



DOBOT

Dobot MG400 User Guide



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Shenzhen Yuejiang Technology CO.,Ltd.|China

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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.

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Preface

Purpose

This document describes the functions, technical specifications and installation procedure of Dobot MG400 robot, which is convenient for users to understand and use the robot.

Intended Audience

This document is intended for:

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

Change History

Date	Issue	Change Description
16 November, 2023	V1.7	Updated dimensions
19 July, 2023	V1.6	Update notice of workspace Update content styles
20 March, 2023	V1.5	Reconstruct and update the document
3 March, 2022	V1.4	Update the sequence of 3. Electrical Specifications , and modify the motion range of J4 joint
23 August, 2021	V1.3	Update the end-effector size, and add description on reserved mounting hole
26 July, 2021	V1.2	Add input and output circuit examples in different application scenarios
6 April, 2021	V1.1	Add description on hand-guiding button and diameter of the air interface
6 February, 2021	V1.0	The first releases

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

Symbol	Description
	avoided, could result in minor or moderate injury, robot damage
 NOTICE	Indicates a potentially hazardous situation which, if not avoided, can result in equipment damage, data loss, or unanticipated result
 NOTE	Provides additional information to emphasize or supplement important points in the main text

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1. Security Precautions

1.1 Liability

1.1.1 Validity and Responsibility

The information in this document does not cover designing, installing and operating a complete robot system, nor does it cover all peripheral equipment that can affect the safety of the complete system. The complete system must be designed and installed in accordance with the safety requirements set forth in the standards and regulations of the country where the robot is installed.

The integrators of Dobot are responsible for ensuring that the applicable safety laws and regulations in the country concerned are observed and that any significant hazards in the complete robot application are eliminated. This includes, but is not limited to:

- Performing a risk assessment for the complete robot system.
- Adding safety machines and mechanisms based on the risk assessment.
- Setting up the appropriate safety settings in the software.
- Ensuring that the user will not modify any safety measures.
- Validating that the total robot system is designed and installed correctly.
- Specifying instructions for use.
- Marking relevant signs and contact information of the integrators on the robot.
- Archiving relevant technical files.

1.1.2 Limitation of Liability

Any safety information provided in this document should not be construed as a warranty by Dobot. The robot may cause injury or damage even if all safety instructions are observed.

1.1.3 Intended Use

Dobot MG400 is a collaborative robot only for general industrial use, such as processing or delivering products or parts through end tools.

Dobot MG400 is equipped with special safety mechanisms including collision detection. These mechanisms are purposely designed for human-robot collaborative operation, but only intended for non-hazardous applications after risk assessment, where tools, commodities, environments and other machines have been demonstrated to be incapable of significant risk through application-specific risk assessments.

Any use or application deviating from intended use is deemed to be impermissible misuse, including, but is not limited to:

- Use in potentially explosive environments.
- Use in life critical applications.
- Use before performing a risk assessment.
- Use over-stated specifications.

1.2 Safety warning signs

The following safety warning signs may appear in the products, and their meanings are described as follows.

Sign	Description
 DANGER	Indicates a high degree of potential danger, which, if not avoided, will result in death or serious injury.
 ELECTRICITY	May cause dangerous power consumption soon, which, if not avoided, will cause personal injury or serious damage to the equipment.
 HOT	May cause dangerous hot surfaces, which, if touched, may cause personal injury.
 WARNING	Indicates a moderate or low potential hazard, which, if not avoided, may cause minor personal injury and damage to the equipment.
 ATTENTION	Indicates a potential risk, which, if ignored, may result in damage to the robot arm, loss of data or unpredictable results
 NOTICE	A situation that, if not avoided, can cause personal injury or damage to the equipment. For items marked with such signs, depending on the specific situation, there is sometimes a possibility of significant consequences

1.3 General safety

Follow the safety instructions below when starting and using the robot for the first time.

DANGER

- The robot system is electrical equipment. Non-professional technicians should not modify the circuit, otherwise, it may cause damage to devices or personal injury.
- Comply with the local laws and regulations when operating the robot. The security precautions in this document are only supplemental to the local laws and regulations.
- Use the robot in the specified environment scope. Exceeding the specifications or load conditions will shorten the service life of the robot, even damage it.
- Ensure that the robot is operated under the security conditions and there is no harmful object around the robot.
- Turning on or off the power continually may result in degraded performance of the main circuit components inside the controller. If turning on or off the power continually is required, please keep the frequency less than once per minute.

⚠ NOTICE

- The personnel responsible for installation, operation and maintenance of equipment must first receive strict training, understand various safety precautions, and master correct operation and maintenance methods before they can operate and maintain equipment.
- Personnel without professional training shall not disassemble and repair the equipment without authorization. If the device fails, please contact Dobot technical support engineer in time.
- Be sure to carry out daily inspections and regular maintenance, and replace faulty components in time to ensure the safe operation of the equipment.
- If the equipment is scrapped, please comply with relevant laws to properly handle industrial waste and protect the environment.
- Please establish safety measures (such as guardrails, ropes or warning lines) near the operating area of the robot to ensure that personnel remain out of reach of the robot being operated or the robot about to start operation.
- Do not enter the safety range of the robot as determined by the risk assessment or touch the robot while the system is in operation.
- Do not expose the robot to permanent magnetic fields all the time. Strong magnetic fields can cause damage to the robot.
- Dobot assumes no responsibility for robot damage or personal injury caused by failure to follow product instructions or other improper operations.
- Use appropriate and reliable lifting equipment during handling operations such as lifting rings and bridge crane. According to the relevant regulations of various countries, it must be carried out by personnel with operating qualification certificates or personnel authorized by the company.
- Make sure that there are no obstacles within 2 meters of the robot during transportation. Relevant personnel should stay away from the suspended robot.
- Dobot is not responsible for any damage caused during the transportation and handling of equipment.
- Make sure that the robot is in the packing posture before packaging, and the brakes on each axis are normal.
- Make sure that there are no obstacles around the packing area, so that the staff can leave in a timely manner in case of an emergency.
- When the robot is transported, the packaging needs to be fixed to ensure that the robot is stable.
- After removing the outer packaging, make sure that the robot maintains the original packing posture and the brakes of each axis are normal.
- During the commissioning process, make sure that no relevant personnel and equipment (include computer used for debugging) stay in the dangerous area of the machine.
- If necessary, wear corresponding safety protective equipment, such as safety helmets, safety shoes (with non-slip soles), face shields, protective glasses and gloves. Inappropriate clothing may cause personal injury.
- In order to prevent personnel from entering the working space of the robot arm by mistake, please set up safety barriers to prevent personnel from entering the hazardous area.
- Do not enter the working space of the manipulator at will during operating the robot, otherwise cause injury to the robot or yourself.

- The personnel responsible for installation, operation, and maintenance of the equipment must first undergo strict training, understand various safety precautions, and master the correct operation and maintenance methods before operating and maintaining the equipment.
- When an abnormality occurs in the mechanical arm, it is necessary to ensure that the machine is stopped and then checked.
- After the commissioning of the operator is completed, the test needs to be performed in the Manual mode first, and then it is automatically run after it is confirmed to be correct.
- If the controller needs to be restarted due to power failure, when restarting, the robot must be manually returned to the initial position of the automatic operation program before restarting the automatic operation.
- Before maintenance and wiring work, the power supply must be cut off, and the sign **No power supply** must be put on. Otherwise, electric shock and personal injury may result.
- Please observe the ESD regulations when disassembling the robot or controller.
- Avoid dismantling the power supply system in the controller. After the controller is turned off, its power supply system may still have high voltage for several hours.
- Please contact our technical support staff for the disassembly and repair of the robot.
- Maintenance and repair work must be carried out by designated personnel, otherwise electric shock and personal injury may result.
- If the brake is manually released, the robot may move because of the action of gravity. So, when manually releasing the brake, please ensure that the robot body and the tools or workpieces installed on the robot are effectively supported.
- In order to prevent electric shock, when replacing parts, please turn off the circuit breaker in advance and cut off the main power before proceeding.
- Turn off the main power supply for 5 minutes before replacing parts.
- The replacement operation must be performed by the specified operator.
- The robot is designed and tested according to the group I class A engineering medical robot standard. In order to reduce the radio interference in light industry or family environment, please take protective measures.
- It is prohibited to operate the robot in strong radiation environment (such as RF source without shielding), otherwise, it could interfere with robot work.



