Dobot MG400 Robot Arm Kit Desktop User Guide

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Dobot MG400 Robot Arm Kit Desktop

Magician Pro
DOBOT
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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	Change Description
2023/03/20	Reconstruct and update the document
2022/03/03	Update the sequence of **3. Electrical Specifications**, and modify the motion range of J4 joint
2021/08/23	Update the end-effector size, and add a description on the reserved mounting hole
2021/07/26	Add input and output circuit examples in different application scenarios
2021/04/06	Add a description on a hand-guiding button and the diameter of the air interface
2021/02/06	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 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

Security Precautions

Liability

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.

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.

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.

Safety warning signs

The following safety warning signs may appear in this document, 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

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 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 the 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.

- In order to prevent personnel from accidentally entering the working space of the robot arm, be sure to set up safety fence to prevent personnel from entering the hazardous area.
- Before operating the robot, make sure that no one is inside the safety fence. When operating the robot, be sure to operate outside the safety fence.
- 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 (including computers 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.
- 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 while operating the robot, otherwise cause injury to the robot or yourself.
- The personnel responsible for the 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. To reduce radio interference in in light industry or family environment, please take protective measures.
- It is prohibited to operate the robot in a strong radiation environment (such as an RF source without shielding), otherwise, it could interfere robot’s work.

WARNING

- Before the operation, please wear protective clothing, such as an 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.

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 about 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, 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, 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 bundled 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.

Emergency

Emergency stop switch

After you press the emergency stop switch in emergencies, the robot will immediately stop all motions and be locked. The emergency stop switch is not a safeguard. It is a complimentary protective measure and are not intended to prevent injury.

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.

WARNING

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

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.

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.

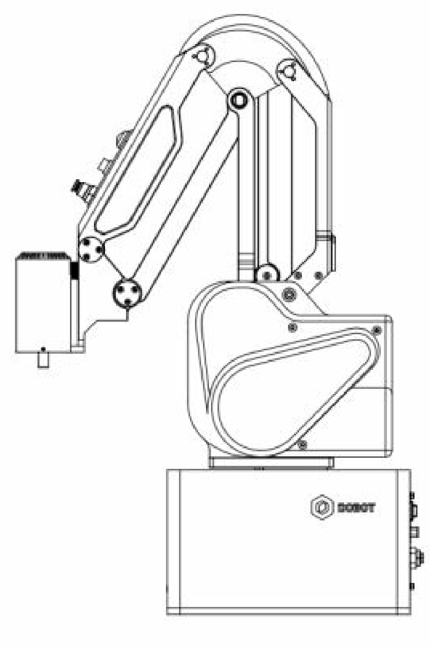


Figure 2.1 Packaging posture

Product Introduction

Overview

MG400 is an ultra-compact desktop robot arm. It is designed to integrate 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.

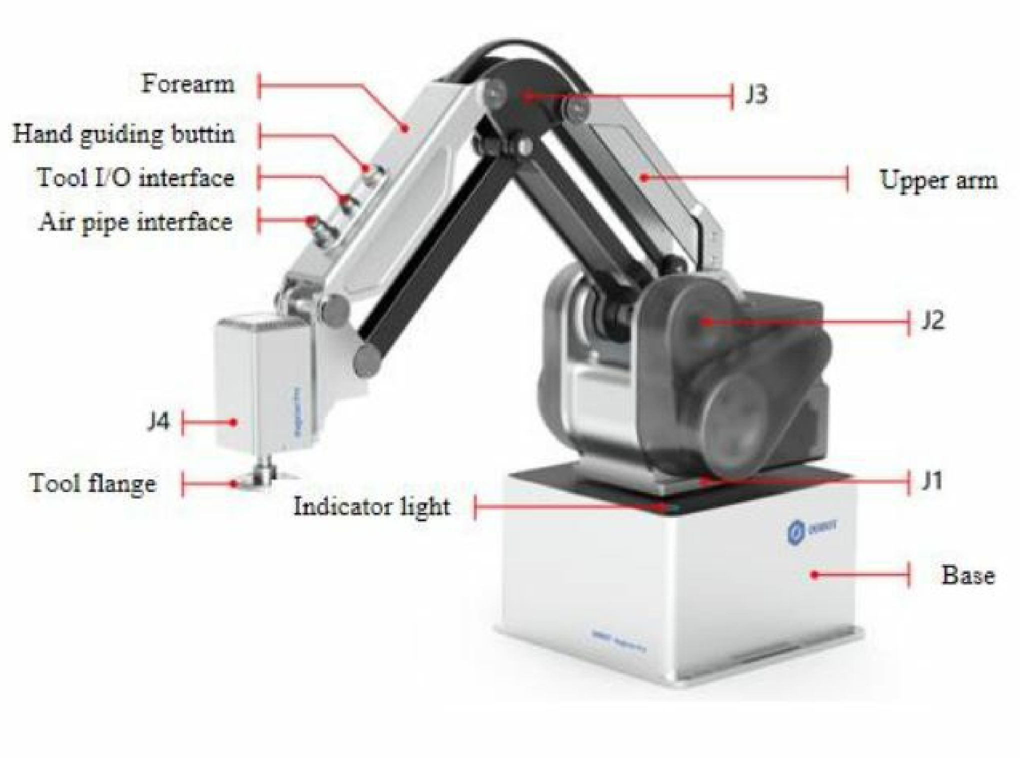

Forearm
Hand guiding buttin
Tool I/O interface
Air pipe interface
J4
Tool flange
Indicator light
J3
Upper arm
J2
J1
Base

Figure 3.1 MG400

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

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 an 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 6.2Tool 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.

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	Windows7/10/11	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

Product Features

Coordinate system

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.

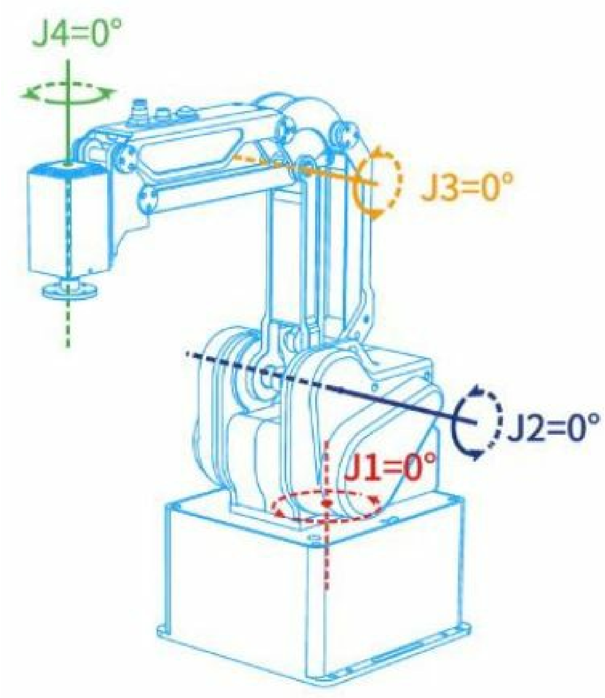


Figure 4.1 Joint coordinate system

User coordinate system

The user coordinate system is a movable coordinate system that is used for representing equipment like fixtures, and 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.

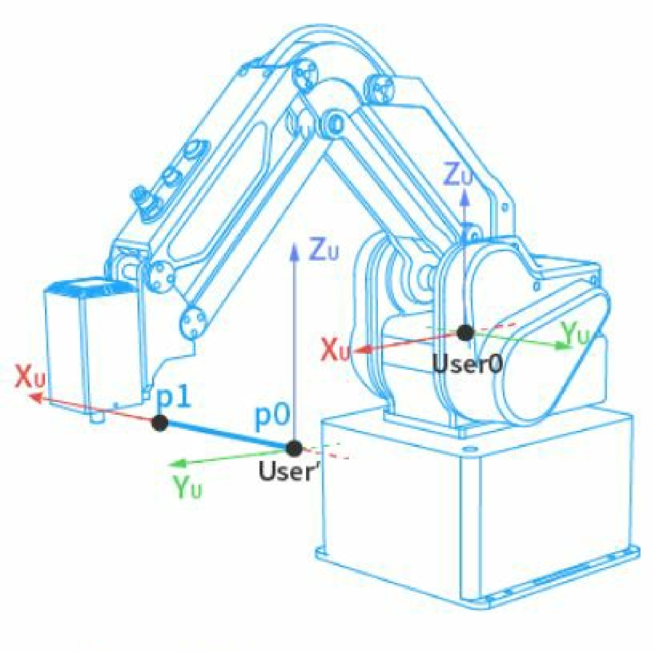

ZU
ZU
XU
YU
User0
XU
p1
p0
YU
User'

Figure 4.2 User coordinate system

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.

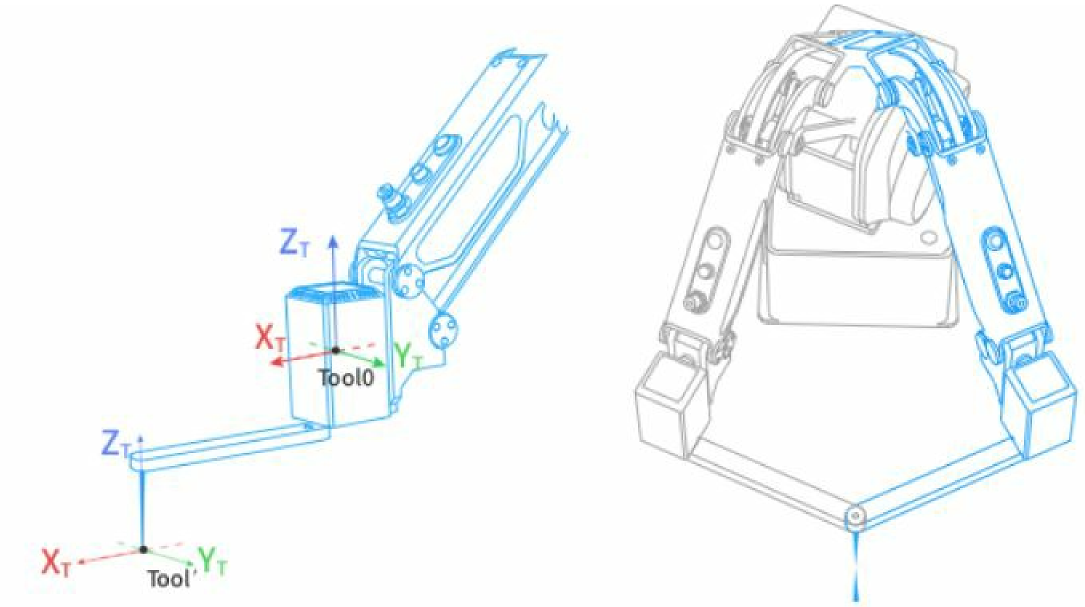

ZT
XT
YT
Tool0
ZT
XT
YT
Tool'

Figure 4.3 Tool coordinate system

Home posture

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

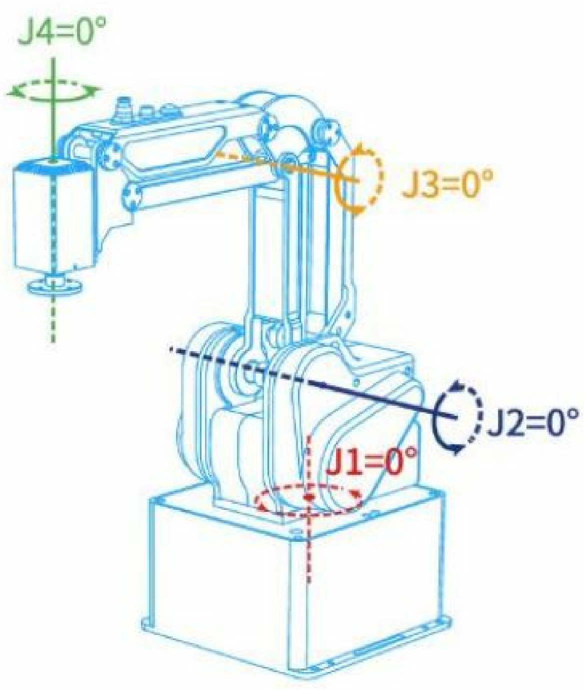


Figure 4.4 Home point sticker

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.

