

KX24 Owner's Manual



SKU/Model Number: KX2401

LAGUNA

Laguna Tools
744 Refuge Way, Suite 200
Grand Prairie, TX 75050
lagunatools.com

Scope of This Manual

This manual outlines the basic procedures for the KX24.

For detailed instructions and videos, please go to www.lagunatools.com. Refer to www.lagunatools.com for the latest manual revision.

Customer Service

For technical support, please contact Laguna Tools Customer Service by phone 1-800-332-4094 or email customer_service@lagunatools.com. Please note the machine type in the subject line.

In the space provided, record the serial number, model number, and install date of the machine.

Serial No.	
Model No.	
Install Date:	

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DISCLAIMER

Laguna Tools is not responsible for errors or omissions. Specifications subject to change. Machines may be shown with optional accessories.

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1.0 General Information and Safety

1.1 Overview

SAVE THIS MANUAL. Keep this manual for the safety warnings, precautions, assembly, operating, inspection, and maintenance procedures. Read this Owner's Manual in its entirety prior to assembly or operation.

Read and understand all warnings and operation instructions before using any tool or equipment. Always follow basic safety precautions to reduce the risk of personal injury. Improper operation, maintenance, or modification of tools or equipment could result in serious injury or property damage. Laguna Tools equipment is designed for specific and limited applications. This product should not be modified nor used for any application other than its intended use.

PERSONAL SAFETY IS THE RESPONSIBILITY OF THE OPERATOR.

1.2 Safety Signs and Call-Outs

DANGER

An imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

A potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

A potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

NOTE

A helpful tip from Laguna Tools technical staff.

1.3 Proposition 65 Warning of Harmful Exposure

Some dust created by power sanding, sawing, grinding, drilling, and other construction activities contains chemicals known to the state of California to cause cancer, birth defects, or other reproductive harm. Some examples of these chemicals are:

- Lead from lead-based paint.
- Crystalline silica from bricks, cement, and other masonry products.
- Arsenic and chromium from chemically treated lumber.



DANGER

Fire Warning

Use extreme caution when working with flammable materials such as wood or acrylic, as they are more volatile than other materials.

Keep the machine clean and follow the maintenance schedule.

Always have a fire extinguisher ready to extinguish a fire.

Never leave the machine running unattended.

The tools sold by Laguna Tools are safe when used properly, as described by the American National Safety Institute, the UL Standards of safe tool use, and the IEC standards of safe tool use. Laguna Tools is in no way responsible for injury or death that occurs while using this product.

The risk of exposure varies depending on frequency of use. To reduce exposure to these chemicals, work in a well-ventilated area and work with approved safety equipment, such as face or dust masks that are specifically designed to filter out microscopic particles. For more information go to <https://www.p65warnings.ca.gov/>.

1.4 Intended Use

The KX24 machine is designed to cut wood, acrylics, wood-fiber composites, certain plastics, foam, and non-ferrous metals. Do not use this machine for other than its intended use.

1.5 Safety Information

The KX24 machine is an electrical appliance and precision machine. Please 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. Failure to comply with all warnings may cause serious personal injury or damage to the machine.

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The KX24 machine is designed and intended for use by properly trained and experienced personnel only. Personnel who are not familiar with the correct and safe operation of the KX24 should not operate the machine until properly trained.

1.5.1 Shop Environment

1. Verify the floor can bear the weight of the machine and workpieces.
2. Ensure the floor around the machine is clean and free of scrap material, oil, and grease.
3. Do not lean material against the gantry, guide rails, or table.
4. Support the weight of the dust hose attached to the dust shoe (optional) 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. Position the KX24 CNC machine away from overhead pipes and plumbing fixtures to prevent condensation from dripping on to the spoil boards and control system components.
6. Locate the KX24 CNC machine away from sinks, faucets, or other water supplies or storage to prevent splash-outs that can damage the spoil boards and control system components.
7. Provide adequate room between the KX24 CNC 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. Verify there is adequate space between machines to allow for the possibility the workpiece will extend over the end of the KX24 CNC machine.
9. Store cutting tools in a dry location and prevent contact to preserve the cutting edge.

1.5.2 Health and Safety

1. 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. Wear ear protectors (plugs or muffs) even during short periods of operation.
2. Before operating this machine: remove all hand, wrist, or neck jewelry and push sleeves up over the elbows. Do not wear loose clothing which may become caught in the machine and confine long hair. Non-slip footwear or anti-skid floor strips are recommended.
3. 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

the State of California to cause cancer. Wood products also emit chemicals known to the State of California to cause birth defects or other reproductive harm (California Health and Safety Code Section 56).

4. 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 KX24 CNC machine or vicinity.
5. Do not operate this machine while tired or under the influence of drugs, alcohol, or any medications.

1.5.3 Electrical

1. Verify the switch is in the OFF position before connecting the machine to the power supply.
2. Verify 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 the shop are operating simultaneously. If necessary, place a cover on the outlet to prevent accidental disconnection.
3. Verify all machine adjustments or maintenance with the machine unplugged from the power source.
4. Follow effective lockout procedures to reduce the risk from high voltage wires and components and prevent accidental operation.
5. Do not operate in a damp or wet location or exposed to rain, fog, or snow.
6. 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.
7. While the use of an extension cord is discouraged, if it is necessary, verify the cord is in good condition, meets the current requirements, and is located so as not to present a tripping hazard.

1.5.4 Additional Safeguards

1. Remove and store adjusting keys and wrenches before turning on the power. If necessary for visibility, apply safety markings to adjusting wrenches and keys.
2. Install safety guards consistent with general shop safety practices. Always keep safety guards in place when the machine is in use. If removed for maintenance purposes, use extreme caution, and replace the guards immediately after completion of maintenance.

3. 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.
4. Keep visitors a safe distance from the work area. Keep children away.
5. Control liquids in the shop to limit the possibility of spillage that can damage the machine and potentially cause damage or personal injury from electric shock or fire. Never use the table to apply or dry finishes.

1.5.5 Maintenance

1. Establish a weekly and monthly maintenance checklist and follow it diligently.
2. 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. Analyze breakage or damage to determine the cause and take appropriate remedial action.
3. Do not operate the machine if a component of the control system is damaged. It should be properly repaired or replaced before use.
4. Follow instructions for lubricating and changing accessories.
5. Store maintenance tools and supplies nearby, consistent with the shop maintenance practices and resources.

1.5.6 Operational Practice

1. Never leave the machine running unattended. Always be in close reach of the emergency stop button.
2. Turn off the power and do not leave the machine until it comes to a complete stop.
3. Avoid pinch points and entanglement hazards. Keep hands and clothing away from the ball screws, thrust bearings, gantry, guide rails, and rotating cutting tools while in operation.
4. 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 designed. The right tool will do the job better and more safely.
5. 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 this purpose.
6. Do not lay a hot cutting tool on its side.
7. Use recommended accessories; improper accessories may be hazardous.

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8. Do not use dull, gummy, or damaged cutting tools. Keep bits and other cutting tools clean and sharp for the best and safest performance.
9. Turn off the machine before cleaning. Use a vacuum, brush, or compressed air to remove chips or debris. Do not use bare hands.
10. 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.
11. Remove loose items and unnecessary workpieces from the table before starting the machine.
12. 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.
13. Always secure a workpiece to the spoil bard using clamps, vacuum, or double-sided tape. If the workpiece is mounted in a jig, ensure that the fixture is securely held to the table. Never hold a workpiece down by hand while operating.
14. Inspect the material of the workpiece to detect any defects that may result in ejection of large pieces of scrap.
15. Verify the workpiece is free from nails, hardware, or other foreign objects.
16. After installing a cutting tool, verify the collet is securely tightened. An unsecured cutting tool may fly loose from the collet and cause injury. Verify that the adjusting wrenches have been removed and are secured before turning on the power.

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2.0 Definitions

4th Axis – An accessory that enables the CNC to operate as a lathe.

Axis – Direction of movement. On a three-axis machine: X (left-right), Y (front-back) & Z (up-down).

Array Work – Division of the machine work surface into square or rectangular workspaces so that the toolpath can be ran in each space to produce several identical profiles.

Ball End (Ball Nose) – A cutting tool that has a rounded cutting arc, where the arc diameter is equal to the cutting diameter.

Ball-screw – Drive system component. The ball-screw is rotated by the stepper motor and provided the means for moving the gantry and spindle along the axes.

Bed – The Bed of the CNC consists of a welded steel frame and an extruded aluminum tabletop, tongue and groove tabletop with integrated T-slots.

Breakpoint – The point in a toolpath file where a break is created. In a job file, a breakpoint will allow you to stop work and save a location to resume from later.

CAD – Computer aided design using software to assist in designs.

CAM – Computer aided manufacturing using software to define toolpaths and assist in manufacturing processes.

Chip Load – Chip load is the measure of the thickness of a chip a cutter will cut.

CNC – Computer numerical control

Climb Cut – Refers to the relationship of the cutting tool rotation to the direction of feed. A climb cut deflects the cutting away from the cut, with the direction of the feed.

Collet – A metal collar that holds the cutting tool within a spindle nut.

Conventional Cut – Refers to the relationship of the cutting tool rotation to the direction of feed. A conventional cut deflects the toward the cut, against the direction of the feed.

Compression Bit – A cutting tool with a combination of up and down shear cutting edges. Typically used for cutting laminate material to prevent tear-out on both sides of the sheet.

Deflection – Tool deflection occurs when the spindle speed and feed rate exert sufficient force to deflect the cutting tool. Deflection leads to excessive wear and chatter which can shorten tool life and will leave unwanted tooling marks on the material.

Down-Shear Bit – A cutting tool whose edges carve downward on the face of the toolpath. Reduces the potential for tear-out but requires a slower feed-rate.

Drag Knife – A cutting tool that holds a razor or knife blade used to cut and inscribe material. Used with spindle or router motors turned off, and freely spins as it follows the direction of the toolpath.

Dust Shoe – An accessory which aids in dust collection by limiting the spread of dust and debris by channeling the air flow through an attached dust collection system.

End-Mill – A cutting tool with a straight end, typically with a spiral flute(s). It creates a channel with a flat bottom perpendicular to the sides.

Feed and Speed – A combination of factors that must be set to control the work performed by the cutting tool.

Feed-rate – The speed at which the cutting tool moves along a work piece.

Flute Length – The length of the cutting portion on a router bit or cutting tool.

Flutes – The cutting edges or inserts of a router bit or cutting tool.

Finish Cut – A 3D toolpath reduces or eliminates the irregular contours left by the rough cut.

Form Bit – A bit that carves a standard profile such as a round over, ogee or similar contours.

Gantry – The frame structure that straddles the bed and carries the spindle. It moves on guide rails along the length of the bed and is driven by the ball-screw system.

Gantry Bridge – The part of the gantry that lies between the upright towers. The upper bridge carries the spindle and cooling system. The lower bridge supports the weight of the gantry and affixes directly to the Y axis ball-screw.

Gantry Upright (Towers) – Parts of the gantry that extend upward, supporting the upper gantry bridge.

G-Code – A machine language that uses axis points and commands which the machine uses to move and perform functions.

Grid – The minimal movement units of the router. The router head automatically moves to the next grid position when the directional button is toggled in either continuous or step mode.

HHC – The handheld controller component of the control system.

Hold-down – A clamp or other such device used to firmly hold a workpiece or fixture to the table. Includes clamps, double-sided tape, vacuum pods and others.

Home Position – Mechanical point set using magnetic limits switches.

Origin – User designated zero point for the work piece. From which the router will reference the positioning of all cutting.

Plunge – The distance on the Z axis that the spindle and cutting tool moves toward, into, or along the material.

Plunge Rate – The speed of descent of the spindle on the Z axis.

Pocket Tool-path – A toolpath that creates a cavity in the horizontal surface of a work piece.

Post Processor – A software function that enables the CAD/CAM application to format G-Code enabling the control system of a CNC to follow the designated toolpaths.

Profile Tool-path – A tool paths that cuts along the profile of a set of vectors. Typically used to cut out the shape of a design.

Proximity Switch – A magnetic limit switch that is used to find the HOME position.

Restore Point – The point along a toolpath where the spindle will start to resume a toolpath following a break.

Rough Cut – A 3D toolpath where the initial cut is designed to remove unwanted material, leaving a rough contour.

Soft Limits – Limits on movement availability. Imposed by the workspace boundaries and based on controller settings and the location of HOME. An “out of soft limits error” implies that based on the positioning of the workpiece, there is not enough room to move in a designated direction.

Speed Scale – Allows for the reduction of the feed-rate at the beginning of a toolpath to reduce the stress on a cutting tool as it first contacts the material.

Spindle Speed – Rotational speed of cutting tool (RPM).

Step Down – Distance in Z-axis that the cutting tool plunges into the material.

Step-over – The amount the cutting tool moves away from the previous cutting path as it routes the new path.

Stepper Motor – DC motor that moves in very precise steps upon the receipt of “pulses”, which results in very accurate positioning and speed control.

Surfacing – The process of leveling the surface of the spoil boards so that they are perpendicular to the spindle.

Tool-path – User defined route which the cutter follows to machine a workpiece.

Touch-Off Puck – A device used to set the zero point (Origin) for the Z axis.

U-Disk – External data storage device that is inserted into a USB interface.

Up-Shear Bit – A cutting tool whose edges carve upward along the face of the toolpath. Increases the potential for tear-out but allows for a slightly higher feed-rate.

VFD – Variable Frequency Drive which controls the speed (RPM) of the spindle. Enables the fine tuning of the spindle during the operation of a toolpath.

Working Envelope – The three-dimensional area that the spindle can travel within while cutting or milling.

3.0 Electrical Components

WARNING

All electrical components must be performed by a qualified electrician 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 damage to the machine and void any warranties that are in place.

The Pro Model CNC machines are rated for 110V +/- 10% having an operational range of 110-120V. The machines come pre-wired with a NEMA 5-15p plug for use on a circuit with a grounded outlet as pictured. It is recommended that these machines be connected to a dedicated 10-amp circuit.



Figure 3-1: NEMA 5-15p Plug

Verify the machine is connected to a matching outlet. No adapter is available, nor should one be used.

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

3.1 Grounding Instructions

Laguna Tools 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 CNC 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.

 WARNING

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.

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

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

Use an extension cord that is heavy 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 or no more than 8-10 feet.

4.0 Specifications

KX24 Specification Table	
X Axis Travel	24" (610mm)
Y Axis Travel	48" (1210mm)
Z Axis Travel	5.5" (140mm)
Table Work Area	24" x 48" (610mm x 1219mm)
Collet	ER-11
Collet Size	1/4" and 1/8"
High Speed Spindle	1 HP (800W) Electro Air Cooled Spindle
Spindle Speed	0~24,000 RPM
Max. Rec. Feed-Rate	200-250 IPM (Shuttle Speed)
Max Rapid Feed Rate	300 IPM
Precision Linear Guide Rails	X/Y/Z Axis
Precision Ball Screw	X/Y/Z Axis
Power Requirements	110 V, 60Hz, 15A Single Phase
Working Table	MDF Locking Table
Gantry Bridge	High Rigidity Aluminum Extrusion
Gantry Support	Aluminum Alloy
Machine Dimensions (L x W x H)	61.25" x 40" x 24.8" (1555mm x 1020mm x 630mm)
Machine Dimensions with Stand (L x W x H)	61.25" x 40" x 55.5" (1555mm x 1020mm x 1401mm)
Shipping Dimensions (L x W x H)	65" x 43" x 20" (1651mm x 1092mm x 508mm)
Gantry Clearance	6.5" (165mm)
Stand Dimensions (optional) (L x W x H)	44.5" x 38.5" x 30.5" (1130mm x 978mm x 775mm)
Stepper Motor	Dual Drive Y-Axis and 24V High Torque Stepper Motors
Machine Frame	Steel & Aluminum Frame
Recommended Working Area (L x W)	108" x 96" (2743mm x 2438mm)
Metal Base (optional)	Bolt-together Steel Base
Required Floor Space	62" x 40" (1575mm x 1016mm)
Max. Machine Height	35" (889mm)
Machine Weight	Net Weight: 179.3 lbs (81kg)
	Gross Weight: 232.6 lbs (105.5kg)
Tool Touch Off Puck	Standard Accessory
Integrated Air-Cooling System	Standard Accessory
Controller	15.1" Touchscreen iCNC Controller

5.0 KX24 Overview

The KX24 is a compact yet powerful machine that redefines the CNC experience by delivering cutting-edge technology in an easy-to-use format. Whether you're just starting out or looking to elevate your woodworking, the KX:24 is set to transform your workshop with its intuitive controls and versatile performance.

5.1 Features

- 15.1" touchscreen display
- 1 HP (800W) Electro Spindle (0-24,000 RPM)
- Prismatic Linear Guides and Ball Screws
- Dual Drive Y-Axis and 24V High Torque Stepper Motors:
- Auto Tool Touch-Off
- Integrated T-Slots and MDF Spoil Board



1. **Gantry** – The gantry straddles the table. It is moved along the length of the table by a helical rack and pinion.
2. **Spindle** – This machine is equipped with a 1hp (800W) electro air cooled spindle.
3. **Dust Shoe**–The dust shoe keeps control of any dust and can be attached to a dust hose.
4. **Touchscreen Controller** – This is the controller for the KX24.
5. **Table** – MDF table equipped with five T-Slot clamping system.
6. **Control Cabinet** – This is the main power for the controller.
7. **Stand (optional)** –This stand helps elevate and mobilize the machine.

6.0 Setup and Assembly

Please carefully read and understand all setup and assembly instructions before beginning this procedure.

WARNING

This machine is heavy. Seek assistance from an experienced professional if you have any doubt about the following unboxing or set up procedures.

DO NOT attempt any procedure that you feel is unsafe or you believe you do not have the physical capability of achieving.

DANGER

DO NOT plug in the machine until setup and assembly is complete.

6.1 Receiving the Machine

Following delivery and before the driver has left, inspect the packing, invoice, and shipping documents. Next, ensure there is no visible damage to the packaging or the machine. All damage must be noted on the delivery documents and signed by the receiver and the delivery driver. Contact Laguna Tools Customer Service as soon as possible in case of damage. It is advisable to photograph and document any shipping damage. The original packaging is required to return damaged equipment to Laguna Tools.

NOTE

Sawdust may be found in the machine upon arrival. This is because the machine has been tested prior to shipment from the factory and/or Laguna Tools. Laguna Tools tests all machines prior to shipping, but some adjustments may have to be undertaken by the customer. These adjustments are covered in the various sections of this manual.

Most large machinery will be delivered on a tractor trailer 48 to 53 feet long. Please notify a Sales Representative with any Delivery Restrictions. The customer is required to have a forklift (6000 lbs. or larger is recommended) with 72-inch forks or fork extensions.

6.2 Packaging Contents

- One (1) Controller Bracket
- One (1) Controller Support Pole
- One (1) Controller Arm Mount
- One (1) KX24 Router Table
- One (1) Electrical Control cabinet
- One (1) Touchscreen iCNC controller
- One (1) Controller Cable
- Four (4) Leveling Feet
- One (1) USB Cable
- One (1) Tool Touch-Off Puck
- One (1) Mobile Stand (sold separately)
 - Four (4) Long Stand Uprights
 - Four (4) Short Stand Uprights
 - Four (4) Corner Legs
 - One (1) Cross Brace
 - One (1) Control Cabinet Shelf
 - Four (4) Swivel Casters
 - Four (4) Leveling Feet
 - Four (4) Rubber Bushings
 - Four (4) Corner Caster Brackets
 - Four (4) Flat Washers (M17)
 - Four (4) Hex Bolts (M17x45)
 - Four (4) Hex Nuts (M17)

- Sixty (60) Carriage Bolts (M10x15)
- Sixty (60) Lock Washers (M10)
- Sixty (60) Hex Nuts (M10)
- One (1) Dust Collection Bracket (sold separately)
- Two (2) Dust Collection Support Poles (sold separately)
- One (1) Dust Collection Hose (sold separately)
- One (1) Dust Shoe (sold separately)
- One (1) LED Light (sold separately)
- Four (4) Hold Down Clamps (sold separately)

6.3 Hardware

- One (1) Right angle 15 pin VGA Male/Female Adapter
- Two (2) ER11 Collets (One pre-installed in the spindle)
- Two (2) Wrenches with 13mm end and 17mm end
- Eight (8) 6mm Allen Bolts (M6)
- Eight (8) Flat Washers (M6)
- Eight (8) Lock Washers (M6)
- Three (3) Socket Head Cap Allen Bolt (M4x15)
- Three (3) Flat Washers (M4)

Remove all contents from the shipping boxes. Do not discard the carton or packing materials until the assembly is complete. Accessories commonly ship inside the machine or stand packaging and can be easily overlooked. There may be extra packing contents or hardware that is included.

6.4 Tools Required for Assembly

- Philips Screwdriver
- Small Phillips Screwdriver
- 10mm, 15mm, 17mm, and 19mm Wrenches
- 10mm Socket and Ratchet
- Utility Knife

- Level
- 3mm, 4mm, 5mm, and 6mm Allen keys
- Rubber Mallet
- Small punch
- Level

6.5 Assembling the Stand

Tools Required for Assembly

- #1 Philips Screwdriver
- 15mm Wrench
- 10mm Wrench
- 10mm Socket and Ratchet
- 19mm Wrench
- 4mm Allen key
- Utility Knife
- Level
- Lock Washers (M10)
- Hex Nuts (M10)
- Carriage Bolts (M10 x 15)

CAUTION

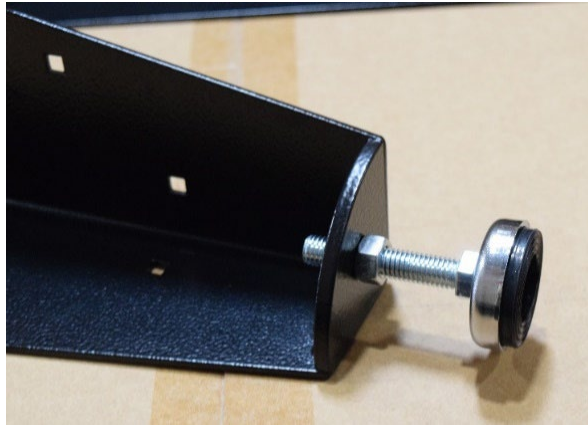
Laguna recommends using two people for assembly. Some components may be heavy and or uneven in weight distribution.

NOTE

Laguna recommends inserting the bolts into all bolt holes before assembly to clean out any burrs or debris.

