

Edition

02/2025

Equipment Manual

SIMATIC NET

Rugged Ethernet switches

RUGGEDCOM RSG907R

<https://www.siemens.com/ruggedcom>

SIEMENS

SIMATIC NET

Rugged Ethernet switches RUGGEDCOM RSG907R

Equipment Manual

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Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

DANGER

Indicates that death or severe personal injury will result if proper precautions are not taken.

WARNING

Indicates that death or severe personal injury may result if proper precautions are not taken.

CAUTION

Indicates that minor personal injury can result if proper precautions are not taken.

NOTICE

Indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

WARNING

Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of Siemens Canada Ltd.. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

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Preface

This guide describes the RUGGEDCOM RSG907R. It describes the major features of the device, installation, commissioning and important technical specifications.

It is intended for use by network technical support personnel who are responsible for the installation, commissioning and maintenance of the device. It is also recommended for use by network and system planners, system programmers, and line technicians.

Note

Illustrations are intended for demonstration purposes only.

Cybersecurity information

Siemens provides products and solutions with industrial cybersecurity functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial cybersecurity concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial cybersecurity measures that may be implemented, please visit <https://www.siemens.com/cybersecurity-industry>.

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply the latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Cybersecurity RSS Feed under <https://www.siemens.com/cert>.

Accessing documentation

The latest user documentation for RUGGEDCOM RSG907R is available online at <https://support.industry.siemens.com>. To request or inquire about a user document, contact Siemens Customer Support.

Supplementary documentation

Documentation related to RUGGEDCOM RSG907R is available on the Siemens Industry Online Support website at <https://support.industry.siemens.com/cs/ww/en/ps/24990>.

For specific documents, search the following:

- **Product notes**
<https://support.industry.siemens.com/cs/ww/en/ps/24990/pm>
- **Manuals**
<https://support.industry.siemens.com/cs/ww/en/ps/24990/man>
- **FAQs**
<https://support.industry.siemens.com/cs/ww/en/ps/24990/faq>
- **Application examples**
<https://support.industry.siemens.com/cs/ww/en/ps/24990/ae>
- **Catalogs/brochures**
<https://support.industry.siemens.com/cs/ww/en/ps/24990/cat>
- **Certificates**
<https://support.industry.siemens.com/cs/ww/en/ps/24990/cert>
- **Downloads**
<https://support.industry.siemens.com/cs/ww/en/ps/24990/dl>

Other documents that may be of interest include:

- **RUGGEDCOM SFP Transceivers Reference Manual**
<https://support.industry.siemens.com/cs/us/en/ps/29769/man>
- **SINEC NMS Operating Instructions**
<https://support.industry.siemens.com/cs/ww/en/ps/25518/man>
- **SINEC PNI Operating Instructions**
<https://support.industry.siemens.com/cs/ww/en/ps/26672>

SIMATIC NET glossary

The SIMATIC NET glossary describes special terms that may be used in this document.

The glossary is available online via Siemens Industry Online Support (SIOS) at:

<https://support.industry.siemens.com/cs/ww/en/view/50305045>

Registered trademarks

The following and possibly other names not identified by the registered trademark sign ® are registered trademarks of Siemens Canada Ltd.:

- RUGGEDCOM
- ROS

- RCDP
- Discovery Protocol

Other designations in this manual might be trademarks whose use by third parties for their own purposes would infringe the rights of the owner.

Warranty

Siemens warrants this product for a period of five (5) years from the date of purchase, conditional upon the return to factory for maintenance during the warranty term. This product contains no user-serviceable parts. Attempted service by unauthorized personnel shall render all warranties null and void. The warranties set forth in this article are exclusive and are in lieu of all other warranties, performance guarantees and conditions whether written or oral, statutory, express or implied (including all warranties and conditions of merchantability and fitness for a particular purpose, and all warranties and conditions arising from course of dealing or usage or trade). Correction of nonconformities in the manner and for the period of time provided above shall constitute the Seller's sole liability and the Customer's exclusive remedy for defective or nonconforming goods or services whether claims of the Customer are based in contract (including fundamental breach), in tort (including negligence and strict liability) or otherwise.

For warranty details, visit <https://www.siemens.com> or contact a Siemens customer service representative.

Training

Siemens offers a wide range of educational services ranging from in-house training of standard courses on networking, Ethernet switches and routers, to on-site customized courses tailored to the customer's needs, experience and application.

Siemens' Educational Services team thrives on providing our customers with the essential practical skills to make sure users have the right knowledge and expertise to understand the various technologies associated with critical communications network infrastructure technologies.

Siemens' unique mix of IT/Telecommunications expertise combined with domain knowledge in the utility, transportation and industrial markets, allows Siemens to provide training specific to the customer's application.

For more information about training services and course availability, visit <https://www.siemens.com> or contact a Siemens Sales representative.

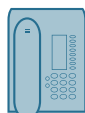
Customer support

Customer support is available 24 hours, 7 days a week for all Siemens customers. For technical support or general information, contact Siemens Customer Support through any of the following methods:



Online

Visit <http://www.siemens.com/automation/support-request> to submit a Support Request (SR) or check on the status of an existing SR.



Telephone

Call a local hotline center to submit a Support Request (SR). To locate a local hotline center, visit https://w3.siemens.com/aspa_app/?lang=en.



Mobile app

Install the Industry Online Support app by Siemens Aktiengesellschaft on any Android, Apple iOS or Windows mobile device and be able to:

- Access Siemens' extensive library of support documentation, including FAQs and manuals
- Submit SRs or check on the status of an existing SR
- Contact a local Siemens representative from Sales, Technical Support, Training, etc.
- Ask questions or share knowledge with fellow Siemens customers and the support community

Contacting Siemens

Address	Siemens Canada Ltd. Digital Industries Process Automation 300 Applewood Crescent Concord, Ontario Canada, L4K 5C7
Telephone	Toll-free: 1 888 264 0006 Tel: +1 905 856 5288 Fax: +1 905 856 1995
E-Mail	info.ruggedcom@siemens.com
Web	https://www.siemens.com

Ordering RUGGEDCOM products

Use the RUGGEDCOM Configurator to select and configure RUGGEDCOM products and accessories. Once selected, an item(s) can be transferred to the Siemens Industry Mall and ordered.



RUGGEDCOM Configurator

<http://www.siemens.com/ruggedcom-configurator>

Introduction

The RUGGEDCOM RSG907R is a utility-grade, fully managed Ethernet switch featuring an integrated HSR/PRP RedBox designed for mission-critical, time-sensitive applications (i.e IEC 61850 substations) that require zero downtime.

- **Integrated PRP/HSR Solution**
The HSR/PRP RedBox function allows regular Ethernet end devices to participate in HSR or PRP networks. The device also allows an HSR network to connect to a PRP network over the Coupler port (port 5). QuadBox functionality is available when used in conjunction with another RUGGEDCOM RSG907R or RUGGEDCOM RSG909R.
- **Removable SFP Transceivers**
Ports designated for Redundant Network Access (RNA) – ports **A/B** and **5** – can be customized with a wide array of Small Form-factor Portable (SFP) transceivers offered by Siemens, making the device flexible to the needs of the redundant network application.
- **Fixed Ethernet Ports**
In addition to removable SFP transceivers, the device also features four standard 100Base-FX fixed fiber optic Ethernet ports for Local Area Network (LAN) access.
- **Built for Harsh Environments**
The device provides a high level of immunity to electromagnetic interference, heavy electrical surges, extreme temperatures and humidity for reliable operation in harsh environments.

The device features IP40 degree protection and does not use internal fans for cooling.

The device supports an extended operating temperature range of -40 to 85 °C (-40 to 185 °F).
- **Compact Design**
The small form factor of the RUGGEDCOM RSG907R allows for installation in space-limited cabinets and on DIN rails.
- **Dual Input Power**
The device features dual power inputs to support redundant AC or DC power sources.
- **RUGGEDCOM ROS**
RUGGEDCOM ROS provides advanced Layer 2 networking functions and cyber security features.

1.1 Feature highlights

Ethernet ports

- 4 x 100Base-FX fiber optic Ethernet ports
- 3 x 1000Base-SX/LX SFP transceivers
- Industry standard LC fiber optical connectors

Rated for reliability in harsh environments

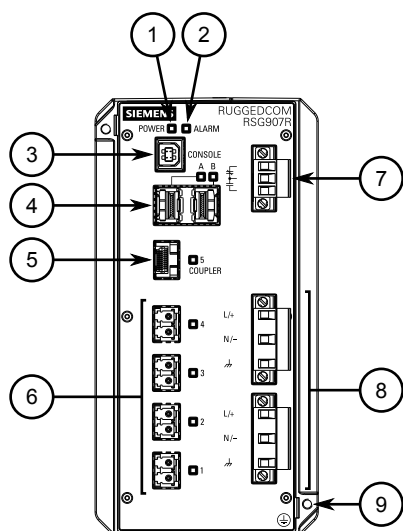
- Immunity to EMI and heavy electrical surges
- -40 to 85 °C (-40 to 185 °F) ambient operating temperature (no fans)
- Die Cast Aluminum
- DIN or panel mounting options provide secure mechanical reliability
- [Optional] Conformal coated printed circuit boards

Power supply

- Fully integrated power supply
- Dual HI AC inputs: 88-300 VDC or 85-264 VAC
- Dual low-voltage DC inputs: 12, 24 or 48 VDC
- Terminal blocks for reliable maintenance free connections
- CSA/UL 62368-1 safety approved to 85 °C (185 °F)

1.2 Description

The RUGGEDCOM RSG907R features various ports, controls and indicator LEDs on the front panel for connecting, configuring and troubleshooting the device.



