



UFACTORY UARM

User Manual



SHENZHEN UFACTORY CO. LTD.

V 4.10.2

Table

1. Safety Precautions	4
1.1. Precautions	4
1.2. General Safety	4
1.3. Emergency Stop	4
2. Quick Start	6
2.1. uArmWiring	6
2.2. Install uArm Studio	6
2.2.1. System Requirements	6
2.2.2. Download and Install the uArm Studio Software	6
2.3. Power On/Off	7
3. Product Description	8
3.1. Overview	8
3.2. uArm	8
3.2.1. External Structure	8
3.2.2. Base & Indicator	9
3.3. Extension Port	9
3.4. Workspace	10
4. Operating Guide	11
4.1. uArm Studio Software Instructions	11
4.2. Blockly: Visual Programming Tutorial	12
4.2.1. Quick Start	12
4.2.2. Blockly Function Description	13
4.3. Teach&Play Tutorial	14
4.3.1. Suction Cup Installation Tutorial	14
4.3.2. Gripper Installation Tutorial	15
4.3.3. Teach&Play	16
4.3.4. Calibration Tutorial	19

4. 4. Drawing	20
4. 4. 1. Universal Pen Holder Installation Tutorial	20
4. 4. 2. Import Patterns & Parameters Setting	22
4. 4. 3. Adjust the Zero Point	22
5. Appendix	24

1. Safety Precautions

This chapter describes the safety precautions that should be taken when using this product. Please read this manual carefully before using it. User should strictly follow this operating manual.

1.1. Precautions

1. When working with the robotic arm, do not put your hand between the connecting rods;
2. Please use the official standard power adapter ;
3. Please make sure that there is enough space on the desktop to avoid hitting obstacles during the operation of the robotic arm ;

1.2. General Safety

- If an error occurs, please contact support@ufactory.cc in time.
- If the product is scrapped, please comply with relevant laws to properly dispose of industrial waste and protect the environment.
- The robotic arm comes with small spare parts; please keep them away from children to prevent accidental swallowing.
- Parental guidance is required if the operation is conducted by children. Please shut down uArm properly in time when the operation is completed.
- Do not put your hand into the range of motion to prevent accidents.
- It is strictly forbidden to change or remove and modify the nameplate, instructions, icons, and markings of the robotic arm and related equipment.
- Be careful during handling and installation. Pay attention to the instructions on the box and place the robot according to the direction of the arrow. Otherwise, the machine may be damaged.
- Before operating the robotic arm, please refer to the user manual attached to the box.

1.3. Emergency Stop

Press the power button to stop the drive, all actions and the running program

in uArm Studio will be stopped.

Should not press the power button during normal operation. If the power button is pressed during the action, the trajectory of the robot will then be changed and become different with the initial setting, which may trigger an unexpected situation such as a collision.

2. Quick Start

This chapter briefly describes how to control uArm through uArm Studio so that users can quickly understand and start using uArm .

2.1. uArmWiring

- Step 1 Connect the power cord
- Step 2 Turn on the power switch
- Step 3 Connect uArm via USB cable and your computer

2.2. Install uArm Studio

Users can control the robotic arm by uArm Studio, and to realize teaching reproduction, 3D printing and other operations. This chapter takes the teaching reproduction as an example.

2.2.1. System Requirements

Operating systems supported by uArm Studio software are as follows:

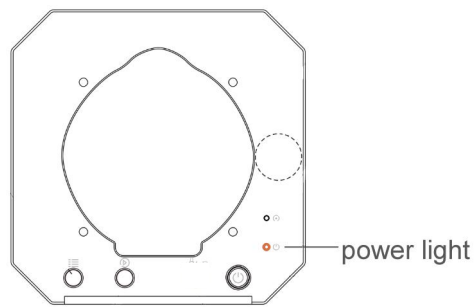
- Windows 10
- Ubuntu 16.04, 20.04
- Mac OSX 10.10

2.2.2. Download and Install the uArm Studio Software

Before using uArm , please download the uArm Studio software and install according to the instructions.

Download link: <https://www.ufactory.cc/pages/download-uarm>

2.3. Power On/Off



After pressing the power button, the power indicator lights up, indicating that the robotic arm is turned on.

After pressing the power button, the power indicator is off, indicating that the robotic arm is off.

