

## RUGGEDCOM RS900

### Installation Guide

#### Preface

---

#### Introduction

1

#### Installing the Device

2

#### Communication Ports

3

#### Technical Specifications

4

#### Dimension Drawings

5

#### Certification

6

Copyright © 2016 Siemens Canada Ltd

All rights reserved. Dissemination or reproduction of this document, or evaluation and communication of its contents, is not authorized except where expressly permitted. Violations are liable for damages. All rights reserved, particularly for the purposes of patent application or trademark registration.

This document contains proprietary information, which is protected by copyright. All rights are reserved. No part of this document may be photocopied, reproduced or translated to another language without the prior written consent of Siemens Canada Ltd.

## »» Disclaimer Of Liability

Siemens has verified the contents of this document against the hardware and/or software described. However, deviations between the product and the documentation may exist.

Siemens shall not be liable for any errors or omissions contained herein or for consequential damages in connection with the furnishing, performance, or use of this material.

The information given in this document is reviewed regularly and any necessary corrections will be included in subsequent editions. We appreciate any suggested improvements. We reserve the right to make technical improvements without notice.

## »» Registered Trademarks

RUGGEDCOM™ and ROS™ are trademarks of Siemens Canada Ltd.

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

## »» Third Party Copyrights

Siemens recognizes the following third party copyrights:

- Copyright © 2004 GoAhead Software, Inc. All Rights Reserved.

## »» Security Information

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, machines, equipment and/or networks. They are important components in a holistic industrial security concept. With this in mind, Siemens' products and solutions undergo continuous development. Siemens recommends strongly that you regularly check for product updates.

For the secure operation of Siemens products and solutions, it is necessary to take suitable preventive action (e.g. cell protection concept) and integrate each component into a holistic, state-of-the-art industrial security concept. Third-party products that may be in use should also be considered. For more information about industrial security, visit <http://www.siemens.com/industrialsecurity>.

To stay informed about product updates as they occur, sign up for a product-specific newsletter. For more information, visit <http://support.automation.siemens.com>.

## »» 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 [www.siemens.com/ruggedcom](http://www.siemens.com/ruggedcom) or contact a Siemens customer service representative.

## » Contacting Siemens

### Address

Siemens Canada Ltd  
Industry Sector  
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

[ruggedcom.info.i-ia@siemens.com](mailto:ruggedcom.info.i-ia@siemens.com)

### Web

[www.siemens.com/ruggedcom](http://www.siemens.com/ruggedcom)



# Table of Contents

Preface ..... vii

    Alerts ..... vii

    Related Documents ..... vii

    Accessing Documentation ..... viii

    Training ..... viii

    Customer Support ..... viii

Chapter 1

Introduction ..... 1

    1.1 Feature Highlights ..... 1

    1.2 Description ..... 2

Chapter 2

Installing the Device ..... 5

    2.1 Required Tools and Materials ..... 6

    2.2 Installing the Device in Hazardous Locations ..... 6

    2.3 Mounting the Device ..... 7

        2.3.1 Mounting the Device on a DIN Rail ..... 7

        2.3.2 Mounting the Device to a Panel ..... 8

    2.4 Connecting Power ..... 9

        2.4.1 Connecting High AC/DC Power ..... 10

        2.4.2 Connecting Low DC Power ..... 11

    2.5 Connecting the Failsafe Alarm Relay ..... 12

    2.6 Connecting to the Device ..... 13

    2.7 Cabling Recommendations ..... 14

Chapter 3

Communication Ports ..... 15

    3.1 Copper Ethernet Ports ..... 15

    3.2 Fiber Optic Ethernet Ports ..... 17

Chapter 4

Technical Specifications ..... 19

    4.1 Power Supply Specifications ..... 19

    4.2 Failsafe Relay Specifications ..... 20

    4.3 Copper Ethernet Port Specifications ..... 20

|  |    |
|--|----|
| 4.4 Fiber Optic Ethernet Port Specifications ..... | 20 |
| 4.5 Operating Environment .....                    | 21 |
| 4.6 Mechanical Specifications .....                | 22 |
| Chapter 5  |    |
| Dimension Drawings .....                           | 23 |
| Chapter 6  |    |
| Certification .....                                | 25 |
| 6.1 Approvals .....                                | 25 |
| 6.1.1 CSA .....                                    | 25 |
| 6.1.2 CSA/Sira .....                               | 26 |
| 6.1.3 European Union (EU) .....                    | 27 |
| 6.1.4 FCC .....                                    | 27 |
| 6.1.5 FDA/CDRH .....                               | 27 |
| 6.1.6 Industry Canada .....                        | 28 |
| 6.1.7 Other Approvals .....                        | 28 |
| 6.2 EMC and Environmental Type Tests .....         | 28 |

# Preface

This guide describes the RUGGEDCOM RS900. 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.

## CONTENTS

- [“ Alerts ”](#)
- [“Related Documents”](#)
- [“Accessing Documentation”](#)
- [“Training”](#)
- [“Customer Support”](#)

## Alerts

The following types of alerts are used when necessary to highlight important information.



### **DANGER!**

*DANGER alerts describe imminently hazardous situations that, if not avoided, will result in death or serious injury.*



### **WARNING!**

*WARNING alerts describe hazardous situations that, if not avoided, may result in serious injury and/or equipment damage.*



### **CAUTION!**

*CAUTION alerts describe hazardous situations that, if not avoided, may result in equipment damage.*



### **IMPORTANT!**

*IMPORTANT alerts provide important information that should be known before performing a procedure or step, or using a feature.*



### **NOTE**

*NOTE alerts provide additional information, such as facts, tips and details.*

## Related Documents

Other documents that may be of interest include:

- *RUGGEDCOM ROS User Guide* for the RUGGEDCOM RS900

## Accessing Documentation

The latest user documentation for RUGGEDCOM RS900 v is available online at [www.siemens.com/ruggedcom](http://www.siemens.com/ruggedcom). To request or inquire about a user document, contact Siemens Customer Support.

## 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 [www.siemens.com/ruggedcom](http://www.siemens.com/ruggedcom) or contact a Siemens Sales representative.

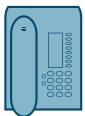
## Customer Support

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 <http://www.automation.siemens.com/mcms/aspa-db/en/automation-technology/Pages/default.aspx>.



### Mobile App

Install the Industry Online Support app by Siemens AG 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





# Introduction

The RUGGEDCOM RS900 is a nine-port utility grade, fully managed Ethernet switch specifically designed to operate reliably in electrically harsh and climatically demanding environments.

The RUGGEDCOM RS900 provides a high level of immunity to electromagnetic interference and heavy electrical surges typical of environments found on plant floors and curb-side traffic control cabinets. An operating temperature range of -40 to 85 °C (-40 to 185 °F) coupled with hazardous location certification (Class I Division 2), optional conformal coating and a galvanized steel enclosure allows the RUGGEDCOM RS900 to be placed in almost any location.

The RUGGEDCOM RS900 can be mounted on a DIN rail or panel for efficient use of cabinet space.

The integrated power supply supports a wide range of voltages (88-300 VDC or 85-264 VAC) for worldwide operability, as well as dual-redundant, reversible polarity, 24 VDC and 48 VDC power supply inputs for high availability applications requiring dual or backup power inputs.

The RUGGEDCOM RS900's superior ruggedized design and embedded RUGGEDCOM Rugged Operating System (ROS) provides superior system reliability and advanced networking features making it ideally suited for creating Ethernet networks for mission-critical, real-time, control applications.

