



## Technical Specifications

This appendix provides technical specifications and includes the following sections:

- [Switch Specifications, page 1-1](#)
- [Module Specifications, page 1-4](#)
- [Power Specifications for the Cisco MDS 9513 Director, page 1-6](#)
- [Power Specifications for the Cisco MDS 9509 Director, page 1-10](#)
- [Power Specifications for the Cisco MDS 9506 Director, page 1-15](#)
- [Transceiver Specifications, page 1-20](#)



Note

Specifications for cables and connectors are provided in [Appendix 1, “Cable and Port Specifications.”](#)

## Switch Specifications

The Cisco MDS 9500 Series supports hot-swappable fan modules that provide 85 cfm (cubic feet per minute) of airflow per slot with 410 W of power dissipation per slot.

[Table 1-1](#) lists the environmental specifications for the Cisco MDS 9500 Series.

**Table 1-1** *Environmental Specifications for the Cisco MDS 9500 Series*

Description	Specification
Temperature, certified for operation	32 to 104°F (0 to 40°C)
Temperature, designed and tested for operation	32 to 130°F (0 to 55°C)
Temperature, ambient nonoperating and storage	-40 to 158°F (-40 to 70°C)
Humidity (RH), ambient (noncondensing) operating	10 to 90%
Humidity (RH), ambient (noncondensing) nonoperating and storage	5 to 95%
Altitude, certified for operation	0 to 6500 ft (0 to 2000 m)
Altitude, designed and tested for operation	-200 to 10000 ft (-60 to 3000 m)
Noise levels	70 dB

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Table 1-2 lists the physical specifications for the Cisco MDS 9513 Director.

**Table 1-2 Physical Specifications for the Cisco MDS 9513 Director**

Description	Specification
Dimensions (HxWxD)	24.5 x 17.5 x 28 in. (62.2 x 44.5 x 71.1 cm) Chassis requires 14 RU <sup>1</sup> , 15 RU with a rack-mount kit. Chassis depth including cable guide is 33 in. (83.8 cm). Crossbar module: 1.7 x 14.0 x 11.2 in. (4.4 x 35.6 x 28.4 cm)
Weight	Chassis only: 101 lb (45.36 kg) Fully loaded chassis <sup>2</sup> : 375 lb (170.10 kg) System fan tray: 18 lbs (8.2 kg) Crossbar module fan tray: 2.25 lbs (1.02 kg)
Power supply	6000-W, AC input 33 lb (15 kg)
Airflow	275 to 325 lfm <sup>3</sup> through system fan module, or 90 cfm <sup>4</sup> per supervisor, switching, or services module. Total of 1150 cfm if all slots are filled. Spacing requirements: <ul style="list-style-type: none"> <li>If installed in an open rack (no side panels), the horizontal distance required between the chassis and any devices that exhaust air towards the chassis is a minimum of 12 in. (304 cm), and the distance required between the chassis air vents and any walls is a minimum of 6 in. (15.2 cm).</li> </ul>

1. RU = rack unit; 1 RU = 1.75 in. (4.45 cm).
2. Depending on what modules are installed in the chassis.
3. lfm = linear feet per minute.
4. cfm = cubic feet per minute.

Table 1-3 lists the physical specifications for the Cisco MDS 9509 Director.

**Table 1-3 Physical Specifications for the Cisco MDS 9509 Director**

Description	Specification
Dimensions (HxWxD)	24.5 x 17.25 x 18.8 in. (62.2 x 43.8 x 47.8 cm) Chassis requires 14 RU <sup>1</sup> plus space for shelf brackets. Chassis depth including cable guide is 21.64 in. (55.0 cm).
Weight	Chassis only: 55 lb (24.9 kg) Chassis configured with two supervisor modules, and 2500-W power supplies: 120 lb (54.4 kg) Chassis configured with two supervisor modules, and 4000-W power supplies: 140 lb (63.5 kg) System fan tray: 10.5 lb (5.0 kg).

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**Table 1-3 Physical Specifications for the Cisco MDS 9509 Director (continued)**

Description	Specification
Power supply	4000-W, AC input 3000-W, AC input 2500-W, AC input 2500-W, DC input
Airflow	300 lfm <sup>2</sup> through system fan module, or 80 cfm <sup>3</sup> per supervisor, switching, or services module. Total of 720 cfm if all slots are filled.  Spacing requirements: <ul style="list-style-type: none"> <li>• If installed in a cabinet, a minimum clearance of 2.5 in. (6.4 cm) is required between the chassis air vents and the cabinet walls.</li> <li>• If installed in an open rack (no side panels), the horizontal distance required between the chassis and any devices that exhaust air towards the chassis is a minimum of 6 in. (15.2 cm), and the distance required between the chassis air vents and any walls is a minimum of 2.5 in. (6.4 cm).</li> </ul>

1. RU = rack unit; 1 RU = 1.75 in. (4.45 cm)
2. lfm = linear feet per minute
3. cfm = cubic feet per minute

Table 1-4 lists the physical specifications for the Cisco MDS 9506 Director.