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1. Insert the leveling feet onto the bottom of the all the corner legs
 - a. Tighten the upper nut using a 15mm wrench



CAUTION

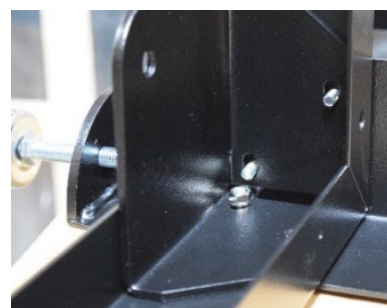
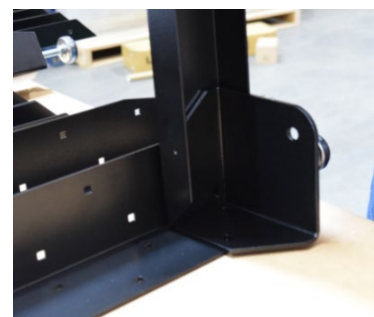
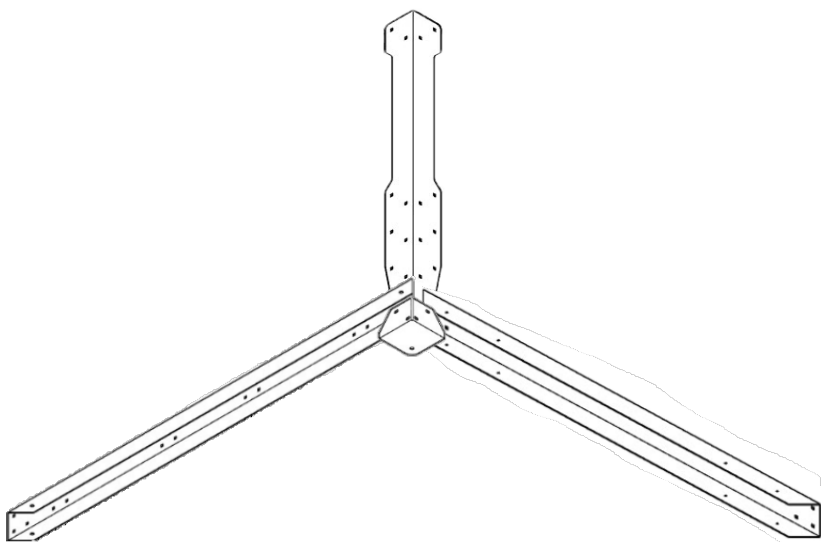
Laguna recommends using two people for step 2

NOTE

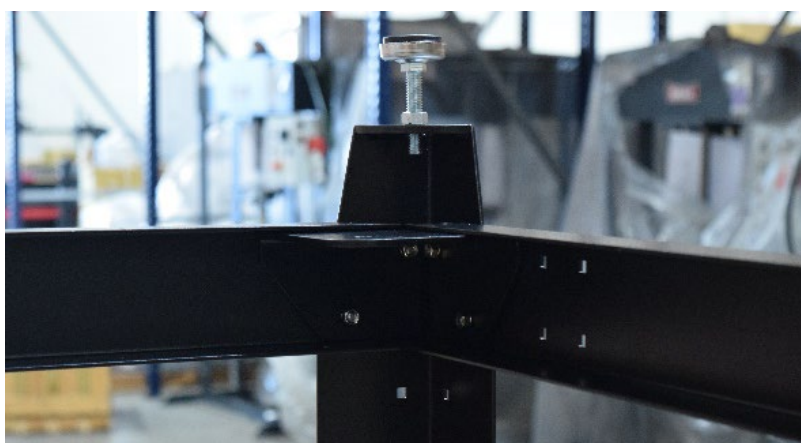
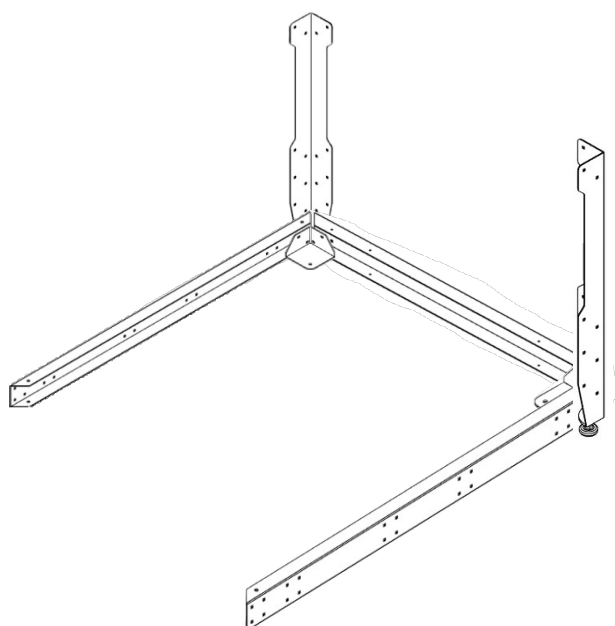
Leave all stand hardware tightened by hand until all stand hardware is assembled. machine is placed on the stand. This allows for some play when the machine is attached to the stand.

2. Align the long stand upright and short stand upright with the lower holes on the corner leg.
 - a. Place the caster bracket inside the uprights and align the caster bracket with all the holes
 - b. Insert a 10mm bolt through each of the holes.
 - c. Place a lock washer and a nut onto the other side of the bolt.

- d. Hand-tighten the nut. This will reduce any alignment issues throughout the assembly. You will fully tighten the nuts at a later point.

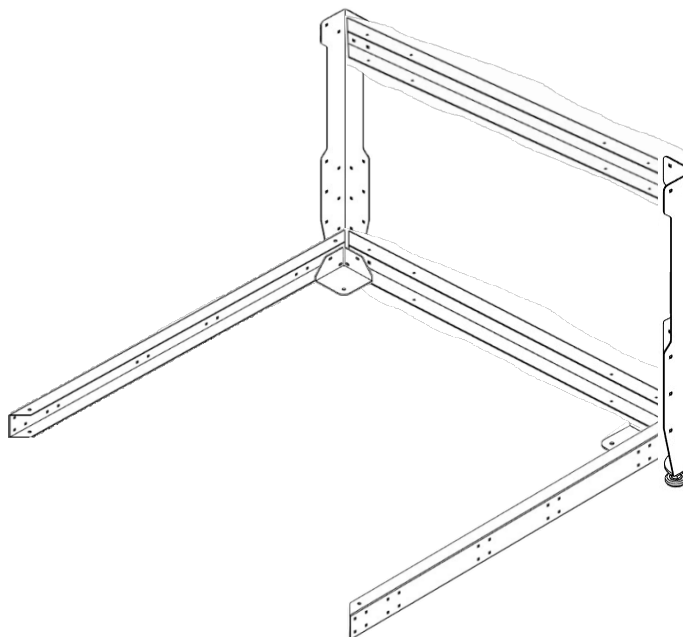


3. Align the other caster bracket, upright, and corner leg to the assembled upright.
a. Insert the 10mm bolt, nut, and lock washer and hand tighten the nut.

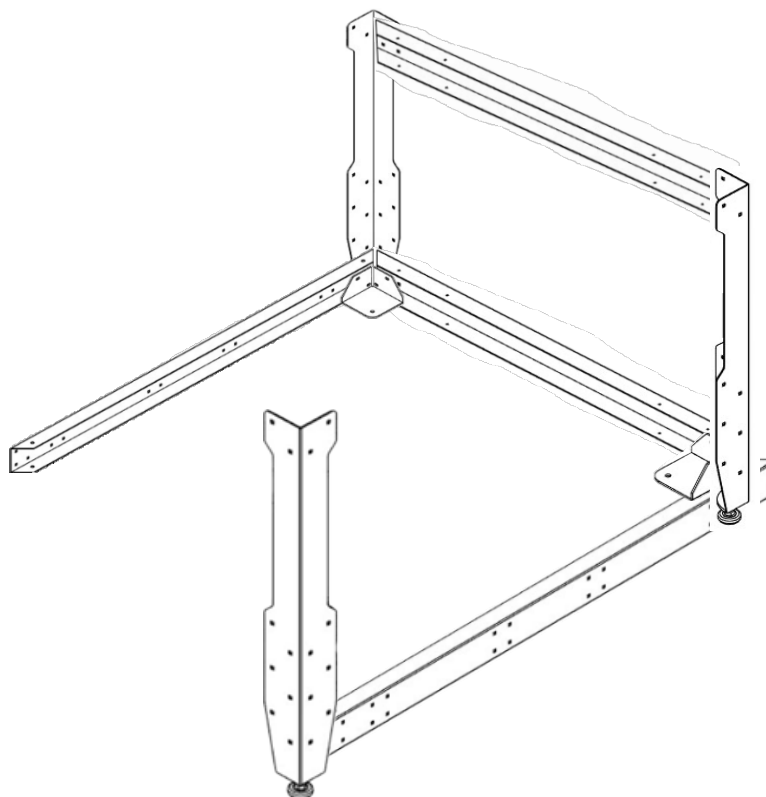


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4. Attach the top brace to the support legs and secure it with the 10mm bolts, nuts, and lock washers.

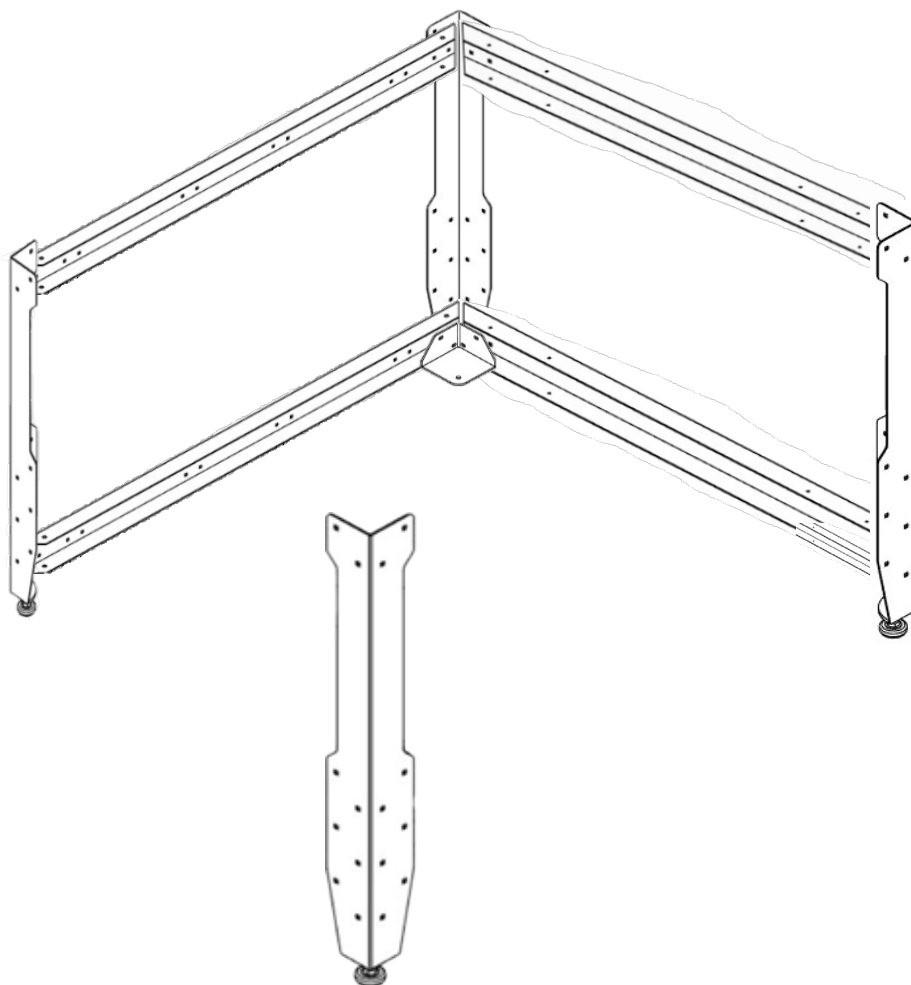


5. Attach a long top long brace and a support leg.
 - a. Secure them with the 10mm bolts, nuts, and lock washer.



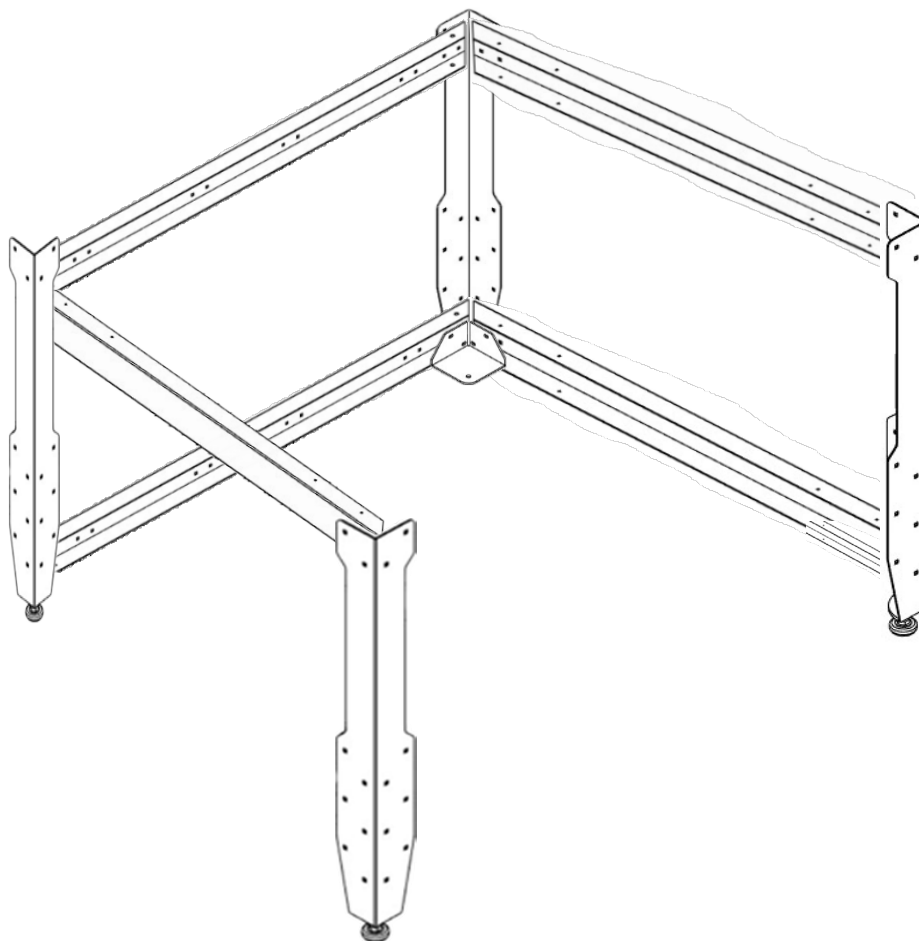
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6. Attach a long top long brace and a support leg. Secure them with the 10mm bolts, nuts, and lock washer.



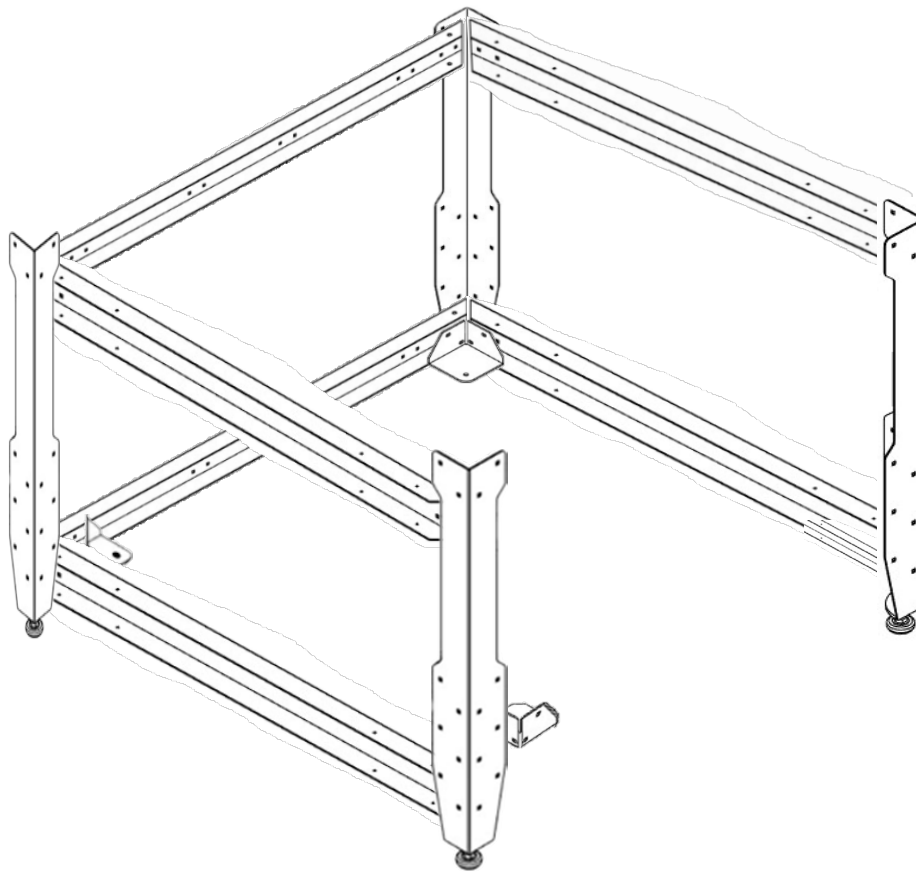
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7. Attach the crossmember brace to the top
 - a. Secure it with the 10mm bolt, nut, and lock washer



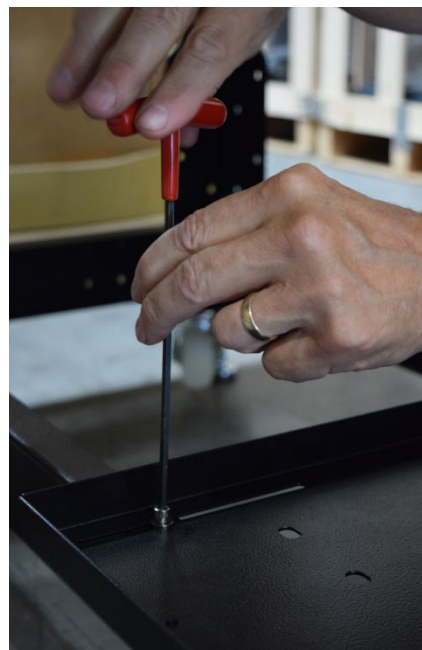
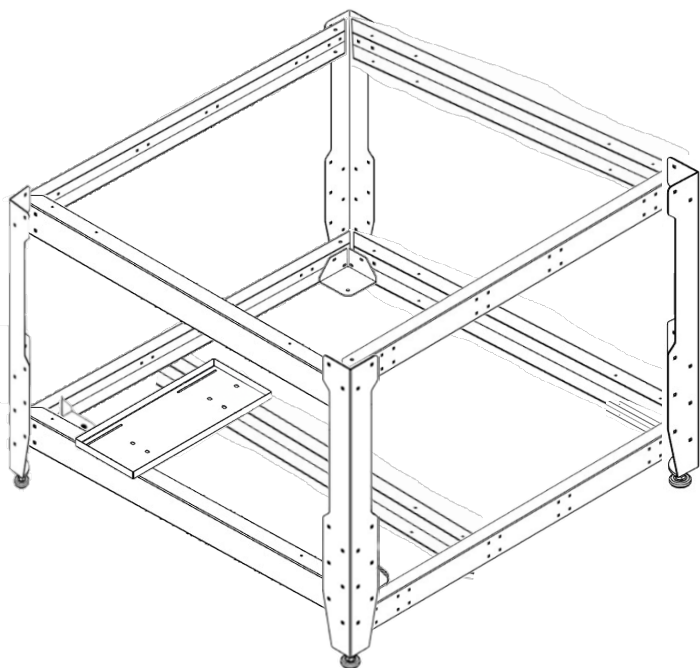
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1. Align the other caster bracket and uprights with the lower holes on the corner leg.
 - a. Insert the 10mm bolt, nut, and lock washer and hand tighten the nut.
2. Align the long stand upright and short stand upright with the lower holes on the corner leg.
 - a. Place the caster bracket inside the upright and align the caster bracket with all the holes
 - b. Insert a 10mm bolt through the holes. Place a lock washer and a nut onto the other side of the bolt.
 - c. Hand-tighten the nut. This will reduce any alignment issues throughout the assembly. You will fully tighten the nuts at a later point.

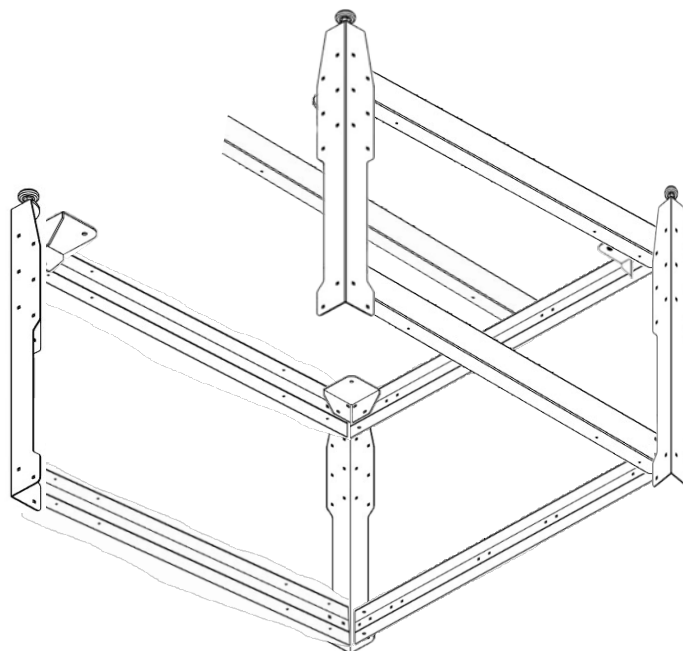


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3. Go back and use a 10mm wrench or socket to tighten ALL of the nuts. Do not overtighten them.
4. Place the shelf onto the two braces and secure it by using the 4mm self-tapping bolts and washers.
 - a. Use a 4mm Allen key to fasten the bolts shelf down.

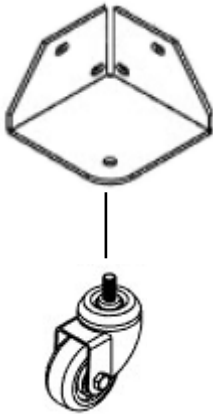


10. Using two people, flip the stand upside down

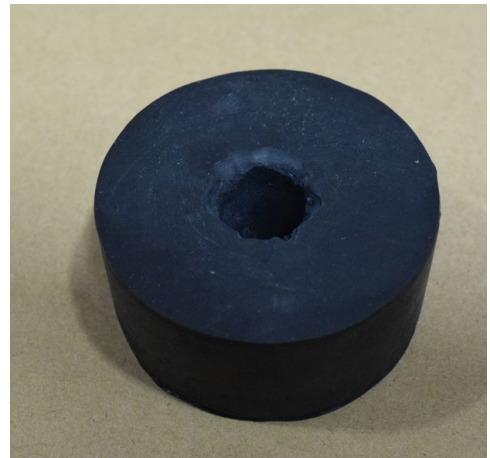


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11. Screw in the all the casters to their respective caster brackets.
 - a. Tighten all the nuts using a 17mm wrench.

