

SIEMENS

Edition

02/2025

Equipment Manual

SIMATIC NET

Rugged Ethernet switches

RUGGEDCOM RS900GP

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

Legal information

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 RS900GP. 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.

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 RS900GP 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 RS900GP is available on the Siemens Industry Online Support website at <https://support.industry.siemens.com/cs/ww/en/ps/24992>.

For specific documents, search the following:

- **Product notes**
<https://support.industry.siemens.com/cs/ww/en/ps/24992/pm>
- **Manuals**
<https://support.industry.siemens.com/cs/ww/en/ps/24992/man>
- **FAQs**
<https://support.industry.siemens.com/cs/ww/en/ps/24992/faq>
- **Application examples**
<https://support.industry.siemens.com/cs/ww/en/ps/24992/ae>
- **Catalogs/brochures**
<https://support.industry.siemens.com/cs/ww/en/ps/24992/cat>
- **Certificates**
<https://support.industry.siemens.com/cs/ww/en/ps/24992/cert>
- **Downloads**
<https://support.industry.siemens.com/cs/ww/en/ps/24992/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



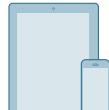
Visit <http://www.siemens.com/automation/support-request> to submit a Support Request (SR) or check on the status of an existing SR.

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-configuration>

Introduction

The RUGGEDCOM RS900GP is an industrially hardened, fully managed Ethernet switch providing dual fiber optical Gigabit Ethernet ports and eight Fast Ethernet copper ports, each capable of supplying high power 802.3at compliant Power over Ethernet (PoE).

Designed to operate reliably in harsh industrial environments, the RUGGEDCOM RS900GP provides a high level of immunity to electromagnetic interference and heavy electrical surges typical of environments found in electric utility substations, factory floors or in curb side traffic control cabinets. An operating temperature range of -40 to 85 °C (-40 to 185 °F) coupled with optional conformal coating and a powder coated aluminum enclosure allows the RUGGEDCOM RS900GP to be placed in almost any location.

The embedded RUGGEDCOM RS900GP (Rugged Operating System) provides advanced networking features such as Enhanced Rapid Spanning Tree (eRSTP), Port Rate Limiting and a full array of intelligent functionality for high network availability and manageability.

1.1 Feature highlights

Ethernet ports

- Up to 2 x 100/1000Base-X fiber optic ports or 2 x 10/100/1000Base-TX copper ports
- 8 x 10/100Base-TX RJ45 802.3af/802.3at compliant PoE ports
- Data and power over a single Ethernet cable
- Auto-sensing ports provide power only to PoE end devices
- Compatible with RUGGEDCOM WIN CPE and Pico base stations
- Industry standard fiber optic connectors: LC, SC, ST and SFP pluggable optics
- Bi-directional simplex fiber support
- Long haul optics allow Gigabit distances up to 70 km (43.5 mi)

Rated for reliability in harsh environments

- Immunity to EMI and heavy electrical surges
- -40 to 85°C (-40 to 185 °F) operating temperature (no fans)
- [Optional] Conformal coated printed circuit boards

Universal power supply options

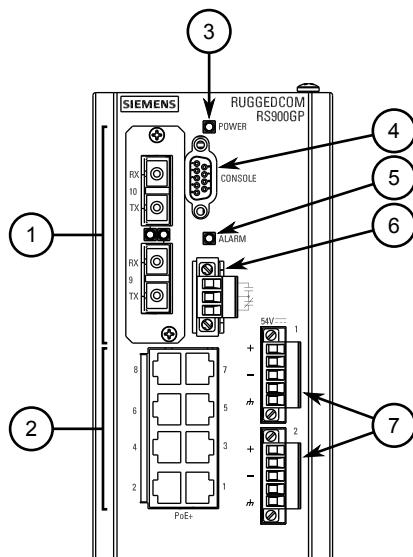
Power supply

- Single 54 VDC, 255 W (or greater) external power supply can deliver 30 W x 8 port per IEEE 802.3at
- Second power supply input for a redundant 54 V power supply
- Complies with IEEE 802.3af, 15 W x 8 output when using 48 VDC power supplies

1.2

Description

The RUGGEDCOM RS900GP features various ports, controls and indicator LEDs on the front panel for connecting, configuring and troubleshooting the device.



- ① Fiber optic or SFP (Small Form-Factor Pluggable) Ethernet ports
- ② Copper PoE Ethernet ports
- ③ POWER LED
- ④ RS-232 console port (DB9)
- ⑤ ALARM LED
- ⑥ Failsafe alarm relay
- ⑦ Redundant power supply terminal blocks

Figure 1.1 RUGGEDCOM RS900GP

Communication ports

Receive and transmit network traffic, as well as provide remote Web access to the RUGGEDCOM RS900GP operating system. For more information, refer to:

- "Connecting to the device" (Page 15)
- "Communication ports" (Page 17)

RS-232 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 "Connecting to the device" (Page 15).						
POWER LED	Illuminates when power is being supplied to the device.						
	<table border="1"><thead><tr><th>Color</th><th>Description</th></tr></thead><tbody><tr><td>Green</td><td>Device is receiving power</td></tr><tr><td>Off</td><td>No power</td></tr></tbody></table>	Color	Description	Green	Device is receiving power	Off	No power
Color	Description						
Green	Device is receiving power						
Off	No power						
ALARM LED	Illuminates when an alarm condition exists.						
Failsafe alarm relay	Latches to default state when a power disruption or other alarm condition occurs. For more information, refer to: <ul style="list-style-type: none">"Connecting the failsafe alarm relay" (Page 12)"Failsafe alarm relay specifications" (Page 25)						
Power supply terminal block	A pluggable terminal block. For more information, refer to: <ul style="list-style-type: none">"Connecting power" (Page 13)"Power supply specifications" (Page 25)						

1.3 Required tools and materials

The following tools and materials are required to install the RUGGEDCOM RS900GP:

Tools/materials	Purpose
DC power cord (16 AWG)	For connecting power to the device.
CAT-5 Ethernet cables	For connecting the device to the network.
#2 Phillips Flathead screwdriver	For mounting the device to a DIN rail.
Phillips screwdriver	For mounting the device to a panel.
4 x M3.5 (#6-32) 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

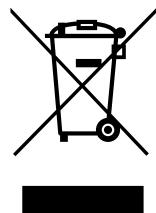
This product is low in pollutants, can be recycled, and meets the requirements of the WEEE directive 2012/19/EU for the disposal of electrical and electronic equipment.

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.

**1.5 Supported fiber optic cables**

The following fiber optic cable types are supported under the stated conditions.