**Table 1-4 Physical Specifications for the Cisco MDS 9506 Director**

Description	Specification
Dimensions (HxWxD)	12.25 x 17.37 x 21.75 in. (31.1 x 44.1 x 55.2 cm). Chassis requires 7 RU <sup>1</sup> . Chassis depth including cable guides is 26.75 inches (67.9 cm).
Weight	Chassis only: 46 lb (20.9 kg). Chassis configured with two supervisor modules, fan module, and two power supplies: 86 lb (39 kg). System fan tray: 7.70 lbs (3.49 kg) 1900W AC power supply: 11 lbs (4.99 kg)

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**Table 1-4 Physical Specifications for the Cisco MDS 9506 Director (continued)**

Description	Specification
Power supply	1900-W, AC input 1900-W, DC input
Airflow	300 lfm <sup>2</sup> through system fan module, or 80 cfm <sup>3</sup> per supervisor, switching, or services module (total of 480 cfm if all slots are filled). Spacing requirements: <ul style="list-style-type: none"> <li>• If installed in a cabinet, a minimum of 2.5 in. (6.4 cm) is required between the chassis air vents and the cabinet walls.</li> <li>• If installed in an open rack (no side panels), the horizontal distance required between the chassis and any devices that exhaust air towards the chassis is a minimum of 6 in. (15.2 cm), and the distance required between the chassis air vents and any walls is a minimum of 2.5 in. (6.4 cm).</li> </ul>

1. RU = rack unit; 1 RU = 1.75 in. (4.45 cm)
2. lfm = linear feet per minute
3. cfm = cubic feet per minute

## Module Specifications

Table 1-5 lists the specifications for the Cisco MDS 9500 Series supervisor modules, services modules, and switching modules.

**Table 1-5 Cisco MDS 9500 Series Module Specifications**

Description	Specification
<b>Environmental Requirements</b>	
Temperature, certified for operation (module intake of ambient)	32 to 104°F (0 to 40°C)
Temperature, designed and tested for operation	32 to 130°F (0 to 55°C)
Temperature, ambient nonoperating and storage	-40 to 167°F (-40 to 75°C)
Humidity (RH), ambient (noncondensing) operating	10 to 90%
Altitude, certified for operation	0 to 6500 ft (0 to 2000 m)
Altitude, designed and tested for operation	-200 to 10000 ft (-60 to 3000 m)
<b>Physical Characteristics</b>	

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**Table 1-5 Cisco MDS 9500 Series Module Specifications (continued)**

Description	Specification
Dimensions	1.75 x 15.5 x 16.5 in. (4.4 x 39.4 x 41.9 cm) <b>Note</b> These are the maximum dimensions of the faceplate and board, and include the connectors on the board.
Weight	8 to 11.5 lb (1.4 to 5.2 kg)

## Weight of Modules

Table 1-6 lists the weight for each module in the Cisco MDS 9000 Family.

**Table 1-6 Weight of Modules in the Cisco MDS 9000 Family**

Module	Weight
8-port 10-Gbps FCoE module	8 lb (3.63 kg)
48-Port 8-Gbps Advanced Fibre Channel Switching module	10.0 lb (4.5 kg)
32-Port 8-Gbps Advanced Fibre Channel Switching module	10.0 lb (4.5 kg)
MDS 9513 256-Gbps Fabric 3 Module	5 lb (2.26 kg)
16-port Storage Services Node	10.0 lb (4.5 kg)
48-port 8-Gbps switching module	10.25 lb (4.65 kg)
24-port 8-Gbps switching module	10.25 lb (4.65 kg)
4/44-port 8-Gbps Host-Optimized switching module	9.75 lb (4.42 kg)
Fabric 2 external crossbar module (DS-13SLT-FAB2)	6 lb (2.7 kg)
Fabric 1 external crossbar module (DS-13SLT-FAB1)	6 lb (2.7 kg)
48-port 4-Gbps switching module	11.0 lb (4.99 kg)
24-port 4-Gbps switching module	7.75 lb (3.52 kg)
12-port 4-Gbps switching module	7.5 lb (3.40 kg)
4-Port 10-Gbps switching module	8.5 lb (3.86 kg)
32-port FC switching module	9 lb (4.1 kg)
16-port FC switching module	9 lb (4.1 kg)
SSM	11 lb (5 kg)
ASM	11 lb (5 kg)
CSM	11.5 lb (5.2 kg)
IPS-8	10 lb (4.5 kg)
IPS-4	9 lb (4.1 kg)

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**Table 1-6** *Weight of Modules in the Cisco MDS 9000 Family (continued)*

Module	Weight
MSM-18/4	8.5 lb (3.86 kg)
MPS-14/2	10 lb (4.5 kg)
Supervisor-2A for MDS 9500 Series	7.25 lb (3.3 kg)
Supervisor-2 for MDS 9500 Series	7.25 lb (kg)
Supervisor-1 for MDS 9500 Series	9 lb (4.1 kg)
Supervisor for MDS 9200 Series	9 lb (4.1 kg)
Crossbar module fan tray	2.25 lb (1.13 kg)
Module blank panels	0.50 lb (0.25 kg)

Table 1-7 lists the specifications for the batteries on the Cisco MDS 9000 Family caching services module.



**Note**

The CSM does not support Cisco SAN-OS Release 3.0(1).

**Table 1-7** *Caching Services Module Battery Specifications*

Attribute	Value
Nominal voltage	9.6 V
Rated capacity	Typical discharge capacity at 0.2C rate: 2100 mAh
	Minimum discharge capacity at 0.2C rate: 2000 mAh
	Minimum discharge capacity at 5C rate: 1800 mAh (1 V/cell discharge cut-off)
Discharge	The battery is capable of continuous discharge from 41 to 140°F (5 to 60°C) at 5C-rate
Charge	From 32 to 59°F (0 to 15°C) at C/10 rate and from 59 to 104°F (15 to 40°C) at C/2 rate
Storage temperature	32 to 95°F (0 to +35°C)
Relative humidity range	From 5 to 90%

## Power Specifications for the Cisco MDS 9513 Director

This section includes the following topics:

- [Specifications for the Cisco MDS 9513 Power Supplies, page 1-7](#)
- [Component Power Requirements and Heat Dissipation for the Cisco MDS 9513 Director, page 1-7](#)
- [AC Power Consumption for the Cisco MDS 9513 Director, page 1-9](#)

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## Specifications for the Cisco MDS 9513 Power Supplies

The 6000-W AC power supply provides power based upon the input voltage. Each power supply has two AC power connections and will provide power as follows:

- One AC power connection @ 110 VAC = No output
- Two AC power connection @ 110 VAC = 2900 W output
- One AC power connection @ 220 VAC = 2900 W output
- One AC power connection @ 110 VAC and one AC power connection @ 220 VAC = 2900 W output
- Two AC power connection @ 220 VAC = 6000 W output

If a 110 VAC input is chosen, a 110-VAC power cord (CAB-7513AC=) must be ordered separately.