- ① POWER LED
- ② ALARM LED
- ③ USB console port
- ④ RNA port (port A/B)
- ⑤ Port 5
- ⑥ Fiber optic Ethernet ports (ports 1 to 4)
- ⑦ Failsafe alarm relay
- ⑧ Power supply terminal blocks
- ⑨ Chassis ground screw

Figure 1.1 RUGGEDCOM RSG907R

POWER LED	Illuminates green during boot up and when power is supplied to the device.
ALARM LED	Illuminates red when an alarm condition exists.
Console port	The USB Type-B console port is for interfacing directly with the device and accessing initial management functions. For information about connecting to the device via the serial console port, refer to "Connecting to the device" (Page 25).
Communication ports	Communication ports in general receive and transmit data, as well as provide access to the RUGGEDCOM ROS Web interface. For more information about the various ports available, refer to "Communication ports" (Page 27).
Failsafe alarm relay	Latches to default state when a power disruption or other alarm condition occurs. For more information, refer to: • "Connecting the failsafe alarm relay" (Page 13) • "Failsafe alarm relay specifications" (Page 31)
Power supply terminal blocks	Pluggable terminal blocks for connecting one or more power sources. For more information, refer to "Connecting power" (Page 14) and "Power supply specifications" (Page 31).
Chassis ground terminal	Protects the device from power surges and accumulated static electricity. For information about grounding the device, refer to "Connecting power" (Page 14).

1.3 Required tools and materials

The following tools and materials are required to install the RUGGEDCOM RSG907R:

Tools/materials	Purpose
AC power cord (16 AWG)	For connecting power to the device.
USB Type-B console port cable	For connecting to the RUGGEDCOM ROS console interface.
Multi-mode fiber optic cables	For connecting the device to a LAN.
Flathead screwdriver	For mounting the device to a DIN rail.
Phillips screwdriver	For mounting the device to a panel.
Torx screwdriver	For attaching mounting brackets to the device.
4 x M5 or #10-24 screws	For mounting the device to a panel.

1.4 Decommissioning and disposal

Proper decommissioning and disposal of this product is important to prevent malicious users from obtaining proprietary information and to protect the environment.

Decommissioning

This product may include sensitive, proprietary data. Before taking the product out of service, either permanently or for maintenance by a third-party, make sure it has been fully decommissioned.

For more information, refer to the RUGGEDCOM ROS Configuration Manual associated with the installed software release.

Recycling and disposal

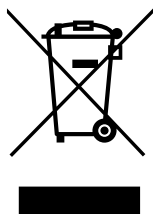
This product is low in pollutants, can be recycled, and meets the requirements of the WEEE directive 2012/19/EU for the disposal of electrical and electronic equipment.

Do not dispose of electronics at public disposal sites.

For environmentally friendly recycling and the disposal of electronics, contact a certified disposal company for electronic scrap or your Siemens representative.

For more information, refer to <https://support.industry.siemens.com/cs/ww/en/view/109479891>.

Note the different national regulations.



Installing the device

This chapter describes how to install the device, including mounting the device, connecting power, and connecting the device to the network.



⚠ DANGER

Electrocution hazard – risk of serious personal injury and/or damage to equipment

Before performing any maintenance tasks, make sure all power to the device has been disconnected and wait approximately two minutes for any remaining energy to dissipate.



⚠ WARNING

Radiation hazard – risk of serious personal injury

This product contains a laser system and is classified as a *Class I LASER PRODUCT*. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

⚠ WARNING

Fire/electrical/burn hazard – risk of serious personal injury and/or damage to the device

Do not use any parts that show evidence of damage. If damaged parts are used, the device may not function according to the specification. Damaged parts can lead to:

- Injury to personnel
- Loss of certification/approvals
- Violation of EMC regulations
- Damage to the device or other components



⚠ CAUTION

Burn hazard – risk of personal injury

The surface of the device may be hot during operation, or as a result of the ambient air temperature.

Wear appropriate personal protective equipment and use caution when working with or around the device.

 NOTICE

This product contains no user-serviceable parts. Attempted service by unauthorized personnel shall render all warranties null and void.

Changes or modifications not expressly approved by Siemens Canada Ltd. could invalidate specifications, test results, and agency approvals, and void the user's authority to operate the equipment.

 NOTICE

This product should be installed in a *restricted access location* where access can only be gained by authorized personnel who have been informed of the restrictions and any precautions that must be taken. Access must only be possible through the use of a tool, lock and key, or other means of security, and controlled by the authority responsible for the location.

2.1 General procedure

The general procedure for installing the device is as follows:

Note

The user is responsible for the operating environment of the device, including maintaining the integrity of all protective conductor connections and checking equipment ratings. Make sure to review all operating and installation instructions before commissioning or performing maintenance on the device.

1. **Review the relevant certification information for any regulatory requirements.**

For more information, refer to "Approvals" (Page 37).

2. **Unpack and inspect the device.**

For more information, refer to "Unpacking the device" (Page 9).

3. **Mount the device.**

For more information, refer to "Mounting the device" (Page 9).

4. **Connect the failsafe alarm relay.**

For more information, refer to "Connecting the failsafe alarm relay" (Page 13).

5. **Connect power and ground the device.**

For more information, refer to "Connecting power" (Page 14).

6. **Connect the device to the network.**

For more information, refer to "Connecting the device to the network" (Page 20).

7. **Configure the device.**

For more information, refer to "Configuring the device" (Page 26).

2.2 Unpacking the device

When unpacking the device, do the following:

1. Inspect the package for damage before opening it.
2. Visually inspect each item in the package for any physical damage.

 NOTICE

Do not use any parts that show evidence of damage

If you use damaged parts, there is no guarantee the device will function according to the specification.

If you use damaged parts, this can lead to the following problems:

- Injury to persons
- Loss of approvals
- Violation of the EMC regulations
- Damage to the device and other components

Use only undamaged parts.

3. Verify all items are included.

If any item is missing or damaged, contact Siemens for assistance.

2.3 Mounting the device

The RUGGEDCOM RSG907R is designed for maximum mounting and display flexibility. It can be equipped with adapters that allow it to be attached to a DIN rail or panel.

Note

Heat generated by the device is channeled outwards from the enclosure. As such, it is recommended that 2.5 cm (1 in) of space be maintained on all open sides of the device to allow for some convectional airflow.

Forced airflow is not required. However, any increase in airflow will result in a reduction of ambient temperature and improve the long-term reliability of all equipment mounted in the rack space.

Note

For detailed dimensions of the device with either DIN rail or panel hardware installed, refer to "Dimension drawings" (Page 33).

2.3.1 Mounting the device on a DIN rail

The RUGGEDCOM RSG907R can be ordered with a DIN rail adapter preinstalled on the back of the chassis. Use the adapter to mount the device to a standard 35 mm (1.4 in) by 15 mm (0.6 in) IEC/EN 60715 or TS35 DIN rail.

⚠ NOTICE

DIN rail mounting is not recommended for constant vibration environments.

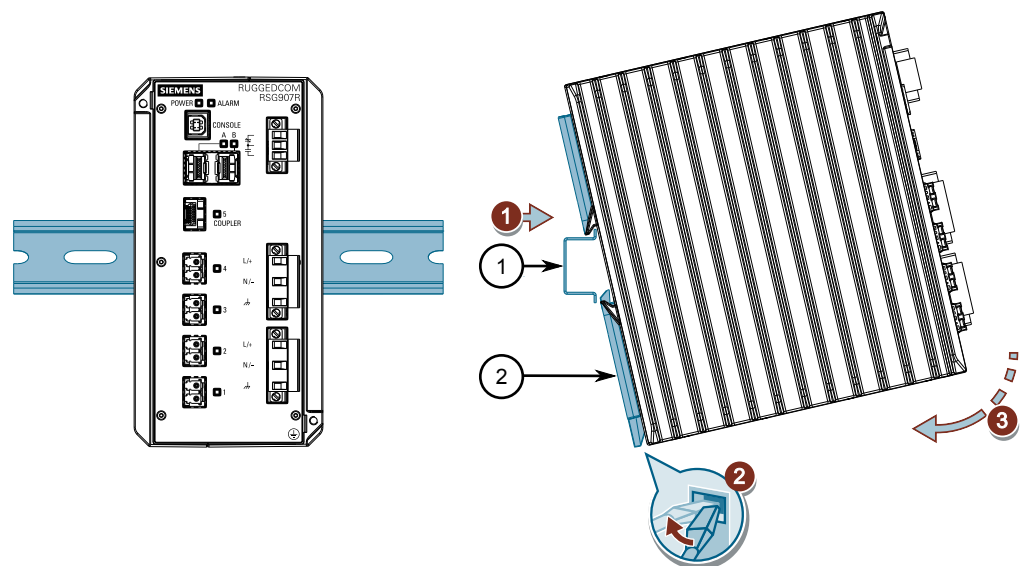
Mounting the device

To mount the device to a DIN rail, do the following:

1. Hook the top teeth of the adapter onto the DIN rail.

Note

The adapter features a sliding release with a slot at the bottom for a flathead screwdriver.



