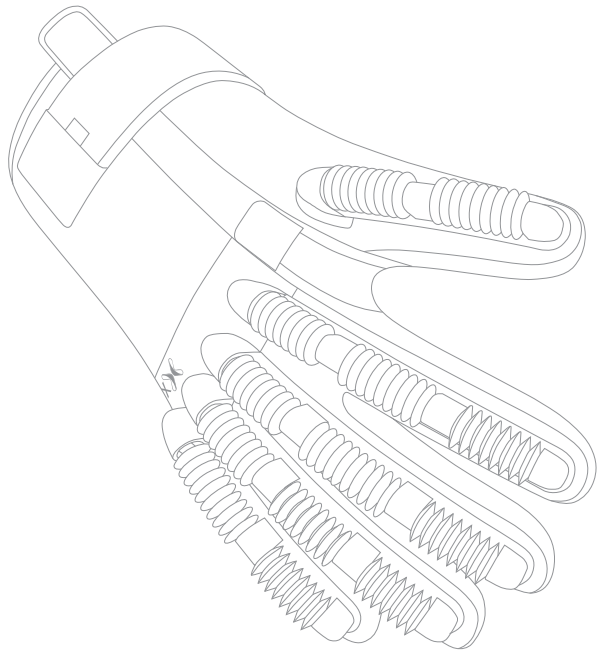




Product Name: Rehabilitation Robot
Product No.: XFT-2005A

Manufacturer: Shenzhen XFT Medical Limited
Add: Room 203, Building 1, Biomedicine Innovations Industrial Park,
#14 Jinhui Road, Pingshan New District, Shenzhen, China
Tel: 86-755-29888818 Web: www.xft-china.com Mail: xft@xft.cn

Date: 2022-10-11
Doc. No.: XFT-2005A-GB(S)
Version: C1

Rehabilitation Robot | XFT-2005A |

User Manual

Thanks for choosing our product. Please read this manual before use and keep it carefully.

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Warranty Card

Product Name: _____ Model No.: _____

Purchase Date: _____ Product Serial No.: _____

Buyer's Information: _____

Distributor's Information: _____

Manufacturer: Shenzhen XFT Medical Limited
Add: Room 203, Building 1, Biomedicine Innovations Industrial Park,
#14 Jinhui Road, Pingshan New District, Shenzhen, China
Tel: 86-755-29888818 Web: www.xft-china.com Mail: xft@xft.cn

Distributor Seal: _____

10.FCC COMPLIANCE STATEMENT:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Radiation Exposure Statement

The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction.

FCC ID:2AS212005A

1. Precautions

- Please read the User Manual carefully before use.
- Please keep this User Manual in a place where the user can refer to it at any time and keep it properly.

List of Symbols

	Caution
	Manufacturer
	Fragile
	Upward
	Keep dry
	The transport package cannot be rolled during handling
	Please dispose of the device/ battery /accessory/ packing in accordance with the legal obligation in your location
	The protection level of the EMG Armband's shell against harmful liquid and particulate matter is IP66

9. After Sales Service

Warranty Declaration

- 1) The XFT-2005A Rehabilitation Robot is provided with two-year warranty starting from the date of purchasing.
- 2) We will not provide free repair services for the malfunctions caused by the following behaviors:
- Disassemble or modify the product without authorization.
 - Accidentally blow or drop the product during use or transportation.
 - Lack of reasonable maintenance.
 - Operate not according to the instruction.
 - Repaired by unauthorized repair store.
- 3) When asking for warranty service, please show the purchase invoice and warranty card.
- It is charged according to the stipulation for the repair service out of warranty.
 - Please contact XFT when asking for warranty service.

8. Specifications

8.1 Work Environment

Temperature: 5°C~40°C
Relative humidity: ≤80%(non-condensing)
Atmosphere Pressure: 86kPa ~ 106kPa

8.2 Storage and Transport Condition

Temperature: -20°C~55°C
Relative humidity: ≤93% (non-condensing)
Atmosphere Pressure: 70kPa ~ 106kPa

8.3 Specifications of the Controller and the Components

Controller	
Size	218x181x94mm (±10mm)
Weight	1kg(±10%)
EMG armband (Optional)	
Size	326x64x16mm (±3mm)
Weight	52g ±10g (Only EMG armband)
Rehab Glove	
Specifications	Left / Right side Size: L/M/S
Power Adapter	
Specifications	Input: AC100-240V, 50-60Hz, 1A Output: DC12V, 3A

Note:

- The controller can only be used in connection with the Rehab Glove supplied by the manufacturer.
- The above accessories are consumables. If you need to replace them, please contact the manufacturer or the service provider designated by the manufacturer.

