



DOBOT

User Guide

Dobot MG400

Maintenance Guide

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Shenzhen Yuejiang Technology Co., Ltd.

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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 manual aims to help users with execution of operations related to service and troubleshooting.

Intended Audience

This document is intended for:

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

Change History

Date	Change Description
2022/1/06	The first release

Symbol Conventions

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

Symbol	Description
 DANGER	Indicates a hazard with a high level of risk which, if not avoided, could result in death or serious injury
 WARNING	Indicates a hazard with a medium level or low level of risk which, if not avoided, could result in minor or moderate 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. Safety Precautions

This section describes the security precautions that should be noticed when you use this product. Please read this document carefully before using the robot arm for the first time. This product needs to be used in an environment meeting design specification. You cannot remold the product without authorization, otherwise, it could lead to product failure, and even personal injury, electric shock, fire, etc. People who use this product for system design and manufacture must be trained by our company, relevant institutions, or must have the same professional skills. The installation personnel, operators, teaching personnel, programmers and system developers of the robot arm must read this document carefully and use the robot arm strictly according to the regulations of this document.

1.1 Security warning sign

The following safety warning signs may appear in this manual, and their meanings are as follows.

Symbol	Description
 DANGER	Indicates a high degree of potential danger, which, if unavoidable, will result in death or serious injury
 ELECTRICITY	Dangerous power consumption will soon be caused. If it cannot be avoided, it will cause personal injury or serious injury to the equipment.
 HOT	May cause dangerous hot surfaces, if touched, may cause personal injury
 WARNING	Indicates that there is a moderate or low potential hazard. If it cannot be avoided, it may cause minor injuries to the personnel and damage to the equipment.
 NOTICE	Indicates a potential risk, and ignoring these texts may result in damage to the robotic arm, loss of data, or unpredictable results

1.2 General security

You need to follow the security rules below when starting or using the robot for the first time.



- Please be sure to install the robot arm and all electrical equipment according to the requirements and specifications in this guide.
- Preliminary test and inspection of the robot arm and its protection system are required before it is used for the first time and put into production.
- Before starting the system and device for the first time, check whether the device and system are intact, safe to operate, and damaged. You should check whether it complies with national or regional safety regulations, and all safety functions must

be tested.

- You must check and ensure that all security parameters and user programs are correct and that all security features works properly. A person qualified to operate the robot arm is required to check each safety function. Start the machine only after it has passed a thorough and careful safety test and has reached the safety level.
- Professional personnel are required to install and debug the robot arm according to the installation standards.
- Once the robot arm is installed and constructed, you need to carry out a full risk assessment again and maintain the documentation.
- Set and change security parameters by authorized personnel. Use passwords or isolation measures to prevent unauthorized personnel from changing or setting security parameters. After changing security parameters, you need to analyze related security functions.
- In case of accidents or abnormal operation of robot arm, you can press the emergency stop switch to stop the action of the robot arm.
- MG400 joint modules are partly equipped with brakes. Maintain the posture of the robot arm when the power is off. Do not manually switch on or off the power supply system frequently. It is recommended that the interval between switching on and off the power supply system be longer than 10 seconds.
- MG400 robot arm has the function of collision detection. When the external force on the robot arm exceeds the normal force range set by the user, the robot arm will stop automatically to prevent it or the operator from being injured in collision. This function is specially set for the safety of man-machine cooperation, but the robot arm system must be in the normal operation range.



- The robot and the control cabinet generate heat during operation. Please do not operate or touch the robot when the robot is working or has just stopped working.
- Turn off the power and wait an hour for the robot to cool down.
- Do not put your fingers where the control cabinet gets hot.



- Please ensure that the robot arm and tools are installed correctly and safely.
- Please ensure that the robot has enough space to move freely.
- If the robot is damaged, please do not use it.
- Do not connect security devices to normal I/O interfaces. Only secure interfaces can be used.
- Ensure proper installation settings (such as arm mounting angle, weight in TCP, TCP offset, security configuration). Save the installation file and load it into the program.

- Ensure that there are not sharp corners or torsion points in tools and obstacles, and that there are not sharp corners or torsion points in tools and obstacles, and that all personnel are out of reach of the robot arm.
- When using the teaching device, pay attention to the motion range of the robot arm.
- Any impact will release a lot of kinetic energy, which is much higher than that under high speed and high load.
- Connecting different devices may aggravate or cause new hazards. You should always conduct a comprehensive risk assessment of the entire installation. When you need to set safety and emergency performance levels, you are advised to select the highest performance level. Be sure to read and understand the manuals for all equipment used in installation.
- Do not alter the robot arm. Changes to the robot arm could cause hazards that the integrator could not predict. The authorized reorganization of the robot arm shall be in accordance with the latest version of the relevant service guide. Shenzhen Yuejiang Technology Co., Ltd. rejects all responsibility if the robot arm is changed or altered in any way.
- Before transporting the robot arm, you need to check the insulation and protection measures.
- Comply with transportation requirements when carrying the robot arm. Handle them carefully to avoid collisions.

 NOTICE

- It is strongly recommended that a separate inspection of all the functions of the robot arm and the arm procedures be performed when the robot arm is connected to or operated with machinery that can cause damage to the robot arm. It is recommended to use temporary waypoints outside other mechanical workspaces to test robot programs
- Do not expose the robot arm to permanent magnetic field all the time. Strong magnetic fields can damage robots.
- Shenzhen Yuejiang Technology Co., Ltd. shall not be liable for any damage or personal injury due to program error or improper operation of the robot arm

1.3 Personal security

It is of vital significance to ensure the safety of operators when using the robot arm system. Please strictly follow the general precautions listed below.