3. Product Description

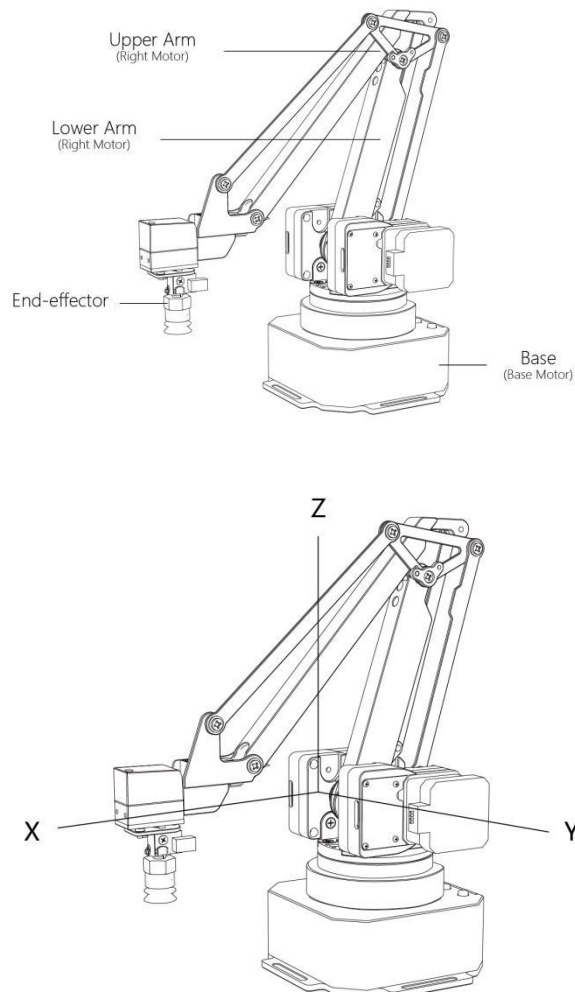
3.1. Overview

uArm is the world's first open-source desktop robotic arm, it features open source hardware and software, you can expand and develop uArm functions according to your own needs. The uArm Swift Pro with uArm vision module to perform image recognition and it is ideal for AI robotics research.

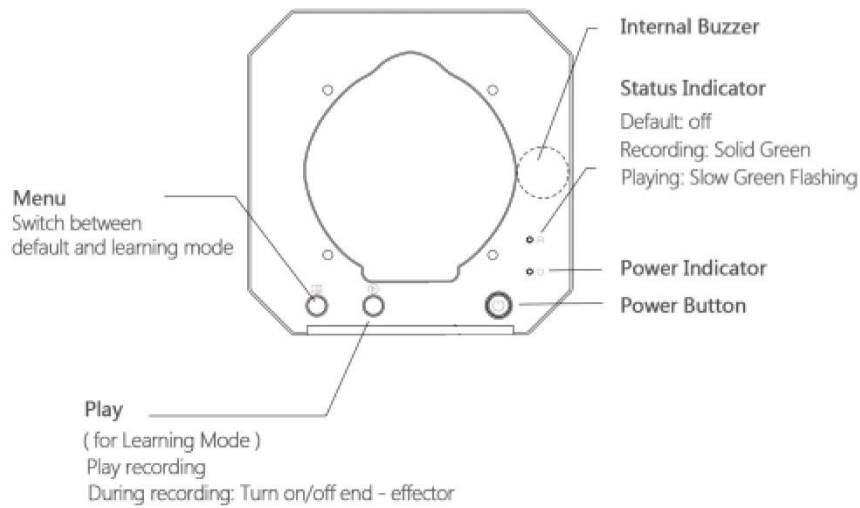
3.2. uArm

3.2.1. External Structure

The appearance of the uArm is as shown in the figure.