Cautions

- Please carefully check whether the power adapter and wire are intact before charging so as to avoid the risk of electric shock.
- Keep this product out of the reach of children.
- It is forbidden for patients with pustules, bleeding, burns, inflammation, ulcers and etc. to wear the product.
- Please stop using this product and see the doctor if the body shows any physical abnormality such as redness, itching or pain.
- Please do not disassemble, repair, or modify this product without authorization so as to avoid the risk of electric shock.
- Please stop using it immediately if you feel abnormalities during use.
- Children or unconscious people must use it under the supervision of adults.
- Do not use the power adapter that is not equipped with this product to do the charging.
- This equipment can only be used with the rehab glove supplied by the manufacturer.
- The washing temperature of gloves should not exceed 40°C, and the drying temperature should not exceed 40°C.

2. Product Overviews

2.1 Product Introduction

XFT-2005A Rehabilitation Robot is a functional rehabilitation training device designed for stroke patients or patients with hand lack of move ability. Combining the latest EMG biofeedback and flexible robot technology and using flexible pneumatic bionic muscles as the power source, the Rehabilitation Robot helps patients to do passive rehabilitation training through preset training program. By monitoring the EMG signal of the patient's limb in real time through EMG armband, the Rehabilitation Robot will be triggered to train the flexion and extension functions of the affected limb when the EMG signal reaches the preset threshold. The Rehabilitation Robot can also help to train the patient's limb motor function and prevent the patient's muscle atrophy.

Two different configurations: basic version and advanced version.

Six working modes: extension and flexion training mode, finger tip touch training mode, single finger training mode, power assist training mode, resistance training mode and mirror training mode.

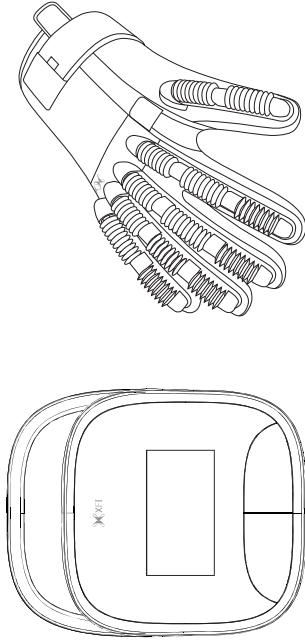


Fig. 1 Controller and rehab glove

7. Product Configuration

Version	Configuration List
Basic Version	Controller * 1 Rehab Glove * 1 Power Adapter * 1 User Manual * 1
Advanced Version	Controller * 1 Rehab Glove * 1 EMG armband (single channel) * 1 Power Adapter * 1 User Manual * 1

Note: configurations are reference only and are subject to change without notice.

6. Maintenance and Care

6.1 Maintenance of the Controller and the Components

Precaution

- Do not expose it to direct sunlight, high temperature, humidity, dust, and corrosive gas.
- Please keep it out of reach of children.
- Users are not allowed to disassemble, repair, or modify this product without authorization.
- All other maintenance and services are the responsibility of the seller and manufacturer.
- The equipment is not waterproof, so do not immerse it in water or use a strong detergent containing bleach to clean it.
- Do not throw, step on, or place heavy pressure on the device.
- Please store them and keep them clean when the rehabilitation gloves are not in use.
- For replacement or repair of accessories, please contact the seller or service provider.

6.2 Product Expiration Disposal

The product (including the controller and the EMG armband) valid is 3 years. After the expiration, please dispose of this product in accordance with the national regulations on electronic product disposal.

6.3 Product Cleaning and Disinfection

Periodic clean the surface and cable of the controller with a soft cloth dampened with clean water.

Note: Please do shut off the alternative power supply before cleaning.

The washing temperature of gloves should not exceed 40°C, and the drying temperature should not exceed 40°C.