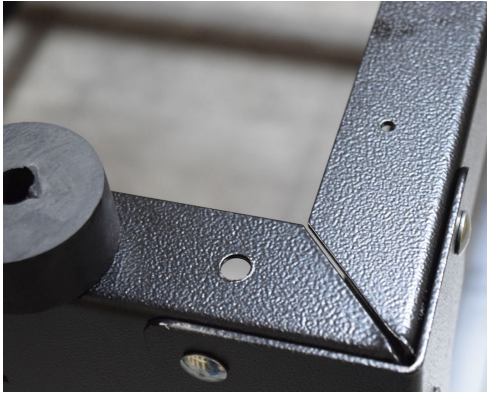


12. Using two people flip the stand right side up.
13. Grab the rubber bushings, utility knife, and the four 17mm bolts.
14. Use the utility knife to cut a hole in the middle of the rubber bushings, making the hole slightly smaller in diameter than the threaded part of 17mm bolt. Cutting these holes will make it easier to insert the bolts when installing the router table
 - a. Do this to all of the rubber bushings

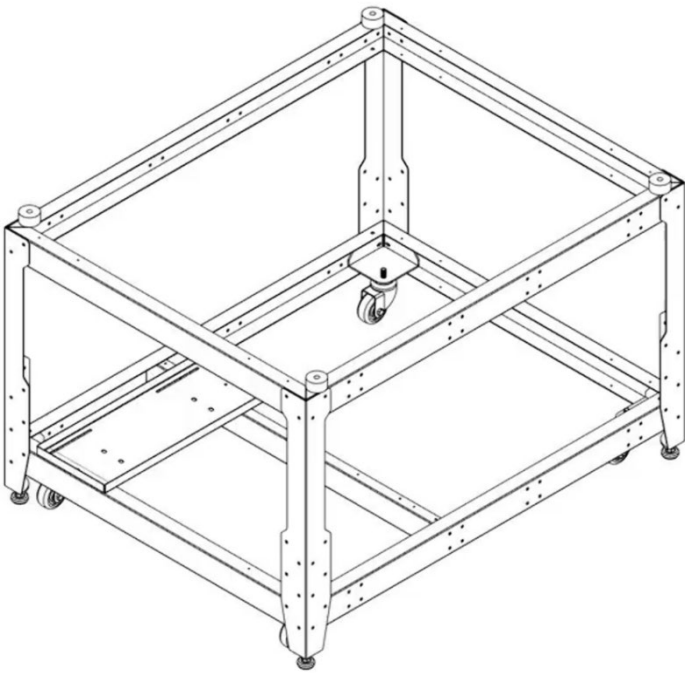


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15. Place one (1) rubber bushing over each of the holes in the stand. The next section (6.6) will explain two methods of how to safely place the machine on top of the stand.



A fully assembled stand should look like the pictures below



Place a level on the stand to check for levelness. Use the 15mm wrench to adjust the leveling feet accordingly.

6.6 Installing the Router Table on the Stand

Tools needed:

- Forklift
- 17mm wrench

6.6.1 Using a Forklift

The KX24 router table assembly is heavy. Please use a safe, secure method for lifting and use caution when placing the machine.

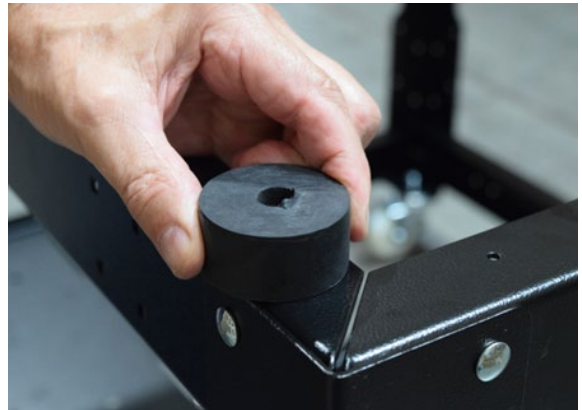
To avoid damage, never lift the router by the gantry.

1. If using a forklift, keep forks under the steel frame to avoid damaging the wiring and mechanics of the machine. Place a scrap piece of lumber beneath the router assembly and carefully slide forks beneath the steel base. Verify the forks extend through to the other side of the machine for safe lifting.



Figure 6-1: Router Table with Dust Shoe

2. Position the router over the stand and align holes on router mounting flanges and stand uprights. Be careful to make sure the stand is properly oriented with the machine front.
3. If not done already, place one (1) rubber bushing over each of the holes in the stand. Lower the machine to sit on the bushings.
 - a. Remove the gantry covers using a Phillips screwdriver to remove the screws.
 - b. Attach the machine to the stand using one (1) M17 hex bolt, one (1) washer at each corner.
 - c. Insert the bolt/washer through the machine mounting flange and the rubber bushings.



- d. Thread the bolt loosely into the stand mounting holes. Do not tighten until all bolts have been threaded.
 - e. Remove the forklift and tighten bolts evenly using a 17mm wrench.
4. Place a level on the router table, then level the assembled machine by adjusting the leveling feet. Level the machine in all directions.



6.6.2 Using Human Strength

You can also place the machine on top of the stand using 4 able bodied people to lift the machine. The machine itself weighs about 235 pounds.

The KX24 router table assembly is heavy. Please use a safe, secure method for lifting and use caution when placing the machine.

To avoid damage, never lift the router by the gantry.

WARNING

This machine is heavy. Seek assistance from an experienced professional if you have any doubt about the following unboxing or set up procedures.

DO NOT attempt any procedure that you feel is unsafe or you believe you do not have the physical capability of achieving.

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Do not lift the router table by the side covers. Only lift the router table by strong, rigid points on the machine. Do not lift the machine by the gantry.

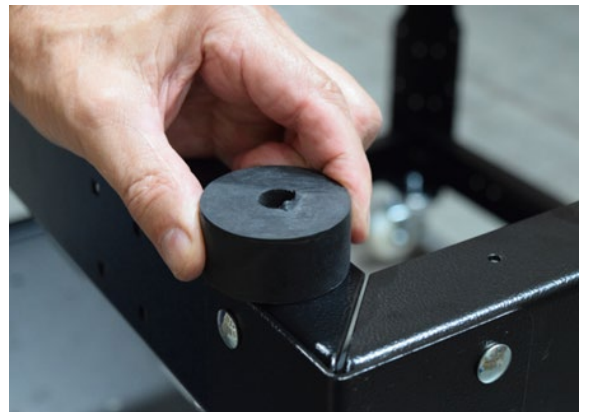


Figure 6-2: Incorrect Way to Lift Machine without Forklift



Figure 6-3: Correct Ways to Lift Machine without Forklift

1. Position the router over the stand and align holes on router mounting flanges and stand uprights. Be careful to make sure the stand is properly oriented with the machine front.
2. If not done already, place one (1) rubber bushing over each of the holes in the stand. Lower the machine to sit on the bushings.
 - a. Remove the gantry cover using a Phillips screwdriver to remove the screws.
 - b. Attach the machine to the stand using one (1) M17 hex bolt, one (1) washer at each corner.
 - c. Insert the bolt/washer through the machine mounting flange and the rubber bushings.



- d. Hand-tighten the bolt loosely into the stand mounting holes. Do not tighten until all bolts have been threaded.
 - e. Use a 17mm wrench to tighten all bolts evenly.
3. Place a level on the router table, then level the assembled machine by adjusting the leveling feet. Level the machine in all directions.



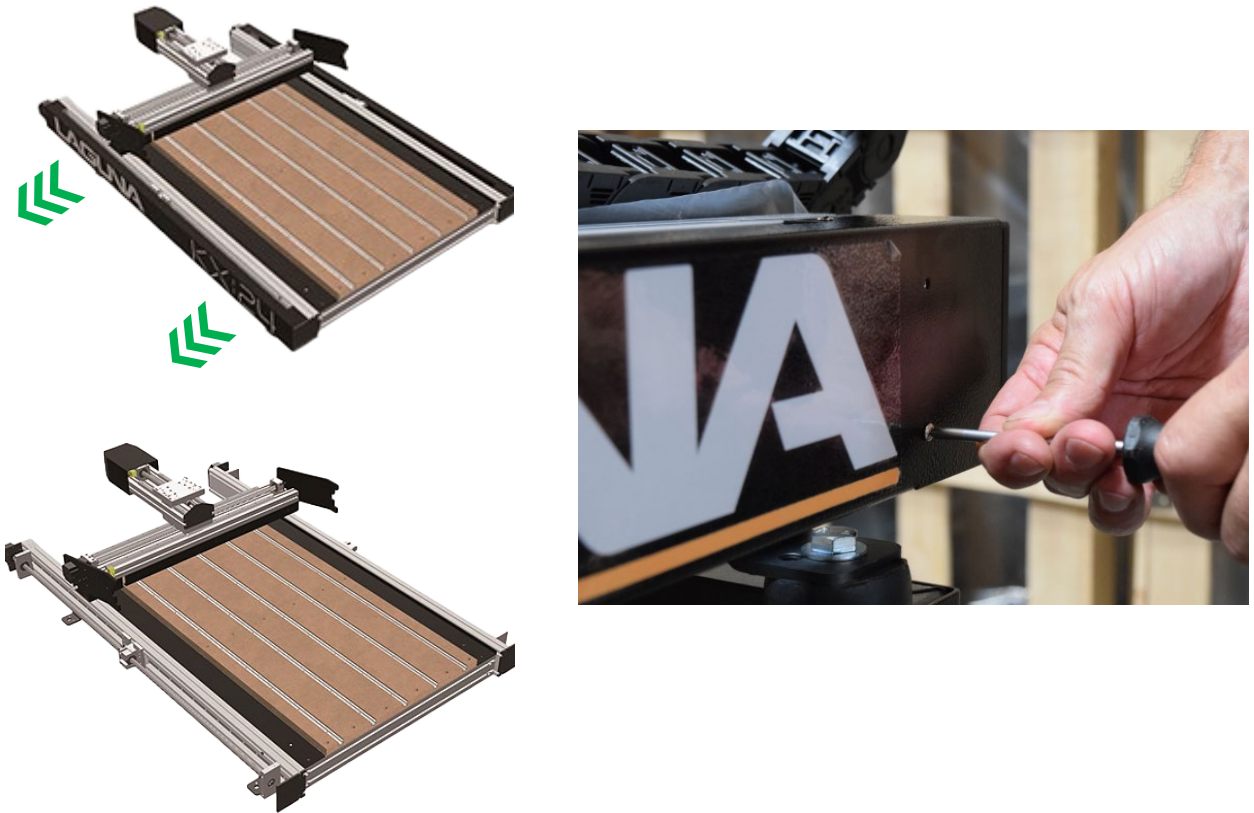
6.7 Assembling the gantry

Tools required

- Rubber Mallet
- Small punch
- Phillips screwdriver
- 6mm Allen Key
- 5mm Allen Key
- 3mm Allen Key

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1. Remove the rail cover using the Phillip screwdriver to remove the screws.



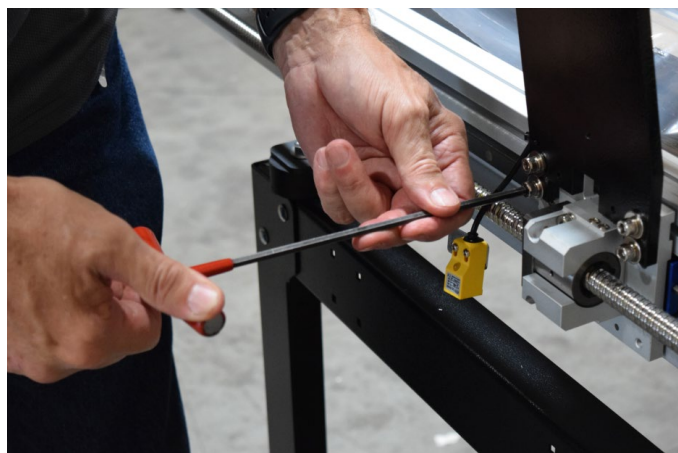
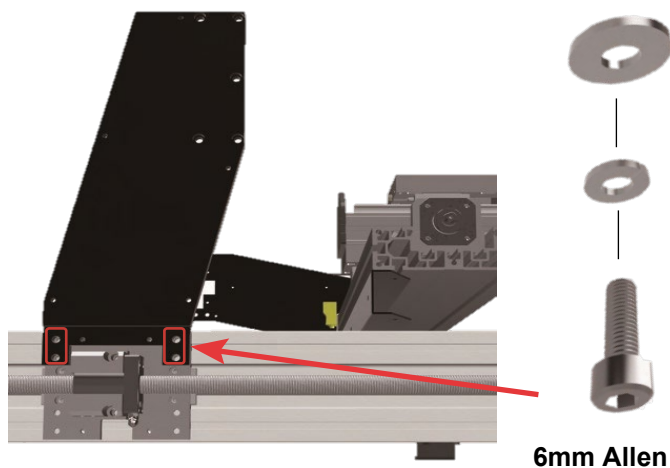
2. Use the rubber mallet and punch to knock out and remove the 2 alignment pins that are on both gantries. Removing the pins will make it easier to align the gantry with the screw holes. Do not lose or damage these pins.



3. Once all the pins are removed, use 2 people to lift and align the gantry with the alignment and screw holes.
4. Align the alignment pin hole and re-insert alignment pins.

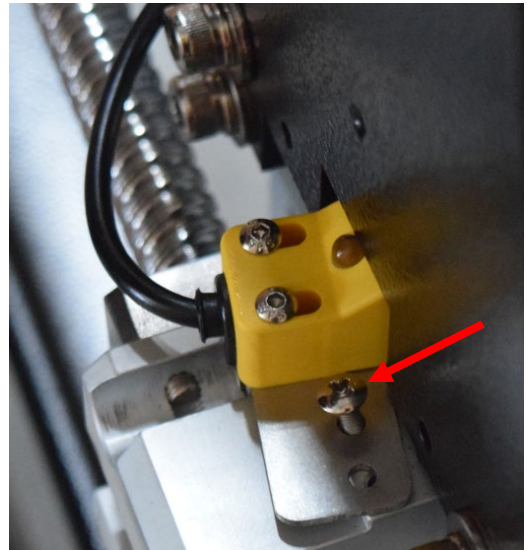
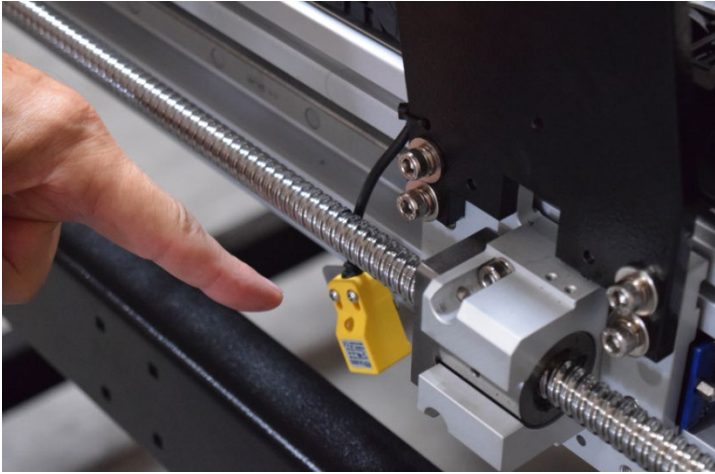
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- a. Use the rubber mallet and punch to carefully hammer the pins back in place. Do not break the pins.
5. Grab the 6mm Allen bolt and place the lock washer and then a regular washer on it.
6. Insert the bolt/washer combo into the gantry holes and hand tighten them.
7. Once all the bolts are hand tightend, use the 6mm Allen key to tighten the four bolts on each gantry.
 - a. **Do not overtighten the bolts.**



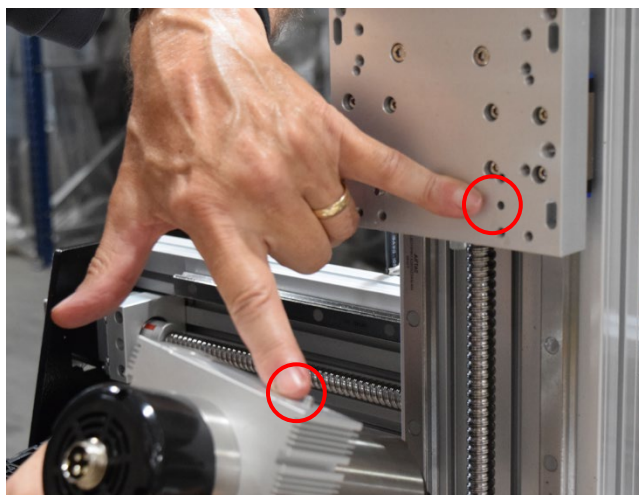
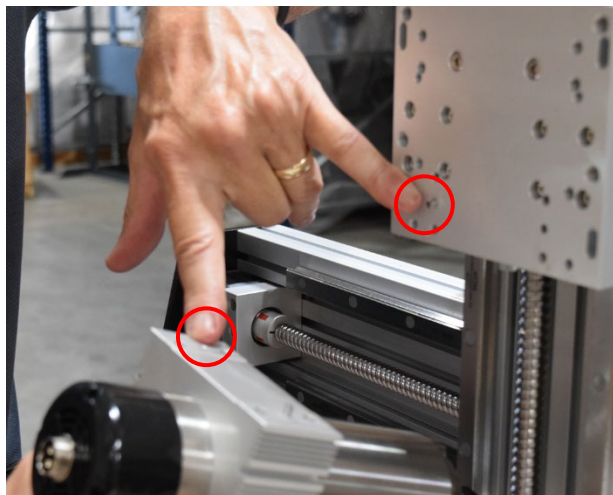
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8. Align the the X-axis proximity sensor to its port and secure to the top of the bearing housing
 - a. Fasten the sensor screws using the Phillips screwdriver



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9. Place and hold the spindle on the spindle plate and align the alignment with the holes.
 - a. Use the rubber mallet to hammer the spindle in place.



10. Use a 6mm Allen key to fasten the four bolts onto the spindle plate.
 - a. Tighten the bolts in a cross pattern. **DO NOT OVERTIGHTEN THE BOLTS.**

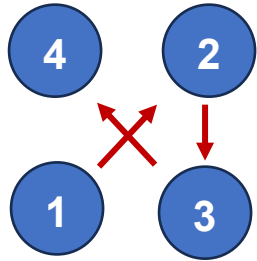
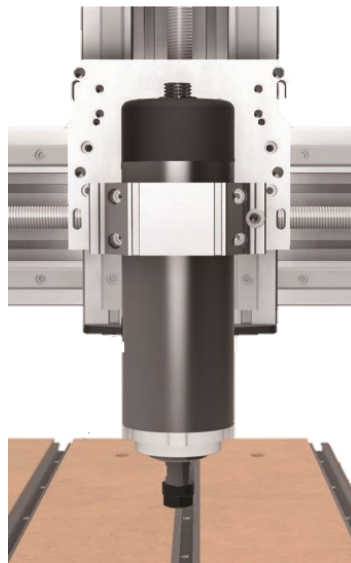
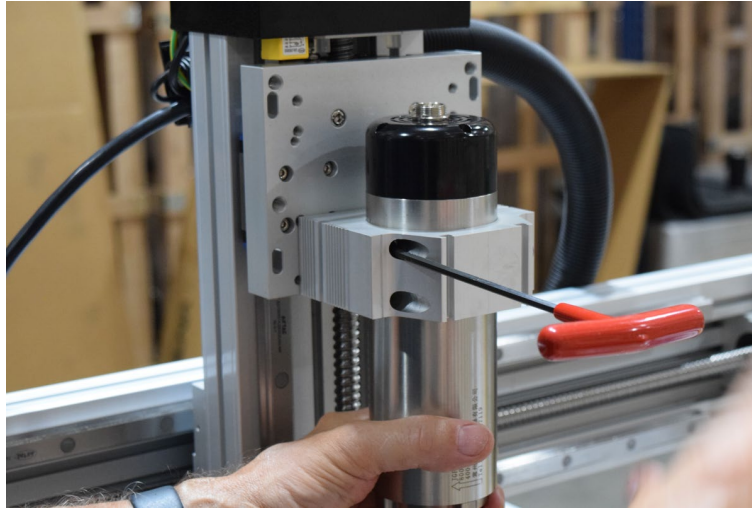


Figure 6-4: Spindle Bolt Tightening Pattern

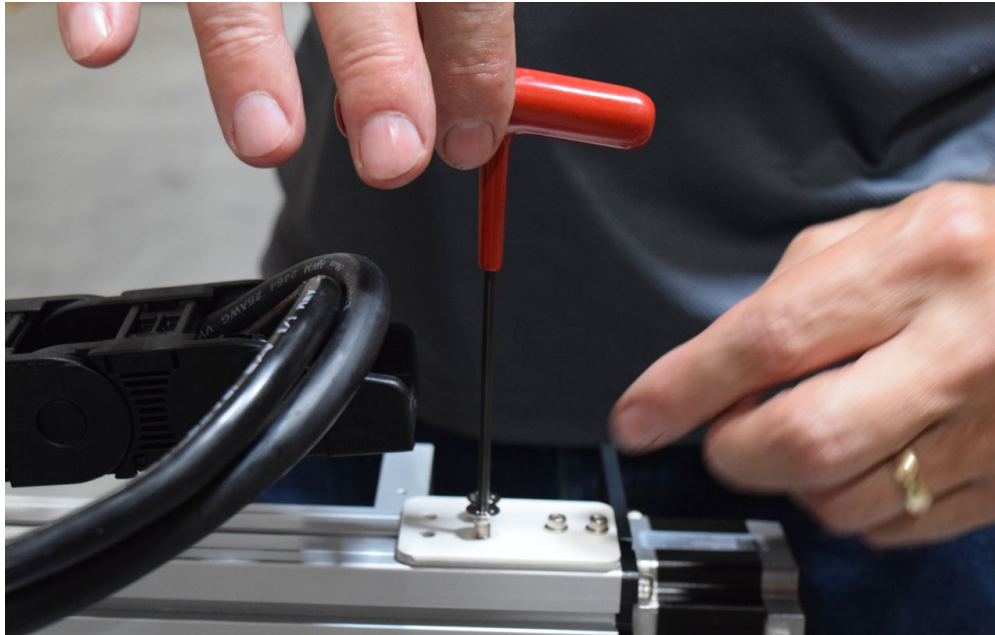


11. Align the prongs on to spindle plug and insert the plug into the spindle.
 - a. Turn the locking ring clockwise to fully secure the plug on to the threads.



