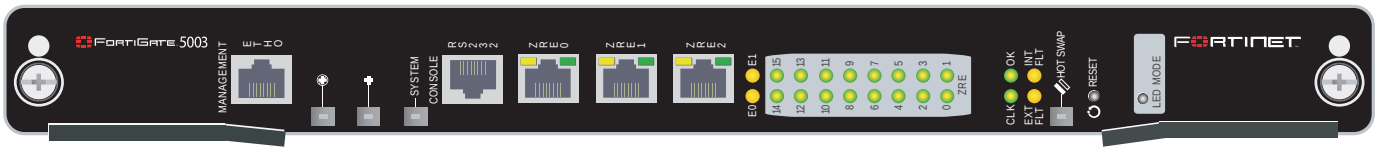
FortiSwitch-5003



A detailed guide to the features and capabilities of the FortiSwitch-5003 System. This *FortiSwitch-5003 System Guide* describes FortiSwitch-5003 hardware features, how to install the FortiSwitch-5003 module in a FortiGate-5000 series chassis, and contains troubleshooting information to help you diagnose and fix problems.

The most recent versions of this and all FortiGate-5000 series documents are available from the FortiGate-5000 page of the Fortinet Technical Documentation web site (http://docs.forticare.com).

Visit http://support.fortinet.com to register your FortiSwitch-5003 system. By registering you can receive product updates, technical support, and FortiGuard services.

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FortiSwitch-5003 System Guide

01-30000-0384-20070201

Warnings and cautions

Only trained and qualified personnel should be allowed to install or maintain FortiGate-5000 series equipment. Read and comply with all warnings, cautions and notices in this document.

CAUTION: Risk of Explosion if Battery is replaced by an Incorrect Type. Dispose of Used Batteries According to the Instructions.

Caution: You should be aware of the following cautions and warnings before installing FortiGate-5000 series hardware

- Turning off all power switches may not turn off all power to the FortiGate-5000 series equipment. Except where noted, disconnect the FortiGate-5000 series equipment from all power sources, telecommunications links and networks before installing, or removing FortiGate-5000 series components, or performing other maintenance tasks. Failure to do this can result in personal injury or equipment damage. Some circuitry in the FortiGate-5000 series equipment may continue to operate even though all power switches are off.
- An easily accessible disconnect device, such as a circuit breaker, should be incorporated into the data center wiring that connects power to the FortiGate-5000 series equipment.
- Install FortiGate-5000 series chassis at the lower positions of a rack to avoid making the rack top-heavy and unstable.
- Do not insert metal objects or tools into open chassis slots.
- Electrostatic discharge (ESD) can damage FortiGate-5000 series equipment. Only perform the procedures described in this document from an ESD workstation. If no such station is available, you can provide some ESD protection by wearing an anti-static wrist or ankle strap and attaching it to an ESD connector or to a metal part of a FortiGate chassis.
- Some FortiGate-5000 series components may overload your supply circuit and impact your overcurrent protection and supply wiring. Refer to nameplate ratings to address this concern.
- Make sure all FortiGate-5000 series components have reliable grounding. Fortinet recommends direct connections to the branch circuit.
- If you install a FortiGate-5000 series component in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Make sure the operating ambient temperature does not exceed the manufacturer's maximum rated ambient temperature.
- Installing FortiGate-5000 series equipment in a rack should be such that the amount of airflow required for safe operation of the equipment is not compromised.
- This equipment is for installation only in a Restricted Access Location (dedicated equipment room, service closet or the like), in accordance with the National Electrical Code.
- Per the National Electrical Code, sizing of a Listed circuit breaker or branch circuit fuse and the supply conductors to the equipment is based on the marked input current rating. A product with a marked input current rating of 25 A is required to be placed on a 40 A branch circuit. The supply conductors will also be sized according to the input current rating and also derated for the maximum rated operating ambient temperature, Tma, of the equipment.
- FortiGate-5000 series equipment shall be installed and connected to an electrical supply source in accordance with the applicable codes and regulations for the location in which it is installed. Particular attention shall be paid to use of correct wire type and size to comply with the applicable codes and regulations for the installation / location. Connection of the supply wiring to the terminal block on the equipment may be accomplished using Listed wire compression lugs, for example, Pressure Terminal Connector made by Ideal Industries Inc. or equivalent which is suitable for AWG 10. Particular attention shall be given to use of the appropriate compression tool specified by the compression lug manufacturer, if one is specified.