## CONTENTS

- [Section 1.1, "Feature Highlights"](#)
- [Section 1.2, "Description"](#)

### Section 1.1

## Feature Highlights

### Ethernet Ports

- 6 x copper Ethernet ports (10/100Base-TX)
- [Optional] Up to 3 x copper (10/100Base-TX) or fiber optic (10/100Base-FX) Ethernet ports
- Multi-mode and single-mode optical transceivers
- Long haul optics allow distances up to 90 km (56 mi)
- Industry standard fiber optical connectors: LC, SC, ST, MTRJ

### Rated for Reliability in Harsh Environments

- Immunity to EMI and heavy electrical surges
- [Optional] Certified for use in explosive environments in accordance with the ATEX directive
- [Optional] Hazardous Location Certification: Class I Division 2
- -40 to 85 °C (-40 to 185 °F) operating temperature (no fans)
- 20 AWG galvanized steel enclosure
- DIN or panel mounting options provide secure mechanical reliability
- [Optional] Conformal coated printed circuit boards

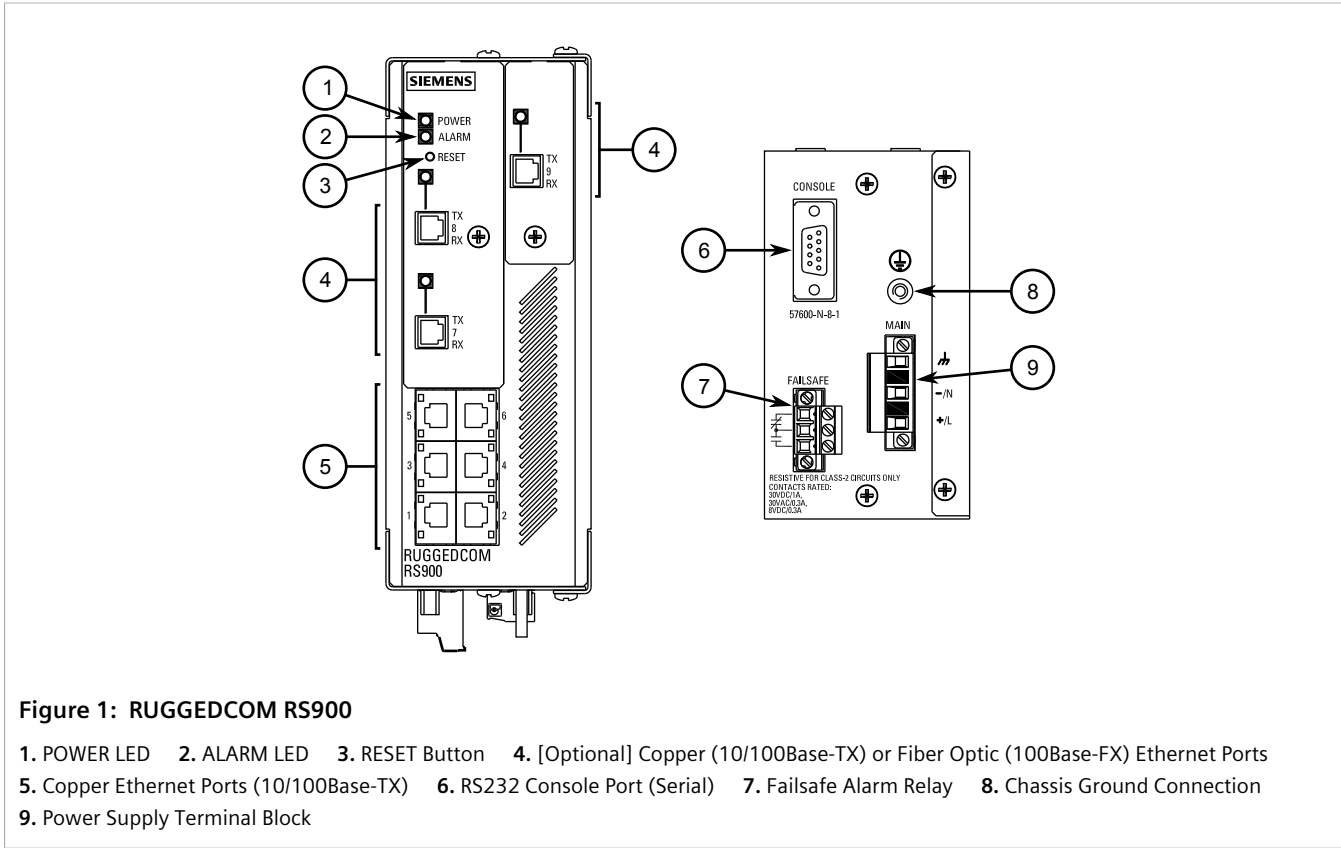
Universal Power Supply Options

- Fully integrated power supply
- Universal high-voltage range:
  - 125-250 VDC or 100-240 VAC (Hazardous Environments)
  - 88-300 VDC or 85-264 VAC (Non-Hazardous Environments)
- Dual low-voltage DC inputs: 24 VDC or 48 VDC
- Terminal blocks for reliable maintenance free connections
- CSA/UL 60950-1 safety approved to 85 °C (185 °F)

Section 1.2

Description

The RUGGEDCOM RS900 features various ports, controls and indicator LEDs on the front panel for connecting, configuring and troubleshooting the device.



|                    |  |
|--------------------|--|
| POWER LED          | Illuminates when power is supplied to the device.  |
| ALARM LED          | Illuminates when an alarm condition exists.  |
| RS232 Console Port | The serial 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 <a href="#">Section 2.6, "Connecting to the Device"</a> . |

|                                    |   |
|------------------------------------|---|
| <b>RESET Button</b>                | Shuts down and restarts the device.   |
| <b>Communication Ports</b>         | Receive and transmit data, as well as provide access to the RUGGEDCOM ROS Web interface. For more information about the various ports available for the RUGGEDCOM RS900, refer to <a href="#">Chapter 3, <i>Communication Ports</i></a> .   |
| <b>Failsafe Alarm Relay</b>        | Latches to default state when a power disruption or other alarm condition occurs. For more information, refer to: <ul style="list-style-type: none"><li>• <a href="#">Section 2.5, "Connecting the Failsafe Alarm Relay"</a></li><li>• <a href="#">Section 4.2, "Failsafe Relay Specifications"</a></li></ul> |
| <b>Power Supply Terminal Block</b> | A pluggable terminal block. For more information, refer to <a href="#">Section 2.4, "Connecting Power"</a> and <a href="#">Section 4.1, "Power Supply Specifications"</a> .   |



## 2 Installing the Device

The following sections describe how to install the device, including mounting the device, installing/removing modules, 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!**

*Do not disconnect or open equipment unless power has been switched off or the area is known to be non-hazardous.*

### **Avertissement**

*Débrancher ou ouvrir l'équipement seulement si l'alimentation a été coupée ou si l'on sait que la zone ne pose aucun danger.*



### **WARNING!**

*Substitution of the components may impair suitability for Class I, Division 2.*

### **Avertissement**

*Le remplacement de composants pourrait compromettre l'admissibilité à la Classe I, Division 2.*



### **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.*



### **IMPORTANT!**

*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.*



### **IMPORTANT!**

*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.*

The general procedure for installing the device is as follows:

1. Mount the device to a DIN rail or panel.
2. Connect power to the device and ground the device to safety Earth.
3. Connect the failsafe alarm relay.

4. Connect the device to the network.

#### CONTENTS

- [Section 2.1, "Required Tools and Materials"](#)
- [Section 2.2, "Installing the Device in Hazardous Locations"](#)
- [Section 2.3, "Mounting the Device"](#)
- [Section 2.4, "Connecting Power"](#)
- [Section 2.5, "Connecting the Failsafe Alarm Relay"](#)
- [Section 2.6, "Connecting to the Device"](#)
- [Section 2.7, "Cabling Recommendations"](#)

#### Section 2.1

## Required Tools and Materials

The following tools and materials are required to install the RUGGEDCOM RS900:

| Tools/Materials        | Purpose                                   |
|------------------------|---|
| AC power cord (16 AWG) | For connecting power to the device.       |
| CAT-5 Ethernet cables  | For connecting the device to the network. |
| Flathead screwdriver   | For mounting the device to a DIN rail.    |
| Phillips screwdriver   | For mounting the device to a panel.       |
| 4 x #6-32 screws       | For mounting the device to a panel.       |

#### Section 2.2

## Installing the Device in Hazardous Locations

The RUGGEDCOM RS900 is designed to comply with the safety standards for Class I, Division 2, Zone 2 hazardous locations where concentrations of flammable gases, vapors or liquids may be present, as opposed to normal operating environments.

