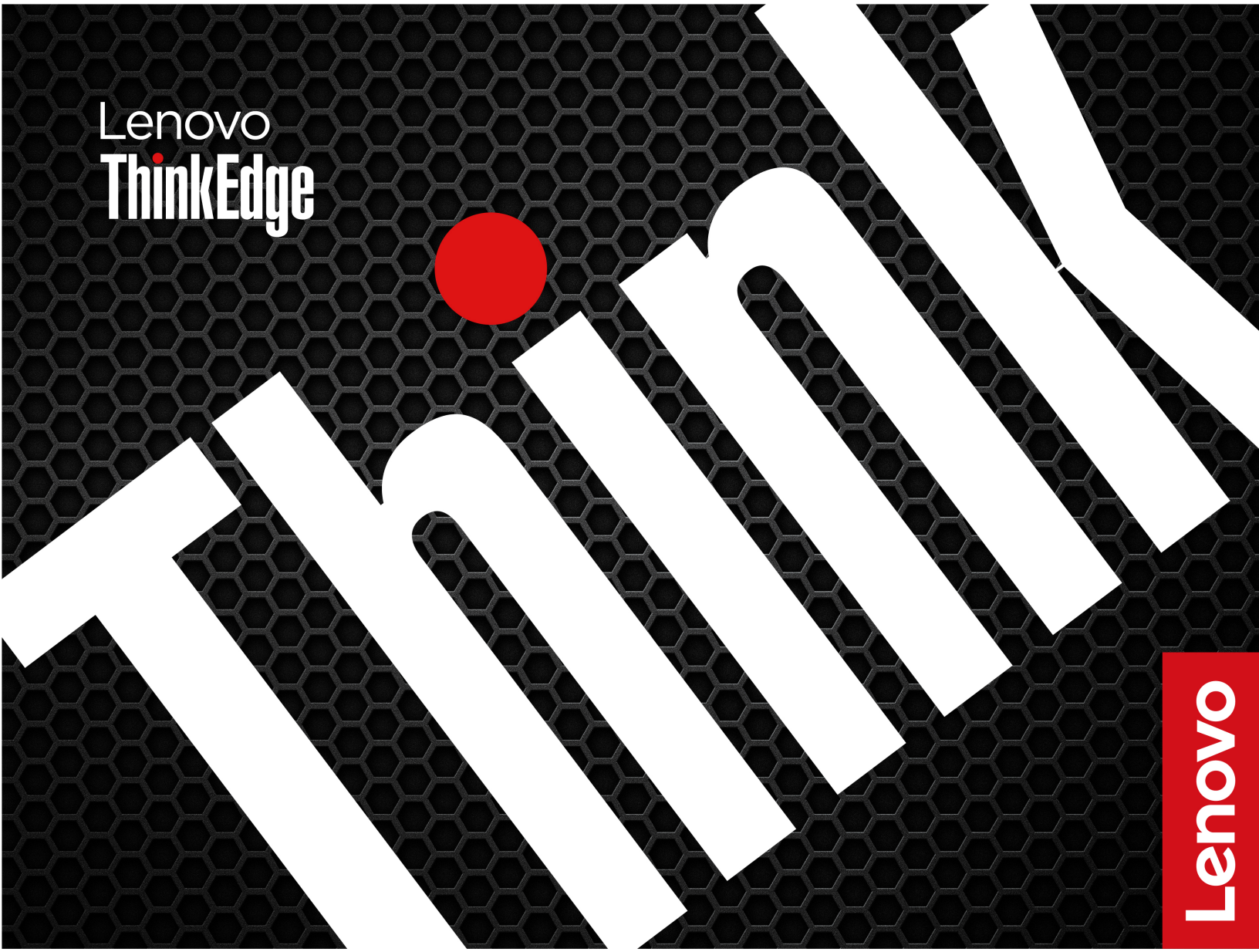
ThinkEdge SE10
User Guide



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

Restricted access location statement

“Equipment intended for Restricted Access Location” or equivalent. (instruction)

Attention: This product is used in restricted access location. During operation, the temperature of the computer surface might become very high and burn the skin. Avoid keeping your hands or any other part of your body in contact with the computer.

Second Edition (June 2023)

Contents

About this guide

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

Before starting your tour, please read the following information:

- This guide applies to Lenovo product model(s) listed below:

  Product name: ThinkEdge SE10

Machine types	Machine volume	Operating temperature
12NH, 12NJ, 12NQ, 12NR	SE10: 0.83 L	0°C–50°C (32°F–122°F)
12NK, 12NL, 12NS, 12NT	SE10-I: 1.45 L	-20°C–60°C (-4°F–140°F)
12NM, 12NN	SE10-I: 1.45 L	-40°C–70°C (-40°F–158°F)

  Note: For 12NM and 12NN models, the system can ensure stable operation only within the temperature range of -40°C to 70°C.

- Illustrations in this documentation might look different from your product.
- Depending on the model, some optional accessories, features, and software programs might not be available on your computer.
- Depending on the version of 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 on the documentation of your computer, including this *User Guide*. To get the latest documentation, go to: https://smartsupport.lenovo.com
- Canonical® makes periodic feature changes to the Ubuntu® operating system through Software Updates. As a result, some information in this documentation might become outdated. Refer to Ubuntu resources for the latest information.

Chapter 1. Product overview

ThinkEdge SE10 series are versatile products in our ThinkEdge portfolio. These compact yet powerful devices balance environmental requirements with reliable performance and effortless deployment and maintenance. This technology was created to solve some of the toughest challenges you face when it comes to capturing data at the outermost edge for your business. From extreme temperatures to the most constrained spaces, SE10 users can now scale the spectrums of ruggedness and flexibility thanks to the ground up modular design.

ThinkEdge SE10 series highlights:

- **Unconstrained Entry Performance**: Intel® ATOM® dual and quad core processors give these compact yet powerful edge clients unconstrained performance.
- **Modular Design**: The SE10 addresses variations with a ground up modular design, allowing users to scale up and down the spectrums of ruggedness and flexibility.
- **Easy Deployment and Maintenance**: Compatible design to meet VESA™, DIN, ThinkCentre Tiny mounting and 3 years life cycle.
- **Environmental Adaptability**: Purposefully designed & Mil-STD compliant. Configurable to adapt to a broad range of Edge vertical applications.

Front view

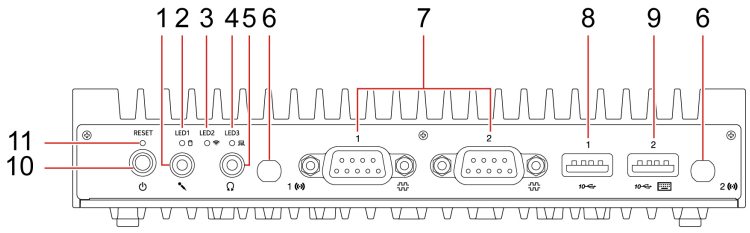


Figure 1. Front view — SE10

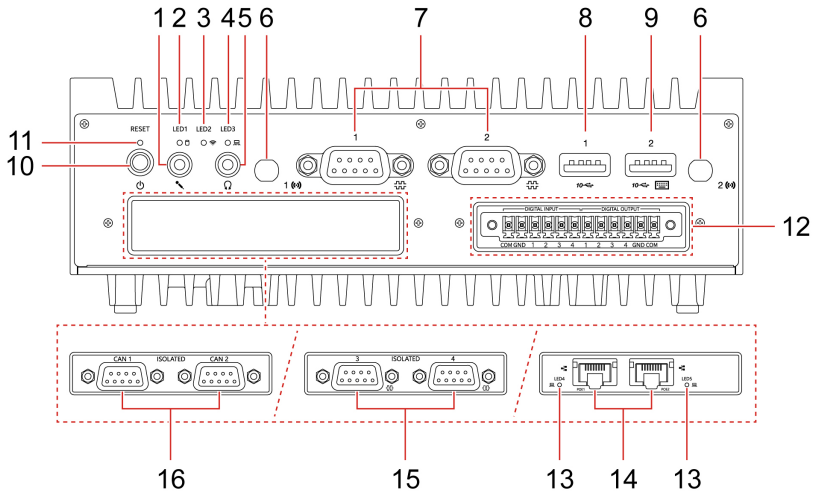


Figure 2. Front view — SE10-I

Item	Description	Item	Description
1	Microphone connector	2	Storage drive activity indicator
3	Wi-Fi® status indicator	4	Customizable LED indicator
5	Headphone connector	6	Wireless WAN antenna slots (2)*
7	Serial connectors 1-2 (RS232/RS422/RS485) (2)	8	USB-A 3.2 Gen 2 connector
9	USB-A 3.2 Gen 2 connector (smart power on)	10	Power button with indicator
11	Reset hole	12	Digital Input and Digital Output connector*
13	POE status indicators (2)*	14	POE connectors (2)*
15	Serial connectors 3-4 (RS232/RS422/RS485) (2)*	16	CANbus connectors (2)*

* for selected models

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.

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

USB device	Data rate (Gbit/s)
3.2 Gen 1	5
3.2 Gen 2	10
3.2 Gen 2 × 2	20
Thunderbolt 3	40
Thunderbolt 4	40

Storage drive activity indicator

LED status	Indication
Blinking green	The indicator is showing data transfer status.
Off	The computer is off or in sleep mode.

Wi-Fi status indicator

LED status	Indication
Solid blue	The indicator is showing successful wireless network connection.
Off	The computer is off or in sleep mode. Or the Wi-Fi is disabled.

Headphone connector

The headphone connector is compatible with headphones or earphones with a 3.5mm (0.14 inch), TRS (3-pole) plug.

Power button with indicator

Press to turn on the computer. The indicator in the power button shows the system status of your computer.

LED status	Indication
Solid white	The computer is operating normally.
Off	The computer is off or in sleep mode.

To turn off the computer, you can short press the power button until the indicator turns off.

Reset hole

Used to reset your computer if the computer stops responding and you cannot turn it off by pressing the power button.

Related topics

- “Customizable LED indicator” on page 12.
- “Serial connectors” on page 12.
- “Digital Input and Digital Output connector” on page 13.
- “POE connectors” on page 15.
- “CANbus connector” on page 16.

Rear view

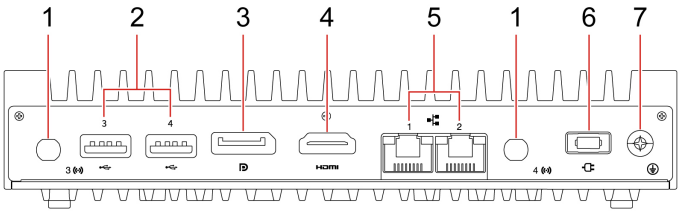


Figure 3. Rear view — SE10

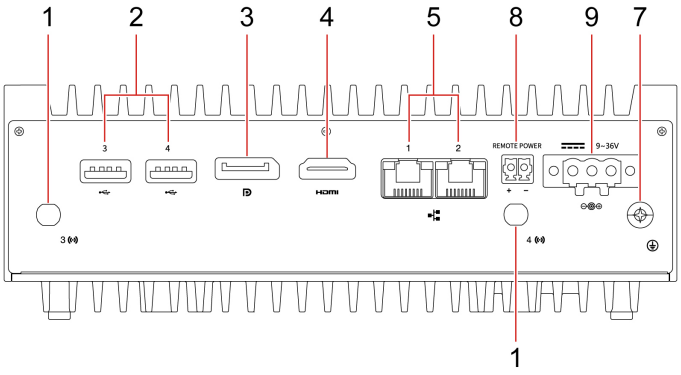


Figure 4. Rear view — SE10-I

Item	Description	Item	Description
1	Wi-Fi antenna slots (2)*	2	USB-A 2.0 connectors (2)
3	DisplayPort™ out connector	4	HDMI™ out connector
5	Ethernet connectors (2)	6	AC/DC power connector (DC in 20 V)
7	Chassis grounding	8	Remote power button connector
9	DC power connector (DC in 9-36 V)		

* for selected models

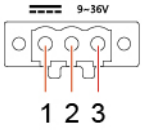
DisplayPort out connector

The connector supports max 4096*2160@60Hz as specified in DisplayPort 1.4.

HDMI out connector

The connector supports max 3840*2160@30Hz as specified in HDMI 1.4b.

DC power connector (DC in 9-36 V)



Pin	Signal
1	GND
2	GND
3	V+ (DC in)

Notes:

- Use the 3-pin phoenix terminal provided by Lenovo in box.
- Connections made to this connector must use the cable (18 AWG-12 AWG / 105°C).
- The power supply voltage tolerance is ±5%.
- Torque the screws at 0.4N.m.

Related topics

- “Ethernet connectors” on page 16.
- “Remote power button connector” on page 16.

Side view

Left view

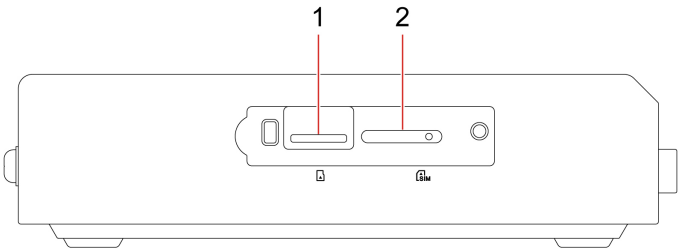


Figure 5. Left view — SE10

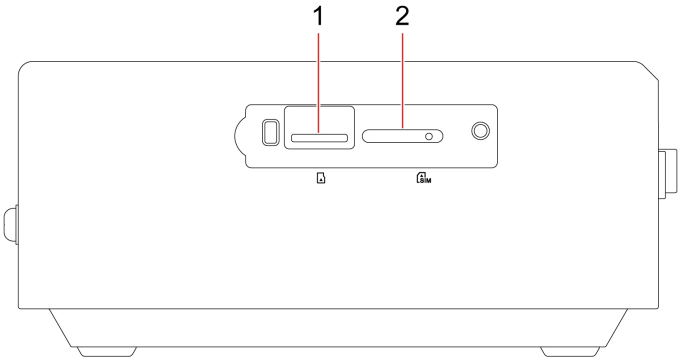


Figure 6. Left view — SE10-I

Item	Description	Item	Description
1	TF card slot	2	Nano-SIM card slot

Nano-SIM card slot

Note: The cellular service is provided by authorized mobile service carriers in some countries and regions. You must have a cellular plan from a service carrier to connect to the cellular network.

