Lenovo

ThinkSystem SD650 V2/SD650-N V2 Neptune® DWC Trays and DW612 Neptune® DWC Enclosure Maintenance Manual

Machine Types: 7D1M , 7D1N and 7D1L

Note

Before using this information and the product it supports, be sure to read and understand the safety information and the safety instructions, which are available at:
https://pubs.lenovo.com/safety_documentation/

The server is intended for use in a system/rack always installed on the load side of Power Distribution Unit (PDU) or Uninterruptible Power Supply (UPS) supplying a maximum 20 A branch circuit protection. The overall system/rack connection to mains power is to be a Pluggable Type B connector.

In addition, be sure that you are familiar with the terms and conditions of the Lenovo warranty for your solution, which can be found at:
http://datacentersupport.lenovo.com/warrantylookup

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Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية

Antes de instalar este produto, leia as Informações de Segurança.

在安装本产品之前，请仔细阅读 Safety Information （安全信息）。

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

Ennen kuin asennat tämän tuotteen, lue turvaohjeet kohdasta Safety Information.

Avant d'installer ce produit, lisez les consignes de sécurité.

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

Πριν εγκαταστήσετε το προϊόν αυτό, διαβάστε τις πληροφορίες ασφάλειας
(safety information).

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

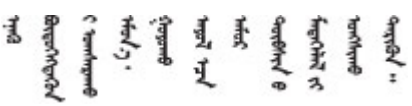
A termék telepítése előtt olvassa el a Biztonsági előírásokat!

Prima di installare questo prodotto, leggere le Informazioni sulla Sicurezza.

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

Пред да се инсталира овој продукт, прочитајте информацијата за безбедност.



Les sikkerhetsinformasjonen (Safety Information) før du installerer dette produktet.

Przed zainstalowaniem tego produktu, należy zapoznać się
z książką "Informacje dotyczące bezpieczeństwa" (Safety Information).

Antes de instalar este produto, leia as Informações sobre Segurança.

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Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

Antes de instalar este producto, lea la información de seguridad.

Läs säkerhetsinformationen innan du installerar den här produkten.

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Bu ürünü kurmadan önce güvenlik bilgilerini okuyun.

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Safety inspection checklist

Use the information in this section to identify potentially unsafe conditions with your solution. As each machine was designed and built, required safety items were installed to protect users and service technicians from injury.

Notes:

- The product is not suitable for use at visual display workplaces according to §2 of the Workplace Regulations.
- The complete process of setup must be done in the server room.

CAUTION:
S041

CAUTION:

- **This equipment must be installed or serviced by trained personnel, as defined by the NEC, IEC 62368-1 and IEC 60950-1, the standard for Safety of Electronic Equipment within the Field of Audio/ Video, Information Technology and Communication Technology.**
- **Access to the equipment is by the use of a tool, lock and key, or other means of security, and is controlled by the authority responsible for the location.**

Important: Electrical grounding of the solution is required for operator safety and correct system function. Proper grounding of the electrical outlet can be verified by a certified electrician.

Use the following checklist to verify that there are no potentially unsafe conditions:

1. Make sure that the power is off and the power cord is disconnected.

2. Check the power cord.
   - Make sure that the third-wire ground connector is in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground.
   - Make sure that the power cord is the correct type.

     To view the power cords that are available for the server:

     a. Go to:

        http://dcsc.lenovo.com/#/

     b. Click **Preconfigured Model** or **Configure to order**.

     c. Enter the machine type and model for your server to display the configurator page.

     d. Click **Power → Power Cables** to see all line cords.
   - Make sure that the insulation is not frayed or worn.
3. Check for any obvious non-Lenovo alterations. Use good judgment as to the safety of any non-Lenovo alterations.
4. Check inside the solution for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
5. Check for worn, frayed, or pinched cables.
6. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.
7. The design of the electrical distribution system must take into consideration the total grounding leakage current from all power supplies in the enclosure.

   “CAUTION”: High touch current. Connect to earth before connecting to supply.

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Chapter 1. Introduction

The ThinkSystem SD650 V2/SD650-N V2 Neptune® DWC Trays and DW612 Neptune® DWC Enclosure is a 6U solution designed for high-volume network transaction processing. This solution includes a single enclosure that can contain up to six SD650 V2/SD650-N V2 trays, which are designed to deliver a dense, scalable platform for distributed enterprise and hyperconverged solutions.

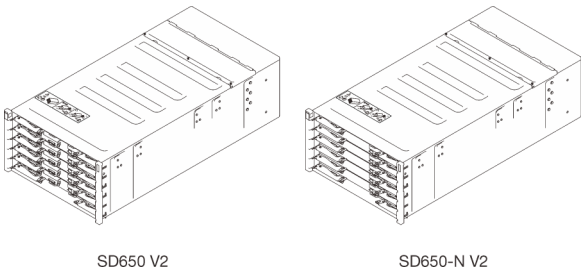

Figure 1. Enclosure with six SD650 V2/SD650-N V2 trays installed

The solution comes with a limited warranty. For details about the warranty, see:
https://support.lenovo.com/us/en/solutions/ht503310

For details about your specific warranty, see:
http://datacentersupport.lenovo.com/warrantylookup

Specifications

The following information is a summary of the features and specifications of the solution. Depending on the model, some features might not be available, while some specifications might not apply.

Enclosure Specifications

A summary of the features and specifications of the enclosure.

Note: One DW612 Enclosure could contain six SD650 V2/SD650-N V2 trays.

Attention: Environment quality must be maintain over the lifetime of the system to receive warranty and support on affecting components. For water quality requirement, see Lenovo Neptune Direct Water-Cooling Standards.

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Table 1. Enclosure specifications

Specification	Description
Dimension	6U enclosure • Height: 263.3 mm (10.37 inches) • Depth: 930.6 mm (36.64 inches) • Width: 447 mm (17.6 inches) • Weight: – Empty enclosure (with midplane and cables): approximately 23.6 kg (52.04 lbs) – Fully configured (stand-alone): – Enclosure with six SD650 V2 trays: approximately 156.54 kg (345.17 lbs) – Enclosure with six SD650-N V2 trays: approximately 168.94 kg (372.51 lbs)
Power supply	**SD650 V2 tray:** Supports six hot-swap ac power supplies (conditionally upgradable to nine with ThinkSystem 2400W (230V) v4 Platinum hot-swap power supply, see “PSU configuration” in *Setup Guide*). • Input voltage: 200-240 Vac • Wattage: – 1800W – 2400W **SD650-N V2 tray:** Supports six hot-swap ac power supplies (conditionally upgradable to nine power supplies, see “PSU configuration” in *Setup Guide*). • Input voltage: 200-240 Vac • Wattage: 2400W **Note:** SD650-N V2 tray supports ThinkSystem 2400W (230V) v4 Platinum hot-swap power supply Delta only. All the installed power supply units must be ThinkSystem 2400W (230V) v4 Platinum hot-swap power supply Delta. **CAUTION:** **Power supplies and redundant power supplies in the enclosure must be with the same brand, power rating, wattage or efficiency level.**
System Management Module 2 (SMM2)	Hot-swappable See https://pubs.lenovo.com/mgt_tools_smm2/ for more details about SMM2.

Table 1. Enclosure specifications (continued)

Specification	Description
Acoustical noise emissions	• SD650 V2 sound power level (LWAd): – Idle: 6.5 Bel – Operation: 7.6 Bel • SD650-N V2 sound power level (LWAd): – Idle: 7.0 Bel – Operation: 9.5 Bel **Notes:** • These levels were measured in controlled acoustical environments according to procedures specified by ISO 7779, and are reported in accordance with ISO 9296. • The declared acoustic noise levels are based on specified configurations, and may change depending on configuration/condition changes. • The declared acoustic noise levels may increase greatly if high-power components are installed, such as high-power NICs and high-power M.2.
Heat output	Approximate heat output: • SD650 V2 – Minimum configuration (with one minimal configuration tray): 4003.5 BTU per hour (1275 watts) – Maximum configuration (with six maximal configuration trays): 23480.92 BTU per hour (7478 watts) • SD650-N V2 – Minimum configuration (with one minimal configuration tray): 7790.34 BTU per hour (2481 watts) – Maximum configuration (with six maximal configuration trays): 44986.78 BTU per hour (14327 watts)
Electrical input	• Sine-wave input (50-60 Hz) required • Input voltage range: – Minimum: 200 Vac – Maximum: 240 Vac

Table 1. Enclosure specifications (continued)

Specification	Description
Water requirement	**Attention:** The water required to initially fill the system side cooling loop must be reasonably clean, bacteria-free water (<100 CFU/ml) such as de-mineralized water, reverse osmosis water, de-ionized water, or distilled water. The water must be filtered with an in-line 50 micron filter (approximately 288 mesh). The water must be treated with anti-biological and anti-corrosion measures. Environment quality must be maintain over the lifetime of the system to receive warranty and support on affecting components. For more information please see Lenovo Neptune Direct Water-Cooling Standards. • Water Temperature: – SD650 V2 tray: ASHRAE class W4: 2°C - 50°C (35.6°F - 122°F) with the following exceptions: – With processors of 205W or higher: 2°C - 45°C (35.6°F - 113°F) – With M.2 drives: 2°C - 45°C (35.6°F - 113°F) – With Intel® Xeon® Platinum 8368Q processor: 2°C - 35°C (35.6°F - 95°F) – SD650-N V2 tray: ASHRAE class W4: 2°C - 45°C (35.6°F - 113°F) – For 80 GB NVIDIA HGX™ A100 4-GPU: ASHRAE class W3: 2°C - 40°C (35.6°F - 104°F) – With Intel® Xeon® Platinum 8368Q processor: 2°C - 35°C (35.6°F - 95°F) • Maximum pressure: 4.4 bars • Minimum water flow rate: – SD650 V2 tray: 6.0 liters per minute per enclosure, assuming 1.0 lpm per compute tray with 6 trays per enclosure (1 tray consists of 2 compute nodes) – For processors below 205W: 6.0 liters per minute per enclosure, assuming 1.0 lpm per compute tray with 6 trays per enclosure – For processors above 205W: 7.5 liters per minute per enclosure, assuming 1.25 lpm per compute tray with 6 trays per enclosure – SD650-N V2 tray with 40/80 GB NVIDIA HGX™ A100 4-GPU: 21.0 liters per minute per enclosure, assuming 3.5 lpm per compute tray with 6 trays per enclosure (1 tray consists of 1 compute node and 1 GPU node)

Table 1. Enclosure specifications (continued)

Specification	Description
Environment	**Attention:** Environment quality must be maintain over the lifetime of the system to receive warranty and support on affecting components. For water quality requirement, see Lenovo Neptune Direct Water-Cooling Standards. The SD650 V2 tray, the SD650-N V2 tray and DW612 Enclosure are supported in the following environment: • Air temperature requirements: – Operating: ASHRAE class A2: 10°C - 35°C (50°F - 95°F); when the altitude exceeds 900 m (2953 ft), the maximum ambient temperature value decreases by 1°C (1.8°F) with every 300 m (984 ft) of altitude increase. – Powered off: 5°C - 45°C (41°F - 113°F) – Shipping/storage: -40°C - 60°C (-40°F - 140°F) To use the 240 GB M.2 drive, the following conditions must be met: – If inlet water temperature is 45°C, then the ambient air temperature cannot exceed 27°C. – If inlet water temperature is 30°C, then the ambient air temperature cannot exceed 35°C. • Relative humidity (non-condensing): – Operating: ASHRAE Class A2: 8% - 80%, maximum dew point : 21°C (70°F) – Shipment/storage: 8% - 90% • Maximum altitude: 3048 m (10 000 ft) • Particulate contamination: Airborne particulates and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the solution. For information about the limits for particulates and gases, see "Particulate contamination" on page 456. **Note:** The solution is designed for standard data center environment and recommended to be placed in industrial data center.

Tray specifications

A summary of the features and specifications of the tray.

Tray specifications

Note: The SD650 V2 tray contains two compute nodes while the SD650-N V2 tray contains one compute node and one GPU node.

Table 2. Tray specifications

Specification	Description
Dimension	Tray • Height: 41.0 mm (1.61 inches) • Depth: 693.2 mm (27.29 inches) • Width: 437.5 mm (17.22 inches) • Weight estimation: – SD650 V2 tray: 20.67 kg (45.58 lbs) – SD650-N V2 tray: 22.05kg (48.62 lbs)
Operating systems	Supported and certified operating systems include: • Microsoft Windows Server • VMware ESXi • Red Hat Enterprise Linux • SUSE Linux Enterprise Server References: • Complete list of available operating systems: https://lenovopress.lenovo.com/osig. • OS deployment instructions: See “Deploy the operating system” in *Setup Guide*.

Node specifications

A summary of the features and specifications of the compute node and the GPU node.

Compute node specifications

Note: The SD650 V2 tray contains two compute nodes while the SD650-N V2 tray contains one compute node and one GPU node.

Table 3. Compute node specifications

Specification	Description
Processor (depending on the model)	• Supports two 3rd Gen Intel® Xeon® Scalable processors per node. **Notes:** 1. Use the Setup utility to determine the type and speed of the processors in the node. 2. For a list of supported processors, see https://serverproven.lenovo.com/. 3. If the Intel® Xeon® Platinum 8368Q processor is installed, the supported water temperature is 2°C - 35°C (35.6°F - 95°F).
Memory	See “Memory module installation order” in *Setup Guide* for detailed information about memory configuration and setup. • Slots: 16 DIMM slots per node • Type: – PC4-25600 (dual-rank), 3200 MT/s, error correcting code (ECC), double-data-rate 4 (DDR4) registered DIMM (RDIMM) • Supports (depending on the model): – SD650 V2 compute node: – 2Rx4 32 GB and 64 GB size RDIMMs – 2Rx8 16 GB size RDIMMs – SD650-N V2 compute node: – 2Rx4 32 GB and 64 GB size RDIMMs • Minimum: – SD650 V2 compute node: 256 GB per node – SD650-N V2 compute node: 512 GB per node • Maximum: 2048 GB per node **Important:** The tray only supports fully populated processor and memory configuration (2 processors and 16 DIMMs).
Drive bays	• Supports up to two 2.5-inch 7mm simple-swap Serial ATA (SATA)/Non-Volatile Memory express (NVMe) solid-state drives per node. • Supports up to one 2.5-inch 15mm simple-swap Serial ATA (SATA)/Non-Volatile Memory express (NVMe) solid-state drive per node. **Attention:** As a general consideration, do not mix standard 512-byte and advanced 4-KB format drives in the same RAID array because it might lead to potential performance issues.
M.2 drive/backplane	ThinkSystem M.2 backplane supports up to two identical M.2 drives. Supports 2 different physical sizes of M.2 drives: • 42 mm (2242) • 80 mm (2280) See “Install an M.2 drive into the M.2 backplane” on page 188 for supported M.2 drive configurations.

Table 3. Compute node specifications (continued)

Specification	Description
RAID	• Software RAID level 0 and 1 for SATA storage • Integrated on-board Hardware RAID level 1 • Intel VROC NVMe RAID Premium level 0 and 1
Expansion slots	Supports up to two Half-Height Half-Length x16 Gen 4 PCIe slots.
Video controller (integrated into Lenovo XClarity Controller)	• ASPEED • SVGA compatible video controller • Avocent Digital Video Compression • Video memory is not expandable **Note:** Maximum video resolution is 1920 x 1200 at 60 Hz.
Input/Output (I/O) features	• Front operator panel • KVM breakout cable connector • External LCD diagnostics handset connector • One 1 Gb RJ45 Ethernet port with share-NIC feature for Lenovo XClarity Controller access • One 25 Gb SFP28 Ethernet port with share-NIC feature for Lenovo XClarity Controller access
Minimum configuration for debugging	• One DW612 Enclosure • One SD650 V2 tray (contains two nodes) • Two processors on a specific node • 16 DIMMs on a specific node • Six CFF v4 power supplies (any type) • One disk (any type) (If OS is needed for debugging)

GPU node specifications

Note: The SD650-N V2 tray contains one compute node and one GPU node.

Table 4. GPU node specifications

Specification	Description
GPU	• NVIDIA HGX A100 four GPU board • NVIDIA HGX A800 four GPU board
Expansion slots	Supports one Half-Height Half-Length x16 Gen 4 PCIe slot.
Minimum configuration for debugging	• One DW612 Enclosure • One SD650-N V2 tray • Two processors on a right node • 16 DIMMs on a right node • Six units of ThinkSystem 2400W (230V) v4 Platinum hot-swap power supply Delta • One disk (any type) (If OS is needed for debugging)

Firmware updates

Several options are available to update the firmware for the solution.

You can use the tools listed here to update the most current firmware for your server and the devices that are installed in the server.

- Best practices related to updating firmware is available at the following site:
  - http://lenovopress.com/LP0656
- The latest firmware can be found at the following site:
  - http://datacentersupport.lenovo.com/products/servers/system-x/system-x3850-x6/6241/downloads
- You can subscribe to product notification to stay up to date on firmware updates:
  - https://datacentersupport.lenovo.com/tw/en/solutions/ht509500

Update method terminology

- **In-band update**. The installation or update is performed using a tool or application within an operating system that is executing on the server's core CPU.
- **Out-of-band update**. The installation or update is performed by the Lenovo XClarity Controller collecting the update and then directing the update to the target subsystem or device. Out-of-band updates have no dependency on an operating system executing on the core CPU. However, most out-of-band operations do require the server to be in the S0 (Working) power state.
- **On-Target update.** The installation or update is initiated from an installed operating system executing on the target server itself.
- **Off-Target update.** The installation or update is initiated from a computing device interacting directly with the server's Lenovo XClarity Controller.
- **UpdateXpress System Packs (UXSPs)**. UXSPs are bundled updates designed and tested to provide the interdependent level of functionality, performance, and compatibility. UXSPs are server machine-type specific and are built (with firmware and device driver updates) to support specific Windows Server, Red Hat Enterprise Linux (RHEL) and SUSE Linux Enterprise Server (SLES) operating system distributions. Machine-type-specific firmware-only UXSPs are also available.

Firmware updating tools

See the following table to determine the best Lenovo tool to use for installing and setting up the firmware:

Tool	Update Methods Supported	Core System Firmware Updates	I/O Devices Firmware Updates	Graphical user interface	Command line interface	Supports UXSPs
Lenovo XClarity Provisioning Manager (LXPM)	In-band[2] On-Target	√		√		
Lenovo XClarity Controller (XCC)	Out-of-band Off-Target	√	Selected I/O devices	√		

Tool	Update Methods Supported	Core System Firmware Updates	I/O Devices Firmware Updates	Graphical user interface	Command line interface	Supports UXSPs
Lenovo XClarity Essentials OneCLI (OneCLI)	In-band Out-of-band On-Target Off-Target	√	All I/O devices		√	√
Lenovo XClarity Essentials UpdateXpress (LXCE)	In-band Out-of-band On-Target Off-Target	√	All I/O devices	√		√
Lenovo XClarity Essentials Bootable Media Creator (BoMC)	In-band Out-of-band Off-Target	√	All I/O devices	√ (BoMC application)	√ (BoMC application)	√
Lenovo XClarity Administrator (LXCA)	In-band[1] Out-of-band[2] Off-Target	√	All I/O devices	√		√
Lenovo XClarity Integrator (LXCI) for VMware vCenter	Out-of-band Off-Target	√	Selected I/O devices	√		
Lenovo XClarity Integrator (LXCI) for Microsoft Windows Admin Center	In-band Out-of-band On-Target Off-Target	√	All I/O devices	√		√
Lenovo XClarity Integrator (LXCI) for Microsoft System Center Configuration Manager	In-band On-Target	√	All I/O devices	√		√

Notes:

1. For I/O firmware updates.
2. For BMC and UEFI firmware updates.

- **Lenovo XClarity Provisioning Manager**

  From Lenovo XClarity Provisioning Manager, you can update the Lenovo XClarity Controller firmware, the UEFI firmware, and the Lenovo XClarity Provisioning Manager software.

Note: By default, the Lenovo XClarity Provisioning Manager Graphical User Interface is displayed when you start the server and press the key specified in the on-screen instructions. If you have changed that default to be the text-based system setup, you can bring up the Graphical User Interface from the text-based system setup interface.

For additional information about using Lenovo XClarity Provisioning Manager to update firmware, see:

"Firmware Update" section in the LXPM documentation compatible with your server at https://pubs.lenovo.com/lxpm-overview/

Important: Lenovo XClarity Provisioning Manager (LXPM) supported version varies by product. All versions of Lenovo XClarity Provisioning Manager are referred to as Lenovo XClarity Provisioning Manager and LXPM in this document, unless specified otherwise. To see the LXPM version supported by your server, go to https://pubs.lenovo.com/lxpm-overview/.

- **Lenovo XClarity Controller**

  If you need to install a specific update, you can use the Lenovo XClarity Controller interface for a specific server.

  Notes:

  – To perform an in-band update through Windows or Linux, the operating system driver must be installed and the Ethernet-over-USB (sometimes called LAN over USB) interface must be enabled.

    For additional information about configuring Ethernet over USB, see:

    "Configuring Ethernet over USB" section in the XCC documentation version compatible with your server at https://pubs.lenovo.com/lxcc-overview/

  – If you update firmware through the Lenovo XClarity Controller, make sure that you have downloaded and installed the latest device drivers for the operating system that is running on the server.

  For additional information about using Lenovo XClarity Controller to update firmware, see:

  "Updating Server Firmware" section in the XCC documentation compatible with your server at https://pubs.lenovo.com/lxcc-overview/

  Important: Lenovo XClarity Controller (XCC) supported version varies by product. All versions of Lenovo XClarity Controller are referred to as Lenovo XClarity Controller and XCC in this document, unless specified otherwise. To see the XCC version supported by your server, go to https://pubs.lenovo.com/lxcc-overview/.

- **Lenovo XClarity Essentials OneCLI**

  Lenovo XClarity Essentials OneCLI is a collection of command line applications that can be used to manage Lenovo servers. Its update application can be used to update firmware and device drivers for your servers. The update can be performed within the host operating system of the server (in-band) or remotely through the BMC of the server (out-of-band).

  For additional information about using Lenovo XClarity Essentials OneCLI to update firmware, see:

  https://pubs.lenovo.com/lxce-onecli/onecli_c_update

- **Lenovo XClarity Essentials UpdateXpress**

  Lenovo XClarity Essentials UpdateXpress provides most of OneCLI update functions through a graphical user interface (GUI). It can be used to acquire and deploy UpdateXpress System Pack (UXSP) update packages and individual updates. UpdateXpress System Packs contain firmware and device driver updates for Microsoft Windows and for Linux.

  You can obtain Lenovo XClarity Essentials UpdateXpress from the following location:

  https://datacentersupport.lenovo.com/solutions/lnvo-xpress

- **Lenovo XClarity Essentials Bootable Media Creator**

  You can use Lenovo XClarity Essentials Bootable Media Creator to create bootable media that is suitable for firmware updates, VPD updates, inventory and FFDC collection, advanced system configuration, FoD Keys management, secure erase, RAID configuration, and diagnostics on supported servers.

  You can obtain Lenovo XClarity Essentials BoMC from the following location:

  https://datacentersupport.lenovo.com/solutions/lnvo-bomc

- **Lenovo XClarity Administrator**

  If you are managing multiple servers using the Lenovo XClarity Administrator, you can update firmware for all managed servers through that interface. Firmware management is simplified by assigning firmware-compliance policies to managed endpoints. When you create and assign a compliance policy to managed endpoints, Lenovo XClarity Administrator monitors changes to the inventory for those endpoints and flags any endpoints that are out of compliance.

  For additional information about using Lenovo XClarity Administrator to update firmware, see:

  https://pubs.lenovo.com/lxca/update_fw.html

- **Lenovo XClarity Integrator offerings**

  Lenovo XClarity Integrator offerings can integrate management features of Lenovo XClarity Administrator and your server with software used in a certain deployment infrastructure, such as VMware vCenter, Microsoft Admin Center, or Microsoft System Center.

  For additional information about using Lenovo XClarity Integrator to update firmware, see:

  https://pubs.lenovo.com/lxci-overview/

Configuring the LAN over USB interface manually

To perform a firmware update through the operating system using Lenovo XClarity Essentials OneCLI, the Lenovo XClarity Controller must be configured to use the LAN over USB interface. The firmware update package attempts to perform the setup automatically, if needed. If the automatic setup fails or if you prefer to set up the LAN over USB manually, use one of the following procedures.

Additional information about using the Lenovo XClarity Controller to enable LAN over USB is available at:

https://pubs.lenovo.com/lxcc-overview/

Installing the LAN over USB Windows device driver

When you install a Windows operating system, there might be an unknown RNDIS device in the Device Manager. Lenovo provides a Windows INF file that identifies this device.

Complete the following steps to install `ibm_rndis_server_os.inf`:

Note: You only have to perform these steps if the compute node is running a Windows operating system and the `ibm_rndis_server_os.inf` file has not been previously installed. The file only has to be installed once. It is required by Windows operating systems to detect and use the LAN over USB functionality.

Step 1. Click **Administrative Tools → Computer Management → Device Manager** and find the RNDIS Device. Click **Properties → Driver → Reinstall driver**. Point the solution to the `\Windows\inf` directory where it can find the `ibm_rndis_server_os.inf` file and install the device.

Step 2. Click **Administrative Tools → Device Manager**. Right-click **Network adapters** and select **Scan for hardware changes**. A small pop-up confirms that the Ethernet device is found and installed. The New Hardware Wizard starts automatically.

Step 3. When you are prompted `Can Windows connect to Windows Update to search for software?`, select **No, not this time**. Click **Next** to continue.

Step 4. When you are prompted `What do you want the wizard to do?`, select **Install from a list or specific location (Advanced)**. Click **Next** to continue.

Step 5. When you are prompted `Please choose your search and installation options`, select **Don't search. I will choose the driver to install**. Click **Next** to continue.

Step 6. When you are prompted `Select a hardware type, and then click Next`, select **Network adapters**. Click **Next** to continue.

Step 7. When you are prompted with the statement `Completing the Found New Hardware Wizard`, click **Finish**. A new local area connection appears. If the message `This connection has limited or no connectivity` is displayed, ignore this message.

Step 8. Return to the Device Manager. **Lenovo USB Remote NDIS Network Device** appears under **Network Adapters**.

Step 9. Use the Lenovo XClarity Controller interface to view or set the IP address for the LAN adapter.

Additional information about using the Lenovo XClarity Controller to configure LAN over USB is available at:

https://pubs.lenovo.com/lxcc-overview/

Tech Tips

Lenovo continually updates the support website with the latest tips and techniques that you can use to solve issues that your server might encounter. These Tech Tips (also called retain tips or service bulletins) provide procedures to work around issues or solve problems related to the operation of your server.

To find the Tech Tips available for your server:

1. Go to http://datacentersupport.lenovo.com and navigate to the support page for your server.
2. Click on **How To's** from the navigation pane.
3. Click **Article Type → Solution** from the drop-down menu.

   Follow the on-screen instructions to choose the category for the problem that you are having.

Security advisories

Lenovo is committed to developing products and services that adhere to the highest security standards in order to protect our customers and their data. When potential vulnerabilities are reported, it is the responsibility of the Lenovo Product Security Incident Response Team (PSIRT) to investigate and provide information to our customers so they may put mitigation plans in place as we work toward providing solutions.

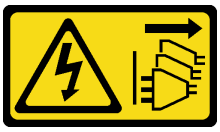
The list of current advisories is available at the following site:

https://datacentersupport.lenovo.com/product_security/home

Power on nodes

When a tray is plugged into the enclosure, each node performs a short self-test (power LED flashes quickly - 4 times per second). Once the self test is completed successfully, the node enters a standby state (power LED flashes slowly - once per a second).

S002



CAUTION:
The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

Each node can be turned-on (power LED on) in any of the following ways:

- You can press the power button.
- The node can restart automatically after a power interruption.
- The node can respond to remote power-on requests sent to the Lenovo XClarity Controller.

For information about powering off nodes, see “Power off nodes” on page 14.

Power off nodes

Each node remains in a standby state when it is connected to a power source, allowing the Lenovo XClarity Controller to respond to remote power-on requests.

To remove all power from the nodes (power status LED off), remove the tray from the enclosure.

Note: This removes power immediately from both nodes.

To place the solution in a standby state (power status LED flashes once per second):

Note: The Lenovo XClarity Controller can place the solution in a standby state as an automatic response to a critical system failure.

- Start an orderly shutdown using the operating system (if supported by your operating system).
- Press the power button to start an orderly shutdown (if supported by your operating system).
- Press and hold the power button for more than 4 seconds to force a shutdown.

When in a standby state, the solution can respond to remote power-on requests sent to the Lenovo XClarity Controller. For information about powering on the solution, see “Power on nodes” on page 13.

Chapter 2. Solution components

Use the information in this section to learn about each of the components associated with your solution.

Identifying your component

When you contact Lenovo for help, the machine type, model, and serial number information help support technicians to identify your components and provide faster service.

The enclosure machine type, model number and serial number are on the enclosure label that can be found on the front of the enclosure, as shown in the following illustration.

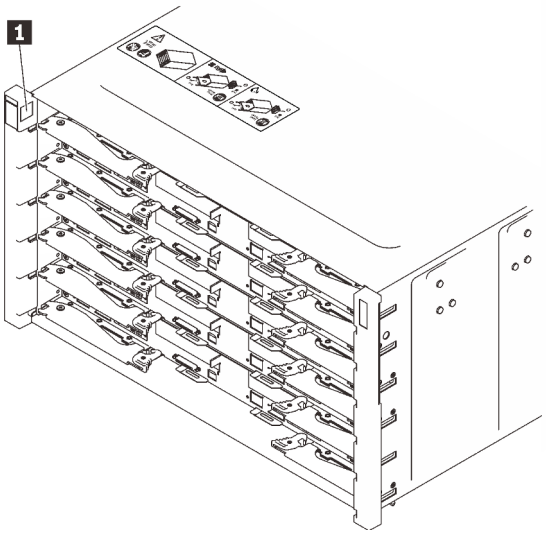


Figure 2. Enclosure label on the front of the enclosure

Table 5. Enclosure label on the front of the enclosure

1 Enclosure label

The tray model number can be found on the front of the tray, as shown in the following illustration.

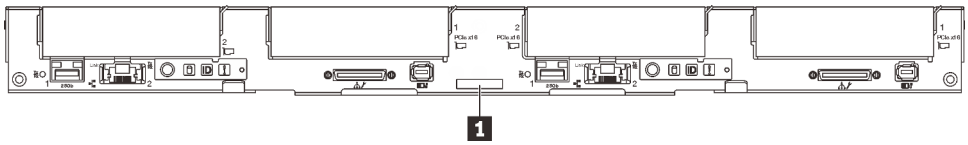


Figure 3. SD650 V2 tray model number

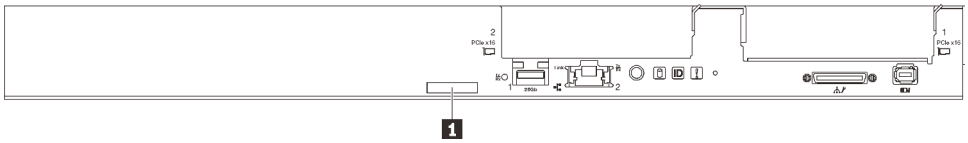


Figure 4. SD650-N V2 tray model number

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Table 6. Tray model number

1 Tray model number

QR code

In addition, the system Service Label is located on the inside surface of the tray cover, provides a quick response (QR) code for mobile access to service information. You can scan the QR code with a mobile device using a QR code reader application and get quick access to the Service Information web page. The Service Information web page provides additional information for parts installation and replacement videos, and error codes for solution support.

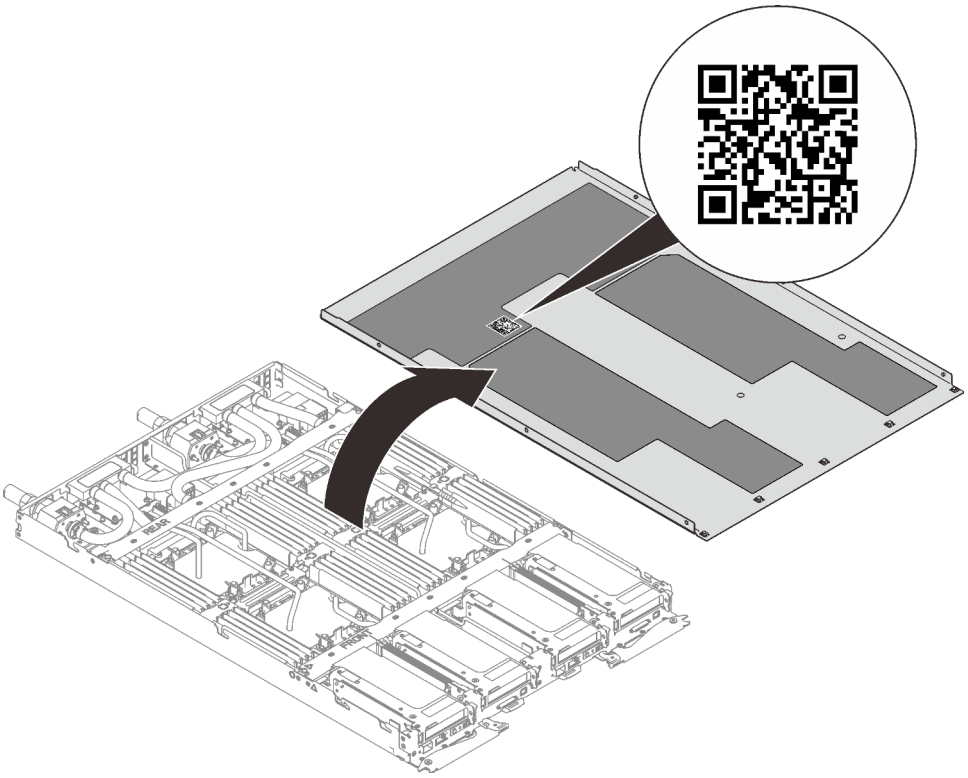


Figure 5. Service Label and QR code

Network access tag

The Lenovo XClarity Controller network access information for both nodes can be found on the pull out information tag located at the front of the tray. You can use the information on the pull out tag to access the XCC MAC address and LLA for each node. The left node information is on the left side and the right node information is on the right side. You can also use the information tag for your own node labeling information such as the hostname, the system name and the inventory bar code.

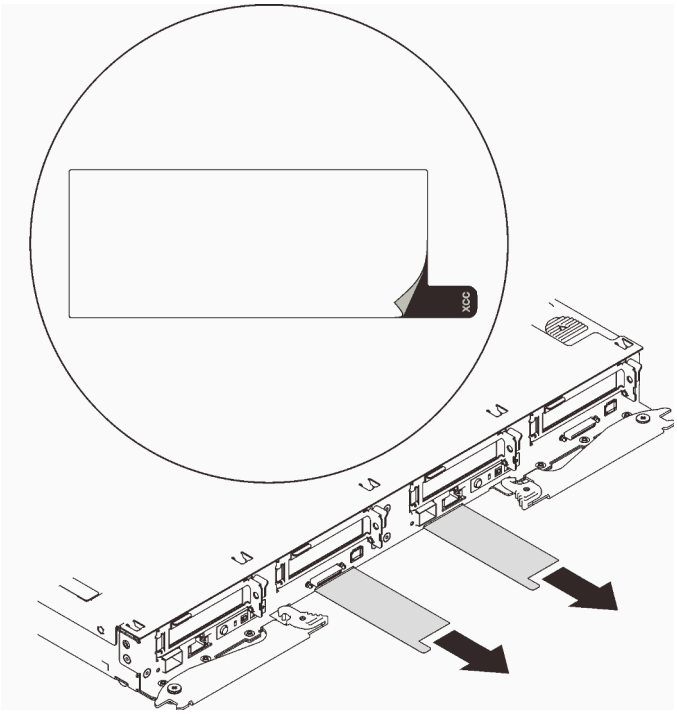


Figure 6. Network access information on the pull out tag

Front view

The following illustration shows the controls, LEDs, and connectors on the front of the solution.

Enclosure

Note: The illustrations in this document might differ slightly from your hardware.

The enclosure supports up to six trays.

The following illustration shows six trays installed in the enclosure.

The slot numbers are indicated on both sides of the enclosure.

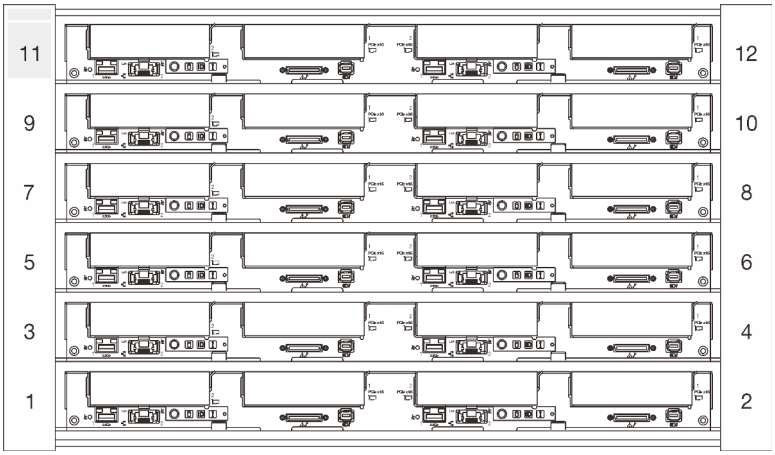


Figure 7. Enclosure with six SD650 V2 trays

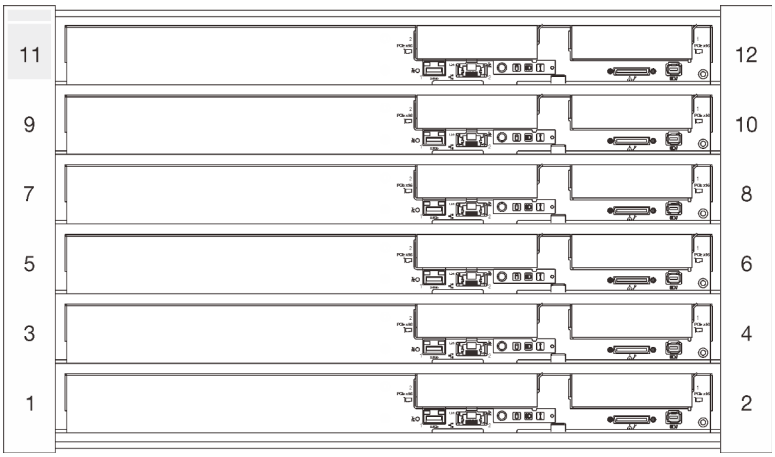


Figure 8. Enclosure with six SD650-N V2 trays

SD650 V2 tray

The following illustrations show the controls, LEDs, and connectors on the front of each tray.

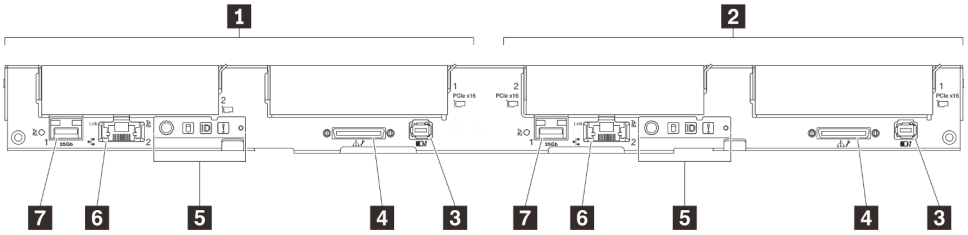


Figure 9. SD650 V2 tray

Table 7. SD650 V2 Tray indicators, controls, and connectors

1 Left node (odd bay numbers)	5 Front operator panel
2 Right node (even bay numbers)	6 1 Gb RJ45 Ethernet port with share-NIC feature for Lenovo XClarity Controller
3 External LCD diagnostics handset connector	7 25 Gb SFP28 Ethernet port with share-NIC feature for Lenovo XClarity Controller
4 USB 3.0 Console Breakout Cable	

SD650-N V2 tray

The following illustrations show the controls, LEDs, and connectors on the front of each tray.

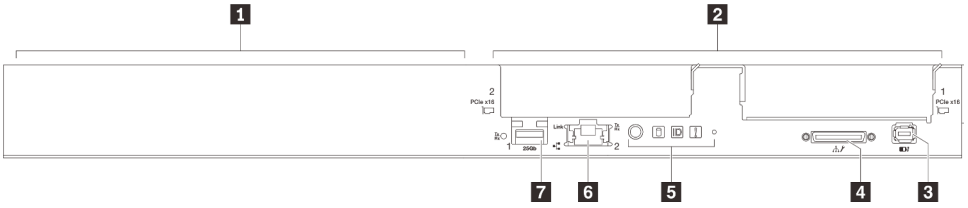


Figure 10. SD650-N V2 tray

Table 8. SD650-N V2 Tray indicators, controls, and connectors

1 GPU node/Left node (odd bay numbers)	5 Front operator panel
2 Compute node/Right node (even bay numbers)	6 1 Gb RJ45 Ethernet port with share-NIC feature for Lenovo XClarity Controller
3 External LCD diagnostics handset connector	7 25 Gb SFP28 Ethernet port with share-NIC feature for Lenovo XClarity Controller
4 USB 3.0 Console Breakout Cable	

Front LEDs and buttons

The following illustration shows LEDs and buttons on the front of the solution. By viewing the status of LEDs, you can often identify the source of the error.

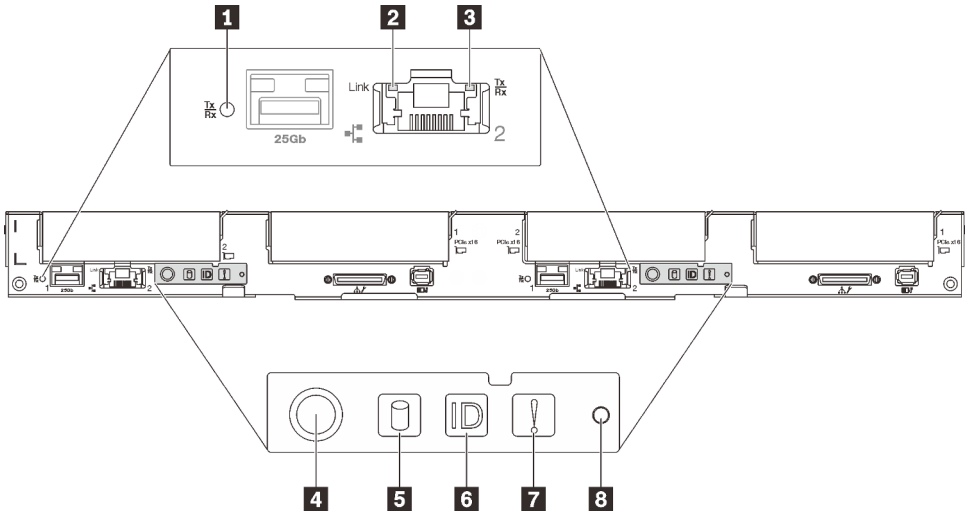


Figure 11. Front LEDs and buttons

Table 9. Front LEDs and buttons

1 25 Gb Ethernet port link and activity (SFP28) LED (green)	5 Drive activity LED (green)
2 1 Gb Ethernet port link (RJ45) LED (green)	6 Identification LED (blue)
3 1 Gb Ethernet port activity (RJ45) LED (green)	7 System-error LED (yellow)
4 Node power button / LED (green)	8 NMI button

1 25 Gb Ethernet port link and activity (SFP28) LED (green): Use this green LED to distinguish the network status.

Off: The network is disconnected.

Blinking: The network is accessing.

On: The network is established.

2 1 Gb Ethernet port link (RJ45) LED (green): Use this green LED to distinguish the network status.

Off: The network link is disconnected.

On: The network link is established.

3 1 Gb Ethernet port activity (RJ45) LED (green): Use this green LED to distinguish the network status.

Off: The node is disconnected from a LAN.

Blinking: The network is connected and active.

4 Node power LED (green): Press this button to turn the node on and off manually. The states of the power LED are as follows:

Off: Power is not present or the power supply, or the LED itself has failed.

Flashing rapidly (4 times per second): The node is turned off and is not ready to be turned on. The power button is disabled. This will last approximately 5 to 10 seconds.

Flashing slowly (once per second): The node is turned off and is ready to be turned on. You can press the power button to turn on the node.

On: The node is turned on.

5 Drive activity LED (green): If the LED is lit, it indicates that the drive is powered, but not actively reading or writing data. If the LED is flashing, the drive is being accessed.

6 Identification LED (blue): Use this blue LED to visually locate the node among other nodes. You can light this LED remotely with Lenovo XClarity Administrator.

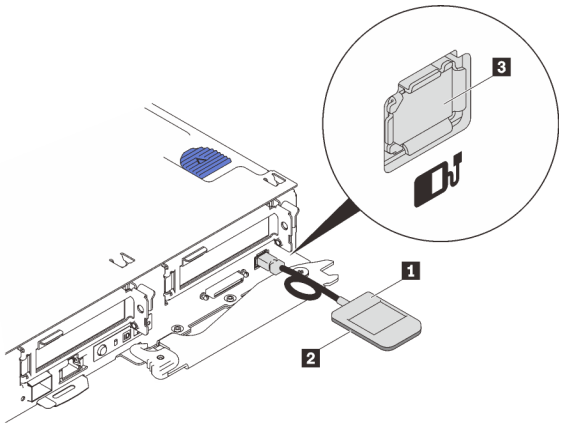
7 System-error LED (yellow): When this yellow LED is lit, it indicates that a system error has occurred.

8 NMI button: Press this button to force a nonmaskable interrupt to the processor. You might have to use a pen or the end of a straightened paper clip to press the button. You can also use it to force a blue-screen memory dump (use this button only when you are directed to do so by Lenovo Support).

External LCD diagnostics handset

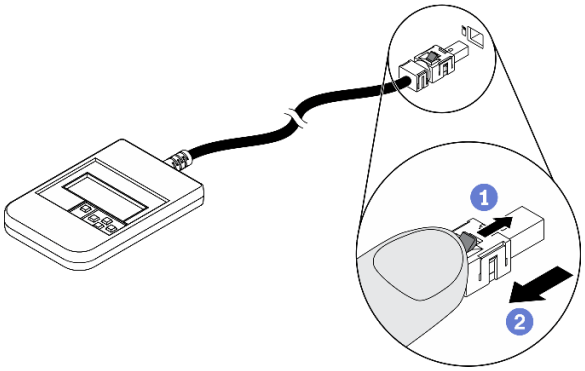
The external LCD diagnostics handset is an external device that is connected to the server with a cable, and it allows quick access to system information such as errors, system status, firmware, network, and health information.

Location of the external LCD diagnostics handset

Location	Callouts
The external LCD diagnostics handset is connected to the server with an external cable. 	1 External LCD diagnostics handset
	2 Magnetic bottom With this component, the diagnostic handset can be attached to the top or side of the rack with hands spared for service tasks.
	3 External diagnostics connector This connector is located on the front of the server, and is used to connect an external LCD diagnostics handset.

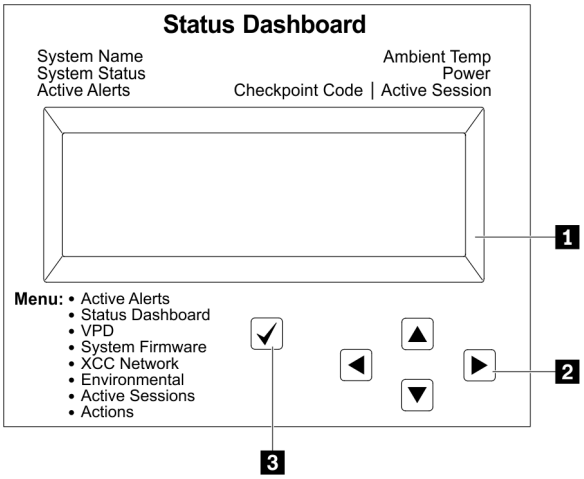
Note: When unplugging the external handset, see the following instructions: ❶ Press the plastic clip on the plug forward.

❷ Hold the clip and remove the cable from the connector.



Display panel overview

The diagnostics device consists of an LCD display and 5 navigation buttons.

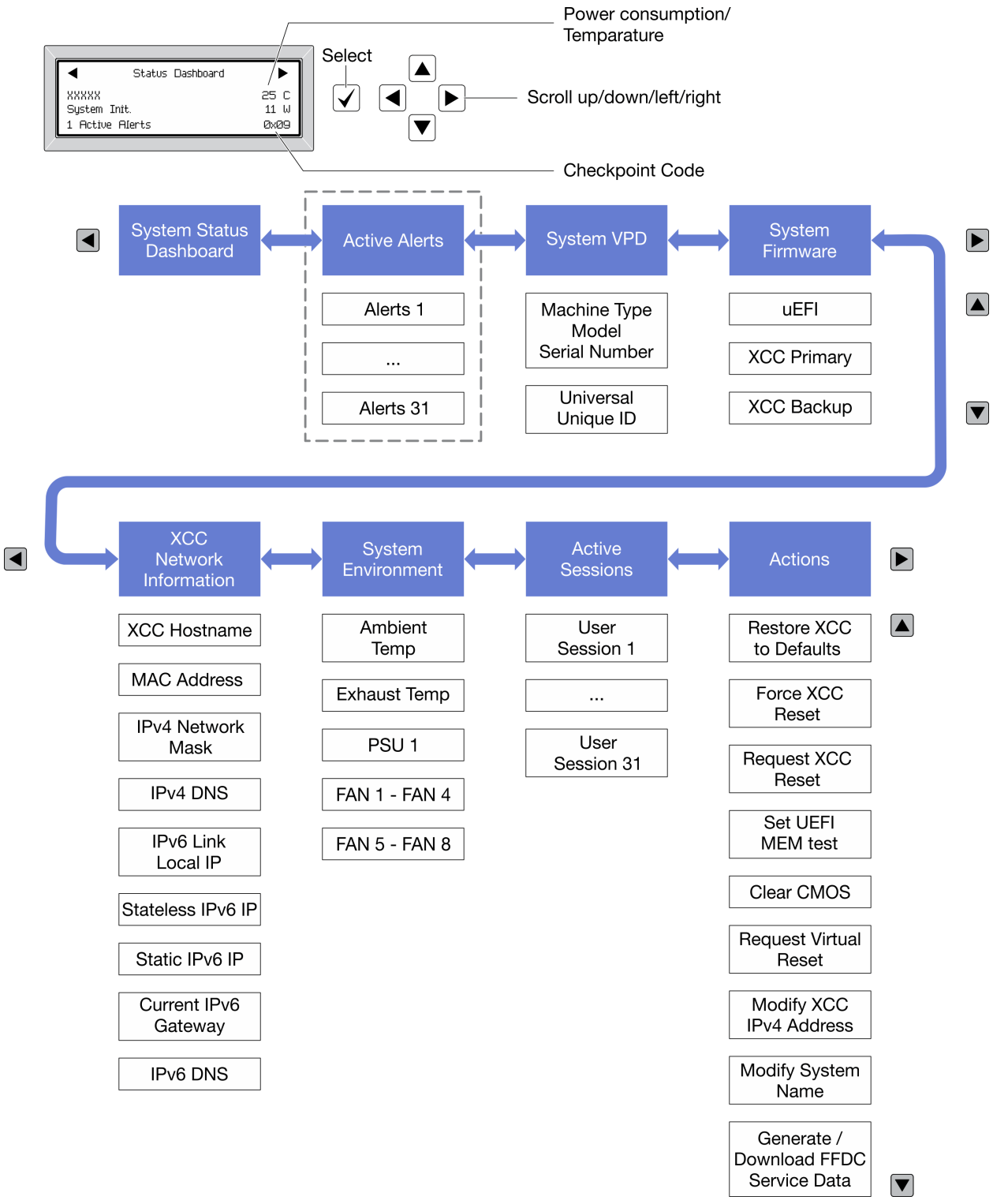


1 LCD display
2 Scroll buttons (up/down/left/right) Press the scroll buttons to locate and select system information.
3 Select button Press the select button to select from the options in the menu.

Option flow diagram

The external LCD diagnostics handset displays various system information. Navigate through the options with the scroll keys.

Depending on the model, the options and entries on the LCD display might be different.

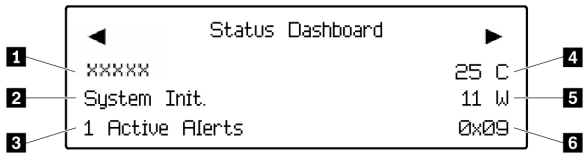


Full menu list

Following is the list of available options. Switch between an option and the subordinate information entries with the select button, and switch among options or information entries with the scroll buttons.

Depending on the model, the options and entries on the LCD display might be different.

Home Menu (System Status Dashboard)

Home Menu	Example
1 System name 2 System status 3 Active alert quantity 4 Temperature 5 Power consumption 6 Checkpoint code	

Active Alerts

Sub Menu	Example
Home screen: Active error quantity **Note:** The “Active Alerts” menu displays only the quantity of active errors. If no errors occur, the “Active Alerts” menu will not be available during navigation.	1 Active Alerts
Details screen: • Error message ID (Type: Error/Warning/Information) • Occurrence time • Possible sources of the error	Active Alerts: 1 Press ▼ to view alert details FQXSPPU009N(Error) 04/07/2020 02:37:39 PM CPU 1 Status: Configuration Error

System VPD Information

Sub Menu	Example
• Machine type and serial number • Universal Unique ID (UUID)	Machine Type: xxxx Serial Num: xxxxxx Universal Unique ID: xxxxxxxxxxxxxxxxxxxxxxxxxxxx

System Firmware

Sub Menu	Example
UEFI • Firmware level (status) • Build ID • Version number • Release date	UEFI (Inactive) Build: D0E101P Version: 1.00 Date: 2019-12-26
XCC Primary • Firmware level (status) • Build ID • Version number • Release date	XCC Primary (Active) Build: DVI399T Version: 4.07 Date: 2020-04-07
XCC Backup • Firmware level (status) • Build ID • Version number • Release date	XCC Backup (Active) Build: D8BT05I Version: 1.00 Date: 2019-12-30

XCC Network Information

Sub Menu	Example
• XCC hostname • MAC address • IPv4 Network Mask • IPv4 DNS • IPv6 Link Local IP • Stateless IPv6 IP • Static IPv6 IP • Current IPv6 Gateway • IPv6 DNS **Note:** Only the MAC address that is currently in use is displayed (extension or shared).	XCC Network Information XCC Hostname: XCC-xxxx-SN MAC Address: xx:xx:xx:xx:xx:xx IPv4 IP: xx.xx.xx.xx IPv4 Network Mask: x.x.x.x IPv4 Default Gateway: x.x.x.x

System Environmental Information

Sub Menu	Example
• Ambient temperature • Exhaust temperature • PSU status • Spinning speed of fans by RPM	Ambient Temp: 24 C Exhaust Temp: 30 C PSU1: Vin= 213 w Inlet= 26 C FAN1 Front: 21000 RPM FAN2 Front: 21000 RPM FAN3 Front: 21000 RPM FAN4 Front: 21000 RPM

Active Sessions

Sub Menu	Example
Quantity of active sessions	Active User Sessions: 1

Actions

Sub Menu	Example
Several quick actions are available: • Restore XCC to Defaults • Force XCC Reset • Request XCC Reset • Set UEFI Memory Test • Clear CMOS • Request Virtual Reseat • Modify XCC Static IPv4 Address/Net mask/Gateway • Modify System Name • Generate/Download FFDC Service Data	Request XCC Reset? This will request the BMC to reboot itself. Hold √ for 3 seconds

Rear view

The following illustration shows the components on the rear of the enclosure.

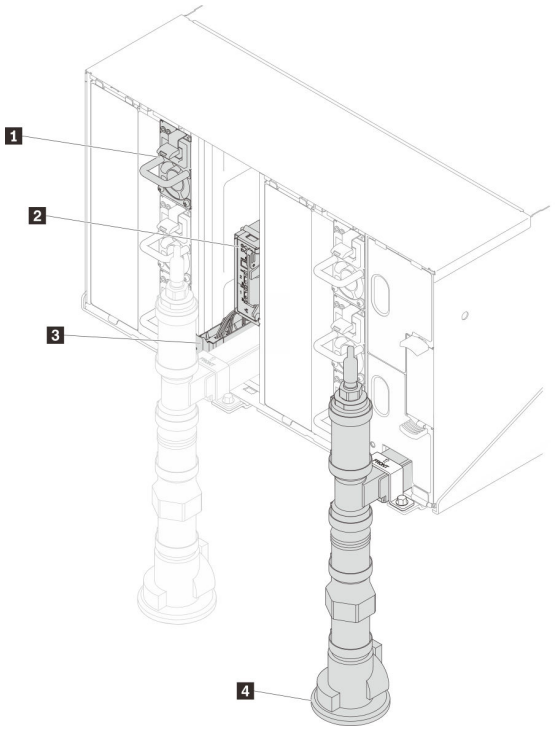


Figure 12. Rear view

Table 10. Rear view

1 Power supply	3 Drip sensor assembly
2 System Management Module 2	4 Manifold

System Management Module 2 (SMM 2)

The following illustration shows the connectors and LEDs on the SMM2 module.

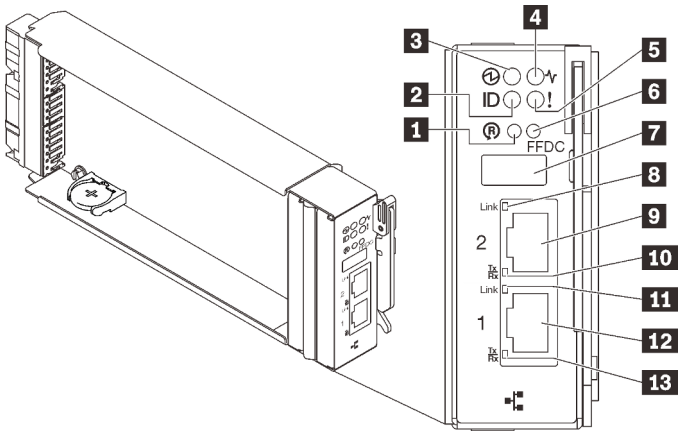


Figure 13. SMM2 connectors and LEDs

Table 11. SMM2 connectors and LEDs

1 Reset button hole	8 Ethernet port 2 link (RJ-45) LED (green)
2 Identification LED (blue)	9 Ethernet port 2
3 Power LED (green)	10 Ethernet port 2 activity (RJ-45) LED (green)
4 Status LED (green)	11 Ethernet port 1 link (RJ-45) LED (green)
5 Check log LED (yellow)	12 Ethernet port 1
6 USB port service mode button (FFDC dump)	13 Ethernet port 1 activity (RJ-45) LED (green)
7 USB 2.0 connector	

1 **Reset button**: Press the button for 1 to 4 seconds, SMM2 reboots. Press over 4 seconds, SMM2 reboots and loads to the default settings.

2 **Identification LED**: When this LED is lit (blue), it indicates the enclosure location in a rack.

3 **Power-on LED**: When this LED is lit (green), it indicates that the SMM2 has power.

4 **Status LED**: This LED (green) indicates the operating status of the SMM2.

- **Continuously on**: The SMM2 has encountered one or more problems.
- **Off**: When the enclosure power is on, it indicates the SMM2 has encountered one or more problems.
- **Flashing**: The SMM2 is working.
  - During the pre-boot process, the LED flashes rapidly.
    - Ten times per second: The SMM2 hardware is working and the firmware is ready to initialize.
    - Two times per second: The firmware is initializing.
  - When the pre-boot process is completed and the SMM2 is working correctly, the LED flashes at a slower speed (about once every two seconds).

5 **Check log LED**: When this LED is lit (yellow), it indicates that a system error has occurred. Check the SMM2 event log for additional information.

6 **USB port service mode button (FFDC dump)**: Press this button to collect FFDC logs after inserting the USB storage device to the USB 2.0 connector.

7 **USB 2.0 connector**: Insert the USB storage device to this connector and then press the **USB port service mode button** to collect FFDC logs.

8 **Ethernet port 2 link (RJ-45) LED**: When this LED is lit (green), it indicates that there is an active connection through the remote management and console (Ethernet) port 2 to the management network.

9 **Ethernet port 2**: Use this connector to access SMM2 management.

10 **Ethernet port 2 activity (RJ-45) LED**: When this LED is flashing (green), it indicates that there is an activity through the remote management and console (Ethernet) port 2 over the management network.

11 **Ethernet port 1 link (RJ-45) LED**: When this LED is lit (green), it indicates that there is an active connection through the remote management and console (Ethernet) port 1 to the management network.

12 **Ethernet port 1**: Use this connector to access SMM2 management.

13 **Ethernet port 1 activity (RJ-45) LED**: When this LED is flashing (green), it indicates that there is an activity through the remote management and console (Ethernet) port 1 over the management network.

Power supplies

The ThinkSystem DW612 Neptune® DWC Enclosure Type 7D1L supports nine autoranging power supplies.

The power supplies get electrical power from a 200 - 240 V ac power source and convert the ac input into 12 V outputs. The power supplies are capable of autoranging within the input voltage range. There is one common power domain for the enclosure that distributes power to each of the DWC tray and modules through the system midplane.

AC redundancy is achieved by distributing the ac power cord connections between independent ac circuits.

Each power supply has internal fans and a controller. The power supply controller can be powered by any installed power supply that is providing power through the midplane.

Attention: The power supplies contain internal cooling fans. Do not obstruct the fan exhaust vents.

You have to install all of the six power supplies regardless of the type of power supply, the enclosure power load, or selected enclosure power policy.

The ThinkSystem DW612 Neptune® DWC Enclosure Type 7D1L does not support mixing of low input voltage power supplies with high input voltage power supplies. For example, if you install a power supply with an input voltage of 100 - 127 V ac in a enclosure that is powered by 200 - 240 V ac power supplies, the 100 - 127 V power supply will not power on. The same restriction applies to a enclosure that is powered by 100 - 127 V ac power supplies. If you install a 200 - 240 V ac power supply in a enclosure that is powered by 100 - 127 V ac power supplies, the 200 - 240 V ac power supply will not power on.

The following illustration shows the power supply:

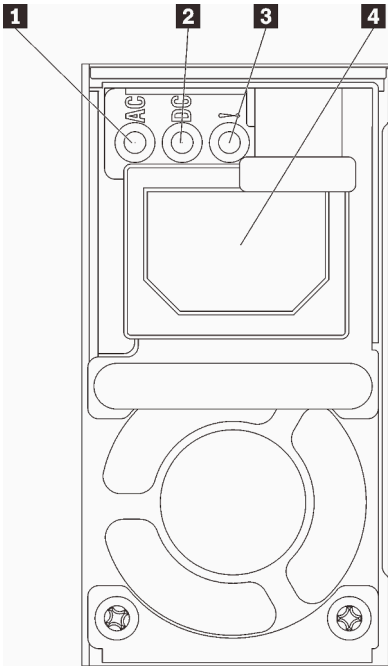


Figure 14. Power supply LEDs and connectors

1 Input (AC) power LED (green)	3 Power supply error LED (yellow)
2 Output (DC) power LED (green)	4 Power cord connector

There are three LEDs on each power supply:

1 AC power LED (green): When this LED is lit (green), it indicates that ac power is being supplied to the power supply.

2 DC power LED (green): When this LED is lit (green), it indicates that dc power is being supplied from the power supply to the enclosure midplane.

3 Power supply error LED (yellow): When this LED is lit (yellow), it indicates that there is a fault with the power supply.

Note: Before unplugging the ac power cord from the power supply, or removing the power supply from the enclosure, verify that the capacity of the remaining power supplies are sufficient to meet the minimum power requirements for all components in the enclosure.

System board layout

The illustrations in this section provide information about the connectors and switches that are available on the node system board.

System-board LEDs

The following illustration shows the light-emitting diodes (LEDs) on the system board.

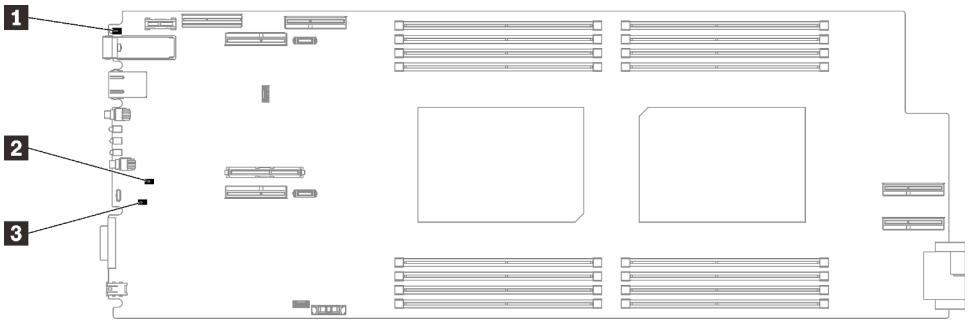


Figure 15. System-board LEDs

Table 12. System-board LEDs

1 Network activity LED	3 ME heartbeat LED
2 XCC heartbeat LED	

1 Network activity LED (green, visible from front view) behavior:

Blinking: There are on-going network activities.

On: Network is established, while there is no activity.

Off: There is no established network.

2 XCC heartbeat LED (green) behavior:

Blinking slowly: XCC is functioning.

Blinking rapidly and constantly: XCC is malfunctioning.

On: XCC is malfunctioning.

Off: XCC is malfunctioning.

3 ME heartbeat LED (green) behavior:

Blinking: PCH ME is functioning.

On: PCH ME is malfunctioning.

Off: PCH ME is malfunctioning.

System-board internal connectors

The following illustration shows the internal connectors on the system board.

Note: The SD650 V2 tray contains two compute nodes while the SD650-N V2 tray contains one compute node and one GPU node.

Compute node

The following illustration shows the internal connectors on the system board of the compute node.

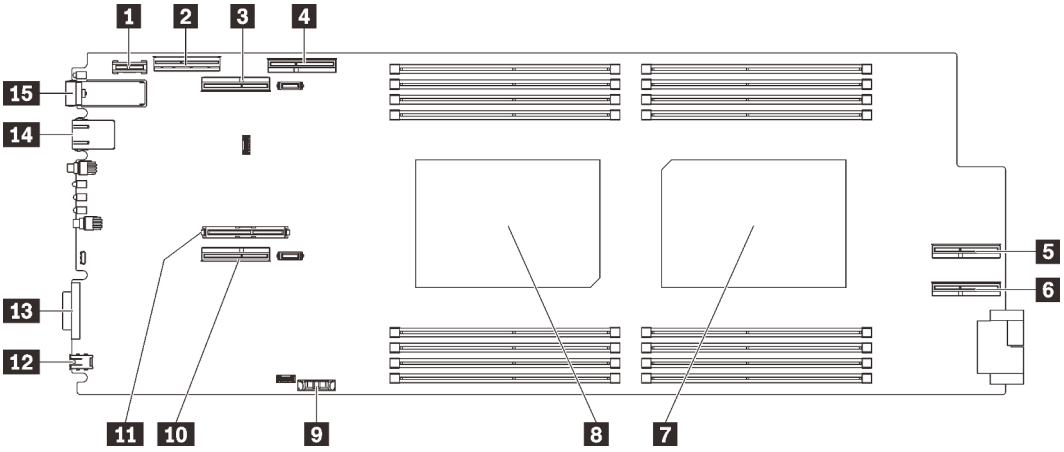


Figure 16. Internal connectors on the system board of the compute node

Table 13. Internal connectors on the system board of the compute node

1 Trusted cryptographic module (TCM) connector	9 CMOS battery (CR2032) connector
2 NVMe/SATA connector	10 PCIe 1 (riser 1) connector
3 PCIe 2 (riser 2) connector (shared with GPU)	11 M.2 connector
4 PCIe 3 connector (for GPU)	12 External LCD diagnostics handset connector
5 PCIe 4 connector (for GPU)	13 KVM connector
6 PCIe 5 connector (for GPU)	14 1 Gb Ethernet connector
7 Processor 2 connector	15 25 Gb Ethernet connector
8 Processor 1 connector	

The following illustration shows the location of the DIMM connectors on the system board of the compute node.

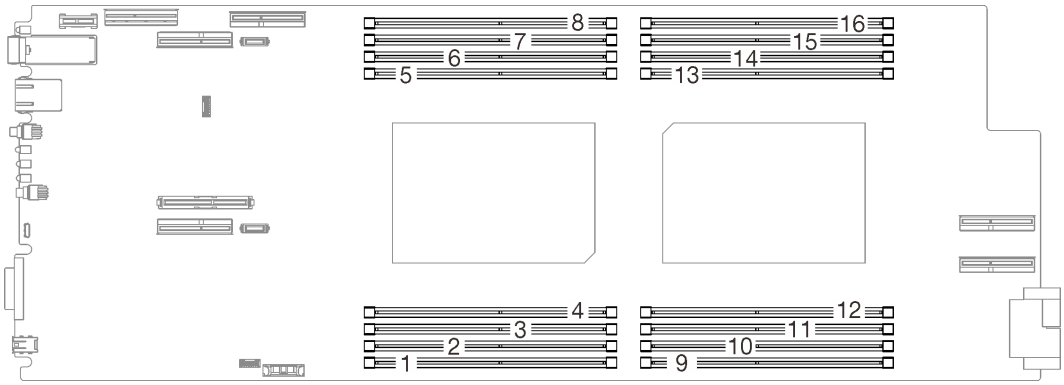


Figure 17. The location of the DIMM connectors on the system board of the compute node

GPU node

The following illustration shows the internal connectors on the system board of the GPU node.

Note: The SD650-N V2 tray contains one compute node and one GPU node.

The following illustration shows the location of the GPU connector and GPU numbering.

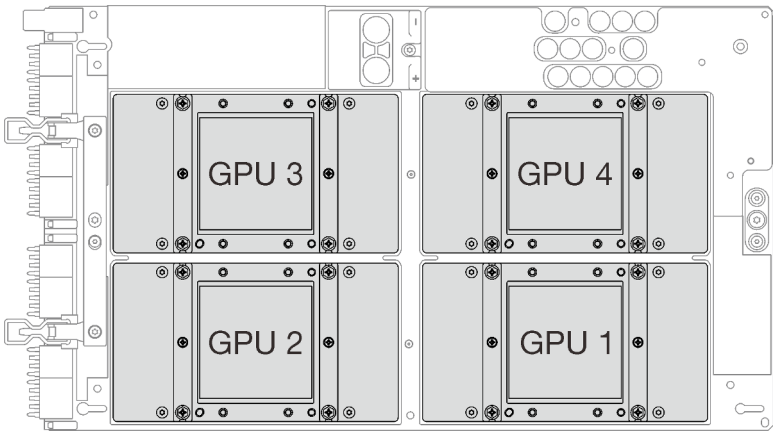


Figure 18. GPU connector and numbering

System-board switches

The following illustration shows the location and description of the switches.

Important:

1. Before you change any switch settings or move any jumpers, turn off the solution; then, disconnect all power cords and external cables. Review the information in https://pubs.lenovo.com/safety_documentation/, "Installation Guidelines" on page 51, "Handling static-sensitive devices" on page 54, and "Power off nodes" on page 14.
2. If there is a clear protective sticker on the switch blocks, you must remove and discard it to access the switches.
3. Any system-board switch or jumper block that is not shown in the illustrations in this document are reserved.

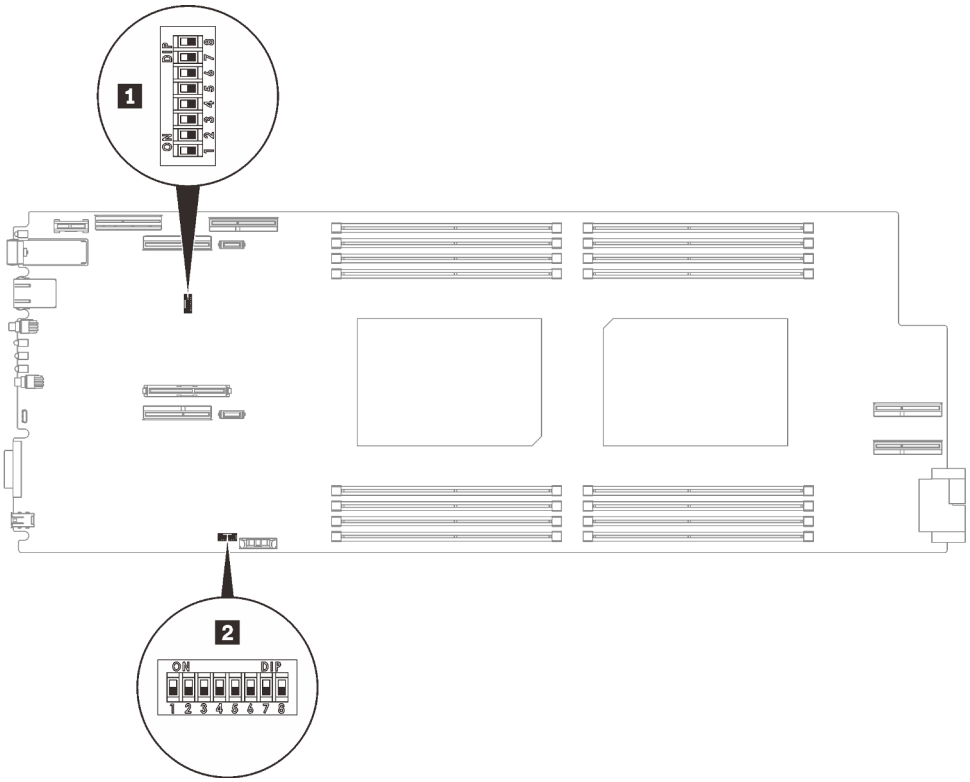


Figure 19. Location of the switches on the system board

Table 14. Switch definition

Switch name	Switch number	Switch name	Usage description	
			On	Off
1 SW2	3	Machine Engine (ME) firmware security override	ME update by jumper.	Normal (default)
	4	Password override	Overrides the power-on password.	Normal (default)
	5	Low security	Enable low security	Normal (default)
2 SW3	3	Clear CMOS	Clear CMOS data	Normal (default)
	5	Serial select	Sends the XCC to the serial port	Send the serial input output (SIO) to the front serial port (default) .

PCIe slot numbering

Use this information to identify slot numbering for SD650 V2 and SD650-N V2 trays.

SD650 V2 tray

Note: The SD650 V2 tray contains two compute nodes.

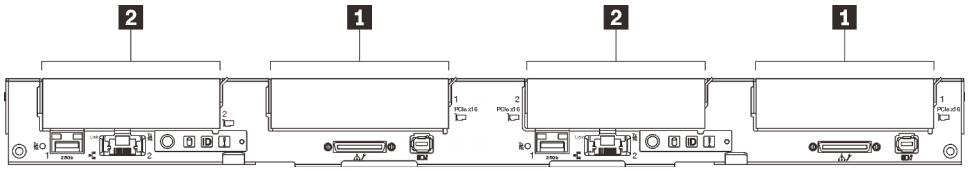


Figure 20. PCIe slot numbering - SD650 V2 tray

1 PCIe slot 1	2 PCIe slot 2

SD650-N V2 tray

Note: The SD650-N V2 tray contains one compute node and one GPU node.

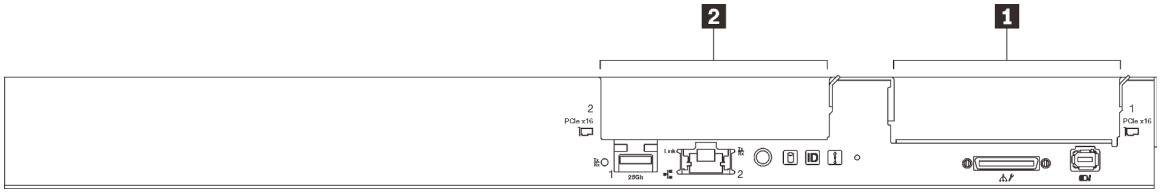


Figure 21. PCIe slot numbering - SD650-N V2 tray

1 PCIe slot 1	2 PCIe slot 2

Use the following mapping table to identify the slot numbering for GPUs.

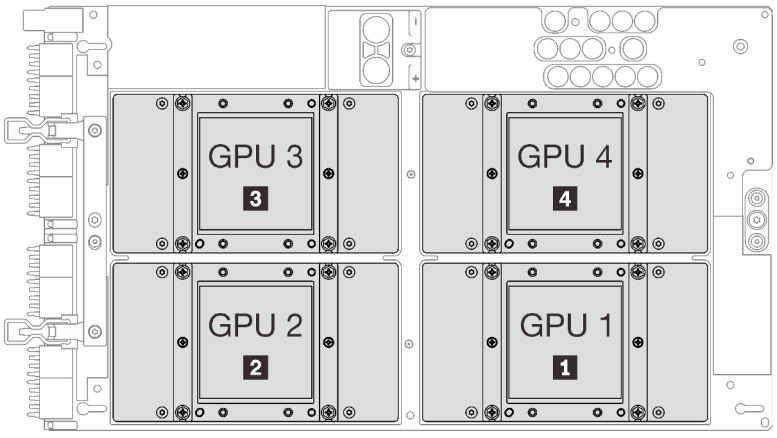


Figure 22. GPU numbering - SD650-N V2 tray

1 PCIe slot 2	3 PCIe slot 4
2 PCIe slot 3	4 PCIe slot 5

Internal cable routing

Some of the components in the solution have internal cables and cable connectors.

Note: Disengage all latches, release tabs, or locks on cable connectors when you disconnect cables from the system board. Failing to release them before removing the cables will damage the cable sockets on the system board, which are fragile. Any damage to the cable sockets might require replacing the system board.

SD650 V2 tray

Use this information to route the cables for SD650 V2 trays.

ConnectX-6 Shared I/O adapter

ConnectX-6 Shared I/O adapters comes in two types:

Table 15.

Configuration	NVMe/SATA drive	M.2 backplane
Configuration 1: Shared I/O A	√	√
Configuration 2: Shared I/O B	X	√

Refer to corresponding table to route the cables for ConnectX-6 Shared I/O adapters.

- **Shared I/O A**

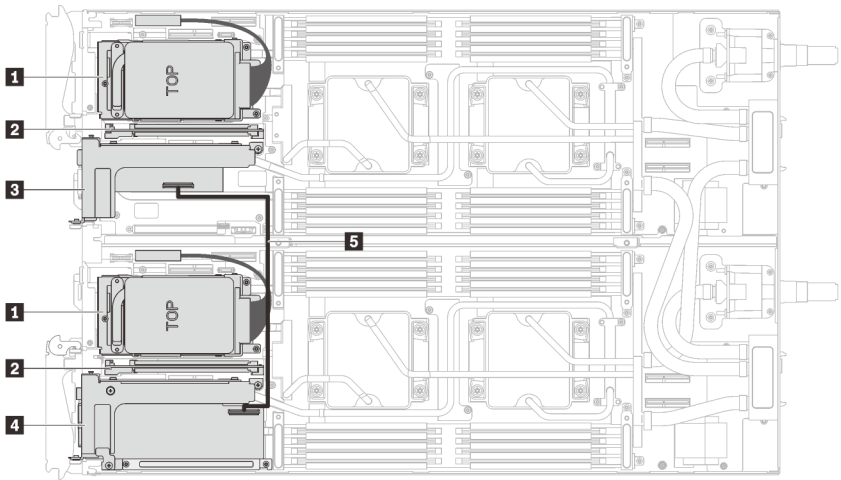


Figure 23. Cable routing - Shared I/O A (with NVMe/SATA drives and M.2 backplane)

1 NVMe/SATA drives	4 Main adapter
2 M.2 backplane	5 350mm IPEX cable
3 Auxiliary adapter	

- **Shared I/O B**

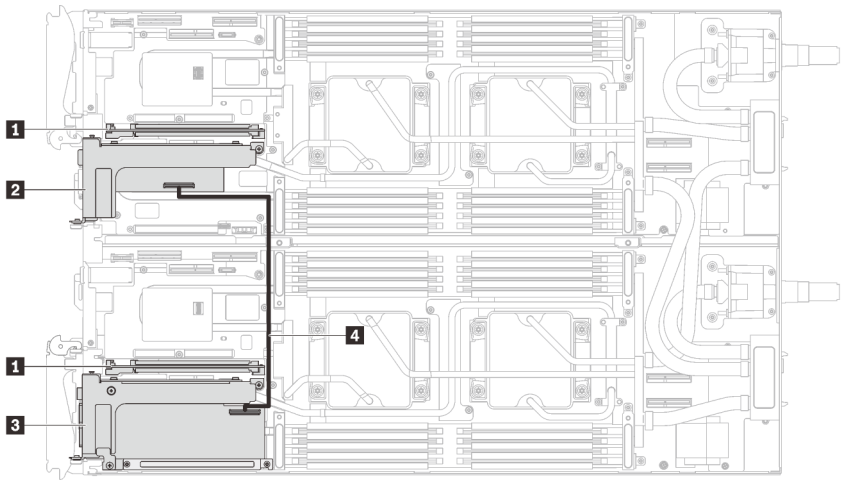


Figure 24. Cable routing - Share I/O B (with M.2 backplane)

1 M.2 backplane	3 Main adapter
2 Auxiliary adapter	4 350mm IPEX cable

SD650-N V2 tray

Use this information to route the cables for SD650-N V2 trays.

Cable installation order

Use this information to route the cables for SD650-N V2 trays.

GPU power cable installation

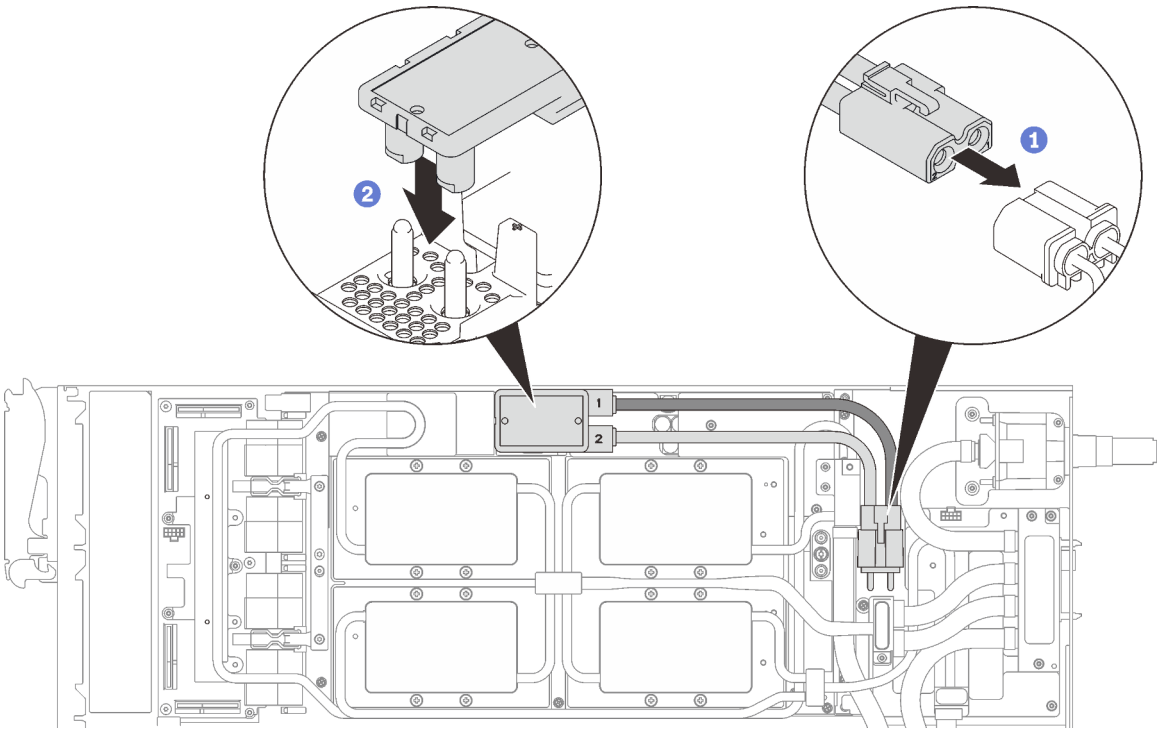
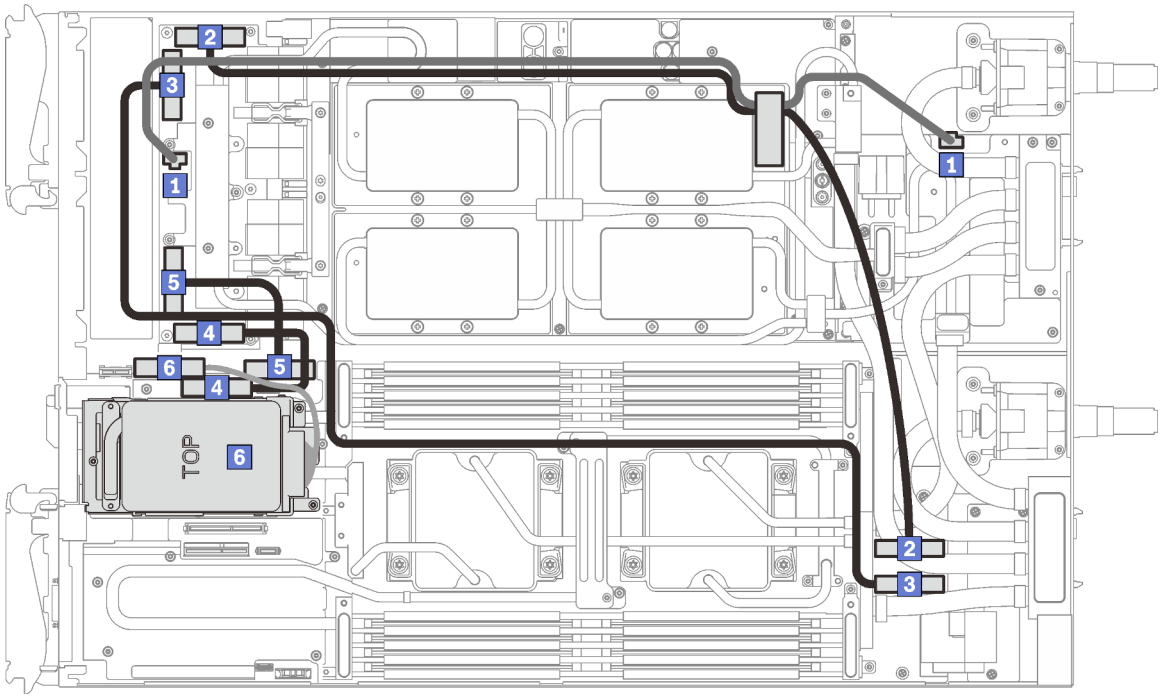


Figure 25. GPU power cable installation

One-PCIe adapter configuration

Important: Connect cables according to the following order.



1 Retimer board power cable	4 PCIe slot 2 MCIO cable
2 PCIe slot 4 MCIO cable	5 PCIe slot 3 MCIO cable
3 PCIe slot 5 MCIO cable	6 Drive SATA/NVMe cable

Figure 26. SD650-N V2 tray cable routing - One-PCIe adapter configuration

Two-PCIe adapter configuration

Important: Connect cables according to the following order.

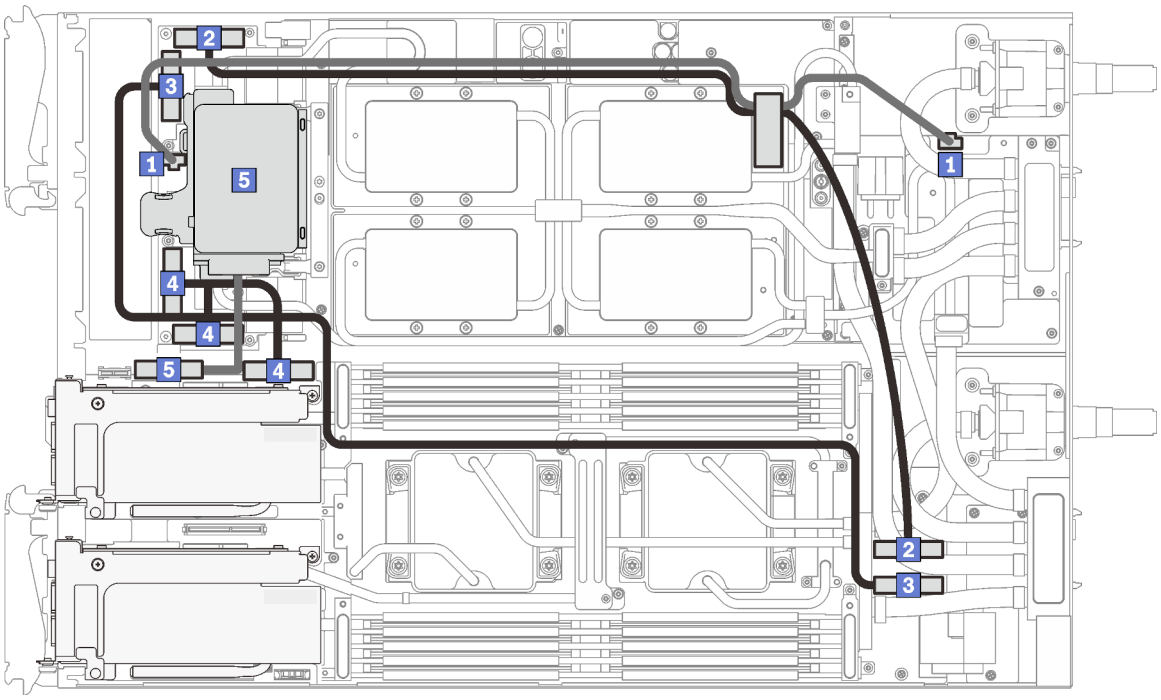


Figure 27. SD650-N V2 tray cable routing - Two-PCIe adapter configuration

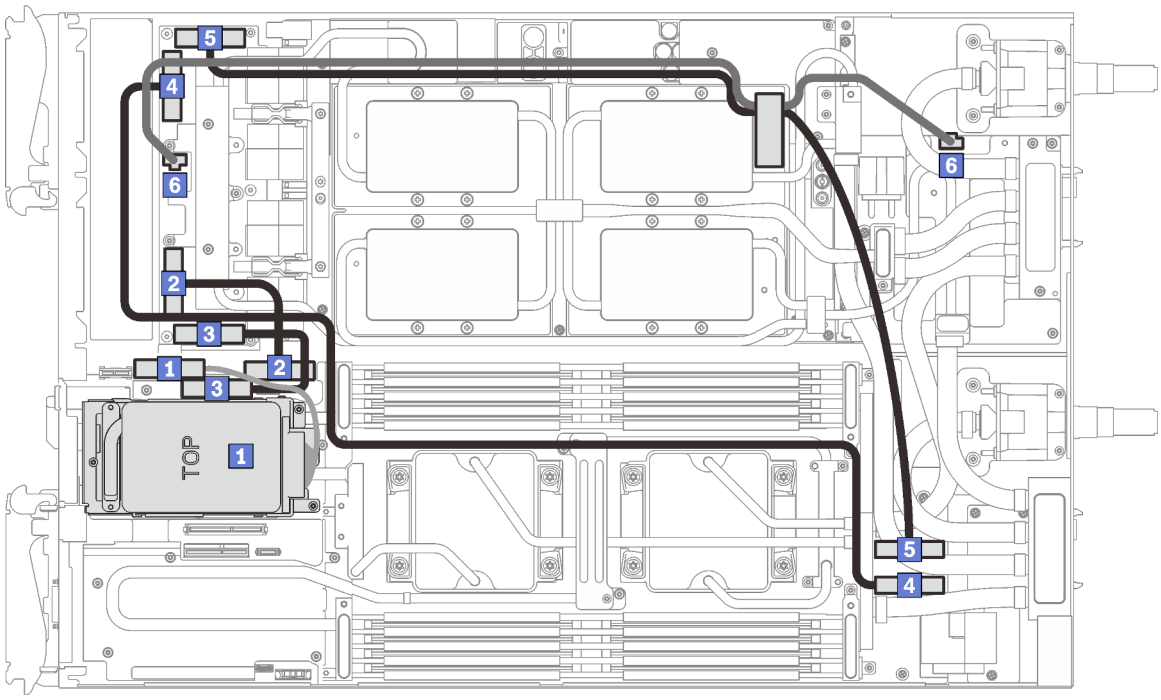
1 Retimer board power cable	4 PCIe slot 3 MCIO Y-cable
2 PCIe slot 4 MCIO cable	5 Drive SATA/NVMe cable
3 PCIe slot 5 MCIO cable	

Cable removal order

Use this information to disconnect the cables from SD650-N V2 trays.

One-PCIe adapter configuration

Important: Disconnect cables according to the following order.



1 Drive SATA/NVMe cable	4 PCIe slot 5 MCIO cable
2 PCIe slot 3 MCIO cable	5 PCIe slot 4 MCIO cable
3 PCIe slot 2 MCIO cable	6 Retimer board power cable

Figure 28. SD650-N V2 tray cable removal - One-PCIe adapter configuration

Two-PCIe adapter configuration

Important: Disconnect cables according to the following order.

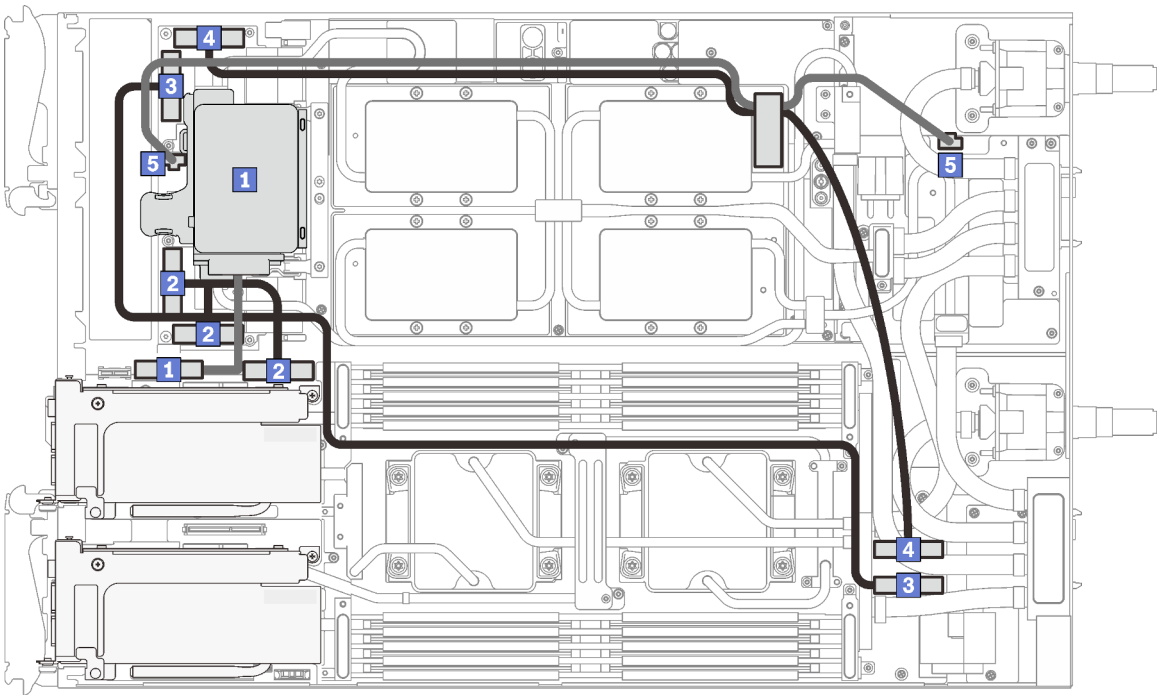


Figure 29. SD650-N V2 tray cable removal - Two-PCIe adapter configuration

1 Drive SATA/NVMe cable	4 PCIe slot 4 MCIO cable
2 PCIe slot 3 MCIO Y-cable	5 Retimer board power cable
3 PCIe slot 5 MCIO cable	

GPU power cable removal

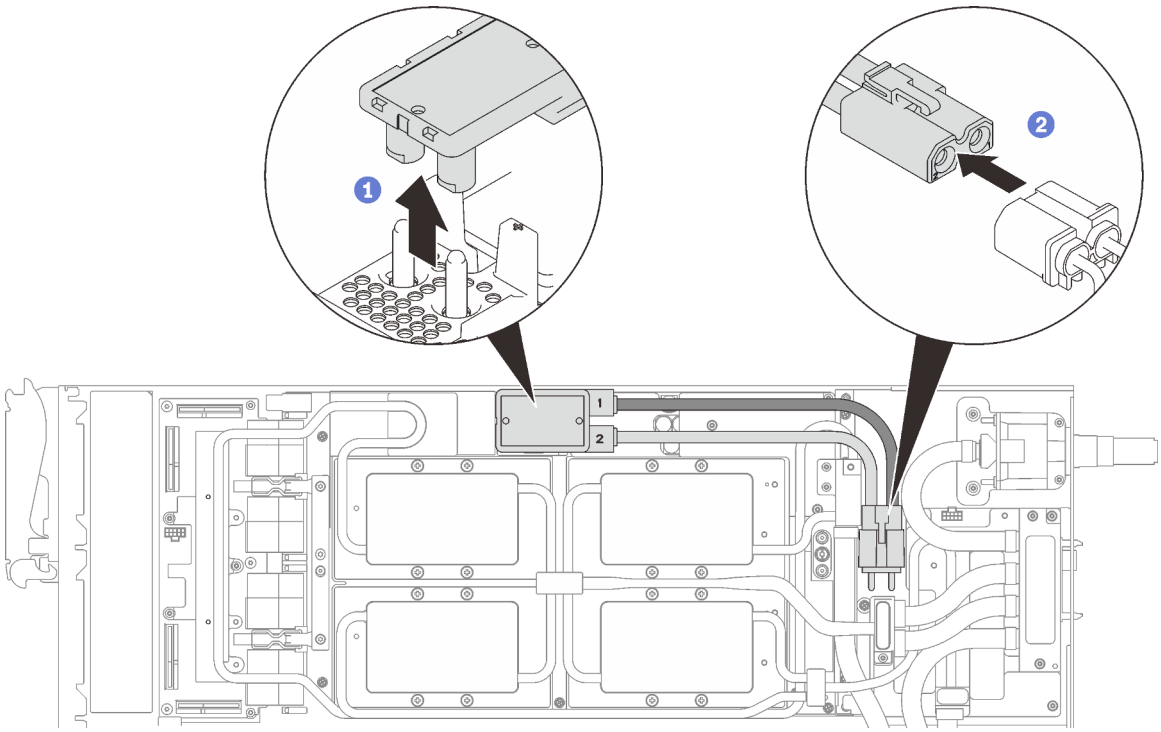


Figure 30. GPU power cable removal

Parts listing

Identify each of the components that are available for your solution with the parts listing.

For more information about ordering the parts:

1. Go to **http://datacentersupport.lenovo.com** and navigate to the support page for your solution.
2. Click **Service Parts**.
3. Enter the serial number to view a listing of parts for your solution.

The parts listed in the following table are identified as one of the following:

- **Tier 1 customer replaceable unit (CRU):** Replacement of Tier 1 CRUs is your responsibility. If Lenovo installs a Tier 1 CRU at your request with no service agreement, you will be charged for the installation.
- **Tier 2 customer replaceable unit (CRU):** You may install a Tier 2 CRU yourself or request Lenovo to install it, at no additional charge, under the type of warranty service that is designated for your solution.
- **Field replaceable unit (FRU):** FRUs must be installed only by trained service technicians.
- **Consumable parts:** Purchase and replacement of consumable is your responsibility. If Lenovo acquires or installs a consumable component at your request, you will be charged for the service.

Note: Depending on the model, your solution might look slightly different from the illustration.

Enclosure components

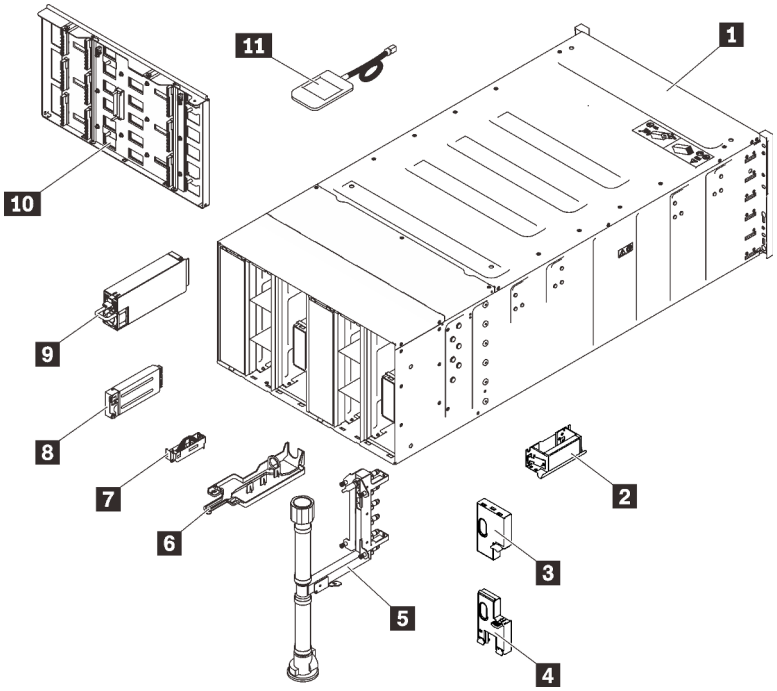


Figure 31. Enclosure components

Table 16. Parts list

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
For more information about ordering the parts shown in Figure 32 “Enclosure components” on page 43: **https://datacentersupport.lenovo.com/products/servers/thinksystem/da240-enclosure/7d1j/parts** **It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.**					
1	6U enclosure assembly			√	
2	Lift handle			√	
3	Upper EMC shield			√	
4	Lower EMC shield			√	
5	Manifold assembly			√	
6	Drip sensor tray			√	
7	Drip sensor assembly			√	
8	System Management Module 2			√	
9	Power supply	√			

Table 16. Parts list (continued)

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
For more information about ordering the parts shown in Figure 32 "Enclosure components" on page 43: **https://datacentersupport.lenovo.com/products/servers/thinksystem/da240-enclosure/7d1j/parts** **It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.**					
10	Midplane			√	
11	External LCD diagnostics handset	√			

SD650 V2 components

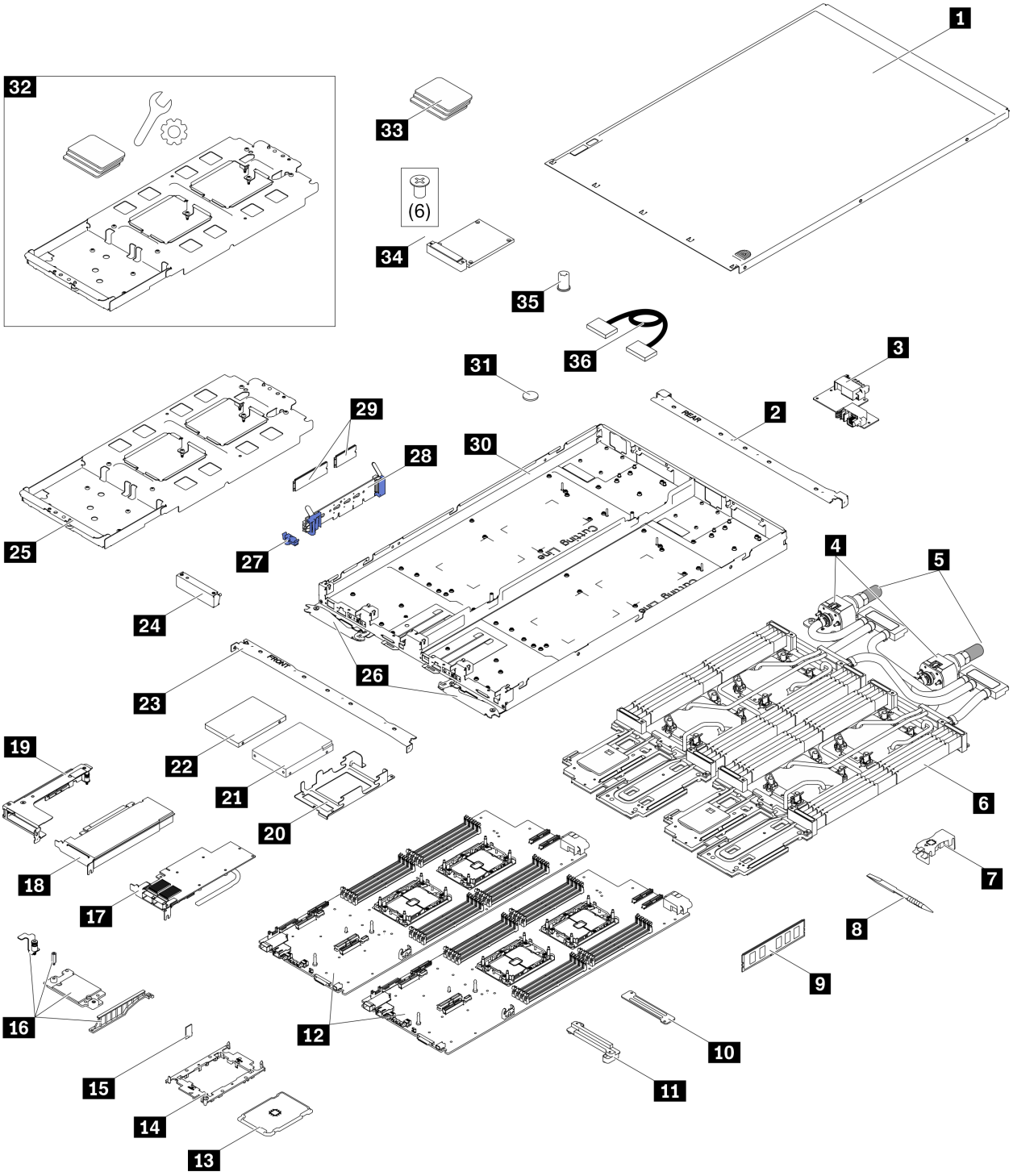


Figure 32. SD650 V2 components

Table 17. Parts list

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
For more information about ordering the parts shown in Figure 33 "SD650 V2 components" on page 46: **http://datacentersupport.lenovo.com/products/servers/thinksystem/sd630v2/7d1k/parts** **It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.**					
1	Tray cover			√	
2	Rear cross brace			√	
3	Power distribution board			√	
4	Quick connects			√	
5	Quick connect plug covers			√	
6	Water loop			√	
7	DIMM comb			√	
8	DIMM tool			√	
9	DIMM			√	
10	DIMM VR clamp plate			√	
11	DIMM VR cold plate			√	
12	System board			√	
13	Processor			√	
14	Processor retainer			√	
15	Trusted Cryptographic Module (TCM)			√	
16	ConnectX-6 kit			√	
17	ConnectX-6 adapter			√	
18	Adapter			√	
19	PCIe riser cage			√	
20	Drive cage			√	
21	2.5-inch drive (15mm)			√	
22	2.5-inch drive (7mm)			√	
23	Front cross brace			√	
24	Blank bezel filler	√			
25	Water loop carrier			√	
26	SD650 V2 cam handles			√	
27	M.2 retainer clip			√	
28	M.2 backplane			√	

Table 17. Parts list (continued)

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
For more information about ordering the parts shown in Figure 33 "SD650 V2 components" on page 46: **http://datacentersupport.lenovo.com/products/servers/thinksystem/sd630v2/7d1k/parts** **It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.**					
29	M.2 drive (42 mm and 80 mm)			√	
30	SD650 V2 tray			√	
31	CMOS battery (CR2032)				√
32	DWC waterloop service kit			√	
33	SD650-N V2/ SD650-V2 Neptune® DWC gap pad and putty kit			√	
34	Upper drive conduction plate assembly			√	
35	Heat sink peek nut			√	
36	Cable			√	

SD650-N V2 components

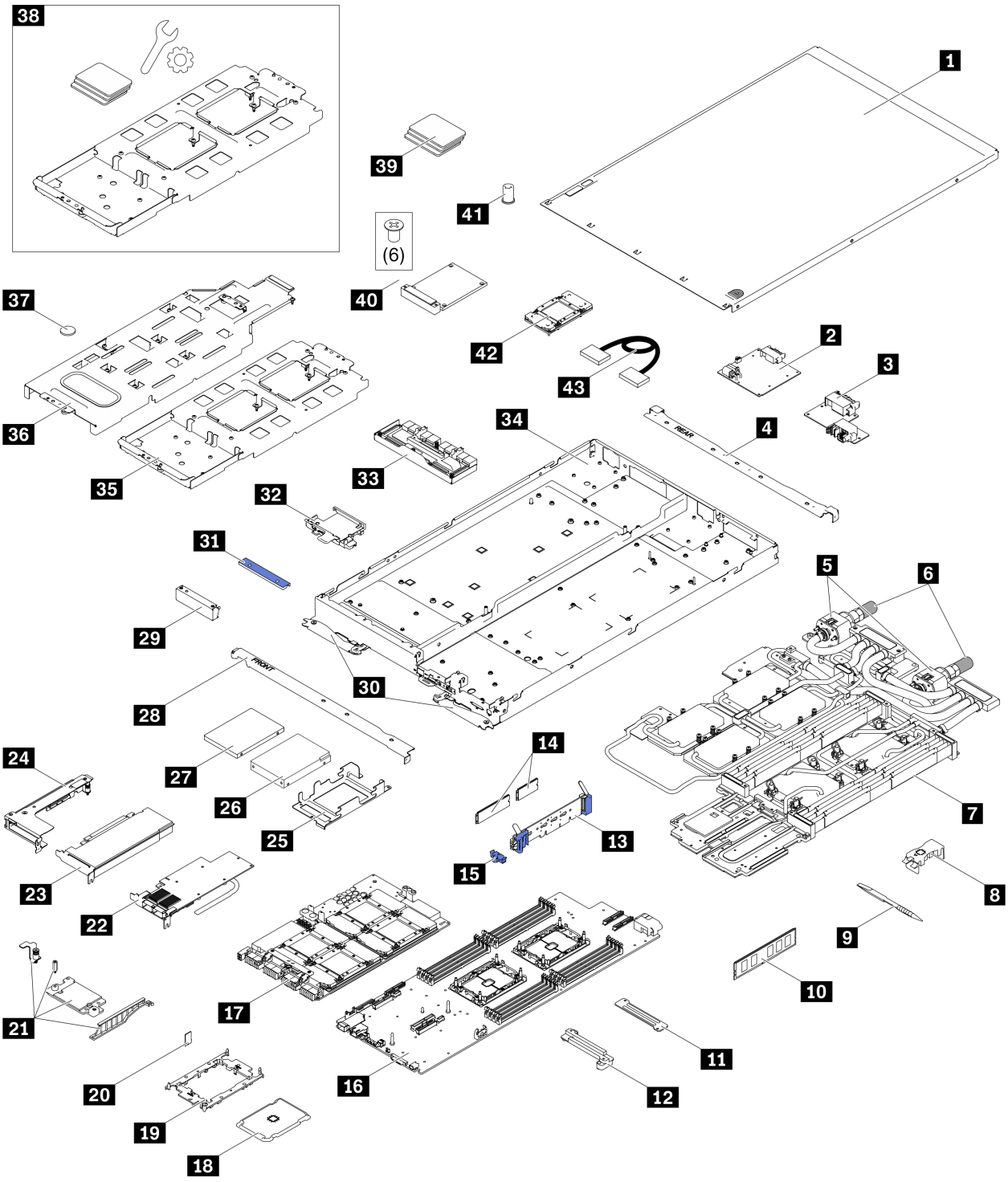


Figure 33. SD650-N V2 components

Table 18. Parts listing

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
For more information about ordering the parts shown in Figure 32 "SD650-N V2 components" on page 43: **http://datacentersupport.lenovo.com/products/servers/thinksystem/sd650-n-v2/7d1n/parts** **It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.**					
1	Tray cover			√	
2	GPU Power distribution board			√	
3	Power distribution board			√	
4	Rear cross brace			√	
5	Quick connects			√	
6	Quick connect plug covers			√	
7	Water loop			√	
8	DIMM comb			√	
9	DIMM tool			√	
10	DIMM			√	
11	DIMM VR clamp plate			√	
12	DIMM VR cold plate			√	
13	M.2 backplane			√	
14	M.2 drive (42 mm and 80 mm)			√	
15	M.2 retainer clip			√	
16	System board			√	
17	GPU board			√	
18	Processor			√	
19	Processor retainer			√	
20	Trusted Cryptographic Module (TCM)			√	
21	ConnectX-6 kit			√	
22	ConnectX-6 adapter			√	
23	Adapter			√	
24	PCIe riser cage			√	
25	Drive cage (for compute node)			√	
26	2.5-inch drive (15mm)			√	
27	2.5-inch drive (7mm)			√	
28	Front cross brace			√	

Table 18. Parts listing (continued)

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
For more information about ordering the parts shown in Figure 32 "SD650-N V2 components" on page 43: **http://datacentersupport.lenovo.com/products/servers/thinksystem/sd650-n-v2/7d1n/parts** **It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.**					
29	Blank bezel filler	√			
30	SD650-N V2 tray cam handles			√	
31	Retimer clamp plate **Note:** The retimer clamp plate is available only if no drive is installed in the GPU node.			√	
32	Drive cage (for GPU node) **Note:** The drive cage is available only if the drive is installed in the GPU node.			√	
33	Retimer board			√	
34	SD650-N V2 tray			√	
35	Compute node water loop carrier			√	
36	GPU node water loop carrier			√	
37	CMOS battery (CR2032)				√
38	Neptune® DWC Waterloop service kit			√	
39	SD650-N V2/ SD650-V2 Neptune® DWC gap pad and putty kit			√	
40	Upper drive conduction plate assembly			√	
41	Heat sink peek nut			√	
42	GPU			√	
43	Cable			√	

Power cords

Several power cords are available, depending on the country and region where the server is installed.

To view the power cords that are available for the server:

1. Go to:

   http://dcsc.lenovo.com/#/

2. Click **Preconfigured Model** or **Configure to order**.
3. Enter the machine type and model for your server to display the configurator page.
4. Click **Power → Power Cables** to see all line cords.

Notes:

- For your safety, a power cord with a grounded attachment plug is provided to use with this product. To avoid electrical shock, always use the power cord and plug with a properly grounded outlet.
- Power cords for this product that are used in the United States and Canada are listed by Underwriter's Laboratories (UL) and certified by the Canadian Standards Association (CSA).
- For units intended to be operated at 115 volts: Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a parallel blade, grounding-type attachment plug rated 15 amperes, 125 volts.
- For units intended to be operated at 230 volts (U.S. use): Use a UL-listed and CSA-certified cord set consisting of a minimum 18 AWG, Type SVT or SJT, three-conductor cord, a maximum of 15 feet in length and a tandem blade, grounding-type attachment plug rated 15 amperes, 250 volts.
- For units intended to be operated at 230 volts (outside the U.S.): Use a cord set with a grounding-type attachment plug. The cord set should have the appropriate safety approvals for the country in which the equipment will be installed.
- Power cords for a specific country or region are usually available only in that country or region.

Chapter 3. Hardware replacement procedures

This section provides installation and removal procedures for all serviceable system components. Each component replacement procedure references any tasks that need to be performed to gain access to the component being replaced.

For more information about ordering parts:

https://datacentersupport.lenovo.com/products/servers/thinksystem/da240-enclosure/7d1j/parts

http://datacentersupport.lenovo.com/products/servers/thinksystem/sd630v2/7d1k/parts

http://datacentersupport.lenovo.com/products/servers/thinksystem/sd650-n-v2/7d1n/parts

Note: If you replace a part, such as an adapter, that contains firmware, you might also need to update the firmware for that part. For more information about updating firmware, see “Firmware updates” on page 9.

Installation Guidelines

Before installing components in your server, read the installation guidelines.

Before installing optional devices, read the following notices carefully:

Attention: Prevent exposure to static electricity, which might lead to system halt and loss of data, by keeping static-sensitive components in their static-protective packages until installation, and handling these devices with an electrostatic-discharge wrist strap or other grounding system.

- Read the safety information and guidelines to ensure your safety at work:
  - A complete list of safety information for all products is available at:

    https://pubs.lenovo.com/safety_documentation/
  - The following guidelines are available as well: “Handling static-sensitive devices” on page 54 and “Working inside the solution with the power on” on page 54.
- Make sure the components you are installing are supported by your server. For a list of supported optional components for the server, see https://serverproven.lenovo.com/.
- When you install a new server, download and apply the latest firmware. This will help ensure that any known issues are addressed, and that your server is ready to work with optimal performance. Go to ThinkSystem SD650 V2/SD650-N V2 Neptune® DWC Trays and DW612 Neptune® DWC Enclosure Drivers and Software to download firmware updates for your server.

  Important: Some cluster solutions require specific code levels or coordinated code updates. If the component is part of a cluster solution, verify the latest Best Recipe code level menu for cluster supported firmware and driver before you update the code.
- It is good practice to make sure that the server is working correctly before you install an optional component.
- Keep the working area clean, and place removed components on a flat and smooth surface that does not shake or tilt.
- Do not attempt to lift an object that might be too heavy for you. If you have to lift a heavy object, read the following precautions carefully:
  - Make sure that you can stand steadily without slipping.

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  - Distribute the weight of the object equally between your feet.
  - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
  - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.
- Back up all important data before you make changes related to the disk drives.
- Have a small flat-blade screwdriver, a small Phillips screwdriver, and a T8 torx screwdriver available.
- To view the error LEDs on the system board and internal components, leave the power on.
- You do not have to turn off the server to remove or install hot-swap power supplies, hot-swap fans, or hot-plug USB devices. However, you must turn off the server before you perform any steps that involve removing or installing adapter cables, and you must disconnect the power source from the server before you perform any steps that involve removing or installing a riser card.
- Blue on a component indicates touch points, where you can grip to remove a component from or install it in the server, open or close a latch, and so on.
- Terra-cotta on a component or a terra-cotta label on or near a component indicates that the component can be hot-swapped if the server and operating system support hot-swap capability, which means that you can remove or install the component while the server is still running. (Terra-cotta can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.
- The Red strip on the drives, adjacent to the release latch, indicates that the drive can be hot-swapped if the server and operating system support hot-swap capability. This means that you can remove or install the drive while the server is still running.

  Note: See the system specific instructions for removing or installing a hot-swap drive for any additional procedures that you might need to perform before you remove or install the drive.
- After finishing working on the server, make sure you reinstall all safety shields, guards, labels, and ground wires.

Safety inspection checklist

Use the information in this section to identify potentially unsafe conditions with your solution. As each machine was designed and built, required safety items were installed to protect users and service technicians from injury.

Notes:

- The product is not suitable for use at visual display workplaces according to §2 of the Workplace Regulations.
- The complete process of setup must be done in the server room.

CAUTION:
S041

CAUTION:

- **This equipment must be installed or serviced by trained personnel, as defined by the NEC, IEC 62368-1 and IEC 60950-1, the standard for Safety of Electronic Equipment within the Field of Audio/Video, Information Technology and Communication Technology.**
- **Access to the equipment is by the use of a tool, lock and key, or other means of security, and is controlled by the authority responsible for the location.**

Important: Electrical grounding of the solution is required for operator safety and correct system function. Proper grounding of the electrical outlet can be verified by a certified electrician.

Use the following checklist to verify that there are no potentially unsafe conditions:

1. Make sure that the power is off and the power cord is disconnected.
2. Check the power cord.
   - Make sure that the third-wire ground connector is in good condition. Use a meter to measure third-wire ground continuity for 0.1 ohm or less between the external ground pin and the frame ground.
   - Make sure that the power cord is the correct type.

     To view the power cords that are available for the server:

     a. Go to:

        http://dcsc.lenovo.com/#/

     b. Click **Preconfigured Model** or **Configure to order**.

     c. Enter the machine type and model for your server to display the configurator page.

     d. Click **Power → Power Cables** to see all line cords.
   - Make sure that the insulation is not frayed or worn.
3. Check for any obvious non-Lenovo alterations. Use good judgment as to the safety of any non-Lenovo alterations.
4. Check inside the solution for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
5. Check for worn, frayed, or pinched cables.
6. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.
7. The design of the electrical distribution system must take into consideration the total grounding leakage current from all power supplies in the enclosure.

   “CAUTION”: High touch current. Connect to earth before connecting to supply.

System reliability guidelines

Review the system reliability guidelines to ensure proper system cooling and reliability.

Make sure the following requirements are met:

- When the solution comes with redundant power, a power supply must be installed in each power-supply bay.
- Adequate space around the solution must be spared to allow solution cooling system to work properly. Leave approximately 50 mm (2.0 in.) of open space around the front and rear of the solution. Do not place any object in front of the fans.

- For proper cooling and airflow, refit the solution cover before you turn the power on. Do not operate the solution for more than 30 minutes with the solution cover removed, for it might damage solution components.
- Cabling instructions that come with optional components must be followed.
- A removed hot-swap drive must be replaced within two minutes after removal.
- A removed hot-swap power supply must be replaced within two minutes after removal.
- All processor sockets must contain either a socket cover or a processor with heat sink.

Working inside the solution with the power on

You might need to keep the power on with the solution cover removed to look at system information on the display panel or to replace hot-swap components. Review these guidelines before doing so.

Attention: The solution might stop and data loss might occur when internal solution components are exposed to static electricity. To avoid this potential problem, always use an electrostatic-discharge wrist strap or other grounding systems when working inside the solution with the power on.

- Avoid loose-fitting clothing, particularly around your forearms. Button or roll up long sleeves before working inside the solution.
- Prevent your necktie, scarf, badge rope, or hair from dangling into the solution.
- Remove jewelry, such as bracelets, necklaces, rings, cuff links, and wrist watches.
- Remove items from your shirt pocket, such as pens and pencils, in case they fall into the solution as you lean over it.
- Avoid dropping any metallic objects, such as paper clips, hairpins, and screws, into the server.

Handling static-sensitive devices

Review these guidelines before you handle static-sensitive devices to reduce the possibility of damage from electrostatic discharge.

Attention: Prevent exposure to static electricity, which might lead to system halt and loss of data, by keeping static-sensitive components in their static-protective packages until installation, and handling these devices with an electrostatic-discharge wrist strap or other grounding system.

- Limit your movement to prevent building up static electricity around you.
- Take additional care when handling devices during cold weather, for heating would reduce indoor humidity and increase static electricity.
- Always use an electrostatic-discharge wrist strap or other grounding system, particularly when working inside the solution with the power on.
- While the device is still in its static-protective package, touch it to an unpainted metal surface on the outside of the solution for at least two seconds. This drains static electricity from the package and from your body.
- Remove the device from the package and install it directly into the solution without putting it down. If it is necessary to put the device down, put it back into the static-protective package. Never place the device on the solution or on any metal surface.
- When handling a device, carefully hold it by the edges or the frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Keep the device from others' reach to prevent possible damages.

Replace components in the enclosure

Use the following information to remove and install the enclosure components.

Enclosure midplane replacement

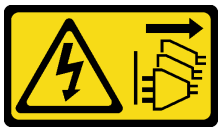
Use the following procedures to remove and install the enclosure midplane.

Remove the enclosure midplane

Use this information to remove the enclosure midplane.

About this task

S002



CAUTION:
The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Follow the following steps to shut down the solution.
  1. Record the machine type model, the enclosure serial number, and retrieve the existing universally unique identifier (UUID) information from the enclosure midplane that you are removing. The procedure for obtaining this data might require different steps depending on the functional state of the enclosure.
     a. Log onto the Lenovo XClarity Controller and access the command-line interface (CLI). You can access the XCC CLI through a direct serial or Ethernet connection to the XCC, or through a Secure Shell (SSH) connection to the XCC. You must authenticate with the XCC before issuing commands.
     b. Query for the machine type model, enclosure serial number, and the UUID values by using the CLI `info` command. Record this information before you proceed.
  2. Enclosure is not operating:
     a. Obtain the enclosure serial number and the machine type model from one of the enclosure labels.
     b. Record the enclosure serial number, the machine type model, and the UUID before you proceed.
- Shut down the operating system and turn off any compute nodes in the enclosure. See the documentation that comes with the compute node for detailed instructions.
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.

Procedure

Step 1. Make preparations for this task.

a. Remove all trays in the front of the enclosure (see “Remove a DWC tray from the enclosure” on page 149).

b. Remove all EMC shields on both sides.

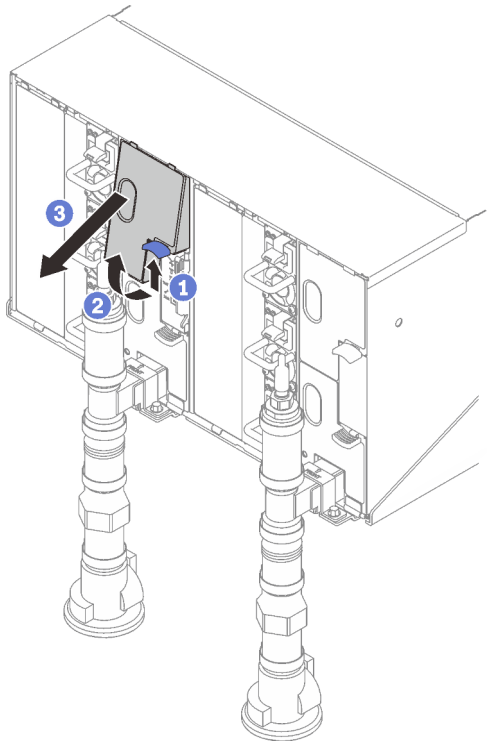


Figure 34. Upper EMC shields removal

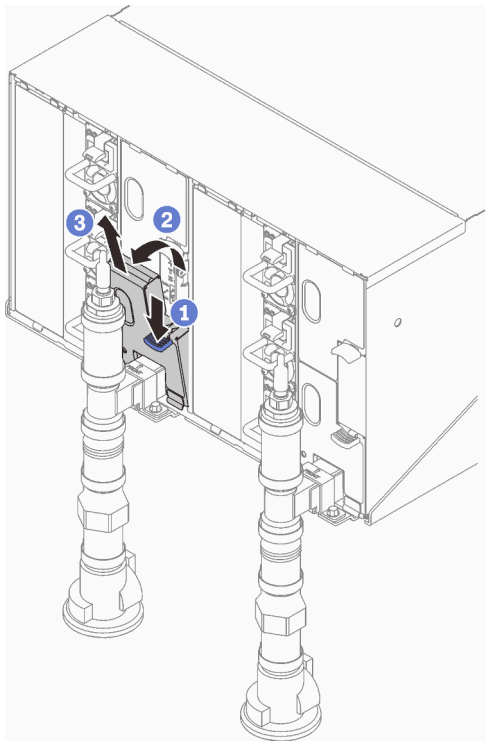


Figure 35. Lower EMC shields removal

c. ❶ Push the latch up upwards and ❷ slide the drip sensor assembly backwards, then; lift the drip sensor assembly up to clear sensor post and pull it out of the enclosure.

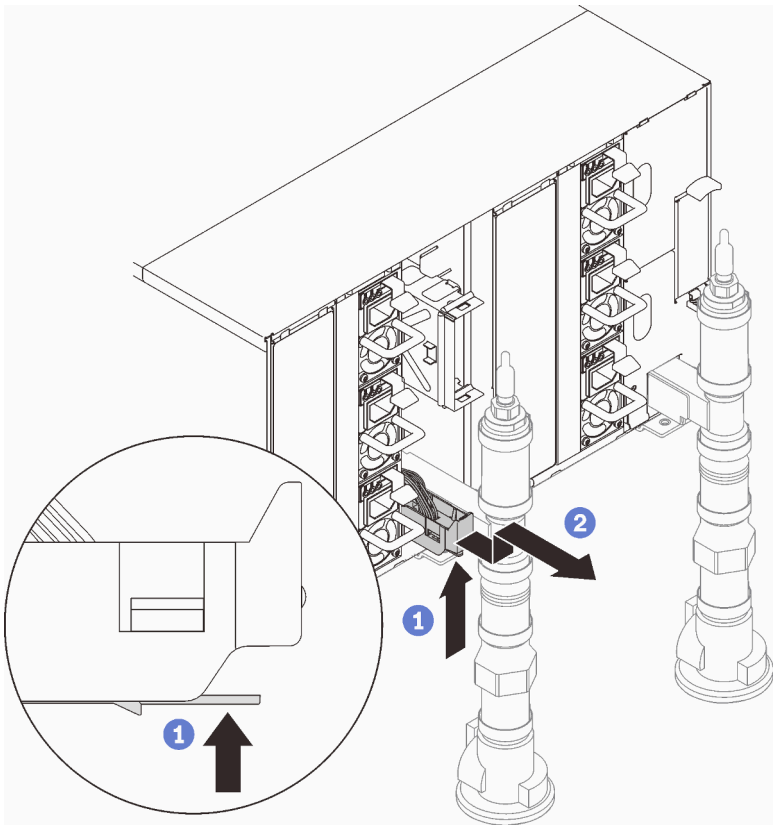


Figure 36. Drip sensor assembly removal

d. Remove manifold retention brackets that are retaining manifolds (top enclosure position only).

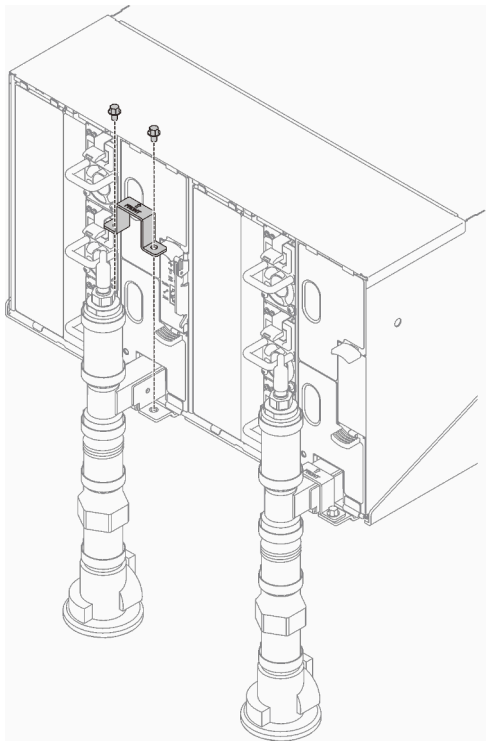


Figure 37. Retention bracket removal

e. Remove the SMM2 and the SMM2 support bracket.

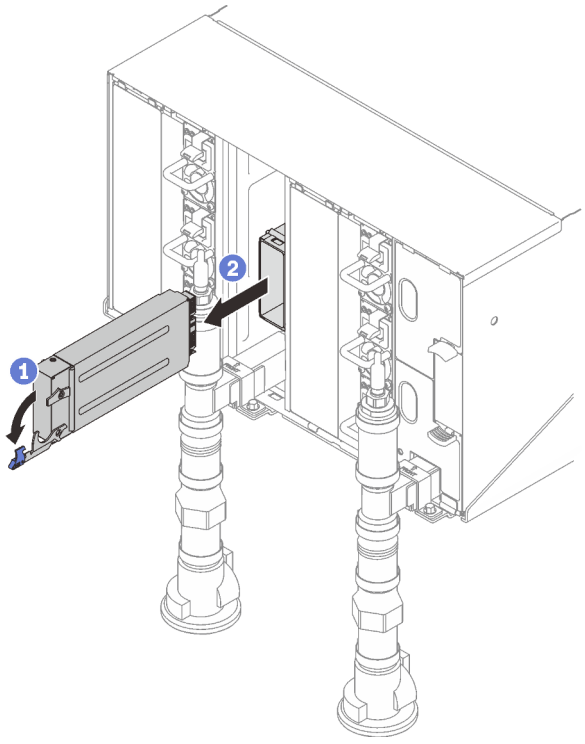


Figure 38. SMM2 removal

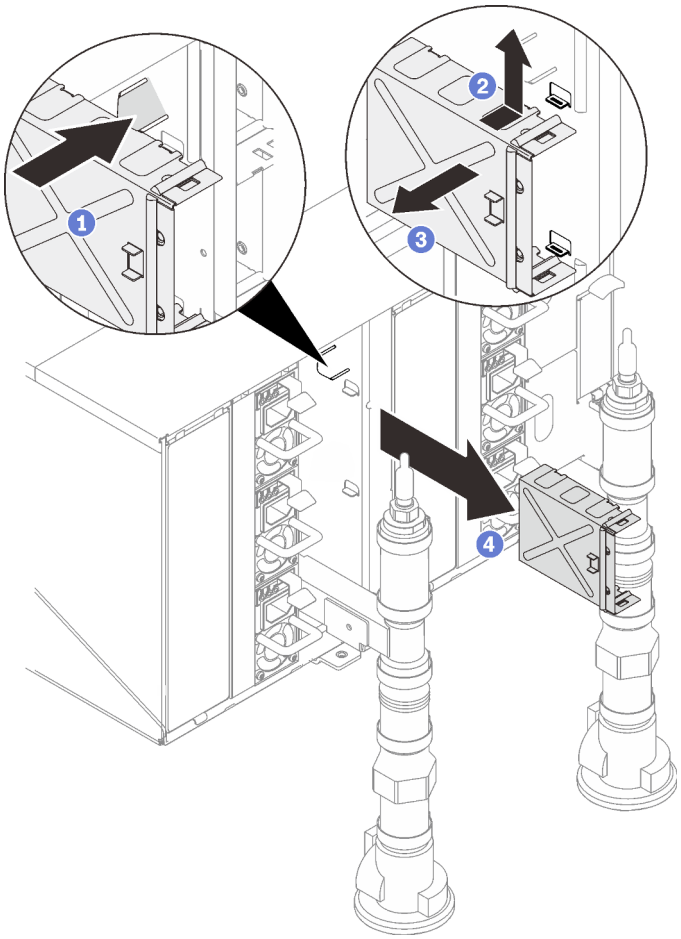


Figure 39. SMM2 support bracket removal

f. Remove the blank filler.

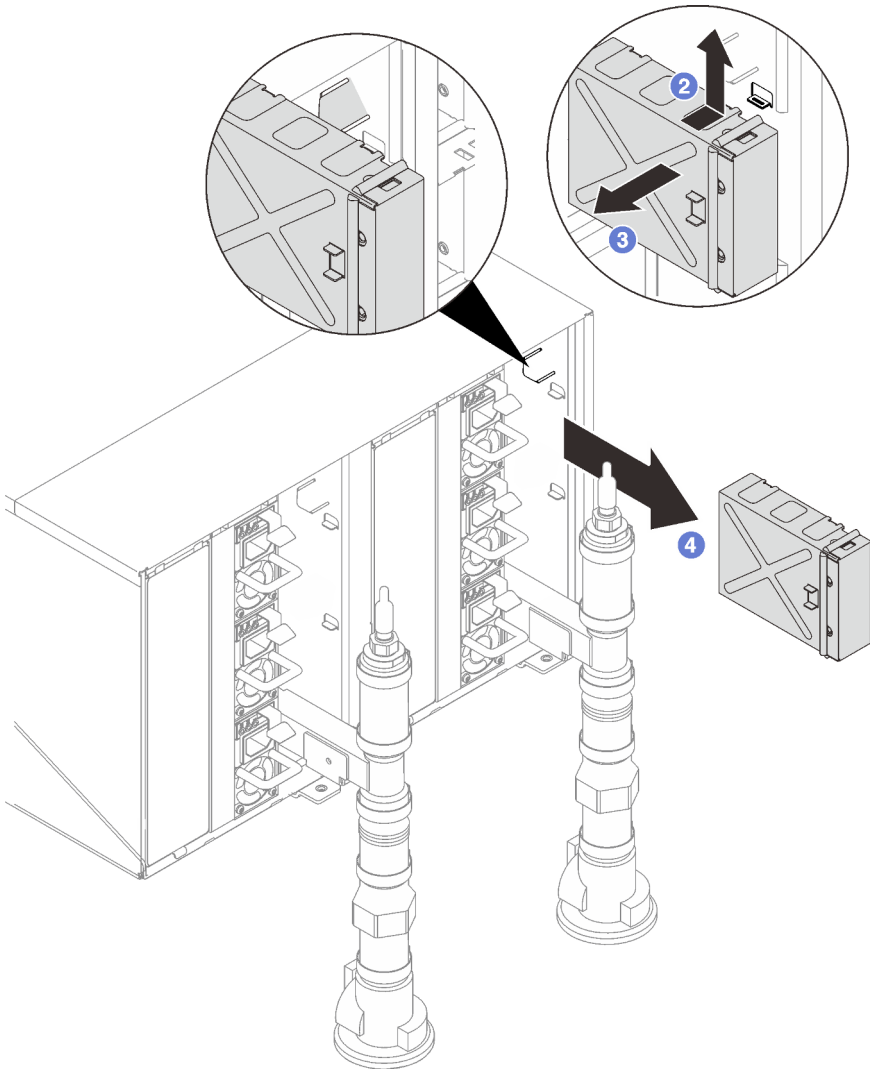


Figure 40. Blank filler removal

g. Remove all power supplies from the enclosure.

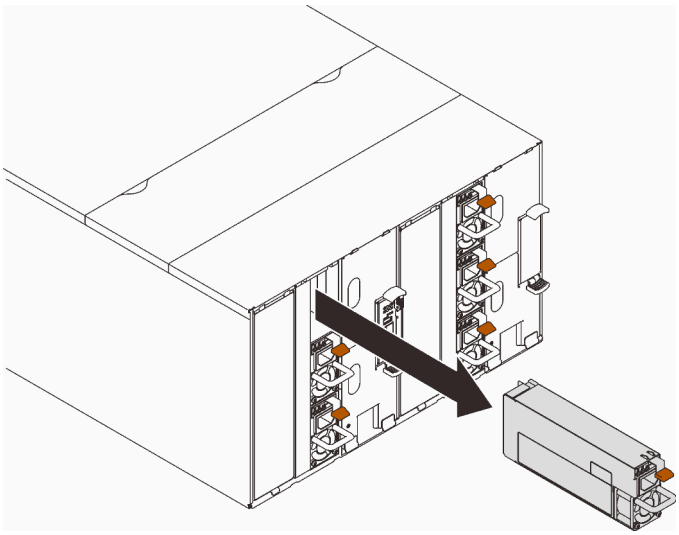


Figure 41. Power supply removal

h. Remove eight screws (using the screwdriver contained in the manifold repair kit) to loosen two manifolds from the enclosure.

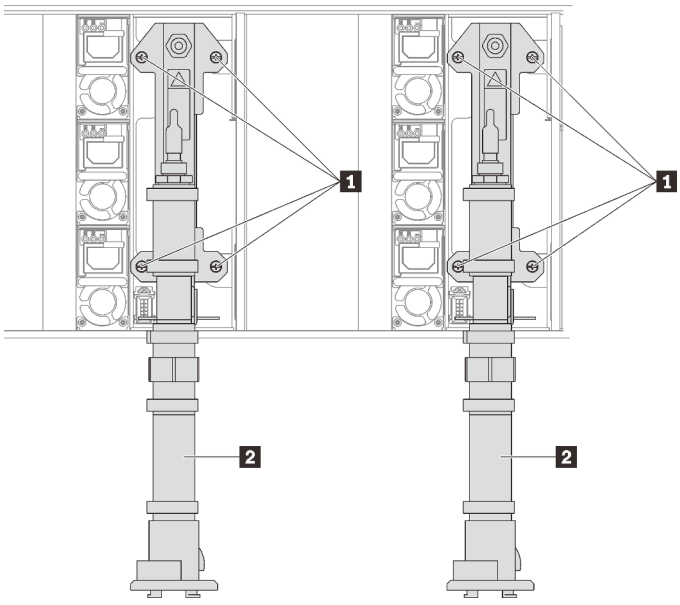


Figure 42. Manifold screw locations

Table 19. Manifold screw locations

1 Screws	2 Manifold

i. Remove eight screws to remove two support brackets on both sides.

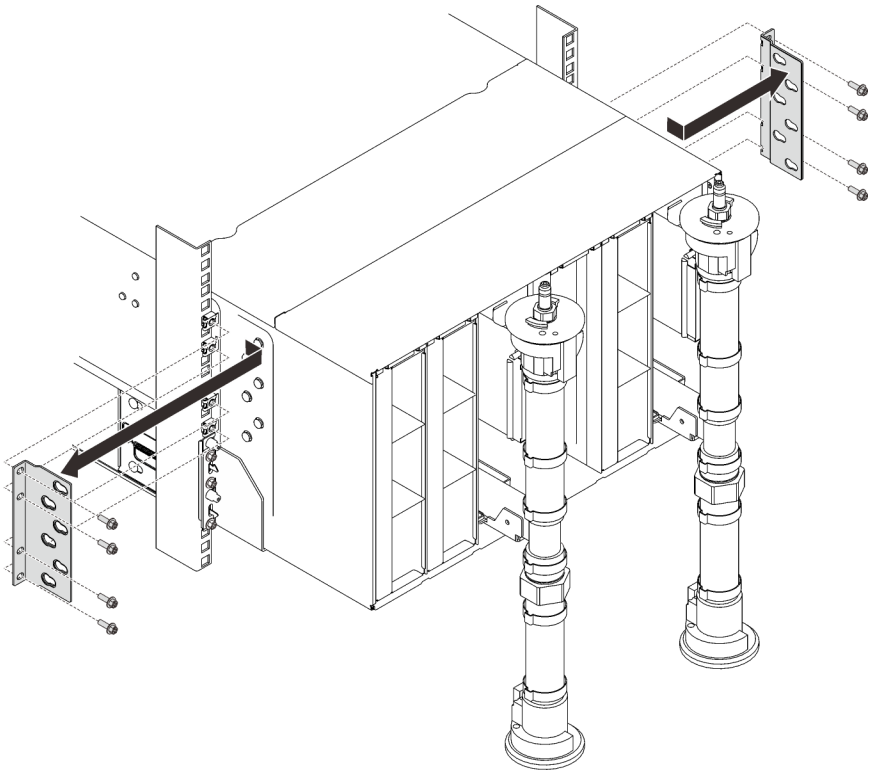


Figure 43. Support bracket removal

j. Remove the two EIA covers from the front of the enclosure, then, remove the six screws that secure the enclosure to the rack.

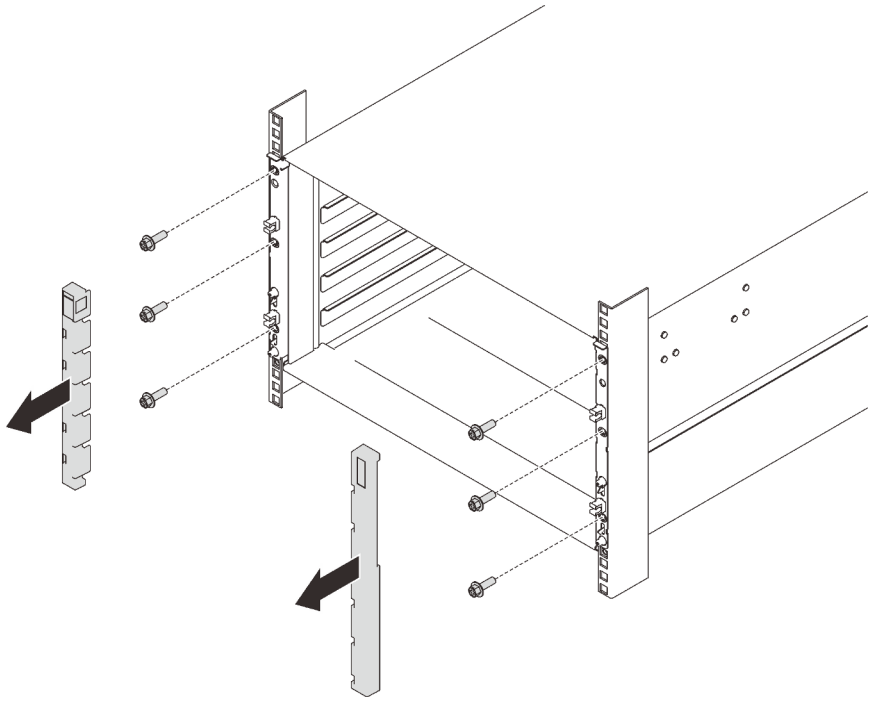


Figure 44. EIA cover removal

k. Slide the enclosure out until it allows you to attach front handles at both sides. Align slots on the handles with posts on the enclosure and slide handles up until them lock into places.

Attention: Three trained technicians are required to complete the enclosure installation/ removal task.

- Two technicians must hold the front and rear handles at both sides of the enclosure.
- One technician must protect the cables from damage.

