



KingKong-C1 Controller User Manual

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Contents

Preface	1
Chapter 1 Safety	2
1.1 Safety Terminology	2
1.2 Safety Precautions	2
1.2.1 Overview	2
1.2.2 Safety Precautions	2
Chapter 2 Controller Overview	5
2.1 Controller Introduction	5
2.2 Product Information	6
2.2.1 Controller Description	6
2.3 Product Features	6
Chapter 3 Hardware Description and Usage	8
3.1 Product Interface Definitions	9
3.2 Controller Connections	9
3.3 I/O Slave Wiring	10
3.4 Teach Pendant	10
Chapter 4 Environment and Installation	11
4.1 Installation Environment	11
4.2 Controller Installation	11

Preface

Thank you for choosing the KingKong controller designed by Robotphoenix. We are committed to providing comprehensive technical support to ensure the successful application of our products.

This manual applies to the KingKong-C1 controller and provides an overview of the controller's product specifications, hardware description, applications, as well as installation and maintenance instructions.

In addition to this manual, more product information and technical documentation can be obtained from our official website:

www.rprobotic.com

Product Warranty (One Year)

Robotphoenix provides the original purchaser with a one-year product quality warranty starting from the date of purchase. This warranty does not apply to products that have been repaired or modified by unauthorized service personnel. Robotphoenix shall not be liable for any injury or equipment damage resulting from improper use, natural disasters, incorrect installation, or failure to follow the instructions in this manual.

If the product fails within the warranty period, we will provide free repair or replacement services. For products that are out of warranty, material costs and service labor fees may be charged as appropriate. Please contact your sales representative for detailed information.

If you believe that the product you purchased is malfunctioning, please follow the steps below:

- 1、Collect information related to the issue you encountered (e.g., product model/version, fault description, error codes), and note any abnormal messages displayed on the screen.
- 2、Contact Robotphoenix after-sales service and describe the fault in detail, referring to this manual, the product, and any other relevant supporting information.。
- 3、If the product is diagnosed as faulty, please provide the serial number of the purchased product so that we can arrange the return of the faulty unit as soon as possible.
- 4、Carefully pack the faulty product and include the after-sales service card and proof of purchase (such as a sales invoice) in the package. Products without valid proof of purchase will not be eligible for warranty service.。

Unpacking Inspection Upon unpacking, please carefully check the following:

- 1) Whether the model on the product nameplate matches your order, and whether the unit is in good condition.
- 2) Whether the product has been damaged during transportation. If any parts are missing or damaged, please contact us immediately for resolution.

Chapter 1 Safety

1.1 Safety Terminology

This manual uses the following safety levels:

 Warning	Indicates a potentially hazardous situation which, if not avoided or if the instructions are ignored and the product is used improperly, could result in death or serious personal injury.
 Warning	Indicates an electrical hazard. Failure to follow the instructions and improper operation may result in electric shock and personal injury.
 Caution	Indicates a potentially hazardous situation which, if not avoided or if the instructions are ignored and the product is used improperly, may result in minor or moderate personal injury, or equipment damage.

1.2 Safety Precautions

1.2.1 Overview

Users who are using this product for the first time should carefully read this manual before operation. Industrial robots, regardless of motion speed, pose significant potential hazards. A pause or wait during program execution may be immediately followed by a very fast and dangerous motion command.

Even if you are familiar with the current robot's motion paths and operating modes, the robot's trajectory in automatic mode may still be altered unexpectedly by external signals. Therefore, all safety regulations must be strictly observed when entering the robot's working area.

If you have any questions regarding the product's functions or performance, please consult Robotphoenix technical support. Seeking assistance when needed helps ensure the correct and safe use of this product.

1.2.2 Safety Precautions

Operators must adhere to the following safety instructions:

 Warning	● To protect operators who do not have sufficient knowledge of electrical equipment from the risk of electric shock, the controller must be installed inside a locked control cabinet. The cabinet enclosure shall have a protection rating of at least IP20, and only operators who have received training in electrical equipment and possess adequate electrical knowledge are allowed to open the control cabinet. ● A safety circuit must be designed and implemented to ensure that, in the event of an external power failure or controller malfunction, the control system keeps the robot in a safe state. ● The controller's power supply input and control signal input/output circuits are designed as safe low-voltage DC circuits, and proper safety isolation must be maintained between these circuits and any hazardous voltage circuits. ● The emergency stop (E-Stop) function must be operable in all automated modes, and resetting the E-Stop must not cause the machine to start unexpectedly or uncontrollably. ● When installing or removing modules, all external power sources used by the system must be completely disconnected before performing any operation. Failure to disconnect all power may result in module damage or unintended motion.
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 Warning	● Always turn off the robot system and any related devices and disconnect the power plug before performing any replacement or maintenance work. Performing operations while the system is powered may result in electric shock or system malfunction. ● Do not connect or disconnect motor connectors while the power is on. Doing so may cause the robot to move unexpectedly, posing a serious safety hazard. Additionally, performing work while the system is powered may result in electric shock or equipment failure.
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 Caution	● In the event of controller damage or partial circuit failure, uncontrolled outputs may occur. To ensure safe and proper operation of the equipment, appropriate external control circuits must be designed. ● The controller is designed for indoor use in electrical environments with Overvoltage Category II (OVC II). The power system should be equipped with surge protection to prevent overvoltage from lightning strikes from reaching the controller's power input, signal input, or control output terminals, thereby avoiding equipment damage. ● Do not use the controller in the following environments: Areas with dust, oil mist, conductive particles, corrosive gases, or flammable gases. Areas exposed to high temperature, condensation, rain, or direct wind. Areas subject to vibration or mechanical shock. ● Electric shock, fire, or improper operation may also result in equipment damage or degradation.
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Installers must adhere to the following safety instructions:

 Warning	● Installation, wiring, maintenance, and inspection of this product must be performed only by qualified personnel who have received training in electrical equipment and possess sufficient electrical knowledge. All external power supplies used by the system must be completely disconnected before performing wiring or other operations. Failure to do so may result in electric shock, equipment malfunction, or unintended motion. ● When drilling screw holes or performing wiring operations, ensure that metal shavings or wire ends do not fall into the controller's ventilation openings, as this may cause fire, equipment malfunction, or unintended operation. ● When installing modules, ensure they are fully seated with their respective connectors and that the module locking hooks are securely fastened. Improper installation may lead to unintended operation, equipment malfunction, or module detachment. ● For connections to connectors and external devices, use the tools specified by the manufacturer for crimping, pressing, or proper soldering. Poor connections may cause short circuits, fire, or unintended operation. ● To ensure the safety of both equipment and personnel, the system must be reliably grounded using cables of adequate wire gauge.
	● Terminal bolts on the terminal block must be tightened within the specified torque range. Bolts that are too loose may cause short circuits, fire, or unintended operation, while bolts that are over-tightened may damage the bolts or modules, potentially leading

 Caution	to detachment, short circuits, fire, or unintended operation. •Cable terminals must be properly insulated. After installation on the terminal block, the insulation distance between cables must be maintained. Failure to do so may result in electric shock or equipment damage. •Cable connections must be made correctly according to the type of interface being connected. Connecting to the wrong interface or incorrect wiring may cause module or external device malfunction. •Do not bundle control or communication cables together with main power or high-voltage lines, and maintain a minimum separation of 100 mm between them. Insufficient separation may result in noise interference causing unintended operation. •For applications with severe electrical interference, use shielded cables for high-frequency signal input or output to improve the system's electromagnetic compatibility (EMC) and reduce susceptibility to interference.
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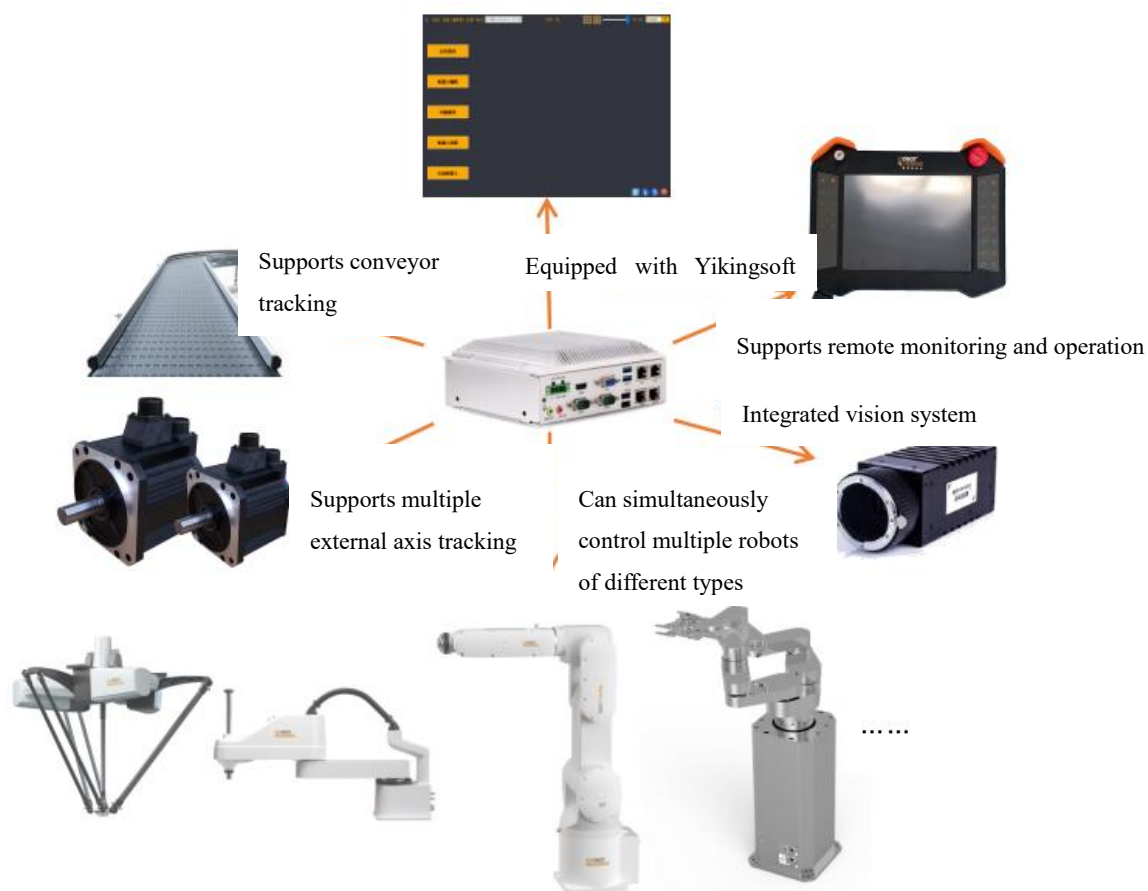
Chapter 2 Controller Overview

