

# SIEMENS

## RUGGEDCOM RSG920P

### Installation Guide

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# Preface

This guide describes the RUGGEDCOM RSG920P. 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 RSG920P*
- *RUGGEDCOM RPS1300 Operating Instructions* (<https://support.industry.siemens.com/cs/ww/en/view/109478699>)

# Accessing Documentation

The latest user documentation for RUGGEDCOM RSG920P v is available online at [www.siemens.com/ruggedcom](http://www.siemens.com/ruggedcom). To request or inquire about a user document, contact Siemens Customer Support.

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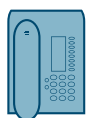
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- Access Siemens' extensive library of support documentation, including FAQs and manuals
- Submit SRs or check on the status of an existing SR
- Contact a local Siemens representative from Sales, Technical Support, Training, etc.
- Ask questions or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



# 1 Introduction

The RUGGEDCOM RSG920P is a rugged, high density, Ethernet switch designed to operate in harsh environments with widely varying climatic and environmental conditions. Tested and certified to withstand extreme temperatures, vibrations and shocks, the RUGGEDCOM RSG920P offers exceptional reliability for industrial applications, such as transportation systems and oil/gas applications.

Offering 20 Gigabit Ethernet ports, including four SFP slots and four Power-over-Ethernet (PoE) ports, the RUGGEDCOM RSG920P is suitable for applications that require high bandwidths and is ready to accommodate future network expansions.

- The four SFP slots provide ultimate flexibility in up-link distances and bandwidth, with support for Gigabit and Fast Ethernet.
- The four PoE ports supply up to 120 W (30 W per port) of power, allowing the RUGGEDCOM RSG920P to accommodate various PoE devices, such as cameras, intercom devices, Wireless LAN Access points and Bluetooth sensors. Smart Power Management options provide higher reliability for the most important devices on the network when power demands exceed the available supply.

The small form factor of the RUGGEDCOM RSG920P allows for installation in space-limited cabinets and on DIN rails.

RUGGEDCOM ROS provides advanced layer 2 networking functions, and advanced cyber security features. Coupled with the ruggedized hardware design, RUGGEDCOM RSG920P is ideal for creating mission-critical, real-time, control applications where high reliability and availability is of paramount importance.

The following sections provide more information about the RUGGEDCOM RSG920P:

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

## Section 1.1

# Feature Highlights

### Ethernet Ports and Inputs

- 16 x 10/100/1000Base-TX RJ-45 Ports
- 4 x 100/1000Base-TX/FX/SX/LX SFP Ports



#### NOTE

*A separate power supply is required for PoE Ports*

- 4 x IEEE 802.3at PoE (Power over Ethernet) Ports (30 W per port max, 120 W aggregate total)
- Two isolated digital inputs

### 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)

Universal Power Supply Options

- Fully integrated power supply
- Universal high-voltage range: 98-300 VDC or 88-264 VAC
- Low-voltage DC input: 9-60 VDC
- Terminal blocks for reliable maintenance free connections
- CSA/UL 60950-1 safety approved to 85 °C (185 °F)

Section 1.2

Description

The RUGGEDCOM RSG920P features various ports, controls and indicator LEDs on the front panel for connecting, configuring and troubleshooting the device.

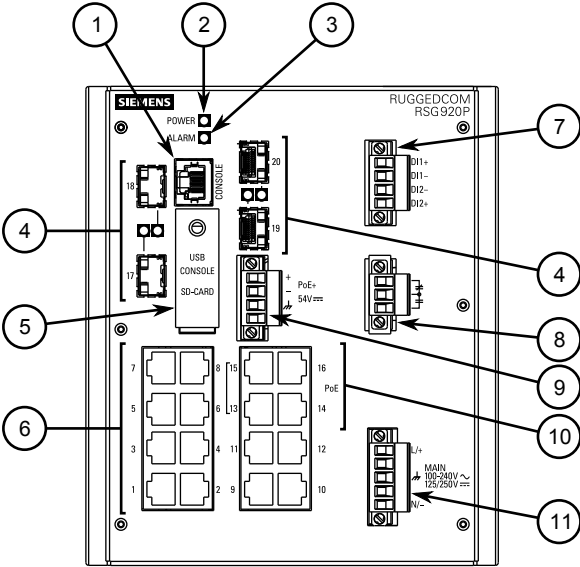


Figure 1: RUGGEDCOM RSG920P

1. RS-232 Console Port (RJ45) 2. POWER LED 3. ALARM LED 4. SFP Ethernet Ports 5. Access Plate 6. 10/100/1000 Mbps Copper Ethernet Ports 7. Digital Inputs 8. Failsafe Alarm Relay 9. PoE+ Power Input 10. PoE+ Ports 11. Main Power Supply Terminal Block

- **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 2.8, “Connecting to the Device”](#).
- **POWER LED** – Illuminates when power is being supplied to the device.

Color	Description
Green	Device ready
Red	Device booting up
Off	No power

- **ALARM LED** – Illuminates when an alarm condition exists.
- **Port Status LEDs** – Indicate the status of each port. For more information, refer to [Chapter 3, \*Communication Ports\*](#).
- **Access Plate** – The removable access plate provides access to the USB Type-B console port and microSD slot.
  - Use the USB console port to connect directly to the USB port on a workstation. For more information about the USB console port, refer to [Section 2.8, “Connecting to the Device”](#).
  - Use a microSD card to load/store the firmware and configuration for the device. For information about using a microSD card, refer to [Section 2.7, “Inserting/Removing the MicroSD Card”](#).
- **Digital Inputs** – Two isolated independent digital inputs to monitor external equipment, such as a passive switch or voltage provided by external equipment. For more information, refer to [Section 2.6, “Connecting the Digital Inputs”](#).
- **Failsafe Alarm Relay** – Latches to default state when a power disruption or other alarm condition occurs. For more information, refer to:
  - [Section 2.5, “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 2.3, “Connecting Power”](#)
  - [Section 4.1, “Power Supply Specifications”](#)



## 2 Installing the Device

The following sections describe 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.*



### **IMPORTANT!**

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

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



### **IMPORTANT!**

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



### **IMPORTANT!**

*The RUGGEDCOM RSG920P 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/approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to make sure the RUGGEDCOM RSG920P operates properly and safely. The permissible ambient conditions must be complied with. The information in the relevant document must be observed.*



### **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*

**IMPORTANT!**

*Do not install the RUGGEDCOM RSG920P in a nuclear power plant or other nuclear-related facilities.*

**IMPORTANT!**

*The RUGGEDCOM RSG920P must be located in an area accessible only by qualified service personnel or other authorized users. Operation of the device is permitted only when this requirement is met.*

The general procedure for installing the device is as follows:

1. Mount the device to a rack or panel.
2. Connect power to the device and ground the device to safety Earth.
3. Connect the failsafe alarm relay.
4. Connect the digital inputs.
5. Connect the device to the network.

These steps, and other related information, are described in the following sections:

- [Section 2.1, “Required Tools and Materials”](#)
- [Section 2.2, “Mounting the Device”](#)
- [Section 2.3, “Connecting Power”](#)
- [Section 2.4, “Grounding the Device”](#)
- [Section 2.5, “Connecting the Failsafe Alarm Relay”](#)
- [Section 2.6, “Connecting the Digital Inputs”](#)
- [Section 2.7, “Inserting/Removing the MicroSD Card”](#)
- [Section 2.8, “Connecting to the Device”](#)
- [Section 2.9, “Gigabit Ethernet 1000Base-TX Cabling Recommendations”](#)

## Section 2.1

# Required Tools and Materials

The following tools and materials are required to install the RUGGEDCOM RSG920P:

Tools/Materials	Purpose
RUGGEDCOM RPS1300 or equivalent 54 VDC output power supply	For supplying PoE power to the device.
AC power cord (16 AWG)	For connecting power to the device.
CAT-5 Ethernet cables	For connecting the device to the network.
Flathead screwdriver	For mounting the device to a DIN rail.
Phillips screwdriver	For mounting the device to a panel.
4 x #8-32 screws	For mounting the device to a panel.