WARNING

- Before the operation, please wear protective clothing, such as antistatic uniform, protective gloves, and protective shoes.
- It is prohibited to modify or remove the nameplates, instructions, icons and marks on the robot and the related equipment.
- Before operating the equipment, please find and be familiar with the operation method of the emergency stop function to ensure that the robot arm can be stopped urgently in the case of sudden stress. The emergency stop function is Stop Category 1.
- Be careful when carrying or installing the robot. Please follow the instructions on the packing box to put down the robot gently and place it correctly in the direction of the arrow.

- Please use the matched cables when connecting a robot to internal or external equipment for personal security and equipment protection.
- Please ensure that the robot and tools are installed correctly.
- Please ensure that the robot has enough space to move freely.
- If the robot is damaged, do not continue to use it.
- Any impact will release a lot of kinetic energy, which is much higher than that under high speed and high load.

1.4 Personal safety

When operating the robot system, please strictly follow the general precautions listed below to ensure the personal safety of the operator.

⚠ WARNING

- Please comply with local laws or regulations with regard to the maximum weight one person is permitted to carry.
- Do not touch the terminal blocks or disassemble the equipment with the power ON. Otherwise, it may result in an electric shock.
- Please confirm that the equipment is well grounded, otherwise it will endanger personal safety.
- Do not touch the terminal blocks or remove the interval circuit components within 10 minutes after the power is shut off, so as to avoid an electric shock since there is residual capacitance inside the controller.
- Even if the power switch of the controller is already in the OFF status, touching the terminal blocks or removing the interval circuit components is not allowed, so as to avoid an electric shock since there is residual capacitance inside the controller.
- When working with robots, do not wear loose clothing or jewelry. When operating the robot, make sure that you have bundle your hair behind your head.
- If the robot appears to have stopped during the operation of the equipment, it may be because the robot is waiting for the start signal and is in the state of being about to move. In this case, the robot should also be considered to be in motion. Do not approach the robot.

1.5 Emergency

1.5.1 Emergency stop switch

After you press the emergency stop switch in emergency, the robot will immediately stop all motions and be locked. According to IEC 60204-1 and ISO 13850, the emergency stop switch is not a safeguard. It is a complimentary protective measure and not intended to prevent injury.

1.5.2 Emergency recovery

The emergency stop switch will be locked after you press it. To unlock the switch, you need to rotate the switch according to the mark on the switch. The alarm can be cleared through the software only after the emergency stop switch is unlocked. Then the robot arm can be enabled and resumed.

from the emergency status.

 **WARNING**

Please operate the robot to recover from the emergency only after the danger of the robot system is completely removed.

1.5.3 Forced joint movement

In the unlikely event of an emergency, you may need to move the robot joint(s) when the robot power is either impossible or unwanted. In this case, you must push or pull the robot arm hard to move the joint(s).

 **WARNING**

Moving the locked joints forcefully may cause joint damage. Please operate only in emergencies.

2. Transportation

The robot should be restored to its packaging posture during transportation, as shown below, and transported with its original packaging. The robot arm has four joints: J1, J2, J3 and J4, and the corresponding joint angles of the factory posture are: J1= 0°, J2= 0°, J3= 60°, J4= 0°. You can adjust the joint angles through jogging or programming. See the corresponding software guide for details.

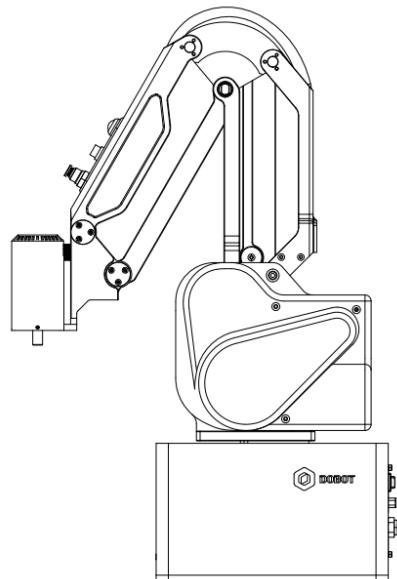


Figure 2.1 Packaging posture

During transportation, ensure that the robot arm is stable and fixed by corresponding measures.

During transportation and long-term storage, ensure that the ambient temperature ranges from -20 °C to +55 °C, and the ambient humidity is no more than 95% without condensation.

When moving the robot from its packaging to the installation space, hold the robot arm in place until all mounting bolts are securely tightened at the base of the robot.

After transportation, store the original package in a dry place for repacking and transporting it in the future.



WARNING

- Ensure that the operator is not unduly stressed on their back or other body parts when lifting the equipment, and use appropriate lifting equipment if necessary.
- Dobot shall not be held responsible for any damage caused by transportation of the equipment.
- Be sure to follow all installation instructions when installing the robot.

3. Product Introduction

3.1 Overview

MG400 is an ultra-compact desktop robot arm. It is designed integrating the controller and the robot arm body. The controller is installed in the base. MG400 robot arm includes 4 rotating joints, and two connecting rods (upper arm and forearm), as shown in Figure 3.1.

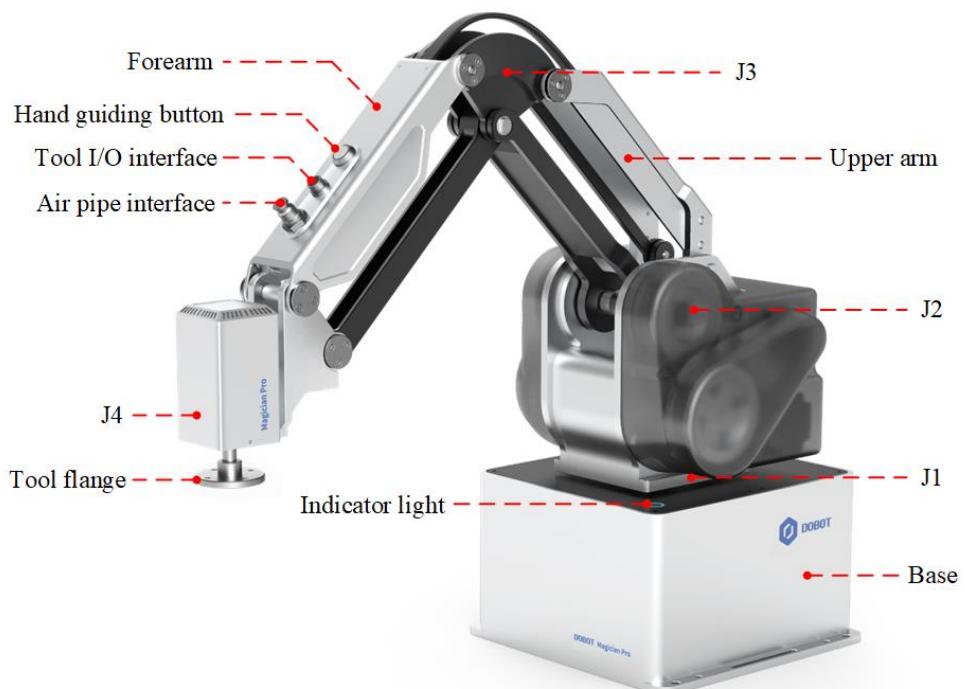


Figure 3.1 MG400

3.2 Robot base

The base is equipped with core computing and electrical components of MG400. The electrical interface board is on the back of the base, and a circular indicator light button is on the base, as described below.

Table 3.1 Indicator light

Color	Status	Definition
White light	Flash	System is starting
Blue light	Steady on	The robot arm has been started but not enabled
	Flash	Hand-guiding status
Green light	Steady on	The robot arm is enabled (not running projects)

	Flash	Automatic running (project is running)
Red light	Steady on	General alarm
	Flash	Position limit alarm

3.3 End button and interface

MG400 is equipped with a button and two interfaces on its forearm.

- **Hand-guiding button:** When the robot arm is enabled and not running a program, long press the button and then you can drag the joints for teaching. After dragging the robot arm to the teaching point, press the end button again and the joints will be locked (cannot be dragged). In addition, when the machine is powered normally, this button can also release the motor brake in emergency stop or other alarm states to rescue trapped people.

 NOTE

During the dragging process, you need to hold the robot arm with your hands, otherwise it may lift or fall slowly.

- **Tool I/O interface:** Aerial socket, which is used to connect the end tool. See 6.2 Tool I/O interface for details.
- **Air pipe interface:** It is connected to the air source interface on the back of the base for supplying air for the tool. The corresponding diameter of the air pipe is 4mm.