### » Special Conditions for Safe Use

Installation and use of the device in a hazardous location must meet the following special conditions for safe use:

- The equipment shall be installed in an enclosure that is considered to be not accessible in normal operation without the use of a tool providing a degree of protection of not less than IP54 according to CSA/UL/IEC/EN 60079-0 and CSA/UL/IEC/EN 60079-15. The enclosure shall have a minimum service temperature range of -40 to 100 °C (-40 to 212 °F).
- The equipment shall be used in an area of not more than pollution degree 2 as defined in IEC/EN 60664-1.
- The serial DB9 console port shall only be used in the safe area.
- The equipment must be appropriately connected to safety Earth upon installation.

**NOTE**

For further details of the device's compliance with Class I, Division 2, Zone 2 standards, refer to [Section 6.1, "Approvals"](#).

## » Sample Hazardous Location Label

The following is an example of the RUGGEDCOM RS900 hazardous location label:

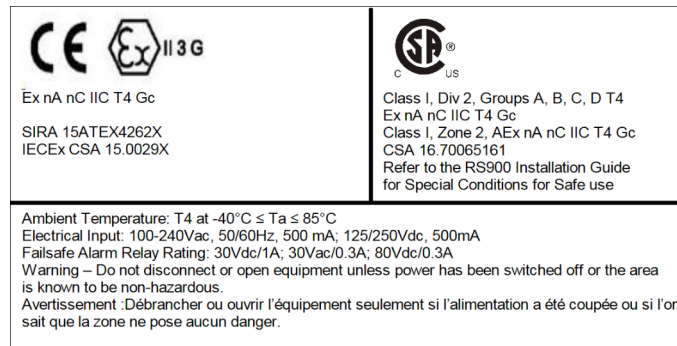


Figure 2: Compliance Label (Example)

### Section 2.3

## Mounting the Device

The RUGGEDCOM RS900 is designed for maximum mounting and display flexibility. It can be equipped with adapters that allow it to be installed on a 35 mm (1.4 in) DIN rail or affixed to a panel.

**NOTE**

For detailed dimensions of the device with either DIN rail or panel hardware installed, refer to [Chapter 5, Dimension Drawings](#).

### CONTENTS

- [Section 2.3.1, "Mounting the Device on a DIN Rail"](#)
- [Section 2.3.2, "Mounting the Device to a Panel"](#)

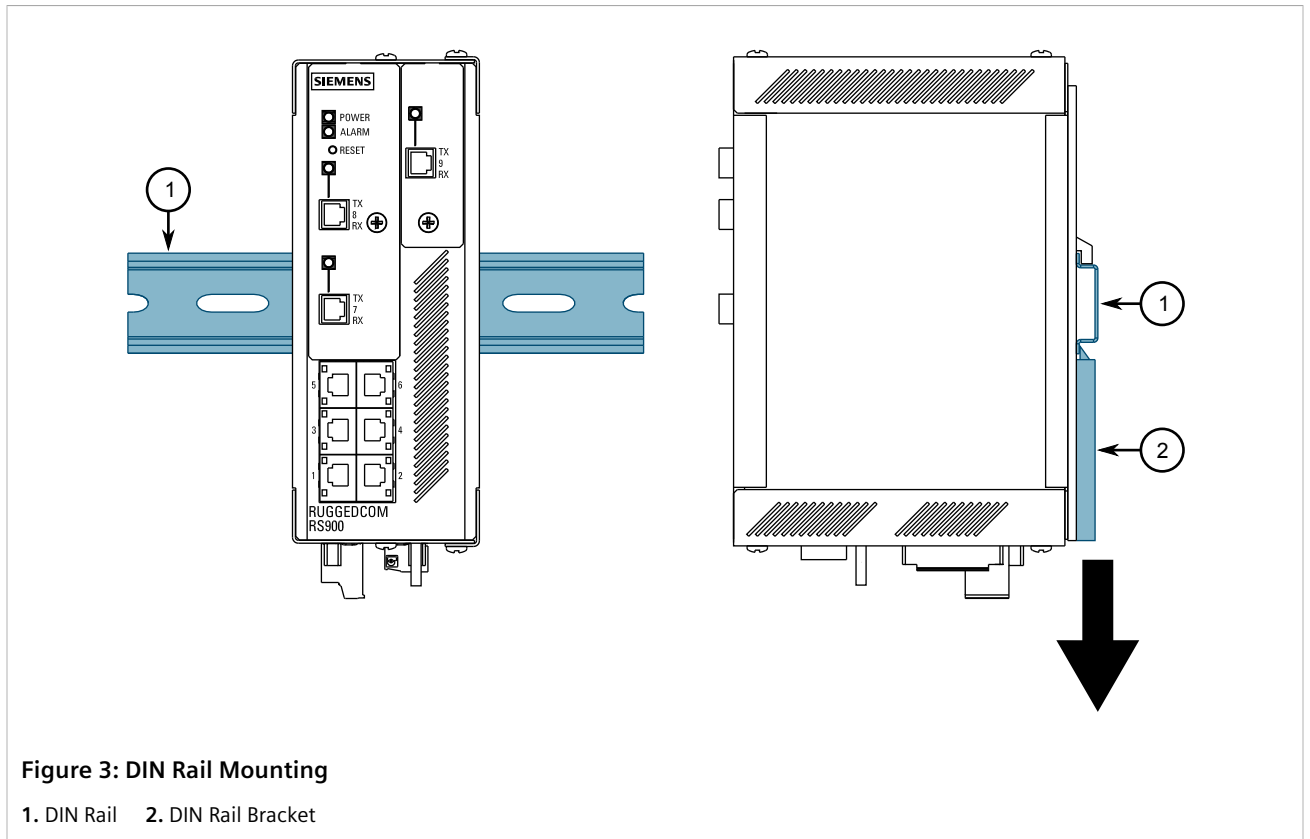
### Section 2.3.1

## Mounting the Device on a DIN Rail

For DIN rail installations, the RS900 can be equipped with a DIN rail bracket pre-installed on the back of the chassis. The bracket allows the device to be slid onto a standard 35 mm (1.4 in) DIN rail.

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

1. Align the slot in the bracket with the DIN rail.



2. Pull the release on the bracket down and slide the device onto the DIN rail. Let go of the release to lock the device in position. If access to the release is limited, use a slotted screwdriver or a similar tool to reach the release.

### Section 2.3.2

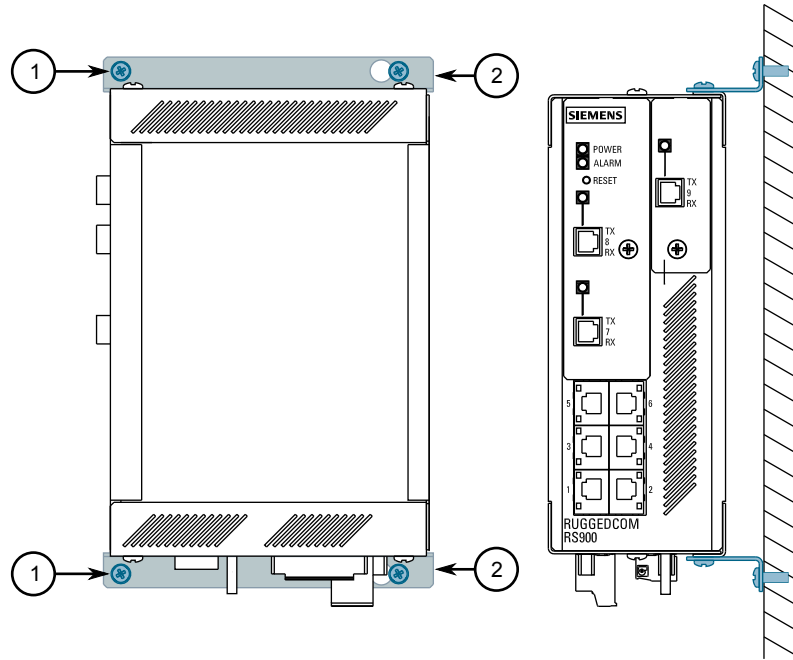
## Mounting the Device to a Panel

For panel installations, the RUGGEDCOM RS900 can be equipped with panel adapters pre-installed 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. Prepare mounting holes in the panel where the device is to be installed.
2. Place the device against the panel and align the adapters with the mounting holes.





