



Cisco NCS 560-4 Router Overview

The Cisco NCS 560-4 (4RU) router, is a full-featured, modular and programmable aggregation router. It is designed for the cost-effective delivery of converged mobile (IP RAN, Mobile xHaul), residential, and business services (MEF CE 3.0, layer 2/layer 3 and EVPN). The Cisco NCS 560-4 router provides redundancy, shallow depth, low power consumption, high Ethernet interface density, and high services scale, is optimized for aggregation and remote Point-Of-Presence (POP) applications

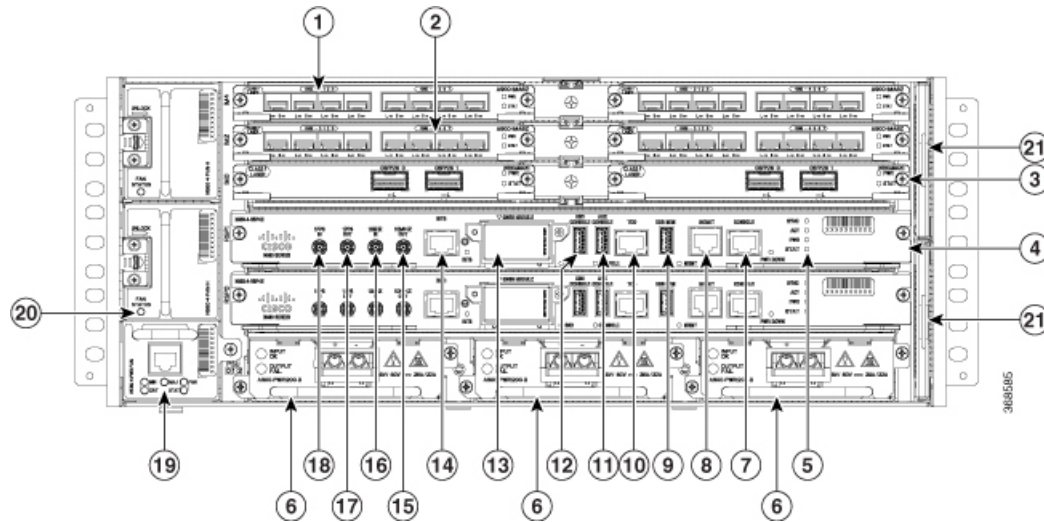
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Cisco NCS 560-4 Router Features

- Fully redundant and centralized forwarding
- Six Interface Module (IM) slots
- Aggregate backplane capacity of 1.8Tbps
- Support for 1:1 and 2:1 power supply redundancy configurations, capable of delivering approximately 1.5KW to the router
- Three fan trays working in pull-mode and drawing air from right to left

The image below illustrates the Cisco NCS 560-4 Router chassis design.

Figure 1: Cisco NCS 560-4 Router Front Panel



1	Interface module slot	2	Interface module slot
3	Interface module slot	4	Route Switch Processor (N560-4-RSP4E or N560-4-RSP4)
5	System LEDs	6	Power Supplies (three)
7	RJ-45 Console	8	Management Port
9	USB memory port	10	Time of day timing (ToD) port
11	Auxiliary console	12	USB console
13	GNSS module	14	BITS timing port
15	10 MHz Out	16	10 MHz In
17	1PPS Out	18	1PPS In
19	Master fan tray	20	Slave fan tray
21	Fan Filters	—	—

The cabling for all interfaces (power, data and control) are on the front side of the chassis. The chassis grounding point is located on the rear side of the chassis.

The following image illustrates the slot numbering scheme for the FRUs in Cisco NCS 560-4 router in case of single width IMs.