Cable Type	Wavelength (nm)	Modal Bandwidth (MHz-km)	Distance (m)		
			100Base-FX	1000Base-SX	10GBase-SR
OM1 (62.5/125)	850	200	—	275	33
	1300	500	2000	—	—
OM2 (50/125)	850	500	—	550	82
	1300	500	2000	—	—
OM3 (50/125) ^a	850	1500	—	550	300
	1300	500	2000	—	—
OM4 (50/125) ^a	850	3500	—	550	400
	1300	500	2000	—	—

^a Laser optimized.

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 1 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 RuggedCom Inc. 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.

Note

This product contains a Lithium battery that is not replaceable by the operator or by service personnel.

2.1 General procedure

The general procedure for installing the device is as follows:

 **NOTICE**

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 33).
2. Mount the device.
3. Connect the failsafe alarm relay.
4. Connect power to the device and ground the device to safety Earth.
5. Connect the device to the network.
6. Configure the device.

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

Cabling recommendations

Siemens does not recommend the use of copper cabling of any length for critical, real-time substation automation applications. 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 1 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.

2.4

Mounting the device

The RUGGEDCOM RS900GP 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.

⚠ NOTICE

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.

2.4.1 Mounting the device on a DIN rail

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 28).

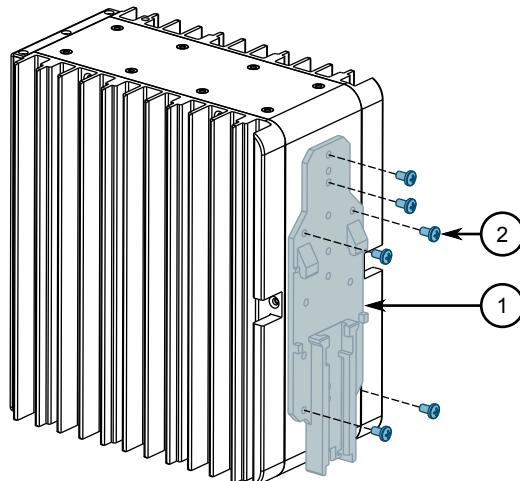
2.4.1 Mounting the device on a DIN rail

For DIN rail installations, the RUGGEDCOM RS900GP can be ordered with a DIN rail adapter that can be affixed to the back of the chassis. Use the adapter to mount the device to a standard 35 mm (1.4 in) IEC/EN 60715 or TS35 DIN rail.

Mounting the device

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

1. Secure the DIN rail bracket to the back of the device chassis.



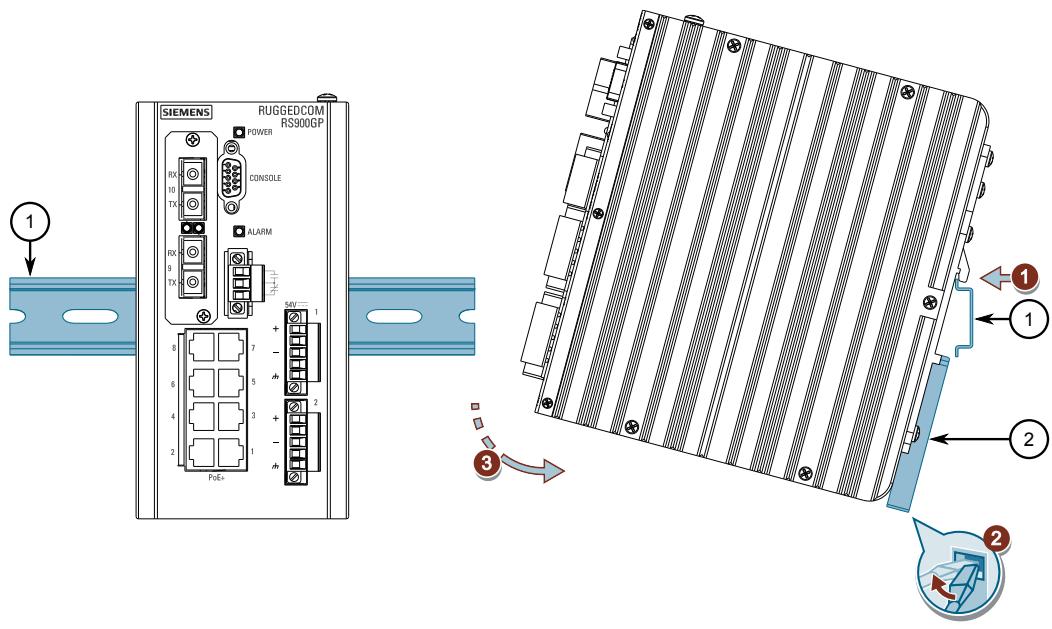
① DIN rail bracket
② Screw

Figure 2.1 DIN rail bracket assembly

2. 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 2.2 Mounting the device to a DIN rail

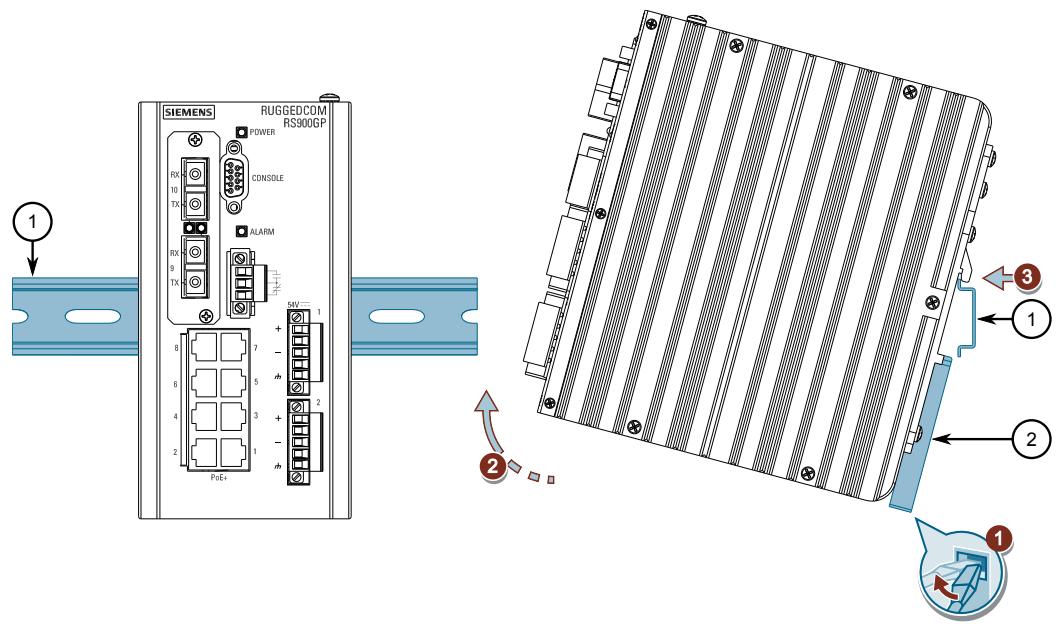
3. Insert a flathead screw driver into the slot of the sliding release and move it down.
4. Push the device against the bottom of the DIN rail.
5. Let go of the sliding release to latch the device.

