ThinkCentre neo 50s Gen 5
User Guide

Read this first

Before using this documentation and the product it supports, ensure that you read and understand the following:

- *Safety and Warranty Guide*
- *Generic Safety and Compliance Notices*
- *Setup Guide*

First Edition (September 2024)

Contents

About this documentation

- This guide applies to the Lenovo product models listed below. Illustrations in this guide may look slightly different from your product model.

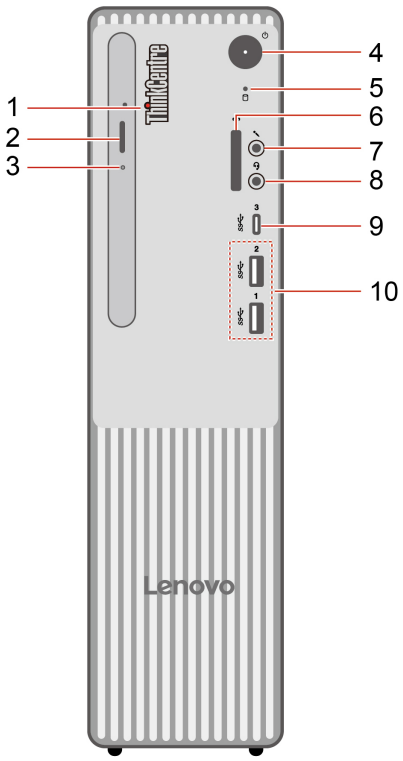
Model name	Machine types (MT)
ThinkCentre neo 50s Gen 5	12XG, 12XF, 12XE, 12XD

- For more compliance information, refer to *Regulatory Notice* at https://pcsupport.lenovo.com and *Generic Safety and Compliance Notices* at https://pcsupport.lenovo.com/docs/generic_notices.
- Depending on the model, some optional accessories, features, and software programs might not be available on your computer.
- Depending on the version of the operating systems and programs, some user interface instructions might not be applicable to your computer.
- Documentation content is subject to change without notice. Lenovo makes constant improvements to the documentation of your computer, including this *User Guide*. To get the latest documentation, go to https://pcsupport.lenovo.com.
- Microsoft® makes periodic feature changes to the Windows® operating system through Windows Update. As a result, some information in this documentation might become outdated. Refer to Microsoft resources for the latest information.

Chapter 1. Meet your computer

This computer is equipped with an extensive selection of ports, providing convenient connectivity options for multiple devices.

Front view



Item	Description	Item	Description
1	ThinkCentre® LED	2	Optical drive eject button*
3	Optical drive activity indicator*	4	Power button with power indicator
5	Storage drive activity indicator	6	SD-card slot*
7	Microphone connector	8	Headset connector
9	USB-C® connector (USB 5Gbps)	10	USB-A connectors (USB 5Gbps)

* for selected models

Note: For more information about the USB connector name update, see Appendix A “Notice for USB connector name update” on page 45.

Statement on USB transfer rate

Depending on many factors such as the processing capability of the host and peripheral devices, file attributes, and other factors related to system configuration and operating environments, the actual transfer

rate using the various USB connectors on this device will vary and will be slower than the data rate listed in the connector name or below for each corresponding device.

USB device	Data rate (Gbit/s)
Thunderbolt 3	40
Thunderbolt 4	40

Power indicator

Show the system status of your computer.

- **Blinking for three times:** The computer is initially connected to power.
- **On:** The computer is starting up or working.
- **Off:** The computer is off or in hibernation mode.
- **Blinking rapidly:** The computer is entering sleep or hibernation mode.
- **Blinking slowly:** The computer is in sleep mode.

Headset connector

The headset connector is compatible with:

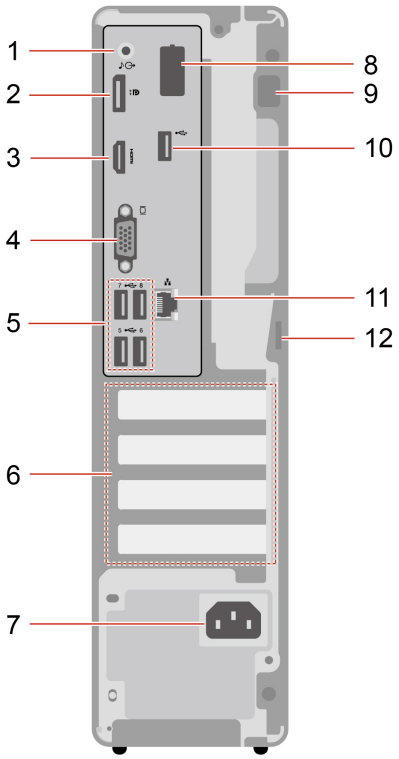
- Headphones or earphones with a 3.5mm (0.14 inch), TRS (3-pole) plug
- Headsets with a 3.5mm (0.14 inch), CTIA-compliant TRRS (4-pole) plug

Note: This headset connector does not support standalone external microphones with a TRS (3-pole) plug or headsets with an OMTP-compliant TRRS (4-pole) plug.

Related topics

- “USB specifications” on page 5.
- “Optical drive and optical drive latch” on page 29.
- “Transfer data” on page 7.

Rear view



Item	Description	Item	Description
1	Audio line-out connector	2	DisplayPort™ out connector
3	HDMI™ out connector	4	VGA-out connector
5	USB-A connectors (Hi-Speed USB)	6	PCI-Express card area
7	Power cord connector	8	Smart cable clip*
9	Security-lock slot	10	USB-A connector (Hi-Speed USB)*
11	Ethernet connector	12	Padlock loop

* for selected models

Related topics

- “USB specifications” on page 5.
- “Connect an external display” on page 7.
- “Access networks” on page 7.
- “Lock the computer” on page 9.
- “PCIe card” on page 22.

Specifications

Specification	Description
Dimensions	• Width: 92.5 mm (3.6 inches) • Height: 339.5 mm (13.4 inches) • Depth: 291.4 mm (11.5 inches)
Weight (without packaging)	Maximum configuration as shipped: 4.63 kg (10.2 lb)
Hardware configuration	Type `Device Manager` in the Windows search box and then press Enter. Type the administrator password or provide confirmation, if prompted.
Power supply	• 180-watt automatic voltage-sensing power supply • 260-watt automatic voltage-sensing power supply
Electrical input	• Input voltage: From 100 V ac to 240 V ac • Input frequency: 50/60 Hz
Memory	Up to two double data rate 5 (DDR5) non-error correction code (non-ECC) unbuffered dual in-line memory modules (UDIMMs) Maximum memory capacity: 64 GB
Storage device	• 3.5-inch hard disk drive* • M.2 solid-state drive* • Optical drive* To view the storage drive capacity of your computer, type `Disk Management` in the Windows search box and then press Enter. **Note:** The storage drive capacity indicated by the system is less than the nominal capacity.
Video features	• The integrated graphics card supports the following: – DisplayPort out connector – HDMI out connector – VGA-out connector • The optional discrete graphics card provides an enhanced video experience and extended capabilities.
Expansion	• Card reader* • Memory slots • M.2 solid-state drive slot • Optical drive* • Storage drive bay • PCI Express slots
Network features	• Bluetooth* • Ethernet LAN • Wireless LAN*

* for selected models

Operating environment

Maximum altitude (without pressurization)

- Operating: From 0 m (0 ft) to 3048 m (10 000 ft)
- Storage: From 0 m (0 ft) to 12192 m (40 000 ft)

Temperature

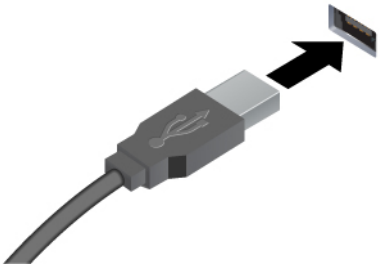
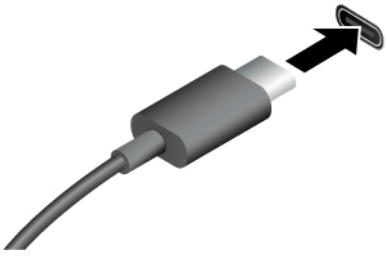
- Operating: From 5°C (41°F) to 35°C (95°F)
- Storage:
  - For common desktop computers: From -40°C (-40°F) to 60°C (140°F)
  - For all-in-one desktop computers: From -20°C (-4°F) to 60°C (140°F)

Relative humidity

- Operating: 20%-80% (non-condensing)
- Storage: 10%-90% (non-condensing)

USB specifications

Note: Depending on the model, some USB connectors might not be available on your computer.

Connector name	Description
 • USB-A connector (Hi-Speed USB) • SS USB-A connector (USB 5Gbps)	Connect USB-A compatible devices, such as a USB-A keyboard, USB-A mouse, USB-A storage device, or USB-A printer.
 • SS USB-C connector (USB 5Gbps)	• Charge USB-C compatible devices with the output voltage and current of 5 V and 3 A. • Connect to USB-C accessories to help expand your computer functionality. To purchase USB-C accessories, go to https://www.lenovo.com/accessories.

The Vantage app

The Vantage app is a customized one-stop solution to help you maintain your computer with automated updates and fixes, configure hardware settings, and get personalized support.

To access the Vantage app, type `Vantage` in the Windows search box.