Right view

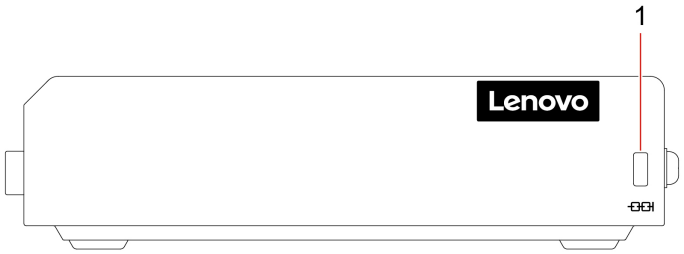


Figure 7. Right view — SE10

Figure 8. Right view — SE10-I

Item	Description
1	Kensington NanoSaver® lock slot

Matrix of external antennas

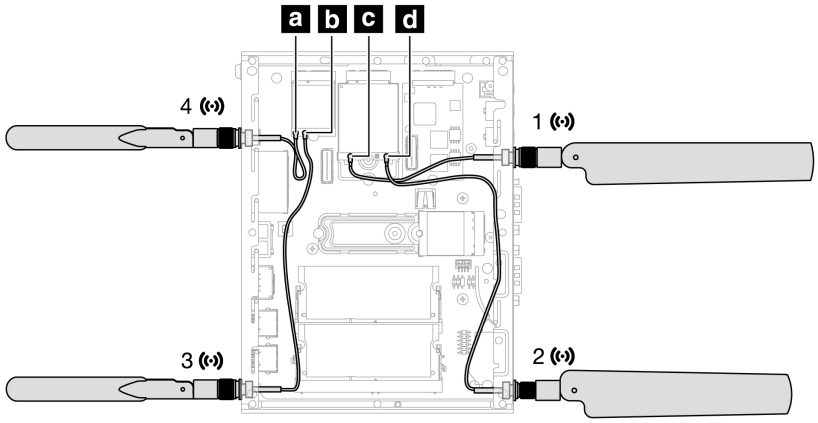
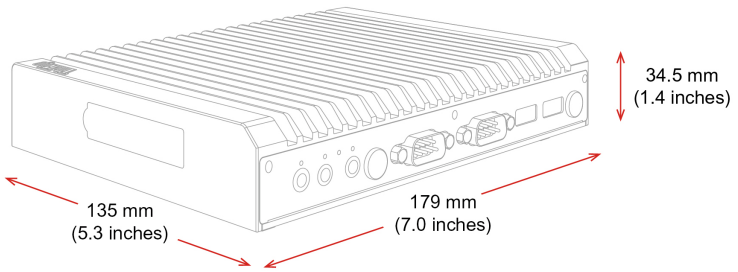
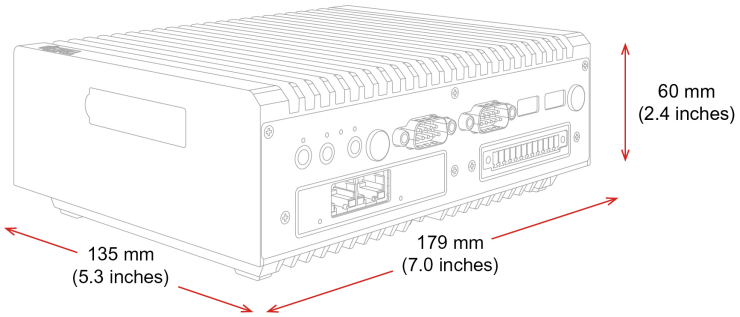


Figure 9. Antenna location and cable connection

External antennas	Location	Cable connection
1, 2 Wireless WAN antennas (4G)*	Front panel	c: Wireless WAN main antenna (orange) d: Wireless WAN auxiliary antenna (blue)
3, 4 Wi-Fi antennas*	Rear panel	a: Wireless LAN auxiliary antenna (gray) b: Wireless LAN main antenna (black)

* for selected models

Features and specifications

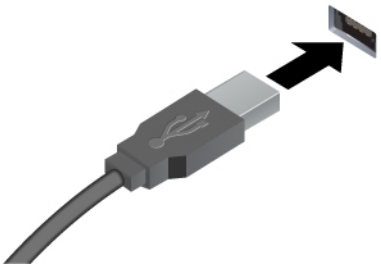
Specification	Description
Dimensions	• SE10: 0.83 L  • SE10-I: 1.45 L 
Weight (without packaging)	Maximum configuration as shipped: • SE10: 1.5 kg (3.31 lb) • SE10-I: 2.6 kg (5.73 lb)
Power supply	• SE10: 65-watt automatic voltage-sensing power adapter • SE10-I: – 9 V dc–36 V dc – 65-watt automatic voltage-sensing power adapter* – 90-watt automatic voltage-sensing power adapter*
Electrical input	• AC: – Input voltage: 100 V ac–240 V ac – Input frequency: 50 Hz–60 Hz • DC: – Input voltage: 9 V dc–36 V dc
Memory	Double data rate 4 (DDR4) small outline dual in-line memory module (SODIMM)
Storage device	• M.2 solid-state drive • Embedded multi media card (eMMC) (for SE10-I)

Specification	Description
Video features	The integrated graphics card supports the following: • DisplayPort connector • HDMI out connector
Audio features	The integrated audio card supports: • Headphone connector • Microphone connector
Network features	• Ethernet LAN • Bluetooth* • Wireless LAN* • Wireless WAN (4G)*

* 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 1 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.

Chapter 2. Customize your computer

Connect your computer with an external display, a keyboard, and a mouse before deployment.

Operating environment

Note: The operating environment is not applicable for hardware accessories. The operating temperature of various accessories depends on the corresponding accessory temperature specification.

The operating environment for the industrial device must be:

- Over Voltage Category II
- Pollution degree 2
- Dry location
- IP Protection class: IP50

Maximum altitude (without pressurization)

- Operating: From 0 m (0 ft) to 4572 m (15 000 ft)
- Storage: From 0 m (0 ft) to 12 192 m (40 000 ft)

Temperature

- Operating: 0.83 L (65 W adapter) ambient temperature from 0°C (32°F) to 50°C (122°F) (with the air flow speed at 0.7 m/s)
- Operating: 1.45 L (65 W adapter or 9-36 V DC Input) ambient temperature from -20°C (-4 °F) to 60°C (140°F) (with the air flow speed at 0.7 m/s)
- Operating: 1.45 L (9-36 V DC Input) ambient temperature from -40°C (-40°F) to 70°C (158°F) (with the air flow speed at 0.7 m/s), this condition does not apply to Mainland China or India.
- Operating: 1.45 L (90 W adapter) ambient temperature from 0°C (32°F) to 40°C (104°F) (with the air flow speed at 0.7 m/s)

Note: If your computer is stored or transported in temperatures less than -20°C (-4°F), allow the computer to rise slowly to an optimal operating temperature before use. Using the computer in a lower operating temperature might result in irreparable damage to your computer.

Relative humidity

- Operating: 95% (non-condensing) at 40°C (104°F)
- Storage: 10%-90% (non-condensing) at 60°C (140°F)

Configurable connectors

You can customize or configure the following connectors with compatible peripheral equipment based on your needs.

Customizable LED indicator

The default setting of this LED is for wireless WAN, which supports the following LED status:

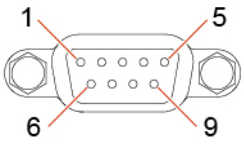
LED status	Indication
Solid yellow	The RF function is enabled.
Off	The RF function is disabled.

Besides, you can also customize the LED to indicate other functions with the following LED status as you preferred:

- The indicator is always off.
- The indicator is always on.
- The indicator is blinking.

To customize this LED, see “Use the software development kit (SDK)” on page 17.

Serial connectors



Used to connect an external modem, a serial printer, or other devices that use a serial connector.

To change the serial mode among RS232 (default), RS422, and RS485, do either of the following steps based on the serial connector locations.

- For serial connectors 1-2, see “Change the Serial Port UART type” on page 45.
- For serial connectors 3-4, see “Use the software development kit (SDK)” on page 17.

Table 1. RS232 Pin definition mapping table (for serial connectors 1-2)

Pin number	Pin definition
1	DCD
2	RXD
3	TXD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

Table 2. RS232 Pin definition mapping table (for serial connectors 3-4)

Pin number	Pin definition
2	RXD
3	TXD
5	GND
7	RTS
8	CTS

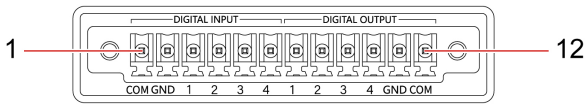
Table 3. RS422 Pin definition mapping table

Pin number	Pin definition
1	TX-
2	TX+
3	RX+
4	RX-
5	GND

Table 4. RS485 Pin definition mapping table

Pin number	Pin definition
1	DATA-
2	DATA+
5	GND

Digital Input and Digital Output connector



Used to connect an external modem, a serial printer, or other devices that use a serial connector. To customize this connector, see “Use the software development kit (SDK)” on page 17.

Notes:

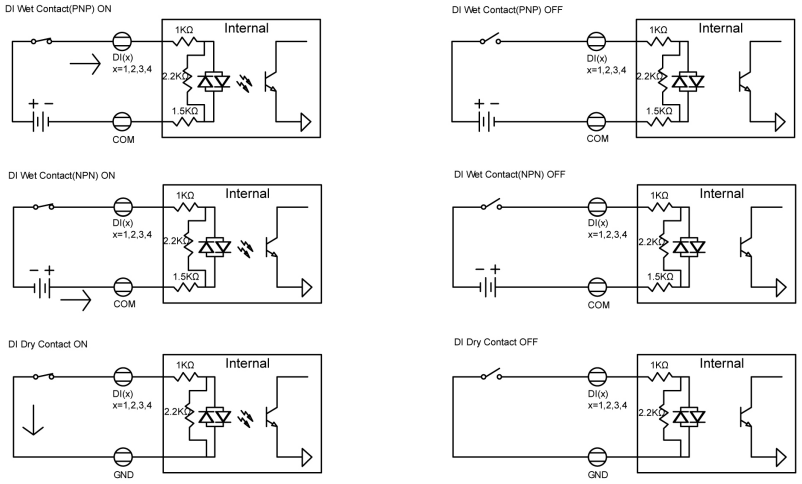
- Use the 12-pin phoenix terminal provided by Lenovo in box.
- Connections made to this connector must use the cable (28 AWG-14 AWG / 105°C).

Connector	Description
Digital Input	• **Channels:** 4 • **Input type:** NPN, PNP • **Dry contact:** – Logic 0: Open – Logic 1: Close to GND • **Wet contact (from external power supply):** – Logic 0: 0 V to 0.8 V – Logic 1: 5 V to 30 V
Digital Output	• **Channels:** 4 • **Output type:** NPN • **Voltage:** 5 V to 30 V from external power supply • **Current:** – 500 mA/Channel at 25°C – 300 mA/Channel at 60°C **Note:** Do not plug your power supply directly in Digital Output connector. Otherwise, the output MOSFET will be damaged.

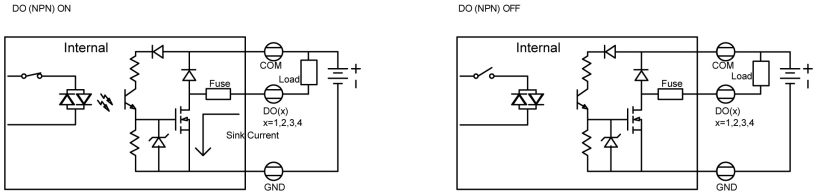
Table 5. Digital Input and Digital Output Pin definition mapping table

Pin number	Pin definition
1	Digital Input-COM
2	Digital Input-GND
3	Digital Input-1
4	Digital Input-2
5	Digital Input-3
6	Digital Input-4
7	Digital Output-1
8	Digital Output-2
9	Digital Output-3
10	Digital Output-4
11	Digital Output-GND
12	Digital Output-COM

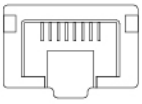
- Digital Input diagram



- Digital Output diagram



POE connectors

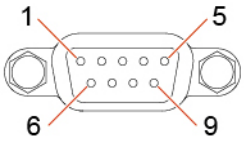


POE connectors are equipped with Intel I225 Ethernet controllers that support 10/100/1000/2500 Mbps. Each POE connector also supports POE IEEE 802.3af 15.4W to IP camera. The port provides a standard RJ-45 jack connector with LED indicators on left and right side.

Note: In industrial environments, it is recommended to use shielded network cables.

LED status	Indication
Solid yellow on the left side	The indicator is showing successful Ethernet connection.
Blinking orange on the right side	The indicator is showing data transfer status and the transfer speed is 2500 Mbps.
Blinking green on the right side	The indicator is showing data transfer status and the transfer speed is 1000 Mbps.
Solid yellow on the left side and LED off on the right side	The indicator is showing data transfer status and the transfer speed is 10/100 Mbps.

CANbus connector



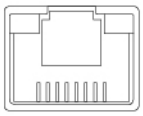
Used to connect to a CANbus enabled device or dongle. To customize this connector, see “Use the software development kit (SDK)” on page 17.

Note: Connections made to this connector must use the cable (26 AWG-18 AWG / 105°C).

Table 6. CANbus Pin definition mapping table

Pin number	Pin definition
2	CANL
6	GND
7	CANH

Ethernet connectors

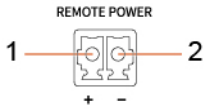


Ethernet connectors are equipped with Intel I225 Ethernet controllers that support 10/100/1000/2500 Mbps. The Ethernet port provides a standard RJ-45 jack connector with LED indicators on left and right side.

Note: In industrial environments, it is recommended to use shielded network cables.

LED status	Indication
Solid yellow on the left side	The indicator is showing successful Ethernet connection.
Blinking orange on the right side	The indicator is showing data transfer status and the transfer speed is 2500 Mbps.
Blinking green on the right side	The indicator is showing data transfer status and the transfer speed is 1000 Mbps.
Solid yellow on the left side and LED off on the right side	The indicator is showing data transfer status and the transfer speed is 10/100 Mbps.

Remote power button connector



Pin	Signal
1	PWR_BTN+
2	PWR_BTN-

These pins are normally open (NO).

