

## Assembly of the Robotic Arm

Before assembling the Robotic Arm, we first need to adjust the 5 servos of the Robotic Arm by 90 degrees.

# 1. The basic assembly of the Robotic Arm

The basic assembly of the Robotic Arm is mainly divided into Four parts:

1. **Assemble the Pedestal**
2. **Assemble the Mechanical Arm**
3. **Assemble the Pedestal and the Mechanical Arm as a Basic Robotic Arm Combination.**
4. **Assemble the Mechanical hand.**

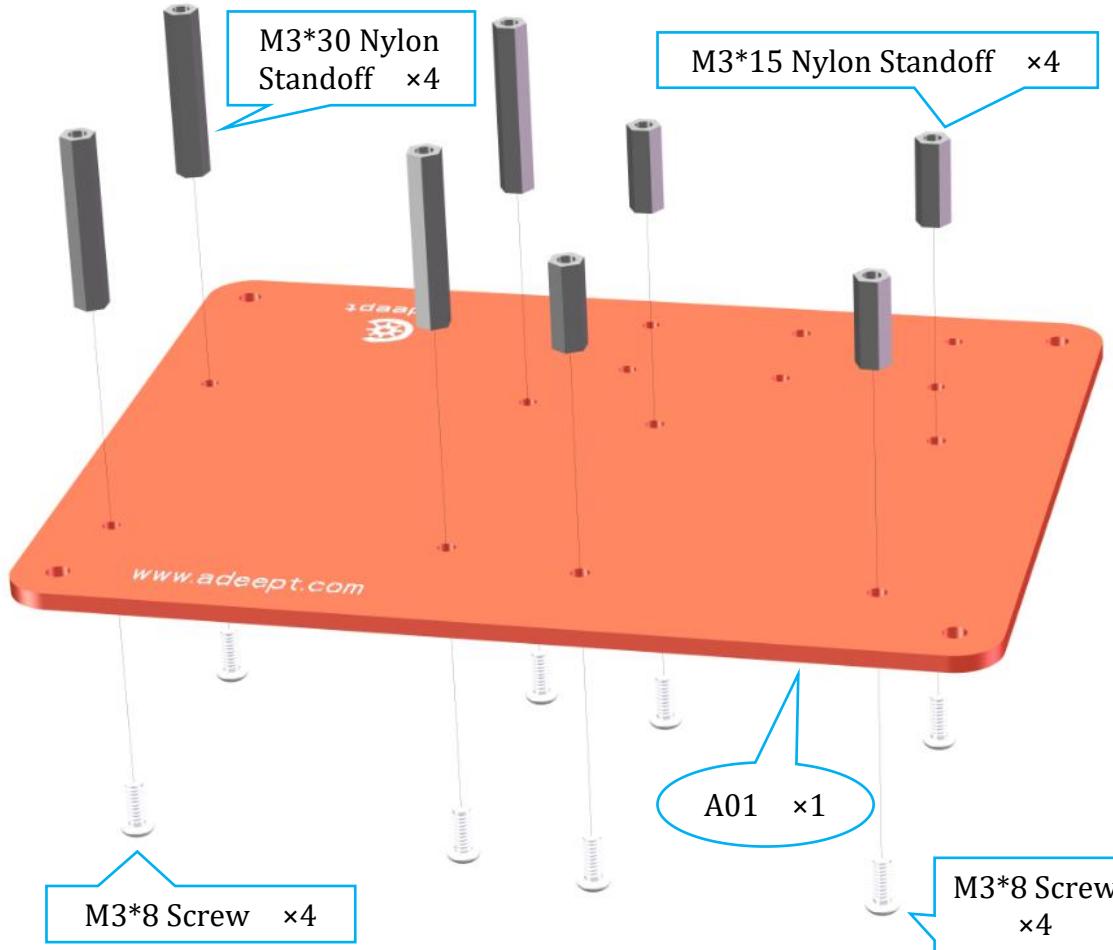
## 1.1. Assemble the Pedestal

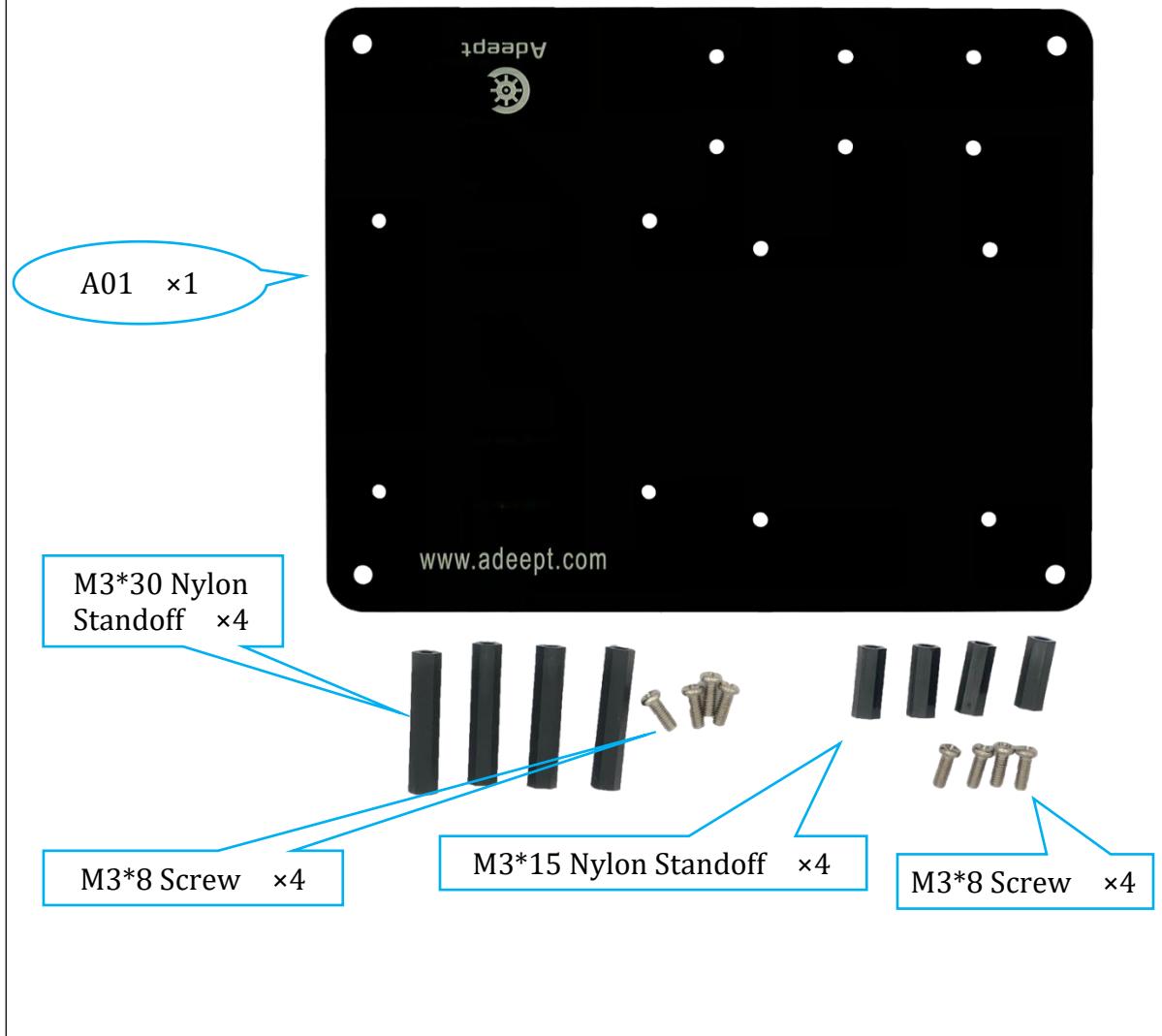
### 1.1.1. Assemble the Substrate

1. Fix M3\*15 and M3\*30 Nylon Standoffs to A01 acrylic plate with M3\*8 screws.

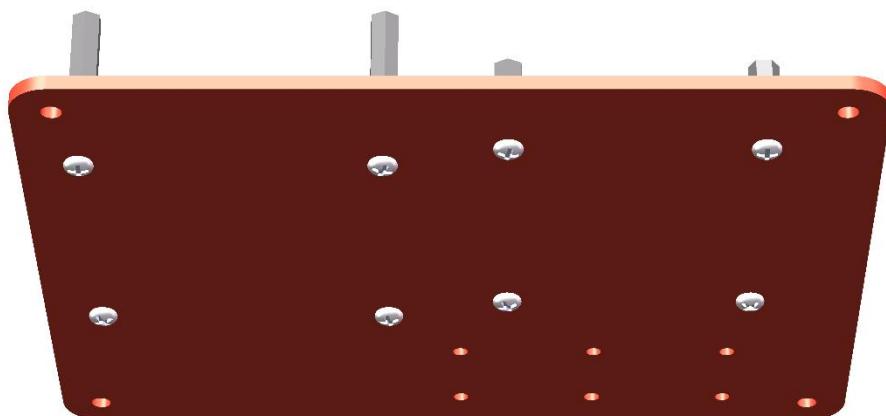
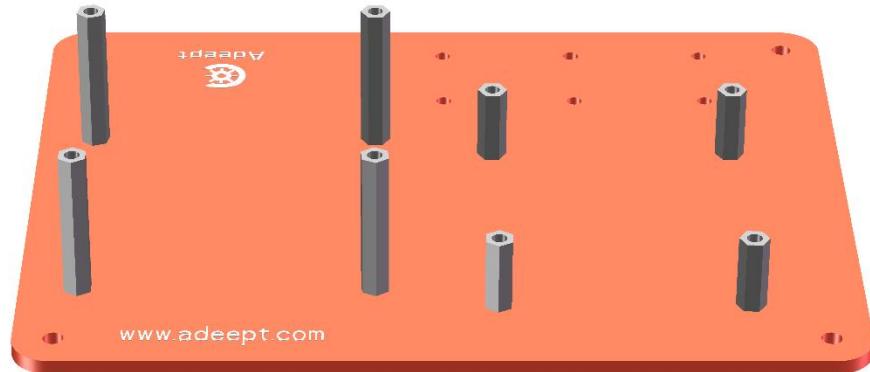
Assemble the following components

Model Diagram



*Physical Diagram*

## Effect diagram after assembling

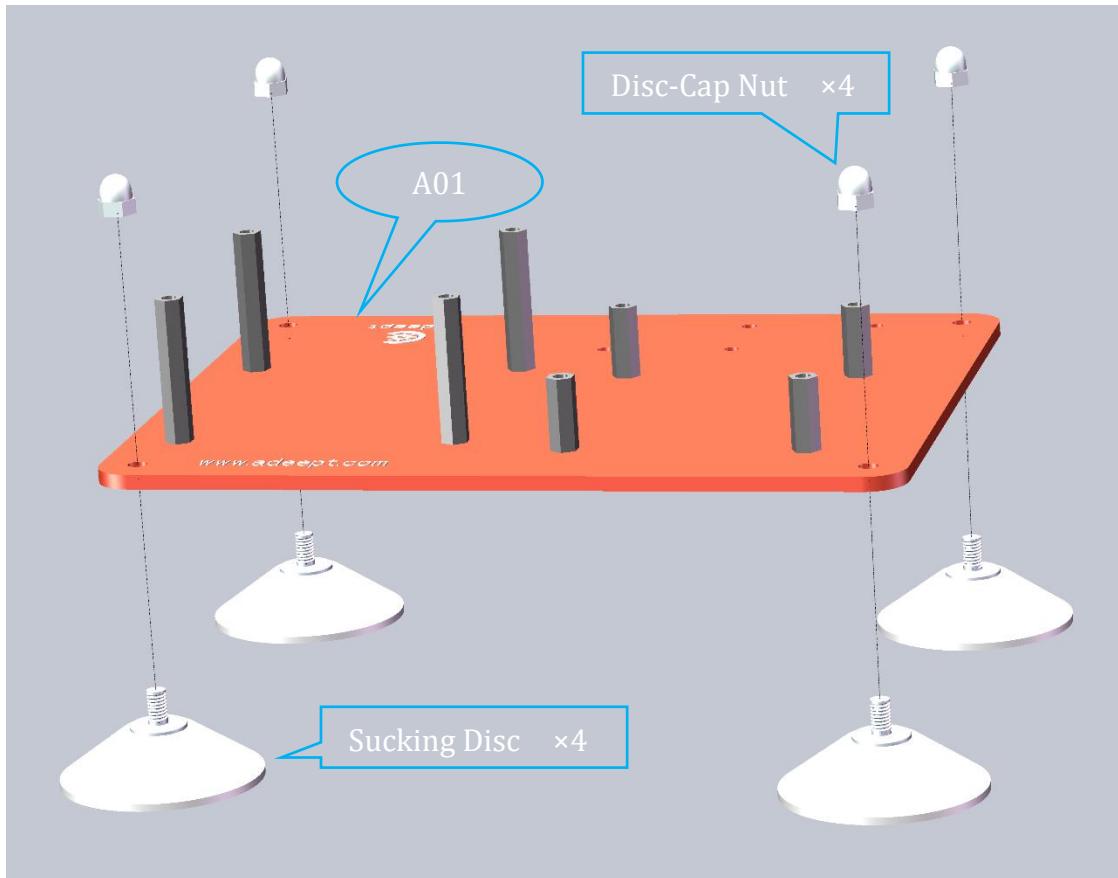
*Model Diagram*

*Physical Diagram*

## 2. Use Disc-Cap Nut to fix Sucking Disc to A01 acrylic plate.

Assemble the following components

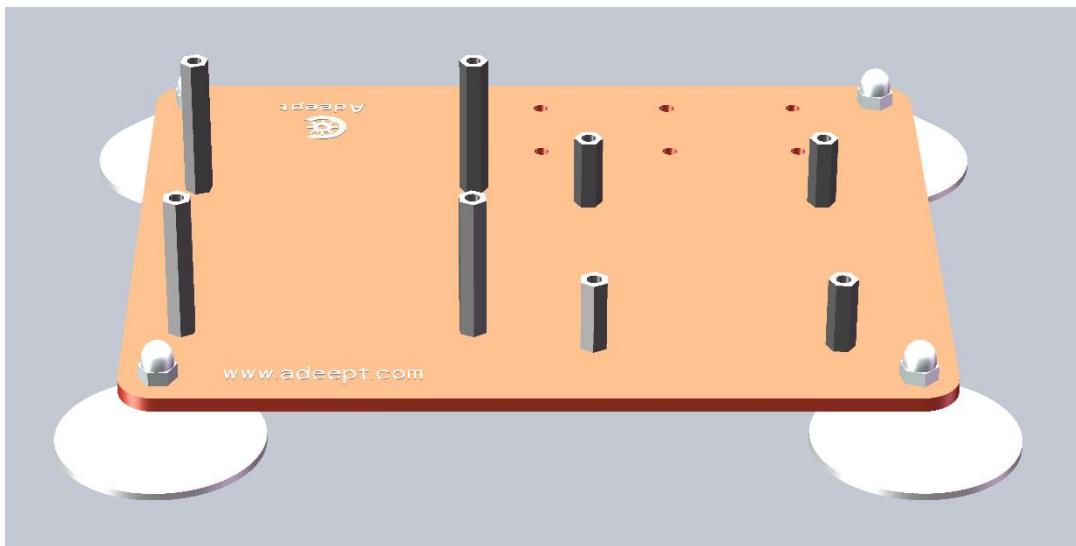
*Model Diagram*



*Physical Diagram*

### Effect diagram after assembling

*Model Diagram*



*Physical Diagram*

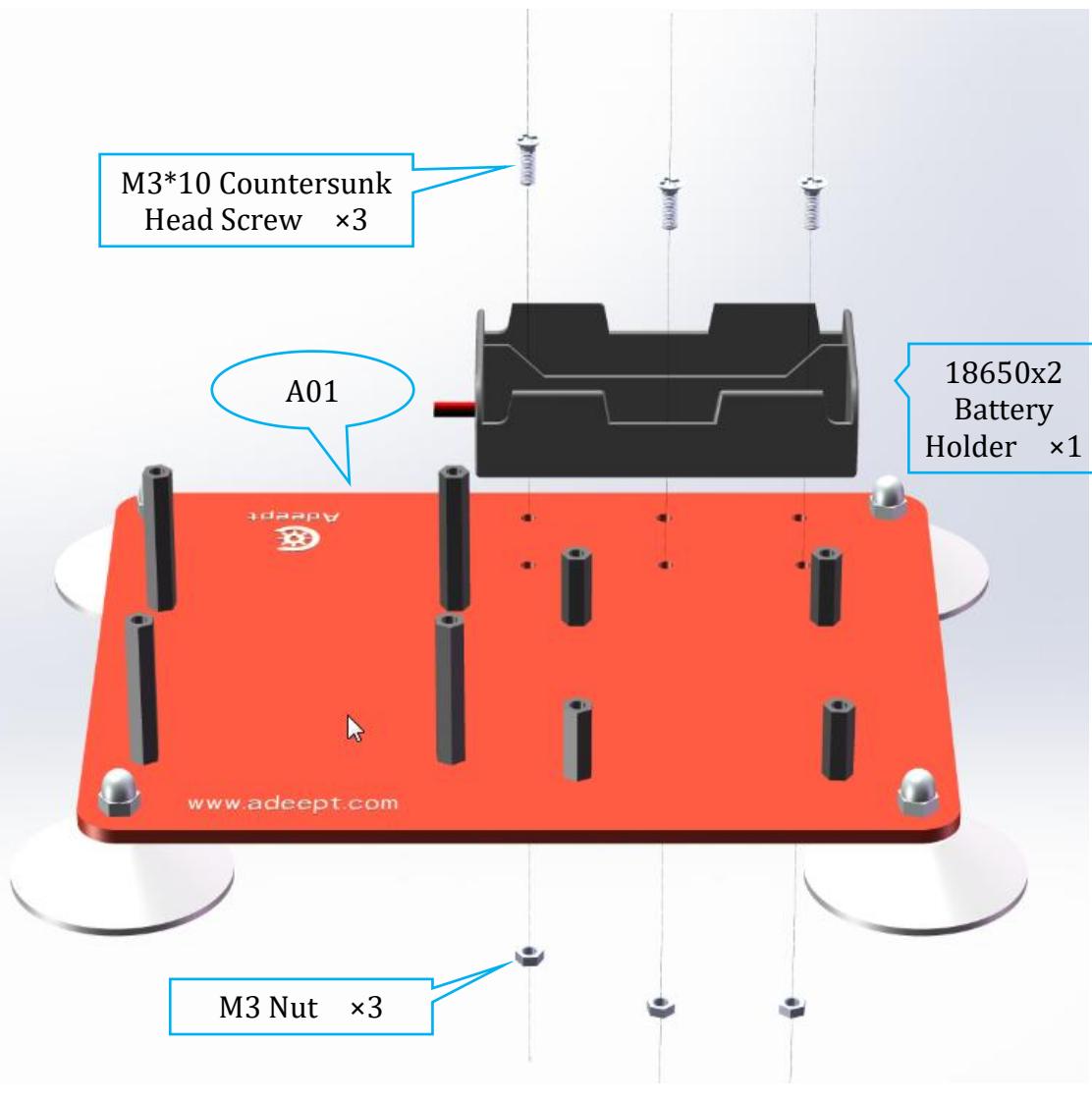


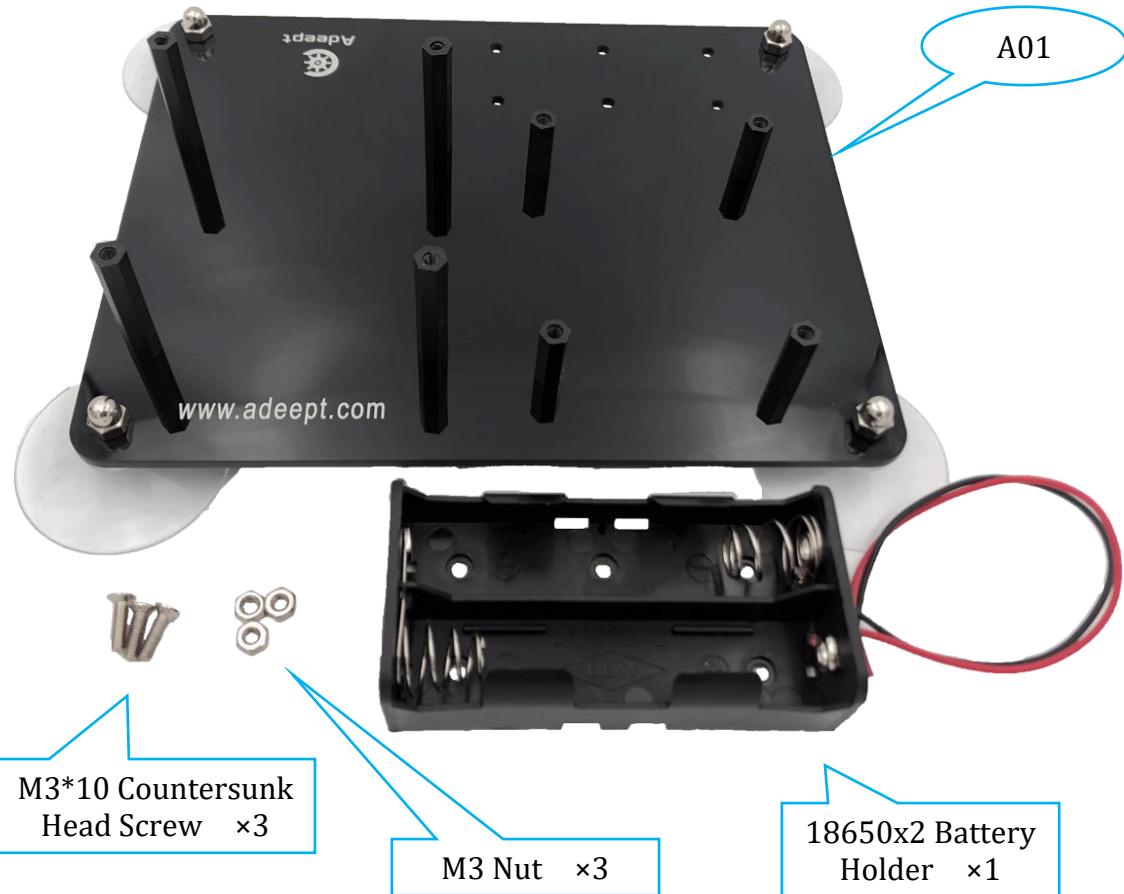
### 1.1.2. Assemble the Battery Holder

3. Use M3\*10 Countersunk Head Screw and M3 Nut to fix Battery Holder to A01 acrylic plate.

Assemble the following components

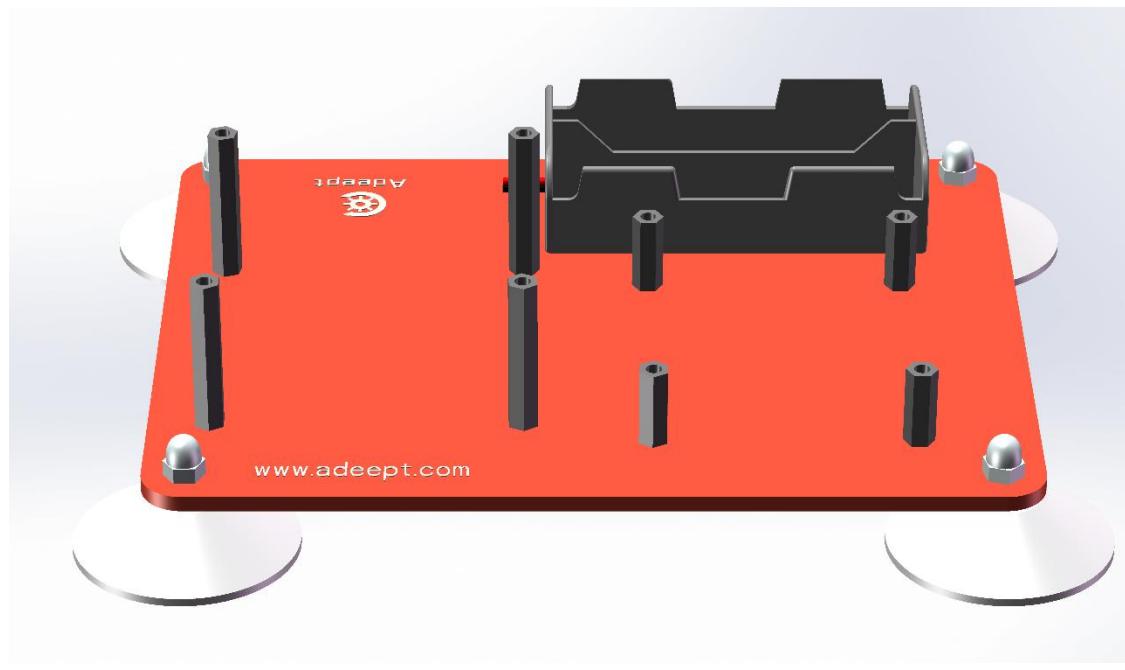
*Model Diagram*



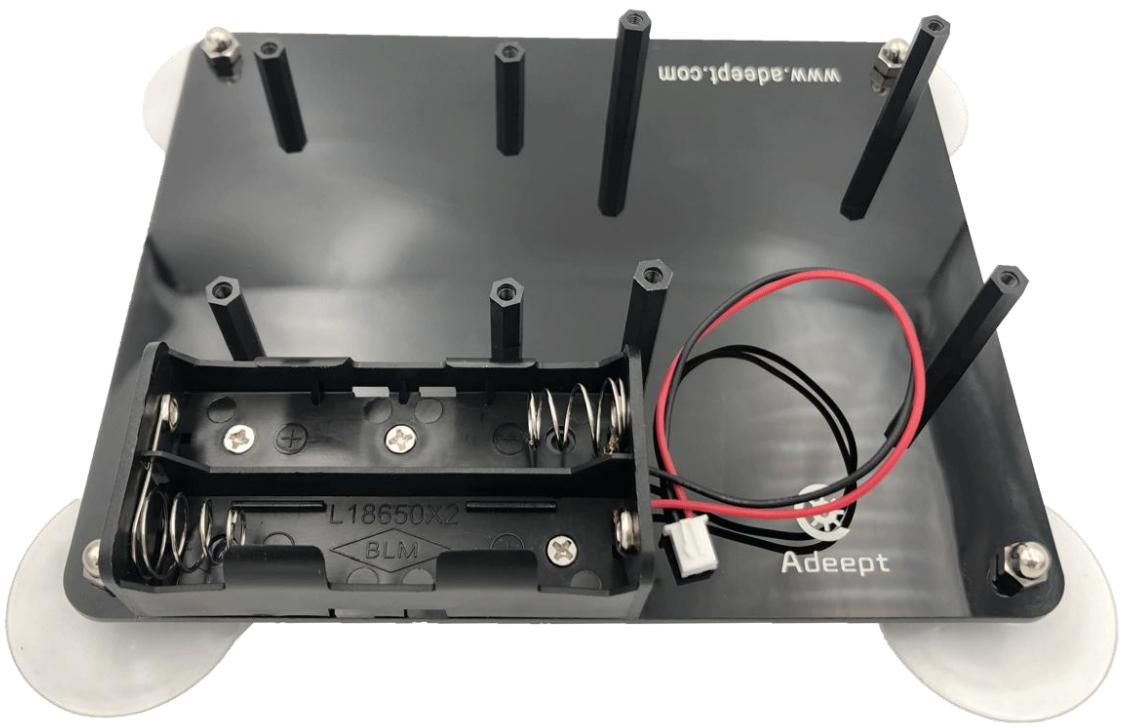
*Physical Diagram*

## Effect diagram after assembling

Model Diagram

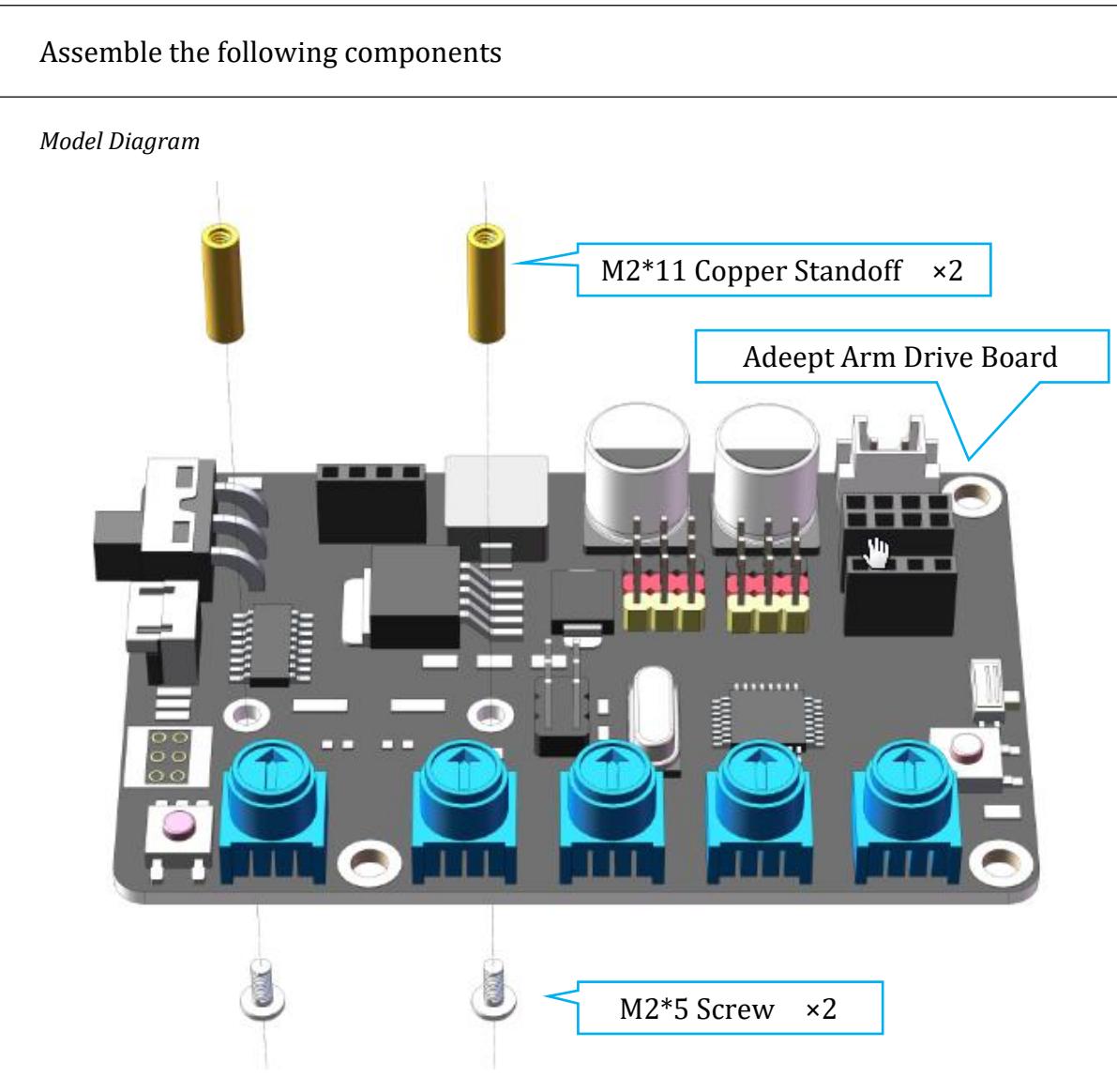


Physical Diagram

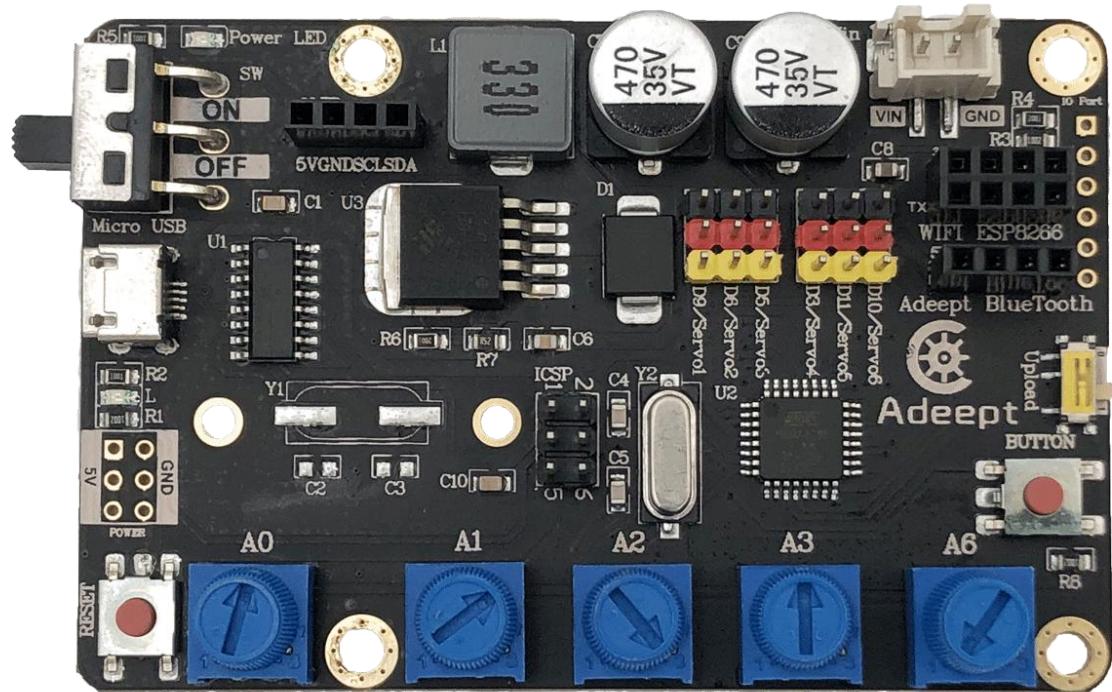


### 1.1.3. Assemble Adeept Arm Drive Board

4. Use M2\*5 Screws to fix the M2\*11 Copper Standoff to Adeept Arm Drive Board



### *Physical Diagram*



## Adept Arm Drive Board

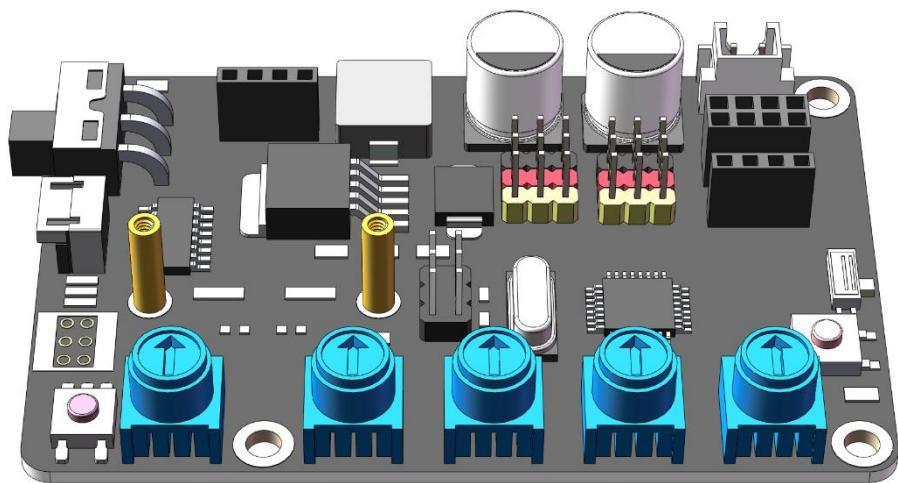
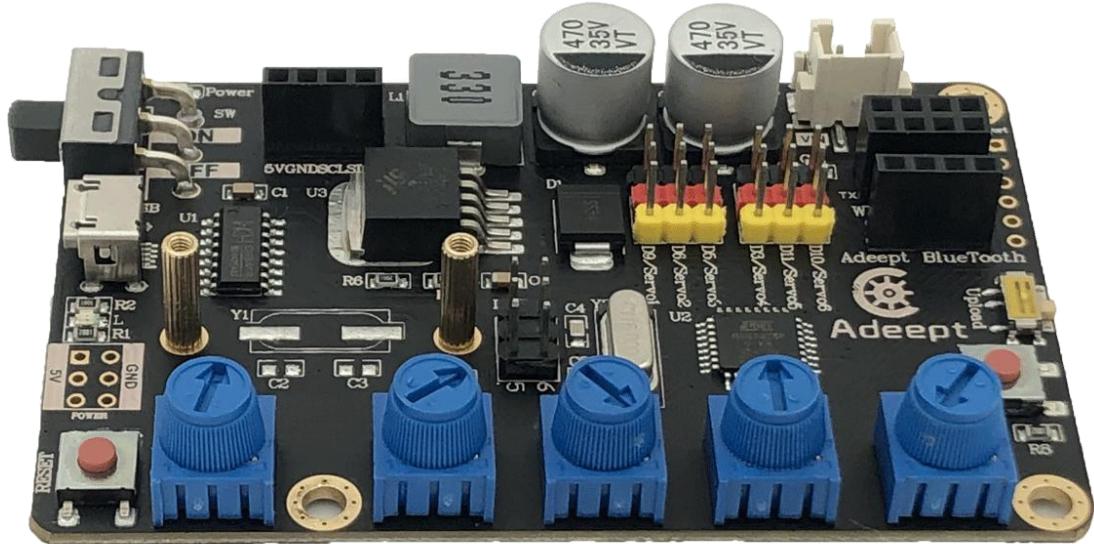


M2\*5 Screw ×2



M2\*11 Copper Standoff ×2

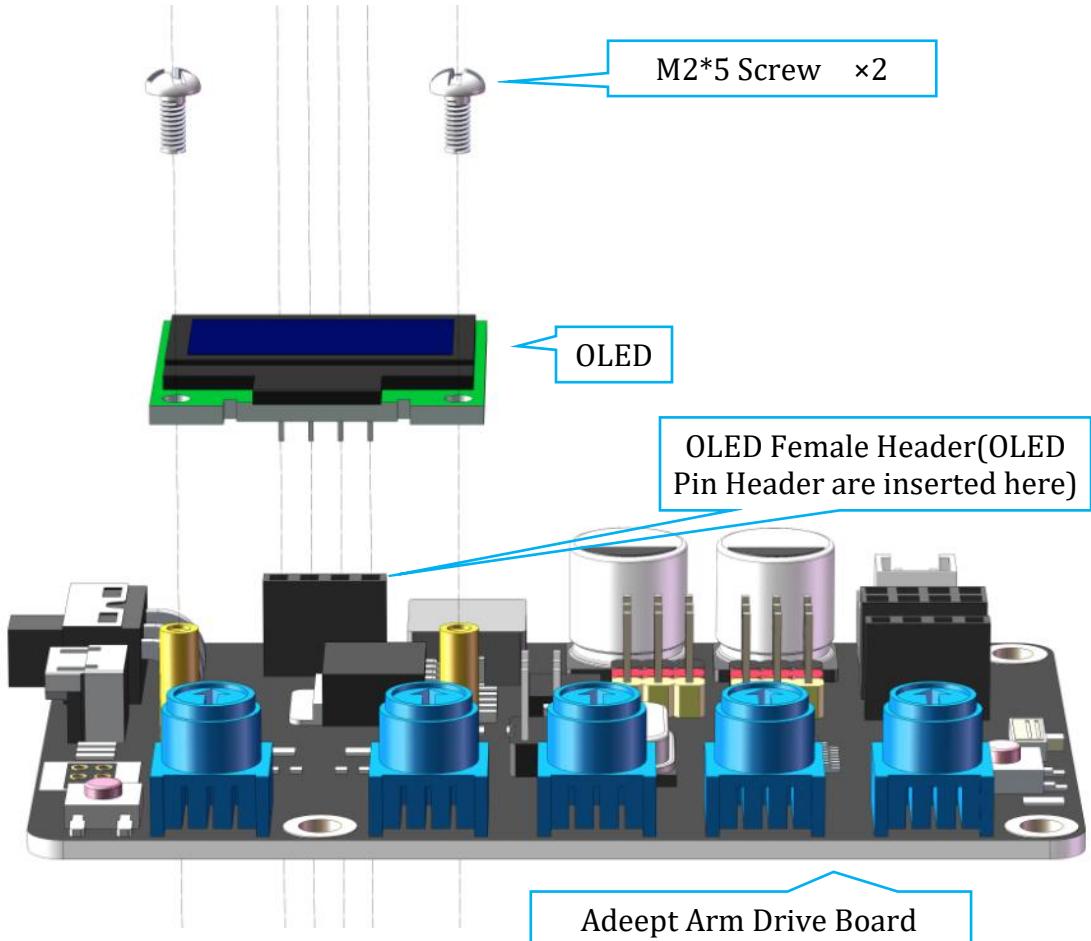
## Effect diagram after assembling

*Model Diagram**Physical Diagram*

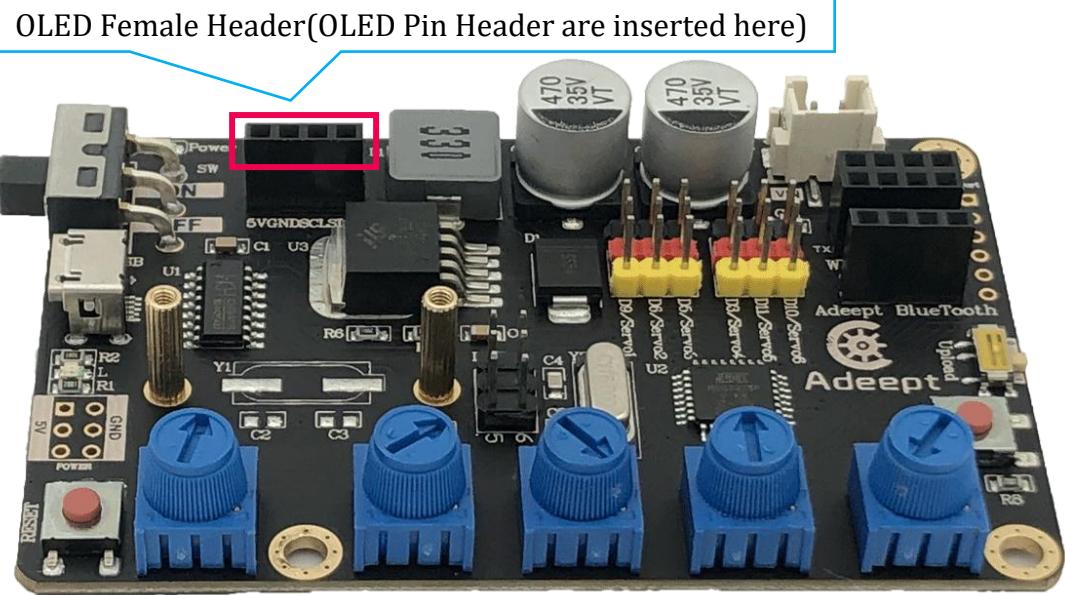
5. Insert the OLED Pin Header into the OLED Female Header on the drive board, and then use M2\*5 Screws to fix the OLED to the just fixed Copper Standoff.

