# **OVERVIEW**



1. 3x USB-A (USB 5Gbps)	8. Microphone mute button
2. USB-C (USB 10Gbps), with 15W charging	9. PC / monitor mode switch
3. Ethernet (RJ-45)	10. 3x USB-A (USB 10Gbps)
4. HDMI (HDMI in 1.4 / HDMI out 2.1 TMDS combo)	11. Headphone / microphone combo jack (3.5mm)
5. DisplayPort 1.4	12. Card reader *
6. Serial *	13. Power button
7. Power connector	

Notes:

• Items with \* are only available on selected models

# ThinkCentre M90a Gen 5

# PERFORMANCE

## **Processor**

## **Processor Family**

## 13th / 14th Generation Intel® Core™ i3 / i5 / i7 Processor

## Processor\*\*

Processor Name	Cores	Threads	Base Frequency	Max Frequency	Cache	Processor Graphics
Core™ i3- 13100	4 (4 P-core + 0 E-core)	8	P-core 3.4GHz	P-core 4.5GHz	12MB	Intel® UHD Graphics 730
Core™ i5- 13400	10 (6 P-core + 4 E-core)	16	P-core 2.5GHz / E- core 1.8GHz	P-core 4.6GHz / E-core 3.3GHz	20MB	Intel® UHD Graphics 730
Core™ i5- 13500	14 (6 P-core + 8 E-core)	20	P-core 2.5GHz / E- core 1.8GHz	P-core 4.8GHz / E-core 3.5GHz	24MB	Intel® UHD Graphics 770
Core™ i7- 13700	16 (8 P-core + 8 E-core)	24	P-core 2.1GHz / E- core 1.5GHz	Max Turbo up to 5.2GHz / P-core 5.1GHz / E-core 4.1GHz	30MB	Intel® UHD Graphics 770
Core™ i3- 14100	4 (4 P-core + 0 E-core)	8	P-core 3.5GHz	P-core 4.7GHz	12MB	Intel® UHD Graphics 730
Core™ i5- 14400	10 (6 P-core + 4 E-core)	16	P-core 2.5GHz / E- core 1.8GHz	P-core 4.7GHz / E-core 3.5GHz	20MB	Intel® UHD Graphics 730
Core™ i5- 14500	14 (6 P-core + 8 E-core)	20	P-core 2.6GHz / E- core 1.9GHz	P-core 5.0GHz / E-core 3.7GHz	24MB	Intel® UHD Graphics 770
Core™ i7- 14700	20 (8 P-core + 12 E-core)	28	P-core 2.1GHz / E- core 1.5GHz	Max Turbo up to 5.4GHz / P-core 5.3GHz / E-core 4.2GHz	33MB	Intel® UHD Graphics 770

## **Operating System**

## **Operating System**\*\*

- Windows® 11 Pro
- Windows® 11 Home
- Windows® 11 Home Single Language
- Windows® 11 DG Windows® 10 Pro 64
- No preload operating system

## Graphics

## Graphics\*\*

Graphics	Туре	Memory	Connector	Max Resolution	Key Features
Intel® UHD graphics 730	Integrated	Shared	1x HDMI <sup>®</sup> 2.1 TMDS, 1x DP 1.4	4096x2160@60Hz(HDMI®), 4096x2160@60Hz(DP)	DirectX® 12
Intel <sup>®</sup> UHD graphics 770	Integrated	Shared	1x HDMI <sup>®</sup> 2.1 TMDS, 1x DP 1.4	4096x2160@60Hz(HDMI®), 4096x2160@60Hz(DP)	DirectX® 12
NVIDIA <sup>®</sup> GeForce MX570A	Discrete	4GB GDDR6	1x HDMI <sup>®</sup> 2.1 TMDS, 1x DP 1.4	4096x2160@60Hz(HDMI®), 4096x2160@60Hz(DP)	DirectX® 12

## **Monitor Support**

## **Monitor Support**

Supports up to 3 independent displays via native display and 2 external monitor; supports external monitors via DisplayPort<sup>™</sup> and HDMI<sup>®</sup>; work as standalone monitor via HDMI<sup>®</sup> (HDMI<sup>®</sup> in / out combo)

## Chipset

## Chipset

Intel<sup>®</sup> Q670 chipset

## Memory

### Max Memory<sup>[1]</sup>

- Models with Core™ i3/i5: Up to 64GB DDR5-4800
- Models with Core™ i7: Up to 64GB DDR5-5200

### Memory Slots

Two DDR5 SO-DIMM slots, dual-channel capable

### Memory Type\*\*[2]

- DDR5-4800
- DDR5-5200
- DDR5-5600

## **Memory Protection**

Non-ECC

## Notes:

[1] The max memory is based on the test results with current Lenovo<sup>®</sup> memory offerings.