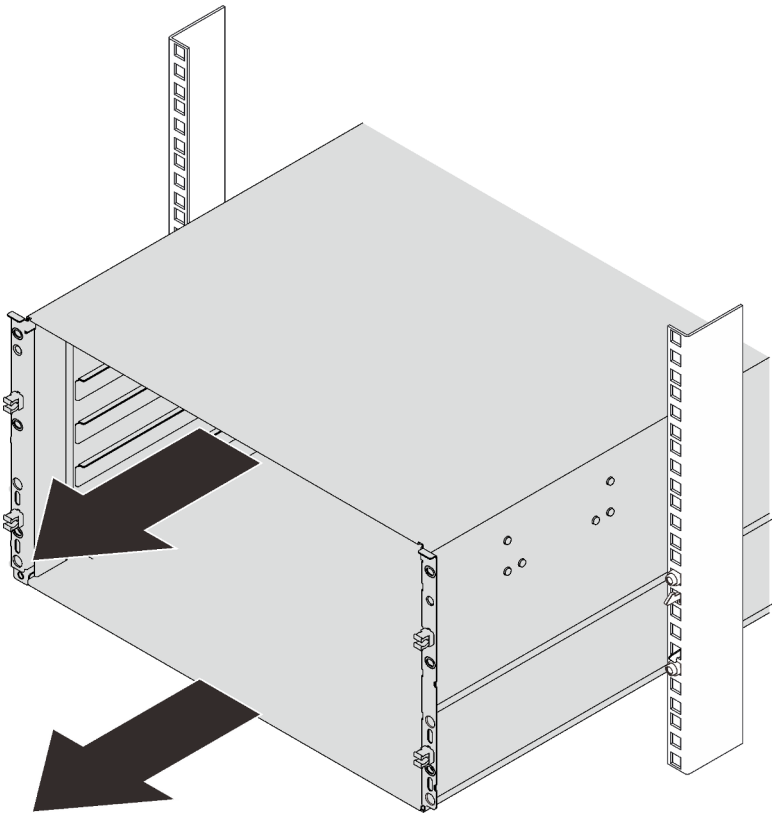


Figure 45. Sliding the enclosure

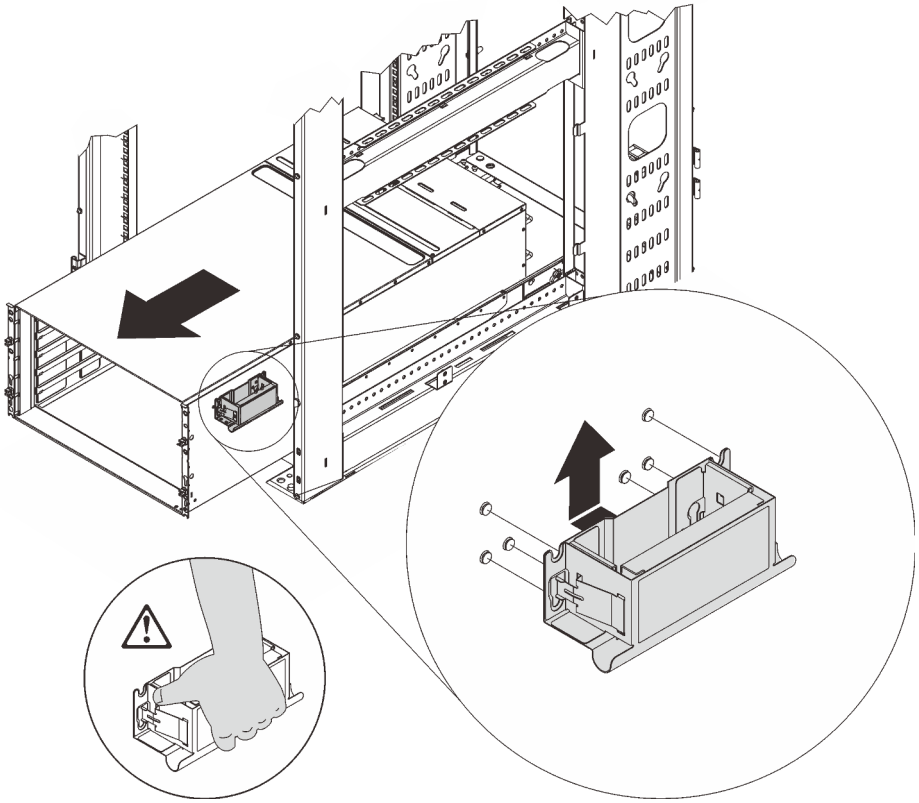


Figure 46. Installing the front handle

l. Hold the front handles at both sides, and slide the enclose out until there is enough space to install the rear handles.

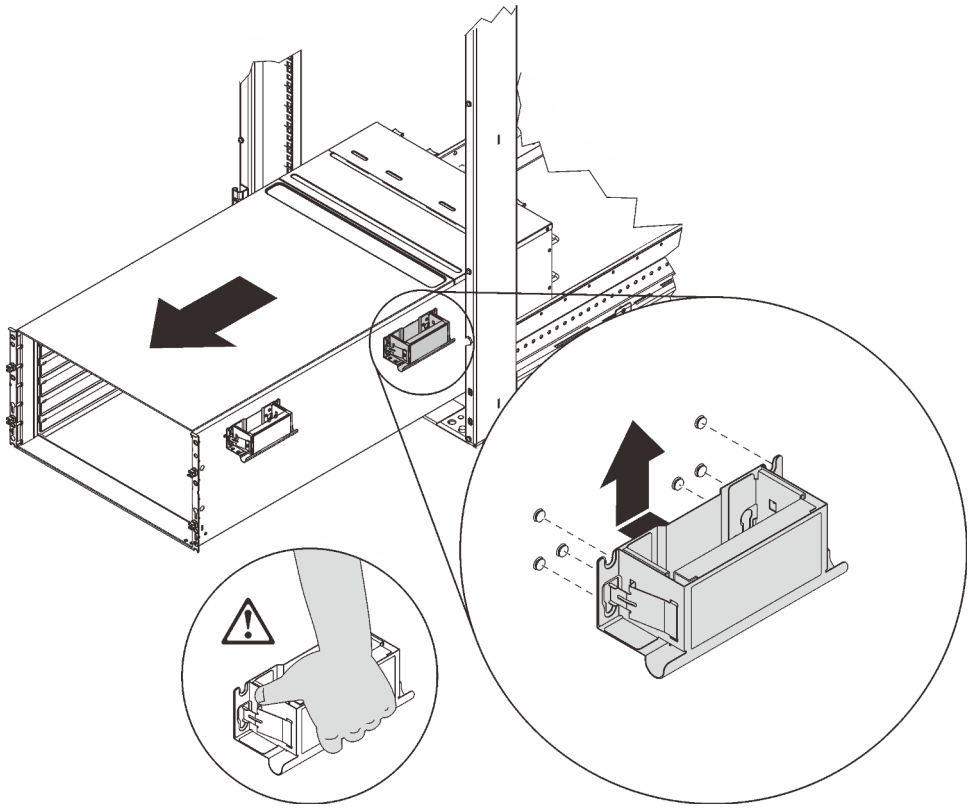


Figure 47. Rear handle installation

m. Carefully hold front and rear handles at both sides to slide the enclosure out of the rack; then, gently put the enclosure on a stable work surface.

Step 2. Remove the top cover.

a. ❶ Loosen the three captive screws on the top cover.

b. ❷ Rotate the top cover outwards.

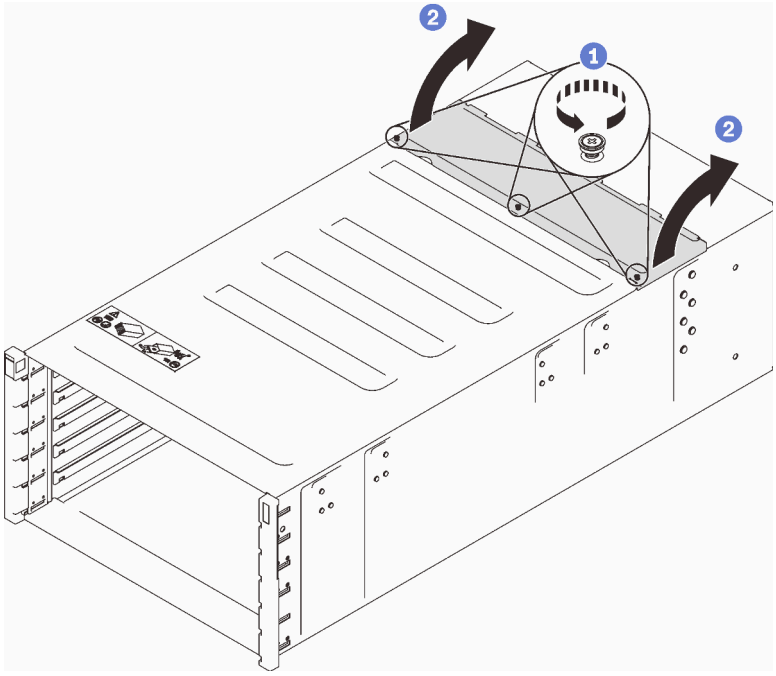


Figure 48. Top cover outward rotation

Step 3. Remove the enclosure midplane from an enclosure.

a. ❶ Unplug two cables on the enclosure midplane.

Note: Make sure that you do not grasp the connectors on the enclosure midplane. You could damage the connectors.

b. ❷ Loosen two screws that secure the enclosure midplane to the enclosure.

c. ❸ Carefully grasp the enclosure midplane and slide it away from the enclosure.

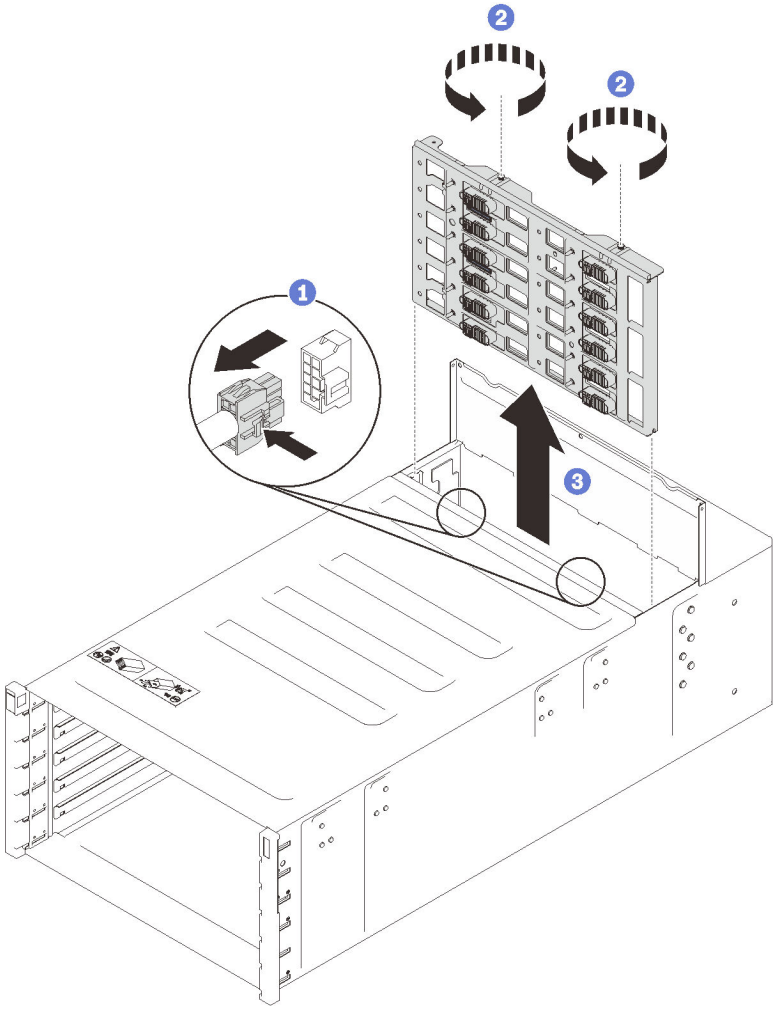


Figure 49. Removal of the enclosure midplane from an enclosure

After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

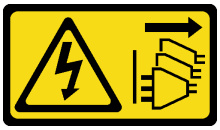
Watch the procedure on YouTube

Install the enclosure midplane

(Trained service technician only) Use this information to install the enclosure midplane.

About this task

S002



CAUTION:
The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52

Procedure

Step 1. Connect the two fan cables to the enclosure and route the cables through cable clips.

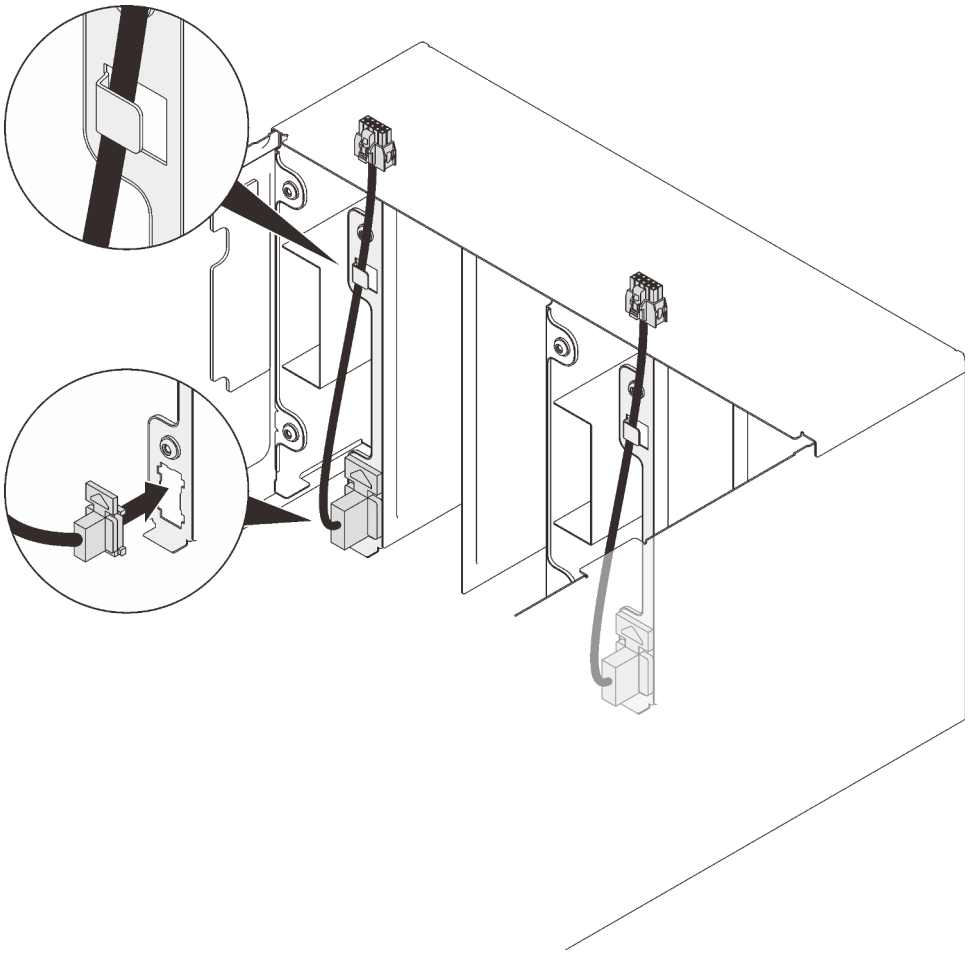


Figure 50. Fan cable installation

Step 2. Install the midplane.

a. ❶ Carefully align the enclosure midplane with the guide pins in the enclosure; then, slide the midplane into the enclosure.

Attention: Do not grasp the connectors on the enclosure midplane when you install it in the enclosure. Touching the connectors might damage the connector pins.

b. ❷ Fasten two screws on the top of the midplane.

c. ❸ Connect the fan cables to the midplane.

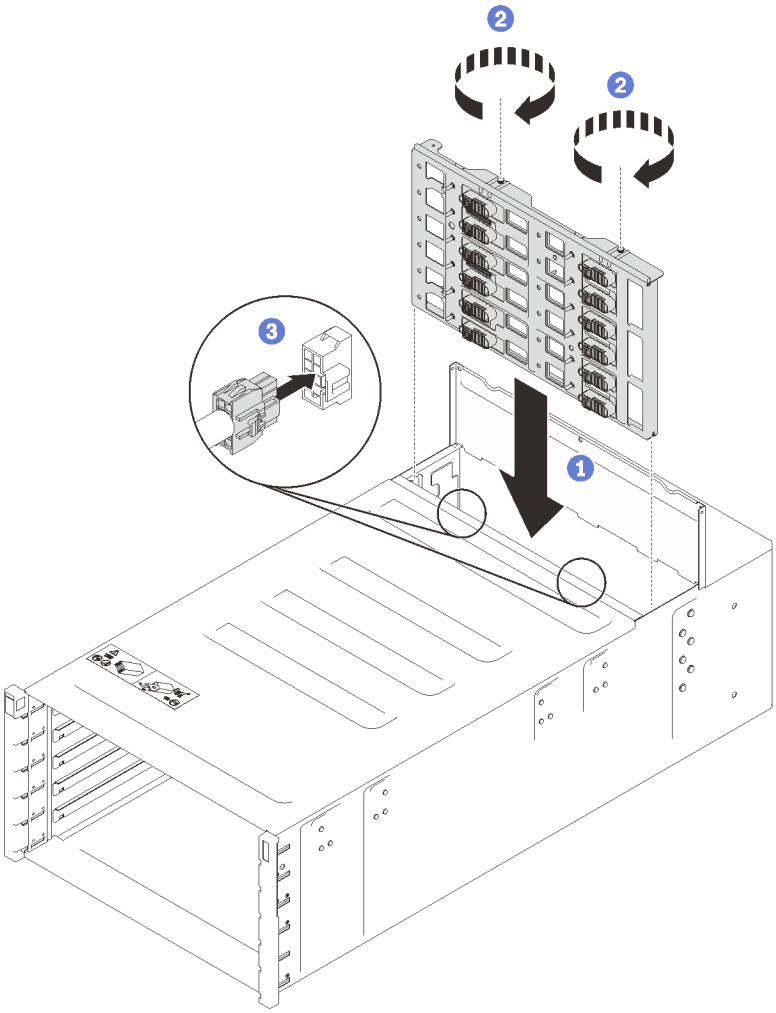


Figure 51. Enclosure midplane installation

Step 3. Install the top cover.

a. ❶ Insert the rear top cover tabs into the slot on the enclosure; then, rotate the top cover inwards.

b. ❷ Tighten the three captive screws on the top cover.

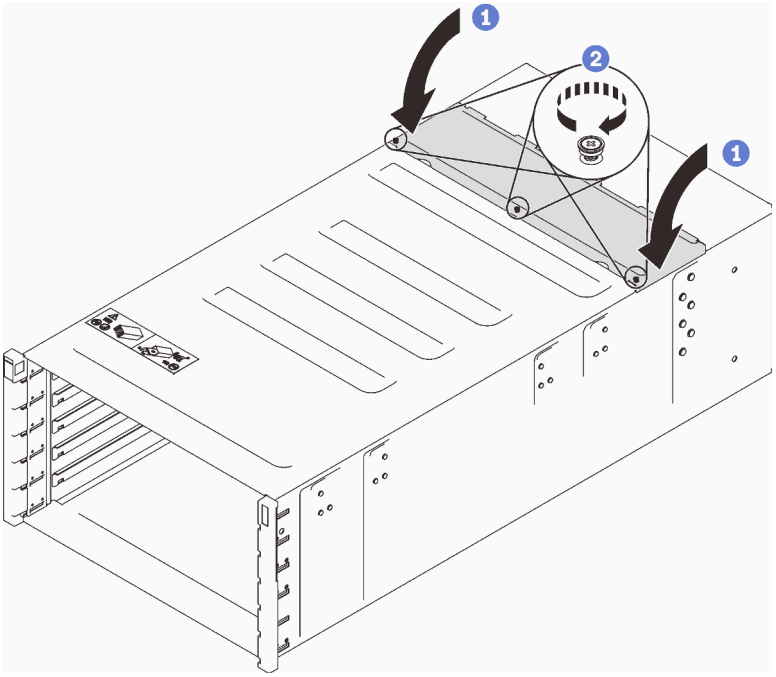


Figure 52. Top cover inward rotation

After you finish

Reassemble the enclosure and program the vital product data (VPD) that is stored on the card. Complete the following steps:

Attention: Three trained technicians are required to complete the enclosure installation/removal task.

- Two technicians must hold the front and rear handles at both sides of the enclosure.
- One technician must protect the cables from damage.

1. Carefully put the enclosure into the rack and slide the enclosure until rear handles are near front rack rails; then, remove rear handles at both sides.

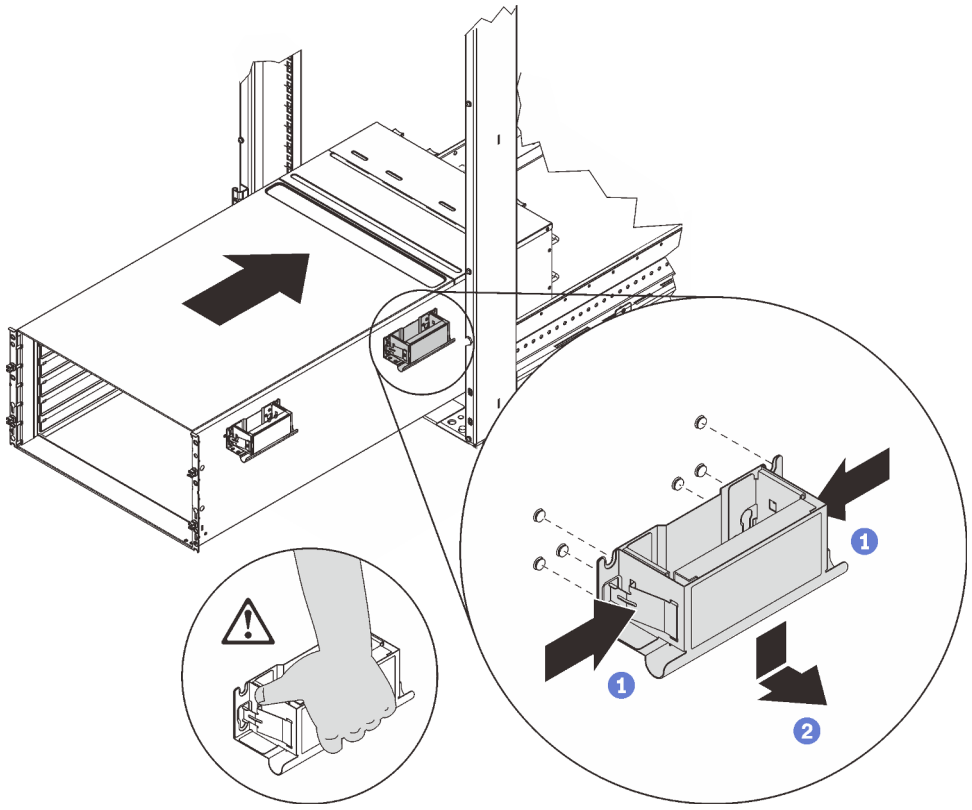


Figure 53. Rear handle removal

2. Slide the enclosure farther into the rack until front handles are near front rack rails; then, remove front handles at both sides.

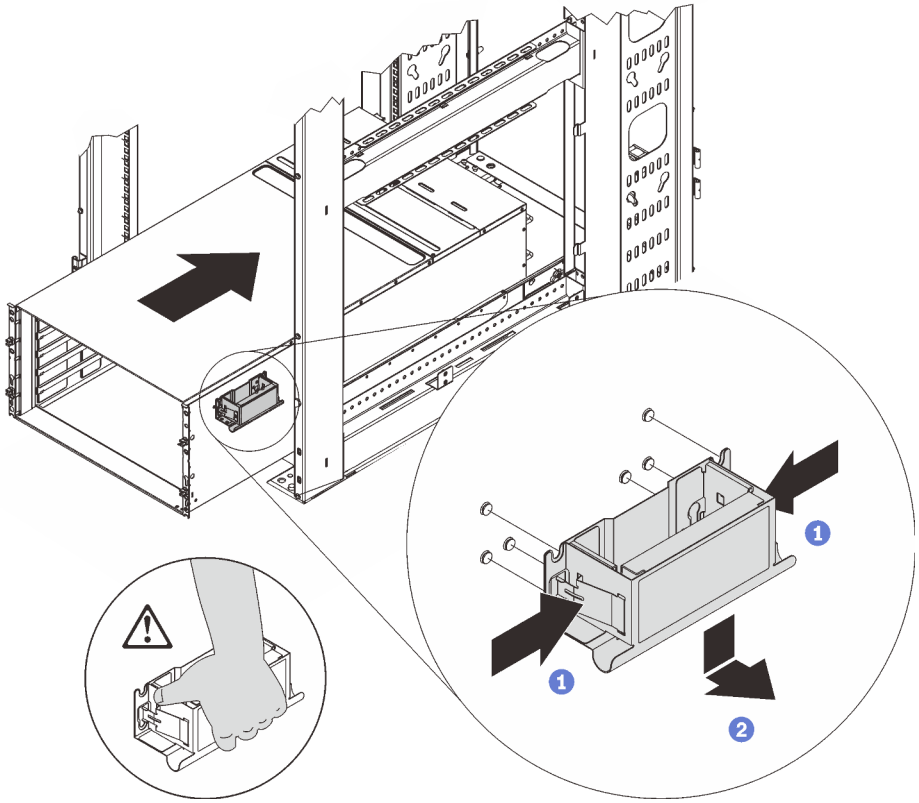


Figure 54. Front handle removal

3. Side the enclosure all the way back to the rack.

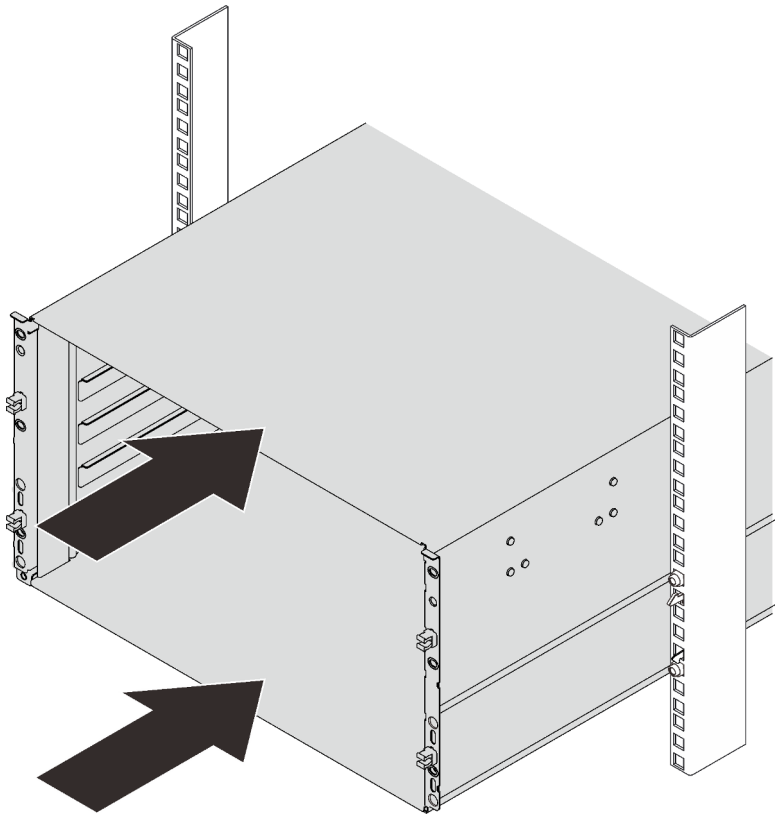


Figure 55. Sliding the rack

4. Secure the enclosure to the rack with six screws; then, reinstall the EIA covers.

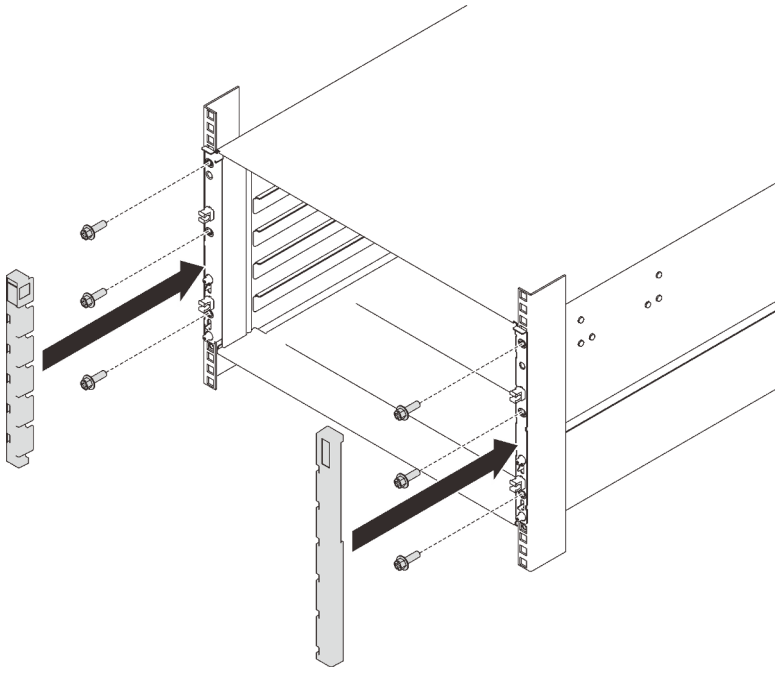


Figure 56. EIA cover installation

5. Reinstall eight screws to secure two support brackets on the rear enclosure.

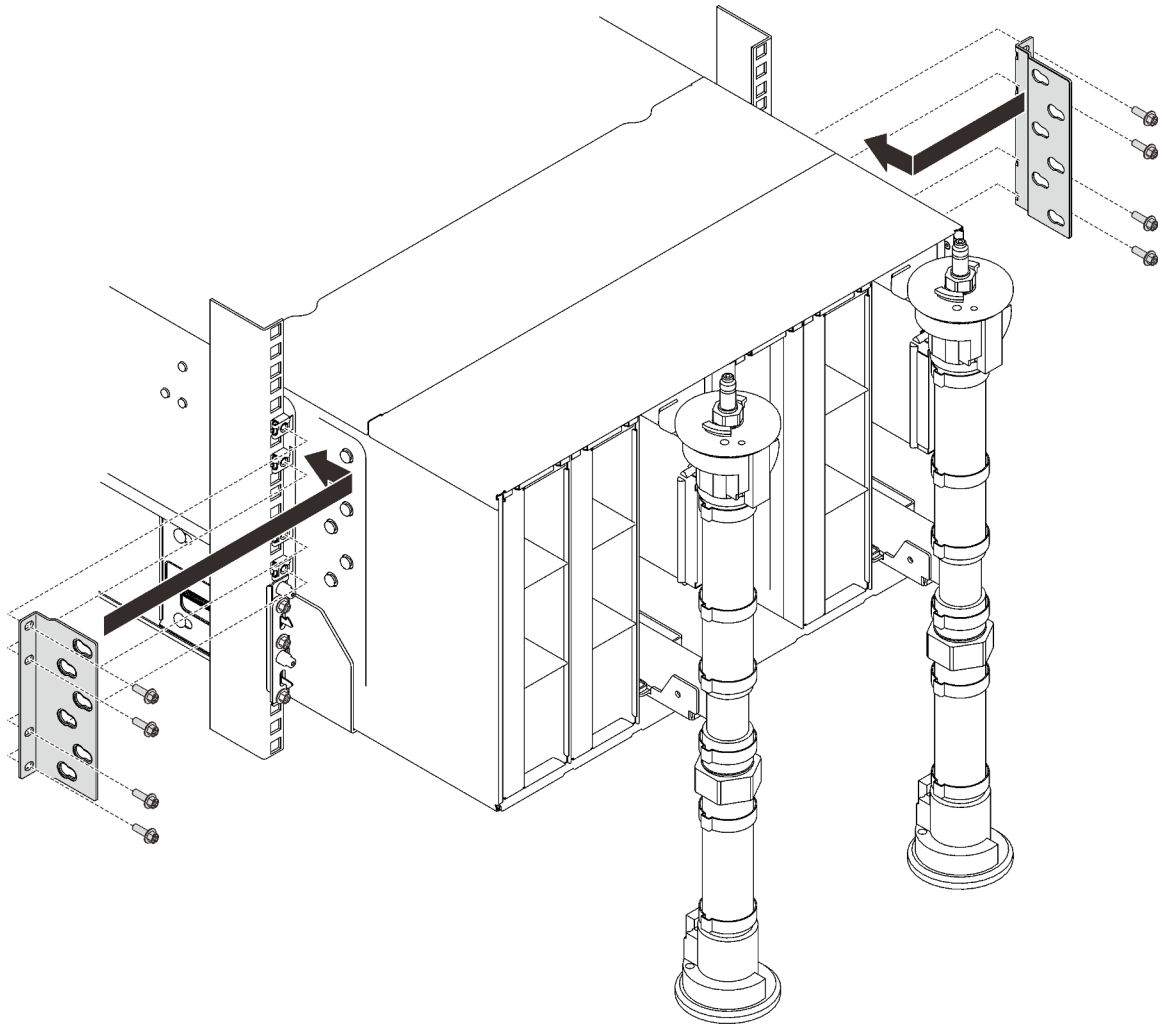


Figure 57. Support bracket installation

6. Reinstall eight screws (using the screwdriver contained in the manifold repair kit) to secure two manifolds.

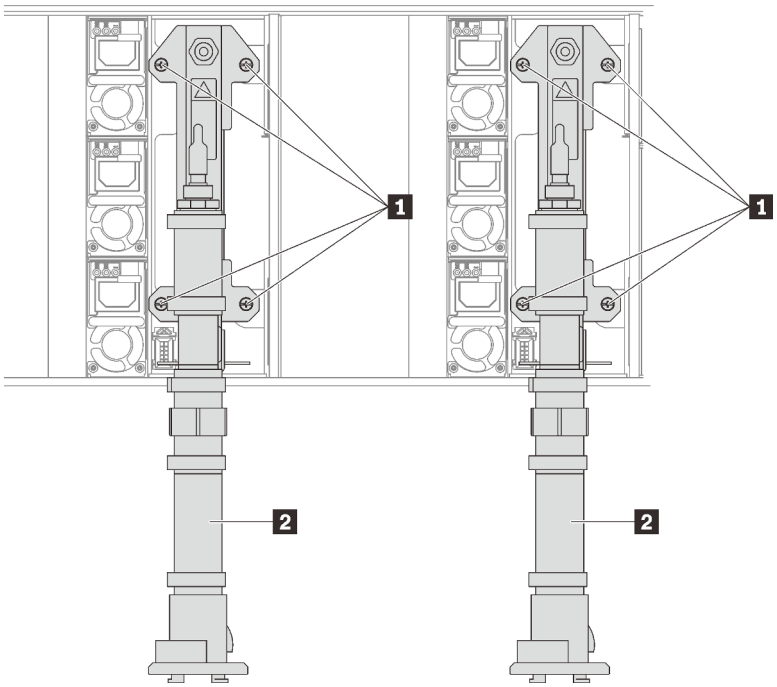


Figure 58. Manifold screw locations

Table 20. Manifold screw locations

1 Screws	2 Manifold

7. Reinstall all power supplies back to the enclosure.

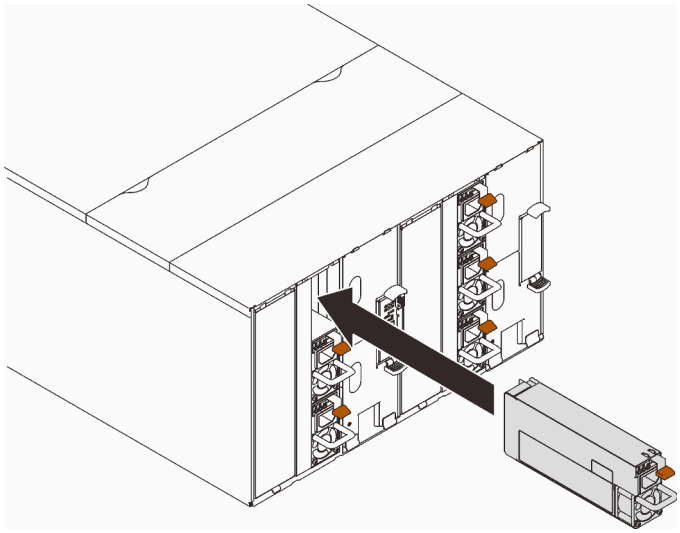


Figure 59. Power supply installation

8. Reinstall the blank filler.

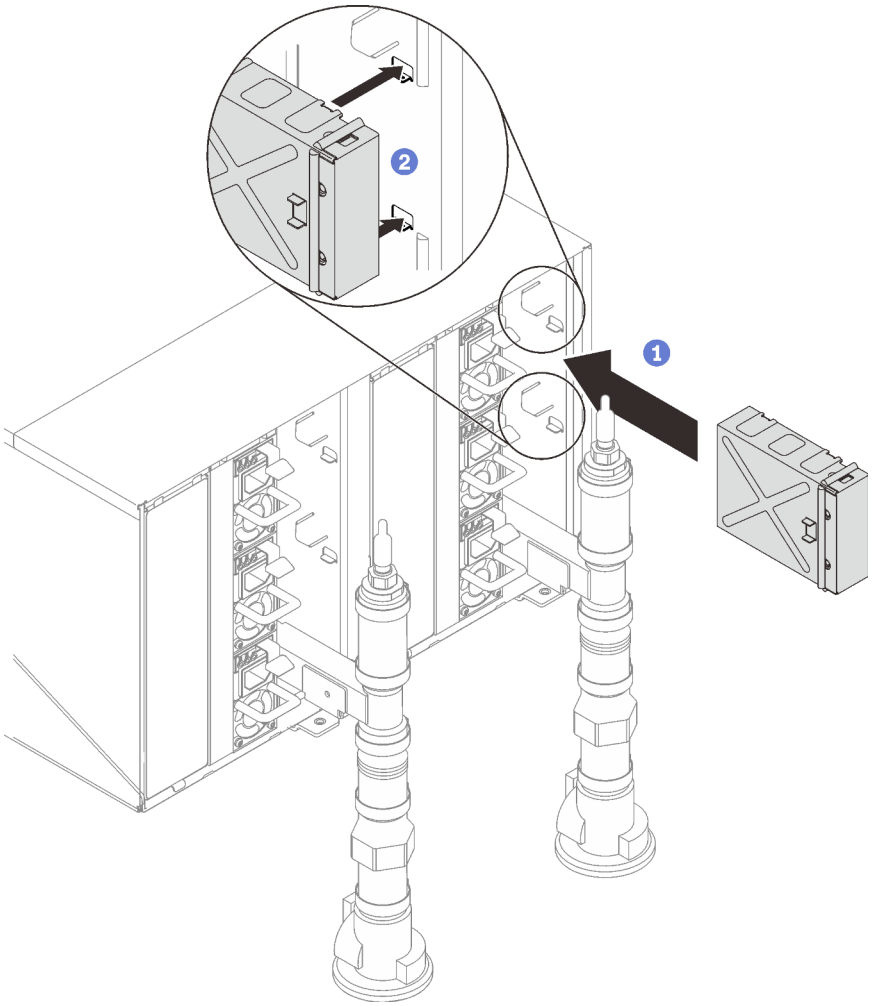


Figure 60. Blank filler installation

9. Reinstall the SMM2 support bracket and the SMM2.

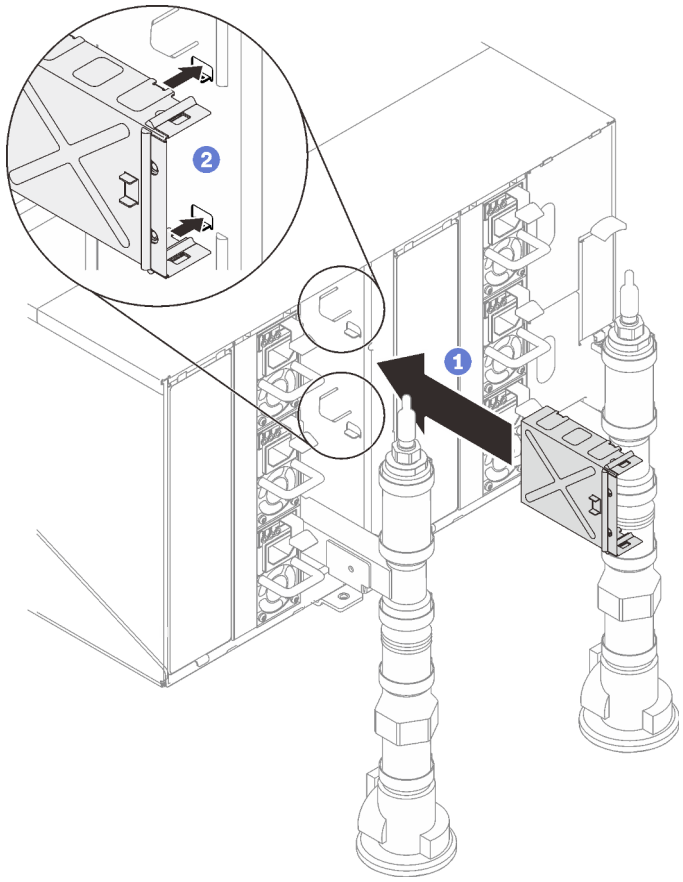


Figure 61. SMM2 support bracket installation

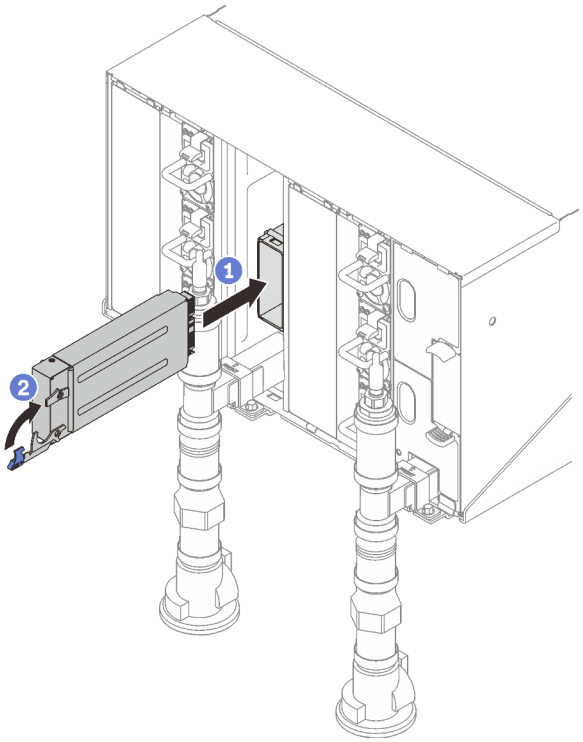


Figure 62. SMM2 installation

Reinstall manifold retention brackets that are retaining the manifolds (top enclosure position only).

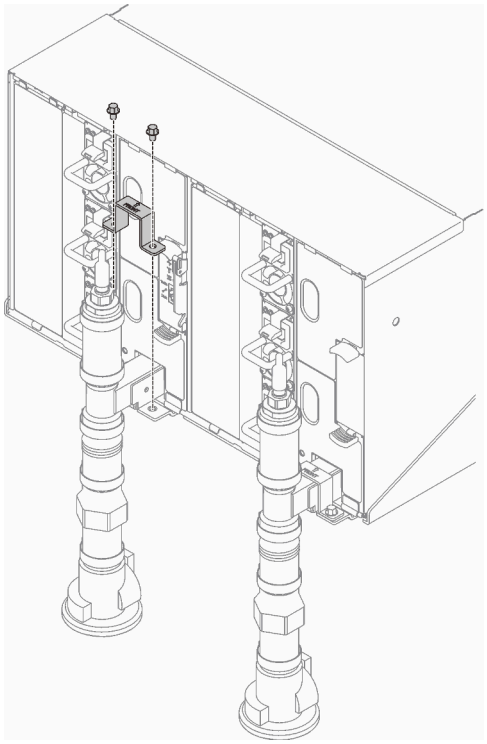


Figure 63. Retention bracket installation

Align the drip sensor assembly with the enclosure and slide it into place.

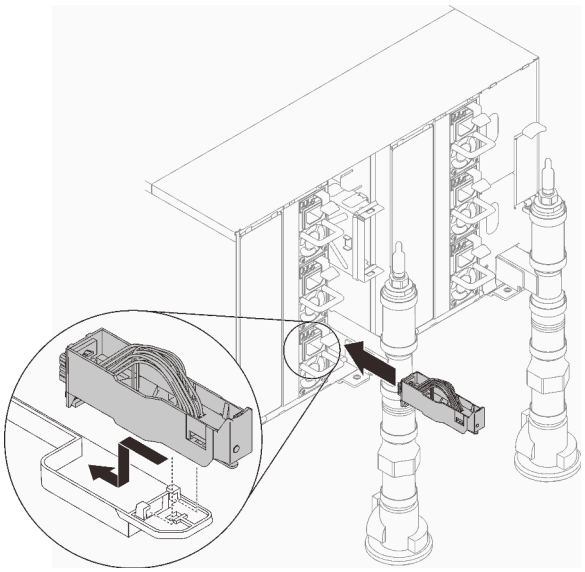


Figure 64. Drip sensor assembly installation

10. Reinstall all EMC shields.

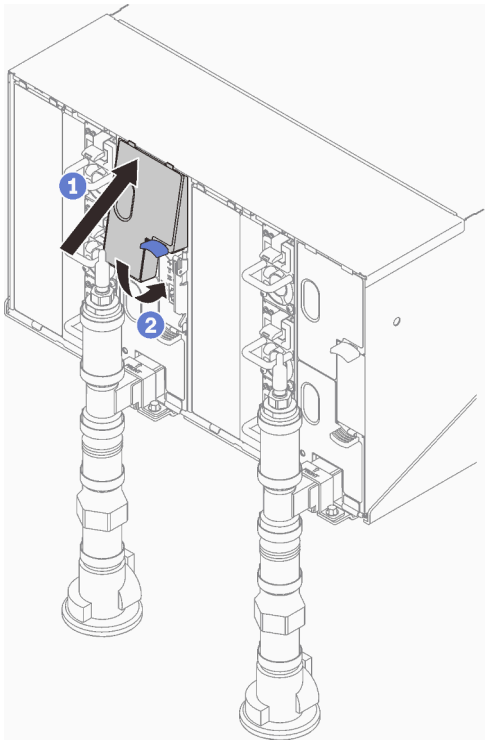


Figure 65. EMC shields installation

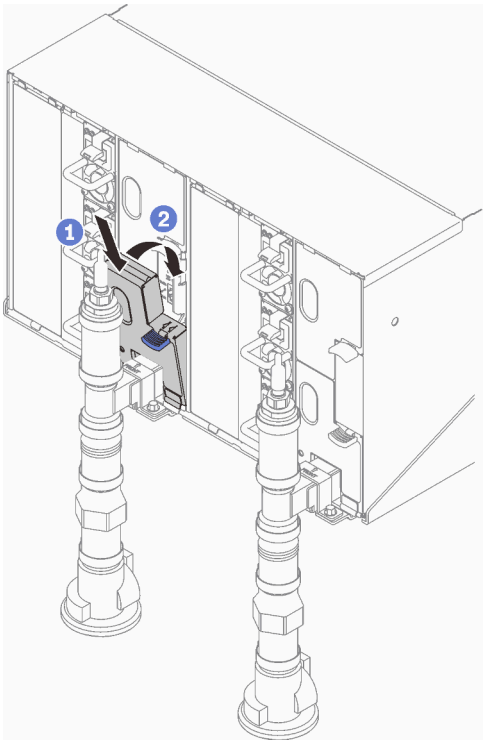


Figure 66. EMC shields installation

11. Reinstall the components that you removed from the rear of the enclosure.
12. Connect any cables that you disconnected from the modules in the rear of the enclosure.
13. Connect the enclosure to power.
14. Update the solution firmware to the latest level.
15. Write down new enclosure midplane serial number (for example: `Y030UN34B063`) and UUID (for example: `2E2B686CC6B311E2907C6EAE8B16A49E`).
16. Log in to the web interface.
17. Go to **System Information** section, click on the **Midplane VPD** tab.
18. Update the new enclosure midplane serial number and UUID onto the fan and power controller.
19. Close the release handles on the tray in order to seat the nodes in the enclosure midplane connectors.
20. Restart any nodes that you shut down. See the documentation that comes with the compute node for detailed instructions.
21. The fan and power controller is powered-on automatically.

Demo video

Watch the procedure on YouTube

Drip sensor assembly replacement

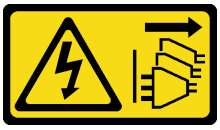
Use the following procedures to remove and install the drip sensor assembly.

Remove the drip sensor assembly

Use this information to remove the drip sensor assembly.

About this task

S002



CAUTION:
The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52

Procedure

Step 1. Make preparations for this task.

a. ❶ Press down the blue latch and ❷ rotate the top of the shield rearward; then, ❸ lift the shield up to clear the manifold pipe that enters the enclosure.

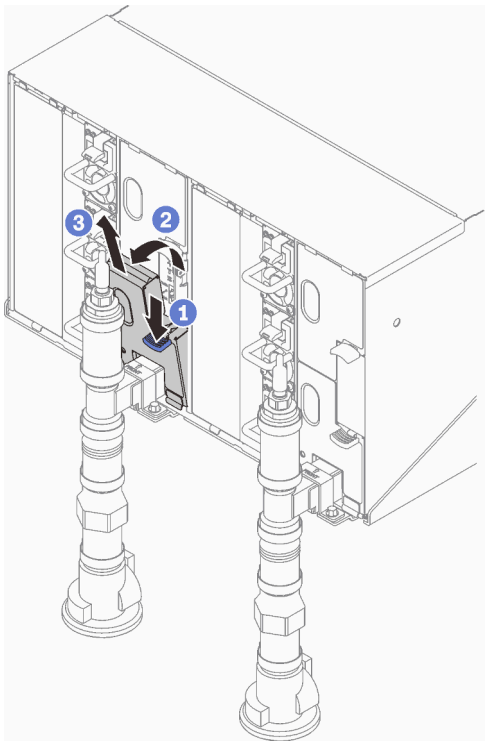


Figure 67. Lower left EMC shield removal

Note: If there is a manifold vertical pipe in front of the EMC shield, you need to slide it sideways out from underneath the pipe.

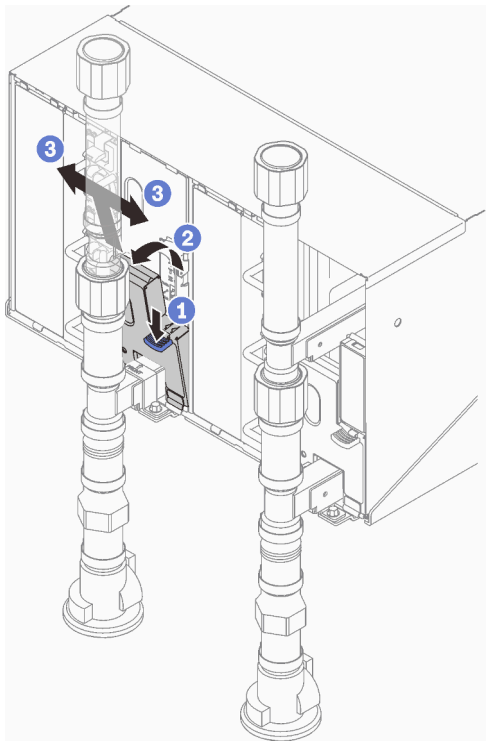


Figure 68. Lower left EMC shield removal

Step 2. Remove the drip sensor assembly.

a. ❶ Push the latch up upwards.

b. ❷ Slide the drip sensor assembly backwards, then; lift the drip sensor assembly up to clear sensor post and pull it out of the enclosure.

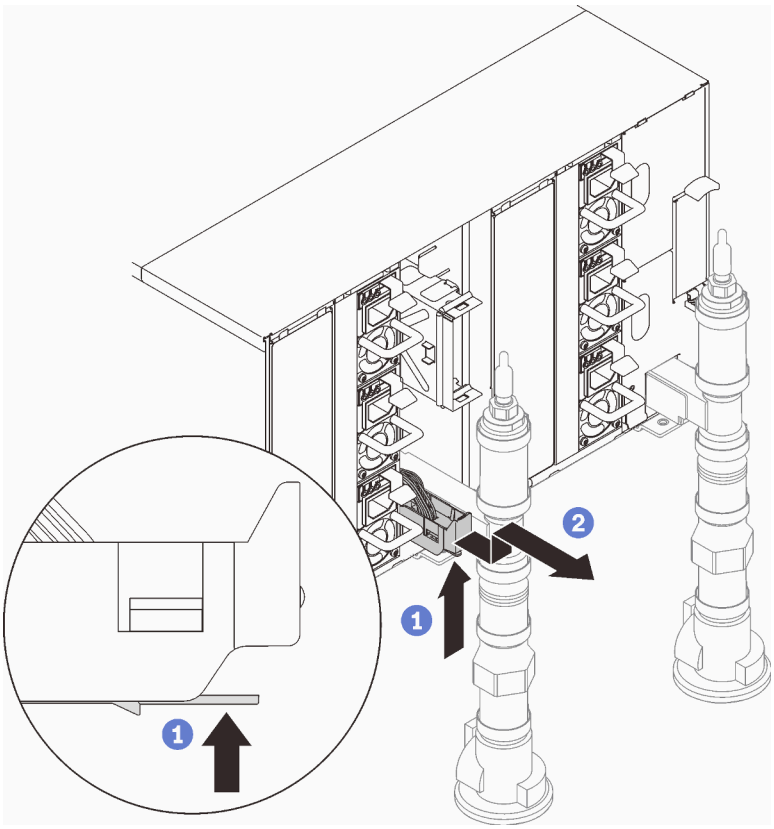


Figure 69. Drip sensor assembly removal

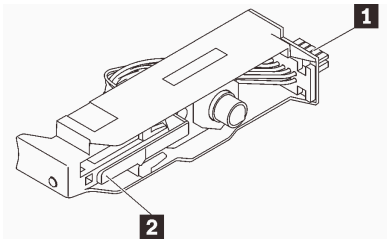


Figure 70. Drip sensor assembly

Table 21. Drip sensor assembly

1 Connector	2 Latch

After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

Watch the procedure on YouTube

Install the drip sensor assembly

Use this information to install the drip sensor assembly.

About this task

S002

CAUTION:
The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52

Procedure

Step 1. Align the drip sensor assembly with the enclosure and slide it into place.

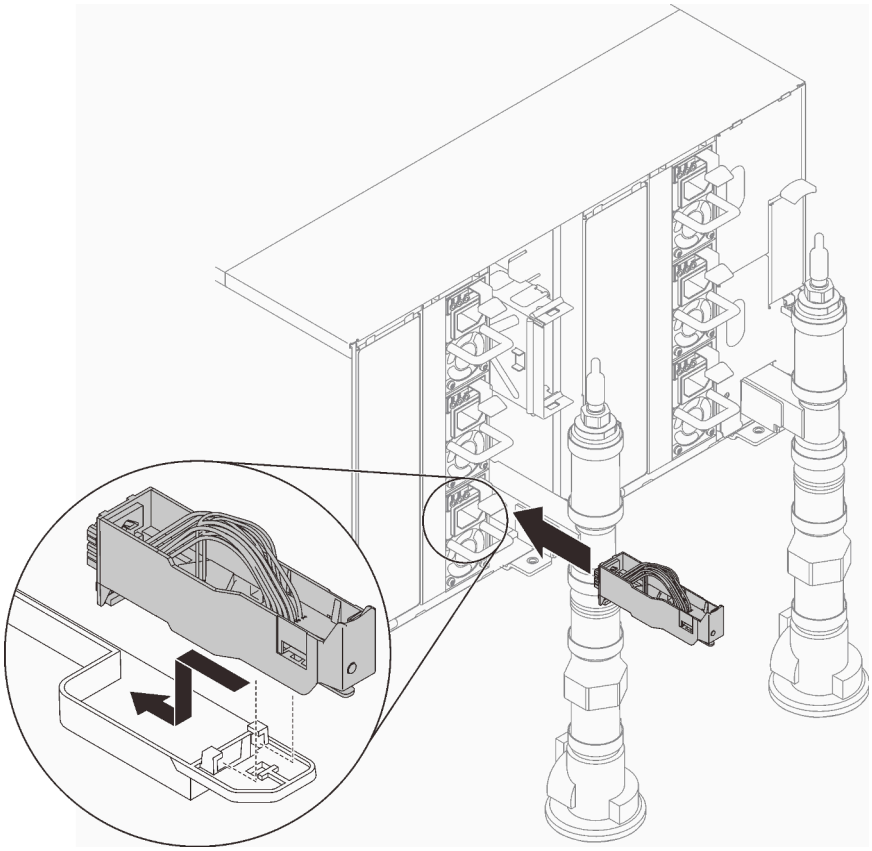


Figure 71. Drip sensor assembly installation

After you finish

1. Reinstall the EMC shield that you removed.

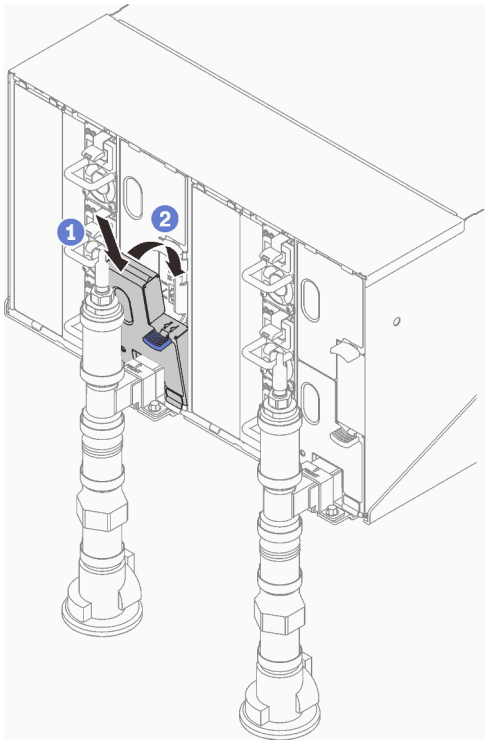


Figure 72. Lower left EMC shield installation

Demo video

Watch the procedure on YouTube

System Management Module 2 (SMM 2) replacement

Use the following procedures to remove and install the SMM2.

Go to https://pubs.lenovo.com/mgt_tools_smm2/ to see more details about SMM2.

USB flash drive replacement for SMM2 data backup and restore

Use this information to remove and install the USB flash drive from and to the SMM2 for data backup and restore.

About this task

Procedure

Step 1. Align the USB flash drive with the connector on the SMM2 and push it in until it is firmly connected.

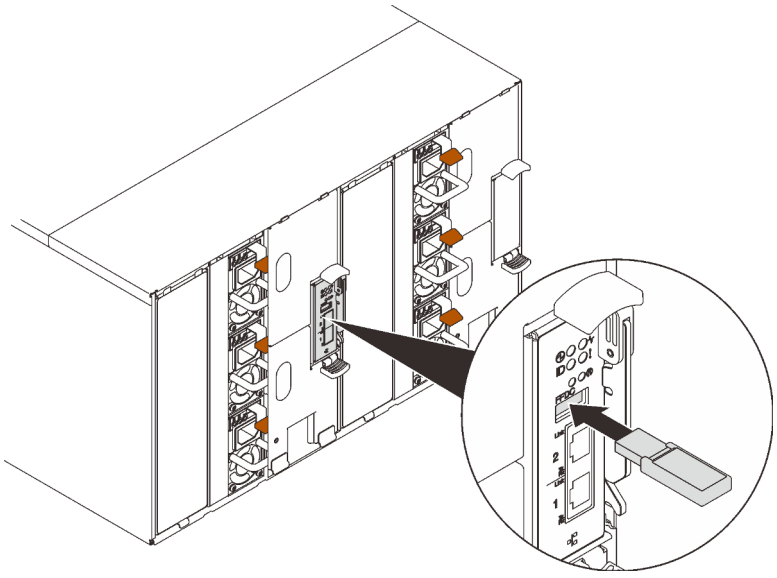


Figure 73. USB flash drive installation

Step 2. Complete the following steps to perform backup of SMM2 settings, enclosure VPD and power distribution boards (PDB) VPD.

a. Update the solution firmware to the latest level.

b. Log in to SMM2 web interface.

c. Go to the **Configuration** section, select **Backup and Restore Configuration**, and perform SMM2 settings backup via **Backup Configuration to Storage Device**.

Note: Alternatively, you can choose to back up SMM2 settings via **Backup Configuration from Network**.

d. Go to the **System Information** section, select **Enclosure VPD** or **PDB VPD**, and perform data backup respectively.

Step 3. After data backup is completed, pull the USB flash drive out of the connector to remove it from the SMM2.

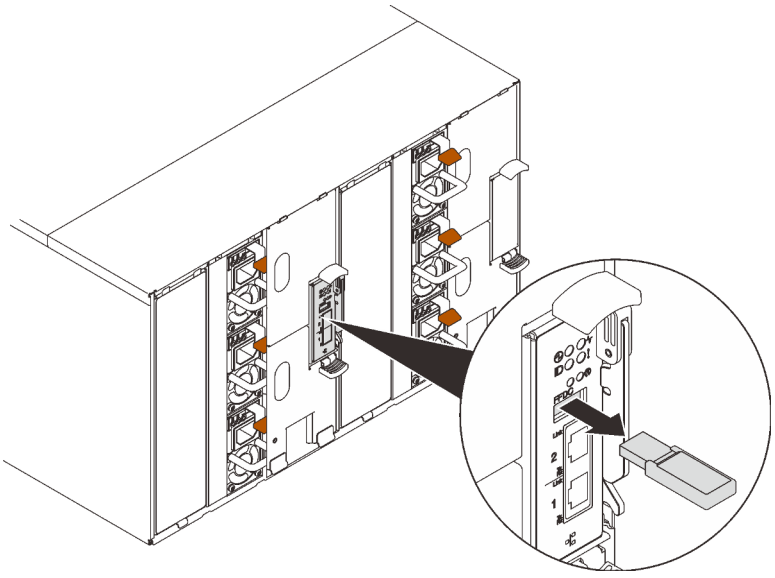


Figure 74. USB flash drive removal

Step 4. Remove the SMM2 from the enclosure (see “Remove the SMM2” on page 89).

Step 5. Install the new SMM2 (see “Install the SMM2” on page 94).

Step 6. Keep the USB flash drive and install it to the new SMM2 (see Step 1).

Step 7. Log in to the SMM2 web interface and perform data restore of SMM2 settings, enclosure VPD and PDB VPD.

Note: If SMM2 settings are backed up via the network, restore and apply the configurations via **Restore from Network Backup Configuration** in **Backup and Restore Configuration**.

After you finish

For more detailed information, see “Backup and Restore Configuration” in *System Management Module 2 User Guide* at https://pubs.lenovo.com/mgt_tools_smm2/c_smm_recovery.

Backup and Restore

Configurations are automatically saved when they are set or modified. You can back up or restore the configurations to or from a local device.

If a storage device is inserted and detected, it can be used for SMM2 to preserve and migrate SEL and user configurations. SMM2 only keeps the latest configuration file in the storage device for backup and restore.

Note: The storage device can be a USB device depending on the machine types. The storage capacity of the USB storage device should be higher than 1 GB. The support file system is FAT32. For more details, refer to “USB flash drive replacement for SMM2 data backup and restore” in *Maintenance Manual* of your solution.

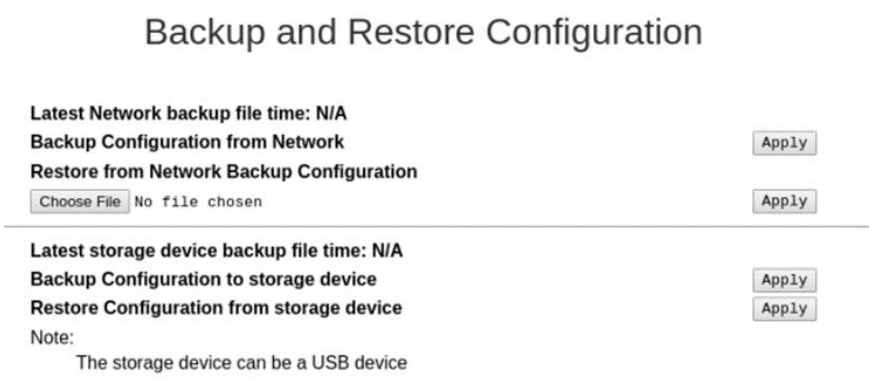


Figure 75. SMM2 Backup and Restore Configuration

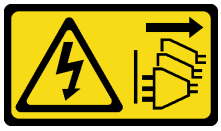
- **Backup**: Allows users to back up SEL and the following enclosure configurations to a local device or USB storage device.
  - Power supply redundancy policy
  - Oversubscription mode
  - Zero output
  - Enclosure capping/saving or compute node capping/saving
  - Acoustic mode setting
  - Power restore policy
  - The settings in the configuration tabs
- **Restore**: Allows users to restore and apply the configurations stored in a local device or USB storage device to SMM2.

Remove the SMM2

Use this information to remove the SMM2.

About this task

S002



CAUTION:
The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

S038

CAUTION:
Eye protection should be worn for this procedure.

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- If you want to migrate current enclosure settings and the enclosure midplane VPD onto the new SMM2, make sure you have done the following:
  1. You had performed SMM2 settings backup, the enlcosure VPD backup, and the midplane VPD backup procedures.
  2. Keep the old USB key which is removed from the SMM2 and install it onto the new SMM2.

Procedure

Step 1. Make preparations for this task.

a. Remove EMC shields.

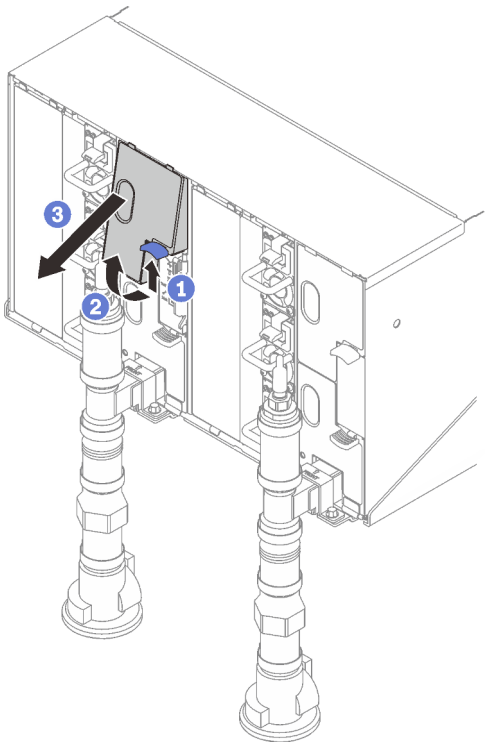


Figure 76. Upper EMC shield removal

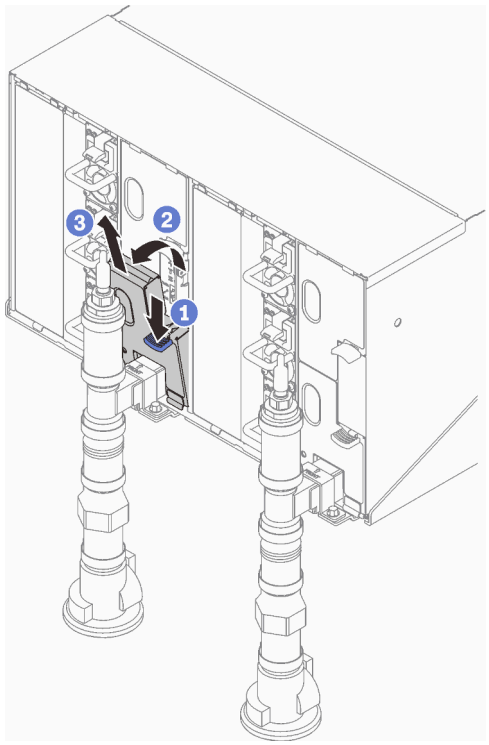


Figure 77. Lower left EMC shield removal

b. If you want to migrate current enclosure settings and the enclosure midplane VPD onto the new SMM2, make sure you have done the following:
   1. You had performed SMM2 settings backup, the enlcosure VPD backup, and the midplane VPD backup procedures.
   2. Keep the old USB key which is removed from the SMM2 and install it onto the new SMM2.

Step 2. ❶ Rotate the latch and ❷ slide the SMM2 out of the support bracket.

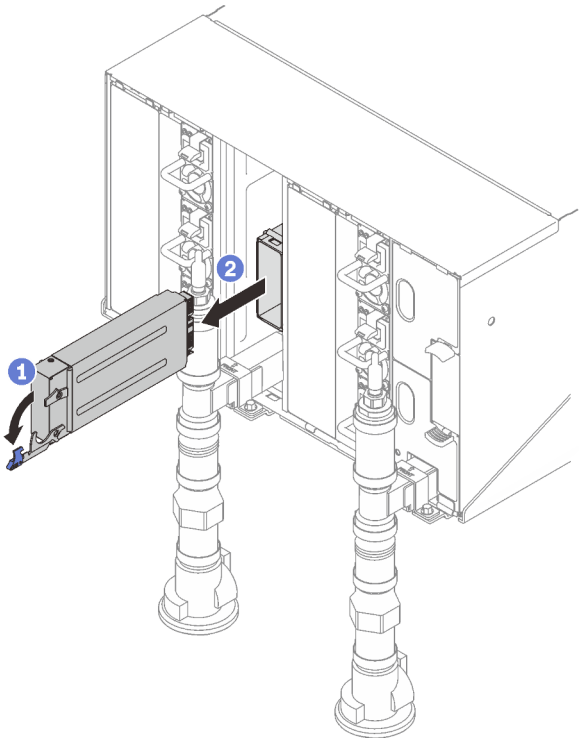


Figure 78. SMM2 removal

Step 3. Press release tabs and slide the support bracket out of the enclosure.

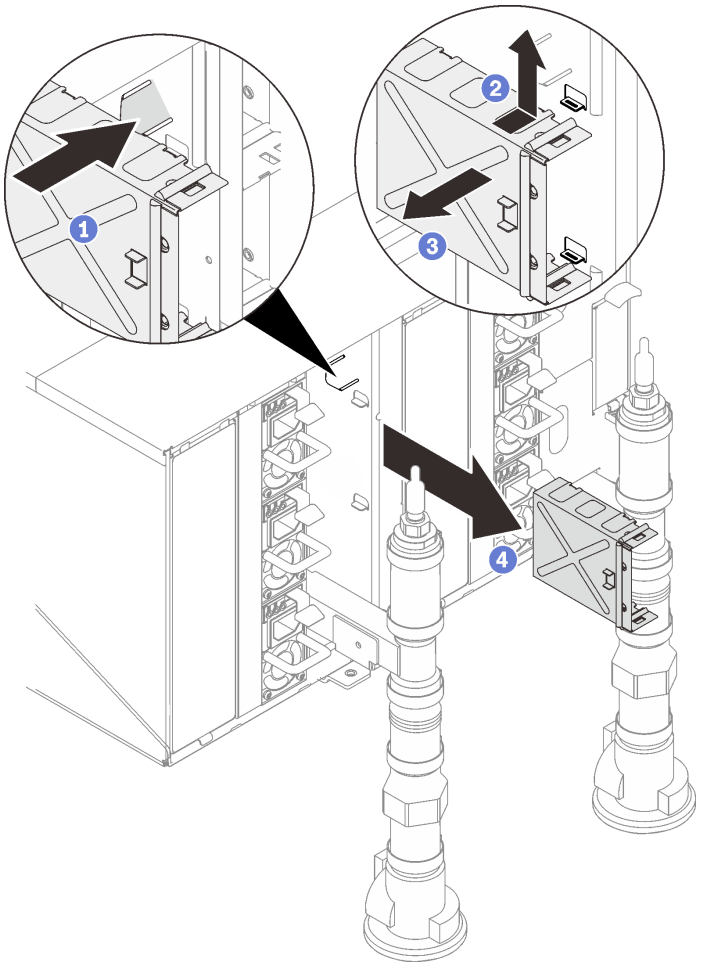


Figure 79. Support bracket removal

After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Attention: You can only disassemble the SMM2 for recycle. Do not disassemble it for any other purposes.

1. Remove SMM2 battery (see “Remove the SMM2 battery” on page 99).
2. Remove the four screws that secure the SMM2 board to the module.
3. Gently slide the SMM2 board out of the module.

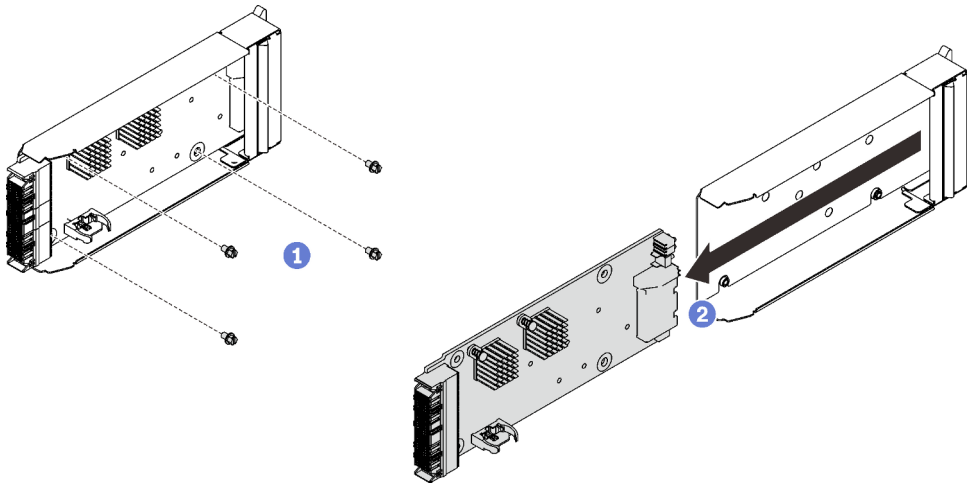


Figure 80. SMM2 board removal

4. Recycle the unit in compliance with local regulations.

Demo video

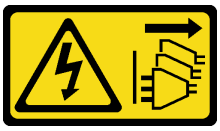
Watch the procedure on YouTube

Install the SMM2

Use this information to install the SMM2.

About this task

S002



CAUTION:
The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

S038

CAUTION:
Eye protection should be worn for this procedure.

Attention:

- Read the following sections to ensure that you work safely.

- “Installation Guidelines” on page 51
- “Safety inspection checklist” on page 52

Procedure

Step 1. Remove EMC shields.

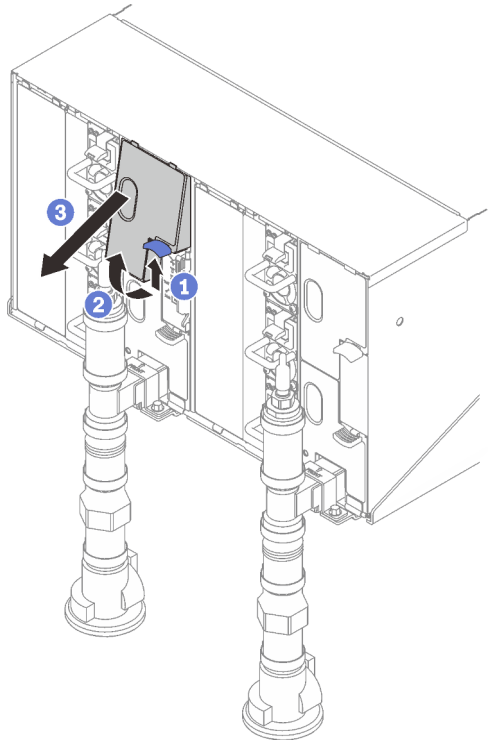


Figure 81. Upper EMC shield removal

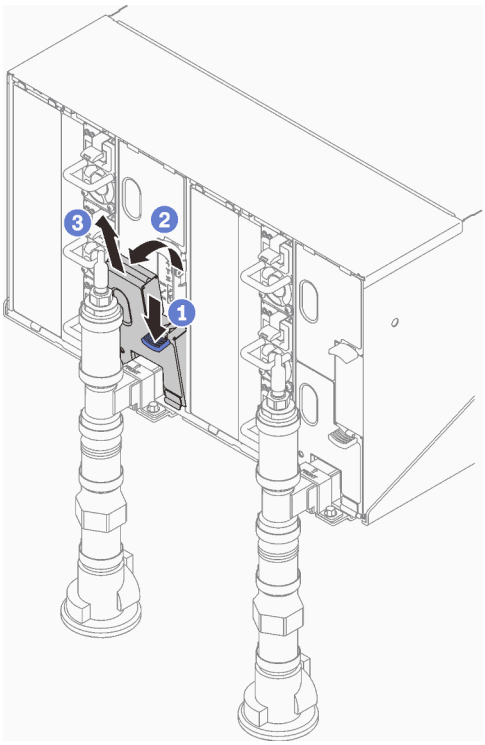


Figure 82. Lower left EMC shield removal

Step 2. Install the SMM2 module support bracket.

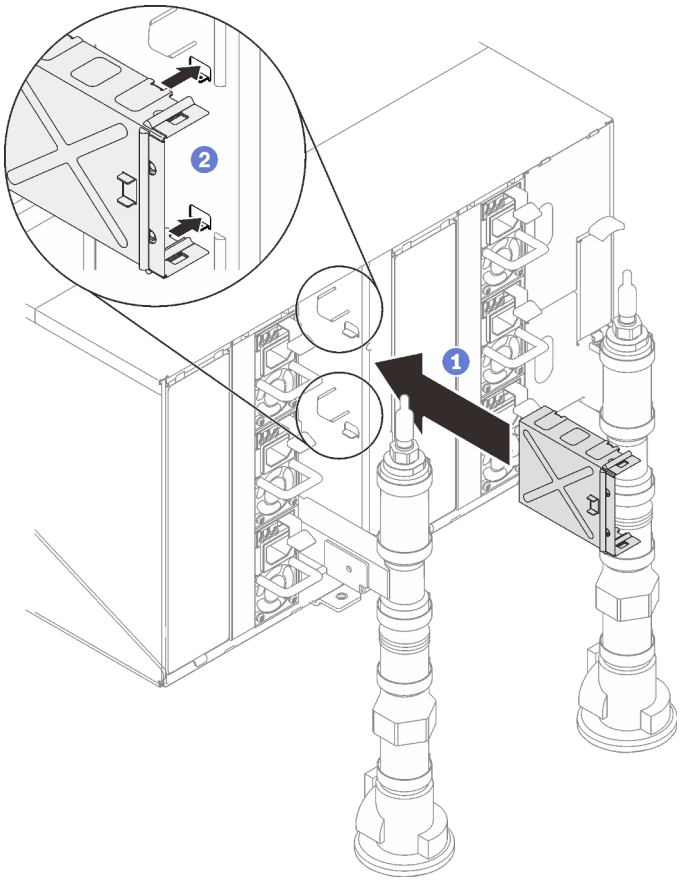


Figure 83. Support bracket installation

Step 3. ❶ Align the SMM2 module with the support bracket; then, slide the SMM2 module into place and ❷ rotate the latch.

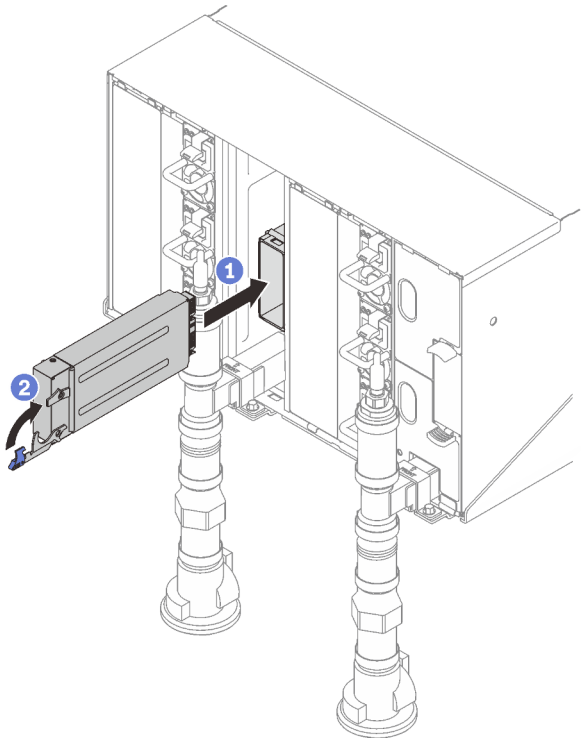


Figure 84. SMM2 installation

After you finish

1. When the status LED on the SMM2 goes from fast blinking to slow blinking, it indicates the SMM2 is ready to work. However, if the status LED is off or continuously lit, it indicates the SMM2 has encountered one or more problems.
2. Check the power LED on each node to make sure it is on.
3. If shared I/O adapters are installed, complete the following steps to make sure the enclosure supports shared I/O.
   a. Enable SMM2 IPMI interface via XCC with the following command (Default setting is network enabled but IPMI disabled).
   ```
   ipmitool -I lanplus -H [XCC_IP] -U [USERID] -P [PASSWD] raw
   0x3A 0xF1 0x04
   ```
   b. Query the current enclosure mode with the following command:
   ```
   ipmitool -I lanplus -H $SMM2_IP -U $USERID -P $PASSWORD raw 0x32 0xC5 0x01

   response data
   byte 1: current mode
   01: Normal mode
   02: Shared I/O mode
   ```
   c. If the enclosure is in normal mode, configure the enclosure mode to Shared I/O mode with the following command:
   ```
   ipmitool -I lanplus -H $SMM2_IP -U $USERID -P $PASSWORD raw 0x32 0xC5 0x00 0x02

   response data
   byte 1: previous mode
   01: Normal mode
   02: Shared I/O mode
   byte 2: current mode
   01: Normal mode
   ```

```
02: Shared I/O mode
```

4. Make sure you follow the guidelines in “PSU configuration” in *Setup Guide*.
5. Reset SMM with the following command.
```
ipmitool -I lanplus -H $SMM2_IP -U $USERID -P $PASSWORD mc reset cold
```

Demo video

Watch the procedure on YouTube

SMM 2 battery replacement

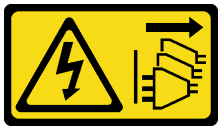
Use the following procedures to remove and install the SMM2 battery.

Remove the SMM2 battery

Use this information to remove the SMM2 battery.

About this task

S002



CAUTION:
The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

S004

CAUTION:
When replacing the lithium battery, use only Lenovo specified part number or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

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

Dispose of the battery as required by local ordinances or regulations.

S005

CAUTION:
The battery is a lithium ion battery. To avoid possible explosion, do not burn the battery. Exchange it only with the approved part. Recycle or discard the battery as instructed by local regulations.

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52

Procedure

Step 1. Make preparations for this task.

a. Remove the SMM2 (see “Remove the SMM2” on page 89).

b. If you want to migrate current enclosure settings and the enclosure midplane VPD onto the new SMM2, make sure you have done the following:

1. You had performed SMM2 settings backup, the enlcosure VPD backup, and the midplane VPD backup procedures.
2. Keep the old USB key which is removed from the SMM2 and install it onto the new SMM2.

Step 2. Locate the battery.

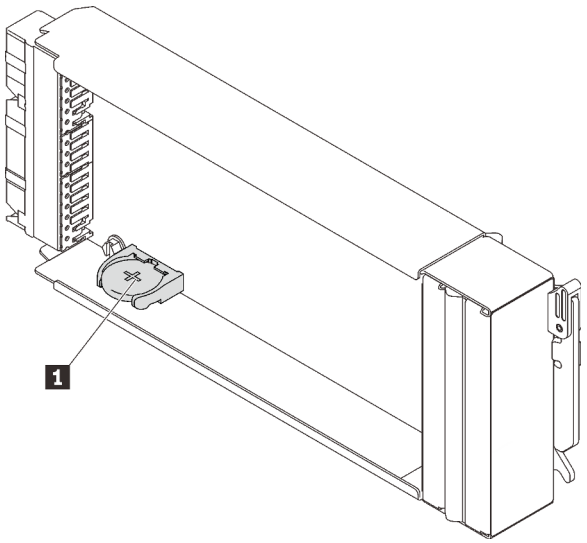


Figure 85. SMM2 battery location

Table 22. SMM2 battery location

1	SMM2 battery

Step 3. Using your fingernail, press the battery retaining clip. The battery should pop free.

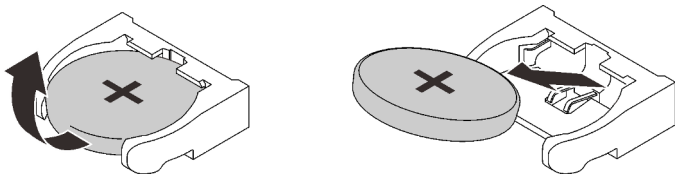


Figure 86. SMM2 battery removal

Note: Do not lift the battery by using excessive force. Failing to remove the battery properly may damage the socket on the SMM2. Any damage to the socket may require replacing the SMM2.

Step 4. Dispose of the battery as required by local ordinances or regulations. See *Environmental Notices* for more information.

Step 5. Store original SMM2 VPD back to new SMM2 for warranty remaining, if it is replaced.

After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

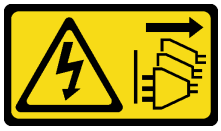
Watch the procedure on YouTube

Install the SMM2 battery

Use this information to install the SMM2 battery.

About this task

S002



CAUTION:
The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

S004

CAUTION:
When replacing the lithium battery, use only Lenovo specified part number or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

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

Dispose of the battery as required by local ordinances or regulations.

S005

CAUTION:
The battery is a lithium ion battery. To avoid possible explosion, do not burn the battery. Exchange it only with the approved part. Recycle or discard the battery as instructed by local regulations.

Attention:

- Read the following sections to ensure that you work safely.
  - "Installation Guidelines" on page 51
  - "Safety inspection checklist" on page 52
- When replacing the battery, you must replace it with a lithium battery of the same type from the same manufacturer.

Procedure

Step 1. Locate the battery.

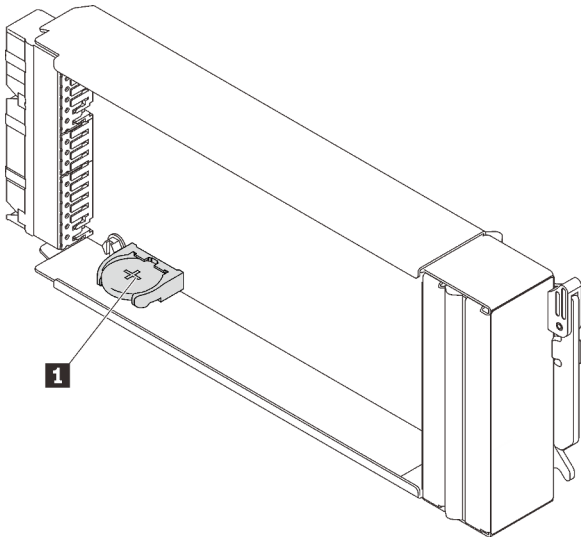


Figure 87. SMM2 battery location

Table 23. SMM2 battery location

1	SMM2 battery

Step 2. Follow any special handling and installation instructions that come with the battery.

Step 3. Tilt the battery so that you can insert it into the socket.

Step 4. As you slide the battery into place, press the battery down into the socket until it clicks into place.

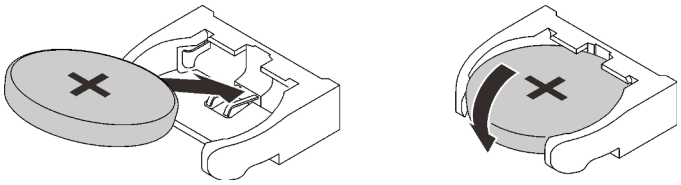


Figure 88. SMM2 battery installation

After you finish

1. Reinstall the SMM2 into the enclosure (see "Install the SMM2" on page 94).
2. After you replace the battery, you must reconfigure the SMM2 settings.
3. Start the Setup utility and reset the configuration.

Demo video

Watch the procedure on YouTube

Hot-swap power supply replacement

Use the following procedures to remove and install a hot-swap power supply.

Remove a hot-swap power supply

Use this information to remove a hot-swap power supply.

About this task

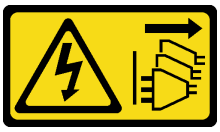
S001

DANGER

Electrical current from power, telephone, and communication cables is hazardous.
To avoid a shock hazard:

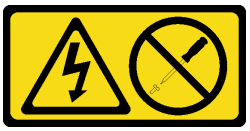
- **Connect all power cords to a properly wired and grounded electrical outlet/source.**
- **Connect any equipment that will be attached to this product to properly wired outlets/sources.**
- **When possible, use one hand only to connect or disconnect signal cables.**
- **Never turn on any equipment when there is evidence of fire, water, or structural damage.**
- **The device might have more than one power cord, to remove all electrical current from the device, ensure that all power cords are disconnected from the power source.**

S002



CAUTION:
The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

S035



CAUTION:
Never remove the cover on a power supply or any part that has this label attached. Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

CAUTION:

High touch current. Connect to earth before connecting to supply.

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Disconnect the power cord from the connector on the back of the power supply.
- If only one hot-swap power supply is installed in the solution, you must turn off the solution before removing the power supply.

Procedure

Step 1. Press and hold the orange release tab.

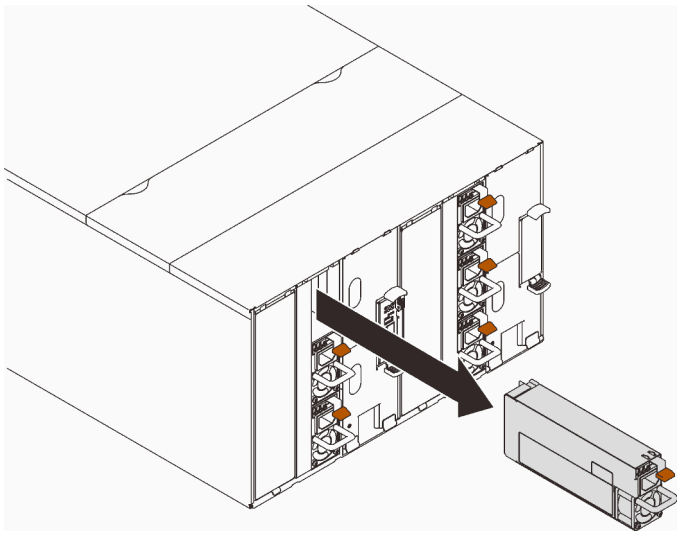


Figure 89. Hot-swap power supply removal

Step 2. Grasp the handle and pull the power supply out of the bay.

After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

Watch the procedure on YouTube

Install a hot-swap power supply

Use this information to install a hot-swap power supply.

About this task

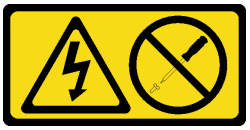
S001

DANGER

Electrical current from power, telephone, and communication cables is hazardous.
To avoid a shock hazard:

- **Connect all power cords to a properly wired and grounded electrical outlet/source.**
- **Connect any equipment that will be attached to this product to properly wired outlets/sources.**
- **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.**
- **The device might have more than one power cord, to remove all electrical current from the device, ensure that all power cords are disconnected from the power source.**

S035



CAUTION:
Never remove the cover on a power supply or any part that has this label attached. Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

CAUTION:

High touch current. Connect to earth before connecting to supply.

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- The following notes describe the type of power supply that the enclosure supports and other information that you must consider when you install a power supply:
  - Make sure you follow the guidelines in “PSU configuration” in *Setup Guide*.
  - For redundancy support, you must install an additional hot-swap power supply, if one is not installed in your model.
  - Make sure that the devices that you are installing are supported. For a list of supported optional devices for the enclosure, see https://serverproven.lenovo.com/.
- SD650-N V2 tray supports ThinkSystem 2400W (230V) v4 Platinum hot-swap power supply Delta only. All the installed power supply units must be ThinkSystem 2400W (230V) v4 Platinum hot-swap power supply Delta.

Procedure

Step 1. Slide the hot-swap power supply into the bay until the release latch clicks into place.

Important: During normal operation, each power-supply bay must contain either a power supply or power-supply filler panel for proper cooling.

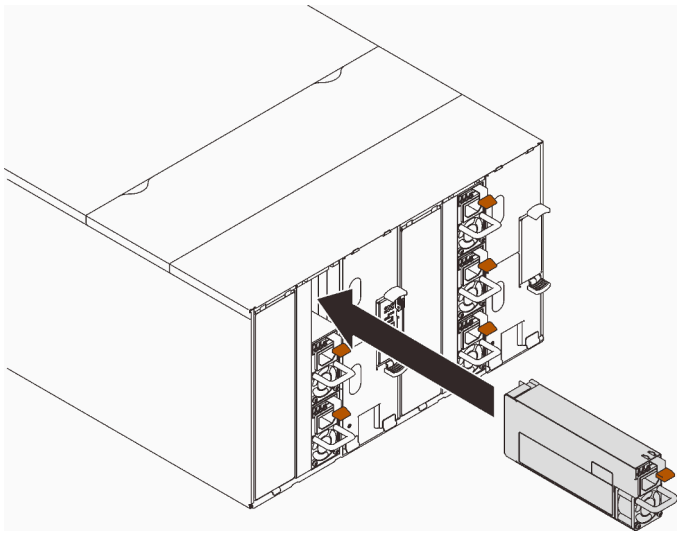


Figure 90. Hot-swap power supply installation

Step 2. Connect one end of the power cord for the new power supply into the ac connector on the back of the power supply; then, connect the other end of the power cord into a properly grounded electrical outlet.

Step 3. If the node is turned off, turn on the node.

Step 4. Make sure that the ac power LED on the power supply is lit, indicating that the power supply is operating correctly. If the solution is turned on, make sure that the dc power LED on the power supply is lit also.

After you finish

1. Reconnect the power cords and any cables that you removed.
2. Turn on all compute nodes.

Demo video

Watch the procedure on YouTube

Manifold replacement

Use the following procedures to remove and install the manifold.

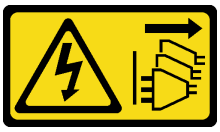
Remove the manifold

Use this information to remove the manifold.

About this task

CAUTION:
The water might cause irritation to the skin and eyes. Avoid direct contact with the lubricant.

S002



CAUTION:
The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

S038

CAUTION:
Eye protection should be worn for this procedure.

L011

تحذير: يجب ارتداء النظارات الواقية لهذا الاجراء. (L011)

AVISO: Para este procedimento, são necessários óculos de proteção. (L011)

ВНИМАНИЕ: За тази процедура са необходими предпазни очила. (L011)

ATTENTION : Cette procédure requiert des lunettes de protection. (L011)

警告：该过程需要护目镜。 **(L011)**

警告：此程序需要護目鏡。(L011)

OPREZ: Za izvođenje postupka su potrebne zaštitne naočale. (L011)

POZOR: K tomuto postupu jsou nutné ochranné brýle. (L011)

Pas på! Proceduren kræver beskyttelsesbriller. (L011)

WAARSCHUWING: Voor deze procedure is een beschermende bril vereist. (L011)

CAUTION: Protective eyewear is needed for the procedure. (L011)

VAROITUS: Toimet edellyttävät silmänsuojaimien käyttöä. (L011)

Vorsicht: Bei dieser Prozedur eine Schutzbrille tragen. (L011)

ΠΡΟΣΟΧΗ: Για τη συγκεκριμένη διαδικασία απαιτούνται προστατευτικά γυαλιά. (L011)

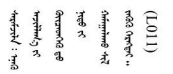
VESZÉLY: Az eljáráshoz védőszemüveget kell viselni. (L011)

ATTENZIONE: per la procedura sono necessarie protezioni per gli occhi. (L011)

危険: この作業には目を保護する道具が必要です。
(L011)

주의: 이 절차에는 보호용 안경이 필요합니다. (L011)

ВНИМАНИЕ: За изведување на постапката потребни се заштитни очила. (L011)



ADVARSEL: Vernebriller må benyttes for denne prosedyren. (L011)

ZAGROŻENIE: Procedura wymaga zastosowania okularów ochronnych. (L011)

CUIDADO: É necessário utilizar protecção ocular para a execução deste procedimento. (L011)

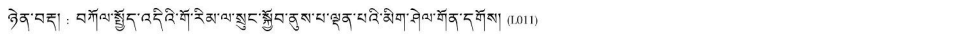
ОСТОРОЖНО: При выполнении этой операции необходимо надеть защитные очки. (L011)

VÝSTRAHA: Vykonanie tejto procedúry vyžaduje pomôcku na ochranu očí. (L011)

POZOR: Za ta postopek je potrebna zaščitna oprema za oči. (L011)

PRECAUCIÓN: Utilice protección ocular para llevar a cabo el procedimiento. (L011)

Varning: Skyddsglasögon krävs. (L011)



(L011) ئاگاھلاندۇرۇش: سز مەشغۇلات جەريانىدا كۆز ئاسراش كۆزەينىكى تاقىۋېلىشىڭىز كېرەك.

Daezsingj: Aen cauhcoz neix aeu yungh yenjging baujhoh lwgda. (L011)

L014

تحذير: يجب ارتداء القفازات الكيميائية المقاومة لهذا الاجراء. (L014)

AVISO: Para este procedimento, são necessárias luvas com resistência química. (L014)

ВНИМАНИЕ: За тази процедура са необходими химически устойчиви ръкавици. (L014)

ATTENTION : Cette procédure requiert des gants de protection contre les produits chimiques. (L014)

警告：该过程需要化学防护手套。 (L014)

警告：此程序需要抗化學劑手套。(L014)

OPREZ: Za ovaj postupak su potrebne kemijski otporne zaštitne rukavice. (L014)

POZOR: K tomuto postupu jsou nutné ochranné brýle. (L014)

Pas på! Bær handsker, der er modstandsdygtige over for kemikalier, når du skal udføre denne proces. (L014)

WAARSCHUWING: Voor deze procedure zijn tegen chemicaliën beschermende handschoenen vereist. (L014)

CAUTION: Chemical resistant gloves are needed for this procedure. (L014)

VAROITUS: Toimet edellyttävät kemiallisesti kestävistä materiaaleista valmistettujen suojakäsineiden käyttöä. (L014)

Vorsicht: Bei dieser Aktion müssen chemische Schutzhandschuhe getragen werden. (L014)

ΠΡΟΣΟΧΗ: Για τη συγκεκριμένη διαδικασία απαιτούνται ειδικά γάντια, ανθεκτικά στις χημικές ουσίες. (L014)

VIGYÁZAT: Az eljáráshoz vegyi anyagokkal szemben ellenálló védőszemüveget kell viselni. (L014)

ATTENZIONE: per questa procedura sono necessari guanti resistenti ad agenti chimici. (L014)

危険：この作業には化学耐性のあるグローブが必要です。(L014)

주의: 이 절차를 수행하려면 내화학성 장갑을 착용해야 합니다. (L014)

ВНИМАНИЕ: За изведување на оваа постапка потребни се ракавици за хемиска заштита. (L014)

ᠠᡳᠮᡳᡵᡳᠨ ᠪᡝᡵᡤᡝᠨ ᠪᡝᡵᡤᡝᠨ ᠪᡝᡵᡤᡝᠨ ᠪᡝᡵᡤᡝᠨ ᠪᡝᡵᡤᡝᠨ ᠪᡝᡵᡤᡝᠨ ᠪᡝᡵᡤᡝᠨ ᠪᡝᡵᡤᡝᠨ ᠪᡝᡵᡤᡝᠨ ᠪᡝᡵᡤᡝᠨ (L014)

ADVARSEL: Vernehansker av motstandsdyktig materiale må benyttes for denne prosedyren. (L014)

ZAGROŻENIE: Procedura wymaga użycia rękawic ochronnych. (L014)

CUIDADO: É necessária a utilização de luvas resistentes a químicos para a execução deste procedimento. (L014)

ОСТОРОЖНО: Для этой процедуры необходимы перчатки, устойчивые к химическим воздействиям. (L014)

VÝSTRAHA: Vykonanie tejto procedúry vyžaduje rukavice odolné chemikáliám. (L014)

POZOR: Za delo so potrebne proti kemičnim sredstvom odporne rokavice. (L014)

PRECAUCIÓN: Utilice guantes resistentes a los productos químicos para llevar a cabo el procedimiento. (L014)

Varning: Kemikalietåliga handskar behövs. (L014)

ཉེན་ཁ། : བཀོལ་སྤྱོད་འདིའི་ཚེ་རིམ་ལ་སྲུང་སྐྱོབ་ཀྱས་པ་ལྟེན་པའི་རླས་འགྱུར་རུལ་འགོག་ལག་ཤྲབས་ཚོན་དགོས། (L014)

(L014) ئاگاھلاندۇرۇش: بۇ مەشغۇلات جەريانىدا خىمىيىلىك چىرىشتىن ساقلىنىش پەلىيىنى كىيىۋېلىشىڭىز كېرەك.

Daezsingj: Aen cauhcoz neix aeu yungh madfwngz naih vayoz myaex. (L014)

L016

خطر: قد يتم التعرض لخطر الصدمة الكهربائية بسبب الماء أو المحلول المائي الذي يوجد بهذا المنتج.
تجنب العمل في أو بالقرب من أي جهاز فعال بأيدي مبتلة أو عند وجود تسرب للماء. (L016)

AVISO: Risco de choque elétrico devido à presença de água ou solução aquosa no produto. Evite trabalhar no equipamento ligado ou próximo a ele com as mãos molhadas ou quando houver a presença de água derramada. (L016)

ОПАСНО: Риск от токов удар поради вода или воден разтвор, присъстващи в продукта.
Избягвайте работа по или около оборудване под напрежение,
докато сте с мокри ръце или когато наоколо има разляна вода.
(L016)

DANGER : Risque de choc électrique lié à la présence d'eau ou d'une solution aqueuse dans ce produit. Évitez de travailler avec ou à proximité d'un équipement sous tension avec des mains mouillées ou lorsque de l'eau est renversée. (L016)

危险：由于本产品中存在水或者水溶液，因此存在电击风险。请避免使用潮湿的手在带电设备或者有水溅出的环境附近工作。 (L016)

危險：本產品中有水或水溶液，會造成電擊的危險。手濕或有潑濺的水花時，請避免使用或靠近帶電的設備。(L016)

OPASNOST: Rizik od električnog udara zbog vode ili tekućine koja postoji u ovom proizvodu.
Izbjegavajte rad u
blizini opreme pod naponom s mokrim rukama ili kad je u blizini prolivena
tekućina.
(L016)

NEBEZPEČÍ: Riziko úrazu elektrickým proudem v důsledku vody nebo vodního roztoku přítomného v tomto produktu. Dejte pozor, abyste při práci s aktivovaným vybavením nebo v jeho blízkosti neměli mokré ruce a vyvarujte se potřísnění nebo polití produktu vodou. (L016)

Fare! Risiko for stød på grund af vand eller en vandig opløsning i produktet. Undgå at arbejde med eller i nærheden af strømførende udstyr med våde hænder, eller hvis der er spildt vand. (L016)

GEVAAR: Risico op elektrische schok door water of waterachtige oplossing die aanwezig is in dit product. Vermijd werken aan of naast apparatuur die onder spanning staat als u natte handen hebt of als gemorst water aanwezig is. (L016)

DANGER: Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)

VAARA: Tässä tuotteessa oleva vesi tai vettä sisältävä liuos voi aiheuttaa sähköiskuvaaran. Vältä työskentelyä jännitteellisen laitteen ääressä tai sen läheisyydessä märin käsin tai jos laitteessa tai sen läheisyydessä on vesiroiskeita. (L016)

Gefahr: Aufgrund von Wasser oder wässriger Lösung in diesem Produkt besteht die Gefahr eines elektrischen Schlags. Nicht mit nassen Händen oder in der Nähe von Wasserlachen an oder in unmittelbarer Nähe von Bauteilen arbeiten, die unter Strom stehen. (L016)

ΚΙΝΔΥΝΟΣ: Κίνδυνος ηλεκτροπληξίας εξαιτίας της παρουσίας νερού ή υγρού διαλύματος στο εσωτερικό του προϊόντος. Αποφύγετε την εργασία με ενεργό εξοπλισμό ή κοντά σε ενεργό εξοπλισμό με βρεγμένα χέρια ή όταν υπάρχει διαρροή νερού. (L016)

VESZÉLY: A víz vagy a termékben lévő vizes alapú hűtőfolyadék miatt fennáll az elektromos áramütés veszélye. Ne dolgozzon áram alatt lévő berendezésen és közelében nedves kézzel, illetve amikor folyadék kerül a berendezésre. (L016)

PERICOLO: rischio di scossa elettrica a causa di presenza nel prodotto di acqua o soluzione acquosa. Evitare di lavorare su o vicino l'apparecchiatura accesa con le mani bagnate o in presenza di acqua. (L016)

危険: この製品内に存在する水または水溶液によって、電気ショックの危険があります。手が濡れている場合やこぼれた水が周囲にある場合は、電圧が印加された装置またはその周辺での作業は行わないでください。(L016)

위험: 이 제품에는 물 또는 수용액으로 인한 전기 쇼크 위험이 있습니다. 젖은 손으로 또는 엎질러진 물이 있는 상태에서 전력이 공급되는 장비나 그 주변에서 작업하지 마십시오. (L016)

ОПАСНОСТ: Опасност од струен удар поради присаство на вода или на воден раствор во овој производ. Избегнувајте работење на опрема вклучена во струја или во близина на опрема вклучена во струја со влажни раце или кога има истурено вода.
(L016)

(L016)

FARE: Fare for elektrisk støt på grunn av vann eller en vandig oppløsning som finnes i dette produktet. Unngå å arbeide med eller i nærheten av strømførende utstyr med våte hender eller ved eventuelt vannsøl. (L016)

NIEBEZPIECZEŃSTWO: Ryzyko porażenia prądem elektrycznym z powodu występowania w produkcie wody lub roztworu wodnego. Nie należy pracować przy podłączonym do źródła zasilania urządzeniu lub w jego pobliżu z mokrymi dłońmi lub kiedy rozlano wodę. (L016)

PERIGO: Risco de choque eléctrico devido à presença de água ou líquidos no produto. Evite trabalhar com equipamento com energia, ou na sua proximidade, com mãos molhadas ou caso exista água derramada. (L016)

ОПАСНО: Риск поражения электрическим током вследствие присутствия в этом продукте воды или водного раствора. Избегайте выполнения работ на оборудовании, находящемся под напряжением, или рядом с таким оборудованием влажными руками или при наличии пролитой воды. (L016)

NEBEZPEČENSTVO: Riziko úrazu elektrickým prúdom v dôsledku prítomnosti vody alebo vodného roztoku v tomto produkte. Vyhnite sa práci na zapnutom zariadení alebo v jeho blízkosti s vlhkými rukami, alebo keď je prítomná rozliata voda.
(L016)

NEVARNOST: Nevarnost električnega udara zaradi vode ali vodne raztopine, prisotne v izdelku. Ne delajte na opremi ali poleg opreme pod energijo z mokrimi rokami ali ko je prisotna razlita voda.
(L016)

PELIGRO: Existe riesgo de choque eléctrico por agua o por una solución de agua que haya en este producto. Evite trabajar en equipos bajo tensión o cerca de los mismos con las manos húmedas o si hay agua derramada. (L016)

Fara: Risk för elektriska stötar på grund av vatten eller vattenbaserat medel i denna produkt. Arbeta inte med eller i närheten av elektriskt laddad utrustning om du har våta händer eller vid vattenspill. (L016)

ཉེན་བརྡ། : ཐོན་རྫས་འདིའི་ནང་དུ་ཆུའམ་ཆུའི་གཤེར་གཟུགས་འདུས་ཡོད་པས། དེ་ལས་གློག་རྒྱུག་པའི་ཉེན་ཁ་ཡོད། ལག་པའི་ཐོག་ཆུ་ཡོད་པའམ་ཆུ་ཐིག་མར་བཞུར་བའི་གནས་ཚུལ་འོག་གློག་ཡོད་པའི་སྒྲིག་ཆས་ལ་བཀོལ་སྤྱོད་བྱེད་མི་ཉན། (L016)

خەتەرلىك: بۇ مەھسۇلاتتا سۇ ياكى ئېرىتمە بولغاچقا، شۇڭا توك سوقۇۋېتىش خەۋپى مەۋجۇتدۇر. قول ھۆل ھالەتتە ۋە ياكى سۇ سىرغىپ چىققان ھالەتتە، توكلۇق ئۈسكۈنىگە قارىتا ۋە ياكى توكلۇق ئۈسكۈنىنىڭ ئەتراپىدا مەشغۇلات ئېلىپ بارغىلى بولمايدۇ. (L016)

Yungyiemj: Youzyiz aen canjbinj miz raemx roxnaeuz raemx yungzyiz, sojyij miz yungyiemj bungqden. Mboujndaej fwngz miz raemx seiz youq ndaw sezbi roxnaeuz youq henzgyawj guhhong. (L016)

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Ensure proper handling procedures are followed when working with any chemically treated water used in the compute rack cooling system. Ensure that material safety data sheets (MSDS) and safety information are provided by the water chemical treatment supplier and that proper personal protective equipment (PPE) is available as recommended by the water chemical treatment supplier. Protective gloves and eyewear may be recommended as a precaution.

Procedure

Step 1. Make preparations for this task.

a. Slide all DWC trays in the entire rack out of the enclosure about 4-inch or 100 mm (see “Remove a DWC tray from the enclosure” on page 149).

b. At the front of the rack, close both Eaton ball valves.

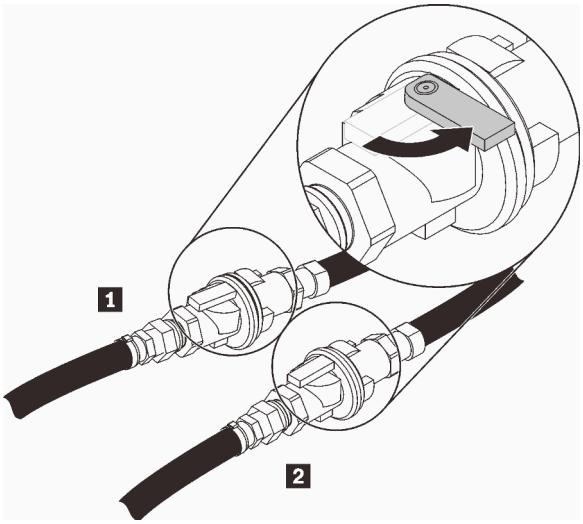


Figure 91. Eaton ball valves closed

Table 24. Eaton ball valves

1 Rack supply	2 Rack return

c. Remove EMC shields on both sides of the top enclosure.

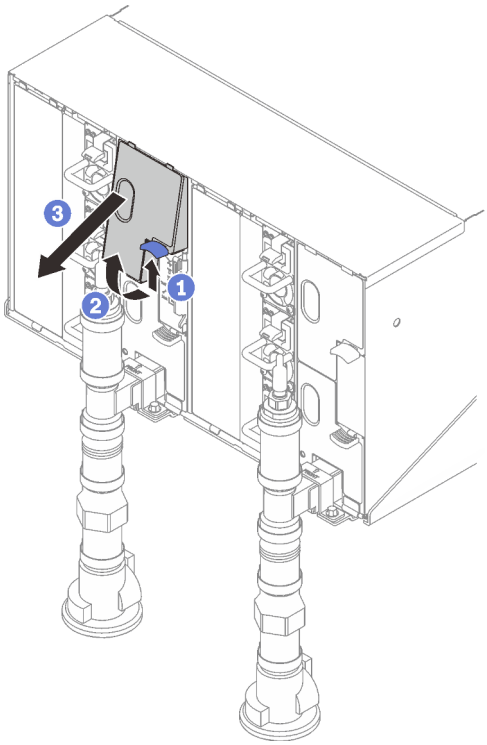


Figure 92. EMC shields removal

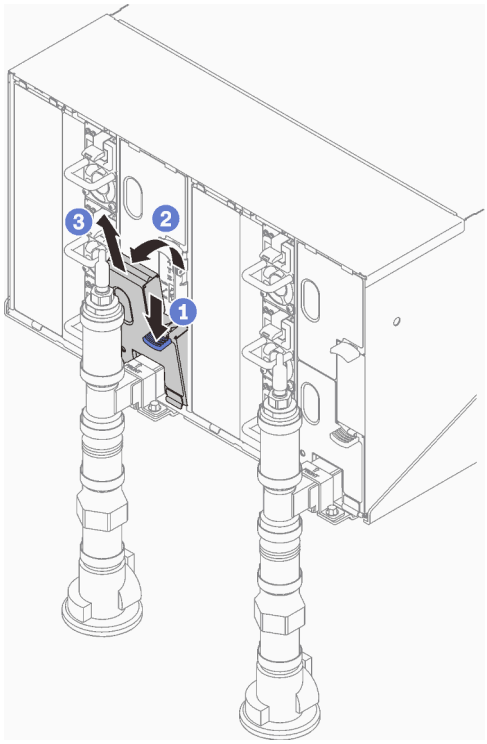


Figure 93. EMC shields removal

d. Remove the red quick connect plug covers from the tops of each manifold.

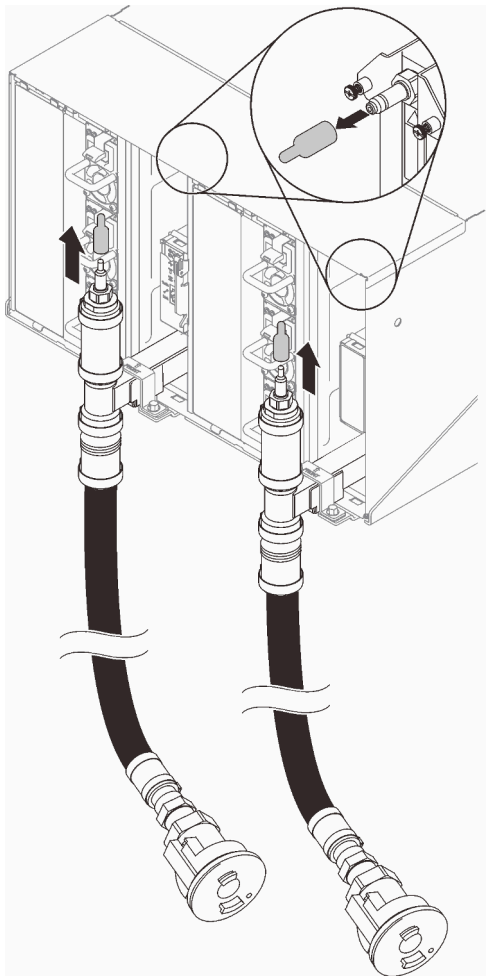


Figure 94. Quick connect plug covers removal

e. Place the open hose end of the drain hose (tool left at customer site) into a bucket. Make sure that the lever on the drain hose valve is closed (lever is pointed away from the hose).

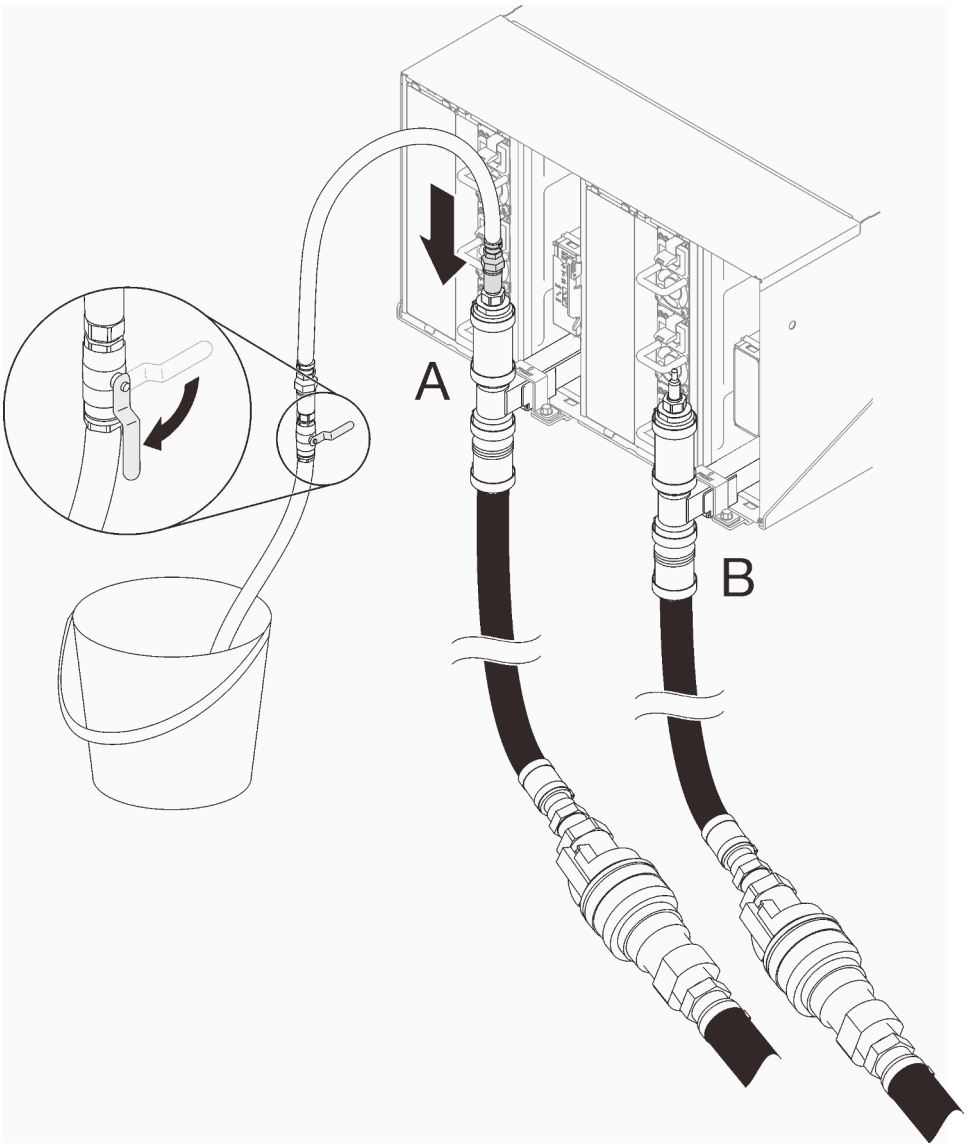


Figure 95. Water draining

f. Connect the Quick connect socket from the drain hose tool to the top of the return side manifold (position middle of the rack).

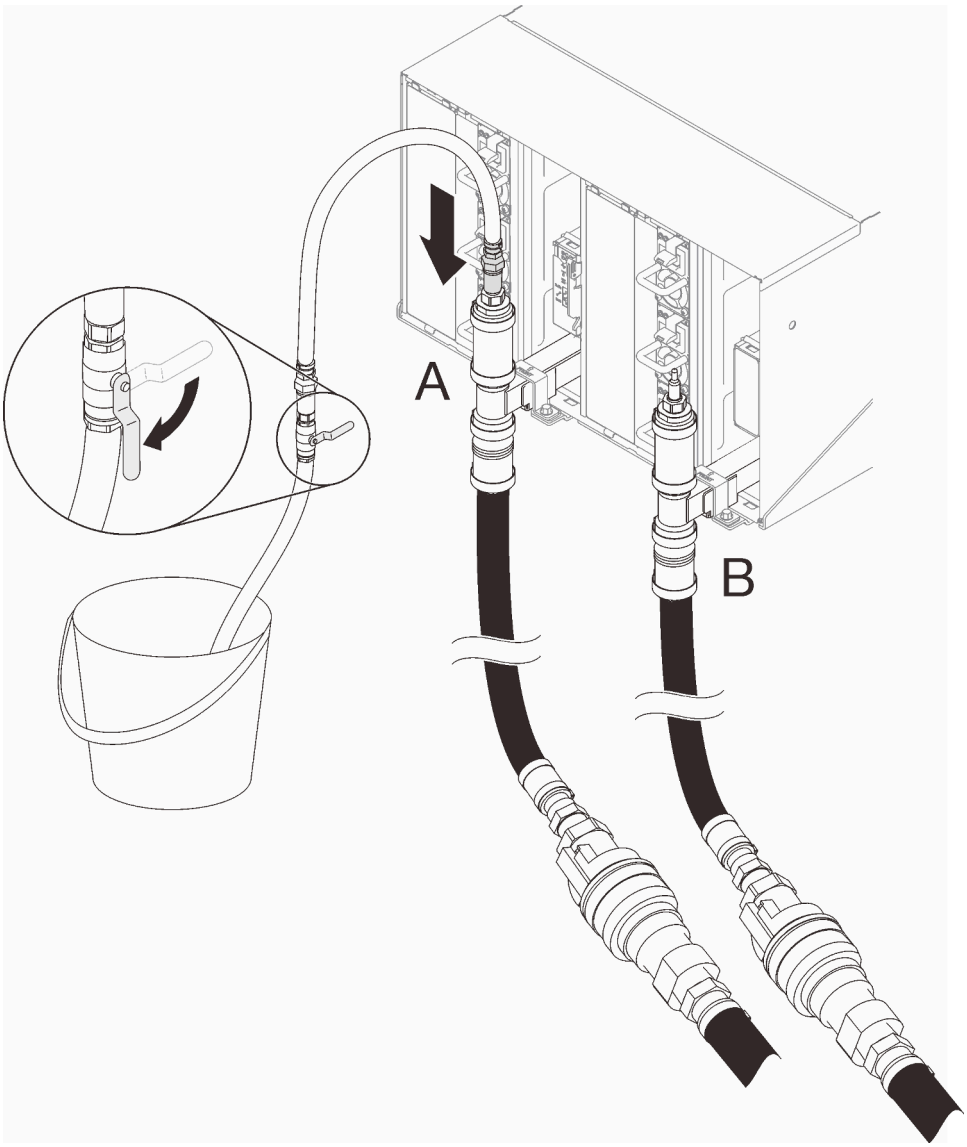


Figure 96. Quick connect socket from the drain hose tool to the top of the return side manifold connection

g. Once the quick connect is attached, slowly open the hose valve and allow water to drain until water stops flowing (approximately 1 minute).

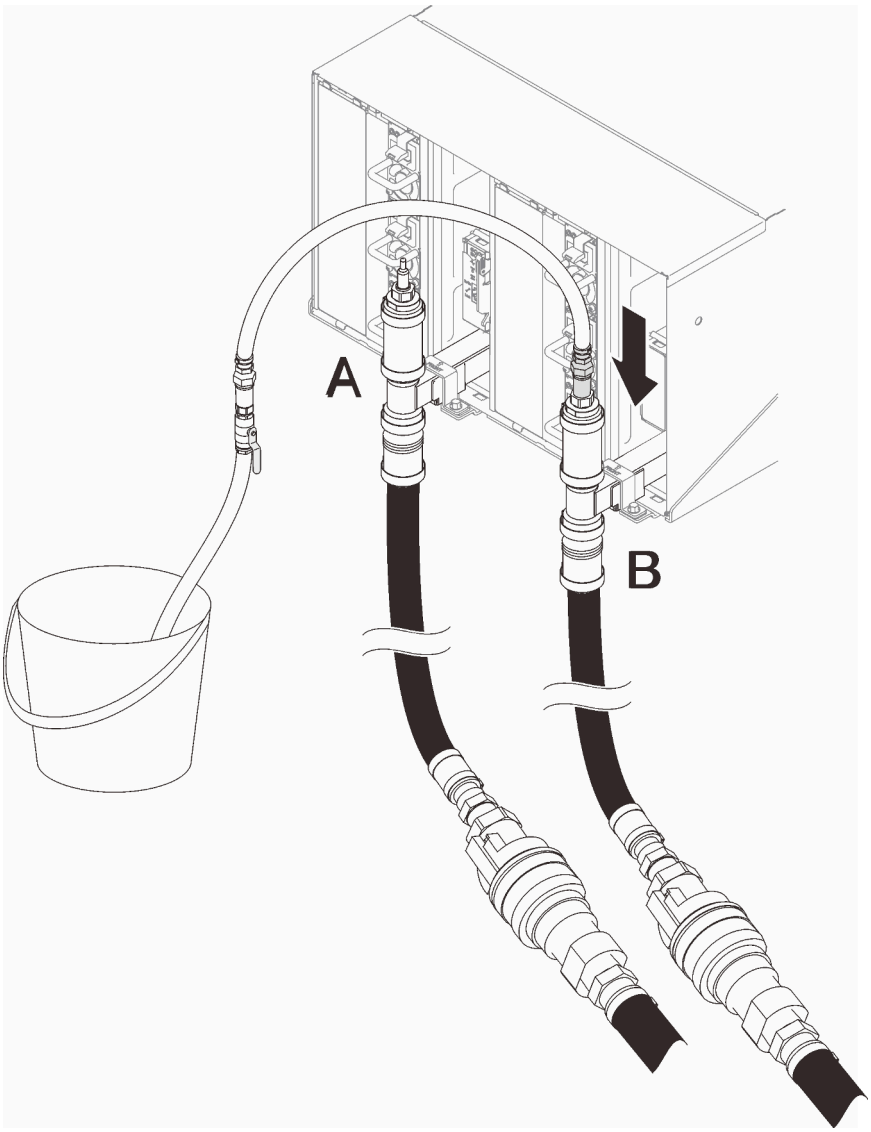


Figure 97. Water draining

h. Move to the top position of the other manifold (position closest to the rack side wall). Leave the hose connected to the top of the manifold until water stops flowing. Disconnect quick connect from top of manifold.

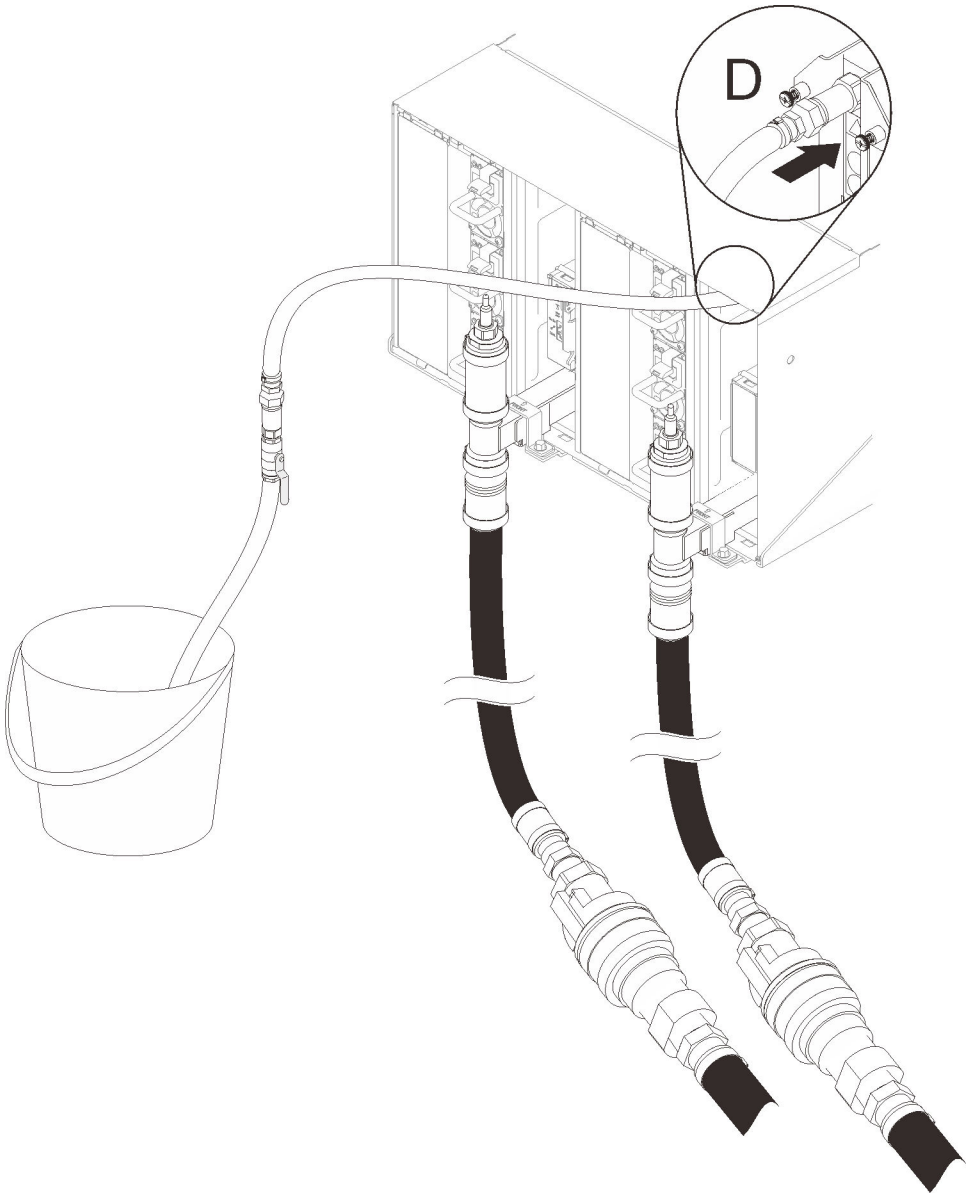


Figure 98. Quick connect socket from the drain hose tool to the top of the supply side manifold connection

i. Continue to each enclosure from the top enclosure to the bottom enclosure by reaching into each enclosure Location C and Location D quick connects and allow for a steady stream of water to drain. Repeat drain process until all positions in the entire rack have been drained.

j. Re-attach the hose which should be put onto the manifold that has the section to be replaced to the top of the manifold before moving back around to the front of the rack.

k. At this point, the manifold should be properly drained to allow for service. Since there still can be some water left in the manifold, prepare work area with absorbent cloths to collect any water that may drain out.

l. Determine which manifold needs to be replaced.

m. Move to the rear of the rack. Remove manifold retention bracket that is retaining the manifold (top enclosure position only).

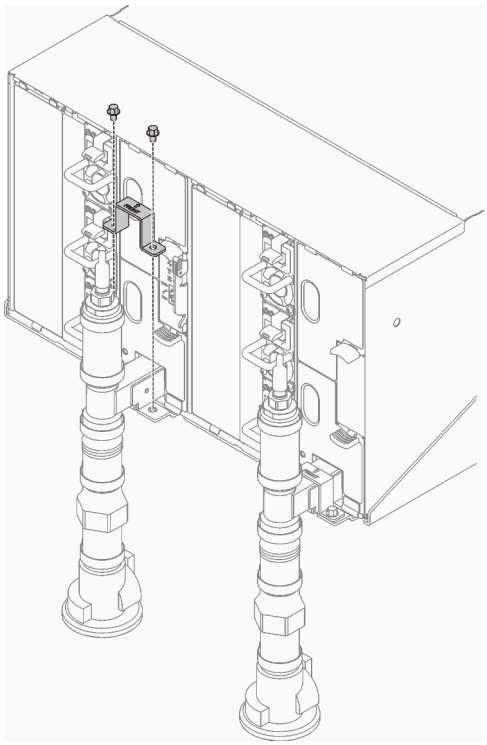


Figure 99. Retention bracket removal

n. ❶ Push the latch up upwards and ❷ slide the drip sensor assembly backwards, then; lift the drip sensor assembly up to clear sensor post and pull it out of the enclosure.

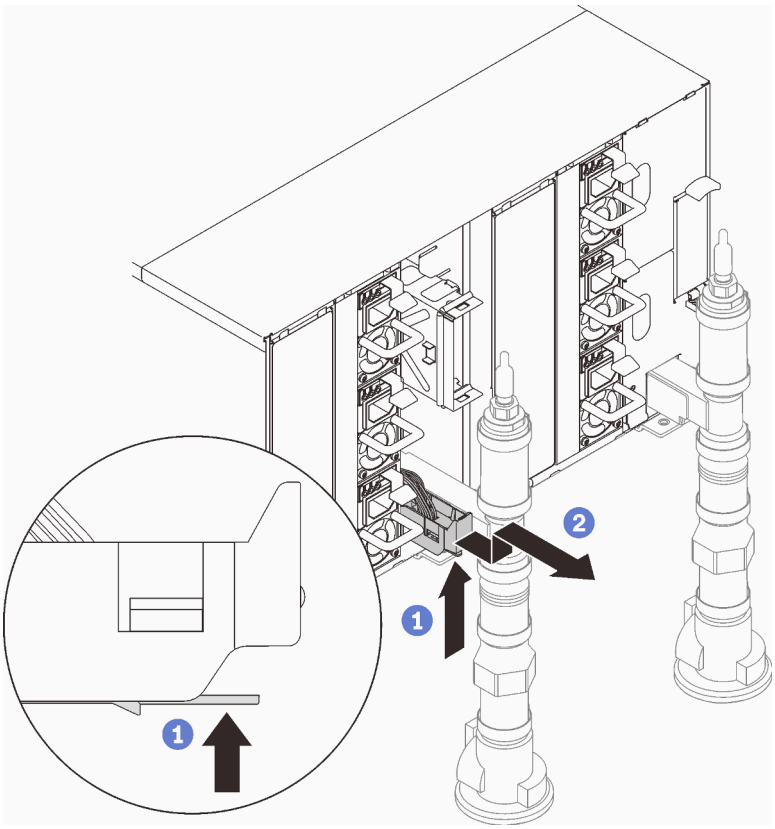


Figure 100. Drip sensor assembly removal

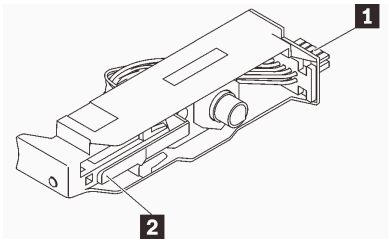


Figure 101. Drip sensor assembly

Table 25. Drip sensor assembly

1 Connector	2 Latch

o. Remove SMM2 and SMM2 support bracket if portion of left manifold is being replaced. If it is the right side manifold, remove blank filler.

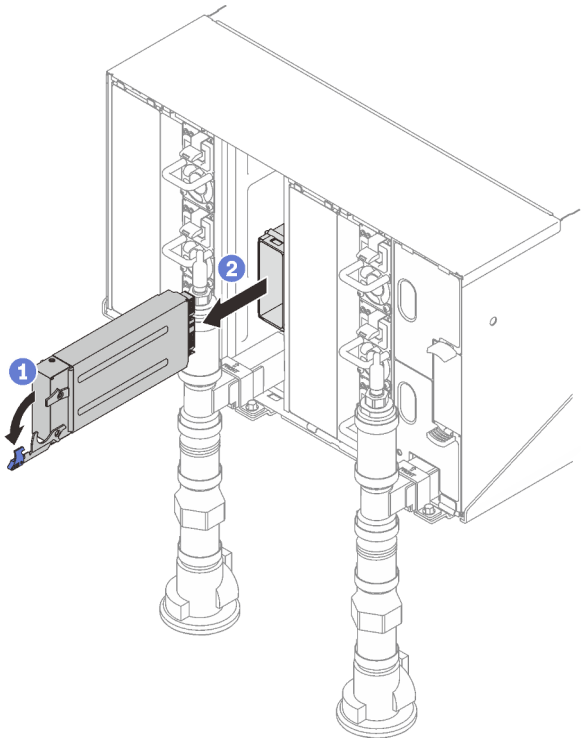


Figure 102. SMM2 removal

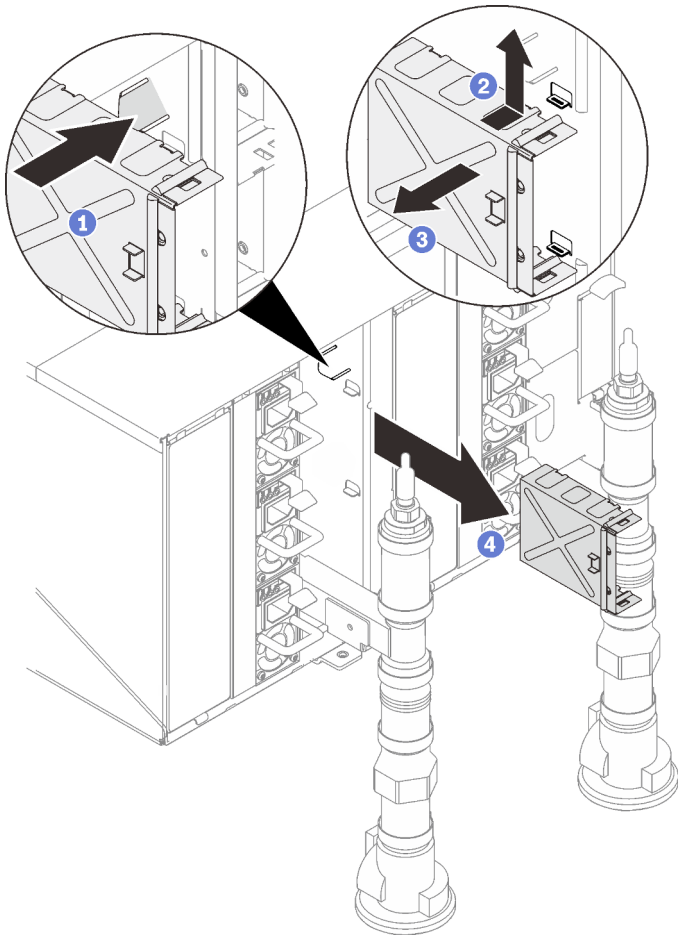


Figure 103. SMM2 Support bracket removal

Step 2. Unscrew four screws (using the screwdriver contained in the manifold repair kit) to loosen the manifold bracket from the enclosure.

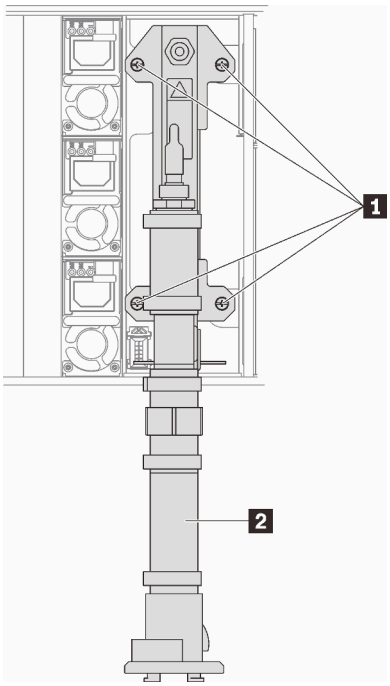


Figure 104. Manifold screw locations

Table 26. Manifold screw locations

1 Screws	2 Manifold

Step 3. Repeat steps 14-17 for all manifold sections until you can freely access the entire manifold to be replaced.

Step 4. Remove the entire manifold and lay it on the ground for the next steps.

Step 5. Place a pan under the section of the manifold to be removed.

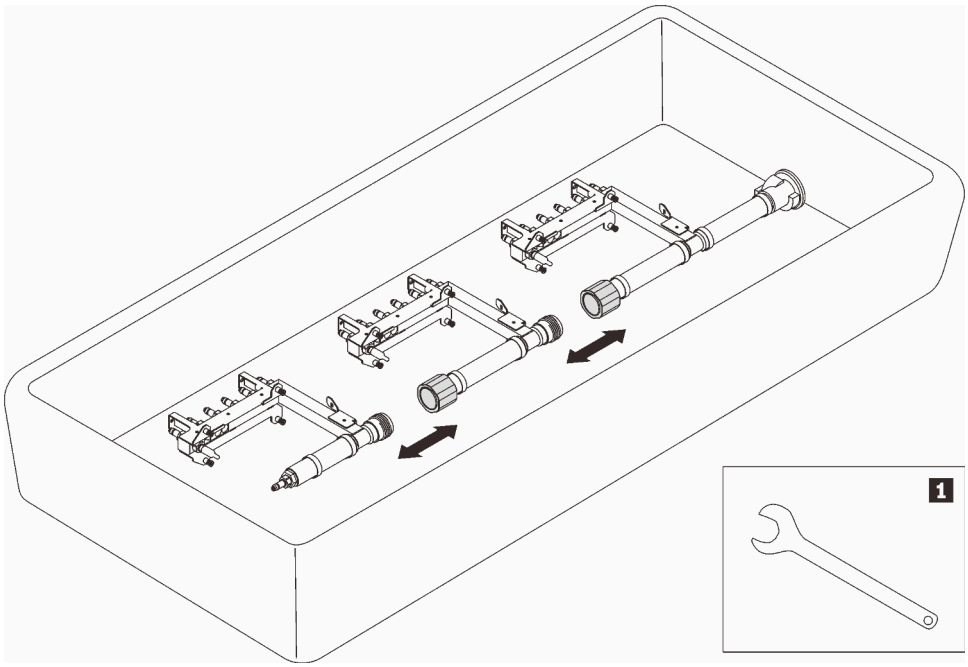


Figure 105. Manifold disassemble

Table 27. Manifold disassemble

1	41mm wrench

Step 6. Disconnect manifold section to be replaced from the rest of the manifold by disconnecting the couplings. Use 41mm wrench supplied with replacement manifold section kit.

After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

Watch the procedure on YouTube

Install the manifold

Use this information to install the manifold.

About this task

CAUTION:
The water might cause irritation to the skin and eyes. Avoid direct contact with the lubricant.

S002

CAUTION:

The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

S038

CAUTION:
Eye protection should be worn for this procedure.

