SIEMENS

RUGGEDCOM RX1500

Installation Guide

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Preface

This guide describes the RUGGEDCOM RUGGEDCOM RX1500. It describes the major features of the device, installation, commissioning and important technical specifications.

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

CONTENTS

- "Alerts"
- "Related Documents"
- "Accessing Documentation"
- "Training"
- "Customer Support"

Alerts

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



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



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



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



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



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

Related Documents

Other documents that may be of interest include:

- *RUGGEDCOM ROX II User Guide for the RUGGEDCOM RX1500*
- *RUGGEDCOM RX1500 Series Modules Catalog*

Accessing Documentation

>

The latest user documentation for RUGGEDCOM RX1500 is available online at https://www.siemens.com/ruggedcom. To request or inquire about a user document, contact Siemens Customer Support.

Training

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

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

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

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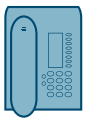
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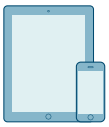
Online

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



Telephone

Call a local hotline center to submit a Support Request (SR). To locate a local hotline center, visit http://www.automation.siemens.com/mcms/aspa-db/en/automation-technology/Pages/default.aspx.



Mobile App

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

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

1 Introduction

The RUGGEDCOM RUGGEDCOM RX1500 is a cost-efficient, rugged Layer 3 switch and router. The RUGGEDCOM RX1500's modular and field replaceable platform can be equipped with WAN, serial, and Ethernet options, making it ideally suited for electric power utilities, the industrial plant floor, and traffic control systems.

The RUGGEDCOM RX1500 is designed to provide a high level of immunity to electromagnetic interference (EMI) and heavy electrical surges typical of the harsh environments found in many industrial applications. An operating temperature range of -40 to 85 °C (-40 to 185 °F) allows the RUGGEDCOM RX1500 to be placed in almost any location.

CONTENTS

- Section 1.1, "Feature Highlights"
- Section 1.2, "Description"

Section 1.1

Feature Highlights

Reliability in Harsh Environments

- Immunity to EMI and high voltage electrical transients
- -40 to 85 °C (-40 to 185 °F) operating temperature (no fans)
- Failsafe output relay for critical failure or error alarming

Universal Power Supply Options

- Dual redundant, modular, hot-swappable power supplies
- Fully integrated power supplies (no external adapters)
- Input voltage ranges: 13-36 VDC and 37-72 VDC or 85-264 VAC and 88-300 VDC for worldwide operability
- CSA/UL 60950-1 safety approved to 85 °C (185 °F)

Physical Ports

- Field replaceable line modules
- Up to 24 100Base-FX ports
- Up to 24 10/100Base-TX ports
- Up to 12 10Base-FL/100Base-SX ports
- Up to 8 Gigabit Ethernet ports
- Up to 24 serial ports
- Up to 4 T1/E1 RJ48C ports or 2 E1 BNC ports
- Up to 2 DDS (Digital Data Services) ports
- Up to 8 active cellular data interfaces

Section 1.2

Description

The RUGGEDCOM RX1500 features various ports, controls and indicator LEDs on the front panel for connecting, configuring and troubleshooting the device.

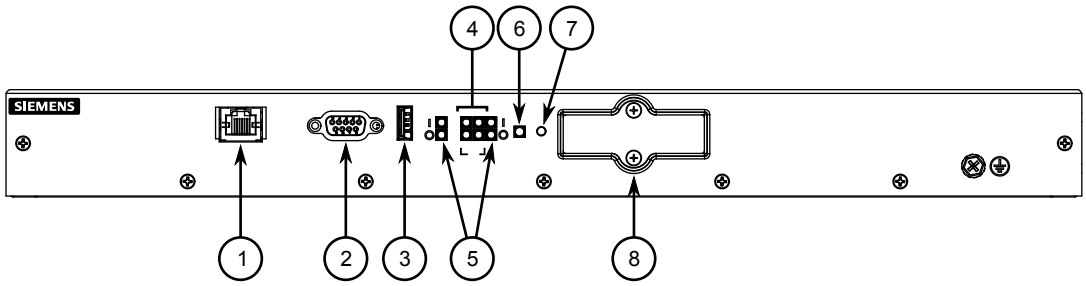


Figure 1: RUGGEDCOM RX1500

1. Management Port **2.** RS232 Serial Console Port (DB9) **3.** Utility USB Port **4.** Port Status LEDs **5.** Power Status LEDs **6.** Alarm Indicator LED **7.** Lamp Test/Alarm Cut-Off (LT/ACO) Button **8.** Compact Flash Card Port

Management Port	This 10/100Base-T Ethernet port is used for system management that is out-of-band from the switch fabric.
RS-232 Serial 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 3.1, "Connecting to the Device".
Utility USB Port	Use the USB port to upgrade the ROX II software or install files, such as configuration files and feature key files. For more information, refer to the *RUGGEDCOM ROX II User Guide* for the RUGGEDCOM RX1500.
Lamp Test/Alarm Cut-Off (LT/ACO) Button	This button performs two functions: • Press and hold this button to test all indicator LEDs • Press and release this button to acknowledge an active alarm
Power Status LEDs	Indicates the status of the power modules. • I = The power module is receiving power • O = The power module is supplying power
Port Status LEDs	Indicates when ports are active. • Green = OK • Orange = Warning alert • Red = Configuration error
Alarm Indicator LED	Indicates when an alarm condition exists. • Green = Alarms cleared/acknowledged • Red = Alarm
Compact Flash Card Port	Houses the CompactFlash (CF) card that contains active and backup installations of RUGGEDCOM ROX II, along with the configuration database and other system data. For more information, refer to Section 3.3, "Accessing the CompactFlash Card".

2 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!
Radiation hazard – risk of Radio Frequency (RF) exposure. This device is compliant with the requirements set forth in FCC 47 CFR, section 1.1307, addressing Radio Frequency (RF) exposure from radio frequency base stations, as defined in FCC OET Bulletin 65 [http://transition.fcc.gov/Bureaus/Engineering_Technology/Documents/bulletins/oet65/oet65.pdf]. The emitted radiation should be as little as possible. To achieve minimum RF exposure, install the device when it is configured not to transmit and set it to operational mode remotely, rather than having a technician enable transmission on-site. For maintenance of the base station, or other operations which require RF exposure, the exposure should be minimized in time and according to the regulations set forth by the country of installation or the Federal Communications Commission (FCC).

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.*

CONTENTS

- Section 2.1, “General Procedure”
- Section 2.2, “Required Tools and Materials”
- Section 2.3, “Cabling Recommendations”

- Section 2.4, “Mounting the Device”
- Section 2.5, “Connecting the Failsafe Alarm Relay”
- Section 2.6, “Connecting Power”

Section 2.1
General Procedure

The general procedure for installing the device is as follows:

1. Review the relevant certification information for any regulatory requirements. For more information, refer to Section 7.1, “Approvals”.
2. Review the *RUGGEDCOM RX1500 Series Modules Catalog* for special installation or regulatory requirements related to the modules installed in the device. In the case of cellular modem line modules, this includes antenna installation and regulatory requirements.
3. Mount the device.
4. Connect the failsafe alarm relay.
5. Connect power to the device and ground the device to safety Earth.
6. Connect the device to the network.
7. Configure the device.

Section 2.2
Required Tools and Materials

The following tools and materials are required to install the RUGGEDCOM RX1500:

Tools/Materials	Purpose
AC/DC power cord (16 AWG)	For connecting power to the device.
Lightning protector	For protecting the device from harmful electrical strikes.
Shielded coaxial cables	For connecting the device to antennas and an Ethernet network.
SIM Card(s) provided by the network carrier	For accessing a network carrier's cellular network. Required only if a cellular modem module is equipped.
Flathead screwdriver	For mounting the device to a DIN rail.
Phillips screwdriver	For mounting the device to a panel.
4 x #6-32 screws	For mounting the device to a panel.
Braided or equivalent ground wire	For grounding the device to safety Earth.

Section 2.3
Cabling Recommendations

Siemens recommends using SIMATIC NET industrial Ethernet shielded cables for all Ethernet ports.

CONTENTS

- Section 2.3.1, “Protection On Twisted-Pair Data Ports”
- Section 2.3.2, “Gigabit Ethernet 1000Base-TX Cabling Recommendations”

Section 2.3.1
Protection On Twisted-Pair Data Ports

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.

Section 2.3.2
Gigabit Ethernet 1000Base-TX Cabling Recommendations

The IEEE 802.3ab Gigabit Ethernet standard defines 1000 Mbit/s 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.

Section 2.4

Mounting the Device

The RUGGEDCOM RX1500 is designed for maximum mounting and display flexibility. It can be equipped with connectors that allow it to be installed in a 48 cm (19 in) rack, 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 rack, DIN rail or panel hardware installed, refer to Chapter 6, Dimension Drawings.

CONTENTS

- Section 2.4.1, “Mounting the Device to a Rack”
- Section 2.4.2, “Mounting the Device on a DIN Rail”
- Section 2.4.3, “Mounting the Device to a Panel”

Section 2.4.1

Mounting the Device to a Rack

For rack mount installations, the RUGGEDCOM RX1500 can be equipped with rack mount adapters pre-installed at the front or rear of the chassis. Additional adapters are provided for added stability.

CAUTION!

Vibration hazard – risk of damage to the device. Always use four rack mount adapters (two at the front of the device and two at the rear) when installing the device in high-vibration or seismically active locations.

CAUTION!

Electrical/mechanical hazard – risk of damage to the device. Before installing the device in a rack, make sure of the following:

- *When installing the device in a closed or multi-device rack, be aware that the operating ambient temperature of the rack may be higher than the ambient temperature of the room. Make sure the rack is installed in a suitable environment that can withstand the maximum ambient temperature generated by the rack.*
- *Do not exceed the maximum number of devices or weight restrictions specified by the rack manufacturer.*
- *Do not overload the supply circuit. Refer to the over-current protection and power supply ratings specified by the rack manufacturer.*

- *Make sure the rack and all devices have a proper ground-to-Earth connection. Pay particular attention to power supply connections other than direct connections to the branch circuit (e.g. power strips).*

To secure the device to a standard 48 cm (19 in) rack, do the following:

1. Make sure the rack mount adapters are installed on the correct side of the chassis.
   - To make the modules and ports accessible, install the rack mount adapters at the rear of the chassis
   - To make the management ports and LEDs accessible, install the rack mount adapters at the front of the chassis

NOTE
The chassis features multiple mounting holes, allowing the rack mount adapters to be installed up to 25 mm (1 in) from the face of the device.

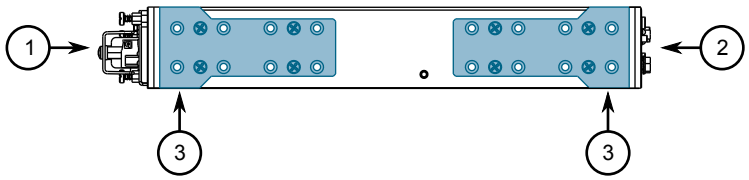


Figure 2: Rack Mount Adapters

1. Rear **2.** Front **3.** Rack Mount Adapter

2. If required, install adapters on the opposite side of the device to protect from vibrations.
3. Insert the device into the rack.
4. Secure the adapters to the rack using the supplied hardware.

Section 2.4.2
Mounting the Device on a DIN Rail

For DIN rail installations, the RUGGEDCOM RX1500 can be equipped with panel/DIN rail adapters pre-installed on each side of the chassis. The adapters allow the device to be slid onto a standard 35 mm (1.4 in) DIN rail.

