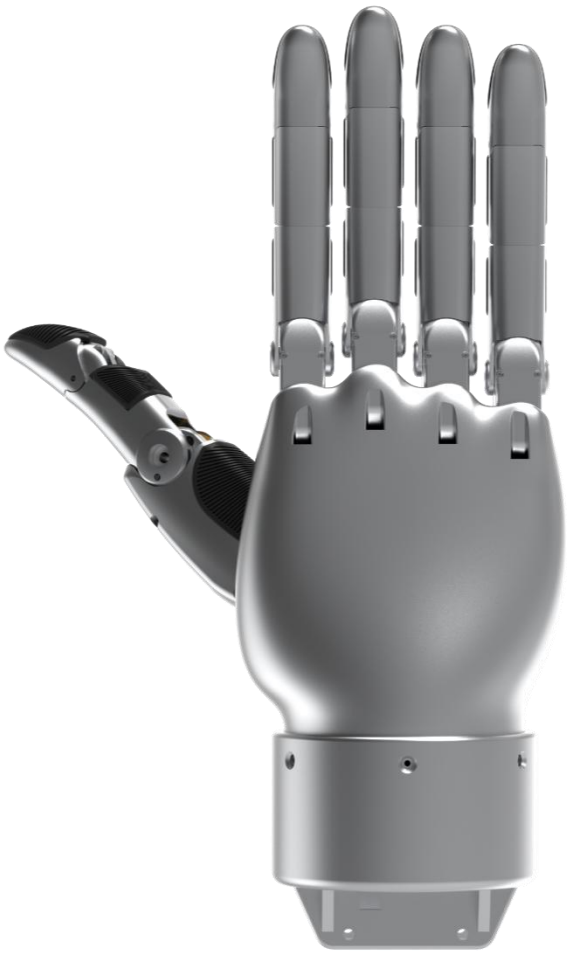
灵心巧手
LINKERBOT

Linker Hand O7B
Produce Manual



Linkerbot Beijing Technology co., Ltd

Version revision record

Version	Change date	Change description
V1.0	2025.09.11	Linker Hand O7B First edition

Safety Instructions

Before installing or using this product, please read this manual and related manuals carefully. Be sure to read the relevant descriptions for the safety matters outlined in the manuals.

1. Ensure that this product is connected using the provided or specified cables, and properly secure the product in accordance with regulations. Do not use damaged power cords, plugs, or loose sockets.

2. This product must comply with the installation requirements described in this manual. Using the product beyond the specified installation requirements may shorten the product's service life and could cause serious safety issues.

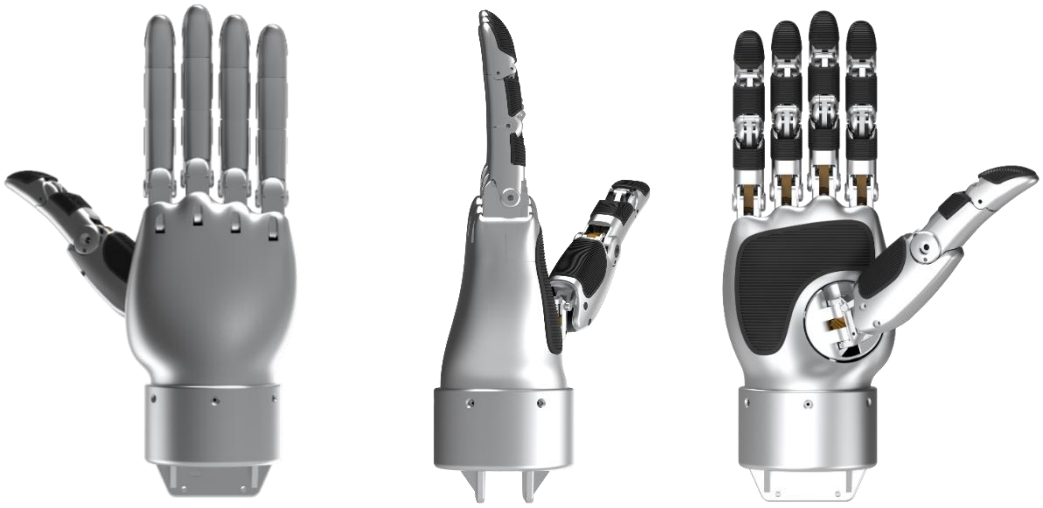
3. If this product operates at high power for an extended period, its temperature will rise. If the temperature becomes excessively high, stop operation and allow the product to cool down for a period of time before using it again.