### Note

Power output does not include the power used by the individual modules used in the chassis.

Table 1-8 lists the specifications for the Cisco MDS 9513 power supplies.

**Table 1-8 Specifications for Cisco MDS 9513 Power Supplies**

Description	Specification
<b>6000-W AC Power Supply</b>	
Type	Autoranging input with power factor corrector.
Voltage	100 to 240 VAC ( $\pm 10\%$ ).
Current rating	16 A maximum at 100 to 120 VAC and 2900-W output. 16 A maximum at 200 to 240 VAC and 6000-W output.
Frequency	50 to 60 Hz (nominal) ( $\pm 3$ Hz for full range).
Output capacity	One AC power connection @ 110 VAC = No output Two AC power connection @ 110 VAC = 2900 W output One AC power connection @ 220 VAC = 2900 W output One AC power connection @ 110 VAC and one AC power connection @ 220 VAC = 2900 W output Two AC power connection @ 220 VAC = 6000 W output
Output voltage at 110/120	3.3 V at 10 A, 50 V at 57 A
Output voltage at 200/240	3.3 V at 10A, 50 V at 119 A

## Component Power Requirements and Heat Dissipation for the Cisco MDS 9513 Director

Consider heat dissipation when sizing the air-conditioning requirements for an installation. The power and heat associated with a Cisco MDS 9513 Director varies based upon the following considerations:

- Power supply type
- Switching module type and number of switching modules installed
- Average switching traffic levels

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Table 1-9 lists the power requirements and heat dissipation for the components of the Cisco MDS 9513 Director.

**Note**

Unless noted otherwise, the data listed in Table 1-9 is based on worst-case conditions. Typical numbers are approximately 30 percent below the numbers listed here.

**Table 1-9 Requirements and Heat Dissipation for 6000-W AC Power Supplies**

Module Type/ Product Number	NX-OS Release	SAN-OS Release	Power Required (watts)	Heat Dissipation (BTU/hr)	Input Current			
					90 VAC (amps)	120 VAC (amps)	180 VAC (amps)	240 VAC (amps)
Fan tray 1 (front panel), DS-13SLT-FAN-F		3.x	248	1059	3.44	2.58	1.72	1.29
Fan tray 2 (rear panel), DS-13SLT-FAN-R		3.x	70	299	0.97	0.73	0.49	0.36
Cisco MDS 9513 chassis, DS-C9513, with front (DS-13SLT-FAN-F) and rear (DS-13SLT-FAN-R) fan trays		3.x	318	1358	4.41	3.31	2.21	1.65
Cisco MDS 9000 8-Port 10-Gbps FCoE module (DS-X9708-K9)	5.2		150	640	2.08	1.56	1.04	0.78
48-Port 8-Gbps Advanced Fibre Channel Switching module(DS-X9248-256K9)	5.2		310	1387	4.51	3.39	2.26	1.69
32-Port 8-Gbps Advanced Fibre Channel Switching module(DS-X9232-256K9)	5.2		302	1323	4.31	3.23	2.15	1.61
Cisco MDS 9513 256-Gbps Fabric 3 Module (DS-13SLT-FAB3)	5.2		83	427	1.39	1.04	0.69	0.52
Supervisor-2A, DS-X9530-SF2A-K9	5.2		126	538	1.75	1.31	0.88	0.66
Supervisor-2, DS-X9530-SF2-K9		3.x	126	538	1.75	1.31	0.88	0.66
48-port 4-Gbps switching module, DS-X9148		3.x	185	790	2.57	1.93	1.28	0.96
24-port 4-Gbps switching module, DS-X9124		3.x	147	628	2.04	1.53	1.02	0.77
12-port 4-Gbps switching module, DS-X9112		3.x	132	564	1.83	1.38	0.92	0.69
4-port 10-Gbps switching module, DS-X9704		3.x	172	734	2.39	1.79	1.19	0.90
18/4 Multiservice module, DS-X9304-18K9		3.2.(1)	200	855	2.78	2.08	1.39	1.04
Crossbar module, DS-13SLT-FAB1, DS-13SLT-FAB2		3.x	63	269	0.88	0.66	0.44	0.33



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**Table 1-9 Requirements and Heat Dissipation for 6000-W AC Power Supplies (continued)**

Module Type/ Product Number	NX-OS Release	SAN-OS Release	Power Required (watts)	Heat Dissipation (BTU/hr)	Input Current			
					90 VAC (amps)	120 VAC (amps)	180 VAC (amps)	240 VAC (amps)
48-port 8-Gbps switching module, DS-X9248-96K9	4.x		298	1273	4.14	3.11	2.07	1.55
24-port 8-Gbps switching module, DS-X9224-96K	4.x		273	1163	3.79	2.84	1.90	1.42
4/44-port 8-Gbps Host-Optimized switching module, DS-X9248-48K9	4.x		214	915	2.98	2.23	1.49	1.12
16-port Storage Services Node, DS-X9316-SSNK9	4.2(1)		298	1273	4.14	3.11	2.08	1.55

## AC Power Consumption for the Cisco MDS 9513 Director

Table 1-10 shows the typical AC power consumption for a Cisco MDS 9513 Director.

