Cisco Nexus 7000 Series 3.5-kW High-Voltage Power Supply Modules

Product Overview

The Cisco Nexus® 7000 Series 3.5-kW high-voltage (HV) power supply module (Figure 1) delivers high efficiency, fault tolerance, load sharing, and hot-swappable features to Cisco Nexus 7000 Series Switches. The Cisco Nexus 7000 Series chassis can accommodate multiple power supply modules, providing both chassis-level and facility-level power fault redundancy.

Figure 1. Cisco Nexus 7000 Series 3.5-kW HVAC/HVDC Power Supply Module

The Cisco Nexus 7000 Series HV power supply modules are universal and versatile power supplies as a single module can support a wide range of AC and DC inputs (100 to 277 VAC and 200 to 380 VDC). Designed to address high-availability requirements, the power supplies provide multiple system-level redundancy options and incorporate internal component-level monitoring, temperature sensors, and intelligent remote-management capabilities. The power supply modules are fully hot swappable, helping ensure no system interruption during installation or upgrades, and they are accessible from the front for easy insertion and removal.

The Cisco Nexus 7000 Series HV power supplies are 80 Plus Titanium certified with up to 96 percent efficiency, so less power is wasted as heat, and more power is available for the system to use than with previous-generation power supplies and other typical power supplies. The power supply modules can deliver up to 3500 Watts (W) of output power at high voltage AC and DC (HVAC/HVDC) inputs. Table 1 summarizes the maximum output power levels at various input voltage ranges.

Table 1. Available Output Power Based on Input Voltage

Input Type	Input Voltage	Output
AC input	100 to 120 VAC	1500W
	200 to 210 VAC	3100W
	215 to 240 VAC and 277 VAC	3500W
DC input	200 to 215 VDC	3100W
	220 to 380 VDC	3500W

Cisco Nexus 7000 Series Power Supply Redundancy

The Cisco Nexus 7000 Series chassis supports multiple load sharing, fault tolerance, and various modes of power redundancy to help ensure high availability and optimal operation of Cisco Nexus 7000 Series Switches. As few as one power supply can be used to operate a switch chassis. Use of multiple power supplies provides additional power capacity and redundancy to maintain system power after a failure of a power supply, the power supply generator, or a facility component such as an uninterruptible power supply (UPS) or a circuit breaker.

The Cisco Nexus 7000 Series can operate in four user-configurable power-redundancy modes, summarized in Table 2, to meet the redundancy needs of the environment.

Table 2. Power Redundancy Modes

Redundancy Mode	Description
Combined	This mode does not provide redundancy. The power available to the system is the sum of the power outputs of all power supplies in the chassis.
Power supply redundancy (N+1)	This mode guards against failure of one of the power supplies. The redundant power available to the system is the sum of all power outputs less one of the maximum-rated power supplies.
Input source redundancy (grid redundancy)	This mode guards against failure of one power supply or input circuit (grid). The power available to the system is the minimum power from both grids. If one of the power supplies fails, the operational power redundancy mode changes to the combined mode.
Power supply and input source redundancy (full redundancy)	This mode guards against the failure of one power supply or one grid. The power available is the minimum power from the input source and power supply redundancy. If one of the power supplies fails, the operational power redundancy mode changes to the power supply redundancy (N+1) mode.

The total amount of power available to the Cisco Nexus 7000 Series Switch depends on the type of power supplies installed and the configured power supply redundancy mode. The 3.5-kW HV power supply supports low-voltage and high-voltage AC and DC inputs, which results in different levels of output power for the different redundancy modes. The 3.5-kW HV power supplies can co-exist with 3.0-kW power supplies in the Cisco Nexus switches and operate transparently while sharing current at a slightly higher level proportional to the output power available from the voltage range in Table 1.

Features and Benefits

Table 3 summarizes the features and benefits of the Cisco Nexus 7000 Series 3.5-kW HV power supply modules.

Table 3. Features and Benefits

Feature	Benefit
Universal input: 100 to 277 VAC and 50 to 60 hertz (Hz) or 200 to 380 VDC	Provides the flexibility to provision circuits with either low-voltage (120 VAC) or high-voltage (220, 240, or 277 VAC) AC inputs or high-voltage (200 or 380 VDC) DC inputs, depending on availability and power output needs
Energy efficient	Offers 90 to 96% efficiency to reduce power waste even at low loads achieved with 80 Plus Titanium certification for 3.5 kW (for more information, go to http://www.80plus.org)
Compatible with Cisco Nexus 7000 4-Slot Switches	Supports low- and high-voltage AC or high-voltage DC inputs, and the compact size provides different levels of power redundancy for Cisco Nexus 7000 4-Slot Switches
Hot swappable	Enables continuous system operation, with no downtime when replacing the power supply (assuming that the remaining power supplies can provide enough power to support the system)
Temperature sensors and instrumentation	Measures internal temperature and shuts down the power supply if the temperature exceeds thresholds; prevents damage due to overheating of the power supply unit
Internal fault monitoring	Detects short circuits and component failures within the power supply unit; if a failure is found, the unit is shut down
Intelligent remote management	Allows users to remotely power-cycle one or all power supplies using the supervisor command-line interface (CLI), enabling remote management and improving operating efficiency (not available at initial software release)

