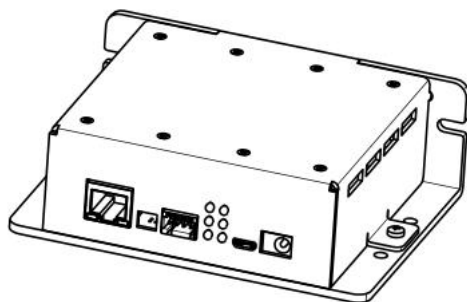


Robot elevator IoT module

E-BOX Product Manual



Statement

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This manual is for user's reference and guidance only, the description may not be exhaustive, if you encounter problems that cannot be solved, please contact our technical support engineers.

This manual will be updated from time to time and the latest user manuals will include the latest content and images without notice.

The contents of this manual are for the user's reference and guidance only, please refer to the actual product. None of the statements made constitute a warranty of any kind.

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Safety instructions

Use warning:

This product is a robot elevator IOT module, which is limited to be installed in the elevator car roof, machine room or elevator shaft, please do not use it in outdoor (such as open balcony), rugged ground (such as stairs) and other environments.

This equipment is not intended for use by persons with poor physical health (including children), sensory or mental abilities, or lack of experience and knowledge, unless supervised by a person in charge of the use of the equipment or instructed in their safety.

The installation and maintenance of this equipment requires professionals to operate, especially for the installation and maintenance of the elevator IOT module installed and maintained in the elevator car roof and shaft for installation and maintenance, the relevant personnel must hold elevator operation documents that can be qualified for elevator electrical installation and maintenance, and enter the elevator shaft for construction and operation according to the safety requirements for elevator installation and maintenance operation.

Non-professionals are not allowed to clean and maintain this product.

Please make sure the elevator is in normal use before use to avoid the robot not being able to use the elevator normally.

Please do not move the fixed elevator IOT module at will. If you need to move it, please contact our staff.

Please clean and maintain the main unit in the off or power-off state.

Please do not hit the elevator IOT module with hardware or sharp objects.

Please do not spill any liquid into the inside of this product.

The robot is an electronic product, please keep it away from fire.

If you need to deliver the product, please make sure the main unit is off and recommend using the original box for packaging.

Please use the product in accordance with the user manual or getting started guide, and the user is responsible for any damage or injury caused by improper use.

Power supply:

Do not use any third party power adapter. Do not disassemble, repair or modify the power adapter without permission.

Manual Introduction

This manual introduces the functional features, installation and usage of the E-BOX elevator IOT module, as well as the matters that need attention in use.

This manual includes the following:

1. Product introduction: Briefly describe the overview, component composition and detailed technical parameters of the elevator IOT module.
2. Operation steps: Introduce the preparation and precautions during the installation and commissioning of the elevator IOT module, and the process of the robot riding the elevator.
3. Appendix: Introduce the applicable site elevator requirements, common failures and safety precautions for elevator IOT modules.
4. After-sales service policy.

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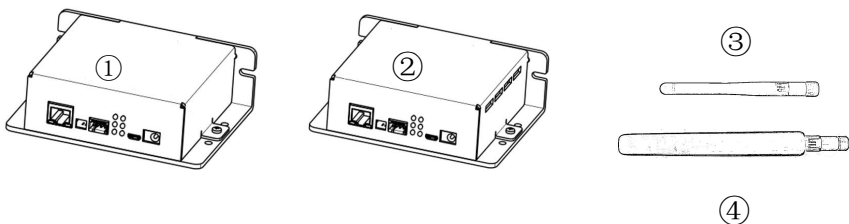
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Product introduction

Product Overview

This product is designed as an elevator control solution terminal for robots moving autonomously in multi-story buildings, and is used in high-grade buildings, such as star hotels, high-grade office buildings, high-grade communities, and high-grade indoor public places. The robot elevator IOT module integrates 4G module for remote communication, LoRa module for local communication, 10M/100M Ethernet interface, standard RS-485 interface, etc., to meet the robot's normal communication with the robot elevator IOT module even in cross-floor scenarios and realize the robot's functions of user guidance and delivery of items. The robotic elevator IOT module can normally respond to the call requests of multiple robots and make the robots reach the target floor accurately. The robot elevator IOT module is independent of various control systems in the building and interfaces with the elevator system through dry contacts or protocols, while adding multiple protection mechanisms to meet the normal operation of the robot in multiple complex scenarios.