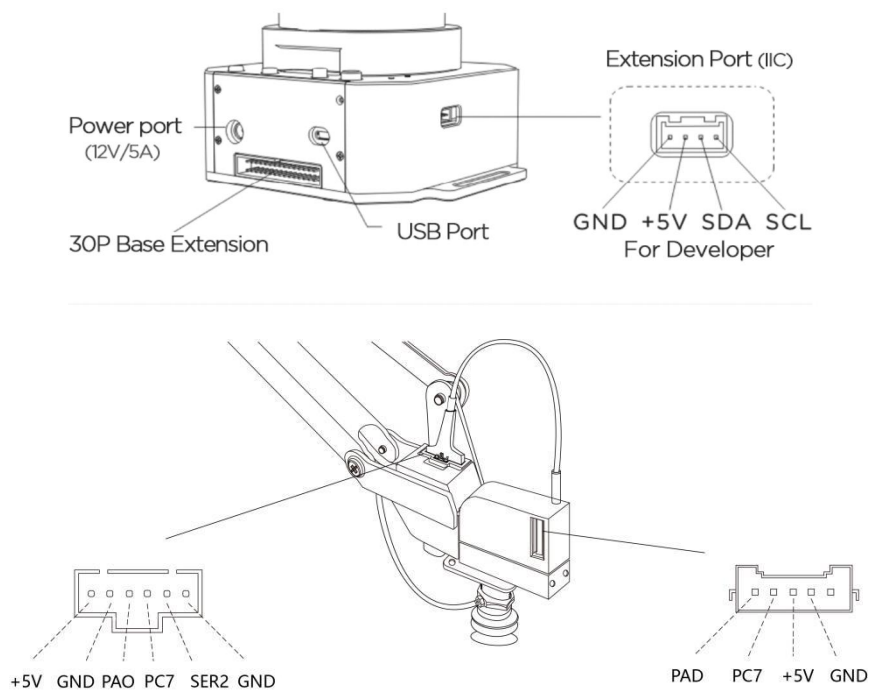


3.2.2. Base & Indicator



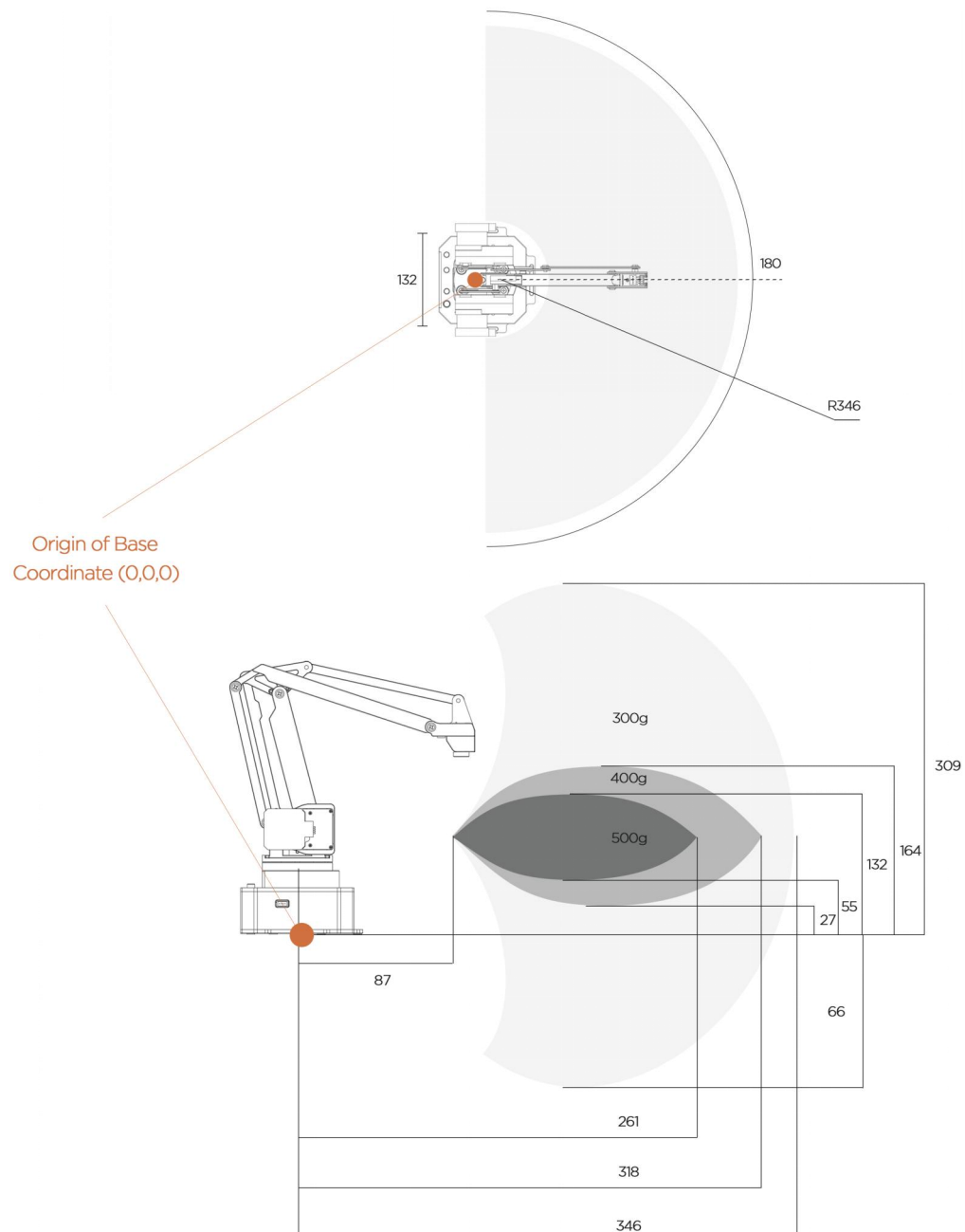
3.3. Extension Port

The uArm interface is located on the back of the base and the arm. The diagram of the base extension is shown in the figure.



3. 4. Workspace

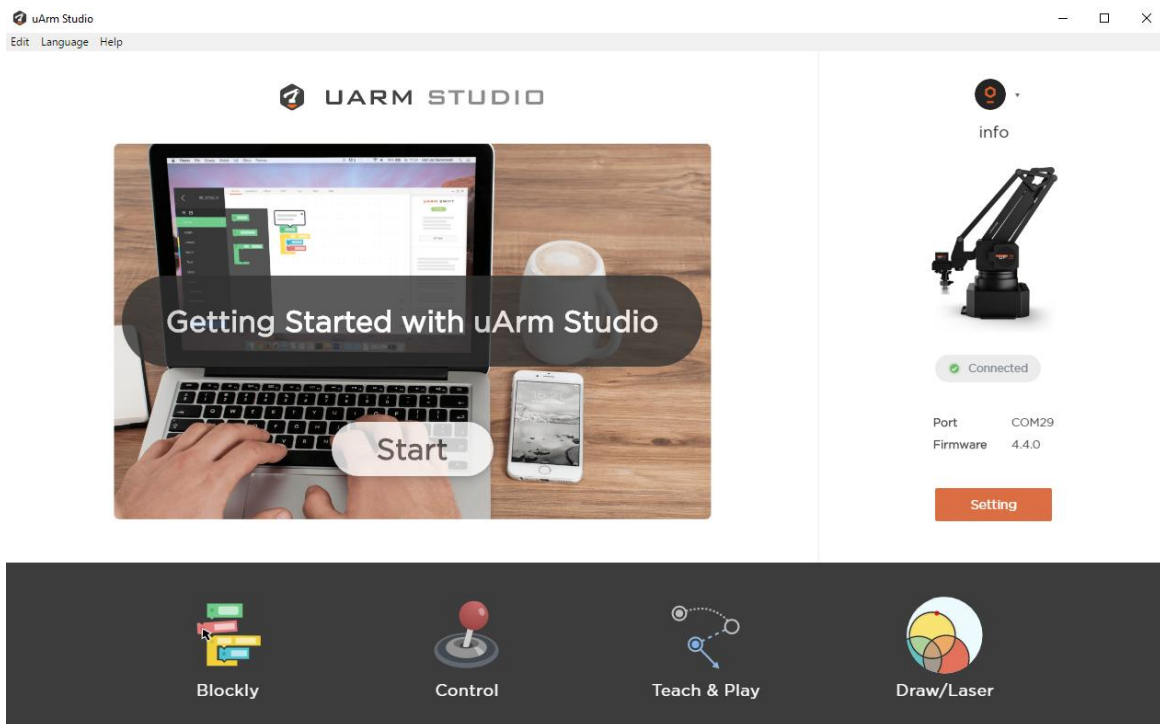
uArm 's workspace is shown in the figure.