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.

2.4.2 Mounting the device to a panel



① DIN rail

② DIN rail adapter

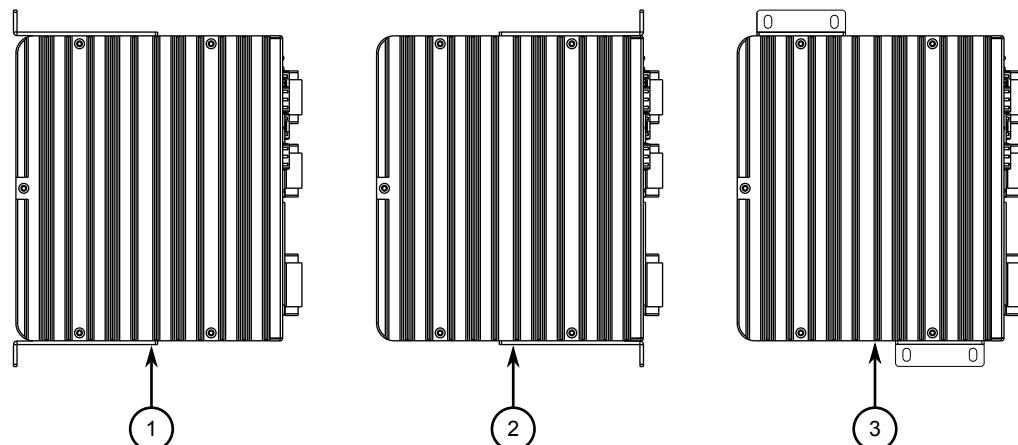
Figure 2.3

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.

2.4.2 Mounting the device to a panel

For panel installations, the RUGGEDCOM RS900GP can be equipped with panel adapters that allow the device to be attached to a panel in multiple orientations.



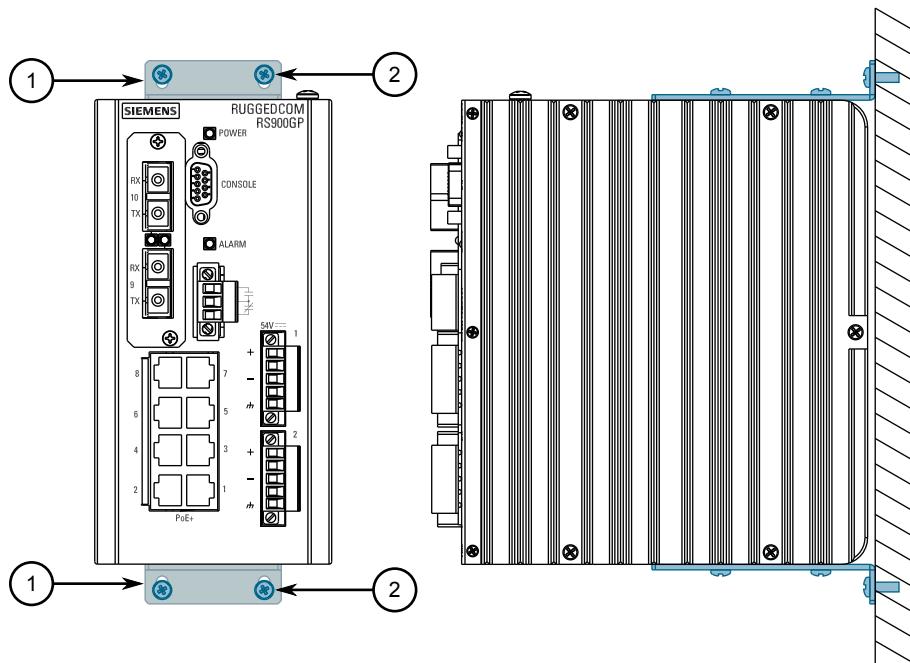
① Rear mount orientation

② Front mount orientation

③ Side mount orientation

Figure 2.4 Panel mount options

1. Secure the adapters to the device in the desired orientation.
2. Place the device against (side or rear mount orientation) or insert it into (front mount orientation) the panel and align the adapters with the mounting holes.



① Panel adapter

② Screw

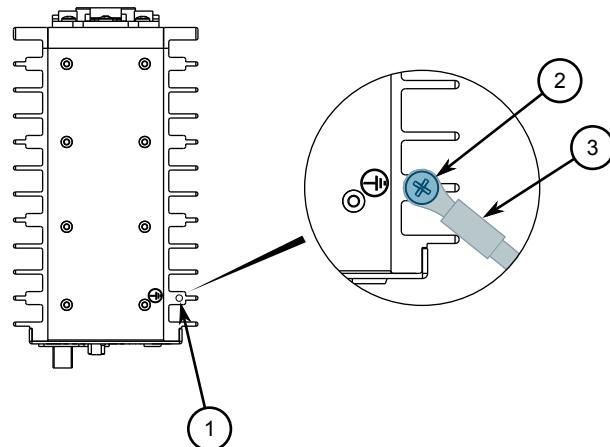
Figure 2.5 Panel mounting (Rear mount orientation shown)

3. Install #6 screws (not supplied) to secure the adapters to the panel.

2.5

Grounding the device

The RUGGEDCOM RS900GP chassis features a threaded hole for connecting the device to ground (Earth). It is recommended to terminate the ground connection with an M3 ring tongue, and then torque to 1.7 N·m (15 lbf-in).



- ① Chassis ground connection
- ② M3 screw
- ③ M3 ring tongue

Figure 2.6 Chassis ground connection

2.6

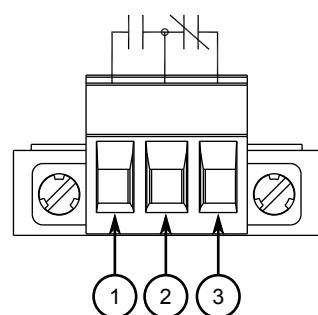
Connecting the failsafe alarm relay

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 RS900GP. One common application for this relay is to signal an alarm if a power failure occurs. For more information, refer to the "RUGGEDCOM RS900GP User Guide" for the RUGGEDCOM RS900GP.

The following shows the proper relay connections.



