

Lesson 2 Position Calibration

Before starting game, the picking position of gripper must be calibrated, otherwise the robot may fail to pick object and affect the normal use.

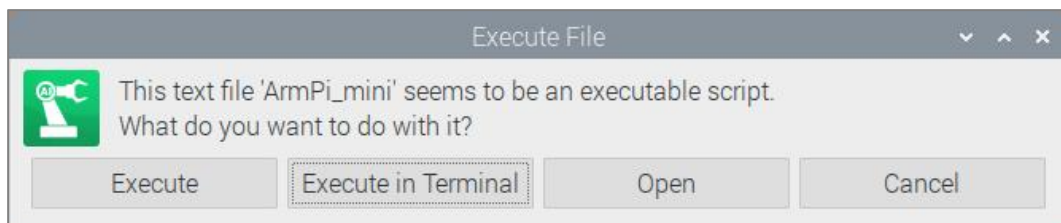
1. Preparation

- 1) Turn on ArmPi mini according to the tutorial “4.Start ArmPi mini/ Lesson 1 First Start ArmPi min”.
- 2) Connect robot via VNC remote tool according to the tutorial “4.Start ArmPi min/ Lesson 2 Set Development Environment”.
- 3) Adjust deviation according to the tutorial “4.Start ArmPi min/ Lesson 4 Deviation Adjustment”
- 4) Place the robot on map according to the tutorial “4.Start ArmPi min/ Lesson 5 Position Calibration/ 1. Map Placement”

2. Whether the picking position needs to be calibrated?

- 1) Double click  to open PC software.

- 2) Click “Execute” to enter the editing interface of PC software.



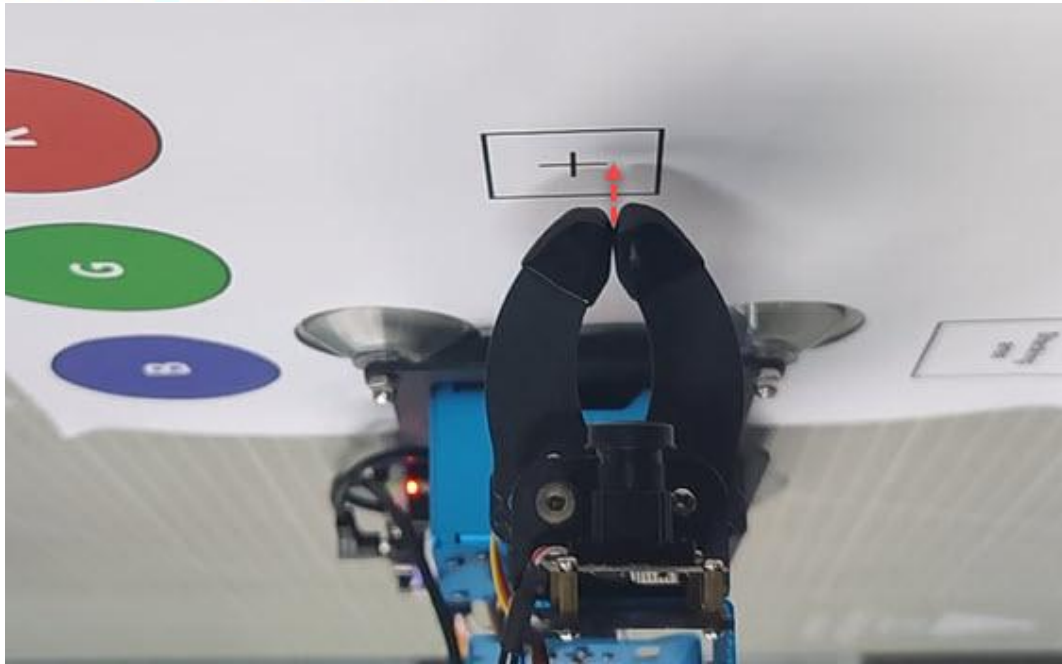
- 3) Then click “Read” in the upper left corner and click “Ok” to read the initial position information of the gripper.



4) Click “Run to Coordinate” to control the robot arm to move to the top of the picking area and observe its position. If the gripper is right at the 1cm above the center of the cross mark in picking area, the position does not need to calibrate, as the figure shown below. If it does not meet the requirements, you need to continue the following steps for calibration.