 NOTICE

- All operators using the robot arm system shall pass the training course sponsored by Shenzhen Yuejiang Technology Co., LTD., and ensure that they fully master the safe and standard operation process and have the qualification of robot arm operation. For more information, please contact us at yuejiang@dobot.cc. [mailto:郵](mailto:yuejiang@dobot.cc)

[箱为yuejiang@dobot.cc](mailto:yuejiang@dobot.cc)

- When working with robots, please do not wear loose clothing or jewelry. When operating the robot, make sure that you have bundled your long 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. Please do not approach the robot.
- Lines should be drawn on the floor to mark the motion range of the robot arm, so that the operator can understand the motion range of the robot arm with tools (manipulator, tools, etc.).
- Please ensure that safety measures (e.g. guardrails, ropes, or protective screens) have been established near the operation area of robot arm to protect the operator and surrounding people. Locks should be installed as required so that no one other than the operator responsible for the operation can access the power supply of the robot arm.

2. Robot Arm Inspections

2.1 General cleaning

If you notice dust/dirt/oil on the control cabinet or robot arm, clean the surface of the machine with a dust-free cloth/alcohol and check whether there are defects on the surface.

2.2 Control cabinet

In order to maintain high performance of the robot for a long time, maintenance inspection must be carried out. The personnel in charge of maintenance must draw up maintenance plans and carry out maintenance conscientiously. Table 2.1 and Table 2.2 list the recommended inspection periods and items. If the relevant parts are found to be unqualified, please repair or replace them immediately.

Table 2.1 Power-off (without movement) inspection

Item	Content	Period		
		Daily	Once three months	Once six months
Clean the robot body	You can use water and 10% ethanol to wipe any visible dust, dirt and oil on the robot body.	√		
Whether joint screws are loose	Confirm the screw torque at each joint of the robot body according to the screw securing torque table.			√
Whether connector is loose	Robot cable unit and external connectors on the robot.		√	
Brake	Confirm that the robot's 2/3 joint brake functions normally.	√		
Synchronous belt	Remove the shell and check whether the synchronous belt is loose. If it is, you need to re-tension.		√	
Button cell	—	Replace once one year and a half		
Battery component	The upper computer SCS alarms when the encoder battery fails.	Replace once five years		

Table 2.2 Power-on (with movement) inspection

Item	Content	Period		
		Daily	Once three months	Once six months
Working area	Movement area of each joint			✓
Movement, sound and vibration of the robot	Check whether there are abnormal movement, sound and vibration in the movement of the robot	✓		
Whether connector is loose	Robot cable unit and external connectors on the robot		✓	
Brake	Powered on and off to check the sound of the motor brake. If there is no sound, it needs to be replaced	✓		

2.3 Torque value

Table 2.3 Torque for securing screws

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	4.5 Nm	2 Nm
4 mm	-	2 Nm	-
5 mm	-	-	7.5 Nm

The torque for securing screws varies according to screw types or base materials. If it is not recorded in the table, please contact the after-sales service department of Yuejiang Technology Co., Ltd.

In addition, equipment must be overhauled after every 10,000 hours of operation. If you have any questions about the maintenance and adjustment method, please contact the after-sale service department of Yuejiang Technology Co., Ltd.

2.4 Functional test

The purpose of the functional test is to ensure that screws, bolts, tools and robot arm are not loose. The screws/bolts mentioned in the inspection plan shall be checked with a torque wrench and the torque shall comply with the specification.

3. Maintenance

The purpose of maintenance is to ensure the normal operation of the system or restore the system to normal operation in case of a fault. Maintenance includes fault diagnosis and actual repairs.

Maintenance must be performed by a system integrator authorized by Yuejiang Technology Co., Ltd. or after sales staff of yuejiang technology Co., Ltd.

3.1 Vulnerable part list

Table 3.1 Vulnerable part list

No.	Material	Specification	Number	Material code
1	synchronous belt	Ceptor-VI 80S3M303	2	2299059300
2	synchronous belt	Ceptor-VI 80S3M267	1	2299059400
3	synchronous belt	Ceptor-VI 80S3M291	1	2299059500
4	synchronous belt	Ceptor-VI 80S3M249	1	2299059600
5	synchronous belt	Ceptor-VI 80S3M243	1	2299059700
6	button cell	Panasonic, CR2032 button cell, 3.0V	1	2108000800
7	battery components	two LS14500 lithium batteries in parallel, Jianya terminal: A1250H-2P, L=80mm, V3.0	1	2108003100
8	ribbon	2.5mm*150mm, black	6	2604023200
9	aviation plug	ELECTRIC, aviation plug, Chrome plated copper, silver, six core, male pin, 3A/30V	1	2109025500
10	wiring terminals	CONNECTOR, wiring terminals, 3.5mm interval, 10Pin, KF12EKNM-3.50-10P-1K, single interval, black	4	2106058800
11	power adapter	Module, power adapter, input: 100-240VAC 50/60Hz, output: 48VDC, 240W	1	2004031200
12	power adapter	Module, power adapter, input: 85~264VAC/47Hz~63Hz, output: 48V, 240W	1	2004031000
13	M.Pro emergency stop components	wire, M.Pro emergency stop components, LAS1-AY-22TSB/R+S10+HB-BX1/16 + four-core flexible cable + four-pin connector, 1500mm, V3.0	1	2005059501
14	M.Pro servo drive board PCBA	PCBA, M.Pro, servo drive board PCBA, four-layer board, V2.0, using 2002021103	1	2001018403
15	M.Pro servo drive board PCBA	PCBA, M.Pro, servo drive board PCBA, six-layer board, V1.0, using 2002021002	1	2001018502
16	M.Pro main control panel PCBA	PCBA, M.Pro, main control panel PCBA, V1.0, using 2002021802	1	2001018102
17	M.Pro indicator board PCBA	PCBA, M.Pro, indicator board PCBA, two-layer board, V1.0, using PCB material code 2002022002	1	2001018302