4. Operating Guide

4.1. uArm Studio Software Instructions

The uArm robotic arm has teach-play, drawing, which can be implemented by uArm Studio software. The functions supported by uArm Studio are shown in the figure, and the detailed functions are as shown in the table.



Module	Function
Blockly	The robotic arm is controlled in a visual programming manner, and the user can program by means of drag-n-drop.
Teach&Play	Once the teaching mode has recorded a series of actions that taught to the robotic arm, the robotic arm automatically repeats the recorded

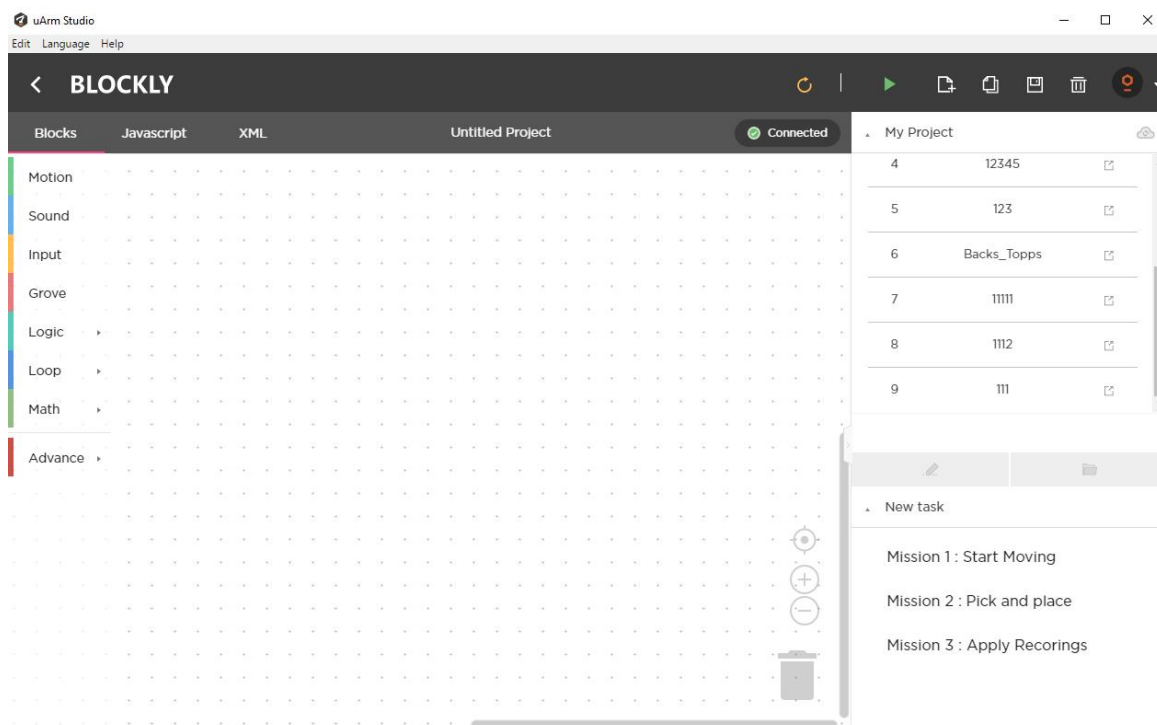
	actions.
Drawing	Use the robotic arm to complete the drawing operations.

4.2. Blockly: Visual Programming Tutorial

uArm Studio Blockly is a visual programming interface designed specifically for uArm.

4.2.1. Quick Start

There are three tasks for newbie to help you quickly understand Blockly.



▲ New task

Mission 1 : Start Moving

Mission 2 : Pick and place

Mission 3 : Apply Recorings

4.2.2. Blockly Function Description

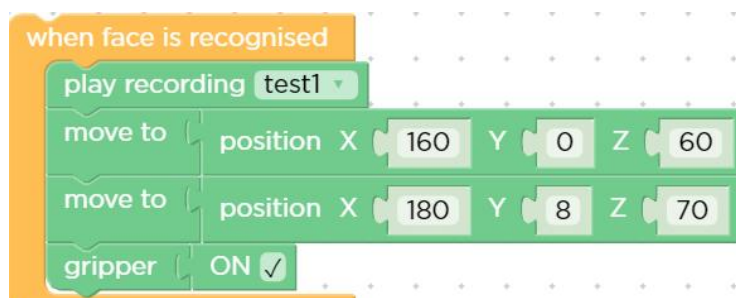
1) Control the basic motion of uArm



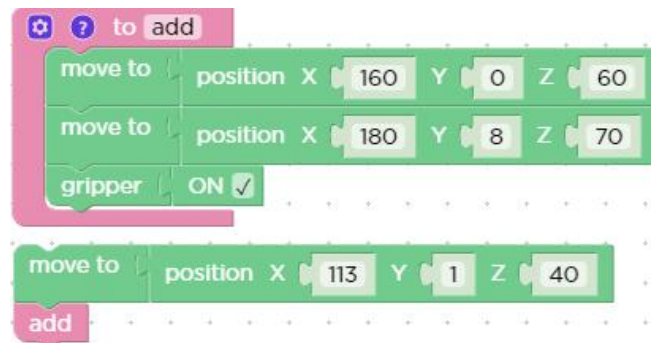
2) Events (How to trigger a command)



3) Apply the action you recorded



4) Advanced programming (functions, variables, etc.)