Contents

FortiSwitch-5003 module

The FortiSwitch-5003 module provides base backplane interface switching for the FortiGate-5140 chassis and the FortiGate-5050 chassis. You can use this switching for data communication or HA heartbeat communication between the base backplane interfaces of FortiGate-5000 series modules installed in slots 3 and up in these chassis. FortiSwitch-5003 modules can be used for base backplane communication in a single chassis or between multiple chassis.

Install FortiSwitch-5003 modules in chassis slots 1 and 2. A FortiSwitch-5003 module in slot 1 provides communications on base backplane interface 1. A FortiSwitch-5003 module in slot 2 provides communications on base backplane interface 2.

If your configuration includes only one FortiSwitch-5003 module you can install it in slot 1 or slot 2 and configure the FortiGate-5000 modules installed in the chassis to use the correct base backplane interface.

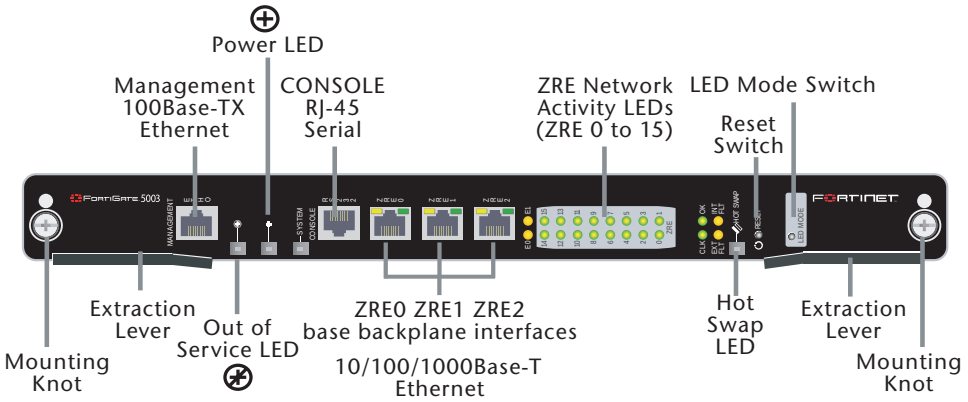
The FortiSwitch-5003 module includes the following features:

- A total of 16 10/100/1000Base-T gigabit ethernet interfaces:
  - 13 backplane 10/100/1000Base-T gigabit interfaces for base backplane switching between FortiGate-5000 series modules installed in the same chassis as the FortiSwitch-5003
  - Three front panel 10/100/1000Base-T gigabit interfaces (ZRE0, ZRE1, ZRE2) for base backplane switching between two or more FortiGate-5000 series chassis
- One 100Base-TX out of band management ethernet interface (ETH0)
- RJ-45 RS-232 serial console connection (CONSOLE)
- Mounting hardware
- LED status indicators

Front panel LEDs and connectors

From the FortiSwitch-5003 font panel you can view the status of the module LEDs to verify that the module is functioning normally. You can also connect the FortiSwitch-5003 module in one chassis to a FortiSwitch-5003 module in another chassis through the front panel ethernet connections. The front panel also includes and out of band management ethernet interface and the RJ-45 console port for connecting to the FortiSwitch-5003 CLI.

Figure 1: FortiSwitch-5003 front panel



LEDs

Table 1 lists and describes the FortiSwitch-5003 module front panel LEDs.