18	M.Pro wire adapter plate PCBA	PCBA, M.Pro wire adapter plate PCBA, four-layer board, V1.0, screen 2002023201	1	2001019901
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3.2 Recommended tools

When installing and maintaining a robot arm, you need to prepare the following tools (anti-static tools):

- Cross head screwdriver -PH0, PH1



- Hex socket screwdriver and screw bit: M2.5, M3, M4, M5



- Socket screwdriver: 5.5mm (diagonal size), 6mm (diagonal size)



- ESD wrist strap



- Sound wave tensiometer



3.3 Preparation for parts return

- Remove all non-Dobot equipment such as clamps, hoses, cables etc. from the robot arm. Yuejiang technology Co., Ltd. will not be responsible for any damage to non-Dobot equipment installed on the robot arm.
- Back up all relevant documents before sending the arm/part to Yuejiang Technology Co., Ltd. Yuejiang Technology Co., Ltd. is not responsible for the loss of programs, data or files stored in the robot arm.
- The robot arm should restore to the factory posture before returning. Factory posture can reduce the space occupied by the robot arm, which is convenient for packaging and transportation.

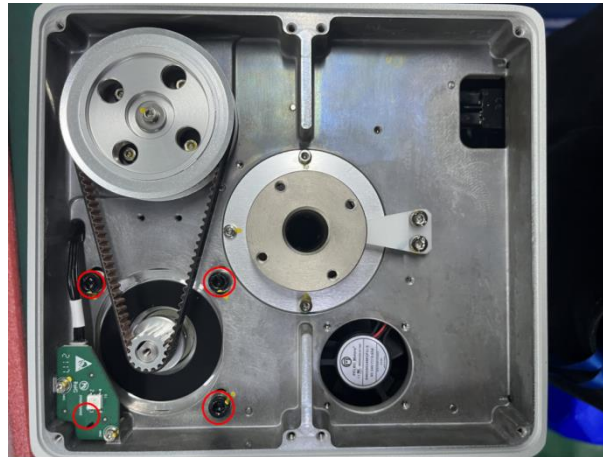
3.4 Maintenance of robot arm

3.4.1 Replacement of J1 primary synchronous belt

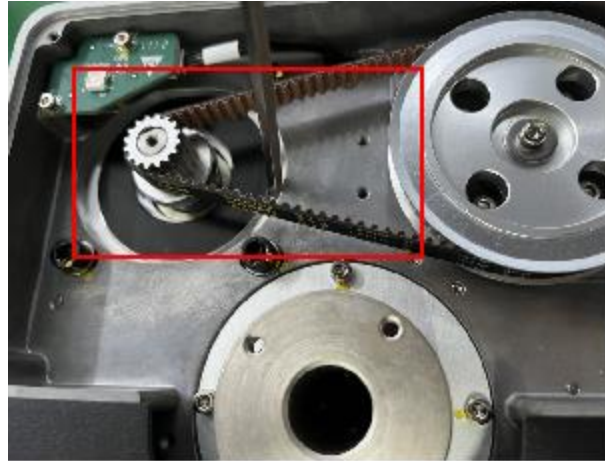
- Step 1** Remove the top cover of the base: Remove four M3*8 socket countersunk screws from the base cover using a hex wrench.



- Step 2** Loosen screws of the J1 motor: Loosen four M5*16 hexagon socket cap screws of the J1 motor using a hex wrench to move the motor back and forth in the screw slot.



- Step 3** Install J1 primary synchronous belt: Install the primary synchronous belt (80S3M303) to the two synchronous pulleys, and push the motor to tension the synchronous belt. Lock the four screws on the motor using a torque wrench (torque: 7.5 Nm), Place the test probe of sound wave tensiometer (parameter: M:2.3, W:8, S: 89) in the middle part of the synchronous belt, about 10mm away from the synchronous belt. Move the middle part of the synchronous belt by hand to read the test results, requiring that the test results are within the range of 50~60Hz.



- Step 4** Install the top cover of the base. Secure four M3*8 hex socket countersunk screws on the top cover of the base using a torque wrench with a torque of 0.5 Nm.



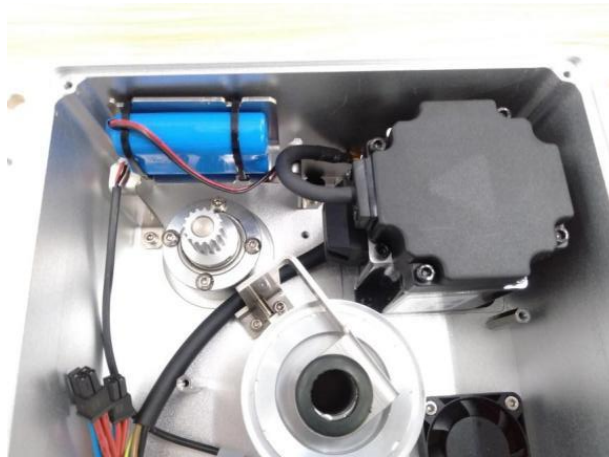
- Step 5** Calibrate the home point.

