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› NYMOLABS NBS-6040 CNC Router Machine and 5-Axis MPG Handwheel Controller User Manual

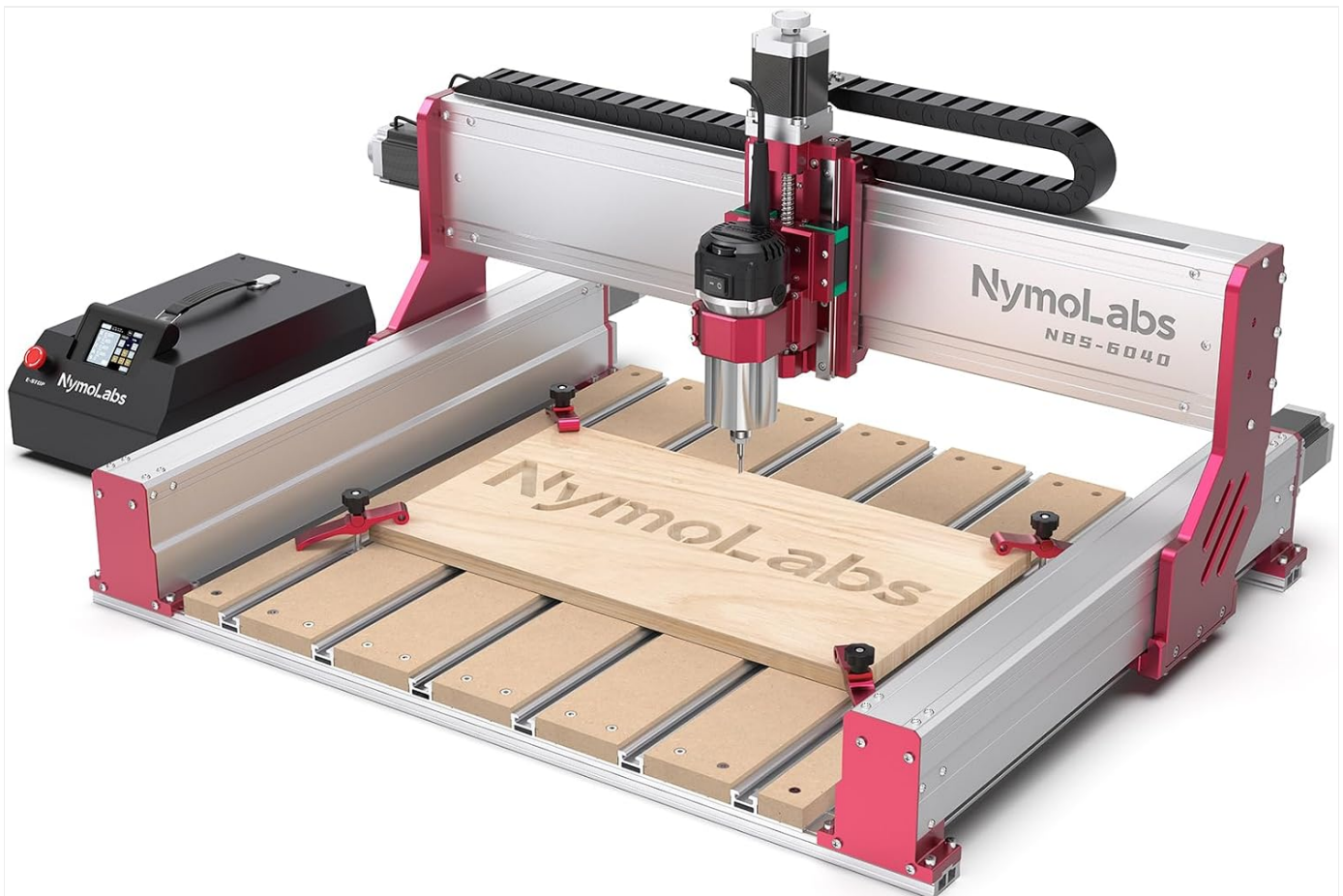
NYMOLABS NBS-6040

NYMOLABS NBS-6040 CNC Router Machine and 5-Axis MPG Handwheel Controller User Manual

Model: NBS-6040

1. INTRODUCTION

This manual provides essential information for the safe and efficient operation of your NYMOLABS NBS-6040 CNC Router Machine and the accompanying 5-Axis MPG Handwheel Controller. The NBS-6040 is designed for precision routing and engraving tasks, featuring a custom-made 710W trim router spindle, linear rails, and ball screws on every axis for enhanced rigidity and accuracy. It operates on an open-source Grbl v1.1 based system, supporting 4-axis linkage motion and offline control capabilities.



