanning Tree Protocol<br>IEEE 802.1p for Class of Service<br>IEEE 802.1Q for VLAN Tagging<br>IEEE 802.1w for Rapid Spanning Tree Protocol<br>IEEE 802.3 for 10BaseT<br>IEEE 802.3ad for Static Port Trunk<br>IEEE 802.3u for 100BaseT(X)<br>IEEE 802.3x for flow control |

## Ethernet Software Features

|                       |                                                                                                                                                                                                |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Configuration Options | Command Line Interface (CLI), Command Line Interface (CLI) through Serial/Telnet/SSH, Web Browser (HTTP/HTTPS), Windows Utility                                                                |
| Filter                | 802.1Q, IGMP v1/v2, Static Multicast                                                                                                                                                           |
| Management            | Back Pressure Flow Control, DHCP server, Flow control, HTTP, IPv4, LLDP, Port Mirror, QoS/CoS/ToS, RARP, SMTP, SNMP Inform, SNMP Trap, SNMPv1/v2c/v3, Syslog, Telnet, TFTP, Account Management |
| MIB                   | RFC1213                                                                                                                                                                                        |
| Redundancy Protocols  | Link Aggregation, RSTP, Static Port Trunk, STP, Turbo Ring v2                                                                                                                                  |
| Routing Redundancy    | VRRP                                                                                                                                                                                           |
| Security              | Broadcast storm protection <sup>2</sup> , HTTPS/SSL, Local Account Accessibility, TACACS+ <sup>2</sup> , Port Lock, SSH                                                                        |
| Time Management       | NTP Server/Client, SNTP                                                                                                                                                                        |
| Unicast Routing       | Static Route, RIPV1/V2                                                                                                                                                                         |

## Switch Properties

|                   |               |
|-------------------|---------------|
| IGMP Groups       | 256           |
| MAC Table Size    | 8 K           |
| Max. No. of VLANs | 16            |
| VLAN ID Range     | VID 1 to 4094 |

## LED Interface

|                |                                   |
|----------------|-----------------------------------|
| LED Indicators | STATE, PWR1, PWR2, FAULT, 10/100M |
|----------------|-----------------------------------|

## NAT

|          |                                 |
|----------|---------------------------------|
| Features | 1-to-1, N-to-1, Port forwarding |
|----------|---------------------------------|

## Serial Interface

|              |                            |
|--------------|----------------------------|
| Console Port | M12 A-coded male connector |
|--------------|----------------------------|

## Power Parameters

|               |                                                                       |
|---------------|-----------------------------------------------------------------------|
| Input Current | 0.85 A @ 24 VDC, 0.17 A @ 110 VDC                                     |
| Input Voltage | 24/36/48/72/96/110 VDC, Redundant dual inputs, No. of power inputs: 2 |

2. Not supported in FW v1.2.

|                             |                   |
|-----------------------------|-------------------|
| Operating Voltage           | 16.8 to 137.5 VDC |
| Overload Current Protection | Supported         |
| Power Connector             | M23 connector     |
| Reverse Polarity Protection | Supported         |

#### Physical Characteristics

|              |                                                |
|--------------|------------------------------------------------|
| Housing      | Metal                                          |
| IP Rating    | IP54                                           |
| Dimensions   | 250 x 175.8 x 116.3 mm (9.84 x 6.92 x 4.58 in) |
| Weight       | 4,030 g (8.88 lb)                              |
| Installation | DIN-rail mounting (optional), Wall mounting    |
| Protection   | TN-5916-WV-CT-T: PCB conformal coating         |

#### Environmental Limits

|                                        |                            |
|----------------------------------------|----------------------------|
| Operating Temperature                  | -40 to 75°C (-40 to 167°F) |
| Storage Temperature (package included) | -40 to 85°C (-40 to 185°F) |
| Ambient Relative Humidity              | 5 to 95% (non-condensing)  |
| Altitude                               | 2000 m                     |

