MG400 Training System Standard Conveyor Demo Guide

Issue: V1.1

Date: 2023-01-06

Shenzhen Yuejiang Technology Co., Ltd.

Disclaimer

To the maximum extent permitted by applicable law, the products described (including its hardware, software, and firmware, etc.) in this document are provided **AS IS**, which may have flaws, errors or faults. Dobot makes no warranties of any kind, express or implied, including but not limited to, merchantability, satisfaction of quality, fitness for a particular purpose and non-infringement of third party rights. In no event will Dobot be liable for any special, incidental, consequential or indirect damages resulting from the use of our products and documents.

Before using our product, please thoroughly read and understand the contents of this document and related technical documents that are published online, to ensure that the robot is used on the premise of fully understanding the robot and related knowledge. Please use this document with technical guidance from professionals. Even if follow this document or any other related instructions, damages or losses will be happening in the using process. Dobot shall not be considered as a guarantee regarding all security information contained in this document.

The user has the responsibility to make sure of following the relevant practical laws and regulations of the country, in order that there is no significant danger in the use of the robot.

Shenzhen Yuejiang Technology Co., Ltd.

Address: Room 1003, Building 2, Chongwen Garden, Nanshan iPark, Liuxian Blvd, Nanshan District, Shenzhen, Guangdong Province, China

Website: www.dobot.cc

Preface

Purpose

This document describes the use of conveyor in MG400 training system for users to fully understand and use MG400 training system.

Intended Audience

This document is intended for:

- Customer Engineer
- Sales Engineer
- Installation and Commissioning Engineer
- Technical Support Engineer

Change History

Date	Change Description
2023/01/06	Update the operation instructions and figures
2022/06/23	The first release

Symbol Conventions

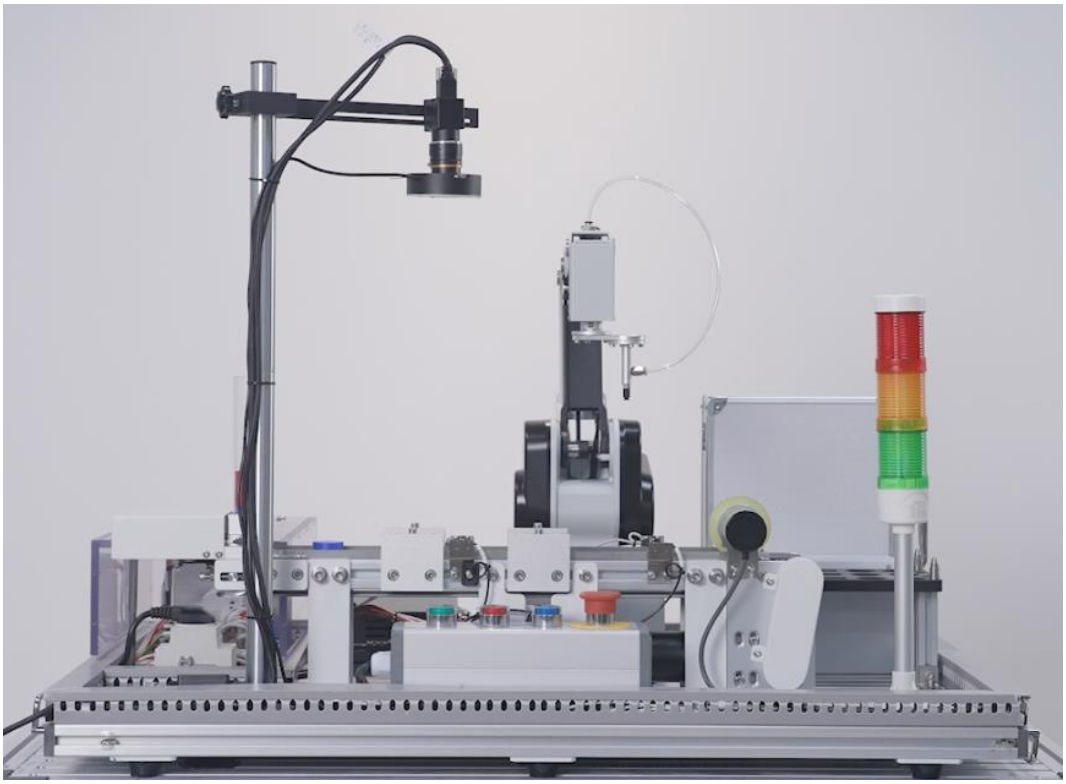
The symbols that may be found in this document are defined as follows.

