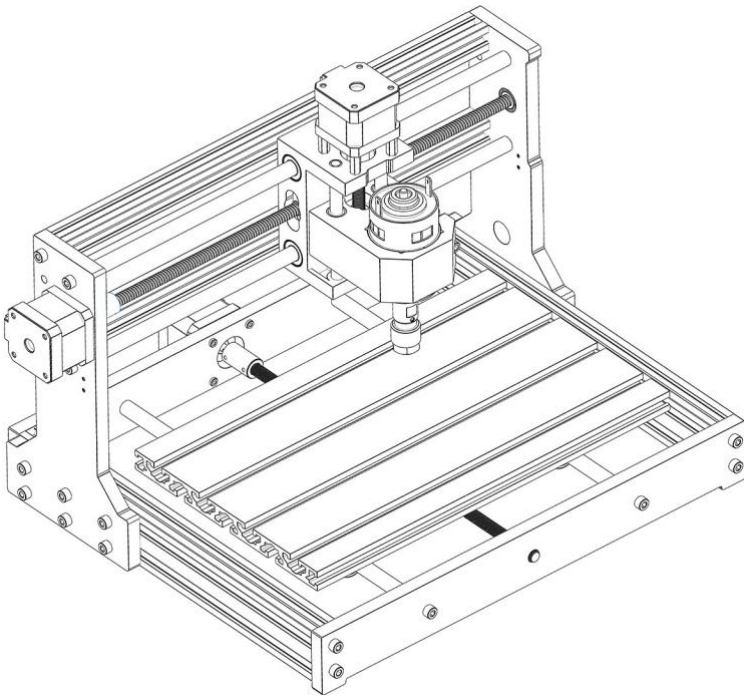




MONOPRICE

Desktop CNC Engraver/Carver



P/N 44220

User's Manual

SAFETY WARNINGS AND GUIDELINES

Please read this entire manual before using this device, paying extra attention to these safety warnings and guidelines. Please keep this manual in a safe place for future reference.

- This device is intended for indoor use only.
- Do not expose this device to water or moisture of any kind. Do not place drinks or other containers with moisture on or near the device. If moisture does get in or on the device, immediately remove it from its power source and allow it to fully dry before reapplying power.
- Do not touch the device, the power cord, or any other connected cables with wet hands.
- Do not expose this device to excessive vibration or extreme force, shock, or fluctuations in temperature or humidity.
- Do not expose this device to excessively high temperatures. Do not place it in, on, or near a heat source, such as a fireplace, stove, radiator, etc. Do not leave it in direct sunlight.
- Do not place or install this device in an area where it can be exposed to excessive amounts of dust, humidity, oil, smoke, or combustible vapors.
- Prior to operation, check the unit and power cord for physical damage. Do not use if physical damage has occurred.
- Before plugging the unit into a power outlet, ensure that the outlet provides the same type and level of power required by the device.
- Unplug this device from the power source when not in use.
- Take care to prevent damage to the power cord. Do not allow it to become crimped, pinched, walked on, or become tangled with other cords. Ensure that the power cord does not present a tripping hazard.
- Never unplug the unit by pulling on the power cord. Always grasp the connector head or adapter body.
- Do not reach inside the unit during operation.
- Ensure that the unit is turned off and unplugged from its power source before making repairs or performing service.

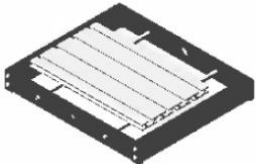
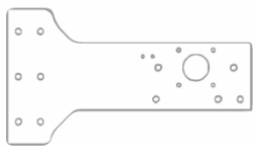
- Clean using a soft, dry cloth only. Do not use chemical cleaners, solvents, or detergents. For stubborn deposits, moisten the cloth with warm water.
- Keep out of reach of children.

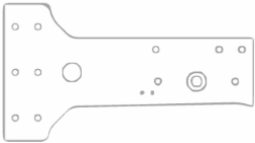
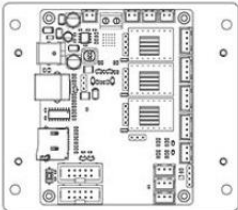
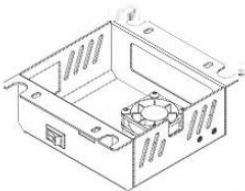
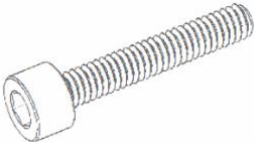
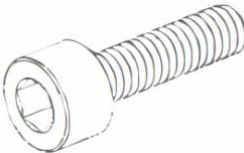
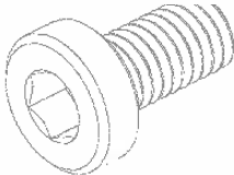
CUSTOMER SERVICE

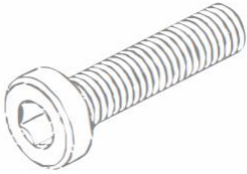
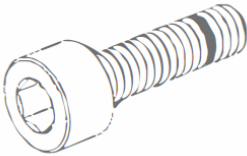
The Monoprice™ Customer Service department is dedicated to ensuring that your ordering, purchasing, and delivery experience is second to none. If you have any problem with your order, please give us an opportunity to make it right. You can contact a Monoprice Customer Service representative through the Live Chat link on our website www.monoprice.com or via email at support@monoprice.com. Check the website for support times and links.

PACKAGE CONTENTS

Please take an inventory of the package contents to ensure you have all the items listed below. If anything is missing or damaged, please contact Monoprice™ Customer Service for a replacement.

