



VSE1100 and VSE2100 Virtual Services Engine

Hardware Installation Guide



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VSE1100 and VSE2100 Hardware Installation Guide

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About the Documentation

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- Documentation Conventions on page xi
- Documentation Feedback on page xiii
- Requesting Technical Support on page xiv

Junos OS Documentation and Release Notes

For a list of related Junos OS documentation, see <http://www.juniper.net/techpubs/software/junos/>.

If the information in the latest release notes differs from the information in the documentation, follow the *Junos OS Release Notes*.

To obtain the most current version of all Juniper Networks® technical documentation, see the product documentation page on the Juniper Networks website at <http://www.juniper.net/techpubs/>.

Documentation Conventions

Table 1 on page xii defines the notice icons used in this guide.

Table 1: Notice Icons

Icon	Meaning	Description
	Informational note	Indicates important features or instructions.
	Caution	Indicates a situation that might result in loss of data or hardware damage.
	Warning	Alerts you to the risk of personal injury or death.
	Laser warning	Alerts you to the risk of personal injury from a laser.
	Tip	Indicates helpful information.
	Best practice	Alerts you to a recommended use or implementation.

Table 2 on page xii defines the text and syntax conventions used in this guide.

Table 2: Text and Syntax Conventions

Convention	Description	Examples
Bold text like this	Represents text that you type.	To enter configuration mode, type the configure command: user@host> configure
Fixed-width text like this	Represents output that appears on the terminal screen.	user@host> show chassis alarms No alarms currently active
<i>Italic text like this</i>	<ul style="list-style-type: none"> Introduces or emphasizes important new terms. Identifies guide names. Identifies RFC and Internet draft titles. 	<ul style="list-style-type: none"> A policy <i>term</i> is a named structure that defines match conditions and actions. <i>Junos OS CLI User Guide</i> RFC 1997, <i>BGP Communities Attribute</i>
<i>Italic text like this</i>	Represents variables (options for which you substitute a value) in commands or configuration statements.	Configure the machine's domain name: [edit] root@# set system domain-name <i>domain-name</i>

Table 2: Text and Syntax Conventions (*continued*)

Convention	Description	Examples
Text like this	Represents names of configuration statements, commands, files, and directories; configuration hierarchy levels; or labels on routing platform components.	<ul style="list-style-type: none">To configure a stub area, include the stub statement at the [edit protocols ospf area area-id] hierarchy level.The console port is labeled CONSOLE.
< > (angle brackets)	Encloses optional keywords or variables.	stub <default-metric <i>metric</i>>;
(pipe symbol)	Indicates a choice between the mutually exclusive keywords or variables on either side of the symbol. The set of choices is often enclosed in parentheses for clarity.	broadcast multicast (<i>string1</i> <i>string2</i> <i>string3</i>)
# (pound sign)	Indicates a comment specified on the same line as the configuration statement to which it applies.	rsvp { # Required for dynamic MPLS only
[] (square brackets)	Encloses a variable for which you can substitute one or more values.	community name members [<i>community-ids</i>]
Indentation and braces ({ })	Identifies a level in the configuration hierarchy.	<pre>[edit] routing-options { static { route default { nexthop <i>address</i>; retain; } } }</pre>
;(semicolon)	Identifies a leaf statement at a configuration hierarchy level.	
GUI Conventions		
Bold text like this	Represents graphical user interface (GUI) items you click or select.	<ul style="list-style-type: none">In the Logical Interfaces box, select All Interfaces.To cancel the configuration, click Cancel.
> (bold right angle bracket)	Separates levels in a hierarchy of menu selections.	In the configuration editor hierarchy, select Protocols>Ospf .

Documentation Feedback

We encourage you to provide feedback, comments, and suggestions so that we can improve the documentation. You can provide feedback by using either of the following methods:

- Online feedback rating system—On any page at the Juniper Networks Technical Documentation site at <http://www.juniper.net/techpubs/index.html>, simply click the stars to rate the content, and use the pop-up form to provide us with information about your experience. Alternately, you can use the online feedback form at <https://www.juniper.net/cgi-bin/docbugreport/>.

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Requesting Technical Support

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active J-Care or JNASC support contract, or are covered under warranty, and need post-sales technical support, you can access our tools and resources online or open a case with JTAC.

- JTAC policies—For a complete understanding of our JTAC procedures and policies, review the *JTAC User Guide* located at <http://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf>.
- Product warranties—For product warranty information, visit <http://www.juniper.net/support/warranty/>.
- JTAC hours of operation—The JTAC centers have resources available 24 hours a day, 7 days a week, 365 days a year.

Self-Help Online Tools and Resources

For quick and easy problem resolution, Juniper Networks has designed an online self-service portal called the Customer Support Center (CSC) that provides you with the following features:

- Find CSC offerings: <http://www.juniper.net/customers/support/>
- Search for known bugs: <http://www2.juniper.net/kb/>
- Find product documentation: <http://www.juniper.net/techpubs/>
- Find solutions and answer questions using our Knowledge Base: <http://kb.juniper.net/>
- Download the latest versions of software and review release notes: <http://www.juniper.net/customers/csc/software/>
- Search technical bulletins for relevant hardware and software notifications: <http://kb.juniper.net/InfoCenter/>
- Join and participate in the Juniper Networks Community Forum: <http://www.juniper.net/company/communities/>
- Open a case online in the CSC Case Management tool: <http://www.juniper.net/cm/>

To verify service entitlement by product serial number, use our Serial Number Entitlement (SNE) Tool: <https://tools.juniper.net/SerialNumberEntitlementSearch/>

Opening a Case with JTAC

You can open a case with JTAC on the Web or by telephone.

- Use the Case Management tool in the CSC at <http://www.juniper.net/cm/>.
- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

For international or direct-dial options in countries without toll-free numbers, see <http://www.juniper.net/support/requesting-support.html>.

PART 1

Overview

- [Virtual Services Engine Platform Overview on page 3](#)
- [Device Features and Specifications on page 5](#)

CHAPTER 1

Virtual Services Engine Platform Overview

- [Virtual Services Engine and JunosV App Engine Overview on page 3](#)

Virtual Services Engine and JunosV App Engine Overview

Virtual Services Engines (VSEs) are devices on which the JunosV App Engine is deployed. JunosV App Engine is a virtualization platform that hosts network services and applications, which run inside guest operating systems within virtual machines, on the VSE devices.

Each application is built along with its native operating system (OS) into a virtual machine image and then packaged into a Junos-installable package using JunosV App Engine tools. JunosV App Engine enables language-independent and OS-independent integration of third-party and Juniper Networks applications with Junos-based devices. For example, Linux applications can still run on Linux and integrate with devices running Junos OS. JunosV App Engine provides a simpler, cheaper and faster mechanism to integrate with the Junos platform, greatly reducing, and in some cases eliminating, the effort needed to integrate into the Junos environment.

The supported guest operating system is currently the Linux operating system, and the hardware is a tethered device attached to the router on either the router media interface (for example, ge-1/1/0) or a management LAN network (for example, fxp0).

VSE devices and JunosV App Engine together enable creation of multiple instances of the same OS, which offers a scalable software architecture, and provide interfaces for non-Junos applications to integrate into the Junos management system, control plane, and data plane.

For more information about JunosV App Engine, see the *JunosV App Engine Administration Guide*.

Virtual Services Engine provides the following devices:

- VSE1100—Device with a single quad core CPU has these features:
 - Memory: 24 GB RAM@1333Mhz DDR3
 - Processor speed: processor speed (Westmere 2.4GHz)
 - Two hyperthreads per core

- Four cores per physical CPU
- One populated CPU socket
- Simultaneous AC and DC power supply support
- Two preinstalled 900GB SAS hard disks and four pluggable hard disks at the rear (supports SAS and SATA)
- Redundant fans and power supply
- VSE2100—Device with a double quad core CPU has these features:
 - Memory: 48 GB RAM@1333Mhz DDR3
 - Processor speed: processor speed (Westmere 2.4GHz)
 - Two hyperthreads per core
 - Four cores per physical CPU
 - Two populated CPU sockets
 - Simultaneous AC and DC power supply support
 - Two preinstalled 900GB SAS hard disks and four pluggable hard disks at the rear (supports SAS and SATA)
 - Redundant fans and power supply

**Related
Documentation**

- [Chassis Physical Specifications for VSE1100 and VSE2100 on page 9](#)
- [Environmental Requirements and Specifications for VSE1100 and VSE2100 on page 13](#)

CHAPTER 2

Device Features and Specifications

- [VSE1100 and VSE2100 Chassis Overview on page 5](#)
- [VSE1100 and VSE2100 Front Panel Features on page 6](#)
- [VSE1100 and VSE2100 Rear Panel Features on page 8](#)
- [VSE1100 and VSE2100 Chassis Physical Specifications on page 9](#)

VSE1100 and VSE2100 Chassis Overview

The Virtual Services Engine is available in two models: VSE1100 and VSE2100. [Table 3 on page 5](#) provides an overview of chassis features for the VSE1100 model.