6.7.1 Securing the Caterpillar Track and Sensor

1. Use a 3mm Allen key to remove the screws. Do not lose the screws.

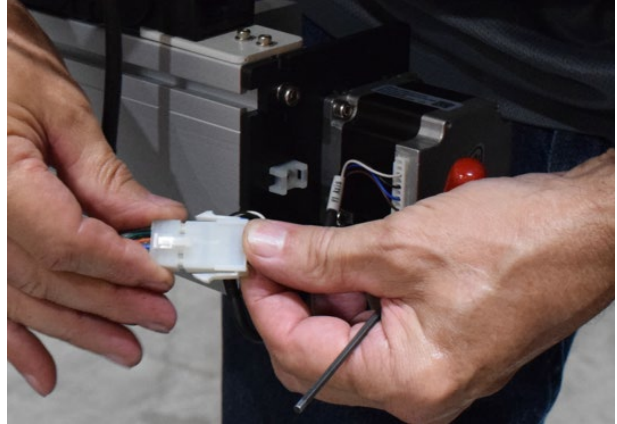
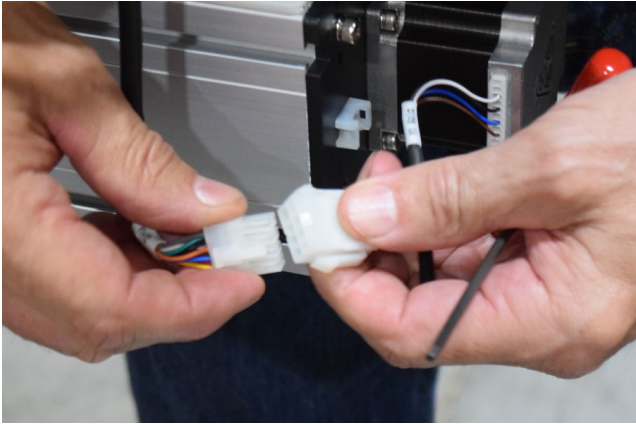


2. Align and place the caterpillar track with the screw holes.
 - a. Insert the screws into the holes and fasten them to the track using a 3mm Allen key.



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3. Attach the sensor to its port until a “click” sound is heard. This indicates a proper connection.



1. Re-Install both side covers and tighten them using the Phillips screws and Phillips screwdriver.
 - a. Be careful not to pinch any wires when replacing the covers.

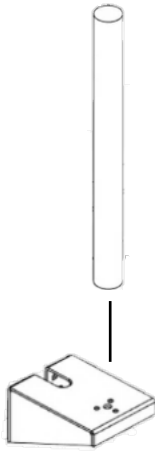


6.8 Installing the Touchscreen Controller

Tools required

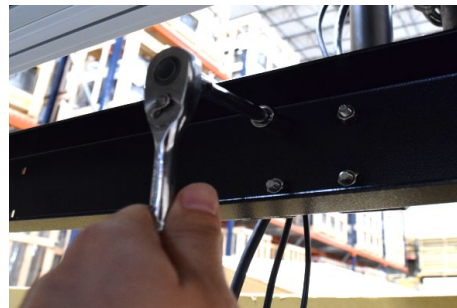
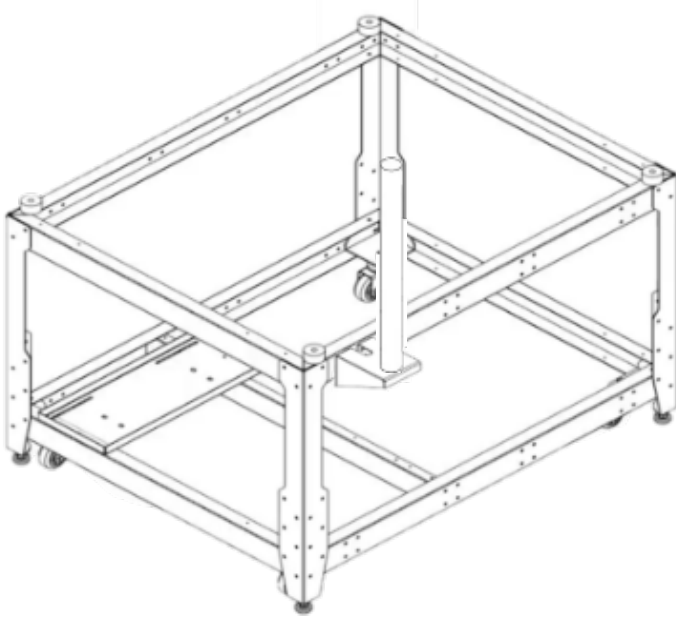
- 10mm socket and ratchet
- Phillips screwdriver
- 4mm Allen Key
- 5mm Allen Key
- 3mm Allen Key

1. Insert bracket pole onto the bracket and align it with the holes.
 - a. From the underside of the bracket, fasten the 3mm Allen bolts with the 3mm Allen key.

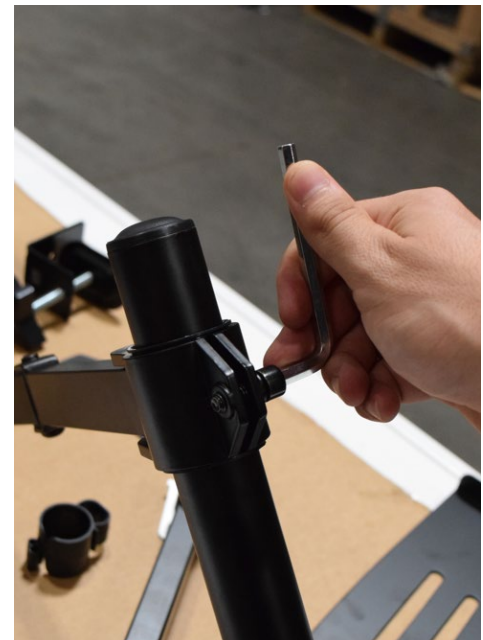
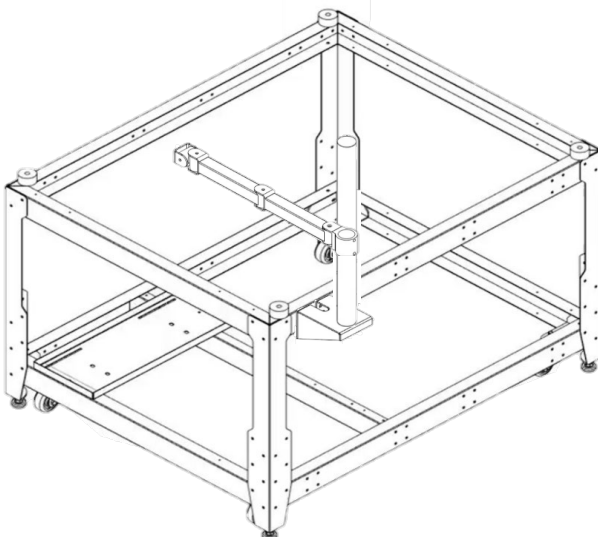


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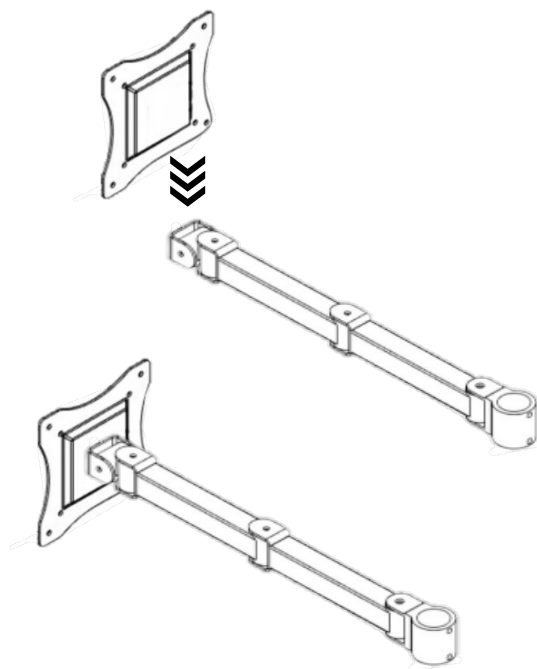
2. Attach the bracket/pole assembly to the stand and secure with the four 10mm bolts, nuts and lock washer. Insert bolts from the outside, with lock washers and nuts on the inside.



3. Locate the mount arm and use a 4mm Allen key to loosen the screw on the mount arm.
 - a. Slide the mount onto the bracket pole.
 - b. Tighten the screw back.



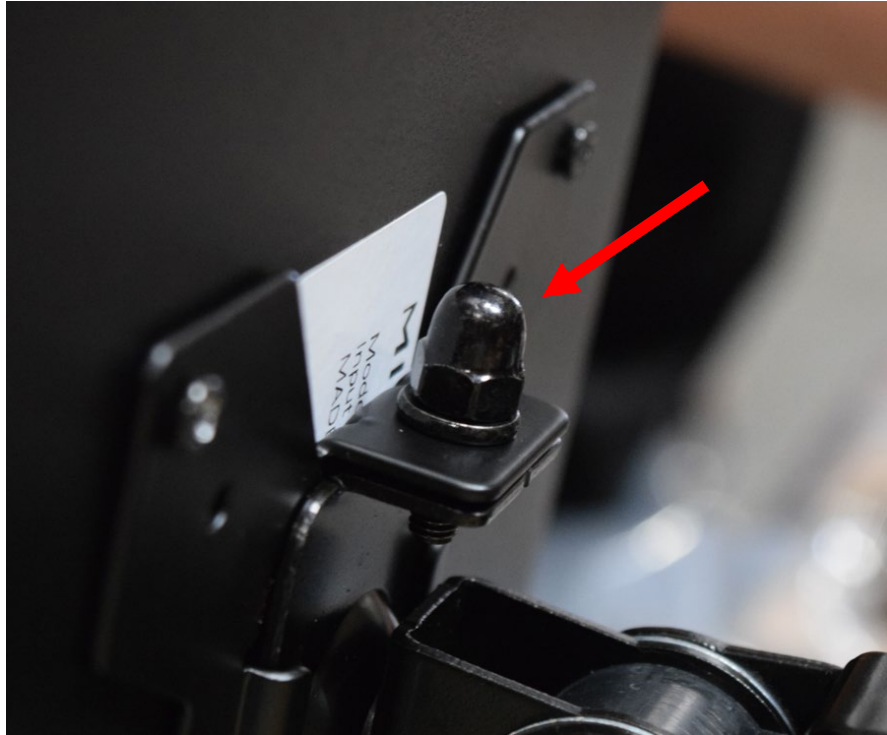
4. Slide the square mount onto the mount arm and make sure it is secure.



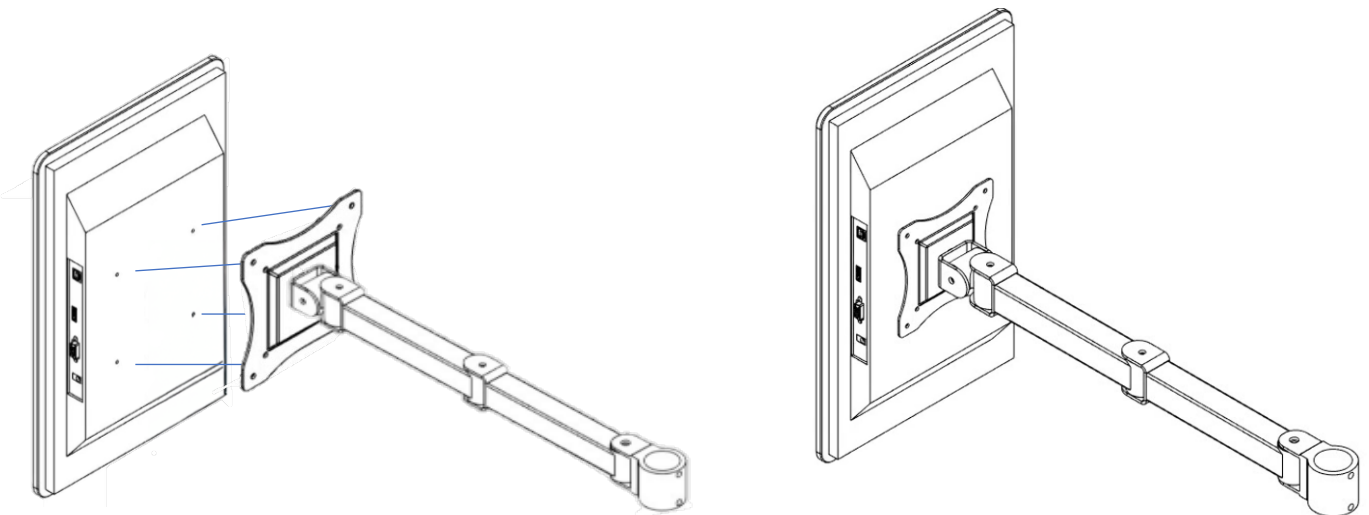
5. Insert the mount screw into the top and use a 3mm Allen key to tighten the screw.



6. Place the castle nut onto the mount screw and turn in clockwise to tighten it.



7. Align the monitor to the mount and hand thread the screws into the mount.
 - a. DO NOT DROP THE MONITOR
8. Use a Phillips screwdriver to tighten the screws.
 - a. DO NOT OVERTIGHTEN THE SCREWS





6.9 Installing the Control Cabinet and Cables

Tools required: Small flathead screwdriver

With the machine mounted on the stand or safely on a secure work surface, finish the setup.

1. Insert the control cabinet into the front right cavity of the toolbox or for a stand without a toolbox, sit the control cabinet on the shelf. Power and communication cables will run through the lower hole in the back of the toolbox.



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2. Insert the cable connectors into their corresponding female receptacles on the monitor.
 - a. If applicable, twist the collar/knobs on the cable to tighten.

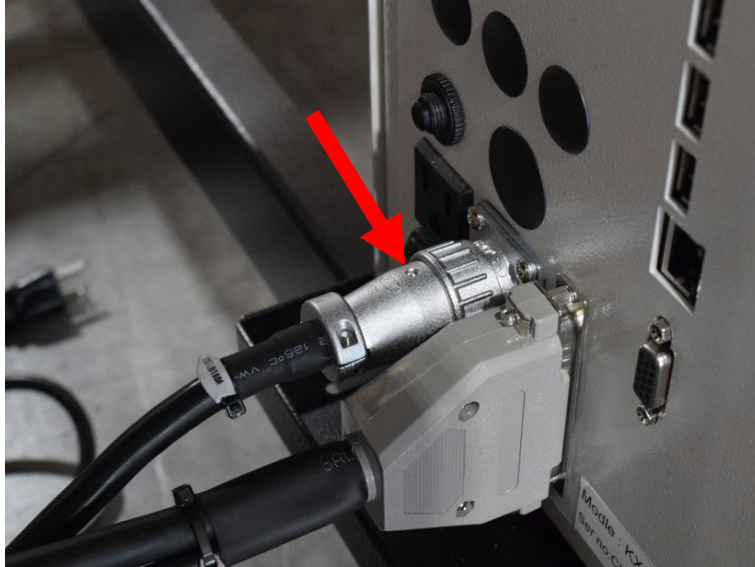


3. Verify the position of the electrical cord through the back of the stand safely, so it will not be run over by the casters and to prevent tripping hazards.
4. Insert the cable to the back of the control cabinet.
 - a. Use a small flathead screwdriver to fasten the top and bottom screws on the cable.



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5. Insert the cable with the collar to its corresponding port.
 - a. Twist the collar clockwise to secure it in place. Do not overtighten.



6. Plug in the power cable to its corresponding female receptable.



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7. Plug in the cable with the knobs to its corresponding port.
 - a. Twist the top and bottom knobs clockwise to secure in place. Do not overtighten.



8. Plug in the USB cable to the bottom USB port.



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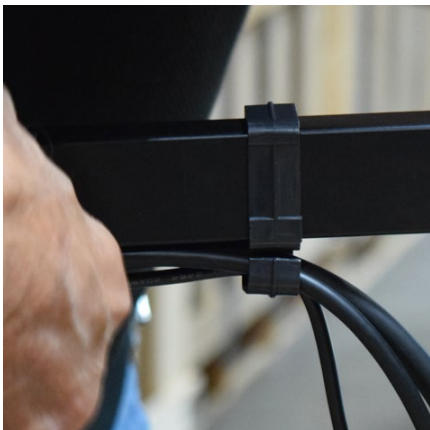
9. Plug in the other power cable.



Once all cables are connected to their corresponding ports, go back and ensure that all plugs, collars, knobs, and screws are tight and secure.

10. Attach the cable management clips onto the mount arm and bracket pole.

11. Place the cables in their corresponding clip.



6.10 Setting up the light

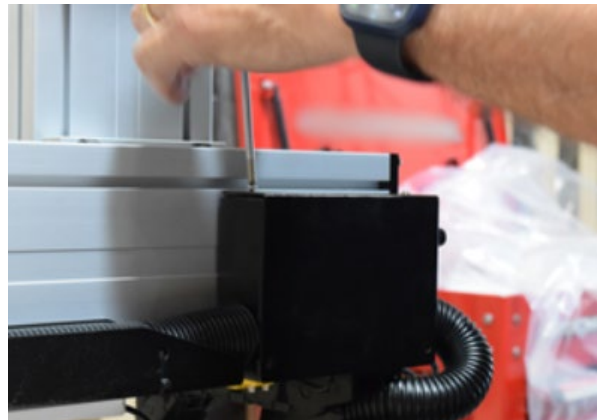
Tools required: Phillips Screwdriver

For easier access, push the gantry to the rear of the machine.

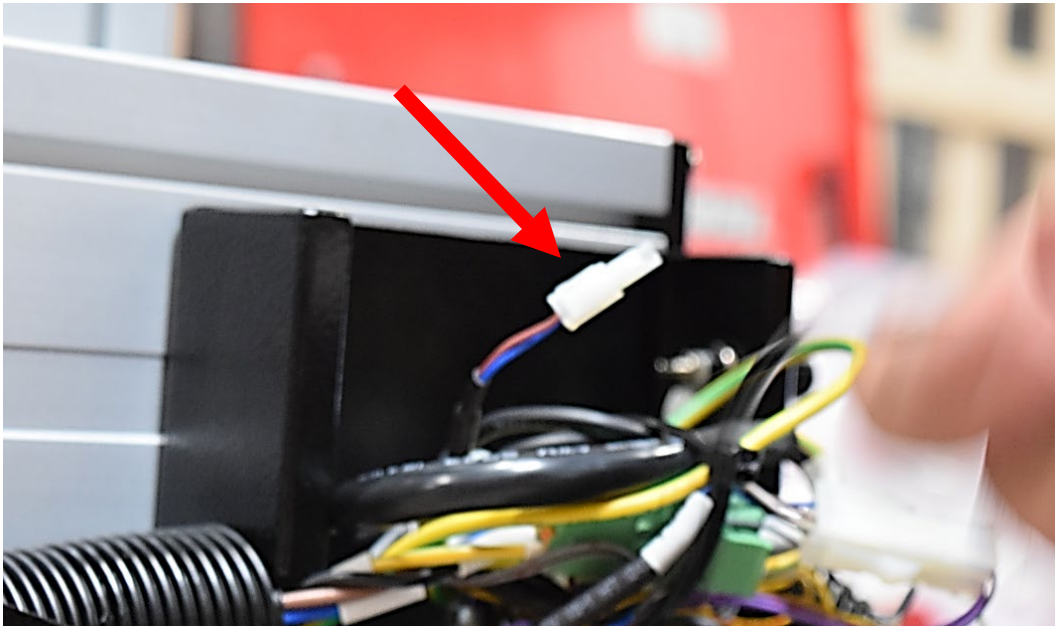
1. Take out the light and remove the adhesive covers on the back of the light.
2. Position the light so the wire is on the same side as the caterpillar track.
3. Align the light with the center of the gantry and firmly press it onto the black part shown in the figures below.



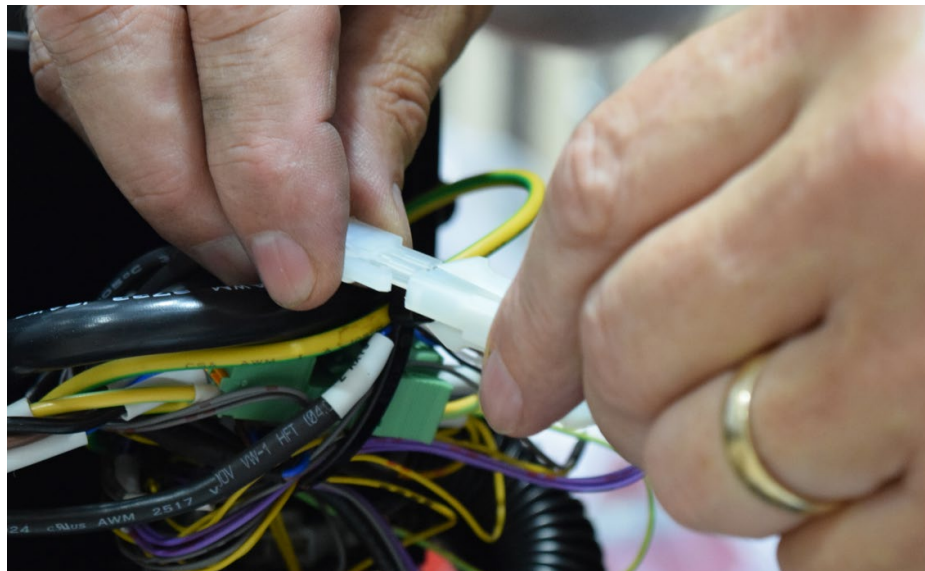
4. Using a Phillips screwdriver, remove the top and side screws on the junction box.
 - a. Remove the cover.



5. Find the red and blue wires that have an unused connector.



6. Plug the light wire into the connector.
 - a. You should hear a “click” sound. This indicates a proper connection.

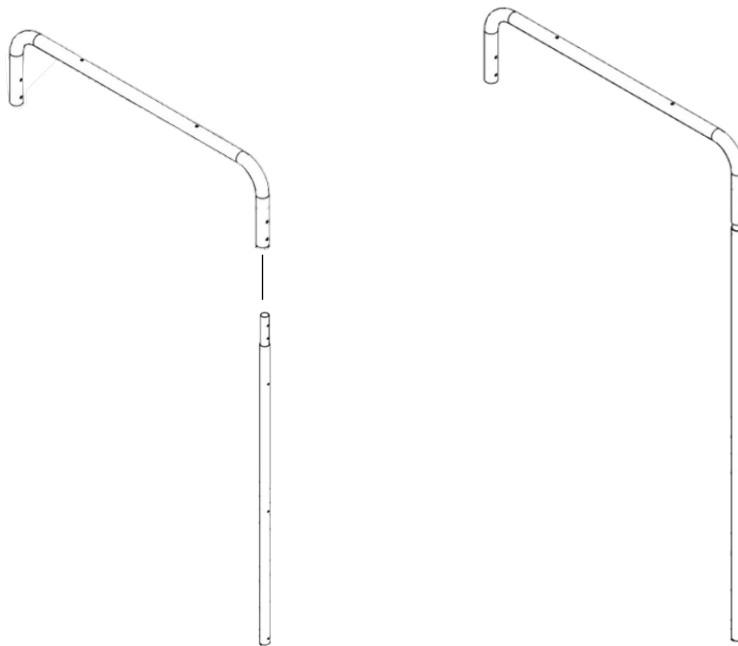


7. Push all the wires back into the junction box and replace the cover.
 - a. DO NOT PINCH ANY WIRES
8. Replace and fasten the junction box screws.