Symbol	Description
⚠DANGER	Indicates a hazard with a high level of risk which, if not avoided, could result in death or serious injury
⚠WARNING	Indicates a hazard with a medium level or low level of risk which, if not avoided, could result in minor or moderate personal injury and damage to the equipment
⚠NOTICE	Indicates a potentially hazardous situation which, if not avoided, can result in damage to the equipment, data loss, or unanticipated result
🕮NOTE	Provides additional information to emphasize or supplement important points in the main text

Contents

1. Introduction

In the MG400 training system, MG400 and sensors are used to pick the material from the conveyor to a specified position.



2. Operations

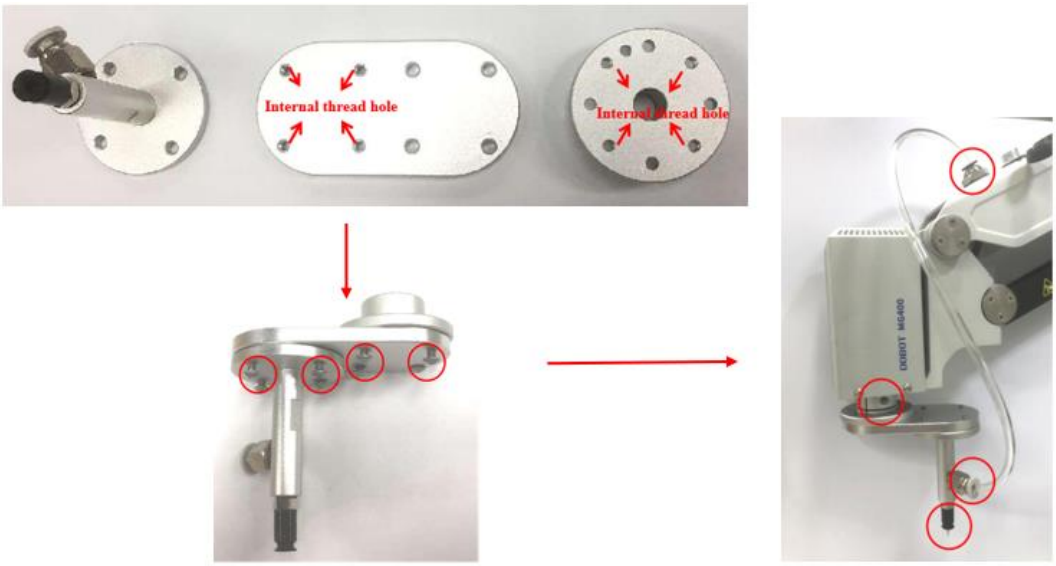
If you have installed the eccentric tool and established the tool coordinate system, please skip the corresponding steps.

2.1 Install eccentric tool on MG400

Install an off-axis sucker at the end of the robot arm. The red box below shows the parts which need to be assembled. The calibration needle is used to calibrate the point when you establish the coordinate system, which needs to be removed after calibration.

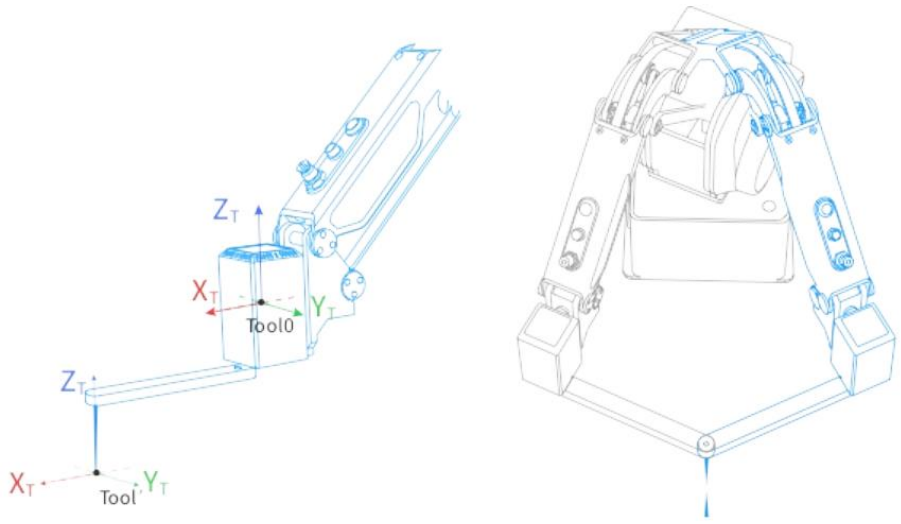
📖NOTE

If you need to remove the air tube, press and hold the spring piece at the air tube interface before removing the air tube.



