

Power Systems

*NVMe U.2 pass-thru cards for the
9009-22G or 9223-22S*

IBM

Note

Before using this information and the product it supports, read the information in [“Safety notices” on page v](#), [“Notices” on page 51](#), the *IBM Systems Safety Notices* manual, G229-9054, and the *IBM Environmental Notices and User Guide*, Z125-5823.

This edition applies to IBM® Power Systems servers that contain the POWER9™ processor and to all associated models.

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Safety notices

Safety notices may be printed throughout this guide:

- **DANGER** notices call attention to a situation that is potentially lethal or extremely hazardous to people.
- **CAUTION** notices call attention to a situation that is potentially hazardous to people because of some existing condition.
- **Attention** notices call attention to the possibility of damage to a program, device, system, or data.

World Trade safety information

Several countries require the safety information contained in product publications to be presented in their national languages. If this requirement applies to your country, safety information documentation is included in the publications package (such as in printed documentation, on DVD, or as part of the product) shipped with the product. The documentation contains the safety information in your national language with references to the U.S. English source. Before using a U.S. English publication to install, operate, or service this product, you must first become familiar with the related safety information documentation. You should also refer to the safety information documentation any time you do not clearly understand any safety information in the U.S. English publications.

Replacement or additional copies of safety information documentation can be obtained by calling the IBM Hotline at 1-800-300-8751.

German safety information

Das Produkt ist nicht für den Einsatz an Bildschirmarbeitsplätzen im Sinne § 2 der Bildschirmarbeitsverordnung geeignet.

Laser safety information

IBM servers can use I/O cards or features that are fiber-optic based and that utilize lasers or LEDs.

Laser compliance

IBM servers may be installed inside or outside of an IT equipment rack.



DANGER: When working on or around the system, observe the following precautions:

Electrical voltage and current from power, telephone, and communication cables are hazardous. To avoid a shock hazard: If IBM supplied the power cord(s), connect power to this unit only with the IBM provided power cord. Do not use the IBM provided power cord for any other product. Do not open or service any power supply assembly. Do not connect or disconnect any cables or perform installation, maintenance, or reconfiguration of this product during an electrical storm.



- The product might be equipped with multiple power cords. To remove all hazardous voltages, disconnect all power cords. For AC power, disconnect all power cords from their AC power source. For racks with a DC power distribution panel (PDP), disconnect the customer's DC power source to the PDP.
- When connecting power to the product ensure all power cables are properly connected. For racks with AC power, connect all power cords to a properly wired and grounded electrical outlet. Ensure that the outlet supplies proper voltage and phase rotation according to the system rating plate. For racks with a DC power distribution panel (PDP), connect the customer's DC power source to the PDP. Ensure that the proper polarity is used when attaching the DC power and DC power return wiring.
- Connect any equipment that will be attached to this product to properly wired outlets.

- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- Do not attempt to switch on power to the machine until all possible unsafe conditions are corrected.
- When performing a machine inspection: Assume that an electrical safety hazard is present. Perform all continuity, grounding, and power checks specified during the subsystem installation procedures to ensure that the machine meets safety requirements. Do not attempt to switch power to the machine until all possible unsafe conditions are corrected. Before you open the device covers, unless instructed otherwise in the installation and configuration procedures: Disconnect the attached AC power cords, turn off the applicable circuit breakers located in the rack power distribution panel (PDP), and disconnect any telecommunications systems, networks, and modems.
- Connect and disconnect cables as described in the following procedures when installing, moving, or opening covers on this product or attached devices.

To Disconnect: 1) Turn off everything (unless instructed otherwise). 2) For AC power, remove the power cords from the outlets. 3) For racks with a DC power distribution panel (PDP), turn off the circuit breakers located in the PDP and remove the power from the Customer's DC power source. 4) Remove the signal cables from the connectors. 5) Remove all cables from the devices.

To Connect: 1) Turn off everything (unless instructed otherwise). 2) Attach all cables to the devices. 3) Attach the signal cables to the connectors. 4) For AC power, attach the power cords to the outlets. 5) For racks with a DC power distribution panel (PDP), restore the power from the Customer's DC power source and turn on the circuit breakers located in the PDP. 6) Turn on the devices.



- Sharp edges, corners and joints may be present in and around the system. Use care when handling equipment to avoid cuts, scrapes and pinching. (D005)

(R001 part 1 of 2):



DANGER: Observe the following precautions when working on or around your IT rack system:

- Heavy equipment—personal injury or equipment damage might result if mishandled.
- Always lower the leveling pads on the rack cabinet.
- Always install stabilizer brackets on the rack cabinet if provided, unless the earthquake option is to be installed.
- To avoid hazardous conditions due to uneven mechanical loading, always install the heaviest devices in the bottom of the rack cabinet. Always install servers and optional devices starting from the bottom of the rack cabinet.
- Rack-mounted devices are not to be used as shelves or work spaces. Do not place objects on top of rack-mounted devices. In addition, do not lean on rack mounted devices and do not use them to stabilize your body position (for example, when working from a ladder).



- Stability hazard:
 - The rack may tip over causing serious personal injury.
 - Before extending the rack to the installation position, read the installation instructions.
 - Do not put any load on the slide-rail mounted equipment mounted in the installation position.
 - Do not leave the slide-rail mounted equipment in the installation position.
- Each rack cabinet might have more than one power cord.
 - For AC powered racks, be sure to disconnect all power cords in the rack cabinet when directed to disconnect power during servicing.

- For racks with a DC power distribution panel (PDP), turn off the circuit breaker that controls the power to the system unit(s), or disconnect the customer's DC power source, when directed to disconnect power during servicing.
- Connect all devices installed in a rack cabinet to power devices installed in the same rack cabinet. Do not plug a power cord from a device installed in one rack cabinet into a power device installed in a different rack cabinet.
- An electrical outlet that is not correctly wired could place hazardous voltage on the metal parts of the system or the devices that attach to the system. It is the responsibility of the customer to ensure that the outlet is correctly wired and grounded to prevent an electrical shock. (R001 part 1 of 2)

(R001 part 2 of 2):



CAUTION:

- Do not install a unit in a rack where the internal rack ambient temperatures will exceed the manufacturer's recommended ambient temperature for all your rack-mounted devices.
- Do not install a unit in a rack where the air flow is compromised. Ensure that air flow is not blocked or reduced on any side, front, or back of a unit used for air flow through the unit.
- Consideration should be given to the connection of the equipment to the supply circuit so that overloading of the circuits does not compromise the supply wiring or overcurrent protection. To provide the correct power connection to a rack, refer to the rating labels located on the equipment in the rack to determine the total power requirement of the supply circuit.
- *(For sliding drawers.)* Do not pull out or install any drawer or feature if the rack stabilizer brackets are not attached to the rack or if the rack is not bolted to the floor. Do not pull out more than one drawer at a time. The rack might become unstable if you pull out more than one drawer at a time.



- *(For fixed drawers.)* This drawer is a fixed drawer and must not be moved for servicing unless specified by the manufacturer. Attempting to move the drawer partially or completely out of the rack might cause the rack to become unstable or cause the drawer to fall out of the rack. (R001 part 2 of 2)



CAUTION: Removing components from the upper positions in the rack cabinet improves rack stability during relocation. Follow these general guidelines whenever you relocate a populated rack cabinet within a room or building.

- Reduce the weight of the rack cabinet by removing equipment starting at the top of the rack cabinet. When possible, restore the rack cabinet to the configuration of the rack cabinet as you received it. If this configuration is not known, you must observe the following precautions:
 - Remove all devices in the 32U position and above.
 - Ensure that the heaviest devices are installed in the bottom of the rack cabinet.

- Ensure that there are little-to-no empty U-levels between devices installed in the rack cabinet below the 32U level, unless the received configuration specifically allowed it.
- If the rack cabinet you are relocating is part of a suite of rack cabinets, detach the rack cabinet from the suite.
- If the rack cabinet you are relocating was supplied with removable outriggers they must be reinstalled before the cabinet is relocated.
- Inspect the route that you plan to take to eliminate potential hazards.
- Verify that the route that you choose can support the weight of the loaded rack cabinet. Refer to the documentation that comes with your rack cabinet for the weight of a loaded rack cabinet.
- Verify that all door openings are at least 760 x 2083 mm (30 x 82 in.).
- Ensure that all devices, shelves, drawers, doors, and cables are secure.
- Ensure that the four leveling pads are raised to their highest position.
- Ensure that there is no stabilizer bracket installed on the rack cabinet during movement.
- Do not use a ramp inclined at more than 10 degrees.
- When the rack cabinet is in the new location, complete the following steps:
 - Lower the four leveling pads.
 - Install stabilizer brackets on the rack cabinet or in an earthquake environment bolt the rack to the floor.
 - If you removed any devices from the rack cabinet, repopulate the rack cabinet from the lowest position to the highest position.
- If a long-distance relocation is required, restore the rack cabinet to the configuration of the rack cabinet as you received it. Pack the rack cabinet in the original packaging material, or equivalent. Also lower the leveling pads to raise the casters off of the pallet and bolt the rack cabinet to the pallet.

(R002)

(L001)



DANGER: Hazardous voltage, current, or energy levels are present inside any component that has this label attached. Do not open any cover or barrier that contains this label. (L001)

(L002)



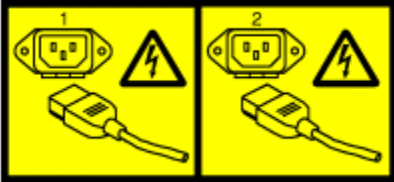
DANGER: Rack-mounted devices are not to be used as shelves or work spaces. Do not place objects on top of rack-mounted devices. In addition, do not lean on rack-mounted devices and do not use them to stabilize your body position (for example, when working from a ladder). Stability hazard:

- The rack may tip over causing serious personal injury.
- Before extending the rack to the installation position, read the installation instructions.

- Do not put any load on the slide-rail mounted equipment mounted in the installation position.
- Do not leave the slide-rail mounted equipment in the installation position.

(L002)

(L003)



or



or

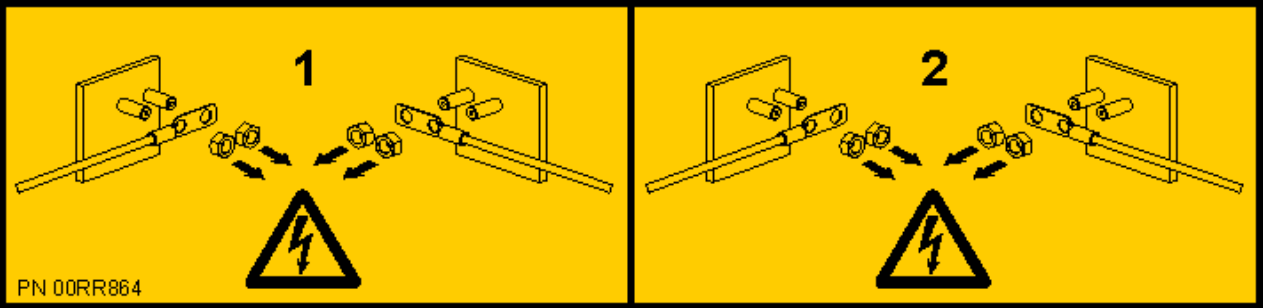



or



or






 **DANGER:** Multiple power cords. The product might be equipped with multiple AC power cords or multiple DC power cables. To remove all hazardous voltages, disconnect all power cords and power cables. (L003)


(L007)




 **CAUTION:** A hot surface nearby. (L007)

(L008)



 **CAUTION:** Hazardous moving parts nearby. (L008)

All lasers are certified in the U.S. to conform to the requirements of DHHS 21 CFR Subchapter J for class 1 laser products. Outside the U.S., they are certified to be in compliance with IEC 60825 as a class 1 laser product. Consult the label on each part for laser certification numbers and approval information.

 **CAUTION:** This product might contain one or more of the following devices: CD-ROM drive, DVD-ROM drive, DVD-RAM drive, or laser module, which are Class 1 laser products. Note the following information:

- Do not remove the covers. Removing the covers of the laser product could result in exposure to hazardous laser radiation. There are no serviceable parts inside the device.
- Use of the controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.

(C026)



CAUTION: Data processing environments can contain equipment transmitting on system links with laser modules that operate at greater than Class 1 power levels. For this reason, never look into the end of an optical fiber cable or open receptacle. Although shining light into one end and looking into the other end of a disconnected optical fiber to verify the continuity of optic fibers may not injure the eye, this procedure is potentially dangerous. Therefore, verifying the continuity of optical fibers by shining light into one end and looking at the other end is not recommended. To verify continuity of a fiber optic cable, use an optical light source and power meter. (C027)



CAUTION: This product contains a Class 1M laser. Do not view directly with optical instruments. (C028)



CAUTION: Some laser products contain an embedded Class 3A or Class 3B laser diode. Note the following information:

- Laser radiation when open.
- Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam. (C030)

(C030)



CAUTION: The battery contains lithium. To avoid possible explosion, do not burn or charge the battery.

Do Not:

- Throw or immerse into water
- Heat to more than 100 degrees C (212 degrees F)
- Repair or disassemble

Exchange only with the IBM-approved part. Recycle or discard the battery as instructed by local regulations. In the United States, IBM has a process for the collection of this battery. For information, call 1-800-426-4333. Have the IBM part number for the battery unit available when you call. (C003)



CAUTION: Regarding IBM provided VENDOR LIFT TOOL:

- Operation of LIFT TOOL by authorized personnel only.
- LIFT TOOL intended for use to assist, lift, install, remove units (load) up into rack elevations. It is not to be used loaded transporting over major ramps nor as a replacement for such designated tools like pallet jacks, walkies, fork trucks and such related relocation practices. When this is not practicable, specially trained persons or services must be used (for instance, riggers or movers).
- Read and completely understand the contents of LIFT TOOL operator's manual before using. Failure to read, understand, obey safety rules, and follow instructions may result in property damage and/or personal injury. If there are questions, contact the vendor's service and support. Local paper manual must remain with machine in provided storage sleeve area. Latest revision manual available on vendor's web site.
- Test verify stabilizer brake function before each use. Do not over-force moving or rolling the LIFT TOOL with stabilizer brake engaged.
- Do not raise, lower or slide platform load shelf unless stabilizer (brake pedal jack) is fully engaged. Keep stabilizer brake engaged when not in use or motion.
- Do not move LIFT TOOL while platform is raised, except for minor positioning.
- Do not exceed rated load capacity. See LOAD CAPACITY CHART regarding maximum loads at center versus edge of extended platform.
- Only raise load if properly centered on platform. Do not place more than 200 lb (91 kg) on edge of sliding platform shelf also considering the load's center of mass/gravity (CoG).
- Do not corner load the platforms, tilt riser, angled unit install wedge or other such accessory options. Secure such platforms -- riser tilt, wedge, etc options to main lift shelf or forks in all four (4x or all other provisioned mounting) locations with provided hardware only, prior to use. Load objects are designed to slide on/off smooth platforms without appreciable force, so take care not

to push or lean. Keep riser tilt [adjustable angling platform] option flat at all times except for final minor angle adjustment when needed.

- Do not stand under overhanging load.
- Do not use on uneven surface, incline or decline (major ramps).
- Do not stack loads.
- Do not operate while under the influence of drugs or alcohol.
- Do not support ladder against LIFT TOOL (unless the specific allowance is provided for one following qualified procedures for working at elevations with this TOOL).
- Tipping hazard. Do not push or lean against load with raised platform.
- Do not use as a personnel lifting platform or step. No riders.
- Do not stand on any part of lift. Not a step.
- Do not climb on mast.
- Do not operate a damaged or malfunctioning LIFT TOOL machine.
- Crush and pinch point hazard below platform. Only lower load in areas clear of personnel and obstructions. Keep hands and feet clear during operation.
- No Forks. Never lift or move bare LIFT TOOL MACHINE with pallet truck, jack or fork lift.
- Mast extends higher than platform. Be aware of ceiling height, cable trays, sprinklers, lights, and other overhead objects.
- Do not leave LIFT TOOL machine unattended with an elevated load.
- Watch and keep hands, fingers, and clothing clear when equipment is in motion.
- Turn Winch with hand power only. If winch handle cannot be cranked easily with one hand, it is probably over-loaded. Do not continue to turn winch past top or bottom of platform travel. Excessive unwinding will detach handle and damage cable. Always hold handle when lowering, unwinding. Always assure self that winch is holding load before releasing winch handle.
- A winch accident could cause serious injury. Not for moving humans. Make certain clicking sound is heard as the equipment is being raised. Be sure winch is locked in position before releasing handle. Read instruction page before operating this winch. Never allow winch to unwind freely. Freewheeling will cause uneven cable wrapping around winch drum, damage cable, and may cause serious injury.
- This TOOL must be maintained correctly for IBM Service personnel to use it. IBM shall inspect condition and verify maintenance history before operation. Personnel reserve the right not to use TOOL if inadequate. (C048)

Power and cabling information for NEBS (Network Equipment-Building System) GR-1089-CORE

The following comments apply to the IBM servers that have been designated as conforming to NEBS (Network Equipment-Building System) GR-1089-CORE:

The equipment is suitable for installation in the following:

- Network telecommunications facilities
- Locations where the NEC (National Electrical Code) applies

The intrabuilding ports of this equipment are suitable for connection to intrabuilding or unexposed wiring or cabling only. The intrabuilding ports of this equipment *must not* be metallically connected to the interfaces that connect to the OSP (outside plant) or its wiring. These interfaces are designed for use as intrabuilding interfaces only (Type 2 or Type 4 ports as described in GR-1089-CORE) and require isolation from the exposed OSP cabling. The addition of primary protectors is not sufficient protection to connect these interfaces metallically to OSP wiring.

Note: All Ethernet cables must be shielded and grounded at both ends.

The ac-powered system does not require the use of an external surge protection device (SPD).

The dc-powered system employs an isolated DC return (DC-I) design. The DC battery return terminal *shall not* be connected to the chassis or frame ground.

The dc-powered system is intended to be installed in a common bonding network (CBN) as described in GR-1089-CORE.

NVMe U.2 pass-thru card for the 9009-22G or 9223-22S

Find information about installing, removing, replacing, and permanently removing an NVMe U.2 pass-thru card from the IBM Power® System S922 (9009-22G) or IBM Power System H922S (9223-22S) server.

Installing an NVMe U.2 pass-thru card in the 9009-22G or 9223-22S system

Find information about installing an NVMe U.2 pass-thru card in the IBM Power System S922 (9009-22G) or IBM Power System H922S (9223-22S) server.

About this task

Note: Installing this feature is a customer task. You can complete this task yourself, or contact a service provider to complete the task for you. You might be charged a fee by the service provider for this service.

If your system is managed by the Hardware Management Console (HMC), use the HMC to install the part in the system. For instructions, see [Installing a part by using the HMC \(www.ibm.com/support/knowledgecenter/POWER9/p9haj/hmcinstall.htm\)](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/hmcinstall.htm).

If you do not have an HMC, complete the steps in the following procedures to install an NVMe U.2 pass-thru card.

Preparing the 9009-22G or 9223-22S system to install an NVMe U.2 pass-thru card

To prepare the system to install an NVMe U.2 pass-thru card, complete the steps in this procedure.

Procedure

1. Identify the part and the system that you are working on. For instructions, see [Identifying a part \(www.ibm.com/support/knowledgecenter/POWER9/p9haj/sal.htm\)](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/sal.htm).
Use the blue identify LED on the enclosure to locate the system. Ensure that the serial number of the system matches the serial number to be serviced.
2. Stop the system. For instructions, see [Stopping a system \(www.ibm.com/support/knowledgecenter/POWER9/p9haj/crustopsys.htm\)](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/crustopsys.htm).
3. Label and disconnect the power cords from the system unit.
See [Figure 1 on page 2](#).

Notes:

- This system might be equipped with two or more power supplies. If the removing and replacing procedures require the system power to be turned off, ensure that all the power sources to the system are disconnected.
- The power cord **(B)** is fastened to the system with hook-and-loop fastener **(A)**. If you are placing the system in a service position after you disconnect the power cords, ensure that you unstrap the fastener.

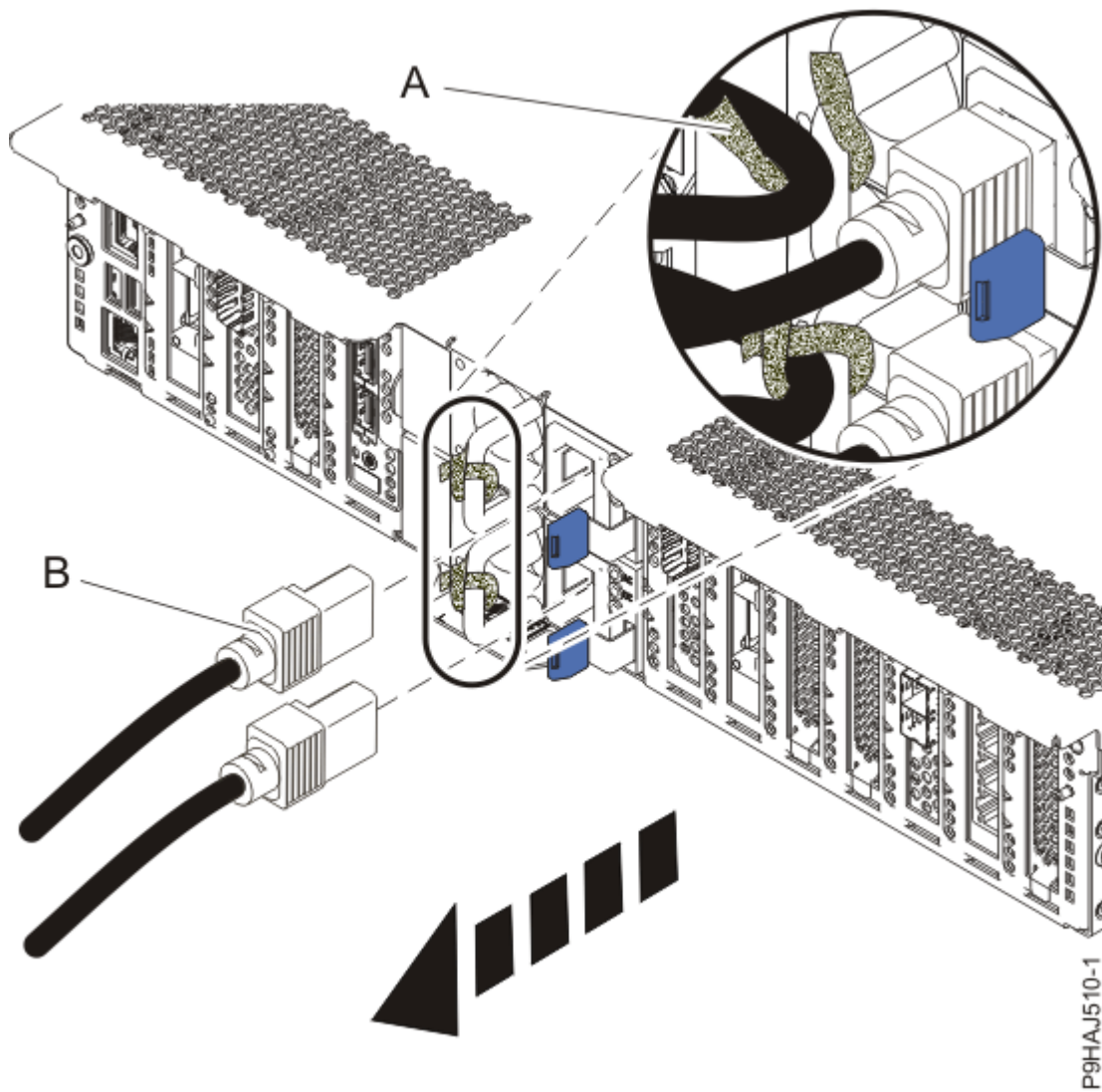
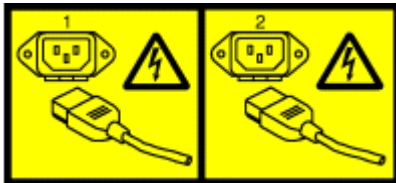


Figure 1. Removing the power cords

(L003)



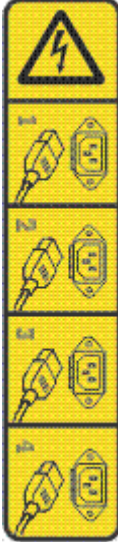
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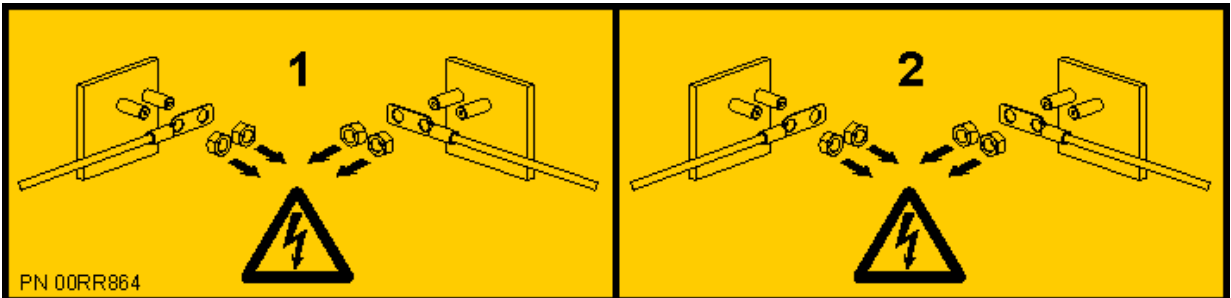
or




or



or



 **DANGER:** Multiple power cords. The product might be equipped with multiple AC power cords or multiple DC power cables. To remove all hazardous voltages, disconnect all power cords and power cables. (L003)

4. Open the side latches (**A**) and pull the latches to slide the system unit fully into the service position, until the slides click and hold the system unit securely. Ensure that the screws inside the latches are not secured to the rack.