3.4.2 Replacement of J1 secondary synchronous belt

- Step 1** Remove the top cover of the base: Remove four M3*8 hex socket countersunk screws from the base top cover-1 using a hex wrench.



- Step 2** Loosen the screws of the J1 motor: Loosen four M5*16 hexagon socket cap screws for the J1 motor using a hex wrench to move the motor back and forth in the screw slot.



- Step 3** Loosen the secondary reduction mechanism. Remove two M2.5*5 button head screws that secure the LED plate. Remove the LED plate, and loosen four M3 hexagon socket cap screws.



- Step 4** Remove the base cover of the robot: Put the robot upside down, and remove the anti-removal label of the base. Remove four M3*8 hex socket countersunk screws from

the base cover, and remove the rear cover.



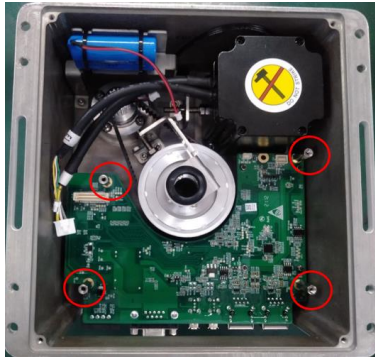
- Step 5** Remove the servo drive board PCBA. Remove the plug terminals on the PCBA. Remove four M3*6 hexagon socket cap screws using a hex wrench, and place the PCBA in an ESD bag.



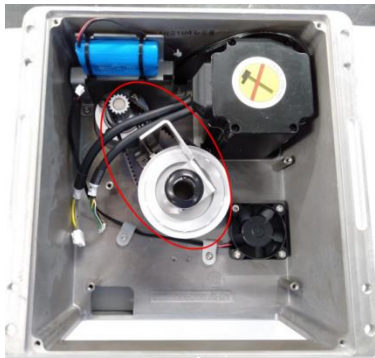
- Step 6** Remove the PCBA on the servo control board, the plug terminals on the PCBA, and four M3*16 single-head hexagonal studs using a socket wrench. Remove the rocker switch connectors, and place the PCBA in an ESD bag.



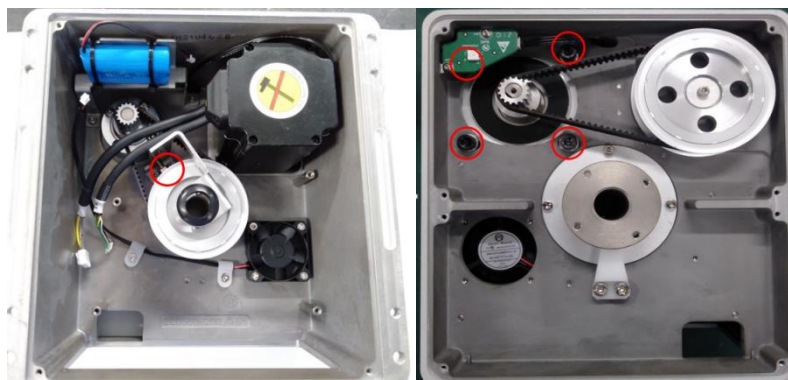
- Step 7** Remove the PCBA main control board, remove the plug terminals on the PCBA, remove the four M3*20 single-head hexagonal studs using a socket wrench, remove the rocker switch connectors, and place the PCBA in an ESD bag.



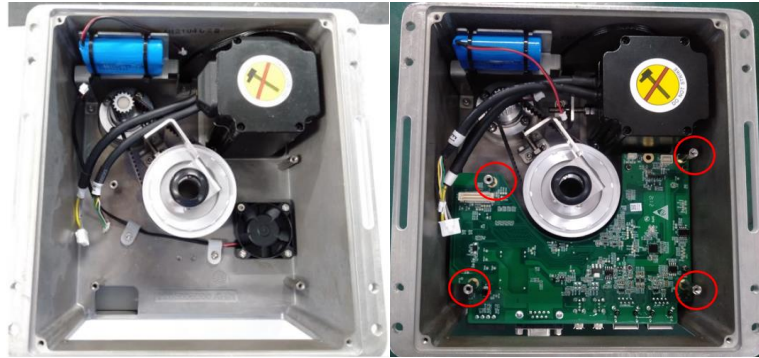
- Step 8** Remove the old synchronous belt, loosen the hex screws, and remove the synchronous pulley.



- Step 9** Install a new synchronous belt: Install the 120S3M267 synchronous belt on the two synchronous pulleys. Tighten the outer hexagonal bolts with an outer hexagonal wrench, and tighten the synchronous belt. Secure four M3*10 hexagon socket cap screws at the secondary deceleration place using a torque wrench (torque: 2.0N.m). Place the test probe of sound wave tensiometer (parameter: M: 2.3, W: 12, S: 74) in the middle part of the synchronous belt, about 10mm away from the synchronous belt. Move the middle part of the synchronous belt by hand to read the test results. The test results should be within the range of 85~96Hz.



- Step 10** Install the main control panel PCBA: Secure the main control panel PCBA using four M3*20 single-head hexagonal studs with a torque of 0.6 Nm.



- Step 11** Install the servo control panel PCBA: Connect the rocker switch wire to the servo control panel PCBA, and then fix the PCBA with four M3*16 single-head hexagonal studs with a torque value of 0.6Nm. Connect each terminal according to the position in the figure below.