Notes:

- Use the 2-pin phoenix terminal provided by Lenovo in box.
  - Dimensions:
    - Distance from center of pin #1 to center of pin #2: 0.100″ (2.54 mm)
    - Width of connector: 0.199″ (5.05 mm)
  - Terminal:
    - 9588T - Brass
    - 9588TP - Phosphor bronze
- Connections made to this connector must use the cable (28 AWG-14 AWG / 105°C).

Use the software development kit (SDK)

Lenovo provides a software development kit (SDK) for your computer. You can use the SDK to develop or configure the following functions or connectors based on your needs.

- **Digital Input and Digital Output connector (DI/DO connector)**: You can collect signals and transfer data with sensors, transducers, and relay modules connected to the DI/DO connectors. For example, you can control output of lamps, 7-segment LED displays, relays, and other products which are used as an interface for digital communication with controllers such as a Programmable Logic Controller (PLC).
- **Serial connector**: You can use this connector as serial communication. For example, you can collect serial logs connected to a peripheral equipment to your computer.
- **CANbus connector**: The CANbus connector is a high-integrity serial bus system for networking intelligent devices. CAN busses and compatible peripheral equipment are common components in automotive and industrial systems.
- **Customizable LED indicator**: You can customize the LED to any function as you preferred. The default is for wireless WAN.
- **Watchdog timer**: You can create a watchdog timer to monitor whether your computer is running correctly and to restart your computer automatically when your computer hangs without human intervention.

To download the software development kit (SDK):

1. Go to https://support.lenovo.com/docs/thinkedge_sdk.
2. Follow the on-screen instructions to select the correct software development kit for your computer.

Get started with Ubuntu Server

You can access the following web site to learn more details on the Ubuntu Server OS: https://ubuntu.com/server/docs.

Ubuntu server does not come with a desktop GUI installed by default so the unit can run headless and be managed using ssh. Configuration is expected to be done from the command line.

By default the system is configured with a default account “ubuntu” with password “ubuntu”. The first time you login you will be prompted to update the password to something unique.

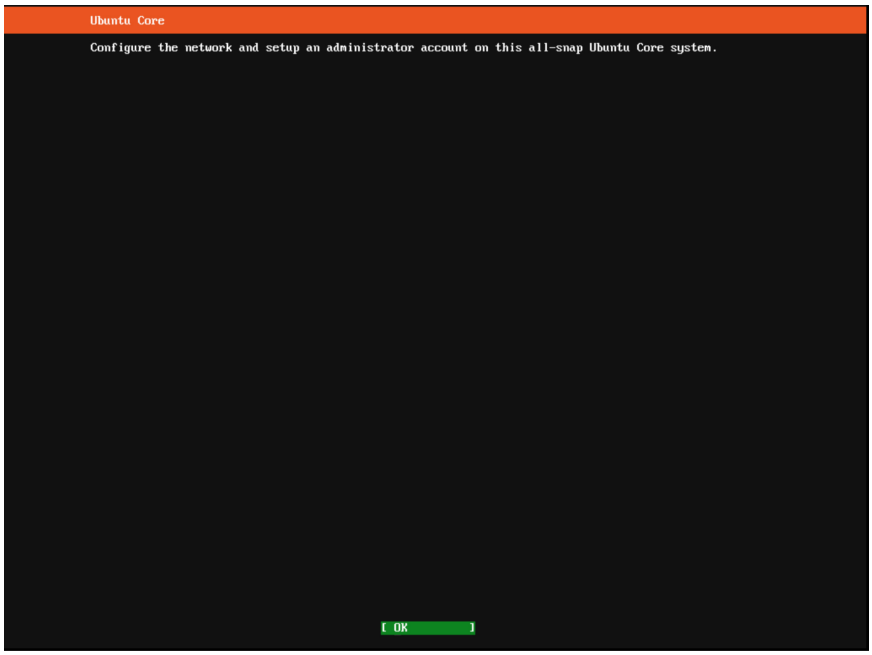
You will likely want to create your own user account using the **adduser <username>** command and follow the instructions. If you want to give that account supervisor privileges, use the **usermod -aG sudo <username>** command.

Get started with Ubuntu Core

You can access the following web site to learn more details on the Ubuntu Core OS: https://ubuntu.com/core/docs.

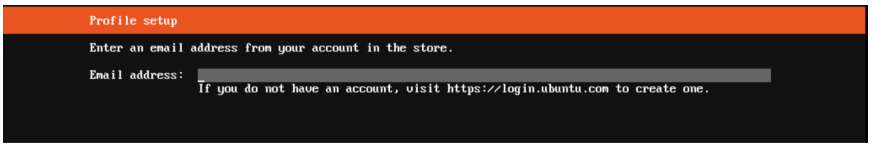
The first startup in Ubuntu Core requires setting up with an Ubuntu One account. For access, refer to https://ubuntu.com/core/docs/connect-with-ssh and do the following steps.

1. Register an Ubuntu One account.
2. Generate an SSH key pair on your second Linux computer.
3. Import SSH public key.
4. Setup Ubuntu Core OS on SE10 / SE10-I, do the following steps.
   a. Boot Ubuntu Core OS and press **OK**.

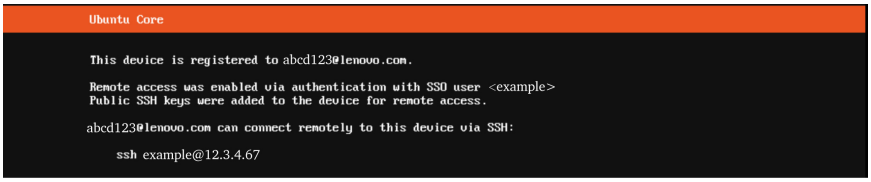


   b. Set network connection and ensure that it can access Ubuntu One account.

   c. Input the Ubuntu One account registered email address.



This information will be shown after the device is registered.



5. Connect to a device.
   After setting, you can login the Ubuntu Core by SSH from the second computer in the same LAN network.

System board

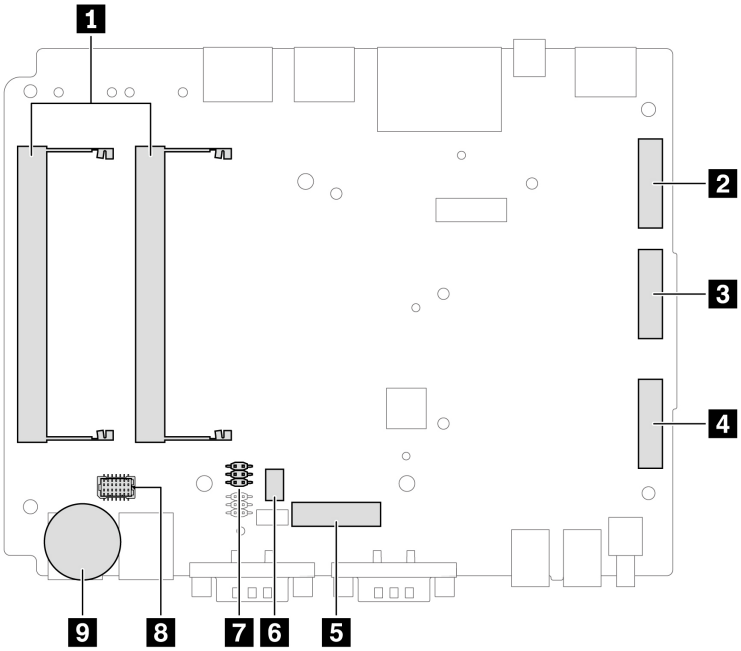


Figure 10. System board — front view

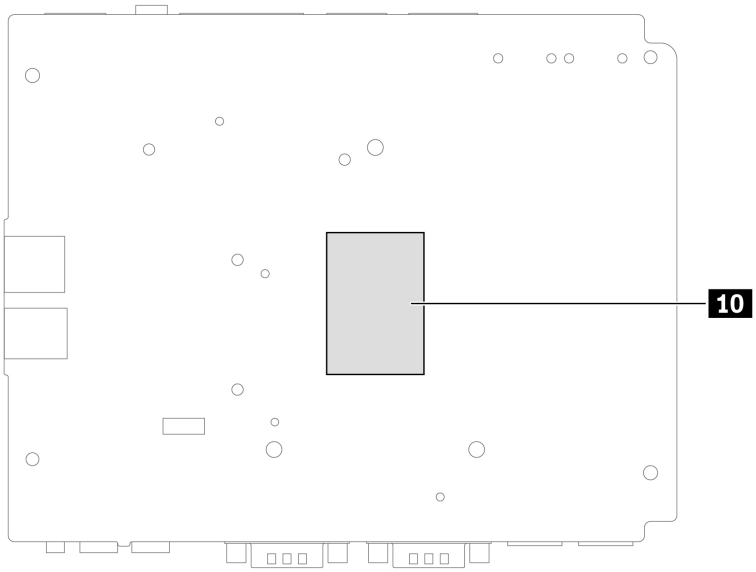


Figure 11. System board — rear view

Item	Description	Item	Description
1	Memory slots	2	Wi-Fi card slot
3	Wireless WAN card (4G) slot	4	POE M.2 LAN card slot
5	M.2 solid-state drive slot	6	POE board power connector
7	Clear CMOS (Complementary Metal Oxide Semiconductor) / Recovery jumper	8	DI/DO board connector
9	Coin-cell battery	10	Microprocessor

Clear CMOS / Recovery jumper

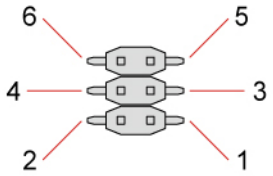


Figure 12. Clear CMOS / Recovery jumper

Clear CMOS / Recovery jumper Pin definition mapping table

Pin number	Pin definition
1	ME_DISABLE
2	CLEAR_CMOS
3	HAD_SDOUT
4	R_GND
5	PM_RSMRST#
6	AT_RSMRST#

Clear CMOS / Recovery jumper function table

Function	Pin connection
ME disable	1-3
Clear CMOS	2-4
ATX Mode (Default)	4-6
AT Mode	5-6

System board diagram

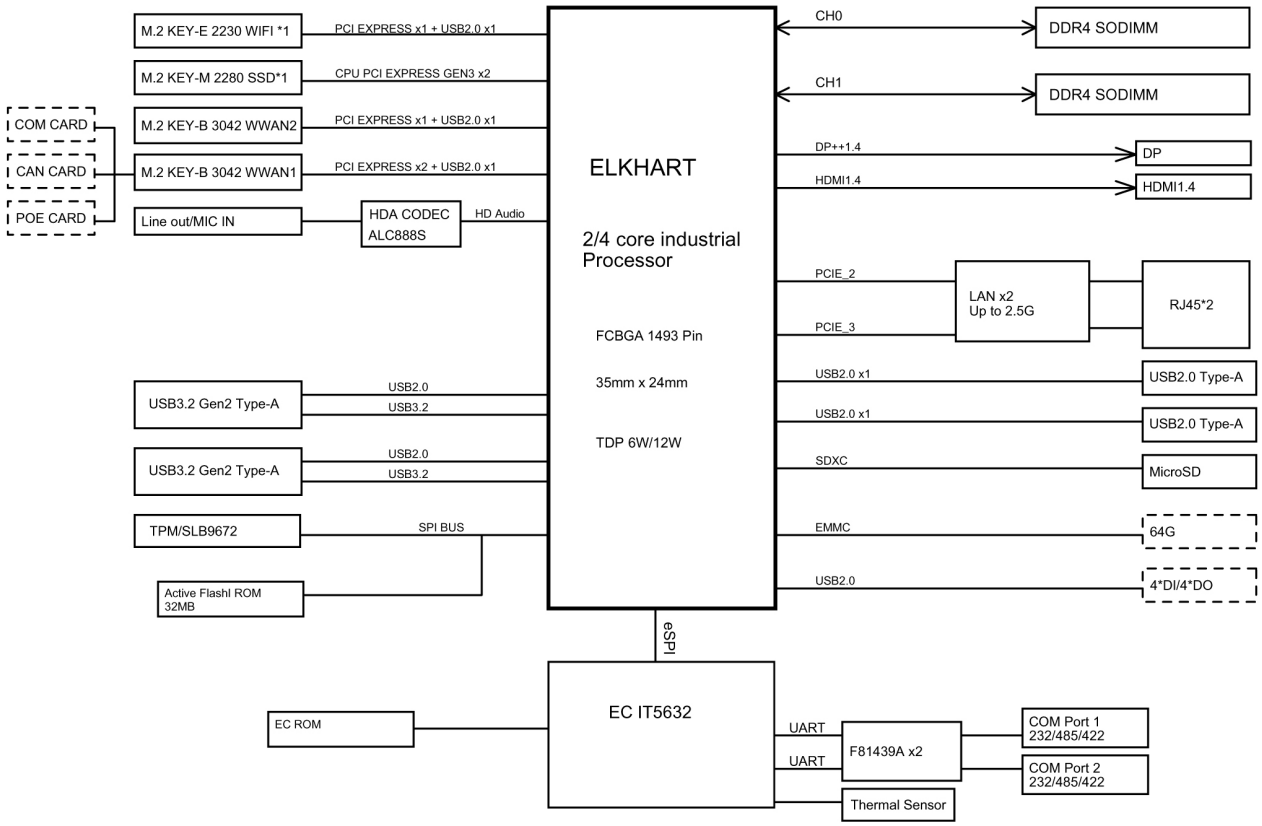


Figure 13. System board diagram

Restore system image to factory image

Lenovo provides a Digital Download for your computer. For example, you can restore system image to factory image.

To download the Digital Download:

1. Go to https://smartsupport.lenovo.com.
2. Search by your computer product name to enter the support web page for your computer.
3. Click **Drivers & Software**.
4. Click **Order Now** at the **Get Recovery Media** tab and follow the on-screen instructions.

Chapter 3. Use your computer

Mount on wall

You can mount your computer on the wall by using the following tools. To purchase Tiny VESA Mount or Tiny Sandwich Kit, go to https://www.lenovo.com/accessories.

