Mech-Mind IPC STD User Manual
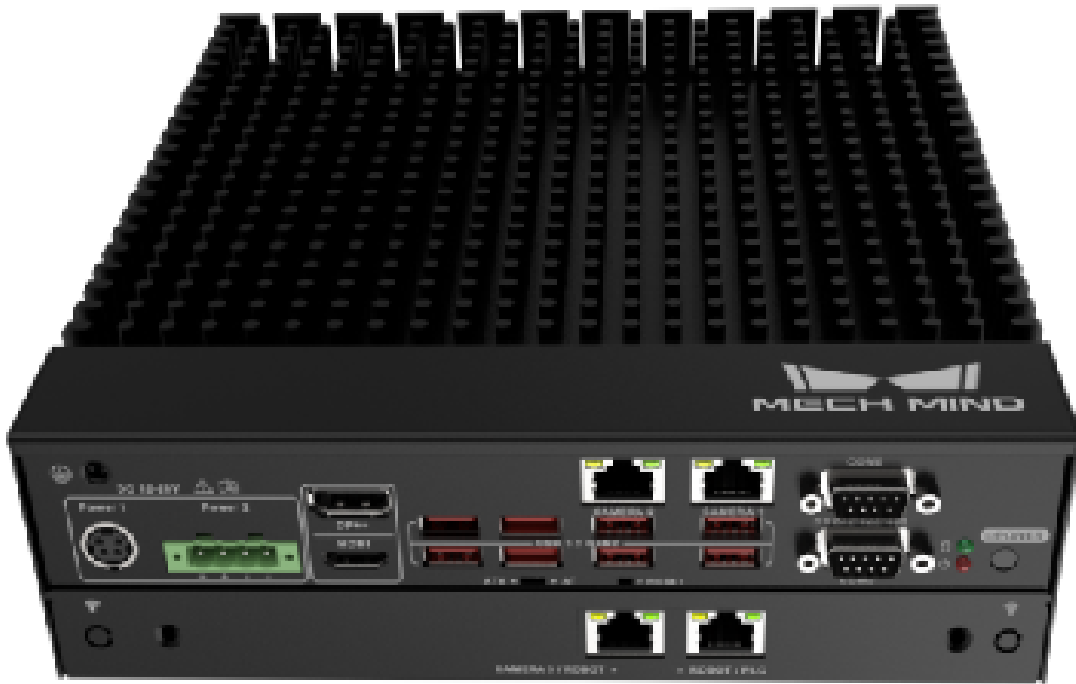
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Preface

This user manual applies to the industrial PCs (IPCs) of the Mech-Mind IPC STD model.

The IPCs of the Mech-Mind IPC STD model can be purchased with the following order numbers:

- IPCW-i5-16G-512G-EU
- IPCW-i5-16G-512G-US
- IPCW-i5-16G-512G-UK
- IPCW-i5-16G-512G-JP
- IPCW-i5-16G-512G-KR

1. Safety Instructions

- To ensure safe use, please do not use the product before reading this manual and becoming familiar with the correct usage. Improper use and maintenance may damage the product or cause other hazards. Mech-Mind shall not be liable for any injury or damage brought upon the user or any third party due to improper use and maintenance.

- Following the instructions and warnings in this manual can lower risks, but cannot eliminate all risks.

- Every step has been inspected during the drafting of this user manual. Please do not hesitate to contact Mech-Mind if you find any problems or mistakes in the manual.

- This product is to be mounted, connected, used and maintained by trained adults only. To ensure safe operation, the product should be transported, stored, mounted, connected, used and maintained properly.

- The precautions outlined in this section shall be strictly observed. Failure to follow these precautions may result in damage to the Mech-Mind IPC STD series.

1.1. General Safety Precautions

Follow the safety precautions outlined below:

- Make sure to follow these general principles.

- Make sure the power is turned off and the power cord is disconnected when moving, installing, or modifying the system.

- Do not apply voltage levels that exceed the specified voltage range. Doing so may cause a fire and/or electric shock.

