

# User Manual

## AIR-510

### Embedded Computer

**ADVANTECH**

*Enabling an Intelligent Planet*

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## Product Warranty (2 years)

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandise authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

## Packing List

Before setting up the system, check that the items listed below are included and in good condition. If any item is not in accord with the table, please contact your dealer immediately.

■ 1 x AIR-510 Barebone	P/N: AIR-510-000A1
■ 1 x CPU Cooler	P/N: 1970005349T001
■ 2 x Four 2.5" Storage Metal Tray	P/N: 1960115564N000
■ 32 x Screw M3x5L to fix 2.5" SSD and storage tray	P/N: 1930005836-01
■ 4 x CABLE TIE (P.G. GT-160M)	P/N: 1992822010

# Declaration of Conformity

## CE

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

## FCC Class B

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

## Technical Support and Assistance

1. Visit the Advantech website at [www.advantech.com/support](http://www.advantech.com/support) where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
  - Product name and serial number
  - Description of your peripheral attachments
  - Description of your software (operating system, version, application software, etc.)
  - A complete description of the problem
  - The exact wording of any error messages



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## Warnings and Cautions/ Avertissements et mises en garde

**Warning!** Warnings, if not observed, indicate conditions where there is risk of personal injury!



Les avertissements, s'ils ne sont pas respectés, indiquent des conditions dans lesquelles il existe un risque de blessure !

**Caution!** Cautions are included to help you avoid damaging hardware or losing data.



Des précautions sont incluses pour vous aider à éviter d'endommager le matériel ou de perdre des données.

## Document Feedback

To assist us in making improvements to this manual, we welcome comments and constructive criticism. Please send all such - in writing - to:  
support@advantech.com

## Safety Instructions/ Consignes de sécurité

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by

service personnel:

- The power cord or plug is damaged.
  - Liquid has penetrated into the equipment.
  - The equipment has been exposed to moisture.
  - The equipment does not work well, or you cannot get it to work according to the user's manual.
  - The equipment has been dropped and damaged.
  - The equipment has obvious signs of breakage.
15. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -20° C (-4° F) OR ABOVE 60 °C (140° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.
  16. CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER, DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
  17. This product is intended to be supplied by an UL certified power supply, Tma= 40 degrees Centigrade or equivalent statement provided in operating manual, if power unit is not provided.

The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).

DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

1. Lire attentivement les consignes de sécurité.
2. Conserver ce manuel d'utilisation pour référence ultérieure.
3. Débrancher cet équipement de toute prise secteur avant de le nettoyer. Utilisez un chiffon humide. Ne pas utiliser de détergents liquides ou en aérosol pour le nettoyage.
4. Pour les équipements enfichables, la prise de courant doit être située à proximité de l'équipement et doit être facilement accessible.
5. Garder cet équipement à l'abri de l'humidité.
6. Placer cet équipement sur une surface stable lors de l'installation. Laisser tomber cet équipement peut causer des dommages.
7. Les ouvertures du boîtier sont destinées à la convection d'air. Protéger l'équipement contre la surchauffe. NE PAS COUVRIR LES OUVERTURES.
8. Vous assurez que la tension de la source d'alimentation est correcte avant de connecter l'équipement à la prise de courant.
9. Placer le cordon d'alimentation de sorte que personne ne puisse marcher dessus. Ne placer rien sur le cordon d'alimentation.
10. Toutes les mises en garde et tous les avertissements sur l'équipement doivent être notés.
11. Si l'équipement n'est pas utilisé pendant une longue période, débranchez-le de la source d'alimentation pour éviter tout dommage dû à une surtension transitoire.
12. Ne versez jamais de liquide dans une ouverture. Cela peut provoquer un incendie ou un choc électrique.
13. N'ouvrez jamais l'équipement. Pour des raisons de sécurité, l'équipement ne doit être ouvert que par une personne qualifiée.
14. Si l'une des situations suivantes se présente, faites vérifier l'équipement par le personnel de service :
  - Le cordon d'alimentation ou la fiche est endommagé.

- Du liquide a pénétré dans l'équipement.
- L'équipement a été exposé à l'humidité.
- L'équipement ne fonctionne pas bien ou vous ne parvenez pas à le faire fonctionner conformément au manuel d'utilisation.
- L'équipement est tombé et a été endommagé.
- L'équipement présente des signes évidents de casse.

15. NE LAISSEZ PAS CET ÉQUIPEMENT DANS UN ENVIRONNEMENT OÙ LA TEMPÉRATURE DE STOCKAGE PEUT DESCENDRE EN DESSOUS DE  $-20^{\circ}$  C ( $-4^{\circ}$  F) OU AU-DESSUS DE  $60^{\circ}$  C ( $140^{\circ}$  F). CELA POURRAIT ENDOMMAGER L'ÉQUIPEMENT. L'ÉQUIPEMENT DOIT ÊTRE DANS UN ENVIRONNEMENT CONTRÔLÉ.

16. ATTENTION : RISQUE D'EXPLOSION SI LA BATTERIE EST INCORRECTEMENT REMPLACÉE. LA REMPLACER UNIQUEMENT PAR LE MÊME TYPE OU ÉQUIVALENT RECOMMANDÉ PAR LE FABRICANT, JETER LES PILES USAGÉES SELON LES INSTRUCTIONS DU FABRICANT.

17. Ce produit est destiné à être alimenté par une alimentation électrique certifiée UL, Tma = 40 degrés centigrades ou ayant des caractéristiques équivalents à ceux fournis dans le manuel d'utilisation, si l'unité d'alimentation n'est pas fournie.

Le niveau de pression acoustique au niveau de l'utilisateur, selon la norme CEI 704-1:1982, n'est pas supérieur à 70 dB (A).

