

FPM-7620E Processing Module Guide

FortiGate-7000E Series

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October 28, 2019

FPM-7620E Processing Module Guide

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Change log

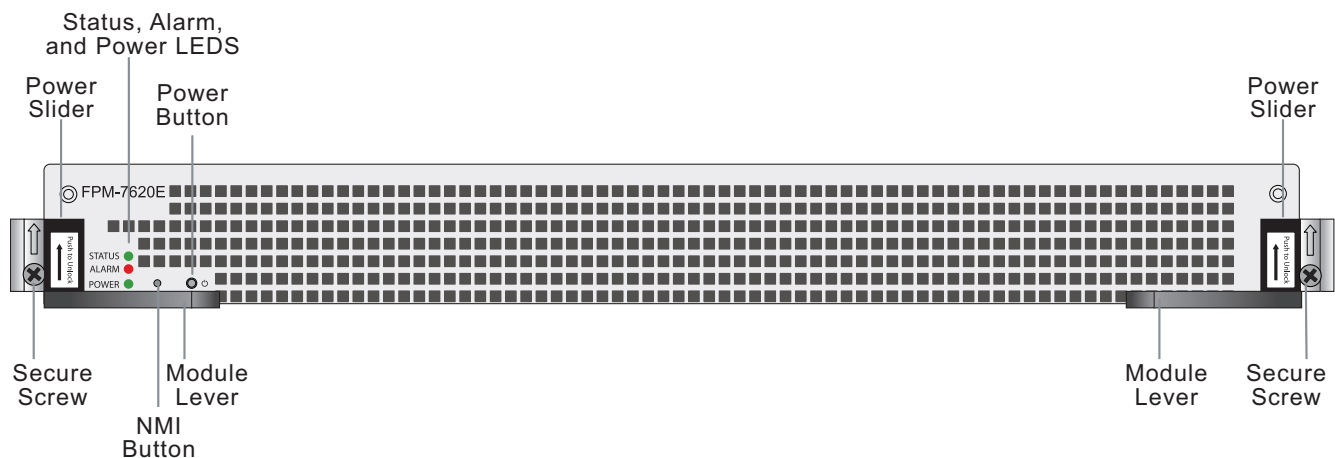
Date	Change description
October 28, 2019	Restructuring and bug fixing.

FPM-7620E processing module

The FPM-7620E processing module is a high-performance worker module that processes sessions load balanced to it by FortiGate-7000 series interface (FIM) modules over the chassis fabric backplane. The FPM-7620E can be installed in any FortiGate-7000 series chassis in slots 3 and up.

The FPM-7620E includes two 80Gbps connections to the chassis fabric backplane and two 1Gbps connections to the base backplane. The FPM-7620E processes sessions using a dual CPU configuration, accelerates network traffic processing with four NP6 processors, and accelerates content processing with eight CP9 processors. The NP6 network processors are connected by the FIM switch fabric so all supported traffic types can be fast path accelerated by the NP6 processors.

FPM-7620E front panel



Mounting hardware

Use the module levers, power sliders, and secure screws to insert, secure and remove the module from the chassis.

Module levers

Carefully slide the module all of the way into the chassis slot and fully close the module levers to seat the module into the chassis slot and to connect the module to the chassis backplane connectors. When both module levers are fully closed, the power sliders can be lowered to their bottom position, locking the module levers and turning on power to the module.

Raise the power sliders to unlock the module levers and turn off module power. Then open the module levers to eject the module from the backplane connectors; allowing the module to be removed from the chassis.

The module lever mechanism helps reduce the engagement force required to insert or eject the module from the backplane connectors.

The module levers do not fully secure the module in the chassis. The secure screws must be tightened to reliably secure the module in the chassis and to make sure the module remains securely connected to the backplane for power and network connectivity.

Power sliders

Close the module levers and move the power sliders to their bottom position to lock the module levers and turn the module power switch on.

Move the power sliders to the top position to unlock the module levers and turn the module power switch off.

Gently push the power sliders down to make sure they are in their bottom position. If the module LEDs do not light the module is not receiving power. If this happens check the power sliders to make sure they are in their bottom position.

Secure screws

Fully tighten the secure screws to lock the module in the chassis providing a secure and reliable connection with the backplane.

Loosen the secure screws before ejecting the module from the chassis.

Physical description

Dimensions	1.69 x 17.11 x 18.49 in. (43 x 435 x 470 mm) (Height x Width x Length)
Weight	14.0 lb. (6.4 kg)
Operating Temperature	32 to 104°F (0 to 40°C)
Storage Temperature	-31 to 158°F (-35 to 70°C)
Relative Humidity	10% to 90% (Non-condensing)
Power consumption	Max: 410W; Average: 320W
Max Current	34A
Heat Dissipation	1395BTU/h
Joules/h	1466KJ/h

Front panel LEDs

LED	State	Description
STATUS	Off	The FPM-7620E is powered off.
	Green	The FPM-7620E is powered on and operating normally.
	Flashing Green	The FPM-7620E is starting up.
ALARM	Red	Major alarm.
	Amber	Minor alarm
	Off	No alarms
POWER	Green	The FPM-7620E is powered on and operating normally.
	Off	The FPM-7620E is powered off.

Turning the module on and off

You can use the front panel power button to turn the FPM-7620E power on or off. If the FPM-7620E is powered on, press the power switch to turn it off. If the FPM-7620E is turned off and installed in a chassis slot, press the power button to turn it on.