Notes:

- The available features vary depending on the computer model.
- The Vantage app makes periodic updates of the features to keep improving your experience with your computer. The description of features might be different from that on your actual user interface. You can download the latest version of Vantage app from Microsoft Store.

The Vantage app enables you to:

- Know the device status easily and customize device settings.
- Download and install UEFI BIOS, firmware, and driver to keep your computer up-to-date.
- Monitor your computer health, and secure your computer against outside threats.
- Scan your computer hardware and diagnose hardware problems.
- Look up warranty status (online).
- Access *User Guide* and helpful articles.

Chapter 2. Get started with your computer

Access networks

This section helps you connect to a wireless or wired network.

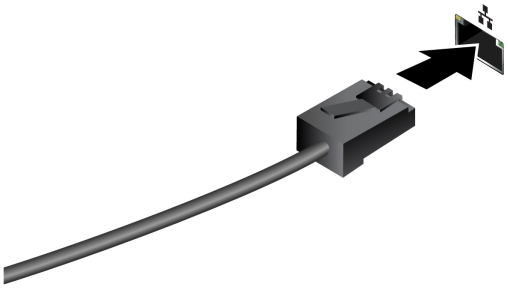
Connect to Wi-Fi networks (for selected models)

Click on the bottom right of your display to connect to an available network. Provide required information, if needed.

Note: The wireless LAN module on your computer may support different standards. For some countries or regions, use of 802.11ax may be disabled according to local regulations.

Connect to the wired Ethernet

Connect your computer to a local network through the Ethernet connector on your computer with an Ethernet cable.



Connect an external display

Connect a projector or a monitor to your computer to give presentations or expand your workspace.

Change display settings

1. Right-click a blank area on the desktop and select display settings.
2. Select the display that you want to configure and change display settings of your preference.

Transfer data

You can install a disc or media card to transfer data.

Use the optical drive (for selected models)

If your computer has an optical drive, read the following information.

Know the type of your optical drive

1. Type `Device Manager` in the Windows search box and then press Enter. Type the administrator password or provide confirmation, if prompted.
2. Select an optical drive, and then follow the on-screen instructions.

Install or remove a disc

1. With the computer on, press the eject button on the optical drive. The tray slides out of the drive.
2. Insert a disc into the tray or remove a disc from the tray, and then push the tray back into the drive.

Note: If the tray does not slide out of the drive when you press the eject button, turn off the computer. Then, insert a straightened paper clip into the emergency-eject hole adjacent to the eject button. Use the emergency eject only in an emergency.

Record a disc

1. Insert a recordable disc into the optical drive that supports recording.
2. Do one of the following:
   - Type `AutoPlay` in the Windows search box and then press Enter. Turn on **Use AutoPlay for all media and devices**.
   - Open Windows Media Player.
   - Double-click the ISO file.
3. Follow the on-screen instructions.

Use a media card (for selected models)

If your computer has a SD-card slot, read the following information.

Install a media card

1. Locate the SD-card slot.
2. Ensure that the metal contacts on the card are facing the ones in the SD-card slot. Insert the card firmly into the SD-card slot until it is secured in place.

Remove a media card

Attention: Before removing the card:

1. Click the triangular icon in the Windows notification area to show hidden icons. Right-click the icon prompting you to safely remove hardware and eject media.
2. Select the corresponding item to eject the card from the Windows operating system.
3. Press the card and remove it from your computer. Store the card safely for future use.

Connect to a Bluetooth device (for selected models)

You can connect all types of Bluetooth-enabled devices to your computer, such as a keyboard, a mouse, a smartphone, or speakers. To ensure successful connection, place the devices at most 10 meters (33 feet) from the computer.

Conventional pair

This topic helps you connect to a Bluetooth device by conventional pair.

Step 1. Type `Bluetooth` in the Windows search box and then press Enter.

Step 2. Turn on both the Bluetooth on your computer and the Bluetooth device. Make sure the device is discoverable.

Step 3. Select the device when it is displayed on the **Add a device** list, and then follow the on-screen instructions.

Notes: If the Bluetooth connection failed, do the following:

1. Type `Device Manager` in the Windows search box and then press Enter.
2. Locate the Bluetooth adapter. Right-click and select **Update driver**.
3. Select **Search automatically for drivers**, and then follow the on-screen instructions.

Swift pair

This topic helps you connect to a Bluetooth device by swift pair.

If your Bluetooth device supports swift pair, do the following:

Step 1. Enable swift pair notification on Bluetooth settings page.

Step 2. Turn on both the Bluetooth on your computer and the Bluetooth device. Make sure the device is discoverable.

Step 3. Click **Connect** when a swift pair notification appears on your computer.

Notes: If the Bluetooth connection failed, do the following:

1. Type `Device Manager` in the Windows search box and then press Enter.
2. Locate the Bluetooth adapter. Right-click and select **Update driver**.
3. Select **Search automatically for drivers**, and then follow the on-screen instructions.

Set the power plan

For ENERGY STAR® compliant computers, the following power plan takes effect when your computers have been idle for a specified duration:

- Turn off the display: After 10 minutes
- Put the computer to sleep: After 25 minutes

To awaken the computer from Sleep mode, press any key on your keyboard.

To set the power plan:

1. Type **Power Options** in the Windows search box and then press Enter.
2. Choose or customize a power plan of your preference.

Security

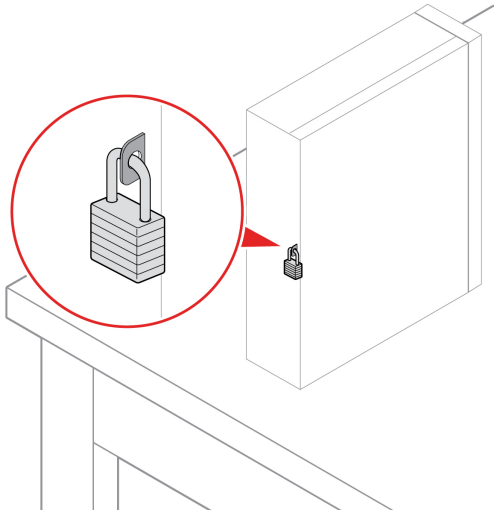
This computer offers a wealth of security measures to protect both the device and data safety.

Lock the computer

Note: Lenovo makes no comments, judgments, or warranties about the function, quality, or performance of the locking device and security feature. You can purchase computer locks from Lenovo.

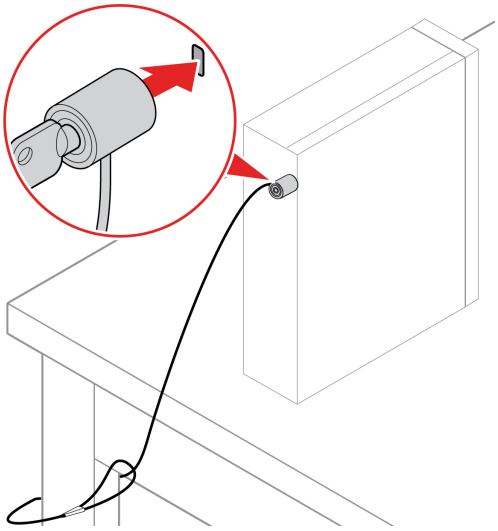
Padlock

Locking the computer cover through a padlock prevents unauthorized access to the inside of your computer.



Security lock

Lock your computer to a desk, table, or other fixtures through a security lock.



Smart USB protection

The Smart USB Protection function is a security function that helps prevent data from being copied from the computer to USB storage devices connected to the computer. You can set the Smart USB Protection function to one of the following modes:

- **Disabled** (default setting): You can use the USB storage devices without limitation.
- **Read Only**: You cannot copy data from the computer to the USB storage devices. However, you can access data on the USB storage devices.
- **No Access**: You cannot access the USB storage devices from the computer.

To configure the Smart USB Protection function:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Security** → **Smart USB Protection** and press Enter.

3. Select the desired setting and press Enter.
4. Press F10 or Fn+F10 to save the changes and exit.

Use software security solutions

The following software solutions help secure your computer and information.

- **Windows Security**

  Windows Security is a software built-in to the operating system. It continually scans for malicious software, viruses, and other security threats. Besides, Windows updates are downloaded automatically to help keep your computer safe. Windows Security also enables you to manage tools including firewall, account protection, application and browser control, and so on.

- **Antivirus programs**

  Lenovo preinstalls a full-version antivirus software on selected models of computer. It helps defend the computer against viruses, safeguard your identity, and keep your personal information secured.

- **Absolute Persistence**

  Absolute Persistence technology is embedded in firmware. It detects changes that happen on the hardware, software, or the call-in location. It keeps you always knowing what condition the computer is in. To activate the technology, you have to purchase a subscription to Absolute.

Note: For more information about how to use these software solutions, refer to their help systems respectively.

Use BIOS security solutions

This section provides BIOS solutions to secure your computer and information.

Wipe the storage drive data

It is recommended that you wipe the storage drive data before recycling the storage drive or the computer.

To wipe the storage drive data:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Security → secure wipe → Enabled**.
3. Press F10 or Fn+F10 to save the changes and exit.
4. Restart the computer. When the logo screen is displayed, press F12 or Fn+F12.
5. Select **App Menu → secure wipe** and press Enter.
6. Select the storage drive you will wipe and click **NEXT**.
7. Select the entire storage drive or partition to wipe as desired.
8. Select the method as desired and click **NEXT**.
9. Click **Yes** to confirm your option when the prompting window is displayed.
10. If you have set a hard disk password for the storage drive, enter the password. Otherwise, set a temporary password following the on-screen instructions. Then, click **NEXT**. The wiping process begins.