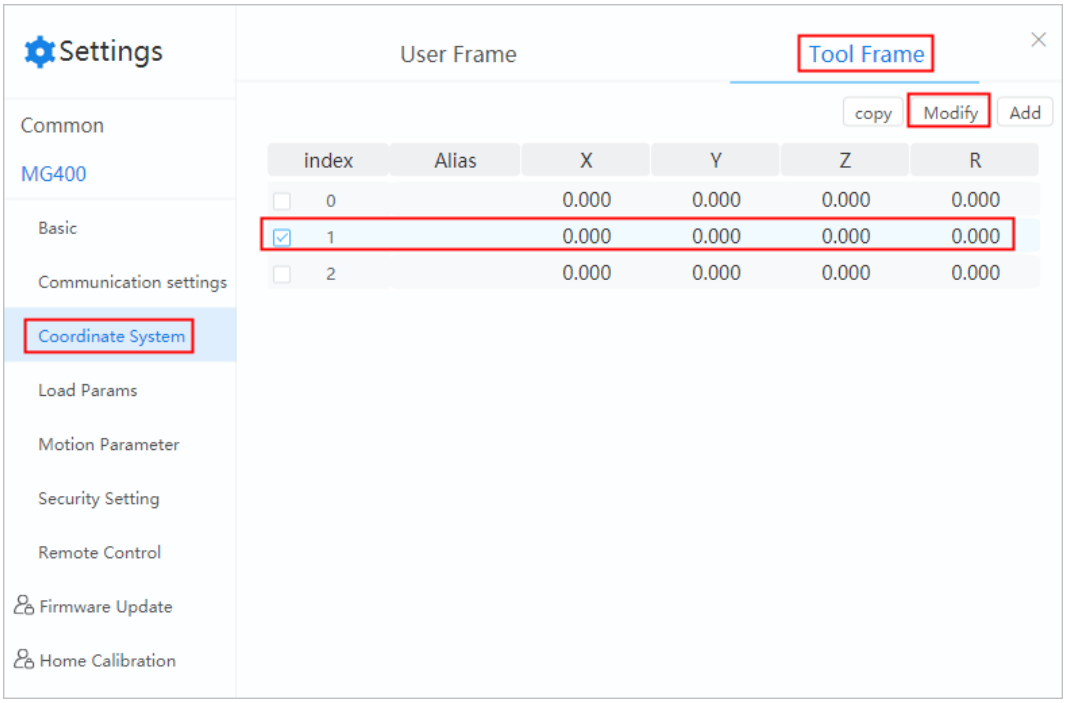
2.2 Establish tool coordinate system

The Tool coordinate system is generated by the two-point calibration method. After installing an end effector on MG400, adjust the pose of the tool so that the TCP (Tool Center Point) aligns with the same point (reference point) in space with two different poses, obtain the position offset of the tool, and generate the tool coordinate system, as shown in the figure below.

