

SIEMENS

RUGGEDCOM RS900GP

Installation Guide

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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.

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 RS900GP

Accessing Documentation

The latest Hardware Installation Guides and Software User Guides for most RUGGEDCOM products are available online at www.siemens.com/ruggedcom.

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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.

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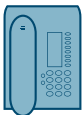
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- Access Siemens' extensive library of support documentation, including FAQs and manuals
- Submit SRs or check on the status of an existing SR
- Contact a local Siemens representative from Sales, Technical Support, Training, etc.
- Ask questions or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

1 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 a powder coated aluminum enclosure and optional conformal coating allows the RUGGEDCOM RS900GP to be placed in almost any location.

The embedded RUGGEDCOM Rugged Operating System (ROS) 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.

Section 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 RJ-45 802.3af/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)
- Conformal coated printed circuit boards (optional)

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

Cyber Security

- Multi-level user passwords
- SSH/SSL (128-bit encryption version)
- Enable/disable ports, MAC-based port security

- Port-based network access control (IEEE 802.1x)
- VLAN (IEEE 802.1Q) to segregate and secure network traffic
- RADIUS centralized password management
- SNMPv3 authentication and 56-bit encryption

Section 1.2

Description

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

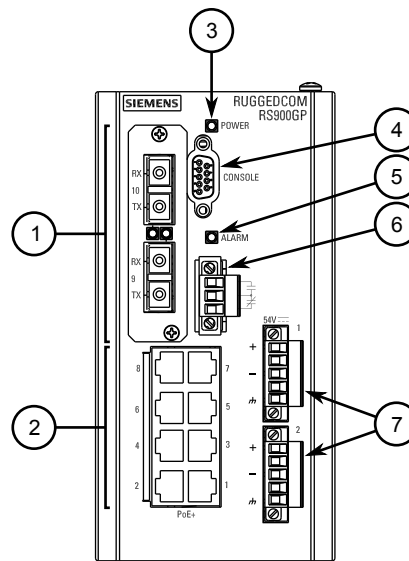


Figure 1: RUGGEDCOM RS900GP

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

- **Fiber Optic, SFP and Copper PoE Ethernet Ports** – Receive and transmit network traffic, as well as provide remote Web access to the RUGGEDCOM ROS operating system. For more information, refer to:
 - [Section 2.5, “Connecting to the Device”](#)
 - [Section 3.2, “Copper Ethernet Ports”](#)
 - [Section 3.3, “Fiber Optic Ethernet Ports”](#)
 - [Section 3.4, “SFP Optic Ethernet Ports”](#)
- **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 [Section 2.5, “Connecting to the Device”](#).
- **POWER LED** – Illuminates when power is being supplied to the device.

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:
 - [Section 2.4, “Connecting the Failsafe Alarm Relay”](#)
 - [Section 4.3, “Failsafe Alarm Relay Specifications”](#)
- **Power Supply Terminal Block** – A pluggable terminal block. For more information, refer to:
 - [Section 2.2.2, “Connecting Low DC Power”](#)
 - [Section 4.1, “Power Supply Specifications”](#)

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!

Burn hazard – risk of serious personal injury. Avoid contact with the surface of the unit. The metal surface may be hot due to the high allowable ambient temperature per specification.



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.



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 RuggedCom Inc. 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.



NOTE

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

- [Section 2.1, “Mounting the Device”](#)
- [Section 2.2, “Connecting Power”](#)
- [Section 2.3, “Grounding the Device”](#)
- [Section 2.4, “Connecting the Failsafe Alarm Relay”](#)
- [Section 2.5, “Connecting to the Device”](#)
- [Section 2.6, “Cabling Recommendations”](#)

Section 2.1

Mounting the Device

The RUGGEDCOM RS900GP is designed for maximum mounting and display flexibility. It can be equipped with connectors that allow it to be installed in a 35 mm (1.4 in) DIN rail or directly on a panel.



NOTE

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

The following sections describe the various methods of mounting the device:

- [Section 2.1.1, “Mounting the Device on a DIN Rail”](#)
- [Section 2.1.2, “Mounting the Device to a Panel”](#)