    Note: Duration of the wiping process varies depending on the storage drive capacity.
11. Click **Reboot** when you are prompted to reset the system, and then one of the following will happen:
    - If the system storage drive data is wiped, you will be prompted that no operating system is found.
    - If the non-system storage drive data is wiped, the computer restarts automatically.

Cover presence switch

The cover presence switch prevents the computer from logging in to the operating system when the computer cover is not properly installed or closed.

To enable the cover presence switch connector on the system board:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Security → Cover Tamper Detected** and press Enter.
3. Select **Enabled** and press Enter.
4. Press F10 or Fn+F10 to save the changes and exit.

If the cover presence switch is enabled and the computer cover is not correctly installed or closed, an error message will be displayed when you turn on the computer. To bypass the error message and log in to the operating system:

1. Properly install or close the computer cover.
2. Enter the BIOS menu, save and then exit.

Intel BIOS guard

The Intel® BIOS Guard module cryptographically verifies all BIOS updates. This hardware-based security helps prevent software and malware attacks on the computers BIOS.

Smart USB Protection

The Smart USB Protection function is a security function that helps prevent data from being copied from the computer to USB storage devices connected to the computer. You can set the Smart USB Protection function to one of the following modes:

- **Disabled** (default setting): You can use the USB storage devices without limitation.
- **Read Only**: You cannot copy data from the computer to the USB storage devices. However, you can access data on the USB storage devices.
- **No Access**: You cannot access the USB storage devices from the computer.

To configure the Smart USB Protection function:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Security → Smart USB Protection** and press Enter.
3. Select the desired setting and press Enter.
4. Press F10 or Fn+F10 to save the changes and exit.

UEFI BIOS passwords

You can set passwords in UEFI (Unified Extensible Firmware Interface) BIOS (Basic Input/Output System) to strengthen the security of your computer.

Password types

You can set a power-on password, supervisor password, system management password, or hard disk password in UEFI BIOS to prevent unauthorized access to your computer. However, you are not prompted to enter any UEFI BIOS password when your computer resumes from sleep mode.

- Power-on password

  When a power-on password is set, you are prompted to enter a valid password each time the computer is turned on.
- Supervisor password

Setting a supervisor password deters unauthorized users from changing configuration settings. If you are responsible for maintaining the configuration settings of several computers, you might want to set a supervisor password.

When a supervisor password is set, you are prompted to enter a valid password each time you try to enter the BIOS menu.

If both the power-on password and supervisor password are set, you can enter either password. However, you must use your supervisor password to change any configuration settings.

- Hard disk password

  Setting a hard disk password prevents unauthorized access to the data on the storage drive. When a hard disk password is set, you are prompted to enter a valid password each time you try to access the storage drive.

  Note: After you set a hard disk password, your data on the storage drive is protected even if the storage drive is removed from one computer and installed in another.

- System management password (for selected models)

  You can enable the system management password to have the same authority as the supervisor password to control security related features. To customize the authority of the system management password through the UEFI BIOS menu:

  1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
  2. Select **Security → System Management Password Access Control**.
  3. Follow the on-screen instructions.

  If you have set both the supervisor password and the system management password, the supervisor password overrides the system management password.

Set, change, and remove a password

Before you start, print these instructions.

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Security**.
3. Depending on the password type, select **Set Supervisor Password**, **Set Power-On Password**, **Set System Management Password**, or **Hard Disk Password** and press Enter.
4. Follow the on-screen instructions to set, change, or remove a password.
5. Press F10 or Fn+F10 to save the changes and exit.

You should record your passwords and store them in a safe place. If you forget the passwords, contact a Lenovo-authorized service provider.

Note: If the hard disk password is forgotten, Lenovo cannot remove the password or recover data from the storage drive.

Chapter 3. UEFI BIOS

Enter the UEFI BIOS menu

Turn on or restart the computer. When the logo screen is displayed, press F1 or Fn+F1 to enter the UEFI BIOS menu.

Note: If you have set UEFI BIOS passwords, enter the correct passwords when prompted. You also can select **No** or press Esc to skip the password prompt and enter the UEFI BIOS menu. However, you cannot change the system configurations that are protected by passwords.

Navigate the UEFI BIOS menu

Follow the on-screen instructions to navigate in the UEFI BIOS menu.

The table below introduces the available settings of the UEFI BIOS menu. You can follow the on-screen instruction to navigate in the UEFI BIOS menu.

Note: The UEFI BIOS menu might vary depending on system configurations.

Menu	Introduction
Main	This category provides the general product-related and firmware information including system summary, machine type, product serial number, UUID number, etc.
Devices	This category introduces how to configure various devices such as USB ports and audio controllers.
Advanced	This category provides advanced information about the computer such as the CPU features.
Main Power	This category introduces power and thermal management solutions.
Security	This category introduces various passwords, locks, and software to protect your computer.
Startup	This category introduces how to set the boot priority order.
Exit	This category introduces how to exit as you prefer.

You can go to Lenovo BIOS Simulator Center https://download.lenovo.com/bsco/index.html to explore the detailed settings by your product name.

Note: The Lenovo BIOS Simulator Center makes periodic updates of the settings. The UEFI BIOS simulator interface and description of settings might be different from that on your actual user interface.

Enable or disable the ErP LPS compliance mode

Lenovo computers meet the eco-design requirements of the ErP Lot 3 regulation. Follow the instruction to enable or disable the ErP LPS compliance mode.

For more information about the eco-design requirements, go to: https://www.lenovo.com/us/en/compliance/eco-declaration.

You can enable the ErP LPS compliance mode to reduce the consumption of electricity when the computer is off. To enable or disable the ErP LPS compliance mode:

Step 1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.

Step 2. Select **Power → Enhanced Power Saving Mode** and press Enter.

Step 3. Enable or disable the feature as desired.

Note: Please note that when the Enhanced Power Saving Mode is disabled, the power consumption might be increased when the computer is off.

Step 4. Press F10 or Fn+F10 to save the changes and exit.

When the ErP LPS compliance mode is enabled, you can wake up the computer by doing one of the following:

- Press the power button.
- Enable the Wake Up on Alarm feature to make the computer wake up at a set time.

To meet the off mode requirement of ErP compliance, you need to disable the Fast Startup function.

1. Go to **Control Panel** and view by large icons or small icons.
2. Click **Power Options → Choose what the power buttons do → Change settings that are currently unavailable**.
3. Clear the **Turn on fast startup (recommended)** option from the **Shutdown settings** list.

Update the UEFI BIOS

When you install a new program, device driver, or hardware component, you might need to update the UEFI BIOS.

Download and install the latest UEFI BIOS update package by one of the following methods:

From the Vantage app

Follow the instructions to update the UEFI BIOS from the Vantage app.

Step 1. Open the Vantage app, and then click **Device → System Update**.

Step 2. If the latest UEFI BIOS update package is available, follow the on-screen instructions to download and install the package.

From the Lenovo Support Web site

Follow the instructions to update the UEFI BIOS from the Lenovo Support Web site.

Step 1. Go to https://pcsupport.lenovo.com and select the entry for your computer.

Step 2. Click **Drivers & Software → Manual Update → BIOS/UEFI**.

Step 3. Follow the on-screen instructions to download and install the latest UEFI BIOS update package.

From the Windows Update

Follow the instructions to update the UEFI BIOS from the Windows Update.

Step 1. Type `Settings` in the Windows search box and press Enter.

Step 2. Click **Update & Security → Windows Update → Check for Updates**.

Step 3. If a BIOS update package appears in your update list, click **Download or Install** to initiate the update.

ICE performance mode

The ICE performance mode helps you adjust the acoustic and thermal performance of your computer. Three options are available:

- **Balance mode**: The computer works at the balance mode with balanced noise and better performance.
- **Performance mode** (default setting): The computer works at the best performance with normal acoustic level.

  Note: The term “best” only refers to the best effect among different settings of the product itself.
- **Full Speed**: All fans in the computer will run at full speed.

Change the ICE performance mode

To change the ICE performance mode:

Step 1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.

Step 2. Select **Power → Intelligent Cooling** and press Enter.

Step 3. Select **Performance Mode** and press Enter.

Step 4. Set the performance mode as desired.

Step 5. Press F10 or Fn+F10 to save the changes and exit.

Chapter 4. CRU replacement

Customer Replaceable Units (CRUs) are parts that can be replaced by the customer. Lenovo computers contain the following types of CRUs:

- **Self-service CRUs:** Refer to parts that can be replaced easily by customer themselves or by trained service technicians at an additional cost.
- **Optional-service CRUs:** Refer to parts that can be replaced by customers with a greater skill level. Trained service technicians can also provide service to replace the parts under the type of warranty designated for the customer's machine.

If you intend on installing the CRU, Lenovo will ship the CRU to you. CRU information and replacement instructions are shipped with your product and are available from Lenovo at any time upon request. You might be required to return the defective part that is replaced by the CRU. When return is required: (1) return instructions, a prepaid shipping label, and a container will be included with the replacement CRU; and (2) you might be charged for the replacement CRU if Lenovo does not receive the defective CRU within thirty (30) days of your receipt of the replacement CRU. For full details, see the Lenovo Limited Warranty documentation at:
https://www.lenovo.com/warranty/llw_02

CRU list

The following is the CRU list of your computer.