- Step 12** Install the servo drive board PCBA: Connect the rocker switch wire to the servo drive board PCBA, and then fix the PCBA using four M3*6 inner hexagon button head screws with a torque of 0.6 Nm. Connect each terminal according to the position in the figure. Fix the wire harness with a cable tie.



- Step 13** Install the base cover of the robot: Fix the base cover with four M3*8 hex socket countersunk screws.

- Step 14** Install the LED adapter plate. Fix the plate using two M2.5*5 hexagon socket cap screws, with a torque of 0.3Nm.

- Step 15** Install J1 primary synchronous belt: Mount the primary synchronous belt which was removed before to the two synchronous pulleys, and push the motor to tension the synchronous belt. Secure the four screws on the motor using a torque wrench (torque: 7.5 Nm). Place the test probe of sound wave tensiometer (parameter: M: 2.3, W: 8, S: 89) in the middle part of the synchronous belt, about 10mm away from the synchronous belt. Move the middle part of the synchronous belt by hand to read the test results. The test results should be within the range of 50~60Hz.
- Step 16** Install the top cover of the base: Secure four M3*8 hex socket countersunk screws on the base top cover-1 using a torque wrench with a torque of 0.5 Nm.



- Step 17** Calibrate the home point.

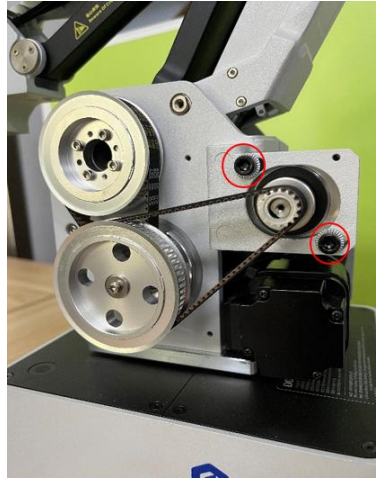
3.4.3 Replacement of J2 primary synchronous belt

- Step 1** Disassemble the motor casing (left): Remove four M3*8 hexagon socket cap screws from the base top cover-1 using a hex wrench.



- Step 2** Loosen the screws of the J2 motor: Loosen two M5*16 hexagon socket cap screws

of the J2 motor using a hex wrench to move the motor back and forth in the screw slot.



Step 3 Disassemble J2 primary synchronous belt.



Step 4 Install a new J2 primary synchronous belt: Mount the primary synchronous belt (80S3M291) to the two synchronous pulleys, and push the motor to tension the synchronous belt. Lock the two screws on the motor using a torque wrench (torque: 7.5 Nm). Place the test probe of sound wave tensiometer (parameter: M: 2.3, W: 8, S: 84) in the middle part of the synchronous belt, about 10mm away from the synchronous belt. Move the middle part of the synchronous belt by hand to read the test results. The test results should be within the range of 50~60Hz.



- Step 5** Disassemble the motor casing (left): Fix the motor casing (left) with three M3*8 hexagon socket cap screws (torque: 1.0 Nm).



- Step 6** Calibrate the home point.

3.4.4 Replacement of J2 secondary synchronous belt

- Step 1** Disassemble the motor casing (left): Remove four M3*8 hexagon socket cap screws from the base top cover-1 using a hex wrench.



- Step 2** Loosen the screws of the J2 motor: Loosen two M5*16 hexagon socket cap screws of the J2 motor using a hex wrench to move the motor back and forth in the screw slot.



Step 3 the secondary deceleration mechanism Loosen four M3*10 screws using a hex wrench.

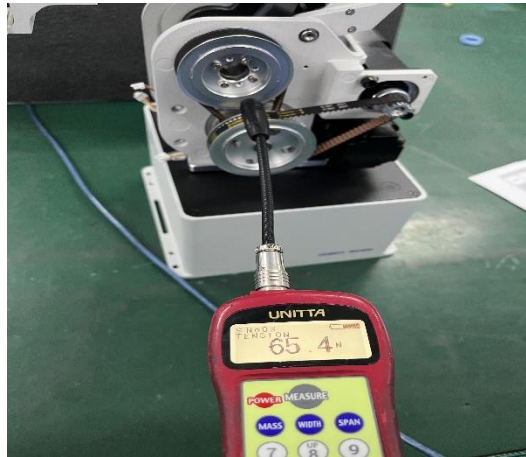


Step 4 Disassemble the J2 secondary synchronous belt.



Step 5 Install a new synchronous belt: Install the 100S3M249 synchronous belt on the two synchronous pulleys. Tighten the synchronous belt, and secure four M3*10 hexagon socket cap screws at the secondary deceleration place using a torque wrench (torque: 2.0N.m). Place the test probe of sound wave tensiometer (parameter: M: 2.3, W: 10, S: 65) in the middle part of the synchronous belt, about 10mm away from the synchronous belt. Move the middle part of the synchronous belt by hand to read the test results. The test results should be within the range of 50~60Hz.

- Step 6** Install a new J2 primary synchronous belt: Mount the primary synchronous belt (80S3M291) to the two synchronous pulleys, and push the motor to tension the synchronous belt. Lock the two screws on the motor using a torque wrench (torque: 7.5 Nm). Place the test probe of sound wave tensiometer (parameter: M: 2.3, W: 8, S: 84) in the middle part of the synchronous belt, about 10mm away from the synchronous belt. Move the middle part of the synchronous belt by hand to read the test results. The test results should be within the range of 50~60Hz.



- Step 7** Install the motor casing (left): Fix the motor casing (left) with three M3*8 hexagon socket cap screws (torque: 1.0 Nm).



- Step 8** Calibrate the home point.