## Section 2.2

# Mounting the Device

The RUGGEDCOM RSG920P 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.



### IMPORTANT!

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

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



### NOTE

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

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

- [Section 2.2.1, “Mounting the Device on a DIN Rail”](#)
- [Section 2.2.2, “Mounting the Device to a Panel”](#)

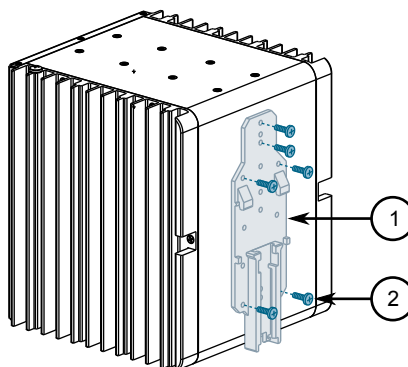
## Section 2.2.1

# Mounting the Device on a DIN Rail

For DIN rail installations, the RUGGEDCOM RSG920P 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:

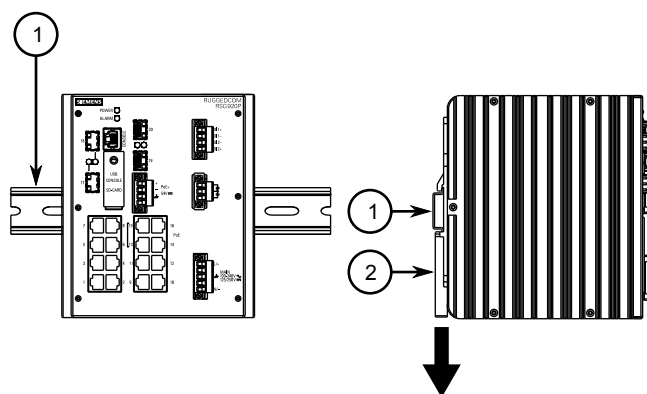
1. Secure the DIN rail bracket to back of the device chassis.



**Figure 2: DIN Rail Bracket Assembly**

1. DIN Rail Bracket    2. Screw

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



**Figure 3: DIN Rail Mounting**

1. DIN Rail 2. DIN Rail Bracket

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 2.2.2

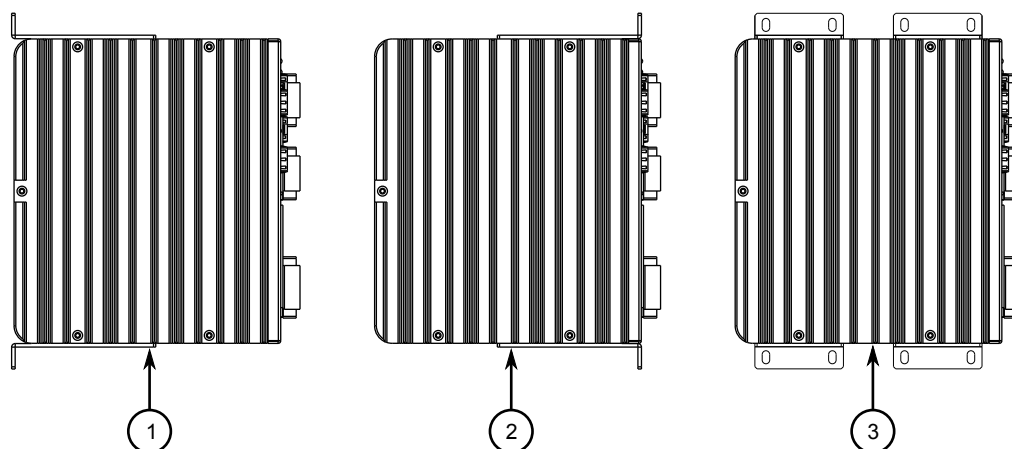
## Mounting the Device to a Panel

For panel installations, the RUGGEDCOM RSG920P can be equipped with panel adapters that allow the device to be attached to a panel in multiple orientations.



#### NOTE

*A side mount orientation requires additional adapters.*



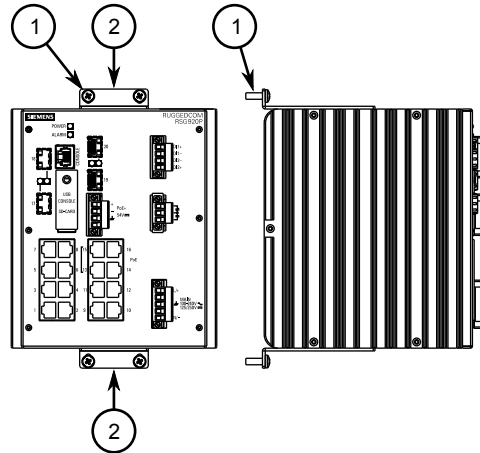
**Figure 4: Panel Mount Options**

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



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

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 #8 screws (not supplied) to secure the adapters to the panel.

### Section 2.3

## Connecting Power

The RUGGEDCOM RSG920P supports a single integrated high AC/DC or low DC power supply, as well as an external power supply for the Power-over-Ethernet (PoE) ports.



### IMPORTANT!

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

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

- [Section 2.3.1, "Connecting High AC/DC Power"](#)
- [Section 2.3.2, "Connecting Low DC Power"](#)
- [Section 2.3.3, "Connecting an External PoE Power"](#)

### Section 2.3.1

## Connecting High AC/DC Power

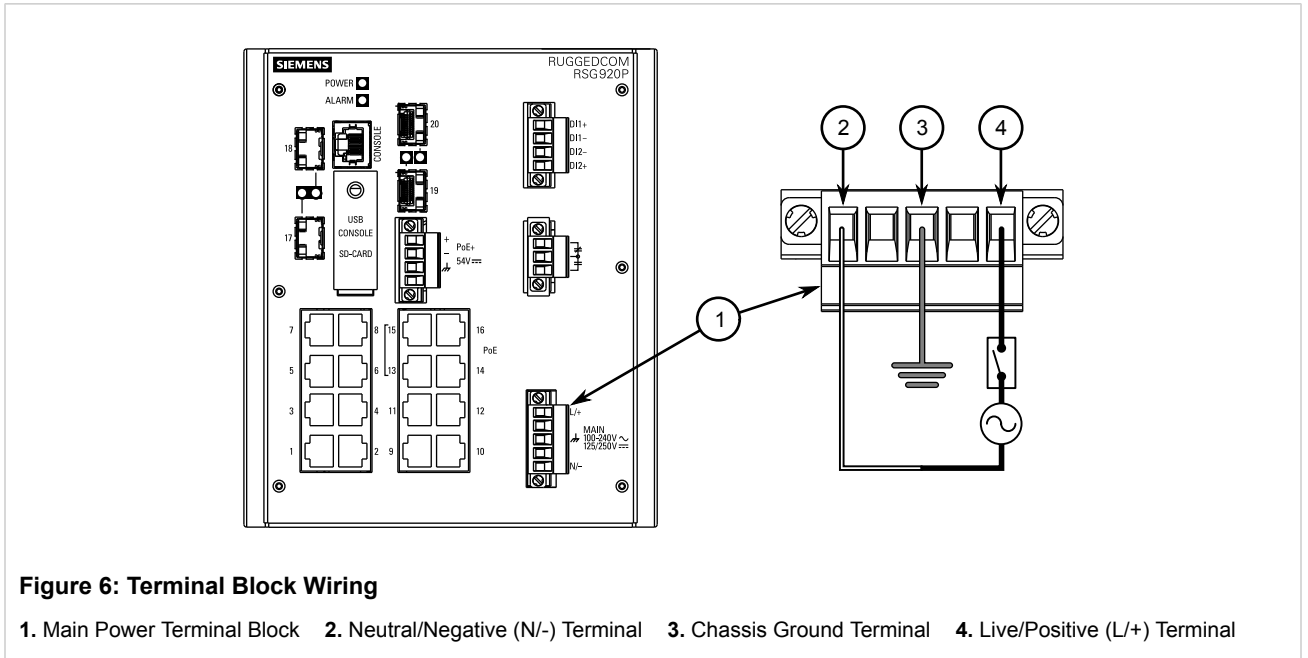
To connect a high AC/DC power supply to the device, do the following:



### CAUTION!

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

1. Secure a European-style terminal block (or Euroblock) to the terminal.
2. Connect the live/positive wire from the power source to the live/positive (L/+) terminal on the terminal block.