- ① DIN rail
- ② DIN rail adapter

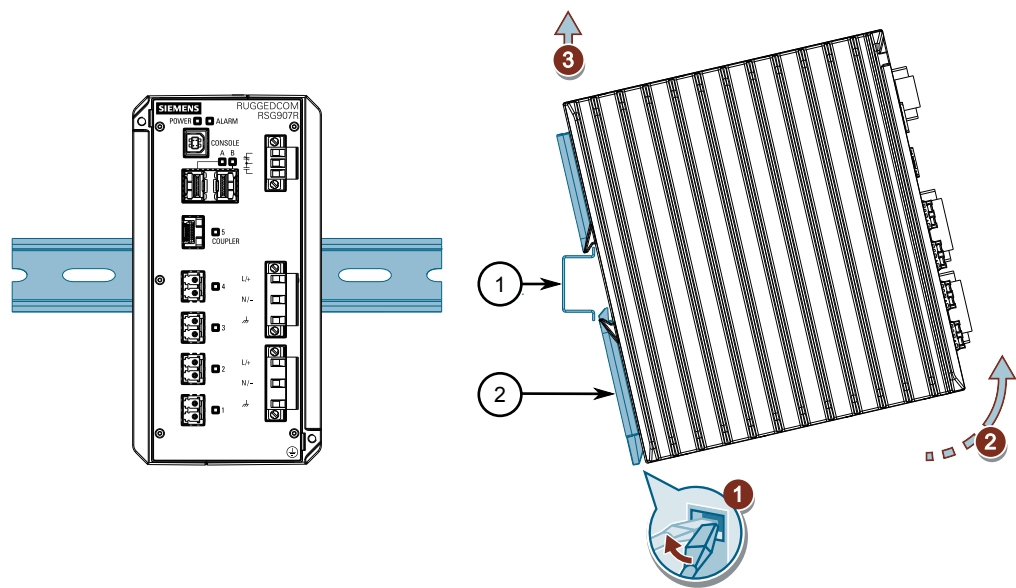
Figure 2.1 Mounting the device to a DIN rail

2. Insert a flathead screwdriver into the slot of the sliding release and move it down.
3. Push the device against the bottom of the DIN rail, then let go of the sliding release to latch the device.

Removing the device

To remove the device from a DIN rail, do the following:

1. Insert a flathead screwdriver into the slot of the sliding release and move it down.



- ① DIN rail
- ② DIN rail adapter

Figure 2.2 Removing the device from a DIN rail

2. Swing the bottom of the device away from the DIN rail.
3. Lift the device off the DIN rail.

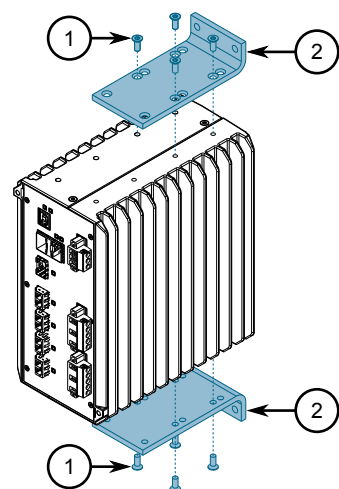
2.3.2 Mounting the device to a panel

For panel installations, the RUGGEDCOM RSG907R can be equipped with panel adapters on the top and bottom of the chassis. The adapters allow the device to be attached to a panel using screws.

To mount the device to a panel, do the following:

1. Secure the mounting adapters to the top and bottom of the device using the four M4 screws included with the device.

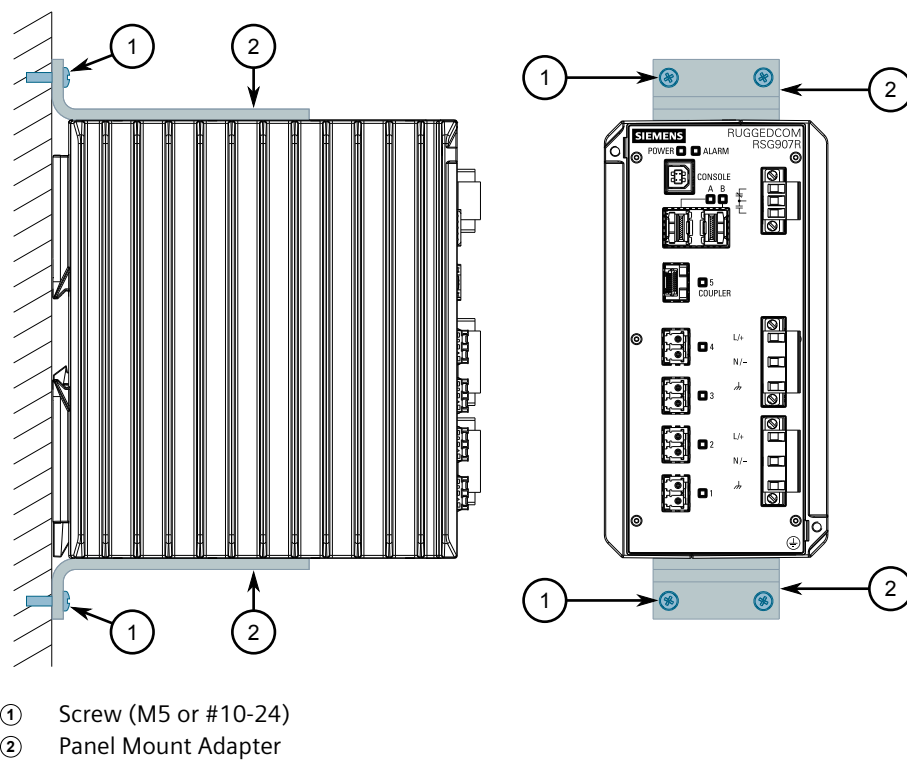
2.3.2 Mounting the device to a panel



- ① Screw (M4)
- ② Panel mount adapter

Figure 2.3 Panel mount adapter assembly

2. Prepare mounting holes in the panel where the device is to be installed.
3. Place the device against the panel and align the adapters with the mounting holes.



- ① Screw (M5 or #10-24)
- ② Panel Mount Adapter

Figure 2.4 Panel Mounting

4. Secure the adapters to the panel with M5 or #10-24 screws.

2.4 Connecting the failsafe alarm relay

The failsafe relay can be configured to latch based on alarm conditions. The NO (Normally Open) contact is closed when the unit is powered and there are no active alarms. If the device is not powered or if an active alarm is configured, the relay opens the NO contact and closes the NC (Normally Closed) contact.

Note

Control of the failsafe relay output is configurable through RUGGEDCOM RSG907R. One common application for this relay is to signal an alarm if a power failure occurs. For more information, refer to the "RUGGEDCOM ROS Configuration Manual" for the RUGGEDCOM RSG907R.

To connect the failsafe alarm relay, do the following:

1. Insert the failsafe alarm relay terminal block into the device and tighten the screws.

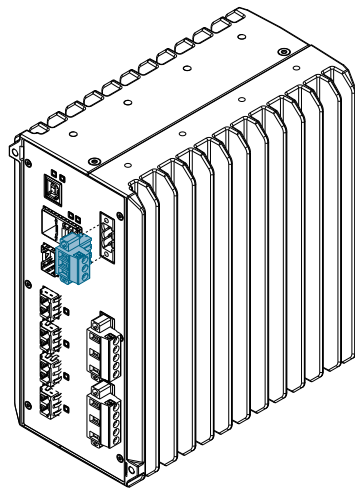
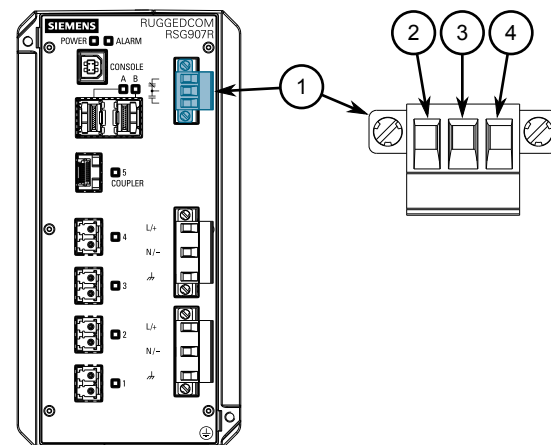


Figure 2.5 Assembling the Failsafe Alarm Relay Terminal Block

2. Connect a failsafe device to the terminal block.



- ① Failsafe alarm relay terminal block
- ② Normally open
- ③ Common
- ④ Normally closed

Figure 2.6 Failsafe alarm relay wiring

2.5 Connecting power

The RUGGEDCOM RSG907R features two input terminals that allow the device to be powered by:

- Up to one independent AC and one independent DC power source
- Two independent DC power sources

Note

The RUGGEDCOM RSG907R is a dual input power supply system. Due to this structure, induced voltages will be observed between the positive/live and chassis/ground terminals, and between the negative/neutral and chassis/ground terminals.

⚠ CAUTION

Electrical hazard – risk of damage to the device

Do not connect more than one HI AC/DC power supply to the device. Connecting more than one HI AC power supply could result in electrical damage to the device.

⚠ NOTICE

Electrical hazard – risk of power disruption

Due to power supply safety features, some AC/DC voltage will be coupled to the redundant power terminals (between the positive/live and chassis/ground terminals, and between the negative/neutral and chassis/ground terminals). While

the maximum amount of current transfer is below the safety threshold, it may be enough to trip some external Ground Fault Circuit Interrupter (GFCI) breakers. Before connecting power, review the installation and make sure this condition can be supported.

Note

- For 110/230 VAC rated equipment, an appropriately rated AC circuit breaker must be installed.
- For 125/250 VDC rated equipment, an appropriately rated DC circuit breaker must be installed.
- Use minimum #16 gage copper wiring when connecting terminal blocks.
- Equipment must be installed according to applicable local wiring codes and standards.