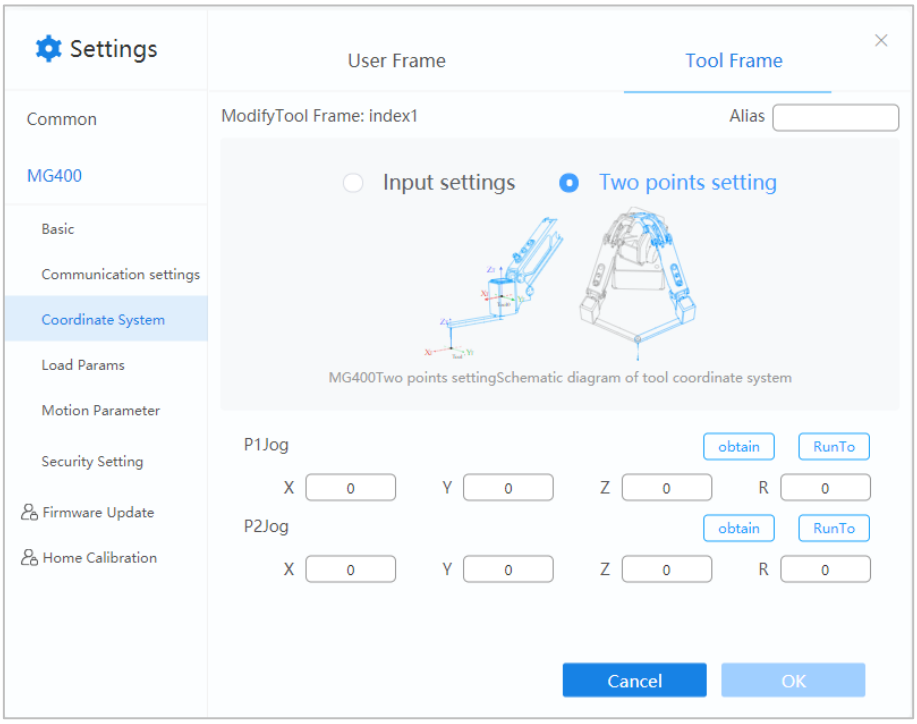


Step 1 Open DobotStudio Pro (you can download from Dobot website and install it). Click **Settings** > **Coordinate System** > **Tool Frame**.

Step 2 Select a Tool coordinate system (take No. 1 as an example). Then click **Modify** to update the coordinate system (if there is only No. 0, you can click **Add** to add a coordinate system).



Step 3 Click **Two points setting**.

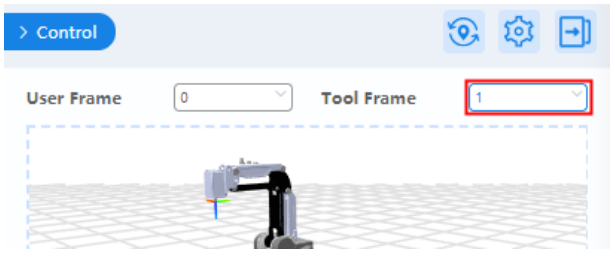


Step 4 Place the calibration tool on the conveyor. Jog MG400 to align the needle at the end of the robot with the calibration needle on the conveyor. Then click **obtain** on P1 panel.

Step 5 Jog MG400 to change its posture while keeping the needle at the end of the robot aligned with the calibration needle on the conveyor. Then click **obtain** on P2 panel.

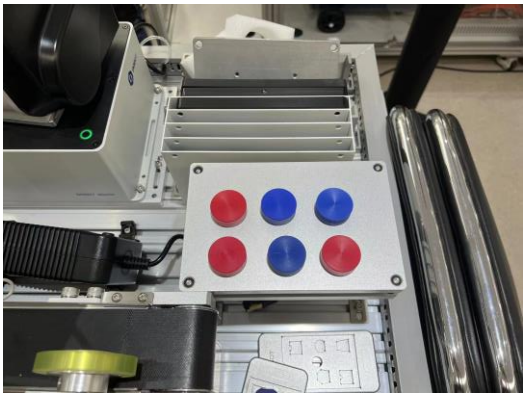
Step 6 Click **OK**. The Tool coordinate system 1 is updated.

Step 7 Modify the **Tool Frame** on the Control panel to **1**.

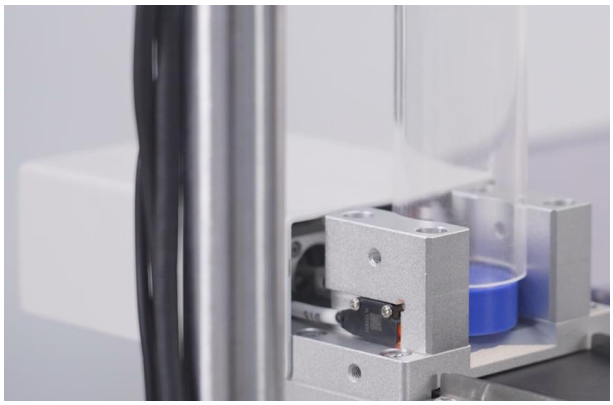


2.3 Place Materials

This demo includes 6 circle blocks, as placed in the figure below.