Assemble the following components

*Model Diagram*



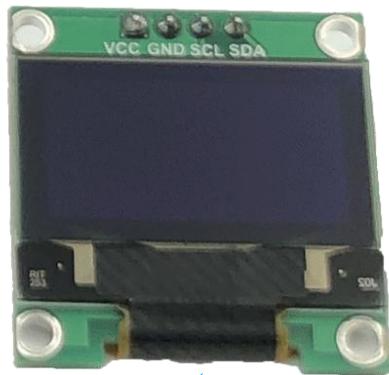
## Physical Diagram



Adeept Arm Drive Board

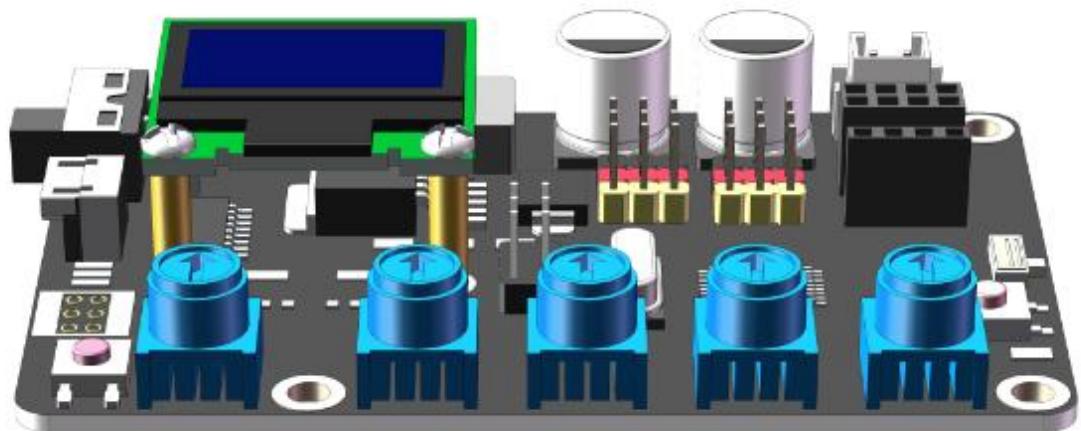
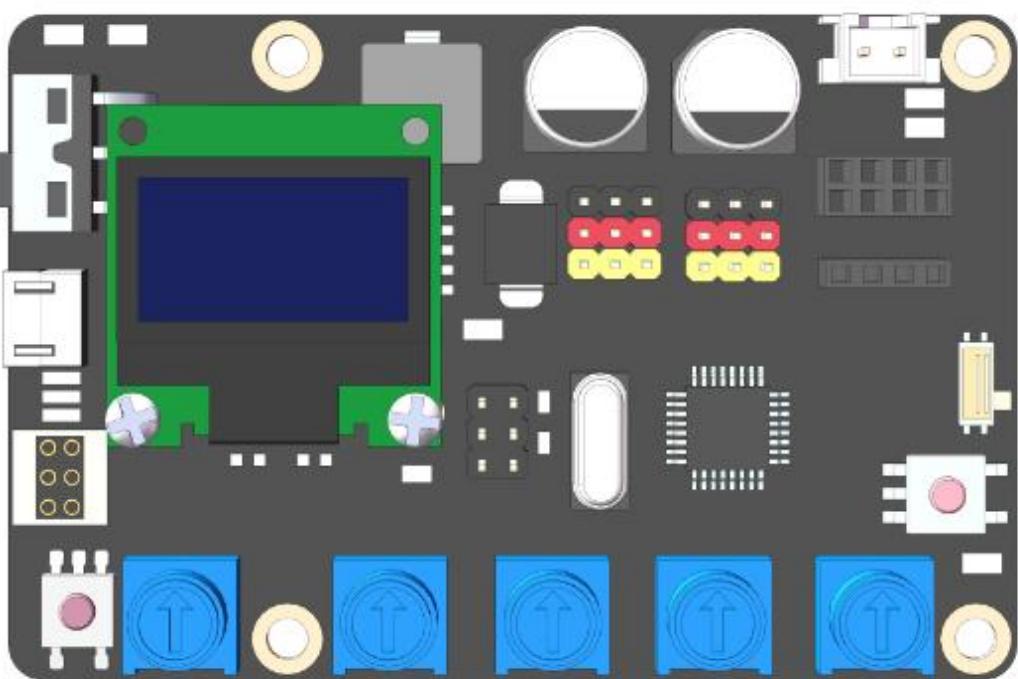


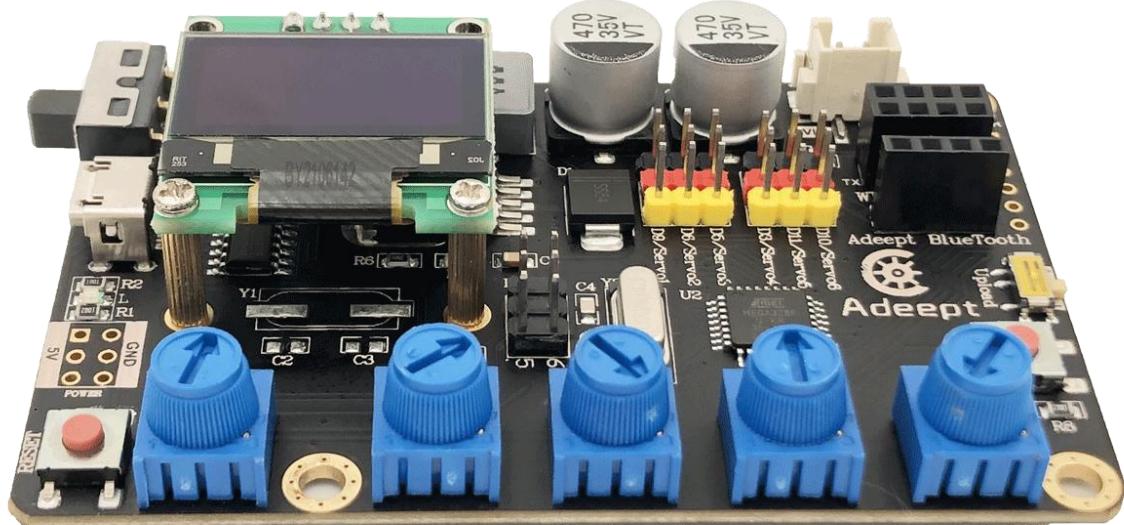
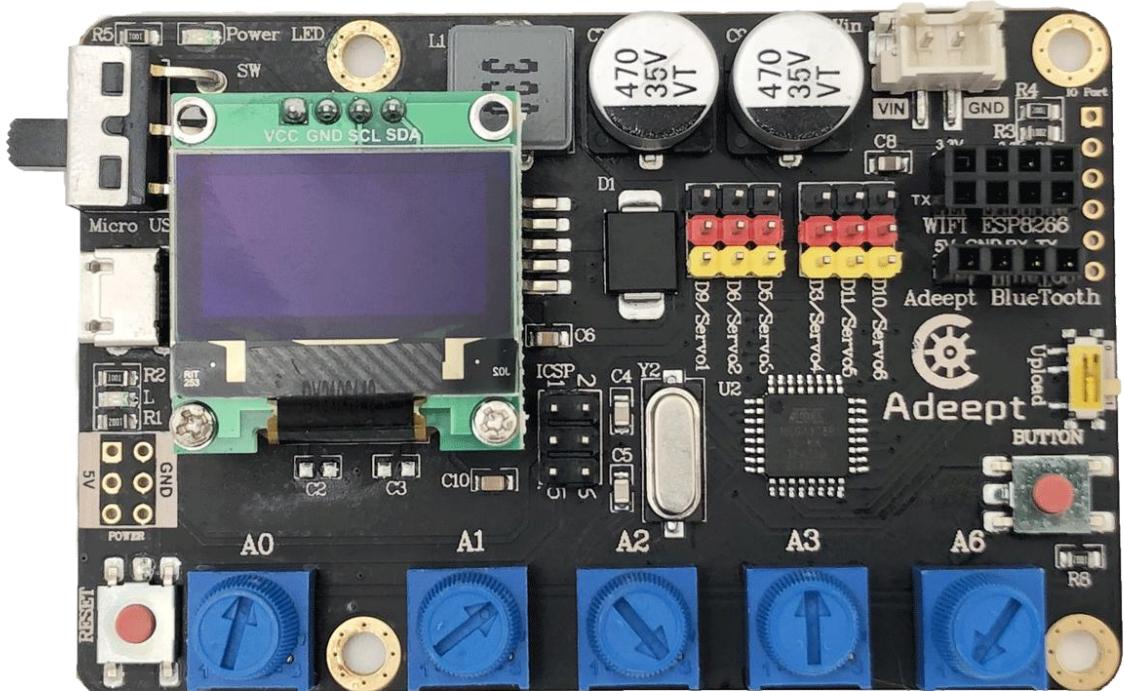
M2\*5 Screw ×2



OLED

## Effect diagram after assembling

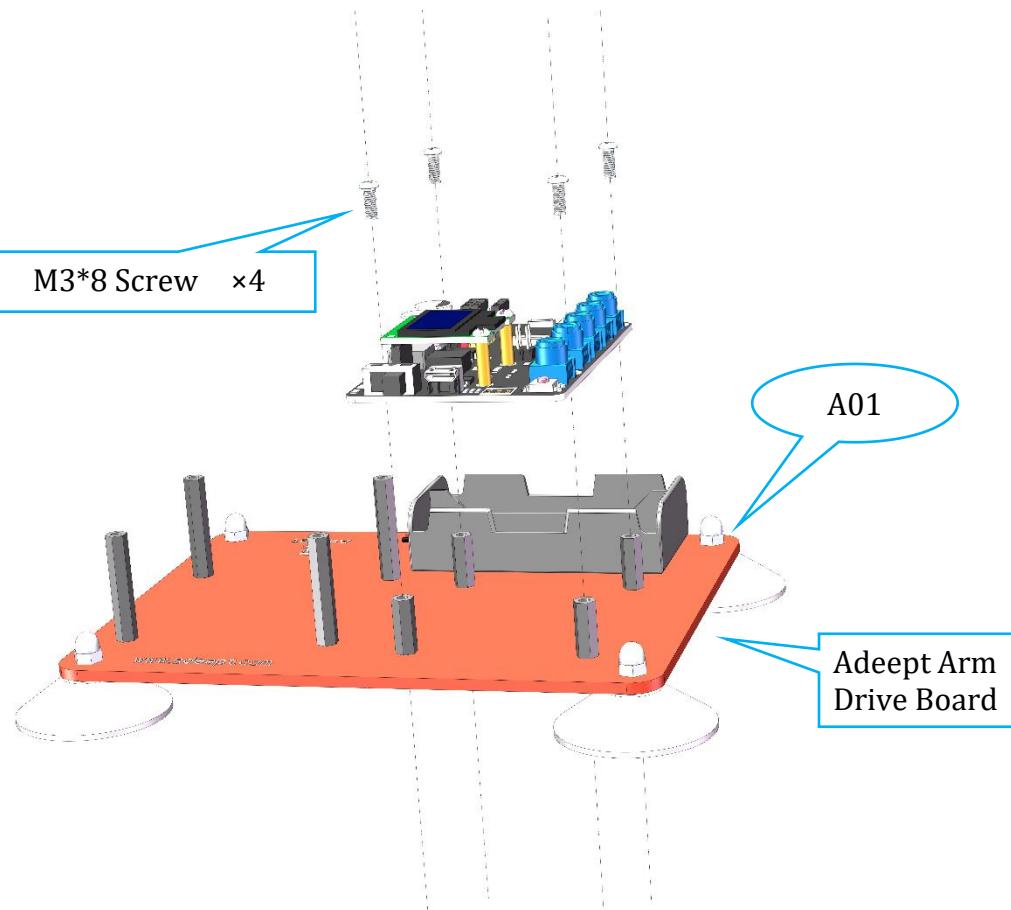
*Model Diagram**Physical Diagram*



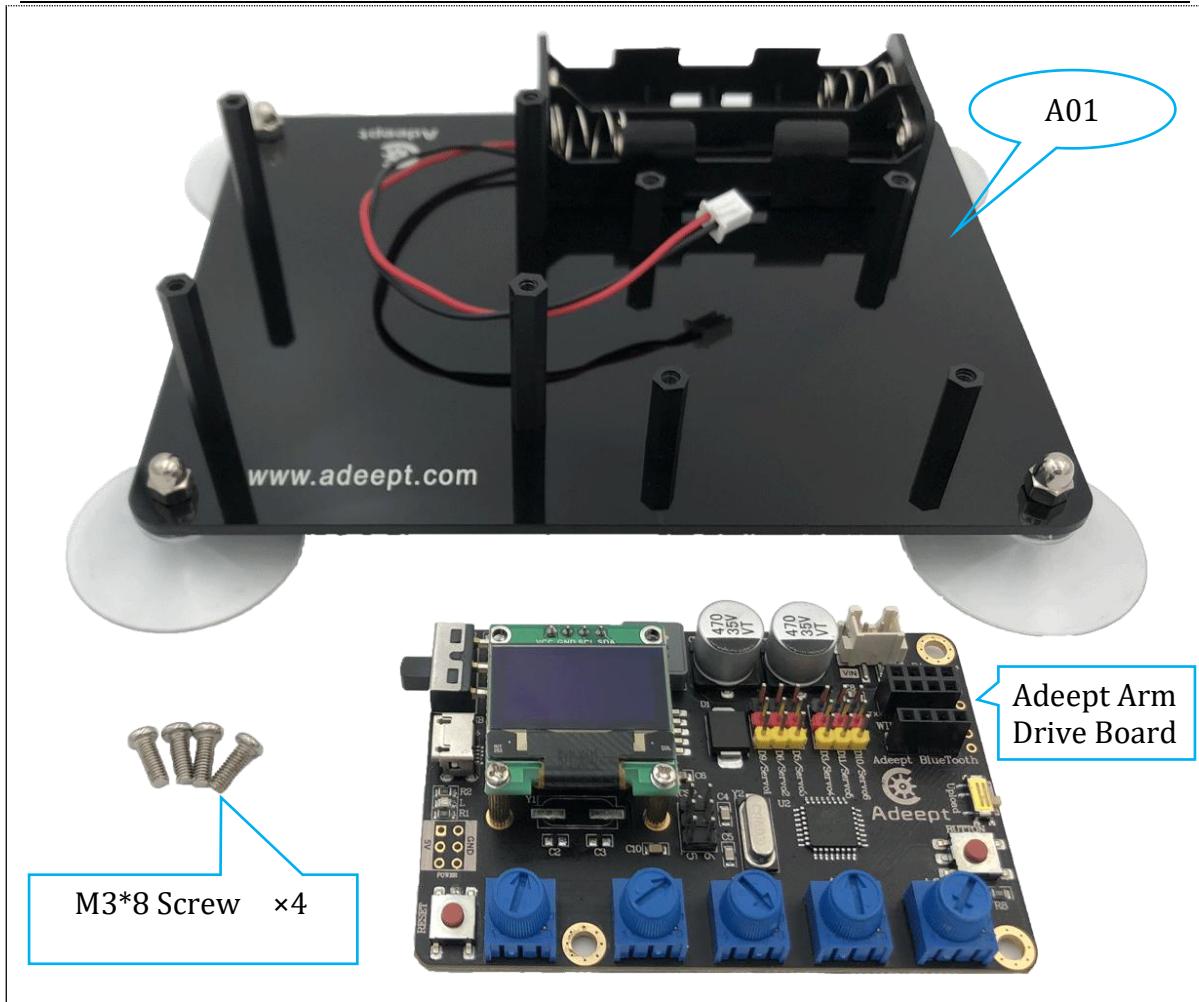
## 6. Fix Adeept Arm Drive Board to M3\*15 Nylon Standoffs on A01 acrylic plate.

Assemble the following components

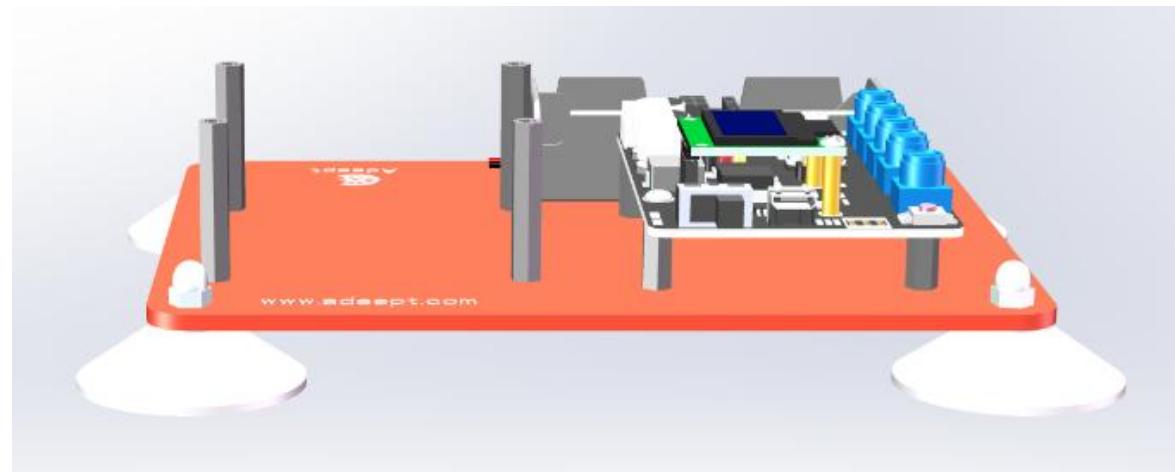
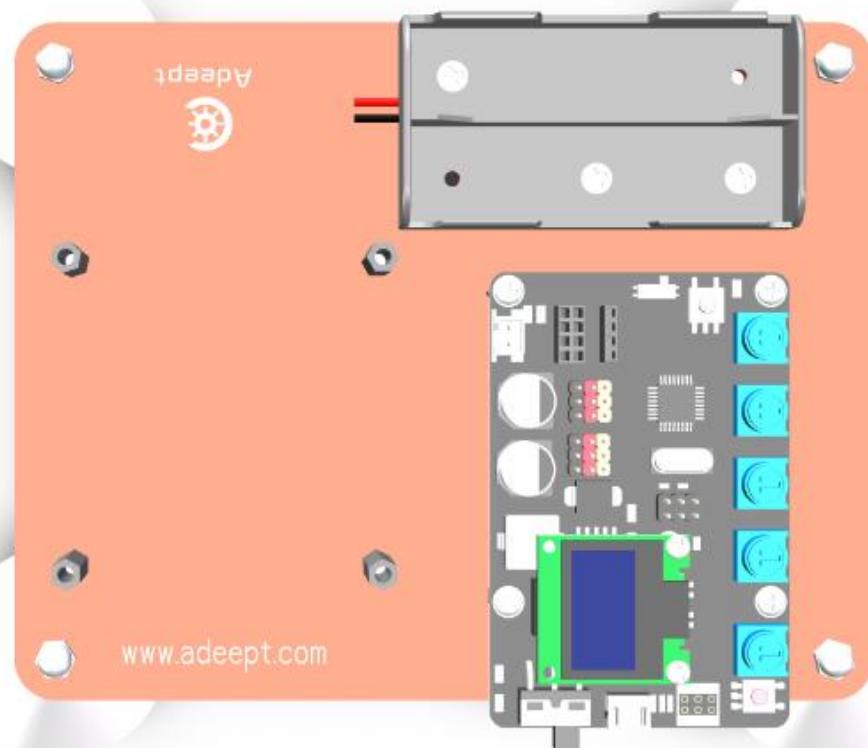
*Model Diagram*



*Physical Diagram*



## Effect diagram after assembling

*Model Diagram*

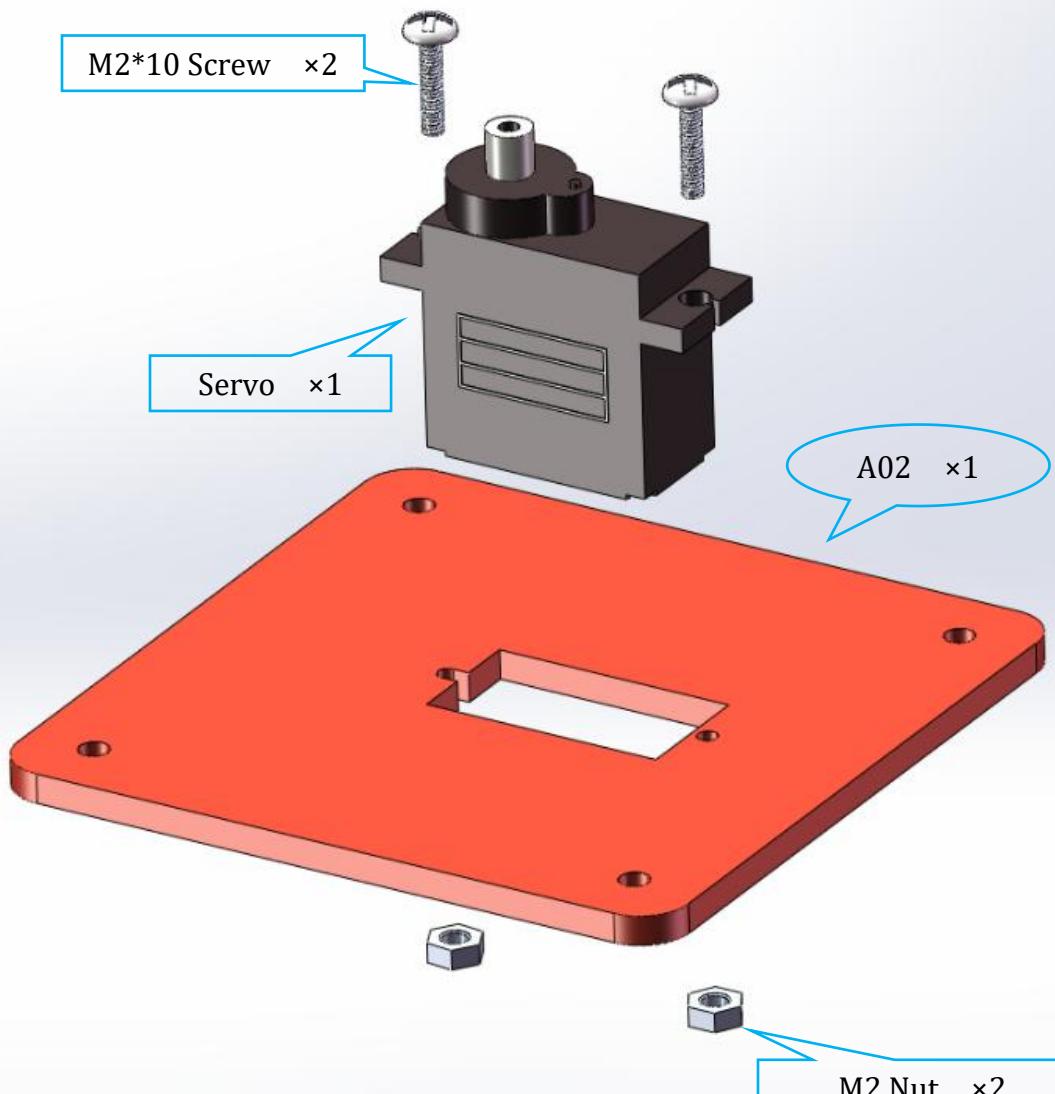
*Physical Diagram*

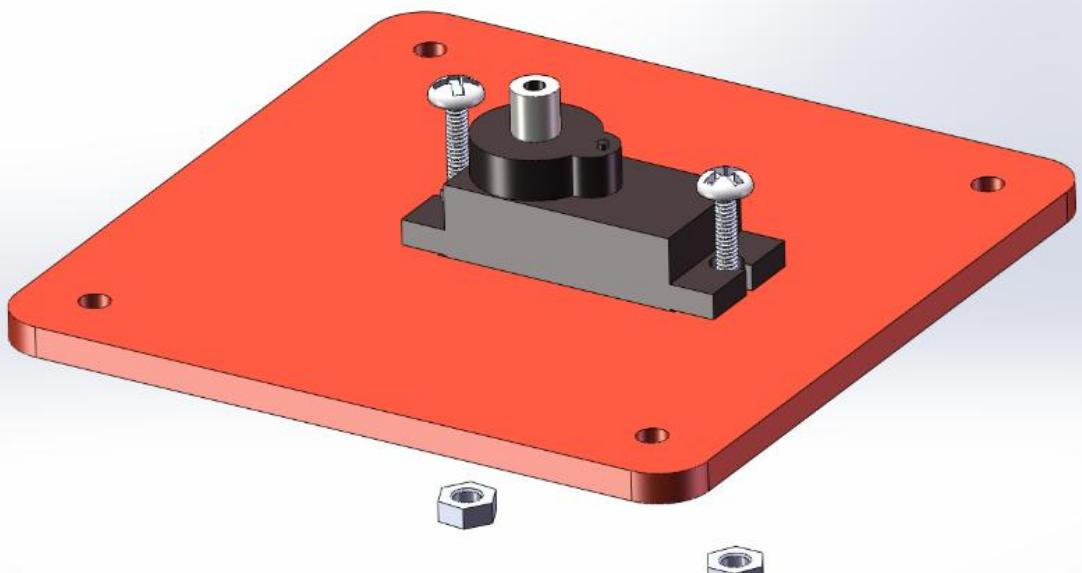
### 1.1.4. Assemble Turntable-Structure-Matrix

7. Fix a servo to A02 acrylic plate with M2\*10 Screws and M2 Nuts.

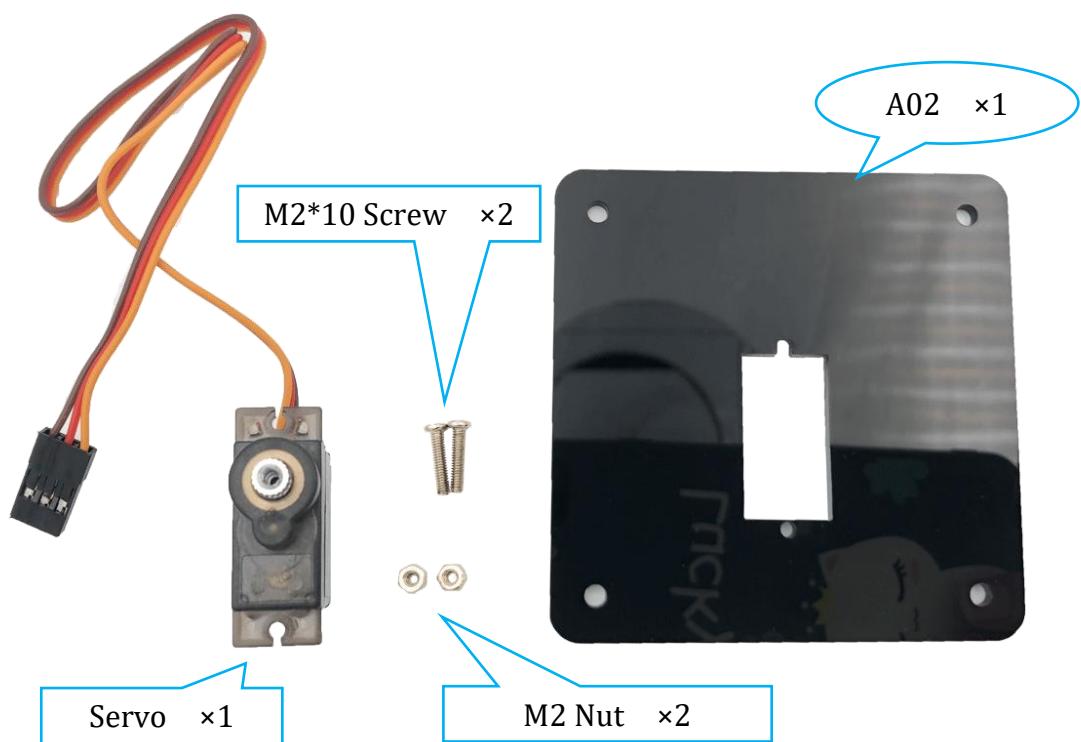
Assemble the following components

*Model Diagram*



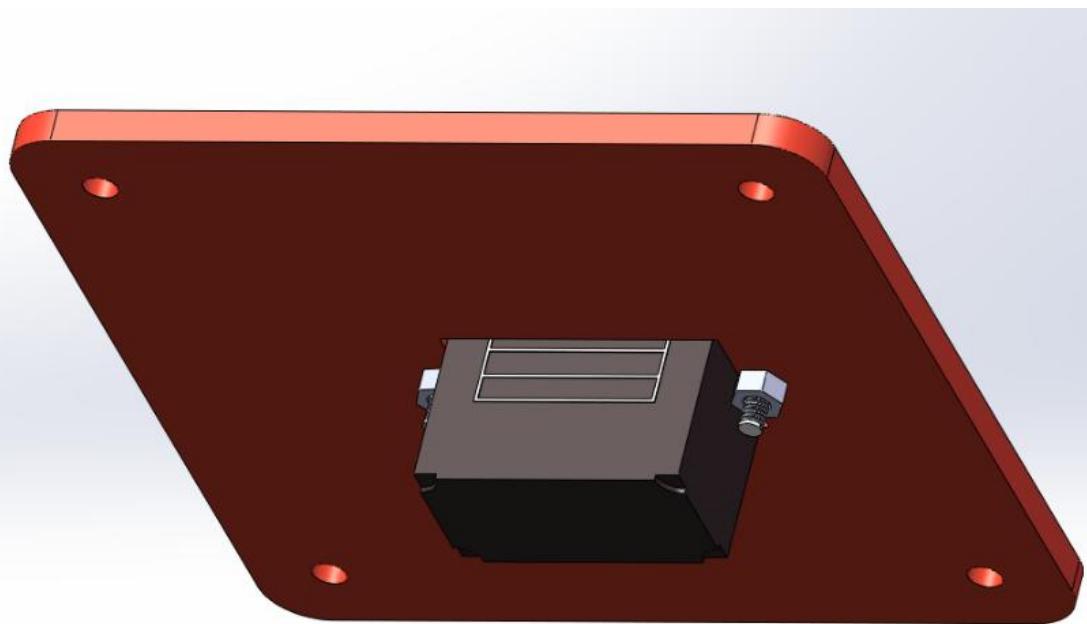
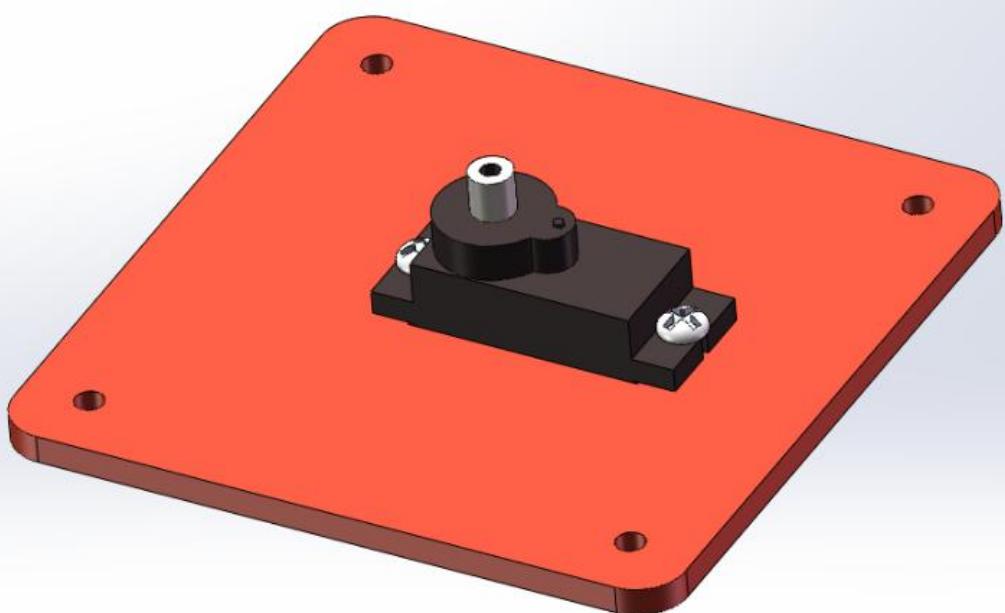


Physical Diagram



Assemble the following components

*Model Diagram*

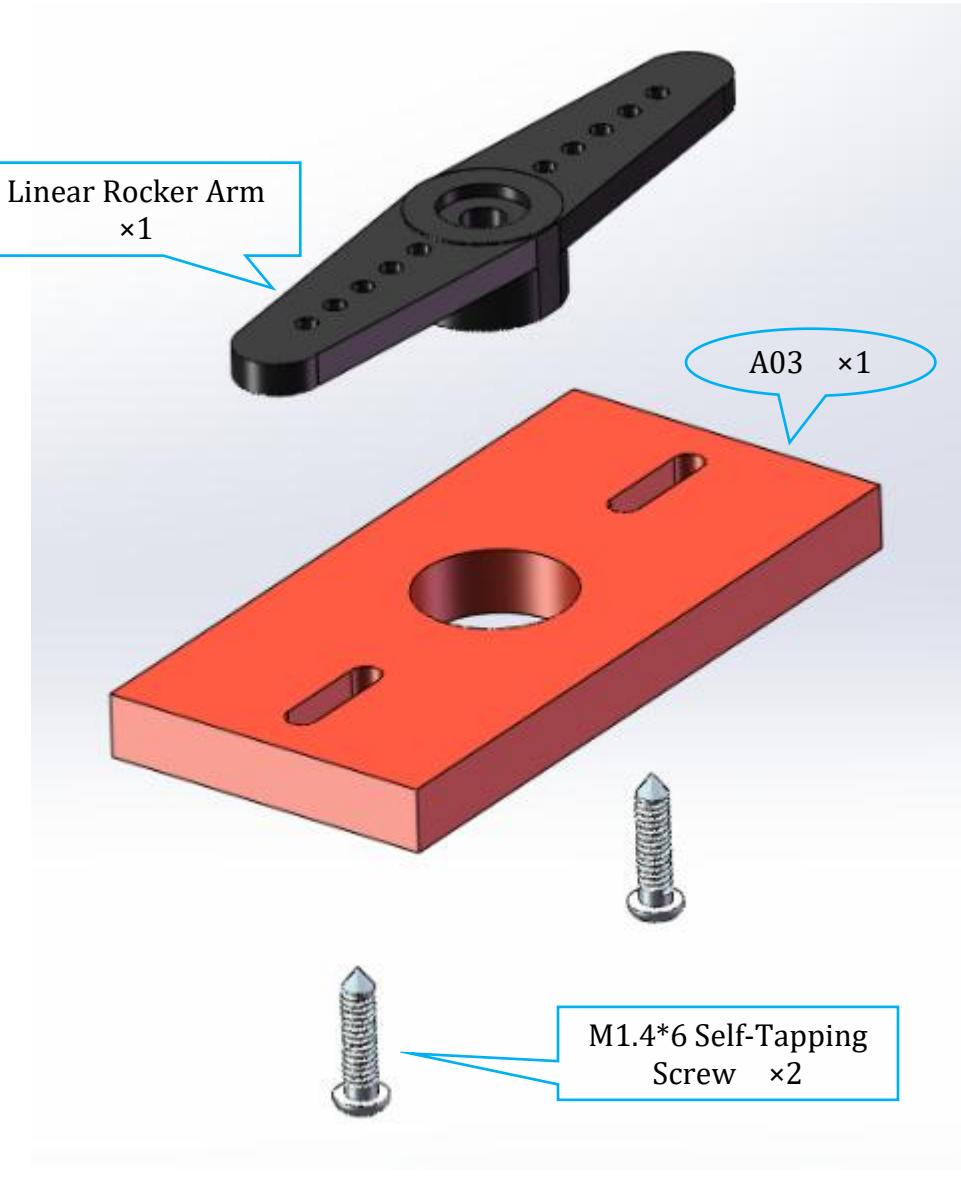


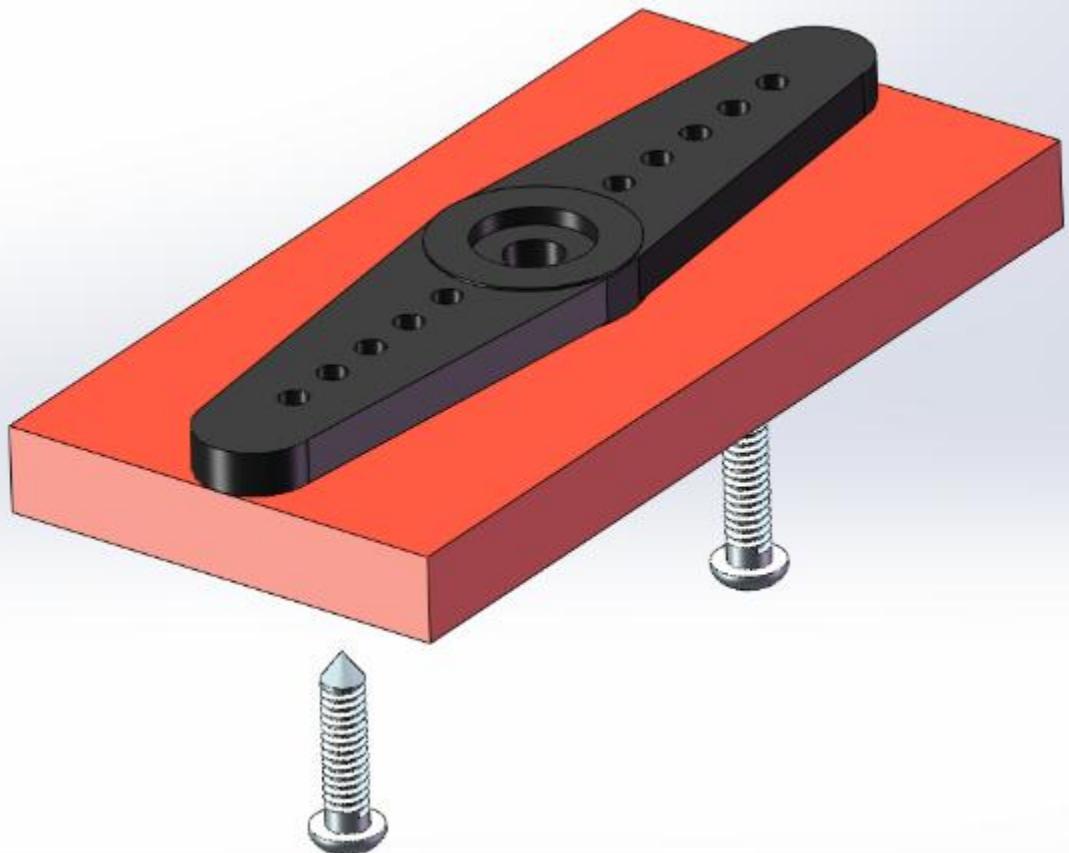
*Physical Diagram*

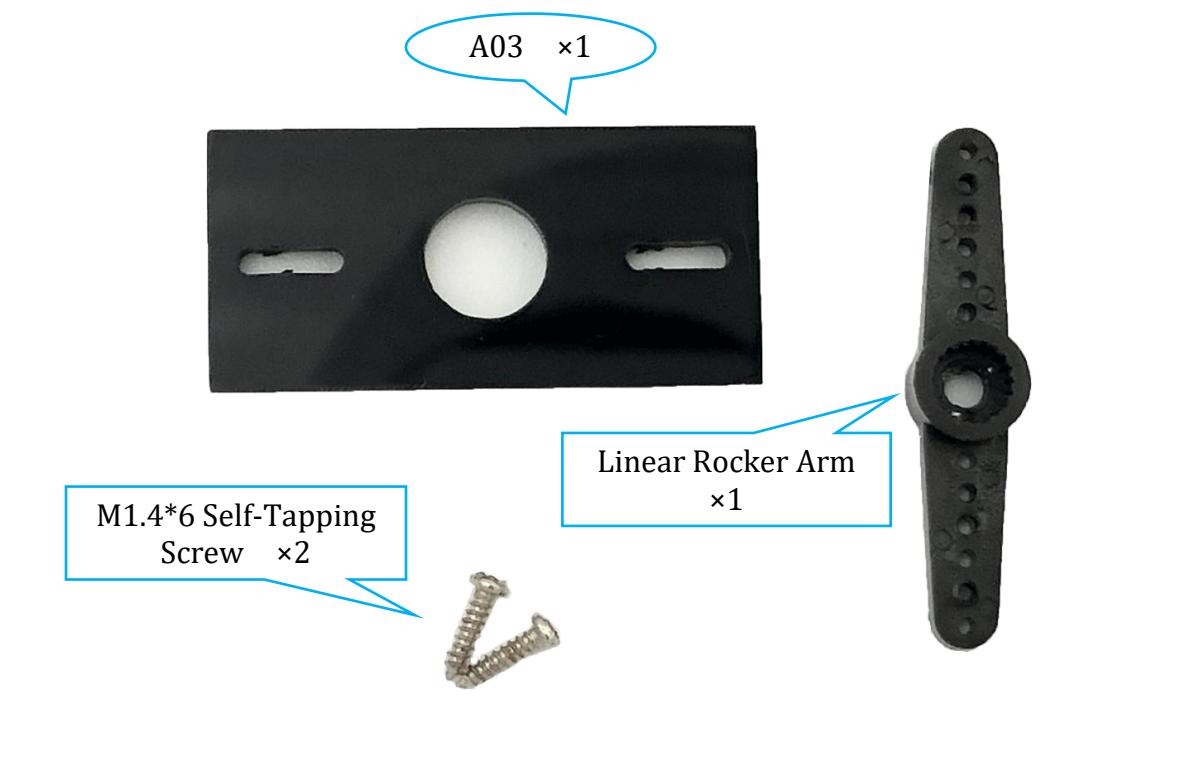
8. Fix the Linear Rocker Arm to the acrylic part of A03 acrylic plate with the Self-Tapping Screw ([Linear Rocker Arm provided by the Servo bag](#)).

Assemble the following components

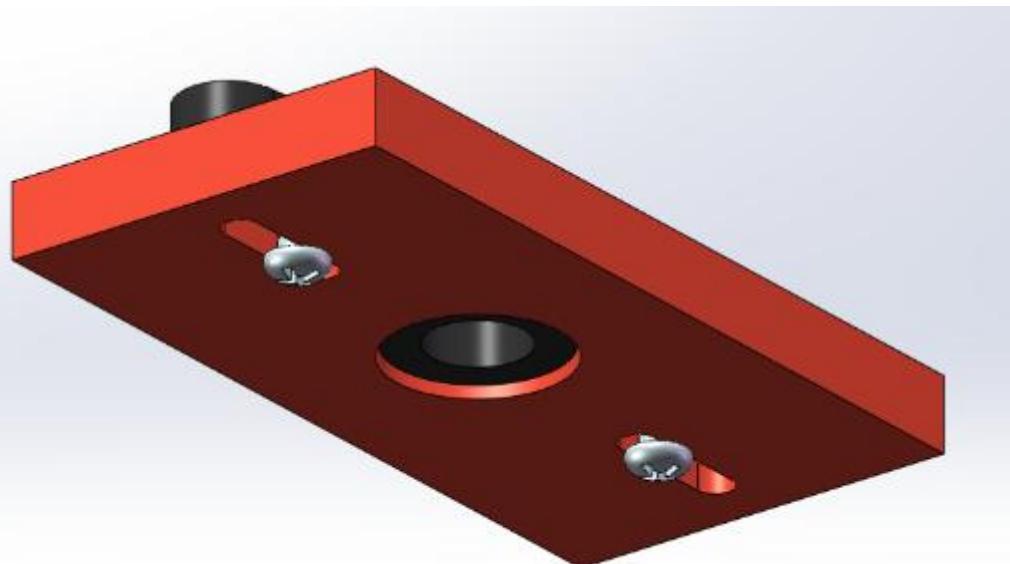
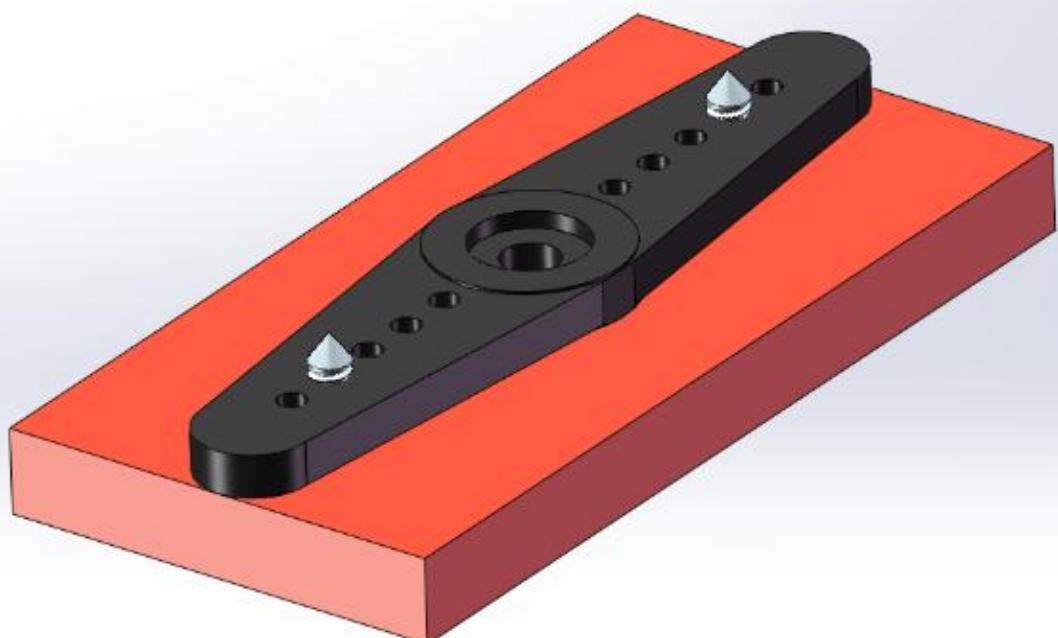
*Model Diagram*





*Physical Diagram*

## Effect diagram after assembling

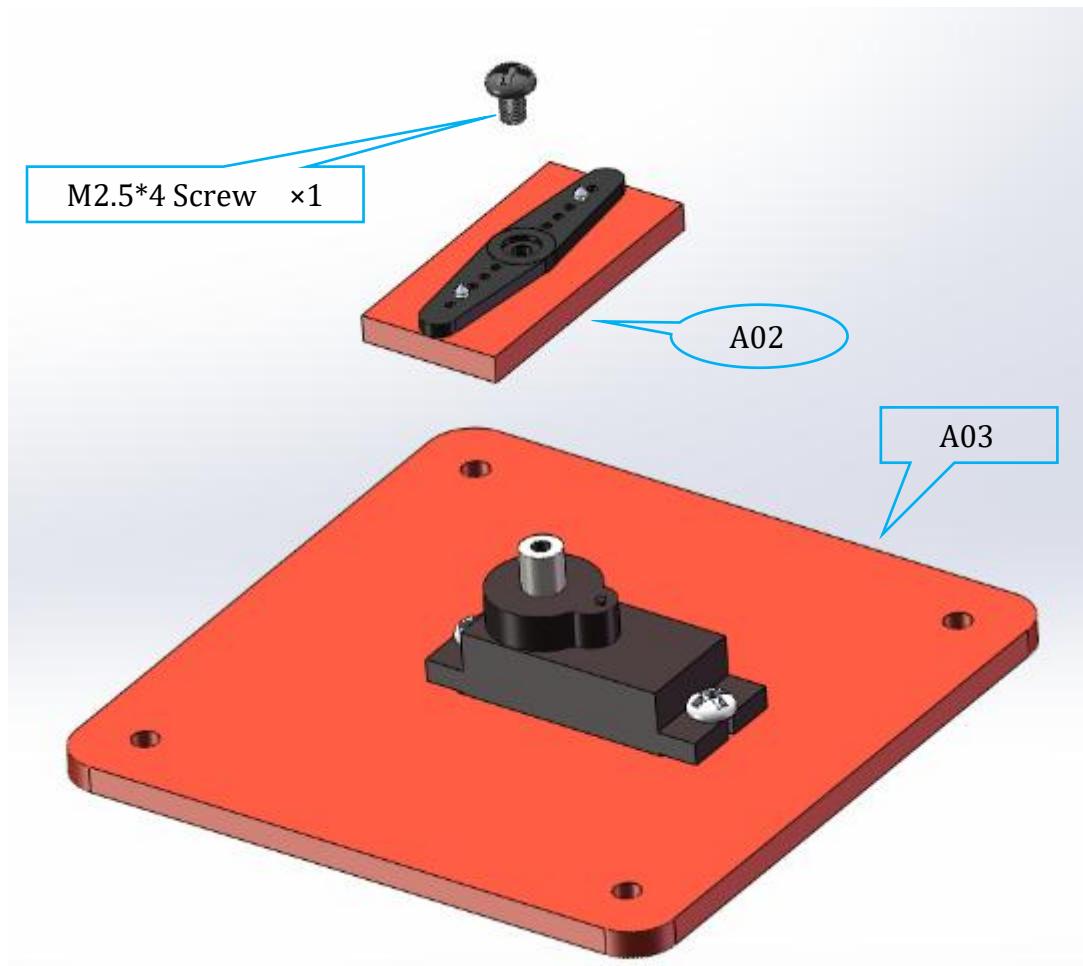
*Model Diagram**Physical Diagram*

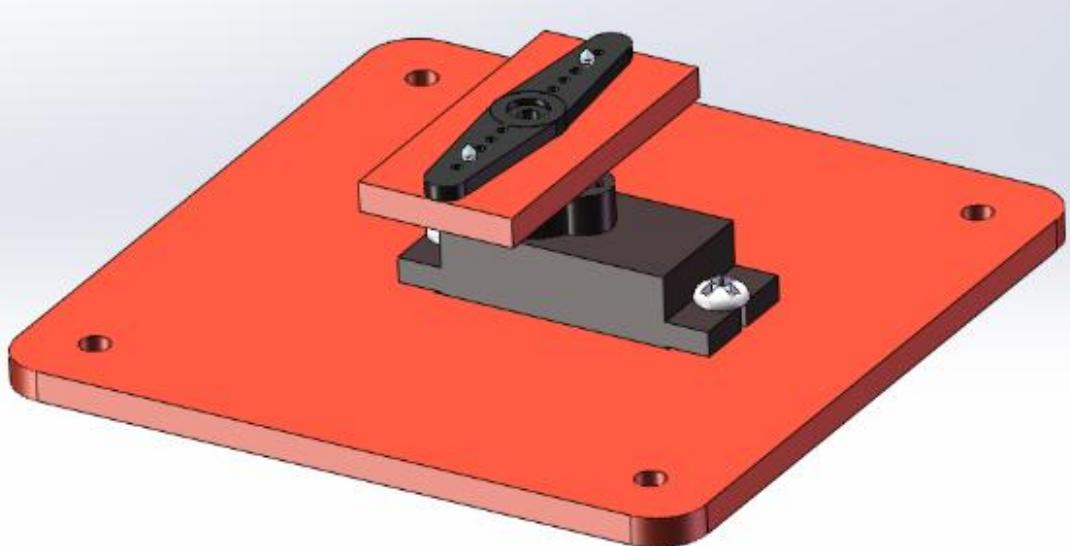


9. Fix the Rocker Arm on A03 acrylic plate to the Servo in the A02 acrylic plate with the M2.5\*4 Screw (**M2.5\*4 Screw provided by the Servo bag**).

