灵心巧手
LINKERBOT

Linker Hand L10B
Product Manual



Linkerbot Beijing Technology co., Ltd

Version revision record

Version	Change date	Change description
V1.0	2025.09.11	Linker Hand L10B 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.

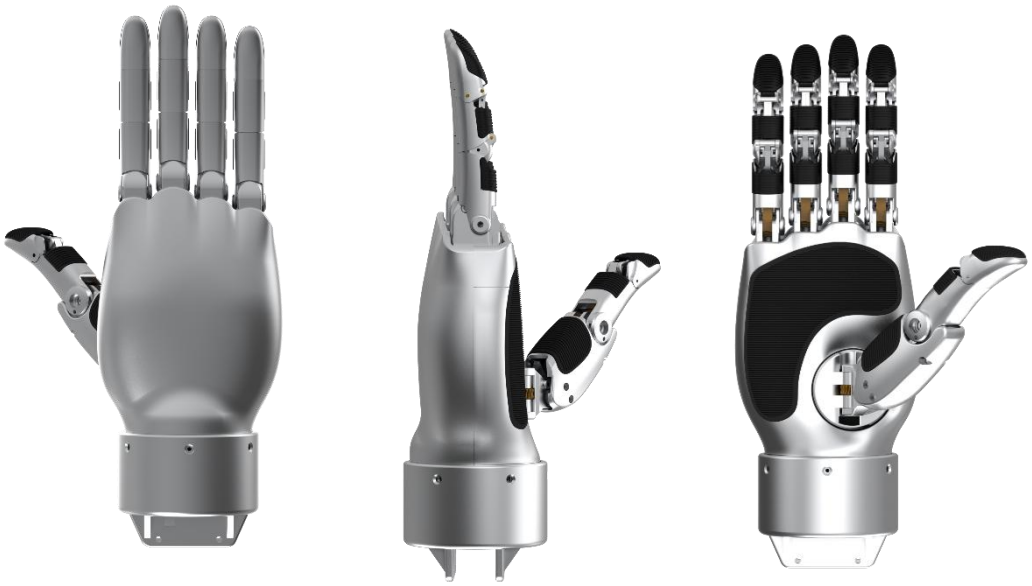
4. This equipment can only be used by trained personnel. Do not open the housing or disassemble the equipment without authorization. If the equipment malfunctions, do not attempt to repair it yourself; please contact our after-sales service department.

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.

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1 Product Introduction



Product Appearance Diagram

Linker Hand L10B is a high-precision bionic manipulator launched by Linker Bot Company in response to market demands. Driven by self-developed joint motor modules and combined with worm gear transmission, it achieves a high-degree-of-freedom dexterous hand design with 10 Degrees of Freedom (DoF) and 20 joints (10 active joints + 10 passive joints). It features high load capacity, precise control, compact structure and efficient transmission.

1) High Load Capacity

The L10 has excellent load performance: the maximum grasping force of its five fingers can reach 80N, and the maximum fingertip force of both the thumb and the four fingers reaches 15N. This force level enables it to stably grasp and operate objects of various weights, adapting to 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 performance, ensuring stability and safety under load.

2) Precise Control

Precise control is reflected in its high repeat 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 800kHz, ensuring high-speed, stable transmission of commands and real-time response. Combined with its force-position hybrid control algorithm, the dexterous hand can simulate the fine operations of a human hand, such as precise grasping and flexible pinching, making it suitable for scientific research and industrial scenarios requiring high-precision operations.

3) Compact Structure & Efficient Transmission

The L10B adopts worm gear transmission, featuring a compact structure, large transmission ratio, good self-locking performance (preventing reversal under specific conditions) and stable operation. This allows the dexterous hand to control its size and weight to the greatest extent (total weight of 800g) while ensuring output torque and accuracy. Its configuration of 10 active joints plus 10 passive joints enables complex movements and adaptive grasping.

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 adjustments, meeting scenarios with high position accuracy requirements such as precision assembly and path-based operations.

