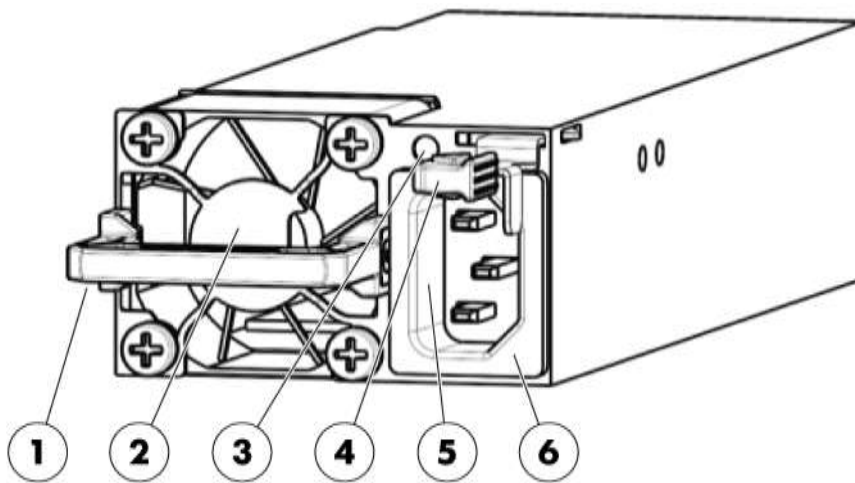# QuickSpecs

Overview

HP Flexible Slot Power Supplies

HP Flexible Slot (Flex Slot) Power Supplies share a common electrical and physical design that allows for hot plug, tool-less installation into HP ProLiant Gen9 Performance servers. HP's Flex Slot power supplies are certified for high-efficiency operation and offer multiple power output options, allowing users to "right-size" a power supply for specific server configurations. This flexibility helps to reduce power waste, lower overall energy costs, and avoid "trapped" power capacity in the data center.

Flex Slot power supplies are rated for Platinum-level certification with efficiency of up to 94%. Support for HP Power Discovery Services, via embedded power line communication technology, is also available with the 1400W Platinum Plus model. This feature enables each server to communicate identification, location, and power-related data to the Intelligent Power Distribution Unit in the rack which can then be shared with HP Insight Control to manage power usage and efficiency in the data center.

HP Flexible Slot Power Supplies

1. Power Supply Handle
2. Identification Label
3. Power Supply LED Status Indicator
4. Release Lever
5. C-14 Input Connector
6. Power Discovery Services Communication Port (1400W Platinum Plus model only)

Models

HP Power Supplies

NOTE: Mixing different power supplies in the same server may limit or disable some power supply features including support for power redundancy. To ensure access to all available features, all power supplies within the same server should have the same output and efficiency ratings.

HP Flexible Slot Platinum Power Supply Kits
NOTE: Flex Slot Platinum power supplies support power efficiency of up to 94% and include a standard C-14 power inlet connector.

HP 500W Flex Slot Platinum Hot Plug Power Supply Kit	720478-B21
HP 800W Flex Slot Platinum Hot Plug Power Supply Kit	720479-B21

HP Flexible Slot Platinum Plus Power Supply Kits
NOTE: Flex Slot Platinum Plus power supplies support power efficiency of up to 94% and include a C-14 power inlet connector that can support HP Power Discovery Services (blue connector).

HP 1400W Flex Slot Platinum Plus Hot Plug Power Supply Kit	720620-B21

Standard Features

Features/Benefits

Platinum-Certified Power Efficiency

- Platinum (94%) power efficiency certification from 80Plus program – one of the highest power efficiency certifications available in the IT industry
- Reduces data center operating costs related to power by reducing server power requirements and power waste

Flex Slot Design

- Tool-less hot plug design improves serviceability buy allowing quick and easy access to system power supplies
- Common form factor across all ProLiant Gen9 Performance series servers allows multiple server platforms to share power supply spares, reducing cost and space requirements for spares

Multiple Power Output Options

- Multiple output options allowing users to "right-size" their power needs and avoid "trapped" power capacity in their data centers caused by over-subscribing power needs
- Support for both low-line and high-line AC input voltages providing additional flexibility to operate in multiple It environments (500W and 800W Platinum only)

Power Management

- Supports multiple operating modes to maximize power efficiency when configuring servers with redundant power supplies
- Integrated support for HP's Power Discovery Services which communicates with the intelligent PDU to monitor and manage power usage (1400W Platinum Plus only)

80Plus Certification

The 80PLUS test protocol was developed jointly by Ecos Plug Load Solutions and the Electric Power Research Institute (EPRI) in 2003, with the program being formally launched in 2004.

