Cisco Catalyst 4500E Power Supply

Q. What tool is available to select the power supply and my selected configuration?
A. The name of the tool is Cisco® Power Calculator. It is located at cpc.

Q. In the Cisco Power Calculator tool, what is difference between output power and typical power used?
A. Output power and heat dissipation numbers computed by the Cisco Power Calculator are maximum values for facility power and cooling capacity planning. Typical power draw is about 20 percent lower than the maximum value shown.

Q. In the Cisco Power Calculator tool calculation for my configuration, I see the "Total Output Current for this PSU" value is 70.6A, which is very high, and the electrical technician tells me that it cannot be supported at the input socket.
A. The current values in these reports reflect the 12V output bus. Input current values are much lower (under 20A). That is what your electrician will need. For specific input current for a power supply, here is the datasheet.

Q. What is the inrush power of different power supplies with the Cisco Catalyst® 4500?
A. Following is the detail of inrush power for each of power supplies, tested at maximum input voltage of 264VAC. The peak inrush current increases as input voltage increases, so peak inrush at 240VAC will be slightly less than the maximum measured value.

- **1300W power supply:** Peak inrush current 90A max for one cycle of AC on cold start and 90A max for hot start for one cycle of AC.
- **2800W power supply:** Peak inrush current 90A max for one cycle of AC on cold start and 90A max for hot start for one cycle of AC.
- **4200W power supply:** Peak inrush current at cold turn-on shall be limited to 70A (power supply off for more than 1 hour) for one cycle of AC and 140A at hot turn-on (power supply on for more than 1 hour) for one cycle of AC.
- **6000W power supply:** Peak inrush current at cold turn-on shall be limited to 70A (power supply off for more than 1 hour) for one cycle of AC and 140A at hot turn-on (power supply on for more than 1 hour) for one cycle of AC.
- **9000W power supply:** Peak inrush current at cold turn-on shall be limited to 60A (power supply off for more than 1 hour) for one cycle of AC and 100A at hot turn-on (power supply on for more than 1 hour) for one cycle of AC.

* The reason for the distinction between cold and hot turn-on is that there are devices in the input circuit that might allow more current to flow when the unit has been running for some time (hot) vs. not recently running (cold).

Q. What do you mean by cold start and hot start of a power supply?
A. Cold start is when power supply has been off for more than 1 hour, and hot start is when the power supply has been on for more than 1 hour.

Q. In redundant mode, is only one power supply used, or do both power supplies share the load?

A. In redundant mode, each power supply operates at 50 percent capacity and provides the same total power as a single power supply. If one fails, the backup reverts to providing 100 percent power.

Q. In combined mode, how much power output do we get from each power supply?

A. In combined mode, each power supply operates at 83 percent. If one fails, then the running supply provides 100 percent of its power capacity.

Q. My customer has a Cisco Catalyst 4510 with dual 4200W AC power supplies. Can my customer connect one AC input from each power supply to a UPS, and the other input to wall AC?

A. Yes, it can be done. The basic recommendation would be to choose a higher capacity UPS to meet the actual maximum kVA rating required by the Cisco Catalyst 4500 system.

Q. With a Power over Ethernet (PoE) power supply of 4200W, if I am not using any PoE devices, can I use the available PoE power as data power?

A. No, the 4200W power supply is the PoE power supply. That means it has a fixed share of PoE and data power. With a single 220V input in a single 4200W power supply, it support a maximum of 1360W for data power that will be used to power up the line cards and chassis. The inline power (PoE) will also be available whether you use it or not. But PoE power cannot be converted to data power because different rails are used for data and PoE in a power supply.

Q. What happens if a device tries to draw more power than the power budget of the port?

A. Cisco IOS® Software shuts down power to that port.

Q. Is it possible to use mixed AC and DC power supplies in the same chassis?

A. AC and DC would need different power supplies; hence this configuration mix is not supported.

Q. Where can I get more detail on specification of Cisco Catalyst 4500 power supplies?

A. More detail on specifications and connectors of each power supply can be found at http://www.cisco.com/c/en/us/td/docs/switches/lan/catalyst4500/hardware/catalyst4500e/installation/guide/Eseries/0aspecs.html#wp1010964.

Q. I am upgrading my power supply from 1400W AC, which is using 13 Amp input current, to 6000W AC. Can I keep using the existing 12 Amp input current on new 6000W AC power supply?