L011

تحذير: يجب ارتداء النظارات الواقية لهذا الاجراء. (L011)

AVISO: Para este procedimento, são necessários óculos de proteção. (L011)

ВНИМАНИЕ: За тази процедура са необходими предпазни очила. (L011)

ATTENTION : Cette procédure requiert des lunettes de protection. (L011)

警告：该过程需要护目镜。 **(L011)**

警告：此程序需要護目鏡。(L011)

OPREZ: Za izvođenje postupka su potrebne zaštitne naočale. (L011)

POZOR: K tomuto postupu jsou nutné ochranné brýle. (L011)

Pas på! Proceduren kræver beskyttelsesbriller. (L011)

WAARSCHUWING: Voor deze procedure is een beschermende bril vereist. (L011)

CAUTION: Protective eyewear is needed for the procedure. (L011)

VAROITUS: Toimet edellyttävät silmänsuojaimien käyttöä. (L011)

Vorsicht: Bei dieser Prozedur eine Schutzbrille tragen. (L011)

ΠΡΟΣΟΧΗ: Για τη συγκεκριμένη διαδικασία απαιτούνται προστατευτικά γυαλιά. (L011)

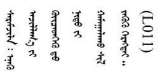
VESZÉLY: Az eljáráshoz védőszemüveget kell viselni. (L011)

ATTENZIONE: per la procedura sono necessarie protezioni per gli occhi. (L011)

危険: この作業には目を保護する道具が必要です。
(L011)

주의: 이 절차에는 보호용 안경이 필요합니다. (L011)

ВНИМАНИЕ: За изведување на постапката потребни се заштитни очила. (L011)


(L011)

ADVARSEL: Vernebriller må benyttes for denne prosedyren. (L011)

ZAGROŻENIE: Procedura wymaga zastosowania okularów ochronnych. (L011)

CUIDADO: É necessário utilizar protecção ocular para a execução deste procedimento. (L011)

ОСТОРОЖНО: При выполнении этой операции необходимо надеть защитные очки. (L011)

VÝSTRAHA: Vykonanie tejto procedúry vyžaduje pomôcku na ochranu očí. (L011)

POZOR: Za ta postopek je potrebna zaščitna oprema za oči. (L011)

PRECAUCIÓN: Utilice protección ocular para llevar a cabo el procedimiento. (L011)

Varning: Skyddsglasögon krävs. (L011)

ཉེན་བརྡ། : བཀོལ་སྤྱོད་འདིའི་ཐོག་རིམ་ལུགས་སྤྱད་སྐྱེད་ཆུས་པ་ལྟན་པའི་མིག་ཤེལ་གོན་དགོས། (L011)

ئاگاھلاندۇرۇش: سز مەشغۇلات جەريانىدا كۆز ئاسراش كۆزەينىكى تاقۇبلىشىڭىز كېرەك. **(L011)**

Daezsingj: Aen cauhcoz neix aeu yungh yenjging baujhoh lwgda. (L011)

L014

تحذير: يجب ارتداء القفازات الكيميائية المقاومة لهذا الاجراء. (L014)

AVISO: Para este procedimento, são necessárias luvas com resistência química. (L014)

ВНИМАНИЕ: За тази процедура са необходими химически устойчиви ръкавици. (L014)

ATTENTION : Cette procédure requiert des gants de protection contre les produits chimiques. (L014)

警告：该过程需要化学防护手套。 (L014)

警告：此程序需要抗化學劑手套。(L014)

OPREZ: Za ovaj postupak su potrebne kemijski otporne zaštitne rukavice. (L014)

POZOR: K tomuto postupu jsou nutné ochranné brýle. (L014)

Pas på! Bær handsker, der er modstandsdygtige over for kemikalier, når du skal udføre denne proces. (L014)

WAARSCHUWING: Voor deze procedure zijn tegen chemicaliën beschermende handschoenen vereist. (L014)

CAUTION: Chemical resistant gloves are needed for this procedure. (L014)

VAROITUS: Toimet edellyttävät kemiallisesti kestävistä materiaaleista valmistettujen suojakäsineiden käyttöä. (L014)

Vorsicht: Bei dieser Aktion müssen chemische Schutzhandschuhe getragen werden. (L014)

ΠΡΟΣΟΧΗ: Για τη συγκεκριμένη διαδικασία απαιτούνται ειδικά γάντια, ανθεκτικά στις χημικές ουσίες. (L014)

VIGYÁZAT: Az eljáráshoz vegyi anyagokkal szemben ellenálló védőszemüveget kell viselni. (L014)

ATTENZIONE: per questa procedura sono necessari guanti resistenti ad agenti chimici. (L014)

危険：この作業には化学耐性のあるグローブが必要です。(L014)

주의: 이 절차를 수행하려면 내화학성 장갑을 착용해야 합니다. (L014)

ВНИМАНИЕ: За изведување на оваа постапка потребни се ракавици за хемиска заштита. (L014)

ᠠᠩᠬᠠᠷᠤᠯ᠄ ᠡᠨᠡ ᠠᠵᠢᠯᠯᠠᠭᠠ ᠶᠢ ᠬᠢᠬᠦ ᠳᠦ ᠬᠢᠮᠢ ᠶᠢᠨ ᠪᠣᠳᠠᠰ ᠲᠤ ᠲᠡᠰᠪᠦᠷᠢ ᠲᠠᠢ ᠪᠡᠭᠡᠯᠵᠡ ᠡᠮᠦᠰᠬᠦ ᠬᠡᠷᠡᠭᠲᠡᠢ᠃ (L014)

ADVARSEL: Vernehansker av motstandsdyktig materiale må benyttes for denne prosedyren. (L014)

ZAGROŻENIE: Procedura wymaga użycia rękawic ochronnych. (L014)

CUIDADO: É necessária a utilização de luvas resistentes a químicos para a execução deste procedimento. (L014)

ОСТОРОЖНО: Для этой процедуры необходимы перчатки, устойчивые к химическим воздействиям. (L014)

VÝSTRAHA: Vykonanie tejto procedúry vyžaduje rukavice odolné chemikáliám. (L014)

POZOR: Za delo so potrebne proti kemičnim sredstvom odporne rokavice. (L014)

PRECAUCIÓN: Utilice guantes resistentes a los productos químicos para llevar a cabo el procedimiento. (L014)

Varning: Kemikalietåliga handskar behövs. (L014)

ཉེན་ཁ། : བཀོལ་སྤྱོད་འདིའི་གོ་རིམ་ལ་སྒྲུང་སྐྱོབ་ནུས་པ་ལྡན་པའི་རྫས་འགྱུར་རླུལ་འགོག་ལག་ཤུབས་གོན་དགོས། (L014)

ئاگاھلاندۇرۇش: بۇ مەشغۇلات جەريانىدا خىمىيىلىك چىرىشتىن ساقلىنىش پەلىيىنى كىيىشىڭىز كېرەك. (L014)

Daezsingj: Aen cauhcoz neix aeu yungh madfwngz naih vayoz myaex. (L014)

L016

خطر: قد يتم التعرض لخطر الصدمة الكهربائية بسبب الماء أو المحلول المائي الذي يوجد بهذا المنتج.
تجنب العمل في أو بالقرب من أي جهاز فعال بأيدي مبتلة أو عند وجود تسرب للماء. (L016)

AVISO: Risco de choque elétrico devido à presença de água ou solução aquosa no produto. Evite trabalhar no equipamento ligado ou próximo a ele com as mãos molhadas ou quando houver a presença de água derramada. (L016)

ОПАСНО: Риск от токов удар поради вода или воден разтвор, присъстващи в продукта.
Избягвайте работа по или около оборудване под напрежение,
докато сте с мокри ръце или когато наоколо има разляна вода.
(L016)

DANGER : Risque de choc électrique lié à la présence d'eau ou d'une solution aqueuse dans ce produit. Évitez de travailler avec ou à proximité d'un équipement sous tension avec des mains mouillées ou lorsque de l'eau est renversée. (L016)

危险：由于本产品中存在水或者水溶液，因此存在电击风险。请避免使用潮湿的手在带电设备或者有水溅出的环境附近工作。 (L016)

危險：本產品中有水或水溶液，會造成電擊的危險。手濕或有潑濺的水花時，請避免使用或靠近帶電的設備。(L016)

OPASNOST: Rizik od električnog udara zbog vode ili tekućine koja postoji u ovom proizvodu.
Izbjegavajte rad u
blizini opreme pod naponom s mokrim rukama ili kad je u blizini prolivena
tekućina.
(L016)

NEBEZPEČÍ: Riziko úrazu elektrickým proudem v důsledku vody nebo vodního roztoku přítomného v tomto produktu. Dejte pozor, abyste při práci s aktivovaným vybavením nebo v jeho blízkosti neměli mokré ruce a vyvarujte se potřísnění nebo polití produktu vodou. (L016)

Fare! Risiko for stød på grund af vand eller en vandig opløsning i produktet. Undgå at arbejde med eller i nærheden af strømførende udstyr med våde hænder, eller hvis der er spildt vand. (L016)

GEVAAR: Risico op elektrische schok door water of waterachtige oplossing die aanwezig is in dit product. Vermijd werken aan of naast apparatuur die onder spanning staat als u natte handen hebt of als gemorst water aanwezig is. (L016)

DANGER: Risk of electric shock due to water or a water solution which is present in this product. Avoid working on or near energized equipment with wet hands or when spilled water is present. (L016)

VAARA: Tässä tuotteessa oleva vesi tai vettä sisältävä liuos voi aiheuttaa sähköiskuvaaran. Vältä työskentelyä jännitteellisen laitteen ääressä tai sen läheisyydessä märin käsin tai jos laitteessa tai sen läheisyydessä on vesiroiskeita. (L016)

Gefahr: Aufgrund von Wasser oder wässriger Lösung in diesem Produkt besteht die Gefahr eines elektrischen Schlags. Nicht mit nassen Händen oder in der Nähe von Wasserlachen an oder in unmittelbarer Nähe von Bauteilen arbeiten, die unter Strom stehen. (L016)

ΚΙΝΔΥΝΟΣ: Κίνδυνος ηλεκτροπληξίας εξαιτίας της παρουσίας νερού ή υγρού διαλύματος στο εσωτερικό του προϊόντος. Αποφύγετε την εργασία με ενεργό εξοπλισμό ή κοντά σε ενεργό εξοπλισμό με βρεγμένα χέρια ή όταν υπάρχει διαρροή νερού. (L016)

VESZÉLY: A víz vagy a termékben lévő vizes alapú hűtőfolyadék miatt fennáll az elektromos áramütés veszélye. Ne dolgozzon áram alatt lévő berendezésen és közelében nedves kézzel, illetve amikor folyadék kerül a berendezésre. (L016)

PERICOLO: rischio di scossa elettrica a causa di presenza nel prodotto di acqua o soluzione acquosa. Evitare di lavorare su o vicino l'apparecchiatura accesa con le mani bagnate o in presenza di acqua. (L016)

危険: この製品内に存在する水または水溶液によって、電気ショックの危険があります。手が濡れている場合やこぼれた水が周囲にある場合は、電圧が印加された装置またはその周辺での作業は行わないでください。(L016)

위험: 이 제품에는 물 또는 수용액으로 인한 전기 쇼크 위험이 있습니다. 젖은 손으로 또는 엎질러진 물이 있는 상태에서 전력이 공급되는 장비나 그 주변에서 작업하지 마십시오. (L016)

ОПАСНОСТ: Опасност од струен удар поради присаство на вода или на воден раствор во овој производ. Избегнувајте работење на опрема вклучена во струја или во близина на опрема вклучена во струја со влажни раце или кога има истурено вода.
(L016)

FARE: Fare for elektrisk støt på grunn av vann eller en vandig oppløsning som finnes i dette produktet. Unngå å arbeide med eller i nærheten av strømførende utstyr med våte hender eller ved eventuelt vannsøl. (L016)

NIEBEZPIECZEŃSTWO: Ryzyko porażenia prądem elektrycznym z powodu występowania w produkcie wody lub roztworu wodnego. Nie należy pracować przy podłączonym do źródła zasilania urządzeniu lub w jego pobliżu z mokrymi dłońmi lub kiedy rozlano wodę. (L016)

PERIGO: Risco de choque eléctrico devido à presença de água ou líquidos no produto. Evite trabalhar com equipamento com energia, ou na sua proximidade, com mãos molhadas ou caso exista água derramada. (L016)

ОПАСНО: Риск поражения электрическим током вследствие присутствия в этом продукте воды или водного раствора. Избегайте выполнения работ на оборудовании, находящемся под напряжением, или рядом с таким оборудованием влажными руками или при наличии пролитой воды. (L016)

NEBEZPEČENSTVO: Riziko úrazu elektrickým prúdom v dôsledku prítomnosti vody alebo vodného roztoku v tomto produkte. Vyhnite sa práci na zapnutom zariadení alebo v jeho blízkosti s vlhkými rukami, alebo keď je prítomná rozliata voda.
(L016)

NEVARNOST: Nevarnost električnega udara zaradi vode ali vodne raztopine, prisotne v izdelku. Ne delajte na opremi ali poleg opreme pod energijo z mokrimi rokami ali ko je prisotna razlita voda.
(L016)

PELIGRO: Existe riesgo de choque eléctrico por agua o por una solución de agua que haya en este producto. Evite trabajar en equipos bajo tensión o cerca de los mismos con las manos húmedas o si hay agua derramada. (L016)

Fara: Risk för elektriska stötar på grund av vatten eller vattenbaserat medel i denna produkt. Arbeta inte med eller i närheten av elektriskt laddad utrustning om du har våta händer eller vid vattenspill. (L016)

(L016)

خەتەرلىك: بۇ مەھسۇلاتتا سۇ ياكى ئېرىتمە بولغاچقا، شۇڭا توك سوقۇۋېتىش خەۋپى مەۋجۇتدۇر. قول هۆل هالەتتە ۋە ياكى سۇ سرغىپ چىققان هالەتتە، توكلۇق ئۈسكۈنىگە قارىتا ۋە ياكى توكلۇق ئۈسكۈنىنىڭ ئەتراپىدا مەشغۇلات ئېلىپ بارغىلى بولمايدۇ. **(L016)**

Yungyiemj: Youzyiz aen canjbinj miz raemx roxnaeuz raemx yungzyiz, sojyij miz yungyiemj bungqden. Mboujndaej fwngz miz raemx seiz youq ndaw sezbi roxnaeuz youq henzgyawj guhhong.
(L016)

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Ensure proper handling procedures are followed when working with any chemically treated water used in the compute rack cooling system. Ensure that material safety data sheets (MSDS) and safety information are provided by the water chemical treatment supplier and that proper personal protective equipment (PPE) is available as recommended by the water chemical treatment supplier. Protective gloves and eyewear may be recommended as a precaution.

Procedure

Step 1. Make sure the DWC tray(s) are removed from the enclosure (see “Remove a DWC tray from the enclosure” on page 149).

Step 2. Install new manifold section into the manifold and connect couplings.

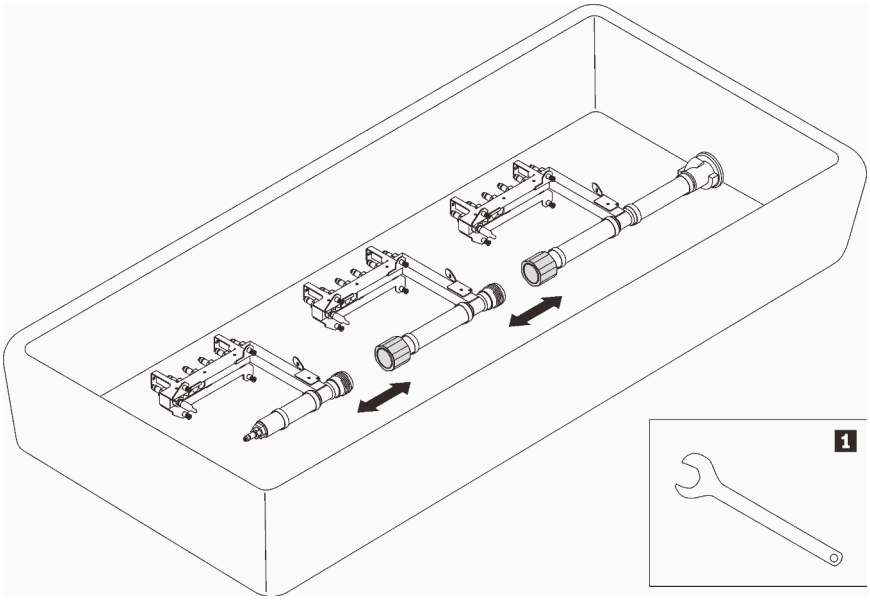


Figure 106. Manifold disassemble

Table 28. Manifold disassemble

1	41mm wrench

Step 3. Install the manifold.

a. ❶ Align the drip sensor tray with the manifold and slide it into the place.

b. ❷ Align the manifold with the enclosure and slide it into the place.

c. ❸ Tighten four screws (using the screwdriver contained in the manifold repair kit) between manifold bracket and enclosure.

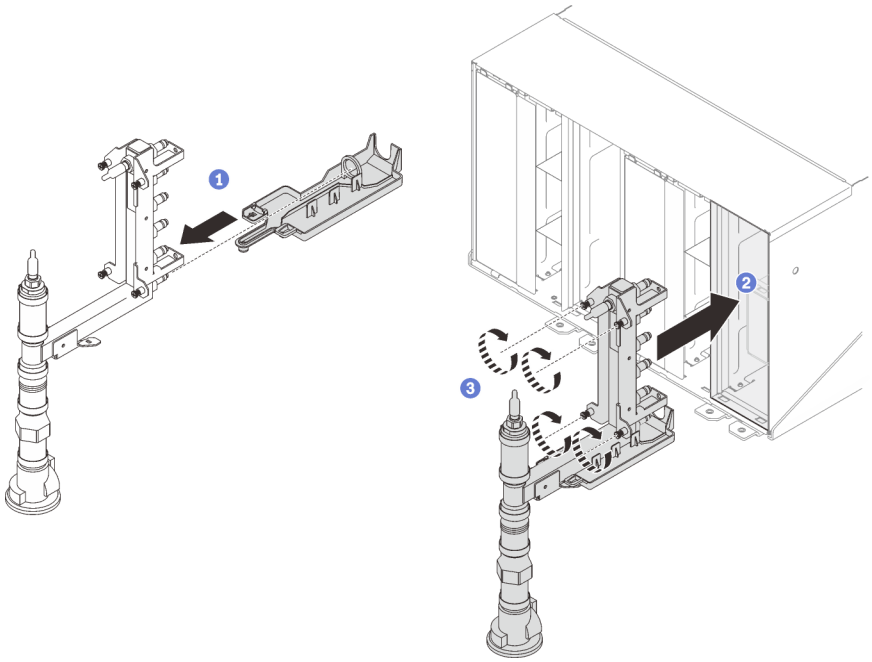


Figure 107. Manifold installation

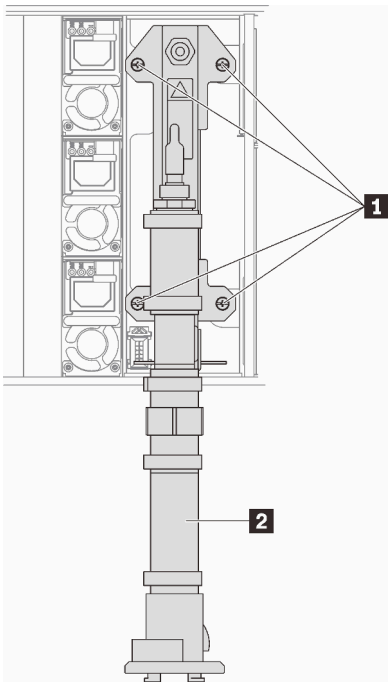


Figure 108. Manifold screw locations

Table 29. Manifold screw locations

1 Screws	2 Manifold

Step 4. Starting from the top, connect the manifold bracket for the top manifold section into the top enclosure.

Step 5. Continue to connect the other manifold sections working from the top down to the bottom.

Step 6. Reinstall all drip sensor assemblies into enclosure.

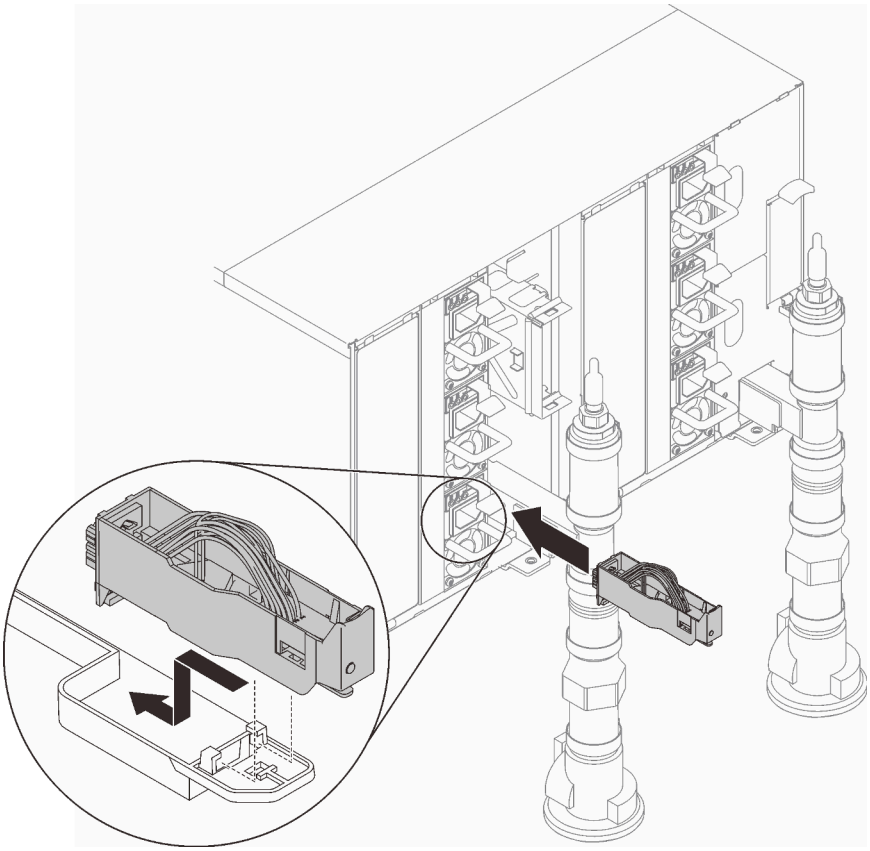


Figure 109. Drip sensor assembly installation

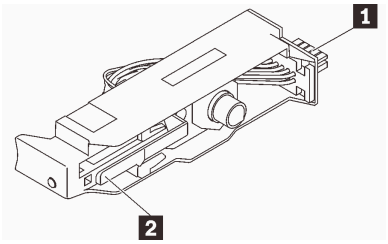


Figure 110. Drip sensor assembly

Table 30. Drip sensor assembly

1 Connector	2 Latch

Step 7. For the manifold water fill/refill process, at the rear of the rack, connect the hose assembly (supplied to customer installation site) to the top quick connect at the top of the rack (location A). Make sure the hose still remains in the bucket with the valve closed (valve handle perpendicular to the hose).

Note: The red plug cover will need to be removed at all positions first in order to plug to the quick connects.

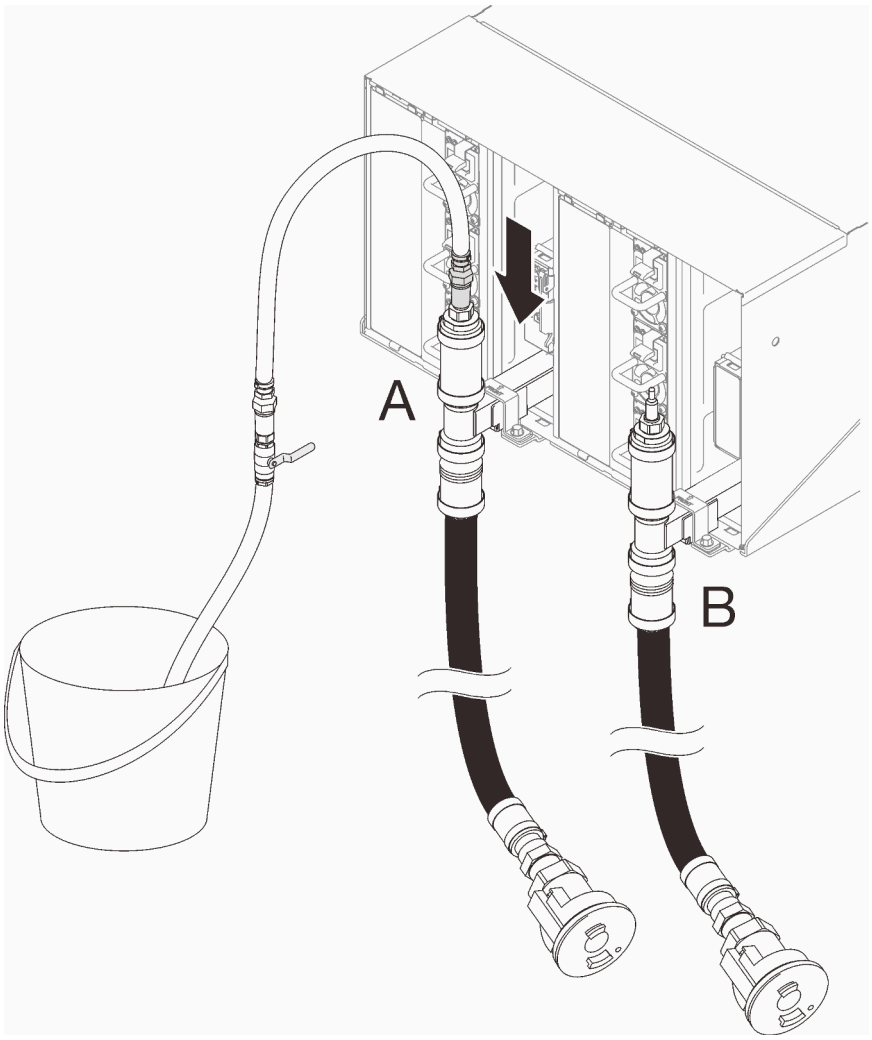


Figure 111. Hose assembly to top quick connect connection

Step 8. At the front of the rack, connect the facility supply hose to the rack return hose. Partially open the supply hose, about 1/4 of the way.

Note: Do not fully open the facility ball valve or you will reduce your ability to control the flow as you fill the rack.

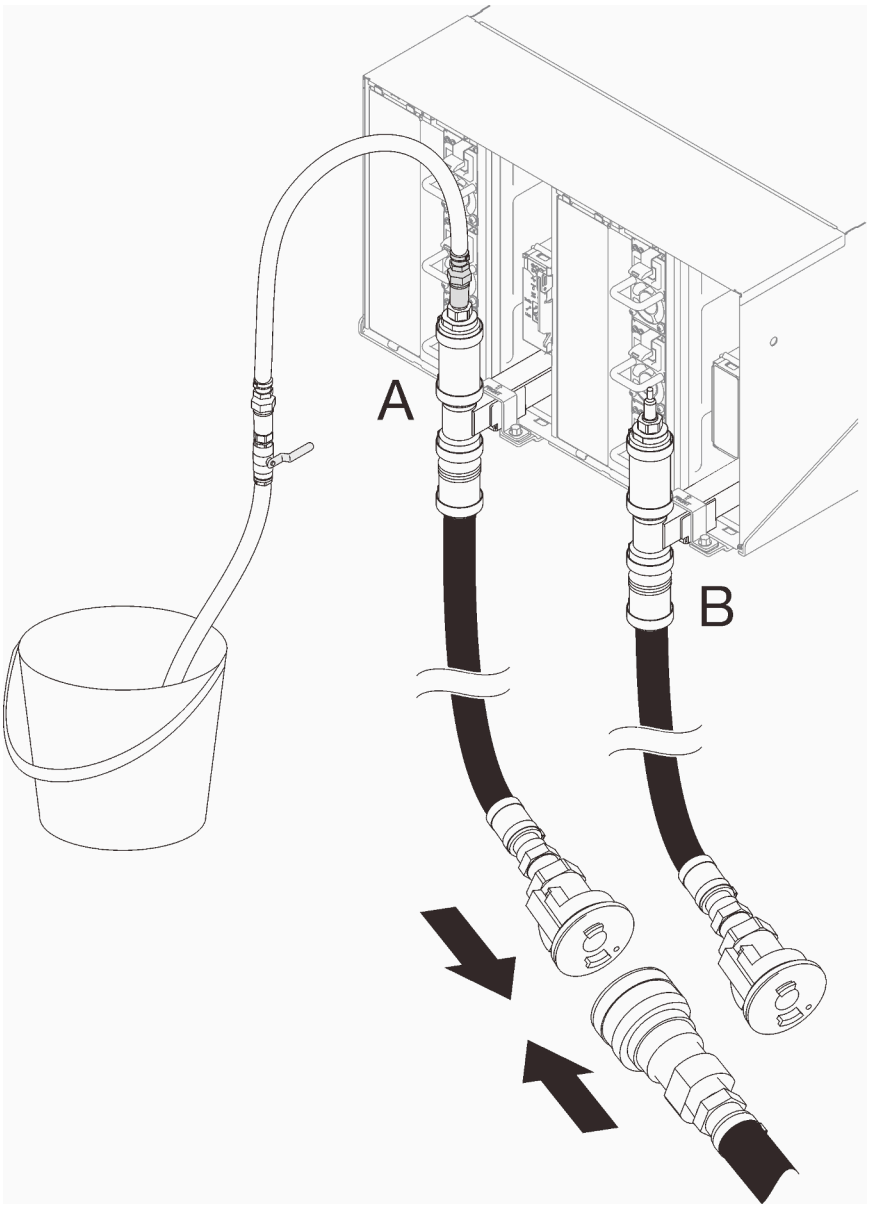


Figure 112. Facility supply hose to rack return hose connection

Step 9. At the back of the rack, slowly open the valve on the hose part of the way allowing air to flow out of the hose. Allow this to take place until a steady stream of water flows into the bucket or there are minimal bubbles in the sight-glass. It may take approximately one to two minutes for air bubbles to clear the hose.

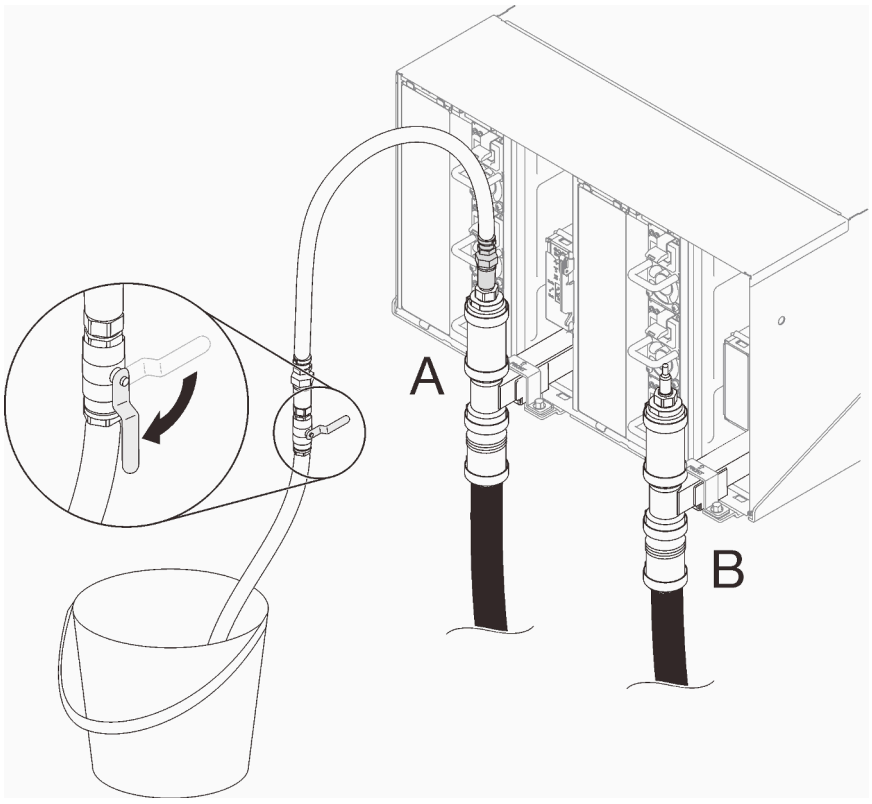


Figure 113. Hose valve opening

Step 10. Close the valve on the hose. Then disconnect the hose assembly from Location A and move to Location B. Slowly open the valve and allow this to stay in place until a steady stream of water flows into the bucket or there are minimal bubbles in the sight-glass. Close the valve on the hose again.

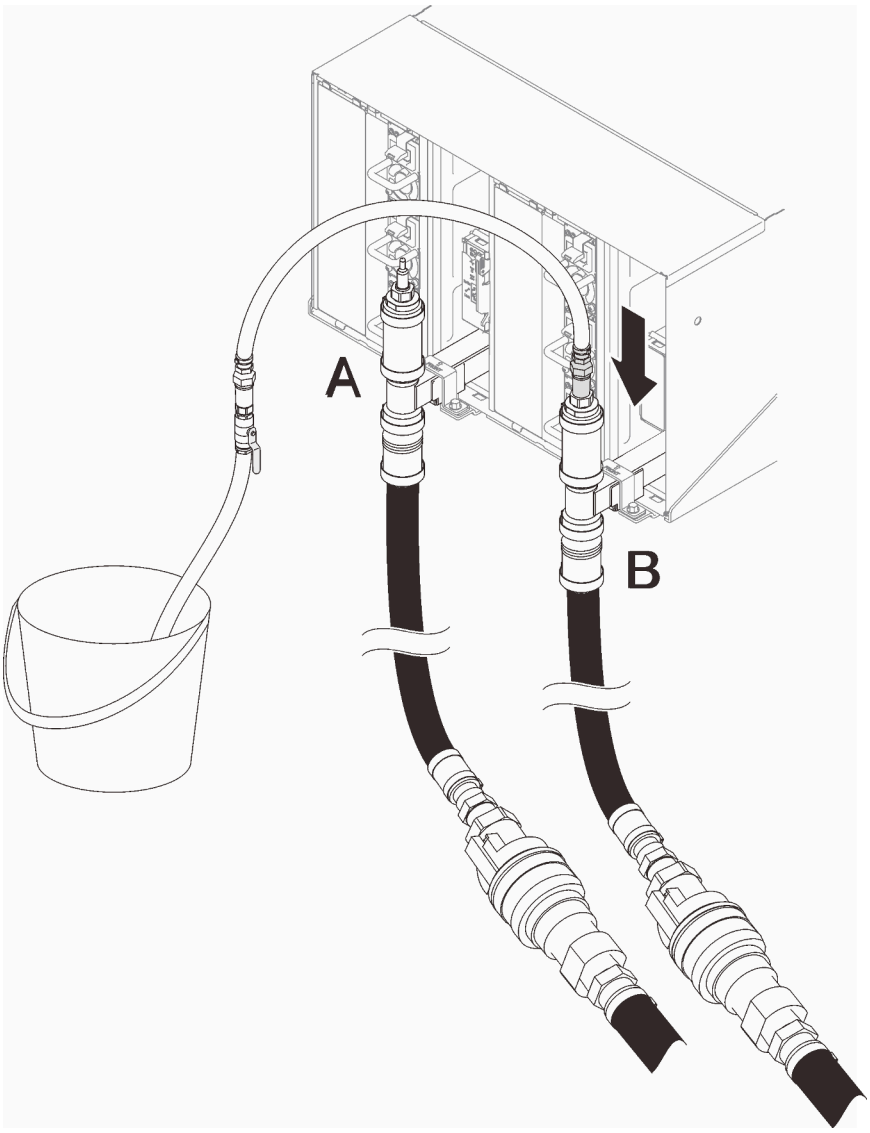


Figure 114. Hose assembly movement

Step 11. Go back to the front of the rack, disconnect the facility supply hose from the rack return hose and connect the facility supply hose to the rack supply hose.

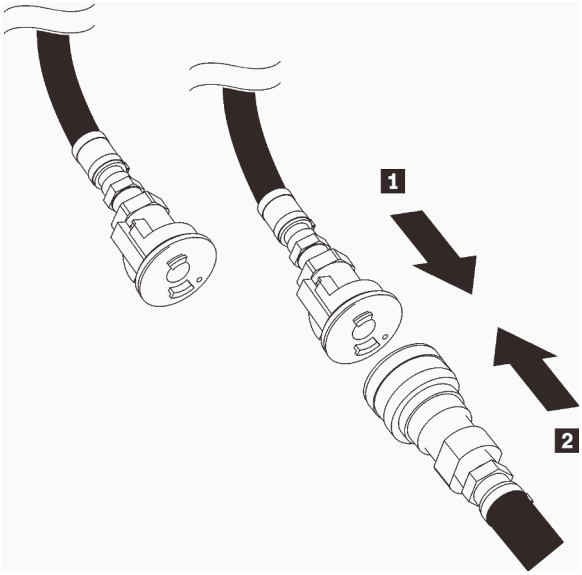


Figure 115. Facility supply hose to the rack supply hose connection

Step 12. Again, at the back of the rack, ensure the hose still remains connected to Location B. Open the valve on the hose and leave in place until a steady stream of water flows into the bucket or there are minimal bubbles in the sight-glass.

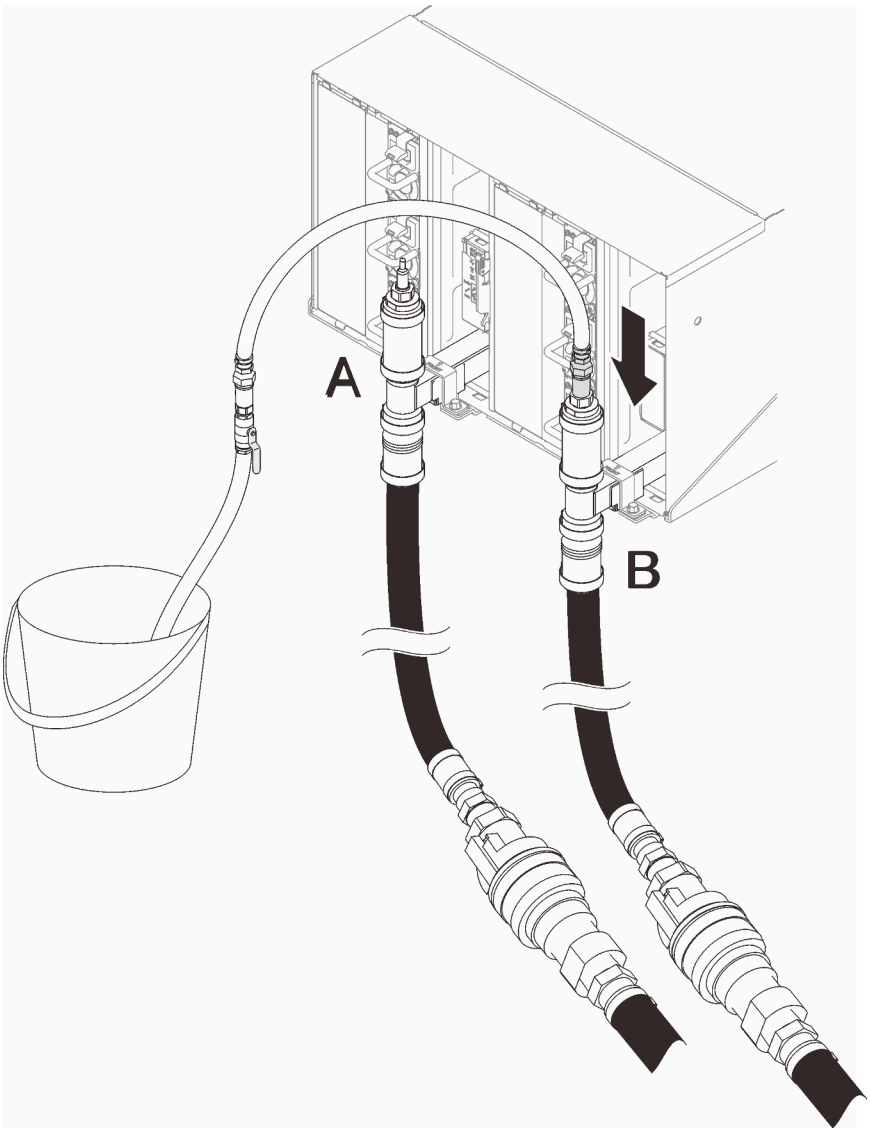


Figure 116. Hose assembly movement

Step 13. Close the valve on the hose. Then remove hose assembly from Location B and move to Location A. Open the valve on the hose and allow this to stay in place until a steady stream of water flows into the bucket or there are minimal bubbles in the sight-glass.

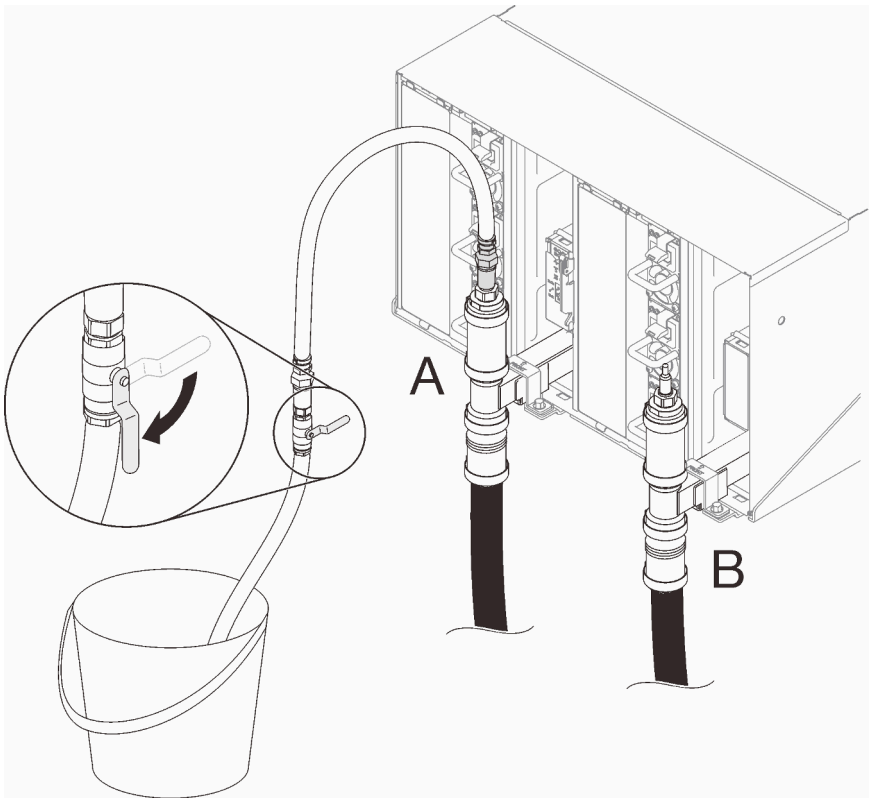


Figure 117. Hose valve opening

Step 14. Close the valve on the hose. Disconnect and move to Location C and open the valve slowly. Leave in place until a steady stream of water flows or minimal bubbles are in the sight-glass. Approximate time 10-15 seconds.

Notes:

- Top position EMC shields on all enclosure positions will need to be removed in order to access the quick connects.
- The red plug covers will need to be removed first in order to access the quick connects.

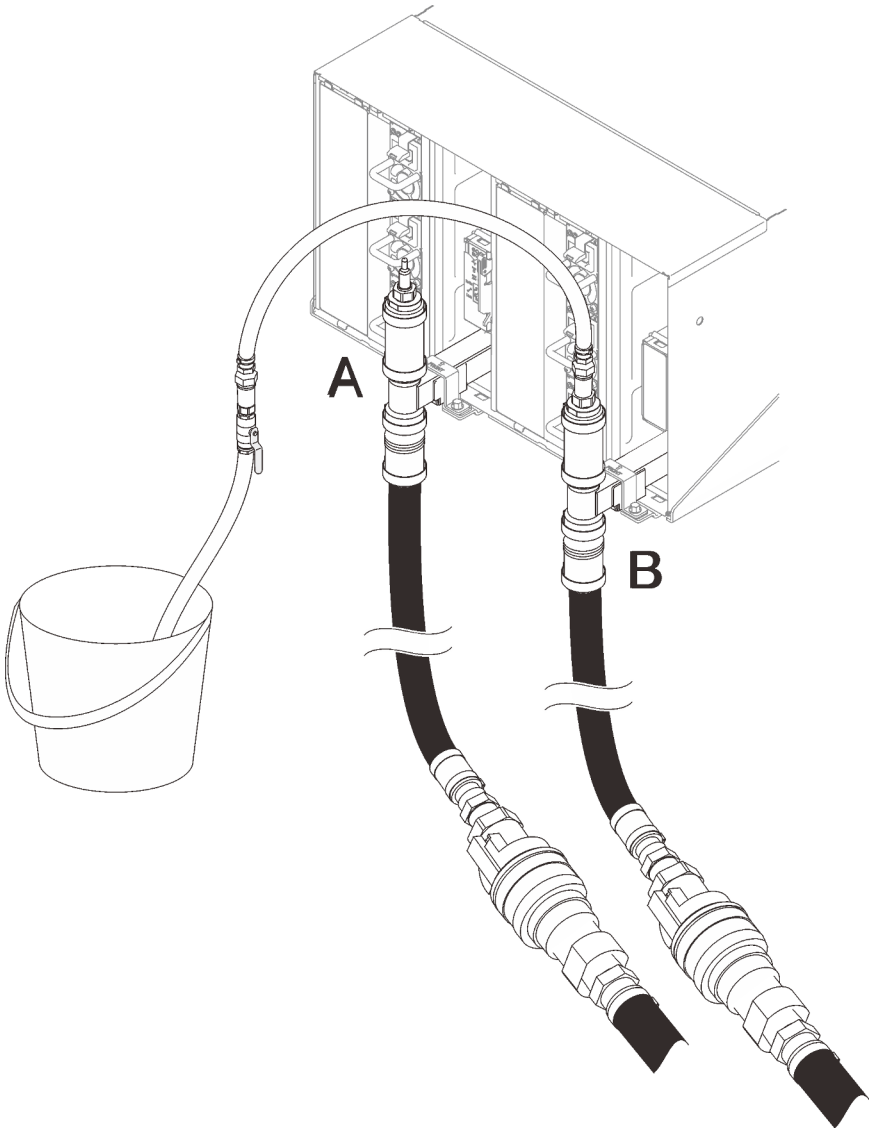


Figure 118. Hose assembly movement

Step 15. Close the valve on the hose. Disconnect and move the hose to Location D and repeat the process down the full rack ensuring each enclosure has minimal air bubbles in the sight glass.

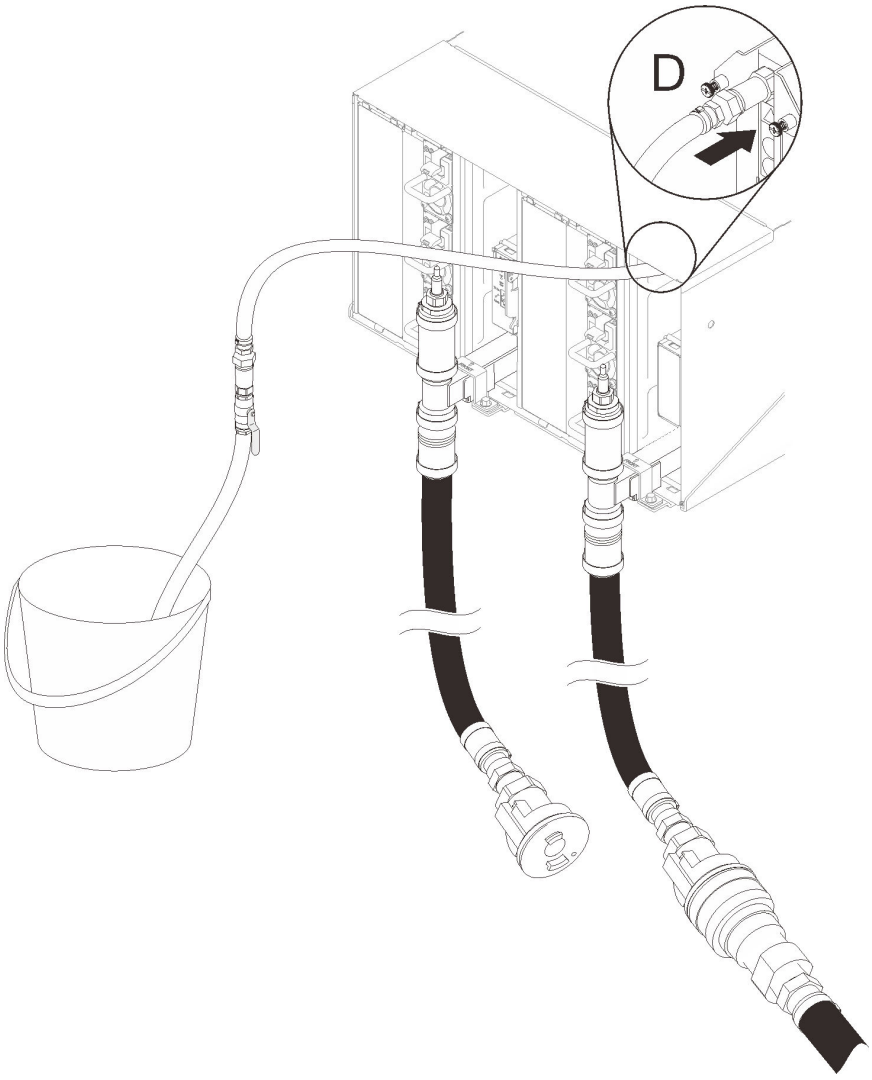


Figure 119. Hose assembly movement

Step 16. Continue to each enclosure from the top enclosure to the bottom enclosure by reaching into each enclosure Location C and Location D quick connects and allow for a steady stream of water to flow. There should be minimal air present in the sight glass.

Note: Be sure to always close the valve on the hose before disconnecting it from one of the enclosure locations as you work your way down the rack.

Step 17. Once completed, go back to the front and connect the facility return hose to the rack return hose. Fully open all connections on both the supply and return side. The manifold should be completely filled.

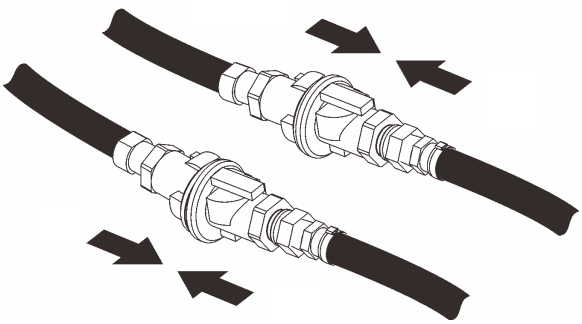


Figure 120. Facility return hose to the rack return hose connection

Step 18. Check for leaks at the rear or the rack.

Step 19. Install the SMM2 support bracket.

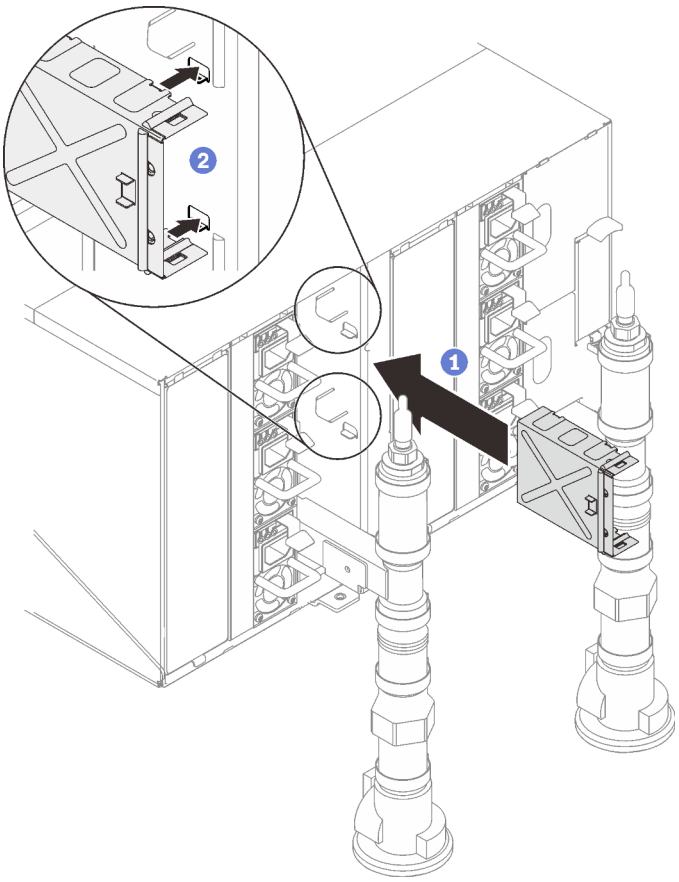


Figure 121. SMM2 support bracket installation

Step 20. Reinstall the SMM2.

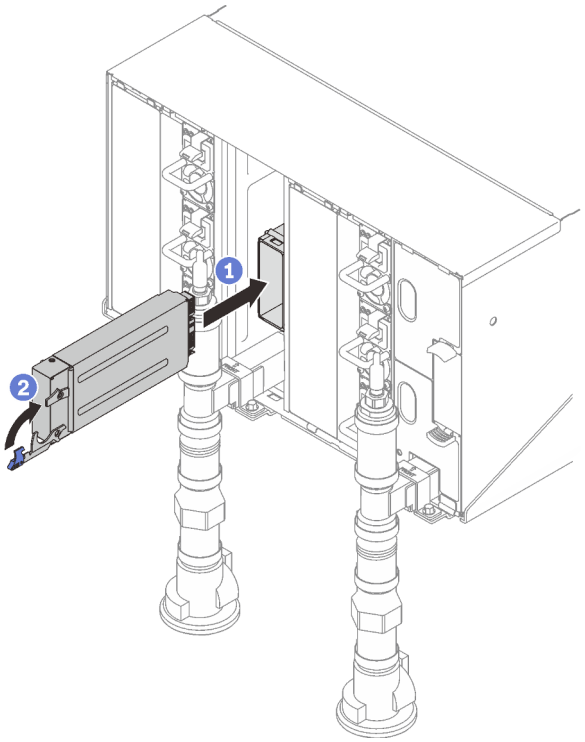


Figure 122. SMM2 installation

Step 21. Reinstall all EMC shields.

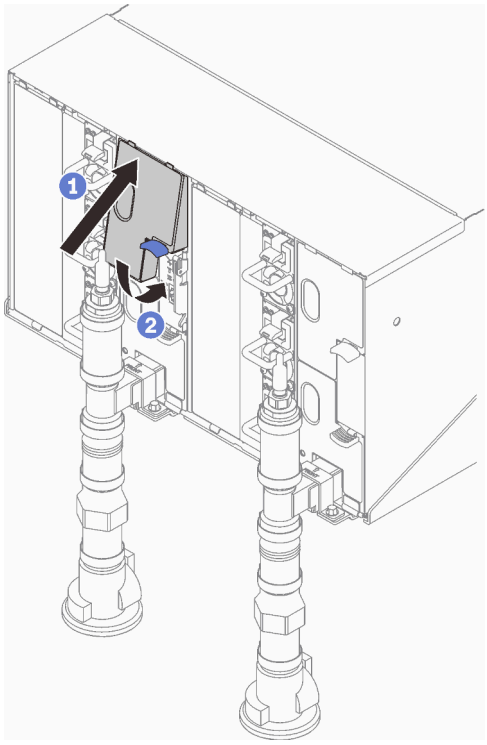


Figure 123. EMC shields installation

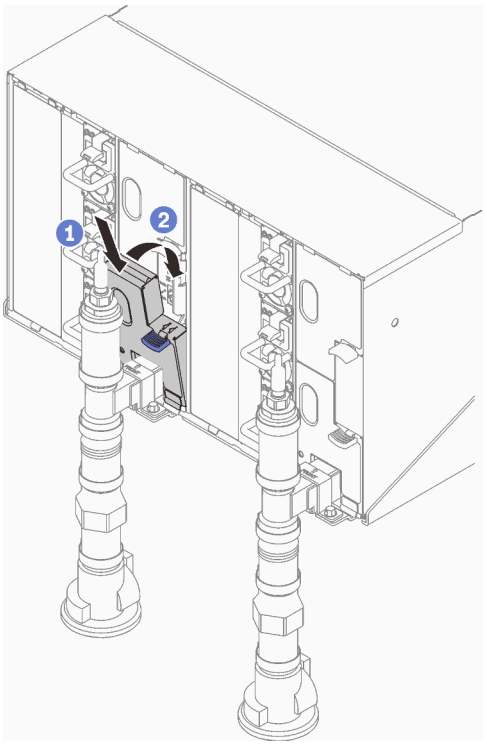


Figure 124. EMC shields installation

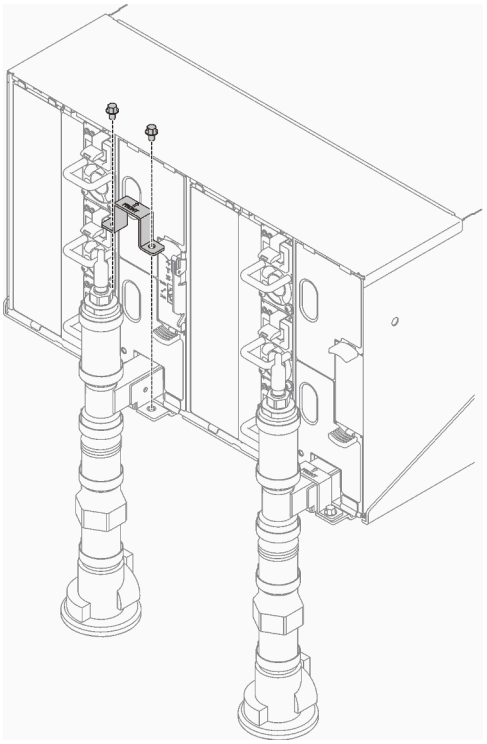


Figure 125. Retention bracket installation

Demo video

Watch the procedure on YouTube

Replace components in the tray

Use the following information to remove and install tray components.

DWC tray replacement

Use the following procedures to remove and install a DWC tray.

Remove a DWC tray from the enclosure

Use this information to remove a DWC tray from the enclosure.

About this task

S002

CAUTION:
The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

Important: For your safety, use the lift tool to remove the tray from the rack.

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.

Procedure

Step 1. Rotate the front cam handles as shown in the illustration. The DWC tray moves out of the tray bay approximately 0.6 cm (0.25 inch).

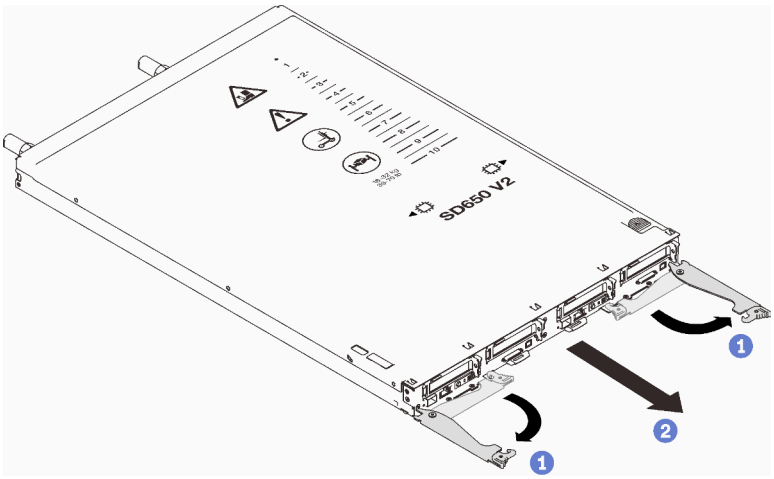


Figure 126. DWC tray removal

Attention:

- To maintain proper system cooling, do not operate the ThinkSystem DW612 Neptune® DWC Enclosure Type 7D1L without a DWC tray or tray bay filler installed in each tray bay.
- When you remove the DWC tray, note the tray bay number. Reinstalling a DWC tray into a different tray bay from the one it was removed from can have unintended consequences. Some configuration information and update options are established according to tray bay number. If you reinstall the DWC tray into a different tray bay, you might have to reconfigure the DWC tray.

Step 2. Pull the DWC tray out of the DW612 Enclosure until you see the warning icon in the right side of the cover; then, adjust hands and grip tray (~49lb) at sides to carefully pull out of enclosure.

Step 3. Once the DWC tray has been serviced, place the tray back into the original position as soon as possible.

After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

Watch the procedure on YouTube

Install a DWC tray in the enclosure

Use this information to install a DWC tray in the enclosure.

About this task

S002

CAUTION:

The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

Attention:

- Read the following sections to ensure that you work safely.
  - "Installation Guidelines" on page 51
  - "Safety inspection checklist" on page 52
- For your safety, use the lift tool to install the tray into the rack.

Procedure

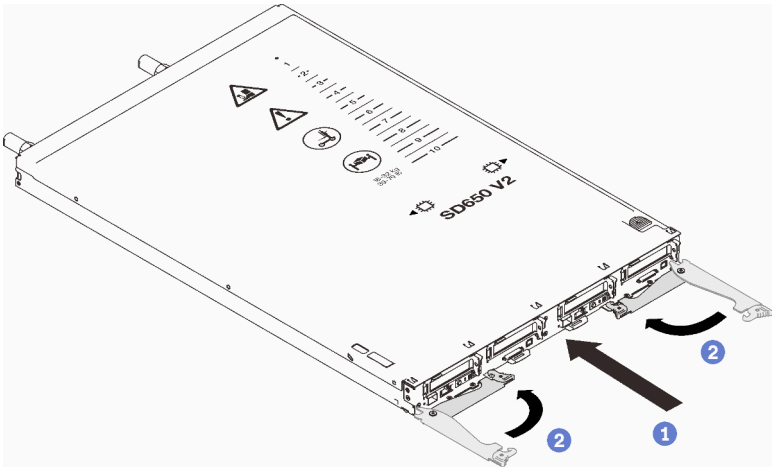


Figure 127. DWC tray installation

Step 1. Select the tray bay.

Attention:

- To maintain proper system cooling, do not operate the ThinkSystem DW612 Neptune® DWC Enclosure Type 7D1L without a DWC tray or tray bay filler installed in each tray bay.
- If you are reinstalling a DWC tray that you removed, you must install it in the same tray bay from which you removed it. Some DWC tray configuration information and update options are established according to tray bay number. Reinstalling a DWC tray into a different tray bay can have unintended consequences. If you reinstall the DWC tray into a different tray bay, you might have to reconfigure the DWC nodes in the tray.

Step 2. Make sure that the front cam handles on the DWC tray are in the open position.

Step 3. Insert the DWC tray into the tray bay until it stops.

Step 4. Rotate the front cam handles on the front of the DWC tray to the closed position to secure the tray in the enclosure.

Note: After the DWC tray is installed, the XCC in the DWC tray initializes. This process takes approximately 110 seconds. The power LED flashes rapidly, and the power button on the DWC tray does not respond until this process is complete.

Step 5. Connect all required external cables to the enclosure.

Note: Use extra forces to connect QSFP cables to the enclosure if Mellanox ConnectX-6 adapters are installed.

Step 6. Press the power buttons to turn on both nodes in the DWC tray.

Step 7. Make sure that the power LED on the node control panel is lit continuously, indicating that the each node is receiving power and is turned on.

Step 8. If you have other trays to install, do so now.

If this is the initial installation of the DWC tray in the enclosure, you must configure the DWC tray through the Setup utility and install the DWC tray operating system.

If you have changed the configuration of the DWC tray or if you are installing a different DWC tray from the one that you removed, you must configure the DWC tray through the Setup utility, and you might have to install the DWC tray operating system.

Demo video

Watch the procedure on YouTube

Tray cover replacement

Use the following procedures to remove and install the tray cover.

Remove the tray cover

Use this information to remove the tray cover.

About this task

S014

CAUTION:
Hazardous voltage, current, and energy levels might be present. Only a qualified service technician is authorized to remove the covers where the label is attached.

S033

CAUTION:
Hazardous energy present. Voltages with hazardous energy might cause heating when shorted with metal, which might result in spattered metal, burns, or both.

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52

- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.

Procedure

Step 1. Remove the tray out of the enclosure (see “Remove a DWC tray from the enclosure” on page 149).

Attention: For safety, use the lift tool to remove the tray from the rack.

Step 2. Press on the release latch and the push point at the same time and slide the cover toward the rear of the DWC tray.

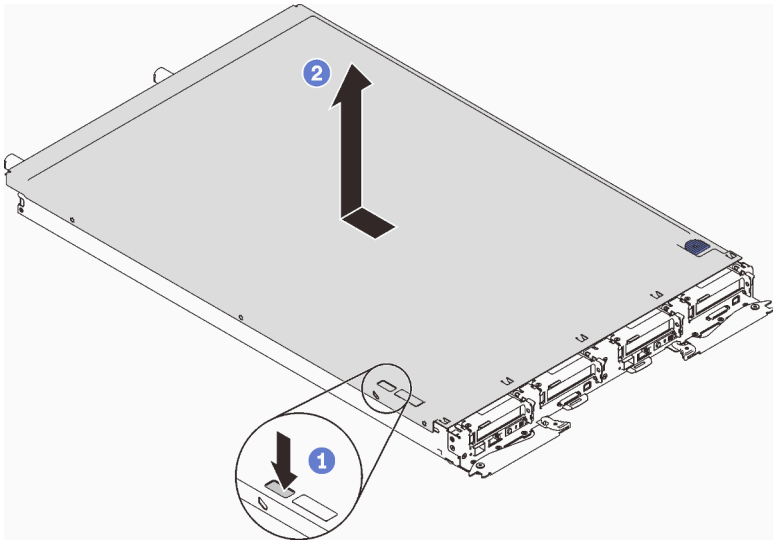


Figure 128. Tray cover removal

Step 3. Lift the cover off the DWC tray and set it aside.

Note: Service label instructions are located on the underside of each tray cover.

After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

Watch the procedure on YouTube

Install the tray cover

Use this information to install the tray cover.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52

Procedure

Step 1. Slide the node out of the enclosure (see “Remove a DWC tray from the enclosure” on page 149).

Step 2. Position the cover on top of the tray.

Step 3. Slide the cover toward the front of the tray.

Important: Before you slide the cover forward, make sure that all the tabs on the front, rear, and side of the cover engage the enclosure correctly. If all the tabs do not engage the enclosure correctly, it will be very difficult to remove the cover later.

Step 4. Make sure that the cover correctly engages all the insert tabs on the tray.

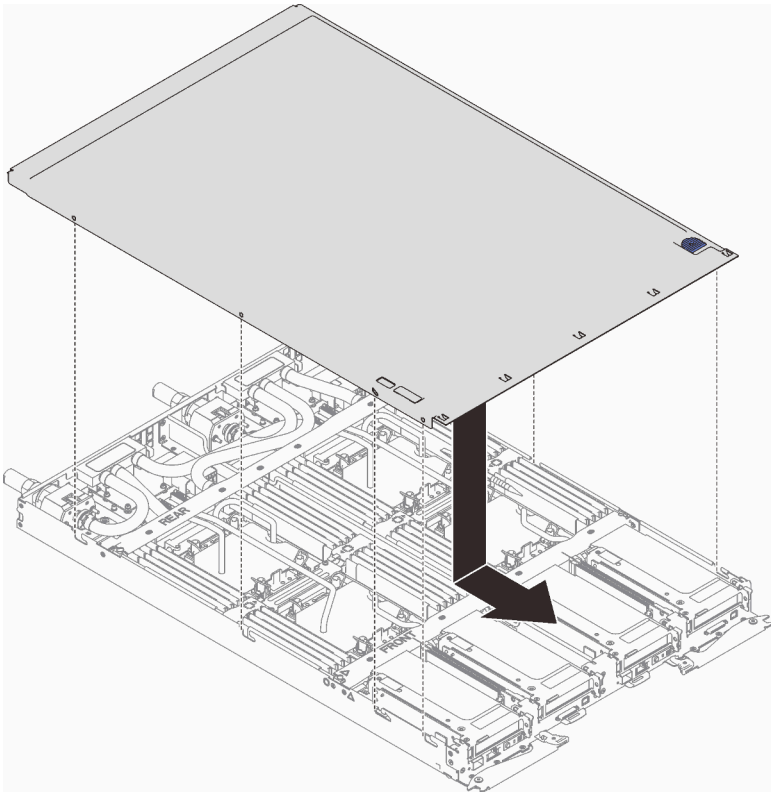


Figure 129. Tray cover installation

After you finish

1. Reinstall the tray into the enclosure (see “Install a DWC tray in the enclosure” on page 150).

   Note: For your safety, use the lift tool to install the tray into the rack.

2. Connect all required external cables to the enclosure.

   Note: Use extra forces to connect QSFP cables to the enclosure if Mellanox ConnectX-6 adapters are installed.

3. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

Watch the procedure on YouTube

Replace components in the compute node

Use the following information to remove and install compute node components.

CMOS battery (CR2032) replacement

Use the following procedures to remove and install the CMOS battery (CR2032).

Remove the CMOS battery

Use this information to remove the CMOS battery.

About this task

To avoid possible danger, read and follow the following safety statement.

- **S004**

CAUTION:
When replacing the lithium battery, use only Lenovo specified part number or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

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

Dispose of the battery as required by local ordinances or regulations.

- **S005**

CAUTION:
The battery is a lithium ion battery. To avoid possible explosion, do not burn the battery. Exchange it only with the approved part. Recycle or discard the battery as instructed by local regulations.

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52

- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.
- The following notes describe information that you must consider when replacing the battery.
  - Lenovo has designed this product with your safety in mind. The lithium battery must be handled correctly to avoid possible danger. If you replace the battery, you must adhere to the following instructions.
  - If you replace the original lithium battery with a heavy-metal battery or a battery with heavy-metal components, be aware of the following environmental consideration. Batteries and accumulators that contain heavy metals must not be disposed of with normal domestic waste. They will be taken back free of charge by the manufacturer, distributor, or representative, to be recycled or disposed of in a proper manner.
  - After you replace the battery, you must reconfigure the solution and reset the system date and time.

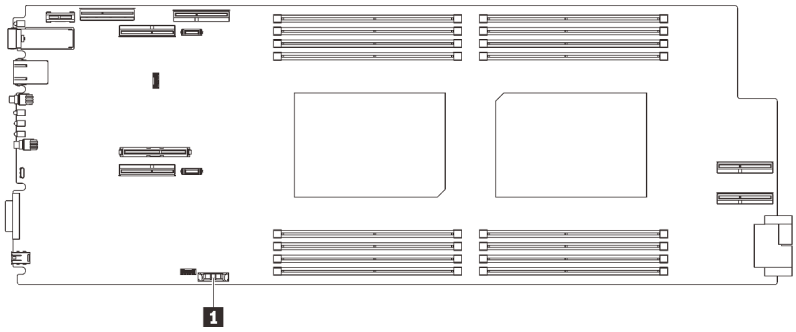


Figure 130. CMOS battery location

Table 31. CMOS battery location

1 CMOS battery	

Procedure

Step 1. Make preparations for this task.

a. Remove the tray (see “Remove a DWC tray from the enclosure” on page 149).

Attention: For safety, use the lift tool to remove the tray from the rack.

b. Remove the tray cover (see “Remove the tray cover” on page 152).

c. Remove the PCIe riser-cage assembly (see “Remove a PCIe riser assembly” on page 200).

Step 2. Remove the CMOS battery:

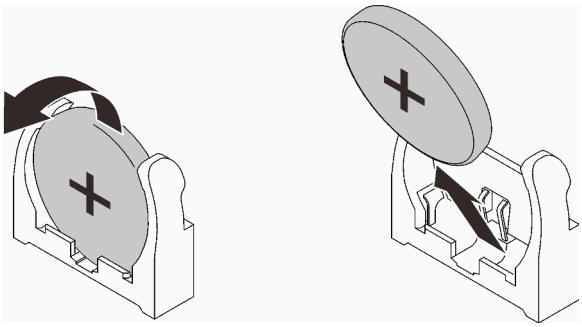


Figure 131. CMOS battery removal

a. Pivot the battery toward the middle of the compute node.
b. Lift the battery from the socket.

   Attention: Do not lift the battery by using excessive force. Failing to remove the battery properly may damage the socket on the system board. Any damage to the socket may require replacing the system board.

Step 3. Dispose of the CMOS battery as required by local ordinances or regulations.

After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

Watch the procedure on YouTube

Install the CMOS battery (CR2032)

Use this information to install the CMOS battery.

About this task

To avoid possible danger, read and follow the following safety statement.

- **S004**

CAUTION:
When replacing the lithium battery, use only Lenovo specified part number or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

Do not:

- **Throw or immerse into water**
- **Heat to more than 100°C (212°F)**

– **Repair or disassemble**

Dispose of the battery as required by local ordinances or regulations.

- **S005**

CAUTION:
The battery is a lithium ion battery. To avoid possible explosion, do not burn the battery. Exchange it only with the approved part. Recycle or discard the battery as instructed by local regulations.

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- The following notes describe information that you must consider when replacing the system battery in the node.
  - When replacing the system battery, you must replace it with a lithium battery of the same type from the same manufacturer.
  - After you replace the system-board battery, you must reconfigure the node and reset the system date and time.
  - To avoid possible danger, read and follow the following safety statement.

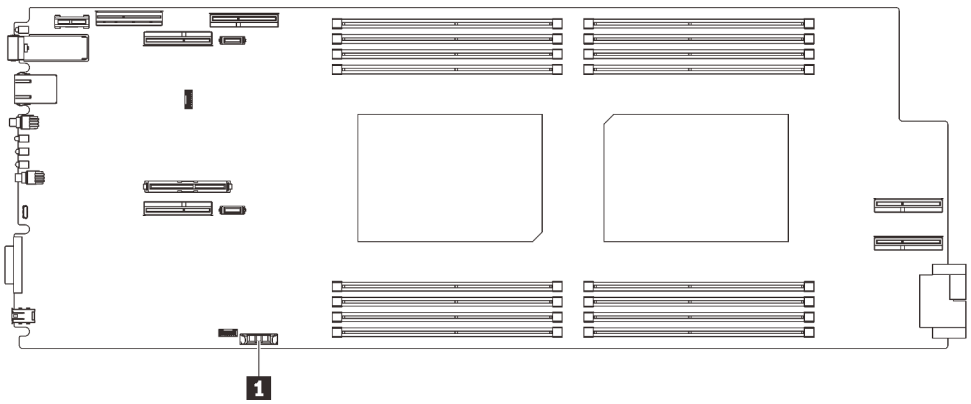


Figure 132. CMOS battery location

Table 32. CMOS battery location

1 CMOS battery	

Procedure

Step 1. Follow any special handling and installation instructions that come with the CMOS battery.

Step 2. Insert the new CMOS battery:

a. Face the positive (+) symbol to the center of the node; then, place the battery into the seat until it clicks in place.

b. As you slide the CMOS battery into place, press the top of the CMOS battery into the socket. Make sure that the battery clip holds the battery securely.

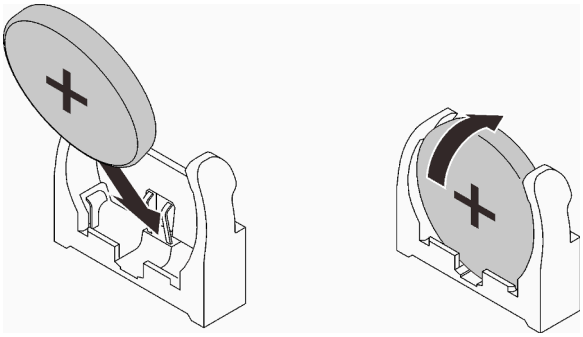


Figure 133. CMOS battery installation

After you finish

1. Reinstall the PCIe riser-cage assembly (see “Install a PCIe riser assembly” on page 206).
2. Reinstall the tray cover (see “Install the tray cover” on page 153).
3. Reinstall the tray (see “Install a DWC tray in the enclosure” on page 150).

   Note: For safety, use the lift tool to install the tray into the rack.
4. Connect all required external cables to the enclosure.

   Note: Use extra forces to connect QSFP cables to the enclosure if Mellanox ConnectX-6 adapters are installed.
5. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

Watch the procedure on YouTube

DIMM replacement

Use the following procedures to remove and install a DIMM.

Remove a memory module

Use this information to remove a memory module.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.

- Memory modules are sensitive to static discharge and require special handling. In addition to the standard guidelines for "Handling static-sensitive devices" on page 54:
  - Always wear an electrostatic-discharge strap when removing or installing memory modules. Electrostatic-discharge gloves can also be used.
  - Never hold two or more memory modules together so that they touch. Do not stack memory modules directly on top of each other during storage.
  - Never touch the gold memory module connector contacts or allow these contacts to touch the outside of the memory-module connector housing.
  - Handle memory modules with care: never bend, twist, or drop a memory module.

Procedure

Step 1. Make preparations for this task.

a. Remove the tray (see "Remove a DWC tray from the enclosure" on page 149).

Attention: For safety, use the lift tool to remove the tray from the rack.

b. Remove the tray cover (see "Remove the tray cover" on page 152).

c. You can find the memory module tool attached to the DIMM comb.

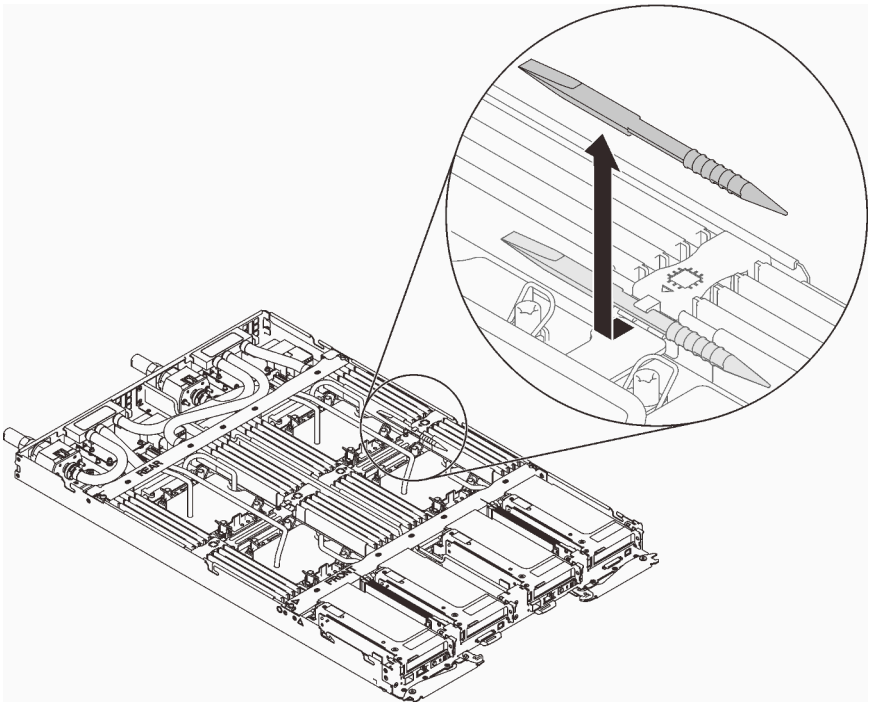


Figure 134. Memory module tool

Step 2. Carefully use the memory module tool to press the retaining clips outward on each end of the memory module connector.

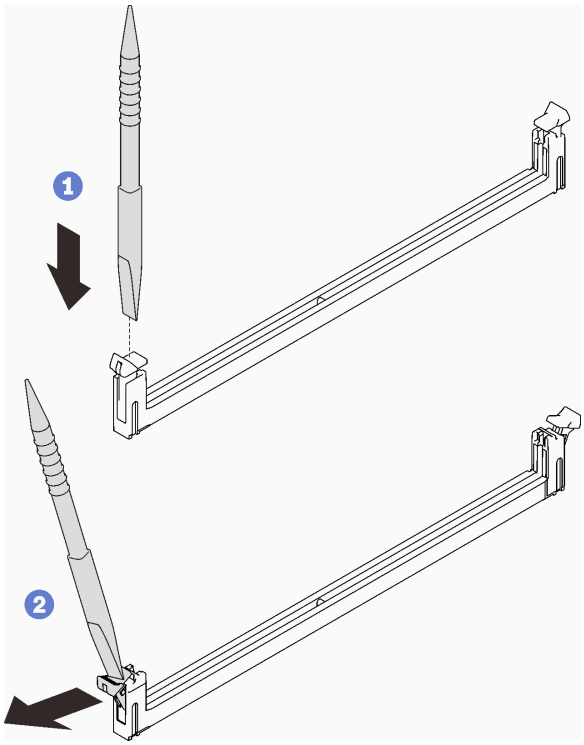


Figure 135. Memory module removal

Attention: To avoid breaking the retaining clips or damaging the memory module connectors, open and close the clips gently.

Step 3. Carefully remove the memory module.

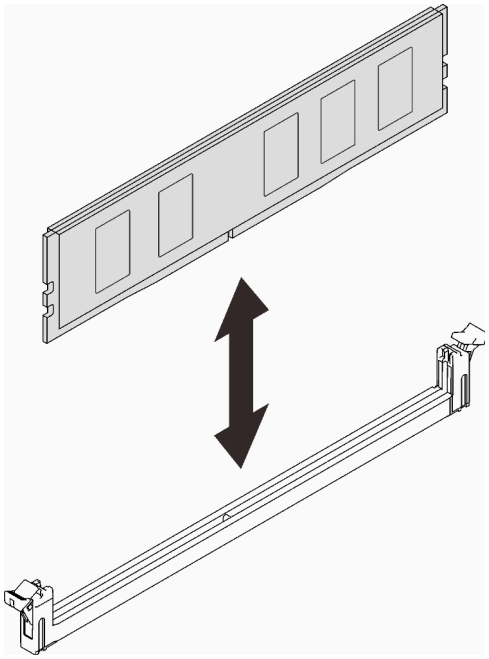


Figure 136. Memory module removal

After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

Watch the procedure on YouTube

Install a memory module

Use this information to install a memory module.

About this task

See “Memory module installation order” in *Setup Guide* for detailed information about memory configuration and setup.

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Memory modules are sensitive to static discharge and require special handling. In addition to the standard guidelines for “Handling static-sensitive devices” on page 54:
  - Always wear an electrostatic-discharge strap when removing or installing memory modules. Electrostatic-discharge gloves can also be used.
  - Never hold two or more memory modules together so that they touch. Do not stack memory modules directly on top of each other during storage.
  - Never touch the gold memory module connector contacts or allow these contacts to touch the outside of the memory-module connector housing.
  - Handle memory modules with care: never bend, twist, or drop a memory module.
  - Do not use any metal tools (such as jigs or clamps) to handle the memory modules, because the rigid metals may damage the memory modules.
  - Do not insert memory modules while holding packages or passive components, which can cause package cracks or detachment of passive components by the high insertion force.
  - DIMM fillers must be installed in unused slots for proper cooling.

The following illustration shows the location of the memory module connectors on the system board.

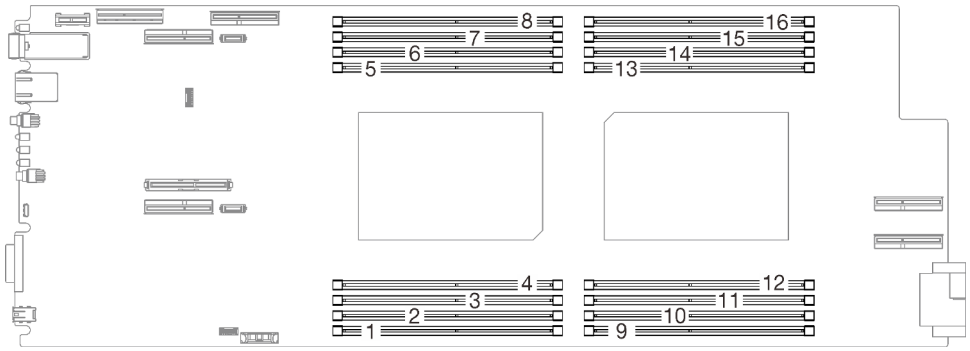


Figure 137. The location of the memory module connectors on the system board

You can find the memory module tool attached to the DIMM comb.

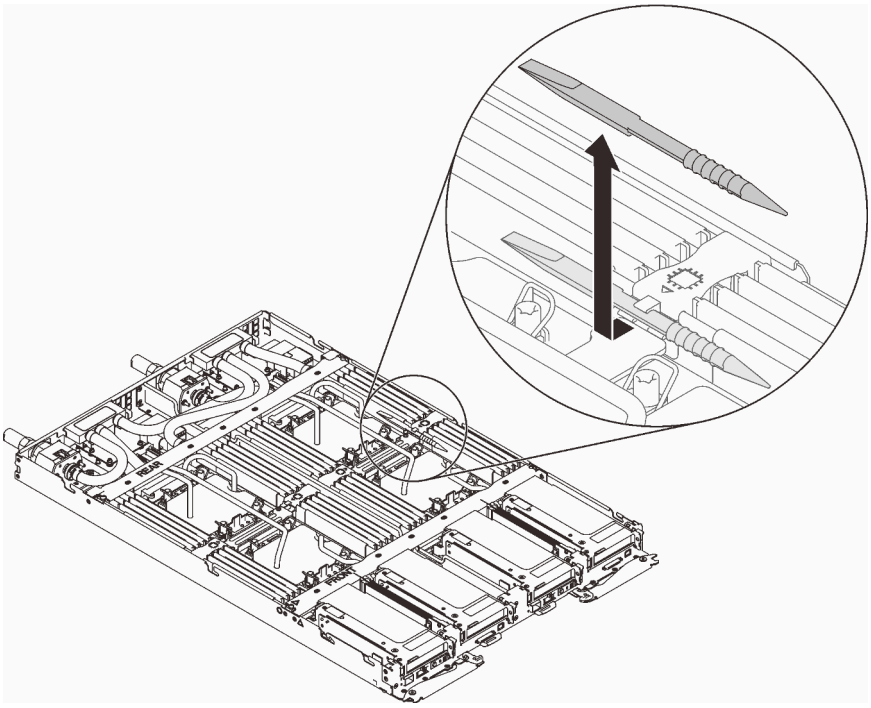


Figure 138. Memory module tool

Procedure

Step 1. Carefully use the memory module tool to press down the retaining clips on each end of the memory module connector.

Note: Memory module tool is recommended due to space limitations caused by location of water loop tubes through the memory section.

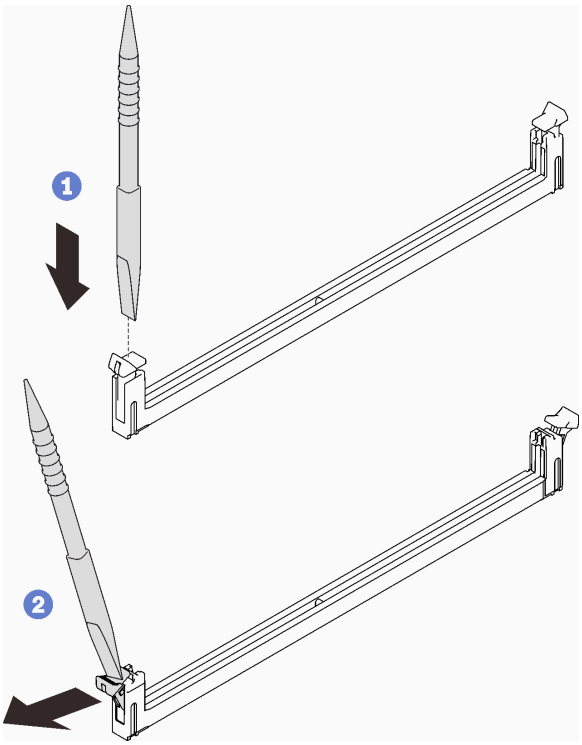


Figure 139. Memory module removal

Attention:

- Memory modules are static-sensitive devices. The package must be grounded before it is opened.
- To avoid breaking the retaining clips or damaging the memory module connectors, open and close the clips gently.

Step 2. Touch the static-protective package that contains the memory module to any unpainted metal surface on the outside of the node. Then, remove the memory module from the package.

Step 3. Align the memory module with the slot, and gently place the memory module on the slot with both hands.

Step 4. Firmly press both ends of the memory module straight down into the slot until the retaining clips snap into the locked position.

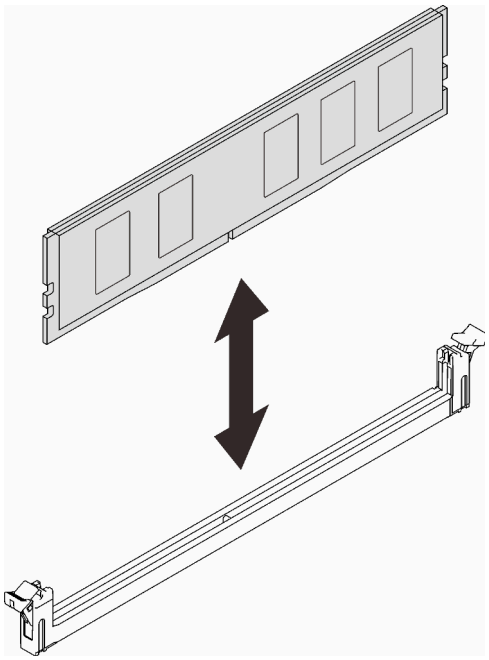


Figure 140. memory module installation

Note: If there is a gap between the memory module and the retaining clips, the memory module has not been correctly inserted; open the retaining clips, remove the memory module, and then reinsert it.

After you finish

1. Reinstall the memory module tool.

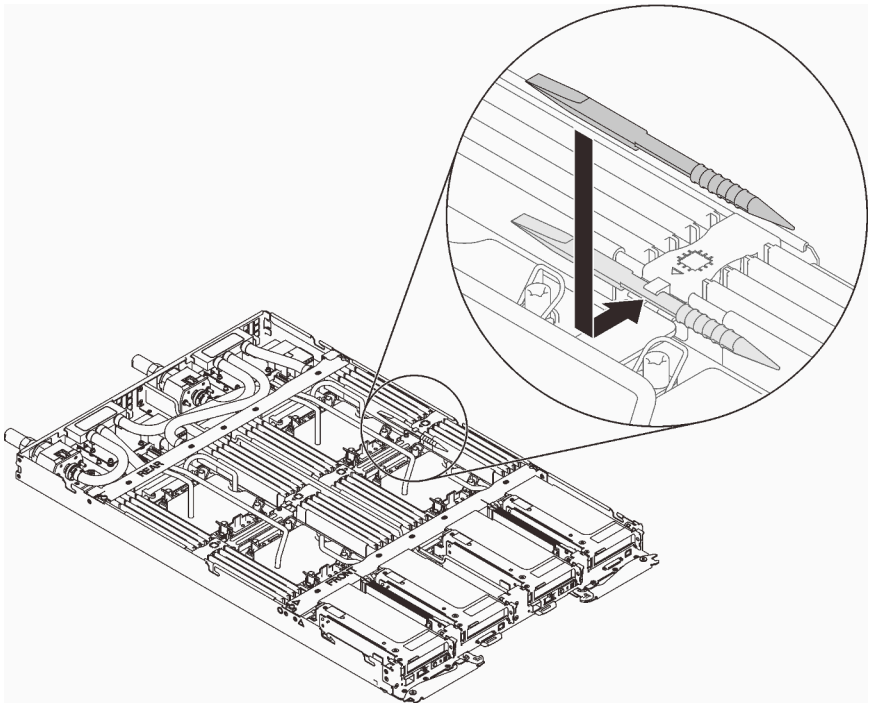


Figure 141. Memory module tool

2. Reinstall the tray cover (see “Install the tray cover” on page 153).
3. Reinstall the tray (see “Install a DWC tray in the enclosure” on page 150).

   Note: For safety, use the lift tool to install the tray into the rack.
4. Connect all required external cables to the enclosure.

   Note: Use extra forces to connect QSFP cables to the enclosure if Mellanox ConnectX-6 adapters are installed.
5. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

Watch the procedure on YouTube

DIMM comb replacement

Use the following procedures to remove and install a DIMM comb.

Remove a DIMM comb

Use this information to remove a DIMM comb.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.

Procedure

Step 1. Make preparations for this task.

a. Remove the tray (see “Remove a DWC tray from the enclosure” on page 149).

   Attention: For safety, use the lift tool to remove the tray from the rack.

b. Remove the tray cover (see “Remove the tray cover” on page 152).

Step 2. Gently hold the DIMM comb and removal it out of the chassis.

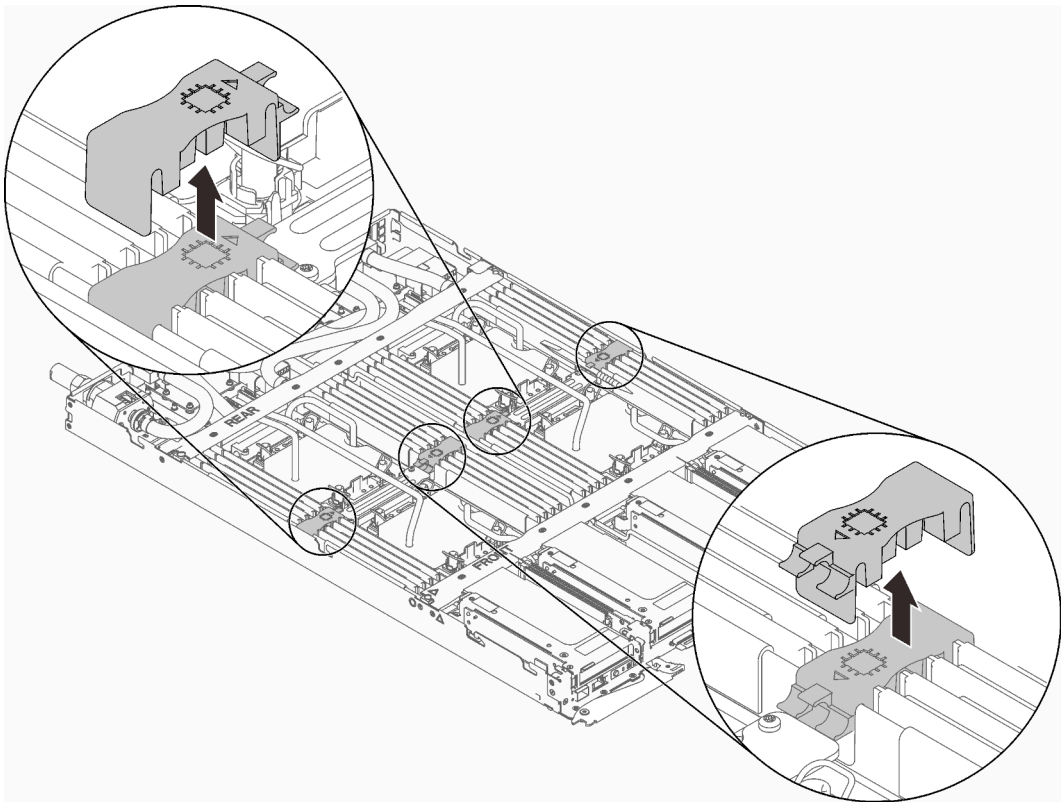


Figure 142. DIMM comb removal

After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

Watch the procedure on YouTube

Install a DIMM comb

Use this information to install a DIMM comb.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52

Procedure

Step 1. Align the DIMM comb with the slots and insert it into the chassis.

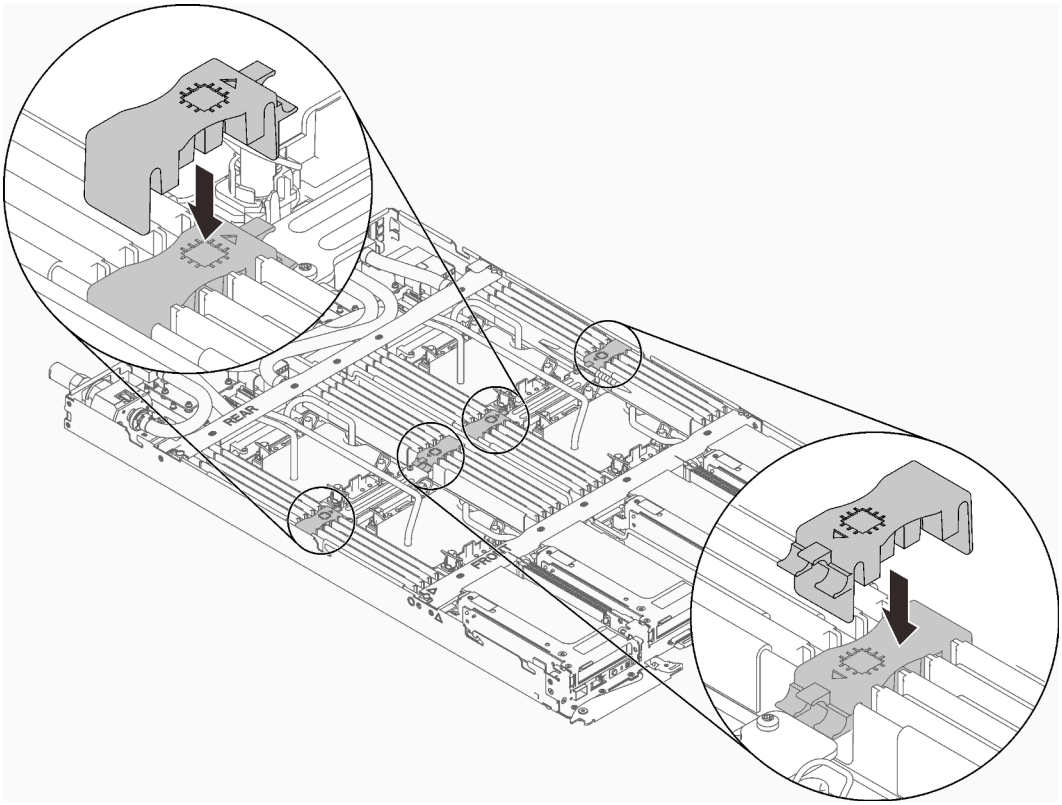


Figure 143. DIMM comb installation

After you finish

1. Reinstall the tray cover (see “Install the tray cover” on page 153).
2. Reinstall the tray (see “Install a DWC tray in the enclosure” on page 150).

   Note: For safety, use the lift tool to install the tray into the rack.
3. Connect all required external cables to the enclosure.

   Note: Use extra forces to connect QSFP cables to the enclosure if Mellanox ConnectX-6 adapters are installed.
4. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

Watch the procedure on YouTube

Drive (in a compute node) replacement

Use the following procedures to remove and install a drive in a compute node.

Remove a drive from a compute node

Use this information to remove a drive from a compute node.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.

Procedure

Step 1. Make preparations for this task.

a. Remove the tray (see “Remove a DWC tray from the enclosure” on page 149).

Attention: For safety, use the lift tool to remove the tray from the rack.

b. Remove the tray cover (see “Remove the tray cover” on page 152).

c. Remove the drive cage (see “Remove a drive cage assembly” on page 173).

Step 2. There are different procedures for removing one and two drives, follow the steps according to your configuration.

For removing one drive only, complete the following steps.

1. Remove the drive.
   a. ❶ Pull the release latch.
   b. ❷ Slide the drive out of the drive cage.
   c. ❸ Disconnect the cable connector.

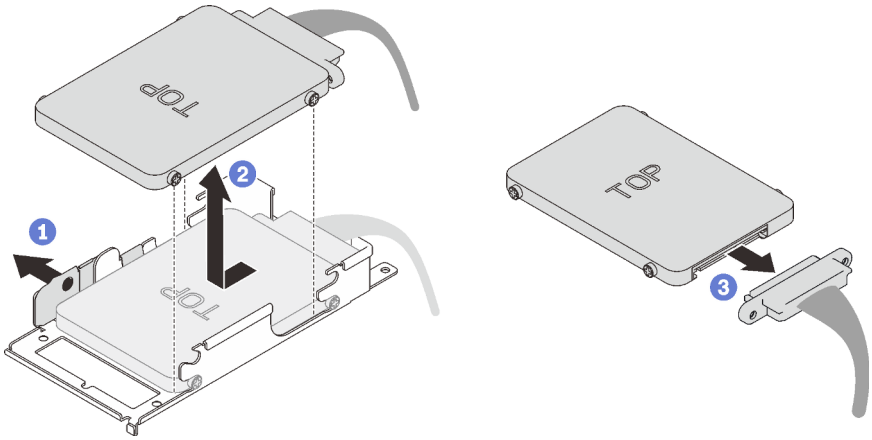


Figure 144. Drive removal

For removing two drives, complete the following steps.

1. Remove the upper drive.
   a. ❶ Remove the two screws.
   b. ❷ Pull the release latch.
   c. ❸ Slide the drive out of the drive cage.

d. ❹ Remove the four screws; then, remove the conduction plate.

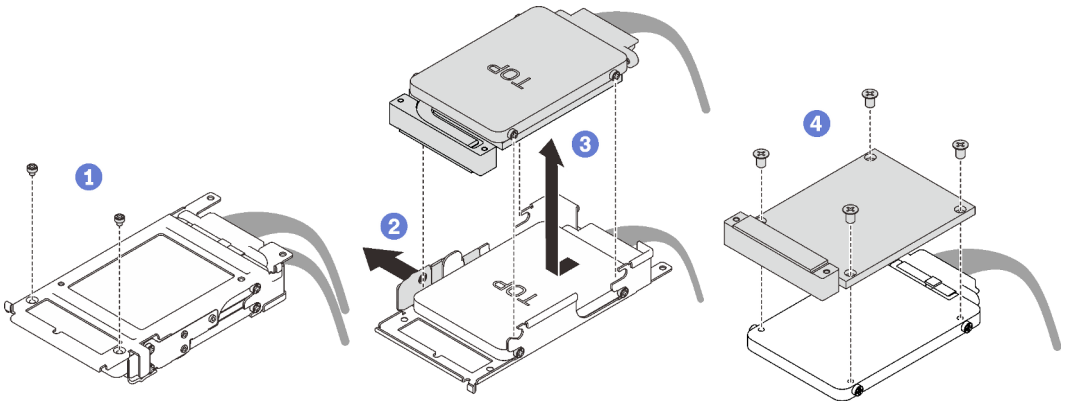


Figure 145. Upper drive removal

2. Remove the lower drive.
   a. ❶ Pull the release latch.
   b. ❷ Slide the drive out of the drive cage.
   c. ❸ Disconnect the cable connector.

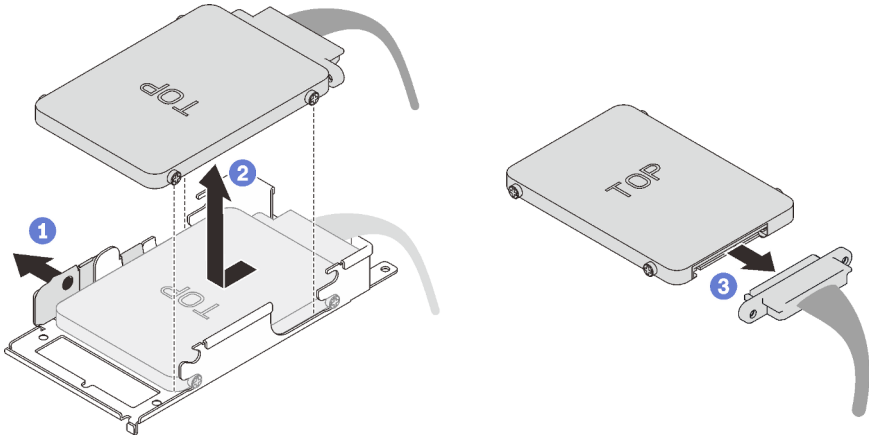


Figure 146. Lower drive removal

After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

Watch the procedure on YouTube

Install a drive in a compute node

Use this information to install a drive in a compute node.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52

Note: Ensure you have “SD650 V2 or SD650-N V2 Neptune® DWC Waterloop Service Kit “ in hand to install components.

Procedure

Step 1. **For installing one drive only, complete the following steps.**

1. Connect the cable to the drive; then, slide the drive into drive cage and make sure the drive is inserted into the place.

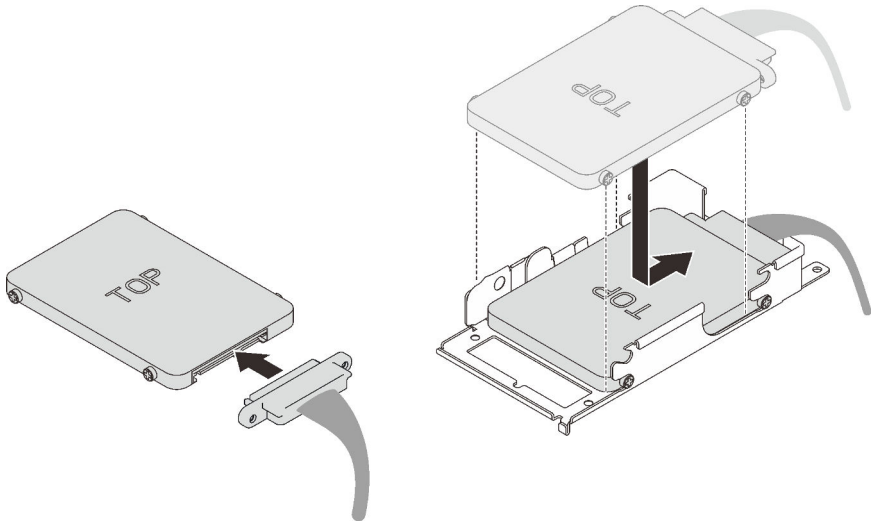


Figure 147. Drive installation

Step 2. **For installing two drives, complete the following steps.**

1. Install the lower drive.
   a. Connect the cable to the drive.
   b. Slide the lower drive into drive cage and make sure the lower drive is inserted into the place.

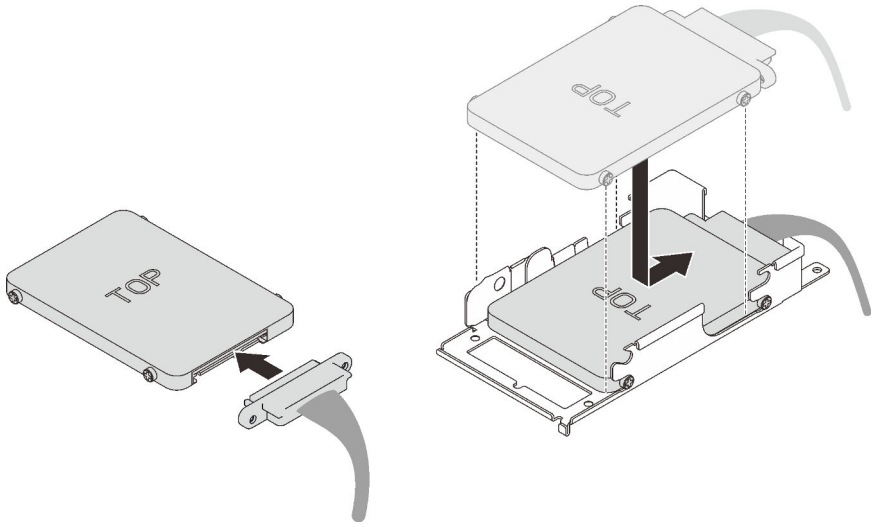


Figure 148. Lower drive installation

2. Install the upper drive.
   a. ❶ Align the conduction plate with the rear side of the upper drive; then, fasten the four screws.
   b. ❷ Slide the upper drive into drive cage and make sure the upper drive is inserted into the place.
   c. ❸ Flip over the drive assembly cage and fasten the two screws.

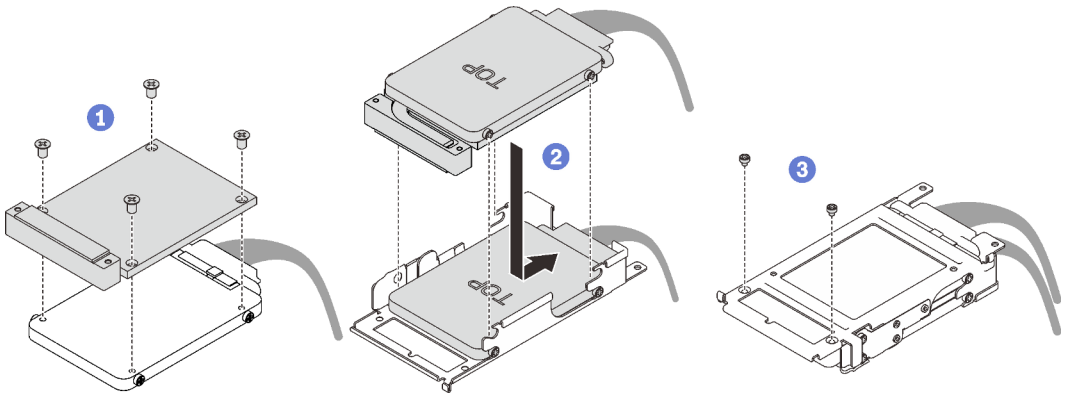


Figure 149. Upper drive installation

After you finish

1. Reinstall the drive cage (see “Install a drive cage assembly” on page 175).
2. Reinstall the tray cover (see “Install the tray cover” on page 153).
3. Reinstall the tray (see “Install a DWC tray in the enclosure” on page 150).

   Note: For safety, use the lift tool to install the tray into the rack.
4. Connect all required external cables to the enclosure.

   Note: Use extra forces to connect QSFP cables to the enclosure if Mellanox ConnectX-6 adapters are installed.

5. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

Watch the procedure on YouTube

Drive cage assembly replacement

Use the following procedures to remove and install a drive cage assembly.

Remove a drive cage assembly

Use this information to remove a drive cage assembly.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.

Procedure

Step 1. Make preparations for this task.

a. Remove the tray (see “Remove a DWC tray from the enclosure” on page 149).

Attention: For safety, use the lift tool to remove the tray from the rack.

b. Remove the tray cover (see “Remove the tray cover” on page 152).

Step 2. Disconnect the drive cable.

Step 3. Remove the 3 screws and remove the drive assembly out of the node.

- One-drive cage assembly

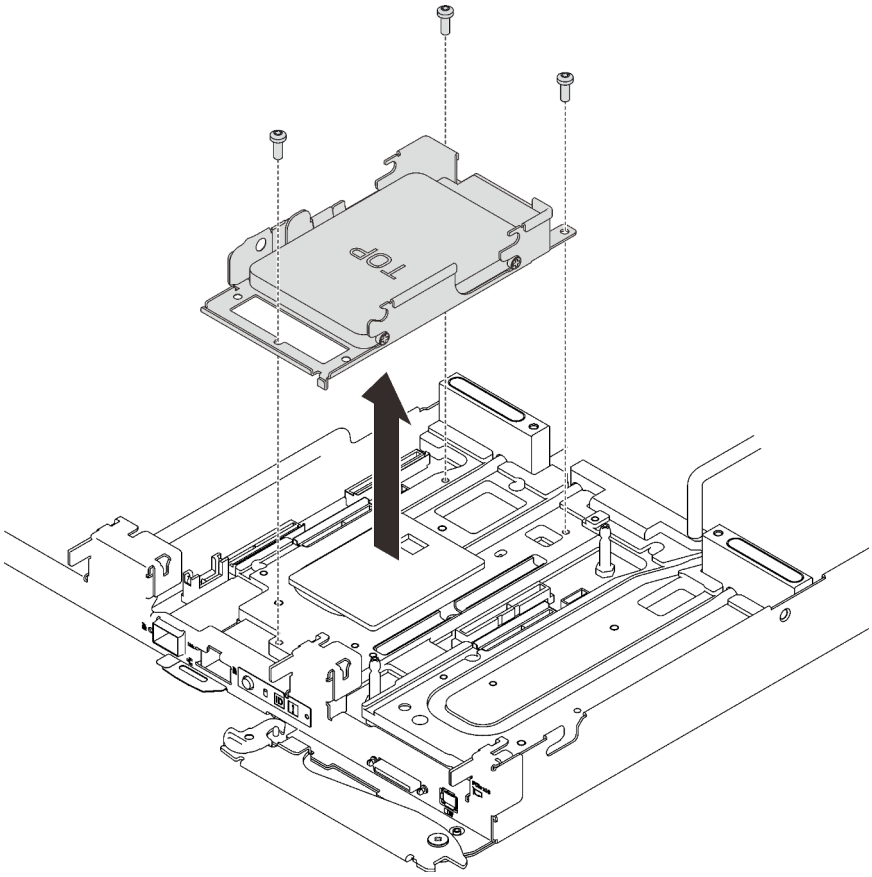


Figure 150. One-drive cage assembly removal

- Two-drive cage assembly

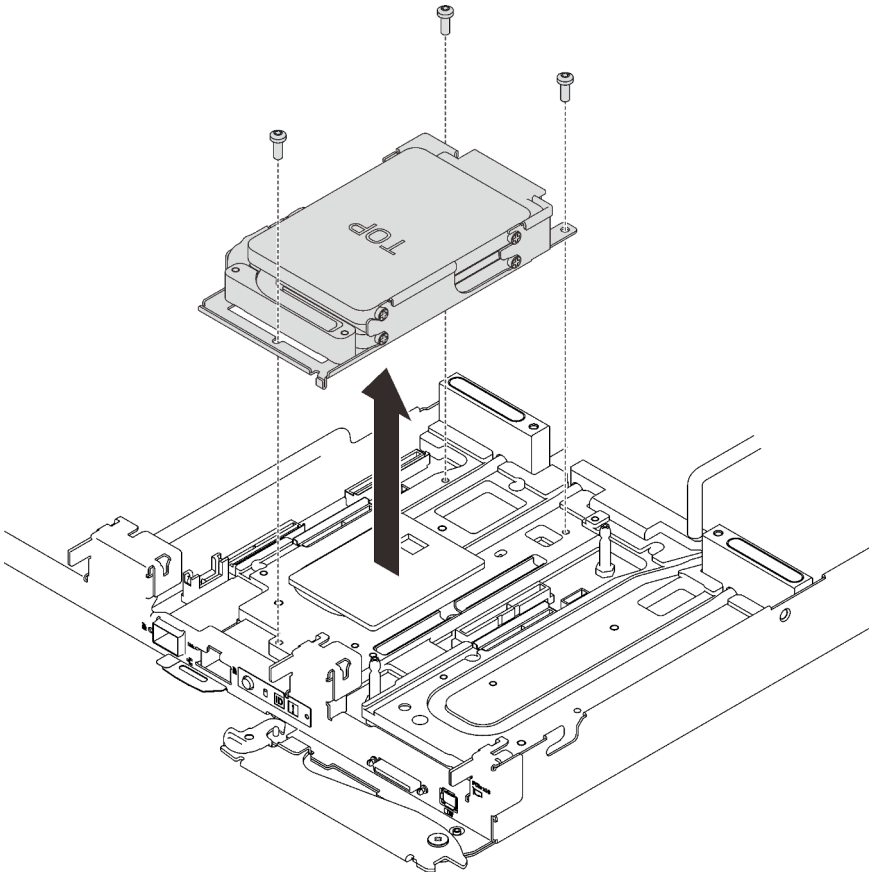


Figure 151. Two-drive cage assembly removal

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

Watch the procedure on YouTube

Install a drive cage assembly

Use this information to install a drive cage assembly.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Ensure the drives are installed correctly into the drive cage assembly (see “Install a drive in a compute node” on page 170).

Notes:

- Ensure you have “SD650 V2 or SD650-N V2 Neptune® DWC Waterloop Service Kit “ in hand to install components.

Procedure

Step 1. Remove the blank bezel fillers if they are installed.

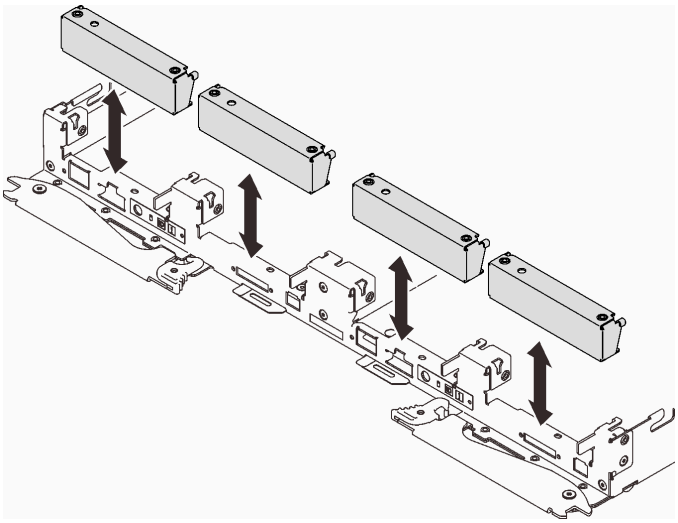


Figure 152. Blank bezel filler removal

Step 2. Connect the cable connector to the system board and route the cable as the following illustration.

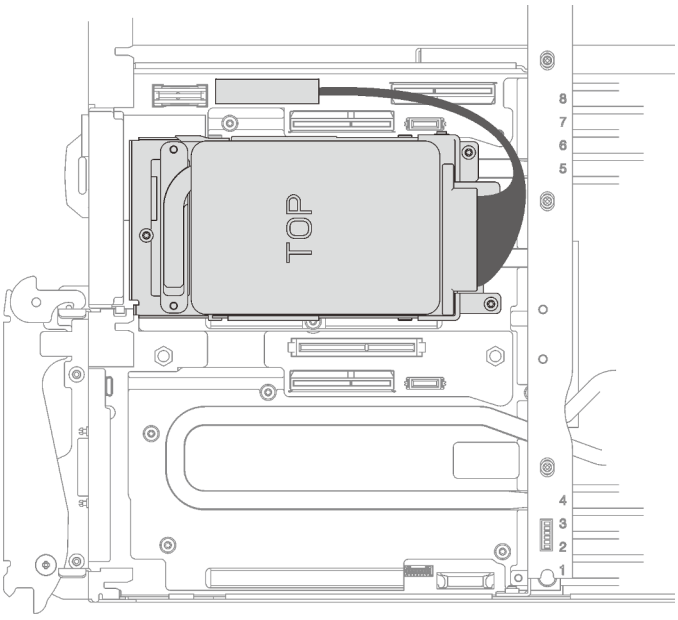


Figure 153. Drive assembly installation

Step 3. If the gap pad located on the reverse side of the drive cage is damaged or missing, replace it with the new one.

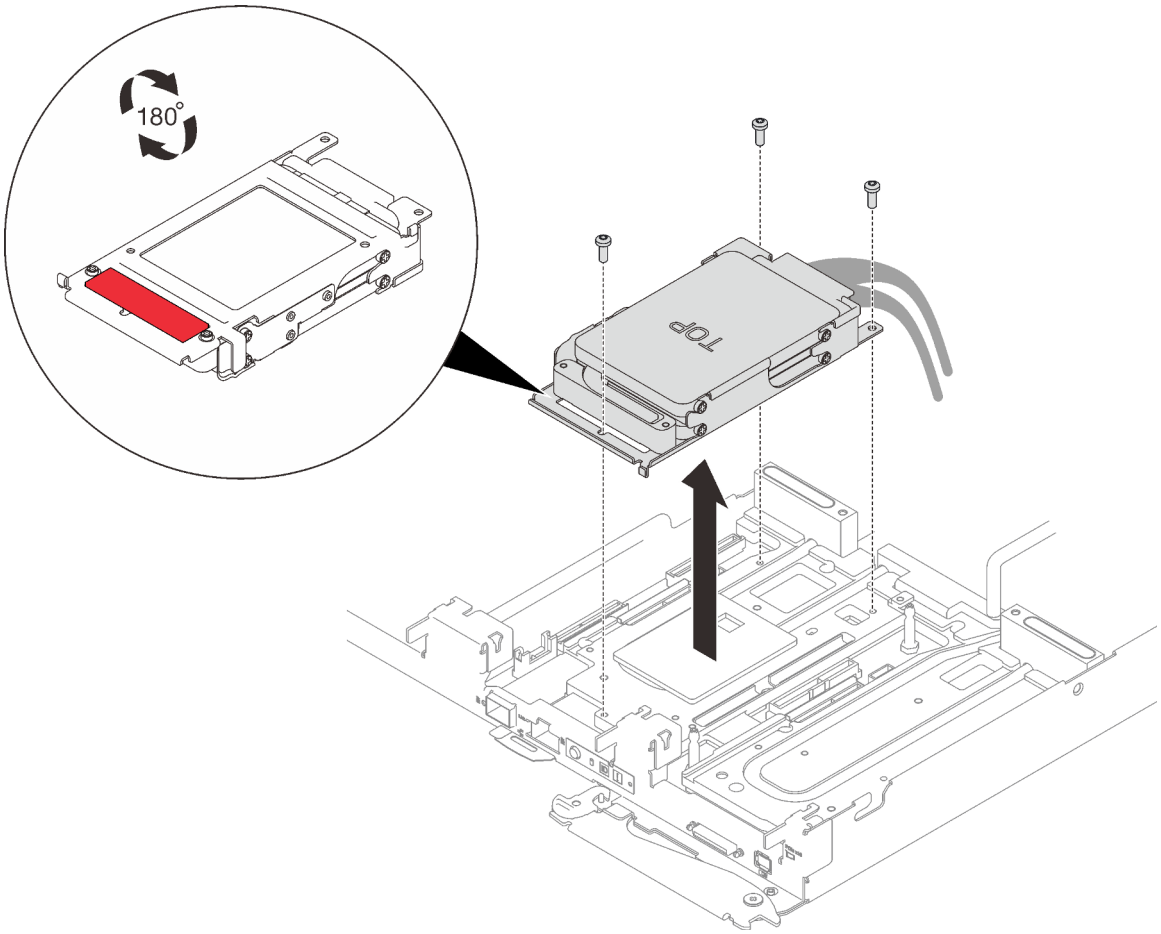


Figure 154. Gap pad

Step 4. Install the drive cage assembly and fasten the three screws.

- One-drive cage assembly

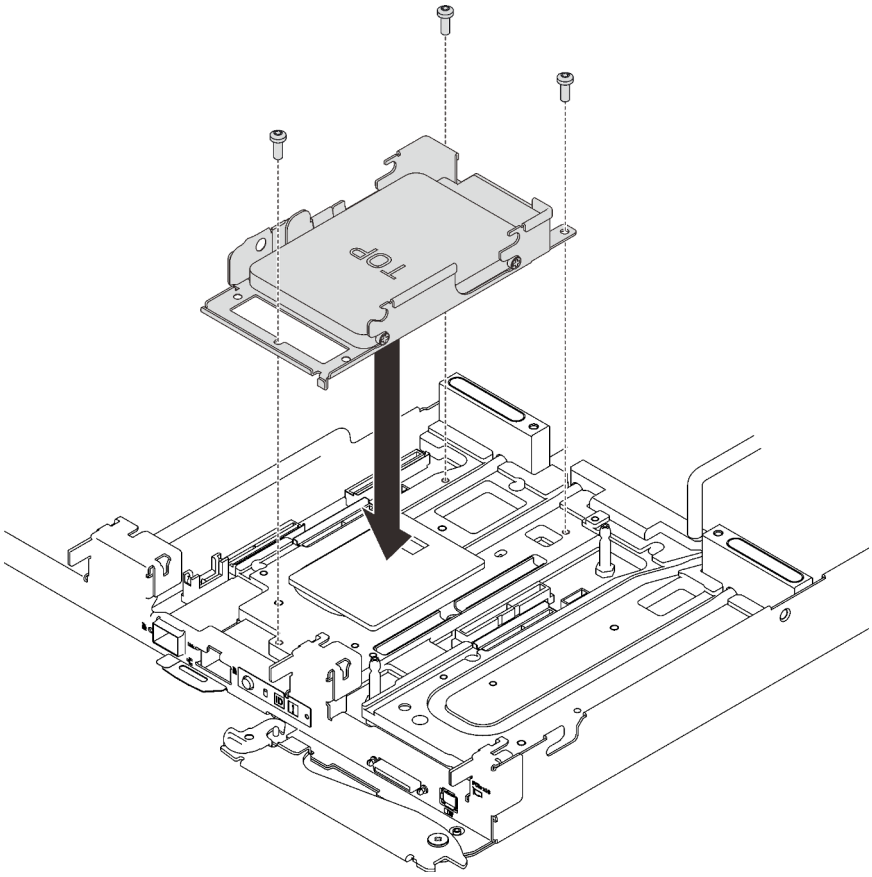


Figure 155. One-drive cage assembly installation

- Two-drive cage assembly

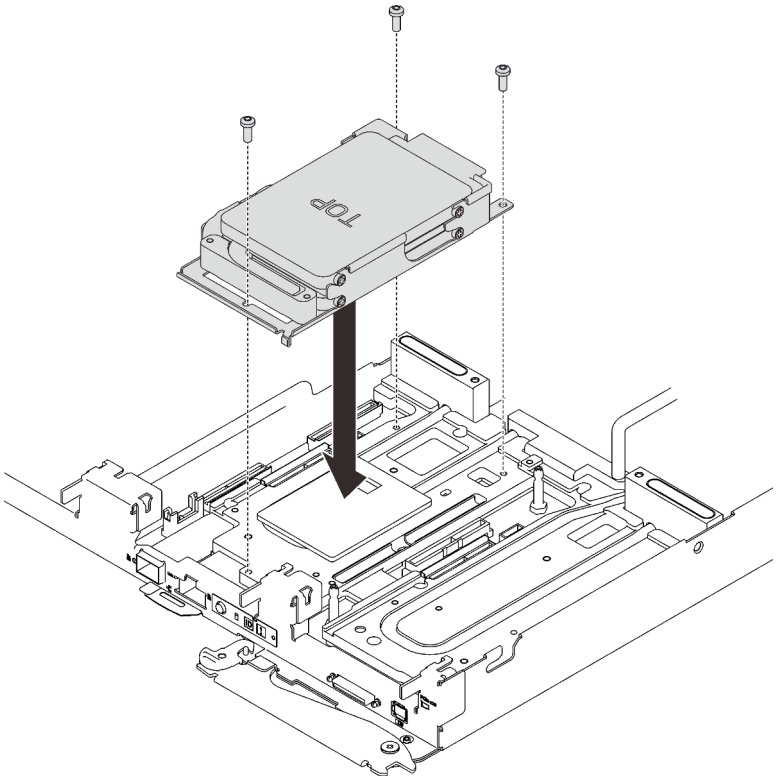


Figure 156. Two-drive cage assembly installation

After you finish

1. Reinstall the tray cover (see “Install the tray cover” on page 153).
2. Reinstall the tray (see “Install a DWC tray in the enclosure” on page 150).

   Note: For safety, use the lift tool to install the tray into the rack.
3. Connect all required external cables to the enclosure.

   Note: Use extra forces to connect QSFP cables to the enclosure if Mellanox ConnectX-6 adapters are installed.
4. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

Watch the procedure on YouTube

External LCD diagnostics handset replacement

Follow instructions in this section to remove or install the external LCD diagnostics handset.

Remove the external LCD diagnostics handset

Use this information to remove the external LCD diagnostics handset.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).

Procedure

Step 1. Disconnect the external LCD diagnostics handset cable.

a. ❶ Press the plastic clip on the plug forward.

b. ❷ Hold the clip and remove the cable from the connector.

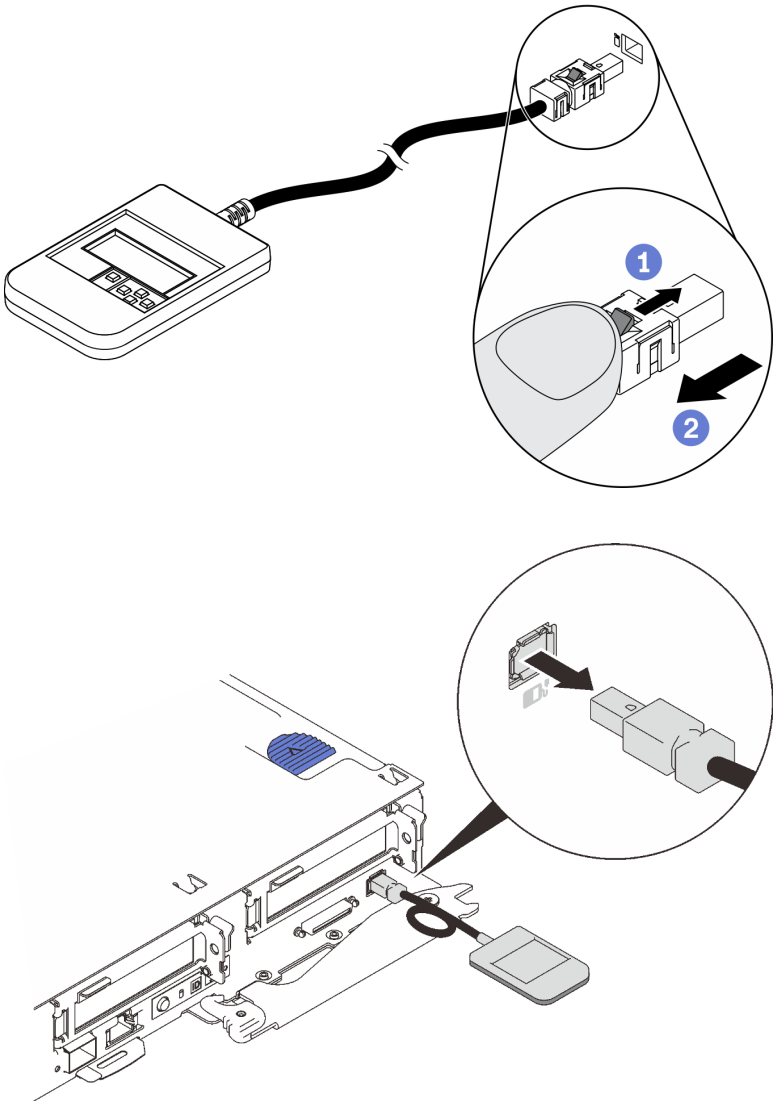


Figure 157. Disconnecting the external LCD diagnostics handset cable

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Install the external LCD diagnostics handset

Use this information to install the external LCD diagnostics handset.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52

Procedure

Step 1. Align the connector on the cable with that on the server, and push it in.

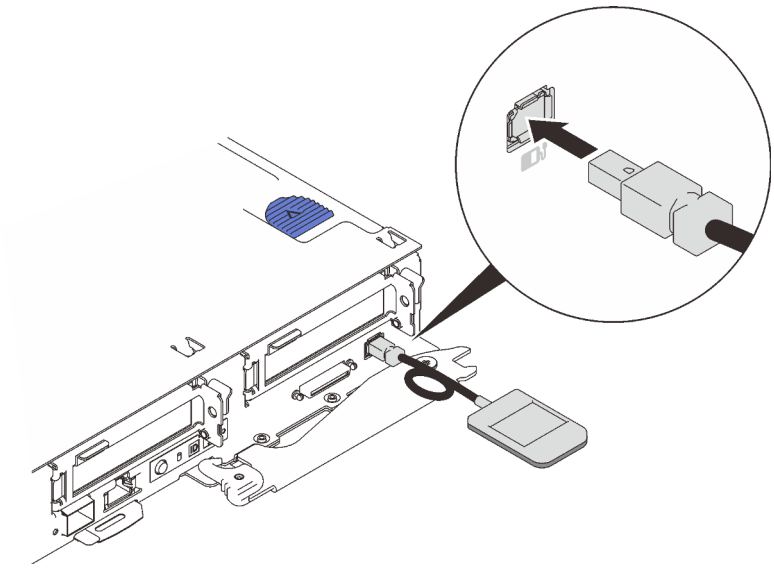


Figure 158. Connecting the external LCD diagnostics handset cable

Step 2. Attach the external LCD diagnostics handset to a metal surface with the magnetic bottom.

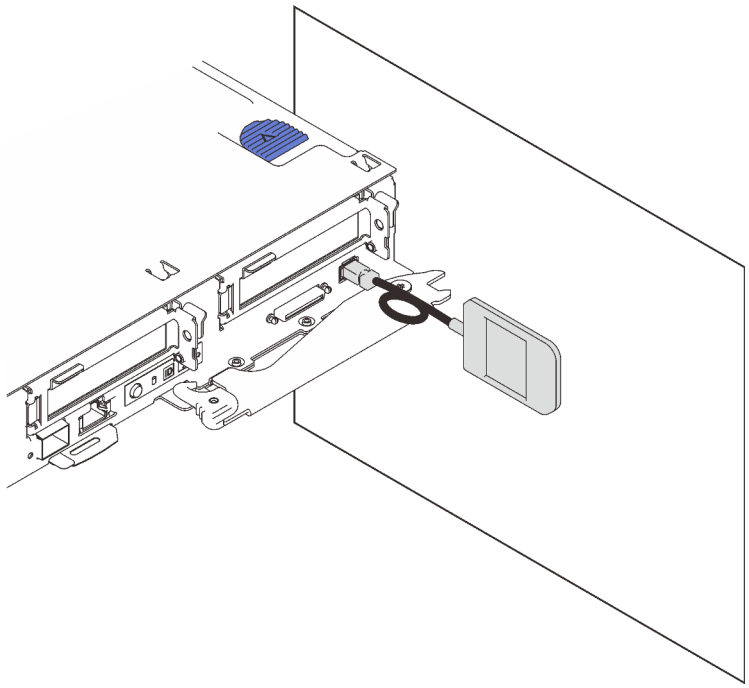


Figure 159. Attaching the external LCD diagnostics handset to a metal surface

After you finish

1. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

M.2 backplane replacement

Use the following procedures to remove and install the M.2 backplane.

Remove the M.2 backplane

Use this information to remove the M.2 backplane.

About this task

S001

DANGER

Electrical current from power, telephone, and communication cables is hazardous.
To avoid a shock hazard:

- **Connect all power cords to a properly wired and grounded electrical outlet/source.**
- **Connect any equipment that will be attached to this product to properly wired outlets/sources.**
- **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.**
- **The device might have more than one power cord, to remove all electrical current from the device, ensure that all power cords are disconnected from the power source.**

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.

Procedure

Step 1. Make preparations for this task.

a. Remove the tray (see “Remove a DWC tray from the enclosure” on page 149).

Attention: For safety, use the lift tool to remove the tray from the rack.

b. Remove the tray cover (see “Remove the tray cover” on page 152).

Step 2. Remove the M.2 backplane from the system board by pulling up on both ends of the backplane at the same time.

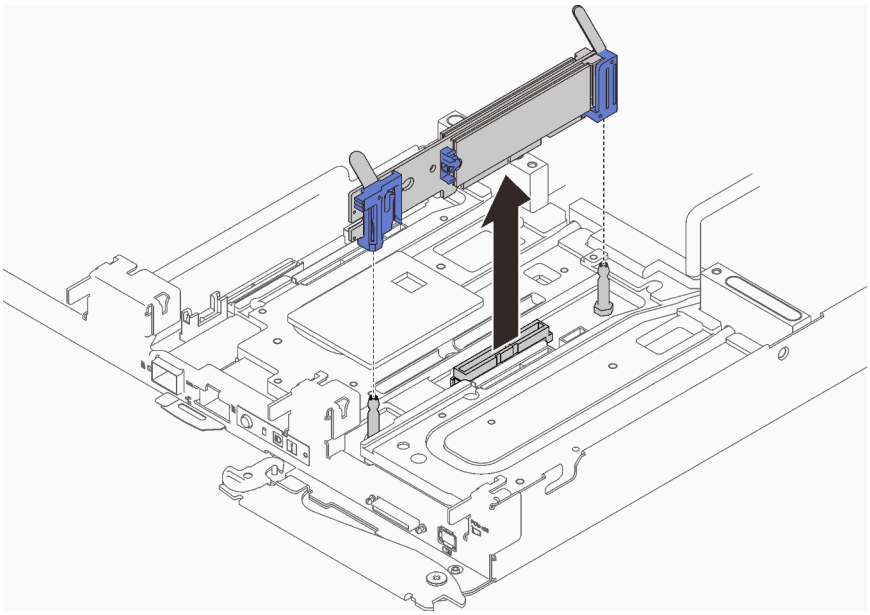


Figure 160. M.2 backplane removal

After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Attention: You can only disassemble the M.2 backplane for recycle. Do not disassemble it for any other purposes.

1. ❶ Carefully slide the retainer out of the slot.
2. ❷ Remove the four screws.
3. ❸ Remove the two retainers and the two mylars.

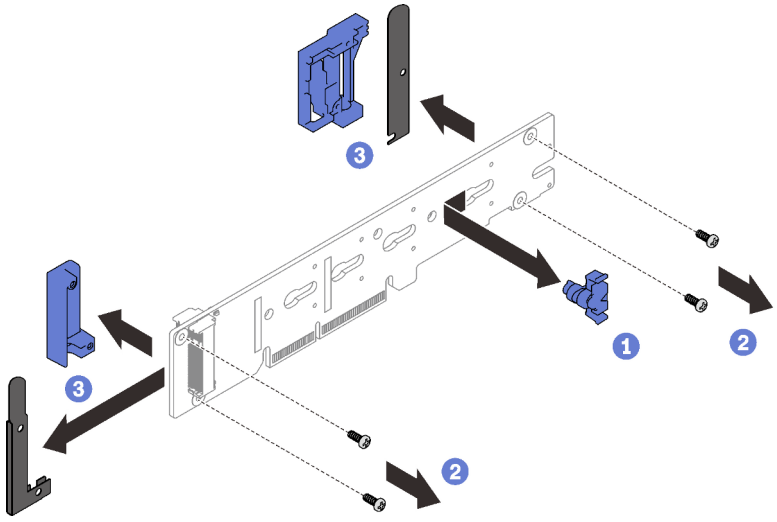


Figure 161. Disassembling M.2 backplane

4. Recycle the unit in compliance with local regulations.

Demo video

Watch the procedure on YouTube

Install the M.2 backplane

Use this information to install the M.2 backplane.

About this task

S001

DANGER

Electrical current from power, telephone, and communication cables is hazardous.
To avoid a shock hazard:

- **Connect all power cords to a properly wired and grounded electrical outlet/source.**
- **Connect any equipment that will be attached to this product to properly wired outlets/sources.**
- **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.**
- **The device might have more than one power cord, to remove all electrical current from the device, ensure that all power cords are disconnected from the power source.**

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).

Note: Ensure you have “SD650 V2 or SD650-N V2 Neptune® DWC Waterloop Service Kit “ in hand to install components.

Procedure

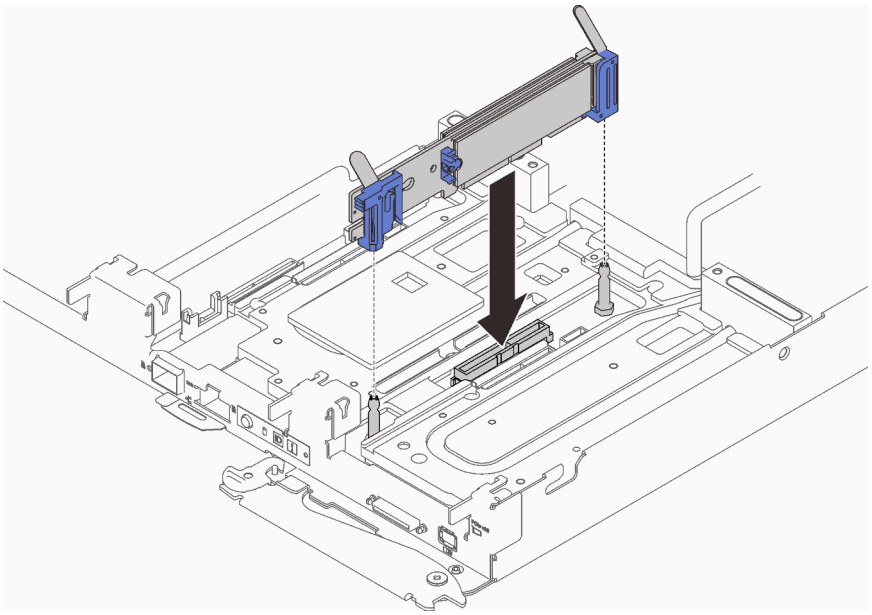


Figure 162. M.2 backplane installation

Step 1. Align the openings located at the bottom of the blue plastic supports at each end of the M.2 backplane with the guide pins on the system board; then, insert the backplane in the system board connector. Press down on the M.2 backplane to fully seat it.

After you finish

1. Reinstall the tray cover (see "Install the tray cover" on page 153).
2. Reinstall the tray (see "Install a DWC tray in the enclosure" on page 150).

   Note: For safety, use the lift tool to install the tray into the rack.
3. Connect all required external cables to the enclosure.

   Note: Use extra forces to connect QSFP cables to the enclosure if Mellanox ConnectX-6 adapters are installed.
4. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

Watch the procedure on YouTube

M.2 drive replacement

Use the following procedures to remove and install M.2 drives.

Remove an M.2 drive from the M.2 backplane

Use this information to remove an M.2 drive from the M.2 backplane.

About this task

S001

DANGER

Electrical current from power, telephone, and communication cables is hazardous.
To avoid a shock hazard:

- **Connect all power cords to a properly wired and grounded electrical outlet/source.**
- **Connect any equipment that will be attached to this product to properly wired outlets/sources.**
- **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.**
- **The device might have more than one power cord, to remove all electrical current from the device, ensure that all power cords are disconnected from the power source.**

Attention:

- Read the following sections to ensure that you work safely.
  - "Installation Guidelines" on page 51
  - "Safety inspection checklist" on page 52
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.

Procedure

Step 1. Make preparations for this task.

a. Remove the tray (see "Remove a DWC tray from the enclosure" on page 149).

   Attention: For safety, use the lift tool to remove the tray from the rack.

b. Remove the tray cover (see "Remove the tray cover" on page 152).

c. Remove the M.2 backplane (see "Remove the M.2 backplane" on page 182).

Step 2. Press both sides of the retainer and slide it backward to loosen the M.2 drive from the M.2 backplane.

Note: If your M.2 backplane has two M.2 drives, they will both release outward when you slide the retainer backward.

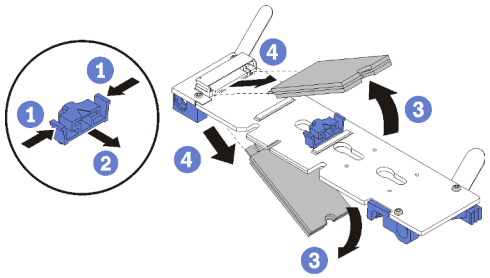


Figure 163. M.2 drive removal

Step 3. Remove the M.2 drive by rotating it away from the M.2 backplane and pulling away from the connector at an angle (approximately 30 degrees).

After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

Watch the procedure on YouTube

Install an M.2 drive into the M.2 backplane

Use this information to install an M.2 drive in the M.2 backplane.

About this task

S001

DANGER

Electrical current from power, telephone, and communication cables is hazardous.
To avoid a shock hazard:

- **Connect all power cords to a properly wired and grounded electrical outlet/source.**
- **Connect any equipment that will be attached to this product to properly wired outlets/sources.**
- **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.**
- **The device might have more than one power cord, to remove all electrical current from the device, ensure that all power cords are disconnected from the power source.**

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51

– “Safety inspection checklist” on page 52

See the following table for supported M.2 drive configurations.

Table 33. M.2 drive configuration

M.2 drive configuration	Support status
Single 32 GB M.2 drive (42 mm long)	Supported
Single 128 GB M.2 drive (80 mm long)	Supported
Dual 32 GB M.2 drives (42 mm long) with RAID backplane	Supported
Dual 128 GB M.2 drives (80mm long) with RAID backplane	Only supported in certain environments. Contact Lenovo Services for additional details.

Procedure

Step 1. Locate the connector on each side of the M.2 backplane.

Notes:

- Some M.2 backplanes support two identical M.2 drives. When two drives are installed, align and support both drives when sliding the retainer forward to secure the drives.

Step 2. Insert the M.2 drive at an angle (approximately 30 degrees) into the connector and rotate it until the notch catches on the lip of the retainer; then, slide the retainer forward (toward the connector) to secure the M.2 drive in the M.2 backplane.

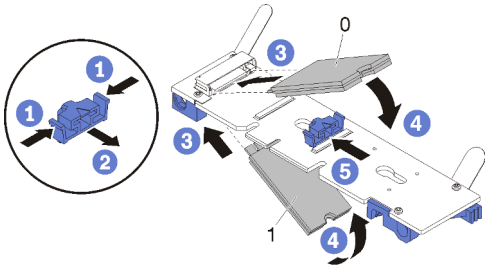


Figure 164. M.2 drive installation

Attention: When sliding the retainer forward, make sure the two nubs on the retainer enter the small holes on the M.2 backplane. Once they enter the holes, you will hear a soft “click” sound.

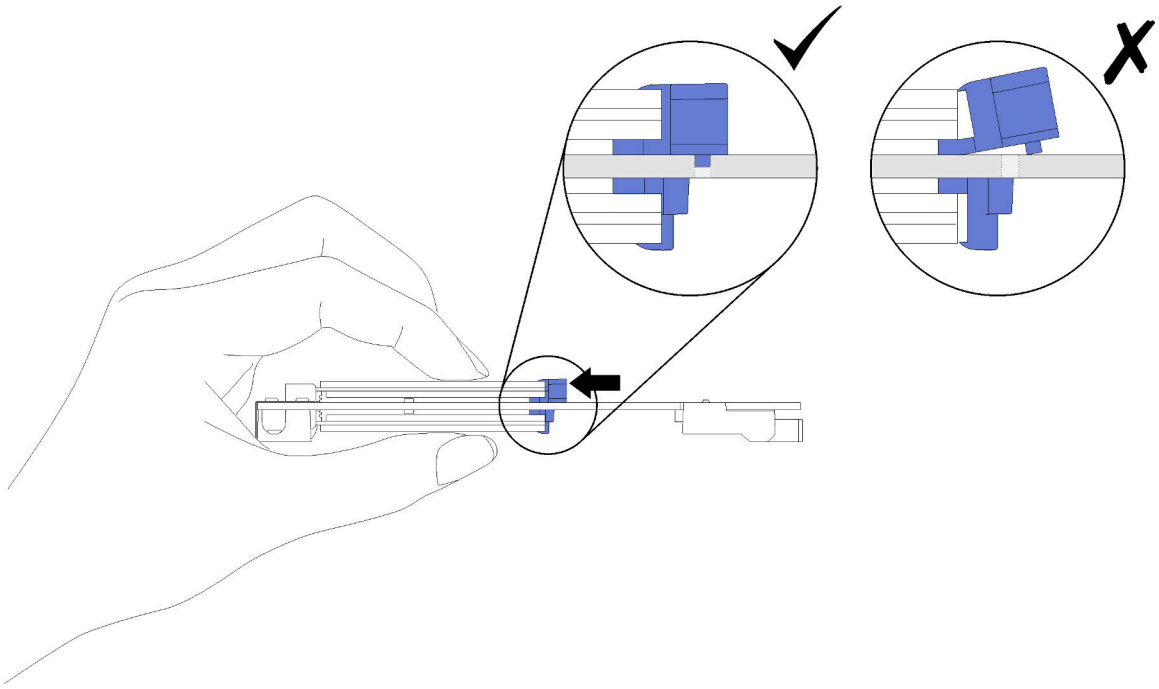


Figure 165. M.2 drive installation

After you finish

1. Reinstall the M.2 backplane (see “Install the M.2 backplane” on page 185).
2. Reinstall the tray cover (see “Install the tray cover” on page 153).
3. Reinstall the tray (see “Install a DWC tray in the enclosure” on page 150).

   Note: For safety, use the lift tool to install the tray into the rack.
4. Connect all required external cables to the enclosure.

   Note: Use extra forces to connect QSFP cables to the enclosure if Mellanox ConnectX-6 adapters are installed.
5. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

Watch the procedure on YouTube

How to adjust the position of the retainer on the M.2 backplane

Use this information to adjust the position of the retainer on the M.2 backplane.

About this task

Attention:

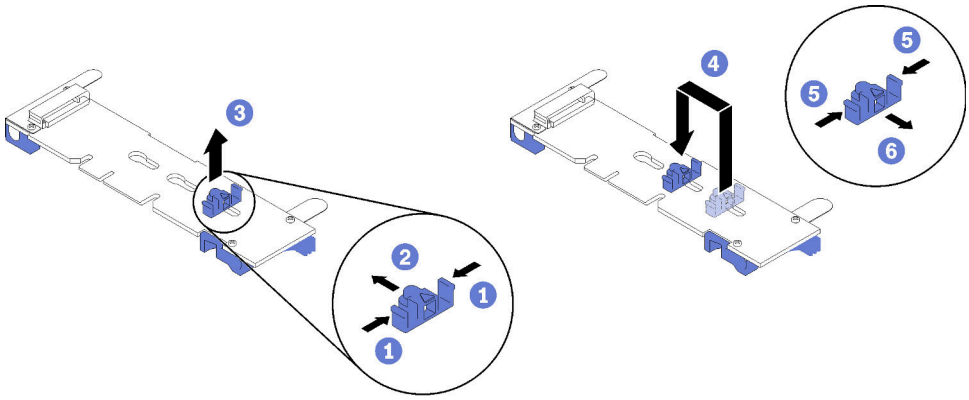
- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52

Procedure

Step 1. Locate the correct keyhole that the retainer should be installed into to accommodate the particular size of the M.2 drive you wish to install.

Step 2. Press both sides of the retainer and move it forward until it is in the large opening of the keyhole; then, remove it from the backplane.

Step 3. Insert the retainer into the correct keyhole and slide it backwards until the nubs are in the holes.



Demo video

Watch the procedure on YouTube

PCIe adapter replacement

Use the following procedures to remove and install a PCIe adapter.

Remove a PCIe adapter

Use this information to remove a PCIe adapter.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.
- Use extra forces to disconnect QSFP cables if they are connected to the solution.

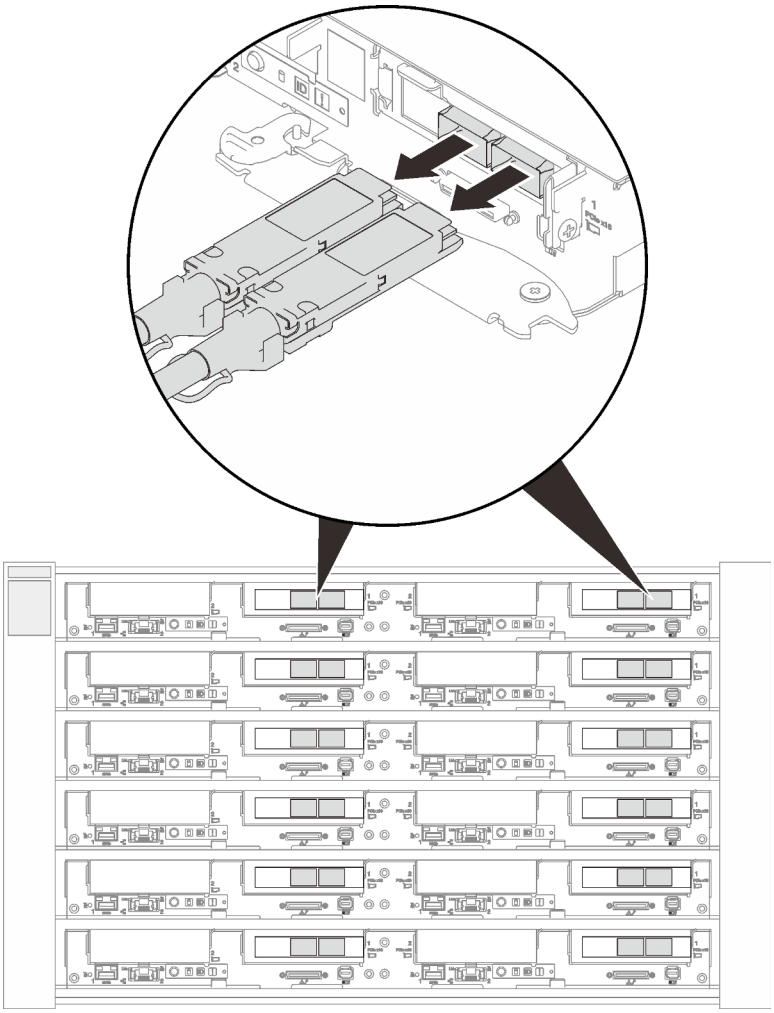


Figure 166. Disconnecting QSFP cables from SD650 V2 tray

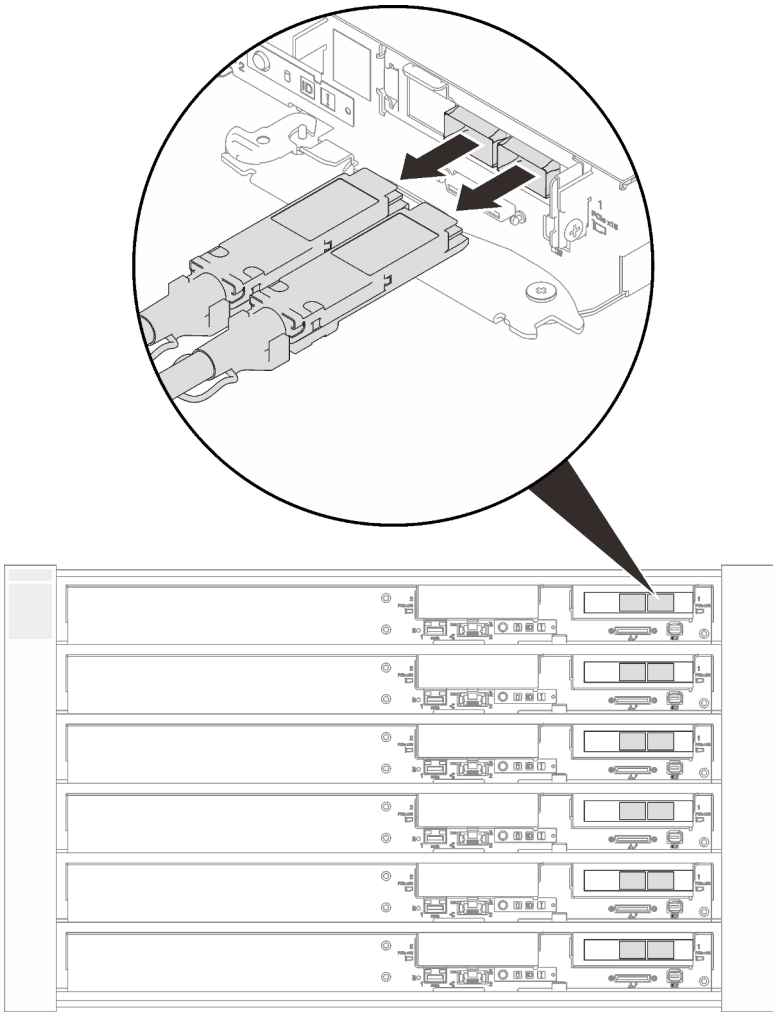


Figure 167. Disconnecting QSFP cables from SD650-N V2 tray

Procedure

Step 1. Make preparations for this task.

a. Remove the tray (see “Install a DWC tray in the enclosure” on page 150).

