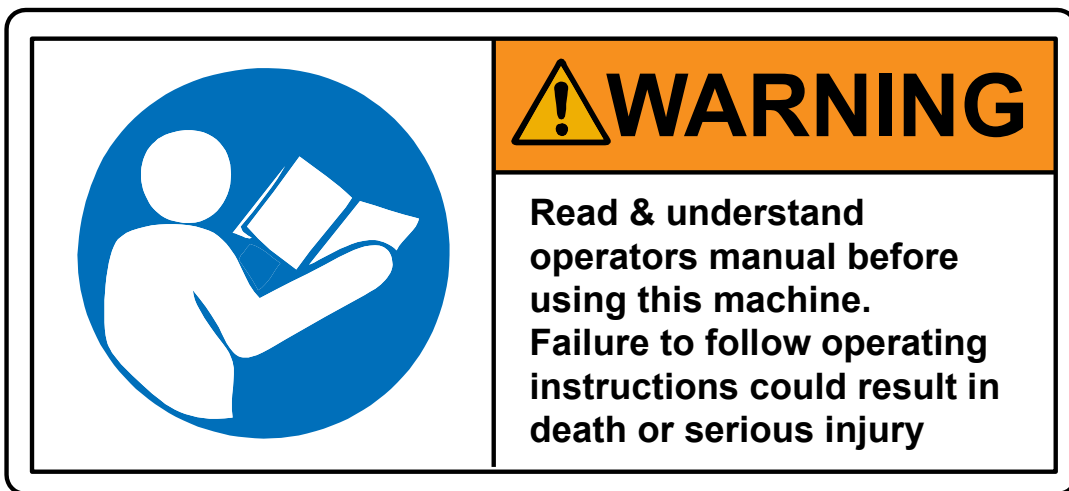


I2R CNC/ UCCNC

I2R CNC: Imagination to Reality
CNC ROUTER USERS MANUAL



Imagination to
Reality CNC



Before using/turning on the machine, the device should be carefully checked to make sure all connections are secure and the device is technically sound.



**Ensure You understand
the safety considerations
of a machine provided
in the open configuration
without a safety
enclosure**



**Do NOT Interfere
with the machine
when under CNC
control**



**NEVER LEAVE
THE MACHINE
WORKING
UNATTENDED**

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3 INTRODUCTION

Thank you for purchasing your I2R CNC router system. Firstly, please inspect the machine and all components after delivery has been received. Please check and ensure all aspects of the machine and associated extra items are in good condition and there is no evidence of damage or wear to any components due to the shipping process.

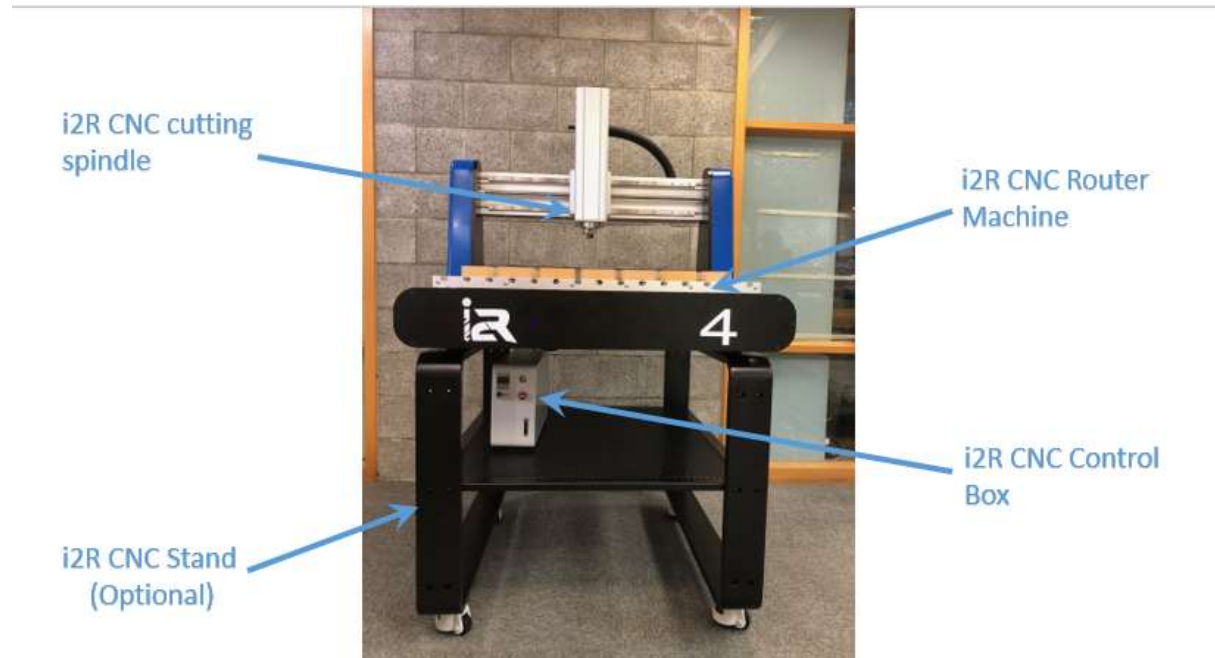
Please ensure you read the operational manuals for this i2R CNC router machine prior to attempting to use the system. All persons that use, or come into contact with the i2R CNC router system must be familiar with the instruction manual prior to using the system.

This manual serves to provide the information needed to safely operate and maintain the I2R CNC router system. This manual has been designed to be used as an instruction tool as well as a reference tool for everyday use. Step by step instructions are provided where possible to help all levels of users understand the machine.

NOTE: Important aspects of machine use and best practices are highlighted and should be adopted where possible to maximise the machine tool life and performance. It is VERY IMPORTANT that all personnel read and understand the safety guidelines outlined in Section 3 (reference page 9) BEFORE operating the machine. All Warning and Caution notices must be noted and adhered to before interacting with the equipment. Always follow all the safety protocols!

4 MACHINE OVERVIEW

4.1 COMPONENT IDENTIFICATION



Component	Function
i2R CNC controller	The i2R CNC controller is the white control box that has the electronics necessary to move and manipulate the machine position and spindle speed.
i2R CNC router main machine	This is the main machine XYZ platform. This consists of 3 ball screw driven axes on an aluminium frame
i2R CNC main cutting spindle	The Cutting spindle rotates and drives the cutting tool in the materials the CNC router is asked to cut and process
i2R CNC Stand	The i2R CNC stand is a steel stand that the machine can sit on (This is option extra)

5 SAFETY

The i2R CNC router is an electrical appliance and precision machine. Protect yourself and your investment. Read and understand the entire owner's manual before attempting assembly or operation. Read and understand the warnings posted on the machine and in this manual. On i2R CNC router Basic models, before attaching a router, read and become thoroughly familiar with all the router manufacturer's operating and safety instructions. Failure to comply with all the warnings may cause serious personal injury or costly damage to your i2R CNC router.

This i2R CNC router is designed and intended for use by properly trained and experienced personnel only. If you are not familiar with the proper and safe operation of a CNC machine, do not use the i2R CNC router until proper training and knowledge have been obtained.

Your i2R CNC router machine is intended for cutting wood, acrylics, wood-fibre composites, certain plastics and non-ferrous metals. Do not use this machine for other than its intended use. If used for other purposes, I2R disclaims any real or implied warranty and is NOT responsible for any injury that may result from that use.

5.1 MEANING OF THE RELATED SYMBOLS

DANGER Symbols and texts, that are marked with the addition "DANGER", warn against a specific threatening/dangerous hazard (serious injury, long term damage, death)
Unconditional attention must be given to these references!

WARNING Symbols and texts, that are marked with the addition "WARNING", warn against a possibly threatening danger (serious injury, long term damage, death)
Unconditional attention must be given to these references!

CAUTION Symbols and texts, that are marked with the addition "CAUTION", warn against a possibly threatening danger (possible injuries, risk of damages)
Unconditional attention must be given to these references!



Where the manual refers with this symbol (shown left) it contains very important references. Compliance is unconditional in order to avoid damage to people and property.

Unconditional attention must be given to these references!



Danger through electric shock.



Danger through mechanical movements – danger of crushing and pinching



Danger through uncontrolled movement / crashing and heavy loads.



Danger through flying particles ejected by the machine system. Carry unconditionally visibility protection – ALWAYS WEAR EYE PROTECTION –



READ THE MANUAL – and have the manual to hand at all times near the machining area.



DANGER spindle cutting edge



LOOSE CLOTHING – never wear loose clothing of jewellery near machine.



DANGER face mask must be worn



WARNING – ear protection must be worn





WARNING – face mast must be worn

5.2 WORKSHOP ENVIRONMENT

1. Ensure that the floor can bear the weight of the machine and work pieces mounted on it.
2. Keep the floor around the machine clean and free of scrap material, oil and grease.
3. Do not lean lumber or other heavy materials against the gantry, guide rails or table.



4. Support the weight of the dust hose attached to the dust shoe accessory to prevent the weight of the hose from dislodging the dust shoe. Ensure that there is sufficient slack in the dust collection hose to allow the spindle to cover the entire work area.
5. Locate the I2R CNC router away from overhead pipes and plumbing fixtures to prevent condensation from dripping on to the spoil boards and control system components. 
6. Locate the I2R CNC router away from sinks, faucets or other water supplies or storage to prevent splash-out that can damage the spoil boards and control system components. 
7. Provide adequate room between the I2R CNC router and other machines in the shop to reduce the chance of accidental jarring when transporting lumber or other heavy materials through the shop and while materials are being worked on other machines.
8. Ensure adequate space between machines to allow for the possibility that the work piece will extend over the end of the I2R CNC router table.
9. Store cutting tools in a dry location and prevent contact to preserve the cutting edges.

5.3 HEALTH AND SAFETY

10. Always wear approved personal health and safety equipment as indicated for the materials and type of operations that will be performed. These should include a dust mask, hearing protection, safety clothing, and safety glasses/face shield. Do not rely on prescription or over-the-counter eyeglasses; they are *not* safety glasses. Wear ear protectors (plugs or muffs) even during short periods of operation.



11. Before operating this machine; remove any hand, wrist, and neck jewellery and roll sleeves up past the elbows. Be sure to not wear loose clothing which may become caught in the machine and confine long hair.
 - a. Non-slip footwear or anti-skid floor strips are recommended.



12. Use a dust mask or other safeguards to avoid inhaling dust generated from wood products. Install dust collection equipment consistent with shop ventilation practices and budget. Remove dust and debris from the floor frequently to prevent slipping. Drilling, sawing, sanding or machining wood products generates wood dust and other substances known to cause cancer. Wood products may emit harmful chemicals.



13. In addition to other health hazards, dust from wood and other materials is flammable. Do not operate welding, wood burning, smelting, soldering or other high-heat tools on the AutoRoute™ table or vicinity.
14. Do not operate this machine while tired or under the influence of drugs, alcohol or any medication.

5.4 ELECTRICAL

15. Make certain the switch is in the OFF position before connecting the machine to the power supply.
16. Make certain the machine is properly grounded and the circuit is protected with a fuse or circuit breaker in accordance with local codes. Install a separate circuit if necessary to limit power loss when multiple machines in your shop are operating simultaneously. If necessary, place a cover on the outlet to prevent accidental disconnection.
17. Make all machine adjustments or maintenance with the machine unplugged from the power source.
18. Follow effective lockout procedures to reduce the risk from high voltage wires and components, and prevent intentional bypassing of safety controls and accidental operation.
19. Don't use in a damp or wet location, or expose to rain, fog or snow.
20. Keep the electrical cord away from sharp edges, heat or moving parts, and do not store materials on top of it. Position the cord so it will not become a tripping hazard.
21. While the use of an extension cord is discouraged, it is recognized that the wiring layout of the shop may not allow the placement of the I2R CNC router directly next to an outlet. If it is necessary to use an extension cord, make sure the extension cord is in good condition, heavy enough to carry the current requirements, and installed to prevent a tripping hazard. An undersized cord will cause a reduction in voltage resulting in loss of power and overheating which may result in fire or electrical shock.
22. Connect the CNC router to the provided receptacle on the router table so that all machine movement can be regulated by the control box.



5.5 OTHER SAFEGUARDS

23. Remove and store adjusting keys and wrenches before turning on the power. If necessary for visibility, apply safety markings to adjusting wrenches and keys.

24. Install safety guards consistent with general shop safety practices. Keep safety guards in place at all times when the machine is in use. If removed for maintenance purposes, use extreme caution and replace the guards immediately after completion of maintenance.



25. Check damaged parts immediately. Before further use of the machine, a guard or other part that is damaged should be carefully checked to determine that it will operate properly and perform its intended function.

26. Keep visitors a safe distance from the work area. Keep children away.

27. Control liquids in your shop to limit the possibility of spillage that can damage the AutoRoute™ which can cause damage or personal injury from electric shock or fire. Be careful with storage and use of cleaning fluids, finishes and solvents. Never use the table to apply or dry finishes.

5.6 MAINTENANCE

28. Establish a weekly and monthly maintenance checklist and follow it diligently.

29. Routine maintenance should include periodic checks for alignment of moving parts, looseness or binding of moving parts, worn or bare wires, breakage of parts, skewed mounting and any other conditions that may affect its operation or cause injury. Analyse breakage or damage to determine the cause and take appropriate remedial action.

30. Do not operate the I2R CNC router if a component of the control system is damaged. It should be properly repaired or replaced before use.

31. Follow instructions for lubricating and changing accessories.

32. Store maintenance tools and supplies nearby, consistent with shop maintenance practices and resources.

5.7 OPERATIONAL PRACTICE

33. Never leave the machine running unattended. Always be in close reach of the emergency stop button.

34. Turn the power off and do not leave the machine until it comes to a complete stop.

35. Avoid pinch points and entanglement hazards. Keep hands and clothing away from the ball screws, thrust bearings, gantry, guide rails and rotating cutting tool while in operation.



36. Use the right tool at the correct speed and feed rate. Do not force a tool or attachment to do a job for which it was not designed. The right tool will do the job better and more safely.

37. Do not touch a cutting tool immediately after use. It will be hot and may cause skin burns. Exercise caution when handling the collet and spindle nut if the cutting tool is hot. Keep a heavy glove or oven mitt on hand for the purpose.



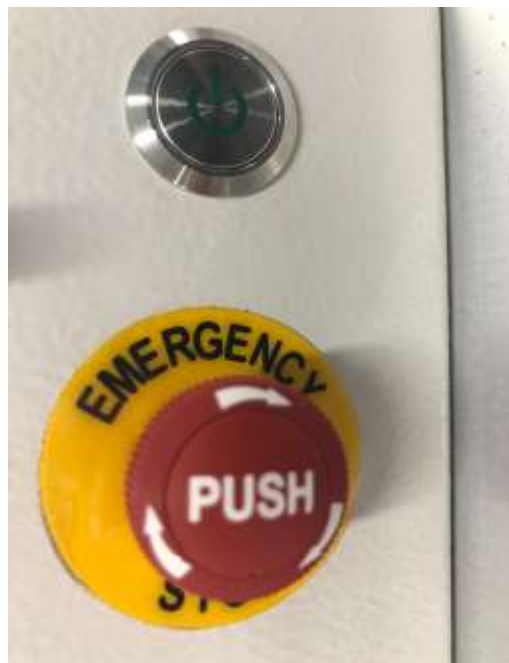
38. Do not lay a hot cutting tool on its side. Create a rack for cooling off hot cutting tools.

39. Use recommended accessories; improper accessories may be hazardous.

40. Do not use dull, gummy, or damaged cutting tools. Keep bits and other cutting tools clean and sharp for best and safest performance.
41. Turn off the machine before cleaning. Use a vacuum, brush or compressed air to remove chips or debris. Do not use hands.
42. Do not climb or stand on the machine. Serious personal injury and costly damage could occur if the machine tips over or the gantry is dislodged.
43. Remove loose items and unnecessary work pieces from the table before starting the machine.
44. Plan tool paths to make multiple passes rather than to take off a large amount of material at one time. This will reduce mechanical stress and heat on cutting tools.
45. Always secure a work piece to the spoil board using clamps, vacuum, or double-sided tape. If the work piece is mounted in a jig ensure that the fixture is securely held to the table. Never hold a work piece down by hand while operating.
46. Inspect the material of your work piece to detect any defects that may result in ejection of large pieces of scrap.
47. Make sure the work piece is free from nails, hardware, or other foreign objects.
48. After installing a cutting tool, make sure the collet is securely tightened. An unsecured cutting tool may fly loose from the collet and cause injury. Be sure that the adjusting wrenches have been removed and are secured before turning on the power.

5.8 EMERGENCY SWITCH

In the case where you need to immediately shut off power to the machine, hit the red emergency stop button located at the front of the control box.



WARNING: FOR YOUR OWN SAFETY READ INSTRUCTION MANUAL BEFORE OPERATING TOOL

5.9 GROUNDING INSTRUCTIONS:

This tool should be connected to a grounded metal permanent wiring system, or to a system having an equipment-grounding conductor. The I2R CNC router control system is wired assuming the ground pin on the AC controller box connection is connected to a grounded conductor.

5.10 STORAGE

In the case where the machines are stored and not used for extended periods of time (greater than 3 days) the machine must be placed in an atmosphere free from moisture and from excessive changes in temperature. The machine must be kept clean and sprayed periodically with silicone spray. The ball screws must be well greased.

6 LIABILITY AND GUARANTEE



All statements in these operating instructions serve the certain and undisturbed business of the CNC Router.

The operating instructions are an important component of the machine, its safe use, and the long term reliability of the CNC router system. These instructions must be read and studied carefully by ANY operator of the machine system before use.

Improper handling of the machine can lead to serious injury to the operator(s) and severe damage to the machine. The machine manufacturer and provider are not liable (except in the case of due negligence) for damage and injury due to improper handling and use of the CNC router machine.

We the manufacturers and appointed agents reserve the right to make variations to the frame and components in the event of future developments.

7 WARRANTY




The machine system is guaranteed with a 12-month warranty from the date of delivery on site at the customer location.

The warranty covers all hardware aspects of the machine use within the 12-month warranty period

provided the machine operation and use meets the following requirements:



- The machine is used by trained operators only. The use of the machine by untrained persons will **immediately void** the warranty as well as putting the machine and the untrained operator in serious risk of injury or damage.
 - The machine is used within the application scope recommended/discussed. This will have been discussed with the customer before purchase. Machining of hard materials e.g. stainless steel or other hard metals will put the machine under excessive stress and load, and will void the warranty. Section 8 outlines the scope of work that can be carried out on the CNC routers.
 - The machine is maintained in the same state and configuration as when the machine was delivered / installed. Modifications effecting the safe operation of the machine will void the warranty.
 - The environment where the machine is kept does not expose the machine to excessive moisture or thermal changes.
 - The AC electrical supply to the machine is reliable and free from excessive noise – if necessary a dedicated MCB/RCD switch may be required.
 - The AC electrical system has a reliable and professionally installed earth connection.
 - I2RCNC must be notified in the case where a mist coolant system is to be run on the machine. Special precautions are needed and the machine configuration will be different if mist coolant is to be used
 - The machine is kept clean, free from build-up of materials on moving parts especially the linear slides, and generally in good condition. Excessive build-up of material around the spindle and the linear slide mechanisms of the CNC router frame can cause excessive loads in the drive system and damage to the machine drives.
- 
- The maintenance of the ball screws is carried out periodically to ensure free unrestricted movement (see section 14)
 - The linear slides are periodically cleaned, inspected and lubricated (see section 14)
 - The cables to the machine, the power and communications are managed and protected. Damaged cables can cause short circuits and can damage the machine's sensitive electronics. Machine damage due to cable damage voids the warranty terms.
 - Damage or failure of the machine, or part of the machine is reported to i2RCNC immediately upon discovery of a problem.

7.1 WARRANTY REGARDING THE CONTROL PC

In the case ***where i2RCNC provides a PC for the CNC router operation*** the Guarantee on the control PC will be in-line with the CNC router system.

In the case ***where the customers control PC is used*** i2RCNC can take no responsibility for loss of functionality caused by subsequent failure of the customer's PC. In the case where i2RCNC installs the

machine on site, i2RCNC will test the control PC to ensure it is suitable for controlling the CNC router system.

We can provide remote login and reconfiguration if the control PC encounters technical issues. We recommend you purchase a fresh new control PC prior to the machine arrival and use this as the dedicated machine for the CNC system. A moderate spec Windows PC is sufficient for controlling the machine. Any extra/additional CAD packages you wish to run may require you to upgrade to a higher spec windows system.

A Laptop is fit for purpose and often the preferred unit to control the i2R system – As a machine operator you need to consider how to manage the use of the control PC as it is important not to let the swarf and chips generated during the cutting process interfere with the PC – for example - the keyboard etc.

8 RECOMMENDED USE

8.1 TYPICAL APPLICATION MATERIALS

The i2RCNC router systems are suitable for milling, boring, and engraving the following materials:

- Wood.
- Plastics.
- Aluminium and other nonferrous metals (under certain very specific conditions)
- Fibre composites e.g. GFK or CFK (with specific attention to the dust generated from cutting)

The above list of materials is appropriate if the following conditions are met

- Appropriate tooling is used for the job requirement
- The tools have been installed correctly in the collet mounting system in the provided spindle. Never use a tool outside of its operating parameters.
- The spindle speed and feed rate are appropriate for the job
- In the case where you are machining aluminium some extra care is required to maintain good chip development. If necessary, a cold airline will improve chip generation.
- Coolant may be required in some cases where aluminium is the main application. In the case where coolant is used the operator must pay close attention to manage the coolant run off.
- In all cases – especially where composites are machined – provision of adequate extraction systems to eliminated hazardous swarf, dust and particulates must be implemented.

8.2 SPECIAL NOTE ON APPLICATION MATERIALS

If the CNC router system is used on materials outside of the scope of recommended use, then the warranty does not cover and issues caused by this incorrect machine usage.

9 MACHINE INSTALLATION

9.1 MACHINE INSTALLATION

In the case where a Machine is delivered by i2RCNC directly to the customer then the following aspects must be taken into account

- Prior to delivery i2RCNC must be notified of any narrow or difficult access areas to the position where the machine will be finally installed
- If any access points / hallways / gates etc. are narrower / smaller / lower than normal and the machine has to go in at difficult / awkward angles, then i2RCNC should be notified of such issues prior to delivery.
- It is important that sufficient man power / forklift is provided to allow easy movement of the machine into place
- If manually lifted, then 4 able bodied persons. 1 on each corner of the machine and the machine should be lifted without any cardboard underneath it.