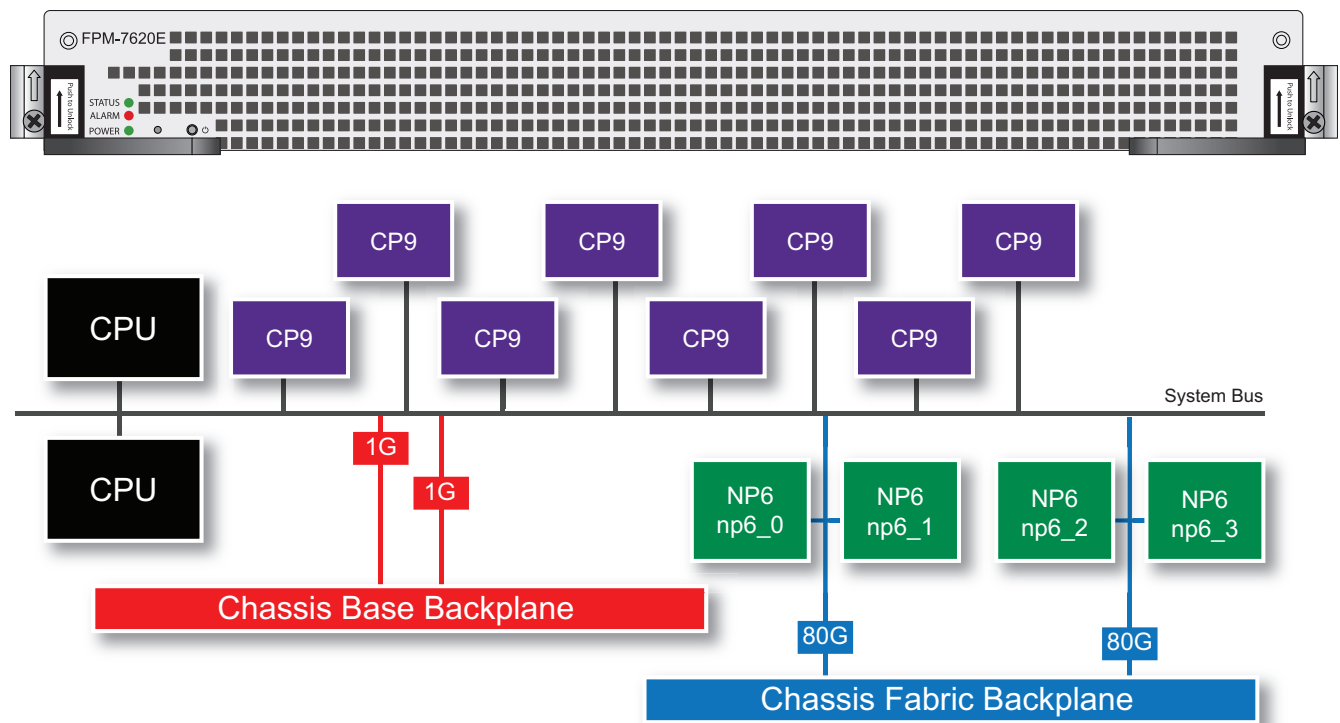
NMI switch

When working with Fortinet Support to troubleshoot problems with the FPM-7620E you can use the front panel non-maskable interrupt (NMI) switch to assist with troubleshooting. Pressing this switch causes the software to dump registers/backtraces to the console. After the data is dumped the FPM-7620E reboots. While the FPM-7620E is rebooting, traffic is temporarily blocked. The FPM-7620E should restart normally and traffic can resume once the it is up and running.

NP6 network processors - offloading data traffic

The four FPM-7620E NP6 network processors, eight CP9 processors, and FIM module integrated switch fabric (ISF) provide hardware acceleration by offloading data traffic from the FPM-7620E CPUs. The result is enhanced network performance provided by the NP6 processors plus the network processing load is removed from the CPU. The NP6 processor can also handle some CPU intensive tasks, like IPsec VPN encryption/decryption. Because of the integrated switch fabric, all sessions are fast-pathed and accelerated.

FPM-7620E hardware architecture



Accelerated IPS, SSL VPN, and IPsec VPN (CP9 content processors)

The FPM-7620E includes eight CP9 processors that provide the following performance enhancements:

- Flow-based inspection (IPS, application control etc.) pattern matching acceleration with over 10Gbps throughput
- IPS pre-scan
- IPS signature correlation
- Full match processors
- High performance VPN bulk data engine
- IPsec and SSL/TLS protocol processor
- DES/3DES/AES128/192/256 in accordance with FIPS46-3/FIPS81/FIPS197
- MD5/SHA-1/SHA256/384/512-96/128/192/256 with RFC1321 and FIPS180
- HMAC in accordance with RFC2104/2403/2404 and FIPS198
- ESN mode
- GCM support for NSA "Suite B" (RFC6379/RFC6460) including GCM-128/256; GMAC-128/256
- Key Exchange Processor that supports high performance IKE and RSA computation
- Public key exponentiation engine with hardware CRT support
- Primary checking for RSA key generation
- Handshake accelerator with automatic key material generation
- True Random Number generator
- Elliptic Curve support for NSA "Suite B"

- Sub public key engine (PKCE) to support up to 4096 bit operation directly (4k for DH and 8k for RSA with CRT)
- DLP fingerprint support
- TTTD (Two-Thresholds-Two-Divisors) content chunking
- Two thresholds and two divisors are configurable

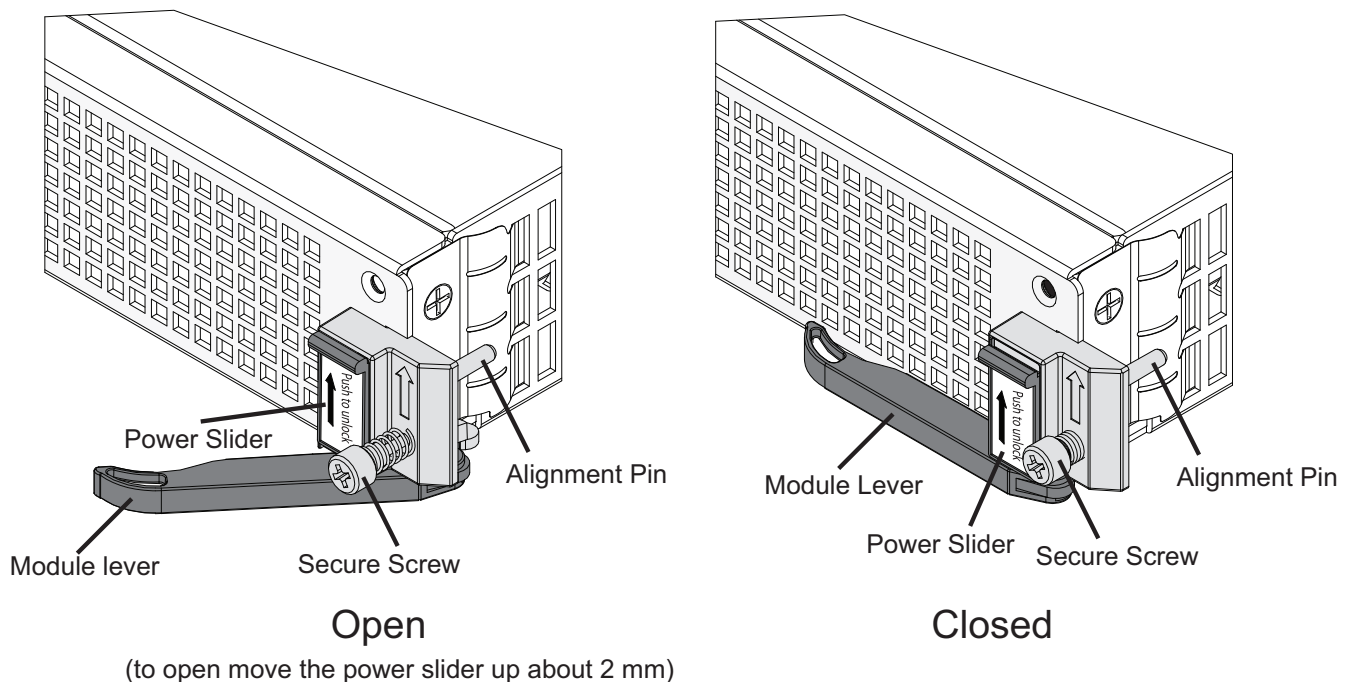
Hardware installation

This chapter describes installing a FPM-7620E processing module into a FortiGate-7000 chassis.