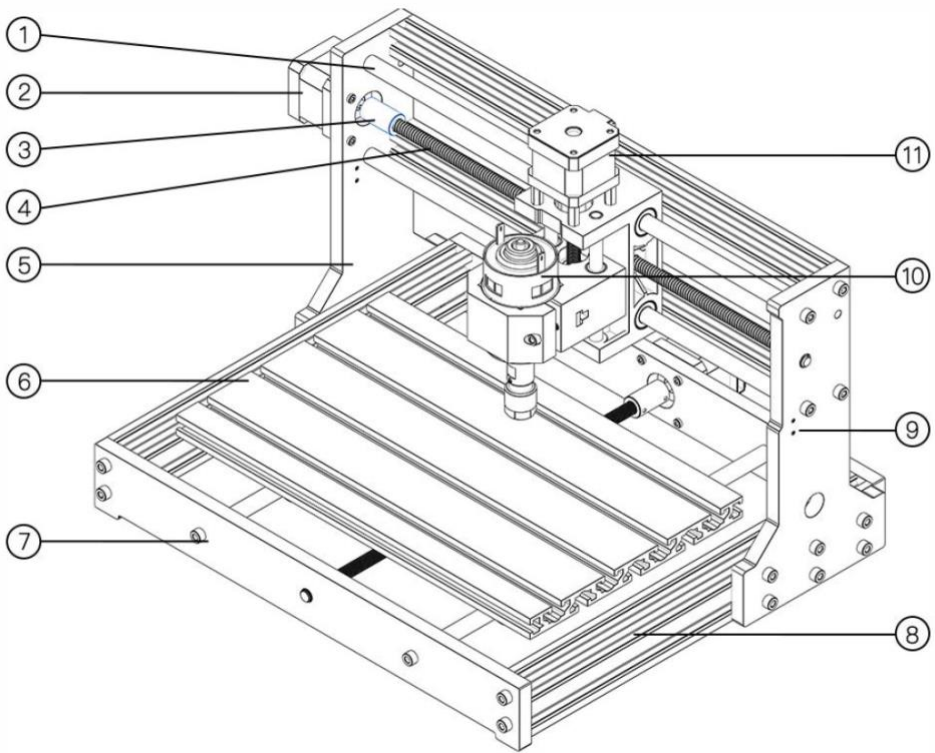
		
1x Base	2x Profile	2x Guide Rod
		
X-axis Screw Rod	1x Y-axis Screw Rod	1x Left Plate

		
1x Right Plate	1x Z-axis Module	2x Motor Module
		
1x ER11 Spindle Motor Chuck	1x Motherboard Module	1x Motherboard Cover
		
12x M5x25 Screw	8x M5x16 Screw	4x M3x6 Screw

		
8x M3x14 Screw	4x M4x12 Screw	1x Clamping Screw Set
		
1x Tool Kit	1x Wire Bag	1x USB Cable
		
1x AC Power Adapter	1x AC Power Cord	1x User's Manual

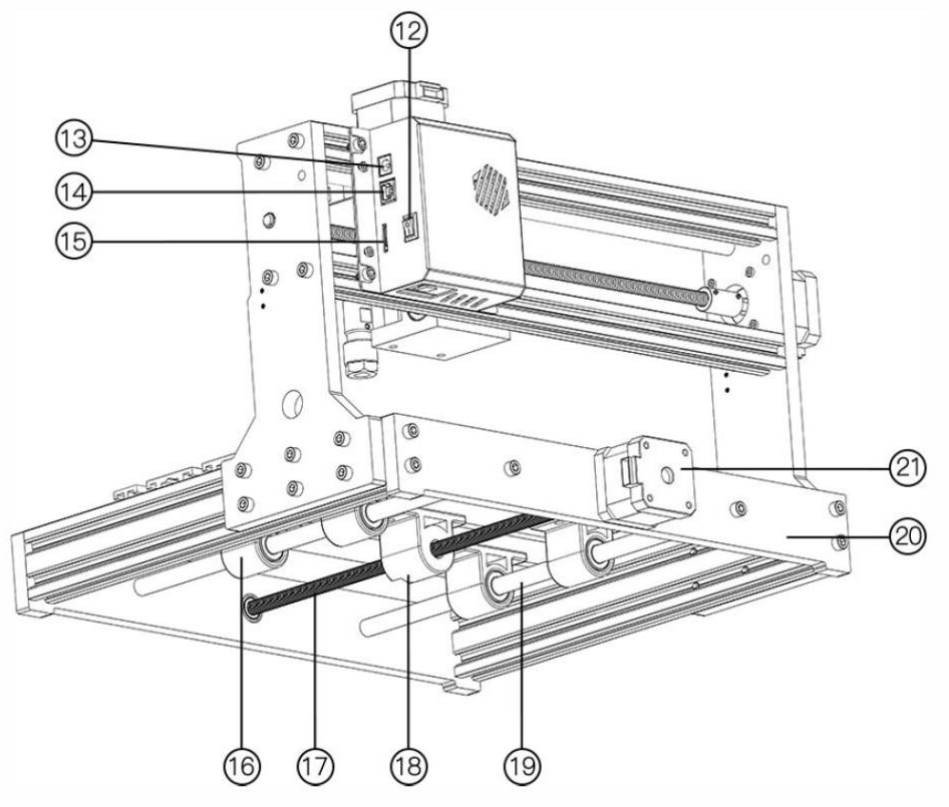
PRODUCT OVERVIEW

Front View



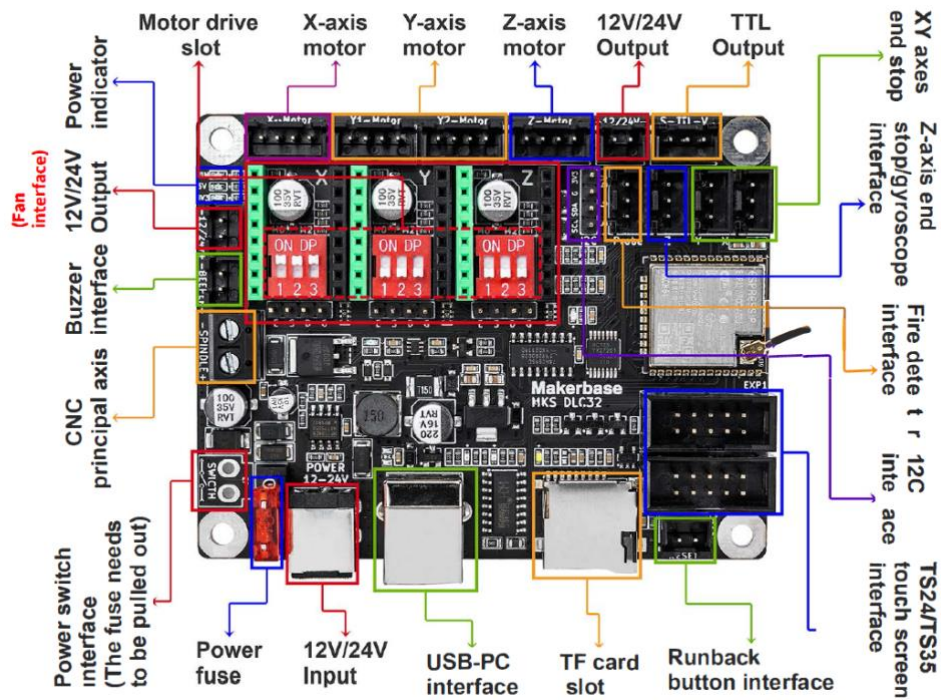
- 1. X-axis Guide Rod
- 2. X-axis Stepper Motor
- 3. X-axis Coupling
- 4. X-axis Screw Rod
- 5. Left Plate
- 6. Y-axis Engraving Platform
- 7. Front Plate
- 8. Right Profile
- 9. Right Plate
- 10. Spindle Motor
- 11. Z-axis Stepper Motor