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

1. Align the adapters with the DIN rails and slide the device into place.

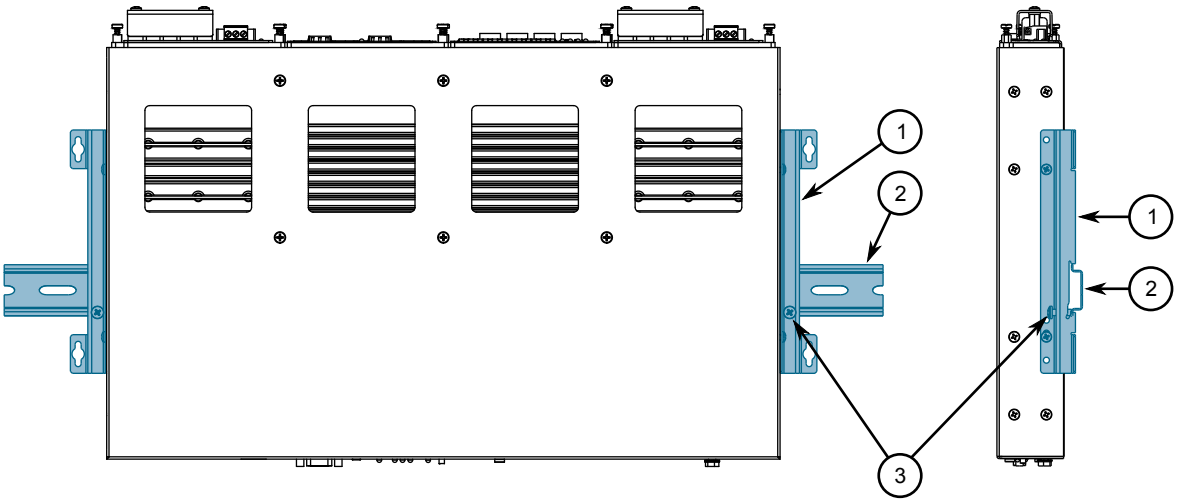


Figure 3: DIN Rail Mounting

1. Panel/DIN Rail Adapter **2.** DIN Rail **3.** Screw

2. Install one of the supplied screws on either side of the device to secure the adapters to the DIN rails.

Section 2.4.3

Mounting the Device to a Panel

For panel installations, the RUGGEDCOM RX1500 can be equipped with panel/DIN rail adapters pre-installed on each side of the chassis. The adapters allow the device to be attached to a panel using screws.

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

1. Place the device against the panel and mark the mounting holes on the panel.

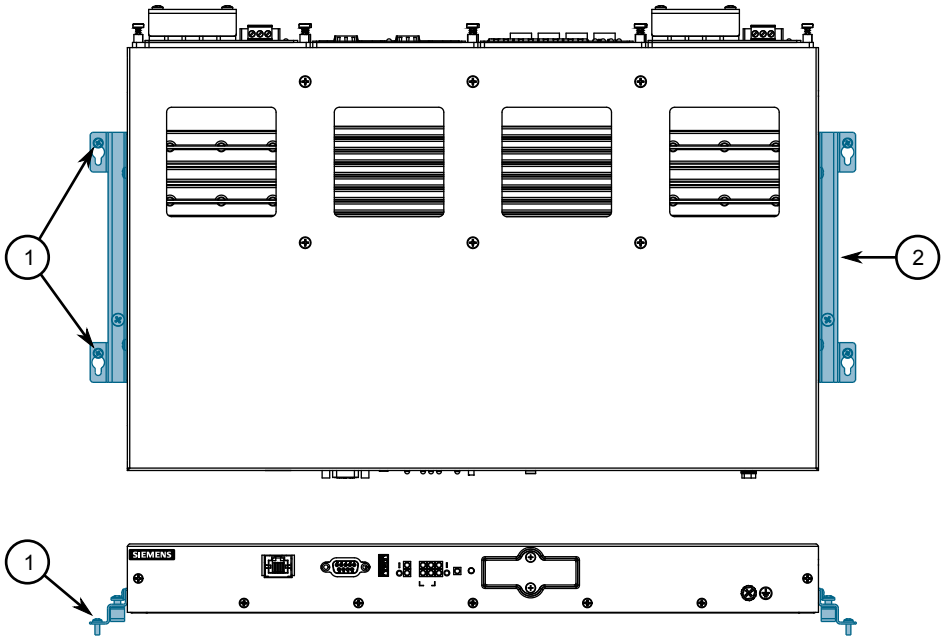


Figure 4: Panel Mounting

1. Screw **2.** Panel/DIN Rail Adapter

2. Prepare the mounting holes
3. Align the device with the mounting holes and secure it to the panel.

Section 2.5

Connecting the Failsafe Alarm Relay

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

NOTE
Control of the failsafe relay output is configurable through ROX II. One common application for this relay is to signal an alarm if a power failure occurs. For more information, refer to the ROX II User Guide for the RUGGEDCOM RX1500.

The following shows the proper relay connections.

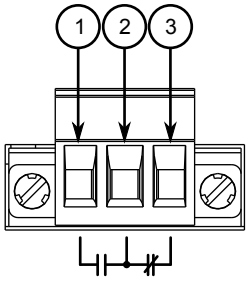


Figure 5: Failsafe Alarm Relay Wiring

1. Normally Open **2.** Common **3.** Normally Closed

Section 2.6

Connecting Power

The RUGGEDCOM RX1500 supports dual redundant high AC, high DC and/or low DC power modules that can be installed in any combination. The use of two power modules is recommended to provide redundancy and load balancing.

Power modules can be equipped with either a screw-type or pluggable terminal block. The screw-type terminal block is installed using Phillips screws and compression plates, allowing either bare wire connections or crimped terminal lugs. Use #6 size ring lugs for secure, reliable connections under severe shock or vibration.

For information about installing or removing a power module, refer to Section 4.3, "Installing/Removing Power Modules".

DANGER!

Electrocution hazard – risk of serious personal injury or death. The device may have two power modules equipped, which may be connected to separate power sources. Make sure all power sources are off before servicing the power module terminals.

IMPORTANT!

- *In a high AC/DC and low DC (24/48 V) power module arrangement, the placement of the AC and DC power supplies is not slot-dependent. Either power module slot can be used for AC or DC power.*
- *For maximum redundancy in a dual power module configuration, use two independent power sources.*
- *Use only #16 gage copper wiring when connecting terminal blocks.*
- *The maximum wire length between the terminal block and power source must not exceed 6 m (20 ft) for 24 V power supplies or 18 m (60 ft) for 48 V power supplies.*
- *For 125/230 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.*
- *It is recommended to provide a separate 20 A circuit breaker for each power module module.*

- *Equipment must be installed according to applicable local wiring codes and standards.*

CONTENTS

- Section 2.6.1, "Connecting High AC/DC Power"
- Section 2.6.2, "Connecting Low DC Power"

Section 2.6.1

Connecting High AC/DC Power

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

DANGER!
Electrocution hazard – risk of death, serious personal injury and/or damage to the device. Make sure the supplied cover is always installed over high voltage screw-type terminal blocks.

CAUTION!
Electrical hazard – risk of damage to equipment. Do not connect AC power cables to a 12, 24 or 48 VDC power supply terminal block. Damage to the power supply may occur.

NOTE
The screw-type terminal block is installed using Phillips screws and compression plates, allowing either bare wire connections or crimped terminal lugs. Use #6 size ring lugs for secure, reliable connections.

1. Connect the power supply terminal block to the device.

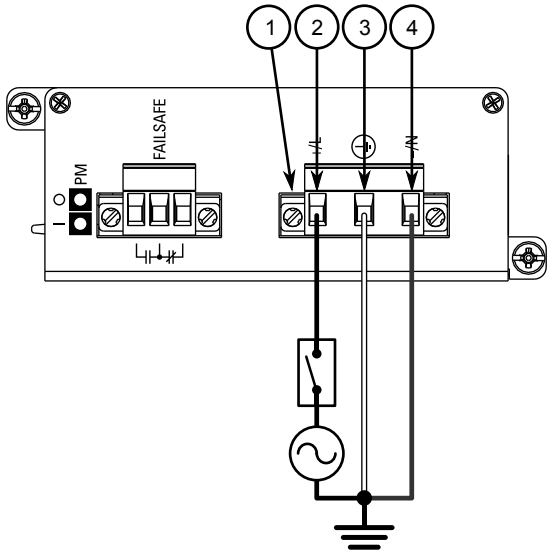


Figure 6: AC Terminal Block Wiring – Pluggable Terminal Block for HIP Power Supplies

1. 3-Position Terminal Block **2.** Positive/Live (+/L) Terminal **3.** Ground Terminal **4.** Negative/Neutral (-/N) Terminal

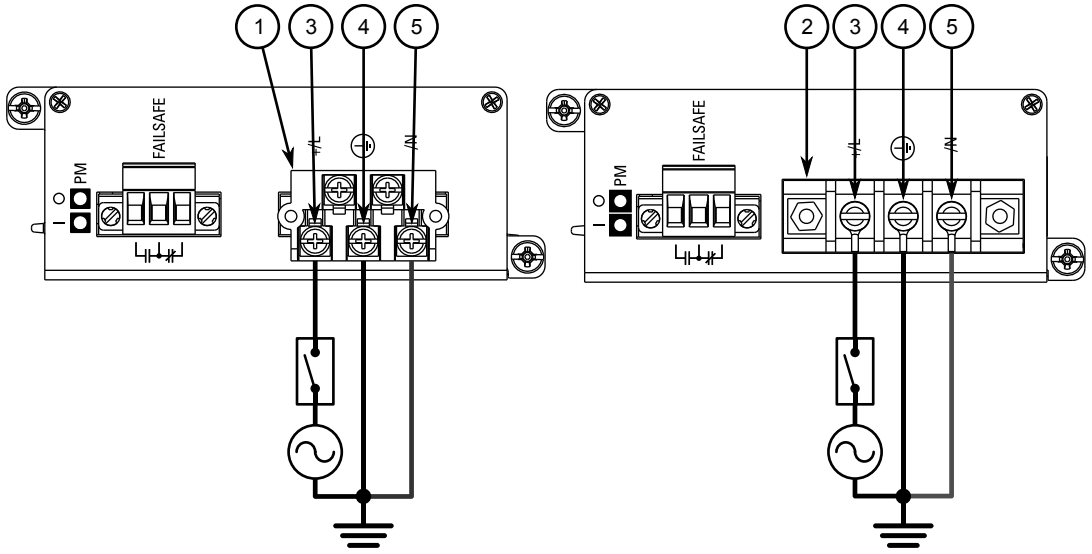


Figure 7: AC Terminal Block Wiring – Screw-Type Terminal Block for HI Power Supplies

1. 5-Position Terminal Block **2.** 3-Position Terminal Block **3.** Positive/Live (+/L) Terminal **4.** Ground Terminal **5.** Negative/Neutral (-/N) Terminal

2. Connect the positive wire from the power source to the positive/live (+/L) terminal on the terminal block.
3. Connect the negative wire from the power source to the neutral/negative (-/N) terminal on the terminal block.
4. Using a braided wire or other appropriate grounding wire, connect the ground terminal to the chassis ground connection. The ground terminal is used as the ground conductor for surge and transient suppression circuitry internal to the unit.
5. Using a #10 ring lug and #10-32 screw, secure the ground terminal on the power source to the chassis ground terminal on the device. Make sure the lug is tightened to 3.4 N·m (30 lbf·in).

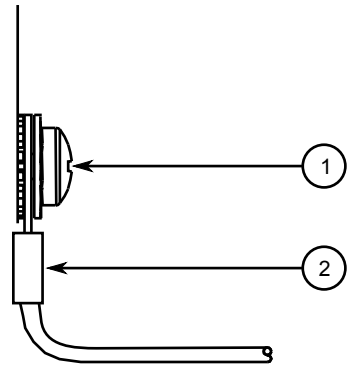


Figure 8: Chassis Ground Connection

1. #10-32 Screw **2.** #10 Ring Lug

6. Install the safety cover over the terminal block.

Section 2.6.2

Connecting Low DC Power

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

CAUTION!
Electrical hazard – risk of damage to equipment. Do not connect AC power cables to a 12, 24 or 48 VDC power supply terminal block. Damage to the power supply may occur.