6.11 Installing the Dust Collection System

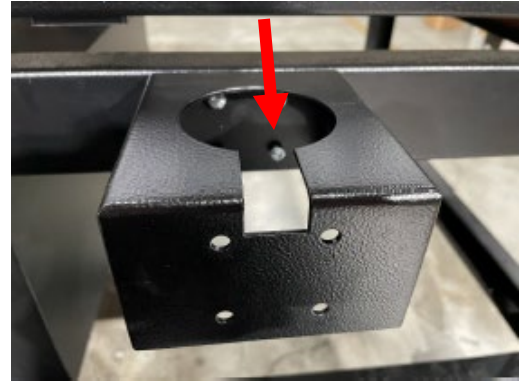
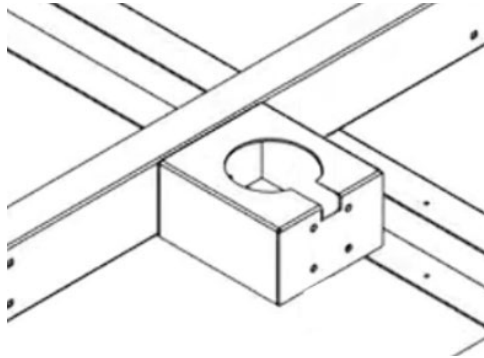
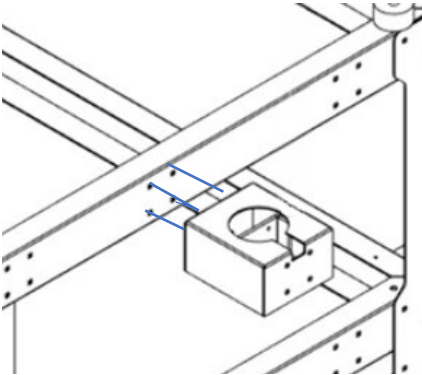
Tools required

- 5mm Allen Key
 - 3mm Allen Key
1. Align the two poles together and fasten them using a 3mm Allen key and the 3mm Allen bolts and plastic nuts.
 - a. Place the plastic nut on the same side as the bolt head.
 - b. Place the poles to the side.

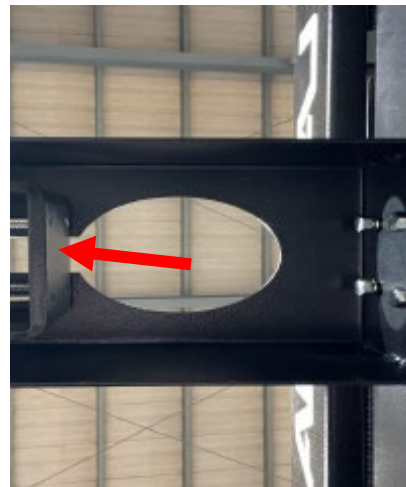
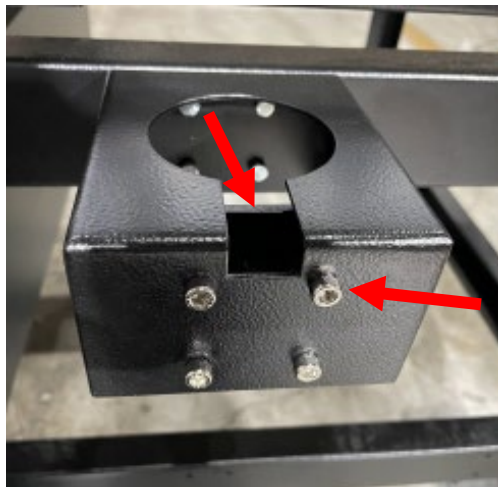
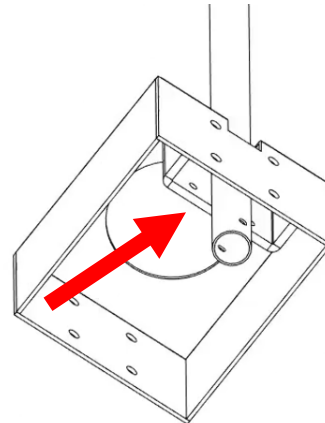
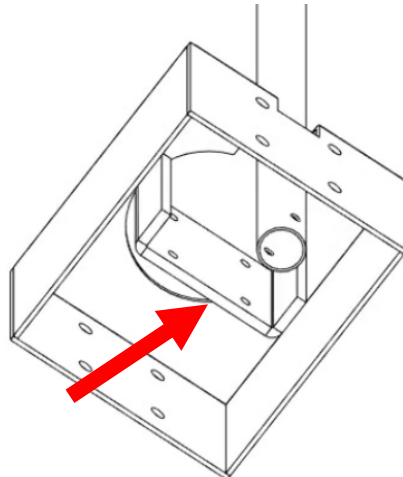


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4. Align the bracket to the stand and insert the four 10mm bolts, lock washers, and nuts.
 - a. Insert the bolts first and then then put the lock washer and nut on the other side.
 - b. Fasten the bolts using a 10mm socket. Do not overtighten them.

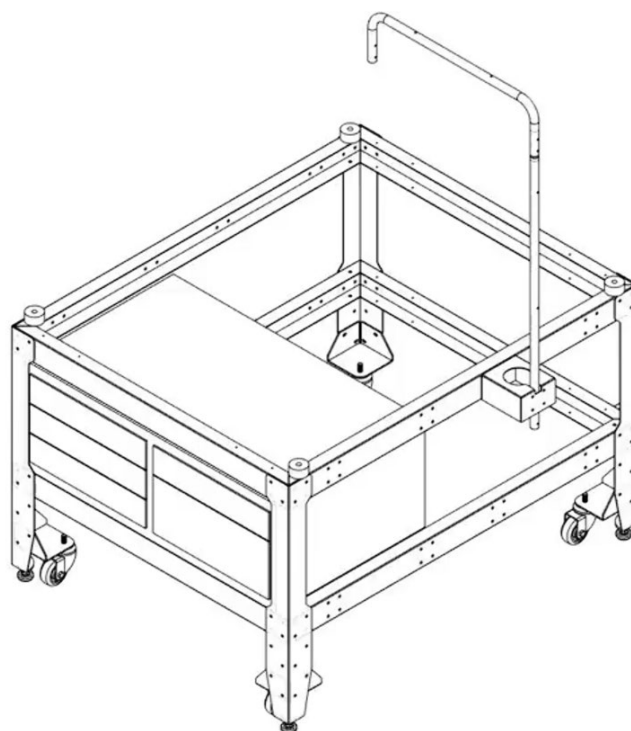
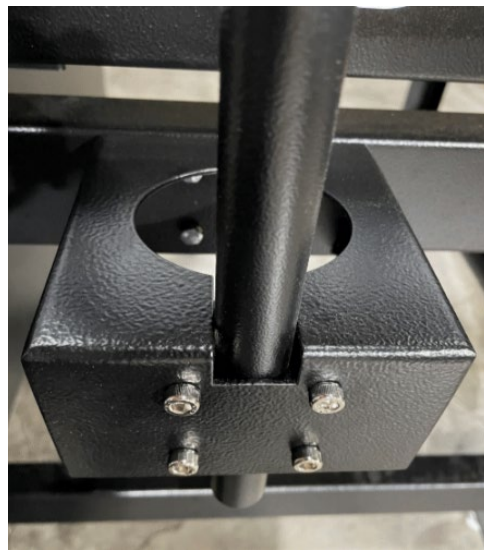
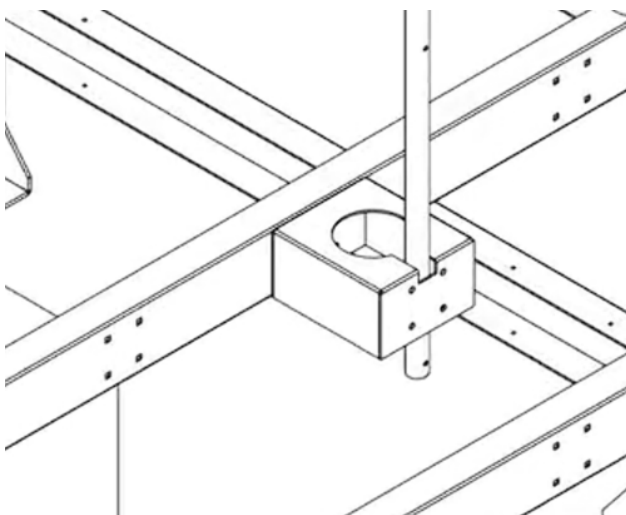


1. Place the inside plate on the inside of the bracket and insert the four 5mm Allen bolts.
 - a. Hand-tighten the bolts.



KX24 Owner's Manual

5. Insert the pole into the small space in between the inside bracket.
 - a. Use the 5mm Allen key to fasten the four outer bracket bolts.



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1. Attach the dust hose and secure it with zip ties.



1. Slide the clear plate onto the spindle.
 - a. You may have to loosen the bolt.
2. Attach the dust hose to the clear plate and secure with a band clamp.



3. Attach the dust shoe to the spindle. It is magnetic.



7.0 Changing Collets and Tooling

Remove all tooling from the spindle at the end of the day. Do not leave any tooling in the spindle overnight. This includes tool cones, collets, router bits, etc.

Leaving any tooling in the spindle overnight can cause the tooling to get dirty, stuck, rust, and cause damage to the spindle.

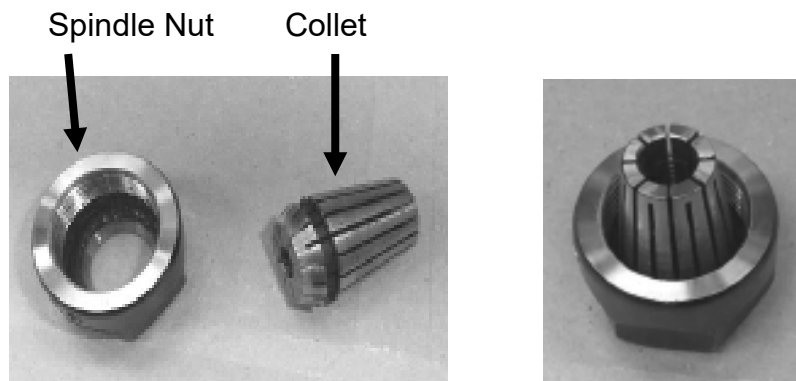
Tools needed

- 17mm wrench
- 13mm wrench
- ER-11 Collet
- Spindle nut
- Router bit

NOTE

Disconnect the power to the machine before changing or fitting the router bit.

1. Select the desired spindle nut, router bit, and a collet of correct size.



2. Fit the collet into the spindle nut and press it until it snaps into place.



NOTE

The router bit must not be fitted into the collet until the collet has been fitted into the spindle nut. With the router bit fitted in the collet, the collet cannot compress and snap into the spindle nut.

3. Hand thread the spindle nut onto the spindle



4. Place the bit into the collet, but **note that the flute (cutting edge) of the router bit must not be inside the collet and should be a minimum of 1/16 " outside the collet.**



5. Hold the router spindle with the 13mm wrench and tighten the spindle nut with the 17mm wrench. Do not overtighten.



To remove the collet:

1. Hold the router spindle with the 13mm wrench and loosen the spindle nut with the 17mm wrench.
2. Remove the router bit if there is one in the collet.
 - a. Allow the bit to cool down if it's hot.
3. Remove the spindle nut from the spindle.
4. Hold the spindle nut in place and squeeze the collet inward. (the collet will compress)
5. Pull the collet out of the spindle nut. (it might take a lot of force)
 - a. If the collet does not come out, a pair of pliers may be needed to grasp the collet.
 - b. If the collet does not come out, place a punch on the backside of the collet and use a hammer to punch the collet out.

NOTE

Keep collets clean and blow out dust to maintain clamping ability and cut quality.

8.0 Touchscreen Controller & Button Functions

The touchscreen controller is where the user can control the KX24. The groups below listed in Figure 8-1 are separated by function. A description of the buttons and their functions are listed below

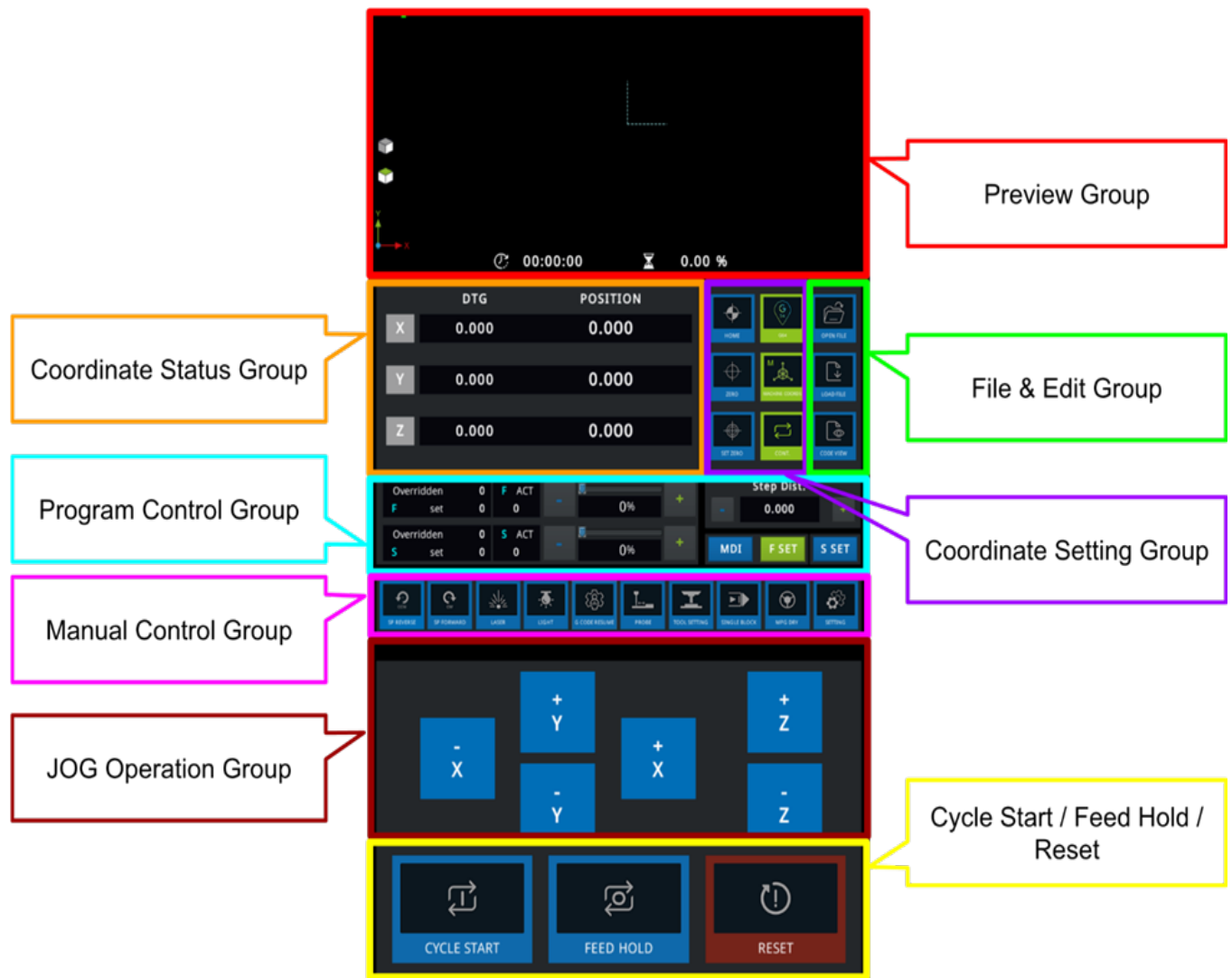
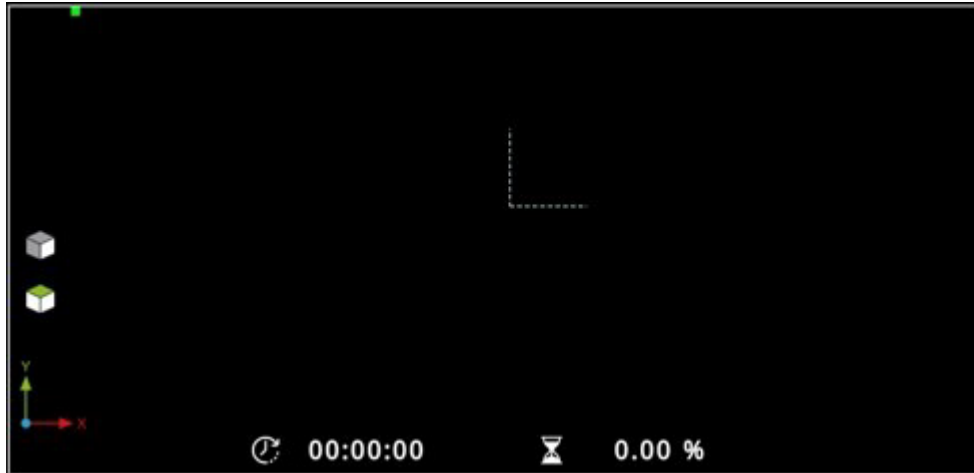


Figure 8-1: Touchscreen Controls



Run- Machine Status: Process



Standby- Machine Status: Standby



Alarm- Machine Status: Alarm Alert



XY & XZ Complex Plane XY & XZ- Rotating about the Y-axis as the fixed axis, with the viewing angle of X and Z set at a 45° angle.



XY Plane- Viewed from the Z- axis direction overlookign the X and Y planes. This is also the initial perspective when loading the G-Code file.



XZ Plane- Overlooking the X and Z planes from the Y-axis direction.



YZ Plane- Overlooking the Y and Z planes from the Z-axis direction.



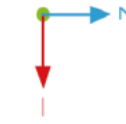
Rotation of Coordinate Axis System- Coordinate System for Path View



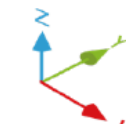
Rotation of Coordinate Axis System- Coordinate System for Path View



Rotation of Coordinate Axis System- Coordinate System for Path View



Rotation of Coordinate Axis System- Coordinate System for Path View



Rotation of Coordinate Axis System- Coordinate System for Path View

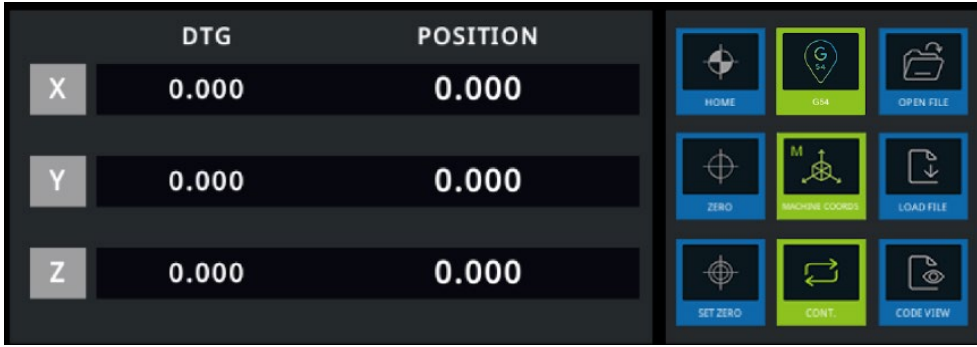


Processing Time- Processed Time



Estimated Processing Time- Estimated Processing time

KX24 Owner's Manual



X-Axis- Axis display enabled



Y-Axis- Axis display enabled



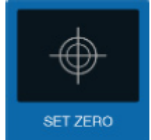
Z-Axis- Axis display enabled



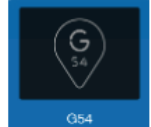
Home- Homing all axes



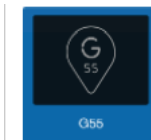
Zero- Move to the work origin



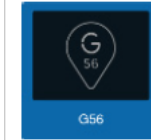
Set Zero- Set working origin (the coordinate values will be zero)



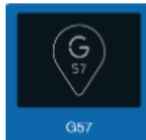
G54- Coordinate System Selection- G54



G55- Coordinate System Selection- G55



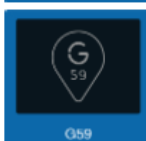
G56- Coordinate System Selection- G56



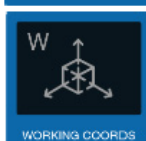
G57- Coordinate System Selection- G57



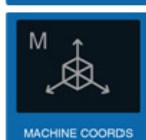
G58- Coordinate System Selection- G58



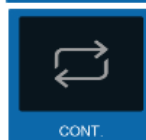
G59- Coordinate System Selection- G59



Working Coordinate- Switch to Machine Coordinate



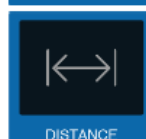
Machine Coordinate- Switch to Working Coordinate



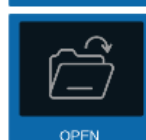
Cont. Mode- Switch to continuous mode



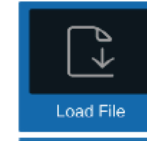
Step Mode- Switch to Step Mode



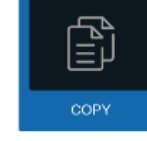
Distance- Custom distance



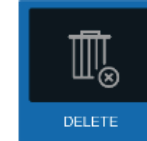
Open- Open the file



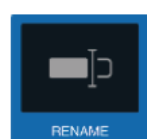
Load File- Load the file



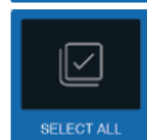
Copy- Copy



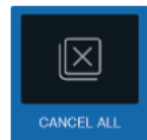
Delete- Delete



Rename- Rename



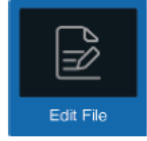
Select All- Select All



Cancel All- Cancel All



USB- Read USB drive



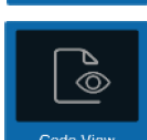
Edit File- Open file editing page



File Explore- File explore



Home- Back to home

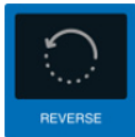
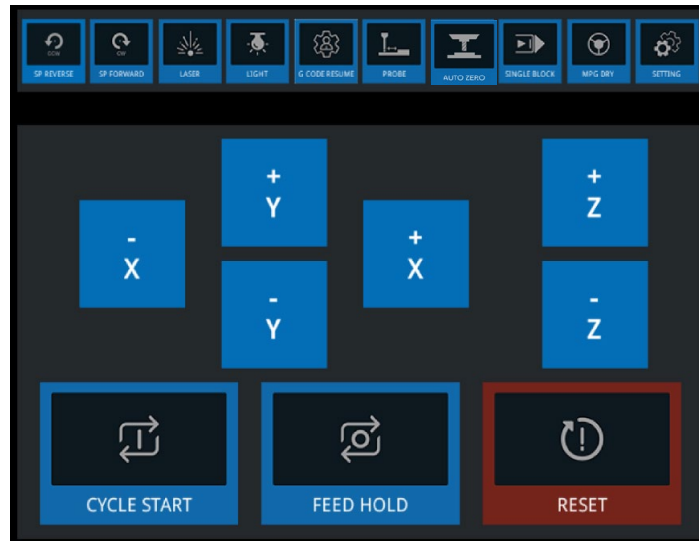


Code View- Code view

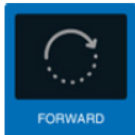
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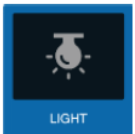
Overridden F set	Overridden F Set- Set the feed rate	100%	Increase or decrease feed magnification- Increase or decrease feed magnification explore
Overridden S set	Overridden S Set- Set the spindle speed	200%	Increase or Decrease Spindle Magnification- Increase or decrease spindle speed magnification
F ACT	F Active- Current feed rate	Step Dist. - 0.000 +	Step Distance- Select step distance and increase/decrease distance by pressing the “-” and “+” buttons
S ACT	S Active- Current spindle speed	MDI	MDI- Input desired G-Code commands
+	Increase Magnification- Increase magnification by pressing the “+” button	F SET	F Set- Setting manual mode Feed Rate
-	Decrease Magnification- Decrease magnification by pressing the “-” button.	S SET	S Set- Setting manual mode Spindle Speed



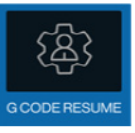
Spindle Reverse- Rotates the spindle counterclockwise (This function only available in the metalworking series)



Spindle Forward- Rotates the spindle clockwise.



