

ThinkCentre neo 50a 24 Gen 5
ThinkCentre neo 50a 27 Gen 5
User Guide

Lenovo
ThinkCentre

Lenovo

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 (January 2024)

© Copyright Lenovo 2024.

LIMITED AND RESTRICTED RIGHTS NOTICE: If data or software is delivered pursuant to a General Services Administration "GSA" contract, use, reproduction, or disclosure is subject to restrictions set forth in Contract No. GS-35F-05925.

Contents

Discover your Lenovo computer iii

Chapter 1. Meet your computer. 1

Overview	1
Rear	2
Features and specifications	3
USB specifications	4

Chapter 2. Get started with your computer. 5

Get started with Ubuntu Desktop	5
Connect to a Bluetooth-enabled device (for selected models)	5
Adjust the computer stand	6
Access networks	6
Connect to the wired Ethernet	7
Connect to Wi-Fi networks (for selected models)	7
Use the touch screen (for selected models)	7
Connect an external display	8

Chapter 3. Explore your computer 9

Night light	9
Set the power plan	9
ICE performance mode	9
Purchase accessories	10

Chapter 4. UEFI BIOS 11

Enter the UEFI BIOS menu	11
Navigate the UEFI BIOS menu	11
Enable or disable the ErP LPS compliance mode	11
Update UEFI BIOS.	12

Chapter 5. CRU replacement 13

CRU list	13
--------------------	----

Chapter 6. Help and support 15

Self-help resources	15
Lenovo diagnostic tools	15
Call Lenovo	16
Before you contact Lenovo	16
Lenovo Customer Support Center.	16
Purchase additional services.	17

Appendix A. Supplemental information about the Ubuntu operating system 19

Appendix B. Compliance information. 21

Appendix C. Notices and trademarks. 23

Discover your Lenovo computer

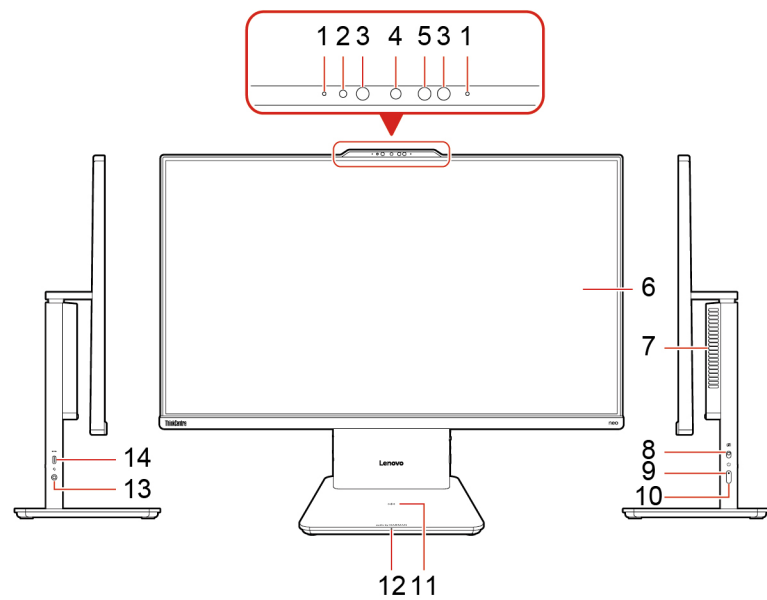
Thank you for choosing a Lenovo computer! We are dedicated to delivering the best solution to you.

Before starting your tour, please read the following information:

- Illustrations in this documentation might look different from your product.
- Depending on the model, some optional accessories, features, software programs, and user interface instructions might not be applicable to your computer.
- Documentation content is subject to change without notice. To get the latest documentation, go to <https://pcsupport.lenovo.com>.

Chapter 1. Meet your computer

Overview



Item	Description	Item	Description
1	Microphones	2	Integrated camera activity indicator
3	Infrared LED*	4	Integrated camera
5	Infrared camera*	6	Multi-touch screen*
7	Air vent	8	Camera switch
9	Power button indicator	10	Power button
11	Wireless charging pad*	12	Wireless charging indicator*
13	Combo audio jack	14	USB-C® (3.2 Gen 2) connector

* for selected models

Note: Place the phone horizontally on the center of the wireless charging pad to activate wireless charging.

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 below for each corresponding device.