4. This equipment can only be used by trained personnel. Do not open the housing or disassemble the equipment without authorization. If the equipment malfunctions, do not attempt to repair it yourself; please contact our after-sales service department.

5. The diagrams and photos in this manual are representative examples and may differ in details from the purchased product. Additionally, this manual may be revised appropriately due to product improvements, specification changes, or other reasons.

Table of Contents

1 Product Introduction



Product Appearance Diagram

Linker Hand O7B is a high-precision bionic dexterous hand launched by Linker Bot in response to market demands. Driven by self-developed joint motor modules and integrated with worm gear transmission, it achieves a dexterous hand design with 7 degrees of freedom (DoF) and 17 joints (7 active joints + 10 passive joints), featuring high load capacity, precise control, a compact structure, and efficient transmission.

1) High Load Capacity

The O7B boasts excellent load capacity, with a maximum five-finger grip force of 60N and a maximum fingertip force of 14N for both the thumb and the other four fingers.This level of force allows it to stably grasp and manipulate objects of various weights, making it suitable for multi-task scenarios ranging from precision assembly to light industrial operations.

Its high load capacity benefits from the advanced worm gear transmission design. This structure not only provides strong output torque but also has excellent self-locking features, ensuring stability and safety under load.

2) Precise Control

Precise control is reflected in its high repetitive positioning accuracy (less than ±0.2mm) and advanced control system. It supports CAN and RS485 industrial bus interfaces with a communication rate of up to 1MHz, ensuring high-speed, stable transmission of commands and real-time response. Combined with its hybrid force-position control algorithm, the dexterous hand can simulate the fine operations of human hands, such as precise grasping and flexible pinching, making it suitable for scientific research and industrial scenarios that require high-precision operations.

3) Compact Structure & Efficient Transmission

The O7B adopts worm gear transmission, featuring a compact structure, large transmission ratio, good self-locking performance (prevents reversal under specific conditions), and stable operation. This allows the dexterous hand to minimize its size and weight (634.5g overall) while ensuring output torque and precision. The configuration of 7 active joints plus 10 passive joints not only enables complex movements and adaptive grasping but also balances control complexity and cost.

1.1 Product Functions

1.1.1 Position Control

It can precisely control the spatial position of the entire hand and each finger joint, and smoothly execute preset trajectory movements. This ensures operational accuracy from overall movements to single-joint fine-tuning, meeting scenarios with high position accuracy requirements such as precision assembly and path-based operations.

1.1.2 Speed Control

It can flexibly adjust the finger movement speed according to task requirements, accurately adapting to different operation rhythms—high-speed mode improves efficiency, while low-speed mode ensures the safety of fine operations. This effectively balances operation efficiency and operational safety, adapting to diverse

task scenarios.

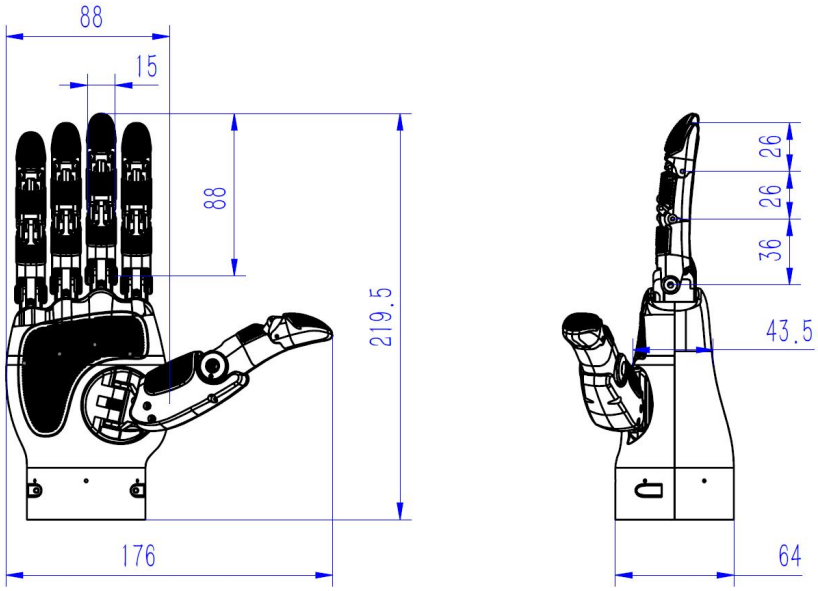
1.1.3 Tactile Feedback (Force Control)