Self-service CRUs

- Computer cover
- Dongles
  - Dongle HDMI to VGA*
  - Dongle HDMI to HDMI*
  - Dongle DisplayPort to dual DisplayPort*
  - Dongle DisplayPort to HDMI*
  - Dongle DisplayPort to DVI*
  - Dongle DisplayPort to VGA*
  - Smart Cable*
- Drive bay assembly
- Dummy optical drive cover*
- Front bezel
- Hard disk drive*
- Keyboard*
- Mouse*
- Optical drive*
- Optical drive bezel*
- Optical drive bracket*
- Optical drive latch*
- Pad lock*

- Power Cord
- Vertical stand*

Optional-service CRUs

- CPU cooler
- M.2 solid-state drive heat sink*
- M.2 solid-state drive*
- Memory module
- PCIe card*
- Power supply assembly

* for selected models

Vertical stand

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

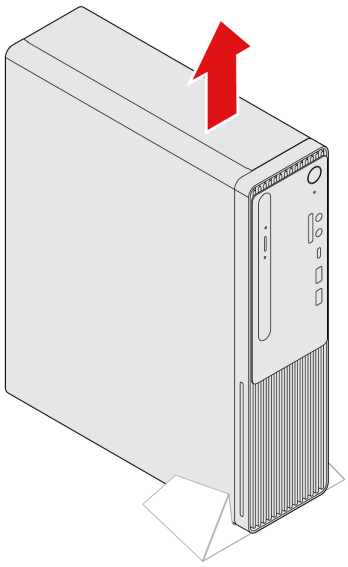
Before you open the computer cover, turn off the computer and wait several minutes until the computer is cool.

For access, do the following:

1. Remove any media from the drives and turn off all connected devices and the computer.
2. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.

Removal steps

Pick up the computer and remove the vertical stand.



Computer cover

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

Before you open the computer cover, turn off the computer and wait several minutes until the computer is cool.

For access, do the following:

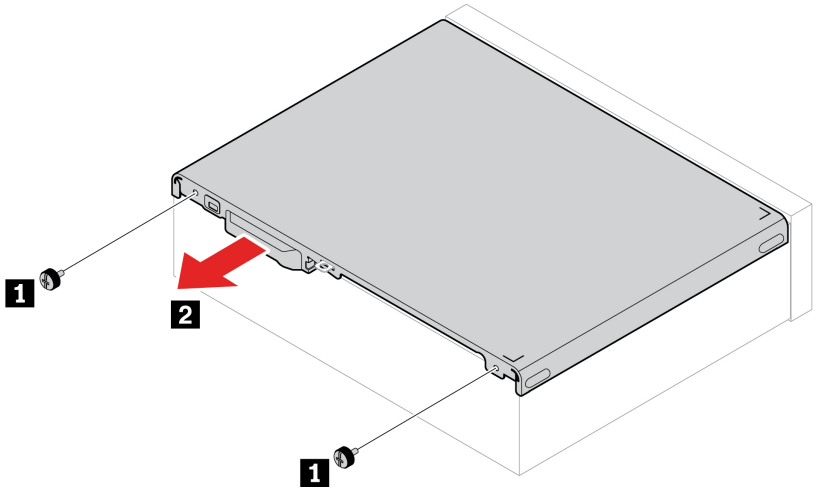
1. Remove any media from the drives and turn off all connected devices and the computer.
2. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
3. Unlock any locking device that secures the computer cover.
4. Remove the vertical stand. See “Vertical stand” on page 20.
5. Lay down the computer to place the computer cover facing up.

Removal steps

1. Remove the two screws which secure the computer cover to the chassis, one screw at each edge of the chassis. Find screw specification like torque in the following screw table.

Screw (quantity)	Torque
Screw, #6-32 x L8, Hexhead (2)	3± 0.5 lb/in

2. Pull the computer cover to remove it.



Note: If a locking device is available, use it to lock the computer after installing the computer cover.

PCIe card

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

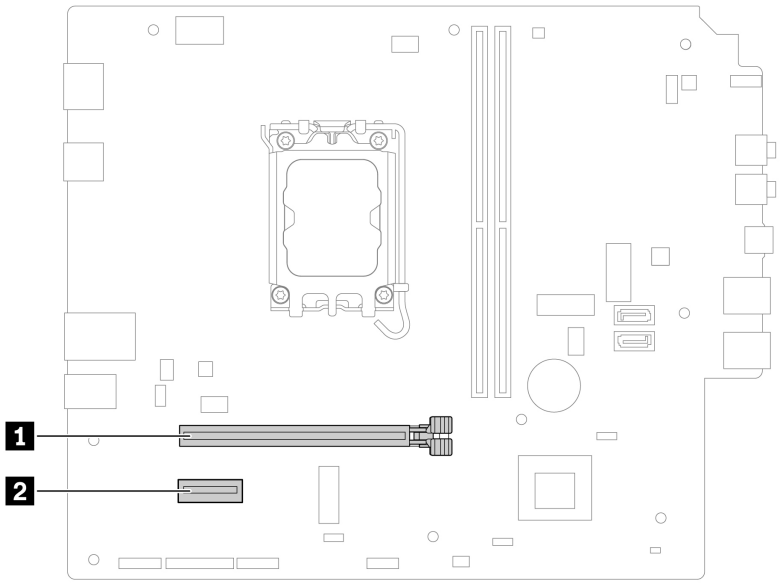
Before you open the computer cover, turn off the computer and wait several minutes until the computer is cool.

For access, do the followings:

1. Remove the computer cover. See “Computer cover” on page 21.
2. Disconnect the PCI-Express cables from the system board if any.

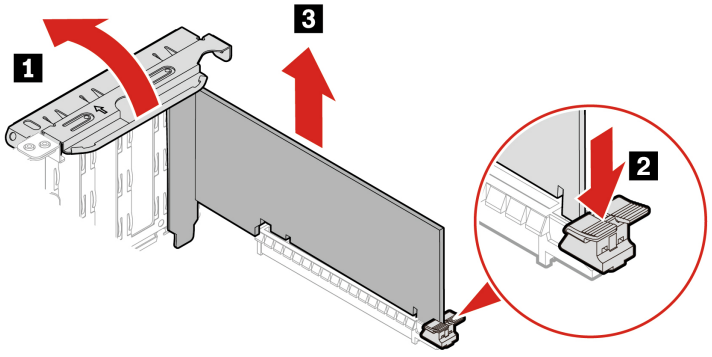
Installation rule

Install the graphics card to the PCIe slot 1 shown in the following illustration.



Removal steps

1. Pivot the PCIe latch outwards.
2. Press the retaining latch at the end of PCIe slot to unsecure PCIe card.
3. Gently pull the PCIe card out of the PCIe slot.



Front bezel

Prerequisite

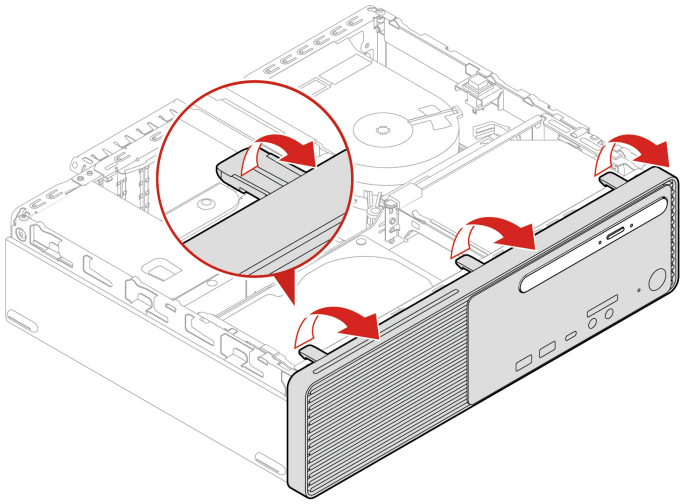
Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

For access, remove the following parts in order, if any:

- “Computer cover” on page 21
- “Optical drive and optical drive latch” on page 29

Removal steps

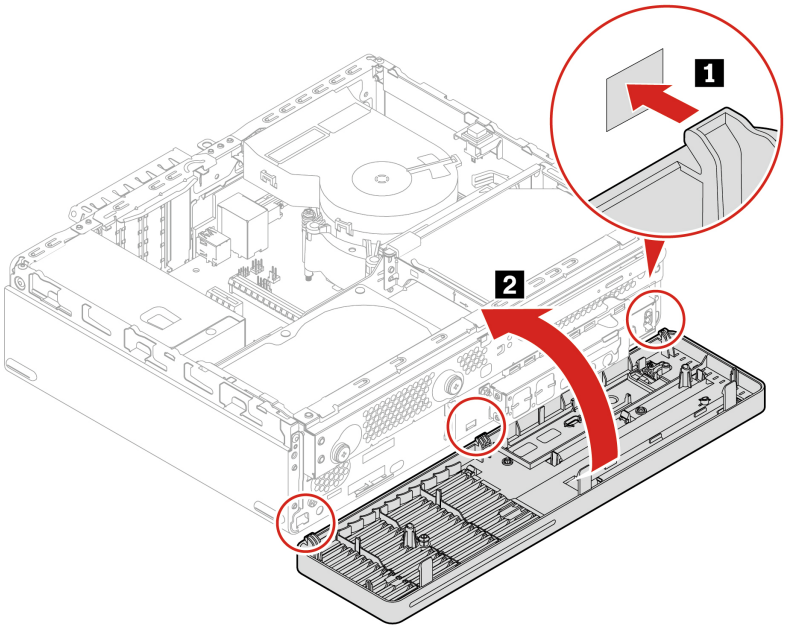
Release three elastic hooks from the top of the front bezel.