Parts List & Introduction



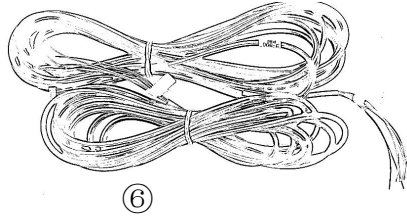
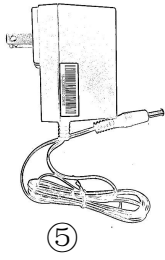


Figure 1 Illustration of product component composition

No.	Parts	Mounting position	number	Remarks
①	E-BOX Master	Elevator machine room (when there is a machine room elevator) Top of the elevator shaft (when there is no machine room elevator)	1	
②	E-BOX Slave	Elevator top	1	
③	4G Antenna	E-BOX Master	1	
④	LoRa Antenna	E-BOX Master & E-BOX Slave	2	
⑤	Power adapter	E-BOX Master 及 E-BOX Slave	2	Adapters may vary due to different standards in each country
⑥	IO Wires and Cables	Connection with elevator control box buttons	2	Select installation as needed

***Tip: The packing list may vary from batch to batch, please refer to the actual product.**

Product Basic Parameters

Model	E-BOX
Size	128*110*41mm
Nominal voltage	DC12V
Max. operating current	0.75A
Max. power consumption	9W
Network Interface	2G/3G/4G/RJ45

Working temperature and humidity	-10-50℃：RH:5%～85%， No dust
Storage temp.	-30℃-60℃
Work Environment	Installation site altitude not exceeding 1000m
Input power	100-240V， 50/60Hz
IOT Support	<p>Robot: support communication with our own robot and realize elevator ride</p> <p>Robot elevator floor position detection module: communicates with the floor position detection module to obtain real-time elevator operating floor position</p>
Sensors	Accelerometer

Product Interface Introduction

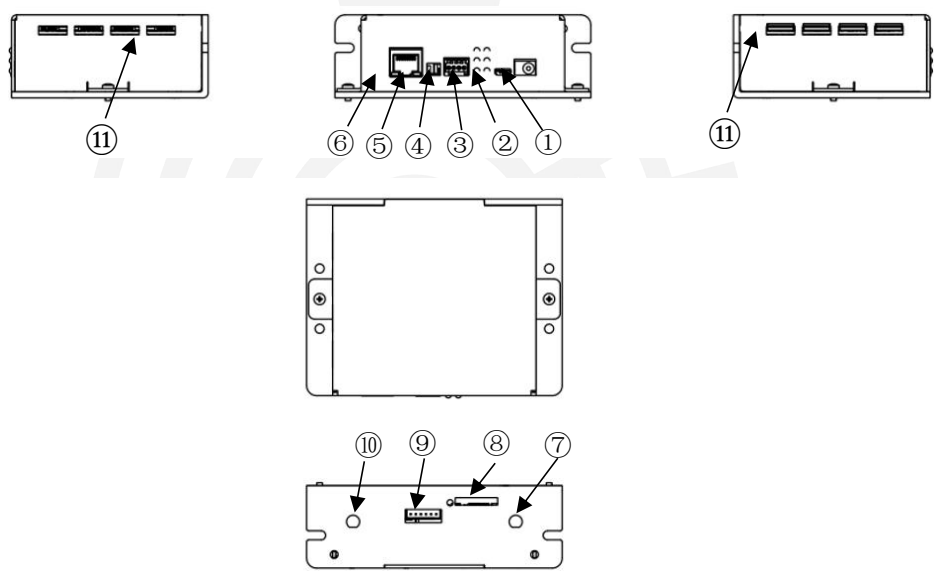


Figure 2 Schematic diagram of robot elevator IOT module interface

Note: The projection view in Figure 2 is the first view.