Braking time and braking angle

When the J1~J4 axes trigger 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

Mechanical Specifications

Dimensions

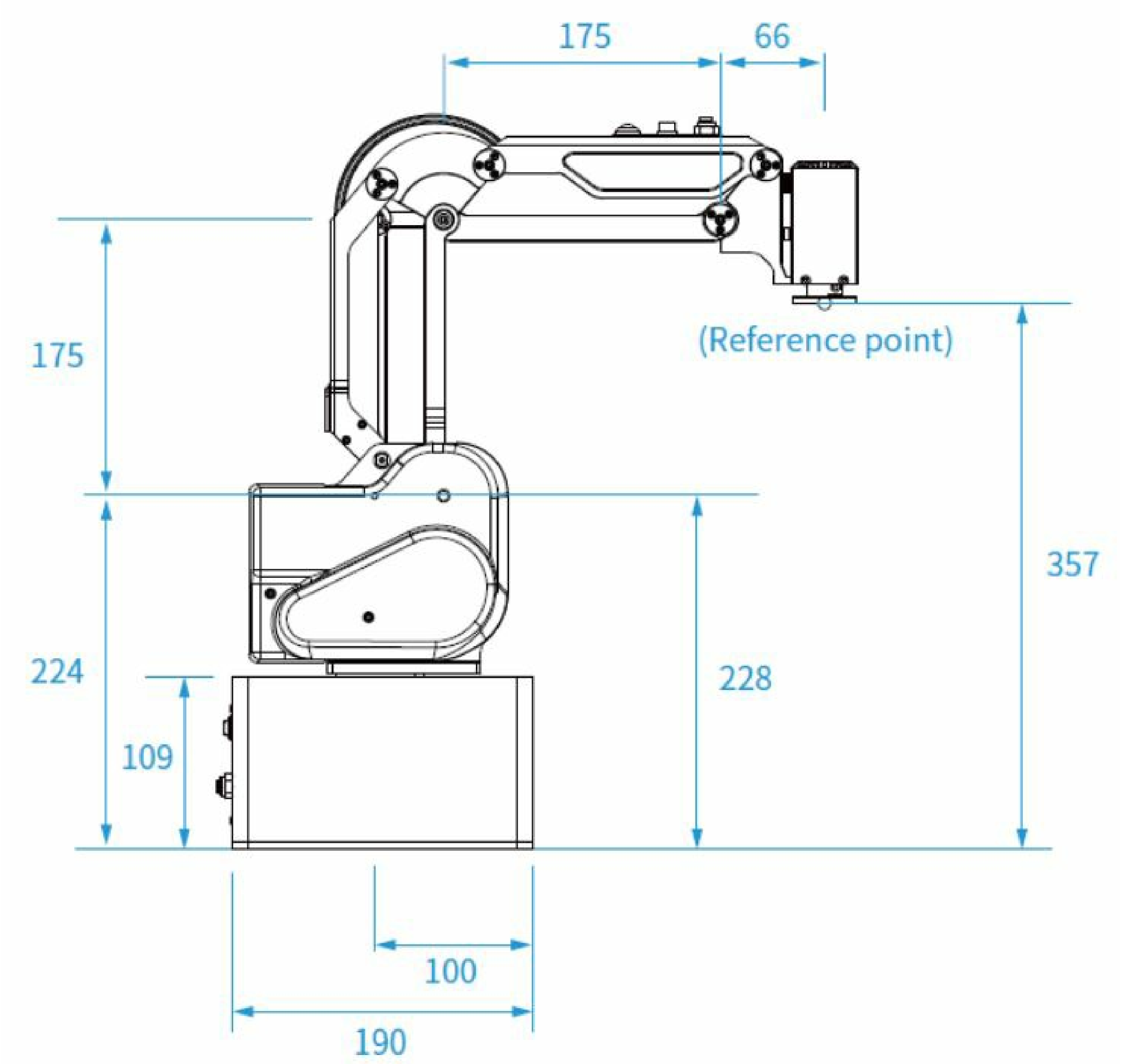

175
66
175
(Reference point)
357
224
228
109
100
190

Figure 5.1 MG400 Dimensions

Base installation dimensions

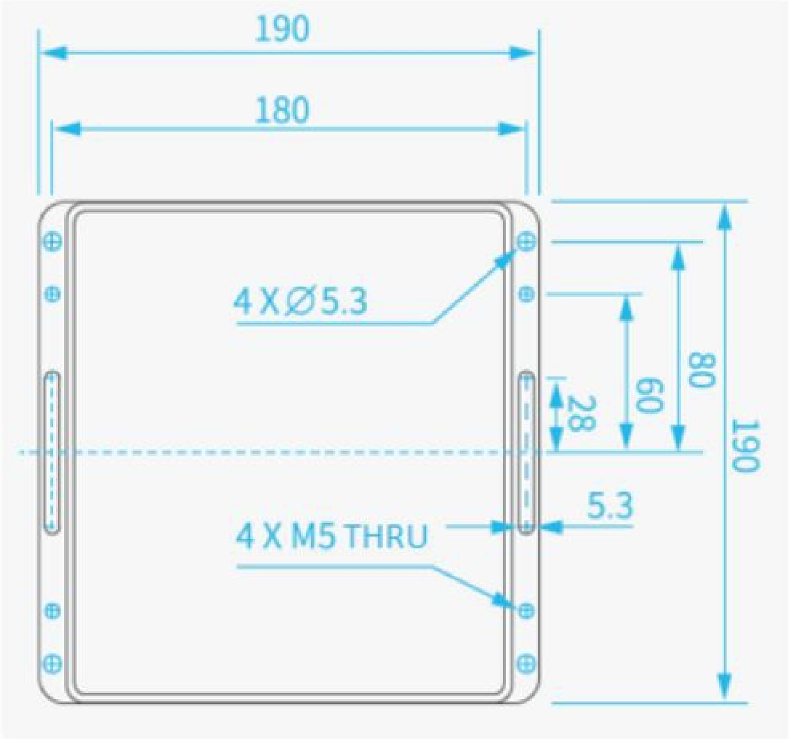

190
180
4 X Ø5.3
28
60
80
190
5.3
4 X M5 THRU

Figure 5.2 Base installation dimensions

End dimensions

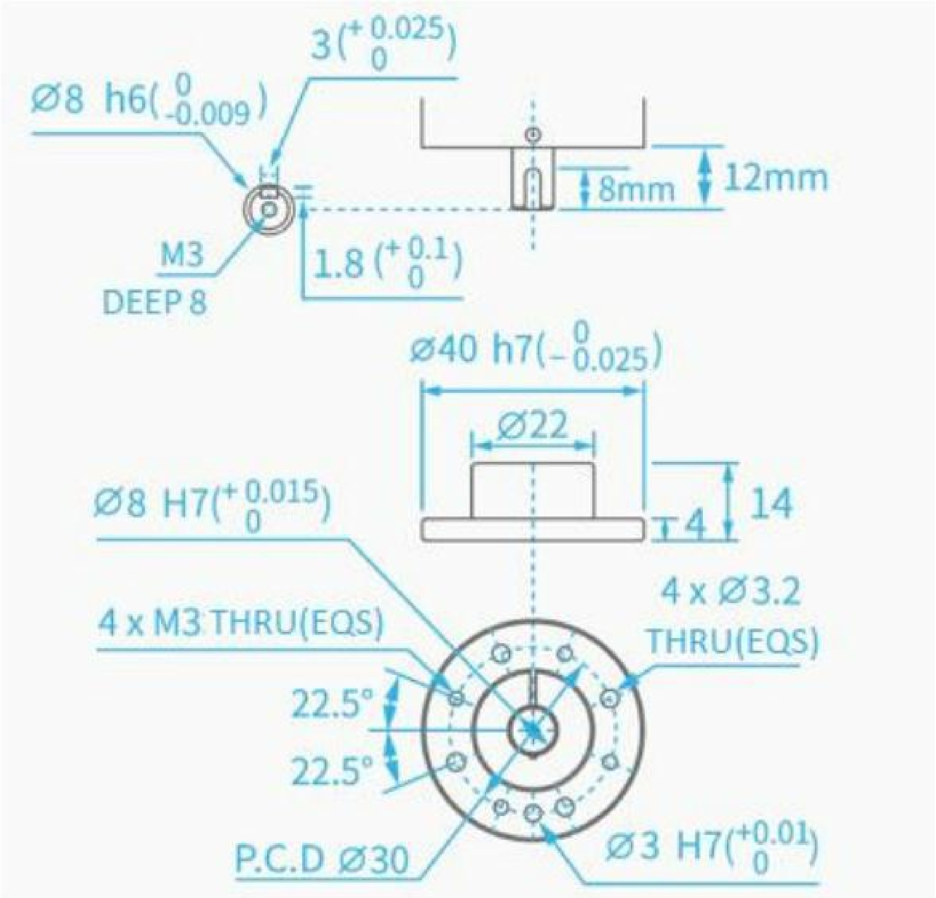

3(+0.025 0)
Ø8 h6(0 -0.009)
8mm
12mm
M3
DEEP 8
1.8 (+0.1 0)
Ø40 h7(-0 0.025)
Ø22
Ø8 H7(+0.015 0)
14
4
4 x Ø3.2
THRU(EQS)
4 x M3 THRU(EQS)
22.5°
22.5°
P.C.D Ø30
Ø3 H7(+0.01 0)

