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HEXBUG 406-4323

# HEXBUG VEX Robotics Motorized Robotic Arm Instruction Manual

Model: 406-4323

Brand: HEXBUG



## 1. INTRODUCTION

This manual provides comprehensive instructions for the assembly, operation, and maintenance of your HEXBUG VEX Robotics Motorized Robotic Arm. This construction kit allows you to build a functional robotic arm, inspired by real industrial robots, and explore fundamental STEM principles through hands-on learning.

The VEX Robotics Motorized Robotic Arm is designed to pick up and relocate items using four degrees of freedom and an articulated grabber hand. The entire crane mechanism can rotate 360 degrees, enabling complex actions. The kit includes over 350 snap-together pieces and offers two alternate build configurations for extended engagement.



Image 1.1: The fully assembled HEXBUG VEX Robotics Motorized Robotic Arm, showcasing its articulated structure and control box.

## 2. SAFETY INFORMATION

Please read and understand all safety instructions before assembly and operation. Failure to follow these instructions may result in injury or damage to the product.

- **Small Parts Warning:** This kit contains small parts and is not suitable for children under 3 years of age due to choking hazards. Recommended for ages 8 and up.
- **Battery Safety:**
  - Requires 3x C/LR14 batteries (not included).
  - Do not mix old and new batteries.
  - Do not mix alkaline, standard (carbon-zinc), or rechargeable (nickel-cadmium) batteries.
  - Insert batteries with correct polarity (+ and -).
  - Remove exhausted batteries promptly.
  - Do not short-circuit battery terminals.
  - Remove batteries if the product is not used for an extended period.
- **Supervision:** Adult supervision is recommended during assembly and operation, especially for younger users.
- **Intended Use:** This product is designed for educational and recreational purposes. Do not use it for any unintended applications.

## 3. WHAT'S IN THE BOX

Your HEXBUG VEX Robotics Motorized Robotic Arm kit includes the following components:

- Instruction manual
- Over 350 snap-together pieces
- Motor component
- Control box (requires 3x C/LR14 batteries, not included)



## 4. SETUP AND ASSEMBLY

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Follow the detailed, step-by-step instructions provided in the included physical instruction manual for proper assembly. The manual uses visual diagrams to guide you through the construction process.

1. **Unpack Components:** Carefully unpack all pieces from the box and verify that all 350+ components are present against the parts list in your manual.
2. **Battery Installation:** Install 3x C/LR14 batteries into the control box, ensuring correct polarity.
3. **Follow Assembly Manual:** Refer to the dedicated assembly manual for precise instructions on connecting each piece. Pay close attention to gear alignment and wire routing to ensure proper functionality. The manual provides clear, color-coded diagrams.
4. **Alternate Builds:** The kit supports two alternate builds (Chopper and Scorpion). Instructions for these are also included in the manual.
5. **Initial Checks:** After assembly, perform a visual check to ensure all connections are secure and no wires are pinched.



Image 4.1: The VEX Robotics kit, showing the packaging and the assembled robotic arm, ready for operation.

## 5. OPERATING THE ROBOTIC ARM

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Once assembled and powered, the VEX Robotics Motorized Robotic Arm can be operated using its integrated control box.

1. **Power On:** Ensure batteries are correctly installed in the control box. Locate the power switch and turn the unit on.
2. **Control Functions:** The control box features various levers and buttons to manipulate the arm's movements.
  - **Base Rotation:** Control the 360-degree rotation of the arm's base.
  - **Arm Articulation:** Adjust the arm's four degrees of freedom to raise, lower, extend, and retract.
  - **Grabber Hand:** Open and close the articulated grabber hand to pick up and release objects.
3. **Picking Up Objects:**
  - Position the arm over the desired object.

- Lower the arm and open the grabber hand.
- Close the grabber hand around the object.
- Carefully lift and relocate the object.

4. **Experimentation:** Practice controlling the arm to develop precision and coordination. Explore its full range of motion and capabilities.