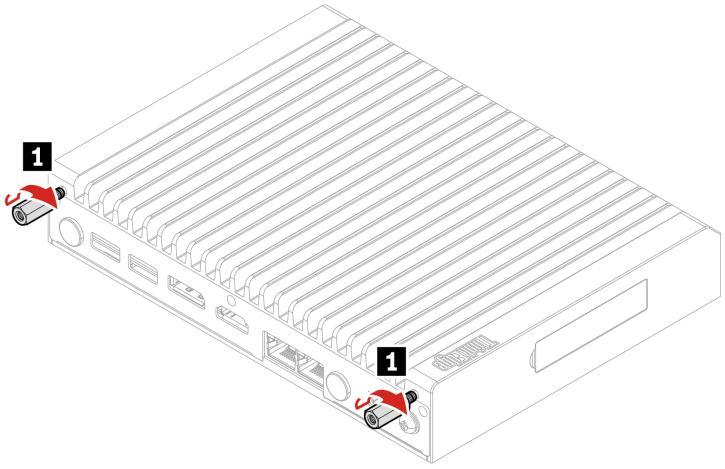
DIN bracket kit

To use DIN bracket kit, see “DIN bracket kit” on page 45.

Tiny VESA Mount (for SE10)

To use Tiny VESA Mount, do the following:

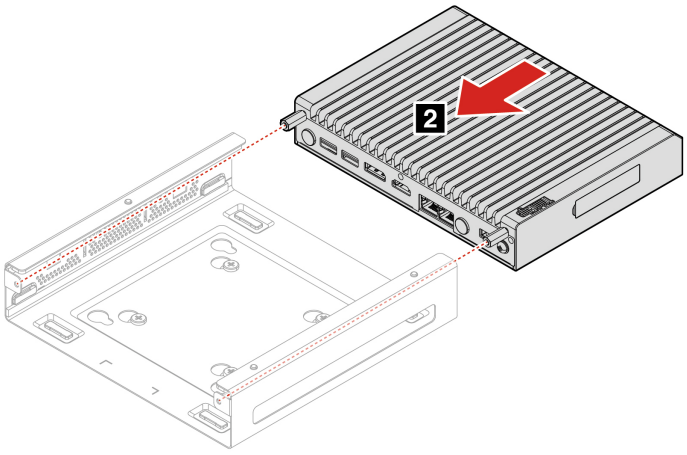
1. Install two nuts to the computer.



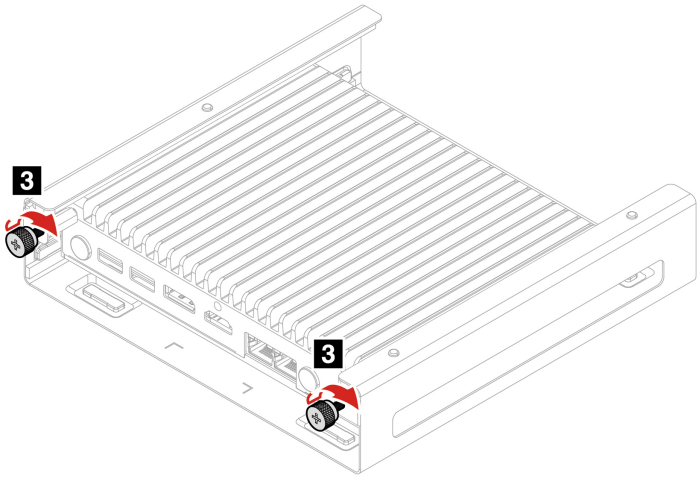
Attention: Use the screws provided by Lenovo to avoid any unpredictable damage to your computer.

Step	Screw (quantity)	Color	Torque
1	M3 × 5 mm, Hexagon nut (2)	Black	0.59 Nm (6.0 kgf-cm)

2. Install the Tiny VESA Mount.



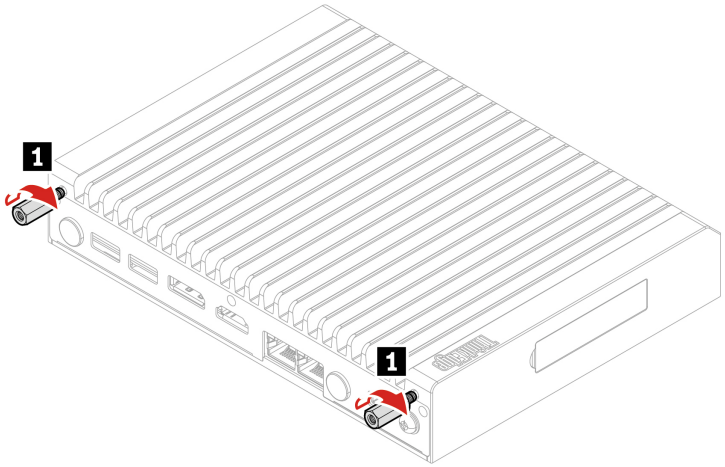
3. Install two screws to secure the Tiny VESA Mount.



Tiny Sandwich Kit (for SE10)

To use Tiny Sandwich Kit, do the following:

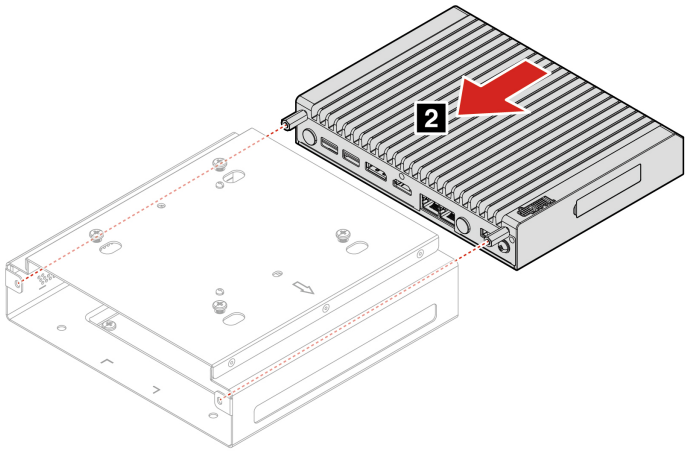
1. Install two nuts to the computer.



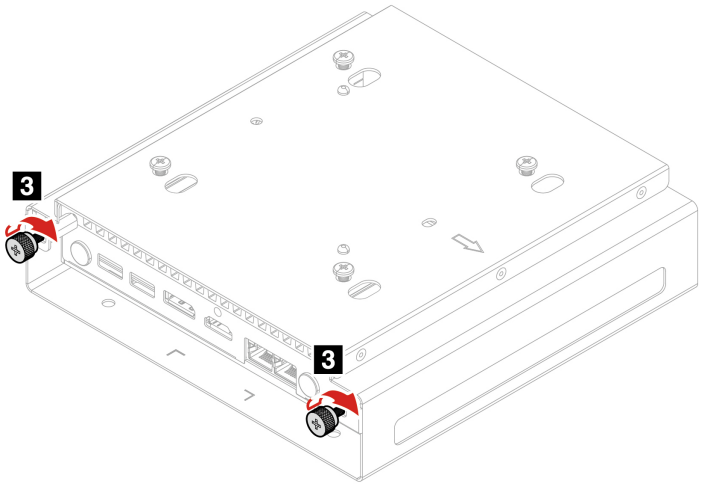
Attention: Use the screws provided by Lenovo to avoid any unpredictable damage to your computer.

Step	Screw (quantity)	Color	Torque
1	M3 × 5 mm, Hexagon nut (2)	Black	0.59 Nm (6.0 kgf-cm)

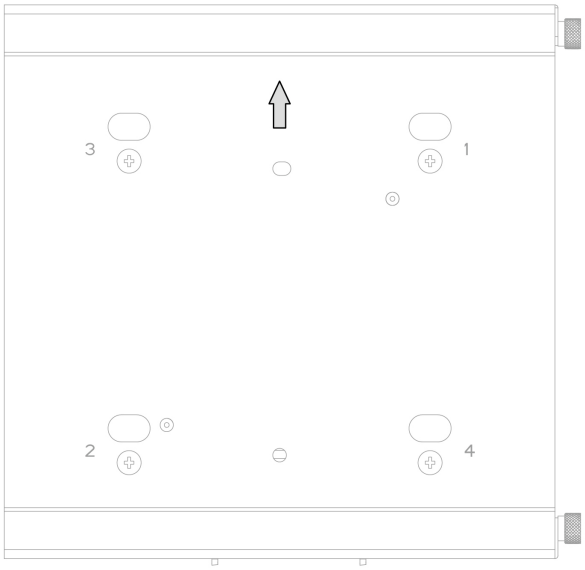
2. Install the Tiny Sandwich Kit.



3. Install two screws to secure the Tiny Sandwich Kit.

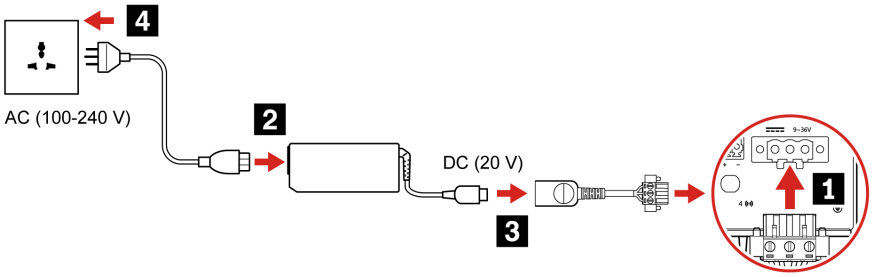


Note: To avoid risks, when mounting on the wall, install the Tiny Sandwich Kit in the direction indicated by the arrow.



Connect an AC/DC power adapter to the DC power connector

For selected models, you can connect an AC/DC power adapter to the DC power connector through a DC converter cable. Use the DC converter cable provided by Lenovo in box.



Access networks

Your computer helps you connect to the world through a wired or wireless network.
To identify the interfaces available, use the **ip a** command. For example:

```
example@ubuntu:~$ ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: enp2s0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc mq state DOWN group default qlen 1000
    link/ether e8:80:88:34:f1:45 brd ff:ff:ff:ff:ff:ff
3: enp3s0: <NO-CARRIER,BROADCAST,MULTICAST,UP> mtu 1500 qdisc mq state DOWN group default qlen 1000
    link/ether e8:80:88:34:f1:44 brd ff:ff:ff:ff:ff:ff
4: wwan0: <BROADCAST,MULTICAST,NOARP> mtu 1500 qdisc noop state DOWN group default qlen 1000
    link/ether 92:09:87:32:2d:a6 brd ff:ff:ff:ff:ff:ff
5: wlp1s0: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default qlen 1000
    link/ether f0:a6:54:db:dd:97 brd ff:ff:ff:ff:ff:ff
    inet 192.168.137.2/24 brd 192.168.137.255 scope global dynamic noprefixroute wlp1s0
       valid_lft 598677sec preferred_lft 598677sec
    inet6 fe80::f2a6:54ff:fedb:dd97/64 scope link
       valid_lft forever preferred_lft forever
```

Connect to the wired Ethernet

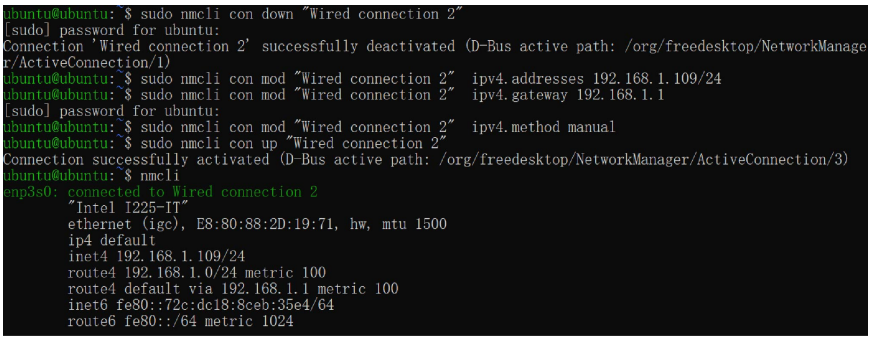
Connect your computer to a local network through the Ethernet connector on your computer with an Ethernet cable.

```
ubuntu@ubuntu:~$ nmcli
enp3s0: connected to Wired connection 2
        "Intel I225-IT"
        ethernet (igc), E8:80:88:2D:19:71, hw, mtu 1500
        ip4 default
        inet4 192.168.1.6/24
        route4 192.168.1.0/24 metric 100
        route4 default via 192.168.1.1 metric 100
        inet6 fe80::72c:dc18:8ceb:35e4/64
        route6 fe80::/64 metric 1024

wlp1s0: connected to SSID 1
        "Intel 6 AX210/AX211/AX411 160MHz"
        wifi (iwlwifi), 8C:F8:C5:3E:EB:35, hw, mtu 1500
        inet4 192.168.137.21/24
        route4 192.168.137.0/24 metric 600
        route4 default via 192.168.137.1 metric 600
        inet6 fe80::f7db:ee8f:f8f2:2155/64
        route6 fe80::/64 metric 1024

p2p-dev-wlp1s0: disconnected
        "p2p-dev-wlp1s0"
        wifi-p2p, hw

enp2s0: unavailable
        "Intel I225-IT"
        ethernet (igc), E8:80:88:2D:19:72, hw, mtu 1500
```

The installer will configure the interface to use DHCP by default. If you want to configure a static IP, use the following commands.

```
$ sudo nmcli con down <connection name>
$ sudo nmcli con mod  <connection name> ipv4.addresses    <xx.xx.xx.xx>/24
$ sudo nmcli con mod  <connection name> ipv4.gateway      <xx.xx.xx.xx>
```

```
$ sudo nmcli con mod  <connection name> ipv4.dns          <xx.xx.xx.xx>
$ sudo nmcli con mod  <connection name> ipv4.method manual
$ sudo nmcli con up   <connection name>
```



If you want to go back to a dynamic IP by DHCP, use the following commands.

```
$ sudo nmcli con down <connection name>
$ sudo nmcli con mod  <connection name> ipv4.method auto
$ sudo nmcli con up   <connection name>
```

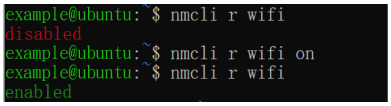
Connect to Wi-Fi networks (for selected models)

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

The easiest way to connect to Wi-Fi is using **nmcli** command. Steps may vary depending on your wireless access point. Use the following commands to scan available SSIDs and configure the Wi-Fi port accordingly.

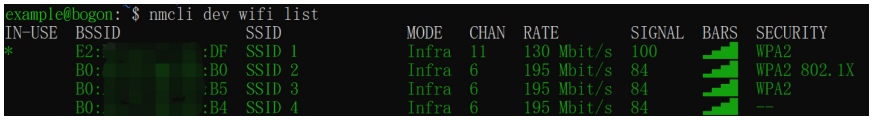
1. Check and confirm if Wi-Fi is enabled.