Figure 5.3 End flange dimensions

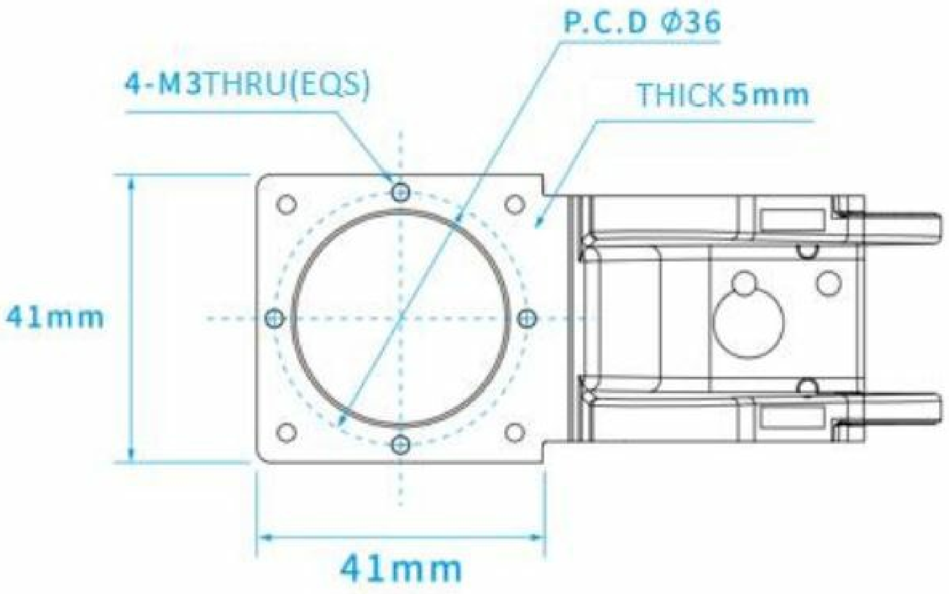

P.C.D Ø36
4-M3THRU(EQS)
THICK5mm
41mm
41mm

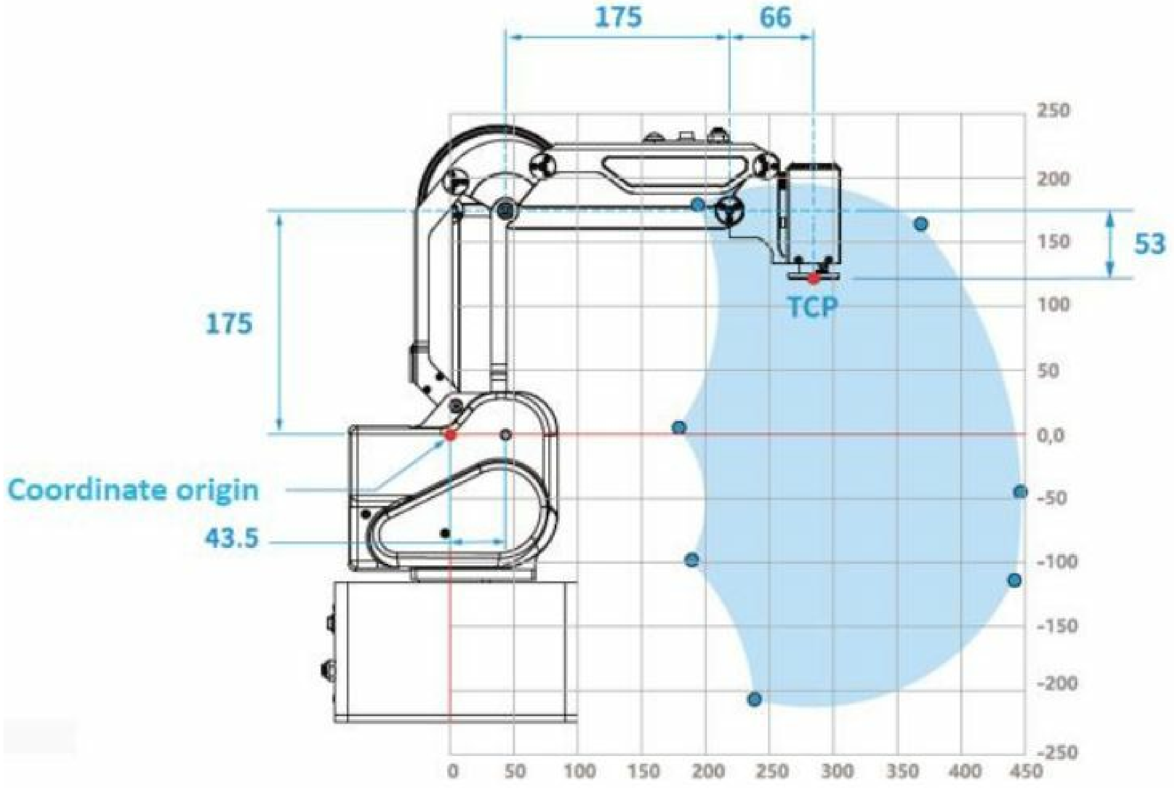
Figure 5.4 End reserved holes

DANGER

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

Workspace
Figure 5.5 shows the workspace of MG400 robot.

NOTICE
When operating the robot, be sure to operate within the workspace.


175
66
175
53
TCP
Coordinate origin
43.5
250
200
150
100
50
0,0
-50
-100
-150
-200
-250
0
50
100
150
200
250
300
350
400
450

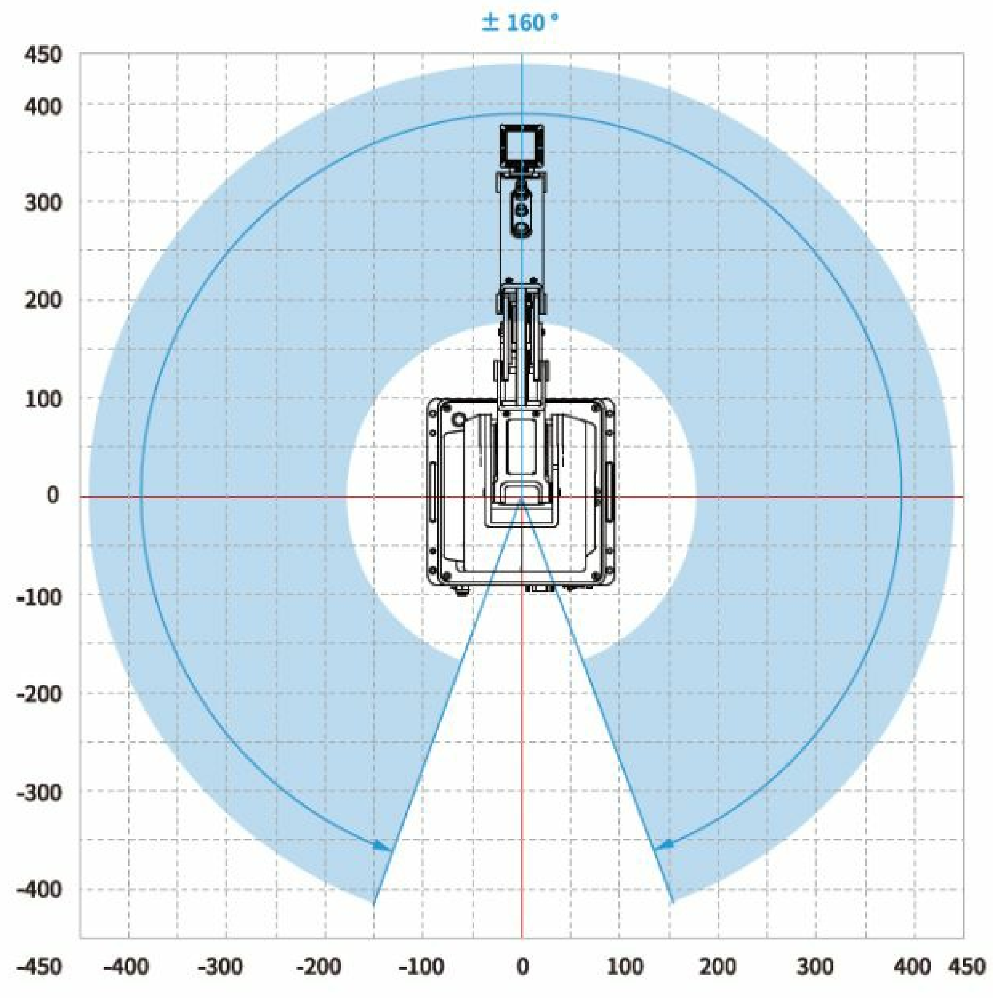

± 160 °
450
400
300
200
100
0
-100
-200
-300
-400
-450
-400
-300
-200
-100
0
100
200
300
400
450

Figure 5.5 Workspace

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.