Figure 1: i2R CNC 4 with box cover removed and ready for lifting

9.2 MACHINE INSTALLATION BY FREIGHT

In the case where a machine is not delivered by i2RCNC but is delivered by a third



party then EXTRA care is needed to ensure the machine is handles correctly.

The machines are crated in cardboard covering.

Please manage the machines with extreme caution and only use forklifts to move the crated machines on their pallets.



Figure 2 Scope of crated machine delivery

9.3 MACHINE ASSEMBLY ONCE DELIVERED

You should inspect your delivery before signing any paperwork with the delivery service. Once you have verified the machine and their contents are 100% in good condition and damage free after transport, only then should you accept the delivery and begin the setup process.

NOTE: in the case where i2RCNC will visit and install machines some (or all) of these tasks will be carried out by one of our installation technicians.

9.3.1 SETTING UP THE MACHINE
















I2R-4

Instructions for assembly



Parts list

- | | | | | |
|---|--|---|---|--|
| 
1
x2pcs
Shoulder Bolts
M8 | 
2
x8pcs
M5x25 | 
3
x10pcs
M3x20 | 
4
x6pcs
M5x10 | |
| 
5
x2pcs
M3x6 | 
6
x16pcs
M5x8 | 
7
x12pcs
M5x16 | 
8
x16pcs
M6x16 | 
9
x2pcs
M4x6 |
| 
10
x4pcs
M10x55 | 
11
x16pcs
M6 | 
12
x12pcs
M5 | 
13
x4pcs
M10 | |

Tools needed



Hex key

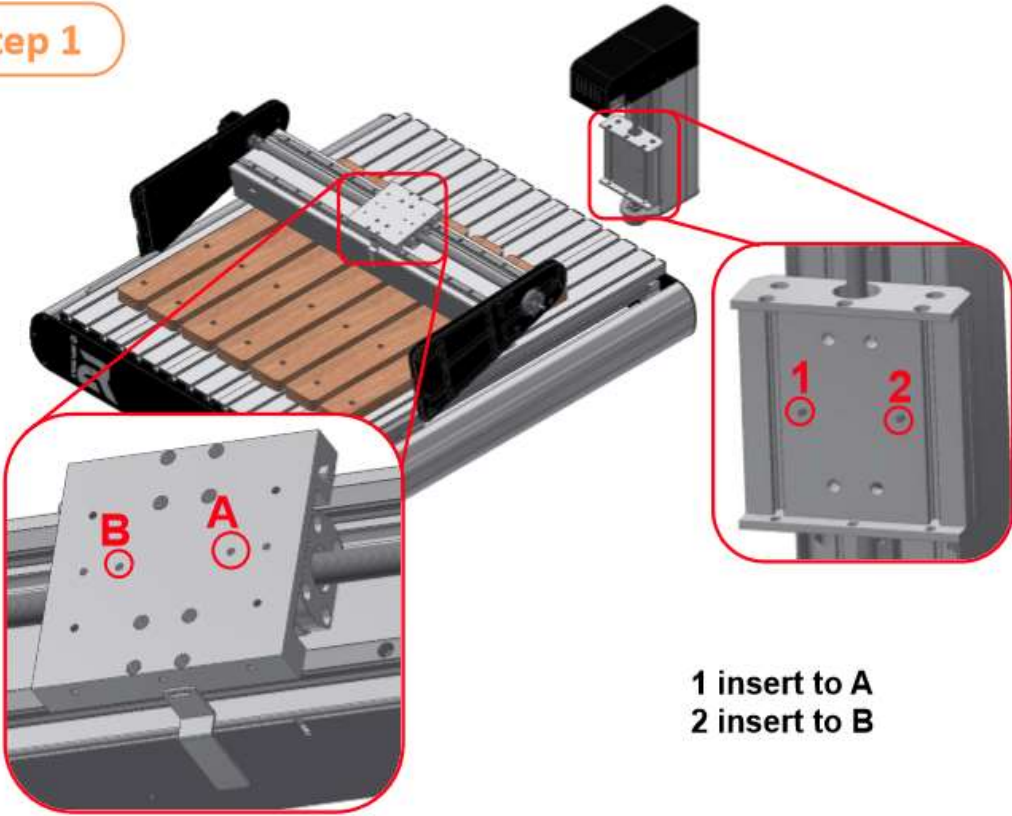


1~2 friends

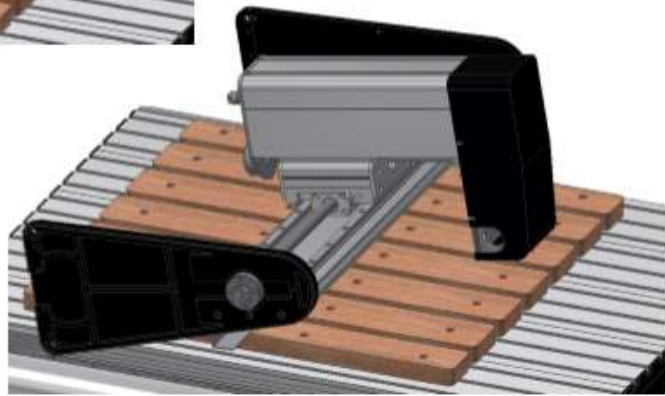
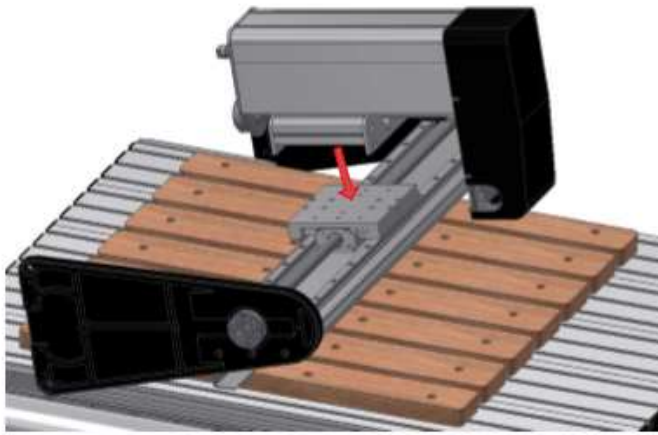
Installing the machine assembly



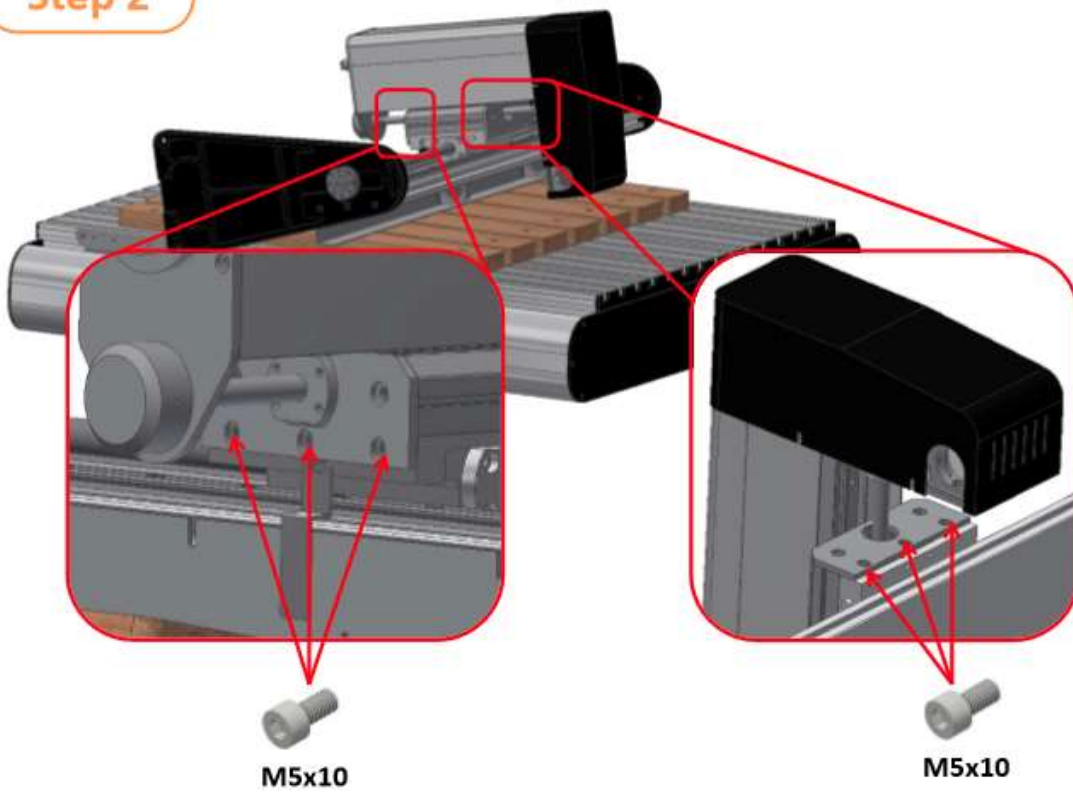
Step 1



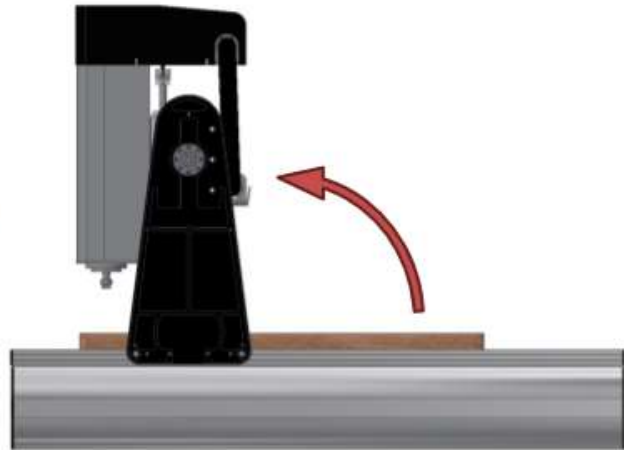
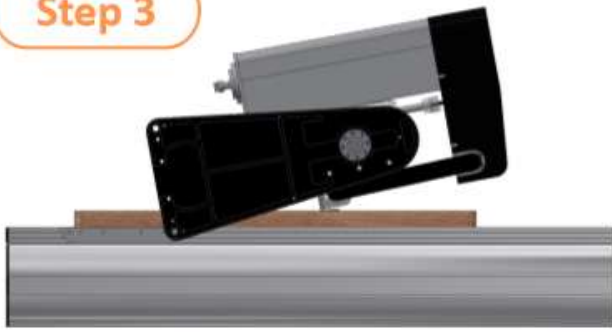
1 insert to A
2 insert to B