USB device	Data rate (Gbit/s)
3.2 Gen 1	5
3.2 Gen 2	10
3.2 Gen 2 × 2	20

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

Power indicator

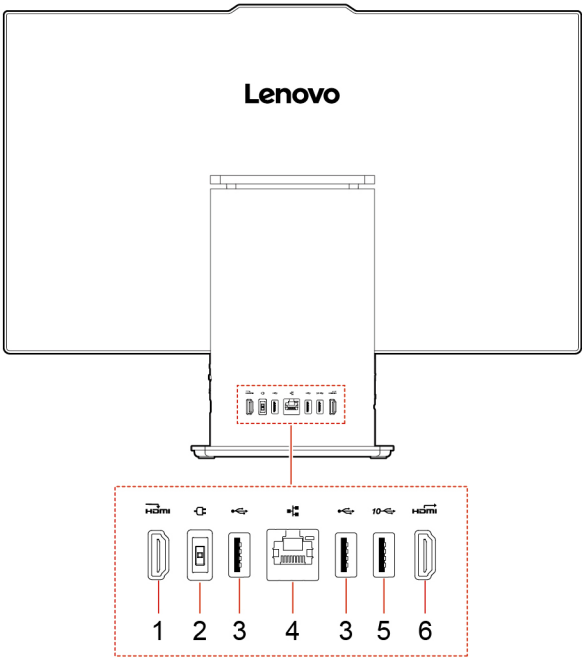
Show the system status of your computer.

- **On:** The computer is on.
- **Off:** The computer is off or in hibernation mode.
- **Blinking slowly:** The computer is in sleep mode.

Related topics

- “Use the touch screen (for selected models)” on page 7.
- “USB specifications” on page 4.

Rear



Item	Description	Item	Description
1	HDMI™ in connector	2	Power connector
3	USB-A 2.0 connectors	4	Ethernet connector
5	USB-A 3.2 Gen 2 connector	6	HDMI 2.1 TMDS out connector

Related topics

- “USB specifications” on page 4.

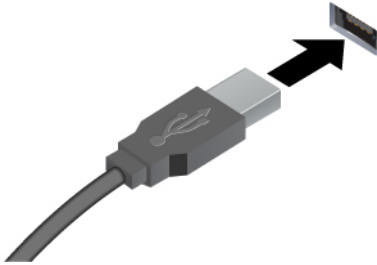
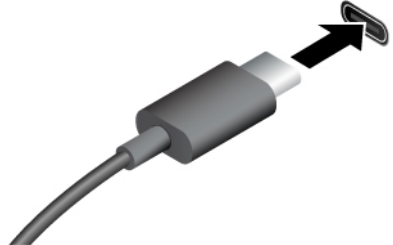
Features and specifications

Specifications	Description
Dimensions	ThinkCentre neo 50a 24 Gen 5 - Width: 539.5 mm (21.2 inches) - Height: 431.2 mm (17.0 inches) - Depth: 192.1 mm (7.6 inches)
	ThinkCentre neo 50a 27 Gen 5 - Width: 611.7 mm (24.1 inches) - Height: 471.7 mm (18.6 inches) - Depth: 192.1 mm (7.6 inches)
Weight (without packaging)	Maximum configuration as shipped: - ThinkCentre neo 50a 24 Gen 5 : 6 kg (13.2 lb) - ThinkCentre neo 50a 27 Gen 5 : 7.1 kg (15.7 lb)
Hardware configuration	- Open the system menu from the top-right corner and click Settings. - Click About.
Power supply	180-watt automatic voltage-sensing power supply* 210-watt automatic voltage-sensing power supply*
Electrical input	- Input voltage: From 100 V ac to 240 V ac - Input frequency: 50/60 Hz
Microprocessor	To view the microprocessor information of your computer, enter Settings and click About .
Memory	Double data rate 5 (DDR5) small outline dual in-line memory module (SODIMM)
Storage device	M.2 solid-state drive (SSD)
	Type Disks in the search box and use the Disks application to view the storage drive capacity of your computer. Note: The storage drive capacity indicated by the system is less than the nominal capacity.
Video features	Maximum resolution: - HDMI out connector: 4096 × 2160 pixels, 60Hz - HDMI in connector: 1920 x 1080 pixels, 100 Hz
Expansion	M.2 slot × 2 (1 for Wireless LAN card, 1 for SSD)
Network features	- Bluetooth* - Ethernet LAN - Wireless LAN*