**Table 1-10 Typical AC Power Consumption for a Cisco MDS 9513 Director**

Module Type / Product Number	Typical AC Power Consumption (Watts)
Cisco MDS 9513 chassis, DS-C9513, with front (DS-13SLT-FAN-F) and rear (DS-13SLT-FAN-R) fan trays, two Supervisor-2 (DS-X9530-SF2-K9) or Supervisor-2A (DS-X9530-SF2A-K9) modules, and two crossbar modules (DS-13SLT-FAB1, DS-13SLT-FAB2, or DS-13SLT-FAB3)	697
48-port 4-Gbps switching module, DS-X9148	181
24-port 4-Gbps switching module, DS-X9124	127
12-port 4-Gbps switching module, DS-X9112	107
4-port 10-Gbps switching module, DS-X9704	162
48-port 8-Gbps switching module, DS-X9248-96K9	230
24-port 8-Gbps switching module, DS-X9224-96K	221
4/44-port 8-Gbps Host-Optimized switching module, DS-X9248-48K9	175
16-port Storage Services Node, DS-X9316-SSNK9	257
8-port 10-Gbps FCoE module, DS-X9708-K9	107
48-Port 8-Gbps Advanced Fibre Channel Switching module, DS-X9248-256K9	267
32-Port 8-Gbps Advanced Fibre Channel Switching module, DS-X9232-256K9	243

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## Power Specifications for the Cisco MDS 9509 Director

This section includes the following topics:

- [Specifications for the Cisco MDS 9509 Power Supplies, page 1-10](#)
- [Component Power Requirements and Heat Dissipation for the Cisco MDS 9509 Director, page 1-11](#)
- [AC Power Consumption for the Cisco MDS 9509 Director, page 1-15](#)

### Specifications for the Cisco MDS 9509 Power Supplies

The 3000-W AC power supply provides power based upon the input voltage, as follows:

- Maximum of 1400 W at input of 100 to 120 VAC (1174 W available to modules and fans)
- Maximum of 3000 W at input of 200 to 240 VAC (2774 W available to modules and fans)

The 2500-W AC power supply provides power based upon the input voltage, as follows:

- Maximum of 1325 W at input of 100 to 120 VAC (1150 W available to modules and fans)
- Maximum of 2525 W at input of 200 to 240 VAC (2331 W available to modules and fans)

If a 110-VAC input is chosen, a 110-VAC power cord (CAB-7513AC=) must be ordered separately.

[Table 1-11](#) lists the specifications for the Cisco MDS 9509 power supplies.

**Table 1-11 Specifications for Cisco MDS 9509 Power Supplies**

Description	Specification
<b>2500-W AC Power Supply</b>	
Type	Autoranging input with power factor corrector.
Voltage	100 to 240 VAC ( $\pm 10\%$ ).
Current rating	16 A maximum at 100 to 120 VAC and 1300-W output. 16 A maximum at 200 to 240 VAC and 2500-W output. <b>Note</b> For current ratings of plugs, see <a href="#">Figure 1-5 on page 1-9</a> .
Frequency	50 to 60 Hz (nominal) ( $\pm 3$ Hz for full range).
Output capacity	1325 W maximum (100 to 120 VAC). 2525 W maximum (200 to 240 VAC).
Output voltage at 110/120	3.3 V at 15 A; 5 V at 5 A; 12 V at 12 A; 42 V at 27.5 A.
Output voltage at 200/240	3.3 V at 15 A; 5 V at 5 A; 12 V at 12 A; 42 V at 55.5 A.
<b>2500-W DC Power Supply</b>	
Voltage	-48 VDC to -60 VDC continuous.
Current rating	70 A at -48 VDC; 55 A at -60 VDC; 80 A at -40.5 VDC.
Terminal block	Accommodates 2 to 14 AWG copper conductors. Use 90°C copper conductors for North American installations. <b>Note</b> Actual size of the wire required is determined by the installer or local electrician. Terminal block material is rated at 302°F (150°C).
Output capacity	2525 W maximum (-48 to -60 VDC).

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**Table 1-11 Specifications for Cisco MDS 9509 Power Supplies (continued)**

Description	Specification
Output voltage	3.3 V at 15 A; 5 V at 5 A; 12 V at 12 A; 42 V at 55.5 A.
<b>3000-W AC Power Supply</b>	
Type	Autoranging input with power factor corrector.
Voltage	100 to 240 VAC ( $\pm 10\%$ ).
Current rating	17.6 A maximum at 100 to 120 VAC and 1400-W output. 17.6 A maximum at 200 to 240 VAC and 3000-W output. For current ratings of plugs, see <a href="#">Figure 1-5 on page 1-9</a>
Frequency	50 to 60 Hz (nominal) ( $\pm 3$ Hz for full range).
Output capacity	1400 W maximum (100 to 120 VAC). 3000 W maximum (200 to 240 VAC).
Output voltage at 110/120	3.3 V at 15 A; 12 V at 12 A; 42 V at 27.9 A.
Output voltage at 200/240	3.3 V at 15 A; 12 V at 12 A; 42 V at 66 A.
<b>4000-W AC Power Supply</b>	
Type	High-line input with power factor corrector, 220 VAC, single-phase circuit.
Voltage	200 to 240 VAC ( $\pm 10\%$ ).
Current rating	23 A <b>Note</b> For current ratings of plugs, see <a href="#">Figure 1-8 on page 1-11</a> .
Frequency	50/60 Hz (nominal) ( $\pm 3\%$ for full range).
Output capacity	4000 W maximum.
Output voltage at 200/240	3.3 V at 15 A; 5 V at 5 A; 12 V at 12 A; 42 V at 91.2 A

## Component Power Requirements and Heat Dissipation for the Cisco MDS 9509 Director

When sizing the air-conditioning requirements for an installation, consider heat dissipation. The power and heat associated with a Cisco MDS 9509 Director varies based upon the following considerations:

- Power supply type
- Switching module type and number of switching modules installed
- Average switching traffic levels

[Table 1-12](#) and [Table 1-13](#) list the power requirements and heat dissipation for the components of the Cisco MDS 9509 Director.