1.1.2 Speed Control

The finger movement speed can be flexibly adjusted according to task requirements to accurately match different operation rhythms—high-speed mode improves efficiency, while low-speed mode ensures the safety of fine operations. This effectively balances operation efficiency and safety, making it suitable for diverse task scenarios.

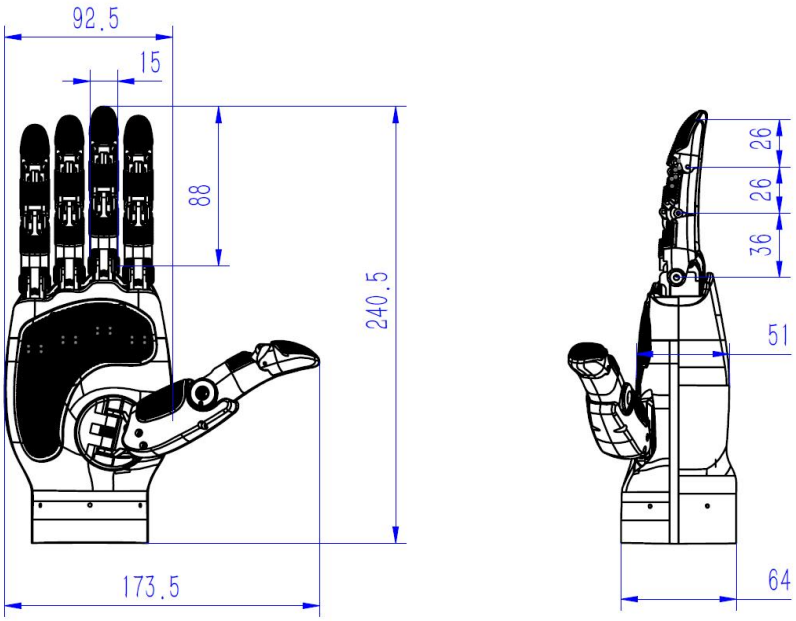
1.1.3 Haptic Feedback (Force Control)

With the help of fingertip sensors, it can real-time detect and precisely control the force and torque applied by the fingers, and dynamically adjust the output force: it not only prevents damage to fragile objects due to excessive force but also avoids object slippage 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 the host computer, enabling continuous iteration of functional modules and optimization of core performance parameters. It is adaptable to industrial scenarios and scientific research needs that require long-term upgrades and iterations, ensuring the equipment operates efficiently for an extended period.

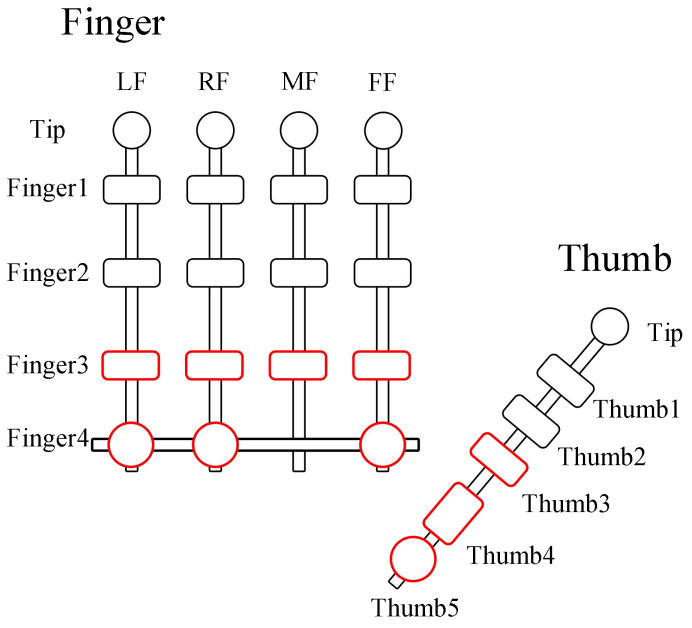
1.2 Appearance Dimensions



Appearance Dimension Drawing (Unit: mm)

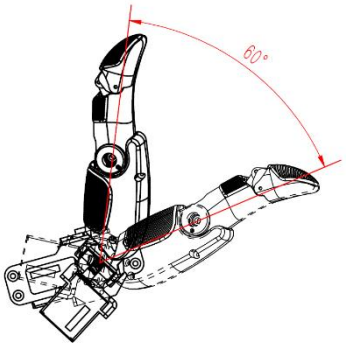
1.3 Degrees of Freedom & Motion Range

This product has a total of 10 Degrees of Freedom (DoF) and 20 joints, including 10 active joints and 10 passive joints. See the following figure for details.

