



# **ROH-AP002 DEXTEROUS HAND USER MANUAL**

**V1.0.0**

OYMotion Technologies Co., Ltd

Address: No.788 Ziping Road, Lane 100, Banxia Road, Shanghai

Tel: +86-21-63210200

Email: [info@oymotion.com](mailto:info@oymotion.com)

## Table of Contents

<b>1. Trademarks and Patents</b>	<b>1</b>
<b>2. Warning and Caution</b>	<b>1</b>
<b>3. Introduction</b>	<b>1</b>
<b>4. Product Model</b>	<b>1</b>
<b>5. Product Main Parts and Size</b>	<b>2</b>
<b>6. Storage, Transportation and Use Environment</b>	<b>3</b>
<b>7. Technical parameters</b>	<b>3</b>
<b>8. Maintenance, Warranty and After-sales Service</b>	<b>5</b>
<b>9. Packing list</b>	<b>6</b>
<b>10. Optional tool package</b>	<b>6</b>
<b>11. Contact Information</b>	<b>8</b>
<b>12. Revision Hisitory</b>	<b>9</b>

## 1. Trademarks and Patents

ROHAND dexterous hand (ROH-AP002) is designed and produced by OYMotion Technologies Co., Ltd with IPs developed by the company. Any other group or individual may not reproduce and transmit any part of this article in any form or by any means (electronic, mechanical, etc.) for any purpose without the written permission from the company.

## 2. Warning and Caution

### **Warning: ROH-AP002 dexterous hand is not waterproof.**

- 2.1. Like all non-waterproof electronic products, the precision electronic circuits, power motors and mechanical structures inside the ROH-AP002 dexterous hand will cause circuit short circuits, rust, and irreversible damage when contaminated by liquid. Users must ensure that no liquid enters the dexterous hand during use, and users must not use the bionic hand in a humid or heavily dusty environment.
- 2.2. The main frame of the ROH-AP002 dexterous hand is composed of high-strength zinc, aluminum alloy and stainless steel, but its load-bearing must be within the design spec. A load that exceeds the design range will bring permanent metal deformation or even fracture, and the internal structure will be permanently damaged. Falling and hitting with heavy objects will also cause damage to the mechanical structure and circuitry of ROH-AP002 dexterous hand.

## 3. Introduction

ROH-AP002 dexterous hand features 11 movable joints, with 6 built-in motor drivers and motor control circuits, providing 6 active degrees of freedom. Equipped with a built-in PID motor control algorithm, it can simulate various human hand grasping operations. Each finger is fitted with a force sensor, enabling real-time monitoring and control of gripping force. Typical applications include robotic end-effectors, educational and research equipment, and bionic prosthetics, etc.

ROH-AP002 dexterous hand with UART, RS485 or CAN FD physical interface, support SerialCtrl dedicated serial protocol, ModBus-RTU protocol and CAN protocol, can provide ROS / ROS2 platforms for secondary development with SDK (a license agreement needs to be signed).

## 4. Product Model

Type	Left/Right	Color	Interface Type	Other Functions
ROH-AP002LB ROH-AP002LB-C	■Left □Right	□Silver	■Integrated cable	■Rubber bumps on finger pads
ROH-AP002RB ROH-AP002RB-C	□Left ■Right	■Black		■Finger touch screen function ■Finger force feedback