* for selected models

USB specifications

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

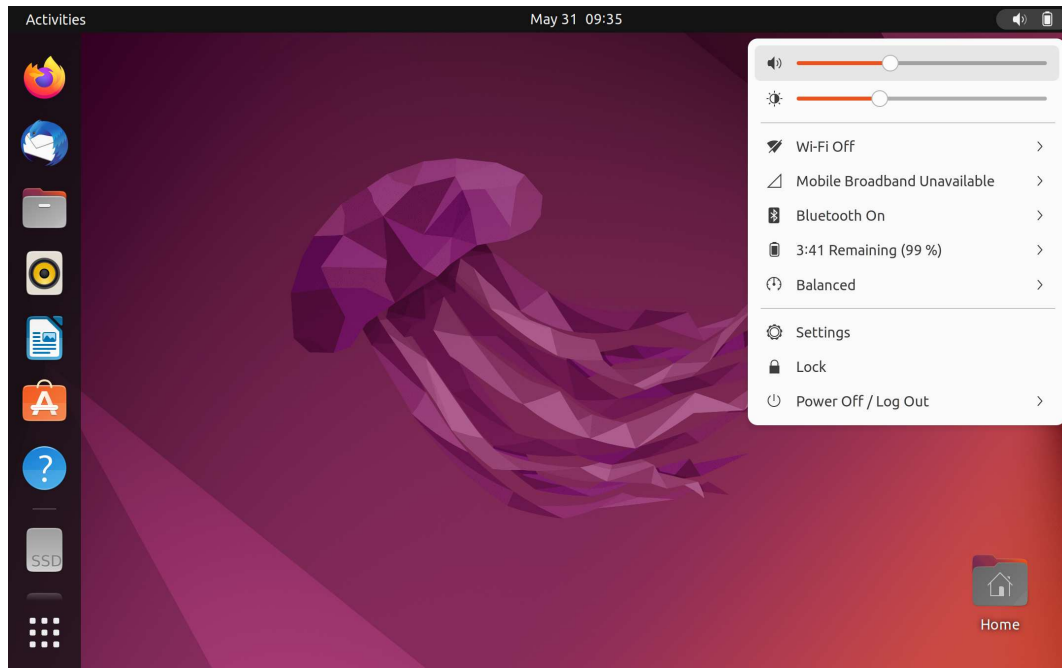
Connector name	Description
 •  USB-A 2.0 connector •  USB-A 3.2 Gen 2 connector	Connect USB-A compatible devices, such as a USB-A keyboard, USB-A mouse, USB-A storage device, or USB-A printer.
 •  USB-C (3.2 Gen 2) connector	• Charge USB-C compatible devices with the output voltage and current of 5 V 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.

Chapter 2. Get started with your computer

Get started with Ubuntu Desktop

Learn the basics of Ubuntu and start working with it right away. For more information about Ubuntu, see the Ubuntu documentation site at: <https://help.ubuntu.com/its/ubuntu-help/index.html>.

The Gnome desktop is installed by default and is designed to be simple and easy to use. Details on using Gnome are available by launching the Help application or online at <https://help.gnome.org/users/>.



Launch an app

- Press the Super key (with the Windows logo) or open the Activities menu on the top left and type in the name of the application you want to launch.
- Click the **Show Applications** button on the lower left, and select the application you want to launch.

Launch settings

Open the system menu from the top-right corner and click **Settings**.

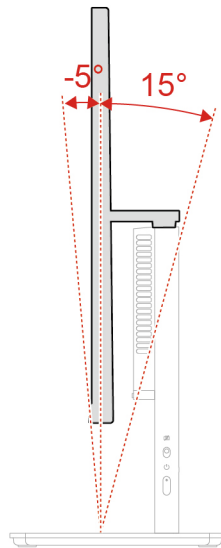
Connect to a Bluetooth-enabled device (for selected models)

You can connect all types of Bluetooth-enabled devices to your computer, such as a keyboard, a mouse, a smartphone, or speakers. Place the device that you are attempting to connect to less than 10 meters (33 feet) from the computer.



1. Turn on Bluetooth on the computer.
 - a. Open the system menu from the top-right corner and then click **Settings** → **Bluetooth**.
 - b. In the Bluetooth section enable Bluetooth with the toggle button at the top.
2. Any discoverable devices will be shown in the **Devices** list.
3. Select a Bluetooth device, and then follow the on-screen instructions.