2.5.1 Connecting AC or DC power

The device features dual power supply inputs to allow for redundant connections to separate, independent power supplies. Each power supply terminal block provides reverse polarity protection.

To connect an external AC or DC power source to the device, do the following:

Note

For examples of the supported wiring configurations, refer to "Wiring examples" (Page 17).

** WARNING****Electrocution hazard – risk of personal injury**

When only one AC/DC power source is connected to the device, the redundant power terminals (between the positive/live and chassis/ground terminals, and between the negative/neutral and chassis/ground terminals) are energized. To prevent contact with the terminals and avoid an electrical shock, do the following when one AC/DC power source is connected to the device:

- Make sure a terminal block is installed in the unused port and that any wires from the secondary terminal block are properly terminated
 - Make sure the first power source is off before connecting (or disconnecting) a second power source
1. If connecting a secondary power source, make sure the power source currently connected to the device is disabled (e.g. power cable is unplugged from the wall receptacle).
 2. Insert the appropriate terminal block(s) into the device and tighten both screws.

Power source	Terminal block type
HI	3 POS
LO	5 POS

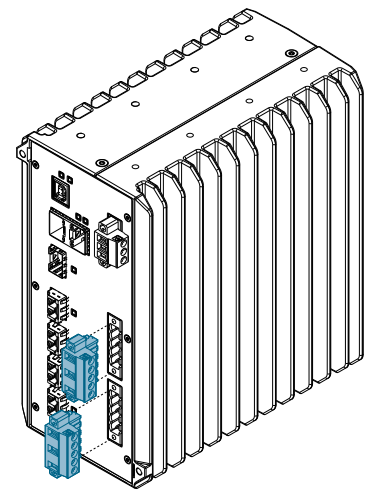


Figure 2.7 Assembling the power terminal blocks

Note

Torque all terminal connections to 0.6 N·m (5 lbf-in).

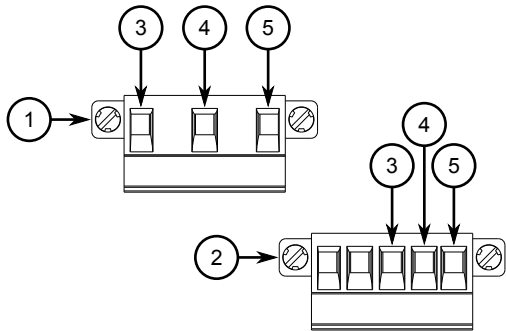
3. Connect the power cable to the device as follows:

HI AC/DC power supply

1. Connect the Line wire (AC) or Positive wire (DC) to the positive/live (+/L) terminal on the terminal block.
2. Connect the Neutral wire (AC) or Negative wire (DC) to the negative/neutral (-/N) terminal on the terminal block.
3. Connect the ground wire to the chassis/ground terminal on the terminal block.

LO DC power supply

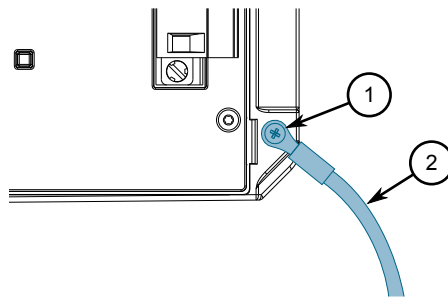
1. Connect the Positive wire to the positive (+) terminal on the terminal block.
2. Connect the Negative wire to the negative (-) terminal on the terminal block.



- ① 3 POS terminal block
- ② 5 POS terminal block
- ③ Chassis/ground terminal
- ④ Negative terminal
- ⑤ Positive terminal

Figure 2.8 Terminal block wiring

3. Connect the ground wire to the chassis/ground terminal on the terminal block.
4. Connect the chassis ground screw to ground (Potential Earth). It is recommended to terminate the ground connection with an M4 ring tongue, and then torque to 1.7 N·m (15 lbf-in).



- ① M4 screw
- ② M4 ring tongue

Figure 2.9 Chassis ground connection

5. Connect the external power supply to a power source. The **Power** LED on the device will turn green when power is being supplied to the device.

2.5.2 Wiring examples

The following illustrate how to connect single and dual power supplies to the device.