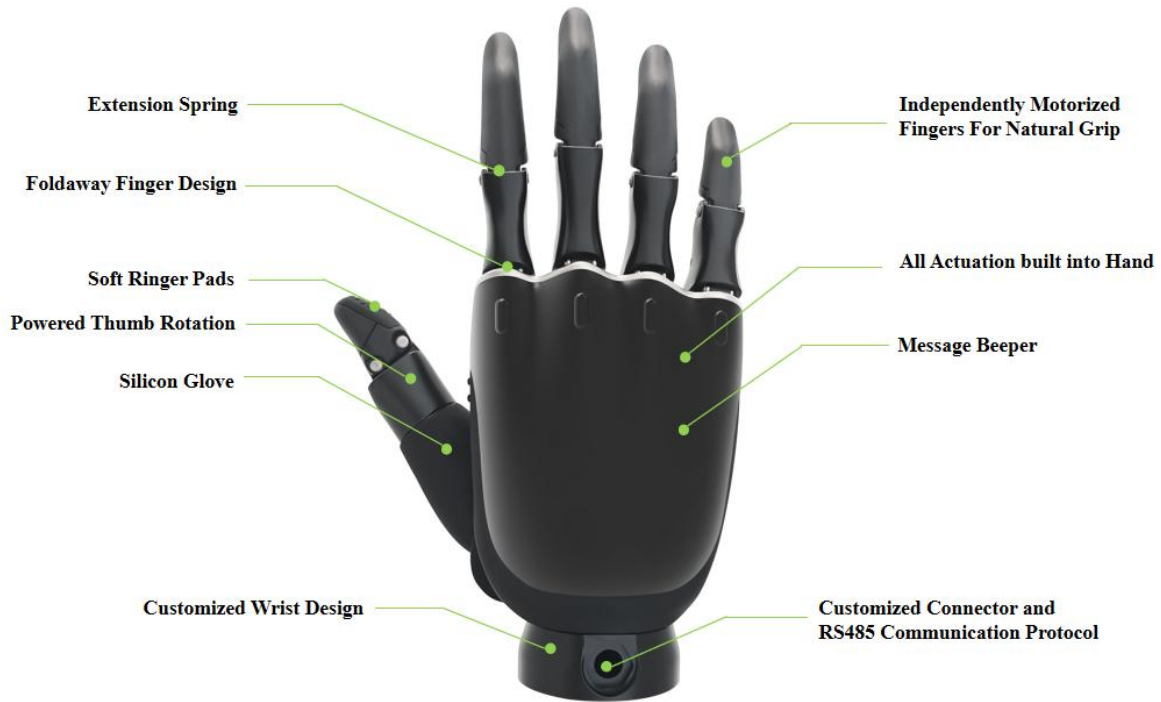
Note: Versions with suffix -C are CAN interface versions.

## 5. Product Main Parts and Size

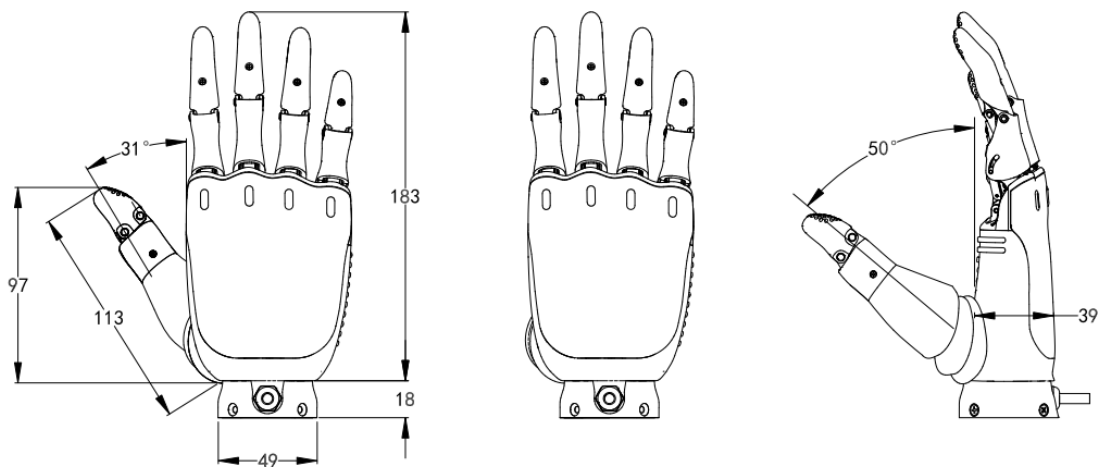
### 5.1. Material

Aluminum alloy, zinc alloy, stainless steel, silicone, plastic.

