



Maintenance Manual for GR Painting Robot Series.

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CMA

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Statement

Thank you for purchasing the painting robots designed by CMA (WUHU) Robotics Company Limited (CMA, in short). The contents stated in the manual are directly related to your safety, lawful rights and responsibilities. Please ensure to read through the manual and correctly set the operation parameters before use. Any operation that does not strictly follow the instructions or the warnings of the manual might lead to physical injury or property damage. All rights for explanation are reserved by CMA.

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This manual is an indispensable part of the whole manual collection and all the professionals involved in operation, teaching, maintenance, and inspection are required take CMA special training on the knowledge instructed by the following manuals:

- ☐ ZL-GR-001-V1: Safety Manual for GR Painting Robot Series.
- ☒ ZL-GR-002-V1: Maintenance Manual for GR Painting Robot Series.
- ☐ ZL-GR-003-V1: Explosion Protection Manual for GR Painting Robot Series.
- ☐ ZL-GR-004-V1: Remote Assistance Manual for GR Painting Robot Series.
- ☐ ZL-GR-005-V1: IO Communication Instruction Manual GR Painting Robot Series.
- ☐ ZL-GR-006-V1: Program Editor Instruction Manual for GR Painting Robot Series
- ☐ ZL-GR6150-001-V1 Installation and Connection Instruction Manual for GR6150 Painting Robot.
- ☐ ZL-GR6150-002-V1 Mechanical Operation and Maintenance Manual for GR6150 Painting Robot.
- ☐ ZL-GR6150-003-V1 Electrical Operation and Maintenance Manual for GR6150 Painting Robot.
- ☐ ZL-GR6150-004-V1: Electrical Schematic Diagram for GR6150 Painting Robot.

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About the Manual

The target readers of the manual include professionals involved in robot operation, maintenance and technical service. This manual intends to explain how to use the program editor for all the GR painting robots designed by CMA. The warning pictograms are classified into four categories, “danger”, “caution”, “attention” and “important” respectively. These warnings are relevant to safety and must be observed.

 Danger	Danger! This warning means death might occur, if an operation is not properly performed.
 Caution	Caution! This warning means death or server physical injury might occur, if an operation is not properly performed.
 Attention	Attention! This warning means minor physical injury or minor material damage may occur, if an operation is not properly performed.
 Important	Important! This warning means special attention should be paid to a certain operation.

Warnings titled by “attention” might also lead to severe consequence in different cases. Therefore it is strongly recommended that anything titled by “attention” should be handled with extreme caution.

- Daily maintenance centers on the mechanical body and electric control cabinet of the robot. When carrying out daily maintenance and cleaning, read the manual and the files attached carefully, and use it correctly after being familiar with all equipment knowledge, safety knowledge and precautions.
- Some of the illustrations in the manual are for the sake of explaining the details. Take off the cover or safety cover for drawing. When operating such parts, be sure to restore the cover or safety cover according to the regulations, and then operate according to the requirements of the manual.

- The figures and photos in this manual are representative examples, which may be different from the products purchased.
- This manual is subject to modification due to product improvement, specification change and convenience of use without prior notice.
- The data number on the cover of the revised manual will be updated and issued in a new version.
- If you need to order the manual due to damage or loss, please contact our agent or the nearest Sales Office on the back cover of the manual and order according to the information number on the cover.
- The company will not be responsible for the unauthorized product transformation of the customer, which is not within the scope of the company's warranty.

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Chapter One Robot operation environment

In order to ensure the stability and service life of the robot, the robot should be used in the following environment:

- Working environment temperature: 0 °C ~ 40 °C
- Working environment humidity: 20 ~ 95HR, no condensation
- Vibration of mounting base: less than 0.5g

If the robot body is an explosion-proof body, the requirements for purified compressed gas by purging are as follows:

- Pressure: 6 ~ 8bar
- Flow rate: 900 ~ 1100 L / min
- Temperature: 0 ~ 40 °C
- Humidity: 2 °C non- dewing / 6bar
- Cleanliness: dust particles less than 5 μ m

Chapter Two Daily cleaning and maintenance of robot body

2.1 Wearing of robot protective clothing

Because the spraying environment is generally bad, in order to prevent a large amount of paint on the surface of the robot body and ensure the reliability and service life of the robot, it is required that the spraying robot must wear protective clothing (in the workplace with explosion-proof requirements, it is necessary to wear anti-static protective clothing). All GR series robots produced by CMA Company are provided with protective clothing of corresponding size and model.

It is recommended to replace the robot protective clothing according to the following cycle. According to the working environment and the amount of spray paint, the replacement time can be determined according to the actual degree of pollution.

The recommended replacement time is as follows:

- Base protective clothing: change every month
- Protective clothing for big arms: change every month
- Craft arm protection: change every week
- Wrist protective clothing: change daily



Protective clothing for craft arm

Protective clothing for wrist

Protective clothing for body

Figure 2-1: Location of robot protective clothing

 Attention	When the robot spraying operation, be sure to wear the protective clothing correctly, no wear and tear!
 重要 Important	Robot protective clothing can be reused after cleaning. It is recommended to change and wash frequently!