Rear View



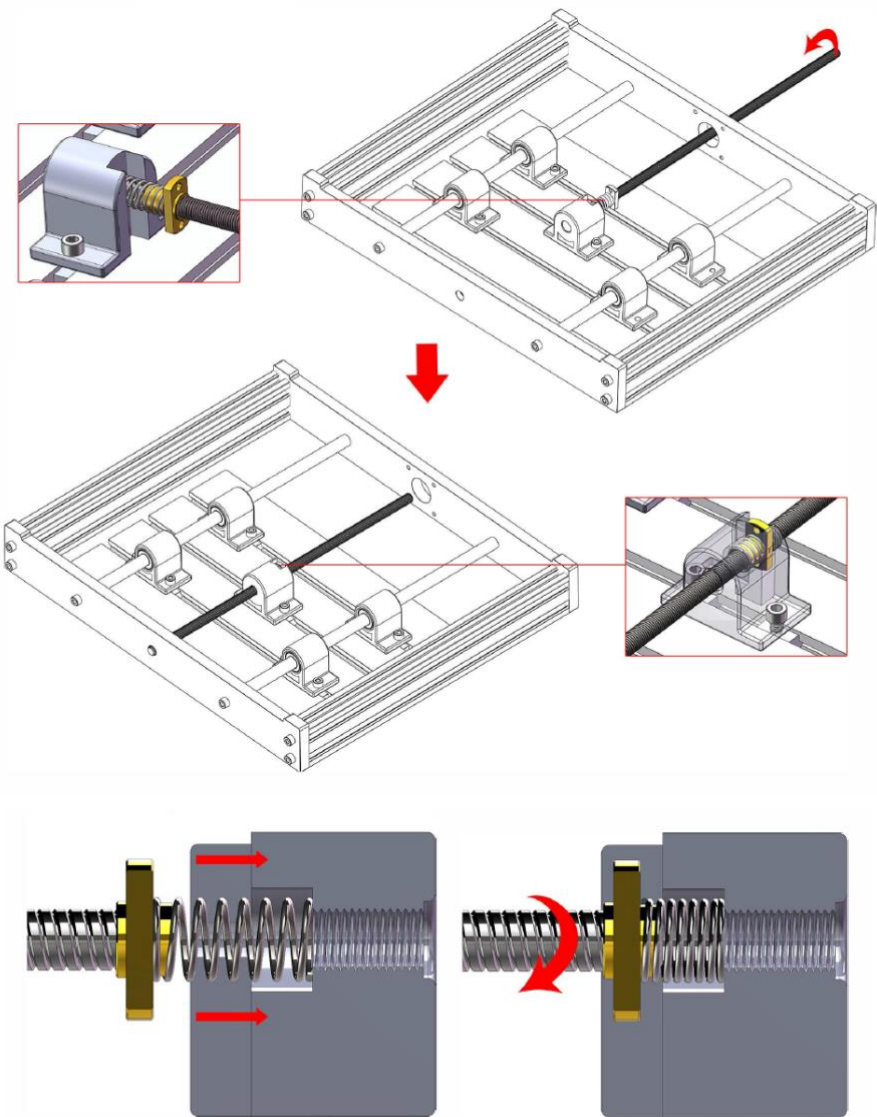
- 12. Power Switch
- 13. DC Connector
- 14. USB Port
- 15. SD™ Card Slot
- 16. Y-axis Guide Rod Slider
- 17. Y-axis Screw Rod
- 18. Y-axis Screw Rod Holder
- 19. Y-axis Guide Rod
- 20. Rear Plate
- 21. Y-axis Stepper Motor

Motherboard Module

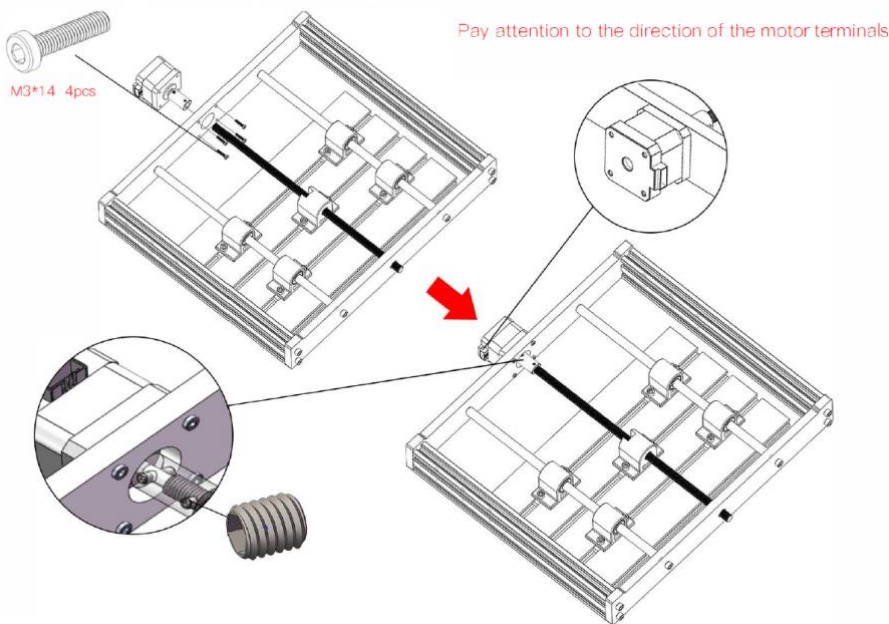


ASSEMBLY

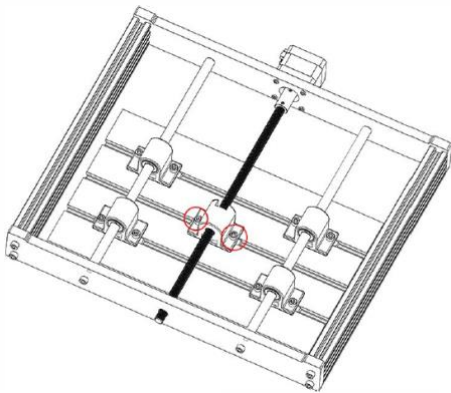
1. Insert the **Y-axis Screw Rod** through the hole in the **Rear Plate** of the **Base**. Screw one of the **Brass Nuts** half-way onto the end of the **Y-axis Screw Rod**. Ensure that the rod's threads do not protrude out of the nut. Slide one of the **Springs** onto the end of the **Brass Nut**, then push the assembly into the vertical slot in the **Y-axis Screw Rod Holder** until the **Spring** is fully compressed. Turn the **Y-axis Screw Rod** clockwise to engage the threads in the **Y-axis Screw Rod Holder**. Continue threading the rod through the holder until the end of the rod is flush with the rear of the **Base**. Ensure that the **Y-axis Screw Rod** rotates smoothly.



