Dioche Diochebvkmai5yn2

Dioche Robobram 6DOF Robotic Arm Kit Instruction Manual

Model: Diochebvkmai5yn2

1. INTRODUCTION

This manual provides essential information for the assembly, operation, and maintenance of your Dioche Robobram 6DOF Robotic Arm Kit. Please read these instructions carefully before beginning assembly or operation to ensure proper function and longevity of the product. This kit is designed for educational purposes, DIY projects, and industrial manipulation demonstrations.

2. PRODUCT OVERVIEW

The Dioche Robobram 6DOF Robotic Arm Kit is a versatile mechanical arm designed for various applications. Its key features include:

- **6-Axis Design:** The robotic arm features a disc-shaped chassis, allowing for flexible and smooth rotation across 6 degrees of freedom.

- **Robust Construction:** All support fittings are constructed from 2mm thick aluminum sheet, enhancing the robot's stability and durability.

- **Precise Movement:** Imported cup bearings are utilized in the handlebar connections, providing flexible steering and centralized control for accurate positioning.

- **Powerful Actuation:** The power system includes 6 MG996 analog servo motors, enabling comprehensive movements such as forward/backward, up/down, and left/right gripping.

- **Educational and DIY Use:** This manipulator is widely used in university education and various DIY production projects.

Figure 2.1: Assembled 6DOF Robotic Arm. This image shows the robotic arm fully assembled, demonstrating its multi-jointed structure and gripper mechanism.

3. PACKAGE CONTENTS

Verify that all components listed below are present in your package. If any parts are missing or damaged, please contact customer support.

- 6 x MG996 Analog Steering Gears
- 1 x Cable Tie
- 5 x Packs of Screw Nut Fittings
- 3 x Extension Cables
- 1 x Flange Bar
- 3 x Flange Bearings
- 6 x Metal Steering Wheels
- 1 x Mechanical Arm Structure
- 1 x Beam
- 1 x U-shaped Bracket
- 2 x L-shaped Brackets
- 2 x Long U-shaped Brackets
- 4 x Multi-function Brackets

Figure 3.1: All components included in the Dioche Robobram 6DOF Robotic Arm Kit. This image displays the various brackets, servo motors, fasteners, and other parts that make up the kit.

4. SAFETY INFORMATION

Observe the following safety precautions during assembly and operation:

- **Power Supply:** Ensure the power supply used (4.8V-7.2V) is stable and provides sufficient current (recommended 5V 10A for optimal performance with all servos). Incorrect voltage or insufficient current can damage the servos or lead to erratic behavior.
- **Moving Parts:** Keep hands, hair, and loose clothing clear of all moving parts during operation to prevent injury.
- **Electrical Connections:** Double-check all wiring connections before applying power. Incorrect wiring can cause short circuits or damage components.
- **Supervision:** Adult supervision is recommended for younger users during assembly and operation.
- **Environment:** Operate the robotic arm on a stable, flat surface, away from liquids and excessive dust.

5. SETUP AND ASSEMBLY

Assembly of the Dioche Robobram 6DOF Robotic Arm requires careful attention to detail. While specific step-by-step diagrams are not provided in this manual, the general process involves:

1. **Identify Components:** Lay out all components and identify the various brackets, servo motors, and fasteners as per the package contents list.
2. **Base Assembly:** Begin by assembling the base structure using the U-shaped and multi-function brackets. Ensure the base is stable.
3. **Servo Installation:** Mount the MG996 servo motors into their designated positions within the brackets. Pay attention to the orientation of each servo to ensure correct range of motion for each joint.
4. **Arm Linkage:** Connect the arm segments using the L-shaped and long U-shaped brackets, along with the flange bar and bearings. Secure all connections with the provided screw nut fittings. Ensure joints move freely

without excessive friction.

5. **Gripper Assembly:** Assemble the gripper mechanism and attach it to the end of the arm. Install the final servo for gripper actuation.

6. **Wiring:** Connect the servo motors to your chosen servo controller (not included). Ensure correct polarity and pin assignments (typically Signal, VCC, GND). Use the provided extension cables if necessary.

7. **Power Supply:** Connect a suitable external power supply (4.8V-7.2V, recommended 5V 10A) to your servo controller.