Remove the hook-and-loop fasteners that secure the cable management arms. Ensure that the cable management arms can move freely. Ensure that the cables at the rear of the system do not catch or bind as you pull the system unit into the service position.

Do not pull out or install any drawer or feature if the rack stabilizer brackets are not attached to the rack. Do not pull out more than one drawer at a time. The rack might become unstable if you pull out more than one drawer at a time.



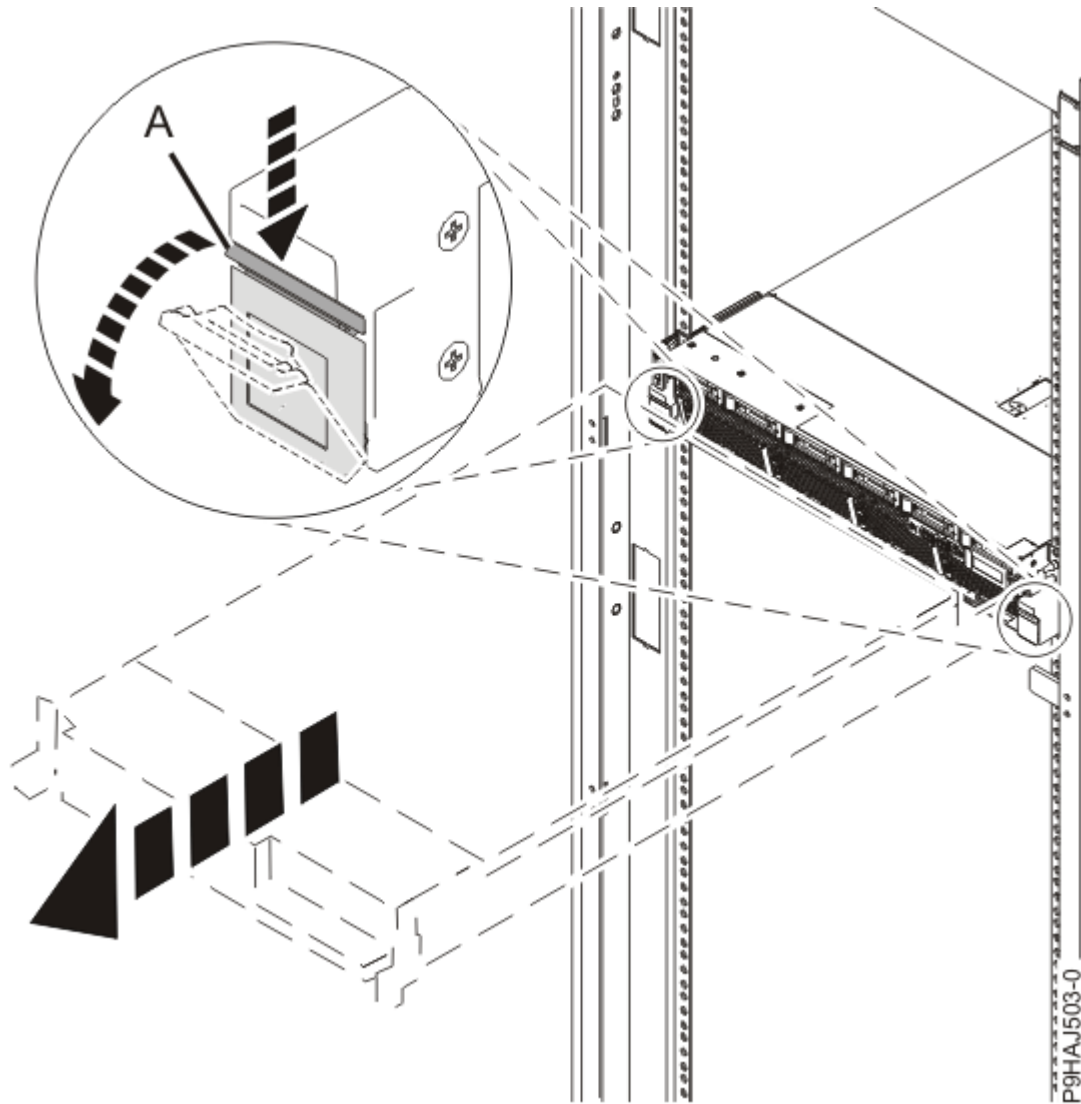


Figure 2. Releasing the side latches

5. Attach the electrostatic discharge (ESD) wrist strap.

The ESD wrist strap must be connected to an unpainted metal surface until the service procedure is completed, and if applicable, until the service access cover is replaced.



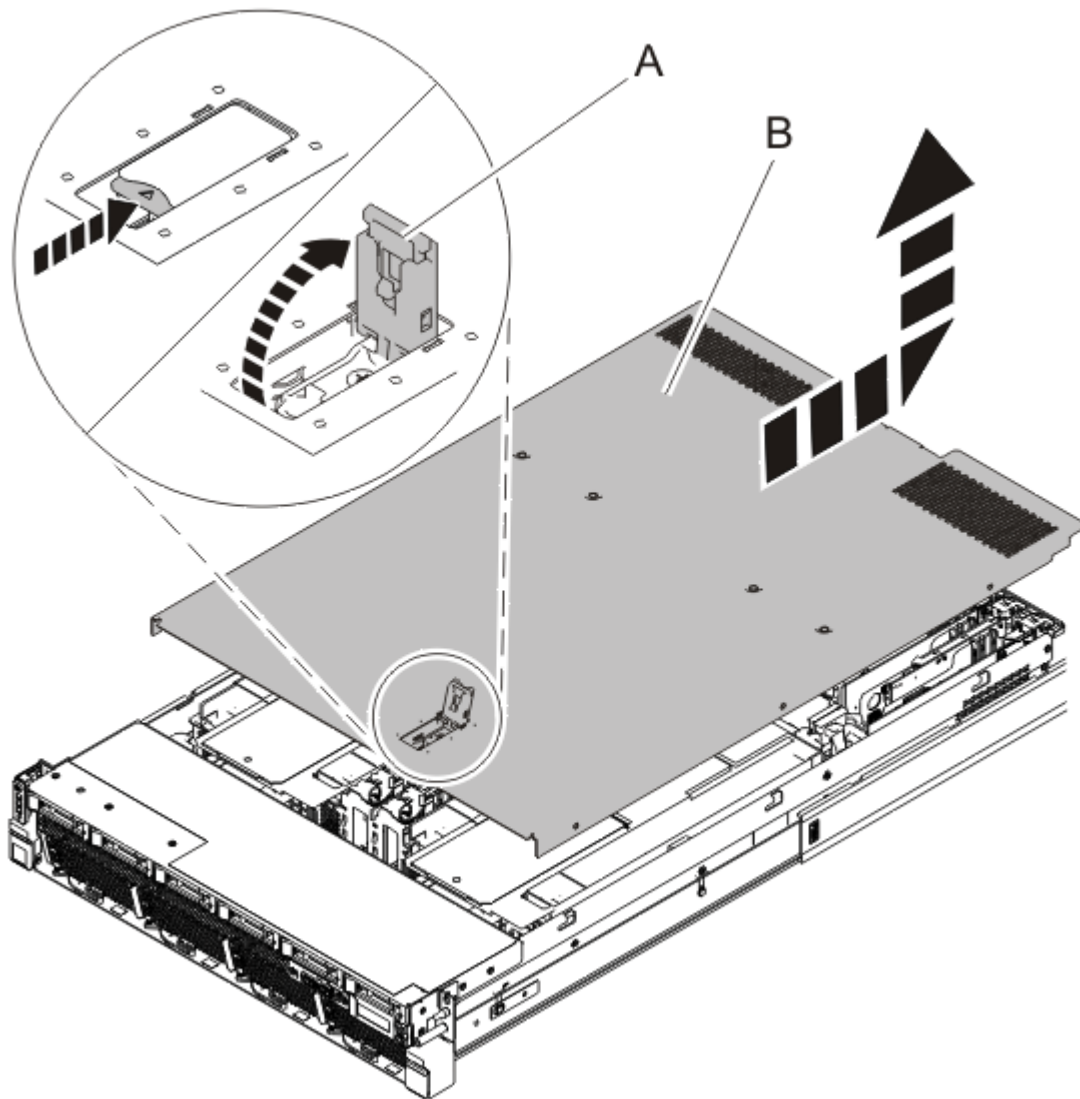
Attention:

- Attach an electrostatic discharge (ESD) wrist strap to the front ESD jack, to the rear ESD jack, or to an unpainted metal surface of your hardware to prevent the electrostatic discharge from damaging your hardware.
- When you use an ESD wrist strap, follow all electrical safety procedures. An ESD wrist strap is used for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
- If you do not have an ESD wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds. If at any point in this service process you move away from the system, it is important to again discharge yourself by touching an unpainted metal surface for at least 5 seconds before you continue with the service process.

6. Release the service access cover latch by pushing the release latch **(A)** in the direction shown.
7. Slide the cover **(B)** off the system unit. When the front of the service access cover clears the upper frame ledge, lift the cover up and off the system unit.



Attention: Operating the system without the service access cover on for more than 10 minutes when the system power is turned on might damage the system components.



P9HAJ505-1

Figure 3. Removing the service access cover

Installing an NVMe U.2 pass-thru card in the 9009-22G or 9223-22S system

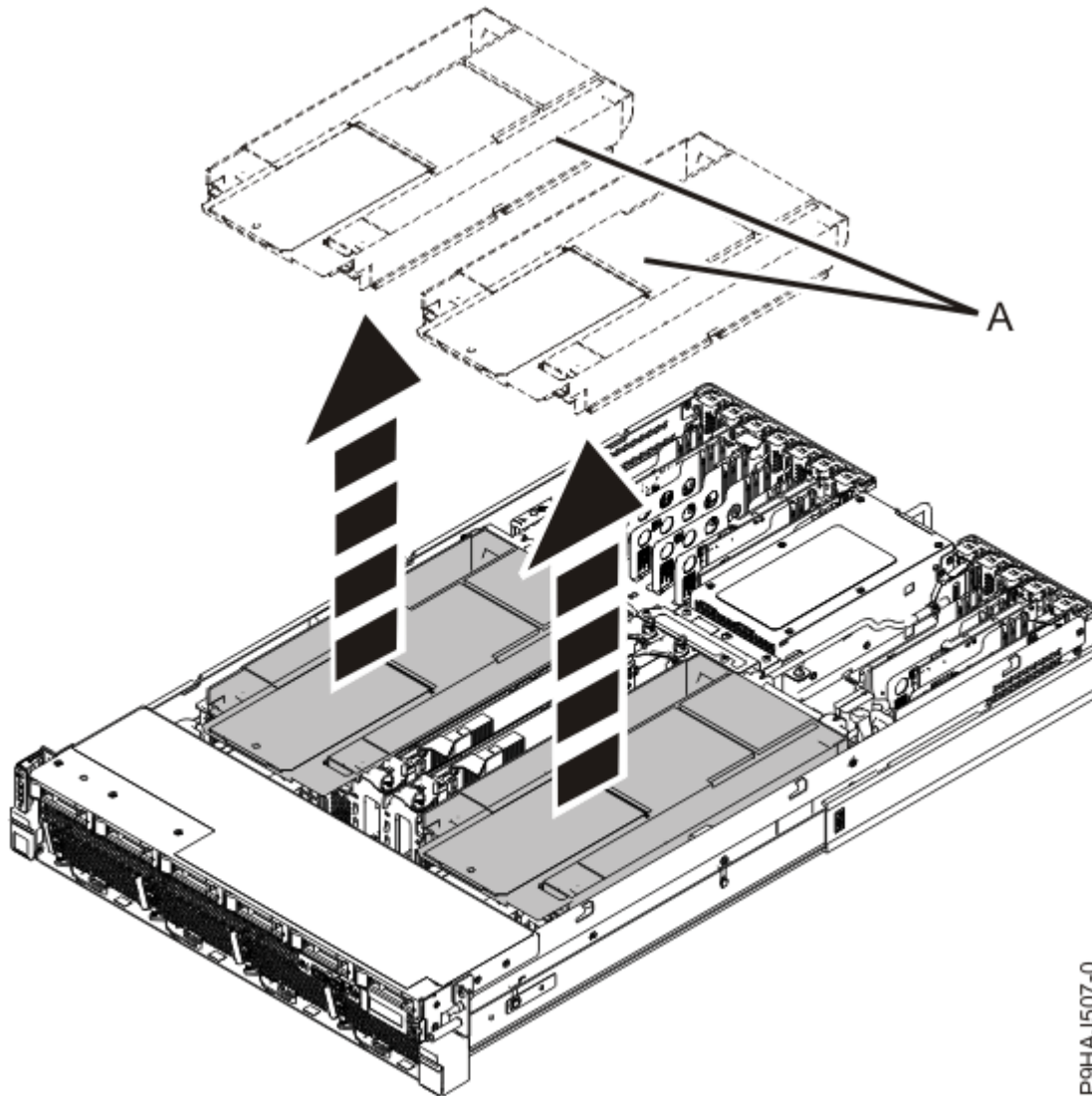
To install an NVMe U.2 pass-thru card in the system, complete the steps in this procedure.

Procedure

1. Ensure that you have the electrostatic discharge (ESD) wrist strap on and that the ESD clip is plugged into a ground jack or connected to an unpainted metal surface. If not, do so now.
2. Lift each air baffle **(A)** straight up.

See [Figure 4](#) on page 7.

Place air baffles upside down on a clean area. When you turn an air baffle over, hold the detachable drive cover to prevent it from coming loose.



P9HAJ507-0

Figure 4. Removing the air baffle

3. Remove the clip-in filler and air divider by completing the following steps.
 - a) Rotate the top of the clip-in filler until the bottom hook unclasp from the air screen.
 - b) Lift the clip-in filler out of the system.

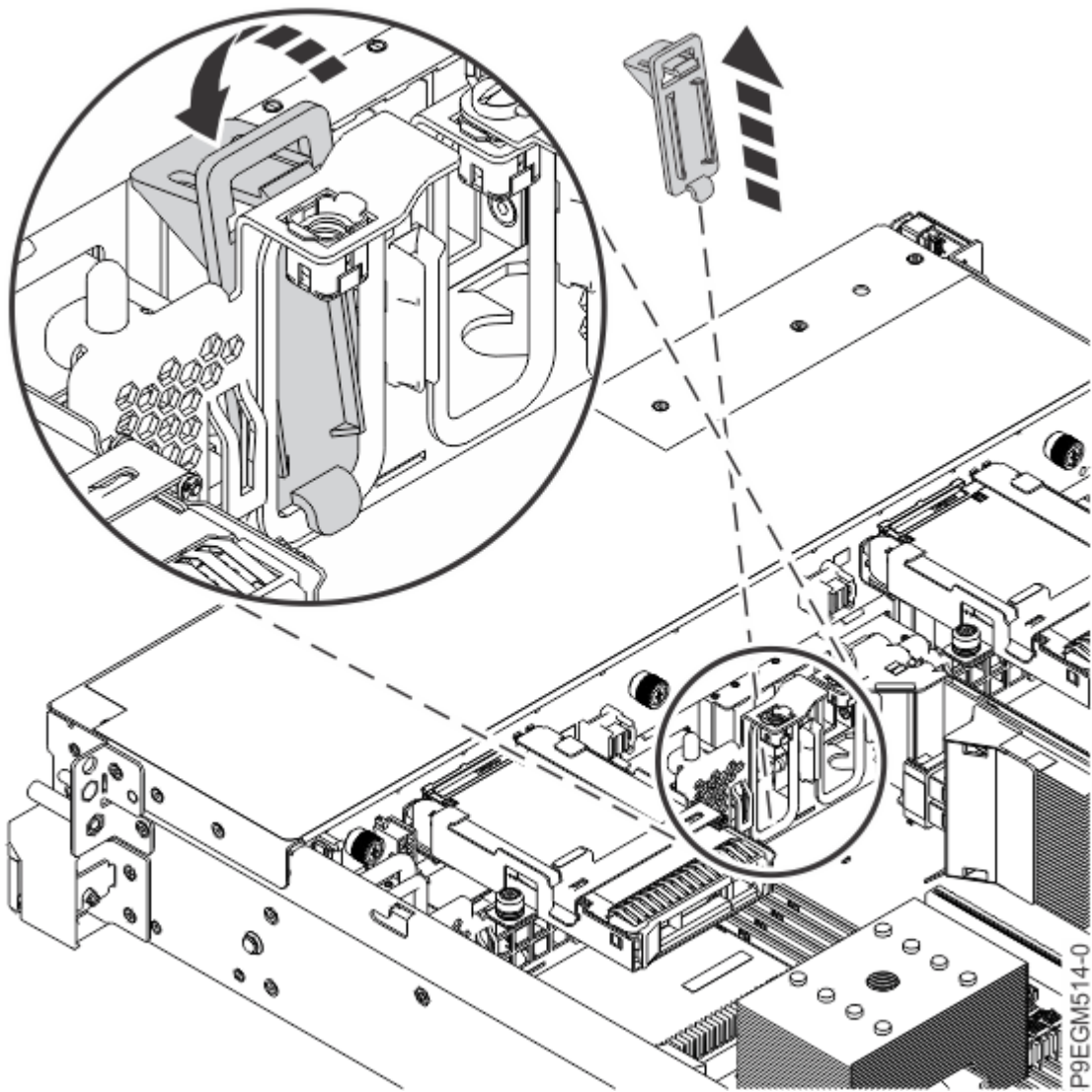


Figure 5. Removing the clip-in filler

c) Lift the air divider up as shown in the following figure.

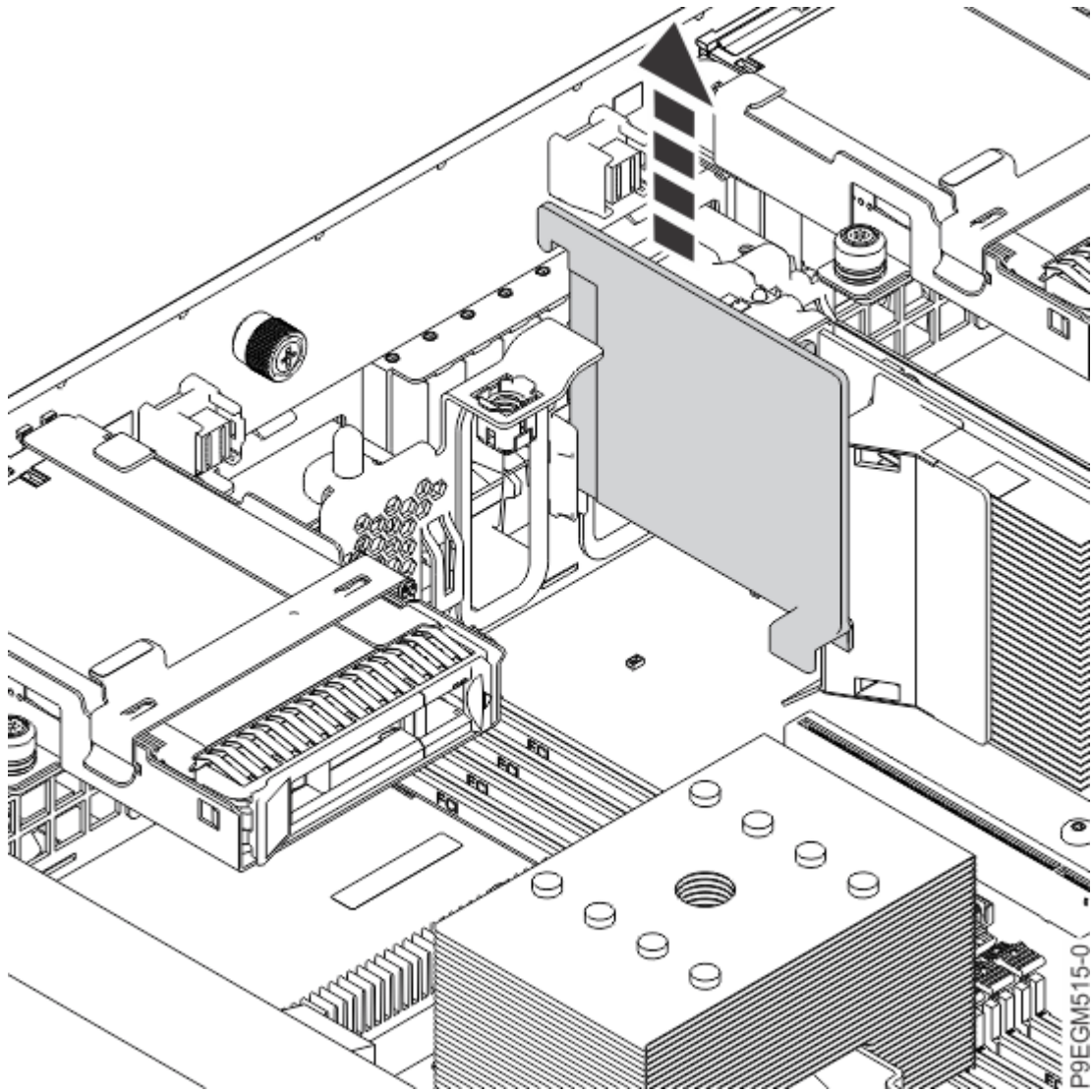


Figure 6. Removing the air divider

- d) Save the clip-in filler and air divider for a future use.
- 4. Plug the NVMe cable into the connector port (**J1**) of the new or replacement NVMe U.2 pass-thru card. Push the connector in until the connector latch clicks. See the following figure.

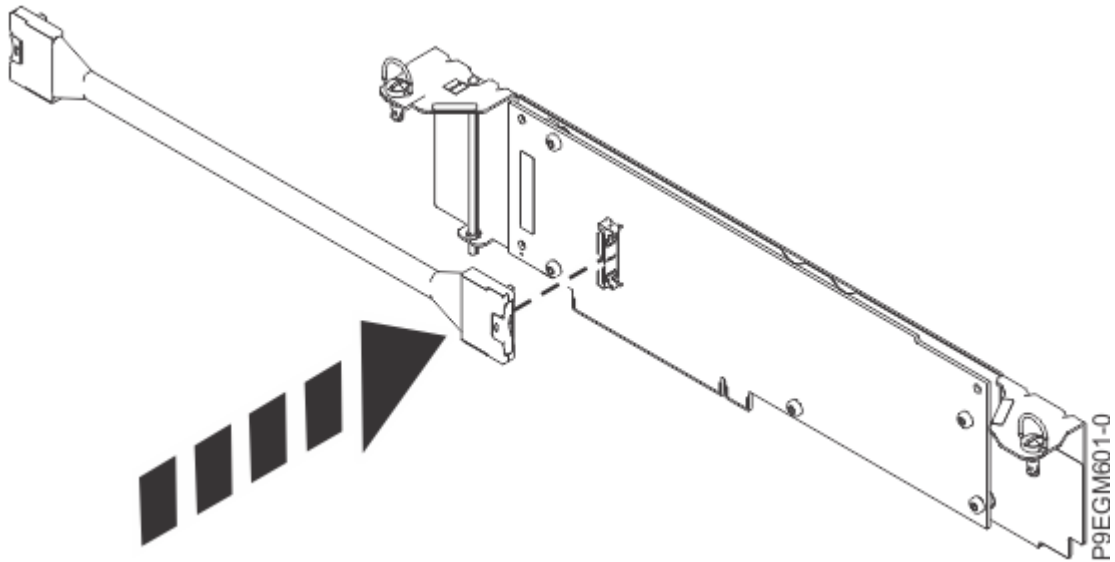


Figure 7. Connecting the NVMe cable to the NVMe U.2 pass-thru card

Note: Do not connect the other end of the NVMe cable into the NVMe drive backplane until you are told to do so.