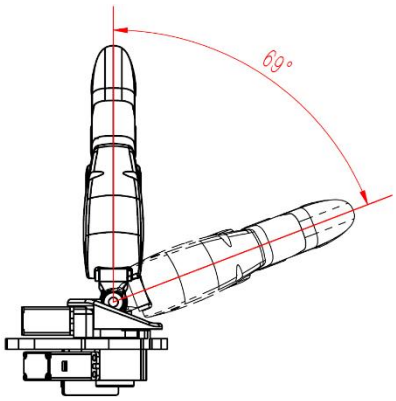


Joint Degrees of Freedom Drawing

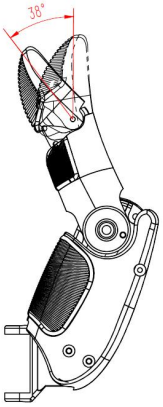
The following is the maximum structural movement range of the product. The actual controlled movement range will be limited to prevent structural collision, so the actual movement range may be smaller than the following range.



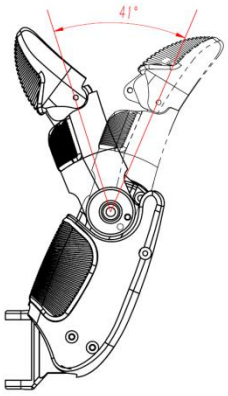
Schematic Diagram of Thumb Rotation Angle



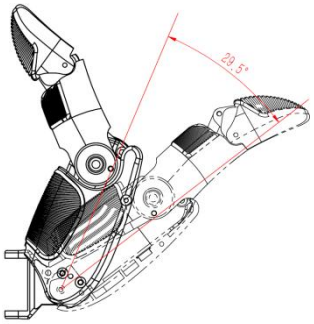
Schematic Diagram of Thumb Side - Swing Angle



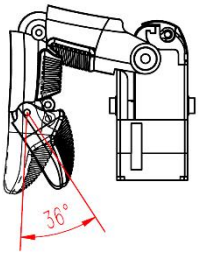
Flexion Angle of the First Thumb Joint



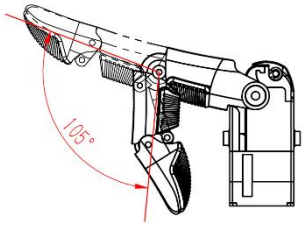
Flexion Angle of the Second Thumb Joint



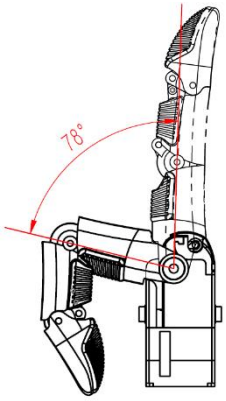
Flexion Angle of the Third Thumb Joint



Flexion Angle of the First Joint of the Four Fingers



Flexion Angle of the Second Joint of the Four Fingers



Full Angle of the Third Joint of the Four Fingers

The following table shows the actual controlled motion angles and motion speeds of this product.

Joints	Maximum Motion Angle (°)	Maximum Motion Speed (°/s)
THUMB1（Flexion）	37.9	63.11
THUMB2（Flexion）	38.4	52.62
THUMB3（Flexion）	27.9	42.78
THUMB4（Lateral Swing）	69	63.21
THUMB5（Rotation）	60	50.9
LF1、RF1、MF1、FF1（Flexion）	35.8	29.11
LF2、RF2、MF2、FF2（Flexion）	102	82.93
LF3、RF3、MF3、FF3（Flexion）	77.9	63.33
FF4（Lateral Swing Toward Thumb）	10.7	84.62
RF4 Side-swing Angle (towards the LF Side)	11.7	44.17
LF4 (towards the lateral side)	17.2	64.93