FT2	IM4		IM5	
	IM2		IM3	
	IM0		IM1	
FT1	RSP1			
	RSP0			
FT0	PSU0	PSU1	PSU2	

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System Specifications

Table 1: System Specifications - Abridged

Component	Specification
Cisco NCS 560-4 Router - Physical	Height: 7 in. (177.88 mm) - 4RU Width: 17.44 in. (443 mm) Depth: 9.5 in. (241.3 mm) Weight: <ul style="list-style-type: none"> • 55.56 lb (25.2 kg) with two RSPs, three DC power supplies, and loaded with a typical combination of interface module cards • 18 lb (8.12 kg) for an empty chassis
Power consumption	Maximum input power 975W (including loss) with 3 power supplies. This is equivalent to 3327 BTU per hr.
AC input voltage and frequency	Voltage range: 85 to 264 VAC, nominal 115 to 230 VAC Frequency Range: 47 to 63 Hz, nominal 50 to 60 Hz
AC Power Supply MTBF at 40°C operating temperature	300,000 hours
DC input voltage	For 1200W DC power supply, voltage range: -40.8V to -72V DC, nominal -48V/-60V DC

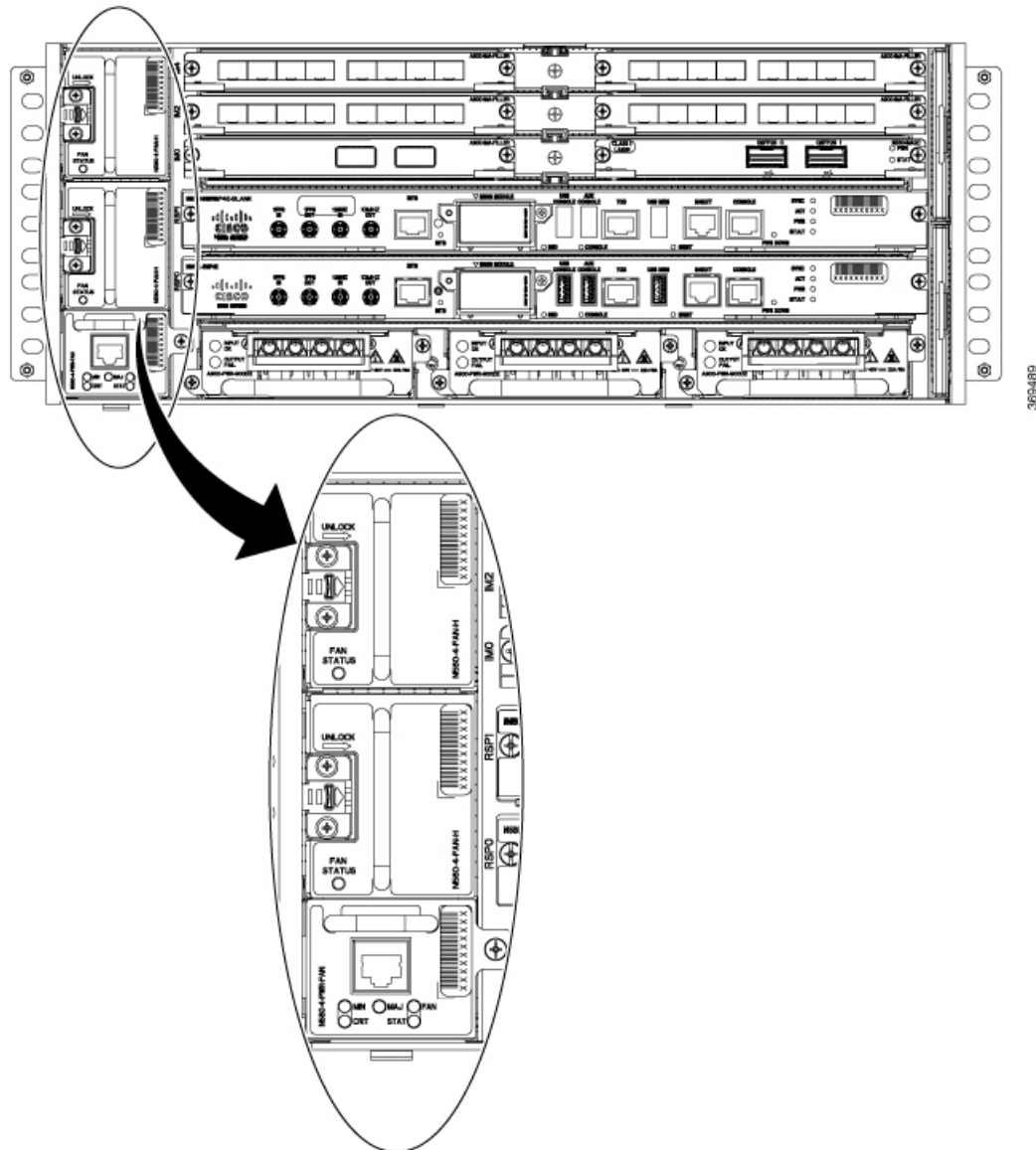
For the complete set of specifications, see the [Cisco Network Convergence System 560-4 Router Data Sheet](#).