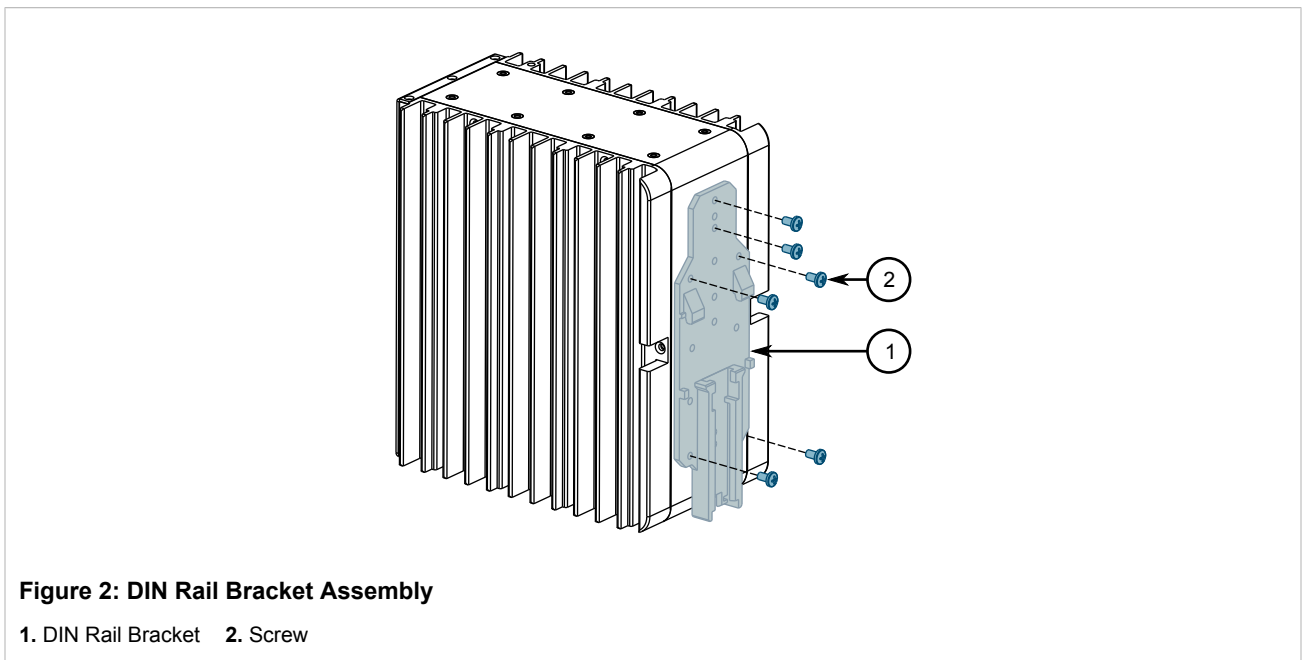
Section 2.1.1

Mounting the Device on a DIN Rail

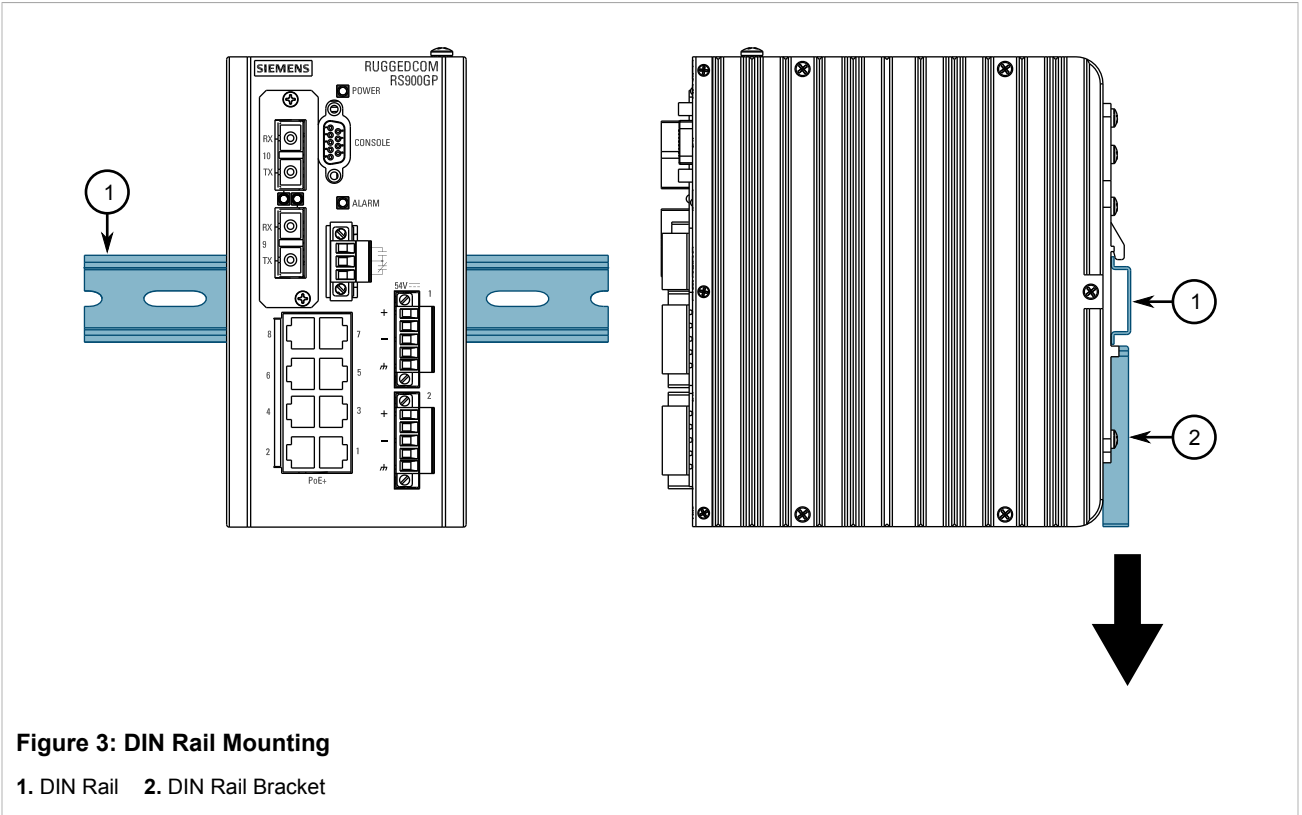
For DIN rail installations, the RUGGEDCOM RS900GP can be equipped with a DIN rail bracket that allows the device to be slid onto a standard 35 mm (1.4 in) DIN rail.

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

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



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



3. 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.

Section 2.1.2

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.

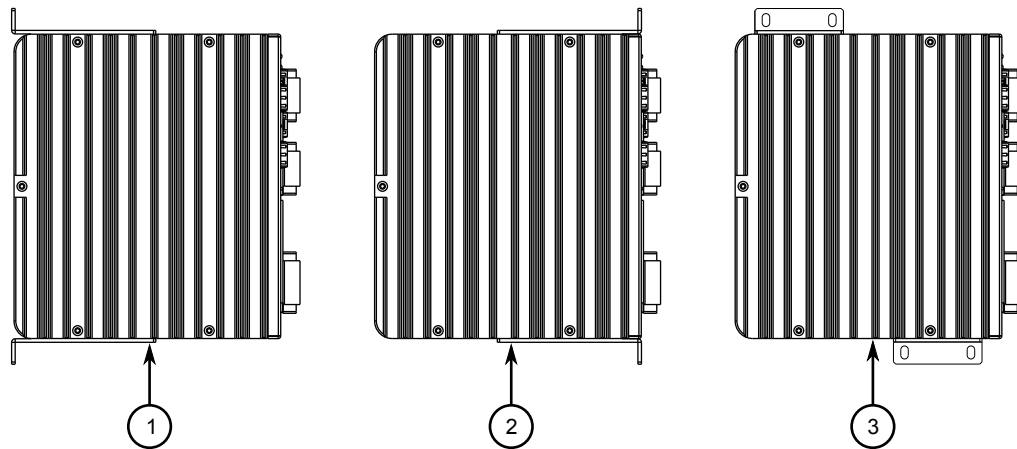


Figure 4: Panel Mount Options

1. Rear Mount Orientation 2. Front Mount Orientation 3. Side Mount Orientation

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.

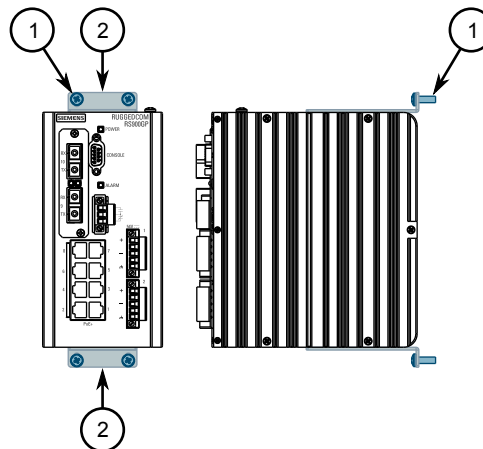


Figure 5: Panel Mounting (Rear Mount Orientation Shown)


1. Screw 2. Panel Adapter


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

Section 2.2

Connecting Power

The RUGGEDCOM RS900GP features a single, integrated low DC power supply, which accepts dual power supply inputs for redundancy.

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

 **IMPORTANT!**

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

The following sections describe how to connect power to the device:

- [Section 2.2.1, “PoE Power Requirements”](#)
- [Section 2.2.2, “Connecting Low DC Power”](#)

Section 2.2.1

PoE Power Requirements

The RUGGEDCOM RS900GP supports eight 10/100Base-TX Power-over-Ethernet (POE) Ports that require external power.