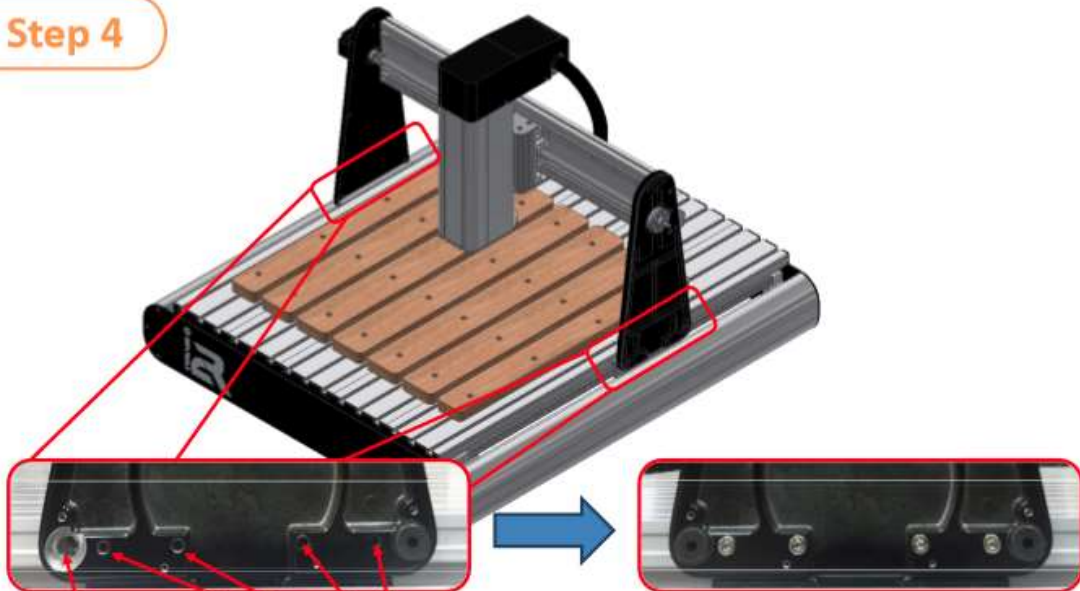
Step 2



Step 3



Step 4

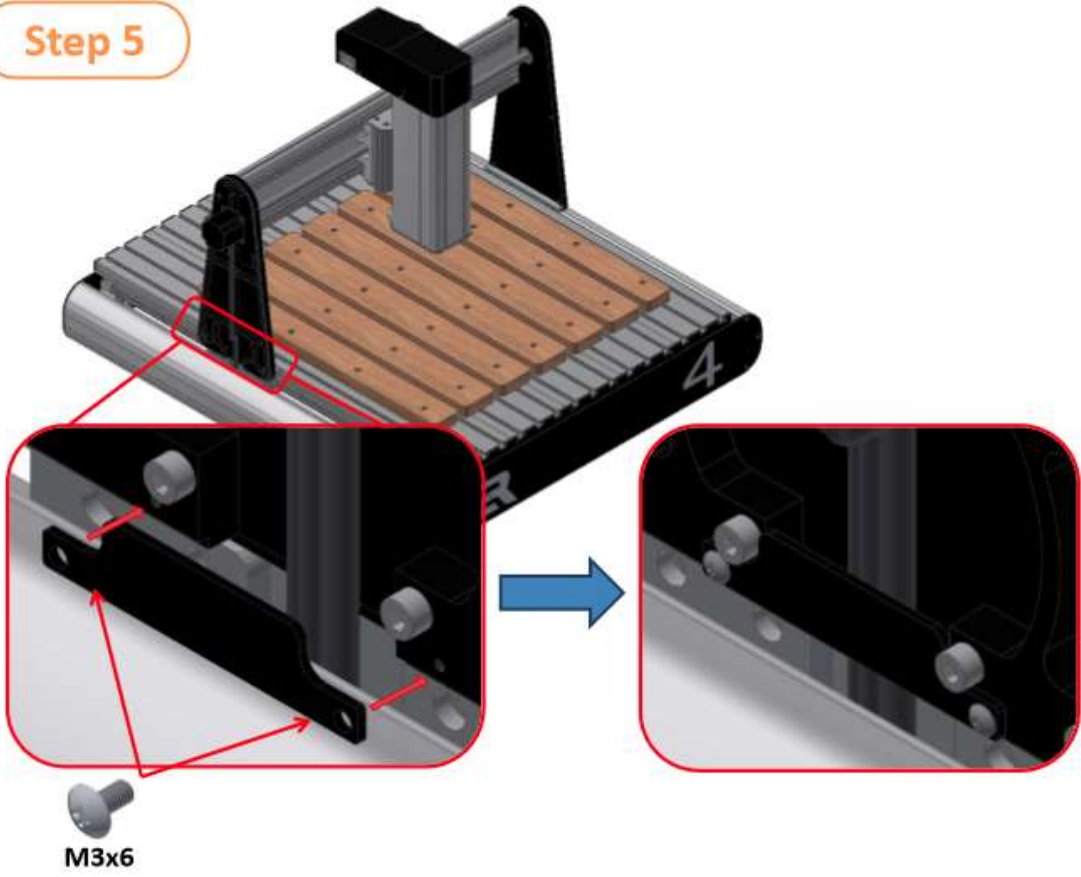


Shoulder Bolts-M8

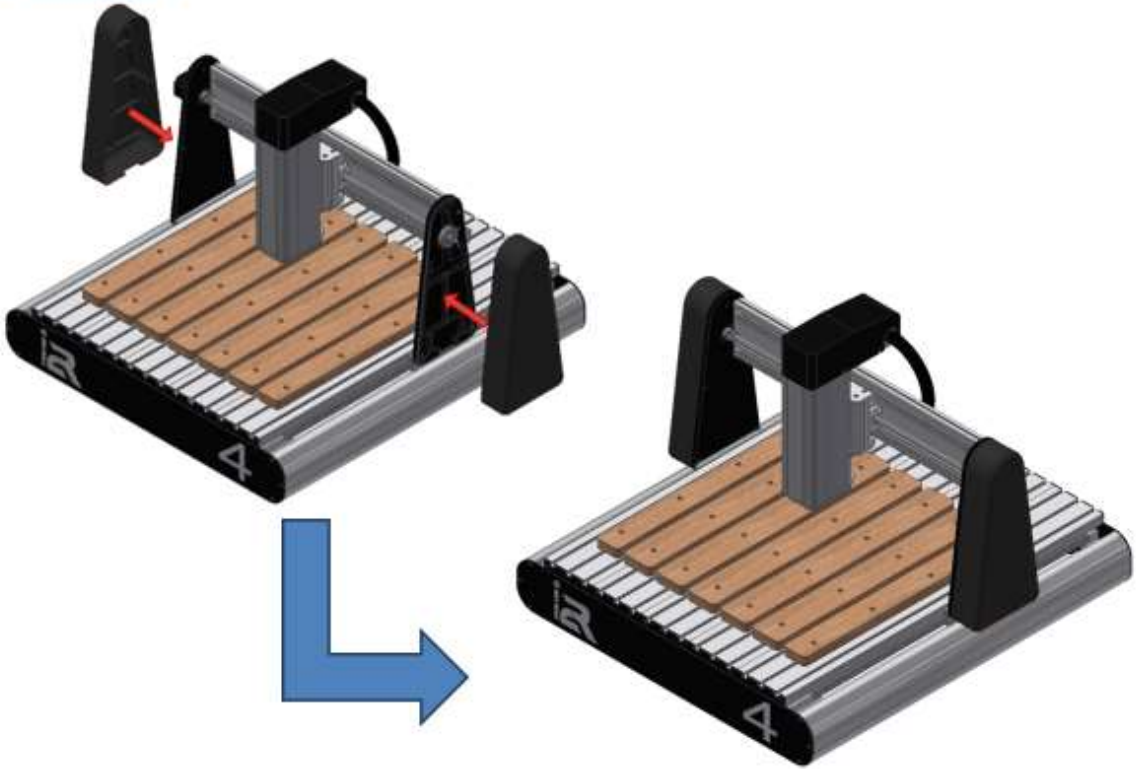


M5x25

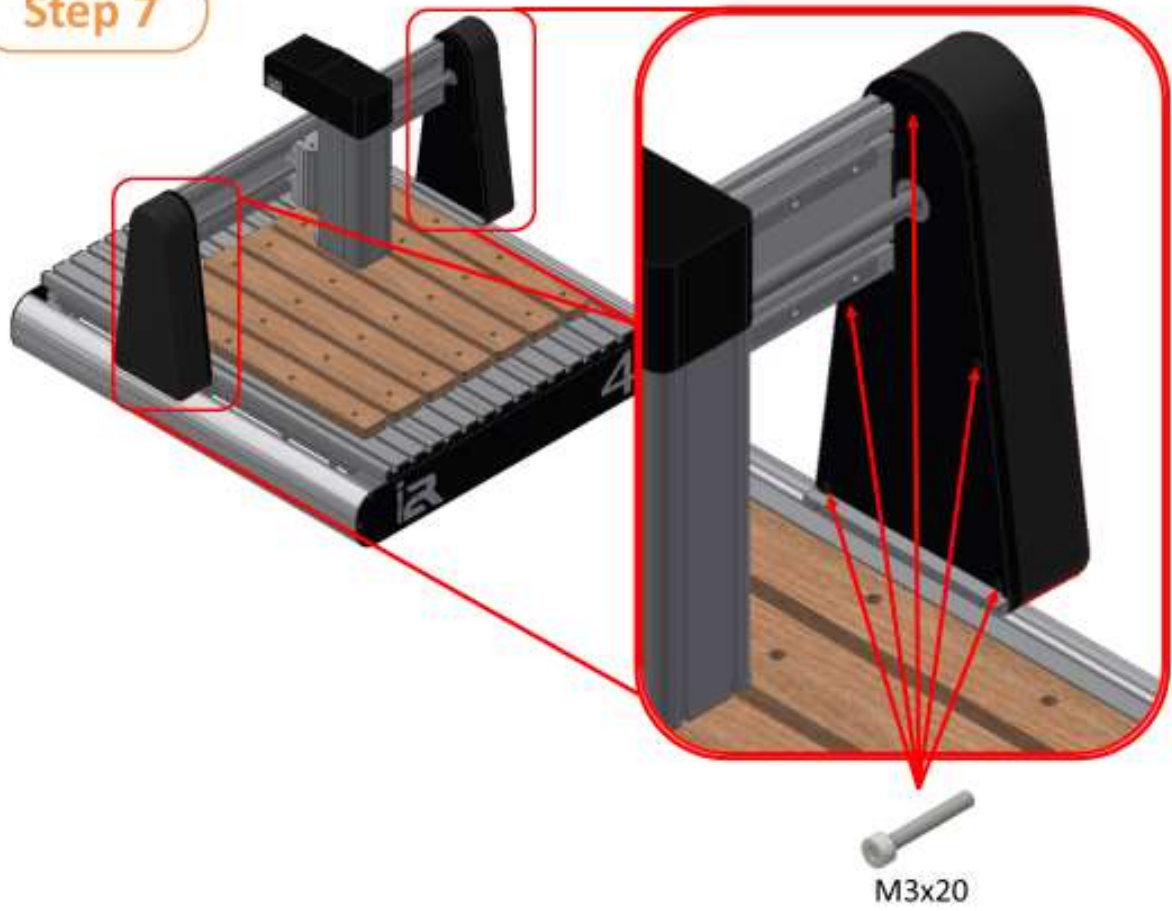
Step 5



Step 6



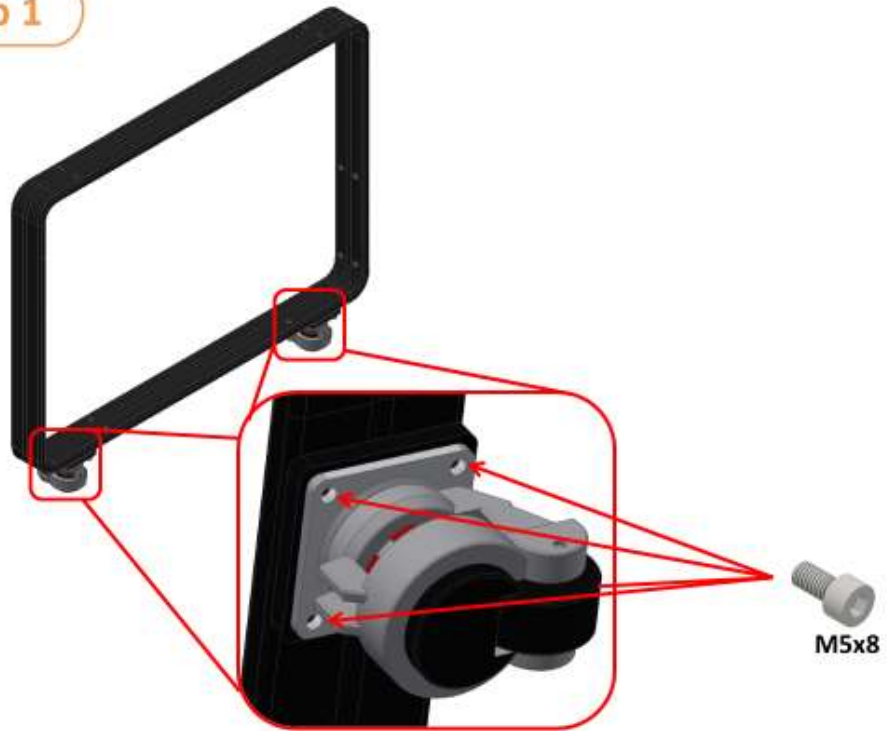
Step 7



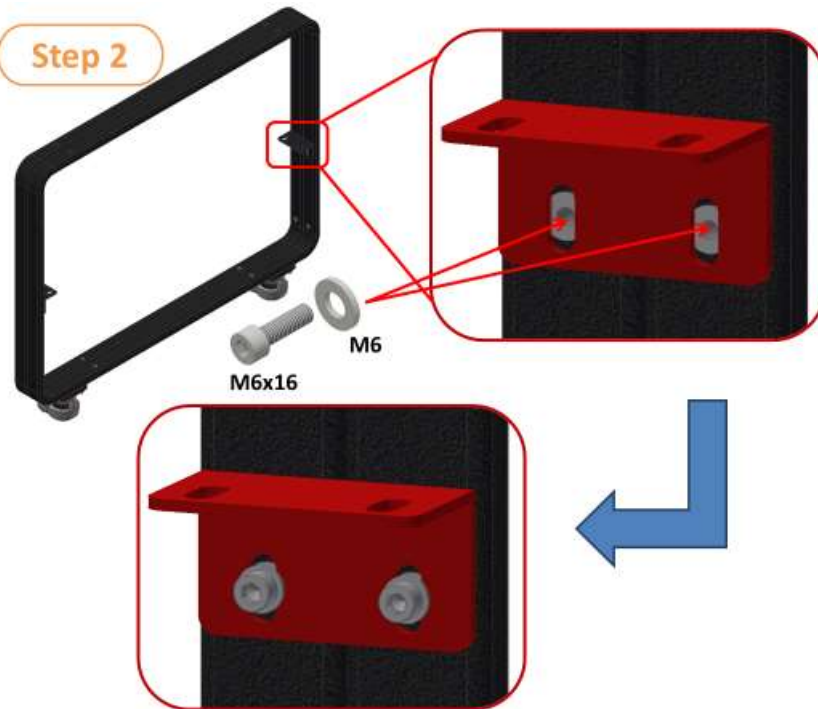
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9.3.2 SETTING UP THE STAND

Step 1



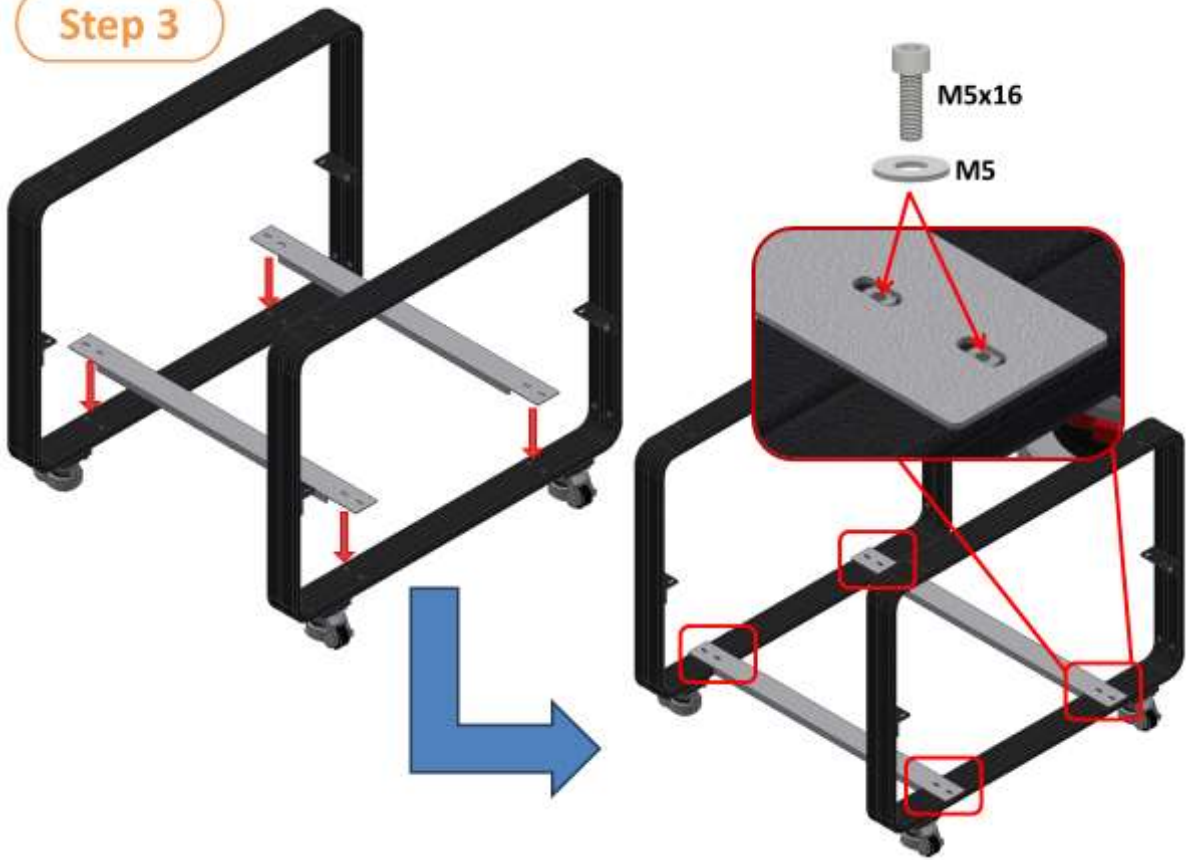
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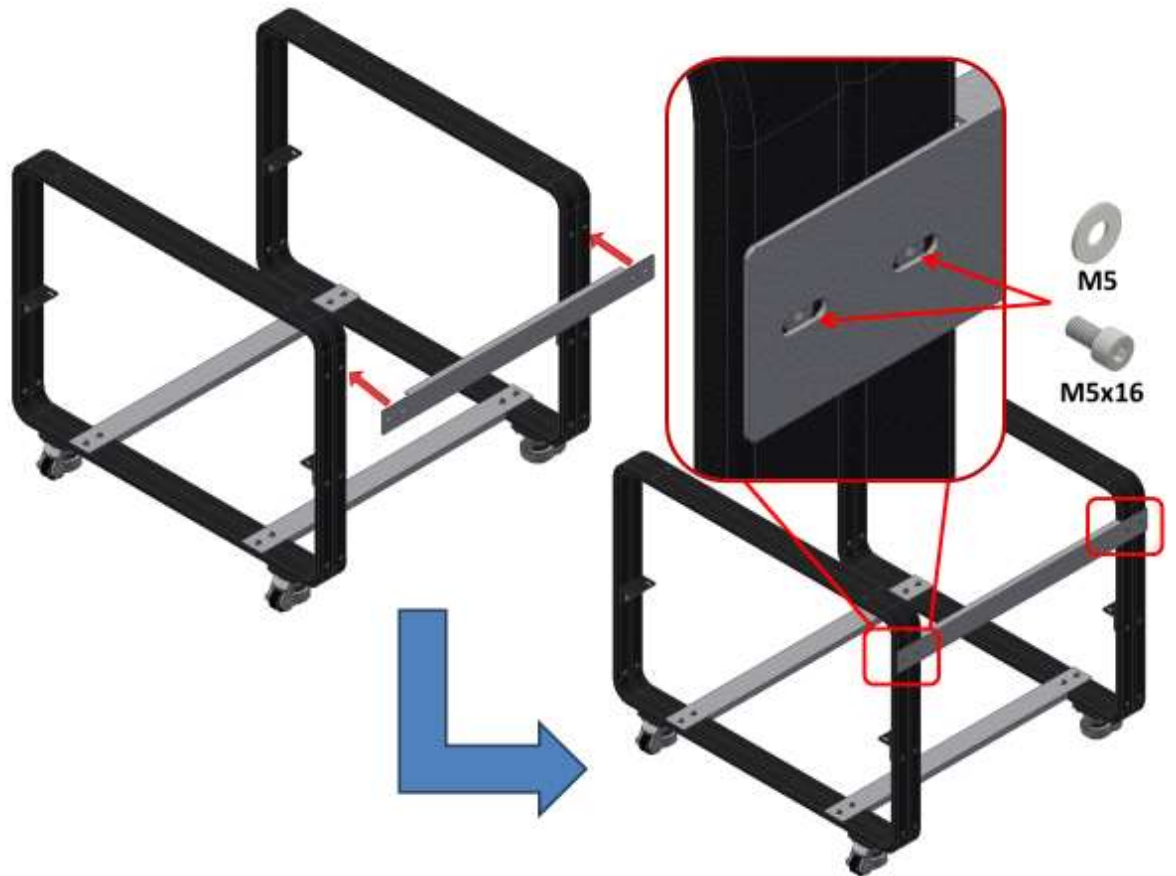


Notice

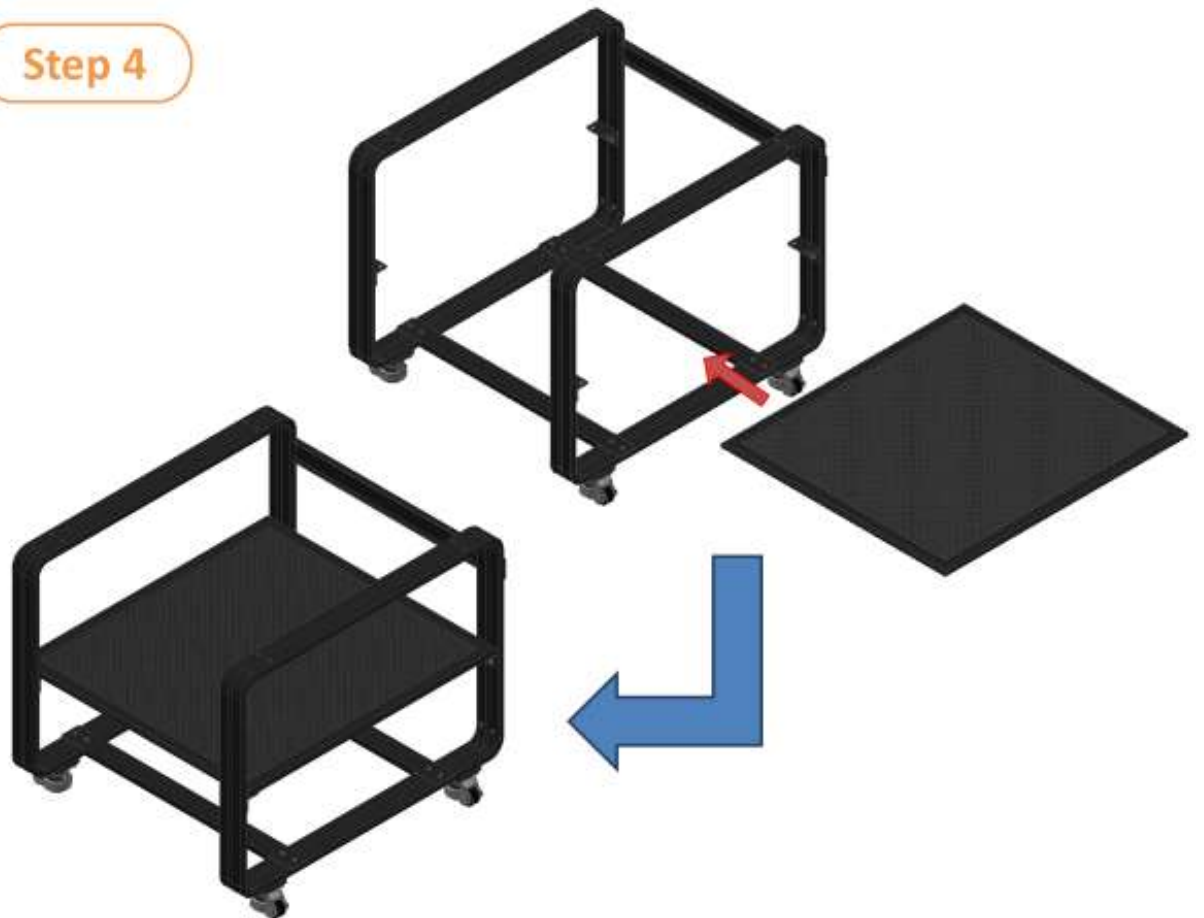


Step 3

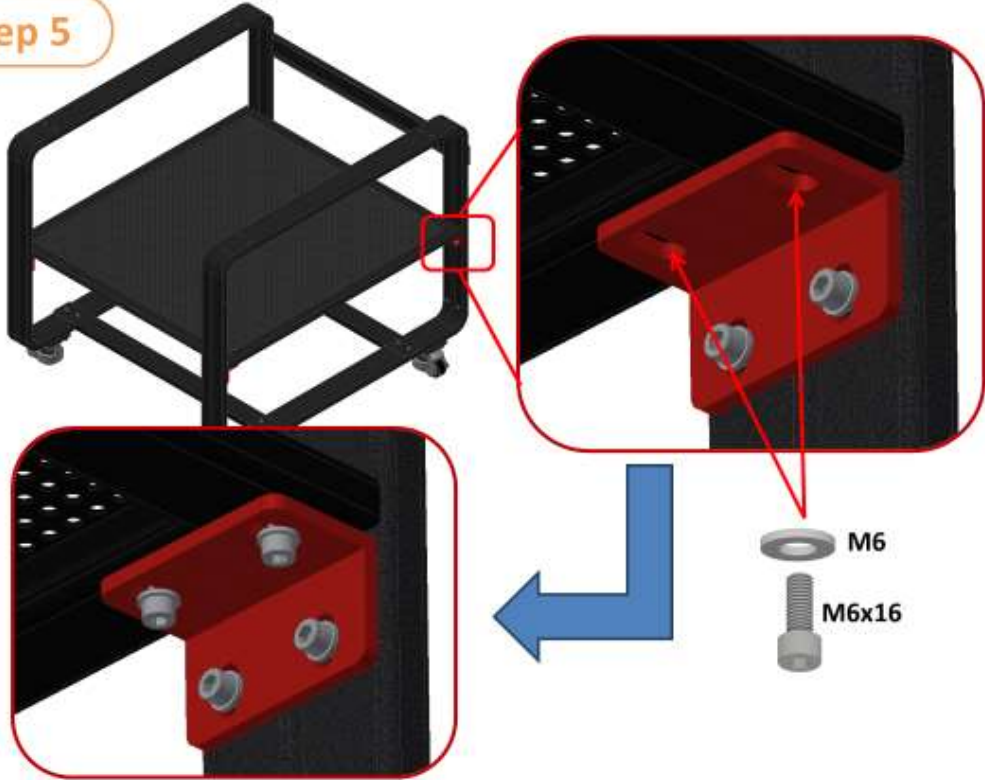




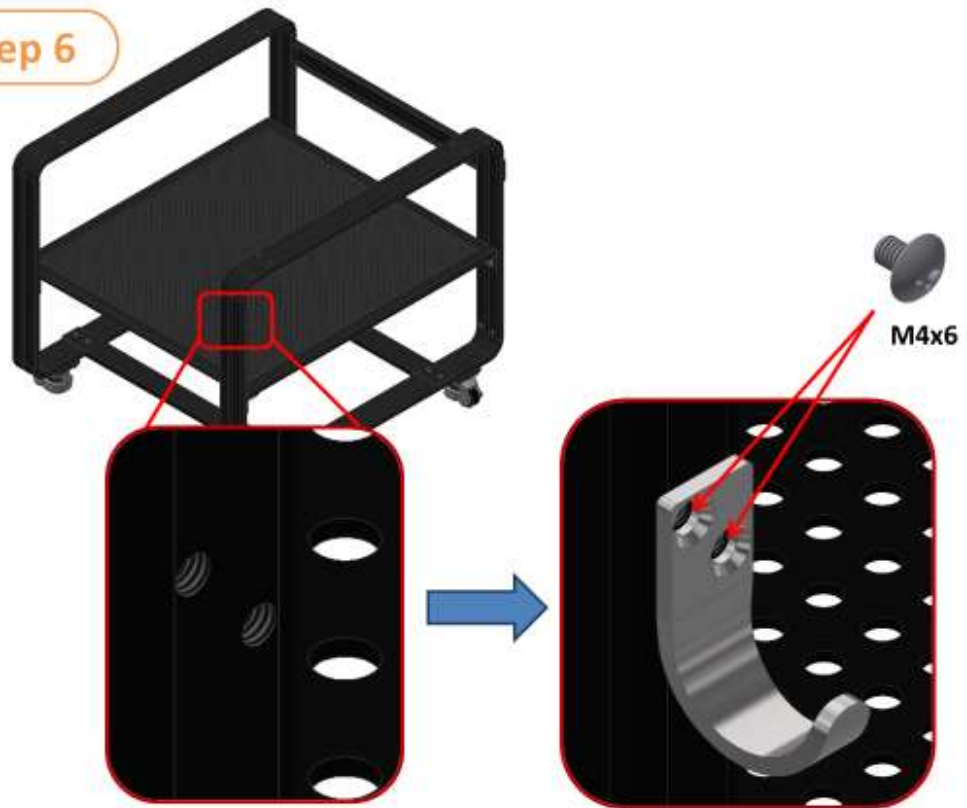
Step 4



Step 5



Step 6



Step 7



Installing the router table on the Stand:

The CNC router table assembly is heavy. Please use a secure means and use caution when lifting onto the stand. At least 2-3 able bodied adults are needed to lift the machine onto the stand.



To avoid damage, be careful to never lift the router by the gantry. Always lift the CNC from under the T-slot table or under the steel frame.

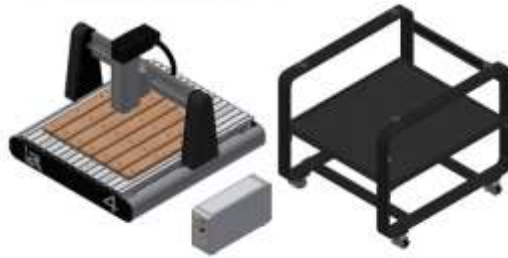


- 1- If using a forklift, keep forks under the steel frame to avoid damaging the wiring and mechanics of the machine.
 - a. Place a scrap piece of lumber beneath the router assembly and carefully slide forks beneath the steel base.

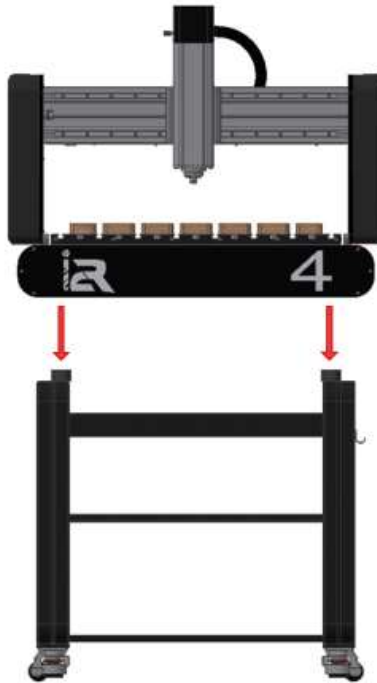


Make sure the forks extend through to the other side of the machine for safe lifting. See Error! Reference source not found. for more detailed info. It's IMPERATIVE you lift only from the steel frame and make sure not to damage the ball screws.