Fan Trays

The fan trays are located on the left side of the chassis, while the dust filters are located on the right side of the chassis.

There are three fan tray field replaceable units (FRUs) in the chassis: two slave fan trays (top two fan trays) and one master fan tray (at the bottom left of the router).

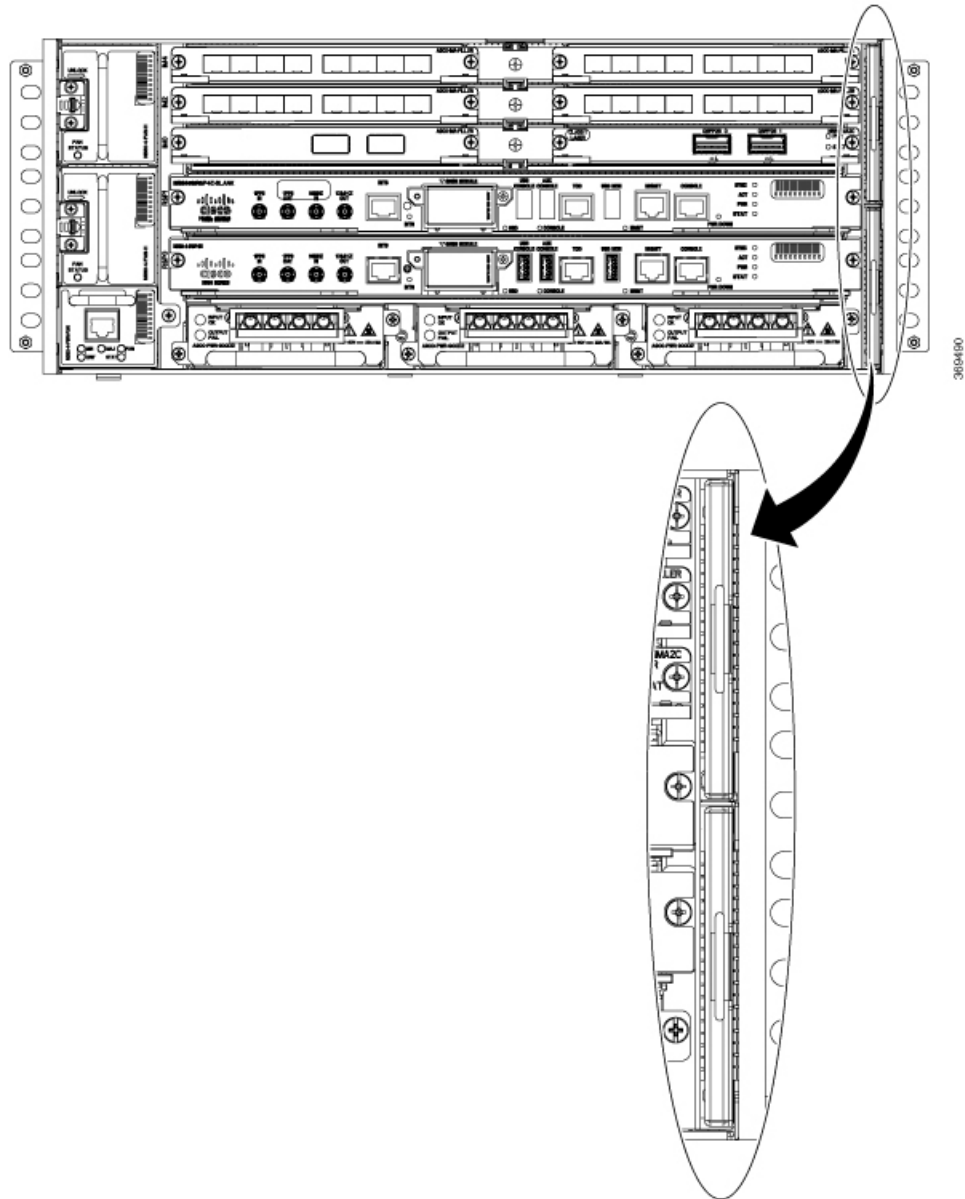
Figure 2: Fan Trays On the Left Side of Router