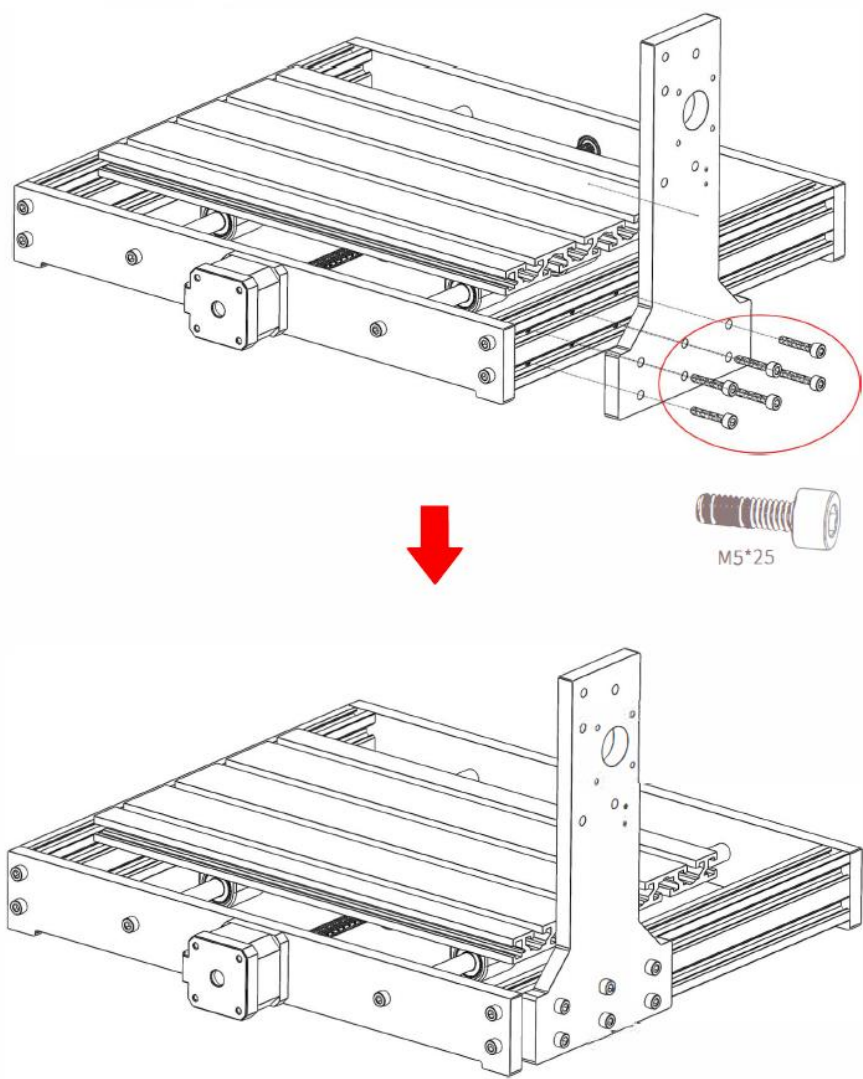
2. Insert the drive shaft of one of the **Motor Modules** into the hole in the **Rear Plate** and onto the **Y-axis Screw Rod**. Ensure that the motor terminals are positioned as shown in the inset image below. If necessary, rotate the **Y-axis Screw Rod** until the face of the **Motor Module** just makes contact with the **Rear Plate**. Secure the **Motor Module** to the **Rear Plate** using **4x M3x14 Screws**. Once the **Motor Module** is secured to the **Rear Plate**, tighten the screws on the **Motor Module** drive shaft to secure the **Motor Module** to the **Y-axis Screw Rod**.



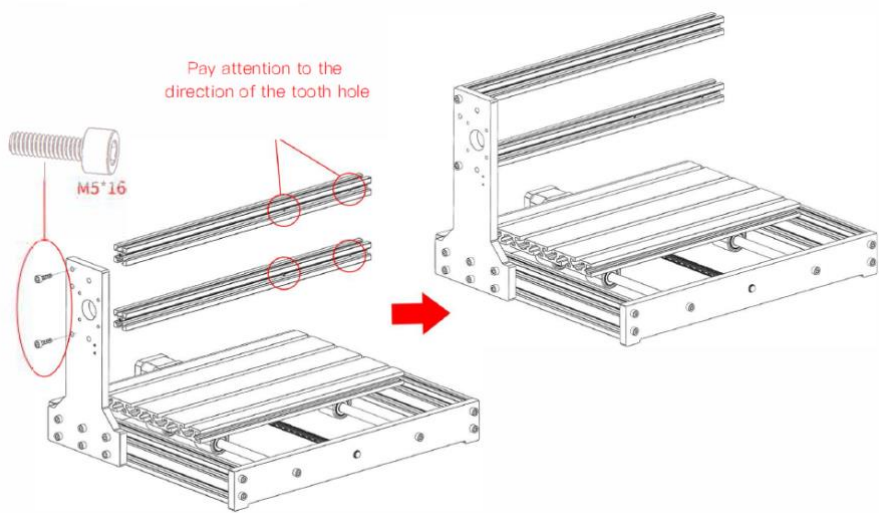
3. Ensure that the **Y-axis Screw Rod** rotates smoothly, then tight the screws on the **Y-axis Screw Rod Holder** to secure it into place on the **Y-axis Engraving Platform**. Ensure that the **Y-axis Screw Rod** still rotates smoothly.



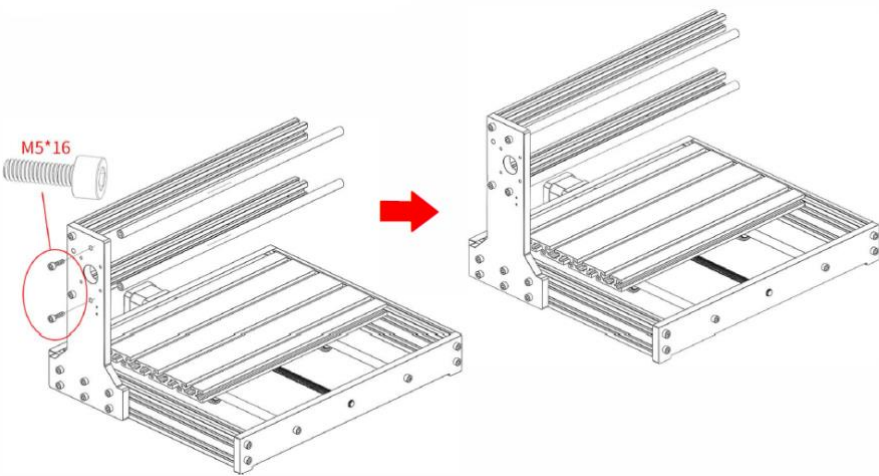
4. Attach the **Left Plate** to the left side of the Base using 6x **M5x25 Screws**.