AVIS DE NON-RESPONSABILITÉ : cet ensemble d'instructions est fourni conformément à la norme CEI 704-1. Advantech décline toute responsabilité quant à l'exactitude des déclarations contenues dans ce document.

## Safety Precaution - Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

1. To avoid electrical shock, always disconnect the power from your PC chassis before you work on it.
2. For the sake of the equipment, disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.
3. Electronic components are also vulnerable to damage by electrostatic discharge. An electrostatic charge can build up on the human body, especially where the air is dry. At minimum, dissipate potential body charge before handling any electronic board by touching a conductive surface on the chassis. Only then remove circuit boards from their antistatic bags. Handle boards by the edges or mounting brackets only; do not touch components or connecting pins.



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# Chapter 1

General Information

# 1.1 Specifications

14th Processor System	CPU	i9-14900/ i9-14900T	i7-14700/ i7-14700T	i5-14500/ i5-14500T	i5-14400/ i5-14400T	i3-14100/ i3-14100T	Intel® Processor 300	Intel® Processor 300T					
	Core Number (Performance and Efficient core)	8P+16E	8P+12E	6P+8E	6P+4E	4P	2P	2P					
	Max. Speed	5.8/ 5.5GHz	5.4/ 5.2GHz	5.0GHz/ 4.8GHz	4.7GHz/ 4.5GHz	4.7GHz/ 4.4GHz	3.9GHz	3.4GHz					
	Smart cache	36M	33M	24M	20M	12M	6M	6M					
	TDP	65W/35W	65W/35W	65W/35W	65W/35W	60W/35W	46W	35W					
13th Processor System	CPU	i9-13900E/ i9-13900TE	i7-13700E/ i7-13700TE	i5-13500E/ i5-13500TE	i3-13100E/ i3-13100TE	i9-13900	i7-13700	i5-13500	i5-13400	i3-13100			
	Core Number (Performance and Efficient core)	8P+16E	8P+8E	6P+8E	4P+0E	8P+16E	8P+8E	6P+8E	6P+4E	4P+0E			
	Max. Speed	5.20GHz/ 5.00GHz	5.10 GHz/ 4.80 GHz	4.60 GHz/ 4.50 GHz	4.40 GHz/ 4.10 GHz	5.60 GHz	5.20 GHz	4.80 GHz	4.80 GHz	4.50 GHz			
	Intel Smart Cache	36MB/ 36MB	30MB/ 30MB	24MB/ 24MB	12MB/ 12MB	36MB	30MB	24MB	20MB	12MB			
	TDP (W)	65W/35W	65W/35W	65W/35W	60W/35W	35W	35W	65W	65W	60W			
12th Processor System	CPU	i9-12900E/ i9-12900TE	i7-12700E/ i7-12700TE	i5-12500E/ i5-12500TE	i3-12100E/ i3-12100TE	G7400E/ G7400TE	G6900E/ G6900TE	i9-12900	i7-12700	i5-12500	i5-12400	i3-12100	
	Core Number (Performance and Efficient core)	8P+8E	8P+4E	6P+0E	4P+0E	2P+0E	2P+0E	8P+8E	8P+4E	6P+0E	6P+0E	4P+0E	
	Max. Speed	5.0GHz/ 4.8GHz	4.8GHz/ 4.7GHz	4.5GHz/ 4.3GHz	4.2GHz/ 4.0GHz	3.6GHz/ 3.0GHz	3.0GHz/ 2.4GHz	5.10GHz	4.9GHz	4.6GHz	4.4GHz	4.3GHz	
	Intel Smart Cache	30MB/ 30MB	25MB/ 25MB	18MB/ 18MB	12MB/ 12MB	6MB/6MB	4MB/4MB	30MB	25MB	18MB	18MB	12MB	
	TDP (W)	65W/35W	65W/35W	65W/35W	60W/35W	46W/35W	46W/35W	65W	65W	65W	65W	60W	
Chipset	Q670E												
BIOS	AMI BIOS UEFI 256 Mbits SPI												
Memory	Technology	DDR5 up to 4400 MT/s											
	Max. Capacity	192 GB (48GB per DIMM)											
	Socket	4 x 288-pin UDIMM (Non-ECC)											
Discrete GPU Slot	PCIe Slot	PCIe Gen5 x16											
	Qty	1											
	TDP	Up to 350W											
Built-in Display	Chipset	Intel® UHD Graphics 770/ 730/ 710 (depends on CPU model)											
	Graphic Engine	Direct x 12, OpenGL 4.5											
	DP	2, up to 4096 x 2304 @ 60Hz											
	HDMI	1, up to resolution 4096 x 2160 @ 60Hz. Supports HDR											
Ethernet	LAN1	10/100/1000 Mbps Intel I219-LM GbE, support Wake On Lan											
	LAN2	10/100/1000/2500 Mbps Intel I226 GbE, support Wake On Lan											
Audio	Interface	Realtek ALC888S, High Definition Audio, Line-out/Mic-in											
Others	Watch dog Timer	255-level timer interval, setup by software											
	TPM	TPM 2.0											
I/O Interface	Serial Port	6 (5 x RS-232, 1 x RS-232/422/485 with auto flow control) Optional											
	USB	3 x USB 3.2 (Gen2 x 1, 5G)											
	DIO	8bit DIO											
Expansions	PCIe Slot	1 x PCIe x4 Gen4.0 1 x PCIe x4 Gen3.0											
	SSD	8 x 2.5" SATAIII hard drive Bay with Max Height 98mm											
Storage	NVME	1 x M.2 M Key 2280 NVMe PCIe x4											
	Microsoft Windows	Windows 10 IoT 2021 LTSC/ Windows 11 IoT Enterprise											
Software Support	Linux	Ubuntu Desktop version is TBD											
	Power Type	AC in											
Power Requirements	Power Input Voltage	100 - 240 V											
	Power Supply	850W built-in											
Mechanical	Mounting	Rack mounting (Optional)											
	Dimensions (W x H x D)	380 x 176 x 466.83 mm											
	Weight	11 kg											
Environment	Operating Temperature	Without PCIe cards peripherals: 0~40 °C											
	Vibration During Operation	With SSD: 1 Grms, IEC 60068-2-64, random, 5 ~ 500 Hz, 1 hr/axis.											
	Shock During Operation	With SSD: 10 G, IEC 60068-2-27, half sine, 11 ms duration											
	Storage Temperature	-40 ~ 85 °C											
	Relative Humidity	95% @ 40 °C (non-condensing)											
	EMC	CE/FCC Class B, CCC, BSMI											
Safety	CB, UL, CCC, BSMI												