IMPORTANT!
When connecting the device to a DC power source, make sure the source provides only positive voltage.

NOTE
The screw-type terminal block is installed using Phillips screws and compression plates, allowing either bare wire connections or crimped terminal lugs. Use #6 size ring lugs for secure, reliable connections.

1. Connect the power supply terminal block to the device.

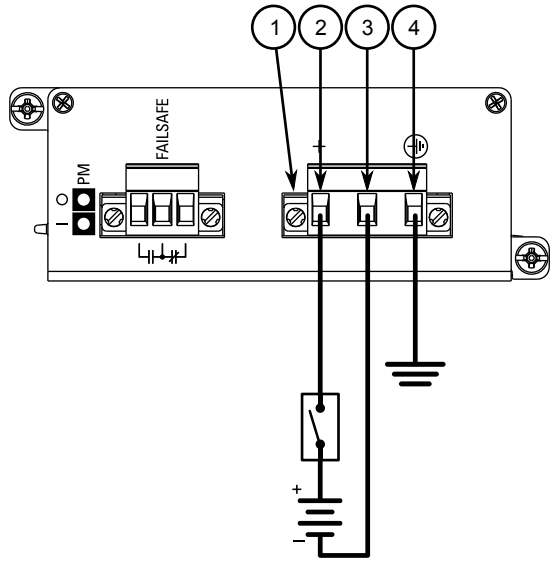


Figure 9: DC Terminal Block Wiring – Pluggable Terminal Block for 12P, 24P and 48P Power Supplies

1. 3-Position Terminal Block **2.** Positive (+) Terminal **3.** Negative (-) Terminal **4.** Ground Terminal

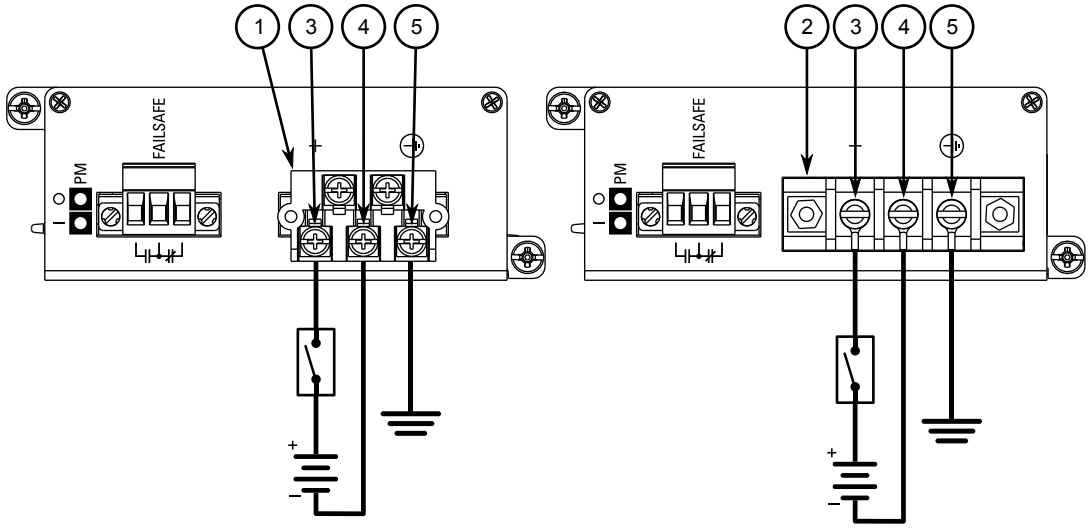


Figure 10: DC Terminal Block Wiring – Screw-Type Terminal Block for 12, 24 and 48 Power Supplies

1. 5-Position Terminal Block **2.** 3-Position Terminal Block **3.** Positive (+) Terminal **4.** Negative (-) Terminal **5.** Ground Terminal

2. Connect the positive wire from the power source to the positive (+) terminal on the terminal block.
3. Connect the negative wire from the power source to the negative (-) terminal on the terminal block.
4. Using a braided wire or other appropriate grounding wire, connect the ground terminal to the chassis ground connection. The surge ground terminal is used as the ground conductor for all surge and transient suppression circuitry internal to the unit.
5. Using a #10 ring lug and #10-32 screw, secure the ground terminal on the power source to the chassis ground terminal on the device. Make sure the lug is tightened to 3.4 N·m (30 lbf·in).

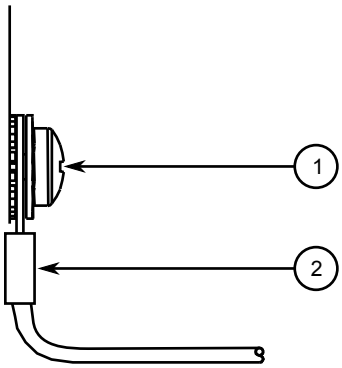


Figure 11: Chassis Ground Connection

1. #10-32 Screw **2.** #10 Ring Lug

6. Install the safety cover over the terminal block. **This is mandatory for 48 VDC power supplies.**

3 Device Management

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

CONTENTS

- Section 3.1, "Connecting to the Device"
- Section 3.2, "Configuring the Device"
- Section 3.3, "Accessing the CompactFlash Card"

Section 3.1

Connecting to the Device

The following describes the various methods for accessing the RUGGEDCOM ROX II console and Web interfaces on the device. For more detailed instructions, refer to the *RUGGEDCOM ROX II User Guide* for the RUGGEDCOM RX1500.

» Serial Console and Management Ports

Connect a workstation directly to the serial console or management ports to access the boot-time control and RUGGEDCOM ROX II interfaces. The serial console port provides access to RUGGEDCOM ROX II's console interface, while the management port provides access to ROX II's console and Web interfaces.

IMPORTANT!
The serial console and management (MGMT) ports are 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:

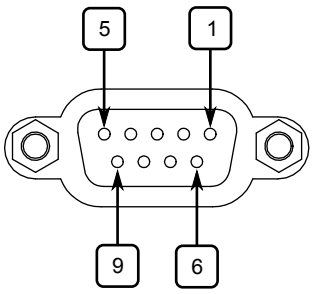


Figure 12: Serial DB9 Console Port

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

Pin	Name	Description
9	Reserved (Do Not Connect)	

For information about how to connect to the device via the serial console port, refer to the *RUGGEDCOM ROX II CLI User Guide* for the RUGGEDCOM RX1500.

For information about how to connect to the device via the management port, refer to either the *RUGGEDCOM ROX II Web Interface User Guide* or the *RUGGEDCOM ROX II CLI User Guide* for the RUGGEDCOM RX1500.

The management port is a 10/100Base-TX copper Ethernet port with an RJ-45 connector. The following is the pin-out for the management port:

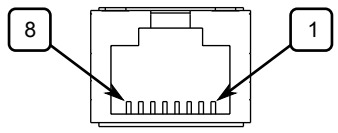


Figure 13: RJ-45 Management Port

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

» Communication Ports

Connect any of the available Ethernet ports on the device to a management switch and access the RUGGEDCOM ROX II console and Web interfaces via the device's IP address. The factory default IP address for the RUGGEDCOM RX1500 is https://192.168.0.2.

For more information about available ports, refer to Chapter 4, *Modules*.

Section 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 ROX II interface. For more information about configuring the device, refer to the *RUGGEDCOM ROX II User Guide* associated with the installed software release.

Section 3.3

Accessing the CompactFlash Card

The RUGGEDCOM RX1500 features a removable CompactFlash (CF) card that stores configuration files, firmware (active and backup versions), file-based feature keys and other system files.

CAUTION!
Configuration hazard – risk of data corruption/loss. Do not remove or insert the CF card when the device is powered on.

The CF card should only be removed in the following scenarios:

- The chassis is defective (with the exception of power and media modules)
- The CF card is deemed defective or corrupt
- The device is rendered non-functional due to a serious configuration error, data corruption, or hardware fault

CAUTION!
Configuration hazard – risk of data corruption/loss. The following will void the warranty and potentially result in configuration data corruption/loss:

- *Using a CF card not approved by Siemens for use with this device*
- *Removing the CF card in any scenario other than those described in this section*

» Inserting the CF card

To insert the CF card into the device, do the following:

IMPORTANT!
The device should only be powered on when the CF card is present.

1. Make sure the device is powered down.
2. Remove the CF card access panel.
3. Insert the CF card into the slot until it is fully seated.

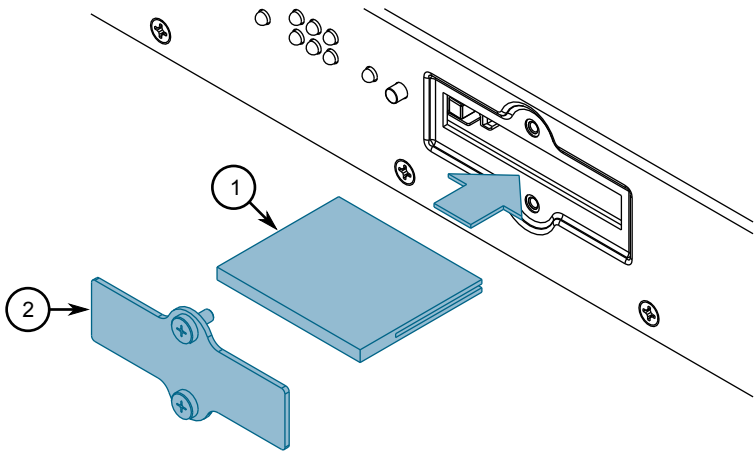


Figure 14: Inserting the CF Card

1. CompactFlash Card **2.** Access Panel

4. Secure the CF card access panel to the chassis.

Removing the CF card

To remove the CF card from the device, do the following:

1. Make sure the device is powered down.
2. Remove the CF card access panel.

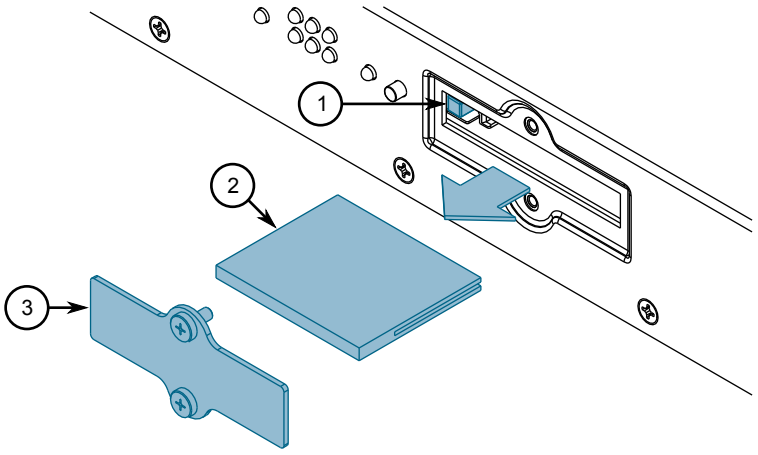


Figure 15: Removing the CF Card

1. Ejector Button **2.** CompactFlash Card **3.** Access Panel

3. Press the ejector button to the left of the CF card and then pull the card out.
4. Secure the CF card access panel to the chassis.

4 Modules

The RUGGEDCOM RX1500 features slots for up to four field-replaceable line modules, which can be used to expand and customize the capabilities of the device to suit specific applications. A variety of modules are available, each featuring a specific type of communication port: copper Ethernet, fiber optic Ethernet, SFP, WAN, cellular modem and DDS. The RUGGEDCOM APE (Application Processing Engine) line module, a utility-grade computing platform for running third-party applications directly from within the RUGGEDCOM RX1500, is also available.

Modules can be installed in any one of the available slots in the device chassis.

Use the RUGGEDCOM ROX II software to determine which ports are equipped on the device. For more information, refer to the *RUGGEDCOM ROX II User Guide* for the device.

NOTE
Only one T1/E1 WAN module and up to two DDS modules are supported.