FPM-7620E mounting hardware

To install a FPM-7620E you slide the module into slot 3 or up in the front of an FortiGate-7000 series chassis and then use the mounting hardware, described in [Mounting hardware on page 5](#), to lock the module into place in the slot. When locked into place and positioned correctly, the module front panel is flush with the chassis front panel and connected to the chassis backplane.

To position the module correctly, you must use the mounting hardware shown below for the right of the FPM-7620E front panel. The mounting hardware on the left of the front panel is the same but reversed. The FPM-7620E mounting hardware aligns the module in the chassis slot and is used to insert and eject the module from the slot.



The FPM-7620E module levers align the module in the chassis slot and insert and eject the module from the slot. The power sliders activate micro switches that turn on or turn off power to the module. When both power sliders are raised, the module cannot receive power. When the sliders are fully closed, the module can receive power if it is fully inserted into a chassis slot.

Inserting a FPM-7620E module into a chassis

This section describes how to install a FPM-7620E module into a FortiGate-7000 series chassis slot 3 or up. The procedure includes photographs to illustrate the procedure steps. The photos were taken in one of Fortinet's hardware labs using a generic module and FortiGate-7000 chassis.



You must carefully slide the module all the way into the chassis slot, close the module levers to seat the module into the slot, and tighten the secure screws to make sure the module is fully engaged with the backplane and secured. You must also make sure that the power sliders are fully closed by gently pushing them down.

Installation Highlights:

1. Module levers must be closed.
2. Secure screws must be tightened.
3. Power sliders must be fully closed for the module to get power and start up.

If the module is not receiving power all LEDs remain off.

FPM-7620E modules are hot swappable. This procedure is the same whether or not the chassis is powered on.



Do not carry the FPM-7620E module by holding the module levers or secure screws. When inserting or removing the FPM-7620E from a chassis slot, handle the module by the front panel. The levers are not designed for carrying the module. If the levers become bent or damaged, the FPM-7620E may not align correctly in the chassis slot.

To complete this procedure, you need the following equipment and tools:

- a FPM-7620E
- a FortiGate-7000 chassis with an empty slot
- an electrostatic discharge (ESD) preventive wrist strap with connection cord
- a Phillips screwdriver

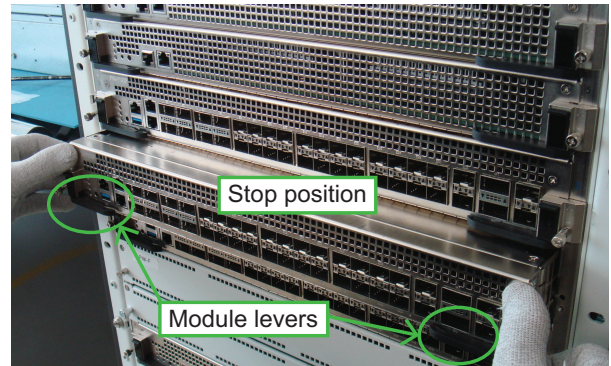
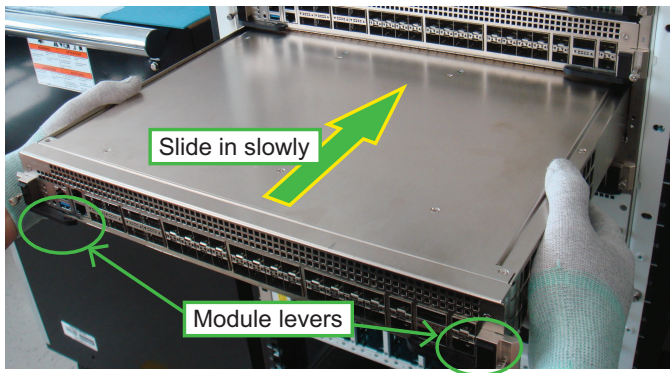


FPM-7620Es must be protected from static discharge and physical shock. Only handle or work with FPM-7620Es at a static-free workstation. Always wear a grounded electrostatic discharge (ESD) preventive wrist strap when handling FPM-7620Es. Attach the ESD wrist strap to your wrist and to an ESD socket or to a bare metal surface on the chassis or frame. (An ESD wrist strap is not visible in the photographs below because they were taken in an ESD safe lab environment.)