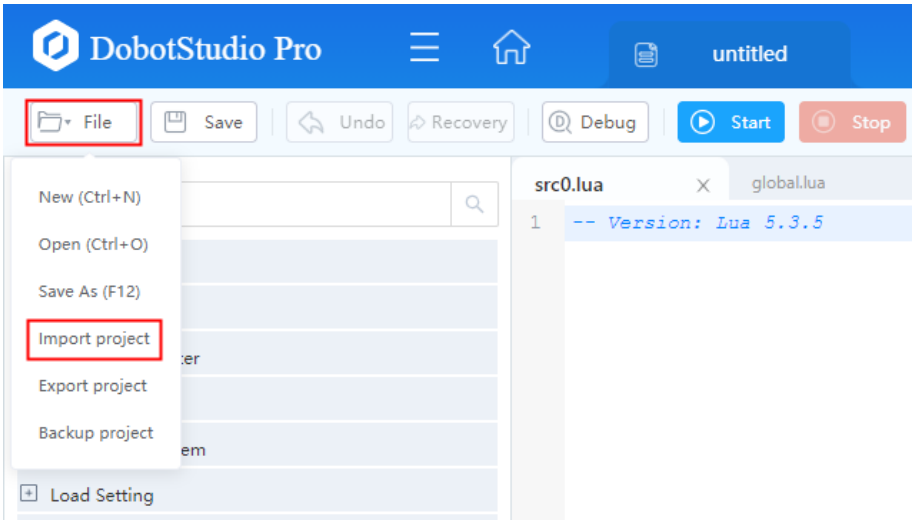


Place a block into the feed barrel.

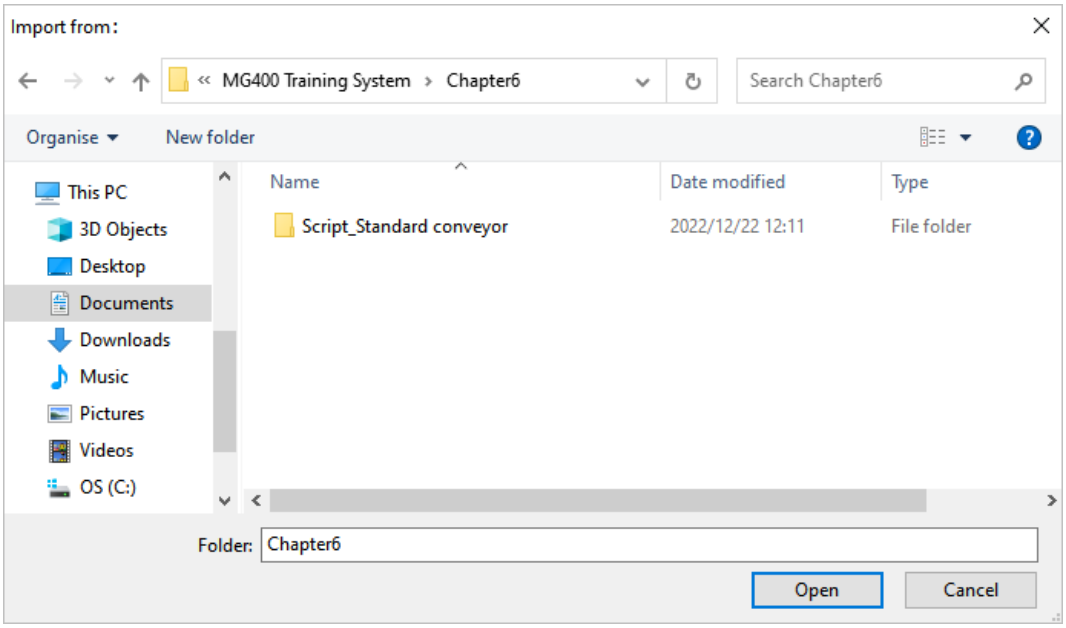


2.4 Import and configure Demo

Step 1 Click  in DobotStudio Pro main page to enter Script page. Click **File** > **Import project**.