*Note: The arm operates at a single speed for each movement. Fine motor control for slow, precise movements is not a primary feature of this model.*

## 6. MAINTENANCE

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

- **Cleaning:** Wipe the robotic arm with a dry, soft cloth. Avoid using water or cleaning solutions, as they may damage electronic components.
- **Battery Replacement:** Replace batteries when movements become sluggish or unresponsive. Always replace all three batteries at once.
- **Connection Checks:** Periodically inspect all snap-together connections to ensure they are secure. Loose connections can affect stability and functionality.
- **Gear Inspection:** Check gears for any debris or wear that might impede smooth operation.
- **Storage:** Store the robotic arm in a clean, dry place away from direct sunlight and extreme temperatures.

## 7. TROUBLESHOOTING

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If you encounter issues with your VEX Robotics Motorized Robotic Arm, refer to the following common problems and solutions:

- **Arm is unresponsive or moves slowly:**
  - Check battery installation and polarity.
  - Replace old batteries with new ones.
  - Ensure all wire connections from the control box to the motor are secure.
- **Arm movements are jerky or inconsistent:**
  - Verify that all snap-together pieces are fully engaged and secure.
  - Inspect gears for any obstructions or misalignment.
  - Ensure wires are not tangled or snagging, especially around the rotating base.
- **Arm base does not rotate smoothly (360 degrees):**
  - Check for any wires or components obstructing the rotation path.
  - Ensure the base is properly seated and not binding against anchor points.
  - Verify that the base assembly was constructed according to the manual's specifications.
- **Missing or damaged parts:**
  - Contact HEXBUG customer service for assistance (see Section 9).

## 8. SPECIFICATIONS

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Feature	Detail
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Model Number	406-4323
Brand	HEXBUG
Product Dimensions	17.99 x 2.48 x 10.75 inches
Item Weight	3.4 pounds
Recommended Age	8 - 15 years
Number of Pieces	350+
Power Source	3x C/LR14 Batteries (not included)
Degrees of Freedom	4 (plus 360-degree base rotation)

## 9. WARRANTY AND SUPPORT


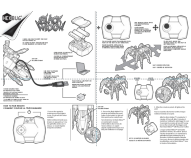
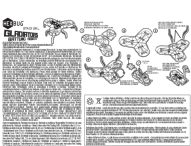
For product support, missing parts, or warranty inquiries, please contact HEXBUG customer service. While specific warranty details are not provided in this manual, HEXBUG is known for its customer support. You can find more information and contact details on the official HEXBUG website or through their Amazon store:

- **HEXBUG Official Website:** [www.hexbug.com](http://www.hexbug.com)
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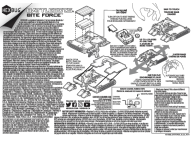
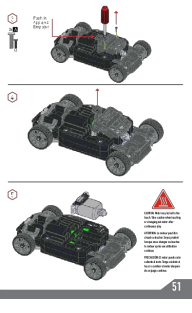


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### Related Documents - 406-4323

	<p><a href="#">HEXBUG Mouse Robotic Cat Toy: Modes, Battery Information, and Safety</a></p> <p>Learn about the HEXBUG Mouse Robotic Cat Toy, including its play modes, battery requirements, and important safety guidelines. Features manufacturer details and FCC compliance.</p>
	<p><a href="#">HEXBUG Black Widow Remote Control Spider - User Guide and Instructions</a></p> <p>Learn how to set up, charge, and operate your HEXBUG Black Widow remote control spider. Includes pairing instructions, control guide, and safety information.</p>
	<p><a href="#">HEXBUG Gladiators Battling Robots Stadium - Assembly and Safety Instructions</a></p> <p>Official instructions for assembling and safely using the HEXBUG Gladiators Battling Robots Stadium. Learn how to set up your battling robots, battery requirements, and important safety information.</p>