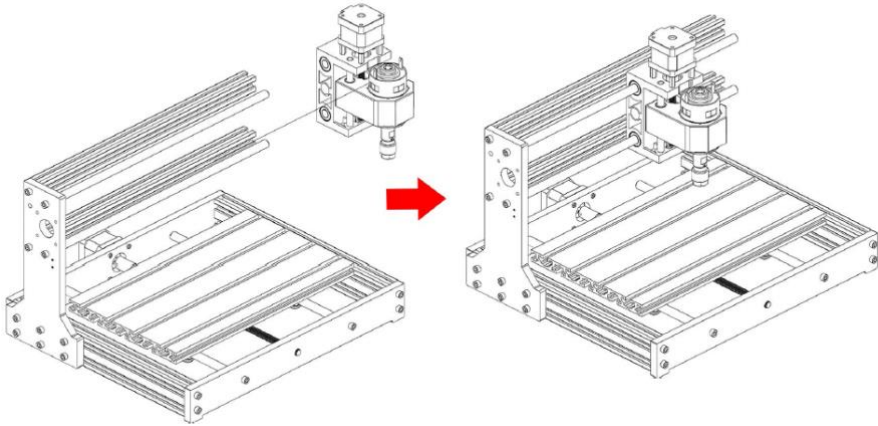
5. Attach the two **Profiles** to the **Left Plate** using 2x **M5x16 Screws**. Ensure that the screw holes on the **Profiles** are positioned away from the **Left Plate**.



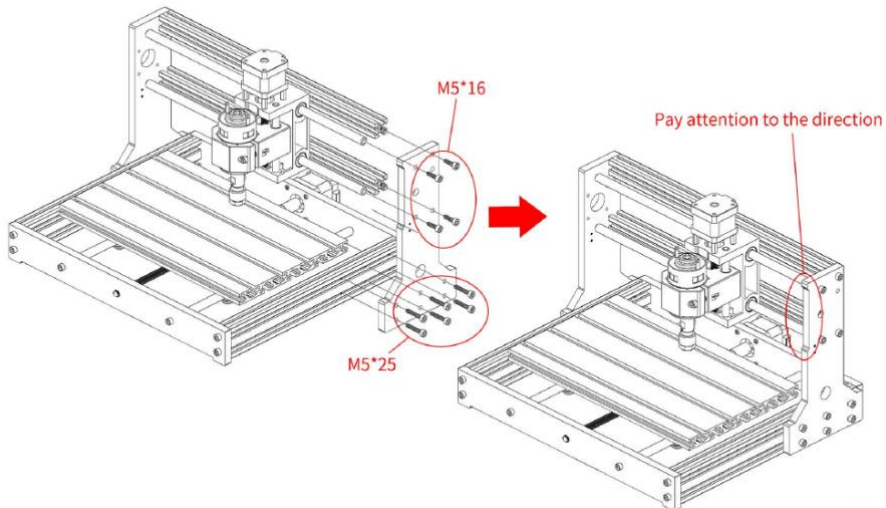
6. Attach the two **Guide Rods** to the **Left Plate** using 2x **M5x16 Screws**.



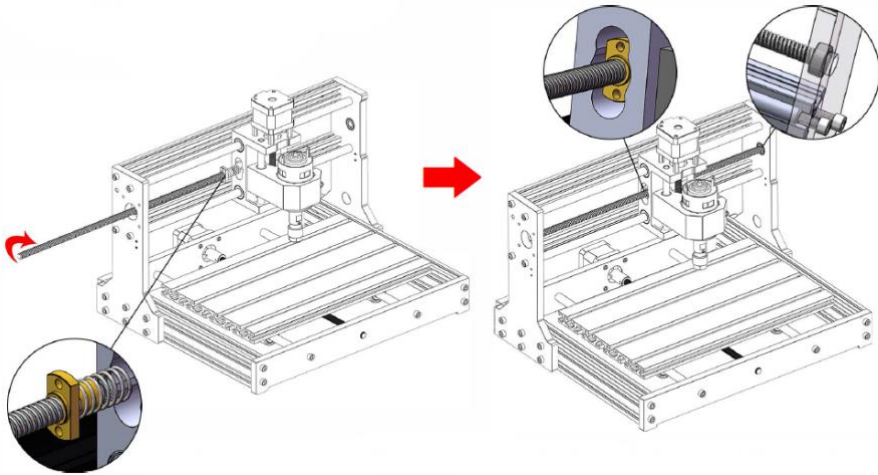
7. Insert the two **Guide Rods** into the holes on the **Z-axis Module**, then slide the **Z-axis Module** onto the **Guide Rods**. Ensure that the module slides smoothly on the **Guide Rods**.



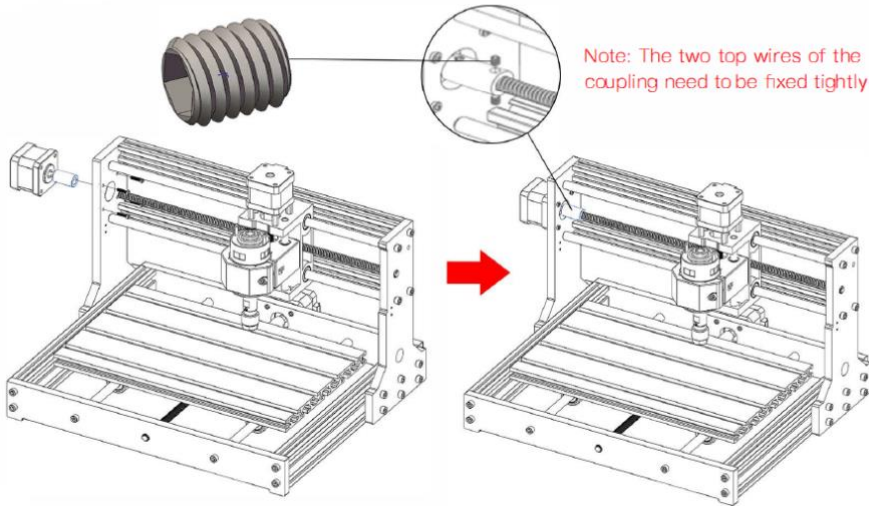
8. Position the **Right Plate** so that the horn at the top is closest to the front of the **Base**, then attach the **Right Plate** to the right side of the **Base** using 6x **M5x25 Screws**. Attach the two **Guide Rods** and two **Profiles** to the **Right Plate** using 4x **M5x16 Screws**. Move the **Z-axis Module** along the **Guide Rods** to ensure that it continues to move smoothly.