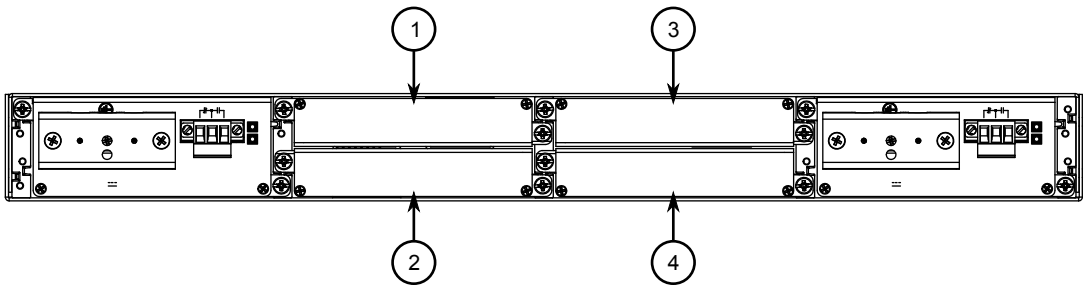


Figure 16: Available Chassis Slots

1. Slot 1 **2.** Slot 2 **3.** Slot 3 **4.** Slot 4

CONTENTS

- Section 4.1, “Available Modules”
- Section 4.2, “Installing/Removing Line Modules”
- Section 4.3, “Installing/Removing Power Modules”

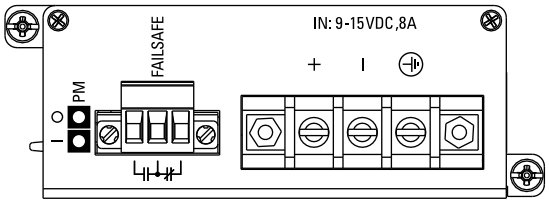
Section 4.1

Available Modules

The following is a list of all power and line modules available for use in the RUGGEDCOM RX1500. For more information about individual modules, refer to the *RUGGEDCOM RX1500 Series Modules Catalog* [https://support.industry.siemens.com/cs/ca/en/view/109747072].

Power Supply Modules

RUGGEDCOM RX1500PN PS 12



Specifications

Input Range: 9 to 15 VDC

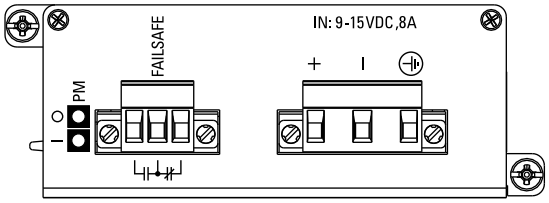
Terminal Type: Screw

Article Numbers

6GK6015-0AL17-0AA0 (Standard)

6GK6015-0AL17-0AA1 (Conformal Coated)

RUGGEDCOM RX1500PN PS 12P



Specifications

Input Range: 9 to 15 VDC

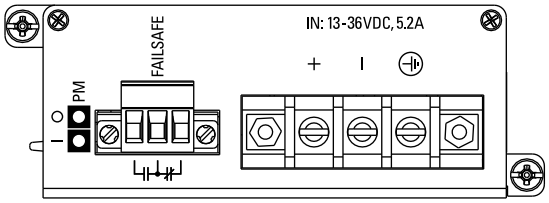
Terminal Type: Pluggable

Article Numbers

6GK6015-0AL18-0AA0 (Standard)

6GK6015-0AL18-0AA1 (Conformal Coated)

RUGGEDCOM RX1500PN PS 24



Specifications

Input Range: 13 to 36 VDC

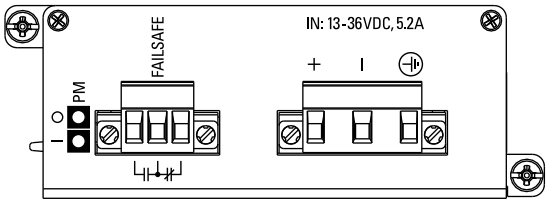
Terminal Type: Screw

Article Numbers

6GK6015-0AL11-0AA0 (Standard)

6GK6015-0AL11-0AA1 (Conformal Coated)

RUGGEDCOM RX1500PN PS 24P



Specifications

Input Range: 13 to 36 VDC

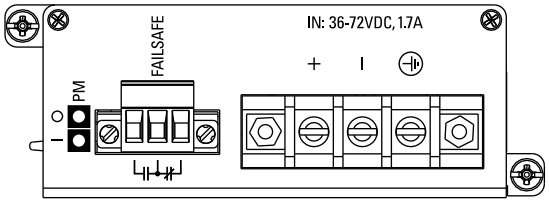
Terminal Type: Pluggable

Article Numbers

6GK6015-0AL14-0AA0 (Standard)

6GK6015-0AL14-0AA1 (Conformal Coated)

RUGGEDCOM RX1500PN PS 48



Specifications

Input Range: 36 to 72 VDC

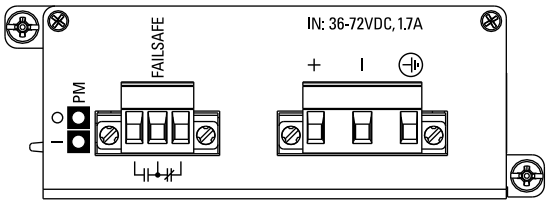
Terminal Type: Screw

Article Numbers

6GK6015-0AL12-0AA0 (Standard)

6GK6015-0AL12-0AA1 (Conformal Coated)

RUGGEDCOM RX1500PN PS 48P



Specifications

Input Range: 36 to 72 VDC

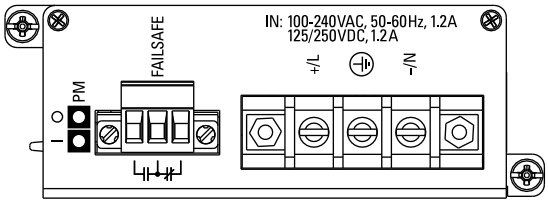
Terminal Type: Pluggable

Article Numbers

6GK6015-0AL15-0AA0 (Standard)

6GK6015-0AL15-0AA1 (Conformal Coated)

RUGGEDCOM RX1500PN PS HI



Specifications

Input Range: 88 to 300 VDC or 85 to 264 VAC

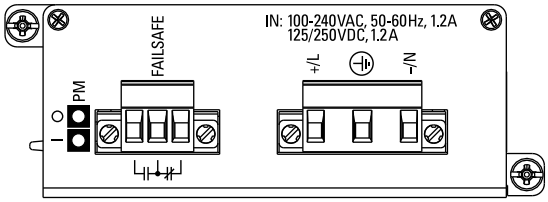
Terminal Type: Screw

Article Numbers

6GK6015-0AL13-0AA0 (Standard)

6GK6015-0AL13-0AA1 (Conformal Coated)

RUGGEDCOM RX1500PN PS HIP



Specifications

Input Range: 88 to 300 VDC or 85 to 264 VAC

Terminal Type: Screw

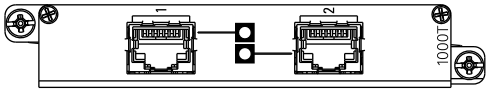
Article Numbers

6GK6015-0AL16-0AA0 (Standard)

6GK6015-0AL16-0AA1 (Conformal Coated)

» Copper Ethernet Modules

RUGGEDCOM RX1500PN LM CG01



Specifications

Ports: 2

Speed: 1000 Mbps

Interface: TX

Port Type: RJ45

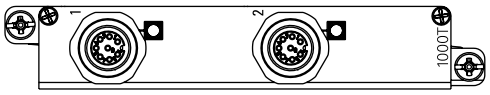
Distance: 100 m (328 ft)

Article Numbers

6GK6015-0AL20-0FC0 (Standard)

6GK6015-0AL20-0FC1 (Conformal Coated)

RUGGEDCOM RX1500PN LM CG03



Specifications

Ports: 2

Speed: 1000 Mbps

Interface: TX

Port Type: M12 (8-Pin, A-Coded)

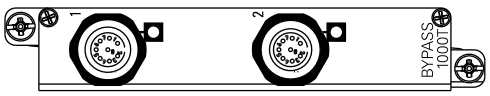
Distance: 100 m (328 ft)

Article Numbers

6GK6015-0AL20-0PB0 (Standard)

6GK6015-0AL20-0PB1 (Conformal Coated)

RUGGEDCOM RX1500PN LM CG03B



Specifications

Ports: 2

Speed: 1000 Mbps

Interface: TX

Port Type: M12 (8-Pin, A-Coded, Controlled Bypass)

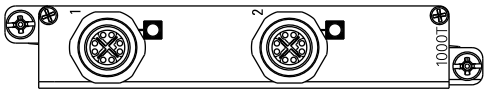
Distance: 100 m (328 ft)

Article Numbers

6GK6015-0AL20-0PE0 (Standard)

6GK6015-0AL20-0PE1 (Conformal Coated)

RUGGEDCOM RX1500PN LM X CG04



Specifications

Ports: 2

Speed: 1000 Mbps

Interface: TX

Port Type: M12 (8-pin, X-Coded)

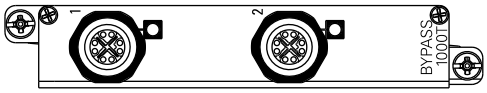
Distance: 100 m (328 ft)

Article Numbers

6GK6015-0AL20-0PH0 (Standard)

6GK6015-0AL20-0PH1 (Conformal Coated)

RUGGEDCOM RX1500PN LM X CG04B



Specifications

Ports: 2

Speed: 1000 Mbps

Interface: TX

Port Type: M12 (8-pin, X-Coded, Controlled Bypass)

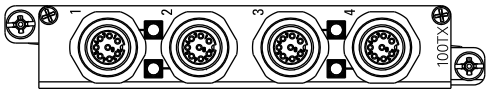
Distance: 100 m (328 ft)

Article Numbers

6GK6015-0AL20-0PJ0 (Standard)

6GK6015-0AL20-0PJ1 (Conformal Coated)

RUGGEDCOM RX1500PN LM 4TX03



Specifications

Ports: 4

Speed: 1000 Mbps

Interface: TX

Port Type: M12 (4-Pin, A-Coded)

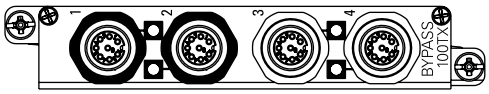
Distance: 100 m (328 ft)

Article Numbers

6GK6015-0AL20-0PC0 (Standard)

6GK6015-0AL20-0PC1 (Conformal Coated)

RUGGEDCOM RX1500PN LM 4TX03B



Specifications

Ports: 4

Speed: 1000 Mbps

Interface: TX

Port Type: M12 (8-Pin, A-Coded, Controlled Bypass)

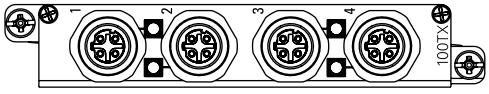
Distance: 100 m (328 ft)

Article Numbers

6GK6015-0AL20-0PF0 (Standard)

6GK6015-0AL20-0PF1 (Conformal Coated)

RUGGEDCOM RX1500PN LM 4TX04



Specifications

Ports: 4

Speed: 1000 Mbps

Interface: TX

Port Type: M12 (4-Pin, D-Coded)

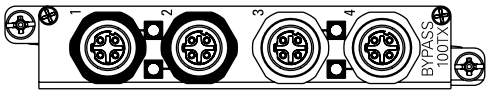
Distance: 100 m (328 ft)

Article Numbers

6GK6015-0AL20-0PD0 (Standard)

6GK6015-0AL20-0PD1 (Conformal Coated)

RUGGEDCOM RX1500PN LM 4TX04B



Specifications

Ports: 4

Speed: 1000 Mbps

Interface: TX

Port Type: M12 (4-Pin, A-Coded, Controlled Bypass)