### 5.2. Structure



### 5.3. Dimensions



ROH-AP002 Dimensions and Angles

Vertical distance from the tip of the middle finger to the wrist	183 mm
Vertical distance from thumb tip to wrist	97 mm
Thumb length	113 mm
Maximum palm width	82 mm
Wrist diameter	49 mm
Maximum opening and closing angle of the thumb side	0~31 Degrees
Maximum opening and closing angle of thumb to palm	0~50 Degrees
Thumb lateral rotation angle	0~90 Degrees
Finger touch screen function	Supported
Finger force feedback	Supported

#### 5.4. Wrist

ROHAND-AP002 provides a variety of wrist designs to choose from and to meet different needs.

## 6. Storage, Transportation and Use Environment

Storage and transportation requirements:	Temperature: -10 degrees Celsius ~ +40 degrees Celsius
Placed in the original packaging box	Humidity: Maximum relative humidity 85%
Working environment	temperature: -10 degrees Celsius ~ +40 degrees Celsius Humidity: Maximum relative humidity 85%
Design service life-span	3 years

## 7. Technical parameters

#### 7.1. Load and speed

Bending/stretching time for full range at maximum speed	0.7 second
Rotation time of thumb for full range at maximum speed	0.7 second
Active force of each finger tip on stretched state	$\geq 0.5$ Kgf
Active force of each finger tip on bended state	$\geq 1.0$ Kgf
Maximum active force of thumb tip	$\geq 1.0$ Kgf
Maximum passive load for four fingers on bended state	30 Kg
Maximum passive load for each fingers on bended state	10 Kg
Maximum passive load for each finger on stretched state	8 Kg

#### 7.2. Weight

Weight (including wrist)	575g $\pm$ 5g
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### 7.3. Power and communication interface

ROH-AP002 dexterous hand adopts DC 12-24V power supply, rated power 48W.

ROH-AP002 dexterous hand supports UART, RS485, CAN interface, various interface parameters are as follows:

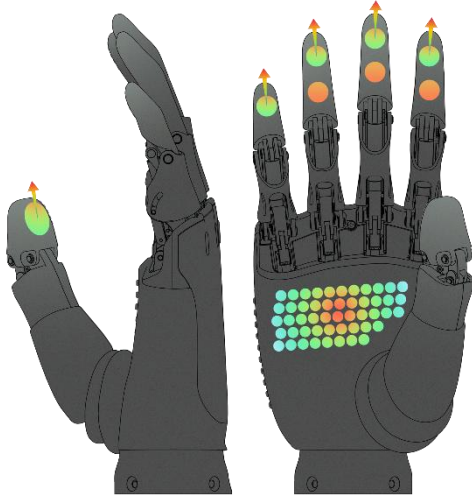
Communication Interface	Baud Rate	Supported Protocol
UART	9600/19200/38400/57600/115200/230400/460800/921600	SerialCtrl ModBus-RTU
RS485	9600/19200/38400/57600/115200/230400/460800	SerialCtrl ModBus-RTU
CAN	1M	SerialCtrl

The ROH-AP002LB/ROH-AP002RB type is equipped with 4-connector XH2.54 terminal blocks with a pitch of 2.54 mm on the PCB, and the connector definitions are as follows.