With the help of fingertip sensors, it can real-time sense and precisely control the force and torque exerted by the fingers, and dynamically adjust the output force. This not only prevents damage to fragile objects due to excessive force but also avoids object slipping caused by insufficient force, providing reliable force control support for fine operations such as screw tightening and thin sheet grasping.

1.1.4 Online Upgrade

It supports online updates of the dexterous hand system firmware via a host computer, enabling continuous iteration of functional modules and optimization of core performance parameters. This adapts to industrial scenarios and scientific research needs that require long-term upgrades and iterations, ensuring the equipment remains in a high-efficiency operating state for a long time.

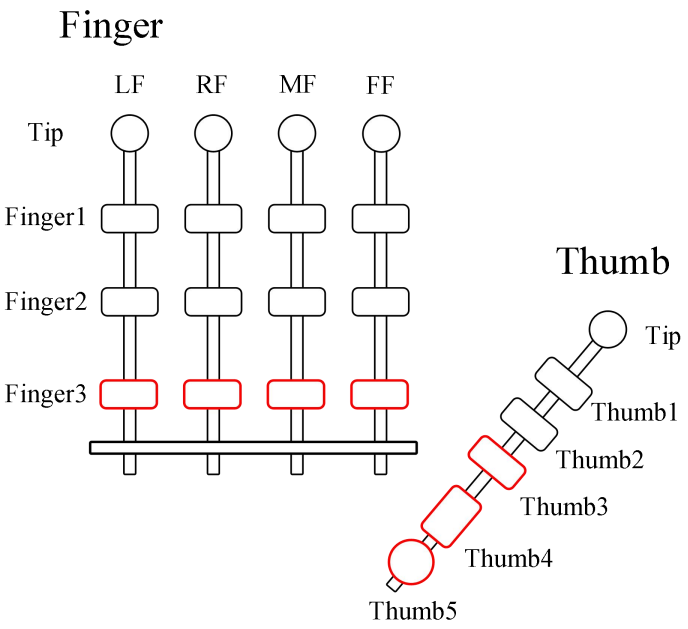
1.2 Appearance Dimensions



Appearance Dimension Diagram (Unit: mm)

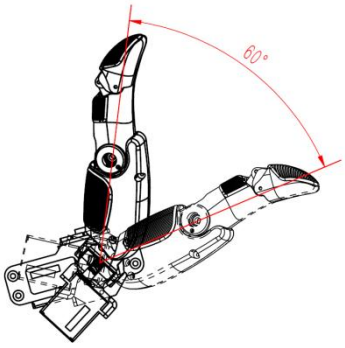
1.3 Degrees of Freedom and Motion Range

This product has a total of 7 degrees of freedom (DoF) and 17 joints, including 7 active joints and 10 passive joints, as shown in the figure below.

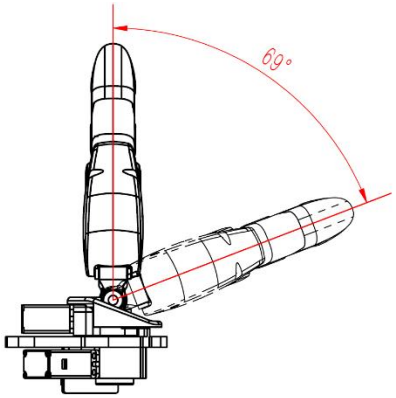


Joint Degrees of Freedom Diagram

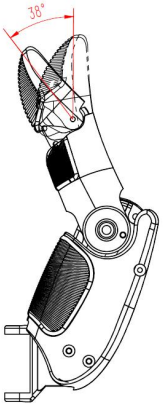
The following is the maximum structural movement range of this product. The actual controlled movement range will be limited to prevent structural collision, so the actual movement range may be smaller than the following range.