2. SAFETY INFORMATION

Operating a CNC machine requires adherence to strict safety protocols to prevent injury and damage. Read and understand all safety warnings before operating the machine.

- **Personal Protective Equipment (PPE):** Always wear safety glasses or a face shield to protect against flying debris. Hearing protection is recommended during operation.
- **Work Area:** Ensure your workspace is clean, well-lit, and free of obstructions. Maintain proper ventilation to dissipate dust and fumes.
- **Emergency Stop:** Familiarize yourself with the location and operation of the emergency stop button. Ensure it is easily accessible.
- **Moving Parts:** Keep hands, hair, and loose clothing away from moving parts of the machine during operation.
- **Electrical Safety:** Ensure the machine is properly grounded. Do not operate with wet hands or in damp conditions. Disconnect power before performing maintenance or adjustments.
- **Material Securement:** Always securely clamp your workpiece to the machine bed to prevent movement during cutting.
- **Supervision:** Never leave the machine unattended while it is operating.

3. PACKAGE CONTENTS

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

- NBS-6040 CNC Router Machine Frame and Gantry
- Custom-made 710W Trim Router Spindle with ER11 Collet
- Control Box
- 5-Axis CNC MPG Handwheel Controller
- Workpiece Clamps
- Power Cables
- USB Cable
- Assembly Hardware and Tools
- User Manual (this document)