**Figure 4: Panel Mounting**

1. Screw 2. Panel Mount Adapter

3. Secure the adapters to the panel with #6-32 screws.

#### Section 2.4

## Connecting Power

The RUGGEDCOM RS900 supports power input from a single high AC/DC or low DC power supply.



### IMPORTANT!

- 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 only #16 gage copper wiring when connecting terminal blocks.
- Equipment must be installed according to applicable local wiring codes and standards.
- All line-to-ground transient energy is shunted to the Surge Ground terminal. In cases where users require the inputs to be isolated from ground, remove the ground braid between Surge and Chassis Ground. Note that all line-to-ground transient protection circuitry will be disabled.

### CONTENTS

- [Section 2.4.1, "Connecting High AC/DC Power"](#)

- [Section 2.4.2, "Connecting Low DC Power"](#)

### Section 2.4.1

## Connecting High AC/DC Power

To connect a high AC/DC power supply to the device, do the following:



#### CAUTION!

*Electrical hazard – risk of damage to equipment. Do not connect AC power cables to terminals for DC power. Damage to the power supply may occur.*



#### CAUTION!

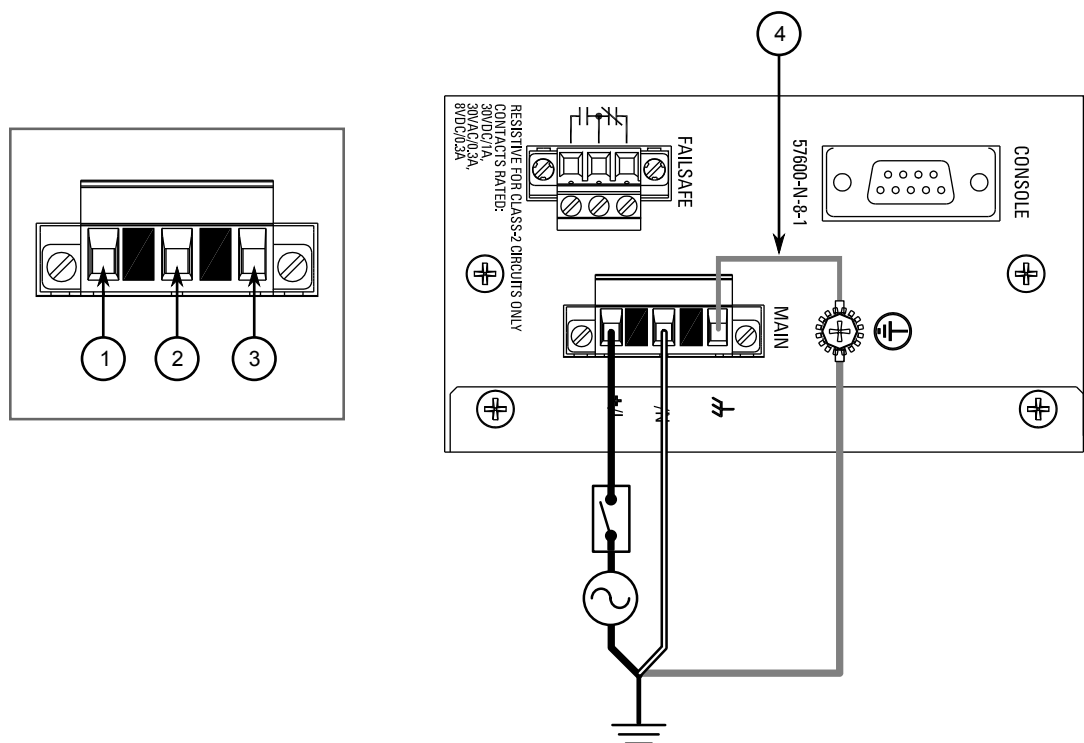
*Electrical hazard – risk of damage to equipment. Before testing the dielectric strength (HIPOT) in the field, remove the braided ground cable connected to the surge ground terminal and chassis ground. This cable connects transient suppression circuitry to chassis ground and must be removed in order to avoid damage to transient suppression circuitry during testing.*



#### NOTE

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

1. Connect the positive wire from the power source to the positive/live (+/L) terminal on the terminal block.



**Figure 5: Terminal Block Wiring**

1. Positive/Live (+/L) Terminal    2. Negative/Neutral (-/N) Terminal    3. Surge Ground Terminal    4. Braided Ground Cable

2. Connect the negative wire from the power source to the negative/neutral (-/N) terminal on the terminal block.
3. Using a braided wire or other appropriate grounding wire, connect the surge ground terminal to the chassis ground connection. The surge ground terminal is used as the ground conductor for all surge and transient suppression circuitry internal to the unit.
4. Connect the ground terminal on the power source to the chassis ground terminal on the device.

#### Section 2.4.2

## Connecting Low DC Power

RUGGEDCOM RS900's equipped with 24 or 48 V power supply inputs feature reverse polarity protection and dual power supply inputs allowing the device to accept redundant connections to a single DC power supply.

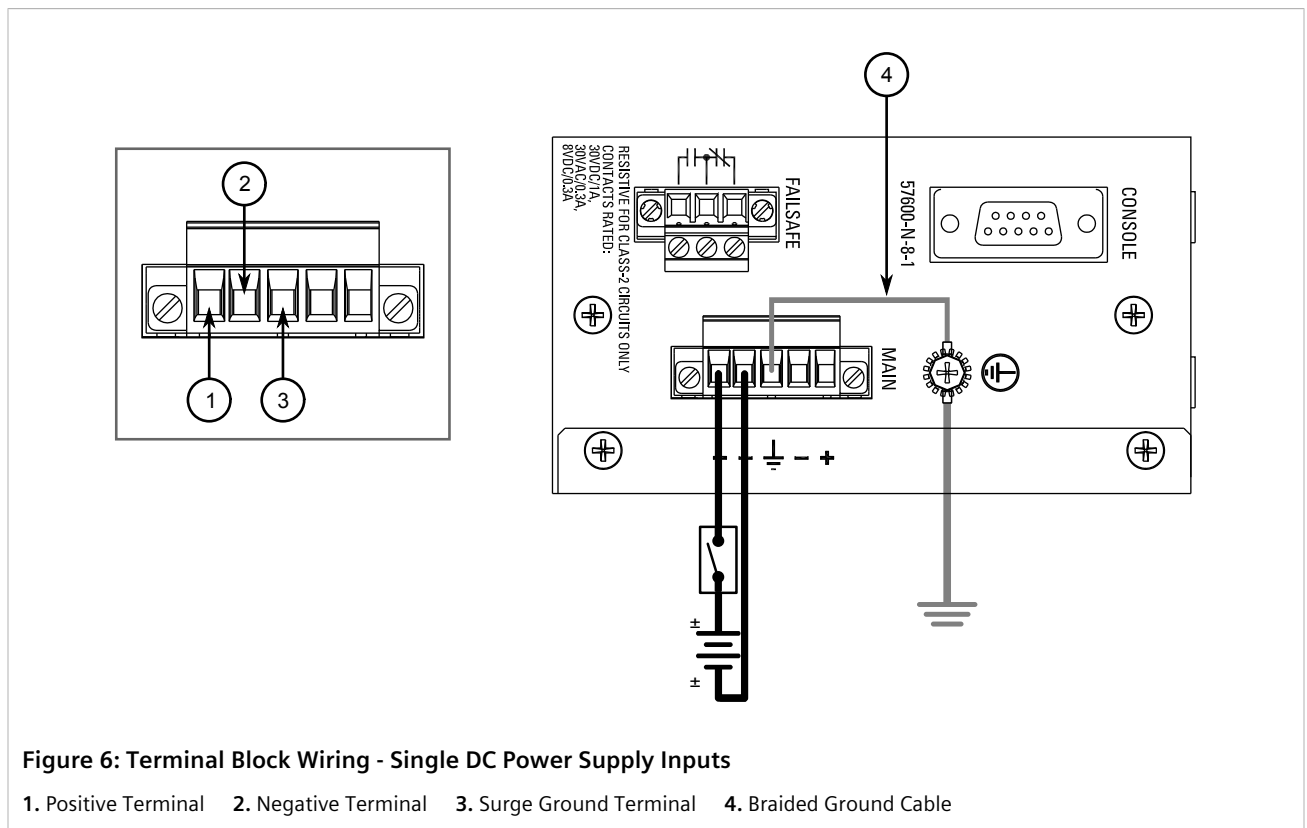
To connect a low DC power supply to the device, do the following:



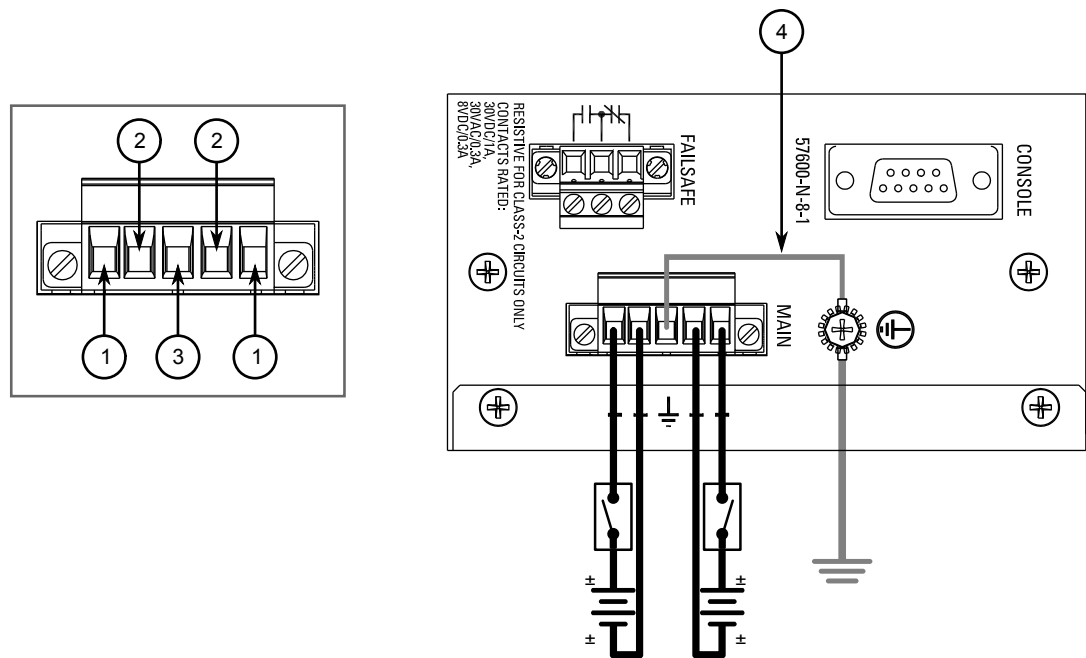
#### NOTE

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

1. Connect the positive wire from the power source to the positive terminal on the terminal block.



2. Connect the negative wire from the power source to the negative terminal on the terminal block.
3. [Optional] If a redundant connection is required, repeat steps [Step 1](#) and [Step 2](#) to connect the secondary power inputs.



**Figure 7: Terminal Block Wiring - Dual DC Power Supply Inputs**

1. Positive Terminal    2. Negative Terminal    3. Surge Ground Terminal    4. Braided Ground Cable

4. Using a braided wire or other appropriate grounding wire, connect the surge ground terminal to the chassis ground connection. The surge ground terminal is used as the ground conductor for all surge and transient suppression circuitry internal to the unit.
5. Connect the ground terminal on the power source to the chassis ground terminal on the device.

## Section 2.5

# Connecting the Failsafe Alarm Relay

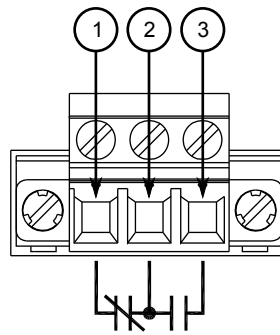
The failsafe relay can be configured to latch based on alarm conditions. The NO (Normally Open) contact is closed when the unit is powered and there are no active alarms. If the device is not powered or if an active alarm is configured, the relay opens the NO contact and closes the NC (Normally Closed)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



### NOTE

*Control of the failsafe relay output is configurable through ROS. One common application for this relay is to signal an alarm if a power failure occurs. For more information, refer to the ROS User Guide for the RUGGEDCOM RS900.*

The following shows the proper relay connections.



**Figure 8: Failsafe Alarm Relay Wiring**

1. Normally Closed    2. Common    3. Normally Open

## Section 2.6

# Connecting to the Device

The following describes the various methods for accessing the ROS console and Web interfaces on the device. For more detailed instructions, refer to the *ROS User Guide* for the RUGGEDCOM RS900.



### IMPORTANT!

*Ethernet cables should be only be connected/disconnected in a non-hazardous area, or when the device is not energized.*

## » RS232 Console Port

Connect a workstation directly to the RS232 serial console port to access the boot-time control and ROS console interface.



### IMPORTANT!

*The serial console port is intended to be used only as a temporary connection during initial configuration or troubleshooting, and should only be used in a safe area (as defined by IEC 60079-0, Edition 6.0).*

## » Pin-Out

The serial console port implements RS232 DCE (Data Communication Equipment) on a DB9 connector. The following is the pin-out for the port:

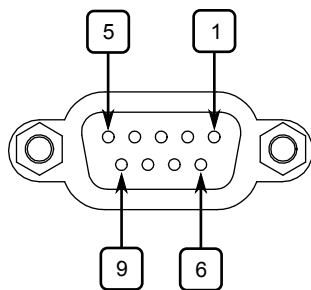


Figure 9: Serial DB9 Console Port

| Pin            | Name                      | Description   |
|----------------|---------------------------|---------------|
| 1 <sup>a</sup> | Reserved (Do Not Connect) |               |
| 2              | TX                        | Transmit Data |
| 3              | RX                        | Receive Data  |
| 4 <sup>a</sup> | Reserved (Do Not Connect) |               |
| 5              | GND                       | Signal Ground |
| 6 <sup>a</sup> | Reserved (Do Not Connect) |               |
| 7 <sup>b</sup> | Reserved (Do Not Connect) |               |
| 8 <sup>b</sup> | Reserved (Do Not Connect) |               |
| 9              | Reserved (Do Not Connect) |               |

<sup>a</sup> Connected internally.

<sup>b</sup> Connected internally.

» Communication Ports

Connect any of the available Ethernet ports on the device to a management switch and access the RUGGEDCOM ROS console and Web interfaces via the device's IP address. The factory default IP address for the RUGGEDCOM RS900 is <https://192.168.0.1> .

For more information about available ports, refer to [Chapter 3, Communication Ports](#) .

Section 2.7

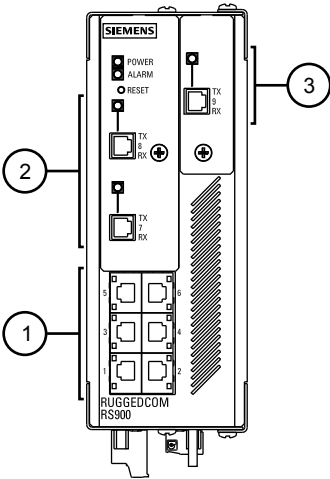
# Cabling Recommendations

All copper Ethernet ports on RUGGEDCOM products include transient suppression circuitry to protect against damage from electrical transients and conform with IEC 61850-3 and IEEE 1613 Class I standards. This means that during a transient electrical event, communications errors or interruptions may occur, but recovery is automatic.

Siemens also does not recommend using copper Ethernet ports to interface with devices in the field across distances that could produce high levels of ground potential rise (i.e. greater than 2500 V), during line-to-ground fault conditions.

# 3 Communication Ports

The RUGGEDCOM RS900 can be equipped with various types of communication ports to enhance its abilities and performance.