HI power supply configurations

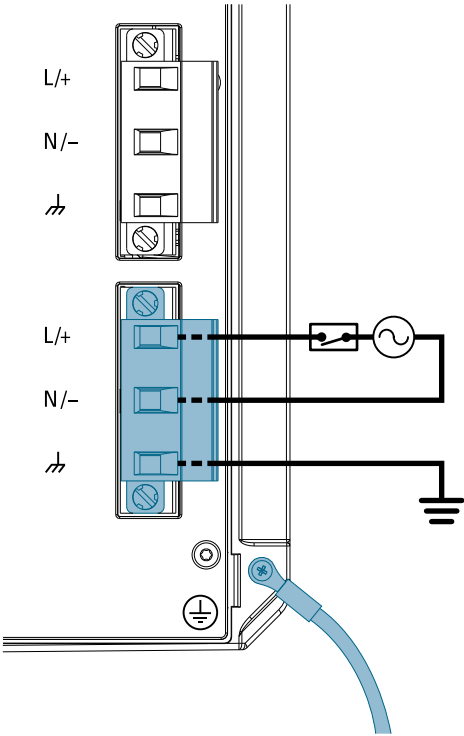


Figure 2.10 Single HI AC power input configuration

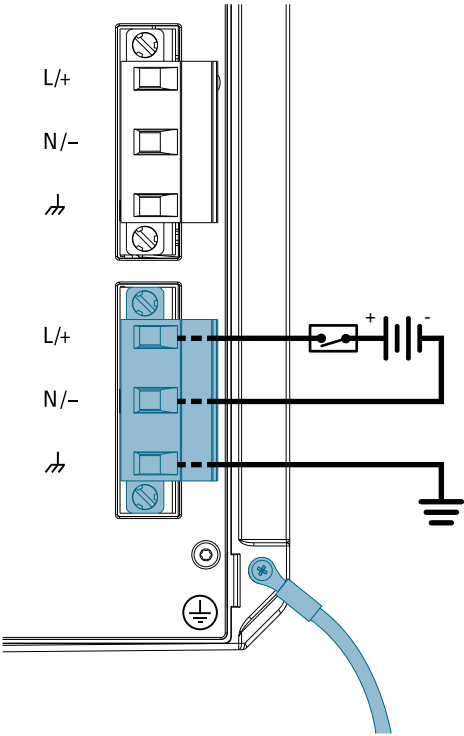


Figure 2.11 Single HI DC power input configuration

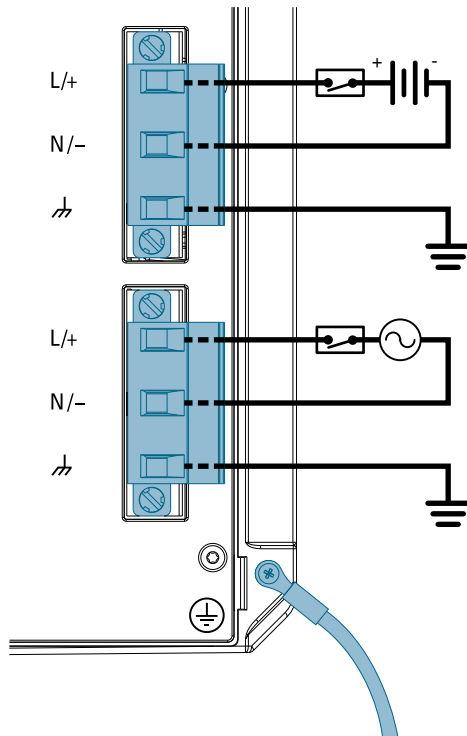


Figure 2.12 Dual HI AC and DC power supplies

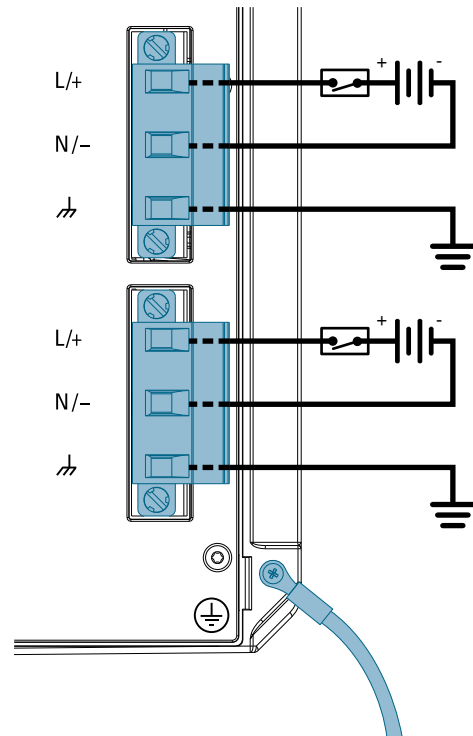


Figure 2.13 Dual HI DC power supplies

LO power supply configurations

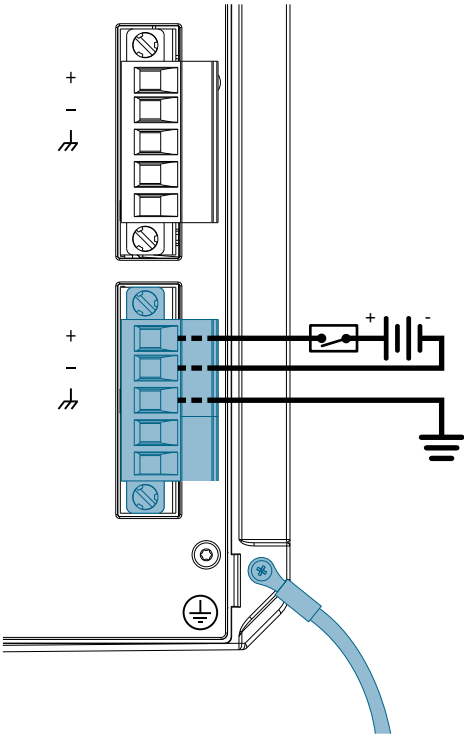


Figure 2.14 Single LO DC power input configuration

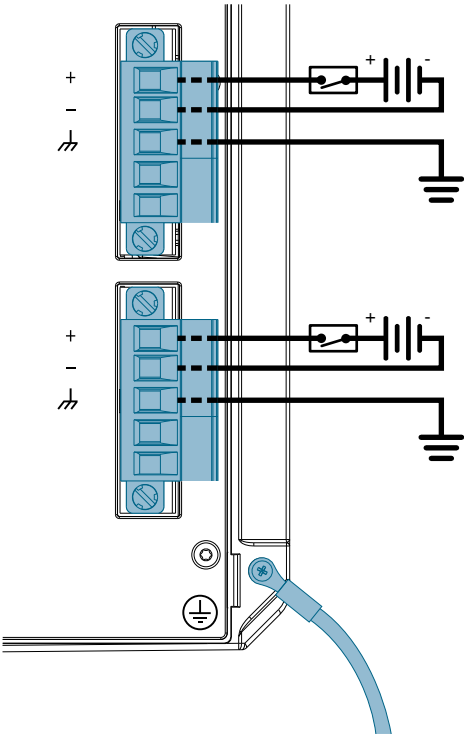


Figure 2.15 Dual LO DC power input configuration

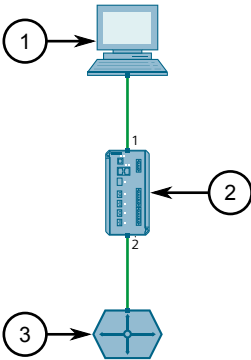
2.6 Connecting the device to the network

Steps to connect the device to the network are application-specific.

Connecting to a local area network

In this application, the device operates as a switch on a Local Area Network (LAN). Connect the device as follows:

Port	Connect to...
A	Not used
B	Not used
5 (Coupler)	Connect to an Ethernet-capable device if the RUGGEDCOM RSG907R is configured as an HSR or PRP RedBox
1 to 4	Connect to an Ethernet-capable device



2.6 Connecting the device to the network

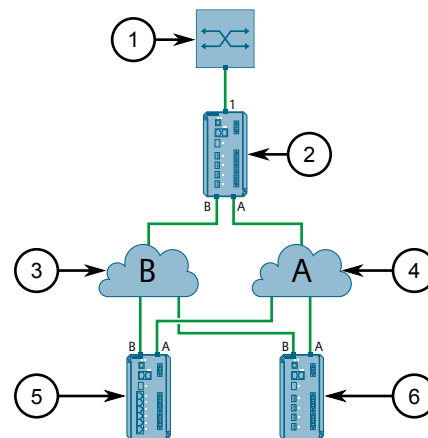
- ① Ethernet-capable device
- ② Switch (RUGGEDCOM RSG907R)
- ③ Router

Figure 2.16 LAN

Connecting to a PRP network

In this application, the device operates as a PRP RedBox on a PRP network. Connect the device as follows:

Port	Connect to...
A	Connect to LAN A
B	Connect to LAN B
5 (Coupler)	Connect to one or more Singly Attached Nodes (SANs)
1 to 4	



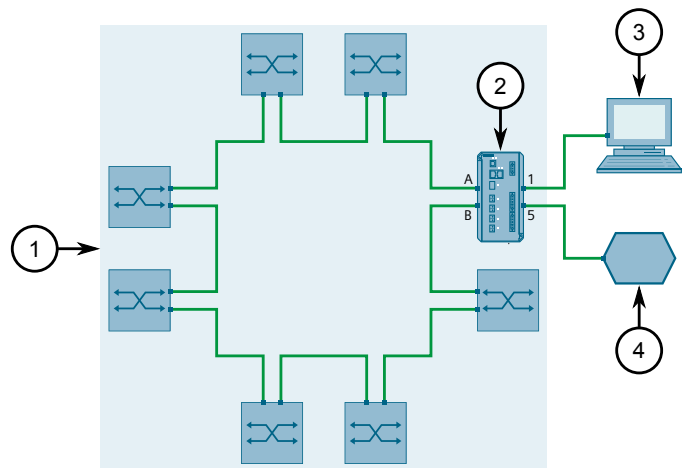
- ① VDAN
- ② PRP RedBox (RUGGEDCOM RSG907R)
- ③ LAN B
- ④ LAN A
- ⑤ DAN (RUGGEDCOM RSG907R RSG909R;RSG908C;RSG910C)
- ⑥ DAN (RUGGEDCOM RSG907R RSG907R)

Figure 2.17 A PRP network

Connecting to an HSR ring

In this application, the device operates as an HSR RedBox in an HSR ring. Connect the device as follows:

Port	Connect to...
A	Connect to port B of the neighboring HSR device
B	Connect to port A of the neighboring HSR device
5	[Optional] Connect to a Singly Attached Node (SAN)
1 to 4	Connect to one or more Singly Attached Nodes (SANs)



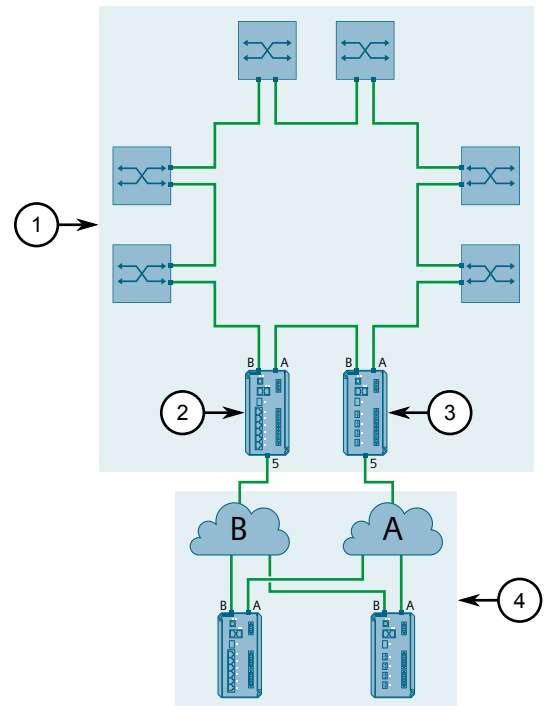
- ① HSR ring
- ② HSR RedBox (RUGGEDCOM RSG907R)
- ③ HSR-unaware device
- ④ SAN

Figure 2.18 An HSR ring

Connecting an HSR ring and PRP network

In this application, the device operates as one of two HSR/PRP RedBoxes in an HSR ring that is connected to either LAN A or LAN B in the PRP network. Connect the device as follows:

Port	Connect to...
A	Connect to port B of the neighboring HSR/PRP RedBox or to the HSR ring
B	Connect to port A of the neighboring HSR/PRP RedBox or to the HSR ring
5 (Coupler)	Connect to LAN A or LAN B
1 to 4	Connect to one or more Singly Attached Nodes (SANs)



- ① HSR ring
- ② HSR/PRP RedBox (RUGGEDCOM RSG909R/ RSG908C/RSG910C)
- ③ HSR/PRP RedBox (RUGGEDCOM RSG907R)
- ④ PRP network

Figure 2.19 HSR-to-PRP coupling

Connecting HSR rings

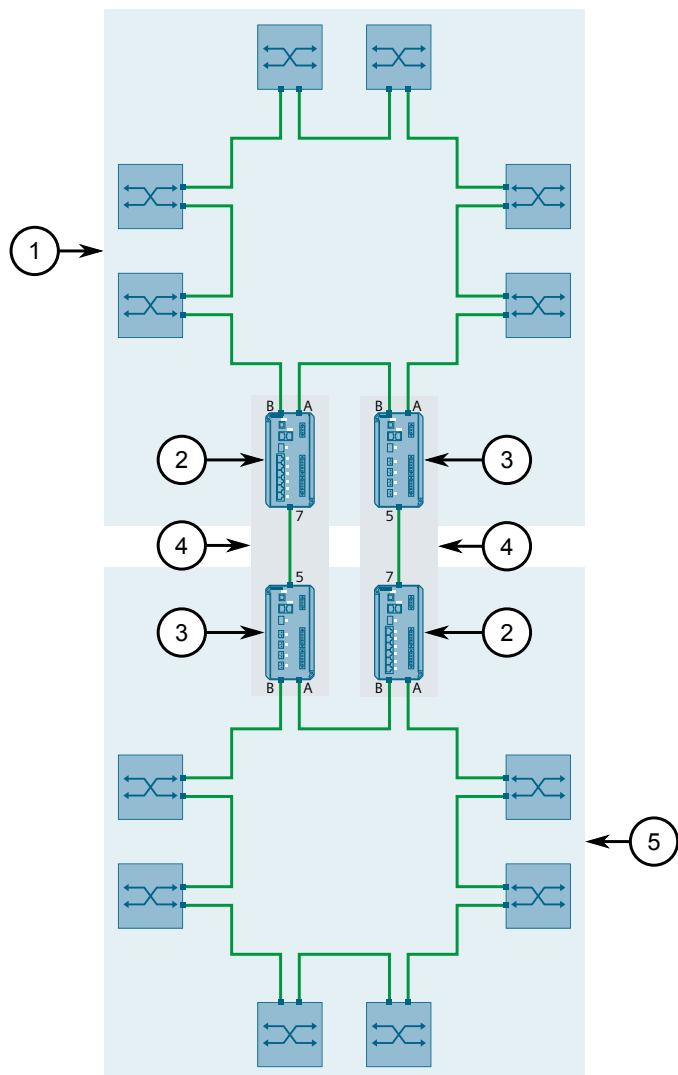
In this application, the device operates as an HSR/HSR RedBox in an HSR ring that is connected to another HSR/HSR RedBox. When linked, the two HSR/HSR RedBoxes form a QuadBox or Quadruple Port device. Connect the device as follows:

Note

Quadbox applications typically consist of two Quadboxes between each HSR ring.