## 1.2 Environmental Specification

**Table 1.2: Environmental Specification**

Operating Temperature	0 ~ 40° C (32 ~ 122° F) with SSD
Non-operating Temperature	-20 ~ 60 °C (-4 ~ 140° F)
Environment	
Humidity	95% @ 40° C, non-condensing
Vibration (5 ~5 00Hz)	1 Grms (For SSD)

## 1.3 Power Supply Options

Table 1.3 Power Supply Options	
Part No.	PS-5851-1
Watt	850W
Input Rating	100 ~ 240 Vac, 10A, 50/60Hz
Output voltage	+3.3 V@ 20A, +5 V@ 20A +12 V @ 70.5A, -12 V@ 0.3A +5 Vsb @ 2.5A

The customers need to calculate the power budget of the intended applications.

# 1.4 Dimensions

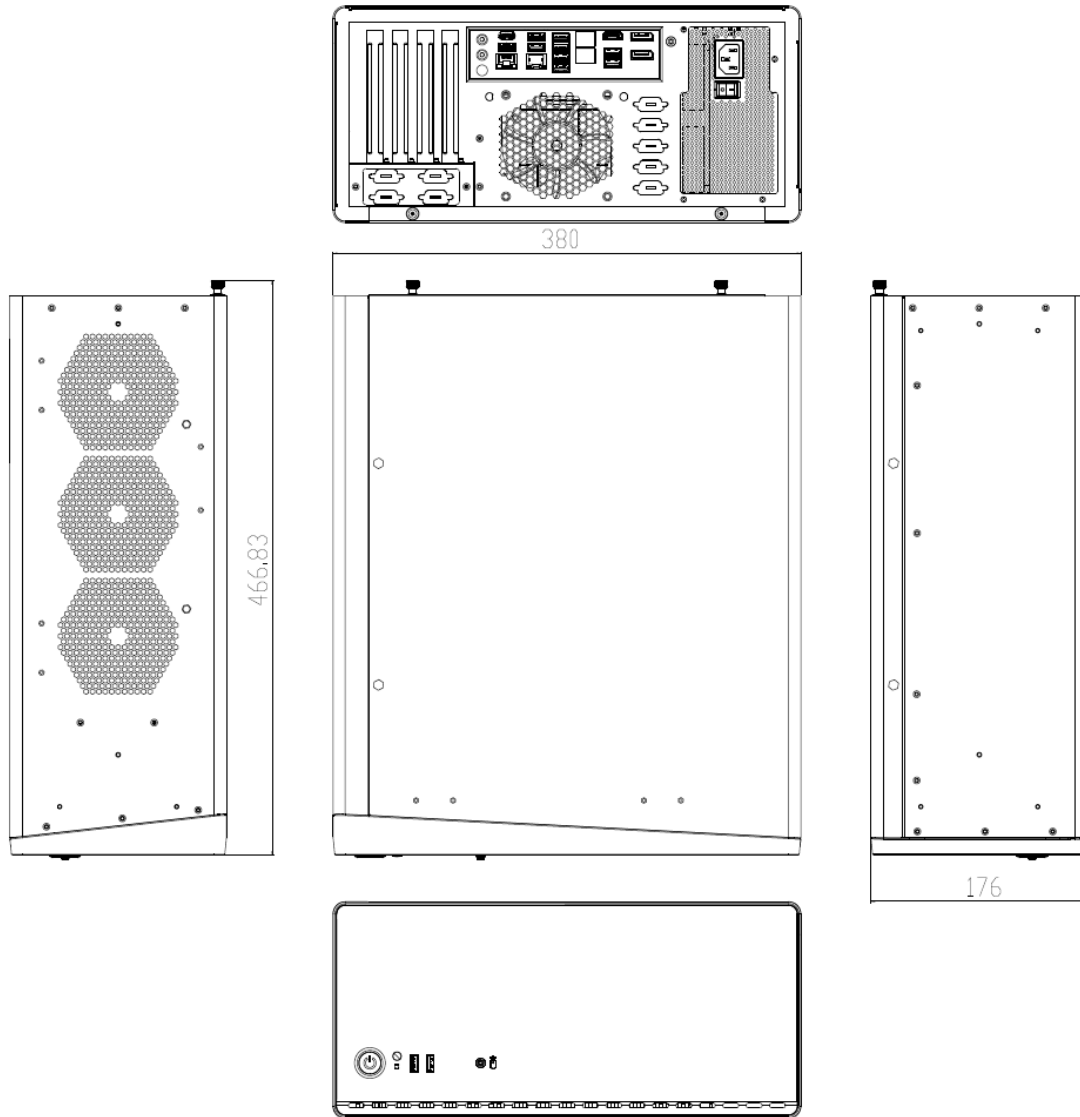


Figure 1.1 Dimensions (Unit:mm)