Table 3: VSE1100 and VSE2100 Hardware Specifications

Category	Specification
Rack mountable	1 U; Front-mount or mid-mount; optional front-and-rear four-post mount
Traffic interfaces	(VSE1100) Four 1-Gigabit Ethernet RJ-45 ports (VSE2100) Two 10-Gigabit Ethernet RJ-45 ports
Console interface	(VSE1100 and VSE2100) One RJ-45 serial console port
USB interface	(VSE1100 and VSE2100) One USB port for software installation or reinstallation
Processor	(VSE1100) Single-quad core Intel (VSE2100) Dual-quad core Intel
RAM	(VSE1100) 24 GB DDR3 (VSE2100) 48 GB DDR3
Storage	(VSE1100 and VSE2100) Six storage drive slots. Shipped with two SAS 900 GB 2.5-inch HDD in rear. Four additional 2.5-inch SATA or SAS drives slots (as specified by Juniper Networks) can be installed in front, in any combination.
Fans	(VSE1100 and VSE2100) Three 40-mm fans

Table 3: VSE1100 and VSE2100 Hardware Specifications (*continued*)

Category	Specification
	When the device is cool, the fans spin at a slower speed to reduce noise and save energy. As the device heats up, the fans run at a faster speed. In the event of fan failure, the fault LED blinks and the remaining fan or fans run at full speed.
Power supplies	<p>Removable AC power supply standard: 90 VAC to 264 VAC, 50-60 Hz, 4.0 A Max, 650 W. Standard IEC power cord is provided for AC power supply.</p> <p>Removable DC power supply is an available option: -48 VDC, 20 A Max, 650 W. DC power cables supplied by the customer.</p> <p>AC and DC power supplies are supported simultaneously.</p>

- Related Documentation**
- [Front Panel Features of VSE1100 and VSE2100 on page 6](#)
 - [Rear Panel Features of VSE1100 and VSE2100 on page 8](#)

VSE1100 and VSE2100 Front Panel Features

Figure 1 on page 6 shows the VSE1100 front panel features. Figure 2 on page 7 shows VSE2100 the front panel features. Table 6 on page 8 describes the front panel LEDs. Table 7 on page 8 describes the front panel connectivity ports.

Figure 1: VSE1100 Front Panel Features

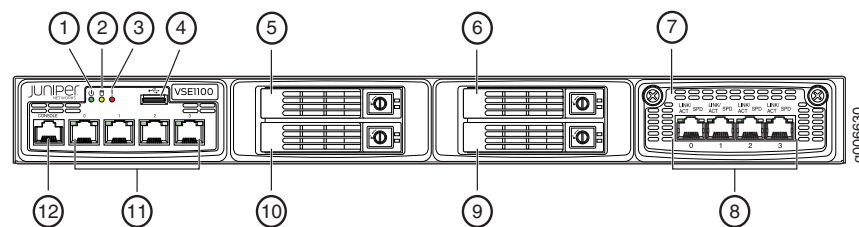


Table 4 on page 6 lists the VSE1100 components on the front panel.

Table 4: VSE1100 Components on the Front Panel

Number	Component
1	Power LED.
2	Hard disk activity LED.
3	Hardware fault LED.
4	USB port.
5, 6, 9, and 10	Drive 2, Drive 4, Drive 5, and Drive 3, respectively. SAS drives are supported.
7	Input/output controller (IOC).

Table 4: VSE1100 Components on the Front Panel (*continued*)

Number	Component
8	1-Gigabit Ethernet ports and LEDs. These IOC ports are numbered 0, 1, 2, and 3.
11	1-Gigabit Ethernet ports and LEDs. These MGMT ports are numbered 0, 1, 2, and 3.
12	Console port.

Figure 2: VSE2100 Front Panel Features

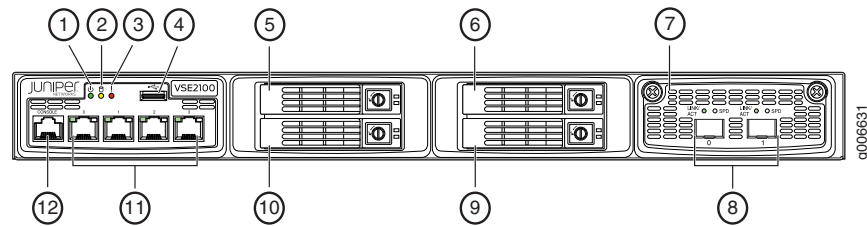


Table 5 on page 7 lists the VSE2100 components on the front panel.

Table 5: VSE2100 Components on the Front Panel

Number	Component
1	Power LED.
2	Hard disk activity LED.
3	Hardware fault LED.
4	USB port.
5, 6, 9, and 10	Drive 2, Drive 4, Drive 5, and Drive 3, respectively. SAS drives are supported.
7	Input/output controller (IOC).
8	10-Gigabit Ethernet ports and LEDs. These IOC ports are numbered 0 and 1.
11	1-Gigabit Ethernet ports and LEDs. These MGMT ports are numbered 0, 1, 2, and 3.
12	Console port.

Table 6: VSE1100 and VSE2100 Front Panel LEDs

LEDs	Description
Chassis	Power (green)—Device is powered on Hard disk activity (yellow)—Storage drive is in use Hardware fault (red)—Fan, power supply, or temperature alarm has occurred
Ethernet port	Left (green)—Link is active; momentarily blinks for activity Right—Link speed: <ul style="list-style-type: none"> • Off—10 Mbps • Green—100 Mbps • Yellow—1000 Mbps
Storage drive modules (up to 4)	Top (green)—Disk activity Bottom (red)—Has no function

Table 7: VSE1100 and VSE2100 Front Panel Ports

Ports	Description
Console	One RJ-45 serial console port
USB	One USB port for software installation/reinstallation
Traffic	(VSE1100) Four RJ-45 Ethernet 1-Gigabit and four MGMT 1-Gigabit Ethernet ports, labeled 0 through 3 left to right (VSE2100) Two RJ-45 Ethernet 10-Gigabit, labeled 0 through 1 left to right and four 1-Gigabit Ethernet ports, labeled 0 through 3 left to right

Related Documentation

- [Chassis Overview for VSE1100 and VSE2100 on page 5](#)
- [Rear Panel Features of VSE1100 and VSE2100 on page 8](#)

VSE1100 and VSE2100 Rear Panel Features

See [Figure 3 on page 9](#) for the VSE1100 and VSE2100 rear panel features. [Table 9 on page 9](#) describes the rear panel components.

Figure 3: VSE1100 and VSE2100 Rear Panel Features

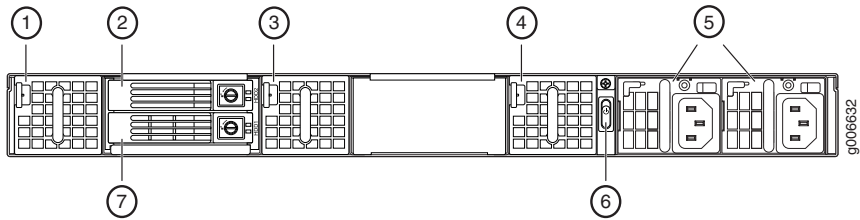


Table 8 on page 9 lists the VSE1100 and VSE2100 components on the rear panel.

Table 8: VSE1100 and VSE2100 Components on the Rear Panel

Number	Component
1	Cooling fans
2 and 7	Preinstalled Drive 0 and Drive 1 respectively
3 and 4	Removable cooling fans
5	Removable AC power supplies
6	Power switch

Table 9: Description of the VSE1100 and VSE2100 Rear Panel Components

Component	Description
Cooling fans	Draw air through the air inlet on the chassis front panel and exhausts it through the fan vents on the chassis rear panel
Power switch	Switch to power on or power off the device
Power supply	Replaceable AC or DC power supply

- Related Documentation
- [Chassis Overview for VSE1100 and VSE2100 on page 5](#)
 - [Front Panel Features of VSE1100 and VSE2100 on page 6](#)

VSE1100 and VSE2100 Chassis Physical Specifications

The Virtual Services Engine chassis is a rigid sheet-metal structure that houses the hardware components. Table 10 on page 9 summarizes the physical specifications of the VSE chassis.

Table 10: Physical Specifications of the VSE1100 and VSE2100 Engine Chassis

Description	Value
Chassis height	1.75 in. (44.5 mm)

Table 10: Physical Specifications of the VSE1100 and VSE2100 Engine Chassis (*continued*)

Description	Value
Chassis width	17.25 in (438.1 mm)
Chassis depth	28 in (711.1 mm)
Weight	30.6 lb (13.9 kg)

**Related
Documentation**

- [Rack Requirements for VSE1100 and VSE2100 on page 14](#)
- [Installing VSE1100 and VSE2100 on page 43](#)
- [Connecting Power to AC-Powered VSE1100 and VSE2100 on page 45](#)
- [Connecting Power to DC-Powered VSE1100 and VSE2100 on page 46](#)

PART 2

Planning

- [Site Preparation on page 13](#)
- [Cable and Pinout Specifications on page 17](#)
- [Planning Power Requirements on page 21](#)
- [Compliance on page 23](#)

CHAPTER 3

Site Preparation

- [Environmental Requirements and Specifications for VSE1100 and VSE2100 Devices on page 13](#)
- [Rack Requirements for VSE1100 and VSE2100 Devices on page 14](#)
- [Clearance Requirements for Airflow and Hardware Maintenance for VSE1100 and VSE2100 Devices on page 15](#)

Environmental Requirements and Specifications for VSE1100 and VSE2100 Devices

The device must be installed in a rack housed in a dry, clean, well-ventilated, and temperature-controlled environment.