The 80 PLUS performance specification requires power supplies in servers to be 80% or greater energy efficient at 20%, 50% and 100% of rated load with a true power factor of 0.9 or greater. This makes an 80 PLUS certified power supply substantially more efficient than typical power supplies found in many other electrical devices.

Who benefits from the 80PLUS power supply program?

- Commercial/Residential Consumers - empowered with information regarding energy efficient IT options that help them cut energy costs and reduce their environmental impact
- Utility/Power Providers - participation in a program that focuses on reducing power demands on overburdened grids as well as reducing power waste and its associated environmental impact

Standard Features

What are the efficiency requirements for each certification level?

80 PLUS Certification	230V Internal		
% of Rated Load	20%	50%	100%
80 PLUS Bronze	81%	85%	81%
80 PLUS Silver	85%	89%	85%
80 PLUS Gold	88%	92%	88%
80 PLUS Platinum	90%	94%	91%

What level of certification do HP Flexible Slot Power Supplies meet?

HP's Platinum and Platinum Plus power supply options meet 80PLUS requirements for Platinum certification. To review 80Plus certification reports for each HP Flexible Slot Power Supply, please refer to the 80Plus website at: www.80plus.org.

HP Power Discovery Services

HP Power Discovery Services (PDS) combines the HP Intelligent Power Distribution Unit (iPDU) and HP Flex Slot Platinum Plus power supplies with HP Insight Control software to create an automated, energy-aware network between IT systems and facilities.

HP Power Discovery Services Features and Benefits :

- Captures highly accurate power data across racks and rows of servers in order to identify and eliminate areas of waste
- Extends the life of the data center by reclaiming up to 3x energy capacity of the data center
- Ensures uptime by eliminating human error during power planning and provisioning

Which HP Flex Slot Power Supply Supports PDS?

- HP 1400W Flex Slot Platinum Plus Hot Plug Power Supply Kit

How Is PDS enabled by Flex Slot Platinum Plus Power Supplies?

HP Flex Slot Platinum Plus Power Supplies include an embedded power line communication feature that allows the power supply to communicate server data (such as name, UUID, and IP address) to an HP Intelligent Power Distribution Unit (iPDU). This feature is supported on all HP ProLiant Gen9 servers that support HP Flex Slot Platinum Plus power supplies.

NOTE: Standard power cables and jumper cords do not support the power line communications feature required for operating HP Power Discovery Services. Please refer to the "Related Options" section of this quickspec for more information on cable options that support Power Discovery Services.

To learn more on HP Power Discovery Services, please visit the HP website at: www.hp.com/go/ipd.

Support for Redundant Power Supplies

An HP ProLiant Gen9 server configured with 2 Flex Slot Power Supplies – 500W, 800W, or 1400W - supports the following three power scenarios:

- Operation with a single power supply
- Operation with redundant power supplies in load-balanced mode
- Operation with redundant power supplies in high-efficiency mode

Standard Features

A single Flex Slot Power Supply supporting the entire load of the server can achieve the highest efficiency when operating in the middle range (50%) of its capacity.

For redundant Flex Slot Power Supplies operating in load-balanced mode (the default mode when adding redundant power supplies), the load is shared equally between the two power supplies. In general, the load-balanced mode offers better efficiency for loads requiring more than 60 percent of the primary power supply capacity.

When high-efficiency mode is enabled for redundant supplies (via the server's ROM-based setup utility under System options -> Redundancy options), each power supply in the server is designated as either a primary or secondary supply, and the entire server load is shifted to the primary power supply. This allows the primary power supply to operate at higher efficiency points on the load curve while the secondary power supply operates in idle mode, providing no output power and consuming very little energy (typically two to four watts per supply). The user can also specify that odd or even power supplies will be designated manually or automatically as secondary supplies. This flexibility allows users to balance the load across a rack manually or automatically.

Compatibility

HP Flex Slot power supplies are compatible with all HP ProLiant Gen9 Performance servers including the:

- HP ProLiant DL360 Gen9
- HP ProLiant DL380 Gen9
- HP ProLiant ML350 Gen9

To check for power supply compatibility, please review the appropriate HP Server QuickSpecs at www.hp.com/go/qs.