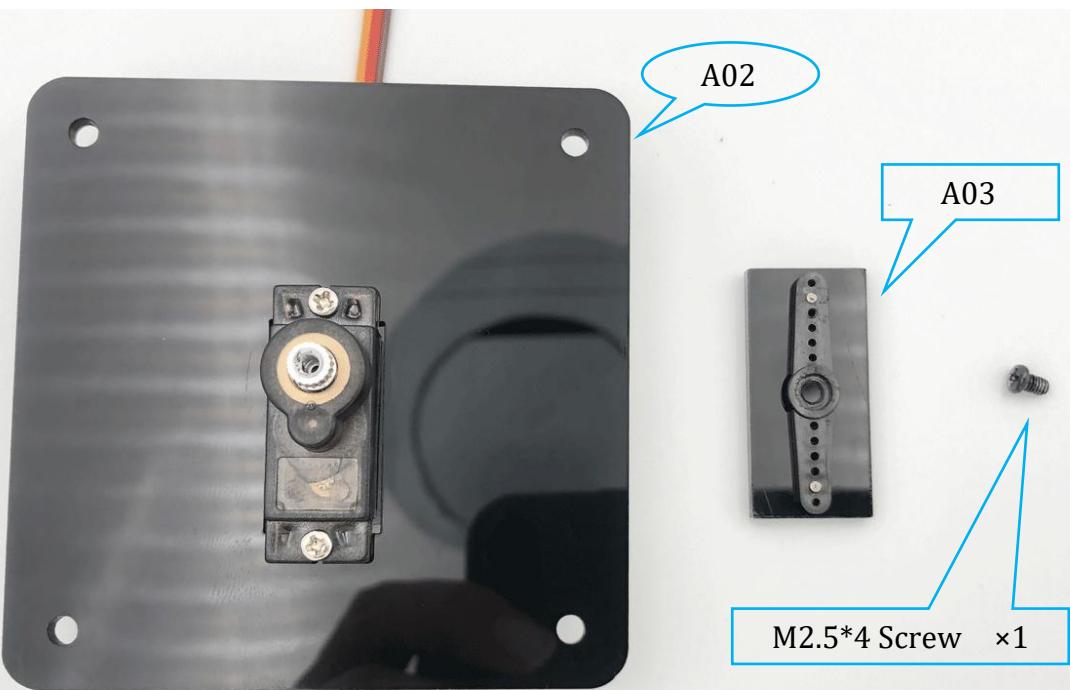
Assemble the following components

*Model Diagram*

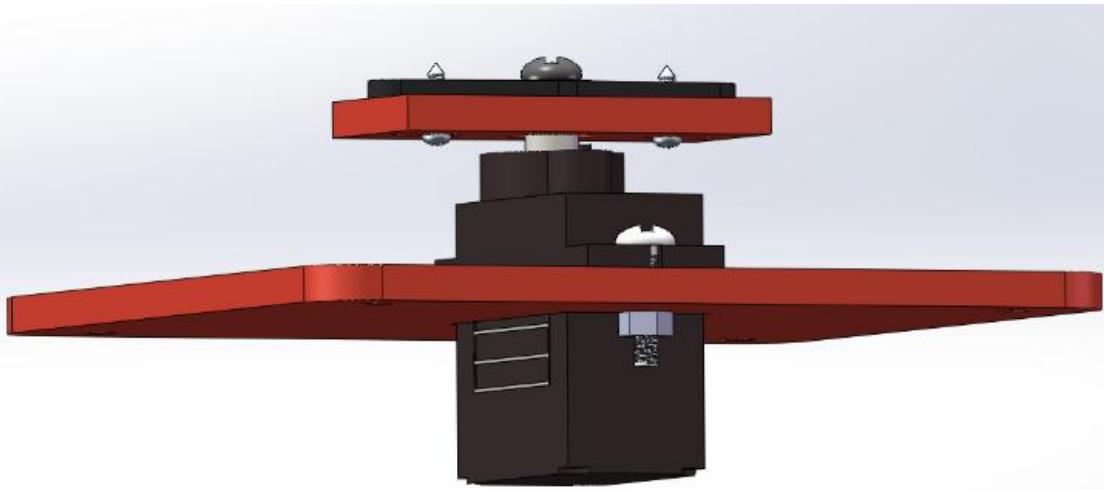
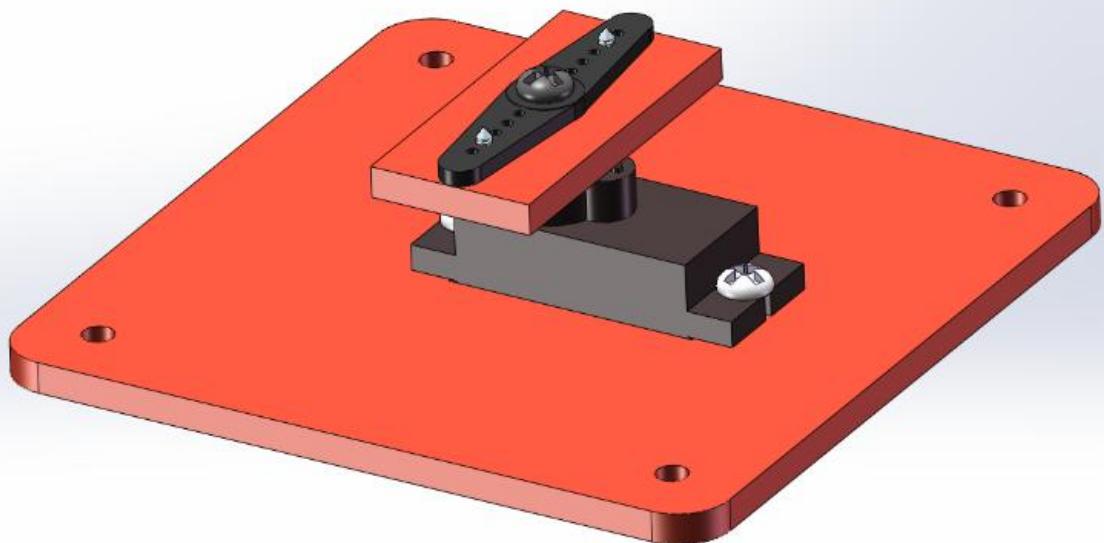




*Physical Diagram*



## Effect diagram after assembling

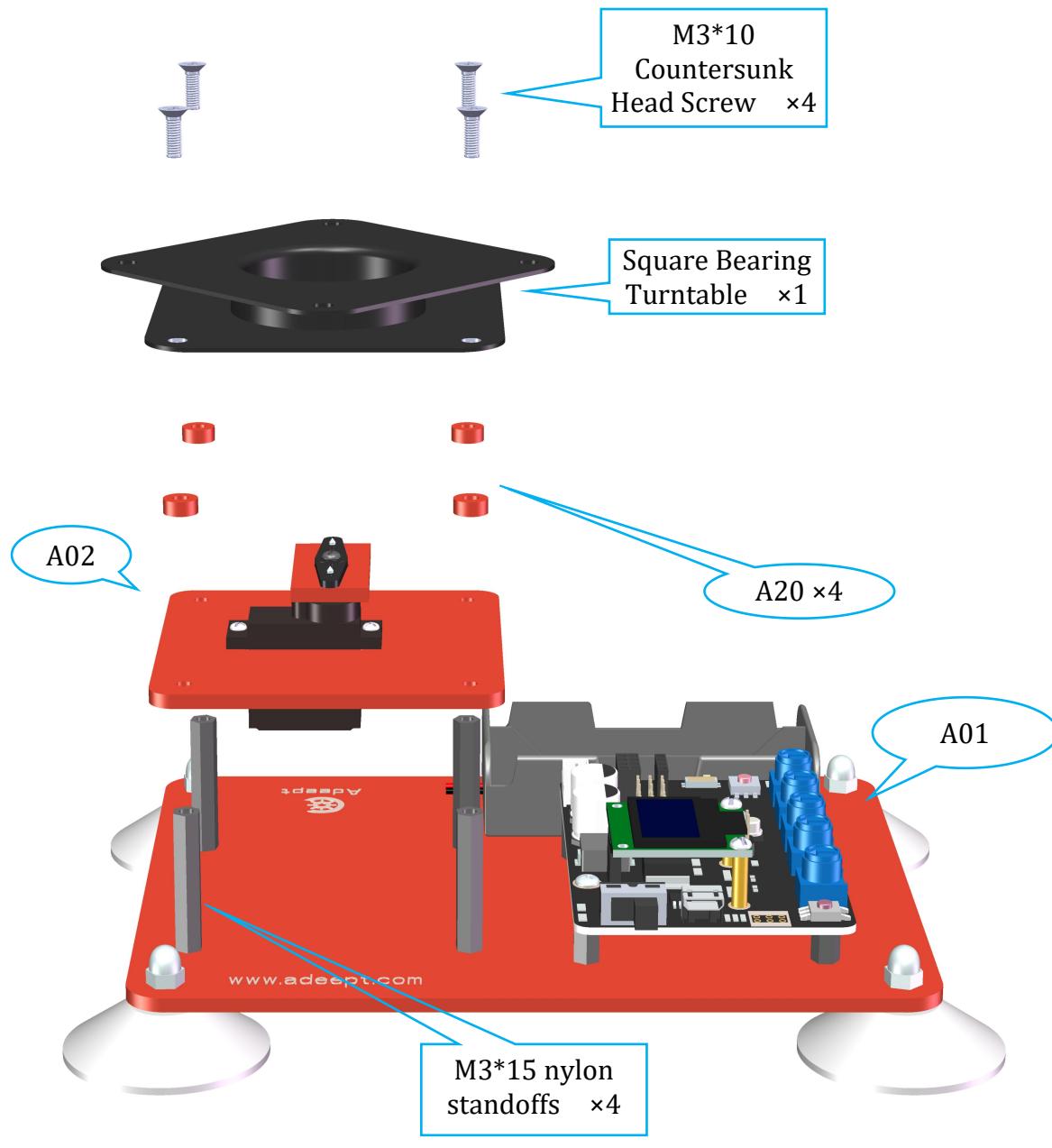
*Model Diagram**Physical Diagram*



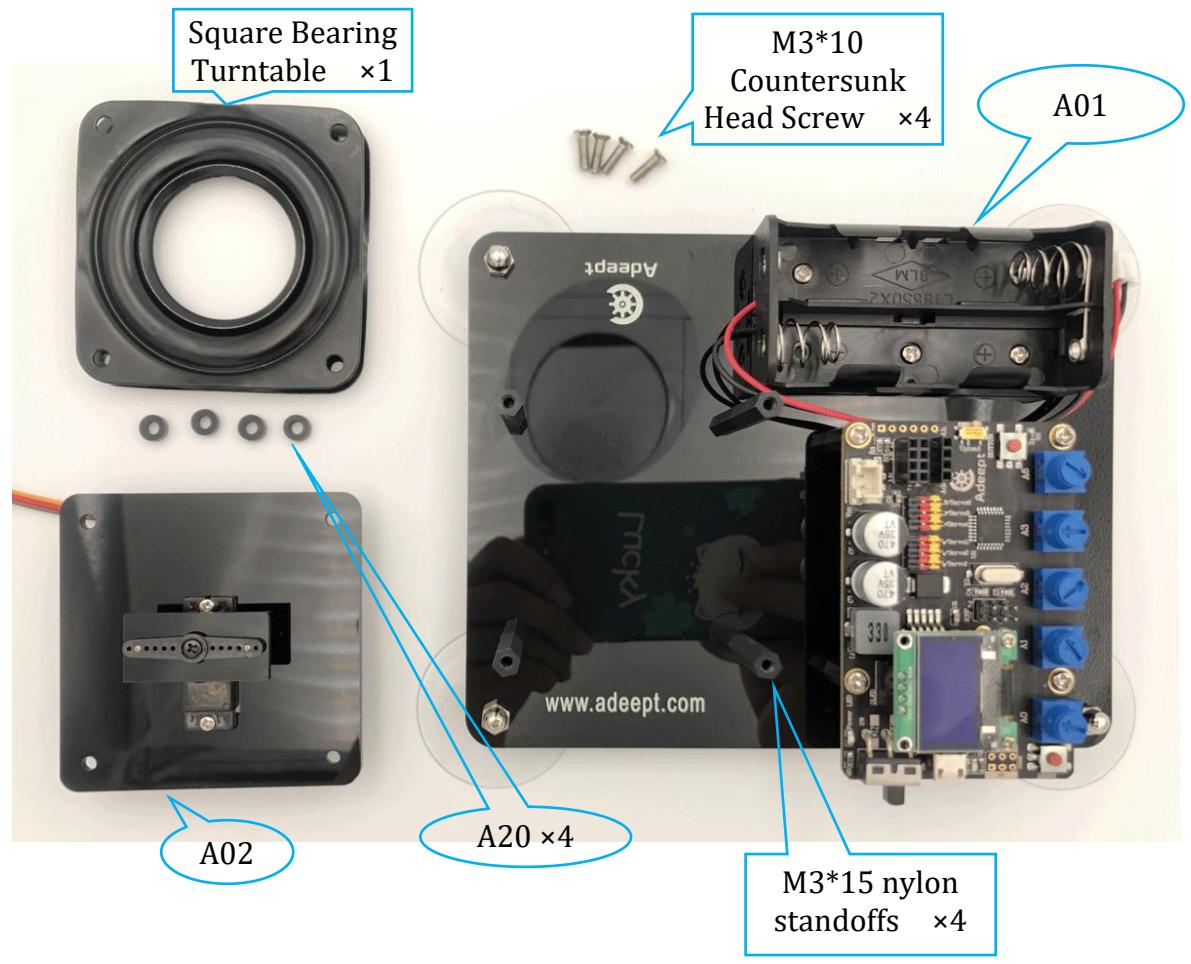
10. Fix the A02 acrylic plate and Square Bearing Turntable to the M3\*15 nylon standoffs on A01 acrylic plate with the M3\*10 Countersunk Head Screw (Note the assembly position of A20).

Assemble the following components

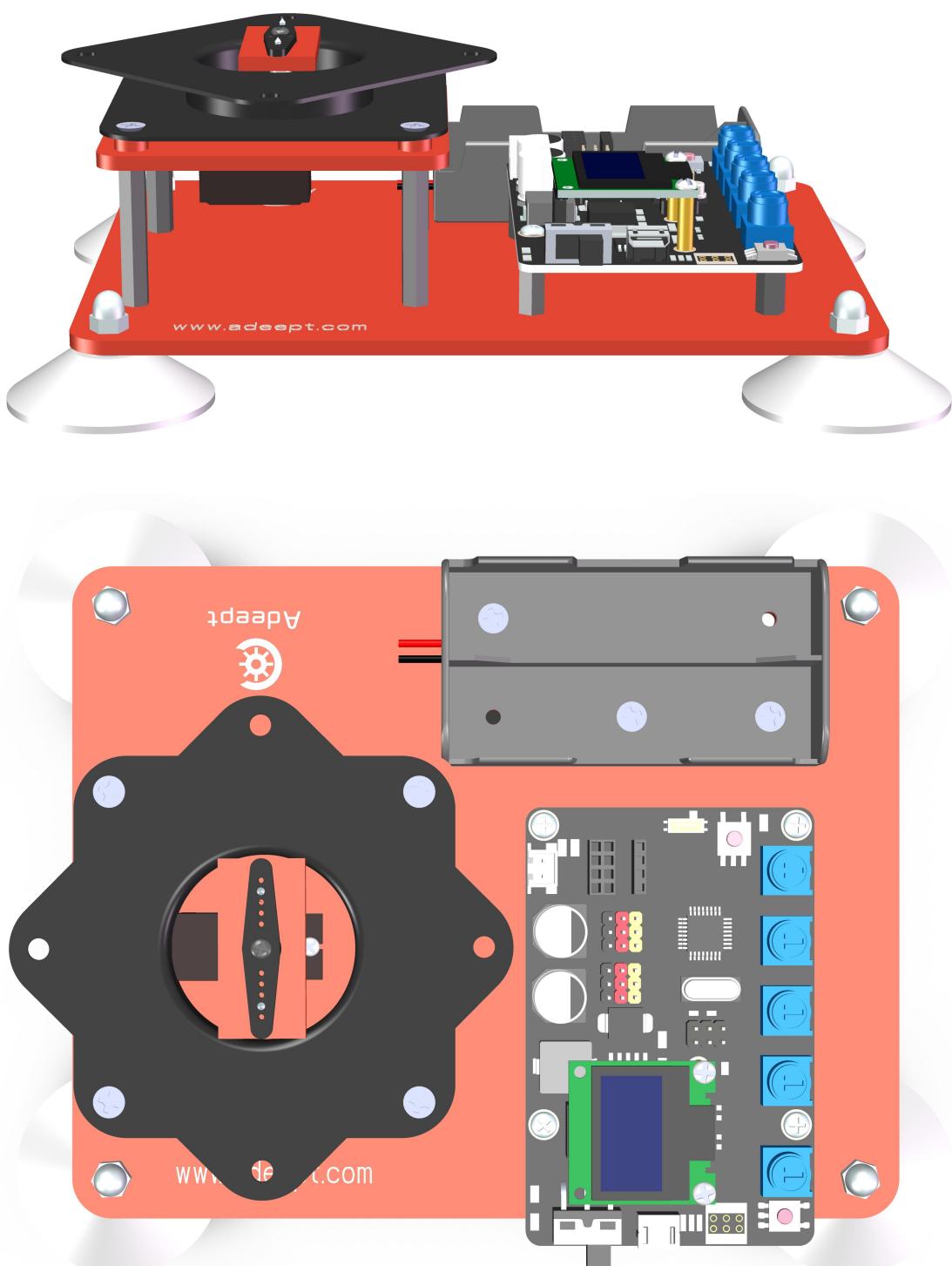
*Model Diagram*



## Physical Diagram



## Effect diagram after assembling

*Model Diagram*

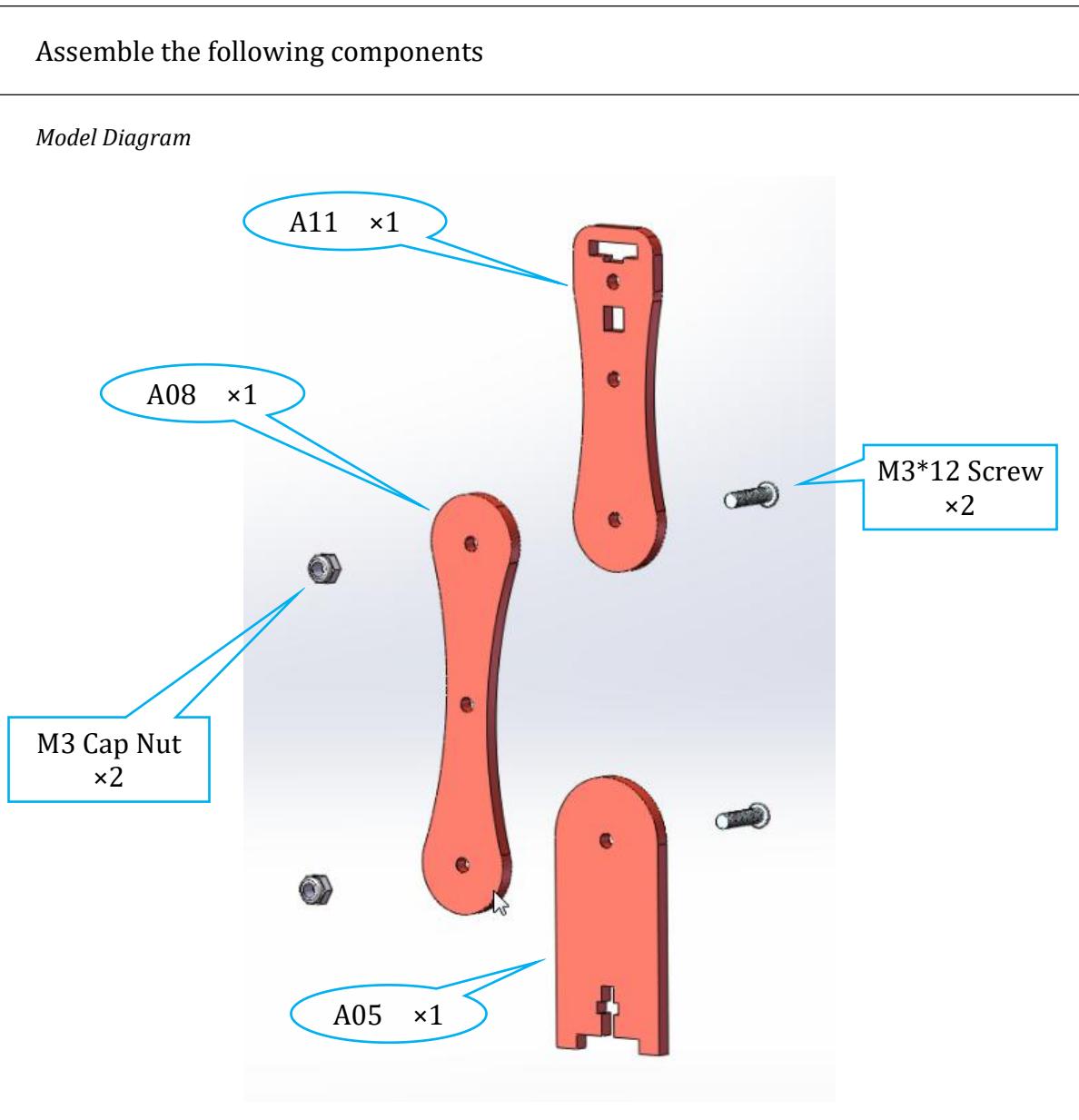
Physical Diagram

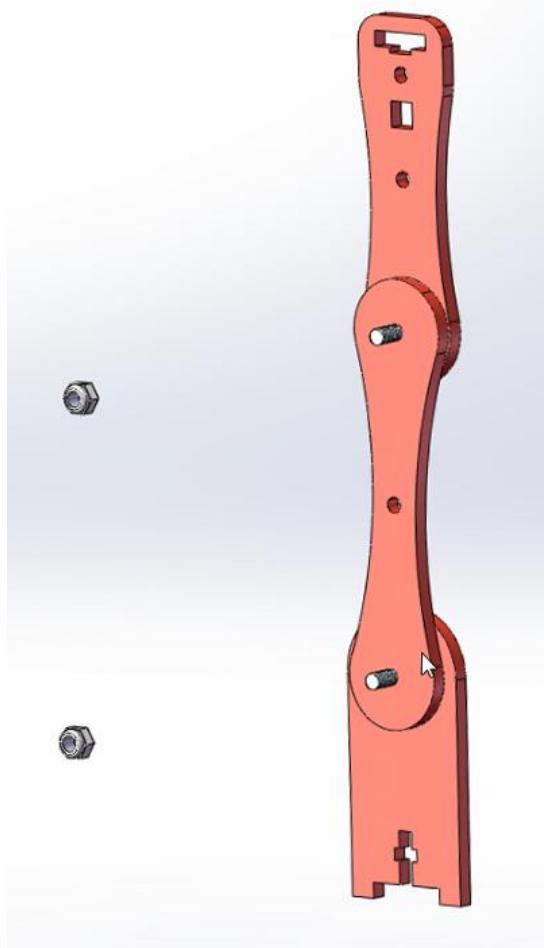


## 1.2. Assemble the Mechanical Arm

### 1.2.1. Assemble the Driven Mechanical Arm

1. Fix the A05 acrylic plate and A11 acrylic plate to A08 acrylic plate.

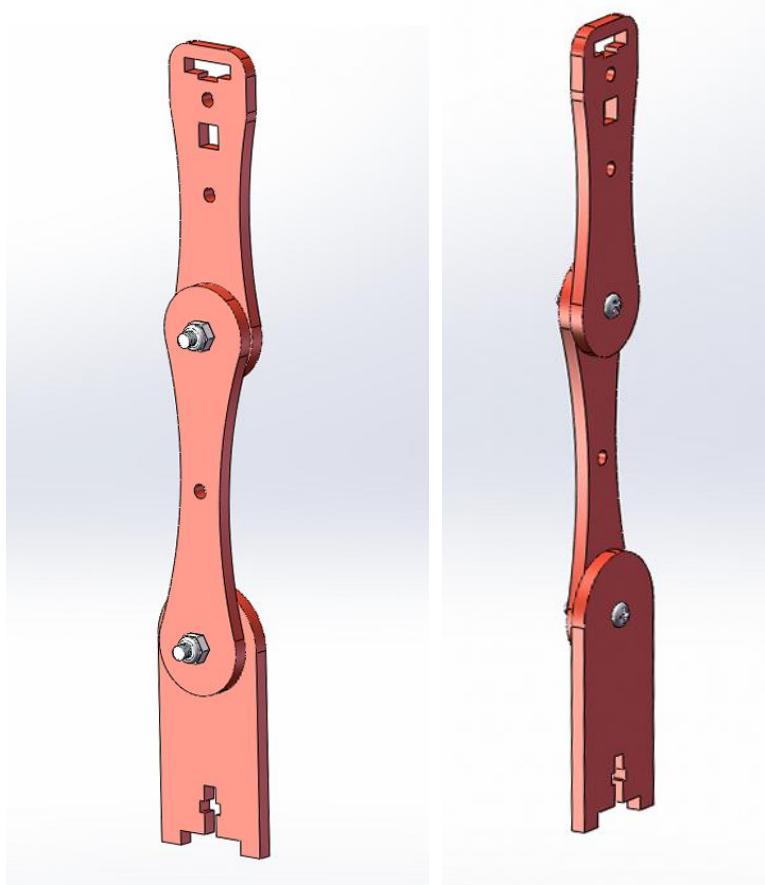




*Physical Diagram*



## Effect diagram after assembling

*Model Diagram**Physical Diagram*

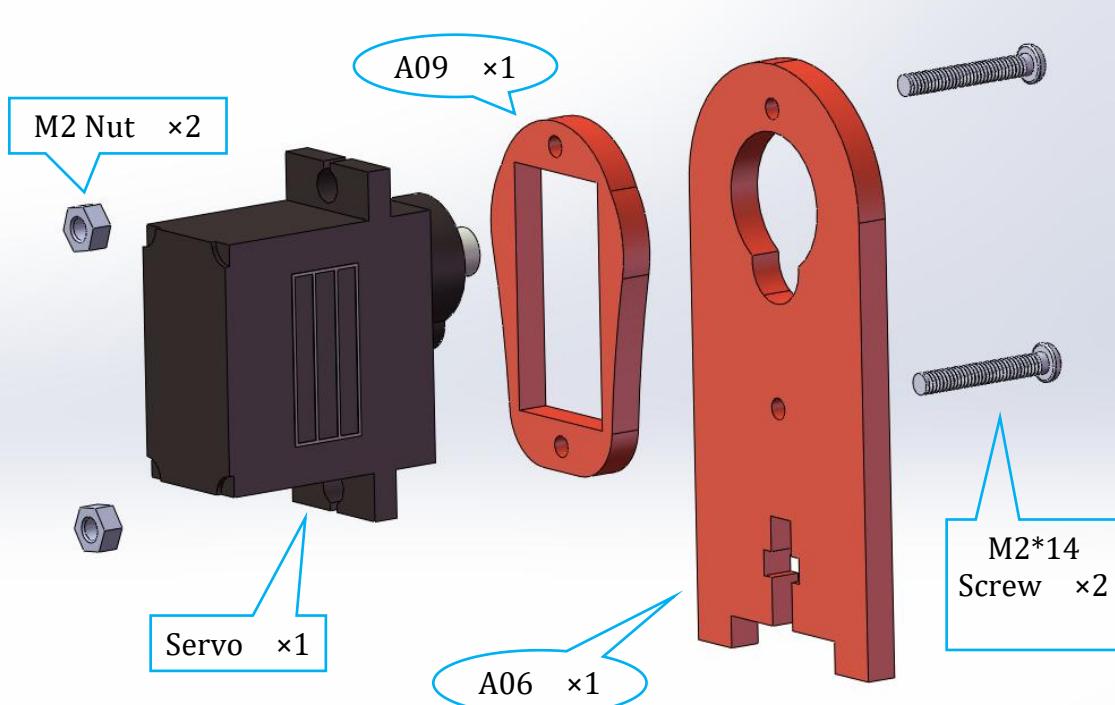


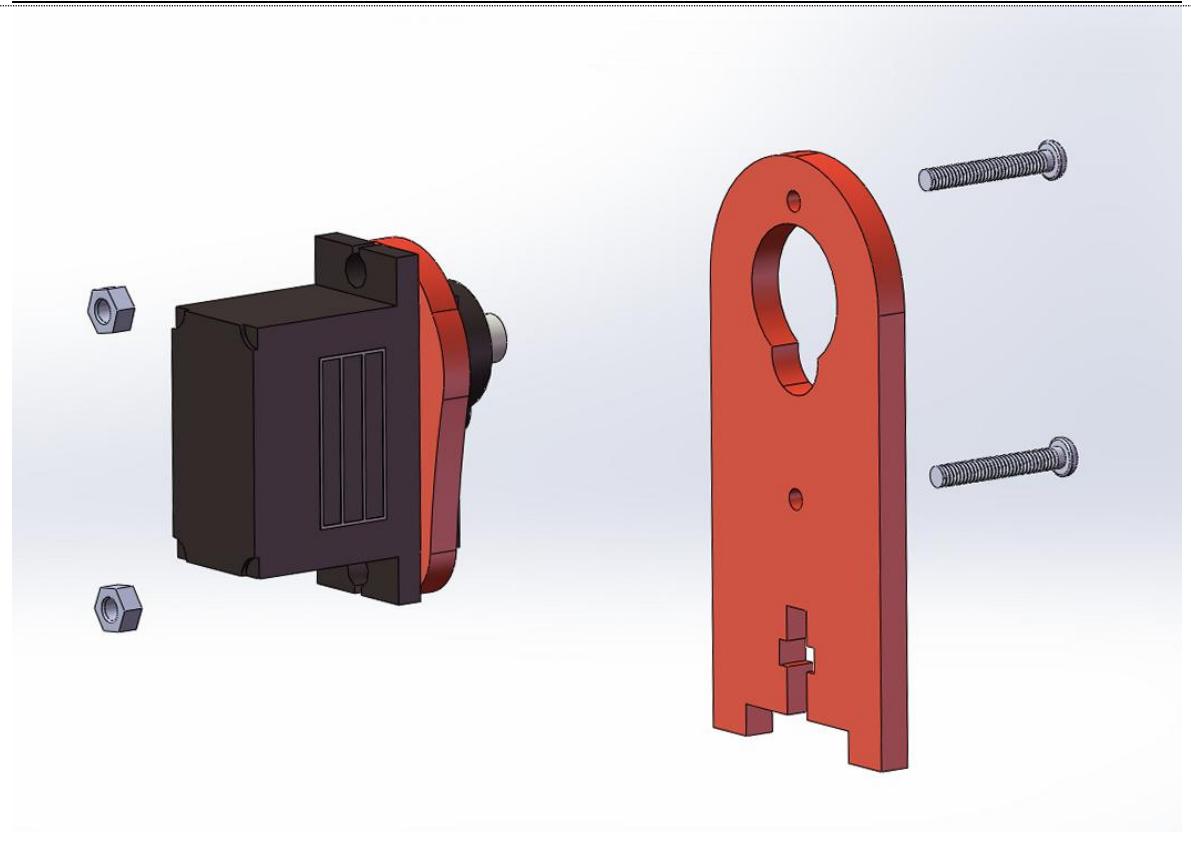
## 1.2.2. Assemble the Driving Mechanical Arm