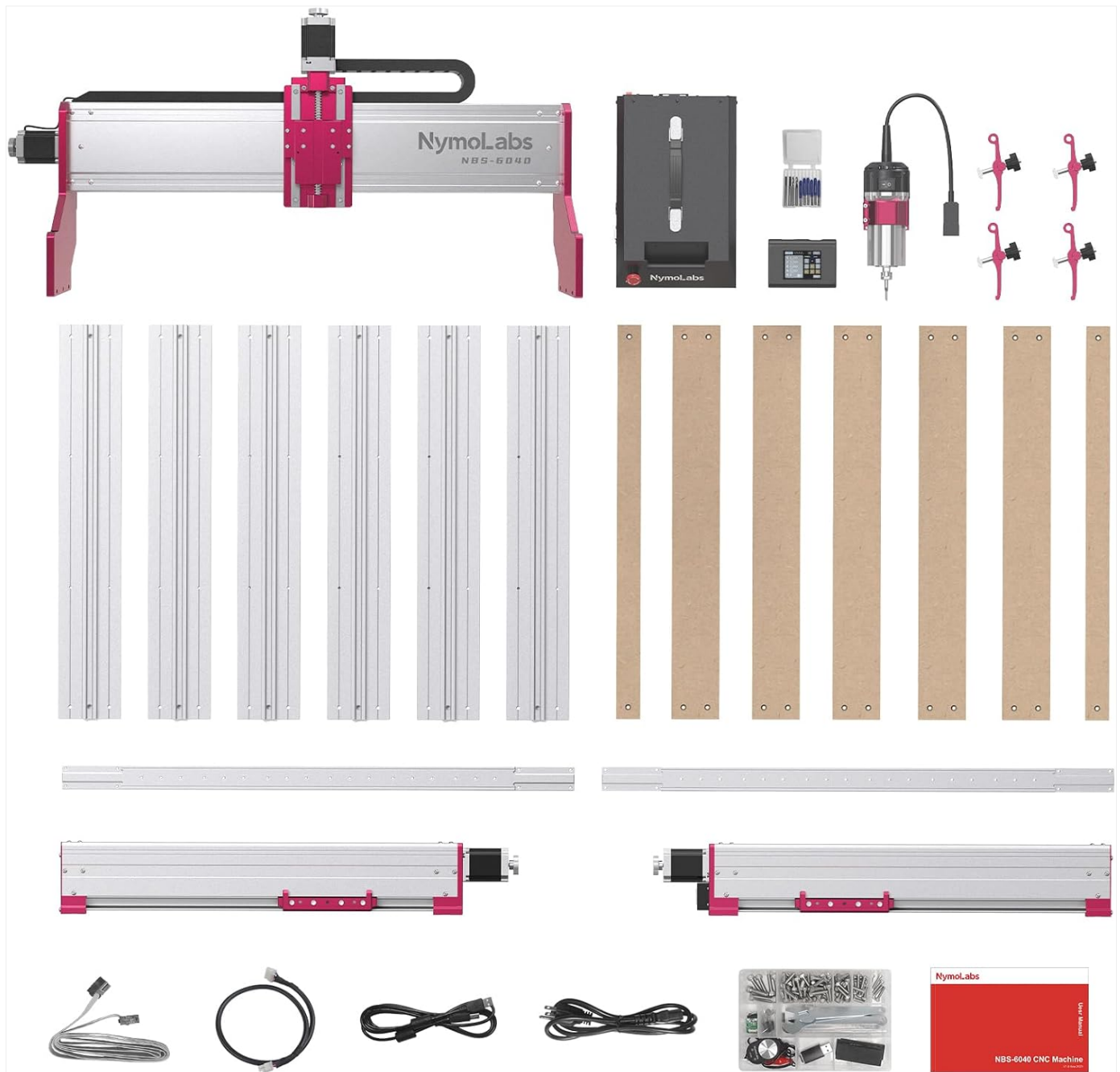


Image: An exploded view showing all major components included with the NBS-6040 CNC Router Machine, including the frame, gantry, control box, spindle, and various accessories.



Image: The 5-Axis CNC MPG Handwheel Controller, featuring a rotary dial and selection switches, connected via a coiled cable.

4. SETUP

The NBS-6040 features a modular design for straightforward assembly. Follow these general steps for initial setup:

1. **Unpacking:** Carefully remove all components from the packaging. Retain packaging for future transport or storage.
2. **Assembly:** Assemble the machine frame and gantry according to the detailed assembly guide provided separately or available on the NYMOLABS website. Ensure all fasteners are tightened securely.
3. **Spindle Installation:** Mount the 710W trim router spindle onto the gantry. Ensure it is seated correctly and secured.
4. **Control Box Connection:** Connect the stepper motor cables, spindle cable, and limit switch cables from the machine to the corresponding ports on the control box.
5. **MPG Handwheel Controller Connection:** Plug the 5-Axis MPG Handwheel Controller into its designated port on the control box.
6. **Power Connection:** Connect the power cable to the control box and then to a suitable power outlet.
7. **Software Installation:** Install the necessary Gbrl-compatible control software on your computer. Refer to the software guide for detailed instructions.