If you have one NVMe U.2 pass-thru card, it is installed in slot P1-C49 and a filler is in slot P1-C50.

The NVMe cable connects from port **(J1)** on the NVMe drive backplane to port **(J1)** on the NVMe U.2 pass-thru card. See the following figure.

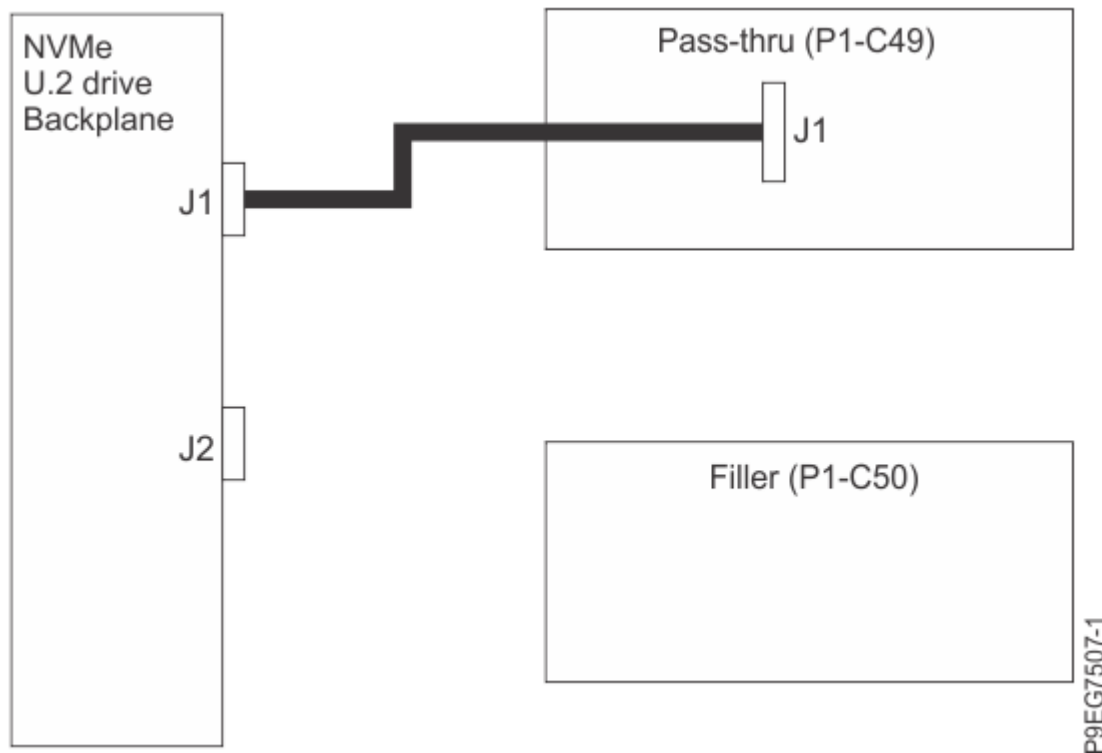
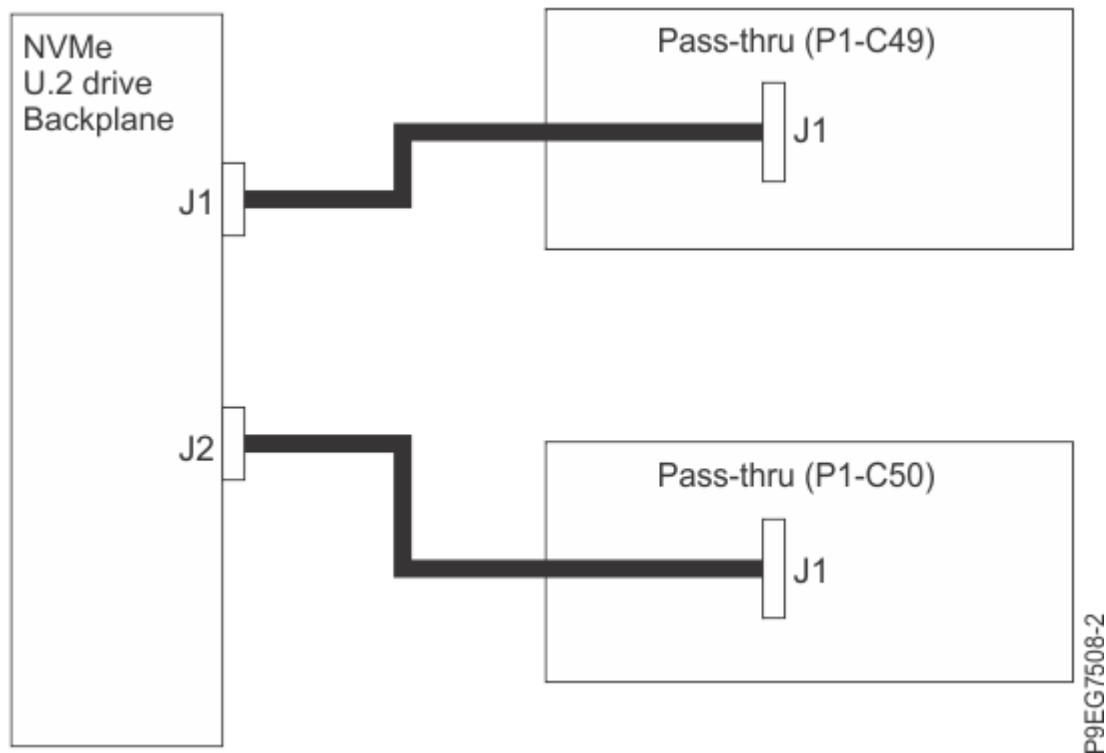


Figure 8. Connecting the NVMe cable for a system with one NVMe U.2 pass-thru card in P1-C49 and a filler in slot P1-C50

If you have two NVMe U.2 pass-thru cards, one is installed in slot P1-C49 and the other one is installed in slot P1-C50.

One NVMe cable connects from port **(J1)** on the NVMe drive backplane to port **(J1)** on the NVMe U.2 pass-thru card in slot P1-C49. One NVMe cable connects from port **(J2)** on the NVMe drive backplane to port **(J1)** on the NVMe U.2 pass-thru card in slot P1-C50. See the following figure.



P9EG7508-2

Figure 9. Connecting the NVMe cable for a system with two NVMe U.2 pass-thru cards in slot P1-C49 and slot P1-C50

5. To install or replace the NVMe U.2 pass-thru card, complete the following steps:
 - a) Route the NVMe cable into position while you lower the NVMe U.2 pass-thru card into its slot.
 - b) Push the NVMe U.2 pass-thru card down to seat the card.
 - c) Push in and twist the screws **(A)** clockwise to fully seat the NVMe U.2 pass-thru card.

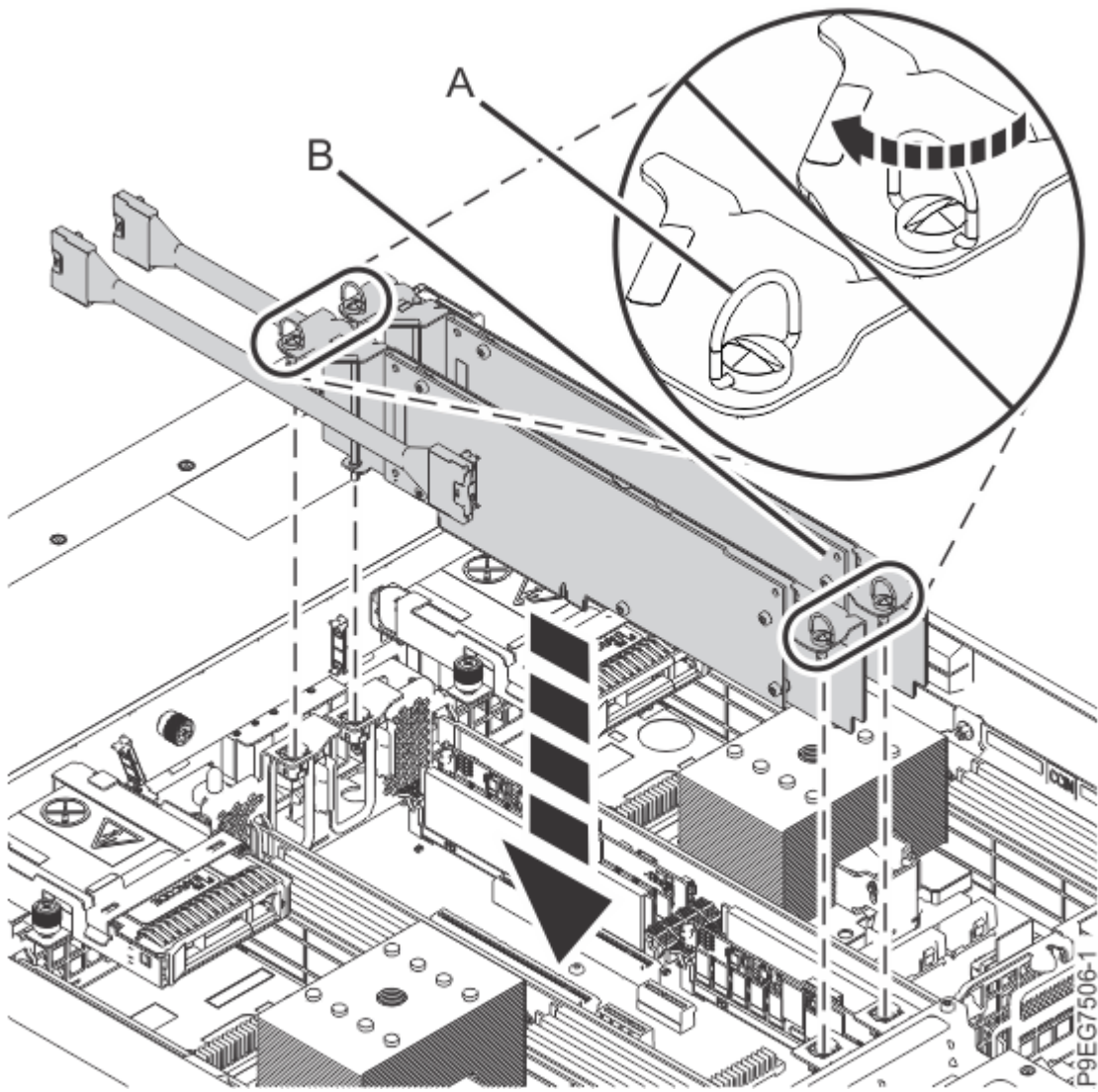


Figure 10. Seating the NVMe U.2 pass-thru card

6. Connect the NVMe cable to the port on the NVMe drive backplane. Push the connector in until the connector latch clicks.

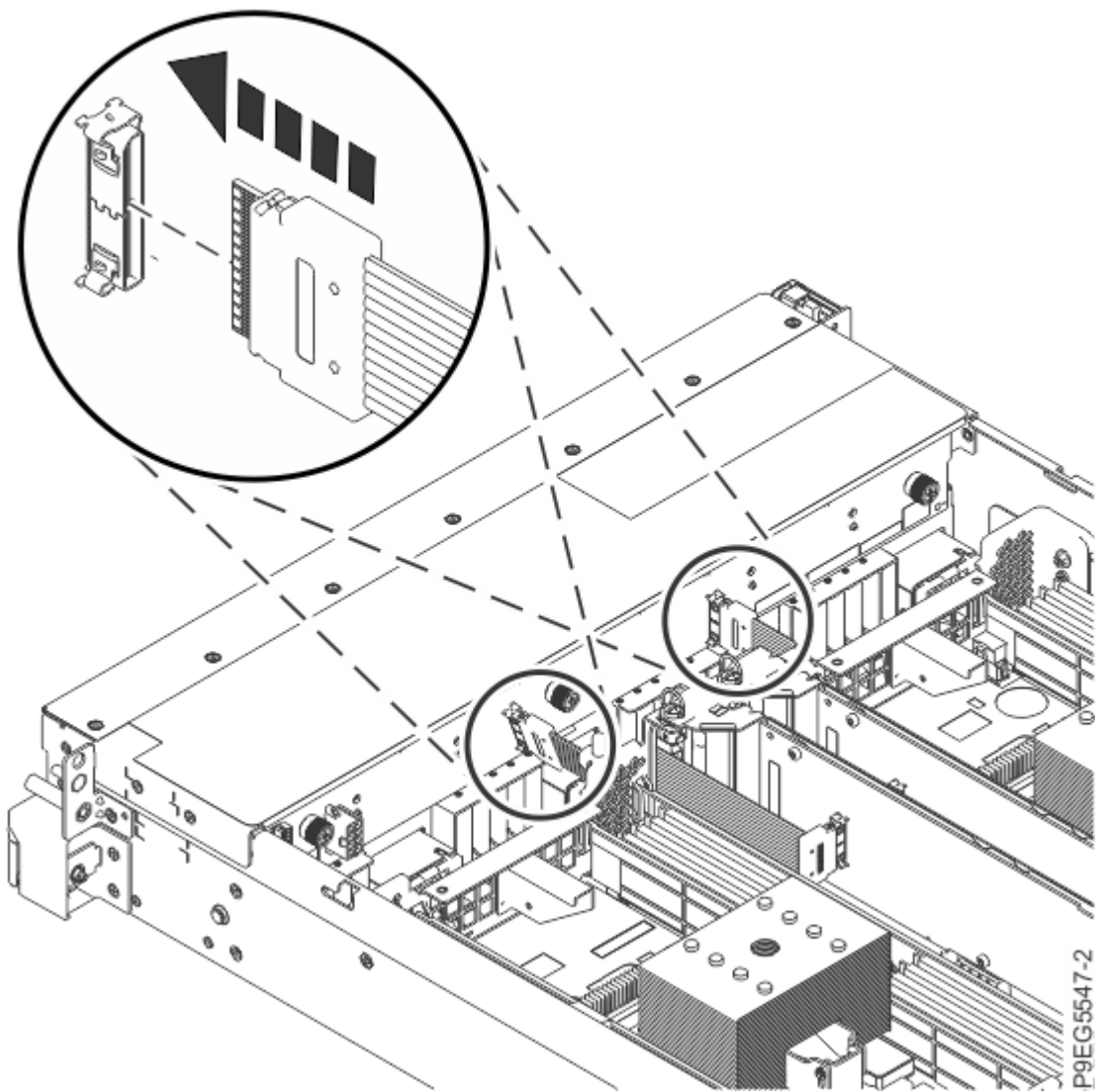
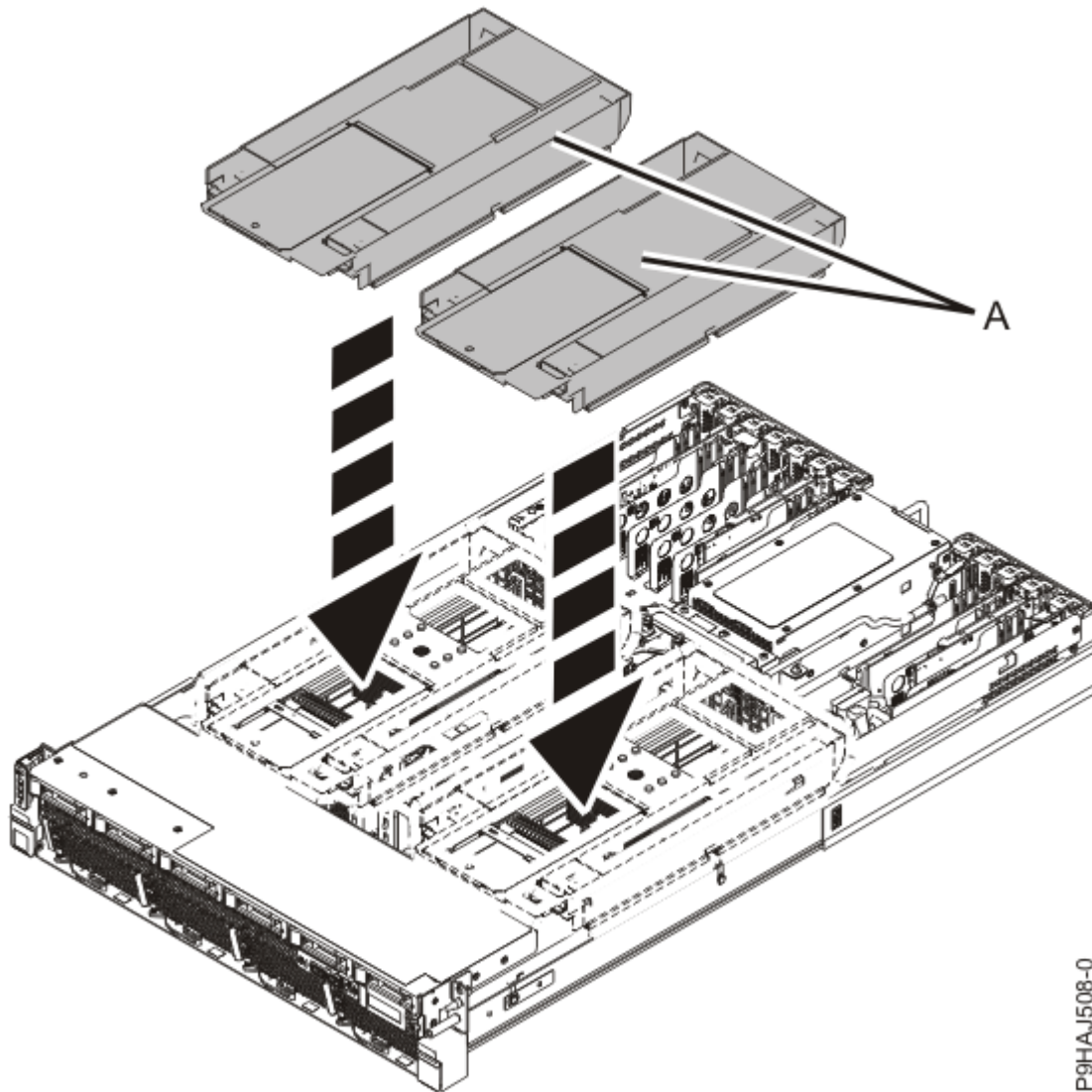


Figure 11. Connecting the NVMe cable to the NVMe drive backplane

7. Replace each air baffle **(A)** straight down into the chassis.

See [Figure 12](#) on page 14. When an air baffle is upside-down, hold the detachable drive cover to prevent it from coming loose.



P9HAJ508-0

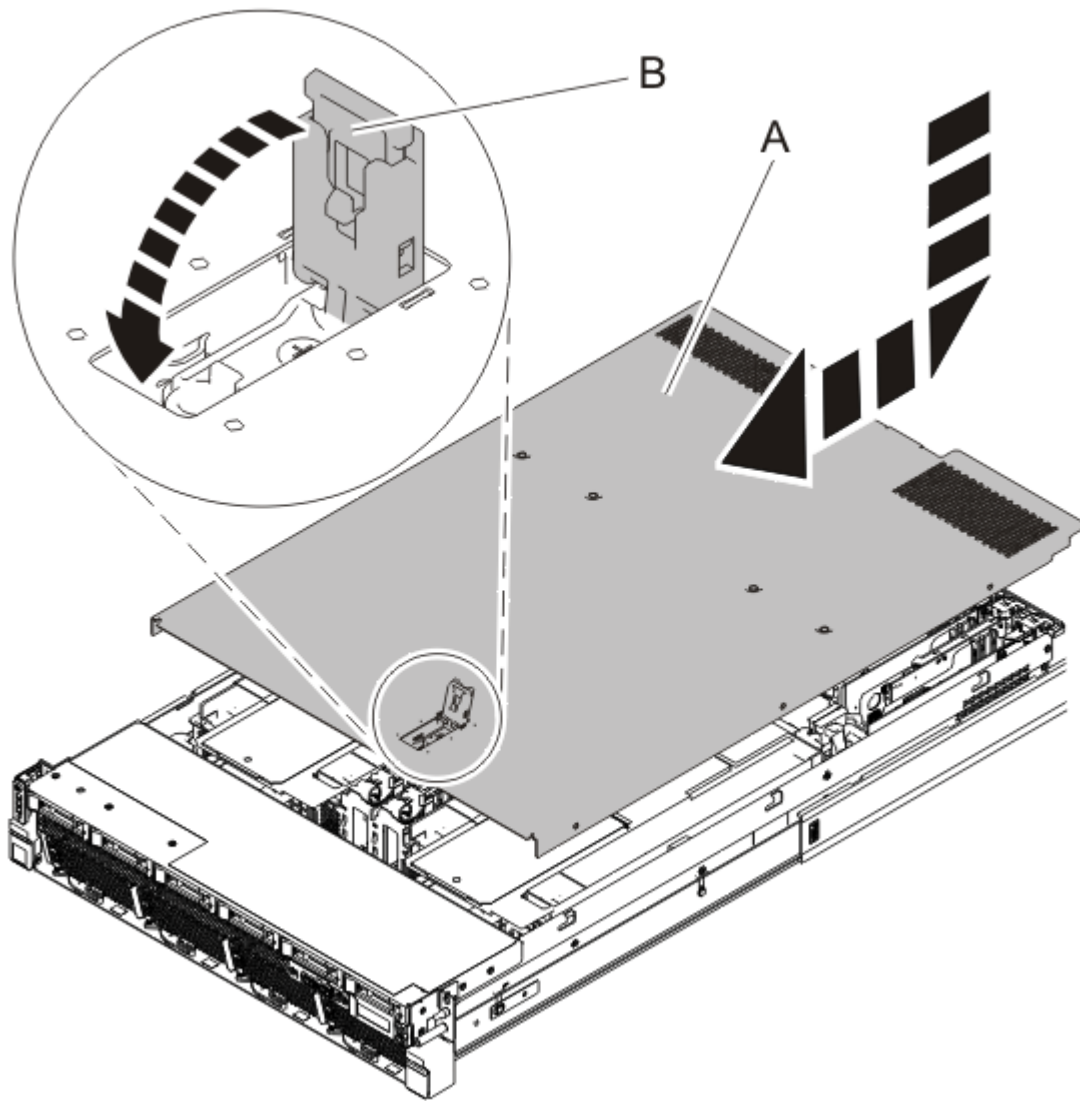
Figure 12. Replacing the air baffle

Preparing the 9009-22G or 9223-22S system for operation after installing an NVMe U.2 pass-thru card

To prepare the system for operation after installing an NVMe U.2 pass-thru card, complete the steps in this procedure.

Procedure

1. Ensure that you have the electrostatic discharge (ESD) wrist strap on and that the ESD clip is plugged into a ground jack or connected to an unpainted metal surface. If not, do so now.
2. Slide the service access cover **(A)** onto the system unit.
3. Close the release latch **(B)** by pushing it in the direction shown.



P9HAJ506-1

Figure 13. Installing the service access cover

4. Unlock the blue rail safety latches (**A**) by pushing them inward.

Ensure that the cable management arms can move freely. Ensure that the cables at the rear of the unit do not catch or bind as you push the unit into the operating position.