2.1 Controller Introduction

The KingKong-C1 controller is designed based on an IPC + RTOS architecture and utilizes an x86 computing platform. The controller features multiple Ethernet ports, RS485/232 COM interfaces, and an EtherCAT master interface, enabling precise and complex motion control of robots.

This controller can be widely applied to various types of robots, including SCARA, Delta, and small six-axis robots.

The figure below illustrates the composition of the robot control system:



2.2 Product Information

2.2.1 Controller Description

The KingKong-C1 controller is an all-in-one vision and motion control robot controller developed by Robotphoenix. It is equipped with an Intel Celeron J6412 processor and integrates multiple hardware interfaces, including: 5 Gigabit Ethernet ports, 5 serial ports (RS232/RS485), 4 USB ports, HDMI interface.

This configuration provides versatile connectivity for various robot applications.



2.3 Product Features

- Motion Control + PC Solution: Based on a "motion control + PC" architecture with EtherCAT bus communication, supporting motion control of up to 48 axes.
- Integrated System: Combines robot motion control, vision recognition, external axis tracking, conveyor tracking, and vibration suppression algorithms into a unified system, offering high cost-performance and user-friendly operation.
- Multi-Robot Control Technology: A single controller can simultaneously control multiple robots of different configurations, supporting Delta, SCARA, six-axis, and wafer-handling robots, among other types.