Modular Design for Easy Assembly

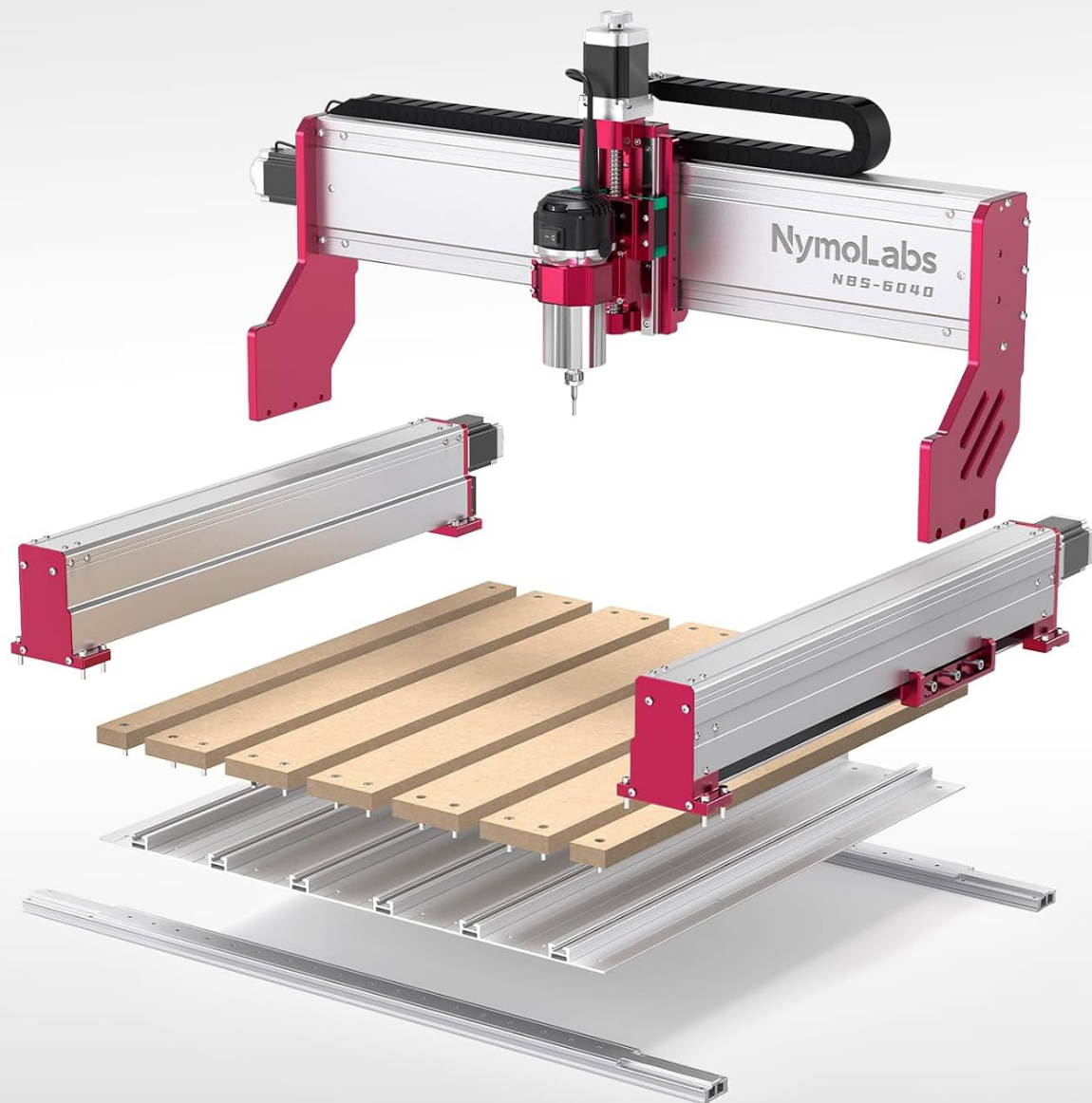


Image: An illustration demonstrating the modular components of the NBS-6040 CNC Router Machine, highlighting its easy assembly process.

5. OPERATING INSTRUCTIONS

5.1 Spindle Operation

The NBS-6040 features a custom-made 710W trim router spindle with an adjustable speed range of 7,000 to 30,000 RPM. It uses an ER11 collet, compatible with bits ranging from 1-8mm, including 1/4" and 1/8" sizes.

- **Collet Installation:** Ensure the correct size ER11 collet and nut are used for your chosen bit. Insert the collet into the spindle, then insert the bit, and tighten the nut securely with the provided wrenches.
- **Speed Adjustment:** The spindle speed can be adjusted manually via the control knob on the spindle itself or through software commands, depending on your setup.



Custom-Made Trim Router Spindle & ER-11 Collet

7000–30000 RPM

Image: A detailed view of the custom-made trim router spindle, highlighting the ER11 collet and the speed adjustment dial, with a speed range of 7,000-30,000 RPM.

5.2 5-Axis CNC MPG Handwheel Controller

The MPG (Manual Pulse Generator) Handwheel Controller allows for precise manual movement of the machine axes.



Mark	Description
OFF	MPG OFF
X	Select operation X axis
Y	Select operation Y axis
Z	Select operation Z axis
4	Select operation 4 axis
5	Select operation 5 axis
X1	Low speed
X10	Medium speed
X100	High speed

Image: A diagram illustrating the controls and functions of the 5-Axis CNC MPG Handwheel Controller, including axis selection and speed settings.