3.4.5 Replacement of J3 primary synchronous belt

- Step 1** Disassemble the motor casing (right): Remove four M3*8 hexagon socket cap screws from the motor casing (right) using a hex wrench.



Step 2 Loosen the screws of the J3 motor: Loosen two M5*16 hexagon socket cap screws of the J3 motor using a hex wrench to move the motor back and forth in the screw slot.

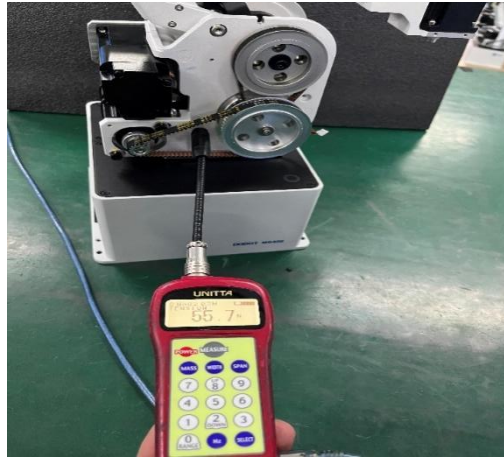


Step 3 Disassemble J3 primary synchronous belt.



Step 4 Install a new J3 primary synchronous belt: Install the primary synchronous belt (80S3M303) to the two synchronous pulleys, and push the motor to tension the

synchronous belt. Lock the two screws on the motor using a torque wrench (torque: 7.5 Nm). Place the test probe of sound wave tensiometer (parameter: M: 2.3, W: 8, S: 88) in the middle part of the synchronous belt, about 10mm away from the synchronous belt. Move the middle part of the synchronous belt by hand to read the test results. The test results should be within the range of 50~60Hz.



Step 5 Install the motor casing (left): Fix the motor casing (left) with three M3*8 hexagon socket cap screws (torque: 1.0 Nm).



Step 6 Calibrate the home point.

3.4.6 Replacement of J3 secondary synchronous belt

Step 1 Disassemble the motor casing (left): Remove three M3*8 hexagon socket cap screws from the motor casing (left) using a hex wrench.



Step 2 Loosen the screws of the J3 motor: Loosen two M5*16 hexagon socket cap screws of the J1 motor using a hex wrench to move the motor back and forth in the screw slot.



Step 3 Loosen the secondary deceleration mechanism. Loosen four M3*10 screws using a hex wrench.



Step 4 Disassemble the J3 secondary synchronous belt.



- Step 5** Install a new synchronous belt: Install the 80S3M243 synchronous belt on the two synchronous pulleys. Tighten the synchronous belt, and secure four M3*10 hexagon socket cap screws at the secondary deceleration place using a torque wrench (torque: 2.0N.m). Place the test probe of sound wave tensiometer (parameter: M: 2.3, W: 8, S: 60) in the middle part of the synchronous belt, about 10mm away from the synchronous belt. Move the middle part of the synchronous belt by hand to read the test results. The test results should be within the range of 50~60Hz.



- Step 6** Install J3 primary synchronous belt: Install the primary synchronous belt (80S3M303) to the two synchronous pulleys, and push the motor to tension the synchronous belt. Lock the two screws on the motor using a torque wrench (torque: 7.5 Nm). Place the test probe of sound wave tensiometer (parameter: M: 2.3, W: 8, S: 88) in the middle part of the synchronous belt, about 10mm away from the synchronous belt. Move the middle part of the synchronous belt by hand to read the test results. The test results should be within the range of 50~60Hz.



Step 7 Install the motor casing (left): Fix the motor casing (left) with three M3*8 hexagon socket cap screws (torque: 1.0 Nm).



Step 8 Calibrate the home point.

3.4.7 Replacement of battery component

Step 1 Remove the base cover of the robot: Put the robot upside down, and remove the anti-removal label of the base. Remove four M3*8 hex socket countersunk screws from the base cover, and remove the rear cover.



- Step 2** Disassemble the battery components: Unplug the battery cable terminal. Remove two M3*8 hexagon socket cap screws using a hex wrench. Cut off the cable ties using scissors.



- Step 3** Replace the new battery components: Bind the new battery component to the sheet metal with cable ties, and secure the two M3*8 hexagon socket head cap screws with a torque wrench.
- Step 4** Calibrate the home point.

3.4.8 Replacement of button cells

- Step 1** Remove the base cover of the robot: Put the robot upside down, and remove the anti-removal label of the base. Remove four M3*8 hex socket countersunk screws from the base cover, and remove the rear cover.



- Step 2** Disassemble the servo drive board PCBA: Remove the plug terminals on the PCBA. Remove four M3*6 hexagon socket button head screws using a hex wrench, and place the PCBA in an ESD bag.



- Step 3** Install the servo control panel PCBA: Remove the plug terminals on the PCBA. Remove four M3*16 single-head hexagonal studs using a socket wrench. Remove the rocker switch connectors, and place the PCBA in an ESD bag.



- Step 4** Disassemble the main control panel PCBA: Remove the plug terminals on the PCBA, and four M3*20 single-head hexagonal studs using a socket wrench. Remove the rocker switch connectors, and place the PCBA in an ESD bag.

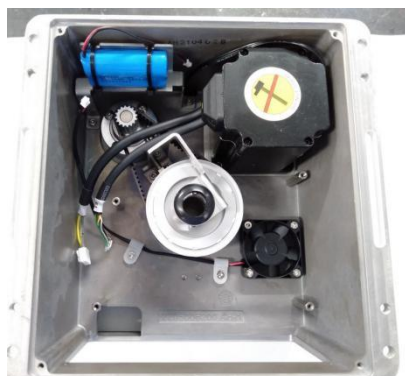


- Step 5** Replace the button cells: Replace the button cells on the main control panel with new

cells.