Service and Support

Service and Support	**HP Technology Services**

HP Technology Services offers you consultants and support experts to solve your most complex infrastructure problems. We help keep your business running, boost availability, and avoid downtime.

Protect your business beyond warranty with HP Care Pack Services
When you buy HP Options, it's also a good time to think about what level of service you may need. HP Care Pack services provide total care and support expertise with committed response choices designed to meet your IT and business need.

HP Foundation Care services deliver scalable support-packages for HP industry-standard servers and software. You can choose the type and level of service that is most suitable for your business needs. New to this portfolio is HP Collaborative Support. If you are running business critical environments, HP offers Proactive Care or Critical Advantage. These services help you deliver high levels of application availability through proactive service management and advanced technical response.

Here is the support service recommendation from the Foundation Care and Proactive Care portfolio. For customized support service solution, HP can work with you to tailor a service solution for your unique support requirements using broader services portfolio of Foundation Care and Proactive Care.

Recommended HP Care Pack Services for optimal satisfaction with your HP product

Recommended Services

3-Year HP 24x7 4 hour Response, Hardware Support Onsite Service
Provides you with rapid remote support and if required an HP authorized representative who will arrive on site any time and day of the year to begin hardware maintenance service within 4 hours of the service request being logged.
http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EEE.pdf

OR

3-Year HP 24x7 4 hour Response, HP Collaborative Support
Offers customers a single point of contact for server problem diagnosis, hardware problem resolution, and basic software problem diagnosis, fault isolation, and resolution if available to HP. If the problem is with HP HW, the representative will arrive on site any time and day of the year to begin hardware maintenance service within 4 hours of the service request being logged. In case, the issue is with HP or supported third-party software product and cannot be resolved by applying known fixes, HP will contact the third-party vendor and create a problem incident on your behalf.

HP ProLiant Server Hardware Installation
Provides for the basic hardware installation of HP branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner
http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-9356EN.pdf

Related HP Care Pack Services to enhance your HP product experience

Related Services

3-Year HP 24x7 4 hour Response, Proactive Care or Critical Advantage
Helps optimize your systems and delivers high levels of application availability through proactive service management and advanced technical response. A skilled Technical Manager will own your query or issue end to end until resolved, delivering a single point of contact for you
http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA3-2140ENW.pdf

OR

3-Year HP 6-hour Onsite Call-to-Repair, HP Collaborative Support
Offers customers a single point of contact for server problem diagnosis, hardware problem resolution to return the hardware in operating condition within 6 hours of the initial service request to the HP

Service and Support

Global Solution Center, and basic software problem diagnosis, fault isolation, and resolution if available to HP. In case, the issue is with HP or supported third-party software product and cannot be resolved by applying known fixes, HP will contact the third-party vendor and create a problem incident on your behalf.

HP Proactive Select Service
Provides a flexible way to purchase HP best-in-class consultancy and technical services. You can buy Proactive Select Service Credits when you purchase your hardware and then use the credits over the next 12 months. http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA2-3842ENN.pdf

Insight Remote Support	Provides 24 X 7 remote monitoring, proactive notifications, and problem resolution. Learn more http://www.hp.com/go/insightremotesupport
HP Support Center	Personalized online support portal with access to information, tools and experts to support HP business products. Submit support cases online, chat with HP experts, access support resources or collaborate with peers. Learn more http://www.hp.com/go/hpsc HP's Support Center Mobile App* allows you to resolve issues yourself or quickly connect to an agent for live support. Now, you can get access to personalized IT support anywhere, anytime. HP Insight Remote Support and HP Support Center are available at no additional cost with a HP warranty, HP Care Pack or HP contractual support agreement. *HP' Support Center Mobile App is subject to local availability
Parts and materials	HP will provide HP-supported replacement parts and materials necessary to maintain the covered hardware product in operating condition, including parts and materials for available and recommended engineering improvements. Supplies and consumable parts will not be provided as part of this service; standard warranty terms and conditions apply. Parts and components that have exceeded their maximum supported lifetime and/or the maximum usage limitations as set forth in the manufacturer's operating manual or the technical product data sheet will not be provided, repaired or replaced as part of this service.
Warranty / Service Coverage	For ProLiant servers and storage systems, this service covers HP-branded hardware options qualified for the server, purchased at the same time or afterward, internal to the enclosure, as well as external monitors up to 22" and tower UPS products; these items will be covered at the same service level and for the same coverage period as the server unless the maximum supported lifetime and/or the maximum usage limitation has been exceeded. Coverage of the UPS battery is not included; standard warranty terms and conditions apply. The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by HP due to malfunction. It does not apply to any exchange of Disk or SSD/Flash Drives that have not failed. SSD/Flash Drives that are specified by HP as consumable parts and/or that have exceeded maximum supported lifetime and/or the maximum usage limit as set forth in the manufacturer's operating manual or the technical data sheet are not eligible for the defective media retention service feature option.
For more information	To learn more on services for HP ESSN Options, please contact your HP sales representative or HP Authorized Channel Partner. Or visit: http://www.hp.com/services/proliant or www.hp.com/services/bladesystem