- An electric shock may occur if the power is still on.

- Do not put any object down or insert any object into the vent.

- If a large amount of dust, water, or liquid enters the system, turn off the power immediately, unplug the power cord, and contact the system supplier.

- Do not drop the device on a hard surface.

- Do not use the device in locations where the ambient temperature exceeds the rated temperature.

2. Technical Specifications

Model	Mech-Mind IPC STD
Configuration	
CPU	Intel® Core i5-12400 2.5GHz (6 cores)
Chipset	Intel® R680E
Memory	16 GB SO-DIMM DDR4 3200MHz (up to 64 GB)
GPU card	No discrete graphics card
Storage	512 GB SSD
Operating system	Windows 10 IoT Enterprise LTSC 2021
Wireless network	2 x External WiFi antennas
Switches	1 x POWER switch 1 x RESET switch 1 x AT/ATX power mode switch
IO interfaces	
Network ports	4 x Intel® I225 2.5 GbE
USB ports	8 x USB 3.2 GEN2
Serial ports	4 x RS232 2 x RS232/422/485
Digital IO	15-pin DIO
Display interfaces	1 x HDMI (up to 3840 x 2160 @ 60Hz) 1 x DP (up to 3840 x 2160 @ 60Hz)
Mechanical features	
Dimensions (W x D x H)	230 mm x 256 mm x 76 mm
Weight (net/gross)	3.33 kg/3.7 kg
Electronics	
Power supply	Adapter AC input: 100-240 V, 2.3 A, 50-60 Hz Adapter DC output: 19.0 V, 9.47 A, 180.0 W
Rated output power	180 W
Environmental	
Operating environment	Operating temperature: -20°C to 45°C; humidity: 10% to 95%; non-condensing

Model	Mech-Mind IPC STD
Storage environment	Storage temperature: -40°C to 85°C; humidity: 10% to 95%; non-condensing
Safety & Certification	
Certification	CE/FCC/VCCI/KC/NRTL
Warranty	
Warranty period	One year

NOTE | For more information about certification, please contact Mech-Mind Technical Support.

| Model	Mech-Mind IPC STD

3. Product Overview

3.1. Overview

The Mech-Mind IPC STD series is a fanless system for harsh industrial environments, powered by a 12th-generation Intel Core processor, Intel R680E chipset, and has dual-260-pin DDR4 SDRAM SODIMM slots that support up to 64 GB memory (16 GB preloaded). The Mech-Mind IPC STD series provides IO interfaces including a digital I/O port, an HDMI port, a DP port, four 2.5 GbE LANs, eight USB 3.2 GEN2 ports, two RS-232/422/485 and four RS-232 connectors.

3.2. Product Views

3.2.1. Front View

The following figure shows the front panel of the Mech-Mind IPC STD series and the interfaces on it.
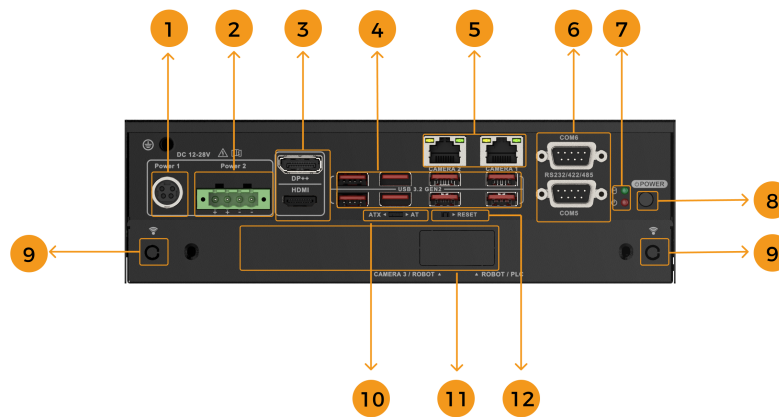
No.	Description	No.	Description
1	DC Jack, DC 12V to 28V	2	Power terminal block, DC 12V to 28V
3	HDMI/DP port	4	8 x USB 3.2 GEN2 ports
5	2 x RJ45 2.5 GbE (CAMERA 1 and CAMERA 2), Intel® I225 controller	6	2 x DB9 serial ports (COM 5 and COM 6), supporting RS232/422/485
7	HDD/Power LEDs	8	POWER button (switch)
9	2 x WIFI antennas	10	Power mode switch, supporting AT/ATX
11	Reserved for extension IO board; default: 2 x RJ45 2.5 GbE (CAMERA 3/ROBOT, ROBOT/PLC)	12	RESET button (switch)