Table 1: FortiSwitch-5003 module front panel LEDs and switches

LED	State	Description
⊛	Off	Normal operation.
	Red	Out of service. The LED turns on if the FortiSwitch-5003 module fails. The LED may also flash briefly when the module is powering on.
⊕	Green	The FortiSwitch-5003 module is powered on and operating normally.
	Yellow	Caution status. Caution status is indicated by the fault condition of the CLOCK, OK or INT FLT LEDs.
	Off	The module is not connected to power.
System	Off	Normal operation.
E0, E1	Yellow or Green	Link status of out of band management interfaces (not used).
ZRE 0-15 (ZRE network activity LEDs, LED Mode switch changes mode)	Green	Link/Activity mode: Blinking to indicate network traffic on this interface. Table 2 on page 7 lists the ZRE LEDs and the interface that each represents. Link/Speed mode: 100 Mbps connection.
	Yellow	Link/Activity mode: The interface is disabled and cannot forward packets. (not used) Link/Speed mode: 1000 Mbps connection.
	Off	Link/Activity mode: No link. Link/Speed mode: 10 Mbps connection.
LED Mode switch	Change the ZRE network activity LED display mode. Normally the ZRE network activity LEDs operate in Link/Activity mode. In this mode the LEDs flash green to indicate a link and to indicate network traffic. Press this button to switch the ZRE LEDs to Link/Speed mode. In Link/Speed mode the ZRE LEDs use a solid color to indicate a link. The color of the LED indicates the speed of the link.	
CLK	Flashing Green	Initialization completed successfully.
OK	Green	Initialization completed successfully.

Table 1: FortiSwitch-5003 module front panel LEDs and switches (Continued)

LED	State	Description
EXT FLT	Off	Normal operation.
	Yellow	Cannot establish a link to a configured interface or another connection problem external to the FortiSwitch-5003 module. This LED may indicate issues that do not affect normal operation.
INT FLT	Off	Normal operation.
	Yellow	Failure of internal tests. Indicates a hardware or software problem with the FortiSwitch-5003 module.
Hot Swap	Blue	Indicates the FortiSwitch-5003 module is ready to be hot swapped. During a hot swap, the LED is on. The LED turns off when the FortiSwitch-5003 module is correctly installed.
Reset switch	Press and hold Reset for three seconds to restart the FortiSwitch-5003 module.	

About the ZRE network activity LEDs

The ZRE network activity LEDs show links and network activity for the interfaces and connections listed in Table 2.

Figure 2: FortiSwitch-5003 ZRE network activity LEDs

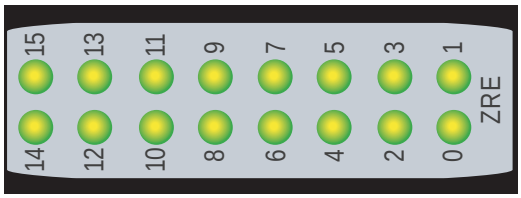


Table 2: ZRE network activity LEDs FortiSwitch-5003 interfaces and connections

ZRE network activity LED	Interface or connection
0	ZRE0 front panel interface.
1	ZRE1 front panel interface.
2	ZRE2 front panel interface.
3 to 14	Base backplane connection to FortiGate-5000 series modules in chassis slots 3 to 14.
15	Base backplane link. Indicates that the FortiSwitch-5003 module can connect to the base backplane interface.

Connectors

Table 3 lists and describes the FortiSwitch-5003 front panel connectors.

Table 3: FortiSwitch-5003 connectors

Connector	Type	Speed	Protocol	Description
ETH0	RJ-45	100Base-T	Ethernet	Front panel out of band management interface. A second out of band management interface, ETH1, connects to the shelf managers. Neither of the out of band management interfaces are used.
CONSOLE	RJ-45	9600 bps	RS-232 serial	Serial connection to the command line interface.
ZRE0, ZRE1, ZRE2	RJ-45	10/100/1000 Base-T	Ethernet	Redundant connections to another FortiSwitch-5003 module in an different FortiGate-5140 or FortiGate-5050 chassis. Use these interfaces for base backplane interface connections between FortiGate-5000 series chassis.