Related Options

VAC C13 to C14 Power Cables	HP C13 - C14 WW 250V 10A Gray 0.7m Jumper Cord	A0K03A
	HP C13 - C14 WW 250V 10A Gray 1.37m Jumper Cord	A0K04A
	HP C13 - C14 WW 250V 10Amp Flint Gray 2.0m Jumper Cord	AF573A
	HP C13 - C14 WW 250V 10A Gray 3.0m Jumper Cord	A0K06A
	HP C13 - C14 WW 250V 10Amp 0.7m Jumper Cord	142257-B28
	HP C13 - C14 WW 250V 10Amp 1.4m Jumper Cord	142257-006
	HP C13 - C14 WW 250V 10Amp 1.4m 15 pc Jumper Cord	142257-007
	HP C13 - C14 WW 250V 10Amp 2.0m Jumper Cord	A0K02A
	HP C13 - C14 WW 250V 10Amp 2.5m Jumper Cord	142257-002
	HP C13 - C14 WW 250V 10Amp 3.0m Jumper Cord	142257-003
	HP C13-C14 WW 250V 10Amp Pwr Line 2.5m 1pc Jumper Cord	D9Y24A
	HP C13-C14 WW 250V 10Amp Pwr Line 2.5m 5pc Jumper Cord	D9Y25A
	NOTE: Standard power cables and jumpers do not support Power Line Communications or Power Discovery Services.	
Power Line Communication (PLC) Power Cables	HP C13 - C14 WW 250V 10Amp IPD 0.76m 1pc Jumper Cord	SG506A
	HP C13 - C14 WW 250V 10Amp IPD 0.76m 5pc Jumper Cord	SG507A
	HP C13 - C14 WW 250V 10Amp IPD 1.37m 1pc Jumper Cord	SG508A
	HP C13 - C14 WW 250V 10Amp IPD 1.37m 5pc Jumper Cord	SG509A
	HP C13 - C14 WW 250V 10Amp IPD 1.83m 1pc Jumper Cord	SG510A
	HP C13 - C14 WW 250V 10Amp IPD 1.83m 5pc Jumper Cord	SG511A
	HP C13 - C14 WW 250V 10Amp IPD 3.0m 1pc Jumper Cord	SG512A
	NOTE: These cables are required for the 1400W Platinum Plus option if using the HP Intelligent PDU for Power Discovery Services.	

QuickSpecs

Power Specifications

HP 500W Flex Slot Platinum Hot Plug Power Supply (720478-B21)	HP's Generic Part Number					723594-001		
	HP's Spares Part Number					754377-001		
Input Voltage Range (V rms)	100-240							
Frequency Range (Nominal) (Hz)	50-60							
Nominal Input Voltage (V rms)	100	120	127	200	208	220	230	240
Maximum Rated Output Wattage Rating (Watts)	500	500	500	500	500	500	500	500
Nominal Input Current (A rms)	5.6	4.6	4.3	2.7	2.6	2.5	2.4	2.3
Maximum Rated Input Wattage Rating (Watts)	558	550	543	539	538	538	537	537
Maximum Rated VA (Volt-Amp)	564	556	549	544	544	543	542	542
Efficiency (%)	89.6	90.9	92.1	92.8	92.9	93.0	93.1	93.1
Power Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Leakage Current (mA)	0.32	0.38	0.40	0.63	0.65	0.69	0.72	0.75
Maximum Inrush Current (A peak)	30							
Maximum Inrush Current duration (ms)	10							
Maximum British Thermal Unit Rating (BTU-Hr)	1904	1877	1853	1839	1837	1834	1832	1832