8. **Controller Setup:** Configure your servo controller and programming environment (e.g., Arduino, Raspberry Pi) to control each of the 6 servo motors. Calibrate the servo angles to prevent over-rotation and mechanical stress.
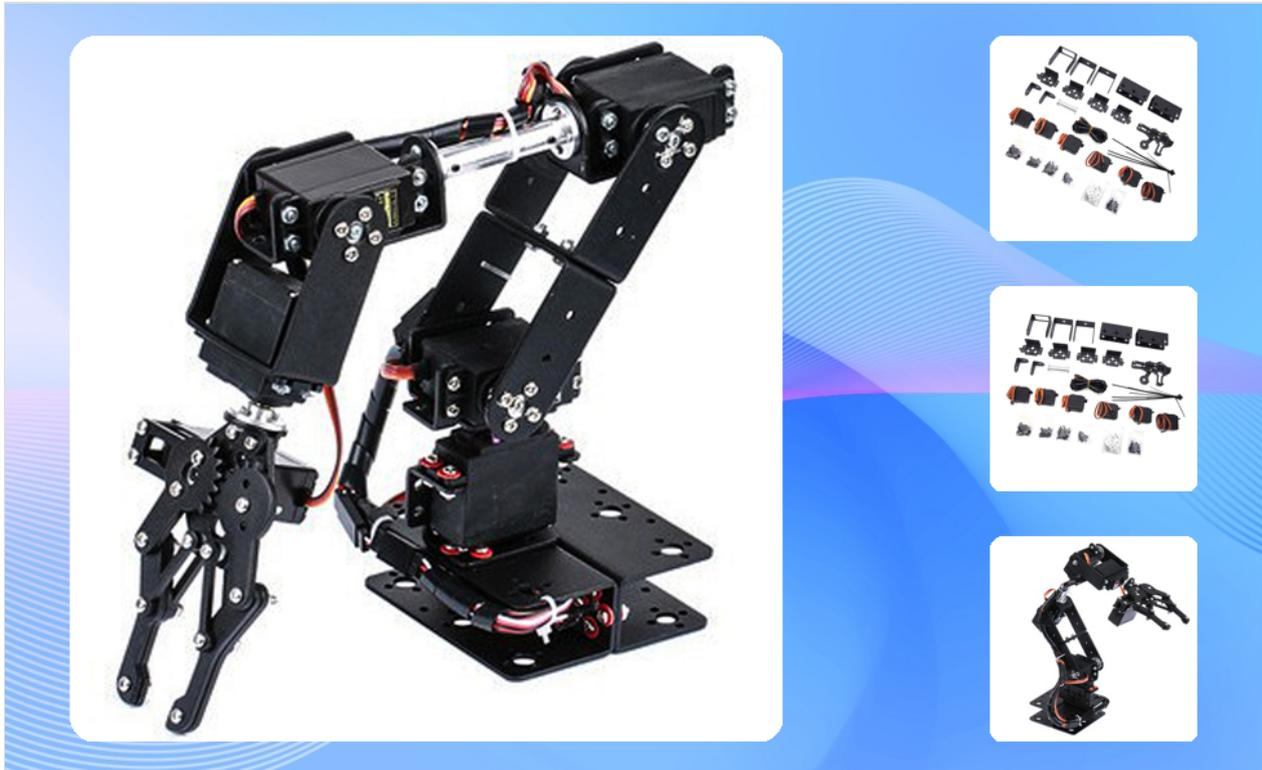