Installation steps

There are three swivel hooks at the bottom of the front bezel. and there are three hook slots at the bottom of the front panel.

1. Insert the three swivel hooks to each hook slot.
2. Pivot the front bezel inwards to install it to the chassis.



Dummy optical drive cover

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

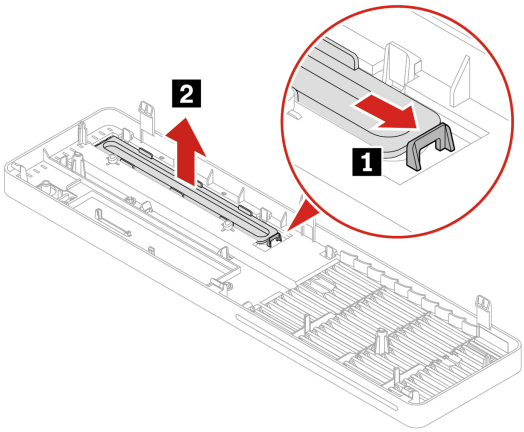
Before you open the computer cover, turn off the computer and wait several minutes until the computer is cool.

Remove these parts in order:

- “Computer cover” on page 21
- “Front bezel” on page 23

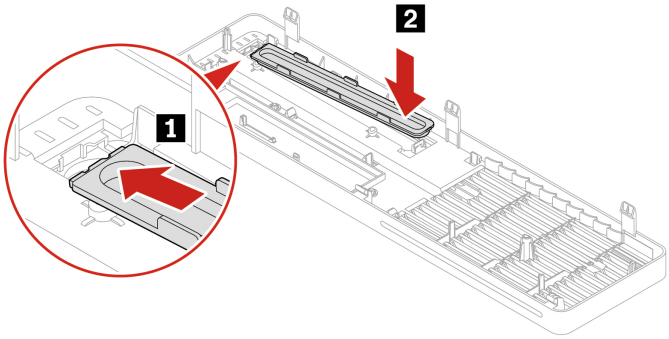
Removal steps

1. Release the dummy optical drive cover from front bezel by pushing it toward the center of the front bezel.
2. Remove it from the front bezel.



Installation steps

1. Insert the uneven side of the dummy optical drive cover to the inside slot which is close to the edge of the front bezel.
2. Press the other side of the dummy optical drive cover down.



Drive bay assembly

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

Before you open the computer cover, turn off the computer and wait several minutes until the computer is cool.

For access, remove these parts in order:

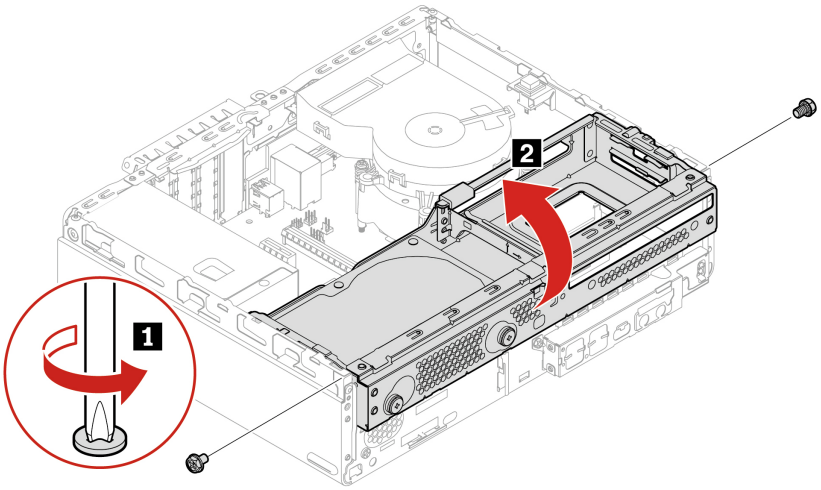
- “Computer cover” on page 21
- “Optical drive and optical drive latch” on page 29
- “Front bezel” on page 23

Removal steps

1. Remove the two screws which secure the drive bay assembly to the chassis, one screw at each corner of the chassis. Find screw specification like torque in the following screw table.

Screw (quantity)	Torque
Screw, #6-32 x L8, Hexhead (2)	5 ± 0.5 lb/in

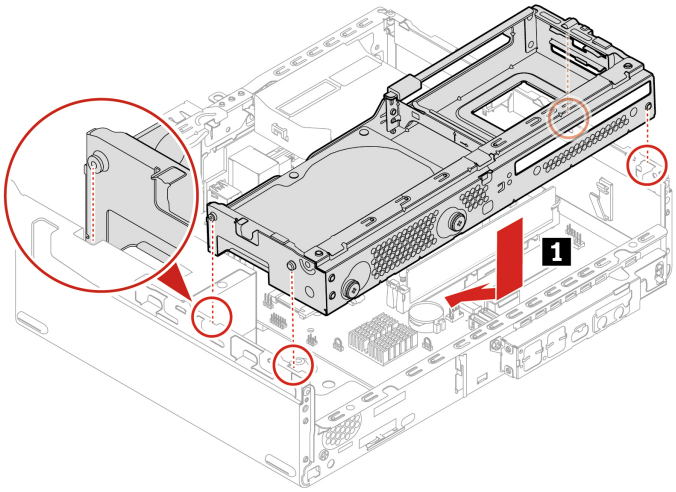
2. Pivot the drive bay assembly upward, then remove it.

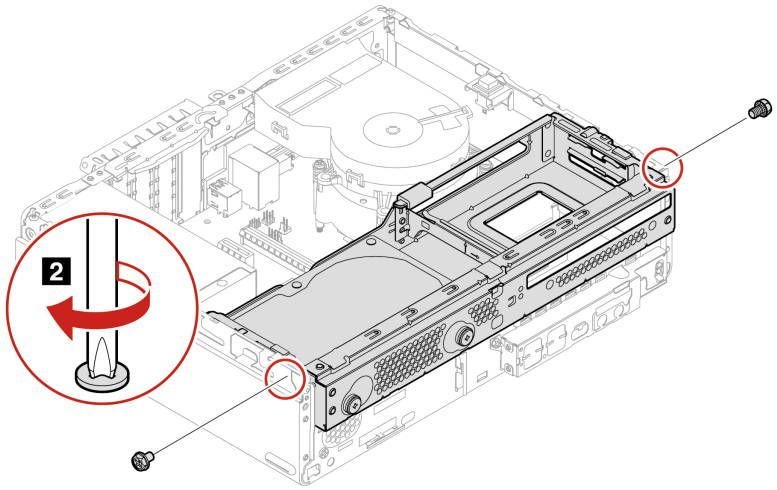


Installation steps

There are four holes on the chassis to locate the drive bay assembly.

1. Insert the drive bay assembly into the four holes. Then pivot the drive bay assembly downward to install it to the chassis.
2. Secure the two screws.





Hard disk drive

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

Attention: The internal storage drive is sensitive. Inappropriate handling might cause damage and permanent loss of data. When handling the internal storage drive, observe the following guidelines:

- Replace the internal storage drive only for repair. The internal storage drive is not designed for frequent changes or replacement.
- Before replacing the internal storage drive, make a backup copy of all the data that you want to keep.
- Do not touch the contact edge of the internal storage drive. Otherwise, the internal storage drive might get damaged.
- Do not apply pressure to the internal storage drive.
- Do not make the internal storage drive subject to physical shocks or vibration. Put the internal storage drive on a soft material, such as cloth, to absorb physical shocks.

For access, do the following:

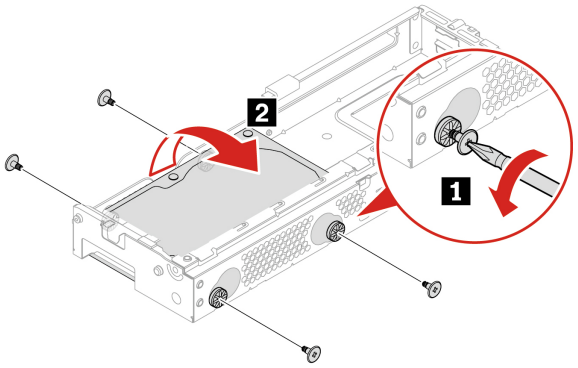
1. Remove these parts in order:
   - “Computer cover” on page 21
   - “Optical drive and optical drive latch” on page 29
   - “Front bezel” on page 23
   - “Drive bay assembly” on page 26
2. Disconnect the signal cable and the power cable from the hard disk drive.

Removal steps

1. Remove the four screws which secure the hard disk drive to the drive bay assembly, two screws at each side of the hard disk drive. Find screw specification like torque in the following screw table.