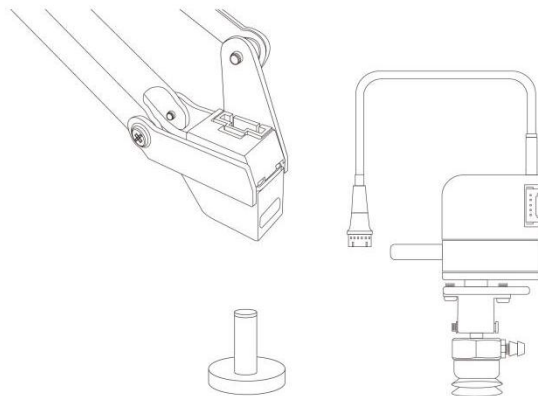
4.3. Teach&Play Tutorial

Holding the uArm to record the action , then playing the recorded action.

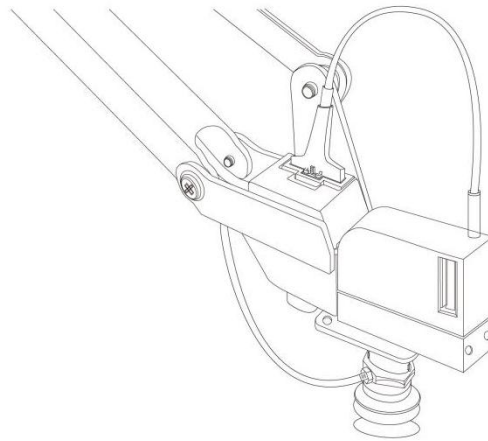
4.3.1. Suction Cup Installation Tutorial

Step 1 : Install the suction cup on the fourth axis of the arm and tighten the hand screw.

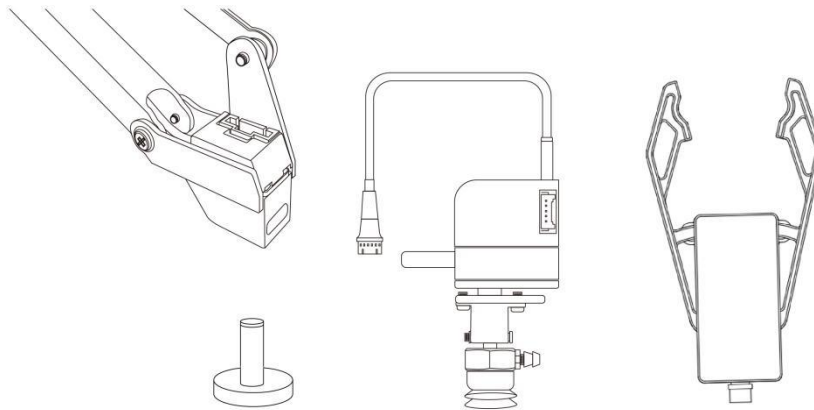
Note : If you need to remove the suction cup, please loosen the hand screw.



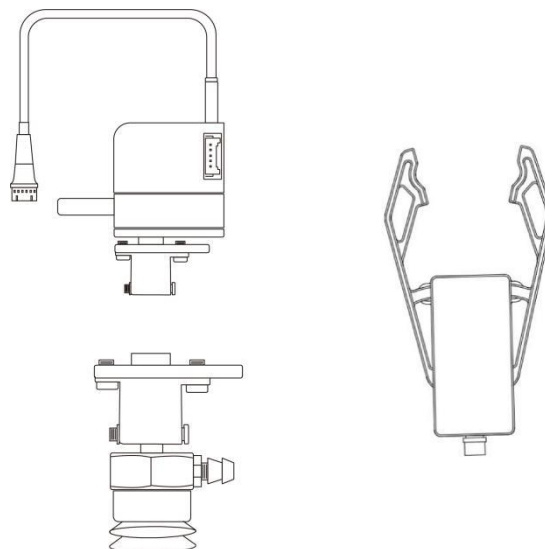
Step 2: Connect the wires of the fourth axis, the suction tube and the limit switch.