Feature	Benefit
Real-time power draw	Shows real-time actual power consumption (not available at initial software release)
Variable fan speed	Allows reduction in fan speed for lower power use and lower audible noise in well-controlled environments while helping ensure sufficient system cooling capacity

Product Specifications

Table 4 lists product specifications for the Cisco Nexus 7000 Series HVAC/HVDC power supply module, and Table 5 lists cable specifications.

Table 4. Product Specifications

Item	Specification	
Power Supply	**AC Input**	**DC Input**
Chassis compatibility	Cisco Nexus 7000 4-Slot Switch (up to 4)	
Software compatibility	Cisco® NX-OS Software Release 7.3 or later	
Physical specifications	(H x W x D) 1.6 x 3.95 x 22 in. (4.1 x 10 x 55.9 cm) Weight: 11 lb (5 kg)	
Input voltage range	120 VAC nominal low-line mode (85 to 132 VAC) 240 VAC nominal high-line mode (170 to 264 VAC) 277 VAC nominal high line mode (188 to 305 VAC)	240 VDC nominal high-line mode (192 to 288 VDC) 380 VDC nominal high-line mode (260 to 400 VDC)
Input frequency range	47 to 63 Hz	
Input current (each input)	20A service, 16A maximum at nominal line voltage (240 or 277 VAC)	20A service, 16A maximum at nominal line voltage (240 or 380 VDC)
Rush-in current	AC input: 65A maximum for 1 cycle	DC input: 75A maximum
Power supply input receptacles	Anderson 2006G Saf-D-Grid IEC rated 400 VAC and VDC	
Power cord rating	16 to 20A	
Output holdup time	20 milliseconds (ms) minimum	
Cooling fan	Integrated variable speed	
Environmental conditions	• Operating temperature: 32 to 104°F (0 to 40°C) • Storage temperature: –40 to 185°F (–40C to 85°C) • Relative humidity operating, noncondensing: 10 to 90% • Relative humidity nonoperating, noncondensing: 10 to 95%	
Certifications	80+ Titanium certification	
Regulatory compliance	• EMC compliance • FCC Part 15 (CFR 47) (USA) Class A • ICES-003 (Canada) Class A • EN55022 (Europe) Class A • CISPR22 (International) Class A • AS/NZS CISPR22 (Australia and New Zealand) Class A • VCCI (Japan) Class A • KN32 (Korea) Class A • KN35 (Korea) • CNS13438 (Taiwan) Class A • TCVN 7189 (Vietnam) • CISPR24 • EN55024 • EN50082-1 • EN61000-3-2 • EN61000-3-3 • EN61000-6-1 • EN300 386 • EN61000-4-5	

Item	Specification
Environment standards	• NEBS criteria levels* SR-3580 NEBS Level 3 (GR-63-CORE, issue 3, and GR-1089-CORE, issue 4) • Verizon NEBS compliance* Telecommunications Carrier Group (TCG) Checklist • Century Link NEBS requirements* Telecommunications Carrier Group (TCG) Checklist • ATT NEBS requirements* ATT TP76200 level 3 • ETSI* ETS 300 019-1-1, Class 1.2 Storage ETS 300 019-1-2, Class 2.3 Transportation ETS 300 019-1-3, Class 3.2 Stationary Use *Validation in progress
Safety compliance	• UI/CSA/IEC/EN 60950-1 • AS/NZS 60950
LED indicators	• Green input LED (1 to 2): On when input voltage in inputs is within range (1 for AC and 2 for DC) • Green output LED: On when the DC voltage is within the valid range • Red fault LED: On and blinking when the power supply's internal self-diagnostic tests have failed or any other power supply failure has occurred • Blue ID LED: On and blinking when the operator has flagged this card for identification
Reliability and availability	Capable of online insertion and removal (OIR)
MIBs	Supports Simple Network Management Protocol Versions 1, 2, and 3 (SNMPv1, v2, and v3; see Cisco NX-OS Software release notes for more information about specific MIB support)
Warranty	Cisco Nexus 7000 Series Switches come with the standard Cisco 1-year limited hardware warranty