### Note

Unless noted otherwise, the data listed in [Table 1-12](#) and [Table 1-13](#) is based on worst-case conditions. Typical numbers are approximately 30 percent below the numbers listed here.

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**Table 1-12 Requirements and Heat Dissipation for 2500-, 3000-, and 4000-W AC Power Supplies**

Module Type/ Product Number	NX-OS Release	SAN-OS Release	Power Required (watts)	Heat Dissipation (BTU/hr)	Input Current			
					90 VAC (amps)	120 VAC (amps)	180 VAC (amps)	240 VAC (amps)
Cisco MDS 9509 chassis with fan module DS-C9509		3.x	210	897	2.92	2.19	1.46	1.09
		2.x and 1.x	216	920	3.00	2.25	1.50	1.13
Supervisor/fabric 1 DS-X9530-SF1		3.x	210	897	2.92	2.19	1.46	1.09
		2.x and 1.x	220	940	3.05	2.29	1.53	1.15
Supervisor-2, DS-X9530-SF2-K9		3.x	126	538	1.75	1.31	0.88	0.66
48-port 4-Gbps switching module, DS-X9148		3.x	185	790	2.57	1.93	1.28	0.96
		2.x and 1.x	—	—	—	—	—	—
24-port 4-Gbps switching module, DS-X9124		3.x	147	628	2.04	1.53	1.02	0.77
		2.x and 1.x	—	—	—	—	—	—
12-port 4-Gbps switching module, DS-X9112		3.x	132	564	1.83	1.38	0.92	0.69
		2.x and 1.x	—	—	—	—	—	—
4-port 10-Gbps switching module, DS-X9704		3.x	172	734	2.39	1.79	1.19	0.90
		2.x and 1.x	—	—	—	—	—	—
32-port 1-Gbps/2-Gbps Fibre Channel module, DS-X9032		3.x	191	816	2.65	1.99	1.33	0.99
		2.x and 1.x	200	855	2.78	2.08	1.39	1.04
16-port 1-Gbps/2-Gbps Fibre Channel module, DS-X9016		3.x	210	897	2.92	2.19	1.46	1.09
		2.x and 1.x	220	940	3.05	2.29	1.53	1.15
18/4 Multiservice module, DS-X9304-18K9		3.2.(1)	200	855	2.78	2.08	1.39	1.04
MPS-14/2 module DS-X9302-14K9		3.x	200	854	2.78	2.08	1.39	1.04
		2.x and 1.x	227	970	3.15	2.37	1.57	1.19
8-port IPS module DS-X9308-SMIP		3.x	200	854	2.78	2.08	1.39	1.04
		2.x and 1.x	220	940	3.05	2.29	1.53	1.15
4-port IPS module DS-X9304-SMIP		3.x	160	683	2.22	1.67	1.11	0.83
		2.x and 1.x	185	789	2.57	1.93	1.28	0.96

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**Table 1-12 Requirements and Heat Dissipation for 2500-, 3000-, and 4000-W AC Power Supplies (continued)**

Module Type/ Product Number	NX-OS Release	SAN-OS Release	Power Required (watts)	Heat Dissipation (BTU/hr)	Input Current			
					90 VAC (amps)	120 VAC (amps)	180 VAC (amps)	240 VAC (amps)
32-port SSM DS-X9032-SSM		3.x	281	1200	3.90	2.93	1.95	1.46
		2.x and 1.x	295	1260	4.10	3.07	2.05	1.54
32-port ASM DS-X9032-SMV		3.x	281	1200	3.90	2.93	1.95	1.46
		2.x and 1.x	295	1260	4.10	3.07	2.05	1.54
CSM DS-X9560-SMC		3.x	200	854	2.78	2.08	1.39	1.04
		2.x and 1.x	210	919	2.99	2.19	1.50	1.12
48-port 8-Gbps switching module, DS-X9248-96K9	4.x		298	1273	4.14	3.11	2.07	1.55
24-port 8-Gbps switching module, DS-X9224-96K	4.x		273	1163	3.79	2.84	1.90	1.42
4/44-port 8-Gbps Host-Optimized switching module, DS-X9248-48K9	4.x		214	915	2.98	2.23	1.49	1.12
16-port Storage Services Node, DS-X9316-SSNK9	4.2(1)		298	1273	4.14	3.11	2.08	1.55
Cisco MDS 9000 8-Port 10-Gbps FCoE module (DS-X9708-K9)	5.2		150	640	2.08	1.56	1.04	0.78
48-Port 8-Gbps Advanced Fibre Channel Switching module(DS-X9248-256K9)	5.2		310	1387	4.51	3.39	2.26	1.69
32-Port 8-Gbps Advanced Fibre Channel Switching module(DS-X9232-256K9)	5.2		302	1323	4.31	3.23	2.15	1.61
Supervisor-2A, DS-X9530-SF2A-K9	5.2		126	538	1.75	1.31	0.88	0.66