Figure 5.1: Example of robotic arm assembly. This image illustrates the general structure of the robotic arm with its various joints and servo motor placements, providing a visual guide for assembly.
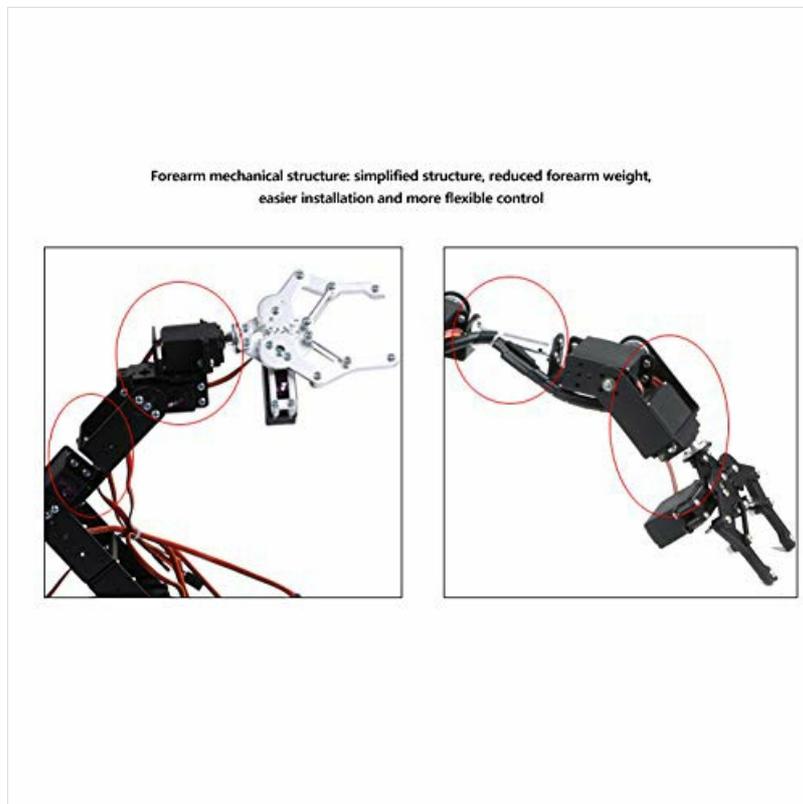
Figure 5.2: Detail of the forearm mechanical structure. This image highlights the simplified structure of the forearm, designed for easier installation and flexible control.

6. OPERATING INSTRUCTIONS

Once assembled and connected to a suitable controller, the robotic arm can be operated by sending commands to its servo motors. Each servo controls a specific joint, allowing for precise manipulation.

- **Controller Interface:** Use your chosen microcontroller (e.g., Arduino, Raspberry Pi) and its programming environment to send Pulse Width Modulation (PWM) signals to each servo.
- **Joint Control:** Each of the 6 servos corresponds to a degree of freedom (DOF). Adjust the PWM signal to control the angle of each joint. The MG996 servos have a limit angle of 180 degrees.
- **Movement Planning:** For complex tasks, plan the sequence of joint movements to achieve the desired end-effector position and orientation. Avoid sudden or jerky movements that could stress the mechanical components.
- **Gripper Operation:** Control the gripper servo to open and close the gripper jaws. Ensure the gripper has a firm hold on objects before attempting to lift or move them.
- **Load Capacity:** Be mindful of the arm's load capacity. Overloading the arm can damage the servo gears and reduce overall performance.

Figure 6.1: Robotic arm performing a task. This image shows the robotic arm in an operational setting, demonstrating its ability to interact with objects.

7. MAINTENANCE

Regular maintenance ensures the longevity and optimal performance of your robotic arm kit.

- **Cleaning:** Keep the arm free from dust and debris. Use a soft, dry cloth for cleaning. Avoid using harsh chemicals or solvents.
- **Joint Inspection:** Periodically check all joints and fasteners for looseness. Tighten any loose screws to maintain structural integrity.
- **Servo Health:** Listen for unusual noises from the servos, which could indicate wear or damage. Avoid forcing the arm's movement manually against servo resistance.
- **Wiring Check:** Inspect all wiring for fraying or damage. Ensure connections are secure.
- **Lubrication:** While not typically required for these types of servos, if any mechanical joints show signs of stiffness, a small amount of dry lubricant (e.g., silicone spray) can be applied, avoiding contact with electrical components.