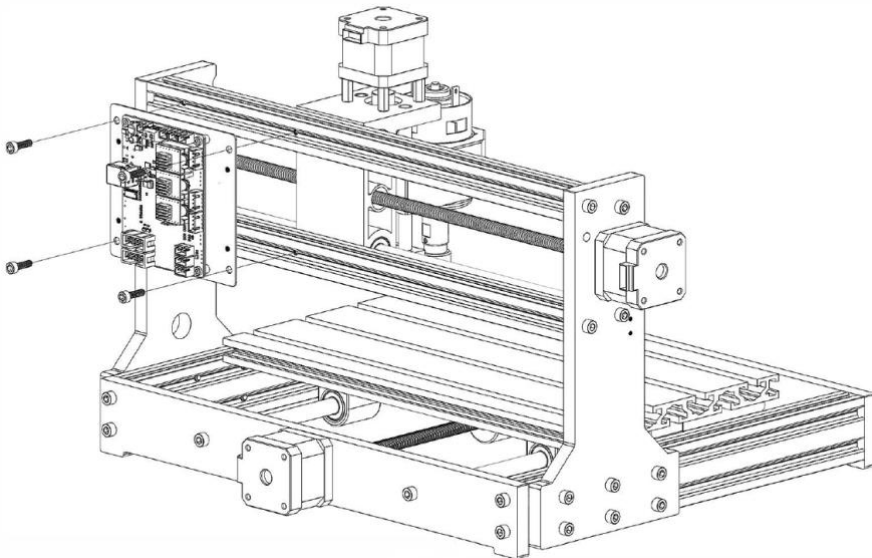
9. Insert the **X-axis Screw Rod** through the hole in the **Left Plate**. Screw one of the **Brass Nuts** half-way onto the end of the **X-axis Screw Rod**. Ensure that the rod's threads do not protrude out of the nut. Slide the one of the **Springs** onto the end of the **Brass Nut**, then push the assembly into the vertical slot in the **Z-axis Module** until the **Spring** is fully compressed. Turn the **X-axis Screw Rod** clockwise to engage the threads in the **Z-axis Module**. Continue threading the rod through the module until the end of the rod is flush with the face of the **Left Plate**. Ensure that the **X-axis Screw Rod** rotates smoothly.



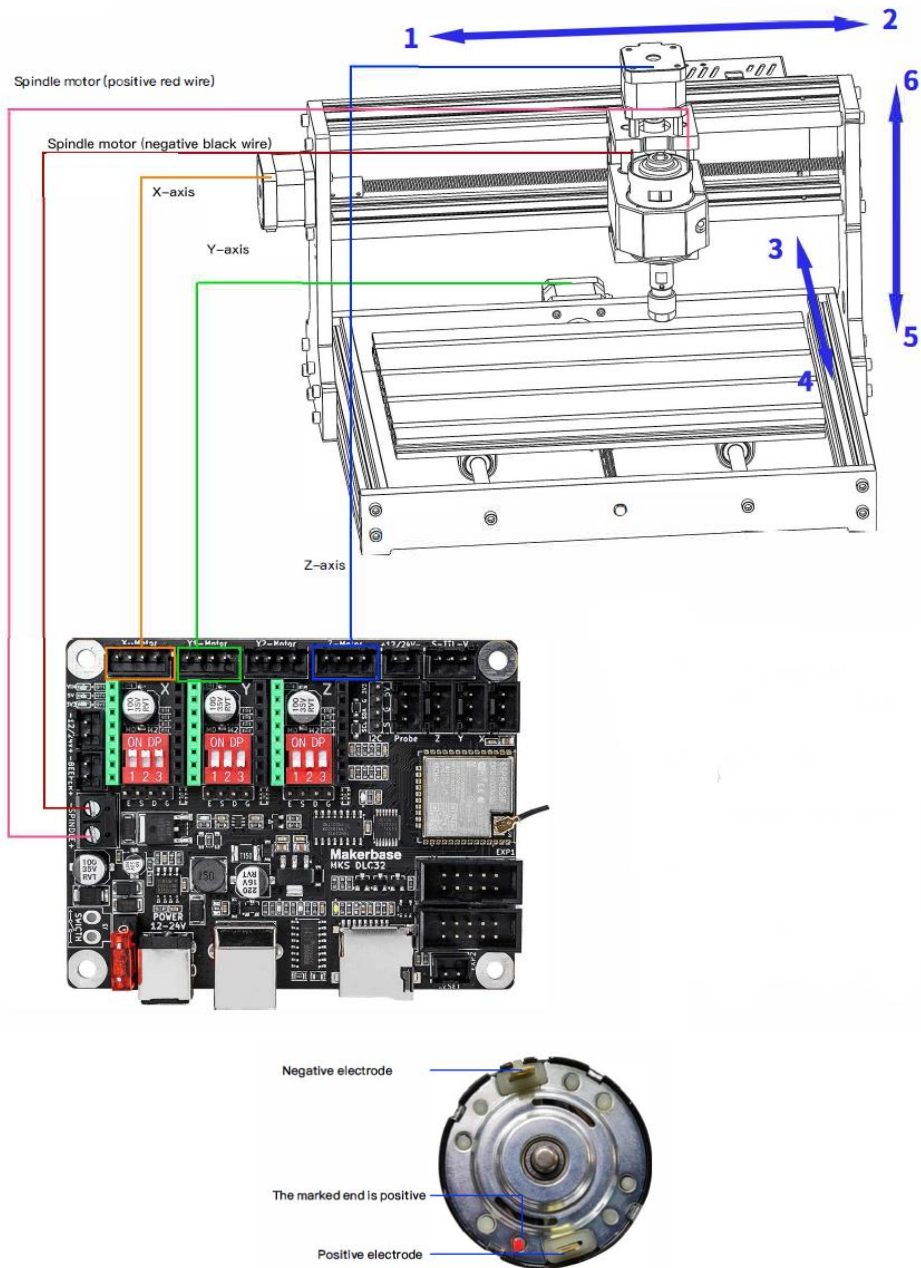
10. Insert the drive shaft of one of the **Motor Modules** into the hole in the **Left Plate** and onto the **X-axis Screw Rod**. If necessary, rotate the **X-axis Screw Rod** until the face of the **Motor Module** just makes contact with the **Left Plate**. Secure the **Motor Module** to the **Left Plate** using 4x **M3x14 Screws**. Once the Motor Module is secured to the Rear Plate, tighten the screws on the Motor Module drive shaft to secure the **Motor Module** to the **X-axis Screw Rod**.