Attention: For safety, use the lift tool to remove the tray from the rack.

b. Remove the tray cover (see “Remove the tray cover” on page 152).

c. Remove the PCIe riser assembly (see “Remove a PCIe riser assembly” on page 200).

Step 2. There are different procedures for removing a general adapter or a ConnectX-6 adapter, follow the corresponding steps to complete the removal procedures.

General adapter removal

1. Remove the screws; then, grasp the adapter by its edges and carefully pull it out of the PCIe riser-cage.

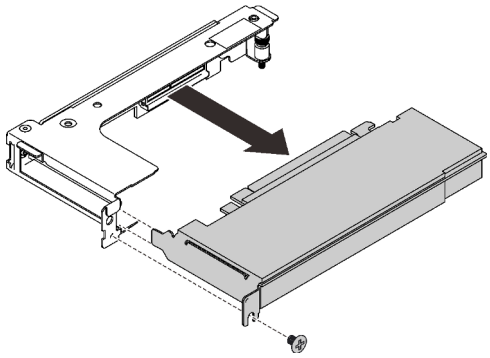


Figure 168. General adapter removal

Mellanox ConnectX-6 adapter removal

1. Remove the screws; then, grasp the adapter by its edges and carefully pull it out of the PCIe riser-cage.

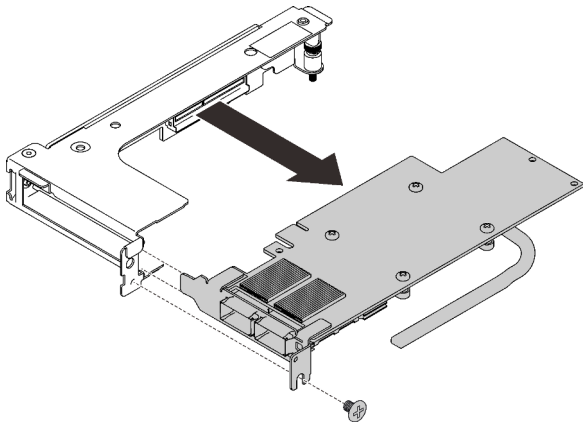


Figure 169. Mellanox ConnectX-6 adapter removal

2. ❶ Carefully pull two latches outwards and ❷ open the bottom cable clip cover; then, ❸ remove the cable clip away from the connectors.
3. ❹ Gently grasp and pull the black mylar sheets outwards.
4. ❺ Pull the cable connectors out of the adapter.

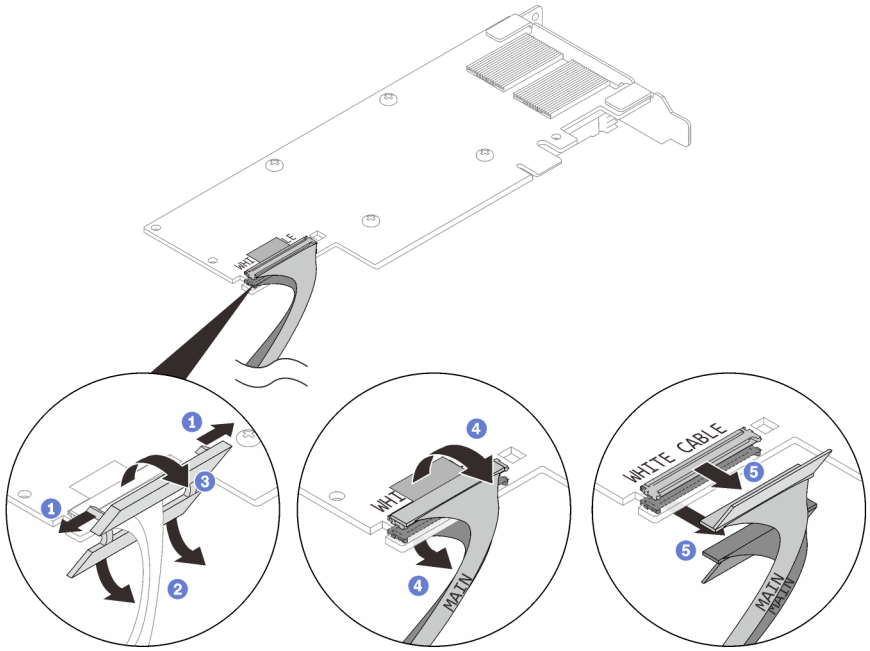


Figure 170. Cable removal

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

Watch the procedure on YouTube

Install a PCIe adapter

Use this information to install a PCIe adapter.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52

Note: Ensure you have “SD650 V2 or SD650-N V2 Neptune® DWC Waterloop Service Kit “ in hand to install components.

Procedure

Step 1. Remove the screw; then, remove the filler out of the cage.

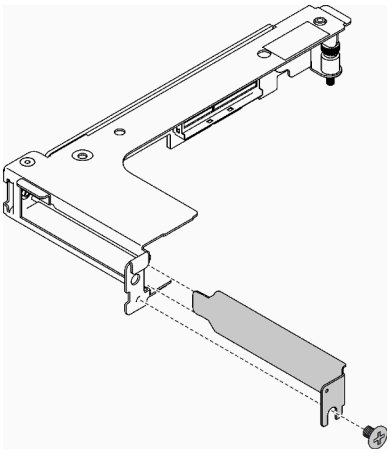


Figure 171. Filler removal

Step 2. There are different procedures for installing a general adapter or a ConnectX-6 adapter, follow the corresponding steps to complete the removal procedures.

General adapter installation

1. Align the adapter with the PCIe slot on the riser-cage; then, carefully press the adapter straight into the slot until it is securely seated.
2. Fasten the screw to secure the adapter.

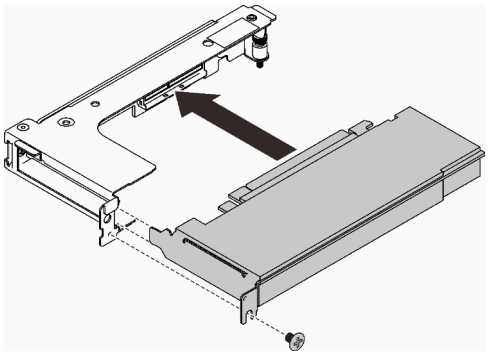


Figure 172. General adapter installation

ConnectX-6 adapter installation

Refer to the following illustrations to distinguish two types of ConnectX-6 adapters and riser cages.

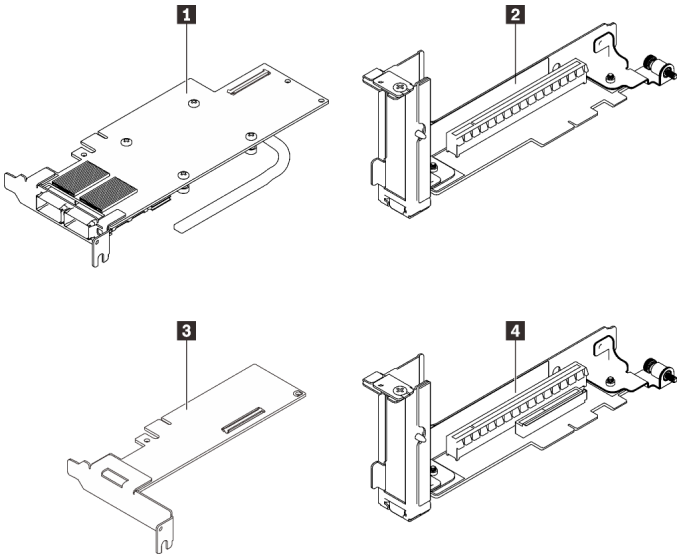


Figure 173. Main / Auxiliary adapters and riser cages

Table 34. Main / Auxiliary adapters and riser cages

1 Main adapter	3 Auxiliary adapter
2 1U riser cage for main adapter	4 Balance I/O riser cage for auxiliary adapter

Attention:

- There are **WHITE CABLE** and **BLACK CABLE** callouts on an adapter, connect cables to connectors according to cable colors.
- There are **MAIN** and **AUX** labels on cables, connect **MAIN** ends to a main adapter while connect **AUX** ends to an auxiliary adapter.

1. ❶ Gently push the connectors into the slots.
2. ❷ Close the cable covers and slightly press cable covers until them click into the places.
3. ❸ Insert the two latches into the slots next to the connectors; then, ❹ close the cable clip covers and slightly press them to secure connectors.

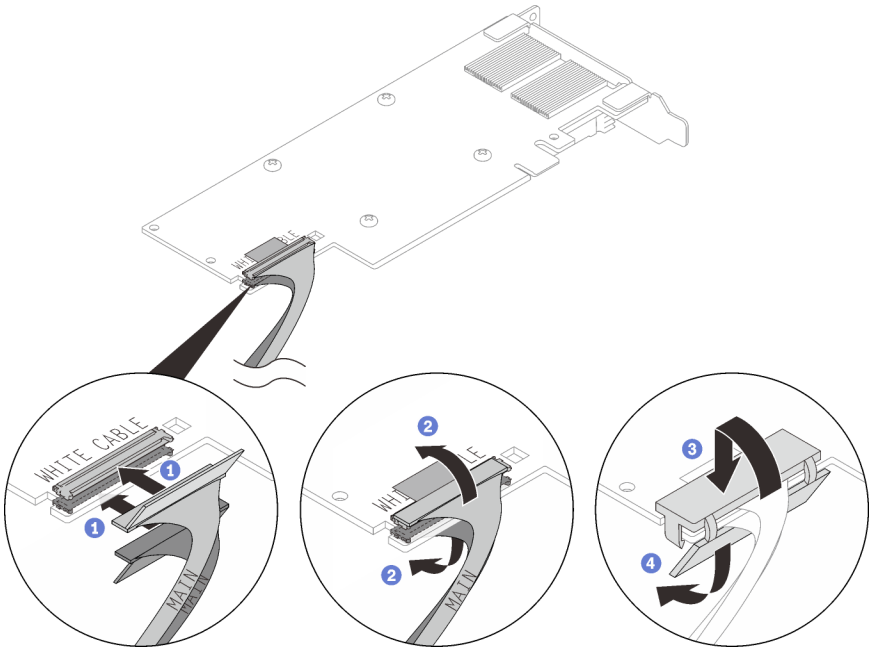


Figure 174. Cable installation

4. Align the adapter with the PCIe slot on the riser-cage; then, carefully press the adapter straight into the slot until it is securely seated.
5. Fasten the screw to secure the adapter.

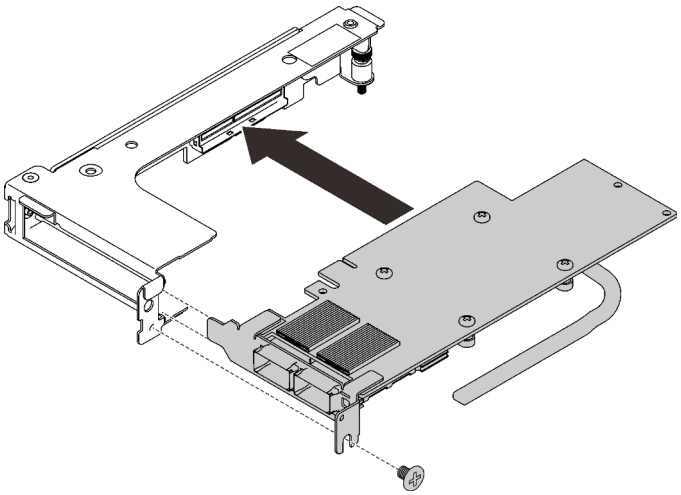


Figure 175. Mellanox ConnectX-6 adapter installation

After you finish

1. Install the PCIe riser assembly to the node (see “Install a PCIe riser assembly” on page 206).
2. Reinstall the tray cover (see “Install the tray cover” on page 153).
3. Reinstall the tray (see “Install a DWC tray in the enclosure” on page 150).

   Note: For safety, use the lift tool to install the tray into the rack.
4. Connect all required external cables to the enclosure.

Note: Apply extra forces to connect QSFP cables to the enclosure if Mellanox ConnectX-6 adapters are installed.

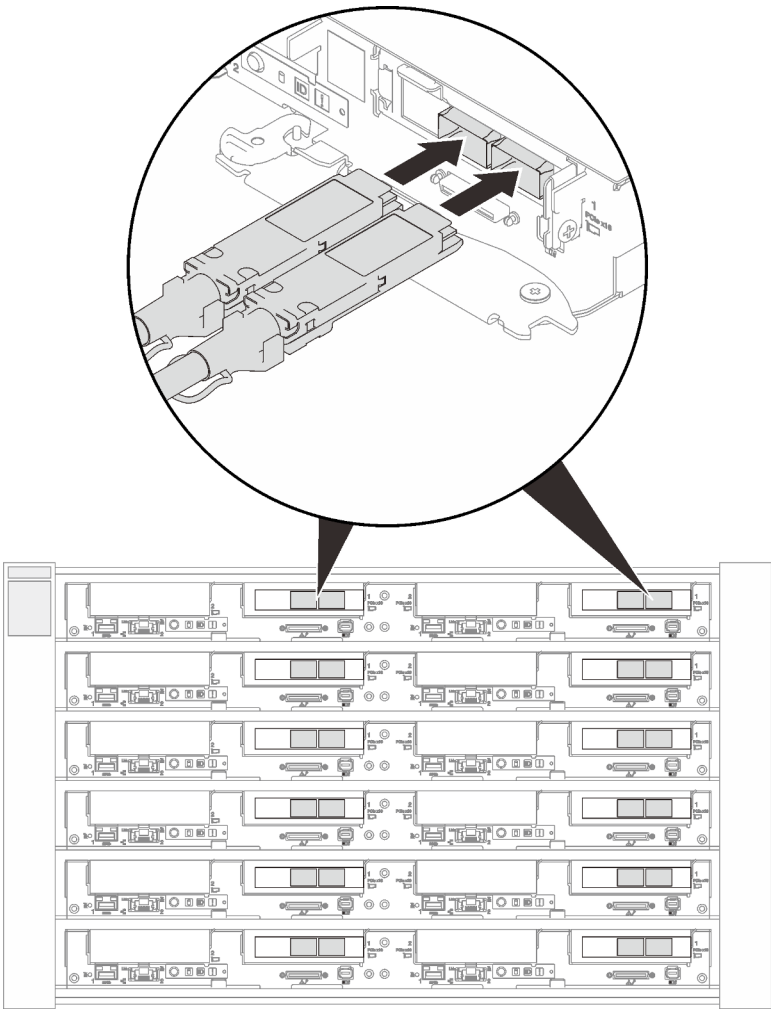


Figure 176. Connecting QSFP cables to SD650 V2 tray

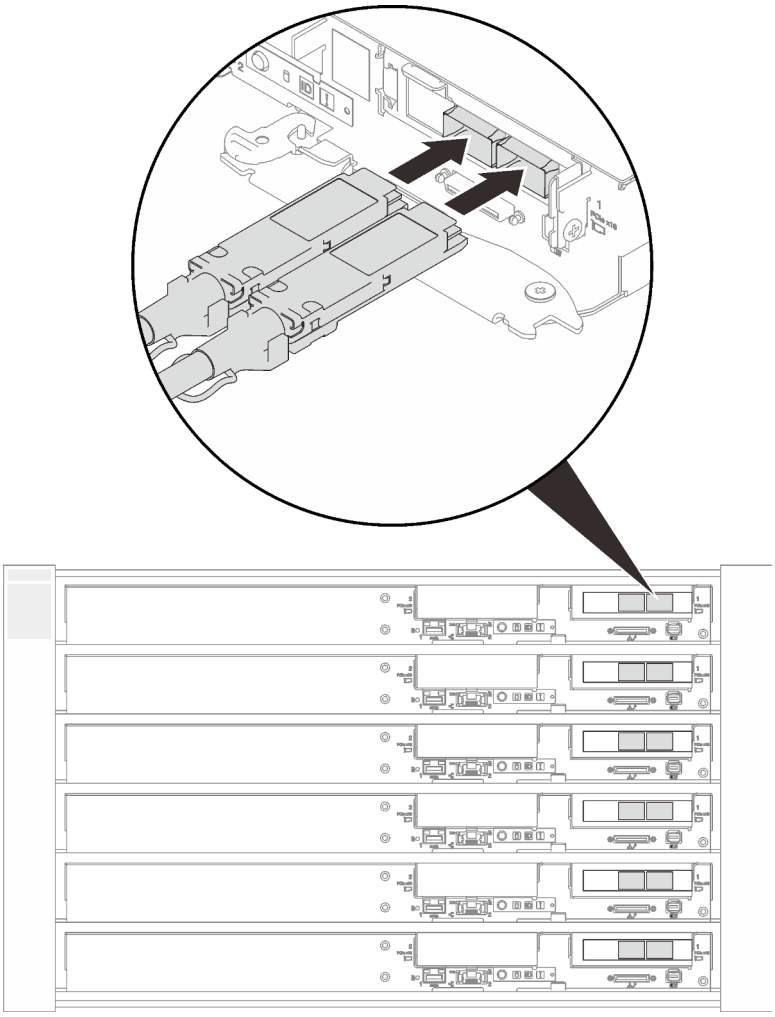


Figure 177. Connecting QSFP cables to SD650-N V2 tray

5. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

Watch the procedure on YouTube

PCIe riser assembly replacement

Use the following procedures to remove and install a PCIe riser assembly.

Remove a PCIe riser assembly

Use this information to remove a PCIe riser assembly.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51

  - “Safety inspection checklist” on page 52
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.
- Use extra forces to disconnect QSFP cables if they are connected to the solution.

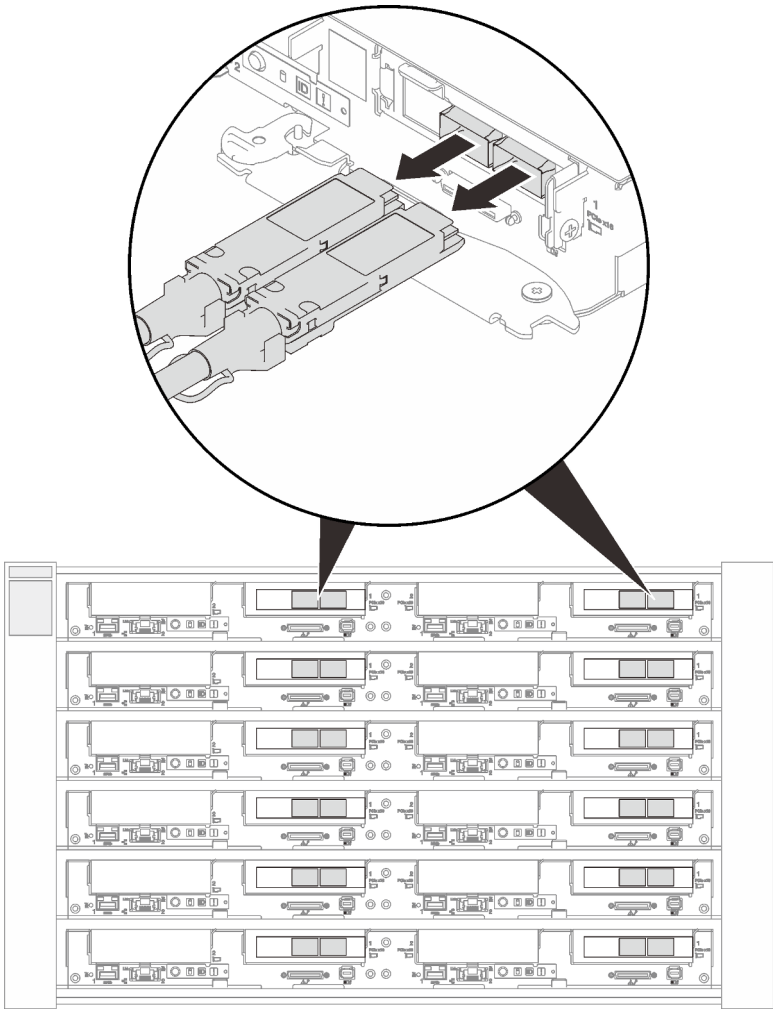


Figure 178. Disconnecting QSFP cables from SD650 V2 tray

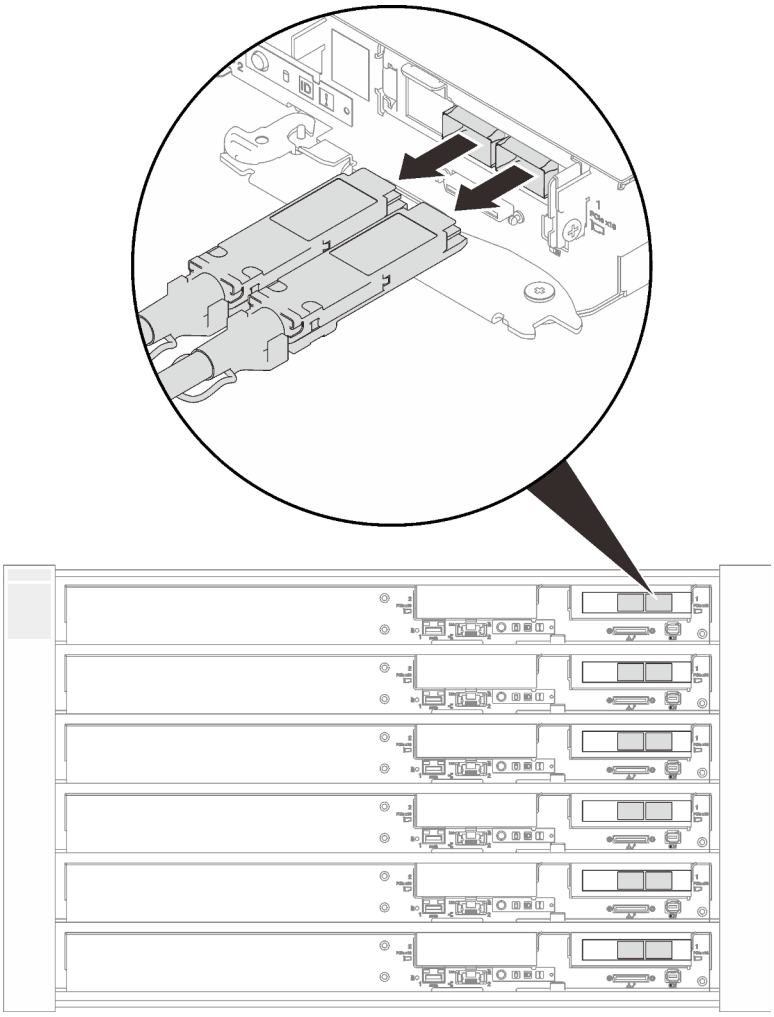


Figure 179. Disconnecting QSFP cables from SD650-N V2 tray

Procedure

Step 1. Make preparations for this task.

a. If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).

Important: The primary adapter is always installed to the right node (node 2/4/6/8/10/12), while the auxiliary adapter is installed to the left node (node 1/3/5/7/9/11). As an auxiliary node requires a connected and functioning primary node to function, always follow the following power on/off sequence:

- When powering **off** the nodes, always power off node 1/3/5/7/9/11 (auxiliary node) first.
- When power **on** the nodes, always power on 2/4/6/8/10/12 (primary node) first.

b. Remove the tray (see “Install a DWC tray in the enclosure” on page 150).

Attention: For safety, use the lift tool to remove the tray from the rack.

c. Remove the tray cover (see “Remove the tray cover” on page 152).

Step 2. There are different procedures for installing the PCIe riser assembly with a general adapter or a ConnectX-6 adapter, follow the corresponding steps to complete the removal procedures.

PCIe riser assembly with general adapters

1. Loosen the captive screw on the PCIe riser assembly.
2. Carefully grasp the PCIe riser-cage assembly by its edges and remove it out of the node.

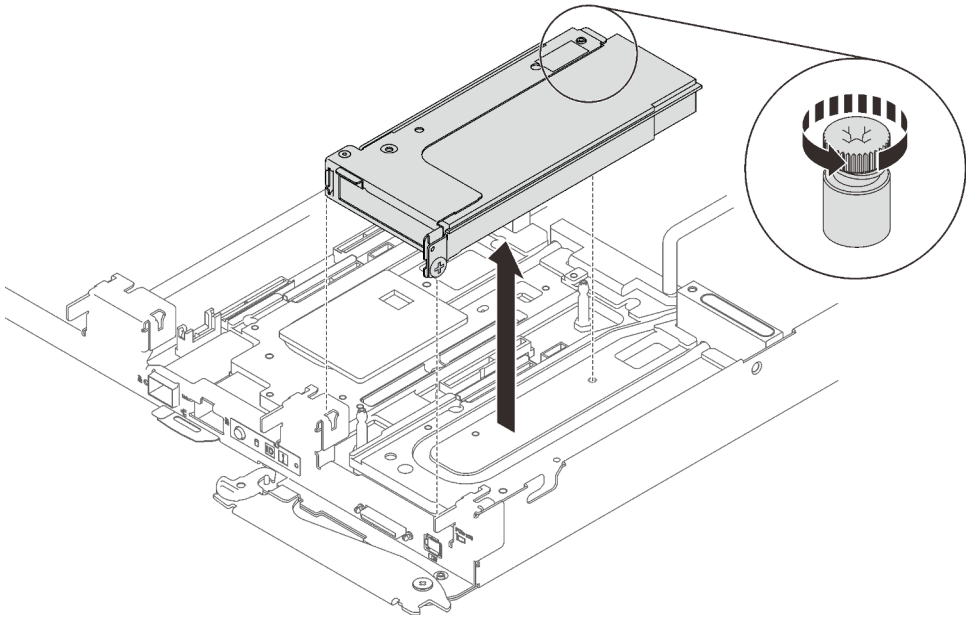


Figure 180. PCIe riser assembly removal

PCIe riser assembly with ConnectX-6 adapter

1. Loosen the clamp bracket captive screw and remove it out of the node.

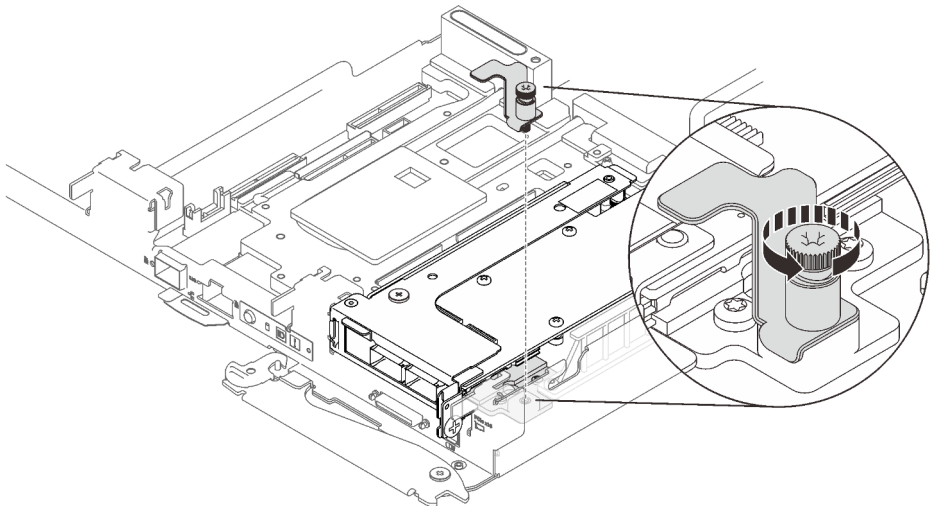


Figure 181. Clamp bracket captive screw removal

2. Remove the two screws; then, remove the heatpipe beam out of the node.

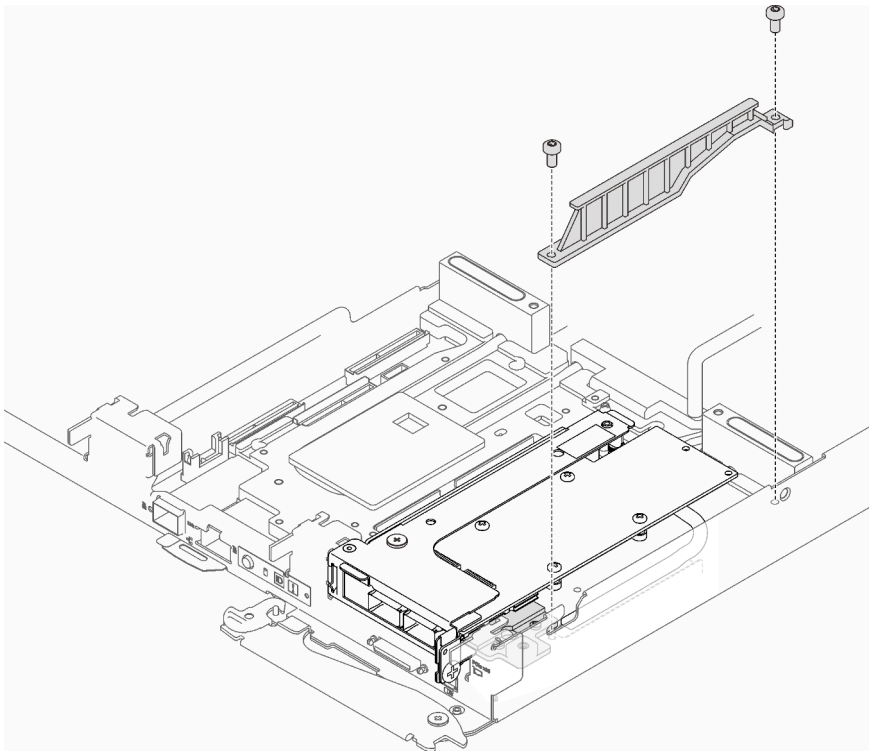


Figure 182. Heatpipe beam removal

3. Remove the screw and loosen the captive screw on the PCIe riser assembly; then, carefully grasp the PCIe riser-cage assembly by its edges and remove it out of the node.

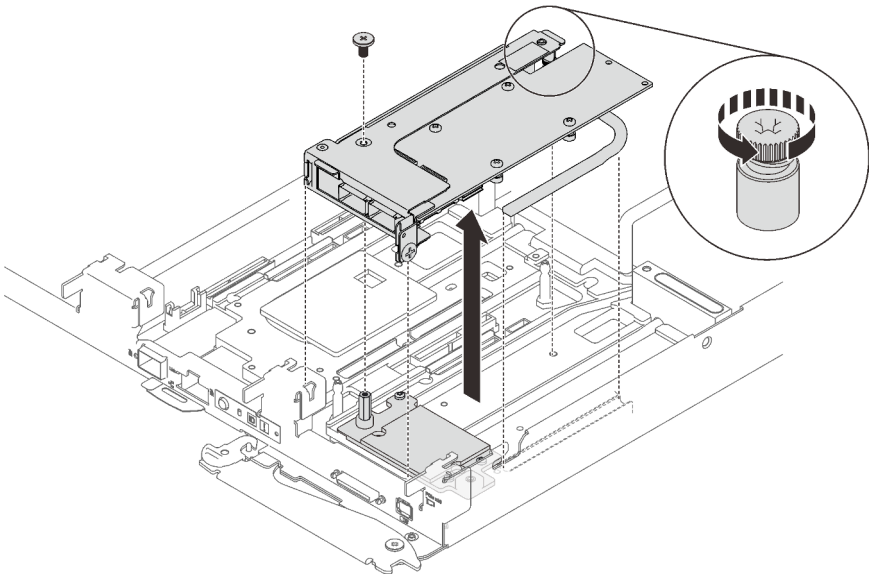


Figure 183. PCIe riser assembly removal

4. Remove the cold plate if needed.
   a. Remove the hex screw and three Torx T10 screws.
   b. Remove the cold plate out of the node.

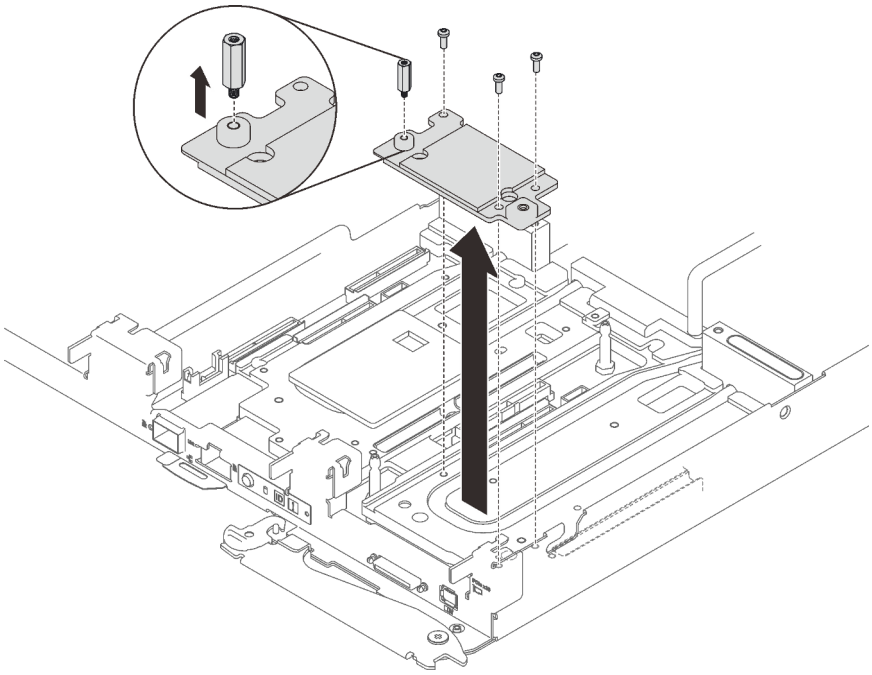


Figure 184. Cold plate removal

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Attention: You can only disassemble a PCIe riser assembly for recycle. Do not disassemble it for any other purposes.

1. Remove the two screws, then, separate the expansion board from the cage.

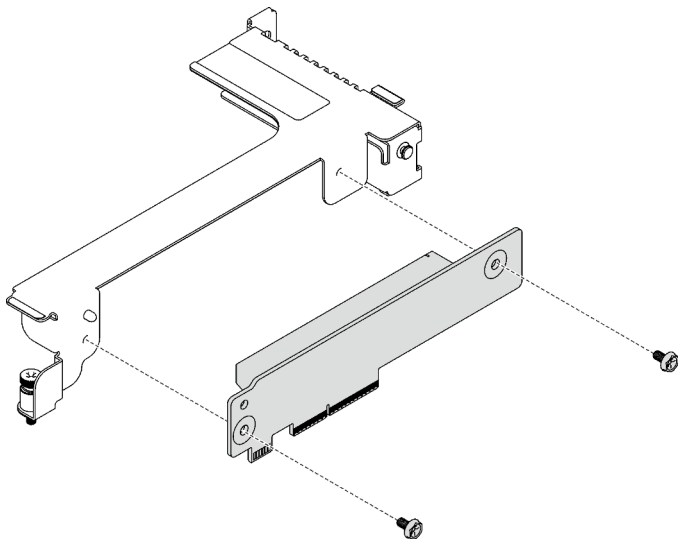


Figure 185. Expansion board removal

2. Recycle the unit in compliance with local regulations.

Demo video

Watch the procedure on YouTube

Install a PCIe riser assembly

Use this information to install a PCIe riser assembly.

About this task

Required tools

Ensure you have “SD650 V2 or SD650-N V2 Neptune® DWC Waterloop Service Kit “ in hand to install components.

Important: Gap pad/putty pad replacement guidelines

- Before replacing the gap pad/putty pad, gently clean the interface plate or the hardware surface with an alcohol cleaning pad.
- Hold the gap pad/putty pad carefully to avoid deformation. Make sure no screw hole or opening is blocked by the gap pad/putty pad material.
- Do not use expired putty pad. Check the expiry date on putty pad package. If the putty pads are expired, acquire new ones to properly replace them.

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- See “Internal cable routing” on page 33 for cable routing details.

Installation procedure of PCIe riser varies depending on the type of PCIe adapter that is installed in the riser.

- For PCIe riser with regular adapter, see “Install a PCIe riser assembly with regular adapter” on page 206.
- For PCIe riser with ConnectX-6 adapter, see “Install a PCIe riser assembly with ConnectX-6 adapter” on page 207.

Install a PCIe riser assembly with regular adapter

Procedure

Step 1. Align the two tabs on PCIe riser assembly with the slots on the front node; then, insert the PCIe riser assembly onto the system board.

Step 2. Fasten the captive screw on the PCIe riser assembly.

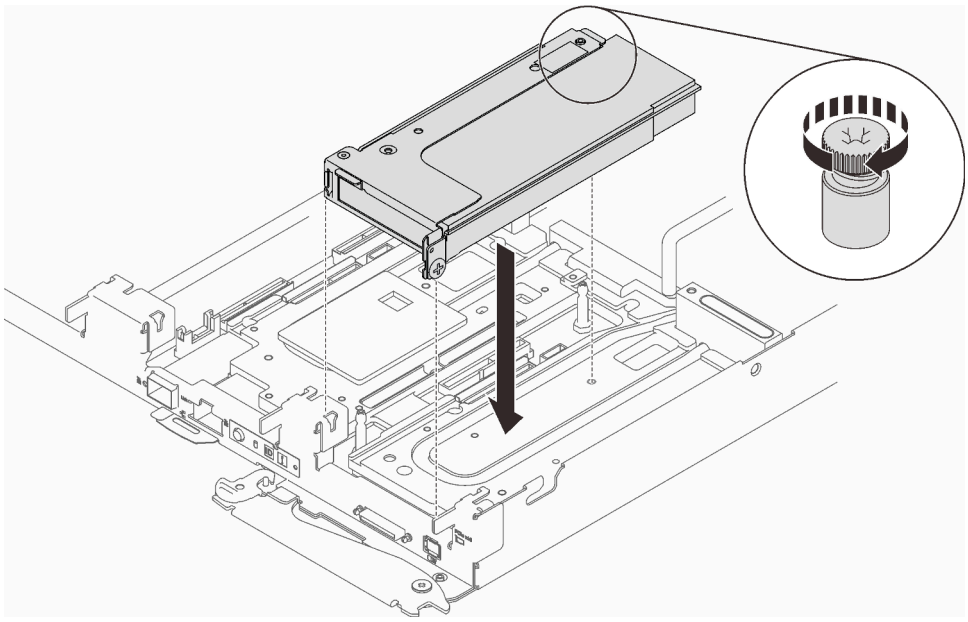


Figure 186. PCIe riser assembly installation

Step 3. See “Internal cable routing” on page 33 for cable routing details.

Install a PCIe riser assembly with ConnectX-6 adapter

Procedure

Step 1. In the case of installing shared I/O adapters for the first time, complete the following steps to make sure the enclosure supports shared I/O adapters before powering off any of the target nodes.

1. Query the current enclosure mode with the following command:
```
ipmitool -I lanplus -H $SMM2_IP -U $USERID -P $PASSWORD raw 0x32 0xC5 0x01

response data
byte 1: current mode
01: Normal mode
02: Shared I/O mode
```
2. If the enclosure is in normal mode, configure the enclosure mode to Shared I/O mode with the following command:
```
ipmitool -I lanplus -H $SMM2_IP -U $USERID -P $PASSWORD raw 0x32 0xC5 0x00 0x02

response data
byte 1: previous mode
01: Normal mode
02: Shared I/O mode
byte 2: current mode
01: Normal mode
02: Shared I/O mode
```
3. Power off the auxiliary node (node 1/3/5/7/9/11) first; then, power off the corresponding primary node (node 2/4/6/8/10/12).
4. Proceed to remove the tray and the tray cover (see “Install a DWC tray in the enclosure” on page 150 and “Remove the tray cover” on page 152).

Step 2. Place the cold plate on the node; then, secure the cold plate with one hex standoff screw and three Torx T10 screws.

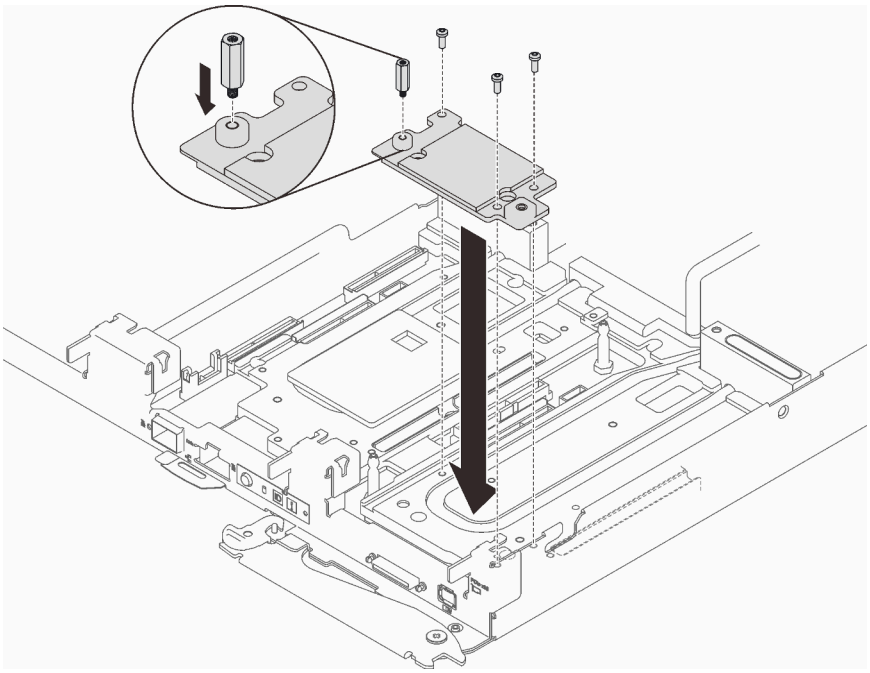


Figure 187. Cold plate installation

Step 3. Replace the cold plate putty gap pad with a new one.

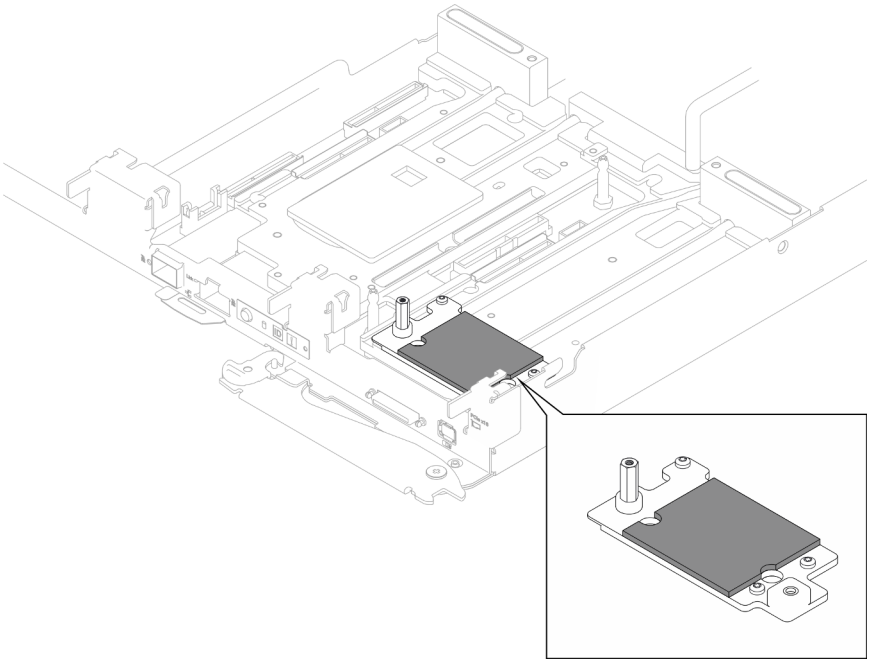


Figure 188. Cold plate putty pad for CX-6 riser

Make sure to follow Gap pad/putty pad replacement guidelines.

Step 4. Align the two tabs on the PCIe riser assembly with the slots on the front node; then, insert the PCIe riser assembly onto the system board; then, secure the riser assembly with a screw, and fasten the captive screw.

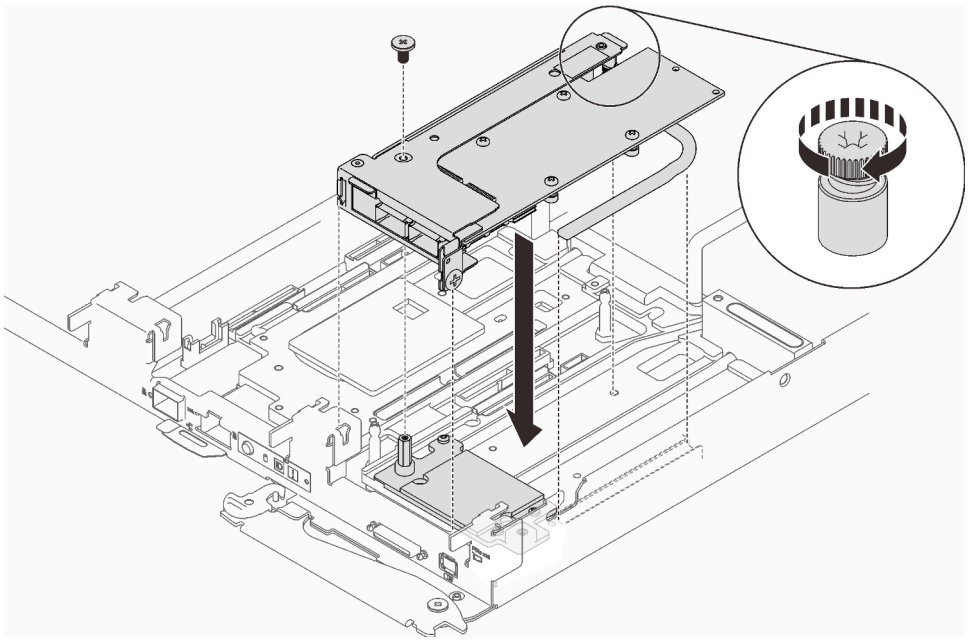


Figure 189. PCIe riser assembly installation

Step 5. Install the heatpipe beam, and secure it with two screws.

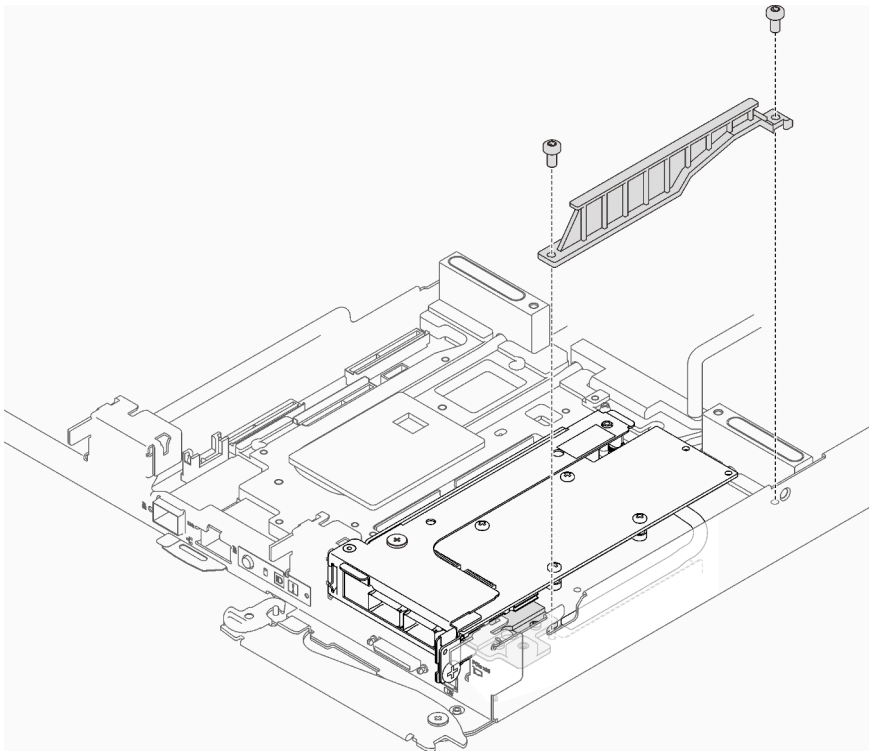


Figure 190. Heatpipe beam installation

Step 6. Install the clamp bracket captive screw and fasten it.

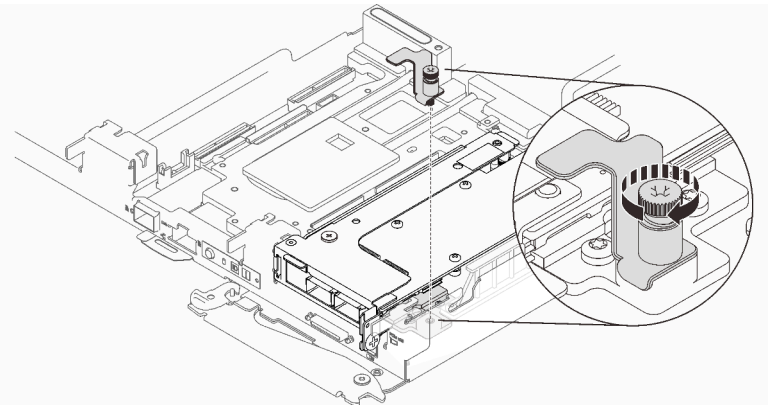


Figure 191. Clamp bracket captive screw installation

Step 7. Proceed to the next step based the type of ConnectX-6 adapter that is installed in the riser:

- **Stand-alone ConnectX-6 adapter:**

  Skip to After you finish.

- **Shared I/O**

  Refer to the following table to see supported configurations for shared I/O ConnectX-6 adapters:

  Table 35.

Configuration	NVMe/SATA drive	M.2 backplane
Configuration 1: Shared I/O A	√	√
Configuration 2: Shared I/O B	X	√

  Route the cable as in the corresponding figure.

  – **Shared I/O A (with NVMe/SATA drives and M.2 backplane):**

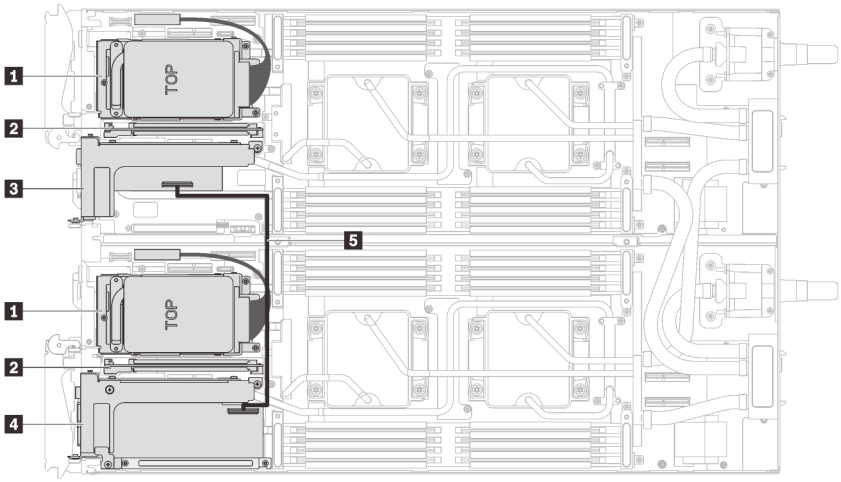


Figure 192. Cable routing - Shared I/O A (with NVMe/SATA drives and M.2 backplane)

1 NVMe/SATA drives	4 Main adapter
2 M.2 backplane	5 350mm IPEX cable
3 Auxiliary adapter	

– **Shared I/O B (with M.2 backplane):**

Route the cable as in the following figure.

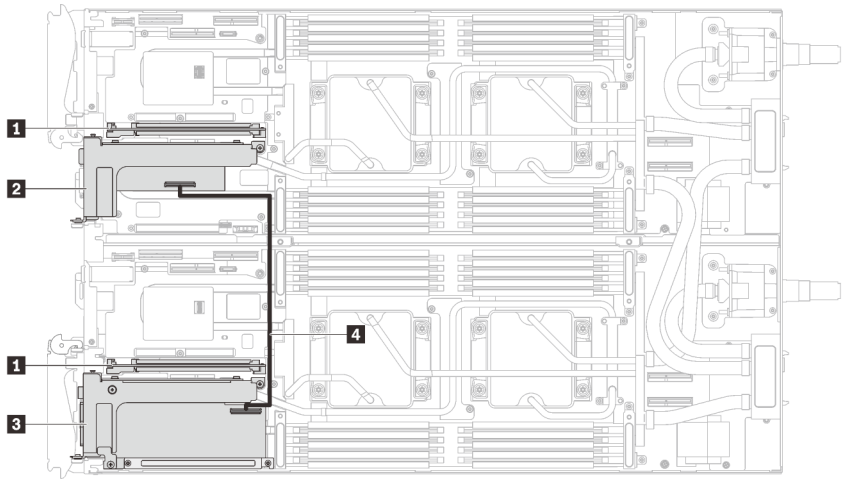


Figure 193. Cable routing - Share I/O B (with M.2 backplane)

1 M.2 backplane	3 Main adapter
2 Auxiliary adapter	4 350mm IPEX cable

After you finish

1. Reinstall the tray cover (see “Install the tray cover” on page 153).
2. Reinstall the tray (see “Install a DWC tray in the enclosure” on page 150).

   Note: For safety, use the lift tool to install the tray into the rack.
3. Connect all required external cables to the enclosure.

   Note: Apply extra forces to connect QSFP cables to the enclosure if Mellanox ConnectX-6 adapters are installed.

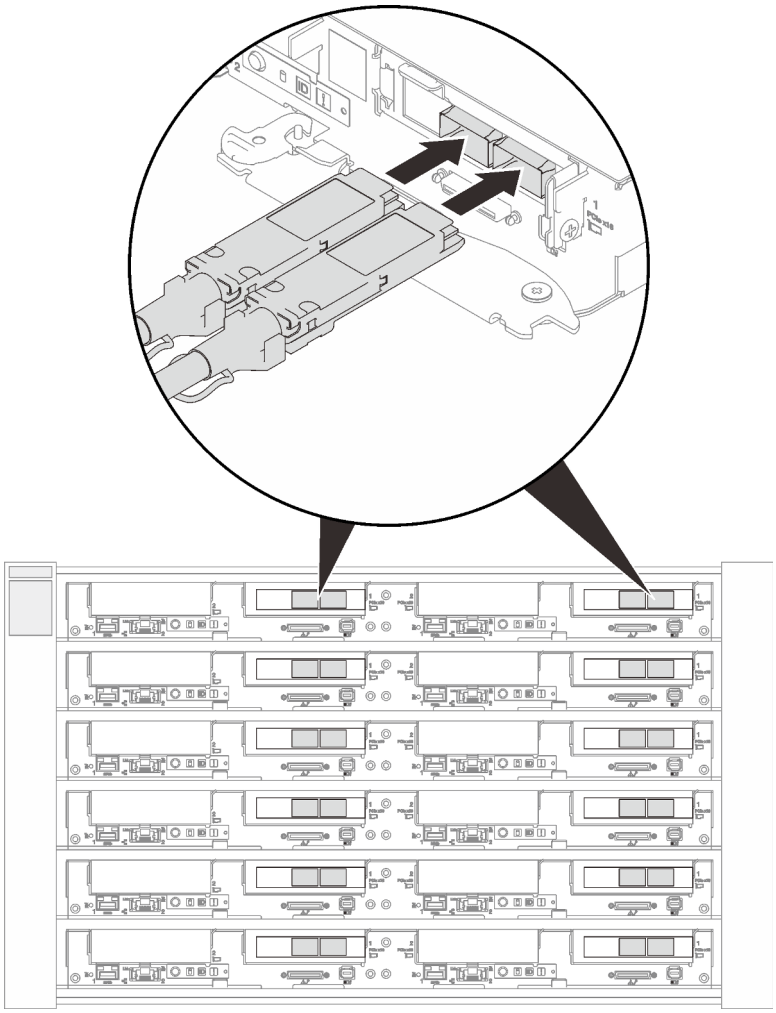


Figure 194. Connecting QSFP cables to SD650 V2 tray

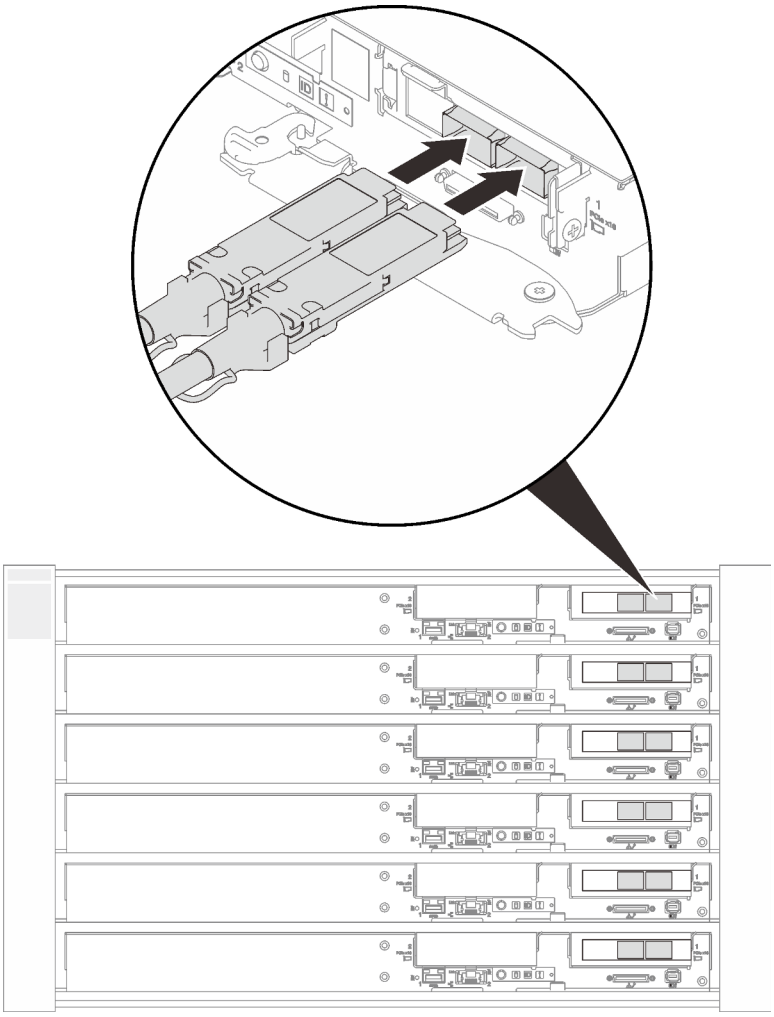


Figure 195. Connecting QSFP cables to SD650-N V2 tray

4. If the installed adapters are shared I/O ones, power on the primary node (node 2/4/6/8/10/12) first; then, power on the auxiliary node (node 1/3/5/7/9/11).

   Important: The primary adapter is always installed to the right node (node 2/4/6/8/10/12), while the auxiliary adapter is installed to the left node (node 1/3/5/7/9/11). As an auxiliary node requires a connected and functioning primary node to function, always follow the following power on/off sequence:

   - When powering **off** the nodes, always power off node 1/3/5/7/9/11 (auxiliary node) first.
   - When power **on** the nodes, always power on 2/4/6/8/10/12 (primary node) first.
5. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

Watch the procedure on YouTube

Power distribution board replacement

Use the following procedures to remove and install the power distribution board.

Remove the power distribution board

Use this information to remove the power distribution board.

About this task

S001

DANGER

Electrical current from power, telephone, and communication cables is hazardous.
To avoid a shock hazard:

- **Connect all power cords to a properly wired and grounded electrical outlet/source.**
- **Connect any equipment that will be attached to this product to properly wired outlets/sources.**
- **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.**
- **The device might have more than one power cord, to remove all electrical current from the device, ensure that all power cords are disconnected from the power source.**

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.

Procedure

Step 1. Make preparations for this task.

a. Remove the tray (see “Install a DWC tray in the enclosure” on page 150).

Attention: For safety, use the lift tool to remove the tray from the rack.

b. Remove the tray cover (see “Remove the tray cover” on page 152).

c. Remove the water loop (“Remove the water loop in SD650 V2 tray” on page 266).

Step 2. Remove the power distribution board.

a. ❶ Remove the five Phillips #1 screws (per node).

b. ❷ Gently pull the power distribution board connector to disconnect it from the system board.

c. ❸ Carefully pull the power distribution board inwards to disengage it from the node.

Note: Use a 3/16" hex head screwdriver to ensure the proper removal and installation.

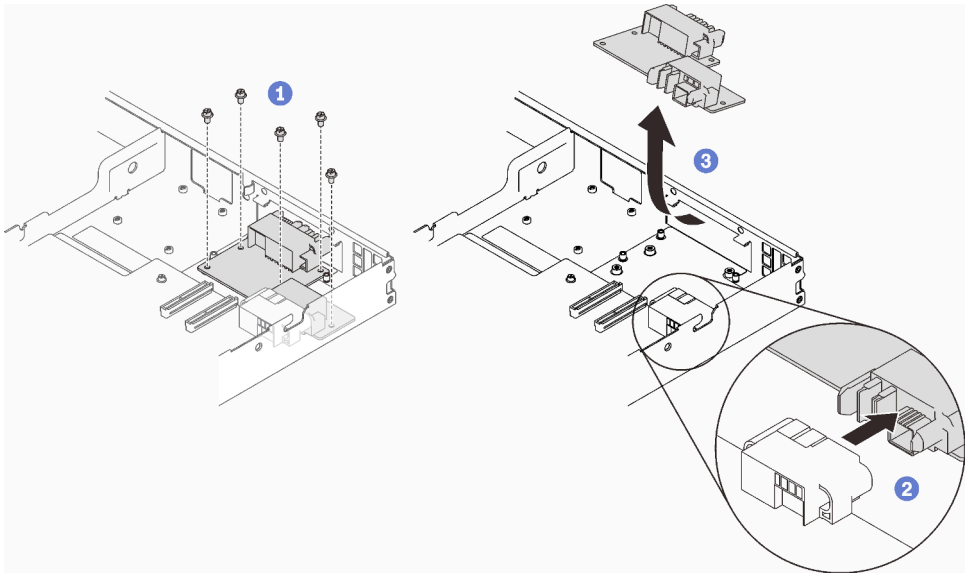


Figure 196. Power distribution board removal

After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

Watch the procedure on YouTube

Install the power distribution board

Use this information to install the power distribution board.

About this task

S001

DANGER

Electrical current from power, telephone, and communication cables is hazardous.
To avoid a shock hazard:

- **Connect all power cords to a properly wired and grounded electrical outlet/source.**
- **Connect any equipment that will be attached to this product to properly wired outlets/sources.**
- **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.**
- **The device might have more than one power cord, to remove all electrical current from the device, ensure that all power cords are disconnected from the power source.**

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52

Note: Ensure you have “SD650 V2 or SD650-N V2 Neptune® DWC Waterloop Service Kit “ in hand to install components.

Procedure

Step 1. Install the power distribution board.

❶ Tilt the power distribution board and align it with the hole; then, slide it into the place.

❷ Gently push the power distribution board connector to ensure it is connected to the system board.

❸ Fasten the five Phillips #1 screws.

Note: Use a 3/16" hex head driver to ensure the proper removal and installation.

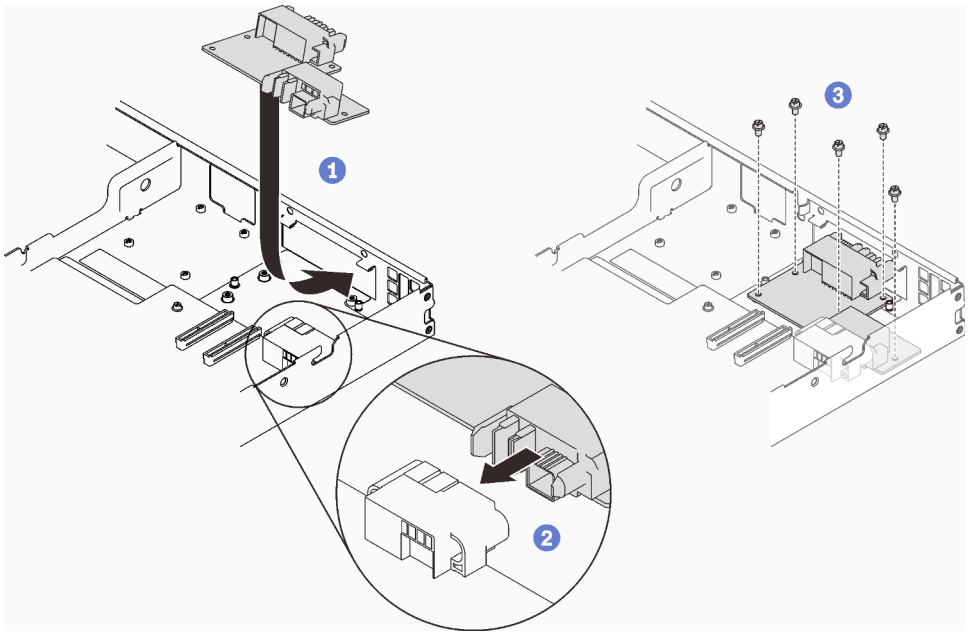


Figure 197. Power distribution board installation

After you finish

1. Reinstall the water loop (“Install the water loop in SD650 V2 tray” on page 275).
2. Reinstall the tray cover (see “Install the tray cover” on page 153).
3. Reinstall the tray (see “Install a DWC tray in the enclosure” on page 150).

   Note: For safety, use the lift tool to install the tray into the rack.
4. Connect all required external cables to the enclosure.

   Note: Use extra forces to connect QSFP cables to the enclosure if Mellanox ConnectX-6 adapters are installed.
5. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

Watch the procedure on YouTube

Processor replacement

Use the following procedures to replace an assembled processor.

Attention: Before reusing a processor or heat sink, make sure you use Lenovo proven alcohol cleaning pad and thermal grease.

Important: The processor in your solution can throttle in response to thermal conditions, temporarily lowering its speed to reduce heat output. In instances where a few processor cores are throttled for an extremely short time period (100 ms or less), the only indication might be an entry in the operating system event log with no corresponding entry in the system XCC event log. If this situation occurs, the event can be ignored and processor replacement is not required.

Remove a processor

This task has instructions for removing an assembled processor. This task requires a Torx T30 driver.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.
- If the Intel® Xeon® Platinum 8368Q processor is installed, the supported water temperature is 2°C - 35°C (35.6°F - 95°F).
- Each processor socket must always contain a cover. When removing or installing a processor, protect empty processor sockets with a cover.
- Do not touch the processor socket or processor contacts. Processor-socket contacts are very fragile and easily damaged. Contaminants on the processor contacts, such as oil from your skin, can cause connection failures.
- Do not allow the thermal grease on the processor or water loop to come in contact with anything. Contact with any surface can compromise the thermal grease, rendering it ineffective. Thermal grease can damage components, such as electrical connectors in the processor socket. Do not remove the grease cover from the cold plate until you are instructed to do so.
- To avoid damaging the water loop, always use the water loop carrier when removing, installing or folding the water loop.
- Before you install a new or replace a processor, update your system firmware to the latest level. See “Update the firmware” in the *ThinkSystem SD650 V2/SD650-N V2 Neptune® DWC Trays and DW612 Neptune® DWC Enclosure Setup Guide*.
- To avoid damaging the water loop, always use the water loop carrier when removing, installing or folding the water loop.

Prepare the following screwdrivers to ensure you can install and remove corresponding screws properly.

Screwdriver Type	Screw Type
Torx T10 head screwdriver	Torx T10 screw
Torx T30 head screwdriver	Torx T30 screw
Phillips #1 head screwdriver or 3/16" hex head screwdriver	Phillips #1 screw
Phillips #2 head screwdriver	Phillips #2 screw

Procedure

Step 1. Make preparations for this task.

a. Remove the tray (see “Remove a DWC tray from the enclosure” on page 149).

Attention: For safety, use the lift tool to remove the tray from the rack.

b. Remove the tray cover (see “Remove the tray cover” on page 152).

c. Remove the front and the rear cross braces (14x Phillips #1 screws).

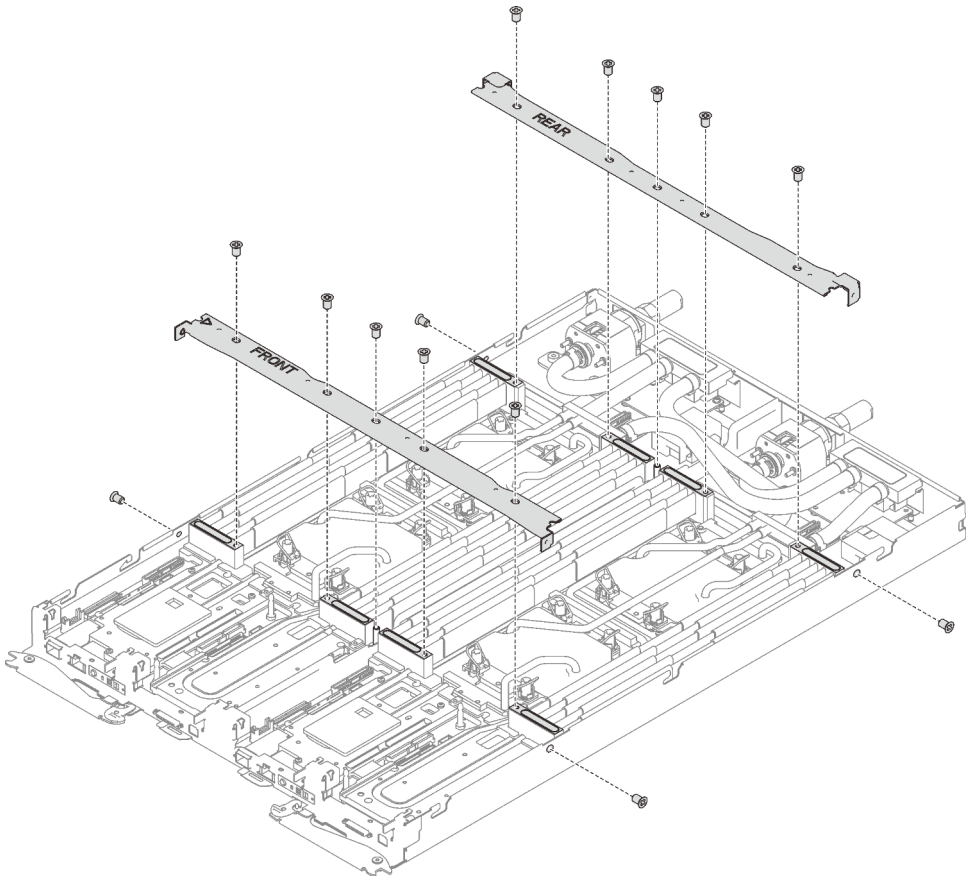


Figure 198. Cross brace removal

d. Remove the DIMM comb from the affected node (see “Remove a DIMM comb” on page 166).

e. Remove DIMMs from the affected node (see “Remove a memory module” on page 159).

f. Remove M.2 Backplanes from the node (see “Remove the M.2 backplane” on page 182).

g. Remove drive cage assemblies from the node if applicable (see “Remove a drive cage assembly” on page 173).

h. Remove PCIe riser assemblies from the node if applicable (see “Remove a PCIe adapter” on page 191).

i. Remove two Torx T10 screw (per node); then, slide the VR (voltage regulator) clamp plate out of the node.

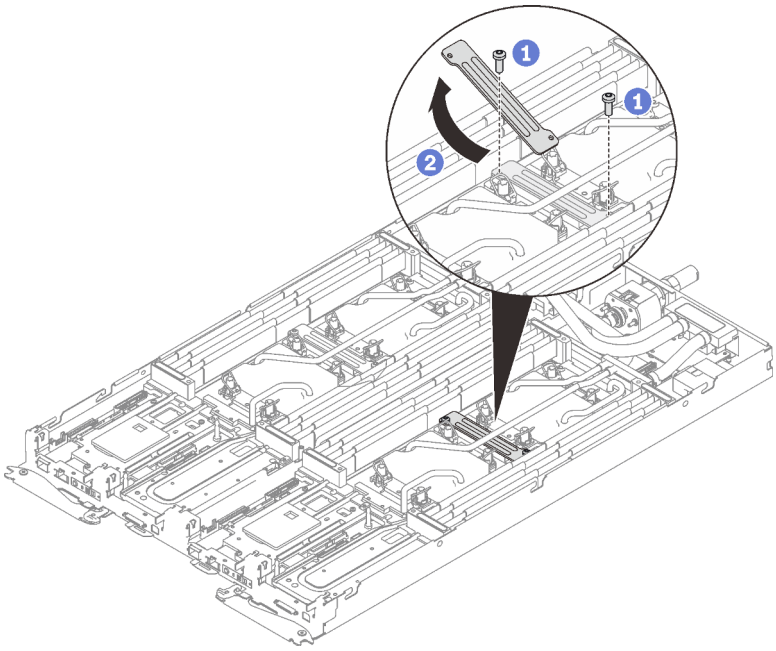


Figure 199. VR clamp plate removal

j. Remove water loop screws (13x Torx T10 screws per node) with a torque screwdriver sets to the proper torque.

Note: For reference, the torque required for the screws to be fully tightened/removed is 0.5-0.6 newton-meters, 4.5-5.5 inch-pounds.

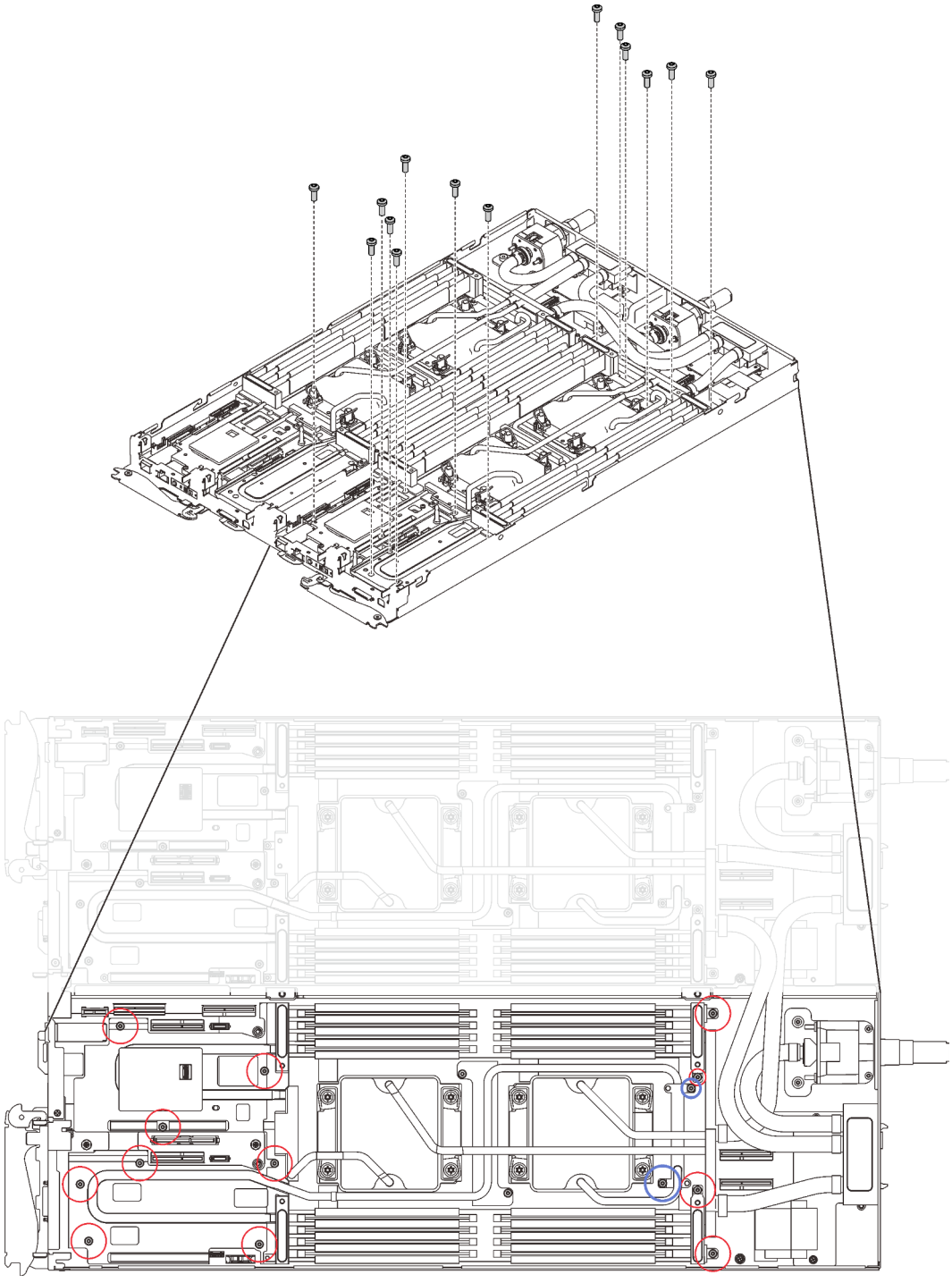


Figure 200. Water loop screws removal

k. Remove the following screws to loosen the quick connect.

- Four Torx T10 screws (per node) to loosen the quick connect.
- Two Phillips #1 screws (per node) on the rear of the node.

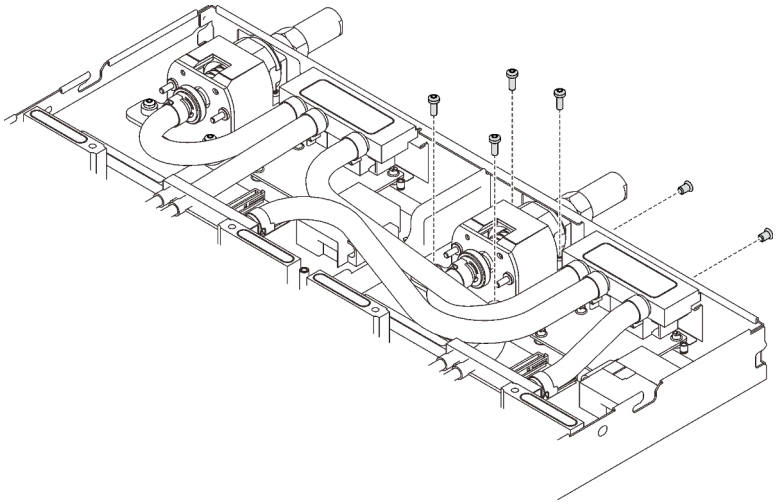


Figure 201. Screws removal

l. Orient the water loop carrier with the M.2 backplane guide pin; then, gently put the water loop carrier down and ensure it is seated firmly on the water loop.

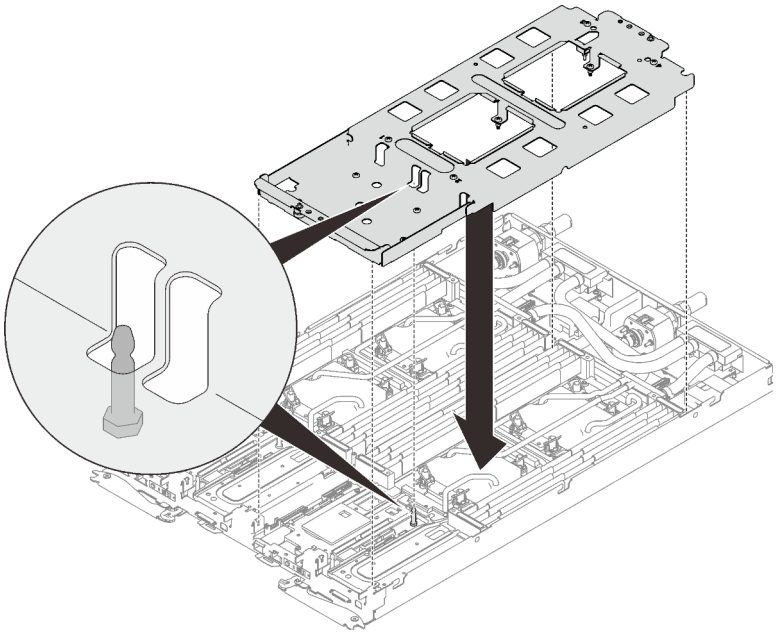


Figure 202. Water loop carrier installation

m. Tighten water loop carrier screws (12x Phillips #2 screws per node).

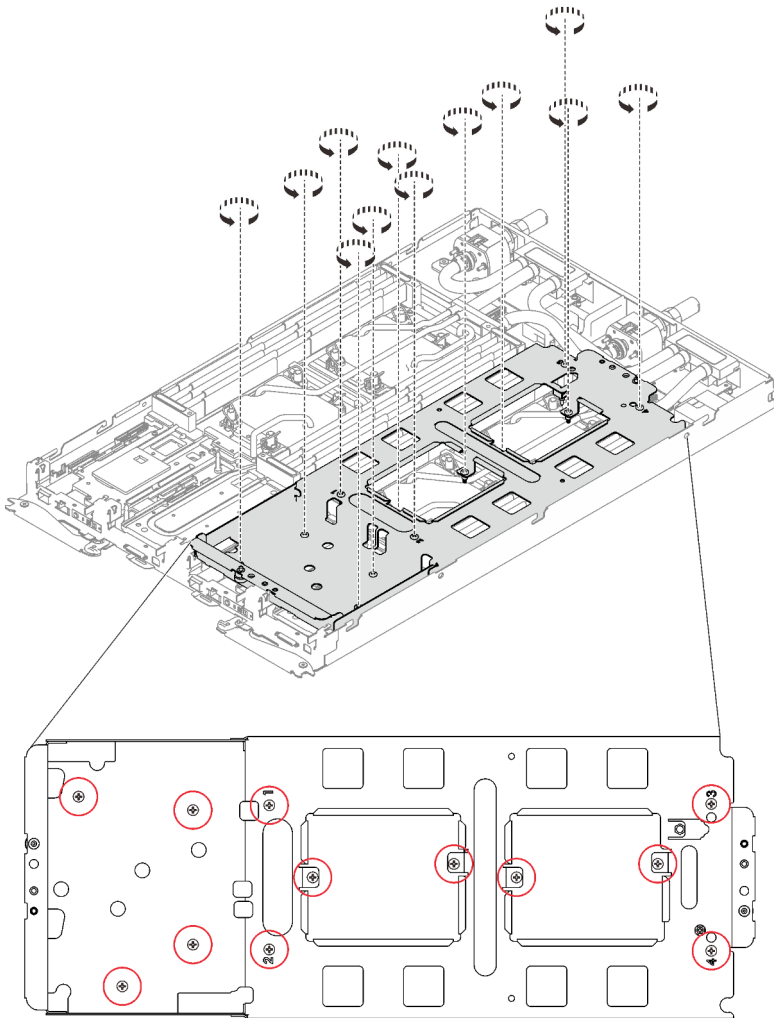


Figure 203. Water loop carrier screws installation

n. Loosen processors properly.

1. ❶ Fully loosen all Torx T30 captive screws (8x Torx T30 captive screws per node) on cold plates with a general screwdriver until they stop, following the removal sequence shown on the cold plate label.

   Note: For reference, the torque required for the screws to be fully tightened/removed is 1.1-1.15 newton-meters, 9.8-10.2 inch-pounds.

   Attention: To prevent damage to components, make sure that you follow the indicated loosening sequence.

2. ❷ Rotate all anti-tilt wire bails (8x anti-tilt wire bails per node) inwards to the unlocked position.

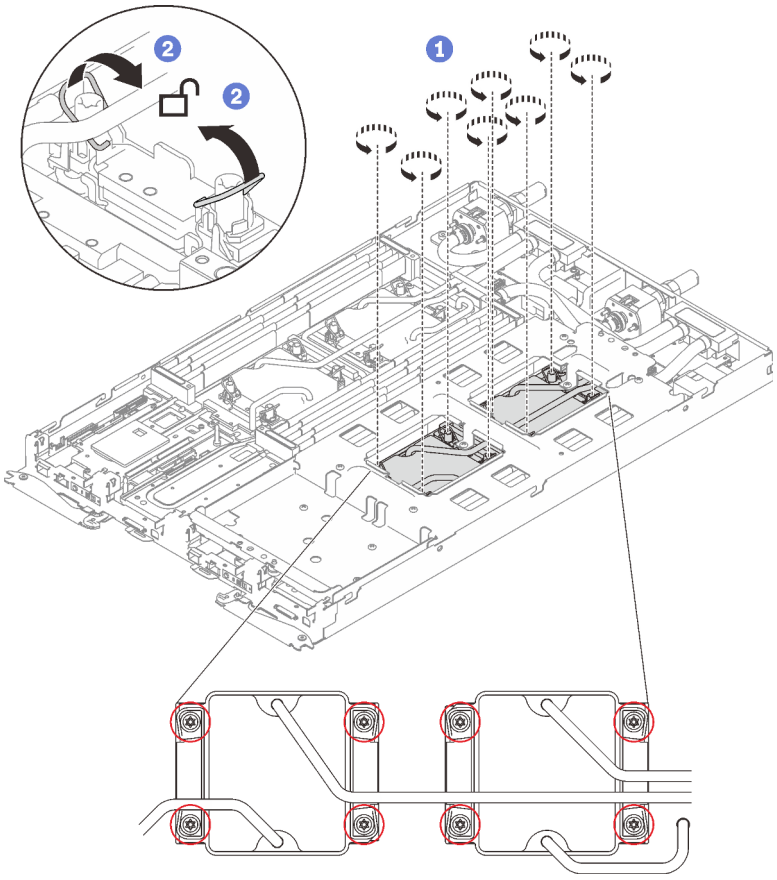


Figure 204. Loosening processors

o. Fold the water loop.

1. ❶ Carefully unhook the quick connect and slide it out of the opening in the rear of the tray; then, lift the water loop up off the system board.
2. ❷ Carefully rotate the water loop so one half is sitting on top of the other half.

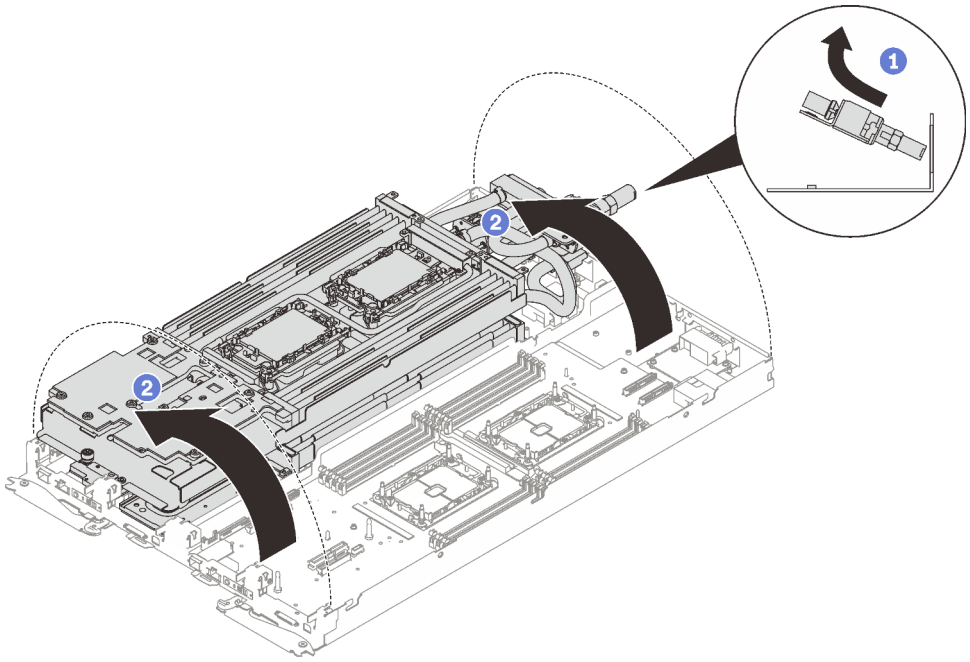


Figure 205. Folding the water loop

Step 2. Remove the processor from the retainer.

Note: Do not touch the contacts on the processor.

a. ❶ Lift the handle to release the processor from the retainer.

b. ❷ Carefully hold the processor by its edges; then, lift the processor from the retainer.

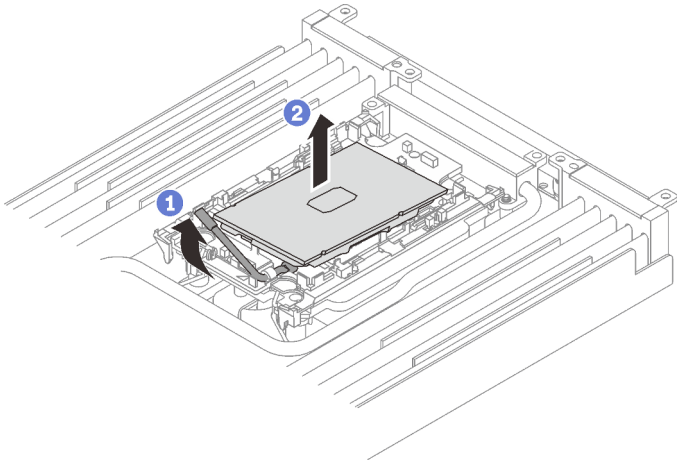


Figure 206. Processor removal

Step 3. Without putting the processor down, wipe the thermal grease from the top of the processor with an alcohol cleaning pad; then, place the processor on a static protective surface with the processor-contact side up.

Step 4. Remove the processor retainer from the underside of the cold plate.

Note: The processor retainer will be discarded and replaced with a new one.

a. ❶ Carefully release the retaining clips from the cold plate.

b. ❷ Lift the retainer from the cold plate.

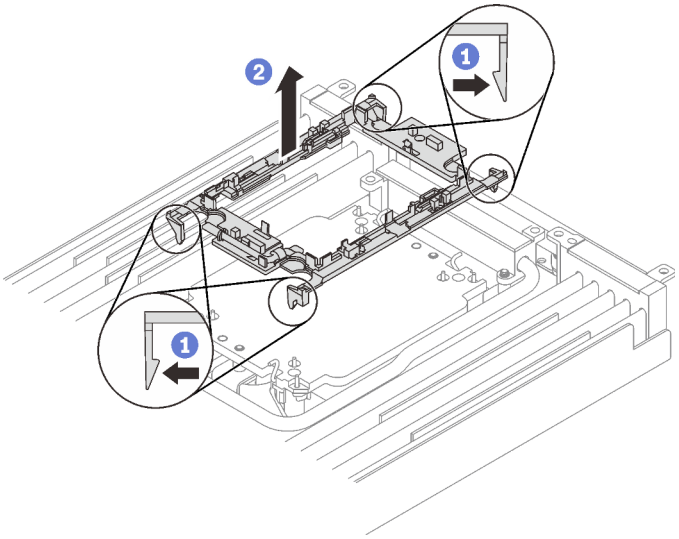


Figure 207. Processor retainer removal

Step 5. Wipe the thermal grease from the bottom of the cold plate with an alcohol cleaning pad.

After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

Watch the procedure on YouTube

Install a processor

This task has instructions for installing a processor. This task requires a Torx T30 driver.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.
- If the Intel® Xeon® Platinum 8368Q processor is installed, the supported water temperature is 2°C - 35°C (35.6°F - 95°F).
- Each processor socket must always contain a cover. When removing or installing a processor, protect empty processor sockets with a cover.
- Do not touch the processor socket or processor contacts. Processor-socket contacts are very fragile and easily damaged. Contaminants on the processor contacts, such as oil from your skin, can cause connection failures.
- Do not allow the thermal grease on the processor or water loop to come in contact with anything. Contact with any surface can compromise the thermal grease, rendering it ineffective. Thermal grease can damage components, such as electrical connectors in the processor socket. Do not remove the grease cover from the cold plate until you are instructed to do so.
- To avoid damaging the water loop, always use the water loop carrier when removing, installing or folding the water loop.
- Before you install a new or replace a processor, update your system firmware to the latest level. See “Update the firmware” in the *ThinkSystem SD650 V2/SD650-N V2 Neptune® DWC Trays and DW612 Neptune® DWC Enclosure Setup Guide*.
- To avoid damaging the water loop, always use the water loop carrier when removing, installing or folding the water loop.

Notes:

- See https://serverproven.lenovo.com/ for a list of processors supported for your system. All processors on the system board must have the same speed, number of cores, and frequency.
- Optional devices available for your system might have specific processor requirements. See the documentation that comes with the optional device for information.
- Ensure you have “SD650 V2 or SD650-N V2 Neptune® DWC Waterloop Service Kit “ in hand to install components.

Prepare the following screwdrivers to ensure you can install and remove corresponding screws properly.

Screwdriver Type	Screw Type
Torx T10 head screwdriver	Torx T10 screw
Torx T30 head screwdriver	Torx T30 screw

Phillips #1 head screwdriver or 3/16" hex head screwdriver	Phillips #1 screw
Phillips #2 head screwdriver	Phillips #2 screw

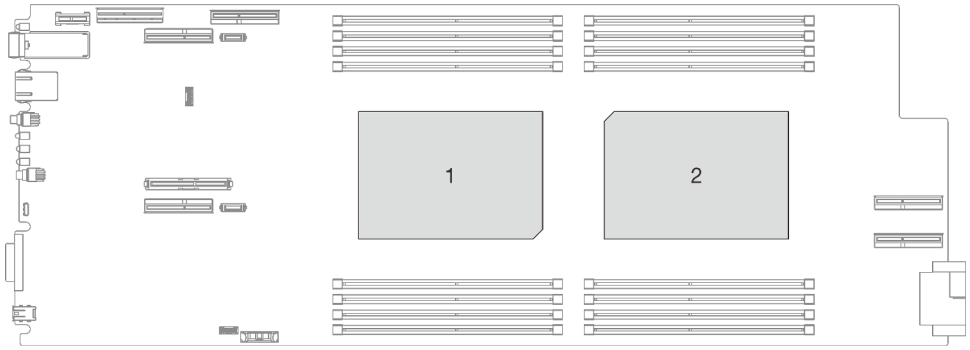


Figure 208. Processor locations

Procedure

Step 1. Follow the following steps if you are replacing processors:

a. If there is any old thermal grease on the processor and the cold plate, gently clean the top of the processor and the cold plate using an alcohol cleaning pad.

b. Remove the processor identification label from the water loop and replace it with the new label that comes with the replacement processor. If you are unable to remove the label and place it on the new water loop, or if the label is damaged during transfer, write the processor serial number from the processor identification label on the new water loop in the same location as the label would be placed using a permanent marker.

c. Apply approximately 0.65 g of the new thermal grease to the center of the processor top. If you have cleaned the top of the processor with an alcohol cleaning pad, make sure to apply the new thermal grease after the alcohol has fully evaporated.

Notes:

- Carefully place the processor and retainer on a flat surface with the processor-contact side down.

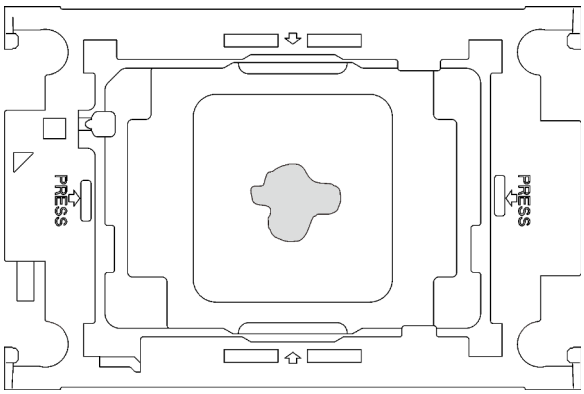


Figure 209. Thermal grease application

Step 2. Install processor retainers onto processors if needed.

a. Align the triangular mark on the processor retainer with the triangular mark on the processor corner edge.

b. Gently place the processor retainer on the processor; then, carefully press the four sides of the processor retainer to secure the processor.

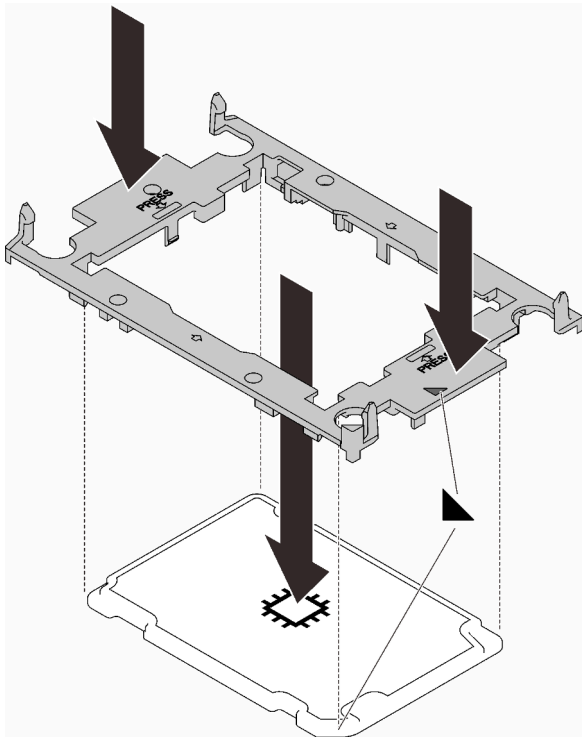


Figure 210. Installing a processor retainer

Step 3. Remove two plastic grease covers if needed.

a. ❶ Use a scissors to cut off tapes.

b. ❷ Remove plastic grease covers from underside of water loop cold plates.

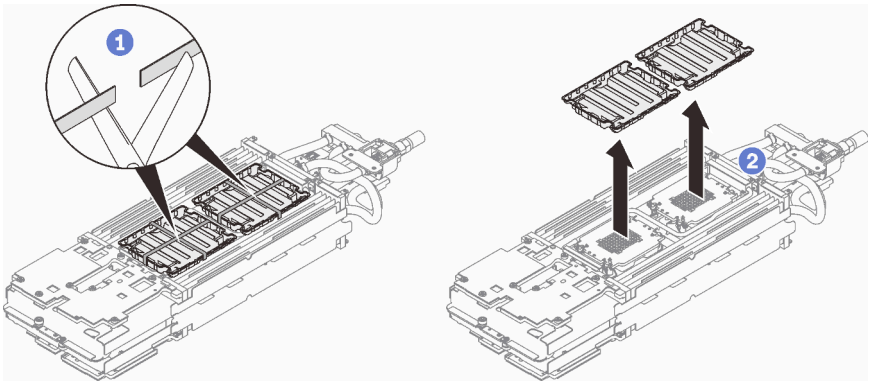


Figure 211. Plastic grease covers removal

Step 4. Align the triangular marks on the processor retainers with the triangular slots on the underside of the water loop cold plate; then, attach the processors to the underside of the water loop cold plate by inserting the processor retainer posts and clips features into the openings at the four corners of the cold plate.

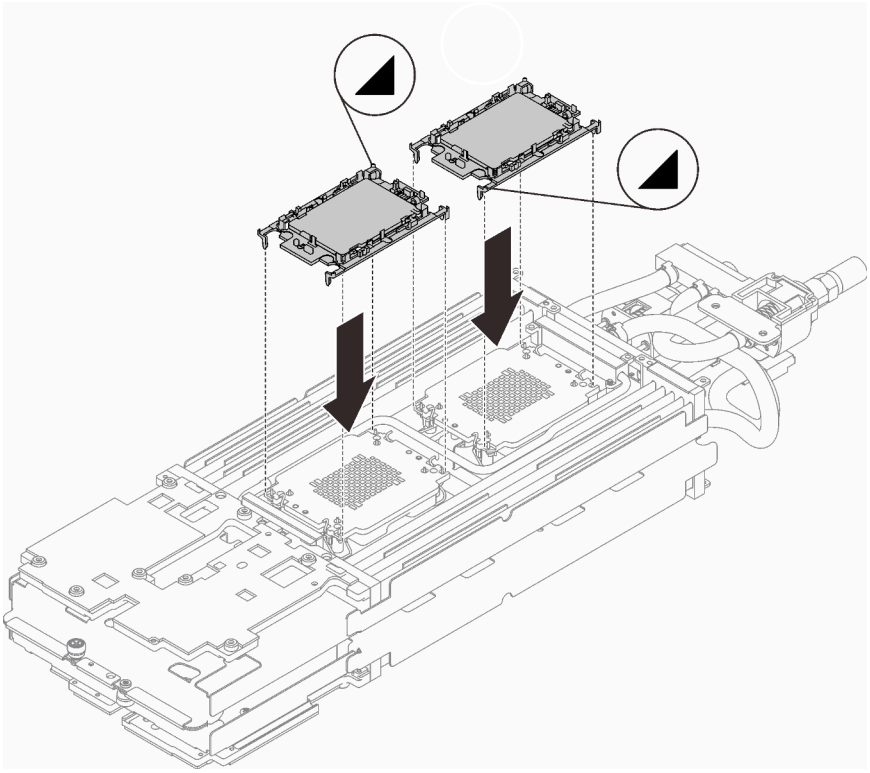


Figure 212. Processor installation

Step 5. Rotate all anti-tilt wire bails (8x anti-tilt wire bails per node) outwards to the unlocked position.

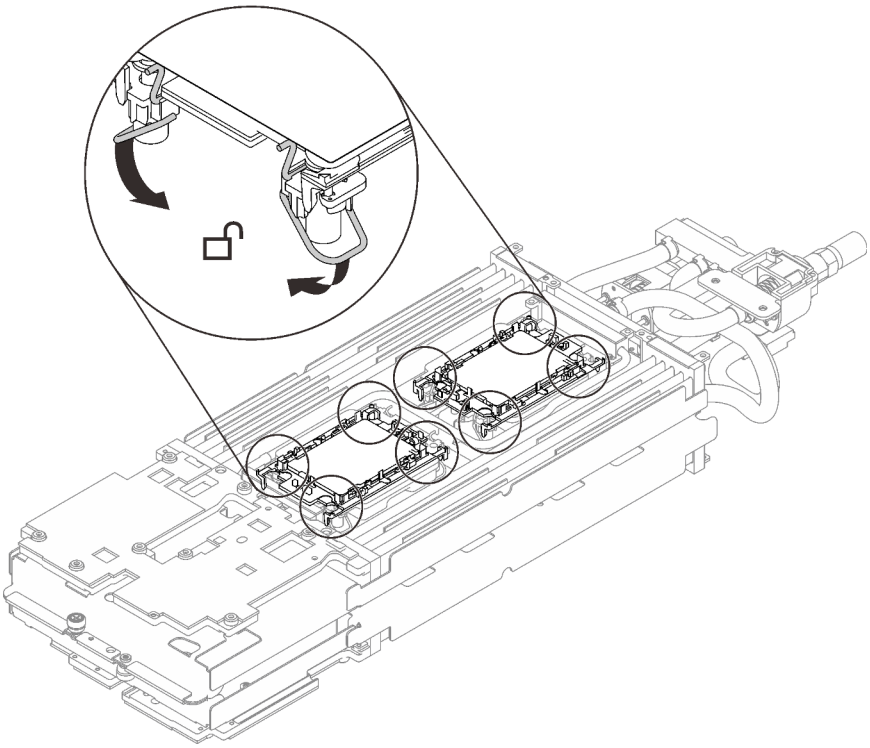


Figure 213. Processor - unlocked position

Step 6. Check the gap pads on the water loop, if any of them are damaged or missing, replace them with the new ones.

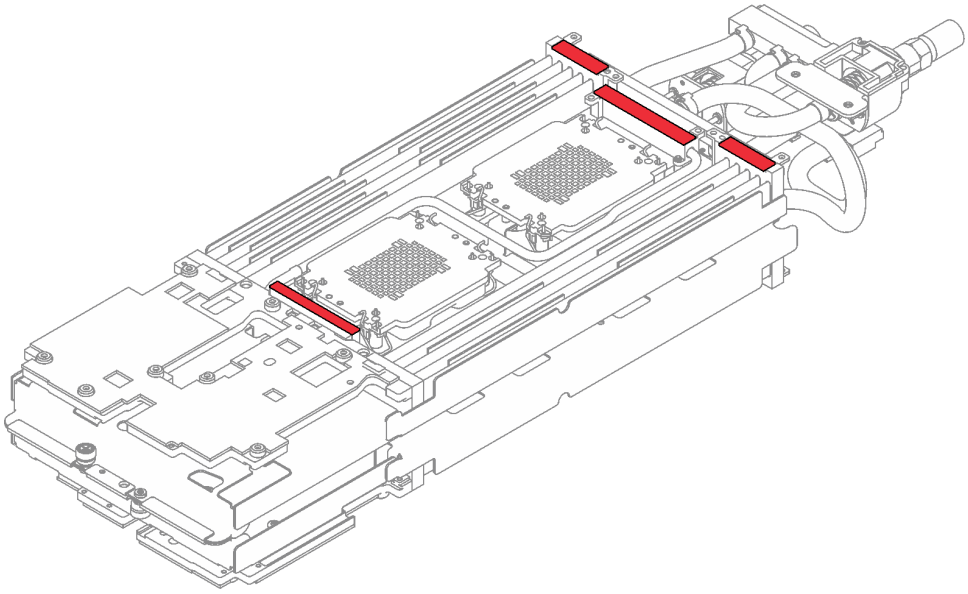


Figure 214. Water loop - Gap pads

Step 7. Reinstall the water loop.

a. ❶ Carefully rotate the top side of the water loop.

b. ❷ Carefully insert the quick connect into the tray opening as shown.

c. ❸ Carefully position the water loop on two guide pins near the rear of the node; then, gently put the water loop down and ensure it is firmly seated on the system board.

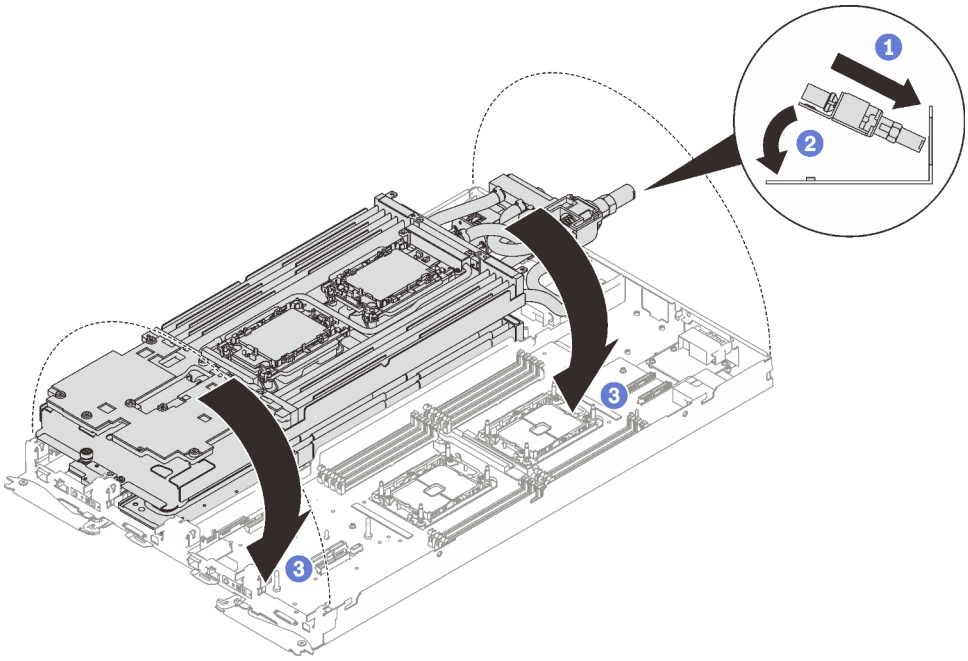


Figure 215. Water loop installation

Step 8. Ensure the processors are secured properly.

a. ❶ Rotate anti-tilt wire bails (8x anti-tilt wire bails per node) outwards to the locked position.

b. ❷ Fully tighten all Torx T30 captive screws (8x Torx T30 captive screws per node) on cold plate with a general screwdriver until they stop, following the installation sequence shown on the cold plate label.

Note: For reference, the torque required for the screws to be fully tightened/removed is 1.1-1.15 newton-meters, 9.8-10.2 inch-pounds.

Attention: To prevent damage to components, make sure that you follow the indicated tightening sequence.

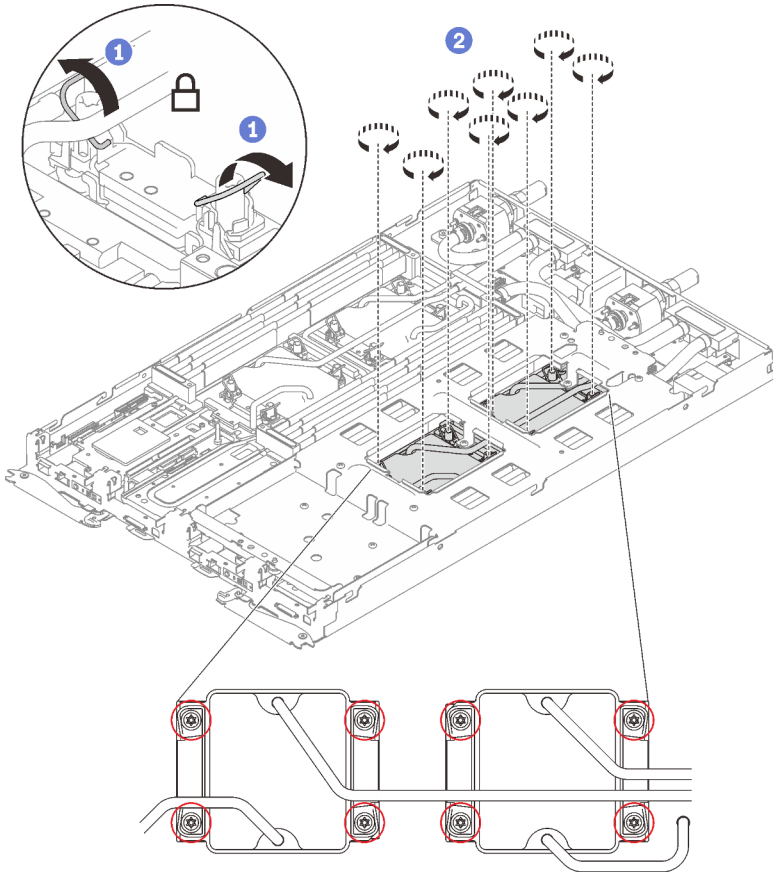


Figure 216. Processors installation

After you finish

1. Loosen water loop carrier screws (12x Phillips #2 screws per node).

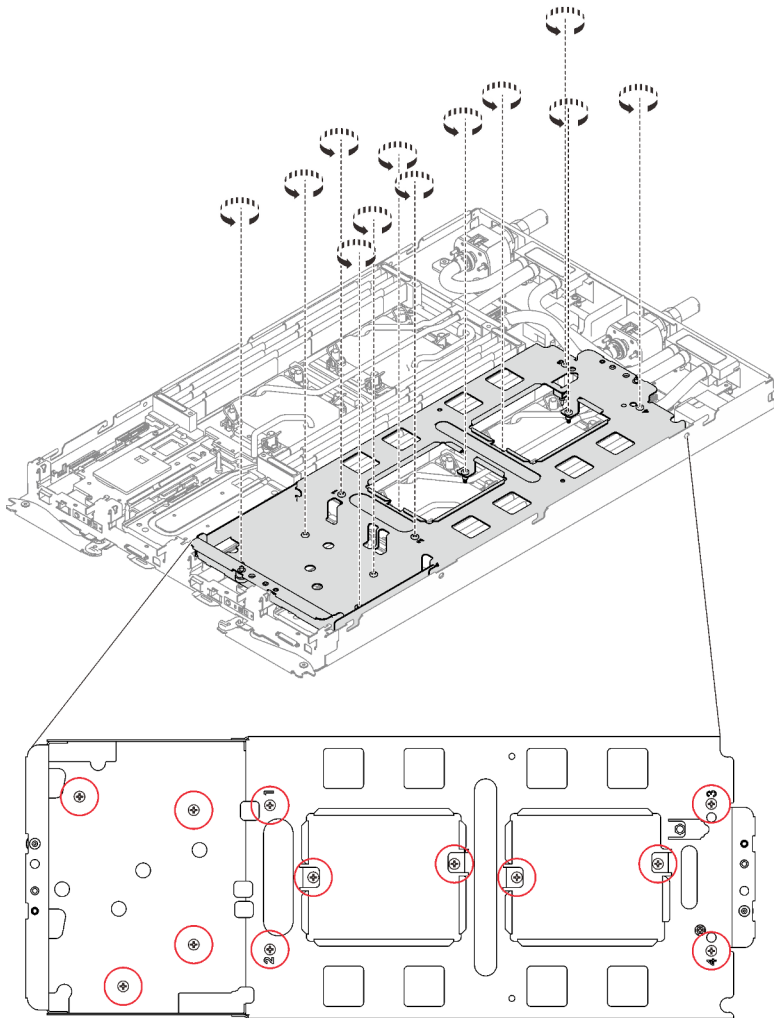


Figure 217. Loosening water loop carrier screws

2. Carefully lift the water loop carrier up and away from the water loop.

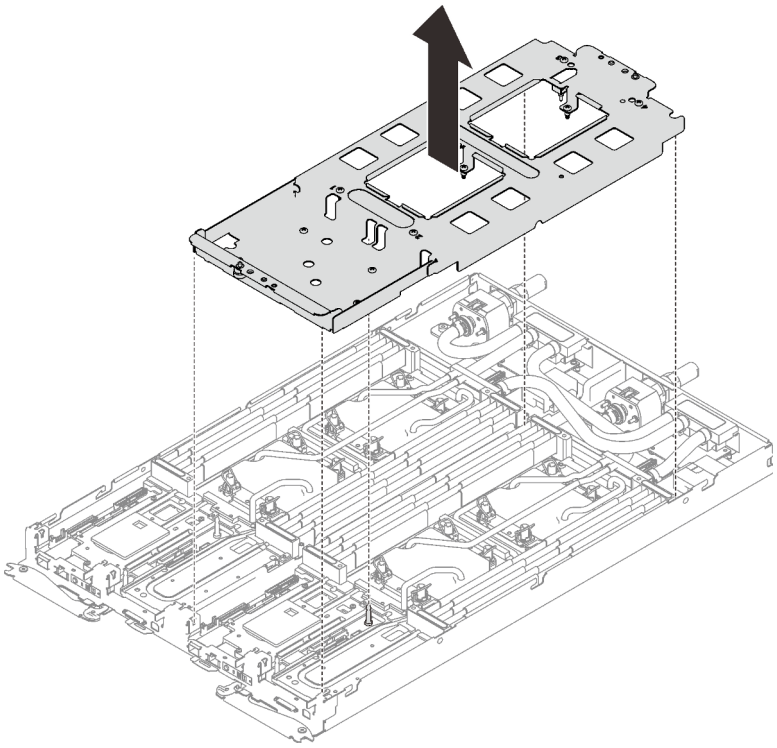


Figure 218. Water loop carrier removal

3. Install the water loop screws (13x Torx T10 screws per node) with a torque screwdriver sets to the proper torque.

   Notes:

   - For reference, the torque required for the screws to be fully tightened/removed is 0.5-0.6 newton-meters, 4.5-5.5 inch-pounds.
   - The screw holes that are circled in blue are meant for 9.5 mm screws, while the others that are circled in red are meant for 8.0 mm ones.

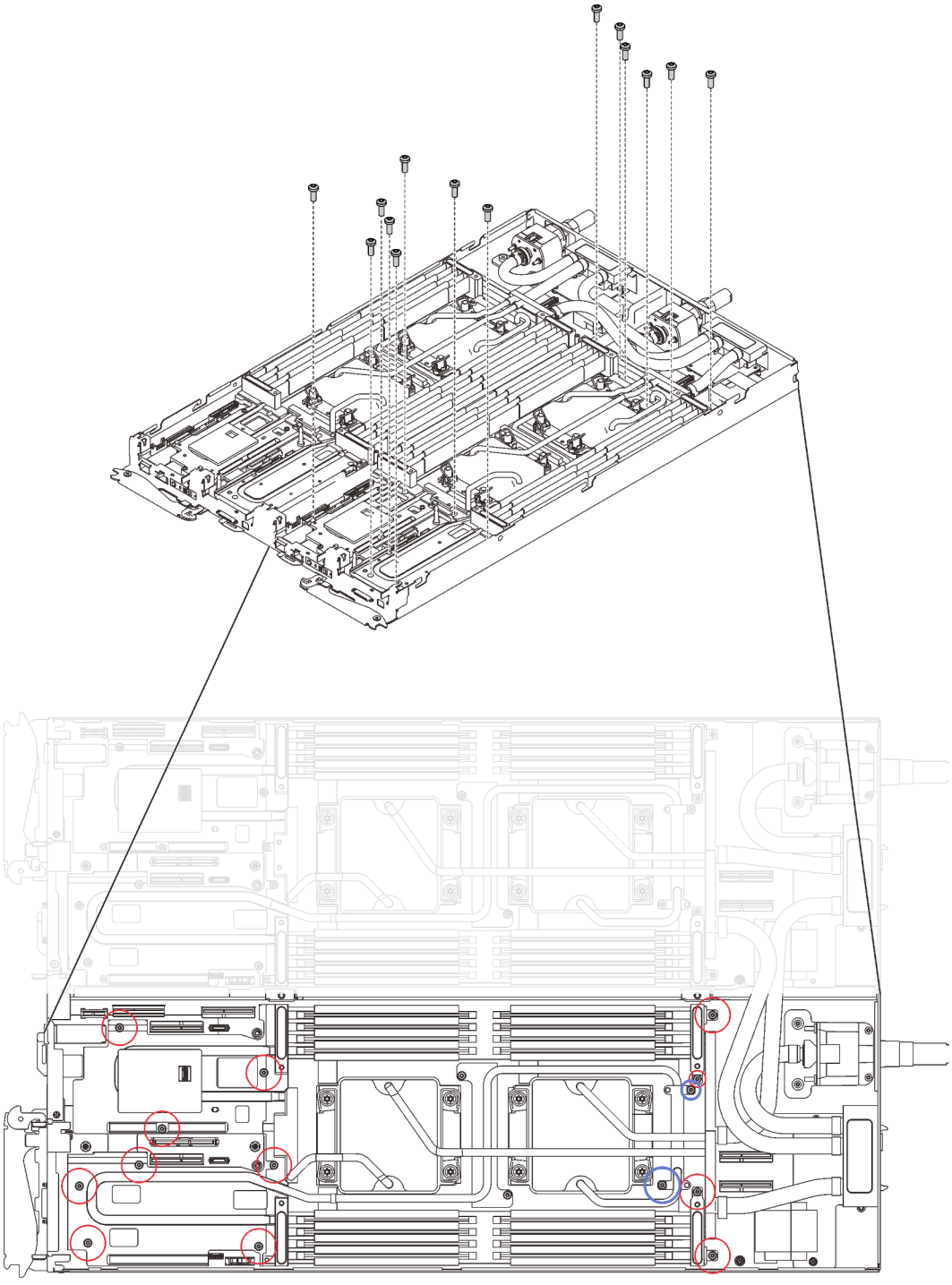


Figure 219. Water loop screws installation

4. Reinstall the following screws.
   - Four Torx T10 screws (per node) to secure the quick connect.
   - Two Phillips #1 screws (per node) on the rear of the node.

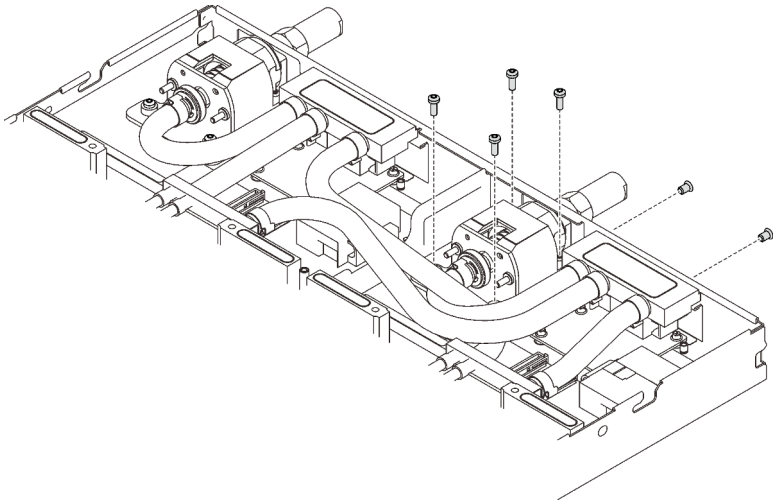


Figure 220. Screws installation

5. Slide the VR clamp plate into the node and install two Torx T10 screws (per node).

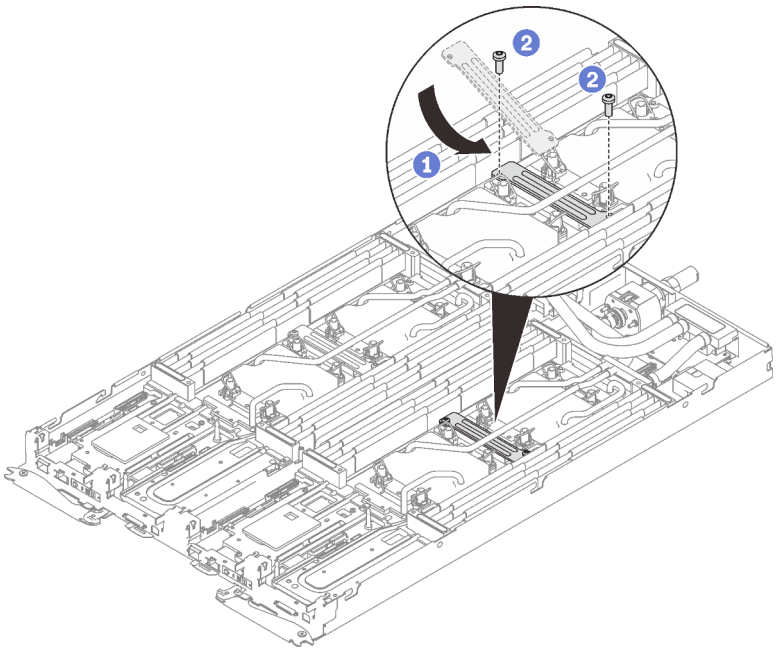


Figure 221. VR clamp plate installation

6. Reinstall DIMMs for both nodes (see “Install a memory module” on page 162).
7. Reinstall DIMM combs. (see “Install a DIMM comb” on page 167).
8. Reinstall M.2 backplanes (see “Install the M.2 backplane” on page 185).
9. Reinstall drive cage assemblies if applicable (see “Install a drive cage assembly” on page 175).
10. Reinstall PCIe rise assemblies if applicable (see “Install a PCIe adapter” on page 195).
11. Reinstall the front and the rear cross braces (14x Phillips #1 screws).

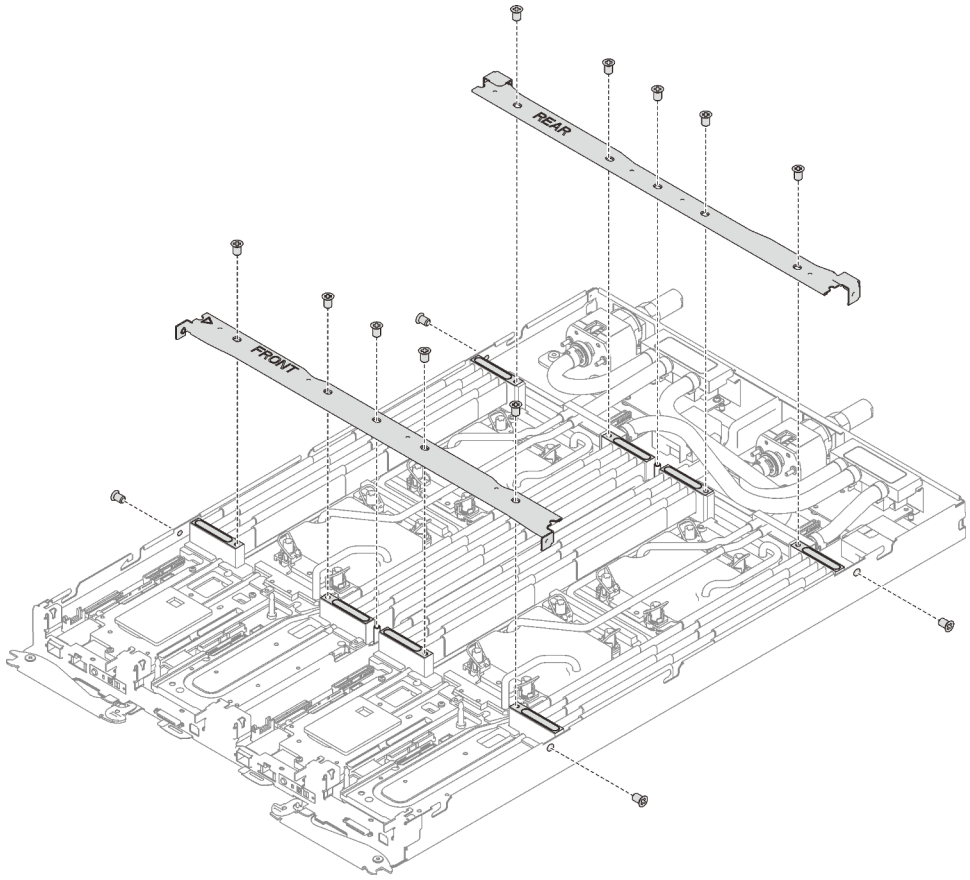


Figure 222. Cross brace installation

12. Reinstall the tray cover (see “Install the tray cover” on page 153).
13. Reinstall the tray (see “Install a DWC tray in the enclosure” on page 150).

    Note: For safety, use the lift tool to install the tray into the rack.
14. Connect all required external cables to the enclosure.

    Note: Use extra forces to connect QSFP cables to the enclosure if Mellanox ConnectX-6 adapters are installed.
15. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

Watch the procedure on YouTube

System board replacement

Use the following procedures to remove and install a system board.

Important: Before you return the system board, make sure that you install the CPU socket dust covers from the new system board. To replace a CPU socket dust cover:

1. Take a dust cover from the CPU socket assembly on the new system board and orient it correctly above the CPU socket assembly on the removed system board.

2. Gently press down the dust cover legs to the CPU socket assembly, pressing on the edges to avoid damage to the socket pins. You might hear a click on the dust cover is securely attached.
3. **Make sure** that the dust cover is securely attached to the CPU socket assembly.

Remove the system board

Use this information to remove the system board.

About this task

S001

DANGER

Electrical current from power, telephone, and communication cables is hazardous.
To avoid a shock hazard:

- **Connect all power cords to a properly wired and grounded electrical outlet/source.**
- **Connect any equipment that will be attached to this product to properly wired outlets/sources.**
- **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.**
- **The device might have more than one power cord, to remove all electrical current from the device, ensure that all power cords are disconnected from the power source.**

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.
- To avoid damaging the water loop, always use the water loop carrier when removing, installing or folding the water loop.

Prepare the following screwdrivers to ensure you can install and remove corresponding screws properly.

Table 36. Screwdriver type list

Screwdriver type	Screw type
Torx T10 head screwdriver	Torx T10 screw

Table 36. Screwdriver type list (continued)

Torx T30 head screwdriver	Torx T30 screw
Phillips #1 head screwdriver or 3/16" hex head screwdriver	Phillips #1 screw
Phillips #2 head screwdriver	Phillips #2 screw
3/16" hex head screwdriver	Hex head screw
2.5x0.4 mm Flat head screwdriver	2.5x0.4 mm flat head screwdriver

Procedure

Step 1. Make preparations for this task.

a. Remove the tray (see “Remove a DWC tray from the enclosure” on page 149).

Attention: For safety, use the lift tool to remove the tray from the rack.

b. Remove the tray cover (see “Remove the tray cover” on page 152).

c. Remove the front and the rear cross braces (14x Phillips #1 screws).

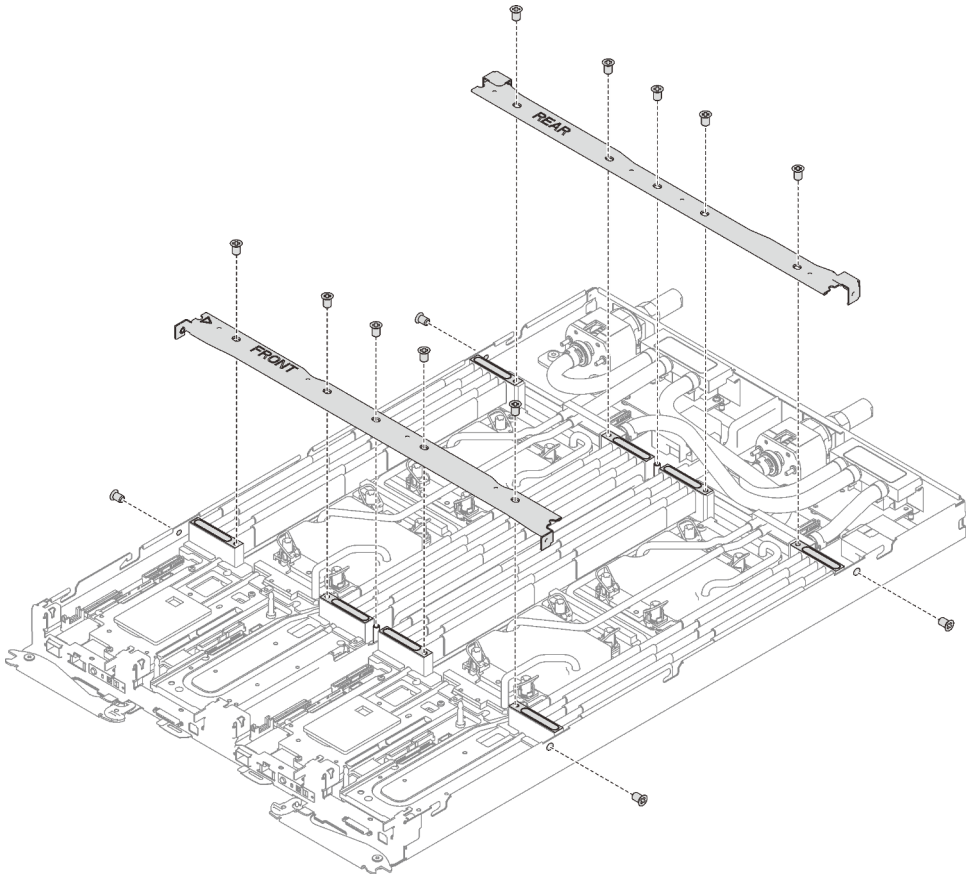


Figure 223. Cross brace removal

d. Remove all DIMM combs (see “Remove a DIMM comb” on page 166).

e. Remove DIMMs from both nodes (see “Remove a memory module” on page 159).

f. Remove M.2 Backplanes from the node (see “Remove the M.2 backplane” on page 182).

g. Remove drive cage assemblies from the node if applicable (see “Remove a drive cage assembly” on page 173).

h. Remove PCIe riser assemblies from the node if applicable (see “Remove a PCIe adapter” on page 191).

i. Remove two Torx T10 screw (per node); then, slide the VR clamp plate out of the node.

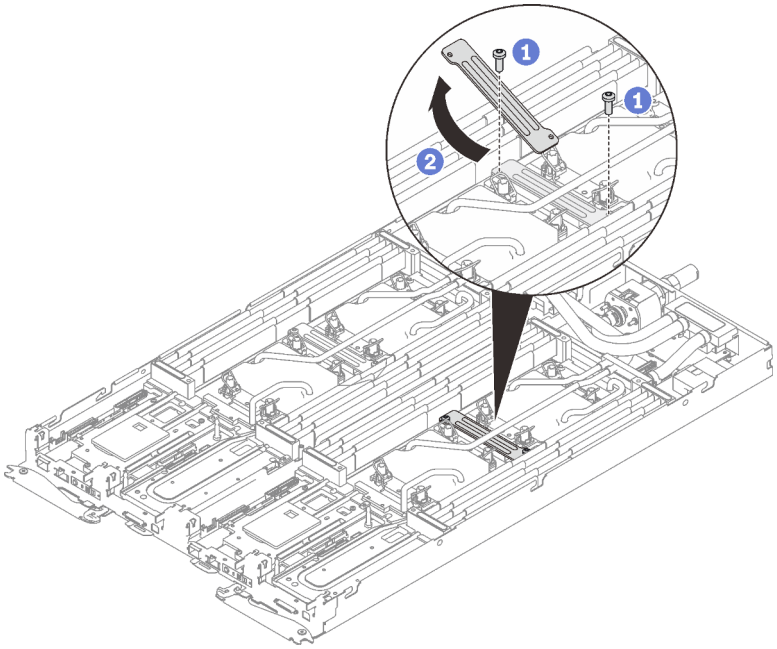


Figure 224. VR clamp plate removal

j. Remove water loop screws (13x Torx T10 screws per node) with a torque screwdriver sets to the proper torque.

Note: For reference, the torque required for the screws to be fully tightened/removed is 0.5-0.6 newton-meters, 4.5-5.5 inch-pounds.

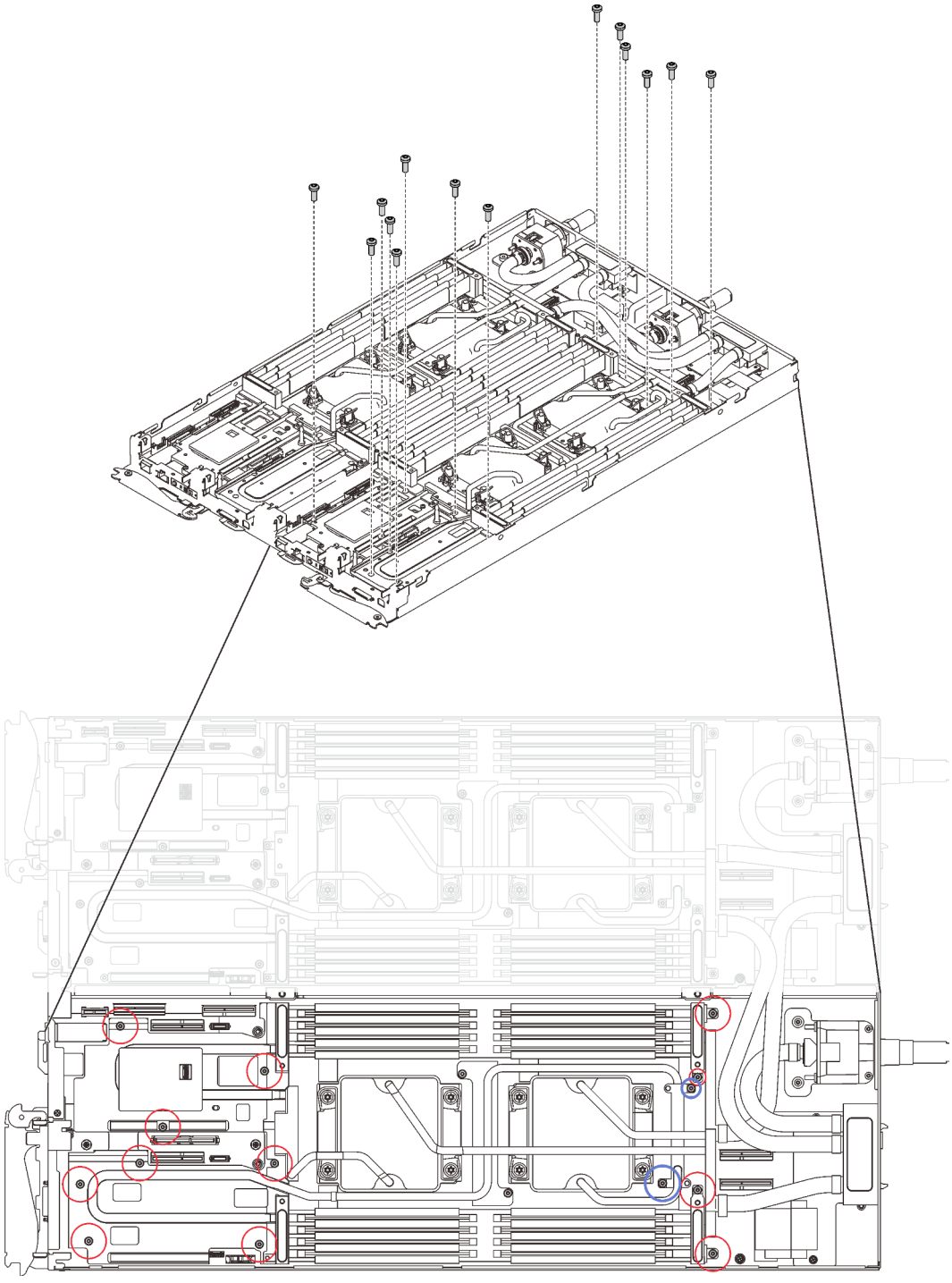


Figure 225. Water loop screws removal

k. Remove the following screws to loosen the quick connect.

- Four Torx T10 screws (per node) to loosen the quick connect.
- Two Phillips #1 screws (per node) on the rear of the node.

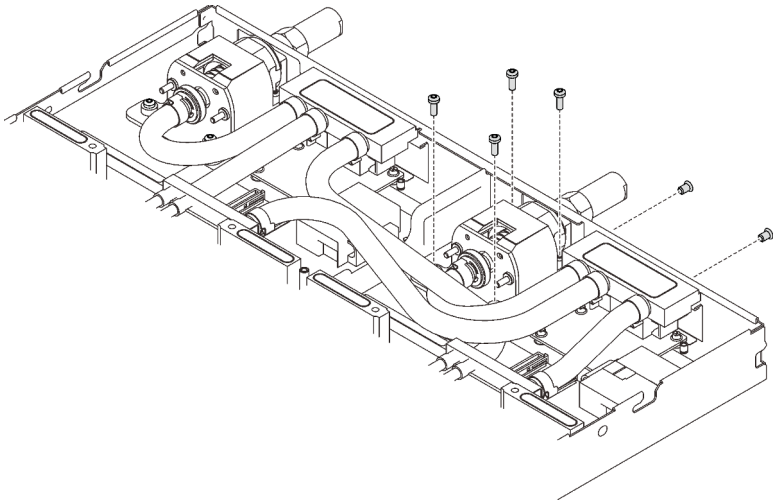


Figure 226. Screws removal

l. Orient the water loop carrier with the M.2 backplane guide pin; then, gently put the water loop carrier down and ensure it is seated firmly on the water loop.

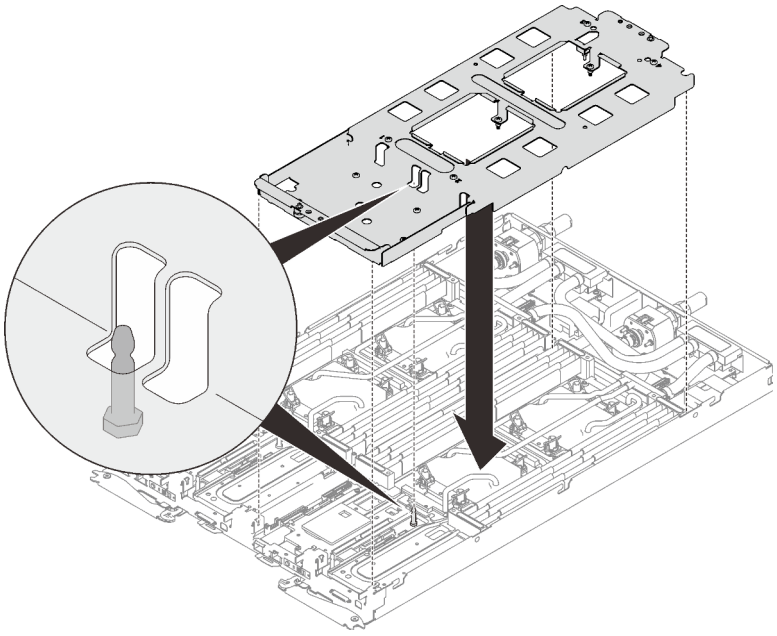


Figure 227. Water loop carrier installation

m. Tighten water loop carrier screws (12x Phillips #2 screws per node).

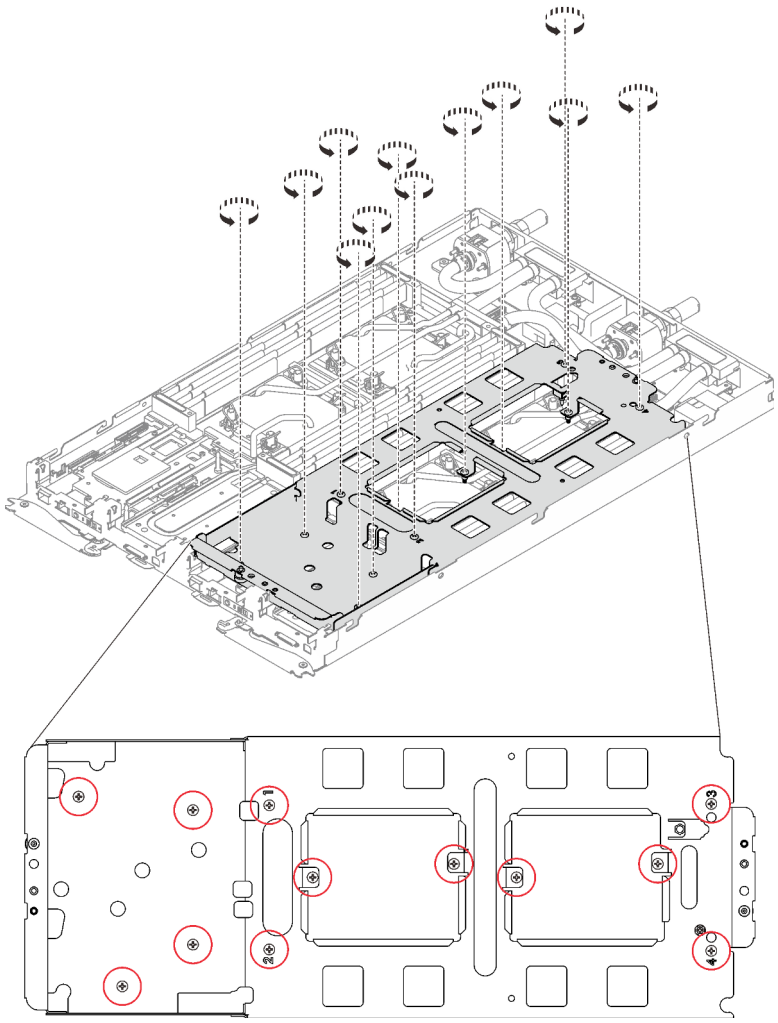


Figure 228. Water loop carrier screws installation

n. Loosen processors properly.

1. ❶ Fully loosen all Torx T30 captive screws (8x Torx T30 captive screws per node) on cold plates in the removal sequence shown on the cold plate label (with a torque screwdriver sets to the proper torque).

   Note: For reference, the torque required for the screws to be fully tightened/removed is 1.1-1.15 newton-meters, 9.8-10.2 inch-pounds.

   Attention: To prevent damage to components, make sure that you follow the indicated loosening sequence.

2. ❷ Rotate all anti-tilt wire bails (8x anti-tilt wire bails per node) inwards to the unlocked position.

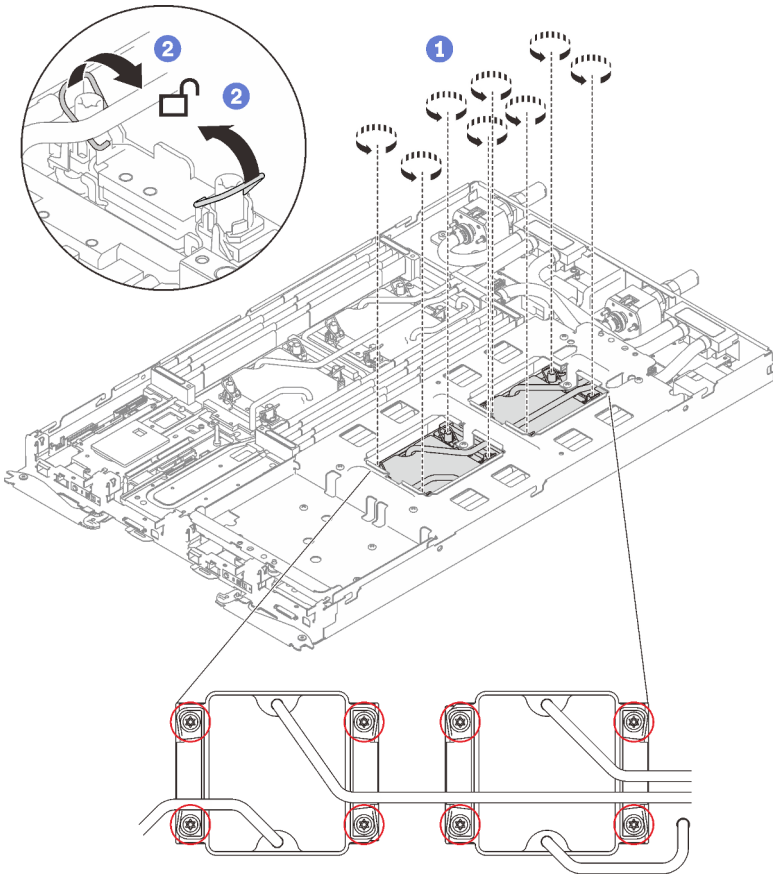


Figure 229. Loosening processors

o. Fold the water loop.