MPG Handwheel Controller Functions

Mark	Description
OFF	MPG OFF
X	Select operation X axis
Y	Select operation Y axis
Z	Select operation Z axis
4	Select operation 4 axis

Mark	Description
5	Select operation 5 axis
X1	Low speed movement
X10	Medium speed movement
X100	High speed movement

5.3 Basic Workflow

1. **Design:** Create your design using CAD/CAM software.
2. **G-code Generation:** Generate G-code from your design, ensuring it is compatible with Grbl v1.1.
3. **Workpiece Setup:** Securely clamp your material to the machine bed.
4. **Zeroing:** Use the MPG controller or software to set the X, Y, and Z zero points for your workpiece.
5. **Load G-code:** Load the generated G-code file into your control software or offline controller.
6. **Start Operation:** Initiate the carving process. Monitor the machine closely during operation.

6. MAINTENANCE

Regular maintenance ensures the longevity and optimal performance of your NBS-6040 CNC Router Machine.

- **Cleaning:** After each use, clean the machine thoroughly to remove dust, chips, and debris. Pay special attention to the linear rails, ball screws, and spindle area. A dust shoe (sold separately) can help manage debris during operation.
- **Lubrication:** Periodically apply a thin layer of appropriate lubricant to the linear rails and ball screws to ensure smooth movement and prevent wear. Consult the assembly guide for recommended lubricants.
- **Connection Checks:** Regularly inspect all electrical connections, including power cables, motor cables, and limit switch wires, for any signs of wear or looseness.
- **Spindle Care:** Keep the spindle clean and free of dust buildup. Ensure the collet and nut are clean before inserting bits.
- **Fastener Inspection:** Periodically check all bolts and screws for tightness, especially those securing the gantry and machine frame.

7. TROUBLESHOOTING

This section addresses common issues you might encounter. For more complex problems, contact NYMOLABS technical support.

- **Machine Not Powering On:**
 - Check if the power cable is securely connected to both the control box and the power outlet.
 - Verify that the power switch on the control box is in the 'ON' position.
 - Ensure the power outlet is functional.
- **Axes Not Moving:**
 - Confirm that all stepper motor cables are securely connected to the control box and the motors.
 - Check if the emergency stop button is disengaged.
 - Verify that the control software is connected to the machine and sending commands.
 - Ensure the correct axis is selected on the MPG Handwheel Controller if using manual control.
- **Spindle Not Rotating:**
 - Check the spindle's power connection to the control box.

- Ensure the spindle's power switch (if present) is 'ON'.
- Verify that the G-code or software command is correctly initiating spindle rotation.
- **Communication Errors:**
 - Ensure the USB cable is securely connected between the control box and your computer.
 - Verify that the correct COM port is selected in your control software.
 - Restart both the machine and your computer.

8. SPECIFICATIONS

Key technical specifications for the NYMOLABS NBS-6040 CNC Router Machine:

Feature	Specification
Model Number	NBS-6040
Brand	NYMOLABS
Power Source	Corded Electric
Spindle Power	710W Custom-Made Trim Router
Maximum Rotational Speed	30,000 RPM
Collet Type	ER11
Collet Gripping Range	1-8mm (including 1/4", 1/8")
Control System	Open-source Grbl v1.1 based (32-bit chips, 80 KHz pulse frequency)
Axis Movement	Linear Rails & Ball Screws on every axis
X-Axis Travel	23.6 inches (600mm)
Y-Axis Travel	15.7 inches (400mm)
Z-Axis Travel	4.5 inches (115mm)
Overall Length	37.4 inches (950mm)
Overall Width	30 inches (765mm)
Overall Height	19.9 inches (505mm)
Base Type	Fixed