Dust Filter (N560-4-FILTER)

The dust filters (set of two filters) are located on the right side of the chassis and prevent dust from entering the chassis.

Figure 3: Dust Filters On the Right Side of the Router



Interface Modules

Table 2: Supported Interface Modules and Part Numbers for the Supported Route Processors

RSP Module	Interface Modules	Part Number	Slot
N560-4-RSP4 and N560-4-RSP4E	2x100G Interface module	N560-IMA2C N560-IMA2C-CC	0,1
OR N560-4-RSP4-CC and N560-4-RSP4E-CC	8/16-port 1 Gigabit Ethernet (SFP/SFP) + 1-port 10 Gigabit Ethernet (SFP+) / 2-port 1 Gigabit Ethernet (CSFP) Interface Module	A900-IMA8CS1Z-M A900-IMA8CS1Z-CC	0, 1, 2, 3, 4, 5
	8x10G Interface module	A900-IMA8Z A900-IMA8Z-CC	0, 1, 2, 3, 4, 5

The *interface-path-id* is *rack / slot / module / port*. The slash between values is required as part of the notation.

- For IM N560-IMA2C the port numbering is **HundredGigE** — 0/0/0/0 - 0/0/0/1
- For IM A900-IMA8Z the port numbering is **TenGigE** — 0/0/0/1 - 0/0/0/7
- For IM A900-IMA8CS1Z-M the port numbering is:
 - **GigE** — 0/0/0/0 - 0/0/0/15
 - **TenGigE** — 0/0/0/16

RSP Modules (N560-4-RSP4 and N560-4-RSP4E)

The Cisco NCS 560-4 router supports both, N560-4-RSP4 and N560-4-RSP4E. Each RSP has 32GB CPU memory.

When redundant RSPs are installed, the control and data plane are 1:1 redundant and the standby RSP components are in hot-standby state, ready to take over as active in the event of a failover.



Note

A failover indicates a failure in the software or in the card due to reasons, such as RSP card OIR, host kernel crash or virtual machine crash triggering heartbeat failure.

Whereas, switchover is a graceful operator-initiated task that leads to the RSP being brought down.

The RSP modules handle the data plane, network timing, and control plane functionalities for the router. The RSP configuration allows you to use Cisco IOS XR software to control chassis management, redundancy, external management, and system status indications on the router.

RSP features include:

- Redundant RSP management—The RSP manages detection of RSPs, exchange of health and status information, role negotiation, function for detection, health and status exchange, role negotiation

- Traffic management, including buffering, queuing, and scheduling, Ethernet MAC functions
- Network clocking functions including phase and time-of-day for BITS, 1 PPS, 10 MHz, and 1588 PTP clock references.
- Storage of software images, system configuration, and SysLog
- In Service Software Upgrade (ISSU) capability with zero topology loss and minimum packet loss (50 msec)
- External management interfaces (RS232 console, management ENET, USB console, USB storage) and system status LED indicators
- Centralized data plane, timing, and control plane functions for the system
- High-level control of interface modules
- Management functionalities for the router
- Control plane (host) CPU and associated memory in which IOS-XR and platform control software runs



Note If your system includes redundant RSPs, both RSPs should be of the same type and have the same memory size. We strongly recommend that you avoid configuring your router using mixed route processor cards.

