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Cooling System and Airflow in an EX4550 Switch

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The cooling system in an EX4550 switch consists of three fan modules and a single fan in each power supply. EX4550 switches provide back-to-front airflow (air comes in from the back of the switch) or front-to-back (air exhausts through the back of the switch) airflow depending on the fan modules and power supplies installed in the switch.

Fan Modules

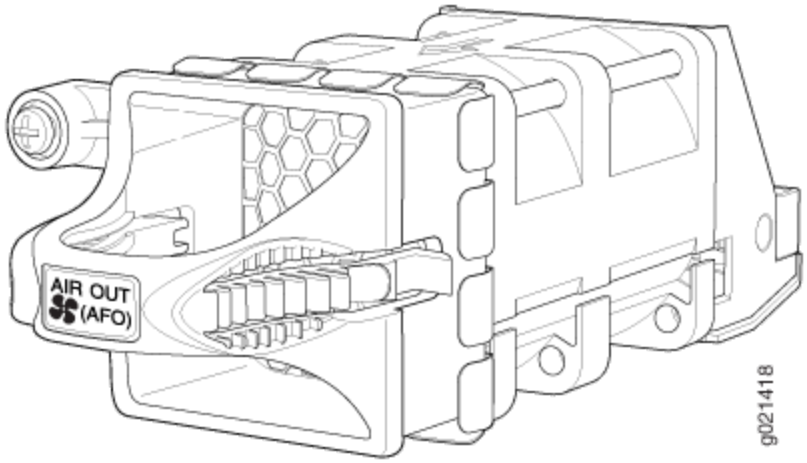
Fan modules for the EX4550 switches are hot-insertable and hot-removable field-replaceable units (FRUs).

All the EX4550 switchmodels, except the EX4550-32F-S switches are shipped with three fan modules pre-installed in the rear panel of the switch. EX4550-32F-S switches are not shipped with pre-installed fan modules; you must order them separately.

Each switch can accommodate three fan modules in the fan module slots on the rear panel of the switch. The fan module slots are numbered 1 through 3 from left to right. Each slot has a fan icon next to it.

Figure 1 shows a fan module used in an EX4550 switch.

Figure 1: Fan Module Used in an EX4550 Switch



You remove and replace a fan module from the rear panel of the chassis. The switch continues to operate for a limited period of time (30 seconds) during the replacement of the fan module without thermal shutdown.

NOTE All three fan modules must be installed for optimal functioning of the switch.

Two variants of fan modules are available, each with a different airflow direction—back-to-front airflow, indicated by the label `AIR IN (AFI)`, or front-to-back, indicated by the label `AIR OUT (AFO)`. Table 1 lists the available fan module model numbers and the direction of airflow in them.

Table 1: Fan Modules in EX4550 Switches

Model Number	Label on the Fan Module	Direction of Airflow in the Fan Module
EX4550-FAN-AFI	`AIR IN (AFI)`	Back-to-front—air comes in from the back of the switch.
EX4550-FAN-AFO	`AIR OUT (AFO)`	Front-to-back—air exhausts from the back of the switch.

Airflow Direction in EX4550 Switches

Table 2 shows the direction of airflow in EX4550 switches as shipped. All the EX4550 switches except the EX4550-32F-S switches have the fan modules and power supplies preinstalled on the rear panel of the switches. Power supplies and fan modules for the EX4550-32F-S switch are not shipped by default; you must order them separately.

Table 2: Airflow Direction in EX4550 Switches

Model Number	Fan Modules and Power Supply	Direction of Airflow
• EX4550-32F-AFI • EX4550–32T-AFI	The switch ships with three fan modules, each bearing a label `AIR IN (AFI)`, and an AC power supply bearing a label `AFI`.	Back-to-front—air intake to cool the chassis is through the vents on the rear panel of the chassis, and hot air exhausts through the vents on the front panel of the chassis.
• EX4550-32F-AFO • EX4550–32T-AFO	The switch ships with three fan modules, each bearing a label `AIR OUT (AFO)`, and an AC power supply bearing a label `AFO`.	Front-to-back—air intake to cool the chassis is through the vents on the front panel of the chassis, and hot air exhausts through the vents on the rear panel of the chassis.
• EX4550-32F-DC-AFI • EX4550–32T-DC-AFI	The switch ships with three fan modules, each bearing a label `AIR IN (AFI)` and a DC power supply bearing a label `AFI`.	Back-to-front—air intake to cool the chassis is through the vents on the rear panel of the chassis, and hot air exhausts through the vents on the front panel of the chassis.
• EX4550-32F-DC-AFO • EX4550–32T-DC-AFO	The switch ships with three fan modules, each bearing a label `AIR OUT (AFO)` and a DC power supply bearing a label `AFO`.	Front-to-back—air intake to cool the chassis is through the vents on the front panel of the chassis, and hot air exhausts through the vents on the rear panel of the chassis.