1. Remove the FPM-7620E module from its packaging.

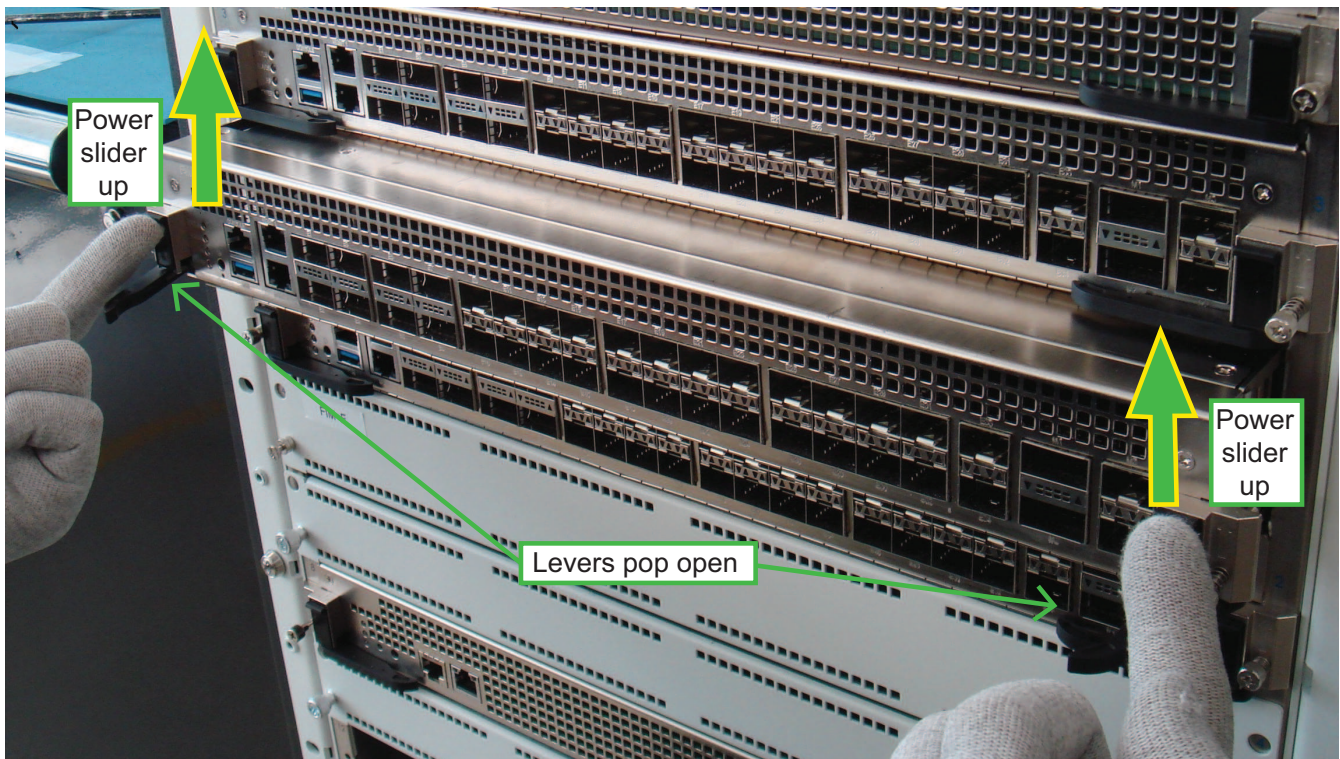
The module levers are closed when you first remove a new module from its packaging.

2. Align the module with the chassis slot, slowly slide the module into the slot, stop at about 1-2 inches from fully inserting it.



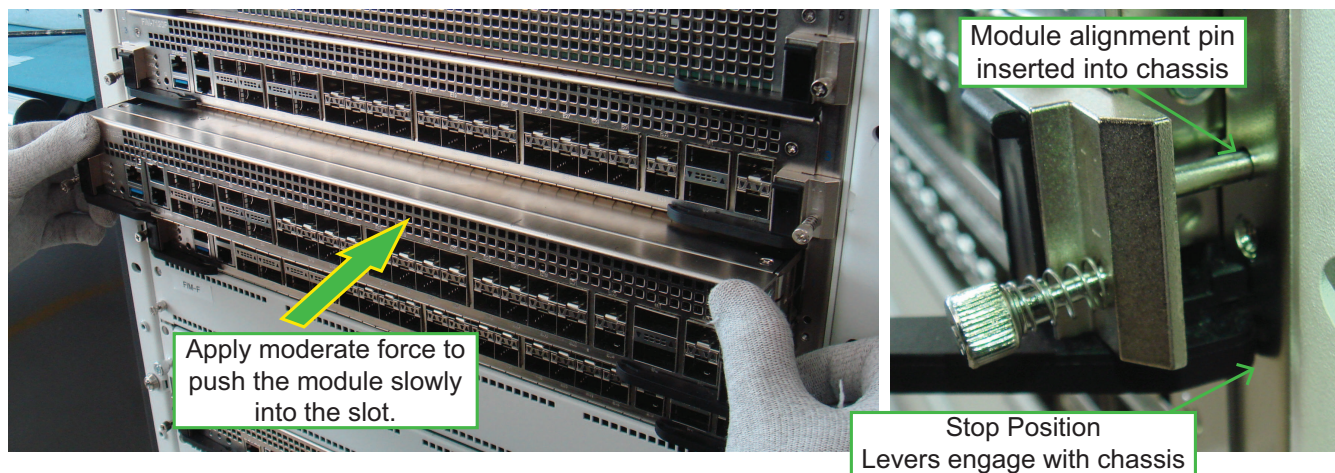
3. Unlock the left and right module levers by pushing the power sliders up until the levers pop open.

Before sliding the final portion of the module into the chassis fully open both levers by pushing the power sliders up. Fully open both levers to avoid damaging the lever mechanism. Damaging the levers can prevent the module from connecting to power.



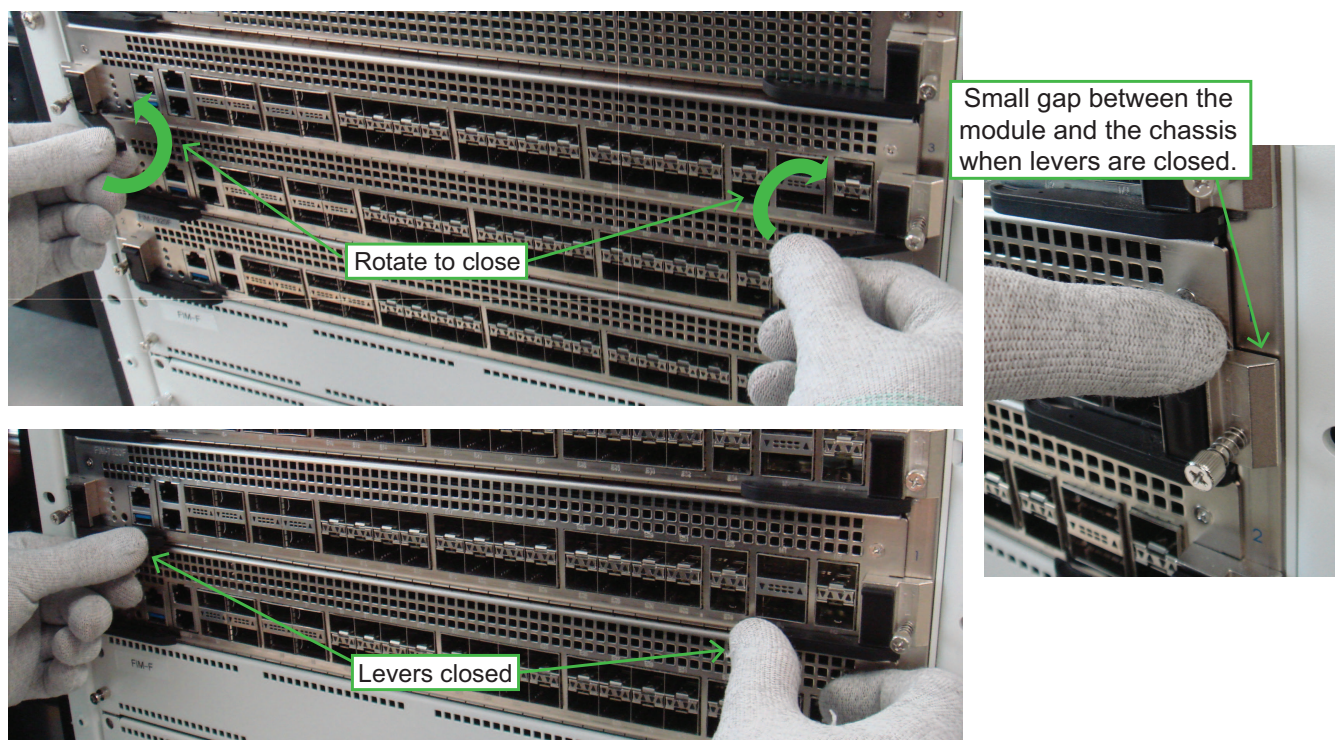
4. Continue pushing the module into the slot until the levers engage with the sides of the chassis slot.