**Table 1-13 Power Requirements and Heat Dissipation for the 2500-W DC Power Supply**

Module Type/ Product Number	SAN-OS Release	Power Required (watts)	Heat Dissipation (BTU/hr)	Input Current	
				48 VDC (amps)	60 VDC (amps)
Cisco MDS 9509 chassis with fan module DS-C9509	3.x	210	956	5.83	4.67
	2.x and 1.x	216	983	6.00	4.80
Supervisor/fabric 1 DS-X9530-SF1	3.x	210	956	5.83	4.67
	2.x and 1.x	220	1000	6.10	4.88

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**Table 1-13 Power Requirements and Heat Dissipation for the 2500-W DC Power Supply (continued)**

Module Type/ Product Number	SAN-OS Release	Power Required (watts)	Heat Dissipation (BTU/hr)	Input Current	
				48 VDC (amps)	60 VDC (amps)
32-port 1-Gbps/2-Gbps Fibre Channel module DS-X9032	3.x	191	869	5.31	4.24
	2.x and 1.x	200	911	5.56	4.45
16-port 1-Gbps/2-Gbps Fibre Channel module DS-X9016	3.x	210	956	5.83	4.67
	2.x and 1.x	220	1000	6.10	4.88
MSM-18/4 module, DS-X9304-18K9	3.2(1)	200	855	2.78	2.08
MPS-14/2 module DS-X9302-14K9	3.x	200	910	5.56	4.44
	2.x and 1.x	227	970	3.15	2.37
8-port IPS module DS-X9308-SMIP	3.x	200	910	5.56	4.44
	2.x and 1.x	220	1000	6.10	4.88
4-port IPS module DS-X9304-SMIP	3.x	160	728	4.44	3.56
	2.x and 1.x	185	841	5.14	4.11
32-port SSM DS-X9032-SSM	3.x	281	1279	7.81	6.24
	2.x and 1.x	295	1342	8.19	6.56
32-port ASM DS-X9032-SMV	3.x	281	1279	7.81	6.24
	2.x and 1.x	295	1342	8.19	6.56
CSM DS-X9560-SMC	3.x	200	910	5.56	4.44
	2.x and 1.x	210	956	5.83	4.67

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## AC Power Consumption for the Cisco MDS 9509 Director

Table 1-14 shows the typical AC power consumption for the Cisco MDS 9509 Director

**Table 1-14** Typical AC Power Consumption for a Cisco MDS 9509 Director

Module Type / Product Number	Typical AC Power Consumption (Watts)
Cisco MDS 9509 chassis, DS-C9509, with fan module, and two Supervisor-2 (DS-X9530-SF2-K9) or Supervisor-2A (DS-X9530-SF2A-K9)	380
Cisco MDS 9509 chassis, DS-C9509, with fan module, and two Supervisor-1 (DS-X9530-SF1-K9)	622
48-port 4-Gbps switching module, DS-X9148	181
24-port 4-Gbps switching module, DS-X9124	127
12-port 4-Gbps switching module, DS-X9112	107
4-port 10-Gbps switching module, DS-X9704	162
32-port 1-Gbps/2-Gbps Fibre Channel module, DS-X9032	174
16-port 1-Gbps/2-Gbps Fibre Channel module, DS-X9016	144
Cisco MDS 9000 Family 18/4 - port Multiservice module	199.8
MPS-14/2 module, DS-X9302-14K9	178
32-port SSM, DS-X9032-SSM	211
8-port IPS module, DS-X9308-SMIP	175
4-port IPS module, DS-X9304-SMIP	128
48-port 8-Gbps switching module, DS-X9248-96K9	230
24-port 8-Gbps switching module, DS-X9224-96K	221
4/44-port 8-Gbps Host-Optimized switching module, DS-X9248-48K9	175
16-port Storage Services Node, DS-X9316-SSNK9	257
Cisco MDS 9000 8-Port 10-Gbps FCoE module (DS-X9708-K9)	107
48-Port 8-Gbps Advanced Fibre Channel Switching module(DS-X9248-256K9)	267
32-Port 8-Gbps Advanced Fibre Channel Switching module(DS-X9232-256K9)	243
Supervisor-2A, DS-X9530-SF2A-K9	697

## Power Specifications for the Cisco MDS 9506 Director

This section includes the following topics:

- [Specifications for the Cisco MDS 9506 Power Supplies, page 1-16](#)
- [Component Power Requirements and Heat Dissipation for the Cisco MDS 9506 Director, page 1-17](#)
- [AC Power Consumption for the Cisco MDS 9506 Director, page 1-20](#)

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## Specifications for the Cisco MDS 9506 Power Supplies



### Caution

The following applies to AC power supplies on the Cisco MDS 9506 only:  
The DS-C9506 equipment is suitable for use on TN power systems and the IT-power system connection of Norway (max 230 v phase-phase). If connected to a 230/400-V IT power system, beware of high-leakage current. Earth connection is essential before connecting the supply.

The 1900-W AC power supply provides power based upon the input voltage:

- Maximum of 1050 W at input of 100 to 120 VAC
- Maximum of 1900 W at input of 200 to 240 VAC

A 110-VAC power cord (CAB-7513AC=) must be ordered separately.

[Table 1-15](#) lists the specifications for the Cisco MDS 9506 power supplies.