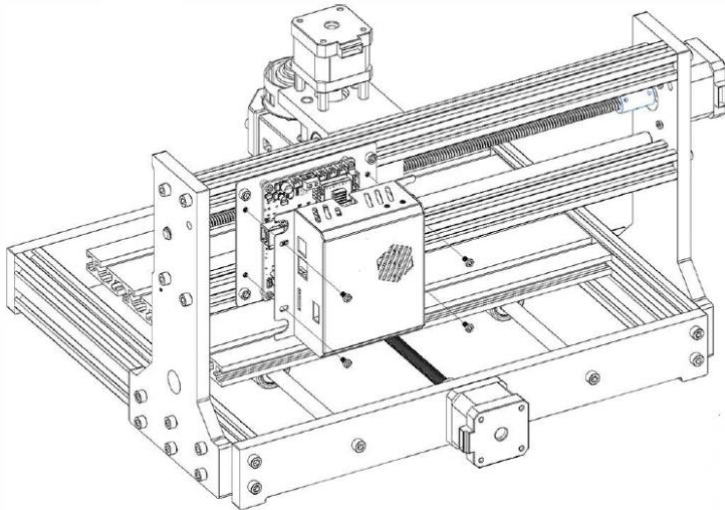
11. Position the **Motherboard Module** against the back side of the two **Profiles** with the DC connector, USB port, and card reader adjacent to the **Right Plate**, then secure it in place using 4x **M4x12 Screws**.



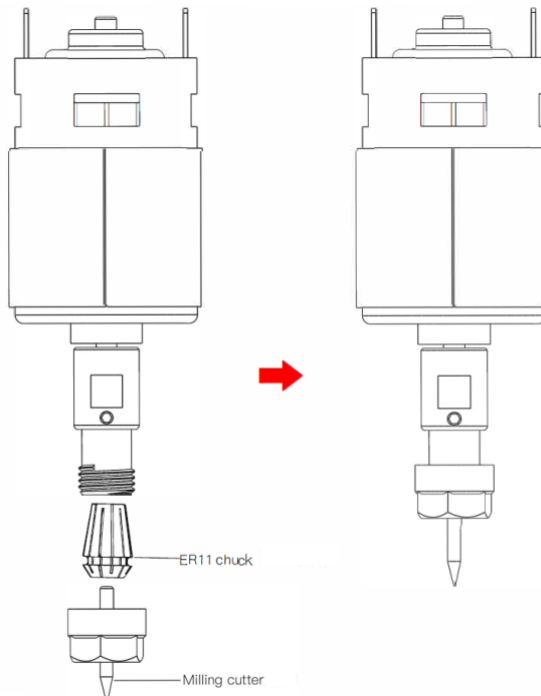
12. Using the wires and wiring harnesses found in the **Wire Bag**, connect the **Spindle Motor**, **X-axis Stepper Motor**, **Y-axis Stepper Motor**, and **Z-axis Stepper Motor** to the **Motherboard Module**, as shown in the diagram below. Note that the blue arrows and numbers in the diagram indicate the direction that the buttons on the **Jog** dialog should move the assembly. See the *DIRECTION CHECK* section for more details.



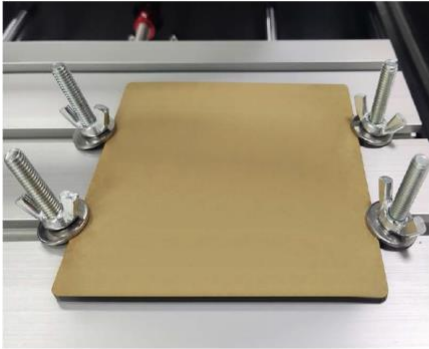
13. Attach the **Motherboard Cover** to the **Motherboard Module** using 4x **M3x6 Screws**.



14. Insert the **ER11 Spindle Motor Chuck** into the **Spindle Assembly**, narrow end first, then insert the **Milling Cutter** into the **ER11 Spindle Motor Chuck** and screw it into place.

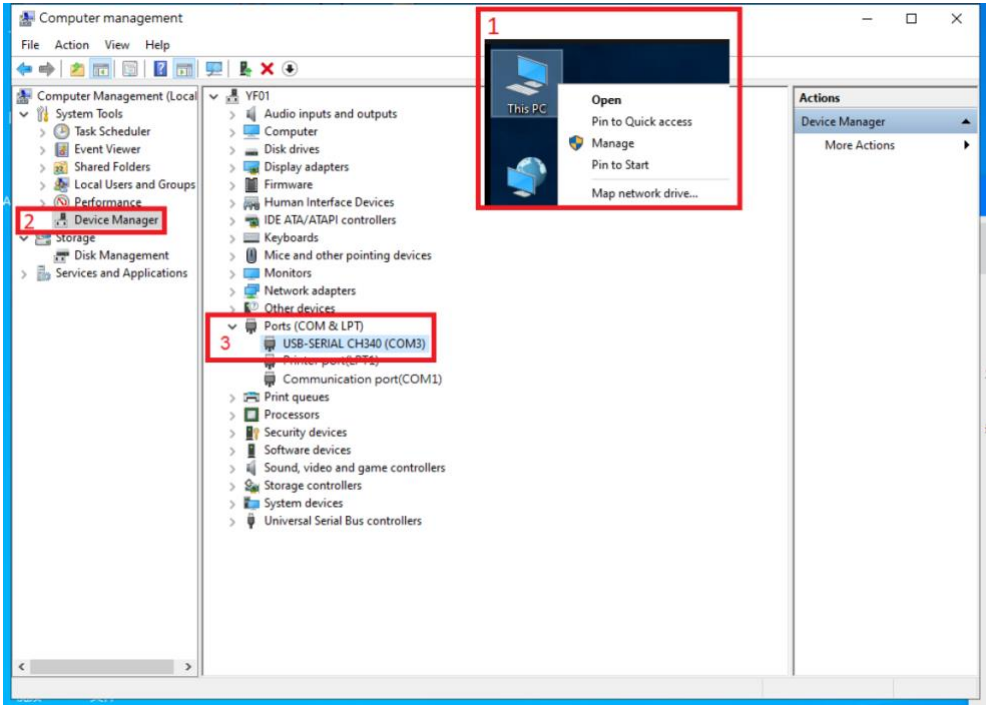


15. While you do not need to do this yet, the following images show how to use the **Clamping Screw Set** to secure an object to the **Engraving Platform**.



CONNECTION TO WINDOWS PC

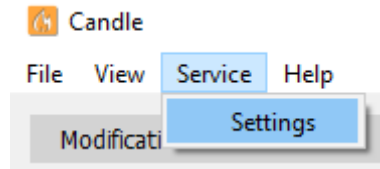
1. Using the included **USB Cable**, plug one end into the engraver/carver, then plug the other end into an available USB port on your computer.
2. Connect the included **Power Cable** to the engraver/carver, then plug the other end into an available power socket (surge protector recommended).
3. Power on the engraver/carver using the on/off switch.
4. Right-click the **This PC** icon on desktop or the **This PC** main directory in File Explorer. Select the **Manage** entry to open the Computer Management application.
5. Click **Device Manager**, then click the **Ports (COM & LPT)** entry. Ensure that there is a **USB-SERIAL CH340 (COM#)** entry. Take note of the **COM#**.