Insert the module by applying moderate force to the front faceplate (not the levers) to slide the module into the slot. The module should glide smoothly. If you encounter any resistance, the module could be aligned incorrectly. Pull the module back out and try inserting it again.



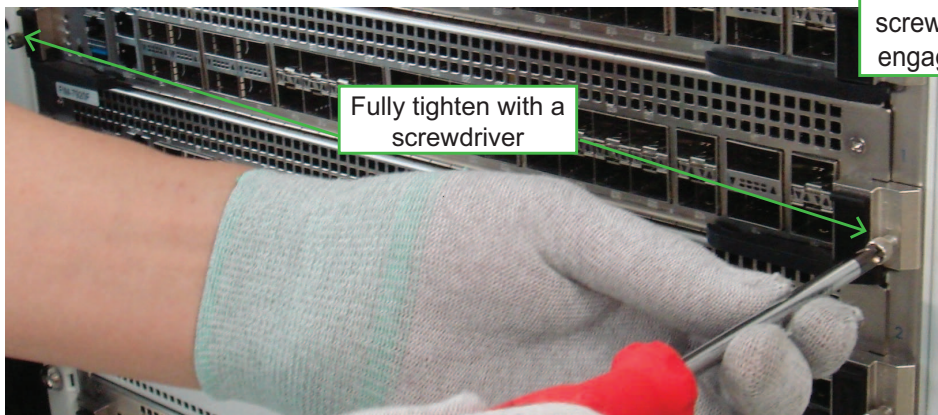
5. Close both levers by pushing them into contact with the module front panel.

Closing the levers draws the module into the chassis slot and connects the module rear connectors to the chassis backplane. The design of the levers leaves gaps to compensate for tolerances. So even when the levers are fully closed, the module may not be fully into position and in contact with the chassis backplane.



6. Tighten both secure screws to close the gap between the module and the chassis.

Begin by engaging the secure screws into the chassis tapped hole by hand and roughly tighten them. Then use a Phillips screwdriver to fully tighten the two secure screws. Do not use a power screwdriver, because the high torque and speed can damage the chassis or screw thread. After tightening both secure screws, the module is fully seated in the chassis slot and the module connectors are fully in contact with the chassis backplane.

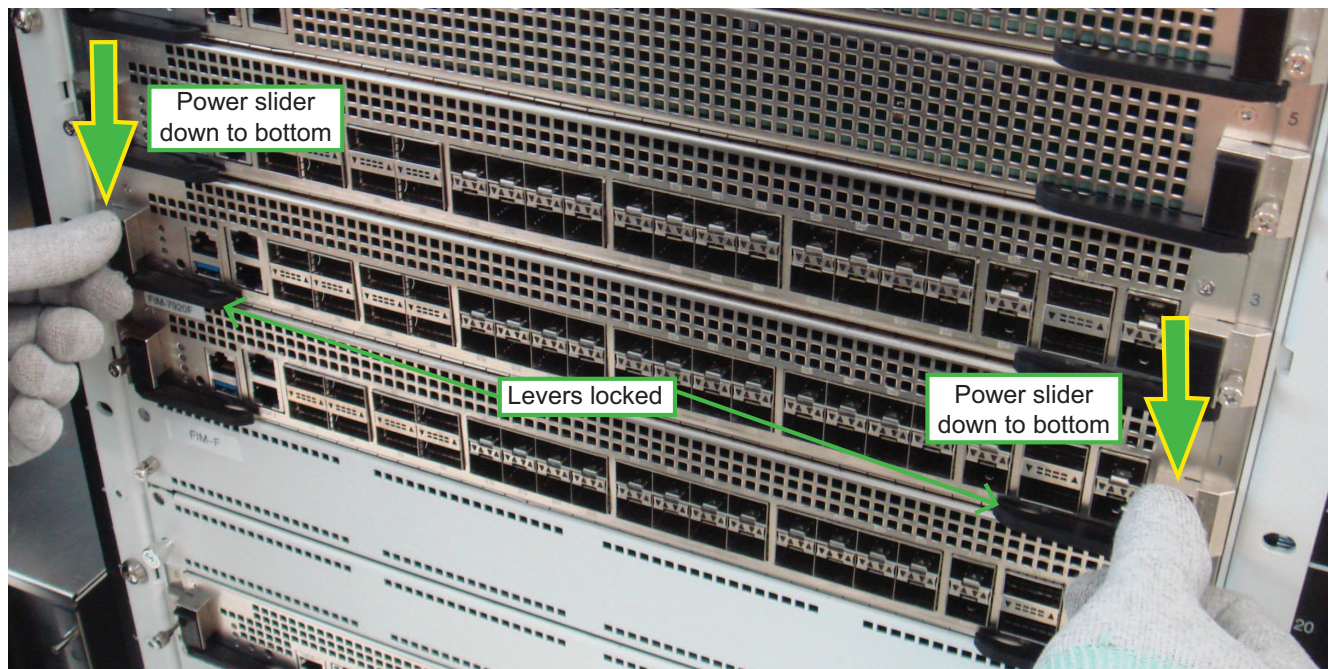


After tightening both secure screws, the module is fully engaged with the chassis.



7. Push down both power sliders to make sure the module power switch is on.

When the module is fully in position, the power sliders should drop down, lock the levers, and turn module power on. Gently push both power sliders down to their bottom position to make sure they are fully closed.