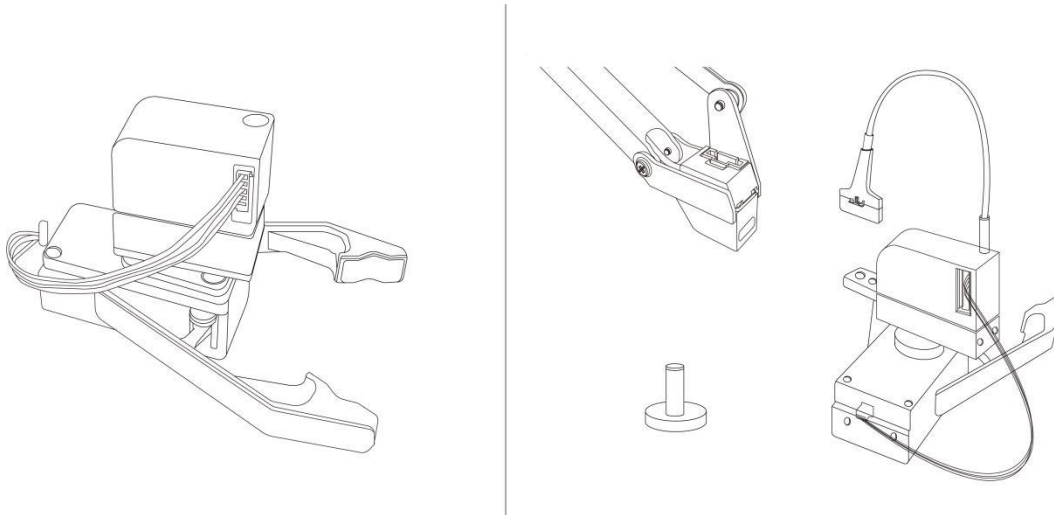
4.3.2. Gripper Installation Tutorial



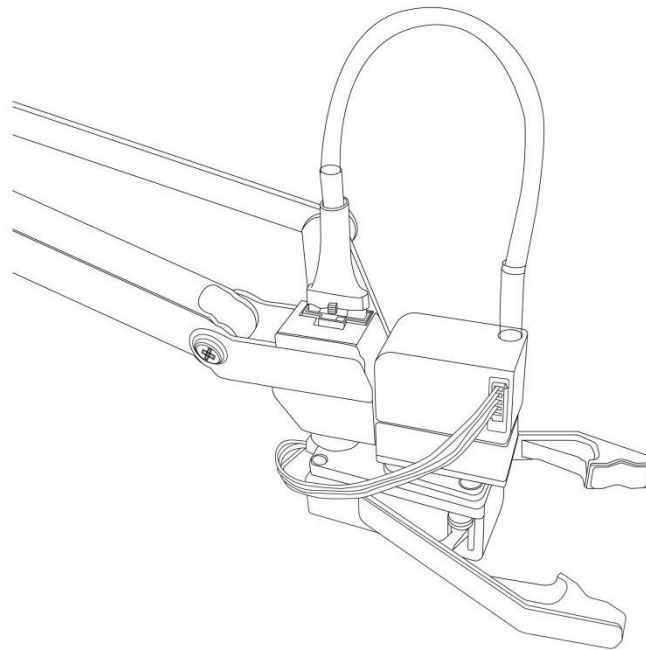
Step 1 : Use a hex wrench to remove the suction cup.



Step 2: Install the gripper and lock the fixing screws.



Step 3: Install the fourth axis motor and gripper.



4.3.3. Teach&Play

Holding the uArm to record the action , then playing the recorded action.

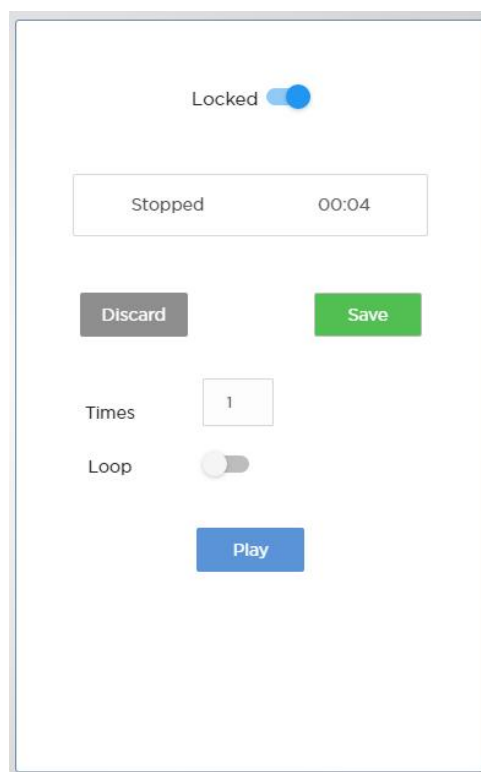
4.3.3.1. Operation Tutorial

1) Record Action

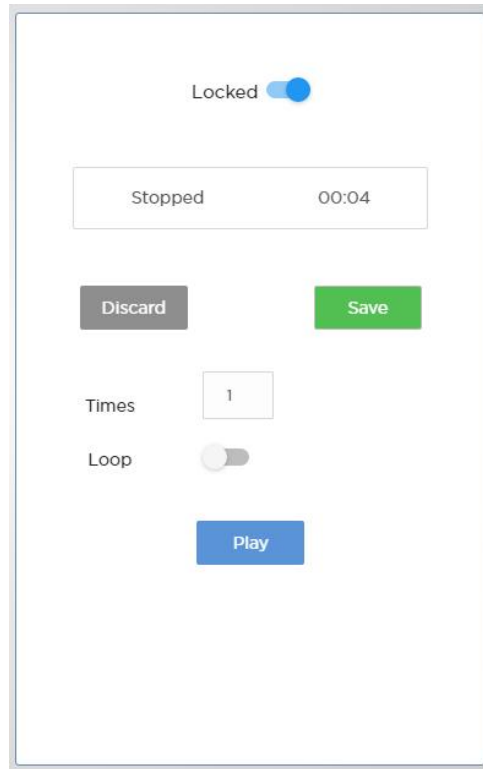
Click 'Start Recording' on uArm Studio or press the Menu button on the uArm base to start recording.