2. Fix a servo to the A06 acrylic plate.

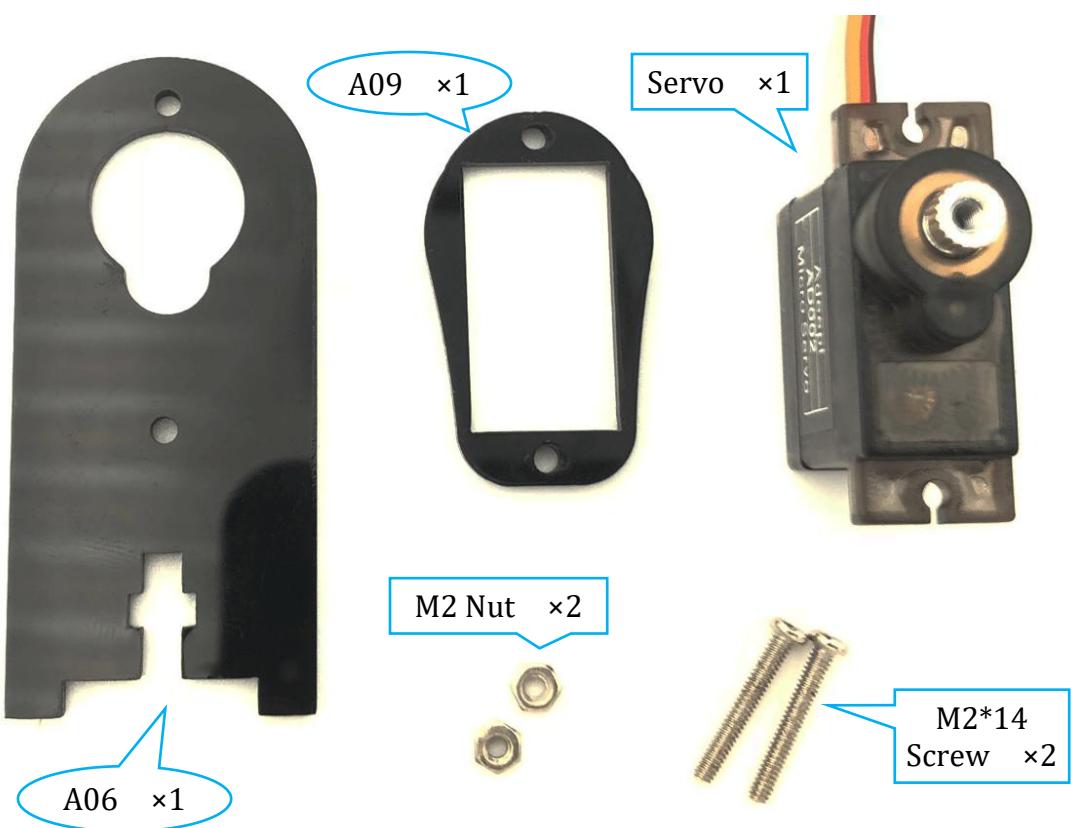
Assemble the following components

*Model Diagram*

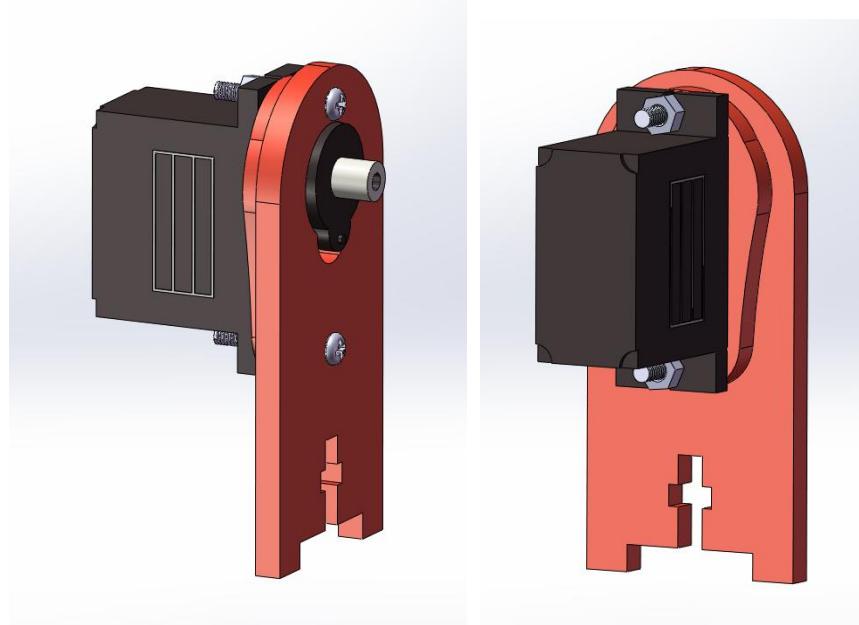


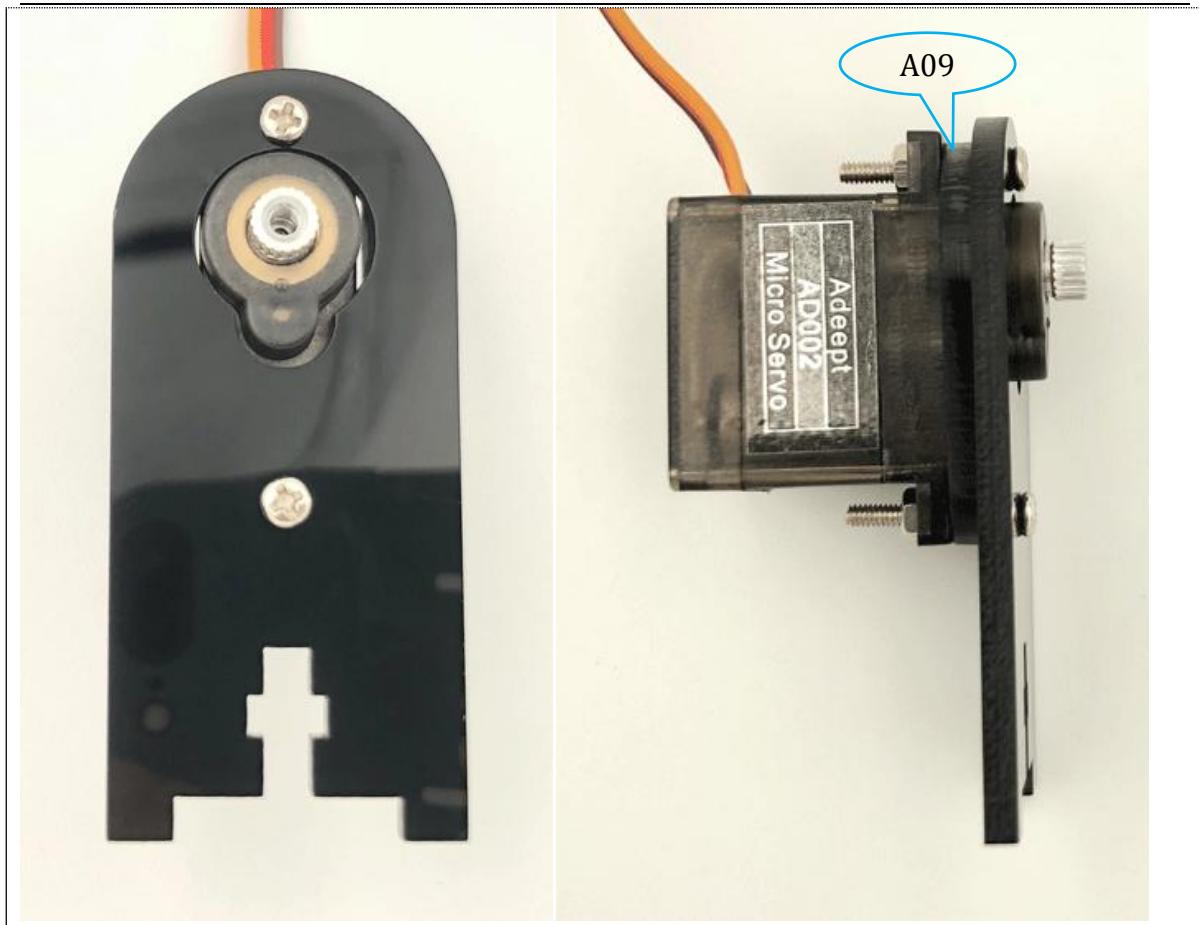


*Physical Diagram*



## Effect diagram after assembling

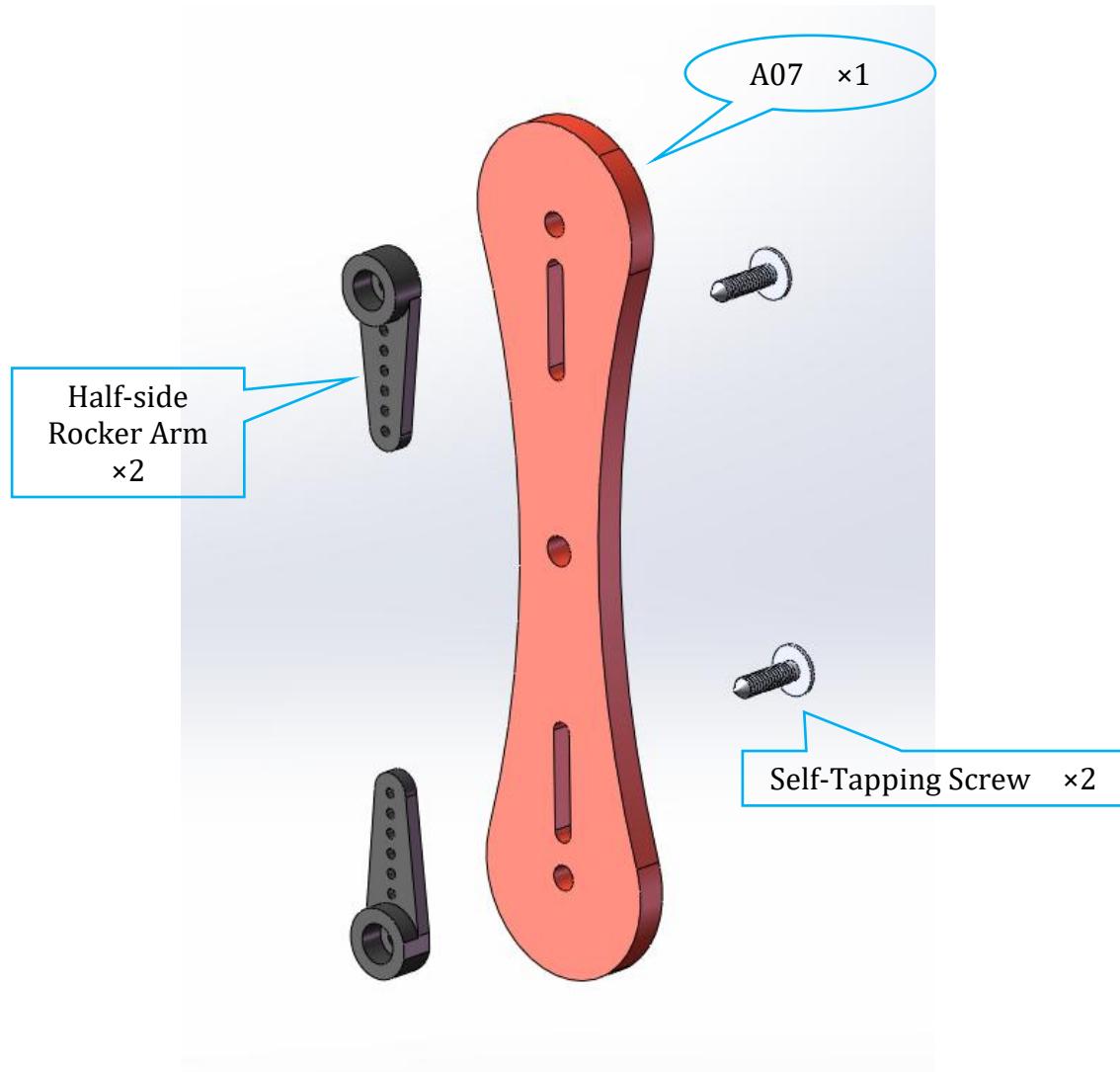
*Model Diagram**Physical Diagram*



3. Fix two Half-side rocker arms to the A07 acrylic plate with Self-Tapping Screw(provided by the Servo bag) .

Assemble the following components

*Model Diagram*



*Physical Diagram*



## Effect diagram after assembling

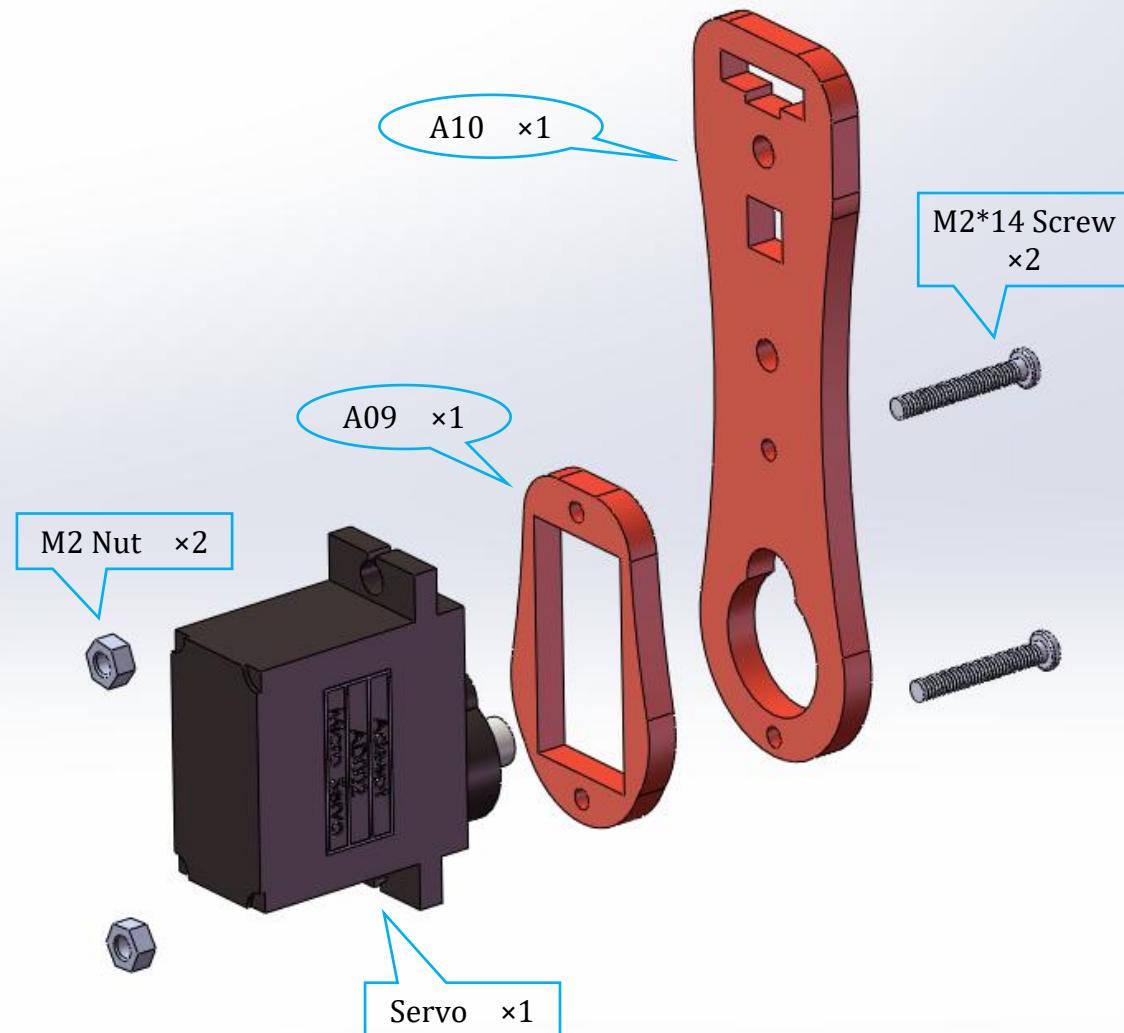
*Model Diagram**Physical Diagram*



## 4. Fix a Servo to the A10 acrylic plate.

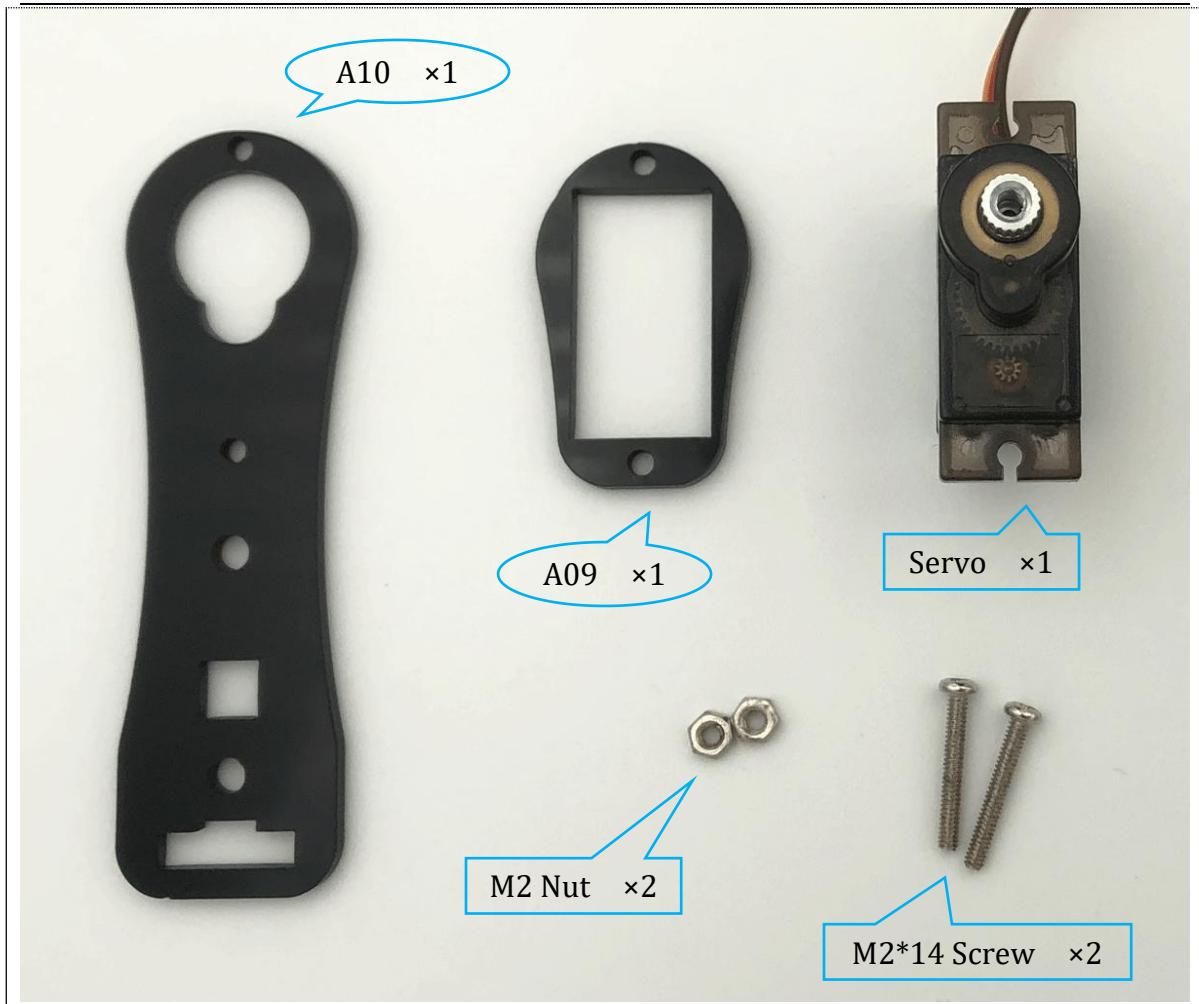
Assemble the following components

*Model Diagram*

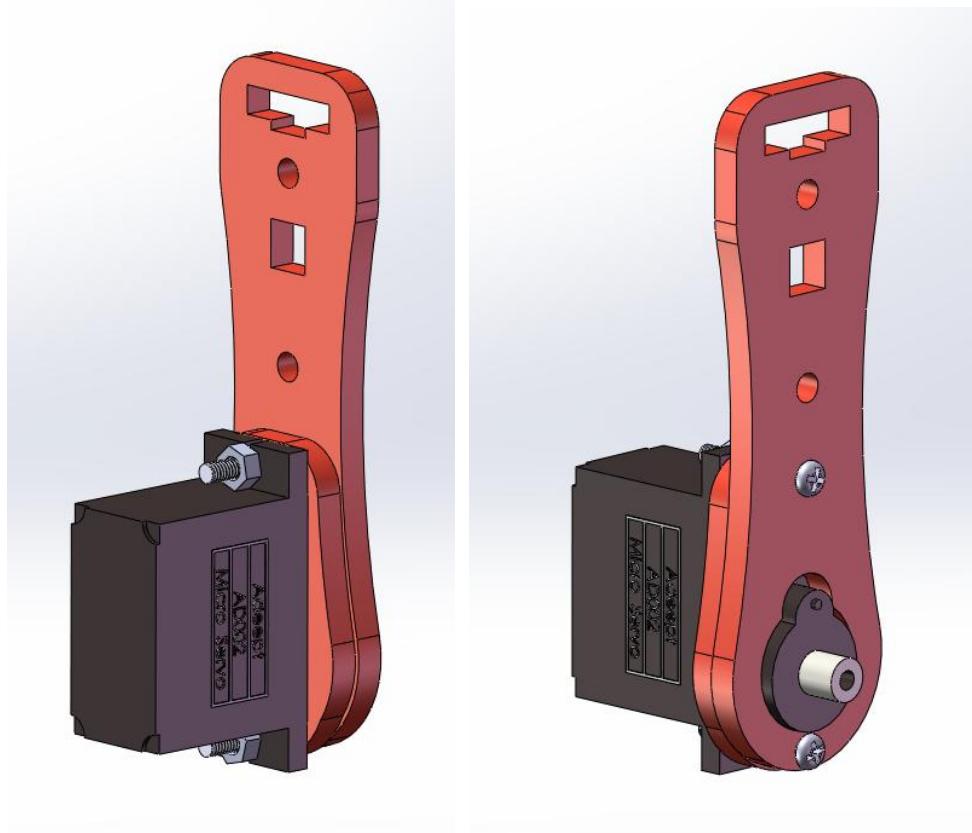


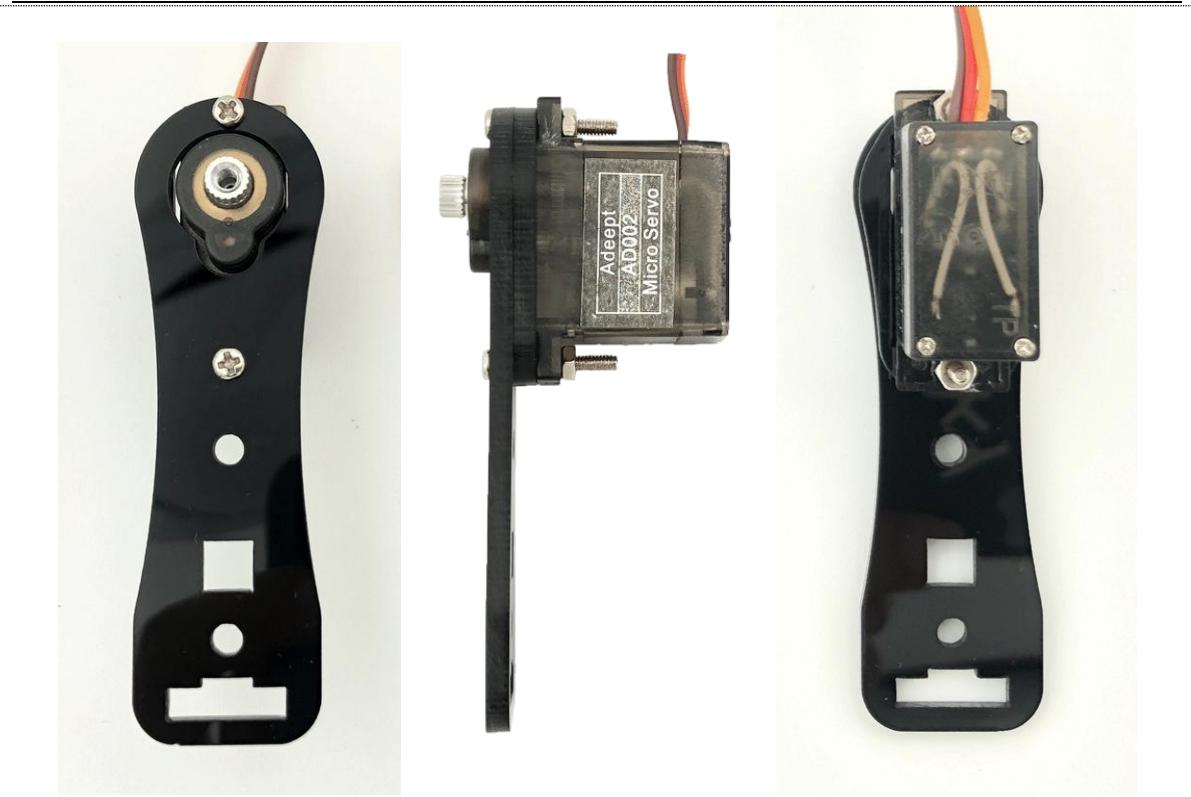


*Physical Diagram*



## Effect diagram after assembling

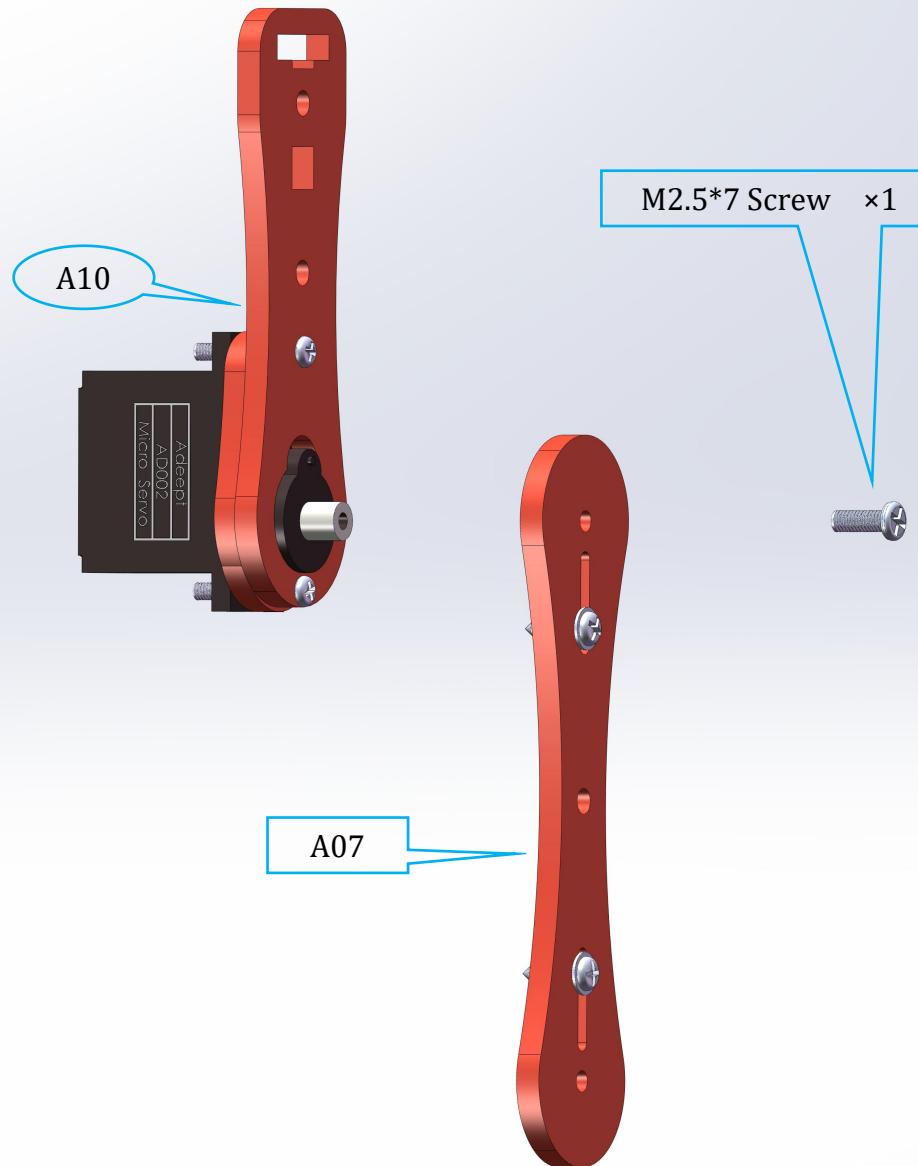
*Model Diagram**Physical Diagram*

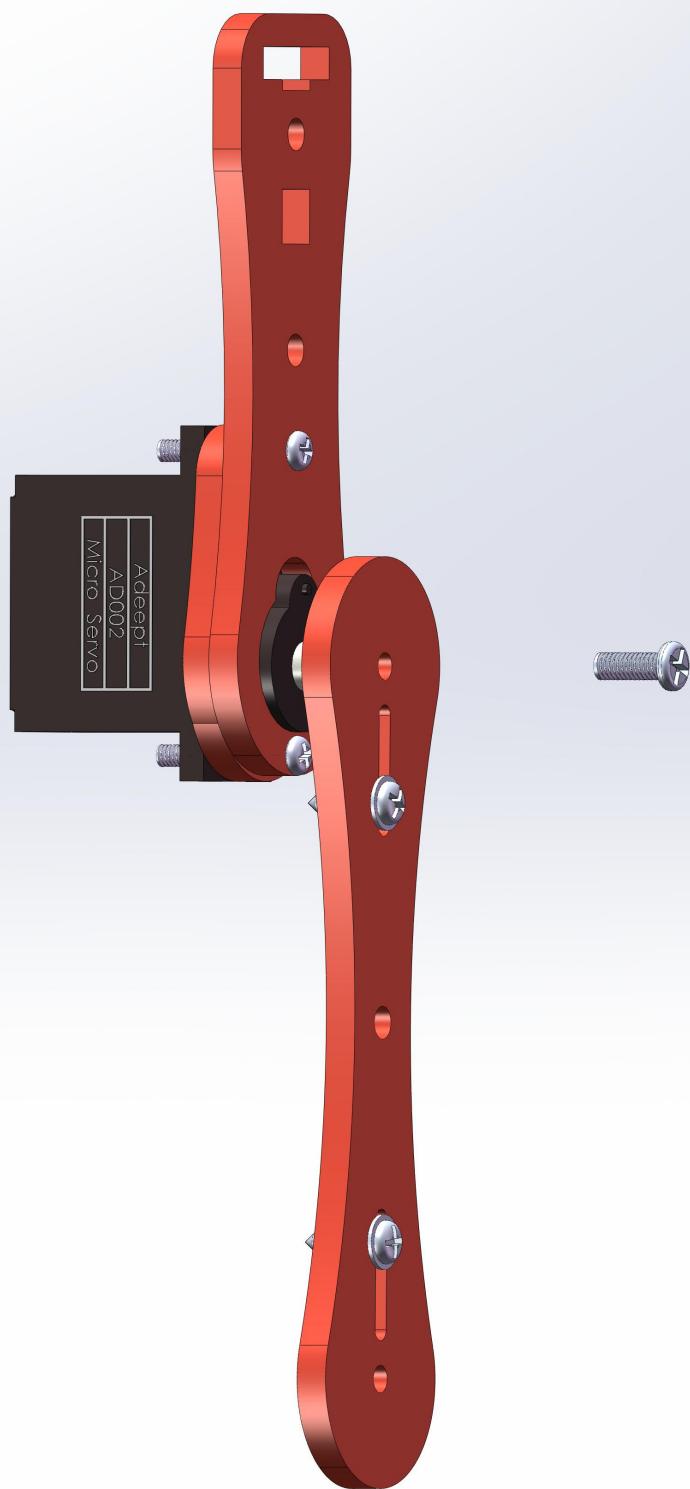


## 5. Assemble the A07 and the A10 combination as a whole.

Assemble the following components

*Model Diagram*





*Physical Diagram*

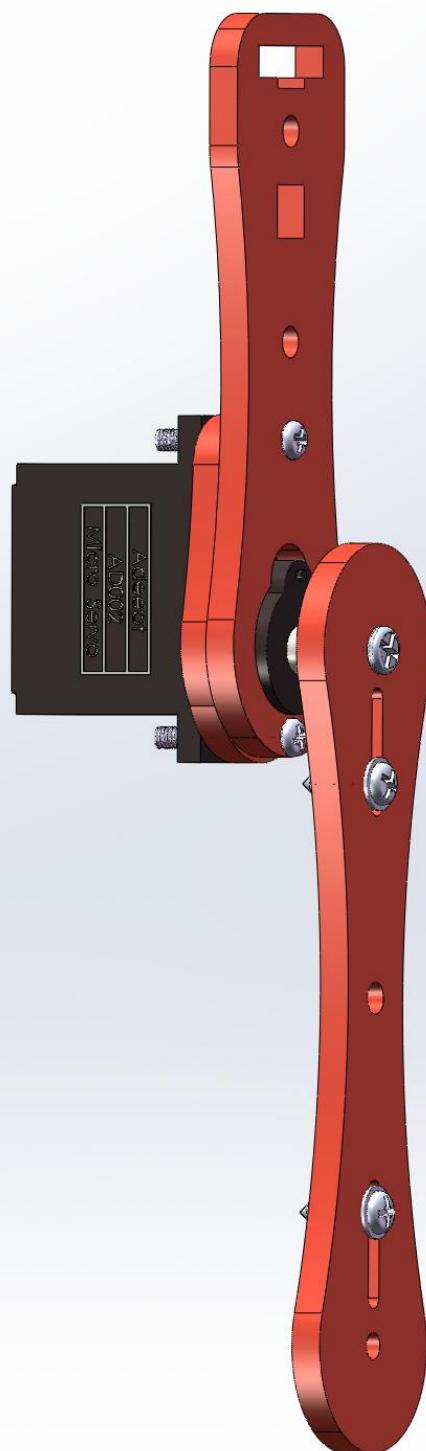
M2.5\*7 Screw ×1

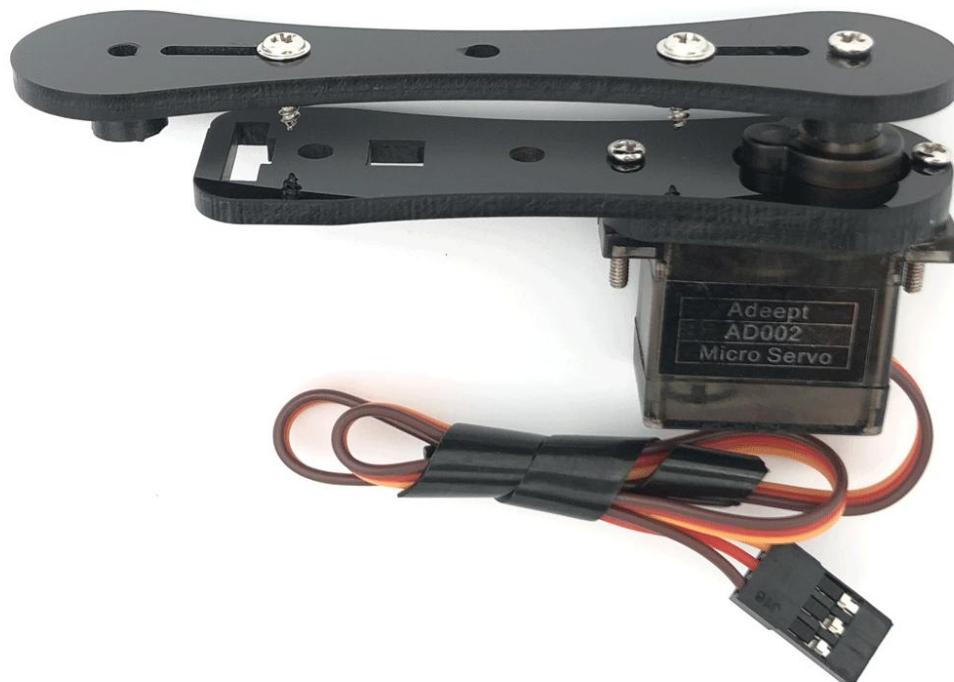


A07



## Effect diagram after assembling

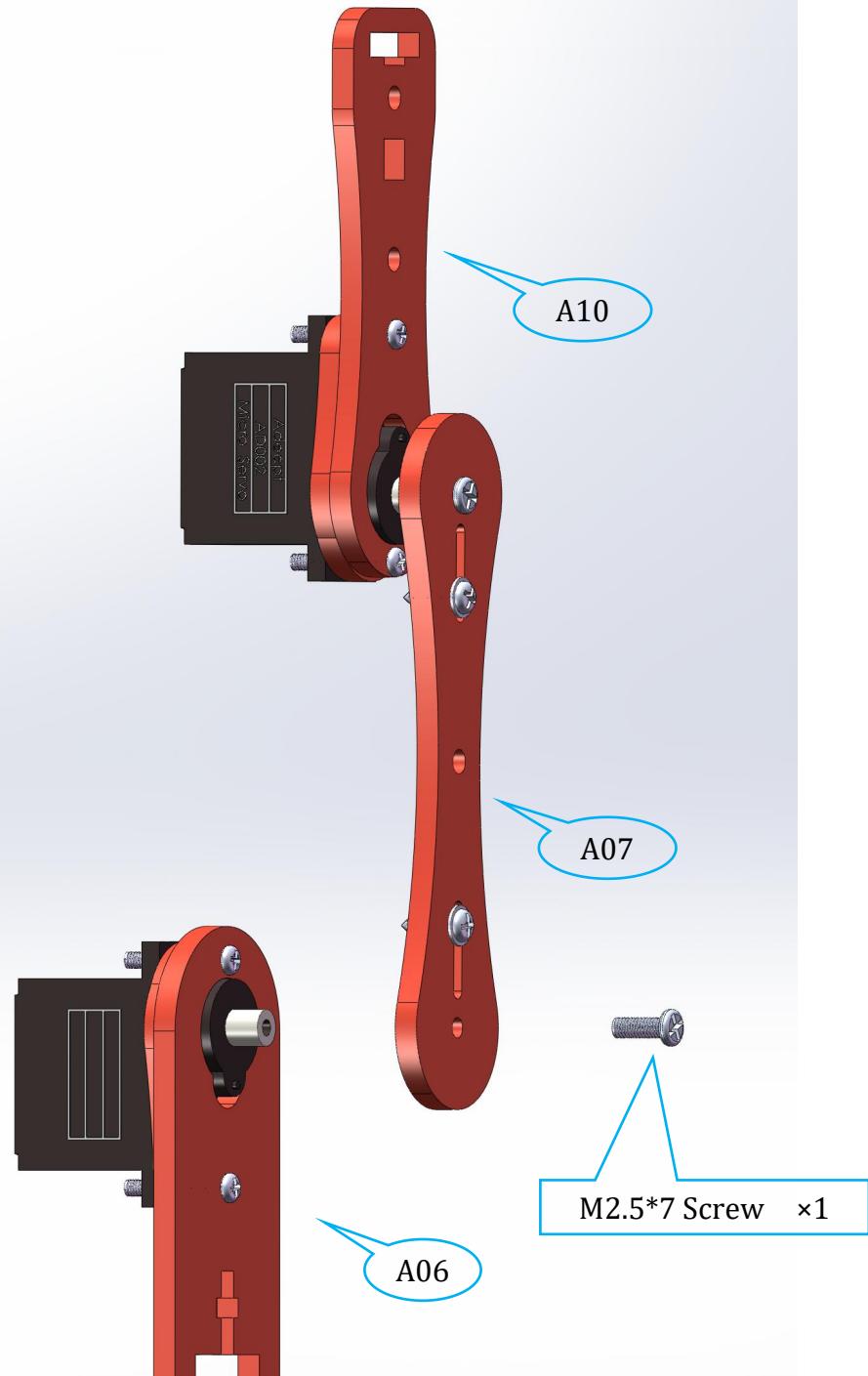
*Model Diagram*

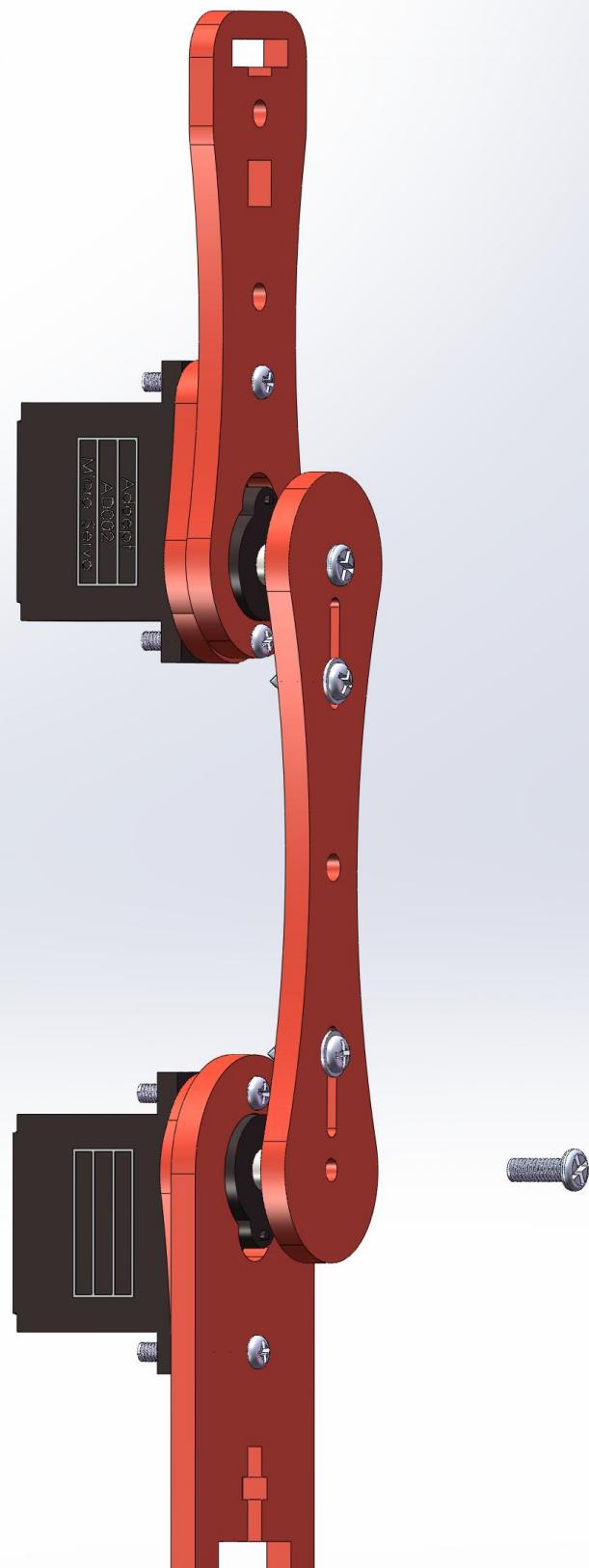
*Physical Diagram*

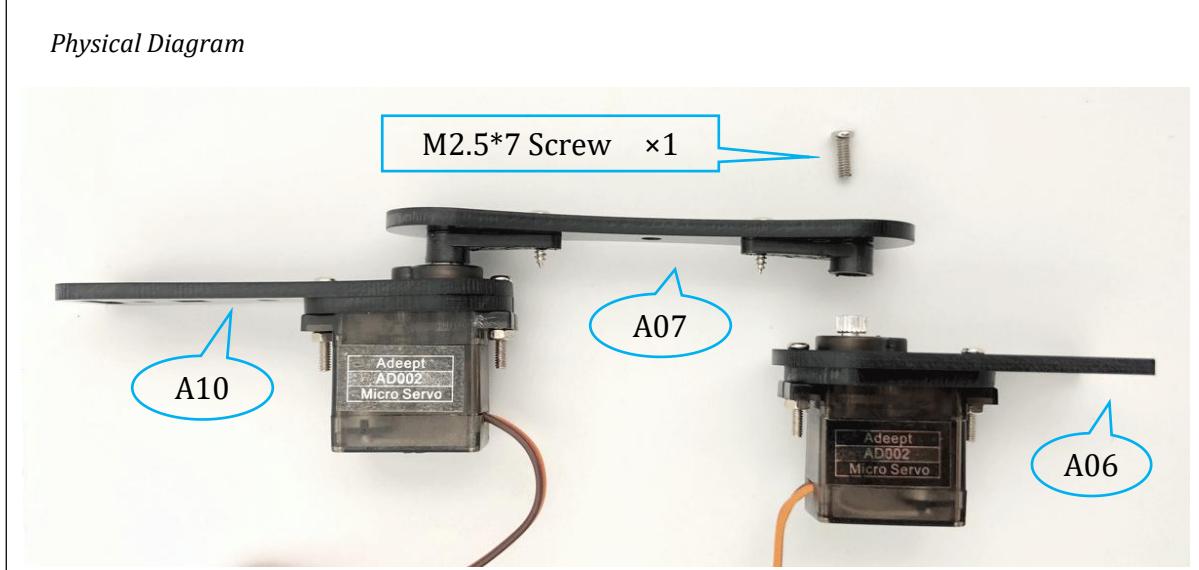
## 6. Assemble A07-A10 combination and A06 combination as a whole.

Assemble the following components

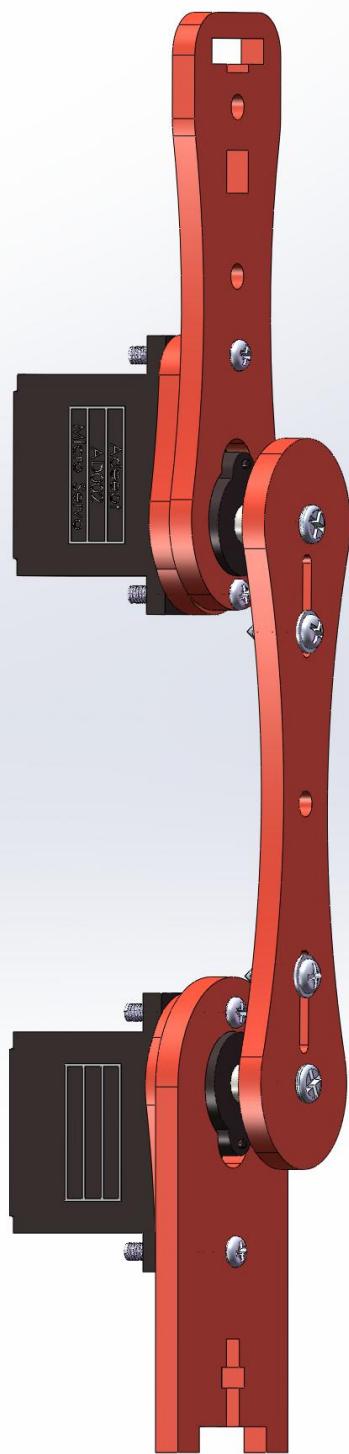
*Model Diagram*

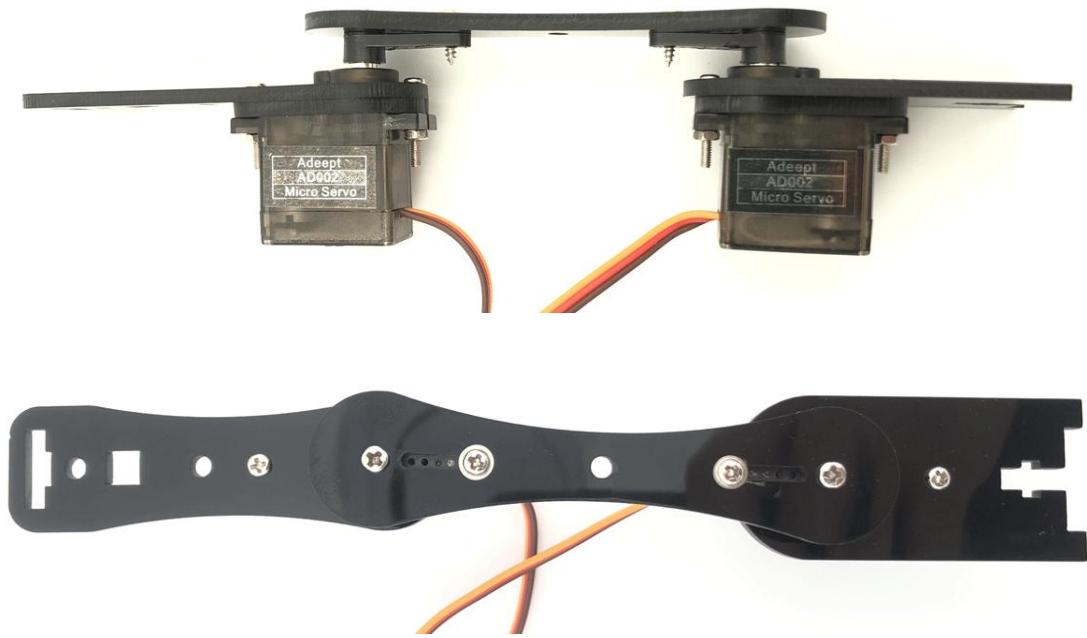




*Physical Diagram*

## Effect diagram after assembling

*Model Diagram*

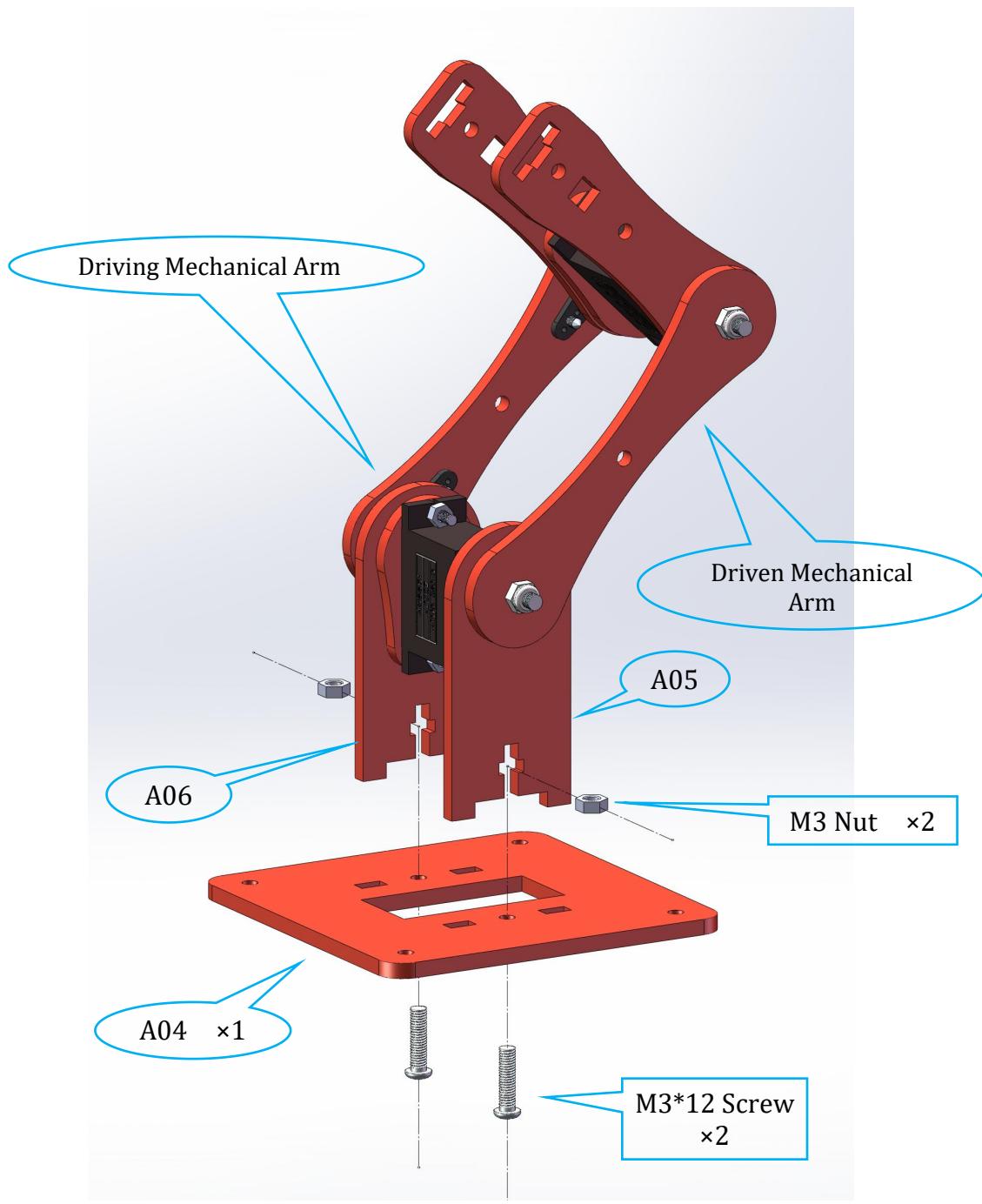
*Physical Diagram*

### 1.2.3. Fix the Driven Mechanical Arm and the Driving Mechanical Arm to A04.

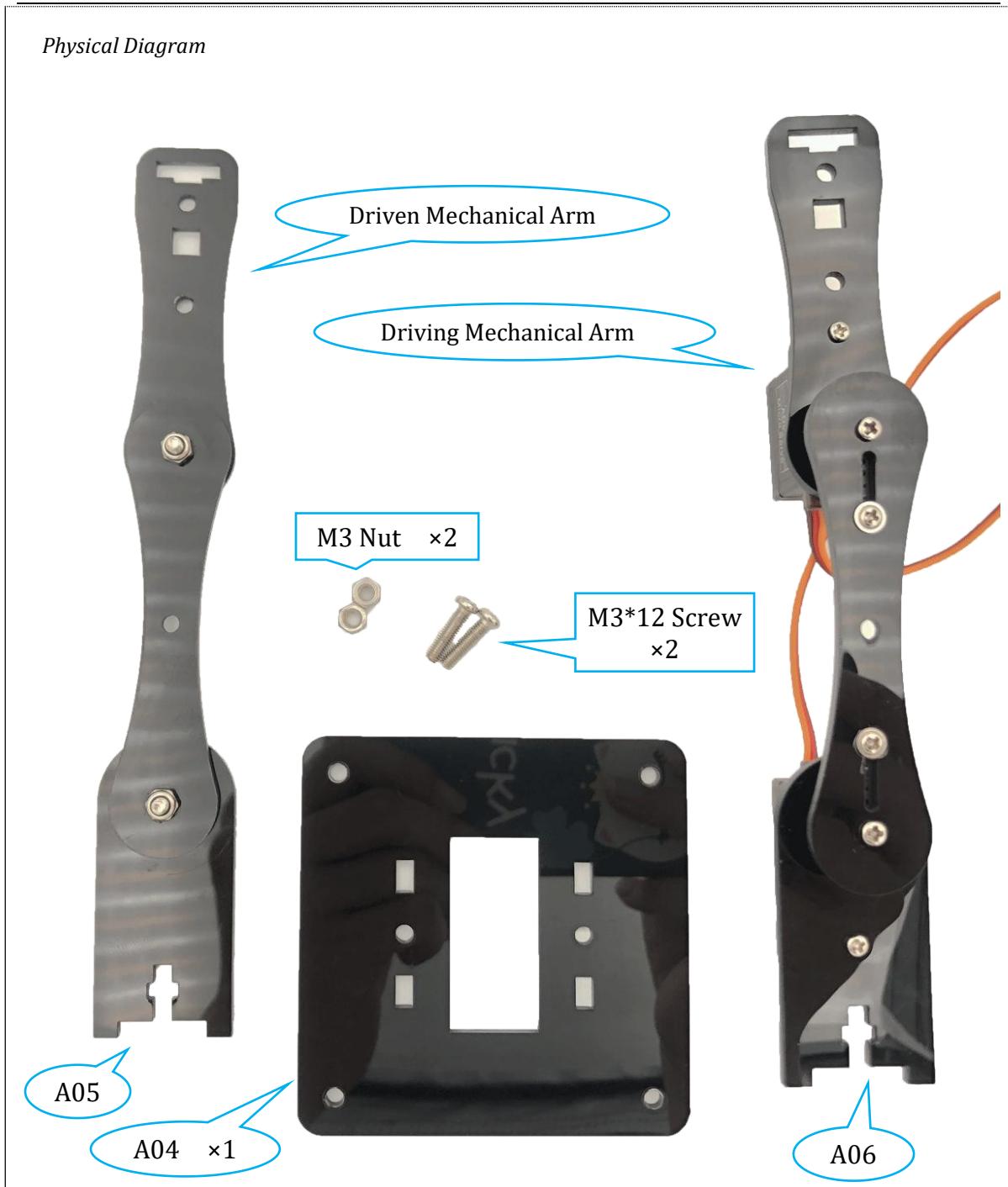
7. Fix the A05 acrylic plate of Driven Mechanical Arm and the A06 acrylic plate of Driving Mechanical Arm to the A04 acrylic plate with M3\*12 Screw and M3 Nut .