To support the **IEEE 802.3at** specification (30 W/port output), the external power supply must meet the following requirements:

Power Supply Type	Input Range		Isolation	Minimum Power Required
	Minimum	Maximum		
DC	51 VDC	57 VDC	1.5 VAC/2.2 kVDC	255 W


To support the **IEEE 802.3af** specification (15 W/port output), the external power supply must meet the following requirements:

Power Supply Type	Input Range		Isolation	Minimum Power Required
	Minimum	Maximum		
DC	45 VDC	57 VDC	1.5 VAC/2.2 kVDC	135 W

Section 2.2.2

Connecting Low DC Power

The RUGGEDCOM RS900GP features a single low DC power supply, which accepts input one or more DC power sources. The use of both power supply inputs is recommended to provide redundancy.

 **IMPORTANT!**
For Power-over-Ethernet (PoE) support, make sure the external power supply meets the requirements. For more information, refer to [Section 2.2.1, “PoE Power Requirements”](#).

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

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

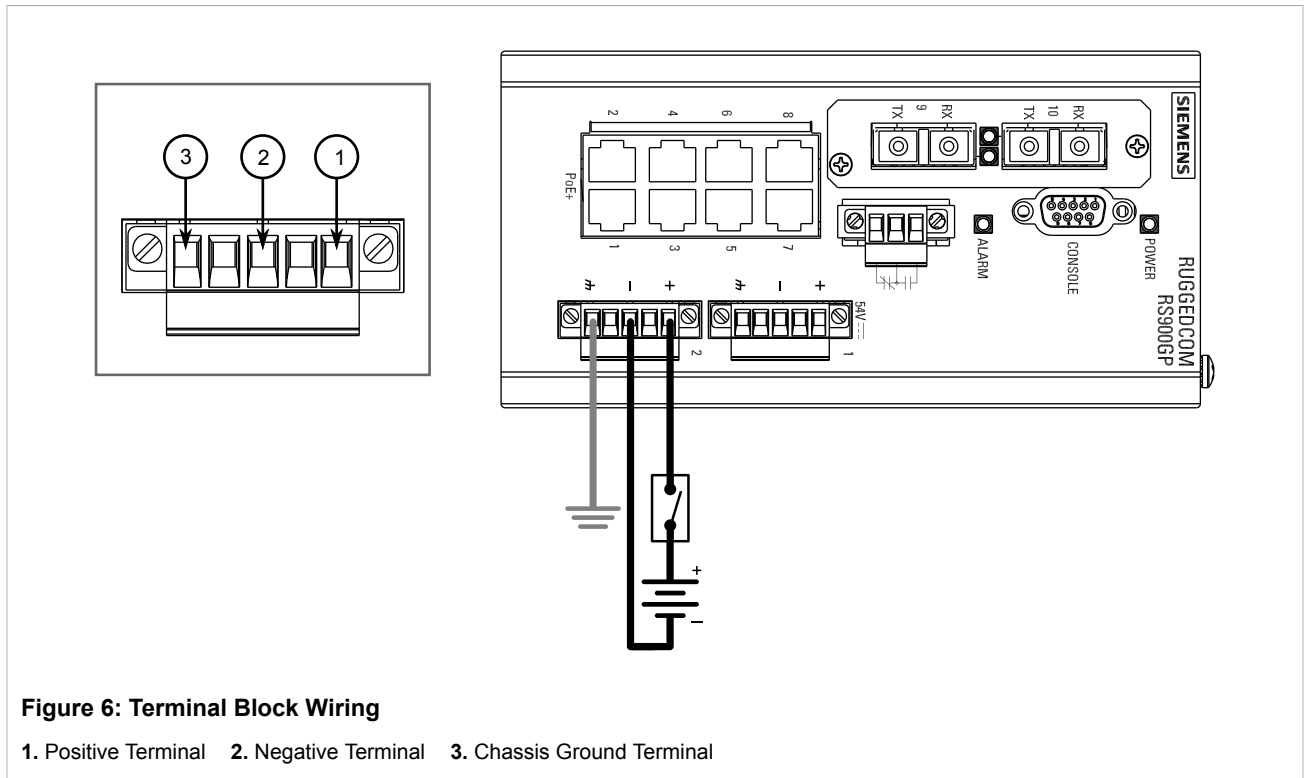


Figure 6: Terminal Block Wiring

1. Positive Terminal 2. Negative Terminal 3. Chassis Ground Terminal

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



CAUTION!

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.

3. Connect the ground terminal on the power source to the chassis ground terminal on the device.

Section 2.3

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 or spade lug, and then torque to 1.7 N·m (15 lbf-in).

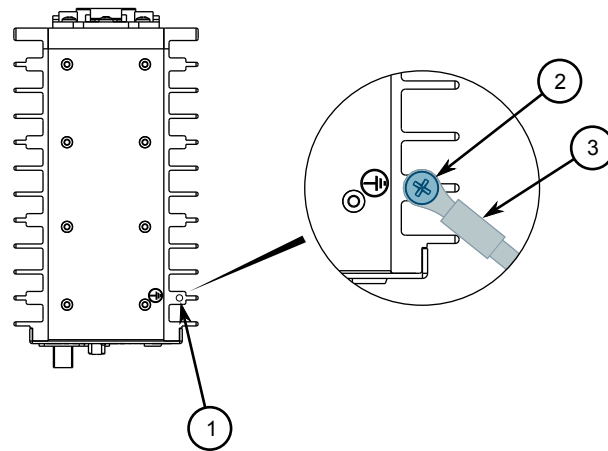


Figure 7: Chassis Ground Connection

1. Chassis Ground Connection 2. M3 Screw 3. M3 Ring Lug

Section 2.4

Connecting the Failsafe Alarm Relay

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



NOTE

Control of the failsafe relay output is configurable through ROS. One common application for this relay is to signal an alarm if a power failure occurs. For more information, refer to the RUGGEDCOM ROS User Guide for the RUGGEDCOM RS900GP.

The following shows the proper relay connections.

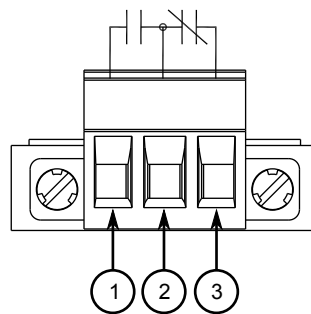


Figure 8: Failsafe Alarm Relay Wiring

1. Normally Open 2. Common 3. Normally Closed

Section 2.5

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 RS900GP.

Serial Console Port

Connect a PC or terminal directly to the 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 temporary connections during initial configuration or troubleshooting.

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

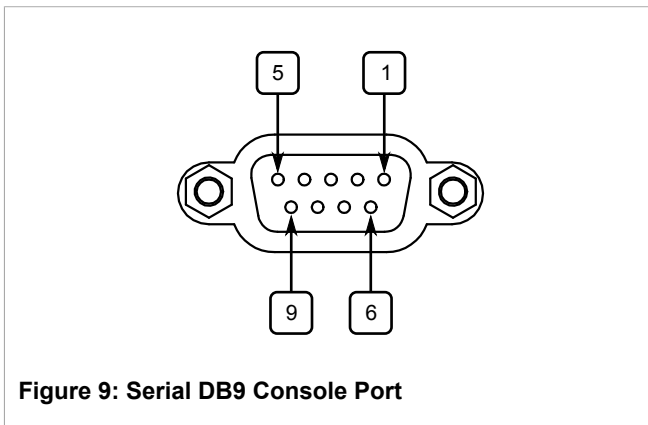


Figure 9: Serial DB9 Console Port

Pin	Name	Description
1	DCD	Data Carrier Detect
2	RX	Receive Data
3	TX	Transmit Data
4	DTR	Data Terminal Ready
5	GND	Signal Ground
6	DSR	Data Set Ready
7	RTS	Request to Send
8	CTS	Clear To Send
9	Reserved (Do Not Connect)	

Communication Ports

Connect any of the available Ethernet ports on the device to a management switch and access the ROS console and Web interfaces via the device's IP address. For more information about available ports, refer to [Chapter 3, Communication Ports](#).