2) Save



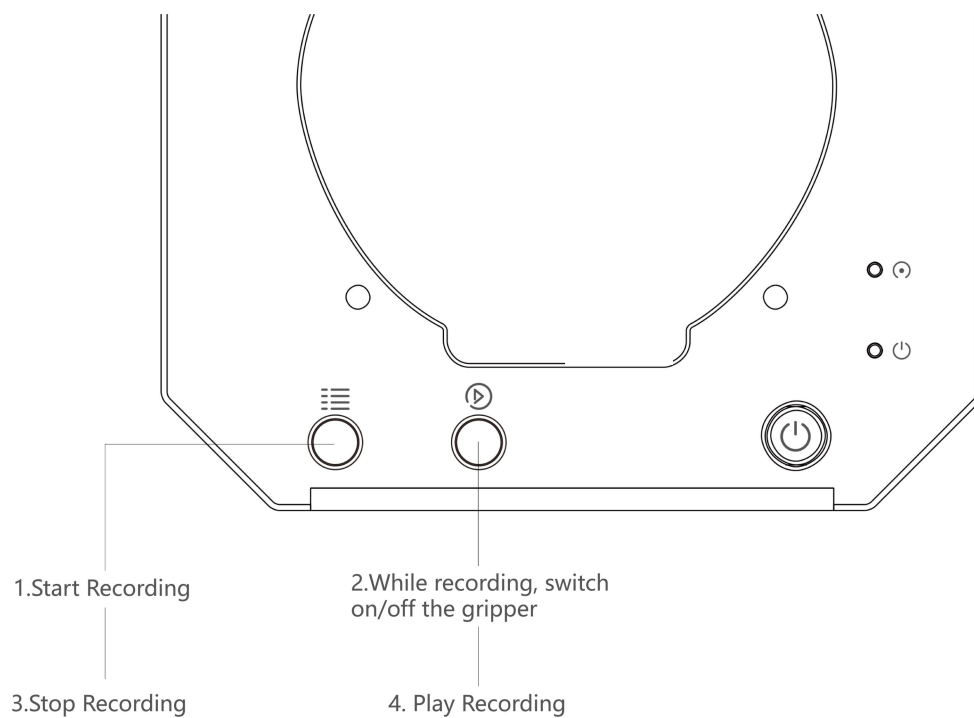
3) Set the times of playback



4.3.3.2. Offline Teaching Operation Tutorial

Teaching with buttons on the robotic arm when offline.

Note: This feature is only supported in 3.x firmware, not in 4.x firmware.



Recording :

1. Turn on the teaching mode: press the menu button, the status indicator will turn green .
2. Hold the uarm and guide it, press the play button to turn on the gripper, and then press the play button again to turn off the gripper.
3. Complete the recording process, press the menu button once, the status indicator will go off.

Play :

1. Press the play button for single play; long press the play button for 2 seconds for playing in loop.
2. During playback, the status indicator flashes slowly .
3. During playback, press the play button to stop playback .

4.3.3.3. Difference between Teach&Play and Offline Teaching

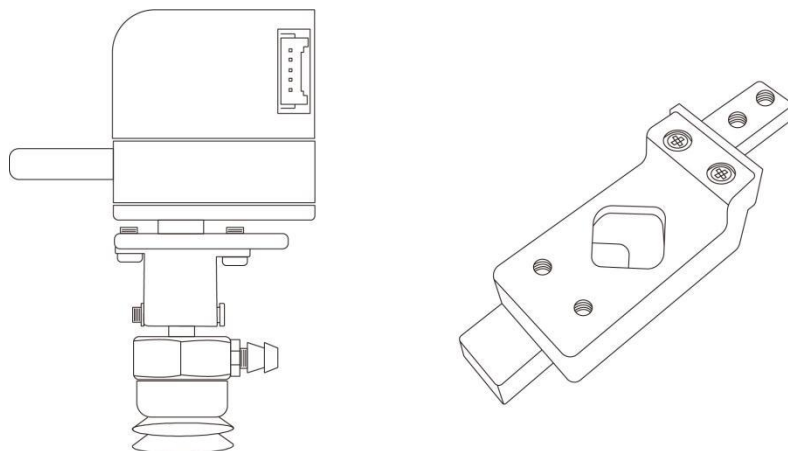
1. Teach&Play has no time limit.
2. You can save and export your recorded actions, and you can also import actions recorded by others.
3. You can use your recorded action in Blockly.

4.3.4. Calibration Tutorial**Calibration tutorial:**

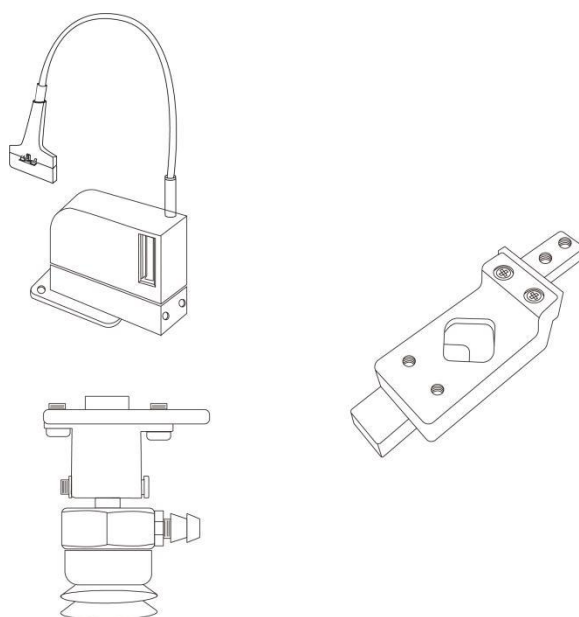
[uArm-Swift-Pro-Calibration.pdf](#)