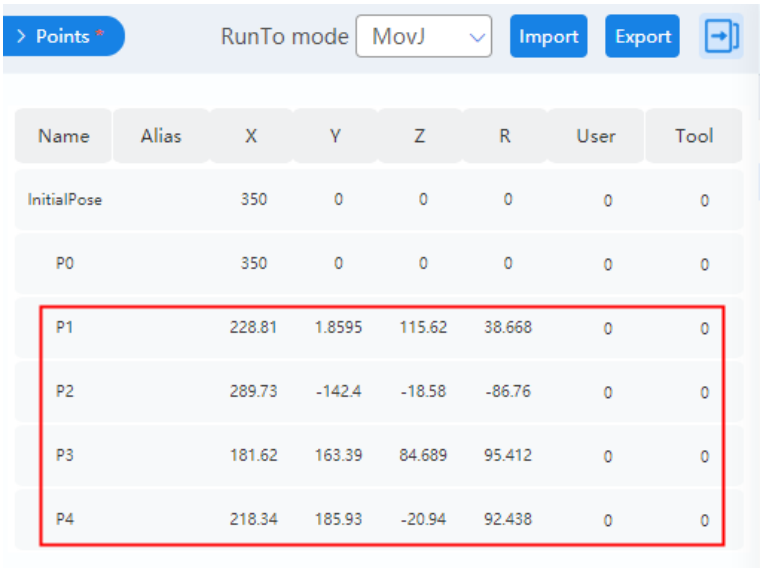


Step 2 Select “Script_Standard conveyor” file, and open it.



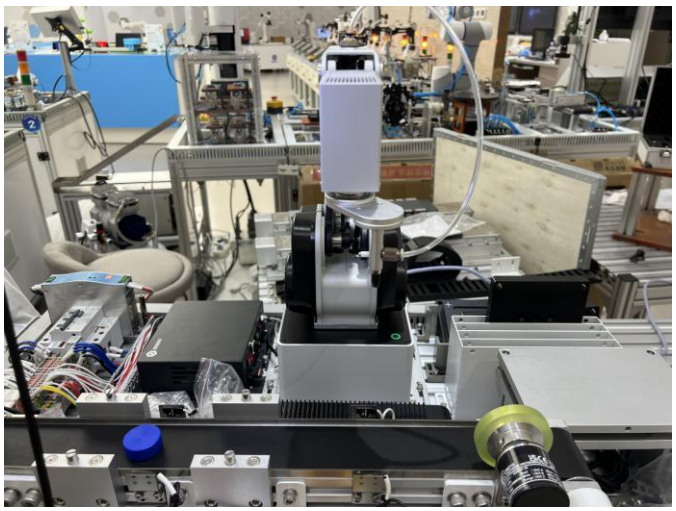
Step 3 Save the project. Enter a project name (such as “Standard_conveyor”) and click **OK.**

Step 4 Open Points panel. Drag or jog the robot to cover the points in turn.

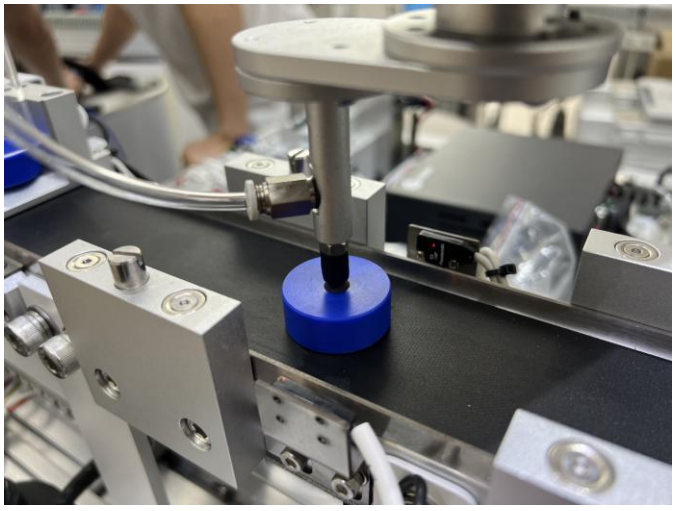


Name	Alias	X	Y	Z	R	User	Tool
InitialPose		350	0	0	0	0	0
P0		350	0	0	0	0	0
P1		228.81	1.8595	115.62	38.668	0	0
P2		289.73	-142.4	-18.58	-86.76	0	0
P3		181.62	163.39	84.689	95.412	0	0
P4		218.34	185.93	-20.94	92.438	0	0