	<p><a href="#">HEXBUG BattleBots Rivals: Setup, Operation, and Safety Guide</a></p> <p>Comprehensive guide for HEXBUG BattleBots Rivals, covering setup, battery installation, remote pairing, gameplay, and essential safety warnings. Includes FCC and CE compliance information.</p>
	<p><a href="#">HEXBUG BITE FORCE Remote Control Robot Toy - Setup, Pairing &amp; Safety Guide</a></p> <p>Comprehensive guide for the HEXBUG BITE FORCE remote control robot toy. Learn about setup, channel pairing, battery safety, and important warnings for safe play. Includes FCC compliance information.</p>
	<p><a href="#">HEXBUG NIGHT HAWK RC Tuner Car Assembly and Safety Guide</a></p> <p>Comprehensive guide for assembling the HEXBUG NIGHT HAWK RC Tuner Car, including battery installation, safety warnings, and compliance information.</p>

Documents - HEXBUG – 406-4323

**INTRODUCING YOUR CHILD TO STEM**

Science, Technology, Engineering, and Mathematics (STEM) education is essential for preparing our children for the future. The 406-4323-711 REV1 STEM kit provides a hands-on learning experience that introduces children to the basics of robotics and engineering.

**VOCABULARY TO KNOW**

- COMPOUND GEAR RATIO:** The combined gear ratio that results from having two or more gear combinations that share a common shaft or axle.
- END EFFECTOR:** The part at the end of the robotic arm.
- FORCE:** A push or pull exerted on an object.
- MECHANICAL ADVANTAGE:** In this context, a mechanical advantage is a system that uses gears to multiply force.
- ROBOTIC ARM:** The most common manufacturing robot designed for heavy, repetitive work.

**GENERAL SOLUTIONS**

MOVEMENT	INPUT	OUTPUT	USES GEAR?	USES SHAFT?
ROTATIONAL FORCE	ROTATIONAL FORCE	ROTATIONAL FORCE	YES	YES
ROTATIONAL FORCE	ROTATIONAL FORCE	ROTATIONAL FORCE	YES	YES
ROTATIONAL FORCE	ROTATIONAL FORCE	ROTATIONAL FORCE	YES	YES

**GEAR RATIO**

Driver (Input) Gear: 40 Teeth  
 Driving (Output) Gear: 10 Teeth  
 Gear Ratio: 4:1

**EXTEND YOUR LEARNING**

**DISCUSS:** The design of a robot like this depends on what it is going to be used to do. What other designs can you think of?

**APPLY:** What other gear ratios could be used to make the compound gear ratio more efficient?

**EXPLORE:** You can explore additional VEX robotics builds and investigations here: <https://www.hexbug.com/vex>

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**VEX ROBOTICS**

**406-4323-710 REV1**

**EXAMINE**

**DISCOVER**

**UNDERSTAND**

**APPLY**

**EXPLORE**

**HEXBUG**

**ROBOTICS**

**406-4323-710 REV1**

**EXAMINE**

**DISCOVER**

**UNDERSTAND**

**APPLY**

**EXPLORE**

**HEXBUG**

**ROBOTICS**

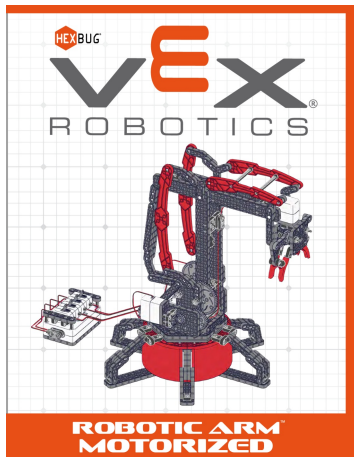
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**406-4323-710 REV1** Explore the world of VEX Robotics Construction Kits by HEXBUG with these additional builds and activities. Each build comes with individual instructions. ZIP FLYERTM Z-360 TM OFFROAD TRUCKTM DISCOVER HOW ROBOTS ARE USED FOR TASKS EXAMINE HOW APPLIED FORCES INTERACT SWITCHGRIP...

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