GNSS Module (A900-CM-GNSS)

The GNSS module is present on the RSP. It is a pluggable module that allows direct interface with the external antenna.



Note Using a single GPS antenna input for both RSPs requires usage of external splitters.



Warning To reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cord. Statement 1023



Note The GNSS module is not hot swappable.

GNSS Module RF Input Requirements

- The GNSS module requires an active GPS/GNSS antenna with built-in Low-Noise Amplifier (LNA) for optimal performance. The antenna LNA amplifies the received satellite signals for two purposes:
 - Compensation of losses on the cable
 - Lifting the signal amplitude in the suitable range for the receiver frontend

The Amplification required is 22dB gain + cable/connector loss + Splitter signal loss.

The recommended range of LNA gain (LNA gain minus all cable and connector losses) at the connector of the receiver module is 22dB to 30dB with a minimum of 20dB and a maximum of 35dB.

- GNSS module provides 5V to the active antenna through the same RF input.
- Surge requirement:
 - GNSS modules have built-in ESD protections on all pins, including the RF-input pin. However, additional surge protection may be required if rooftop antennas are being connected, to meet the regulations and standards for lightning protection in the countries where the end-product is installed.
 - A lightning protection must be mounted at the place where the antenna cable enters the building. The primary lightning protection must be capable of conducting all potentially dangerous electrical energy to PE (Protective Earth).
 - Surge arrestors should support DC-pass and suitable for the GPS frequency range (1.575GHz) with low attenuation.
- Antenna Sky visibility:


Note

The antenna terminal should be earthed at the building entrance in accordance with the ANSI/NFPA 70, the National Electrical Code (NEC), in particular Section 820.93, Grounding of Outer Conductive Shield of a Coaxial Cable.

- Use a passive splitter if more than one GNSS modules are fed from a single antenna.

Power Supply

The Cisco NCS 560-4 Router supports three 1200W DC and AC power supplies in PSU0, PSU1, and PSU2, in 2+1 mode or 1+1 mode.

The AC and DC power supplies support:

- -40.8 VDC to -72 VDC
- 85 VAC to 264 VAC

The power supplies are hot-swappable. They are enclosed to prevent exposure to high voltages, and therefore, no power cable interlock is required. However, the power supplies are automatically shut down when removed from the chassis. The power supplies are rated to deliver 1200W (~100A at +12VDC) to the other FRUs in the system and are rated for operation at 5°C above the chassis operating temperature.

See the below tables for the AC and DC power supply specifications.