1.5 Product Parameters

1.5.1 Basic Parameters

Model	Linker hand L10B
Degrees of Freedom (DoF)	10
Number of Joints	20 (10 Active + 10 Passive)
Transmission Method	Worm Gear Transmission
Control Interface	CAN/RS485
Weight	800g
Maximum Load	25kg
Operating Voltage	DC24V±10%
Static Current	0.2A
Average No-Load Operating Current	0.5A
Maximum Current	3A
Repeat Positioning Accuracy	< ±0.2mm
Opening/Closing Time	1.2s

1.5.2 Force Performance Parameters

Performance Indicator	Specific Parameter
Maximum Thumb Fingertip Force	15N
Maximum Four-Finger Fingertip Force	15N
Maximum Five-Finger Grasping Force	80N

1.6 Sensor System

1.6.1 Tactile Sensor

Linker Hand L10 is equipped with fingertip sensors, which can detect and sense the presence and distance of objects; when in contact, it can accurately capture three-dimensional force and identify surface texture and temperature changes.

1) Pressure Sensor

Parameter	Specification
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 Sensor (Optional)

Parameter	Specification
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
Direction Resolution	45°
Detection Distance	1cm（Metal, Human Body）

1.6.2 Visual-Tactile Perception (Optional)

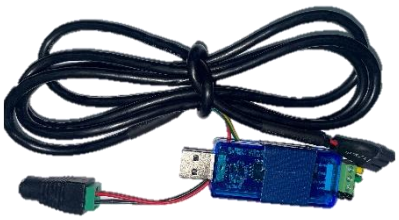
The visual-tactile perception mode essentially integrates visual perception and deep learning large model technology. The principle of this solution is: a high-precision camera captures the deformation of variable flexible materials; when the material is stressed, its surface grid changes shape, and a micro

binocular camera records this deformation process in real-time; then, with the help of a trained deep learning large model, it accurately maps the depth information and movement trend of the object.

2 Installation and Debugging

2.1 Accessories List

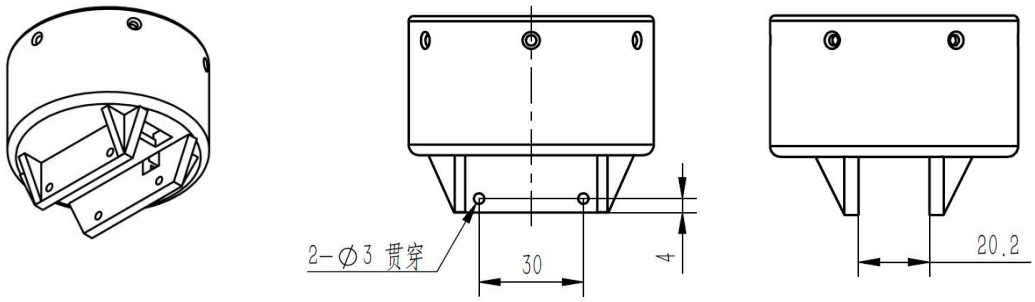
Before installing the dexterous hand, check whether the accessories are complete.

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

2.2 Installation Instructions

2.2.1 Mechanical Installation Instructions

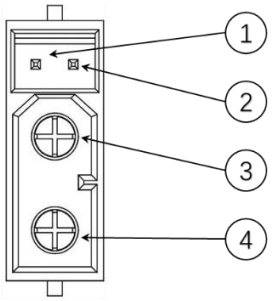
M3 screws are required for installation; the specific length should be adjusted according to the thickness of the fixing part. The installation flange structure diagram is shown below.