## 1.5 Front View Diagram

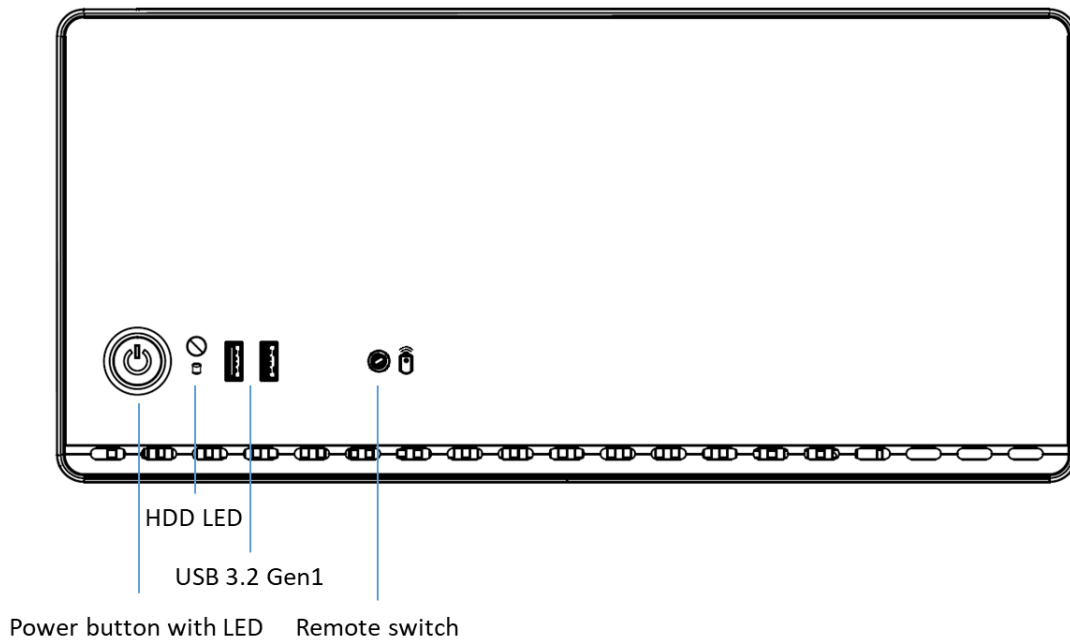


Figure 1.2 Front View Diagram

## 1.6 Rear View Diagram