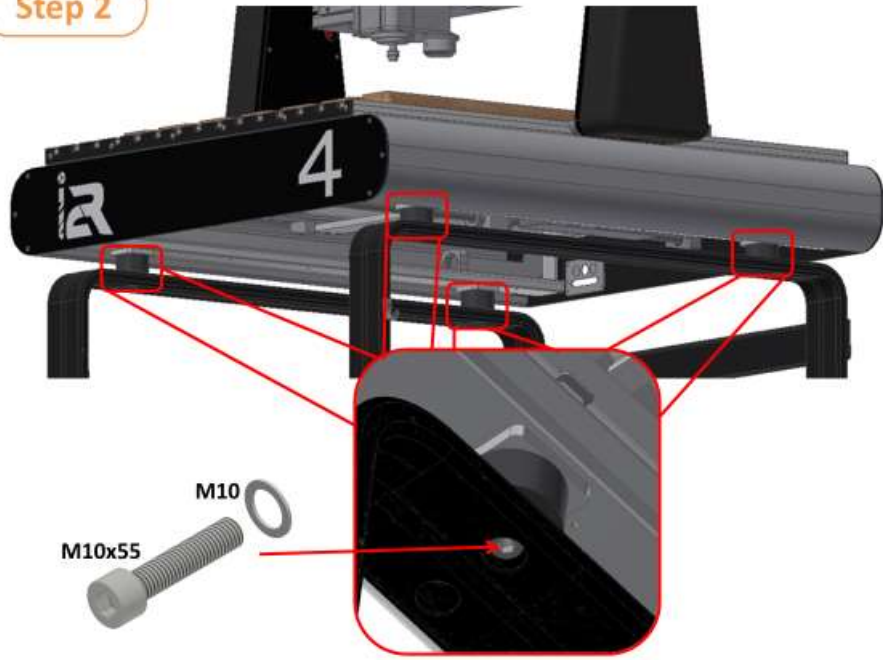
Combine the machine assembly and stand



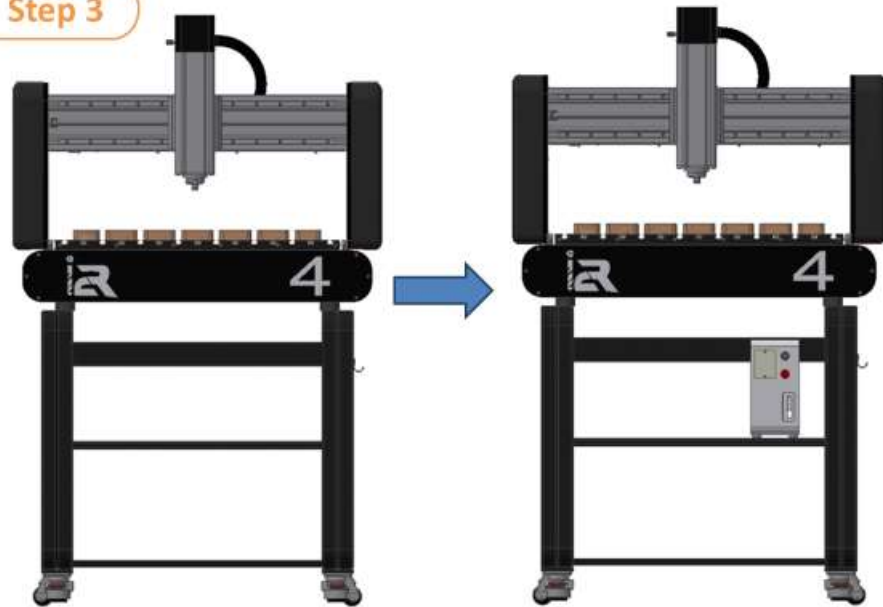
Step 1

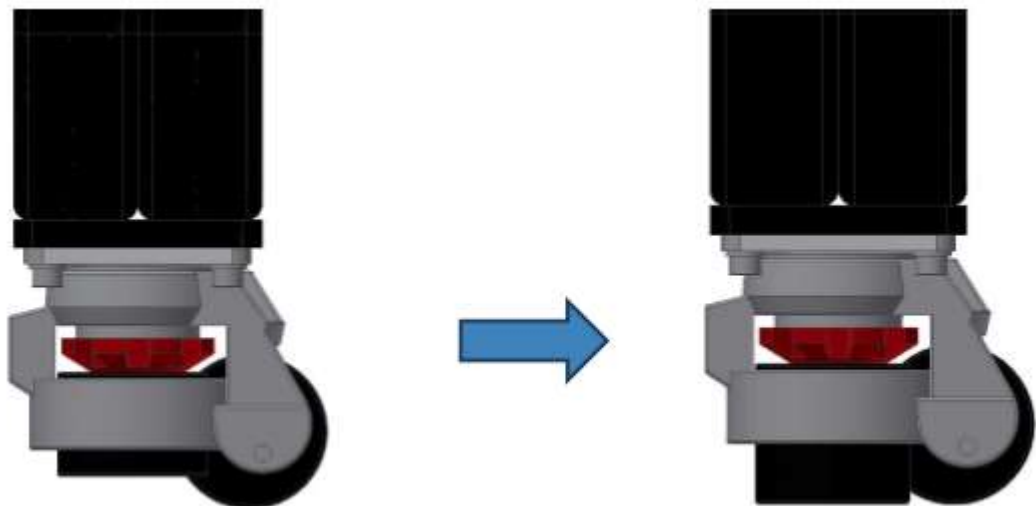
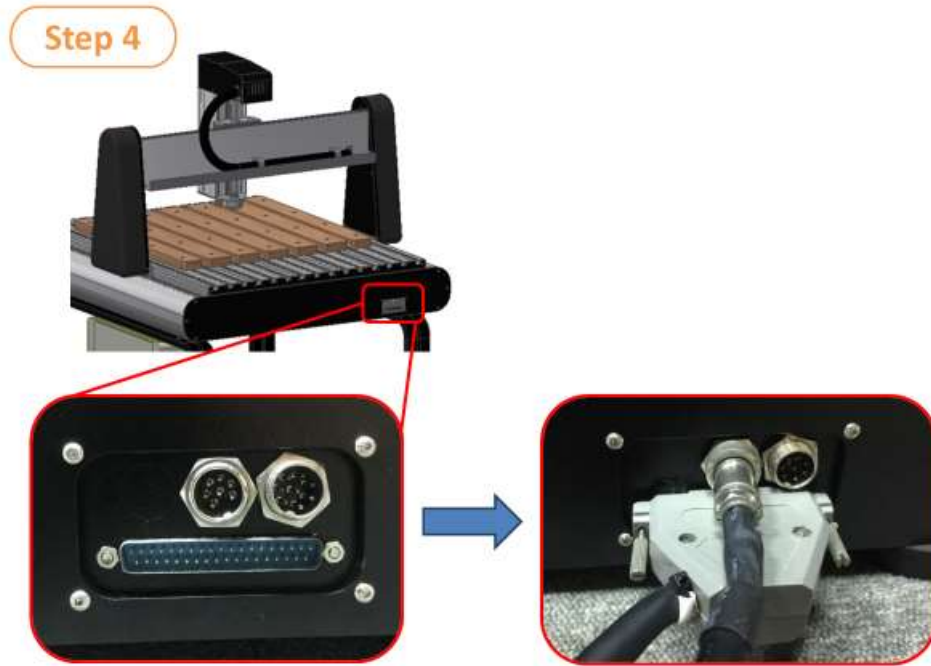


Step 2



Step 3





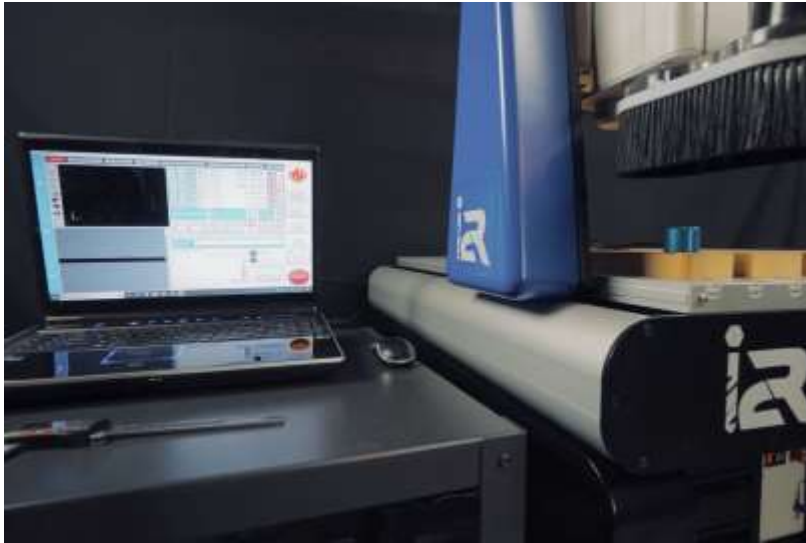
Move your CNC to the desired location, then turn the red gear and the anti-vibration pad until it makes contact with the floor. The caster wheel should be lifted and no longer touching the ground.

If you need to reposition your i2R, simply rotate the red gear in the opposite direction.

9.3.3 FINAL MECHANICAL SETUP PREPARATION

You are now ready to plug in the cables from the control box to the CNC.

- 1) Position your laptop next to your i2R CNC and turn on your laptop.



First connection steps

- The following steps should be carried out to ensure the safe setup and operation of the i2R CNC. Always inspect all connectors and anything you are handling for damage or any sign of mishandling.



Figure 3: Cable summary out of control box

- 1) There are 3 cables coming out of the control box (control box is identified in Figure 3).
 - Connect 2 of the cables from the white control box into the back of the machine as shown in Figure 4. Left plug will not have any cable connected.
 - Carefully look at the pins on within each plug, align and seat these cables.
(there is only one correct way to seat connectors)
 - Carefully tighten the connectors and careful not to cross thread the locking part of the connectors.



Figure 4: Connections to the back of the machine

- 2) Check the power button (shown in
- 3)
- 4)

- 5) Figure 5) on the front of the controller box
 - The power switch should be depressed with no light indicating it is powered OFF!
 - **NOTE**
 -
 -

- Figure 5 shows button in the OFF position.
- Check that the E-Stop switch is not pressed in. Turn it clockwise to disengage it.



Figure 5: The Power button and estop are not activated

- 6) Plug in the 3 pin plug powering the control box into the AC wall socket outlet.
 - Ensure you are plugging into 110v rated outlet the connection has standard domestic electrical protection installed.
 - Inspect the plug for any sign of damage
 - DO NOT plug into a live socket
- 7) Turn on the main controller by pressing the power button (White console box)
 - Push the power button to turn on your i2R CNC.
 - The button will light up (you might hear a small clunk from motors engaging)
 - You should see the Ethernet connector on the front of the white control box blink.
 - Connect the Ethernet port located at the front of the control box to your PC (connection sequence not important)
 - You are now ready to setup the UCCNC software and run your I2R CNC router!

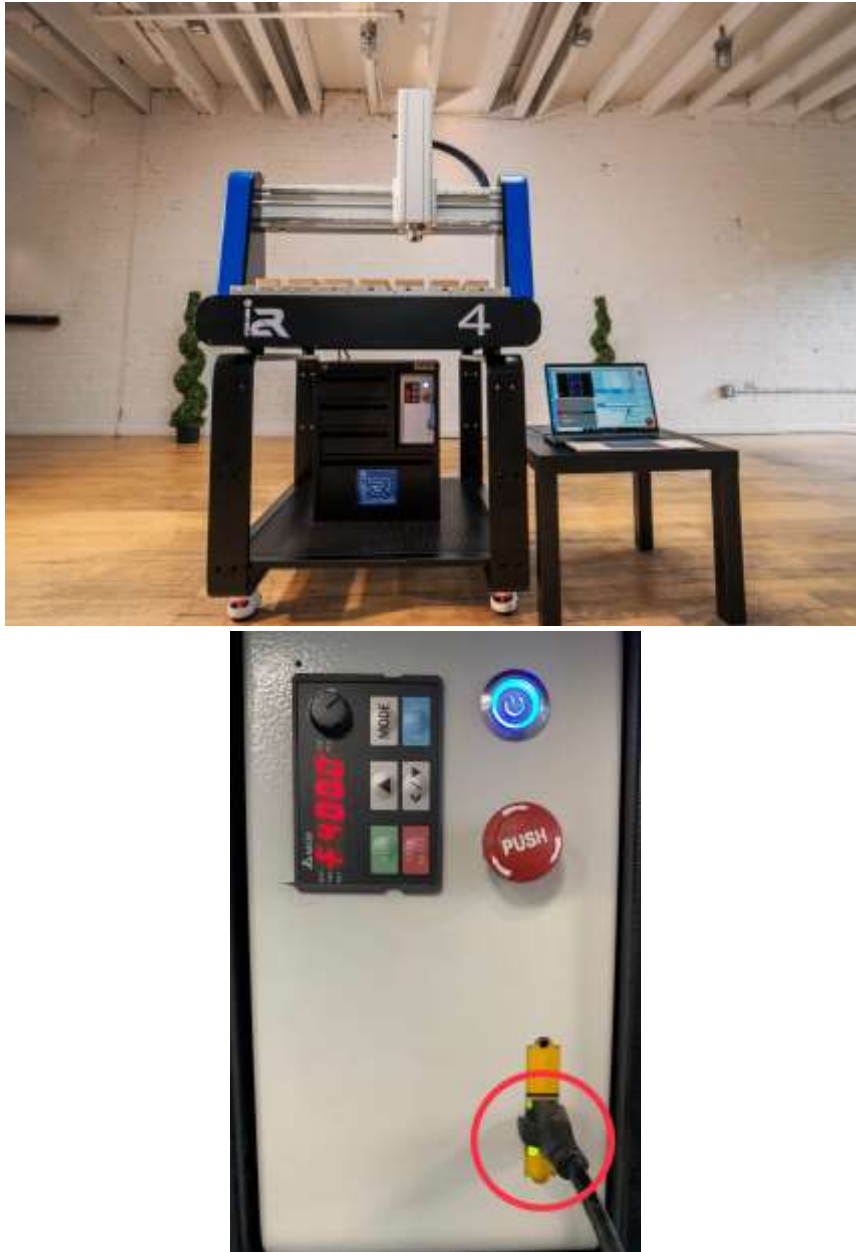


Figure 6: Push the power button and plug in Ethernet cable to your PC

10 I2R CNC SETUP AND CONFIGURATION

This section of the manual is intended to show you how to manually configure your I2R CNC machine to be controlled by UCCNC software. The UCCNC software is a full G-code based machine controller and is therefore compatible with G-code based CAM packages.

Note: *We highly recommend being connected to the internet at this point.*

We support the UCCNC in conjunction with Vecetric products. VCarve Desktop, VCarve Pro and Aspire are the most popular CAM packages we support. The combination of VCarve and the UCCNC is a very user friendly and powerful machine control package.

Please read this manual completely before using your I2R CNC ROUTER system with the UCCNC software.

To minimise the risk of injury and/or to prevent property damage, please only operate the machine and the associated control unit when you are sure that you have understood these instructions completely!

Should questions arise, please contact us.

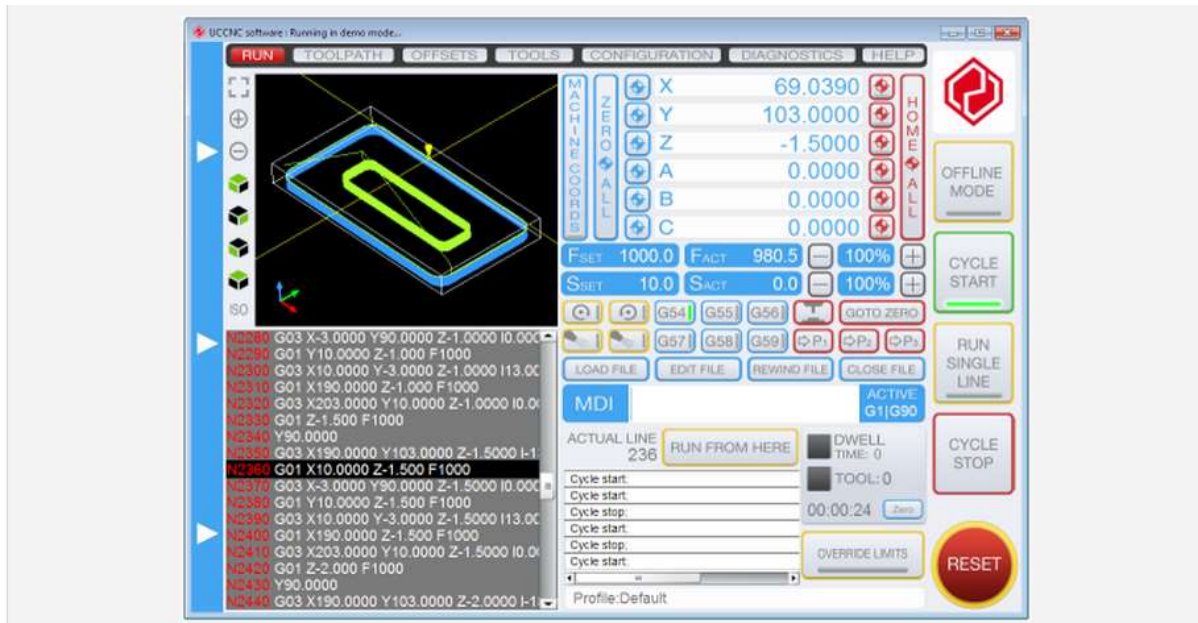


Figure 7: UCCNC controller main GUI

10.1.1 ITEMS REQUIRED FOR UCCNC OPERATION

You need to make sure you have the following items for using your i2RCNC machine with UCCNC.

- I2R 4, 6, 8 series CNC router
- I2R UCCNC Control Box
- Control PC with Ethernet port
- PC connected to the machine via CAT 5 Ethernet cable

10.2 UCCNC SETUP PRE CHECKS

This section assumes you have done the following:

- 1) Securely located your machine on your workbench or I2R supplied table
- 2) You have physically connected your controller to your I2R machine
- 3) You have turned on the controller
- 4) You have a windows based laptop running beside the machine
- 5) You have connected the machine to the control computer using CAT5 Ethernet cable

Hardware requirements

This software requires Microsoft Windows XP, 7, 8, 8.1 or 10 Operating System running on an x86 or x64 desktop or laptop or tablet computer.

The minimal hardware requirements for the computer are as follows:

- CPU frequency: minimum 1.8 GHz (duo or dual core is recommended.)
- Graphics card: OpenGL 1.3 or higher compatible
- RAM: minimum 1GB for XP and 2GB for all other supported OS.
- Hard drive space: minimum 16GB UCCNC Set up file

Software pre-requirements

- Prior to installing the UCCNC software the .NET framework 2.0 needs to be installed. The .net framework 2.0 is Microsoft's runtime environment for applications (like the UCCNC) developed in Visual Studio.
- On Windows XP operating system the .net framework 2.0 can be installed from a file which is available on Microsoft's website and we also keep a copy of this file on the following link: http://cncdrive.com/MC/Software%20prerequisites/dotnetfx2_0.exe
- On Windows 7. the .Net framework 2.0 is part of the Operating system, no need to install it.
- On Windows 8.,8.1 and 10 it can be installed with enabling the .Net 3.5 compatibility option in Windows and then it installs automatically via the Windows update. The .Net framework 3.5 package contains the .Net 2.0 package too. The above link also works.
- If the .Net framework is not installed, the UCCNC software installer will not run, it will drop an error message on startup and the installer will exit.
- On Windows 10. no error message will be shown, but the installer will not run without the .Net framework 3.5 installed.

Recommended: *Use a PC/Laptop with Ethernet that's connected to Wifi. Ethernet port will be configured to communicate with the UCCNC Control Box while you can still use WIFI for internet.*

10.3 STEP 1 UCCNC INSTALLATION

Do not rush the installation.

Recommended: *Click the link below to watch a step by step video on how to configure and install the UCCNC software onto your computer.*

[WATCH HERE!](#)

<https://www.youtube.com/watch?v=N1XIkT0-myl&feature=youtu.be>

10.3.1 IP ADDRESS CONFIG

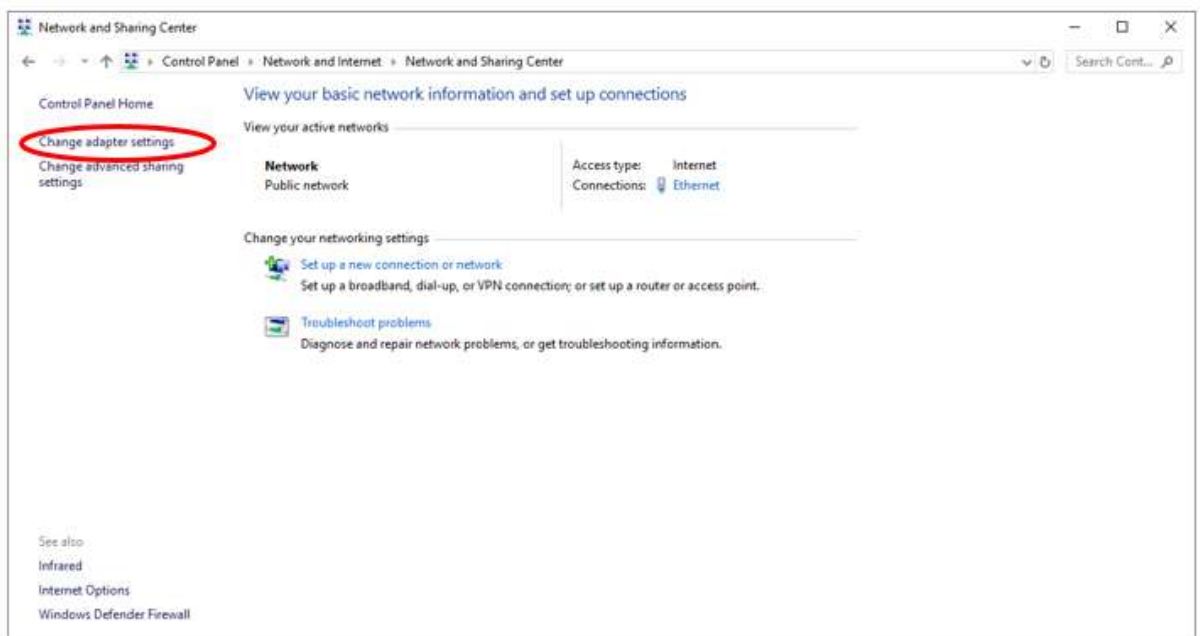
Your UCCNC module in the I2R controller is an Ethernet controller. Ethernet control is the most robust control for CNC applications. The controller requires an IP address to be set on the local PC connected to the machine.

- If necessary, additional information is available for reference on pages 6/21 of the UC400ETH manual.