2.6 Connecting the device to the network

Port	Connect to...
A	Connect to port B of the neighboring HSR/HSR RedBox or to the HSR ring
B	Connect to port A of the neighboring HSR/HSR RedBox or to the HSR ring
5 (Coupling)	Connect to the coupling (or interlink) port of the companion HSR/HSR RedBox
1 to 4	Connect to one or more Singly Attached Nodes (SANs)



- ① HSR ring
- ② HSR Quadbox
- ③ HSR/HSR RedBox (RUGGEDCOM RSG909R/RSG908C/RSG910C)
- ④ HSR/HSR RedBox (RUGGEDCOM RSG907R)

Figure 2.20 HSR Quadbox

Device management

This section describes how to connect to and manage the device.

3.1 Connecting to the device

The following describes the various methods for accessing the RUGGEDCOM RSG907R console and Web interfaces on the device. For more detailed instructions, refer to the "RUGGEDCOM ROS Configuration Manual" for the RUGGEDCOM RSG907R.

Console port

Connect a workstation directly to the USB Type-B console port to access the boot-time control and RUGGEDCOM RSG907R interfaces. The console port provides access to RUGGEDCOM RSG907R's console interface.

Note

Console ports are intended to be used only as a temporary connection during initial configuration or troubleshooting.

Note

For Microsoft Windows users, the RUGGEDCOM USB Serial Console driver must be installed on the users workstation before connecting via the USB Type-B console port. For more information, refer to the "RUGGEDCOM ROS Configuration Manual" for the RUGGEDCOM RSG907R.

Use the following settings to connect to the port:

Speed	57600 baud
Data bits	8
Stop bit	1
Parity	None
Flow control	Off
Terminal ID	VT100

Ethernet ports

Connect any of the available Ethernet ports on the device to a management switch and access the RUGGEDCOM RSG907R console and Web interfaces via the

device's IP address. The factory default IP address for the RUGGEDCOM RSG907R is <https://192.168.0.1>.

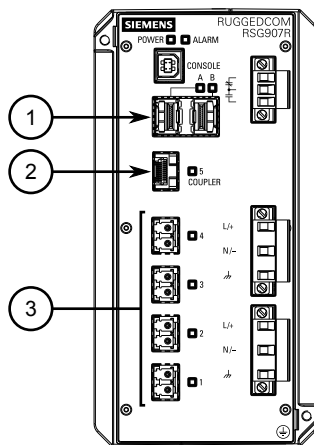
For more information about available ports, refer to "Communication ports" (Page 27).

3.2 Configuring the device

Once the device is installed and connected to the network, it must be configured. All configuration management is done via the RUGGEDCOM RSG907R interface. For more information about configuring the device, refer to the "RUGGEDCOM ROS Configuration Manual" associated with the installed software release.

Communication ports

The RUGGEDCOM RSG907R can be equipped with various types of communication ports to enhance its abilities and performance.



- ① Ports A and B
- ② Port 5
- ③ Ports 1 to 4

Figure 4.1 Port Assignment

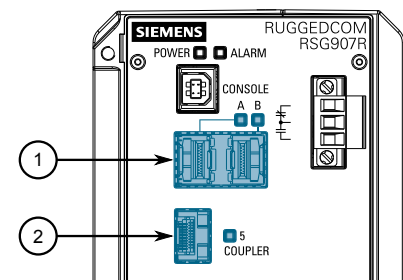
Port	Type
A/B	SFP Transceiver (1000Base-SX/LX)
5	SFP Transceivers (1000Base-SX/LX)
1 to 4	Fiber Optic (100Base-FX) Ethernet Ports

4.1 Redundant network access (RNA) ports

The RUGGEDCOM RSG907R features three dedicated Small Form-factor Pluggable (SFP) transceiver sockets for PRP/HSR applications:

HSR/PRP ports

Port	Description
A	Port A and B enable the device to connect to a Parallel Redundancy Protocol (PRP) network or a High-Availability Seamless Redundancy (HSR) ring.
B	
5	The Coupler port serves the following purposes: - To connect two HSR devices to form a QuadBox - To connect a SAN (Singly Attached Node) to an HSR ring via an HSR device - To connect a VDAN (Virtual Dual Attached Node) to a PRP network via a PRP device - To connect an HSR ring to a PRP network and vice versa - To connect an HSR ring to an RSTP network



- ① Ports A and B
 ② Port 5 (Coupler)

Figure 4.2 HSR/PRP ports

LEDs

Each RNA port features an LED that indicates the link/activity state of the port.

State	Description
Green (Solid)	Link established
Green (Blinking)	Link activity
Off	No link detected

Compatible SFPs

For more information about which SFP transceivers are compatible with the RUGGEDCOM RSG907R, as well as instructions for ordering and installation/removal, refer to the "[RUGGEDCOM SFP Transceivers Reference Manual \[https://support.industry.siemens.com/cs/ca/en/view/109482309\]](https://support.industry.siemens.com/cs/ca/en/view/109482309)".

⚠ NOTICE

Only use SFP transceivers approved by Siemens for RUGGEDCOM products. Siemens accepts no liability as a result of performance issues related in whole or in part to third-party components.

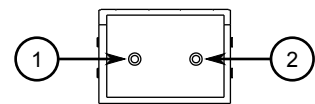
⚠ NOTICE

RNA ports A and B must operate at the same speed. Inconsistent speed in these ports will generate an alarm. Make sure to use SFPs with compatible speeds on ports A and B.

4.2 Fiber optic Ethernet ports

The RUGGEDCOM RSG907R features four fixed Fiber optic Ethernet ports, each with an LC (Lucent Connector) connector. Make sure the Transmit (Tx) and Receive (Rx) connections of each port are properly connected and matched to establish a proper link.

Port types



- ① Tx connector
- ② Rx connector

Figure 4.3 LC port

LEDs

Each port features an LED that indicates the link/activity state of the port.

State	Description
Green (Solid)	Link established
Green (Blinking)	Link activity
Off	No link detected

Specifications

For specifications on the available fiber optic Ethernet ports, refer to "Fiber optic Ethernet port specifications" (Page 32).

4.3 SFP transceivers

The RUGGEDCOM RSG907R supports up to three Small Form-Factor Pluggable (SFP) transceiver sockets, which are compatible with a wide array of SFP transceivers available from Siemens.

LEDs

Each socket features an LED that indicates its link state.

State	Description
Green (Solid)	Link established
Green (Blinking)	Activity
Off	No link detected

Compatible SFP transceivers

For more information about which SFP transceivers are compatible with the RUGGEDCOM RSG907R, as well as instructions for ordering and installation/removal, refer to the "RUGGEDCOM SFP Transceivers Reference Manual [<https://support.industry.siemens.com/cs/ca/en/view/109482309>]".

Note

Only use SFP transceivers approved by Siemens for RUGGEDCOM products. Siemens accepts no liability as a result of performance issues related in whole or in part to third-party components.

Technical specifications

This section provides important technical specifications related to the device.

5.1 General specifications

Insulation	Class I
Overvoltage category	OVC II

5.2 Power supply specifications

Note

When determining cable lengths, make sure the nominal input voltage for the power supply is provided at the power source.

Power supply type	Input voltage			Internal fuse rating	Isolation	Maximum power consumption ^a
	Minimum	Maximum	Nominal			
LO	10 VDC	60 VDC	12 VDC, 24 VDC, 48 VDC	5 A	1.5 kVDC	13.4 W
HI	88 VDC	300 VDC	125 VDC, 250 VDC	3.15 A	5 kVDC	15.3 W
	85 VAC	264 VAC	110 VAC, 220 VAC	3.15 A	5 kVDC	15.5 W

^a Current consumption may vary based on configuration.

