



## 2 Robot Pick and Place

NAME: \_\_\_\_\_

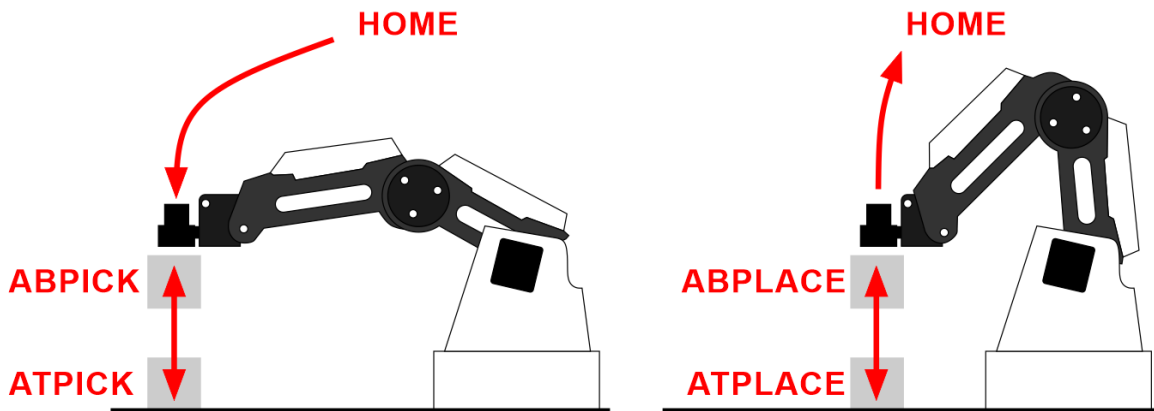
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### INTRODUCTION

Robotic arms are excellent for performing pick and place operations such as placing small electronic components on circuit boards, as well as large boxes on pallets. A pick and place operation will require at least 5 points:

- Home
- Above the pick point
- At the pick point
- Above the place point
- At the drop point
- Above the place point
- Home



As a rule, always go to a position above the pick or place point first so that the robot can accurately and repeatedly place the object straight down in a linear motion, with no friction or interference.

### KEY CONCEPTS

- How does a robot perform a **pick and place** operation?
- What **end effector** or **end of arm tooling** works best?
- What are Pick and Place **conventions** in industry?
- How do I attach the **Mechanical gripper** to the Dobot?
- How do I **record** positions with the Dobot?
- How do I easily edit a program in DobotStudio?

## KEY VOCABULARY

- Relative positions
- Palletizing
- Pick and Place
- Home
- Linear movements
- Joint movements
- End effector
- End of Arm Tooling (EoAT)

## EQUIPMENT & SUPPLIES

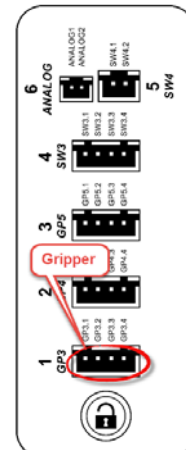
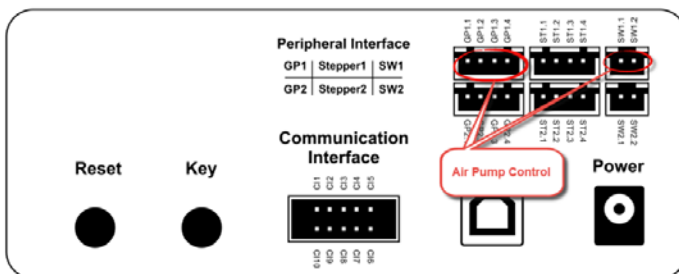
- Dobot Magician
- Dobot Field Diagram
- 3/4 inch cylinders
- 3/4 inch cubes
- Pneumatic Gripper
- DobotStudio software
- Accompanying video: Pick & Place with the Dobot

## PROCEDURE



**Caution: NEVER wire anything to the Dobot Magician while it has power on. ALWAYS turn it off before making connections or damage to the robot could occur.**

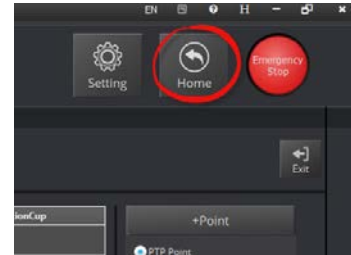
1. Attach the *Gripper* to the *rotational servo* and then attach it to the robot, and plug in the wires as shown below



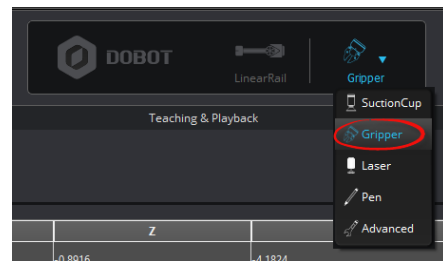
- Open Dobot Studio software and connect the robot.