8. If the chassis is powered on, check the module LEDs to verify that the module is operating correctly

LED	Normal operation state
Status	Green
Alarm	Off
HA	Off
Power	Green

Shutting down and removing a FPM-7620E module from a chassis

This procedure describes how to shut down and remove a FPM-7620E module from FortiGate-7000 chassis. The procedure includes photographs to illustrate the procedure steps. The photos were taken in one of Fortinet's hardware labs using a generic module and FortiGate-7000 chassis.

FPM-7620Es are hot swappable. This procedure is the same whether or not the chassis is powered on.



Do not carry the FPM-7620E by holding the module levers or secure screws. When inserting or removing the FPM-7620E from a chassis slot, handle the module by the front panel. The levers are not designed for carrying the module. If the levers become bent or damaged, the FPM-7620E may not align correctly in the chassis slot.

To complete this procedure, you need the following equipment and tools:

- a FortiGate-7000 chassis with a FPM-7620E module installed
 - an electrostatic discharge (ESD) preventive wrist strap with connection cord
 - a Phillips screwdriver
-



FPM-7620Es must be protected from static discharge and physical shock. Only handle or work with FPM-7620Es at a static-free workstation. Always wear a grounded electrostatic discharge (ESD) preventive wrist strap when handling FPM-7620Es. (An ESD wrist strap is not visible in the photographs below because they were taken in an ESD safe lab environment.)

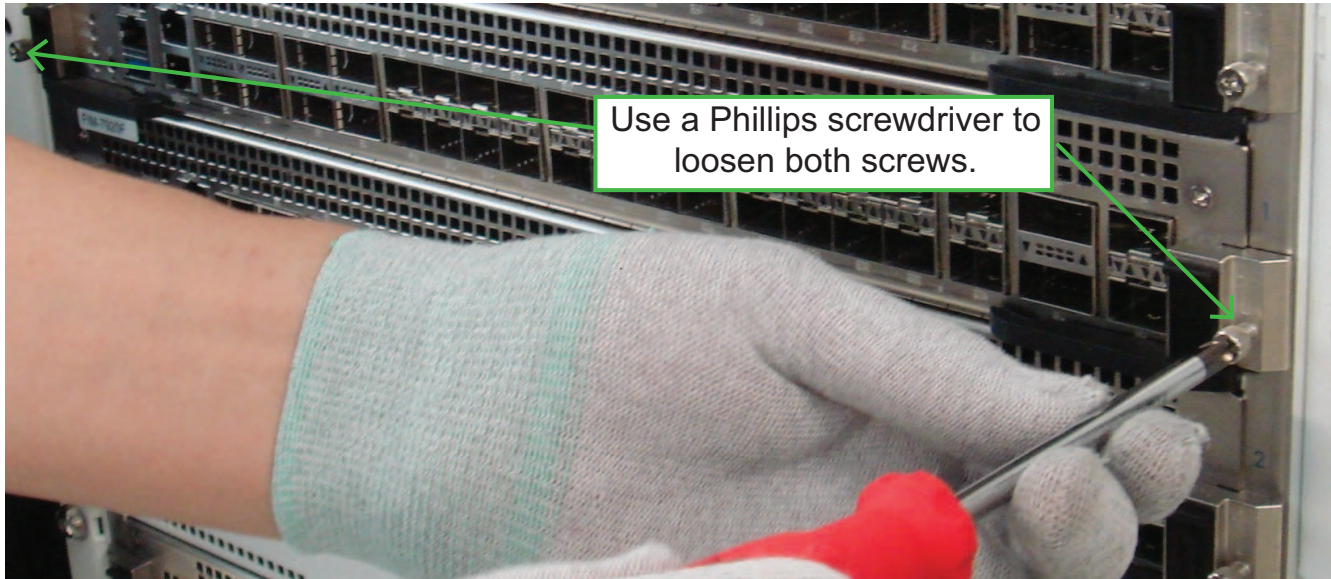
1. Shut down the module operating system properly.

To avoid potential hardware problems, always shut down the module operating system properly before removing the module from a chassis slot or before powering down the chassis. To shutdown the module, connect to the module GUI and select **Shutdown** from the administrator menu. Or, from the module CLI, enter the `execute shutdown` command.

2. Disconnect all cables from the module, including all network cables and USB cables or keys.

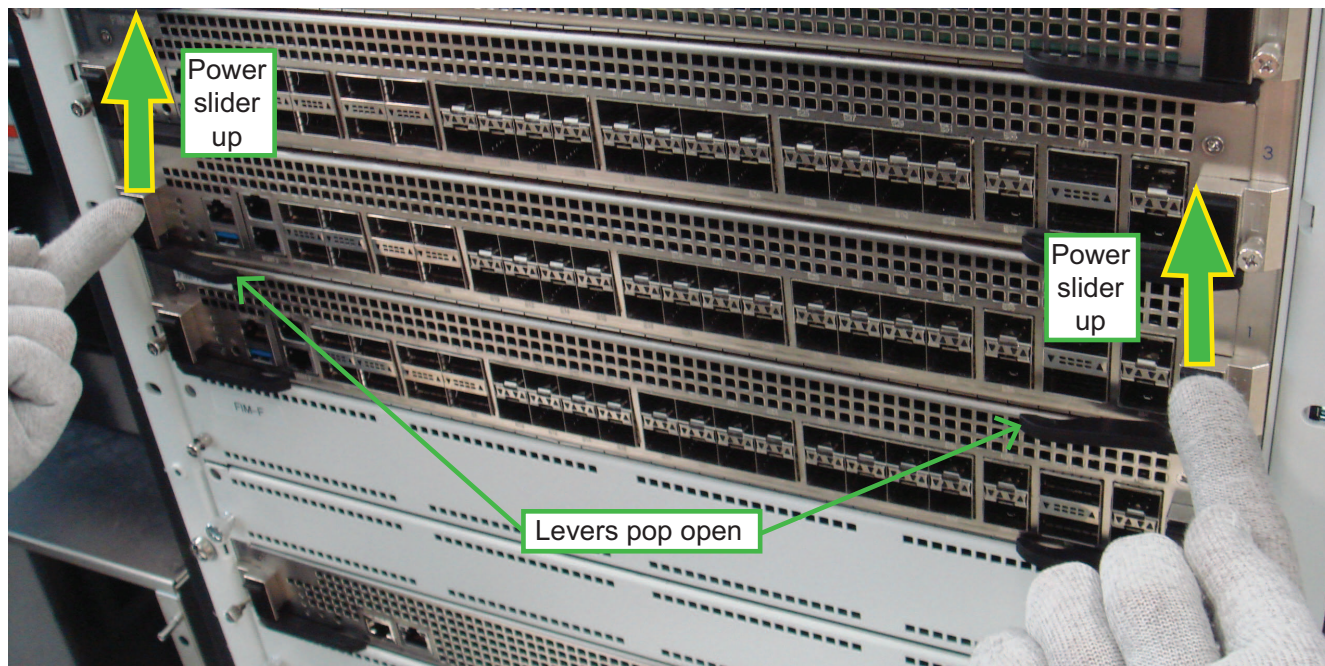
3. Use a Phillips screwdriver to loosen both secure screws and then fully loosen them by hand.