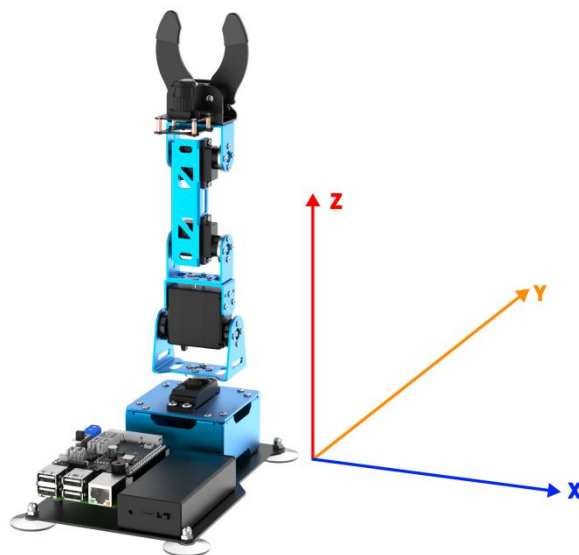


5) If the following deviation situation occurs, as the figure shown below, you need to calibrate the picking position. Thus the following operation steps will calibrate this deviation.



3. Calibration Principle

Take the robot arm as the first person view and take the centre point of the base as the coordinate original point, as the figure shown below.



The default initial value of the gripping position is $X=1.00\text{cm}$, $Y=14.00\text{cm}$ and $Z=0.00\text{cm}$. The pitch angle is 90 degrees and the running time is 1500ms.

The coordinate value of gripper can be set in the position calibration interface of PC software, as the figure shown below.

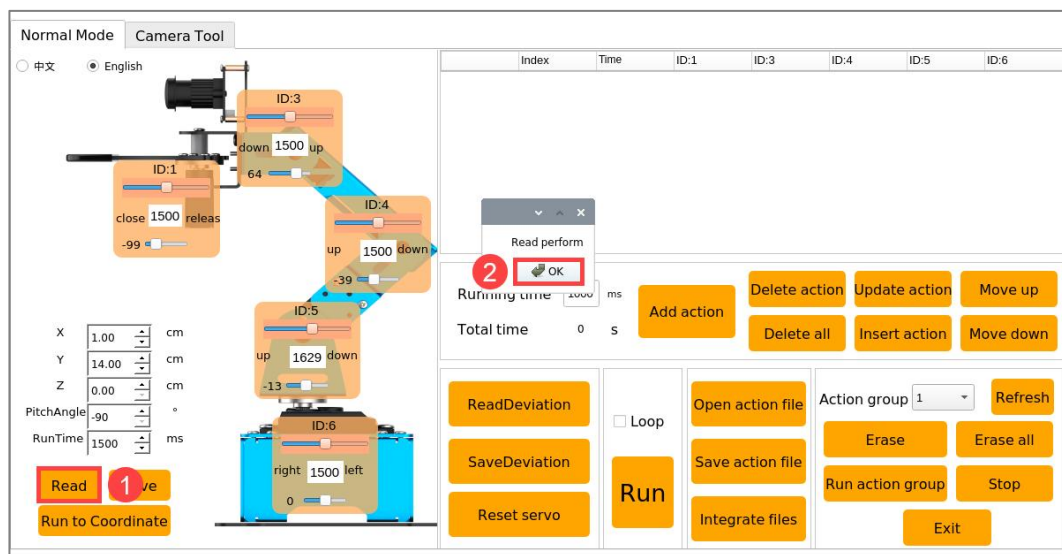
X	1.00	▲ ▼	cm
Y	14.00	▲ ▼	cm
Z	0.00	▲ ▼	cm
PitchAngle	-90	▲ ▼	°
RunTime	1500	▲ ▼	ms

Parameter	Function
X	Adjust x-axis value to control the gripper to move left or right.
Y	Adjust y-axis value to control the gripper to move forwards and backwards.
Z	Adjust z-axis value to control the gripper move up and down. (The z-axis value has been set as 1cm which is a right position for the gripper to stop the middle position between two blocks. It is not commended to modify this value.)
Pitch angle	The angle between gripper and x axis, i.e., the angles when the gripper looks upward and downward. This parameter does not need to be modified.
Running time	The movement time used by the gripper to move from the previous position to the set coordinate value. (just for checking the running effect)
Read	Read the current position information of gripper.
Save	Save the coordinate value of the adjusted gripping position.
Run to Coordinate	Click it to move robot arm to the set coordinate value

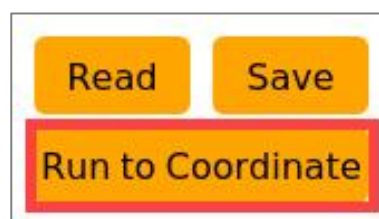
4. Calibration Steps

Observing the following example, you can find that the picking position of gripper is offset upward relative to the cross mark in the picking area of the map, and then we need to adjust it to 1cm directly above the cross mark.