Light- Power ON/OFF light



G Code Resume- Resume machining from the last program interruption point



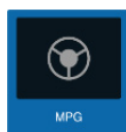
Probe- Click to execute the measurement mode set in the Probe (there will be a confirmation window). Setting the workpiece plane Z0.



Auto Zero- Measure the tool length at the current position



Single Block- Click once to execute a one of G-Code in the program file



MPG- Power ON/OFF hand-wheel simulation mode



Setup- Machine basic functions setting



X Positive Button- Jogs the spindle in the positive X-axis direction



X Negative Button- Moves the spindle in the negative X-axis direction



Y Positive Button- Moves the spindle in the positive Y-axis direction



Y Negative Button- Moves the spindle in the negative Y-axis direction



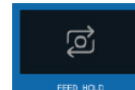
Z Positive Button- Moves the spindle in the positive Z-axis direction



Z Negative Button- Moves the spindle in the negative Z-axis direction



Cycle Start- Execute machining file

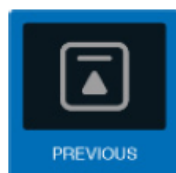


Feed Hold- Pauses the operation.



Reset- Off State : Clicking will trigger an alarm and stop the machine.
On State : Clicking will reset the alarm and clear errors.

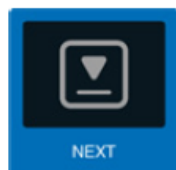
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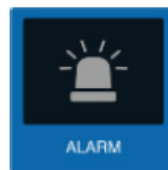
Previous- Previous page



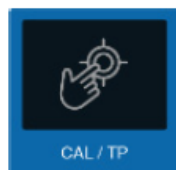
System Update- System upgrade and update procedures



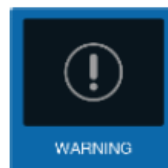
Next- Next page



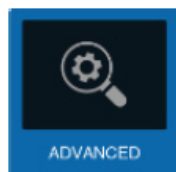
Alarm- Alarm message report



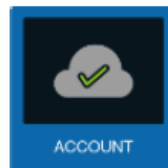
Cal/TP- Calibration of touch screen



Warning- Warning message report



Advanced- Advanced mode setting (the password is required)



Account- Account mode setting (the password is required)



Home- Back to Home

9.0 Operating the Machine

Before cutting a workpiece, Laguna Tools recommends that the operator become familiar with the controller for operation of the machine, setting up a job, and processing a file.

9.1 Homing the Machine

The home position is a pre-programmed position point that moves the spindle to the bottom left corner of the machine. This position should never be modified.



1. To home the machine, press the home button.

WARNING! THE SPINDLE WILL MOVE. KEEP ALL BODY PARTS AWAY

9.2 Setting Work Origin

CAUTION

It is recommended that the Z-Axis Origin be set relative to the top of the work material to reduce risk of cutting into the worktable.

NOTE

When the machine is restarted, a HOME operation must be done to reset that reference point. However, the last programmed Origin (which is in reference to HOME) is still stored in memory. Simply press the ORIGIN/OK button and the machine will return to this location.

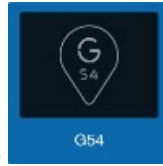
Once the Origin is completely set, the coordinate screen will reflect this information by showing both the X and Y axes zeroed. The Z-Axis will have raised to the programmed safe height after touching the puck and will reflect that distance.

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Creating an Origin will establish a zero point or reference point from which the machine will perform the cutting process set in the toolpath. The Origin should match the zero point (datum) of the uploaded toolpath created in the design software.

An Origin for both the X and Y axes and the Z-Axis need to be set before beginning operation of a file. Failure to set both the Origins may result in damage to the machine or the cutting tool.

1. Verify the tooling is properly secured within the collet. Use only ER-11 collets of the correct size matching the shaft diameter of the selecting tooling.
2. Use the arrow buttons to move the X, Y, and Z-Axis to your desired start point.



3. Select the desired (G-Code)
4. Press the desired axis to be set. It will be highlighted in yellow once selected.
 - a. Each axis will need to be selected individually.

	DTG	POSITION
X	0.000	0.000
Y	0.000	0.000
Z	0.000	0.000

- b. If setting the origin of all axes, press all axes and confirm that they are selected.

	DTG	POSITION
X	0.000	0.000
Y	0.000	0.000
Z	0.000	0.000



5. Press Set Zero **. WARNING! THE SPINDLE AND GANTRY WILL MOVE. KEEP ALL BODY PARTS AWAY!**
6. The origin is now set.

9.3 Manually Setting Z-Work Origin (Z-Zero)

Remember that the Z-0 location is the surface of either the material or the spoil board, in which the controller should only read zero along the Z-Axis when the bit is touching that surface.

More fragile bits may require that the Z-Axis Origin be set manually without the use of the touch-off device to prevent the tooling from breaking. To set the Z-Work origin manually.

1. Place a piece of paper on the workpiece.
2. Adjust the axis travel magnification to 10% and lower the Z-axis spindle gradually.



3. When approaching, switch to STEP MODE



4. Set the distance to .01mm~.1mm



5. Slowly jog the Z-axis downward until the tool touches the paper (there is a slight resistance when pulling the paper).
6. Select the Z-Axis. It will highlight in yellow once selected.

	DTG	POSITION
X	0.000	0.000
Y	0.000	0.000
Z	0.000	0.000



7. Press SET ZERO

Please note that the Z-axis in the coordinate box will reset to "0".



9.4 Setting Origin Points (Offsets)

An offset is a stored location in the CNC control that stores mathematical values/coordinates.

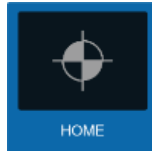
An offset represents the position of the tool where all the axes lie at the zero position.

Some reasons an offset may be used are for:

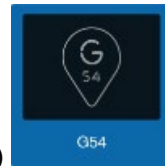
- Different tool lengths
- Un-leveled/ not uniform material

There are two methods to set an offset listed below. Method 1 is recommended.

Method 1 (recommended)



1. Press the home button



2. Press the working coordinates (G-Code) and select the desired G-Code. (G54-G59)
3. Move the X, Y, and Z axes to your desired offset point.
4. Press the desired axis to be set. It will be highlighted in yellow once selected.
 - a. Each axis will need to be selected individually.
 - b. Laguna recommends setting the Z-axis individually.

	DTG	POSITION
X	0.000	0.000
Y	0.000	0.000
Z	0.000	0.000

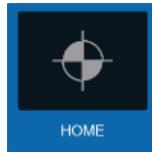
- c. If setting the offset of all axes, press all axes and confirm that they are selected.

	DTG	POSITION
X	0.000	0.000
Y	0.000	0.000
Z	0.000	0.000

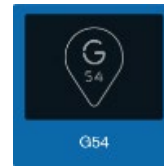


- d. Press
- e. The offset is now set.

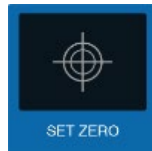
Method 2



1. Press the home button



2. Press the working coordinates (G-Code) (G54-G59)



3. Press



4. Press (you may need press this button to toggle through until you find **distance**)

5. Input the values to be modified by pressing the data box.



(a keyboard will appear)

6. Press the desired axis to be set. It will be highlighted in yellow once selected.
 - a. Each axis will need to be selected individually.
 - b. Laguna recommends setting the Z-axis individually.

	DTG	POSITION
X	0.000	0.000
Y	0.000	0.000
Z	0.000	0.000

- c. If setting the offset of all axes, press all axes and confirm that they are selected.

	DTG	POSITION
X	0.000	0.000
Y	0.000	0.000
Z	0.000	0.000

Example of Method 2

You need to move the X-axis to the right by 305mm. Switch to the DISTANCE mode, enter 305 in the data box, and press "OK" . Then press the X axis, you will see the X-axis move to the right by 305mm.

9.4.1 Programming Additional Origin Points (Offsets)

The KX24 controller allows multiple offsets to be programmed. The controller allows for six offsets (G54 -G59) to be programmed. Additional offsets can be set by selecting different G-codes when setting an offset.

9.5 Moving the Router (Spindle) Head

Movement of the router or spindle head can be done manually in one of three (3) ways.

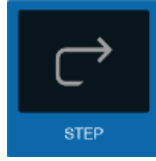
Continuous and Step mode, both use the internal grid settings (minimum movement feed) to aid in accuracy. The default grid has two (2) settings depending on the movement speed mode selected (CONT or STEP). In either Continuous or Step mode, the machine will move to the next grid distance when the button is toggled.

The movement speed mode selected can be seen on the controllers coordinate screen display. To switch between these two (2) modes, press the desired mode.



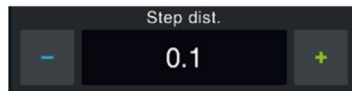
1. **Continuous Mode** – Hold down any axis directional button, i.e. X+/-, Y+/-, Z+/- and the head will move until the button is released.
 - a. The controller will display the location of the router in relation to the current Origin as it moves.
 - b. Continuous mode default speed is 0.5 mm grid.

- c. During the first 0.5 seconds the button is held down the machine will operate as if in step mode and move to the nearest grid at a lower speed.
- d. While in continuous mode, the machine will always stop on a grid position.



- 2. **Step mode** – Tap or hold (toggle) any of the directional buttons, i.e. X+/-, Y+/-, Z+/- to move the router head in grid-based increments. Useful for the precise placement of coordinates and tooling.

- a. Movement speed is default at one grid distance per 0.5 sec.
- b. Step mode default speed is 0.1 mm grid.



- 3. **Distance mode** – Allows the input of a set distance to which the router will move. To use the distance mode:

- a. Press CONT or STEP to cycle through until it displays DIST. The numerical distance will be highlighted.
- b. Enter the required distance and press OK. Display will now show DIST with the numerical distance no longer highlighted. The distance is measured in millimeters (mm)
- c. Tap any of the directional buttons to move the router head the programmed distance in that direction.

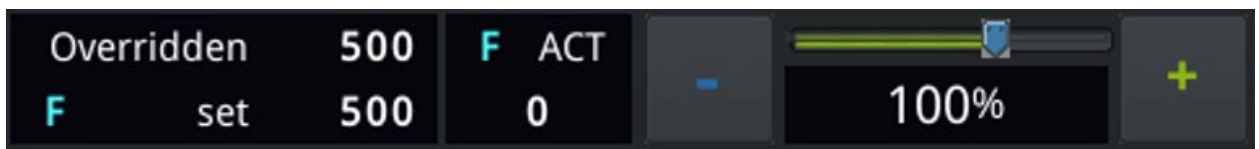
9.6 Adjusting Spindle Speed and Feed Rate

9.6.1 Feed Rate (F-value) Adjustment

Feed rate refers to the speed at which the cutting tool moves along a work piece.

Pressing the "+" and "-" to adjust the feed magnification, corresponding to the changes in the F-value set by GCODE.

Recommended machining speed adjustment (cutting speed):
2000-3500 (mm/min).



9.6.2 Spindle Speed (S-Value) Adjustment

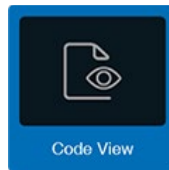
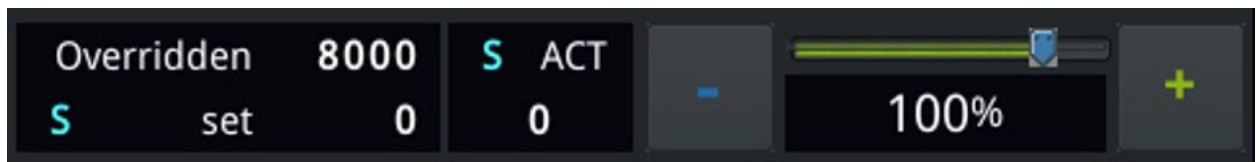
Spindle speed refers to the rotational speed of the cutting tool (RPM).

Pressing the "+" and "-" to adjust the feed magnification, corresponding to the changes in the S-value set by GCODE.

Recommended machining speed adjustment (cutting speed):

- Woodworking : 18000~24000 RPM
- Metalworking : 24000 RPM

The Emergency Stop button on the control cabinet is in red.



During machining, choose CODE VIEW() to view the real-time processing status in G-code.

Real-time parameter: S ACT / F ACT

Adjustment of Spindle Speed: "S+" to increase; "S-" to decrease.

Adjustment of Feed Rate: "F+" to increase; "F-" to decrease.

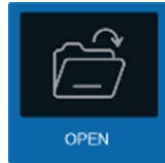
9.7 Speed Scale Adjustment

The speed scale (percentage of the feed-rate programmed within the software) is displayed before a toolpath file is set to begin. This can be changed both before the file begins (during the file parameters screen) and while the toolpath is in operation. To change parameter settings:

1. **Before the toolpath operation begins** – While the file parameters screen is being displayed, highlight the Speed Scale setting. Use the Delete button to select and remove the original parameter. Press OK after entering the new parameter. Must be 0.1 (10%) through 1.0 (100%) in 0.1 increments.
2. **During toolpath operation** – While the file is in operation, the Y+/- buttons can be used to increase or decrease the Speed Scale in 0.1 (10%) increments. Cannot exceed 1.0 (100%) of the feed-rate programmed in the software.

9.8 Processing & Running a File

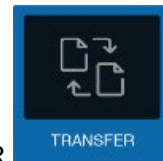
1. Insert the USB drive into the machine's USB port.



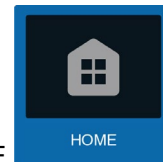
2. Press OPEN



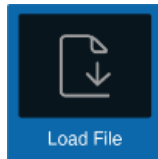
3. Press USB



4. Choose the file you want to process and click TRANSFER



5. Confirm the file you have selected is transferred and press HOME

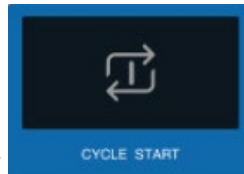


6. Press LOAD FILE

7. Enter the list and select your desired file.

- a. If making a V-carve cut, it is recommended to select the file using that bit first.

8. Verify that the machine parameters on the page match the settings.

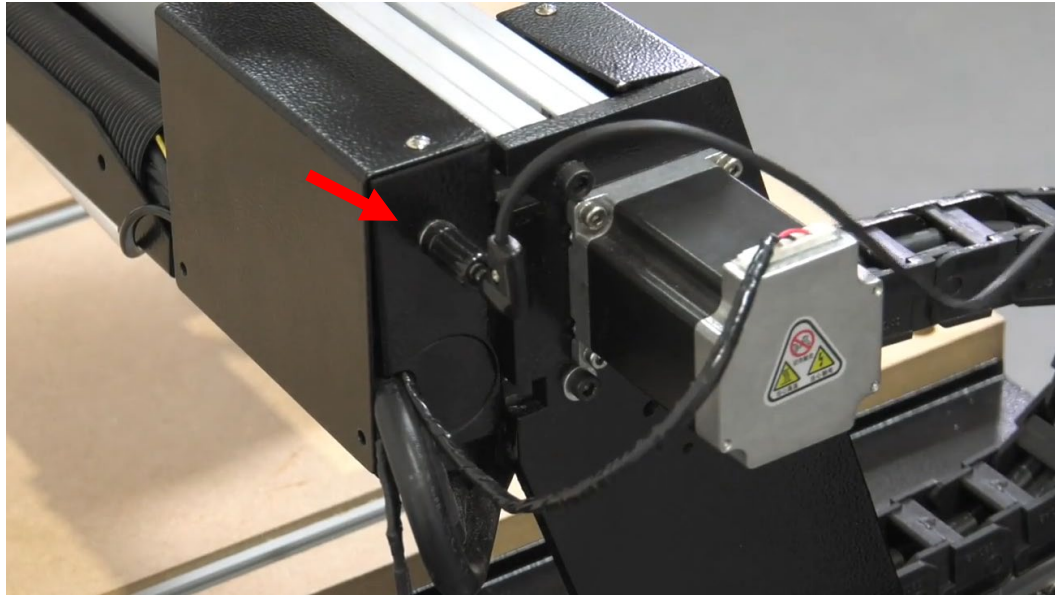


9. Press CYCLE START

9.9 Tool Touch Off

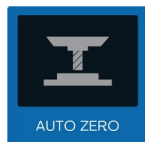
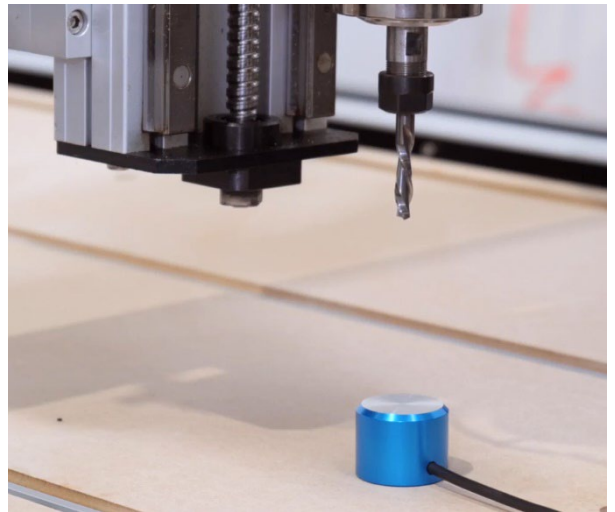
A tool touch off calibrates the position of the Z-Zero position. Always perform a tool touch off when changing tooling. You can also perform a manual tool touch off by referencing section 9.3.

1. Remove the dust shoe if one is equipped.
2. Move the spindle to a flat surface on the spoil board.
3. Plug in the tool-touch off puck to the port on the end of the gantry.



4. Place the TTO puck on the workpiece directly beneath the tooling.
It is recommended using the top of the material, however, be sure to select this in the design software when setting up the material parameters.

With material that is not uniform in thickness, the top of the spoil board may be used for the tool touch-off device placement. Again, be sure that the selection in the software matches the chosen location of the device.

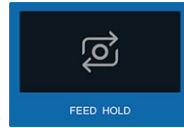


5. Press **Auto Zero**. **WARNING! THE SPINDLE WILL MOVE. KEEP ALL BODY PARTS AWAY!**
6. The tooling should touch the puck 3 times and then retract.

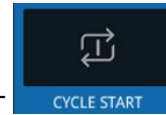
9.10 Pausing During Toolpath Operation

A file that is in operation, otherwise known as a job, can be paused. While paused, some changes can be enacted. This function should only be used for very brief pauses to adjust settings, such as a bit height or position.

To pause a job:



1. Press the FEED HOLD button during operation.
 - a. The machine movement will immediately stop.
 - b. **WARNING! SPINDLE REMAINS ACTIVE. KEEP ALL BODY PARTS AWAY.**
 - c. **Laguna recommends stopping the spindle when pausing.**
2. While the machine is Paused, the bit position can be adjusted in any direction. It is recommended that this be done in Step mode at a low speed.



3. After making the adjustments, press CYCLE START to continue the file operation.

Be advised, changes that are made will only affect the toolpath in operation.

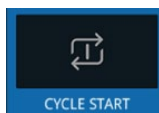
9.11 G-Code Resume

When cutting a job, the RESET button may have to be pressed if a problem arises. When this button is pressed, all movement is stopped. To go back to the point where the reset button was pressed, you will have to perform a G-Code resume.

To perform a G-Code Resume



1. Press G-CODE RESUME
2. Press SUBSTITUTE
 - a. If you want to go back to a further record line, press the "Search line no." box
 - b. When prompted, type in the any number that is less than the "record line number"
 - c. Press "Calc" and then the large arrow.
3. Press "Search"



4. Press CYCLE START to resume the G-Code.
 - a. If prompted, press OK.

10.0 Cutting a Workpiece

Before beginning, Laguna Tools recommends that the operator become familiar with the safety checks, maintenance checks, controller for operation of the machine, setting up a job, and processing a file.

1. Make sure that you have a USB drive with your design file uploaded onto it.

- a. Ensure that the correct parameters are set for the workpiece. (Ex: height, width, thickness, etc)



2. Verify the machine stand leveling feet (if available) have been lowered to prevent the machine from moving.
3. Insert your desired tooling into the spindle.
 - a. Reference section 7.0 for help on inserting the tooling.
4. Turn on the machine by rotating the power switch to the right. The controller display should light, displaying the loading screen. The emergency stop button may need to be released if it has been used.
5. Raise the Z-Axis to a safe height that is above the material and clamps.

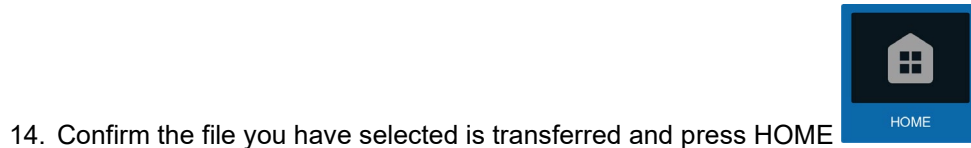


6. Press the HOME button
 - a. This operation must be performed before any other function.
7. Place the workpiece where the home position is (bottom left corner) of the table and ensure that the workpiece is securely held to the table which can be done using any of the following:
 - a. Clamps
 - b. Fixtures
 - c. Double-sided tape
8. Perform a Tool touch off (TTO). **WARNING! THE SPINDLE WILL MOVE. KEEP ALL BODY PARTS AWAY!**
 - a. Reference section 9.9 for help performing a tool touch off.
9. If you do not want to cut starting from the home position, you will need to set your origin point (offset) Refer to section 9.2 & 9.3 for help on setting the origin point.

10. After the tool touch off is complete, insert your USB drive that has your design into the USB port on the front of the control cabinet. Wait about 20 seconds for the USB drive to be read by the machine.



13. Select the file you want to process (file will be highlighted)



16. Select your desired file. (file will have a check mark by it)
17. Verify that all machine parameters are set. (Ex: Spindle speed, speed scale, offsets, etc)
18. Verify that the machine parameters on the page match the settings.