Ensure that these environmental guidelines are followed:

- The site must be as dust-free as possible, because dust can clog air intake vents and filters, reducing the efficiency of the device cooling system.
- Maintain ambient airflow for normal device operation. If the airflow is blocked or restricted, or if the intake air is too warm, the device might overheat, causing the device temperature monitor to power off the device to protect the hardware components.

[Table 11 on page 14](#) lists the required environmental conditions for normal device operation.

Table 11: VSE1100 and VSE2100 Series Environmental Tolerances

Category	Specification
Ambient temperature	Normal operating: 41°F to 104°F (5°C to 40°C) Storage: -40°F to 158°F (-40°C to 70°C)
Ambient humidity	Relative humidity (operating): 8% to 90% noncondensing Relative humidity (storage): 5% to 95% noncondensing
Altitude	Operating: 10,000 ft (3048 m) maximum Storage: 40,000 ft (12,192 m) maximum

Related Documentation

- [Clearance Requirements for Airflow and Hardware Maintenance for VSE1100 and VSE2100 on page 15](#)

Rack Requirements for VSE1100 and VSE2100 Devices

Before you install a VSE1100 or VSE2100 in a rack, you must ensure that the rack complies with a standard 19-in (48.26 cm) rack as defined in *Cabinets, Racks, Panels, and Associated Equipment* (document number EIA-310-D) published by the Electronics Industry Association (<http://www.eia.org>). Refer to this standard for details on rack size and mounting hole spacing.

When selecting a rack, ensure that the physical characteristics of the rack comply with the following specifications:

- The size, strength, and location of the rack must accommodate the device's weight and external dimensions.
- The inner edge of the rack rails must allow sufficient space for the width of the chassis.
- The rack must have sufficient vertical usable space to accommodate the height of the device: 3.5 in (88.9 mm), or 2 U.



NOTE: A U is the standard rack unit defined in *Cabinets, Racks, Panels, and Associated Equipment* (document number EIA-310-D) published by the Electronics Industry Association.

- The rack must provide holes or hole patterns spaced at 1-U increments that match the holes provided in the device mounting brackets.
- If you do not ground the device directly to a site earth-grounding facility, the rack must be grounded to a reliable earth ground.
- You must use only copper grounding conductors.
- To ensure a reliable, low-resistance ground bond between the chassis and the rack, the mounting area on the rack should be paint-free, bare plated metal. The use of

thread-forming screws and placing external-tooth, paint-piercing lock washers between the screw head and equipment mounting brackets help ensure a good ground bond. You must provide these fasteners.

- The location of the rack must allow for the clearance requirements specified in [“Clearance Requirements for Airflow and Hardware Maintenance for VSE1100 and VSE2100” on page 15.](#)



CAUTION: Always secure the rack in which you are installing the Virtual Services Engine to the structure of the building. If your geographical area is subject to earthquakes, bolt the rack to the floor. For maximum stability, also secure the rack to ceiling brackets.

**Related
Documentation**

- [General Safety Guidelines and Warnings for VSE on page 28](#)
- [Chassis Physical Specifications for VSE1100 and VSE2100 on page 9](#)
- [Clearance Requirements for Airflow and Hardware Maintenance for VSE1100 and VSE2100 on page 15](#)

Clearance Requirements for Airflow and Hardware Maintenance for VSE1100 and VSE2100 Devices

When planning the installation site, allow sufficient clearance around the rack.

- For the cooling system to function properly, the airflow around the chassis must be unrestricted.
 - Allow at least 6 in. (15.2 cm) of clearance on the side between devices that have fans or blowers installed.
 - Allow 2.8 in. (7 cm) between the side of the chassis and any non-heat-producing surface such as a wall.
 - Ensure that the airflow vents in the front and rear panels remain open and uncovered for proper cooling.
- For service personnel to remove and install hardware components, there must be adequate space at the front and back of the device. At least 24 in. (61.0 cm) is required both in front of and behind the chassis. The front of the chassis extends approximately 0.5 in. (1.27 cm) beyond the mounting ears.

**Related
Documentation**

- [Rack Requirements for VSE1100 and VSE2100 on page 14](#)

CHAPTER 4

Cable and Pinout Specifications

- [RJ-45 Console Connector Pinout for VSE on page 17](#)
- [AC Power Cord Specifications for VSE1100 and VSE2100 Devices on page 17](#)

RJ-45 Console Connector Pinout for VSE

[Table 12 on page 17](#) describes the pinout for the RJ-45 console port connector.

Table 12: RJ-45 Console Connector Pinout

Pin	Signal	Description
1	RTS Output	Request to Send
2	DTR Output	Data Terminal Ready
3	TxD Output	Transmit Data
4	GND	Chassis Ground
5	GND	Chassis Ground
6	RxD Input	Receive Data
7	DSR Input	Data Set Ready
8	CTS Input	Clear to Send

**Related
Documentation**

- [Connecting a Console Server to VSE1100 and VSE2100 on page 47](#)

AC Power Cord Specifications for VSE1100 and VSE2100 Devices

Detachable AC power cords are supplied with AC-powered devices. The coupler is type C13 as described by International Electrotechnical Commission (IEC) standard 60320. The plug at the male end of the power cord fits into the power source outlet that is standard for your geographical location.



CAUTION: The AC power cord for the devices is intended for use with that device only and not for any other use.

Power Cable Warning (Japanese)

WARNING: The attached power cable is only for this product. Do not use the cable for another product.

注意

付属の電源コードセットはこの製品専用です。
他の電気機器には使用しないでください。

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NOTE: In North America, AC power cords must not exceed 4.5 meters (approximately 14.75 feet) in length, to comply with National Electrical Code (NEC) Sections 400-8 (NFPA 75, 5-2.2) and 210-52 and Canadian Electrical Code (CEC) Section 4-010(3). The cords supplied with the device are in compliance.

Table 13 on page 18 lists AC power cord specifications provided for each country or region.

Table 13: AC Power Cord Specifications for Virtual Services Engines

Country/Region	Electrical Specifications	Plug Standards
Australia	250 VAC, 10 A, 50 Hz	AS/NZ 3112
China	250 VAC, 10 A, 50 Hz	GB2099 and GB1002
Europe (except Italy, Switzerland, and United Kingdom)	250 VAC, 10 A, 50 Hz	CEE (7) VII
Italy	250 VAC, 10 A, 50 Hz	CEI 23-16
Japan	125 VAC, 12 A, 50 or 60 Hz	JIS C8303
North America	125 VAC, 13 A, 60 Hz	NEMA 5-15
Switzerland	250 VAC, 10 A, 50 Hz	SEV 1011 SEV 6534/2
United Kingdom	250 VAC, 10 A, 50 Hz	BS 1363/A

Related Documentation

- [Connecting Power to AC-Powered VSE100 and VSE2100 on page 45](#)
- [General Safety Guidelines and Warnings for VSE on page 28](#)

- [General Electrical Safety Guidelines and Warnings for VSE on page 31](#)
- [AC Power Electrical Safety Guidelines for VSE on page 32](#)
- [Prevention of Electrostatic Discharge Damage on VSE on page 34](#)

CHAPTER 5

Planning Power Requirements

- [Power Specifications for VSE1100 and VSE2100 Devices on page 21](#)

Power Specifications for VSE1100 and VSE2100 Devices

This topic describes the power supply electrical specifications for VSE1100 and VSE2100. An AC power supply is standard. A DC power supply is an available option.

[Table 14 on page 21](#) lists the power supply electrical specifications for VSE1100 and VSE2100.

Table 14: Power Supply Electrical Specifications for VSE1100 and VSE2100

Item	Specification
AC input voltage	100 VAC to 240 VAC
AC input line frequency	47 or 63 Hz nominal
AC system current rating	4.0 A max
AC minimum efficiency	88%
DC input voltage	–40 VDC to –72 VDC
DC system current rating	20 A max
DC minimum efficiency	88%

Related Documentation

- [General Safety Guidelines and Warnings for VSE on page 28](#)
- [AC Power Cord Specifications for VSE1100 and VSE2100 on page 17](#)
- [Connecting Power to AC-Powered VSE1100 and VSE2100 on page 45](#)
- [Connecting Power to DC-Powered VSE1100 and VSE2100 on page 46](#)

CHAPTER 6

Compliance

- [Agency Approvals for VSE1100 and VSE2100 Devices on page 23](#)

Agency Approvals for VSE1100 and VSE2100 Devices

VSE1100 and VSE2100 devices comply with the following standards:

- Safety
 - CAN/CSA-C22.2 No. 60950-1
 - EN 60950
 - IEC 60950-1
 - UL 60950-1
- EMC
 - FCC Class A
 - EN 55022 Class A
 - EN 55024 Immunity
 - EN 61000-3-2
 - VCCI Class A

**Related
Documentation**

PART 3

Safety

- [General Safety Guidelines and Warnings on page 27](#)
- [Electrical Safety Guidelines and Warnings on page 31](#)

CHAPTER 7

General Safety Guidelines and Warnings

- Definition of Safety Warning Levels for Virtual Services Engines on page 27
- General Safety Guidelines and Warnings for Virtual Services Engines on page 28

Definition of Safety Warning Levels for Virtual Services Engines

The VSE documentation uses the following levels of safety warnings:



NOTE: You might find this information helpful in a particular situation or might otherwise overlook it.