UC400ETH ethernet motion controller
user's guide

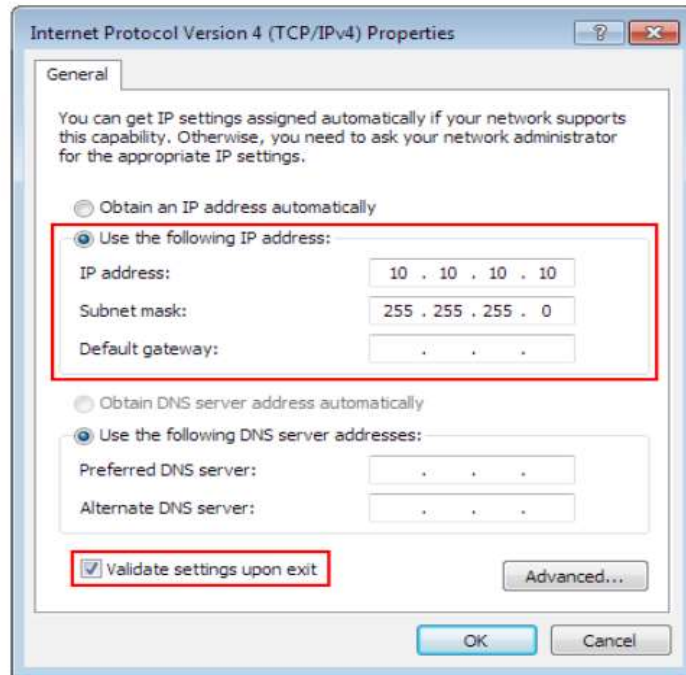


- Configure your Ethernet port to communicate with the Control Box.
- Select Open Control Panel → Network and Internet → Network and Sharing Center, on left side then select **Change adapter setting**



- Right Click or double click on “Ethernet →select properties→Double Click Internet Protocol Version 4 (TCP/IPv4)
- Enter 10.10.10.10 for IP address
- Enter 255.255.255.0 for Subnet Mask
- Press OK

Error! Reference source not found. **(below) shows the IPV4 network IP address that needs to be set.**



Once configured you can run the utility scanner to check the module is connecting to the machine.

- The UCCNC utility checker is in the Cdrive/UCCNC/Util main folder.
- Open the utility checker and hit scan
- You should see your module number pop up on the screen

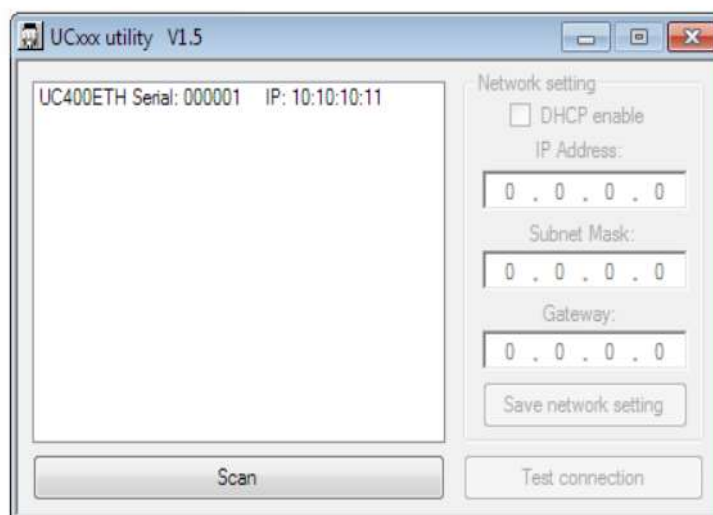



Figure 8: Utility scanner showing that the module is connecting okay with the computer

10.3.2 INSTALL THE UCCNC

Once you have the module successfully connecting to the control computer you can now install the UCCNC software.

Open the installation folder and double click the installer

1. Run the installer (note the version in this manual may differ from the version in your installer)

Name	Date modified	Type	Size
 setup_1.2049	18/08/2014 17:15	Application	32,915 KB

NOTE!!!! THE VERSION OF THE SOFTWARE WILL BE THE MOST CURRENT INSTALLER CURRENTLY 1.2049

The latest version of the installer is always available on the CNC Drive website

<https://cncdrive.com/UCCNC.html>

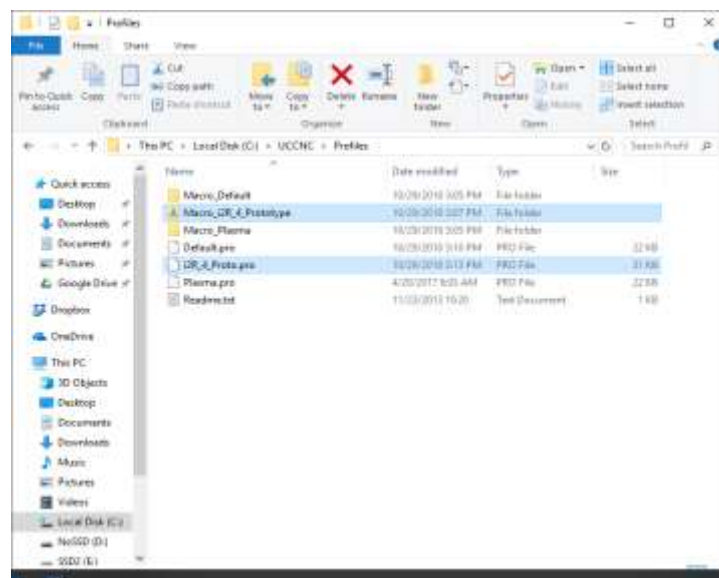
10.4 STEP 2 UCCNC LICENSE AND PROFILE INSTALLER

The next step is to install the license key that was provided to you by:

1. Drag the **UCCNClicense_XXXX.txt** file provided in your Email into where you have UCCNC installed. By Default, it will install in your drive "C:\UCCNC".
2. Each control box is assigned a unique license with the purchase of an i2R CNC.

You will be sent a file that is specific to the model of your machine.

1. Click on the profile for your specific machine that you have purchased IE: "i2R4".
2. Drag both the "i2R4" profile and "Macro i2R 4" (highlighted in blue below) file into your UCCNC installation folder located in your C:\UCCNC\Profile.



Note: Every Profile created needs 2 components to function. Macro_xx_xx folder and xx.Pro file with same file name.

3. Close back out to your desktop. There should now be a desktop shortcut labelled UCCNC. All of the settings are now loaded and your machine is ready for full operation.
 - NOTE!!!! When UCCNC installs for the first time there is a default shortcut always loaded to the desktop.

- VERY IMPORTANT: Make sure you delete the generic shortcut called “UCCNC” and not the i2R profile that you just installed. If you use the generic shortcut your machine will not be set up with the correct parameters.



10.5 STEP 3 MACHINE OPERATION

10.5.1 STEP3_A MACHINE OPERATION WITH UCCNC

- Make sure your I2R machine is powered on
- Make sure your UC400ETH connection light is on in the front of control box is connected to the PC
- Make sure the emergency stop button on the front of the machine is released
- Make sure the power button in front of your I2R controller has the light on.
- Make sure you have carried out all “setup operations from Step 1. Step 2. And Step 3 **Exactly.**

Double click on the i2R-4 shortcut

- The software should open and go straight to splash screen shown in Figure 9

- **Note** if you have installed the license file correctly you should not see any window pop up regarding the license when you open the program. Before you try to open the finally installed and validated UCCNC – make sure there are no other open UCCNC windows.

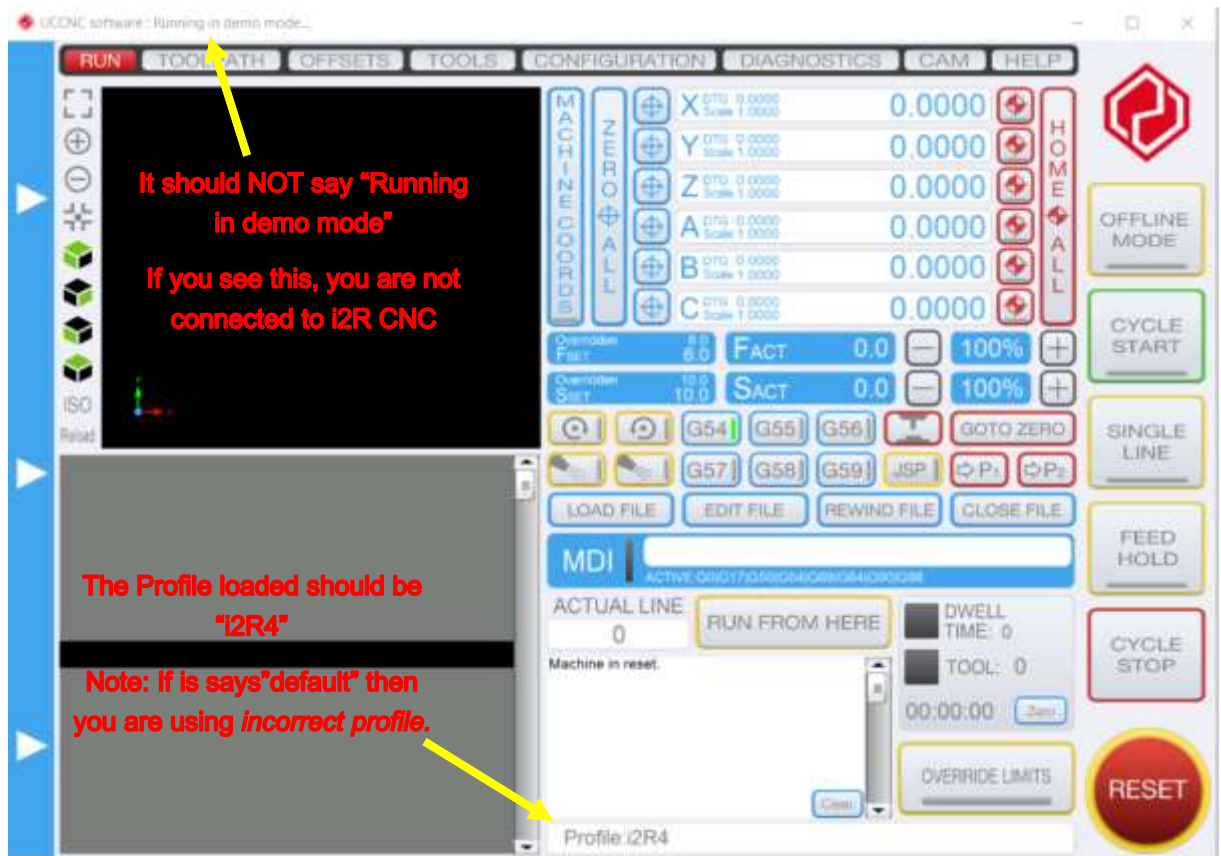


Figure 10: UCCNC main screen summary

- Figure 10 shows the main screen once you open the UCCNC controller.
 - NOTE – top left hand side. You should NOT see the text “Running in Demo mode” it should just say UCCNC software after the icon.
 - NOTE – In the profile summary box (next to red reset button) you should see the text “Profile XXXX” showing you have loaded the correct profile.
- Hit the rest button (it should be flashing yellow and red and is shown in Figure 11). Once clicked it should remain solid red in colour. You should now be able to control the machine with your UCCNC software

NOTE – Whenever you are not directly interacting / controlling the machine you must click the reset button so the **button flashes red and yellow**. This is a safety procedure to make sure you don’t accidentally turn on the spindle system.

Now two very specific steps have to occur to turn on the spindle! Always click reset when you are not directly controlling the machine!

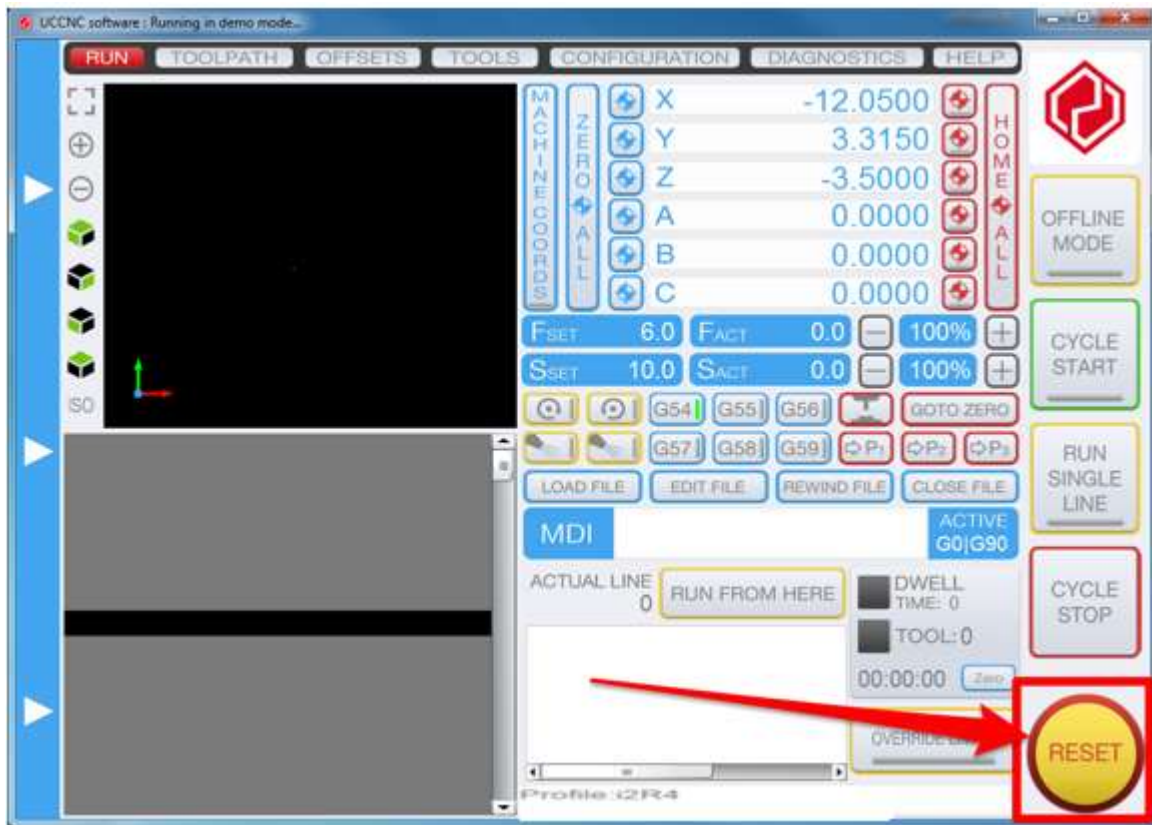


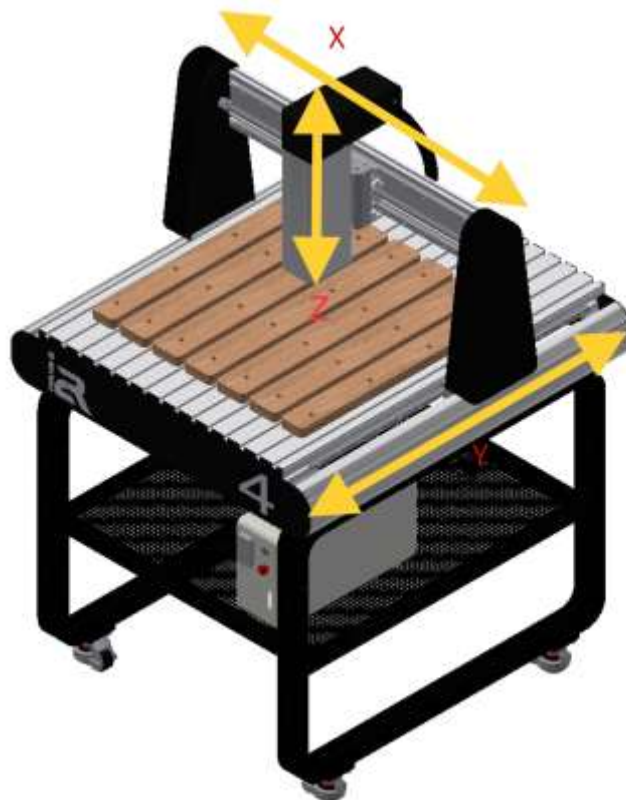
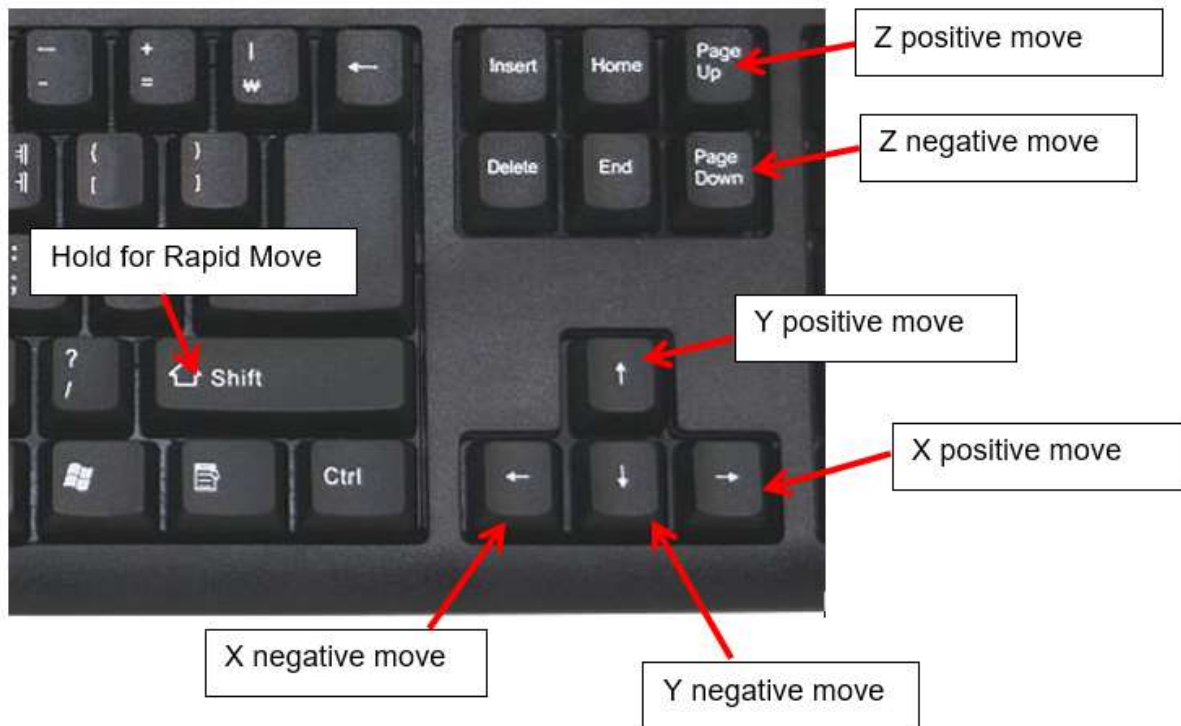
Figure 11: Reset button on UCCNC front panel

When machining, all calibration and measurements and inputs in the machine are moved using millimetres. You may work in inches or mm when using CAM software like in VCarve but you must be sure that you select the post processor for MM.

The UCCNC lets you jog the machine with the Keyboard in **Rapid** and **Slow** jog modes. The directions of movement are assigned as follows

- Right arrow key – jog X right / positive
- Left arrow key – jog X left / negative
- Up arrow key – Jog Y up / positive
- Down arrow key – Jog Y down / negative
- Page up – Z axis up / positive
- Page down – Z axis down / negative
- Holding the **“Shift”** key while pressing the directions of movement keys will move the machine in rapid mode.

- Releasing the “**Shift**” key will result in the slow jog motion



10.5.2 STEP3_B MACHINE HOMING AND SOFT LIMITS

You are given the choice of configuring the machine with the soft limits enabled or with the general machine configuration.

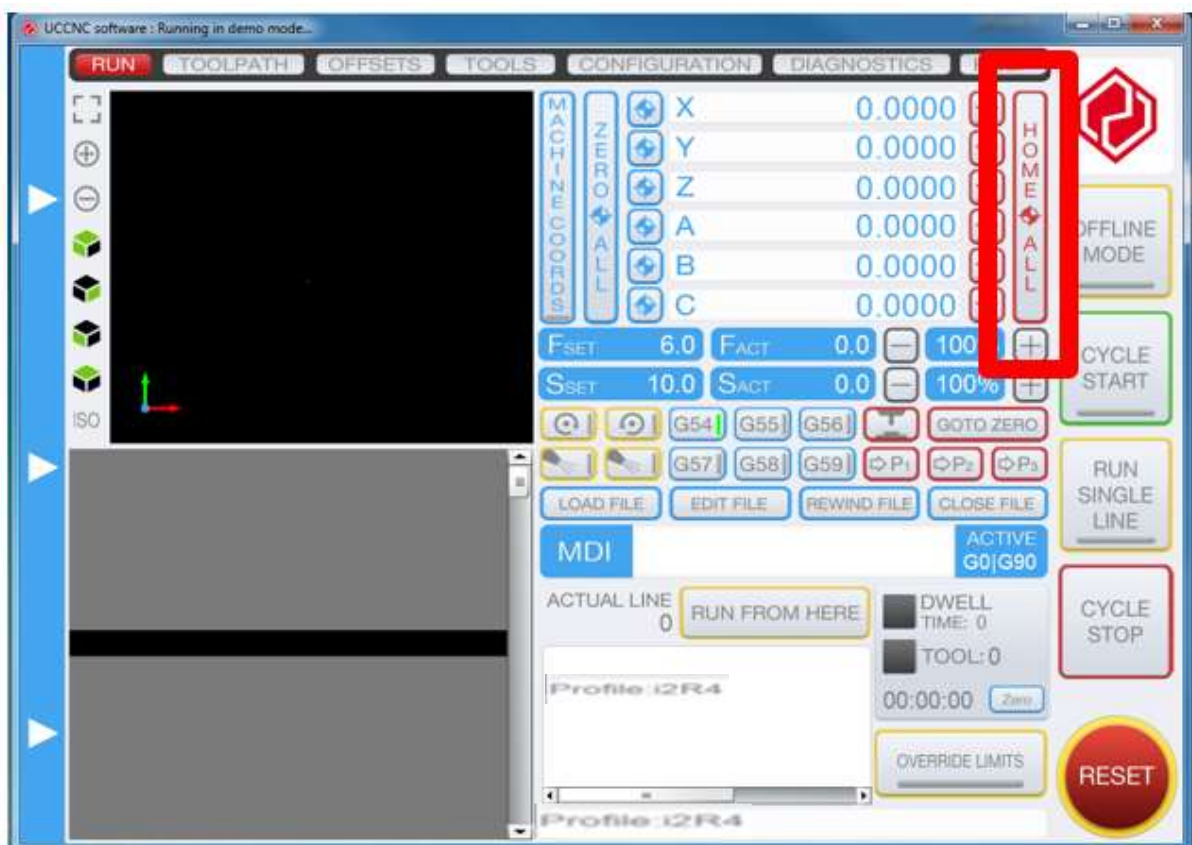
Soft limits are software defined limits that can be enabled to prevent your machine from moving outside of its zone of movement (and crashing). In order for the soft limits to work you have to make sure you have loaded the correct profile for your machine (i2R4, i2R6, i2R8) as the values are related to the geometry of the machines.