   ```
   $ nmcli r wifi
   $ nmcli r wifi on
   ```

2. Scan available Wi-Fi list.

   ```
   $ nmcli dev wifi list
   ```

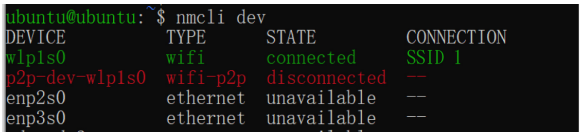
   

3. Create a connection with an available SSID. Add a password if needed.

```
$ nmcli dev wifi connect <SSID name>
$ nmcli dev wifi connect <SSID name> password <WIFI password>
```

4. List the devices managed by Network Manager and check the Wi-Fi status.

```
$ nmcli dev
```



Once the Wi-Fi has been configured successfully, you can use the following commands to disconnect or connect the target SSID.

```
$ nmcli con down <SSID name>
$ nmcli con up   <SSID name>
```

Connect to a cellular network (for selected models)

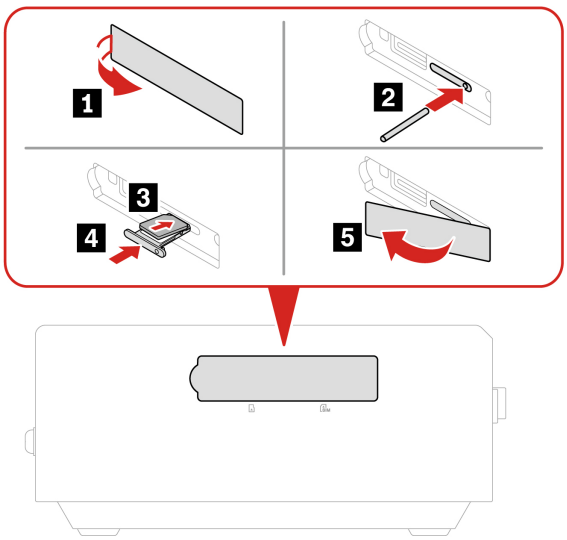
If your computer supports wireless WAN connections, you can purchase a nano-SIM card to establish wireless WAN connections and get online using the cellular signal.

Note: The cellular service is provided by authorized mobile service carriers in some countries and regions. You must have a cellular plan from a service carrier to connect to the cellular network.

To establish a wireless WAN connection:

1. **Install a nano-SIM card:**
   a. Turn off the computer.
   b. Install a nano-SIM card. Pay attention to the orientation of the card and ensure that it is seated correctly.

      Note: Place the computer horizontally on a flat surface. Align the nano-SIM card with the computer and install it into the card slot.



c. Install the wireless WAN antennas. Pay attention to the silk print number of each wireless WAN antenna and ensure that it matches the silk print number of the corresponding wireless WAN antenna slot.

d. Turn on the computer.

2. **Connect to a cellular network:**

a. Use **mmcli** command to list the modem.

```
$ sudo mmcli -L
```

```
example@ubuntu: $ sudo mmcli -L
    /org/freedesktop/ModemManager1/Modem/0 [Quectel] Quectel EM05-G
```

b. Check the detected modem's status.

```
$ sudo mmcli -m 0
```

```
  General  |                  path: /org/freedesktop/ModemManager1/Modem/0
           |             device id: a185436fa2f94cea3061036819b865e7de46fecc
  ----------------------------------
  Hardware |          manufacturer: Quectel
           |                 model: Quectel EM05-G
           |      firmware revision: EM05GFAR07A07M1G
           |        carrier config: VoLTE_OPNMKT_CT
           |  carrier config revision: 050113FC
           |          h/w revision: QUECTEL Mobile Broadband Modul
           |             supported: gsm-umts, lte
           |               current: gsm-umts, lte
           |           equipment id: 016389000002039
  ----------------------------------
  System   |                device: /sys/devices/pci0000:00/0000:00:14.0/usb1/1-3
           |               drivers: option, cdc_mbim
           |                plugin: quectel
           |          primary port: cdc-wdm2
           |                 ports: cdc-wdm2 (mbim), ttyUSB0 (at), wwan0 (net)
  ----------------------------------
  Status   |                  lock: sim-pin2
           |        unlock retries: sim-pin2 (3)
           |                 state: registered
           |           power state: on
           |           access tech: lte
           |        signal quality: 35% (recent)
  ----------------------------------
  Modes    |             supported: allowed: 3g; preferred: none
           |                        allowed: 4g; preferred: none
           |                        allowed: 3g, 4g; preferred: 4g
           |                        allowed: 3g, 4g; preferred: 3g
           |               current: allowed: 3g, 4g; preferred: 4g
  ----------------------------------
  Bands    |             supported: utran-1, utran-4, utran-6, utran-5, utran-8, utran-2,
           |                        eutran-1, eutran-2, eutran-3, eutran-4, eutran-5, eutran-7, eutran-8,
           |                        eutran-12, eutran-13, eutran-14, eutran-18, eutran-19, eutran-20,
           |                        eutran-25, eutran-26, eutran-28, eutran-38, eutran-39, eutran-40,
           |                        eutran-41, eutran-66, eutran-71, utran-19
           |               current: utran-1, utran-4, utran-6, utran-5, utran-8, utran-2,
           |                        eutran-1, eutran-2, eutran-3, eutran-4, eutran-5, eutran-7, eutran-8,
           |                        eutran-12, eutran-13, eutran-14, eutran-18, eutran-19, eutran-20,
           |                        eutran-25, eutran-26, eutran-28, eutran-38, eutran-39, eutran-40,
           |                        eutran-41, eutran-66, eutran-71, utran-19
  ----------------------------------
  IP       |             supported: ipv4, ipv6, ipv4v6
  ----------------------------------
  3GPP     |                  imei: 016389000002039
           |        enabled locks: fixed-dialing
           |           operator id: 46011
           |         operator name: 中国电信
           |          registration: home
           |  packet service state: attached
  ----------------------------------
  3GPP EPS |  ue mode of operation: csps-2
           |   initial bearer path: /org/freedesktop/ModemManager1/Bearer/0
           |    initial bearer apn: CTNET
           | initial bearer ip type: ipv4v6
  ----------------------------------
  SIM      |      primary sim path: /org/freedesktop/ModemManager1/SIM/0
           |        sim slot paths: slot 1: /org/freedesktop/ModemManager1/SIM/0 (active)
           |                        slot 2: none
```

c. The SIM index is required before entering the SIM PIN. Write down the SIM index, which in this case is `0` (it is the number at the end of `/org/freedesktop/ModemManager1/SIM/0`).

d. Enter SIM PIN to unlock SIM (optional).

```
$ sudo mmcli -i 0 --pin=<PIN>
```

e. Enable the modem.

```
$ sudo mmcli -m 0 --enable
```

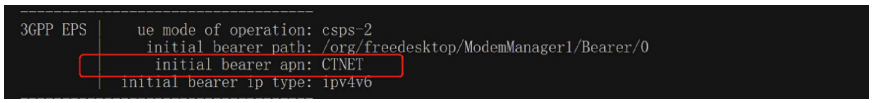
f. Establish an IP connection by **nmcli** command.

```
$ sudo nmcli c add type gsm ifname <interface> con-name <name> apn <operator_apn>
$ sudo nmcli connection up id <name>
```

Notes:

- **<interface>** is the string listed as “primary port:” in the output from `sudo mmcli -m <N>`.

  For above snapshot, it’s `cdc-wdm2`.
- **<name>** is an arbitrary name you used to identify the connection.
- **<operator_apn>** is the APN name for your cellular data plan. You can find **apn** from `mmcli -m 0`.



g. Enable or disable the wireless WAN service by the following commands based on your needs.

- Enable:

  ```
  $ nmcli r wwan0 on
  ```
- Disable:

  ```
  $ nmcli r wwan0 off
  ```

When you need to change the nano-SIM card, ensure that the current gsm connections in Network Manager is deleted first. Then, do the following steps.

1. Get all gsm connections of the current nano-SIM card and delete the configured connection.

   ```
   $ nmcli con
   $ sudo nmcli con delet <conn_id>
   ```
2. Turn off the computer.
3. Change the nano-SIM card.
4. Turn on the computer.
5. Connect to a new cellular network.

Access Global Navigation Satellite System (GNSS)

If your computer supports wireless WAN card, you can open the ttyUSB0 file to access GNSS by AT command (The following content uses minicom as an example.). You can turn on, acquire positioning information, or turn off GNSS based on your needs.

To access GNSS, do the following steps.

1. Run the following command as root.

   ```
   # minicom -D /dev/ttyUSB0
   ```
2. Use the following command to read the current GNSS state.

   ```
   AT+QGPS?
   ```

   - The return result of `0` indicates that GNSS is off.

     ```
     AT+QGPS=0
     ```
   - The return result of `1` indicates that GNSS is on.

     ```
     AT+QGPS=1
     ```
3. Use the following command to turn on GNSS.

   ```
   AT+QGPS=1
   ```
4. Use the following command to acquire location information.

```
AT+QGPSLOC=0
```

5. Use the following command to turn off GNSS.

   ```
   AT+QGPSEND
   ```

Table 7. Supplementary information of `AT+QGPSLOC=0`

Examples	Parameter description
Test Command `AT+QGPSLOC=0`	Response: `+QGPSLOC: <UTC>, <latitude>, <longitude>, <HDOP>, <altitude>, <fix>, <COG>, <spkm>, <spkn>, <date>, <nsat>` OK
<latitude>	Format: `ddmm.mmmmN/S` (Quoted from GPGGA sentence) • **dd**: Degree. Range: 00 – 89 • **mm.mmmm**: Minute. Range: 00.0000 – 59.9999 • **N/S**: North latitude/South latitude
<longitude>	Format: `dddmm.mmmmE/W` (Quoted from GPGGA sentence) • **ddd**: Degree. Range: 000 – 179 • **mm.mmmm**: Minute. Range: 00.0000 – 59.9999 • **E/W**: East longitude/West longitude

Use a TF card

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

Install a TF card

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

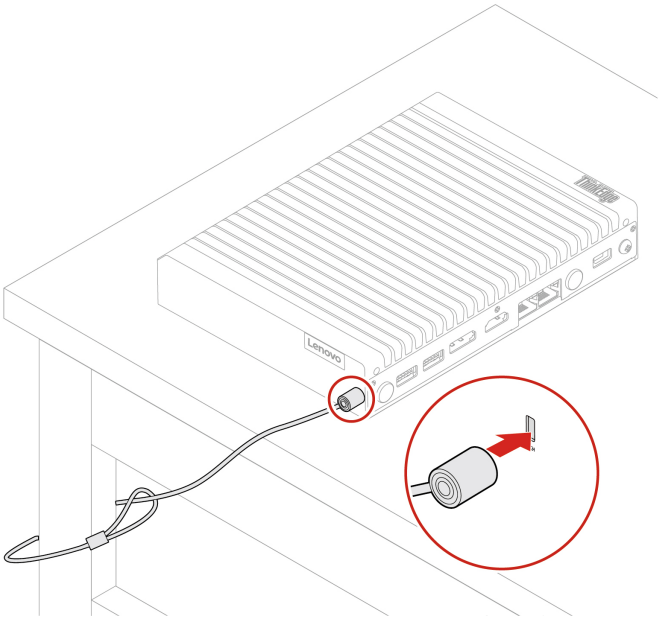
Chapter 4. Secure your computer and information

Lock the computer

Note: You are responsible for evaluating, selecting, and implementing the locking device and security feature. 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.

Kensington NanoSaver lock

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



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, 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**, 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 to have the passwords removed.

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

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.

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 or modify 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.

Chapter 5. UEFI BIOS

This chapter provides information about configuring and updating UEFI BIOS, and clearing CMOS.

What is UEFI BIOS

Note: The operating system settings might override any similar settings in UEFI BIOS.

UEFI BIOS is the first program that the computer runs when the computer is turned on. UEFI BIOS initializes the hardware components and loads the operating system and other programs. Your computer comes with a setup program with which you can change UEFI BIOS settings.

Enter the BIOS menu

Restart the computer. When the logo screen is displayed, press F1 or Fn+F1 to enter the BIOS menu.

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

Navigate in the BIOS interface

Attention: The default configurations are already optimized for you in **boldface**. Improper change of the configurations might cause unexpected results.

Depending on your keyboard, you can navigate in the BIOS interface by pressing the following keys, or combinations of Fn and the following keys:

Key	Function
F1 or Fn+F1	General Help
Esc or Fn+Esc	Exit the submenu
↑ ↓ or Fn+↑ ↓	Locate an item
← → or Fn+← →	Move keyboard focus
+/– or Fn++/–	Change value
Enter	Enter the submenu
F9 or Fn+F9	Setup Defaults
F10 or Fn+F10	Save and exit

Change the display language of UEFI BIOS

UEFI BIOS supports three or four display languages: English, French, simplified Chinese, and Russian (for selected models).

To change the display language of UEFI BIOS:

1. Select **Main → Language** and press Enter.
2. Set the display language as desired.

Change the display mode of UEFI BIOS (for selected models)

You can use UEFI BIOS in the graphic mode or the text mode according to your needs.

The keys on the keyboard used to perform various tasks are displayed at the bottom of the screen. In addition to the keyboard, you also can use the mouse to make selections.

To change the display mode of UEFI BIOS:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Main → Setup Mode Select** and press Enter.
3. Set the display mode as desired.

Set the system date and time

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Main → System Time & Date** and press Enter.
3. Set the system date and time as desired.
4. Press F10 or Fn+F10 to save the changes and exit.

Change the boot priority order

If the computer does not boot from a device as expected, you can change the boot priority order permanently or select a temporary boot device.

Change the boot priority order permanently

1. Depending on the type of the storage device, do one of the following:
   - If the storage device is internal, go to step 2.
   - If the storage device is a disc, ensure that the computer is on or turn on the computer. Then, insert the disc into the optical drive.
   - If the storage device is an external device other than a disc, connect the storage device to the computer.
2. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
3. Select **Startup → Boot Priority Order**, and then follow the on-screen instructions to change the boot priority order.
4. You can also select the first priority device group by selecting **Startup → First Boot Device**, and then follow the on-screen instructions to select the first boot device within this group. Your computer will boot from the first boot device before trying the boot priority order you set in the previous step.
5. Press F10 or Fn+F10 to save the changes and exit.

Select a temporary boot device

Note: Not all discs and storage drives are bootable.