HP 800W Flex Slot Platinum Hot Plug Power Supply (720479-B21)	HP's Generic Part Number					723599-001		
	HP's Spares Part Number					754381-001		
Input Voltage Range (V rms)	100-240							
Frequency Range (Nominal) (Hz)	50-60							
Nominal Input Voltage (V rms)	100	120	127	200	208	220	230	240
Maximum Rated Output Wattage Rating (Watts)	800	800	800	800	800	800	800	800
Nominal Input Current (A rms)	9.1	7.5	7.0	4.4	4.2	4.0	3.8	3.7
Maximum Rated Input Wattage Rating (Watts)	906	891	878	871	870	869	868	868
Maximum Rated VA (Volt-Amp)	915	900	887	880	879	877	876	877
Efficiency (%)	88.3	89.8	91.1	91.9	92.0	92.1	92.2	92.1
Power Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Leakage Current (mA)	0.32	0.38	0.40	0.63	0.65	0.69	0.72	0.75
Maximum Inrush Current (A peak)	30							
Maximum Inrush Current duration (ms)	10							
Maximum British Thermal Unit Rating (BTU-Hr)	3090	3040	2997	2972	2968	2963	2960	2963

HP 1400W Flex Slot Platinum Plus Hot Plug Power Supply (720620-B21)	HP's Generic Part Number			733427-001	
	HP's Spares Part Number			754383-001	
Input Voltage Range (V rms)	200-240				
Frequency Range (Nominal) (Hz)	50-60				
Nominal Input Voltage (V rms)	200	208	220	230	240
Maximum Rated Output Wattage Rating (Watts)	1400	1400	1400	1400	1400
Nominal Input Current (A rms)	7.9	7.6	7.2	6.8	6.5
Maximum Rated Input Wattage Rating (Watts)	1567	1564	1560	1557	1554
Maximum Rated VA (Volt-Amp)	1583	1580	1575	1572	1570
Efficiency (%)	89.4	89.5	89.8	89.9	90.1
Power Factor	0.99	0.99	0.99	0.99	0.99
Leakage Current (mA)	0.63	0.65	0.69	0.72	0.75
Maximum Inrush Current (A peak)	30				
Maximum Inrush Current duration (ms)	10				
Maximum British Thermal Unit Rating (BTU-Hr)	5346	5336	5322	5311	5302

Technical Specifications

All AC Power Supplies:

Operating Temperature	41° to 131°F (5° to 55°C)
Operating Relative Humidity (%)	5% to 95%, non condensing
Operating Elevation	The maximum ambient temperature of the power supply shall have an altitude de-rating, from sea level, of 1.0°C per every 304.8 m (1.8°F per every 1000 ft) above sea level to a maximum of 3048 m (10,000 ft).
Storage Temperature	-40° to 185°F (-40 to 85°C)
Storage Relative Humidity (%)	5% to 95%, non condensing
Storage Elevation	0 to 50,000ft (0 to 15,240m)
Input Voltage	Low Line - Rated: 100V - 127V; Min 90V to Max 132V High Line - Rated: 200 - 240V; Min 180V to Max 264V (model 720620-B21 supports High Line AC input only)
Input Frequency	Rated: 50 - 60Hz; Min 47Hz to Max 63Hz
FCC EMI Certification	CE Mark, UL, cUL, IEC, EN, KCC, BSMI, CCC, TUV, C-tick, CISPR Class A
Mechanical Dimensions (WxHxD)	2.68 x 1.59 x 8.87 in (6.80 x 4.04 x 22.53 cm) Note: Length includes from handle to card-edge
Unit Weight	2.0 lbs. (0.91 kg) 3.0 lbs. (1.36 kg) (model 720620-B21 only)
Shipping Dimensions (WxHxD)	14.75 x 7.5 x 5.75 in (37.47 x 19.05 x 14.61 cm)
Shipping Weight	3.5 lb (1.59 kg) 4.5 lb (2.04 kg) (model 720620-B21 only)
Kit Contents	All option kits ship with: (1) Power supply unit, (1) IEC C13-C14 jumper cable, installation/safety guide

Environment-friendly Products and Approach	**End-of-life Management and Recycling**	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: http://www.hp.com/go/green. To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.
		The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/green. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.