#### Standards and Certifications

|                         |                                                                                                                                                                                                                                            |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EMC                     | EN 55032/24                                                                                                                                                                                                                                |
| EMS                     | IEC 61000-4-2 ESD: Contact: 6 kV; Air: 8 kV<br>IEC 61000-4-3 RS: 80 MHz to 1 GHz: 20 V/m<br>IEC 61000-4-4 EFT: Power: 2 kV; Signal: 2 kV<br>IEC 61000-4-5 Surge: Power: 2 kV; Signal: 2 kV<br>IEC 61000-4-6 CS: 10 V<br>IEC 61000-4-8 PFMF |
| Freefall                | IEC 60068-2-31                                                                                                                                                                                                                             |
| Radio Frequency         | FCC                                                                                                                                                                                                                                        |
| Railway                 | EN 50121-4, EN 50155, IEC 60571                                                                                                                                                                                                            |
| Railway Fire Protection | EN 45545-2                                                                                                                                                                                                                                 |
| Safety                  | IEC 60950-1, UL 61010-2-201                                                                                                                                                                                                                |
| Shock                   | IEC 60068-2-27, IEC 61373, EN 50155                                                                                                                                                                                                        |
| Vibration               | IEC 60068-2-64, IEC 61373, EN 50155                                                                                                                                                                                                        |

#### Declaration

|               |                   |
|---------------|-------------------|
| Green Product | RoHS, CRoHS, WEEE |
|---------------|-------------------|

#### MTBF

|           |                 |
|-----------|-----------------|
| Time      | 556,025 hrs     |
| Standards | Telcordia SR332 |

## Warranty

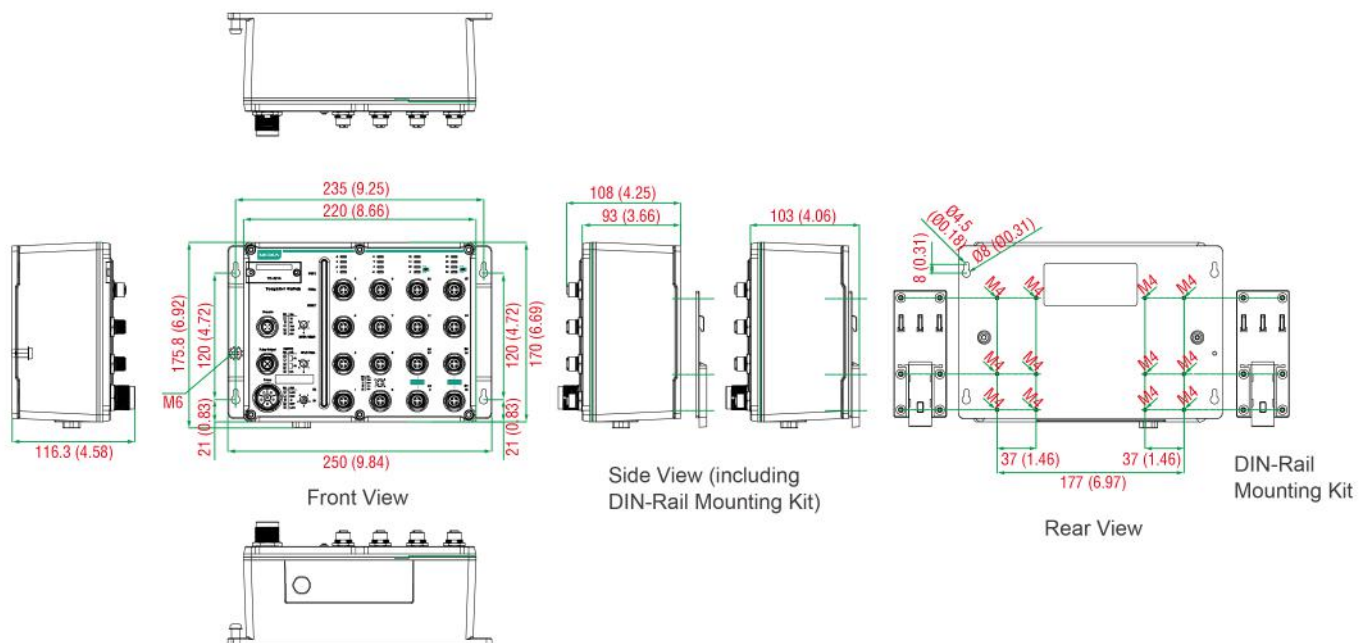
|                 |                                                                      |
|-----------------|----------------------------------------------------------------------|
| Warranty Period | 5 years                                                              |
| Details         | See <a href="http://www.moxa.com/warranty">www.moxa.com/warranty</a> |