3.4 Operation terminal

MG400 robot supports control through PC and App, as shown in Table 3.2. If you need to use WiFi for control, you need to plug the WiFi module into the controller.

Table 3.2 Operation terminal parameters

Terminal type	PC	Tablet (Android)	iPad
Operation system	Windows 7/10/11	Android 10 and above	iOS 10 and above
Control software	DobotStudio Pro	Dobot CRStudio	Dobot CRStudio
Minimum configuration	CPU: Intel Core i3 Memory: 4GB Storage space: 256GB	CPU: 4-core Running memory: 2G Storage space: 32G	Storage space: 32G
Communication mode	LAN/WiFi	WiFi	WiFi

4. Product Features

4.1 Coordinate system

4.1.1 Joint coordinate system

The joint coordinate system is determined based on all motion joints. All joints are rotating joints, and the positive rotating direction is shown in Figure 4.1.

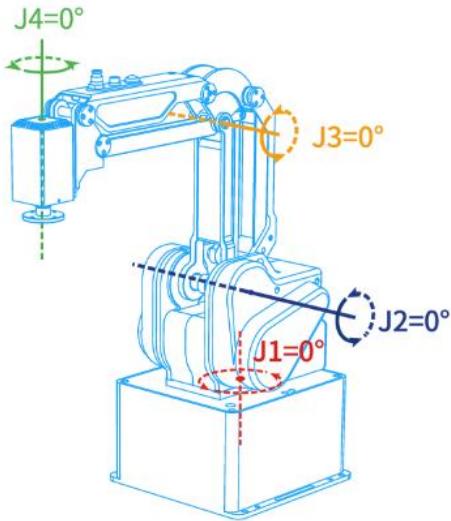


Figure 4.1 Joint coordinate system

4.1.2 User coordinate system

The user coordinate system is a movable coordinate system which is used for representing equipment like fixtures, workbenches. The origin and the orientations of axes can be defined based on the site requirements to measure point data within the workspace and arrange tasks conveniently. The default user coordinate system is determined based on the robot base, as shown in Figure 4.2.

- X-axis: perpendicular to the base (positive direction: forward).
- Y-axis: perpendicular to the base (positive direction: left).
- Z axis: vertical upward according to the right-hand rule.

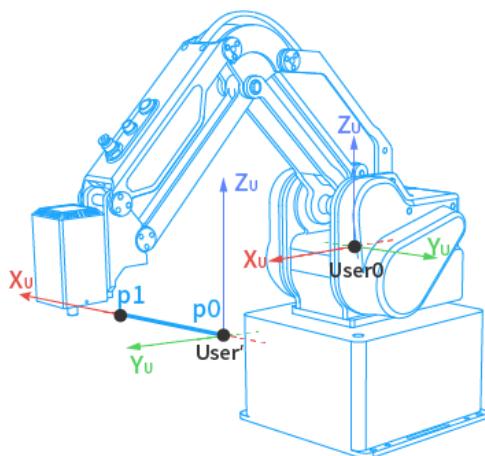


Figure 4.2 User coordinate system

4.1.3 Tool coordinate system

The tool coordinate system defines the tool center point (TCP) and tool posture, of which the origin and orientations vary with the position and angle of the workpiece at the end of robot. The default tool coordinate system is determined based on the end of the robot, as shown in Figure 4.3.

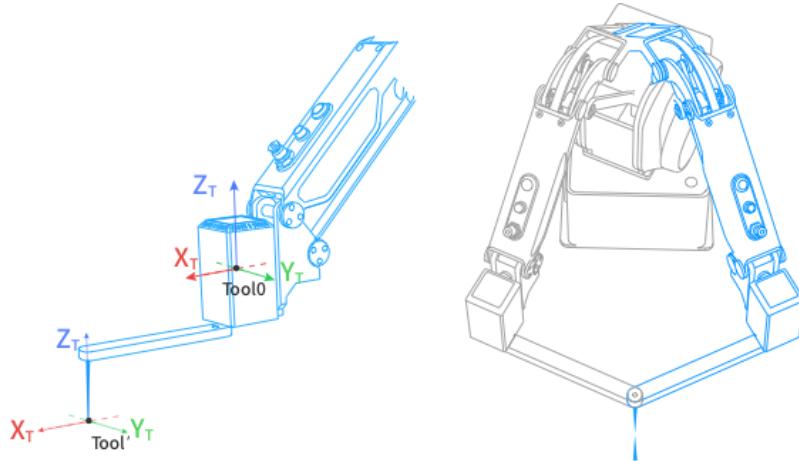


Figure 4.3 Tool coordinate system

4.2 Home posture

The posture when all joint angles of the robot are 0 degrees is called the home posture, as shown in Figure 4.4.

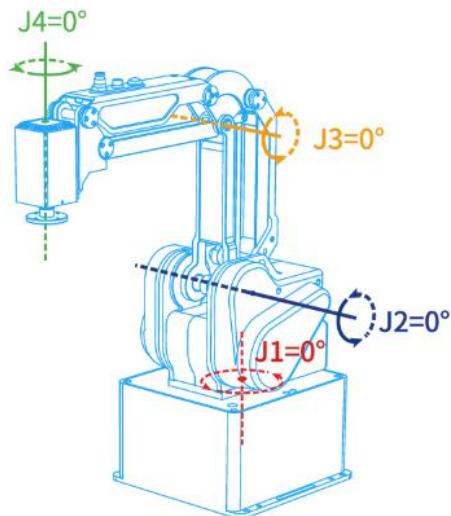


Figure 4.4 Home point sticker

If the home point of the robot arm changes due to the replacement of the transmission parts or the collision, you can calibrate using the calibration block through the control software. See the corresponding software guide for details.

4.3 Braking time and braking angle

When the J1~J4 axes triggers an emergency stop at maximum speed, maximum load and maximum arm span, the maximum braking angle and braking time of each joint are shown in the table below.

Table 4.1 Braking time and Braking distance

Axis	Maximum braking angle (°)	Maximum braking time (ms)
J1	63.391	427
J2	16.13	114
J3	17.951	123
J4	22.027	131