3.2.2. Rear View

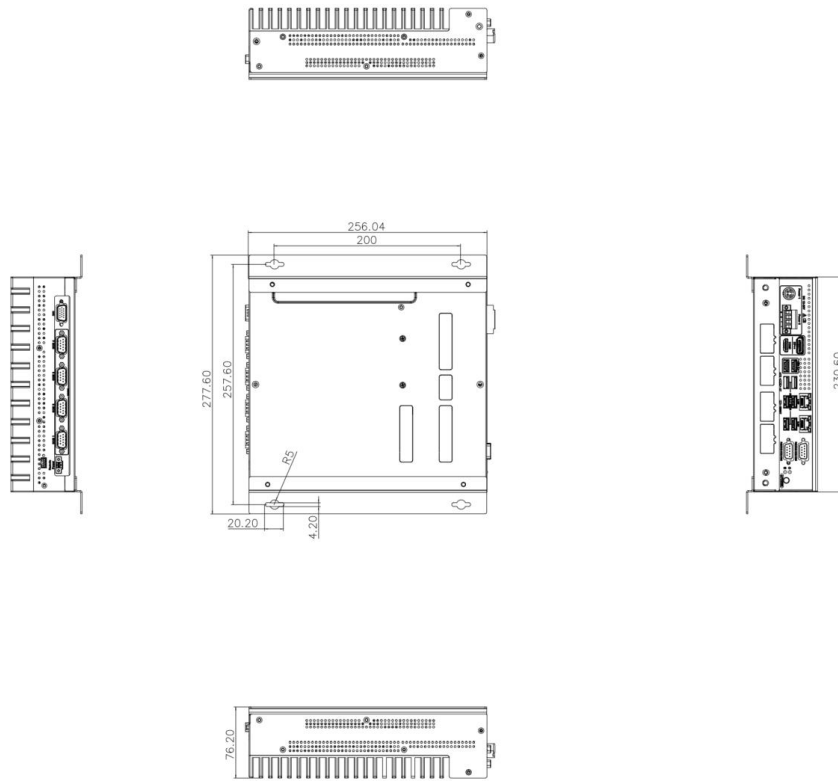The following figure shows the rear panel of the Mech-Mind IPC STD series and the interfaces on

it.
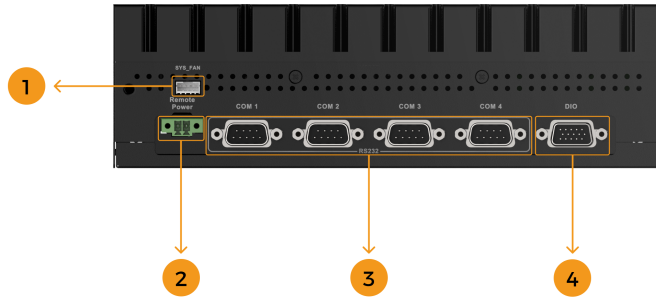
No.	Description	No.	Description
1	System fan connector (SYS_FAN)	2	Remote power connector
3	4 x DB9 serial ports (COM 1 to COM 4), supporting RS232	4	15-pin digital IO (DIO) port

3.3. Mechanical Dimensions & Mounting Holes

4. Installation

4.1. Unpacking Checklist

NOTE | If some of the components listed in the checklist below are missing, please do not proceed with the installation and contact Mech-Mind Technical Support.