Base backplane communications

This section provides a brief introduction to using FortiSwitch-5003 modules for base backplane communication. See the *FortiGate-5000 Base Backplane Communication Guide* for more information about base backplane communication.

FortiSwitch-5003 modules installed in a FortiGate-5140 or FortiGate-5050 chassis in slot 1 or slot 2 provide base backplane switching for all of the FortiGate-5000 series modules installed in chassis slots 3 and above. Base backplane switching can be used for HA heartbeat communication and for data communication between FortiGate-5000 series modules.

The FortiGate-5000 series modules can all be installed in the same chassis, or you can use the FortiSwitch-5003 front panel ZRE interfaces for base backplane communication among multiple FortiGate-5140 and FortiGate-5050 chassis. The communication can be among a collection of the same chassis (for example, multiple FortiGate-5050 chassis) or among a mixture of FortiGate-5140 and FortiGate-5050 chassis. In most cases you would connect the same base backplane interfaces together, but you can also use the FortiSwitch-5003 front panel ZRE interfaces for connections between base backplane interface 1 and base backplane interface 2. Again these connections can be within the same chassis or among multiple chassis.

A FortiSwitch-5003 module in slot 1 provides communications on base backplane interface 1. The FortiGate-5001SX and the FortiGate-5001FA2 modules communicate with base backplane interface 1 using the interface named port9. The FortiGate-5005FA2 module communicates with base backplane interface 1 using the interface named base1.

A FortiSwitch-5003 module in slot 2 provides communications on base backplane interface 2. The FortiGate-5001SX and the FortiGate-5001FA2 modules communicate with base backplane interface 2 using the interface named port10. The FortiGate-5005FA2 module communicates with base backplane interface 2 using the interface named base2.

In a single chassis, more than one cluster can use the same base backplane interface for HA heartbeat communication. To separate heartbeat communication for multiple clusters on the same base backplane interface, configure a different HA group name and password for each cluster.

In a single chassis, you can also use the same base backplane interface for data and HA heartbeat communication. If you are operating multiple clusters and multiple data paths on the same base backplane interface you may experience some bandwidth limitations. To increase the amount of bandwidth available you can add a second FortiSwitch-5003 module and use both backplane interfaces for HA heartbeat and data communication.

If you have two FortiSwitch-5003 modules and two backplane interfaces available you can balance the traffic between the base backplane interfaces by how you configure your FortiGate-5000 module data interfaces and HA heartbeat interfaces. For example, if you have two busy FortiGate-5001SX clusters you might configure one cluster to use port9 for HA heartbeat traffic and the other to use port10. If you have a number of data paths that use the same base backplane interfaces you can change the configuration to distribute traffic between both base backplane interfaces.

Hardware installation

Before use, the FortiSwitch-5003 module must be correctly inserted into slot 1 or slot 2 in a FortiGate-5140 or FortiGate-5050 chassis.

This chapter describes:

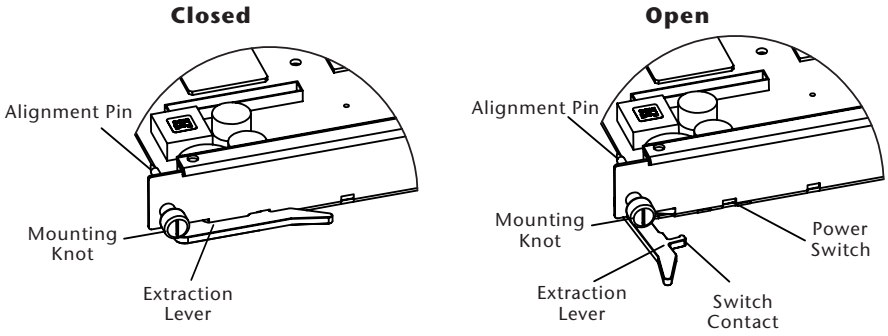
Inserting a FortiSwitch-5003 module into a chassis

The following procedure describes how to correctly use the FortiSwitch-5003 mounting components shown in Figure 3 to insert a FortiSwitch-5003 module into slot 1 or slot 2 of a FortiGate-5140 or FortiGate-5050 chassis.