1. ❶ Carefully unhook the quick connect and slide it out of the opening in the rear of the tray; then, lift the water loop up off the system board.
2. ❷ Carefully rotate the water loop so one half is sitting on top of the other half.

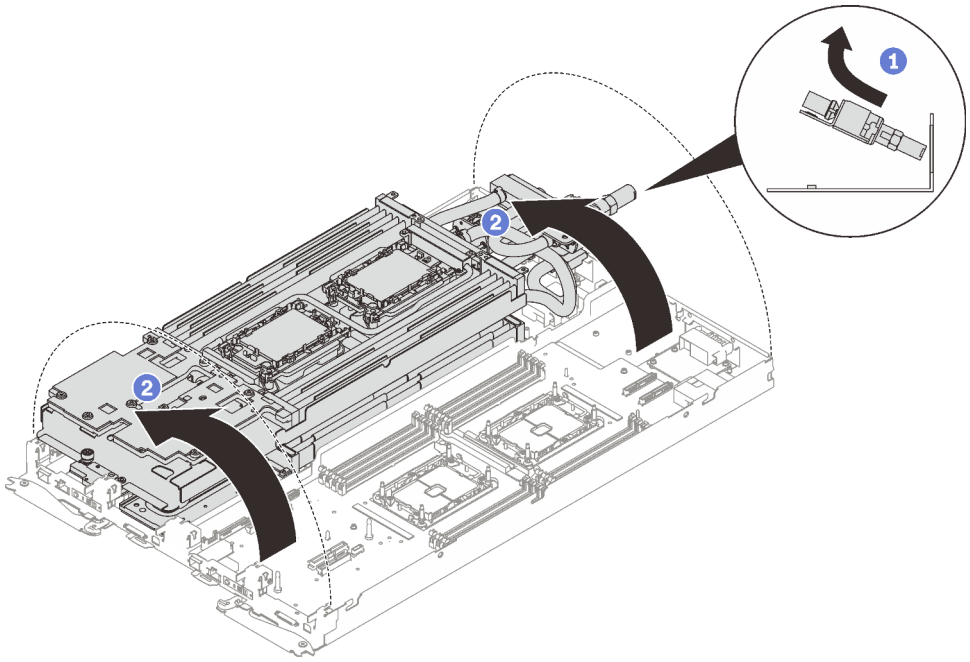


Figure 230. Folding the water loop

p. Remove the twoTorx T10 screws (per node) to remove the VR water loop trough out of the system board.

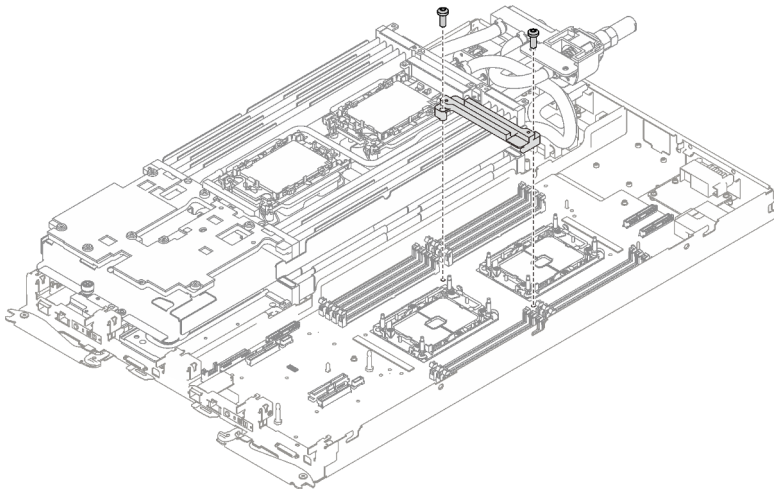


Figure 231. VR water loop trough removal

q. Remove the power distribution board (see “Remove the power distribution board” on page 214).

Step 2. Remove the following screws.

- Five Phillips #1 screws per node on the system board (with a torque screwdriver sets to the proper torque).

  Note: For reference, the torque required for the screws to be fully tightened/removed is 0.5-0.6 newton-meters, 4.5-5.5 inch-pounds.

- Two jackscrews per node at the front of the node.

Notes:

- Use 2.5x0.4 mm Flat head screwdriver to remove and install jackscrews.
- For reference, the torque required for the screws to be fully tightened/removed is 0.059 newton-meters, 0.52 inch-pounds.

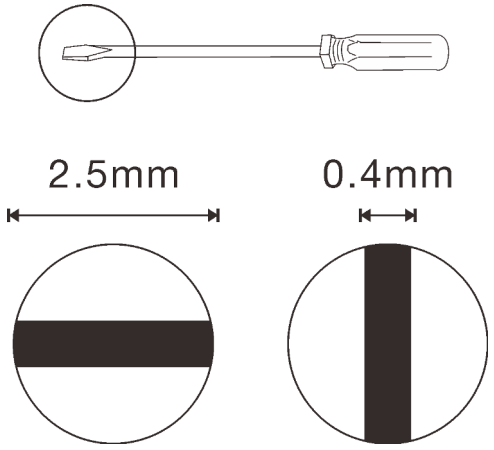


Figure 232. 2.5x0.4 mm Flat head screwdriver

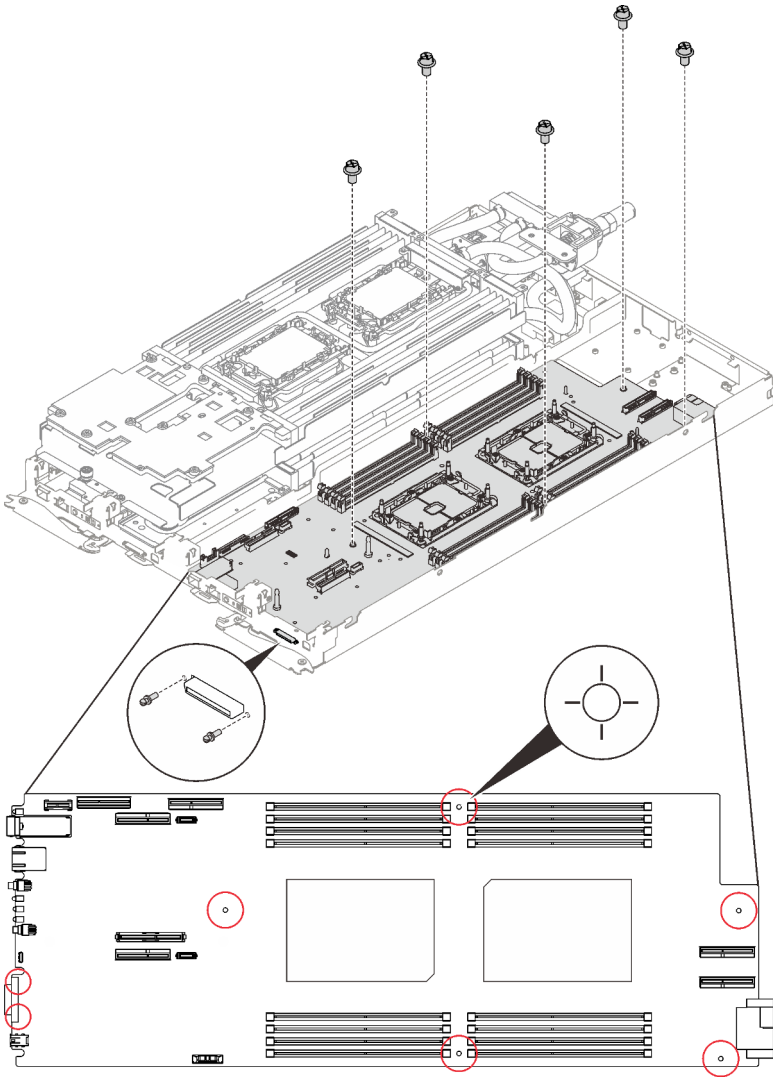


Figure 233. Screws removal

Step 3. Carefully hold the M.2 backplane guide pin and tilt the system board with an angle.

Step 4. Gently slide the system board backward; then, carefully lift and remove the system board from the node.

Note: When you remove the system board from the node, avoid touching the connectors on the system board. Be careful not to damage any surrounding components inside the node.

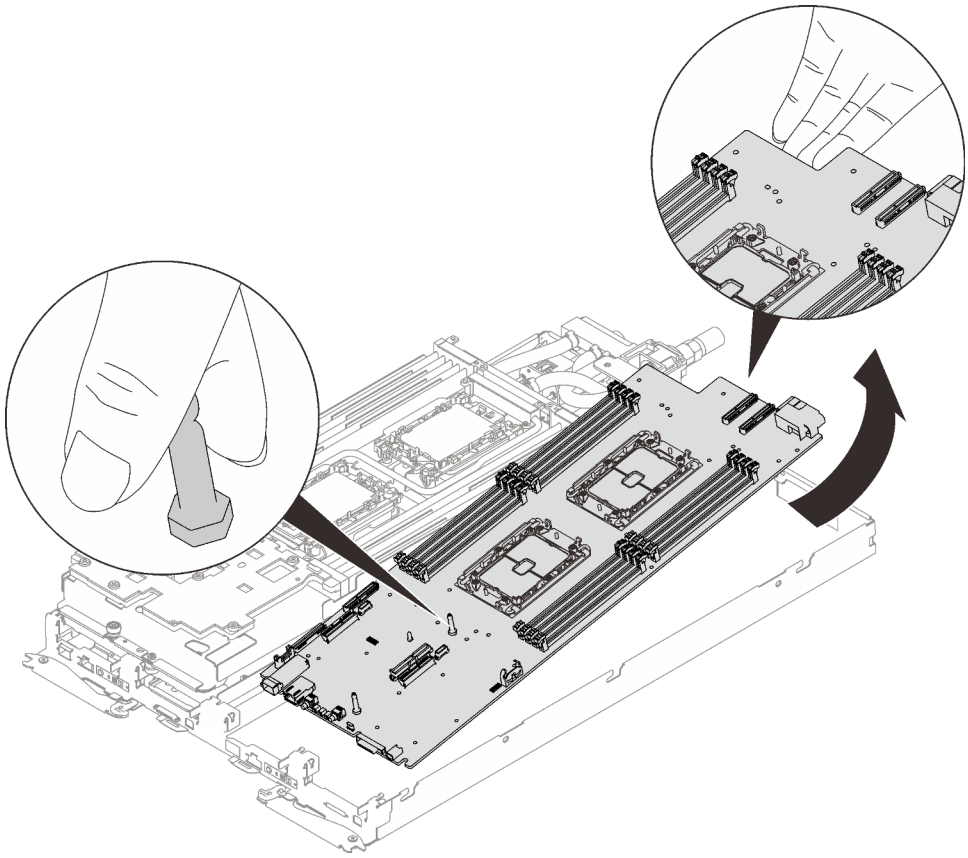


Figure 234. System board removal

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Important: Before you return the system board, make sure that you install the processor socket dust covers from the new system board. To replace a processor socket dust cover:

1. Take a dust cover from the processor socket assembly on the new system board and orient it correctly above the processor socket assembly on the removed system board.
2. Gently press down the dust cover legs to the processor socket assembly, pressing on the edges to avoid damage to the socket pins. You might hear a click on the dust cover is securely attached.
3. **Make sure** that the dust cover is securely attached to the processor socket assembly.

Attention: You can only disassemble the system board for recycle. Do not disassemble it for any other purposes.

1. Remove the two guide pins out of the system board.

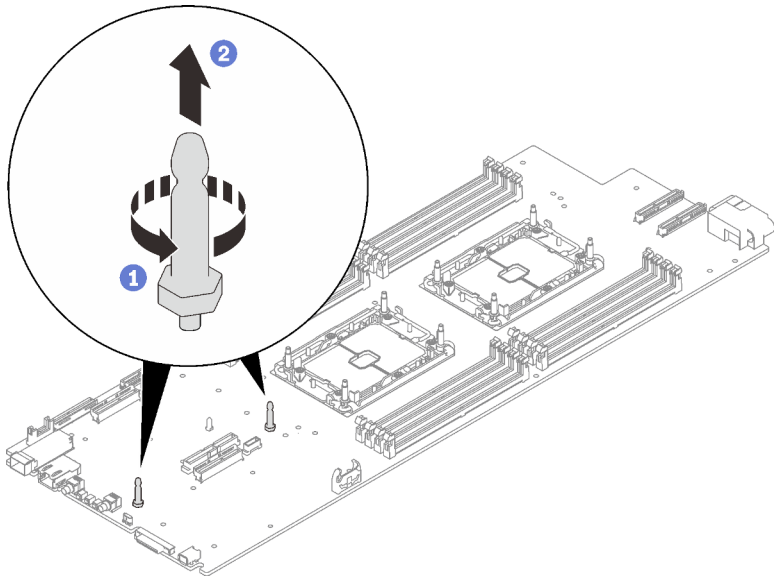


Figure 235. Guide pins removal

2. Recycle the unit in compliance with local regulations.

Demo video

Watch the procedure on YouTube

Install the system board

Use this information to install the system board.

About this task

S001

DANGER

Electrical current from power, telephone, and communication cables is hazardous.
To avoid a shock hazard:

- **Connect all power cords to a properly wired and grounded electrical outlet/source.**
- **Connect any equipment that will be attached to this product to properly wired outlets/sources.**
- **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.**
- **The device might have more than one power cord, to remove all electrical current from the device, ensure that all power cords are disconnected from the power source.**

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.
- To avoid damaging the water loop, always use the water loop carrier when removing, installing or folding the water loop.

Note: Ensure you have “SD650 V2 or SD650-N V2 Neptune® DWC Waterloop Service Kit “ in hand to install components.

Prepare the following screwdrivers to ensure you can install and remove corresponding screws properly.

Table 37. Screwdriver type list

Screwdriver type	Screw type
Torx T10 head screwdriver	Torx T10 screw
Torx T30 head screwdriver	Torx T30 screw
Phillips #1 head screwdriver or 3/16" hex head screwdriver	Phillips #1 screw
Phillips #2 head screwdriver	Phillips #2 screw
3/16" hex head screwdriver	Hex head screw
2.5x0.4 mm Flat head screwdriver	2.5x0.4 mm flat head screwdriver

Procedure

Step 1. Install the system board.

a. Carefully hold the front M.2 guide pin and tilt the system board with an angle.

b. Align the Ethernet connector and VGA connector with corresponding holes; then, gently slide the system board forward.

c. Orient the system board on two guide pins at rear of the node to insure proper alignment; then, carefully insert the system board into the node.

Note: When you install the system board from the node, avoid touching the connectors on the system board. Be careful not to damage any surrounding components inside the node.

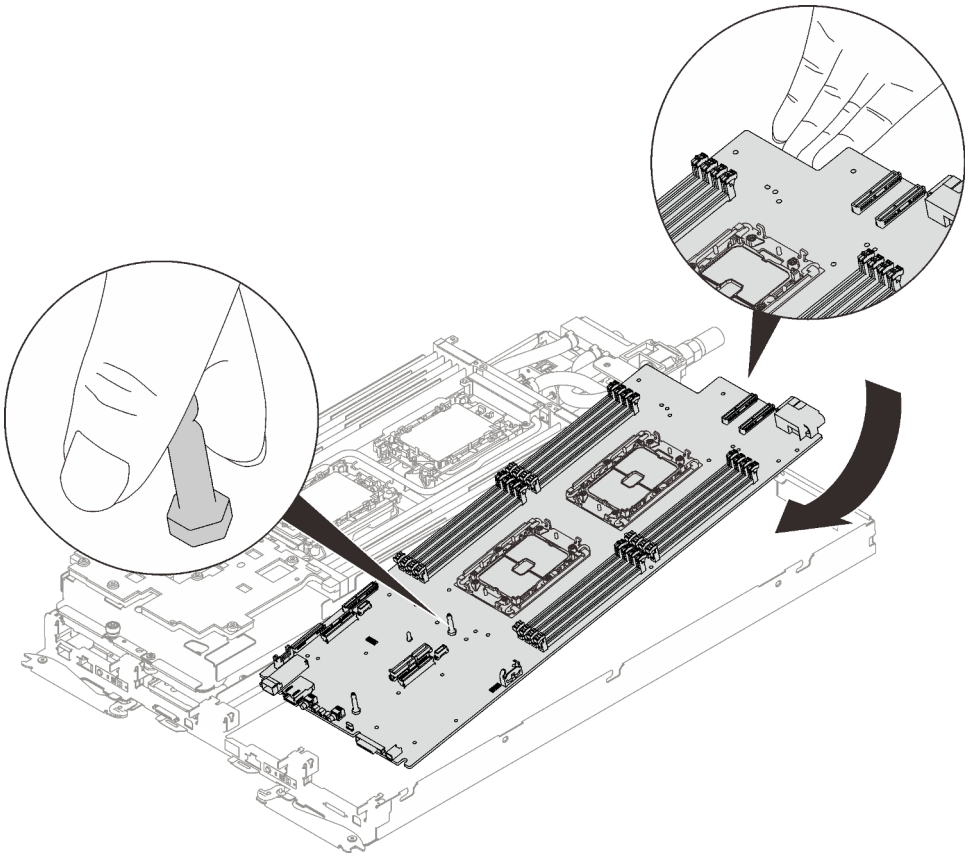


Figure 236. System board installation

Step 2. Install and tighten the following screws.

- Five Phillips #1 screws per node on the system board (with a torque screwdriver sets to the proper torque).

  Note: For reference, the torque required for the screws to be fully tightened/removed is 0.5-0.6 newton-meters, 4.5-5.5 inch-pounds.

- Two jackscrews per node at the front of the node.

  Notes:

  – Use 2.5x0.4 mm Flat head screwdriver to remove and install jackscrews.

  – For reference, the torque required for the screws to be fully tightened/removed is 0.059 newton-meters, 0.52 inch-pounds.

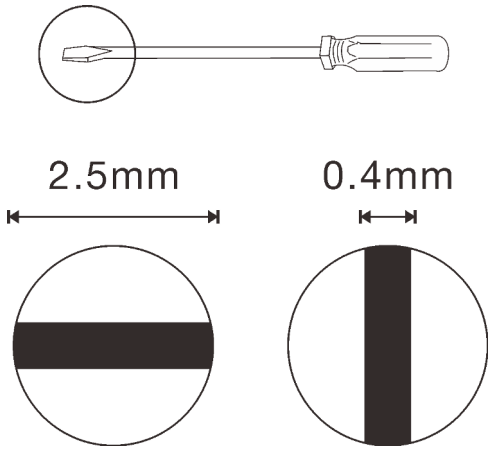


Figure 237. 2.5x0.4 mm Flat head screwdriver

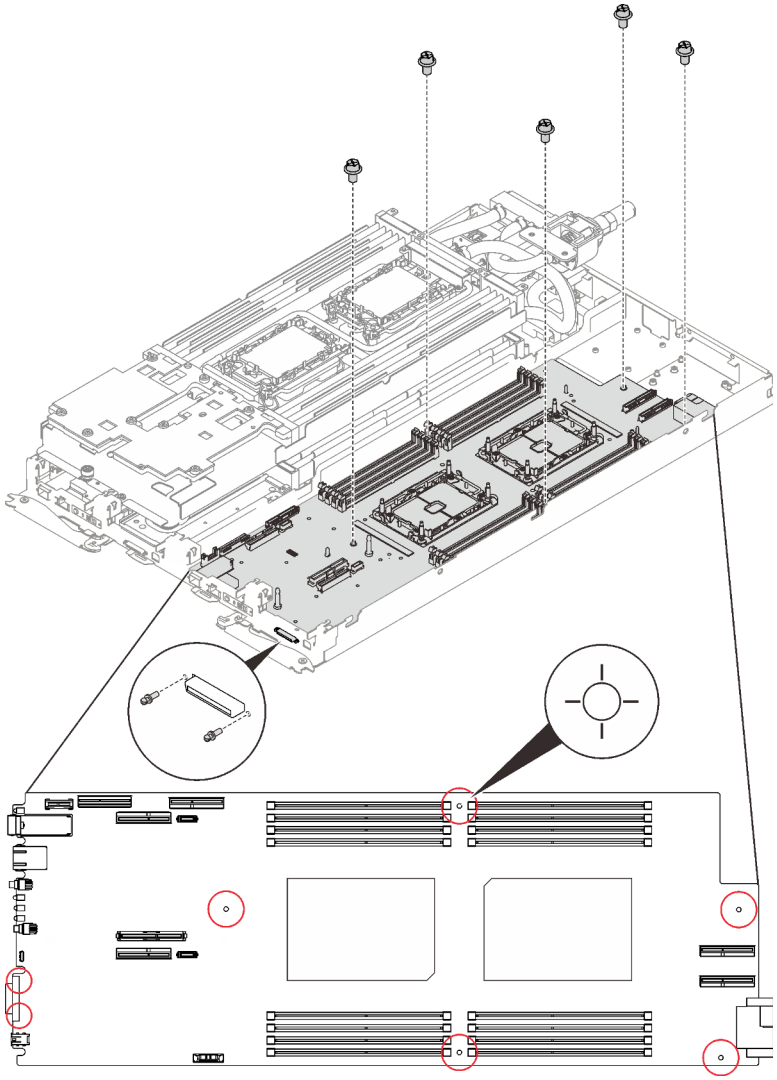


Figure 238. Screws installation

After you finish

1. Reinstall the power distribution board (see “Install the power distribution board” on page 215).
2. Check the gap pads on the reverse side of the VR water loop, replace them with new ones if they are damaged or missing.

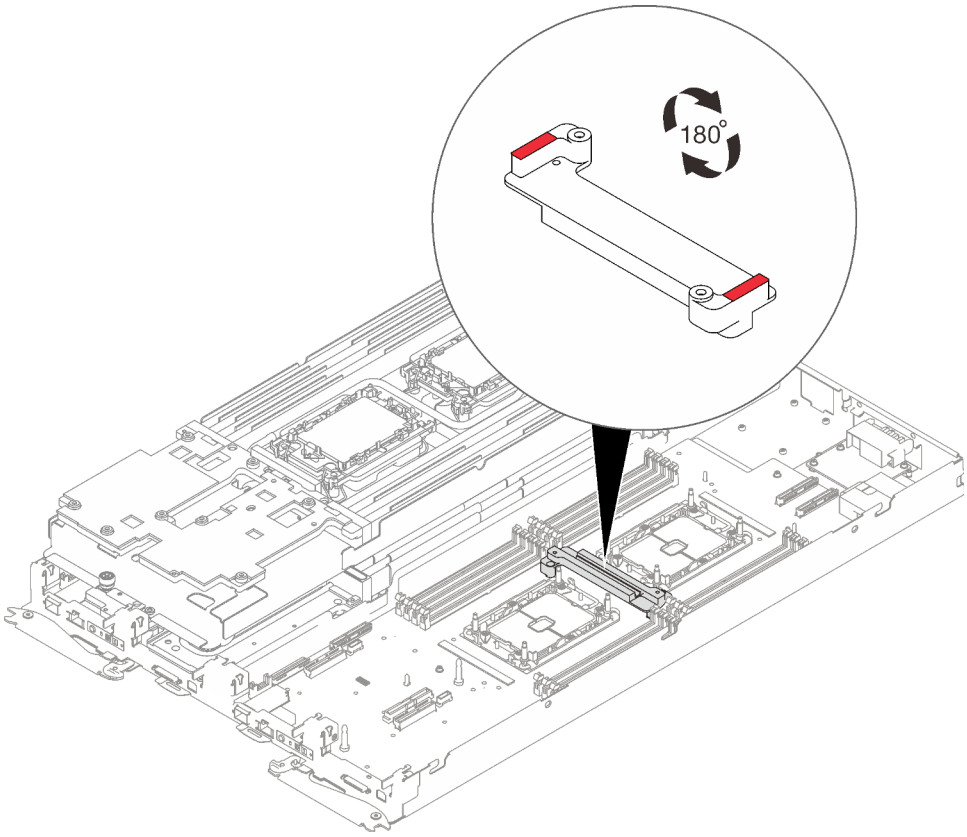


Figure 239. VR water loop - Gap pads

3. Align the VR water loop trough with the holes on the system board; then, fasten the two Torx T10 screws (per node).

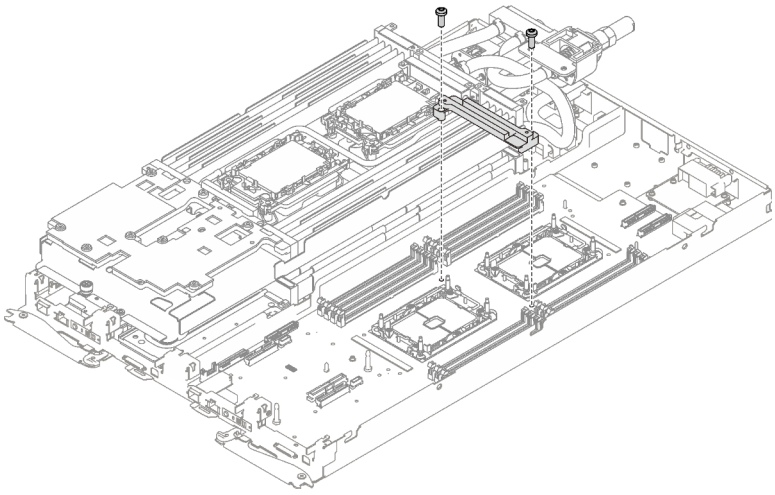


Figure 240. VR water loop trough installation

4. Check the gap pads on the water loop, if any of them are damaged or missing, replace them with the new ones.

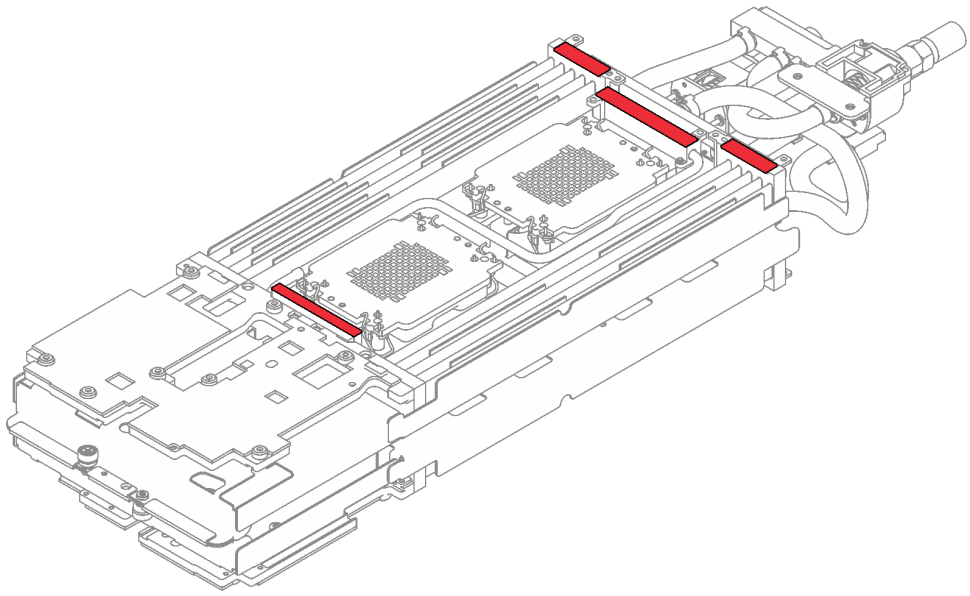


Figure 241. Water loop - Gap pads

5. Reinstall the water loop.
   a. ❶ Carefully rotate the top side of the water loop.
   b. ❷ Carefully insert the quick connect into the tray opening as shown.
   c. ❸ Carefully position the water loop on two guide pins near the rear of the node; then, gently put the water loop down and ensure it is firmly seated on the system board.

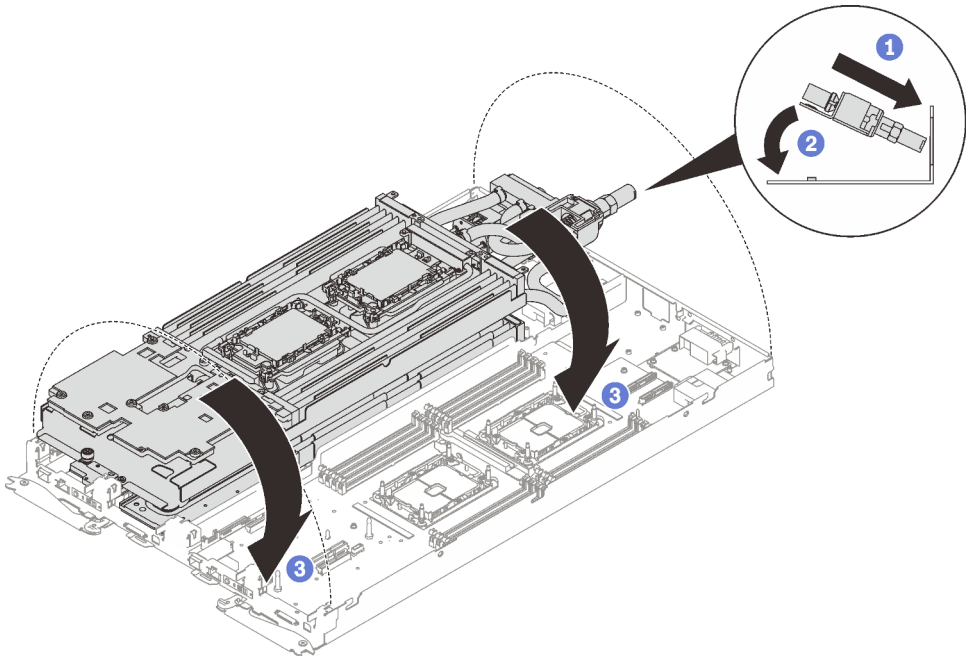


Figure 242. Water loop installation

6. Ensure the processors are secured properly.
   a. ❶ Rotate anti-tilt wire bails (8x anti-tilt wire bails per node) outwards to the locked position.
   b. ❷ Fully tighten all Torx T30 captive screws (8x Torx T30 captive screws per node) on cold plates in the installation sequence shown on the cold plate label (with a torque screwdriver sets to the proper torque).

      Note: For reference, the torque required for the screws to be fully tightened/removed is 1.1-1.15 newton-meters, 9.8-10.2 inch-pounds.

      Attention: To prevent damage to components, make sure that you follow the indicated tightening sequence.

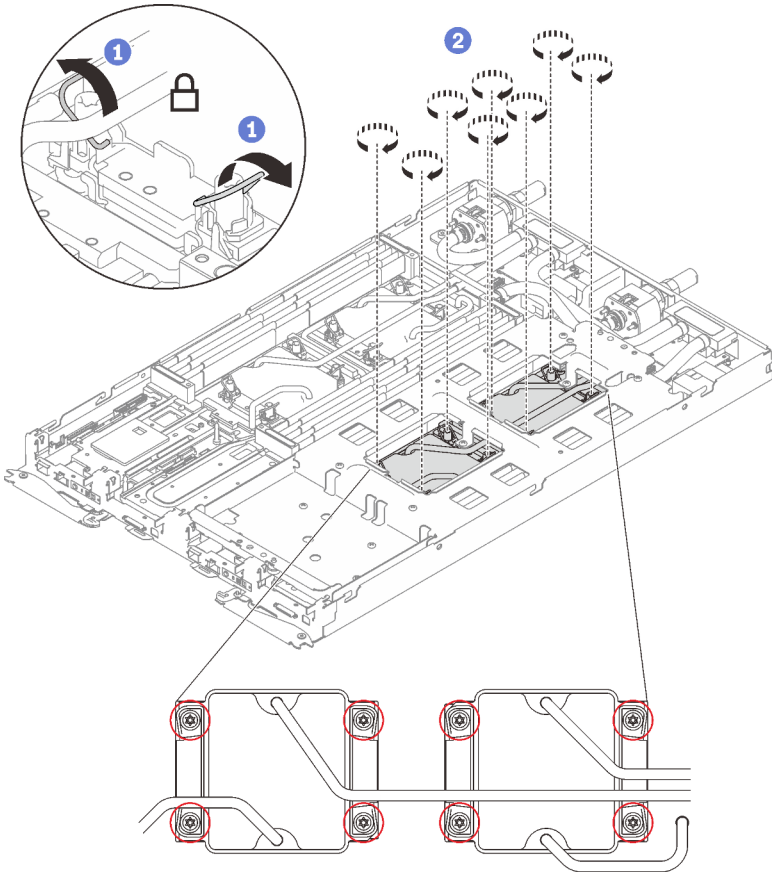


Figure 243. Processors installation

7. Loosen water loop carrier screws (12x Phillips #2 screws per node).

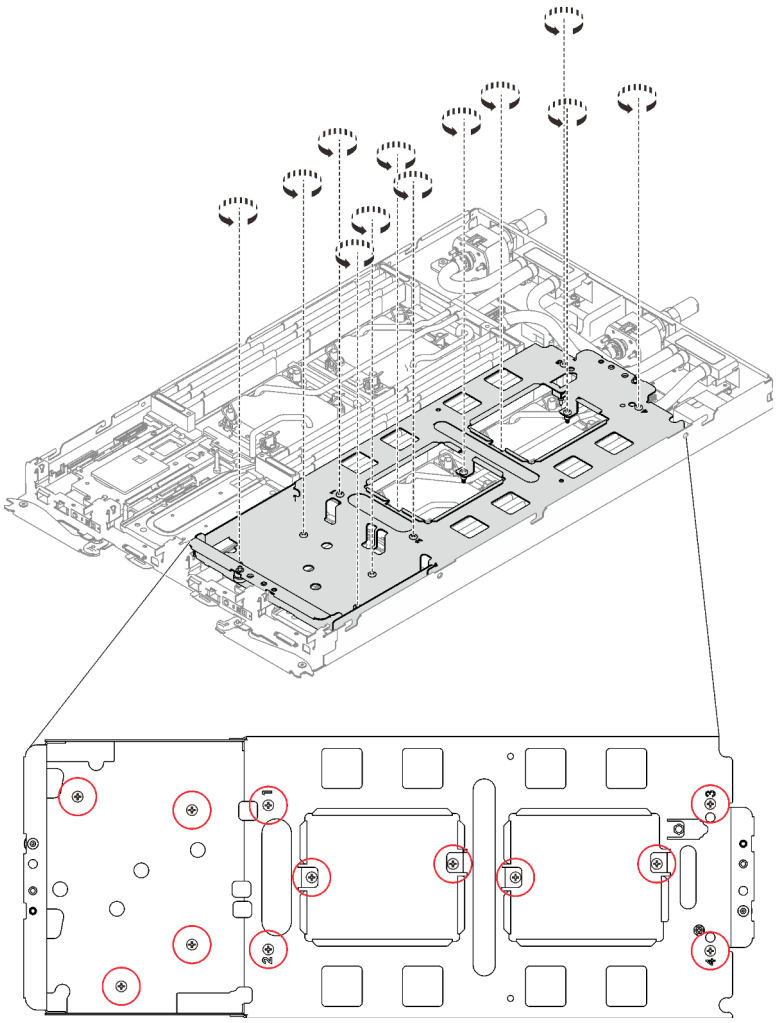


Figure 244. Loosening water loop carrier screws

8. Carefully lift the water loop carrier up and away from the water loop.

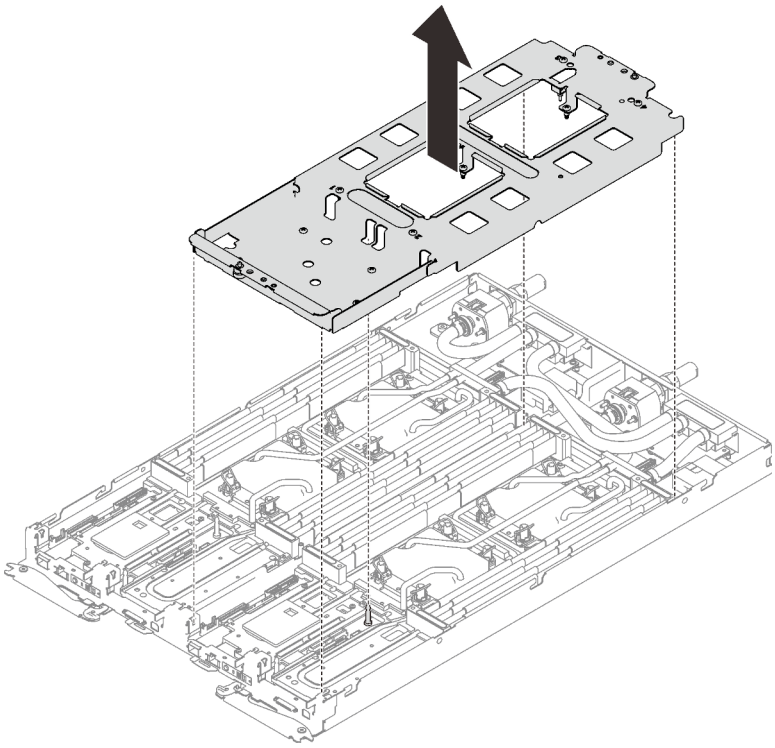


Figure 245. Water loop carrier removal

9. Install the water loop screws (13x Torx T10 screws per node) with a torque screwdriver sets to the proper torque.

   Notes:

   - For reference, the torque required for the screws to be fully tightened/removed is 0.5-0.6 newton-meters, 4.5-5.5 inch-pounds.
   - The screw holes that are circled in blue are meant for 9.5 mm screws, while the others that are circled in red are meant for 8.0 mm ones.

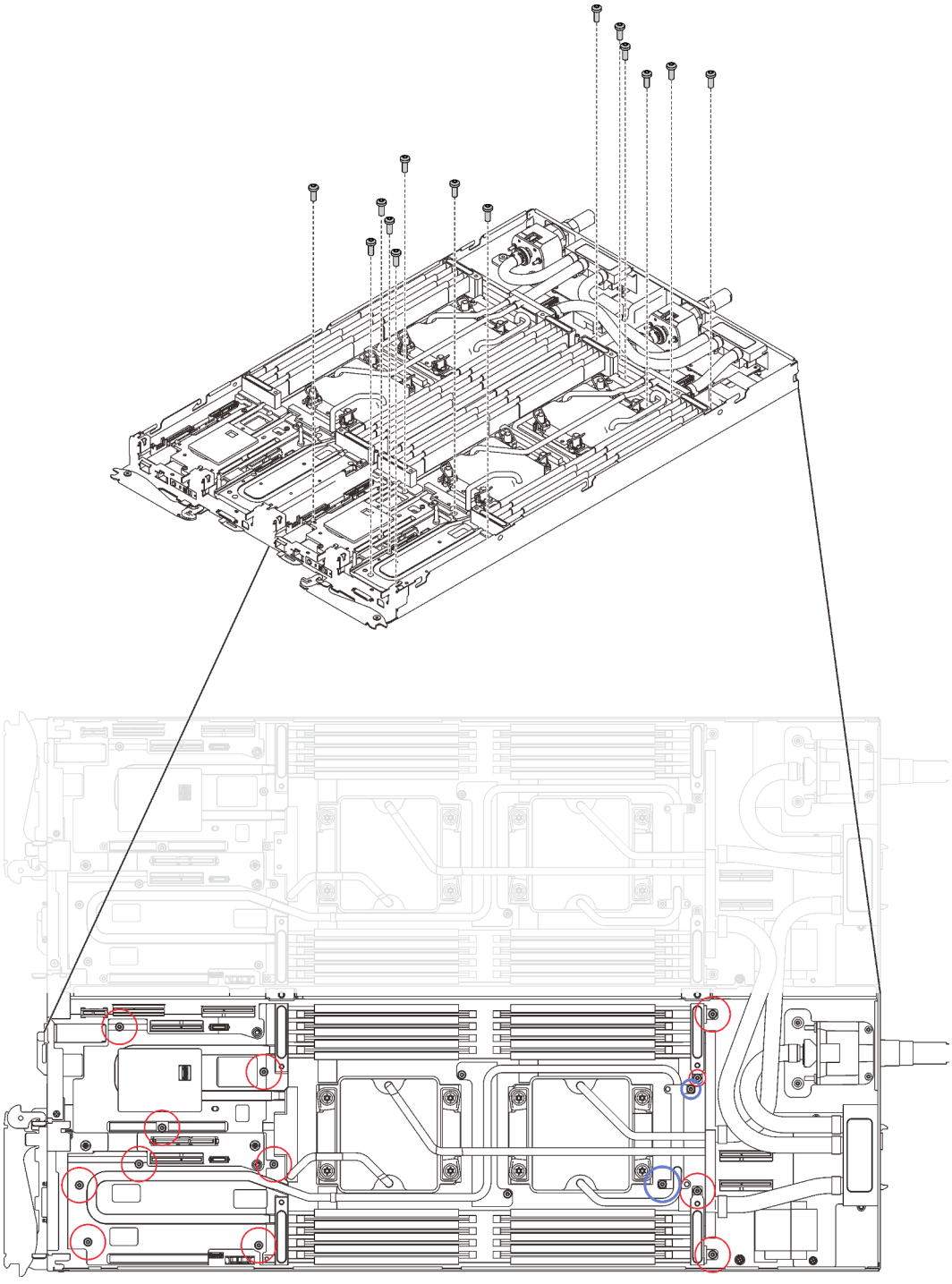


Figure 246. Water loop screws installation

10. Reinstall the following screws.
    - Four Torx T10 screws (per node) to secure the quick connect.
    - Two Phillips #1 screws (per node) on the rear of the node.

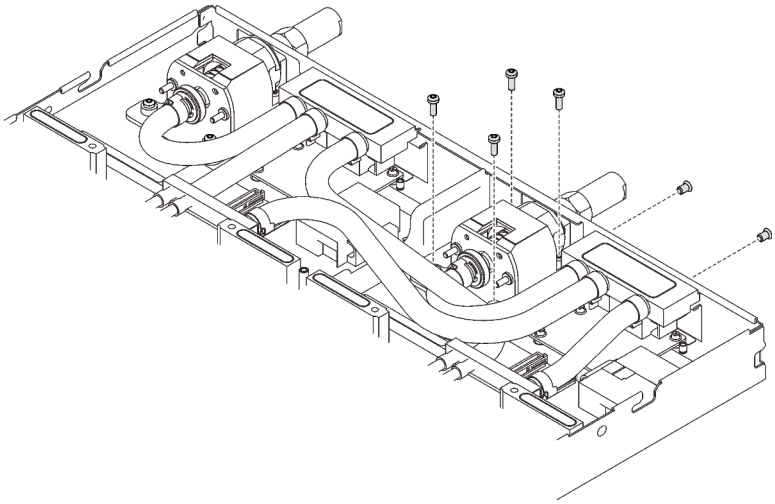


Figure 247. Screws installation

11. Slide the VR clamp plate into the node and install two Torx T10 screws (per node).

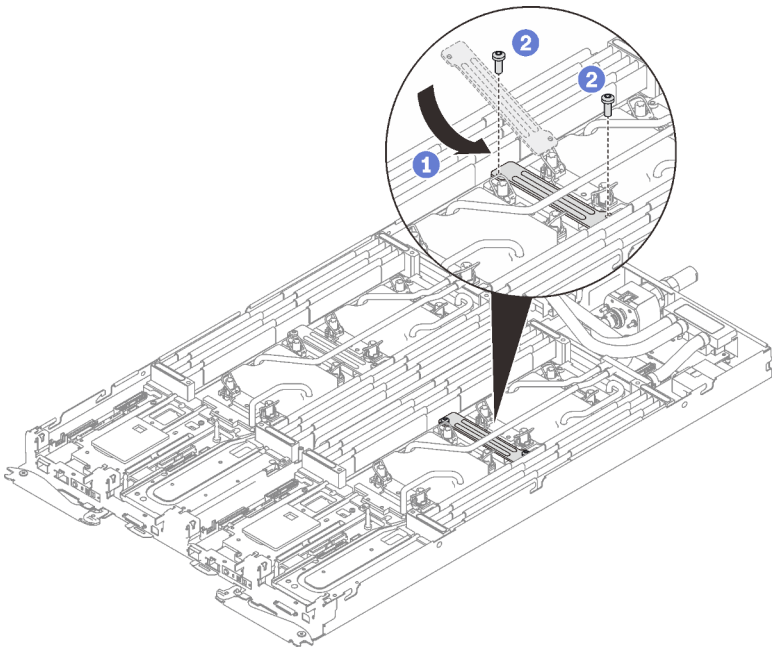


Figure 248. VR clamp plate installation

12. Reinstall DIMMs for both nodes (see “Install a memory module” on page 162).
13. Reinstall DIMM combs. (see “Install a DIMM comb” on page 167).
14. Reinstall M.2 backplanes (see “Install the M.2 backplane” on page 185).
15. Reinstall drive cage assemblies if applicable (see “Install a drive cage assembly” on page 175).
16. Reinstall PCIe rise assemblies if applicable (see “Install a PCIe adapter” on page 195).
17. Reinstall the front and the rear cross braces (14x Phillips #1 screws).

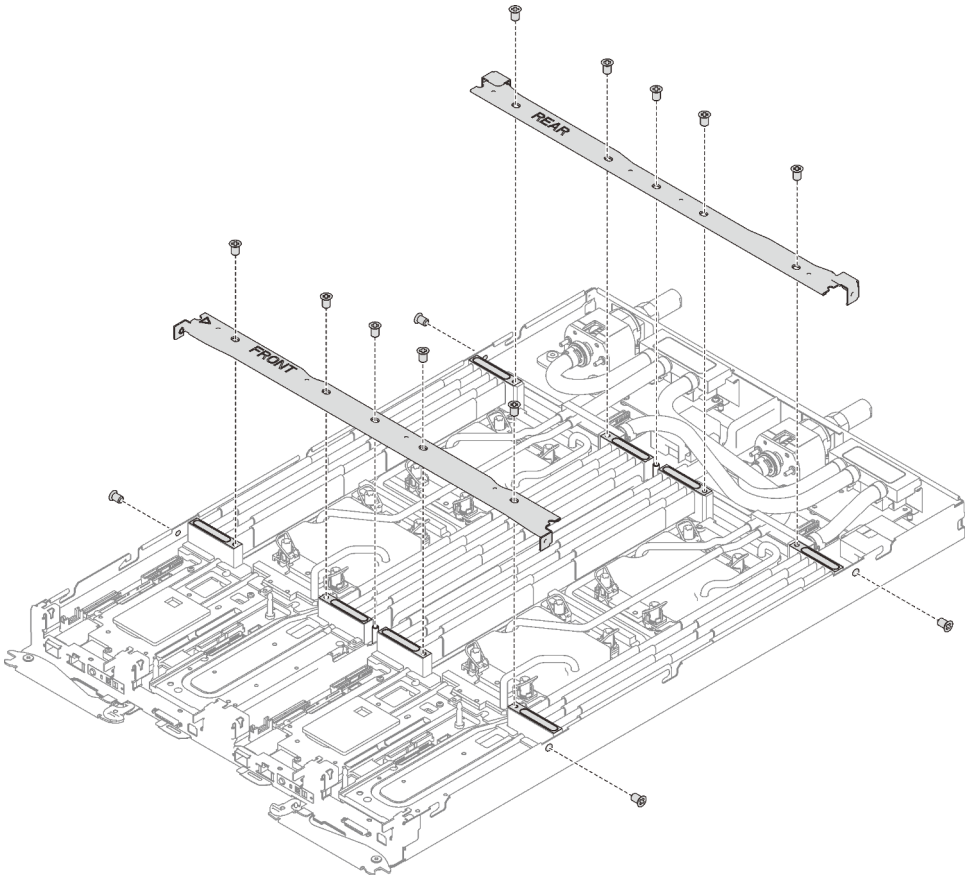


Figure 249. Cross brace installation

18. Reinstall the tray cover (see “Install the tray cover” on page 153).
19. Reinstall the tray (see “Install a DWC tray in the enclosure” on page 150).

    Note: For safety, use the lift tool to install the tray into the rack.
20. Connect all required external cables to the enclosure.

    Note: Use extra forces to connect QSFP cables to the enclosure if Mellanox ConnectX-6 adapters are installed.
21. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.
22. Update the Universally Unique Identifier (UUID) and DMI/SMBIOS data with new vital product data (VPD). Use the Lenovo XClarity Provisioning Manager to update the UUID and DMI/SMBIOS data. See “Update the Universal Unique Identifier (UUID)” on page 260 and “Update the asset tag” on page 262.
23. Enable TPM/TCM. See “Enable TPM/TCM” on page 264
24. Optionally, enable Secure Boot.

Demo video

Watch the procedure on YouTube

Update the Universal Unique Identifier (UUID)

Optionally, you can update the Universal Unique Identifier (UUID).

There are two methods available to update the UUID:

- From Lenovo XClarity Provisioning Manager

  To update the UUID from Lenovo XClarity Provisioning Manager:

  1. Start the server and press the key according to the on-screen instructions. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at https://pubs.lenovo.com/lxpm-overview/.) The Lenovo XClarity Provisioning Manager interface is displayed by default.
  2. If the power-on Administrator password is required, enter the password.
  3. From the System Summary page, click **Update VPD**.
  4. Update the UUID.

- From Lenovo XClarity Essentials OneCLI

  Lenovo XClarity Essentials OneCLI sets the UUID in the Lenovo XClarity Controller. Select one of the following methods to access the Lenovo XClarity Controller and set the UUID:

  – Operate from the target system, such as LAN or keyboard console style (KCS) access
  – Remote access to the target system (TCP/IP based)

  To update the UUID from Lenovo XClarity Essentials OneCLI:

  1. Download and install Lenovo XClarity Essentials OneCLI.

     To download Lenovo XClarity Essentials OneCLI, go to the following site:

     https://datacentersupport.lenovo.com/solutions/HT116433

  2. Copy and unpack the OneCLI package, which also includes other required files, to the server. Make sure that you unpack the OneCLI and the required files to the same directory.
  3. After you have Lenovo XClarity Essentials OneCLI in place, type the following command to set the UUID:
     `onecli config createuuid SYSTEM_PROD_DATA.SysInfoUUID [access_method]`

     Where:

     [access_method]
     The access method that you select to use from the following methods:

     – Online authenticated LAN access, type the command:
       `[--bmc-username <xcc_user_id> --bmc-password <xcc_password>]`

       Where:

       xcc_user_id
       The BMC/IMM/XCC account name (1 of 12 accounts). The default value is USERID.

       xcc_password
       The BMC/IMM/XCC account password (1 of 12 accounts).

       Example command is as follows:
       `onecli config createuuid SYSTEM_PROD_DATA.SysInfoUUID --bmc-username <xcc_user_id> --bmc-password <xcc_password>`

     – Online KCS access (unauthenticated and user restricted):

       You do not need to specify a value for *access_method* when you use this access method.

       Example command is as follows:
       `onecli config createuuid SYSTEM_PROD_DATA.SysInfoUUID`

Note: The KCS access method uses the IPMI/KCS interface, which requires that the IPMI driver be installed.

– Remote LAN access, type the command:
`[--bmc <xcc_user_id>:<xcc_password>@<xcc_external_ip>]`

Where:

xcc_external_ip
The BMC/IMM/XCC external IP address. There is no default value. This parameter is required.

xcc_user_id
The BMC/IMM/XCC account name (1 of 12 accounts). The default value is USERID.

xcc_password
The BMC/IMM/XCC account password (1 of 12 accounts).

Note: BMC, IMM, or XCC external IP address, account name, and password are all valid for this command.

Example command is as follows:
`onecli config createuuid SYSTEM_PROD_DATA.SysInfoUUID --bmc <xcc_user_id>:<xcc_password>@<xcc_external_ip>`

4. Restart the Lenovo XClarity Controller.
5. Restart the server.

Update the asset tag

Optionally, you can update the asset tag.

There are two methods available to update the asset tag:

- From Lenovo XClarity Provisioning Manager

  To update the asset tag from Lenovo XClarity Provisioning Manager:

  1. Start the server and press the key specified in the on-screen instructions to display the Lenovo XClarity Provisioning Manager interface.
  2. If the power-on Administrator password is required, enter the password.
  3. From the System Summary page, click **Update VPD**.
  4. Update the asset tag information.

- From Lenovo XClarity Essentials OneCLI

  Lenovo XClarity Essentials OneCLI sets the asset tag in the Lenovo XClarity Controller. Select one of the following methods to access the Lenovo XClarity Controller and set the asset tag:

  – Operate from the target system, such as LAN or keyboard console style (KCS) access
  – Remote access to the target system (TCP/IP based)

  To update the asset tag from Lenovo XClarity Essentials OneCLI:

  1. Download and install Lenovo XClarity Essentials OneCLI.

     To download Lenovo XClarity Essentials OneCLI, go to the following site:

     https://datacentersupport.lenovo.com/solutions/HT116433

  2. Copy and unpack the OneCLI package, which also includes other required files, to the server. Make sure that you unpack the OneCLI and the required files to the same directory.

3. After you have Lenovo XClarity Essentials OneCLI in place, type the following command to set the DMI:
   `onecli config set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> [access_method]`

   Where:

   <asset_tag>
   The server asset tag number. Type `aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa`, where *aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa* is the asset tag number.

   [access_method]
   The access method that you select to use from the following methods:

   – Online authenticated LAN access, type the command:
     `[--bmc-username <xcc_user_id> --bmc-password <xcc_password>]`

     Where:

     xcc_user_id
     The BMC/IMM/XCC account name (1 of 12 accounts). The default value is USERID.

     xcc_password
     The BMC/IMM/XCC account password (1 of 12 accounts).

     Example command is as follows:

     ```
     onecli config set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> --bmc-username <xcc_user_id>
     --bmc-password <xcc_password>
     ```

   – Online KCS access (unauthenticated and user restricted):

     You do not need to specify a value for *access_method* when you use this access method.

     Example command is as follows:

     ```
     onecli config set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag>
     ```

     Note: The KCS access method uses the IPMI/KCS interface, which requires that the IPMI driver be installed.

   – Remote LAN access, type the command:
     `[--bmc <xcc_user_id>:<xcc_password>@<xcc_external_ip>]`

     Where:

     xcc_external_ip
     The BMC/IMM/XCC IP address. There is no default value. This parameter is required.

     xcc_user_id
     The BMC/IMM/XCC account (1 of 12 accounts). The default value is USERID.

     xcc_password
     The BMC/IMM/XCC account password (1 of 12 accounts).

     Note: BMC, IMM, or XCC internal LAN/USB IP address, account name, and password are all valid for this command.

     Example command is as follows:

     ```
     onecli config set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> --bmc <xcc_user_id>:<xcc_
     password>@<xcc_external_ip>
     ```

4. Reset the Lenovo XClarity Controller to the factory defaults. See “Resetting the BMC to Factory Default” section in the XCC documentation compatible with your server at https://pubs.lenovo.com/lxcc-overview/.

Enable TPM/TCM

The server supports Trusted Platform Module (TPM), Version 1.2 or Version 2.0

Note: For customers in Chinese Mainland, integrated TPM is not supported. However, customers in Chinese Mainland can install a Trusted Cryptographic Module (TCM) adapter or a TPM adapter (sometimes called a daughter card).

When a system board is replaced, you must make sure that the TPM/TCM policy is set correctly.

CAUTION:
Take special care when setting the TPM/TCM policy. If it is not set correctly, the system board can become unusable.

Set the TPM policy

By default, a replacement system board is shipped with the TPM policy set to **undefined**. You must modify this setting to match the setting that was in place for the system board that is being replaced.

There are two methods available to set the TPM policy:

- From Lenovo XClarity Provisioning Manager

  To set the TPM policy from Lenovo XClarity Provisioning Manager:

  1. Start the server and press the key according to the on-screen instructions to display the Lenovo XClarity Provisioning Manager interface.
  2. If the power-on Administrator password is required, enter the password.
  3. From the System Summary page, click **Update VPD**.
  4. Set the policy to one of the following settings.
     - **NationZ TPM 2.0 enabled - China only**. Customers in the Chinese Mainland should choose this setting if a NationZ TPM 2.0 adapter is installed.
     - **TPM enabled - ROW**. Customers outside of the Chinese Mainland should choose this setting.
     - **Permanently disabled**. Customers in the Chinese Mainland should use this setting if no TPM adapter is installed.

     Note: Although the setting **undefined** is available as a policy setting, it should not be used.

- From Lenovo XClarity Essentials OneCLI

  Note: Please note that a Local IPMI user and password must be setup in Lenovo XClarity Controller for remote accessing to the target system.

  To set the TPM policy from Lenovo XClarity Essentials OneCLI:

  1. Read TpmTcmPolicyLock to check whether the TPM_TCM_POLICY has been locked:
     `OneCli.exe config show imm.TpmTcmPolicyLock --override --imm <userid>:<password>@<ip_address>`

     Note: The imm.TpmTcmPolicyLock value must be 'Disabled', which means TPM_TCM_POLICY is NOT locked and changes to the TPM_TCM_POLICY are permitted. If the return code is ‘Enabled’ then no changes to the policy are permitted. The planar may still be used if the desired setting is correct for the system being replaced.
  2. Configure the TPM_TCM_POLICY into XCC:
     - For customers in Chinese Mainland with no TPM, or customers that require to disable TPM:

```
OneCli.exe config set imm.TpmTcmPolicy "NeitherTpmNorTcm" --override --imm <userid>:<password>@<ip_
address>
```

- For customers in Chinese Mainland that require to enable TPM:
  ```
  OneCli.exe config set imm.TpmTcmPolicy "NationZTPM20Only" --override --imm <userid>:<password>@<ip_
  address>
  ```
- For customers outside Chinese Mainland that require to enable TPM:
  ```
  OneCli.exe config set imm.TpmTcmPolicy "TpmOnly" --override --imm <userid>:<password>@<ip_address>
  ```

3. Issue reset command to reset system:
   ```
   OneCli.exe misc ospower reboot --imm <userid>:<password>@<ip_address>
   ```
4. Read back the value to check whether the change has been accepted:
   ```
   OneCli.exe config show imm.TpmTcmPolicy --override --imm <userid>:<password>@<ip_address>
   ```

   Notes:

   - If the read back value is matched it means the TPM_TCM_POLICY has been set correctly.

     imm.TpmTcmPolicy is defined as below:

     - Value 0 use string “Undefined” , which means UNDEFINED policy.
     - Value 1 use string “NeitherTpmNorTcm”, which means TPM_PERM_DISABLED.
     - Value 2 use string “TpmOnly”, which means TPM_ALLOWED.
     - Value 4 use string “NationZTPM20Only”, which means NationZ_TPM20_ALLOWED.
   - Below 4 steps must also be used to ‘lock’ the TPM_TCM_POLICY when using OneCli/ASU commands:
5. Read TpmTcmPolicyLock to check whether the TPM_TCM_POLICY has been locked , command as below:
   ```
   OneCli.exe config show imm.TpmTcmPolicyLock --override --imm <userid>:<password>@<ip_address>
   ```

   The value must be 'Disabled', it means TPM_TCM_POLICY is NOT locked and must be set.
6. Lock the TPM_TCM_POLICY:
   ```
   OneCli.exe config set imm.TpmTcmPolicyLock "Enabled"--override --imm <userid>:<password>@<ip_address>
   ```
7. Issue reset command to reset system, command as below:
   ```
   OneCli.exe misc ospower reboot --imm <userid>:<password>@<ip_address>
   ```

   During the reset, UEFI will read the value from imm.TpmTcmPolicyLock, if the value is 'Enabled' and the imm.TpmTcmPolicy value is valid, UEFI will lock the TPM_TCM_POLICY setting.

   Note: The valid values for imm.TpmTcmPolicy include 'NeitherTpmNorTcm', 'TpmOnly', and 'NationZTPM20Only'.

   If the imm.TpmTcmPolicyLock is set as 'Enabled' but imm.TpmTcmPolicy value is invalid, UEFI will reject the 'lock' request and change imm.TpmTcmPolicyLock back to 'Disabled'.
8. Read back the value to check whether the ‘Lock’ is accepted or rejected. Command as below:
   ```
   OneCli.exe config show imm.TpmTcmPolicy --override --imm <userid>:<password>@<ip_address>
   ```

   Note: If the read back value is changed from 'Disabled' to 'Enabled' that means the TPM_TCM_POLICY has been locked successfully. There is no method to unlock a policy once it has been set other than replacing system board.

   imm.TpmTcmPolicyLock is defined as below:

   Value 1 uses string “Enabled" , which means lock the policy. Other values are not accepted.

Enable UEFI Secure Boot

Optionally, you can enable UEFI Secure Boot.

There are two methods available to enable UEFI Secure Boot:

- From Lenovo XClarity Provisioning Manager

  To enable UEFI Secure Boot from Lenovo XClarity Provisioning Manager:

  1. Start the server and press the key specified in the on-screen instructions to display the Lenovo XClarity Provisioning Manager interface. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at https://pubs.lenovo.com/lxpm-overview/.)
  2. If the power-on Administrator password is required, enter the password.
  3. From the UEFI Setup page, click **System Settings → Security → Secure Boot**.
  4. Enable Secure Boot and save the settings.

- From Lenovo XClarity Essentials OneCLI

  To enable UEFI Secure Boot from Lenovo XClarity Essentials OneCLI:

  1. Download and install Lenovo XClarity Essentials OneCLI.

     To download Lenovo XClarity Essentials OneCLI, go to the following site:

     https://datacentersupport.lenovo.com/solutions/HT116433

  2. Run the following command to enable Secure Boot:
     `OneCli.exe config set SecureBootConfiguration.SecureBootSetting Enabled --bmc <userid>:<password>@<ip_address>`

     where:

     – *<userid>:<password>* are the credentials used to access the BMC (Lenovo XClarity Controller interface) of your server. The default user ID is USERID, and the default password is PASSW0RD (zero, not an uppercase o)

     – *<ip_address>* is the IP address of the BMC.

     For more information about the Lenovo XClarity Essentials OneCLI `set` command, see:

     https://pubs.lenovo.com/lxce-onecli/onecli_r_set_command

  Note: If disabling UEFI secure boot is needed, run the following command:
  `OneCli.exe config set SecureBootConfiguration.SecureBootSetting Disabled --bmc <userid>:<password>@<ip_address>`

Water loop (SD650 V2 tray) replacement

Use the following procedures to remove and install the water loop.

Attention:

- The water loop replacement procedure requires trained personnel.
- For your safety, use lift tool to remove the tray from the enclosure.

Remove the water loop in SD650 V2 tray

Use this information to remove the water loop in SD650 V2 tray.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  – “Installation Guidelines” on page 51

  - “Safety inspection checklist” on page 52
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.
- To avoid damaging the water loop, always use the water loop carrier when removing, installing or folding the water loop.

Prepare the following screwdrivers to ensure you can install and remove corresponding screws properly.

Screwdriver Type	Screw Type
Torx T10 head screwdriver	Torx T10 screw
Torx T30 head screwdriver	Torx T30 screw
Phillips #1 head screwdriver or 3/16" hex head screwdriver	Phillips #1 screw
Phillips #2 head screwdriver	Phillips #2 screw

Procedure

Step 1. Make preparations for this task.

a. Remove the tray (see “Remove a DWC tray from the enclosure” on page 149).

   Attention: For safety, use the lift tool to remove the tray from the rack.

b. Remove the tray cover (see “Remove the tray cover” on page 152).

c. Remove the front and the rear cross braces (14x Phillips #1 screws).

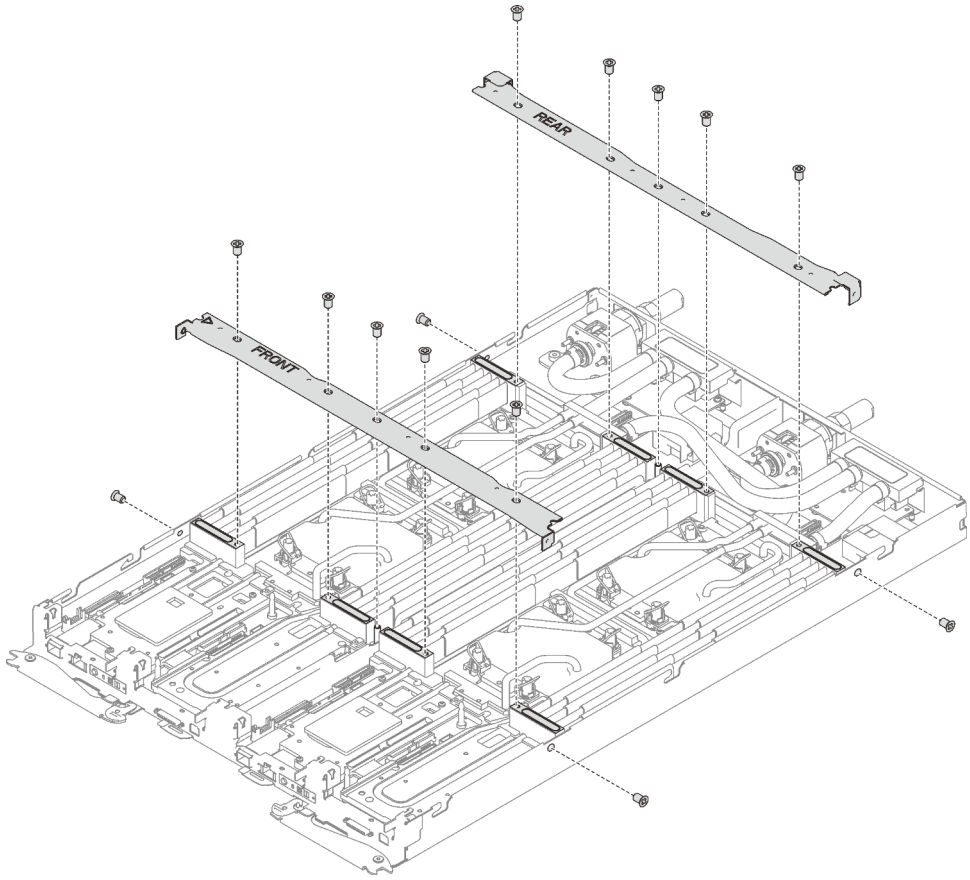


Figure 250. Cross brace removal

d. Remove all DIMM combs (see “Remove a DIMM comb” on page 166).

e. Remove DIMMs from both nodes (see “Remove a memory module” on page 159).

f. Remove M.2 Backplanes from the node (see “Remove the M.2 backplane” on page 182).

g. Remove drive cage assemblies from the node if applicable (see “Remove a drive cage assembly” on page 173).

h. Remove PCIe riser assemblies from the node if applicable (see “Remove a PCIe adapter” on page 191).

Step 2. Remove all Torx T10 screw (4x Torx T10 screw for two nodes); then, slide two VR clamp plates out of the nodes.

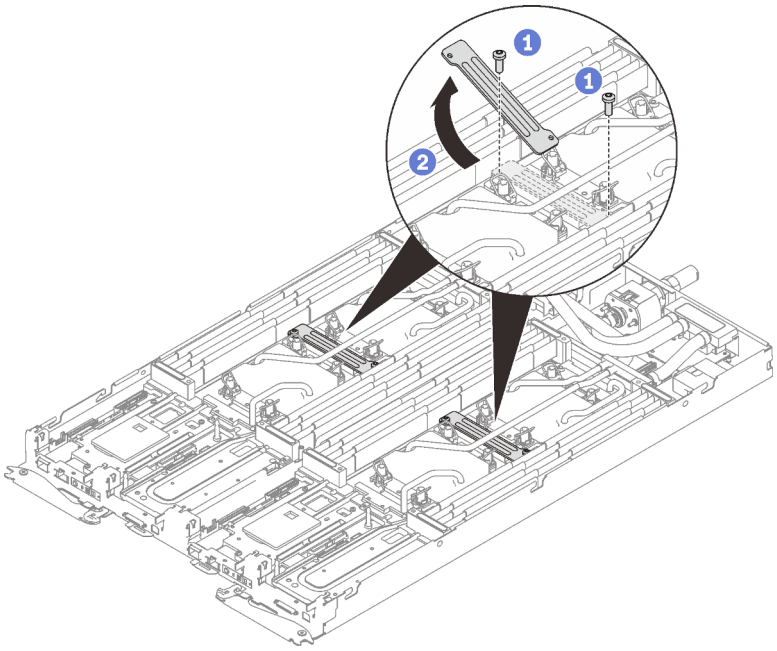


Figure 251. VR clamp plate removal

Step 3. Remove water loop screws (26x Torx T10 screws for two nodes) with a torque screwdriver sets to the proper torque.

Note: For reference, the torque required for the screws to be fully tightened/removed is 0.5-0.6 newton-meters, 4.5-5.5 inch-pounds.

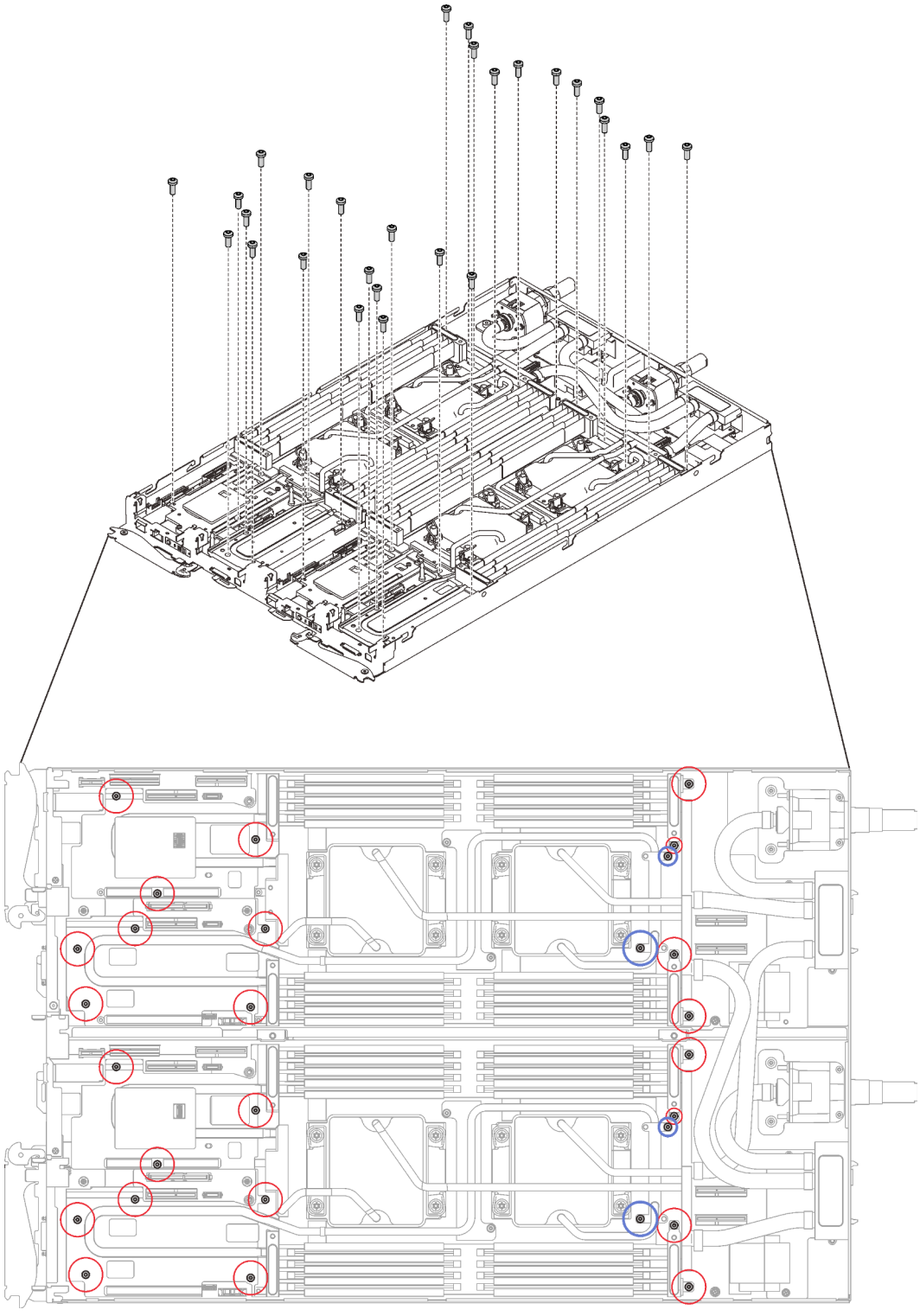


Figure 252. Water loop screws removal

Step 4. Remove the following screws to loosen the quick connect.

- Eight Torx T10 screws to loosen the quick connect.
- Four Phillips #1 screws on the rear of the node.

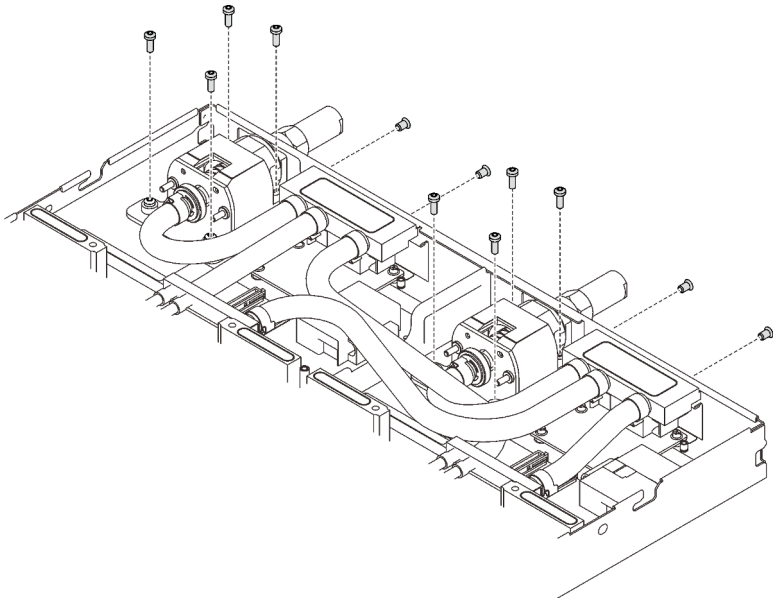


Figure 253. Screws removal

Step 5. Orient two water loop carriers with the M.2 backplane guide pins; then, gently put two water loop carriers down and ensure they are seated firmly on the water loop.

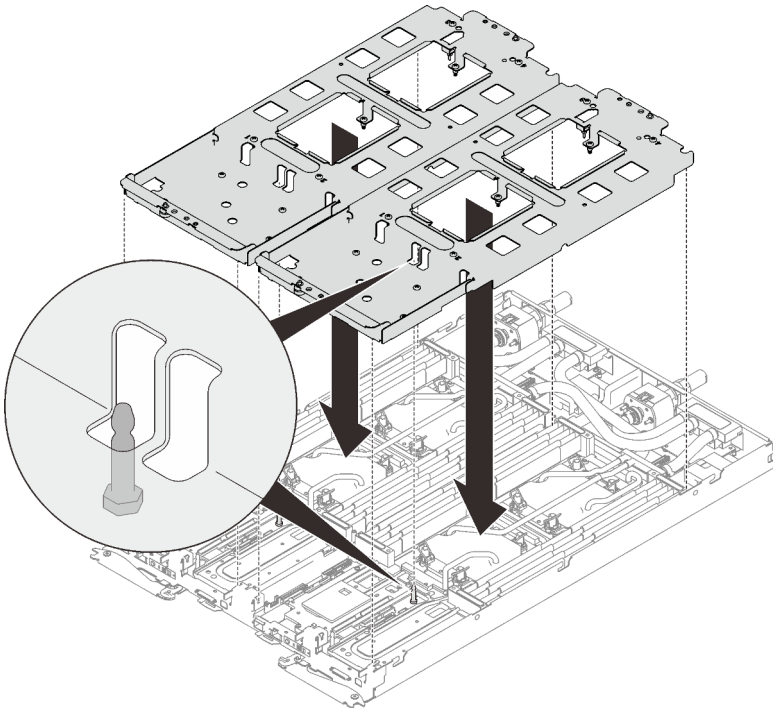


Figure 254. Water loop carrier installation

Step 6. Tighten water loop carrier screws (24x Phillips #2 screws for two nodes).

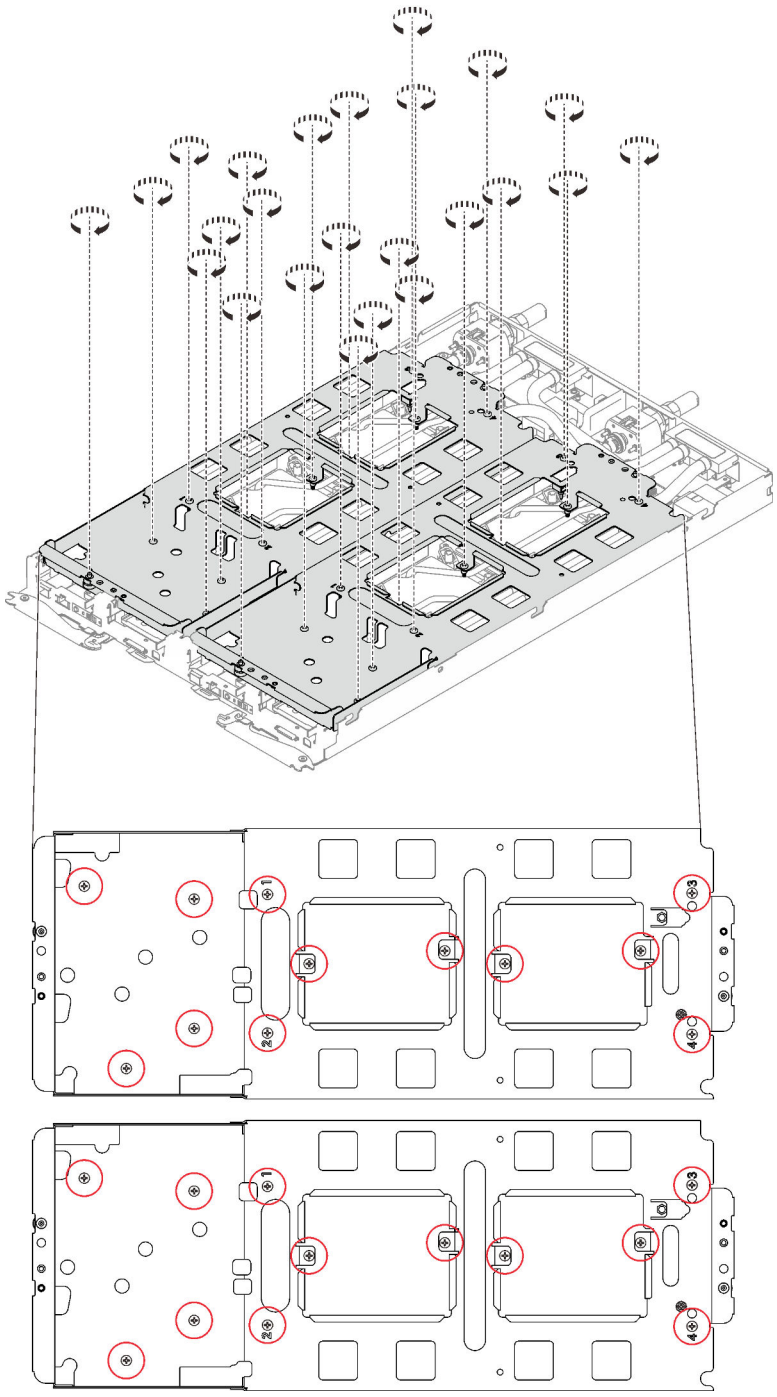


Figure 255. Water loop carrier screws installation

Step 7. Loosen processors properly.

a. ❶ Fully loosen all Torx T30 captive screws (16x Torx T30 captive screws for two nodes) on cold plates with a general screwdriver until they stop, following the removal sequence shown on the cold plate label.

Note: For reference, the torque required for the screws to be fully tightened/removed is 1.1-1.15 newton-meters, 9.8-10.2 inch-pounds.

Attention: To prevent damage to components, make sure that you follow the indicated loosening sequence.

b. ❷ Rotate all anti-tilt wire bails (16x anti-tilt wire bails for two nodes) inwards to the unlocked position.

Note: The following illustration shows screw locations for one node. The screw locations are identical for two nodes.

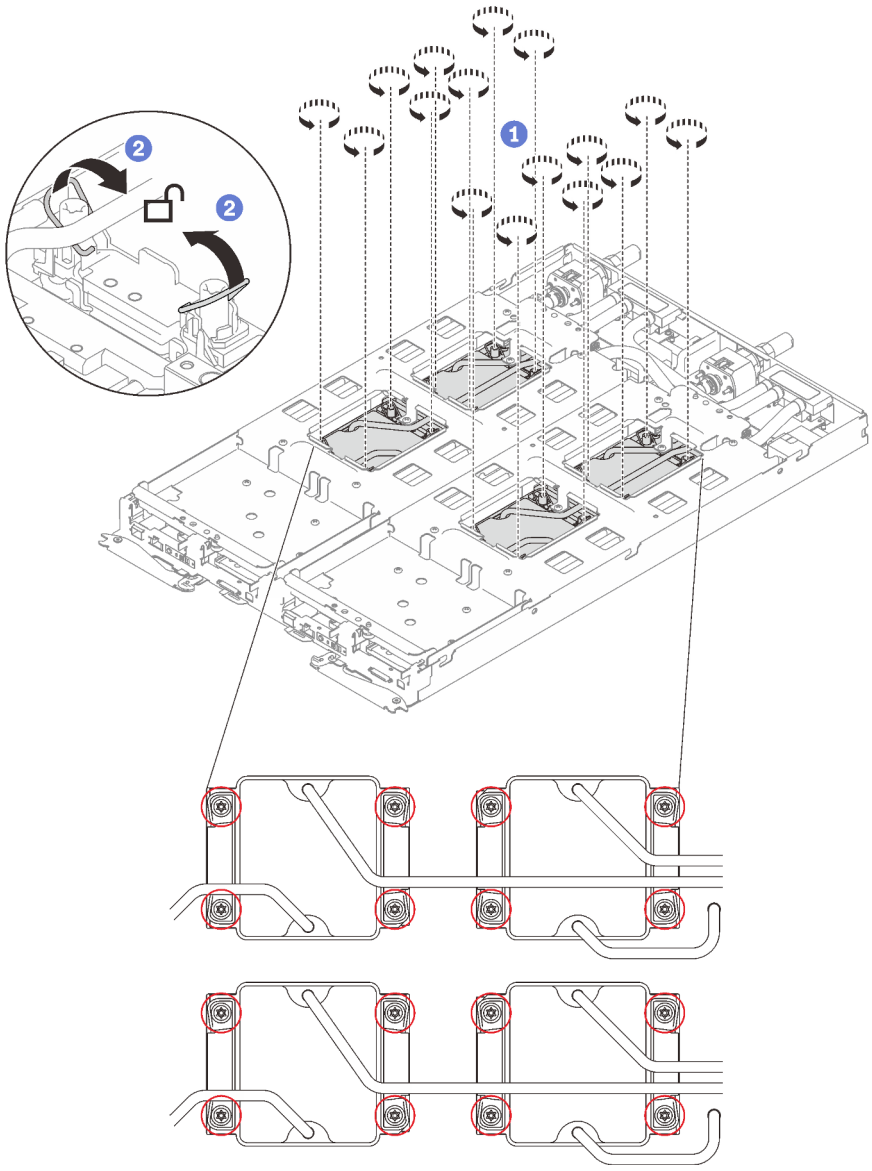


Figure 256. Loosening Torx T30 captive screws

Step 8. Fold the water loop.

1. ❶ Carefully unhook the quick connect and slide it out of the opening in the rear of the tray; then, lift the water loop up off the system board.
2. ❷ Carefully rotate the water loop so one half is sitting on top of the other half.

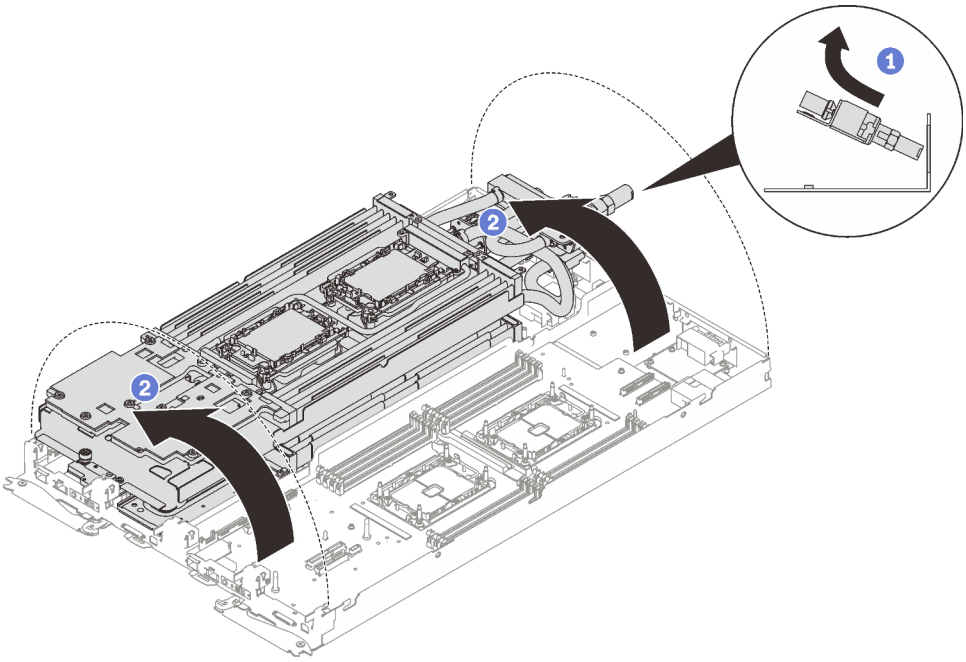


Figure 257. Folding the water loop

Step 9. Fasten two captive thumbscrews to secure water loop carriers to each other.

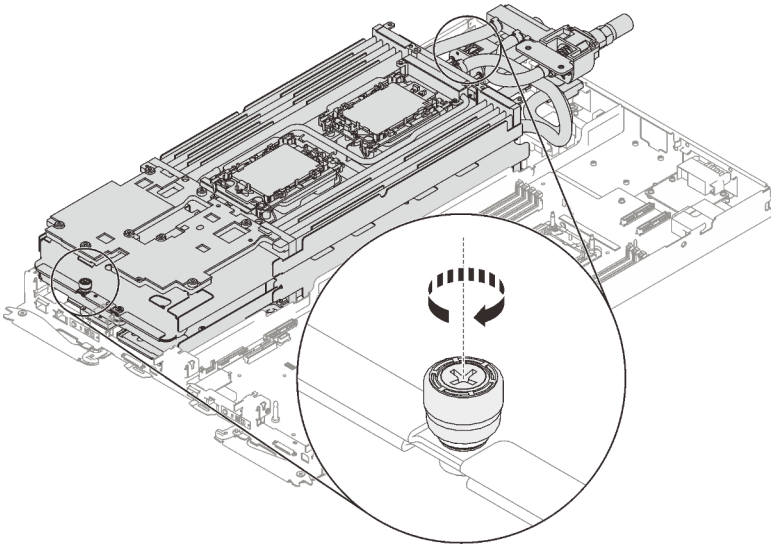


Figure 258. Tightening captive thumbscrews

Step 10. Remove the water loop.

a. Carefully lift the water loop up off the system board.

b. Unhook the quick connect from the four alignment posts and slide the quick connect out of the opening in the rear of the tray.

c. Lift the water loop out of the node.

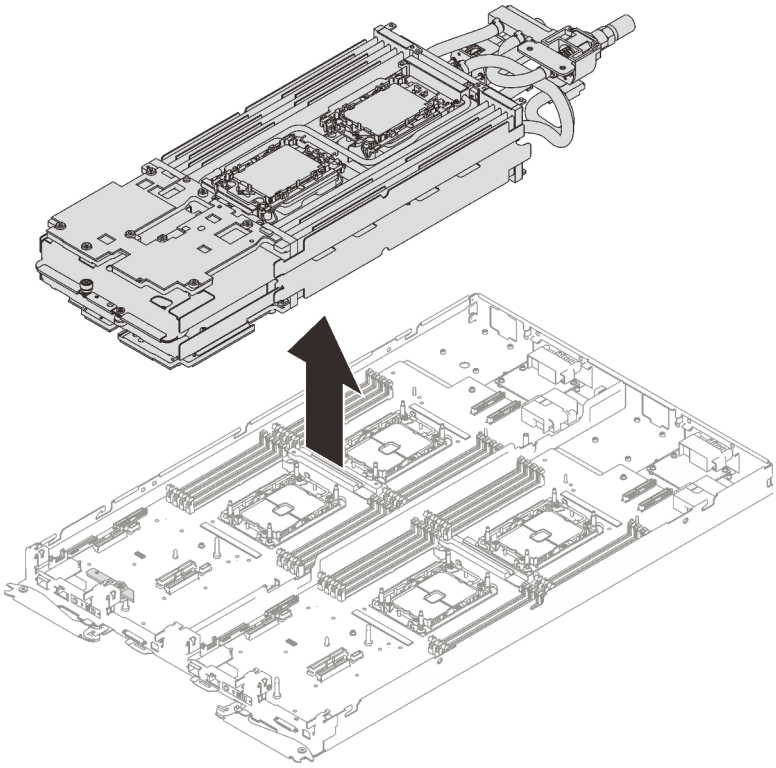


Figure 259. Water loop removal

After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

Watch the procedure on YouTube

Install the water loop in SD650 V2 tray

Use this information to install the water loop in SD650 V2 tray.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.

- To avoid damaging the water loop, always use the water loop carrier when removing, installing or folding the water loop.

Note: Ensure you have “SD650 V2 or SD650-N V2 Neptune® DWC Waterloop Service Kit “ in hand to install components.

Prepare the following screwdrivers to ensure you can install and remove corresponding screws properly.

Screwdriver Type	Screw Type
Torx T10 head screwdriver	Torx T10 screw
Torx T30 head screwdriver	Torx T30 screw
Phillips #1 head screwdriver or 3/16" hex head screwdriver	Phillips #1 screw
Phillips #2 head screwdriver	Phillips #2 screw

Procedure

Step 1. Follow the following steps if you are replacing processors:

a. If there is any old thermal grease on the processor and the cold plate, gently clean the top of the processor and the cold plate using an alcohol cleaning pad.

b. Remove the processor identification label from the water loop and replace it with the new label that comes with the replacement processor. If you are unable to remove the label and place it on the new water loop, or if the label is damaged during transfer, write the processor serial number from the processor identification label on the new water loop in the same location as the label would be placed using a permanent marker.

c. Apply approximately 0.65 g of the new thermal grease to the center of the processor top. If you have cleaned the top of the processor with an alcohol cleaning pad, make sure to apply the new thermal grease after the alcohol has fully evaporated.

Notes:

- Carefully place the processor and retainer on a flat surface with the processor-contact side down.

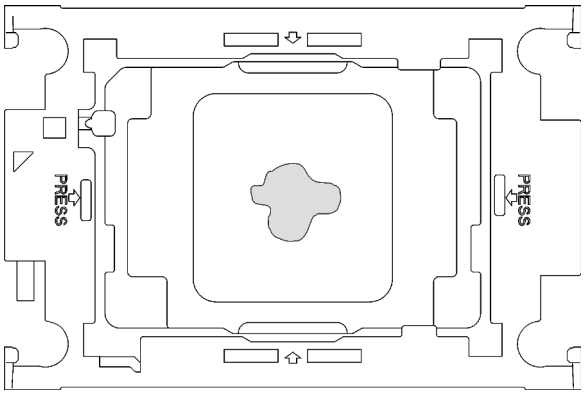


Figure 260. Thermal grease application

Step 2. Install processor retainers onto processors if needed.

a. Align the triangular mark on the processor retainer with the triangular mark on the processor corner edge.

b. Gently place the processor retainer on the processor; then, carefully press the four sides of the processor retainer to secure the processor.

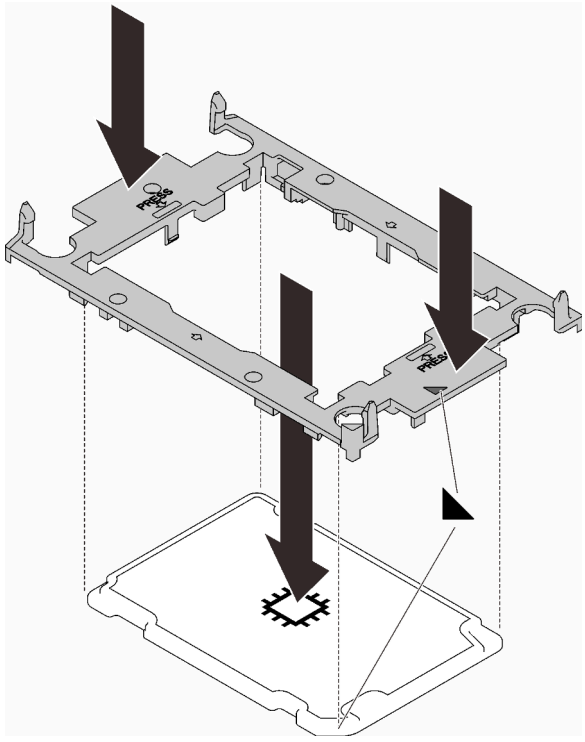


Figure 261. Installing a processor retainer

Step 3. Remove two plastic grease covers if needed.

a. ❶ Use a scissors to cut off tapes.

b. ❷ Remove plastic grease covers from underside of water loop cold plates.

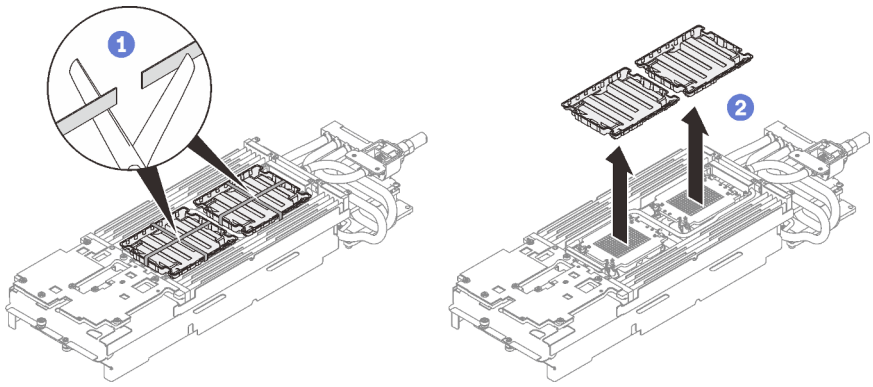


Figure 262. Plastic grease covers removal

Step 4. Align the triangular mark on the processor retainer with the triangular slot on the underside of the water loop cold plate; then, attach the processor to the underside of the water loop cold plate by inserting the processor retainer posts and clips features into the openings at the four corners of the cold plate.

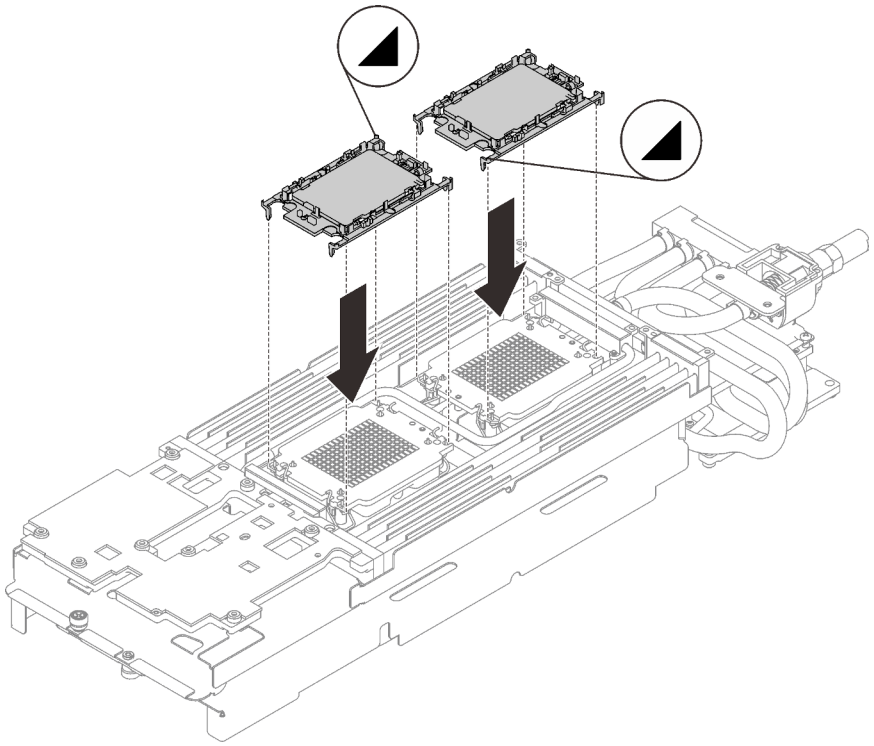


Figure 263. Processor installation

Step 5. Check the gap pads on the water loop, if any of them are damaged or missing, replace them with the new ones.

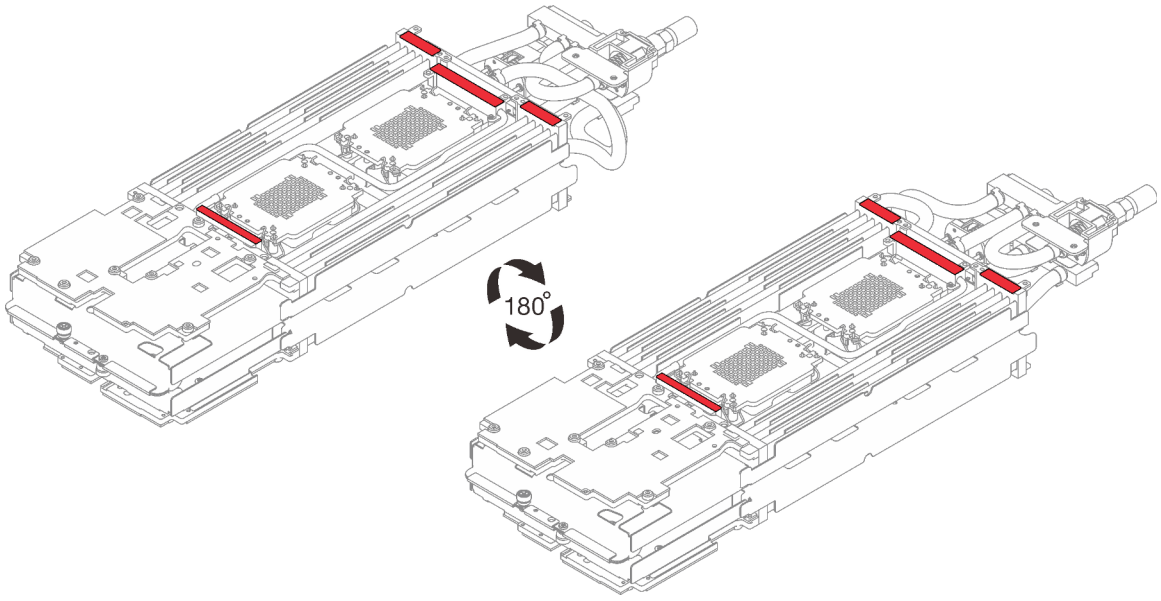


Figure 264. Water loop - Gap pads

Step 6. Rotate eight anti-tilt wire bails outwards to the unlocked position.

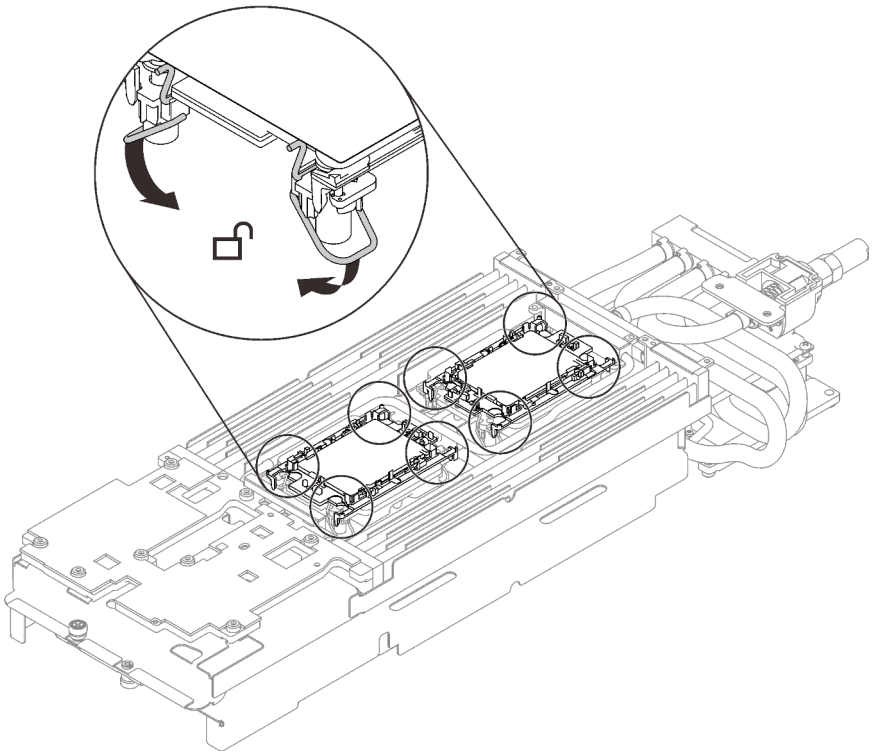


Figure 265. Processor - unlocked position

Step 7. Fully loosen two captive thumbscrews located at each end of the water loop carrier.

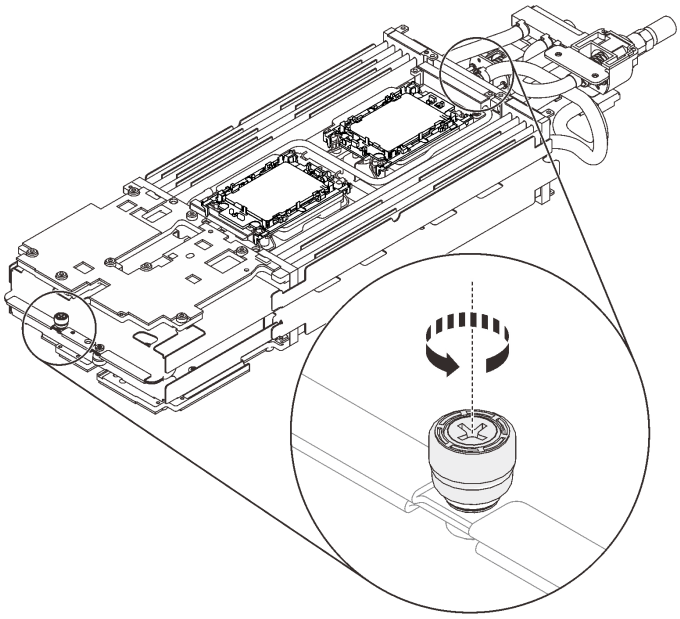


Figure 266. Loosening captive thumbscrews

Step 8. Install the one side of the water loop.

a. ❶ Carefully hold the water loop and flip it.

b. ❷ Carefully position the water loop on two guide pins near the rear of the node; then, carefully insert the quick connect tip through the opening in the rear of the tray.

c. ❸ While holding the water loop with both hands, gently lower down the water loop.

d. ❹ Gently put the water loop down and ensure it is seated firmly on the system board.

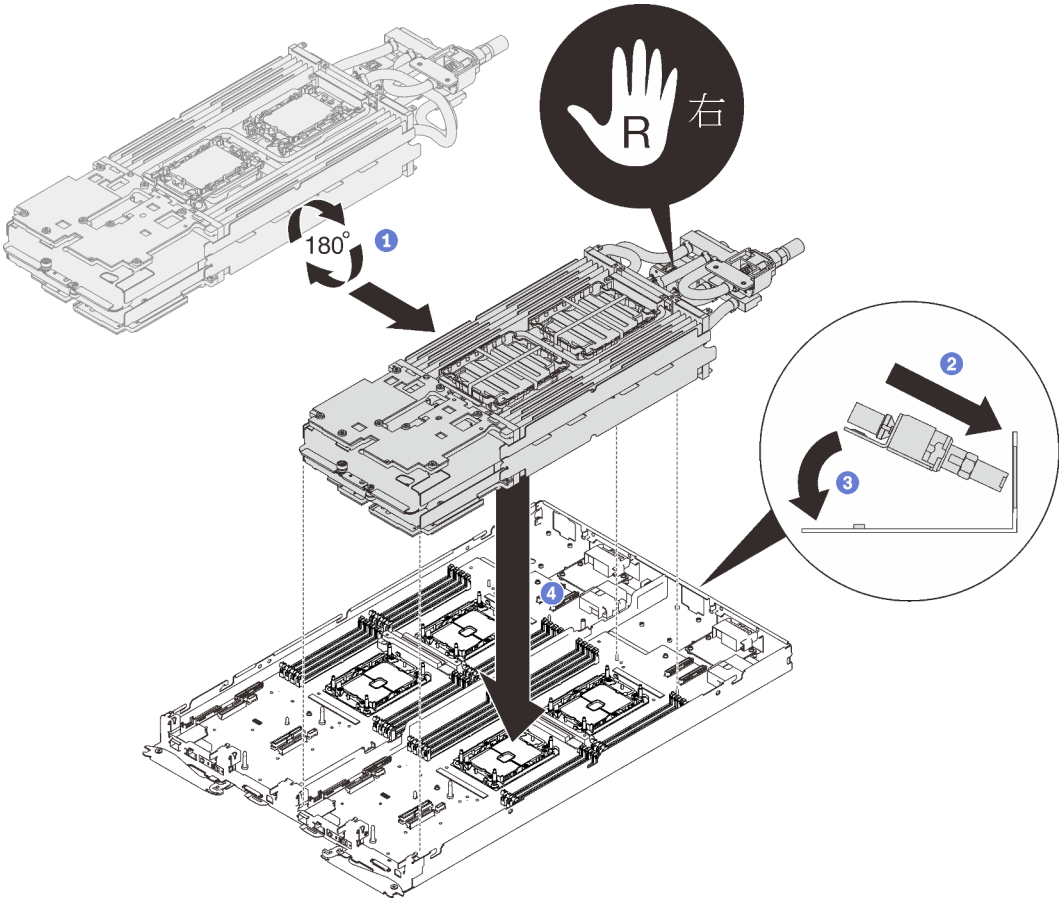


Figure 267. Water loop carrier installation

Step 9. Fully loosen two captive thumbscrews located at each end of the water loop carrier.

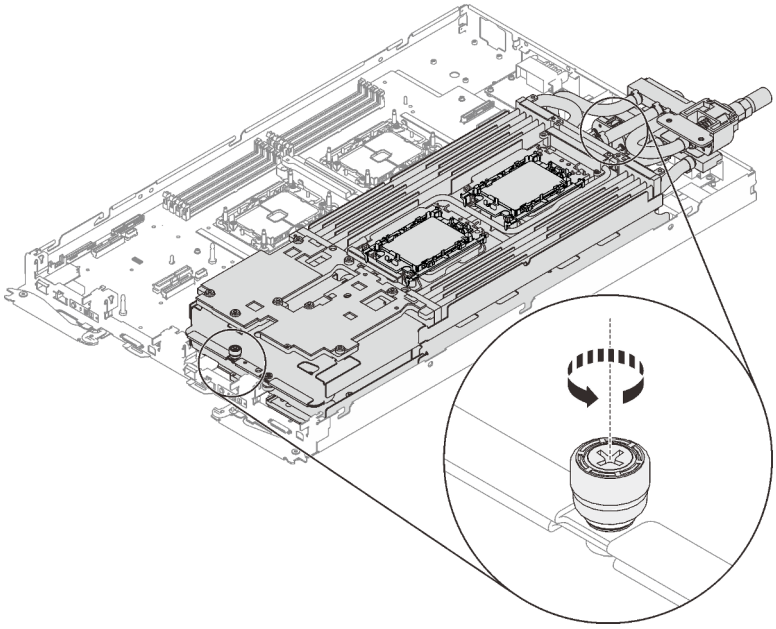


Figure 268. Loosening captive thumbscrews

Step 10. Install the other side of the water loop.

a. ❶ Carefully lift top side of the water loop and rotate it to the other half of the tray.

b. ❷ Carefully insert the quick connect into the tray opening as shown.

c. ❸ Carefully position the water loop on two guide pins near the rear of the node; then, gently put the water loop down and ensure it is firmly seated on the system board.

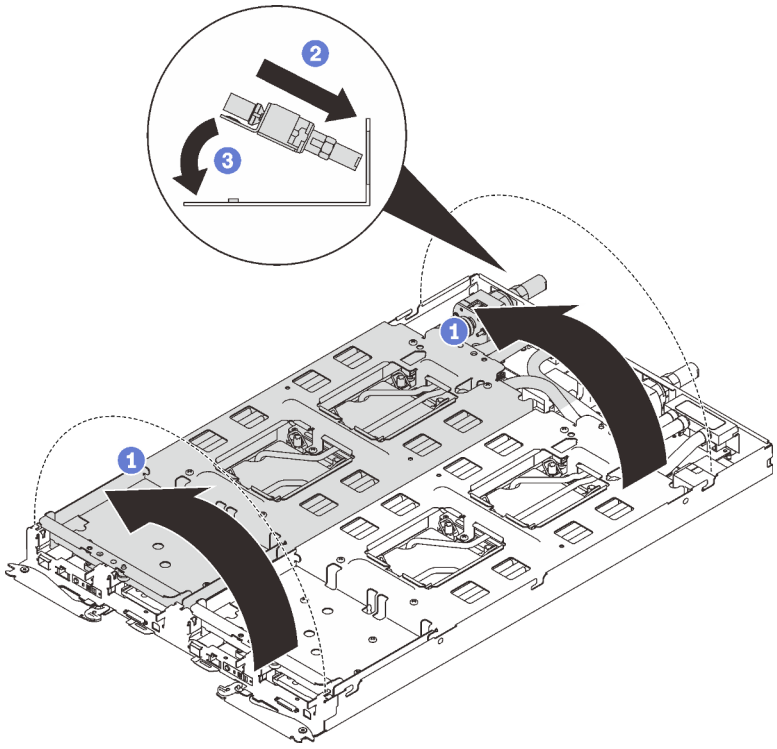


Figure 269. Water loop rotation

Step 11. Ensure the processors are secured properly.

1. ❶ Rotate anti-tilt wire bails (16x anti-tilt wire bails for two nodes) outwards to the locked position.
2. ❷ Fully tighten all Torx T30 captive screws (16x Torx T30 captive screws for two nodes) on cold plates with a general screwdriver until they stop, following the installation sequence shown on the cold plate label.

   Note: For reference, the torque required for the screws to be fully tightened/removed is 1.1-1.15 newton-meters, 9.8-10.2 inch-pounds.

   Attention: To prevent damage to components, make sure that you follow the indicated tightening sequence.

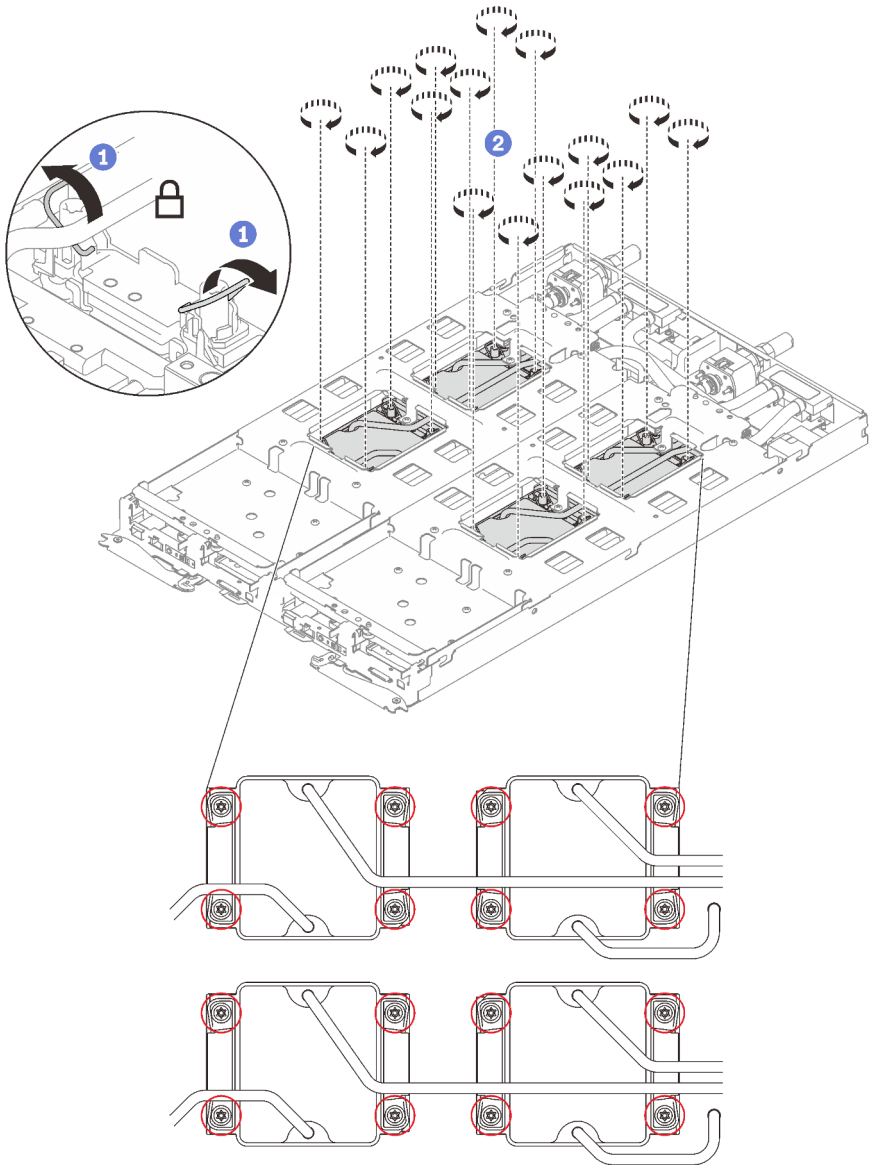


Figure 270. Processors installation

Step 12. Loosen water loop carrier screws (24x Phillips #2 screws for two nodes).

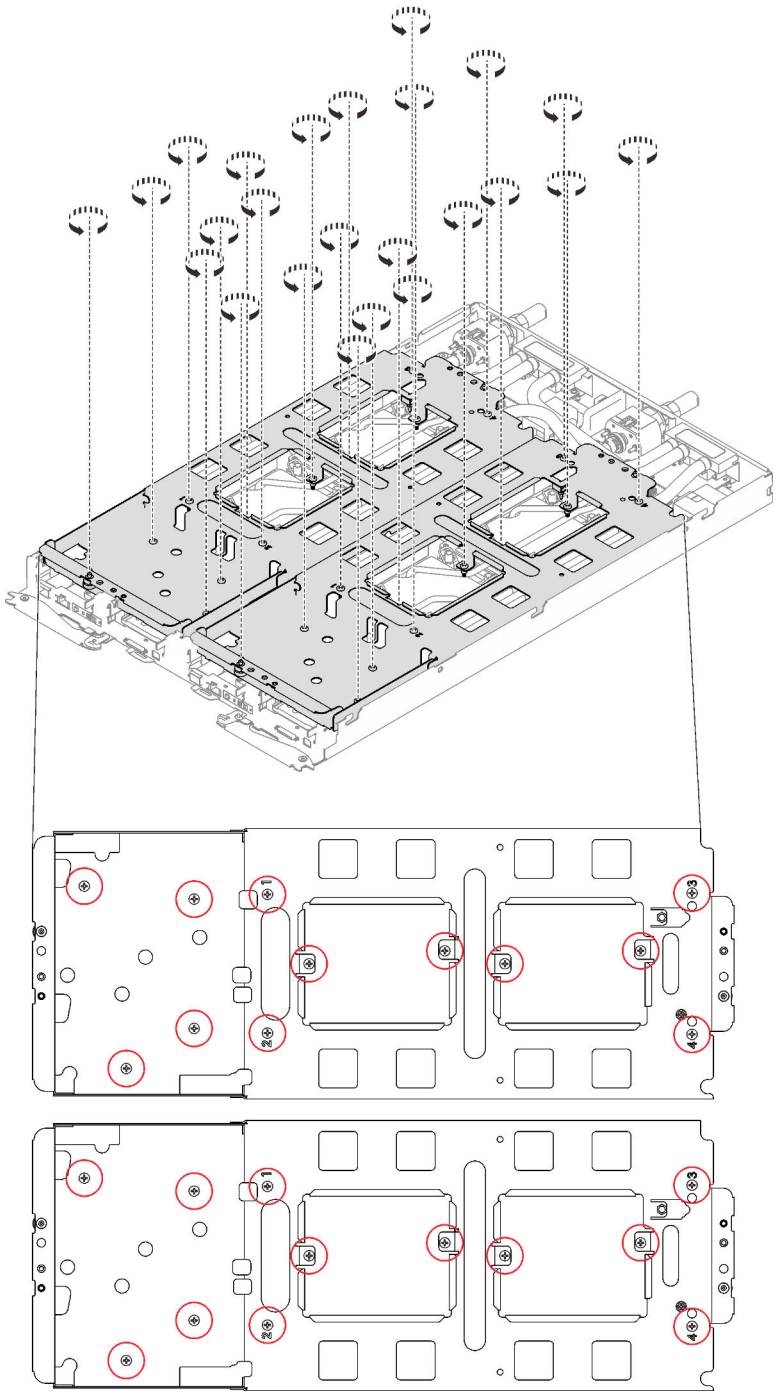


Figure 271. Loosening water loop carrier screws

Step 13. Carefully lift each water loop carrier up and away from the water loop one at a time.

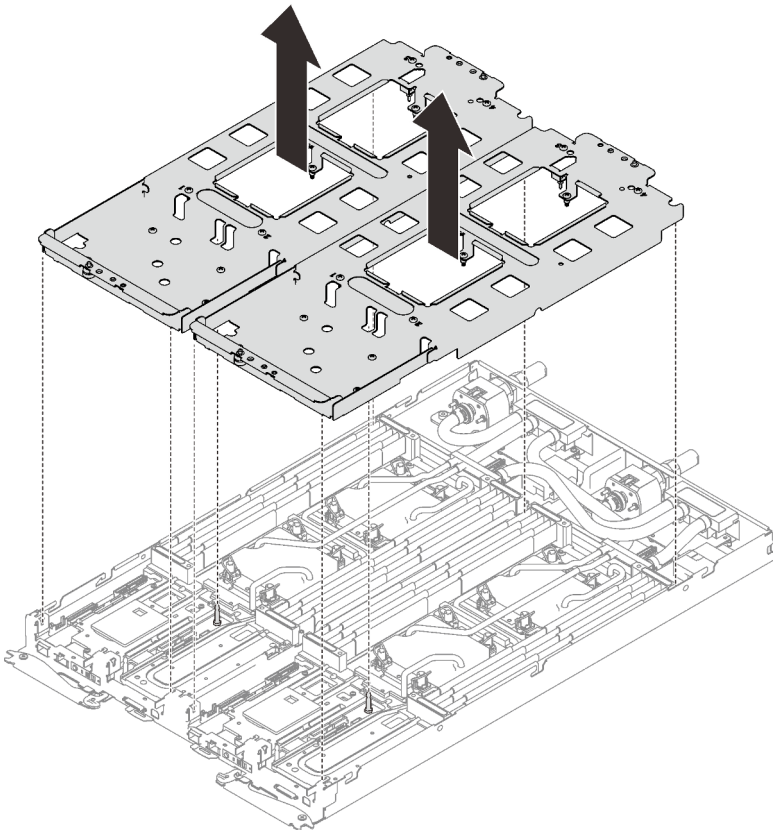


Figure 272. Water loop carrier removal

Step 14. Install the water loop screws (13x Torx T10 screws per node) with a torque screwdriver sets to the proper torque.

Notes:

- For reference, the torque required for the screws to be fully tightened/removed is 0.5-0.6 newton-meters, 4.5-5.5 inch-pounds.
- The screw holes that are circled in blue are meant for 9.5 mm screws, while the others that are circled in red are meant for 8.0 mm ones.

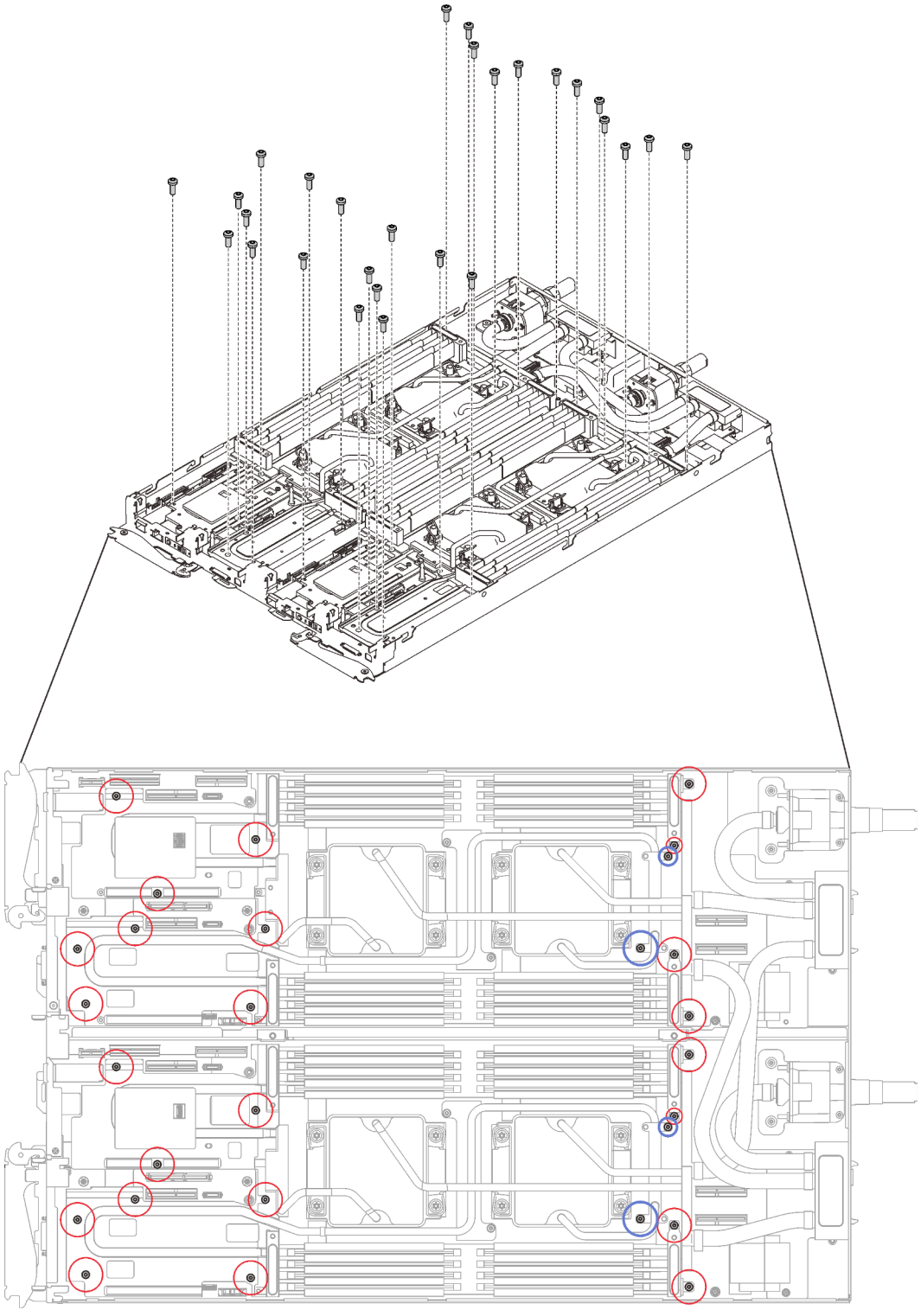


Figure 273. Water loop screws installation

Step 15. Install the following screws.

- Eight Torx T10 screws to secure the quick connect.
- Four Phillips #1 screws on the rear of the node.

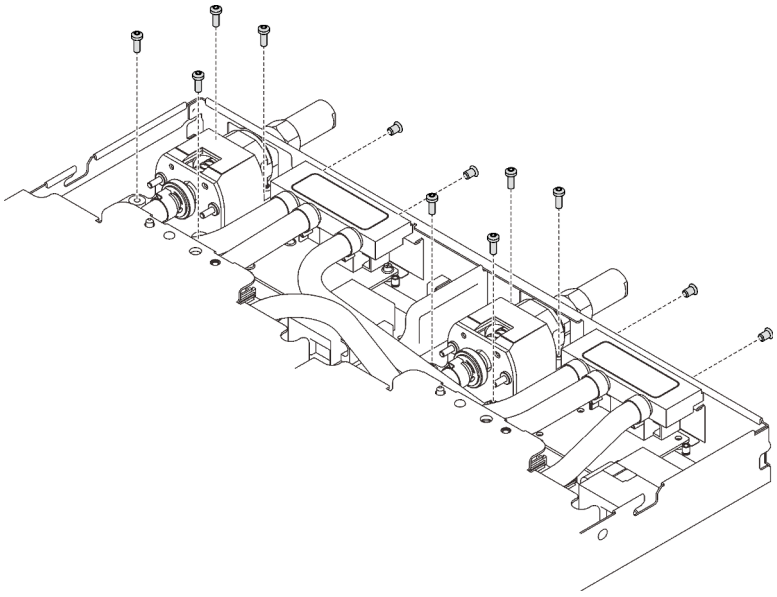


Figure 274. Screws installation

Step 16. Slide two VR clamp plates into the nodes and install Torx T10 screws (4x Torx T10 screw for two nodes).

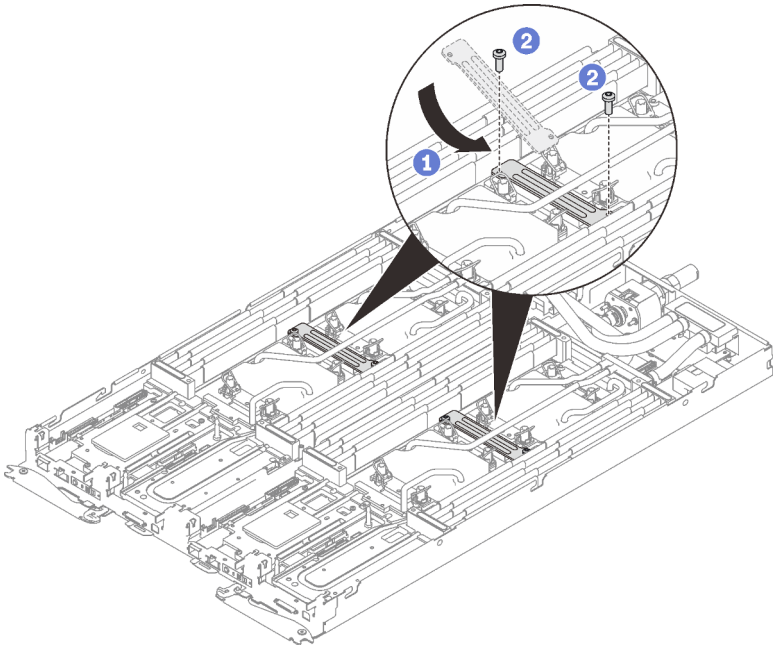


Figure 275. VR clamp plate installation

After you finish

1. Reinstall DIMMs for both nodes (see “Install a memory module” on page 162).
2. Reinstall DIMM combs. (see “Install a DIMM comb” on page 167).
3. Reinstall M.2 backplanes (see “Install the M.2 backplane” on page 185).
4. Reinstall drive cage assemblies if applicable (see “Install a drive cage assembly” on page 175).

5. Reinstall PCIe rise assemblies if applicable (see “Install a PCIe adapter” on page 195).
6. Reinstall the front and the rear cross braces (14x Phillips #1 screws).

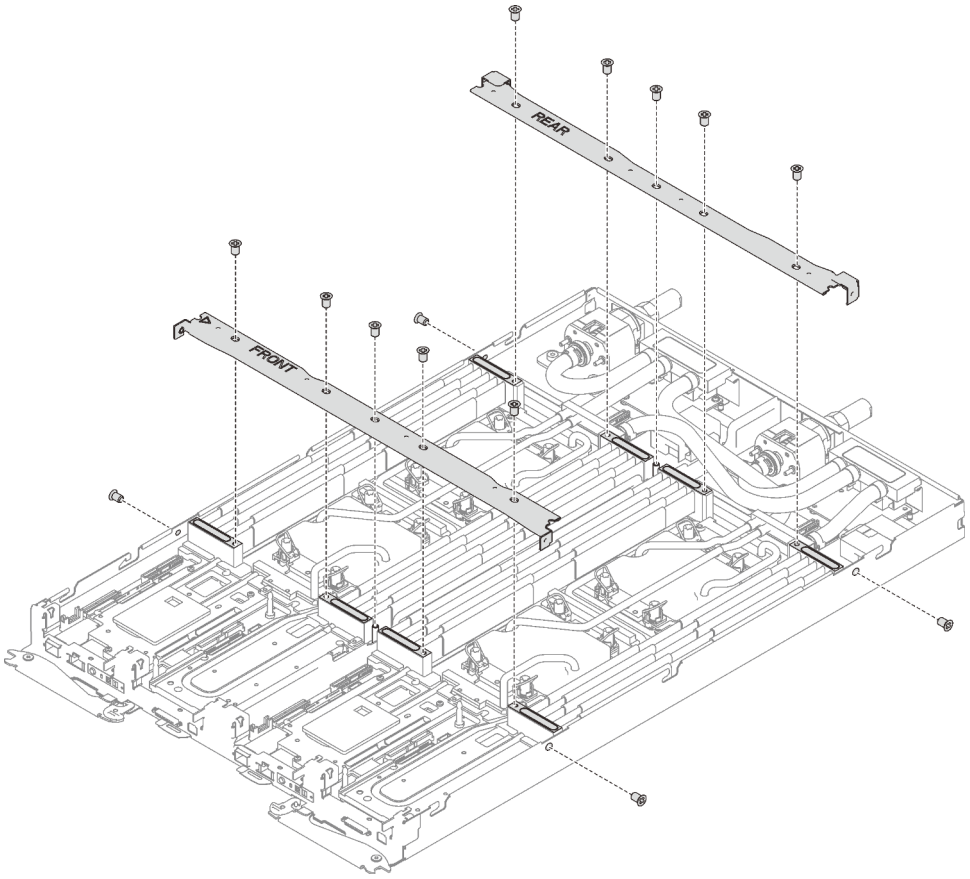


Figure 276. Cross brace installation

7. Reinstall the tray cover (see “Install the tray cover” on page 153).
8. Reinstall the tray (see “Install a DWC tray in the enclosure” on page 150).

   Note: For safety, use the lift tool to install the tray into the rack.
9. Connect all required external cables to the enclosure.

   Note: Use extra forces to connect QSFP cables to the enclosure if Mellanox ConnectX-6 adapters are installed.
10. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

Watch the procedure on YouTube

Replace components in the GPU node

Use the following information to remove and install GPU node components.

Drive (in the GPU node) replacement

Use the following procedures to remove and install a drive in the GPU node.

Remove the drive from the GPU node

Use this information to remove the drive from the GPU node.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.

Procedure

Step 1. Make preparations for this task.

a. Remove the tray (see “Remove a DWC tray from the enclosure” on page 149).

Attention: For safety, use the lift tool to remove the tray from the rack.

b. Remove the tray cover (see “Remove the tray cover” on page 152).

Step 2. Remove the drive.

a. ❶ Disconnect the power cable.

b. ❷ Hold the release tab and push it to release the drive.

c. ❸ Remove the drive out of the drive cage.

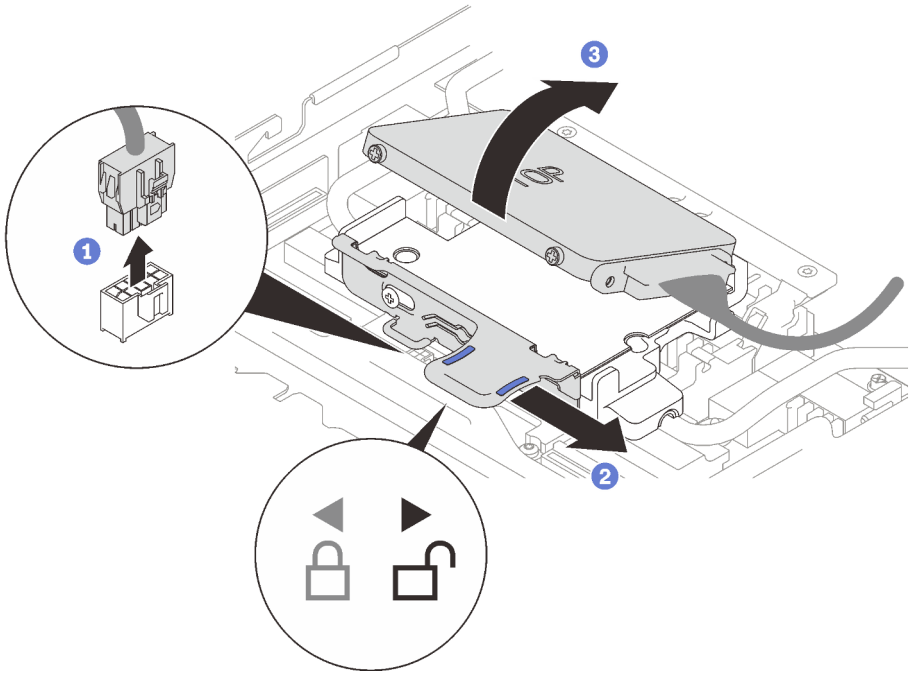


Figure 277. Drive removal

Step 3. Remove the two screws to remove the drive cage.

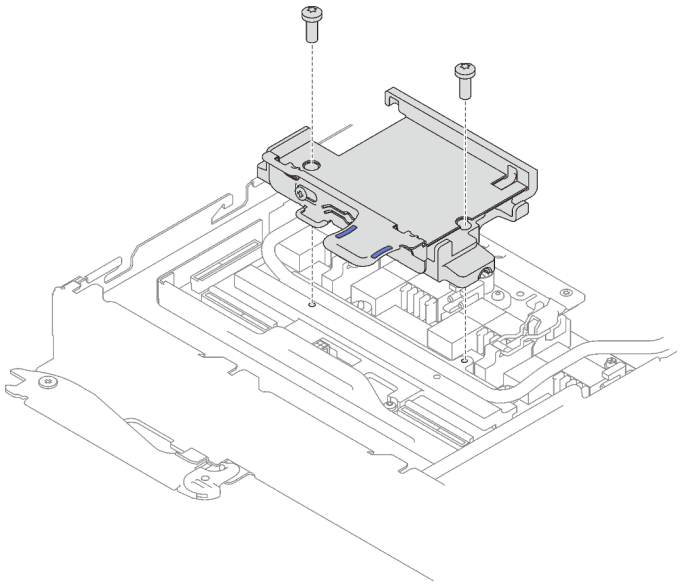


Figure 278. Drive cage removal

After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

Watch the procedure on YouTube

Install the drive in the GPU node

Use this information to install the drive in the GPU node.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52

Note: Ensure you have “SD650 V2 or SD650-N V2 Neptune® DWC Waterloop Service Kit “ in hand to install components.

Procedure

Step 1. Install the two screws to secure the drive cage.

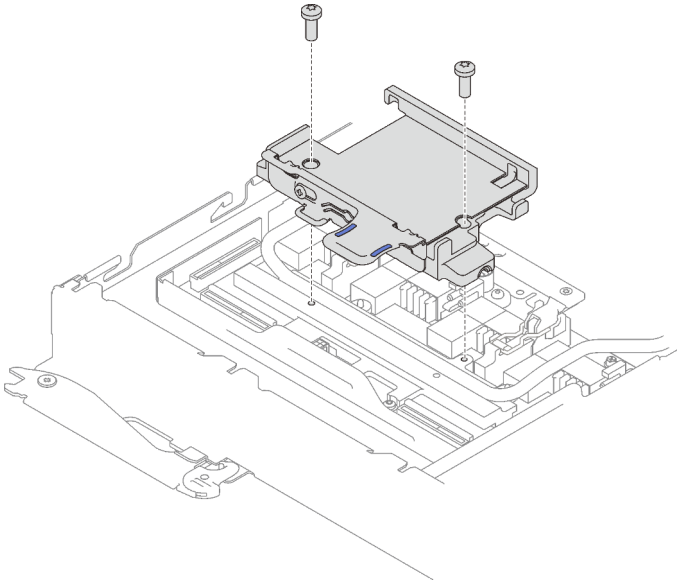


Figure 279. Drive cage installation

Step 2. Install the drive.

a. ❶ Hold the release tab and push it to the right to ensure the drive cage is released.

b. ❷ Align the drive with the two slots; then, push it into the cage to ensure it is firmly seated.

c. ❸ Hold the release tab and push it to the left to secure the drive.

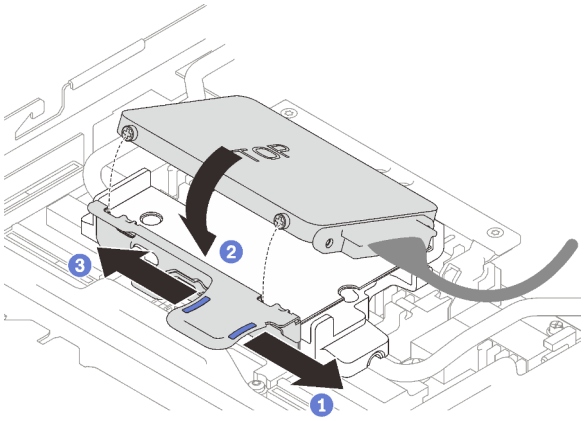


Figure 280. Drive cage installation

Step 3. Connect the cable.

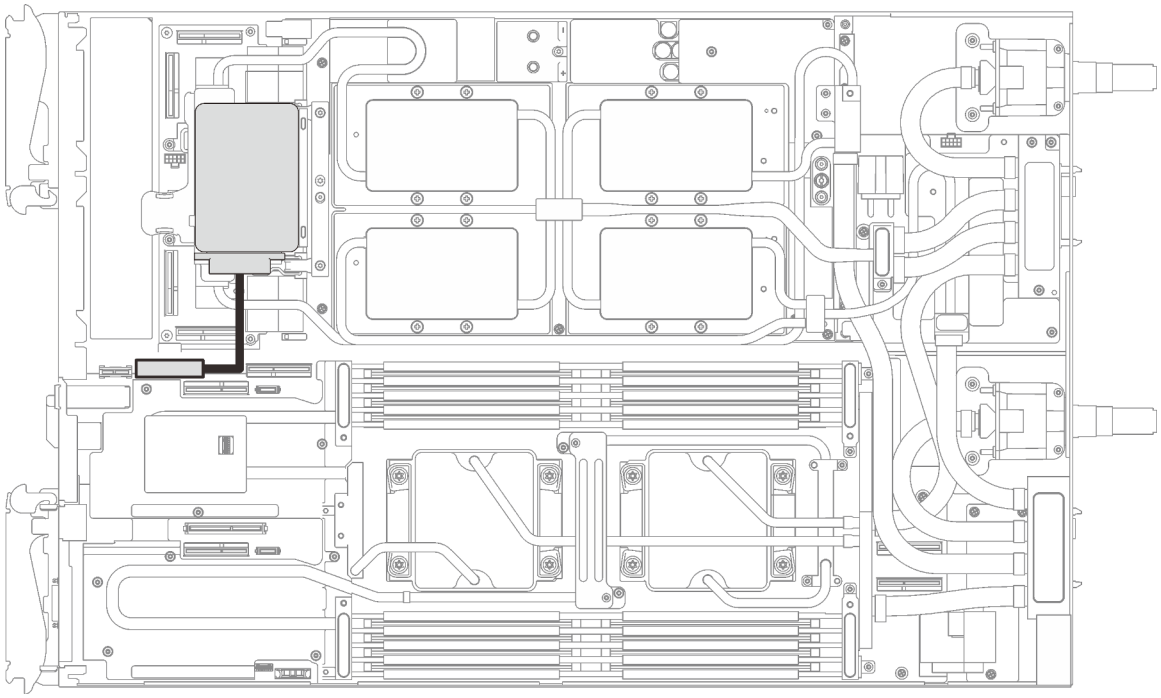


Figure 281. Cable routing

After you finish

1. Reinstall the tray cover (see “Install the tray cover” on page 153).
2. Reinstall the tray (see “Install a DWC tray in the enclosure” on page 150).

   Note: For safety, use the lift tool to install the tray into the rack.
3. Connect all required external cables to the enclosure.

   Note: Use extra forces to connect QSFP cables to the enclosure if Mellanox ConnectX-6 adapters are installed.

4. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

Watch the procedure on YouTube

GPU replacement

Use the following procedures to remove and install a GPU.

Remove a GPU

Use this information to remove a GPU.

About this task

S001

DANGER

Electrical current from power, telephone, and communication cables is hazardous.
To avoid a shock hazard:

- **Connect all power cords to a properly wired and grounded electrical outlet/source.**
- **Connect any equipment that will be attached to this product to properly wired outlets/sources.**
- **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.**
- **The device might have more than one power cord, to remove all electrical current from the device, ensure that all power cords are disconnected from the power source.**

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.
- To avoid damaging the water loop, always use the water loop carrier when removing, installing or folding the water loop.
- A torque screwdriver is available for request if you do not have one at hand.

Prepare the following screwdrivers to ensure you can install and remove corresponding screws properly.

Table 38. Torque screwdriver type list

Torque screwdriver type	Screw type
Torx T10 head screwdriver	Torx T10 screw
Phillips #1 head screwdriver or 3/16" hex head screwdriver	Phillips #1 screw
Phillips #2 head screwdriver	Phillips #2 screw

rt

The following illustration shows the GPU numbering.

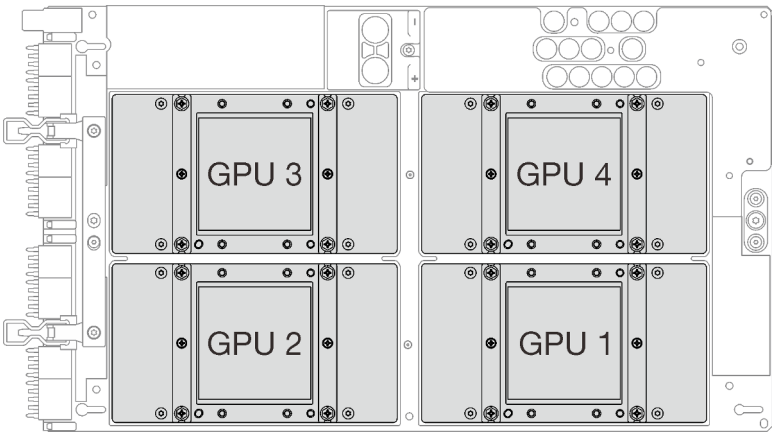


Figure 282. GPU numbering

Procedure

Step 1. Make preparations for this task.

a. Remove the tray (see “Remove a DWC tray from the enclosure” on page 149).

Attention: For safety, use the lift tool to remove the tray from the rack.

b. Remove the tray cover (see “Remove the tray cover” on page 152).

c. Remove the front and the rear cross braces (11x Phillips #1 screws).

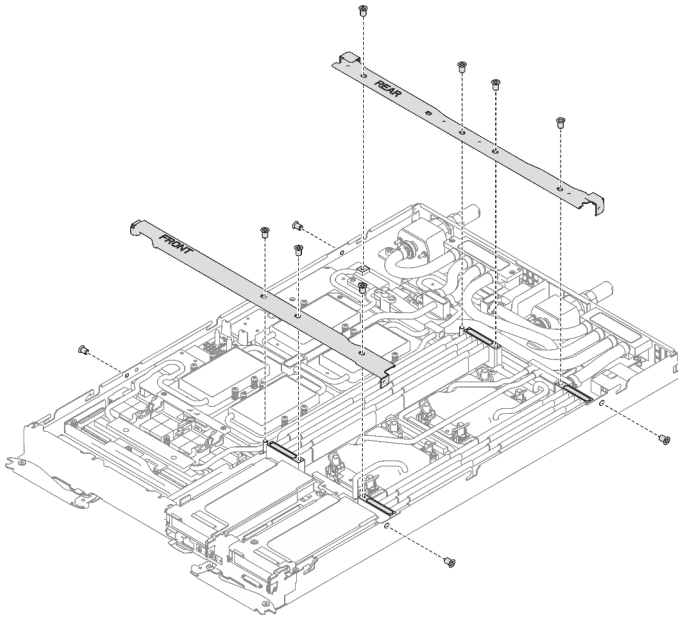


Figure 283. Cross brace removal

d. See “Cable removal order” on page 37 to disconnect cables according to your configuration.

e. Disconnect GPU power cable.