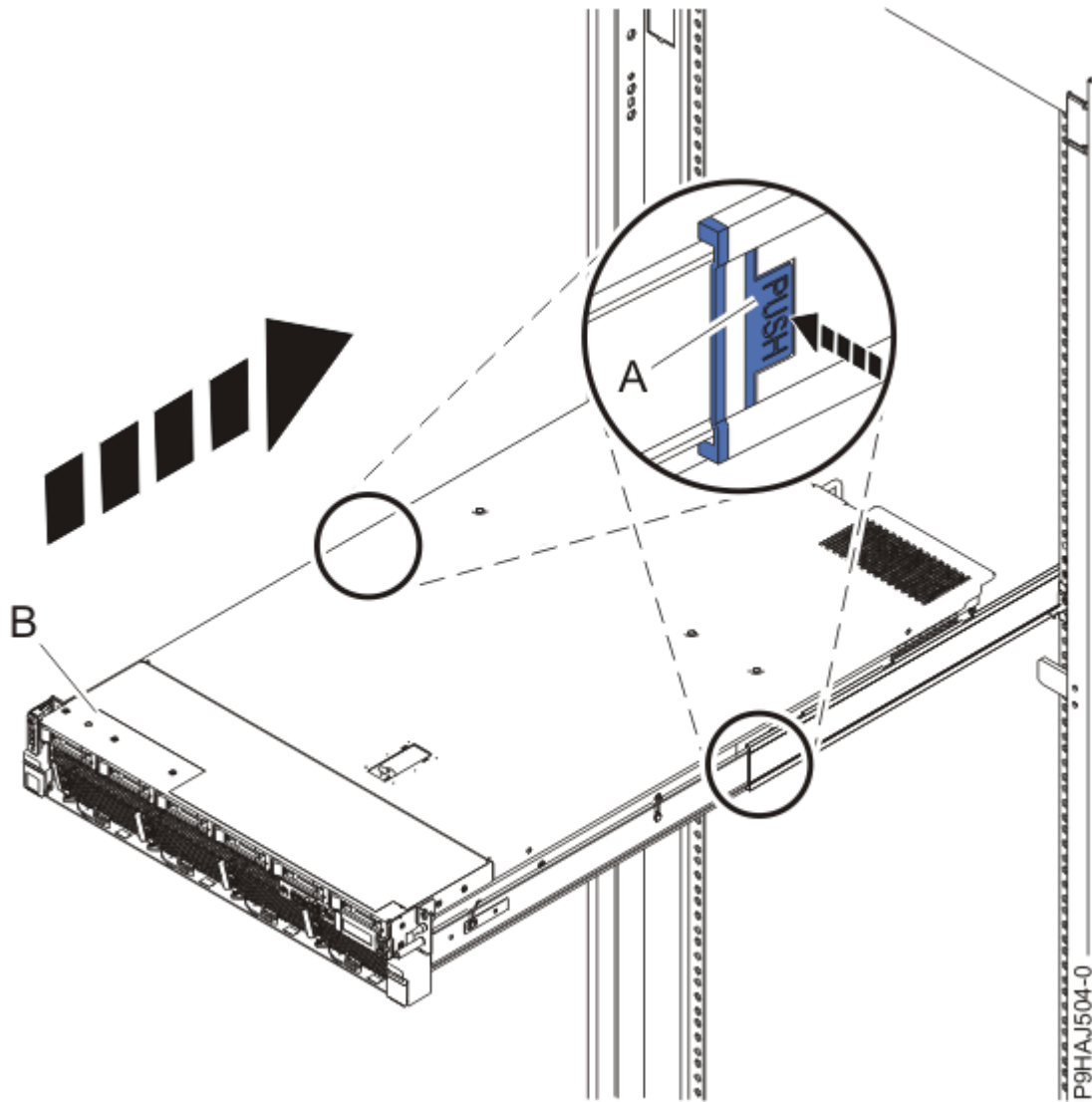


Figure 14. Placing the system into the operating position

5. Push the system unit (**B**) back into the rack until both release latches of the system unit lock into position.

Secure the cable management arm with hook-and-loop fasteners around the back side of the cable management arm, but not around the cables.

6. Using your labels, reconnect the power cords (**A**) to the system unit.

Fasten the power cords to the system using the hook-and-loop fasteners (**B**) as shown in [Figure 15 on page 17](#).

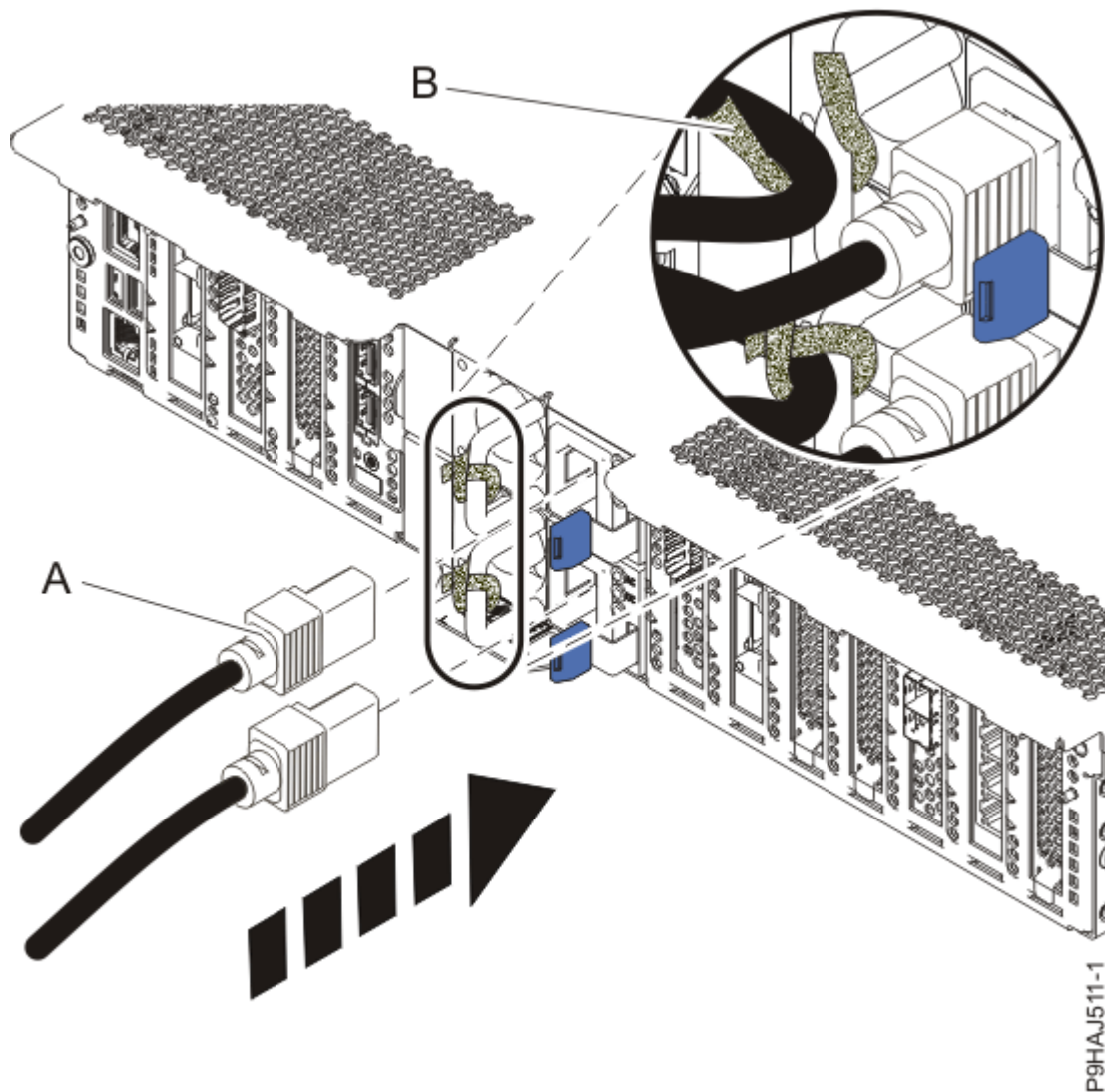


Figure 15. Connecting the power cords

7. Start the system. For instructions, see [Starting a system](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/crustartsys.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/crustartsys.htm).
8. Verify the installed part.
 - If you replaced the part because of a service action, verify the installed part. For instructions, see [Verifying a repair](http://www.ibm.com/support/knowledgecenter/POWER9/p9ect/pxect_verifyrepair.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9ect/pxect_verifyrepair.htm).
 - If you installed the part for any other reason, verify the installed part. For instructions, see [Verifying the installed part](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/pxhaj_hsmverify.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/pxhaj_hsmverify.htm).
9. Turn off the identify LED. For instructions, see [Deactivating an identify LED](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/p9haj_turn_off_identify_led.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/p9haj_turn_off_identify_led.htm).

Removing and replacing an NVMe U.2 pass-thru card in the 9009-22G or 9223-22S system

Find information about removing and replacing an NVMe U.2 pass-thru card in the IBM Power System S922 (9009-22G) or IBM Power System H922S (9223-22S) server.

About this task

Note: Installing this feature is a customer task. You can complete this task yourself, or contact a service provider to complete the task for you. You might be charged a fee by the service provider for this service.

If your system is managed by the Hardware Management Console (HMC), use the HMC to repair a part in the system. For instructions, see [Repairing a part by using the HMC](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/p9haj_hmc_repair.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/p9haj_hmc_repair.htm).

If you do not have an HMC, complete the steps in the following procedures to remove and replace an NVMe U.2 pass-thru card.

Preparing the 9009-22G or 9223-22S system to remove and replace an NVMe U.2 pass-thru card

To prepare the system to remove and replace an NVMe U.2 pass-thru card, complete the steps in this procedure.

Procedure

1. Identify the part and the system that you are working on. For instructions, see [Identifying a part](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/sal.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/sal.htm).

Use the blue identify LED on the enclosure to locate the system. Ensure that the serial number of the system matches the serial number to be serviced.

2. Stop the system. For instructions, see [Stopping a system](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/crustopsys.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/crustopsys.htm).
3. Label and disconnect the power cords from the system unit.

See [Figure 16 on page 19](#).

Notes:

- This system might be equipped with two or more power supplies. If the removing and replacing procedures require the system power to be turned off, ensure that all the power sources to the system are disconnected.
- The power cord **(B)** is fastened to the system with hook-and-loop fastener **(A)**. If you are placing the system in a service position after you disconnect the power cords, ensure that you unstrap the fastener.

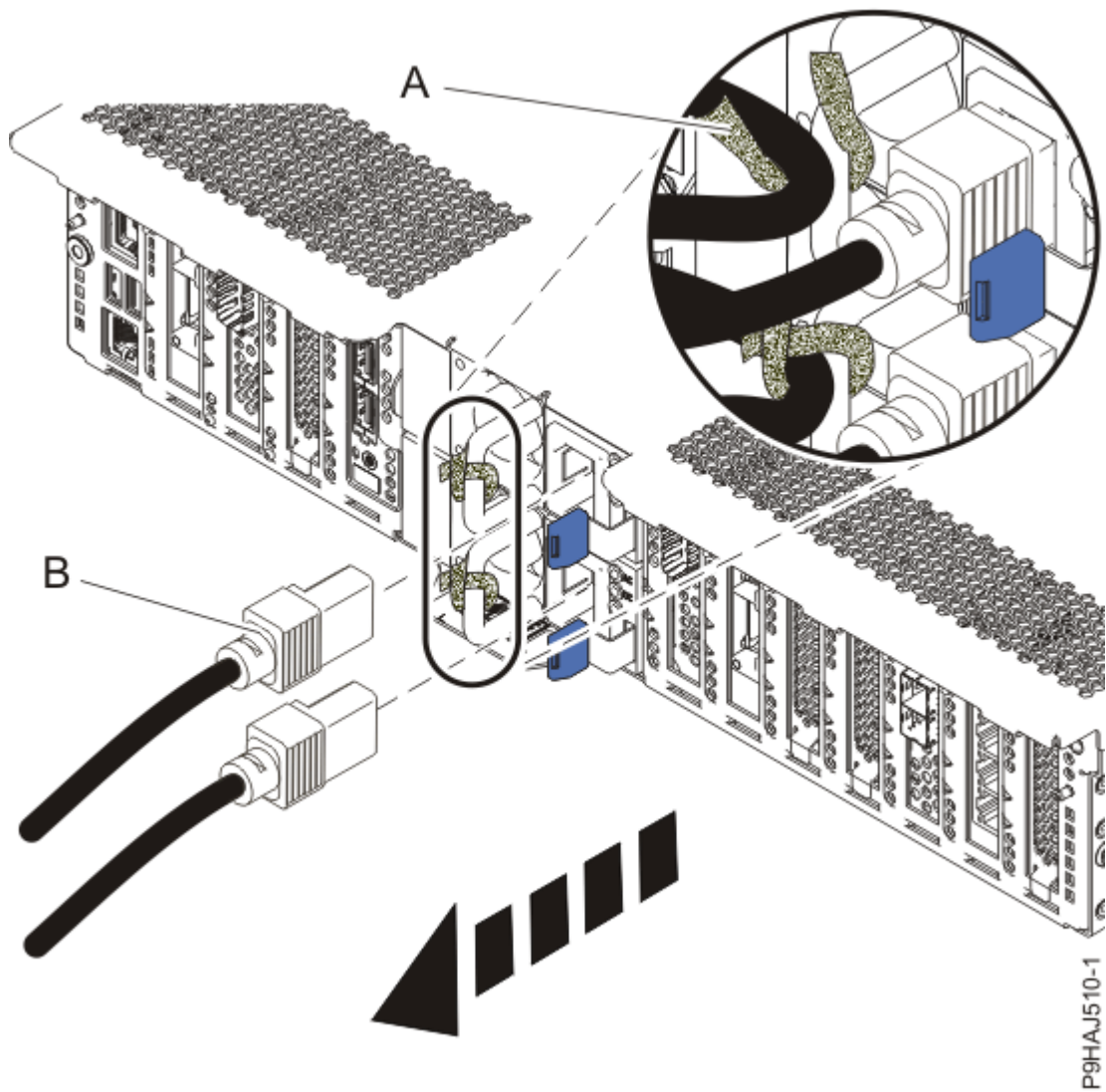
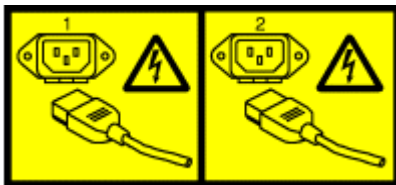


Figure 16. Removing the power cords

(L003)



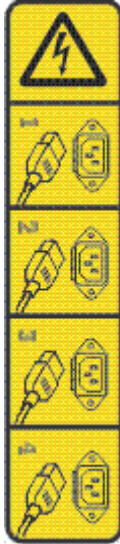
or



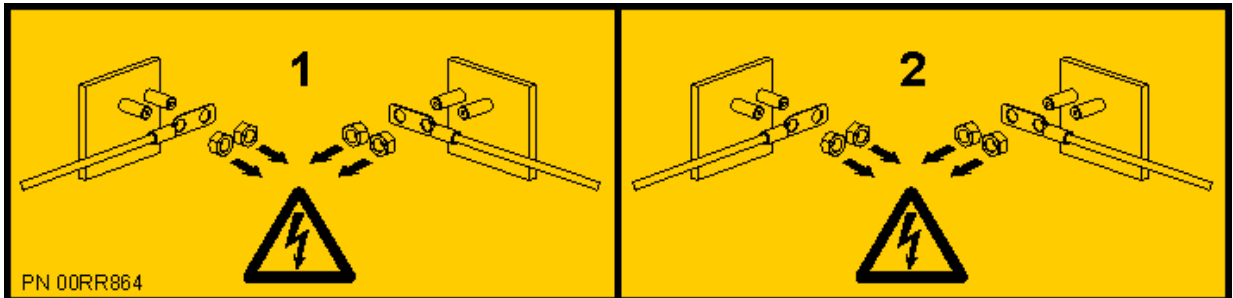
or




or



or



 **DANGER:** Multiple power cords. The product might be equipped with multiple AC power cords or multiple DC power cables. To remove all hazardous voltages, disconnect all power cords and power cables. (L003)

4. Open the side latches (**A**) and pull the latches to slide the system unit fully into the service position, until the slides click and hold the system unit securely. Ensure that the screws inside the latches are not secured to the rack.

Remove the hook-and-loop fasteners that secure the cable management arms. Ensure that the cable management arms can move freely. Ensure that the cables at the rear of the system do not catch or bind as you pull the system unit into the service position.

Do not pull out or install any drawer or feature if the rack stabilizer brackets are not attached to the rack. Do not pull out more than one drawer at a time. The rack might become unstable if you pull out more than one drawer at a time.



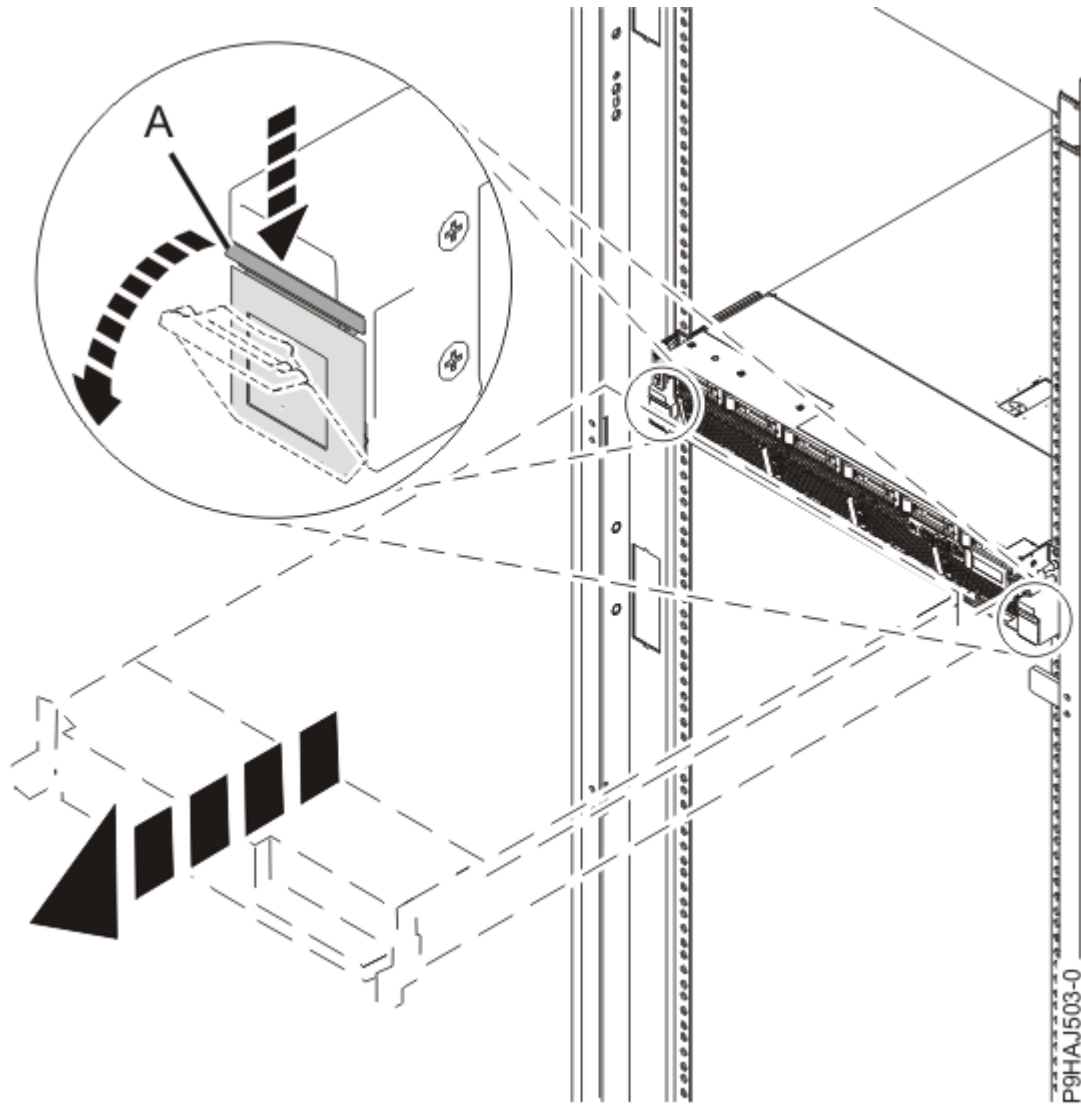


Figure 17. Releasing the side latches

5. Attach the electrostatic discharge (ESD) wrist strap.

The ESD wrist strap must be connected to an unpainted metal surface until the service procedure is completed, and if applicable, until the service access cover is replaced.



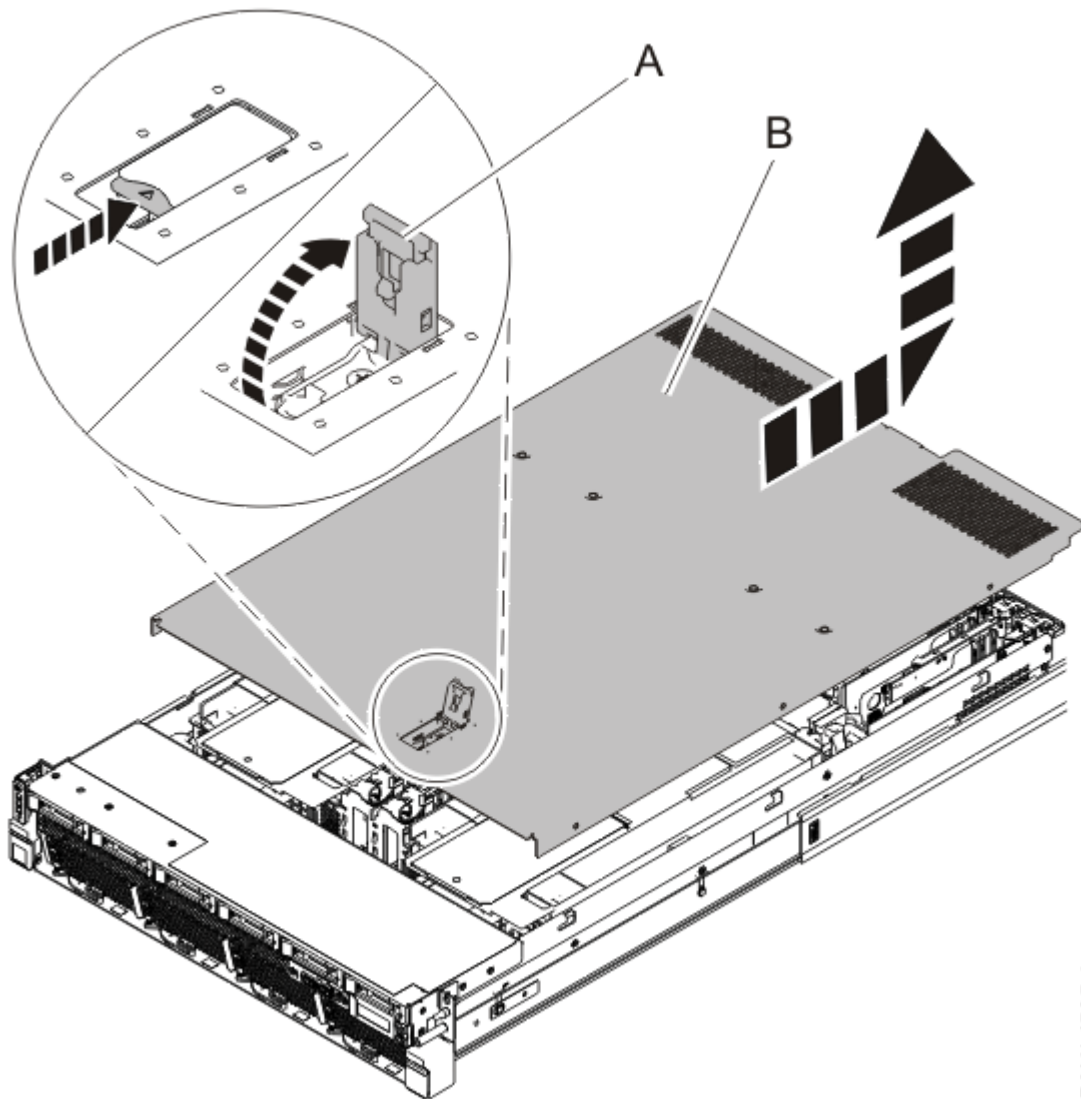
Attention:

- Attach an electrostatic discharge (ESD) wrist strap to the front ESD jack, to the rear ESD jack, or to an unpainted metal surface of your hardware to prevent the electrostatic discharge from damaging your hardware.
- When you use an ESD wrist strap, follow all electrical safety procedures. An ESD wrist strap is used for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
- If you do not have an ESD wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds. If at any point in this service process you move away from the system, it is important to again discharge yourself by touching an unpainted metal surface for at least 5 seconds before you continue with the service process.

6. Release the service access cover latch by pushing the release latch **(A)** in the direction shown.
7. Slide the cover **(B)** off the system unit. When the front of the service access cover clears the upper frame ledge, lift the cover up and off the system unit.



Attention: Operating the system without the service access cover on for more than 10 minutes when the system power is turned on might damage the system components.