- ① Normally open
- ② Common

③ Normally closed

Figure 2.7 Failsafe alarm relay wiring

2.7 connecting power

The RUGGEDCOM RS900GP features an integrated low DC power supply that accepts input from redundant power sources. Requirements for the power source(s) is dependent on the IEEE 802.3 standard required by the application:

Standard	Watts/ port output	Power supply type	Input range		Isolation	Minimum power required
			Minimum	Maximum		
IEEE 802.3at	30	DC	51 VDC	57 VDC	1.5 VAC/2.2 KVDC	255 W
IEEE 802.3af	15	DC	45 VDC	57 VDC	1.5 VAC/2.2 KVDC	135 W

Note

For IEC 61850 compliance, use an IEC 61850 compliant PoE power supply with power cabling no longer than 3 m (118 in).

Otherwise, Siemens recommends using the RUGGEDCOM RPS1300 switch-mode AC power supply. For more information about this power supply, refer to <https://support.industry.siemens.com/cs/ww/en/view/109478699>.

Note

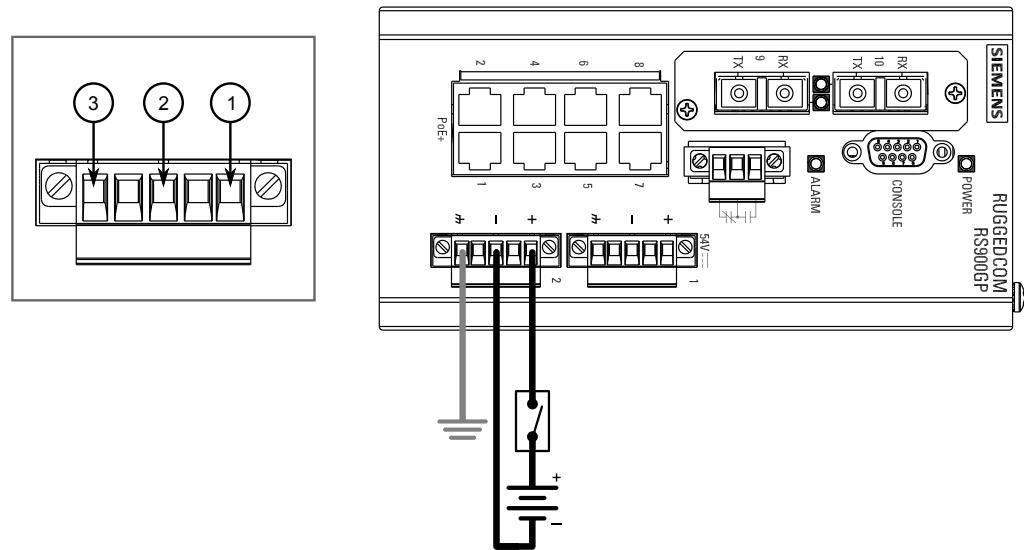
Power sources can be connected to either power supply terminal block on the device.

NOTICE

- Use minimum #16 gage copper wiring when connecting terminal blocks.
- Equipment must be installed according to applicable local wiring codes and standards.

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

1. Secure a European-style terminal block (or Euroblock) to one of the available terminals.
2. Connect the positive wire from the power source to the positive terminal on the terminal block.



- ① Positive terminal
- ② Negative terminal
- ③ Chassis ground terminal

Figure 2.8 Terminal Block Wiring – Single DC Power Supply Inputs

3. Connect the negative wire from the power source to the negative terminal on the terminal block.

⚠ NOTICE

Electrical hazard – risk of damage to the device

For Power-over-Ethernet (PoE) support, make sure the PoE power source is isolated from earth/chassis ground. Do not connect either positive or negative terminals to chassis ground.

4. Connect the ground terminal on the power source to the chassis ground terminal on the device.
5. If a redundant power source is required, repeat step 1 (Page 13) to step 4 (Page 14) using the second terminal.

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 RS900GP console and Web interfaces on the device. For more detailed instructions, refer to the "RUGGEDCOM RS900GP User Guide" for the RUGGEDCOM RS900GP.

Serial console port

Connect a PC or terminal directly to the serial console port to access the boot-time control and RUGGEDCOM ROS console interface.

 **NOTICE**

The serial console port is intended to be used only as a temporary connection during initial configuration or troubleshooting.

The serial console port implements RS-232 DCE (Data Communication Equipment) on a DB9 connector. 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

The following is the pin-out for the port:

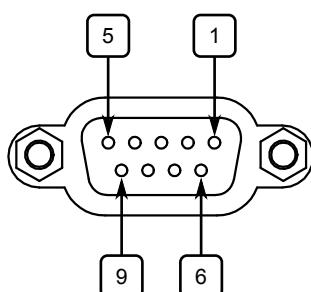


Figure 3.1

Serial DB9 console port

Pin	Name	Description
1 ^a	Reserved (Do not connect)	
2	TX	Transmit Data
3	RX	Receive Data
4 ^a	Reserved (Do not connect)	
5	GND	Signal Ground
6 ^a	Reserved (Do not connect)	
7 ^b	Reserved (Do not connect)	
8 ^b	Reserved (Do not connect)	

Pin	Name	Description
9		Reserved (Do not connect)

^a Connected internally.

^b Connected internally.

Communication ports

Connect any of the available Ethernet ports on the device to a management switch and access the RUGGEDCOM RS900GP console and Web interfaces via the device's IP address. The factory default IP address for the RUGGEDCOM RS900GP is <https://192.168.0.1>.

For more information about available ports, refer to "Communication ports" (Page 17).

3.2 Configuring the device

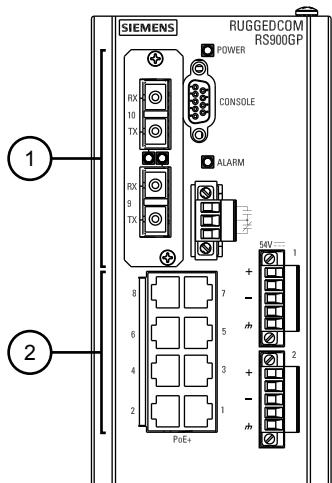
Once the device is installed and connected to the network, it must be configured. All configuration management is done via the RUGGEDCOM RS900GP interface. For more information about configuring the device, refer to the "RUGGEDCOM RS900GP User Guide" associated with the installed software release.

4

Communication ports

The RUGGEDCOM RS900GP features eight standard 10/100Base-TX copper RJ45 Ethernet ports capable of Power-over-Ethernet (PoE). It can also be equipped with two additional Gigabit Ethernet capable ports, for which many fiber transceiver and copper options are available.

Each communication port type has a specific place in the RUGGEDCOM RS900GP chassis.