**Figure 10: Port Assignment**  
1. Ports 1 to 6    2. Ports 7 and 8    3. Port 9

| Port    | Type   |
|---------|--|
| 1 to 6  | Copper Ethernet Ports (10/100Base-TX)                                |
| 7 and 8 | Copper (10/100Base-TX) or Fiber Optic (10/100Base-FX) Ethernet Ports |
| 9       | Fast Ethernet Port (10/100Base-TX or 10/100Base-FX)                  |

**CONTENTS**

- [Section 3.1, “Copper Ethernet Ports”](#)
- [Section 3.2, “Fiber Optic Ethernet Ports”](#)

Section 3.1

## Copper Ethernet Ports

The RUGGEDCOM RS900 supports multiple 10/100Base-TX Ethernet ports that allow connection to standard Category 5 (CAT-5) unshielded twisted-pair (UTP) cables with RJ-45 male connectors. The RJ-45 receptacles are directly connected to the chassis ground on the device and can accept CAT-5 shielded twisted-pair (STP) cables.

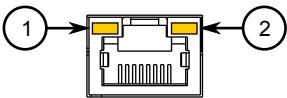


**WARNING!**

*Electric shock hazard – risk of serious personal injury and/or equipment interference. If shielded cables are used, make sure the shielded cables do not form a ground loop via the shield wire and the RJ-45 receptacles at either end. Ground loops can cause excessive noise and interference, but more importantly, create a potential shock hazard that can result in serious injury.*

» LEDs

Each port features a **Speed** and **Link/Activity** LED that indicates the state of the port.



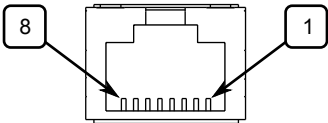
**Figure 11: RJ45 Port LEDs**

1. Speed LED    2. Link/Activity LED

| LED           | State             | Description                       |
|---------------|-------------------|-----------------------------------|
| Speed         | Yellow            | The port is operating at 100 Mbps |
|               | Off               | The port is operating at 10 Mbps  |
| Link/Activity | Yellow (Solid)    | Link established                  |
|               | Yellow (Blinking) | Link activity                     |
|               | Off               | No link detected                  |

» Pin-Out

The following is the pin-out for the RJ-45 male connectors:



**Figure 12: RJ-45 Ethernet Port Pin Configuration**

| Pin | Name                      | Description    |
|-----|---------------------------|----------------|
| 1   | RX+                       | Receive Data+  |
| 2   | RX-                       | Receive Data-  |
| 3   | TX+                       | Transmit Data+ |
| 4   | Reserved (Do Not Connect) |                |
| 5   | Reserved (Do Not Connect) |                |
| 6   | TX-                       | Transmit Data- |
| 7   | Reserved (Do Not Connect) |                |
| 8   | Reserved (Do Not Connect) |                |

» Specifications

For specifications on the available copper Ethernet ports, refer to [Section 4.3, "Copper Ethernet Port Specifications"](#).

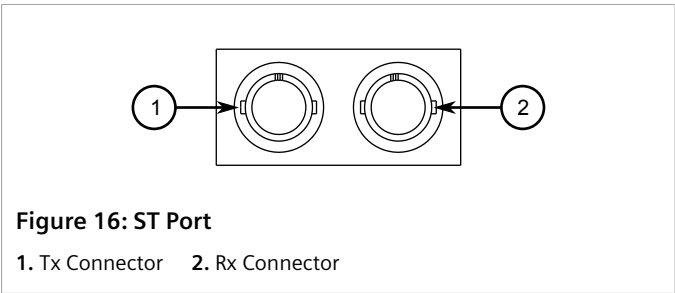
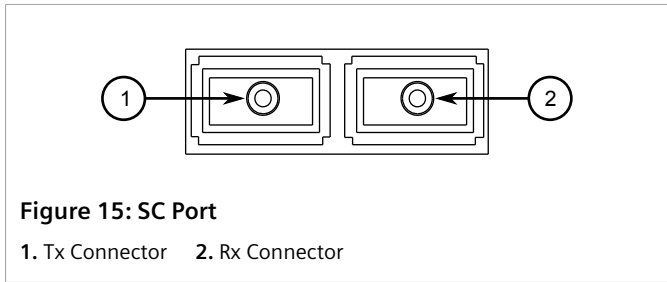
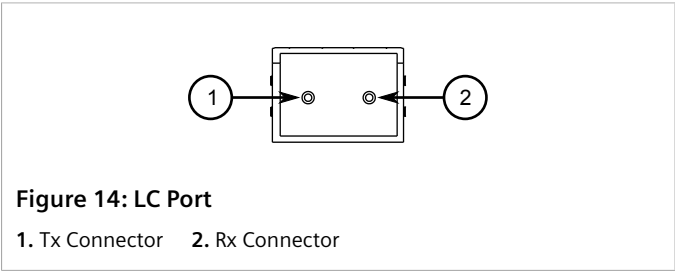
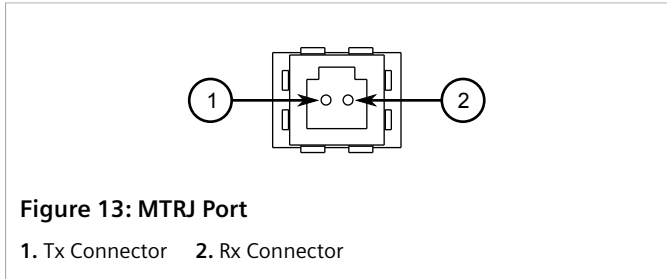


Section 3.2

# Fiber Optic Ethernet Ports

Fiber optic Ethernet ports are available with either MTRJ (Mechanical Transfer Registered Jack), LC (Lucent Connector), SC (Standard or Subscriber Connector) or ST (Straight Tip) connectors. Make sure the Transmit (Tx) and Receive (Rx) connections of each port are properly connected and matched to establish a proper link.

## >> Port Types



## >> LEDs

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

| State             | Description      |
|-------------------|------------------|
| Yellow (Solid)    | Link established |
| Yellow (Blinking) | Link activity    |
| Off               | No link detected |

## >> Specifications

For specifications on the available fiber optic Ethernet ports, refer to [Section 4.4, “Fiber Optic Ethernet Port Specifications”](#).



# 4 Technical Specifications

This section provides important technical specifications related to the device.

## CONTENTS

- [Section 4.1, "Power Supply Specifications"](#)
- [Section 4.2, "Failsafe Relay Specifications"](#)
- [Section 4.3, "Copper Ethernet Port Specifications"](#)
- [Section 4.4, "Fiber Optic Ethernet Port Specifications"](#)
- [Section 4.5, "Operating Environment"](#)
- [Section 4.6, "Mechanical Specifications"](#)

### Section 4.1

## Power Supply Specifications

### » Hazardous Environments

| Power Supply Type | Input Range |         | Internal Fuse Rating <sup>a</sup> | Isolation | Maximum Power Consumption <sup>b</sup> |
|-------------------|-------------|---------|-----------------------------------|-----------|--|
|                   | Minimum     | Maximum |                                   |           |  |
| HI                | 125 VDC     | 250 VDC | 3.15 A(T)                         | 4 kVAC    | 10 W                                   |
|                   | 100 VAC     | 240 VAC |                                   | 4 kVAC    |  |
| 24                | 12 VDC      | 24 VDC  |                                   | 1.5 kVDC  |  |
| 48                | 37 VDC      | 72 VDC  |                                   | 1.5 kVDC  |  |

<sup>a</sup> (T) denotes time-delay fuse.

<sup>b</sup> Power consumption varies based on configuration.

### » Non-Hazardous Environments

| Power Supply Type | Input Range |         | Internal Fuse Rating <sup>c</sup> | Isolation | Maximum Power Consumption <sup>d</sup> |
|-------------------|-------------|---------|-----------------------------------|-----------|--|
|                   | Minimum     | Maximum |                                   |           |  |
| HI                | 88 VDC      | 300 VDC | 3.15 A(T)                         | 4 kVAC    | 10 W                                   |
|                   | 85 VAC      | 264 VAC |                                   | 5.5 kVDC  |  |
| 24                | 10 VDC      | 36 VDC  |                                   | 1.5 kVDC  |  |
| 48                | 37 VDC      | 72 VDC  |                                   | 1.5 kVDC  |  |

<sup>c</sup> (T) denotes time-delay fuse.

<sup>d</sup> Power consumption varies based on configuration.