Flange Structure Diagram

2.2.2 Electrical Installation Instructions

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



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

2.3 Software Debugging Introduction

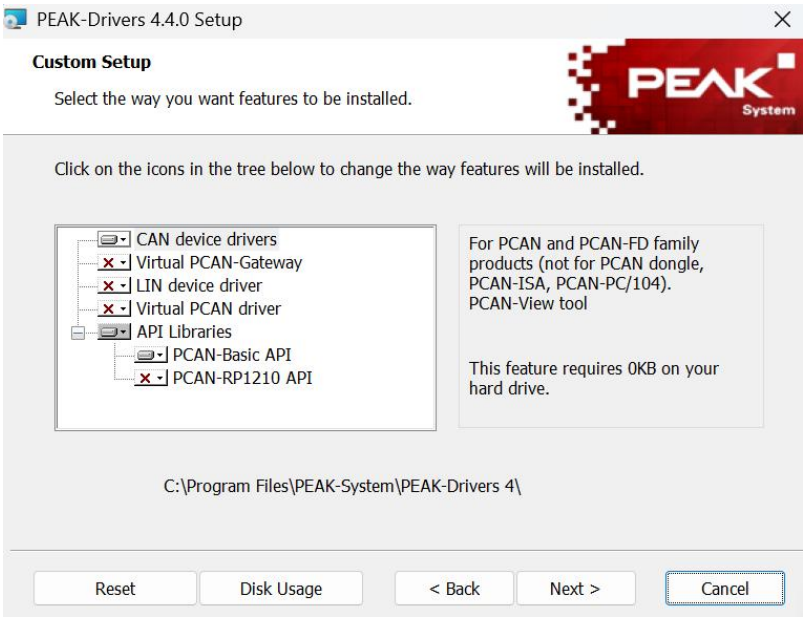
2.3.1 Debugging Preparation

1) Debugging Cable Connection

Use a USB-to-CAN debugging cable to connect the dexterous hand to the debugging PC. Connect the power cable to the power adapter, then plug it into the power port of the USB-to-CAN debugging cable, and plug the other end into an AC220V power strip;

2) USB-to-CAN Driver Installation

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



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

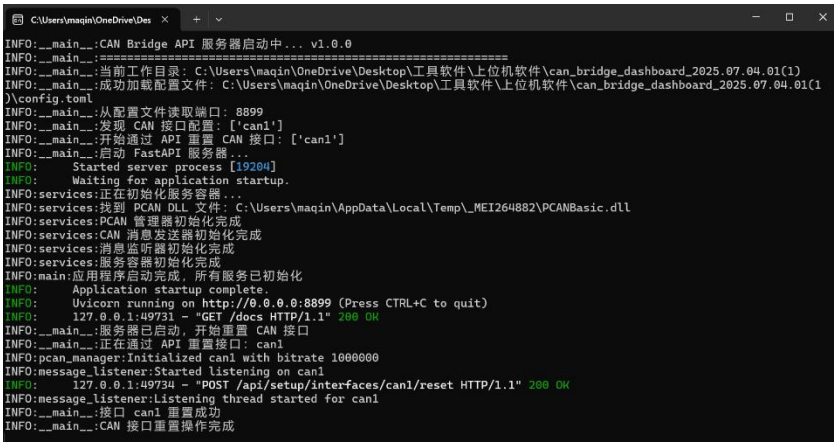
3) Host Computer Software Configuration

Before launching the program, due to the limitations 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 enter the number corresponding to the number of CAN devices. For example: can_interface = ["can1"] # one device# or can_interface = ["can1", "can2"] # two devices. Save 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 a running service.

If a runtime error occurs, the program will record the exception in the can_bridge.log log file. You can feedback the log content to the after-sales engineer to obtain support information.

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

5) Start the console programs 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 a browser, and you will then be able to access the console normally and control the dexterous hand

2.3.2 Host Computer Software

The main functions of the Linker Hand L10 Host Computer Software include Hand Configuration Management, Global Control, Joint Control, Preset



Actions, 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 the online/offline status of the dexterous hand will be



displayed.

2) Global Control

The Global Control functions include Send All Joint Poses, Send All Palm Poses, Send 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 Actions panel, you can preset actions such as making a fist, opening the hand, pinching, and digital gestures. You can also set animations and control the animations.

5) Status Monitoring

In the Status Monitoring panel, you can view the device's real-time 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 additional technical support, please visit the company's official website：

https://linkerbot.cn

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