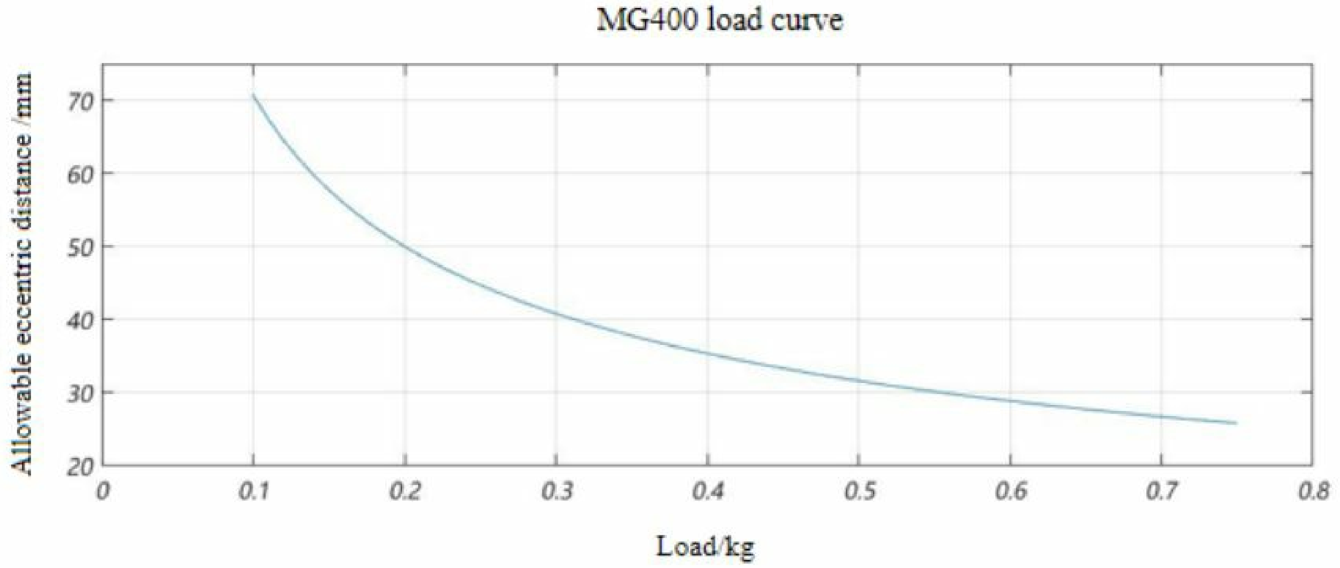


Figure 5.6 MG400 load curve

Electrical Specifications

Base Interface

Interface overview

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

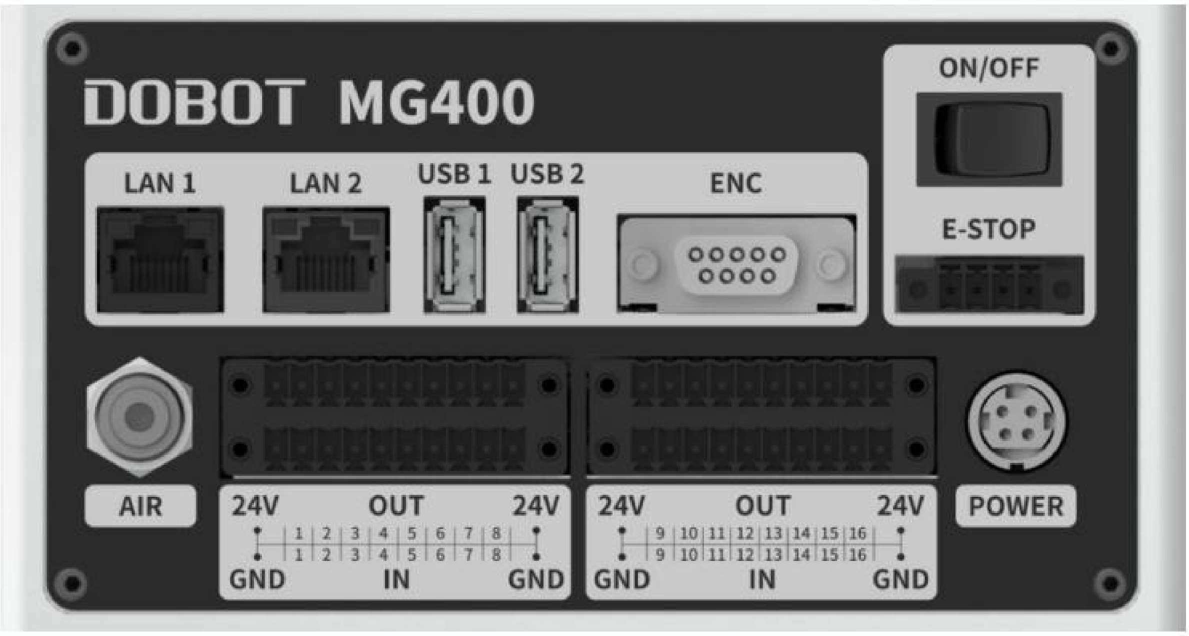

DOBOT MG400
LAN 1
LAN 2
USB 1
USB 2
ENC
ON/OFF
E-STOP
AIR
24V
OUT
24V
1 2 3 4 5 6 7 8
1 2 3 4 5 6 7 8
GND
IN
GND
24V
OUT
24V
9 10 11 12 13 14 15 16
9 10 11 12 13 14 15 16
GND
IN
GND
POWER

Figure 6.1 Interface board of the base

Table 6.1 Interface description

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

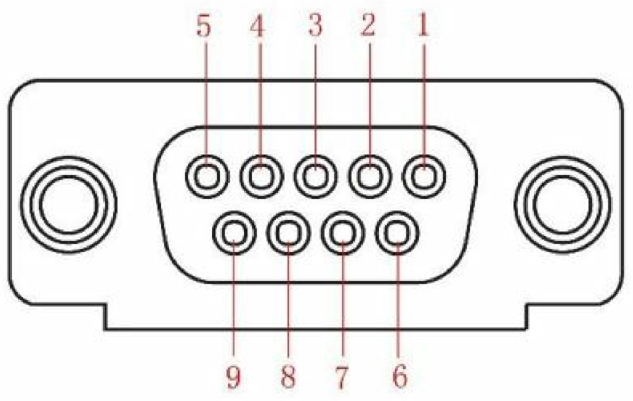


Figure 6.2 ENC interface

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

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.

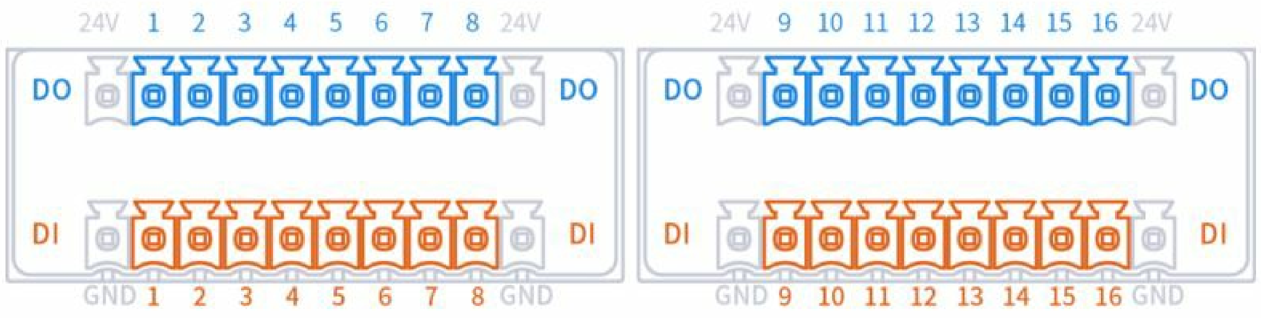

24V 1 2 3 4 5 6 7 8 24V
24V 9 10 11 12 13 14 15 16 24V
DO
DO
DO
DO
DI
DI
DI
DI
GND 1 2 3 4 5 6 7 8 GND
GND 9 10 11 12 13 14 15 16 GND

Figure 6.3 Base I/O interface

NOTE

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

DI wiring

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

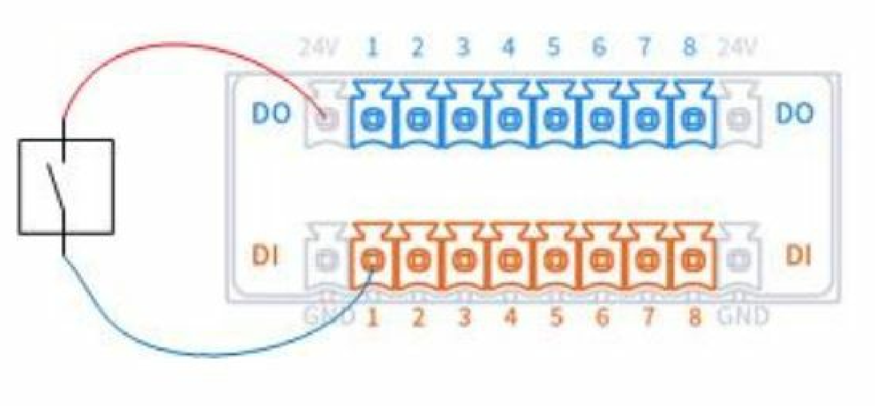

24V 1 2 3 4 5 6 7 8 24V
DO
DO
DI
DI
GND 1 2 3 4 5 6 7 8 GND

Figure 6.4 DI connected to simple switch

The wiring of DI connected to external DO is shown in Figure 6.5, which takes PNP-type DO without power supply as an example. If DO has its own power supply, you do not need to connect V+ cable.

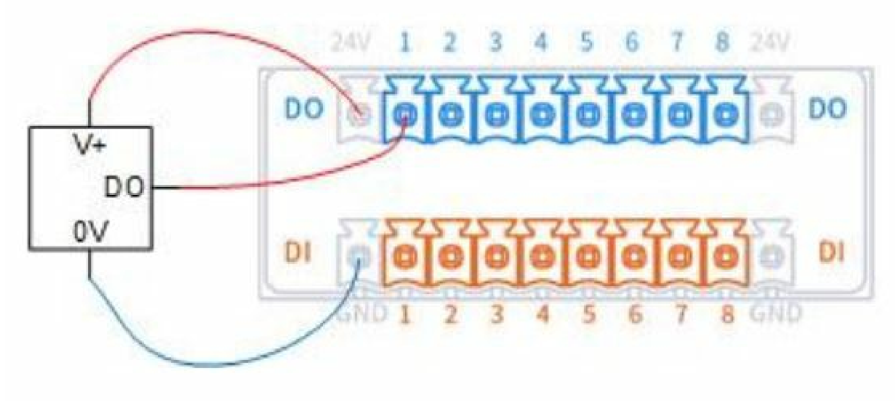

24V 1 2 3 4 5 6 7 8 24V
V+
DO
0V
DO
DO
DI
DI
GND 1 2 3 4 5 6 7 8 GND

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.

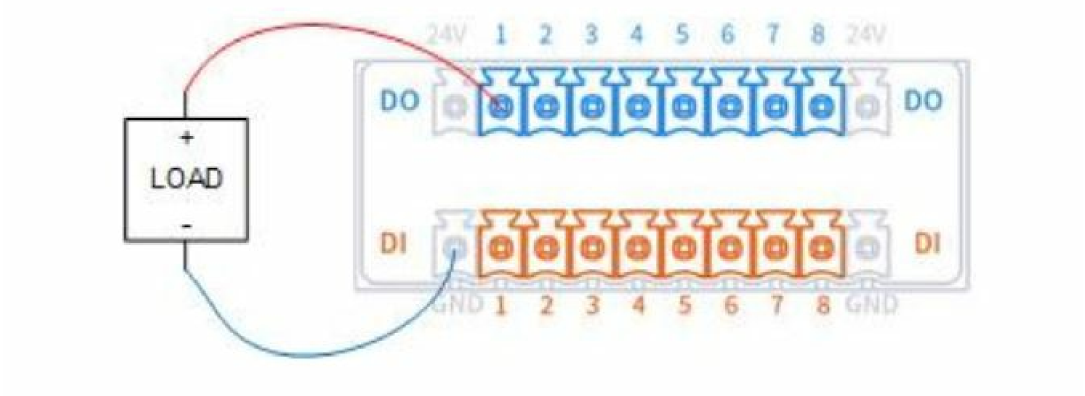
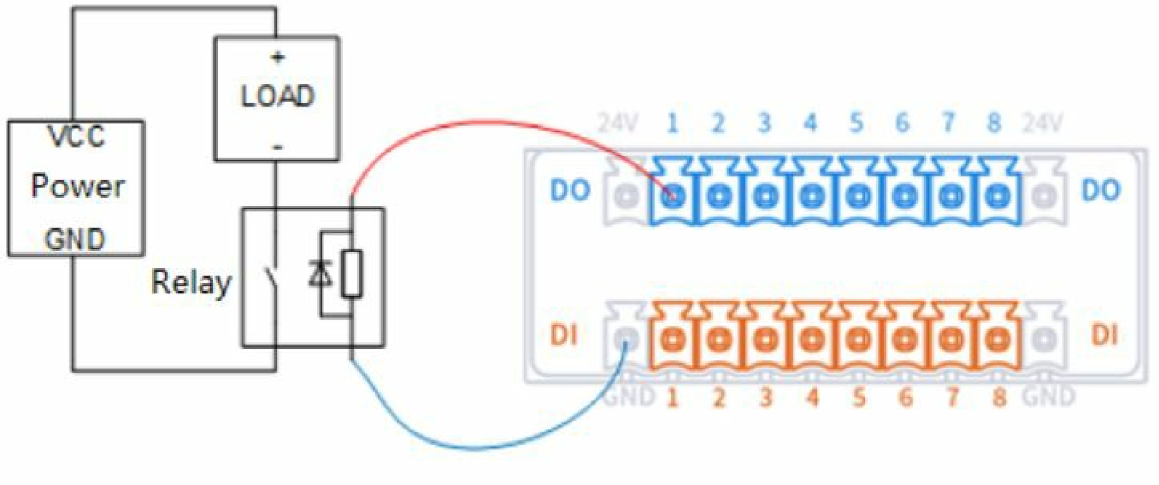