No.	Name of interface	Description	Remarks
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①	Power supply	12V adapter power connector	
②	Micro USB Interface	CONFIG File Configuration Interface	
③	Status Light	Working status	See Figure 3 for more details
④	RFID Interface	Connection to the robot elevator floor position detection module	Only the Slave module needs to be connected
⑤	485 Interface	For connection with other devices	
⑥	RJ45 Ethernet port	Internet via wired connection	Only the Master module needs to be connected
⑦	LoRa Interface	Connect LoRa antennas	
⑧	SIM card slot	Install the SIM card	Only the Master module needs to be connected
⑨	Debugging Interface	Equipment commissioning	
⑩	4G antenna interface	Connect 4G antenna	Only the Master module needs to be connected
⑪	Button IO interface	For connecting elevator buttons	Available for Slave module only Optional installation as needed

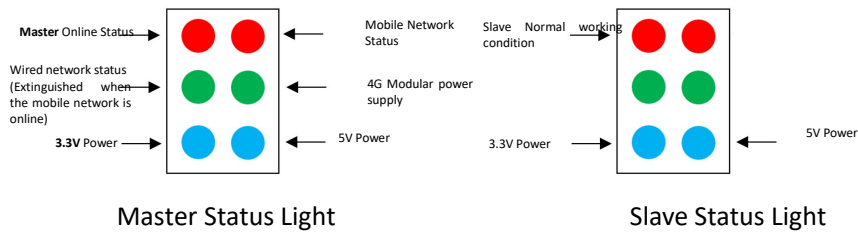


Figure 3 E-BOX status light and function description

Operation steps (using the elevator IOT module)

Follow the steps below to get started with your Elevator IoT module.

Installation and commissioning

The installation, commissioning and maintenance of this product requires professionals to operate, especially for the installation and maintenance of elevator IOT modules installed and maintained in the elevator car roof and shaft for installation and maintenance, the relevant personnel must hold elevator operation documents that can carry out elevator electrical installation and maintenance qualifications, and enter the elevator shaft for construction and operation according to the safety requirements for elevator installation and maintenance operations.

Please refer to the Robotic Ride Construction Plan provided by Keenon for specific installation construction steps and requirements.

Please refer to the QL-SOP-W3-A5 provided by Keenon for specific tuning procedures and requirements.

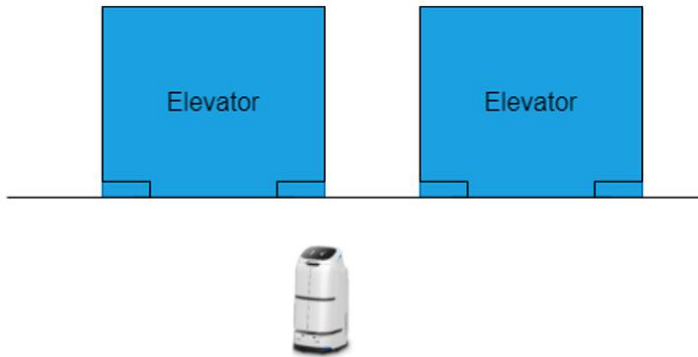
Robotic Elevator Process

After the safety commissioning of this product is completed, the robot can be connected to this product IOT to realize the ride elevator function, and the