The FortiSwitch-5003 module left extraction lever contacts to a hidden power switch. The module must be fully installed in a chassis slot and this extraction lever must be closed and locked for the FortiSwitch-5003 module to receive power and operate normally. If the FortiSwitch-5003 module is not receiving power, the Hot Swap LED glows blue and all other LEDs remain off.

It is important to carefully seat the FortiSwitch-5003 module all the way into the chassis, to not use too much force on the extraction levers, and to make sure that the extraction levers are properly locked and engaged with the hidden power switch. Only then will the FortiSwitch-5003 module power-on and start up correctly.

Figure 3: FortiSwitch-5003 module mounting components



FortiSwitch-5003 modules are hot swappable. The procedure for inserting the FortiSwitch-5003 module into a FortiGate-5000 series chassis slot is the same whether or not the FortiGate-5000 series chassis is powered on or not.

To insert a FortiSwitch-5003 module into a FortiGate-5000 series chassis

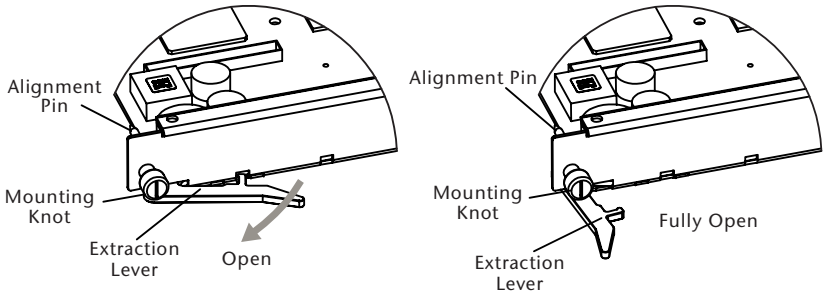
Caution: Do not carry the FortiSwitch-5003 module by holding the extraction levers. When inserting or removing the FortiSwitch-5003 module from a chassis slot, handle the module by the front panel. The extraction levers are designed for positioning and locking the FortiSwitch-5003 module into a slot in a chassis only and should not be used for handling the module. If the extraction levers become bent or damaged the FortiSwitch-5003 module may not align correctly in the chassis slot and the left extraction lever may not activate the power switch.

To complete this procedure, you need:

- A FortiSwitch-5003 module
- A FortiGate-5000 series chassis with an empty slot
- An electrostatic discharge (ESD) preventive wrist or ankle strap with connection cord

Caution: FortiGate-5000 series and FortiSwitch-5000 series modules must be protected from static discharge and physical shock. Only handle or work with FortiGate-5000 series and FortiSwitch-5000 series modules at a static-free workstation. Always wear a grounded electrostatic discharge (ESD) preventive wrist or ankle strap when handling FortiGate-5000 series or FortiSwitch-5000 series modules.

1. Attach the ESD wrist or ankle strap to your wrist or ankle and to an ESD socket or to a bare metal surface on the chassis or frame.
2. Open the left and right extraction levers to their fully open positions.