24V 1 2 3 4 5 6 7 8 24V
+
LOAD
-
DO
DO
DI
DI
GND 1 2 3 4 5 6 7 8 GND

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

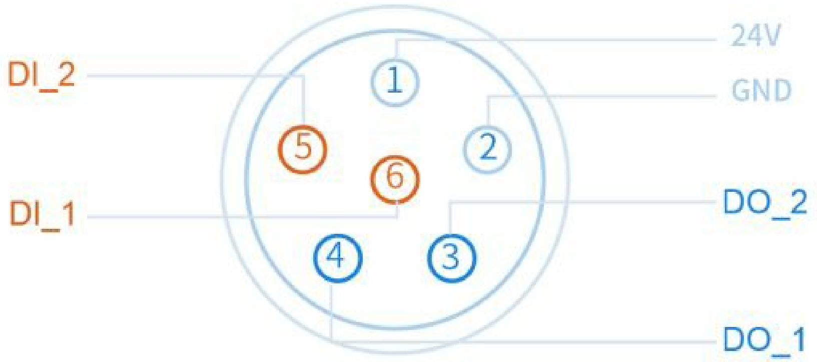


VCC
Power
GND
+
LOAD
-
Relay
24V 1 2 3 4 5 6 7 8 24V
DO
DO
DI
DI
GND 1 2 3 4 5 6 7 8 GND

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

Tool I/O interface

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



DI_2
DI_1
1
2
3
4
5
6
24V
GND
DO_2
DO_1

Figure 6.8 Tool I/O interface

DANGER

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

Installation

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 a 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 transformers, large electromagnetic contactors, welding machines, etc.

Unpacking

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

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.

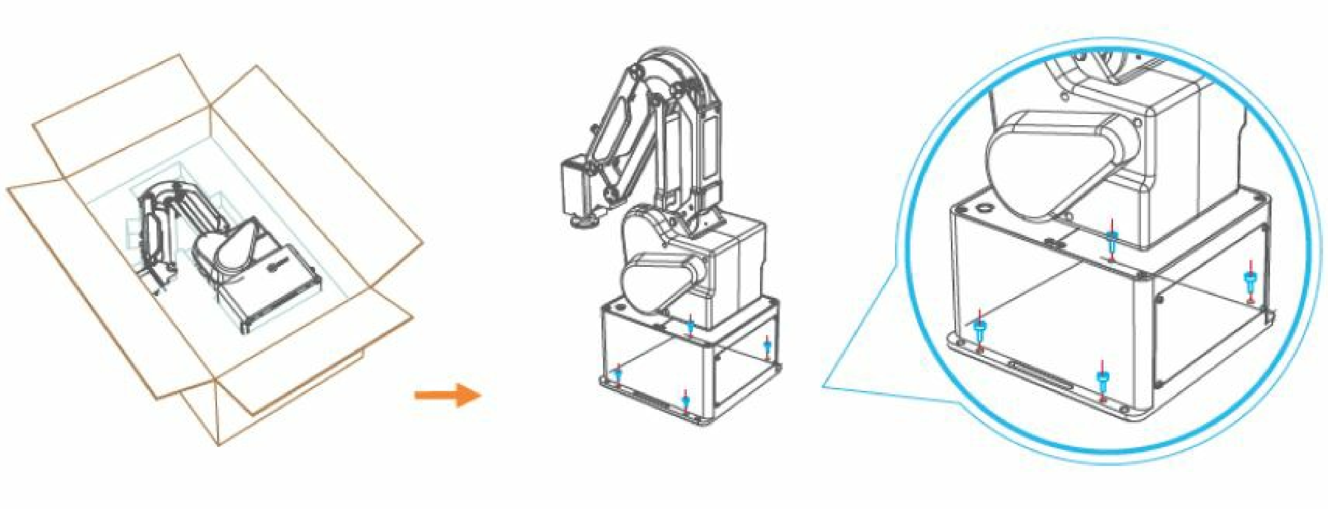


Figure 7.1 Robot base size

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.

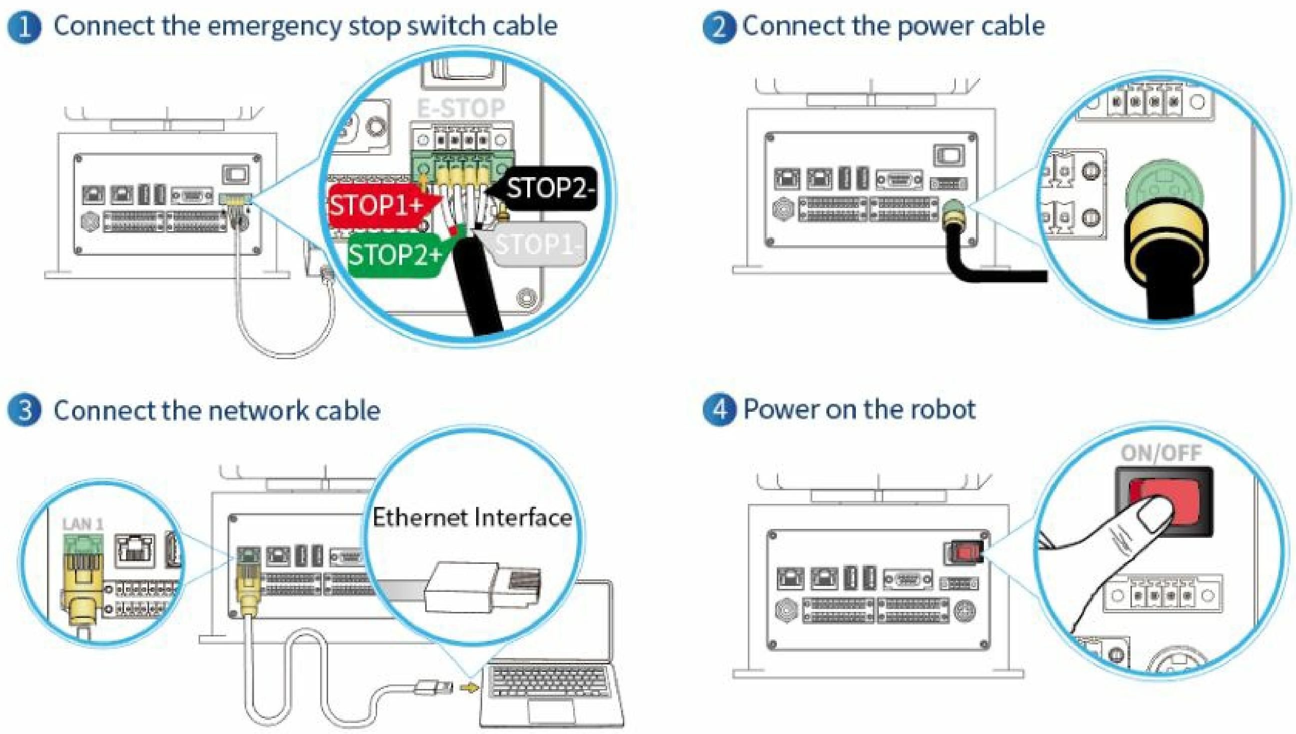

① Connect the emergency stop switch cable
E-STOP
STOP1+
STOP2-
STOP2+
STOP1-
② Connect the power cable
③ Connect the network cable
LAN 1
Ethernet Interface
④ Power on the robot
ON/OFF

Figure 7.2 Robot connection

- Set the specifications and installation method of external cables in compliance with local power distribution laws and regulations.
- Do not remove the controller 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.

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.

Safety Instructions

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

- Replace faulty components using new components with the same article number or equivalent components approved by Dobot.
- Reactivate any 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 robot to ensure that it is completely unpowered. Take necessary precautions to prevent other persons from powering on the system during the repair period.
- Observe ESD regulations during the disassembly of the parts of the robot.
- Prevent water and dust from entering the robot.

Body Maintenance

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 based on Table 8.2 (push aside the joint rubber to check)
	√		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.

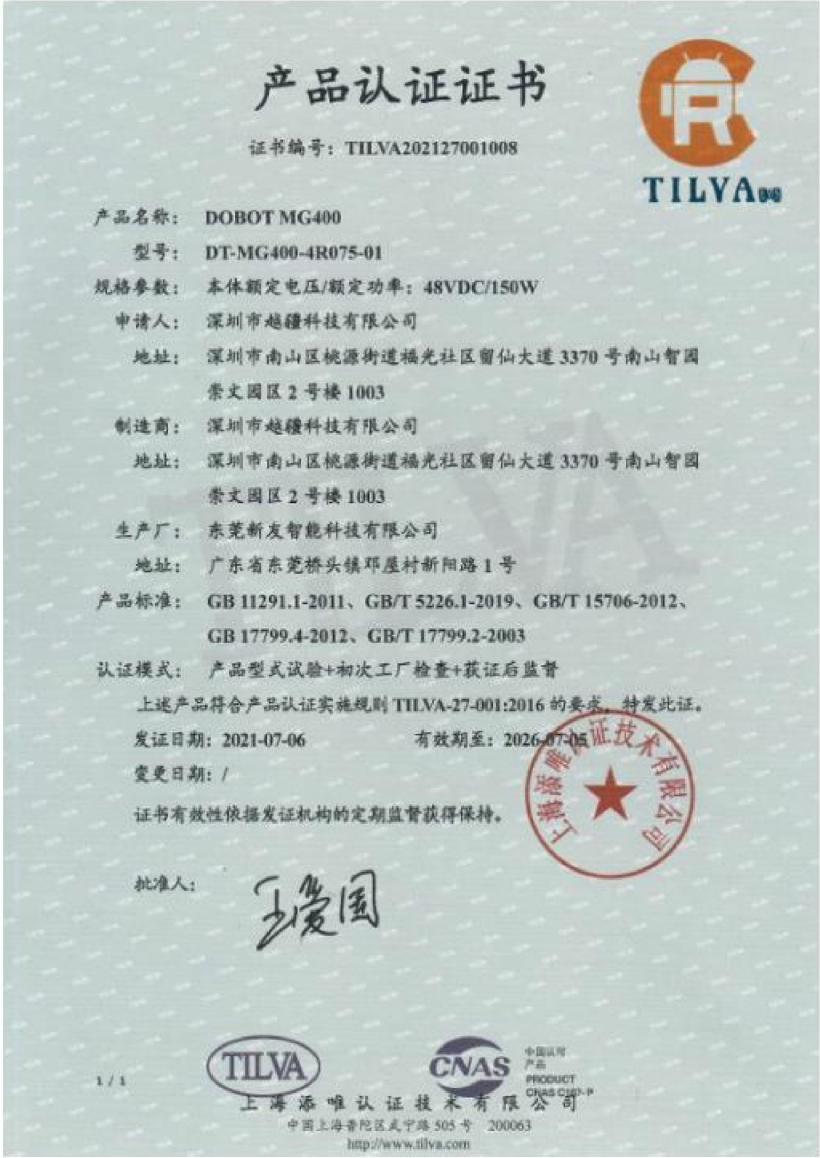
Table 8.2 Bolt tightening torque table

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.