- Step 6** Install the main control panel PCBA: Fix the main control panel PCBA using four M3*20 single-head hexagonal studs with a torque of 0.6 Nm.



- Step 7** Install the servo control panel PCBA: Connect the rocker switch wire to the servo control panel PCBA, and then fix the PCBA with four M3*16 single-head hexagonal studs with a torque value of 0.6Nm. Connect each terminal according to the position in the figure below.



- Step 8** Install the servo drive board PCBA: Connect the rocker switch wire to the servo drive board PCBA, and then fix the PCBA using four M3*6 hexagon socket button head screws with a torque of 0.6 Nm. Connect each terminal according to the position in

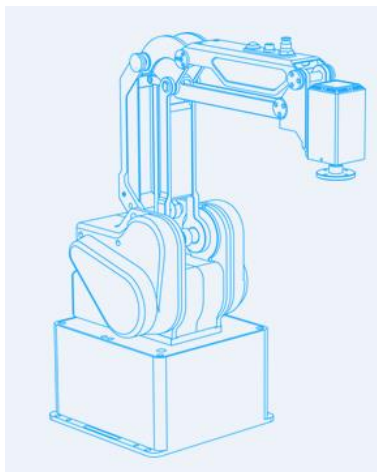
the figure. Fix the wire harness with a ribbon.



Step 9 Install the base cover of the robot: Fix the base cover with four M3*8 hex socket countersunk screws.

4. Calibration of Home Point

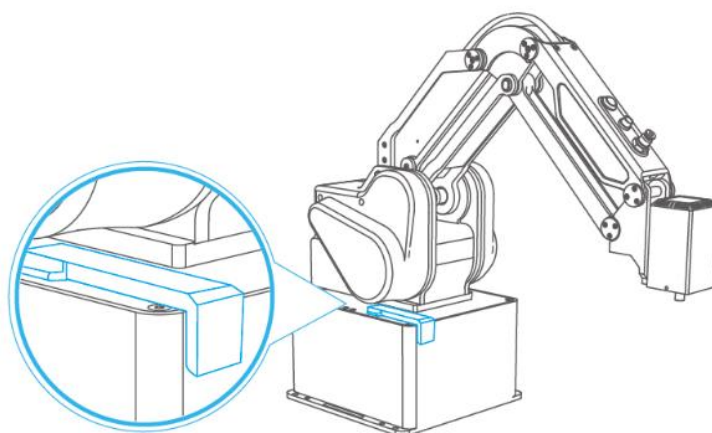
When the synchronous belt, button cells and battery components are replaced, the home point of the robot arm will change. You need to reset the robot arm. The home point of MG400 is shown in the figure below.



- Step 1** Use the calibration block to move MG400 to the vertical state of upper arm and forearm, that is, adjust each axis to the mechanical zero point.

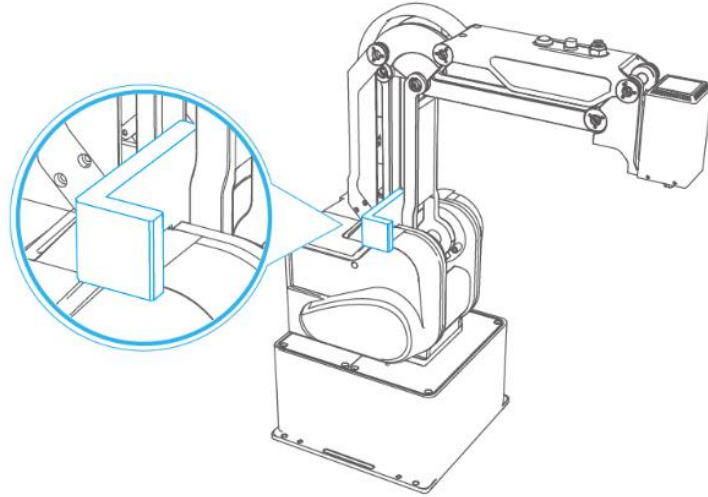


- 1) Place the calibration block in the position shown below and close to the rotating disc. Rotate J1 axis to make the rotating disc parallel and close to the calibration block.

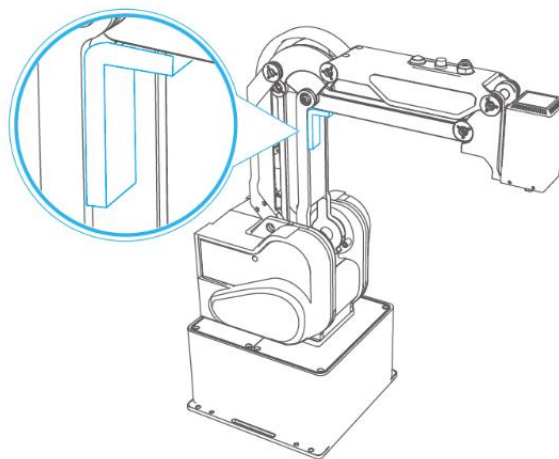


- 2) Clamp the convex groove at the bottom of the calibration block in the gap shown