3. Product Illustration

3.1 Product Components, illustration and buttons

3.1.1 Controller

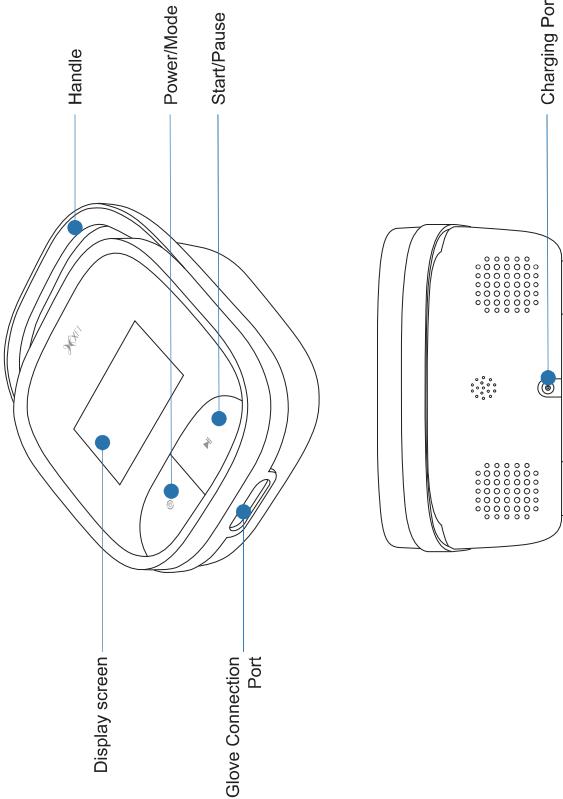
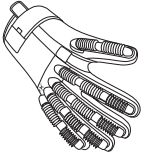
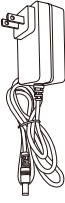
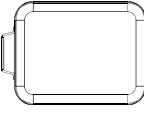


Fig. 2 The front and side view of the Controller

- Handle.
- Display Screen: display training guide information.
- Power/Mode button: press and hold this button to turn on/off the controller, press this button shortly can switch the training modes; press and hold with the Start/Pause button at the same time can enter/exit the setting mode.
- Start/Pause Button: in the training mode, press this button to Start/Pause the training mode; in the setting mode, press the Power/Mode button to select the item, then press the Start/Pause button to set different parameters.
- Glove Connection Port: Used to connect rehab glove.
- Charging Port: Used to connect the power adapter to charge the controller.

3.1.2 Accessories

No	Name	Picture	Note
1	Rehab Glove		Left/Right side Size: L/M/S
2	EMG armband (Optional)		Basic Version: configured without EMG armband Advanced Version: configured with 1 single channel EMG armband
3	Power Adapter		For charging the controller
4	User Manual		/
5	Portable Case		/

5. Troubleshooting

Trouble Description	Reason Analysis	Solutions
The controller does not on after pressing the power button. Press buttons but no response.	1) Press the power button for 1 second. 2) Battery power ran out. It may be the function button issue.	1) Press the power button for 1 second until the screen displayed. 2) Connect the adapter for charging. 1) Make sure the controller is on, Screen display normal, then press the function button. 2) If the controller is in normal.
Abnormal extension and flexion of the rehab glove.	It may be leakage of the controller or the glove.	1) Please use new gloves (if any) for testing. 2) If the controller works normally but the rehab gloves do not work, please confirm that the rehab gloves are not damaged or other abnormalities. If not, please contact the manufacturer.
There is no Bluetooth icon on the controller screen when used with an EMG armband.	1) The EMG armband is not turned on. 2) The EMG armband is not paired with the controller first. The battery of the EMG armband is low.	1) Make sure that the EMG armband is on. 2) Make sure that the EMG armband has been paired. 3) Ensure that the EMG armband is fully charged.
The screen prompts "Electrode loose"	When the metal electrodes of the EMG armband are not in good contact with the skin or fall off, the controller cannot detect the EMG signal, and then it will prompt "Electrode loose".	You need to check the connection of the EMG armband. Tighten the wrist strap to make the armband contact with the skin closer. If the skin is too dry, it may cause poor contact. If necessary, add some water to moisturize the skin. After confirming that the contact is good, press the Start/ Pause button again to dismiss the prompt. The device can continue to work.

4.5 Charging

4.5.1 Charge the Controller

Insert the power adapter to the controller charging port and connect the power supply to charge. It takes about 4 hours to charge fully.