- ① Copper Ethernet, SFP or Fiber Optic Ethernet Ports (Ports 9 and 10)
- ② Standard PoE Ports (Ports 1 to 8)

Figure 4.1 Port assignment

4.1

Copper Ethernet ports

The RUGGEDCOM RS900GP supports an optional set of 10/100/1000Base-TX copper RJ45 or micro-D Ethernet ports that allow connection to standard Category 5 (CAT-5) unshielded twisted-pair (UTP) cables with RJ45 male connectors. Each port is directly connected to chassis ground on the device and can accept CAT-5 Unshielded Twisted-Pair (UTP) or Shielded Twisted-Pair (STP) cables.

Communication ports

4.1 Copper Ethernet ports

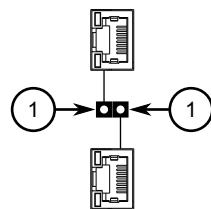
⚠ WARNING

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 RJ45 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

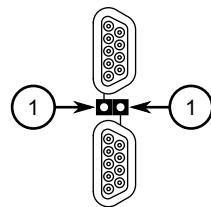
Each port features an LED that indicates its link/activity state.



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

① Link/Activity LED

Figure 4.2 LED for RJ45 Ports (9 to 10)



① Link/Activity LED

Figure 4.3 LED for Micro-D Ports (9 to 10)

Pin-out

The following are the pin-out descriptions for the RJ45 and micro-D connectors:

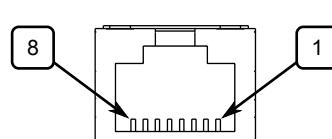


Figure 4.4 RJ45 port pin configuration

Pin	Name		Description
	10/100Base-TX	1000Base-TX	
1	RX+	BI_DB+	Receive Data+ or bi-directional

Pin	Name		Description
	10/100Base-TX	1000Base-TX	
2	RX-	BI_DB-	Receive Data- or bi-directional
3	TX+	BI_DA+	Transmit Data+ or bi-directional
4	Reserved (Do not connect)	BI_DD+	Bi-directional
5	Reserved (Do not connect)	BI_DD-	Bi-directional
6	TX-	BI_DA-	Transmit Data- or bi-directional
7	Reserved (Do not connect)	BI_DC+	Bi-Directional
8	Reserved (Do not connect)	BI_DC-	Bi-Directional

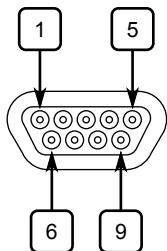


Figure 4.5

Micro-D port pin configuration

Pin	Name	
	10/100Base-TX	1000Base-TX
1	RX+	A+
2	Reserved (Do not connect)	C+
3	Reserved (Do not connect)	
4	Reserved (Do not connect)	D+
5	TX+	B+
6	RX-	A-
7	Reserved (Do not connect)	C-
8	Reserved (Do not connect)	D-
9	TX-	B-

Specifications

For further specifications, refer to "Copper Ethernet port specifications" (Page 26).

4.2 PoE ports

The RUGGEDCOM RS900GP supports eight 10/100Base-TX Power over Ethernet (POE) ports (ports 1 to 8). Each port complies with the IEEE 802.3at and IEEE 802.3af standards, and feature the ability to automatically enable/disable power when PoE-capable devices are connected or removed.

The total allowable power budget for all PoE ports is dependent on the IEEE 802.3 standard required by the application:

Standard	Power budget
IEEE 802.3at	255 W
IEEE 802.3af	135 W

If the power input is less than what is required, to prevent exceeding the power budget, port priorities can be set via the RUGGEDCOM RS900GP operating system to disable low priority ports when demand is too high. Ports can also be enabled/disabled and placed on a power schedule to conserve power. For more information, refer to the "RUGGEDCOM RS900GP User Guide" for the device.

For information about connecting a power source, refer to "connecting power" (Page 13).

LEDs

Each PoE port features an LED that indicates the port's power and link/activity state.

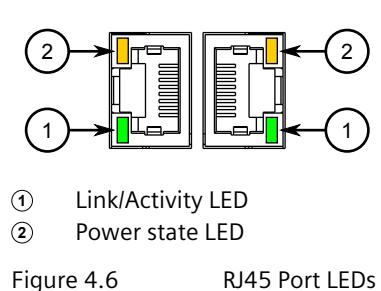


Figure 4.6 RJ45 Port LEDs

LED	State	Description
Link/Activity	Green (Solid)	Link established
	Green (Blinking)	Link activity
	Off	No link detected
Power state	Yellow (Solid)	Power provided
	Yellow (Blinking)	Searching for load
	Off	No power or port disabled

Pin-out

The pin-out for the PoE ports is as follows:

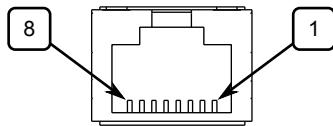


Figure 4.7

RJ45 Ethernet port pin configuration

Pin	Name	Description
1	RX+	Receive Data+
2	RX-	Receive Data-
3	TX+	Transmit Data+
4	V+	PoE
5	V+	PoE
6	TX-	Transmit Data-
7	V-	PoE
8	V-	PoE

Specifications

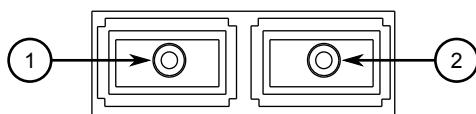
For specifications on the available PoE ports, refer to "Copper Ethernet port specifications" (Page 26).

For PoE power output specifications, refer to "PoE output specifications" (Page 25).

4.3 Fiber optic Ethernet ports

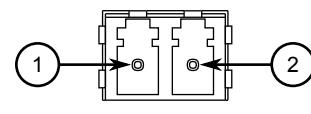
Optional 100Base-FX, 1000Base-SX and 1000Base-LX fiber optic Ethernet ports are available for ports 9 and 10 with either LC (Lucent Connector) and SC (Standard or Subscriber Connector) connectors. Make sure the Transmit (Tx) and Receive (Rx) connections of each port are properly connected and matched to establish a proper link.

Available ports



① Tx connector
② Rx connector

Figure 4.8 SC connector

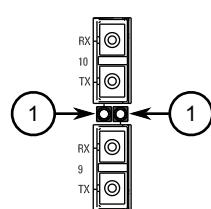


① Tx connector
② Rx connector

Figure 4.9 LC connector

LEDs

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



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

① Link/Activity LED

Figure 4.10 LED for fiber optic Ethernet ports

Specifications

For further specifications, refer to "Fiber optic Ethernet port specifications" (Page 26).

4.4 SFP transceivers

The device features multiple Small Form-factor Pluggable (SFP) transceiver sockets, each compatible with the wide array of SFP/SFP+ transceivers available from Siemens.