Figure 4: DC Power Supply - A900-PWR1200-D

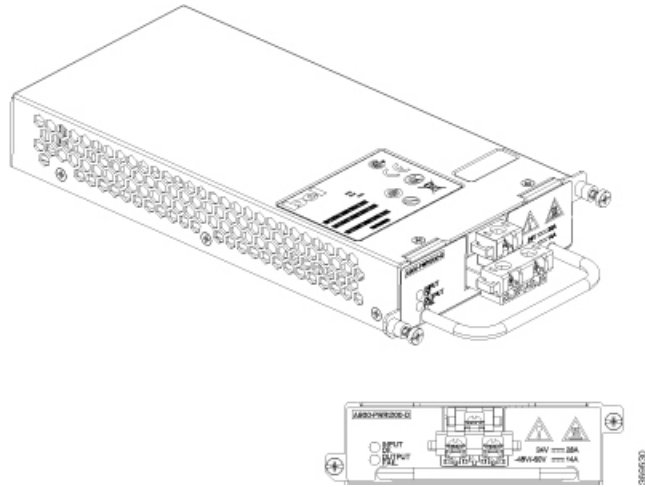
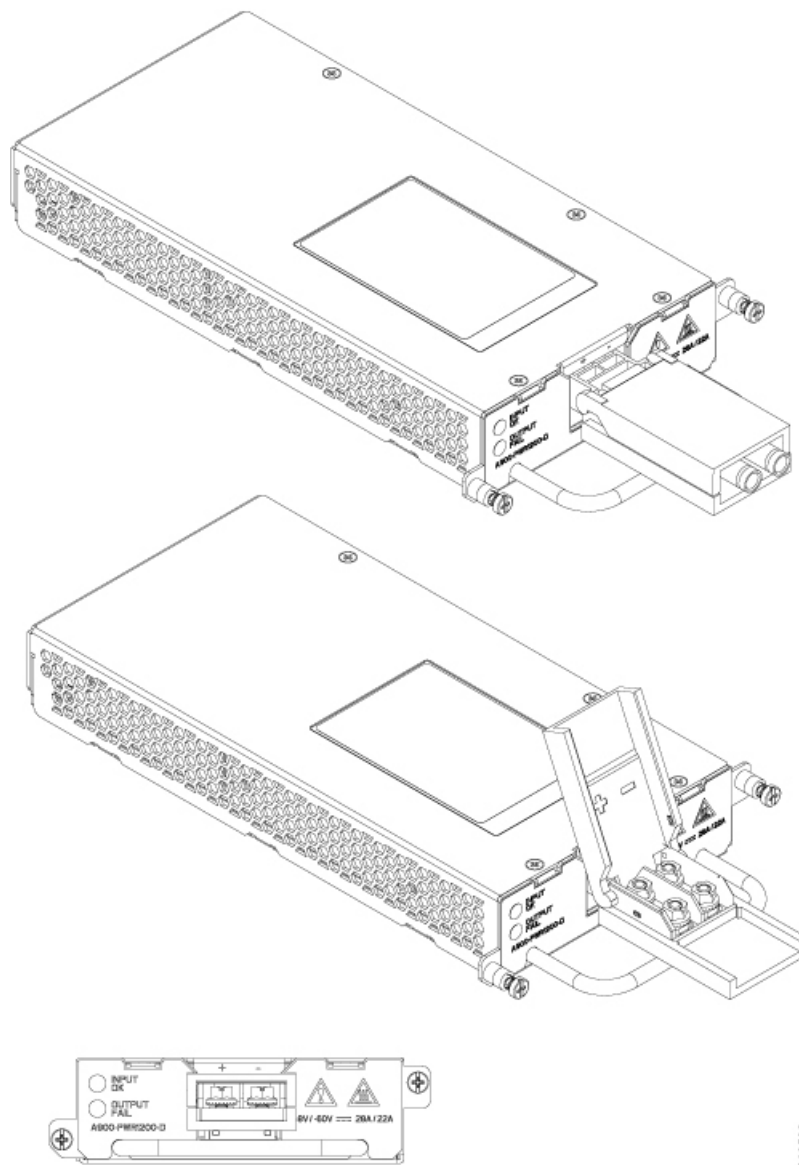


Figure 5: DC Power Supply - N560-PWR1200-D-E



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Table 3: DC Power Supply Specifications

Part numbers	A900-PWR1200-D, N560-PWR1200-D-E
Input power specification	RTN, -48V
Minimum input voltage	-40.8 VDC
Maximum input voltage	-72 VDC
Output voltage	+12 VDC

Wire gauge for DC input power connections	8 AWG minimum for -48/-60 VDC. Connector accepts 8 AWG maximum.
Maximum power output	1200 W