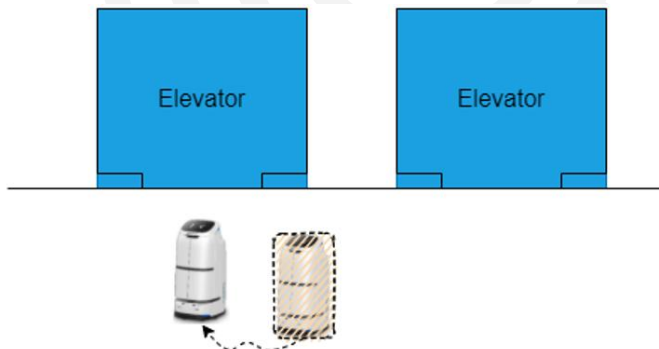
specific ride elevator process is shown below.

1. Call the elevator

- The robot travels to the queue point outside the elevator door and stops, and calls the elevator by wirelessly communicating with the E-BOX robot elevator IOT module via LoRa or 4G (hereinafter simplified as "wireless communication").



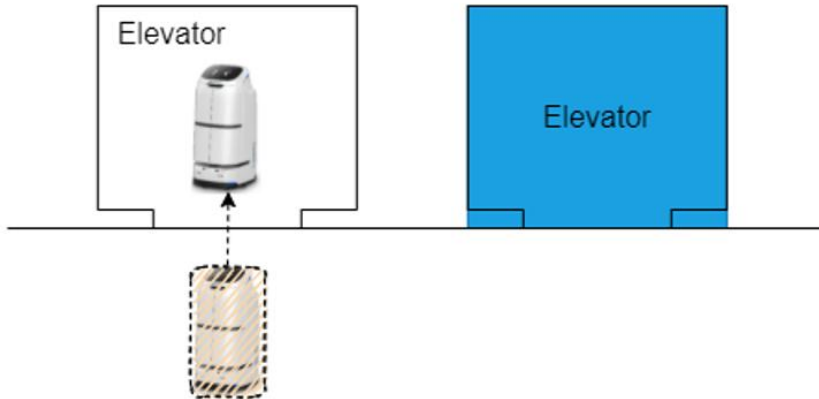
- If the robot elevator IOT module E-BOX responds successfully, the elevator is called to the robot's departure floor by registering the floor button of the manipulator box inside the elevator car. At the same time the robot travels from the queue point to the waiting point for the elevator.



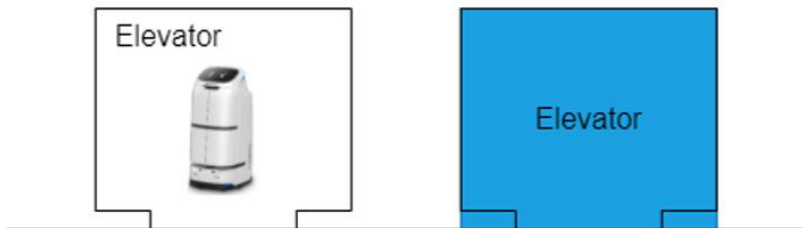
2. Enter the elevator

- After the elevator arrives and opens, the robot communicates wirelessly

with the robotic elevator IOT module E-BOX to request to keep the elevator open; and to identify if there is someone in or out in front of the elevator and if there is enough space for the robot to enter. If it confirms that there is no problem, it travels to the point in the elevator car inside the ladder.



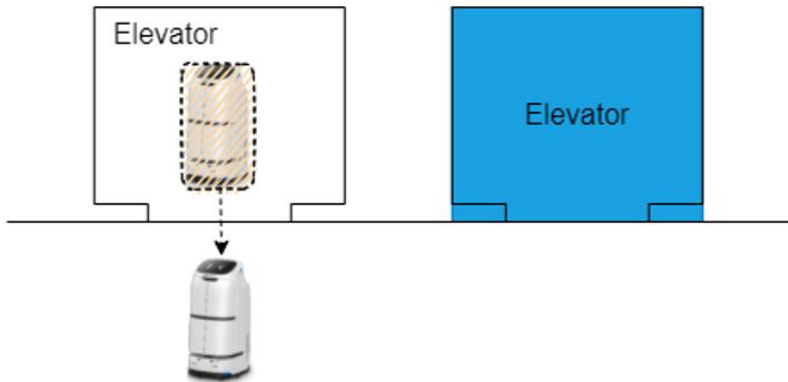
- The robot turns around at the in-ladder point inside the elevator and communicates wirelessly with the robot elevator IOT module E-BOX to control the elevator control box button to register the robot's destination floor and then wait for the elevator to arrive.