Section 4.2

## Failsafe Relay Specifications

### » Hazardous Environments

| Maximum Switching Voltage | Rated Switching Current | Isolation                          |
|---------------------------|-------------------------|------------------------------------|
| 30 VDC                    | 1 A                     | 1500 V <sub>rms</sub> for 1 minute |
| 80 VDC                    | 0.3 A                   |                                    |
| 30 VAC                    |                         |                                    |

### » Non-Hazardous Environments

| Maximum Switching Voltage | Rated Switching Current | Isolation                          |
|---------------------------|-------------------------|------------------------------------|
| 30 VDC                    | 2 A, 60 W               | 1500 V <sub>rms</sub> for 1 minute |
| 125 VDC                   | 0.24 A, 30 W            |                                    |
| 125 VAC                   | 0.5 A, 62.5 W           |                                    |
| 220 VDC                   | 0.24 A, 60 W            |                                    |
| 250 VAC                   | 0.25 A, 62.5 W          |                                    |

Section 4.3

## Copper Ethernet Port Specifications

The following details the specifications for copper Ethernet ports that can be ordered with the RUGGEDCOM RS900.

| Speed <sup>e</sup> | Connector | Duplex <sup>e</sup> | Cable Type <sup>f</sup> | Wiring Standard <sup>g</sup> | Maximum Distance <sup>h</sup> | Isolation <sup>i</sup> |
|--------------------|-----------|---------------------|-------------------------|------------------------------|-------------------------------|------------------------|
| 10/100Base-TX      | RJ-45     | FDX/HDX             | > CAT 5                 | TIA/EIA T568A/B              | 100 m (328 ft)                | 2.5 kV                 |

<sup>e</sup> Auto-negotiating.

<sup>f</sup> Shielded or unshielded.

<sup>g</sup> Auto-crossover and auto-polarity.

<sup>h</sup> Typical distance. Dependent on the number of connectors and splices.

<sup>i</sup> RMS 1 minute.

Section 4.4

## Fiber Optic Ethernet Port Specifications

The following details the specifications for fiber Ethernet ports that can be ordered with the RUGGEDCOM RS900.

**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.

| Mode | Connector Type | Tx $\lambda$ (nm) <sup>j</sup> | Cable Type ( $\mu$ m) | Tx (dBm) |         | Rx Sensitivity (dBm) | Rx Saturation (dBm) | Distance (km) <sup>j</sup> | Power Budget (dB) |
|------|----------------|--------------------------------|-----------------------|----------|---------|----------------------|---------------------|----------------------------|-------------------|
|      |                |                                |                       | Minimum  | Maximum |                      |                     |                            |                   |
| MM   | MTRJ           | 1300                           | 50/125                | -22.5    | -14     | -33.5                | -14                 | 2                          | 11                |
|      |                |                                | 62.5/125              | -19      | -14     | -33.5                | -14                 | 2                          | 14.5              |
| MM   | SC             | 1300                           | 50/125                | -22.5    | -14     | -33.9                | -14                 | 2                          | 11.4              |
|      |                |                                | 62.5/125              | -19      | -14     | -33.9                | -14                 | 2                          | 14.9              |
| MM   | ST             | 1300                           | 50/125                | -22.5    | -14     | -33.9                | -14                 | 2                          | 11.4              |
|      |                |                                | 62.5/125              | -19      | -14     | -33.9                | -14                 | 2                          | 14.9              |
| MM   | LC             | 1310                           | 62.5/125              | -19      | -14     | -32                  | -14                 | 2                          | 13                |
| SM   | ST             | 1310                           | 9/125                 | -15      | -7      | -34                  | -3                  | 20                         | 19                |
| SM   | LC             | 1300                           | 9/125                 | -15      | -8      | -38                  | -3                  | 20                         | 23                |
| SM   | LC             | 1310                           | 9/125                 | -5       | 0       | -35                  | -3                  | 50                         | 30                |
| SM   | LC             | 1310                           | 9/125                 | 0        | 5       | -37                  | 0                   | 90                         | 37                |
| SM   | SC             | 1300                           | 9/125                 | -15      | -8      | -31                  | -7                  | 20                         | 16                |
| SM   | SC             | 1310                           | 9/125                 | -5       | 0       | -34                  | -3                  | 50                         | 29                |
| SM   | SC             | 1310                           | 9/125                 | 5        | 0       | -37                  | 0                   | 90                         | 42                |

<sup>j</sup> Typical.

## Section 4.5

# Operating Environment

| Parameter                     | Range                           | Comments  |
|-------------------------------|---------------------------------|---|
| Ambient Operating Temperature | -40 to 85 °C<br>(-40 to 185 °F) | Measured from a 30 cm (12 in) radius surrounding the center of the enclosure. |
| Ambient Relative Humidity     | 5% to 95%                       | Non-condensing  |
| Ambient Storage Temperature   | -40 to 85 °C<br>(-40 to 185 °F) |   |

Section 4.6

## Mechanical Specifications

| Parameter          | Value  |
|--------------------|--|
| Dimensions         | Refer to <a href="#">Chapter 5, Dimension Drawings</a> |
| Weight             | 1.2 kg (2.7 lbs)                                       |
| Ingress Protection | IP40 (1 mm or 0.04 in objects)                         |
| Enclosure          | 20 AWG Galvanized Steel                                |



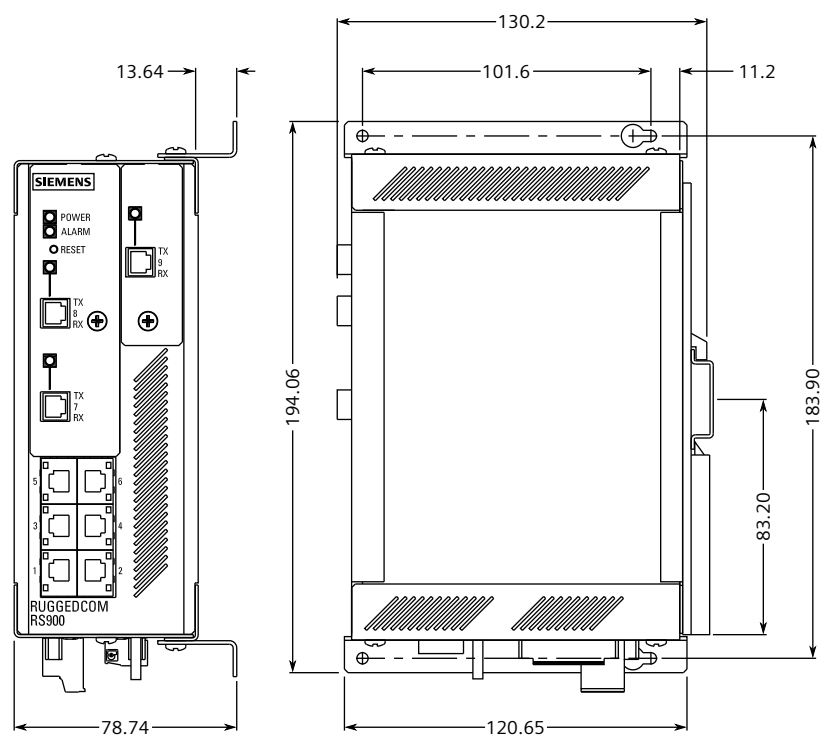


Figure 18: Panel and DIN Rail Mount Dimensions



# 6 Certification

The RUGGEDCOM RS900 device has been thoroughly tested to guarantee its conformance with recognized standards and has received approval from recognized regulatory agencies.

## CONTENTS

- [Section 6.1, "Approvals"](#)
- [Section 6.2, "EMC and Environmental Type Tests"](#)

### Section 6.1

## Approvals

This section details the standards to which the RUGGEDCOM RS900 complies.