5. Mechanical Specifications

5.1 Dimensions

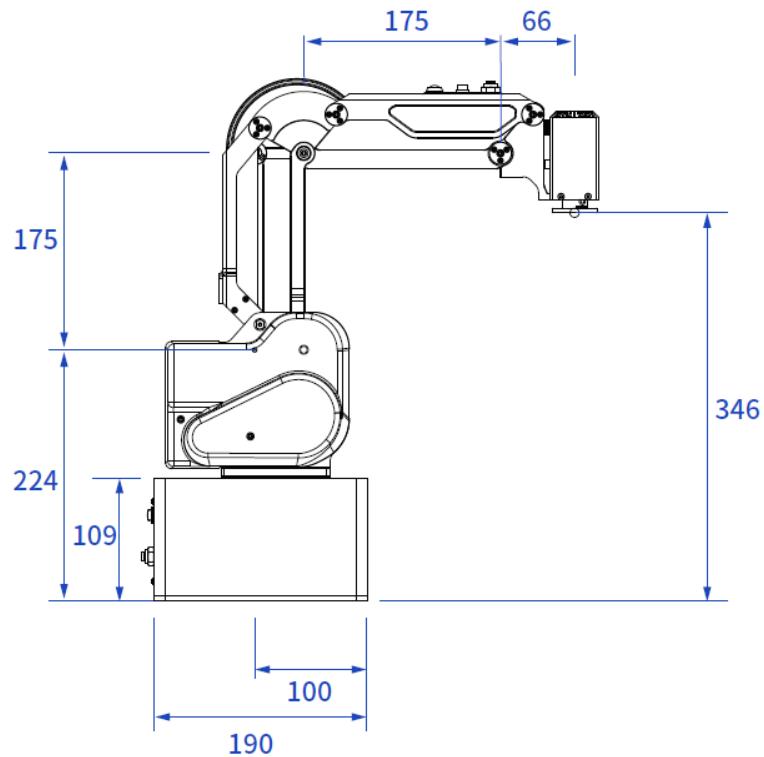


Figure 5.1 MG400 Dimensions

5.2 Base installation dimensions

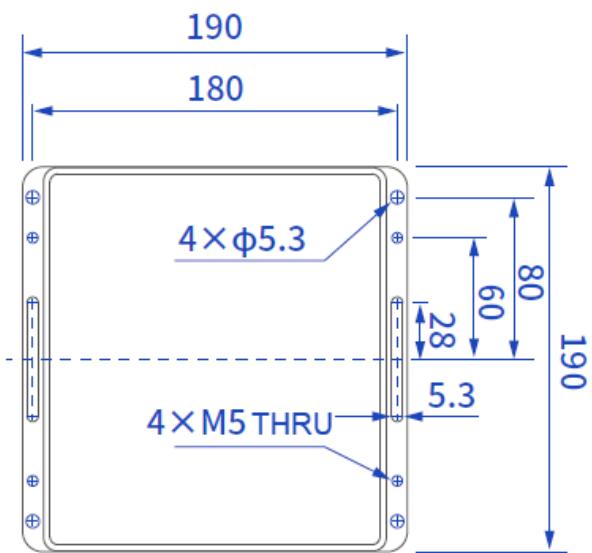


Figure 5.2 Base installation dimensions

5.3 End dimensions

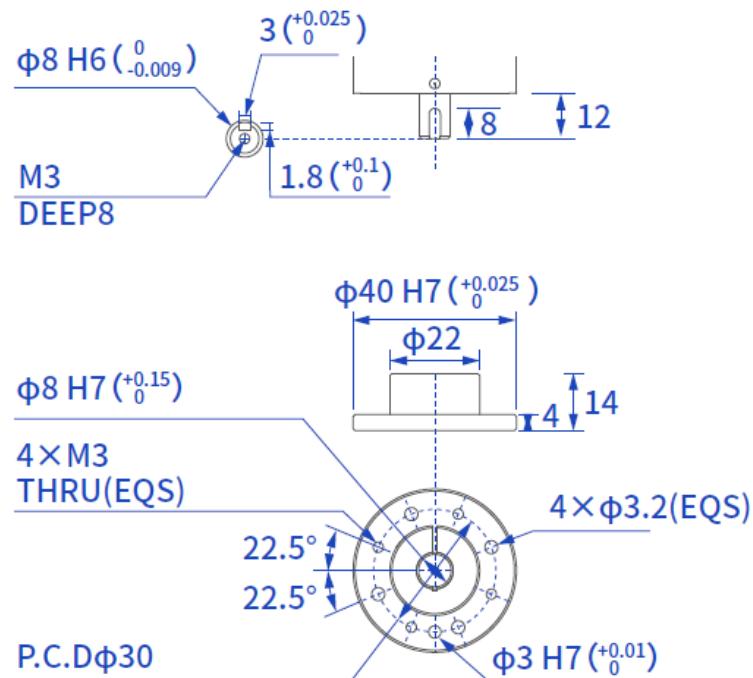


Figure 5.3 End flange dimensions

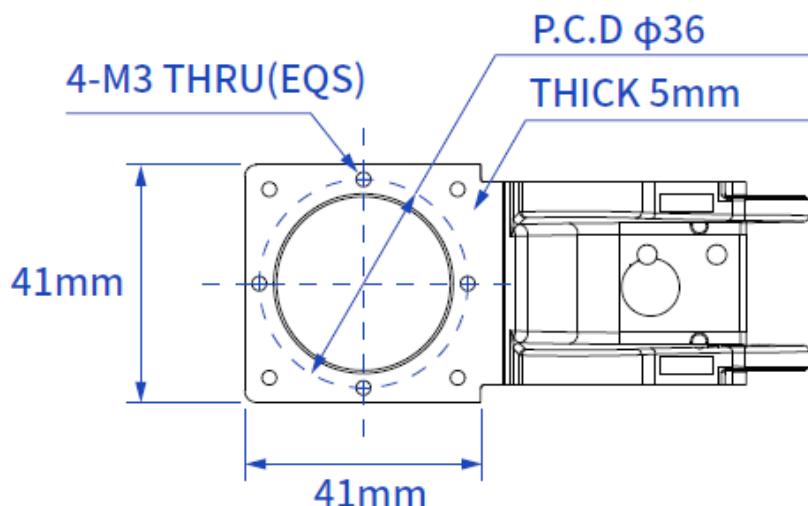


Figure 5.4 End reserved holes



WARNING

- Make sure the tools are properly and safely installed in place.
- Ensure the safe architecture of tools to prevent accidental fall of any parts.

5.4 Workspace

Figure 5.5 shows the workspace of MG400 robot.



NOTICE

When operating the robot, be sure to operate within the workspace and minimize proximity to the working range boundary.

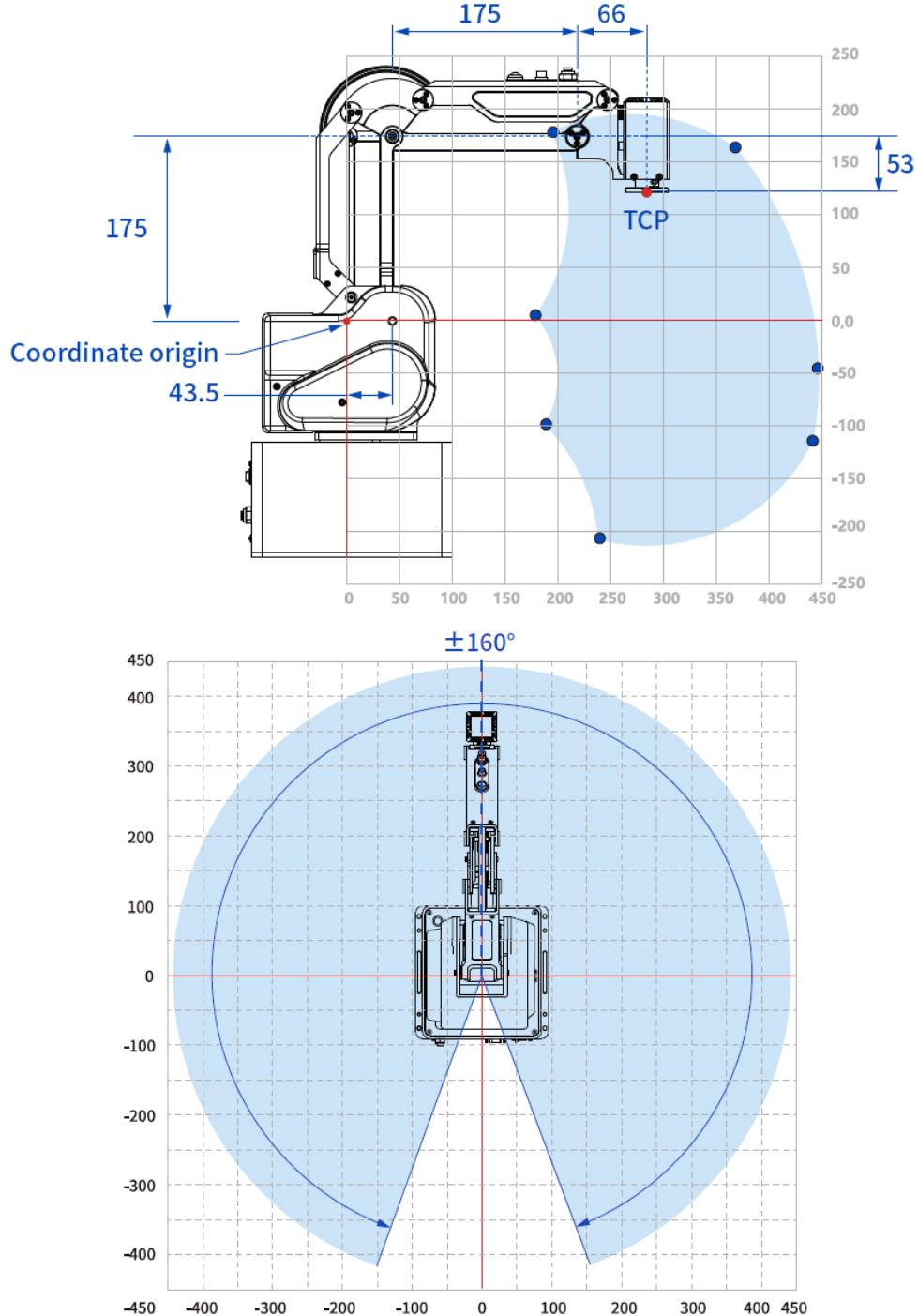


Figure 5.5 Workspace

5.5 Load curve

The load capacity of the robot is negatively correlated with the eccentric distance of the load mass center. The load curve is shown below.