P9HAJ505-1

Figure 18. Removing the service access cover

Removing an NVMe U.2 pass-thru card from the 9009-22G or 9223-22S system

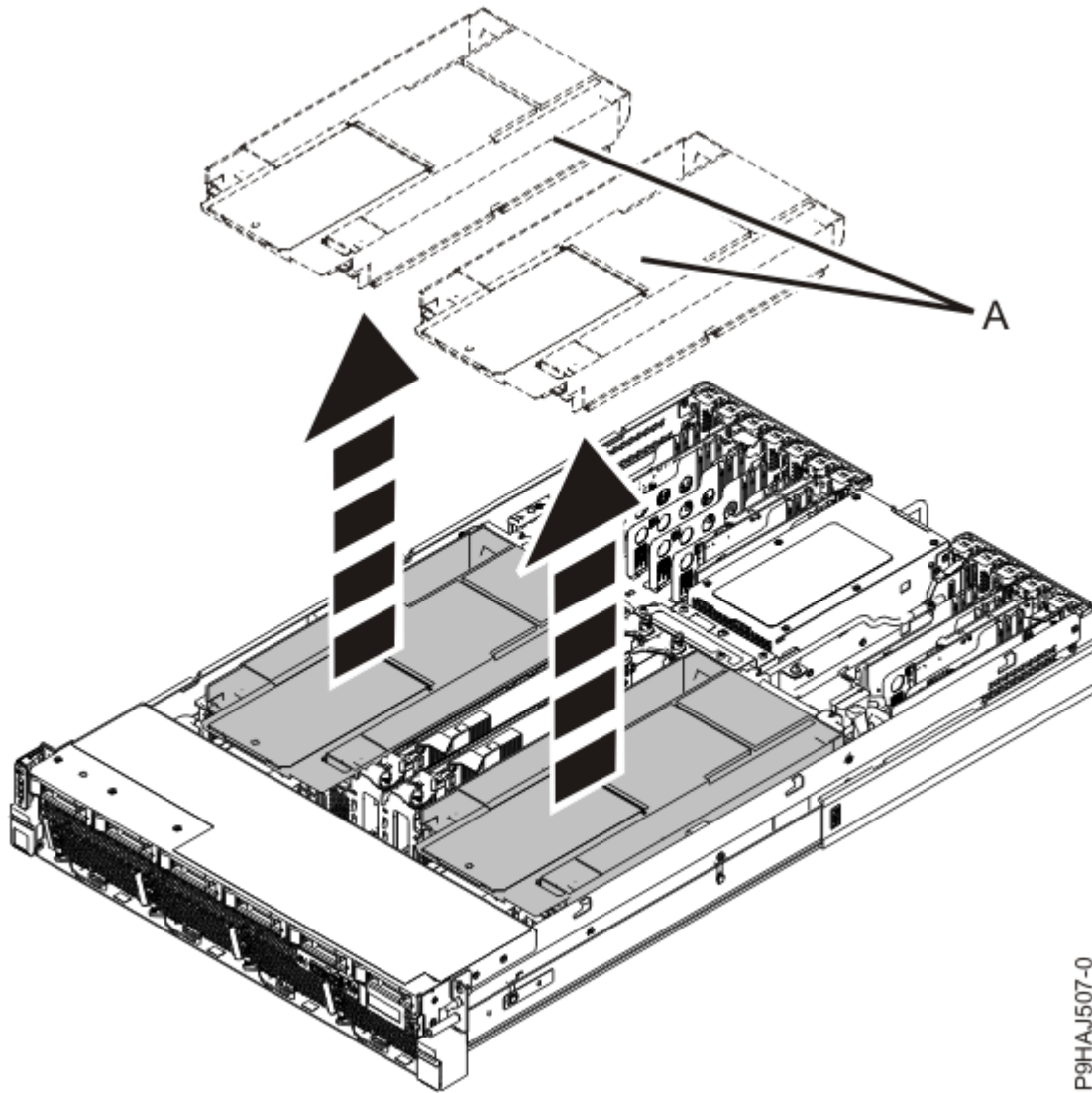
To remove an NVMe pass-thru card from the system, complete the steps in this procedure.

Procedure

1. Ensure that you have the electrostatic discharge (ESD) wrist strap on and that the ESD clip is plugged into a ground jack or connected to an unpainted metal surface. If not, do so now.
2. Lift each air baffle **(A)** straight up.

See [Figure 19 on page 24](#).

Place air baffles upside down on a clean area. When you turn an air baffle over, hold the detachable drive cover to prevent it from coming loose.



P9HAJ507-0

Figure 19. Removing the air baffle

3. To remove the NVMe U.2 pass-thru card, complete the following steps:
 - a) Twist the screws **(A)** counterclockwise to release the NVMe U.2 pass-thru card.
 - b) Lift both the NVMe U.2 pass-thru card and the NVMe cable out of the slot as shown in the following figure.

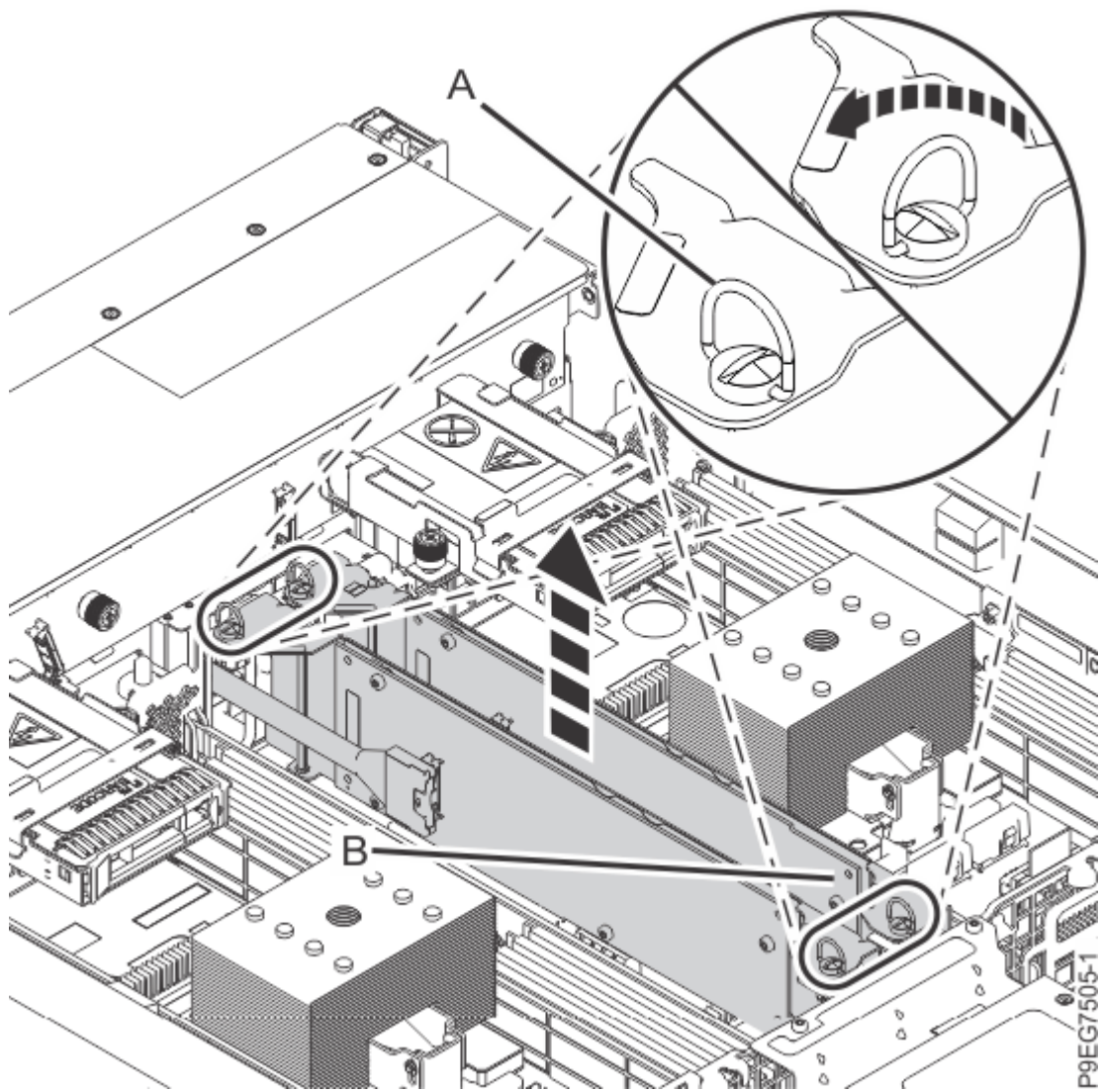


Figure 20. Removing the NVMe U.2 pass-thru card

4. Disconnect the NVMe cable from the NVMe U.2 pass-thru card. See the following figure.

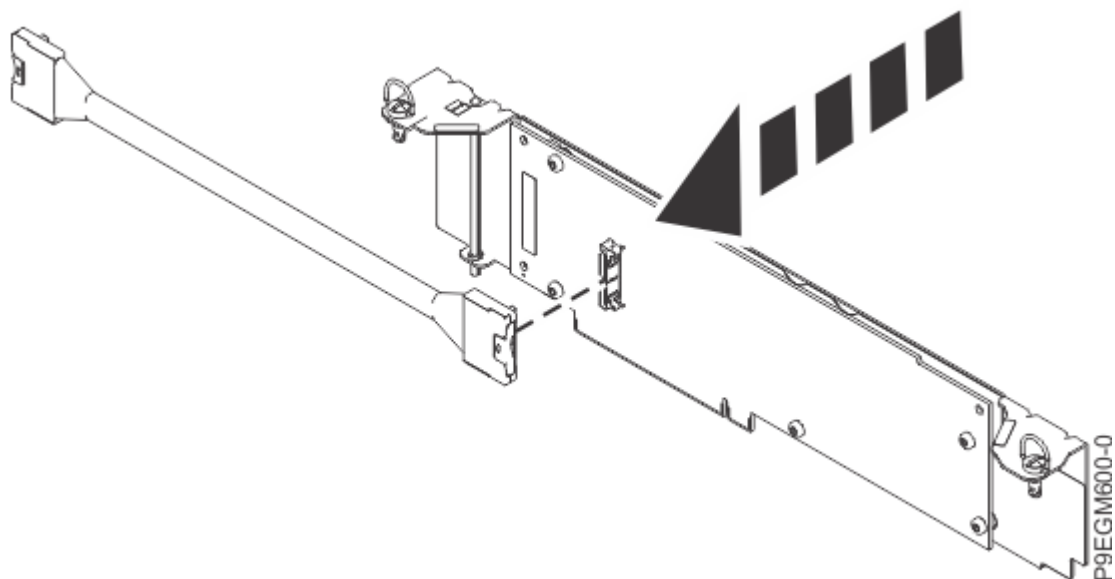


Figure 21. Disconnecting the NVMe cable from the NVMe U.2 pass-thru card

5. Place the NVMe U.2 pass-thru card on an appropriate ESD surface.

Replacing an NVMe U.2 pass-thru card in the 9009-22G or 9223-22S system

To replace an NVMe U.2 pass-thru card in the system, complete the steps in this procedure.

Procedure

1. Ensure that you have the electrostatic discharge (ESD) wrist strap on and that the ESD clip is plugged into a ground jack or connected to an unpainted metal surface. If not, do so now.
2. Plug the NVMe cable into the connector port (**J1**) of the new or replacement NVMe U.2 pass-thru card. Push the connector in until the connector latch clicks. See the following figure.

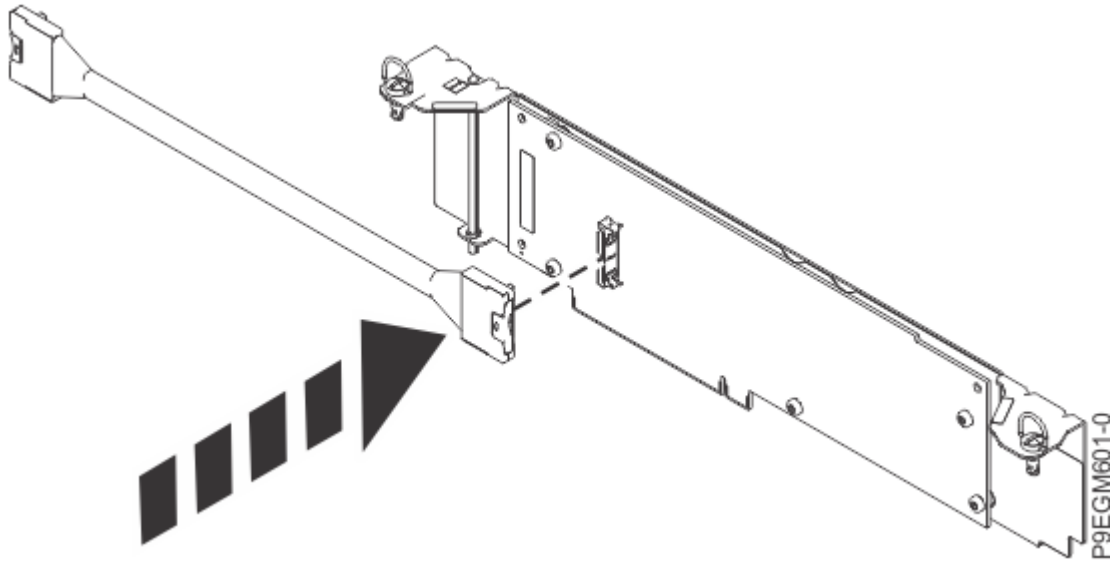


Figure 22. Connecting the NVMe cable to the NVMe U.2 pass-thru card

If you have one NVMe U.2 pass-thru card, it is installed in slot P1-C49 and a filler is in slot P1-C50.

The NVMe cable connects from port (**J1**) on the NVMe drive backplane to port (**J1**) on the NVMe U.2 pass-thru card. See the following figure.

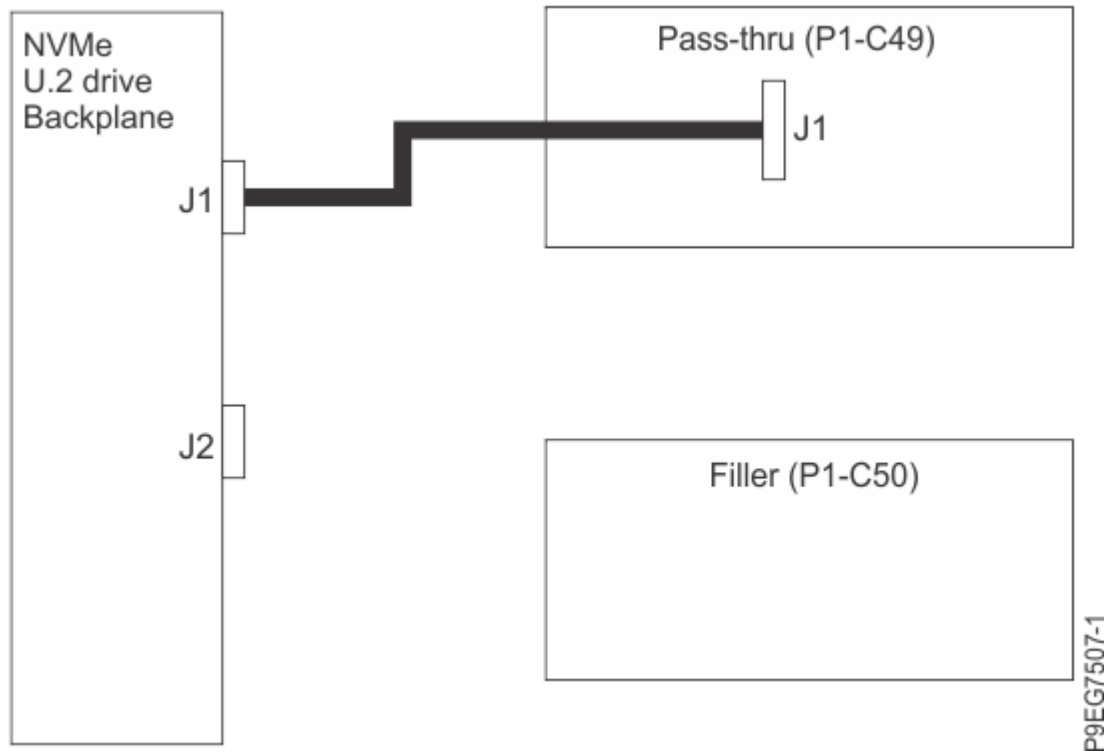


Figure 23. Connecting the NVMe cable for a system with one NVMe U.2 pass-thru card in P1-C49 and a filler in slot P1-C50

If you have two NVMe U.2 pass-thru cards, one is installed in slot P1-C49 and the other one is installed in slot P1-C50.

One NVMe cable connects from port **(J1)** on the NVMe drive backplane to port **(J1)** on the NVMe U.2 pass-thru card in slot P1-C49. One NVMe cable connects from port **(J2)** on the NVMe drive backplane to port **(J1)** on the NVMe U.2 pass-thru card in slot P1-C50. See the following figure.

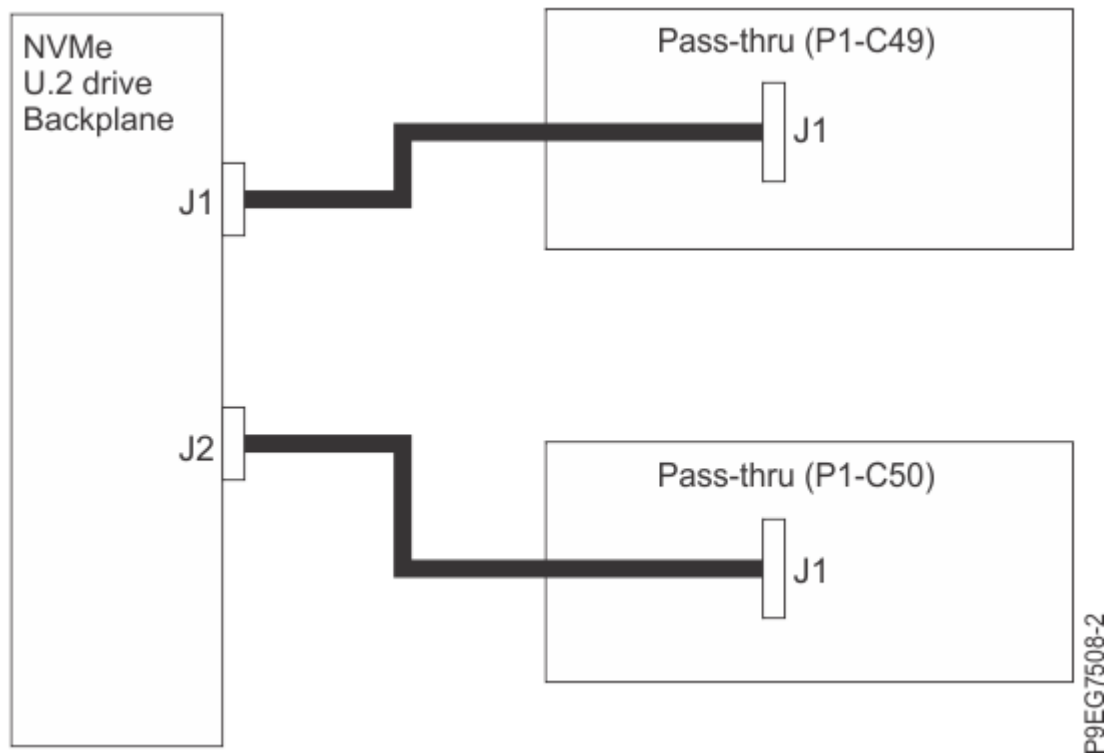


Figure 24. Connecting the NVMe cable for a system with two NVMe U.2 pass-thru cards in slot P1-C49 and slot P1-C50

3. To install or replace the NVMe U.2 pass-thru card, complete the following steps:
 - a) Route the NVMe cable into position while you lower the NVMe U.2 pass-thru card into its slot.
 - b) Push the NVMe U.2 pass-thru card down to seat the card.
 - c) Push in and twist the screws **(A)** clockwise to fully seat the NVMe U.2 pass-thru card.

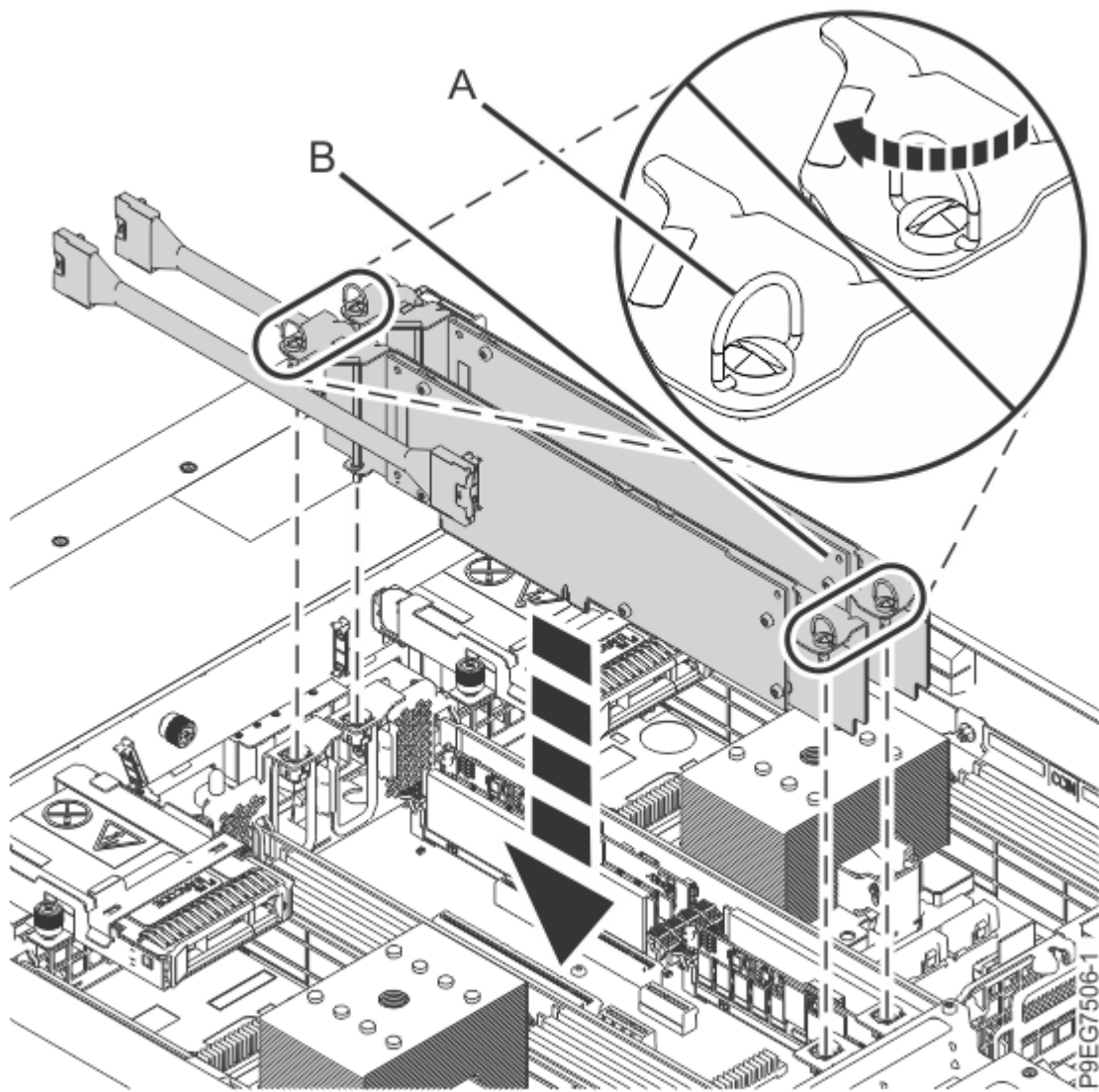
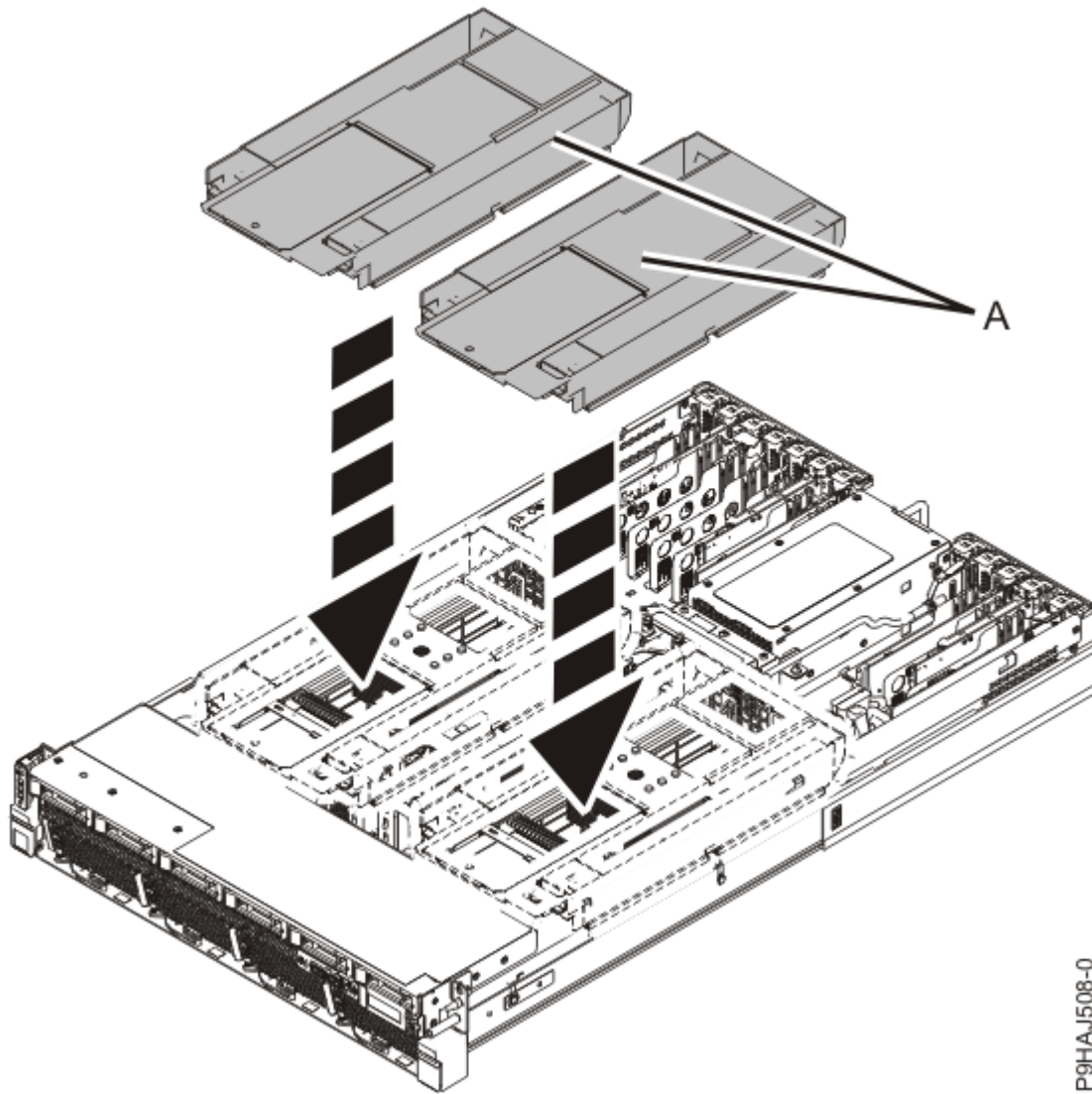


Figure 25. Seating the NVMe U.2 pass-thru card

4. Replace each air baffle **(A)** straight down into the chassis.

See [Figure 26](#) on page 30. When an air baffle is upside-down, hold the detachable drive cover to prevent it from coming loose.