CAUTION: You must observe the specified guidelines to avoid minor injury or discomfort to you or severe damage to the equipment.



WARNING: This symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents.

Waarschuwing Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van standaard maatregelen om ongelukken te voorkomen.

Varoitus Tämä varoitusmerkki merkitsee vaaraa. Olet tilanteessa, joka voi johtaa ruumiinvammaan. Ennen kuin työskentelet minkään laitteiston parissa, ota selvää sähkökytkentöihin liittyvistä vaaroista ja tavanomaisista onnettomuuksien ehkäisykeinoista.

Attention Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant causer des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers posés

par les circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents.

Warnung Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu einer Körperverletzung führen könnte. Bevor Sie mit der Arbeit an irgendeinem Gerät beginnen, seien Sie sich der mit elektrischen Stromkreisen verbundenen Gefahren und der Standardpraktiken zur Vermeidung von Unfällen bewußt.

Avvertenza Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di lavorare su qualsiasi apparecchiatura, occorre conoscere i pericoli relativi ai circuiti elettrici ed essere al corrente delle pratiche standard per la prevenzione di incidenti.

Advarsel Dette varselsymbolet betyr fare. Du befinner deg i en situasjon som kan føre til personskade. Før du utfører arbeid på utstyr, må du være oppmerksom på de faremomentene som elektriske kretser innebærer, samt gjøre deg kjent med vanlig praksis når det gjelder å unngå ulykker.

Aviso Este símbolo de aviso indica perigo. Encontra-se numa situação que lhe poderá causar danos físicos. Antes de começar a trabalhar com qualquer equipamento, familiarize-se com os perigos relacionados com circuitos eléctricos, e com quaisquer práticas comuns que possam prevenir possíveis acidentes.

¡Atención! Este símbolo de aviso significa peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considerar los riesgos que entraña la corriente eléctrica y familiarizarse con los procedimientos estándar de prevención de accidentes.

Varning! Denna varningssymbol signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanligt förfarande för att förebygga skador.

General Safety Guidelines and Warnings for Virtual Services Engines

The following guidelines help ensure your safety and protect the VSE device from damage. The list of guidelines might not address all potentially hazardous situations in your working environment, so be alert and exercise good judgment at all times.

- Perform only the procedures explicitly described in the hardware documentation for this product. Make sure that only authorized service personnel perform other system services.
- Keep the area around the chassis clear and free from dust before, during, and after installation.
- Keep tools away from areas where people could trip over them while walking.

- Do not wear loose clothing or jewelry, such as rings, bracelets, or chains, which could become caught in the chassis.
- Wear safety glasses if you are working under any conditions that could be hazardous to your eyes.
- Do not perform any actions that create a potential hazard to people or make the equipment unsafe.
- Never attempt to lift an object that is too heavy for one person to handle.
- Never install or manipulate wiring during electrical storms.
- Never install electrical jacks in wet locations unless the jacks are specifically designed for wet environments.
- Operate the device only when it is properly grounded.
- Ensure that a reliable, low-resistance ground bond exists between the chassis and the rack, and that the rack is permanently connected to earth.
- Use only copper grounding conductors.
- Ensure that the separate protective earthing terminal on this product, if provided, is permanently connected to earth.
- Do not open or remove chassis covers or sheet-metal parts unless instructions are provided in the hardware documentation for this product. Such an action could cause severe electrical shock.
- Do not push or force any objects through any opening in the chassis frame. Such an action could result in electrical shock or fire.
- Avoid spilling liquid onto the chassis or onto any component. Such an action could cause electrical shock or damage the device.
- Avoid touching uninsulated electrical wires or terminals that have not been disconnected from their power source. Such an action could cause electrical shock.
- Always ensure that all modules, power supplies, and cover panels are fully inserted and that the installation screws are fully tightened.

**Related
Documentation**

- [Definition of Safety Warning Levels for VSE on page 27](#)
- [AC Power Electrical Safety Guidelines for VSE on page 32](#)
- [General Electrical Safety Guidelines and Warnings for VSE on page 31](#)
- [DC Power Electrical Safety Guidelines for VSE on page 33](#)

CHAPTER 8

Electrical Safety Guidelines and Warnings

- General Electrical Safety Guidelines and Warnings for Virtual Services Engines on page 31
- AC Power Electrical Safety Guidelines for Virtual Services Engines on page 32
- DC Power Electrical Safety Guidelines for Virtual Services Engines on page 33
- Prevention of Electrostatic Discharge Damage on Virtual Services Engines on page 34

General Electrical Safety Guidelines and Warnings for Virtual Services Engines



CAUTION: Certain ports on the device are designed for use as intrabuilding (within-the-building) interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE, Issue 4) and require isolation from the exposed outside plant (OSP) cabling. To comply with NEBS requirements and protect against lightning surges and commercial power disturbances, the intrabuilding ports *must not* be metalically connected to interfaces that connect to the OSP or its wiring. The intrabuilding ports on the device are suitable for connection to intrabuilding or unexposed wiring or cabling only. The addition of primary protectors is not sufficient protection for connecting these interfaces metalically to OSP wiring.



CAUTION: Before removing or installing device components, attach an ESD strap to an ESD point, and place the other end of the strap around your bare wrist. Failure to use an ESD strap could result in damage to the device.

- Install Virtual Services Engines in compliance with the following local, national, and international electrical codes:
 - United States—National Fire Protection Association (NFPA 70), United States National Electrical Code.
 - Other countries—International Electromechanical Commission (IEC) 60364, Part 1 through Part 7.

- Evaluated to the TN power system.
- Canada—Canadian Electrical Code, Part 1, CSA C22.1.
- Note the following warning printed on the chassis:
The equipment must be connected to an earthed mains socket-outlet.
Apparaten skall anslutas till jordat uttag när den ansluts till ett nätverk.
- Locate the emergency power-off switch for the room in which you are working so that if an electrical accident occurs, you can quickly turn off the power.
- Make sure that grounding surfaces are cleaned and brought to a bright finish before you make grounding connections.
- Do not work alone if potentially hazardous conditions exist anywhere in your workspace.
- Never assume that power is disconnected from a circuit. Always check the circuit before starting to work.
- Carefully look for possible hazards in your work area, such as moist floors, ungrounded power extension cords, and missing safety grounds.
- Operate Virtual Services Engines within marked electrical ratings and product usage instructions.
- To ensure that Virtual Services Engines and peripheral equipment function safely and correctly, use the cables and connectors specified for the attached peripheral equipment, and make certain they are in good condition.

You can remove and replace some components without powering off or disconnecting power to the device, as detailed elsewhere in the hardware documentation for this product. Never install equipment if it appears damaged.

**Related
Documentation**

- [Definition of Safety Warning Levels for VSE on page 27](#)
- [General Safety Guidelines and Warnings for VSE on page 28](#)
- [AC Power Electrical Safety Guidelines for VSE on page 32](#)
- [DC Power Electrical Safety Guidelines for VSE on page 33](#)

AC Power Electrical Safety Guidelines for Virtual Services Engines



CAUTION: For Virtual Services Engines with AC power supplies, an external surge protective device (SPD) must be used at the AC power source.

The following electrical safety guidelines apply to AC-powered devices:

- AC-powered devices are shipped with a three-wire electrical cord with a grounding-type plug that fits only a grounding-type power outlet. Do not circumvent this safety feature. Equipment grounding must comply with local and national electrical codes.

- The power cord serves as the main disconnecting device for the device. The socket outlet must be near the device and be easily accessible.
- For VSE devices that have more than one power supply connection, you must ensure that all power connections are fully disconnected so that power to the device is completely removed to avoid electric shock. To disconnect power, unplug all power cords (one for each power supply).



CAUTION: The AC power cord for the devices is intended for use with that device only and not for any other use.

Power Cable Warning (Japanese)

WARNING: The attached power cable is only for this product. Do not use the cable for another product.

注意

附属の電源コードセットはこの製品専用です。
他の電気機器には使用しないでください。

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Related Documentation

- [Definition of Safety Warning Levels for VSE on page 27](#)
- [General Safety Guidelines and Warnings for VSE on page 28](#)
- [General Electrical Safety Guidelines and Warnings for VSE on page 31](#)
- [Connecting Power to AC-Powered VSE1100 and VSE2100 on page 45](#)

DC Power Electrical Safety Guidelines for Virtual Services Engines

The following electrical safety guidelines apply to a DC-powered device:

- A DC-powered device is equipped with a DC terminal block that is rated for the power requirements of a maximally configured device.



NOTE: To supply sufficient power, terminate the DC input wiring on a facility DC source capable of supplying at least 8 A at –48 VDC.

Incorporate an easily accessible disconnect device into the facility wiring. Be sure to connect the ground wire or conduit to a solid office earth ground. We recommend a closed loop ring for terminating the ground conductor at the ground stud.

- You must use only copper grounding conductors.
- Run two wires from the circuit breaker box to a source of 48 VDC.

- You must provide an external certified circuit breaker rated minimum 20 A in the building installation.
- A DC-powered device that is equipped with a DC terminal block is intended only for installation in a restricted access location. In the United States, a restricted access area is one in accordance with Articles 110-16, 110-17, and 110-18 of the National Electrical Code ANSI/NFPA 70.