⚠ CAUTION

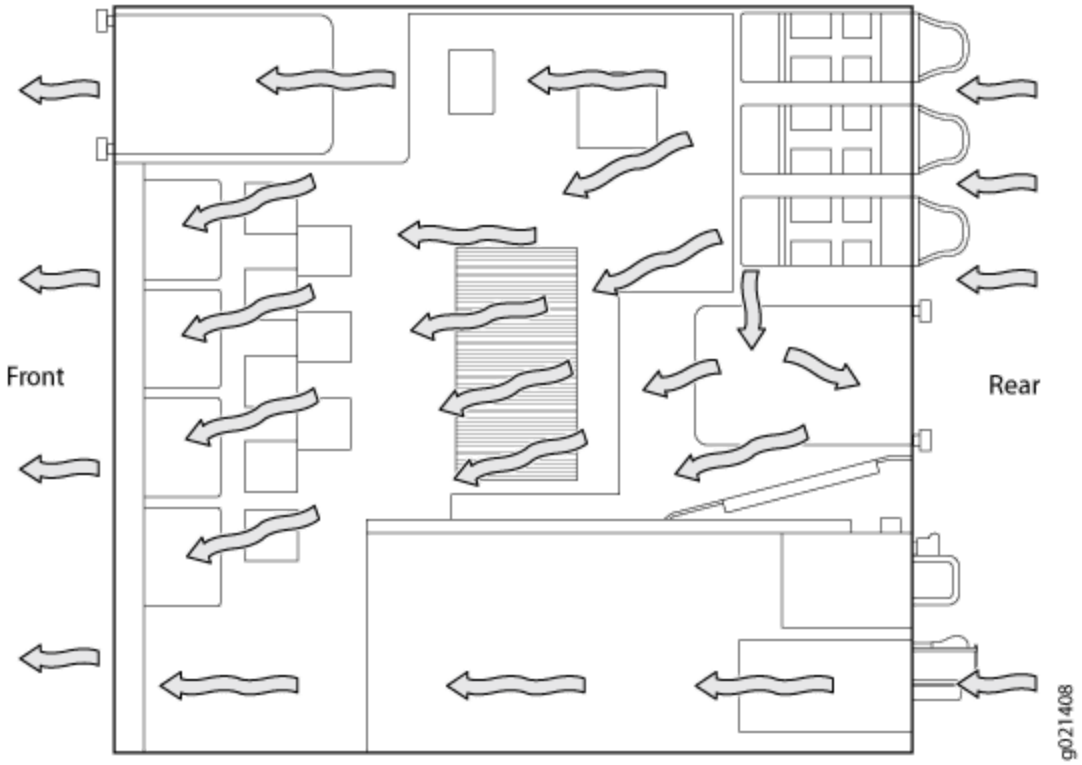
Do not mix:

- AC and DC power supplies in the same chassis.
- Power supplies (`AFI` or `AFO`) and fan modules (`AIR IN (AFI)` or `AIR OUT (AFO)`) with different airflow labels in the same chassis.

Back-to-Front Airflow

In the EX4550 switches that have back-to-front airflow, the air intake to cool the chassis is through the vents on the rear panel, and hot air exhausts through the vents on the front panel of the switch. See Figure 2.