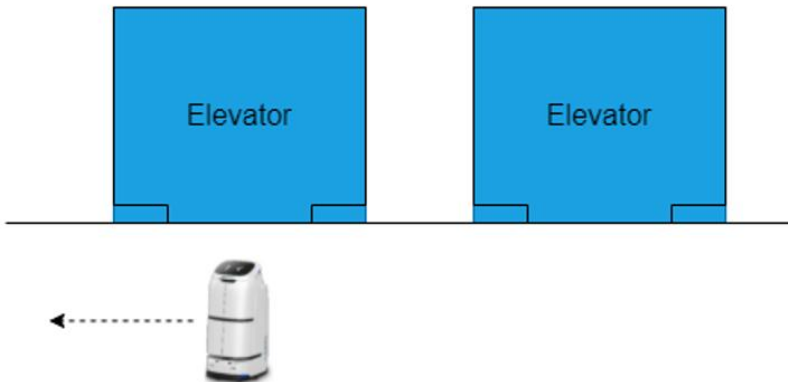
3. Exit the elevator

- After the elevator reaches the destination floor and opens the door, the robot communicates wirelessly with the E-BOX robot elevator IOT module and requests to keep the elevator open; and identifies if there is someone in or out

and if there is enough space in front of the elevator for the robot to exit. If it is confirmed that there is no problem, it exits the elevator car to the exit point.



- The robot communicates wirelessly with the robotic elevator IoT module E-BOX to notify that it is to stop using the elevator and continue with its task.



Appendix

Applicable to the site elevator requirements

The relevant requirements of the site elevator are shown in the following table. For more detailed requirements, please contact the pre-sales personnel of Qing Lang.

Item	Requirements/classification	instructions
Clearance between car floor and floor door floor	$\leq 40\text{mm}$	Standard response
Leveling accuracy	$\leq 5\text{mm}$	Communicate with elevator maintenance to adjust when overrun
Mandatory closing time	$\geq 30\text{s}$	Need to confirm with Keenon if not met
Number of layers stopped	≤ 28 floors	Standard response
	29~55 floors	Confirm with Keenon Technology
Control box button type	mechanical button	Standard response
	touch button	Confirm with Keenon Technology
	touchscreens	Confirm with Keenon Technology
Floor button pinning mechanism	None/Double click/Reverse	Standard response
	click on	Need to contact the elevator manufacturer to cancel
reader	Third party retrofitting	Confirm with Keenon Technology
	Elevator original	Confirm with Keenon Technology

What the client needs to prepare

Location	Rquest	Quantities
elevator machine room ¹	100-240V, 50/60Hz power outlet	1
	Network cable with access to external network (5m)	1
	5m Power Strip	1
elevator car roof	5m Power Strip	1

Note 1: In the case of machine-roomless elevators, the relevant requirement is to ensure that they are set at the top of the elevator shaft.

Exception List and Troubleshooting

Fault Phenomenon	Possible causes and solutions
Robot elevator IOT module status light not on	<ol style="list-style-type: none"> 1. The power supply is not connected properly, please check whether the power supply of the power outlet is normal 2. Please check the adapter connector for looseness
Master wired network status light not on	<ol style="list-style-type: none"> 1. The mobile network status light is always on, this situation is normal 2. Mobile network status is not lit, please check whether the network cable has network. If the network cable has internet access, you need to check whether the network input adds whitelist MAC address information
Master online status light not on	<ol style="list-style-type: none"> 1. Indicates that Master is not successfully connected to DynaSky Cloud 2. Please check if either the wired network status light or the mobile network status light is on 3. Check the Ethernet and 4G antenna interface for looseness, you can try to re-plug the interface. 4. Check if 4G SIM is installed and activated in the background

After-sales service policy.