3. Connect the neutral/negative wire from the power source to the neutral/negative (N/-) terminal on the terminal block.
4. Connect the ground wire to the chassis ground terminal on the device.

### Section 2.3.2

## Connecting Low DC Power

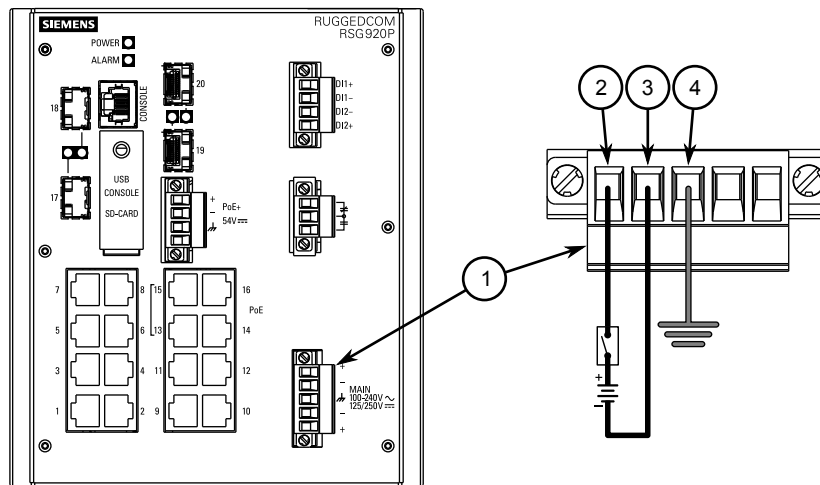
To connect a single or dual power sources to the low DC power supply, do the following:



### IMPORTANT!

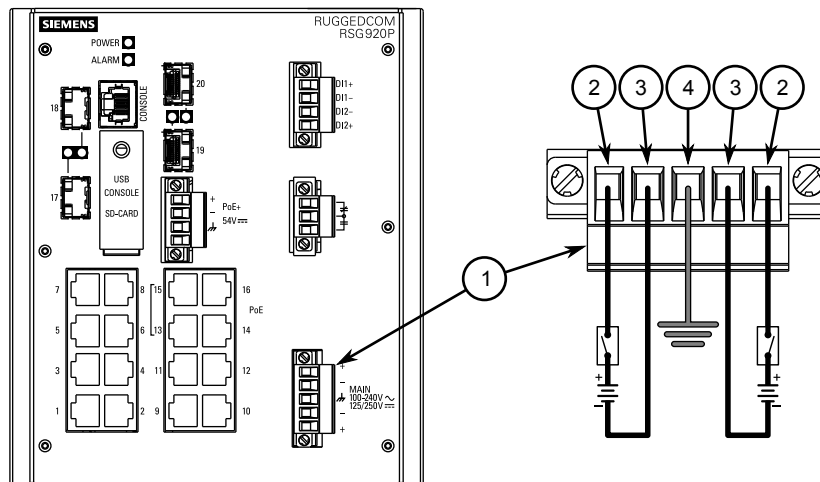
*When connecting two external power sources, if the first external power source has a voltage lower than 33 VDC, the second power source must have a voltage lower than 33 VDC as well. Similarly, if the first power source has a voltage higher than 36 VDC, the second power source must have a voltage higher than 36 VDC.*

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



**Figure 7: Terminal Block Wiring - Connecting a Single DC Power Supply Input**

1. Main Power Terminal Block    2. Chassis Ground Terminal    3. Negative Terminal    4. Positive Terminal



**Figure 8: Terminal Block Wiring - Connecting Dual DC Power Supply Inputs**

1. Main Power Terminal Block    2. Positive Terminal    3. Negative Terminal    4. Chassis Ground Terminal

2. Connect the negative wire from the power source to the negative terminal on the terminal block.
3. Connect the ground wire to the chassis ground terminal on the device.

### Section 2.3.3

## Connecting an External PoE Power

The RUGGEDCOM RSG920P supports four 10/100/1000 Mbps Power-over-Ethernet (POE) Ports that require external power.



**NOTE**  
*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>.*

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

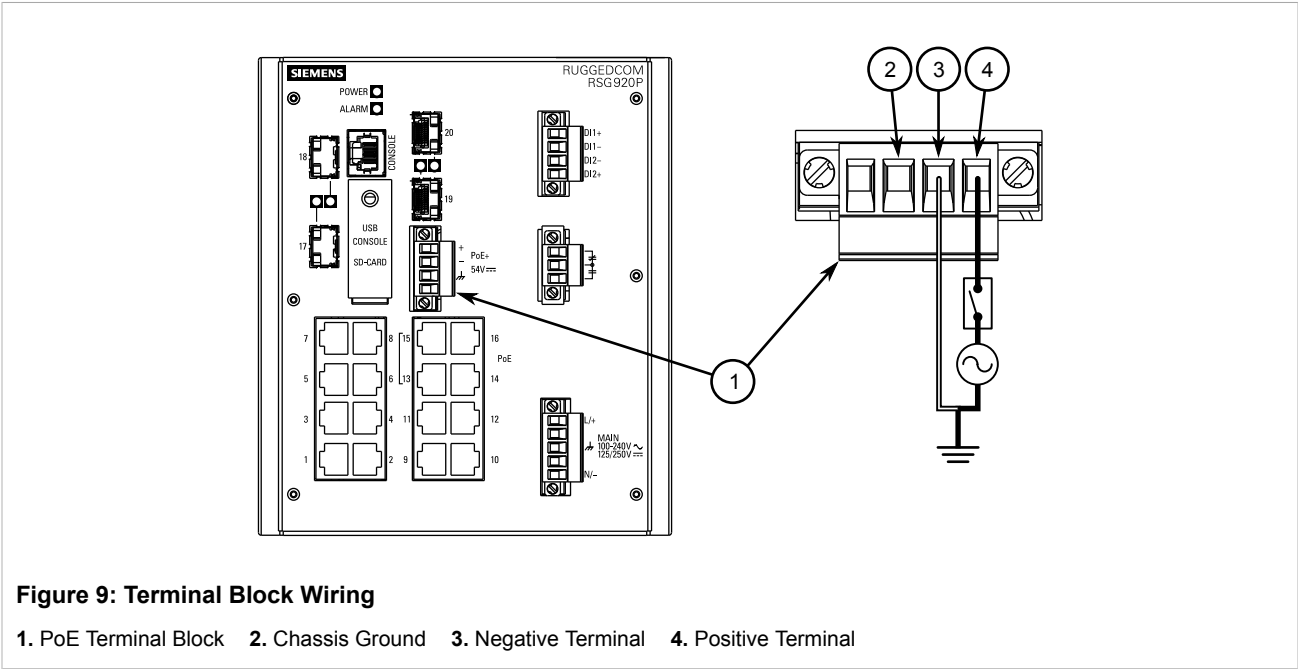
Power Supply Type	Input Range		Isolation	Minimum Power Required
	Minimum	Maximum		
DC	51 VDC	57 VDC	1.5 kVAC/2.2 kVDC	135 W

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 kVAC/2.2 kVDC	75 W

To connect an external power supply for the PoE ports, do the following:

1. Secure a European-style terminal block (or Euroblock) to the terminal.



**Figure 9: Terminal Block Wiring**

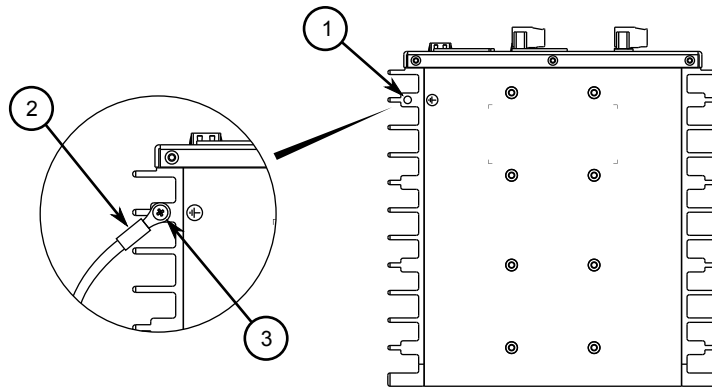
1. PoE Terminal Block    2. Chassis Ground    3. Negative Terminal    4. Positive Terminal

2. Connect the positive wire from the RUGGEDCOM RPS1300 (or another external power supply) to the positive (+) terminal on the terminal block.
3. Connect the negative wire from the RUGGEDCOM RPS1300 (or another external power supply) to the negative (-) terminal on the terminal block.
4. If using an external power supply other than the RUGGEDCOM RPS1300 that has a chassis ground connection, connect the ground terminal on the power supply to the chassis ground terminal on the device.