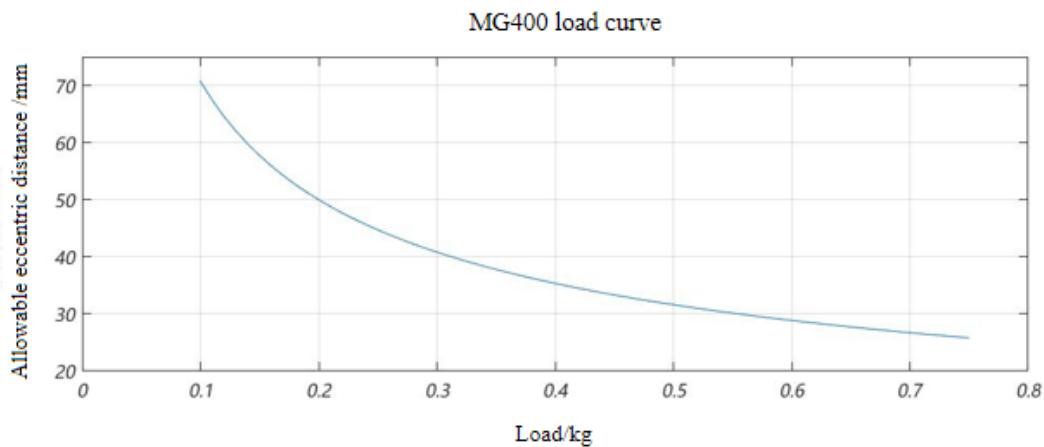


Figure 5.6 MG400 load curve

6. Electrical Specifications

6.1 Base Interface

6.1.1 Interface overview

The base interface board is shown in Figure 6.1 and described in Table 6.1.

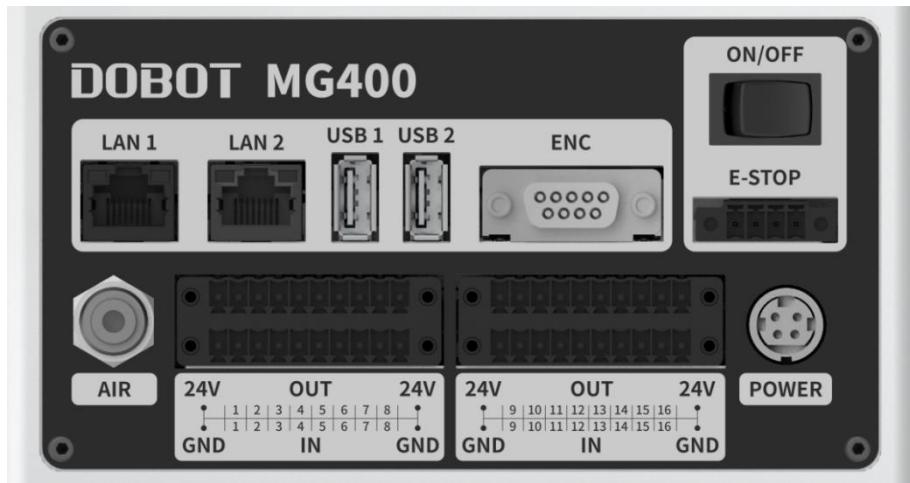


Figure 6.1 Interface board of the base

Table 6.1 Interface description

Screen printing	Description
LAN1	<p>LAN interface The default IP address is 192.168.1.6, which cannot be modified. It can be used for software debugging.</p>
LAN2	<p>LAN interface For connecting to external equipment. The default IP address is 192.168.2.6, which can be modified.</p>
USB1	<p>USB interface For connecting WiFi module, updating firmware, etc.</p>
USB2	<p>USB interface For connecting WiFi module, updating firmware, etc.</p>
ENC	<p>Encoder interface For connecting to the conveyor belt for dynamic tracking</p>
ON/OFF	<p>Power switch For power on/off the robot</p>
E-Stop	Emergency stop interface
Power	Power interface

Screen printing	Description
	For connecting to DC 48V power supply
I/O	I/O interface
AIR	Air source interface. The corresponding air pipe diameter was 4mm

The ENC interface of the MG400 is shown in Figure 6.2, and described in Table 6.2.

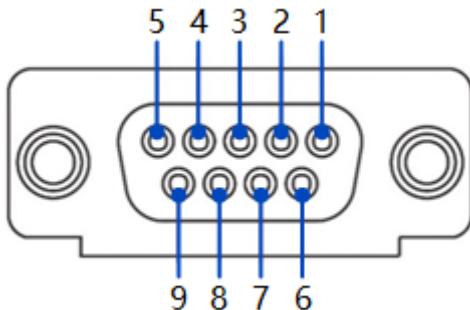


Figure 6.2 ENC interface

Table 6.2 ENC interface description

No.	1	2	3	4	5	6	7	8	9
Description	ABZ_A+	ABZ_A-	ABZ_B+	ABZ_B-	ABZ_Z+	ABZ_Z-	5V	0V	Reserved

6.1.2 Base I/O interface

The MG400 base contains an I/O board, for connecting to external equipment, such as air pump, PLC, etc. The I/O board provides 16 digital inputs and 16 digital outputs, as shown in Figure 6.3.

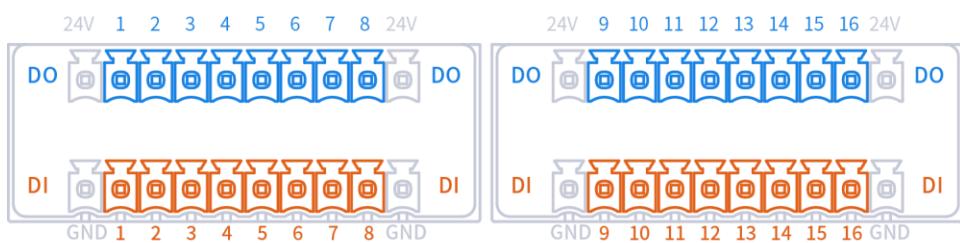


Figure 6.3 Base I/O interface



NOTE

- The digital I/O is powered by the internal 24V power supply, the total current can't exceed 2A.
- The output current of every I/O can't exceed 500mA.

DI wiring

The wiring of DI connected to a simple switch (relay contact, button, switch, etc.) is shown below.

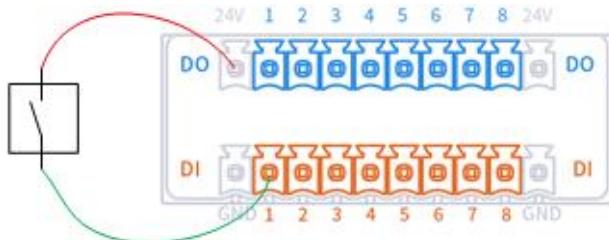


Figure 6.4 DI connected to simple switch

The wiring of DI connected to PNP-type 3-wire sensor is shown in Figure 6.5.

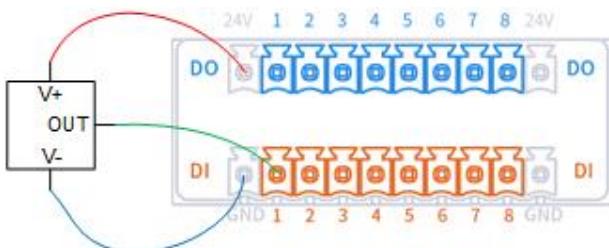


Figure 6.5 DI connected to PNP-type DO

DO wiring

The wiring of DO connected to external load (without external power supply) is shown in Figure 6.6.

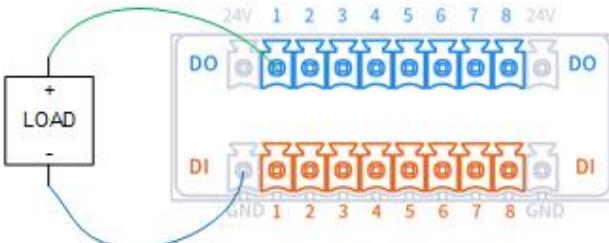


Figure 6.6 DO connected to external load (without external power supply)

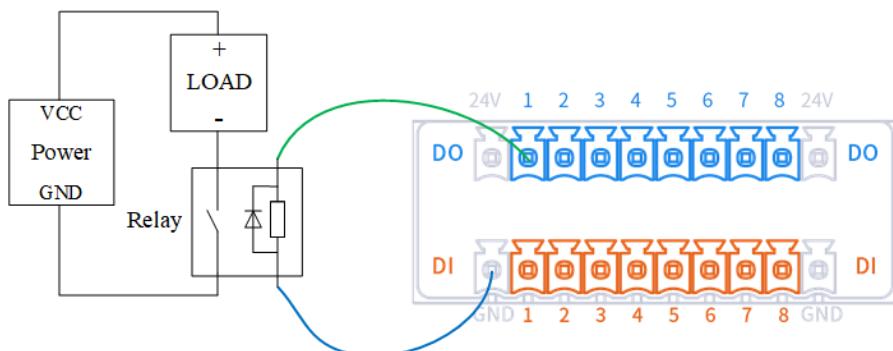


Figure 6.7 DO connected to external load (with external power supply)

6.2 Tool I/O interface

The tool I/O needs to be used with an aerial plug (WEIPU: SF810/P6).