Fully loosen the secure screws, otherwise the levers may be damaged when used to eject the module from the chassis slot. Do not use a power screwdriver, because the high torque and speed can damage the chassis or screw thread.

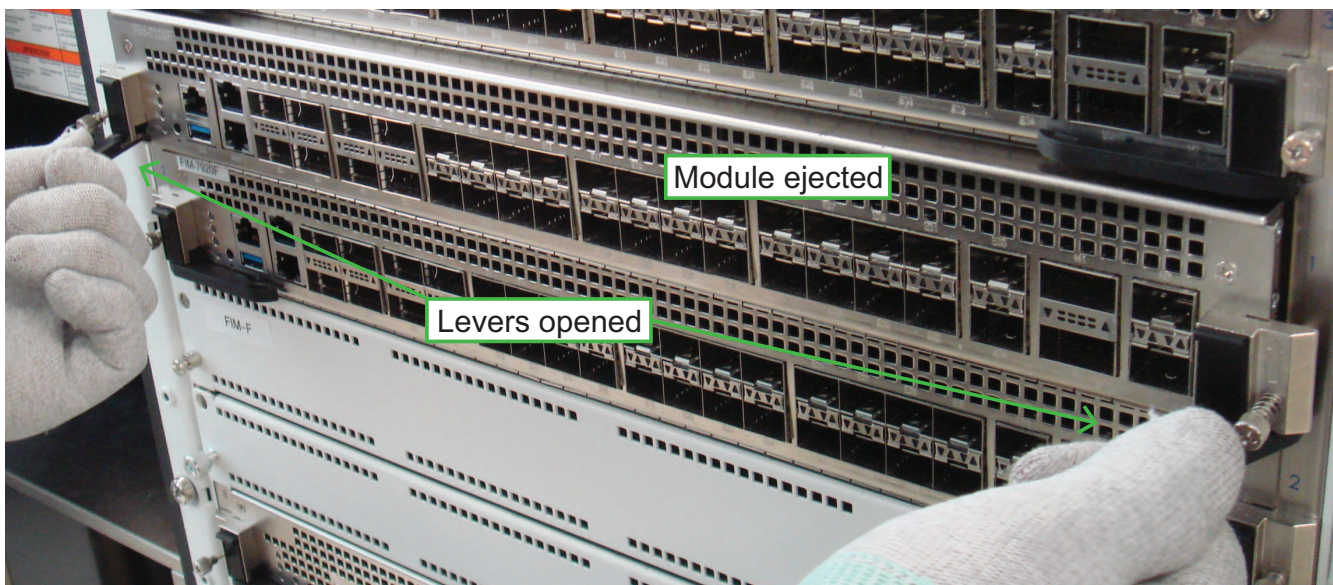
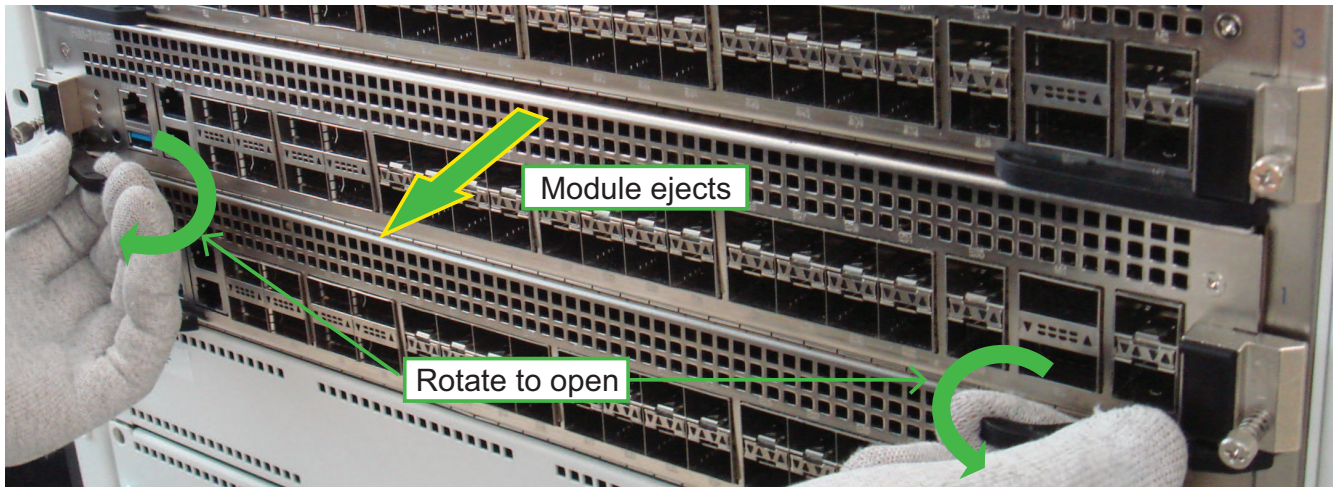


4. Unlock the left and right levers by pushing the power sliders up until the levers pop open.

Push the power sliders up to fully open both levers. If the chassis is powered on, this step turns off the module's power.



5. Use moderate force to fully open the levers and eject the module from the chassis.



6. Hold the levers to slide the module part way out of the chassis slot. Then grasp the module by the sides and carefully slide it out of the slot.



Troubleshooting

This section describes some common troubleshooting topics:

FPM-7620E does not startup

Positioning of FPM-7620E mounting hardware and a few other causes may prevent a FPM-7620E from starting up correctly.

Power sliders and module levers not fully closed

If the power sliders or module levers are damaged or positioned incorrectly, the FPM-7620E may not start up. Make sure the sliders are fully closed and the levers are correctly aligned, fully inserted, and locked and the secure screws are tightened.

Firmware problem

If the FPM-7620E is receiving power and the sliders and levers are fully closed, and you have restarted the chassis and the FPM-7620E still does not start up, the problem could be with FortiOS. Connect to the FPM-7620E console and try cycling the power to the board. If the BIOS starts up, interrupt the BIOS startup and install a new firmware image. See your FortiGate-7000 chassis system guide for information about accessing and installing firmware on individual modules.