P9HAJ508-0

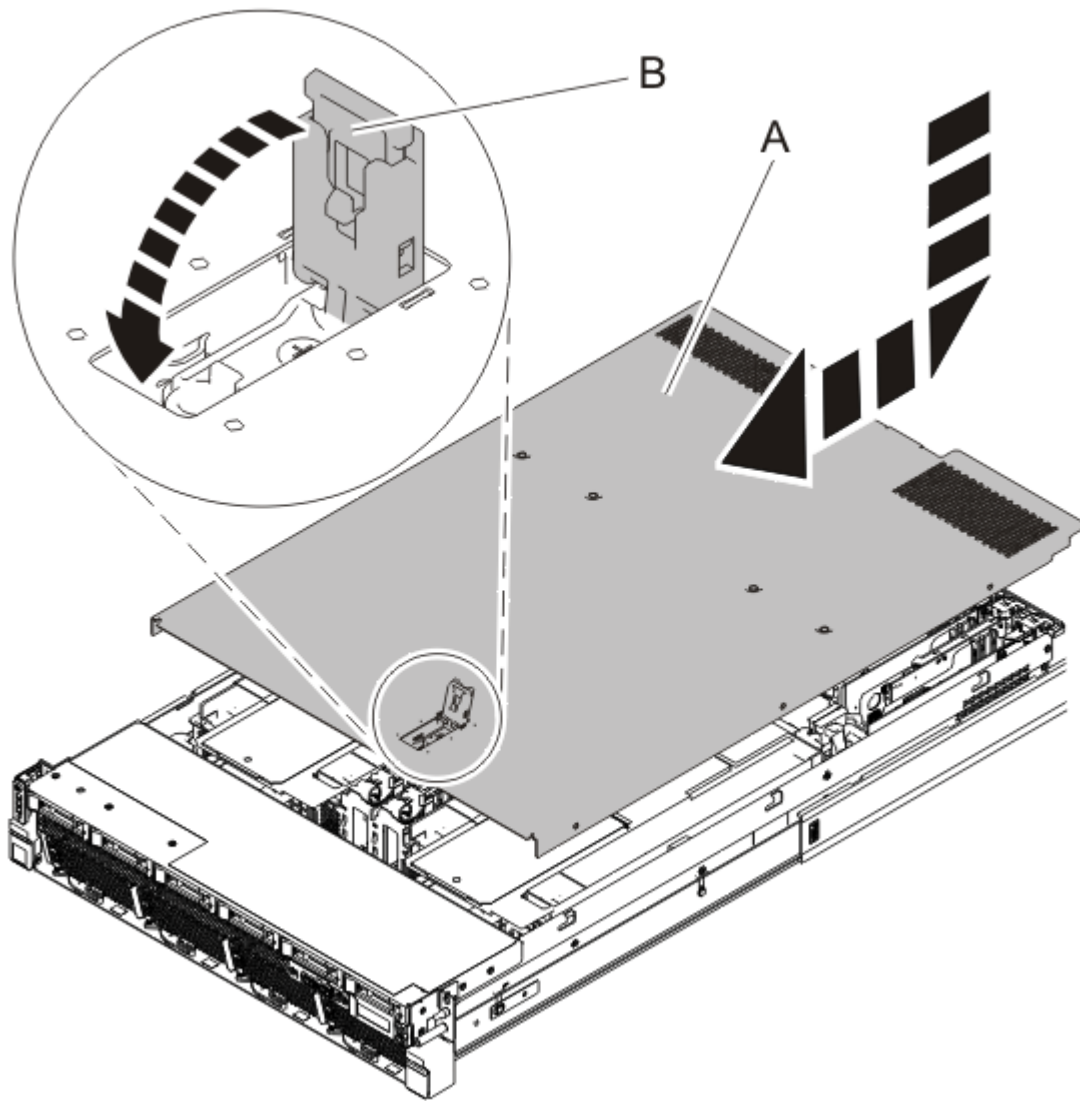
Figure 26. Replacing the air baffle

Preparing the 9009-22G or 9223-22S system for operation after removing and replacing an NVMe U.2 pass-thru card

To prepare the system for operation after removing and replacing an NVMe U.2 pass-thru card, complete the steps in this procedure.

Procedure

1. Ensure that you have the electrostatic discharge (ESD) wrist strap on and that the ESD clip is plugged into a ground jack or connected to an unpainted metal surface. If not, do so now.
2. Slide the service access cover **(A)** onto the system unit.
3. Close the release latch **(B)** by pushing it in the direction shown.



P9HAJ506-1

Figure 27. Installing the service access cover

4. Unlock the blue rail safety latches (**A**) by pushing them inward.

Ensure that the cable management arms can move freely. Ensure that the cables at the rear of the unit do not catch or bind as you push the unit into the operating position.

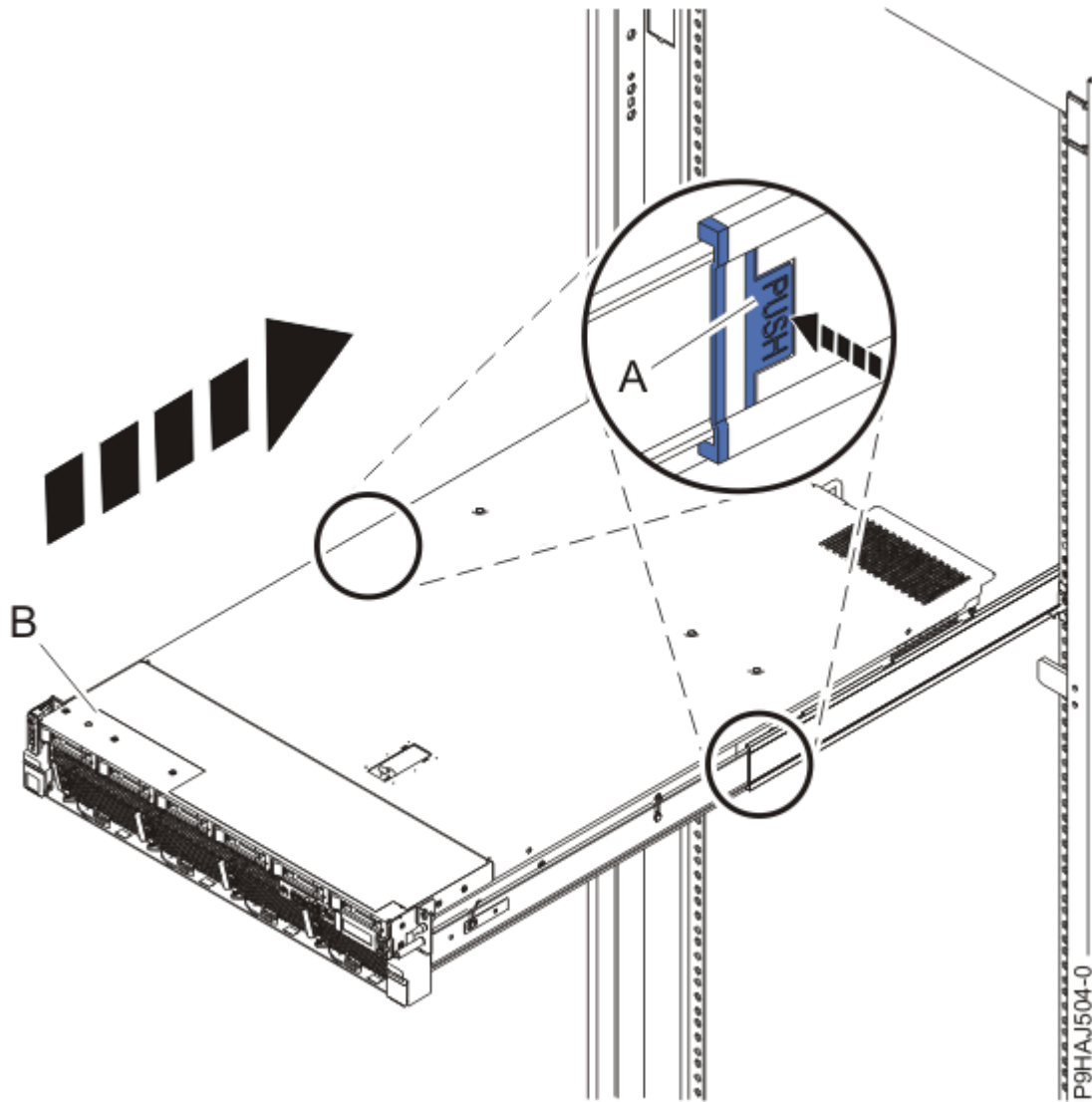


Figure 28. Placing the system into the operating position

5. Push the system unit (**B**) back into the rack until both release latches of the system unit lock into position.

Secure the cable management arm with hook-and-loop fasteners around the back side of the cable management arm, but not around the cables.

6. Using your labels, reconnect the power cords (**A**) to the system unit.

Fasten the power cords to the system using the hook-and-loop fasteners (**B**) as shown in [Figure 29 on page 33](#).

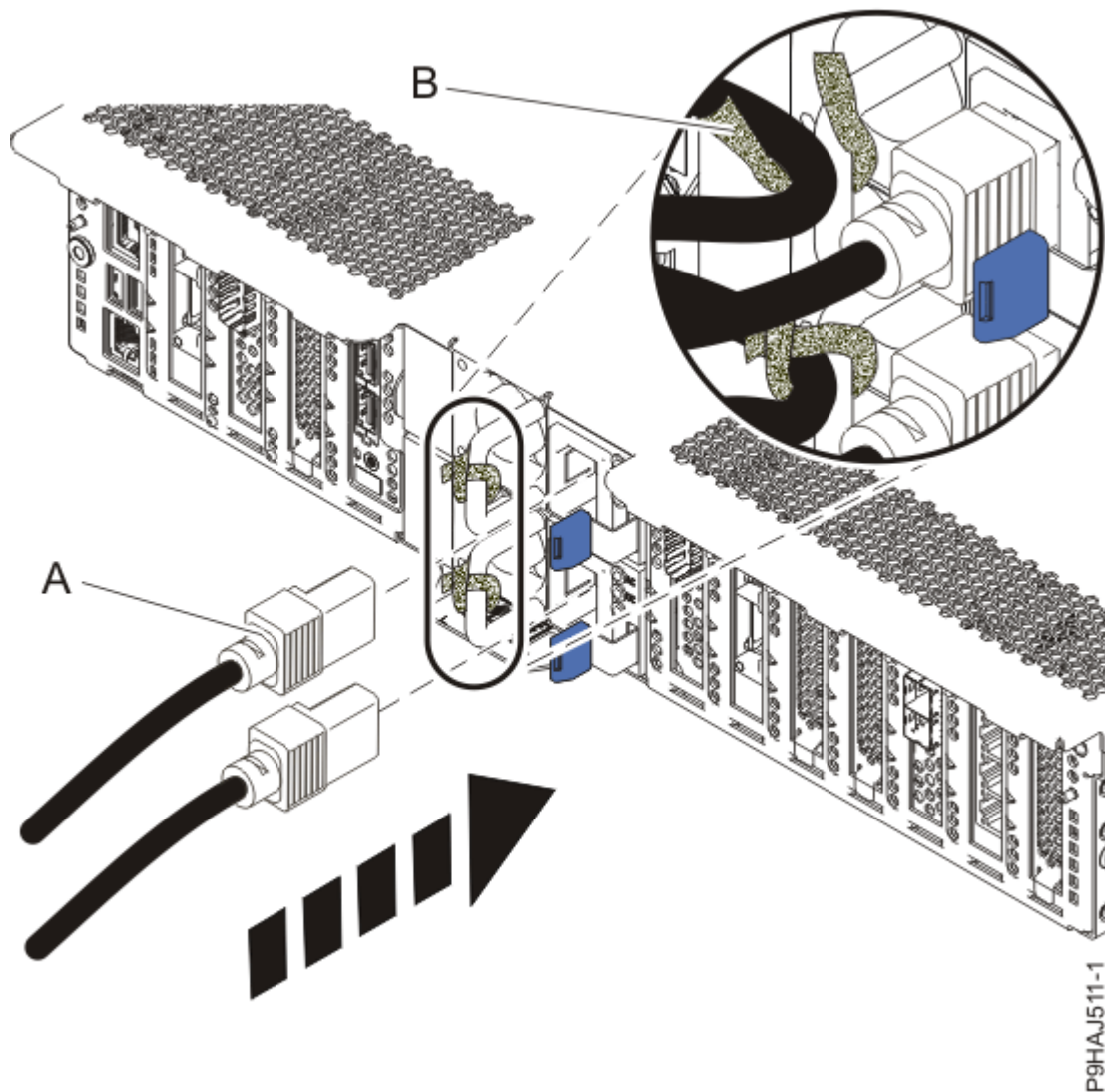


Figure 29. Connecting the power cords

7. Start the system. For instructions, see [Starting a system](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/crustartsys.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/crustartsys.htm).
8. Turn off the identify LED. For instructions, see [Deactivating an identify LED](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/p9haj_turn_off_identify_led.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/p9haj_turn_off_identify_led.htm).
9. Verify the installed part.
 - If you replaced the part because of a service action, verify the installed part. For instructions, see [Verifying a repair](http://www.ibm.com/support/knowledgecenter/POWER9/p9ect/pxect_verifyrepair.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9ect/pxect_verifyrepair.htm).
 - If you installed the part for any other reason, verify the installed part. For instructions, see [Verifying the installed part](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/pxhaj_hsmverify.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/pxhaj_hsmverify.htm).

Permanently removing an NVMe U.2 pass-thru card from the 9009-22G or 9223-22S system

Find information about permanently removing an NVMe U.2 pass-thru card from the IBM Power System S922 (9009-22G) or IBM Power System H922S (9223-22S) server.

About this task

Note: Installing this feature is a customer task. You can complete this task yourself, or contact a service provider to complete the task for you. You might be charged a fee by the service provider for this service.

If your system is managed by the Hardware Management Console (HMC), use the HMC to repair a part in the system. For instructions, see [Repairing a part by using the HMC \(www.ibm.com/support/knowledgecenter/POWER9/p9haj/p9haj_hmc_repair.htm\)](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/p9haj_hmc_repair.htm).

If you do not have an HMC, complete the steps in the following procedures to permanently remove an NVMe U.2 pass-thru card.

Preparing the 9009-22G or 9223-22S system to permanently remove an NVMe U.2 pass-thru card

To prepare the system to permanently remove an NVMe U.2 pass-thru card, complete the steps in this procedure.

Procedure

1. Identify the part and the system that you are working on. For instructions, see [Identifying a part \(www.ibm.com/support/knowledgecenter/POWER9/p9haj/sal.htm\)](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/sal.htm).

Use the blue identify LED on the enclosure to locate the system. Ensure that the serial number of the system matches the serial number to be serviced.

2. Stop the system. For instructions, see [Stopping a system \(www.ibm.com/support/knowledgecenter/POWER9/p9haj/crustopsys.htm\)](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/crustopsys.htm).
3. Label and disconnect the power cords from the system unit.
See [Figure 30 on page 35](#).

Notes:

- This system might be equipped with two or more power supplies. If the removing and replacing procedures require the system power to be turned off, ensure that all the power sources to the system are disconnected.
- The power cord **(B)** is fastened to the system with hook-and-loop fastener **(A)**. If you are placing the system in a service position after you disconnect the power cords, ensure that you unstrap the fastener.

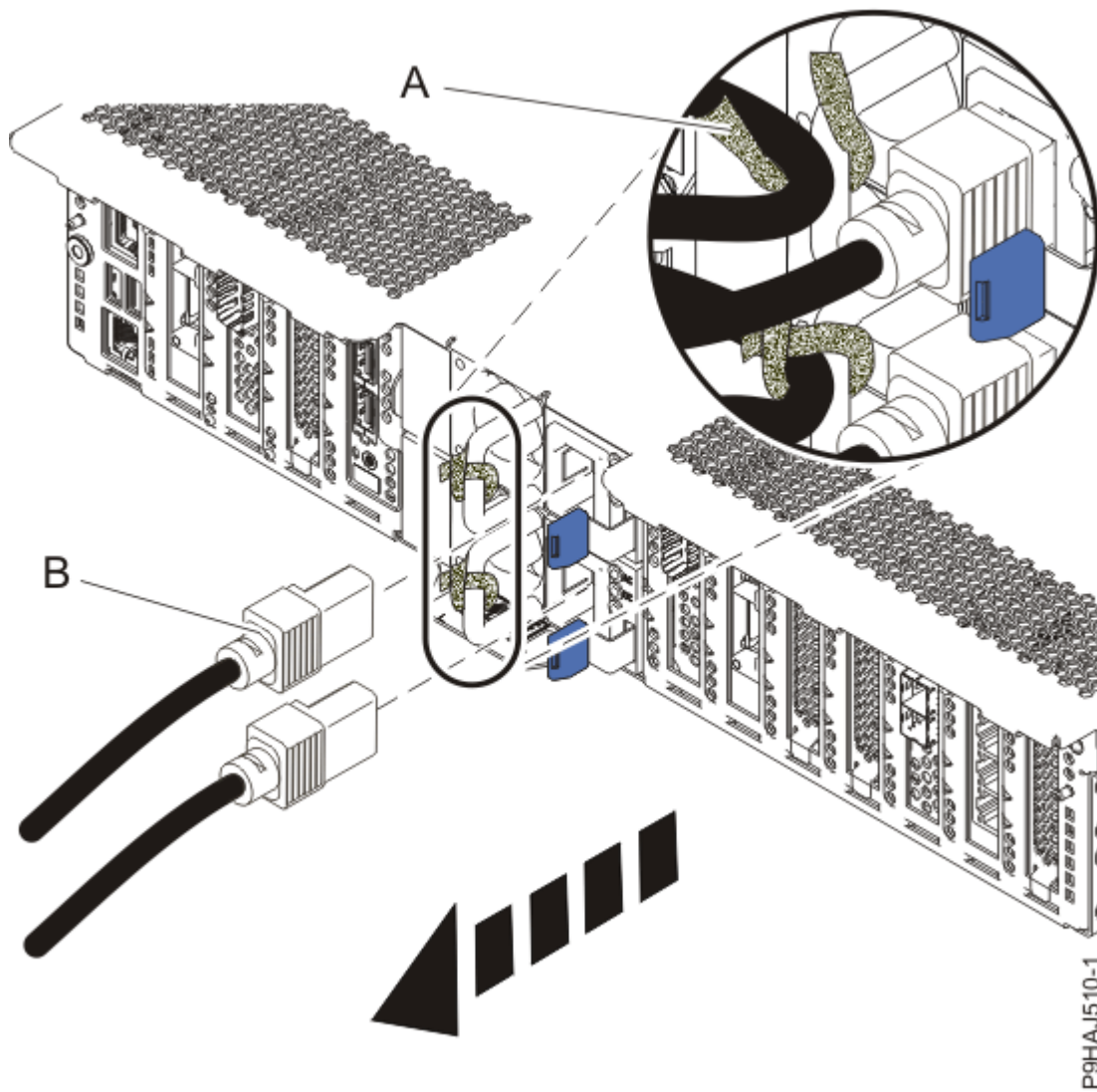
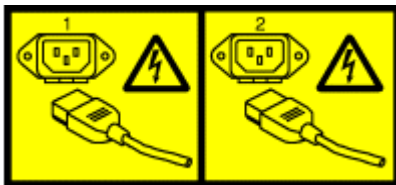


Figure 30. Removing the power cords

(L003)



or



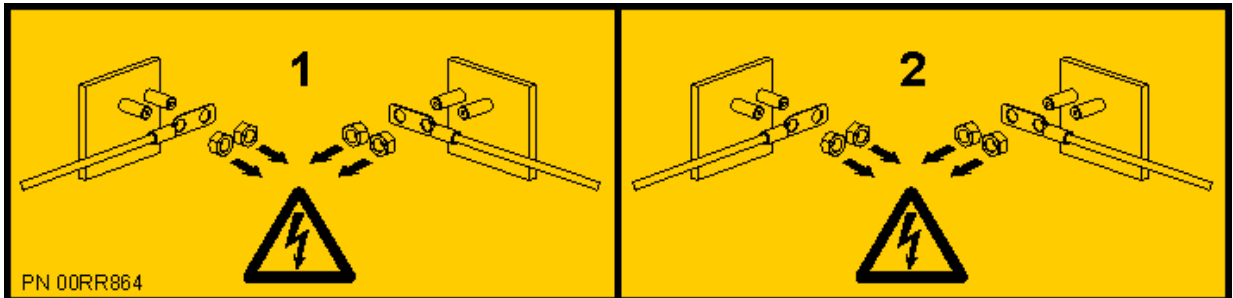
or




or



or



 **DANGER:** Multiple power cords. The product might be equipped with multiple AC power cords or multiple DC power cables. To remove all hazardous voltages, disconnect all power cords and power cables. (L003)

4. Open the side latches (**A**) and pull the latches to slide the system unit fully into the service position, until the slides click and hold the system unit securely. Ensure that the screws inside the latches are not secured to the rack.

Remove the hook-and-loop fasteners that secure the cable management arms. Ensure that the cable management arms can move freely. Ensure that the cables at the rear of the system do not catch or bind as you pull the system unit into the service position.

Do not pull out or install any drawer or feature if the rack stabilizer brackets are not attached to the rack. Do not pull out more than one drawer at a time. The rack might become unstable if you pull out more than one drawer at a time.