Assemble the following components

*Model Diagram*



## Physical Diagram

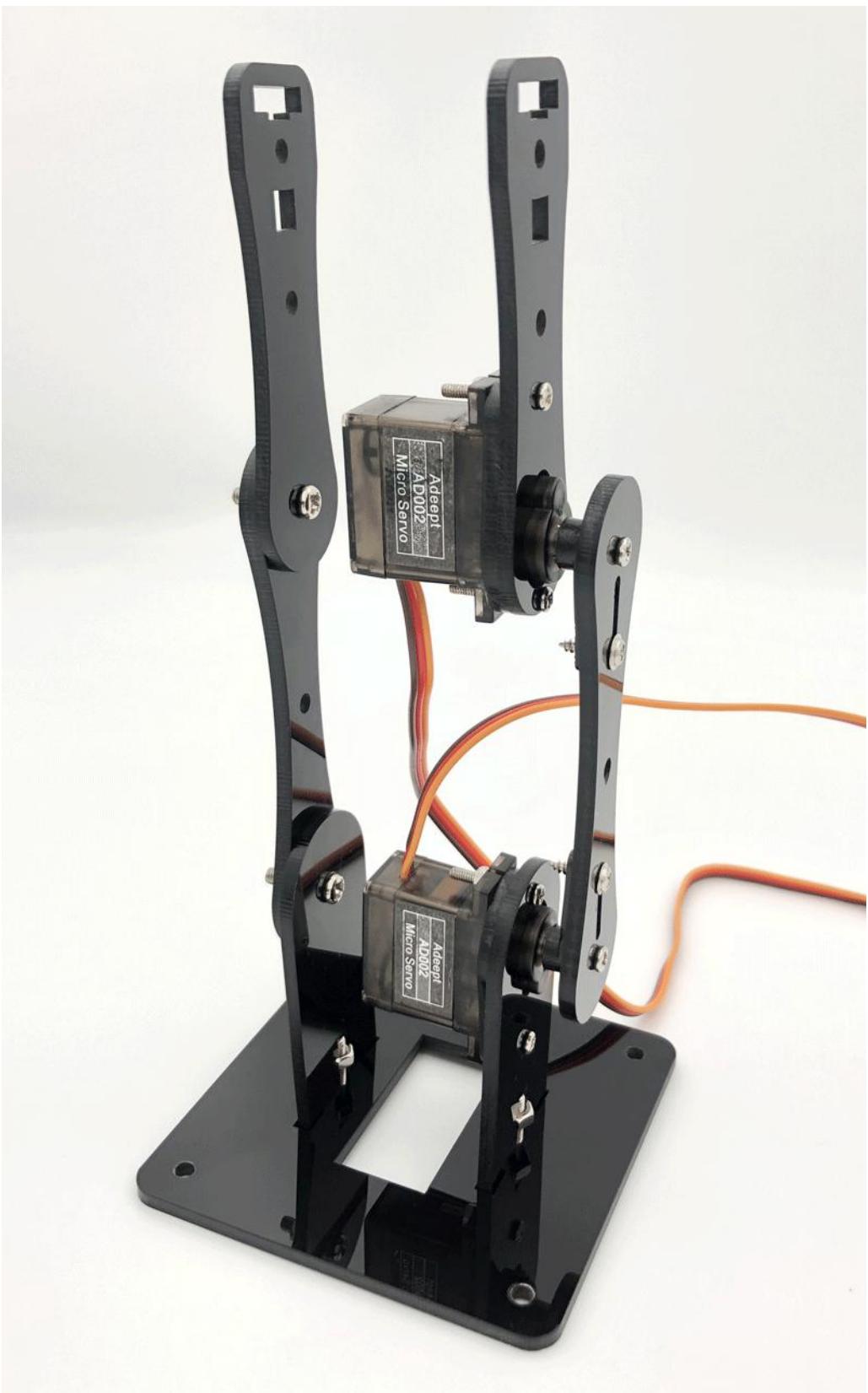


## Effect diagram after assembling

*Model Diagram**Physical Diagram*



Effect diagram after assembling

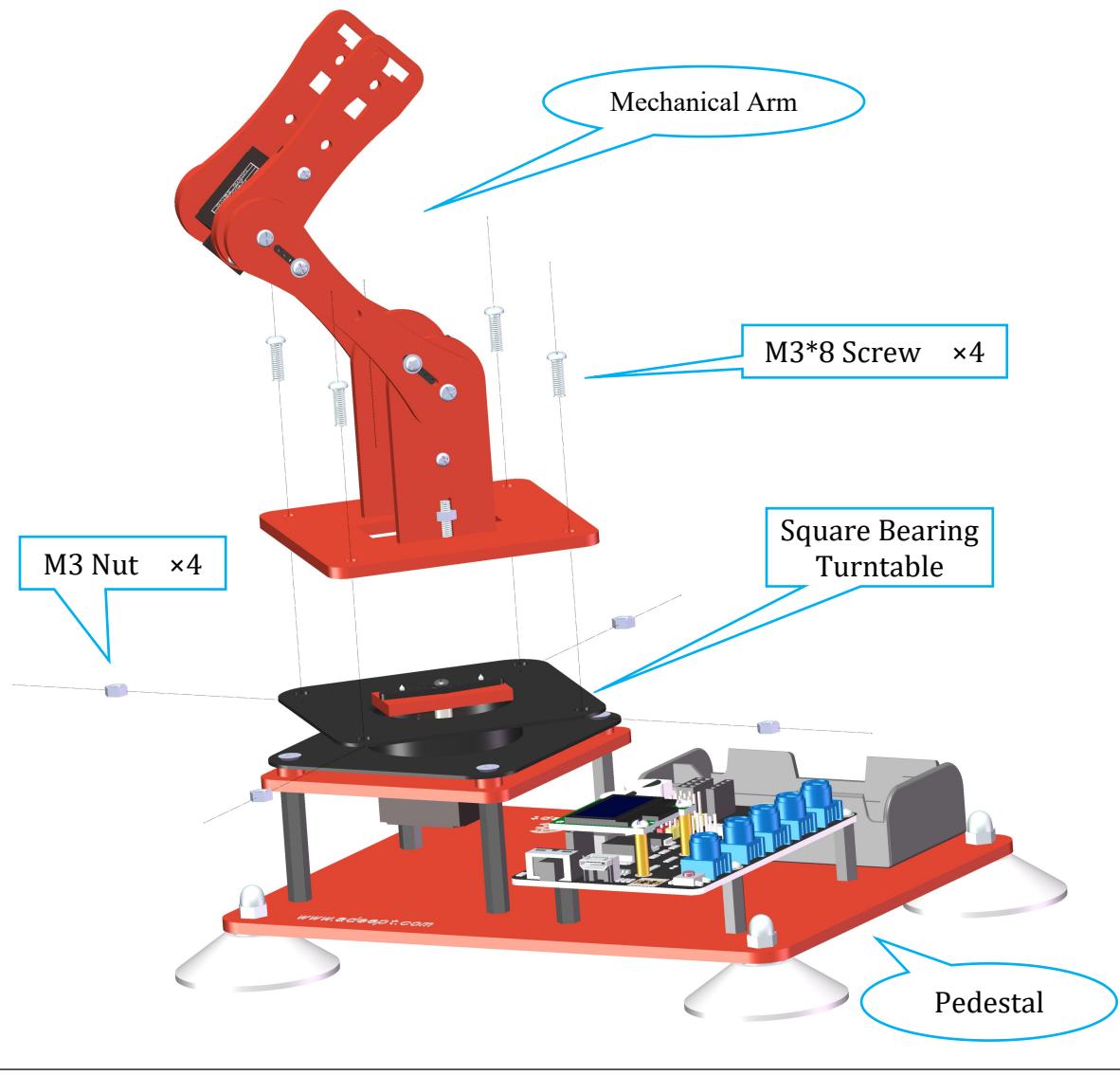


### 1.3. Assemble the Pedestal and the Mechanical Arm as a Basic Robotic Arm Combination.

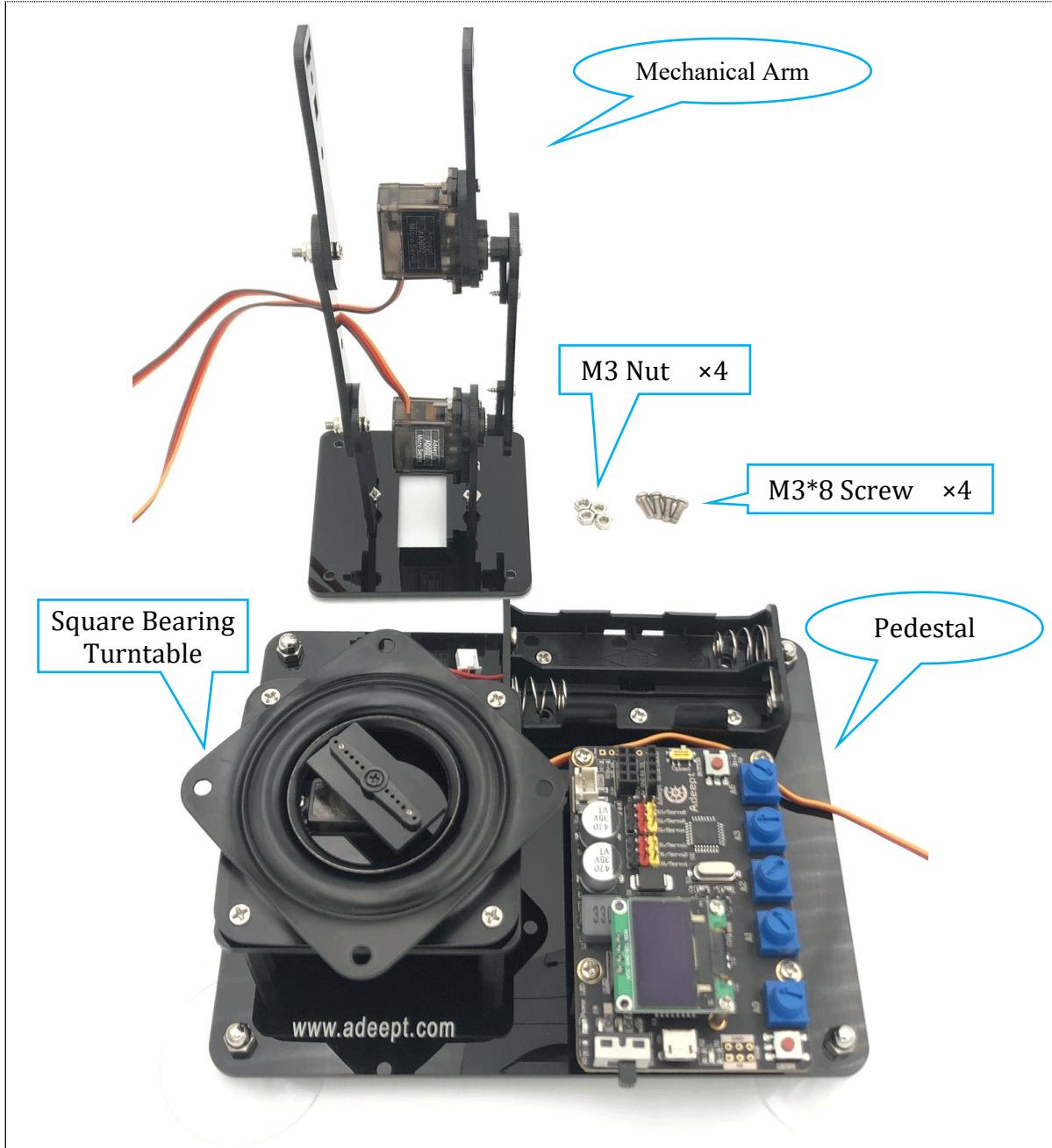
Fix the Mechanical Arm to Upper cover of Square Bearing Turntable in the Pedestal with M3\*8 Screws and M3 Nuts.

Assemble the following components

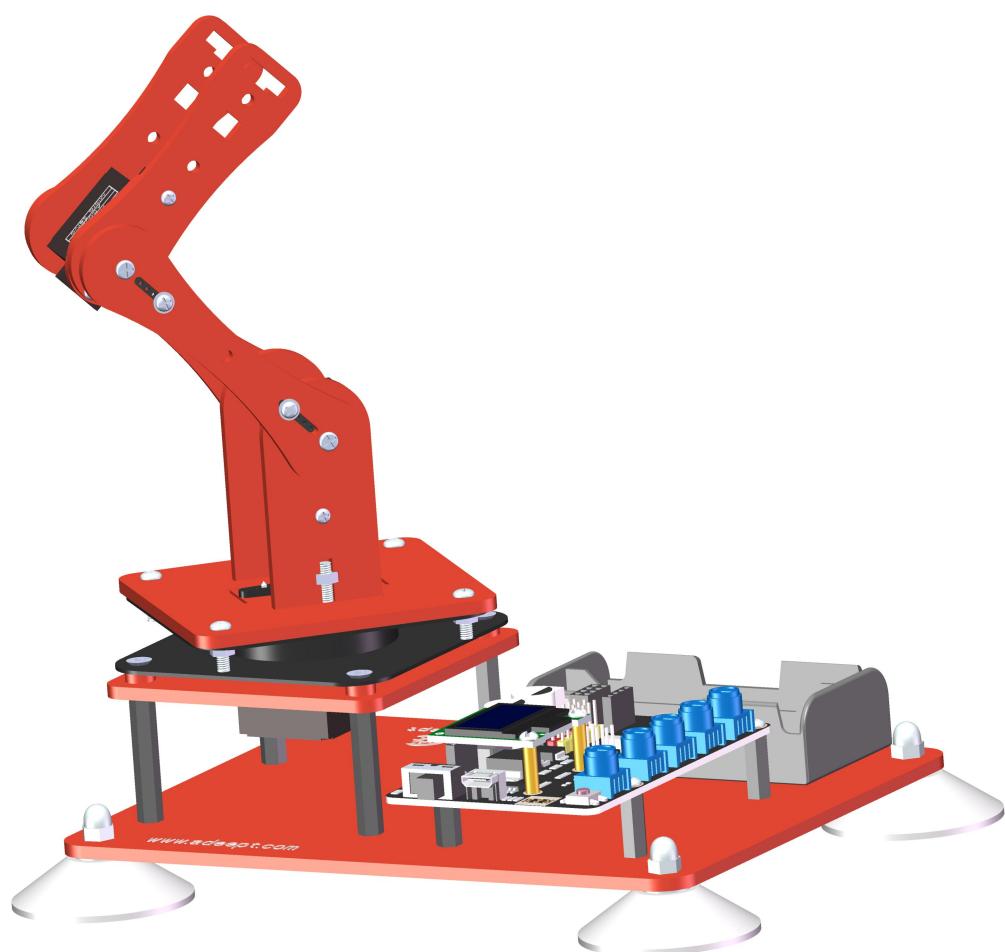
*Model Diagram*

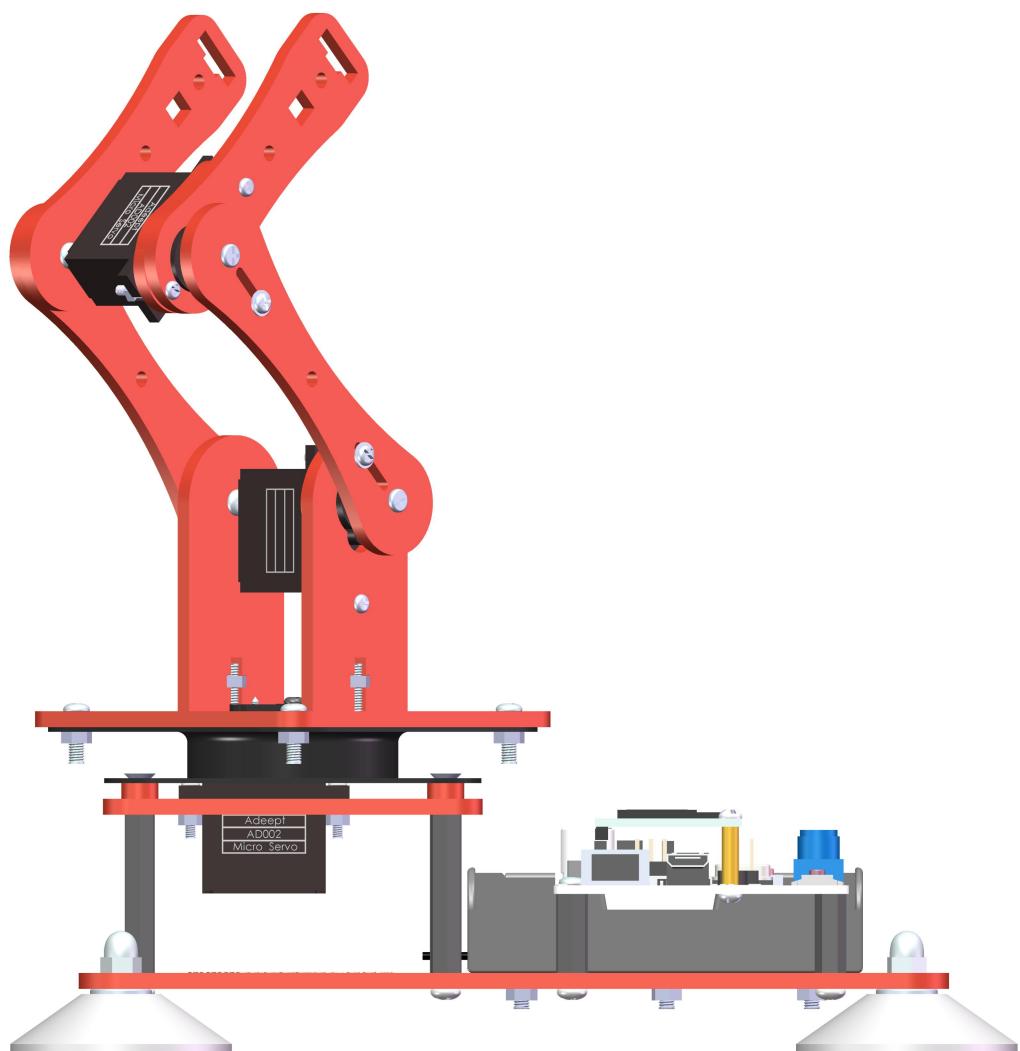


*Physical Diagram*

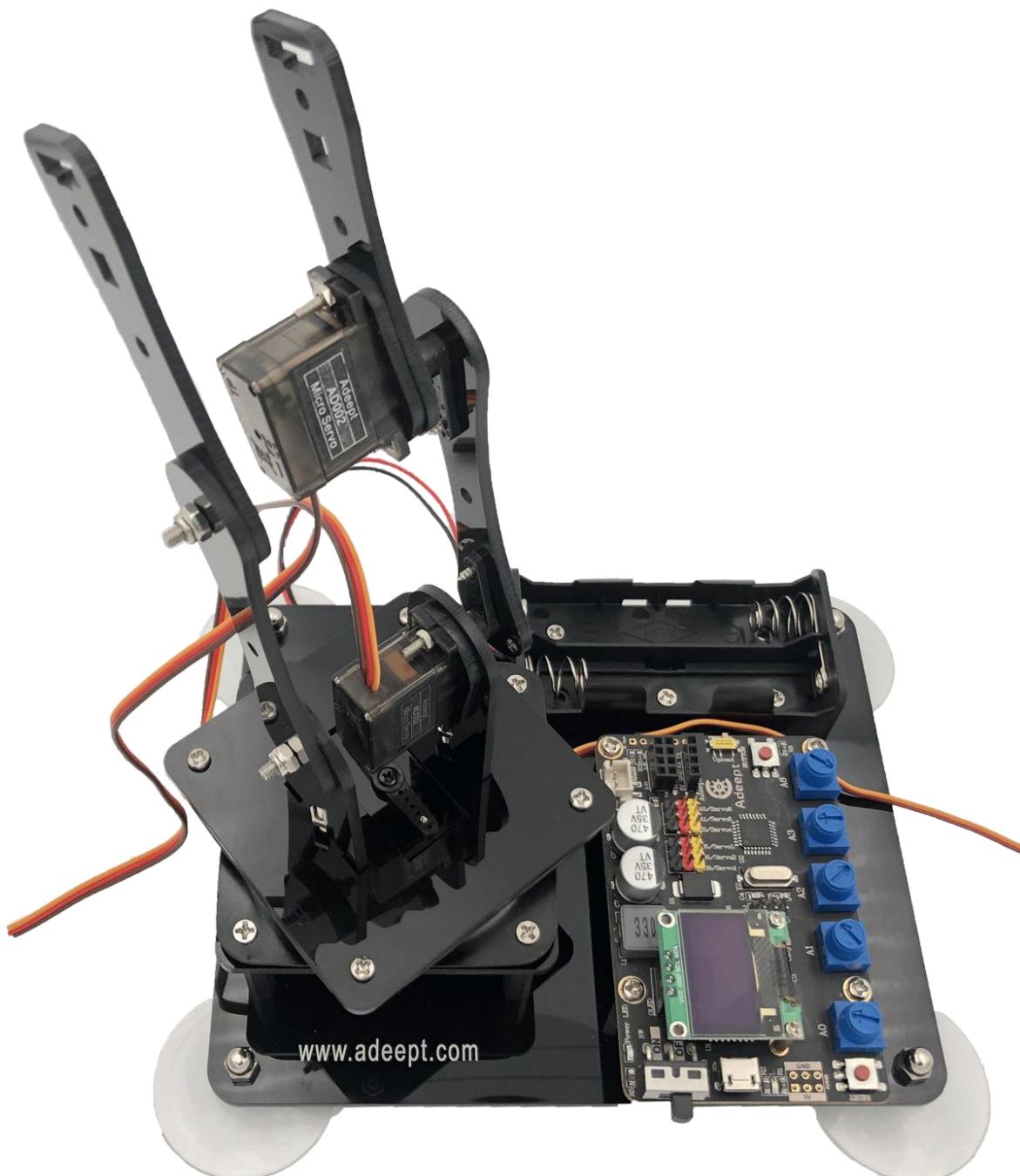


## Effect diagram after assembling

*Model Diagram*



*Physical Diagram*



Effect diagram after assembling



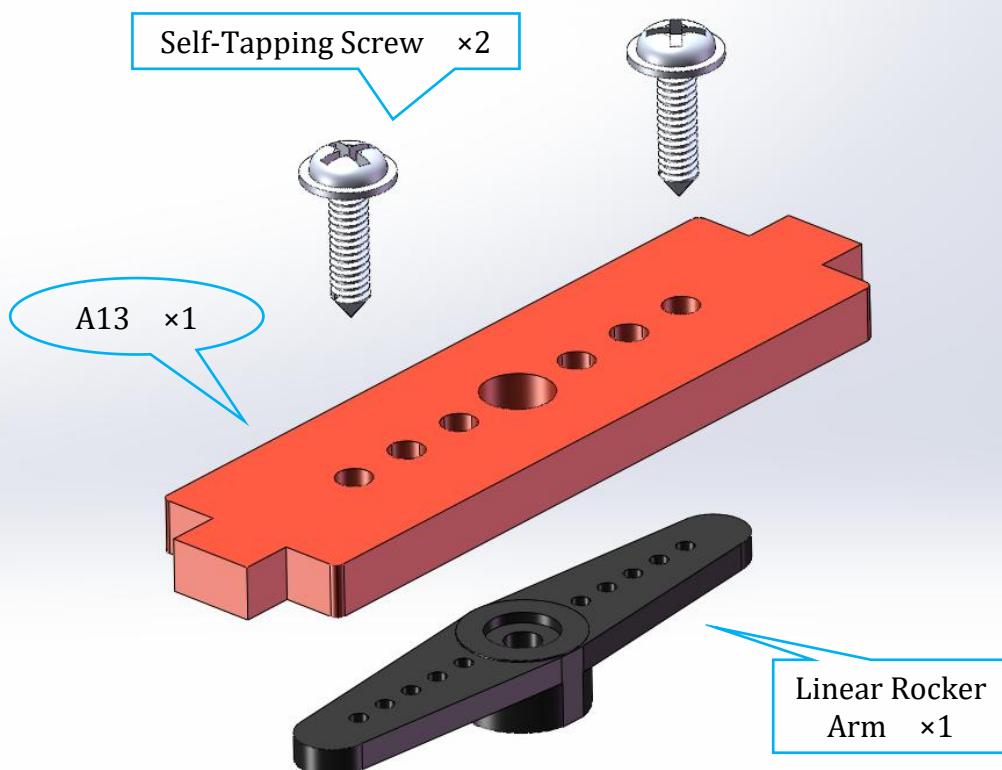
## 1.4. Assemble the Mechanical hand

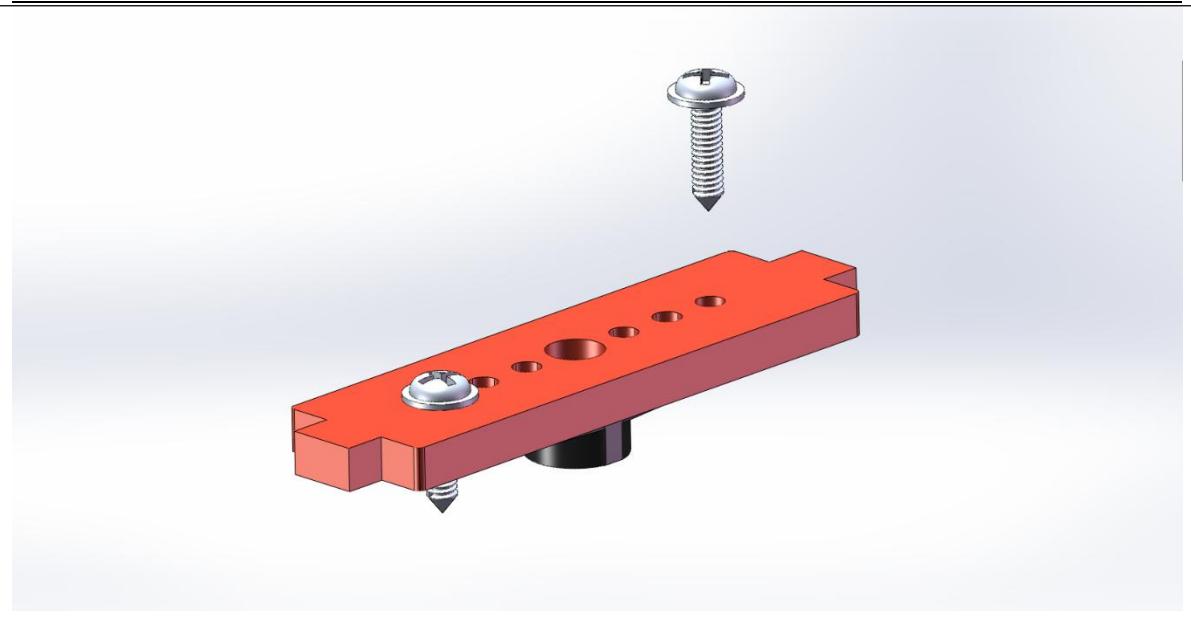
### 1.4.1. Assemble the Mechanical Wrist

1. Fix the Linear Rocker Arm to the A13 acrylic plate with Self-Tapping Screw.

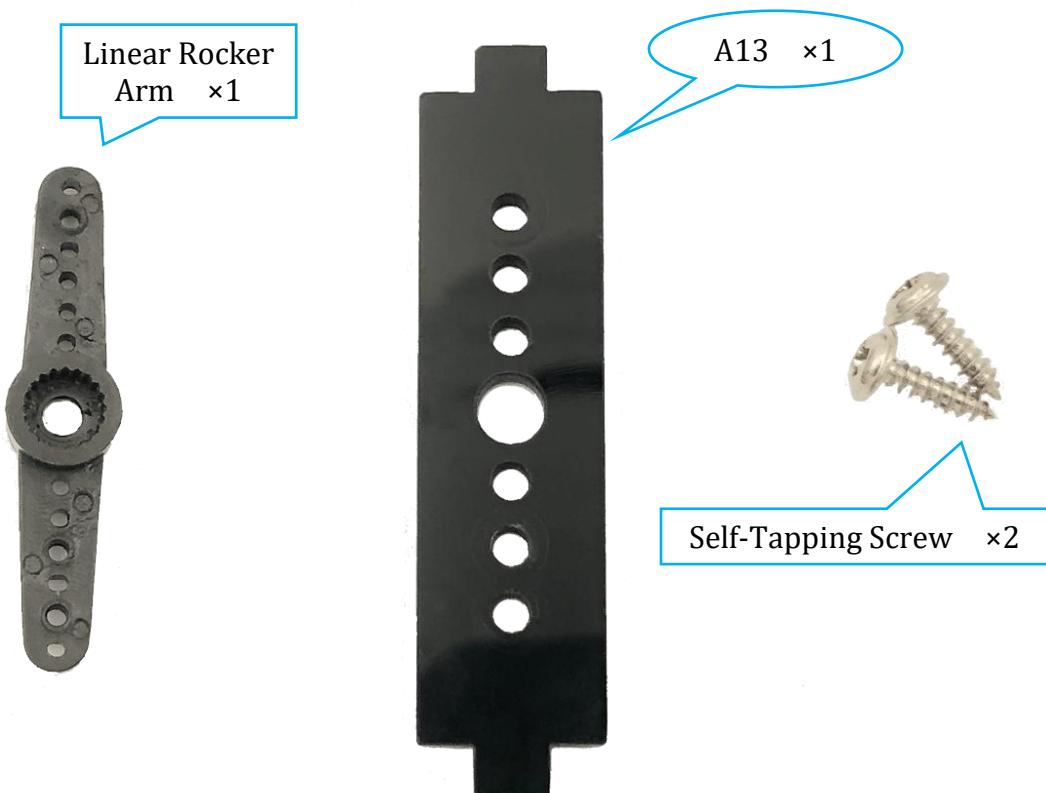
Assemble the following components

*Model Diagram*

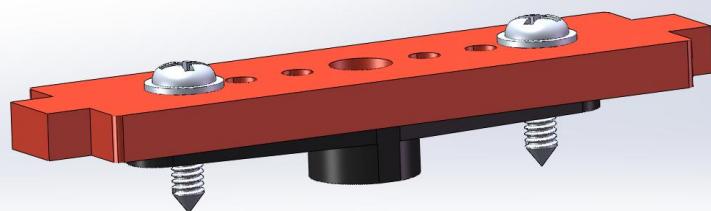
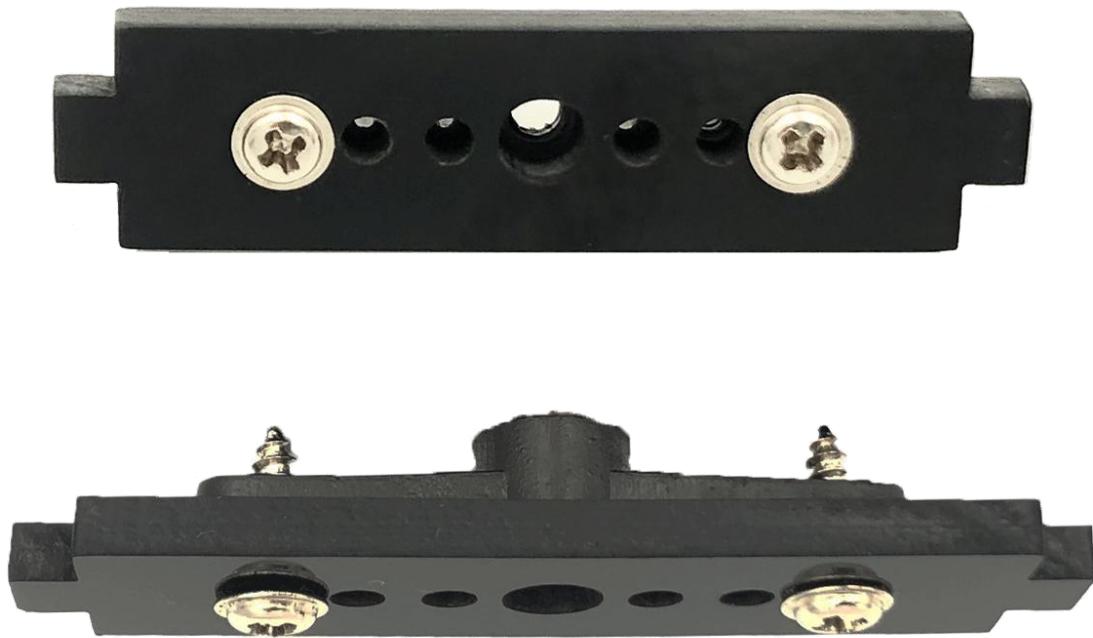




*Physical Diagram*



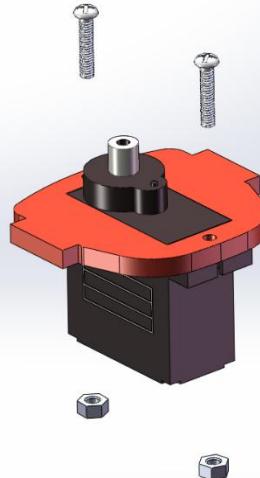
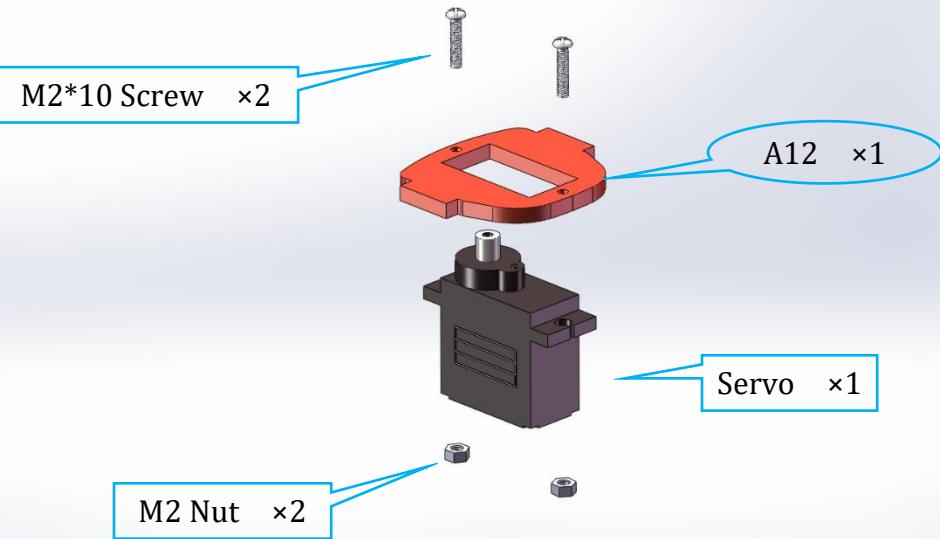
## Effect diagram after assembling

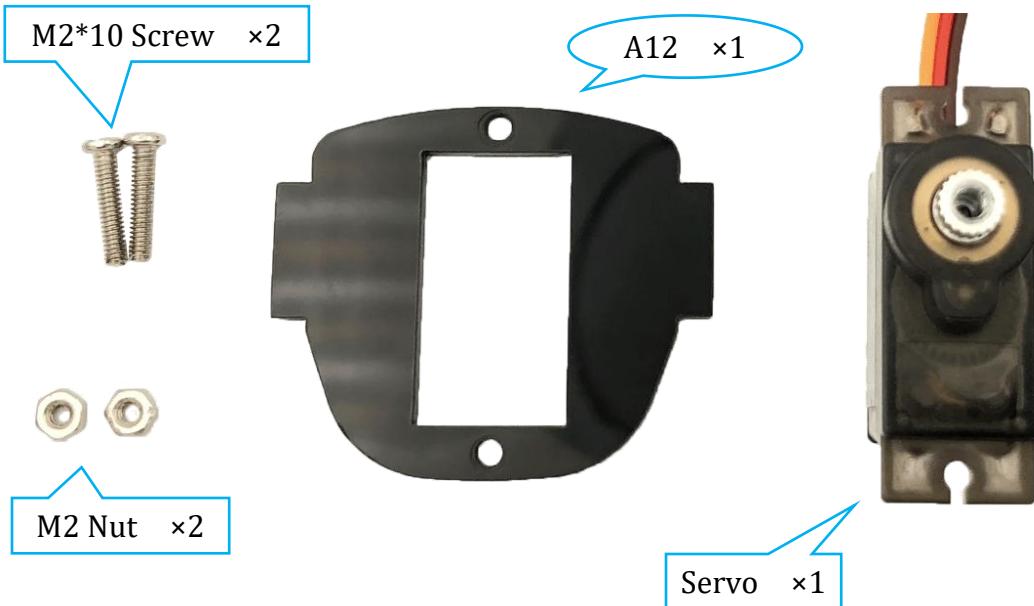
*Model Diagram**Physical Diagram*

## 2. Fix a Servo to the A12 acrylic plate.

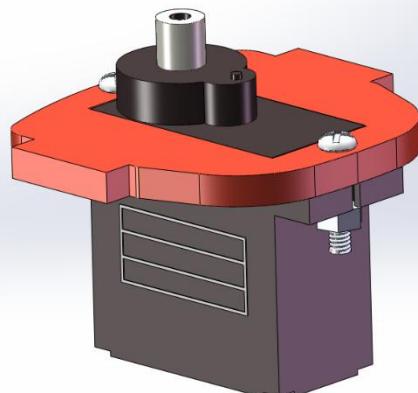
Assemble the following components

*Model Diagram*



*Physical Diagram*

## Effect diagram after assembling

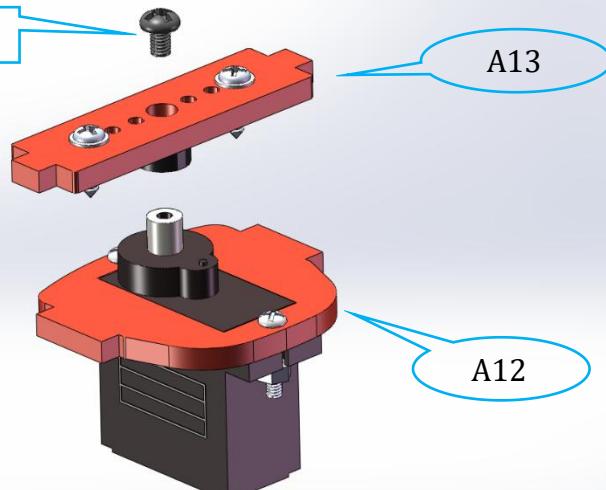
*Model Diagram**Physical Diagram*

3. Fix the A13 to the Servo in the A12 acrylic plate with the M2.5\*4 Screw (**M2.5\*4 Screw provided by the Servo bag**).

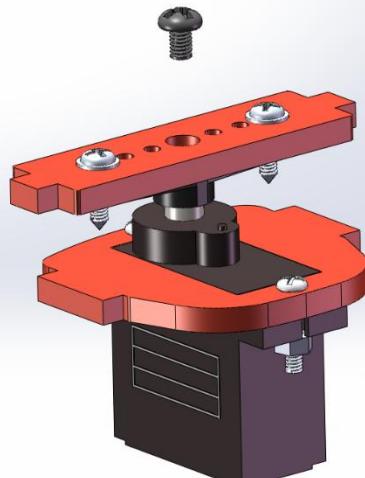
Assemble the following components

*Model Diagram*

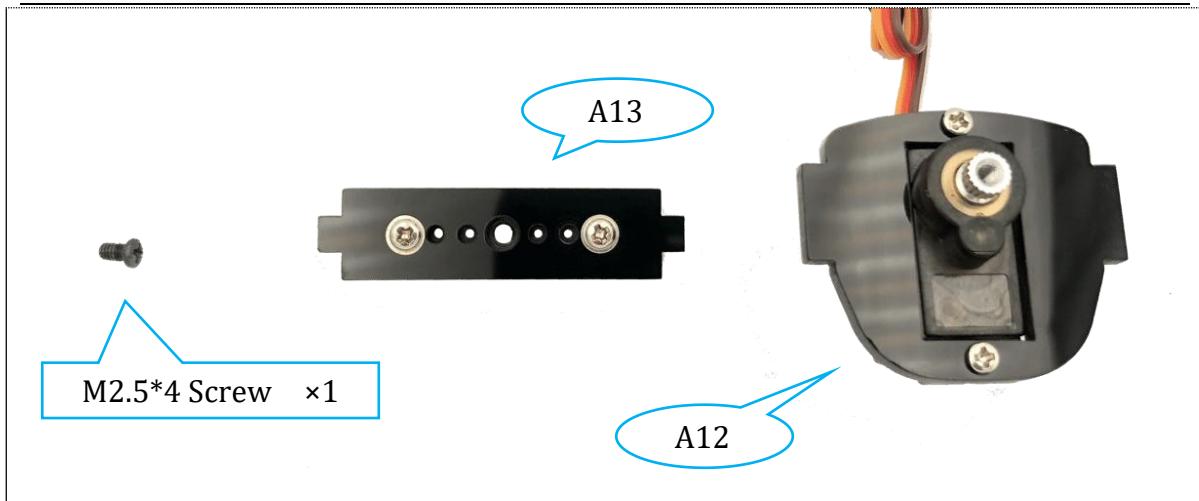
M2.5\*4 Screw ×1



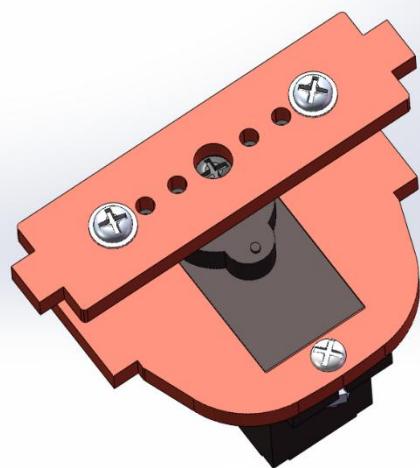
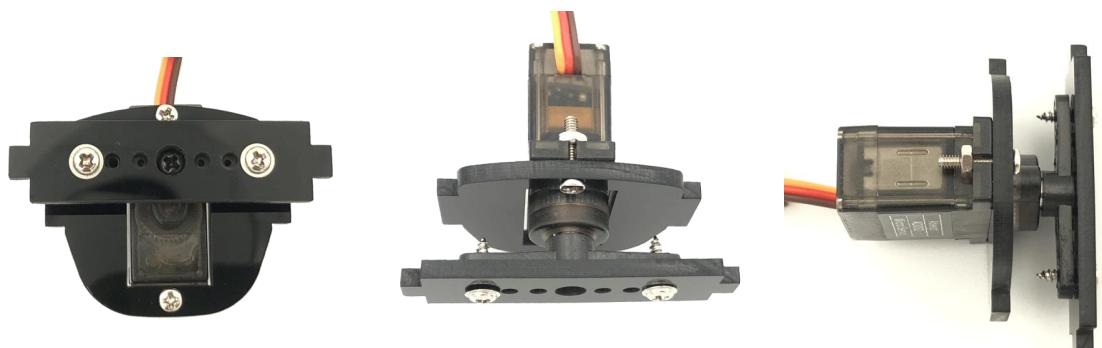
M2.5\*4 Screw



*Physical Diagram*



## Effect diagram after assembling

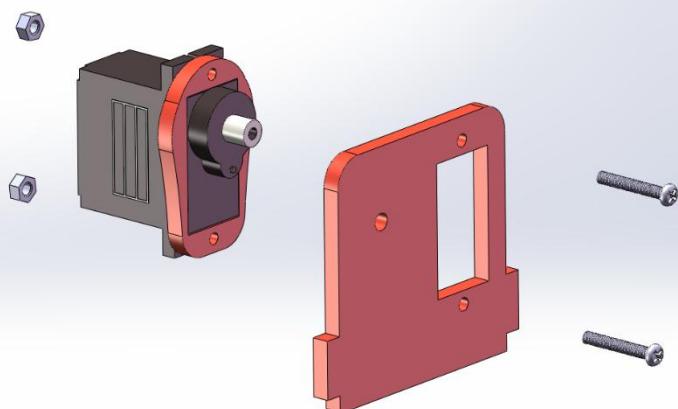
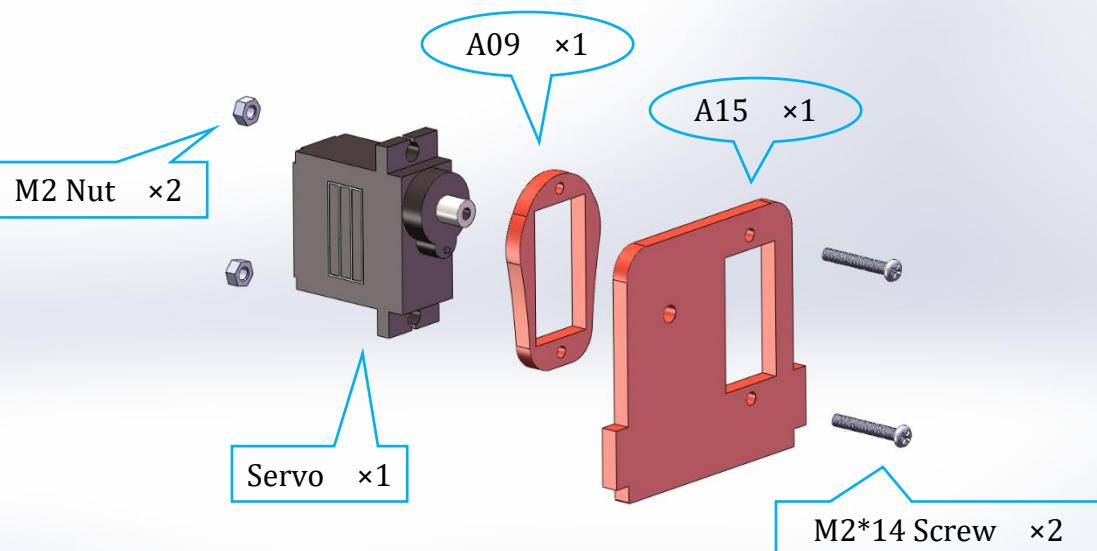
*Model Diagram**Physical Diagram*

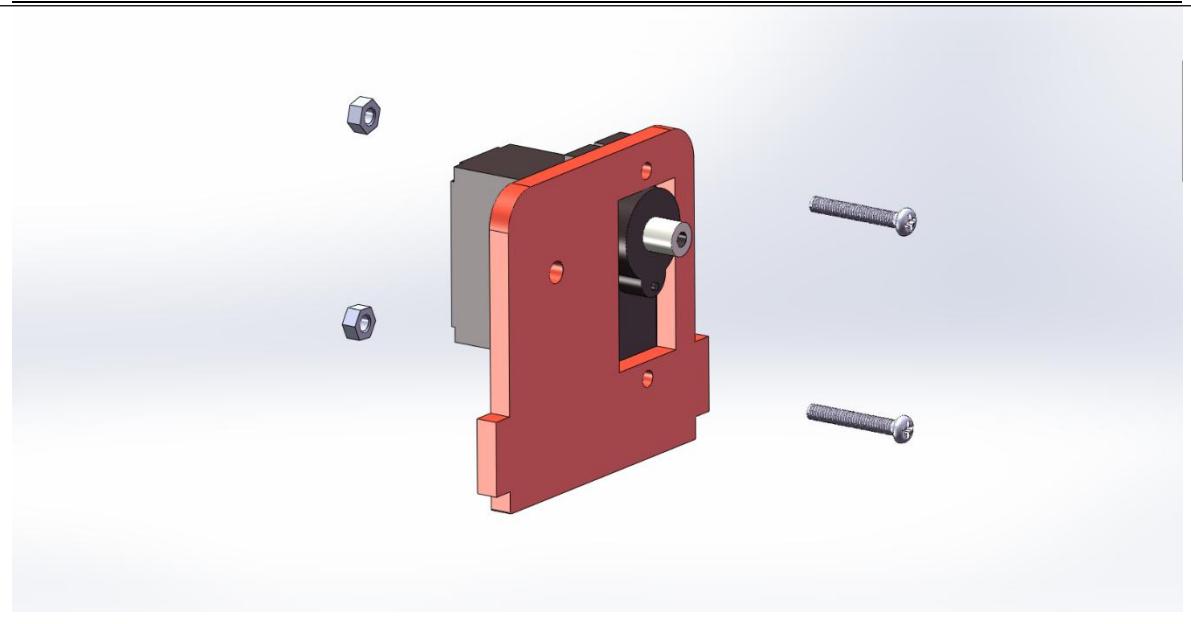
### 1.4.2. Assemble the Mechanical Gripper

4. Fix a Servo to the A15 acrylic plate.

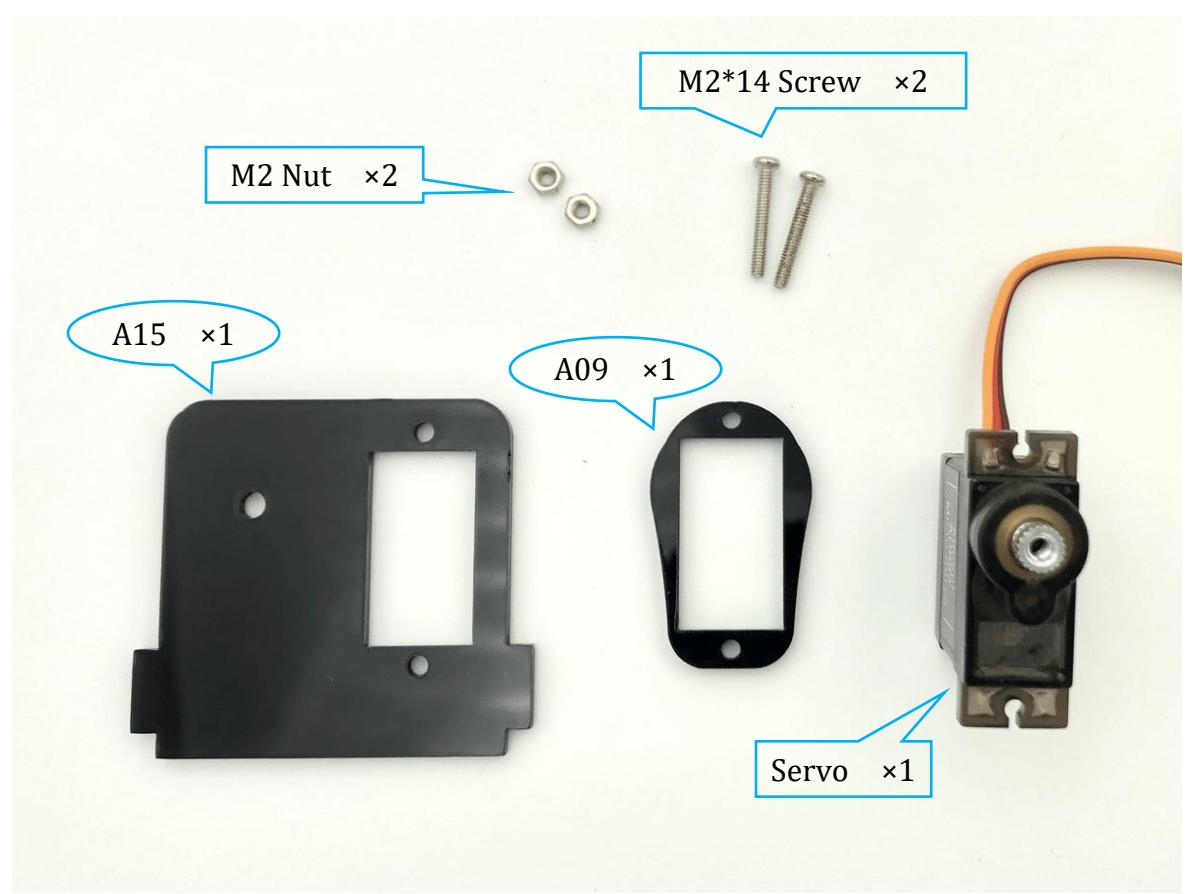
Assemble the following components

*Model Diagram*

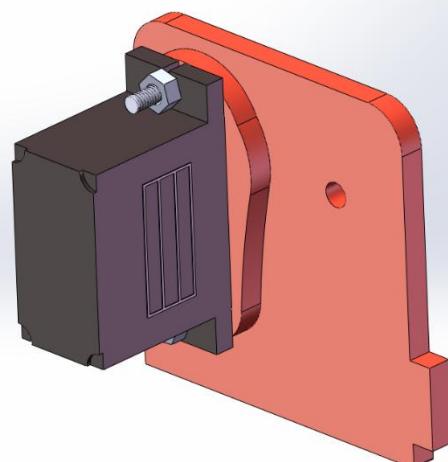
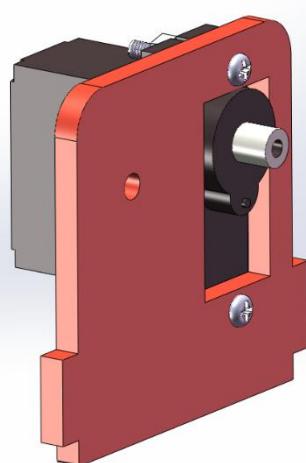