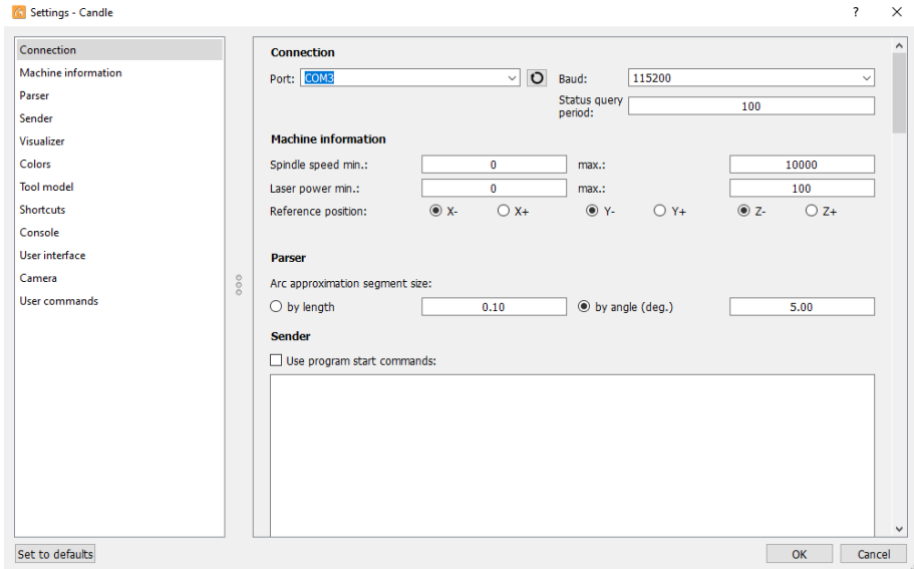
GRBL SOFTWARE INSTALLATION

This engraver/carver runs GRBL firmware, which allows it to use the free, open-source Candle software application, as well as other open-source GRBL software.

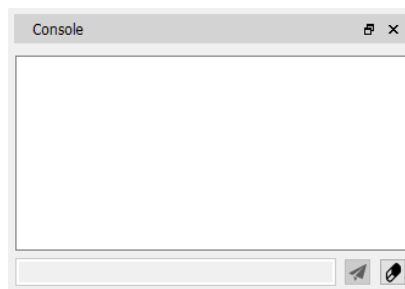
1. With the engraver/carver connected to your computer and powered on, open your web browser and navigate to the <https://github.com/Denvi/Candle> website.
2. Locate the download link for the latest version of the Candle software package, then click it to download the software.
3. Create a directory on your computer where you want Candle to reside, then extract the contents of the zip file into that directory. Candle does not require installation and can be run from any directory desired.
4. Double-click the **Candle.exe** file to run the Candle program.
5. Click the **Service** menu, then select the **Settings** entry.



6. In the **Connection** section, use the **Port** pulldown list box to select the **COM** port number that you noted from **Device Manager** in the section above.



7. Click the **OK** button to save your selection. The software will now attempt to connect to the machine.
8. If the connection is successful, the **Console** section on the main screen will show **[CTRL+X] < Grbl 0.9j ['\$' for help]** (note that the Grbl version number may differ from this example). If not, the connection failed. Double-check the proper installation of the drivers and which port number is selected. Also, try to connect to a different USB port on your computer or swapping the USB cable for a known good cable.

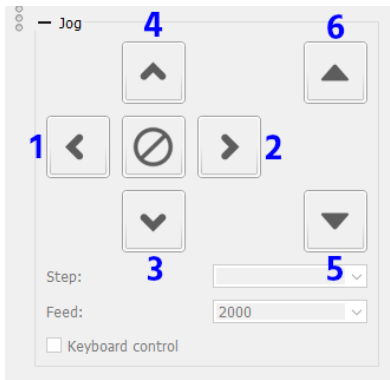


DIRECTION CHECK

Now that Candle is up and running, you can check that your wire connections are correct by using the **Jog** dialog to move the **Spindle**.

Refer to the wiring diagram on page 16 to see the directions that the number buttons in the **Jog** section below will move the **Spindle**. Press each button in turn to verify that the **Spindle** moves in the proper direction.

- If its movement direction is reversed, reverse the wire connection for the corresponding **Stepper Motor**.
- If it moves in an entirely different axis, the **Stepper Motor** is connected to the wrong **Axis Motor Control** connector on the **Motherboard Module**.



CONCLUSION

Congratulations! Your new engraver/carver is properly assembled and up and running.

Note that it is beyond the scope of this manual to document how to use Candle software and to create gcode files for use with the machine. Please refer to online forums and wikis for detailed information on using Candle, or whichever GRBL software package you prefer to use.

TECHNICAL SUPPORT

Monoprice™ is pleased to provide free, live, online technical support to assist you with any questions you may have about installation, setup, troubleshooting, or product recommendations. If you ever need assistance with your new product, please come online to talk to one of our friendly and knowledgeable Tech Support Associates. Technical support is available through the online chat button on our website www.monoprice.com or through email by sending a message to tech@monoprice.com. Check the website for support times and links.

To download the latest drivers, firmware, manuals, etc., go to www.monoprice.com and type the **P/N** into the search bar. If available, support files are linked at the bottom of the product page.

SPECIFICATIONS

P/N	44220
Supported Software	Candle or other GRBL software
Supported Carving Materials	Wood, plastic, aluminum plate, brass, acrylic
Engraving Area	11.8" x 7.1" x 1.6" (300 x 180 x 40 mm)
Input Power	24 VDC, 4A
AC Adapter Input Power	100 ~ 240 VAC, 50/60 Hz
Spindle Motor Speeds	7000 rpm or 9000 rpm
Stepper Motor Torque	1.3A 0.25Nm
Supported Operating Systems	Windows® XP, 7, 8, 10 Home Version
Drill Bits	3.175mm diameter, 0.1mm tip, 30mm length
Dimensions	16.5" x 10.0" x 11.0" (420 x 255 x 280 mm)

REGULATORY COMPLIANCE

Notice for FCC



This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Modifying the equipment without Monoprice's authorization may result in the equipment no longer complying with FCC requirements for Class B digital devices. In that event, your right to use the equipment may be limited by FCC regulations, and you may be required to correct any interference to radio or television communications at your own expense.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Radio Notice for FCC

Caution

This FCC Part 15 radio device operates on a non-interference basis with other devices operating at this frequency. Any changes or modification to said product not expressly approved by Monoprice, including the use of non-approved antennas, could void the user's authority to operate this device.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Notice for ISED Canada

This device complies with ISED Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d'ISDE Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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