Section 2.6

Cabling Recommendations

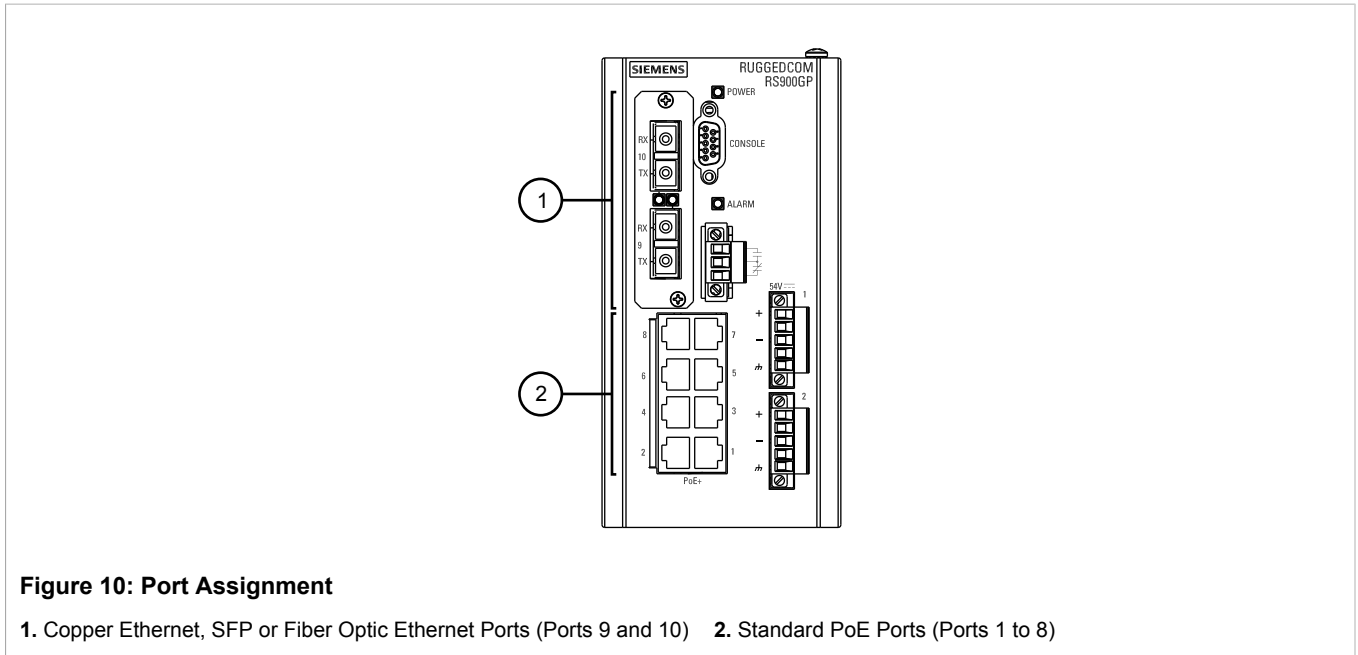
Siemens does not recommend the use of copper cabling of any length for critical, real-time substation automation applications. All copper Ethernet ports on RUGGEDCOM products include transient suppression circuitry to protect against damage from electrical transients and conform with IEC 61850-3 and 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.

3 Communication Ports

The RUGGEDCOM RS900GP features eight standard 10/100Base-TX copper RJ-45 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.



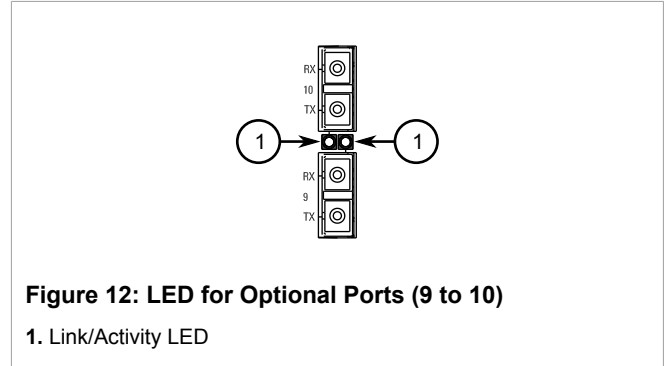
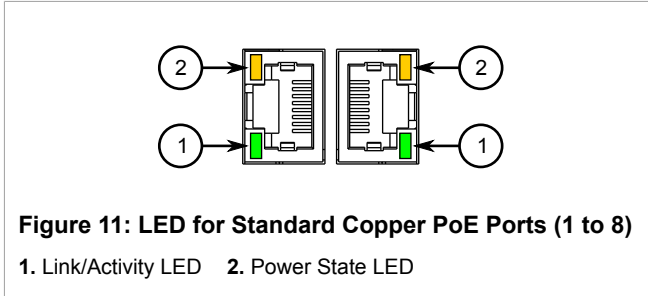
The following sections describe the available ports:

- [Section 3.1, “Port LEDs”](#)
- [Section 3.2, “Copper Ethernet Ports”](#)
- [Section 3.3, “Fiber Optic Ethernet Ports”](#)
- [Section 3.4, “SFP Optic Ethernet Ports”](#)

Section 3.1

Port LEDs

Each communication port features a dedicated LED to indicate the port's link/activity status and power state. The LED is either built into the port (ports 1 to 8) or adjacent to the port (ports 9 and 10).



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

Section 3.2

Copper Ethernet Ports

The RUGGEDCOM RS900GP features eight 10/100Base-TX Power-over-Ethernet (PoE) ports in ports 1 to 8. All PoE ports are powered by an external power supply and feature the ability to automatically enable/disable power when PoE-capable devices are connected or removed.

Optionally, an additional set of 10/100/1000Base-TX copper RJ-45 or micro-D Ethernet ports in ports 9 and 10 may be equipped.

Each copper port is directly connected to chassis ground and accepts a standard Category 5 (CAT-5) Unshielded Twisted-Pair (UTP) or Shielded Twisted-Pair (STP) cable.



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.