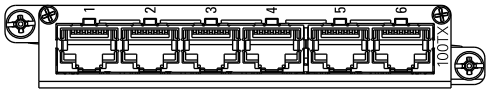
Distance: 100 m (328 ft)

Article Numbers

6GK6015-0AL20-0PG0 (Standard)

6GK6015-0AL20-0PG1 (Conformal Coated)

RUGGEDCOM RX1500PN LM 6TX01



Specifications

Ports: 6

Speed: 100 Mbps

Interface: TX

Port Type: RJ45

Distance: 100 m (328 ft)

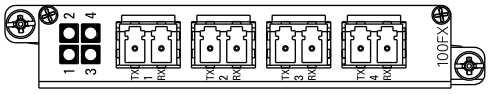
Article Numbers

6GK6015-0AL20-0NB0 (Standard)

6GK6015-0AL20-0NB1 (Conformal Coated)

Fiber Optic Ethernet Modules

RUGGEDCOM RX1500PN LM 4FX11



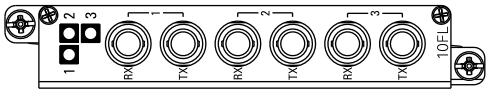
Specifications

Mode: MM
Speed: 100 Mbps
Interface: FX
Wavelength: 1300 nm
Ports: 4
Port Type: LC
Distance: 2 km (1.2 mi)

Article Numbers

6GK6015-0AL20-0BC0 (Standard)
6GK6015-0AL20-0BC1 (Conformal Coated)

RUGGEDCOM RX1500PN LM FL01



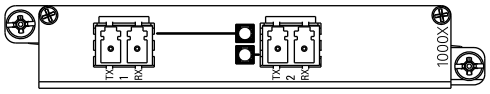
Specifications

Mode: MM
Speed: 10/100 Mbps
Interface: FL/SX
Wavelength: 820 nm
Ports: 3
Port Type: ST
Distance: 2 km (1.2 mi)

Article Numbers

6GK6015-0AL20-0BD0 (Standard)
6GK6015-0AL20-0BD1 (Conformal Coated)

RUGGEDCOM RX1500PN LM FG03



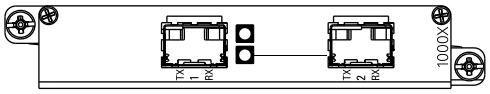
Specifications

Mode: SM
Speed: 1000 Mbps
Interface: LX
Wavelength: 820 nm
Ports: 4
Port Type: LC
Distance: 10 km (6.2 mi)

Article Numbers

6GK6015-0AL20-0EC0 (Standard)
6GK6015-0AL20-0EC1 (Conformal Coated)

RUGGEDCOM RX1500PN LM FG50



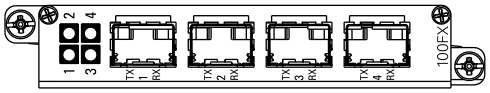
Specifications

SFP Sockets: 2
Speed: 1000 Mbps

Article Numbers

6GK6015-0AL20-0JB0 (Standard)
6GK6015-0AL20-0JB1 (Conformal Coated)

RUGGEDCOM RX1500PN LM FX50



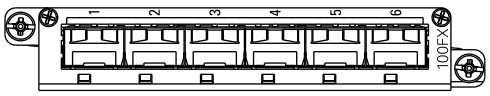
Specifications

SFP Sockets: 4
Speed: 100 Mbps

Article Numbers

6GK6015-0AL20-0JC0 (Standard)
6GK6015-0AL20-0JC1 (Conformal Coated)

RUGGEDCOM RX1500PN LM 6FX50



Specifications

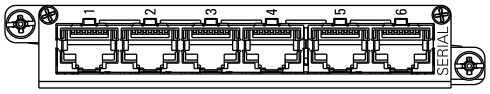
SFP Sockets: 6
Speed: 100 Mbps

Article Numbers

6GK6015-0AL20-0JD0 (Standard)
6GK6015-0AL20-0JD1 (Conformal Coated)

WAN Modules

RUGGEDCOM RX1500PN LM S01



Specifications

Standard: RS232/RS422/RS485

Ports: 6

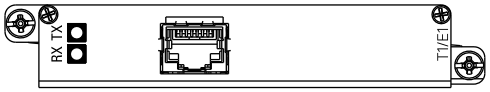
Port Type: RJ45

Article Numbers (Standard)

6GK6015-0AL20-0KB0 (Standard)

6GK6015-0AL20-0KB1 (Conformal Coated)

RUGGEDCOM RX1500PN LM TC1



Specifications

Interface: T1/E1

Ports: 1

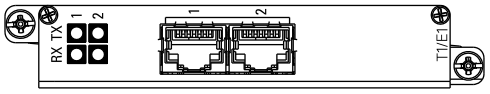
Port Type: RJ48C

Article Numbers (Standard)

6GK6015-0AL20-0MB0 (Standard)

6GK6015-0AL20-0MB1 (Conformal Coated)

RUGGEDCOM RX1500PN LM TC2



Specifications

Interface: T1/E1

Ports: 2

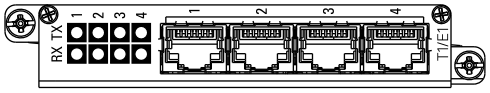
Port Type: RJ48C

Article Numbers (Standard)

6GK6015-0AL20-0MC0 (Standard)

6GK6015-0AL20-0MC1 (Conformal Coated)

RUGGEDCOM RX1500PN LM TC4



Specifications

Interface: T1/E1

Ports: 4

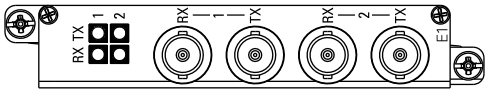
Port Type: RJ48C

Article Numbers (Standard)

6GK6015-0AL20-0MD0 (Standard)

6GK6015-0AL20-0MD1 (Conformal Coated)

RUGGEDCOM RX1500PN LM E02



Specifications

Interface: E1

Ports: 4

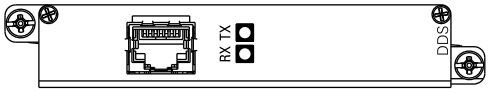
Port Type: BNC (75 Ω)

Article Numbers (Standard)

6GK6015-0AL20-0HC0 (Standard)

6GK6015-0AL20-0HC1 (Conformal Coated)

RUGGEDCOM RX1500PN LM D02



Specifications

Speed: 56 kbps (Master/Slave) or 64 kbps (Slave)

Ports: 1

Port Type: RJ48S

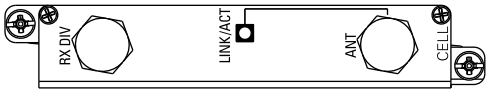
Article Numbers (Standard)

6GK6015-0AL20-0LB0 (Standard)

6GK6015-0AL20-0LB1 (Conformal Coated)

Cellular Modem Modules

RUGGEDCOM RX1500PN LM W11



Specifications

Services: GSM/EDGE/HSPA+

Region: North America (AT&T)

Port Type: 50 Ω SMA

Antennas: 1 x GSM/EDGE/HSPA+, 1 x Receive Diversity (Secondary)

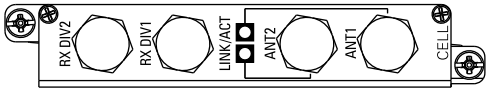
SIM: Dual Mini-SIM (2FF)

Article Numbers (Standard)

6GK6015-0AL20-0WB0 (Standard)

6GK6015-0AL20-0WB1 (Conformal Coated)

RUGGEDCOM RX1500PN LM W12



Specifications

Services: GSM/EDGE/HSPA+

Region: North America (AT&T), European Union, Australia

Port Type: 50 Ω SMA

Antennas: 2 x GSM/EDGE/HSPA+, 2 x Receive Diversity (Secondary)

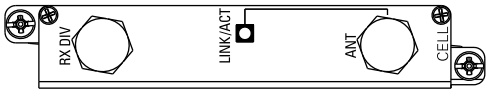
Article Numbers (Standard)

6GK6015-0AL20-0WC0 (Standard)

6GK6015-0AL20-0WC1 (Conformal Coated)

SIM: Dual Mini-SIM (2FF)

RUGGEDCOM RX1500PN LM W21



Specifications

Services: EVDO Rev A

Region: North America (Verizon)

Port Type: 50 Ω SMA

Antennas: 1 x EVDO Rev A, 1 x Receive Diversity (Secondary)

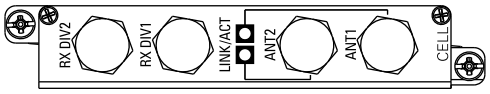
SIM: Dual Mini-SIM (2FF)

Article Numbers (Standard)

6GK6015-0AL20-0WD0 (Standard)

6GK6015-0AL20-0WD1 (Conformal Coated)

RUGGEDCOM RX1500PN LM W22



Specifications

Services: EVDO Rev A

Region: North America (Verizon)

Port Type: 50 Ω SMA

Antennas: 2 x EVDO Rev A, 2 x Receive Diversity (Secondary)

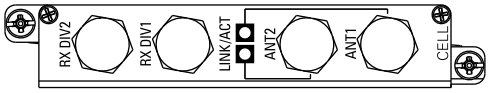
SIM: Dual Mini-SIM (2FF)

Article Numbers (Standard)

6GK6015-0AL20-0WE0 (Standard)

6GK6015-0AL20-0WE1 (Conformal Coated)

RUGGEDCOM RX1500PN LM W32



Specifications

Services: EVDO Rev A

Region: North America (Verizon)

Port Type: 50 Ω SMA

Antennas: 1 x GSM/EDGE/HSPA +, 1 x EVDO Rev A, 2 x Receive Diversity (Secondary)

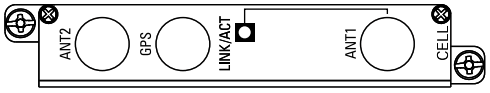
SIM: Dual Mini-SIM (2FF)

Article Numbers (Standard)

6GK6015-0AL20-0WF0 (Standard)

6GK6015-0AL20-0WF1 (Conformal Coated)

RUGGEDCOM RX1500PN LM W41



Specifications

Services: 4G LTE/HSPA+/HSDPA/HSUPA/DC-HSPA+/UMTS/WCDAM/EDGE/GPRS/GSM/GNSS

Region: European Union

Port Type: 50 Ω SMA

Antennas: 1 x LTE Main, 1 x LTE MIMO, 1 x GPS

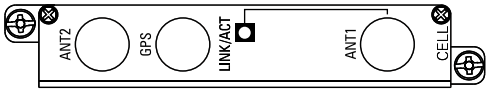
SIM: Dual Mini-SIM (2FF)

Article Numbers (Standard)

6GK6015-0AL20-0WG0 (Standard)

6GK6015-0AL20-0WG1 (Conformal Coated)

RUGGEDCOM RX1500PN LM W51



Specifications

Services: 4G LTE/HSPA+/HSDPA/HSUPA/DC-HSAP+/UMTS/WDCAM/EDGE/GPRS/GSM/CDMA/EVDO/GNSS

Region: North America (AT&T, Rogers, Bell, Telus)

Port Type: 50 Ω SMA

Antennas: 1 x LTE Main, 1 x LTE MIMO, 1 x GPS

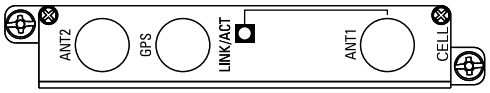
SIM: Dual Mini-SIM (2FF)

Article Numbers (Standard)

6GK6015-0AL20-0WH0 (Standard)

6GK6015-0AL20-0WH1 (Conformal Coated)

RUGGEDCOM RX1500PN LM W61



Specifications

Services: 4G LTE/HSPA+/CDMA/EVDO/GPS/GNSS

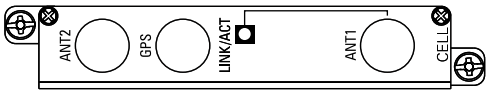
Region: North America (Verizon, Sprint)