The Mech-Mind IPC STD series is shipped with the following components:

No.	Item	Quantity	Schematic diagram
1	Mech-Mind IPC STD	1	
2	Mounting bracket	2	
3	2-pin terminal	1	
4	4-pin terminal	1	

No.	Item	Quantity	Schematic diagram
5	Set screw	8	
6	Power adapter	1	
7	Power cord (EU standard)	1	
8	External antenna	2	

4.2. Installation Precautions

Before installing the Mech-Mind IPC STD series, please pay attention to the following precautions:

- **Read the user manual**: The user manual provides a complete description of the Mech-Mind IPC STD series, installation instructions and configuration options.

- DANGER! Disconnect power: Power to the Mech-Mind IPC STD series must be disconnected during the installation process, or before any attempt is made to access the rear panel. Electric shock and personal injury might occur if the rear panel of the Mech-Mind IPC STD series is opened while the power cord is still connected to an electrical outlet.

- **Qualified personnel**: The Mech-Mind IPC STD series must be installed and operated only by trained and qualified personnel. Maintenance, upgrades, or repairs may only be carried out by qualified personnel who are familiar with the associated dangers.

- **Air circulation**: Make sure there is sufficient air circulation when installing the Mech-Mind IPC STD series. The Mech-Mind IPC STD series' cooling vents must not be obstructed by any objects. Leave at least 5 cm of clearance around the Mech-Mind IPC STD series to prevent overheating.

> NOTE The above-mentioned vents are not fan exhaust ports. The Mech-Mind IPC STD series does not come with a fan.

- **Grounding**: The Mech-Mind IPC STD series should be properly grounded. The voltage feeds must not be overloaded. Adjust the cabling and provide external overcharge protection per the electrical values indicated on the label attached to the panel of the Mech-Mind IPC STD series.

4.3. Mount the System with Mounting Brackets

To mount the system onto a wall or some other surface using the two mounting brackets, please follow the steps below.

1. Turn the system over.
2. Align the retention screw holes in each bracket with the corresponding retention screw holes on the bottom surface.
3. Secure the brackets to the system by inserting retention screws into each bracket.

4. Drill holes into the intended mounting surface.
5. Align the mounting holes on both sides of the mounting bracket with the pre-drilled holes.
6. Insert and lock the four setting screws to secure the system to the target mounting surface.

4.3.1. Install the External Wi-Fi Antennas

To install the external Wi-Fi antennas, follow these steps:

1. Find the two external Wi-Fi antennas in the package and unscrew them.
2. Insert the external Wi-Fi antennas to the antenna connectors on the real panel.
3. Screw the Wi-Fi antennas to the antenna connectors.

5. External Interface Description

5.1. AT/ATX Power Mode Selection

The Mech-Mind IPC STD series supports both AT and ATX power mode startup.

- ATX power mode: IPC can automatically start up when the power supply is connected.
- AT power mode: IPC can start up when you press the **POWER** button.

This setting can be switched via the AT/ATX power mode switch on the front panel, as shown in the image below.
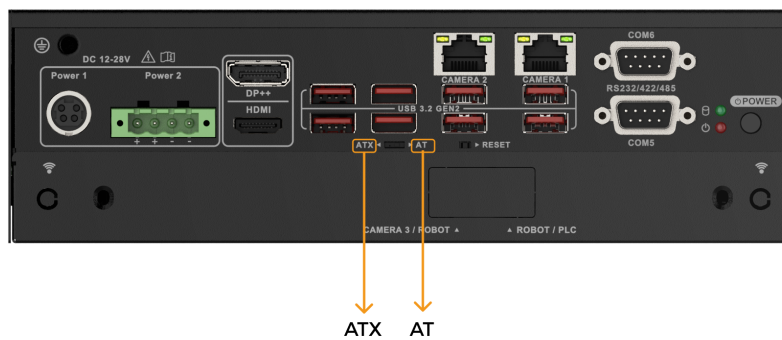
IMPORTANT	The switch is located inside. Please use a precision tool such as a small screwdriver when switching the power mode.