[2] Installed memory is actually DDR5-5600 but may run as DDR5-4800, DDR5-5200, or DDR5-5600 depending on the memory support capability of processor.

## Storage

### Storage Support<sup>[1]</sup>

- Models with Intel® UHD graphics: Up to two drives, 2x M.2 SSD
- M.2 SSD up to 2TB each
  Models with NVIDIA® GeForce MX570A:
  - Up to one drives, 1x M.2 SSD
  - M.2 SSD up to 2TB each

## Storage Type

Disk Type	Interface	Security
M.2 2280 SSD	PCIe <sup>®</sup> NVMe <sup>®</sup> , PCIe <sup>®</sup> 4.0 x4	Opal 2.0

### RAID<sup>[2]</sup>

- RAID 0/1 support for SSDs
- No support

Notes:

[1] The max capacity of each disk type is based on the test results with current Lenovo<sup>®</sup> storage offerings.[2] Only available for models with integrated graphics

## Removable Storage

### **Optical**\*\*

- DVD-ROM, SATA connector, slim (9.0mm)
- DVD burner (DVD±RW), SATA connector, slim (9.0mm)
- None

### Card Reader

- 3-in-1 card reader (SD, SDHC, SDXC)
- No card reader

## Multi-Media

### **Audio Chip**

High Definition (HD) Audio, Realtek® ALC233NL-VB2-CG codec

### Speakers

Stereo speakers, 3W x2, Dolby<sup>®</sup> Atmos<sup>®</sup>

### Microphone

- Dual-microphone array
- No microphone

#### Camera\*\*

- 5.0-megapixel, IR + RGB hybrid, with ThinkShutter (physical switch on/off) and Human Presence Detection (Radar Sensor), ±20° view angle adjustable, Windows<sup>®</sup> Hello support
- 5.0-megapixel, IR + RGB hybrid, with ThinkShutter (physical switch on/off), ±20° view angle adjustable, Windows<sup>®</sup> Hello support
- 5.0-megapixel, with ThinkShutter (physical switch on/off)
- No camera

## **Power Supply**

## Power Supply\*\*

Power	Туре	Efficiency	Key Features
180W	Fixed	90%	100V - 240V, 50-60Hz
230W	Fixed	92%	100V - 240V, 50-60Hz

# DESIGN

## Display Display\*\*[1]

Size	Resolution	Touch	Туре	Brightness	Surface	Aspect Ratio	Contrast Ratio	Color Gamut	Refresh Rate	Viewing Angle (L/R/U/D)	Key Features
23.8"	FHD (1920x1080)	None	IPS	250nits	Anti- glare	16:9	1300:1	99% sRGB	60Hz	89°/89°/89°/89°	14ms response Time, borderless design, TÜV Rheinland® Low Blue Light (Hardware Solution), TÜV Rheinland® Flicker Free, Eyesafe® Certified 2.0
23.8″	FHD (1920x1080)	Multi- touch	IPS	250nits	Anti- glare	16:9	1000:1	72% NTSC	60Hz	89°/89°/89°/89°	14ms response Time, borderless design, TÜV Rheinland® Low Blue Light (Sotware Solution), TÜV Rheinland® Flicker Free

### Touchscreen

• Advanced In-cell Touch (AIT), supports 10-point touch

Non-touch

## Notes:

[1] IPS (in-plane switching) technology may refer to IPS, PLS, ADS, AHVA, AAS.

## Input Device

### Keyboard\*\*

- EOS Wireless Keyboard, black
- Lenovo® Calliope Keyboard (USB connector), black

- Lenovo® Traditional Keyboard (USB connector), black
- No keyboard

### Mouse\*\*

- Lenovo® Calliope Mouse (USB connector), black
- EOS Wireless Mouse, Black
- No mouse

## Mechanical

## Buttons

- Microphone mute button
- Monitor / PC mode switch button
- Power button

## Form Factor

AIO (23.8 inches)