Port Type: 50 Ω SMA

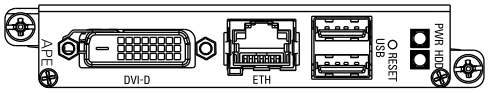
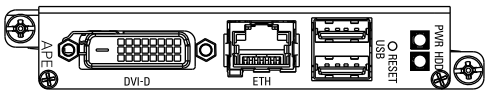
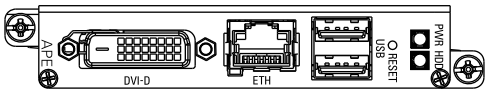
Article Numbers (Standard)

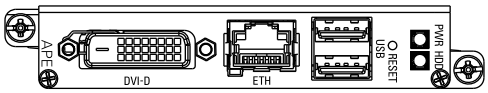
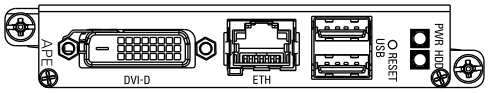
6GK6015-0AL20-0WJ0 (Standard)

6GK6015-0AL20-0WJ1 (Conformal Coated)

	Antennas: 1 x LTE Main, 1 x LTE MIMO, 1 x GPS SIM: Dual Mini-SIM (2FF)	
RUGGEDCOM RX1500PN LM W81 	**Specifications** Services: 4G LTE/HSPA+/EDGE/ GPRS/GSM/UMTS/GNSS Region: Asia-Pacific Port Type: 50 Ω SMA Antennas: 1 x LTE Main, 1 x LTE MIMO, 1 x GPS SIM: Dual Mini-SIM (2FF)	**Article Numbers (Standard)** 6GK60150AL200WK0 (Standard) 6GK60150AL200WK1 (Conformal Coated)

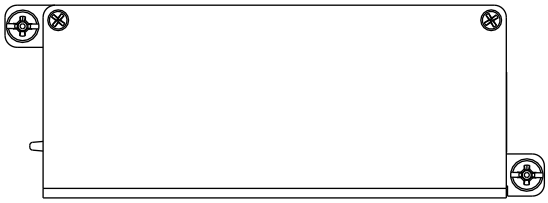
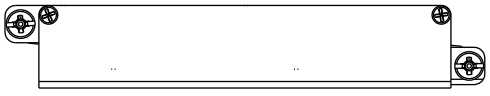
» RUGGEDCOM APE Modules

RUGGEDCOM RX1500PN LM APE1402 	**Specifications** Operating System: Debian Linux® Processor: Intel Atom E660 1.3 GHz, 512 KB L2 Cache RAM: 2 GB DDR2, 800 MHz, 32-bit Disk: 8 GB SATA, Solid State Networking: Realtek RTL8111, RJ45 Gigabit Ethernet Interface USB: 2 x USB 2.1[a] Video: Intel 4108 Graphics Processor, DVI-D	**Article Numbers (Standard)** 6GK6015-0AL20-0GB0 (Standard) 6GK6015-0AL20-0GB1 (Conformal Coated)
RUGGEDCOM RX1500PN LM APE1402W7 	**Specifications** Operating System: Windows® Embedded Standard 7 Processor: Intel Atom E660 1.3 GHz, 512 KB L2 Cache RAM: 2 GB DDR2, 800 MHz, 32-bit Disk: 8 GB SATA, Solid State Networking: Realtek RTL8111, RJ45 Gigabit Ethernet Interface USB: 2 x USB 2.1[a] Video: Intel 4108 Graphics Processor, DVI-D	**Article Numbers (Standard)** 6GK6015-0AL20-0GC0 (Standard) 6GK6015-0AL20-0GC1 (Conformal Coated)
RUGGEDCOM RX1500PN LM APE1404 	**Specifications** Operating System: Debian Linux® Processor: Intel Atom E660T 1.3 GHz, 512 KB L2 Cache RAM: 2 GB DDR2, 800 MHz, 32-bit Disk: 16 GB SATA, Solid State Networking: Realtek RTL8111, RJ45 Gigabit Ethernet Interface USB: 2 x USB 2.1[a] Video: Intel 4108 Graphics Processor, DVI-D	**Article Numbers (Standard)** 6GK6015-0AL20-0GD0 (Standard) 6GK6015-0AL20-0GD1 (Conformal Coated)

RUGGEDCOM RX1500PN LM APE1404W7 	**Specifications** Operating System: Windows® Embedded Standard 7 Processor: Intel Atom E660T 1.3 GHz, 512 KB L2 Cache RAM: 2 GB DDR2, 800 MHz, 32-bit Disk: 16 GB SATA, Solid State Networking: Realtek RTL8111, RJ45 Gigabit Ethernet Interface USB: 2 x USB 2.1[a] Video: Intel 4108 Graphics Processor, DVI-D	**Article Numbers (Standard)** 6GK6015-0AL20-0GE0 (Standard) 6GK6015-0AL20-0GE1 (Conformal Coated)
RUGGEDCOM RX1500PN LM APE1404CKP 	**Specifications** Operating System: Check Point GAiA™ OS Processor: Intel Atom E660T 1.3 GHz, 512 KB L2 Cache RAM: 2 GB DDR2, 800 MHz, 32-bit Disk: 16 GB SATA, Solid State Networking: Realtek RTL8111, RJ45 Gigabit Ethernet Interface USB: 2 x USB 2.1[a] Video: Intel 4108 Graphics Processor, DVI-D	**Article Numbers (Standard)** 6GK6015-0AL20-0GF0 (Standard) 6GK6015-0AL20-0GF1 (Conformal Coated)

[a] *Maximum combined USB device power consumption is 500 mA at 5 V.*

» Blank Modules

RUGGEDCOM RX1500PN PS XXP 	**Specifications** —	**Article Numbers** 6GK6015-0AL10-0AA0 (Standard) 6GK6015-0AL10-0AA1 (Conformal Coated)
RUGGEDCOM RX1500PN LM Blank 	**Specifications** —	**Article Numbers** 6GK6015-0AL20-0AA0 (Standard) 6GK6015-0AL20-0AA1 (Conformal Coated)

Section 4.2

Installing/Removing Line Modules

Upon installing a new line module in the device, all features associated with the module are available in RUGGEDCOM ROX II. For more information, refer to the *RUGGEDCOM ROX II User Guide* for the RUGGEDCOM RX1500.

Once a line module is removed, all the features associated with the module are hidden or disabled in RUGGEDCOM ROX II.

CAUTION!
Electrical hazard – risk of power failure. Do not install more than two RUGGEDCOM APE modules. Installing more than two of this type of module can lead to power fluctuations and irregular shut downs.

IMPORTANT!
Only one WAN line module is supported per chassis.

CAUTION!
Contamination hazard – risk of equipment damage. Prevent the ingress of water, dirts and other debris that may lead to premature equipment failure. Always make sure slots are not left empty and open ports are protected with plugs or covers.

» Removing a Module

To remove a line module, do the following:

1. Make sure power to the device has been disconnected and wait approximately two minutes for any remaining energy to dissipate.
2. [Optional] If the device is installed in a rack, remove it from the rack.
3. Loosen the screws that secure the module.
4. Pull the module from the chassis to disconnect it.

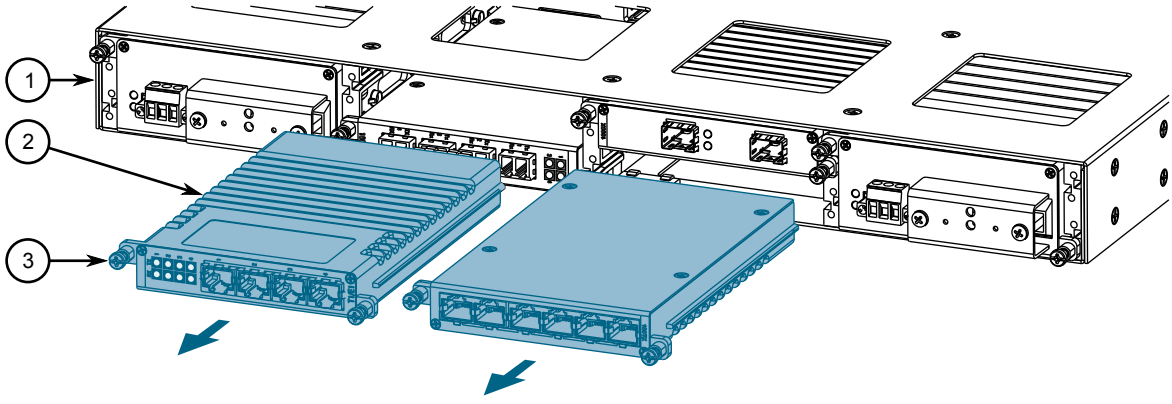


Figure 17: Removing a Module

1. Module **2.** Chassis **3.** Screw

5. Install a new module or a blank module (to prevent the ingress of dust and dirt).
6. [Optional] If necessary, install the device in the rack.
7. Connect power to the device.

» Installing a Module

To install a line module, do the following:

1. Make sure power to the device has been disconnected and wait approximately two minutes for any remaining energy to dissipate.
2. [Optional] If the device is installed in a rack, remove it from the rack.
3. Remove the current module from the slot.
4. Insert the new module into the slot.

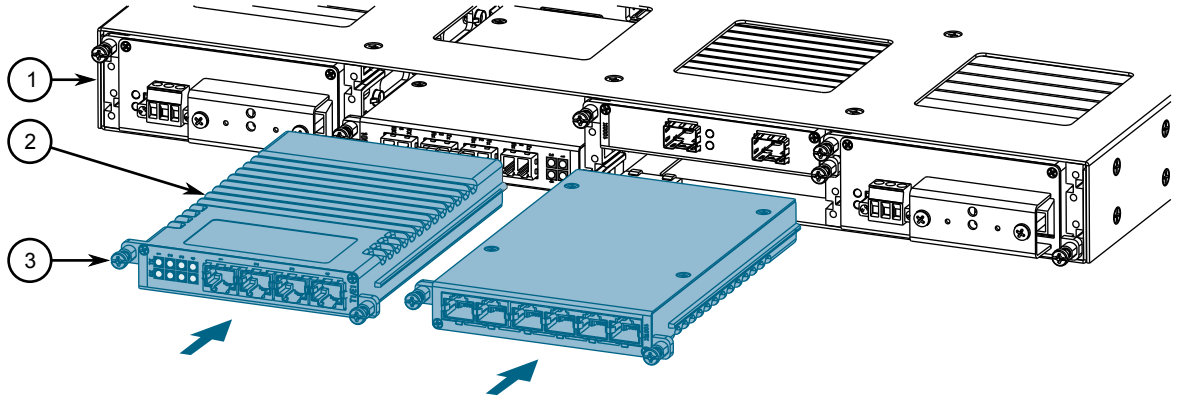


Figure 18: Installing a Module

1. Module **2.** Chassis **3.** Screw

5. Tighten the screws to secure the module.
6. [Optional] If necessary, install the device in the rack.
7. Connect power to the device.

Section 4.3

Installing/Removing Power Modules

The RUGGEDCOM RX1500 supports dual redundant power supply modules.

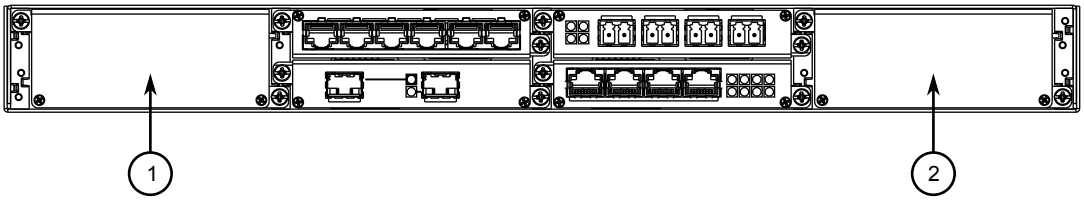


Figure 19: Power Modules

1. Slot PS1 **2.** Slot PS2

CAUTION!
Contamination hazard – risk of equipment damage. Prevent the ingress of water, dirts and other debris that may lead to premature equipment failure. Always make sure slots are not left empty.