## Section 2.4

## Grounding the Device

The RUGGEDCOM RSG920P chassis features a threaded hole for connecting the device to ground (Protective 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 10: Chassis Ground Connection**

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

## Section 2.5

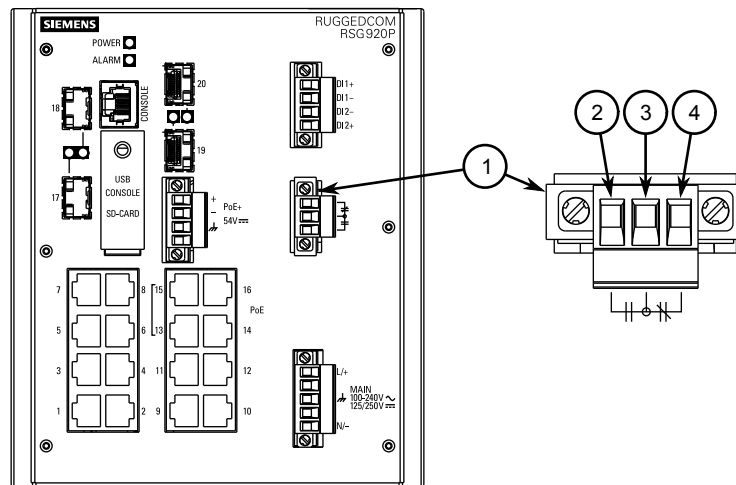
## Connecting the Failsafe Alarm Relay

The failsafe alarm 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 alarm relay output is configurable through ROS. One common application for this relay is to signal an alarm if a power failure occurs. For more information, refer to the ROS User Guide for the RUGGEDCOM RSG920P.*

The following shows the proper relay connections.



**Figure 11: Failsafe Alarm Relay Wiring**

1. Failsafe Alarm Relay Terminal    2. Normally Open Terminal    3. Common Terminal    4. Normally Closed Terminal

## Section 2.6

# Connecting the Digital Inputs

The RUGGEDCOM RSG920P offers two independent digital inputs for monitoring external equipment. Each digital input is associated with an alarm that is configured in RUGGEDCOM ROS. Depending on the configuration, the associated alarm may be triggered if the digital input is in either the HIGH or LOW state.

Each input operates in one of two modes:

- **Passive Mode**  
Supports the use of passive switches, such as a cabinet door switch, relay or a leak detector, where each digital input detects if it is open or closed.
- **Direct Mode**  
Supports direct inputs from external equipment. A voltage between 10 and 30 V indicates state 1, while a voltage between -30 and 8 V indicates state 0. In the undetermined range between 8 and 10 V, the input may be determined to be in either state.

The nominal input voltage is 24 VDC.



### NOTE

*For information about configuring the digital input alarms, refer to the RUGGEDCOM ROS User Guide for the RUGGEDCOM RSG920P.*

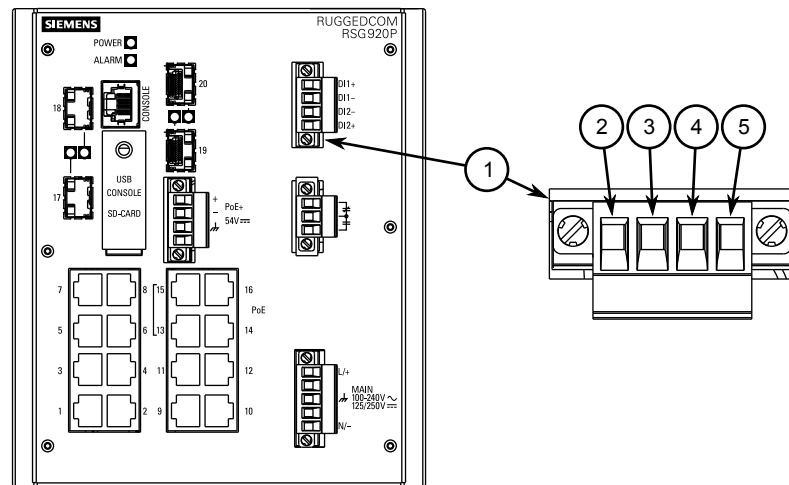


### NOTE

*For technical specifications related to the digital input ports, refer to [Section 4.6, "Digital Input Specifications"](#).*

To connect a digital input, do the following:

1. Secure a European-style terminal block (or Euroblock) to the terminal.
2. Connect the positive cable to the **DI1/2+** terminal.



**Figure 12: Terminal Block Wiring**

1. Digital Input Terminal Block    2. DI2+ Terminal    3. DI2- Terminal    4. DI1- Terminal    5. DI1+ Terminal

3. Connect the negative cable to the **DI1/2-** terminal.

## Section 2.7

# Inserting/Removing the MicroSD Card

The RUGGEDCOM RSG920P accepts a microSD card for storing configuration files and/or software updates.



### CAUTION!

*Configuration hazard – risk of data loss. The microSD card must not be removed or replaced while the device is booting up or when configuration changes are being made. Information on the microSD card may be lost. Make sure the device is powered down before removing or inserting the card.*



### CAUTION!

*Mechanical/electrical hazard – risk of damage to the microSD card.*

- Do not expose the microSD card to extreme temperatures or humidity.
- Do not expose the microSD card to large magnetic or static electric fields.
- Do not bend or drop the microSD card.

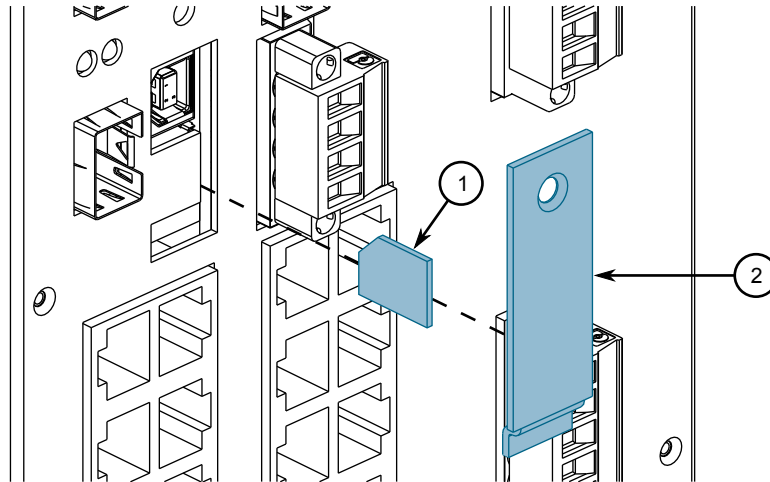


### CAUTION!

*Security hazard – risk of unauthorized access and/or exploitation. Make sure to remove the microSD card before decommissioning the device or sending the device to a third-party.*

To insert or remove a microSD card, do the following:

1. Unscrew the retention screw and remove the access plate.



**Figure 13: Inserting/Removing a MicroSD Card**

1. MicroSD Card 2. Access Plate

2. When removing the card, first press the card in until it springs back.
3. Without touching the contacts on the card, insert or remove the microSD card.
4. When installing the card, push the card in until it clicks in place.
5. Install the access plate and tighten the retention screw.
6. Power up the device.