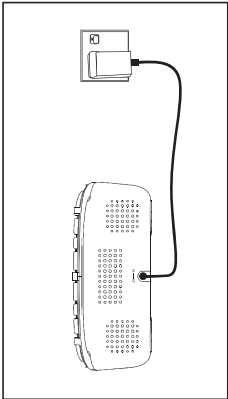


Fig. 12 Charge the controller

4.5.2 Charge the EMG armband

Remove the charging port dust plug of the EMG armband and then connect the power supply to do the charging. (More details please refer to the instruction of the EMG armband)

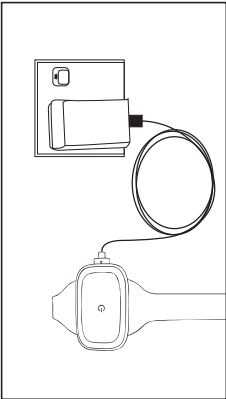


Fig. 13 Charge the EMG armband

3.2 Operation Interface Display



Fig.3 DisplayScreen

No	Description	Illustration	Details
1	Display the current training mode	Extension and flexion training Finger tip touch training Single finger training Power Assist training Resistance training Mirror training	Switch training modes by pressing the Power/ Mode button ● Extension and flexion training ● Finger tip touch training ● Single finger training ● Power assist training (only applicable for the mode connected with EMG armband) ● Resistance training (only applicable for the mode connected with EMG armband) ● Mirror training (only applicable for the mode connected with EMG armband)
2	Bluetooth connection		Display whether the EMG armband is connected successfully

No	Description	Illustration	Details
3	Battery level		Display the current battery level. During charging, it shows the charging icon. When fully charged, it shows the fully charged icon. When the battery icon turns red, it means the battery is too low. When the battery level is below 10%, the battery icon flashes once per second.
4	Training time		Indicates the total training time of the current training mode. When the training starts, the training time will start to count down. The training time can be set in the parameters setting interface: Adjustable from 10 to 30 minutes, with a step of 5 minutes.
5	Extension and flexion time		Indicates the time of the finger extension and flexion of the current training mode. When the training starts, the finger extension or flexion time will start to count down. Finger extension or flexion time can be set in the parameters setting interface. Adjustable from 1 to 9 seconds, with a step of 1 second.
6	Hand state		Indicates whether the current state of the hand is in extension or flexion.
7	EMG value of Extensor and flexor		Display the EMG value of the extension and flexion which detected by the EMG armband. The triggered value can be set in the parameters setting interface. Extension triggered value: adjustable from 5 to 50uv, with a step of 5uv. Flexion triggered value: adjustable from 5 to 50uv, with a step of 5uv.

Step 4. Press and hold the Power/Mode button and the Start/Pause button of the controller together at the same time to exit the parameters setting interface.

4.3 Start/Pause

Turn on the controller, then select the working mode and press the Start/Pause button. The speaker prompts "training starts now", the controller starts to work. The training time starts to count down. Press the Start/Pause button, the speaker prompts "training pause" and the controller pauses work, the training time pauses. Press the Start/Pause button again, the speaker prompts "training starts now", the controller continues to work, the training time continues to count down. When the countdown of the training time is over, the voice prompt "training ends now".

4.4 Shutdown

Forced shutdown: The system shuts down after pressing the power button for 1 second.
Automatic shutdown: Automatic shutdown after 15 minutes of standby without operation.

4.2.3 Pair the EMG armband

Step 1: Press and hold the Power/Mode button and the Start/Pause button of the controller together at the same time to enter the Parameters Settings interface.

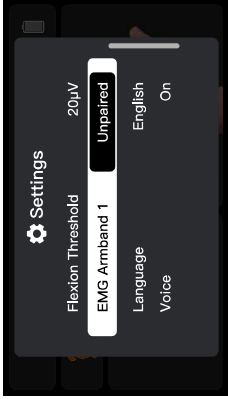


Fig. 9 the armband is not paired

Step 2: Press and hold the Power button of the EMG armband for 3 seconds to turn it on. When in shutdown state, press and hold the Power button of the EMG armband until you hear the continuous beep prompt, in this case, the Bluetooth connection memory will be cleared.

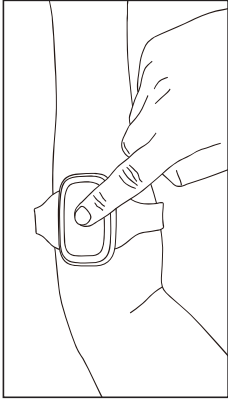


Fig. 10 Clear the Bluetooth connection on the EMG armband

Step 3: Press the Power/Mode button to select armband 1 and then press the Start/Pause button to pair. After the pairing is successful, the parameters interface will display "Connected".