The following sections describe each type of copper port in more detail:

- [Section 3.2.1, “Copper PoE Ports”](#)
- [Section 3.2.2, “Copper RJ-45 and Micro-D Ports \(If Equipped\)”](#)

Section 3.2.1

Copper PoE Ports

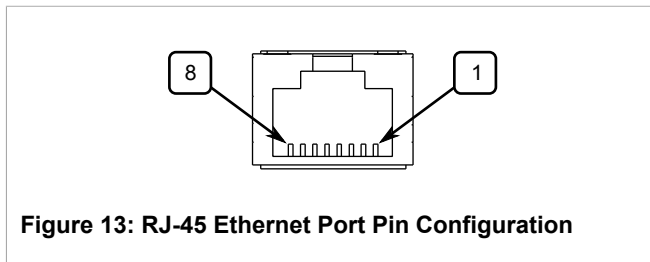
Each 10/100Base-TX copper Power-over-Ethernet (PoE) port is IEEE 802.3at compliant and features the ability to automatically enable/disable power when PoE-capable devices are connected or removed.

Power Budget

The total allowable power budget for all PoE ports is 240 W. If the external power supply is less than 240 W, to prevent exceeding the power budget, port priorities can be set via the RUGGEDCOM ROS 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 ROS User Guide* for the RUGGEDCOM RS900GP.

Pin-Out

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



Pin	Name		Description
	10/100Base-TX	1000Base-TX	
1	RX+	BI_DB+	Receive Data+ or Bi-Directional
2	RX-	BI_DB-	Receive Data- or Bi-Directional
3	TX+	BI_DA+	Transmit Data+ or Bi-Directional
4	PoE+		
5	PoE+		
6	TX-	BI_DA-	Transmit Data- or Bi-Directional
7	PoE-		
8	PoE-		

Specifications

For further specifications, refer to [Section 4.4, “Copper Ethernet Port Specifications”](#).

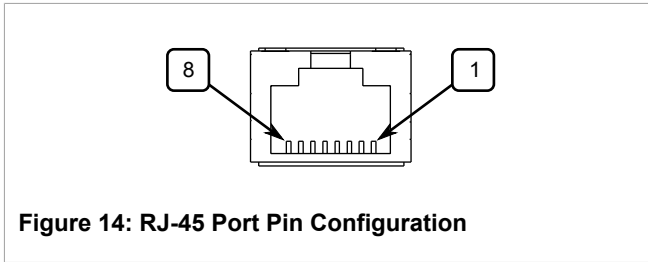
Section 3.2.2

Copper RJ-45 and Micro-D Ports (If Equipped)

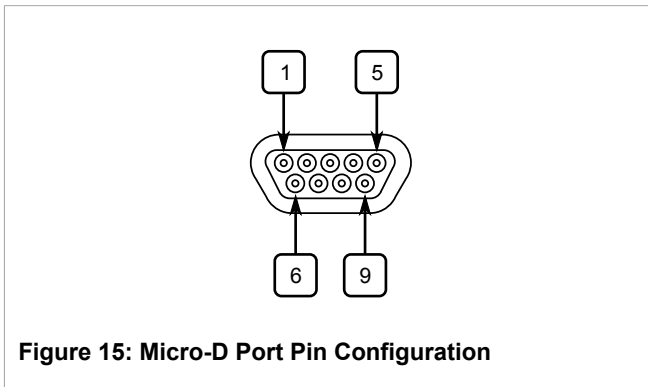
Optional 10/100/1000Base-TX copper RJ-45 or micro-D Ethernet ports are available for ports 9 and 10.

Pin-Out

The following are the pin-out descriptions for the RJ-45 and micro-D connectors:



Pin	Name		Description
	10/100Base-TX	1000Base-TX	
1	RX+	BI_DB+	Receive Data+ or Bi-Directional
2	RX-	BI_DB-	Receive Data- or Bi-Directional
3	TX+	BI_DA+	Transmit Data+ or Bi-Directional
4	Reserved (Do Not Connect)		
5	Reserved (Do Not Connect)		
6	TX-	BI_DA-	Transmit Data- or Bi-Directional
7	Reserved (Do Not Connect)		
8	Reserved (Do Not Connect)		



Pin	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 [Section 4.4, “Copper Ethernet Port Specifications”](#).

Section 3.3

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), SC (Standard or Subscriber Connector), 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.

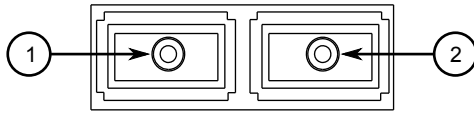


Figure 16: SC Connector

1. Tx Connector 2. Rx Connector

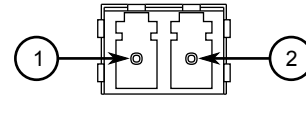


Figure 17: LC Connector

1. Tx Connector 2. Rx Connector

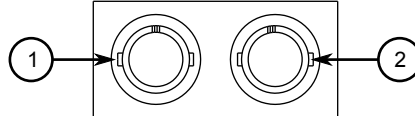


Figure 18: ST Connector

1. Tx Connector 2. Rx Connector

For further specifications, refer to [Section 4.5, “Fiber Optic Ethernet Port Specifications”](#).

Section 3.4

SFP Optic Ethernet Ports

SFP (Small Form-Factor Pluggable) optic Ethernet ports are available with LC (Lucent Connector) connectors. Make sure the Transmit (Tx) and Receive (Rx) connections of each port are properly connected and matched to establish a proper link.

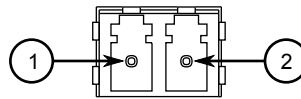


Figure 19: LC Connector

1. Tx Connector 2. Rx Connector

Specifications

For specifications on the available SFP optic Ethernet ports, refer to [Section 4.6, “SFP Optic Ethernet Port Specifications”](#).

Installation/Removal

The following sections describe how to install and remove SFP optical ports:



NOTE

SFP optical ports can be safely inserted and removed while the chassis is powered and operating.

- [Section 3.4.1, “Installing an SFP Optical Port”](#)

- [Section 3.4.2, “Removing an SFP Optical Port”](#)

Section 3.4.1

Installing an SFP Optical Port

To install an SFP optical port, do the following:



CAUTION!

Electrical hazard – risk of damage to equipment. Use only components certified by Siemens with RUGGEDCOM products. Damage to the module and device may occur if compatibility and reliability have not been properly assessed.



CAUTION!

Electrical hazard – risk of damage to equipment. Make sure all electrostatic energy is dissipated before installing or removing components from the device. An electrostatic discharge (ESD) can cause serious damage to the component once it is outside the chassis.

1. Make sure all potential electrostatic build-up has been properly discharged to prevent electrostatic discharges (ESD). This can be accomplished by wearing an ESD wrist strap or by touching Earth or the chassis ground.
2. Remove the dust cover from the port opening in the module.



CAUTION!

Mechanical hazard – risk of component damage. SFP optical ports are designed to insert in only one orientation. Do not force the port into the module.

3. Remove the port from its packaging.
4. Insert the port into the module and swing the bail-latch up to lock it in place.

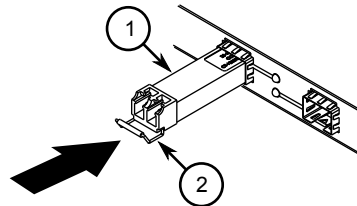


Figure 20: Installing an SFP Optical Port (Typical)

1. SFP Optical Port 2. Metal Bail-Latch

5. Remove the dust cover from the port.
6. Connect a cable to the port and test the connection.

Section 3.4.2

Removing an SFP Optical Port

To remove an SFP optical port, do the following:



CAUTION!