Pin No.	Signals	Colors
1	Marked "B", the DATA+ / B signal line of the RS485 bus; Marked "H": CAN-H differential signaling line of the CAN bus;	White
2	Marked "A", the DATA- / A signal line of the RS485 bus; Marked "L": CAN-L differential signaling line of the CAN bus;	Brown
3	Marked "-", power ground wire	Black
4	Marked as "+", DC 24V power input, 2A current	Red

#### 7.4. Force sensor



Area	Parameters		
3D Force			
Distal Phalanx & Proximal Phalanx	Frequency	≥50Hz	
	Normal Force	Range	0. 1N~25N
		Repeatability Accuracy	±5%
Distal Phalanx	Tangential Force	Range	0. 25N~25N
		Directional Resolution	1°
Dot Matrix			
Palm	Frequency	150Hz	
	Normal Force	Dots	11×5
		Range	0. 1N~25N
		Repeatability Accuracy	±20% (500g load)

## 8. Maintenance, Warranty and After-sales Service

### 8.1. Maintenance

- 8.1.1. Clean regularly during use. It is recommended to use disinfectant wiper to clean up the outer surface of the product, be careful not to let the cleaning liquid seep into the palm of the hand.
- 8.1.2. Do not disassemble it by yourself. If the product needs service, contact the designated after-sales service center.

### 8.2. Warranty

- 8.2.1. 12-month warranty period from the date of sale.

### 8.3. After-sales service

- 8.3.1. Usage and technical support services are provides through internet or telephone.
- 8.3.2. During the warranty period, the manufacturer provides free maintenance and parts replacement; outside the warranty period, the manufacturer provides paid maintenance services. If parts are damaged, the manufacturer will charge for the parts. User bears shipping costs.
- 8.3.3. When the product needs to be sent for repair, the user should ensure that the product is properly packaged and suitable for transportation. Damage or loss caused by transportation is not covered by the warranty.
- 8.3.4. The following situations do not fall within the scope of warranty promised by Party A, including:
  - (1) Wear and wore caused by normal use of the product;

(2) Product damage caused by human factors, such as damage caused by water immersion, impact, improper storage, unauthorized disassembly, improper transportation, etc.;

(3) Damage caused by force majeure factors.

8.3.5. If the failure is caused by human error, or beyond the warranty period, or force majeure factors, the manufacturer will charge parts and maintenance fees.

## 9. Packing list






9.1. ROHAND dexterous hand (model ROH-AP002): 1 piece



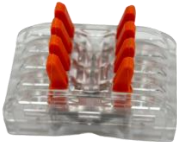

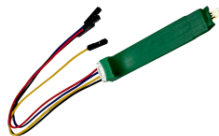
9.2. User manual(digital version): 1 copy

9.3. Certificate: 1 piece

9.4. Warranty card: 1 piece

## 10.Optional tool package

Interface	Tools	Amount	Figure	Description
RS-485	24V / 60W Power	1		DC Stabilized Power Supply, Type:GST60A24-P1J
	USB-485 Module	1		USB to 485 converter, can be shared by multiple devices
	Power/communication cable	1		Power and communication cable with DC socket
	4-Pole quick wiring terminals	1		4-Pole quick connect terminals, for interfacing with user's cables
	Wiring terminals	100		Tube Terminal for Wiring, Model No. E-0508

Interface	Tools	Amount	Figure	Description
	Wiring terminal pliers	1		For wiring
CAN	24V / 60W Power	1		DC Stabilized Power Supply, Type:GST60A24-P1J
	USB-CAN module	1		USB to CAN converter, type IPEH-002022, can be shared by multiple devices
	Power/communication cable	1		Power and communication cable with DC socket
	4-Pole quick wiring terminals	1		4-Pole quick connect terminals, for interfacing with user's cables
	USB-UART Module	1		For updating firmware, can be shared by multiple devices
	1.25mm 4-pole pin	1		For updating firmware, can be shared by multiple devices
	Wiring terminals	100		Tube Terminal for Wiring, Model No. E-0508
	Wiring terminal pliers	1		For wiring

## **11.Contact Information**

Address: No.788 Ziping Road, Lane 100, Banxia Road, Shanghai

Postal code: 201318

Tel: 021-63210200

Email: [info@oymotion.com](mailto:info@oymotion.com)

Web: [www.oymotion.com](http://www.oymotion.com)

## 12.Revision Hisitory

Date	Revision	Modified content
2025.9.15	V1.0.0	Initial version.