Keenon Robotics Co., Ltd. and its authorized distributors sell products under the principle of "who sells, who is responsible". This after-sales service policy only applies to products sold in the People's Republic of China (except Hong Kong, Macau and Taiwan).

1. Free Warranty Service

From the date of sale, we will provide free warranty service during the effective warranty period (the warranty period varies for different parts of the product, please refer to the "Warranty Period for Major Parts"). If the warranty period is exceeded or the warranty service is not met, we will charge a fee with reference to the market price, please contact our after-sales service hotline: 4009651808 for product maintenance.

(1) Warranty Service Coverage

Keenon provides free warranty service for performance failures of the product within the warranty period where no exceptions to the free warranty service exist.

(2) Exceptions to free warranty service

1. Damage to the product caused by negligence, fault, misuse or disaster (e.g. staining by food liquids, water ingress into the product, external shocks, scratches and damage to peripheral components, etc.).

2. Damage caused by failure to use the product properly in accordance with its instruction manual.

3. Damage caused by use in excess of the safe load weight.

4. Reduced performance of expendable components (gimbals, power adapters) due to normal wear and tear.

5. Damage caused by exposure to moisture, extreme temperatures or other extreme environments.

6. Damage caused by crashes, fires, floods or other external causes.

7. cosmetic damage, including but not limited to scratches or other physical damage to the surface of the product.

8. Unable to provide legitimate formal channel purchase vouchers or documents, or forge or alter documents, etc., or provide sales vouchers or product purchase vouchers with contents that do not match the product.

9. Other cases not expressly provided for but comparable to the above-mentioned acts.

(3) Free Warranty Service Team

Keenon technical support team will provide after-sales service to customers through remote technical guidance or on-site service.

2. Return Policy

(1) Return conditions

The customer has the right to submit a return request within 7 natural days (return period) from the date of receipt of the product, and the return procedure will be processed after review by Keenon.

(2) Keenon reserves the right to refuse a customer's return request if the following circumstances occur

(1) Requests for return of products after the return period of 7 natural days (calculated from the date of receipt).

(2) Returned products with cosmetic defects affecting secondary sales, missing and damaged outer packaging, accessories, gifts, manuals and other accompanying parts.

(3) (a) Inability to provide legal formal channel purchase vouchers or documents at the time of return, or forgery or alteration of documents, etc., or the contents recorded in the sales voucher or product purchase voucher provided do not correspond to the product.

(4) Tearing, altering labels, machine serial numbers, waterproof markings, security markings, etc..

(5) Other cases not expressly provided for, but comparable to the above-mentioned acts.

3. Exchange Policy

(1) exchange terms

If the customer receives the product within 30 natural days (the exchange period), and the product fails to operate normally after repair by Keenon's technical support team, Keenon will handle the exchange procedure after audit.

(2) Keenon reserves the right to refuse a customer's request for exchange in the following cases

(1) (a) A request for exchange of products after the expiry of 30 natural days from the date of receipt of the product.

(2) (a) The replacement product is defective in appearance and affects secondary sales, and the outer packaging, accessories, gifts, manuals and other accompanying parts are missing and destroyed.

(3) (a) Inability to provide legal formal channel purchase vouchers or documents at the time of exchange, or forgery or alteration of documents, etc., or the contents recorded in the sales vouchers or product purchase vouchers provided do not correspond to the products.

(4) Damage caused by crashes, fires, floods or other external causes.

(5) Other cases not expressly provided for, but comparable to the above-mentioned acts.