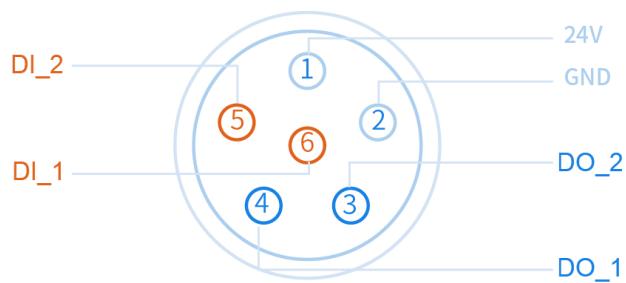


Figure 6.8 Tool I/O interface

⚠️ WARNING

When connecting end tools, ensure that power interruptions do not cause any hazards, such as a workpiece falling off the tool.

7. Installation

7.1 Installation Environment

To maintain the robot performance and ensure safety, please place them in an environment with the following conditions.

 NOTICE

- Install indoors with good ventilation.
- Keep away from excessive and shock.
- Keep away from direct sunlight.
- Keep away from dust, oily smoke, salinity, metal powder, corrosive gases, and other contaminants.
- Do not use in a closed environment. A closed environment may cause high temperature of the robot and shorten its service life.
- Keep away from flammable.
- Keep away from cutting and grinding fluids.
- Keep away from sources of electromagnetic interference, including large transformer, large electromagnetic contactor, welding machine, etc.

7.2 Unpacking

When unpacking, please check the attached shipping list to ensure that there are no contents missing. If any contents are missing, please contact your supplier.

7.3 Robot Installation

After taking the robot from its packaging, tighten the robot base using four M5 (ISO 898-1-1999) hexagonal bolts with a torque of 9 Nm. The installation of the robot directly affects the stability of robot operation. You can design and select the platform according to the size of the hole of the base and the real environment for mounting a robot. The installation height of the robot should be above 0.6 meters. The platform needs to bear not only the weight of the robot arm but also the dynamic force in the maximum acceleration. Please note the following when fixing the robot.

- Design the platform according to the robot's workspace, and ensure that the robot moves without interference.
- Keep the platform level which is used to mount a robot.

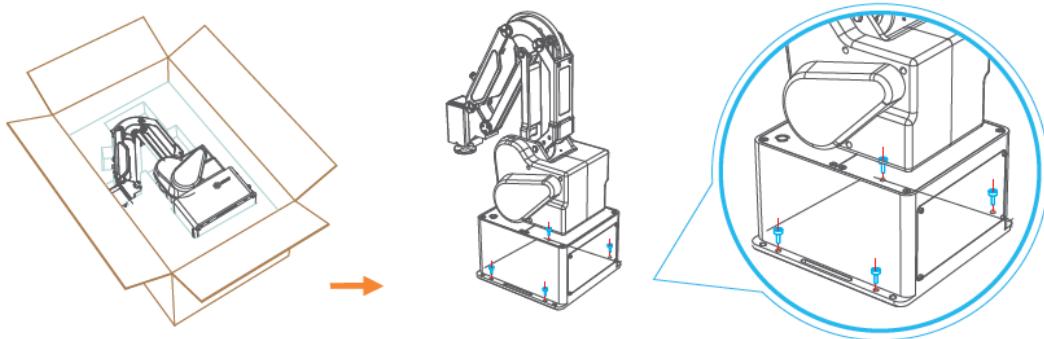


Figure 7.1 Robot base size

7.4 Wiring and powering on

1. Connect the emergency stop switch cable using wiring terminals, as shown below.
2. Connect the power cable. The other end of the power cable is connected to an external power supply via a power adapter.
3. Connect the base LAN1 interface using a network cable to the computer for debugging. If you have purchased a WiFi module, you can also plug the WiFi module into the base USB interface and connect wirelessly.
4. Press the power switch. After the robot is turned on, you can debug the robot arm using the control software (DobotStudio Pro or Dobot CRStudio). See the corresponding user guide for details.

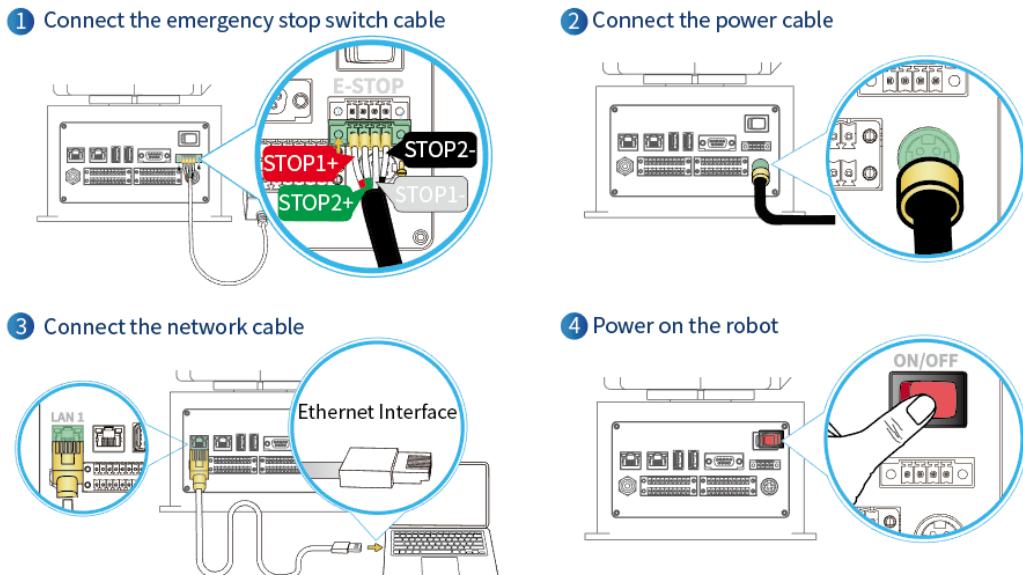


Figure 7.2 Robot connection

⚠ NOTICE

- Set the specifications and installation method of external cables in compliance with local power distribution laws and regulations.
- Do not disassemble the robot by yourself, otherwise it may cause electricity leakage.
- Make sure the device is grounded.
- Do not bend the cable excessively, otherwise it may cause poor contact or cable breakage.
- Make sure the power outlet for the control system is disconnected when connecting an external device, otherwise it may cause an electric shock or device failure.
- Use supporting cables to protect device and personal safety.
- After wiring, ensure that there are no fallen screws or exposed cables in the device.
- Do not plug or remove the power cable or communication cable when the device is running normally.
- Power on the device only after connecting all the cables required.
- Ensure that the cables are connected correctly, otherwise, it may cause fault in internal modules or external devices.
- Before connecting, check whether there is breakage in the insulation and shield of the external cables.

8. Maintenance and Repair

Maintenance and repairing must be performed in compliance with all safety instructions in this manual.

The purpose of maintenance and repairing is to ensure that the system is kept operational, or to return the system to an operational state in the event of a fault. Repairing includes troubleshooting in addition to the actual repair itself.

Repairing must be performed by an authorized system integrator or Dobot technical engineers.

Before returning robots or parts to Dobot, please follow the instructions below:

- Remove all parts that do not belong to Dobot.
- Make a backup copy of the files. Dobot shall not be responsible for the loss of programs, data or files stored in the robot.
- Restore the robot to the packaging posture.

8.1 Safety Instructions

The following safety procedures and warnings must be observed during the operation of the robot or controller:

NOTICE

- Replace faulty components using new components with the same model or equivalent components approved by Dobot.
- Reactivate all deactivated safety measures immediately after the repairing is completed.
- Record all repairs and save them in the technical document with the robot system.
- Remove the main input cables from the back of the controller to ensure that it is completely unpowered. Cut off any other power source connected to the robot or controller. Take necessary precautions to prevent other people from powering on the system during the repair period.
- Observe ESD regulations during the disassembly of the parts of the robot arm or controller.
- Prevent water and dust from entering the robot arm or controller.