Electrical hazard – risk of damage to equipment. Make sure all electrostatic energy is dissipated before performing installing or removing components from the device. An electrostatic discharge (ESD) can cause serious damage to the component once it is outside the chassis.

1. Make sure all potential electrostatic build-up has been properly discharged to prevent electrostatic discharges (ESD). This can be accomplished by wearing an ESD wrist strap or by touching Earth or the chassis ground.
2. Disconnect the cable from the port.
3. Swing the metal bail-latch down and pull the port from the module.

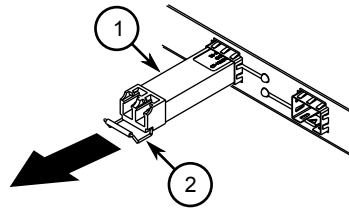


Figure 21: Removing an SFP Optical Port (Typical)

1. SFP Optical Port 2. Metal Bail-Latch

4. Store the port in an ESD-safe bag or other suitable ESD-safe environment, free from moisture and stored at the proper temperature (-40 to 85 °C or -40 to 185 °F).
5. Insert a plug in the empty port opening to prevent the ingress of dust and dirt.

4 Technical Specifications

The following sections provide important technical specifications related to the device and available modules:

- [Section 4.1, “Power Supply Specifications”](#)
- [Section 4.2, “PoE Power Supply Specifications”](#)
- [Section 4.3, “Failsafe Alarm Relay Specifications”](#)
- [Section 4.4, “Copper Ethernet Port Specifications”](#)
- [Section 4.5, “Fiber Optic Ethernet Port Specifications”](#)
- [Section 4.6, “SFP Optic Ethernet Port Specifications”](#)
- [Section 4.7, “Operating Environment”](#)
- [Section 4.8, “Mechanical Specifications”](#)

Section 4.1

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

Section 4.2

PoE Power Supply Specifications

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

Power In	Power Out
51-57 VDC	50-57 VDC, 30 W per Port Maximum (IEEE 302.at)
45-57 VDC	44-57 VDC, 15 W per Port Maximum (IEEE 302.af)

Section 4.3

Failsafe Alarm Relay Specifications



NOTE

The following specifications are for Class-2 circuits only.

Maximum Switching Voltage	Rated Switching Current	Isolation
30 VDC	2 A, 60 W	1500 V _{rms} 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 4.4

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 [Section 3.2, “Copper Ethernet Ports”](#).



NOTE

For specifications on optional copper Small Form-Factor Pluggable (SFP) ports, refer to [Section 4.6, “SFP Optic Ethernet Port Specifications”](#).



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 ^b	Cable Type ^c	Wiring Standard ^d	Maximum Distance ^e	Isolation
RJ-45 (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

^b Auto-Negotiating.

^c Shielded or unshielded.

^d Auto-crossover and auto-polarity.

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

Section 4.5

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 [Section 3.3, “Fiber Optic Ethernet Ports”](#).

**NOTE**

For specifications on optional fiber optic Small Form-Factor Pluggable (SFP) ports, refer to [Section 4.6, “SFP Optic Ethernet Port Specifications”](#).

**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.

- [Section 4.5.1, “Fast Ethernet \(100 Mbps\) Optical Specifications”](#)
- [Section 4.5.2, “Gigabit Ethernet \(1 Gbps\) Optical Specifications”](#)

Section 4.5.1

Fast Ethernet (100 Mbps) Optical Specifications

Mode	Connector Type	Cable Type (µm)	Tx λ (nm) ^f	Tx min. (dBm)	Tx max. (dBm)	Rx Sensitivity (dBm)	Rx Saturation (dBm)	Distance (km) ^f	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

^f Typical.

Section 4.5.2

Gigabit Ethernet (1 Gbps) Optical Specifications

Mode	Connector Type	Cable Type (µm)	Tx λ (nm) ^g	Tx min (dBm)	Tx max (dBm)	Rx Sensitivity (dBm)	Rx Saturation (dBm)	Distance (km) ^g	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

Mode	Connector Type	Cable Type (µm)	Tx λ (nm) ^g	Tx min (dBm)	Tx max (dBm)	Rx Sensitivity (dBm)	Rx Saturation (dBm)	Distance (km) ^g	Power Budget (dB)
SM	SC	9/125	1310	-5	0	-20	-3	25	15
SM	LC	9/125	1310	-7	-3	-24	-3	25	17

^g Typical.

Section 4.6

SFP Optic Ethernet Port Specifications

The RUGGEDCOM RS900GP supports two optional 1 Gps Small Form-Factor Pluggable (SFP) optic Ethernet ports. For more information about the SFP ports, refer to [Section 3.4, “SFP Optic Ethernet Ports”](#).



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).*

Copper SFP

Connector	Duplex ^h	Cable Type ⁱ	Wiring Standard ^j	Maximum Distance	Isolation ^k
RJ-45	FDX/HDX	> CAT-5	TIA/EIA T568A/B	100 m (328 ft)	1.5 kV

^h Auto-Negotiating.

ⁱ Shielded or unshielded.

^j Auto-crossover and auto-polarity.

^k RMS 1 minute.

Fiber Optic SFP

Mode	Connector Type	Cable Type (µm)	Tx λ (nm) ^l	Tx min (dBm)	Tx max (dBm)	Rx Sensitivity (dBm)	Rx Saturation (dBm)	Distance (km) ^l	Power Budget (dB)
MM	LC	50/125	850	-9	-2.5	-20	0	0.5	11
		62.5/125						0.3	
SM	LC	9/125	1310	-9.5	-3	-19	-3	10	9.5
SM	LC	9/125	1310	-7	-3	-23	-3	25	16
SM	LC	9/125	1550	0	5	-23	-3	70	23

^l Typical.

Section 4.7

Operating Environment

Parameter	Range	Comments
Ambient Operating Temperature	-40 to 85 °C (-40 to 185 °F)	Measured from a 30 cm (12 in) radius surrounding the center of the RUGGEDCOM RS900GP enclosure.
Ambient Relative Humidity	5% to 95%	Non-condensing
Ambient Storage Temperature	-40 to 85 °C (-40 to 185 °F)	
Operating Altitude	0 to 15240 m (0 to 50000 ft)	Over temperature range of -40 to 85 °C (-40 to 185 °F)

Section 4.8

Mechanical Specifications

Parameter	Value
Dimensions	Refer to Chapter 5, Dimension Drawings
Weight	2.3 kg (5 lbs)
Ingress Protection	IP40 (1 mm objects)
Enclosure	Aluminum

5 Dimension Drawings



NOTE

All dimensions are in millimeters, unless otherwise stated.