If this does not solve the problem, contact Fortinet Technical Support.

FPM-7620E status LED is flashing during system operation

Normally, the FPM-7620E Status LED is off when the FPM-7620E is operating normally. If this LED starts flashing while the module is operating, a fault condition may exist. At the same time the FPM-7620E may stop processing traffic.

To resolve the problem you can try removing and reinserting the FPM-7620E in the chassis slot. Reloading the firmware may also help.

If this does not solve the problem there may have been a hardware failure or other problem. Contact Fortinet Technical Support for assistance.

Cautions and warnings

Environmental specifications

Ambient operating temperature: 0°C to 40°C

Rack Mount Instructions - The following or similar rack-mount instructions are included with the installation instructions:

Instructions de montage en rack - Les instructions de montage en rack suivantes ou similaires sont incluses avec les instructions d'installation:

Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.

Température ambiante élevée - S'il est installé dans un rack fermé ou à unités multiples, la température ambiante de fonctionnement de l'environnement du rack peut être supérieure à la température ambiante de la pièce. Par conséquent, il est important d'installer le matériel dans un environnement respectant la température ambiante maximale (Tma) stipulée par le fabricant.

Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

Ventilation réduite - Installation de l'équipement dans un rack doit être telle que la quantité de flux d'air nécessaire au bon fonctionnement de l'équipement n'est pas compromise.

Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

Chargement Mécanique - Montage de l'équipement dans le rack doit être telle qu'une situation dangereuse n'est pas liée à un chargement mécanique inégal.

Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

Surtenstion - Il convient de prendre l'ensemble des précautions nécessaires lors du branchement de l'équipement au circuit d'alimentation et être particulièrement attentif aux effets de la suralimentation sur le dispositif assurant une protection contre les courts-circuits et le câblage. Ainsi, il est recommandé de tenir compte du numéro d'identification de l'équipement.

Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

Fiabilité de la mise à la terre - Fiabilité de la mise à la terre de l'équipement monté en rack doit être maintenue. Une attention particulière devrait être accordée aux connexions d'alimentation autres que les connexions directes au circuit de dérivation (par exemple de l'utilisation de bandes de puissance).

Equipment must be used only with UL Listed ITE or Equivalent.

L'équipement doit être utilisé uniquement avec UL ITE ou équivalent.

Refer to specific Product Model Data Sheet for Environmental Specifications (Operating Temperature, Storage Temperature, Humidity, and Altitude).

Référez à la Fiche Technique de ce produit pour les caractéristiques environnementales (Température de fonctionnement, température de stockage, humidité et l'altitude).

Safety

Moving parts - Hazardous moving parts. Keep away from moving fan blades.

Pièces mobiles - Pièces mobiles dangereuses. Se tenir éloigné des lames mobiles du ventilateur.

Warning: Equipment intended for installation in Restricted Access Location.

Avertissement: Le matériel est conçu pour être installé dans un endroit où l'accès est restreint.

Battery - Risk of explosion if the battery is replaced by an incorrect type. Do not dispose of batteries in a fire. They may explode. Dispose of used batteries according to your local regulations. IMPORTANT: Switzerland: Annex 4.10 of SR814.013 applies to batteries.

Batterie - Risque d'explosion si la batterie est remplacée par un type incorrect. Ne jetez pas les batteries au feu. Ils peuvent exploser. Jetez les piles usagées conformément aux réglementations locales. IMPORTANT: Suisse: l'annexe 4.10 de SR814.013 s'appliquent aux batteries.

警告

本電池如果更換不正確會有爆炸的危險

請依製造商說明書處理用過之電池

CAUTION: There is a danger of explosion if a battery is incorrect replaced. Replace only with the same or equivalent type. Dispose batteries of according to the manufacturer's instructions. Disposing a battery into fire, a hot oven, mechanically crushing, or cutting it can result in an explosion. Leaving a battery in an extremely hot environment can result in leakage of flammable liquid, gas, or an explosion. If a battery is subjected to extremely low air pressure, it may result in leakage of flammable liquid, gas, or an explosion.

WARNUNG: Lithium-Batterie Achtung: Explosionsgefahr bei fehlerhafter Batteriewechsel. Ersetzen Sie nur den gleichen oder gleichwertigen Typ. Batterien gemäß den Anweisungen des Herstellers entsorgen.

Beseitigung einer BATTERIE in Feuer oder einen heißen Ofen oder mechanisches Zerkleinern oder Schneiden einer BATTERIE, die zu einer EXPLOSION führen kann.

Verlassen einer BATTERIE in einer extrem hohen Umgebungstemperatur, die zu einer EXPLOSION oder zum Austreten von brennbarer Flüssigkeit oder Gas führen kann.

Eine BATTERIE, die einem extrem niedrigen Luftdruck ausgesetzt ist, der zu einer EXPLOSION oder zum Austreten von brennbarer Flüssigkeit oder Gas führen kann.

Caution: Slide/rail mounted equipment is not to be used as a shelf or a work space.

Attention: Un équipement monté sur bâti ne doit pas être utilisé sur une étagère ou dans un espace de travail.

Fiber optic transceiver must be rated 3.3V, 22mA max, Laser Class 1, UL certified component.

Le transceiver optique doit avoir les valeurs nominales de 3.3 V, maximum 22 mA, Laser Class 1, homologué UL

Regulatory notices

Federal Communication Commission (FCC) – USA

This device complies with Part 15 of FCC Rules. Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received; including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if it is not installed and used in accordance with the instruction manual, it may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

WARNING: Any changes or modifications to this product not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Industry Canada Equipment Standard for Digital Equipment (ICES) – Canada

CAN ICES-3 (A) / NMB-3 (A)

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Cet appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

European Conformity (CE) - EU

This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.



Voluntary Control Council for Interference (VCCI) – Japan

この装置は、クラスA機器です。この装置を住宅環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。VCCI-A

Bureau of Standards Metrology and Inspection (BSMI) – Taiwan

The presence conditions of the restricted substance (BSMI RoHS table) are available at the link below:

限用物質含有情況表 (RoHS Table) 請到以下網址下載:

<https://www.fortinet.com/bsmi>

此為甲類資訊技術設備，於居住環境中使用時，可能會造成射頻擾動，在此種情況下，使用者會被要求採取某些適當的對策。

英屬蓋曼群島商防特網股份有限公司台灣分公司

地址：台北市內湖區行愛路176號2樓

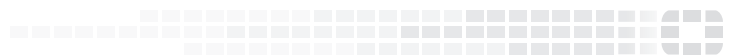
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