Note

When more than two 40 km or 80 km SFP+ transceivers are installed, the maximum temperature at which the device can operate will be reduced to 75 °C (165°F).

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 RS900GP, as well as instructions for ordering and installation/removal, refer to the "[RUGGEDCOM SFP Transceivers Reference Manual](https://support.industry.siemens.com/cs/us/en/ps/29769/man)" [<https://support.industry.siemens.com/cs/us/en/ps/29769/man>].

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.

Installation/removal

For instructions on how to install and remove SFP transceivers, refer to the "[RUGGEDCOM SFP Transceivers Reference Manual](https://support.industry.siemens.com/cs/us/en/ps/29769/man)" [<https://support.industry.siemens.com/cs/us/en/ps/29769/man>].

**NOTICE****Replacement/exchange during operation**

ROS supports replacing and exchanging SFP transceivers while the device is in operation.

After you have replaced an SFP transceiver with another SFP transceiver of the same or a different type, the new SFP transceiver is automatically configured in such a way that it works in the same operating state as the previous SFP transceiver.

When replacing a plug-in transceiver, the parts of the configuration that are not suitable for the new plug-in transceiver (e.g. auto-negotiation) are reset to their default settings.

5

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

Power supply type	Minimum input	Maximum input	Fuse rating	Isolation	Maximum power consumption	Maximum combined power output at PoE ports
54 VDC	45 VDC	57 VDC	6.3A (T) ^a	1.5 kVDC	15 W	273 W

^a (T) denotes time-delay fuse

5.3 PoE output specifications

The RUGGEDCOM RS900GP adheres to the following power output and IEEE 802.3 specifications depending on the input voltage supplied to the device.

Power in	Power out
51 to 57 VDC	50 to 57 VDC, 30 W per port maximum (IEEE 302.at)
45 to 57 VDC	44 to 57 VDC, 15 W per port maximum (IEEE 302.af)

5.4 Failsafe alarm relay specifications

Note

The following specifications are for Class-2 circuits only.

Maximum switching voltage	Rated switching current	Isolation
30 VDC	1 A	1500 V _{rms} for 1 minute

Maximum switching voltage	Rated switching current	Isolation
80 VDC	0.3 A	
30 VAC		

5.5 Copper Ethernet port specifications

The following details specifications for all standard and optional fixed copper Ethernet ports that can be ordered with the RUGGEDCOM RS900GP. For more information about the SFP ports, refer to "Copper Ethernet ports" (Page 17).

Note

- 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.
- All optical power numbers are listed as dBm averages.
- F51 transceivers are rated for -40 to 85 °C (-40 to 185 °F).

Connector	Duplex ^a	Cable type ^b	Wiring standard ^c	Maximum distance ^d	Isolation
RJ45 (PoE and Non-PoE)	FDX/HDX	> CAT-5	TIA/EIA T568A/B	100 m (328 ft)	1.5 kV
micro-D	FDX/HDX	> CAT-5	TIA/EIA T568A/B	100 m (328 ft)	1.5 kV

^a Auto-negotiating.

^b Shielded or unshielded.

^c Auto-crossover and auto-polarity.

^d Typical distance. Dependent on the number of connectors and splices.

5.6 Fiber optic Ethernet port specifications

The following details specifications for all optional fixed fiber optic Ethernet ports that can be ordered with the RUGGEDCOM RS900GP. For more information about the SFP ports, refer to "Fiber optic Ethernet ports" (Page 21).

Note

- 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.
- 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.

Fast Ethernet (100 Mbps) optical specifications

Mode	Connector type	Cable type (μm)	Tx λ (nm) ^a	Tx min. (dBm)	Tx max. (dBm)	Rx sensitivity (dBm)	Rx saturation (dBm)	Distance (km) ^a	Power budget (dB)
MM	SC	62.5/125	1300	-19	-14	-31	-14	2	12
		50/125		-22.5					8.5
SM	SC	9/125	1300	-15	-8	-31	-7	20	16
SM	SC	9/125	1300	-5	0	-34	-3	50	29
SM	SC	9/125	1300	0	5	-37	0	90	37

^a Typical.

Gigabit Ethernet (1 Gbps) optical specifications

Mode	Connector type	Cable type (μm)	Tx λ (nm) ^a	Tx min (dBm)	Tx max (dBm)	Rx sensitivity (dBm)	Rx saturation (dBm)	Distance (km) ^a	Power budget (dB)
MM	LC	50/125	850	-9	-2.5	-20	0	0.5	11
SM	SC	9/125	1310	-10	-3	-20	-3	10	10
SM	LC	9/125	1310	-9.5	-3	-21	-3	10	11.5
SM	SC	9/125	1310	-5	0	-20	-3	25	15
SM	LC	9/125	1310	-7	-3	-24	-3	25	17

^a Typical.

5.7 Operating environment

The RUGGEDCOM RS900GP 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 ^d	2000 m (6562 ft)

^a Measured from a 30 cm (12 in) radius surrounding the center of the RUGGEDCOM RS900GP 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

^d Over temperature range of -40 to 85 °C (-40 to 185 °F)

5.8 Mechanical specifications

Weight	2.3 kg (5 lbs)
--------	----------------

Ingress protection	IP40 (1 mm objects)
Enclosure	Aluminum

5.9 Dimension drawings

Note

All dimensions are in millimeters, unless otherwise stated.