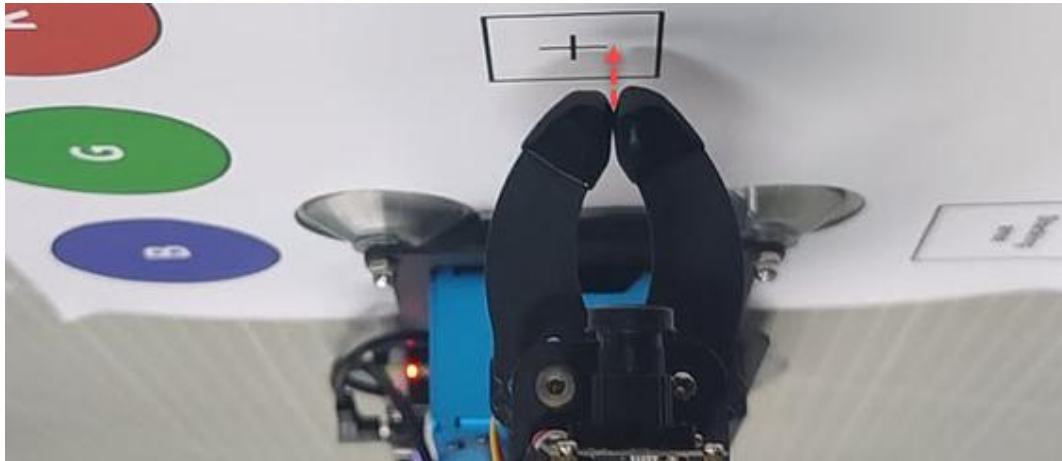
1) Click “Read” button in the lower left corner, and click “OK” to read the position information of picking posture.



2) Click “Run to Coordinate” to control the gripper to move to the picking area, and observe the offset between the cross mark and the gripper.

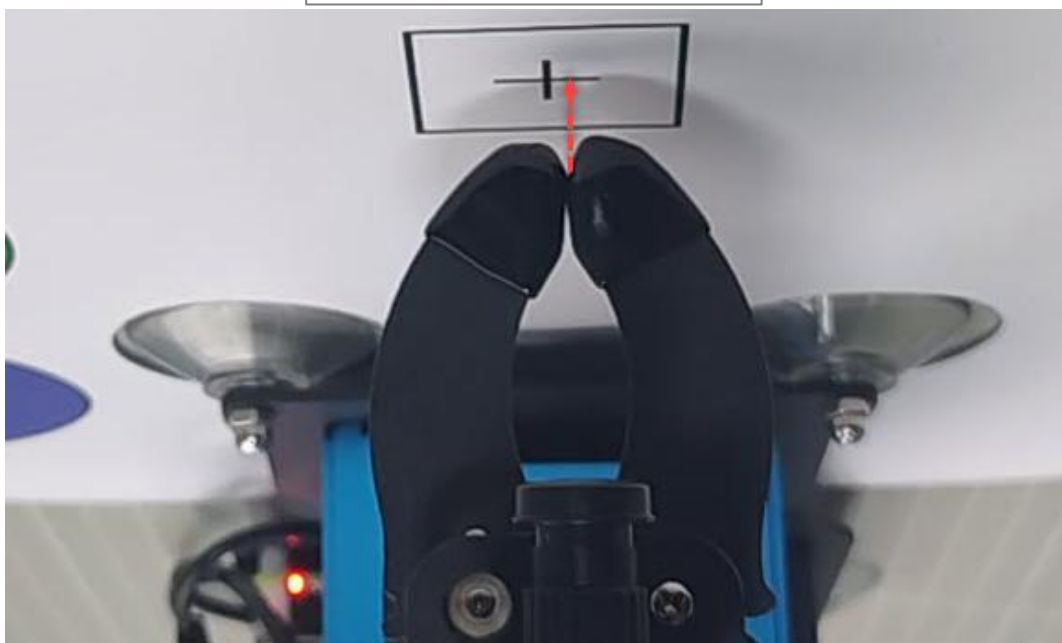


3) You can find that the gripper is offset to the right (take robot as the first person view), and the offset distance is close to 0.5cm.