**Table 1-15 Specifications for Cisco MDS 9506 Power Supplies**

Description	Specification
<b>1900-W AC Power Supply</b>	
Type	Autoranging input with power factor corrector.
Voltage	100 to 240 VAC ( $\pm 10\%$ ).
Current rating	12 A maximum at 100 to 120 VAC and 1050-W output. 12 A maximum at 200 to 240 VAC and 1900-W output. <b>Note</b> For current ratings of plugs, see <a href="#">Figure 1-5 on page 1-9</a> .
Frequency	50/60 Hz (nominal) ( $\pm 3$ Hz for full range).
Output capacity	1050 W maximum (at input of 100 to 120 VAC). 1900 W maximum (at input of 200 to 240 VAC).
Output voltage at 110/120	3.3 V at 2.5 A; 1.5 V at 15 A; 50 V at 20.4 A.
Output voltage at 200/240	3.3 V at 2.5 A; 1.5 V at 15 A; 50 V at 37.4 A.
<b>1900-W DC Power Supply</b>	
Voltage	-48 to -60 VDC continuous.
Current rating	50 A at -48 VDC, 40 A at -60 VDC, 60 A at -40.5 VDC.
Terminal block	Accommodates 2 to 14 AWG copper conductors. Use 90°C copper conductors for North American installations. <b>Note</b> Actual size of the wire required is determined by the installer or local electrician. Terminal block material is rated at 302°F (150°C).
Output capacity	1900 W maximum (at input of -48 to -60 VDC).
Output voltage	3.3 V at 2.5 A; 1.5 V at 15 A; 50 V at 37.4 A.



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## Component Power Requirements and Heat Dissipation for the Cisco MDS 9506 Director

When sizing the air-conditioning requirements for an installation, consider heat dissipation. The power and heat associated with a Cisco MDS 9506 Director varies depending upon the following:

- Power supply type
- Switching module type and number of switching modules installed
- Average switching traffic levels

Table 1-16 and Table 1-17 list the AC and DC power requirements and heat dissipation for the components of the Cisco MDS 9506 Director.



### Note

Unless noted otherwise, the information listed in Table 1-16 and Table 1-17 is based on worst-case conditions. Typical numbers are approximately 30 percent below the numbers listed here.

**Table 1-16** Power Requirements and Heat Dissipation for the 1900-W AC Power Supply

Module Type/ Product Number	NX-OS Release	SAN-OS Release	Power Required (watts)	Heat Dissipation (BTU/hr)	Input Current			
					90 VAC (amps)	120 VAC (amps)	180 VAC (amps)	240 VAC (amps)
Cisco MDS 9506 chassis with fan module DS-C9506		3.x	126	538	1.75	1.31	0.88	0.66
		2.x and 1.x	126	538	1.75	1.32	0.88	0.66
Supervisor/fabric 1 DS-X9530-SF1		3.x	210	897	2.92	2.19	1.46	1.09
		2.x and 1.x	220	940	3.05	2.29	1.53	1.15
Cisco MDS 9000 8-Port 10-Gbps FCoE module (DS-X9708-K9)	5.2		150	640	2.08	1.56	1.04	0.78
48-Port 8-Gbps Advanced Fibre Channel Switching module(DS-X9248-256K9)	5.2		310	1387	4.51	3.39	2.26	1.69
32-Port 8-Gbps Advanced Fibre Channel Switching module(DS-X9232-256K9)	5.2		302	1323	4.31	3.23	2.15	1.61
Supervisor-2A, DS-X9530-SF2A-K9	5.2		126	538	1.75	1.31	0.88	0.66
Supervisor-2, DS-X9530-SF2-K9		3.x	126	538	1.75	1.31	0.88	0.66
48-port 4-Gbps switching module, DS-X9148		3.x	185	790	2.57	1.93	1.28	0.96
		2.x and 1.x	—	—	—	—	—	—
24-port 4-Gbps switching module, DS-X9124		3.x	147	628	2.04	1.53	1.02	0.77
		2.x and 1.x	—	—	—	—	—	—

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**Table 1-16 Power Requirements and Heat Dissipation for the 1900-W AC Power Supply (continued)**

Module Type/ Product Number	NX-OS Release	SAN-OS Release	Power Required (watts)	Heat Dissipation (BTU/hr)	Input Current			
					90 VAC (amps)	120 VAC (amps)	180 VAC (amps)	240 VAC (amps)
12-port 4-Gbps switching module, DS-X9112		3.x	132	564	1.83	1.38	0.92	0.69
		2.x and 1.x	—	—	—	—	—	—
4-port 10-Gbps switching module, DS-X9704		3.x	172	734	2.39	1.79	1.19	0.90
		2.x and 1.x	—	—	—	—	—	—
32-port 1-Gbps/2-Gbps Fibre Channel module DS-X9032		3.x	191	816	2.65	1.99	1.33	0.99
		2.x and 1.x	200	855	2.78	2.08	1.39	1.04
16-port 1-Gbps/2-Gbps Fibre Channel module DS-X9016		3.x	210	897	2.92	2.19	1.46	1.09
		2.x and 1.x	220	940	3.05	2.29	1.53	1.15
18/4 Multiservice module, DS-X9304-18K9		3.2.(1)	200	855	2.78	2.08	1.39	1.04
MPS-14/2 module DS-X9302-14K9		3.x	200	854	2.78	2.08	1.39	1.04
		2.x and 1.x	227	970	3.15	2.37	1.57	1.19
8-port IPS module DS-X9308-SMIP		3.x	200	854	2.78	2.08	1.39	1.04
		2.x and 1.x	220	940	3.05	2.29	1.53	1.15
4-port IPS module DS-X9304-SMIP		3.x	160	683	2.22	1.67	1.11	0.83
		2.x and 1.x	185	789	2.57	1.93	1.28	0.96
32-port SSM DS-X9032-SSM		3.x	281	1200	3.90	2.93	1.95	1.46
		2.x and 1.x	295	1260	4.10	3.07	2.05	1.54
32-port ASM DS-X9032-SMV		3.x	281	1200	3.90	2.93	1.95	1.46
		2.x and 1.x	295	1260	4.10	3.07	2.05	1.54
CSM DS-X9560-SMC		3.x	200	854	2.78	2.08	1.39	1.04
		2.x and 1.x	210	907	2.95	2.22	1.48	1.11
48-port 8-Gbps switching module, DS-X9248-96K9	4.x		298	1273	4.14	3.11	2.07	1.55
24-port 8-Gbps switching module, DS-X9224-96K	4.x		273	1163	3.79	2.84	1.90	1.42