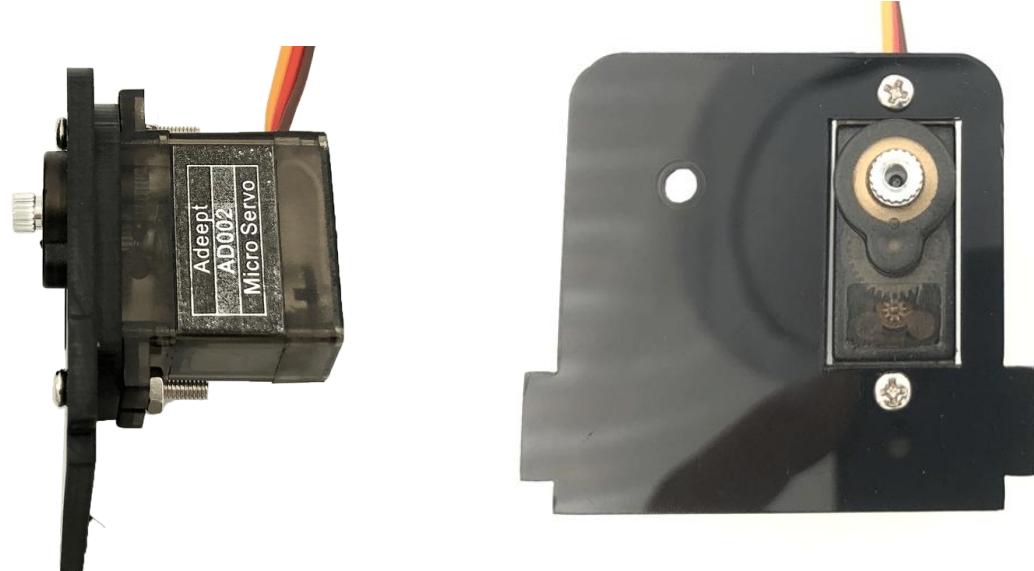


Physical Diagram



## Effect diagram after assembling

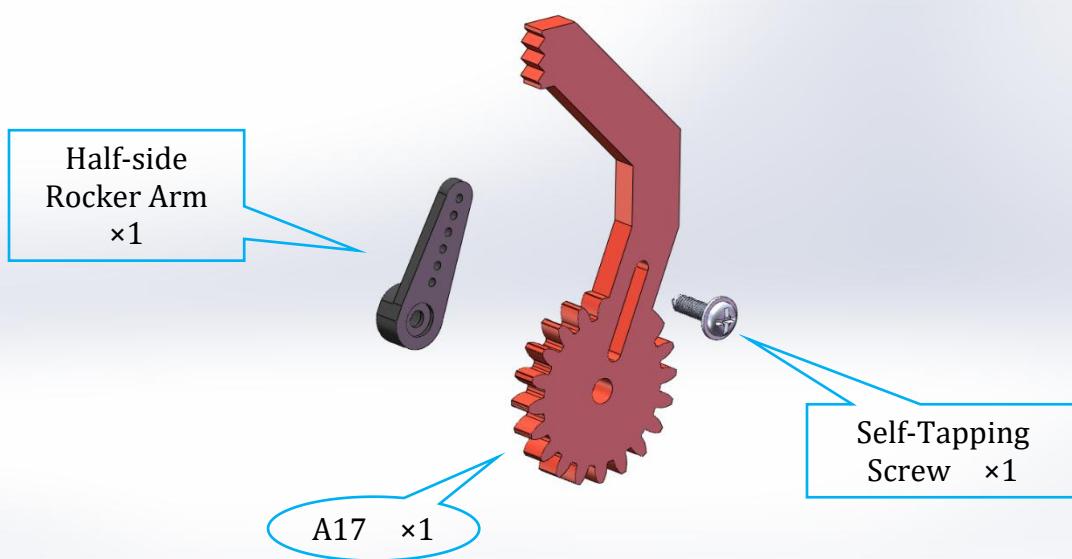
*Model Diagram*

*Physical Diagram*

5. Fix a Half-side Rocker Arm to the A17 acrylic plate with Self-Tapping Screw(provided by the Servo bag) .

Assemble the following components

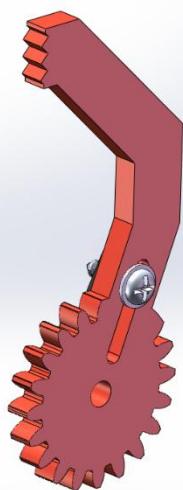
*Model Diagram*

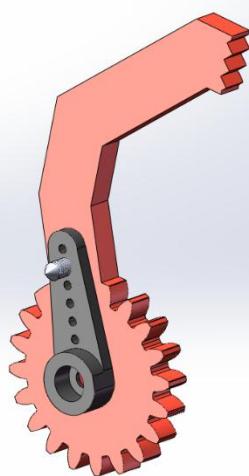


*Physical Diagram*

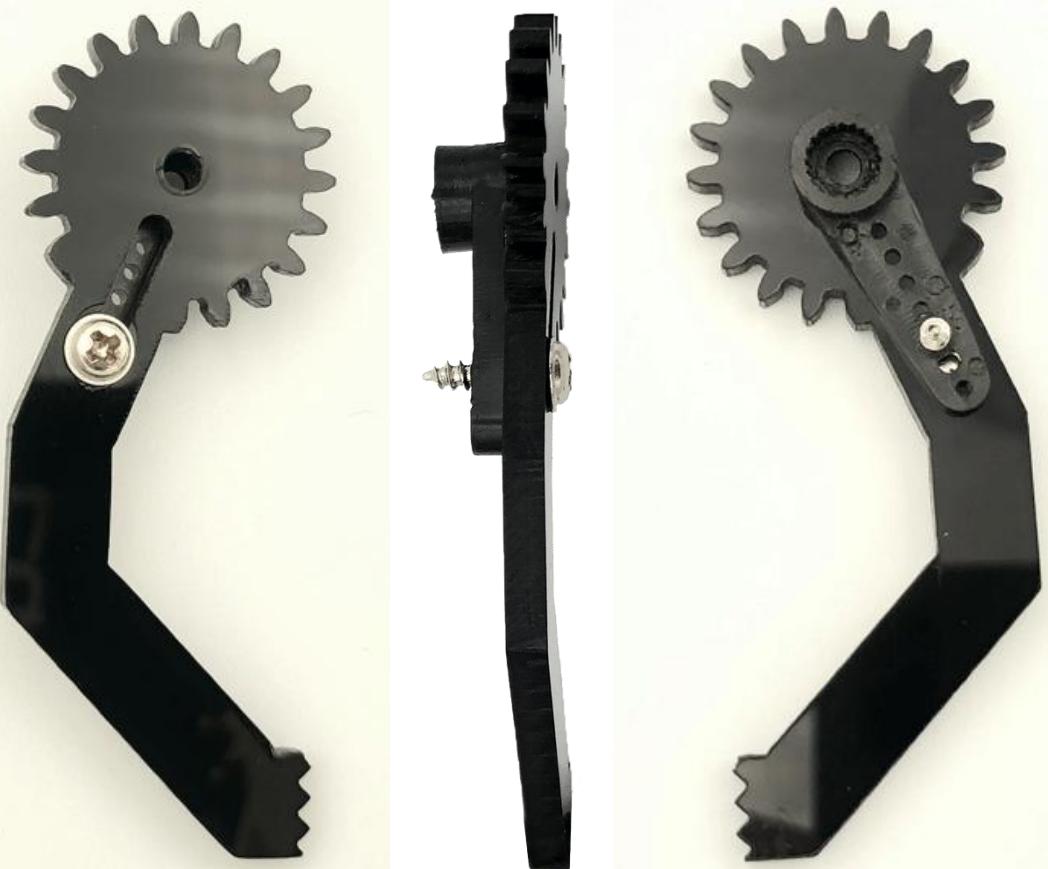


## Effect diagram after assembling

*Model Diagram*



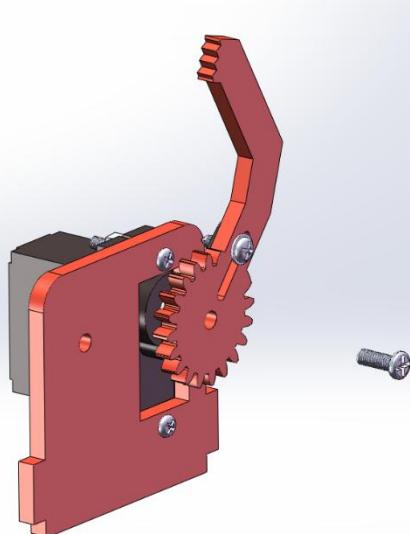
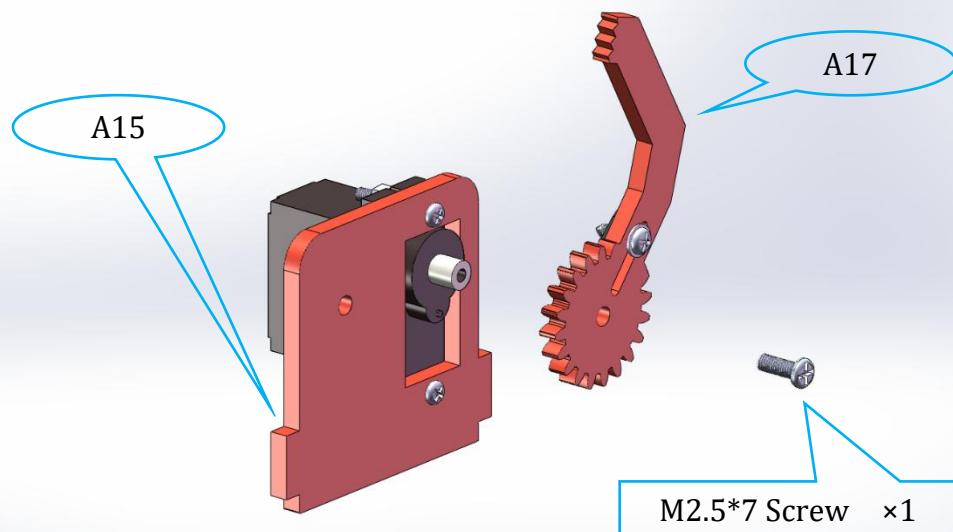
*Physical Diagram*



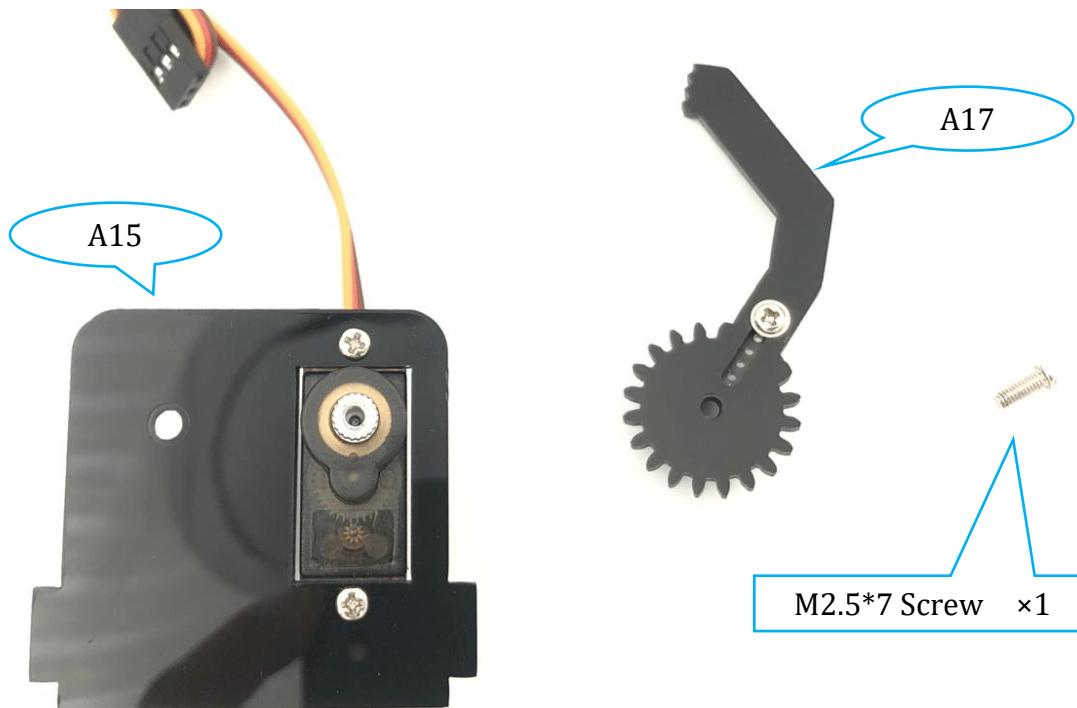
5. Fix the A17 to the Servo in the A15 acrylic plate.

Assemble the following components

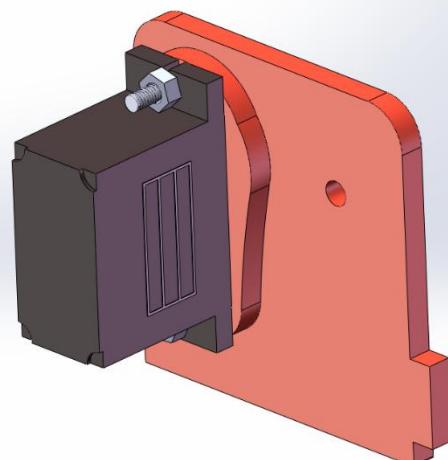
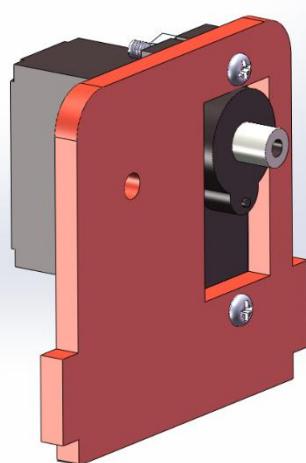
*Model Diagram*

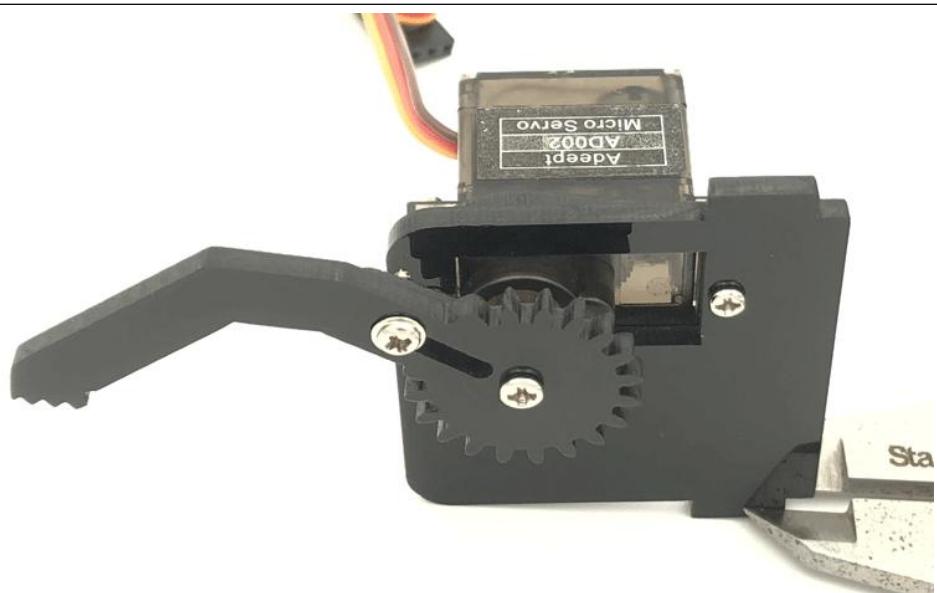
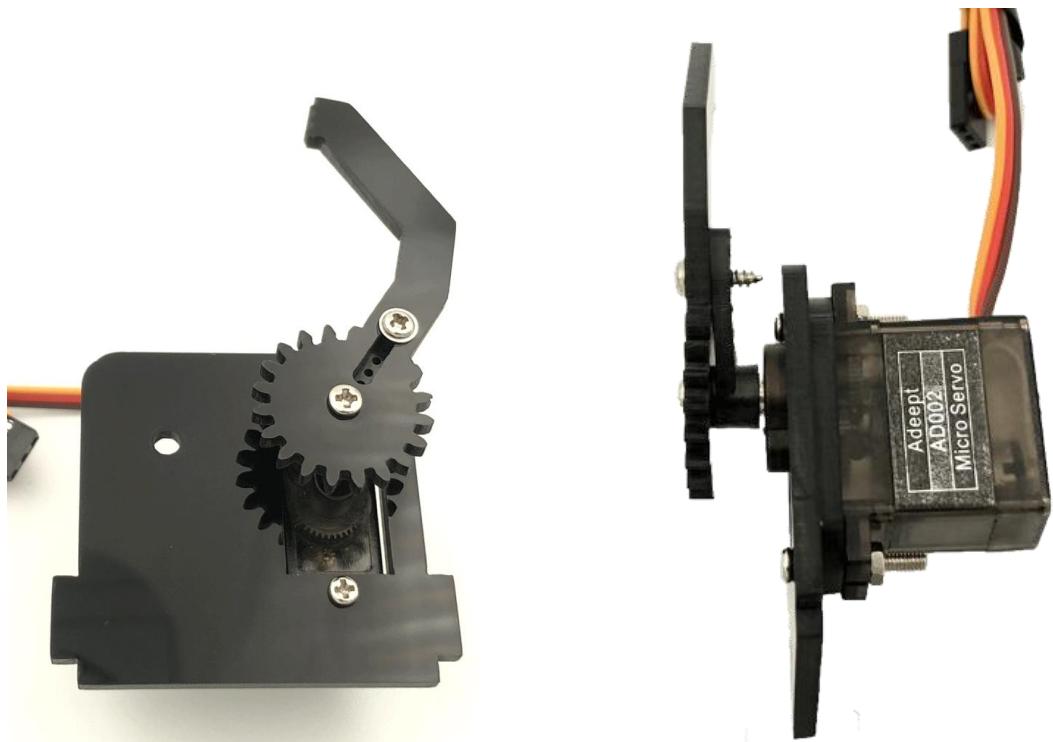


Physical Diagram



## Effect diagram after assembling

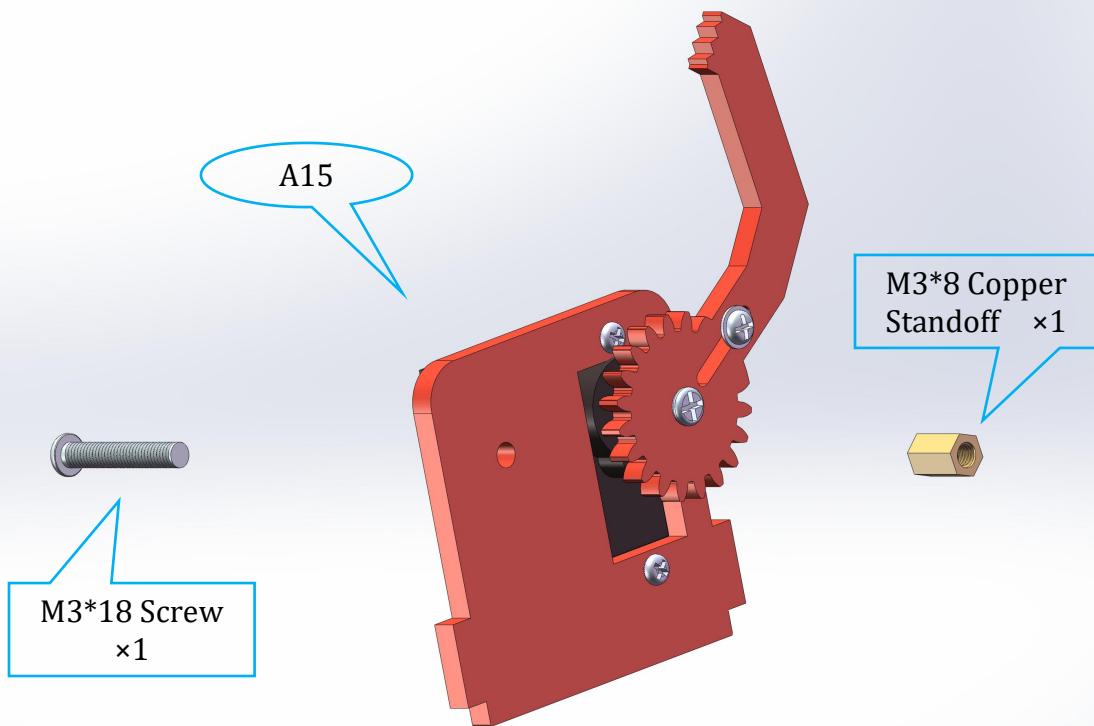
*Model Diagram*

*Physical Diagram*

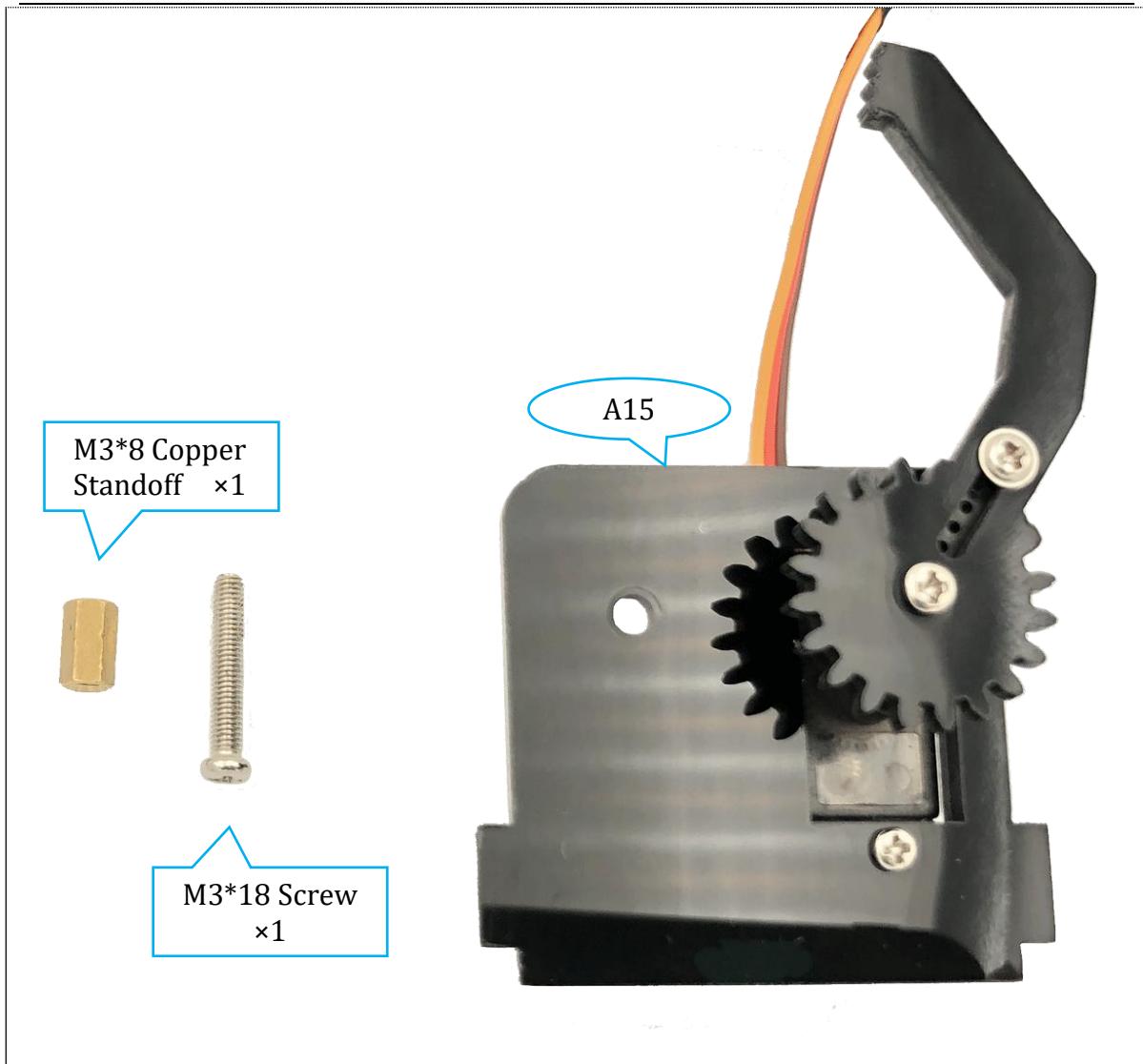
6. Fix a M3\*8 Copper Standoff to the A15 acrylic plate with a M3\*18 Screw.

Assemble the following components

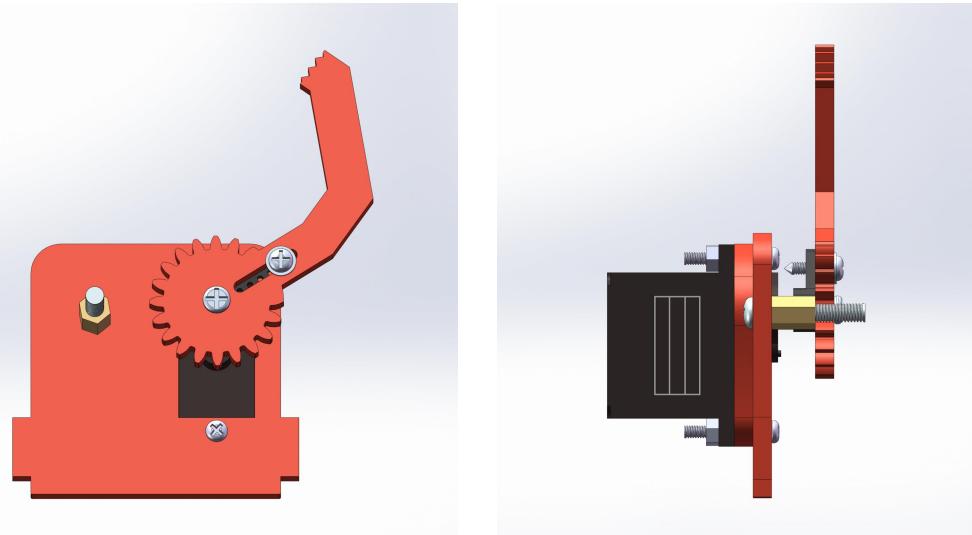
*Model Diagram*



*Physical Diagram*



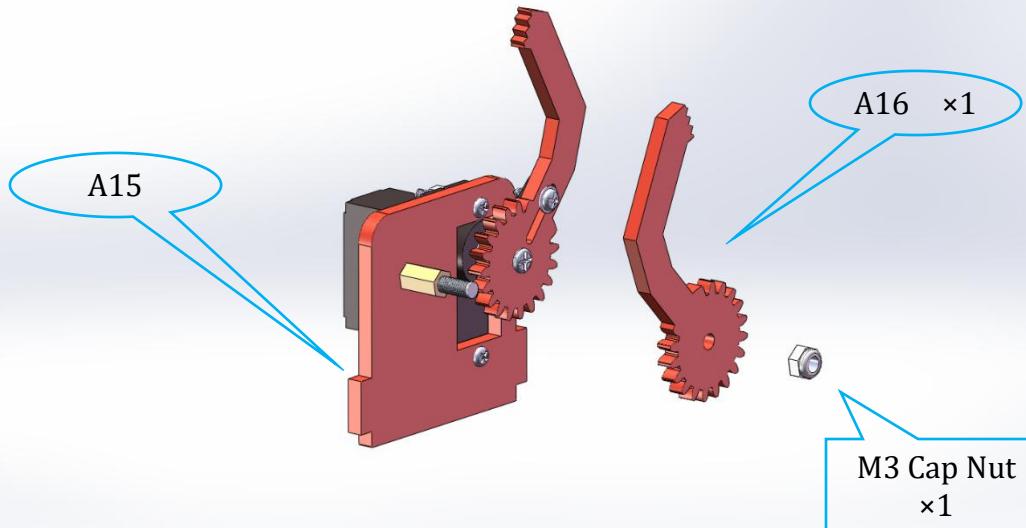
## Effect diagram after assembling

*Model Diagram**Physical Diagram*

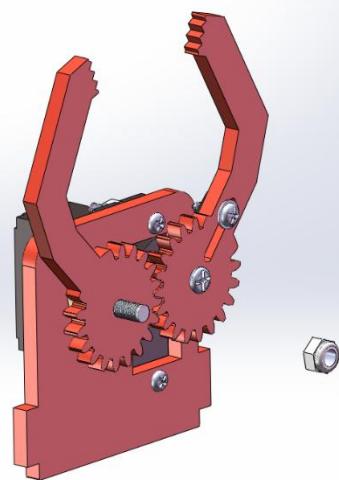
## 7. Fix a A16 to the A15 with a M3 Nut.

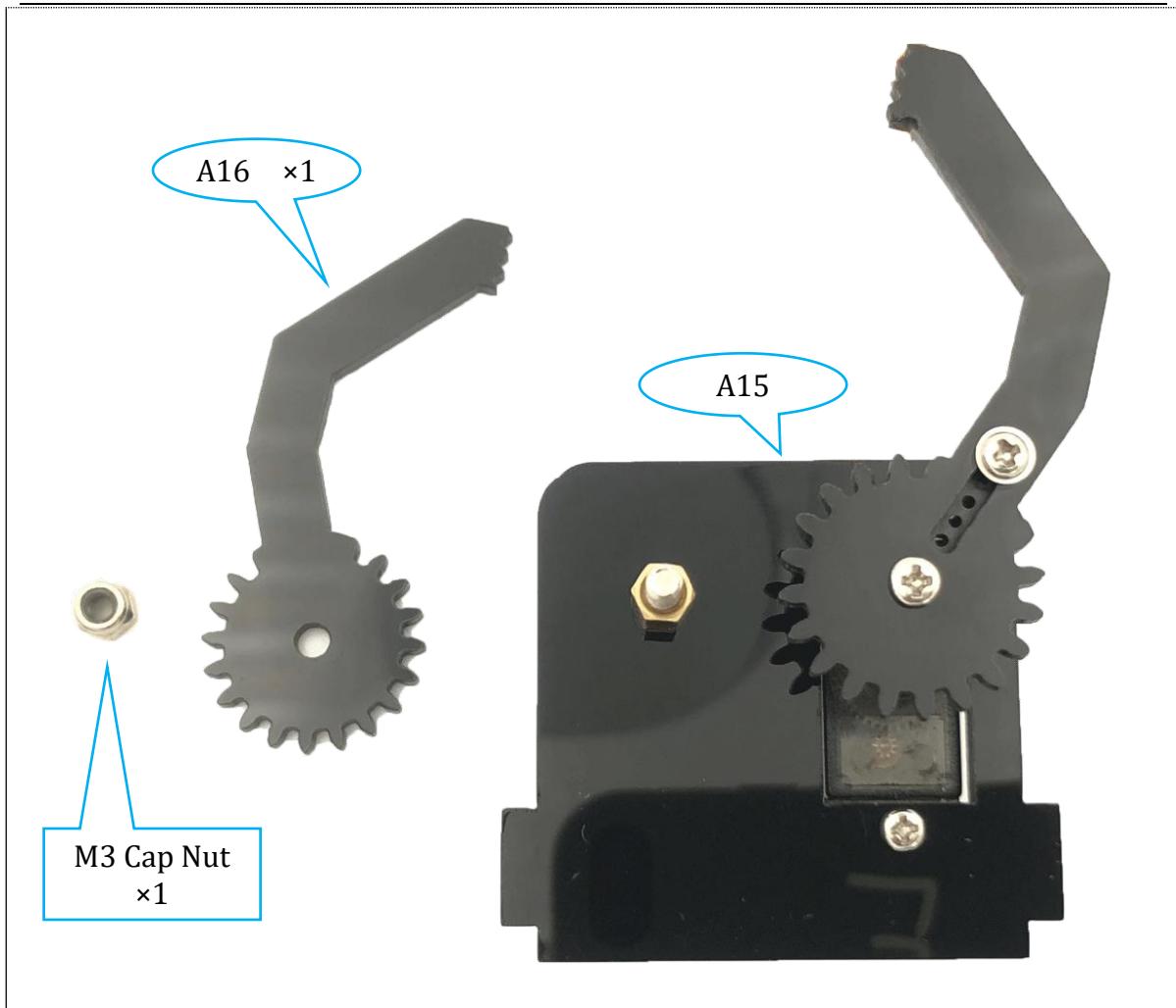
Assemble the following components

*Model Diagram*

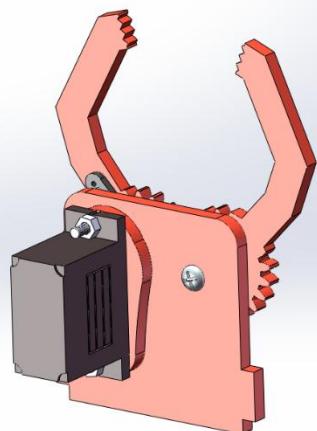
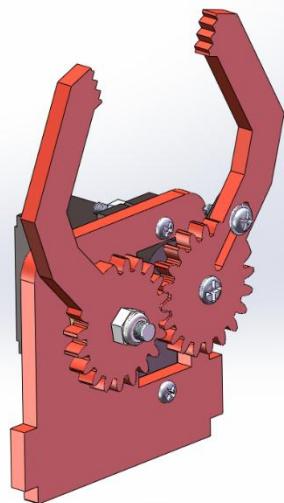


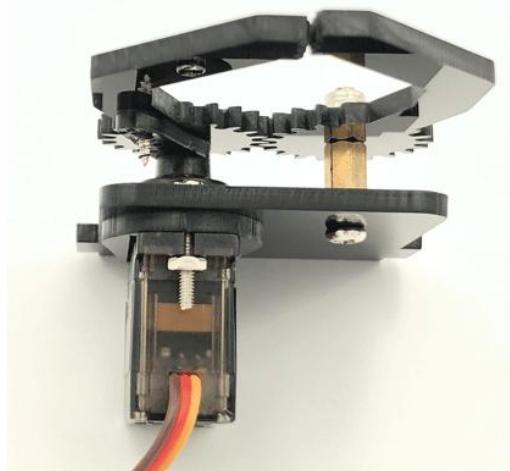
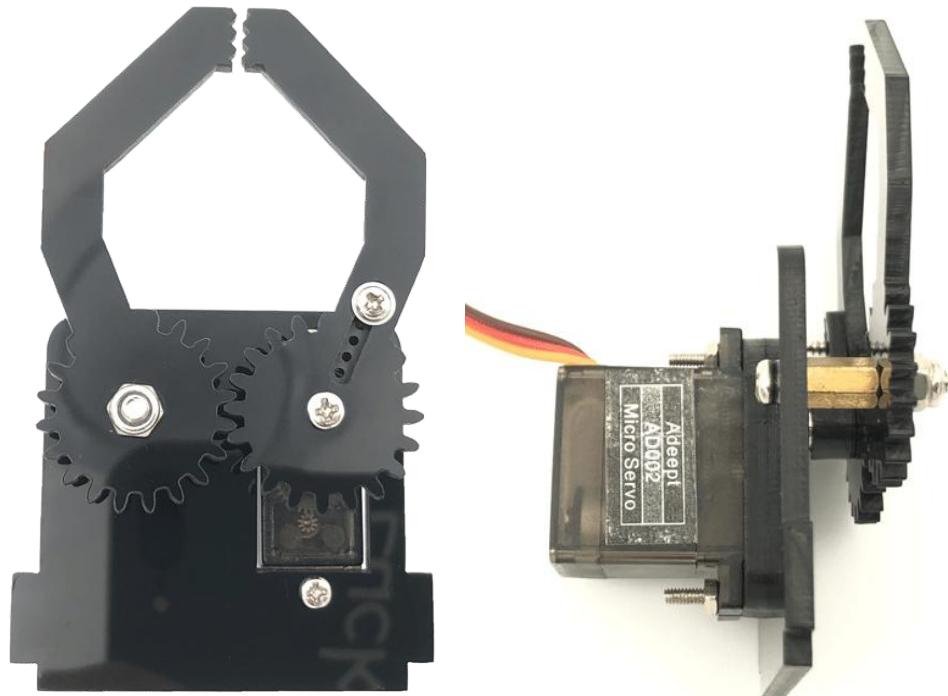
*Physical Diagram*





## Effect diagram after assembling

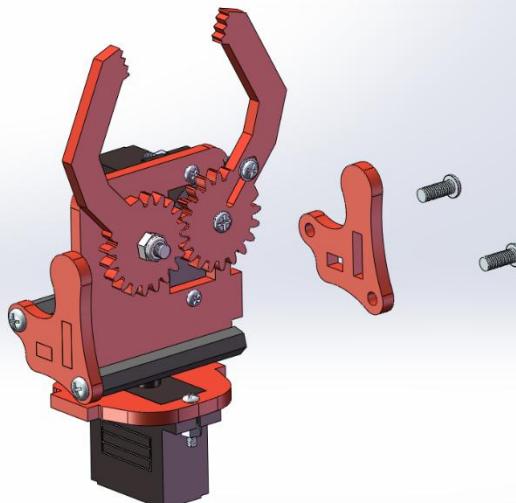
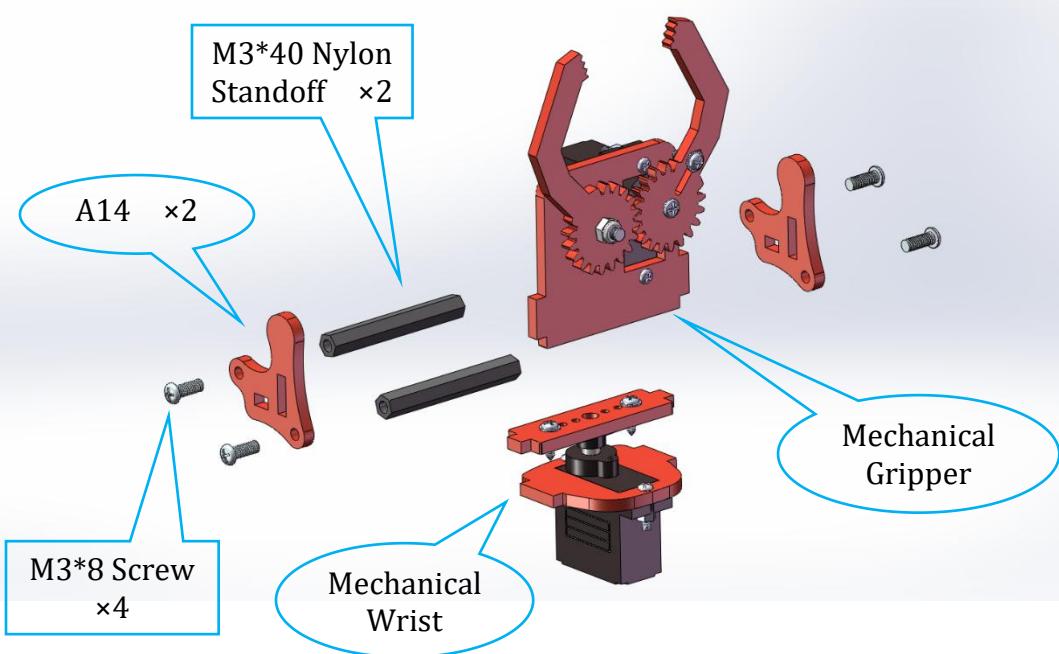
*Model Diagram*

*Physical Diagram*

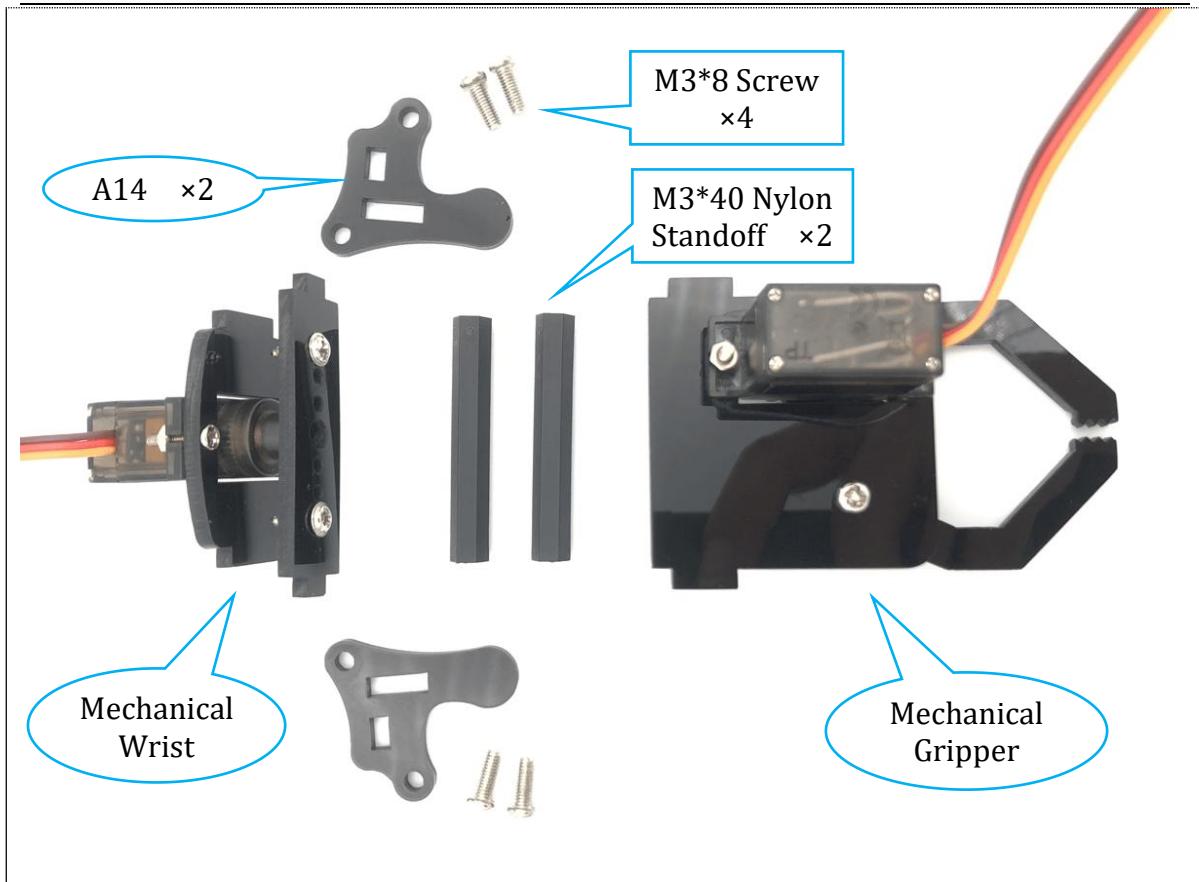
### 1.4.3. Assemble the Mechanical Wrist and the Mechanical Gripper as the Mechanical hand.

