

OWI Inc OWI-632

OWI Inc Hydraulic Arm Edge Kit (Model OWI-632) Instruction Manual

1. INTRODUCTION

Welcome to the OWI Inc Hydraulic Arm Edge Kit instruction manual. This kit provides an engaging and educational experience in hydro-mechanical technology, allowing users to construct and operate a functional robotic arm. Designed to enhance understanding of STEM principles, this kit requires no batteries or electricity, relying solely on water pressure for its movements.

The Hydraulic Arm Edge offers six axes of movement, including gripper control, wrist rotation, wrist mobility, elbow range, base rotation, and shoulder motion. It features a vertical reach of 16.35 inches, a horizontal reach of 12.42 inches, and a lifting capacity of 50 grams. The gripper can open up to 1.89 inches, and a suction apparatus can be activated by removing the gripper for lifting objects with larger surface areas.

2. IMPORTANT SAFETY INFORMATION

- **Adult Supervision:** This kit contains small parts and requires careful assembly. Adult supervision is recommended, especially for users under 14 years of age.
- **Tool Use:** Assembly may require small tools such as nippers, clippers, a sharp knife, and a small Phillips screwdriver. Exercise caution when using sharp tools.
- **Water Handling:** The hydraulic system uses water. Ensure all connections are secure to prevent leaks. Avoid spilling water on electrical components if other devices are nearby.
- **Moving Parts:** Keep fingers and loose clothing clear of moving parts during operation to prevent injury.
- **Choking Hazard:** Small parts are not suitable for children under 3 years.

3. WHAT'S IN THE BOX

Your OWI Inc Hydraulic Arm Edge Kit includes:

- All necessary components for assembly (approximately 229 parts).
- Detailed assembly manual with graphic illustrations.

Please verify all parts are present before beginning assembly. Refer to the parts list in your assembly manual for a complete inventory.

4. ASSEMBLY INSTRUCTIONS

Follow the step-by-step instructions provided in the included assembly manual. Detailed graphic illustrations are designed to guide you through the process. Assembly typically takes several hours and requires patience and attention to detail.

4.1. Recommended Tools

- Small Phillips head screwdriver
- Nippers or small cutters (for removing parts from sprue trees)
- Razor blade (for trimming burrs, use with extreme caution)
- Magnifiers (optional, for small parts)

4.2. Key Assembly Tips

- **Organize Parts:** Keep parts attached to their sprue trees until needed, as they are often letter and number coded.
- **Careful Cutting:** Use nippers or a sharp knife to carefully remove parts from the sprue trees. Trim any burrs to ensure smooth movement and proper fit.
- **Screw Installation:** Some small self-tapping screws may require significant downward force to tighten without stripping the head. Adult assistance may be beneficial.
- **Hydraulic System:** Pay close attention to the instructions for filling the pistons with water and routing the tubes. This step is crucial for proper arm function and may require two people.
- **Lubrication:** Apply plenty of lubricant to the pistons to ensure smooth operation and prevent seals from drying out.



Figure 1: The fully assembled OWI Inc Hydraulic Arm Edge Kit, showcasing its intricate design and hydraulic tubing.



Figure 2: The OWI Inc Hydraulic Arm Edge Kit demonstrating its extended reach and range of motion.

5. OPERATING THE HYDRAULIC ARM

The Hydraulic Arm Edge is controlled via a series of levers that manipulate water pressure to achieve movement. Each lever corresponds to a specific axis of motion.

5.1. Axes of Movement

- **Gripper:** Opens and closes up to 1.89 inches.
- **Wrist Rotation:** Rotates 180 degrees.
- **Wrist Mobility:** Moves 98 degrees.
- **Elbow Range:** Adjusts 44 degrees.
- **Base Rotation:** Rotates 270 degrees.
- **Shoulder Motion:** Moves 45 degrees.

5.2. Suction Apparatus

To activate the suction apparatus, carefully remove the gripper attachment. The suction cup allows for lifting objects with a larger, flat surface area, such as a small mobile phone. Ensure the suction cup is clean and free of debris for optimal performance.

5.3. Braking System

A braking system is integrated into the lever controllers to execute commands accurately. This allows for precise positioning and holding of the arm's movements.

6. MAINTENANCE

- **Cleaning:** Keep the robotic arm clean and free of dust and debris. Use a soft, dry cloth for cleaning. Avoid harsh chemicals.
- **Hydraulic Fluid:** Periodically check the water levels in the hydraulic system. Refill with clean water as needed.
- **Lubrication:** Reapply lubricant to pistons and moving joints if movement becomes stiff or jerky.
- **Storage:** Store the arm in a cool, dry place away from direct sunlight to prevent material degradation.

7. TROUBLESHOOTING

Problem	Possible Cause	Solution
Arm movement is stiff or jerky.	Insufficient lubrication; air in hydraulic lines; dry seals.	Reapply lubricant to pistons. Bleed air from hydraulic lines as per manual. Check seals for damage.
Gripper or suction cup not working correctly.	Improper assembly; air in hydraulic lines; damaged parts.	Review assembly steps for the gripper/suction cup. Bleed hydraulic lines. Inspect parts for breakage.
Spindle gear has excessive play.	Loose connections; manufacturing tolerance.	Ensure all screws and connections around the spindle are tight. While some play may be inherent, excessive looseness can be addressed by checking assembly.

Problem	Possible Cause	Solution
Hydraulic fluid (water) leaks.	Loose tubing connections; cracked tubing or piston.	Check all tubing connections and ensure they are firmly seated. Inspect tubing and pistons for any visible damage. Replace damaged parts if necessary.

8. SPECIFICATIONS

- **Product Dimensions:** 9.53 x 16.35 x 12.7 inches
- **Item Weight:** 2 pounds
- **Model Number:** OWI-632
- **Manufacturer Recommended Age:** 10 years and up
- **Power Source:** Hydraulic (water-powered), no batteries or electricity required.
- **Assembly Parts:** Approximately 229 components.

9. WARRANTY AND SUPPORT

For any questions regarding assembly, operation, or missing parts, please refer to the contact information provided in your product packaging or visit the official OWI Inc website for support. Specific warranty details are typically included with the product documentation.

ASK A QUESTION ABOUT THIS MANUAL

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