Large Size All-Aluminum Body

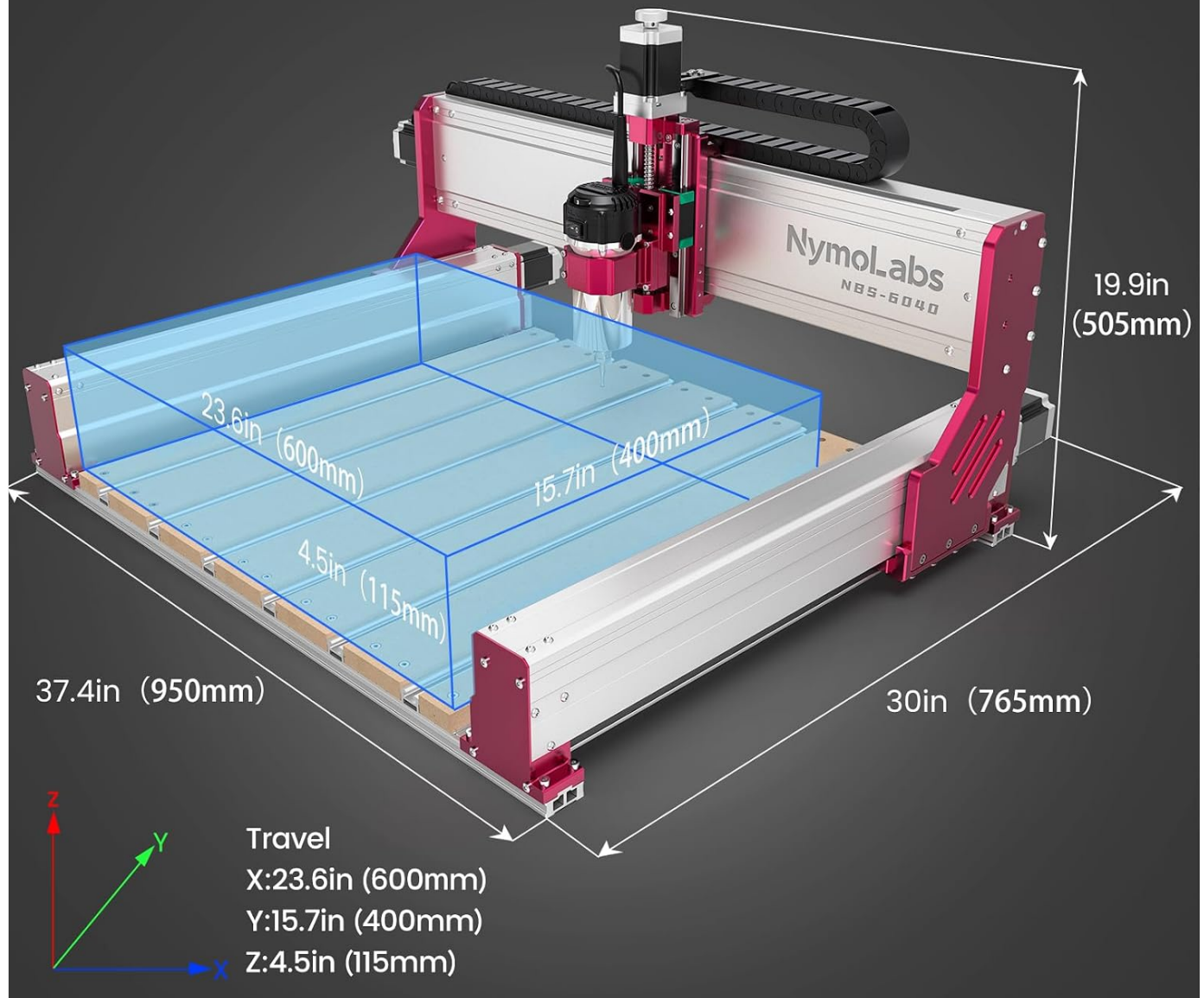


Image: A technical diagram showing the overall dimensions and the X, Y, Z travel capabilities of the NBS-6040 CNC Router Machine.

9. WARRANTY AND SUPPORT

For detailed warranty information, including coverage period and terms, please refer to the warranty card included with your product or visit the official NYMOLABS website. For technical support, troubleshooting assistance beyond this manual, or to inquire about replacement parts, please contact NYMOLABS customer service through the contact information provided on our website or in your product documentation.

Online Resources:

- NYMOLABS Official Website: [Visit NYMOLABS Store](#)

ASK A QUESTION ABOUT THIS MANUAL

Ask about setup, troubleshooting, compatibility, parts, safety, or missing instructions. Manuals+ will review the question and use this page's manual context to help answer it.

Name

Anonymous

Email

you@example.com

After a successful submission, we securely hash the supplied account or form email before sending it to Microsoft Advertising for conversion attribution. [Privacy details](#).

Question

Example: How do I reset this device or fix this error?

Details

Model number, symptoms, what you tried, or the section of the manual you are using.

Submit question