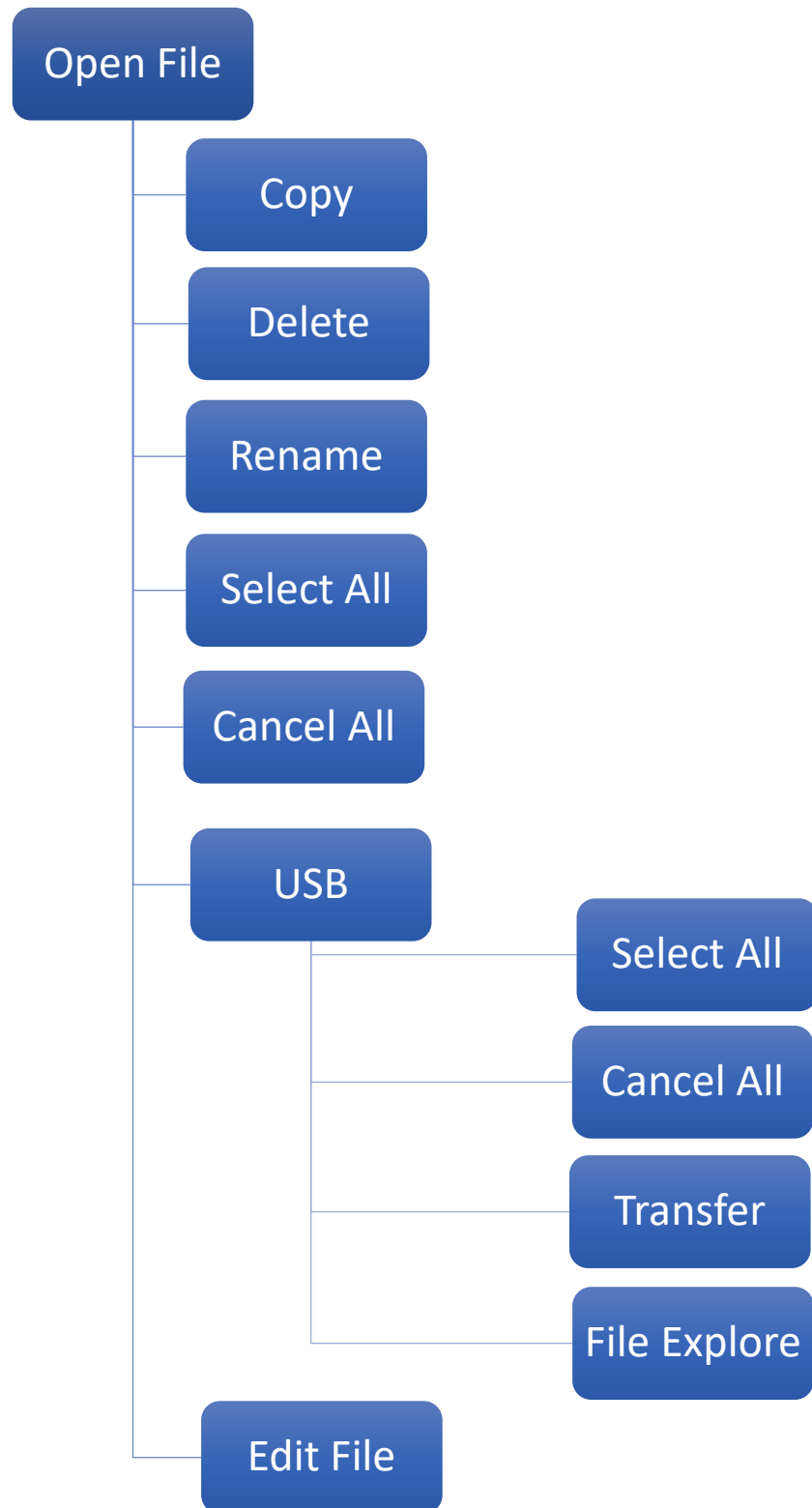
THE SPINDLE WILL MOVE. KEEP ALL BODY PARTS AWAY!

- a. In case of any issues during the process, press the emergency stop button.

20. After a short countdown (4 seconds) during which the spindle will come up to speed, the file will begin. During file operation, the screen will rotate through a list of information. Including: current G-Code line (source number), operating time, speed (mm/min), and file name.

11.0 Controller Menu Paths

11.1 Open File



Copy- Copies the selection

Delete– Deletes the selection

Rename – Allows the user to rename the selection

Select All – Selects all files that are listed

Cancel All– Cancels all selections

USB – Accesses the USB Drive Menu

Select All– Selects all files in the USB

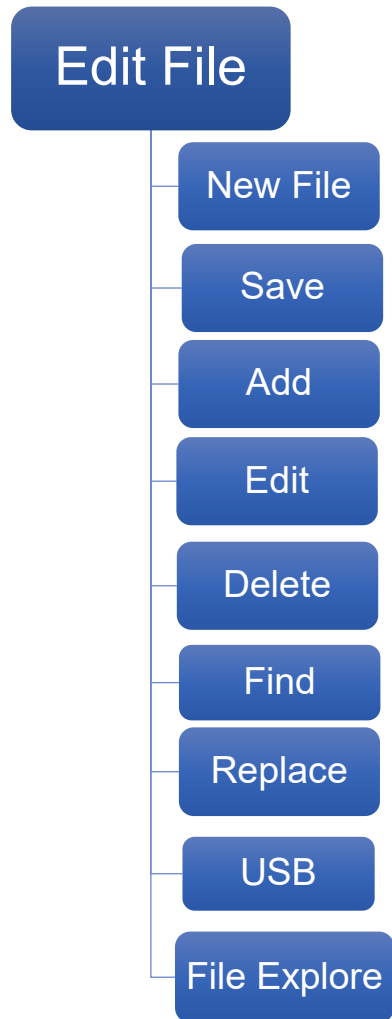
Cancel All – Cancels all selections

Transfer – Transfers the selected files to the machine

File Explore – Explores the selection

Edit File – Allows the user to edit the selected file

11.2 Edit File



New File – Creates a new file

Save – Saves the selected file

Add – Adds the file

Edit – Edits the file or G-Code

Delete – Deletes all selections

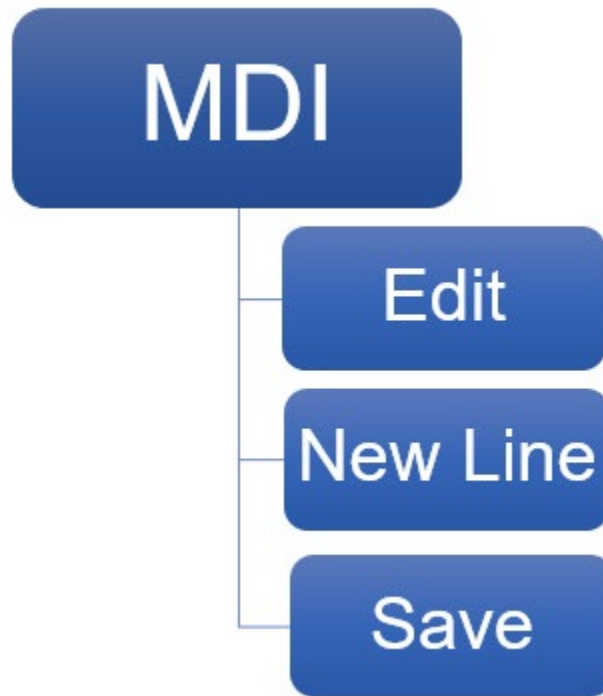
Find – Opens keyboard

Replace – Replaces two selected files

USB – Accesses the USB Drive Menu

File Explore – IDK

11.3 MDI Menu

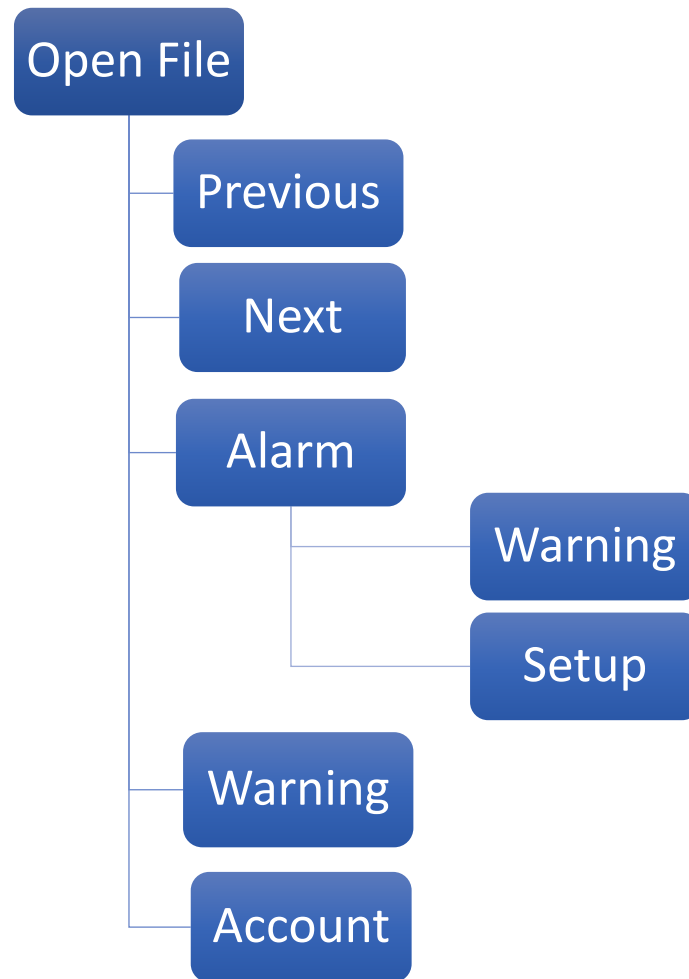


Edit – Allows the user to edit the selected file

New Line – Inserts a new line of typing

Save – Saves the selected file

11.4 Settings Menu



Previous – Goes to the previous screen

Next – Goes to the next screen

Alarm – Displays the alarm screen

Select All – Selects all alarms

Cancel All – Cancels all selections

Transfer – Inserts

File Explore – Saves the selected file

Warning – Allows the user to edit the selected file

Account – Saves the selected file

12.0 Data Restoration and Updates

Occasionally as software evolves, updates may become available for the controller firmware.

When this happens, the updates may be supplied to customers by Laguna Tools.

Restore files for each machine are available.

If needed, Laguna Tools can email these files for emergency repair.

13.0 Maintenance

To ensure optimal machine performance, you must conduct regular maintenance.

Failure to follow maintenance procedures will void the warranty.

WARNING

Always disconnect power to the machine before performing maintenance. Failure to do this may result in serious personal injury or damage to the machine

Table is based on 30 hours of use a week

	Daily	Weekly	Monthly	Every 500 Machine Hours	Every Six Months	Yearly
Wipe the ballscrews and prismatic guides and ensure they are dust free.	X					
Apply a 3 in 1 light machine oil to ballscrews and prismatic linear guides using a clean cloth. Move the machine through travel limits to properly disperse lubricant.	X					
Apply lithium grease to all zerk fittings (grease nipples).				X		
Remove all tooling from the spindle at the end of the day. Do not leave any tooling in the spindle overnight. This includes tool cones, collets, router bits, etc. Leaving any tooling in the spindle overnight can cause the tooling to get dirty, stuck, rust, and cause damage to the spindle.	X					

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Check that all electrical connectors are fitted correctly and are not loose.	X					
Check coolant levels in reservoir.	X					
Check the tool blades for chips and dullness	X					
Ensure that slots in the collets are free of sawdust and debris.	X					
Clean the collets and spindle holes. Uncleaned spindle holes may affect cut quality and pose a safety hazard if significantly dirty.	X					
Clean the router bits	X					
Clean surface dust	X					
Clean the x and y-axis rack rails and the z-axis screw guides	X	X				
Check the dust extraction for blockages, as large pieces could cause blockages	X	X				
Inspect the overall machine for damage and loose or worn parts.	X	X		X		
Disconnect power at the wall and clean the dust from the cabinet and fan covers			X			

13.1 Applying Grease to the Zerk Fittings (Grease Nipples)

A grease gun that uses lithium grease is needed for applying grease to the zerk fittings.

Fit the grease gun onto the desired zerk fitting and disperse the grease. Do not over grease.

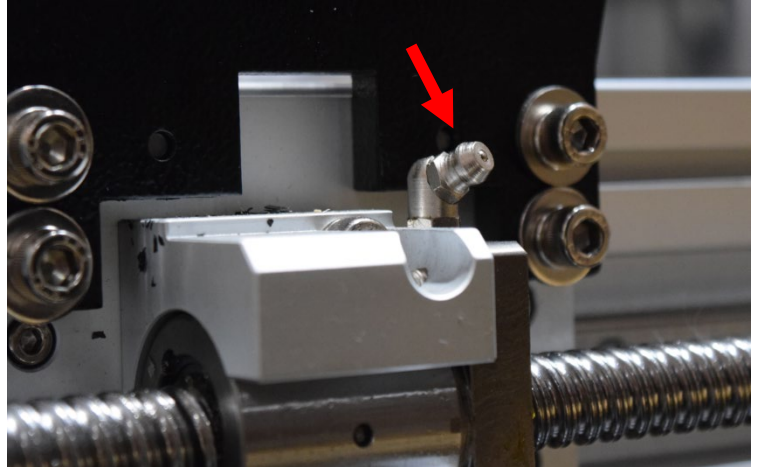
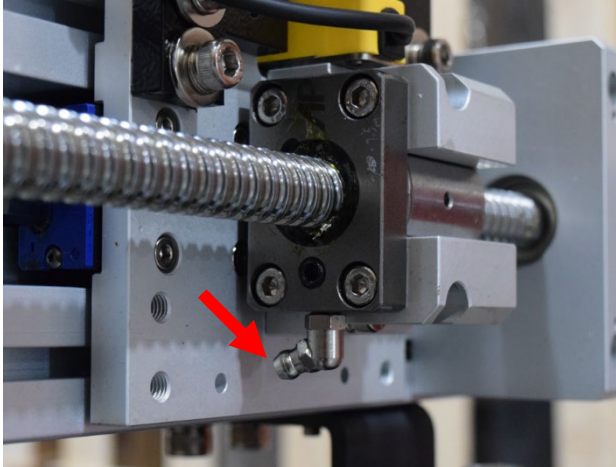


Figure 13-2: Y-Axis Zerk Fittings

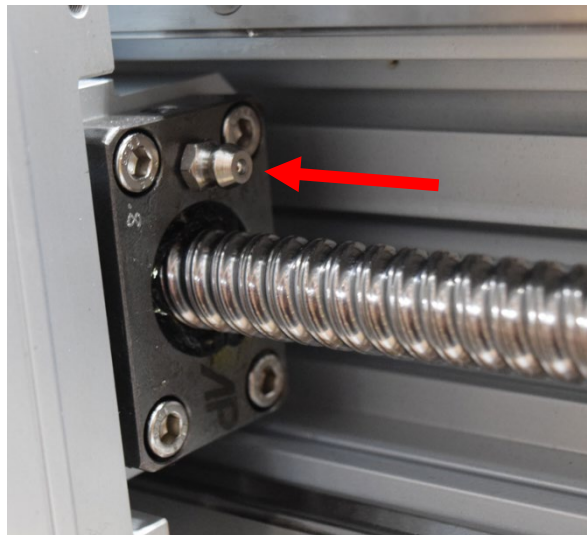


Figure 13-1: X-Axis Zerk Fitting

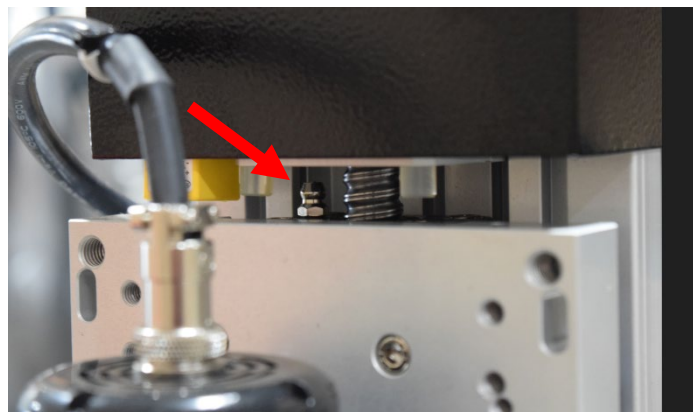


Figure 13-3: Z-Axis Zerk Fitting

14.0 Troubleshooting

14.1 Mechanical and Electrical Problems

Symptom	Possible Cause	Correction
Monitor Not Turning on After Powering Up	Monitor cable is loose or disconnected.	Ensure that the monitor's power cable is securely connected to the power socket at the back of the control cabinet.
	VGA cable is not connected to the monitor and control cabinet	Confirm that the VGA cable is properly connected to both the monitor and control cabinet
	Monitor power switch is turned off.	Verify that the power switch at the back of the monitor is turned on
Machine Not Responding to any Reactions After Startup	Emergency stop is engaged	Check if the emergency stop button has been released
	Alarms are present	Verify if any alarms have been triggered and reset them. The machine cannot be operated if an alarm is active.
Touchscreen Not Responding	Loose USB connection cable	1. Please ensure that the USB connection cable to the monitor is securely tightened. 2. Connect with a mouse to check if the cursor moves. If the cursor moves, please restart the machine and check if the touchscreen responds. If not, please contact customer service
Language Change in the iCNC System		Go to the SETUP page, change the language at the top of the first page

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XYZ Not Zeroing During Homing Process	Loose Cables	Restart the machine. Confirm all cables are tight.
Machine Not Responding During Homing: The system shows changes in the coordinate display during homing process, but the machine does not respond or move.	Improperly installed signal cables	Confirm that the signal cables are properly installed.
	Loose coupling	Please check if the coupling is securely tightened.
		Restart the machine and check if the issue is resolved. If the problem persists after the above steps, please contact customer service.
No Movement When Operating Any Axis	Axis cable is loose or disconnected	Check if the cable for the problematic axis is disconnected, if the coupling is loose or if the main cable in the control cabinet is properly connected.
	Control cabinet cable is loose or disconnected	Verify if any alarms have been triggered by the system.
	Alarms are present	Reinstall the motor cable.
Machine Does Not Stop When Exceeding the Home Limit	Limit switch LED is off	Use a metal object to approach the yellow limit switch and check if the LED is on. If the LED is on, please confirm that the distance should be within 3mm of the origin sensor. If not, please contact customer service.

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	Limit switch is loose	Check that the yellow limit switch is securely tightened.
Axis Moves in the '+' Direction and Exceed Travel Limit Without Stopping	Machine not homed	Please make sure to perform a homing operation after powering on
	Limit switch LED is off	Use a metal object to approach the yellow limit switch and check if the LED is on. If the LED is on, please confirm that the distance should be within 3mm of the origin sensor. If not, please contact customer service
Machine Moving in Negative Direction Without Stopping During Homing.	The limit switch is loose. Limit Switch LED is off.	Please contact customer service. 1-800-332-4094
Axis Moves in the Opposite Direction When Operation		Please contact customer service. 1-800-332-4094
Spindle Not Responding After Activation	Loose spindle cable	Check if the spindle cable is securely connected in the control cabinet.
	Loose axis cables	Inspect the cable box at the rear of the X-axis to ensure that the U, V, W and G cables of the spindle are not loose.
	Alarms are present.	Clear the alarm. Verify any warnings or alarms indicate a malfunction in the VFD. If an error occurs, please open the control cabinet and record the error code on the VFD. Please contact with customer service and provide the error code.
USB Not Reading / Recognized	Faulty USB Port.	Please try using the USB port at the rear of the control cabinet. If the rear

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	Faulty USB drive	USB port does not work, please replace another USB
Tool Touch Off Puck Not Functioning	Tool touch off puck cable improperly installed	Check if the cable is properly installed. Go to SETUP and open the I/O page. Touch the tool touch off puck with a tool and verify if the I4 indicator lights up green.
	Dirty or rusty connector	Inspect the connector for oxidation or deformation. If there is oxidation, use sandpaper to remove it. For deformation, please contact customer service.
LED Light Not Illuminating After Power On	On/off switch not turned on	Check if the LED switch is turned on (at the wiring end).
	Selecting incorrect button	Ensure that the LED icon is correctly selected in the control system.
	Incorrect wiring. Loose wiring connection.	Confirm if the LED wiring polarity is correct (please refer to the LED installation manual). Confirm wiring is correct and not loose.
Water Cooling System Not Starting (KX:44 MODEL ONLY)	Loose connectors	Check if the relevant connectors are loose.
		When the spindle is running, use the multimeter to measure the voltage between brown and blue cables to ensure there is a DC12V power. KX:44 MODEL ONLY

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Machining Graphic is unable to display		Please wait for 1-5 minutes when the machining graphic is complicated.
	Incorrect G-code	Ensure that M30 is added at the end of G-code for the graphic to be generated by the system.
		If you proceed with machining before the graphic appears, the graphic will not be displayed
Object Size Deviation	Loose coupling	Check if the coupling is loose.
	Loose Clamp	Check if the clamp is loose
		Listen for any unusual noise during the operation of three axes. If there is any abnormal noise, please record the relevant conditions and contact customer service.
Discrepancy in Machined Surface	Loose Mounting Screws	Verify the mounting screws on X axis and Z axis are loose.
		Use a triangular ruler with a side length greater than 60cm to check if there are any gaps. Adjust according to the relevant adjustment methods if necessary
If you need to contact customer service, please provide the following information: 1. Machine Model and Serial Number 2. Purchase Year and Month 3. If possible, please include a photo of the machine's nameplate.		

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Symptom	Possible Cause	Correction
Monitor Not Turning On After Powering Up	Short circuit in line cord or plug.	Inspect cord or plug for damaged insulation and shorted wires.
	Loose or separated connection.	Inspect all connections between motor and control cabinet. Some connections may be hidden.
	Blown Fuse	Test and install correct fuses.
Motor attempts start but will not turn.	Jammed spindle	Disconnect from power, try turning spindle by hand. Check reason for jamming.
	Motor faulty	Replace spindle.
	Spindle operated without coolant.	Replace motor. Maintain coolant level.
	Incorrect voltage.	Check incoming voltage.
Motor overheats (shuts off).	Dull cutting tools.	Use sharp tools.
	No coolant in reservoir or blockage in coolant path.	Fill reservoir, check for obstacles in flow path.
Motor stalls, resulting in blown fuses or tripped circuit.	Motor overloaded.	Reduce load on motor.
	Short circuit in motor or loose connections.	Inspect connections on motor for loose or shorted terminals or worn insulation.
	Low voltage	Correct low voltage conditions
	Incorrect fuses or circuit breakers in power line.	Install correct fuses or circuit breakers.

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Symptom	Possible Cause(s)	Possible Solution(s)
Router cutting depth inconsistent.	Loose cutter	Tighten cutter in spindle collet.
	Spoil boards not flat.	Check that spoil boards are flat and clean prior to fitting job.
	Excessive play in Z-Axis ballscrew.	Inspect and correct if needed.
Machine won't power on.	E-stop switch engaged.	Release E-stop switch.
	No incoming power.	Check power plug connection. Check condition of power cable.
	Faulty start switch.	Inspect and replace.
	Internal breaker faulty.	Replace breaker.
Machine will not home.	Limit switches damaged, disconnected, or misadjusted.	Inspect limit switches and correct problem.
Spindle does not cut full design file. Spindle keeps moving/spinning without a toolpath to follow.	USB was not safely removed Design file was not fully uploaded to USB	Click "eject" when removing USB drive from computer. Remove USB drive when safely prompted to do so and re-run.