## Section 2.8

# 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 RSG920P.

## » RS-232 Console Port

Connect a workstation directly to either the RJ-45 or USB Type-B console port to access the boot-time control and ROS interfaces. Both console ports provide access to ROS's console and Web interfaces.



### IMPORTANT!

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



### NOTE

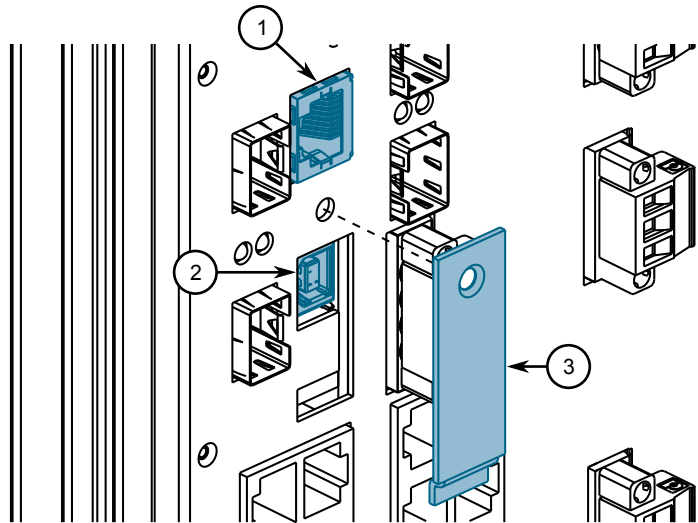
*When the USB Type-B console port is in use, the RJ-45 console port will echo the console output but not accept any user input.*





**NOTE**

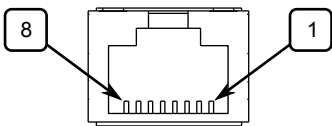
For Microsoft Windows users, the RUGGEDCOM USB Serial Console driver must be installed on the users workstation before connecting via the USB Type-B console port. For more information, refer to the RUGGEDCOM ROS User Guide for the RUGGEDCOM RSG920P.



**Figure 14: Console Ports**

1. RJ-45 Console Port    2. USB Type-B Console Port    3. Access Plate

Connection to the RJ-45 console port is made using an RJ45-to-DB9 console cable. The following is the pin-out for the RJ-45 console port:



**Figure 15: RJ-45 Console Port Pin Configuration**

Pin		Name	Description
RJ-45 Male	DB9 Female		
1	6	DSR <sup>a</sup>	Data Set Ready
2 <sup>b</sup>	1	DCD <sup>a</sup>	Carrier Detect
3	4	DTR <sup>a</sup>	Data Terminal Ready
4	5	GND	Signal Ground
5	2	RxD	Receive Data (to DTE)
6	3	TxD	Transmit Data (from DTE)
7	8	CTS <sup>c</sup>	Clear to Send
8	7	RTS <sup>c</sup>	Read to Send
	9	RI <sup>d</sup>	Ring Indicator

<sup>a</sup> The DSR, DCD and DTR pins are connected together internally.

<sup>b</sup> Reserved (do not connect)

<sup>c</sup> The CTS and RTS pins are connected together internally.

<sup>d</sup> RI is not connected.

## » 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 2.9

## Gigabit Ethernet 1000Base-TX Cabling Recommendations

The IEEE 802.3ab Gigabit Ethernet standard defines 1000 Mbps Ethernet communications over distances of up to 100 m (328 ft) using all 4 pairs in category 5 (or higher) balanced, unshielded twisted-pair cabling. For wiring guidelines, system designers and integrators should refer to the Telecommunications Industry Association (TIA) TIA/EIA-568-A wiring standard that characterizes minimum cabling performance specifications required for proper Gigabit Ethernet operation. For reliable, error-free data communication, new and pre-existing communication paths should be verified for TIA/EIA-568-A compliance.

The following table summarizes the relevant cabling standards:

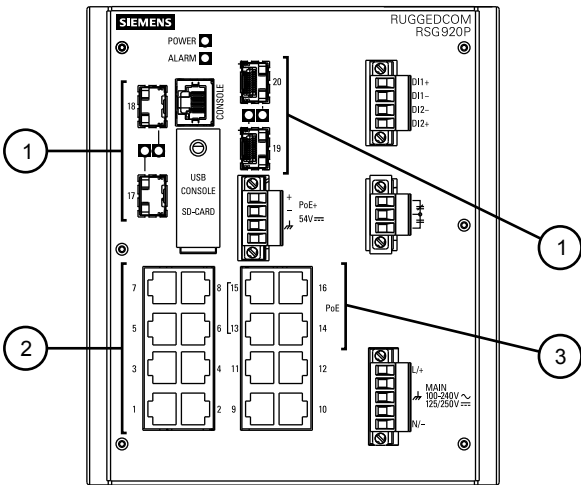
Cabling Category	1000Base-TX Compliant	Required Action
< 5	No	New wiring infrastructure required.
5	Yes	Verify TIA/EIA-568-A compliance.
5e	Yes	No action required. New installations should be designed with Category 5e or higher.
6	Yes	No action required.
> 6	Yes	Connector and wiring standards to be determined.

Follow these recommendations for copper data cabling in high electrical noise environments:

- Data cable lengths should be as short as possible, preferably 3 m (10 ft) in length. Copper data cables should not be used for inter-building communications.
- Power and data cables should not be run in parallel for long distances, and should be installed in separate conduits. Power and data cables should intersect at 90° angles when necessary to reduce inductive coupling.
- Shielded/screened cabling can be used when required. Care should be taken to avoid the creation of ground loops with shielded cabling.

# 3 Communication Ports

The RUGGEDCOM RSG920P can be equipped with various types of communication ports to enhance its abilities and performance.



**Figure 16: Port Assignment**  
1. SFP Ethernet Ports    2. Copper Ethernet Ports    3. PoE+ Ports

Port	Type
1 to 16	10/100/1000 Mbps Copper Ethernet Ports
13 to 16	10/100/1000 Mbps Power-over-Ethernet (POE) Ports
17 to 20	SFP up-link ports supporting Fast Ethernet or Gigabit Ethernet optics (used interchangeably)

The following sections describe the available ports:

- [Section 3.1, “Copper Ethernet Ports”](#)
- [Section 3.2, “SFP Optic Ethernet Ports”](#)
- [Section 3.3, “PoE Ports”](#)

## Section 3.1

# Copper Ethernet Ports

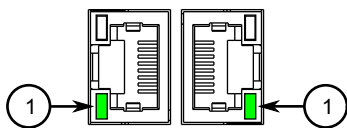
The RUGGEDCOM RSG920P supports several 10/100/1000Base-TX Ethernet ports that allow connection to standard Category 5 (CAT-5) unshielded twisted-pair (UTP) cables with RJ45 male connectors. The RJ45 connectors are directly connected to the chassis ground on the device and can accept CAT-5 shielded twisted-pair (STP) cables.



**WARNING!**  
*Electric shock hazard – risk of serious personal injury and/or equipment interference. If shielded cables are used, make sure the shielded cables do not form a ground loop via the shield wire and the 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 the link/activity state of the port.

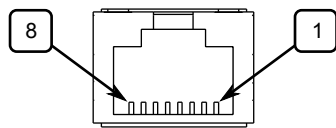


**Figure 17: RJ45 Port LEDs**  
1. Link/Activity LED

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

>> **Pin-Out**

The following is the pin-out for the RJ45 male connectors:



**Figure 18: RJ45 Ethernet Port Pin Configuration**

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)	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

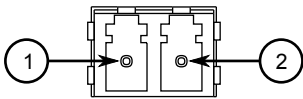
>> **Specifications**

For specifications on the available copper Ethernet ports, refer to [Section 4.4, “Copper Ethernet Port Specifications”](#).