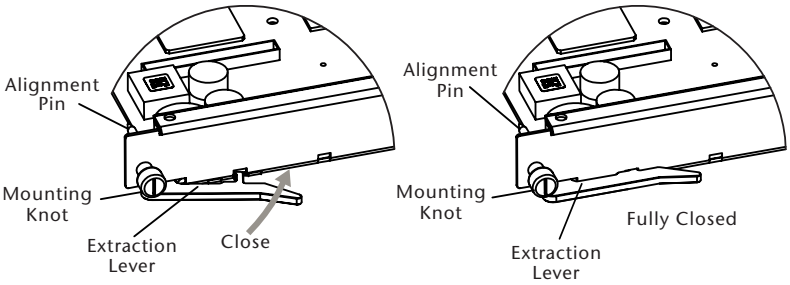
3. Insert the FortiSwitch-5003 module into the empty slot in the chassis.
4. Carefully guide the module into the chassis using the rails in the slot.

   Insert the module by applying moderate force to the front faceplate (not the extraction levers) to slide the module into the slot. The module should glide smoothly into the chassis. If you encounter any resistance while sliding the module in, the module could be aligned incorrectly. Pull the module back out and try inserting it again.
5. Slide the module in until the alignment pins are inserted half way into their sockets in the chassis.

   If the chassis is powered on the Hot Swap LED lights up and turns blue.

6 Turn both extraction levers to their fully-closed positions.

The extraction levers should hook into the sides of the chassis slot. Closing the extraction levers draws the FortiSwitch-5003 module into place in the chassis slot and into contact with the chassis backplane. The FortiSwitch-5003 front panel should be in contact with the chassis front panel.



If the chassis is powered on, as the module slides into place the Hot Swap LED starts flashing blue.

7 Fully tighten the left and right mounting knots to lock the FortiSwitch-5003 module into position in the chassis slot.

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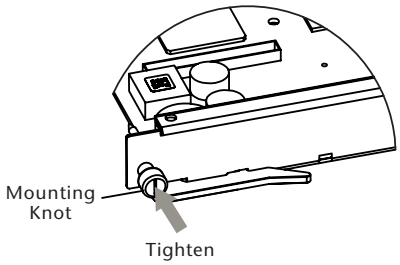


If the chassis is powered on the FortiSwitch-5003 LEDs go through a power up cycle. After a few minutes, if the module is operating correctly the front panel LEDs are lit as described in Table 4.

Table 4: FortiSwitch-5003 normal operating LEDs

LED	State
⊛	Off
⊕	Green
ZRE 15	Yellow
Other ZRE LEDs	May be blinking green if FortiGate-5000 modules are installed.

Removing a FortiSwitch-5003 module from a chassis

The following procedure describes how to correctly use the FortiSwitch-5003 mounting components shown in Figure 3 to remove a FortiSwitch-5003 module from a FortiGate-5000 series chassis slot.

To remove a FortiSwitch-5003 module from a FortiGate-5000 series chassis

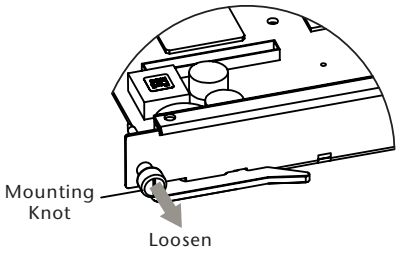
FortiSwitch-5003 modules are hot swappable. The procedure for removing the FortiSwitch-5003 module from a FortiGate-5000 series chassis slot is the same whether or not the FortiGate-5000 series chassis is powered on or not.

Caution: Do not carry the FortiSwitch-5003 module by holding the extraction levers. When inserting or removing the FortiSwitch-5003 module from a chassis slot, handle the module by the front panel. The extraction levers are designed for positioning and locking the FortiSwitch-5003 module into a slot in a chassis only and should not be used for handling the module. If the extraction levers become bent or damaged the FortiSwitch-5003 module may not align correctly in the chassis slot and the left extraction lever may not activate the power switch.