5.3 Failsafe alarm relay specifications

Maximum switching voltage	Rated switching current	Isolation
30 VDC	2 A	5.0 kVAC ^a between coil and contacts 1.0 kVAC ^a between contacts
125 VDC	0.48 A	
300 VDC	0.2 A	
250 VAC	2 A	

^a 50 to 60 Hz for 1 minute

5.4 Supported networking standards

The following networking standards are supported by RUGGEDCOM RSG907R:

Standard	10 Mbps Ports	100 Mbps Ports	1000 Mbps Ports	Notes
IEEE 802.3x	•	•	•	Full Duplex Operation
IEEE 802.3z			•	1000Base-LX
IEEE 802.3ab			•	1000Base-Tx
IEEE 802.1D	•	•	•	MAC bridges
IEEE 802.1Q	•	•	•	VLAN (Virtual LAN)
IEEE 802.1Q-2005	•	•	•	Multiple Spanning Tree Protocol (MSTP)
IEEE 802.1w	•	•	•	Rapid Spanning Tree Protocol (RSTP)
IEEE 802.1p	•	•	•	Priority levels
IEEE 802.1x	•	•	•	Port-based network access control
IEEE 802.3	•			10Base-T
IEEE 802.3ad	•	•	•	Link aggregation
IEEE 802.3u		•		100Base-TX/100Base-FX
IEEE 1588-2008	•	•	•	Precision Time Control (PTP) Version 2
IEC 62439-2:2016	•	•	•	Media Redundancy Protocol (MRP)
IEC 62439-3:2016	•	•	•	High-Availability Seamless Redundancy (HSR), Parallel Redundancy Protocol (PRP)

5.5 Fiber optic Ethernet port specifications

The following details the specifications for fiber Ethernet ports that can be ordered with the RUGGEDCOM RSG907R.

Note

- All optical power numbers are listed as dBm averages. To convert from average to peak, add 3 dBm. To convert from peak to average, subtract 3 dBm.
- Maximum segment length is greatly dependent on factors such as fiber quality, and the number of patches and splices. Consult a Siemens sales associate when determining maximum segment distances.

Data rate (Mbps)	Mode	Connector	Cable (µm)	Wavelength (nm) ^a		Transmit power (dBm)		Receiver sensitivity (dBm)	Receiver saturation (dBm)	Distance (km) ^a	Power budget
				Transmit	Receive	Min	Max				
100	MM	LC	50/125	1308	1308	-22.5	-14	-31	-14	2	11

Data rate (Mbps)	Mode	Connector	Cable (µm)	Wavelength (nm) ^a		Transmit power (dBm)		Receiver sensitivity (dBm)	Receiver saturation (dBm)	Distance (km) ^a	Power budget
				Transmit	Receive	Min	Max				
100	MM	LC	62.5/125	1308	1308	-20	-14	-31	-14	2	11

^a Typical.

5.6 Operating environment

The RUGGEDCOM RSG907R is rated to operate under the following environmental conditions.

Ambient operating temperature ^{ab}	-40 to 85 °C (-40 to 185 °F)
Ambient storage temperature	-40 to 85 °C (-40 to 185 °F)
Ambient relative humidity ^c	5% to 95%
Maximum Altitude	4000 m (13123.3 ft)

^a Measured from a 30 cm (12 in) radius surrounding the center of the enclosure.

^b Operating temperature may vary based on the limitations of installed SFPs. Refer to the "RUGGEDCOM SFP Transceivers Catalog" for SFP temperature ratings.

^c Non-condensing.

5.7 Mechanical specifications

Weight	2.4 kg (5.3 lbs)
Ingress protection	IP40
Enclosure	Die Cast Aluminum

5.8 Dimension drawings

Note

All dimensions are in millimeters, unless otherwise stated.

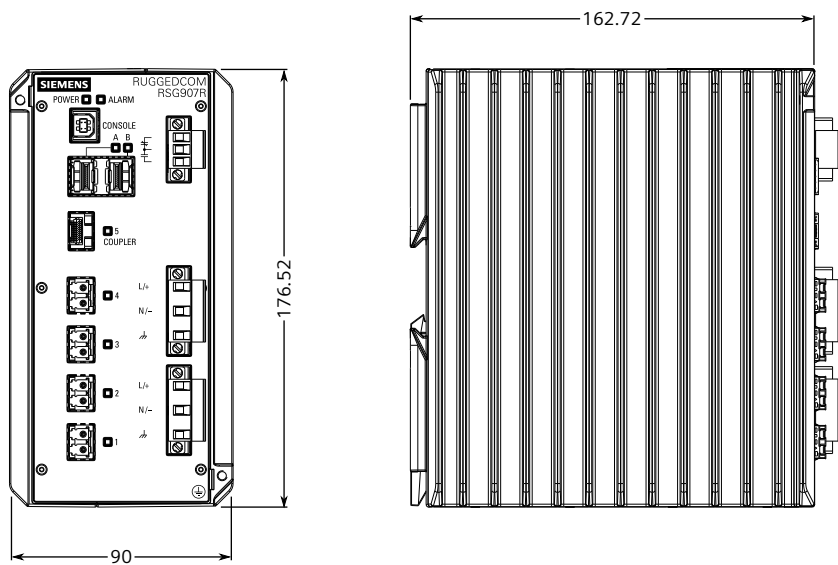


Figure 5.1 Overall Dimensions

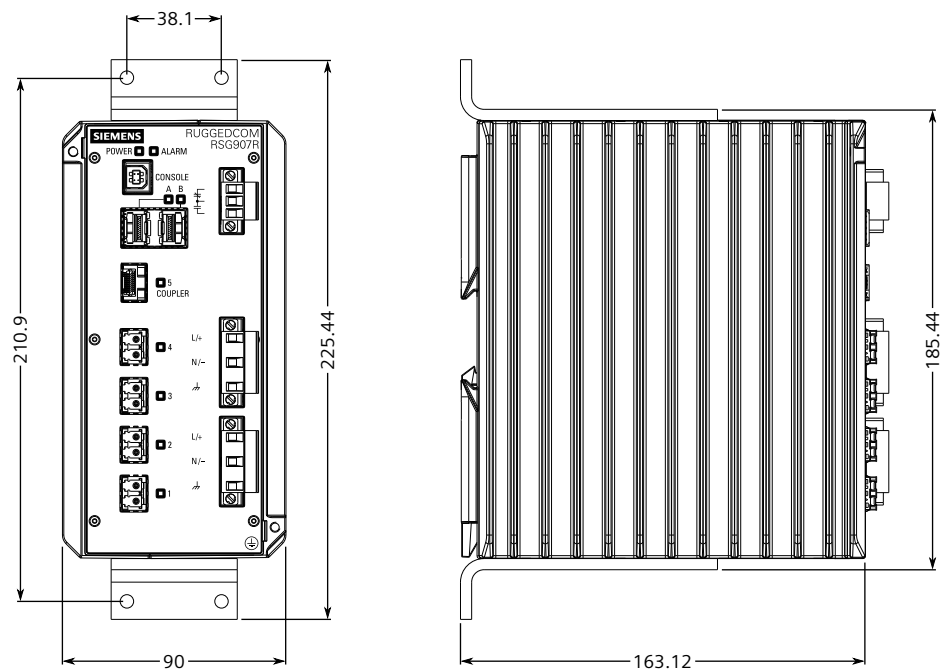


Figure 5.2 Panel mount dimensions

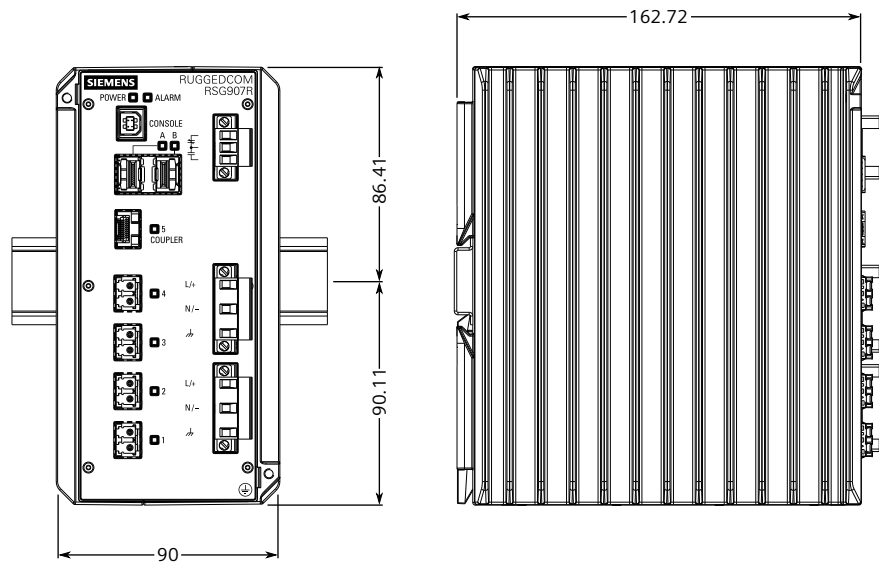


Figure 5.3 DIN rail mount dimensions

Certification

The RUGGEDCOM RSG907R device has been thoroughly tested to guarantee its conformance with recognized standards and has received approval from recognized regulatory agencies.

6.1 Approvals

This section details the standards to which the RUGGEDCOM RSG907R complies.

Note

All relevant certificates and test reports are available on [Siemens Industry Online Support \[https://support.industry.siemens.com/cs/ww/en/ps/16008/cert\]](https://support.industry.siemens.com/cs/ww/en/ps/16008/cert).

6.1.1 UKCA

This device is certified for use in Great Britain and bears the United Kingdom Certified Assessed (UKCA) marking. The marking is printed on the body of the device.



6.1.2 European Union (EU)

This device is declared by Siemens Canada Ltd. to comply with essential requirements and other relevant provisions of the following EU directives:

- **EN 62368-1**
Information Technology Equipment – Safety – Part 1: General Requirements
- **EN 61000-6-2**
Electromagnetic Compatibility (EMC) – Part 6-2: Generic Standards – Immunity for Industrial Environments
- **EN 60825-1**
Safety of Laser Products – Equipment Classification and Requirements
- **EN 63000**
Technical Documentation for the Assessment of Electrical and Electronic Products with Respect to the Restriction of Hazardous Substances

- **CISPR 32/EN 55032**
Electromagnetic compatibility of multimedia equipment – Emission requirements
- **EN 55011**
Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement

The device is marked with a CE symbol and can be used throughout the European community.