Section 3.2

# SFP Optic Ethernet Ports

The RUGGEDCOM RSG920P supports up to four SFP (Small Form-Factor Pluggable) optic Ethernet ports 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 Port**  
1. Tx Connector    2. Rx Connector

## >> LEDs

Each port features an LED that indicates the state of the port.

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

## >> Specifications

For specifications on the available SFP optic Ethernet ports, refer to [Section 4.5, “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 3.2.1, “Installing an SFP Optical Ethernet Port”](#)
- [Section 3.2.2, “Removing an SFP Optical Ethernet Port”](#)

Section 3.2.1

# Installing an SFP Optical Ethernet Port

To install an SFP optical Ethernet port, do the following:



**CAUTION!**

*Electrical hazard – risk of damage to equipment. Use only components certified by Siemens with RUGGEDCOM products. Damage to the 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.*

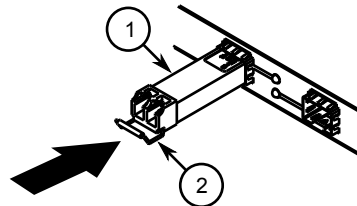
1. Make sure all potential electrostatic build-up has been properly discharged to prevent electrostatic discharges (ESD). This can be accomplished by wearing an ESD wrist strap or by touching Earth or the chassis ground.
2. Remove the dust cover from the port opening in the device.



**CAUTION!**

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

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



**Figure 20: Installing an SFP Optical Ethernet Port (Typical)**

1. SFP Optical Ethernet Port    2. Metal Bail-Latch

5. Connect a cable to the SFP port and test the connection.

Section 3.2.2

## Removing an SFP Optical Ethernet Port

To remove an SFP optical Ethernet port, do the following:

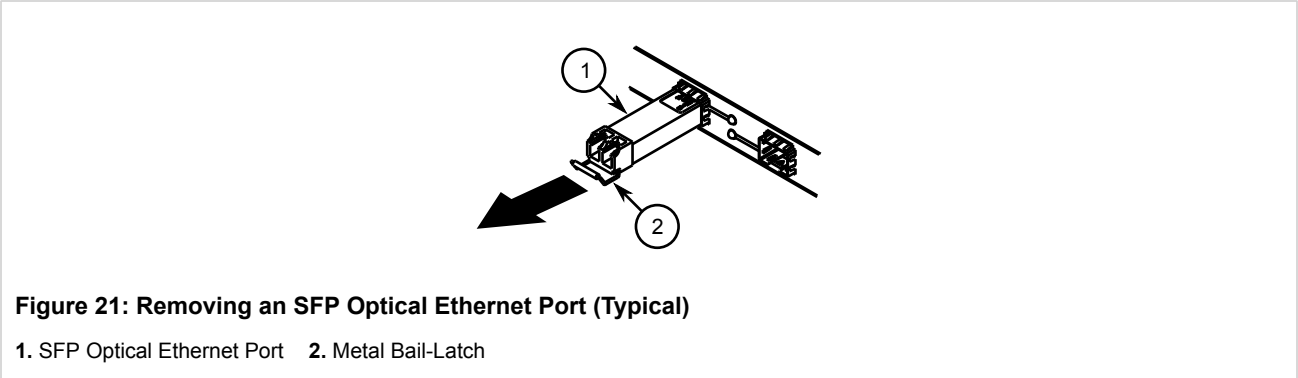


**CAUTION!**

*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 SFP port.

3. Pull down the metal bail-latch on the SFP port and remove the port from the device.



4. Store the SFP 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. Install a dust cover in the port opening in the device to prevent the ingress of moisture, dirt and debris.

Section 3.3

PoE Ports

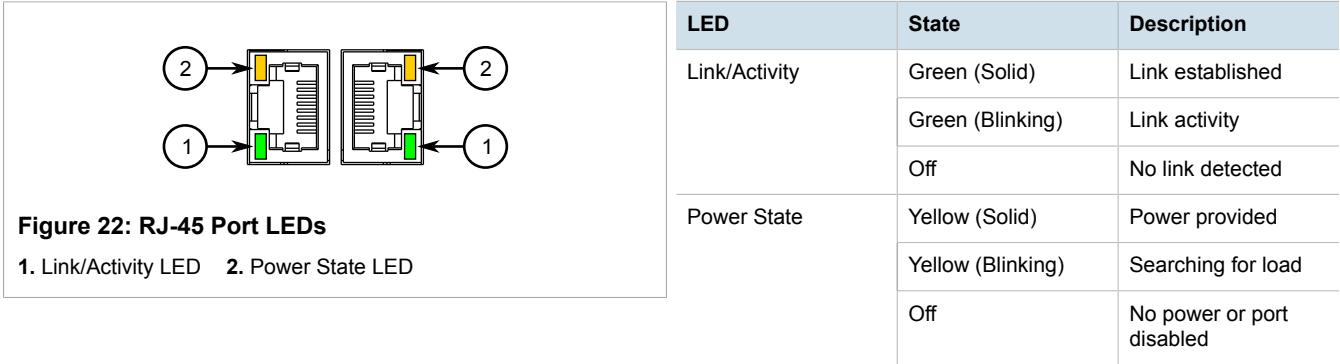
The RUGGEDCOM RSG920P supports four Power over Ethernet (POE) ports (ports 13 to 16) powered by an external power supply. Each port complies with the IEEE 802.3at standard.

The total allowable power budget for all ports is 120 W. If the external power supply is less than 120 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 RSG920P.

For information about connecting the external power supply, refer to [Section 2.3.3, “Connecting an External PoE Power”](#).

>> LEDs

Each PoE port features an LED that indicates the power state of the port and link status.

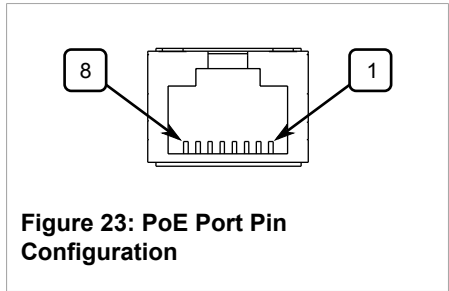


### >> Pin-Out

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



**NOTE**  
*Ports 13 and 15 are wired per IEEE 802.3at Alternative-A, while ports 14 and 16 are wired per IEEE 802.3at Alternative-B.*



Pin	Name		PoE Voltage 54 V Nominal		Description
	10/100Base-TX	1000Base-TX	Ports 13 and 15	Ports 14 and 16	
1	RX+	BI_DB+	V+		Receive Data+ or Bi-Directional
2	RX-	BI_DB-	V+		Receive Data- or Bi-Directional
3	TX+	BI_DA+	V-		Transmit Data+ or Bi-Directional
4	Reserved (Do Not Connect)	BI_DD+		V+	Bi-Directional
5	Reserved (Do Not Connect)	BI_DD-		V+	Bi-Directional
6	TX-	BI_DA-	V-		Transmit Data- or Bi-Directional
7	Reserved (Do Not Connect)	BI_DC+		V-	Bi-Directional
8	Reserved (Do Not Connect)	BI_DC-		V-	Bi-Directional

### >> Specifications

For specifications on the available PoE ports, refer to [Section 4.2, “PoE Power Supply Specifications”](#).



# 4 Technical Specifications

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

- [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, “SFP Optic Ethernet Port Specifications”](#)
- [Section 4.6, “Digital Input Specifications”](#)
- [Section 4.7, “Operating Environment”](#)
- [Section 4.8, “Mechanical Specifications”](#)

## Section 4.1

### Power Supply Specifications

Power Supply Type	Input Range		Internal Fuse Rating <sup>a</sup>	Isolation	Maximum Power Consumption <sup>b</sup>
	Minimum	Maximum			
HI	98 VDC	300 VDC	3.15 A(T)	2.8 kVAC	27 W
	88 VAC	264 VAC			
LO	9 VDC	60 VDC	5 A	1.5 kVDC	

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

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

## Section 4.2

### PoE Power Supply Specifications

The RUGGEDCOM RSG920P adheres to the following power output and IEEE specifications depending on the input voltage supplied to the device.