## CONTENTS

- [Section 6.1.1, "CSA"](#)
- [Section 6.1.2, "CSA/Sira"](#)
- [Section 6.1.3, "European Union \(EU\)"](#)
- [Section 6.1.4, "FCC"](#)
- [Section 6.1.5, "FDA/CDRH"](#)
- [Section 6.1.6, "Industry Canada"](#)
- [Section 6.1.7, "Other Approvals"](#)

### Section 6.1.1

## CSA

This device meets the requirements of the following Canadian Standards Association (CSA) standards under certificate 16.70065161:

- **CAN/CSA-C22.2 No. 60950-1**  
Information Technology Equipment – Safety – Part 1: General Requirements (Bi-National Standard, with UL 60950-1)
- **UL 60950-1**  
Information Technology Equipment – Safety Part 1: General Requirements
- **CAN/CSA-C22.2 No. 213-M1987**  
Non-Incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations
- **CAN/CSA-C22.2 No. 60079-0:11**  
Explosive Atmospheres – Part 0: Equipment – General Requirements

- **CAN/CSA-C22.2 No. 60079-15:12**  
Electrical Apparatus for Explosive Gas Atmospheres – Part 15: Construction, Test and Marking of Type of Protection *N* Electrical Apparatus
- **UL 60079-0, Edition 6.0 (2013)**  
Explosive Atmospheres – Part 0: Equipment – General Requirements
- **UL 60079-15, Edition 4.0 (2013)**  
Explosive Atmospheres – Part 15: Equipment Protection by Type of Protection *N*
- **ANSI/ISA-12.12.01-2013**  
Non-Incendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Division 1 and 2 Hazardous (Classified) Locations

The device is marked with a CSA symbol that indicates compliance with both Canadian and U.S. requirements.



It is specifically approved for use in hazardous locations defined as:

- Class I, Division 2, Groups A, B, C, D T4
- Ex nA nC IIC T4 Gc
- Class I, Zone 2, AEx/Ex nA nC IIC T4 Gc

#### Section 6.1.2

### CSA/Sira

When marked with the following ATEX marking, this device is approved for use in hazardous locations under certificates Sira 15ATEX4262X and IECEx CSA 15.0029X.



#### NOTE

*For the maximum ambient temperature, refer to the hazardous location label affixed to the device.*



The device also meets the requirements of the following CSA/Sira standards:

- **94/9/EC (ATEX)**  
ATEX – Directive of the European Parliament and the Council of 23 March 1994 on the Approximation of the Laws of the Member States Concerning Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres
- **IEC 60079-0, Edition 6.0 (2011)/EN 60079-0:2012**  
Explosive Atmospheres – Part 0: Equipment – General Requirements
- **IEC 60079-15, Edition 4.0 (2010)/EN 60079-15:2010**  
Explosive Atmospheres – Part 15: Equipment Protection by Type of Protection *N*

Section 6.1.3

## 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 60950-1**  
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 50581**  
Technical Documentation for the Assessment of Electrical and Electronic Products with Respect to the Restriction of Hazardous Substances
- **EN 55022**  
Information Technology Equipment – Radio Disturbance Characteristics – Limits and Methods of Measurement

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



A copy of the CE Declaration of Conformity is available from Siemens Canada Ltd. For contact information, refer to [“Contacting Siemens”](#).

Section 6.1.4

## 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 the user will be required to correct the interference on his own expense.

Section 6.1.5

## 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

## Section 6.1.6

## Industry Canada

This device is declared by Siemens Canada Ltd to meet the requirements of the following Industry Canada standard:

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

## Section 6.1.7

## 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 61000-6-2**  
Electromagnetic Compatibility (EMC) – Part 6-2: Generic Standards – Immunity for Industrial Environments
- **IEC 61850-3**  
Communication Networks and Systems in Substations – Part 3: General Requirements
- **NEMA TS-2**  
Traffic Controller Assemblies with NTCIP Requirements

## Section 6.2

## EMC and Environmental Type Tests

The RUGGEDCOM RS900 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                                       | x               |
| IEC 61000-4-4 | Burst (Fast Transient) | Signal Ports       | ± 4 kV @ 2.5 kHz                             | x               |
|               |                        | DC Power Ports     | ± 4 kV                                       | 4               |
|               |                        | AC Power Ports     | ± 4 kV                                       | 4               |
|               |                        | Earth Ground Ports | ± 4 kV                                       | 4               |
| IEC 61000-4-5 | Surge                  | Signal Ports       | ± 4 kV Line-to-Ground<br>± 2 kV Line-to-Line | 4               |
|               |                        | DC Power Ports     | ± 2 kV Line-to-Ground<br>± 1 kV Line-to-Line | 3               |

| Test           | Description                 |                             | Test Levels  | Severity Levels |
|----------------|-----------------------------|-----------------------------|--|-----------------|
| IEC 61000-4-6  | Induced (Conducted) RFI     | AC Power Ports              | $\pm 4$ kV Line-to-Ground<br>$\pm 2$ kV Line-to-Line         | 4               |
|                |                             | 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             | 40 A/m Continuous<br>1000 A/m for 1 s                        |                 |
| IEC 61000-4-29 | Voltage Dips and Interrupts | DC Power Ports              | 30% for 0.1 s<br>60% for 0.1 s<br>100% for 0.05 s            |                 |
|                | IEC 61000-4-11              | Voltage Dips and Interrupts | 100% for 5 Periods<br>100% for 50 Periods                    |                 |
| IEC 61000-4-12 | Damped Oscillatory          | Signal Ports                | 2.5 kV Common Mode @ 1 MHz<br>1 kV Differential Mode @ 1 MHz | 3               |
|                |                             | DC Power Ports              | 2.5 kV Common Mode @ 1 MHz<br>1 kV Differential Mode @ 1 MHz | 3               |
|                |                             | AC Power Ports              | 2.5 kV Common Mode @ 1 MHz<br>1 kV Differential Mode @ 1 MHz | 3               |
| IEC 61000-4-16 | Mains Frequency Voltage     | Signal Ports                | 30 V Continuous<br>300 V for 1 s                             | 4               |
|                |                             | DC Power Ports              | 30 V Continuous<br>300 V for 1 s                             | 4               |
| IEC 61000-4-17 | Ripple on DC Power Supply   | DC Power Ports              | 10%  | 3               |
| IEC 60255-5    | Dielectric Strength         | Signal Ports                | 2 kV (Failsafe Relay Output)                                 |                 |
|                |                             | DC Power Ports              | 1.5 kV   |                 |
|                |                             | 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

The RUGGEDCOM RS900 meets Class 2 requirements for an all-fiber configuration and Class 1 requirements for copper ports. Class 1 allows for temporary communication loss, while Class 2 requires error-free and interrupted communications.

| Description         |                    | Test Levels                                 |
|---------------------|--------------------|---|
| ESD                 | Enclosure Contact  | ± 8 kV                                      |
|                     | Enclosure Air      | ± 15 kV                                     |
| Radiated RFI        | Enclosure Ports    | 35 V/m                                      |
| Fast Transient      | Signal Ports       | ± 4 kV @ 2.5 kHz                            |
|                     | DC Power Ports     | ± 4 kV                                      |
|                     | AC Power Ports     | ± 4 kV                                      |
|                     | Earth Ground Ports | ± 4 kV                                      |
| Oscillatory         | Signal Ports       | 2.5 kV Common Mode @ 1 MHz                  |
|                     | DC Power Ports     | 2.5 kV Common and Differential Mode @ 1 MHz |
|                     | AC Power Ports     | 2.5 kV Common and Differential Mode @ 1 MHz |
| HV Impulse          | Signal Ports       | 5 kV (Failsafe Relay)                       |
|                     | DC Power Ports     | 5 kV  |
|                     | AC Power Ports     | 5 kV  |
| Dielectric Strength | Signal Ports       | 2 kV (Failsafe Relay)                       |
|                     | DC Power Ports     | 1.5 kV                                      |
|                     | AC Power Ports     | 2 kV  |

## » Environmental Type Tests

| Test           | Description                  |         | Test Levels                                    | Severity Levels |
|----------------|------------------------------|---------|--|-----------------|
| IEC 60068-2-1  | Cold Temperature             | Test Ad | -40 °C (-40 °F), 16 Hours                      |                 |
| IEC 60068-2-2  | Dry Heat                     | Test Bd | 85 °C (185 °F), 16 Hours                       |                 |
| IEC 60068-2-30 | Humidity (Damp Heat, Cyclic) | Test Db | 95% (Non-Condensing), 55 °C (131 °F), 6 Cycles |                 |
| IEC 60255-21-1 | Vibration                    |         | 2 g @ 10-150 Hz                                | Class 2         |
| IEC 60255-21-2 | Shock                        |         | 30 g @ 11 ms                                   | Class 2         |