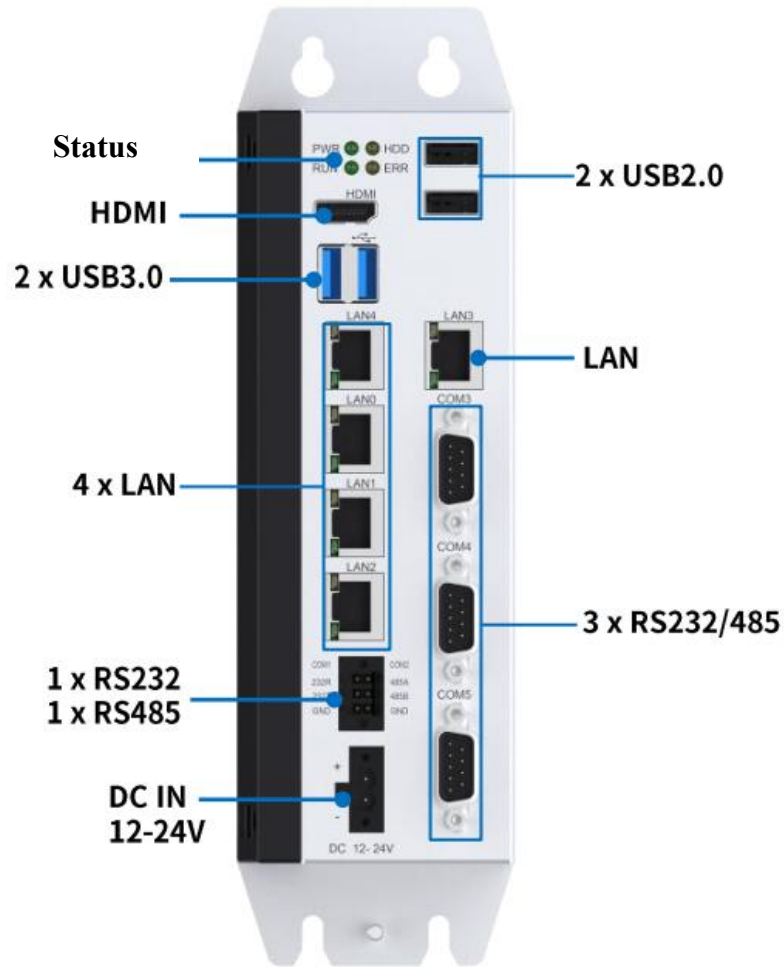
- Industry-Specific Process Packages: Custom-developed process packages tailored to specific industry needs and application requirements.
- Powerful SDK Support: Enables fully programmatic control without using the teach pendant. Robots can function purely as execution units, with all motion control and status monitoring implemented in the user's own software.
- Cloud Platform Monitoring: Supports remote monitoring of the robot's operating status.

Chapter 3 Hardware Description and Usage

Controller Specifications:

Product Name	KingKong Controller	
Hardware Configuration	CPU	Intel® Celeron J6412, 2.0–2.6 GHz, 4 cores / 4 threads, 1.5 MB L2 cache
	TDP	10W
	Memory	DDR4-SDRAM 2666Mhz 8GB
	Storage	128G SSD
	USB Ports	4
	Serial Ports	8G
	Ethernet Ports	5 × Gigabit Ethernet
	LED	4x Led
	HDMI	Maximum resolution 4096 × 2160 @ 60 Hz
Power	Input Voltage	DC 12/24 V ±10%, with overcurrent, overvoltage, and reverse connection protection; built-in supercapacitor allows full load operation for 5 s
	Power Consumption	Maximum 45 W
Mechanical Parameters	Structure	Sheet metal construction, fanless design, supports wall-mount or DIN-Rail installation
	Dimensions	(L)180mm x (W)129mm x (H)66mm
Environmental Requirements	Operating Temperature	-20°C ~ 60°C
	Operating Humidity	5~95% (non-condensing)
Application Areas	Industrial automation, medical, personal care, logistics and transportation, warehousing, 3C electronics, chemical industry, and other related fields	

3.1 Product Interface Definitions



Port	Function
LAN0	Extended network communication
LAN1	Extended network communication
LAN2	Teach pendant connection (IP: 192.168.43.139)
LAN3	EtherCAT master interface
LAN4	Camera connection

3.2 Controller Connections

The controller itself does not support I/O and requires the use of Robotphoenix self-developed I/O slave to achieve I/O control. One I/O slave supports 16 DI, 16 DO, and 2 encoder interfaces. The connection diagram is shown below.