Power In		Power Out
Voltage Range	Internal Fuse Rating	
51-57 VDC	3.15 A Maximum	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

Maximum Switching Voltage	Rated Switching Current	Isolation
30 VDC	2.0 A	2.0 kVAC (1 min)
250 VAC		

Section 4.4

## Copper Ethernet Port Specifications

The following details the specifications for copper Ethernet ports that can be ordered with the RUGGEDCOM RSG920P.

Speed (Mbps) <sup>c</sup>	Interface	Connector	Duplex <sup>c</sup>	Cable Type <sup>d</sup>	Wiring Standard <sup>e</sup>	Maximum Distance <sup>f</sup>	Isolation <sup>g</sup>
10/100/1000	TX	RJ45	FDX/HDX	> CAT-5	TIA/EIA T568A/B	100 m (328 ft)	1.5 kVAC

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

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

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

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

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

Section 4.5

## SFP Optic Ethernet Port Specifications

The RUGGEDCOM RSG920P features four 100/1000Base-FX Small Form-Factor Pluggable (SFP) optic Ethernet ports with LC (Lucent Connector) connectors. For more information about the SFP ports, refer to [Section 3.2, "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.

Speed (Mbit/s)	Interface	Mode <sup>h</sup>	Connector Type	Cable Type (μm)	Tx/Rx λ (nm) <sup>i</sup>	Tx Minimum (dBm) <sup>j</sup>	Tx Maximum (dBm) <sup>j</sup>	Rx Sensitivity (dBm) <sup>j</sup>	Rx Saturation (dBm) <sup>j</sup>	Distance (km) <sup>k</sup>	Power Budget (dB)	Criteria
100 <sup>l</sup>	FX	MM	LC	62.5/125	1310	-19	-14	-32	-14	2	13	A <sup>m</sup>
				50/125								
100 <sup>n</sup>	FX	SM	LC	9/125	1300	-15	-8	-34	-8	20	19	

Speed (Mbit/s)	Interface	Mode <sup>h</sup>	Connector Type	Cable Type (μm)	Tx/Rx λ (nm) <sup>i</sup>	Tx Minimum (dBm) <sup>j</sup>	Tx Maximum (dBm) <sup>j</sup>	Rx Sensitivity (dBm) <sup>j</sup>	Rx Saturation (dBm) <sup>j</sup>	Distance (km) <sup>k</sup>	Power Budget (dB)	Criteria
1000 <sup>l</sup>	SX	MM	LC	62.5/125 50/125	850	-9	-2.5	-20	0	0.5	11	
1000 <sup>l</sup>	LX	SM	LC	9/125	1310	-9.5	-3	-19	-3	10	9.5	B <sup>o</sup>
1000 <sup>n</sup>	LX	SM	LC	9/125	1300	-7	-3	-23	-3	25	16	
1000 <sup>n</sup>	LX	SM	LC	9/125	1550	0	5	-23	-3	70	23	

<sup>h</sup> MM = Multi-Mode, SM = Single-Mode

<sup>i</sup> Typical.

<sup>j</sup> All optical power numbers are listed as dBm averages.

<sup>k</sup> Typical distance. The 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.

<sup>l</sup> Meets Criteria A for ESD testing. No packet loss occurs during ESD discharges directly to the transceiver. Normal operation/function will resume following testing.

<sup>m</sup> The SFP transceiver meets the requirements of Criteria A, as defined by IEC 61000-6-2 (Generic Industrial) and EN50121-3-2 (Wayside Rail EMC)

<sup>n</sup> Meets Criteria B for ESD testing. Some packet loss occurs during ESD discharges directly to the transceiver. Normal operation/function will resume following testing.

<sup>o</sup> The SFP transceiver meets the requirements of Criteria B, as defined by IEC 61000-6-2 (Generic Industrial) and EN50121-3-2 (Wayside Rail EMC)

## Section 4.6

# Digital Input Specifications

Specification	Value
Isolation to System	1.5 kVAC
Input 1 to Input 2 Isolation	1 kVDC
Input Voltage	+/- 30 V Maximum
Logic High	+10 ~ + 30 V
Logic Low	-30 ~ + 8 V
Wetting Voltage	+9.5 V
Input/Output Current	5-10 mA

## 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 enclosure.
Ambient Relative Humidity	5% to 95%	Non-condensing

Parameter	Range	Comments
Ambient Storage Temperature	-40 to 85 °C (-40 to 185 °F)	

Section 4.8

## Mechanical Specifications

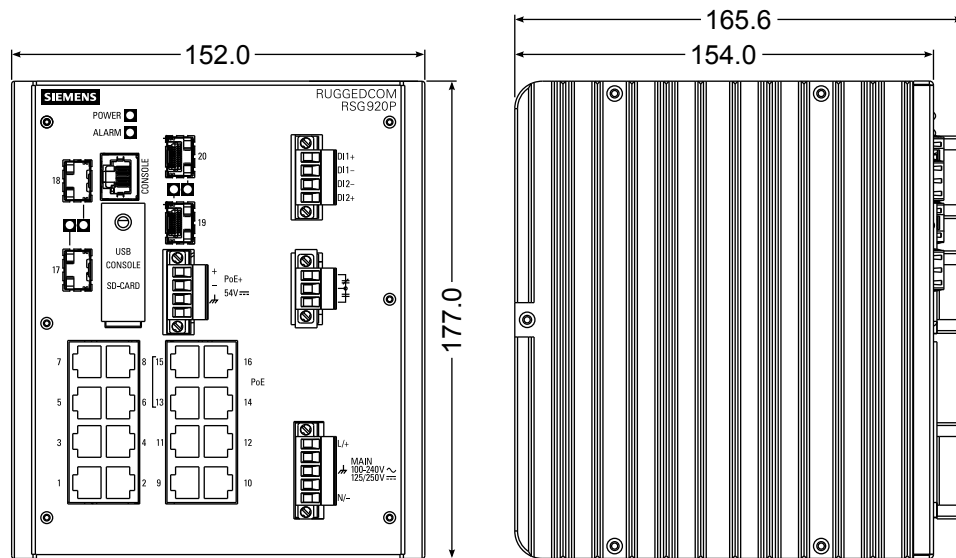
Parameter	Value
Dimensions	Refer to <a href="#">Chapter 5, Dimension Drawings</a>
Weight	4.7 kg (10.5 lbs)
Ingress Protection	IP40 (1 mm or 0.04 in objects)
Enclosure	Aluminum

# 5 Dimension Drawings



## NOTE

*All dimensions are in millimeters, unless otherwise stated.*



**Figure 24: Overall Dimensions**

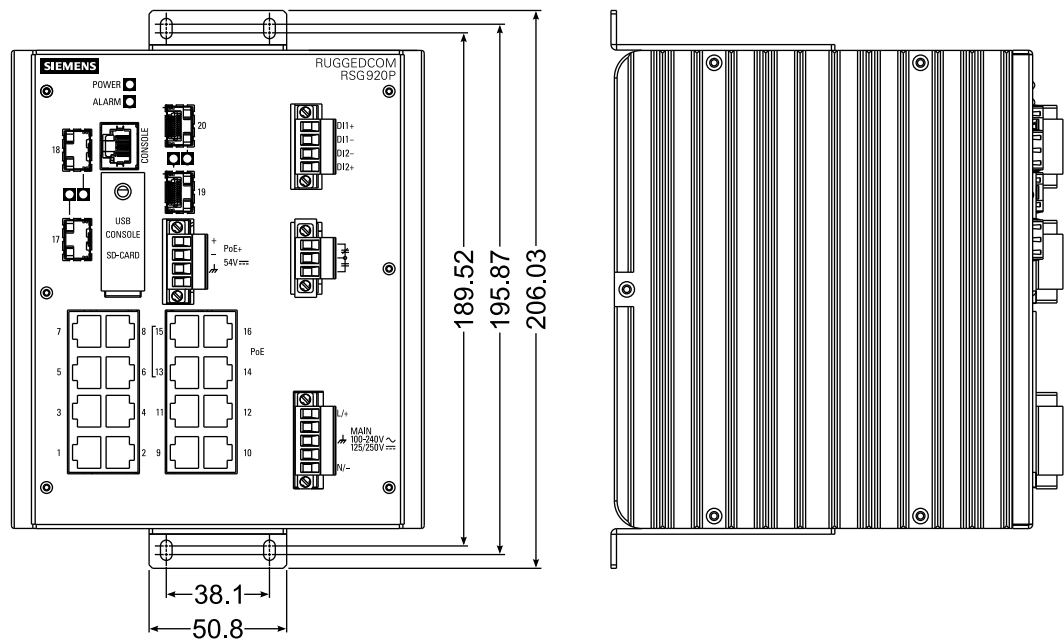


Figure 25: Panel Mount Dimensions (Rear Mount Shown)