Adjust the computer stand



Access networks

This section helps you access networks through connecting to a wired or wireless network.

Connect to the wired Ethernet

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

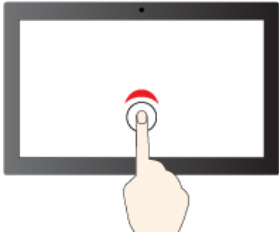
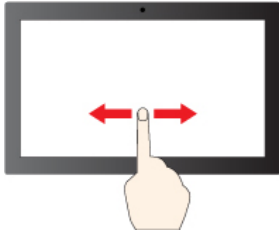
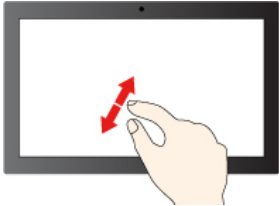
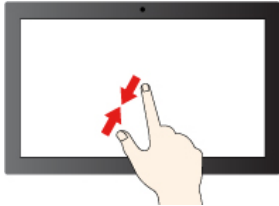
Connect to Wi-Fi networks (for selected models)

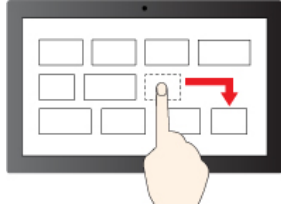
If your computer includes a wireless LAN module, you can connect your computer to Wi-Fi® networks.

1. Open the system menu from the top-right corner and expand the Wi-Fi section of the menu.
2. Click **Select Network**. A list of available wireless networks is displayed.
3. Select a network available for connection. Provide required information, if needed.

Use the touch screen (for selected models)

Note: Some gestures might not be applicable when you use certain apps.

Item and description	Item and description
 Tap once to single click	 Tap twice quickly to double-click
 Tap and hold to right-click	 Slide to scroll through items
 Zoom in	 Zoom out



Drag

Maintenance tips

- Turn off the computer before cleaning the touch screen.
- Use a dry, soft, and lint-free cloth or a piece of absorbent cotton to remove fingerprints or dust from the touch screen. Do not apply solvents to the cloth.
- The touch screen is a glass panel covered with a plastic film. Do not apply pressure or place any metallic object on the screen, which might damage the touch panel or cause it to malfunction.
- Do not use fingernails, gloved fingers, or inanimate objects for input on the screen.
- Regularly calibrate the accuracy of the finger input to avoid a discrepancy.

Connect an external display

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

Change display settings

Right-click a blank area on the desktop and select **Display settings**. Then, you can change display settings as you prefer.

Chapter 3. Explore your computer

Night light

Blue light is the high-energy visible light in the light spectrum. Excessive exposure to blue light might damage your vision. Night light is a feature that reduces the blue light emitted by computer displays. When the night light is on, your computer display shows warmer colors that help you reduce eye strain.

To turn on or turn off the night light:

- Type **Night light** in the search box. Click **Night light**. Then, follow the on-screen instructions.
- Open the system menu from the top-right corner and then click **Settings → Displays → Night Light**. Then, turn on or turn off the **Night light** switch.

Note: Selected Lenovo computers are low blue-light certified. These computers are tested with night light turned on and color temperature set to the default value of 48.

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 5 minutes
- Put the computer to sleep: After 20 minutes

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

To reset the power plan to achieve the best balance between performance and power saving:

1. Open the system menu from the top-right corner and click **Settings**.
2. Click **Power**.
3. Choose or customize a power plan of your preference.

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.

Purchase accessories

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

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

Chapter 4. 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.
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 requirement of ErP/KES off mode 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 UEFI BIOS

When you install a new program, device driver, or hardware component, you might need to update UEFI BIOS. You can update the BIOS from your operating system or a flash update disc (supported only on selected models).

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

- Using the built-in software update service:
Ubuntu software update will check the LVFS site for any firmware updates and notify you when updates are available.
- From the Lenovo Support Web site:
 1. Go to <https://pcsupport.lenovo.com>.
 2. Download the flash BIOS update driver for the operating system version or the ISO image version (used to create a flash update disc). Then, download the installation instructions for the flash BIOS update driver you have downloaded.
 3. Print the installation instructions and follow the instructions to update the BIOS.