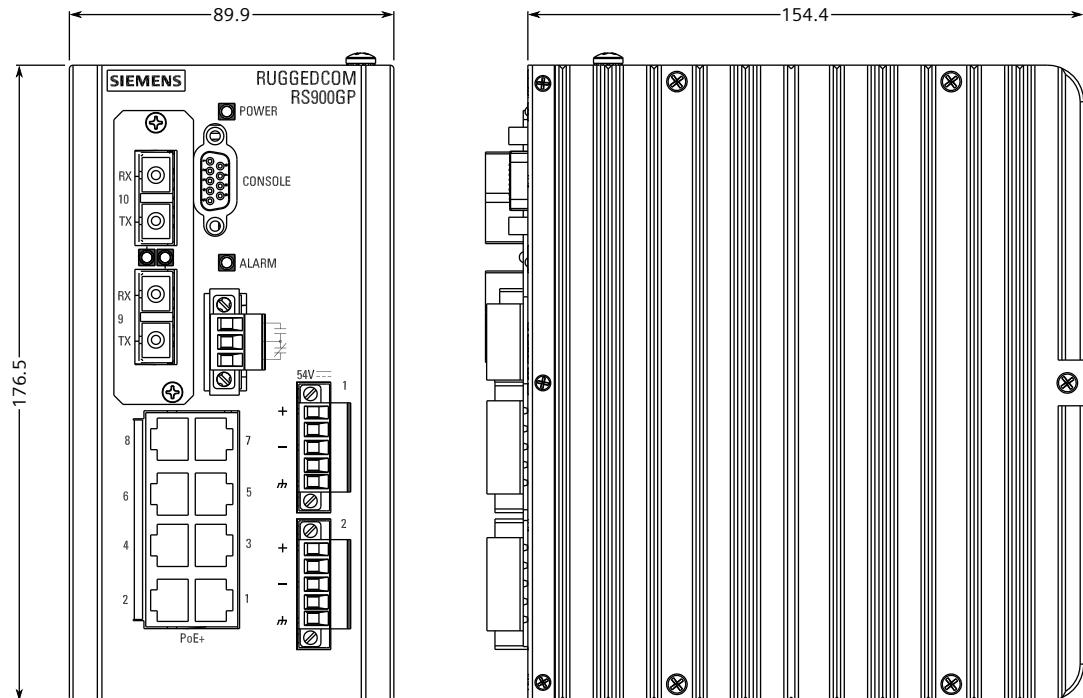


Figure 5.1

Overall dimensions

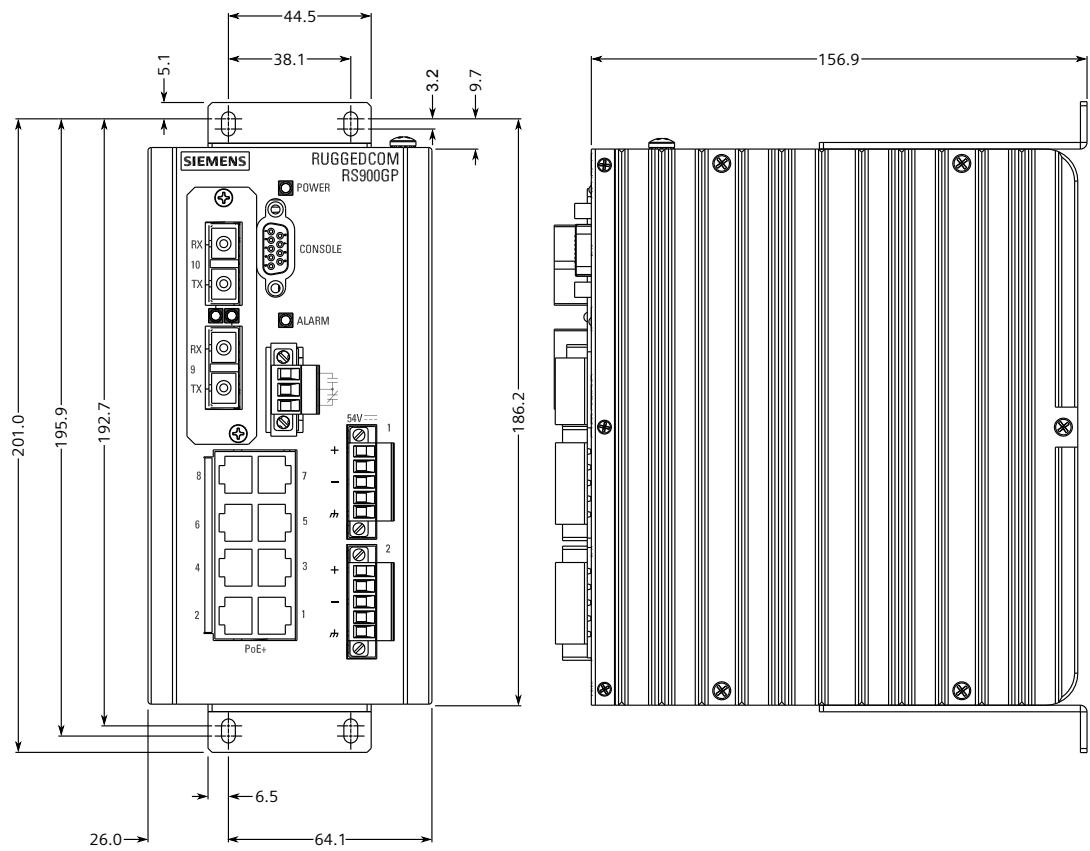


Figure 5.2 Panel mount dimensions (Rear mount shown)

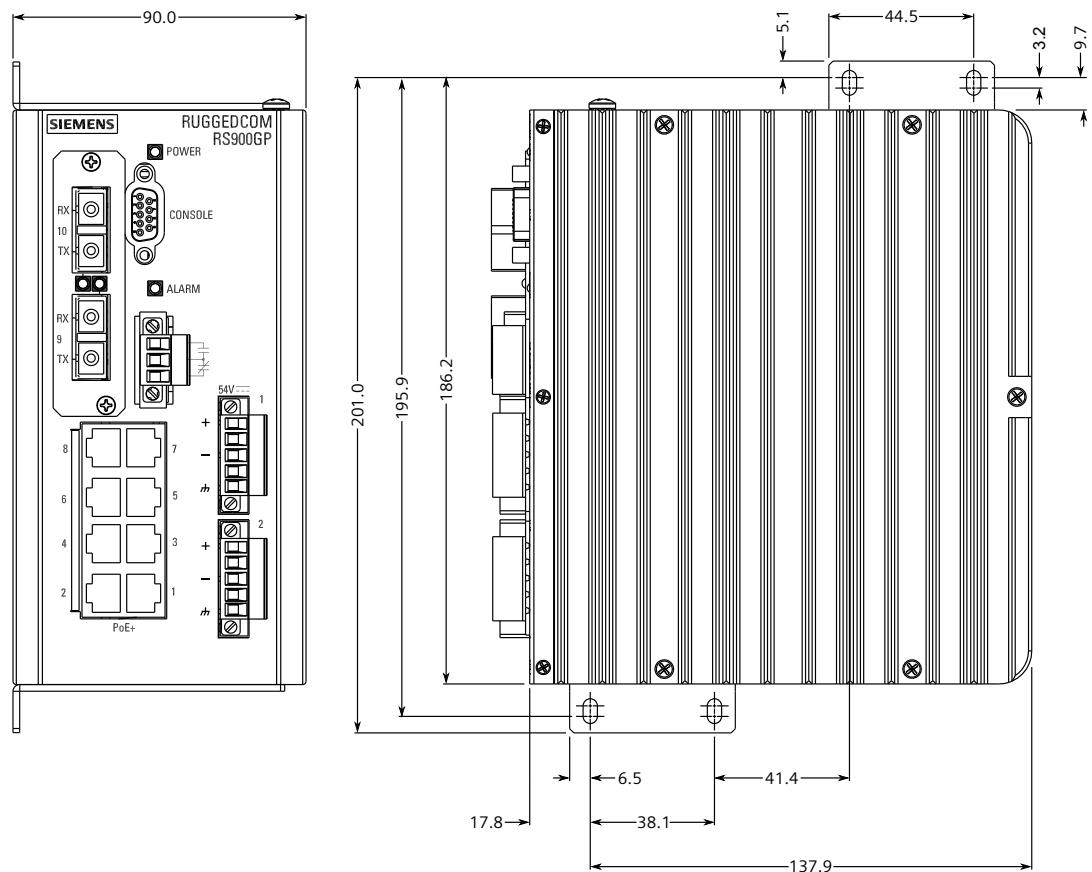


Figure 5.3

Panel mount dimensions (Side mount shown)