To complete this procedure, you need:

- A FortiGate-5000 series chassis with a FortiSwitch-5003 module installed in it
- An electrostatic discharge (ESD) preventive wrist or ankle strap with connection cord

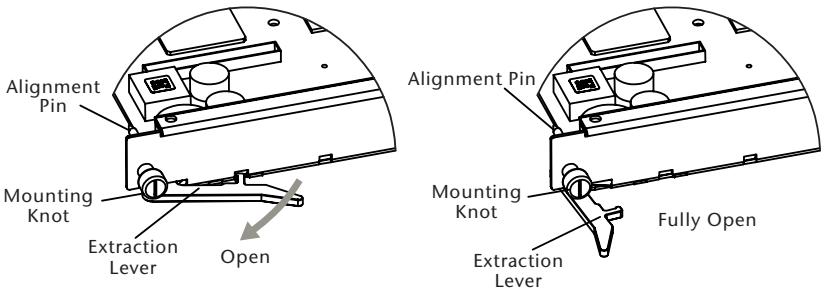
1. Attach the ESD wrist or ankle strap to your wrist or ankle and to an ESD socket or to a bare metal surface on the chassis or frame.
2. Disconnect all cables from the FortiSwitch-5003 unit, including all network cables and console cables.
3. Fully loosen the mounting knots on the left and right sides of the FortiSwitch-5003 front panel.



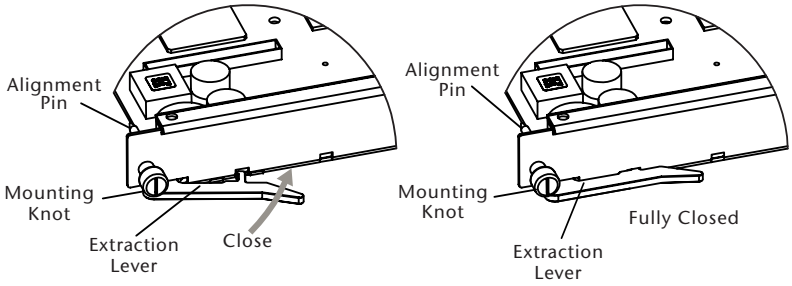
4. Open the left and right extraction levers to their fully open positions.

   Opening the extraction levers slides the module a short distance out of the slot, disconnecting the module from the chassis backplane.

   The Hot Swap LED turns blue. All other LEDs turn off.



5 Pull the module about half way out.
All LEDs turn off.
6 Turn both extraction levers to their fully-closed positions.



7 Carefully slide the module completely out of the slot.

Troubleshooting

This section describes the following troubleshooting topics:

- FortiSwitch-5003 does not startup

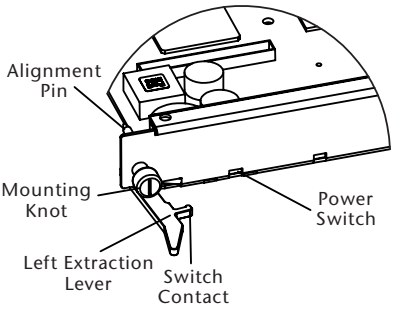
FortiSwitch-5003 does not startup

Positioning of FortiSwitch-5003 extraction levers may prevent a FortiSwitch-5003 module for starting up correctly.

All chassis: left extraction lever not contacting power switch

The left extraction lever activates the FortiSwitch-5003 module power switch.

Figure 4: Location of FortiSwitch-5003 power switch



If the left extraction lever is damaged or positioned incorrectly the FortiSwitch-5003 module does not receive power and will not start up. Make sure the left extraction lever is correctly aligned, fully inserted and locked. Sometimes you may have to make small adjustments to the extraction lever to achieve contact with the switch.

For more information

Support for your Fortinet product is available as online help from within the web-based manager, from the Tools and Documentation CD included with the product, on the Fortinet Technical Documentation web site, from the Fortinet Knowledge Center web site, as well as from Fortinet Technical Support.

Fortinet documentation

The most up-to-date publications and previous releases of Fortinet product documentation are available from the Fortinet Technical Documentation web site at http://docs.forticare.com. FortiGate-5000 series documentation is located in its own section of the site at http://docs.forticare.com/fgt5k.html.

Fortinet Tools and Documentation CD

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