CAUTION: Primary overcurrent protection is provided by the building circuit breaker. This breaker must protect against excess currents, short circuits, and earth-grounding faults in accordance with NEC ANSI/NFPA 70.

- Ensure that the polarity of the DC input wiring is correct. Under certain conditions, connections with reversed polarity might trip the primary circuit breaker or damage the equipment.
- For personal safety, connect a wire for earth ground at both the device and the supply side of the DC wiring.
- The marked input voltage of –48 VDC for a DC-powered device is the nominal voltage associated with the battery circuit, and any higher voltages are to be associated only with float voltages for the charging function.
- Because the device is a positive ground system, you must connect the positive lead to the terminal labeled RTN, the negative lead to the terminal labeled –48 VDC, and the earth ground to the chassis grounding points.

**Related
Documentation**

- [Definition of Safety Warning Levels for VSE on page 27](#)
- [General Safety Guidelines and Warnings for VSE on page 28](#)
- [Connecting Power to DC-Powered VSE1100 and VSE2100 on page 46](#)

Prevention of Electrostatic Discharge Damage on Virtual Services Engines

VSE components that are shipped in antistatic bags are sensitive to damage from static electricity. Some components can be impaired by voltages as low as 30 V. You can easily generate potentially damaging static voltages whenever you handle plastic or foam packing material or if you move components across plastic or carpets. Observe the following guidelines to minimize the potential for electrostatic discharge (ESD) damage, which can cause intermittent or complete component failures:

- Always use an ESD grounding strap when you are handling components that are subject to ESD damage, and make sure that it is in direct contact with your skin.

If a grounding strap is not available, hold the component in its antistatic bag in one hand, and touch the exposed, bare metal of the device with the other hand immediately before inserting the component into the device.



CAUTION: For safety, periodically check the resistance value of the ESD strap. The measurement must be in the range of 1 through 10 Mohms.

- Avoid contact between the component that is subject to ESD damage and your clothing. ESD voltages emitted from clothing can damage components.
- When removing or installing a component that is subject to ESD damage, always place it component-side up on an antistatic surface, in an antistatic card rack, or in an antistatic bag. If you are returning a component, place it in an antistatic bag before packing it.



CAUTION: ANSI/TIA/EIA-568 cables such as category 5e and category 6 can get electrostatically charged. To dissipate this charge, always ground the cables to a suitable and safe earth ground before connecting them to the system.

**Related
Documentation**

- [Definition of Safety Warning Levels for VSE on page 27](#)
- [General Safety Guidelines and Warnings for VSE on page 28](#)
- [Front Panel Features of VSE1100 and VSE2100 on page 6](#)

PART 4

Installation

- [Preparing the Installation on page 39](#)
- [Installing VSE1100 and VSE2100 Devices on page 43](#)
- [Cabling on page 45](#)
- [Powering On on page 49](#)

CHAPTER 9

Preparing the Installation

- [Unpacking and Inspecting VSE1100 and VSE2100 Devices on page 39](#)
- [Before You Install a VSE1100 or VSE2100 Device on page 40](#)

Unpacking and Inspecting VSE1100 and VSE2100 Devices

The Virtual Services Engine (VSE) is shipped in a box. A cardboard accessory box is also included in the shipping box.



NOTE: The device is maximally protected inside the shipping box. Do not unpack it until you are ready to begin installation.

Before you begin unpacking the device, be sure you have the following tools:

- A No. 2 Phillips screwdriver
- A utility knife
- For VSE1100 and VSE2100 devices, two people to assist in lifting

To unpack the device:

1. Move the shipping box to a staging area as close to the installation site as possible, where you have enough room to maneuver.
2. Position the shipping box with the arrows pointing up.
3. Open the shipping box.
4. Remove the accessory box.
5. Verify the parts received against the lists.
6. Save the shipping box and packing materials in case you need to move or ship the device at a later time.

After you remove the equipment from the shipping boxes:

- Confirm the contents of each box.
- Inspect all external surfaces and external connectors for visible signs of damage.

- Inspect all accessories shipped with each unit.
- Document any damage noted during your inspection.
- Confirm that the platform has the correct number and type of modules for your ordered configuration.

If you detect or suspect damage to any equipment:

- Contact the shipper responsible for delivery, and formally report the damage.
- Contact Juniper Networks at 1-888-314-JTAC (from the United States, Canada, or Mexico) or 1-408-745-9500 (from elsewhere), or contact your sales representative or reseller if you have any questions or concerns.

**Related
Documentation**

- [Returning VSE Products for Repair or Replacement on page 65](#)

Before You Install a VSE1100 or VSE2100 Device

Before installing a VSE device:

- Verify that the site meets all environment specifications. See [“Environmental Requirements and Specifications for VSE1100 and VSE2100” on page 13](#).
- Read and understand the clearance requirements for the device to ensure adequate ventilation and enable access to the device for maintenance. See [“Clearance Requirements for Airflow and Hardware Maintenance for VSE1100 and VSE2100” on page 15](#).
- Have the tools and accessories needed to complete the installation. See [“Unpacking and Inspecting VSE1100 and VSE2100” on page 39](#). In addition, you need a flat-bladed screwdriver to remove or replace a storage drive.
- Verify that the cables you plan to use meet the specifications, and review the cabling recommendations. See [“AC Power Cord Specifications for VSE1100 and VSE2100” on page 17](#). Have plastic cable ties or other means to secure traffic and power cables safely out of the way.
- Verify that the electrical supply meets all AC or DC power requirements. See [“Power Specifications for VSE1100 and VSE2100” on page 21](#).

When equipped with a DC power supply, the Virtual Services Engine supports a DC Isolated return (DC-I) installation. In a DC-I installation, the DC power return conductor is isolated from the equipment chassis or frame when connected to the power supply.

- Consider the following guidelines before installing the device:
 - For AC-power-equipped devices you must provide an external Surge Protection Device (SPD).
 - The nominal working voltage range for a DC-power-equipped device is –48 VDC. This device can operate over an input voltage range from –38 VDC to –72 VDC.

- For DC-power-equipped devices, you must provide an external certified, dedicated circuit breaker rated at a minimum of 20 A for each DC power supply.
- For DC-power-equipped devices, you must supply four DC power cables that meet your local code requirements.
- You must provide a good earth ground for the rack.
- On DC-power-equipped models, you must supply a ground cable for the power supply.
- We recommend using a ground cable identified according to local standards to ground the device.

For example, a green wire is typical for ground conductors in the United States, Canada, and countries that follow similar wiring codes for 60-Hz power supplies. A green-and-yellow striped wire is typical for ground conductors in Europe and countries that follow a similar wiring code for 50-Hz power supplies.

- You must use only copper grounding conductors.
- For a ground wire attaching directly to the rack, we recommend using the following ground lug: Panduit P/N LCDX8-10A-L, #8 AWG, #10 stud, 0.625-inch spacing.
- To ensure a reliable low-resistance ground bond, you must provide and use star washers and thread-forming screws with paint-piercing washers to secure the ground wire to the rack frame and to secure the device chassis to the rack.

If you connect the ground wire to a ground rail in the rack or to any other grounding facility provided by the site, you must use the appropriate fasteners to ensure a reliable ground bond. When the ground wire is attached with bolts or to studs, locking washers can help ensure that the ground wire does not come loose.

- Tighten all fasteners to the torque specification recommended by the manufacturer of the fastener or recommended by a recognized standards organization for that size fastener. Do not overtighten the fasteners.

For example, the following values are typical torque specifications for rack screws:

- 10-32—20 in.-lb
- 12-24—30 in.-lb
- M6—20 in.-lb
- You must coat bare conductors with an appropriate antioxidizing compound before making any crimp connections. You must bring all unplated connectors, braided strap, and bus bars to a bright finish and then coat them with an appropriate antioxidizing compound before you connect them.

Related Documentation • [Installing VSE1100 and VSE2100 on page 43](#)

Installing VSE1100 and VSE2100 Devices

- Installing VSE1100 and VSE2100 Devices on page 43

Installing VSE1100 and VSE2100 Devices

To install a VSE1100 or VSE2100 device:

1. Place the shipping container on a flat surface, and remove the hardware components with care.



CAUTION: Do not allow the unpackaged device or any edge or surface of the device to drop more than 3 inches, unsupported. An unsupported drop onto a hard surface from a height greater than 3 inches can cause irreparable physical damage to the storage media. Place impact-absorbing material under the device to prevent loss of storage drive functionality in such cases.

2. Attach the supplied mounting ears and brackets based on whether you intend to use a front-mounting method or a mid-chassis mounting method.
3. Lift the device and insert it in the desired location in the rack.



CAUTION: Because of the Virtual Services Engine's size and weight—up to 30.6 lb (13.9 kg) depending on the configuration—we recommend that you install the device with two people (one to lift and one to secure the device to the rack).

4. Align the holes on the mounting brackets with the holes on both sides of the equipment rack.
5. Secure the device to the rack with thread-forming screws, and place external-tooth, paint-piercing lock washers between the screw head and the mounting bracket to create a reliable low-resistance ground bond between the chassis and the rack.

6. Connect power to the device.

For a standard, AC-power-equipped device, plug the supplied AC power cord into the receptacle on the rear panel. See [“Connecting Power to AC-Powered VSE1100 and VSE2100” on page 45](#).

If you have a DC-power-equipped Virtual Services Engine, see [“Connecting Power to DC-Powered VSE1100 and VSE2100” on page 46](#).