5.2. Power Connectors

There are two power connectors on the front panel. Power 1 connector is a DC Jack connector that supports ACC On signal. Power 2 connector is a 4-pin terminal that can directly connect to a power adapter. The supported power input voltages are:

- Power 1 (DC Jack connector): 12-28 V DC
- Power 2 (Terminal block): 12-28 V DC
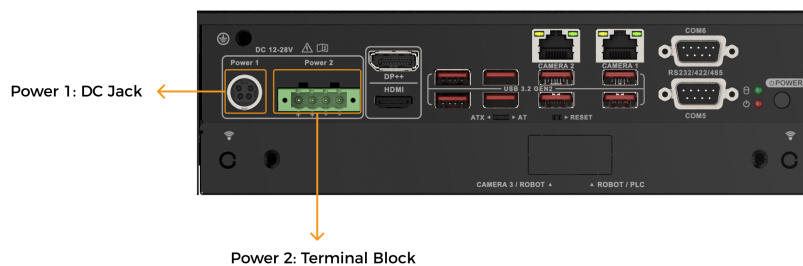
The power LED indicator indicates the status of the power.

Power LED indicator	Description
Off	No power supply

Power LED indicator	Description
Breathing orange	Standby mode
Solid blue	Power-on mode

5.2.1. Power 1 - 4-pin DIN Connector (DC Jack)

NOTE	This connector should be used when you are using a power adapter.

This power connector should be connected to a 12-28 V DC power adapter. Please ensure that the provided power cord is correctly inserted into the power socket.

Pin No.	Description	Pin No.	Description
1	DC_IN1	2	GND
3	DC_IN1	4	GND
5	GND		

5.2.2. Power 2 - 4-pin Terminal Block

| NOTE	This connector should be used when you are using a DIN rail power supply.

This power connector connects the provided 4-pin terminal to the terminal block. The 4-pin terminal connects to a DIN rail power supply.

NOTE	• In practical use, please ensure that the ground terminals of the DIN rail power supply and the IPC are connected to the ground level.

・ Please choose a DIN rail power supply with a capacity greater than that required by the IPC.
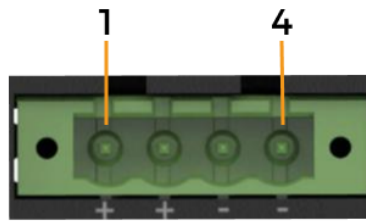
Pin No.	Description	Pin No.	Description
1	DC_IN2	2	DC_IN2
3	GND	4	GND

5.3. Ethernet Ports

The Ethernet ports allow the IPC to connect to an external network.

To connect the IPC to an external network, follow these steps:

1. Locate the Ethernet ports on the IPC.
2. Align the RJ-45 connector on the Ethernet cable with one of the Ethernet ports.
3. Insert the RJ-45 connector on the Ethernet cable into the Ethernet port.

Each Ethernet port on the IPC has two status light-emitting diodes (LEDs), one green and one yellow. The yellow LED indicates the link status or the activity of the port and the green LED indicates the connection speed of the port.

LED	Status	Description
Activity/Link LED (yellow)	Off	No link
	Yellow	Linked
	Blinking	Data is being sent/received
Speed LED (green)	Off	100 Mbps connection
	Orange	1 Gbps connection
	Green	2.5 Gbps connection

5.4. Digital I/O Connector

The digital I/O connector provides programmable input and output for external devices.
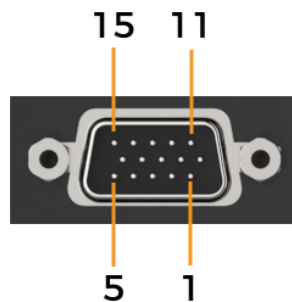
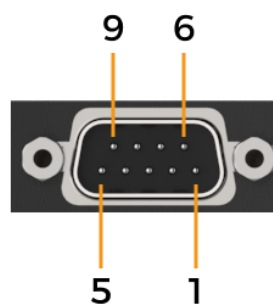The pinouts for the digital I/O connector are listed in the table below.