Screw (quantity)	Torque
Step-screw, #6-32 (4)	5 ± 0.5 lb/in

2. Remove the hard disk drive.



Optical drive and optical drive latch

Prerequisite

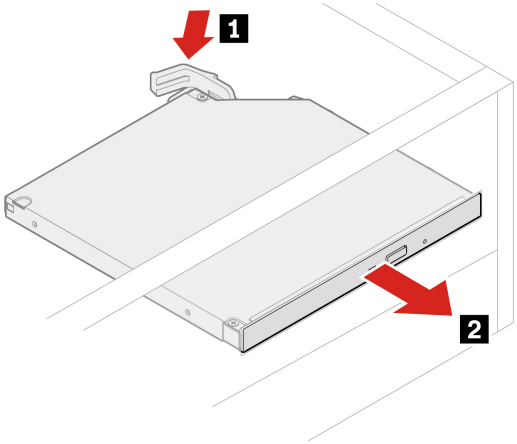
Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

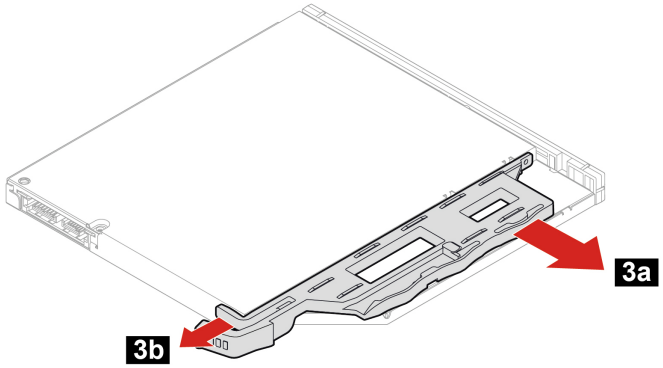
For access, do the following:

1. Remove the “Computer cover” on page 21.
2. Disconnect the signal and power cable from the optical drive.

Removal steps

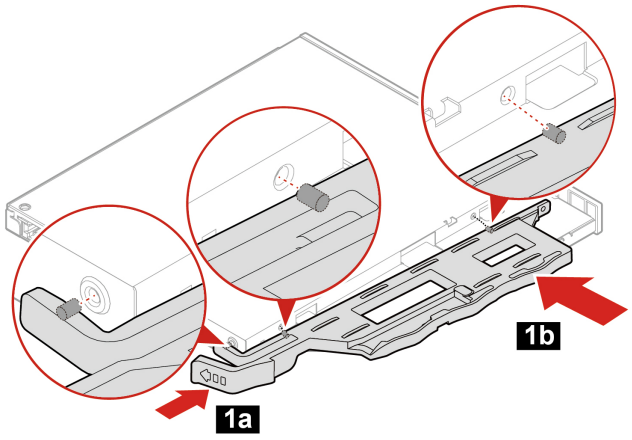
1. Push the optical drive latch toward the front panel of the computer.
2. Remove the optical drive.
3. Pull the optical drive latch out of the optical drive.

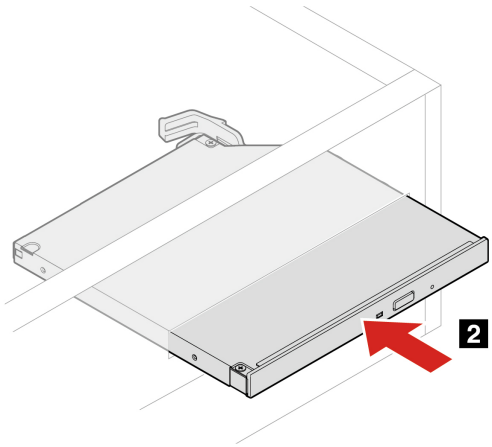




Installation steps

1. There are three holes on the optical drive to locate the optical drive latch. Install the optical drive latch to the optical drive and make sure that it is inserted into these holes.
2. Insert the optical drive to the chassis.





Optical drive bezel

Prerequisite

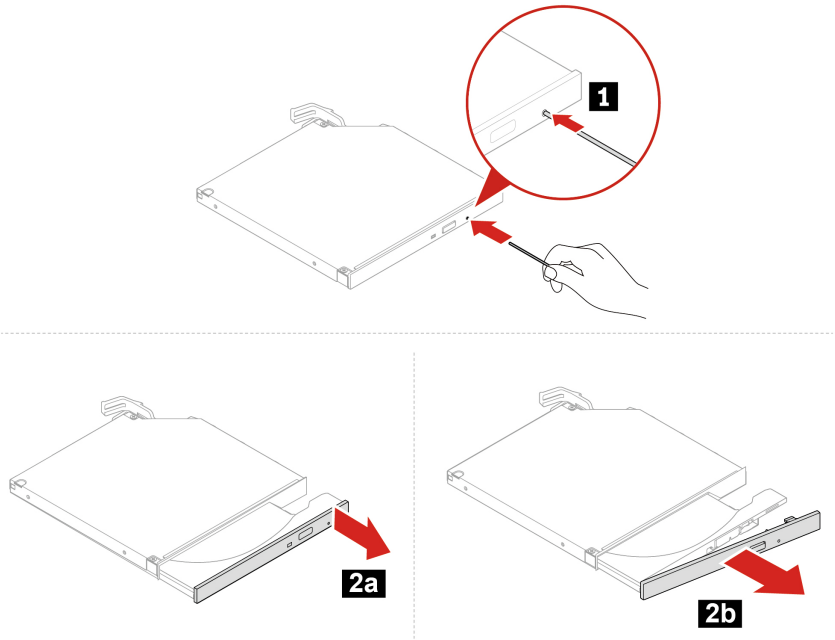
Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

For access, do the following:

1. Remove the “Computer cover” on page 21.
2. Remove the “Optical drive and optical drive latch” on page 29.
3. Disconnect the signal and power cable from the optical drive.

Removal steps

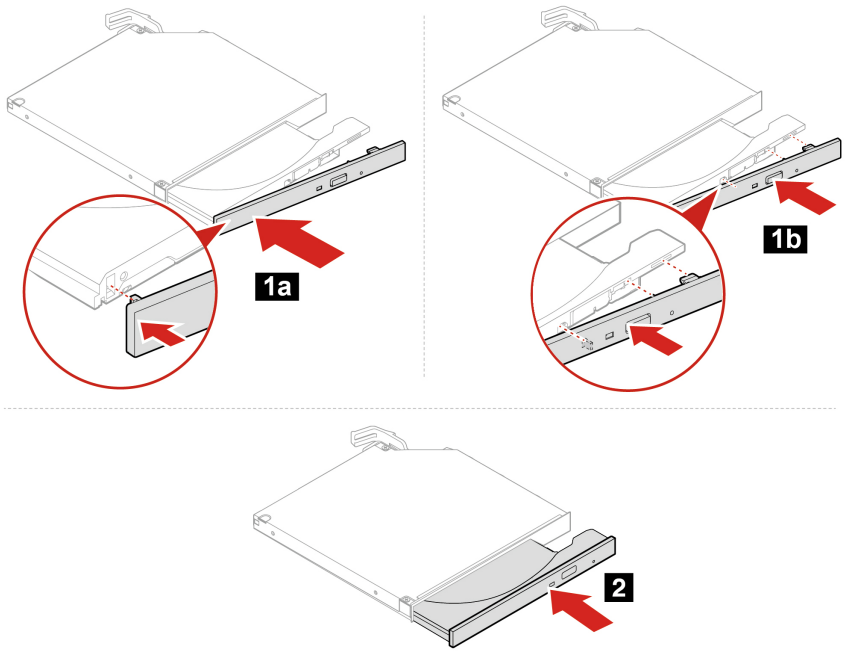
1. Use an ejector like paper clip to eject the optical drive tray.
2. Remove the optical drive bezel from the optical drive.



Installation steps

There are four holes on the optical drive tray to locate the optical drive bezel.

1. Install the optical drive bezel to the optical drive tray, and make sure that it is inserted into these holes.
2. Install the optical drive tray back to the optical drive.



Optical drive bracket

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

For access, remove these parts in order:

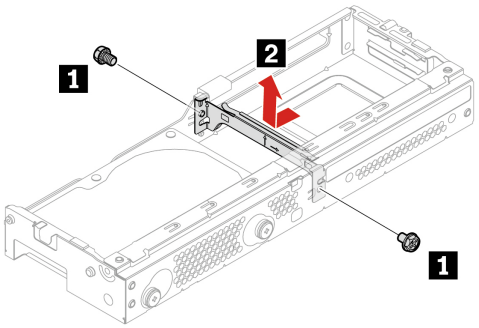
- “Computer cover” on page 21
- “Optical drive and optical drive latch” on page 29
- “Front bezel” on page 23
- “Drive bay assembly” on page 26

Removal steps

1. Remove the two screws which secure the optical drive bracket to the drive bay assembly, one screw at each side of the optical drive bracket. Find screw specification like torque in the following screw table.

Screw (quantity)	Torque
Screw, #6-32 x L8, Hexhead (2)	5 ± 0.5 lb/in

2. Remove the optical drive bracket.

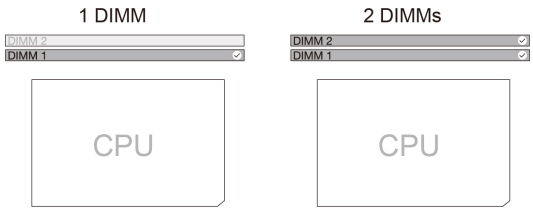


Memory module

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

Ensure that you follow the installation rules shown in the following illustration.