7. To connect to a local management device, plug the supplied Ethernet cable into the console port on the front panel.

For more information, see [“Connecting a Console Server to VSE1100 and VSE2100” on page 47](#).

8. To connect to your network, plug cables you supply into the desired Ethernet ports on the front panel.

9. Power on the device.

See [“Powering On Virtual Services Engines” on page 49](#).

When you turn on the power, the internal port uses two LEDs to indicate the LAN connection status. See [“Front Panel Features of VSE1100 and VSE2100” on page 6](#) for LED details.

**Related
Documentation**

- [Before You Install VSE1100 and VSE2100 on page 40](#)

CHAPTER 11

Cabling

- [Connecting Power to AC-Powered VSE1100 and VSE2100 Devices on page 45](#)
- [Connecting Power to DC-Powered VSE1100 and VSE2100 Devices on page 46](#)
- [Connecting a Console Server to VSE1100 and VSE2100 Devices on page 47](#)

Connecting Power to AC-Powered VSE1100 and VSE2100 Devices

The power supply in a Virtual Services Engine is located on the rear panel.

Ensure that you have a power cord appropriate for your geographical location.

Ensure that you have connected the device chassis to earth ground.



CAUTION: To meet safety and electromagnetic interference (EMI) requirements and to ensure proper operation, you must connect the devices to earth ground before you connect them to power. The device gets additional grounding when you plug the power supply in the device into a grounded AC power outlet by using the AC power cord appropriate for your geographical location (see [“AC Power Cord Specifications for VSE1100 and VSE2100” on page 17](#)).

To connect AC power to the device:

1. Locate the power cord shipped with the device; the cords have plugs appropriate for your geographical location. See [“AC Power Cord Specifications for VSE1100 and VSE2100” on page 17](#).



WARNING: Ensure that the power cord does not drape where people can trip on it or block access to VSE components.

2. Insert the coupler end of the power cord into the AC power cord inlet on the rear panel.
3. If the AC power source outlet has a power switch, set it to the off (O) position.
4. Insert the power cord plug into an AC power source outlet.
5. If the AC power source outlet has a power switch, set it to the on (I) position.

- Related Documentation**
- [General Electrical Safety Guidelines and Warnings for VSE on page 31](#)
 - [AC Power Electrical Safety Guidelines for VSE on page 32](#)
 - [Powering On Virtual Services Engines on page 49](#)

Connecting Power to DC-Powered VSE1100 and VSE2100 Devices



WARNING: Before performing DC power procedures, ensure that power is removed from the DC circuit. To ensure that all power is off, locate the circuit breaker that services the DC circuit, switch the circuit breaker to the off position, and secure the switch handle of the circuit breaker in the off position.



CAUTION: Do not mix AC and DC power supplies within the same device. Damage to the device might occur.

Ensure that the equipment rack is properly grounded and the device has a good low-resistance ground bond to the rack before you connect power to the DC power supplies.

Connect DC power to the device by attaching power cables from the external DC power sources to the terminals on the power supply faceplates. You must provide the power cables.

To connect the DC source power cables to a DC power supply on the device:

1. Switch off the dedicated customer site circuit breaker for the power supply. Ensure that the voltage across the DC power source cable leads is 0 V and that there is no chance that the cable leads might become active during installation.
2. Attach an electrostatic discharge (ESD) grounding strap to your bare wrist, and connect the strap to an ESD point on the grounded rack.
3. Verify that the DC power cables are correctly labeled before making connections to the power supply. In a typical power distribution scheme where the return is connected to chassis ground at the battery plant, you can use a multimeter to verify the resistance of the **V– (–48V)** and **V+ (RTN)** DC cables to chassis ground:
 - The cable with very large resistance (indicating an open circuit) to chassis ground is **V– (–48V)**.
 - The cable with very low resistance (indicating a closed circuit) to chassis ground is **V+ (RTN)**.



CAUTION: You must ensure that power connections maintain the proper polarity. The power source cables might be labeled (+) and (–) to indicate their polarity. There is no standard color coding for DC power cables. The

color coding used by the external DC power source at your site determines the color coding for the leads on the power cables that attach to the terminals on each power supply.

4. Attach the power cables.
 - a. Remove the protective cover from the DC terminals on the power supply.
 - b. Loosen the DC terminal screws.
 - c. Insert the positive (+) DC source power cable, and tighten the screw to secure the cable to the **V+ (RTN)** return terminal.
 - d. Insert the negative (–) DC source power cable, and tighten the screw to secure the cable to the **V– (–48V)** input terminal.
 - e. Replace the protective cover over the DC terminals on the power supply.
5. Attach the grounding cable.
 - a. Remove the screw from the grounding terminal on the power supply.
 - b. Insert the screw through the grounding lug on the cable, and tighten the screw to secure the cable to the power supply grounding terminal.
6. Route the power and grounding cables so that they do not protrude or prevent access to components of any equipment in the rack. Secure the power and grounding cables with plastic cable ties, which you must provide.
7. Verify that the power and grounding cables are connected correctly, that they are not touching or blocking access to device components, and that they do not drape where people could trip on them.
8. Switch on the dedicated customer site circuit breaker for the power supply.

Related Documentation

- [Prevention of Electrostatic Discharge Damage on VSE on page 34](#)
- [Installing VSE1100 and VSE2100 on page 43](#)
- [Powering On Virtual Services Engines on page 49](#)

Connecting a Console Server to VSE1100 and VSE2100 Devices

Virtual Services Engines are Preboot eXecution Environment (PXE) booted from the router. For configuring the device for PXE boot, and the platform and virtual machine (VM) layers for the first time, see the “Application Deployment” section of the *Quick Start Guide: JunosV App Engine*.

To connect a console server:

1. Turn off the power to the console.
2. Connect a cable to the CONSOLE port on the front panel of the device.

The CONSOLE port accepts a cable with an RJ-45 connector. A cable is supplied with the device.

3. Connect the other end of the cable to your console server or terminal server.

**Related
Documentation**

- [RJ-45 Console Connector Pinout for VSE on page 17](#)
- [Installing VSE1100 and VSE2100 on page 43](#)

CHAPTER 12

Powering On

- [Powering On Virtual Services Engines on page 49](#)
- [Powering Off Virtual Services Engines on page 50](#)

Powering On Virtual Services Engines

In this procedure we assume that the device is already connected to a power source.

If the device is equipped with an AC power supply, see [“Connecting Power to AC-Powered VSE1100 and VSE2100” on page 45](#).

If the device is equipped with a DC power supply, see [“Connecting Power to DC-Powered VSE1100 and VSE2100” on page 46](#).

For specifications on the electrical requirements for the device, see [“Power Specifications for VSE1100 and VSE2100” on page 21](#).



CAUTION: Evaluate the overall loading of the branch circuit before you install any equipment into a rack.

To power on the device and configure the Ethernet address:

1. Connect the device to a local console or terminal server.
2. Verify that the power source is operational.
3. Inspect all grounding and power connections to the chassis.
4. Confirm that all cable connections are secure.
5. Press and release the momentary rocker power switch on the rear panel of the chassis to power on the device.
6. Monitor LEDs on the device to verify that the device is booting properly.

To configure the device for a PXE boot and the platform and virtual machine (VM) layers for the first time, see the *Quick Start Guide: JunosV App Engine*.

Related Documentation

- [Powering Off Virtual Services Engines on page 50](#)
- [Installing VSE1100 and VSE2100 on page 43](#)

Powering Off Virtual Services Engines

To power off VSE1100 or VSE2100, you can use one of the following methods:

- From the Junos OS command-line interface (CLI), issue the **request app-engine offline compute-cluster <computer-cluster-name> compute-node <compute-node-name>** command to temporarily suspend the device's operation. For more information about the command, see the *JunosV App Engine Administration Guide*.
- Log in to the computer node console and issue the **shutdown -h now** command from the command prompt.
- Use the power switch at the rear of the chassis to power off the device. This is a toggle button to power on or power off.
- Use the console server remote power feature, if supported by the console server.
- Log in to the compute node console and type **ctrl+^**. Use the **p/-** option to toggle the power.



NOTE: Hot keys may differ depending on the console server vendor.

Related Documentation

- [Powering On Virtual Services Engines on page 49](#)

PART 5

Configuration

- [Connecting Virtual Services Engines on page 53](#)

CHAPTER 13

Connecting Virtual Services Engines

- [Connecting the VSE Platform to the Router on page 53](#)

Connecting the VSE Platform to the Router

To log in to the system command line interface (CLI) for the first time, you need the IP address assigned to the interface.

To connect the router running Junos OS and the VSE platform:

1. Choose any one of the VSE platform interfaces as the management interface. Make sure there is a physical connection from this interface to the router.
2. (Optional, but required for remote power cycling) Connect the console port on the left side of the VSE platform to a console, see [“Connecting a Console Server to VSE1100 and VSE2100” on page 47](#).
3. Configure the TFTP server and the DHCP server for PXE boot.

BIOS is enabled for PXE boot at the time of manufacture for all VSE platform interfaces. For how to enable a PXE boot of the VSE platform, see “Configuring the DHCP Server and TFTP Server for Compute Nodes” in the *JunosV App Engine Administration Guide*.