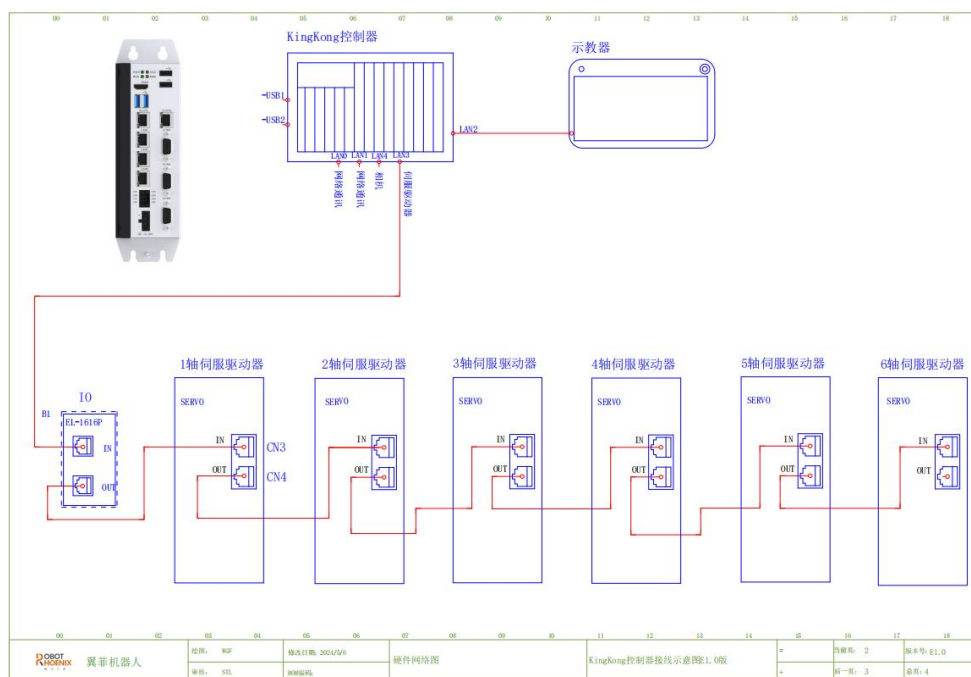


Figure 3.2 Connection Diagram of KingKong-C1 Controller

3.3 I/O Slave Wiring

The first 4 DI channels and the first 4 DO channels of the I/O slave have predefined functions in the controller and cannot be modified by the customer. The wiring diagram of the I/O slave is shown below.

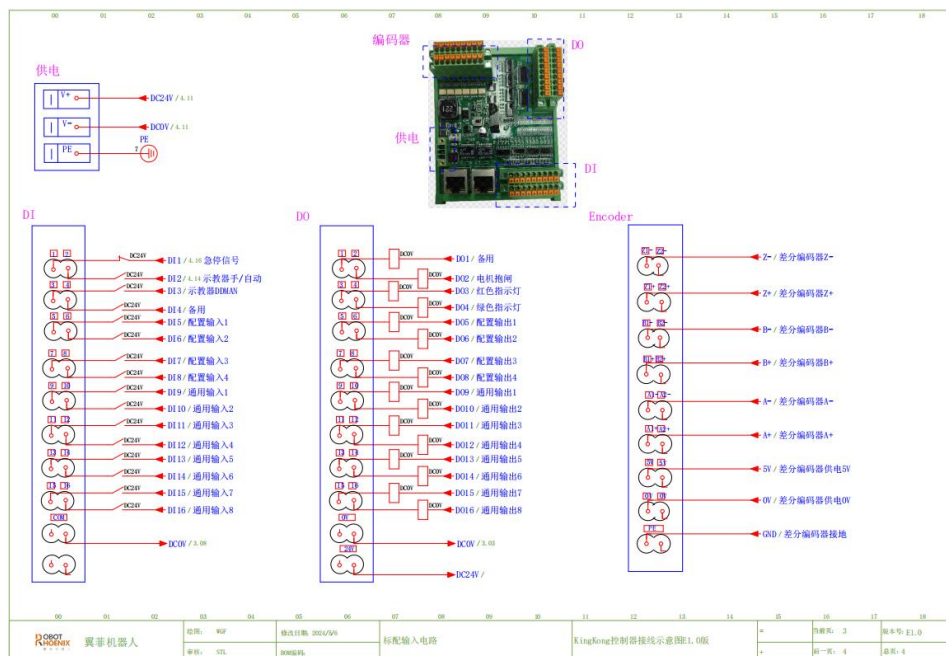


Figure 3.3 Connection Diagram of KingKong-C1 Controller I/O Slave

3.4 Teach Pendant

The Cobra teach pendant is a human-machine interface (HMI) terminal for robots, independently developed by Robotphoenix, based on VNC display and Modbus technologies.

This product is fully compatible with Robotphoenix's KingKong-C1 controller, supporting the Bat series, Python series, Mantis series, and Lobster series robots. It can also be adapted to any controller based on Windows or Linux (with display).

The teach pendant features an independent emergency stop button and supports one-to-multiple robot control, enhancing robot safety performance and reducing operational costs.

Note: The teach pendant Ethernet port is factory-configured to connect to the controller's LAN2 interface, with the IP address set to 192.168.43.139.



Figure 3.4 Appearance of the Teach Pendant

Chapter 4 Environment and Installation

4.1 Installation Environment

Installation Precautions:

The controller is an open-type device and is designed for installation inside a control cabinet. It must be installed within the final system, which should provide appropriate safety and electrical/mechanical protection enclosures.