Certification

Collaborative robot certification



产品认证证书

证书编号：TILVA202127001008

产品名称：DOBOT MG400
型号：DT-MG400-4R075-01
规格参数：本体额定电压/额定功率：48VDC/150W
申请人：深圳市越疆科技有限公司
地址：深圳市南山区桃源街道福光社区留仙大道 3370 号南山智园崇文园区 2 号楼 1003
制造商：深圳市越疆科技有限公司
地址：深圳市南山区桃源街道福光社区留仙大道 3370 号南山智园崇文园区 2 号楼 1003
生产厂：东莞新友智能科技有限公司
地址：广东省东莞桥头镇邓屋村新阳路 1 号
产品标准：GB 11291.1-2011、GB/T 5226.1-2019、GB/T 15706-2012、GB 17799.4-2012、GB/T 17799.2-2003
认证模式：产品型式试验+初次工厂检查+获证后监督

上述产品符合产品认证实施规则 TILVA-27-001:2016 的要求，特发此证。

发证日期：2021-07-06　　有效期至：2026-07-05
变更日期：/

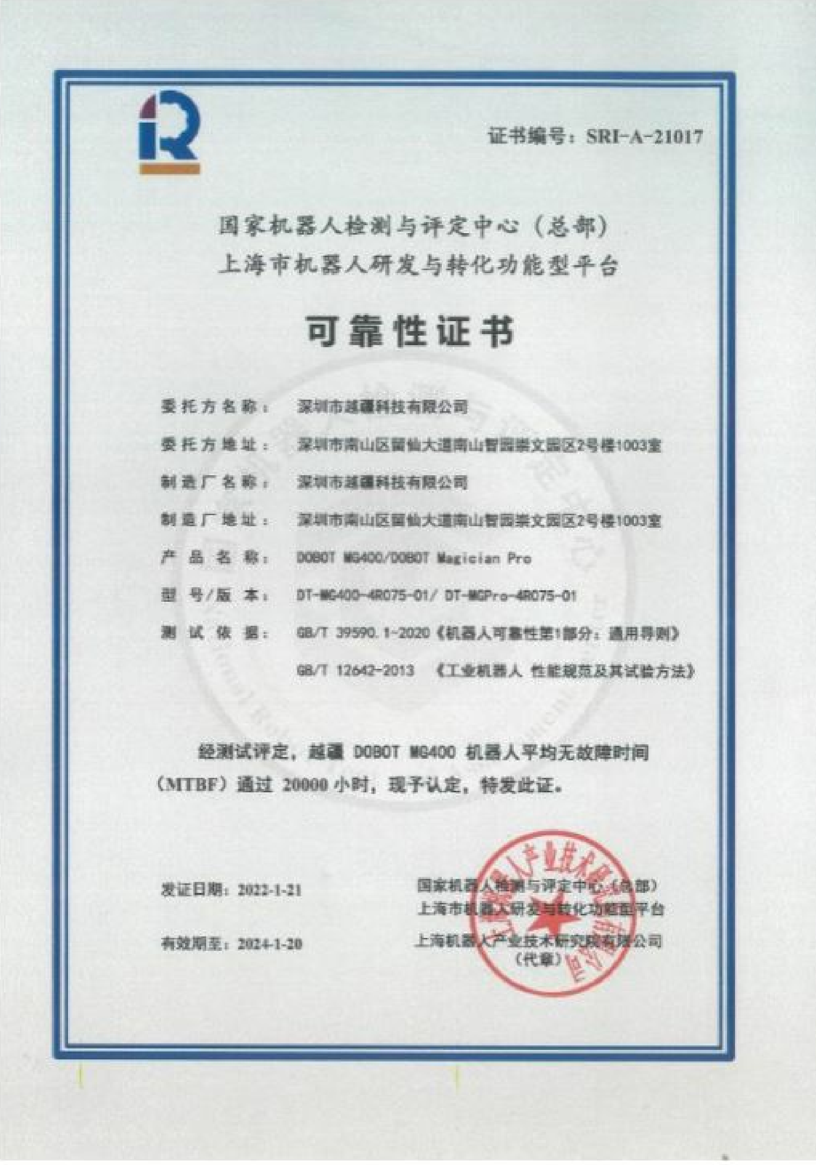
证书有效性依据发证机构的定期监督获得保持。

批准人：王爱国

1 / 1

上海添唯认证技术有限公司
中国上海普陀区武宁路 505 号　200063
http://www.tilva.com

Robot reliability certification



证书编号：SRI-A-21017

国家机器人检测与评定中心（总部）
上海市机器人研发与转化功能型平台

可靠性证书

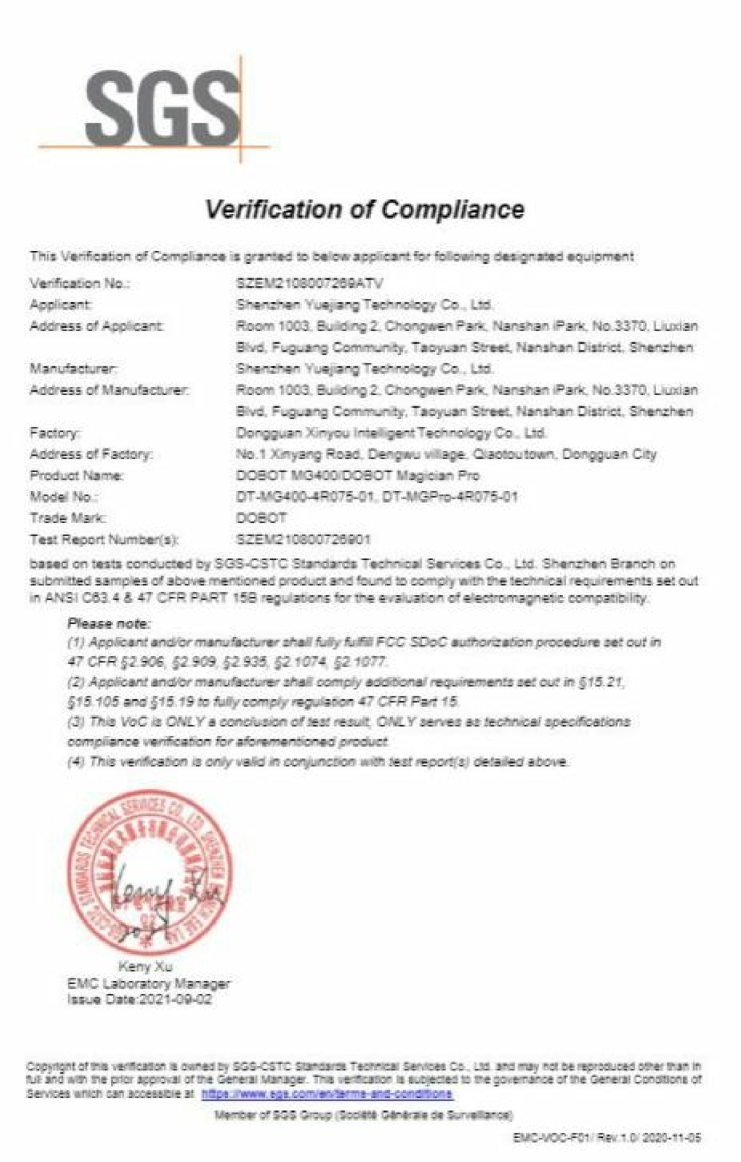
委托方名称：深圳市越疆科技有限公司
委托方地址：深圳市南山区留仙大道南山智园崇文园区2号楼1003室
制造厂名称：深圳市越疆科技有限公司
制造厂地址：深圳市南山区留仙大道南山智园崇文园区2号楼1003室
产品名称：DOBOT MG400/DOBOT Magician Pro
型号/版本：DT-MG400-4R075-01/ DT-MGPro-4R075-01
测试依据：GB/T 39590.1-2020《机器人可靠性第1部分：通用导则》
GB/T 12642-2013 《工业机器人 性能规范及其试验方法》