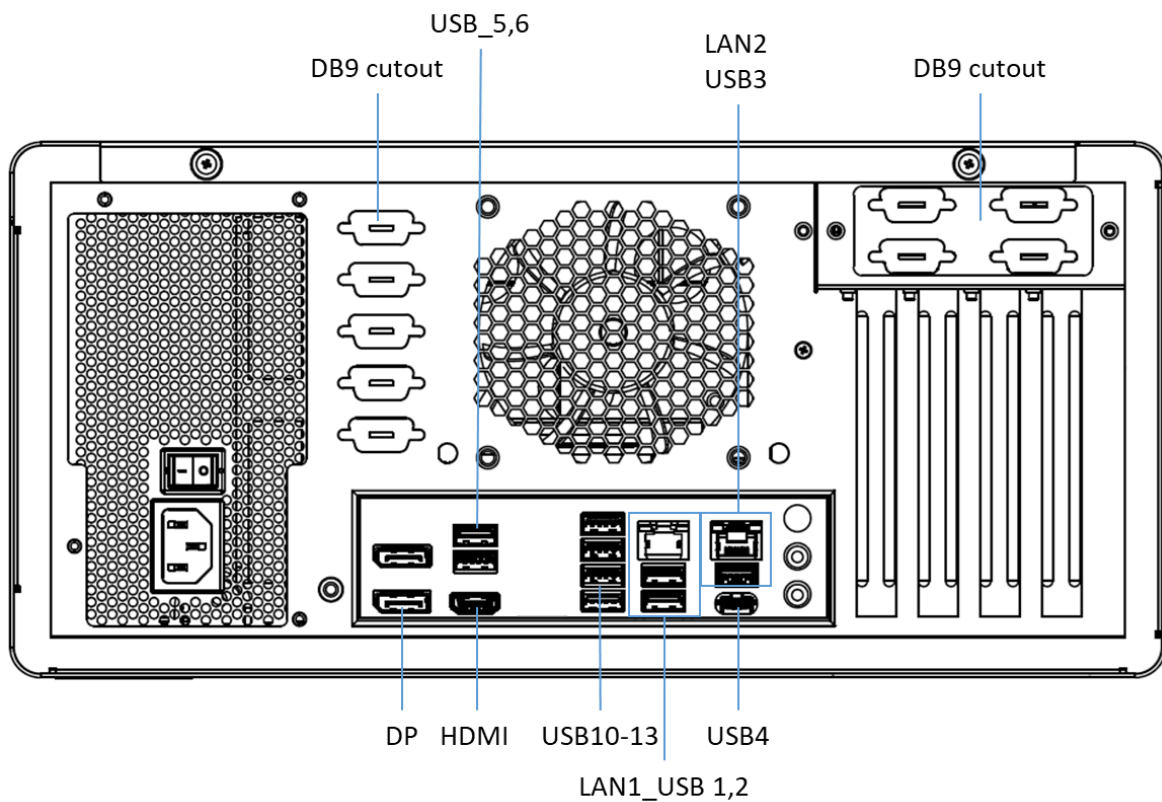
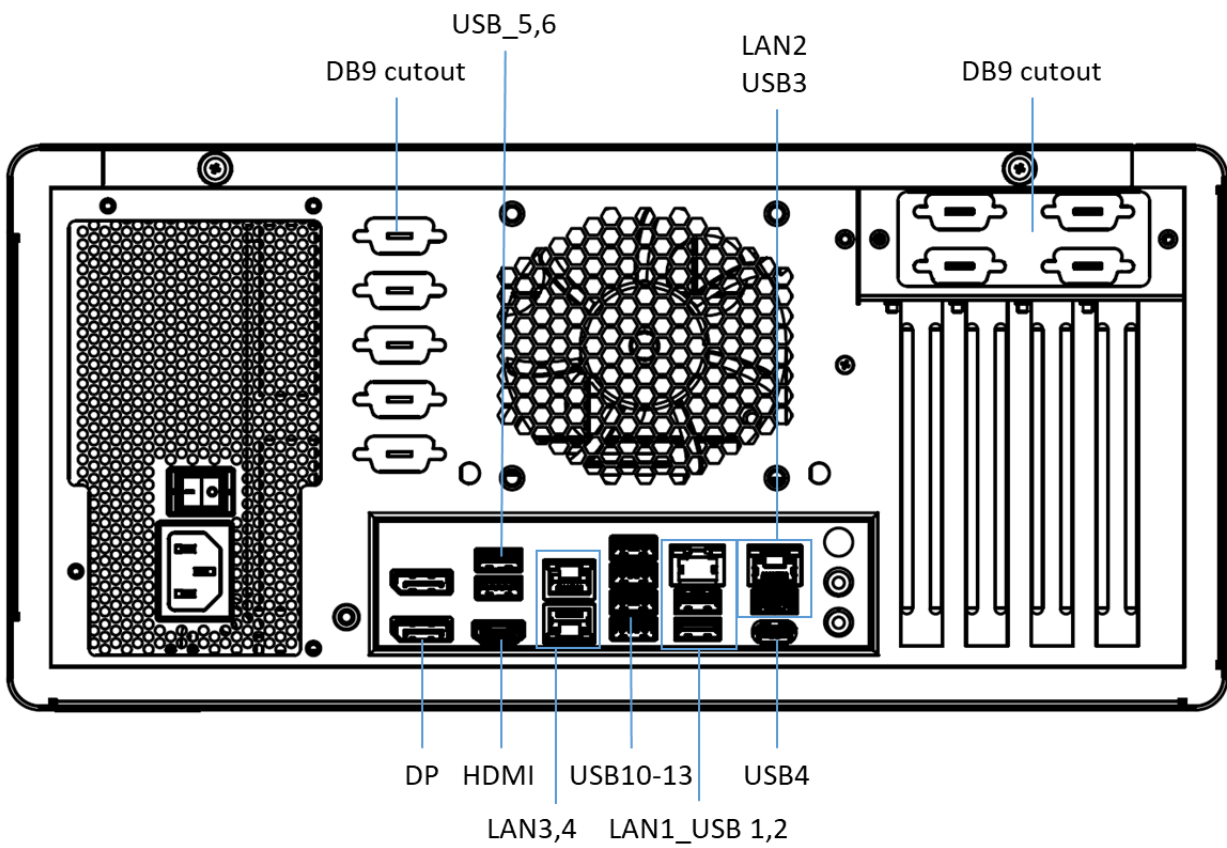


Figure 1.3 Rear View Diagram (Default)