Assemble the following components

*Model Diagram*

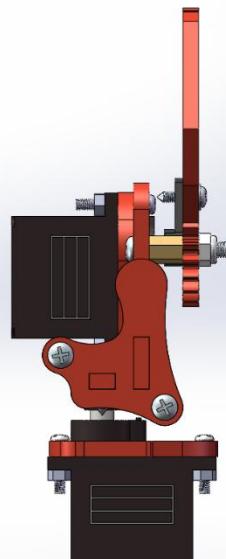
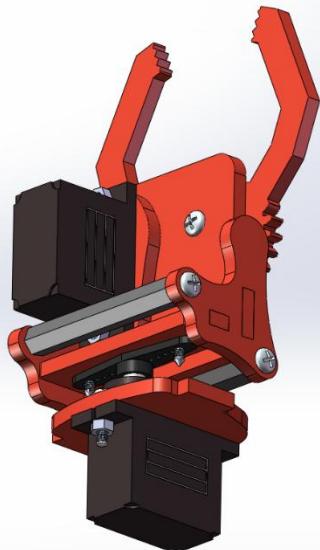


*Physical Diagram*



Effect diagram after assembling

*Model Diagram*



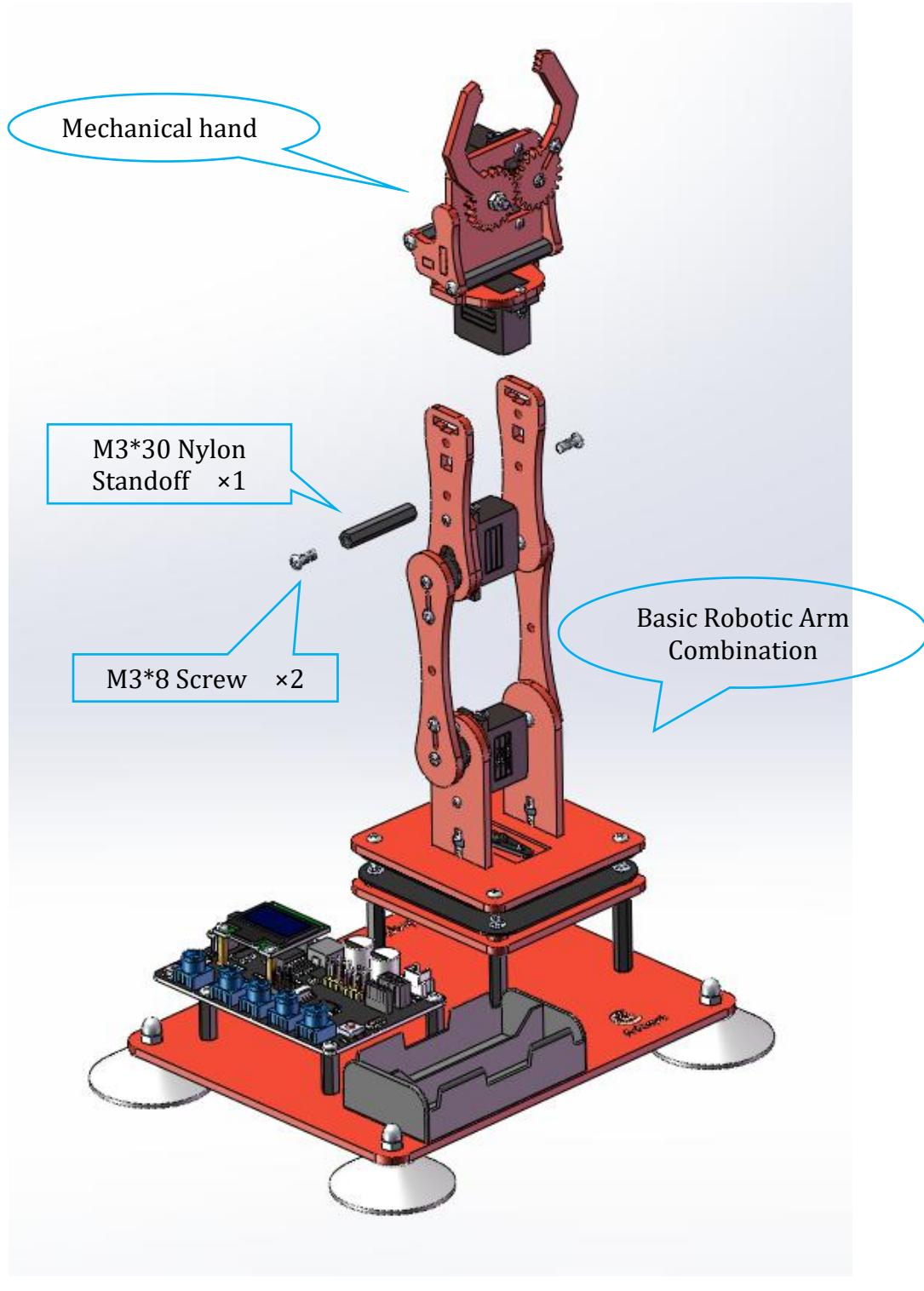
*Physical Diagram*



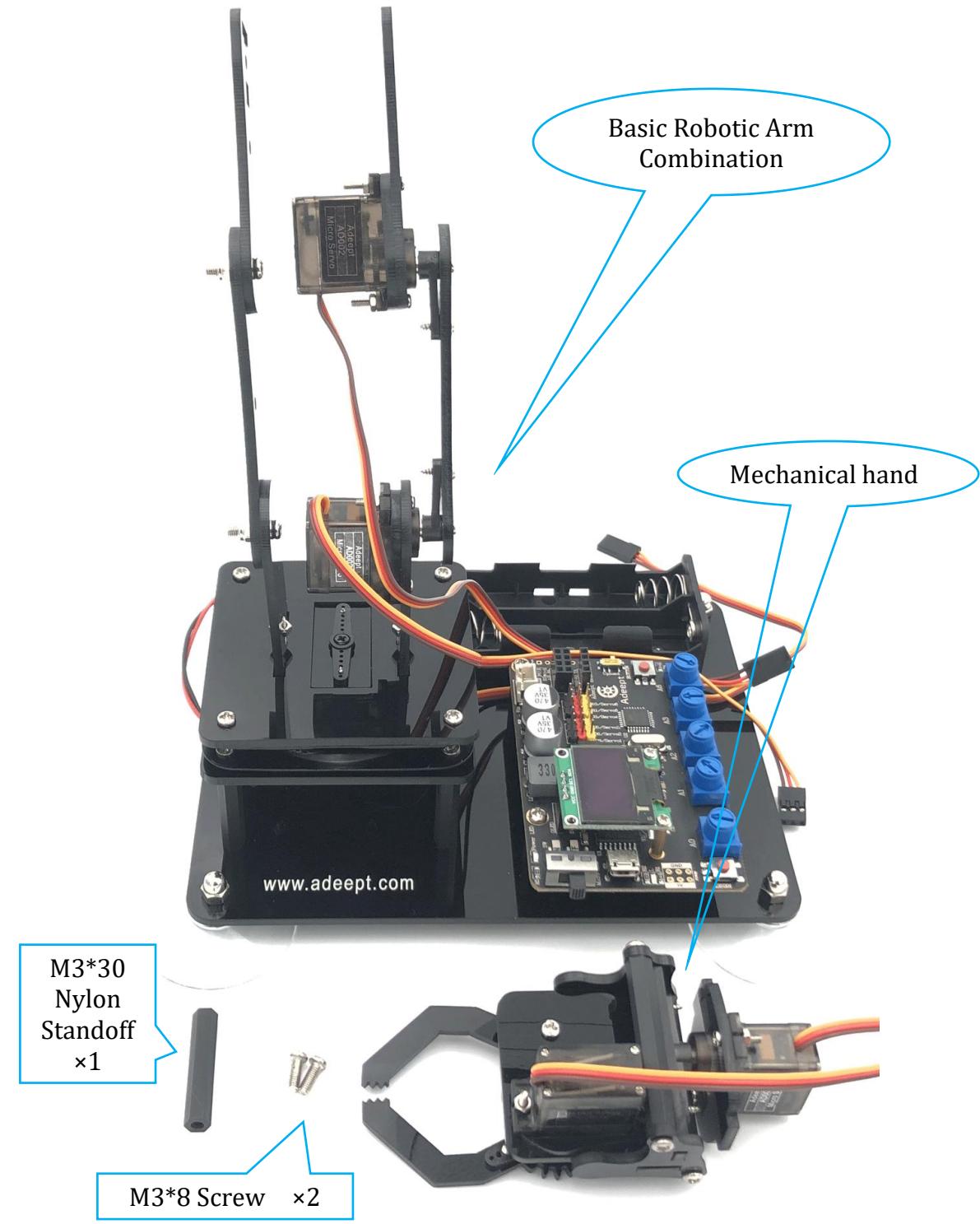
## 2. Play 1

Assemble the following components

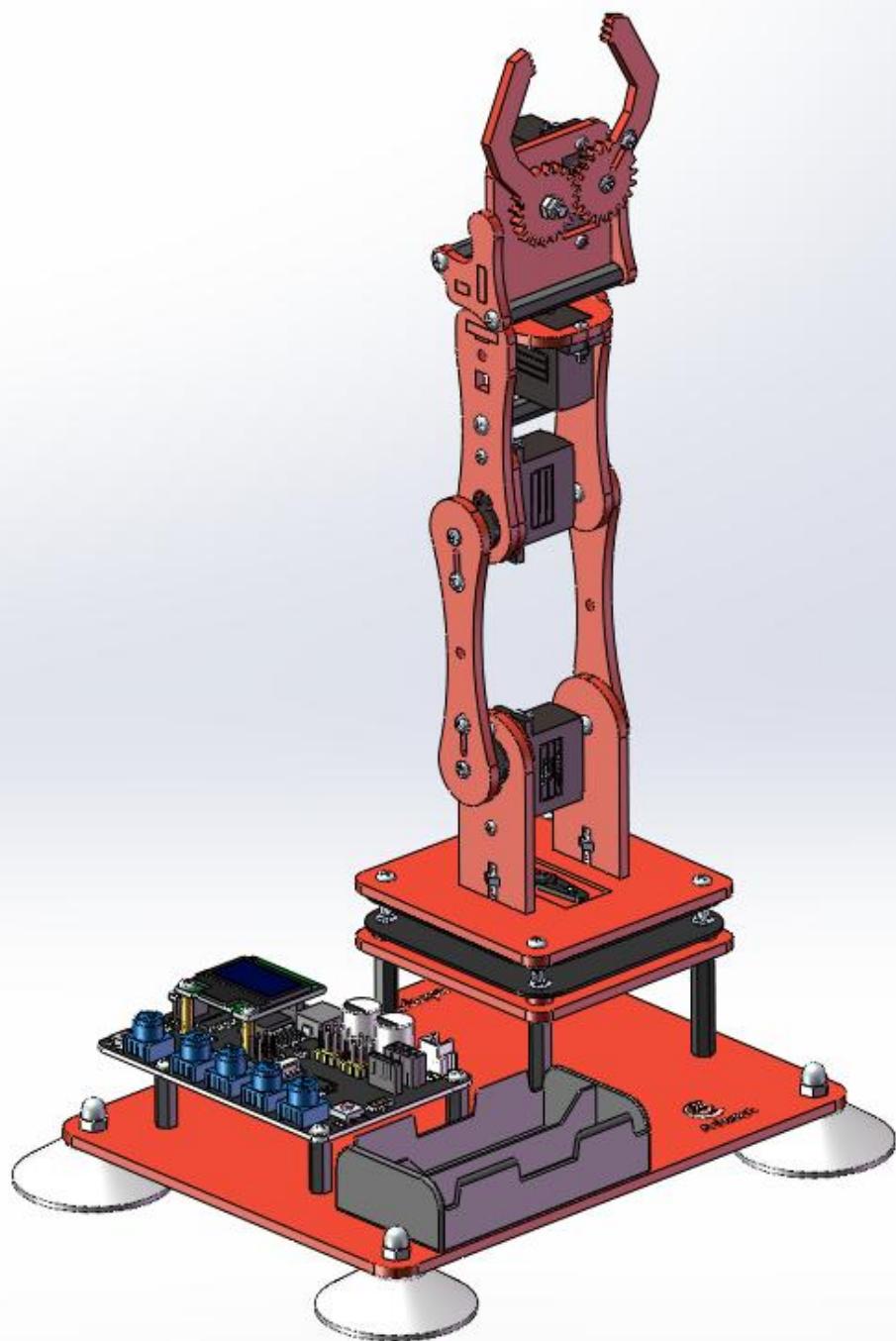
*Model Diagram*

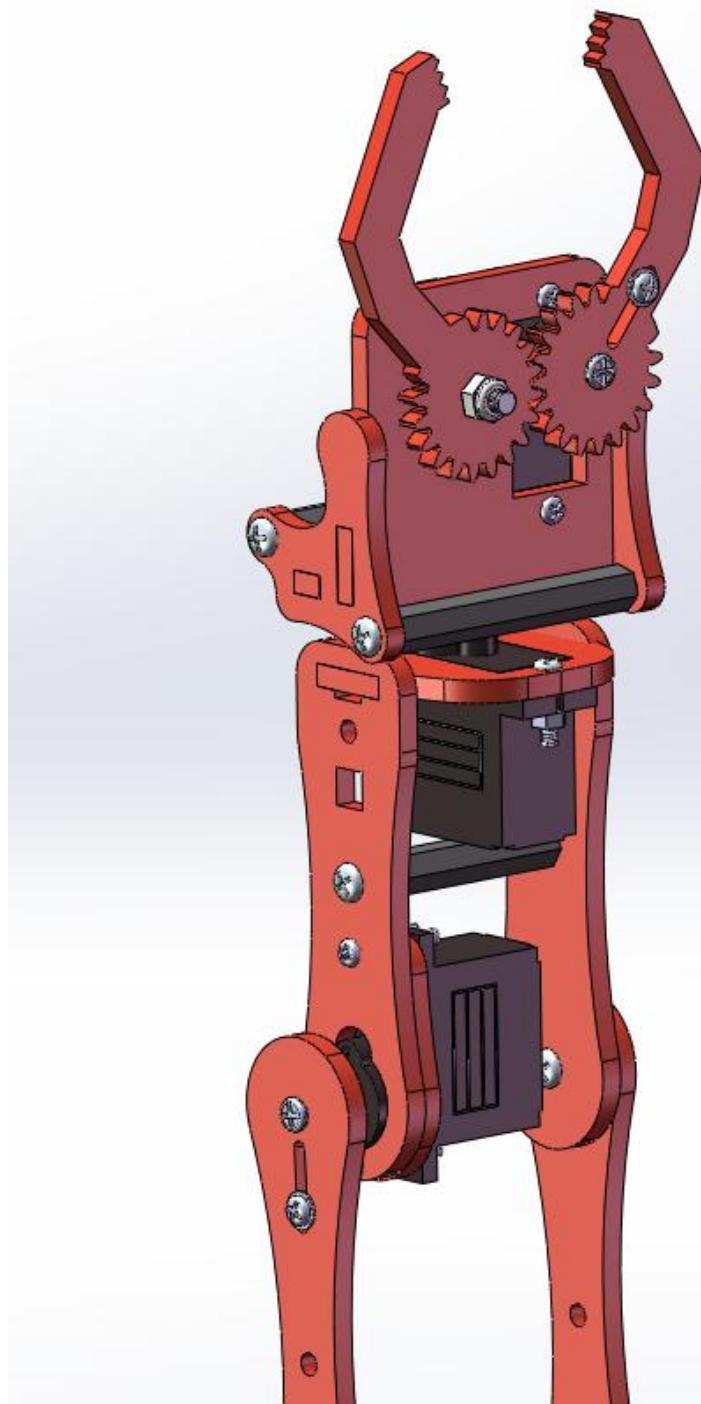


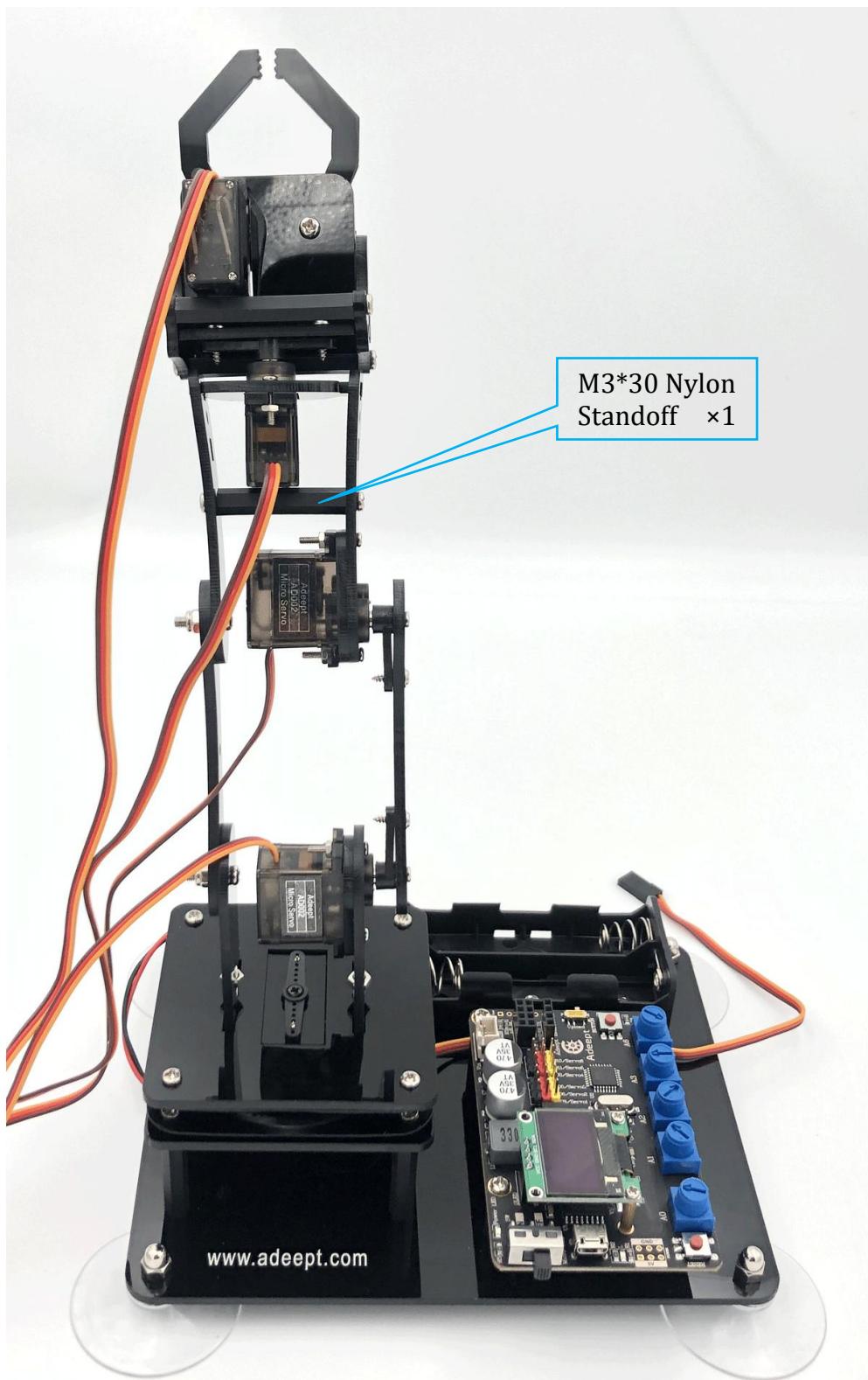
*Physical Diagram*



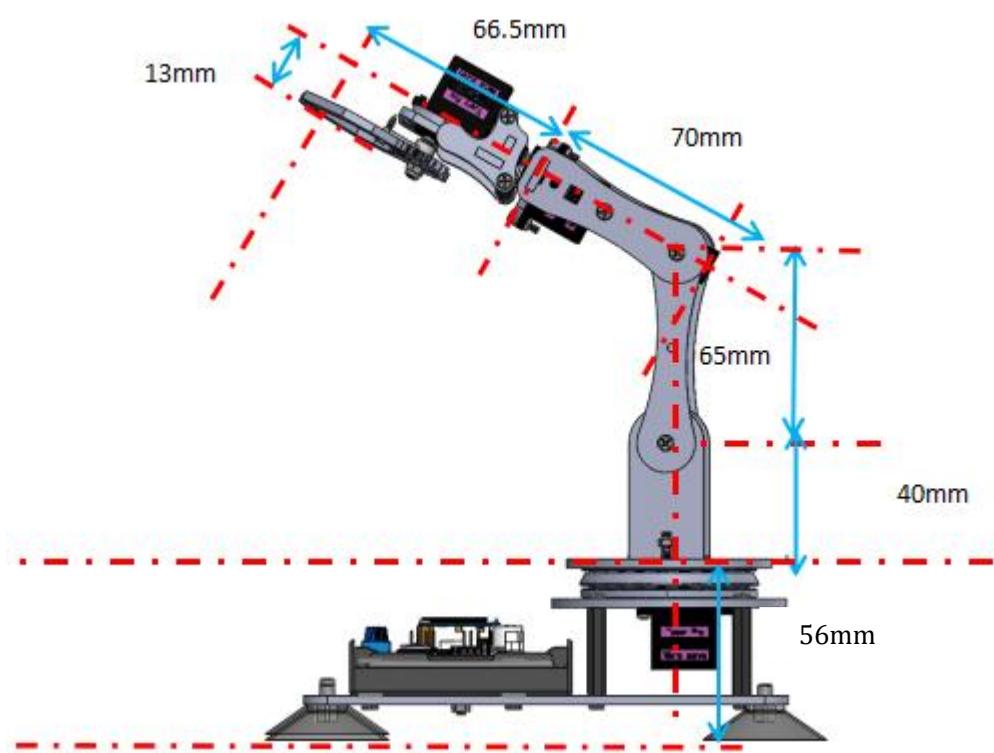
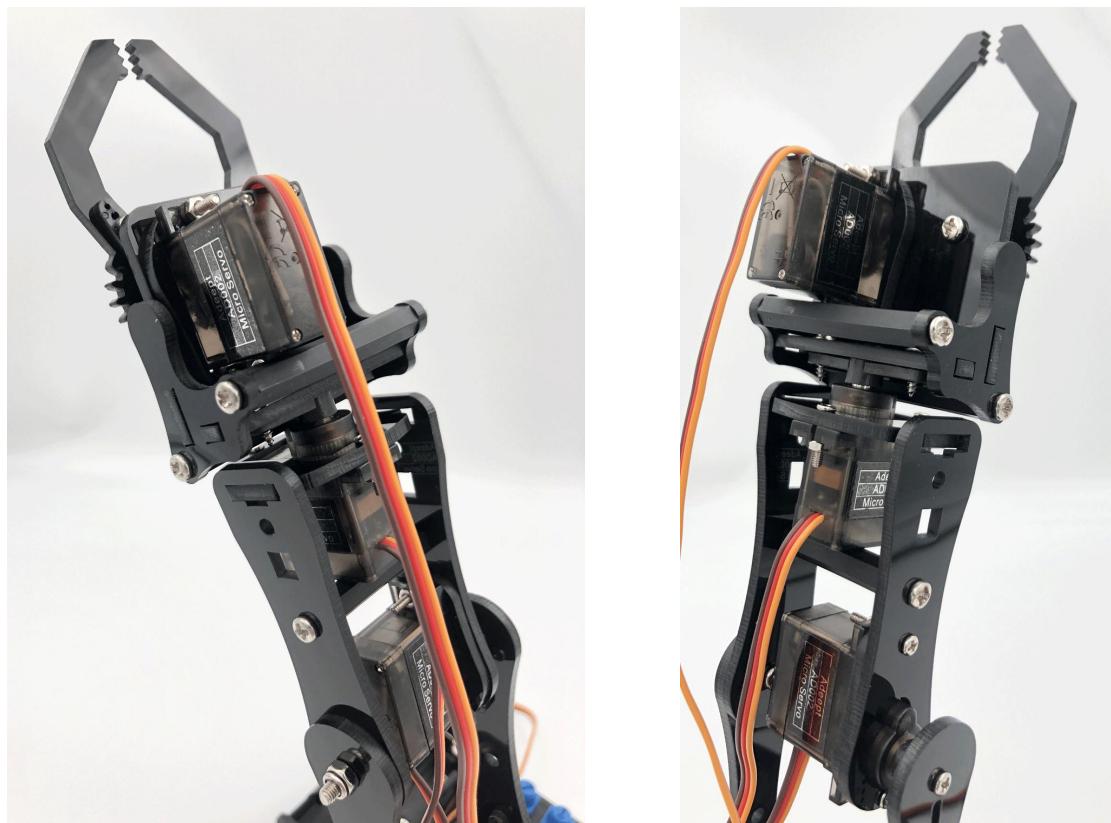
## Effect diagram after assembling

*Model Diagram*

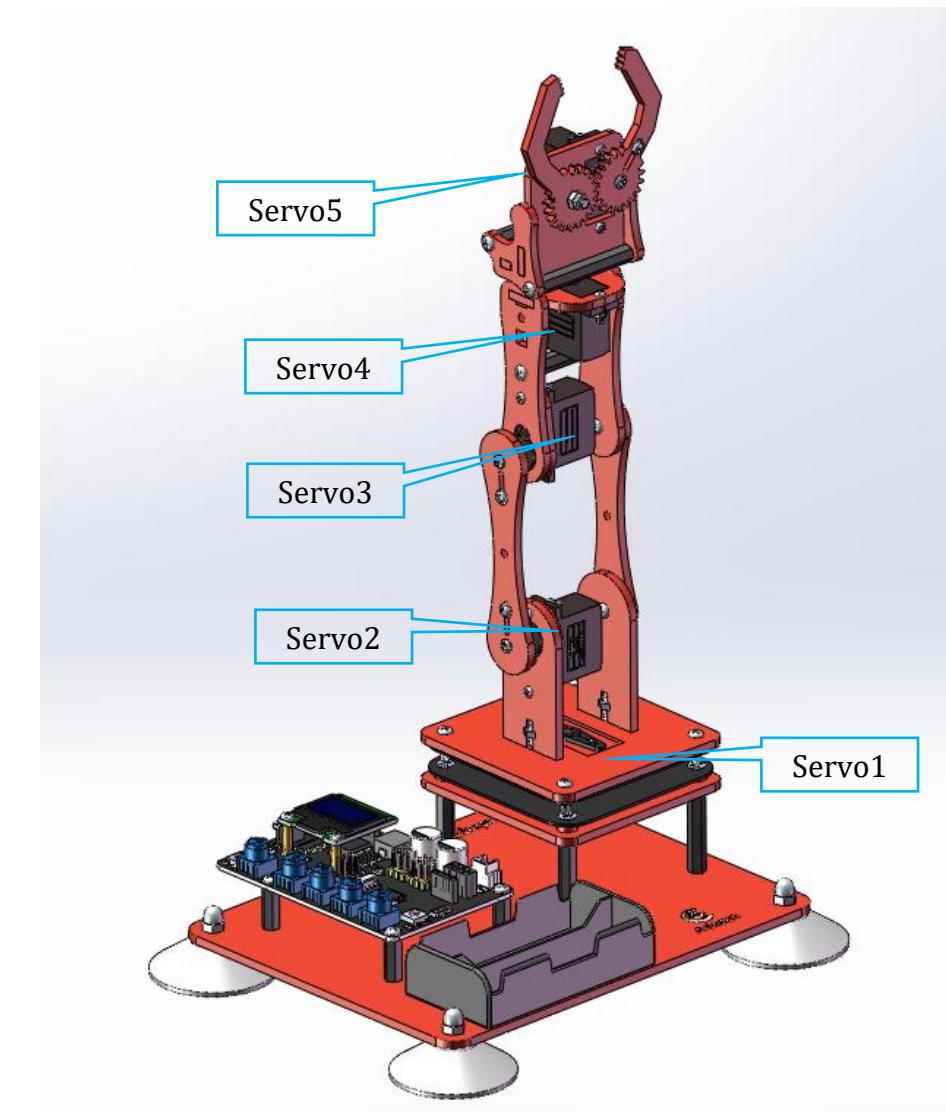


*Physical Diagram*

## Effect diagram after assembling



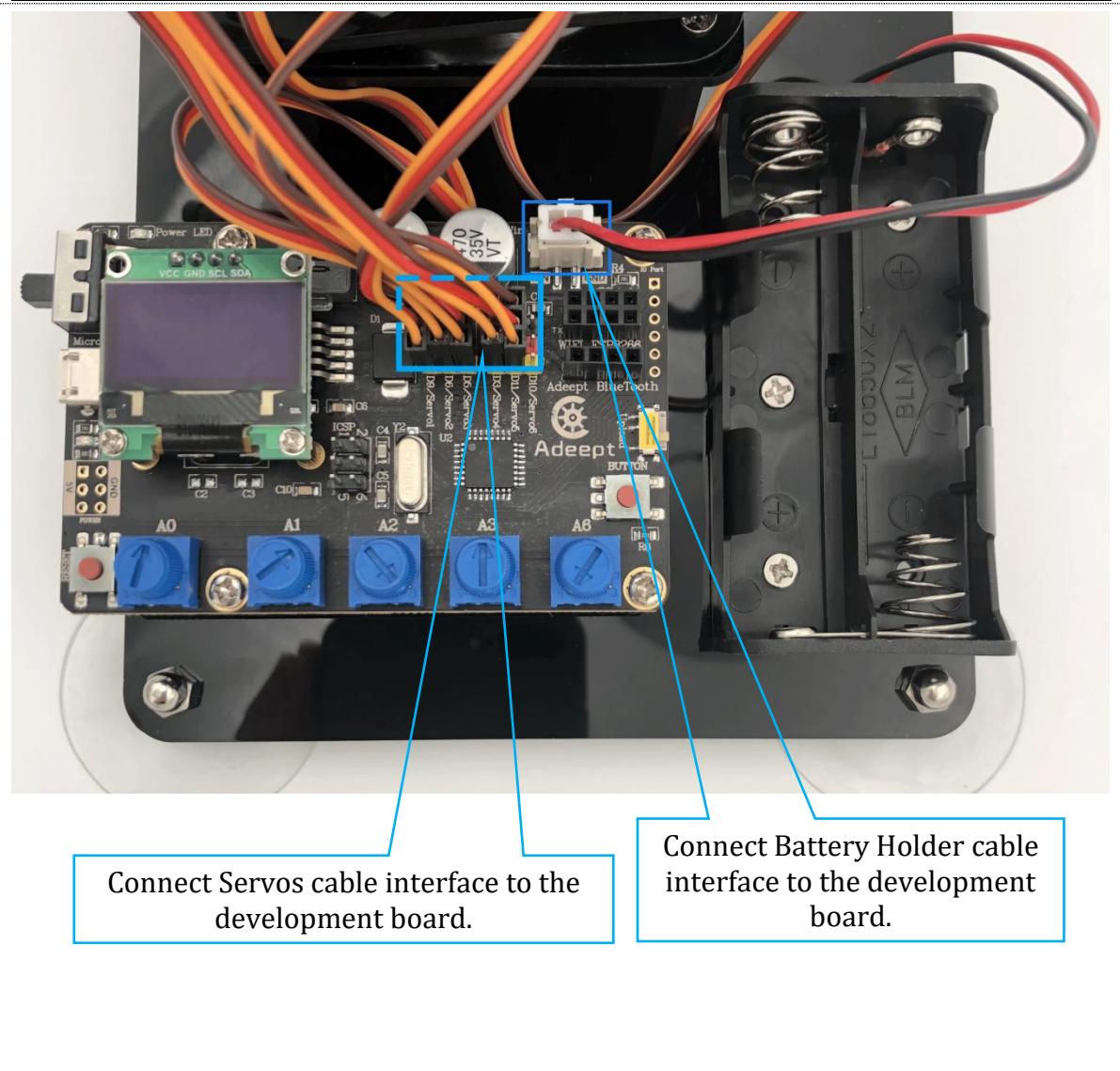
## Circuit Connection



Servo1~6 are connected to the corresponding servo pins of servo1~6 on the Arduino board.

Servo5 has a long distance, you need to connect the servo extension cable and then connect to the servo pins of the Arduino board.

When connecting the circuit, the yellow servo wire is connected to the yellow pin, the red servo wire is connected to the red pin, and the black servo wire is connected to the black pin.



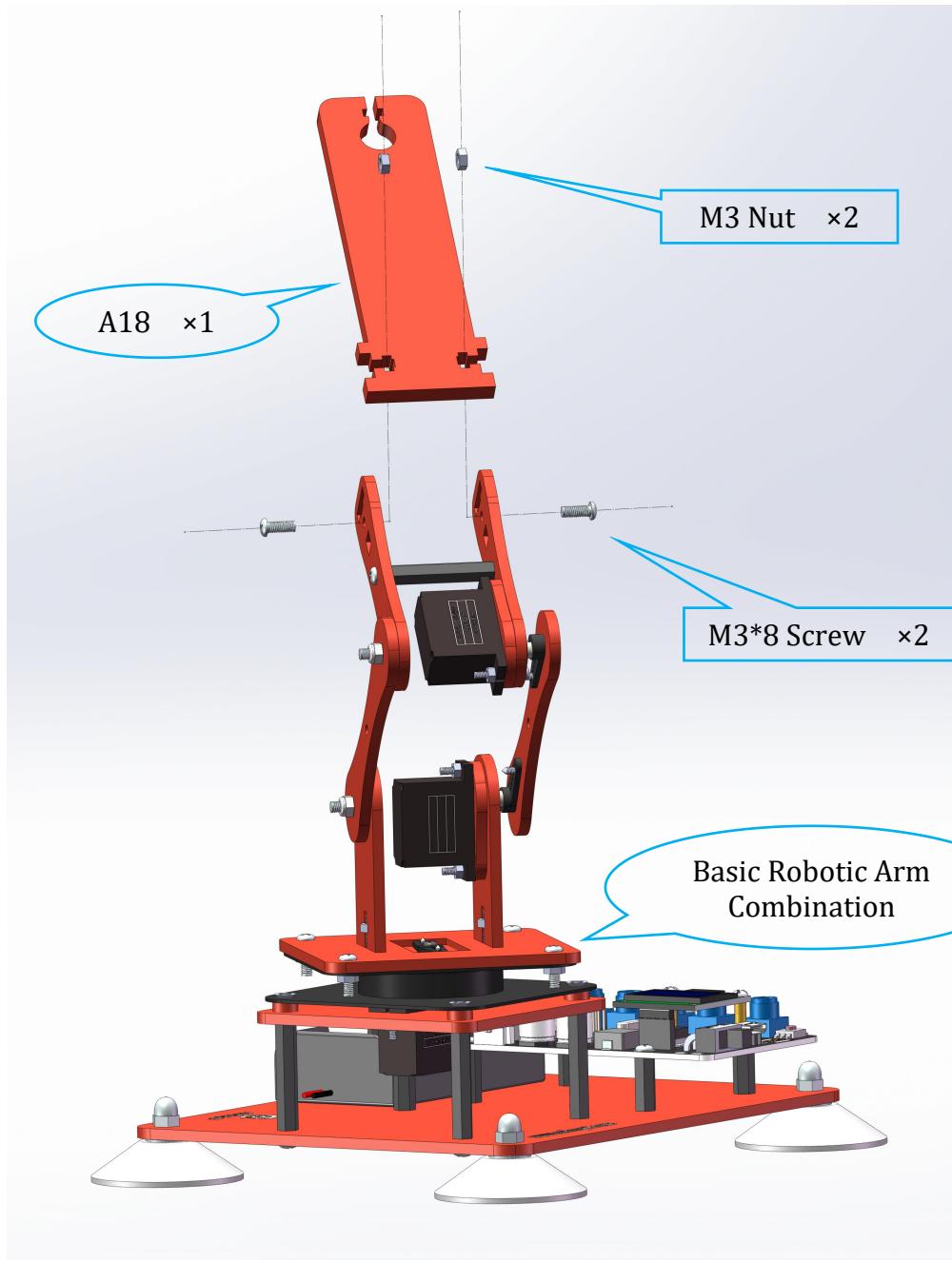
## 3. Play 2

### 3.1. Hold a thinner pen(Prepared by yourself)

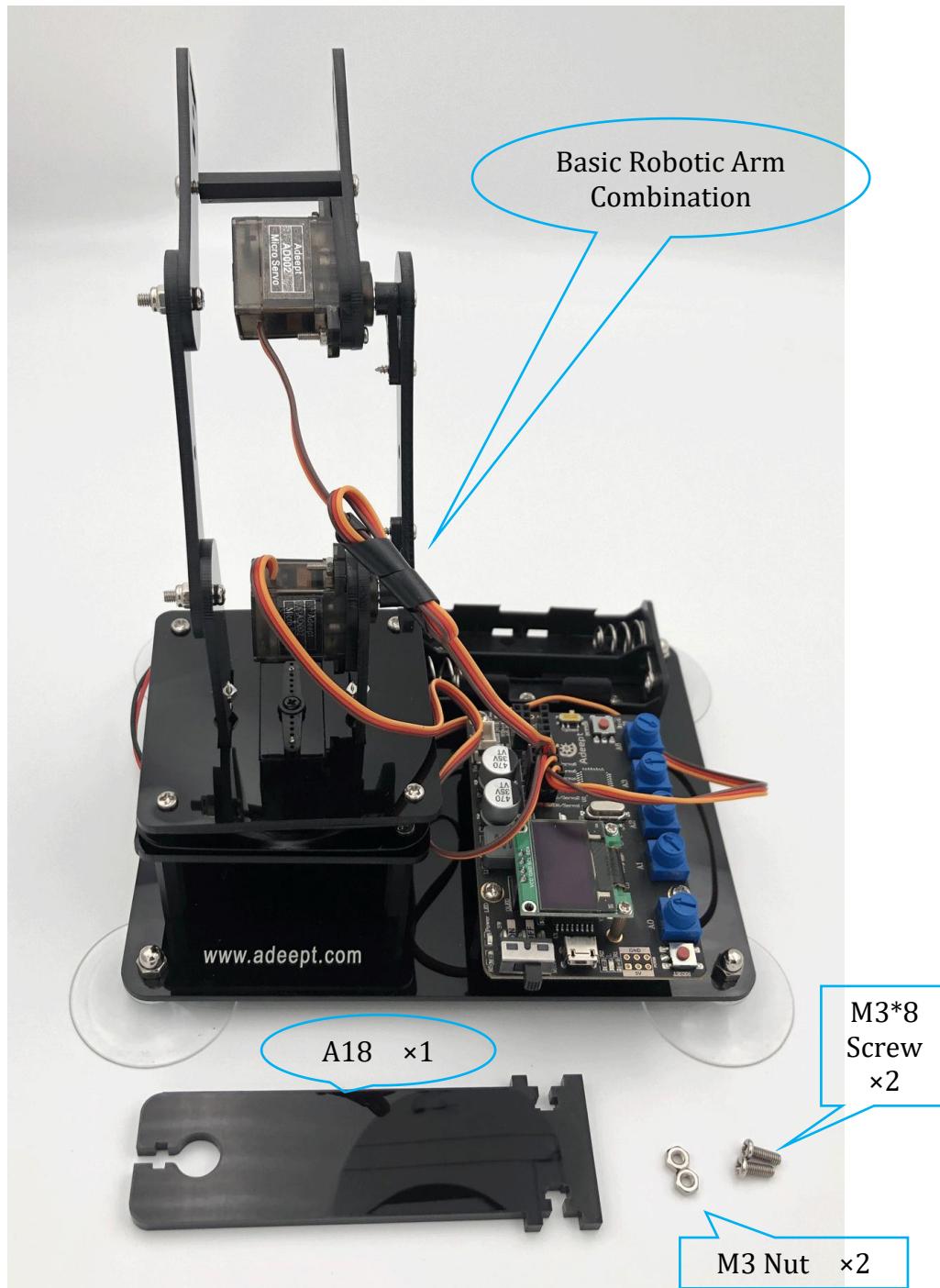
1. Fix A18 between A10 and A11.