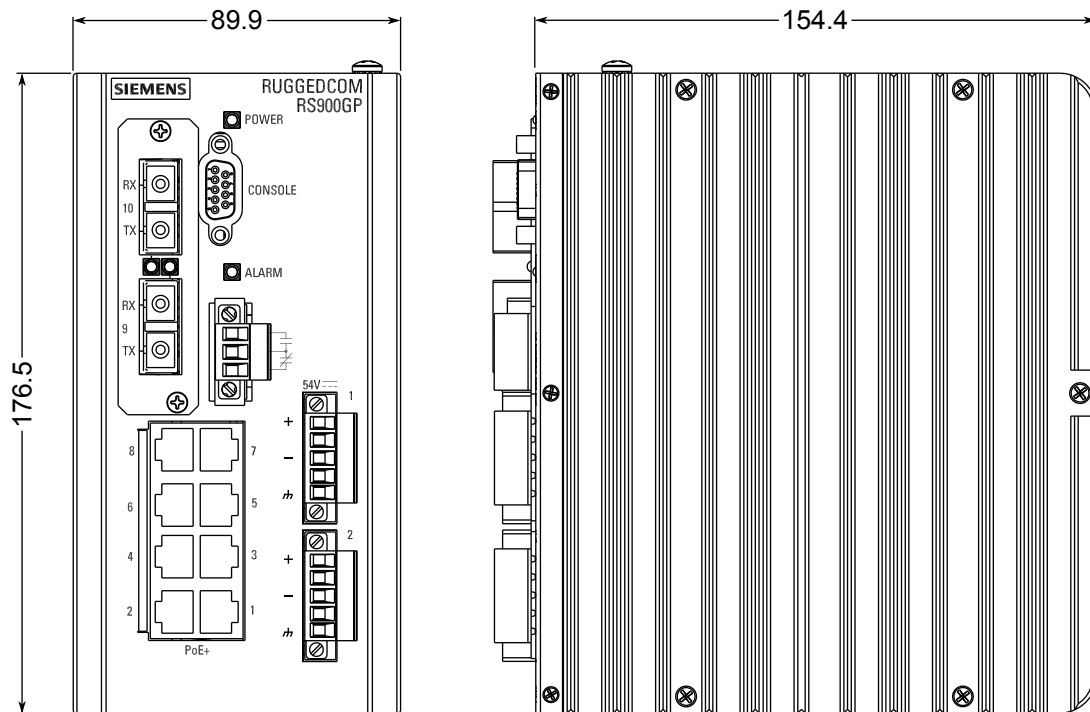


Figure 22: Overall Dimensions

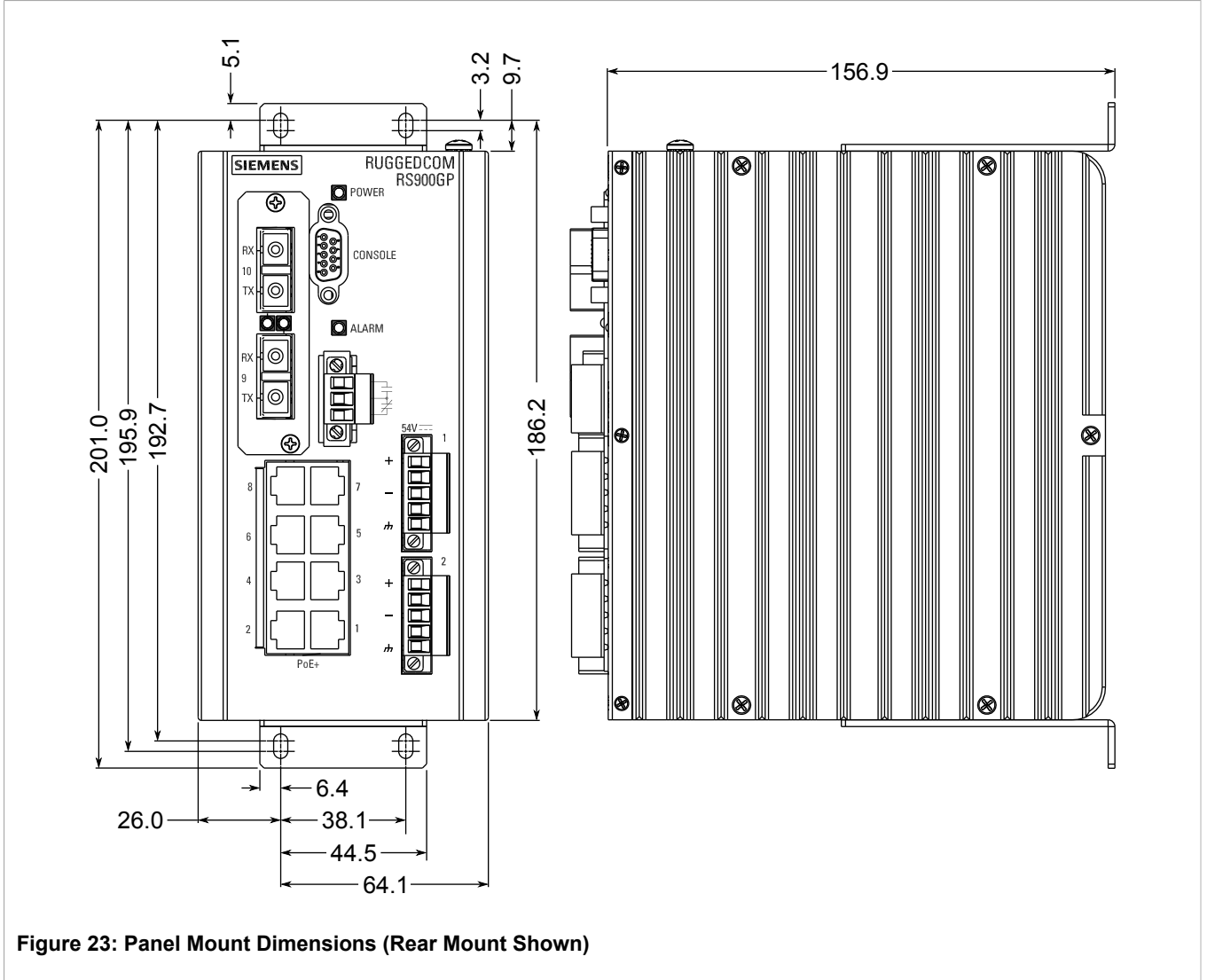


Figure 23: Panel Mount Dimensions (Rear Mount Shown)