Figure 2: Back-to-Front Airflow Through the EX4550 Switch Chassis

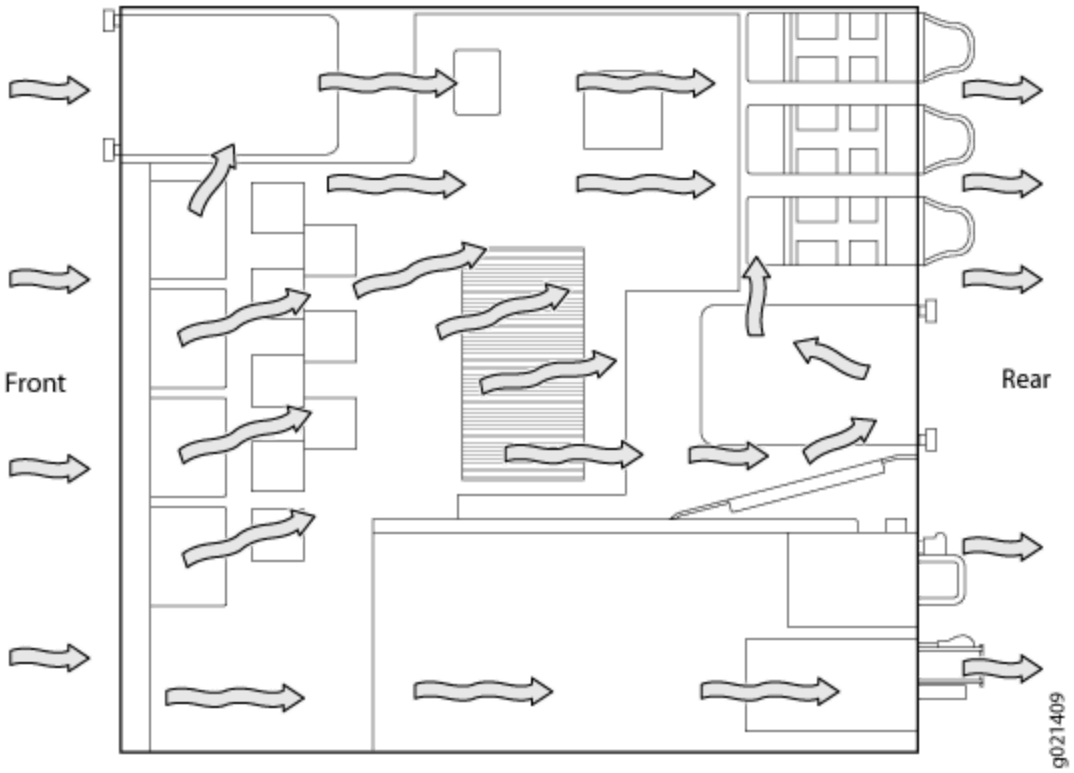


You must install only power supplies that have `AFI` labels in switches in which the fan modules have `AIR IN (AFI)` labels.

Front-to-Back Airflow

In the EX4550 switches that have front-to-back airflow, the air intake to cool the chassis is through the vents on the front panel of the switch, and hot air exhausts through the vents on the rear panel. See Figure 3.

Figure 3: Front-to-Back Airflow Through the EX4550 Switch Chassis



You must install only power supplies that have AFO labels in switches in which the fan modules have AIR OUT (AFO) labels.

Do Not Install Components with Different Airflow in the Switch

Do not mix power supplies with different airflow labels (AFI and AFO) and fan modules with different airflow labels (AIR IN (AFI) and AIR OUT (AFO)) in the same chassis. If the fan modules have AIR IN (AFI) labels, the power supplies must have AFI labels; if the fan modules have AIR OUT (AFO) labels, the power supplies must have AFO labels.

Mixing components with different airflows in the same chassis hampers the performance of the cooling system of the switch and leads to overheating of the chassis.

⚠ CAUTION The system raises an alarm if a fan module fails or if the ambient temperature inside the chassis rises above the acceptable range. If the temperature inside the chassis rises above the threshold temperature, the system shuts down automatically.

Positioning the Switch

In front-to-back airflow, indicated by the label AIR OUT (AFO) on the fan modules and the label AFO on the power supplies, hot air exhausts through the vents on the rear panel of the switch. In back-to-front airflow, indicated by the label AIR IN (AFI) on the fan modules and the label AFI on the power supplies, hot air exhausts through the vents on the front panel of the switch.

In data center deployments, position the switch in such a manner that the AFI and AIR IN (AFI) labels on switch components are next to the cold aisle, and AFO and AIR OUT (AFO) labels on switch components are next to the hot aisle.

Fan Module Status

Each switch has a Status LED (labeled ST) for each fan module on the left side of the corresponding fan module slot. It indicates the status of the fan module. Table 3 describes the Status LED on a fan module in an EX4550 switch.

Table 3: Fan Module LED

LED	State	Description
ST	Green	The fan module is functioning normally.
	Unlit	Indicates one of the following: • The fan module is not installed. • The fan module is not functioning normally.

Under normal operating conditions, the fan modules operate at a moderate speed. Temperature sensors in the chassis monitor the temperature within the chassis.

The system raises an alarm if a fan module fails or if the ambient temperature inside the chassis rises above the acceptable range. If the temperature inside the chassis rises above the threshold temperature, the system shuts down automatically.

You can check the status of fans and the chassis temperature from the Environment Status option in the Status menu on the LCD panel. See LCD Panel in EX4550 Switches.

RELATED DOCUMENTATION

- Removing a Fan Module from an EX4550 Switch

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