2.2 Cleaning and maintenance of robot body

Since the wrist part of the robot works in the place where the most paint mist is sprayed for a long time, although it is protected by wrist protective clothing, part of the paint will still accumulate. Therefore, the wrist part is the key part of cleaning and maintenance. The cleaning methods are as follows:

- Check whether the protective clothing at the base, big arm and process arm is damaged by pulling, clean the paint residue accumulated on the surface of protective clothing with a brush, and replace it in time if there is a large amount of paint gathering or damage;
- Remove wrist protective clothing, use a cloth that does not remove hair, dip in detergent to clean wrist parts (acetone strong corrosion solvent is for bidden). After the wrist is cleaned, Vaseline should be applied on the wrist surface and joint part to prevent the paint from sticking and then it will be convenient for the next cleaning;
- Clean the gun and the inner and outer surfaces of the gun cap to ensure that there is no paint accumulation;
- Clean the outer surface of gun frame to ensure no paint accumulation;
- Check the abrasion of the air pipe and paint pipe, and check whether there is any winding and pulling or abrasion and leakage;
- Check the gun and fixing screw of the gun holder. The connecting screw is free of looseness. After inspection, apply Vaseline for protection.



Clean the wrist of the robot with detergent and apply Vaseline

机器人手腕部分用清洁剂
清洁，涂抹凡士林

Figure 2-2: schematic diagram of wrist cleaning



1. The external surface of the gun holder shall be cleaned without paint accumulation.
- 2.Regularly check and tighten the fixed screws of the spray gun and gun holder.
3. Check the abrasion of air pipe and paint pipe, and there is no leakage

Clean the gun and the inner and outer surfaces of the gun cap and no paint accumulation;

Figure 2-3: cleaning schematic diagram of spraying gun and gun holder



重要

Important

Body cleaning and maintenance is recommended once a day to ensure that the robot works in good condition!

Chapter Three Daily cleaning and maintenance of robot electric control cabinet

3.1 Cleaning of electric control cabinet

A large number of precise electrical components such as controllers and drivers are installed in the robot electric control cabinet, which has high requirements for the environment. The robot electric control cabinet should be placed in a safe environment isolated from the spraying area, so as to ensure the standard sealing of the cable inlet of the electric control cabinet, and prevent the dust from entering the internal driving components of the electric control cabinet, causing poor contact or short circuit conduction.

The cleaning steps of the electric control cabinet are as follows:

- Turn off the power supply, clean and wipe the dust on the surface of the electric control cabinet with a dry rag;
- Check that the incoming cables of the electric control cabinet are in order and the joints are sealed reliably;
- Open the door of the electric control cabinet, and use a vacuum cleaner to remove the dust to ensure the internal cleaning (before cleaning the interior of the controller, be sure to cut off the power supply! Do not blow directly with compressed air;
- Remove the cooling fan and the air inlet / outlet filter cotton of the electric control cabinet, purge and clean with clean gas, and then install them in place again after cleaning. Replace the filter cotton according to the pollution condition of the filter cotton (it is recommended to replace it in 500 hours).。



- 电控柜内务必保持清洁
- 柜内灰尘可以用干燥无尘抹布擦除
- 柜内灰尘可以用吸尘器吸除
- **切勿使用压缩空气吹扫**

- The inside of the electric control cabinet must be kept clean
- The dust in the cabinet can be wiped off with a dry dust-free cloth
- Dust in the cabinet can be removed by vacuum cleaner
- Do not purge with compressed air

Figure 3-1: Internal cleaning of electric control cabinet



Figure 3-2: cleaning of filter cotton at air inlet and outlet

 Caution	Be sure to cut off the power before cleaning the inside of the electric control cabinet!
 Caution	Do not use compressed air to blow directly the inside of the electric control cabinet!
 Important	If the filter cotton is dusty and cannot be cleaned, it must be replaced immediately!

3.2 Cleaning of the teach pendant

The teach pendant is an important device for robot operation and human-computer interaction. It must be cleaned every day and placed in a fixed clean and dry place. The cleaning method of the teach pendant is as follows:

- Turn off the power supply, gently wipe the dust or paint on the surface of the teach pendant with a rag that does not shed hair, check whether the cable of the teach pendant is damaged, and the connection and sealing at the joint are reliable;

- Clean the paint and other pollutants on the surface of the cable of the teach pendant by using a rag that does not shed hair, straighten out the cable, and hang it at the hook of the cable of the teach pendant on the door of the electric cabinet.



Make sure that the teaching box is clean and free from dust and paint pollution

The cable of the teaching box should be cleaned regularly without paint, distortion and damage. When not in use, it should be placed according to the position shown in the figure

Figure 3-3: cleaning of teach pendant



Important

Make sure to check the ventilation and heat dissipation of the electric control cabinet every day, the electric control cabinet is not covered by plastic or other materials, there is enough clearance around the electric control cabinet, and it is far away from the heat source, there is no sundries piled on the top of the electric control cabinet, the cooling fan works normally, and the fan inlet and outlet are not blocked.



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