Table 5. 3.5-kW HV Power Supply Cable Specifications

Locale	Part Number	Cord Length	Wall Appliance Plug Type	Wall Plug Rating
Argentina	CAB-AC-16A-SG-AR	14 ft (4.3m)	EL219A (IRAM2073)	250 VAC, 16A
Australia and New Zealand	CAB-AC-16A-SG-AZ	14 ft (4.3m)	AU20LS3 (AU3 20P) Plug A	250 VAC, 16A
Brazil	CAB-AC-16A-SG-BR	14 ft (4.3m)	NBR14136 EL444	250 VAC, 16A
People's Republic of China	CAB-AC-16A-SG-CH	14 ft (4.3m)	GB 16C	250 VAC, 16A
Continental Europe/International	CAB-AC-16A-SG-EU	14 ft (4.3m)	M2511 IP60G Plug CEE 7-7	250 VAC, 16A
International	CAB-HV-25A-SG-IN1 CAB-HV-25A-SG-IN2 CAB-HV-25A-SG-IN3 CAB-AC-16A-SG-IN	14 ft (4.3m) 14 ft (4.3m) 14 ft (4.3m) 14 ft (4.3m)	Saf-D-Grid 2038K Ring Terminal Saf-D-Grid 2351K IEC60309 Walther 219306	400 VDC, 20A 300 VAC and 500 VDC, 20A 300 VAC, 20A 250 VAC, 16A
India	CAB-AC-16A-SG-IND	14 ft (4.3m)	IA16A3 ZA/SABS 164-1/1:1992	250 VAC,16A
Israel	CAB-AC-16A-SG-IS	14 ft (4.3m)	SI 16S3	250 VAC, 16A
Italy	CAB-AC-16A-SG-IT	14 ft (4.3m)	IT1653 IP60G (CEI 23-50)	250 VAC, 16A
Korea	CAB-AC-16A-SG-SK	14 ft (4.3m)	EL211 (KTL SU04007-1001)	250 VAC, 16A
North America 100 to 125 VAC operation*	CAB-AC-20A-SG-US CAB-AC-20A-SG-US1	14 ft (4.3m) 14 ft (4.3m)	NEMA 5-20P NEMA L5-20P	110 VAC, 20A 125 VAC, 20A

Locale	Part Number	Cord Length	Wall Appliance Plug Type	Wall Plug Rating
North America (200 to 277 VAC operation)	CAB-AC-20A-SG-C20 CAB-AC-20A-SG-US2 CAB-AC-20A-SG-US3 CAB-AC-20A-SG-US4 CAB-HV-25A-SG-US2 CAB-HV-25A-SG-US5	14 ft (4.3m) 14 ft (4.3m) 14 ft (4.3m) 14 ft (4.3m) 14 ft (4.3m) 14 ft (4.3m)	IEC 60320 C20P NEMA 6-20P NEMA L6-20P NEMA L7-20P Ring Terminal Saf-D-Grid 2351K	250 VAC, 20A 250 VAC, 20A 250 VAC, 20A 277 VAC,20A 300 VAC and 500 VDC, 20A 300 VAC, 20A
North America (DC operation)	CAB-HV-25A-SG-US1	14 ft (4.3m)	Saf-D-Grid 2038K	400 VDC, 20A
Power distribution unit (PDU)	CAB-AC-20A-SG-C20	14 ft (4.3m)	IEC 60320 C20P	250 VAC, 20A
South Africa	CAB-AC-16A-SG-SA	14 ft (4.3m)	Src Plug EL 208, SABS 164-1	250 VAC, 16A
Switzerland	CAB-AC-16A-SG-SW	14 ft (4.3m)	CH16S3 Plug SEV 5	250 VAC, 16A

* The Cisco Nexus 7000 Series HV 3500W power supply delivers 1500W at 110 VAC.

Note: Not all cables will be orderable at first customer shipment (FCS).

Ordering Information

To place an order, visit the Cisco Ordering homepage. To download software, visit the Cisco Software Center. Table 6 provides ordering information.

Table 6. Ordering Information

Product Name	Part Number
Cisco Nexus 7000 3.5kW AC Power Supply Module	N7K-HV-3.5KW
Cisco Nexus 7000 3.5kW AC Power Supply Module Spare	N7K-HV-3.5KW=

Service and Support

Cisco offers a wide range of services to help accelerate your success in deploying and optimizing Cisco Nexus 7000 Series Switches in your data center. Cisco's innovative services are delivered through a unique combination of people, processes, tools, and partners and are focused on helping you increase operating efficiency and improve your data center network. Cisco Advanced Services use an architecture-led approach to help you align your data center infrastructure with your business goals and achieve long-term value. Cisco SMARTnet™ Service helps you resolve mission-critical problems with direct access at any time to Cisco network experts and award-winning resources. With this service, you can take advantage of the Cisco Smart Call Home service capability, which offers proactive diagnostics and real-time alerts on your Cisco Nexus 7000 Series Switches. Spanning the entire network lifecycle, Cisco Services help increase investment protection, optimize network operations, provide migration support, and strengthen your IT expertise. For more information about Cisco Data Center Services, visit http://www.cisco.com/go/dcservices.

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For More Information

For more information about the Cisco Nexus 7000 Series, visit the product homepage at http://www.cisco.com/go/nexus7000 or contact your local account representative.

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