1. Ambient Temperature: The surrounding environment has a significant impact on the controller's lifespan. The operating temperature must not exceed the allowed range specified for the device.
2. Mounting Surface: Install the controller vertically on a flame-retardant surface inside the control cabinet, ensuring sufficient space around the controller for heat dissipation.
3. Vibration: Install the controller in a location free from excessive vibration and away from vibrating equipment.
4. Environment Protection: Avoid installation in locations exposed to direct sunlight, high humidity, or condensation.

4.2 Controller Installation

The installation dimensions of the controller are shown in Figure 4.2.

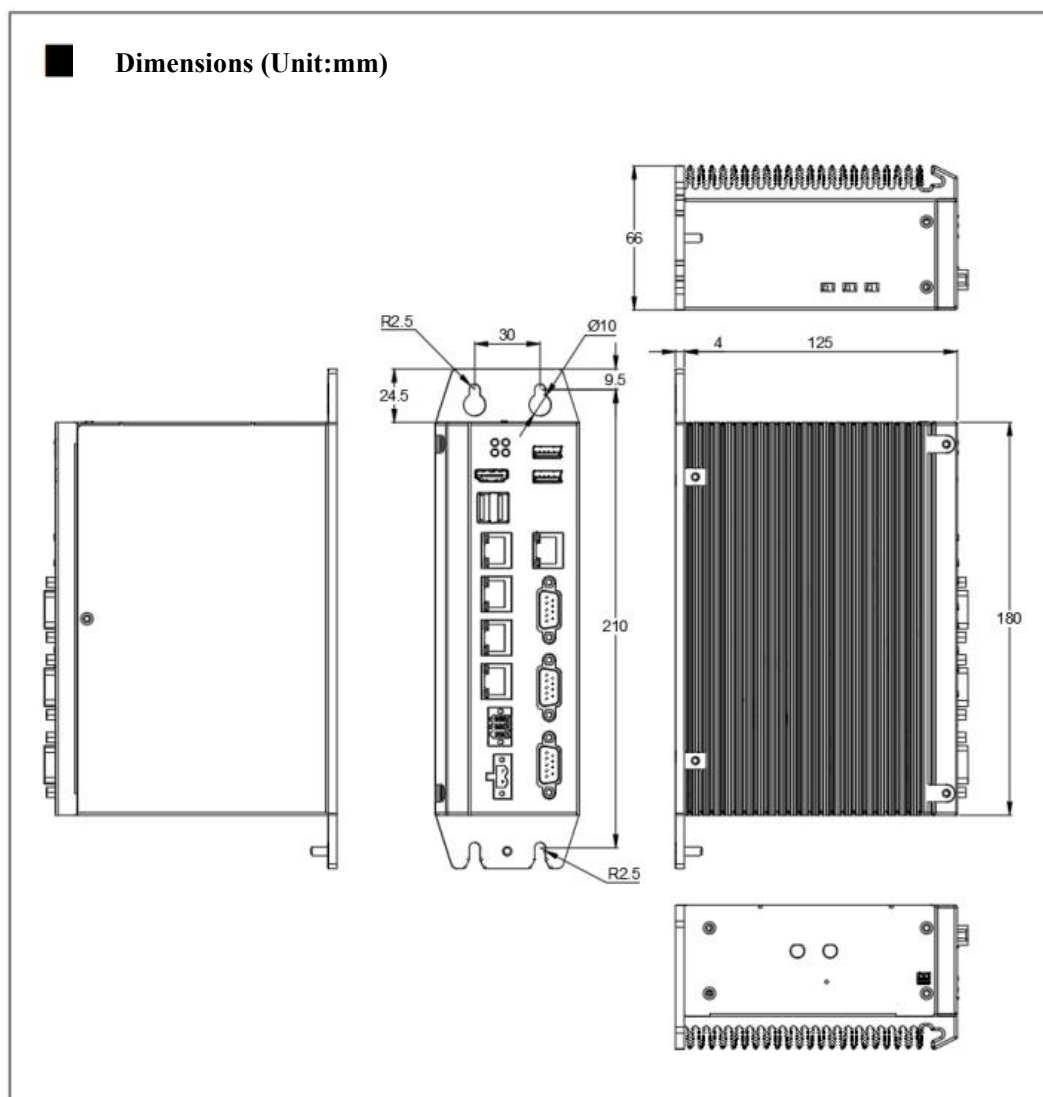


Figure 4.2 Installation Dimensions (Unit: mm)

Revision History

Date	Version	Description of Changes
20260205	V1.0	Initial release