6.1.3 FCC

This device has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This device generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case users will be required to correct the interference at their own expense.

Note

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this device.

6.1.4 FDA/CDRH

This device meets the requirements of the following U.S. Food and Drug Administration (FDA) standard:

- Title 21 Code of Federal Regulations (CFR) – Chapter I – Sub-chapter J – Radiological Health

6.1.5 ISED

This device is declared by Siemens Canada Ltd. to meet the requirements of the following ISED (Innovation Science and Economic Development Canada) standard:

- CAN ICES-3 (A)/NMB-3 (A)

6.1.6 TÜV SÜD

This device is certified by TÜV SÜD to meet the requirements of the following standards:

- **CAN/CSA-C22.2 NO. 62368-1**
Information Technology Equipment – Safety – Part 1: General Requirements (Bi-National standard, with UL 62368-1)
- **IEC/EN/UL 62368-1**
Information Technology Equipment – Safety – Part 1: General Requirements

6.1.7 RRA

This device has been registered by the Korean Radio Research Agency (RRA) under Clause 3, Article 58-2 of the Radio Waves Act. As such, the device is marked with a KC symbol and can be used in the Republic of Korea (South Korea) as a Class A product in a commercial, industrial or business environment.



R-REM-S14-RSG907R

A copy of the KC Declaration of Conformity is available from Siemens Canada Ltd.. For contact information, refer to "Contacting Siemens" (Page viii).

Notices specific to the RRA:



WARNING

Class A Equipment (Industrial Broadcasting and Communication Equipment)

This device complies with the limits of a Class A electromagnetic wave device and is intended for use outside of a residential environment. The seller or user must be aware.

6.1.8 ISO

This device was designed and manufactured using a certified ISO (International Organization for Standardization) quality program that adheres to the following standard:

- **ISO 9001:2015**
Quality management systems – Requirements

6.1.9 RoHS

This device is declared by Siemens Canada Ltd. to meet the requirements of the following RoHS (Restriction of Hazardous Substances) directives for the restricted use of certain hazardous substances in electrical and electronic equipment:

- **EU RoHS Directives (EU) 2011/65 and (EU) 2015/863**
European Directive for Restriction of Hazardous Substances
- **China RoHS (relating to SJ/T 11364)**
Management Methods for the Restriction of the Use of Hazardous Substances in Electrical and Electronic Products

Declarations of conformity for each directive are available online via [Siemens Industry Online Support \[https://support.industry.siemens.com/\]](https://support.industry.siemens.com/).

6.1.10 Other approvals

This device meets the requirements of the following additional standards:

- **IEEE 1613**
IEEE Standard Environmental and Testing Requirements for Communications Networking Devices in Electric Power Substations
- **IEC 61850-3**
Communication Networks and Systems in Substations – Part 3: General Requirements
- **IEC 61000-6-2**
Electromagnetic Compatibility (EMC) – Part 6-2: Generic Standards – Immunity for Industrial Environments
- **IEC 61000-6-4**
Electromagnetic Compatibility (EMC) – Part 6-4: Generic Standards – Emission standard for industrial environments
- **IEC 60068-2**
Environmental testing – Part 2: Tests – ALL PARTS
- **IEC 60255-1**
Measuring relays and protection equipment – Part 1: Common requirements
- **EN 50121-3-2**
Railway applications – Electromagnetic Compatibility – Rolling Stock Apparatus
- **EN 50121-4**
Railway applications – Electromagnetic Compatibility – Emission and Immunity of the Signaling and Telecommunications Apparatus
- **EN 50155**
Railway applications – Rolling stock – Electronic equipment
- **NEMA TS-2**
Traffic Controller Assemblies with NTCIP Requirements

- **EN 45545-2**
Railway Applications – Fire Protection on Railway Vehicles – Requirements for fire Behavior of Materials and Components
- **CISPR 11**
Industrial, scientific and medical equipment – Radio-frequency disturbance characteristics – Limits and methods of measurement

6.2 EMC and environmental type tests

The RUGGEDCOM RSG907R has passed the following Electromagnetic Compatibility (EMC) and environmental tests.

EMC type tests

Test	Description		Test levels	Severity levels
IEC 61000-4-2	ESD	Enclosure contact	± 8 kV	4
		Enclosure air	± 15 kV	4
IEC 61000-4-3	Radiated RFI	Enclosure ports	20 V/m	
IEC 61000-4-4	Burst (Fast transient)	Signal ports	± 4 kV @ 2.5 kHz, 5 kHz	4
		DC power ports	± 4 kV @ 2.5 kHz, 5 kHz	4
		AC power ports	± 4 kV @ 2.5 kHz, 5 kHz	4
		Earth ground ports	± 4 kV @ 2.5 kHz, 5 kHz	4
IEC 61000-4-5	Surge	Signal ports	± 4 kV Line-to-Ground ± 2 kV Line-to-Line	4
		DC power ports	± 2 kV Line-to-Ground ± 1 kV Line-to-Line	3
		AC power ports	± 4 kV Line-to-Ground ± 2 kV Line-to-Line	4
IEC 61000-4-6	Induced (Conducted) RFI	Signal ports	10 V	3
		DC power ports	10 V	3
		AC power ports	10 V	3
		Earth ground ports	10 V	3
IEC 61000-4-8	Magnetic field	Enclosure ports	100 A/m Continuous 1000 A/m for 1 s	
IEC 61000-4-9	Pulse magnetic field	Enclosure ports	300 A/m	4

6.2 EMC and environmental type tests

Test	Description		Test levels	Severity levels
IEC 61000-4-11	Voltage dips and interrupts	AC power ports	30% for 0.5 cycles 60% for 5 cycles 100% for 250 cycles	
IEC 61000-4-16	Mains frequency voltage	Signal ports	30 V continuous 300 V for 1 s	4
		DC power ports	30 V continuous 300 V for 1 s	4
IEC 61000-4-17	Ripple on DC power supply	DC power ports	15%	4
IEC 61000-4-18	Damped oscillatory wave	Slow damped	2.5 kV common 100 kHz or 1 MHz	3
IEC 61000-4-29	Voltage dips and interrupts	DC power ports	30% for 0.1 s 60% for 0.1 s 100% for 0.05 s	
IEC 60255-27	Dielectric strength	Signal ports	2 kV (Failsafe relay output)	
		DC power ports	2 kV or 2.8kV DC	
		AC power ports	2 kV	
	HV impulse	Signal ports	5 kV (Failsafe relay output)	
		DC power ports	5 kV	
		AC power ports	5 kV	

EMC immunity type tests per IEEE 1613

Note

RUGGEDCOM products meet Class 1 requirements for copper Ethernet configurations and Class 2 for fiber Ethernet configurations. Class 1 allows for temporary communication loss, while Class 2 requires error-free and interrupted communications.

Test	Description		Test Levels
IEEE 1613	ESD	Enclosure contact	± 8 kV
		Enclosure air	± 15 kV
IEEE 1613	Radiated RFI	Enclosure ports	35 V/m
IEEE 1613	Fast transient	Signal ports	± 4 kV @ 2.5 kHz, 5 kHz
		DC power ports	± 4 kV @ 2.5 kHz, 5 kHz
		AC power ports	± 4 kV @ 2.5 kHz, 5 kHz
		Earth ground ports	± 4 kV
IEEE 1613	Oscillatory	Signal ports	2.5 kV common mode @ 1 MHz

6.2 EMC and environmental type tests

Test	Description		Test Levels
		DC power ports	2.5 kV common mode @ 1 MHz 1 kV differential mode @ 1 MHz
IEEE 1613	HV impulse	Signal ports	5 kV (Failsafe relay)
		DC power ports	5 kV
		AC power ports	5 kV
IEEE 1613	Dielectric strength	Signal ports	2 kV (Failsafe relay)
		DC power ports	2.8 kVDC or 2 kV
		AC power ports	2 kV
IEEE 1613.1 IEC 61000-4-10	Damped oscillating magnetic field	Enclosure ports	100 A/m for 1 s (100 kHz and 1 MHz)

Environmental type tests

Test	Description		Test levels	Severity levels
IEC 60068-2-1	Cold temperature	Test Ad	-40 °C (-40 °F), 16 hours	
	Cold storage	Test Ab	-40 °C (-40 °F), 16 hours	
IEC 60068-2-2	Dry heat	Test Bd	85 °C (185 °F), 16 hours	
	Dry heat storage	Test Bd	85 °C (185 °F), 16 hours	
IEC 60068-2-30	Humidity (Damp heat, cyclic)	Test Dd	95% (non-condensing), 55 °C (131 °F), 6 cycles	
IEC 60068-2-14	Change of temperature	Test Nb	5 cycles @ -40 to 85 °C (-40 to 185 °F)	
IEC 60068-2-78	Humidity (Damp heat, cyclic)	Test Cab	10 days @ 55 °C (131 °F), 6 cycles	
IEC 60255-21-1	Vibration		2 g @ 10 to 150 Hz	Class 2
IEC 60255-21-2	Shock		30 g @ 11 ms	Class 2
IEC 60255-21-2	Bump		10 g @ 16 ms	Class 1
IEC 60255-21-3	Seismic		Method A	Class 2
IEC 60529	Ingress protection		IP4x	

For more information

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