8. TROUBLESHOOTING

If you encounter issues with your robotic arm, refer to the following troubleshooting guide:

Problem	Possible Cause	Solution

Problem	Possible Cause	Solution
Arm does not move or moves erratically.	- Insufficient power supply. - Incorrect wiring. - Servo damage. - Controller programming error.	- Ensure power supply meets 4.8V-7.2V and provides sufficient current (e.g., 5V 10A). - Verify all servo connections (Signal, VCC, GND) are correct. - Check if servos are making unusual noises or are physically damaged. Replace if necessary. - Review your controller code for correct servo commands and calibration.
Servos make grinding noises or gears strip.	- Overloading the arm. - Excessive force applied to joints. - Incorrect servo calibration (trying to move beyond physical limits). - Loose mechanical connections.	- Reduce the load carried by the arm. - Avoid manually forcing arm movements. - Recalibrate servo limits in your code to prevent over-rotation. - Tighten all screws and ensure smooth joint movement.
Arm is unstable or wobbly.	- Loose fasteners. - Improper assembly. - Base not secure.	- Check and tighten all screws and nuts. - Review assembly steps to ensure all brackets are correctly installed. - Ensure the arm's base is firmly attached to a stable surface.
Gripper does not open/close fully.	- Gripper servo not calibrated. - Mechanical obstruction.	- Adjust the servo limits for the gripper in your controller code. - Inspect the gripper mechanism for any physical obstructions.

9. SPECIFICATIONS

Technical specifications for the Dioche Robobram 6DOF Robotic Arm Kit:

Feature	Detail
Item Type	Mechanical Arm
Color	Black
Model	For Analog Steering Gear
Operating Voltage	4.8V-7.2V
No-load Current	100 mA
Torque	10 kg.cm

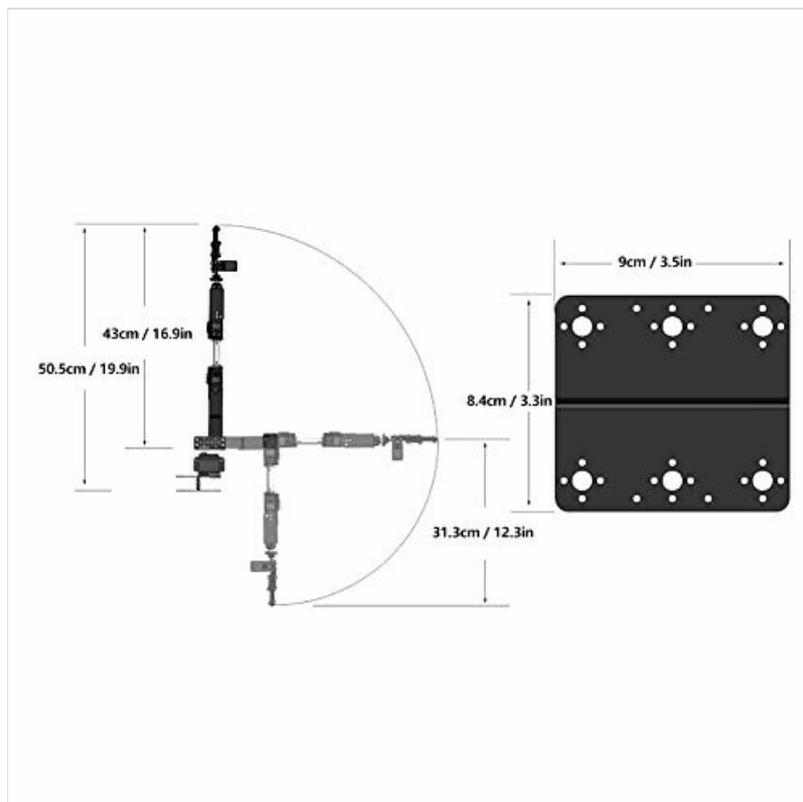| Feature	Detail
Limit Angle	180 degrees
Cable Length	Approx. 30 cm
Gear Material	Metal Gear
Dead Bandwidth	5 μs
Manufacturer	Dioche
Item Model Number	Diochebvkmai5yn2
Package Dimensions	25.1 x 17.6 x 5.2 cm
Package Weight	900 grams
Country of Origin	China
Batteries Required	No

Figure 9.1: Technical drawing showing dimensions of the robotic arm. This diagram provides key measurements for the assembled arm and its base.

10. WARRANTY AND SUPPORT

Specific warranty information for this product is not provided in the available documentation. For any warranty claims, technical support, or inquiries regarding missing/damaged parts, please contact the seller directly through your purchase platform. Ensure you have your order details and product model number (Diochebvkmai5yn2) ready when contacting support.