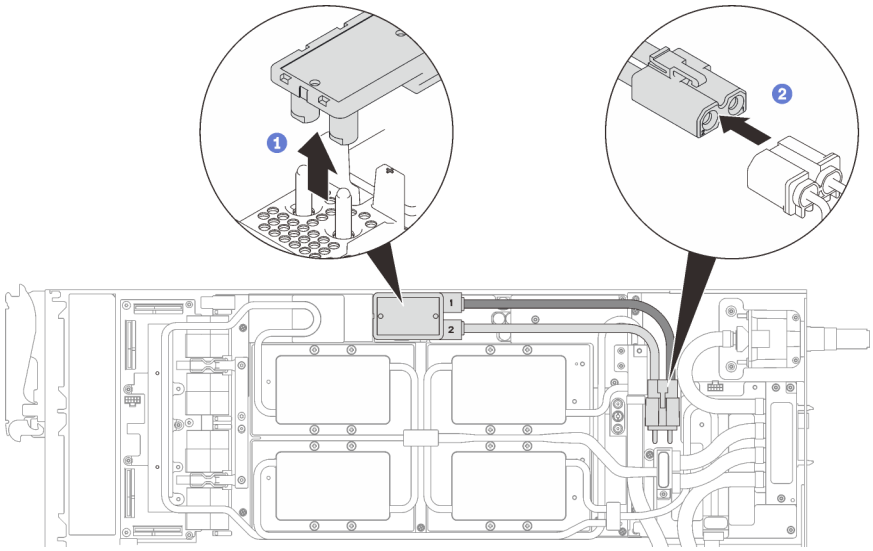


Figure 284. GPU power cable removal

f. Remove the clamp plate or the drive depending on your configuration.

- Clamp plate removal: Remove the two screws to remove the clamp plate.

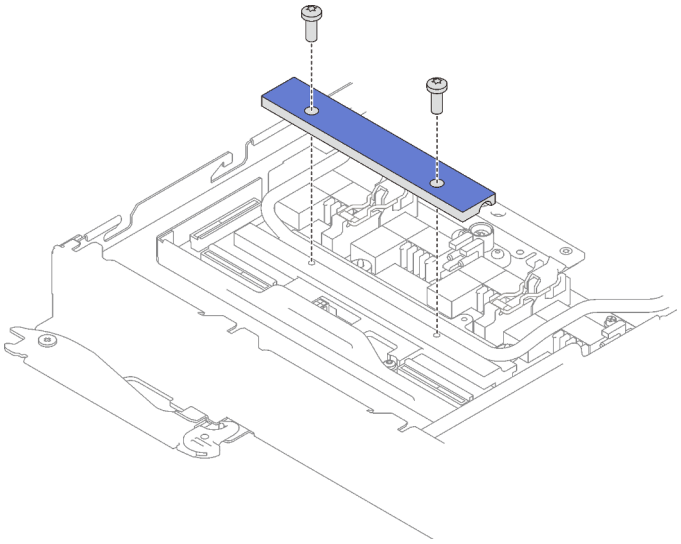


Figure 285. Clamp plate removal

- Drive removal: see “Install the drive in the GPU node” on page 291.

g. Remove seven Torx T10 water loop screws with a torque screwdriver sets to the proper torque.

Note: For reference, the torque required for the screws to be fully tightened/removed is 0.5-0.6 newton-meters, 4.5-5.5 inch-pounds.

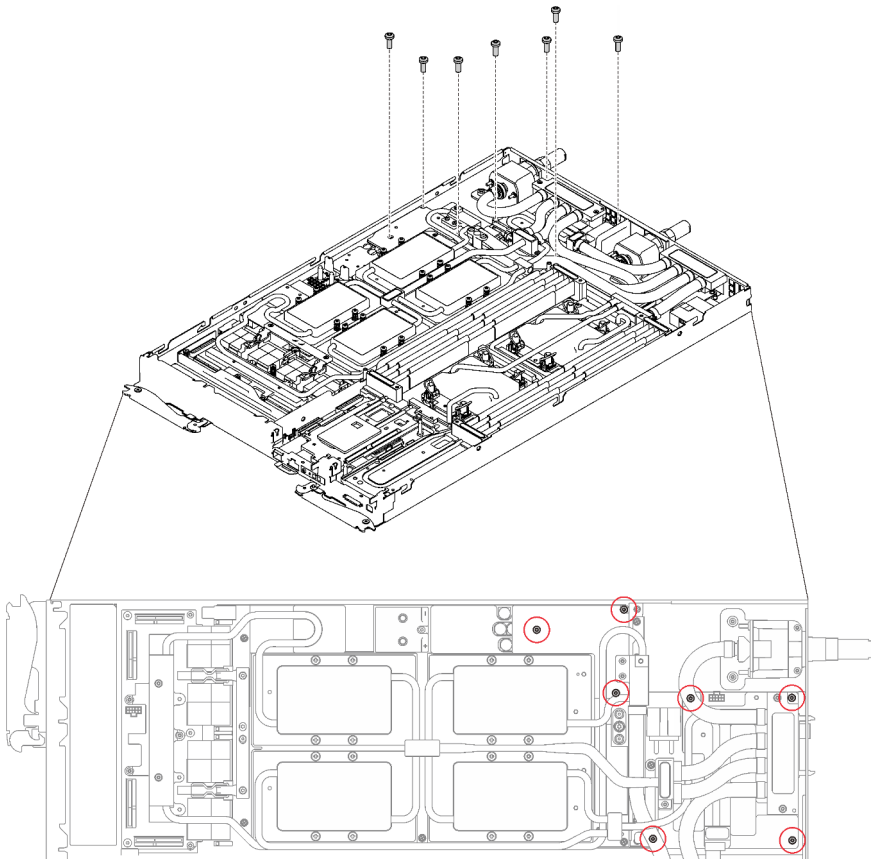


Figure 286. Water loop screws removal

h. Remove GPU cold plate screws (16x Phillips #1 screws) with a torque screwdriver sets to the proper torque.

Note: For reference, the torque required for the screws to be fully tightened/removed is 0.34-046 newton-meters, 3-4 inch-pounds.

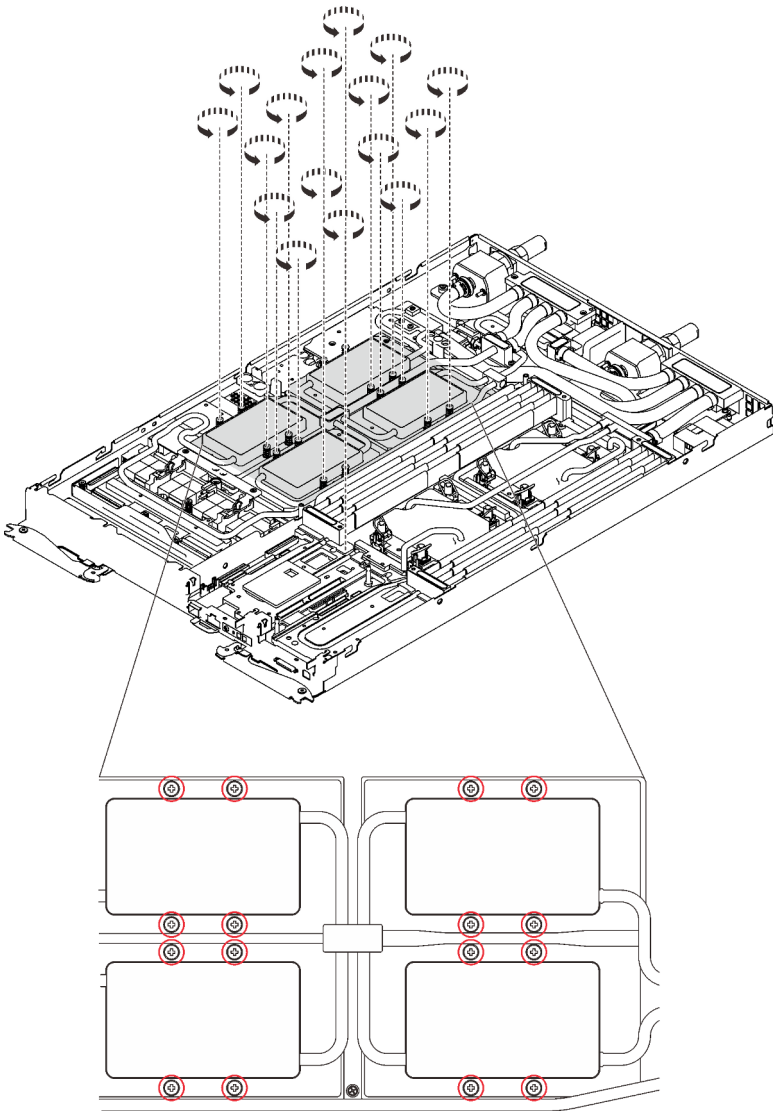


Figure 287. GPU cold plate screws removal

i. Remove the four Torx T10 screws (per node) to loosen the quick connect.

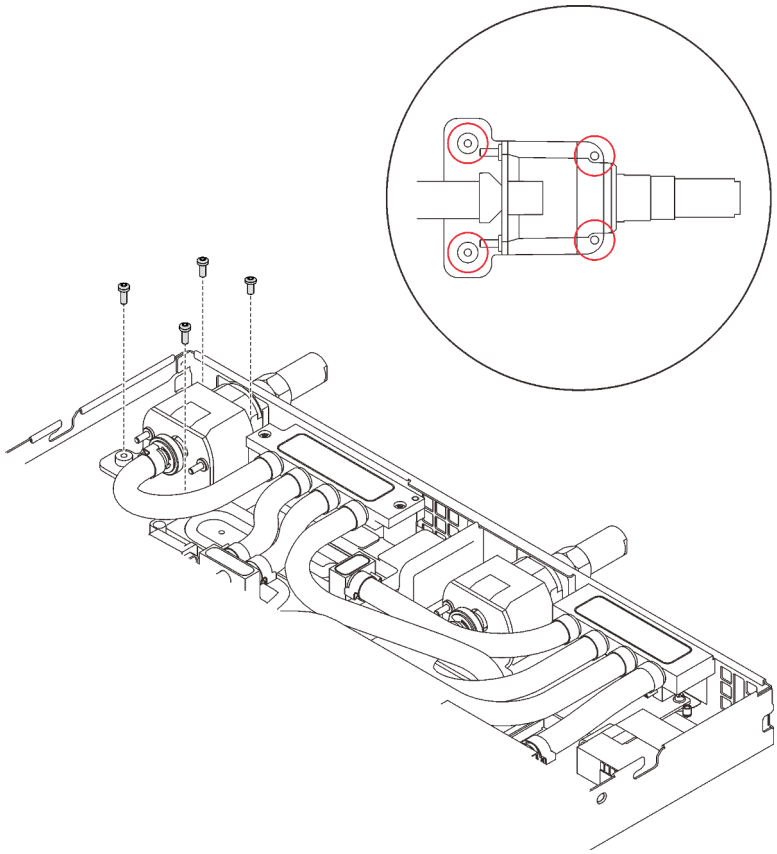


Figure 288. Screws removal

j. Orient the water loop carrier with the slots; then, gently put the water loop carrier down and ensure it is seated firmly on the water loop.

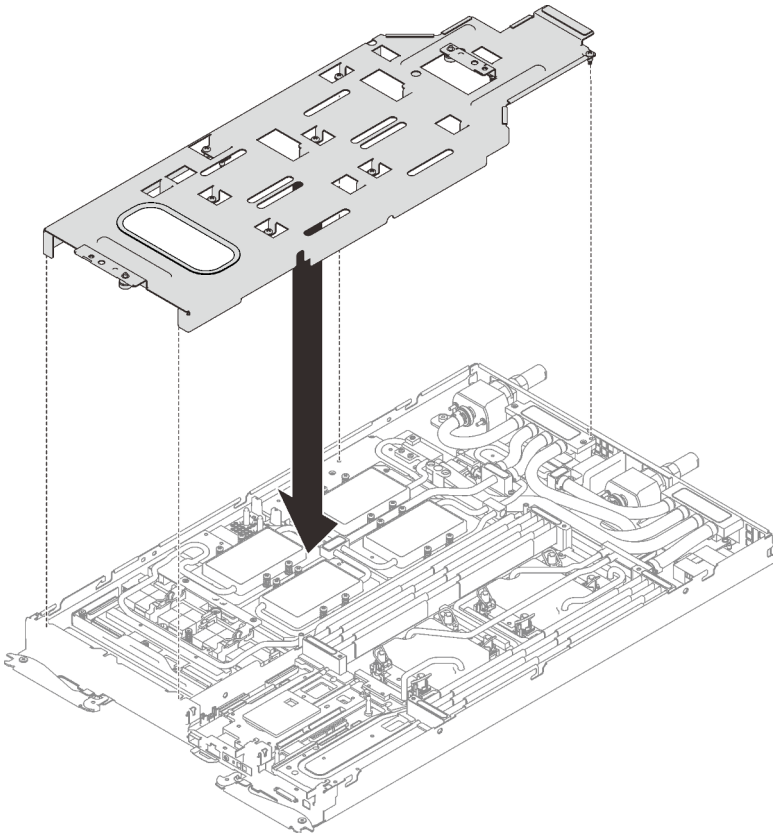


Figure 289. Water loop carrier installation

k. Tighten water loop carrier screws (15x Phillips #2 screws).

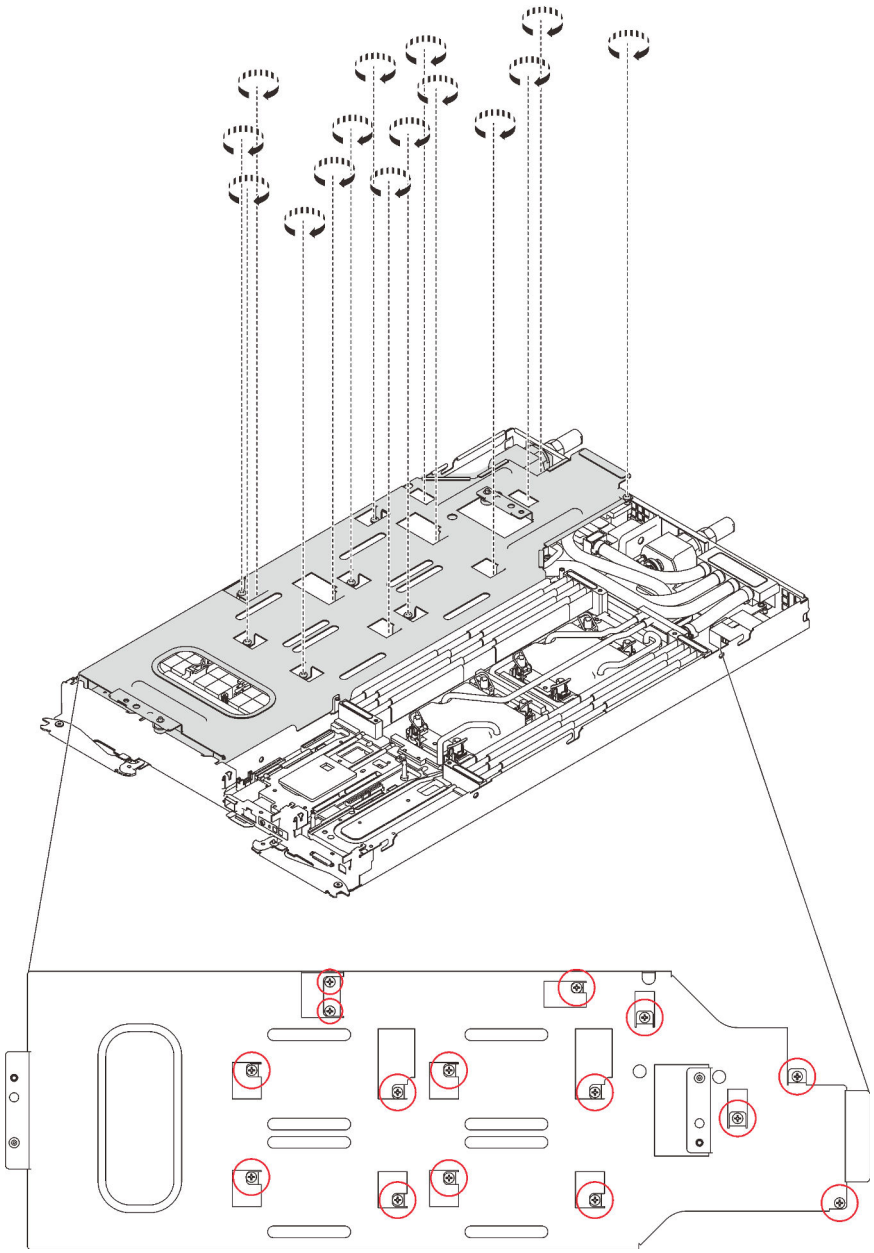


Figure 290. Water loop carrier screws installation

l. Fold the water loop.

1. ❶ Carefully unhook the quick connect and slide it out of the opening in the rear of the tray; then, lift the water loop up off the GPU board.
2. ❷ Carefully rotate the water loop so one half is sitting on top of the other half.

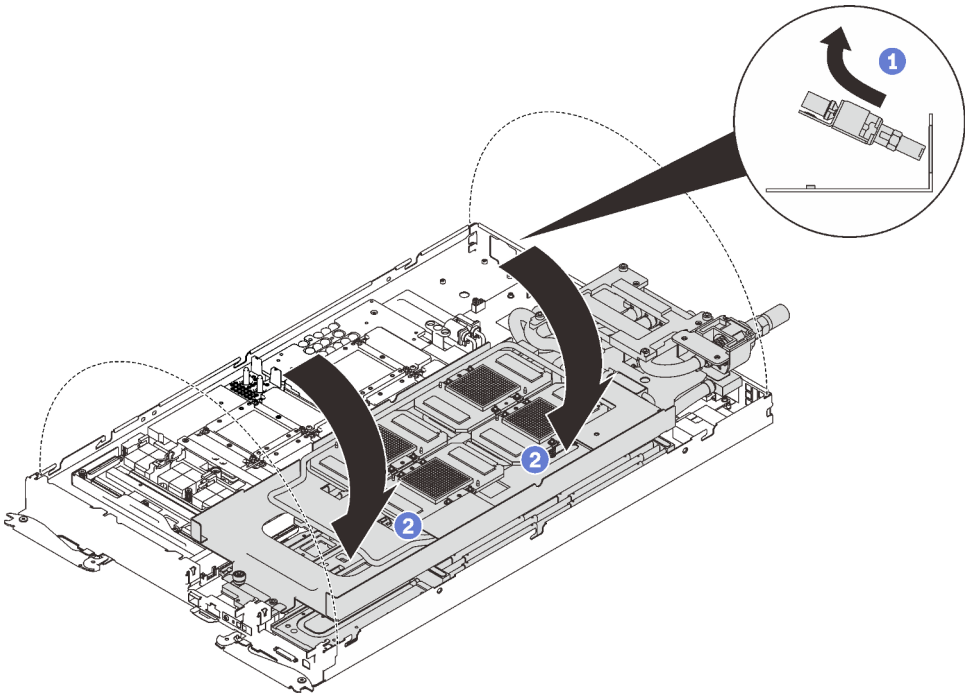


Figure 291. Folding the water loop

Step 2. Locate the GPU which should be moved; then, remove the four Phillips #2 screws (with a torque screwdriver sets to the proper torque) and carefully remove the GPU out of the GPU board.

Note: For reference, the torque required for the screws to be fully tightened/removed is 0.45-0.56 newton-meters, 4-5 inch-pounds.

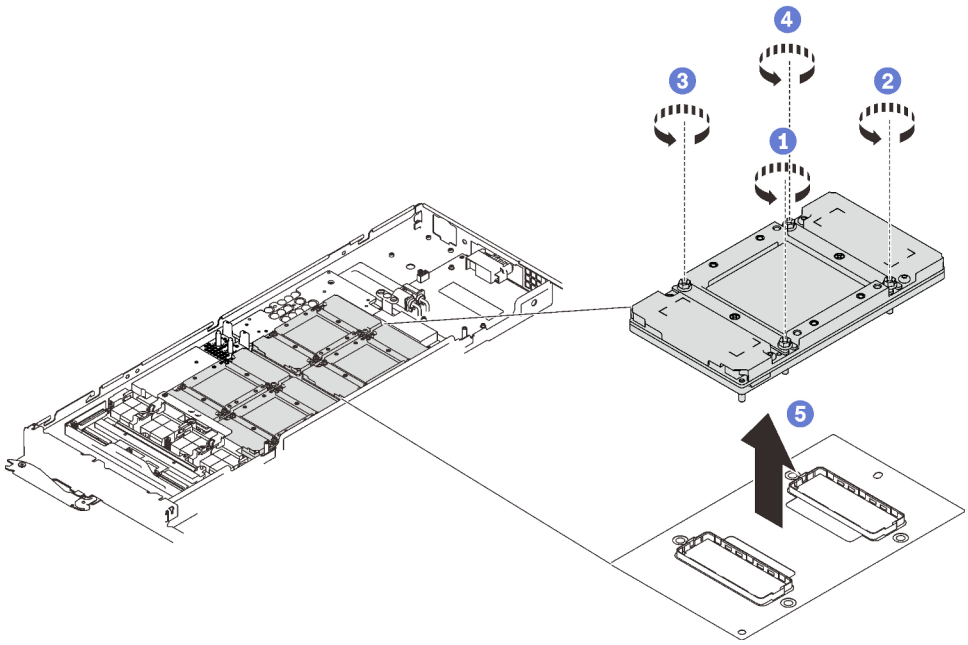


Figure 292. GPU removal

Step 3. Install protective covers to the GPU.

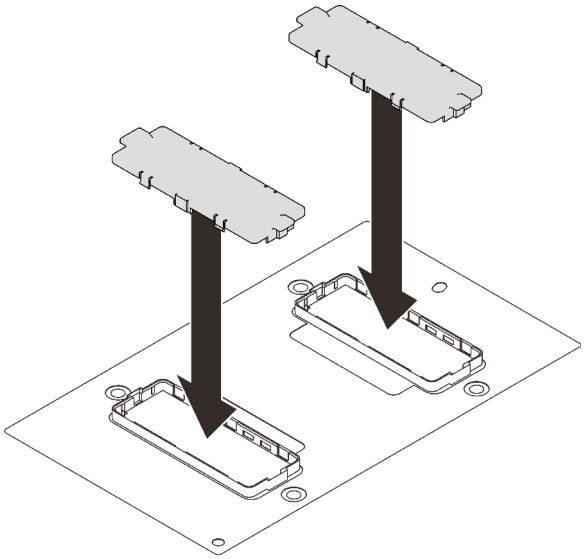


Figure 293. Protective covers installation

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

Watch the procedure on YouTube

Install a GPU

Use this information to install a GPU board.

About this task

S001

DANGER

Electrical current from power, telephone, and communication cables is hazardous.
To avoid a shock hazard:

- **Connect all power cords to a properly wired and grounded electrical outlet/source.**
- **Connect any equipment that will be attached to this product to properly wired outlets/sources.**
- **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.**
- **The device might have more than one power cord, to remove all electrical current from the device, ensure that all power cords are disconnected from the power source.**

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.
- A torque screwdriver is available for request if you do not have one at hand.
- To avoid damaging the water loop, always use the water loop carrier when removing, installing or folding the water loop.
- Remove protective covers from the GPU if they are installed.

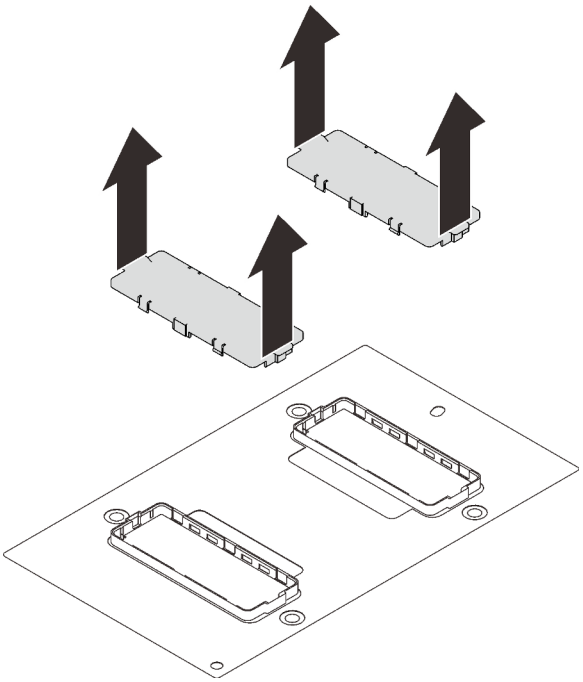


Figure 294. Protective covers removal

Notes:

- Ensure you have “SD650 V2 or SD650-N V2 Neptune® DWC Waterloop Service Kit “ in hand to install components.
- To prevent potential thermal issues, change the **Misc** setting in the BIOS from **Option3** (default value) to **Option1** if the following two conditions are met:
  - The server is equipped with a GPU adapter.
  - The UEFI firmware version is ESE122T or later.

  For the method of changing the **Misc** setting, see https://support.lenovo.com/us/en/solutions/TT1832.

Prepare the following screwdrivers to ensure you can install and remove corresponding screws properly.

Table 39. Torque screwdriver type list

Torque screwdriver type list	Screw type
Torx T10 head screwdriver	Torx T10 screw
Phillips #1 head screwdriver or 3/16" hex head screwdriver	Phillips #1 screw
Phillips #2 head screwdriver	Phillips #2 screw

The following illustration shows the GPU numbering.

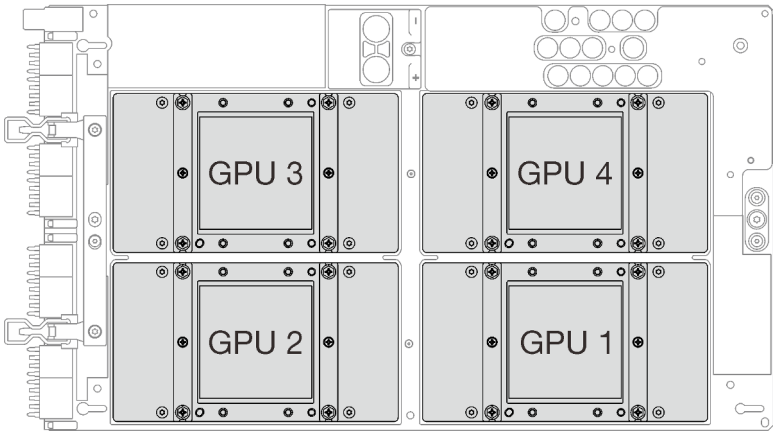


Figure 295. GPU numbering

Procedure

Step 1. Gently place the GPU down on the GPU board; then, install the four Phillips #2 screws with a torque screwdriver sets to the proper torque.

Note: For reference, the torque required for the screws to be fully tightened/removed is 0.45-0.56 newton-meters, 4-5 inch-pounds.

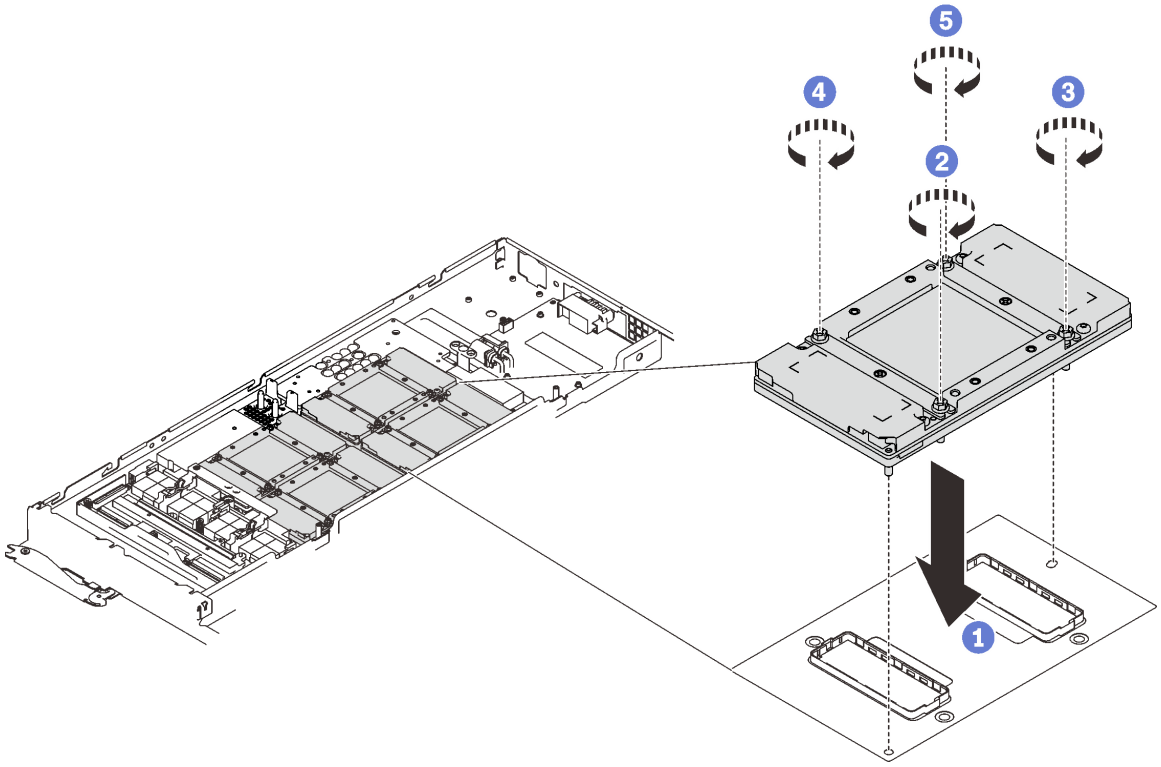


Figure 296. GPU installation

Step 2. Apply the new thermal grease on GPUs.

a. If there is any old thermal grease on four GPUs and the cold plates, gently clean the top of the four GPUs and the cold plates using an alcohol cleaning pad.

b. If you have cleaned the top of the GPUs with an alcohol cleaning pad, make sure to apply the new thermal grease after the alcohol has fully evaporated.

c. Apply gray thermal grease to the top of the four GPUs with a syringe by forming four dots spaced as shown below, with each dot consisting of about 0.5 gram (about 0.225 ml) of gray thermal grease. Each syringe contains 1 gram of thermal grease, sufficient for two dots of thermal grease.

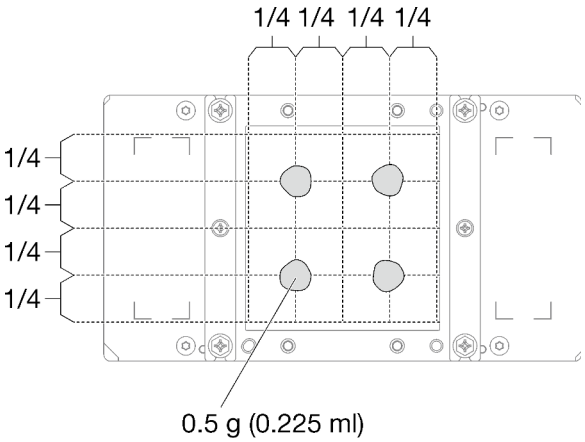


Figure 297. Thermal grease application

Step 3. Replace the existing putty pad with the new one.

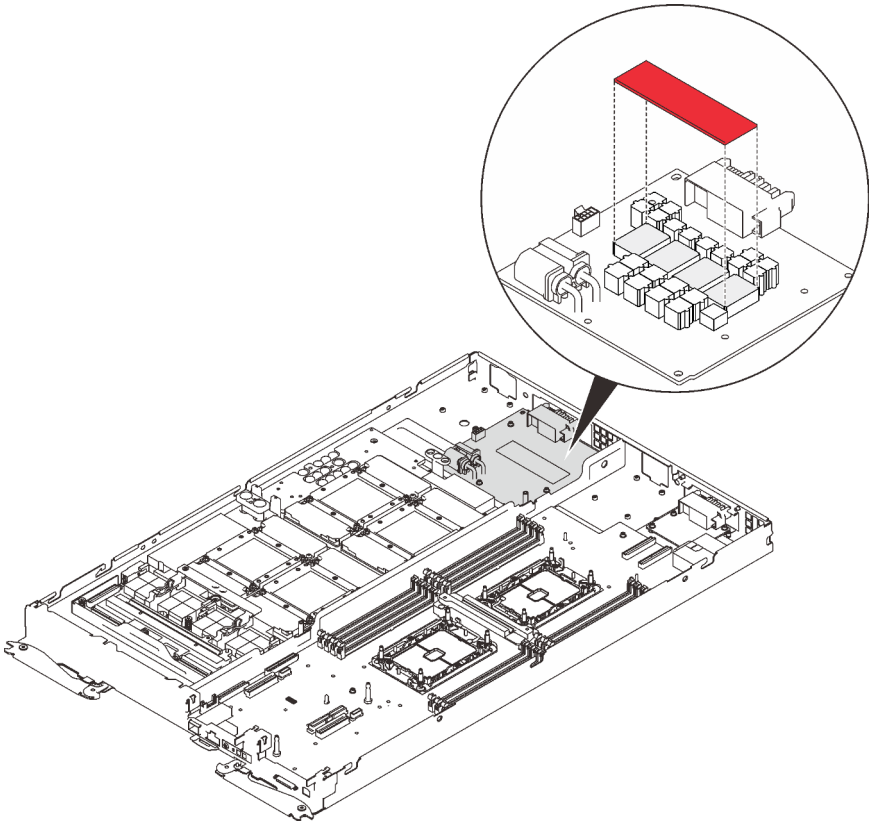


Figure 298. Putty pad

Step 4. Check the gap pads on the water loop, if any of them are damaged or missing, replace them with the new ones.

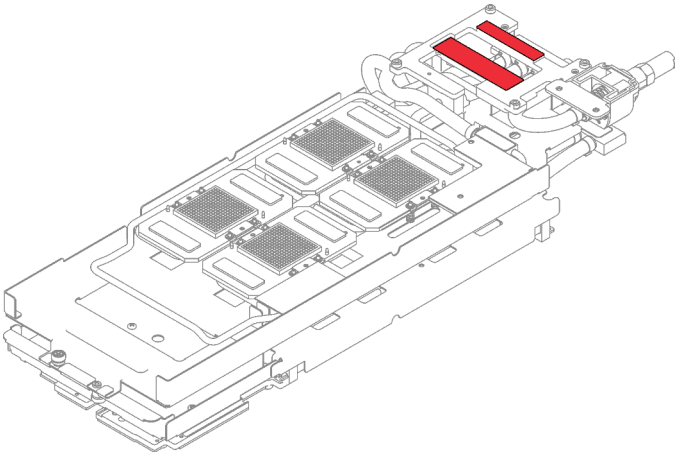


Figure 299. Gap pads on the water loop

Step 5. Reinstall the water loop.

a. ❶ Carefully rotate the top side of the water loop.

b. ❷ Carefully insert the quick connect into the tray opening as shown.

c. ❸ Carefully position the water loop on two guide pins near the rear of the node; then, gently put the water loop down and ensure it is firmly seated on the GPU board.

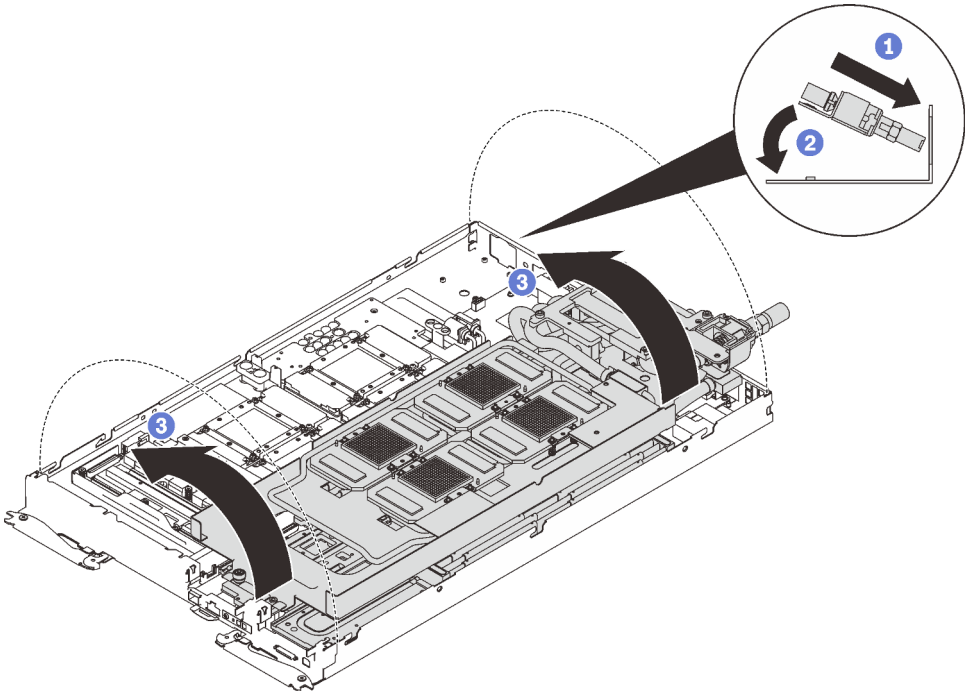


Figure 300. Water loop installation

Step 6. Loosen all water loop carrier screws (15x Phillips #2 screws).

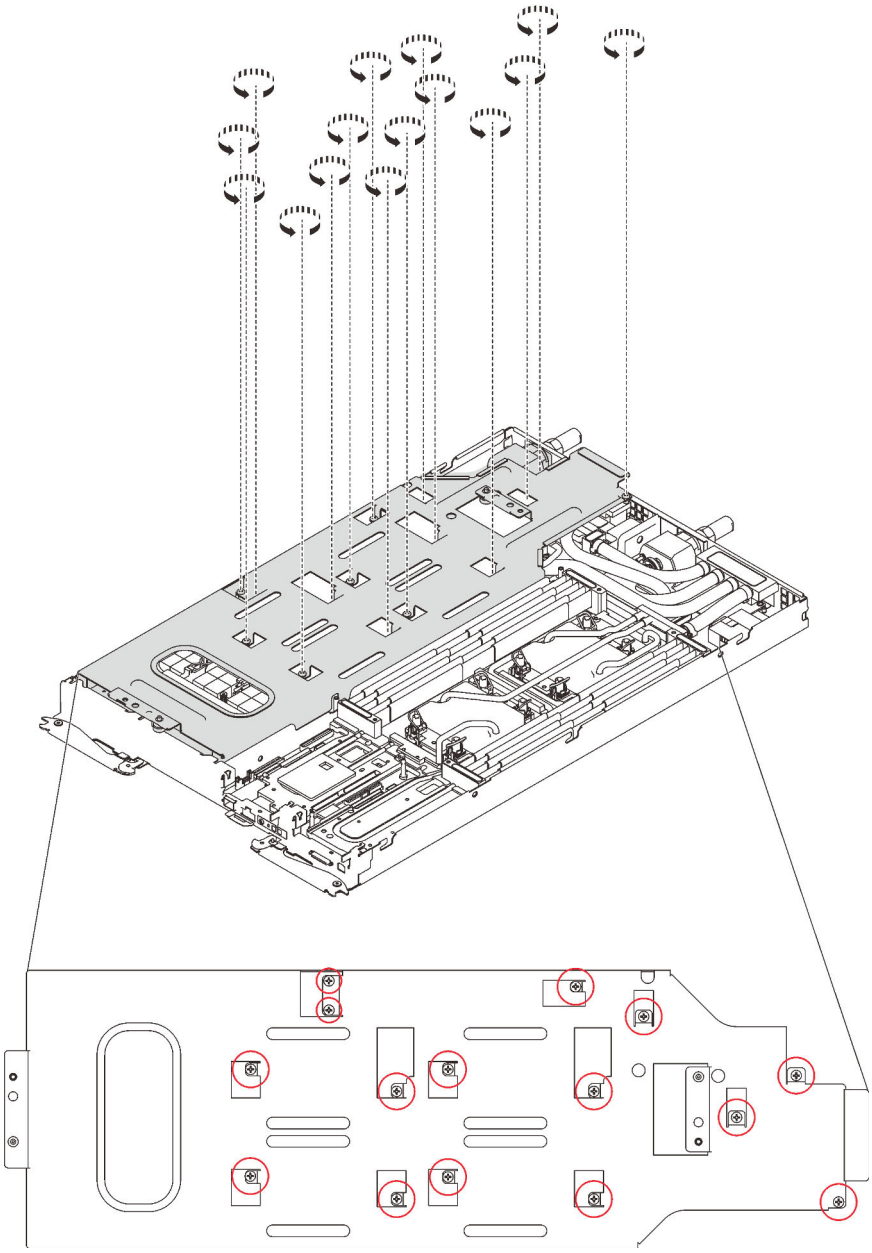


Figure 301. Loosening water loop carrier screws

Step 7. Carefully lift the water loop carrier up and away from the water loop.

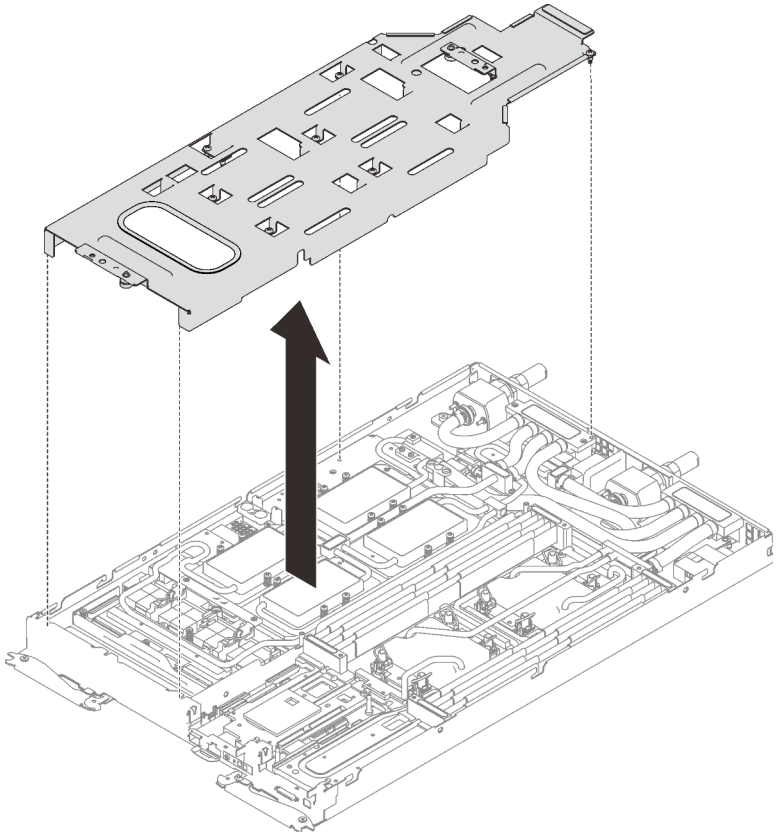


Figure 302. Water loop carrier removal

Step 8. Reinstall water loop screws (7x Torx T10 screws) with a torque screwdriver sets to the proper torque.

Note: For reference, the torque required for the screws to be fully tightened/removed is 0.5-0.6 newton-meters, 4.5-5.5 inch-pounds.

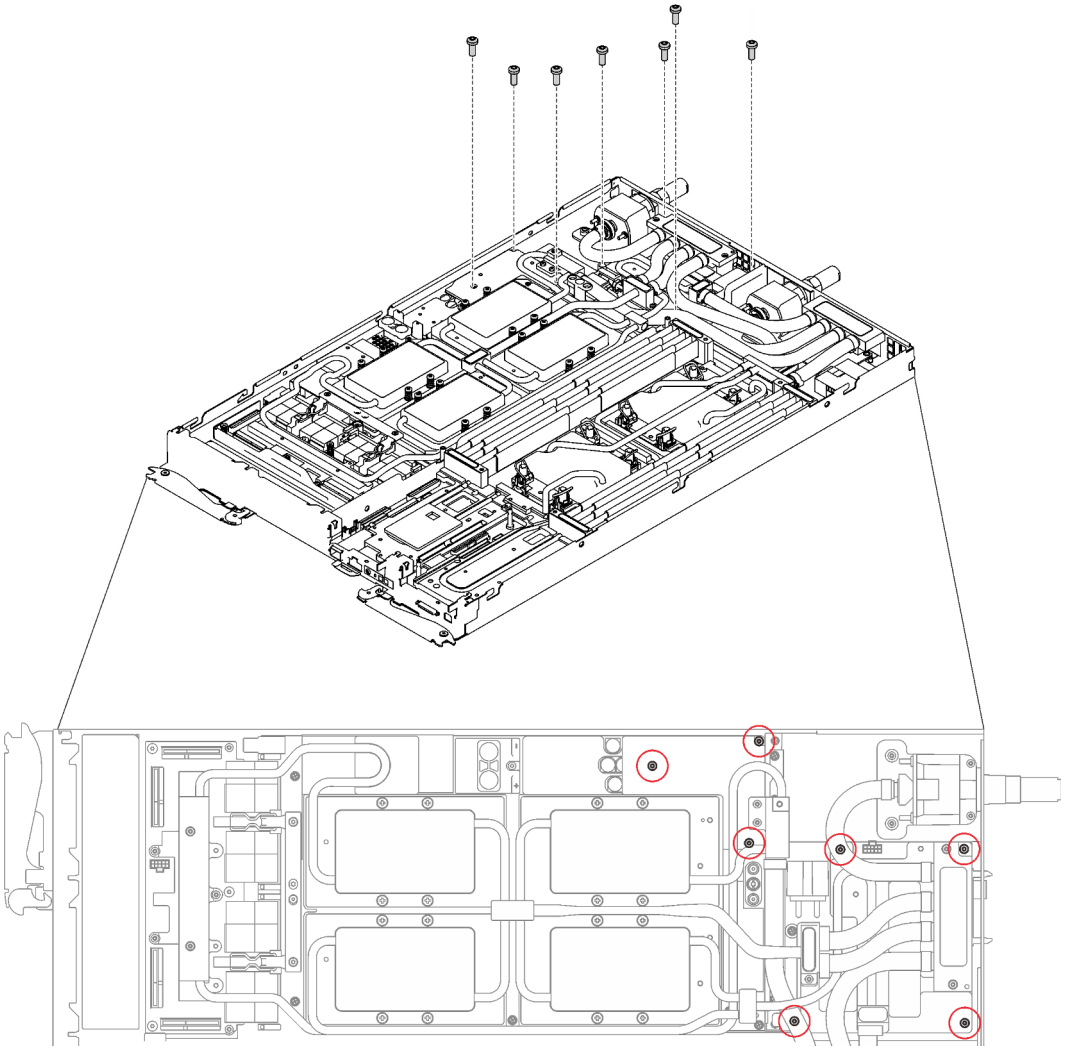


Figure 303. Water loop screws installation

Step 9. Reinstall GPU cold plate screws (4x Phillips #1 screws per GPU cold plate, total of 16x Phillips #1 screws) with a torque screwdriver set to the proper torque. For reference, the torque required for the screws to be fully tightened/removed is 0.34-046 newton-meters, 3-4 inch-pounds.

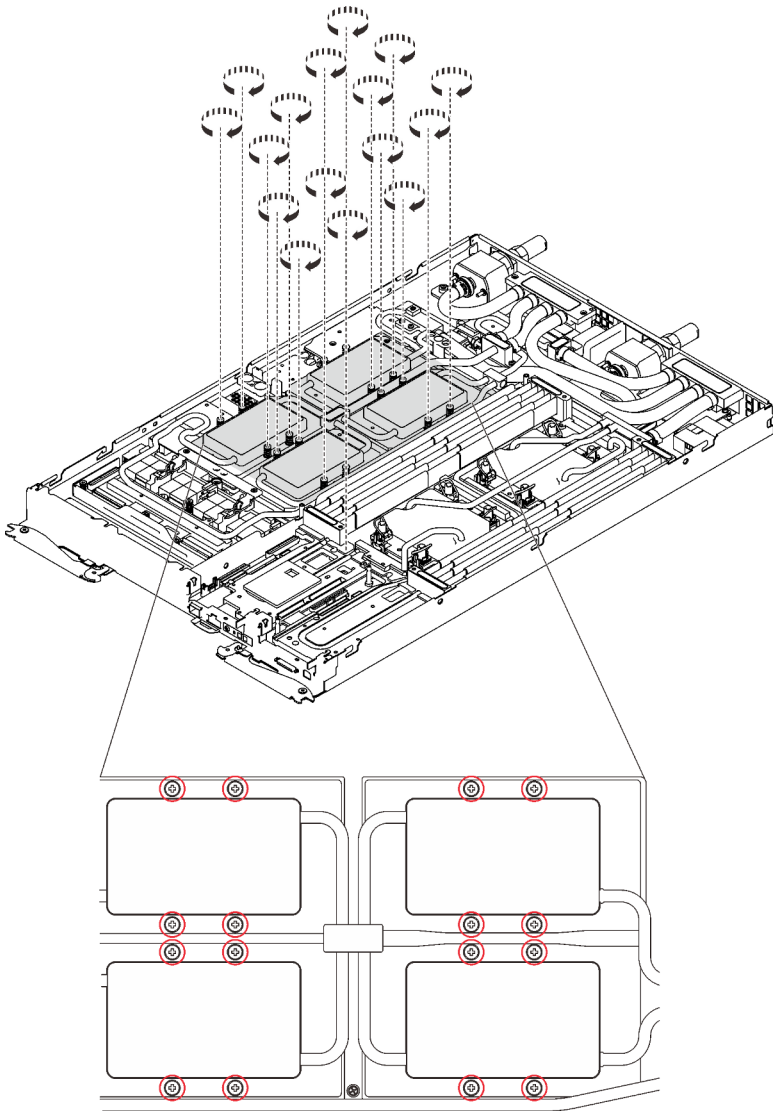


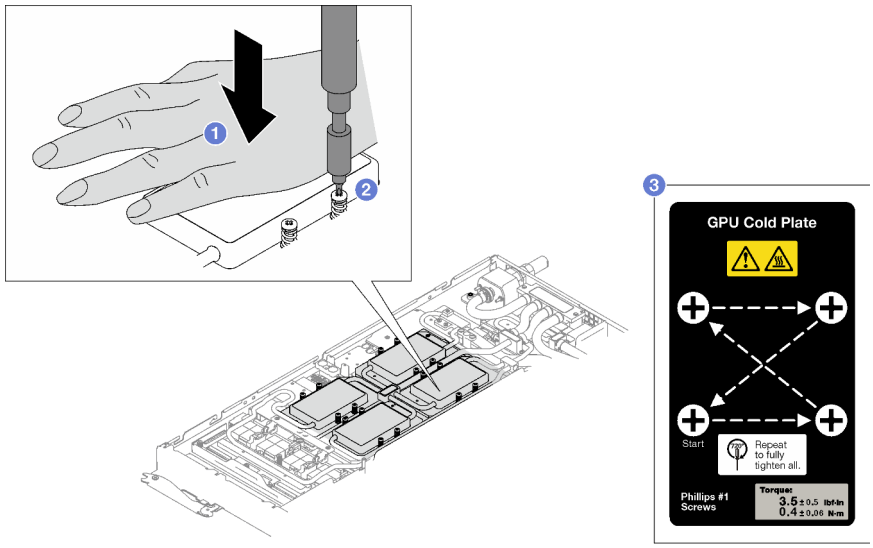
Figure 304. GPU cold plate screws installation

a. 1 Push down the GPU cold plate with your palm to reduce the gap between the GPU cold plate and the GPU.

b. 2 Press the torque screwdriver against the screw so that the screw is engaged with the GPU.

c. 3 Follow the screw sequence specified on the GPU cold plate label, and fasten each screw for 720 degrees with a torque screwdriver set to the proper torque.

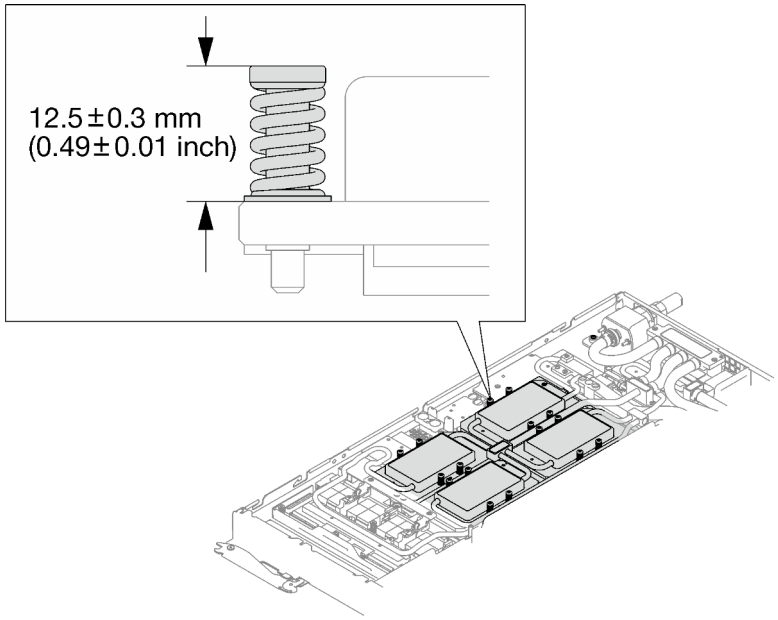
Note: For reference, the torque required for the screws to be fully tightened/removed is 0.46–0.34 newton-meters, 4–3 inch-pounds.



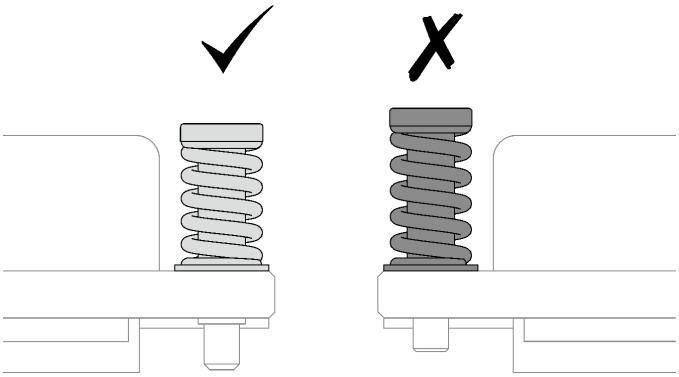
d. 4 Make sure that the GPU cold plate is lowered into the node and its surface is flat without tilting. If the GPU cold plate is tilted, unfasten the screws, and repeat Step 1 to Step 3.

e. 5 Repeat Step 3 until the screws are fully tightened.

f. 6 Make sure the height of each screw is 12.5±0.3 millimeter (0.49±0.01 inch) and is fully compressed. If not, repeat the GPU cold plate installation steps.



Note: Inspect the screws to make sure they are fully compressed.



Step 10. Reinstall the four Torx T10 screws (per node) to secure the quick connect.

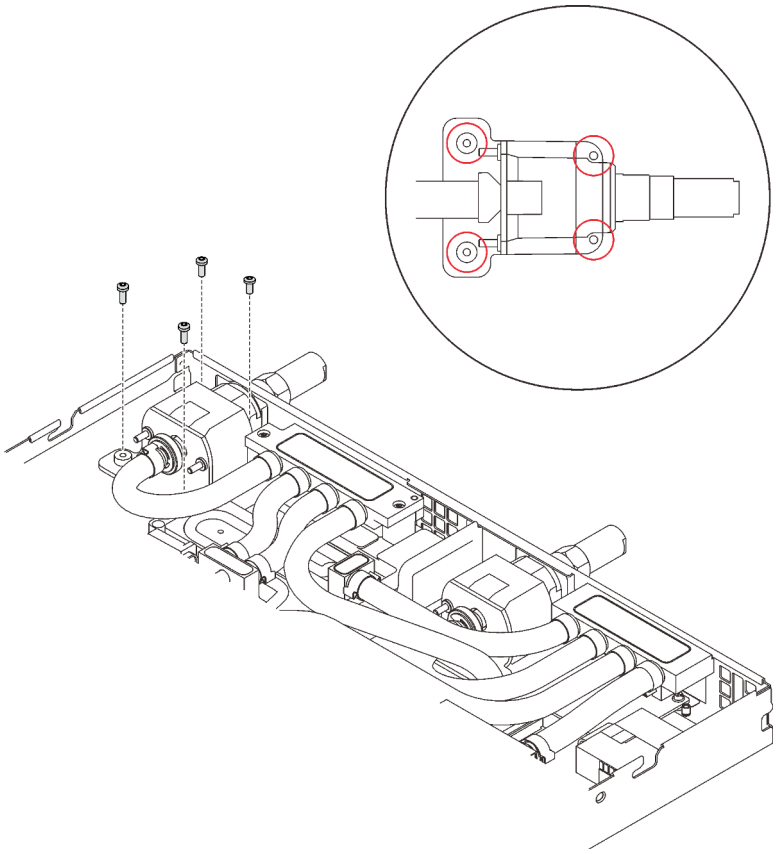


Figure 305. Screws installation

Step 11. Reinstall the clamp plate or the drive depending on your configuration.

- Clamp plate installation: Install the two screws to secure the clamp plate.

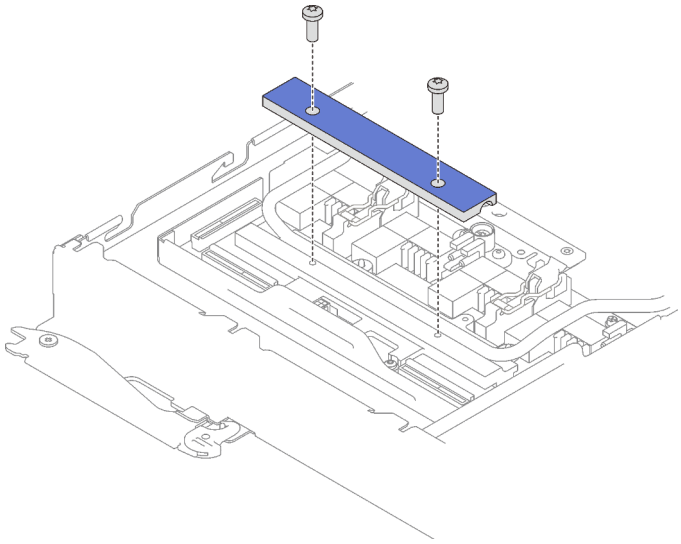


Figure 306. Clamp plate installation

- Drive installation: see “Install the drive in the GPU node” on page 291.

Step 12. Remove the connector cover if necessary.

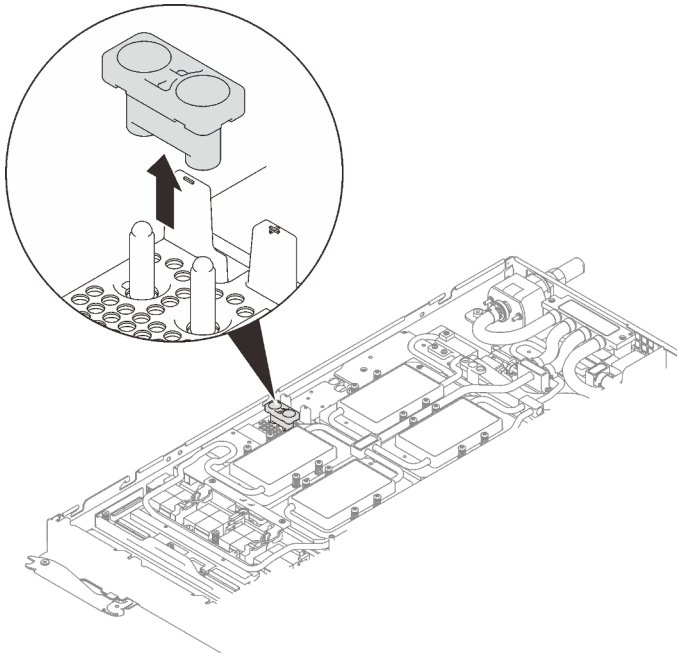


Figure 307. Connector cover removal

Step 13. Connect GPU power cable.

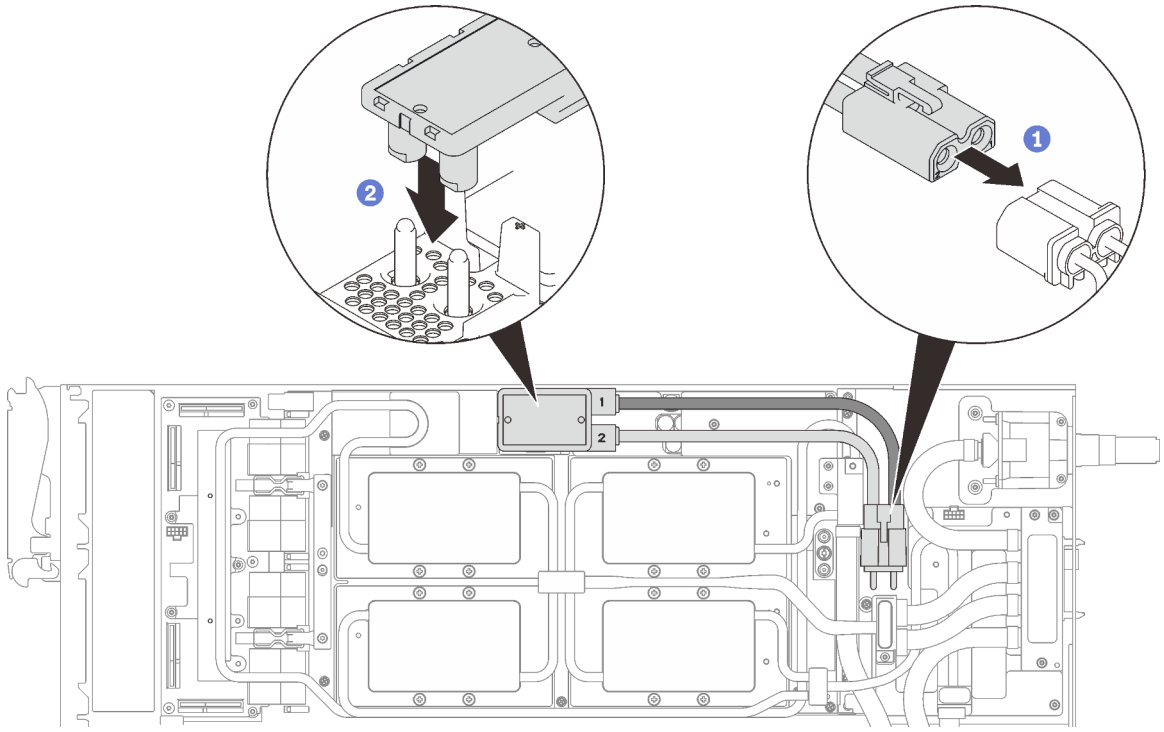


Figure 308. GPU power cable installation

Step 14. See “Cable installation order” on page 35 to connect and route required cables accordingly.

After you finish

1. Reinstall the front and the rear cross braces (14x Phillips #1 screws).

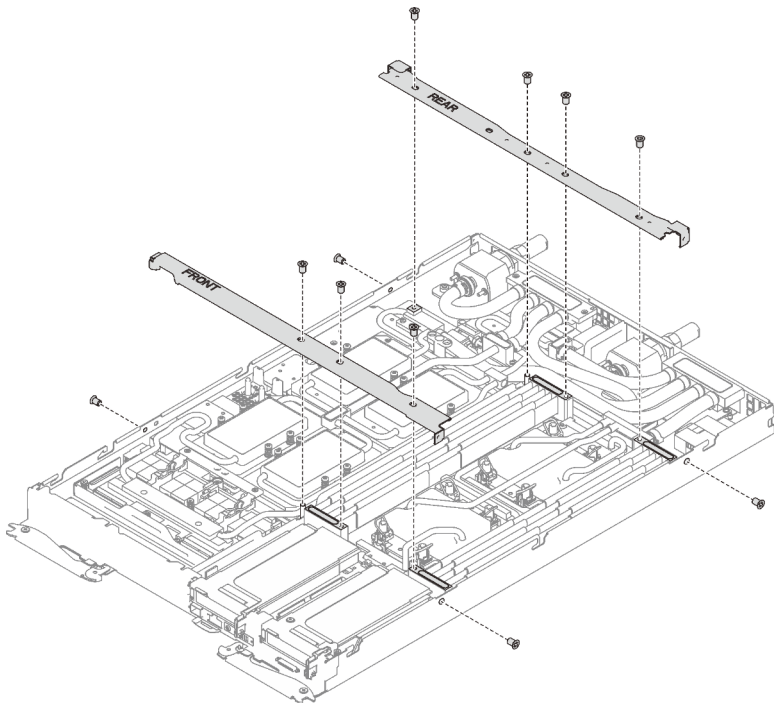


Figure 309. Cross brace installation

2. Reinstall the tray cover (see “Install the tray cover” on page 153).
3. Reinstall the tray (see “Install a DWC tray in the enclosure” on page 150).

   Note: For safety, use the lift tool to install the tray into the rack.
4. Connect all required external cables to the enclosure.

   Note: Use extra forces to connect QSFP cables to the enclosure if Mellanox ConnectX-6 adapters are installed.
5. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

Watch the procedure on YouTube

GPU board replacement

Use the following procedures to remove and install the GPU board.

Remove the GPU board

Use this information to remove the GPU board.

About this task

S001

DANGER

Electrical current from power, telephone, and communication cables is hazardous.
To avoid a shock hazard:

- **Connect all power cords to a properly wired and grounded electrical outlet/source.**
- **Connect any equipment that will be attached to this product to properly wired outlets/sources.**
- **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.**
- **The device might have more than one power cord, to remove all electrical current from the device, ensure that all power cords are disconnected from the power source.**

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Turn off the corresponding DWC tray that you are going to perform the task on.

Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).

- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.
- To avoid damaging the water loop, always use the water loop carrier when removing, installing or folding the water loop.
- A torque screwdriver is available for request if you do not have one at hand.

Prepare the following screwdrivers to ensure you can install and remove corresponding screws properly.

Table 40. Torque screwdriver type list

Torque screwdriver type list	Screw type
Torx T10 head screwdriver	Torx T10 screw
Phillips #1 head screwdriver or 3/16" hex head screwdriver	Phillips #1 screw
Phillips #2 head screwdriver	Phillips #2 screw

The following illustration shows the GPU numbering.

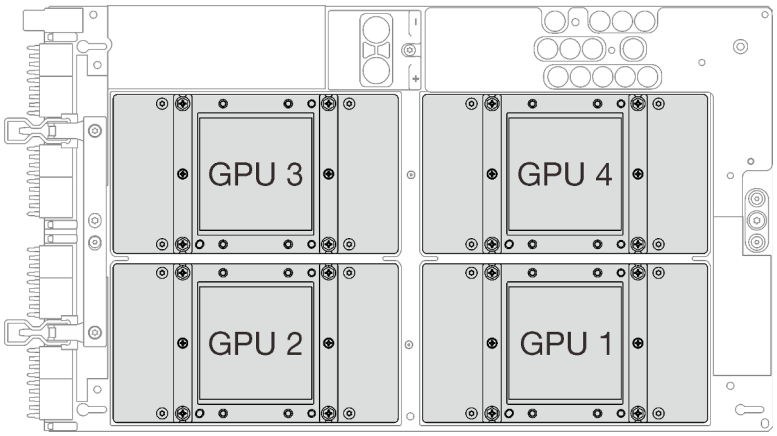


Figure 310. GPU numbering

Procedure

Step 1. Make preparations for this task.

a. Remove the tray (see “Remove a DWC tray from the enclosure” on page 149).

   Attention: For safety, use the lift tool to remove the tray from the rack.

b. Remove the tray cover (see “Remove the tray cover” on page 152).

c. Remove the front and the rear cross braces (11x Phillips #1 screws).

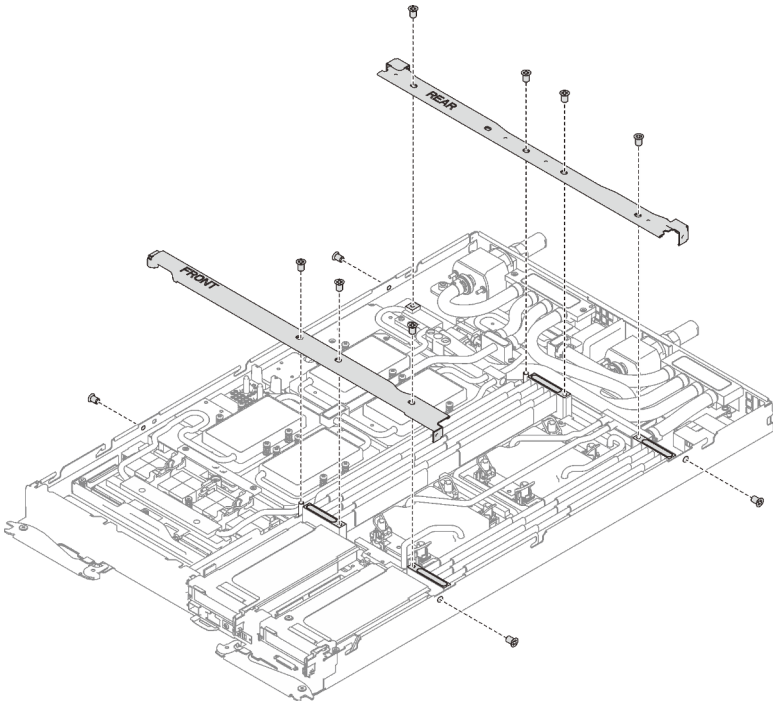


Figure 311. Cross brace removal

d. See “Cable removal order” on page 37 to disconnect cables according to your configuration.

e. Disconnect GPU power cable.

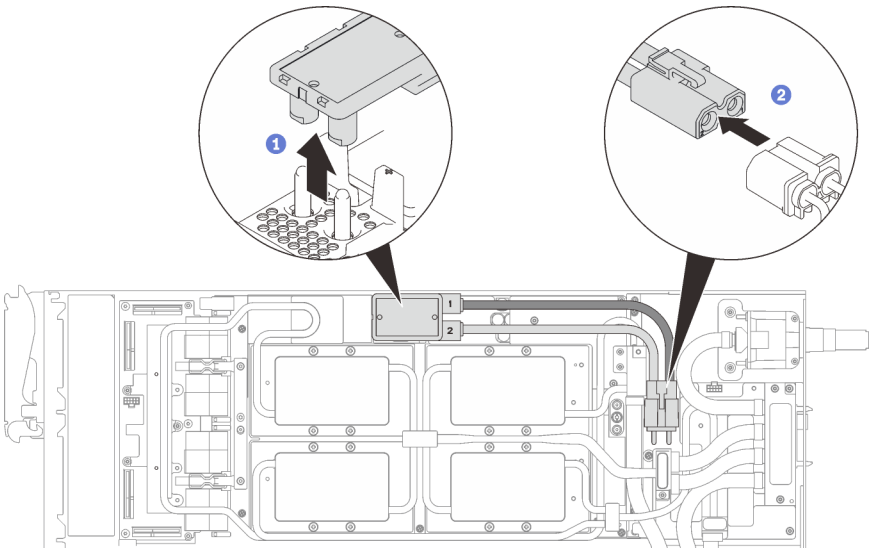


Figure 312. GPU power cable removal

f. Remove the clamp plate or the drive depending on your configuration.

- Clamp plate removal: Remove the two screws to remove the clamp plate.

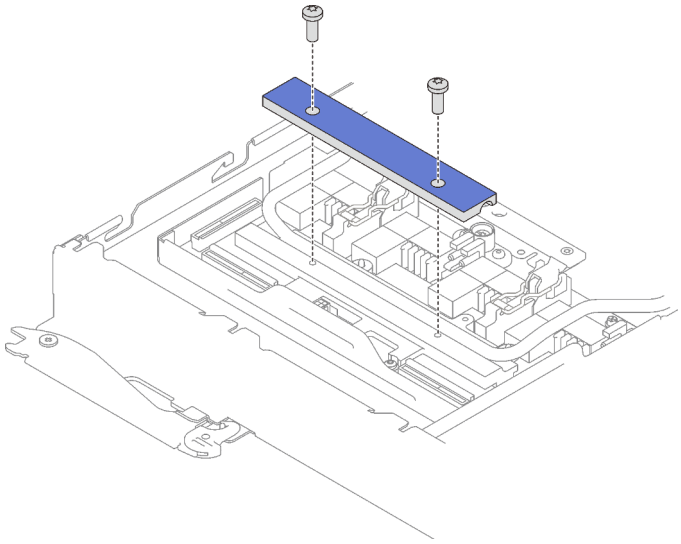


Figure 313. Clamp plate removal

- Drive removal: see “Install the drive in the GPU node” on page 291.

g. Remove seven Torx T10 water loop screws with a torque screwdriver sets to the proper torque.

Note: For reference, the torque required for the screws to be fully tightened/removed is 0.5-0.6 newton-meters, 4.5-5.5 inch-pounds.

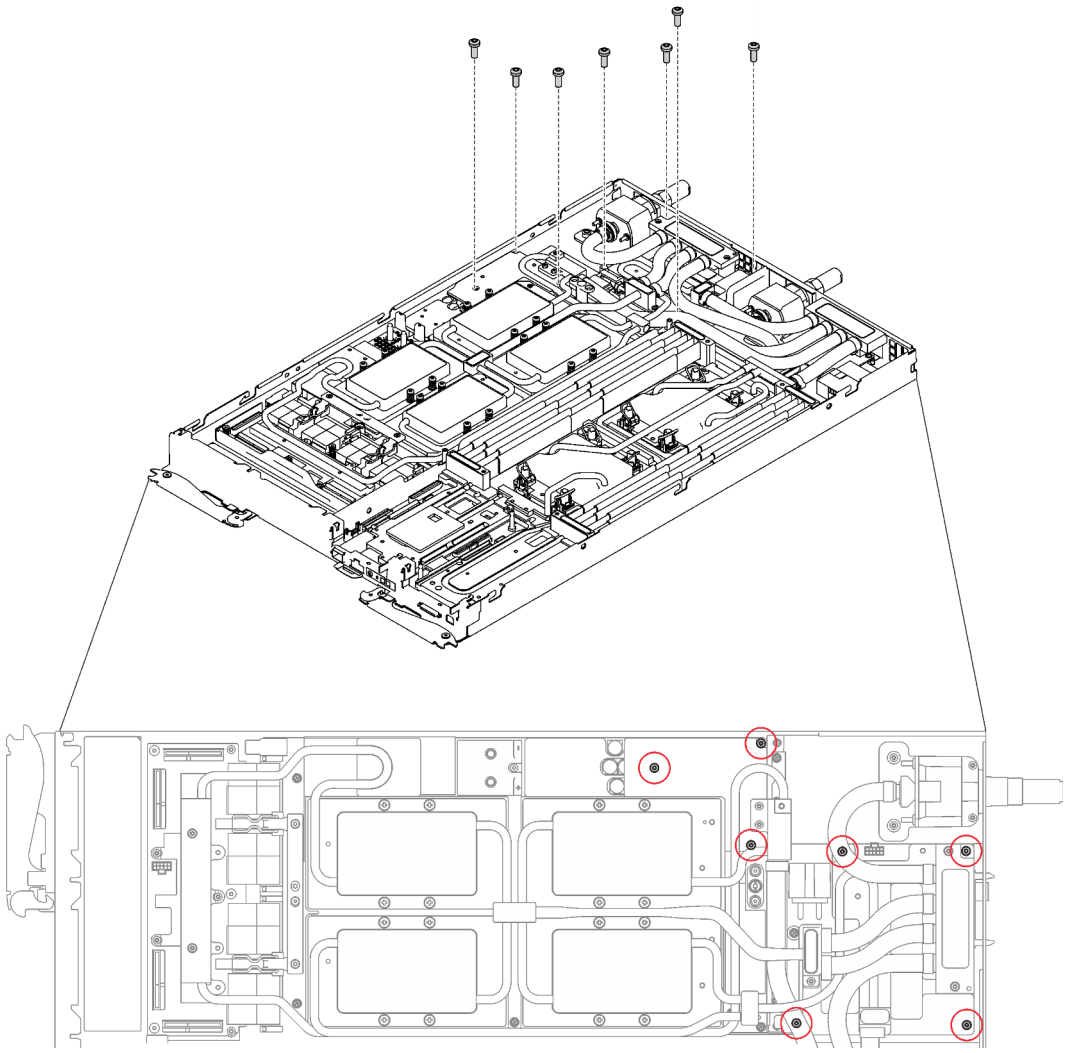


Figure 314. Water loop screws removal

h. Remove GPU cold plate screws (16x Phillips #1 screws) with a torque screwdriver sets to the proper torque.

Note: For reference, the torque required for the screws to be fully tightened/removed is 0.34-046 newton-meters, 3-4 inch-pounds.

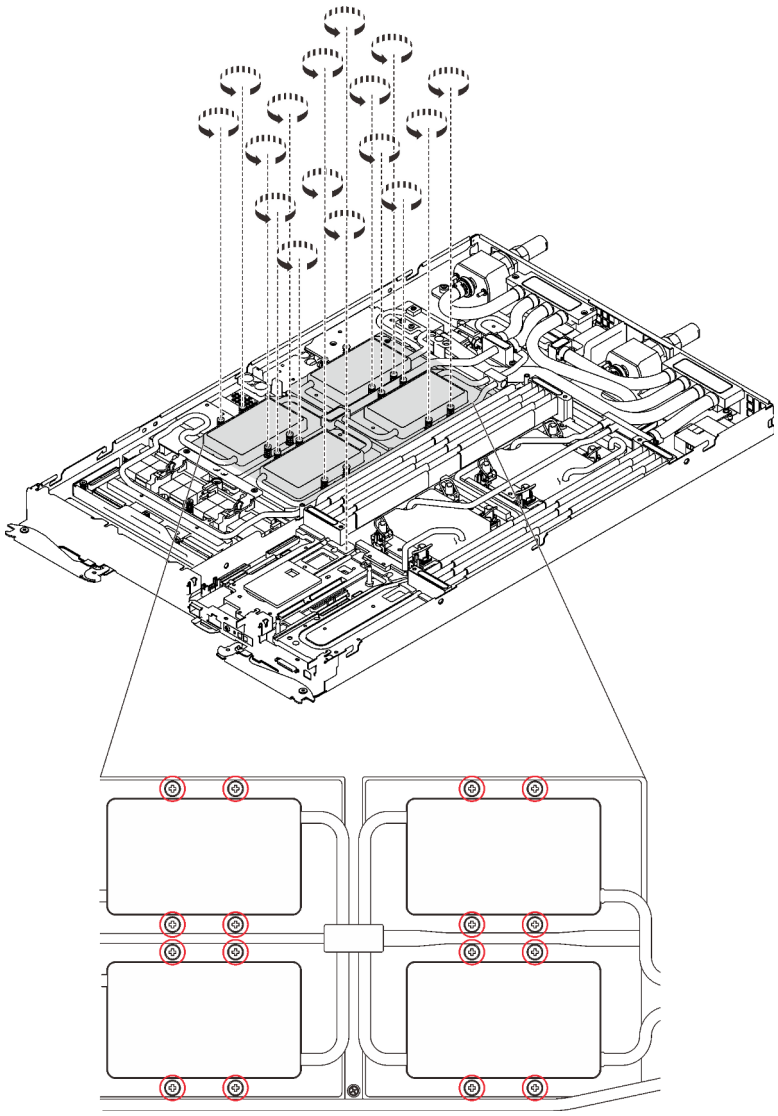


Figure 315. GPU cold plate screws removal

i. Remove the four Torx T10 screws (per node) to loosen the quick connect.

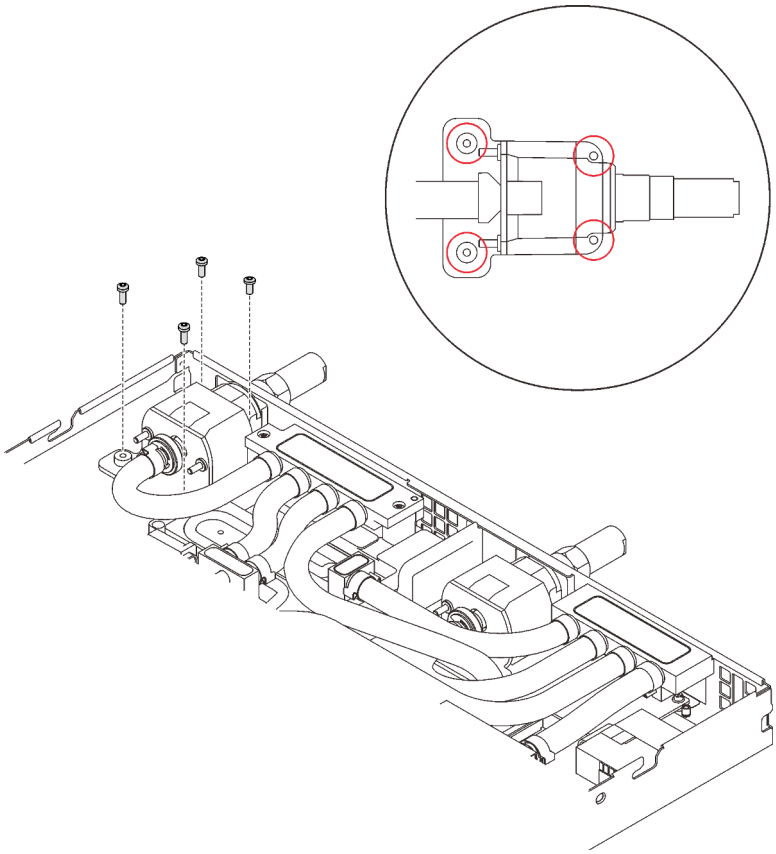


Figure 316. Screws removal

j. Orient the water loop carrier with the slots; then, gently put the water loop carrier down and ensure it is seated firmly on the water loop.

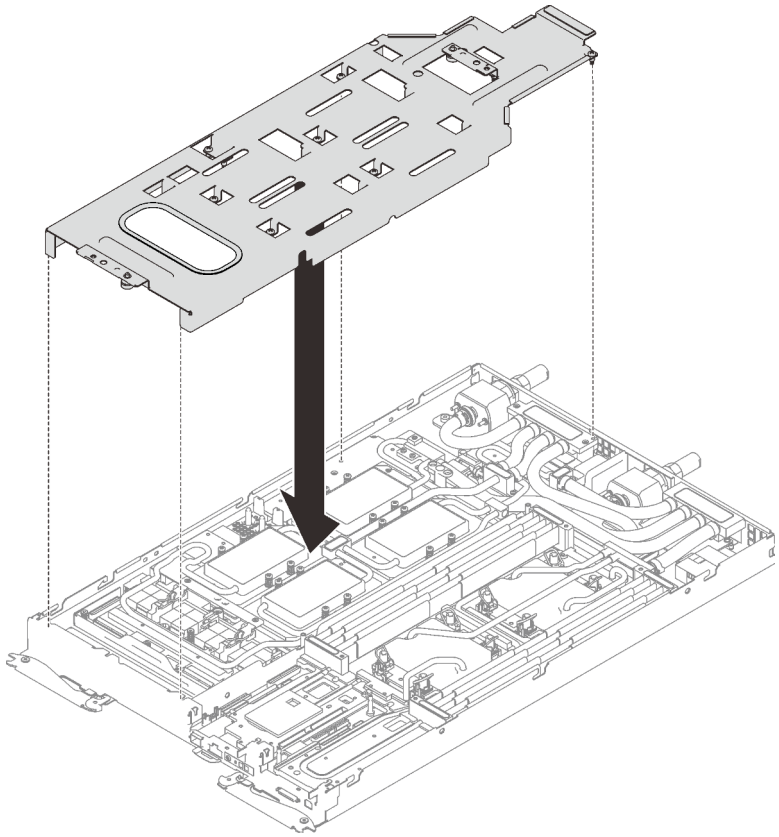


Figure 317. Water loop carrier installation

k. Tighten water loop carrier screws (15x Phillips #2 screws).

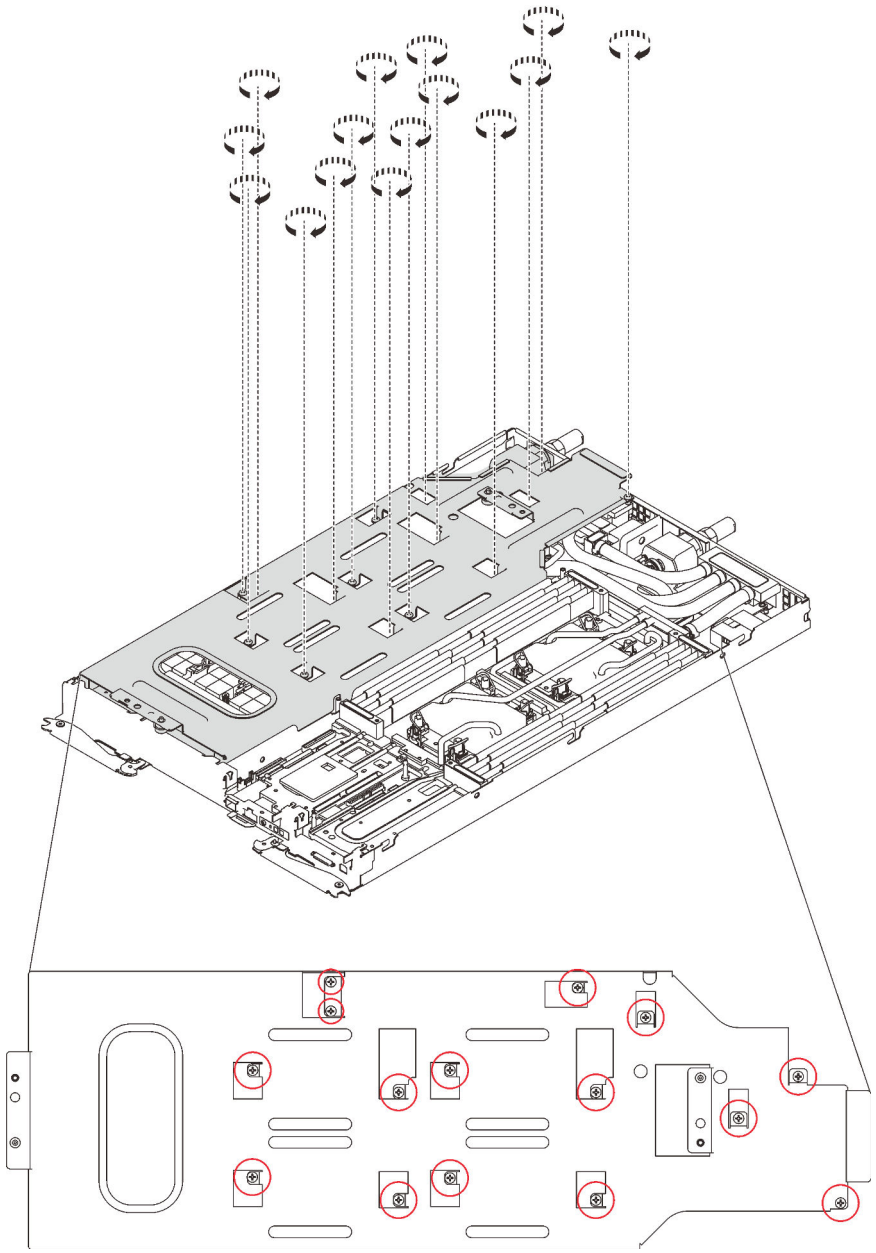


Figure 318. Water loop carrier screws installation

l. Fold the water loop.

1. ❶ Carefully unhook the quick connect and slide it out of the opening in the rear of the tray; then, lift the water loop up off the GPU board.
2. ❷ Carefully rotate the water loop so one half is sitting on top of the other half.

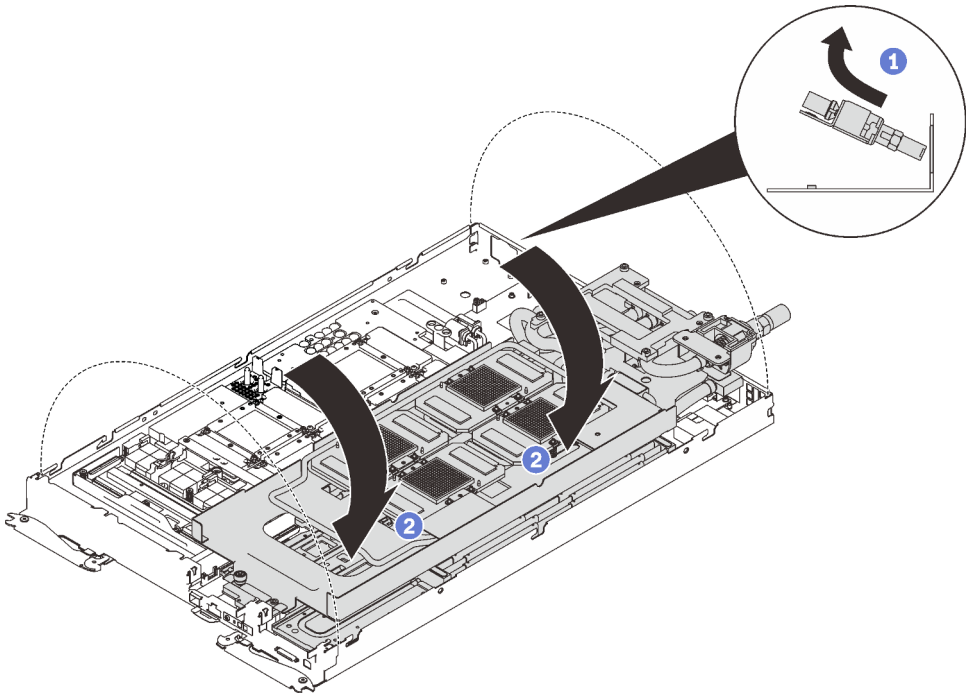


Figure 319. Folding the water loop

m. Remove the retimer board (see “Remove the retimer board” on page 367).

Step 2. Remove two Torx T10 screws with a torque screwdriver sets to the proper torque.

Note: For reference, the torque required for the screws to be fully tightened/removed is 0.5-0.6 newton-meters, 4.5-5.5 inch-pounds.

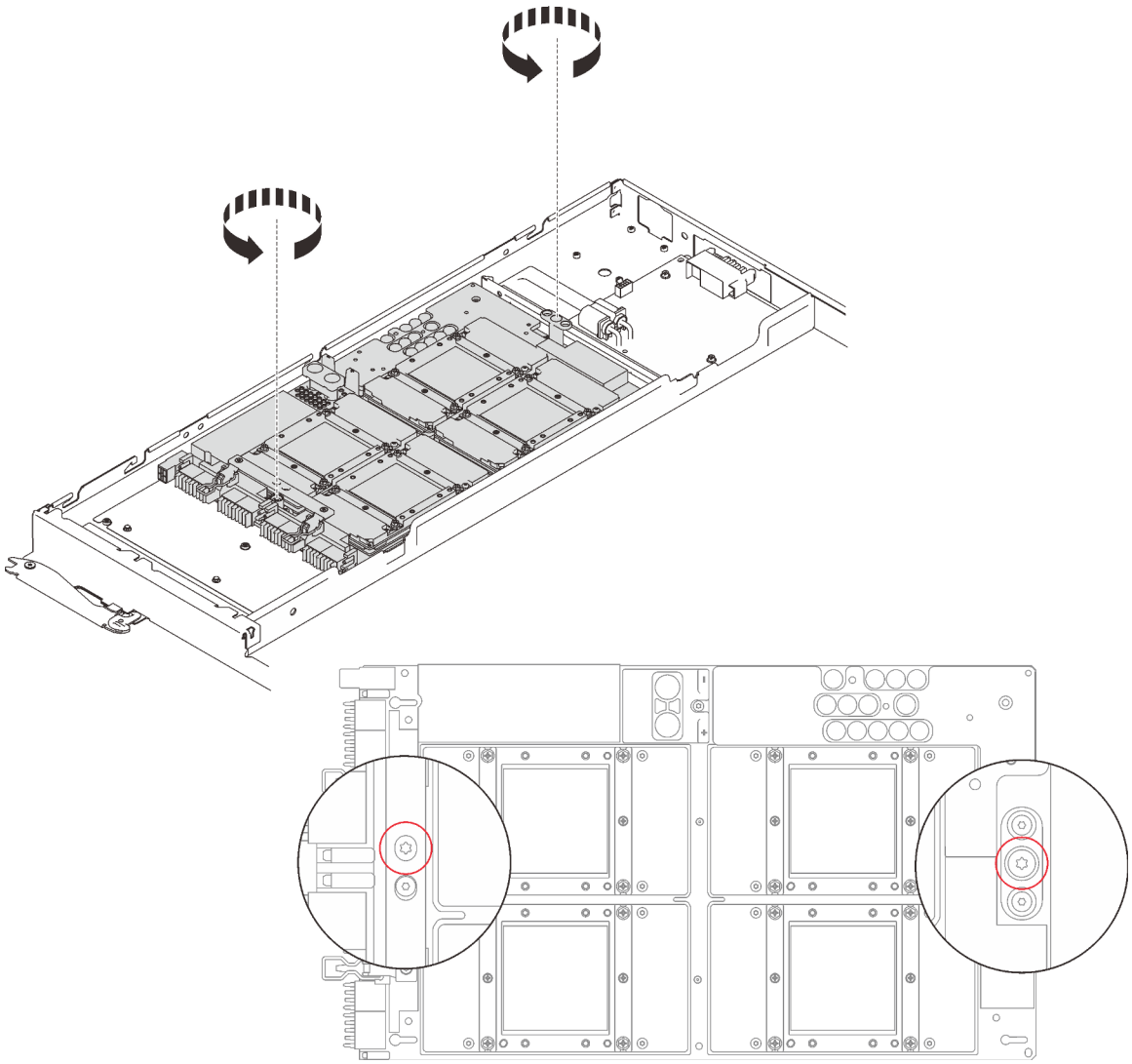


Figure 320. Screws removal

Step 3. Remove the five Phillips #1 screws and remove the GPU board out of the node with a torque screwdriver sets to the proper torque.

Note: For reference, the torque required for the screws to be fully tightened/removed is 0.5-0.6 newton-meters, 4.5-5.5 inch-pounds.

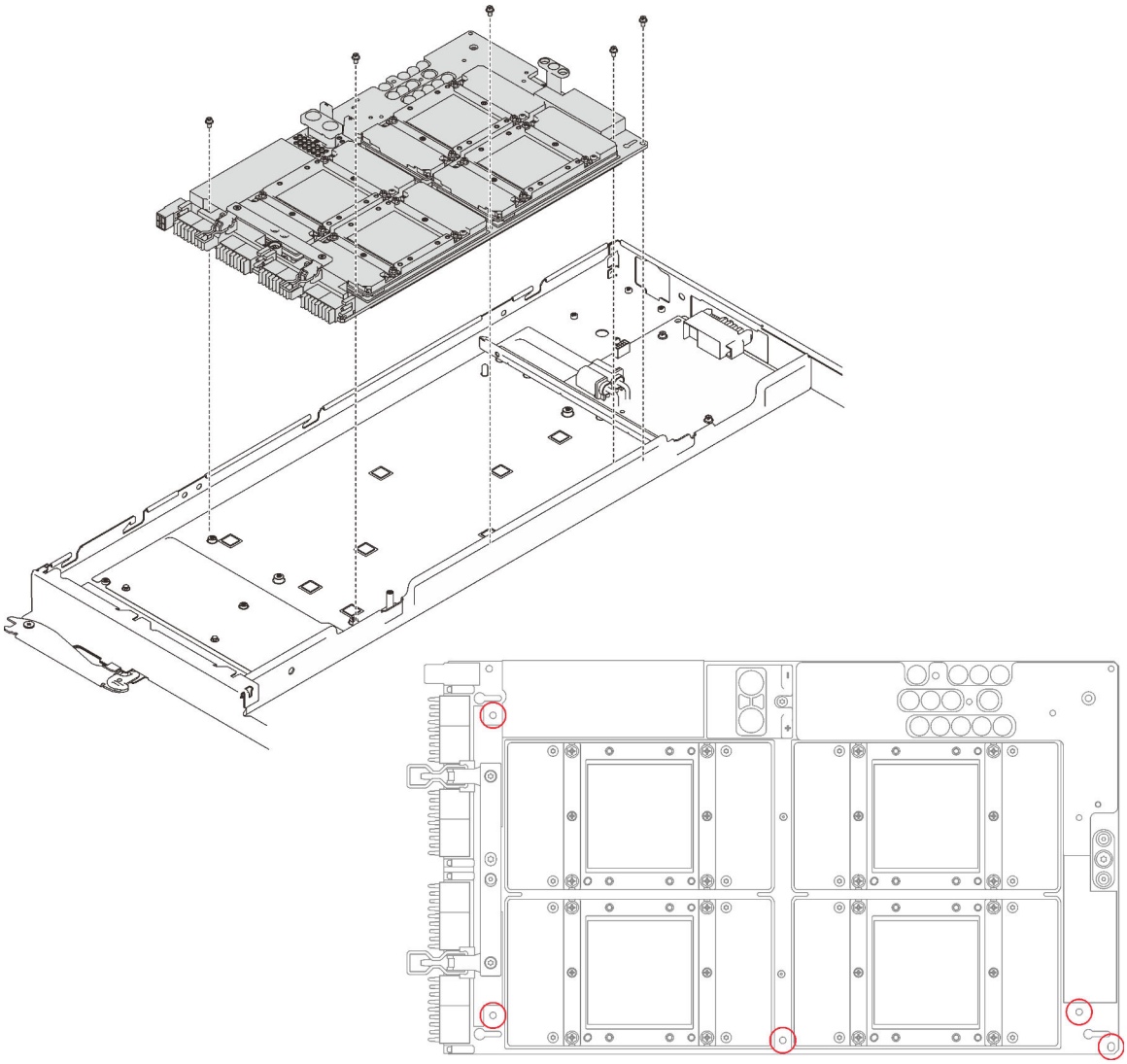


Figure 321. Screws removal

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

Watch the procedure on YouTube

Install the GPU board

Use this information to install the GPU board.

About this task

S001

DANGER

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- **Connect any equipment that will be attached to this product to properly wired outlets/sources.**
- **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.**
- **The device might have more than one power cord, to remove all electrical current from the device, ensure that all power cords are disconnected from the power source.**

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- A torque screwdriver is available for request if you do not have one at hand.
- To avoid damaging the water loop, always use the water loop carrier when removing, installing or folding the water loop.
- Hold the long sides of the GPU board with two hands while removing the new GPU board from the package box.

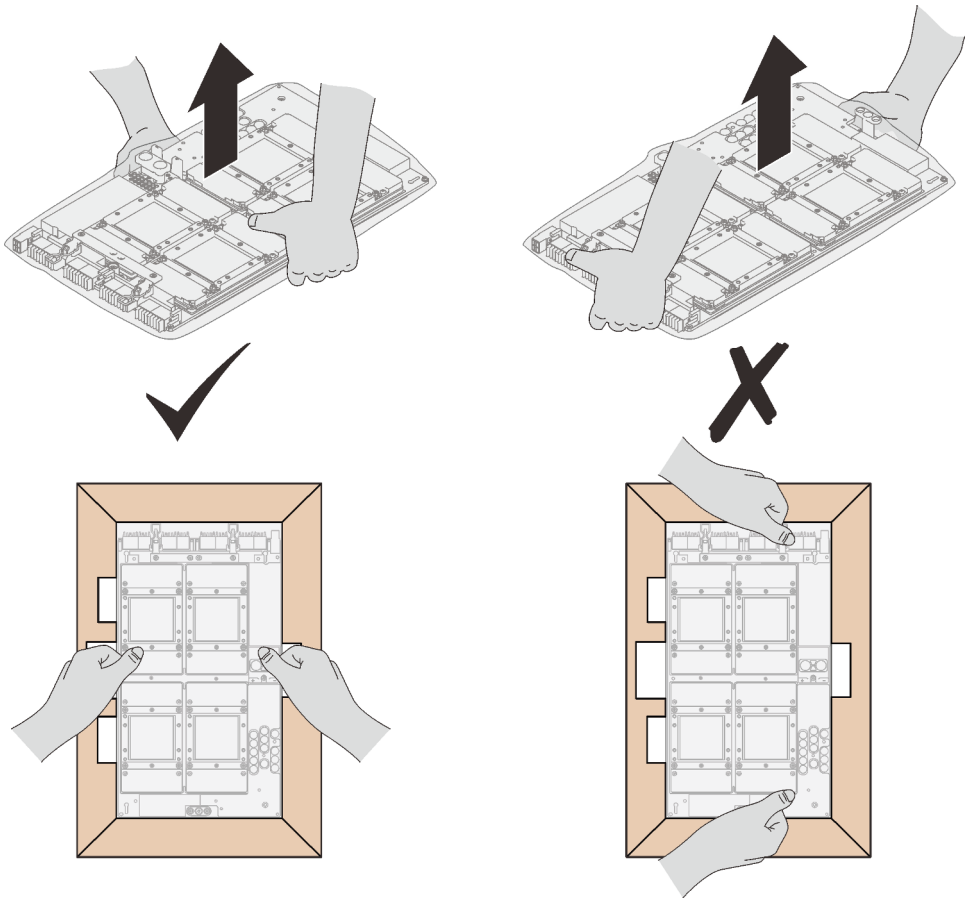


Figure 322. Removing GPU board from the package box

- Once the GPU board is removed from the plastic protective bag, hold two handles with both hands to move the GPU board.

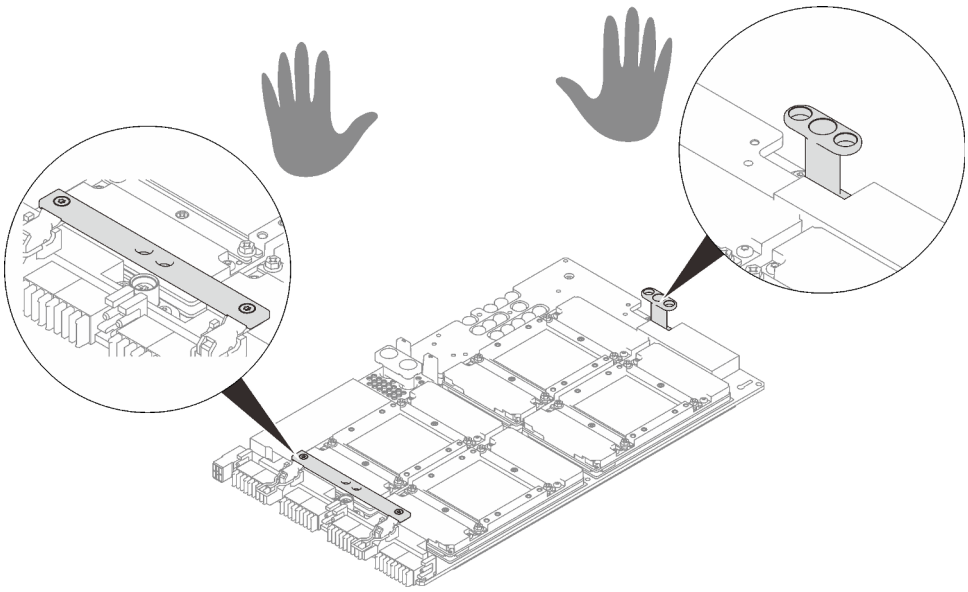


Figure 323. Removing GPU board from the package box

Notes:

- Ensure you have “SD650 V2 or SD650-N V2 Neptune® DWC Waterloop Service Kit “ in hand to install components.
- To prevent potential thermal issues, change the **Misc** setting in the BIOS from **Option3** (default value) to **Option1** if the following two conditions are met:
  - The server is equipped with a GPU adapter.
  - The UEFI firmware version is ESE122T or later.

  For the method of changing the **Misc** setting, see https://support.lenovo.com/us/en/solutions/TT1832.

Prepare the following screwdrivers to ensure you can install and remove corresponding screws properly.

Table 41. Torque screwdriver type list

Torque screwdriver type list	Screw type
Torx T10 head screwdriver	Torx T10 screw
Phillips #1 head screwdriver or 3/16" hex head screwdriver	Phillips #1 screw
Phillips #2 head screwdriver	Phillips #2 screw

The following illustration shows the GPU numbering.

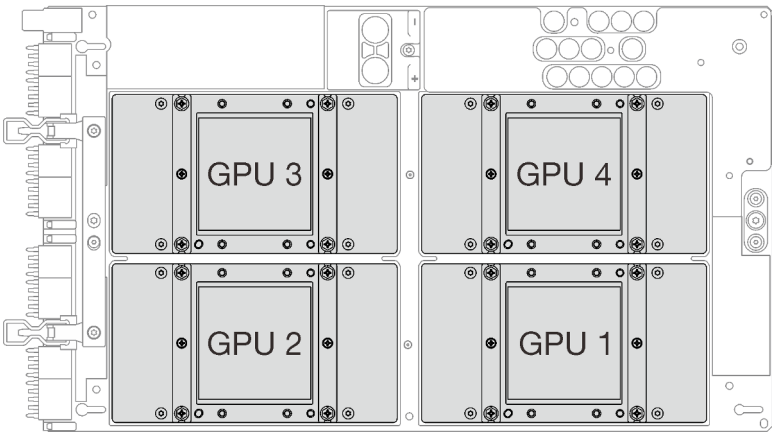


Figure 324. GPU numbering

Procedure

Step 1. Gently place the GPU board down and install the five Phillips #1 screws with a torque screwdriver sets to the proper torque.

Notes:

1. For reference, the torque required for the screws to be fully tightened/removed is 0.5-0.6 newton-meters, 4.5-5.5 inch-pounds.
2. When you install the GPU board from the node, avoid touching the connectors on the GPU board. Be careful not to damage any surrounding components inside the node.

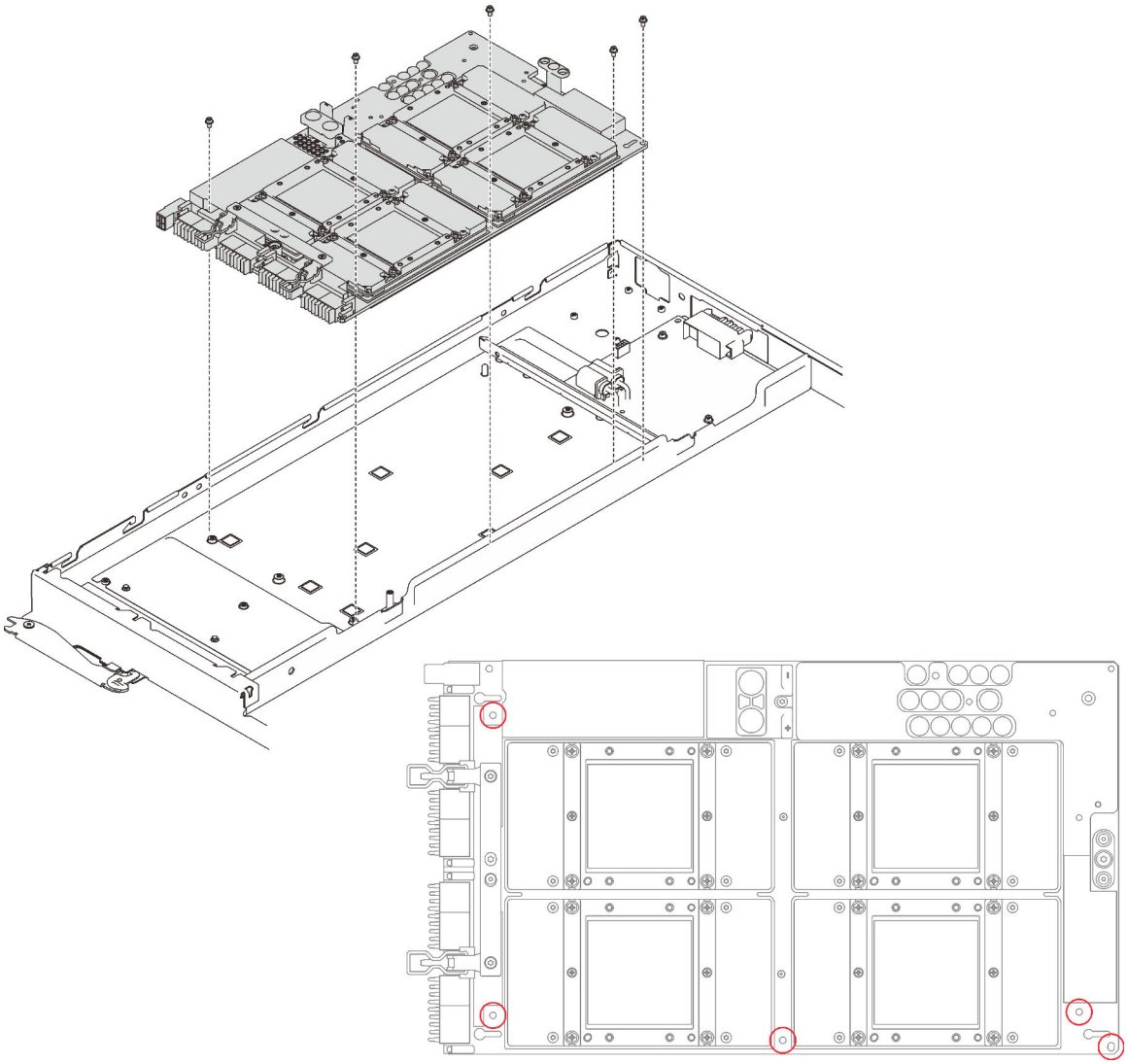


Figure 325. GPU board installation

Step 2. Install the two Torx T10 screws with a torque screwdriver sets to the proper torque.

Note: For reference, the torque required for the screws to be fully tightened/removed is 0.5-0.6 newton-meters, 4.5-5.5 inch-pounds.

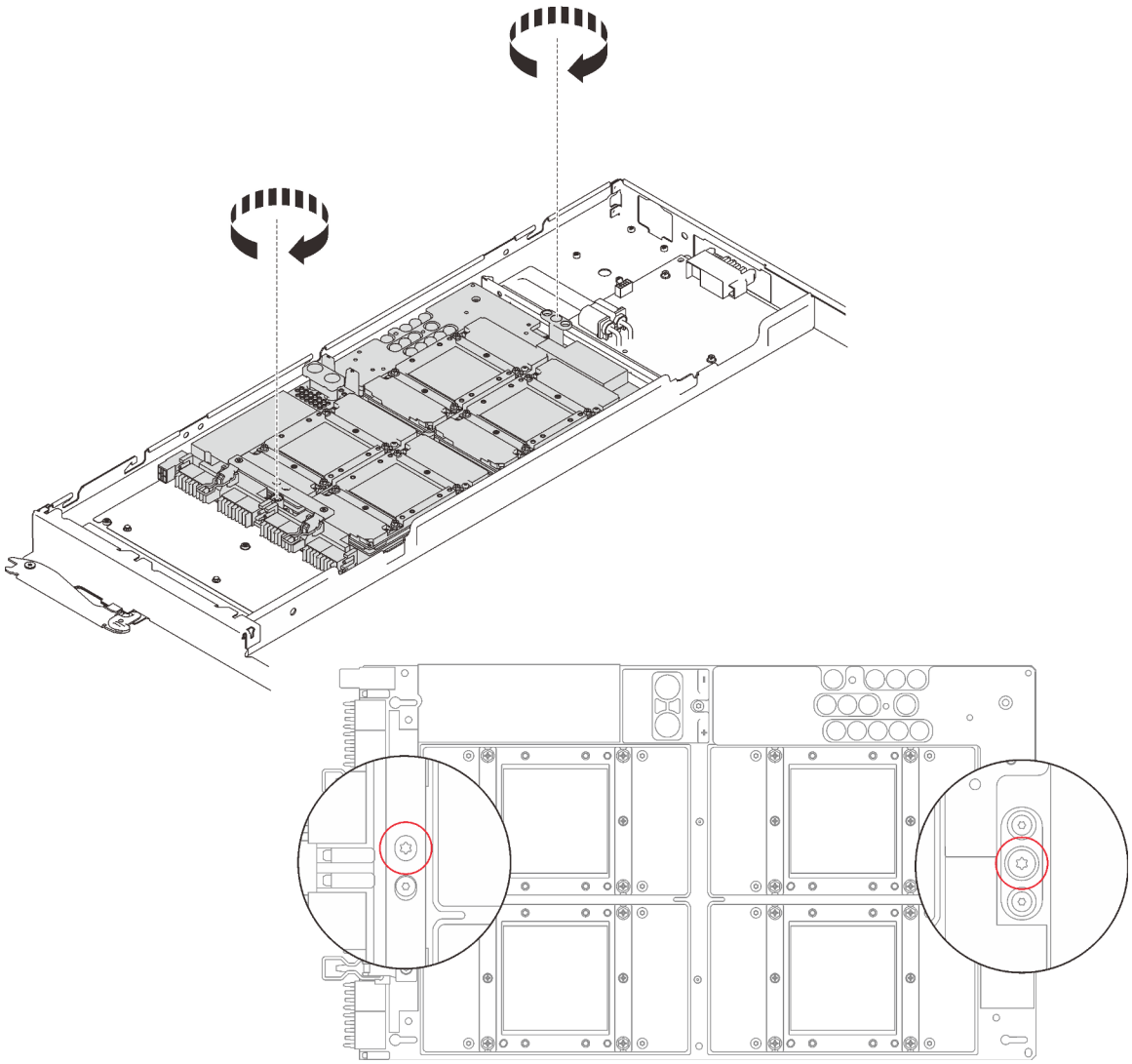


Figure 326. Screws installation

Step 3. Reinstall the retimer board (see “Install the retimer board” on page 376).

Step 4. Apply the new thermal grease on GPUs.

a. If there is any old thermal grease on four GPUs and the cold plates, gently clean the top of the four GPUs and the cold plates using an alcohol cleaning pad.

b. If you have cleaned the top of the GPUs with an alcohol cleaning pad, make sure to apply the new thermal grease after the alcohol has fully evaporated.

c. Apply gray thermal grease to the top of the four GPUs with a syringe by forming four dots spaced as shown below, with each dot consisting of about 0.5 gram (about 0.225 ml) of gray thermal grease. Each syringe contains 1 gram of thermal grease, sufficient for two dots of thermal grease.

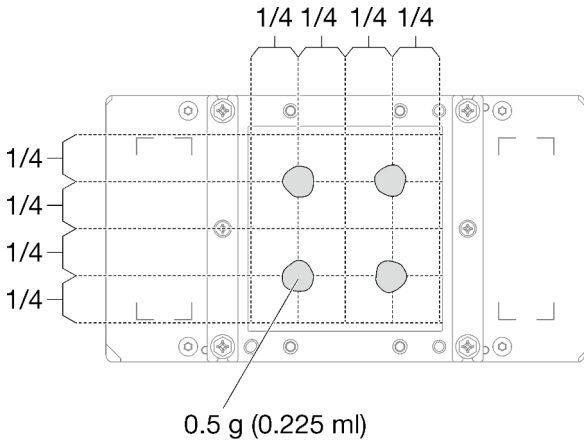


Figure 327. Thermal grease application

Step 5. Replace the existing putty pad with the new one.

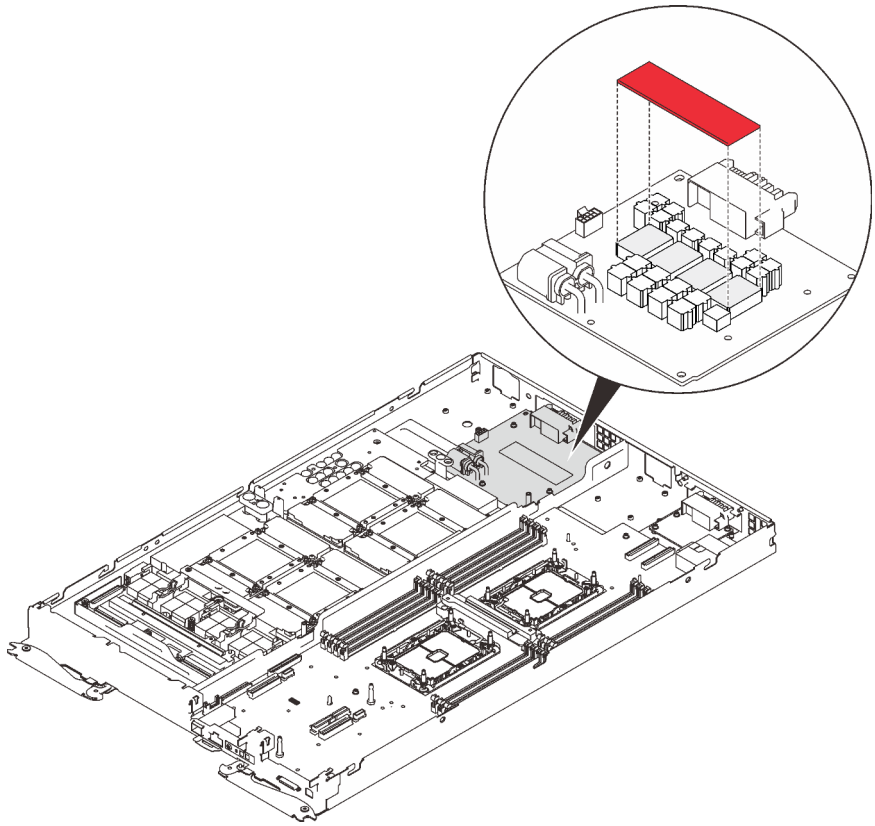


Figure 328. Putty pad

Step 6. Check the gap pads on the water loop, if any of them are damaged or missing, replace them with the new ones.

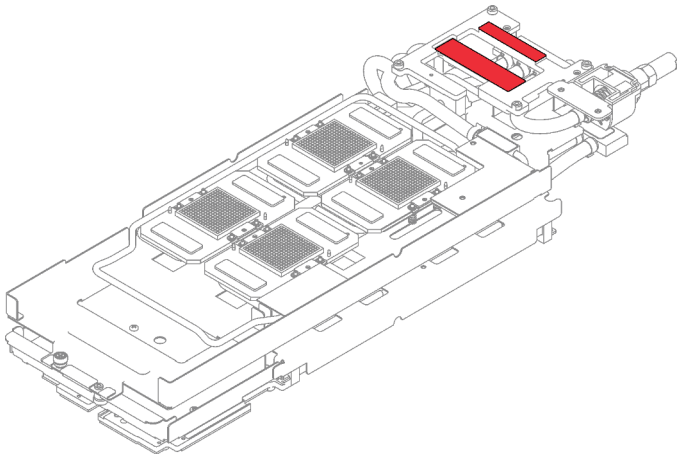


Figure 329. Gap pads on the water loop

Step 7. Reinstall the water loop.

a. ❶ Carefully rotate the top side of the water loop.

b. ❷ Carefully insert the quick connect into the tray opening as shown.

c. ❸ Carefully align the water loop with eight guide pins on four GPU cold plates; then, gently put the water loop down and ensure it is firmly seated on the GPU board.

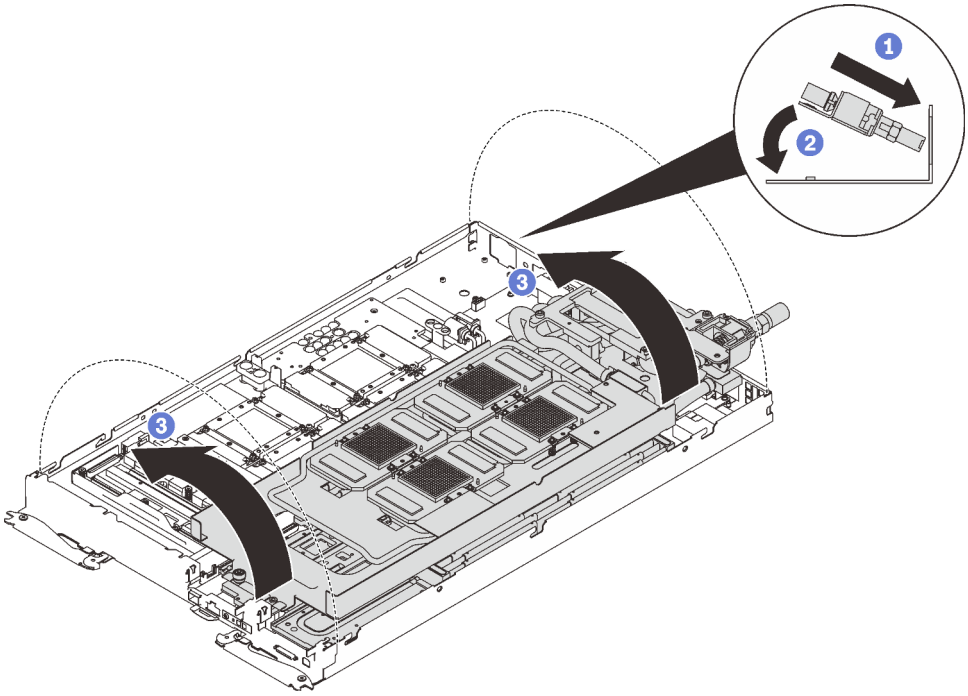


Figure 330. Water loop installation

Step 8. Loosen all water loop carrier screws (15x Phillips #2 screws).

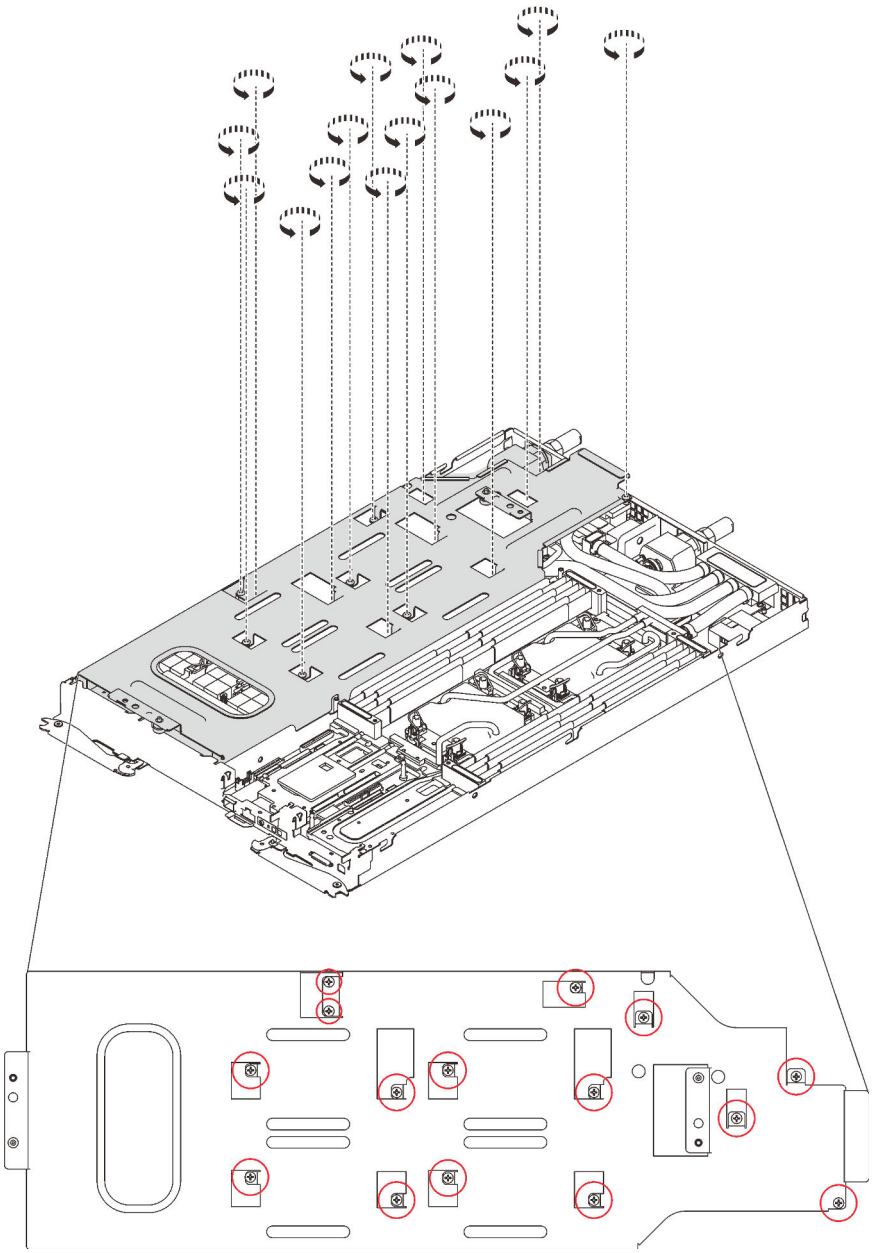


Figure 331. Loosening water loop carrier screws

Step 9. Carefully lift the water loop carrier up and away from the water loop.

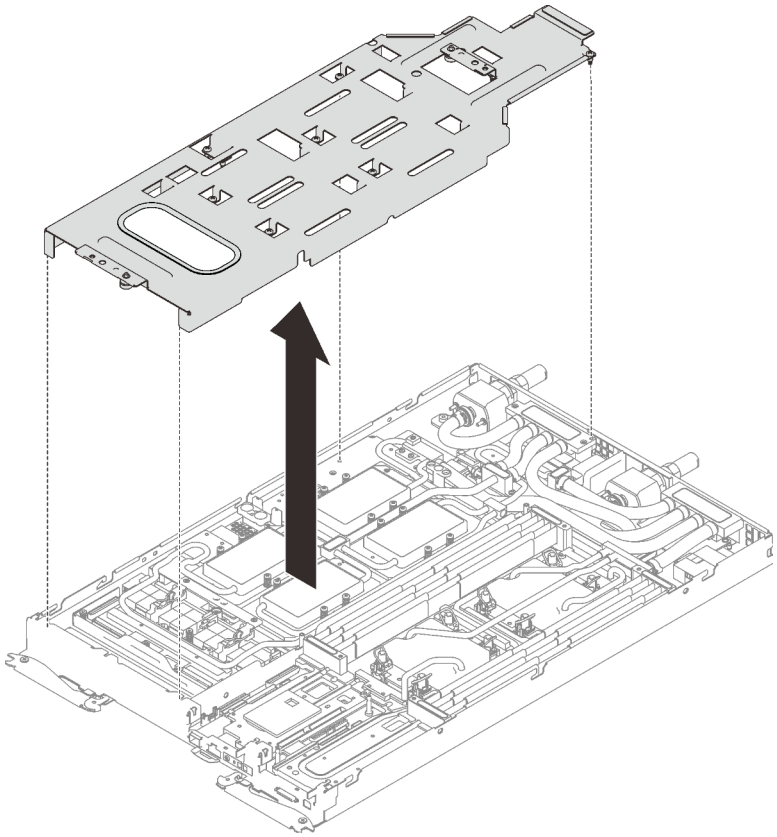


Figure 332. Water loop carrier removal

Step 10. Reinstall water loop screws (7x Torx T10 screws) with a torque screwdriver sets to the proper torque.

Note: For reference, the torque required for the screws to be fully tightened/removed is 0.5-0.6 newton-meters, 4.5-5.5 inch-pounds.

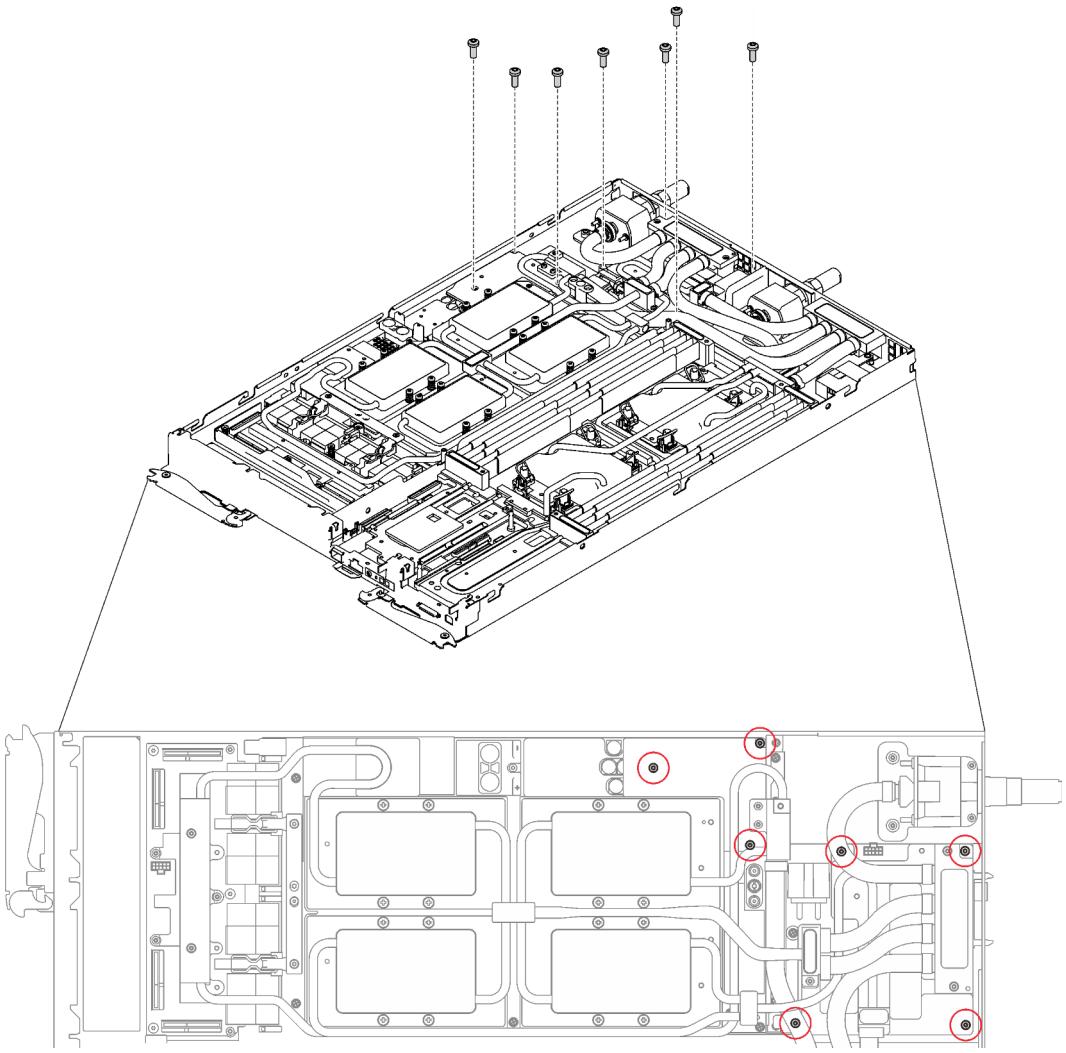


Figure 333. Water loop screws installation

Step 11. Reinstall GPU cold plate screws (4x Phillips #1 screws per GPU cold plate, total of 16x Phillips #1 screws) with a torque screwdriver set to the proper torque. For reference, the torque required for the screws to be fully tightened/removed is 0.34-046 newton-meters, 3-4 inch-pounds.

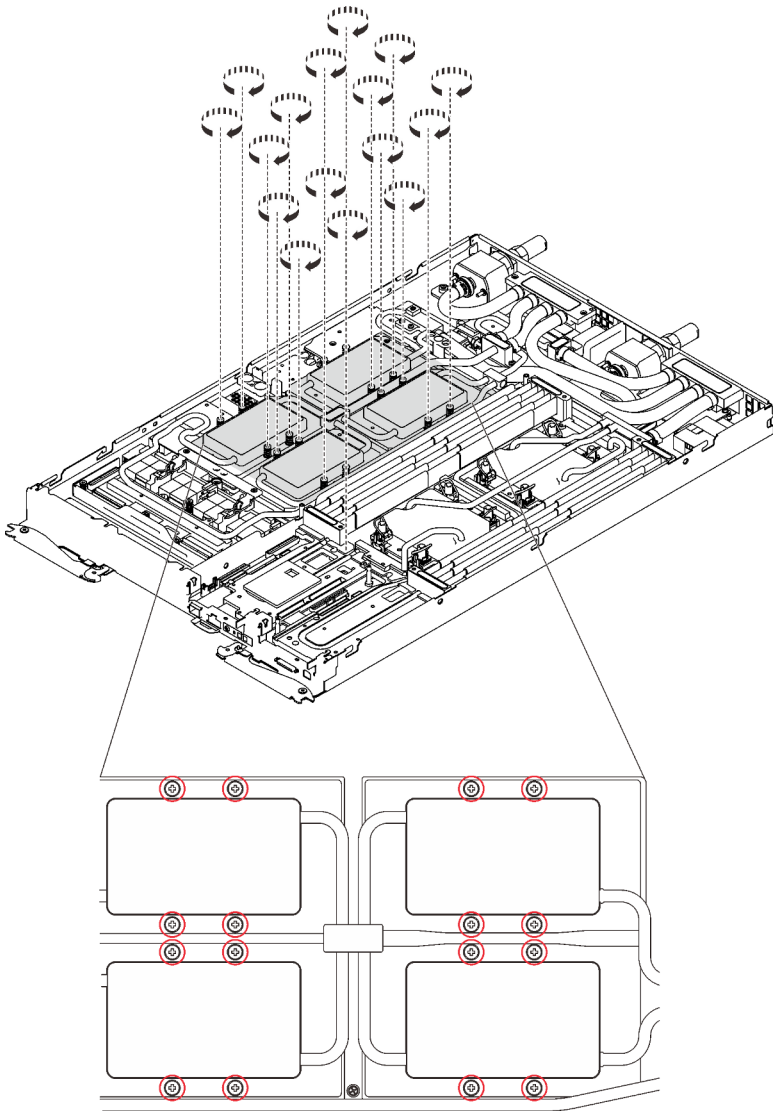


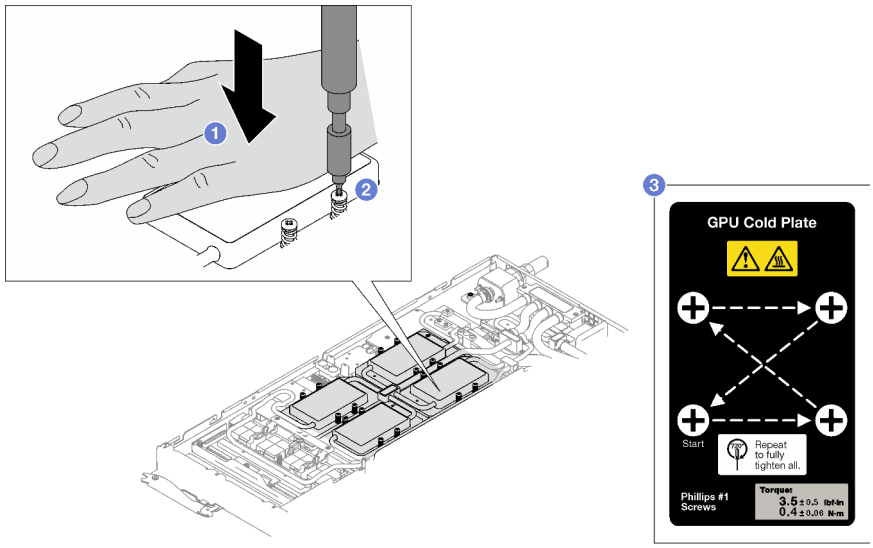
Figure 334. GPU cold plate screws installation

a. 1 Push down the GPU cold plate with your palm to reduce the gap between the GPU cold plate and the GPU.

b. 2 Press the torque screwdriver against the screw so that the screw is engaged with the GPU.

c. 3 Follow the screw sequence specified on the GPU cold plate label, and fasten each screw for 720 degrees with a torque screwdriver set to the proper torque.

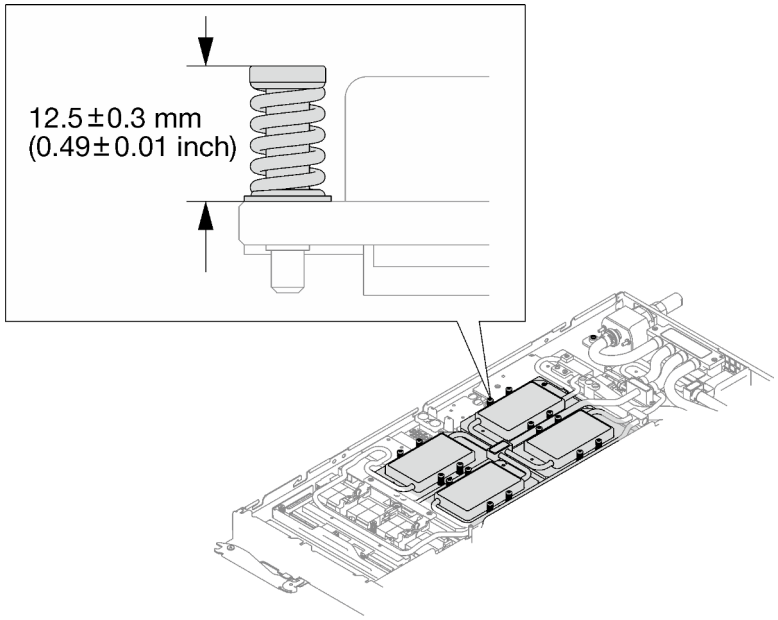
Note: For reference, the torque required for the screws to be fully tightened/removed is 0.46–0.34 newton-meters, 4–3 inch-pounds.



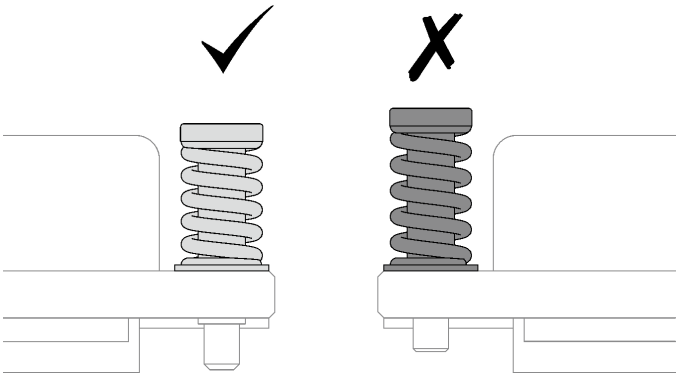
d. 4 Make sure that the GPU cold plate is lowered into the node and its surface is flat without tilting. If the GPU cold plate is tilted, unfasten the screws, and repeat Step 1 to Step 3.

e. 5 Repeat Step 3 until the screws are fully tightened.

f. 6 Make sure the height of each screw is 12.5±0.3 millimeter (0.49±0.01 inch) and is fully compressed. If not, repeat the GPU cold plate installation steps.



Note: Inspect the screws to make sure they are fully compressed.



Step 12. Reinstall the four Torx T10 screws (per node) to secure the quick connect.

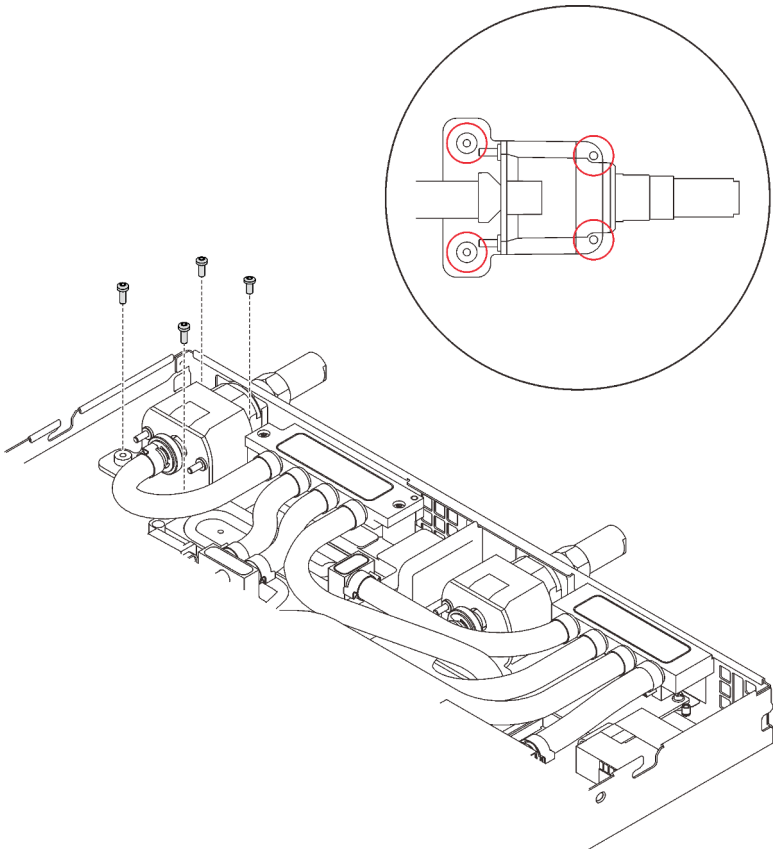


Figure 335. Screws installation

Step 13. Reinstall the clamp plate or the drive depending on your configuration.

- Clamp plate installation: Install the two screws to secure the clamp plate.

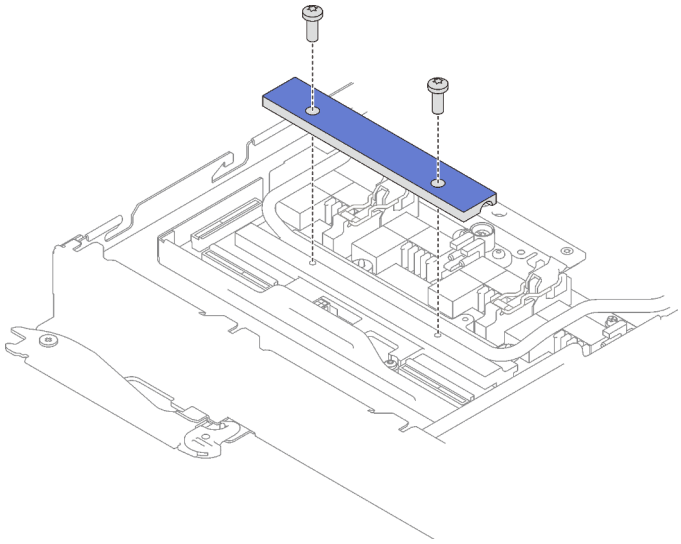


Figure 336. Clamp plate installation

- Drive installation: see “Install the drive in the GPU node” on page 291.

Step 14. Remove the connector cover if necessary.

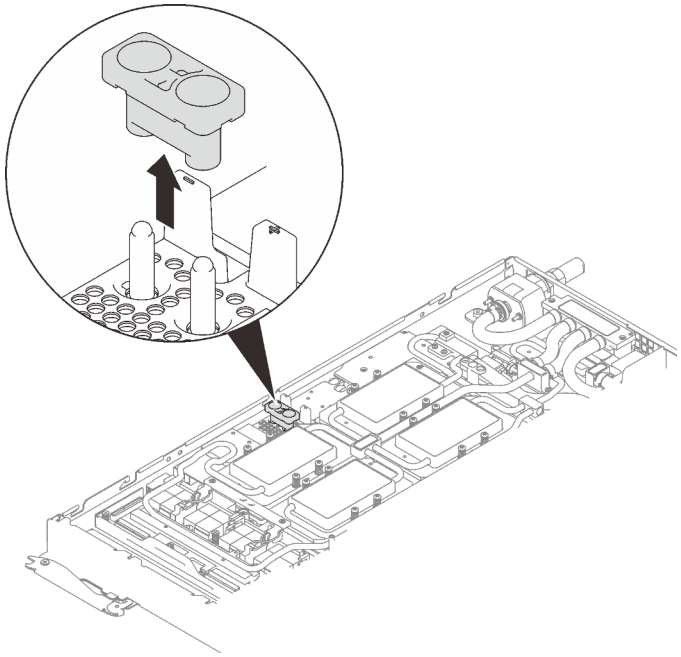


Figure 337. Connector cover removal

Step 15. Connect GPU power cable.

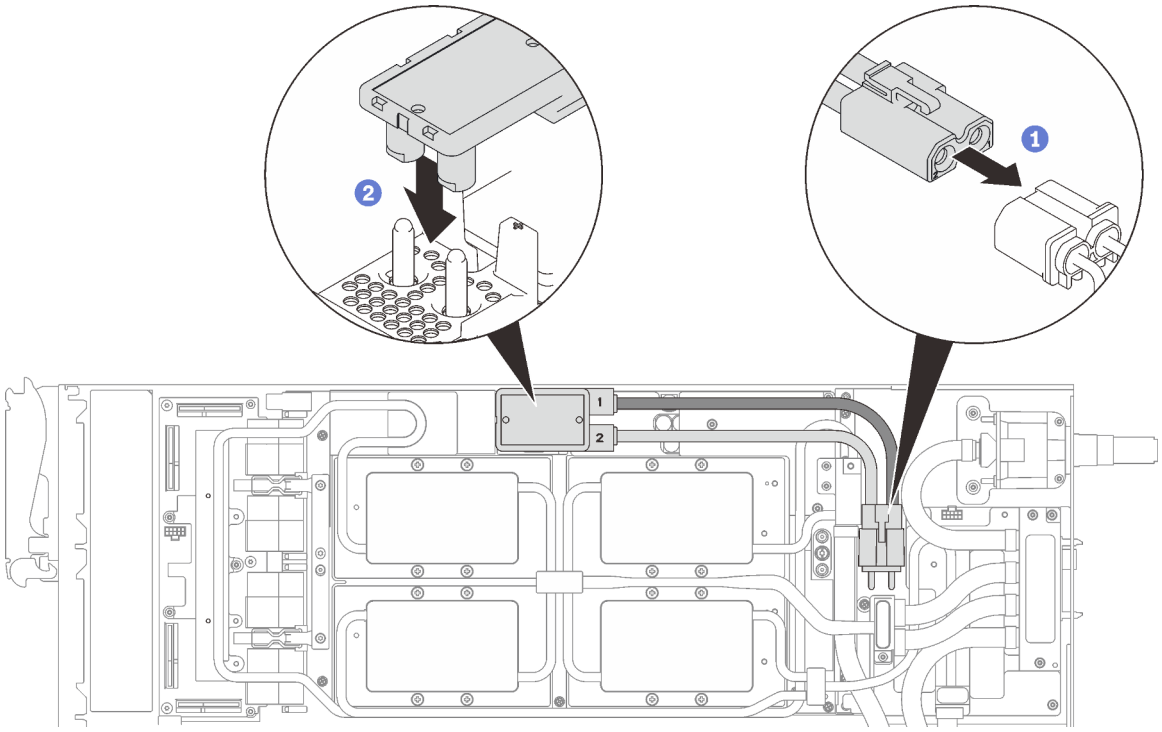


Figure 338. GPU power cable installation

Step 16. See “Cable installation order” on page 35 to connect and route required cables accordingly.