Pin No.	Description	Pin No.	Description
1	GND	2	DIN0
3	DIN1	4	DIN2
5	DIN3	6	DIN4
7	DIN5	8	GND
9	DOUT0	10	DOUT1
11	DOUT2	12	DOUT3
13	DOUT4	14	DOUT4
15	+5VS		

5.5. DB-9 RS-232/422/485 Serial Port Connector

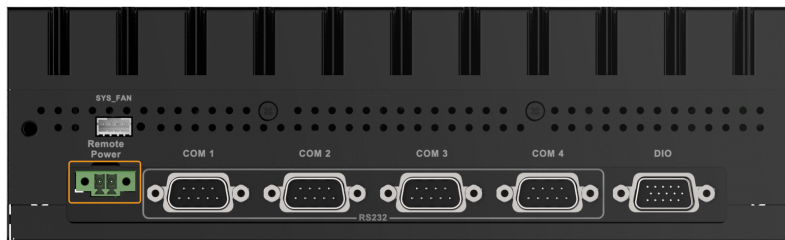The following figure shows RS-232 (COM1 to COM4) and RS-232/422/485 (COM5 to COM6) connector pins.

Pin No.	RS232	RS422	RS485
1	DCD#	TX-	TX-
2	Receiving data	TX+	TX+
3	Sending data	RX+	

Pin No.	RS232	RS422	RS485
4	DTR#	RX-	
5	GND		
6	DSR#		
7	RTS#		
8	CTS#		
9	RI		

5.6. Remote Power Connector

The remote power switch connector can be connected to an external switch to remotely control the power switch.

The remote power switch connector connects to the provided 2-pin terminal. When a short-circuit signal is applied to the 2-pin terminal, the IPC will automatically perform a shutdown operation. The following figure shows possible connection scenarios where the power switch is remotely triggered by an external push-button switch or digital output (DO) signals from Programmable Logic Controllers (PLCs) or robots.
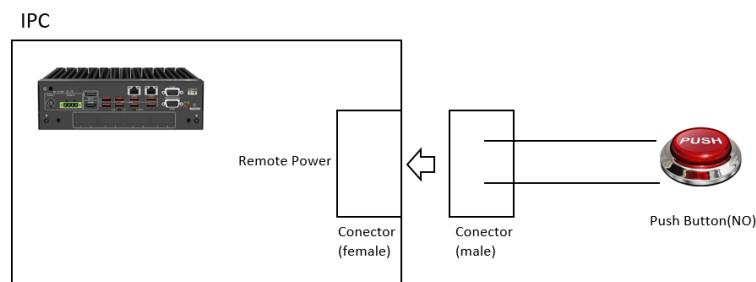
6. Power on/off the IPC

WARNING	Make sure a power supply with the correct input voltage is being fed into the system. Incorrect voltages applied to the system may cause damage to the internal electronic components and may also cause injury to the user.

6.1. Power on the IPC

When the AT/ATX power mode switch is on the ATX side, the IPC automatically starts up after the power connection.

When the AT/ATX power mode switch is on the ATX side, press the **POWER** button on the front panel.

When the IPC is successfully powered on, the power LED indicator should be solid blue.

6.2. Power off the IPC

To power off the IPC, select Start › Power › Shut Down on the IPC's desktop.

When the IPC is successfully powered off, the power LED indicator should be off.

CAUTION	Do not shut down the system by long-pressing the power button or cutting off power. Doing so may result in data loss or system crashes.

6.3. Restart the IPC

To restart the IPC, select Start › Power › Restart. on the IPC's desktop.

When the system is unresponsive or frozen, or normal methods of restarting do not work, you can forcibly restart the IPC by pressing the **RESET** button on the front panel.

NOTE	The **RESET** button is small and located internally. When pressing it, please use a precision tool, such as a small screwdriver.