**Figure 1.4 Rear View Diagram (Optional)**

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# Chapter 2

## System Setup and Diagrams



## 2.1 Open the Chassis Cover

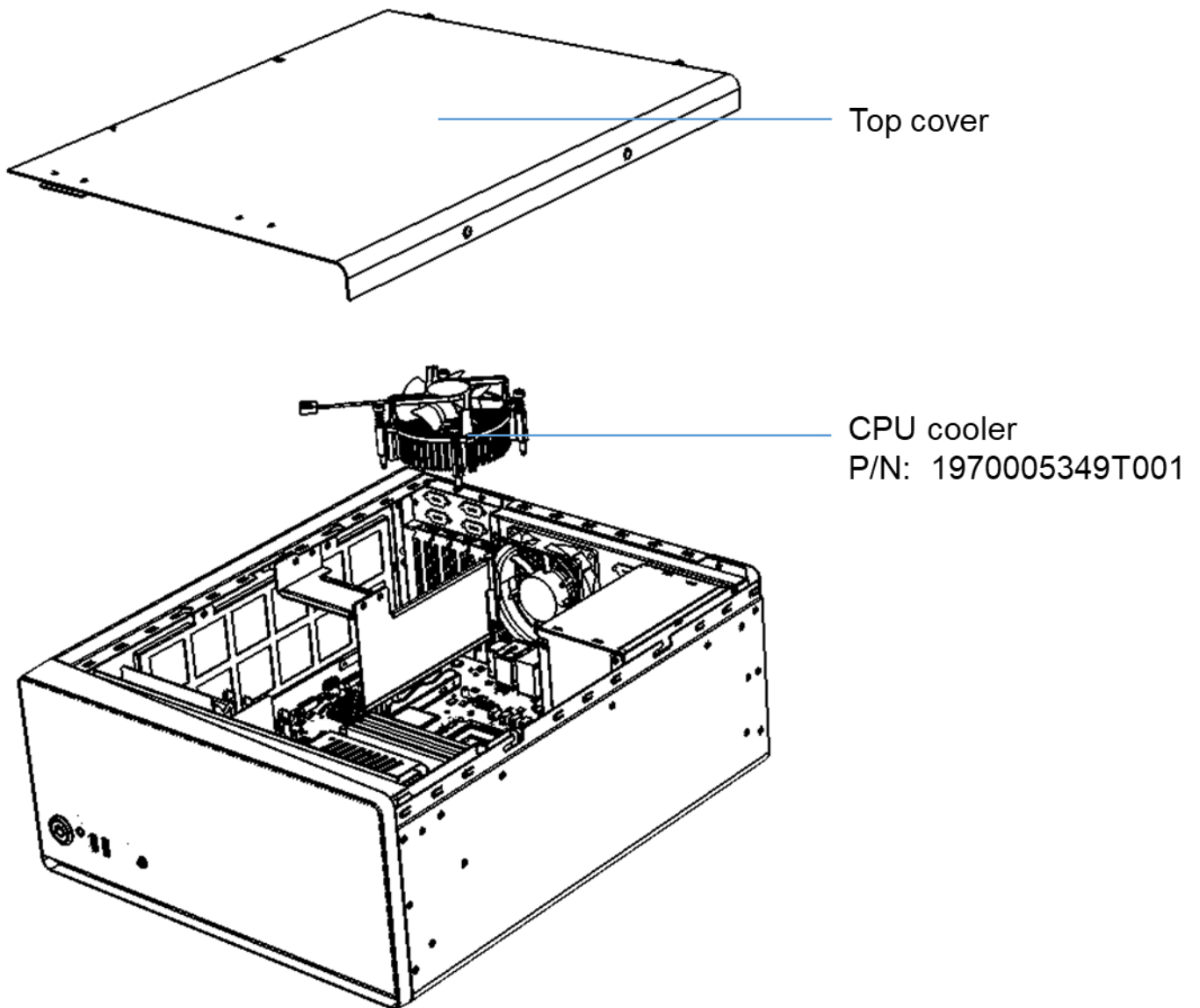


Figure 2.1 Open the Chassis Cover

## 2.2 Installing Storage

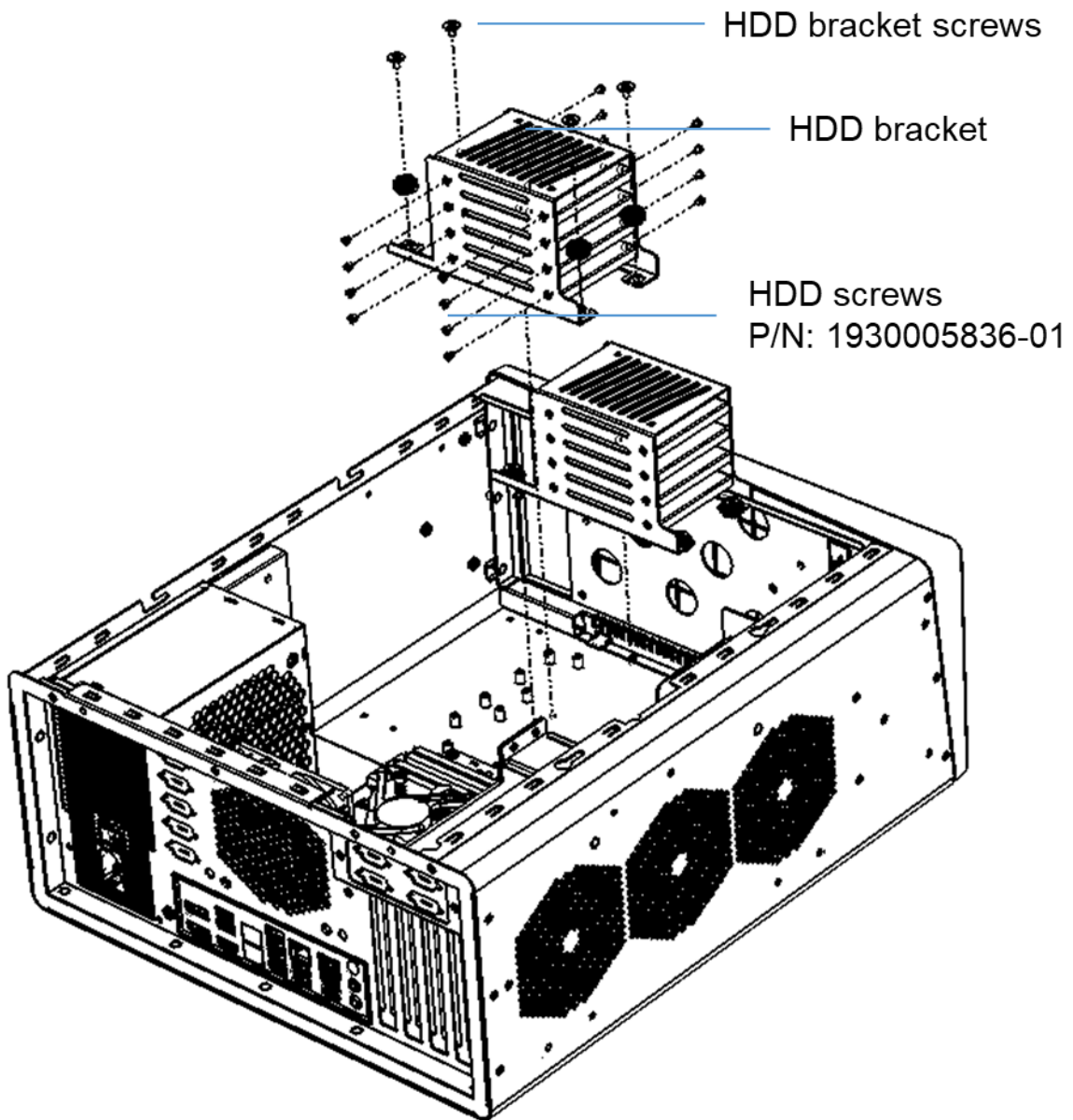


Figure 2.2 Installing Storage / 组装硬盘 / 组装硬盘