4. 4. Drawing

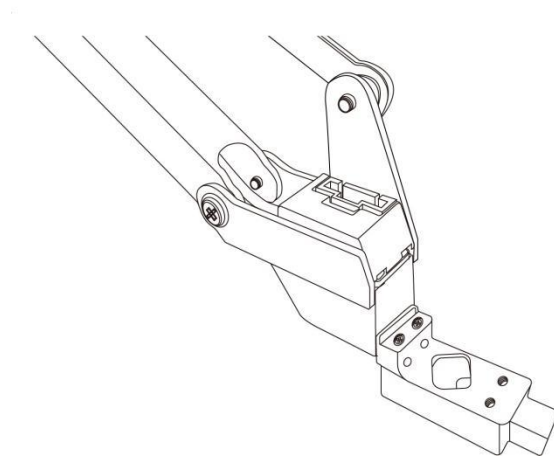
4. 4. 1. Universal Pen Holder Installation Tutorial



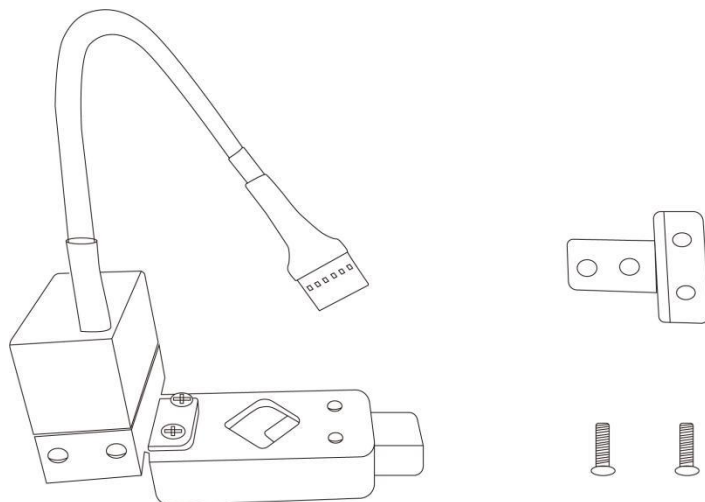
Step 1 : Remove the suction cup with a hexagonal L -wrench



Way 1: Install the universal clip and tighten the screws

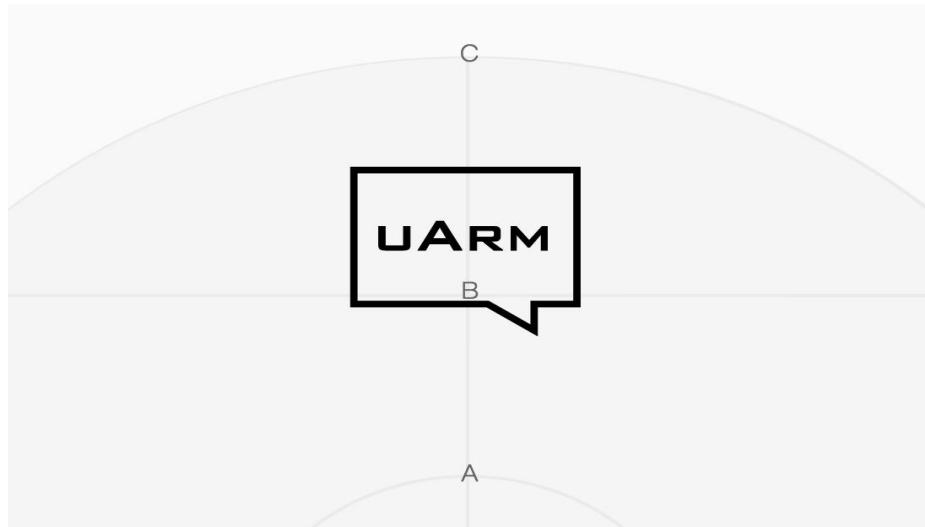


Way 2: Remove the two screws at the front of the universal pen holder ,connect the fourth axis motor



4.4.2. Import Patterns & Parameters Setting

Step 1: Design a pattern, insert text / shape.



(contour or grayscale mode)

Step 2: Click the " Run " button to start running.

Step 3: Start drawing

4.4.3. Adjust the Zero Point

Before using the “ paint ” function, please adjust the zero point to ensure that the pen just touches the table.

Settings

?

Mode

Write/Draw

Laser

Adjust Zero Point

-12

Speed

200

Cancel

Start

5. Appendix

1. uArm Community

uArm studio Download : <https://www.ufactory.cc/download-uarm-robot>

UFACTORY Official Forum: <http://forum.ufactory.cc/>

uArm Technical Support: support@ufactory.cc

2. uArm Firmware Guidance Manual

Download: [Guidance Manual](#)

3. Releases History

Version	Releases Description
1.0.7	Added content to 3D printing operation guide and make
1.0.8	Added details to OpenMV content. Released Content about Laser Nozzle focal Length. Released Precautions for Base Expansion. Released precautions for Custom Button.
1.0.9	Modified the Content of Laser Nozzle Focal Length. Adjustment/Gripper Installation.
1.0.10	Released OpenMV instructions. Released Offline Teaching Content.
1.0.11	Modified the content about OpenMV Instructions.
1.0.12	Released Guidelines on 3D Printing catheter
1.0.13	Released robotic arm working range diagram.
1.0.14	Released 3D printing operation precautions.
1.0.15	Modified the content about Gcode in the Developer' s
1.0.16	Modified visual kit content.

1.0.17	Updated calibration card link.
1.1.23	Updated the official link.
4.10.2	No longer support 3D printing No longer support Bluetooth connection for mobile No longer support OpenMV No longer support engraving