8.2 Body Maintenance

In order for the robot to maintain high performance for a long time, a maintenance inspection must be carried out. The personnel in charge of the maintenance must prepare a maintenance plan and carry out the maintenance. The maintenance items are shown below.

Table 8.1 Check items

Cycle			Maintenance item	Maintenance essential
Daily	3 months	6 months		
√			Robot clean	Wipe off dirt, dust, cutting residue on the body with water or 10% alcohol
√			Cable, cable protective cover and air pipe	Observe the moving part of the cable, check whether the cable is damaged, whether there is local bending or distortion; Check whether the cable protective cover is damaged. Check whether the air pipe is locally bent, twisted, damaged, etc.
		√	Joint bolts	Check the torque of exposed bolts based on Table 8.2
	√		Tool mounting bolts	Check the torque based on Table 8.2.
√			Motor	Abnormal heating or sound confirmation
√			Brake	Check whether the robot arm or end-effector will fall when the servo is powered off
	√		Synchronous belt	Check whether the synchronous belt is worn out, elongated, broken, etc.

Table 8.2 lists the bolted tightening torque table.

Table 8.2 Bolt tightening torque table

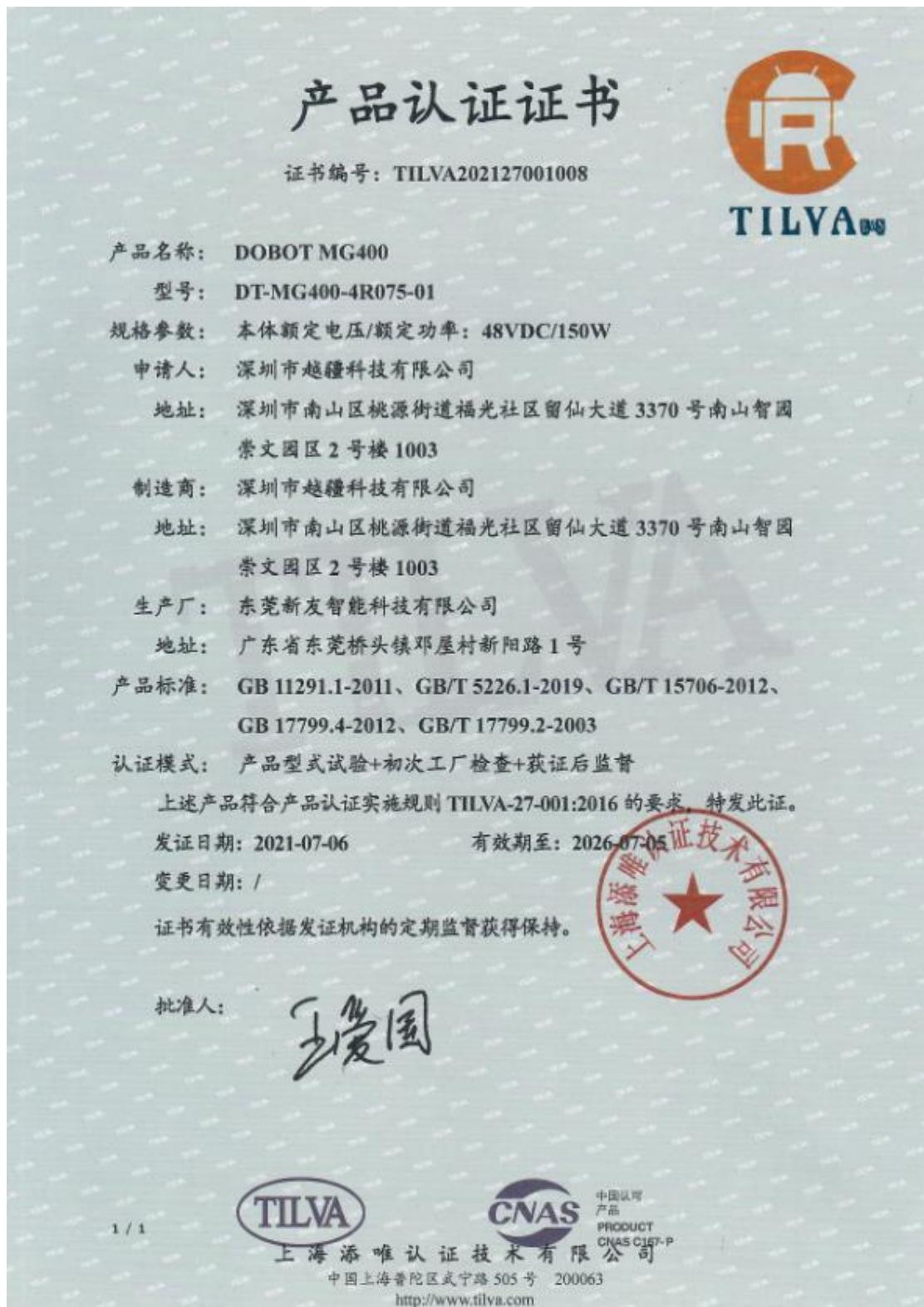
Nominal diameter of screw thread	Countersunk head hexagon socket screw	Hexagon socket button head screws	Hexagon socket cap screws
2.5 mm	0.3 Nm	0.3 Nm	0.5 Nm
3 mm	0.5 Nm	0.6 Nm	2 Nm
4 mm	-	2 Nm	-
5 mm	-	-	7.5 Nm

The tightening torque varies depending on the type of base metal or bolt. When it is not specified, please contact Dobot technical engineers.

In addition, overall maintenance is required every 20,000 hours of operation time or every 4 years (select the shorter of the two periods for maintenance). If you are not clear about the maintenance processes, please contact Dobot technical engineer.

9. Certification

9.1 Collaborative robot certification



9.2 Robot reliability certification



9.3 FCC SDoC certification



Verification of Compliance

This Verification of Compliance is granted to below applicant for following designated equipment

Verification No.: SZEM2108007269ATV
Applicant: Shenzhen Yuejiang Technology Co., Ltd.
Address of Applicant: Room 1003, Building 2, Chongwen Park, Nanshan iPark, No.3370, Liuxian Blvd, Fuguang Community, Taoyuan Street, Nanshan District, Shenzhen
Manufacturer: Shenzhen Yuejiang Technology Co., Ltd.
Address of Manufacturer: Room 1003, Building 2, Chongwen Park, Nanshan iPark, No.3370, Liuxian Blvd, Fuguang Community, Taoyuan Street, Nanshan District, Shenzhen
Factory: Dongguan Xinyou Intelligent Technology Co., Ltd.
Address of Factory: No.1 Xinyang Road, Dengwu village, Qiaotoutown, Dongguan City
Product Name: DOBOT MG400/DOBOT Magician Pro
Model No.: DT-MG400-4R075-01, DT-MGPro-4R075-01
Trade Mark: Dobot
Test Report Number(s): SZEM210800726901

based on tests conducted by SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch on submitted samples of above mentioned product and found to comply with the technical requirements set out in ANSI C63.4 & 47 CFR PART 15B regulations for the evaluation of electromagnetic compatibility.

Please note:

- (1) Applicant and/or manufacturer shall fully fulfill FCC SDoC authorization procedure set out in 47 CFR §2.906, §2.909, §2.935, §2.1074, §2.1077.
- (2) Applicant and/or manufacturer shall comply additional requirements set out in §15.21, §15.105 and §15.19 to fully comply regulation 47 CFR Part 15.
- (3) This VoC is ONLY a conclusion of test result, ONLY serves as technical specifications compliance verification for aforementioned product.
- (4) This verification is only valid in conjunction with test report(s) detailed above.