经测试评定，越疆 DOBOT MG400 机器人平均无故障时间（MTBF）通过 20000 小时，现予认定，特发此证。

发证日期：2022-1-21
有效期至：2024-1-20

国家机器人检测与评定中心（总部）
上海市机器人研发与转化功能型平台
上海机器人产业技术研究院有限公司
（代章）

FCC SDoC certification



SGS

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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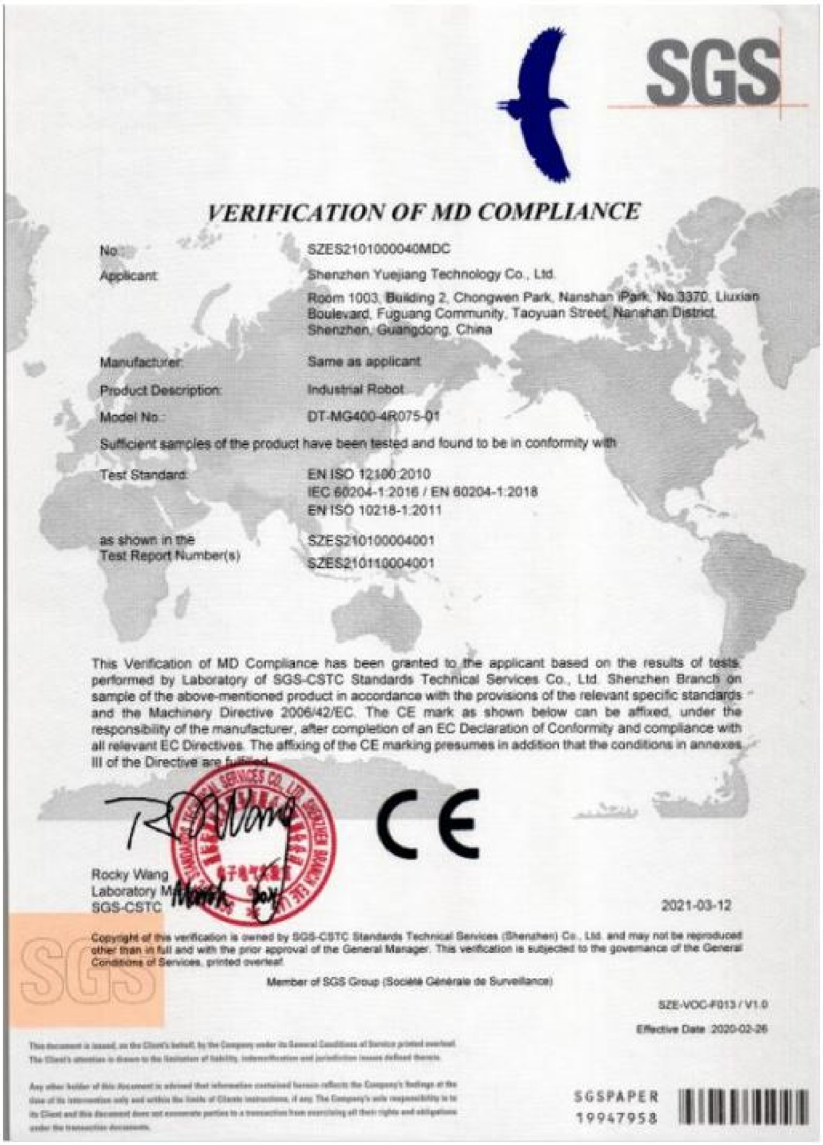
Member of SGS Group (Société Générale de Surveillance)

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

CE-MD certification



SGS

VERIFICATION OF MD COMPLIANCE

No:	SZES2101000040MDC
Applicant:	Shenzhen Yuejiang Technology Co., Ltd. Room 1003, Building 2, Chongwen Park, Nanshan iPark, No.3370, Liuxian Boulevard, Fuguang Community, Taoyuan Street, Nanshan District, Shenzhen, Guangdong, China
Manufacturer:	Same as applicant
Product Description:	Industrial Robot
Model No.:	DT-MG400-4R075-01

Sufficient samples of the product have been tested and found to be in conformity with

Test Standard:	EN ISO 12100:2010 IEC 60204-1:2016 / EN 60204-1:2018 EN ISO 10218-1:2011
as shown in the Test Report Number(s)	SZES210100004001 SZES210110004001

This Verification of MD Compliance has been granted to the applicant based on the results of tests performed by Laboratory of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch on sample of the above-mentioned product in accordance with the provisions of the relevant specific standards and the Machinery Directive 2006/42/EC. The CE mark as shown below can be affixed, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives. The affixing of the CE marking presumes in addition that the conditions in annexes III of the Directive are fulfilled.

CE

R Wang

Rocky Wang
Laboratory M
SGS-CSTC

March [illegible]

2021-03-12

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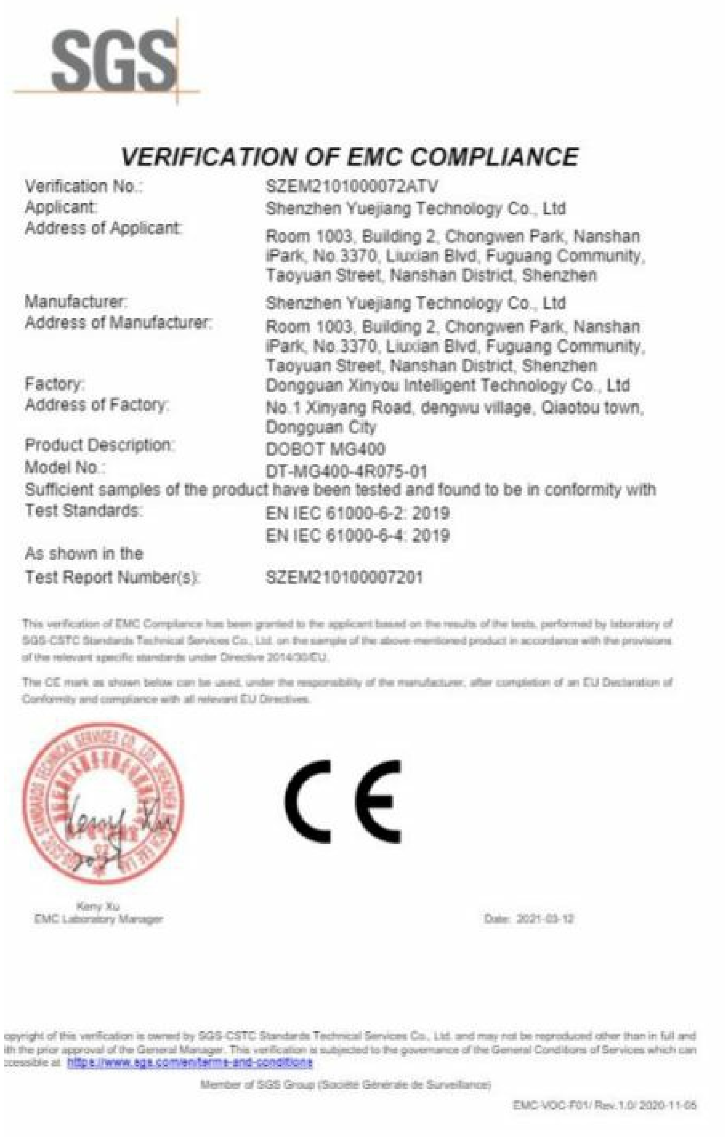
SZE-VOC-F013 / V1.0

Effective Date: 2020-02-26

SGSPAPER
19947958

CE-EMC certification



SGS

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.

CE

Kerry Xu

Kerry Xu
EMC Laboratory Manager

Date: 2021-03-12

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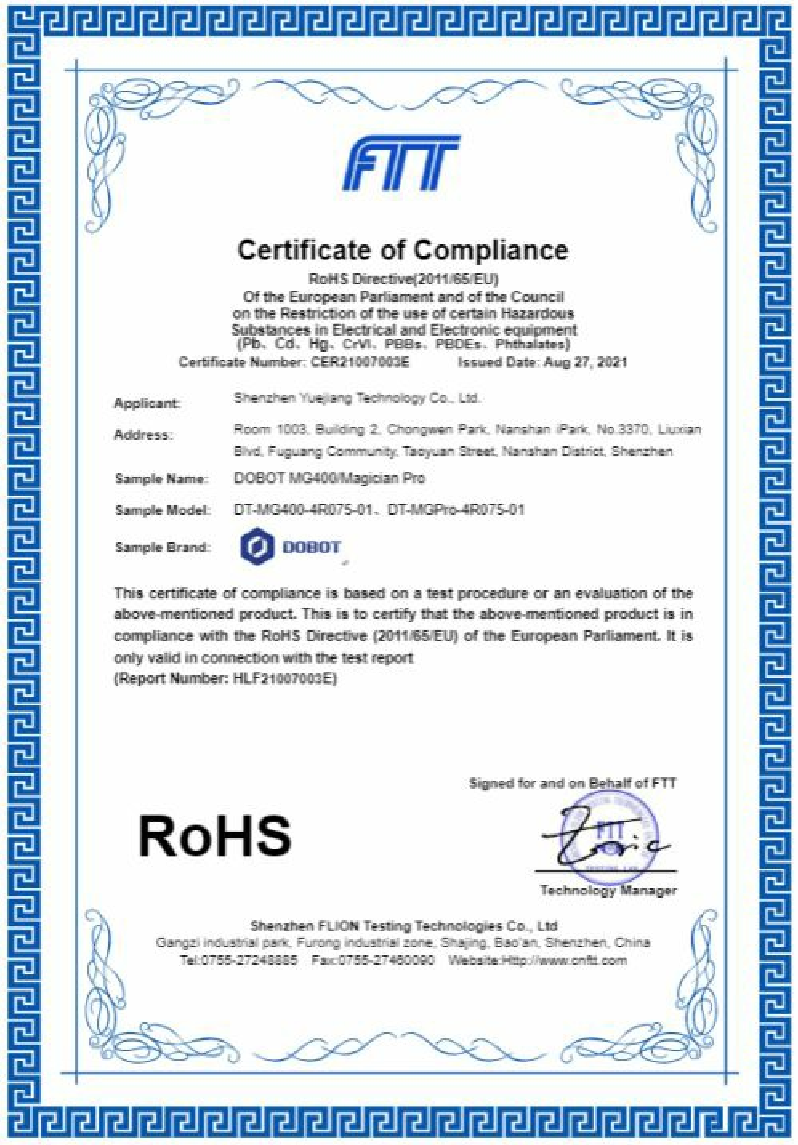
EMC-VOC-F01/ Rev.1.0/ 2020-11-05

RoHS



FTT

Certificate of Compliance

RoHS Directive(2011/65/EU)
Of the European Parliament and of the Council
on the Restriction of the use of certain Hazardous
Substances in Electrical and Electronic equipment
(Pb、Cd、Hg、CrVI、PBBs、PBDEs、Phthalates)

Certificate Number: CER21007003E　　Issued Date: Aug 27, 2021

Applicant:	Shenzhen Yuejiang Technology Co., Ltd.
Address:	Room 1003, Building 2, Chongwen Park, Nanshan iPark, No.3370, Liuxian Blvd, Fuguang Community, Taoyuan Street, Nanshan District, Shenzhen
Sample Name:	DOBOT MG400/Magician Pro
Sample Model:	DT-MG400-4R075-01、DT-MGPro-4R075-01
Sample Brand:	DOBOT

This certificate of compliance is based on a test procedure or an evaluation of the above-mentioned product. This is to certify that the above-mentioned product is in compliance with the RoHS Directive (2011/65/EU) of the European Parliament. It is only valid in connection with the test report
(Report Number: HLF21007003E)