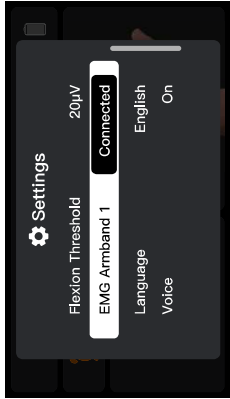


Fig. 11 The armband is paired

4. Operating Instructions

XFT-2005A Rehabilitation Robot is equipped with two configurations: basic version and advanced version.

The basic version is not equipped with an EMG armband, users can only use extension and flexion training mode, finger tip touch training mode, and single finger training mode.

The advanced version is equipped with a single-channel EMG armband, which can be worn on the extensor position of the arm for power assist training mode, resistance training mode and mirror training mode.

4.1 Preparation before use

4.1.1 Connect the Rehab Glove

Insert the tracheal connector of the Rehab Glove into the controller (See Fig. 4). Pay attention to the direction of the tracheal connector, and do not insert it backwards.

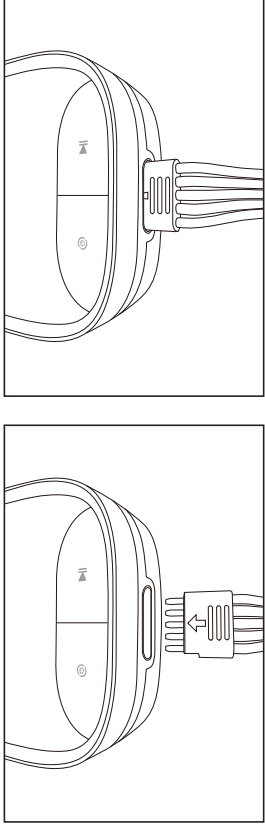
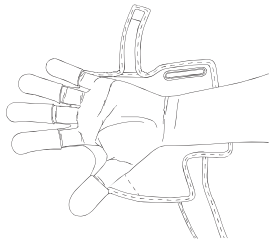
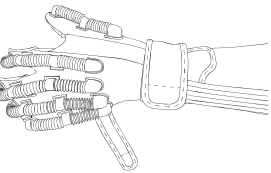


Fig. 4 Connect the Rehab Glove

4.1.2 Wear the Rehab Glove

Please fit the Rehab Robot according to the following steps:

		
Step 1 Wear the Glove Note: Slide each finger into the appropriate sleeve and position each finger into the top of the glove.	Step 2 Stick the wrist strap, pull the wrist strap tight and stick it well. Note: Pull the inside of finger sleeve as far back as possible.	Step 3 Pull the tightening velcro belt from the palm to the back of the hand and stick it together. Note: There is no gap in the wrist between wrist skin and glove when making a fist.

4.1.3 Wear the EMG armband (Only apply for the advanced version)

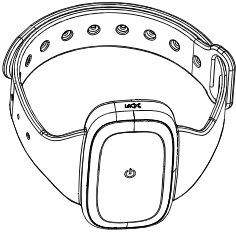


Fig. 5 Front view of Single channel EMG armband

6	Mirror Training Mode		The controller is used with a single-channel EMG armband, and the EMG armband communicates with the controller via Bluetooth. When the EMG armband detects that the extensor EMG signal reaches the threshold, the controller controls the glove to stretch the five fingers simultaneously. When the EMG signal is lower than the threshold, the controller controls the glove to bend the five fingers. Note: When using the mirror training mode, the EMG armband should be worn on the unaffected arm.
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Note: During the training process, if you need to switch other training mode, you need to press the Start/Pause button to pause the current training. Then press the Power/Mode button to select other training modes.