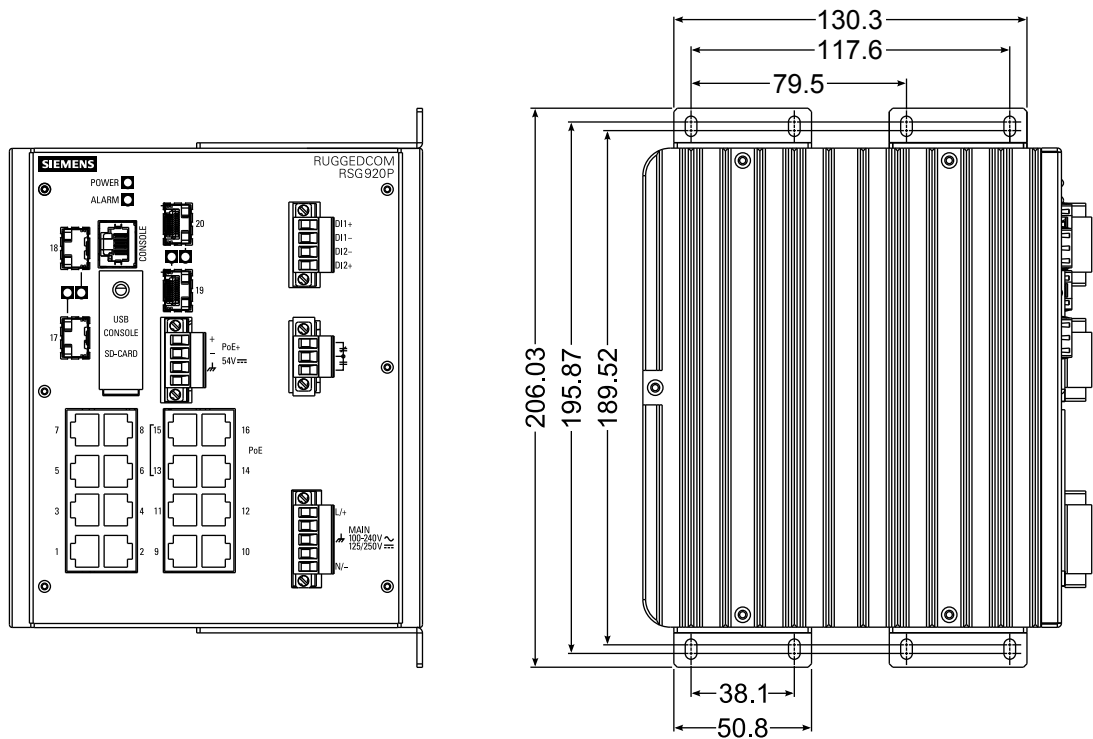


Figure 26: Panel Mount Dimensions (Side Mount Shown)

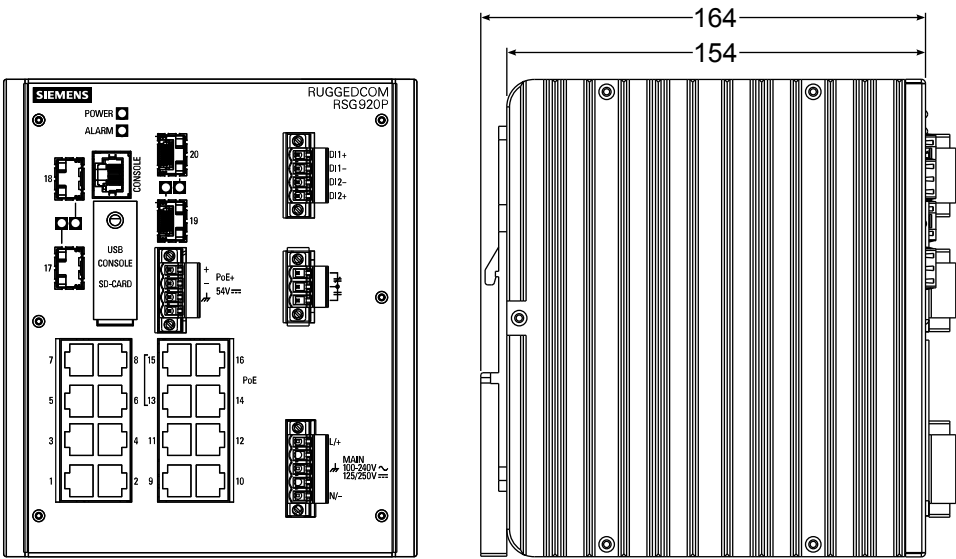


Figure 27: DIN Rail Mount Dimensions





# 6 Certification

The RUGGEDCOM RSG920P 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 RSG920P 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**

- IEC 61000-6-2 (Generic Industrial)
- NEMA TS-2 (Traffic Control Equipment)
- EN 50121-4 (Wayside Rail EMI)
- EN 50121-3-2 (Wayside Rail EMC)
- EN 45545-2 (Fire Protection on Rail Vehicles and Tunnels)

## 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 50581, EN 60825-1, EN 55011, EN 50121-3-2, EN 50121-4	CE Compliance is claimed via Declaration of Self Conformity Route
FCC	FCC Part 15, Class A	Approved

Agency	Standards	Comments
FDA/CDRH	21 CFR Chapter I, Sub-chapter J	Approved

## Section 6.3

## EMI and Environmental Type Tests

The RUGGEDCOM RSG920P has passed the following EMI and environmental tests.

### >> EMI Type Tests

Test	Description		Test Levels	Severity Levels
IEC/EN 61000-4-2	Electrostatic Discharge (ESD)	Enclosure Contact	6 kV	3
		Enclosure Air	8 kV	3
IEC/EN 61000-4-3	Radiated Radio Frequency Immunity (RFI)	Enclosure ports	20 V/m, 80-1000 MHz, 80% Modulation with 1 kHz Sine Wave Signal	X
			20 V/m, 1.4-2.7 GHz, 80% Modulation with 1 kHz Sine Wave Signal	
IEC 61000-4-4	Burst (Electrical Fast Transient)	Signal ports	+/- 2 kV on I/O Lines > 3 m (9.8 ft)	3
		AC Power Ports	+/- 2 kV	3
IEC 61000-4-5	Surge Withstand Immunity	Signal ports	+/- 2 kV Line-to-Earth	3
			+/- 1 kV Line-to-Line	2
		AC Power Ports	+/- 2 kV Line-to-Earth	3
IEC/EN 61000-4-6	Induced (Conducted) Radio Frequency Immunity (RFI)	Signal ports	10 V	3
		AC Power Ports	10 V	3
		Earth ground ports	10 V	3
IEC/EN 61000-4-8	Magnetic Field	DC	300 A/m	X
		AC	100 A/m at 16.7 Hz 100 A/m at 50 and 60 Hz	4
IEC/EN 61000-4-11	Voltage Dips and Interrupts		0% for 1 Cycles 40% for 10 Cycles 70% for 25 Cycles 0% for 250 Cycles	3
IEC/EN 61000-3-2	Harmonic Current Emissions		Class A	
IEC/EN 61000-3-3	Voltage Fluctuation and Flicker in Low-Voltage Supply Systems		Voltage Fluctuation Flicker	

## » Environmental Type Tests

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