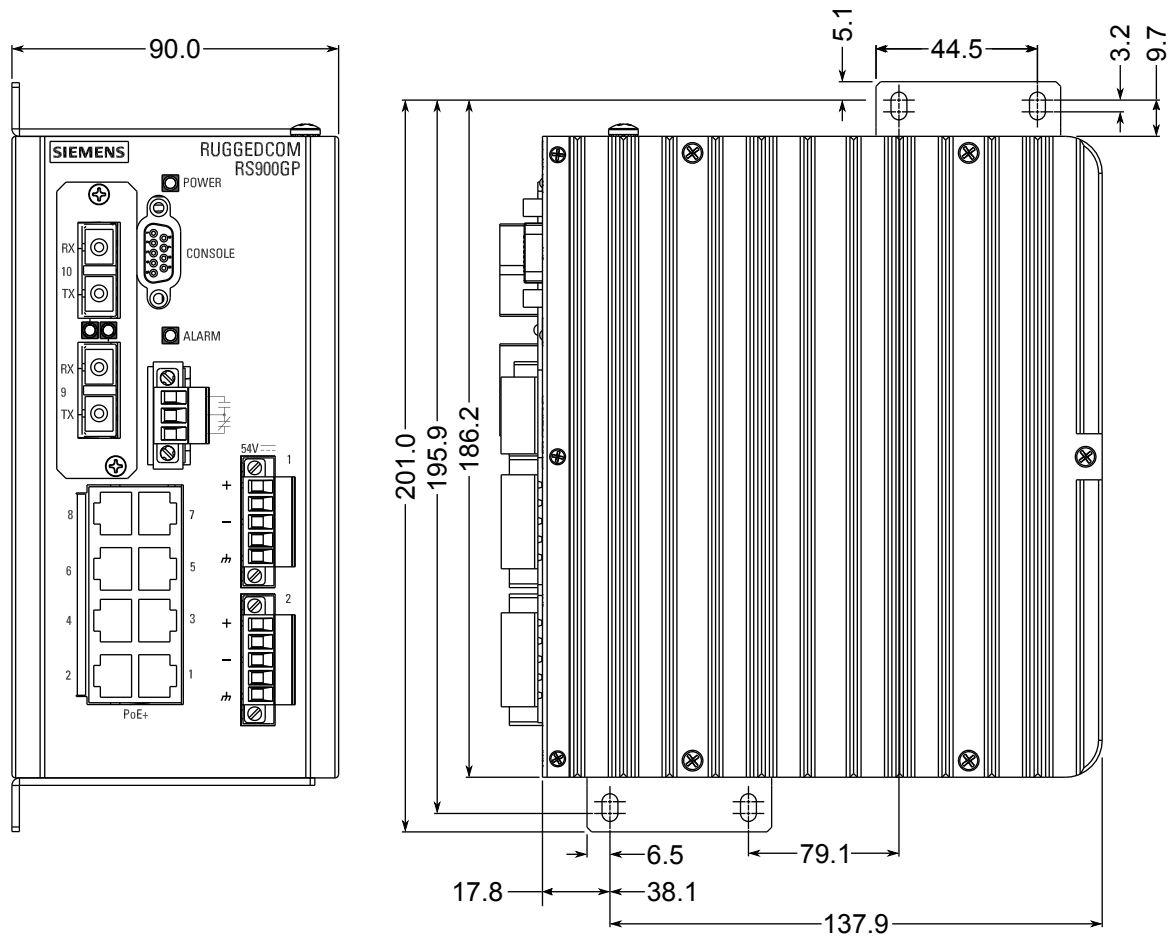


Figure 24: Panel Mount Dimensions (Side Mount Shown)

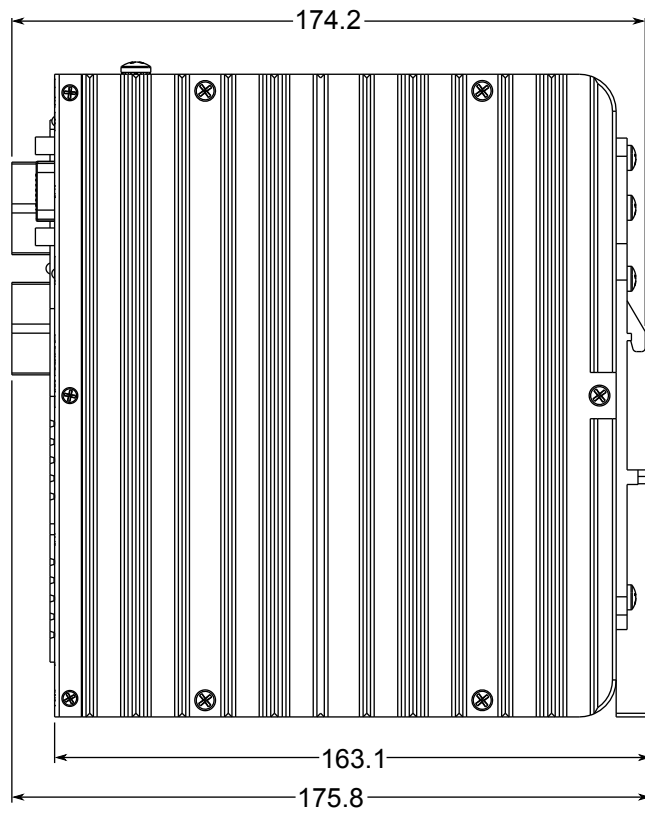


Figure 25: DIN Rail Mount Dimensions

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.

- [Section 6.1, “Standards Compliance”](#)
- [Section 6.2, “Agency Approvals”](#)
- [Section 6.3, “EMI and Environmental Type Tests”](#)

Section 6.1

Standards Compliance

The RUGGEDCOM RS900GP complies with the following standards:

- **FCC Compliance**

This equipment 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 equipment 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.

- **Industry Canada Compliance**

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

- **Other**

EN 50121-4 (Wayside Rail EMI)

Section 6.2

Agency Approvals

Agency	Standards	Comments
TUV	CSA C22.2 No. 60950-1, UL 60950-1	Approved
CE	EN 60950-1, EN 61000-6-2, EN 55022 Class A, EN 60825-1, EN 50581	CE Compliance is claimed via Declaration of Self Conformity Route
FCC	FCC Part 15, Class A	Approved
FDA/CDRH	21 CFR Chapter I, Sub-chapter J	Approved

Section 6.3

EMI and Environmental Type Tests

The RUGGEDCOM RS900GP has passed the following EMI and environmental tests.

IEC 61850-3 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	± 2 kV	4
		DC Power Ports	± 1.5 kV	x
		Earth Ground Ports	± 2 kV	3
IEC 61000-4-5	Surge	Signal ports	± 2 kV line-to-earth, ± 1.5 kV line-to-line	4
		DC Power Ports	± 2 kV line-to-earth, ± 1 kV line-to-line	3
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, 100% for 0.02 s, 100% for 0.05 s	
IEC 61000-4-12	Damped Oscillatory	Signal ports	2.5 kV common, 1 kV differential mode @ 1 MHz	3
		DC Power Ports	2.5 kV common, 1 kV differential mode @ 1 MHz	3
IEC 61000-4-16	Mains Frequency Voltage	Signal ports	30 V Continuous, 300 V for 1s	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 60255-5	Dielectric Strength	Signal ports	1.5 kV (Fail-Safe Relay output)	
		DC Power Ports	2 kV	
IEC 60255-5	HV Impulse	Signal ports	5 kV (Fail-Safe Relay output)	
		DC Power Ports	5 kV	

IEEE 1613 Type Tests



NOTE

The RUGGEDCOM RS900GP meets Class 2 requirements for an all-fiber configuration and Class 1 requirements for copper ports.

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	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 60255-21-1	Vibration		2g @ 10-150 Hz	Class 2
IEC 60255-21-2	Shock		30g @ 11 ms	Class 2