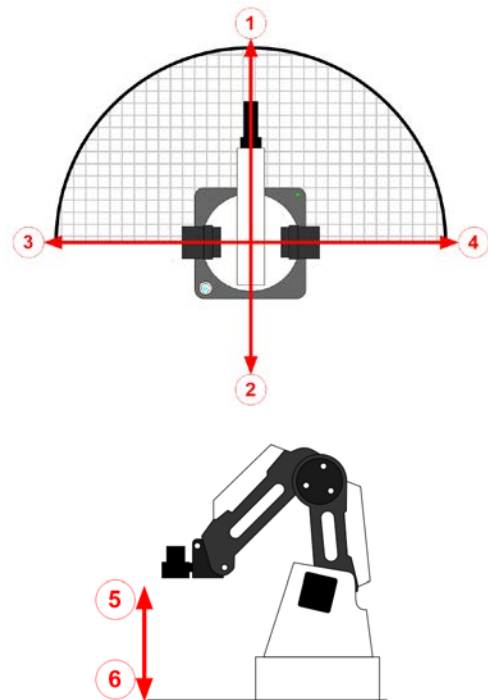
- Home the robot making sure the robot's work envelope is clear.



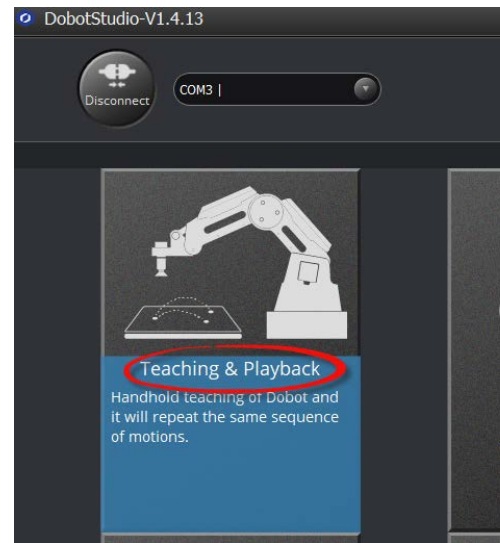
- Be sure the *Gripper* is chosen as the accessory.



- Open the *manual control panel*, and move the robot around. In the space below, draw a diagram showing the X and Y axis on the robot. Be sure to label the arrows as +/-.



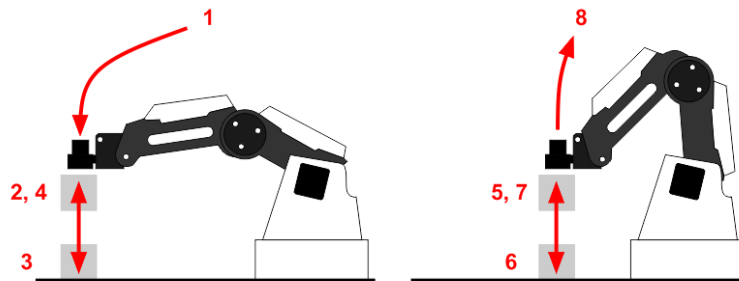
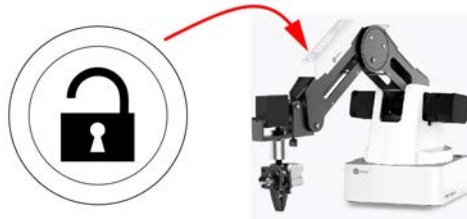
6. Now open the *Teach and Playback* module:



7. Place one of the  $\frac{3}{4}$ " wooden cylinders on one of the squares of the field diagram.

8. Use the "Lock" button on the arm to record all the positions necessary to do a pick and place operation in this order:

- Home
- Above Pick
- At Pick
- Above Pick
- Above Place
- At Place
- Above Place
- Home



9. Name the positions in the *name column* of the program.



*Be sure to name the positions something relevant so that others will be able to tell what the positions are. Example: A point named AbPick means the point above the place where it is picked up.*

- Be sure to open and close the gripper using the *gripper column* as shown.

R	PauseTime	Gripper
-0.1059	0.0	Disable
27.1853	0.0	Close
-31.05	0.0	Open

- Hit the “Play” button to run your program and see what happens. *Did it work the first time? If not, what did you have to change to make it work?*

- Change the position type of step #5 (above place) in the first column to *Move Linear (MOVL)*. *Run the program. What changed?*

- Using the *options menu*, add another Home position between the Above Pick and the Above Place (steps 4 & 5)



Use Copy, Move Up, Paste, or Move Down commands. that you used before in the options menu as shown.

	MotionStyle	Name
1	Options	Home
2	MOVJ	Above Pick
3	MOVJ	At Pick
4	MOVJ	Above Pick
5	MOVJ	Home
6	MOVL	Above Place
7	MOVJ	At Place
8	MOVJ	Above Place
9	MOVJ	Home

- Save your work.