Related Documentation

- [Connecting a Console Server to VSE1100 and VSE2100 on page 47](#)

PART 6

Maintenance

- [Maintaining Components on page 57](#)
- [Packing and Returning Hardware on page 65](#)
- [Product Reclamation and Recycling on page 67](#)

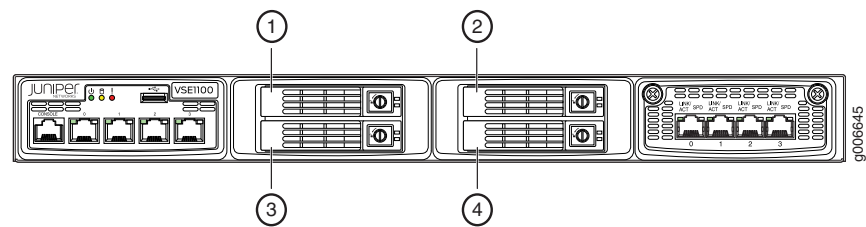
Maintaining Components

- [Replacing a Storage Drive on VSE1100 and VSE2100 Devices on page 57](#)
- [Replacing an IOC on VSE1100 and VSE2100 Devices on page 58](#)
- [Replacing an AC Power Supply on VSE1100 and VSE2100 Devices on page 60](#)
- [Replacing a DC Power Supply on VSE1100 and VSE2100 Devices on page 61](#)
- [Replacing a Cooling Fan on VSE1100 and VSE2100 Devices on page 62](#)

Replacing a Storage Drive on VSE1100 and VSE2100 Devices

The Virtual Services Engine supports Serial Attached SCSI (SAS) and Serial Advanced Technology Attachment (SATA) solid-state drives (SSD) specified by Juniper Networks. [Figure 4 on page 57](#) displays the arrangement of storage drive slots on a VSE1100 device; the layout is the same for a VSE2100 device.

Figure 4: VSE1100 Storage Drive Slots



[Table 15 on page 57](#) describes the storage drives on a VSE1100 or VSE2100 device.

Table 15: Description of VSE1100 and VSE2100 Storage Drive Slots

Number	Component
1, 2, 3, and 4	Storage drives 2, 4, 5, and 3 respectively.

The following drives have been verified to work in VSE1100 and VSE2100 devices:

- SAS 900 GB
- SATA 1TB

To remove a storage drive:

1. Power off the device. For more information, see [“Powering Off Virtual Services Engines” on page 50](#).
2. Remove the storage drive.
 - a. Attach an electrostatic discharge (ESD) grounding strap to your bare wrist, and connect the strap to an ESD point on the chassis.
 - b. Using a flat-bladed screwdriver, rotate the lock on the ejector to the unlocked position.
 - c. Pull the ejector handle outward to the open position.
 - d. Carefully slide the drive out of the slot.
3. Reinstall a storage drive.
 - a. Carefully align the sides of the drive with the guides in the slot.
 - b. Slide the drive into the slot until you feel resistance, carefully ensuring that it is correctly aligned.
 - c. Gently press on the drive and the ejector handle until the drive is fully seated and the handle locks in place.
 - d. Rotate the lock on the ejector to the locked position.
4. Power on the device.

- Related Documentation**
- [Powering On Virtual Services Engines on page 49](#)
 - [Returning VSE Products for Repair or Replacement on page 65](#)

Replacing an IOC on VSE1100 and VSE2100 Devices

The VSE1100 device has a four-port input/output controller (IOC) and the VSE2100 device has a two-port IOC. When you remove an IOC, the VSE device continues to function.

An IOC installs horizontally in the front of the VSE device. The IOCs are hot-insertable and hot-removable.

VSE1100 and VSE2100 devices support the following IOCs:

- 4-port Gigabit IOC (model number UNIV-1GE-4COP)
- 2-port Gigabit IOC (model number UNIV-10GE-2SFPP)

To remove an IOC:

1. Power off the device. See [“Powering Off Virtual Services Engines” on page 50](#) for more information.
2. Attach an electrostatic discharge (ESD) grounding strap to your bare wrist, and connect the strap to an ESD point on the device.

For more information about ESD, see [“Prevention of Electrostatic Discharge Damage on VSE” on page 34](#).

3. Loosen the captive thumbscrews located at the sides of the IOC panel.
4. Carefully slide the IOC out of the device.
5. Place the IOC in its antistatic bag, being careful not to touch components, pins, leads or solder connections.
6. Cover the empty slot with a blank filler panel, and tighten the filler panel's captive thumbscrews.

To install an IOC:

1. Attach an electrostatic discharge (ESD) grounding strap to your bare wrist, and connect the strap to an ESD point on the device.

For more information about ESD, see [“Prevention of Electrostatic Discharge Damage on VSE” on page 34](#).

2. Choose the slot where you want to insert the IOC.
3. Loosen the captive thumbscrews that secure the blank filler panel covering the empty slot, if present, and remove the filler panel.
4. Remove the IOC from its antistatic bag, being careful not to touch components, pins, leads, or solder connections.
5. Verify that the ejectors are in the open position (facing outward).
6. Guide the IOC into the chassis by placing it between the guides of the selected slot and pushing the card until it stops.

The card stops sliding when the ejectors make contact with the device.



CAUTION: If you meet strong resistance when attempting to seat the card using the ejectors, remove it from the device, and confirm that the slot is designed to hold the component. Also, be sure that you have aligned the left and right edges in the correct matching tracks.

7. Insert the IOC by simultaneously pressing both ejectors inward and exerting forward pressure on the card until the small red release buttons click into place.
8. Tighten the captive thumbscrews.

Related Documentation

- [Powering Off Virtual Services Engines on page 50](#)

- [Powering On Virtual Services Engines on page 49](#)
- [Returning VSE Products for Repair or Replacement on page 65](#)

Replacing an AC Power Supply on VSE1100 and VSE2100 Devices

VSE1100 and VSE2100 devices are supplied with an AC power supply as standard equipment.

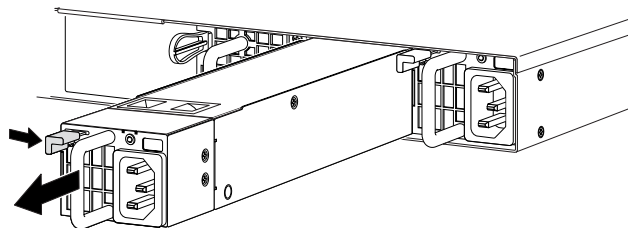


NOTE: After powering off a power supply, wait at least 60 seconds before turning it back on.

To remove an AC power supply:

1. Power off the device. See [“Powering Off Virtual Services Engines” on page 50](#) for more information.
2. Unplug the power cord from the power source receptacle.
3. Attach an electrostatic discharge (ESD) grounding strap to your bare wrist, and connect the strap to an ESD point on the chassis.
4. Unplug the power cord from the inlet in the power supply.
5. The AC power supply has a pull handle and a locking tab. Press the locking tab to the right while you pull out the module using the handle. See [Figure 5 on page 60](#).

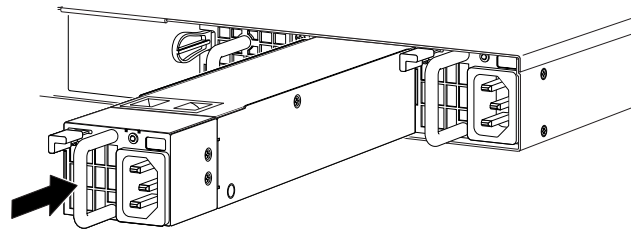
Figure 5: Removing an AC Power Supply



To install an AC power supply:

1. Move the power switch next to the device inlet on the power supply to the off (O) position.
2. Insert the new power supply module into the device. Hold the power supply locking tab to the right until the power supply is fully seated. See [Figure 6 on page 61](#).

Figure 6: Replacing an AC Power Supply



3. Move the power supply locking tab to the left to ensure the power supply module is locked in the device.
4. Insert the power cord into the inlet on the power supply.
5. Insert the power cord into the AC power source outlet.
6. Press and release the momentary rocker power switch on the rear panel of the chassis to power on the device.
7. Observe the status LED on the power supply.
 - The LED is green when the power supply is receiving power and is powering the device.
 - The LED is amber when the power supply is receiving power but is not powering the device.

Related Documentation

- [Powering Off Virtual Services Engines on page 50](#)
- [Powering On Virtual Services Engines on page 49](#)
- [Connecting Power to AC-Powered VSE1100 and VSE2100 on page 45](#)
- [Returning VSE Products for Repair or Replacement on page 65](#)

Replacing a DC Power Supply on VSE1100 and VSE2100 Devices

Although an AC power supply is standard equipment, the Virtual Services Engines can be equipped with a DC power supply.



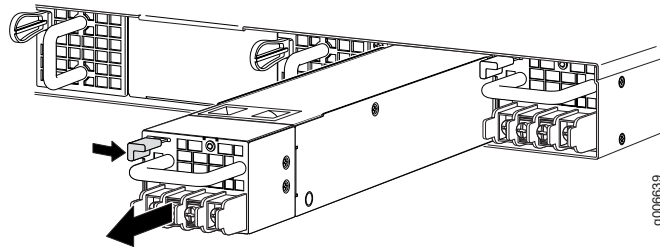
NOTE: After powering off a power supply, wait at least 60 seconds before turning it back on.