NO.	Parameters Settings	Description
1	Extension time	1~9 seconds adjustable, with a step of 1 second
2	Flexion time	1~9 seconds adjustable, with a step of 1 second
3	Training time	10~30 minutes adjustable, with a step of 5 minutes
4	Extensor threshold	5~50 μ V adjustable, with a step of 5 μ V
5	Flexor threshold	5~50 μ V adjustable, with a step of 5 μ V
6	armband 1	Press the Start/Pause button to pair or disconnect the EMG armband

3	Single Finger Training Mode		The controller controls the glove to perform periodic extension and bending of single finger (thumb, index finger, middle finger, ring finger, and little finger in turn) according to the preset finger extension time and flexion time.
4	Power Assist training mode		The controller is used with a single-channel EMG armband, and the EMG armband communicates with the controller via Bluetooth. When the EMG armband detects that the extensor EMG signal reaches the threshold, the controller controls the glove to stretch five fingers synchronously. When the EMG signal is lower than the threshold, the glove bend the five fingers. Note: When using the power assist training mode, the EMG armband should be worn on the affected arm.
5	Resistance Training Mode		The controller is used with a single-channel EMG armband, and the EMG armband communicates with the controller via Bluetooth. When the EMG armband detects that the extensor EMG signal reaches the threshold, the controller controls the glove to bend the five fingers until the extensor EMG signal is lower than the threshold, and the controller controls the glove to stretch the five fingers. Note: When using resistance training mode, the EMG armband should be worn on the affected arm.

Step 1 Wear the EMG armband as below Fig. 7 and Fig. 8 shows

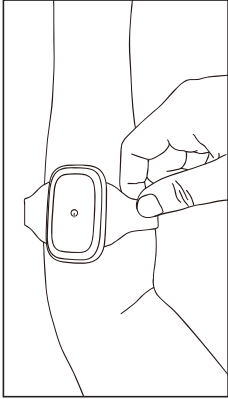


Fig. 6 Wear the single channel EMG armband

Note:

- When using the advanced version, a single-channel EMG armband should be used and the armband should be worn on the extensor position of arm .

Step 2 Turn on the EMG armband

Press and hold the Power button for 3 seconds to turn on the EMG armband. When the EMG armband and the controller are paired, the Bluetooth icon will be displayed on the top right corner.



Fig. 7 Mirror training mode screen

Note: If no Bluetooth icon displayed, please enter the parameters setting interface to check whether the EMG armband matched. Further steps please refer to the instruction in 4.2.5.

4.1.4 Turn on the Rehabilitation Robot

Press and hold the "Power/mode" button to turn on the machine. It will prompt "Welcome to XFT Rehabilitation Robot".



Fig. 8 Powering Screen

4.2 Select Mode and Set Parameters

There are two versions of XFT-2005A and accordingly different modes are included in these different versions.

Basic version includes three modes: extension and flexion training mode, finger tip touch training mode and single finger training mode.

Advanced version includes six modes: extension and flexion training mode, finger tip touch training mode, single finger training, power assist training mode, resistance training mode and mirror training mode.

4.2.1 Operation Instruction of Rehabilitation Robot (Basic Version)

Press the Power/Mode button and select one training mode from extension and flexion training mode, finger tip touch training mode or single finger training mode. Then press Start/Pause button to start the training.

No	Training Mode	Screen	Description
1	Extension and Flexion Training Mode		The controller controls the glove to perform the synchronous and periodic extension and bending of the five fingers according to the preset finger extension time and flexion time.

2	Finger Tip Touch Training Mode		The controller controls the glove to perform periodic extension and bending of two fingers (thumb and index finger, thumb and middle finger, thumb and ring finger, thumb and little finger in turn) according to the preset finger extension time and flexion time.
3	Single Finger Training Mode		The controller controls the glove to perform periodic extension and bending of single finger (thumb, index finger, middle finger, ring finger, and little finger in turn) according to the preset finger extension time and flexion time.

Note: During the training process, if you need to switch other training mode, you need to press the Start/Pause button to pause the current training. Then press the Power/Mode button to select other training modes.

4.2.2 Operation Instruction of Rehabilitation Robot (Advanced Version)

Make sure that the EMG armband has been worn in the correct position and turned on before use. The Bluetooth icon on the upper right corner of the controller screen indicates that the EMG armband and the controller have been successfully connected. Press the Power/Mode button of the controller to select extension and flexion training mode / finger tip touch training mode / single finger training mode / PAS training mode / resistance training mode / mirror training mode, and then press the Start/Pause button to start training.

No	Training Mode	Screen	Description
1	Extension and Flexion Training Mode		The controller controls the glove to perform the synchronous and periodic extension and bending of the five fingers according to the preset finger extension time and flexion time.
2	Finger Tip Touch Training Mode		The controller controls the glove to perform periodic extension and bending of two fingers (thumb and index finger, thumb and middle finger, thumb and ring finger, thumb and little finger in turn) according to the preset finger extension time and flexion time.