After you finish

1. Reinstall the front and the rear cross braces (14x Phillips #1 screws).

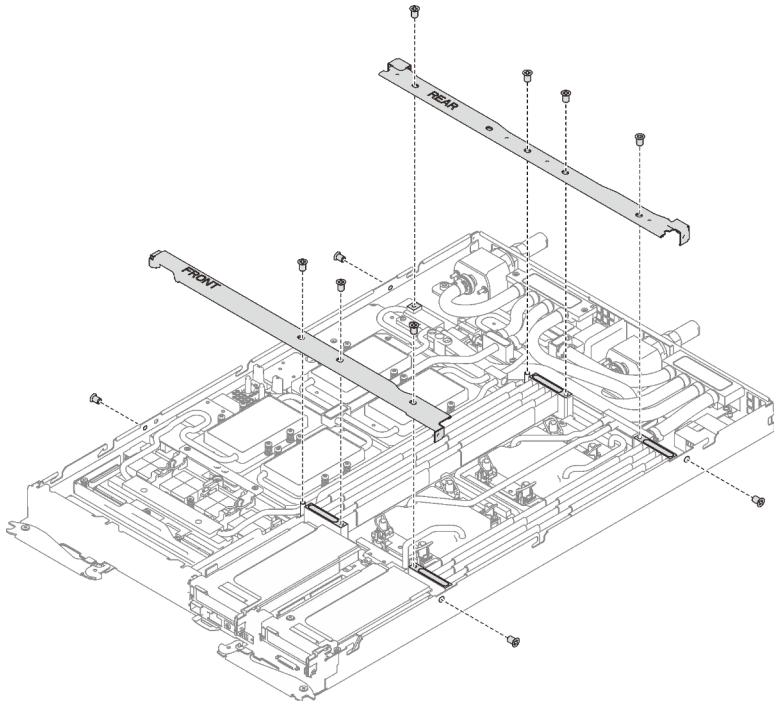


Figure 339. Cross brace installation

2. Reinstall the tray cover (see “Install the tray cover” on page 153).
3. Reinstall the tray (see “Install a DWC tray in the enclosure” on page 150).

   Note: For safety, use the lift tool to install the tray into the rack.
4. Connect all required external cables to the enclosure.

   Note: Use extra forces to connect QSFP cables to the enclosure if Mellanox ConnectX-6 adapters are installed.
5. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.
6. Update the Universally Unique Identifier (UUID) and DMI/SMBIOS data with new vital product data (VPD). Use the Lenovo XClarity Provisioning Manager to update the UUID and DMI/SMBIOS data. See “Update the Universal Unique Identifier (UUID)” on page 260 and “Update the asset tag” on page 262.
7. Enable TPM/TCM. See “Enable TPM/TCM” on page 264
8. Optionally, enable Secure Boot.

Demo video

Watch the procedure on YouTube

GPU power distribution board replacement

Use the following procedures to remove and install the GPU power distribution board.

Remove the GPU power distribution board

Use this information to remove the GPU power distribution board.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.
- A torque screwdriver is available for request if you do not have one at hand.

Procedure

Step 1. Make preparations for this task.

a. Remove the tray (see “Remove a DWC tray from the enclosure” on page 149).

   Attention: For safety, use the lift tool to remove the tray from the rack.

b. Remove the tray cover (see “Remove the tray cover” on page 152).

c. Remove the front and the rear cross braces (11x Phillips #1 screws).

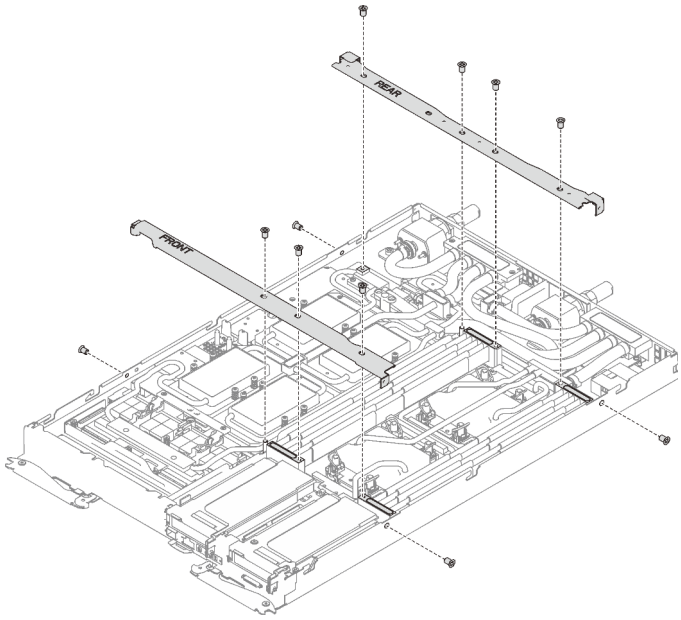


Figure 340. Cross brace removal

d. See “Cable removal order” on page 37 to disconnect cables according to your configuration.

e. Disconnect GPU power cable.

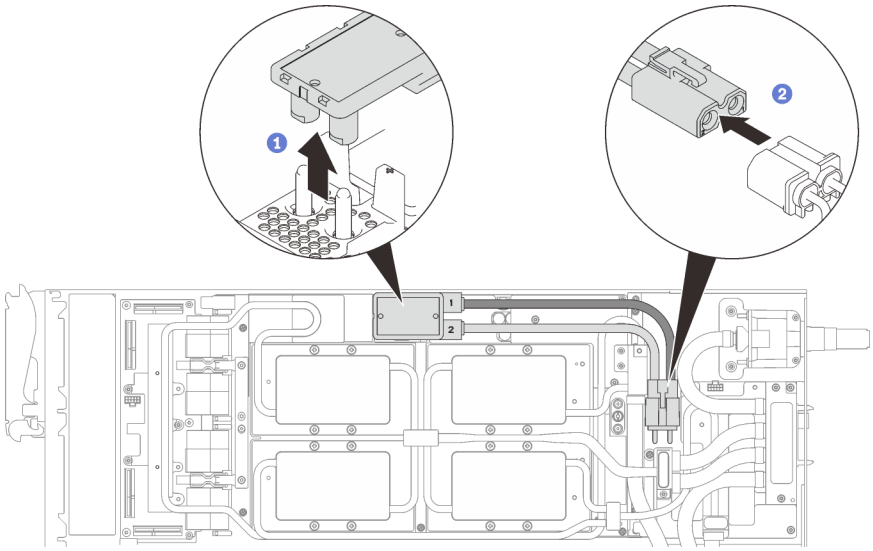


Figure 341. GPU power cable removal

f. Remove the clamp plate or the drive depending on your configuration.

- Clamp plate removal: Remove the two screws to remove the clamp plate.

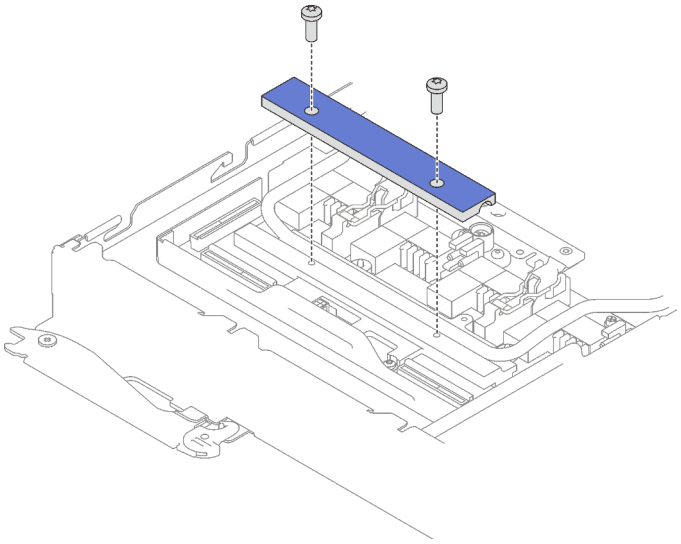


Figure 342. Clamp plate removal

- Drive removal: see “Install the drive in the GPU node” on page 291.

g. Remove seven Torx T10 water loop screws with a torque screwdriver sets to the proper torque.

Note: For reference, the torque required for the screws to be fully tightened/removed is 0.5-0.6 newton-meters, 4.5-5.5 inch-pounds.

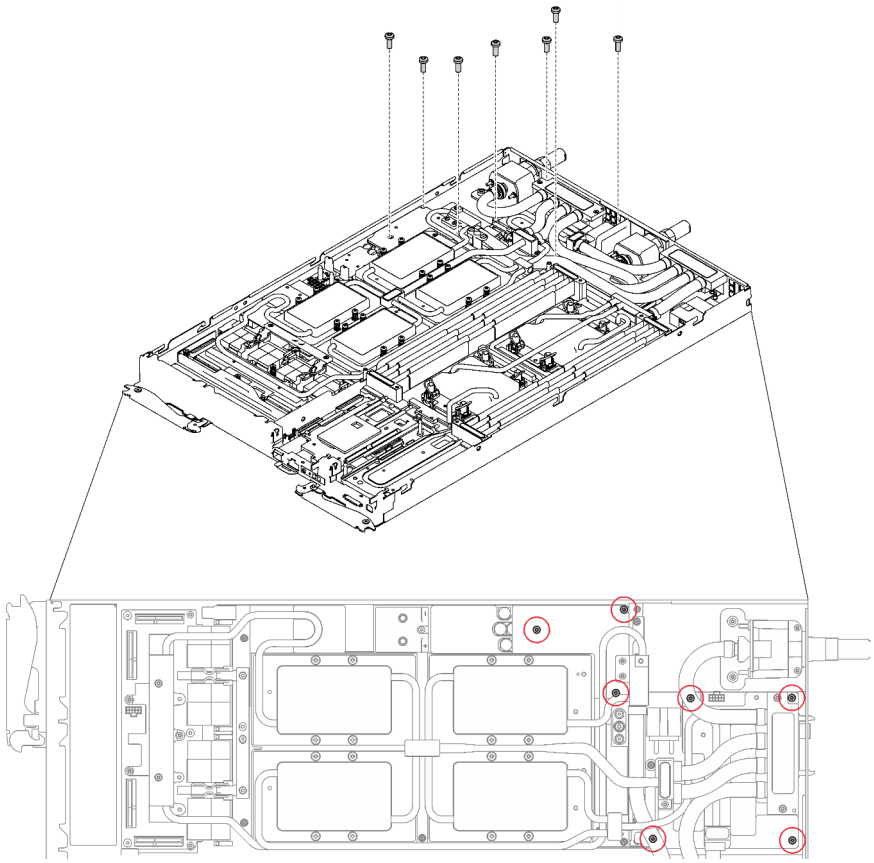


Figure 343. Water loop screws removal

h. Remove GPU cold plate screws (16x Phillips #1 screws) with a torque screwdriver sets to the proper torque.

Note: For reference, the torque required for the screws to be fully tightened/removed is 0.34-046 newton-meters, 3-4 inch-pounds.

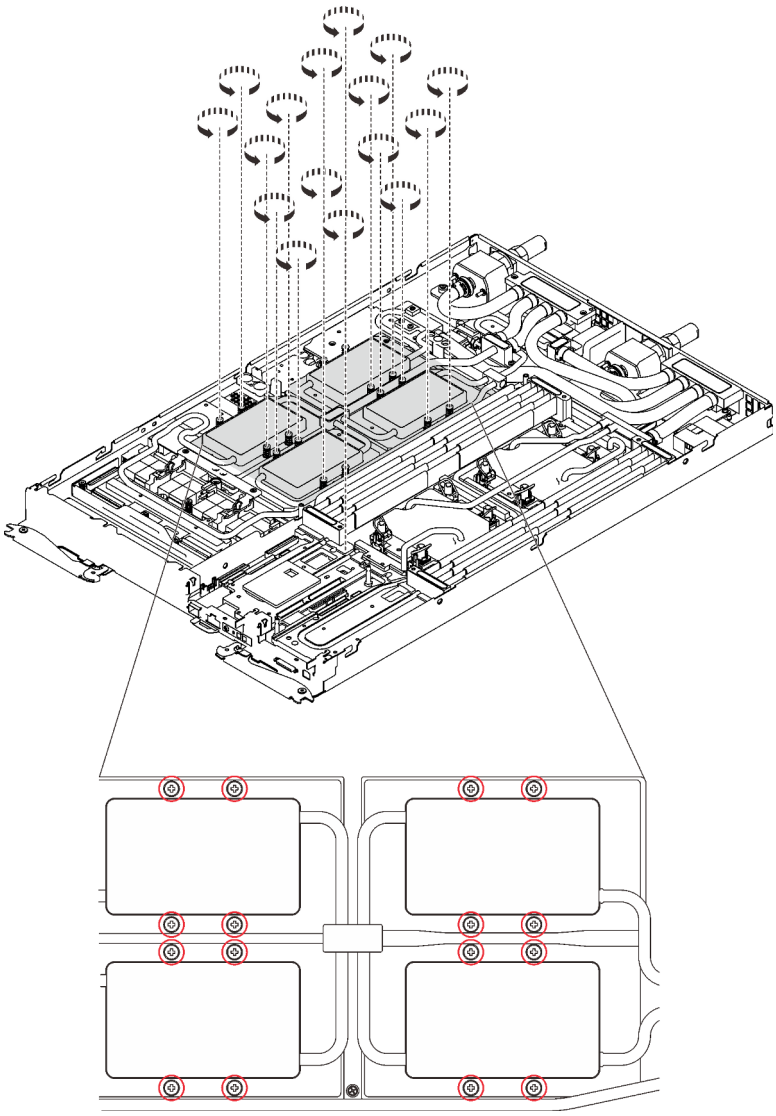


Figure 344. GPU cold plate screws removal

i. Remove the four Torx T10 screws (per node) to loosen the quick connect.

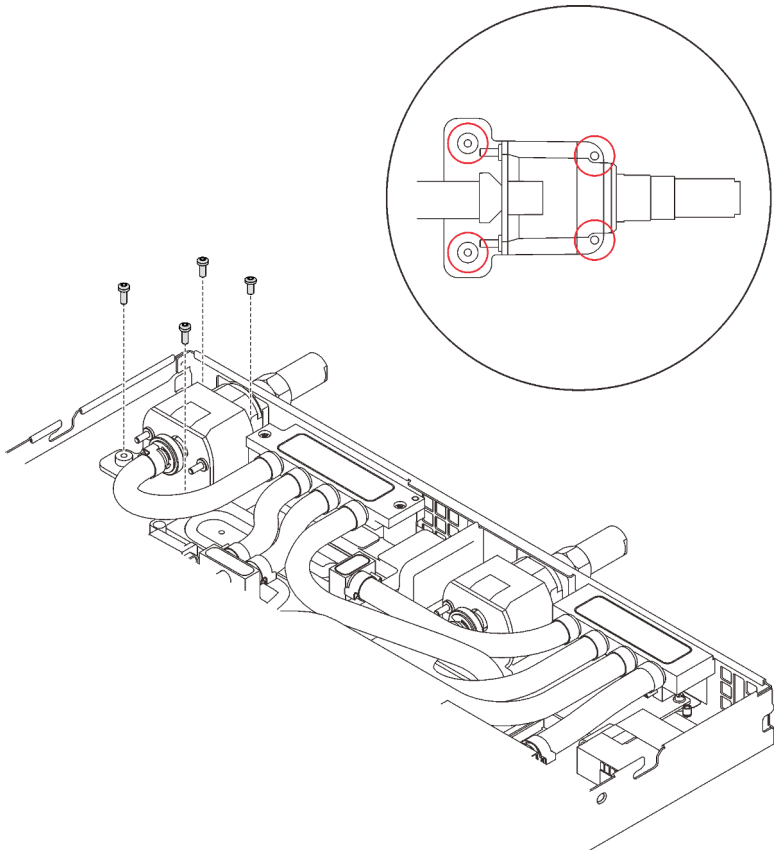


Figure 345. Screws removal

j. Orient the water loop carrier with the slots; then, gently put the water loop carrier down and ensure it is seated firmly on the water loop.

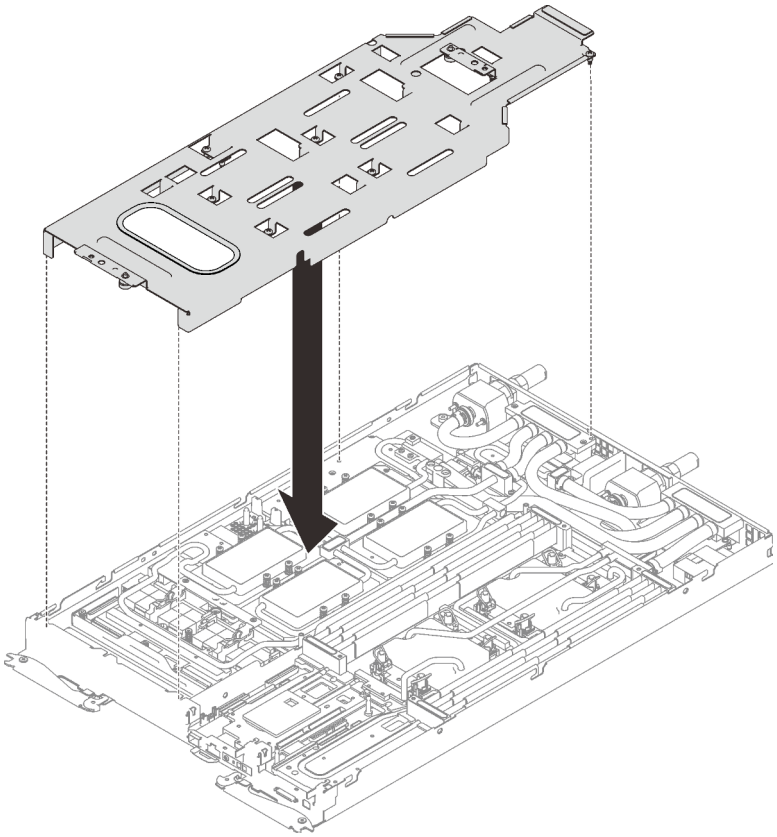


Figure 346. Water loop carrier installation

k. Tighten water loop carrier screws (15x Phillips #2 screws).

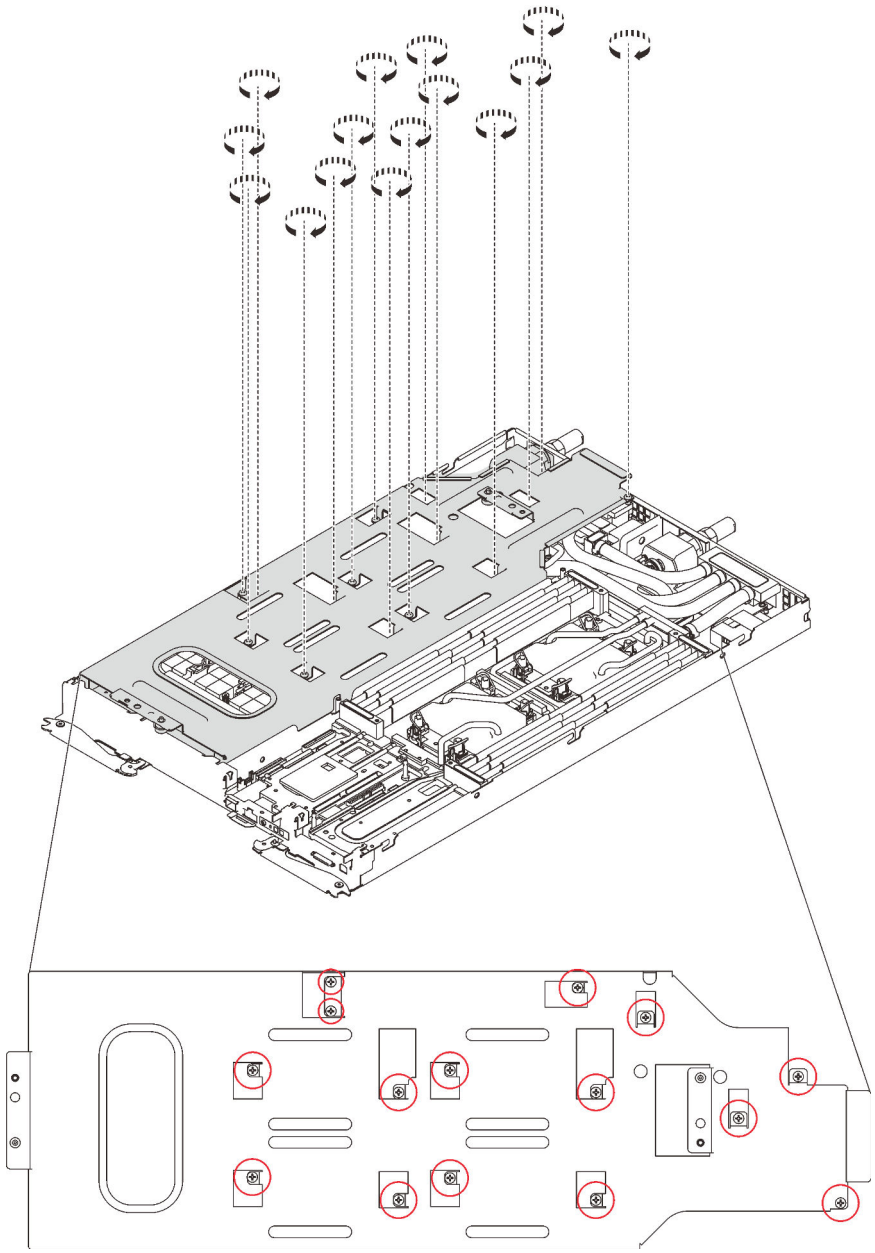


Figure 347. Water loop carrier screws installation

l. Fold the water loop.

1. ❶ Carefully unhook the quick connect and slide it out of the opening in the rear of the tray; then, lift the water loop up off the GPU board.
2. ❷ Carefully rotate the water loop so one half is sitting on top of the other half.

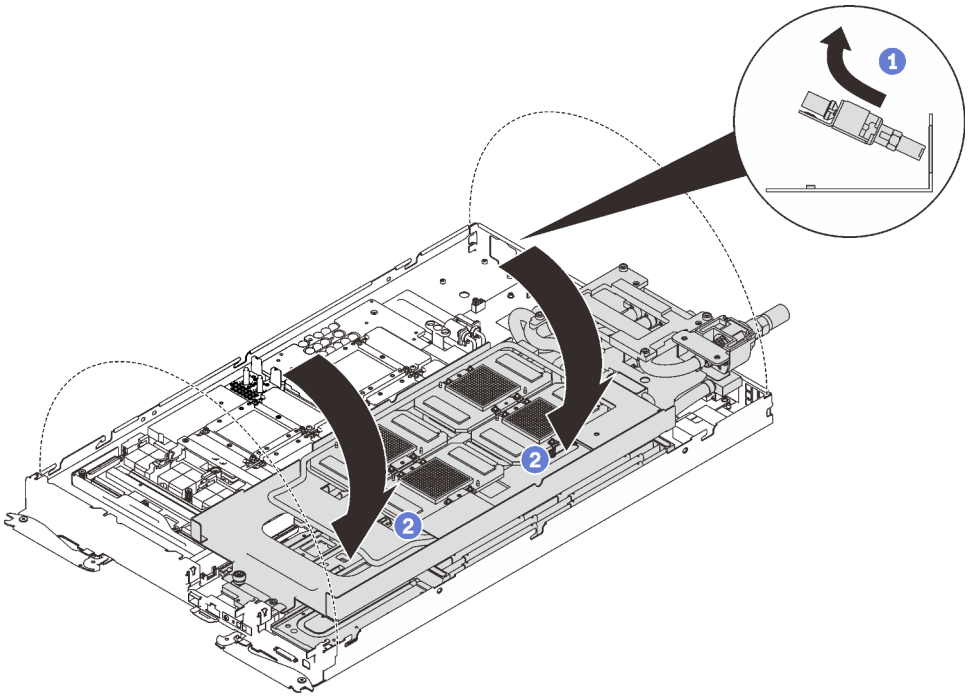


Figure 348. Folding the water loop

Step 2. Remove the five screws.

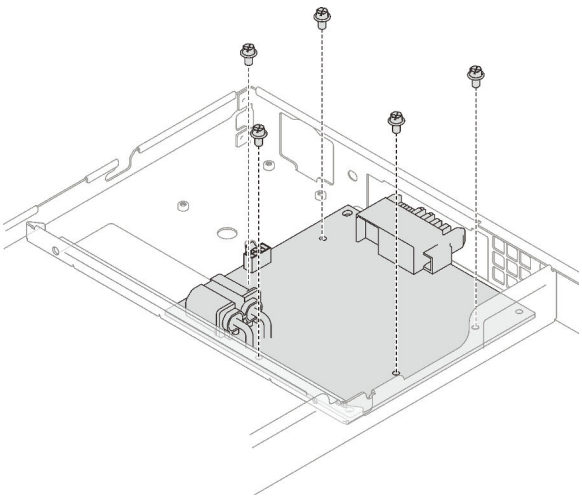


Figure 349. Screws removal

Step 3. Remove the GPU power distribution board out of the node.

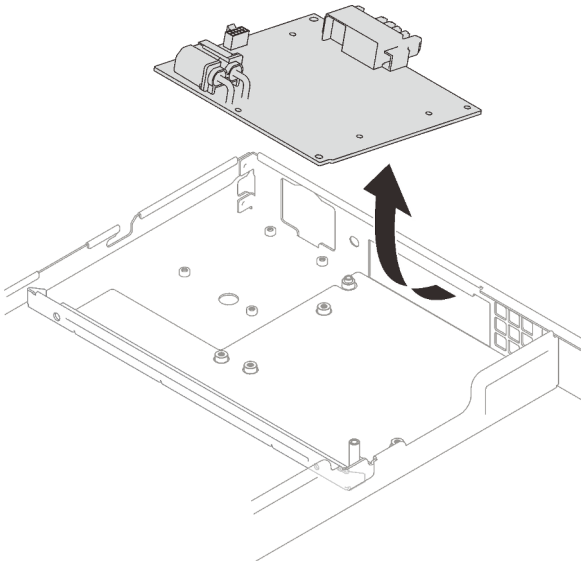


Figure 350. GPU power distribution board removal

After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

Watch the procedure on YouTube

Install the GPU power distribution board

Use this information to install the GPU power distribution board.

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- A torque screwdriver is available for request if you do not have one at hand.

Note: Ensure you have “SD650 V2 or SD650-N V2 Neptune® DWC Waterloop Service Kit “ in hand to install components.

Procedure

Step 1. Align the connector with the slot and place the GPU power distribution board into the node.

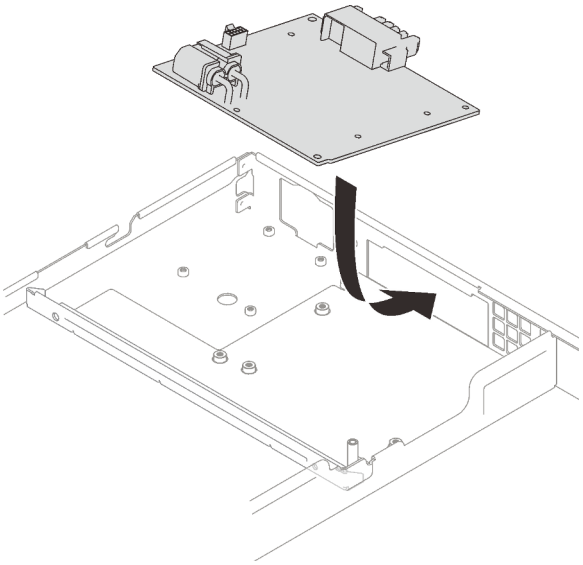


Figure 351. GPU power distribution board installation

Step 2. Insert and fasten the five screws.

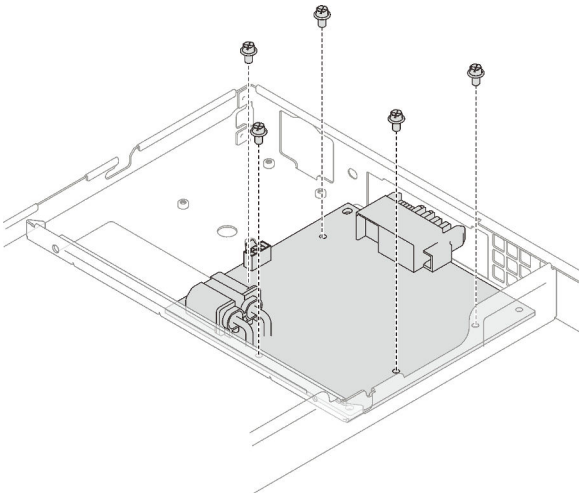


Figure 352. Screws installation

After you finish

1. Apply the new thermal grease on GPUs.
   a. If there is any old thermal grease on four GPUs and the cold plates, gently clean the top of the four GPUs and the cold plates using an alcohol cleaning pad.
   b. If you have cleaned the top of the GPUs with an alcohol cleaning pad, make sure to apply the new thermal grease after the alcohol has fully evaporated.
   c. Apply gray thermal grease to the top of the four GPUs with a syringe by forming four dots spaced as shown below, with each dot consisting of about 0.5 gram (about 0.225 ml) of gray thermal grease. Each syringe contains 1 gram of thermal grease, sufficient for two dots of thermal grease.

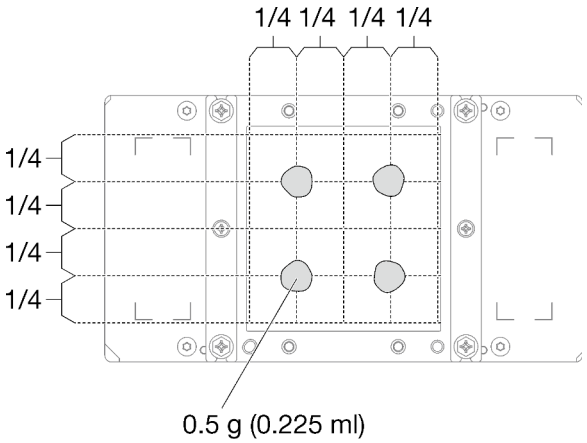


Figure 353. Thermal grease application

2. Replace the existing putty pad with the new one.

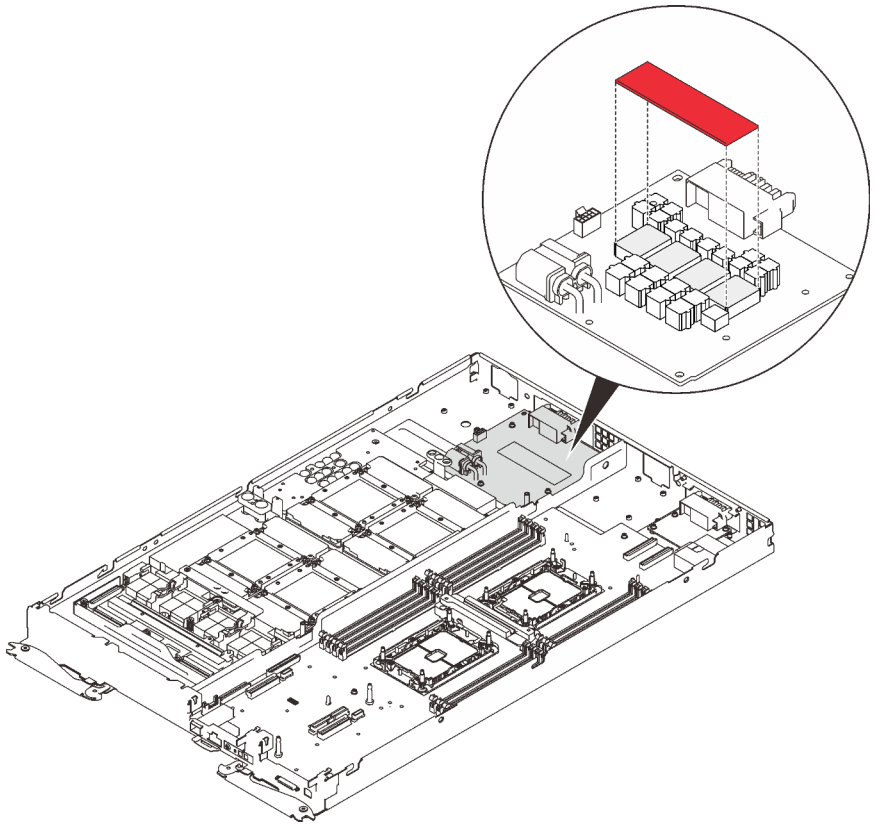


Figure 354. Putty pad

3. Check the gap pads on the water loop, if any of them are damaged or missing, replace them with the new ones.

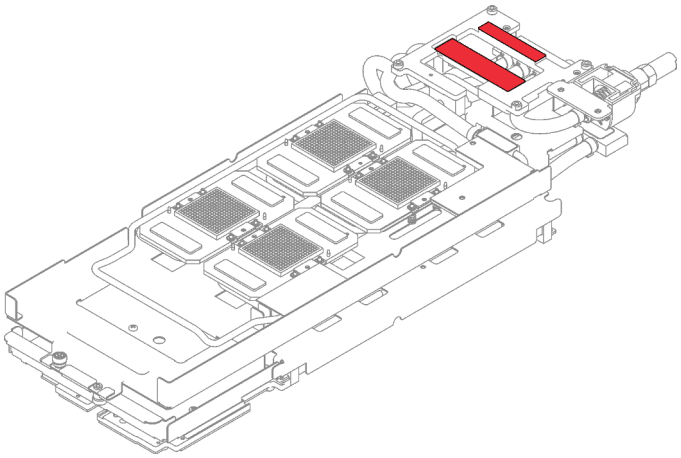


Figure 355. Gap pads on the water loop

4. Reinstall the water loop.
   a. ❶ Carefully rotate the top side of the water loop.
   b. ❷ Carefully insert the quick connect into the tray opening as shown.
   c. ❸ Carefully align the water loop with eight guide pins on four GPU cold plates; then, gently put the water loop down and ensure it is firmly seated on the GPU board.

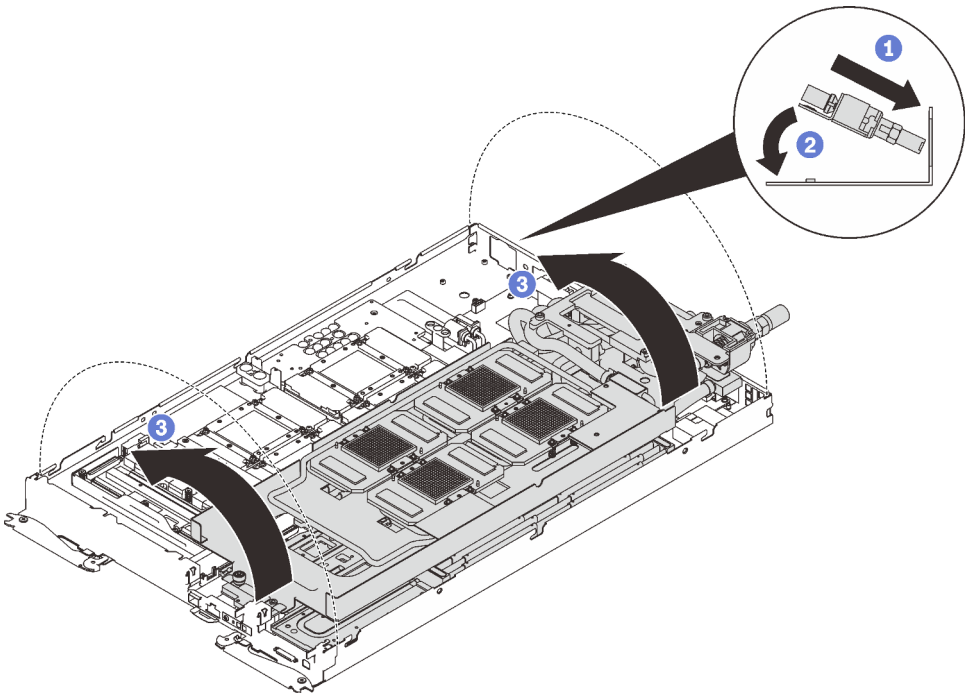


Figure 356. Water loop installation

5. Loosen all water loop carrier screws (15x Phillips #2 screws).

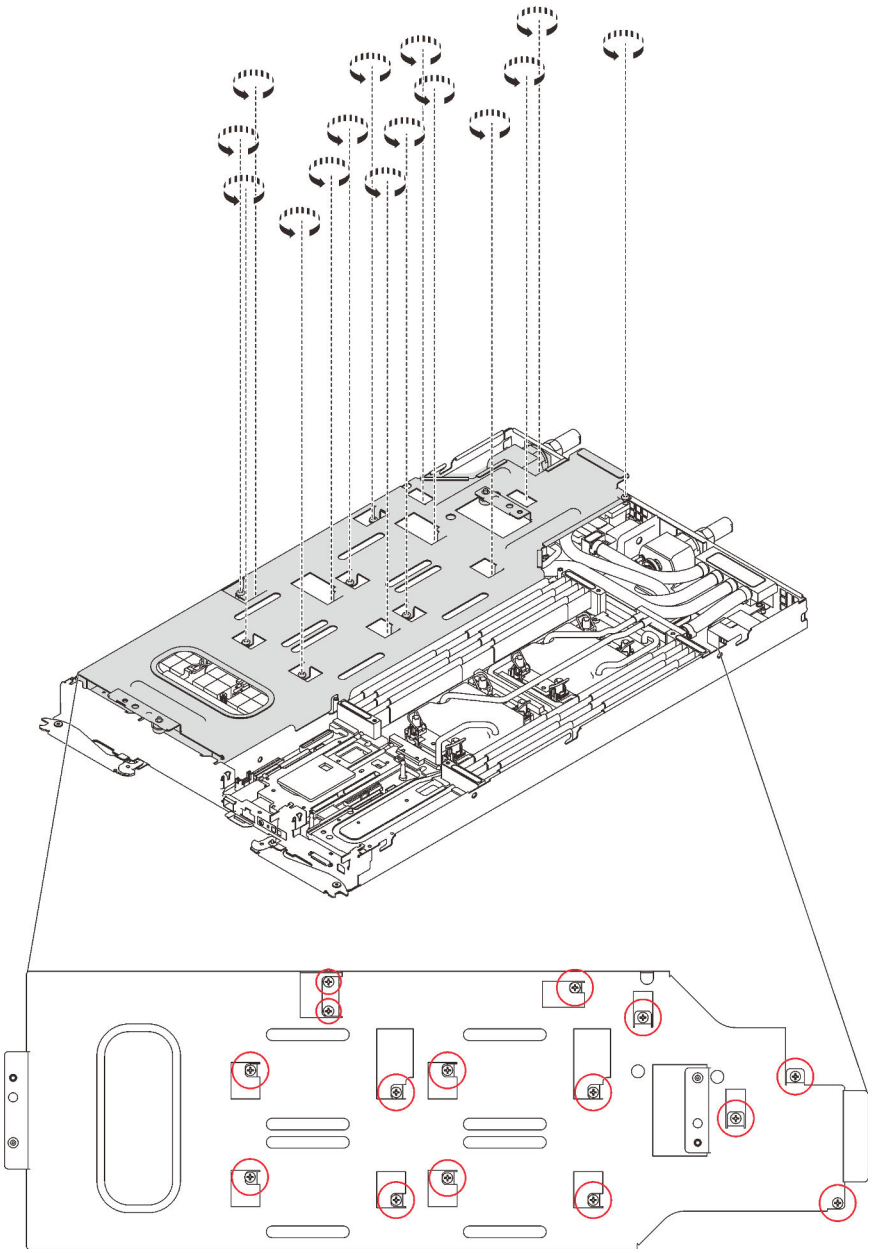


Figure 357. Loosening water loop carrier screws

6. Carefully lift the water loop carrier up and away from the water loop.

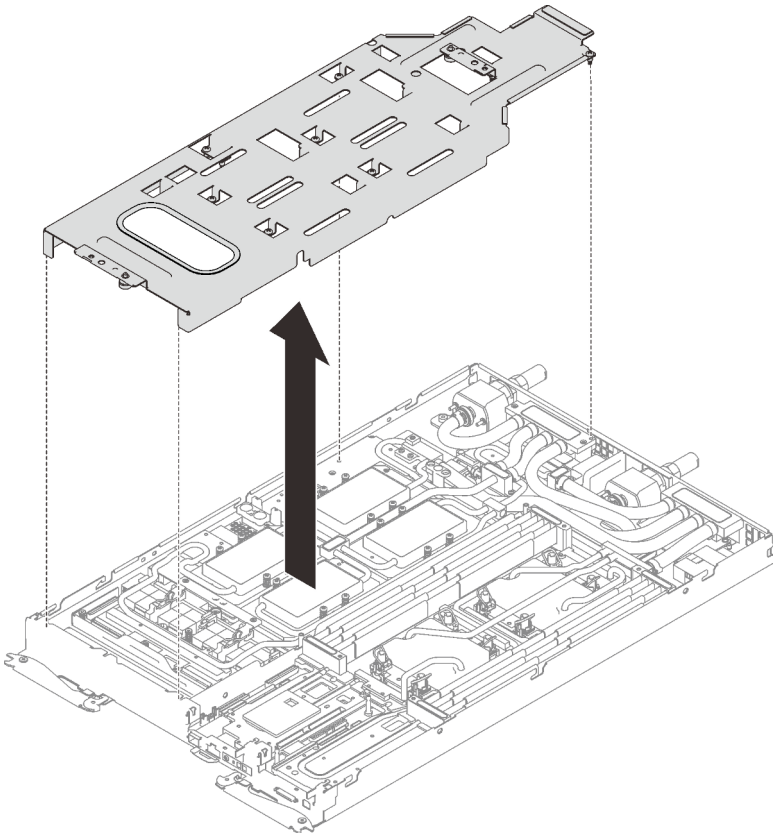


Figure 358. Water loop carrier removal

7. Reinstall water loop screws (7x Torx T10 screws) with a torque screwdriver sets to the proper torque.

   Note: For reference, the torque required for the screws to be fully tightened/removed is 0.5-0.6 newton-meters, 4.5-5.5 inch-pounds.

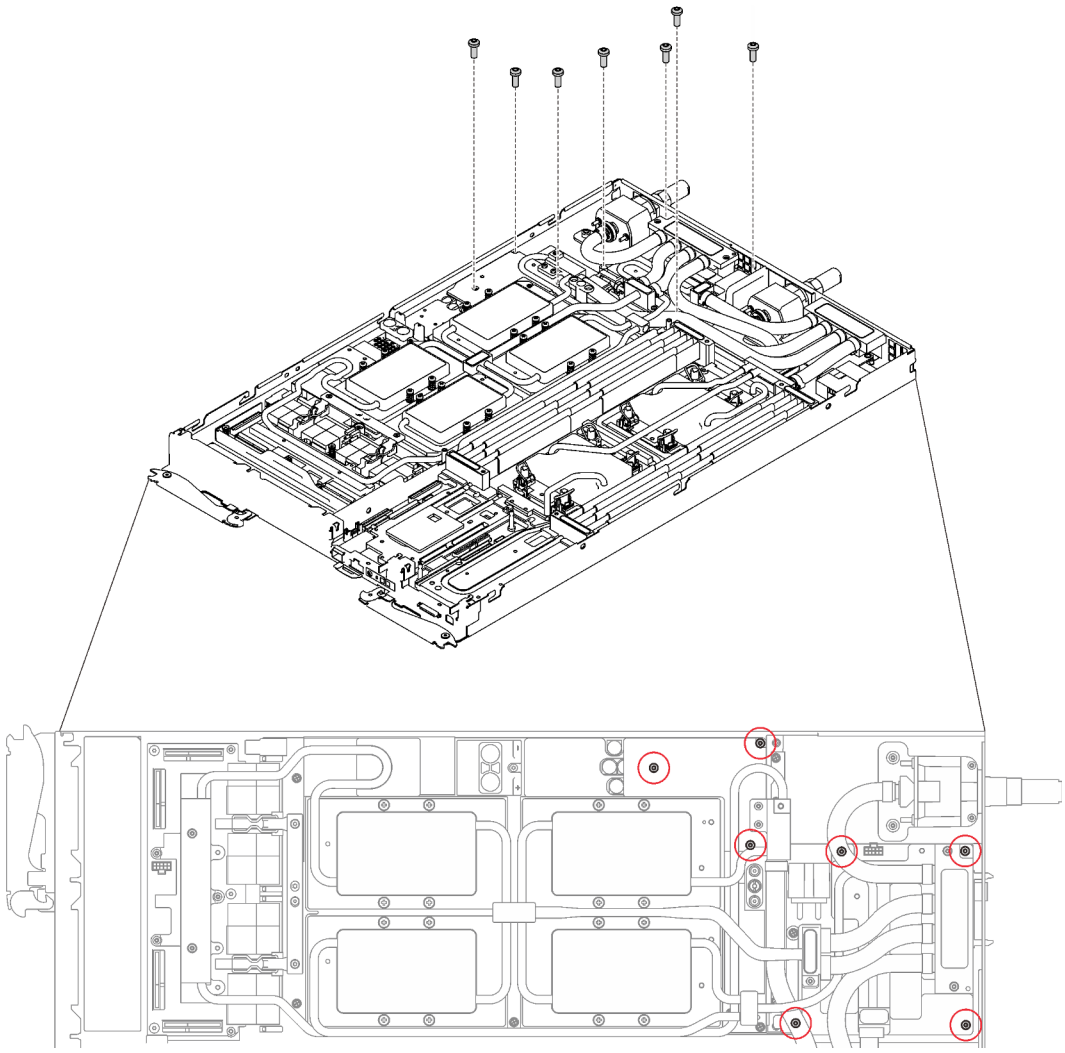


Figure 359. Water loop screws installation

8. Reinstall GPU cold plate screws (4x Phillips #1 screws per GPU cold plate, total of 16x Phillips #1 screws) with a torque screwdriver set to the proper torque. For reference, the torque required for the screws to be fully tightened/removed is 0.34-046 newton-meters, 3-4 inch-pounds.

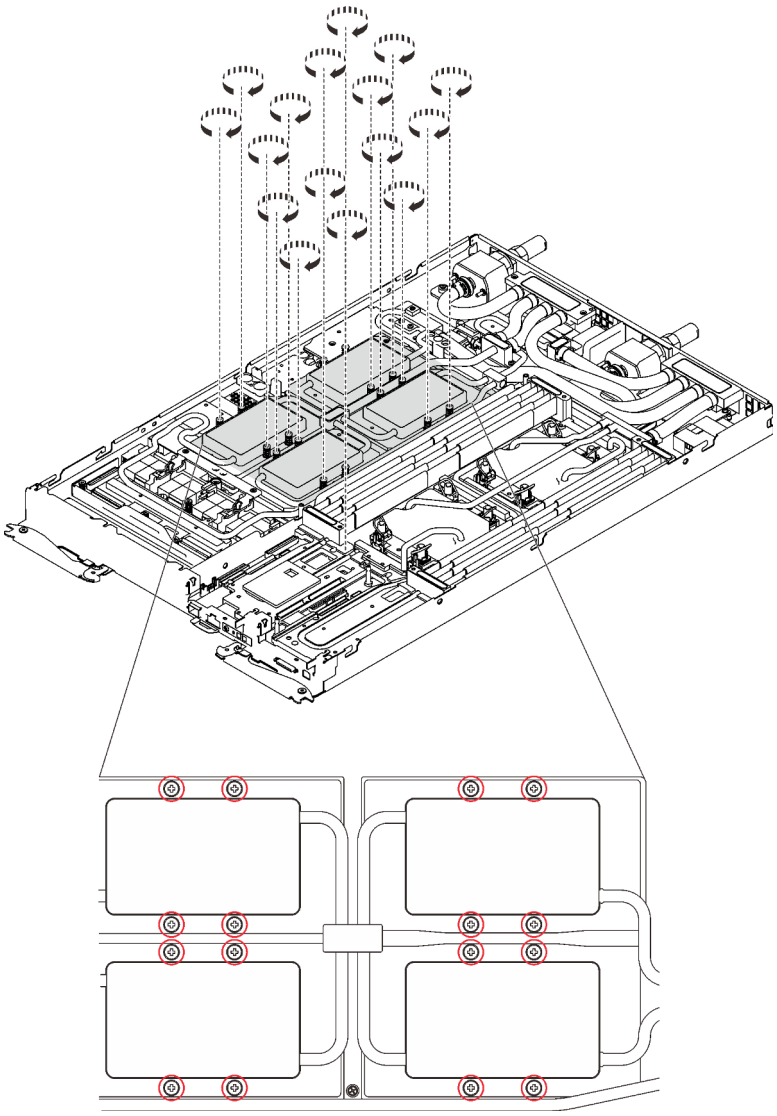
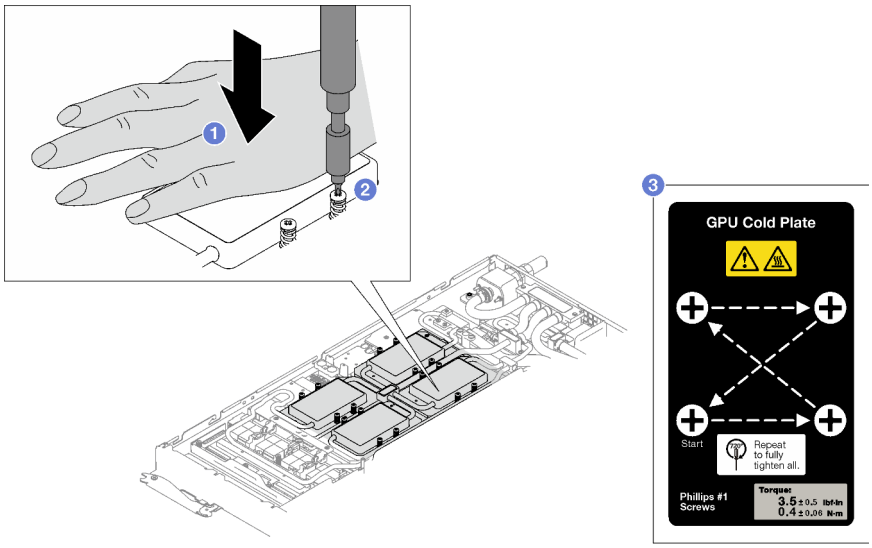


Figure 360. GPU cold plate screws installation

a. 1 Push down the GPU cold plate with your palm to reduce the gap between the GPU cold plate and the GPU.

b. 2 Press the torque screwdriver against the screw so that the screw is engaged with the GPU.

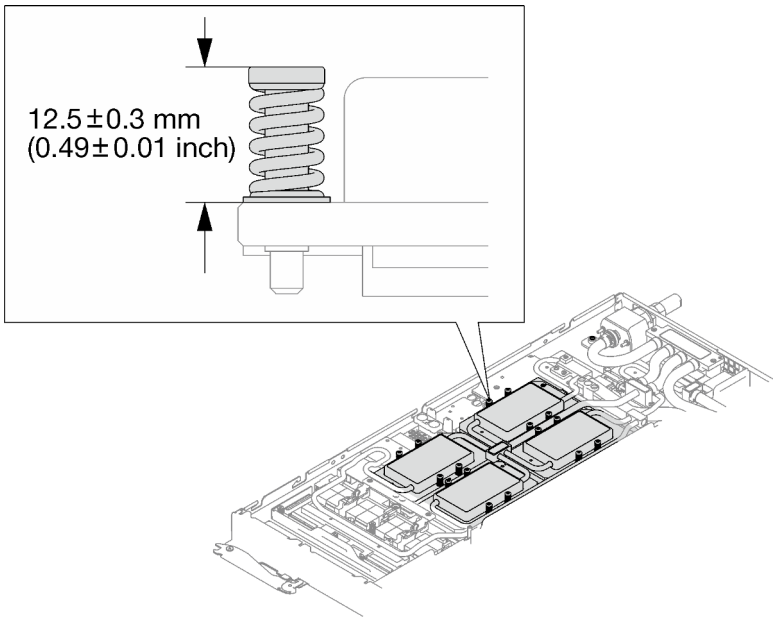
c. 3 Follow the screw sequence specified on the GPU cold plate label and fasten each screw for 720 degrees.



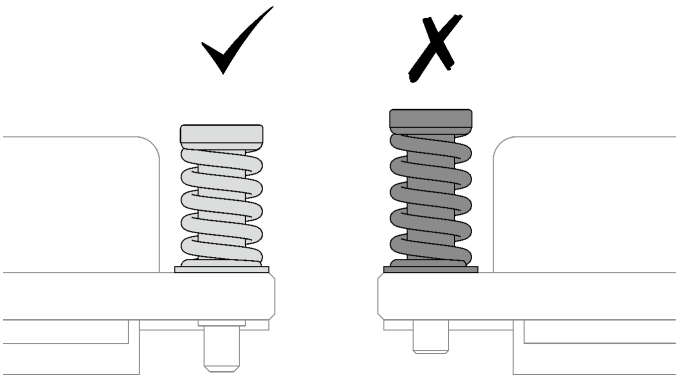
d. 4 Make sure that the GPU cold plate is lowered into the node and its surface is flat without tilting. If the GPU cold plate is tilted, unfasten the screws, and repeat Step 1 to Step 3.

e. 5 Repeat Step 3 until the screws are fully tightened.

f. 6 Make sure the height of each screw is 12.5±0.3 millimeter (0.49±0.01 inch) and is fully compressed. If not, repeat the GPU cold plate installation steps.



Note: Inspect the screws to make sure they are fully compressed.



9. Reinstall the four Torx T10 screws (per node) to secure the quick connect.

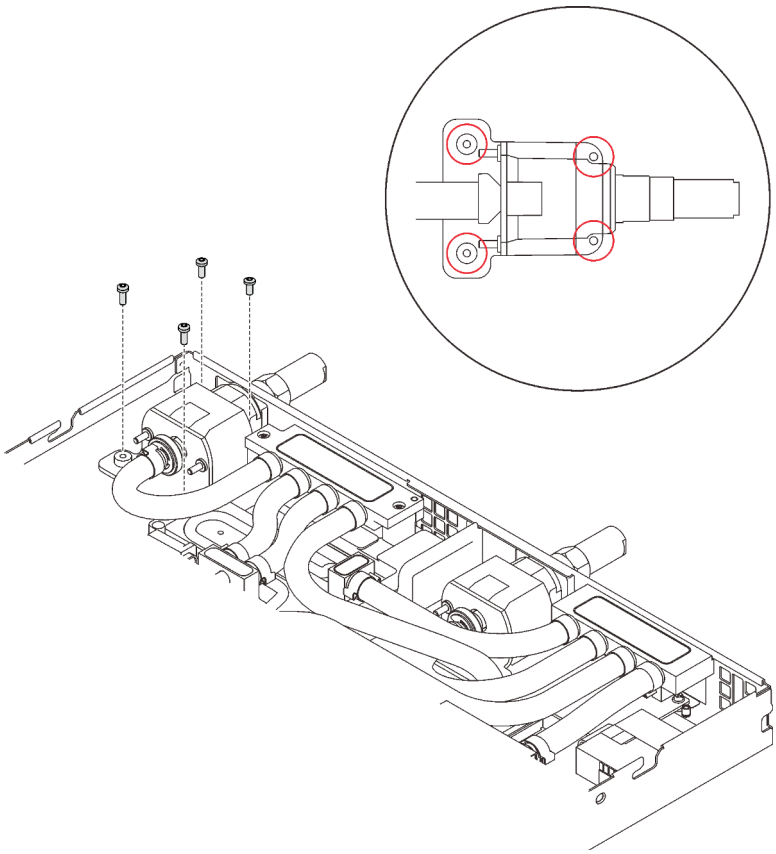


Figure 361. Screws installation

10. Reinstall the clamp plate or the drive depending on your configuration.
    - Clamp plate installation: Install the two screws to secure the clamp plate.

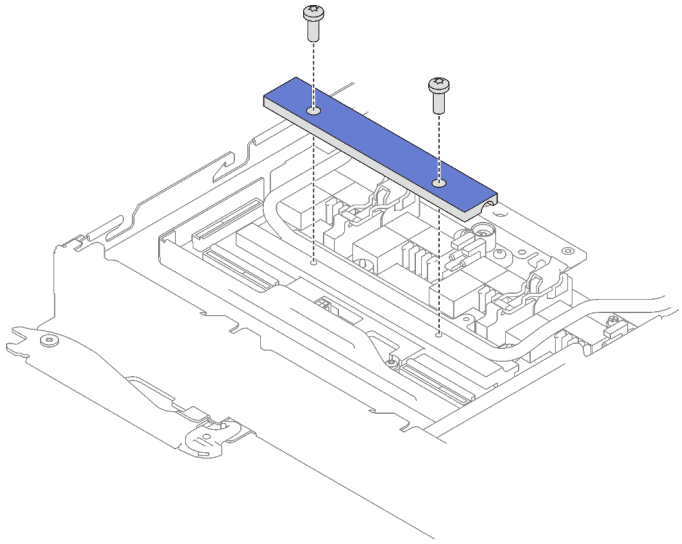


Figure 362. Clamp plate installation

- Drive installation: see “Install the drive in the GPU node” on page 291.

11. Remove the connector cover if necessary.

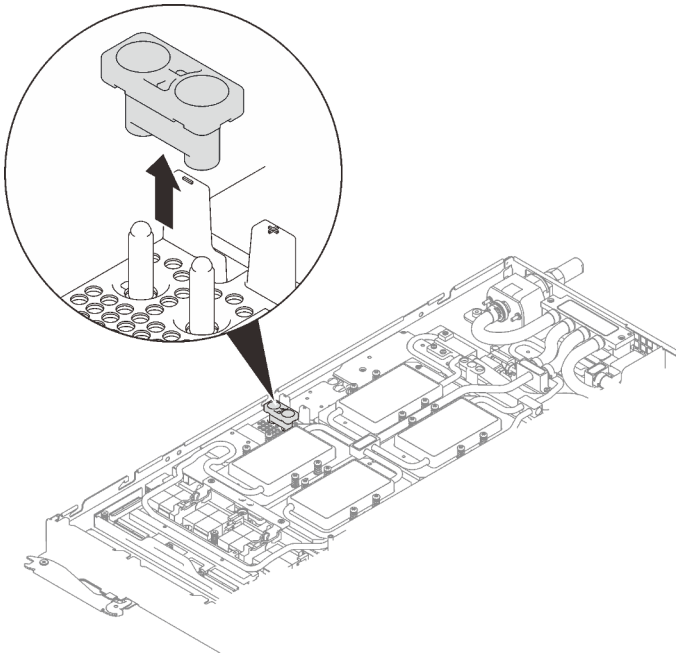


Figure 363. Connector cover removal

12. Connect GPU power cable.

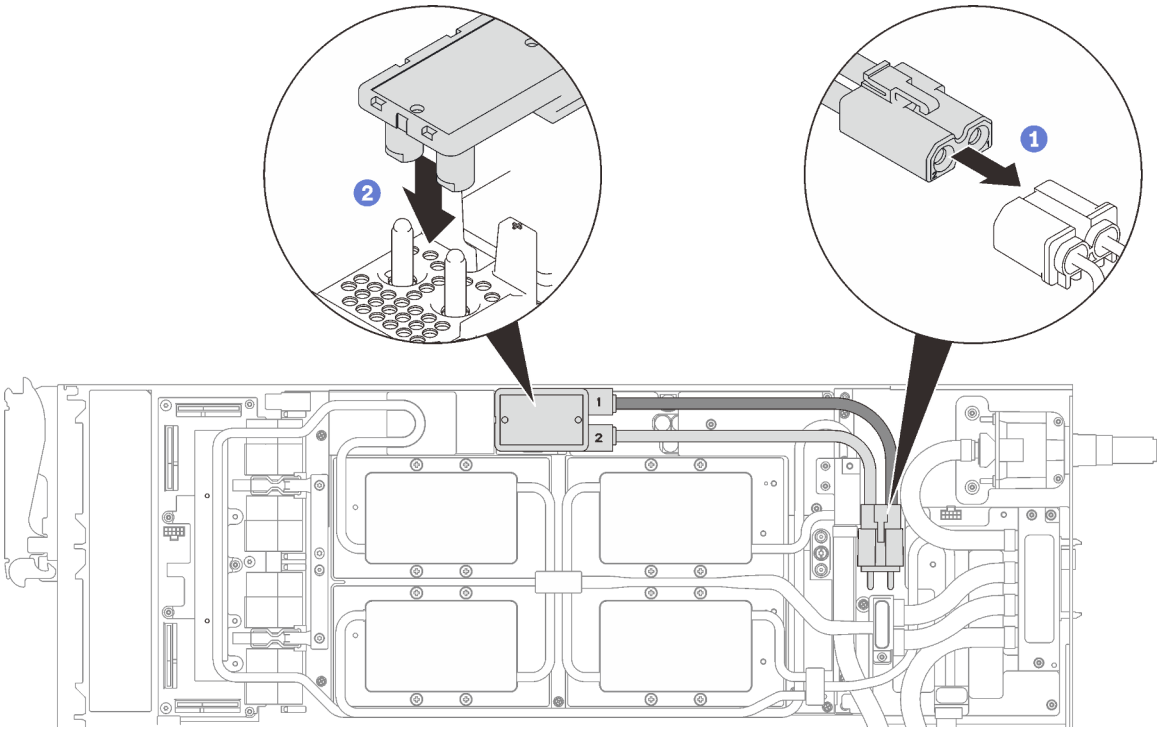


Figure 364. GPU power cable installation

13. See “Cable installation order” on page 35 to connect and route required cables accordingly.
14. Reinstall the front and the rear cross braces (14x Phillips #1 screws).

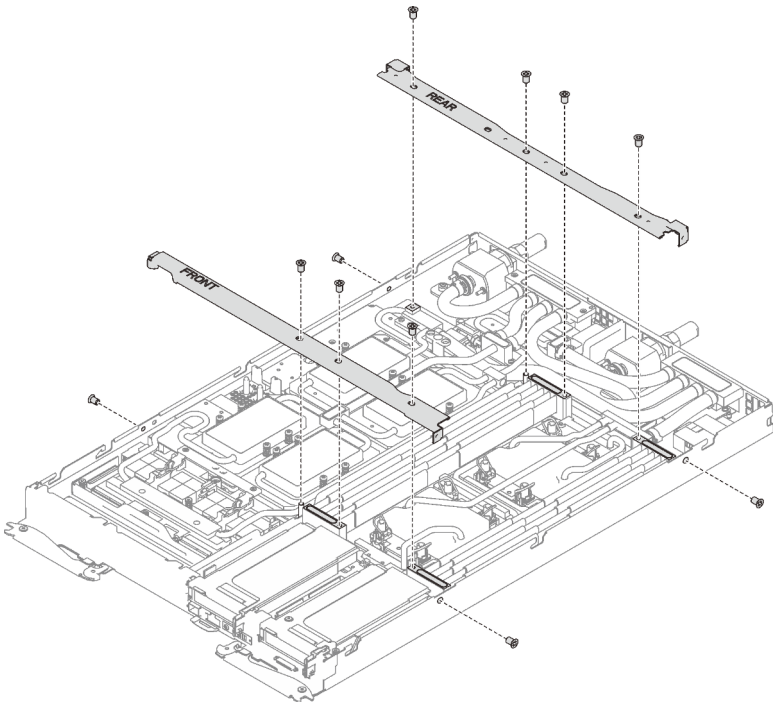


Figure 365. Cross brace installation

15. Reinstall the tray cover (see “Install the tray cover” on page 153).

16. Reinstall the tray (see “Install a DWC tray in the enclosure” on page 150).

    Note: For safety, use the lift tool to install the tray into the rack.
17. Connect all required external cables to the enclosure.

    Note: Use extra forces to connect QSFP cables to the enclosure if Mellanox ConnectX-6 adapters are installed.
18. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

Watch the procedure on YouTube

Retimer board replacement

Use the following procedures to remove and install the retimer board.

Remove the retimer board

Use this information to remove the retimer board.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.
- A torque screwdriver is available for request if you do not have one at hand.

Procedure

Step 1. Make preparations for this task.

a. Remove the tray (see “Remove a DWC tray from the enclosure” on page 149).

   Attention: For safety, use the lift tool to remove the tray from the rack.

b. Remove the tray cover (see “Remove the tray cover” on page 152).

c. Remove the front and the rear cross braces (11x Phillips #1 screws).

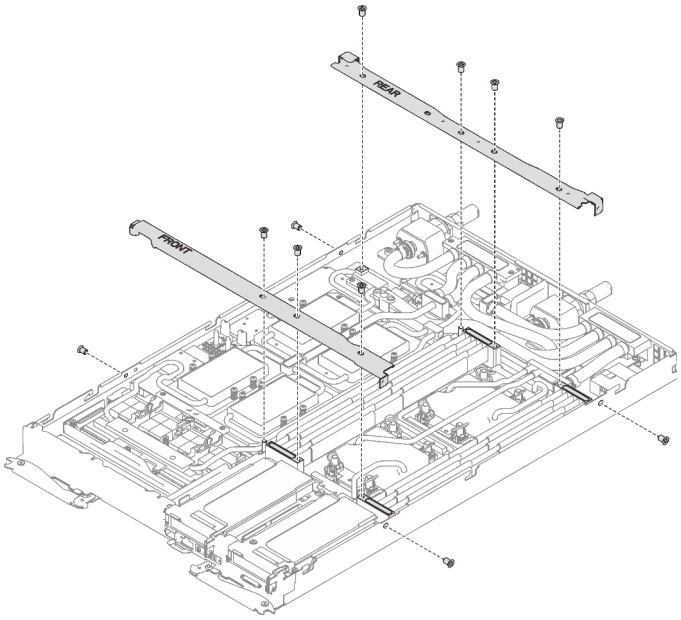


Figure 366. Cross brace removal

d. See “Cable removal order” on page 37 to disconnect cables according to your configuration.

e. Disconnect GPU power cable.

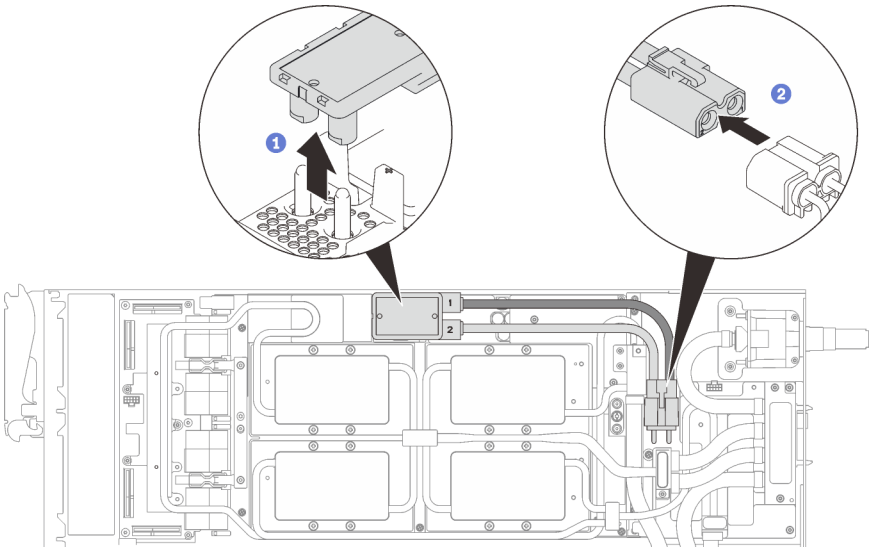


Figure 367. GPU power cable removal

f. Remove the clamp plate or the drive depending on your configuration.

- Clamp plate removal: Remove the two screws to remove the clamp plate.

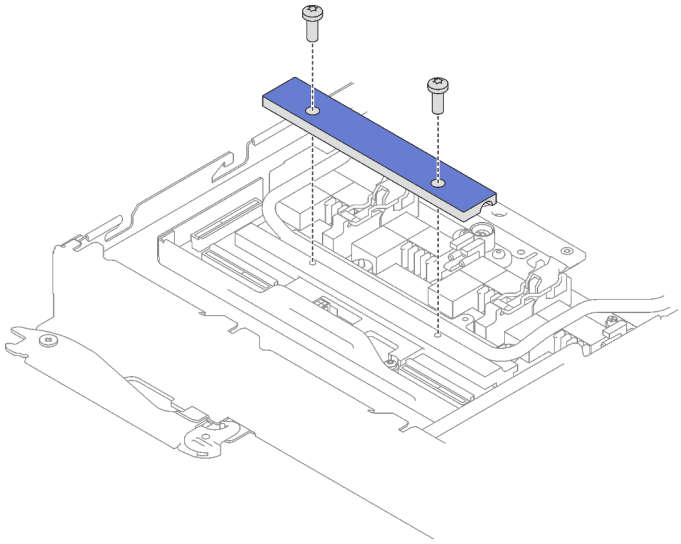


Figure 368. Clamp plate removal

- Drive removal: see “Install the drive in the GPU node” on page 291.

g. Remove seven Torx T10 water loop screws with a torque screwdriver sets to the proper torque.

Note: For reference, the torque required for the screws to be fully tightened/removed is 0.5-0.6 newton-meters, 4.5-5.5 inch-pounds.

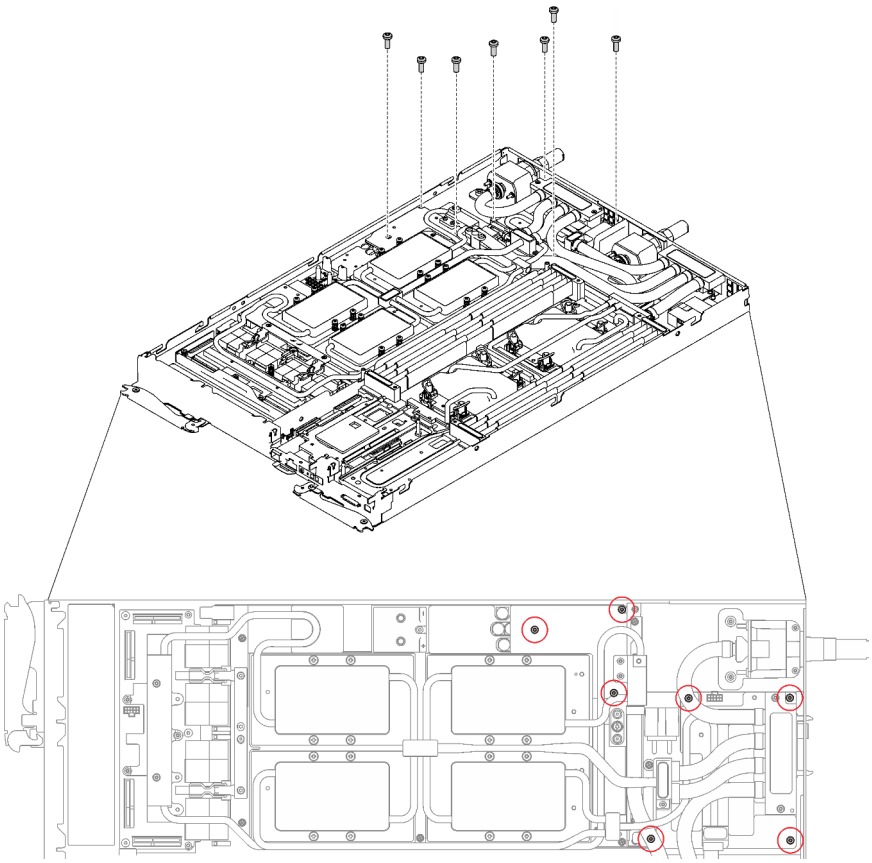


Figure 369. Water loop screws removal

h. Remove GPU cold plate screws (16x Phillips #1 screws) with a torque screwdriver sets to the proper torque.

Note: For reference, the torque required for the screws to be fully tightened/removed is 0.34-046 newton-meters, 3-4 inch-pounds.

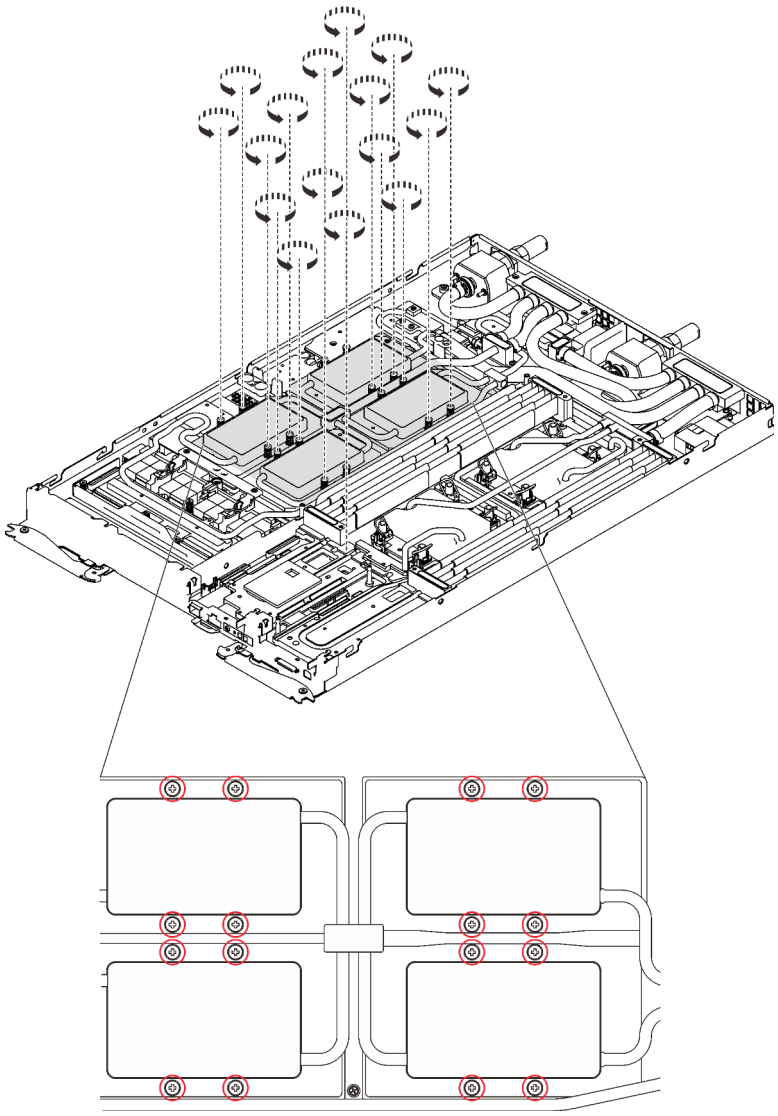


Figure 370. GPU cold plate screws removal

i. Remove the four Torx T10 screws (per node) to loosen the quick connect.

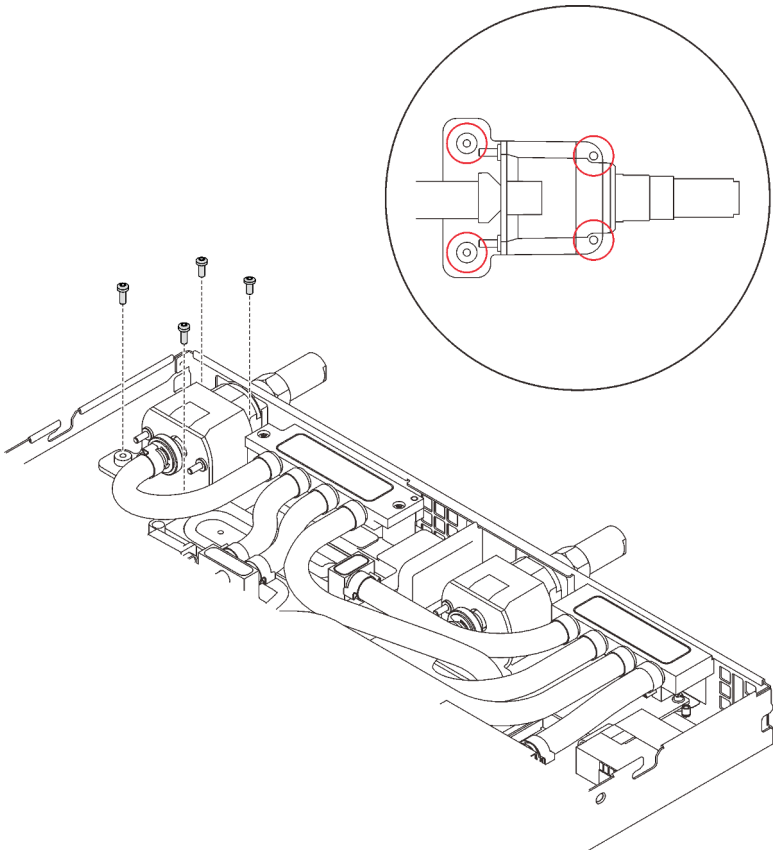


Figure 371. Screws removal

j. Orient the water loop carrier with the slots; then, gently put the water loop carrier down and ensure it is seated firmly on the water loop.

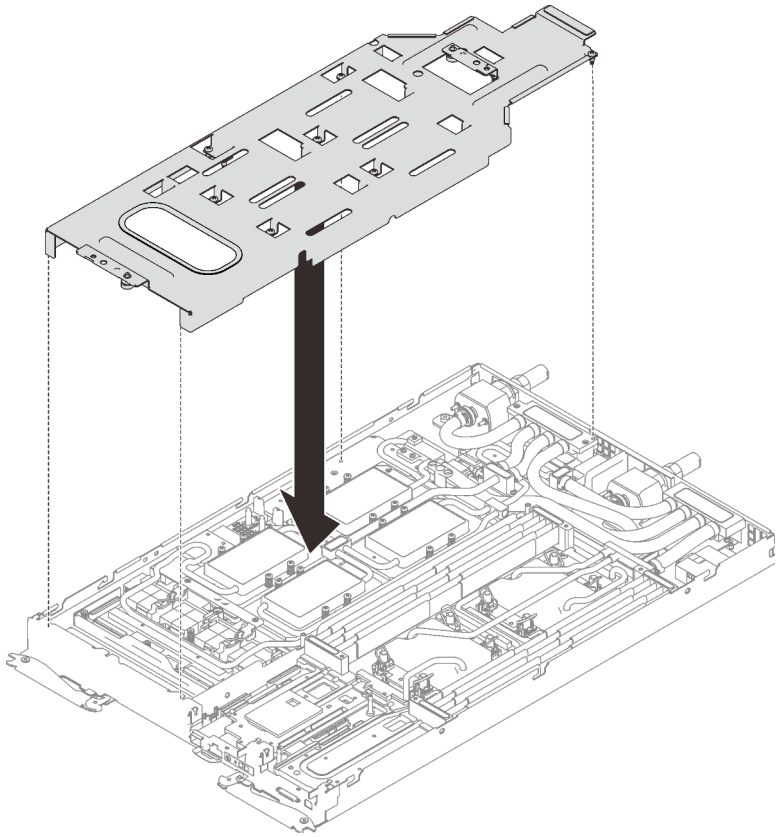


Figure 372. Water loop carrier installation

k. Tighten water loop carrier screws (15x Phillips #2 screws).

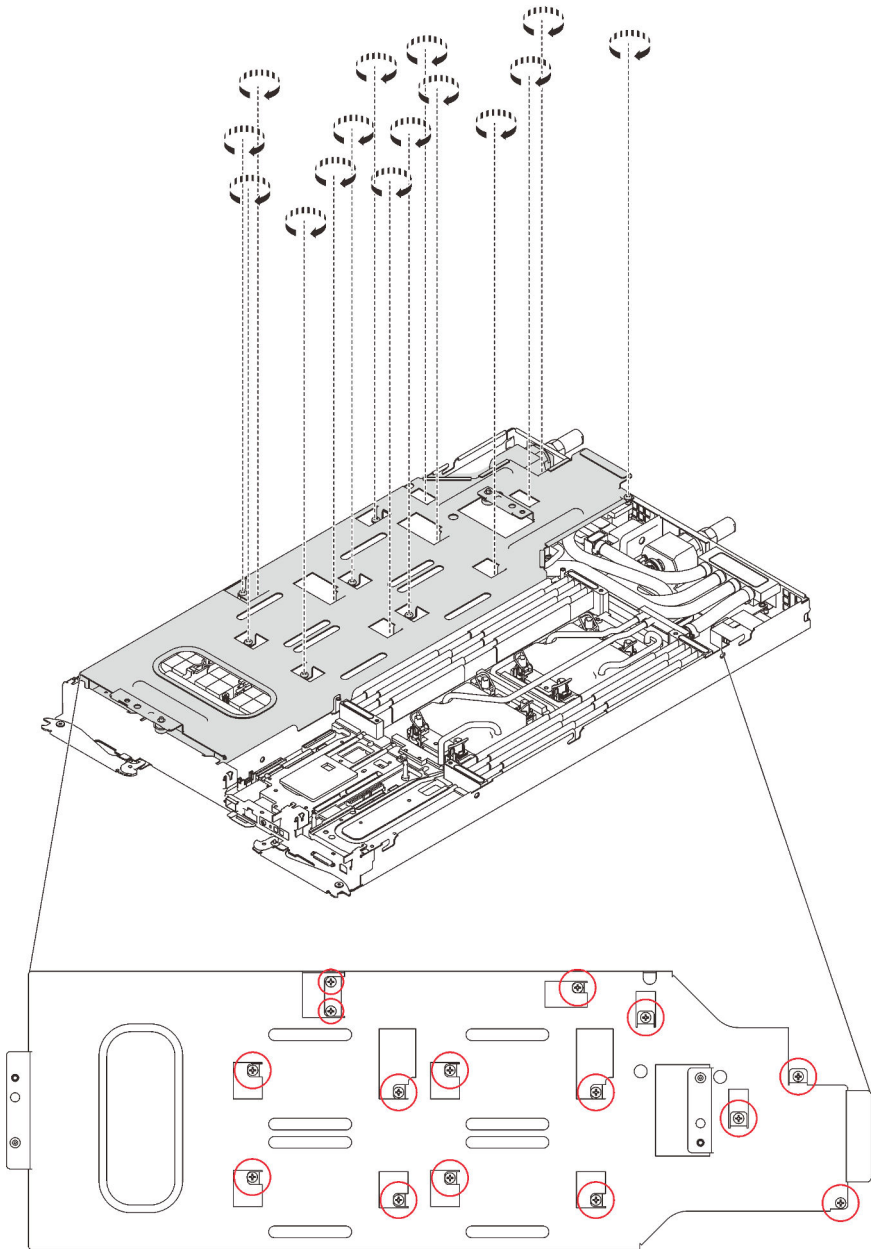


Figure 373. Water loop carrier screws installation

l. Fold the water loop.

1. ❶ Carefully unhook the quick connect and slide it out of the opening in the rear of the tray; then, lift the water loop up off the GPU board.
2. ❷ Carefully rotate the water loop so one half is sitting on top of the other half.

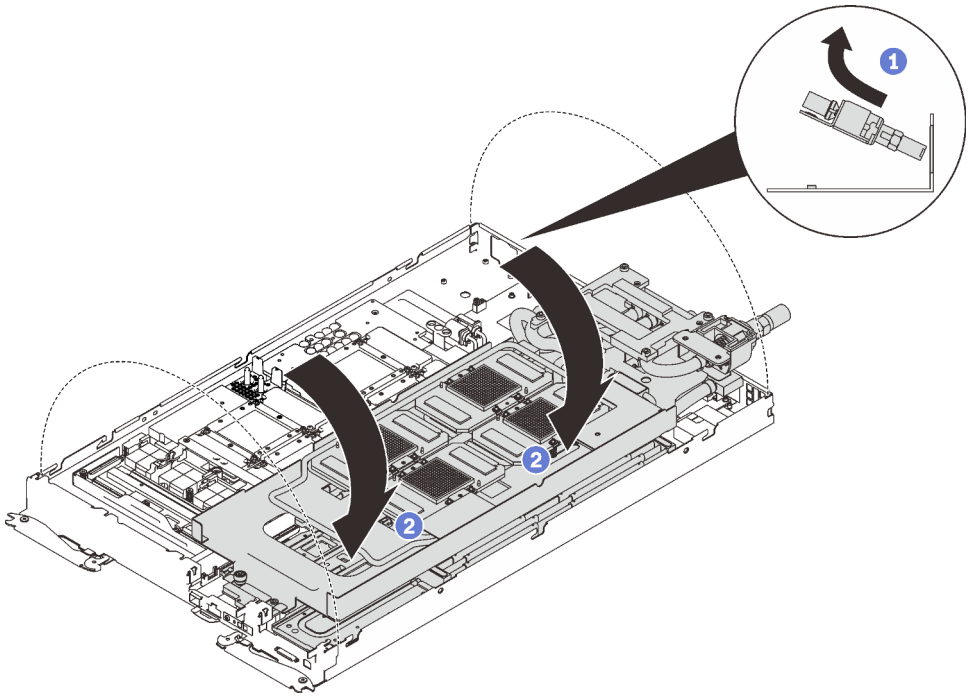


Figure 374. Folding the water loop

Step 2. Remove the three Torx T10 screws with a torque screwdriver sets to the proper torque.

Note: For reference, the torque required for the screws to be fully tightened/removed is 0.5-0.6 newton-meters, 4.5-5.5 inch-pounds.

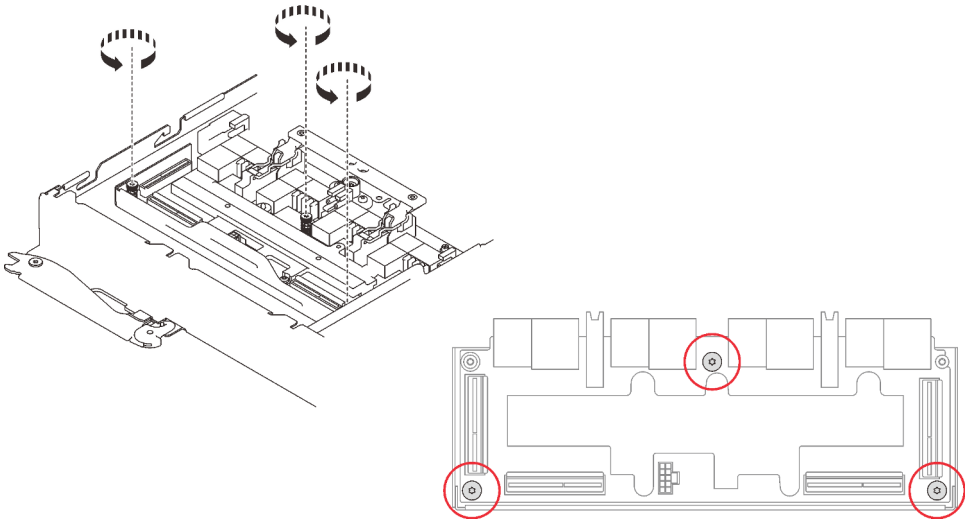


Figure 375. Retimer board removal

Step 3. Remove the retimer board.

a. ❶ Rotate the release handle.

b. ❷ Remove securing clips out of slots on the retimer board.

c. ❸ Pull the retimer board slightly to disconnect it from the GPU borad, then, remove the retimer board out of the node.

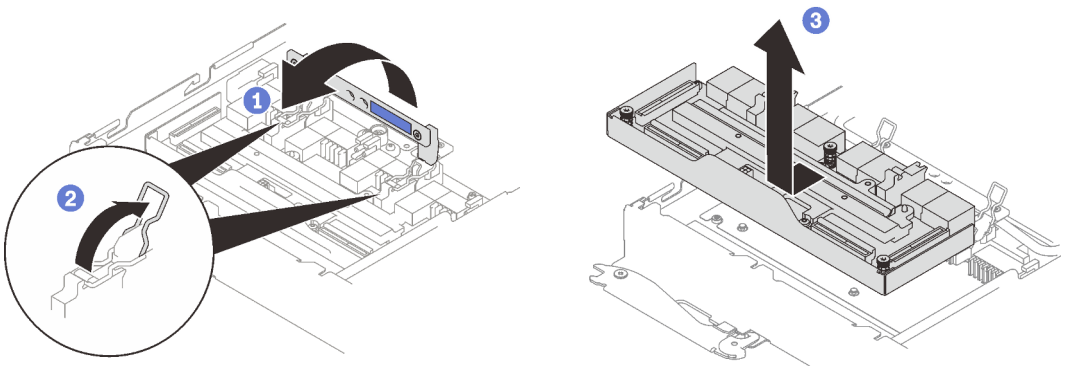


Figure 376. Retimer board removal

After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

Watch the procedure on YouTube

Install the retimer board

Use this information to install the retimer board.

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- A torque screwdriver is available for request if you do not have one at hand.

Note: Ensure you have “SD650 V2 or SD650-N V2 Neptune® DWC Waterloop Service Kit “ in hand to install components.

Procedure

Step 1. If the gap pad located on the retimer board is damaged or missing, replace it with the new one.

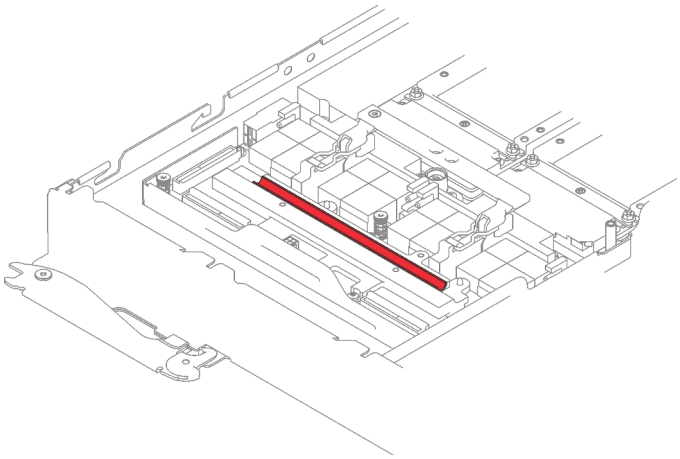


Figure 377. Gap pad on the retimer board

Step 2. Place the retimer board into the node and slightly push it to connect the GPU board.

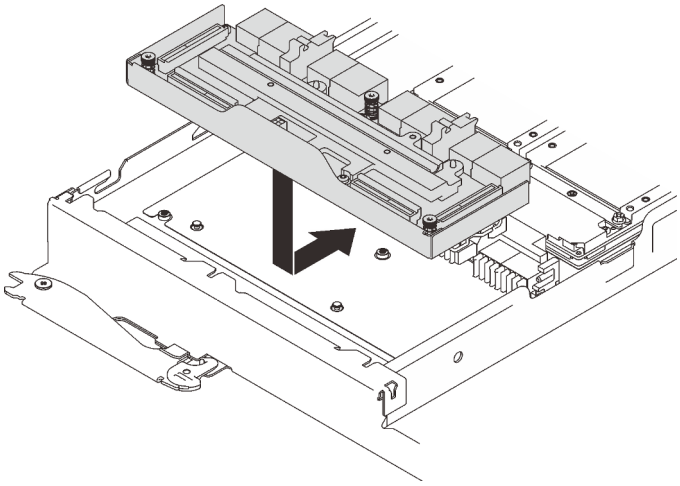


Figure 378. Retimer board installation

Step 3. Place securing clips into the slots and rotate the release handle down.

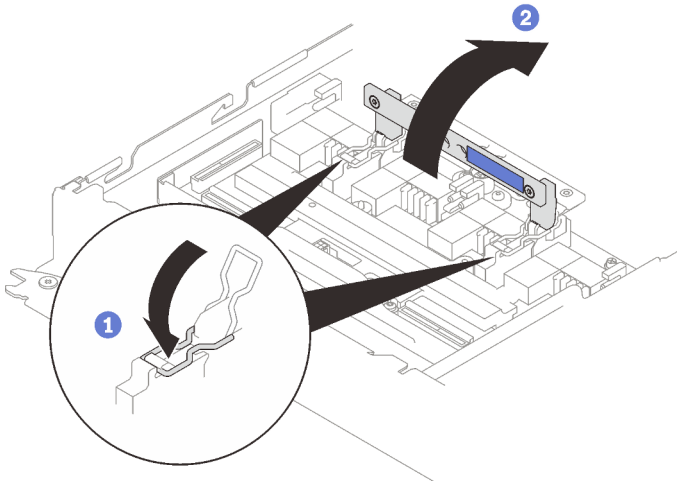


Figure 379. Rotating the handle

Step 4. Install the three screws to secure the retimer board.

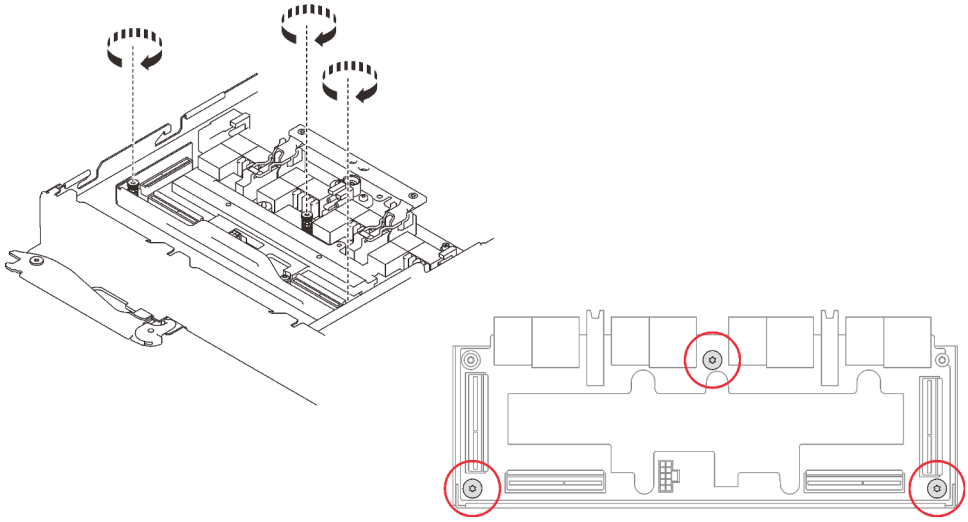


Figure 380. Retimer board installation

Step 5. Apply the new thermal grease on GPUs.

a. If there is any old thermal grease on four GPUs and the cold plates, gently clean the top of the four GPUs and the cold plates using an alcohol cleaning pad.

b. If you have cleaned the top of the GPUs with an alcohol cleaning pad, make sure to apply the new thermal grease after the alcohol has fully evaporated.

c. Apply gray thermal grease to the top of the four GPUs with a syringe by forming four dots spaced as shown below, with each dot consisting of about 0.5 gram (about 0.225 ml) of gray thermal grease. Each syringe contains 1 gram of thermal grease, sufficient for two dots of thermal grease.

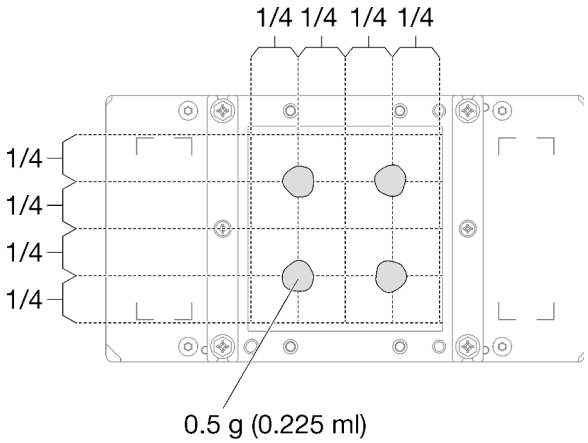


Figure 381. Thermal grease application

Step 6. Replace the existing putty pad with the new one.

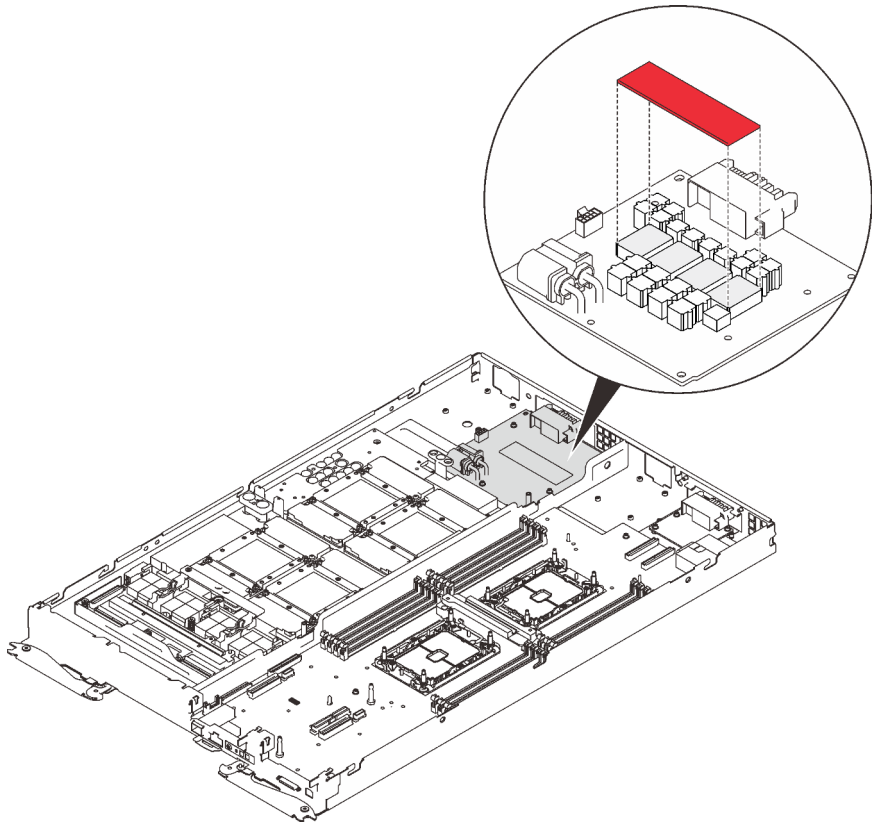


Figure 382. Putty pad

Step 7. Check the gap pads on the water loop, if any of them are damaged or missing, replace them with the new ones.

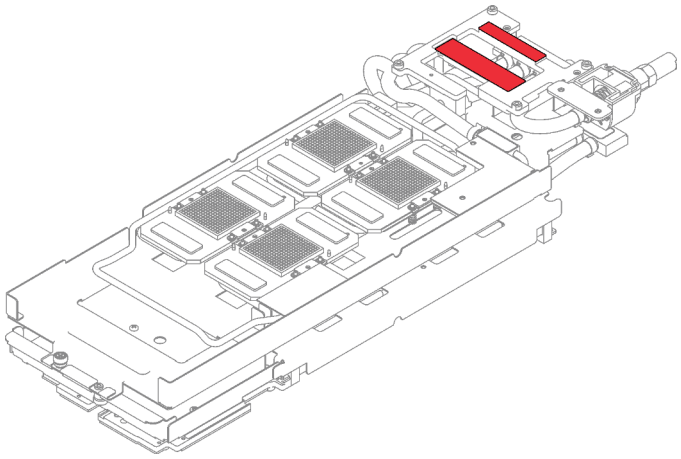


Figure 383. Gap pads on the water loop

Step 8. Reinstall the water loop.

a. ❶ Carefully rotate the top side of the water loop.

b. ❷ Carefully insert the quick connect into the tray opening as shown.

c. ❸ Carefully align the water loop with eight guide pins on four GPU cold plates; then, gently put the water loop down and ensure it is firmly seated on the GPU board.

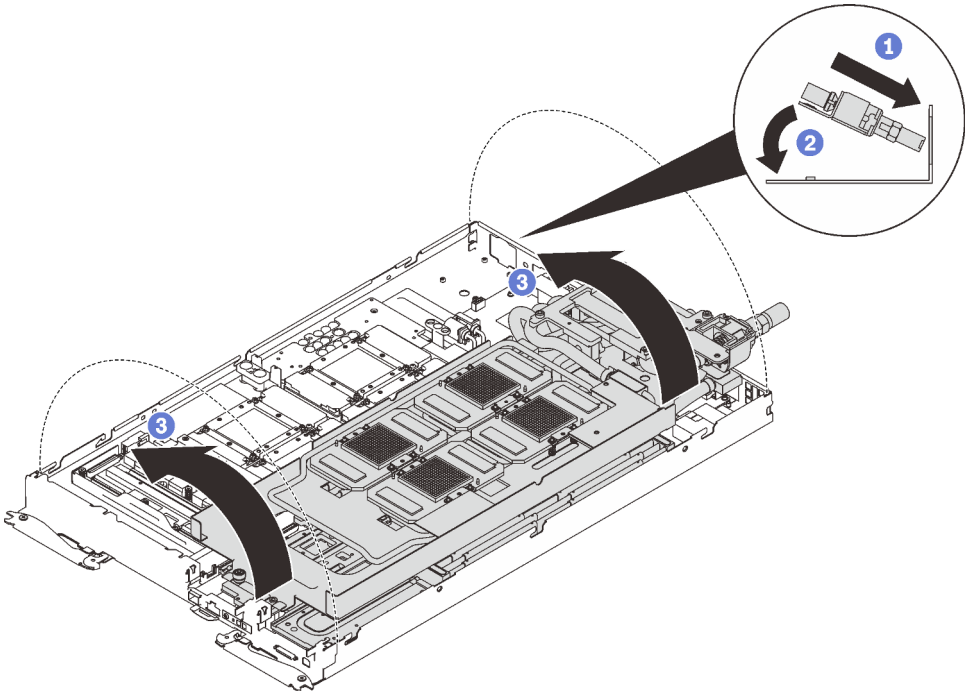


Figure 384. Water loop installation

Step 9. Loosen all water loop carrier screws (15x Phillips #2 screws).

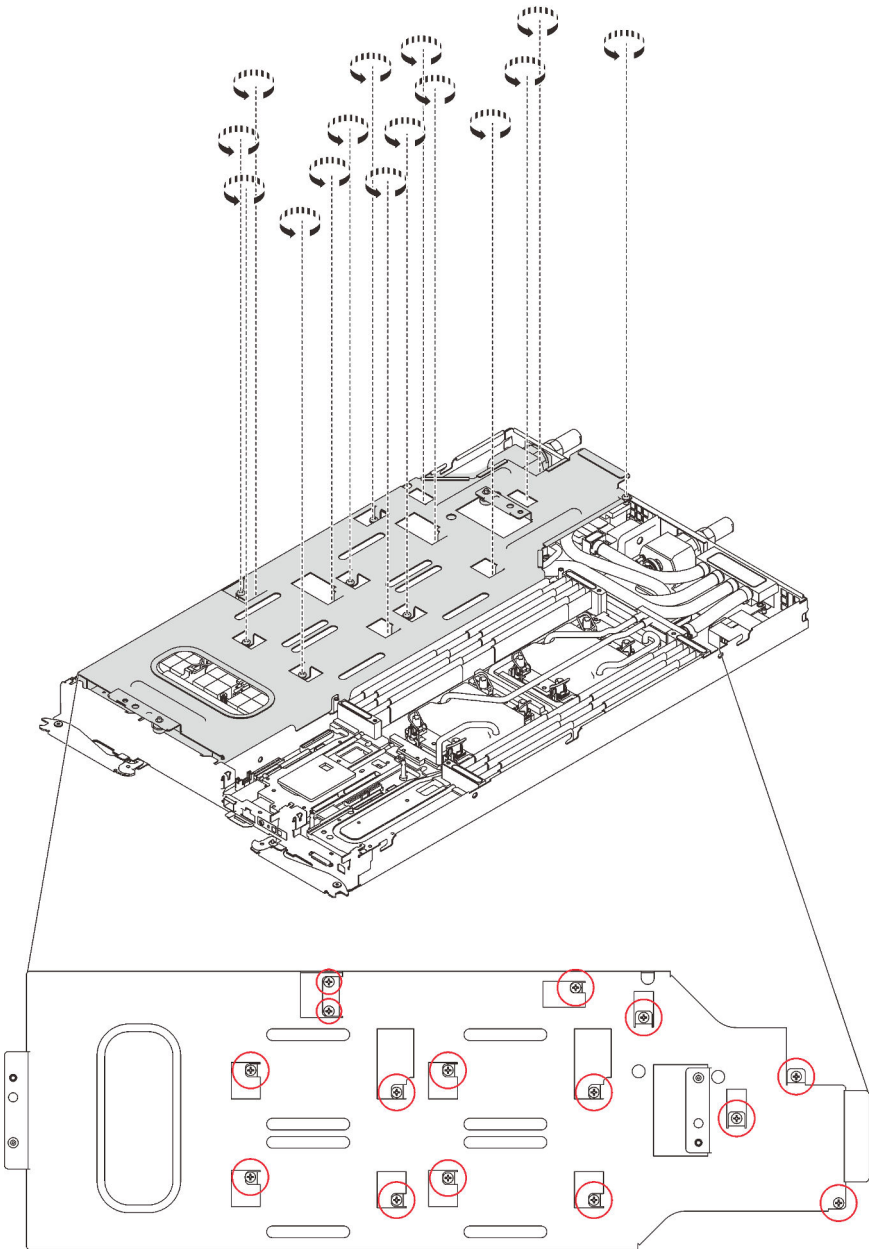


Figure 385. Loosening water loop carrier screws

Step 10. Carefully lift the water loop carrier up and away from the water loop.

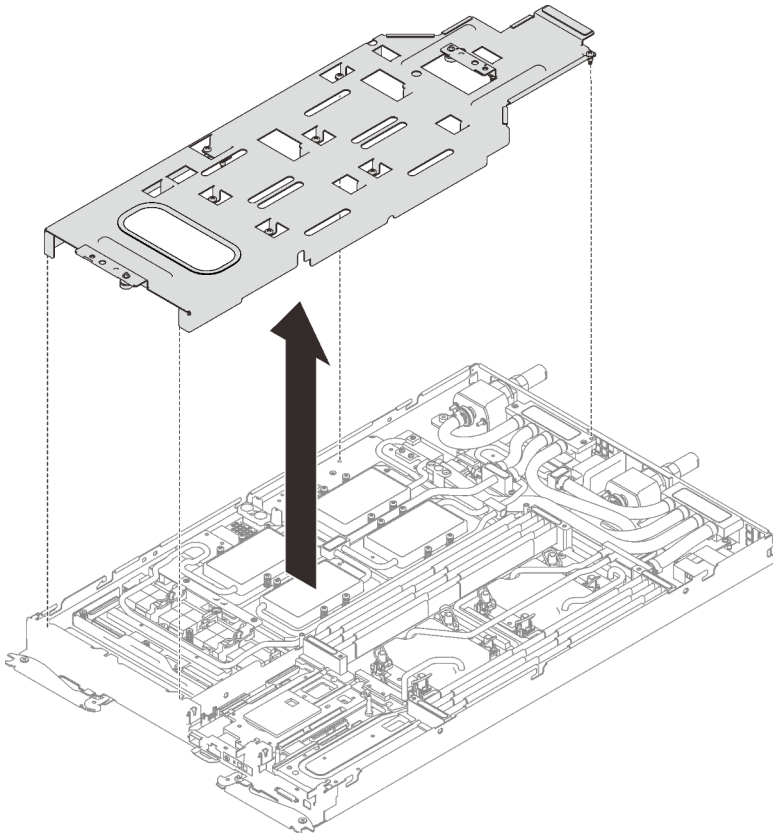


Figure 386. Water loop carrier removal

Step 11. Reinstall water loop screws (7x Torx T10 screws) with a torque screwdriver sets to the proper torque.

Note: For reference, the torque required for the screws to be fully tightened/removed is 0.5-0.6 newton-meters, 4.5-5.5 inch-pounds.

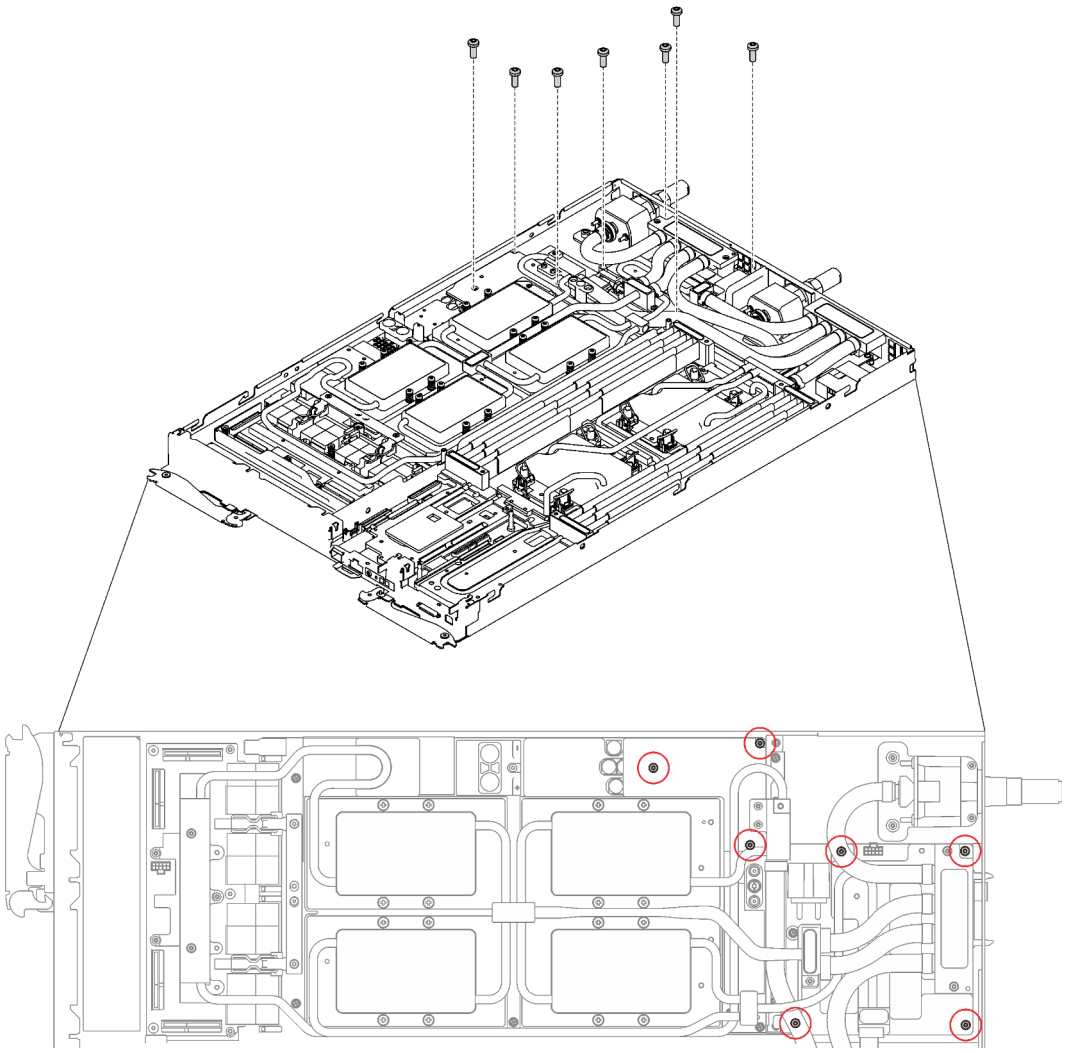


Figure 387. Water loop screws installation

Step 12. Reinstall GPU cold plate screws (4x Phillips #1 screws per GPU cold plate, total of 16x Phillips #1 screws) with a torque screwdriver set to the proper torque. For reference, the torque required for the screws to be fully tightened/removed is 0.34-046 newton-meters, 3-4 inch-pounds.

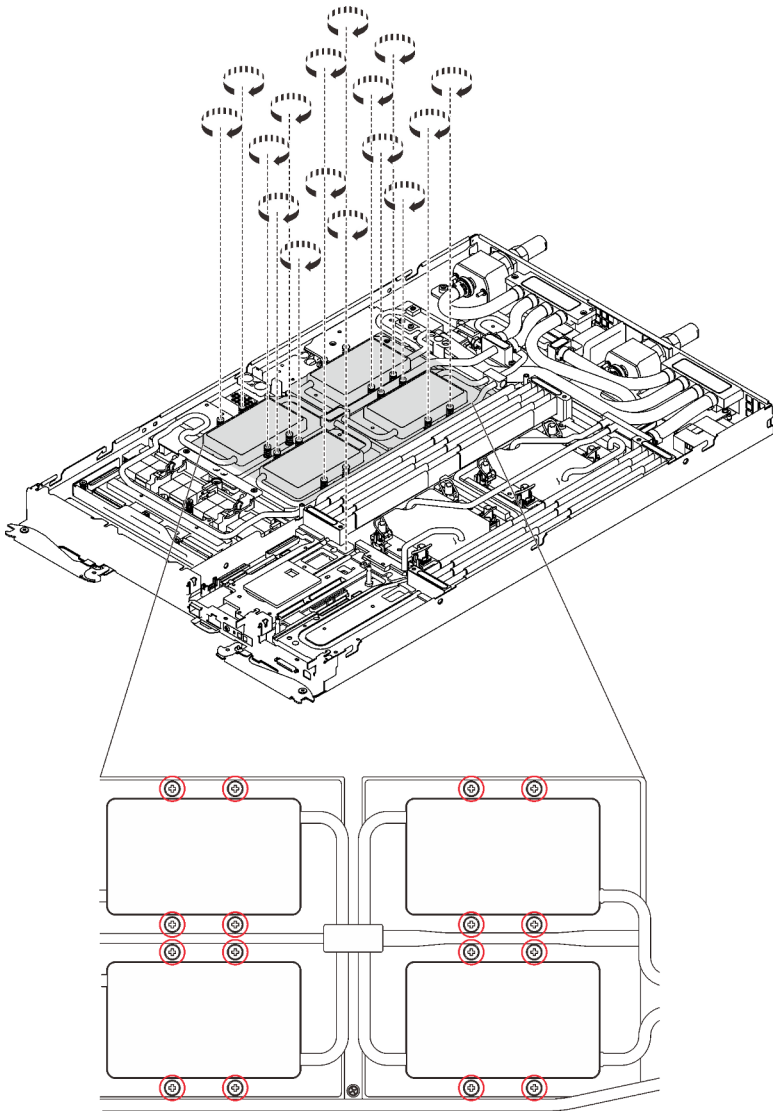


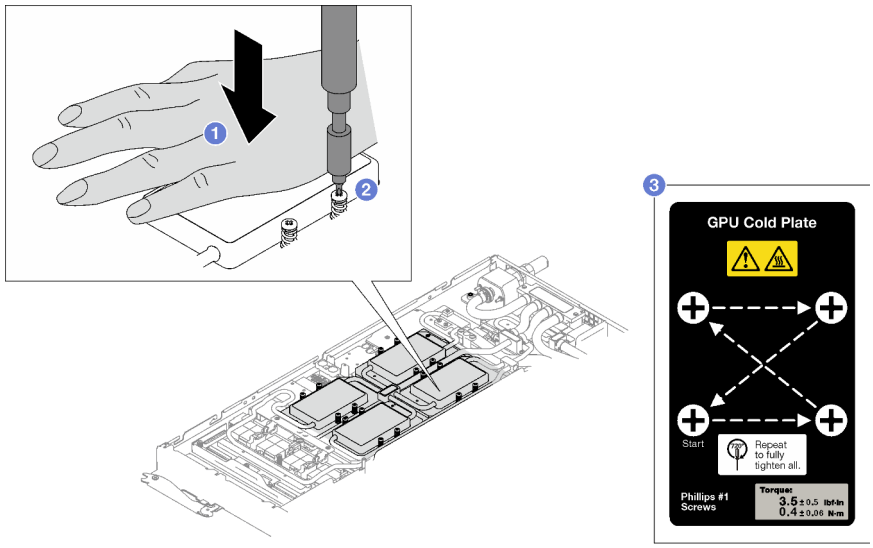
Figure 388. GPU cold plate screws installation

a. 1 Push down the GPU cold plate with your palm to reduce the gap between the GPU cold plate and the GPU.

b. 2 Press the torque screwdriver against the screw so that the screw is engaged with the GPU.

c. 3 Follow the screw sequence specified on the GPU cold plate label, and fasten each screw for 720 degrees with a torque screwdriver set to the proper torque.

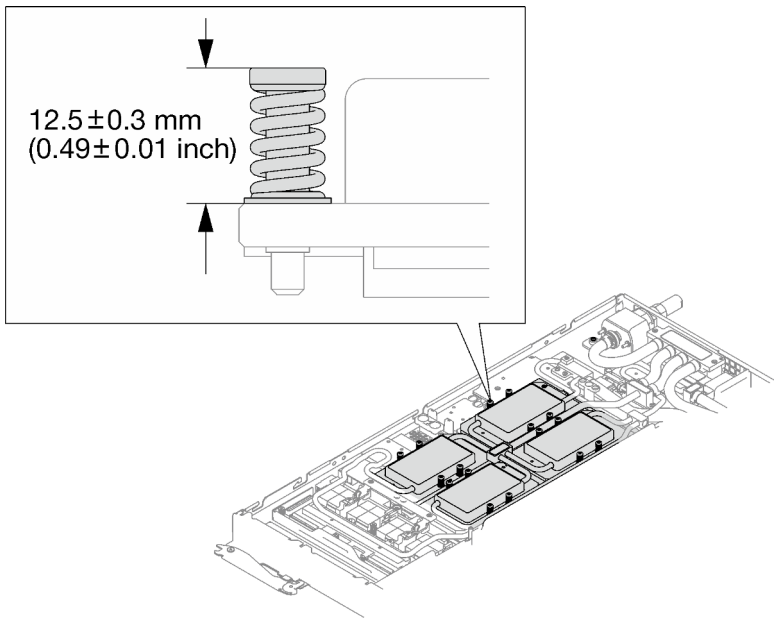
Note: For reference, the torque required for the screws to be fully tightened/removed is 0.46–0.34 newton-meters, 4–3 inch-pounds.



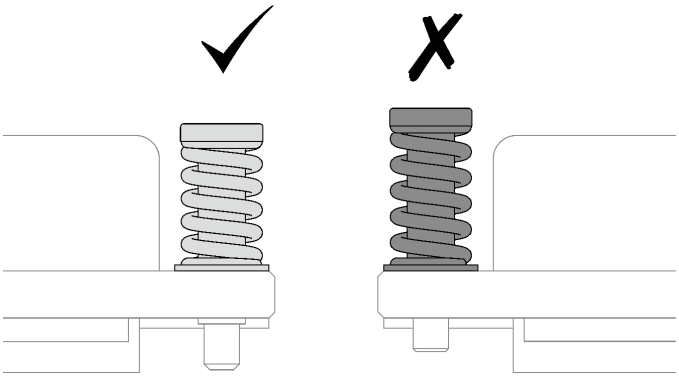
d. 4 Make sure that the GPU cold plate is lowered into the node and its surface is flat without tilting. If the GPU cold plate is tilted, unfasten the screws, and repeat Step 1 to Step 3.

e. 5 Repeat Step 3 until the screws are fully tightened.

f. 6 Make sure the height of each screw is 12.5±0.3 millimeter (0.49±0.01 inch) and is fully compressed. If not, repeat the GPU cold plate installation steps.



Note: Inspect the screws to make sure they are fully compressed.



Step 13. Reinstall the four Torx T10 screws (per node) to secure the quick connect.

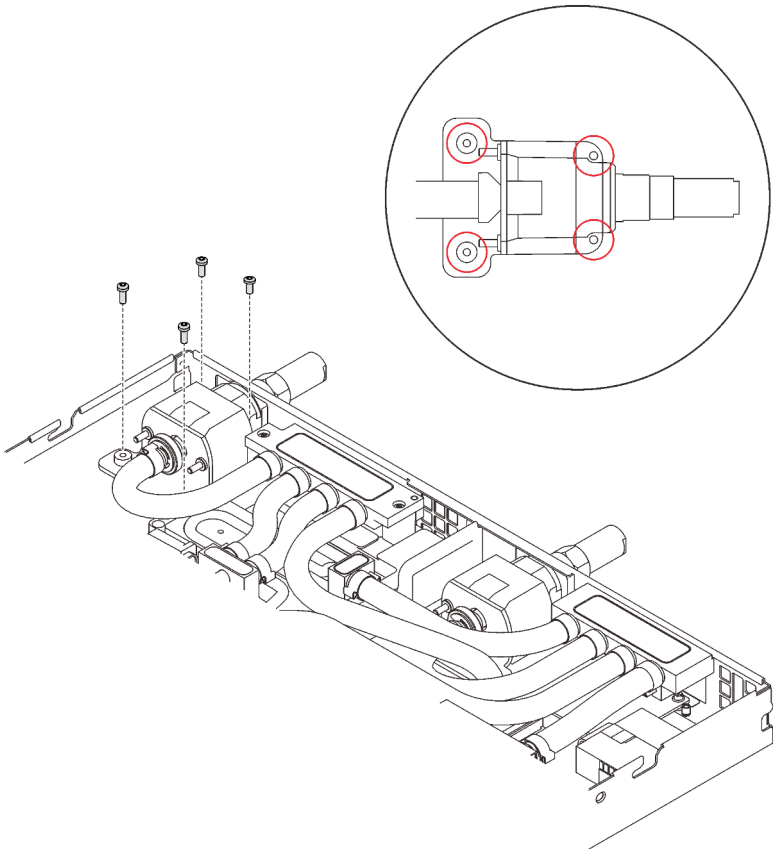


Figure 389. Screws installation

Step 14. Reinstall the clamp plate or the drive depending on your configuration.

- Clamp plate installation: Install the two screws to secure the clamp plate.

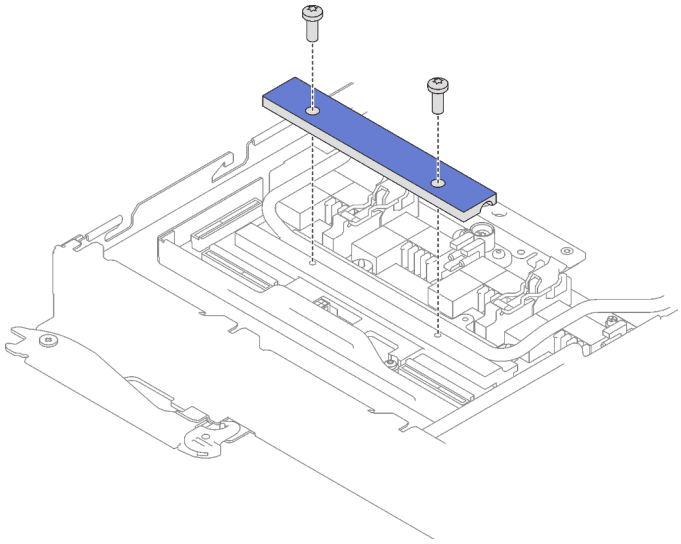


Figure 390. Clamp plate installation

- Drive installation: see “Install the drive in the GPU node” on page 291.

Step 15. Remove the connector cover if necessary.

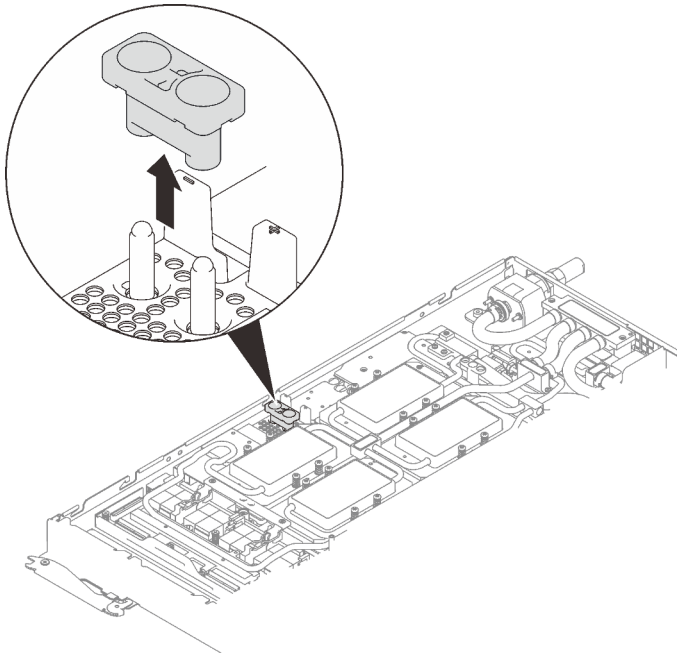


Figure 391. Connector cover removal

Step 16. Connect GPU power cable.

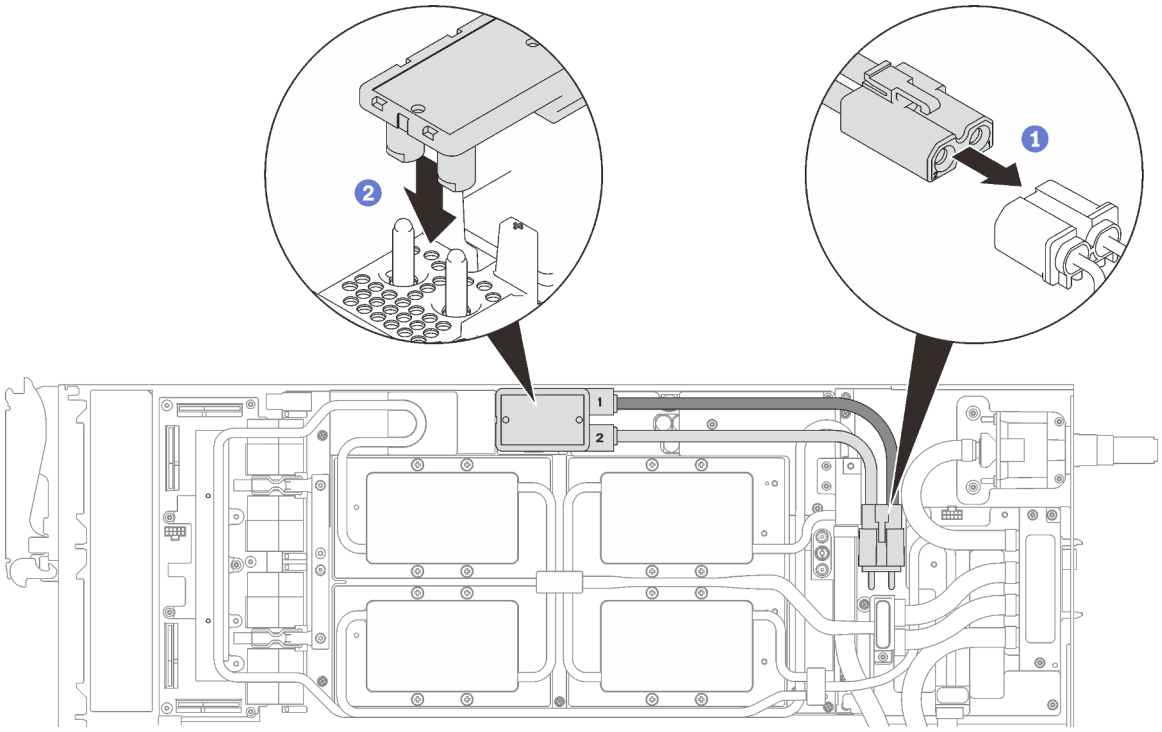


Figure 392. GPU power cable installation

Step 17. See “Cable installation order” on page 35 to connect and route required cables accordingly.

After you finish

1. Reinstall the front and the rear cross braces (14x Phillips #1 screws).

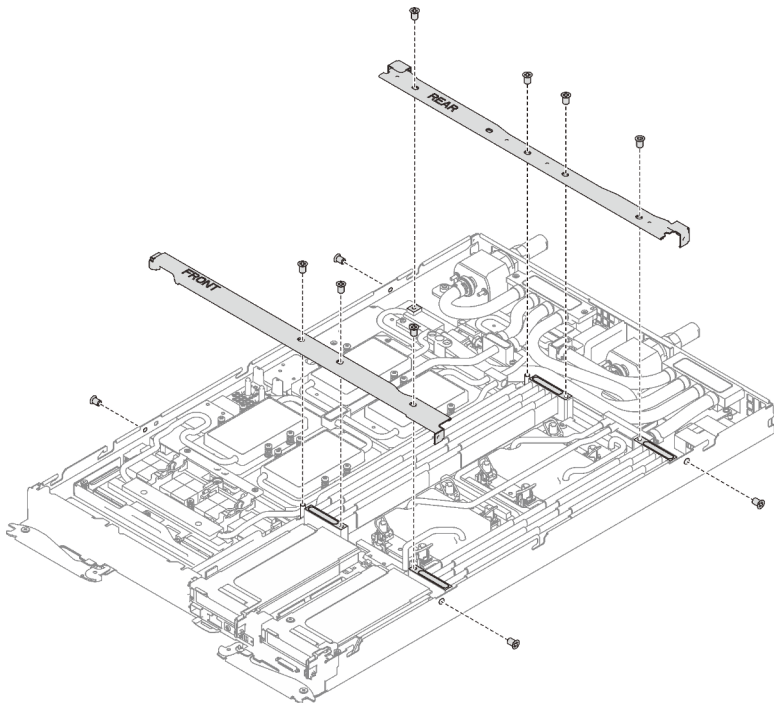


Figure 393. Cross brace installation

2. Reinstall the tray cover (see “Install the tray cover” on page 153).
3. Reinstall the tray (see “Install a DWC tray in the enclosure” on page 150).

   Note: For safety, use the lift tool to install the tray into the rack.
4. Connect all required external cables to the enclosure.

   Note: Use extra forces to connect QSFP cables to the enclosure if Mellanox ConnectX-6 adapters are installed.
5. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

Watch the procedure on YouTube

Water loop (SD650-N V2 tray) replacement

Use the following procedures to remove and install the water loop in SD650-N V2 tray.

Attention:

- The water loop replacement procedure requires trained personnel.
- For your safety, use lift tool to remove the tray from the enclosure.

Remove the water loop in SD650-N V2 tray

Use this information to remove the water loop in SD650-N V2 tray.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.
- A torque screwdriver is available for request if you do not have one at hand.
- To avoid damaging the water loop, always use the water loop carrier when removing, installing or folding the water loop.

Prepare the following screwdrivers to ensure you can install and remove corresponding screws properly.

Screwdriver Type	Screw Type
Torx T10 head screwdriver	Torx T10 screw

Phillips #1 head screwdriver or 3/16" hex head screwdriver	Phillips #1 screw
Phillips #2 head screwdriver	Phillips #2 screw

Procedure

Step 1. Make preparations for this task.

a. Remove the tray (see “Remove a DWC tray from the enclosure” on page 149).

Attention: For safety, use the lift tool to remove the tray from the rack.

b. Remove the tray cover (see “Remove the tray cover” on page 152).

c. Remove the front and the rear cross braces (11x Phillips #1 screws).

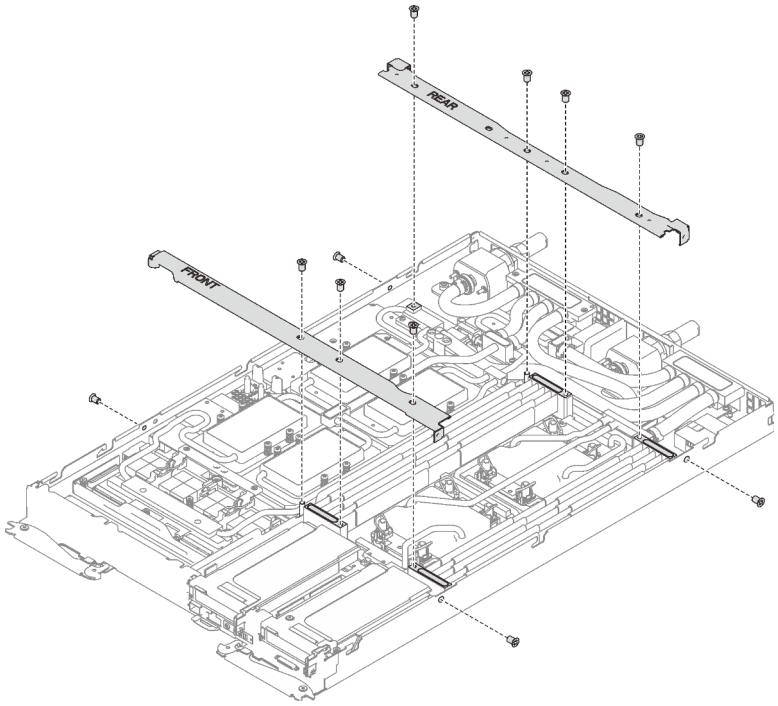


Figure 394. Cross brace removal

d. Remove all DIMM combs (see “Remove a DIMM comb” on page 166).

e. Remove DIMMs from the right node (see “Remove a memory module” on page 159).

f. Remove M.2 Backplanes from the node (see “Remove the M.2 backplane” on page 182).

g. Remove drive cage assemblies from the node if applicable (see “Remove a drive cage assembly” on page 173 and “Remove the drive from the GPU node” on page 289).

h. Remove PCIe riser assemblies from the node if applicable (see “Remove a PCIe adapter” on page 191).

i. Remove the front and the rear cross braces (11x Phillips #1 screws).

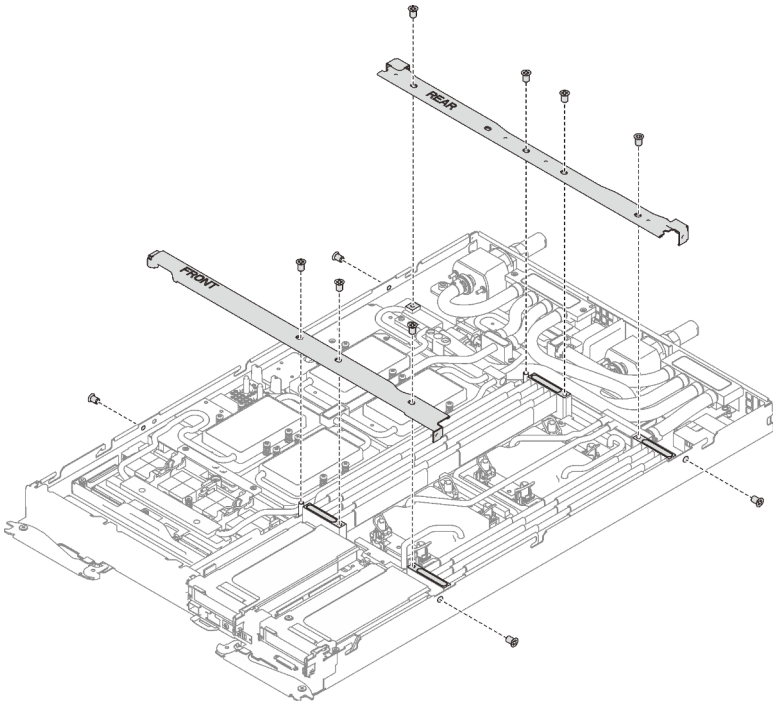


Figure 395. Cross brace removal

j. See “Cable removal order” on page 37 to disconnect cables according to your configuration.

k. Disconnect GPU power cable.

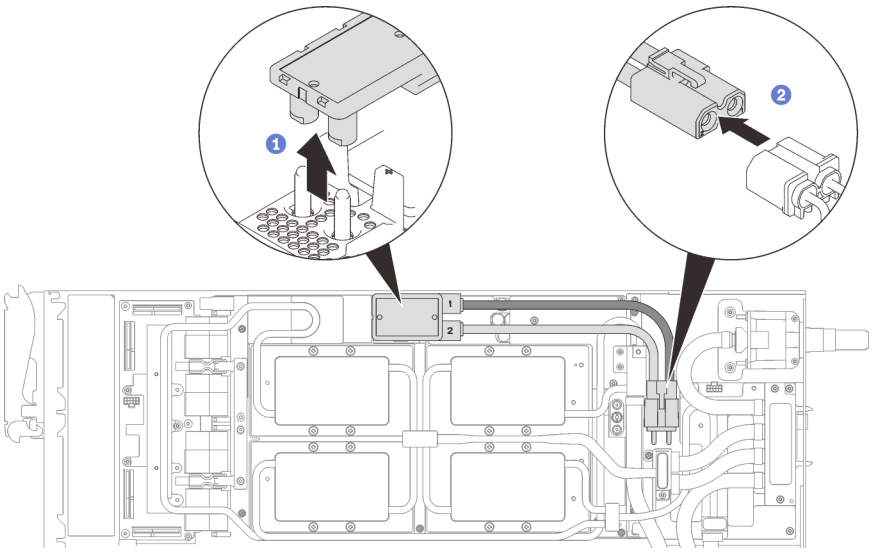


Figure 396. GPU power cable removal

l. Remove the clamp plate or the drive depending on your configuration.

- Clamp plate removal: Remove the two screws to remove the clamp plate.

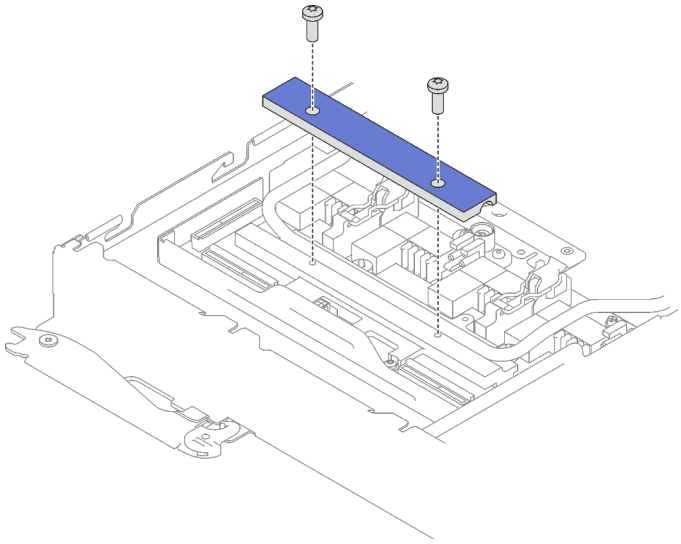


Figure 397. Clamp plate removal

- Drive removal: see “Install the drive in the GPU node” on page 291.

Step 2. Remove water loop screws (19x Torx T10 screws for two nodes) with a torque screwdriver sets to the proper torque.

Note: For reference, the torque required for the screws to be fully tightened/removed is 0.5-0.6 newton-meters, 4.5-5.5 inch-pounds.

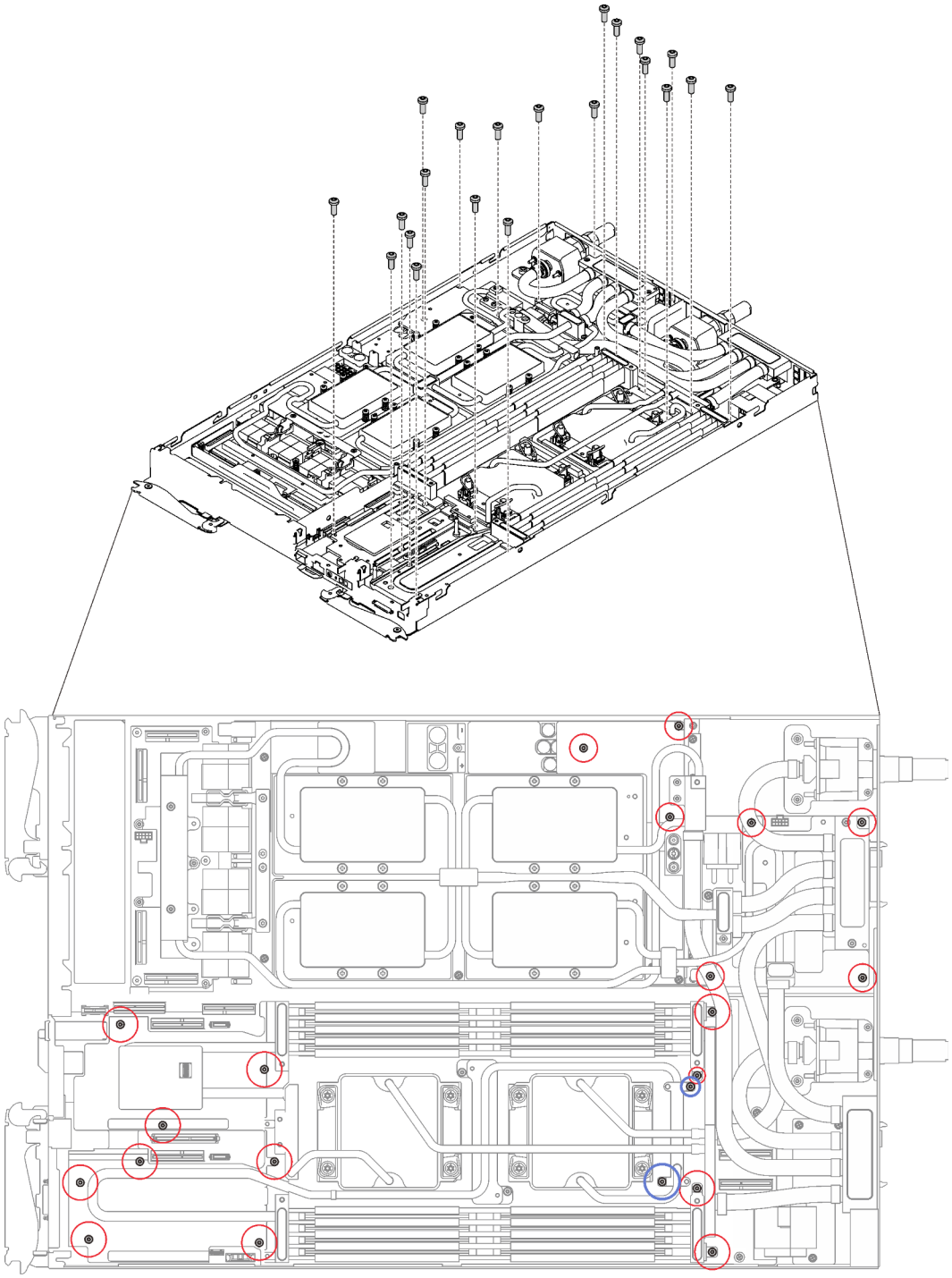


Figure 398. Water loop screws removal

Step 3. Remove GPU cold plate screws (16x Phillips #1 screws) with a torque screwdriver sets to the proper torque.

Note: For reference, the torque required for the screws to be fully tightened/removed is 0.34-046 newton-meters, 3-4 inch-pounds.

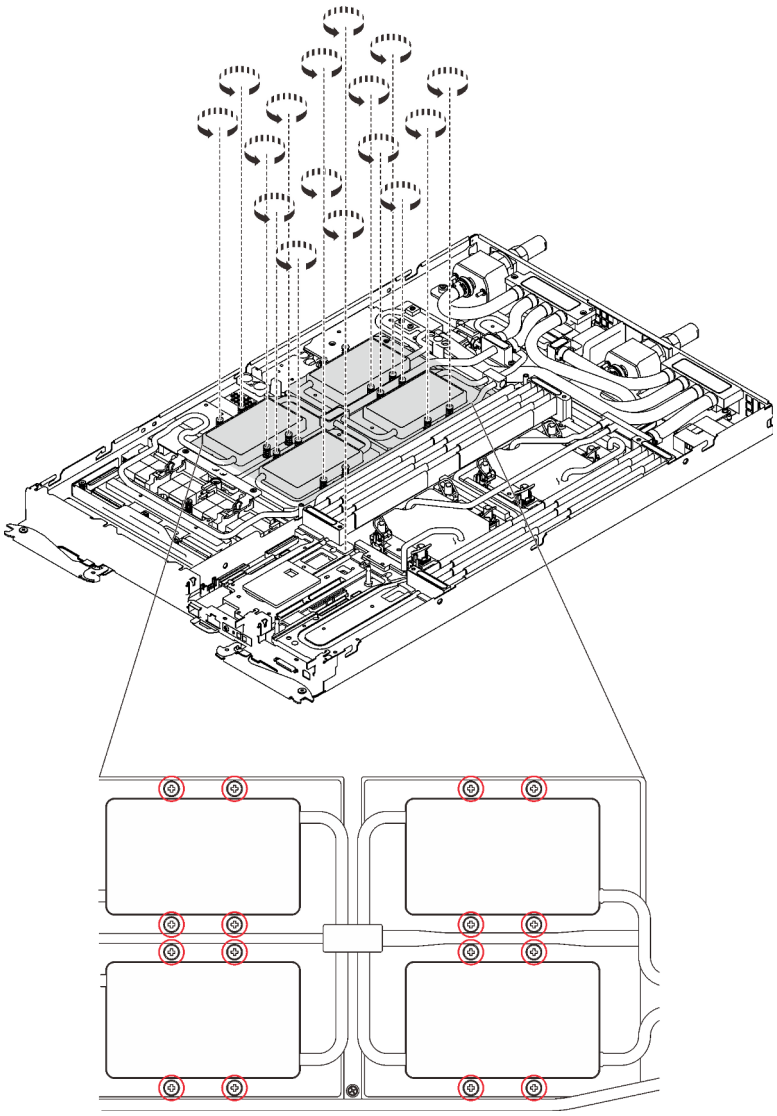


Figure 399. GPU cold plate screws removal

Step 4. Remove the following screws to loosen the quick connect.

- Eight Torx T10 screws to loosen the quick connect.
- Two Phillips #1 screws on the rear of the node.

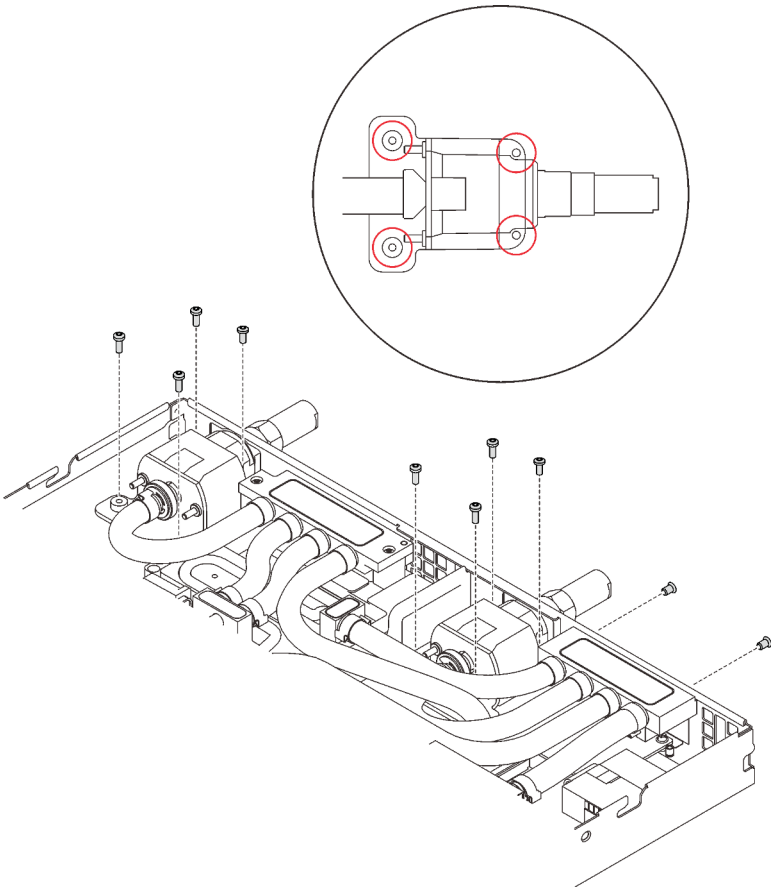


Figure 400. Screws removal

Step 5. Loosen processors properly.

a. ❶ Fully loosen eight Torx T30 captive screws on cold plates with a general screwdriver until they stop in the removal sequence shown on the cold plate label.