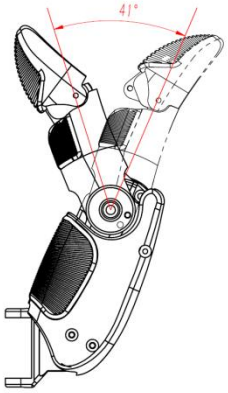
Thumb Rotation Angle Schematic Diagram



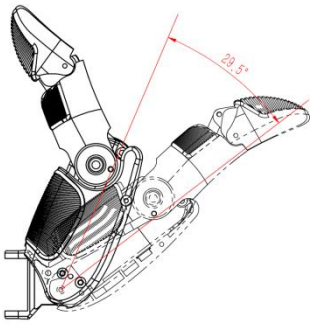
Thumb Side-Swing Angle Schematic Diagram



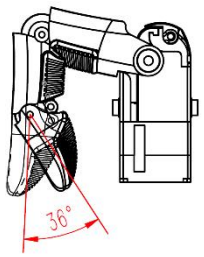
Thumb Joint 1 Flexion Angle Schematic Diagram



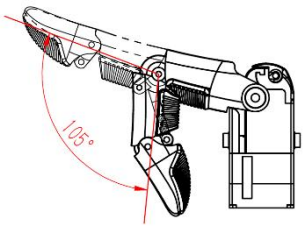
Thumb Joint 2 Flexion Angle Schematic Diagram



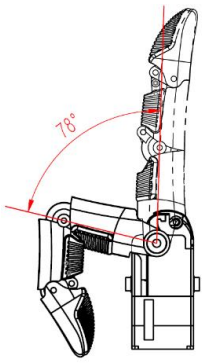
Thumb Joint 3 Flexion Angle Schematic Diagram



Four Fingers Joint 1 Flexion Angle Schematic Diagram



Four Fingers Joint 2 Flexion Angle Schematic Diagram



Four Fingers Joint 3 Flexion Angle Schematic Diagram

The table below shows the actually controlled motion angles and motion speeds of this product

Joints	Maximum Motion Angle (°)	Maximum Motion Speed (°/s)
THUMB1（Flexion）	37.9	36.8
THUMB2（Flexion）	38.4	37.28
THUMB3（Flexion）	27.9	27.09
THUMB4（Lateral Swing）	69	61.61
THUMB5（Rotation）	60	62.5
LF3、RF3、MF3、FF3（Flexion）	34.7	28.92
LF2、RF2、MF2、FF2（Flexion）	102.7	85.58
LF1、RF1、MF1、FF1（Flexion）	76.1	63.42

1.5 Product Parameters

1.5.1 Basic Parameters

Model	Linker hand O7B
Degrees of Freedom (DoF)	7
Number of Joints	17 (7 active + 10 passive)

Transmission Method	Worm Gear Transmission
Control Interface	CAN/RS485
Weight	634.5g
Maximum Load	25kg
Operating Voltage	DC24V±10%
Static Current	0.2A
Average Current during No-Load Motion	0.7A
Maximum Current	2.6A
Repetitive Positioning Accuracy	< ±0.2mm
Opening and Closing Time	1.25s

1.5.2 Force Performance Parameters

Performance Indicator	Specific Parameter
Maximum Fingertip Force of Thumb	14N
Maximum Fingertip Force of Four Fingers	14N
Maximum Grip Force of Five Fingers	60N

1.6 Sensor System

1.6.1 Tactile Sensors

Linker Hand O7B is equipped with fingertip sensors, which can predict and detect the presence and distance of objects; upon contact, it can accurately capture three-dimensional forces and recognize changes in surface texture and temperature.

1) Pressure-Sensitive Sensors

Parameters	Specifications
Piezoresistive Array	6*12
Sensor Force-Bearing Area	9.6*14.4mm
Trigger Force	5g

Measurement Range	20N
Service Life	100,000 Cycles
Communication Frame Rate	200FPS

2) Capacitive Sensors (Optional)

Parameters	Specifications
Sampling Frequency	≥50Hz
Measurement Range	0-30N
Overload Limit	60N
Pressure Sensitivity	0.1N
Measurement Resolution	0.5%FS
Measurement Accuracy	2%FS
Pressure Resolution	0.25N
Directional Resolution	45°
Detection Distance	1cm (for metals, human body)

1.6.2 Visual-Tactile Perception (Optional)

The visual-tactile perception mode essentially integrates visual perception and large deep learning model technology. The principle of this solution is as follows: High-precision cameras capture the deformation of variable flexible materials; when the material is subjected to force, its surface grid undergoes morphological changes, and micro binocular cameras record this deformation process in real time. Then, with the help of a trained large deep learning model, it accurately maps the depth information and motion trends of the object.