1. Depending on the type of the storage device, do one of the following:
   - If the storage device is internal, go to step 2.
   - If the storage device is a disc, ensure that the computer is on or turn on the computer. Then, insert the disc into the optical drive.
   - If the storage device is an external device other than a disc, connect the storage device to the computer.

2. Restart the computer. When the logo screen is displayed, press F12 or Fn+F12.
3. Select the storage device as desired and press Enter.

If you want to change the boot priority order permanently, select **Enter Setup** on Startup Device Menu and press Enter to enter the BIOS menu.

Enable or disable the configuration change detection feature

If you enable configuration change detection, when the POST detects configuration changes of some hardware devices (such as storage drives or memory modules), an error message will be displayed when you turn on the computer.

To enable or disable the configuration change detection feature:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Security → Configuration Change Detection** and press Enter.
3. Enable or disable the feature as desired.
4. Press F10 or Fn+F10 to save the changes and exit.

To bypass the error message and log in to the operating system, press F2 or Fn+F2. To clear the error message, enter the BIOS menu, save and then exit.

Enable or disable the automatic power-on feature

The Automatic Power On item in UEFI BIOS provides various options for you to make your computer start up automatically.

To enable or disable the automatic power-on feature:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Power → Automatic Power On** and press Enter.
3. Select the feature as desired and press Enter.
4. Enable or disable the feature as desired.
5. Press F10 or Fn+F10 to save the changes and exit.

Enable or disable the smart power-on feature

Ensure that the keyboard is connected to a USB connector supporting the smart power-on feature. With the smart power-on feature enabled, you can start up or wake up the computer from the hibernation mode by pressing Alt+P.

To enable or disable the smart power-on feature:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Power → Smart Power On** and press Enter.
3. Enable or disable the feature as desired.
4. Press F10 or Fn+F10 to save the changes and exit.

Enable or disable the ErP LPS compliance mode

Lenovo computers meet the eco-design requirements of the ErP regulation. For more information, 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:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Power → Enhanced Power Saving Mode** and press Enter.
3. Depending on whether you select **Enabled** or **Disabled**, do one of the following:
   - If you select **Enabled**, press Enter. Then, go to the next step.
   - If you select **Disabled**, press Enter. You can change setting for the following features as you preferred:
     - You can select **Enabled** or **Disabled** the Smart Power On feature.
     - You can select **Power on**, **Power off** or **Last state** the After Power Loss feature.
     - Select **Automatic Power On** and press Enter. You can select **Enabled** or **Disabled** the Wake on LAN feature and the Wake from Serial Port Ring feature.

     Note: When the Enhanced Power Saving Mode is disabled, the computer power consumption might be increased in standby mode.
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.

Change BIOS settings before installing a new operating system

BIOS settings vary by operating system. Change the BIOS settings before installing a new operating system.

To change the BIOS settings:

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. From the main interface, select **Security → Secure Boot** and press Enter.
3. Depending on the operating system to be installed, do one of the following:
   - To install the Windows® 10 (64-bit) operating system or Linux systems that support secure boot, select **Enabled** for **Secure Boot**.
   - To install an operating system that does not support secure boot, such as some Linux operating systems, select **Disabled** for **Secure Boot**.
4. Press F10 or Fn+F10 to save the changes and exit.

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 Linux Vendor Firmware Service (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.

Change the Serial Port UART type

1. Restart the computer. When the logo screen is displayed, press F1 or Fn+F1.
2. Select **Devices → Serial Port Setup** and press Enter. You can do the following:
   - Select **Serial Port1 UART Type** and press Enter. You can select **RS232**, **RS422** or **RS485** for Serial Port1 as you preferred.
   - Select **Serial Port2 UART Type** and press Enter. You can select **RS232**, **RS422** or **RS485** for Serial Port2 as you preferred.
3. Press F10 or Fn+F10 to save the changes and exit.

Recover from a BIOS update failure

1. Remove all media from the drives and turn off all connected devices.
2. Insert the BIOS update disc into the optical drive, and then turn off the computer.
3. Disconnect all power cords from electrical outlets. Then, remove any parts that impede access to the Clear CMOS/Recovery jumper.
4. Move the jumper from the standard position to the maintenance position.
5. Reconnect the power cords for the computer and the monitor to electrical outlets.
6. Turn on the computer and the monitor. When the computer beeps, the recovery process begins.
7. After the recovery process is completed, the computer will be turned off automatically.

   Note: Depending on the computer model, the recovery process will take two to three minutes.
8. Disconnect all power cords from electrical outlets.
9. Move the jumper back to the standard position.
10. Reinstall all the parts that have been removed. Then, reconnect the power cords for the computer and the monitor to electrical outlets.
11. Turn on the computer and the monitor. When the logo screen is displayed, press F1 or Fn+F1.
12. To prevent data loss, ensure that BIOS settings are restored to an earlier point.

Clear CMOS

1. Remove all media from the drives and turn off all connected devices and the computer.
2. Disconnect all power cords from electrical outlets. Then, remove any parts that impede access to the Clear CMOS/Recovery jumper.
3. Move the jumper from the standard position to the maintenance position.
4. Reconnect the power cords for the computer and the monitor to electrical outlets.
5. Turn on the computer and the monitor. When the computer beeps, wait for approximately 10 seconds.
6. Turn off the computer by holding the power button for approximately four seconds.

7. Disconnect all power cords from electrical outlets.
8. Move the jumper back to the standard position.
9. Reinstall all the parts that have been removed. Then, reconnect the power cords for the computer and the monitor to electrical outlets.
10. Turn on the computer and the monitor. When the logo screen is displayed, press F1 or Fn+F1.
11. To prevent data loss, ensure that BIOS settings are restored to an earlier point.

Chapter 6. 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

- 2230 to 2280 SSD bracket*
- Bottom cover
- DIN bracket kit*
- Heat sink of PCIe*
- Heat sink of POE*
- IP50 cover pack*
- M.2 solid-state drive
- Memory module
- Power adapter
- Power cord
- Rubber or Hexagon nut (for Tiny VESA Mount or Tiny Sandwich Kit)*
- Tiny VESA Mount screw pack*

Optional-service CRUs

- CANbus expansion card*
- DI/DO dummy bracket*
- DI/DO expansion card*
- Dummy expansion bracket*
- POE expansion card*
- Serial expansion card*

* for selected models

Remove or replace a CRU

This section provides instructions on how to remove or replace a CRU.

Power adapter and power cord

Prerequisite

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

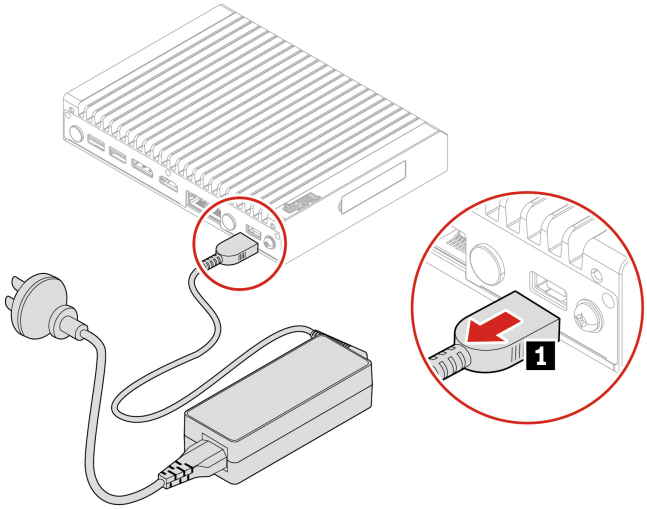
Avoid contact with the hot computer. During operation, the computer becomes hot enough to burn the skin. Before you touch the computer, turn off the computer, disconnect power, and wait approximately 30 minutes for the computer to cool.

For access, do the following:

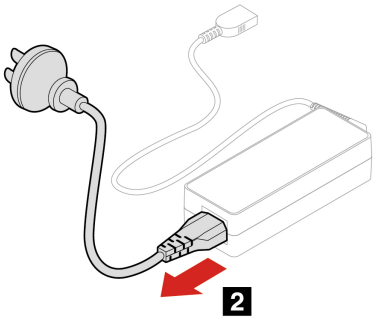
1. Turn off all connected devices and the computer.
2. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.

Removal steps

1. Remove the power adapter.



2. Remove the power cord.



DIN bracket kit

Prerequisite

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

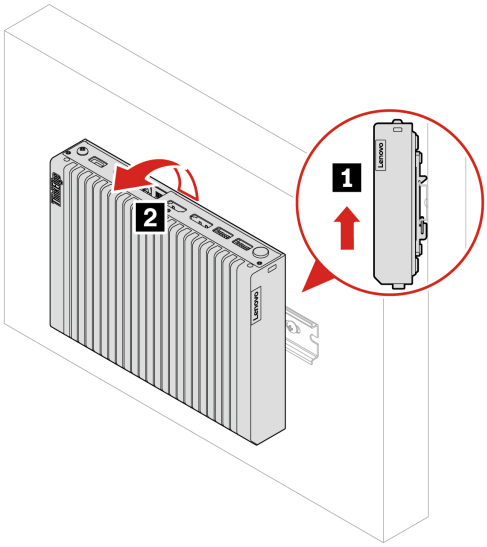
Avoid contact with the hot computer. During operation, the computer becomes hot enough to burn the skin. Before you touch the computer, turn off the computer, disconnect power, and wait approximately 30 minutes for the computer to cool.

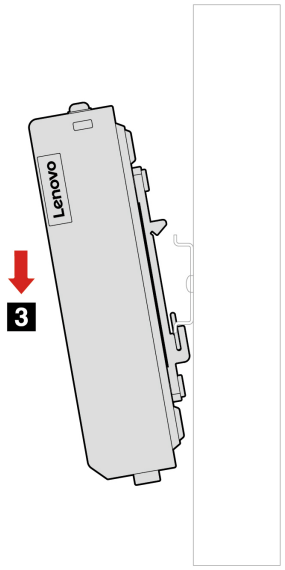
For access, do the following:

1. Turn off all connected devices and the computer.
2. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.

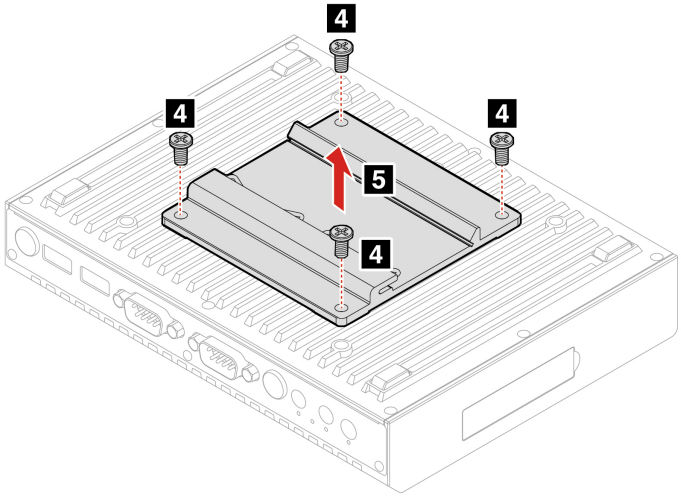
Replacement steps

1. Remove the computer with DIN bracket from the rail.





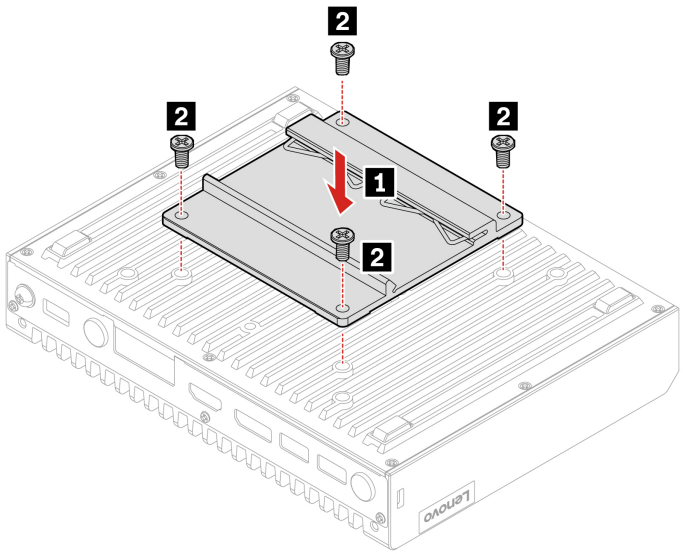
2. Remove the DIN bracket and screws.



Attention: Use the screws provided by Lenovo to avoid any unpredictable damage to your computer.

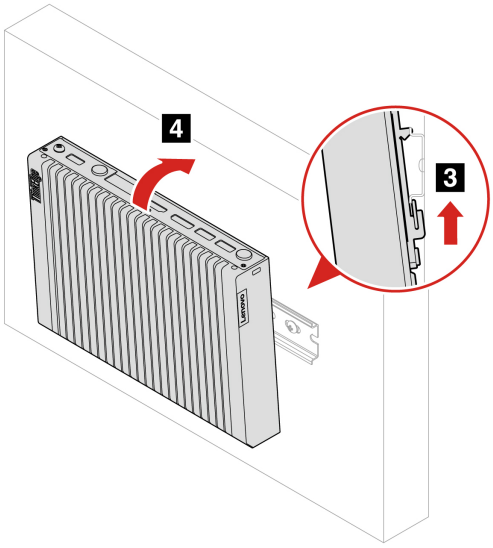
Step	Screw (quantity)	Color	Torque
4	M4 × L8 mm, flat-head (4)	Black	0.78 Nm (8.0 kgf-cm)

3. Install the DIN bracket to the computer.



4. Install the computer with the DIN bracket to the rail.

   Note: Prepare a rail in advance if needed.



Attention: Use the screws provided by Lenovo to avoid any unpredictable damage to your computer.