## Dimensions (WxDxH)[1]

Models	Dimensions
Models (with UltraFlex V stand, with camera)	Lowest in flat mode: 539.6 x 344.19 x 227.54 mm (21.24 x 13.55 x 8.96 inches) Highest in vertical mode: 539.6 x 252.60 x 472.00 mm (21.24 x 9.94 x 18.58 inches)
Models (with UltraFlex V stand, without camera)	Lowest in flat mode: 539.6 x 341.42 x 219.50 mm (21.24 x 13.44 x 8.64 inches) Highest in vertical mode: 539.6 x 252.60 x 451.51 mm (21.24 x 9.94 x 17.78 inches)
Models (with full function monitor stand, with camera)	539.6 x 217.31 x 393.66-501.85 mm (21.24 x 8.56 x 15.50-19.76 inches)
Models (with full function monitor stand, without camera)	539.6 x 217.31 x 374.15-483.16 mm (21.24 x 8.56 x 14.73-19.02 inches)
Models (with tilt only stand, with camera)	539.6 x 213.38 x 453.39 mm (21.24 x 8.40 x 17.85 inches)
Models (with tilt only stand, without camera)	539.6 x 213.38 x 434.39 mm (21.24 x 8.40 x 17.10 inches)
Models (without stand, with camera)	539.6 x 49.6 x 371 mm (21.24 x 1.95 x 14.61 inches)
Models (without stand, without camera)	539.6 x 49.6 x 352 mm (21.24 x 1.95 x 13.86 inches)

## Packaging Dimensions (WxDxH)\*\*

- Models (with UltraFlex V stand): 690 x 545 x 238 mm (27.17 x 21.46 x 9.37 inches)
- Models (with full function monitor stand): 660 x 575 x 228 mm (25.98 x 22.64 x 8.98 inches)
- Models (with tilt only stand): 660 x 550 x 216 mm (25.98 x 21.65 x 8.50 inches)

### Weight<sup>[2]</sup>

Models	Weight
Models (with UltraFlex V stand)	Around 7.83 kg (17.3 lbs)
Models (with full function monitor stand)	Around 8.13 kg (17.9 lbs)
Models (with tilt only stand)	Around 7.61 kg (16.8 lbs)
Models (without stand)	Around 5.53 kg (12.2 lbs)

### **Packaging Weight**

- Models (with UltraFlex V stand): 2.94 kg (6.5 lbs), packaging only
- Models (with full function monitor stand): 2.96 kg (6.5 lbs), packaging only
- Models (with tilt only stand): 2.73 kg (6.0 lbs), packaging only

### Case Color

Black

### Bays

- 1x 2.5" disk bay (optional, only available via special bid)
- 1x slim ODD bay

## **Expansion Slots**

- Models with Intel<sup>®</sup> UHD graphics: Three M.2 slots (one for WLAN, two for SSD)
- Models with NVIDIA® GeForce MX570A: Two M.2 slots (one for WLAN, one for SSD)

## EOU

Toolless cover, stand, motherboard shielding, and memory assembly / removal

### Stand\*\*

- UltraFlex V stand, supports -5° to +70° tilt, up to 70°±2° lift (up to 179.96mm lift in flat mode / up to 84.37mm lift in vertical mode)
- Full function monitor stand, supports -5° to +20° tilt, left & right 45° swivel, 90° pivot, up to 110mm lift
- Tilt only stand, supports -5° to +20° tilt.
- No stand

## Mounting

Supports VESA mount 100mm

## Others

Supports Smart Power On

### Notes:

[1] The system dimensions may vary depending on configurations.

[2] The system weight is approximate and based on results in Lenovo<sup>®</sup> lab, which varies depending on the source of component, variance of the distribution of each component, and manufacturing process. It may not be the exact weight for each specific model.

# CONNECTIVITY

## **Network**

## **Onboard Ethernet**

Gigabit Ethernet, Intel® Ethernet Connection I219-LM, 1x RJ-45, supports Wake-on-LAN

### **Optional Ethernet**

No optional Ethernet

### WLAN + Bluetooth®\*\*

- Realtek® Wi-Fi® 6 RTL8852BE, 802.11ax Dual Band 2x2 Wi-Fi® + Bluetooth® 5.3, M.2 card<sup>[1]</sup>
- Intel<sup>®</sup> Wi-Fi<sup>®</sup> 6 AX201, 802.11ax 2x2 Wi-Fi<sup>®</sup> + Bluetooth<sup>®</sup> 5.2, M.2 Card<sup>[2]</sup>
- Intel® Wi-Fi® 6E AX211, 802.11ax 2x2 Wi-Fi® + Bluetooth® 5.3, Intel® vPro® technology support, M.2 Card<sup>[3]</sup>
- No WLAN and Bluetooth®

#### Notes:

- [1], [3] Bluetooth<sup>®</sup> 5.3 requires Windows<sup>®</sup> 11.
- [2] Bluetooth<sup>®</sup> 5.2 requires Windows<sup>®</sup> 11.