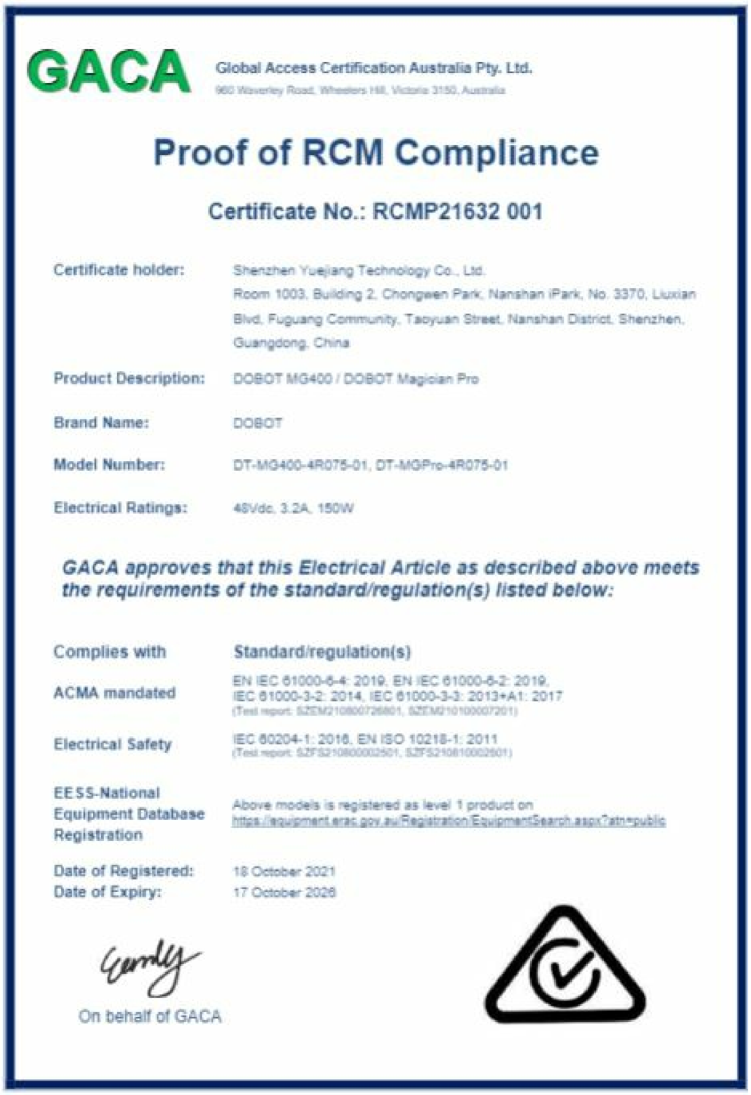
Signed for and on Behalf of FTT

RoHS

Technology Manager

Shenzhen FLION Testing Technologies Co., Ltd
Gangzi industrial park, Furong industrial zone, Shajing, Bao'an, Shenzhen, China
Tel:0755-27248885　Fax:0755-27460090　Website:Http://www.cnftt.com

RCM certification



GACA Global Access Certification Australia Pty. Ltd.
960 Waverley Road, Wheelers Hill, Victoria 3150, Australia

Proof of RCM Compliance

Certificate No.: RCMP21632 001

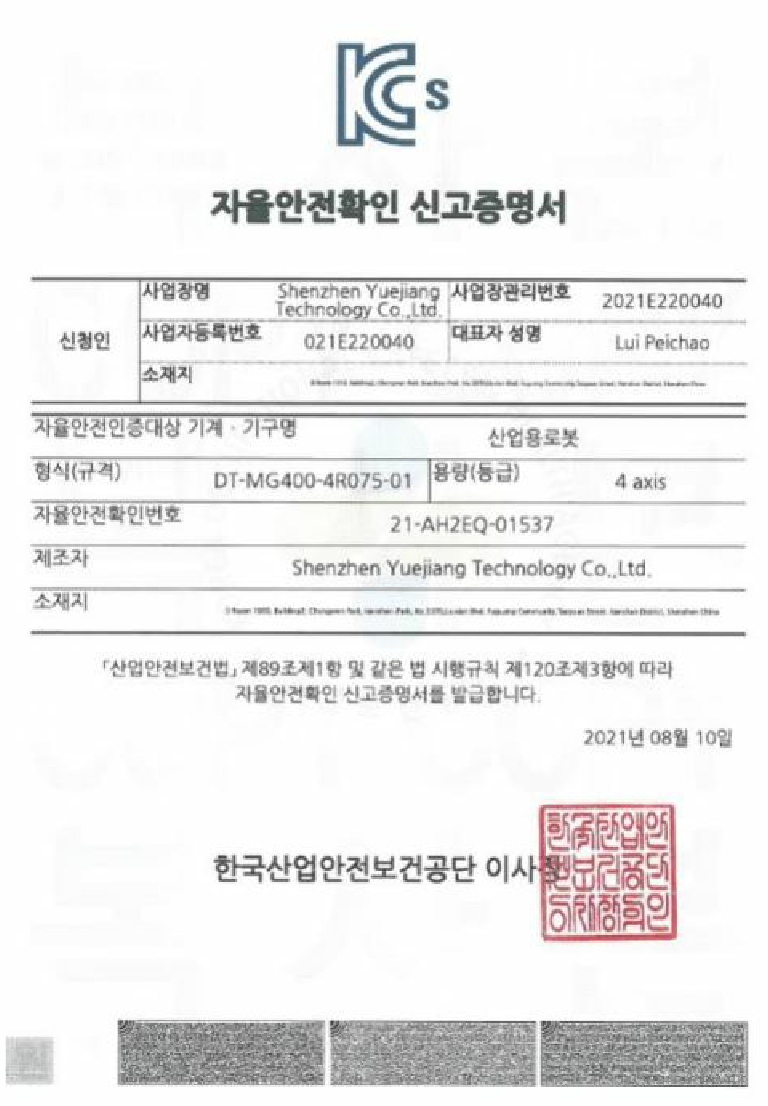
Certificate holder:	Shenzhen Yuejiang Technology Co., Ltd. Room 1003, Building 2, Chongwen Park, Nanshan iPark, No. 3370, Liuxian Blvd, Fuguang Community, Taoyuan Street, Nanshan District, Shenzhen, Guangdong, China
Product Description:	DOBOT MG400 / DOBOT Magician Pro
Brand Name:	DOBOT
Model Number:	DT-MG400-4R075-01, DT-MGPro-4R075-01
Electrical Ratings:	48Vdc, 3.2A, 150W

GACA approves that this Electrical Article as described above meets the requirements of the standard/regulation(s) listed below:

Complies with	Standard/regulation(s)
ACMA mandated	EN IEC 61000-6-4: 2019, EN IEC 61000-6-2: 2019, IEC 61000-3-2: 2014, IEC 61000-3-3: 2013+A1: 2017 (Test report: SZEM210800726801, SZEM210100007201)
Electrical Safety	IEC 60204-1: 2016, EN ISO 10218-1: 2011 (Test report: SZFS210800002501, SZFS210810002501)
EESS-National Equipment Database Registration	Above models is registered as level 1 product on https://equipment.erac.gov.au/Registration/EquipmentSearch.aspx?atn=public
Date of Registered:	18 October 2021
Date of Expiry:	17 October 2026

On behalf of GACA

KCs certification



자율안전확인 신고증명서

신청인	사업장명	Shenzhen Yuejiang Technology Co.,Ltd.	사업장관리번호	2021E220040
	사업자등록번호	021E220040	대표자 성명	Lui Peichao
	소재지			

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			

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

2021년 08월 10일

한국산업안전보건공단 이사장

Warranty

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 by 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.

Disclaimer

Dobot is committed to improving 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.

Technical Specifications

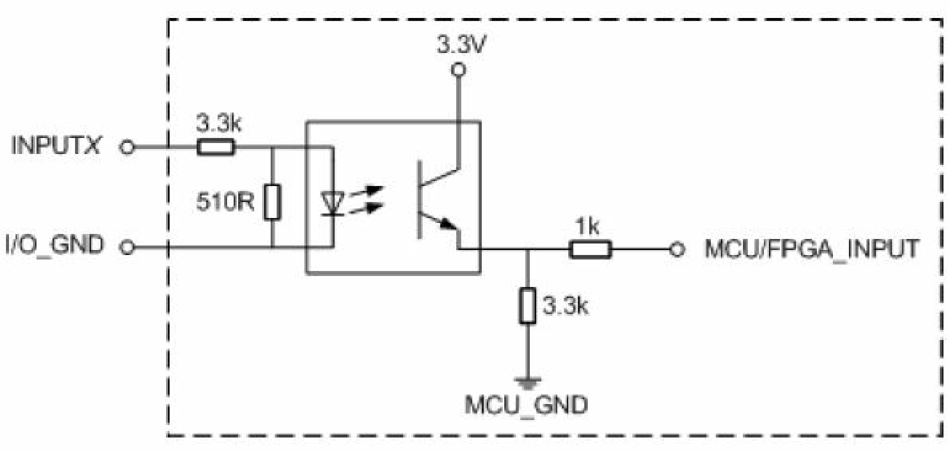
Product	DOBOT MG400	
Model	DT-MG400-4R075-01	
Weight	8kg	
Max load	500g	
Reach	440mm	
Power adapter	100V~240V AC, 50/60Hz, Max. 240W	
Rated voltage	DC48V	
Installation	Table installation, indoor	
Rated power	150W	
Repeatability	±0.05mm	
Base size	190mm * 190mm	
Operation software	DobotStudio Pro, CRStudio	
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℃~55℃	

	Working temperature: 0℃~40℃
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

I/O Simple Circuit

Digital Input

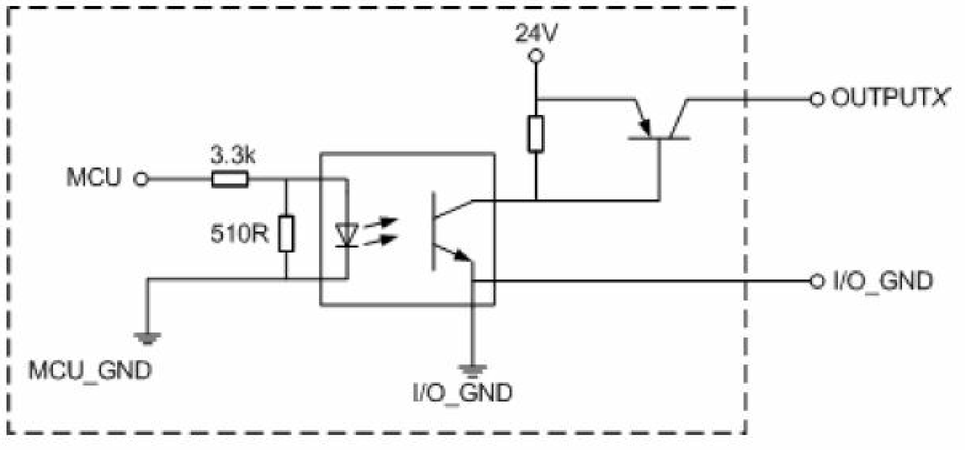
The figure below shows the simple digital input circuit and the table below lists the technical specifications.



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

Documents / Resources

 Dobot MG400 User Guide	[Dobot MG400 Robot Arm Kit Desktop](#) [pdf] User Guide MG400 Robot Arm Kit Desktop, MG400, Robot Arm Kit Desktop, Arm Kit Desktop, Kit Desktop, Desktop

References

- [User Manual](#)