## Package Contents

|                  |                                                                                   |
|------------------|-----------------------------------------------------------------------------------|
| Device           | 1 x TN-5900 Series router                                                         |
| Cable            | 1 x M12-to-DB9 console port                                                       |
| Installation Kit | 2 x cap, female, metal, for M12 port<br>1 x wall-mounting kit                     |
| Documentation    | 1 x document and software CD<br>1 x quick installation guide<br>1 x warranty card |

## Dimensions

Unit: mm (inch)



## Ordering Information

| Model Name      | 10/100BaseT(X) Ports<br>M12 D-Coded 4-Pin Female<br>Connector | 10/100BaseT(X) Ports<br>M12 D-Coded 4-Pin Female<br>Connector with Bypass Relay | Conformal Coating |
|-----------------|---------------------------------------------------------------|---------------------------------------------------------------------------------|-------------------|
| TN-5916-WV-T    | 12                                                            | 4                                                                               | -                 |
| TN-5916-WV-CT-T | 12                                                            | 4                                                                               | ✓                 |

## Accessories (sold separately)

### Storage Kits

|            |                                                                                                                                                              |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ABC-01-M12 | Configuration backup and restoration tool with M12 connector for managed Ethernet switches and wireless APs/Bridges/Clients, 0 to 60°C operating temperature |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|

### Cables

|                                |                                                                            |
|--------------------------------|----------------------------------------------------------------------------|
| CBL-M12D(MM4P)/RJ45-100 IP67   | M12-to-RJ45 cable, IP67-rated, 1 m                                         |
| CBL-M23(FF6P)/OPEN-BK-100 IP67 | M23 to 6-pin power cable, IP67-rated female 6-pin M23 connector, IP67, 1 m |

|                                  |                                                                              |
|----------------------------------|------------------------------------------------------------------------------|
| CBL-M12DMM4PM12DMM4P-BK-100-IP67 | M12-to-M12 Cat-5E STP Ethernet cable, 4-pin D-coded M12 connector, IP67, 1 m |
|----------------------------------|------------------------------------------------------------------------------|

### Connectors

|                     |                                                          |
|---------------------|----------------------------------------------------------|
| M12A-5P-IP68        | A-coded screw-in sensor connector, female, IP68, 4.05 cm |
| M12D-4PMM-IP67      | M12 D-coded connector, QUICKON type, 4-pin male, IP67    |
| M12D-4P-IP68        | M12 D-coded screw-in sensor connector, male, IP68        |
| A-PLG-WPM23-01-IP67 | M23 cable connector, female 6-pin, crimp type, IP67      |

### DIN-Rail Mounting Kits

|               |                                 |
|---------------|---------------------------------|
| DK-DC50131-01 | DIN-rail mounting kit, 6 screws |
|---------------|---------------------------------|

### M12 Connector Caps

|              |                                    |
|--------------|------------------------------------|
| A-CAP-M12F-M | Metal cap for M12 female connector |
| A-CAP-M12M-M | Metal cap for M12 male connector   |

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