Step	Screw (quantity)	Color	Torque
2	M4 × L8 mm, flat-head (4)	Black	0.78 Nm (8.0 kgf-cm)

Bottom cover

Prerequisite

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

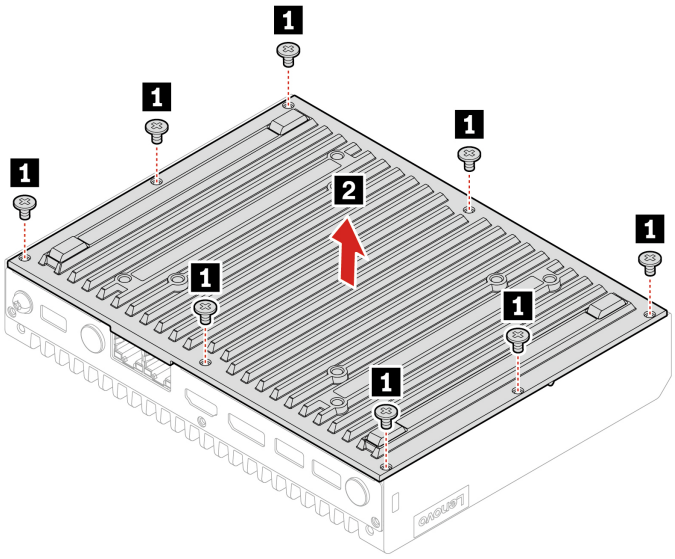
Avoid contact with the hot computer. During operation, the computer becomes hot enough to burn the skin. Before you touch the computer, turn off the computer, disconnect power, and wait approximately 30 minutes for the computer to cool.

For access, do the following:

1. 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 bracket, if any. See “DIN bracket kit” on page 45.
5. Turn over the computer so that the bottom cover is facing up.

Removal steps

1. Remove the bottom cover.



Attention: Use the screws provided by Lenovo to avoid any unpredictable damage to your computer.

Step	Screw (quantity)	Color	Torque
1	M2 × L4 mm, flat-head (8)	Black	0.215 Nm (2.2 kgf-cm ± 0.25 kgf-cm)

Memory module

Prerequisite

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

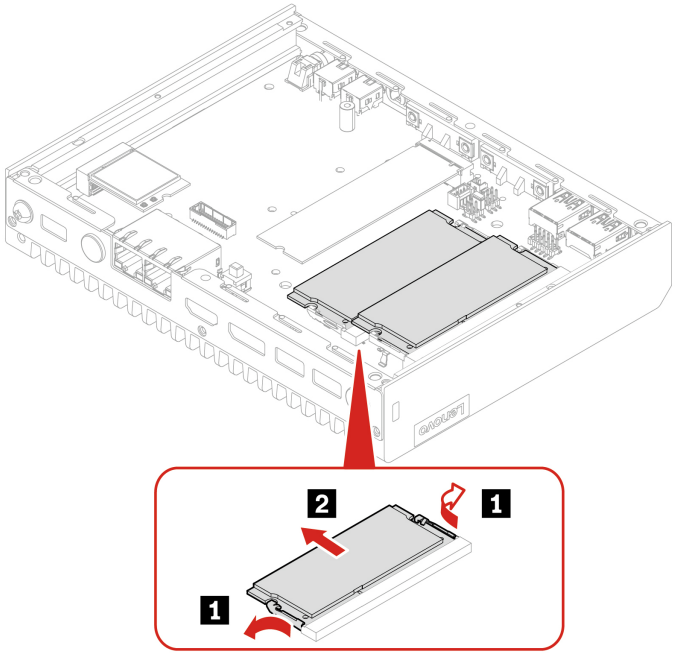
Avoid contact with the hot computer. During operation, the computer becomes hot enough to burn the skin. Before you touch the computer, turn off the computer, disconnect power, and wait approximately 30 minutes for the computer to cool.

For access, do the following:

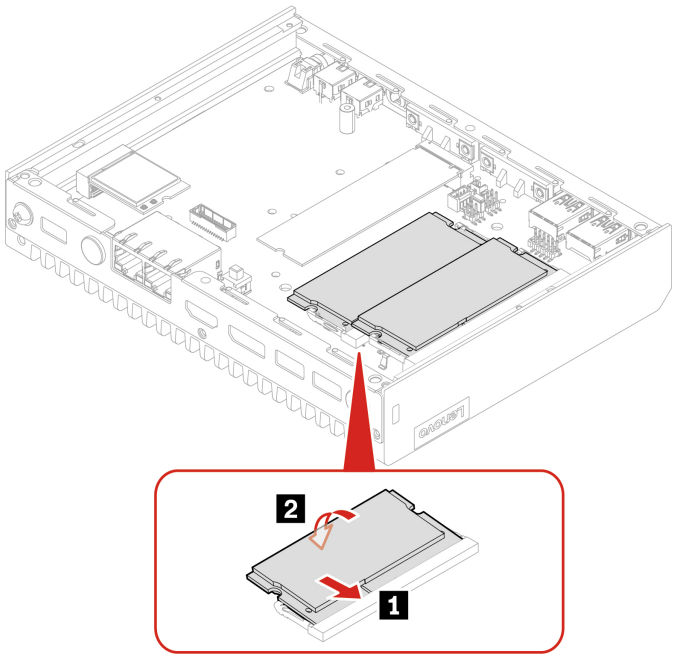
1. Turn off all connected devices and the computer.
2. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
3. Remove the bracket, if any. See “DIN bracket kit” on page 45.
4. Remove the bottom cover. See “Bottom cover” on page 48.

Replacement steps

1. Remove the memory module.



2. Install the memory module.



Expansion modules

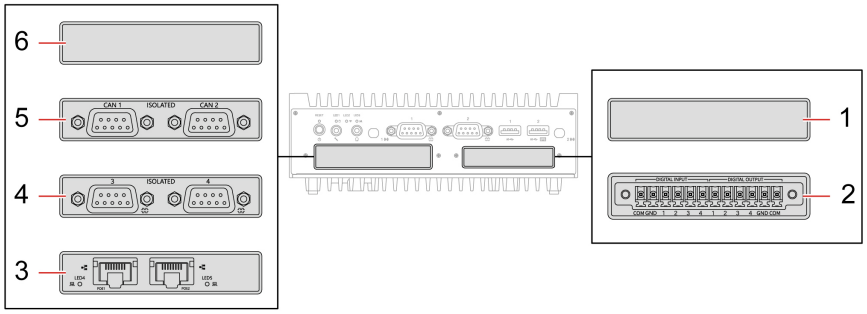


Figure 14. Expansion module location

Item	Expansion module
1	DI/DO dummy bracket
2	DI/DO expansion card
3	POE expansion card
4	Serial expansion card
5	CANbus expansion card
6	Dummy expansion bracket

Prerequisite

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

Avoid contact with the hot computer. During operation, the computer becomes hot enough to burn the skin. Before you touch the computer, turn off the computer, disconnect power, and wait approximately 30 minutes for the computer to cool.

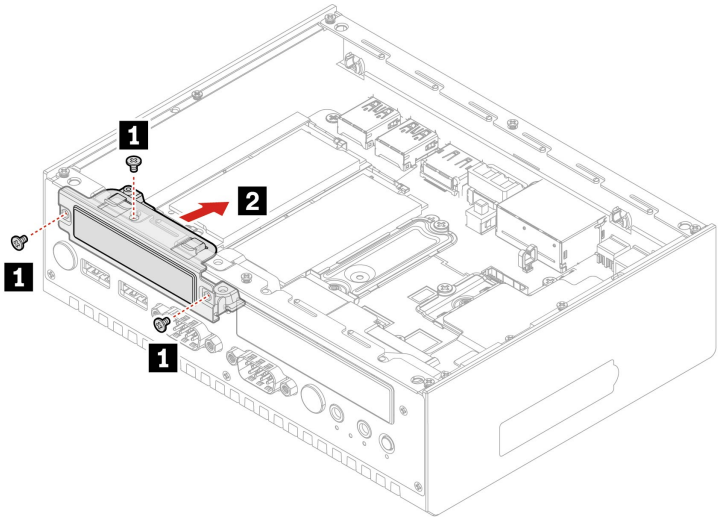
For access, do the following:

1. Turn off all connected devices and the computer.
2. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
3. Remove the bracket, if any. See “DIN bracket kit” on page 45.
4. Remove the bottom cover. See “Bottom cover” on page 48.
5. For removing expansion cards, remove all cables connected to the expansion card.

DI/DO expansion card or DI/DO dummy bracket

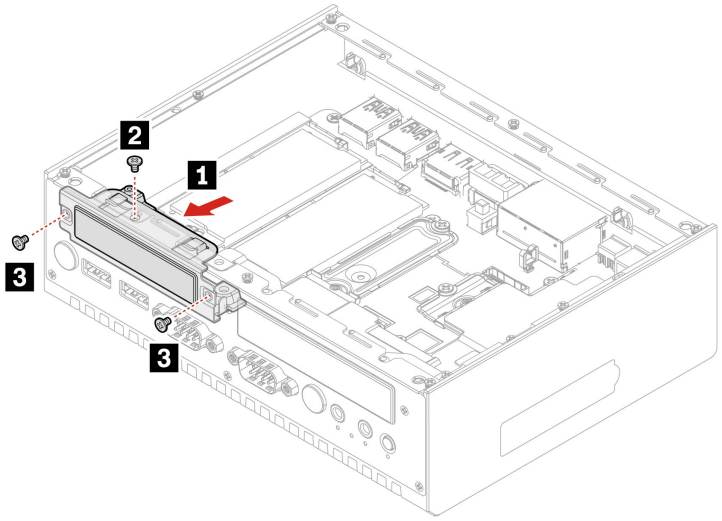
Replacement steps

1. Remove the expansion card or bracket.



Step	Screw (quantity)	Color	Torque
1	M2 × L4 mm, flat-head (3)	Black	0.215 Nm (2.2 kgf-cm ± 0.25 kgf-cm)

2. Install the expansion card or bracket.

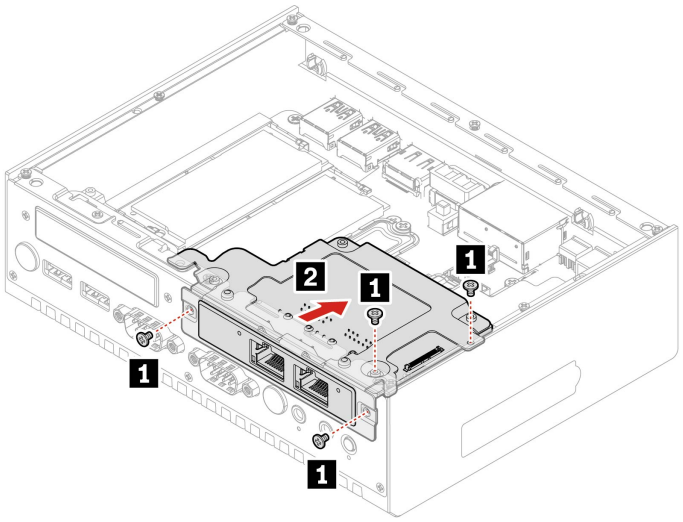


Step	Screw (quantity)	Color	Torque
2 3	M2 × L4 mm, flat-head (3)	Black	0.215 Nm (2.2 kgf-cm ± 0.25 kgf-cm)

POE expansion card

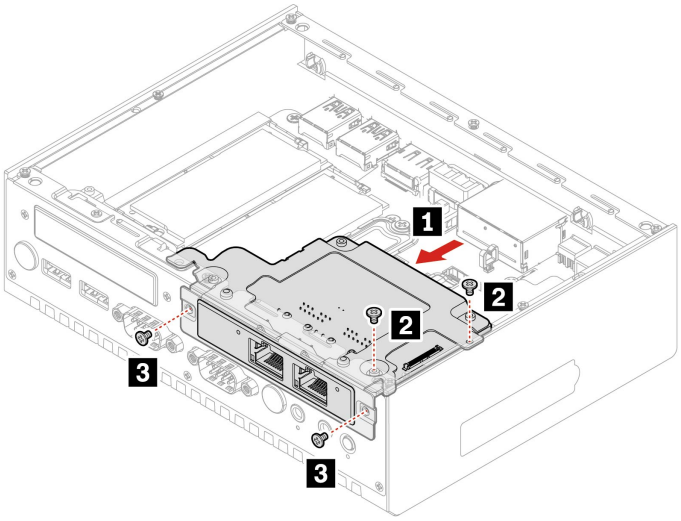
Replacement steps

1. Remove the POE expansion card.



Step	Screw (quantity)	Color	Torque
1	M2 × L4 mm, flat-head (4)	Black	0.215 Nm (2.2 kgf-cm ± 0.25 kgf-cm)

2. Install the POE expansion card.

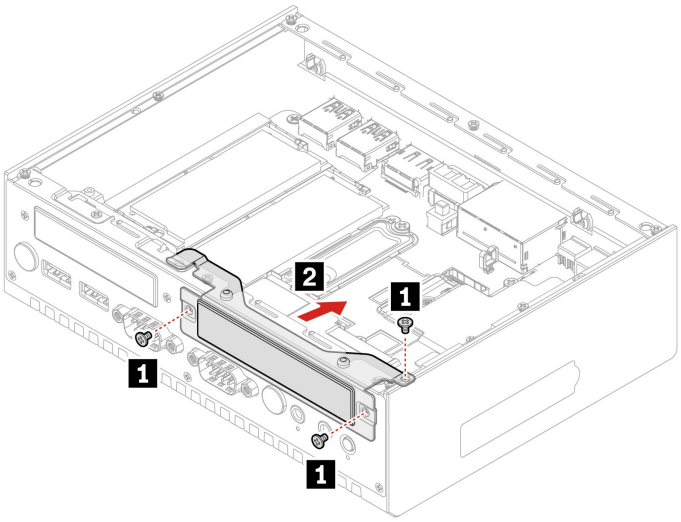


Step	Screw (quantity)	Color	Torque
2 3	M2 × L4 mm, flat-head (4)	Black	0.215 Nm (2.2 kgf-cm ± 0.25 kgf-cm)

CANbus expansion card / Serial expansion card / Dummy expansion bracket

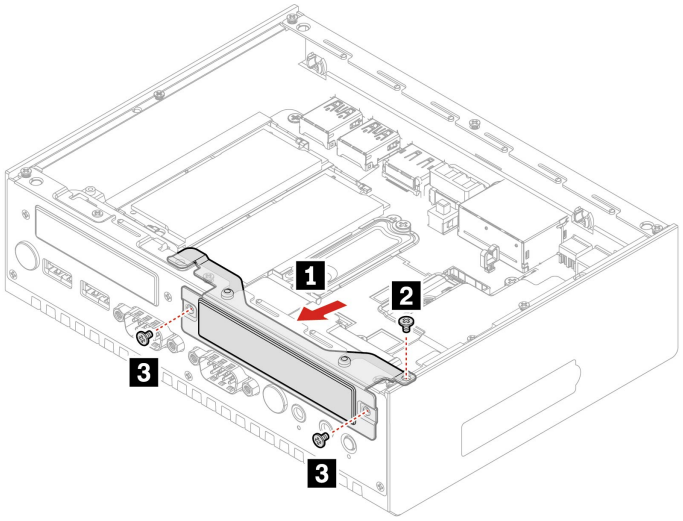
Replacement steps

1. Remove the expansion card or bracket.



Step	Screw (quantity)	Color	Torque
1	M2 × L4 mm, flat-head (3)	Black	0.215 Nm (2.2 kgf-cm ± 0.25 kgf-cm)