## 2.3 Installing Brackets Illustration (Optional)

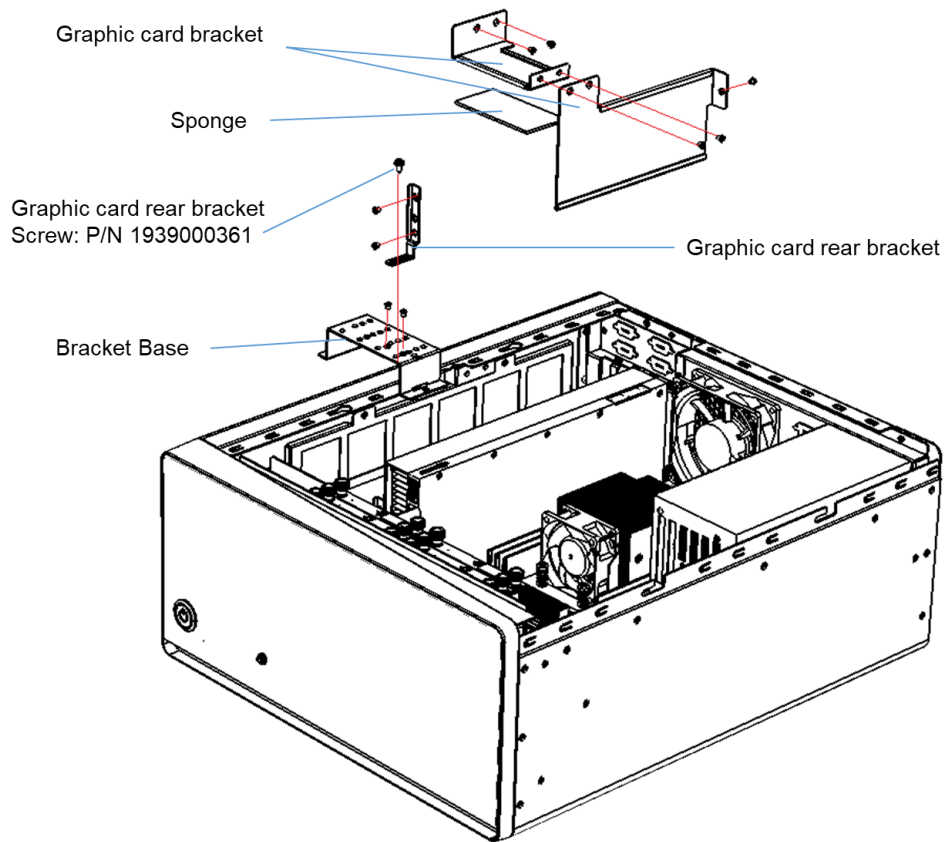


Figure 2.3.1 Installing Graphic Card Bracket

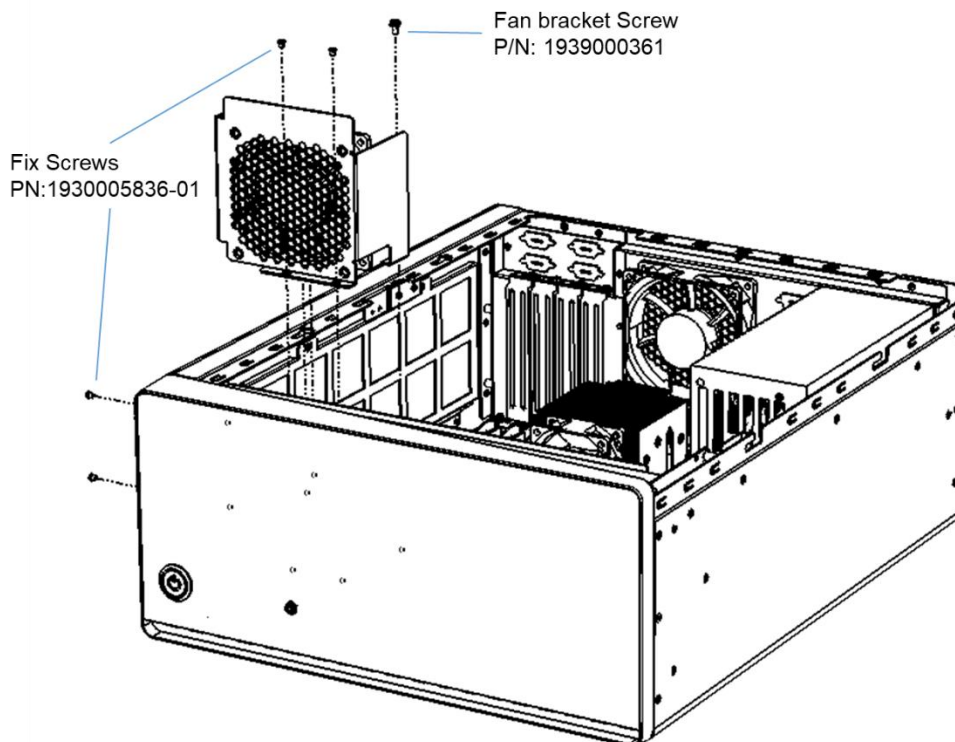


Figure 2.3.2 Installing Fan Bracket

## 2.4 Installing System Mount Kit

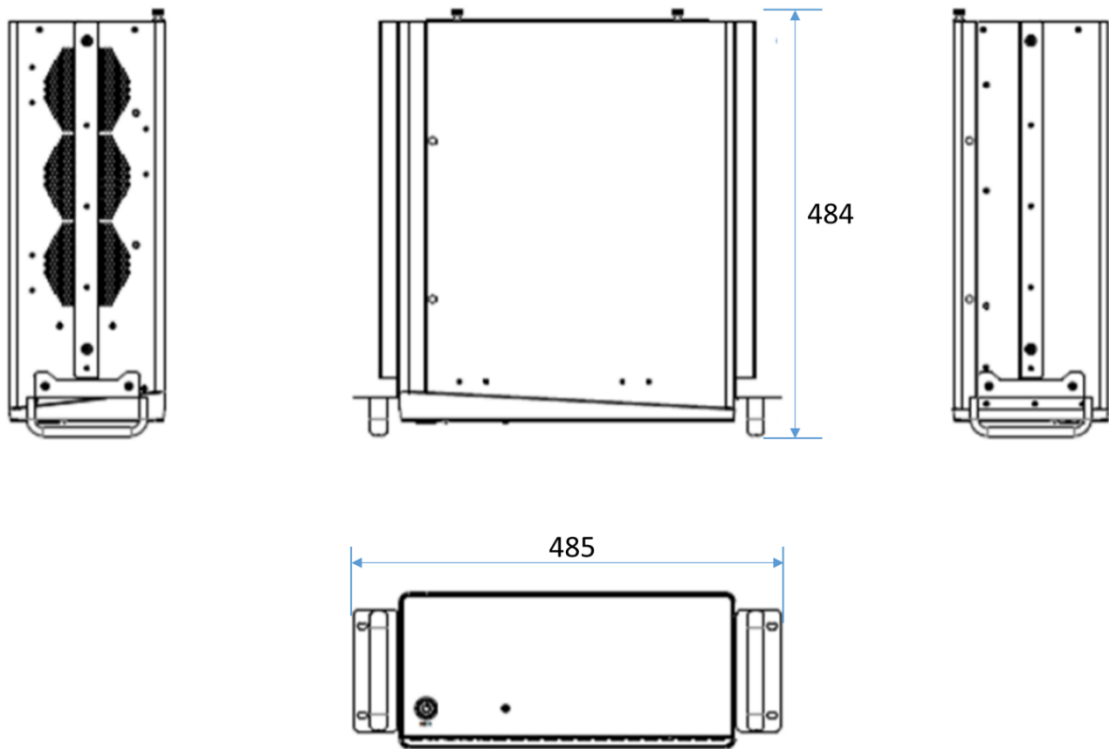


Figure 2.4.1 System with Rack Mount Kit Size(unit: mm)/ 安装机柜  