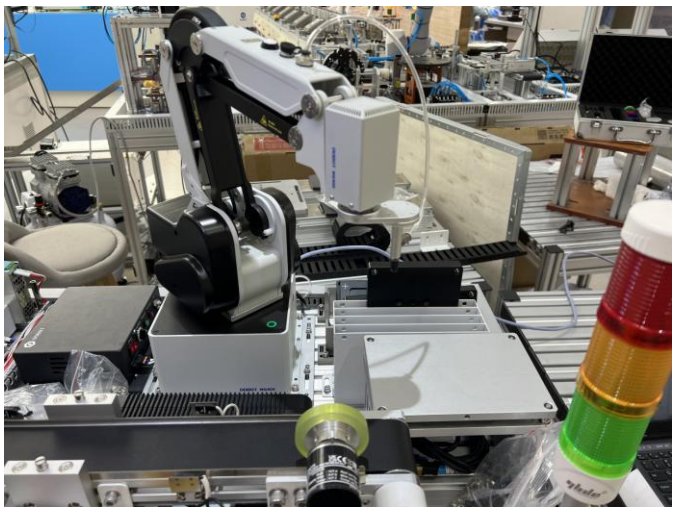
P1 (home point)



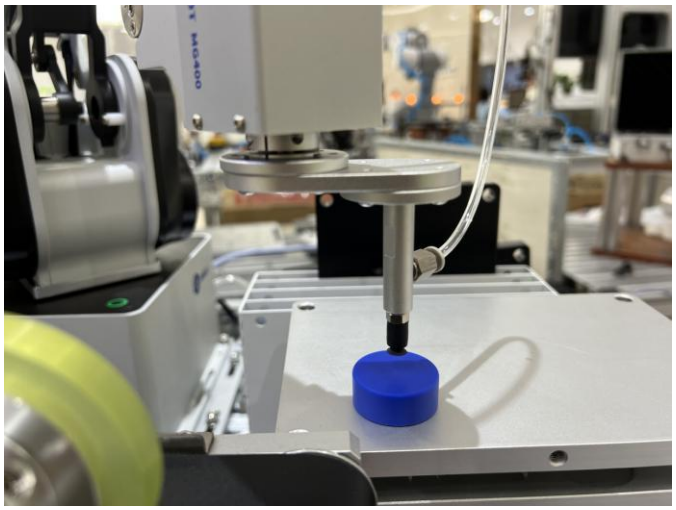
P2 (picking point): Run the project. Then stop running the project and teach the point after the conveyor transports the block to the working range of the robot arm and stops. (As the vision system is not used in this demo, the picking point may not be in the center of the block every time. So just ensure that the block is picked up every time)



P3 (transition point)



P4 (point for placing materials, which is recommended to be suspended)



Step 5 Save and run the project.

2.5 Demo description

MG400 I/O description

DI	Description	DO	Description
DI2	Start	DO2	Enable the push motor
DI3	Stop	DO3	Direction of push motor
DI4	Reset	DO4	Conveyor moves forward
DI5	/	DO5	Conveyor moves backward
DI6	Detect whether there are blocks in the material bin	DO6	Green LED light + green button light
DI7	Photo detection	DO7	Yellow LED light + yellow button light

DI8	In-place detection	DO8	Red LED light + red button light
DI9	Front stop of push motor	DO9	Buzzer
DI10	Back stop of push motor	DO10	Vacuum pumping
DI16	Emergency stop	DO11	Vacuum breaking

This section mainly describes the key script. For complete script, see the project.

1. Feed the material to the conveyor, and the conveyor carries the block to the picking point.

```
WaitDI(6,1)
DO(3, 0)
DO(2, 1)
WaitDI(9,1)
DO(3, 1)
DO(4, 1)
WaitDI(7,1)
DO(4, 0)
WaitDI(10,1)
DO(2, 0)
DO(3, 0)
```

2. The robot moves to the picking point to suck the block.

```
Go(RP(P2, {0,0,30,0}),"SYNC=1")
Move(RP(P2, {0,0,0,0}),"SYNC=1")
DO(10, 1)
Wait(100)
Move(RP(P2, {0,0,50,0}),"SYNC=1")
```

3. The robot moves through the transition point to the placing point, and place the block.

```
Go(P3)
Go(RP(P4, {40*x,40*y,30,0}),"SYNC=1")
Move(RP(P4, {40*x,40*y,0,0}),"SYNC=1")
DO(10, 0)
DO(11, 1)
Wait(100)
DO(11, 0)
Move(RP(P4, {40*x,40*y,30,0}),"SYNC=1")
Go(P1)
```

4. Repeat the steps above 6 times.