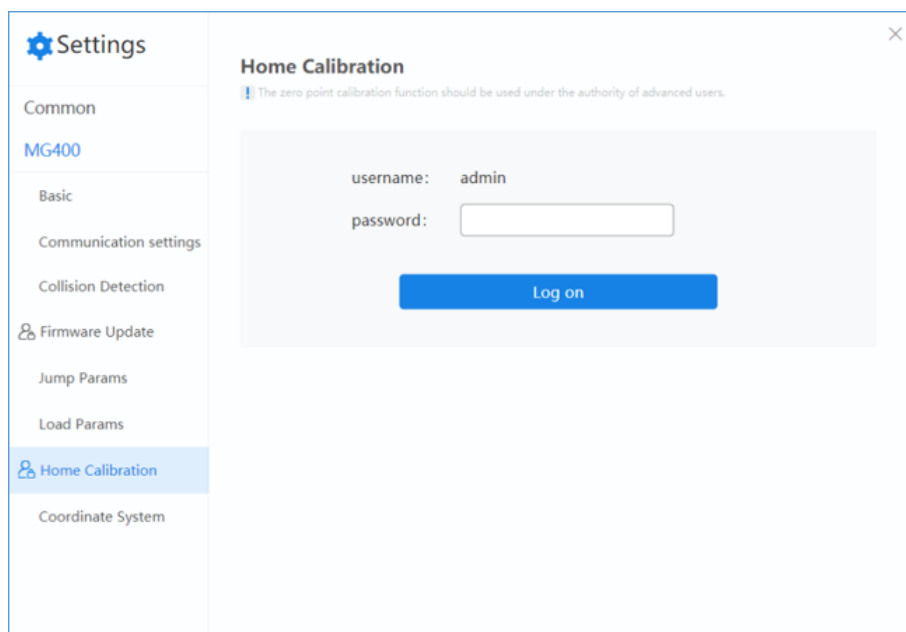
in the figure below, and make the short side of the calibration block face the upper arm. Press the teaching button, and drag J2 axis and J3 axis to make the upper arm parallel and close to the calibration block. At the same time make the angle between the upper arm and the forearm greater than 90°.



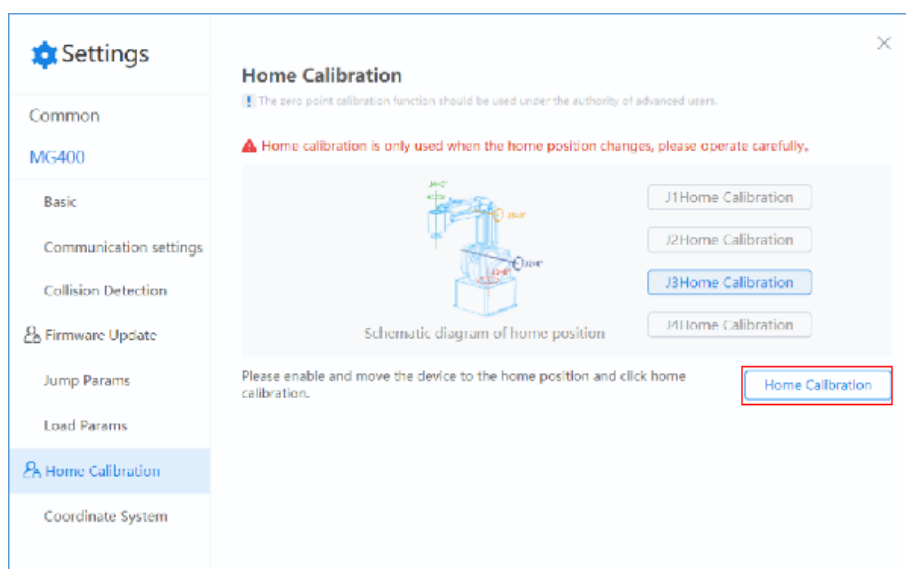
- 3) Put the calibration block in the position shown in the figure below, that is, the angle between the upper arm and the forearm, and make the long side of the calibration block parallel and close to the upper arm. By moving the J3 axis on the control panel, make the forearm parallel and close to the short edge of the calibration block.



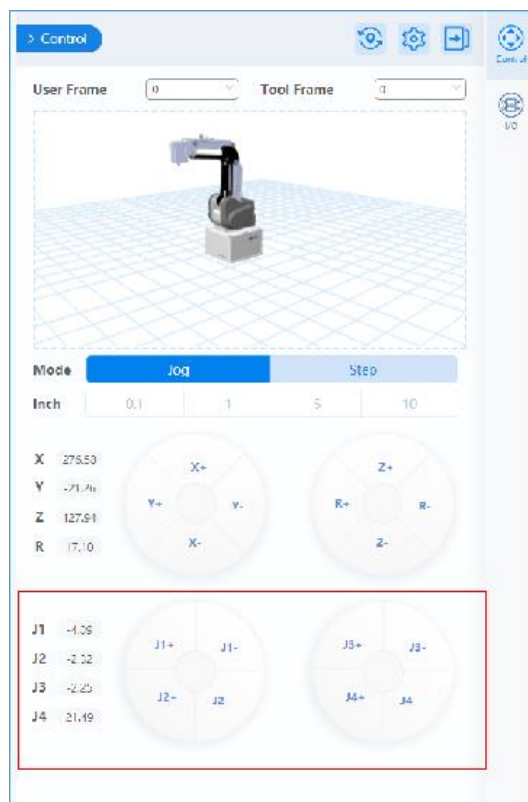
Step 2 Click **Settings > Home Calibration**. Enter the password (default password: 888888), and click **Log on**.



Step 3 Click **Home Calibration** when MG400 is enabled.



If the calibration is successful, you can view the joint coordinates in control panel.
Now the values of J1~J4 are zero.



NOTICE

Home calibration is used only when the home position changes. Please operate cautiously.