Note: For reference, the torque required for the screws to be fully tightened/removed is 1.1-1.15 newton-meters, 9.8-10.2 inch-pounds.

Attention: To prevent damage to components, make sure that you follow the indicated loosening sequence.

b. ❷ Rotate eight anti-tilt wire bails inwards to the unlocked position.

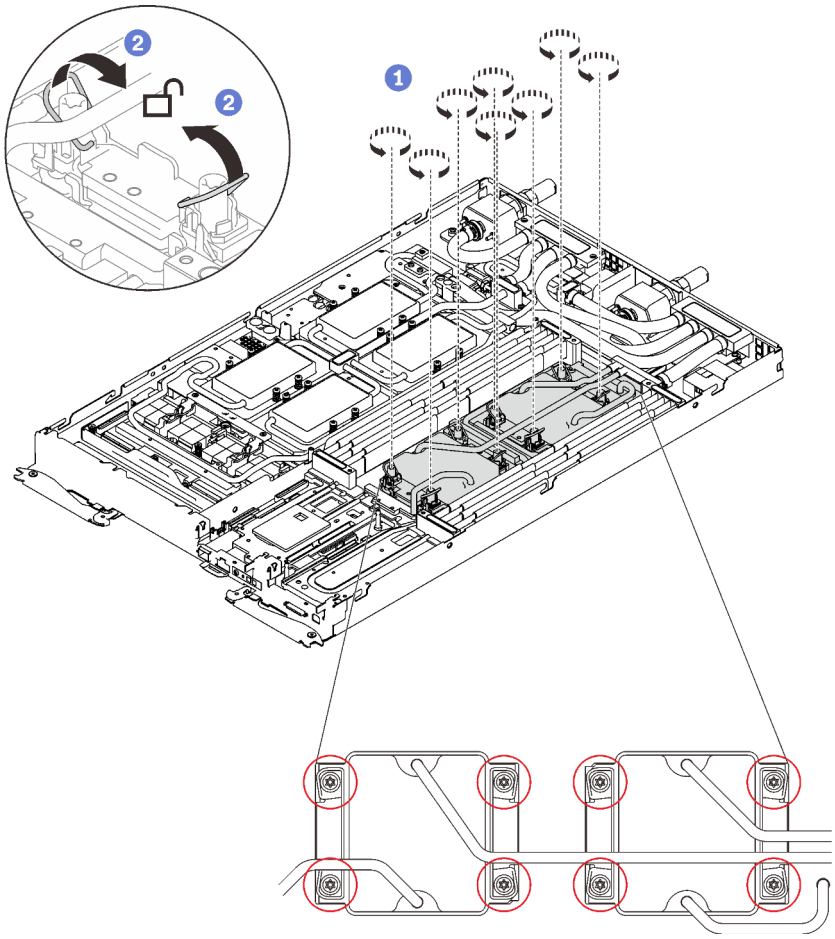


Figure 401. Loosening Torx T30 captive screws

Step 6. Orient two water loop carriers with the guide pins; then, gently put two water loop carriers down and ensure they are seated firmly on the water loop.

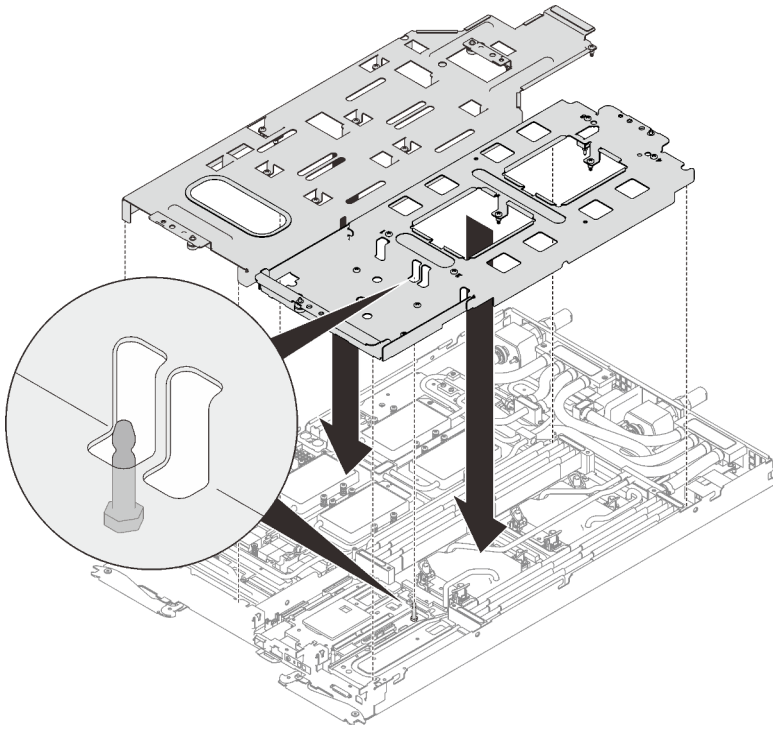


Figure 402. Water loop carrier installation

Step 7. Tighten water loop carrier screws (27x Phillips #2 screws for two nodes).

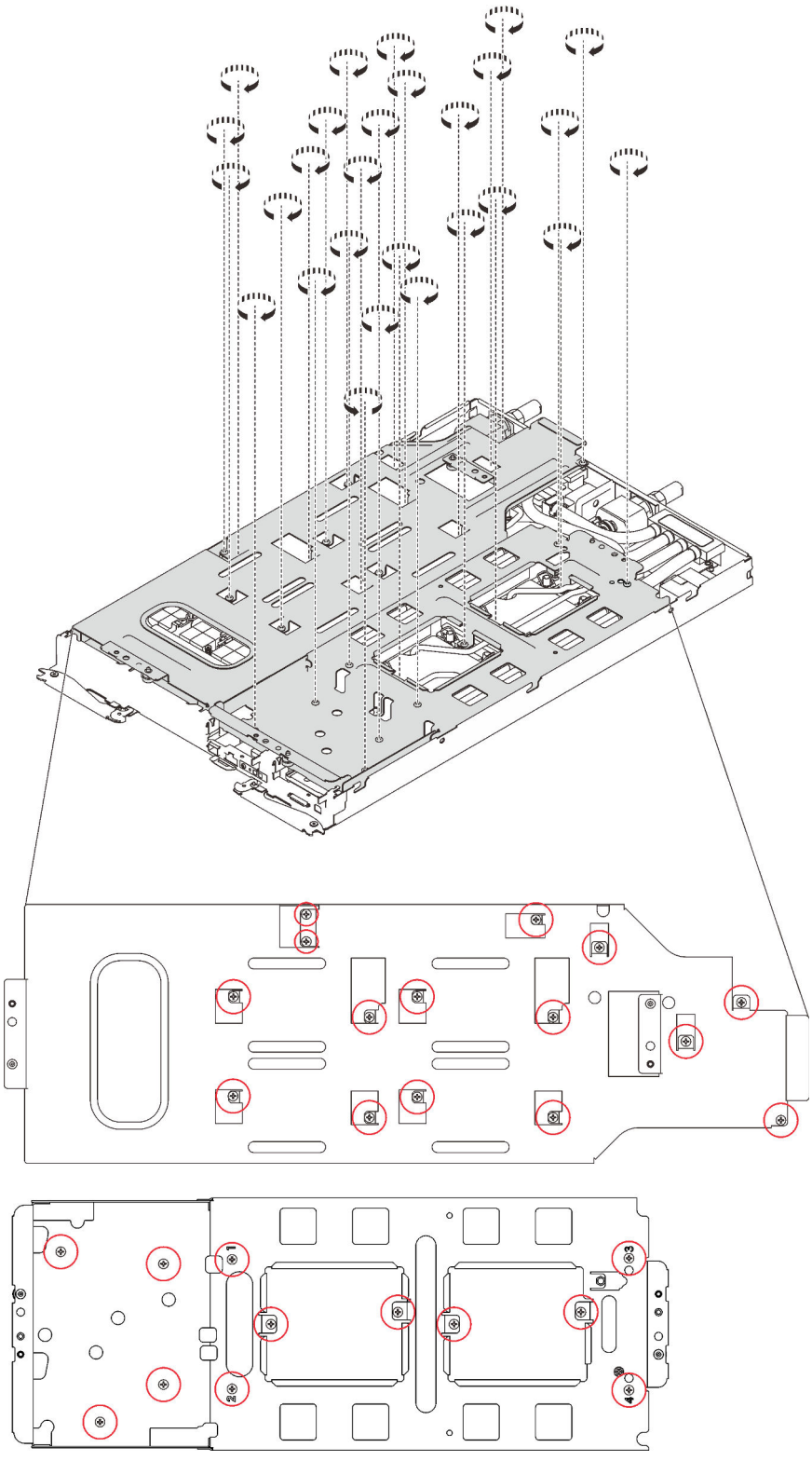


Figure 403. Water loop carrier screws installation

Step 8. Fold the water loop.

1. ❶ Carefully unhook the quick connect and slide it out of the opening in the rear of the tray; then, lift the water loop up off the system board.

2. ❷ Carefully rotate the water loop so one half is sitting on top of the other half.

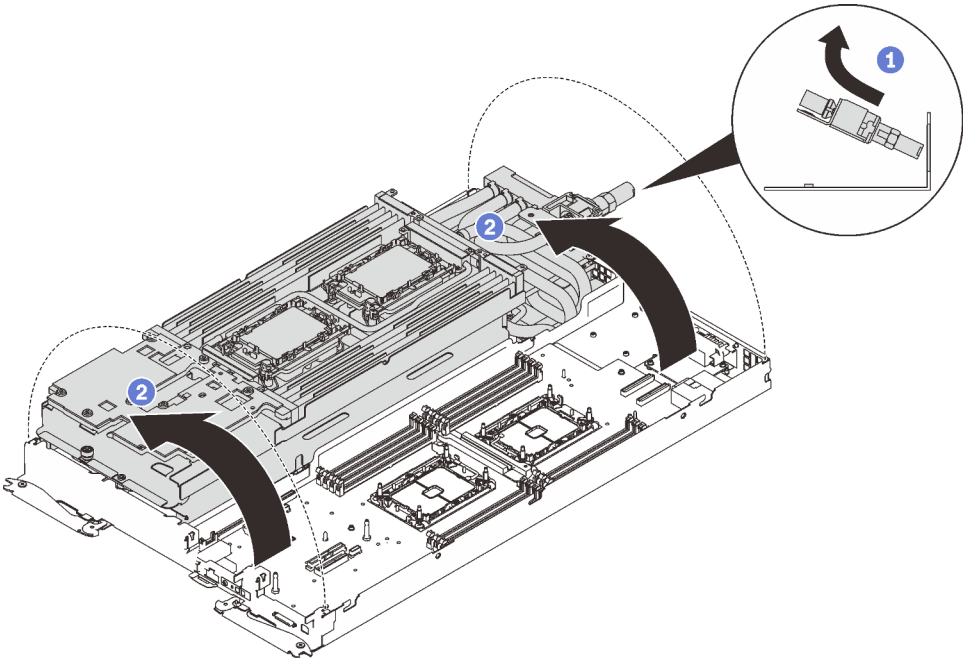


Figure 404. Folding the water loop

Step 9. Fasten two captive thumbscrews to secure water loop carriers to each other.

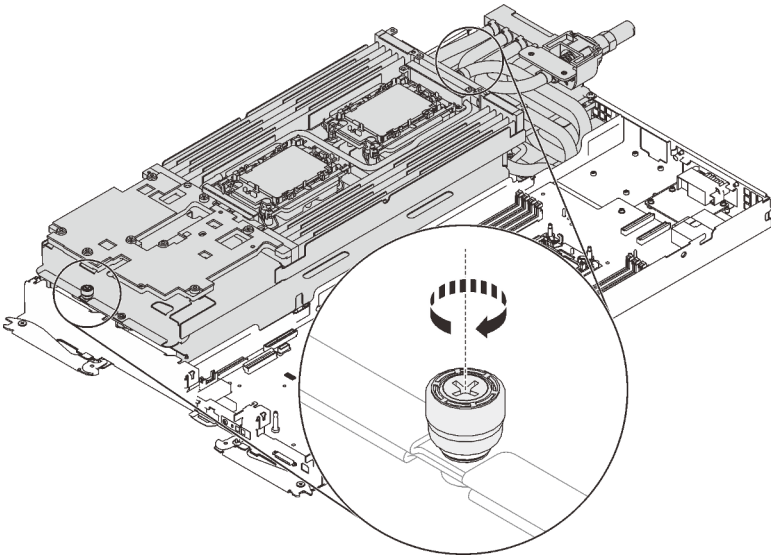


Figure 405. Tightening captive thumbscrews

Step 10. Remove the water loop.

a. Carefully lift the water loop up off the system board.

b. Unhook the quick connect from the four alignment posts and slide the quick connect out of the opening in the rear of the tray.

c. Lift the water loop out of the node.

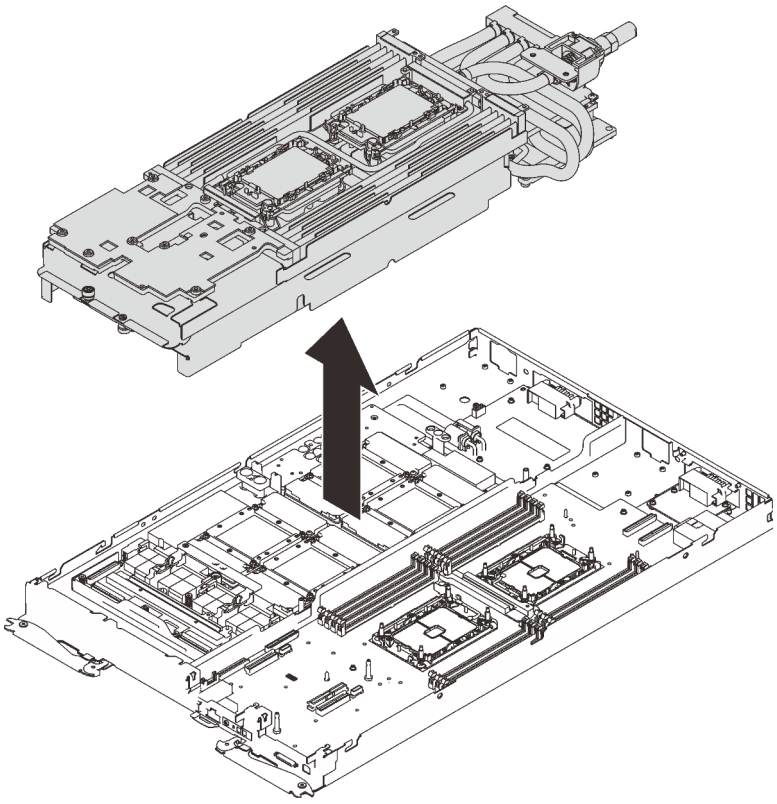


Figure 406. Water loop removal

After you finish

If you are instructed to return the component or optional device, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Demo video

Watch the procedure on YouTube

Install the water loop in SD650-N V2 tray

Use this information to install the water loop in SD650-N V2 tray.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 51
  - “Safety inspection checklist” on page 52
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.

- A torque screwdriver is available for request if you do not have one at hand.
- To avoid damaging the water loop, always use the water loop carrier when removing, installing or folding the water loop.

Note: Ensure you have “SD650 V2 or SD650-N V2 Neptune® DWC Waterloop Service Kit “ in hand to install components.

Prepare the following screwdrivers to ensure you can install and remove corresponding screws properly.

Screwdriver Type	Screw Type
Torx T10 head screwdriver	Torx T10 screw
Phillips #1 head screwdriver or 3/16" hex head screwdriver	Phillips #1 screw
Phillips #2 head screwdriver	Phillips #2 screw

Procedure

Step 1. Install processor retainers onto processors if you need to install processors.

a. Align the triangular mark on the processor retainer with the triangular mark on the processor corner edge.

b. Gently place the processor retainer on the processor; then, carefully press the four sides of the processor retainer to secure the processor.

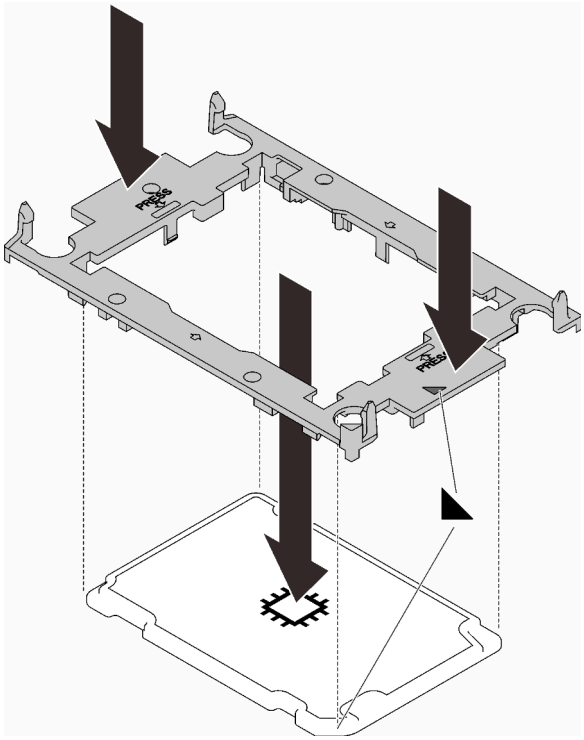


Figure 407. Installing a processor retainer

Step 2. Remove two plastic grease covers if needed.

a. ❶ Use a scissors to cut off tapes.

b. ❷ Remove plastic grease covers from underside of water loop cold plates.

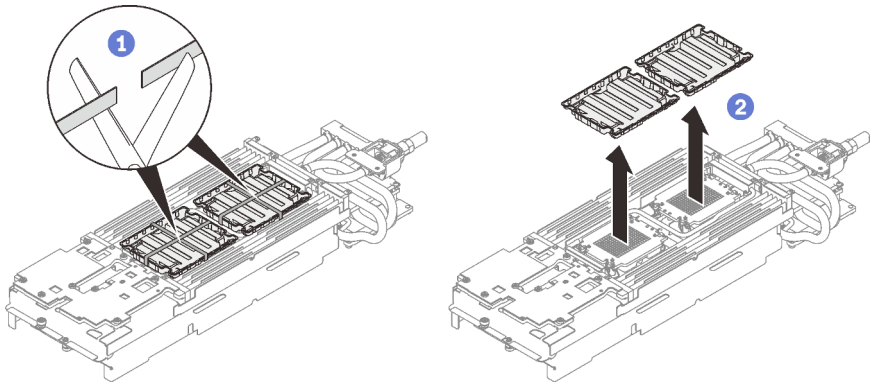


Figure 408. Plastic grease covers removal

Step 3. Align the triangular mark on the processor retainer with the triangular slot on the underside of the water loop cold plate; then, attach the processor to the underside of the water loop cold plate by inserting the processor retainer posts and clips features into the openings at the four corners of the cold plate.

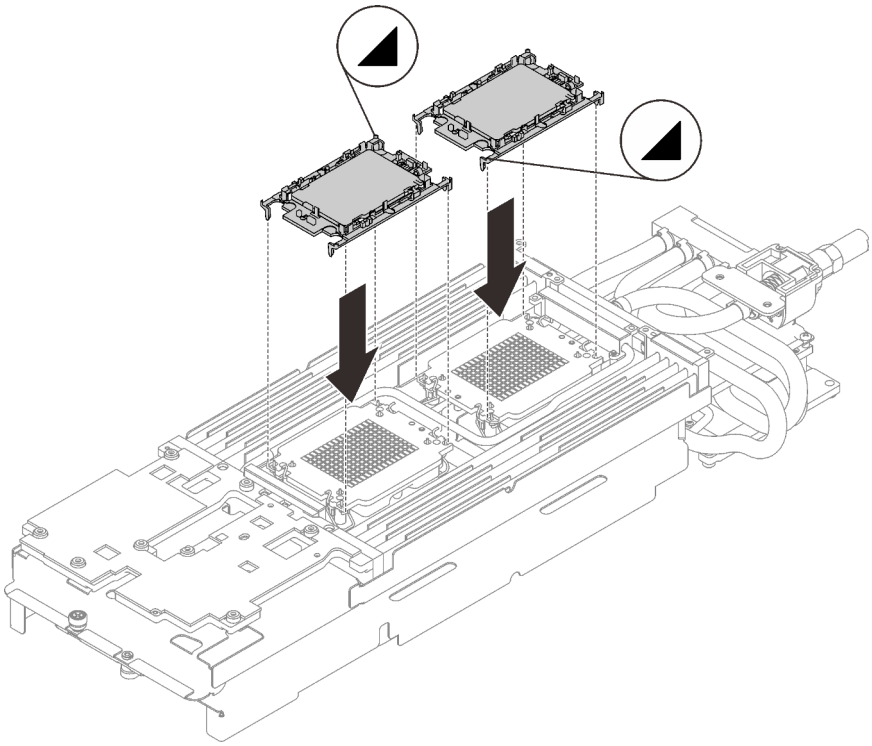


Figure 409. Processor installation

Step 4. Check the gap pads on the water loop, if any of them are damaged or missing, replace them with the new ones.

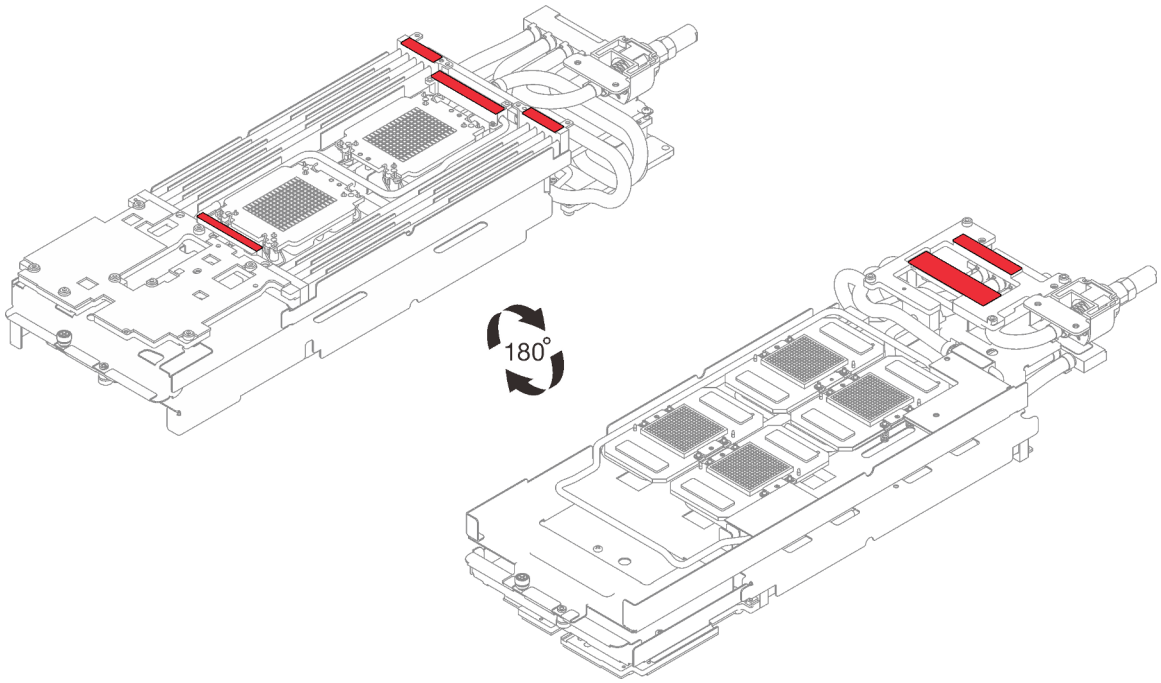


Figure 410. Water loop - Gap pads

Step 5. Rotate eight anti-tilt wire bails outwards to the unlocked position.

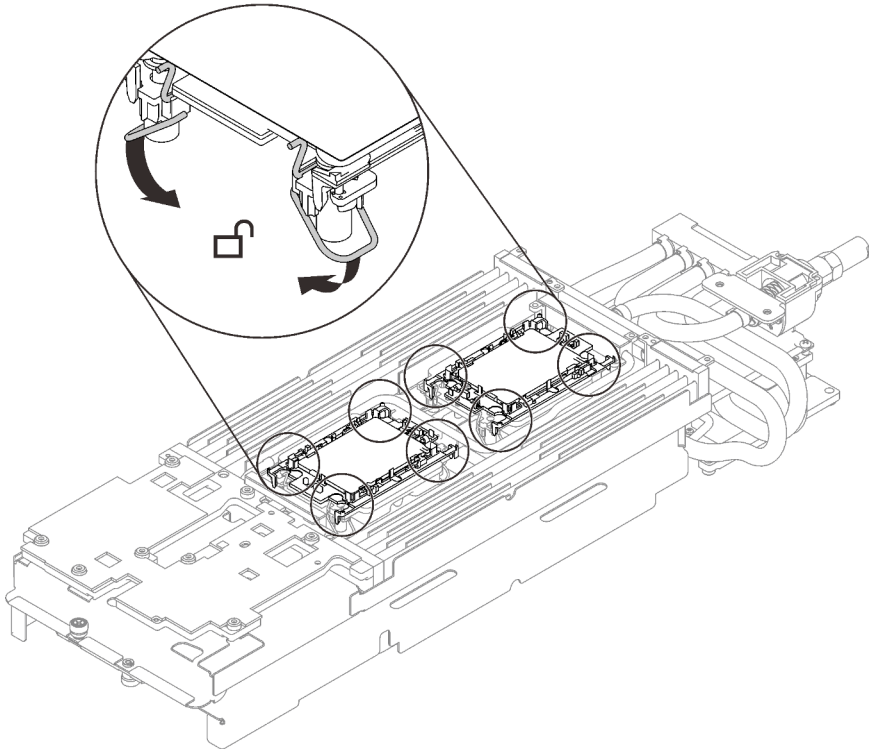


Figure 411. Processor - unlocked position

Step 6. Fully loosen two captive thumbscrews located at each end of the water loop carrier.

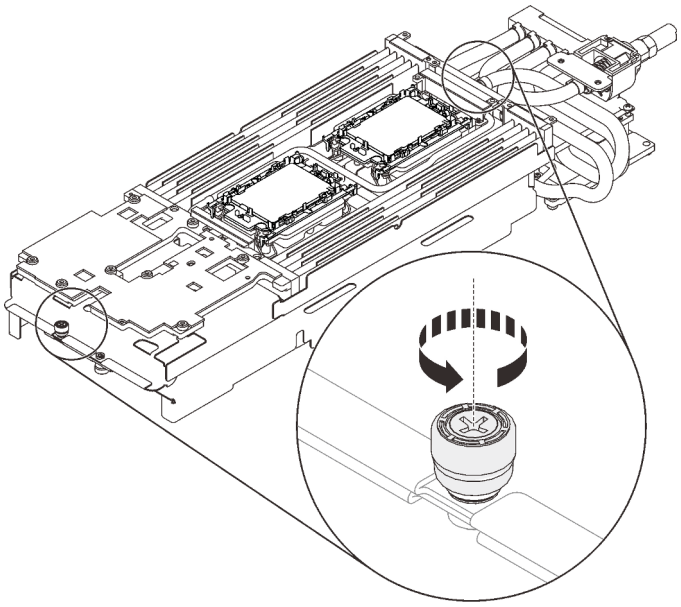


Figure 412. Loosening captive thumbscrews

Step 7. Install the one side of the water loop.

a. ❶ Carefully hold the water loop and flip it.

b. ❷ Carefully align the water loop with eight guide pins on four GPU cold plates; then, carefully insert the quick connect tip through the opening in the rear of the tray.

c. ❸ While holding the water loop with both hands, gently lower down the water loop.

d. ❹ Gently put the water loop down and ensure it is seated firmly on the system board.

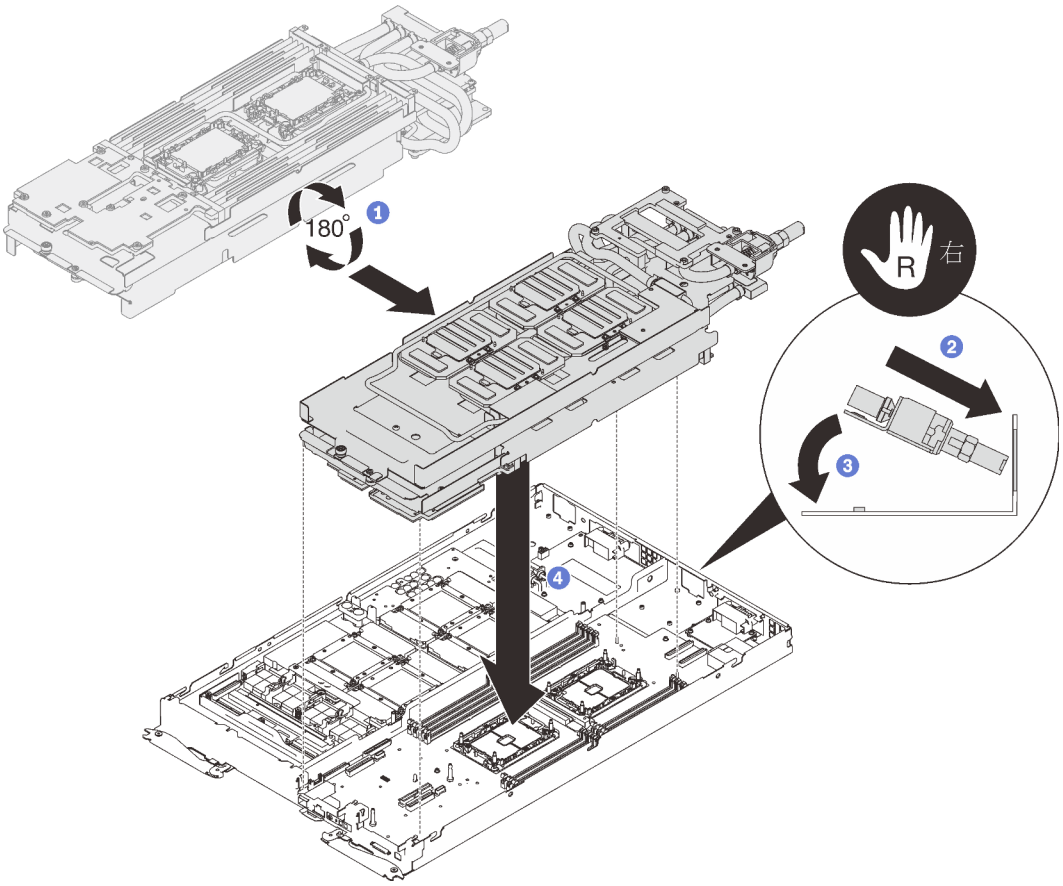


Figure 413. Water loop carrier installation

Step 8. Apply the new thermal grease on GPUs.

a. If there is any old thermal grease on four GPUs and the cold plates, gently clean the top of the four GPUs and the cold plates using an alcohol cleaning pad.

b. If you have cleaned the top of the GPUs with an alcohol cleaning pad, make sure to apply the new thermal grease after the alcohol has fully evaporated.

c. Apply gray thermal grease to the top of the four GPUs with a syringe by forming four dots spaced as shown below, with each dot consisting of about 0.5 gram (about 0.225 ml) of gray thermal grease. Each syringe contains 1 gram of thermal grease, sufficient for two dots of thermal grease.

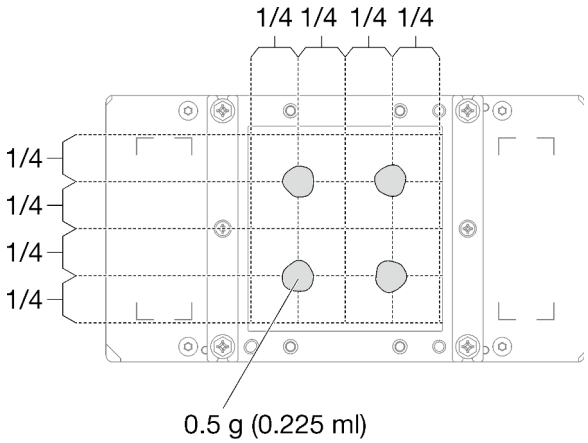


Figure 414. Thermal grease application

Step 9. Replace the existing putty pad with the new one.

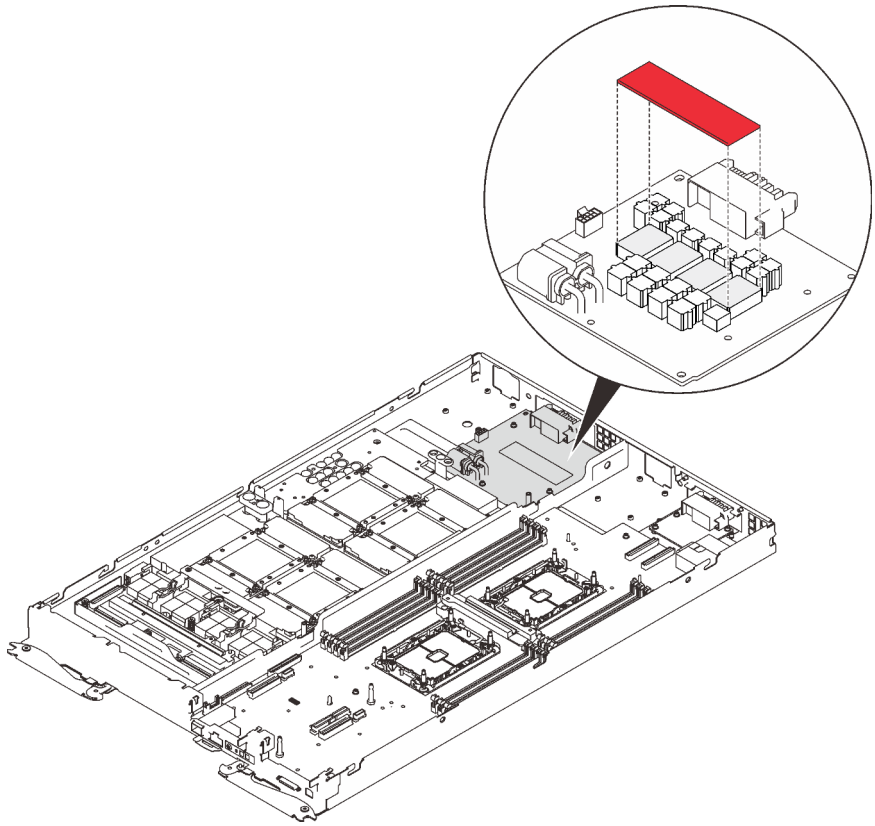


Figure 415. Putty pad

Step 10. Remove all plastic grease covers from underside of water loop cold plates.

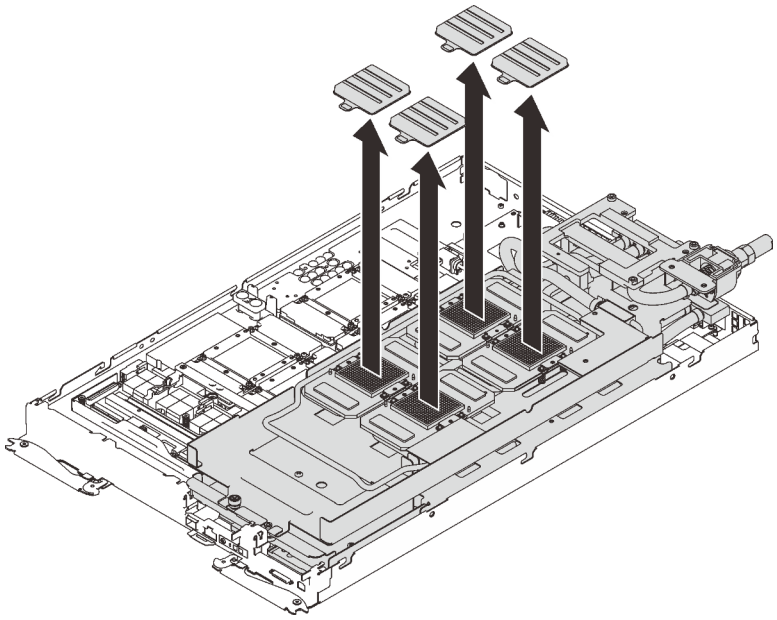


Figure 416. Plastic grease covers removal

Step 11. Fully loosen two captive thumbscrews located at each end of the water loop carrier.

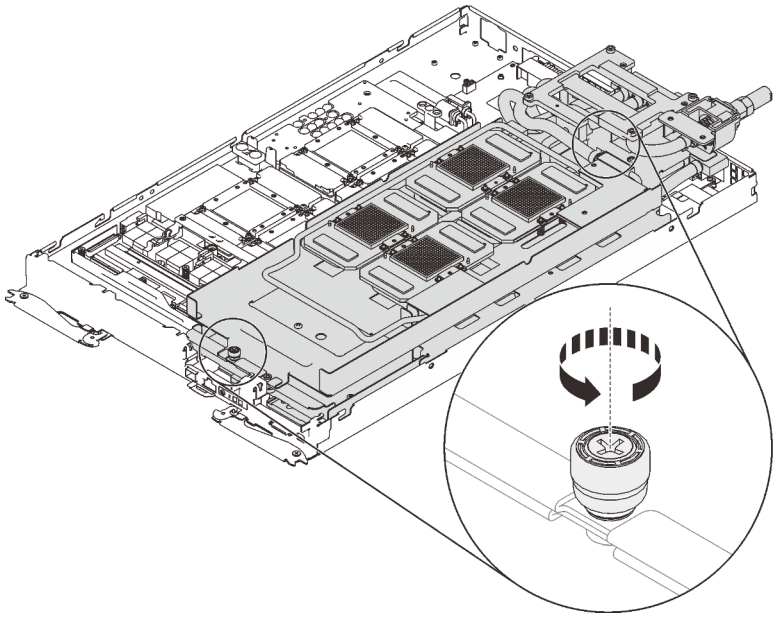


Figure 417. Loosening captive thumbscrews

Step 12. Install the other side of the water loop.

a. ❶ Carefully lift top side of the water loop and rotate it to the other half of the tray.

b. ❷ Carefully insert the quick connect into the tray opening as shown.

c. ❸ Carefully position the water loop on two guide pins near the rear of the node; then, gently put the water loop down and ensure it is firmly seated on the system board.

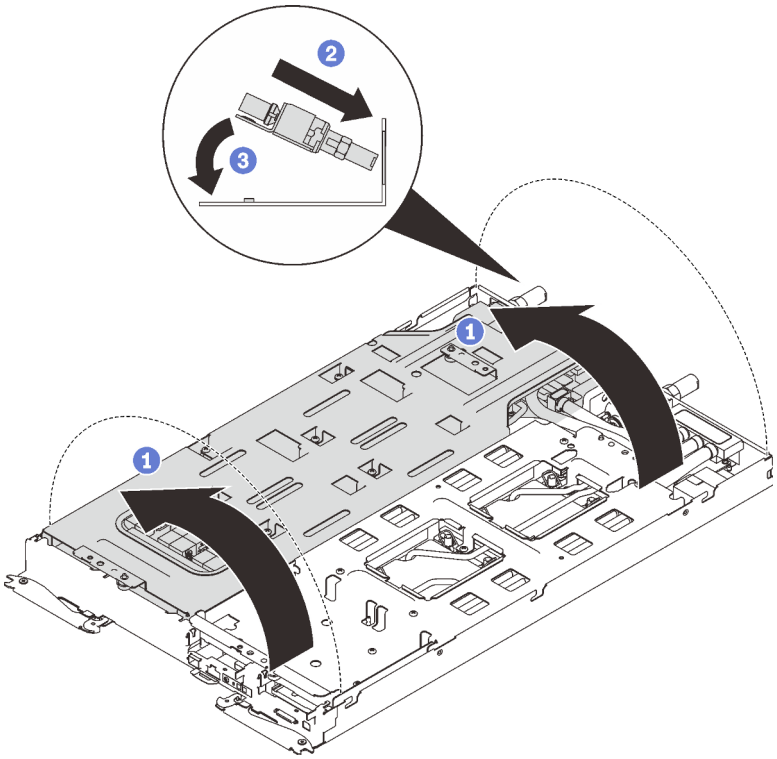


Figure 418. Water loop rotation

Step 13. Loosen water loop carrier screws (27x Phillips #2 screws for two nodes).

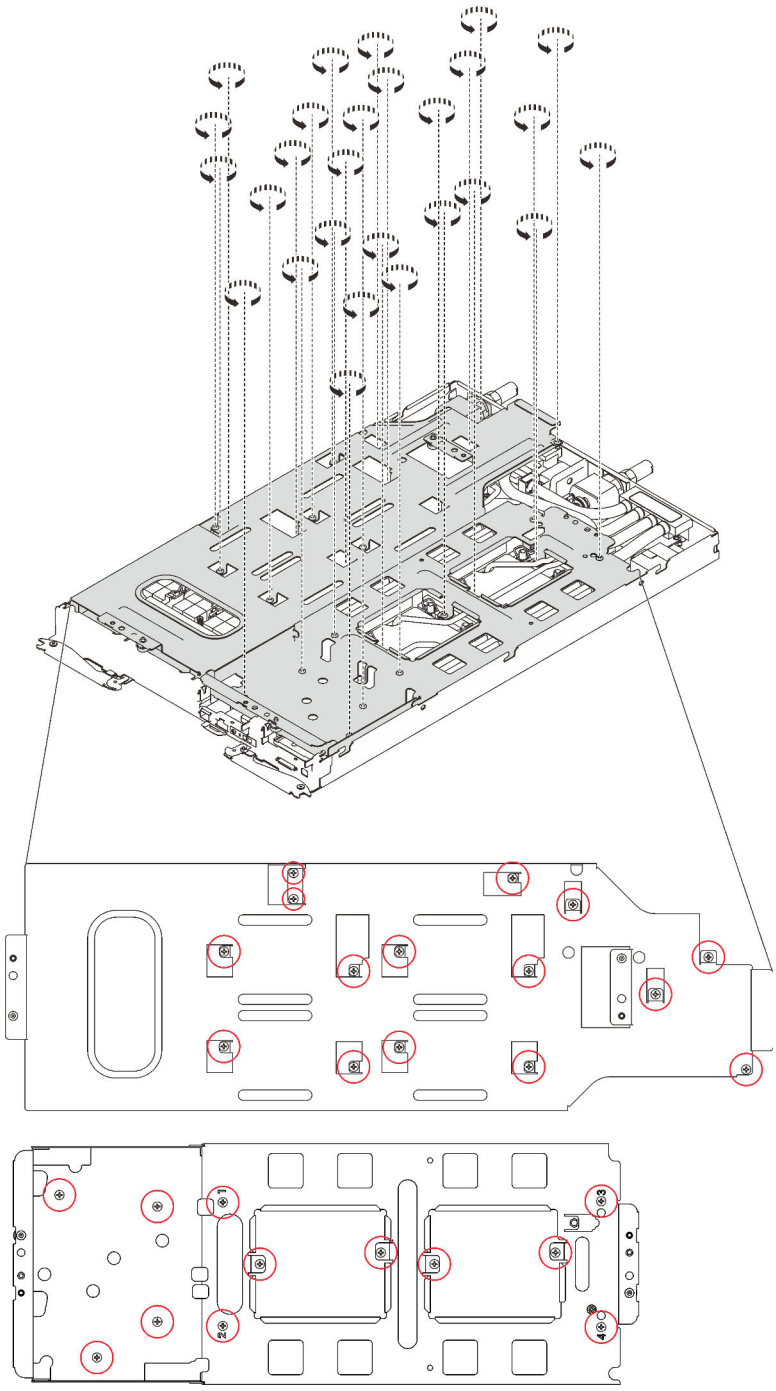


Figure 419. Loosening water loop carrier screws

Step 14. Carefully lift each water loop carrier up and away from the water loop one at a time.

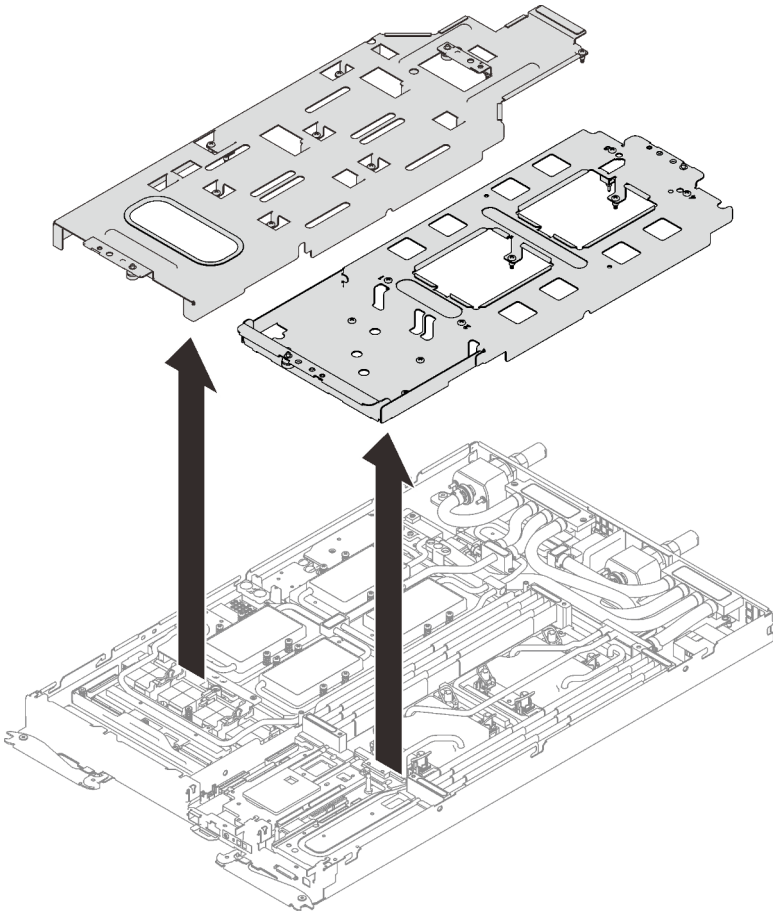


Figure 420. Water loop carrier removal

Step 15. Install water loop screws (21x Torx T10 screws for two nodes) with a torque screwdriver sets to the proper torque.

Notes:

- For reference, the torque required for the screws to be fully tightened/removed is 0.5-0.6 newton-meters, 4.5-5.5 inch-pounds.
- The screw holes that are circled in blue are meant for 9.5 mm screws, while the others that are circled in red are meant for 8.0 mm ones.

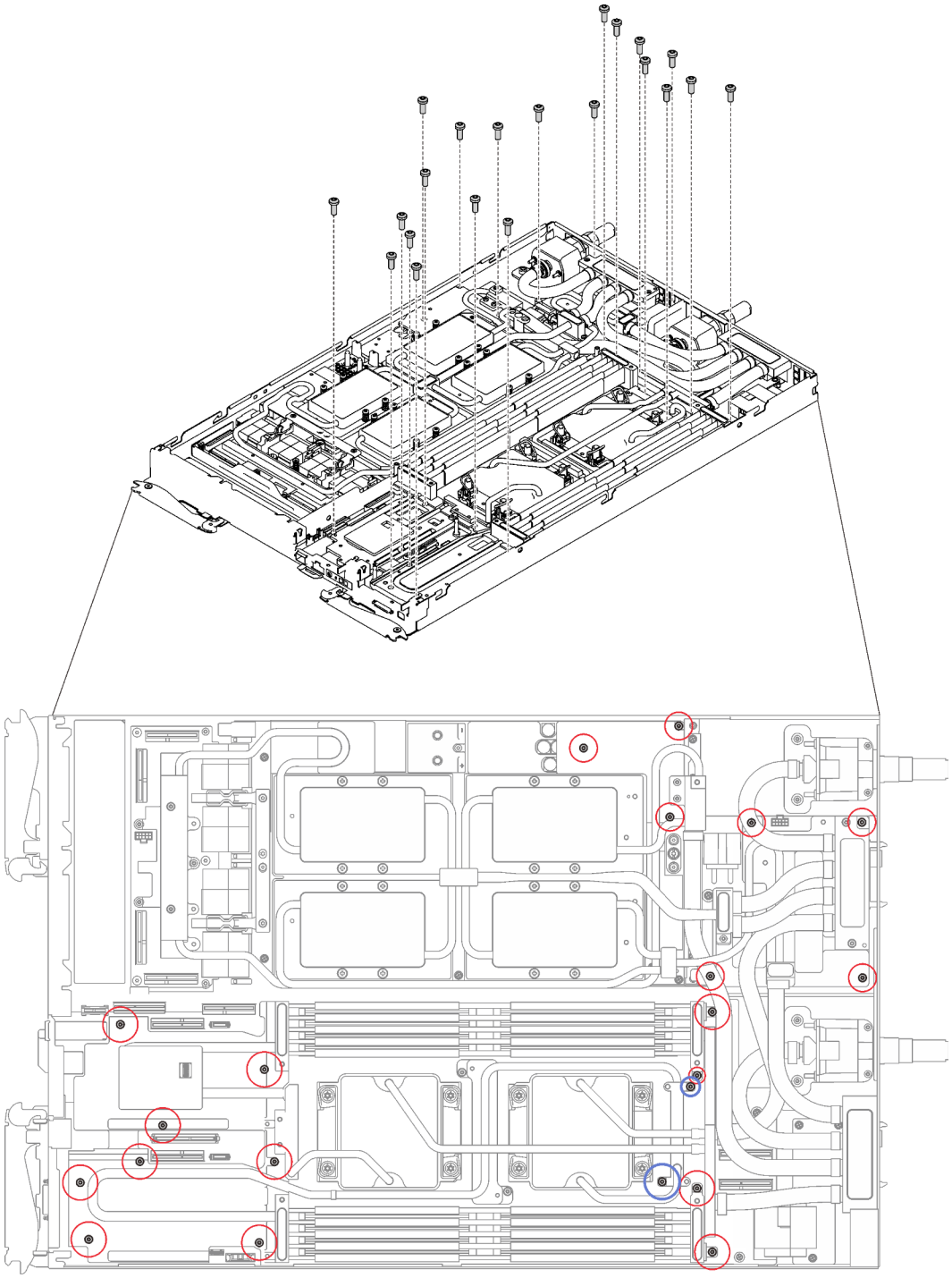


Figure 421. Water loop screws installation

Step 16. Install the following screws.

- Eight Torx T10 screws to secure the quick connect.
- Two Phillips #1 screws on the rear of the node.

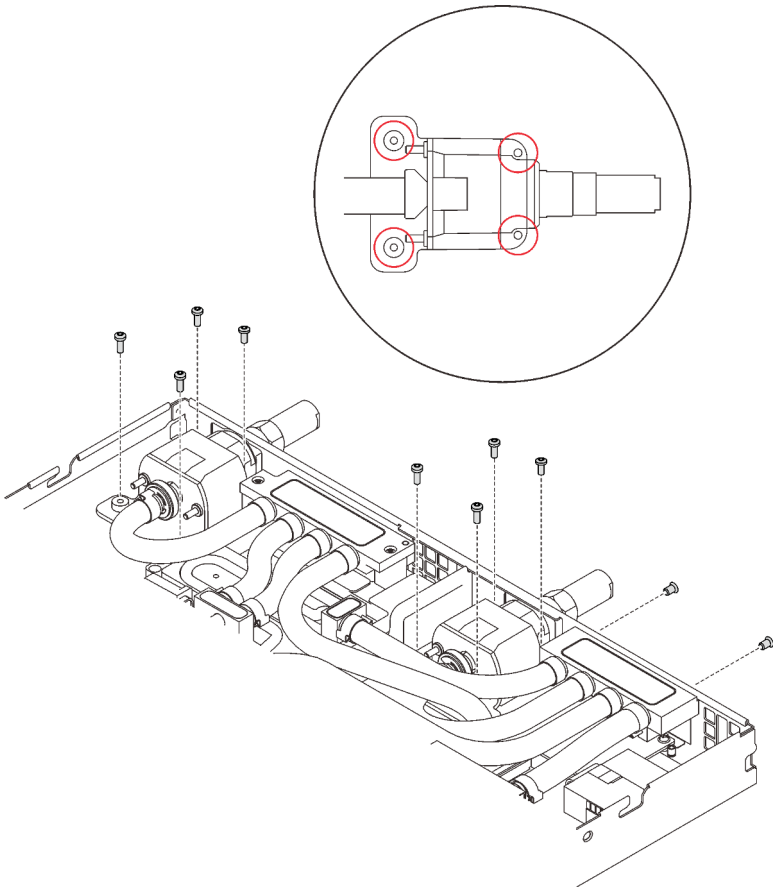


Figure 422. Screws installation

Step 17. Ensure the processors are secured properly.

a. ❶ Rotate anti-tilt wire bails (8x anti-tilt wire bails per node) outwards to the locked position.

b. ❷ Fully tighten all Torx T30 captive screws (8x Torx T30 captive screws per node) with a general screwdriver on cold plates with a general screwdriver until they stop, following the installation sequence shown on the cold plate label.

Note: For reference, the torque required for the screws to be fully tightened/removed is 1.1-1.15 newton-meters, 9.8-10.2 inch-pounds.

Attention: To prevent damage to components, make sure that you follow the indicated tightening sequence.

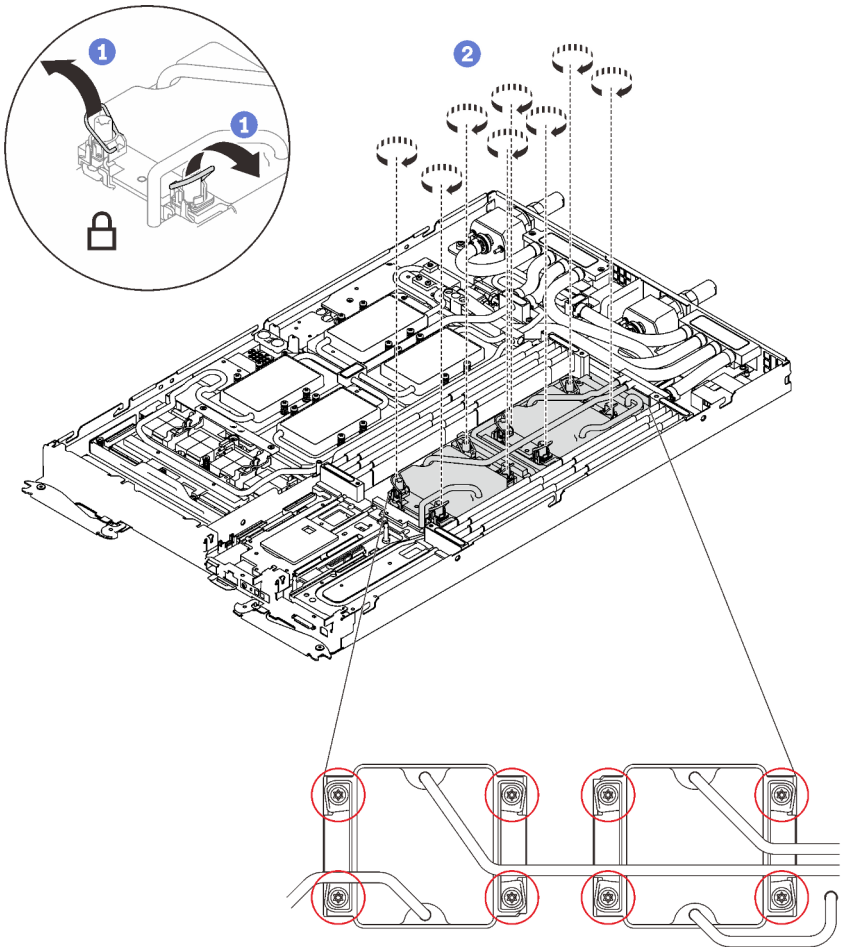


Figure 423. VR clamp plate installation

Step 18. Install the GPU cold plate screws (16x Phillips #1 screws) with a torque screwdriver sets to the proper torque.

Note: For reference, the torque required for the screws to be fully tightened/removed is 0.34-046 newton-meters, 3-4 inch-pounds.

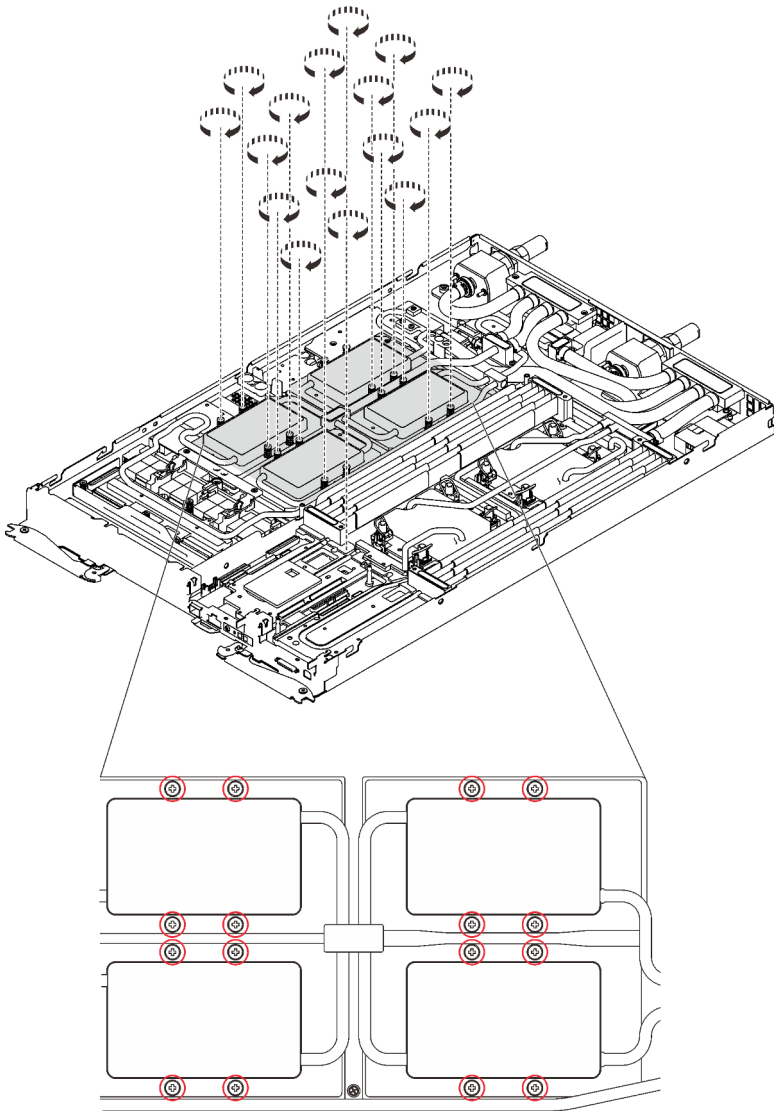


Figure 424. GPU cold plate screw installation

Step 19. Slide the VR clamp plates into the node and install Torx T10 screws.

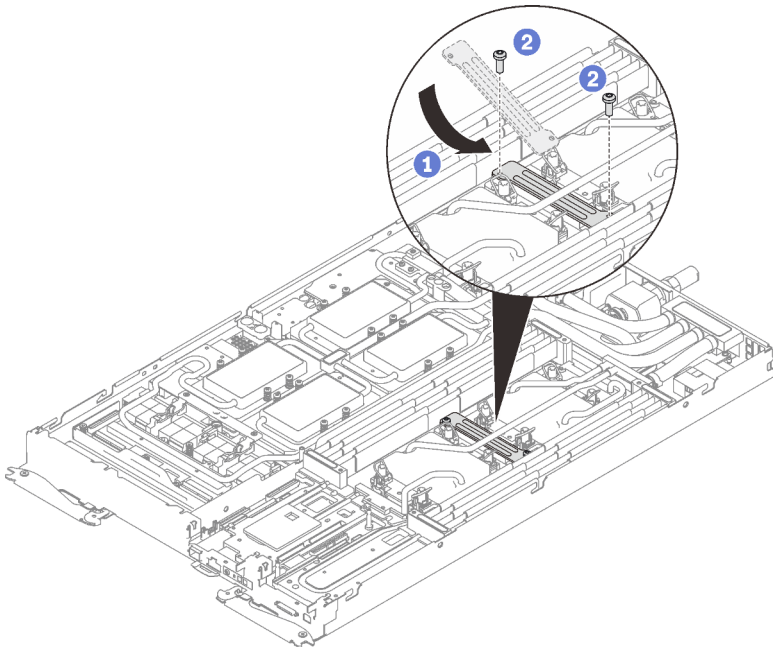


Figure 425. VR clamp plate installation

After you finish

1. Reinstall DIMMs in both nodes (see “Install a memory module” on page 162).
2. Reinstall DIMM combs. (see “Install a DIMM comb” on page 167).
3. Reinstall M.2 backplanes (see “Install the M.2 backplane” on page 185).
4. Reinstall drive cage assemblies if applicable (see “Install a drive cage assembly” on page 175).
5. Reinstall PCIe rise assemblies if applicable (see “Install a PCIe adapter” on page 195).
6. Connect GPU power cable.

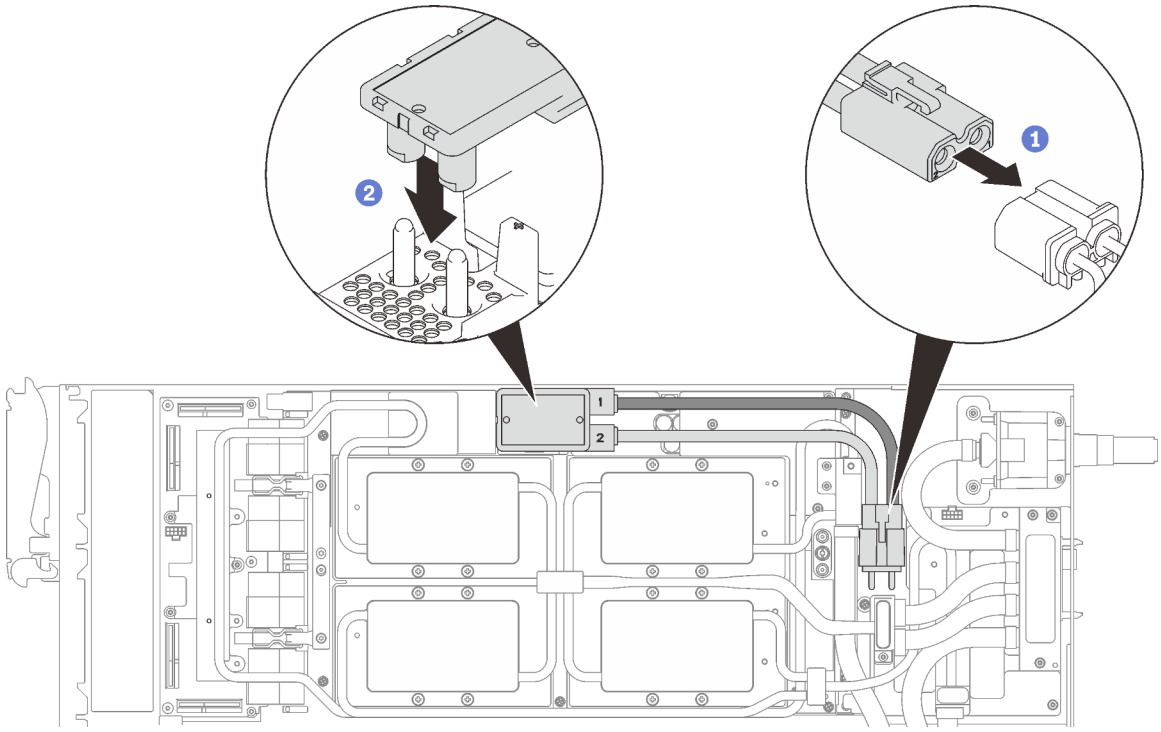


Figure 426. GPU power cable installation

7. See “Cable installation order” on page 35 to connect and route required cables accordingly.
8. Reinstall the front and the rear cross braces (11x Phillips #1 screws).

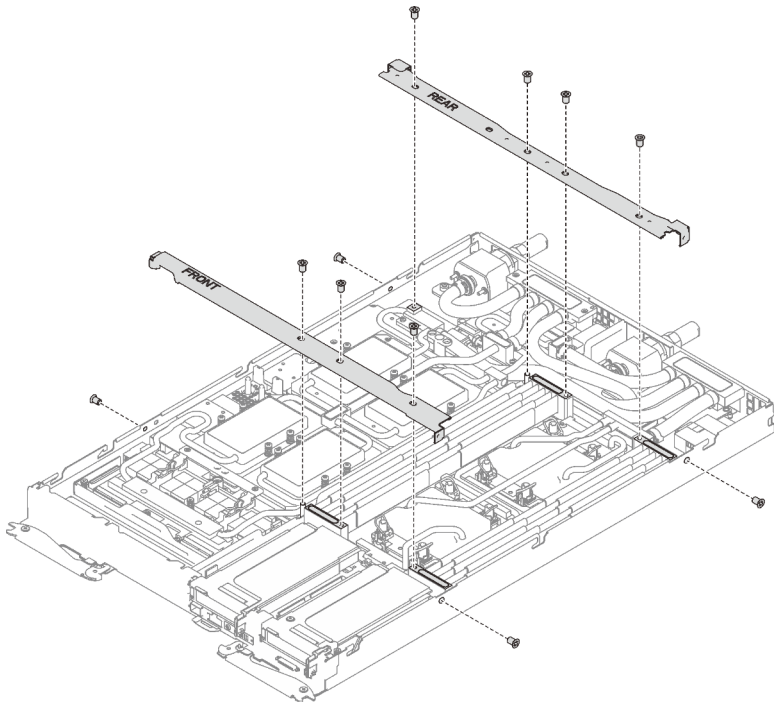


Figure 427. Cross brace installation

9. Reinstall the tray cover (see “Install the tray cover” on page 153).

10. Reinstall the tray (see “Install a DWC tray in the enclosure” on page 150).

    Note: For safety, use the lift tool to install the tray into the rack.
11. Connect all required external cables to the enclosure.

    Note: Use extra forces to connect QSFP cables to the enclosure if Mellanox ConnectX-6 adapters are installed.
12. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

Watch the procedure on YouTube

Complete the parts replacement

Use this information to complete the parts replacement.

To complete the parts replacement, do the following:

1. Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside your solution.
2. Properly route and secure the cables in the solution. Refer to the cable connecting and routing information for each component.
3. If you have removed the solution cover, reinstall it. See “Install the tray cover” on page 153.
4. Reconnect external cables and power cords to the solution.

   Attention: To avoid component damage, connect the power cords last.
5. Update the solution configuration.
   - Download and install the latest device drivers: http://datacentersupport.lenovo.com
   - Update the system firmware. See “Firmware updates” on page 9.
   - Update the UEFI configuration.
   - Reconfigure the disk arrays if you have installed or removed a hot-swap drive or a RAID adapter. See the Lenovo XClarity Provisioning Manager User Guide, which is available for download at: http://datacentersupport.lenovo.com

Chapter 4. Problem determination

Use the information in this section to isolate and resolve issues that you might encounter while using your solution.

Lenovo solutions and servers can be configured to automatically notify Lenovo Support if certain events are generated. You can configure automatic notification, also known as Call Home, from management applications, such as the Lenovo XClarity Administrator. If you configure automatic problem notification, Lenovo Support is automatically alerted whenever a solution encounters a potentially significant event.

To isolate a problem, you should typically begin with the event log of the application that is managing the solution:

- If you are managing the solution from the Lenovo XClarity Administrator, begin with the Lenovo XClarity Administrator event log.
- If you are using some other management application, begin with the Lenovo XClarity Controller event log.

Event logs

An *alert* is a message or other indication that signals an event or an impending event. Alerts are generated by the Lenovo XClarity Controller or by UEFI in the servers. These alerts are stored in the Lenovo XClarity Controller Event Log. If the server is managed by the Chassis Management Module 2 or by the Lenovo XClarity Administrator, alerts are automatically forwarded to those management applications.

Note: For a listing of events, including user actions that might need to be performed to recover from an event, see the *Messages and Codes Reference*, which is available at:http://ralfss28.labs.lenovo.com:8787/help/topic/royce/pdf_files.html

Lenovo XClarity Administrator event log

If you are using Lenovo XClarity Administrator to manage server, network, and storage hardware, you can view the events from all managed devices through the XClarity Administrator.

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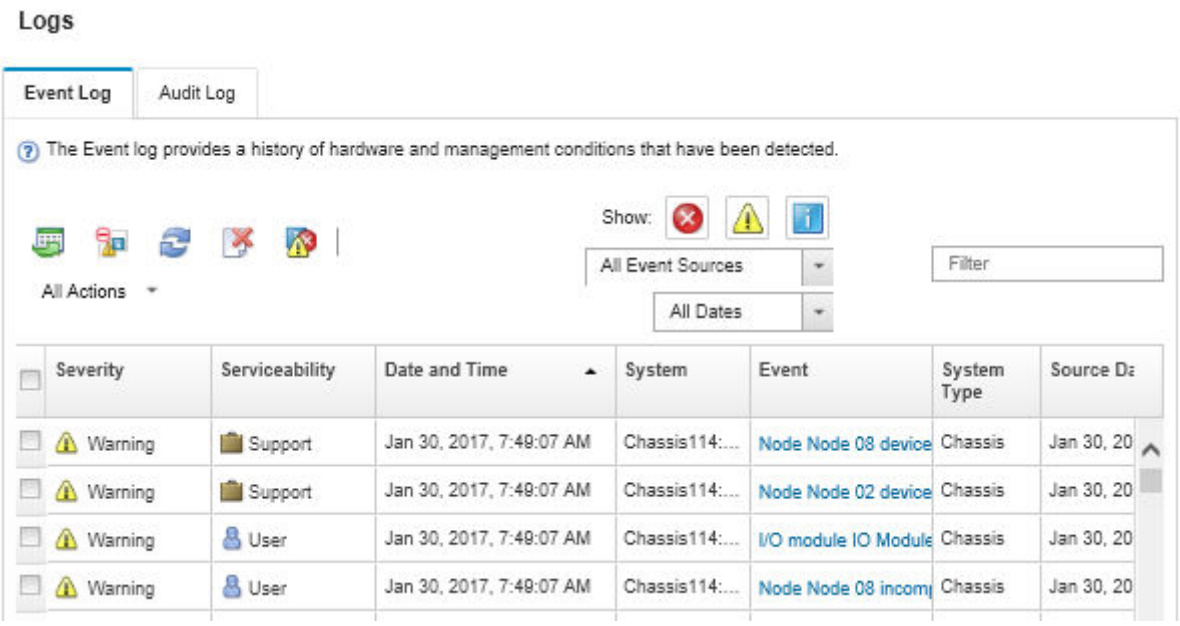


Figure 428. Lenovo XClarity Administrator event log

For more information about working with events from XClarity Administrator, see:

https://pubs.lenovo.com/lxca/events_vieweventlog.html

SMM2 event log

The SMM2 event log contains all events received from all nodes in the enclosure. In addition, it includes events related to power and cooling.

Note: New SMM2 events are appended to the end of the event log. The log can store up to 4, 096 events; you must clear the log to add additional events.

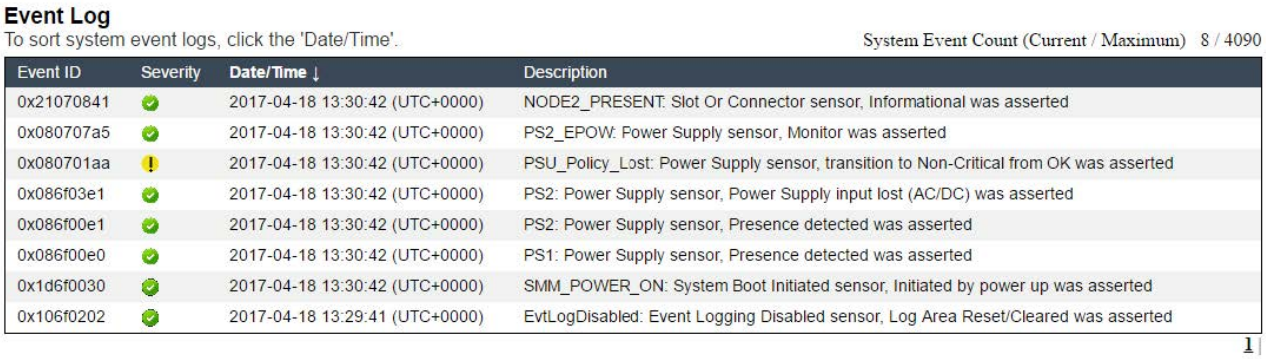


Figure 429. SMM2 event log

Lenovo XClarity Controller event log

The Lenovo XClarity Controller monitors the physical state of the server and its components using sensors that measure internal physical variables such as temperature, power-supply voltages, fan speeds, and component status. The Lenovo XClarity Controller provides various interfaces to systems management software and to system administrators and users to enable remote management and control of a server.

The Lenovo XClarity Controller monitors all components of the server and posts events in the Lenovo XClarity Controller event log.

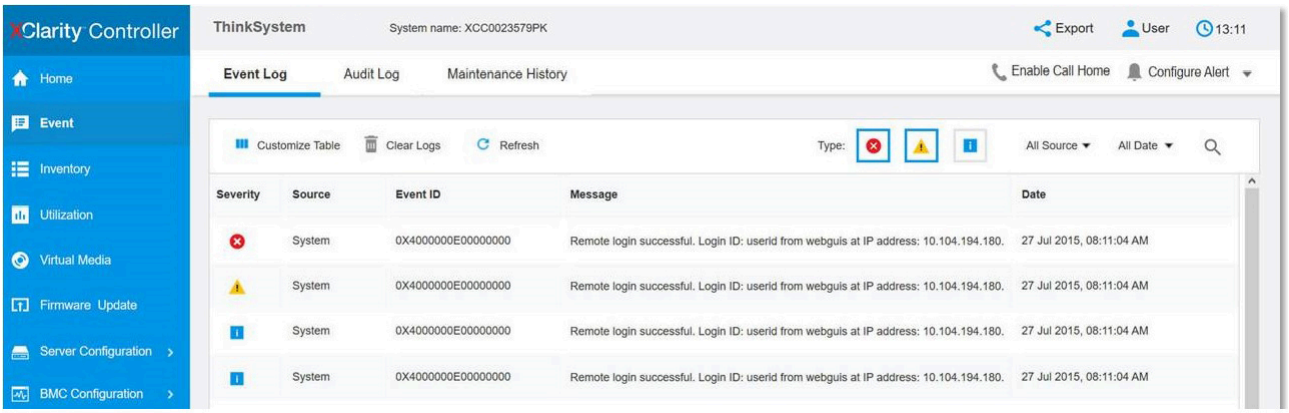


Figure 430. Lenovo XClarity Controller event log

For more information about accessing the Lenovo XClarity Controller event log, see:

"Viewing Event Logs" section in the XCC documentation compatible with your server at https://pubs.lenovo.com/lxcc-overview/

Collecting event logs

Complete the following steps to collect event logs.

Collecting event logs with KVM breakout module/cable

1. Press F1 to display Lenovo XClarity Provisioning Manager system setup interface and check XCC's IP address.

   Note: The default XCC's IP address is 192.168.70.125
2. Connect XCC.
3. Use the following command to enable SMM network.

   ```
   ipmitool -I lanplus -H <XCC's IP> -U USERID -P PASSWORD raw 0x3A 0xF1 0x01
   ```
4. Use the portable Lenovo XClarity Essentials OneCLI to download FFDC logs.
5. (Trained service technicians only) Upload FFDC logs to https://servicetools.lenovo.com/index.shtml.
6. (Trained service technicians only) Diagnose the log data to find out the problems and follow instructions in Chapter 4 "Problem determination" on page 419.

Collecting event logs without KVM breakout module/cable

1. Check the DHCP server for IP address.

   Note: If there is no DHCP server, ensure the defective node is installed in the enclosure and disengage other nodes from the enclosure.
2. Connect the XCC with dedicated IP or static IP via SMM RJ45 or share NIC.

   Note: By default, RJ45 port on the SMM communicates to XCC directly.
3. Press F1 to display Lenovo XClarity Provisioning Manager system setup interface and check XCC's IP address.

Note: All default XCC's IP address is 192.168.70.125, please make sure there is only one XCC with default IP connecting to the SMM RJ45 port.

4. Connect XCC.
5. Use the following command to enable SMM network.

   `ipmitool -I lanplus -H <XCC's IP> -U USERID -P PASSWORD raw 0x3A 0xF1 0x01`

6. Use the portable Lenovo XClarity Essentials OneCLI to download FFDC logs.
7. (Trained service technicians only) Upload FFDC logs to https://servicetools.lenovo.com/index.shtml.
8. (Trained service technicians only) Diagnose the log data to find out the problems and follow instructions in Chapter 4 "Problem determination" on page 419.

LEDs introduction

The following sections introduce LEDs for the solution. By viewing the status of LEDs, you can often identify the source of the error.

Front LEDs

The following illustration shows LEDs on the front of the solution. By viewing the status of LEDs, you can often identify the source of the error.

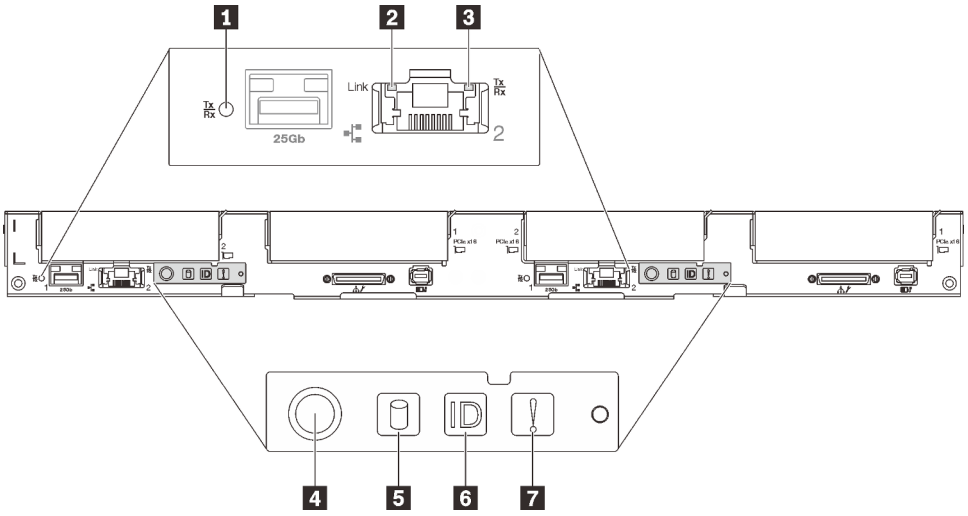


Figure 431. Front LEDs

Table 42. Front LEDs

1 25 Gb Ethernet port link and activity LED (green)	5 Drive activity LED (green)
2 1 Gb Ethernet port link LED (green)	6 Identification LED (blue)
3 1 Gb Ethernet port activity LED (green)	7 System-error LED (yellow)
4 Node power LED (green)	

1 25 Gb Ethernet port link and activity LED (green): Use this green LED to distinguish the network status.

Off: The network is disconnected.

Blinking: The network is accessing.

On: The network is established.

2 1 Gb Ethernet port link LED (green): Use this green LED to distinguish the network status.

Off: The network link is disconnected.

On: The network link is established.

3 1 Gb Ethernet port activity LED (green): Use this green LED to distinguish the network status.

Off: The node is disconnected from a LAN.

Blinking: The network is connected and active.

4 Node power LED (green): Press this button to turn the node on and off manually. The states of the power LED are as follows:

Off: Power is not present or the power supply, or the LED itself has failed.

Flashing rapidly (4 times per second): The node is turned off and is not ready to be turned on. The power button is disabled. This will last approximately 5 to 10 seconds.

Flashing slowly (once per second): The node is turned off and is ready to be turned on. You can press the power button to turn on the node.

On: The node is turned on.

5 Drive activity LED (green): If the LED is lit, it indicates that the drive is powered, but not actively reading or writing data. If the LED is flashing, the drive is being accessed.

6 Identification LED (blue): Use this blue LED to visually locate the node among other nodes. This LED is also used as a presence detection button. You can use Lenovo XClarity Administrator to light this LED remotely.

7 System-error LED (yellow): When this yellow LED is lit, it indicates that a system error has occurred.

System Management Module 2 (SMM 2)

The following illustration shows the connectors and LEDs on the SMM2 module.

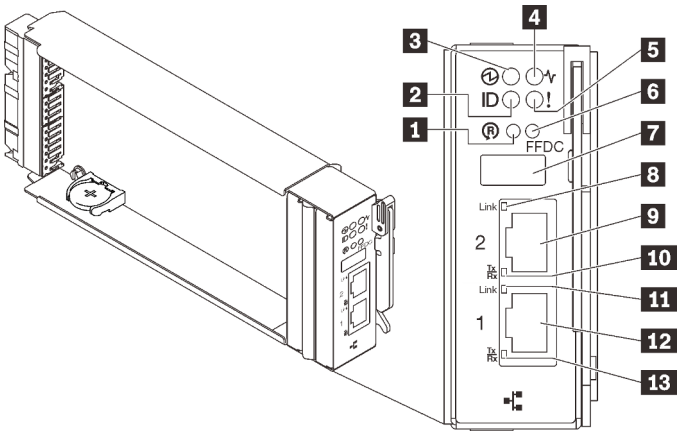


Figure 432. SMM2 connectors and LEDs

Table 43. SMM2 connectors and LEDs

1 Reset button hole	8 Ethernet port 2 link (RJ-45) LED (green)
2 Identification LED (blue)	9 Ethernet port 2
3 Power LED (green)	10 Ethernet port 2 activity (RJ-45) LED (green)

Table 43. SMM2 connectors and LEDs (continued)

4 Status LED (green)	11 Ethernet port 1 link (RJ-45) LED (green)
5 Check log LED (yellow)	12 Ethernet port 1
6 USB port service mode button (FFDC dump)	13 Ethernet port 1 activity (RJ-45) LED (green)
7 USB 2.0 connector	

1 **Reset button**: Press the button for 1 to 4 seconds, SMM2 reboots. Press over 4 seconds, SMM2 reboots and loads to the default settings.

2 **Identification LED**: When this LED is lit (blue), it indicates the enclosure location in a rack.

3 **Power-on LED**: When this LED is lit (green), it indicates that the SMM2 has power.

4 **Status LED**: This LED (green) indicates the operating status of the SMM2.

- **Continuously on**: The SMM2 has encountered one or more problems.
- **Off**: When the enclosure power is on, it indicates the SMM2 has encountered one or more problems.
- **Flashing**: The SMM2 is working.
  - During the pre-boot process, the LED flashes rapidly.
    - Ten times per second: The SMM2 hardware is working and the firmware is ready to initialize.
    - Two times per second: The firmware is initializing.
  - When the pre-boot process is completed and the SMM2 is working correctly, the LED flashes at a slower speed (about once every two seconds).

5 **Check log LED**: When this LED is lit (yellow), it indicates that a system error has occurred. Check the SMM2 event log for additional information.

6 **USB port service mode button (FFDC dump)**: Press this button to collect FFDC logs after inserting the USB storage device to the USB 2.0 connector.

7 **USB 2.0 connector**: Insert the USB storage device to this connector and then press the **USB port service mode button** to collect FFDC logs.

8 **Ethernet port 2 link (RJ-45) LED**: When this LED is lit (green), it indicates that there is an active connection through the remote management and console (Ethernet) port 2 to the management network.

9 **Ethernet port 2**: Use this connector to access SMM2 management.

10 **Ethernet port 2 activity (RJ-45) LED**: When this LED is flashing (green), it indicates that there is an activity through the remote management and console (Ethernet) port 2 over the management network.

11 **Ethernet port 1 link (RJ-45) LED**: When this LED is lit (green), it indicates that there is an active connection through the remote management and console (Ethernet) port 1 to the management network.

12 **Ethernet port 1**: Use this connector to access SMM2 management.

13 **Ethernet port 1 activity (RJ-45) LED**: When this LED is flashing (green), it indicates that there is an activity through the remote management and console (Ethernet) port 1 over the management network.

Power supply LEDs

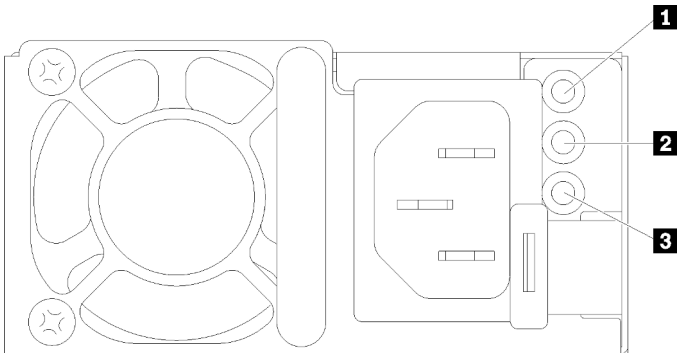


Figure 433. AC power-supply LEDs

1 AC power LED (green)	3 Power supply error LED (yellow)
2 DC power LED (green)	

The following table describes the problems that are indicated by various combinations of the power-supply LEDs on an AC power supply and suggested actions to correct the detected problems.

AC power-supply LEDs			Description	Action	Notes
AC	DC	Error (!)			
On	On/ Blinking	Off	Normal operation.		When the DC LED is blinking as a 1Hz rate, the PSU is at Zero-Output mode, i.e. no DC power output from this PSU
Off	Off	Off	No AC power to the solution or a problem with the AC power source.	1. Check the AC power to the solution. 2. Make sure that the power cord is connected to a functioning power source. 3. Restart the solution. If the error remains, check the power-supply LEDs. 4. If the problem remains, replace the power-supply	This is a normal condition when no AC power is present.
Off	Off	On	The power supply has failed.	Replace the power supply.	
Off	On/ Blinking	Off	The power supply has failed.	Replace the power supply.	
Off	On/ Blinking	On	The power supply has failed.	Replace the power supply.	

On	Off	Off	Power-supply not fully seated, faulty system board, or the power supply has failed.	1. Reseat the power supply. 2. Use the Power Configurator utility to ensure current system power consumption is under limitation. 3. Check the error LEDs on the system board and the Lenovo XClarity Controller error messages.	Typically indicates a power-supply is not fully seated.
On	Off	On	The power supply has failed.	Replace the power supply.	
On	On/ Blinking	On	The power supply has failed.	Replace the power supply.	

Drip sensor LED

The following illustration shows the light-emitting diodes (LEDs) on the drip sensor.

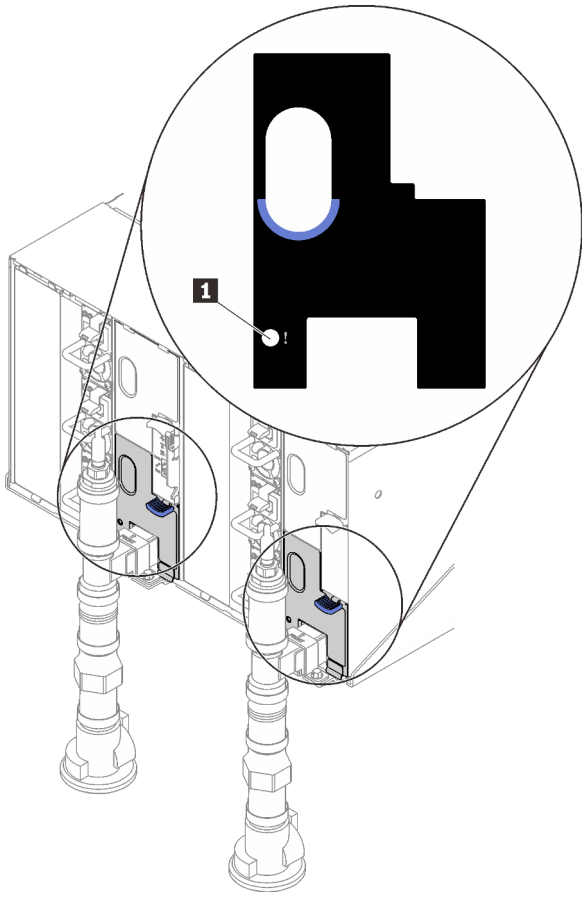


Figure 434. Drip sensor LED

Table 44. Drip sensor LED

1 Drip sensor LED (yellow)

1 Drip sensor LED: When this LED is lit (yellow), it indicates that the drip sensor detects water in its respective catch basin.

General problem determination procedures

Use the information in this section to resolve problems if the event log does not contain specific errors or the solution is inoperative.

If you are not sure about the cause of a problem and the power supplies are working correctly, complete the following steps to attempt to resolve the problem:

1. Power off the solution.
2. Make sure that the solution is cabled correctly.
3. Remove or disconnect the following devices if applicable, one at a time, until you find the failure. Power on and configure the solution each time you remove or disconnect a device.
   - Any external devices.
   - Surge-suppressor device (on the solution).
   - Printer, mouse, and non-Lenovo devices.
   - Each adapter.
   - Hard disk drives.
   - Memory modules until you reach the minimum configuration that is supported for the solution.

     See “Specifications” on page 1 to determine the minimum configuration for your server.
4. Power on the solution.

If the problem is solved when you remove an adapter from the solution, but the problem recurs when you install the same adapter again, suspect the adapter. If the problem recurs when you replace the adapter with a different one, try a different PCIe slot.

If the problem appears to be a networking problem and the solution passes all system tests, suspect a network cabling problem that is external to the server.

Resolving suspected power problems

Power problems can be difficult to solve. For example, a short circuit can exist anywhere on any of the power distribution buses. Usually, a short circuit will cause the power subsystem to shut down because of an overcurrent condition.

Complete the following steps to diagnose and resolve a suspected power problem.

Step 1. Check the event log and resolve any errors related to the power.

Note: Start with the event log of the application that is managing the solution. For more information about event logs, see “Event logs” on page 419

Step 2. Check for short circuits, for example, if a loose screw is causing a short circuit on a circuit board.

Step 3. Remove the adapters and disconnect the cables and power cords to all internal and external devices until the solution is at the minimum configuration that is required for the solution to start. See “Specifications” on page 1 to determine the minimum configuration for your solution.

Step 4. Reconnect all ac power cords and turn on the solution. If the solution starts successfully, reseat the adapters and devices one at a time until the problem is isolated.

If the solution does not start from the minimum configuration, see “Power supply LEDs” on page 425 to replace the components in the minimum configuration one at a time until the problem is isolated.

Resolving suspected Ethernet controller problems

The method that you use to test the Ethernet controller depends on which operating system you are using. See the operating-system documentation for information about Ethernet controllers, and see the Ethernet controller device-driver readme file.

Complete the following steps to attempt to resolve suspected problems with the Ethernet controller.

Step 1. Make sure that the correct device drivers, which come with the server are installed and that they are at the latest level.

Step 2. Make sure that the Ethernet cable is installed correctly.

- The cable must be securely attached at all connections. If the cable is attached but the problem remains, try a different cable.
- Make sure that the cable rating is applicable for the network speed selected. For example, an SFP+ cable is only suitable for 10G operation. An SFP25 cable is needed for 25G operation. Likewise for Base-T operation, a CAT5 cable is required for 1G Base-T operation while a CAT6 cable is required for 10G Base-T operation.

Step 3. Set both the adapter port and the switch port to auto-negotiation. If auto-negotiation is not supported on one of the ports, try configuring both ports manually to match each other.

Step 4. Check the Ethernet controller LEDs on the server. These LEDs indicate whether there is a problem with the connector, cable, or hub.

Although some adapters may vary, when installed vertically the adapter link LED is typically on the left of the port and the activity LED is typically on the right.

- The Ethernet link status LED is lit when the Ethernet controller receives a link indication from the switch. If the LED is off, there might be a defective connector or cable or a problem with the switch.
- The Ethernet transmit/receive activity LED is lit when the Ethernet controller sends or receives data over the Ethernet network. If the Ethernet transmit/receive activity is off, make sure that the hub and network are operating and that the correct device drivers are installed.

Step 5. Check the Network activity LED on the rear of the server. The Network activity LED is lit when data is active on the Ethernet network. If the Network activity LED is off, make sure that the hub and network are operating and that the correct device drivers are installed.

Step 6. Check for operating-system-specific causes of the problem, and also make sure that the operating system drivers are installed correctly.

Step 7. Make sure that the device drivers on the client and server are using the same protocol.

If the Ethernet controller still cannot connect to the network but the hardware appears to be working, the network administrator must investigate other possible causes of the error.

Troubleshooting by symptom

Use this information to find solutions to problems that have identifiable symptoms.

To use the symptom-based troubleshooting information in this section, complete the following steps:

1. Check the event log of the application that is managing the server and follow the suggested actions to resolve any event codes.
   - If you are managing the server from the Lenovo XClarity Administrator, begin with the Lenovo XClarity Administrator event log.
   - If you are using some other management application, begin with the Lenovo XClarity Controller event log.

For more information about event logs, see “Event logs” on page 419)

2. Review this section to find the symptoms that you are experiencing and follow the suggested actions to resolve the issue.
3. If the problem persists, contact support (see “Contacting Support” on page 453).

Power on and power off problems

Use this information to resolve issues when powering on or powering off the server.

Embedded hypervisor is not in the boot list

Complete the following steps until the problem is resolved:

1. Make sure that the optional embedded hypervisor flash device is selected on the boot manager `<F12> Select Boot Device` at startup.
2. See the documentation that comes with the optional embedded hypervisor flash device to validate that the device is configured correctly.
3. Make sure that other software works on the server.

Server does not power on

Complete the following steps until the problem is resolved:

Note: The power button will not function until approximately five to ten seconds after the server has been connected to power to allow the BMC to complete initialization.

1. Make sure that the power button is working correctly:
   a. Disconnect the server power cords.
   b. Reconnect the power cords.
   c. (Trained technician only) Reseat the operator information panel cable, and then repeat steps 1a and 1b.
      - (Trained technician only) If the server starts, reseat the operator information panel. If the problem remains, replace the operator information panel.
      - If the server does not start, bypass the power button by using the force power-on jumper. If the server starts, reseat the operator information panel. If the problem remains, replace the operator information panel.
2. Make sure that the reset button is working correctly:
   a. Disconnect the server power cords.
   b. Reconnect the power cords.
   c. (Trained technician only) Reseat the operator information panel cable, and then repeat steps 2a and 2b.
      - (Trained technician only) If the server starts, replace the operator information panel.
      - If the server does not start, go to step 3.
3. Make sure that both power supplies installed in the server are of the same type. Mixing different power supplies in the server will cause a system error (the system-error LED on the front panel turns on).
4. Make sure that:
   - The power cords are correctly connected to the server and to a working electrical outlet.

- The type of memory that is installed is correct and the installation rules are met.
- The DIMMs are fully seated with lock latches fully closed.
- The LEDs on the power supply do not indicate a problem.
- The processors are installed in the correct sequence.

5. Reseat the following components:
   a. Operator information panel connector
   b. Power supplies
6. Replace the following components and restart the server each time:
   a. Operator information panel connector
   b. Power supplies
7. If you just installed an optional device, remove it, and restart the server. If the server now starts, you might have installed more devices than the power supply supports.
8. Implement the minimum configuration (one processor and one DIMM) to check whether any specific components lock the power permission.
9. Collect the failure information by capturing the system logs and provide it to Lenovo support.
10. See “Power supply LEDs” on page 425.

Server does not power off

Complete the following steps until the problem is resolved:

1. Determine whether you are using an Advanced Configuration and Power Interface (ACPI) or a non-ACPI operating system. If you are using a non-ACPI operating system, complete the following steps:
   a. Press `Ctrl+Alt+Delete`.
   b. Turn off the server by pressing the power button and holding it down for 5 seconds.
   c. Restart the server.
   d. If the server fails POST and the power button does not work, disconnect the power cord for 20 seconds; then, reconnect the power cord and restart the server.
2. If the problem remains or if you are using an ACPI-aware operating system, suspect the system board.

Memory problems

Use this information to resolve issues related to memory.

Displayed system memory is less than installed physical memory

Complete the following steps until the problem is resolved:

Note: Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server.

1. Make sure that:
   - No error LEDs are lit on the operator information panel.
   - No DIMM error LEDs are lit on the system board.
   - Memory mirrored channel does not account for the discrepancy.
   - The memory modules are seated correctly and followed the system memory installation rules.

- You have installed the correct type of memory.
- If you changed the memory, you updated the memory configuration in the Setup utility.
- Check that all banks of memory are enabled in the UEFI setup. The server might have automatically disabled a memory bank when it detected a problem, or a memory bank might have been manually disabled by a previous user.
- There is no memory mismatch when the server is at the minimum memory configuration.

2. Reseat the DIMMs, and then restart the server.
3. Check the POST error log:
   - If a DIMM was disabled by a systems-management interrupt (SMI), move the DIMM to a different slot and run the UEFI setup utility to confirm if the DIMM is enabled, if the DIMM is still disabled then replace the DIMM.
   - If a DIMM was disabled by the user or by POST, move the DIMM to a different slot and run the UEFI setup utility to confirm if the DIMM is enabled, if the DIMM is still disabled then replace the DIMM.
4. Reverse the DIMMs between the channels (of the same processor), and then restart the server. If the problem is related to a DIMM, replace the failing DIMM.
5. Re-enable all DIMMs using the Setup utility, and then restart the server.
6. (Trained technician only) Install the failing DIMM into a DIMM connector for processor 2 (if installed) to verify that the problem is not the processor or the DIMM connector.
7. (Trained technician only) Replace the system board.

Multiple DIMMs in a channel identified as failing

Note: Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server.

1. Separate each DIMM from the failing channel and install the DIMMs into separate channels (typically the each channel is indicated by a white socket) to isolate the DIMMs; then, restart the server. Replace any of the suspecious DIMMs that fail in new channels.
2. Remove the highest-numbered DIMM of those that are identified and replace it with an identical known good DIMM; then, restart the server. Repeat as necessary. If the failures continue after all identified DIMMs are replaced, go to step 4.
3. Return the removed DIMMs, one at a time, to their original connectors, restarting the server after each DIMM, until a DIMM fails. Replace each failing DIMM with an identical known good DIMM, restarting the server after each DIMM replacement. Repeat step 3 until you have tested all removed DIMMs.
4. Replace the highest-numbered DIMM of those identified; then, restart the server. Repeat as necessary.
5. Reverse the DIMMs between the channels (of the same processor), and then restart the server. If the problem is related to a DIMM, replace the failing DIMM.
6. (Trained technician only) Install the failing DIMM into a DIMM connector for processor 2 (if installed) to verify that the problem is not the processor or the DIMM connector.
7. (Trained technician only) Replace the system board.

DIMM PFA issue

1. Update the UEFI and XCC firmware to the latest version.
2. Reseat the failing DIMMs.
3. Swap processors and make sure that there are no damages to processor socket pins.
4. (Train service only) Ensure there is no abnormal material in any DIMM slot.
5. Run memory diagnostics. When you start a solution and press the key according to the on-screen instructions, the LXPM interface is displayed by default. (For more information, see the “Startup” section

in the LXPM documentation compatible with your solution at https://pubs.lenovo.com/lxpm-overview/.) You can perform memory diagnostics with this interface. From the Diagnostic page, go to **Run Diagnostic → Memory test**.

6. Replace the failing DIMMs that fails Memory Test.

Hard disk drive problems

Use this information to resolve issues related to the hard disk drives.

- "Server cannot recognize a hard drive" on page 432

Server cannot recognize a hard drive

Complete the following steps until the problem is solved.

1. Verify that the drive is supported for the server. See https://serverproven.lenovo.com/ for a list of supported hard drives.
2. Make sure that the drive is seated in the drive bay properly and that there is no physical damage to the drive connectors.
3. Run the diagnostics tests for the SAS/SATA adapter and hard disk drives. When you start a solution and press the key according to the on-screen instructions, the LXPM interface is displayed by default. (For more information, see the "Startup" section in the LXPM documentation compatible with your solution at https://pubs.lenovo.com/lxpm-overview/.) You can perform hard drive diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic → HDD test/Disk Drive Test**.

   Depending on the LXPM version, you may see **HDD test** or **Disk Drive Test**.

   Based on those tests:

   - If the adapter passes the test but the drives are not recognized, replace the backplane signal cable and run the tests again.
   - Replace the backplane.
   - If the adapter fails the test, disconnect the backplane signal cable from the adapter and run the tests again.
   - If the adapter fails the test, replace the adapter.

Water leak problems

Use this information to resolve issues related to water leaks.

The SD650 V2/SD650-N V2 design is robust, and is unlikely to leak. If the water is observed outside of the enclosure, make sure the both enclosure and rack power supplies have been disconnected. If no water is observed outside of the enclosure, but there is a suspicion of a water leak in the enclosure or in one of the six compute trays, complete the following steps to determine the source of the leak. The enclosure is equipped with a pair of drip sensor assemblies to help detect any water leaks.

Note: A small leak may not reach either of the drip sensors to trigger a warning. Visual confirmation of a small leak may be required.

Suspicious leakage symptoms

The following situations might occur due to leakage problems:

- **Processor over temperature error indicated by the System Error "!" LED being solid ON at the front of the node**
- **One or more of the nodes shut down unexpectedly**

- **Enclosure SMM2 management may report the following events:**
  - 18040179 : DripSensor 1 Out: Chassis, Predictive Failure asserted was asserted.
  - 1804017A : DripSensor 2 Out: Chassis, Predictive Failure asserted was asserted.
  - 18080076 : DripSensor 1: Chassis, Device Removed / Device Absent was asserted.
  - 18080077 : DripSensor 2: Chassis, Device Removed / Device Absent was asserted.

Possible causes of a leak:

- **Leak at quick connects during installation or removal procedures**
- **Leak in the water loop tubing**

Complete the following steps in order until you are able to isolate the cause of the potential leak:

1. Check enclosure SMM2 messages to see if any leakage warnings have been reported. See *Messages and Codes Reference* for more information.
2. Walk to the rear of the rack and visually check the status of each enclosure's left and right side drip sensor LEDs.

   Users usually have multiple enclosures per rack. Each enclosure has two drip sensors.

   Note: Each enclosure has two drip sensors that should turn on a yellow LED visible through a hole located in the lower left leg of the lower EMC shield if the sensor detects moisture in its drip sensor catch basin.

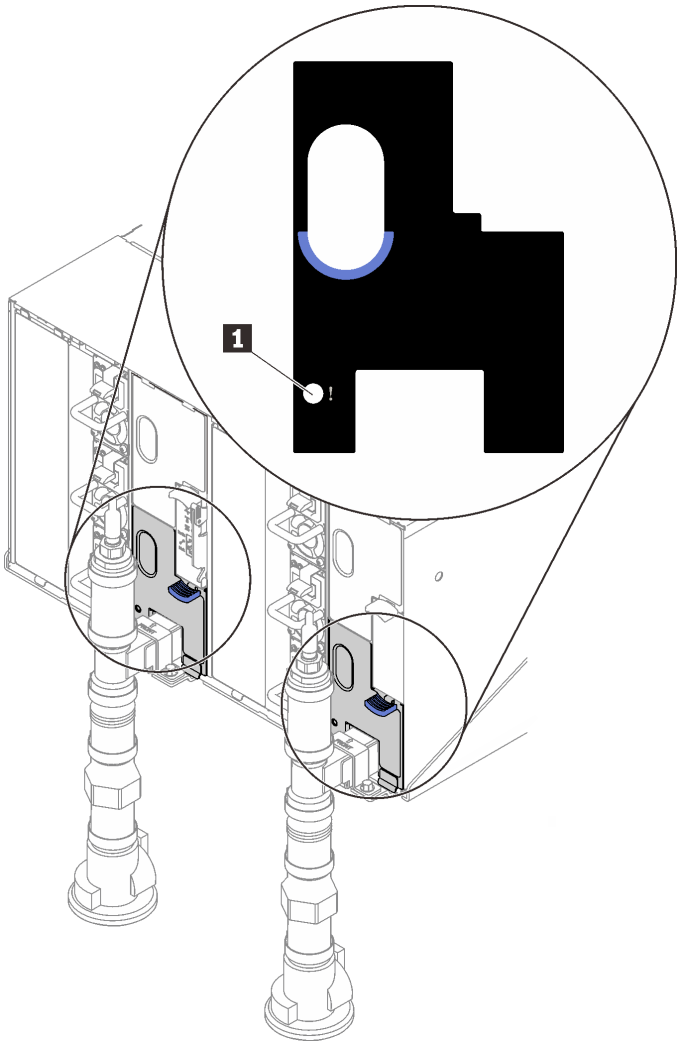
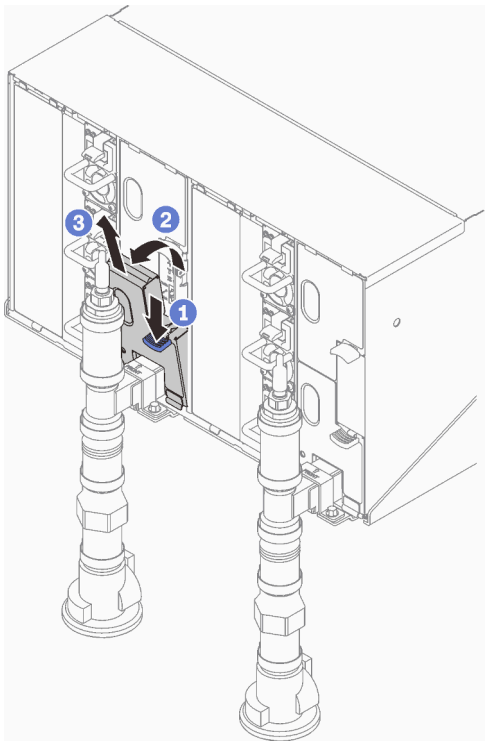


Figure 435. Drip sensor LED

Table 45. Drip sensor LED

1 Drip sensor LED (yellow)

3. Visually check the drip sensor catch basin for any moisture.
   a. Remove the lower left EMC shield in the front of the left drip sensor.



Note: If there is a manifold vertical pipe in front of the EMC shield, you need to slide it sideways out from underneath the pipe.

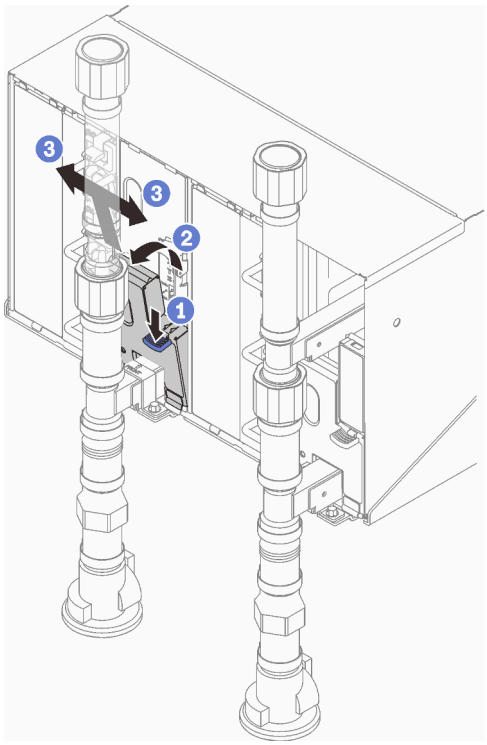


Figure 436. Lower left EMC shield removal

b. Use a flashlight to visually inspect the plastic catch basin for any moisture.

c. Re-install the EMC shield.

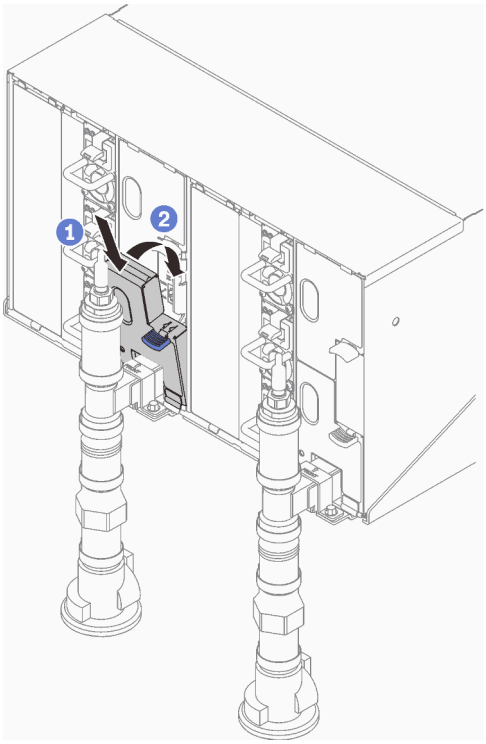


Figure 437. Lower left EMC shield installation

d. Repeat steps for the right side drip sensor catch basin.

4. Power down all nodes either through the OS or by pressing and holding the power button for five seconds.

   Note: Green Power LED for each node (two per compute tray) should be blinking to indicate the nodes are in standby state.

5. Disconnect power cords from all six enclosure power supplies.

   Important: Fully disconnect the power to the entire enclosure prior to attempting to identify a leak within an enclosure.

6. Check the water loop for any moisture.
   a. Remove the top node (bays 11&12) from the enclosure (see “Remove a DWC tray from the enclosure” on page 149), place it on a stable work surface, remove the cover (see “Remove the tray cover” on page 152), and carefully inspect the entire water loop (both rubber and copper tubing) for any signs of moisture. Re-install the compute tray into enclosure (see “Install a DWC tray in the enclosure” on page 150).
   b. Repeat steps for the tray in bays 9 and 10.
   c. Repeat steps for the tray in bays 7 and 8.
   d. Repeat steps for the tray in bays 5 and 6.
   e. Repeat steps for the tray in bays 3 and 4.
   f. Repeat steps for the tray in bays 1 and 2.

      Note: It is important to visually inspect the bottom of the enclosure with a flashlight prior to re-installing the bottom most tray (bays 1 and 2) into the enclosure.

7. If you are unable to identify the problem in the steps above, then you may need to replace one or more of the tray water loops (see “Water loop (SD650 V2 tray) replacement” on page 266). Contact Product Engineer for the further assistance.

Important: The procedures above only cover the Lenovo DWC solution (from the Eaton Ball valves up through the manifold and into the enclosures and compute trays). If your datacenter Cooling Distribution Unit experiences repeated or frequent low water alerts then you should inspect the data center plumbing between the cooling distribution unit and the Lenovo DWC solution (rack).

Monitor and video problems

Use this information to solve problems related to a monitor or video.

Screen is blank

Note: Make sure that the expected boot mode has not been changed from the UEFI to Legacy or vice versa.

1. If the server is attached to a KVM switch, bypass the KVM switch to eliminate it as a possible cause of the problem: connect the monitor cable directly to the correct connector on the rear of the server.
2. The management controller remote presence function is disabled if you install an optional video adapter. To use the management controller remote presence function, remove the optional video adapter.
3. If the server is installed with the graphical adapters while turning on the server, the Lenovo logo is displayed on the screen after approximately 3 minutes. This is normal operation while the system loads.
4. Make sure that:
   - The server is turned on and there is power supplied to the server.
   - The monitor cables are connected correctly.
   - The monitor is turned on and the brightness and contrast controls are adjusted correctly.
5. Make sure that the correct server is controlling the monitor, if applicable.
6. Make sure that corrupted server firmware is not affecting the video; see “Firmware updates” on page 9.
7. Observe the LEDs on the system board; if the codes are changing, go to step 6.
8. Replace the following components one at a time, in the order shown, restarting the server each time:
   a. Monitor
   b. Video adapter (if one is installed)
   c. (Trained technician only) System board.

Screen goes blank when you start some application programs

1. Make sure that:
   - The application program is not setting a display mode that is higher than the capability of the monitor.
   - You installed the necessary device drivers for the application.

The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted

1. If the monitor self-tests show that the monitor is working correctly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescents, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor.

   Attention: Moving a color monitor while it is turned on might cause screen discoloration.

Move the device and the monitor at least 305 mm (12 in.) apart, and turn on the monitor.

Notes:

a. To prevent diskette drive read/write errors, make sure that the distance between the monitor and any external diskette drive is at least 76 mm (3 in.).

b. Non-Lenovo monitor cables might cause unpredictable problems.

2. Reseat the monitor cable.
3. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time:
   a. Monitor cable
   b. Video adapter (if one is installed)
   c. Monitor
   d. (Trained technician only) System board.

Keyboard, mouse, KVM switch or USB-device problems

Use this information to solve problems related to a keyboard, mouse, KVM switch or USB-device problems.

All or some keys on the keyboard do not work

1. Make sure that:
   - The keyboard cable is securely connected.
   - The solution and the monitor are turned on.
2. If you are using a USB keyboard, run the Setup utility and enable keyboardless operation.
3. If you are using a USB keyboard and it is connected to a USB hub, disconnect the keyboard from the hub and connect it directly to the solution.
4. Try to install the USB keyboard into a different USB port as available.
5. Replace the keyboard.

Mouse does not work

1. Make sure that:
   - The mouse cable is securely connected to the solution.
   - The mouse device drivers are installed correctly.
   - The solution and the monitor are turned on.
   - The mouse option is enabled in the Setup utility.
2. If you are using a USB mouse and it is connected to a USB hub, disconnect the mouse from the hub and connect it directly to the solution.
3. Try to install the USB mouse into a different USB port as available.
4. Replace the mouse.

KVM switch problems

1. Make sure that the KVM switch is supported by your solution.

2. Make sure that the KVM switch is powered on correctly.
3. If the keyboard, mouse or monitor can be operated normally with direct connection to the solution, then replace the KVM switch.

USB-device does not work

1. Make sure that:
   - The correct USB device driver is installed.
   - The operating system supports USB devices.
2. Make sure that the USB configuration options are set correctly in system setup.

   Restart the solution and press the key according to the on-screen instructions to display the LXPM system setup interface. (For more information, see the “Startup” section in the LXPM documentation compatible with your solution at https://pubs.lenovo.com/lxpm-overview/.) Then, click **System Settings → Devices and I/O Ports → USB Configuration**.
3. If you are using a USB hub, disconnect the USB device from the hub and connect it directly to the solution.

Optional-device problems

Use this information to solve problems related to optional devices.

- “Insufficient PCIe resources are detected” on page 439
- “A Lenovo optional device that was just installed does not work” on page 439
- “A Lenovo optional device that worked previously does not work now” on page 440

Insufficient PCIe resources are detected

If you see an error message stating “Insufficient PCI Resources Detected,” complete the following steps until the problem is resolved:

1. Press Enter to access System Setup Utility.
2. Select **System Settings → Devices and I/O Ports → MM Config Base**; then, modify the setting to increase the device resources. For example, modify 3 GB to 2 GB or modify 2 GB to 1 GB.
3. Save the settings and restart the system.
4. If the error recurs with the highest device resource setting (1GB), shutdown the system and remove some PCIe devices; then, power on the system.
5. If the reboot failed, repeat step 1 to step 4.
6. If the error recurs, press Enter to access System Setup Utility.
7. Select **System Settings → Devices and I/O Ports → PCI 64–Bit Resource Allocation**, then; modify the setting from **Auto** to **Enable**.
8. If the Boot Device does not support MMIO above 4GB for Legacy Boot, use UEFI Boot Mode or remove/disable some PCIe devices.
9. Contact Lenovo technical support.

A Lenovo optional device that was just installed does not work

1. Make sure that:
   - The device is supported for the server (see https://serverproven.lenovo.com/).
   - You followed the installation instructions that came with the device and the device is installed correctly.
   - You have not loosened any other installed devices or cables.

- You updated the configuration information in the Setup utility. Whenever memory or any other device is changed, you must update the configuration.

2. Reseat the device that you have just installed.
3. Replace the device that you have just installed.

A Lenovo optional device that worked previously does not work now

1. Make sure that all of the cable connections for the device are secure.
2. If the device comes with test instructions, use those instructions to test the device.
3. If the failing device is a SCSI device, make sure that:
   - The cables for all external SCSI devices are connected correctly.
   - Any external SCSI device is turned on. You must turn on an external SCSI device before you turn on the server.
4. Reseat the failing device.
5. Replace the failing device.

Serial-device problems

Use this information to solve problems related to serial devices.

- "Number of serial ports identified by the operating system is less than the number of installed ports" on page 440
- "Serial device does not work" on page 440

Number of serial ports identified by the operating system is less than the number of installed ports

1. Make sure that:
   - Each port is assigned a unique address in the Setup utility and none of the serial ports is disabled.
   - The serial-port adapter (if one is present) is seated correctly.
2. Reseat the serial port adapter.
3. Replace the serial port adapter.

Serial device does not work

1. Make sure that:
   - The device is compatible with the server.
   - The serial port is enabled and is assigned a unique address.
   - The device is connected to the correct connector (see "System-board internal connectors" on page 30).
2. Reseat the following components:
   a. Failing serial device
   b. Serial cable
3. Replace the following components one at a time, restarting the server each time:
   a. Failing serial device
   b. Serial cable
4. (Trained technician only) Replace the system board.

Intermittent problems

Use this information to solve intermittent problems.

- "Intermittent external device problems" on page 441

- “Intermittent KVM problems” on page 441
- “Intermittent unexpected reboots” on page 441

Intermittent external device problems

Complete the following steps until the problem is solved.

1. Update the UEFI and XCC firmware to the latest versions.
2. Make sure that the correct device drivers are installed. See the manufacturer's website for documentation.
3. For a USB device:
   a. Make sure that the device is configured correctly.

      Restart the solution and press the key according to the on-screen instructions to display the LXPM system setup interface. (For more information, see the “Startup” section in the LXPM documentation compatible with your solution at https://pubs.lenovo.com/lxpm-overview/.) Then, click **System Settings → Devices and I/O Ports → USB Configuration**.
   b. Connect the device to another port. If using a USB hub, remove the hub and connect the device directly to the compute node. Make sure that the device is configured correctly for the port.

Intermittent KVM problems

Complete the following steps until the problem is solved.

Video problems:

1. Make sure that all cables and the console breakout cable are properly connected and secure.
2. Make sure that the monitor is working properly by testing it on another compute node.
3. Test the console breakout cable on a working compute node to ensure that it is operating properly. Replace the console breakout cable if it is defective.

Keyboard problems:

Make sure that all cables and the console breakout cable are properly connected and secure.

Mouse problems:

Make sure that all cables and the console breakout cable are properly connected and secure.

Intermittent unexpected reboots

Note: Some uncorrectable errors require that the server reboot so that it can disable a device, such as a memory DIMM or a processor to allow the machine to boot up properly.

1. If the reset occurs during POST and the POST watchdog timer is enabled, make sure that sufficient time is allowed in the watchdog timeout value (POST Watchdog Timer).

   To check the POST watchdog time, restart the solution and press the key according to the on-screen instructions to display the LXPM system setup interface. (For more information, see the “Startup” section in the LXPM documentation compatible with your solution at https://pubs.lenovo.com/lxpm-overview/.) Then, click **BMC Settings → POST Watchdog Timer**.
2. If the reset occurs after the operating system starts, enter the operating system when the system operates normally and set up operating system kernel dump process (Windows and Linux base operating systems will be using different method). Enter the UEFI setup menus and disable the feature, or disable it with the following OneCli command.
   `OneCli.exe config set SystemRecovery.RebootSystemOnNMI Disable --bmc`*xcc_userid* `PASSWORD@`*xcc_ipaddress*

3. See the management controller event log to check for an event code that indicates a reboot. See “Event logs” on page 419 for information about viewing the event log. If you are using Linux base operating system, then capture all logs back to Lenovo support for further investigation.

Power problems

Use this information to resolve issues related to power.

System error LED is on and event log "Power supply has lost input" is displayed

To resolve the problem, ensure that:

1. The power supply is properly connected to a power cord.
2. The power cord is connected to a properly grounded electrical outlet for the server.
3. Make sure that the power supply AC source is stable within the supported range.
4. Swap the power supply to see if the issue follows the power supply, if it follows the power supply, then replace the failing one.
5. Review the event log and see how the problem it is to follow the event log actions to resolved the problems.

Network problems

Use this information to resolve issues related to networking.

Cannot wake server using Wake on LAN

Complete the following steps until the problem is resolved:

1. If you are using the dual-port network adapter and the server is connected to the network using Ethernet 5 connector, check the system-error log or IMM2 system event log (see “Event logs” on page 419), make sure:
   a. Fan 3 is running in standby mode, if Emulex dual port 10GBase-T embedded adapter is installed.
   b. The room temperature is not too high (see “Specifications” on page 1).
   c. The air vents are not blocked.
   d. The air baffle is installed securely.
2. Reseat the dual-port network adapter.
3. Turn off the server and disconnect it from the power source; then, wait 10 seconds before restarting the server.
4. If the problem still remains, replace the dual-port network adapter.

Could not log in using LDAP account with SSL enabled

Complete the following steps until the problem is resolved:

1. Make sure that the license key is valid.
2. Generate a new license key and log in again.

Observable problems

Use this information to solve observable problems.

The solution immediately displays the POST Event Viewer when it is turned on

Complete the following steps until the problem is solved.

1. Correct any errors that are indicated by the light path diagnostics LEDs.
2. Make sure that the solution supports all the processors and that the processors match in speed and cache size.

   You can view processor details from system setup.

   To determine if the processor is supported for the solution, see https://serverproven.lenovo.com/.
3. (Trained technician only) Make sure that processor 1 is seated correctly
4. (Trained technician only) Remove processor 2 and restart the solution.
5. Replace the following components one at a time, in the order shown, restarting the solution each time:
   a. (Trained technician only) Processor
   b. (Trained technician only) System board

Solution is unresponsive (POST is complete and operating system is running)

Complete the following steps until the problem is solved.

- If you are in the same location as the compute node, complete the following steps:
  1. If you are using a KVM connection, make sure that the connection is operating correctly. Otherwise, make sure that the keyboard and mouse are operating correctly.
  2. If possible, log in to the compute node and verify that all applications are running (no applications are hung).
  3. Restart the compute node.
  4. If the problem remains, make sure that any new software has been installed and configured correctly.
  5. Contact your place of purchase of the software or your software provider.
- If you are accessing the compute node from a remote location, complete the following steps:
  1. Make sure that all applications are running (no applications are hung).
  2. Attempt to log out of the system and log back in.
  3. Validate the network access by pinging or running a trace route to the compute node from a command line.
     a. If you are unable to get a response during a ping test, attempt to ping another compute node in the enclosure to determine whether it is a connection problem or compute node problem.
     b. Run a trace route to determine where the connection breaks down. Attempt to resolve a connection issue with either the VPN or the point at which the connection breaks down.
  4. Restart the compute node remotely through the management interface.
  5. If the problem remains, verify that any new software has been installed and configured correctly.

6. Contact your place of purchase of the software or your software provider.

Solution is unresponsive (POST failed and cannot start System Setup)

Configuration changes, such as added devices or adapter firmware updates, and firmware or application code problems can cause the solution to fail POST (the power-on self-test).

If this occurs, the solution responds in either of the following ways:

- The solution restarts automatically and attempts POST again.
- The solution hangs, and you must manually restart the solution for the solution to attempt POST again.

After a specified number of consecutive attempts (automatic or manual), the solution reverts to the default UEFI configuration and starts System Setup so that you can make the necessary corrections to the configuration and restart the solution. If the solution is unable to successfully complete POST with the default configuration, there might be a problem with the system board. You can specify the number of consecutive restart attempts in System Setup. Click **System Settings → Recovery → POST Attempts → POST Attempts Limit**. Available options are 3, 6, 9, and 255.

Voltage planar fault is displayed in the event log

Complete the following steps until the problem is solved.

1. Revert the system to the minimum configuration. See “Specifications” on page 1 for the minimally required number of processors and DIMMs.
2. Restart the system.
   - If the system restarts, add each of the items that you removed one at a time, restarting the system each time, until the error occurs. Replace the item for which the error occurs.
   - If the system does not restart, replace the system board.

Unusual smell

Complete the following steps until the problem is solved.

1. An unusual smell might be coming from newly installed equipment.
2. If the problem remains, contact Lenovo Support.

Solution seems to be running hot

Complete the following steps until the problem is solved.

Multiple compute nodes or enclosure:

1. Make sure that the room temperature is within the specified range (see “Specifications” on page 1).
2. Check the management processor event log for rising temperature events. If there are no events, the compute node is running within normal operating temperatures. Note that you can expect some variation in temperature.

Cannot enter legacy mode after installing a new adapter

Complete the following procedure to solve the problem.

1. Go to **UEFI Setup → Devices and I/O Ports → Set Option ROM Execution Order**.
2. Move the RAID adapter with operation system installed to the top of the list.
3. Select **Save**.
4. Reboot the system and auto boot to operation system.

Cracked parts or cracked enclosure

Contact Lenovo Support.

Collecting service data

See *FPC User's Guide* for more information.

GPU problems

Use this information to resolve problems that are related to GPUs and the GPU board.

- "Health check for GPUs and GPU board" on page 445
- "System fails to detect the GPU board" on page 445
- "System fails to detect a specific GPU" on page 446
- "XCC GPU sensor specifications" on page 446

Health check for GPUs and GPU board

The following sensor status by ipmitool indicates the GPUs and GPU board are in normal state.

```
$ ipmitool -I lanplus -H 192.168.70.125 -U USERID -P PASSWORD
sdr elist | grep GPU
GPU Board Power  | 8Ch | ok  | 21.4 | 250 Watts
GPU Board        | E9h | ok  | 11.8 | Transition to OK
GPU CPUs         | EAh | ok  | 11.9 | Transition to OK
```

The summary of `nvidia-smi` utility indicates 4 GPUs online.

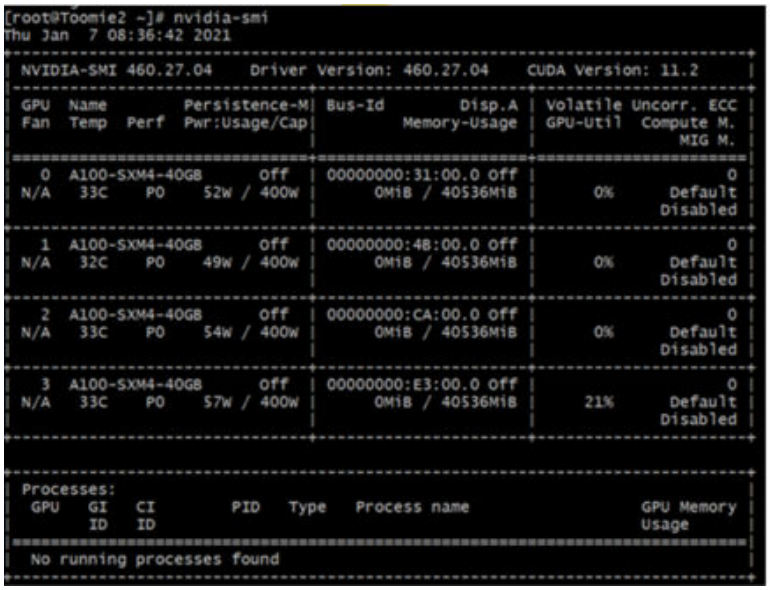


Figure 438. nvidia-smi

System fails to detect the GPU board

When event `Sensor GPU Board has transitioned to critical from a less severe state` appears in the XCC web event log, it indicates the system fails to detect the GPU board. Go through the following steps to solve the problem.

1. Power cycle the system.

2. Check power input related events in XCC and SMM2 (see https://pubs.lenovo.com/mgt_tools_smm2/c_power).
3. Check the system temperature and water flow. Look for leakage, and disconnect then reconnect the water cooling system.
4. Reboot the system, and run ipmi health check (see “Health check for GPUs and GPU board” on page 445).
5. One of the following indicates the problem has been solved:
   - `FQXSPUN0017I (Sensor GPU Board has transitioned to normal state)` in XCC messages
   - `Sensor GPU Board has transitioned to normal state` in web log

   However, if the problem persists, complete the following steps:
   a. Collect XCC service data (see “Collecting service data” on page 452).
   b. Contact Lenovo Service.

System fails to detect a specific GPU

When the event `Sensor GPU CPUs has transitioned to critical from a less severe state` appears in the XCC web event log, it indicates the system fails to detect one or more specific GPUs. Go through the following steps to solve the problem.

1. Check if the retimer is over-temperature from XCC event, if yes, skip the next step.
2. Download the latest firmware from Data Center Support site (https://datacentersupport.lenovo.com/products/servers/thinksystem/SD650v2), and update the firmware.
3. Reboot the system, and run ipmi health check (see “Health check for GPUs and GPU board” on page 445).
4. If the event `Sensor GPU Board has transitioned to normal state` appears in the XCC web event log, it indicates the problem has been solved.

   However, if the problem persists, complete the following steps.
   a. Check XCC web event log to identify defective unit and problem type (see “XCC GPU sensor specifications” on page 446).
   b. Collect XCC service data (see “Collecting service data” on page 452).
   c. Run `nvidia-smi` for diagnosis (see https://developer.nvidia.com/nvidia-system-management-interface for details)
   d. Run `nvidia-bug-report.sh` (embedded tool in NVIDIA driver).
   e. Contact Lenovo Service.

XCC GPU sensor specifications

When seeing an event in XCC web event log, refer to the following table to identify defective unit and problem type. For example:

```
6 | 01/08/2021 | 14:34:53 | 0x0020 | Add-in Card GPU Board | Trasition to Critical from less severe | Asserted |0xA2F60F
```

Table 46. XCC GPU sensor specifications

Sensor Name			Data
GPU CPUs	Sensor Number	EAh	02h - Transition to Critical from less severe Evt Data2: B0h: Thermal alert BBh: Presence and Power status B1h: GPU interrupt info 21h: PCIe link status E0h: GPU count from SMBIOS Evt Data3: XXh: GPU CORE index, 01h: core 1 07h: core 3 + core 4
	Sensor Type	17h	
	Sensor Reading Type	07h	
	Entity ID	0Bh	
	Instance/Type	02h	
	SEL Logged Assertions	02h	
	SEL Logged De-assertions	02h	
	Thresholds De-assertions		
	LED 'ON' Request when Assertion F = Fault KED	02h - F	
	LED 'OFF' Request when De-assertion F = Fault KED	02h - F	
GPU board	Sensor Number	EAh	00h - Transition to OK 02h - Transition to Critical from less severe Evt Data2: F1h: GPU Thermaltrip (no evt3) F2h: PIB Thermaltrip (no evt3) F4h: Retimer Termaltrip F6h: GPU core thermal alert Evt Data3: XXh: GPU CORE index, 01h: core 1 07h: core 3 + core 4 If Evt2: F4h, 01h: Overtemp flag asserted
	Sensor Type	17h	
	Sensor Reading Type	07h	
	Entity ID	0Bh	
	Instance/Type	01h	
	SEL Logged Assertions	02h	
	SEL Logged De-assertions	02h	
	Thresholds De-assertions	N/A	
	LED 'ON' Request when Assertion F = Fault LED	00h - None 02h - F	
	LED 'OFF' Request when De-assertion F = Fault LED	00h - None 02h - F	

System Management Module 2 problems

Use this information to resolve issues related the to the SMM2.

- "System Management Module 2 does not power on" on page 448
- "System Management Module 2 status LED is not flashing normally" on page 448
- "System Management Module 2 ping failure" on page 448
- "System fans failed while the System Management Module 2 is working normally" on page 448

System Management Module 2 does not power on

Complete the following steps until the problem is resolved:

1. Check if the power supplies are installed correctly and power supply LEDs are lit normally.
2. Reseat the SMM2 and check the LED status again.
3. If the problem persists, replace the SMM2.

System Management Module 2 status LED is not flashing normally

When the SMM2 is working, its status LED flashes at a slower speed (about once every two seconds).

If the SMM2 status LED is continuously on or off, or it has been flashing rapidly (two or 10 times per second) for more than 15 minutes, it indicates that the SMM2 may have encountered a problem.

Complete the following steps until the problem is resolved:

1. Reseat the SMM2.
2. If the problem persists, replace the SMM2.

System Management Module 2 ping failure

Complete the following steps until the problem is solved.

1. Check the SMM2 IP address and network status via Lenovo XClarity Controller.
2. Alternatively, you can check SMM2 LEDs to diagnose the SMM2 status (see “System Management Module 2 (SMM 2) ” on page 423 for SMM2 LEDs details).
   - If the SMM2 power LED and the status LED are working abnormally, reinstall the SMM2.
3. If the problem persists, replace the SMM2.

System fans failed while the System Management Module 2 is working normally

Complete the following steps until the problem is solved.

1. Check SMM2 FFDC and SNMP event logs to see if there is any fan fault or absence issue.

   Notes: To collect FFDC logs, you can perform one of the following actions:

   - Insert a USB storage device to the USB connector on SMM2 and then press the USB port service mode button to collect FFDC logs. See “System Management Module 2 (SMM 2) ” on page 423 for the location of the connector and button.
   - Login to the SMM2 WebGUI and click on the **Capture** button of FFDC in the **Management Module** section under **Enclosure Rear Overview** (see “Enclosure Rear Overview” in *System Management Module 2 User Guide* at https://pubs.lenovo.com/mgt_tools_smm2/c_chassis_rear_overview).
2. If there is a fan fault or absence issue, reseat the failing fans.
3. Check the SMM2 FFDC and SNMP event logs to see if there is any compute node communication issue.

   Note: To protect the compute node from thermal damages, the SMM2 is designed to ramp up all system fans if the compute node lost its communication with the SMM2.

   - If the problem persists, reset Lenovo XClarity Controller and login to Lenovo XClarity Controller to collect FFDC logs and check if there is any warning or error reported.
4. If the problem persists, please consult with the technical service.

Software problems

Use this information to solve software problems.

1. To determine whether the problem is caused by the software, make sure that:
   - The server has the minimum memory that is needed to use the software. For memory requirements, see the information that comes with the software.

     Note: If you have just installed an adapter or memory, the server might have a memory-address conflict.
   - The software is designed to operate on the server.
   - Other software works on the server.
   - The software works on another server.
2. If you receive any error messages while you use the software, see the information that comes with the software for a description of the messages and suggested solutions to the problem.
3. Contact your place of purchase of the software.

Appendix A. Getting help and technical assistance

If you need help, service, or technical assistance or just want more information about Lenovo products, you will find a wide variety of sources available from Lenovo to assist you.

On the World Wide Web, up-to-date information about Lenovo systems, optional devices, services, and support are available at:

http://datacentersupport.lenovo.com

Note: This section includes references to IBM web sites and information about obtaining service. IBM is Lenovo's preferred service provider for ThinkSystem.

Before you call

Before you call, there are several steps that you can take to try and solve the problem yourself. If you decide that you do need to call for assistance, gather the information that will be needed by the service technician to more quickly resolve your problem.

Attempt to resolve the problem yourself

You can solve many problems without outside assistance by following the troubleshooting procedures that Lenovo provides in the online help or in the Lenovo product documentation. The Lenovo product documentation also describes the diagnostic tests that you can perform. The documentation for most systems, operating systems, and programs contains troubleshooting procedures and explanations of error messages and error codes. If you suspect a software problem, see the documentation for the operating system or program.

You can find the product documentation for your ThinkSystem products at https://pubs.lenovo.com/

You can take these steps to try to solve the problem yourself:

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Check for updated software, firmware, and operating-system device drivers for your Lenovo product. The Lenovo Warranty terms and conditions state that you, the owner of the Lenovo product, are responsible for maintaining and updating all software and firmware for the product (unless it is covered by an additional maintenance contract). Your service technician will request that you upgrade your software and firmware if the problem has a documented solution within a software upgrade.
- If you have installed new hardware or software in your environment, check https://serverproven.lenovo.com/ to make sure that the hardware and software are supported by your product.
- Go to http://datacentersupport.lenovo.com and check for information to help you solve the problem.
  - Check the Lenovo forums at https://forums.lenovo.com/t5/Datacenter-Systems/ct-p/sv_eg to see if someone else has encountered a similar problem.

Gathering information needed to call Support

If you require warranty service for your Lenovo product, the service technicians will be able to assist you more efficiently if you prepare the appropriate information before you call. You can also go to http://datacentersupport.lenovo.com/warrantylookup for more information about your product warranty.

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Gather the following information to provide to the service technician. This data will help the service technician quickly provide a solution to your problem and ensure that you receive the level of service for which you might have contracted.

- Hardware and Software Maintenance agreement contract numbers, if applicable
- Machine type number (Lenovo 4-digit machine identifier)
- Model number
- Serial number
- Current system UEFI and firmware levels
- Other pertinent information such as error messages and logs

As an alternative to calling Lenovo Support, you can go to https://support.lenovo.com/servicerequest to submit an Electronic Service Request. Submitting an Electronic Service Request will start the process of determining a solution to your problem by making the pertinent information available to the service technicians. The Lenovo service technicians can start working on your solution as soon as you have completed and submitted an Electronic Service Request.

Collecting service data

To clearly identify the root cause of a server issue or at the request of Lenovo Support, you might need collect service data that can be used for further analysis. Service data includes information such as event logs and hardware inventory.

Service data can be collected through the following tools:

- **Lenovo XClarity Provisioning Manager**

  Use the Collect Service Data function of Lenovo XClarity Provisioning Manager to collect system service data. You can collect existing system log data or run a new diagnostic to collect new data.

- **Lenovo XClarity Controller**

  You can use the Lenovo XClarity Controller web interface or the CLI to collect service data for the server. The file can be saved and sent to Lenovo Support.

  - For more information about using the web interface to collect service data, see the “Downloading service data” section in the XCC documentation version compatible with your server at https://pubs.lenovo.com/lxcc-overview/.
  - For more information about using the CLI to collect service data, see the “ffdc command” section in the XCC documentation version compatible with your server at https://pubs.lenovo.com/lxcc-overview/.

- **Lenovo XClarity Administrator**

  Lenovo XClarity Administrator can be set up to collect and send diagnostic files automatically to Lenovo Support when certain serviceable events occur in Lenovo XClarity Administrator and the managed endpoints. You can choose to send diagnostic files to Lenovo Support using Call Home or to another service provider using SFTP. You can also manually collect diagnostic files, open a problem record, and send diagnostic files to the Lenovo Support Center.

  You can find more information about setting up automatic problem notification within the Lenovo XClarity Administrator at https://pubs.lenovo.com/lxca/admin_setupcallhome.html.

- **Lenovo XClarity Essentials OneCLI**

  Lenovo XClarity Essentials OneCLI has inventory application to collect service data. It can run both in-band and out-of-band. When running in-band within the host operating system on the server, OneCLI can collect information about the operating system, such as the operating system event log, in addition to the hardware service data.

To obtain service data, you can run the `getinfor` command. For more information about running the `getinfor`, see https://pubs.lenovo.com/lxce-onecli/onecli_r_getinfor_command.

Contacting Support

You can contact Support to obtain help for your issue.

You can receive hardware service through a Lenovo Authorized Service Provider. To locate a service provider authorized by Lenovo to provide warranty service, go to https://datacentersupport.lenovo.com/serviceprovider and use filter searching for different countries. For Lenovo support telephone numbers, see https://datacentersupport.lenovo.com/supportphonelist for your region support details.

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Important notes

Processor speed indicates the internal clock speed of the processor; other factors also affect application performance.

CD or DVD drive speed is the variable read rate. Actual speeds vary and are often less than the possible maximum.

When referring to processor storage, real and virtual storage, or channel volume, KB stands for 1 024 bytes, MB stands for 1 048 576 bytes, and GB stands for 1 073 741 824 bytes.

When referring to hard disk drive capacity or communications volume, MB stands for 1 000 000 bytes, and GB stands for 1 000 000 000 bytes. Total user-accessible capacity can vary depending on operating environments.

Maximum internal hard disk drive capacities assume the replacement of any standard hard disk drives and population of all hard-disk-drive bays with the largest currently supported drives that are available from Lenovo.

Maximum memory might require replacement of the standard memory with an optional memory module.

Each solid-state memory cell has an intrinsic, finite number of write cycles that the cell can incur. Therefore, a solid-state device has a maximum number of write cycles that it can be subjected to, expressed as `total bytes written` (TBW). A device that has exceeded this limit might fail to respond to system-generated commands or might be incapable of being written to. Lenovo is not responsible for replacement of a device that has exceeded its maximum guaranteed number of program/erase cycles, as documented in the Official Published Specifications for the device.

Lenovo makes no representations or warranties with respect to non-Lenovo products. Support (if any) for the non-Lenovo products is provided by the third party, not Lenovo.

Some software might differ from its retail version (if available) and might not include user manuals or all program functionality.

Particulate contamination

Attention: Airborne particulates (including metal flakes or particles) and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the device that is described in this document.

Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the device to malfunction or cease functioning altogether. This specification sets forth limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits, because numerous other factors, such as temperature or moisture content of the air, can influence the impact of particulates or environmental corrosives and gaseous contaminant transfer. In the absence of specific limits that are set forth in this document, you must implement practices that maintain particulate and gas levels that are consistent with the protection of human health and safety. If Lenovo determines that the levels of particulates or gases in your environment have caused damage to the device, Lenovo may condition provision of repair or replacement of devices or parts on implementation of appropriate remedial measures to mitigate such environmental contamination. Implementation of such remedial measures is a customer responsibility.

Table 47. Limits for particulates and gases

Contaminant	Limits
Reactive gases	Severity level G1 as per ANSI/ISA 71.04-1985[1]: • The copper reactivity level shall be less than 200 Angstroms per month (Å/month ≈ 0.0035 µg/cm^2-hour weight gain).[2] • The silver reactivity level shall be less than 200 Angstroms per month (Å/month ≈ 0.0035 µg/cm^2-hour weight gain).[3] • The reactive monitoring of gaseous corrosivity must be conducted approximately 5 cm (2 in.) in front of the rack on the air inlet side at one-quarter and three-quarter frame height off the floor or where the air velocity is much higher.
Airborne particulates	Data centers must meet the cleanliness level of ISO 14644-1 class 8. For data centers without airside economizer, the ISO 14644-1 class 8 cleanliness might be met by choosing one of the following filtration methods: • The room air might be continuously filtered with MERV 8 filters. • Air entering a data center might be filtered with MERV 11 or preferably MERV 13 filters. For data centers with airside economizers, the choice of filters to achieve ISO class 8 cleanliness depends on the specific conditions present at that data center. • The deliquescent relative humidity of the particulate contamination should be more than 60% RH.[4] • Data centers must be free of zinc whiskers.[5]

[1] ANSI/ISA-71.04-1985. *Environmental conditions for process measurement and control systems: Airborne contaminants*. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.

[2] The derivation of the equivalence between the rate of copper corrosion growth in the thickness of the corrosion product in Å/month and the rate of weight gain assumes that Cu_2S and Cu_2O grow in equal proportions.

[3] The derivation of the equivalence between the rate of silver corrosion growth in the thickness of the corrosion product in Å/month and the rate of weight gain assumes that Ag_2S is the only corrosion product.

[4] The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.

[5] Surface debris is randomly collected from 10 areas of the data center on a 1.5 cm diameter disk of sticky electrically conductive tape on a metal stub. If examination of the sticky tape in a scanning electron microscope reveals no zinc whiskers, the data center is considered free of zinc whiskers.

Water quality requirement

Attention: The water required to initially fill the system side cooling loop must be reasonably clean, bacteria-free water (<100 CFU/ml) such as de-mineralized water, reverse osmosis water, de-ionized water, or distilled water. The water must be filtered with an in-line 50 micron filter (approximately 288 mesh). The water must be

treated with anti-biological and anti-corrosion measures. Environment quality must be maintain over the lifetime of the system to receive warranty and support on affecting components. For more information please see Lenovo Neptune Direct Water-Cooling Standards.

Telecommunication regulatory statement

This product may not be certified in your country for connection by any means whatsoever to interfaces of public telecommunications networks. Further certification may be required by law prior to making any such connection. Contact a Lenovo representative or reseller for any questions.

Electronic emission notices

When you attach a monitor to the equipment, you must use the designated monitor cable and any interference suppression devices that are supplied with the monitor.

Additional electronic emissions notices are available at:

https://pubs.lenovo.com/important_notices/

Taiwan Region BSMI RoHS declaration

單元 Unit	限用物質及其化學符號 Restricted substances and its chemical symbols					
	鉛Lead (Pb)	汞Mercury (Hg)	鎘Cadmium (Cd)	六價鉻 Hexavalent chromium (Cr^{+6})	多溴聯苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
機架	○	○	○	○	○	○
外部蓋板	○	○	○	○	○	○
機械組合件	–	○	○	○	○	○
空氣傳動設備	–	○	○	○	○	○
冷卻組合件	–	○	○	○	○	○
內存模塊	–	○	○	○	○	○
處理器模塊	–	○	○	○	○	○
電纜組合件	–	○	○	○	○	○
電源	–	○	○	○	○	○
儲備設備	–	○	○	○	○	○
電路卡	–	○	○	○	○	○
光碟機	–	○	○	○	○	○
雷射器	–	○	○	○	○	○

備考1. 〝超出0.1 wt %〞及〝超出0.01 wt %〞係指限用物質之百分比含量超出百分比含量基準值。

Note1 : “exceeding 0.1wt%” and “exceeding 0.01 wt%” indicate that the percentage content of the restricted substance exceeds the reference percentage value of presence condition.

備考2. 〝○〞係指該項限用物質之百分比含量未超出百分比含量基準值。

Note2 : “○”indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence.

備考3. 〝-〞係指該項限用物質為排除項目。

Note3 : The “-“ indicates that the restricted substance corresponds to the exemption.

Taiwan Region import and export contact information

Contacts are available for Taiwan Region import and export information.

委製商/進口商名稱: 台灣聯想環球科技股份有限公司
進口商地址: 台北市南港區三重路 66 號 8 樓
進口商電話: 0800-000-702

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