In order for this to work **you must reference the machine each time the machine gets turned on** to tell the software where the edges of the machine movement are each time. The machine will move each axis until it hits that axis limit switch. It will then move away until the switch releases. This is how the software knows where the machine is relative to the limits switches.

This is not 100% required for use of the machine. We recommend you continue to Step 4. At this stage and come back to Step3_B later when you are proficient with the machine and its operation.

Crashing the machine will not do damage provided you press the emergency stop button shortly after. The stepper motors will simply “buzz” and the machine will not move.

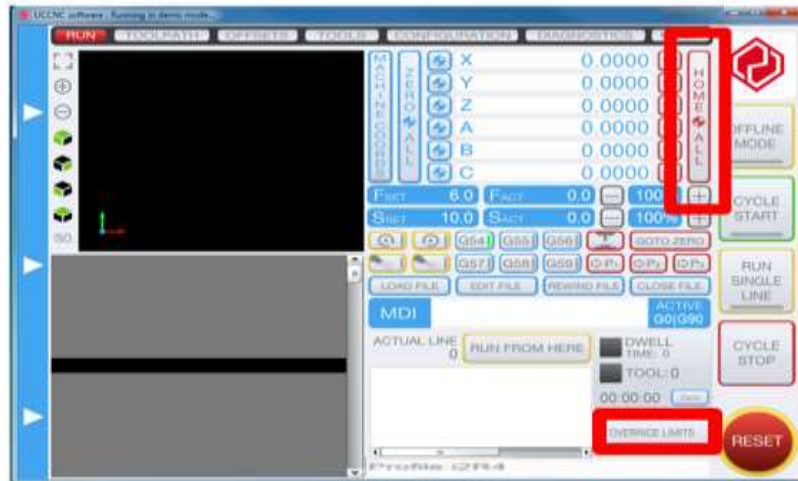
Step 5. Shows you in detail how to setup the machine and to check to make sure you are within the machine limits. Sometimes it is better to check and double check by actually using the machine (shown in Step 5.), rather than relying on the soft limits.



Clicking “Home All” will bring your CNC to a zero position on all your axes. Make sure you do this at the beginning of every new project.

10.6 STEP 4. LIMIT SWITCH TRIGGERED

Occasionally it is possible to jog the machine to the end of the machine travel such that a limit switch will be triggered. The software will now prevent you from controlling the machine. You will not be able to reset the software when the limit is triggered. When this happens you must press the “OVERRIDE LIMITS” button in order to reset the machine. Once the “OVERRIDE LIMITS” button is pressed you can then click the reset button and regain control of the machine. Make sure you jog/move the machine AWAY from the limit switch. You will hear the switch release if you listen carefully. You are now back in the zone of operation for the machine and can continue.



10.7 SPINDLE SYSTEMS

DANGER Before you change the tool in the spindle and before you handle any of the spindle components in any way you must de-activate the spindle system to avoid accidental spindle start-up during handling.

The first stage in disabling the spindle system is to hit the reset button in Mach3/UCCNC. This will de-activate the charge pump signal and will disengage a safety relay in the machine control electronics preventing the possibility of an unexpected start-up of the spindle.



Figure 12: Reset to disable spindle relay

10.8 SETTING SPINDLE RPM: (ONLY ON I2R AXIOM DSP MODELS)

Your UCCNC i2R CNC model controls the spindle and VFD through the UCCNC software. This section is for DSP models.

The DSP Model machines are equipped with a Delta VFD-m inverter for spindle RPM control. This can be found on the front of the white control box.



To adjust the RPM, simply turn the dial. Clockwise (right) to increase RPM and Counter-clockwise (left) to decrease RPM.

This can be adjusted at any time. Included during a machine operation. Allowing RPM to be dialled in

dynamically as needed.

Delta VFD - RPM Values	
Frequency	RPM
250	15,000
267	16,000
283	17,000
300	18,000
317	19,000
333	20,000
350	21,000
367	22,000
383	23,000
400	24,000
Frequency equals desired RPM/60	

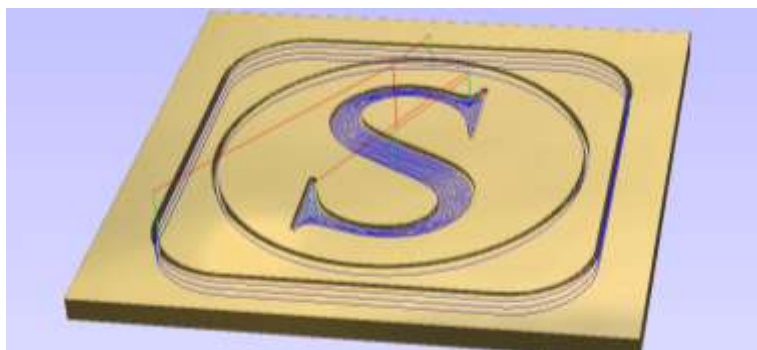
The display shows the RPM in 60Hz frequency. This means that while the RPM is 0-24,000, the display will show 0-400. Each 100-displayed is equal to 6000RPM.

The buttons on the VFD, are intended to be used for programming only and should not be used to set the spindle speeds.

10.9 STEP 5. VCARVE DESKTOP/VCARVE/ASPIRE SETUP

10.9.1 INTRODUCTION AND OVERVIEW

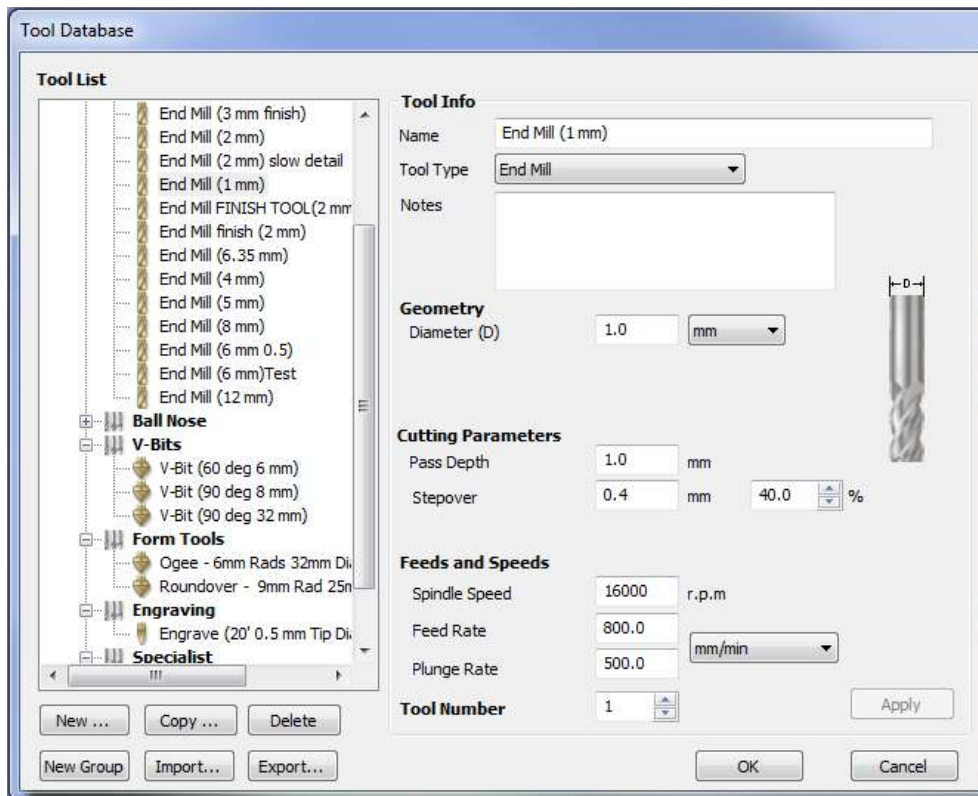
VCarve Desktop is the most basic software available from Vectric. It's a very popular CAM package and is very easy to use. VCarve Desktop is very similar to VCarvePro; however, VCarvePro has a lot more functionality (which makes it more expensive). The best way to learn how to use VCarve Desktop is to open up the software and try to use it. There is a video to help you in your installation folder (Step 5) giving you a step by step run through the process. The video goes through each step in the process for creating your first tool path. The video shows you how to make the part shown below. You can see the live preview that gives you an idea of what the part will look like. You can also see the machine tool path overlaid also. VCarve Desktop gives you a preview so you can check what your part will look like and check for mistakes.



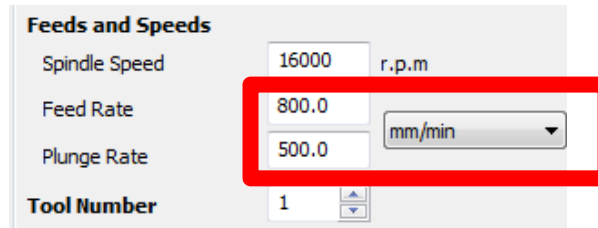
10.9.2 TOOL SETUP

See below for the tool window that opens when you select the tool to use in VCarve Desktop/VCarvePro. Both VCarve Desktop and VCarvePro allow you to build up a tool database. So you can setup a tool for each materials/cutter combination. You can save tools for various jobs. As you learn you will find some settings work better than others. When you find the sweet spot you can save the settings in the tool library. To help you with your settings they are explained as follows

- **Name** – this is not important for the settings – but its good practice to name the tool to be descriptive of what is in the settings.
- **Tool Type** – this is important as it tells VCarve what sort of tool you are using. This will affect the calculations and the live demo so always choose the same tool as you are using
- **Notes** – this field is useful for documenting specific outcomes or requirements needed when running with specific tools and settings. For example, “make sure to clamp work piece well when running with these settings”
- **Diameter** – The diameter of the tool tells VCarve Desktop how to approach tool radius compensation. If for examples you set the tool diameter to 4mm, VCarve Desktop will then make the toolpath run 2mm outside the path you specify (if compensating for tool radius on the outside) to account for the tool geometry.
- **Pass Depth** – is the maximum depth that a tool can go each pass. If your cut depth is set at 5mm for example. And you are using a 1mm cutter. A good strategy would be to machine the 5mm in 1mm passes. VCarve Desktop will then program the machine to cut down 1mm at a time down to the 5mm cut depth.
- **Step over** – this setting is related to the pocketing function where you need to machine out a pocket and not just an outline/profile toolpath. The step over controls how much overlap there is as the cutter pocket out the work.
- **Spindle speed** – Your spindle speed will be set on the dial on the front of the machine. If you look at the front of the controller, you will see a small screen. This is the VFD screen and you can adjust the spindle speed. 0 = 0RPM. 400HZ - 24000RPM
- **Feed Rate** – this parameter is the speed of the machine when machining the work in the X and Y directions. The machine can rapid move at up to 5000mm/min. Typically machining speeds are at 700-2000mm/min. Stick to 1500 with a pass depth of 0.5mm or 1mm when you get started. You can build confidence and speed as you get used to using the machine. If you machine too fast the machine will stall and you will lose position. So be careful and be conservative at first.
- **Plunge rate** – is the same as the feed rate except it related to the Z direction. Typically milling cutters (like slot drills etc.) prefer to mill in X and Y and are not as efficient in the Z / plunge direction. Keep this setting at 500mm/min or so as you get started.

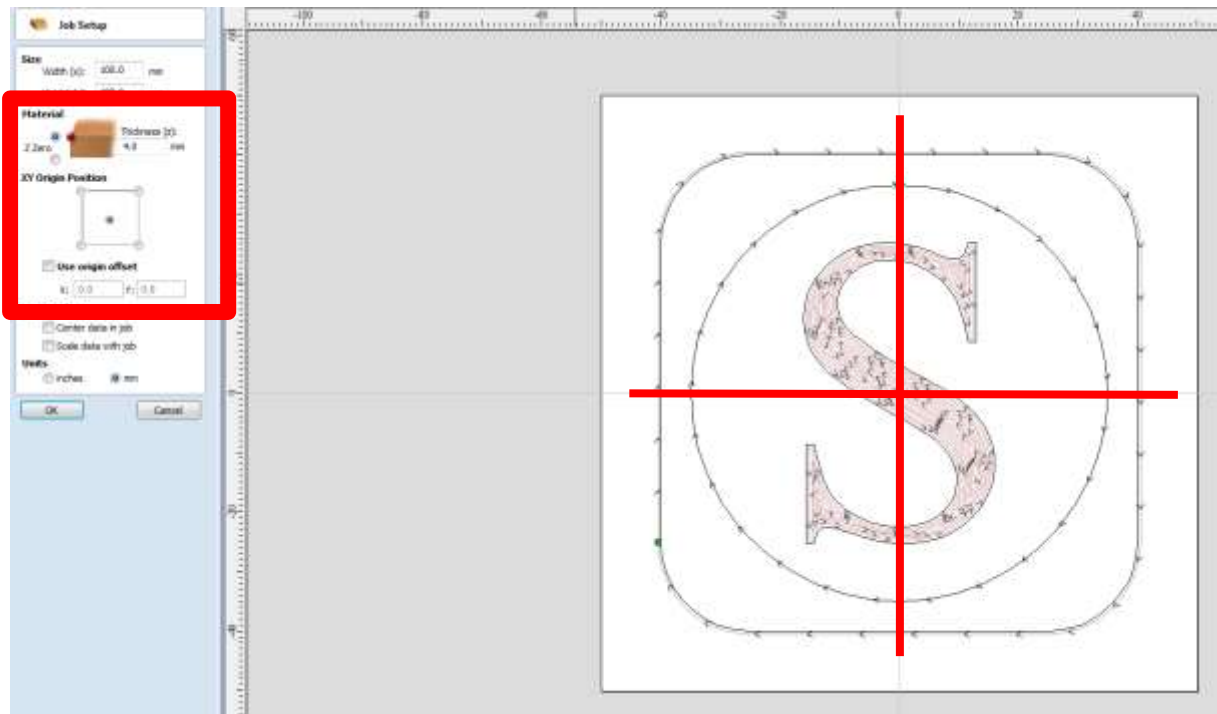


NOTE: It is VERY important that you choose and stick to the same scale in Inches or MM/min in Vcarve.

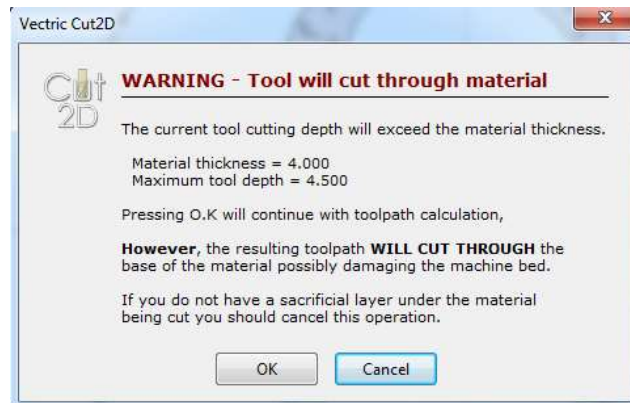


Zeroing The job setup is important. You can see the faint cross hairs on the work piece drawing. The cross hairs appear in the canter of the work. This is because the X, Y origin is setup in the center of the job setup on the left hand side. You can also setup the job origin to be the bottom left. It is very important that you are consistent with the setup here in VCarve Desktop and also with the machine. We recommend using the middle of your work piece.

If you zero in the middle in VCarve Desktop like here – you need to zero, the machine in the middle of the work.



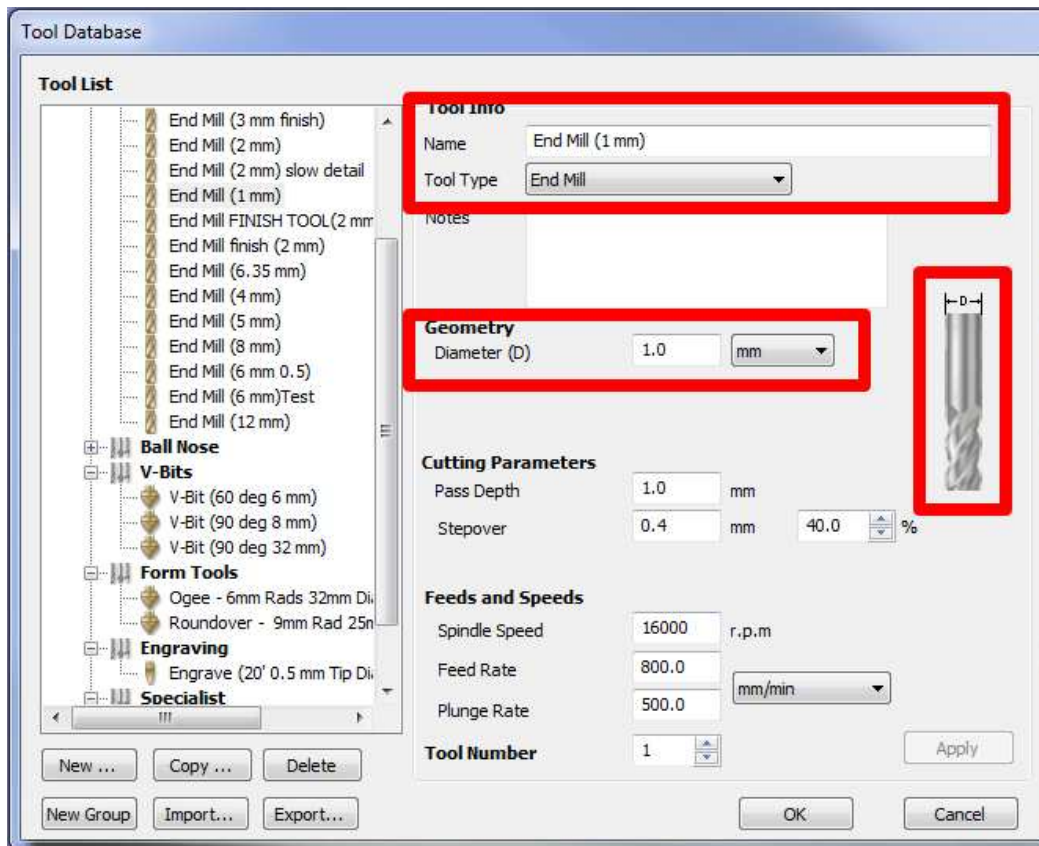
As we have set the thickness of the work to be 4mm (as per our plywood), and we set the cut depth of the final outline cut to be 4.5mm, VCarve Desktop will give a warning. You can still proceed, its simply telling you that you are going to machine deeper than your materials thickness.



If you have a sacrificial layer under your part to be machined (which you do with the MDF) then cutting through deeper than the material thickness will ensure you cut all the way through around the entire perimeter and leave minimal finishing

10.9.3 TOOL RADIUS COMPENSATION

In order for VCarve to carry out effective tool radius compensation (accounting for the fact that the tool has a diameter) Make sure that when you select your tool:



- You select the correct tool type – in this case an end mill. You will see an image of a tool sample on the right hand side in the above figure.
- You enter in the correct tool diameter. The tool diameter is the diameter of the “hole” or the width of the “channel” the tool will make in the work piece. One way to measure this (if not written on tool) is to slowly plunge the tool into a sample work piece – say MDF or plywood (jog only in Z and make sure the spindle is on). The circular hole the milling cutter makes in the work piece (ply or MDF) is the cutter diameter. You can now measure this with a ruler or calliper. NOTE it is best to specify the cutter diameter from the supplied cutter specifications.
- Take some notes for specific jobs. You might find the optimal settings for Perspex for example. It is a good idea to save a new tool with these settings so you always have this tool in your tool library for the next time.

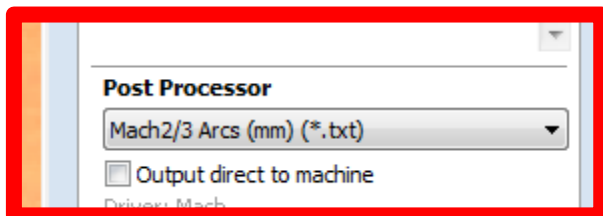
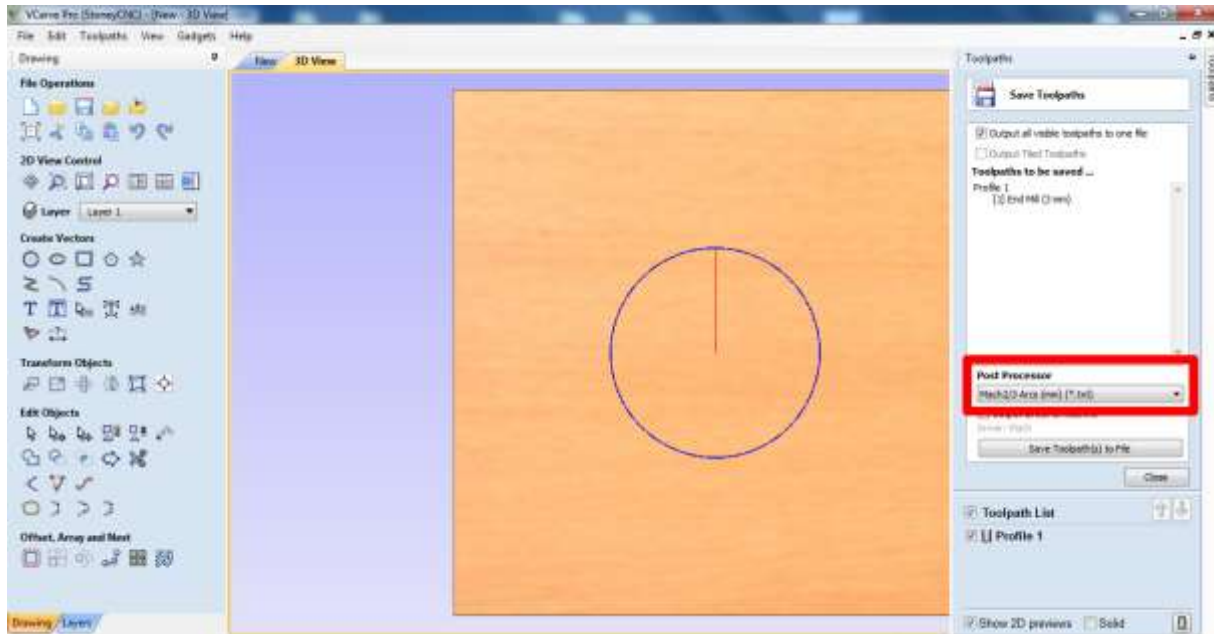
10.9.4 VECTRIC SOFTWARE INSTALLATION

When we provide you with the software – the license number and user name specific to your machine will be emailed to you. If you purchased VCarvePro or VCarve Desktop from us and you do not have a licence number, please let us know.