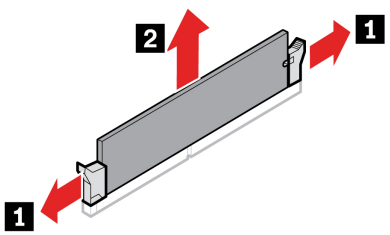


For access, remove these parts in order:

- “Computer cover” on page 21
- “Optical drive and optical drive latch” on page 29
- “Front bezel” on page 23
- “Drive bay assembly” on page 26

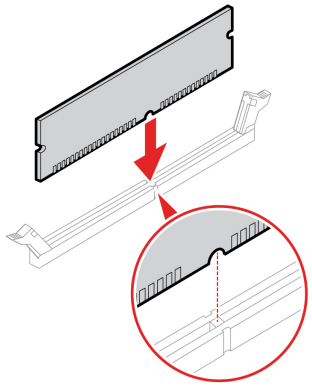
Removal steps

1. Open the two retaining clips.
2. Gently pull the memory module out of the memory slot.



Installation steps

Align the memory module to the slot and press down on both ends until the latches are fully engaged with a click.



M.2 solid-state drive

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

The heat sink might be very hot. Before you open the computer cover, turn off the computer and wait several minutes until the computer is cool.

Attention:

- The internal storage drive is sensitive. Inappropriate handling might cause damage and permanent loss of data. When handling the internal storage drive, observe the following guidelines:
  - Replace the internal storage drive only for repair. The internal storage drive is not designed for frequent changes or replacement.
  - Before replacing the internal storage drive, make a backup copy of all the data that you want to keep.
  - Do not touch the contact edge of the internal storage drive. Otherwise, the internal storage drive might get damaged.
  - Do not apply pressure to the internal storage drive.
  - Do not make the internal storage drive subject to physical shocks or vibration. Put the internal storage drive on a soft material, such as cloth, to absorb physical shocks.

For access, remove these parts in order:

- “Computer cover” on page 21
- “Optical drive and optical drive latch” on page 29
- “Front bezel” on page 23
- “Drive bay assembly” on page 26

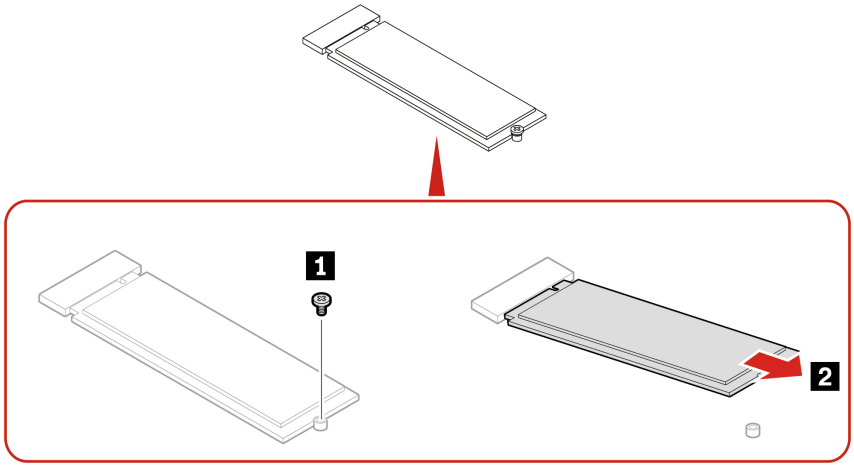
Removal steps for type-1 M.2 solid-state drive

The type-1 M.2 solid-state drive is installed on the system board.

1. Remove the screw which secures the M.2 solid-state drive to the system board. Find screw specification like torque in the following screw table.

Screw (quantity)	Torque
M2 x L3, black coated (1)	1.5 ± 0.5 lb/in

2. Remove the M.2 solid-state drive and thermal pad (if any) depending on the computer model.



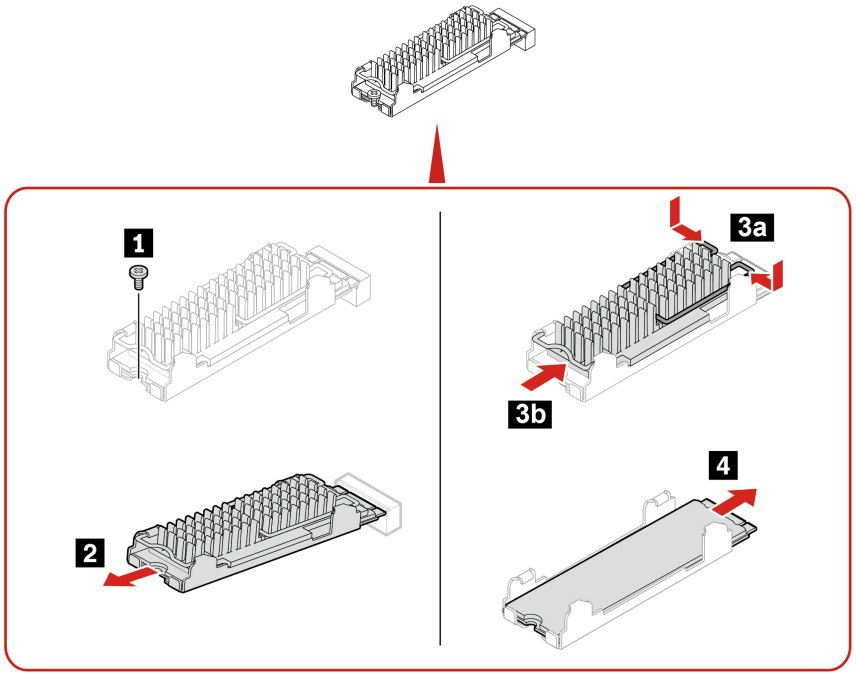
Removal steps for type-2 M.2 solid-state drive

The type-2 M.2 solid-state drive is installed in its heatsink, and the heatsink is installed on the system board.

1. Remove the screw which secures the heatsink to the system board. Find screw specification like torque in the following screw table.

Screw (quantity)	Torque
M2 x L3, black coated (1)	1.5 ± 0.5 lb/in

2. Remove the heatsink.
3. Pinch the two latches on top of the heatsink to remove the heatsink cover.
4. Remove the M.2 solid-state drive and thermal pad (if any) depending on the computer model.



Note: Remove the film that covers the thermal pad (if any) when installing the M.2 solid-state drive, heat sink, and thermal pad.

Power supply assembly

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

Although there are no moving parts in the computer after the power cord has been disconnected, the following warnings are required for your safety.

Keep fingers and other parts of your body away from hazardous, moving parts. If you suffer an injury, seek medical care immediately. Never remove the cover on a power supply or any part that has the following 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.

For access, do the following:

1. Remove these parts in order:
   - “Computer cover” on page 21
   - “Optical drive and optical drive latch” on page 29

- “Front bezel” on page 23
- “Drive bay assembly” on page 26

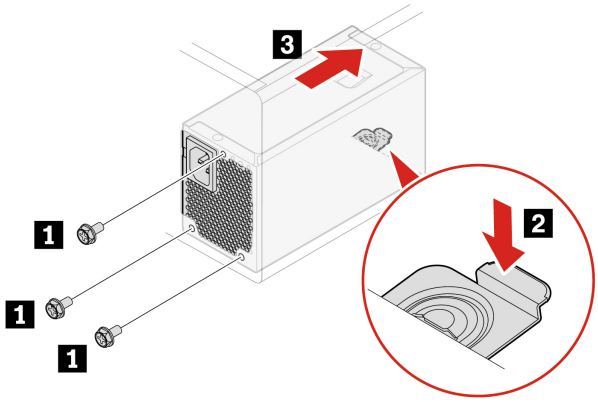
2. Disconnect the power supply assembly cables from the system board.

Removal steps

1. Remove the three screws which secure the power supply assembly to the chassis. Find screw specification like torque in the following screw table.

Screw (quantity)	Torque
Screw, #6-32 x L8, Hexhead (3)	5 ± 0.5 lb/in

2. Press the retaining clip from inside of the chassis.
3. Push the power supply assembly inwards to remove it.



CPU cooler

Prerequisite

Before you start, read *Generic Safety and Compliance Notices*, and print the following instructions.

CAUTION:

The CPU cooler might be very hot. Before you open the computer cover, turn off the computer and wait several minutes until the computer is cool.

For access, do the following:

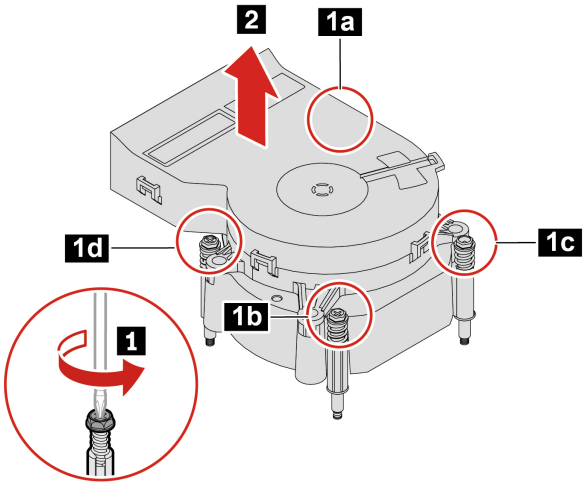
1. Remove these parts in order:
   - “Computer cover” on page 21
   - “Optical drive and optical drive latch” on page 29
   - “Front bezel” on page 23
   - “Drive bay assembly” on page 26
2. Disconnect the CPU cooler cable from the system board.

Removal steps

Notes:

- Ensure that the CPU cooler is horizontal when loosening or fastening the screws.
- Do not touch the thermal grease while handling the heat sink.