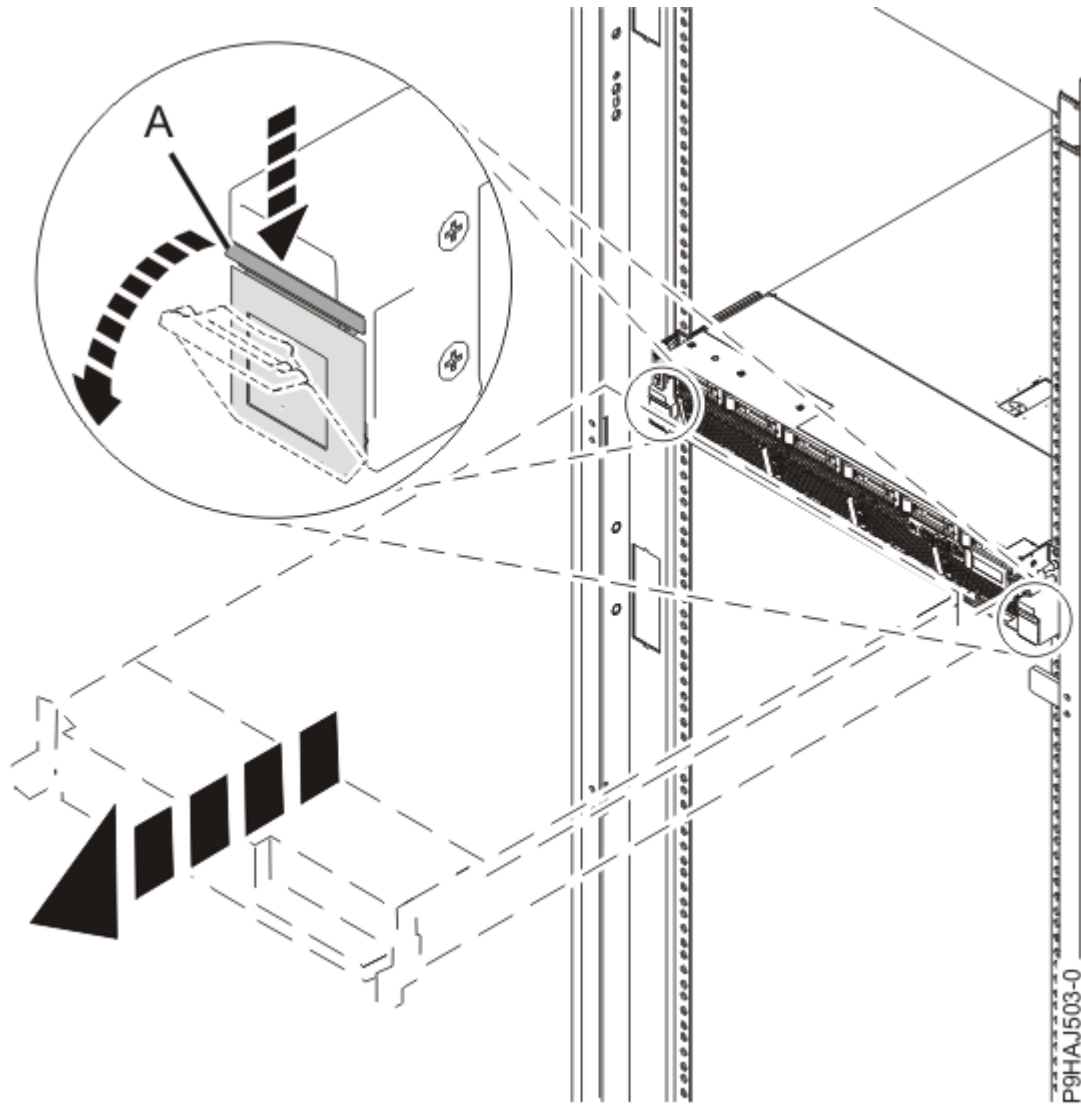


Figure 31. Releasing the side latches

5. Attach the electrostatic discharge (ESD) wrist strap.

The ESD wrist strap must be connected to an unpainted metal surface until the service procedure is completed, and if applicable, until the service access cover is replaced.



Attention:

- Attach an electrostatic discharge (ESD) wrist strap to the front ESD jack, to the rear ESD jack, or to an unpainted metal surface of your hardware to prevent the electrostatic discharge from damaging your hardware.
- When you use an ESD wrist strap, follow all electrical safety procedures. An ESD wrist strap is used for static control. It does not increase or decrease your risk of receiving electric shock when using or working on electrical equipment.
- If you do not have an ESD wrist strap, just prior to removing the product from ESD packaging and installing or replacing hardware, touch an unpainted metal surface of the system for a minimum of 5 seconds. If at any point in this service process you move away from the system, it is important to again discharge yourself by touching an unpainted metal surface for at least 5 seconds before you continue with the service process.

6. Release the service access cover latch by pushing the release latch **(A)** in the direction shown.
7. Slide the cover **(B)** off the system unit. When the front of the service access cover clears the upper frame ledge, lift the cover up and off the system unit.



Attention: Operating the system without the service access cover on for more than 10 minutes when the system power is turned on might damage the system components.

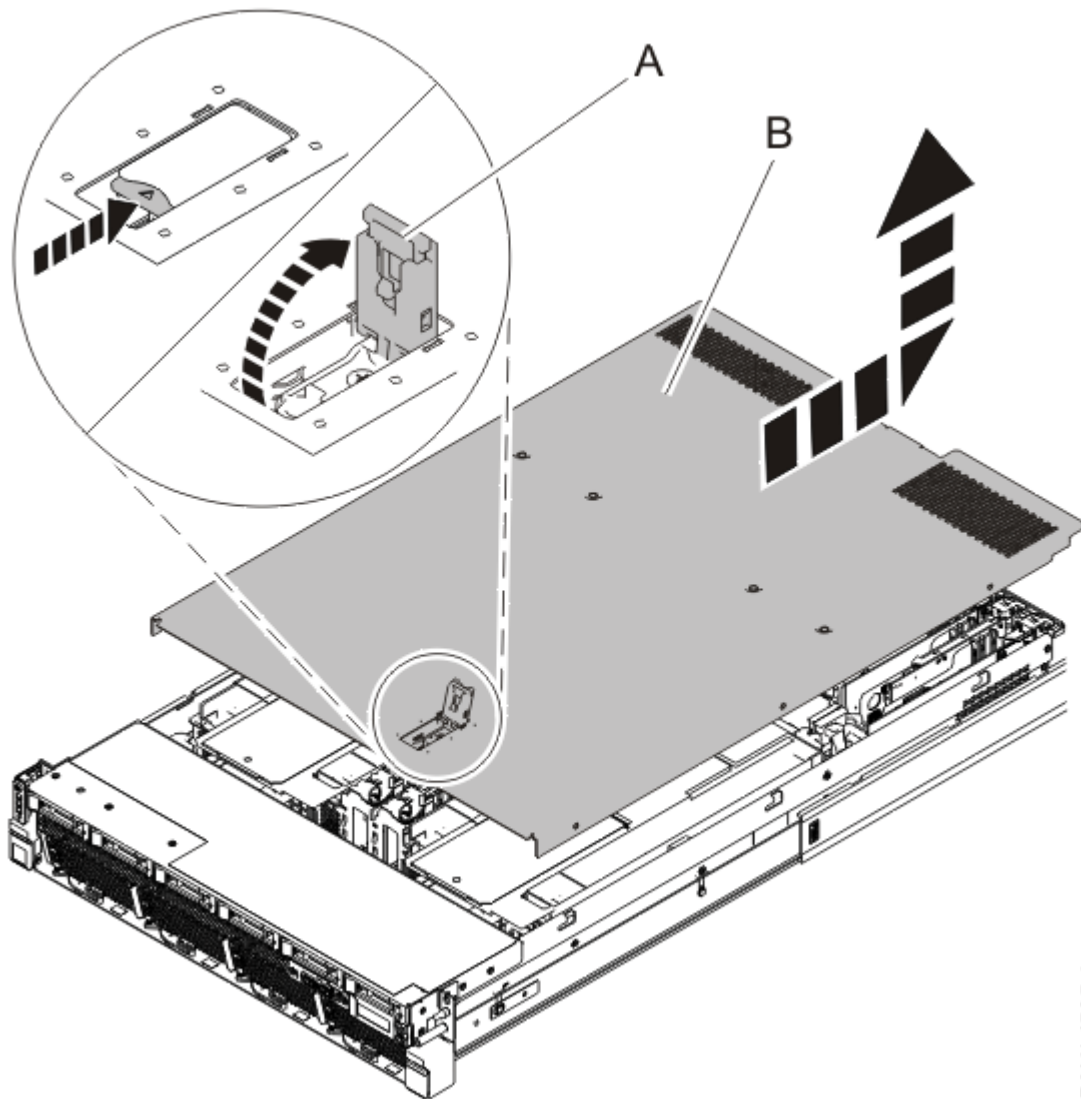


Figure 32. Removing the service access cover

Permanently removing an NVMe U.2 pass-thru card from the 9009-22G or 9223-22S system

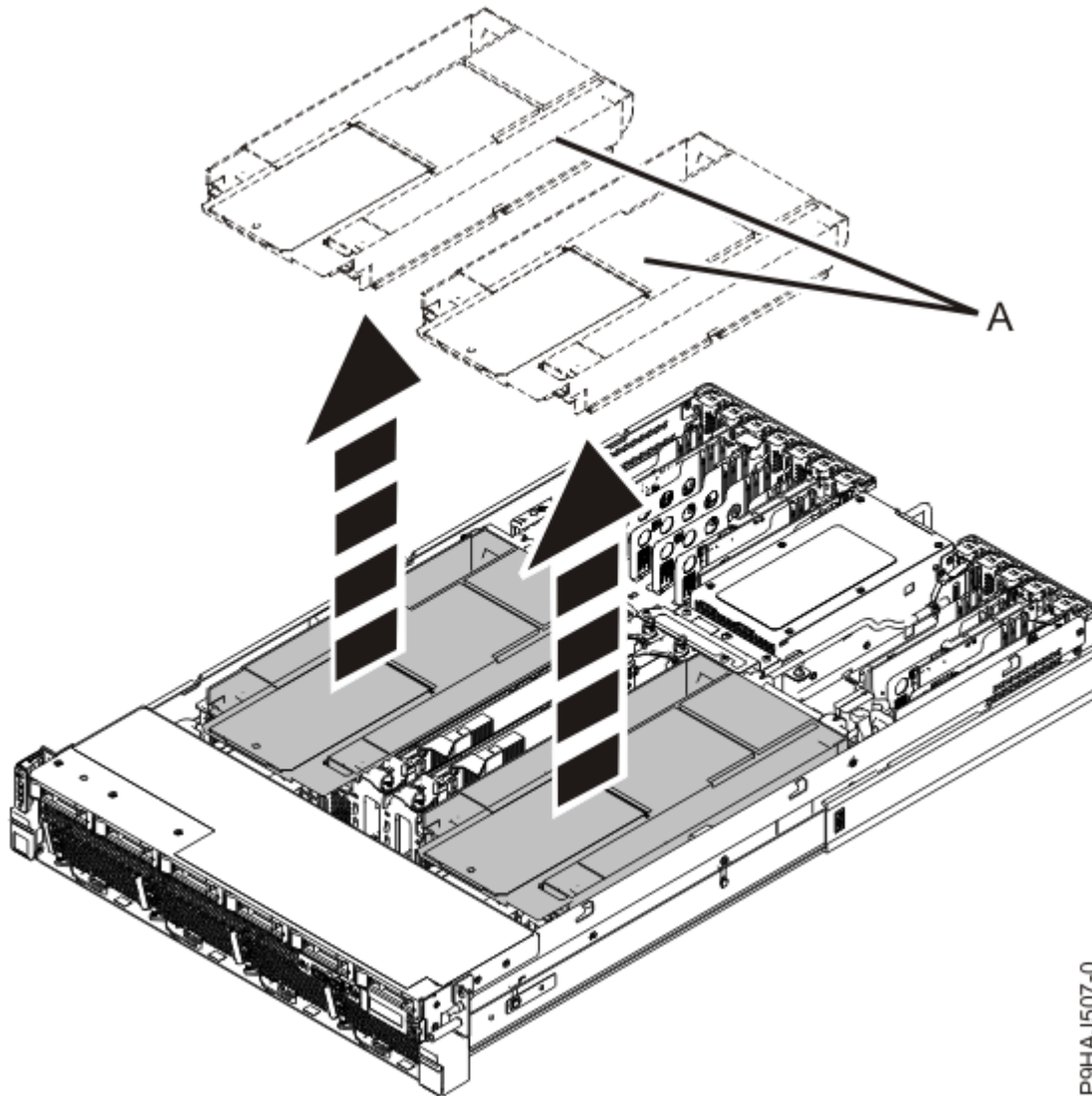
To permanently remove an NVMe pass-thru card from the system, complete the steps in this procedure.

Procedure

1. Ensure that you have the electrostatic discharge (ESD) wrist strap on and that the ESD clip is plugged into a ground jack or connected to an unpainted metal surface. If not, do so now.
2. Lift each air baffle **(A)** straight up.

See [Figure 33 on page 40](#).

Place air baffles upside down on a clean area. When you turn an air baffle over, hold the detachable drive cover to prevent it from coming loose.



P9HAJ507-0

Figure 33. Removing the air baffle

3. Identify the NVMe cable that attaches to the NVMe U.2 pass-thru card you want to permanently remove.
4. Press the connector latch and unplug the NVMe cable that is connected to the NVMe drive backplane. Leave the other end of the cable connected to the NVMe U.2 pass-thru card until directed to unplug it.

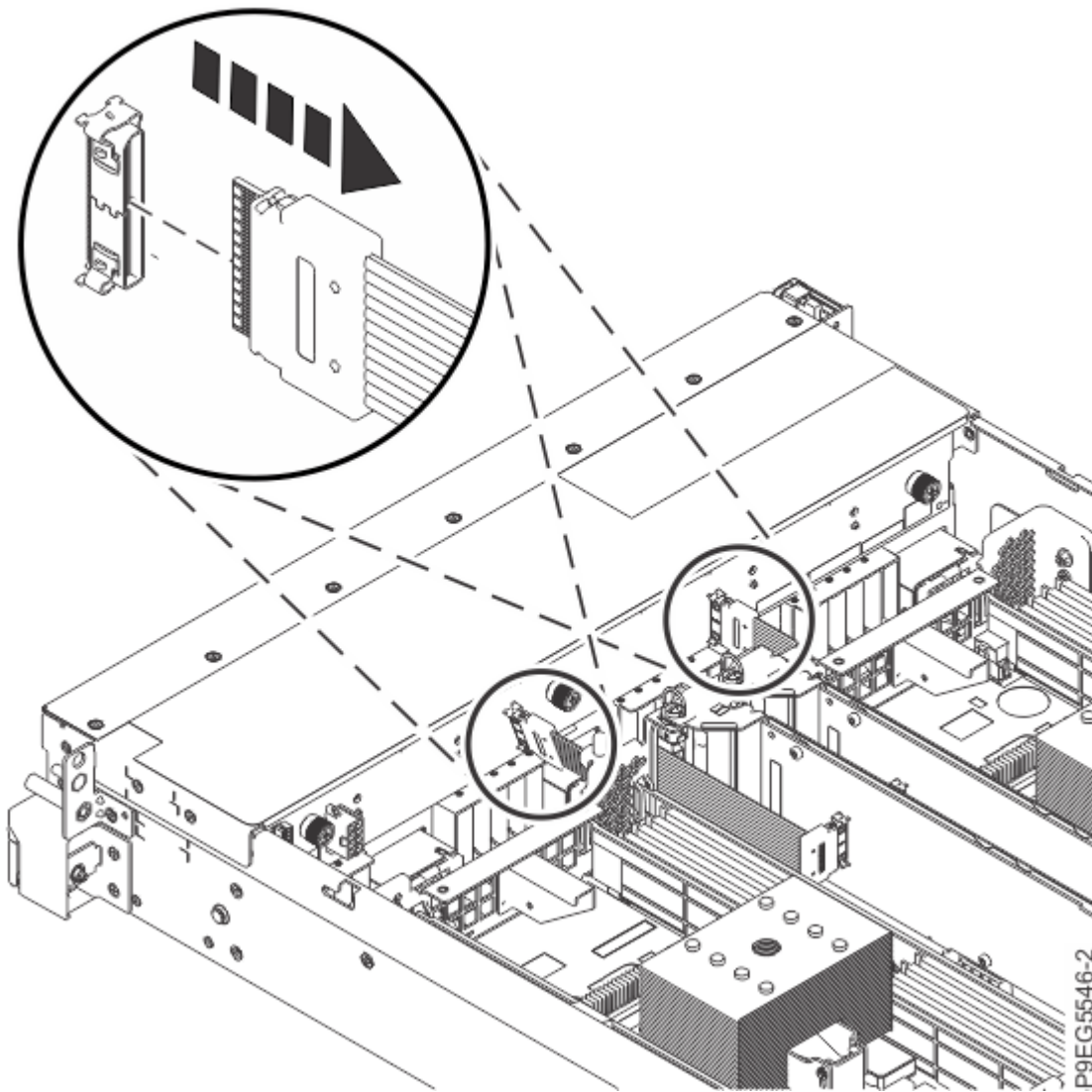


Figure 34. Removing the NVMe cable from the NVMe drive backplane

5. To remove the NVMe U.2 pass-thru card, complete the following steps:
 - a) Twist the screws **(A)** counterclockwise to release the NVMe U.2 pass-thru card.
 - b) Lift both the NVMe U.2 pass-thru card and the NVMe cable out of the slot as shown in the following figure.

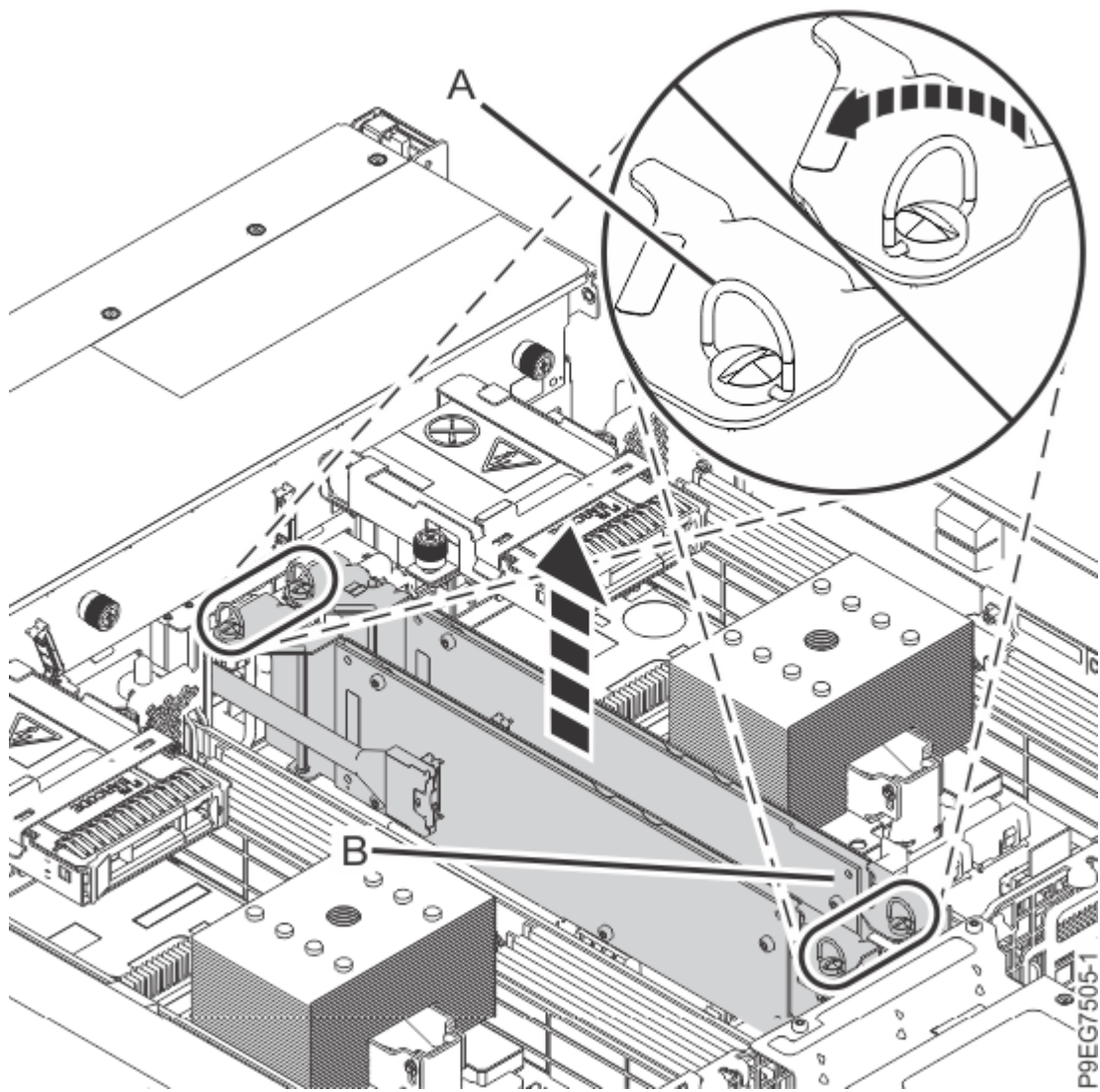


Figure 35. Removing the NVMe U.2 pass-thru card

6. Disconnect the NVMe cable from the NVMe U.2 pass-thru card. See the following figure.

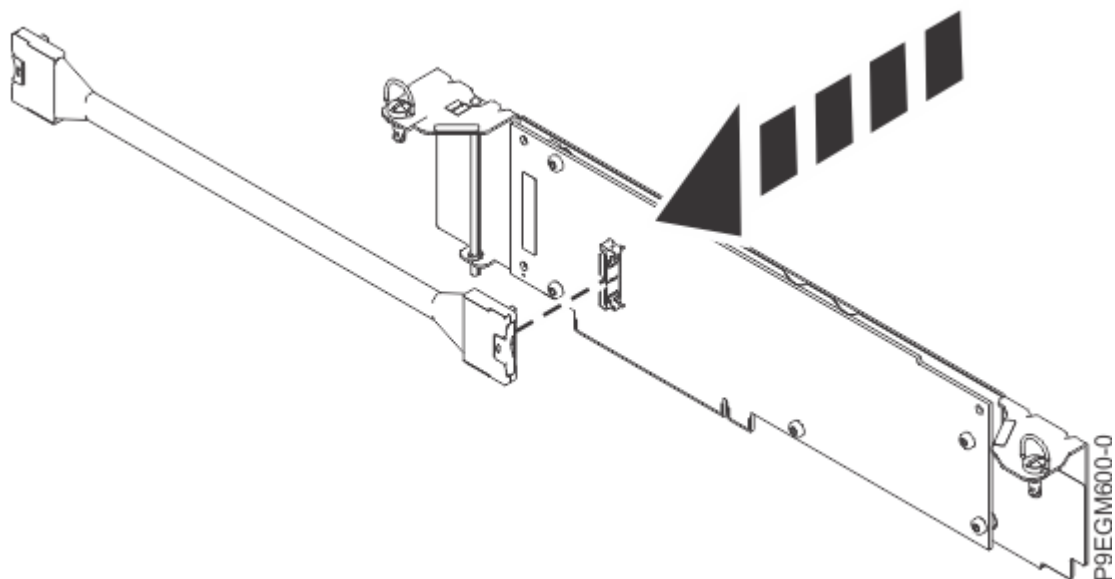


Figure 36. Disconnecting the NVMe cable from the NVMe U.2 pass-thru card

7. Place the NVMe U.2 pass-thru card on an appropriate ESD surface.
8. To ensure proper air flow, you must install a clip-in filler and air divider.
 - a) Align the clip-in filler over the empty SAS slot.
 - b) Rotate the top of the clip-in filler until the bottom hook clips onto the air screen.

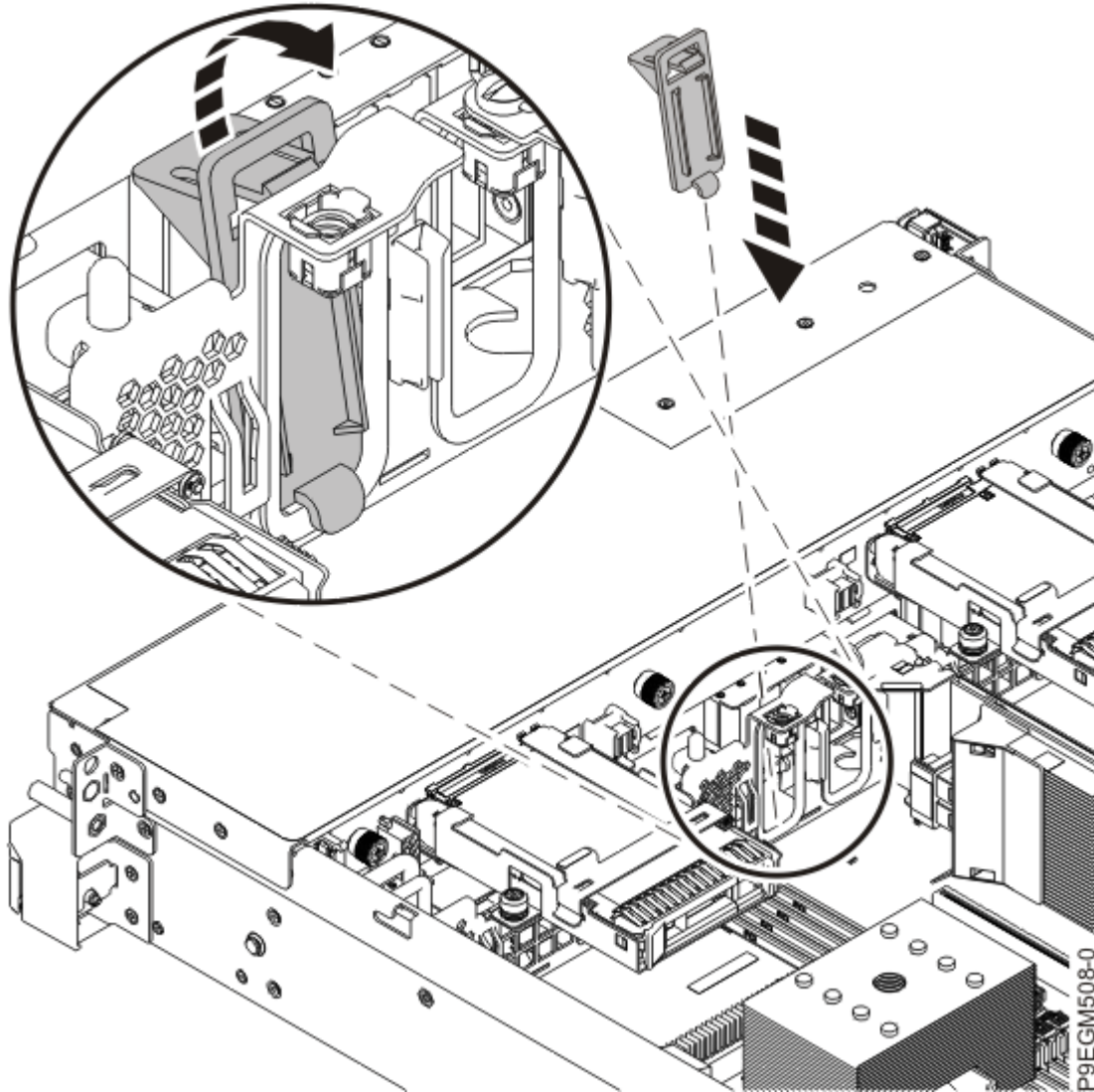


Figure 37. Installing the clip-in filler

- c) Lower the air divider into place as shown in the following figure.