2 Installation and Commissioning

2.1 Accessories List

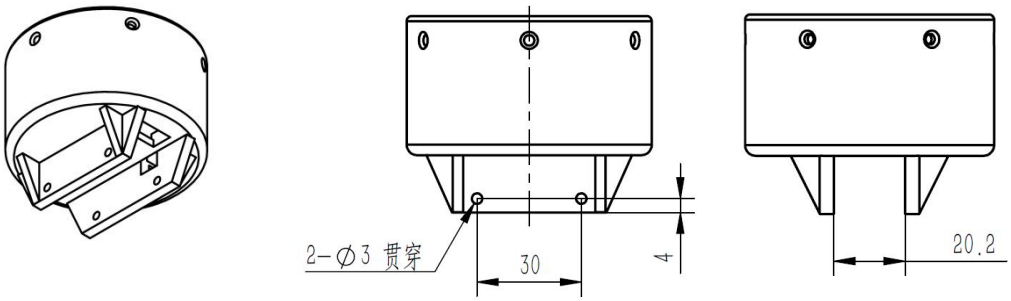
Before installing the dexterous hand, first check whether the accessories are complete.

No.	Name	Quantity	Image
1	USB-to-CAN Debug Cable	1	
2	XT30 Connector Cable (2+2)	1	
3	Power Adapter	1	
4	Power Cable	1	

2.2 Installation Instructions

1) Structural Installation Instructions

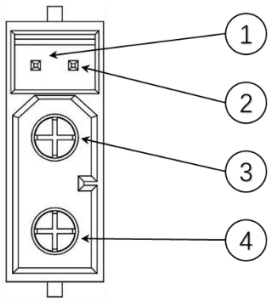
M3 screws are required for installation, with the specific length adjusted according to the thickness of the fixing part. The flange installation diagram is shown below.



Flange Installation Diagram

2) Electrical Installation Instructions

The dexterous hand uses an XT30 connector (2+2), and its wire sequence is shown in the table below.



Wire Sequence	Description
1	CAN L
2	CAN H
3	GND
4	24V

2.3 Software Debugging Introduction

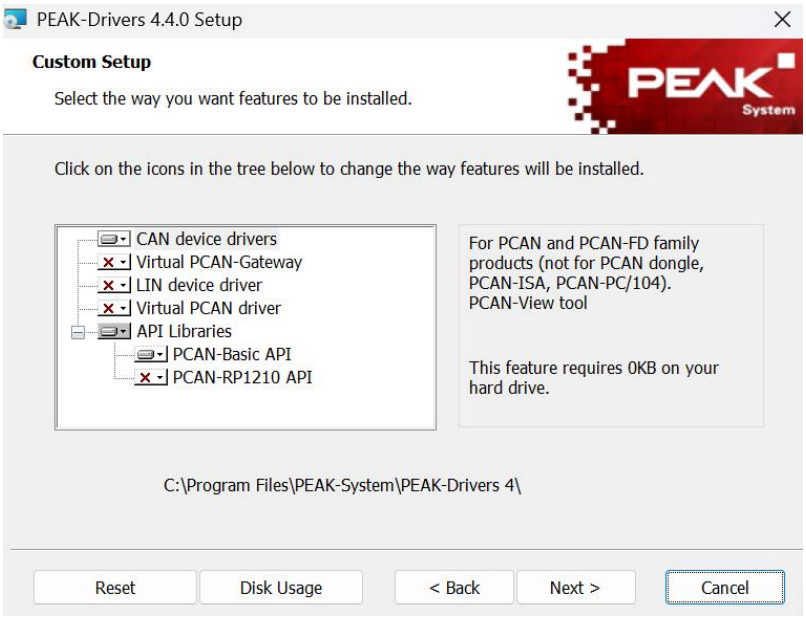
2.3.1 Debugging Preparation Work

1) Debug Cable Connection

Use the USB-to-CAN Debug Cable to connect the dexterous hand to the debugging PC. After plugging the power cable into the power adapter, connect it to the power port of the USB-to-CAN Debug Cable, and plug the other end (of the power adapter) into the AC 220V power strip;