NOTE
Power modules are hot swappable. When installing/removing a power module, it is not necessary to turn off power to the redundant power module.

Removing a Power Module

To remove a power module, do the following:

1. Loosen the screws that secure the module to the chassis until the module can be removed.
2. Slide the module out of the chassis.

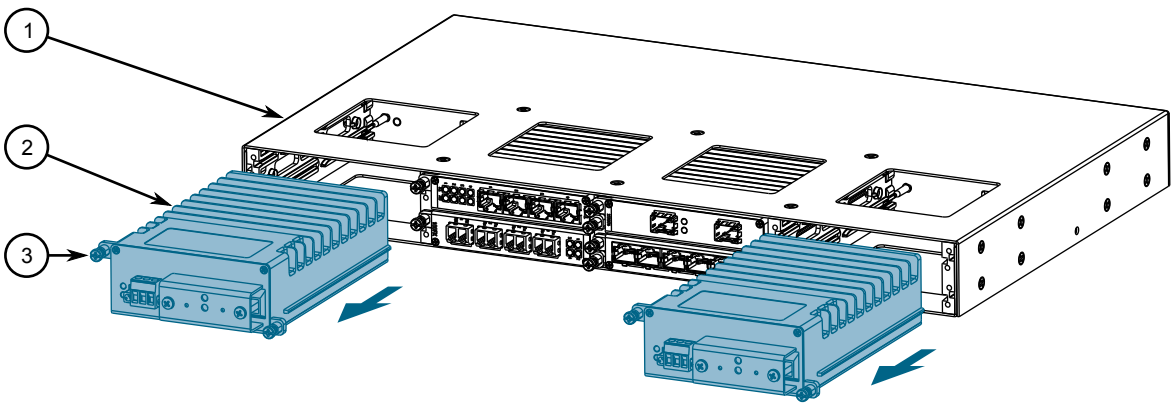


Figure 20: Removing a Power Supply

1. Chassis **2.** Power Supply **3.** Screws

DANGER!
Electrocution hazard – risk of serious personal injury or death. Make sure power to the module is turned off before servicing the power supply terminal.

3. Turn off power to the module.

4. Disconnect the power supply wiring from the terminal block. Alternatively, for convenience, remove the terminal block with the wiring still connected and set it aside to be connected later to the new module.
5. Install a new or blank module to prevent the ingress of dust and dirt.

Installing a Power Module

To install a power module, do the following:

1. If equipped, remove the existing module.
2. If applicable, connect the supplied terminal block to the module or connect the terminal block from the previous module.
3. Confirm or connect the wiring from the power supply to the module. For more information, refer to Section 2.6, "Connecting Power".
4. Insert the module into the empty slot.

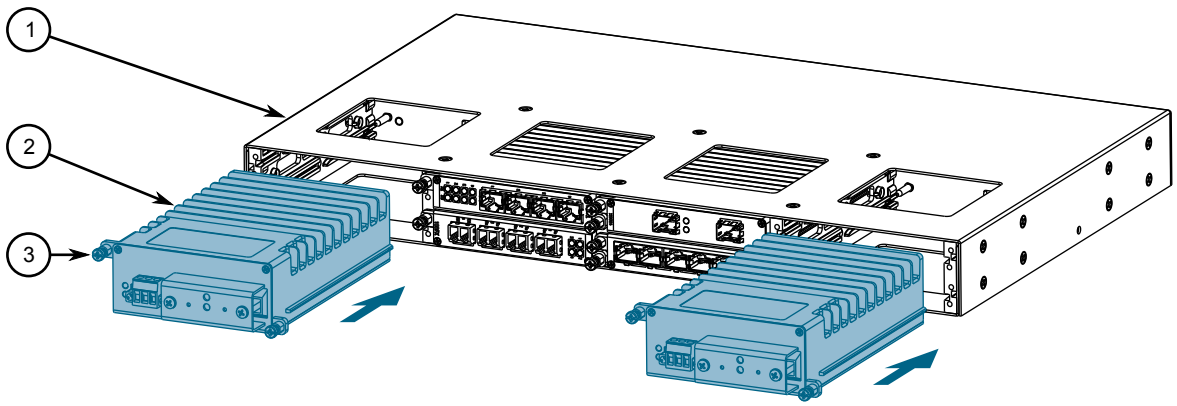


Figure 21: Installing a Power Module

1. Chassis **2.** Power Module **3.** Screws

5. Hand-tighten the screws to secure the power module to the chassis.
6. Turn on power to the module and confirm the module is receiving and supplying power. This is indicated by the LEDs on the module.

LED	State	Description
O	Green	The module is supplying power
I	Green	The module is receiving power

5 Technical Specifications

This section provides important technical specifications related to the device.

CONTENTS

- Section 5.1, "Power Supply Specifications"
- Section 5.2, "Failsafe Relay Specifications"
- Section 5.3, "Operating Environment"
- Section 5.4, "Mechanical Specifications"

Section 5.1

Power Supply Specifications

Power Supply Type	Input Range		Internal Fuse Rating	Maximum Power Consumption[a]	Maximum Cable Length[b]	Insulation
	Min	Max				
HI	88 VDC	300 VDC	3.15 A(T)[c]	65 W	—	2800 VDC for 1 minute
	85 VAC	264 VAC				
HIP	88 VDC	300 VDC	3.15 A(T)[c]	65 W	—	
	85 VAC	264 VAC				
24	13 VDC	36 VDC	10 A(T)[c]	63.5 W	9.4 m (30.8 ft)	1500 VDC for 1 minute
24P						
48	36 VDC	72 VDC	3.15 A(T)[c]	60 W	45.5 m (149 ft)	
48P						
12	9 VDC	15 VDC	12 A	67 W	5.5 m (18 ft)	1500 VAC or 2121 VDC for 1 minute
12P						

[a] *Power consumption varies based on the device configuration.*

[b] *Based on #16 AWG wiring.*

[c] *(T) denotes time-delay fuse.*

Section 5.2
Failsafe Relay Specifications

Maximum Switching Voltage	Rated Switching Current	Isolation
30 VDC	5 A	2800 VDC for 1 minute
250 VAC	6.25 A	

Section 5.3
Operating Environment

The RUGGEDCOM RX1500 is rated to operate under the following environmental conditions.

IMPORTANT!
Temperature limits for select line modules may differ from that which can be withstood by the RUGGEDCOM RX1500. Make sure the selected modules are rated for the expected environmental conditions before deployment. For more information, refer to the RUGGEDCOM RX1500 Series Modules Catalog.

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

[d] *Maximum ambient operating temperature is 70 °C (158 °F) when the device is installed along with Underwriter Laboratories (UL) listed devices.*

Section 5.4
Mechanical Specifications

Dimensions	Refer to Chapter 6, *Dimension Drawings*
Weight	Approximately 4.7 kg (10.3 lb)
Ingress Protection	IP40
Enclosure	Aluminum

6 Dimension Drawings

NOTE
All dimensions are in millimeters, unless otherwise stated.