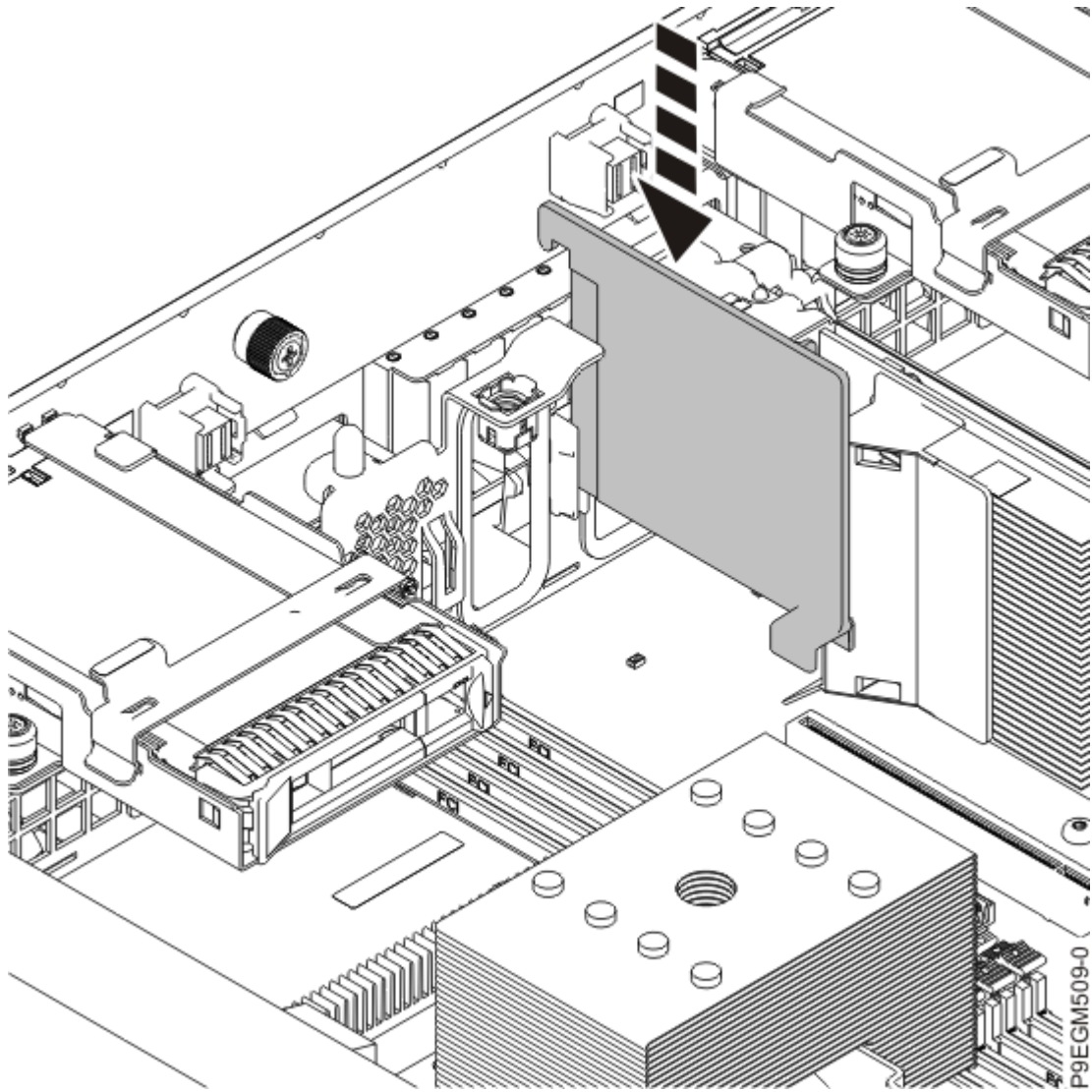
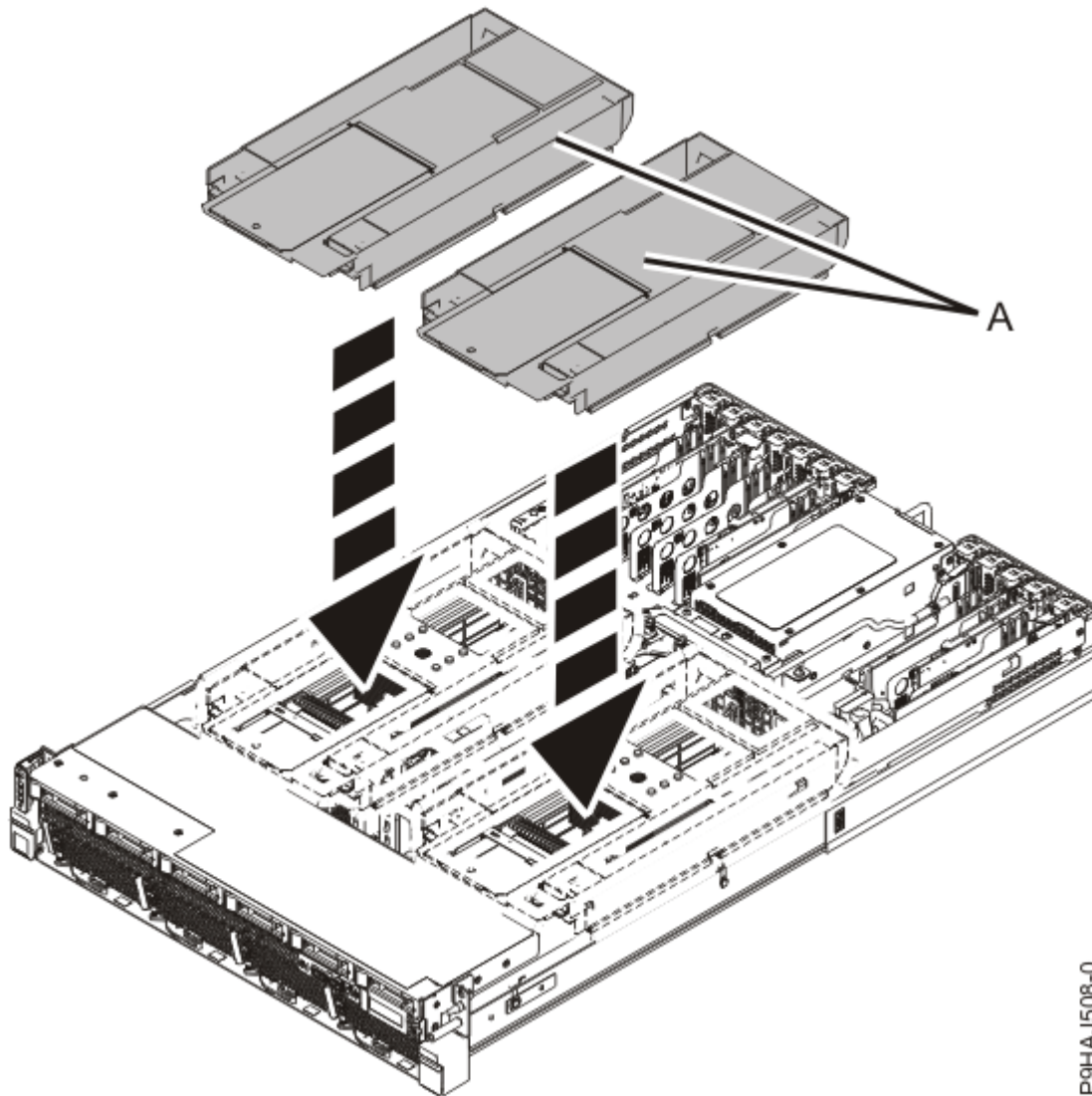


Figure 38. Installing the air divider

9. Replace each air baffle **(A)** straight down into the chassis.

See Figure 39 on page 45. When an air baffle is upside-down, hold the detachable drive cover to prevent it from coming loose.



P9HAJ508-0

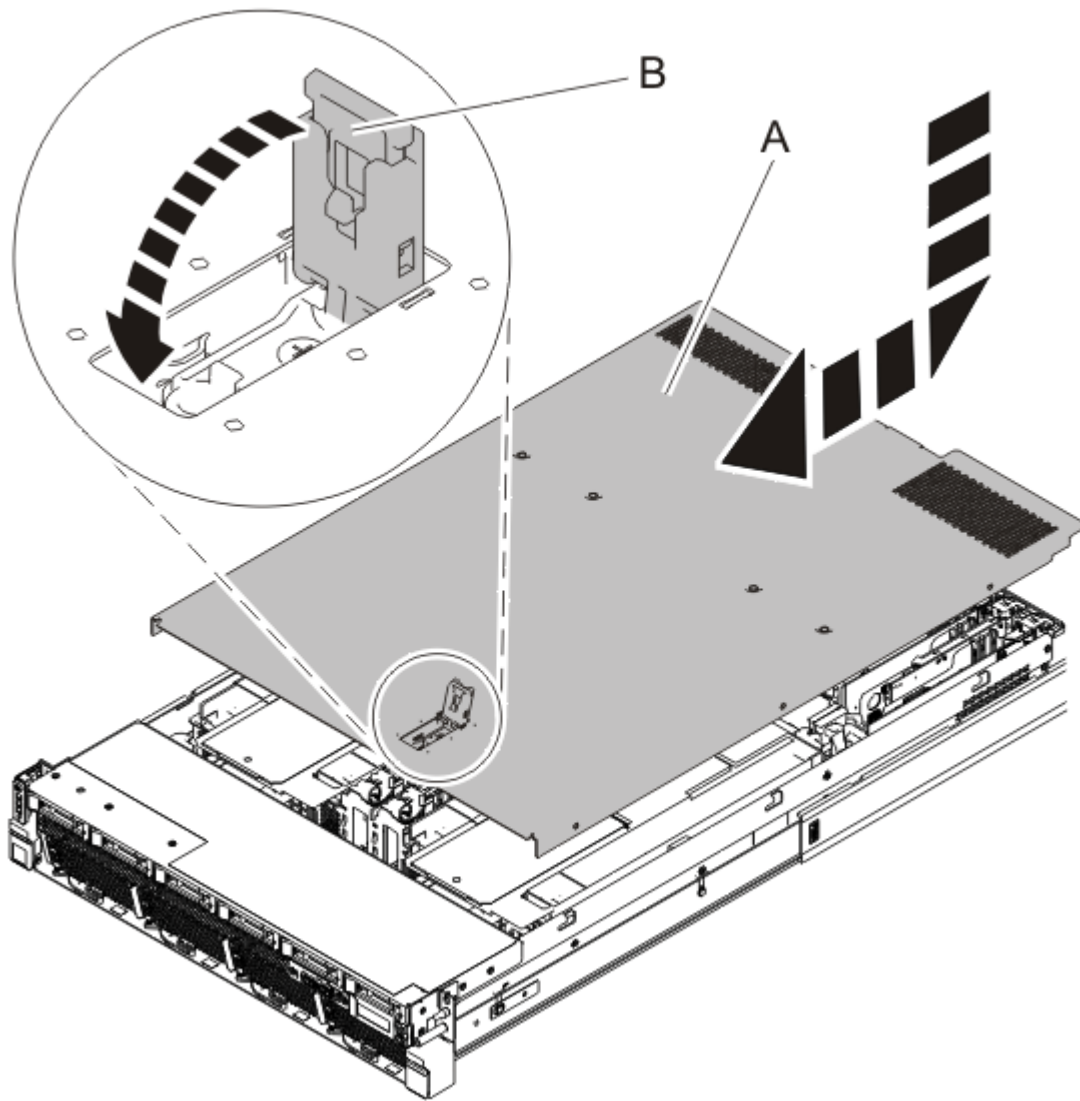
Figure 39. Replacing the air baffle

Preparing the 9009-22G or 9223-22S system for operation after removing and replacing an NVMe U.2 pass-thru card

To prepare the system for operation after permanently removing an NVMe U.2 pass-thru card, complete the steps in this procedure.

Procedure

1. Ensure that you have the electrostatic discharge (ESD) wrist strap on and that the ESD clip is plugged into a ground jack or connected to an unpainted metal surface. If not, do so now.
2. Slide the service access cover **(A)** onto the system unit.
3. Close the release latch **(B)** by pushing it in the direction shown.



P9HAJ506-1

Figure 40. Installing the service access cover

4. Unlock the blue rail safety latches (**A**) by pushing them inward.

Ensure that the cable management arms can move freely. Ensure that the cables at the rear of the unit do not catch or bind as you push the unit into the operating position.

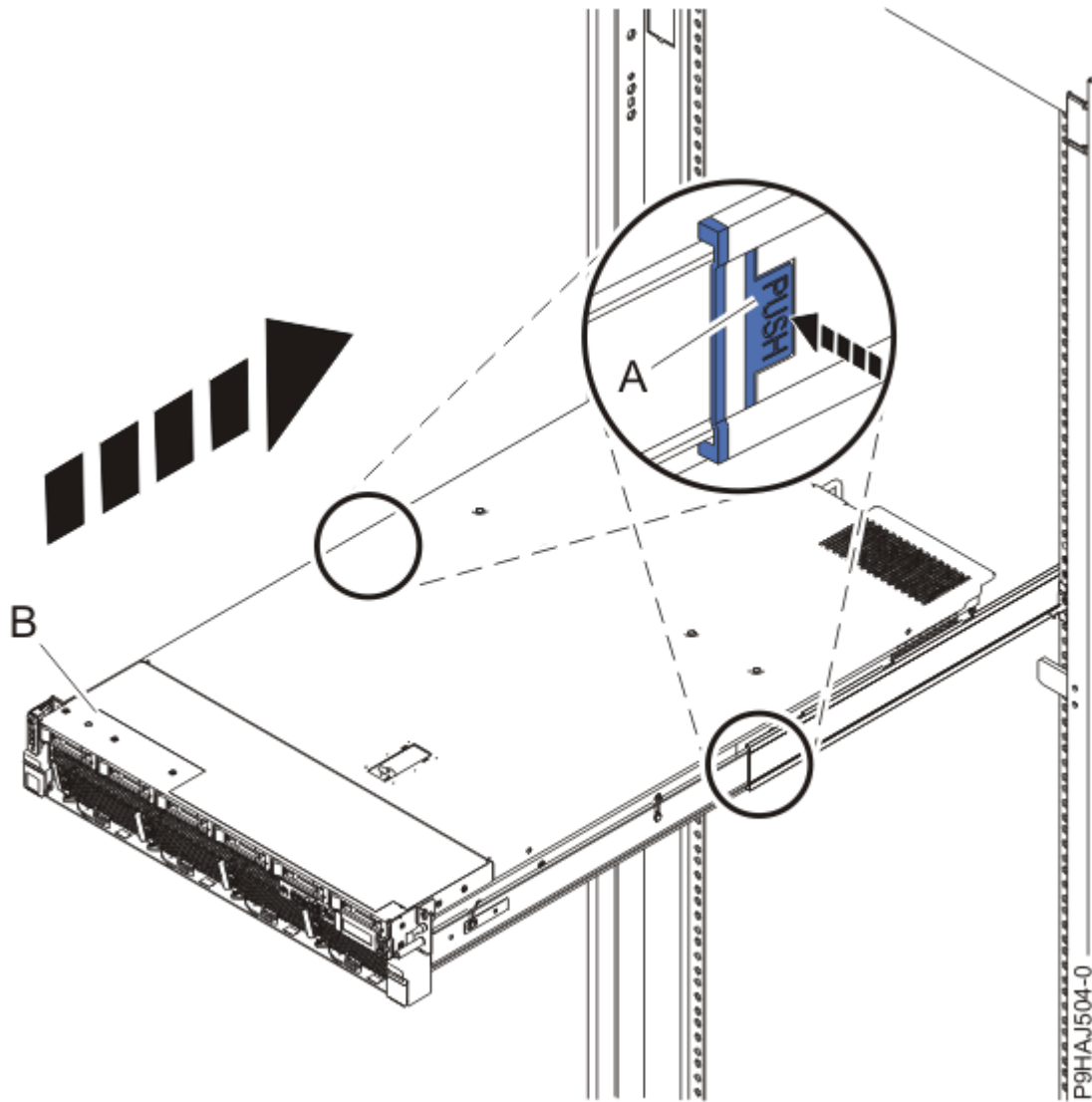


Figure 41. Placing the system into the operating position

5. Push the system unit (**B**) back into the rack until both release latches of the system unit lock into position.

Secure the cable management arm with hook-and-loop fasteners around the back side of the cable management arm, but not around the cables.

6. Using your labels, reconnect the power cords (**A**) to the system unit.

Fasten the power cords to the system using the hook-and-loop fasteners (**B**) as shown in [Figure 42 on page 48](#).

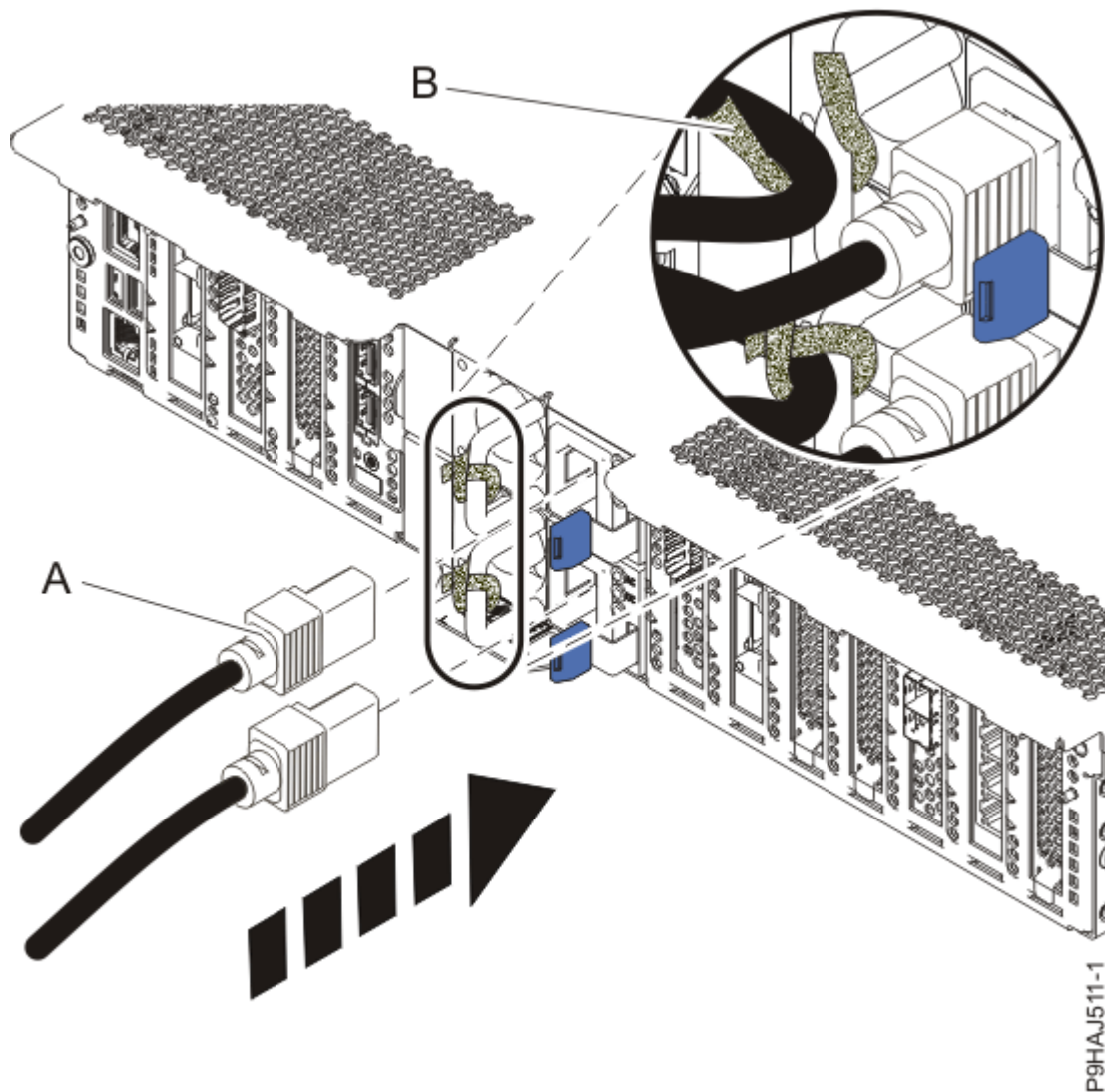


Figure 42. Connecting the power cords

7. Start the system. For instructions, see [Starting a system](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/crustartsys.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/crustartsys.htm).
8. Turn off the identify LED. For instructions, see [Deactivating an identify LED](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/p9haj_turn_off_identify_led.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/p9haj_turn_off_identify_led.htm).
9. Verify the installed part.
 - If you replaced the part because of a service action, verify the installed part. For instructions, see [Verifying a repair](http://www.ibm.com/support/knowledgecenter/POWER9/p9ect/pxect_verifyrepair.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9ect/pxect_verifyrepair.htm).
 - If you installed the part for any other reason, verify the installed part. For instructions, see [Verifying the installed part](http://www.ibm.com/support/knowledgecenter/POWER9/p9haj/pxhaj_hsmverify.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9haj/pxhaj_hsmverify.htm).

Related procedures for installing, removing, and replacing NVMe devices

About this task

Find procedures that are related to installing, removing, and replacing NVMe devices.

Checking the amount of remaining life in NVMe devices

Learn how to use operating system commands to find the amount of remaining life in an NVMe device.

The AIX®, IBM i, and Linux® operating systems have commands that you can use to determine the amount of life that is remaining in an NVMe device.

For more information, see the following procedures:

- [Running the AIX command to check the amount of remaining life in NVMe devices](http://www.ibm.com/support/knowledgecenter/POWER9/p9hak/pxhak_nvme_remaining_life_aix.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9hak/pxhak_nvme_remaining_life_aix.htm)
- [Running the IBM i command to check the amount of remaining life in NVMe devices](http://www.ibm.com/support/knowledgecenter/POWER9/p9hak/pxhak_nvme_remaining_life_ibmi.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9hak/pxhak_nvme_remaining_life_ibmi.htm)
- [Running the Linux command to check the amount of remaining life in NVMe devices](http://www.ibm.com/support/knowledgecenter/POWER9/p9hak/pxhak_nvme_remaining_life_linux.htm) (www.ibm.com/support/knowledgecenter/POWER9/p9hak/pxhak_nvme_remaining_life_linux.htm)

Related information

[“Removing an operational NVMe device from an IBM i logical partition” on page 49](#)

Learn how to remove an operational NVMe device from an IBM i logical partition.

Removing an operational NVMe device from an IBM i logical partition

Learn how to remove an operational NVMe device from an IBM i logical partition.

The IBM i operating system provides commands that you can use to remove an operational NVMe device.

For details, see [Removing an operational NVMe device from a partition](#) in the IBM i Knowledge Center.

Note: To navigate to the page in the IBM i 7.4 Knowledge Center, select **Systems management > Disk management > Disk management checklist > Removing an operational NVMe device from a partition**.

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This device complies with Part 15 of the 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.

Responsible Party:

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