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**Table 1-16 Power Requirements and Heat Dissipation for the 1900-W AC Power Supply (continued)**

Module Type/ Product Number	NX-OS Release	SAN-OS Release	Power Required (watts)	Heat Dissipation (BTU/hr)	Input Current			
					90 VAC (amps)	120 VAC (amps)	180 VAC (amps)	240 VAC (amps)
4/44-port 8-Gbps Host-Optimized switching module, DS-X9248-48K9	4.x		214	915	2.98	2.23	1.49	1.12
16-port Storage Services Node (DS-X9316-SSNK9)	4.2(1)		298	1273	4.14	3.11	2.08	1.55

**Table 1-17 Power Requirements and Heat Dissipation for the 1900-W DC Power Supply**

Module Type/ Product Number	SAN-OS Release	Power Required (watts)	Heat Dissipation (BTU/hr)	Input Current	
				48 VDC (amps)	60 VDC (amps)
Cisco MDS 9506 chassis with fan module DS-C9506	3.x	126	573	3.50	2.80
	2.x and 1.x	126	573	3.50	2.80
Supervisor/fabric 1 DS-X9530-SF1	3.x	210	956	5.83	4.67
	2.x and 1.x	220	1000	6.10	4.88
32-port 1-Gbps/2-Gbps Fibre Channel module DS-X9032	3.x	191	869	5.31	4.24
	2.x and 1.x	200	911	5.56	4.45
16-port 1-Gbps/2-Gbps Fibre Channel module DS-X9016	3.x	210	956	5.83	4.67
	2.x and 1.x	220	1000	6.10	4.88
18/4 Multiservice module, DS-X9304-18K9	3.2.(1)	200	855	2.78	2.08
MPS-14/2 module DS-X9302-14K9	3.x	200	910	5.56	4.44
	2.x and 1.x	227	970	3.15	2.37
8-port IPS module DS-X9308-SMIP	3.x	200	910	5.56	4.44
	2.x and 1.x	220	1000	6.10	4.88
4-port IPS module DS-X9304-SMIP	3.x	160	728	4.44	3.56
	2.x and 1.x	185	841	5.14	4.11
32-port SSM DS-X9032-SSM	3.x	281	1279	7.81	6.24
	2.x and 1.x	295	1342	8.19	6.56
32-port ASM DS-X9032-SMV	3.x	281	1279	7.81	6.24
	2.x and 1.x	295	1342	8.19	6.56
CSM DS-X9560-SMC	3.x	200	910	5.56	4.44
	2.x and 1.x	210	955	5.83	4.66

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## AC Power Consumption for the Cisco MDS 9506 Director

Table 1-18 shows the typical AC power consumption for the Cisco MDS 9506 Director.

**Table 1-18** Typical AC Power Consumption for a Cisco MDS 9506 Director

Module Type / Product Number	Typical AC Power Consumption (Watts)
Cisco MDS 9506 chassis, DS-C9506, with fan module, and two Supervisor-2 (DS-X9530-SF2-K9) or Supervisor-2A (DS-X9530-SF2A-K9) modules	395
Cisco MDS 9506 chassis, DS-C9506, with fan module, and two Supervisor-1 (DS-X9530-SF1-K9)	624
48-port 4-Gbps switching module, DS-X9148	181
24-port 4-Gbps switching module, DS-X9124	127
12-port 4-Gbps switching module, DS-X9112	107
4-port 10-Gbps switching module, DS-X9704	162
32-port 1-Gbps/2-Gbps Fibre Channel module, DS-X9032	174
16-port 1-Gbps/2-Gbps Fibre Channel module, DS-X9016	144
Cisco MDS 9000 Family 18/4 - port Multiservice module	199.8
MPS-14/2 module, DS-X9302-14K9	178
32-port SSM, DS-X9032-SSM	211
8-port IPS module, DS-X9308-SMIP	175
4-port IPS module, DS-X9304-SMIP	128
48-port 8-Gbps switching module, DS-X9248-96K9	230
24-port 8-Gbps switching module, DS-X9224-96K	221
4/44-port 8-Gbps Host-Optimized switching module, DS-X9248-48K9	175
16-port Storage Services Node (DS-X9316-SSNK9)	257
Cisco MDS 9000 8-Port 10-Gbps FCoE module (DS-X9708-K9)	107
48-Port 8-Gbps Advanced Fibre Channel Switching module(DS-X9248-256K9)	267
32-Port 8-Gbps Advanced Fibre Channel Switching module(DS-X9232-256K9)	243
Supervisor-2A, DS-X9530-SF2A-K9	697

## Transceiver Specifications

The Cisco MDS 9500 Series is compatible with X2, SFP, and SFP+ transceivers and cables that have SC and LC connectors. For more information, see the Cisco MDS 9000 Family Pluggable Transceivers data sheet at this URL:

[http://www.cisco.com/en/US/prod/collateral/ps4159/ps6409/ps4358/product\\_data\\_sheet09186a00801bc698.html](http://www.cisco.com/en/US/prod/collateral/ps4159/ps6409/ps4358/product_data_sheet09186a00801bc698.html) .