If you purchased from Vectric directly then Vectric will supply, you with your software license key.

10.10 POST PROCESSOR

As mentioned in Step 5, this part of the process requires you to export the toolpath from VCarve Desktop/VCarvePro to a text file in order to import it into the machine. In order to do this you must choose a post processor specific to your machine. In the case where you are using the I2R machine with UCCNC you must select the “**Mach2/3 Arcs (mm)(*.txt)**” post processor. The drop down menu in VCarve/VCarve Desktop has many post processor options. Make sure choose the “**Mach2/3 Arcs (mm)(*.txt)**” in order to generate the toolpath to be compatible with the I2R machine.



10.11 STEP 6 PART MACHINING

MACHINING OVERVIEW

The final stage is to machine your part and make some chips. To machine your part you must carry out the following steps:

10.11.1 LOAD YOUR G CODE FILE

The G code file is generated from VCarve Desktop/VCarve and from there loaded into the UCCNC software.

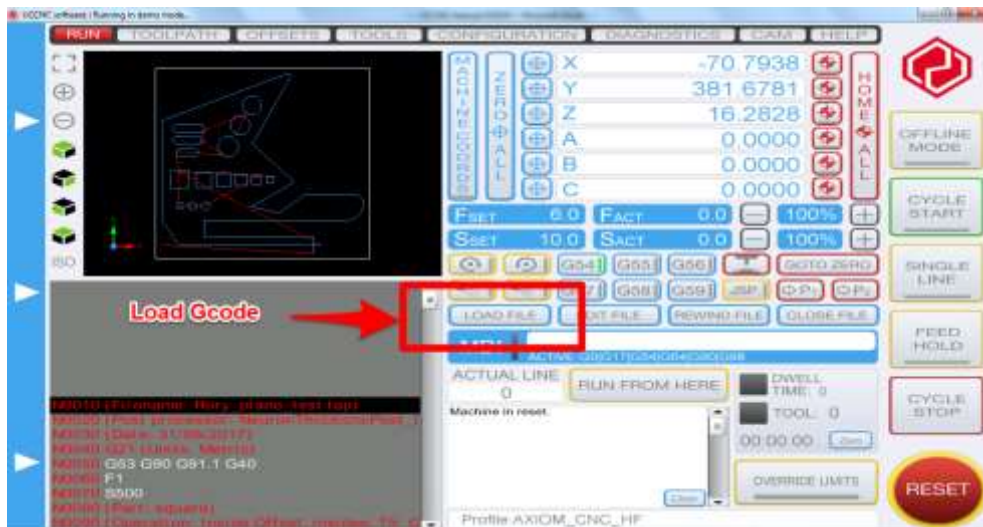


Figure 13: Load Gcode into UCCNC

10.11.2 CLAMP YOUR WORK PIECE TO THE MACHINE TABLE



Figure 14: Clamping methods

10.11.3 LOAD YOUR TOOL

- Before loading any tool or touching the spindle refer to Figure 11 and click the rest button, ensuring that it is flashing, BEFORE attempting to change the tool.
- DO NOT TOUCH the spindle unless the reset button is flashing red and yellow on UCCNC front panel
- The i2R HF spindle uses collets to load the cutters into the spindles. It uses an ER11 collet system. You must disable the spindle system before you handle the collet mounting system by pressing the reset button on the UCCNC front panel (refer to Figure 12)



The procedure for mounting the collets is important.



HF ER11 Collets

- Choose the correct collet for your tool. Always stick to the cutter spec. IE: If using a 3.175mm collet (1/8th inch) then use a 1/8th inch collet with corresponding bit. Using the correct collet for your cutter will make safe tool mounting easier and safer.
- Make sure the collet and collet nut are clean and debris free
- Insert the collet into the collet nut until the collet seats. You should hear a “click”. NOTE: if you mount a collet incorrectly into the spindle it will damage the collet.
- Mount the collet nut (now with seated collet) into the spindle head fixture and loosely tighten by hand only – just so the collet is on the threads of the spindle.
- Insert the tool you wish to use (NOTE: you should have pre- selected your collet size for your tool choice)
- Mount the tool so that you have enough tool sticking out to carry out your machining operation.
- You must now lock the spindle head in order to tighten the collet nut
- On the HF spindle use the wrench provided to lock the head
- The collet nut can now be used to tighten the collet into the spindle head securing the cutter. (NOTE: be careful as you do this as you can slip and damage the cutter or cut/injure yourself. You will be exerting a tightening force with the wrench around and near a sharp cutter. So be careful!)
- Check the cutter is seated in the spindle and collet correctly by eye after you have installed the cutter and tightened the collet.
- Carry out steps in reverse to remove the cutter.
- Never use undersized tools for collets. Always use the correct collet for the correct tool
- Never use a tool beyond its recommended RPM.
- Always expect the unexpected.
- Take extra care when loading a tool and ensure the tool is mounted correctly prior to running a tool path and turning on the spindle.



1. Make sure your machine is on and running in all directions
2. Move the machine and set the machine zero point for the X, Y and Z axes
3. Verify the working area is sufficient and within the machining parameters,
4. Turn on the spindle and ensure that it is spinning clockwise.
5. Click “cycle start” and start carving!

10.12 SPECIAL NOTES ON CLAMPING

WARNING: It's very important the work piece is clamped securely.

10.12.1 *SHEET CLAMPING USING SUPPLIED CLAMPS WITH THE MACHINE*

The T-slot bed provides a number of methods for clamping. The image below shows the typical method for clamping sheet work in small sizes to the T-slot table.

The clamps can be used to clamp a variety of thickness's up to 18mm MDF. There are other options available - please contact us for more information. It is very important the work is securely clamped. If the work hops during use and becomes loose – it is extremely dangerous.



10.12.2 *CLAMP SETS FOR LARGER WORK PIECES*

Another method of clamping is shown here in the image on the left using triangular brackets and fixing cantilever arms. These can work very effectively for larger pieces. The advantage of this configuration is larger work pieces can be clamped securely. However; you have to be careful as the larger the clamps you use, the more you run the risk of crashing into the clamps during use. Always double check before you run your toolpath that the machine will not move itself to crash into the clamps.

10.12.3 *SACRIFICIAL LAYERS*

It's a good idea to always use a sacrificial layer under the work piece you are machining. This is especially important when you are milling all the way through the material. The MDF provided with your i2R CNC is made specifically for this purpose. It protects the T-slot aluminium table. You can use a drill and screws to fix your work piece down as well. It is crude but functional.



10.12.4 VACUUM TABLES

We also provide a range of vacuum tables. The tables come in both MDF and Aluminium configurations. The Aluminium configurations are much better at keeping materials stuck to the work. MDF tables can also work well. Pump specification is very important when considering a vacuum table clamping solution.



10.12.5 SPRAY ADHESIVE

Spray adhesive, especially 3M photo mount spray is a very useful additional method of clamping. For example, a piece of MDF can be clamped to a sacrificial layer of MDF with just the spray adhesive. You have to play with trial and error to find the optimal machining conditions as the spray adhesive is not as strong as the other clamping methods – but can still be VERY effective. For example, when machining letters out of MDF or plywood the addition of spray adhesive as well as the clamps can help prevent the cutout shapes from “hopping” on the bed. For larger pieces this is especially helpful. The reason for this is that it makes sure that the work piece sits flush to the top surface on all areas. Sometimes when clamping larger sheets – the middle of the sheet can rise slightly when clamped at the edges. The spray adhesive does a great job of keeping everything flat and true. Light sanding afterwards gets rid of the adhesive. Trial and error is the best method to approach.

10.12.6 CLAMPING CONSIDERATIONS

It's very important that whatever clamping approach you use that you proceed with caution. This is especially important when your experiment with new methods. Work coming loose when you are machining is extremely difficult.











11 POWER MANAGEMENT OF LAPTOP/PC

It is very important that you disable all screen savers and any temporary shutdown present on your window system. Automatic restarts, updates, screen savers, power save modes etc etc. These can all cause the USB communication to be lost between your machine and control PC. This usually results in lost work.

As the figure show – disable the **Display Dim**, **turn off Display** and **Sleep functions** when the laptop is plugged in.

Change settings for the plan: Balanced

Choose the sleep and display settings that you want your computer to use.

	 On battery	 Plugged in
 Dim the display:	2 minutes	Never
 Turn off the display:	5 minutes	Never
 Put the computer to sleep:	15 minutes	Never
 Adjust plan brightness:		

12 TECHNICAL SPECIFICATIONS

I2R: Imagination to Reality		4	6	8	
X Axis Travel	24" (600mm)	•	•	•	
Y Axis Travel	24" (610mm)	•			
	36" (915mm)		•		
	48" (1200mm)			•	
Z Axis Travel	5.3" (153mm)	•	•	•	
Table Work Area	37.28" x 28.39" (947mm x 720mm)	•			
	49.09" x 28.39" (1247mm x 720mm)		•		
	60.9" x 28.39" (1547mm x 720mm)			•	
Collet	ER11 or upgrade to ER-20	•	•	•	
Collet Chuck	1/8" or 1/4" (3mm or 6mm)	•	•	•	
High Speed Spindle	1.07 HP .8kW/6.5A Electro Spindle	•	•	•	
Spindle Speed	0~24000 RPM	•	•	•	
Rapid Feed Rate	200 IPM/ 5080 mm/min)	•	•	•	
Precision Linear Guide Rails	X/Y/Z Axis	•	•	•	
Precision Ball Screw	X/Y/Z Axis	•	•	•	
Power Requirements	115V, 50~60 Hz, 15 A Single Phase	•	•	•	
	220V, 50~60 Hz, 10A Single Phase				
Working Table	High Rigidity Interlocking Aluminium Extrusion	•	•	•	
	Integrated MDF Spoil Board	•	•	•	
Gantry Bridge	High Rigidity Aluminium Extrusion	•	•	•	
Gantry Support	Gravity Cast Aluminium Alloy	•	•	•	
Gantry Clearance	8.8" (224mm)	•	•	•	
Machine Base	Welded Structural Aluminium Frame	•	•	•	
Machine Footprint	27.16" x 26.31" (690mm x 670mm)	•			
	38.97" x 30" (990mm x 770mm)		•		
	47" x 30" (1197mm x 770mm)			•	
Required Floor Space	37.79" x 36.61" (690mm x 930mm)	•			
	50.98" x 37.36" (1295mm x 949mm)		•		
	62.79" x 37.36" (1595mm x 949mm)			•	
Max. Machine Height	31.37" (797mm)	•	•	•	
Machine Weight	176lbs (80kg)	•			
	209lbs (95kg)		•		
	242lbs (110kg)			•	
Tool Touch Off Puck	Standard Accessory	•	•	•	
Integrated Air Cooling System	Standard Accessory	•	•	•	
Controller Box and Software	UCCNC controller as standard	•	•	•	

13 ELECTRICAL CONNECTIONS



All Electrical connections must be performed by a qualified electrical and follow any local codes and ordinances. Failure to comply may result in serious injury.

Electrical connections that are improperly installed or are outside operational specifications may cause machine damage and void any warranties that are in place.



Figure 15: Standard plug

i2R CNC machines are rated for 110V. The machine and plugs come pre-wired for standard use for the USA market only. It is recommended that these machines be connected to a dedicated circuit.

If the machine must be reconnected for use with a different type of electric circuit, the connection must be done by qualified person(s), and must comply with all local codes and ordinances.

13.1 GROUNDING INSTRUCTIONS:

CNC machines must be grounded. This grounding provides a path of least resistance for electrical current, which during a malfunction will reduce the risk of electrical shock.

All i2R machines are equipped with an electrical cord with grounding conductor and plug. The plug must be used with a matching outlet that is properly installed and grounded in accordance with local codes and ordinances. These plugs must not be modified, if a matching outlet is needed, one must be installed by a qualified electrician. Improper installation may result in electrical shock.



If grounding instructions are not completely understood or if in doubt as to whether the machine is properly grounded, a qualified electrician should be consulted.

13.2 EXTENSION LEADS:

The use of extension cords should be discouraged. It is recommended to place the machines as near to the power source as possible.

If an extension cord is necessary, make sure any cord used is in good conditions. Worn or damaged cords should be replaced immediately.

When using an extension cord, be sure to use one that is rated enough to carry the required current and use only 3-wire extension cords that feature the correct 3-prong grounding plugs and 3-pole receptacles.

An undersized cord will cause a drop-in line voltage resulting in loss of power, overheating and runs the risk of fire.

It is recommended that if an extension cord must be used, it be a 10-12 gauge grounded-three wire cord of no more than 8-10 feet.

14 MAINTENANCE

14.1 GENERAL MAINTENANCE

The best practice when it comes to maintaining your machine tools is to keep the machines clean and free from dirt, dust and debris.

To ensure proper machine operation, it is recommended that the prismatic guides and rolled ball-screws on all axis are kept clean regularly wiped down with a light machine oil lubricant (such as 3-IN-ONE oil). Figure 16 shows the X axis rails and ball screw. The Z and Y axes have the same components.

Every 1000 hours or every year these can be packed with standard grease for optimal operation – See Figure 17 for the recommended grease specification.

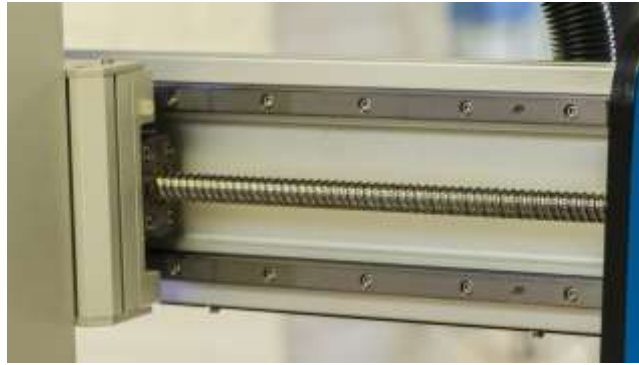


Figure 16: Weekly (best case daily) cleaning and application of light oil externally to screws and rails with cloth and light oil.



Figure 17: Recommended grease for the ball screws when greasing

14.2 ROUTINE CHECKS: (PERFORMED DAILY WITH MACHINE USE)

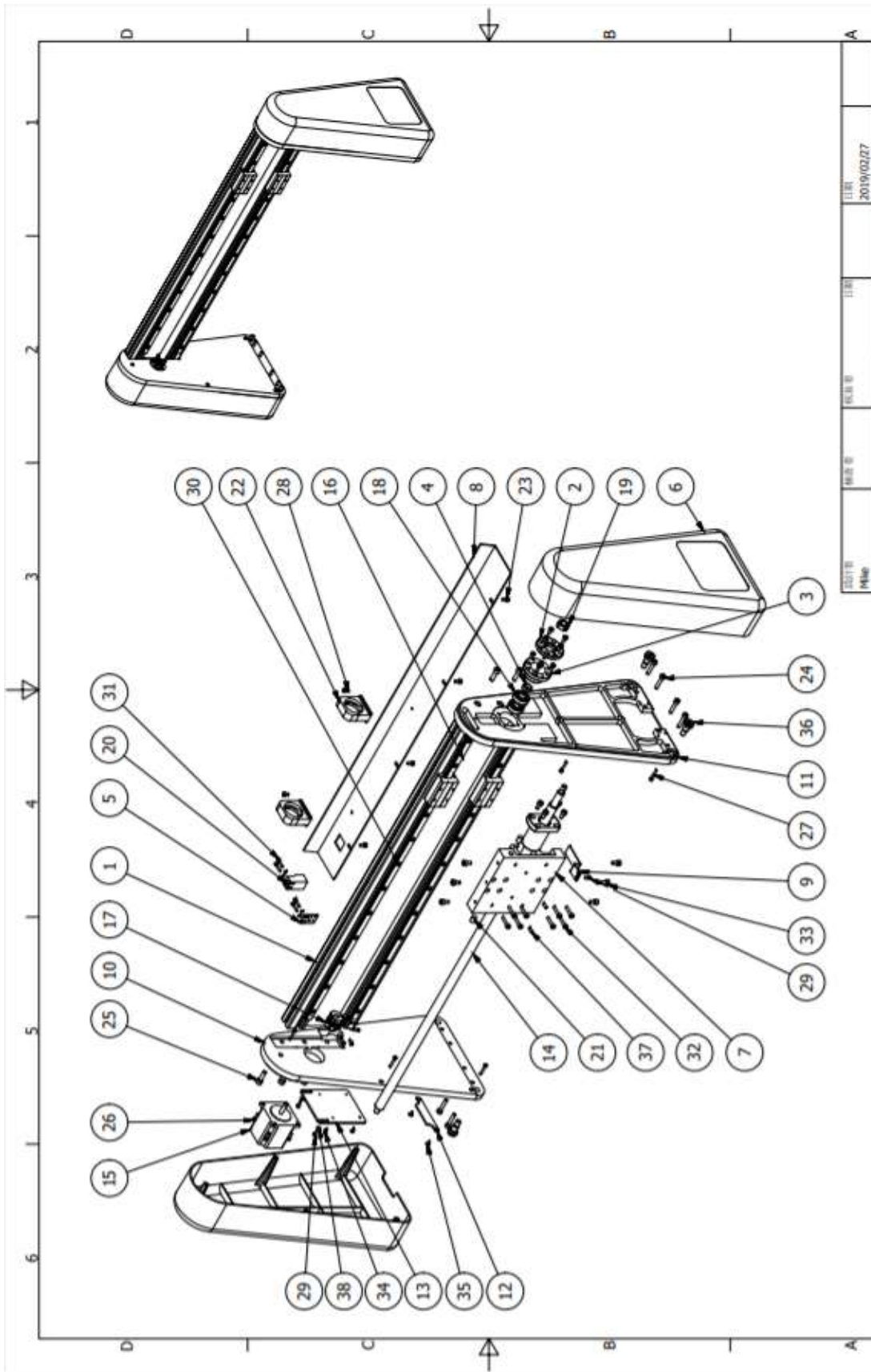
1. Wipe the ball-screws and prismatic guides clean and dust free.
2. Apply light machining grease to the ball-screws and prismatic guides using a clean cloth.
 - a. Move the machine through travel limits to properly disperse the grease lubricant.
3. Check cutting tool edges for chips and/or dullness.
4. Generally, inspect the machine for any damage.
5. Ensure that slots in the collets are free of sawdust and debris.
6. Check coolant levels in reservoir. **(I2R Machines only)**
7. Verify that your dust extractor is free of blockages.
8. Check that all electrical connectors are fitted correctly and are not loose.

14.3 COOLING SYSTEM:

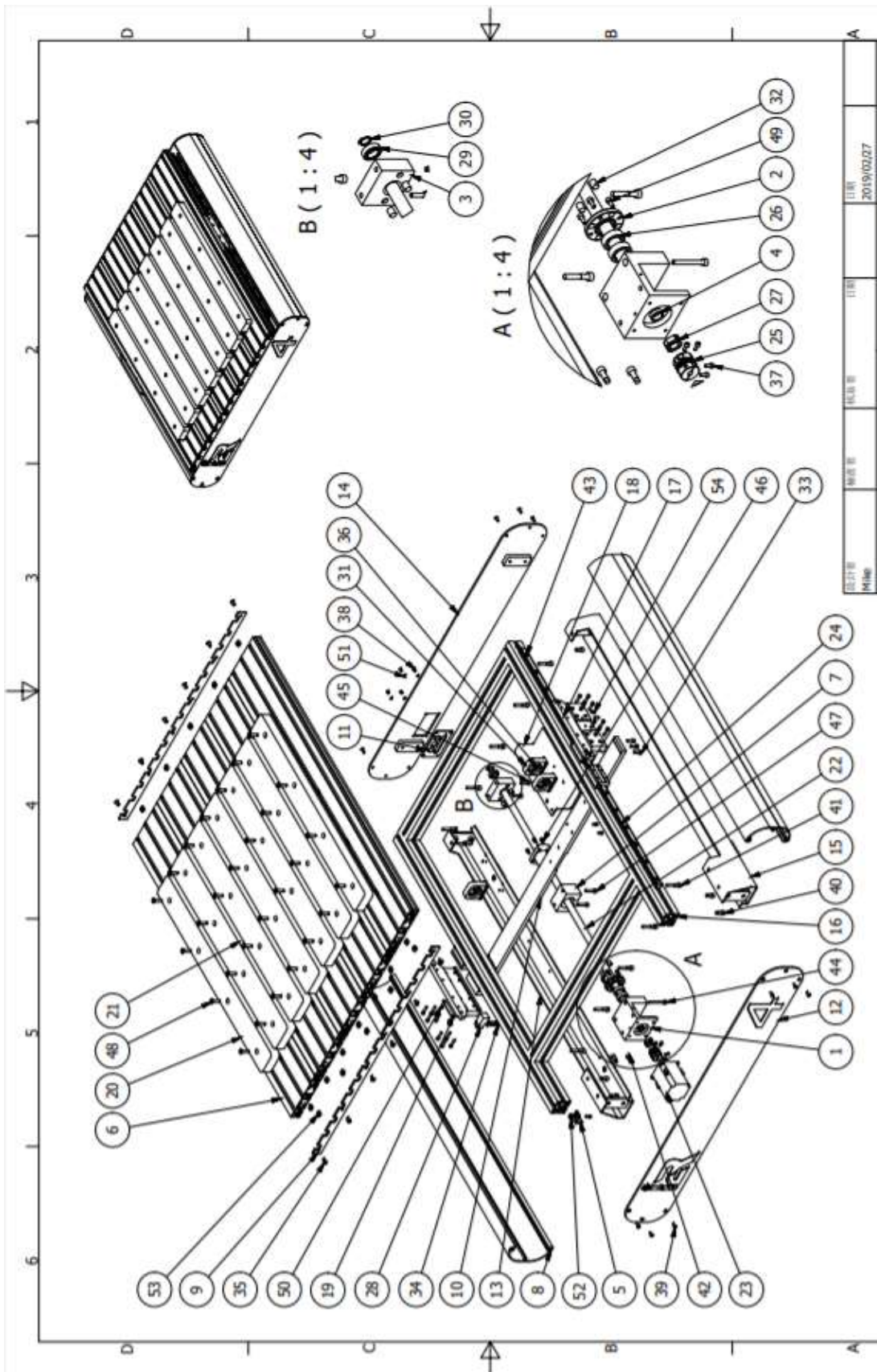
All i2R CNC routers come with an air cooled spindle. Keep the cooling fan free from any blockages so that nothing is disrupting airflow.