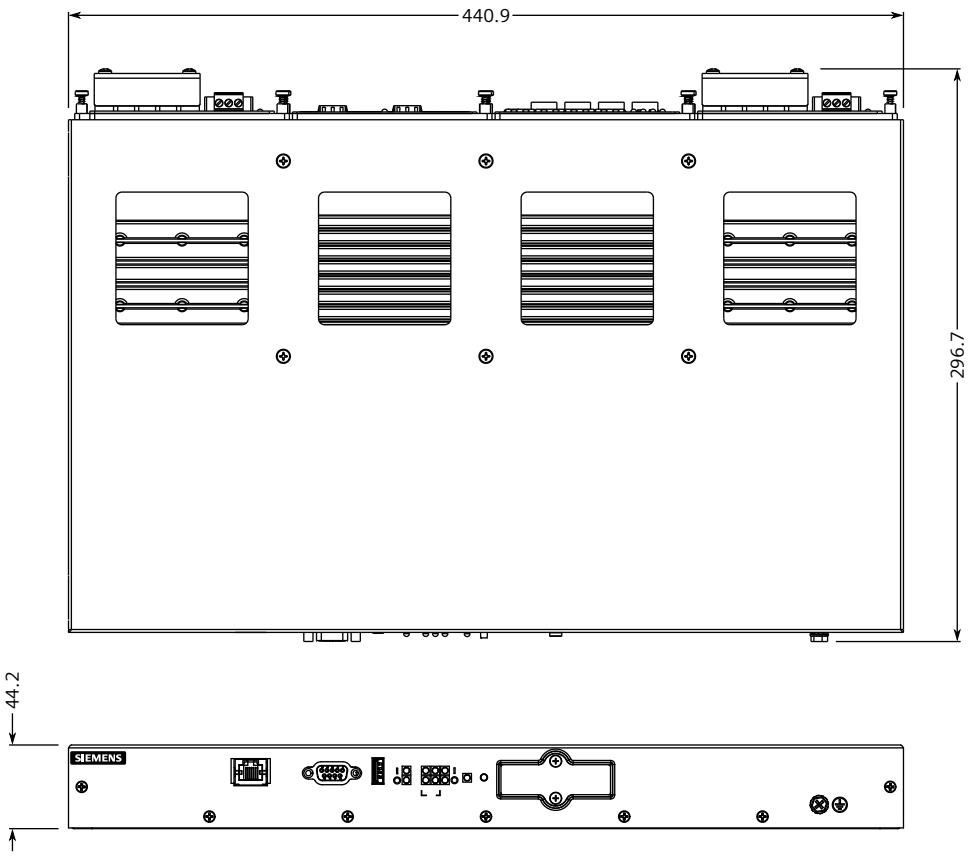


Figure 22: Overall Dimensions

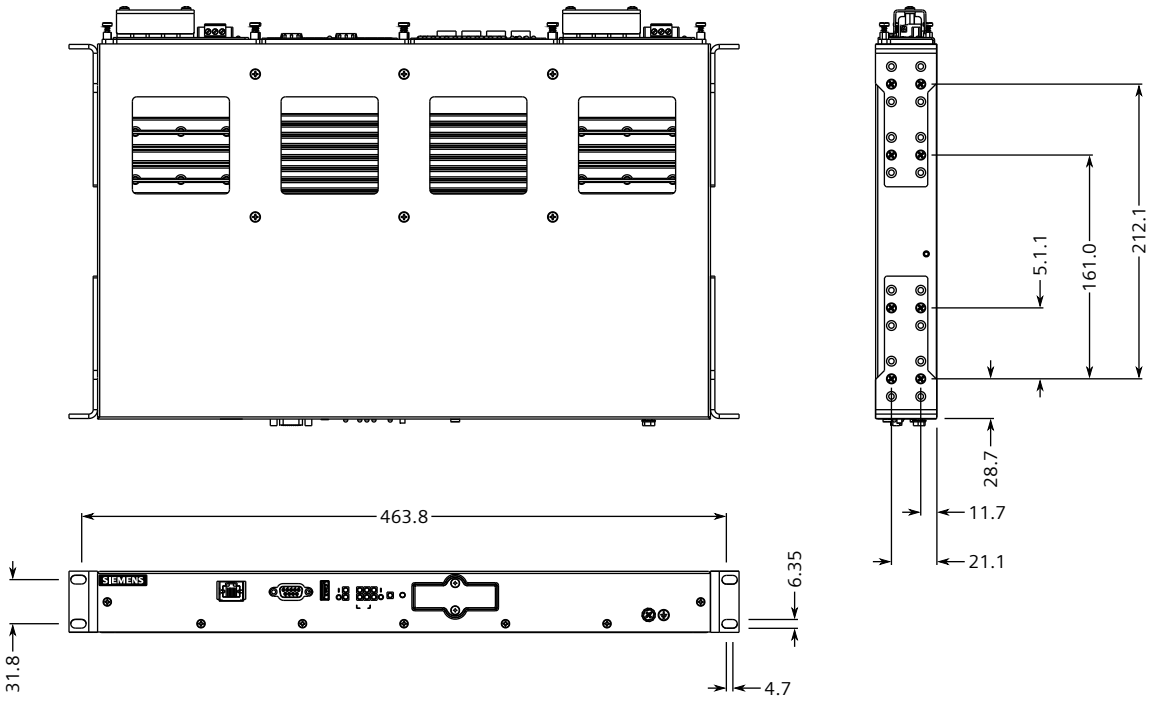


Figure 23: Rack Mount Dimensions

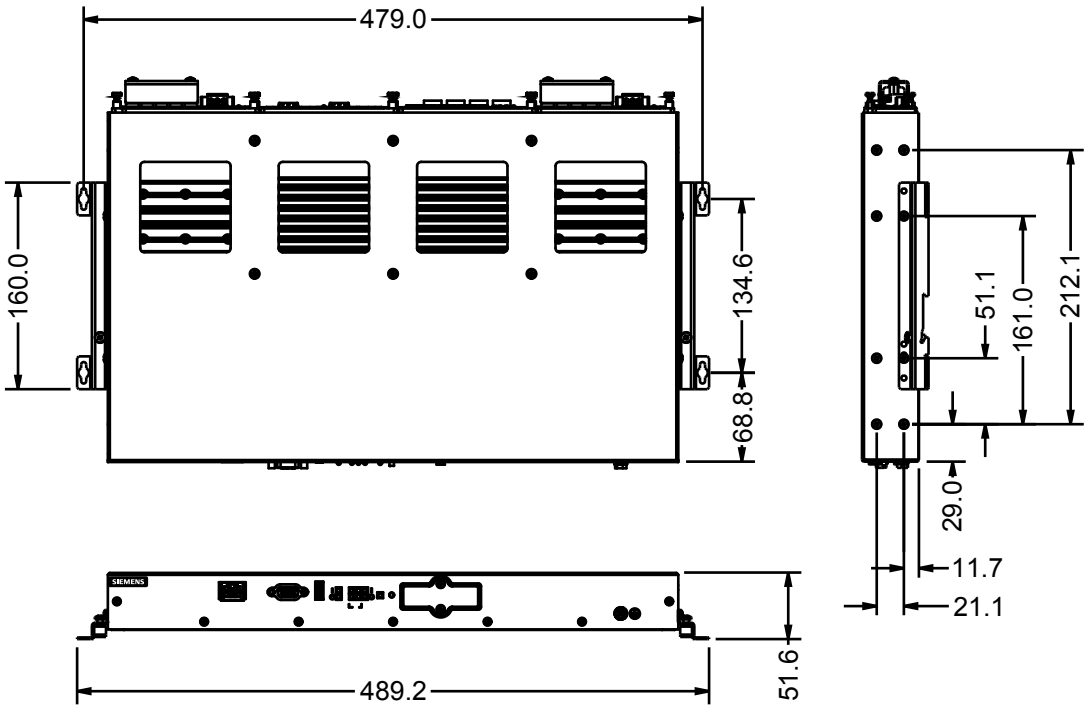


Figure 24: Panel and Din Rail Mount Dimensions

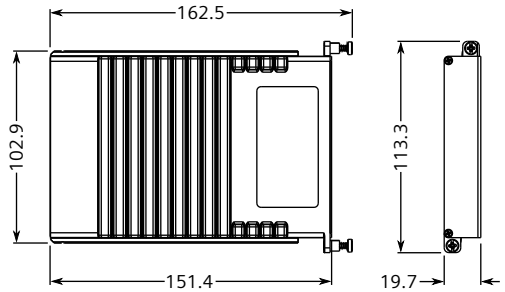


Figure 25: Line Module Dimensions

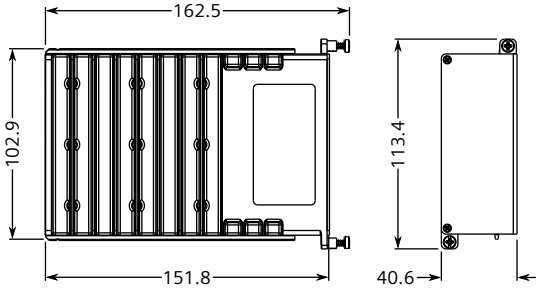


Figure 26: Power Module Dimensions

7 Certification

The RUGGEDCOM RX1500 device has been thoroughly tested to guarantee its conformance with recognized standards and has received approval from recognized regulatory agencies.

NOTE
Certifications related to individual modules are detailed in the RUGGEDCOM Modules Catalog for the device available online.

CONTENTS

- Section 7.1, “Approvals”
- Section 7.2, “EMC and Environmental Type Tests”

Section 7.1

Approvals

This section details the standards to which the RUGGEDCOM RX1500 complies.

CONTENTS

- Section 7.1.1, “TÜV SÜD”
- Section 7.1.2, “European Union (EU)”
- Section 7.1.3, “FCC”
- Section 7.1.4, “FDA/CDRH”
- Section 7.1.5, “ISED”
- Section 7.1.6, “ACMA”
- Section 7.1.7, “RoHS”
- Section 7.1.8, “Other Approvals”

Section 7.1.1

TÜV SÜD

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

- **CAN/CSA-C22.2 NO. 60950-1-07 (R2012)**
  Information Technology Equipment – Safety – Part 1: General Requirements (Bi-National standard, with UL 60950-1)

- **UL 60950-1**
  Information Technology Equipment – Safety – Part 1: General Requirements)

Section 7.1.2
European Union (EU)

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

- **Directive 2014/30/EU**
  Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (recast) Text with EEA relevance
- **Directive 2014/35/EU**
  Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits Text with EEA relevance
- **Directive 2011/65/EU**
  Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment Text with EEA relevance
- **Directive 1999/5/EC**
  Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity
- **EN 60950-1**
  Information Technology Equipment – Safety – Part 1: General Requirements
- **EN 61000-3-2**
  Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)
- **EN 61000-3-3**
  Electromagnetic compatibility (EMC) – Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤16 A per phase and not subject to conditional connection
- **EN 61000-6-2**
  Electromagnetic Compatibility (EMC) – Part 6-2: Generic Standards – Immunity for Industrial Environments
- **EN 60825-1**
  Safety of Laser Products – Equipment Classification and Requirements
- **EN 50581**
  Technical Documentation for the Assessment of Electrical and Electronic Products with Respect to the Restriction of Hazardous Substances
- **EN 55022**
  Information Technology Equipment – Radio Disturbance Characteristics – Limits and Methods of Measurement

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

CE 0680

A copy of the CE Declaration of Conformity is available from Siemens Canada Ltd. For contact information, refer to "Contacting Siemens".

Section 7.1.3
FCC

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

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

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

Section 7.1.4
FDA/CDRH

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

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

Section 7.1.5
ISED

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

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

Section 7.1.6
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 Labelling – Devices) Notice 2014 made under Section 182 of the Radiocommunications Act 1992
- Radiocommunications Labelling (Electromagnetic Compatibility) Notice 2008 made under Section 182 of the Radiocommunications Act 1992
- Radiocommunications (Compliance Labelling – Electromagnetic Radiation) Notice 2003 made under Section 182 of the Radiocommunications Act 1992

- Telecommunications Labelling (Customer Equipment and Customer Cabling) Notice 2001 made under Section 407 of the Telecommunication 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.

Section 7.1.7

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:

- **China RoHS 2**
  Administrative Measure on the Control of Pollution Caused by Electronic Information Products

A copy of the Material Declaration is available online at https://support.industry.siemens.com/cs/ww/en/view/109738831.

Section 7.1.8

Other Approvals

This device meets the requirements of the following additional standards:

- **IEEE 1613**
  IEEE Standard Environmental and Testing Requirements for Communications Networking Devices in Electric Power Substations
- **IEC 61000-6-2**
  Electromagnetic Compatibility (EMC) – Part 6-2: Generic Standards – Immunity for Industrial Environments
- **IEC 61850-3**
  Communication Networks and Systems in Substations – Part 3: General Requirements

Section 7.2

EMC and Environmental Type Tests

The RUGGEDCOM RX1500 has passed the following Electromagnetic Compatibility (EMC) and environmental tests.

EMC Type Test for IEC 61850-3

Test	Description		Test Levels	Severity Levels
IEC 61000-4-2	ESD	Enclosure Contact	± 8 kV	4
		Enclosure Air	± 15 kV	
IEC 61000-4-3	Radiated RFI	Enclosure Ports	20 V/m	Note[a]
IEC 61000-4-4	Burst (Fast Transient)	Signal ports	± 4 kV @ 2.5 kHz	
		DC Power Ports	± 4 kV	4
		AC Power Ports		
		Earth ground ports		
IEC 61000-4-5	Surge	Signal ports	± 4 kV Line-to-Ground ± 2 kV Line-to-Line	4
		DC Power Ports	± 2 kV Line-to-Ground ± 1 kV Line-to-Line	3
		AC Power Ports	± 4 kV Line-to-Ground ± 2 kV Line-to-Line	4
IEC 61000-4-6	Induced (Conducted) RFI	Signal ports	10 V	3
		DC Power Ports		
		AC Power Ports		
		Earth ground ports		
IEC 61000-4-8	Magnetic Field	Enclosure Ports	100 A/m, continuous 1000 A/m for 1 s	Note[a]
			1000 A/m for 1 s	5
IEC 61000-4-11	Voltage Dips and Interrupts	AC Power Ports	30% for 1 period 60% for 50 periods	
IEC 61000-4-12	Damped Oscillatory	Signal ports	2.5 kV common, 1 kV differential mode @1 MHz	3
		DC Power Ports		
		AC Power Ports		
IEC 61000-4-16	Mains Frequency Voltage	Signal ports	30 V Continuous 300 V for 1 s	4
		DC Power Ports		
IEC 61000-4-17	Ripple on DC Power Supply	DC Power Ports	10%	3
IEC 61000-4-29	Voltage Dips and Interrupts	DC Power Ports	30% for 0.1 s 60% for 0.1 s 100% for 0.05 s	
IEC 60255-5	Dielectric Strength	Signal ports	2 kV (Failsafe Relay output)	
		DC Power Ports	1.5 kV	
		AC Power Ports	2 kV	
	HV Impulse	Signal ports	5 kV (Failsafe Relay output)	

Test	Description		Test Levels	Severity Levels
		DC Power Ports	5 kV	
		AC Power Ports		

[a] *Siemens-specified severity levels*

EMC Immunity Type Tests for IEEE 1613

NOTE
The RUGGEDCOM RX1500 meets Class 2 requirements for an all-fiber configuration and Class 1 requirements for copper ports. Class 1 allows for temporary communication loss, while Class 2 requires error-free and interrupted communications.

Description		Test Levels
HV Impulse	Signal ports	5 kV (Failsafe Relay Output)
	DC Power Ports	5 kV
	AC Power Ports	
Dielectric Strength	Signal ports	2 kV
	DC Power Ports	1.5 kV
	AC Power Ports	2 kV
Fast Transient	Signal ports	± 4 kV @ 2.5 kHz
	DC Power Ports	± 4 kV
	AC Power Ports	
	Earth ground ports	
Oscillatory	Signal ports	2.5 kV common mode @1MHz
	DC Power Ports	2.5 kV common 1 kV differential mode @ 1 MHz
	AC Power Ports	
Radiated RFI	Enclosure ports	35 V/m
ESD	Enclosure Contact	± 8 kV
	Enclosure Air	± 15 kV

Environmental Type Tests

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

Test	Description	Test Levels	Severity Levels
IEC 60255-21-2	Shock	30 g @ 11 ms	Class 2
	Bump	10 g @ 16 ms	Class 1
IEC 60255-21-3	Seismic	Method A	Level 2