A. The 6000W and 9000W models would operate at 12 Amp with low-line input (120 VAC nominal) - 85 VAC (min) to 132 VAC (max) - but require a 16A input at high-line input (230 VAC nominal) - 170 VAC (min) to 264 VAC (max).

- Refer to the datasheet for the installation guide for more information.

Q. What are the recommendations for UPS and power configuration?

A.

a. Avoid any UPS type that is based on ferroresonant technology. The reason is that there is a risk of instability between modern power supplies using power factor correction technology and ferroresonant devices, and essentially all Cisco power supplies have power factor correction.

b. For applications using dual power supply configurations, it is highly recommended to not connect both units to a common UPS, mainly to avoid single point of failure configurations.

c. The UPS should be sized to supply at least as much output power as is required by the total of all power supply input loads in the worst-case operational condition.

d. It is highly recommended that each input to the power supply be connected to a dedicated circuit. The risk of not doing so is that in the event of a tripped breaker, the loss of power on that circuit will affect multiple power supply inputs, possibly leading to inadequate power availability to the switch.

e. If more than one power supply (including multiple inputs on a single power supply unit) were connected to the same source, the current rating would need to be high enough to support maximum input current on all devices.

f. The source AC can be out of phase (from different grids) between multiple power supplies or multiple AC power plugs on the same power supply because all AC power supply inputs are isolated.

Q. What are the recommendations for neutral offset from ground?
A. We recommend that neutral offset from ground in a single-phase application be less than 3 volts.

Q. Can I connect different power cables on the two power supplies in a chassis? For instance, power supply 1 would have 2 L6-20, and power supply 2 would have 2 C-19. Is this a supported configuration?
A. Mixing power cords on a multiple input supply is acceptable.

Q. Would there be an issue with connecting the 1400W AC power supplies to 250V 30A circuits rather than 250V 20A circuits?
A. It is not a problem to connect the power supply input to a circuit with a higher current rating than the unit requires. However, it is not acceptable in the reverse situation.

Q. Why are 5-20 plugs not listed as recommended for 2800w PoE power supplies?
A. The 2800W power supply does not operate with a low-line input 110VAC nominal, which applies to the 5-20 connector. The 6-20 connector is for 220VAC nominal inputs, which are supported on the 2800W unit. See Table A-21 here for basic specs of the 2800W PS.

Q. Can the 2800W power supply run on 208V three-phase power?
A. 208VAC is normally a single-phase input derived from a three-phase source, where the connection used is between the hot and neutral leads. It can be used with the supported cables.

Q. A customer has a Cisco Catalyst 4510 with AC power supplies with two feeds, one at 220VAC and the other at 208VAC. Is it ok to feed the two power supplies at different voltages? From the data sheet, it looks like we support a range from 200 to 240V.
A. It is ok to do that.

Q. If a power failure occurs, which modules are shut down? Which ports? Can PoE ports be shut down in some kind of predetermined sequence? For example, can I configure it such that an executive's port is the last to be shut down?
A.

- Modules are powered down bottom-up. So in the even of a shortage of power in a 10-slot chassis, the 10th line card would be the first, and the third would be the last to go down. On each module the ports are powered down right to left. So port 3/48 would be the first, and 3/1 would be the last to lose power. This behavior assumes all the ports are in inline "auto" mode, which implies taking the power from the common PoE pool as available.

- When power becomes available, the power is allocated in the reverse order: left to right per module and top to bottom for a chassis.
- If you want to guarantee a port inline power, configure it in the "static" mode, which essentially removes it from the list of ports trying to contend for inline power from the common PoE pool.

Q. Can I use the AC-input power supply in mixed-voltage (110 VAC or 220 VAC) configurations?

A. The AC-input power supply should not be used in mixed-voltage configurations. All the inputs in a chassis must be at the same voltage (110 VAC or 220 VAC).

Q. In my Cisco Catalyst 4500E switch, I want to change the power source from 110V to 220V. Would my switch need a downtime, or can I do it without affecting any traffic?

A. You can move 110V to 220V or vice versa without any disruption only if you have two power supplies and are in redundant mode. Note that while migrating the input voltage, one power supply would get err-disable during the time of migration. Hence you need a redundant power supply to take care of the chassis power requirement.

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