2) USB-to-CAN Driver Installation

Open the file named PEAK-System_Driver-Setup， Install the driver



files step by step (driver installation is required for Windows systems, while no driver installation is needed for Linux systems). After installing the driver program for the first use, there is no need to reinstall it for subsequent use;

3) Host Computer Software Configuration

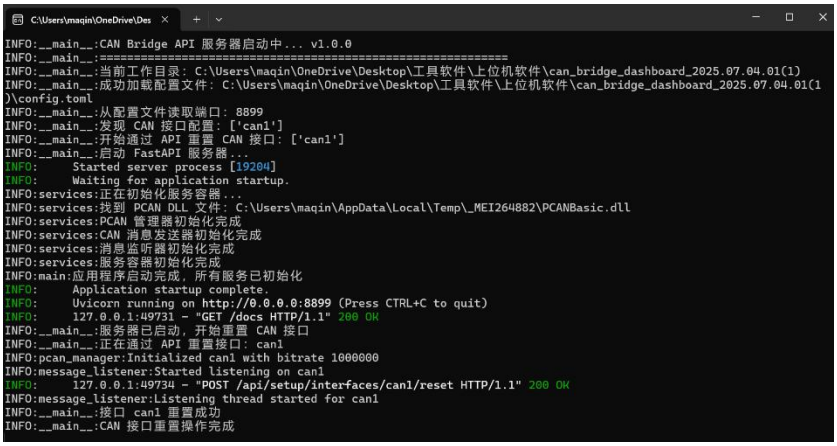
Before launching the program, due to restrictions of the Windows system, we need to update the number of connected CAN devices to the configuration file.

Open the can_bridge_dashboard folder, modify the can_interface field in the config.toml configuration file, and set the value to the number of connected CAN devices. For example: can_interface = ["can1"] # One device # or can_interface = ["can1", "can2"] # Two devices. Save the file

after modification.

4) Start the Adapter Service Program (CAN Bridge)

Double-click to run the can_bridge.exe file: If it runs normally, we will



be able to see the address information of the running service.

If run errors occur, the program will record exceptions in the can_bridge.log file. You can feedback the log content to after-sales engineers to obtain support information.

Due to restrictions of the Windows system, every time we plug or unplug CAN devices, we need to close the previous can-bridge program and restart the program.

5) Start the Console Program for Different Dexterous Hand Devices (Dashboard)

Double-click to run the dashboard.exe file corresponding to the model. And After waiting for the program to finish running, the console program

startup is then completed.

Open http://localhost:9090 in the a browser, and you will be able to access the console normally and control the dexterous hand.

2.3.2 Host Computer Software Description

The main functions of the Linker Hand O7B host computer software include hand configuration management, global control, joint control, preset actions, and status monitoring, etc. The page is shown in the figure below.

1) Hand Configuration Management

As shown in the figure below, you can select the port number, hand type, and model, and view the online/offline status of the dexterous hand

will be displayed.

2) Global Control

The Global control functions include sending all joint poses, Send all palm poses, sending all joint speeds, Reset all hand components,Stop all

Animations,and other functions.

3) Joint Control

In the joint control panel, you can perform joint position control, palm control, global speed control, and global torque control.

4) Preset Actions

In the preset action panel, you can preset actions such as fist-clenching, opening, pinching, and digital gestures. You can also set animations and control them.

5) Status Monitoring

In the status monitoring panel, you can view real-time device logs, hand status, and sensor data, etc.

3 After-Sales Service Terms

1) The product is covered by a 12-month limited warranty from the date of purchase.

2) During the warranty period, we will provide free repair or component replacement for faults caused by manufacturing or material defects.

3) Exclusion Clauses: The following situations are not covered by the warranty:

- Cosmetic wear and tear caused by normal use.
- Damage caused by improper operation, accidents, unauthorized disassembly, or failure to follow the guidelines.

4) No return or exchange will be accepted for non-quality issues.

5) If the product malfunctions in any way, please contact the official after-sales service immediately and do not disassemble it by yourself.

6) Corresponding fees will be charged for repairs outside the warranty period.

Appendix

SDK Acquisition Path：https://github.com/linker-bot/linkerhand-ros-sdk

Technical Support Email：support@linkerbot.cn

For more product information, please visit the company's official website:

https://linkerbot.cn

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