1. Loosen the four screws which secure the CPU cooler to the system board, two screws at each side of the CPU cooler. Loosen the four screws in this order: from top right, bottom left, bottom right, to top left.
2. Remove the CPU cooler.



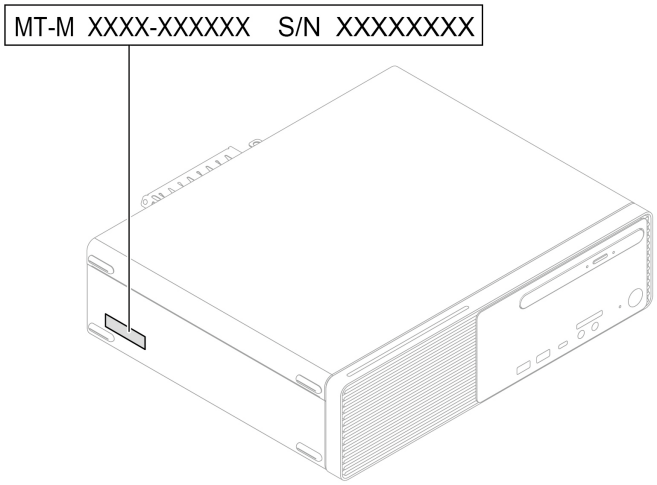
Chapter 5. Help and support

Find your serial number

This topic helps you find computer serial number.

You can find your serial number via:

- **Dashboard** or **Device** in the **Vantage** app
- Bottom of your computer (shown as below illustration)



Diagnose and troubleshoot your computer

This section provides introduction to a set of diagnostics and troubleshooting tools at Lenovo Support Web site and the Vantage app. They can help you diagnose common software and hardware issues.

The following table lists these diagnostics tools and the recommended conditions for each tool.

Diagnostics tool	Recommended scenario
Troubleshoot and diagnose at Lenovo Support Web site	You want to have an online troubleshooting or scan of hardware and drivers on your computer.
Hardware scan	• Your computer is installed with the Vantage app. • You want to perform basic examinations of the hardware components.

Troubleshoot and diagnose at Lenovo Support Web site

Lenovo provides two different diagnosing solutions to help you identify and resolve problems on your computer.

Step 1. Go to https://www.pcsupport.lenovo.com/ and enter your product name in the search box.

Step 2. Click **Troubleshoot & Diagnose** and select the option that fits your need.

Notes:

- Before launching any automatic diagnosing process, a pop-up window will be prompted to install Lenovo Service Bridge. Lenovo Service Bridge helps to connect your computer with Lenovo diagnosing tools.
- Lenovo Support Web site makes periodic updates of the sections to keep improving your experience with your computer. The Web site interface and descriptions of sections might be different from that on your actual interface.

- If you are unaware of what problem your computer goes with, it is recommended that you select **Easy** and follow on-screen instructions to get your firmware updated and obtain the hardware status.
- If you have identified the problem on your computer, you can select **Custom** and follow on-screen instructions to resolve the problem.

If solutions can not resolve problems on your computer, you can follow on-screen instructions to submit an e-ticket or contact Lenovo for professional assistance.

Hardware scan

Hardware scan is an effective hardware testing tool to help you identify existing hardware issues.

To run the Hardware scan:

Step 1. Type `Vantage` in the Windows search box and then press Enter.

Step 2. Click **Hardware scan** or **Support → Hardware scan**.

Step 3. Select **QUICK SCAN** or **CUSTOMIZE** and then follow the on-screen instructions to run the hardware scan.

Notes:

- The Quick Scan tool contains a pre-selected suite of tests that performs basic examinations of the hardware components found in the system. The Customize tool enables you to select one or several hardware components to perform the examinations.
- Before selecting **QUICK SCAN**, click **Refresh Modules** to ensure that the list of hardware components is the components currently available for the computer.

Step 4. If any hardware failure is detected, the result varies depending on the warranty status and varies by country or region. Follow the on-screen instructions to resolve the issue.

Recover your Windows operating system

When you encounter some unexpected issues with your operating system, you can choose to recover your operating system by yourself or call Lenovo Customer Support Center.

Note: Microsoft constantly makes updates to the Windows operating system. Before installing a particular Windows version, check the compatibility list for the Windows version. For details, go to https://support.lenovo.com/us/en/solutions/ht512575.

To recover your operating system to...	See.
Factory defaults	Refer to the instructions in https://support.lenovo.com/HowToCreateLenovoRecovery
A previous system point	Refer to the instructions in Popular Topics: https://support.lenovo.com/solutions/ht118590

Call Lenovo

If you have tried to correct the problem yourself and still need help, you can call Lenovo Customer Support Center.

Before you contact Lenovo

Prepare the needed information before you contact Lenovo.

1. Record the problem symptoms and details:
   - What is the problem? Is it continuous or intermittent?
   - Any error message or error code?
   - What operating system are you using? Which version?
   - Which software applications were running at the time of the problem?
   - Can the problem be reproduced? If so, how?
2. Record the system information:
   - Product name
   - Machine type and serial number.

Self-help resources

Use the following self-help resources to learn more about the computer and troubleshoot problems.

Resources	How to access?
Lenovo Support Web Site	https://pcsupport.lenovo.com
Tips	https://www.lenovo.com/tips
Lenovo Community	https://forums.lenovo.com
Accessibility information	https://www.lenovo.com/accessibility
Windows help information	• Open the Start menu and click **Get Help** or **Tips**. • Use Windows Search. • Microsoft support Web site: https://support.microsoft.com

Purchase accessories or additional services

This topic provides instructions on how to purchase accessories or additional services.

Accessories

Lenovo has a number of hardware accessories and upgrades to help expand the functionalities of your computer. Accessories include memory modules, storage devices, network cards, power adapters, keyboards, mice, and so on.

To shop at Lenovo, go to https://www.lenovo.com/accessories.

Additional services

During and after the warranty period, you can purchase additional services from Lenovo at https://pcsupport.lenovo.com/warrantyupgrade.

Service availability and service names might vary by country or region.

Accessibility features

Lenovo is committed to making information technology accessible to everyone, including those with hearing, vision, or mobility limitations. Lenovo supports accessibility features in the following ways to help all users better engage with Lenovo products.

Accessible documentation

Lenovo documentation is designed to meet users' accessibility needs. Users can read the documentation with assistance as needed. For example:

- Text and images are in high contrast. Color contrast can enhance the visual experience. In this mode, all contents are highlighted to be more visible.
- Text is logical and readable. Images are also readable with alternative text provided. A screen reader can enhance the hearing or listening experience. In this mode, all contents are clearer and easier to understand.
- Text is large and clear, making it easier to read. A magnifier can enlarge the text to improve readability.

For more information, watch the video at:
https://support.lenovo.com/docs/pc_pub_accessibility

Accessible product design

Lenovo product design also supports accessibility features.

Note: The accessibility features vary by product. Depending on the product model, some accessibility features listed below might not be applicable to the product. To get the most up-to-date accessibility information for the product, go to https://www.lenovo.com/accessibility. For additional support from Lenovo, users can find phone numbers for their country or region from https://support.lenovo.com/supportphonelist.

- **Keyboards**

  Lenovo keyboards support various accessibility features. For example:

  - Consistent layout of keyboards for easier use
  - Tactile markings on some keys for easier identification
  - Appropriate spacing between keys for typing efficiency
  - Sufficient contrast of keys, controls, and labels for better visibility
  - On-screen notification or lighted notification for some keys for ease of use
  - Keys and controls that can be reached and operated using one hand and require minimal dexterity for ease of use

- **Industry-standard connectors**

  The industry-standard connectors on Lenovo products enable better compatibility with peripheral devices.

- **Operating systems**

  The accessibility features of the operating systems can be configured to assist users in the following ways:

- Vision features, such as text size and visual effect settings, make the screen contents easier to see.
- Hearing features, such as audio and caption settings, make the screen contents easier to hear.
- Interaction features, such as speech and eye-control settings, make the product easier to control.

To access the accessibility features of the Windows 11 operating system, go to **Start → Settings → Accessibility**.

Appendix A. Notice for USB connector name update

The USB Implementers Forum published a revision of the guideline for USB connector names in September, 2022. Lenovo follows the revised guideline and updates USB connector names accordingly. You can refer to the table below for naming update details.

Current name	Previous name
USB-A connector (Hi-Speed USB)	USB-A 2.0 connector
USB-A connector (USB 5Gbps)	USB-A 3.2 Gen 1 connector
USB-A connector (USB 10Gbps)	USB-A 3.2 Gen 2 connector
USB-A connector (USB 5Gbps, Always On USB)	Always on USB-A 3.2 Gen 1 connector
USB-A connector (USB 10Gbps, Always On USB)	Always on USB-A 3.2 Gen 2 connector
USB-C connector (USB 5Gbps)	USB-C (3.2 Gen 1) connector
USB-C connector (USB 10Gbps)	USB-C (3.2 Gen 2) connector
USB-C connector (USB 20Gbps)	USB 3.2 Gen 2x2
USB-C connector (USB4 20Gbps)	USB 4 Gen 2x2
USB-C connector (USB4 40Gbps)	USB-C (USB 4) connector
USB-C connector (Thunderbolt 3)	USB-C (Thunderbolt 3) connector
USB-C connector (Thunderbolt 4)	USB-C (Thunderbolt 4) connector

Appendix B. Notices and trademarks

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