Figure 6: AC Power Supply - A900-PWR1200-A

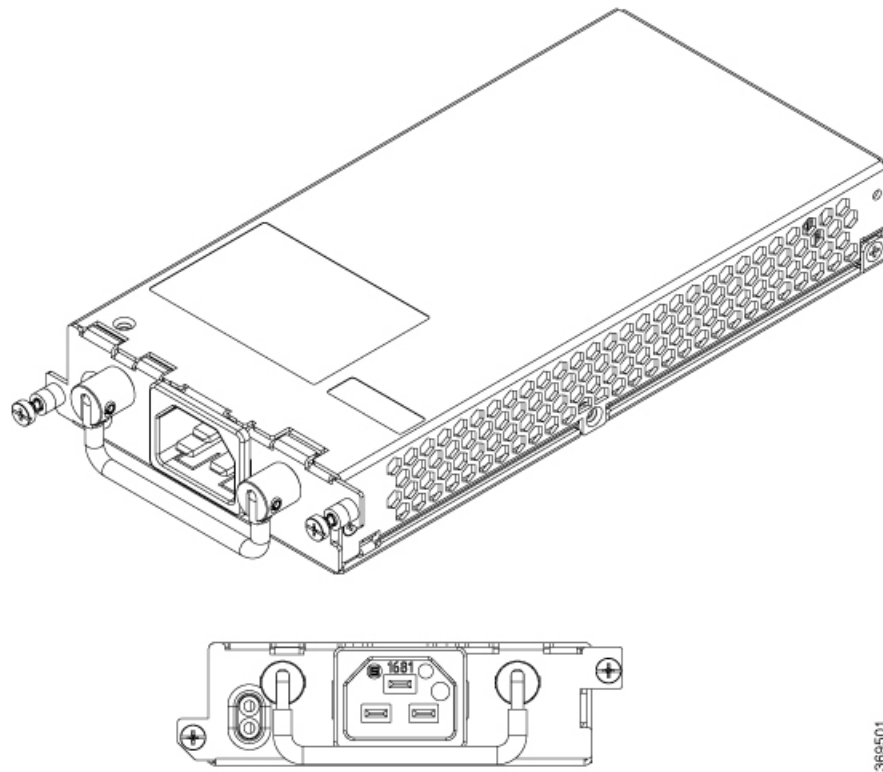


Table 4: AC Power Supply Specifications

Part number	A900-PWR1200-A
Input power specification	115VAC/ 230VAC
Input voltage	85/264 VAC
Minimum input voltage	85 VAC
Maximum input voltage	264 VAC
Minimum output voltage	12V
Maximum output voltage	12.4V
Maximum power output	1200 W

Redundancy

The router supports three power supply units that can be used either in 2+1 or 1+ 1 modes, depending on the overall power requirement of the system.

The Cisco NCS 560-4 Router supports current sharing between the power supplies.

If you install a redundant power supply on the Cisco NCS 560-4 Router, we recommend that you connect each power supply to a separate input power source in order to ensure that the router maintains power in the event of a power interruption caused by an electrical failure, a wiring fault, or a tripped circuit breaker.

Status LEDs

LEDs are also provided on each power supply to indicate the status of the input power and the health of the power supply.

Network Timing Interfaces

The route processor supports the following network timing interfaces:

- BITS input/output port—RJ48 jack
- 1PPS input and output—Mini coaxial connectors
- 2.048 or 10 MHz input and output—Mini coaxial connectors
- Time of Day (ToD) or 1PPS input or output port—Shielded RJ45 jack

Network timing interfaces support redundancy in a redundant RSP configuration. Network timing interfaces on a redundant RSP remain in operation while the RSP is in hot standby mode.

Online Insertion and Removal (OIR)

The following table describes the parameters for the OIR of the various modules in the router.

Table 5: Online Insertion and Removal - Parameters

OIR Module	Ambient ¹	Fan Speed	OIR Time	Comments
Fan Tray ²	30°C	100% PWM	5 mins	Single Fan Fail, Other Fans running at 100% PWM
	40°C	100% PWM	3 mins	
PSU	40°C	As per the fan algorithm	5 mins	Fans running at normal speed
Interface Module				
RSP				

¹ It is not recommended to perform OIR of any module above 40°C ambient

² Fan Tray OIR should be performed only when a fan's failed condition is encountered and other fans are spinning at max speed.

Regulatory Compliance

For regulatory compliance and safety information, see *Regulatory Compliance and Safety Information for the Cisco NCS 500 Series Aggregation Routers*.