Chapter 5. 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

- ac power adapter
- Keyboard*
- Mouse*
- Power cord

* for selected models

Chapter 6. Help and support

Self-help resources

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

Resources	How to access?
Product documentation: • <i>Safety and Warranty Guide</i> • <i>Generic Safety and Compliance Notices</i> • <i>Setup Guide</i> • <i>This User Guide</i> • <i>Regulatory Notice</i>	Go to https://pcsupport.lenovo.com . Then, follow the on-screen instructions to filter out the documentation you want.
Lenovo Support Web site with the latest support information of the following: • Drivers and software • Diagnostic solutions • Product and service warranty • Product and parts details • Knowledge base and frequently asked questions	https://pcsupport.lenovo.com
Ubuntu help information	https://help.ubuntu.com/its/ubuntu-help/index.html

Lenovo diagnostic tools

For information about Lenovo diagnostic tools, go to:
<https://pcsupport.lenovo.com/lenovodiagnosicsolutions>

Call Lenovo

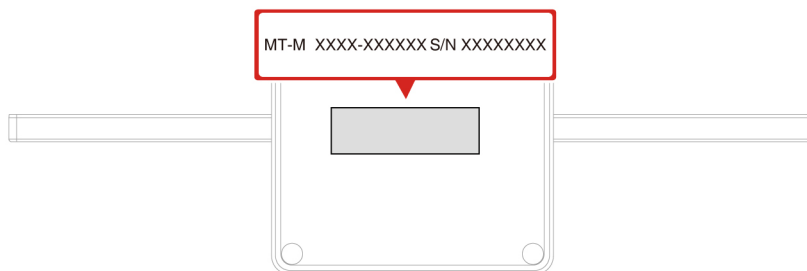
If you have tried to correct the problem yourself and still need help, you can call Lenovo Customer Support Center.

Before you contact Lenovo

Prepare the following 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

The following illustration shows where to find the machine type and serial number of your computer.



Lenovo Customer Support Center

During the warranty period, you can call Lenovo Customer Support Center for help.

Telephone numbers

For a list of the Lenovo Support phone numbers for your country or region, go to:

<https://pcsupport.lenovo.com/supportphonenumberlist>

Note: Phone numbers are subject to change without notice. If the number for your country or region is not provided, contact your Lenovo reseller or Lenovo marketing representative.

Services available during the warranty period

- Problem determination - Trained personnel are available to assist you with determining if you have a hardware problem and deciding what action is necessary to fix the problem.
- Lenovo hardware repair - If the problem is determined to be caused by Lenovo hardware under warranty, trained service personnel are available to provide the applicable level of service.

- Engineering change management - Occasionally, there might be changes that are required after a product has been sold. Lenovo or your reseller, if authorized by Lenovo, will make selected Engineering Changes (ECs) that apply to your hardware available.

Services not covered

- Replacement or use of parts not manufactured for or by Lenovo or nonwarranted parts
- Identification of software problem sources
- Configuration of UEFI BIOS as part of an installation or upgrade
- Changes, modifications, or upgrades to device drivers
- Installation and maintenance of network operating systems (NOS)
- Installation and maintenance of programs

For the terms and conditions of the Lenovo Limited Warranty that apply to your Lenovo hardware product, see *Safety and Warranty Guide* that comes with your computer.

Purchase 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 name might vary by country or region.

Appendix A. Supplemental information about the Ubuntu operating system

In limited countries or regions, Lenovo offers customers an option to order computers with the preinstalled Ubuntu® operating system.

If the Ubuntu operating system is available on your computer, read the following information before you use the computer. Ignore any information related to Windows-based programs, utilities, and Lenovo preinstalled applications in this documentation.

Access the Lenovo Limited Warranty

This product is covered by the terms of the Lenovo Limited Warranty (LLW), version L505-0010-02 08/2011. You can view the LLW in a number of languages from the following Web site. Read the Lenovo Limited Warranty at:

https://www.lenovo.com/warranty/llw_02

The LLW also is preinstalled on the computer. To access the LLW, go to the following directory:

`/opt/Lenovo`

If you cannot view the LLW either from the Web site or from your computer, contact your local Lenovo office or reseller to obtain a printed version of the LLW.

Access the Ubuntu help system

The Ubuntu help system provides information about how to use the Ubuntu operating system. To access the help system from Home Screen, move your pointer to the Launch bar, and then click the **Help** icon. If you cannot find the **Help** icon from the Launch bar, click the **Search** icon on the bottom left, and type Help to search it.