Be sure to wipe down the area around the fan on the top of the spindle encasement to remove any dust after every use. You can also use a vacuum or air compressor to remove dust from the local area.

15 DOCUMENTATION

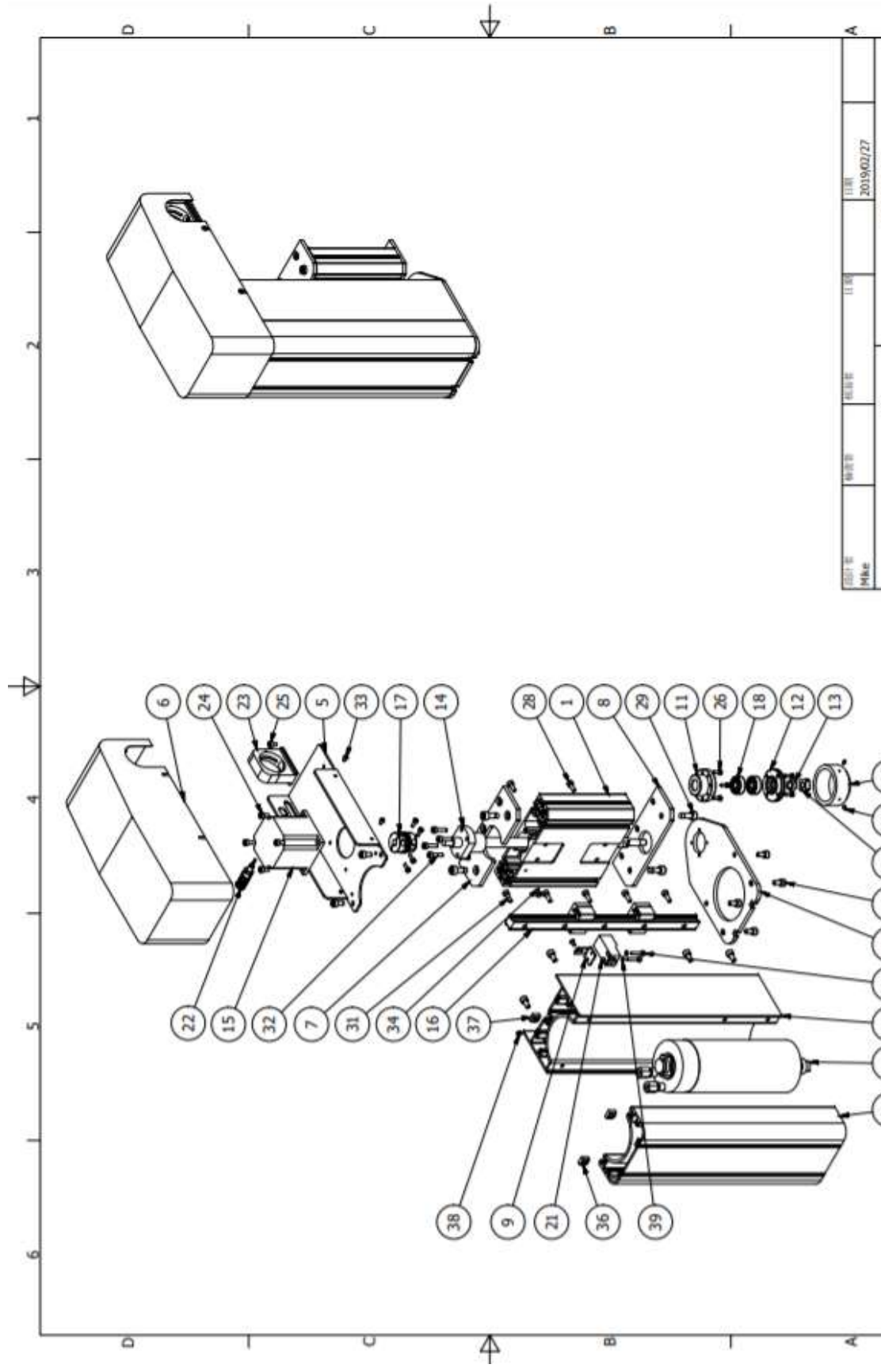


Item	Part Number	Item Name	Quantity	Remarks
	i201M0010	X Axis Combination i2R- 4, 6, 8		
1	AX0100042	X-Axis Aluminium Extrusion	1	
2	AX0100131	Bearing Cap	1	
3	AX0100151	Bearing Housing	1	
4	AX0100191	Spacer	1	
5	AX0100222	Sensor Mask	1	
6	i20101130	Vertical Left and Right Shield	2	
7	i20101201	X-Axis Sliding Board	1	
8	i20101221	Protective Chain lower bracket	1	
9	i20101231	Sensor fixing plate	1	
10	i20101320	Left side panel	1	
11	i20101330	Right Side Panel	1	
12	i20101750	Complete line plate	1	
13	i20101790	PCB fixing board	1	
14	AX0100070	X- Axis Screw	1	
	i201MH010	X-Axis Commercially Available Product for i2R - 4, 6, 8		
15	TK266D-02A51	2-phase stepper motor 7.2w-2A 1.8 ohm	1	
16	STAF-BGXS15BN-1-700-NZ0-20-20	X-Axis Rail	2	
17	SQR20C	Coupling	1	
18	TPI-7001AHTP5	Oblique Ball Bearing	2	
19	BNR12	Anti-loose Bearing nut- 4 angle type	1	
20	DA-1805NO	Square Proximity Switch	1	
21	CXHK8-10	Excellent Glue	2	
22	N-TH-34B	Round tube holder (black)	2	
	i201S0010	X-Axis Screw Package		
23	M4 x 8	Hexagon socket head cap screws	12	
24	M5 x 25	Hexagon socket head cap screws	8	
25	M6 x 20	Hexagon socket head cap screws	6	
26	M4 x 10	Hexagon socket head cap screws	4	
27	M3 x 20	Hexagon socket head cap screws	10	
28	M4 x6	Hexagon socket head cap screws	2	
29	M3 x 16	Hexagon socket head cap screws	3	
30	M4 x 16	Hexagon socket head cap screws	24	
31	M4 x 20	Hexagon socket head cap screws	4	
32	M4 x 10	Hexagon socket head cap screws	8	
33	M5 x 10	Hexagon socket head cap screws	10	
34	M3 x 6	Semicircular head socket head cap screws	4	
35	M3x6	Round head Phillips	8	
36	MSBH10-10	Contour screw M8	10	
37	Pin4x10	Pin	4	
38	M3	Flat washer	2	
39	M4-20 type	Nut M4-20	4	
40	P4-M4	Nut P4M4	24	



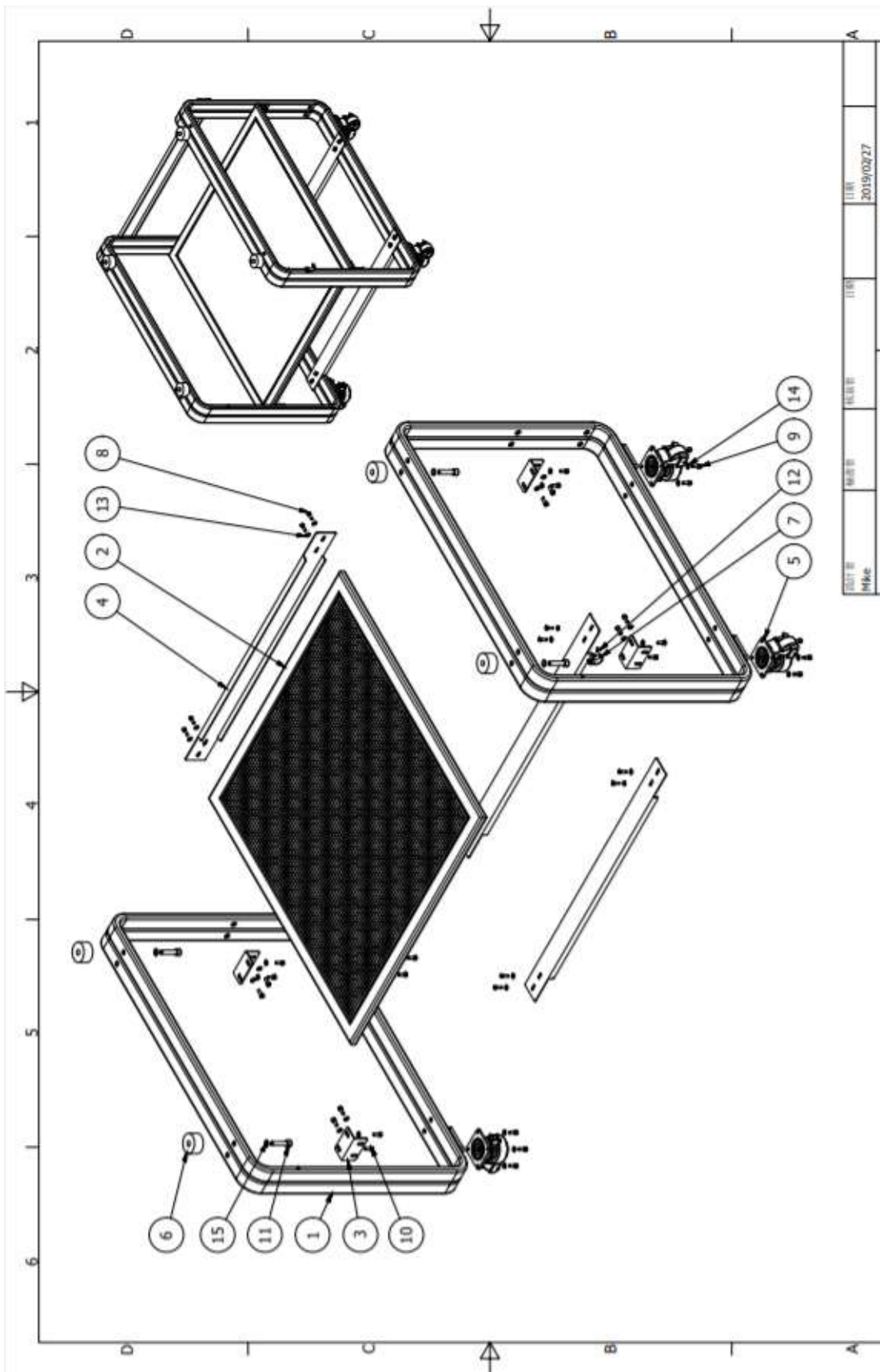
Item	Part Number	Item Name	Quantity	Remarks
	i201M0020	Y-Axis Combination – i2R4		
1	AX0100124	Motor Seat	1	
2	AX0100131	Bearing Cap	1	
3	AX0100171	Y-Axis Bearing Housing	1	
4	AX0100191	Spacer	1	
5	AX0100260	Sensor Matte	1	
6	i20100141	Y-Axis Aluminium Extrusion	5	
7	i20100160	Y-Axis Nut Seat	1	
8	i20100181	Y-axis aluminum extrusion side cover	2	
9	i20101091	Y-axis aluminum extrusion side cover	2	
10	i20101151	Y-axis Slide Board	1	
11	i20101211	Interface back cover	1	
12	i20101261	Y-axis aluminum extrusion front cover	1	
13	i20101272	Structural board (left)	1	
14	i20101281	Y-axis aluminum extrusion back cover	1	
15	i20101292	Structural board (right)	1	
16	i20101301	4040 aluminum extrusion frame	1	
17	i20101350	Slide fixing block	2	
18	i20101490	Y-axis bracketing fixed plate	1	
19	i20101760	Complete line plate	1	
20	AX0100540	24x24-MDF(EDGE)	2	
21	AX0100562	24x24-MDF	5	
22	AX0100200	Y-axis screw	1	
	i201MH020	Y- Axis Products – i2R4		
23	TROY_TK268D-02A51	2-phase stepper motor 9w-2A2.25 ohm	1	
24	STAF-BGXS15BN-2-820-NZ0-20-20_2x2	Y axis rail	2	
25	SQR20C(6.35.8)	Coupling	1	
26	TPI-7001AHTP5	Oblique ball bearing	2	
27	BNR12	Anti-loose bearing nut - four angle type	1	
28	DA-1805NO	Square proximity switch	1	
29	6901ZZ	Deep groove ball bearing	1	
30	STWN12	C buckle	1	
31	N-TH-34B	Round tube holder (black)	3	
32	CXHK8-10	Excellent glue	4	
	i201S0020	Y-Axis Screw Package – i2R4		
33	M5 x 16	Hexagon socket head cap screws	6	
34	M3 x 20	Hexagon socket head cap screws	2	
35	M5 x 10	Hexagon socket head cap screws	12	
36	M4 x 6	Hexagon socket head cap screws	3	
37	M3 x 8	Hexagon socket head cap screws	4	
38	M3 x 6	Semicircular head socket head cap screws	4	
39	M4 x 12	Hexagon socket head cap screws	12	
40	M6 x 16	Hexagon socket head cap screws	6	
41	M6 x 35	Hexagon socket head cap screws	10	
42	M6 x 12	Hexagon socket head cap screws	8	
43	M4 x 20	Hexagon socket head cap screws	44	
44	M5 x 45	Hexagon socket head cap screws	2	
45	M5 x 20	Hexagon socket head cap screws	2	
46	M4 x 8	Hexagon socket head cap screws	6	
47	M5 x 25	Hexagon socket head cap screws	2	

48	M6 x 25	Hexagon socket head cap screws	28	
49	M4 x 10	Hexagon socket head cap screws	9	
50	TRSS3-6	Round head Phillips	2	
51	M3	Flat Washer	6	
52	P4-M4	Nut P4-M4	29	
53	P4-M6	Nut P4-M6	44	
54	Pin 4x10	Pin	4	
55	M8 x 25	Hexagon socket head cap screws	4	
56	P4-M5	Nut	4	
57	M4x4	Stop screw	1	

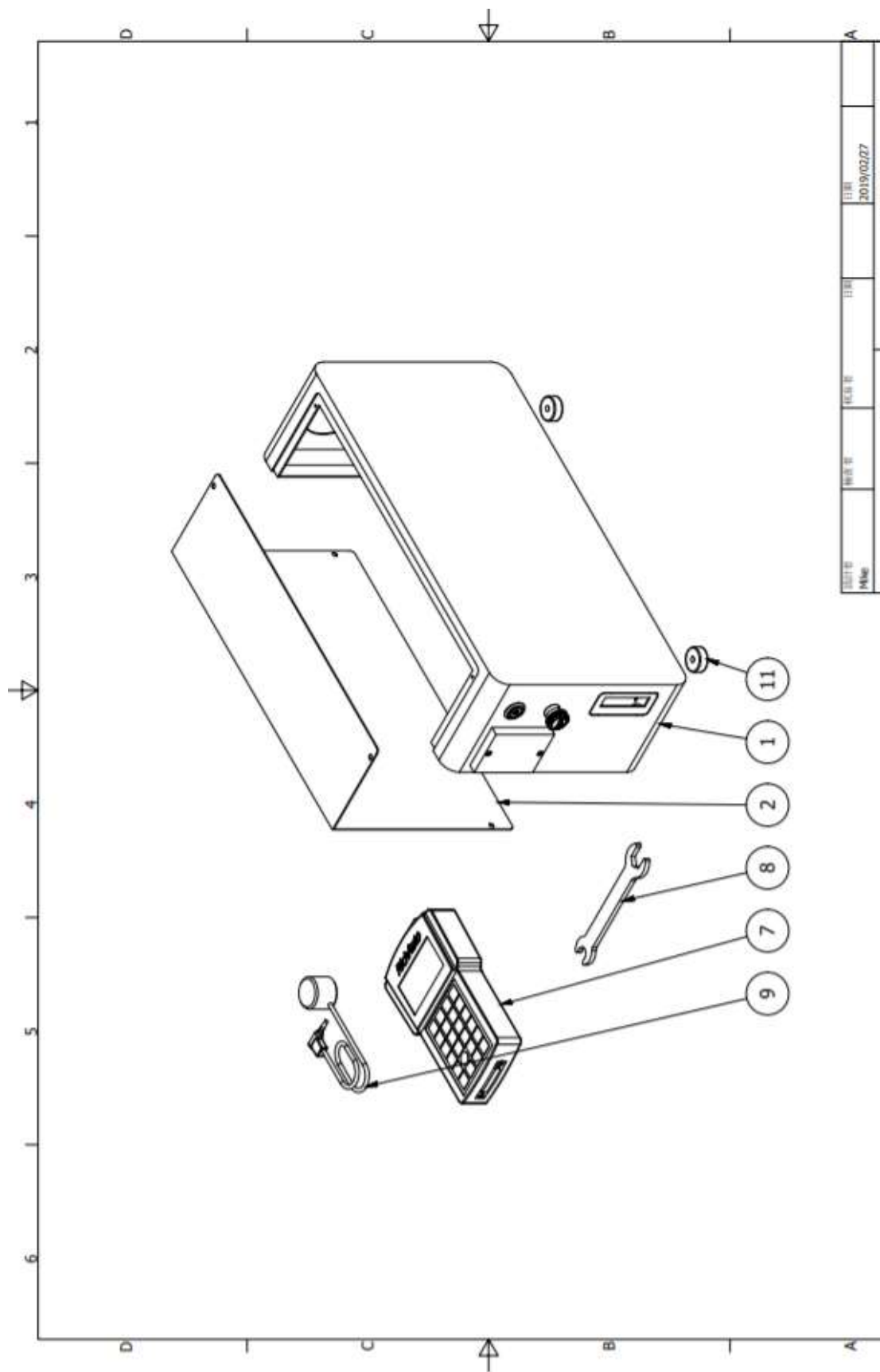


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Item	Part Number	Item Name	Quantity	Remarks
	i201M0030	Z-Axis Combination i2R - 4, 6, 8		
1	i20101021	Z- Axis Slide	1	
2	i20101171	Spindle Holder- B	1	
3	i20101181	Spindle Holder - A	1	
4	i20101032	Z-axis lower cover	1	
5	i20101191	Motor plate gold seat	1	
6	i20101102	X-axis linkage chain	1	
7	i20101050	Sliding block connection block - under	1	
8	i20101061	Sliding block connection block - upper	1	
9	i20101070	Sensor fixing plate	1	
10	AX0300161	Bearing cover	1	
11	AX0300080	Bearing housing	1	
12	AX0300091	Bearing gland	1	
13	AX0300070	Spacer	1	
14	i20101040	Z axis_screw_304L	1	
	i201MH030	Z-Axis i2R - 4, 6, 8		
15	TK266D-02A51	2-phase stepper motor 9w-2A2.25 ohm	1	
16	OME- BGXS15BS-2- L280-20-20	Z axis rail _L280	1	
17	SQR20C(6.35.8)	Coupling SQR20C(6.35,8)	2	
18	708A	Angled ball bearing (8x22x7t)	1	
19	BNR8	Anti-loose bearing nut - four angle type	1	
20	i20101780	Spindle_ø65-V220/800W (Air Cool, 0.8KW 2.5A 220V)	1	
21	DA-1805NO	Square proximity switch	1	
22	N1535	Terminal Black (9404B)	1	
23	N-TH-34B	Round tube holder (black)	1	
	i201S0030	Z-Axis Screw Package i2R - 4, 6, 8		
24	M4 x8	Hexagon socket head cap screws	4	
25	M4 x6	Hexagon socket head cap screws	1	
26	M3 x8	Hexagon socket head cap screws	12	
27	M5 x10	Hexagon socket head cap screws	12	
28	M6 x12	Hexagon socket head cap screws	4	
29	M3 x16	Hexagon socket head cap screws	4	
30	M4 x16	Hexagon socket head cap screws	2	
31	M4 x14	Hexagon socket head cap screws	5	
32	M4 x16	Hexagon socket head cap screws	4	
33	M3 x6	Hexagon socket head cap screws	5	
34	M4 x8	Hexagon socket head cap screws	1	
35	M3 x4	Flat Stop screw	2	
36	M3(W5.5x2.4t)	Nut (W5.5)	1	
37	M3	Flat washer	2	
38	P4-M5	Nut P4-M5	6	
39	P4-M4	Nut P4-M4	5	



Item	Part Number	Item Name	Quantity	Remarks
	i201M0060	Stand Combination i2R-4		
1	i20101243	Base Stand	2	
2	i20101252	Carrier board	1	
3	i20101740	Support plate	4	
4	i20101840	Base bracket	3	
5	FG-50F	Korean casters	4	
6	AX01C00044	Rubber shock pad -50Xd13X25t	4	
7	YGS-3016	3016 white iron hook	1	
	i201S0060	Stand Screw Package i2R - 4, 6, 8		
8	M5 x 16	Hexagon socket head cap screws	12	
9	M6 x 12	Hexagon socket head cap screws	16	
10	M6 x 16	Hexagon socket head cap screws	16	
11	M10 x 55	Hexagon socket head cap screws	4	
12	M4x10	Hexagon socket head cap screws	2	
13	M5	Washer	12	
14	M6	Washer	24	
15	M10	Washer	4	



Item	Part Number	Item Name	Quantity	Remarks
	i201E0010	Electronic Control Combination		
1	i20101800	Electric control box	1	
2	i20101810	Electric control box cover	1	
3	i20101820	switchboard	1	
4	TR22GC-D-D3Z	Three-axis stepper drive	1	
5	LS653M-10K7XN1	700 type inverter -110V	1	
6	WM-C-0.5M	0.5M extension cord	1	
	i201MA010	I2R Box Accessories		
7	RICHAUTO-B11	Handheld motion controller - DSP controller	1	Only on I2R Model
8	AX0301271	Spindle wrench	1	
9	AX0100530	Tool block	1	
10	NFE-08B	Closed wave tube	1	
11	AX01C00012	Rubber pad 25xt10	4	
12	HTS-306	Hexagonal isolation column – L6	4	
13	UC-3	Wiring fixing button	3	