To remove the DC power supply:

1. Power off the device. See [“Powering Off Virtual Services Engines” on page 50](#) for more information.
2. Turn off the site circuit breaker for the power supply.
3. Attach an electrostatic discharge (ESD) grounding strap to your bare wrist, and connect the strap to an ESD point on the device or the rack.

4. Remove the grounding cable from the power supply.
5. Remove the power cables from the power supply
6. The power supply has a pull handle and a locking tab. Press the locking tab to the right while you pull out the power supply using the handle. See [Figure 7 on page 62](#).

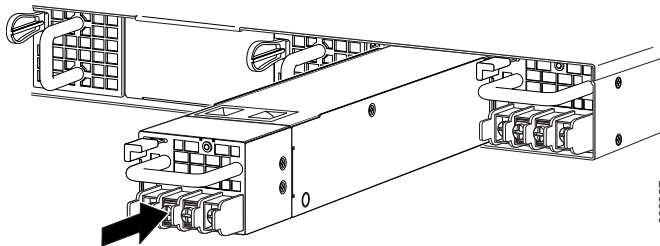
Figure 7: Removing a DC Power Supply



To install the DC power supply:

1. Insert the new power supply into the device. Hold the power supply locking tab to the right until the power supply is fully seated. See [Figure 8 on page 62](#).

Figure 8: Replacing a DC Power Supply



2. Move the power supply locking tab to the left to ensure that the power supply is locked in the device.
3. Reconnect the power cables to the power supply.
4. Reconnect the grounding cable to the power supply.
5. Turn on the site circuit breaker for the power supply.

Related Documentation

- [Powering Off Virtual Services Engines on page 50](#)
- [Connecting Power to DC-Powered VSE1100 and VSE2100 on page 46](#)
- [Returning VSE Products for Repair or Replacement on page 65](#)

Replacing a Cooling Fan on VSE1100 and VSE2100 Devices

The Virtual Services Engine has three cooling fans that are hot-swappable. Replace the fans after 5 years of accumulated use.

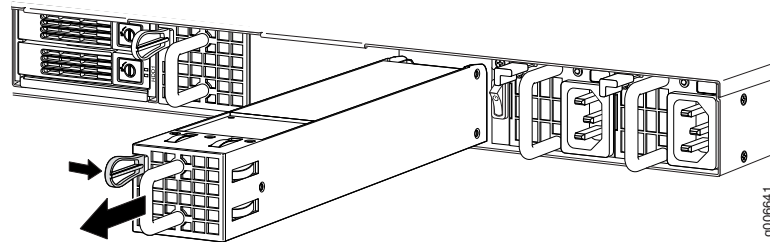


WARNING: To avoid injury, keep tools and your fingers away from the fans as you slide the fan tray out of the chassis.

To replace a fan:

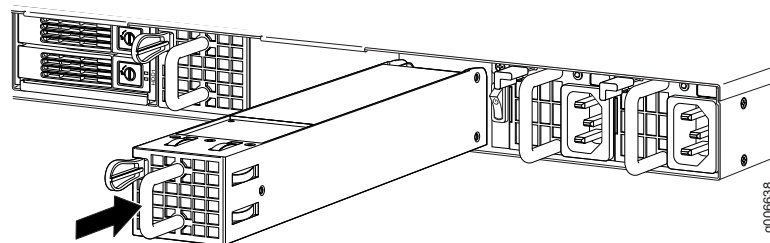
1. Examine the rear of the chassis. Verify that the fan is not spinning.
2. A cooling fan has a pull handle and a locking tab. Press the locking tab to the right while you pull out the fan using the handle. See [Figure 9 on page 63](#).

Figure 9: Removing a Cooling Fan



3. Insert the new fan assembly. Hold the fan assembly locking tab to the right until the fan assembly is fully seated. See [Figure 10 on page 63](#).

Figure 10: Replacing a Cooling Fan



4. Move the fan assembly locking tab to the left to ensure that the fan assembly is locked in the device.

Related Documentation

- [Returning VSE Products for Repair or Replacement on page 65](#)

Packing and Returning Hardware

- [Returning VSE Products for Repair or Replacement on page 65](#)
- [Locating VSE Component Serial Numbers on page 66](#)

Returning VSE Products for Repair or Replacement

When you need to return a component:

1. Determine the part number and serial number of the component. For instructions, see [“Locating VSE Component Serial Numbers” on page 66](#).
2. Obtain a Return Materials Authorization (RMA) number from the Juniper Networks Technical Assistance Center (JTAC). See [“Information You Might Need to Supply to JTAC” on page 71](#).

Provide the following information in your e-mail message or during the telephone call:

- Part number and serial number of component
- Your name, organization name, telephone number, and fax number
- The shipping address for the replacement component, including contact name and phone number
- Description of the failure

The support representative validates your request and issues an RMA number for return of the component.



NOTE: Do not return any hardware until you have received an RMA. This number is necessary to ensure proper tracking and handling of returned material at the factory. Juniper Networks reserves the right to refuse shipments that do not have an RMA. Refused shipments are returned to the shipper through collect freight.

3. Pack the device or component for shipment.
 - a. Ground yourself by using an antistatic wrist strap or other device.
 - b. Follow the proper shutdown procedure for the device. See [“Powering Off Virtual Services Engines” on page 50](#)

- c. Remove all cables from the device.
- d. Remove the device from the rack, and pack it in the shipping box.

If possible, use the original shipping box and packing materials in which the device was originally shipped. If these materials are unavailable, use comparable shipping material, or contact your Juniper Networks representative for information about approved packaging material.

- e. Cover the chassis with an ESD bag, and place packing foam on top of and around the device.

See the customer support Web page for complete repair and return policies and procedures.

Related Documentation

- [Contacting Customer Support on page 71](#)

Locating VSE Component Serial Numbers

Before contacting Juniper Networks to request a Return Materials Authorization (RMA), you must find the serial number on the chassis or component.

Serial numbers are located on the components. ID labels are usually applied near the ejector.

Related Documentation

- [Contacting Customer Support on page 71](#)
- [Information You Might Need to Supply to JTAC on page 71](#)
- [Returning VSE Products for Repair or Replacement on page 65](#)

CHAPTER 16

Product Reclamation and Recycling

- Product Reclamation and Recycling Program on page 67

Product Reclamation and Recycling Program

Juniper Networks is committed to environmentally responsible behavior. As part of this commitment, we continually work to comply with environmental standards such as the European Union's *Waste Electrical and Electronic Equipment* (WEEE) Directive and *Restriction of Hazardous Substances* (RoHS) Directive.

These directives and other similar regulations from countries outside the European Union regulate electronic waste management and the reduction or elimination of specific hazardous materials in electronic products. The WEEE Directive requires electrical and electronics manufacturers to provide mechanisms for the recycling and reuse of their products. The RoHS Directive restricts the use of certain substances that are commonly found in electronic products today. Restricted substances include heavy metals, including lead, and polybrominated materials. The RoHS Directive, with some exemptions, applies to all electrical and electronic equipment.

In accordance with Article 11(2) of Directive 2002/96/EC (WEEE), products put on the market after 13 August 2005 are marked with the following symbol or include it in their documentation: a crossed-out wheeled waste bin with a bar beneath.



Juniper Networks provides recycling support for our equipment worldwide to comply with the WEEE Directive. For recycling information, go to <http://www.juniper.net/environmental>, and indicate the type of Juniper Networks equipment that you wish to dispose of and the country where it is currently located, or contact your Juniper Networks account representative.

Products returned through our reclamation process are recycled, recovered, or disposed of in a responsible manner. Our packaging is designed to be recycled and should be handled in accordance with your local recycling policies.

**Related
Documentation**

- [Environmental Requirements and Specifications for VSE1100 and VSE2100 on page 13](#)

PART 7

Troubleshooting

- [Contacting Customer Support on page 71](#)

CHAPTER 17

Contacting Customer Support

- [Information You Might Need to Supply to JTAC on page 71](#)
- [Contacting Customer Support on page 71](#)

Information You Might Need to Supply to JTAC

When requesting technical support from JTAC by phone, be prepared to provide the following information:

- Priority level
- Indication of what activity was being performed on the device when the problem occurred
- Problem detail and configuration data

When a new request for technical support is submitted, the JTAC engineer:

1. Opens a case and assigns a number.
2. Begins troubleshooting, diagnostics, and problem replication (if appropriate).
3. Provides you with periodic updates on problem status and escalates the problem as appropriate according to escalation management guidelines.
4. Closes the case when you agree that the problem has been resolved.

Related Documentation

- [Locating VSE Component Serial Numbers on page 66](#)
- [Returning VSE Products for Repair or Replacement on page 65](#)

Contacting Customer Support

See the Juniper Networks Web site for complete customer service information:

- <http://www.juniper.net/support/guidelines.html>

For your convenience, we provide multiple options for requesting and receiving technical support from the Juniper Networks Technical Assistance Center (JTAC):

- By the Web using Juniper Networks, Inc. Case Manager:

<https://www.juniper.net/cm/index.jsp>

- By telephone:
From the US, Canada, and Mexico at 1-888-314-JTAC
From all other locations at 408-745-9500

**Related
Documentation**

- [Locating VSE Component Serial Numbers on page 66](#)
- [Information You Might Need to Supply to JTAC on page 71](#)
- [Returning VSE Products for Repair or Replacement on page 65](#)

PART 8

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- [Index on page 75](#)

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