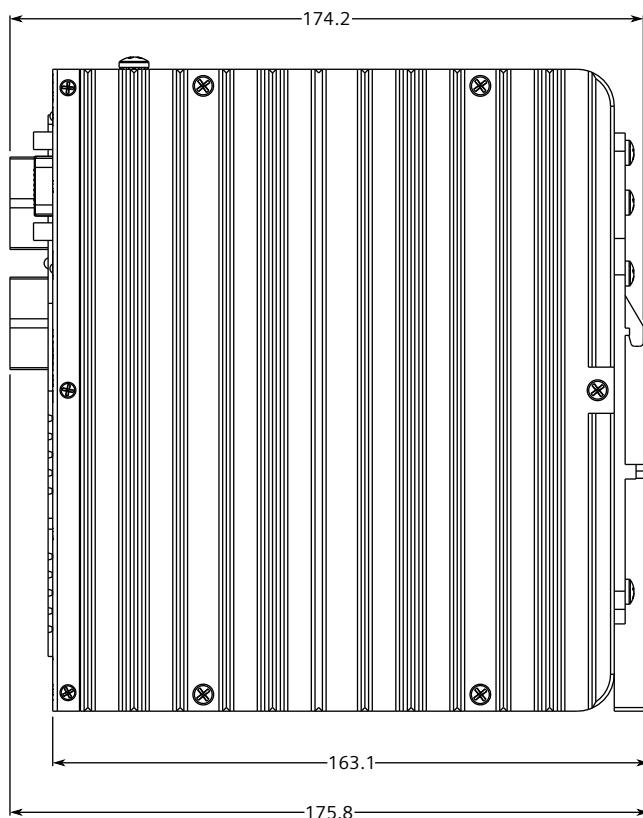


Figure 5.4 DIN rail mount dimensions

6

Certification

The RUGGEDCOM RS900GP 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 RS900GP 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 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)
- **UL 62368-1**
Information Technology Equipment – Safety – Part 1: General Requirements)

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 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

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



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 users will be required to correct the interference at their own expense.

 **NOTICE**

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

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

6.1.6 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)

6.1.7 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

6.1.8 ACMA

This device meets the requirements of the following Australian Communications and Media Authority (ACMA) standards under certificate ABN 98 004 347 880:

- Radiocommunications (Compliance Labeling – Devices) Notice 2014 made under section 182 of the Radiocommunications Act 1992
- Radiocommunications Labeling (Electromagnetic Compatibility) Notice 2017 made under section 182 of the Radiocommunications Act 1992
- Radiocommunications (Compliance Labeling – Electromagnetic Radiation) Notice 2014 made under section 182 of the Radiocommunications Act 1992
- Telecommunications (Labeling Notice for Customer Equipment and Customer Cabling) Instrument 2015 made under section 407 of the Telecommunications Act 1997

The device is marked with an RCM symbol to indicate compliance when sold in the Australian region.



A copy of the Declaration of Conformity is available via Siemens Industry Online Support at <https://support.industry.siemens.com/cs/ww/en/view/89855782>.

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 for Power Utility Automation – 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 50121-4**
Railway applications – Electromagnetic Compatibility – Emission and Immunity of the Signaling and Telecommunications Apparatus

6.2 EMC and environmental type tests

The RUGGEDCOM RS900GP 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		3
		DC power ports	± 1.5 kV	x
		Earth ground ports	± 2 kV	3
IEC 61000-4-5	Surge	Signal ports	± 500 V Line-to-Earth ± 500 V Line-to-Line	x
		DC power ports	± 500 V Line-to-Earth ± 500 V Line-to-Line	x
IEC 61000-4-6	Induced (Conducted) RFI	Signal ports	10 V	3
		DC power ports	10 V	3
		Earth ground ports	10 V	3
IEC 61000-4-8	Magnetic Field	Enclosure ports	40 A/m continuous 1000 A/m for 1 s	
IEC 61000-4-29	Voltage dips and interrupts	DC power ports	30% for 0.1 s 60% for 0.01 s 100% for 0.01 s	
IEC 61000-4-12	Damped oscillatory	Signal ports	2.5 kV common mode @ 1 MHz 1 kV differential mode @ 1 MHz	3
		DC power ports	2.5 kV common mode @ 1 MHz 1 kV differential mode @ 1 MHz	3
IEC 61000-4-16	Mains frequency voltage	Signal ports	30 V continuous	4
		DC power ports	30 V continuous, 300 V for 1s	4
IEC 61000-4-17	Ripple on DC power supply	DC power ports	± 15%	4
IEC 60225-27	Dielectric strength	Signal ports	2 kV (Failsafe relay output)	

Certification

6.2 EMC and environmental type tests

Test	Description		Test levels	Severity levels
		DC power ports	1.5 kV	
	HV impulse	Signal ports	5 kV (Failsafe relay output)	
		DC 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.

Description		Test Levels
ESD	Enclosure Contact	± 8 kV
	Enclosure Air	± 15 kV
Radiated RFI	Enclosure ports	35 V/m
Fast Transient	Signal ports	± 2 kV @ 2.5 kHz
	DC power ports	± 1.5 kV
	Earth ground ports	± 2 kV
Oscillatory	Signal ports	2.2 kV Common Mode @ 1 MHz
	DC power ports	2.2 kV Common and Differential Mode @ 1 MHz
HV Impulse	Signal ports	5 kV (Failsafe Relay)
	DC power ports	5 kV
Dielectric Strength	Signal ports	2 kV (Failsafe Relay)
	DC power ports	1.5 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 60255-21-1	Vibration		2g @ 10-150 Hz	Class 2
IEC 60255-21-2	Shock		30g @ 11 ms	Class 2

For more information

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

Industry Online Support (service and support)
<https://support.industry.siemens.com>

Industry Mall
<https://mall.industry.siemens.com>

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