RESET
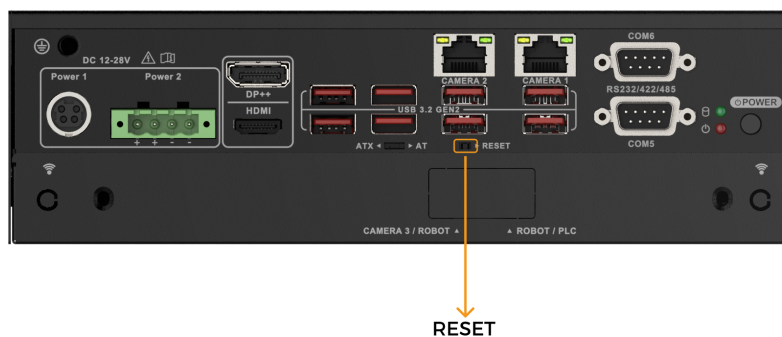
7. Maintenance and Cleaning

When maintaining or cleaning the Mech-Mind IPC STD series, please follow the guidelines below.

7.1. Cleaning Precautions

Prior to cleaning any part or component of the Mech-Mind IPC STD series, please read the details below.

- The interior of the Mech-Mind IPC STD series does not require cleaning. Keep fluids away from the Mech-Mind IPC STD series interior.
- Be cautious of all small removable components when vacuuming the Mech-Mind IPC STD series.
- Turn the Mech-Mind IPC STD series off before cleaning the Mech-Mind IPC STD series.
- Never drop any objects or liquids through the openings of the Mech-Mind IPC STD series.
- Be cautious of any possible allergic reactions to solvents or chemicals used when cleaning the Mech-Mind IPC STD series.
- Avoid eating, drinking and smoking within the vicinity of the Mech-Mind IPC STD series.

7.2. Cleaning Tools

Some components in the Mech-Mind IPC STD series may only be cleaned using a product specifically designed for the purpose. In such cases, the product will be explicitly mentioned in the cleaning tips. Below is a list of items to use when cleaning the Mech-Mind IPC STD series.

- Cloth - Although paper towels or tissues can be used, a soft, clean piece of cloth is recommended when cleaning the Mech-Mind IPC STD series.
- Water or rubbing alcohol - A cloth moistened with water or rubbing alcohol can be used to clean the Mech-Mind IPC STD series.
- Using solvents - The use of solvents is not recommended when cleaning the Mech-Mind IPC STD series as they may damage the plastic parts.
- Vacuum cleaner - Using a vacuum cleaner specifically designed for computers is one of the best methods of cleaning the Mech-Mind IPC STD series. Dust and dirt can restrict the airflow in the Mech-Mind IPC STD series and cause its circuitry to corrode.
- Cotton swabs - Cotton swaps moistened with rubbing alcohol or water are excellent tools for wiping hard-to-reach areas.
- Foam swabs - Whenever possible, it is best to use lint-free swabs such as foam swabs for cleaning.

7.3. Replace Storage

The Mech-Mind IPC STD series supports two types of storage: an M.2 2280 M-key and a 2.5-inch SSD/HDD.