固定支架尺寸/ 系统安装机柜固定支架尺寸

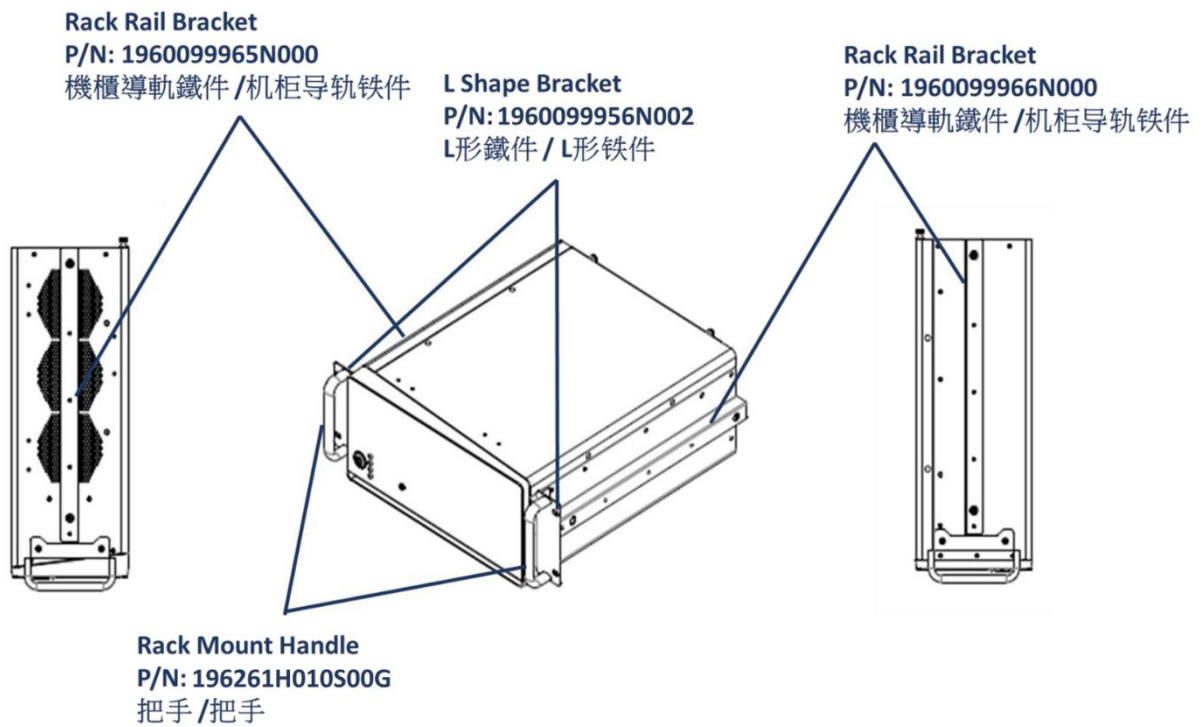


Figure 2.4.2 Installing Rack Mount Kit

# Chapter 3

BIOS Setting

## 3.1 Introduction

AIR-510 BIOS setting please refer to the AIMB-588 B1 user manual

<https://www.advantech.com/zh-tw/support/details/manual?id=1-2LNLQCL>

## **www.advantech.com**

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