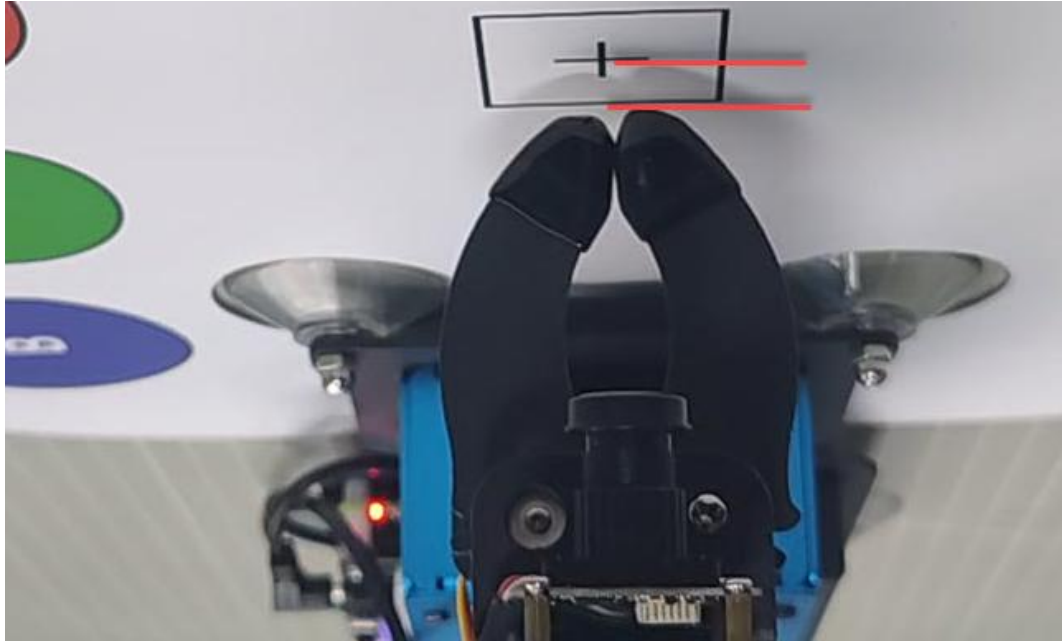
4) Therefore, subtract 0.5cm from the x-axis value, that is, the X value is set to "0.5". Then click "Run to Coordinate" to see the effect after adjustment.

X	0.50	▲	▼	cm
Y	14.00	▲	▼	cm
Z	0.00	▲	▼	cm
PitchAngle	-90	▲	▼	°
RunTime	1500	▲	▼	ms



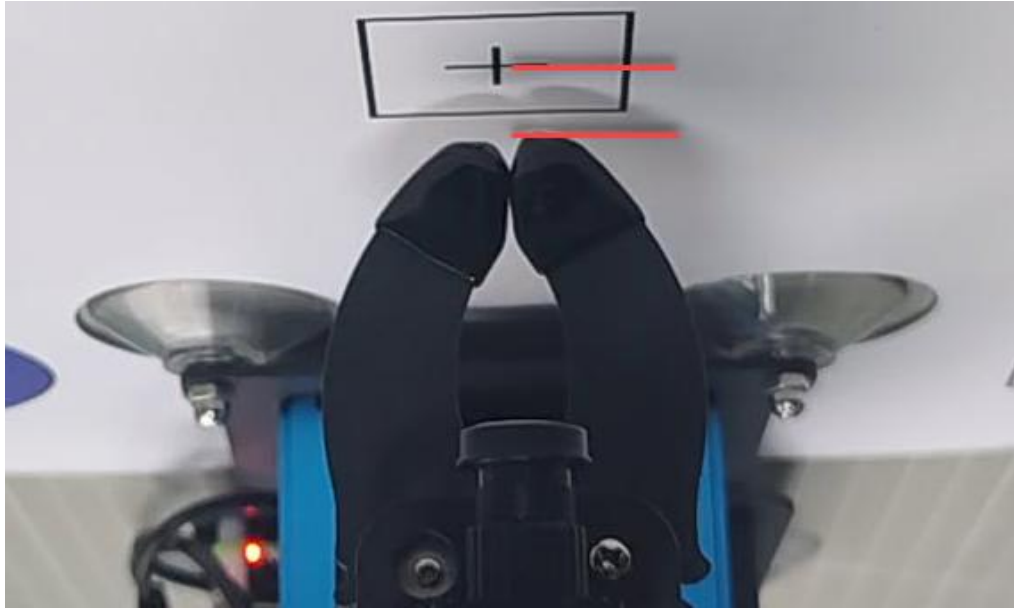
5) Now, the gripper is very close to the center of the cross mark.

6) Now let's look at the y-axis. The gripper is offset forward a little bit. In this case, y-axis value needs to be adjusted.



7) subtract 0.5cm from they-axis value, that is, the y-axis value is set to "13.5". Then click "Run to Coordinate" to see the effect after adjustment.

X	0.50	▲ ▼	cm
Y	13.50	▲ ▼	cm
Z	0.00	▲ ▼	cm
PitchAngle	-90	▲ ▼	°
RunTime	1500	▲ ▼	ms



8) Now, the gripper is offset to the right a little bit. Therefore, observe and adjust the x-axis value until the centre of the gripper directly above the centre of the cross mark.



9) Because the program has set the z-axis value to 1cm, the gripper is directly above the middle of the two sides of the block, so it is not recommended to modify the values of z-axis and pitch angle.

10) Then click “Save” to save the coordinate value to controller. The gripper will run to this position to pick object next time.