Assemble the following components

*Model Diagram*



## Physical Diagram

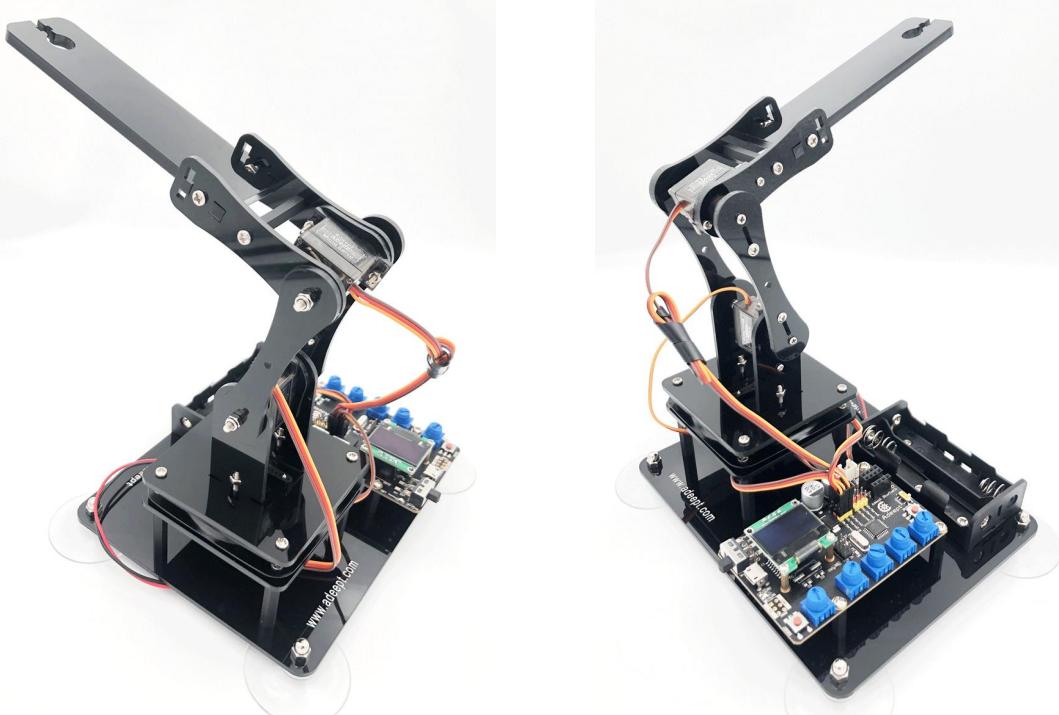


## Effect diagram after assembling

*Model Diagram**Physical Diagram*



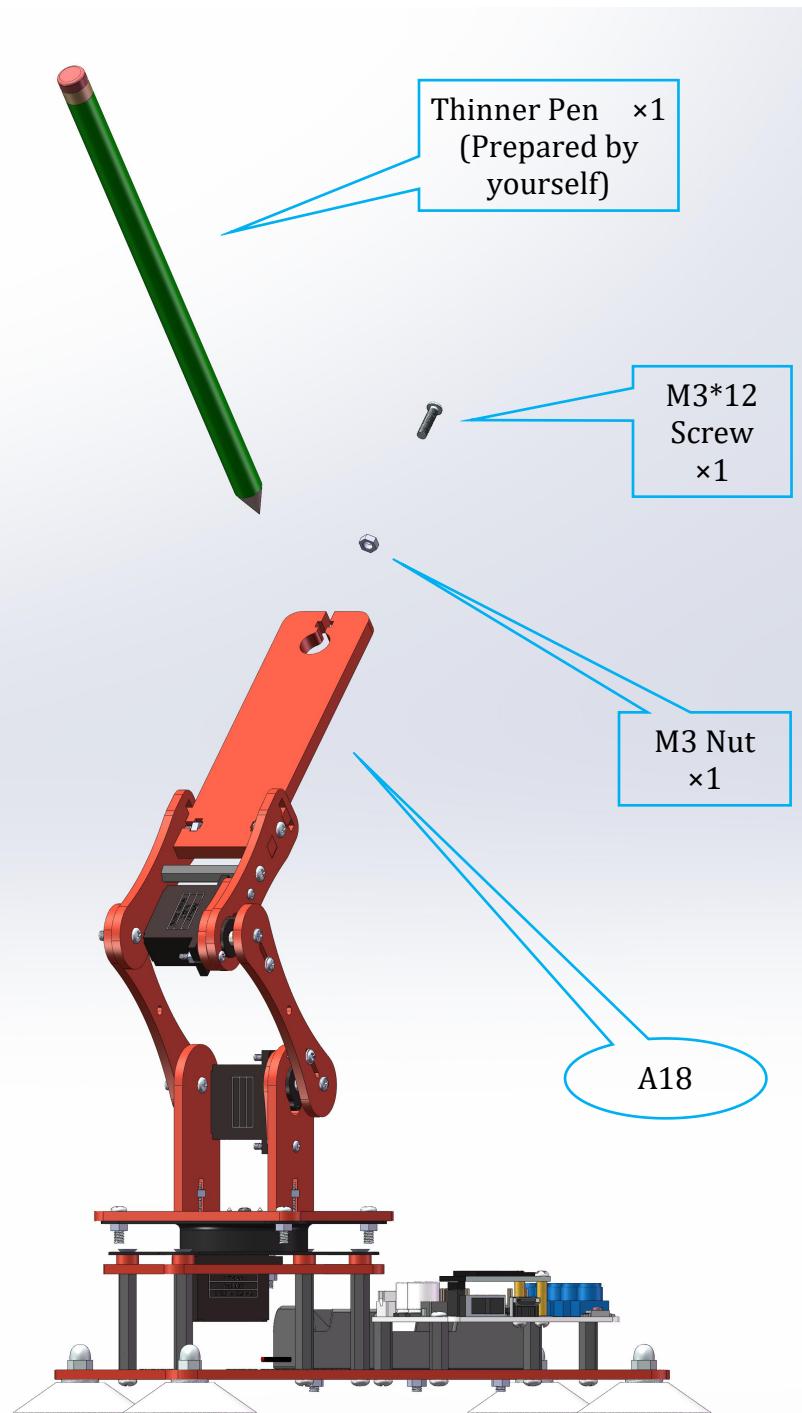
## Effect diagram after assembling

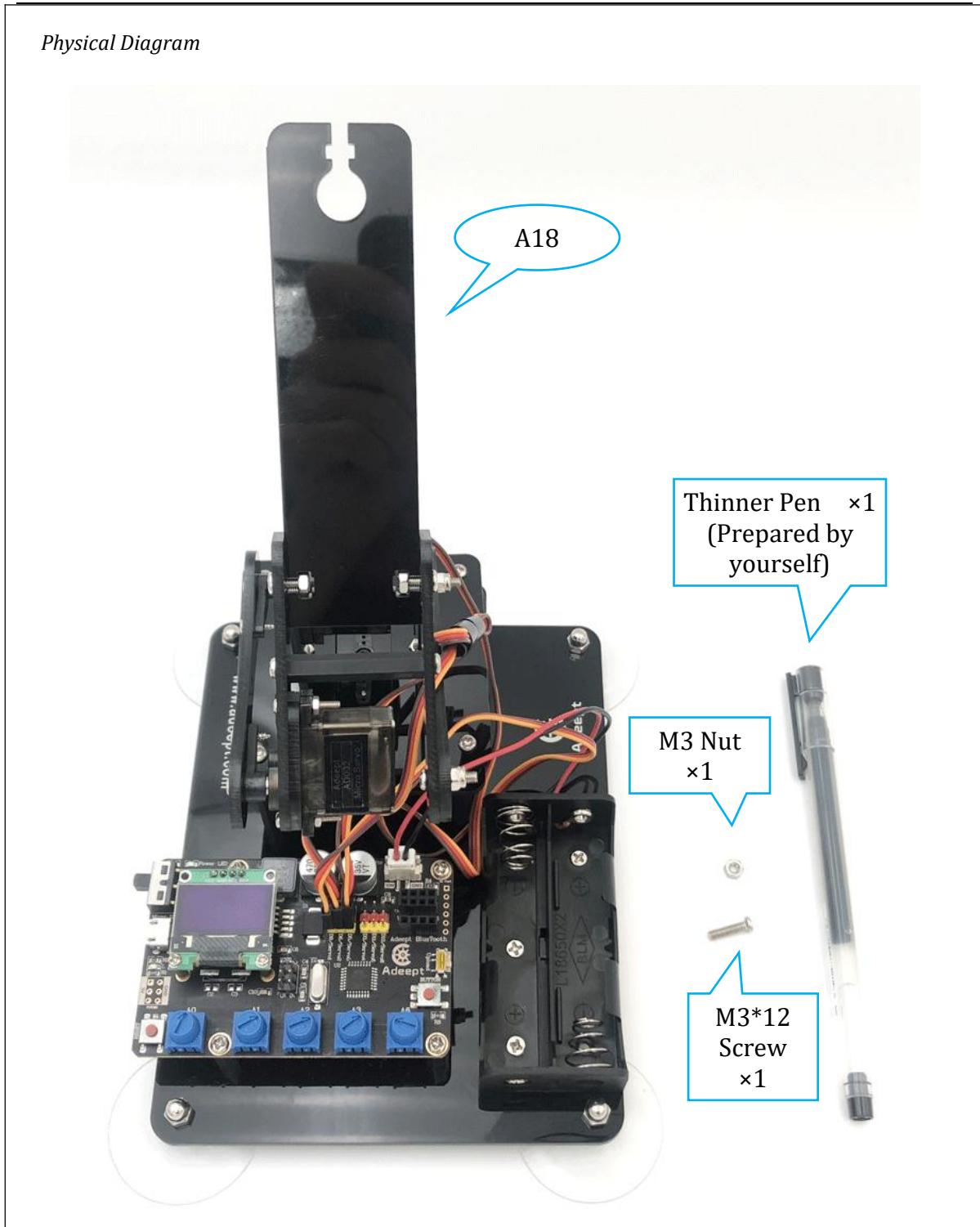


2. Fix a pen prepared by yourself to the A18.

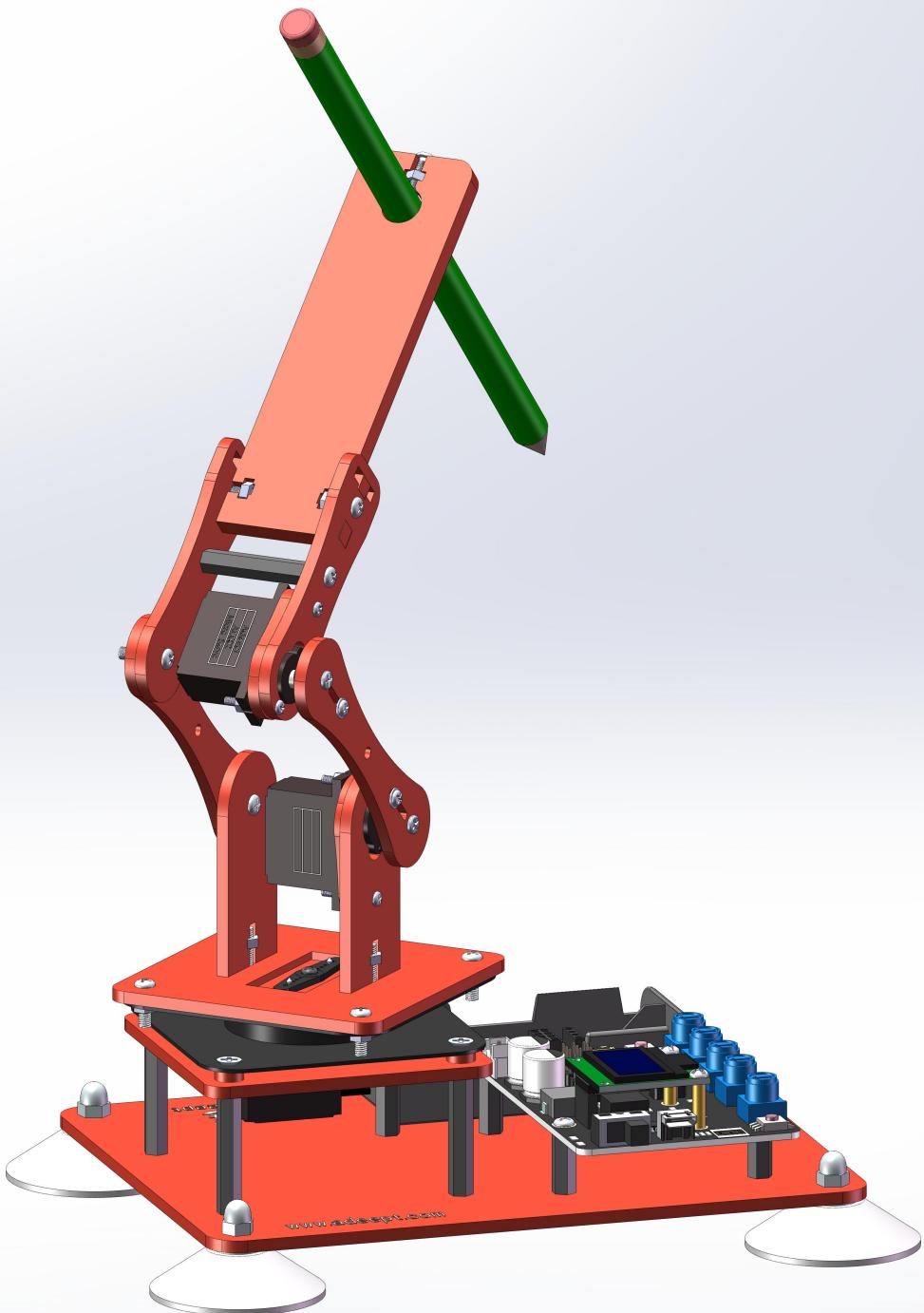
Assemble the following components

*Model Diagram*



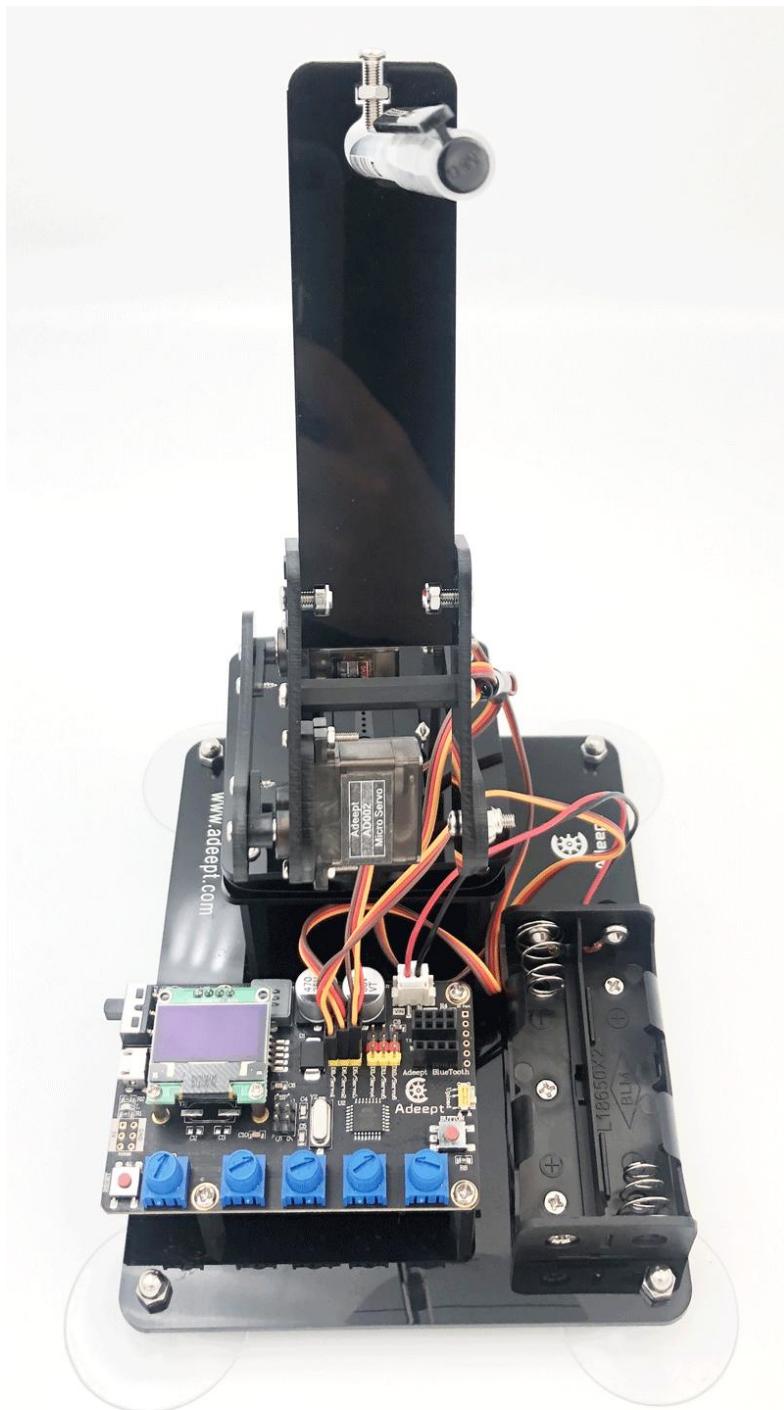
*Physical Diagram*

## Effect diagram after assembling

*Model Diagram*

*Physical Diagram*

## Effect diagram after assembling

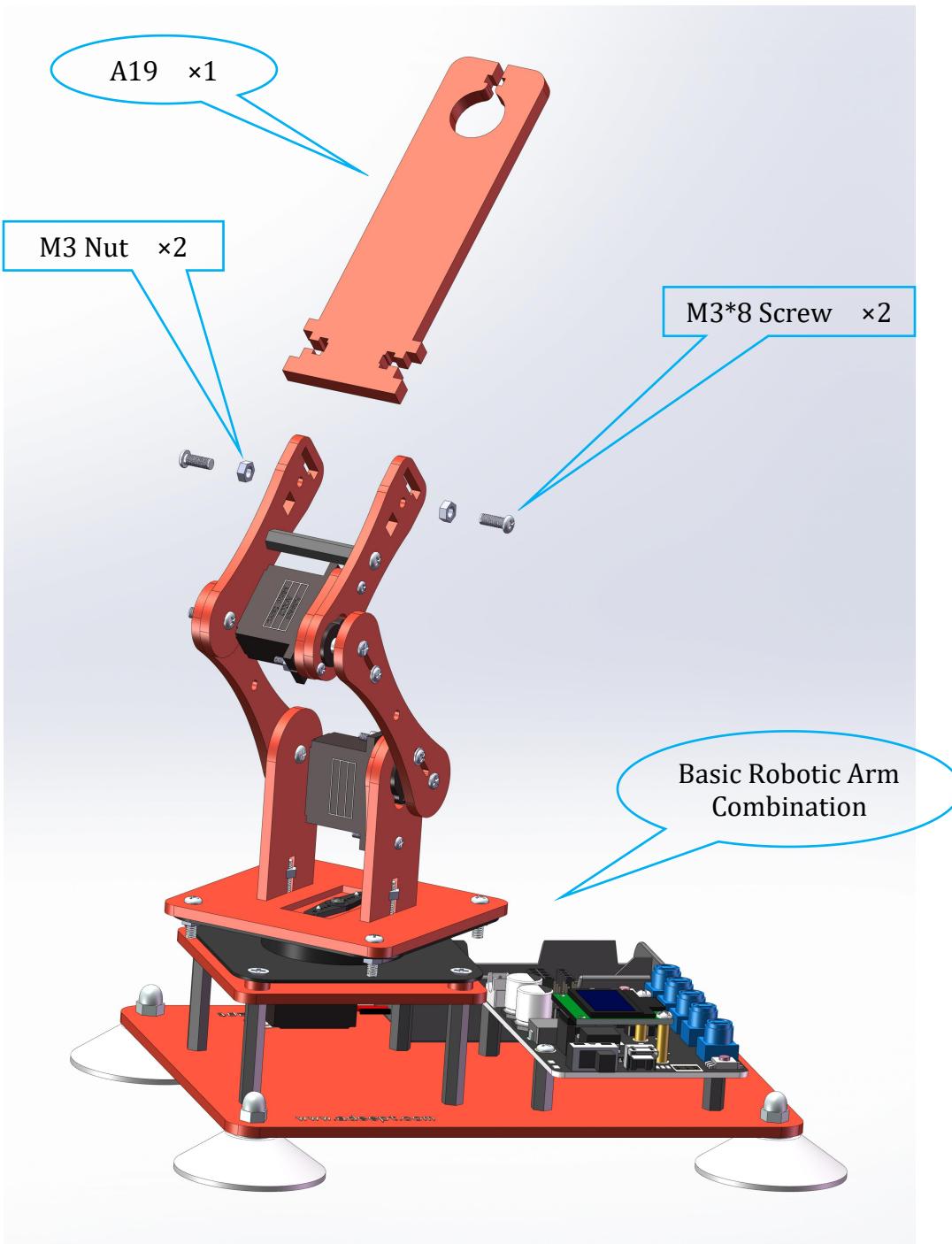
*Physical Diagram*

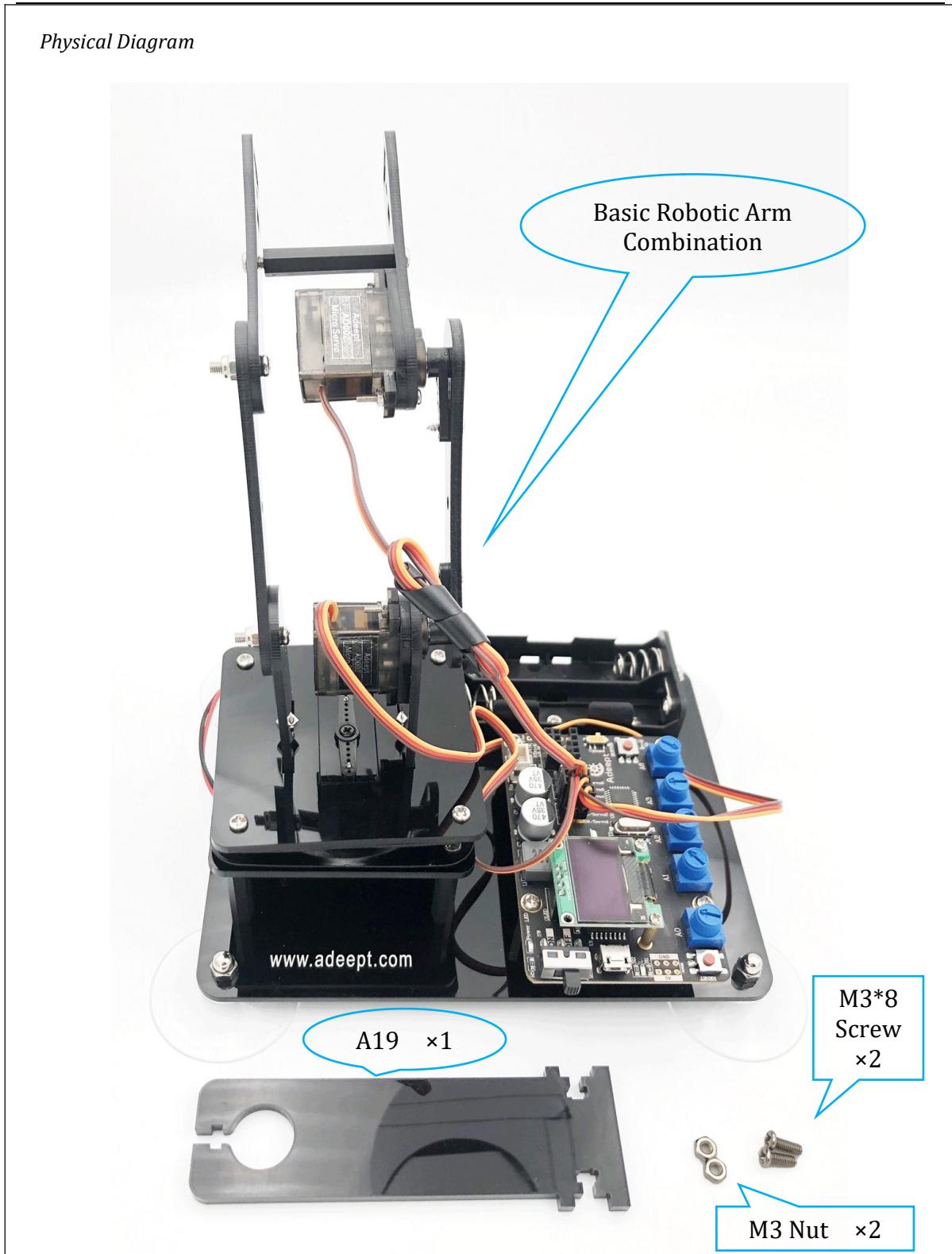
### 3.2. Hold a thicker pen(Prepared by yourself)

1. Fix A19 between A10 and A11.

Assemble the following components

*Model Diagram*

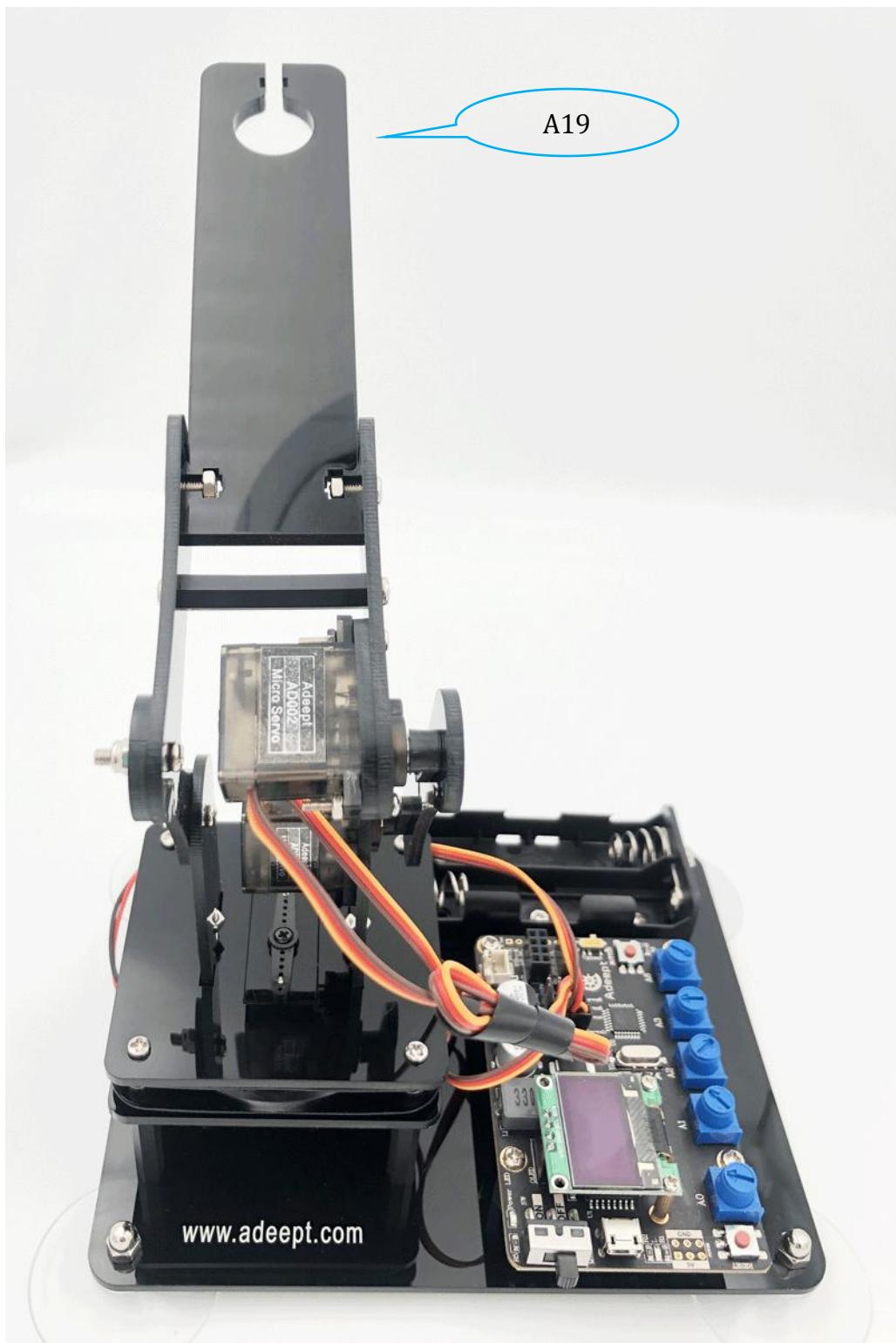


*Physical Diagram*

## Effect diagram after assembling

*Model Diagram*

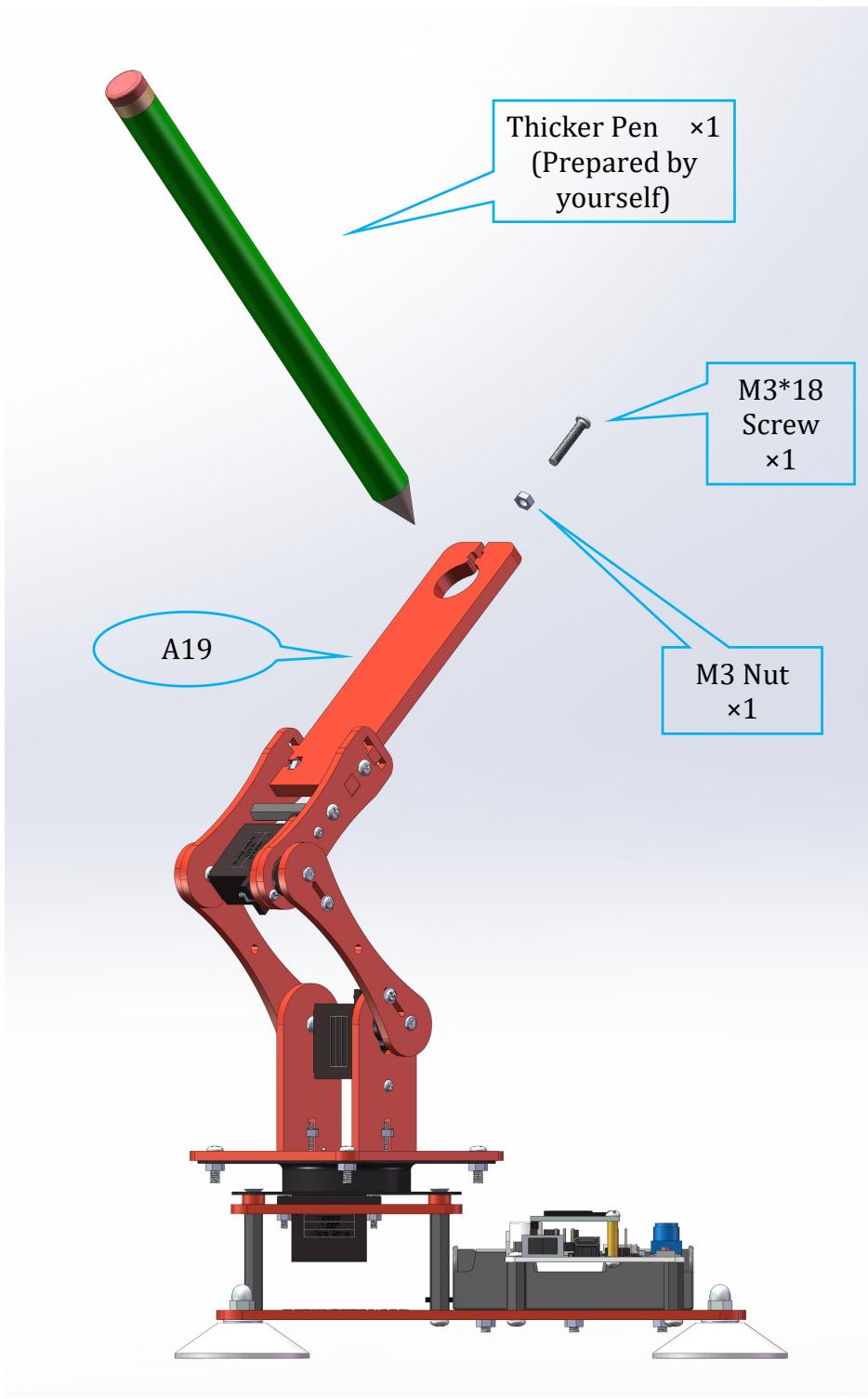
*Physical Diagram*

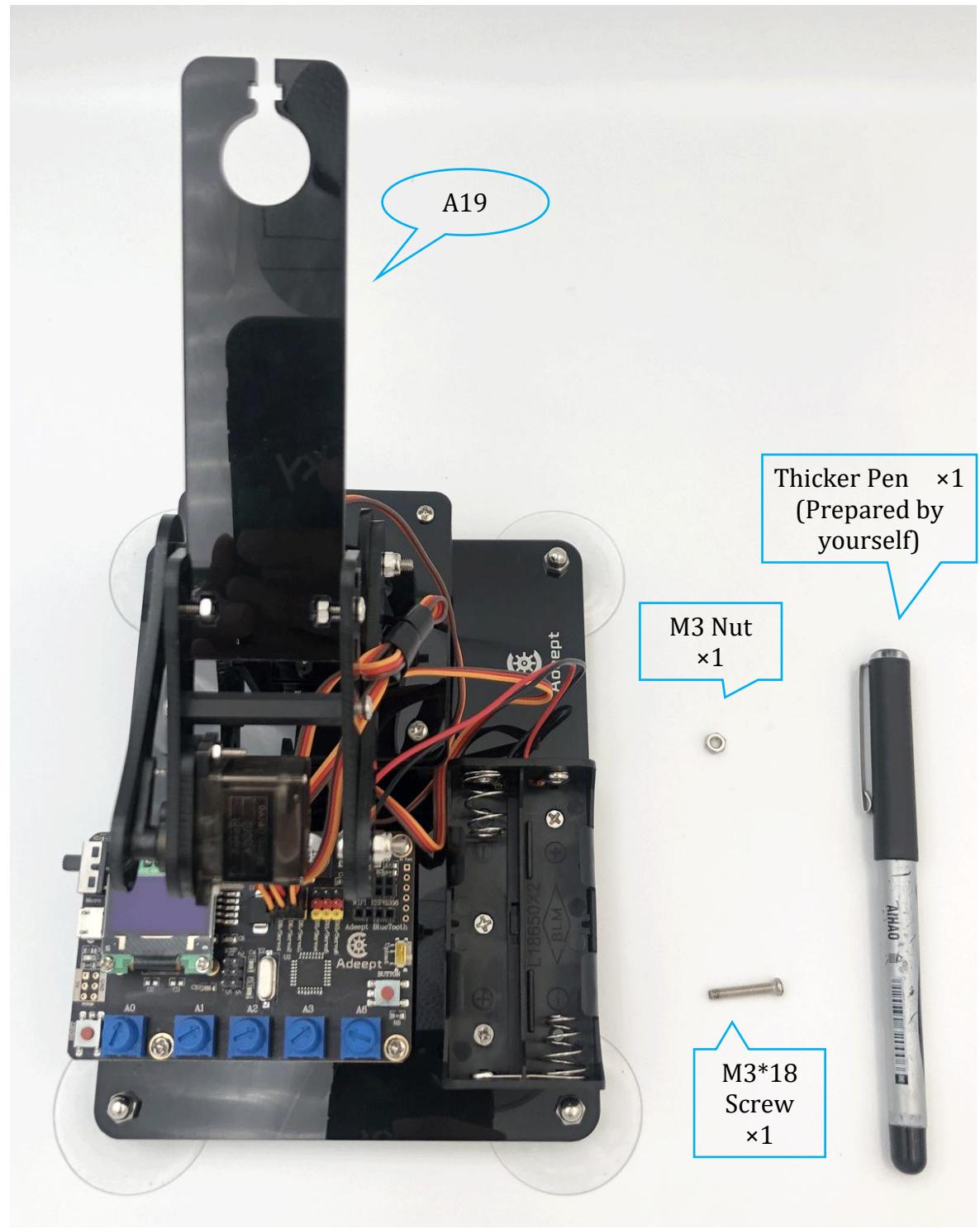


2. Fix a Pen prepared by yourself to the A19.

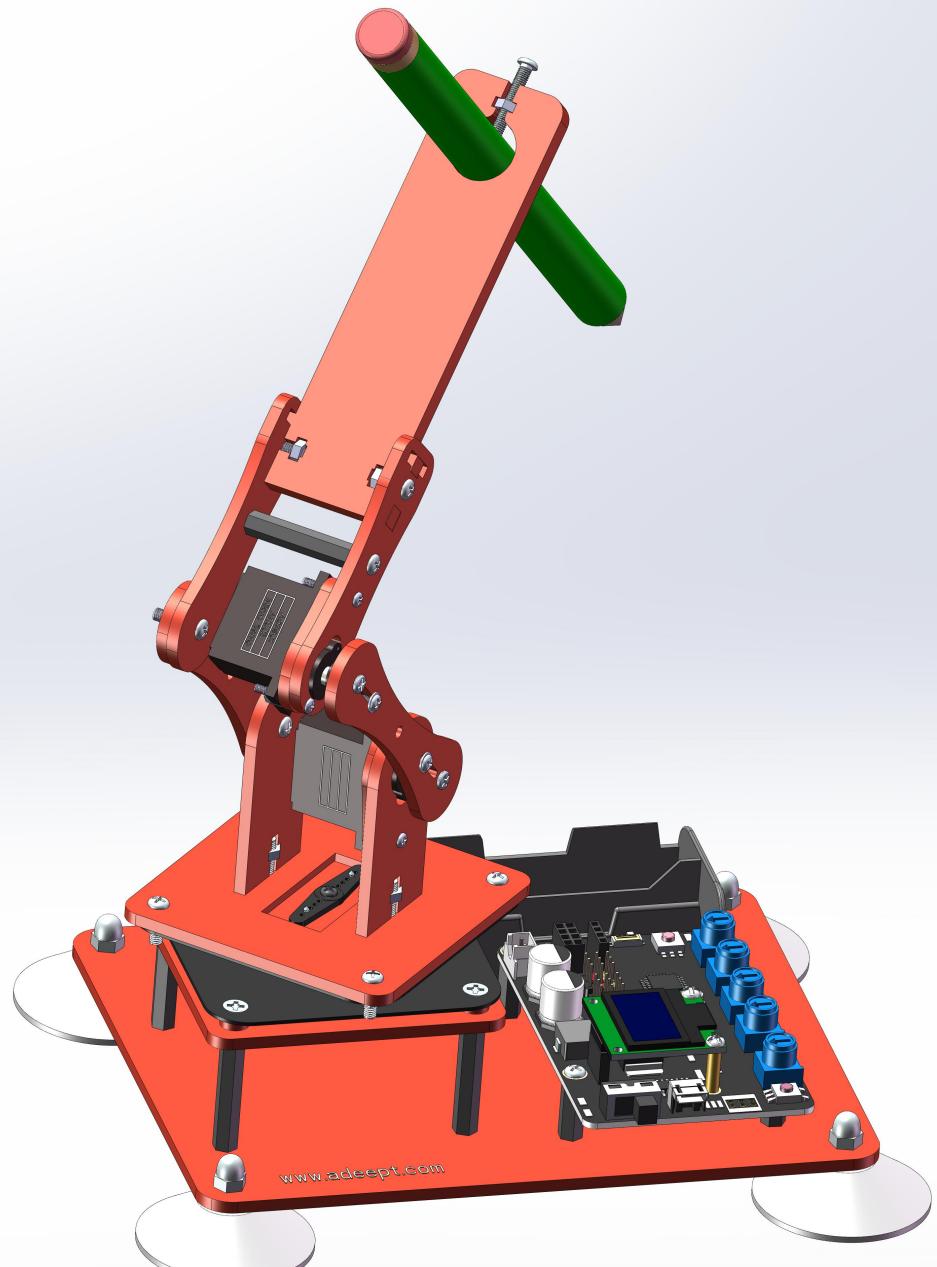
Assemble the following components

*Model Diagram*



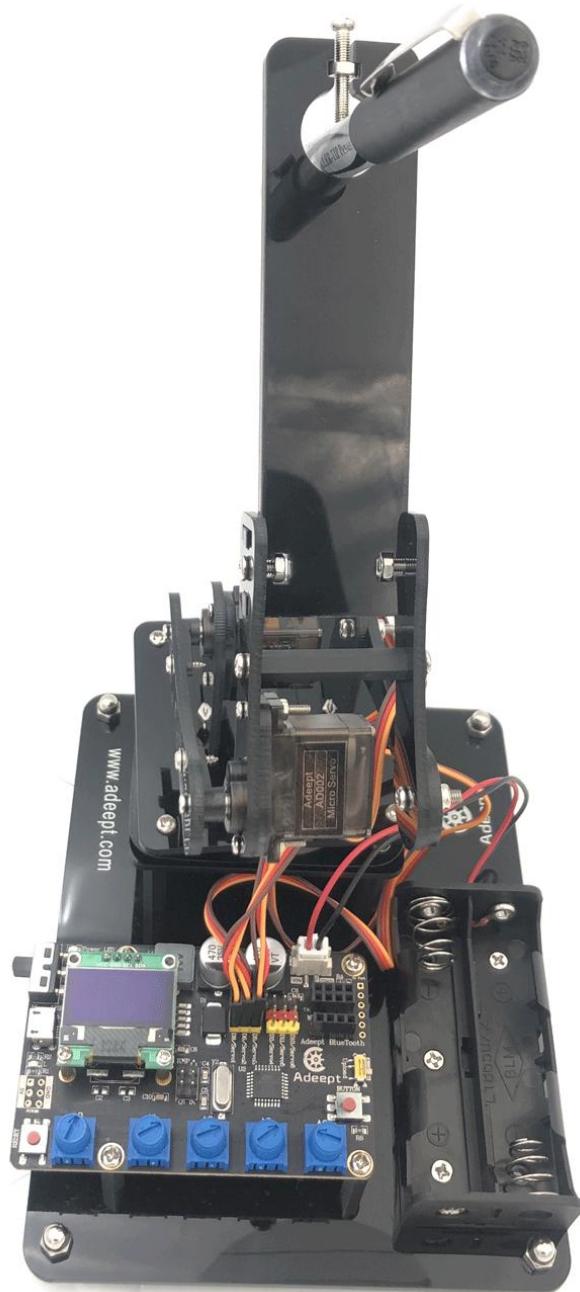
*Physical Diagram*

## Effect diagram after assembling

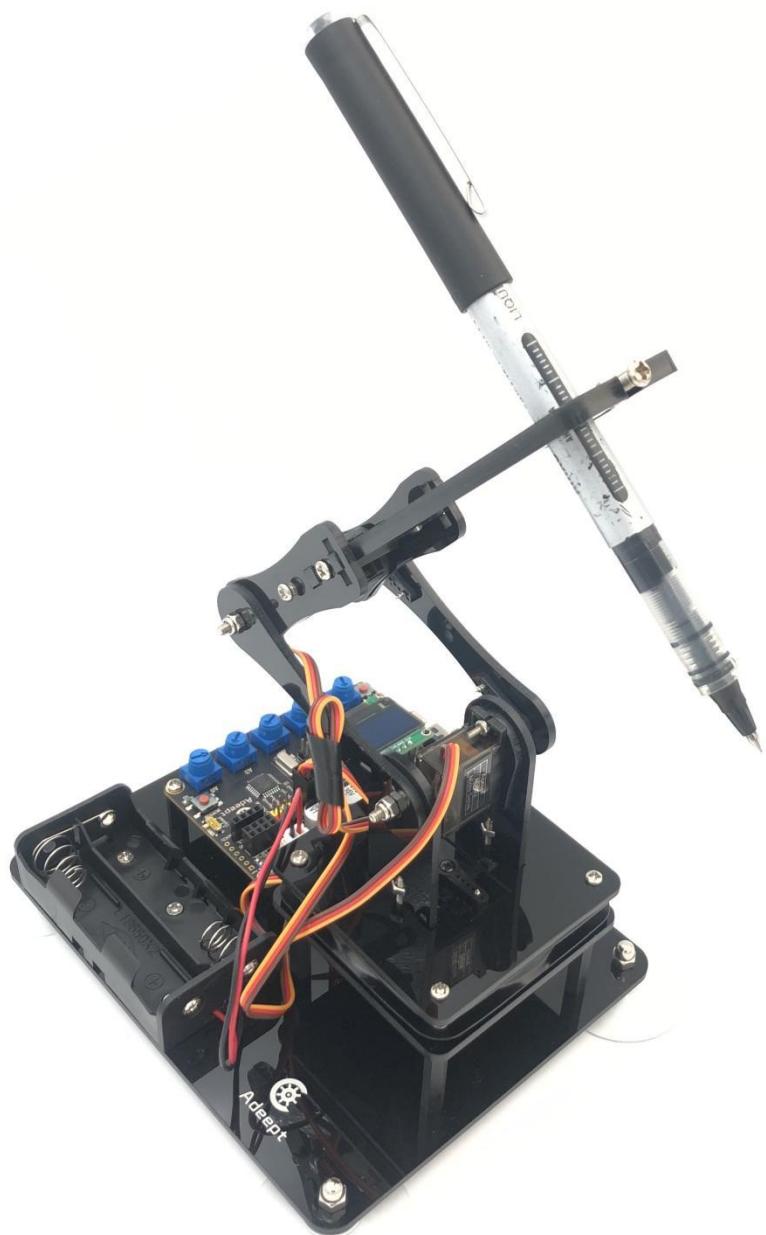
*Model Diagram**Physical Diagram*



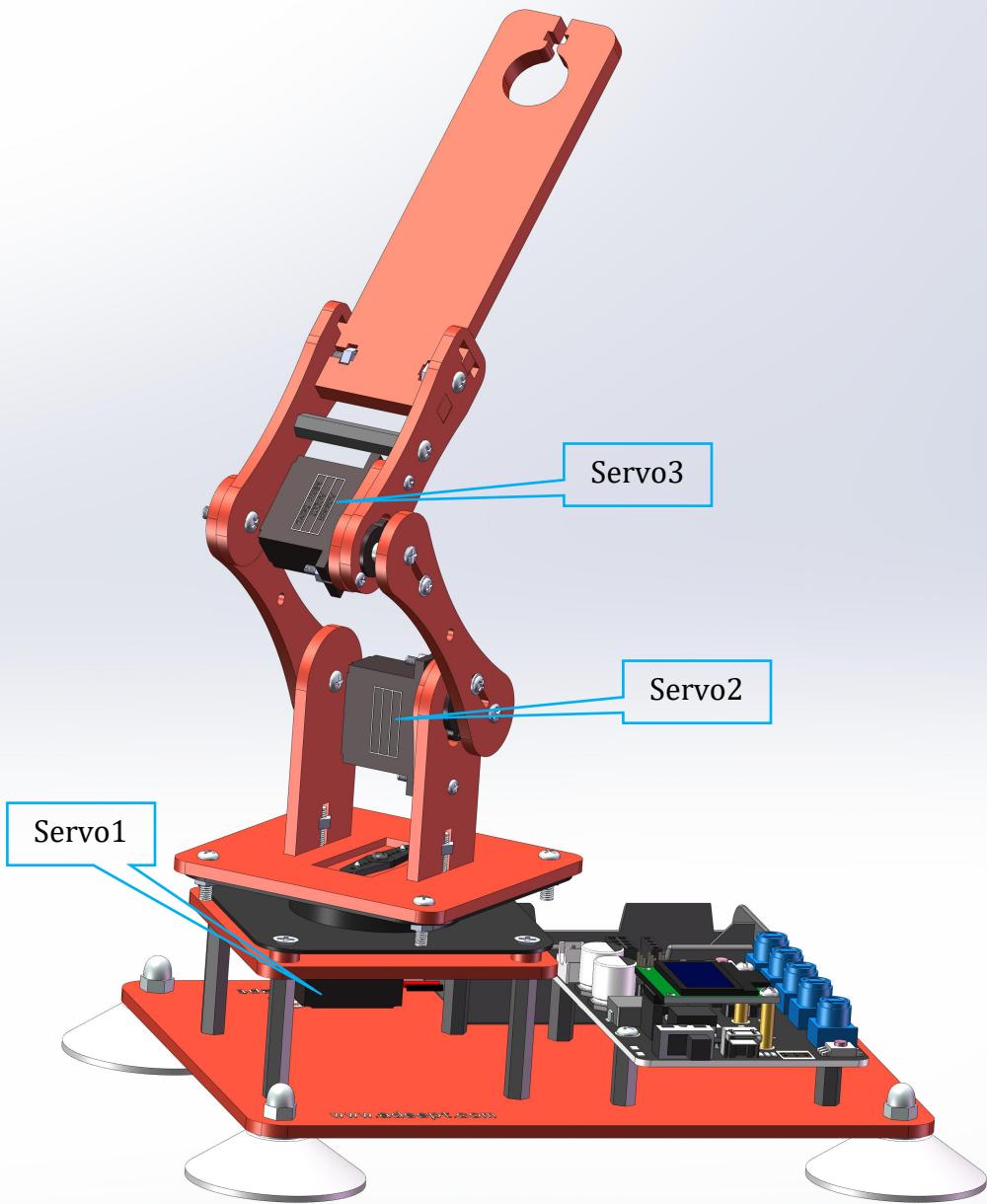
## Effect diagram after assembling



Effect diagram after assembling

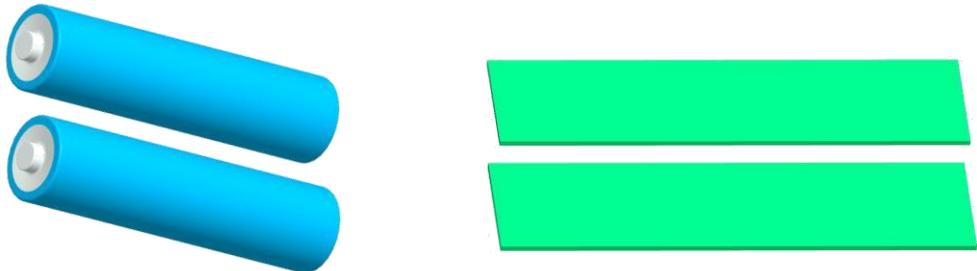


## Circuit Connection



## 4. Assemble and Remove batteries

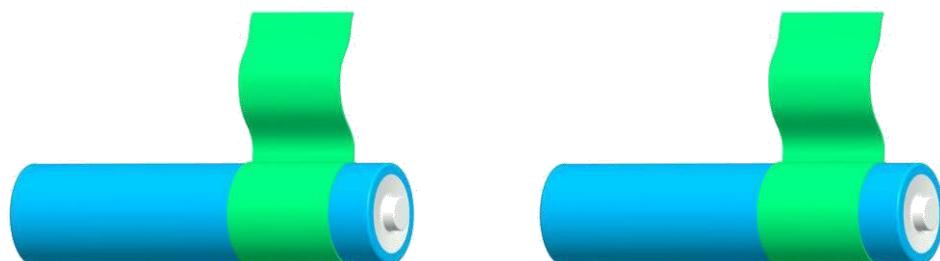
Take out 2 ribbons and 2 batteries.



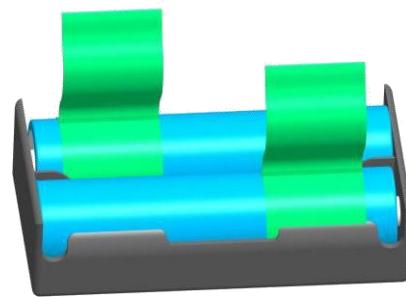
Roll one end of the ribbon to let through a battery and fix.



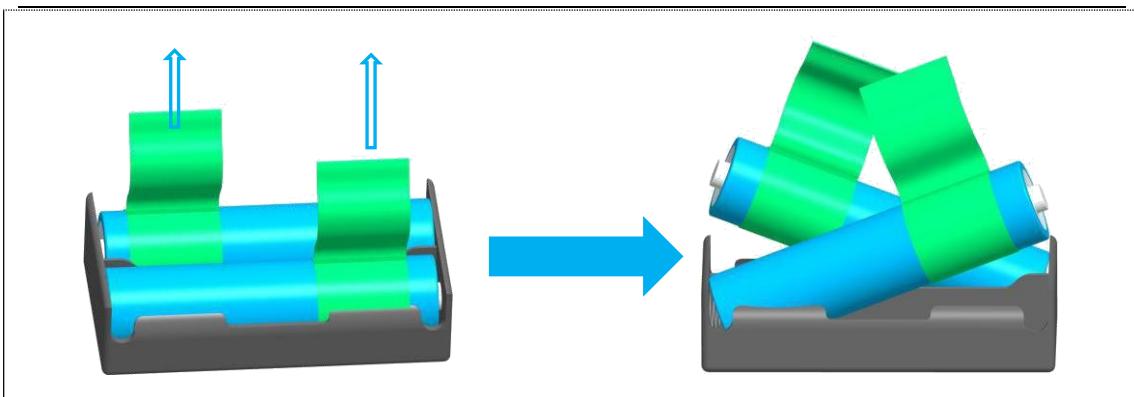
Insert the batteries into the rings-ribbon closer to the anode.



Install the batteries into the holder based on the pole.

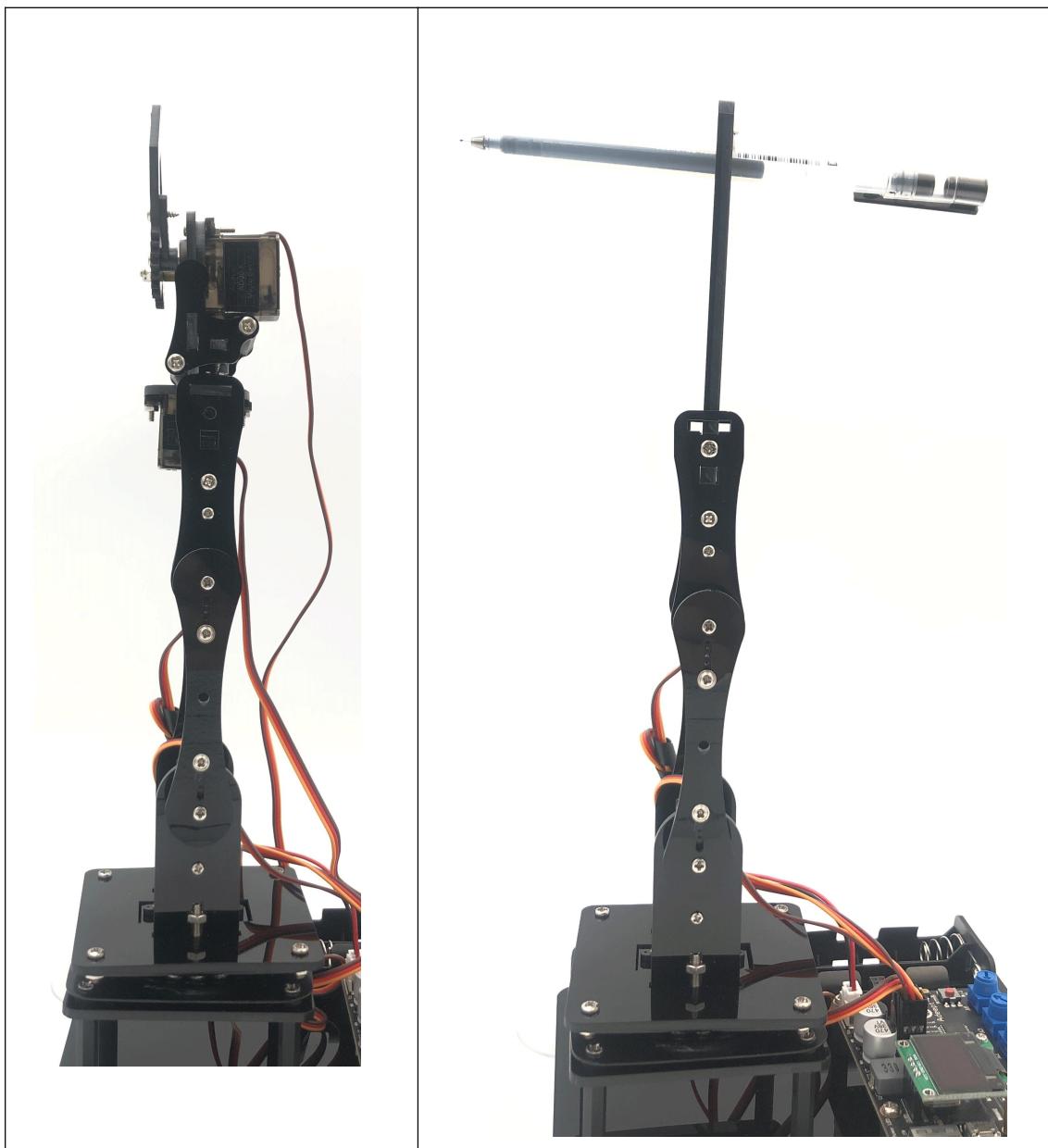


To remove the batteries, just pull the ribbon and take them out.



## 5. Adjustment of the Robot Arm

Before starting to exert the function, we need to test whether there are problems with the assembly of the Robotic Arm. When you connect all the servos mounted on the Robot Arm to the Adeept Arm Drive Board correctly and turn on the power switch (using battery power), the attitude of the Robot Arm is perpendicular to the ground as follows (it may not be able to achieve the effect shown in the picture when powered on, a little error is allowed to exist).



**【If your Robot Arm is assembled and turned on, it is not what it looks like in the picture above, then how do you adjust it?】**

- i. First, you need to re-download the code used in lesson 5: Servo90.ino. Observe whether the robot arm is basically the same as the posture in the above picture.
- ii. If inconsistent , then you need to manually disassemble the Robot Arm for adjustment, is to operate with the power on, generally you just need to manually adjust the A07 section in the figure below, remove it, and then connect the upper and lower sections of the Robot Arm vertical ground, and then install the A07 on to fix them.