2. Install the expansion card or bracket.



Step	Screw (quantity)	Color	Torque
2 3	M2 × L4 mm, flat-head (3)	Black	0.215 Nm (2.2 kgf-cm ± 0.25 kgf-cm)

Heat sink of PCIe

Prerequisite

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

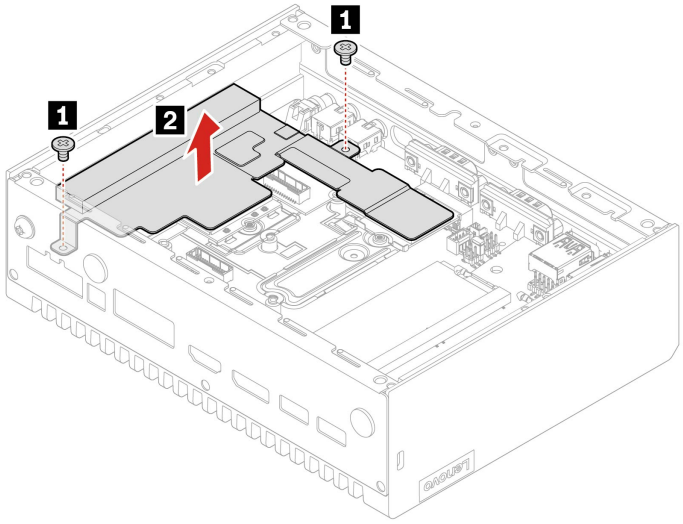
Avoid contact with the hot computer. During operation, the computer becomes hot enough to burn the skin. Before you touch the computer, turn off the computer, disconnect power, and wait approximately 30 minutes for the computer to cool.

For access, do the following:

1. Turn off all connected devices and the computer.
2. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
3. Remove the bracket, if any. See “DIN bracket kit” on page 45.
4. Remove the bottom cover. See “Bottom cover” on page 48.
5. Remove the corresponding expansion card that impede access to the heat sink of PCIe. See “Expansion modules” on page 50.

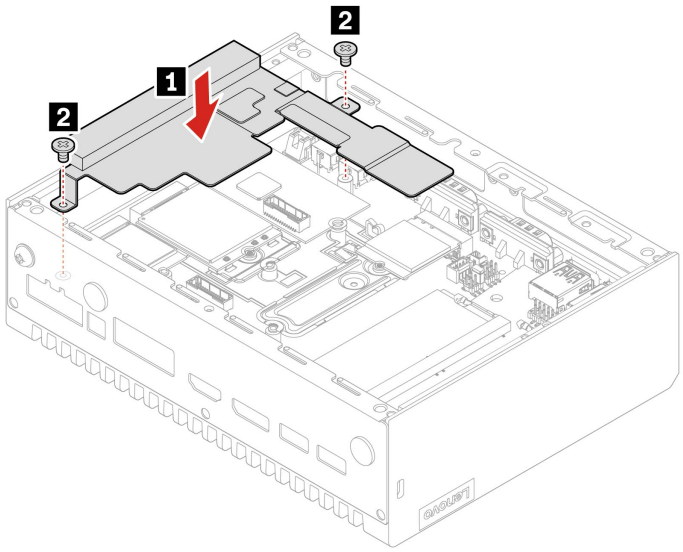
Replacement steps

1. Remove the heat sink of PCIe.



Step	Screw (quantity)	Color	Torque
1	M2 × L4 mm, flat-head (2)	Silver	0.215 Nm (2.2 kgf-cm ± 0.25 kgf-cm)

2. Install the heat sink of PCIe.



Step	Screw (quantity)	Color	Torque
2	M2 × L4 mm, flat-head (2)	Silver	0.215 Nm (2.2 kgf-cm ± 0.25 kgf-cm)

M.2 solid-state drive

Prerequisite

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

Avoid contact with the hot computer. During operation, the computer becomes hot enough to burn the skin. Before you touch the computer, turn off the computer, disconnect power, and wait approximately 30 minutes for the computer to 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.

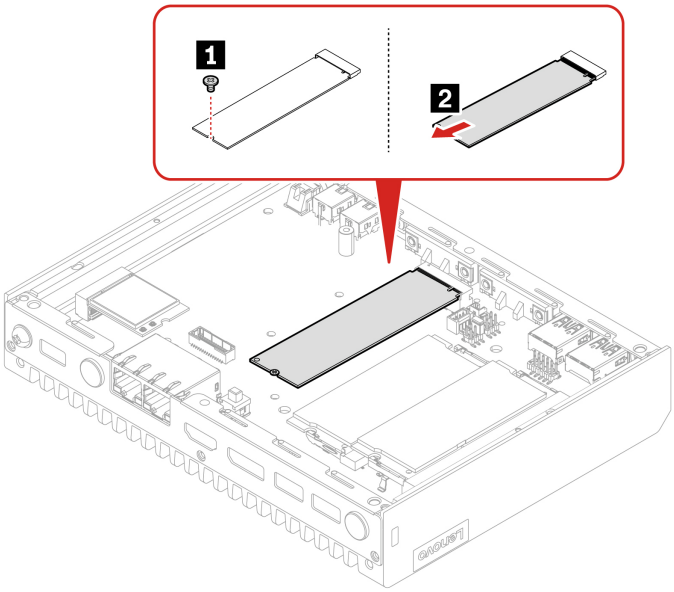
For access, do the following:

1. Turn off all connected devices and the computer.
2. Disconnect all power cords from electrical outlets and disconnect all cables from the computer.
3. Remove the bracket, if any. See “DIN bracket kit” on page 45.
4. Remove the bottom cover. See “Bottom cover” on page 48.
5. Remove the corresponding expansion card that impede access to the heat sink of PCIe. See “Expansion modules” on page 50.
6. Remove the heat sink of PCIe. See “Heat sink of PCIe” on page 54.

Replacement steps

- Type 1: 2280
    1. Remove the M.2 solid-state drive.

        Note: A thermal pad might cover the M.2 solid-state drive. To access the M.2 solid-state drive, peel off the thermal pad first.

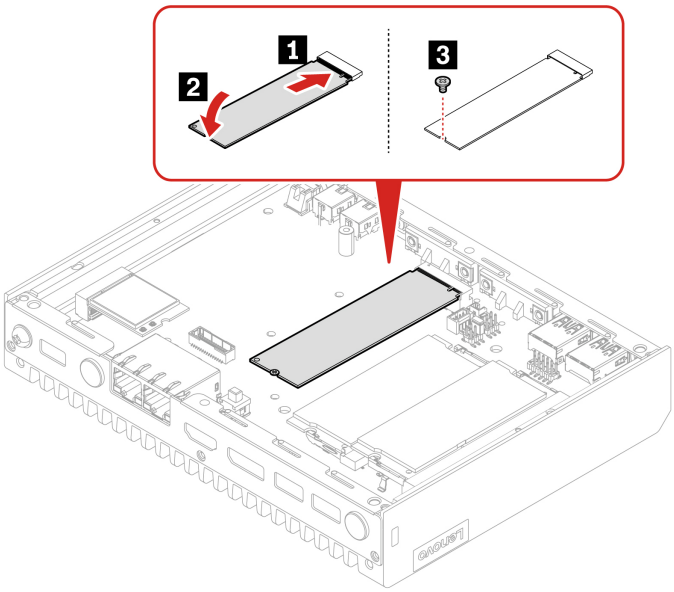


Attention: Use the screws provided by Lenovo to avoid any unpredictable damage to your computer.

Step	Screw (quantity)	Color	Torque
1	M2 × L4 mm, flat-head (1)	Silver	0.215 Nm (2.2 kgf-cm ± 0.25 kgf-cm)

2. Install the M.2 solid-state drive.

Note: After installing the new M.2 solid-state drive, ensure that you attach the new thermal pad to the new M.2 solid-state drive.

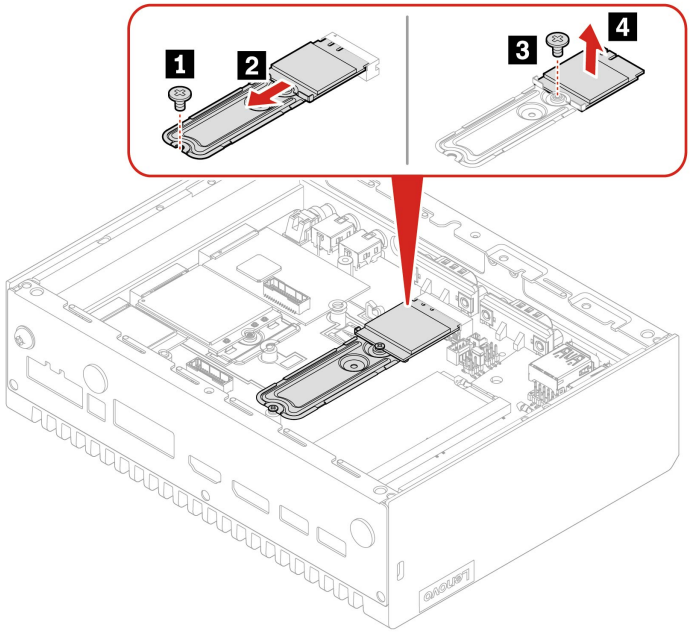


Attention: Use the screws provided by Lenovo to avoid any unpredictable damage to your computer.

Step	Screw (quantity)	Color	Torque
3	M2 × L4 mm, flat-head (1)	Silver	0.215 Nm (2.2 kgf-cm ± 0.25 kgf-cm)

- Type 2: 2230
  1. Remove the M.2 solid-state drive.

     Note: A thermal pad might cover the M.2 solid-state drive. To access the M.2 solid-state drive, peel off the thermal pad first.

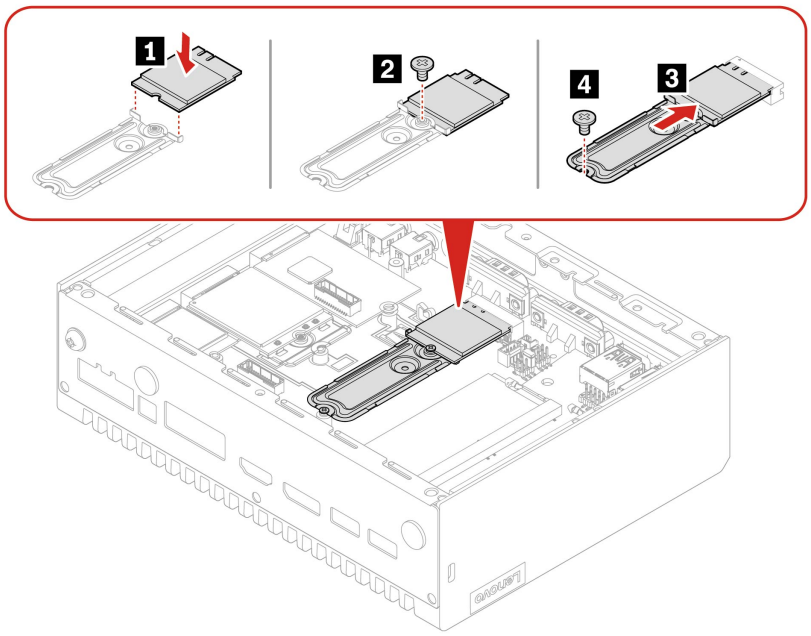


Attention: Use the screws provided by Lenovo to avoid any unpredictable damage to your computer.

Step	Screw (quantity)	Color	Torque
1 3	M2 × L4 mm, flat-head (2)	Silver	0.215 Nm (2.2 kgf-cm ± 0.25 kgf-cm)

  2. Install the M.2 solid-state drive.

     Note: After installing the new M.2 solid-state drive, ensure that you attach the new thermal pad to the new M.2 solid-state drive.



Attention: Use the screws provided by Lenovo to avoid any unpredictable damage to your computer.

Step	Screw (quantity)	Color	Torque
2 4	M2 × L4 mm, flat-head (2)	Silver	0.215 Nm (2.2 kgf-cm ± 0.25 kgf-cm)

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.

There are some tutorial videos that introduce how to use your computer with some accessories.

https://support.lenovo.com/solutions/nanofeaturevideo

Chapter 7. 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: • *Safety and Warranty Guide* • *Setup Guide* • This *User Guide* • *Regulatory Notice*	Go to https://smartsupport.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://smartsupport.lenovo.com
Ubuntu help information	https://ubuntu.com/server/docs https://ubuntu.com/core/docs

Call Lenovo

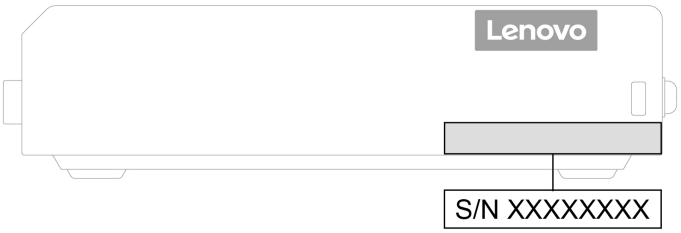
If you have tried to correct the problem yourself and still need help, you can call Lenovo Customer Support Center.

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.



3. Prepare an external display, a keyboard, and a mouse in advance when you need Lenovo onsite services.

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://smartsupport.lenovo.com/supportphonelist

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://smartsupport.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.

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 (https://www.ubuntu.com) 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://smartsupport.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.

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Appendix B. Compliance information

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

Certification-related information

Product name: ThinkEdge SE10

Machine types	Machine volume	Operating temperature
12NH, 12NJ, 12NQ, 12NR	SE10: 0.83 L	0°C–50°C (32°F–122°F)
12NK, 12NL, 12NS, 12NT	SE10-I: 1.45 L	-20°C–60°C (-4°F–140°F)
12NM, 12NN	SE10-I: 1.45 L	-40°C–70°C (-40°F–158°F)

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

Appendix C. Notices and trademarks

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