To learn more about the Ubuntu operating system, go to:

<https://www.ubuntu.com>

Get support information

If you need help, service, technical assistance, or more information about the Ubuntu operating system or other applications, contact the provider of the Ubuntu operating system or the provider of the application. If you need the service and support for hardware components shipped with your computer, contact Lenovo. For more information about how to contact Lenovo, refer to the *User Guide* and *Safety and Warranty Guide*.

To access the latest *User Guide* and *Safety and Warranty Guide*, go to:

<https://pcsupport.lenovo.com>

Access open-source information

This device includes software made publicly available by Lenovo, including software licensed under the General Public License and/or the Lesser General Public License (the open source software).

You may obtain a copy of the corresponding source code for any such open source software licensed under the General Public License and/or the Lesser General Public License (or any other license requiring us to make a written offer to provide corresponding source code to you) from Lenovo for a period of three years without charge except for the cost of media, shipping, and handling, upon written request to Lenovo. This offer is valid to anyone in receipt of this device.

You may send your request in writing to the address below accompanied by a check or money order for \$15 to:

Lenovo Legal Department
Attn: Open Source Team / Source Code Requests
8001 Development Dr.
Morrisville, NC 27560

Please include the version of the OS and the version of the Linux Kernel pre-shipped on this Device as part of your request. Be sure to provide a return address.

The open source software is distributed in hope it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See for example the GNU General Public License and/or the Lesser General Public License for more information.

To view additional information regarding licenses, acknowledgments and required copyright notices for the open source software shipped on your Device, go to `/usr/share/doc/*/copyright`.

Appendix B. Compliance information

Note: For more compliance information, refer to *Generic Safety and Compliance Notices* at <https://pcsupport.lenovo.com>.

Certification-related information

Product name	Machine Types
ThinkCentre neo 50a 24 Gen 5	12SC, 12SD
ThinkCentre neo 50a 27 Gen 5	12SA, 12SB

The latest compliance information is available at:
<https://www.lenovo.com/us/en/compliance>

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)

Appendix C. Notices and trademarks

Notices

Lenovo may not offer the products, services, or features discussed in this document in all countries. Consult your local Lenovo representative for information on the products and services currently available in your area. Any reference to a Lenovo product, program, or service is not intended to state or imply that only that Lenovo product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any Lenovo intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any other product, program, or service.

Lenovo may have patents or pending patent programs covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

*Lenovo (United States), Inc.
8001 Development Drive
Morrisville, NC 27560
U.S.A.
Attention: Lenovo Director of Licensing*

LENOVO PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some jurisdictions do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

Changes are made periodically to the information herein; these changes will be incorporated in new editions of the publication. To provide better service, Lenovo reserves the right to improve and/or modify the products and software programs described in the manuals included with your computer, and the content of the manual, at any time without additional notice.

The software interface and function and hardware configuration described in the manuals included with your computer might not match exactly the actual configuration of the computer that you purchase. For the configuration of the product, refer to the related contract (if any) or product packing list, or consult the distributor for the product sales. Lenovo may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

The products described in this document are not intended for use in implantation or other life support applications where malfunction may result in injury or death to persons. The information contained in this document does not affect or change Lenovo product specifications or warranties. Nothing in this document shall operate as an express or implied license or indemnity under the intellectual property rights of Lenovo or third parties. All information contained in this document was obtained in specific environments and is presented as an illustration. The result obtained in other operating environments may vary.

Lenovo may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Any references in this publication to non-Lenovo Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this Lenovo product, and use of those Web sites is at your own risk.

Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

This document is copyrighted by Lenovo and is not covered by any open source license, including any Linux agreement(s) which may accompany software included with this product. Lenovo may update this document at any time without notice.

For the latest information or any questions or comments, contact or visit the Lenovo Web site:

<https://pcsupport.lenovo.com>

Trademarks

Lenovo, Lenovo logo, ThinkCentre, and ThinkCentre logo are trademarks of Lenovo. Intel, and Thunderbolt are trademarks of Intel Corporation or its subsidiaries in the U.S. and/or other countries. Microsoft and Windows are trademarks of the Microsoft group of companies. DisplayPort is the trademarks of the Video Electronics Standards Association. The terms HDMI and HDMI High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI Licensing LLC in the United States and other countries. Wi-Fi is the registered trademarks of Wi-Fi Alliance. USB-C® is a registered trademark of USB Implementers Forum. All other trademarks are the property of their respective owners.

Lenovo