- M.2 SSD installation

Remove the M.2 2280 reservation screw, install the M.2 2280 NVME card, and then secure the card with the reservation screw that was removed earlier.
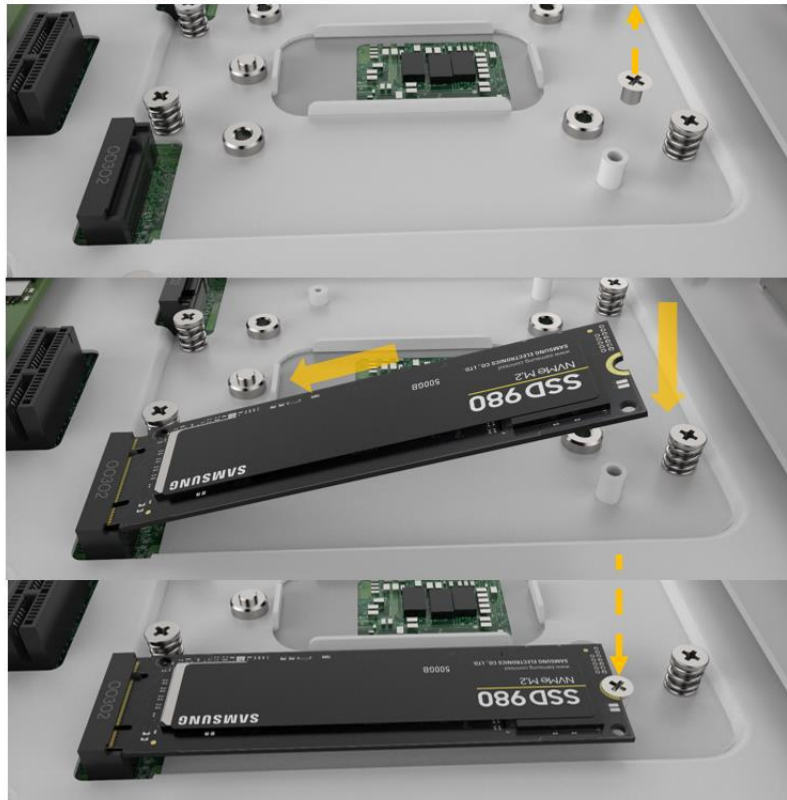
• 2.5" SSD/HDD installation

Place the hard drive into the hard drive holder, then use the four screws to lock the hard drive.

8. Troubleshooting

Symptom	Solution
Blue screen appeared frequently on IPC	Please follow the steps below to re-install the operating system. 1. Please go to "Production Interface→ Maintenance → Backup management", create a backup of the current solution, and copy it to your storage medium. 2. Re-install the operating system. 3. Restore the software and project with the backup file.
Insufficient space on the IPC	1. Check the current space (e.g., C drive and D drive) on your computer, and clear the unneeded files regularly. 2. Set the disk space monitoring rules in the "Production interface configurator". (Skip this step if you have already set the hard disk space monitoring rule.) When there is not enough disk space, alert messages will appear in the status panel of the production interface.

9. Obtain Support

If you need technical support, please contact Mech-Mind Technical Support in any of the following means:

- Email: service@mech-mind.net
- Community: Mech-Mind Online Community

Appendix A: Error Beep Codes During Start

A.1. PEI Beep Codes

Number of Beeps	Description
1	Memory not installed.
1	Memory was installed twice. (InstallPeiMemory routine in PEI Core called twice)
2	Recovery started.
3	DXEIPL was not found.
3	DXE Core Firmware Volume was not found.
4	Recovery failed.
4	S3 Resume failed.
7	Reset PPI is not available

A.2. DXE Beep Codes

Number of Beeps	Description
1	Invalid password.
4	Some of the Architectural Protocols are not available.
5	No Console Output Devices are found.
5	No Console Input Devices are found.
6	Flash update failed.
7	Reset protocol is not available.
8	Platform PCI resource requirements cannot be met.

Appendix B: Hazardous Material Disclosure

The details provided in this appendix are to ensure that the product is compliant with the RoHS II Directive (2015/863/EU). The table below acknowledges the presence of small quantities of certain substances in the product and applies to RoHS II Directive (2015/863/EU).

Please refer to the following table.

Part Name	Toxic or Hazardous Substances and Elements									
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)	Bis(2-ethylhexyl) phthalate (DEHP)	Butyl benzyl phthalate (BBP)	Dibutyl phthalate (DBP)	Diisobutyl phthalate (DIBP)
Housing	O	O	O	O	O	O	O	O	O	O
Printed Circuit Board	O	O	O	O	O	O	O	O	O	O
Metal Fasteners	O	O	O	O	O	O	O	O	O	O
Cable Assembly	O	O	O	O	O	O	O	O	O	O
Fan Assembly	O	O	O	O	O	O	O	O	O	O
Power Supply Assemblies	O	O	O	O	O	O	O	O	O	O
Battery	O	O	O	O	O	O	O	O	O	O

O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in Directive (EU) 2015/863.

X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in Directive (EU) 2015/863.