## **Ports**<sup>III</sup>

### Rear Ports

- + 1x USB-C° (USB 10Gbps / USB 3.2 Gen 2), with data transfer and 15W charging
- 3x USB-A (USB 5Gbps / USB 3.2 Gen 1)
- 1x HDMI $^{\circ}$  (HDMI $^{\circ}$  in 1.4 / HDMI $^{\circ}$  out 2.1 TMDS combo port)
- 1x DisplayPort<sup>™</sup> 1.4
- 1x Ethernet (RJ-45)

## Optional Rear Ports

1x serial

### **Right Ports**

- 3x USB-A (USB 10Gbps / USB 3.2 Gen 2)
- 1x headphone / microphone combo jack (3.5mm)

### **Optional Right Ports**

1x card reader

#### Notes:

[1] The transfer speed of following ports will vary and, depending on many factors, such as the processing speed of the

host device, file attributes and other factors related to system configuration and your operating environment, will be slower than theoretical speed. USB 2.0: 480 Mbit/s; USB 3.2 Gen 1 (SuperSpeed USB 5Gbps, formerly USB 3.0 / USB 3.1 Gen 1): 5 Gbit/s; USB 3.2 Gen 2 (SuperSpeed USB 10Gbps, formerly USB 3.1 Gen 2): 10 Gbit/s; USB4® 20Gbps / USB 3.2 Gen 2x2 (SuperSpeed USB 20Gbps): 20 Gbit/s; USB4® 40Gbps (USB 40Gbps): 40 Gbit/s;

Thunderbolt<sup>™</sup> 3/4: 40 Gbit/s.

# **SECURITY & PRIVACY**

## Security

## Security Chip

Discrete TPM 2.0, TCG certified, FIPS 140-2 certified

## Physical Locks

Kensington® Security Slot™, 3 x 7 mm

## **Chassis Intrusion Switch**

- Chassis intrusion switch
- No chassis intrusion switch

## Fingerprint Reader

No fingerprint reader

## **Other Security**

- (Optional) Smart Human Presence Detection (Camera with Radar Sensor)
- (Optional) ThinkShutter camera cover

### **BIOS Security**

- Administrator password
- Power-on password
- Hard disk password
- Boot sequence control
- Boot without keyboard and mouse
- Self-healing BIOS
- Smart USB protection (allows keyboard / mouse only, blocks all storage devices)
- Individual USB port disablement

# MANAGEABILITY

## System Management

## System Management<sup>[1]</sup>

- Intel<sup>®</sup> vPro<sup>®</sup> Enterprise
- Non-vPro®

Notes:

[1] Intel® vPro® offers a superset of DASH's defined capabilities.

# SERVICE

## Warranty

### Base Warranty\*\*

- 1-year limited onsite service
- 3-year limited onsite service
- No base warranty

#### Notes:

[1] The warranty upgrades may be bundled with some models, please check the "Included upgrade" column in the specific model's configurations. For more service extensions, please go to <u>https://smartfind.lenovo.com/</u>. To learn more details of warranty policy, please access <u>https://pcsupport.lenovo.com/warranty</u>.

# ENVIRONMENTAL

# **Operating Environment**

## Temperature

- Operating: 5°C (41°F) to 35°C (95°F)
- Storage: -20°C (-4°F) to 60°C (140°F)

## **Relative Humidity**

Operating: 20% to 80%

## Altitude

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

# ACCESSORIES

## **Bundled Accessories**

## Bundled Accessories

- DP to DVI dongle
- DP to Dual DP dongle
- DP to HDMI<sup>®</sup> dongle
- DP to VGA dongle
- HDMI® to DVI dongle
- HDMI<sup>®</sup> to VGA dongle
- None

# CERTIFICATIONS

## **Green Certifications**<sup>III</sup>

## **Green Certifications**

- (Optional) ENERGY STAR<sup>®</sup> 8.0
- (Optional) EPEAT<sup>™</sup> Gold Registered
- ErP Lot 3
- GREENGUARD®
- RoHS compliant
- TCO Certified 9.0
- TCO edge

#### Notes:

[1] The items listed under the "Green Certifications" section may not only refer to certification but also registration or selfdeclaration.

## **Other Certifications**

### **Other Certifications**

- (Optional) TÜV Rheinland<sup>®</sup> Low Blue Light (Hardware Solution)
- (Optional) TÜV Rheinland<sup>®</sup> Low Blue Light (Software Solution)
- (Optional) TÜV Rheinland® Ultra Low Noise
- Eyesafe<sup>®</sup> Certified 2.0
- TÜV Rheinland<sup>®</sup> Flicker Free
- UL Anti-dust

### **Mil-Spec Test**

MIL-STD-810H military test passed (Low Pressure [Altitude], High Temperature, Low Temperature, Temperature Shock, Humidity, Sand and Dust, Vibration, Shock, Fungus, Solar Radiation, Contamination by Fluids, Salt Fog)

- Feature with \*\* means that only one offering listed under the feature is configured on selected models.
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