Keny Xu
EMC Laboratory Manager
Issue Date: 2021-09-02

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Member of SGS Group (Société Générale de Surveillance)

EMC-VOC-F01 / Rev.1.0 / 2020-11-05

9.4 CE-MD certification



9.5 CE-EMC certification



VERIFICATION OF EMC COMPLIANCE

Verification No.: SZEM2101000072ATV
Applicant: Shenzhen Yuejiang Technology Co., Ltd
Address of Applicant: Room 1003, Building 2, Chongwen Park, Nanshan iPark, No.3370, Liuxian Blvd, Fuguang Community, Taoyuan Street, Nanshan District, Shenzhen
Manufacturer: Shenzhen Yuejiang Technology Co., Ltd
Address of Manufacturer: Room 1003, Building 2, Chongwen Park, Nanshan iPark, No.3370, Liuxian Blvd, Fuguang Community, Taoyuan Street, Nanshan District, Shenzhen
Factory: Dongguan Xinyou Intelligent Technology Co., Ltd
Address of Factory: No.1 Xinyang Road, dengwu village, Qiaotou town, Dongguan City
Product Description: DOBOT MG400
Model No.: DT-MG400-4R075-01
Sufficient samples of the product have been tested and found to be in conformity with
Test Standards: EN IEC 61000-6-2: 2019
EN IEC 61000-6-4: 2019
As shown in the
Test Report Number(s): SZEM210100007201

This verification of EMC Compliance has been granted to the applicant based on the results of the tests, performed by laboratory of SGS-CSTC Standards Technical Services Co., Ltd. on the sample of the above-mentioned product in accordance with the provisions of the relevant specific standards under Directive 2014/30/EU.

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EU Declaration of Conformity and compliance with all relevant EU Directives.



Kerry Xu
EMC Laboratory Manager

Date: 2021-03-12

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Member of SGS Group (Société Générale de Surveillance)

EMC-VOC-F01/ Rev.1.0/ 2020-11-05

9.6 RoHS



9.7 RCM certification



9.8 KCs certification



자율안전확인 신고증명서

신청인	사업장명	Shenzhen Yuejiang Technology Co.,Ltd.	사업장관리번호	2021E220040		
	사업자등록번호	021E220040	대표자 성명	Lui Peichao		
	소재지	A Room 1005, Building2, Chongren East, Xiangtan Park, No.3370 Luxian Blvd, Fuguan Community, Yuxian Street, Xiangtan District, Shenzhen China				
자율안전인증대상 기계·기구명						
산업용로봇						
형식(규격)	DT-MG400-4R075-01	용량(등급)	4 axis			
자율안전확인번호	21-AH2EQ-01537					
제조자	Shenzhen Yuejiang Technology Co.,Ltd.					
소재지	A Room 1005, Building2, Chongren East, Xiangtan Park, No.3370 Luxian Blvd, Fuguan Community, Yuxian Street, Xiangtan District, Shenzhen China					

「산업안전보건법」 제89조제1항 및 같은 법 시행규칙 제120조제3항에 따라
자율안전확인 신고증명서를 발급합니다.

2021년 08월 10일

한국산업안전보건공단 이사장



10. Warranty

10.1 Product warranty

Without prejudice to any claim agreement that the user (customer) may reach with the distributor or retailer, the manufacturer shall guarantee the quality of the products to the customer in accordance with the terms and conditions below:

If defects caused by manufacturing and/or improper material occur in a new device and its components within 12 months (15 months at most if the shipping time is included) after the device is put into use, Dobot shall provide the necessary spare part, and the user (customer) shall offer personnel to replace the spare part, using another part that represents the latest technology level to replace or repairing the related part.

If the device defects are caused by improper handling and/or failure to follow the relevant information set out in the User Guide, the warranty is invalid.

This warranty does not apply to or extend to maintenance (e.g. installation, configuration, software download) performed by the authorized distributor or customer.

The user (customer) must provide the purchase receipt and the purchase date as valid evidence for the warranty. Claims under this warranty must be made within two months of the apparent failure to perform the product warranty.

The ownership of the equipment or components that are replaced or returned to Dobot shall remain with Dobot. Any other claims arising from or related to the equipment are not covered by this warranty.

Any items in this product warranty do not intend to limit or exclude the legal rights of the customer or to limit or exclude the liability of the manufacturer for the personnel casualty resulting from its negligence. The duration of this product warranty shall not be extended due to the services provided under the product warranty terms. Under the principle of not violating the warranty, Dobot reserves the right to charge customers for the replacement or maintenance. The foregoing does not imply a change in the burden of proof to the detriment of the client. If there are defects on the equipment, Dobot shall not be liable for any damage or loss arising therefrom, including but not limited to loss of production or damage to other production equipment.

10.2 Disclaimer

Dobot is committed to improve the reliability and performance of its products, and as such reserves the right to upgrade products without prior notice. Dobot strives to ensure the contents of the User Guide are precise and reliable, but takes no responsibility for any errors or missing information.

Appendix A Technical Specifications

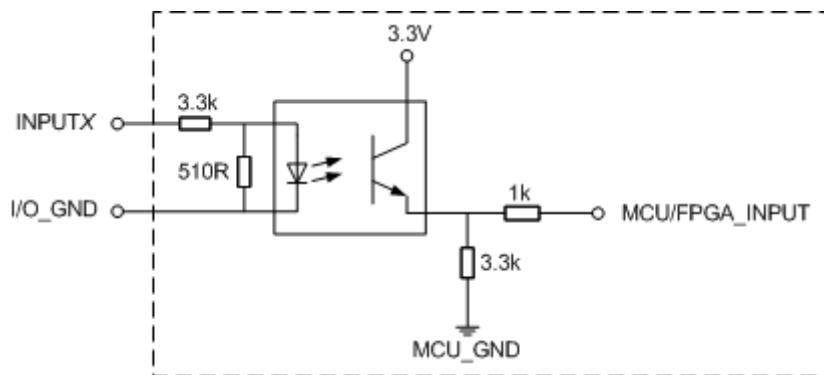
Product	DOBOT MG400	
Model	DT-MG400-4R075-01	
Weight	8kg	
Max load	500g	
Reach	440mm	
Power adapter	100V~240V AC, 50/60Hz, Max. 240W	
Rated voltage	DC48V	
Installation	Table installation, indoor	
Rated power	150W	
Repeatability	±0.05mm	
Base size	190mm * 190mm	
Operation software	DobotStudio Pro, CRStudio	
Motion range	J1	±160°
	J2	-25°~85°
	J3	-25°~105°
	J4	-360° ~360°
Joint maximum speed	J1	300°/s
	J2	300°/s
	J3	300°/s
	J4	300°/s
End-effector I/O interface	DI	2
	DO	2
Base interface	DI	16
	DO	16
	ABZ incremental encoder (differential)	1
	Ethernet	2
	USB 2.0	2
Communication mode	TCP/IP, Modbus, TCP	

Temperature range	Storage temperature: -25°C~55°C Working temperature: 0°C~40°C
Operating altitude range	≤ 1000 m
Safety Standard	EN ISO 10218-1:2011 Steel wire and wire products. General. Test methods EN 60204-1:2018 Safety of machinery. Electrical equipment of machines. General requirements EN ISO 12100:2010 Safety of machinery. General principles for design. Risk assessment and risk reduction
EMC Standard	EN 61000-6-2:2019 Electromagnetic compatibility (EMC). Generic standards. Immunity standard for industrial environments EN 61000-6-4:2019 Electromagnetic compatibility (EMC). Generic standards. Emission standard for industrial environments

Appendix B I/O Simple Circuit

Digital Input

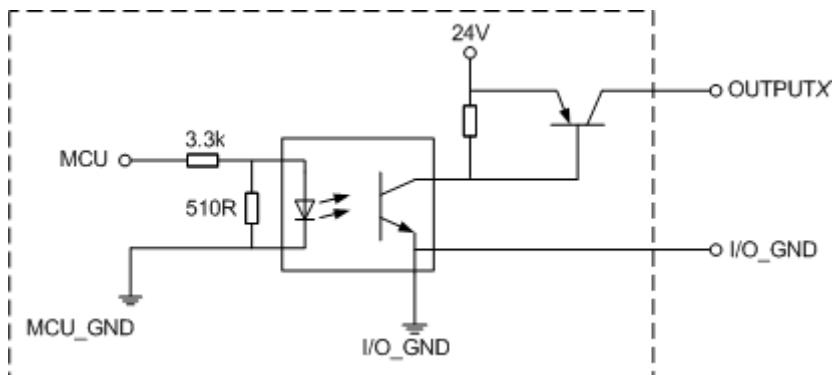
The figure below shows the simple digital input circuit and the table below lists the technical specifications.



Item	Specification
Input channel	16 channels
Connection method	Crimping terminal
Input type	PNP
Input voltage (DC)	24V±10%
Isolation method	Optical coupling isolation

Digital Output

The figure below shows the simple digital output circuit and the table below lists the technical specifications.



Item	Specification
Output channel	16 channels

Item	Specification
Connection method	Crimping terminal
Output type	PNP
Power supply (DC)	24V±10%
Load current of single channel	500mA
Output current	2A
Isolation method	Magnetic isolation