14.2 Controller Functions Problems

Symptom	Possible Cause	Correction
 WARNING <i>Some connections may require a qualified electrician.</i>		
Controller display is blank or flickering.	Cable connections not tight.	Inspect and tighten connections between pendant and control cabinet.
	Loose 24V connection to control board.	Check the 24V connection to the DSP board in the control cabinet.
	Interface damaged.	Replace damaged part.
	Controller damaged.	Replace controller.
Controller keeps restarting automatically.	Insufficient power supply.	Have qualified electrician check incoming power supply.
	Local power grid unstable.	Contact power company.
	Controller damaged.	Connect controller to computer via USB cable. If problem still occurs, replace controller.
Controller display reads "Out of Limit"	HOME operation has not been performed.	HOME all axes and retry.
	Design too large to fit within machine limits.	Check ORIGIN placement and design size.
	Incorrect table size.	Check table size parameters in Machine Setup.
Cannot set work origin on controller.	May be in Machine Coordinate State	Press MENU + 1 to revert to first working coordinate system.

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	Buttons not functioning	Enter MENU/System Setup/Buttons Check to verify function. If buttons not working, replace controller.
Z-Axis fall is too fast during processing	Working speed exceeds Z-Axis maximum speed	Set to safe speed in: MENU/Machine Setup/Max Speed Limit
	Loose coupling or transmission slipping	Tighten connecting parts.
	Incorrect plunge speed in design software.	Check speeds, verify correct post processor is being used.
Z-Axis depth not consistent each time same file is processed and after machine homes.	Working speed exceeds Z-Axis maximum speed.	Set to safe speed in: MENU/Machine Setup/Max Speed Limit.
	Loose coupling or transmission slipping.	Tighten connecting parts.
	Incorrect plunge speed in design software.	Check speeds, verify correct post processor is being used.
Processed workpiece does not match file size.	Pulse equivalent incorrect.	Adjust pulse under: MENU/Machine Setup.
	Incorrect post processor.	Verify that correct post processor was used.
	Wrong cutting tool used.	Use proper tool for process.
Machine not stopping at HOME position	HOME detection plate beyond reach of proximity sensors.	Inspect and adjust

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	Proximity sensor wire is loose or damaged.	Check connections.
	Proximity sensor damaged.	Test and replace.
	Poor connection at Interface board.	Inspect the appropriate connection.
	50-pin data cable is broken.	Replace cable.
Machine moves reverse direction when homing	Incorrect HOME direction settings in Machine Setup	Check settings.
	50-pin data cable is broken.	Replace data line.
Router head does not stop after contacting tool touch-off puck.	Poor connection of between the touch-off device and gantry connections.	Inspect connections inside touch-off device and gantry.
	Poor connection of spindle with "GND" terminal on interface board.	Restore proper connection.
Machine will not move after controller receives commands.	One axis not moving – may be poor connection.	Connect a different axis connection to this terminal to test. If it works, the motor driver is okay. Check connections along corresponding drive and motor.
	All axes not moving.	First, check 50-pin cable connection to interface board. Then check the power supply of motor drivers. Last check mechanical elements of axis system.
Machine moves to new position satisfactorily but does not return correctly to original position.	Mechanical elements, such as ballscrews, are loose or misadjusted.	Inspect and correct as needed.

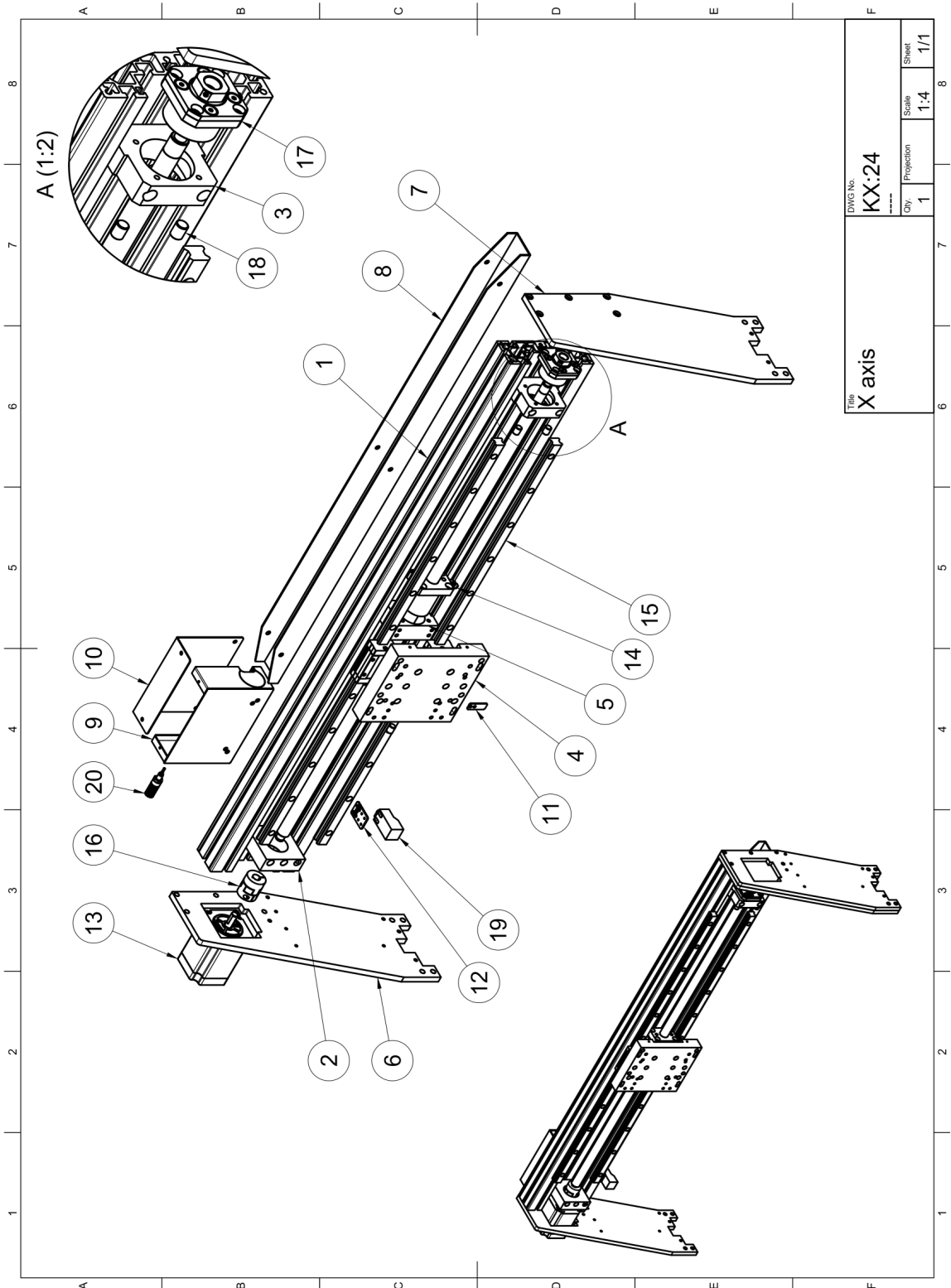
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	The Stepper motors have slipped and lost position.	Check speeds and proper lubrication on all ballscrews and prismatic guides.
Abnormal operation when processing.	Program/drawing file is faulty.	Review program and reload to system. Verify the file is completely saved before removing USB from PC.
After controller powers on, one or more axes move only one direction.	Improper connection between DSP board and motor drive.	Inspect connections.

[illegible]

15.0 Exploded Parts View and Parts Lists

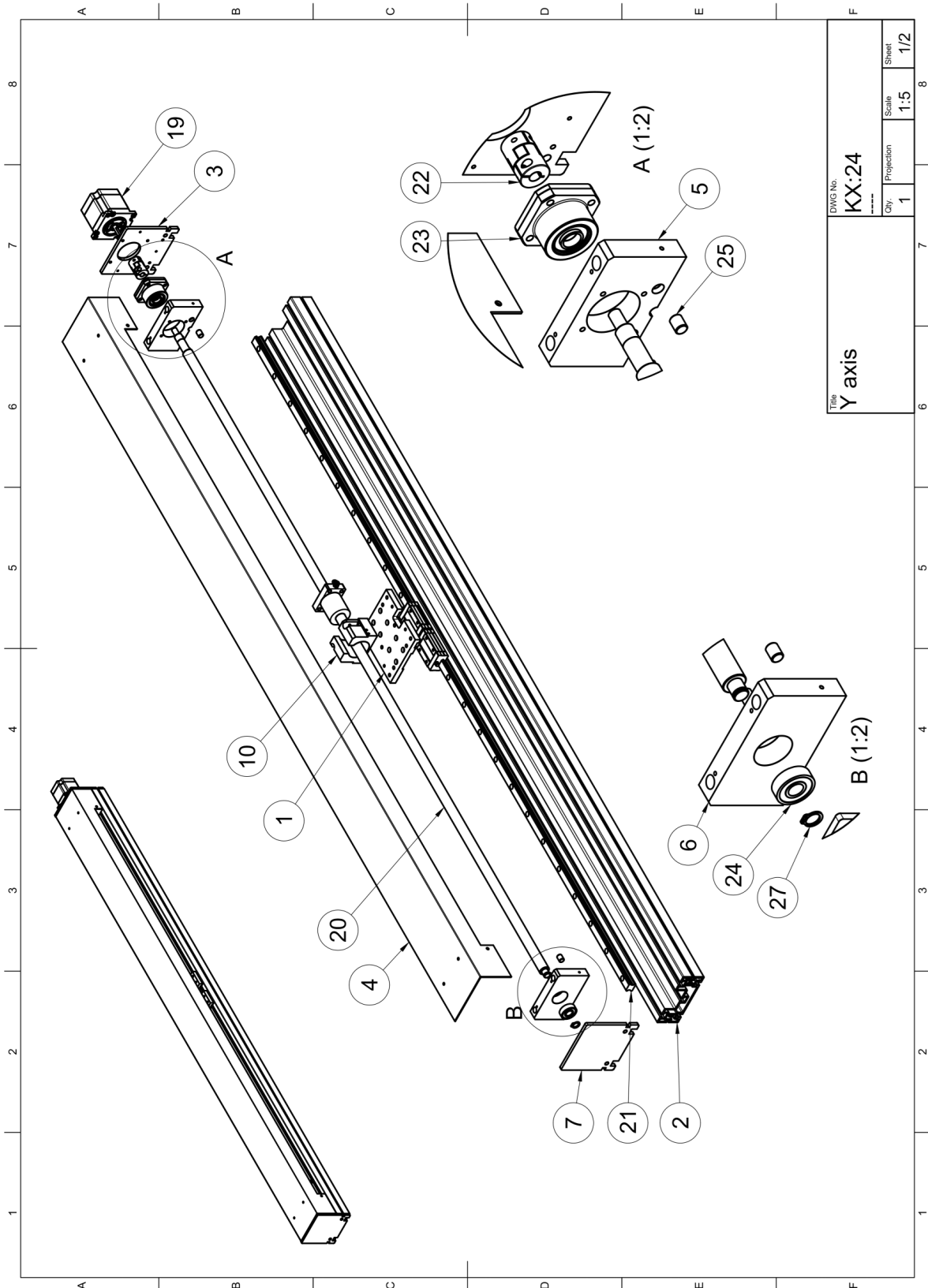
15.1 X-Axis Exploded View



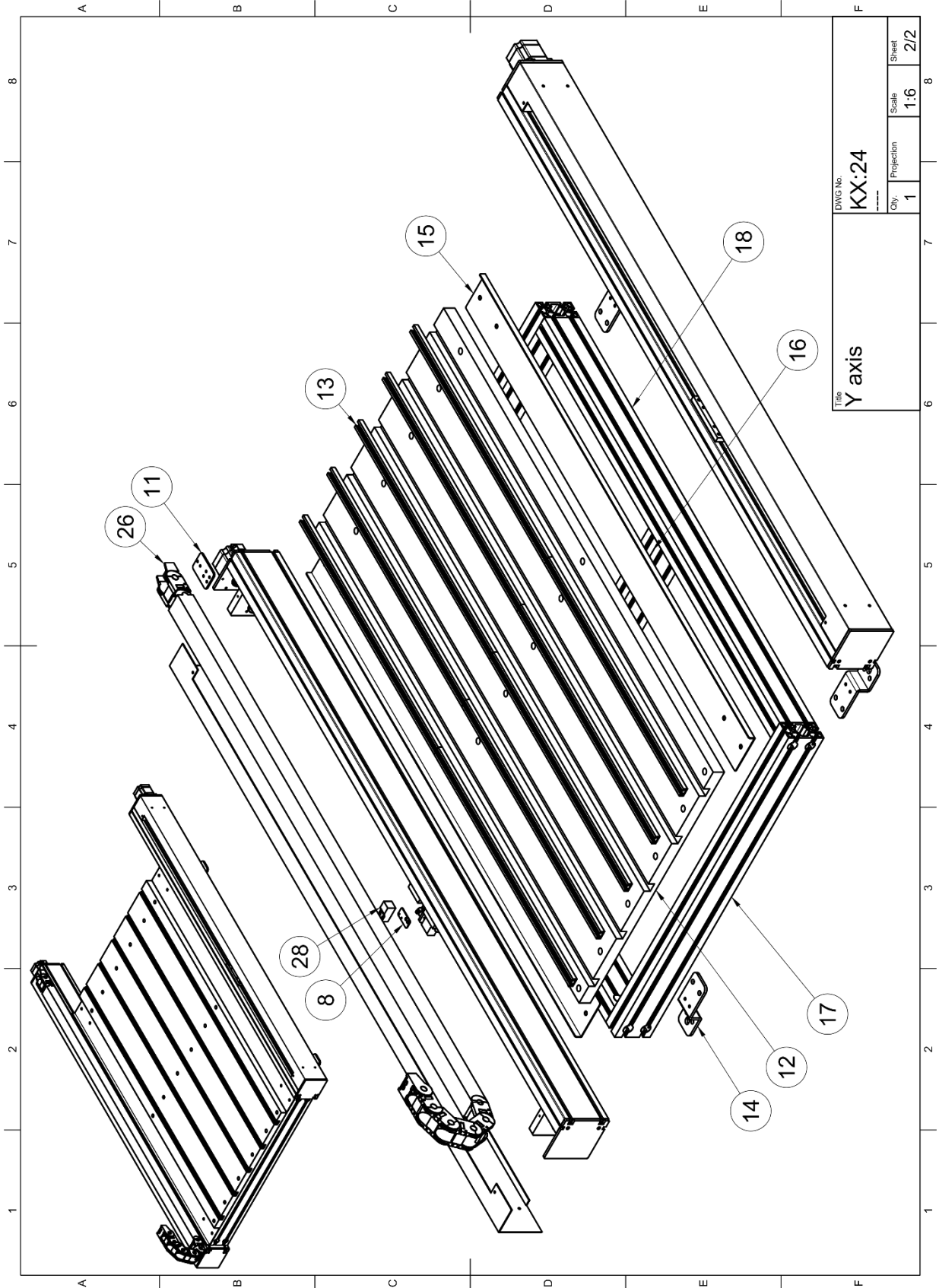
15.1.1 X-Axis Parts List

X AXIS				
NO.	PART NO.	DESCRIPTION	QTY	SPECIFICATION
1	i20700630B	X AXIS ALUMINIUM EXTRUSION	1	890mm
2	i20700640A	MOTOR BASE	1	
3	i20700650A	BEARING SEAT	2	
4	i20700660A	XZ AXIS SLIDE BOARD	1	
5	i20700670A	X AXIS BALL SCREW SEAT	1	
6	i20700680A	LEFT GANTRY	1	
7	i20700690A	RIGHT GANTRY	1	
8	I20700210A	DRAG CHAIN SEAT	1	
9	I20700250B	JUNCTION BOX	1	
10	I20700260A	JUNCTION BOX COVER	1	
11	I20700910A	SENSOR FIXED PLATE	1	
12	AX0100222A	SENSOR RESPONSE PLATE_A	1	
13	57CM22C-4A-CZ	STEPPER MOTOR	1	
14	AX0100202A	X AXIS BALL SCREW	1	812mm
15	LSD15HN1X700S20AN-M4	X AXIS LINEAR GUIDE	2	700mm
16	SQR25C(6.35,10)	COUPLING	1	
17	FK12 C7	BALLSCREW SUPPORT UNIT	1	
18	CXHK8-10	CUSHION PAD	3	
19	EHRP13HC11	PROXIMITY SENSOR	1	
20	N1535	BINDING POST-BLACK	1	

15.2 Y-Axis Exploded View



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15.2.1 Y-Axis Part List

Y AXIS				
	PART NO.	DESCRIPTION	QTY	SPECIFICATION
1	I20700010A	Y AXIS SLIDE BOARD	2	
2	I20700020A	Y AXIS ALUMINIUM EXTRUSION	2	1490mm
3	I20700030A	MOTOR BASE	2	
4	I20700040B	Y AXIS COVER	2	
5	I20700090A	BEARING SEAT_A	2	
6	I20700100A	BEARING SEAT_B	2	
7	I20700130A	Y AXIS FRONT COVER	2	
8	I20700310A	SENSOR RESPONSE PLATE	1	
9	I20700360A	Y AXIS FIXED PLATE	4	
10	I20300450A	Y AXIS BALL SCREW SEAT	2	
11	I20700470A	DRAG CHAIN SEAT	1	
12	I20700490B	PANEL MDF	1	2"x4"
13	I20700510A	C SHAPE ALUMINIUM DIN RAIL	10	610mm
14	I20700730A	Z AXIS BOTTOM FIXED PLATE	4	
15	I20700740A	PANEL LEFT&RIGHT COVER	2	
16	I20700750A	ALUMINIUM EXTRUSION BEAM	1	707mm

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17	I20700750B	ALUMINIUM EXTRUSION BEAM	2	787mm
18	I20700750C	ALUMINIUM EXTRUSION BEAM	2	1065mm
19	57CM12C-3A-CZ	STEPPER MOTOR	2	
20	AX0100393A	Y AXIS BALL SCREW	2	1417mm
21	LSD15HN2X1420S20AN-M4	Y AXIS LINEAR GUIDE	2	1420mm
22	SQR20C(6.35,8)	COUPLING	2	
23	FK12 C7	BALLSCREW SUPPORT UNIT	2	
24	6000ZZ	BEARING	2	
25	CXHK8-10	CUSHION PAD	8	
26	E2.25L.02.055.0-1625L	DRAG CHAIN	1	
27	STWN10	C-SHAPED BUCKLE	2	
28	EHRP13HC11	PROXIMITY SENSOR	1	



15.3.1 Z-Axis Parts List

Z AXIS				
NO.	PART NO.	DESCRIPTION	QTY	SPECIFICATION
1	i20700630C	Z AXIS ALUMINIUM EXTRUSION	1	405mm
2	i20700650A	BEARING SEAT	1	
3	i20700660A	XZ AXIS SLIDE BOARD	1	
4	i20700670A	X AXIS BALL SCREW SEAT	1	
5	I20700700A	Z AXIS TOP COVER	1	
6	I20700710A	Z AXIS BOTTOM COVER	1	
7	I20700720A	Z AXIS MOTOR BASE	1	
8	I20700760A	SENSOR RESPONSE PLATE	1	
9	I20700200A	MOTOR HOLDER	1	
10	57CM22C-4A-CZ	STEPPER MOTOR	1	
11	AX0400051A	Z AXIS BALL SCREW	1	332mm
12	LSD15HN1X280S20AN-M4	Z AXIS LINEAR GUIDE	2	280mm
13	SQR25C(6.35,10)	COUPLING	1	
14	FK12 C7	BALLSCREW SUPPORT UNIT	1	
15	CXHK8-10	CUSHION PAD	3	
16	EHRP13HC11	PROXIMITY SENSOR	1	
17	N-TH-34B	PIPE CLIP	1	
18	i20101780A	SPINDLE	1	

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16.0 Warranties

Dealer Machinery Warranty

New woodworking machines sold by Laguna Tools carry a two-year warranty effective from the date of dealer invoice to customer/end-user. Machines sold through dealers must be registered with Laguna Tools within thirty (30) days of purchase to be covered by this warranty. Laguna Tools guarantees all new machines sold to be free of manufacturers' defective workmanship, parts, and materials. We will repair or replace, without charge, any parts determined by Laguna Tools, Inc. to be a manufacturer's defect. We require that the defective item/part be returned to Laguna Tools with the complaint. The end-user must request a Return Material Authorization (RMA) number from Customer Service. Include the RMA number with any and all returned parts/components requesting warranty coverage*. Any machines returned to Laguna Tools must be returned with packaging in the same manner in which it was received. A part or blade is being returned must have adequate packaging to ensure it is not damaged during shipping. In the event the item/part is determined to be damaged due to lack of maintenance, cleaning, or misuse/abuse, the customer will be responsible for the cost to replace the item/part, plus all related shipping charges. This limited warranty does not apply to natural disasters, acts of terrorism, normal wear and tear, product failure due to lack of maintenance or cleaning, damage caused by accident, neglect, lack of or inadequate dust collection, misuse/abuse or damage caused where repair or alterations have been made or attempted by others.

* The issue of an RMA number is for reference only; it DOES NOT indicate acceptance of the warranty claim.

CNC Limited Warranty

New CNC machines sold by Laguna Tools carry a one-year warranty effective from the date of shipping. Laguna Tools guarantees all new machines sold to be free of manufacturers' defective workmanship, parts, and materials. We will repair or replace, without charge, any parts determined by Laguna Tools, Inc. to be a manufacturer's defect. If the defective item/part is determined to be damaged due to lack of maintenance, cleaning or misuse/abuse, the customer will be responsible for the cost to replace the item/part, plus all related shipping charges. This limited warranty does not apply to natural disasters, acts of terrorism, normal wear and tear, product failure due to lack of maintenance or cleaning, damage caused by accident, neglect, lack of or inadequate dust collection, misuse/abuse or damage caused where repair or alterations have been made or attempted by others.

Laguna Tools, Inc. is not responsible for additional tools or modifications sold or performed (other than from/by Laguna Tools, Inc.) on any Laguna Tools, Inc. woodworking machine. The warranty may be voided upon the addition of such described tools and/or modifications, determined on a case-by-case

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basis. Software purchased through Laguna Tools, Inc., is not covered under this warranty and all technical support must be managed through the software provider. Normal user alignment, adjustment, tuning, and machine settings are not covered by this warranty. It is the responsibility of the user to understand basic woodworking machinery settings and procedures and to properly maintain the equipment in accordance with the standards provided by the manufacturer.

Parts under warranty are shipped at Laguna Tools, Inc.'s cost either by common carrier, FEDEX ground service, or a similar method. Technical support to install replacement parts is primarily provided by phone, fax, e-mail or Laguna Tools Customer Support Website. The labor required to install replacement parts is the responsibility of the user. Laguna Tools is not responsible for damage or loss caused by a freight company or other circumstances not in our control. All claims for loss or damaged goods must be notified to Laguna Tools within twenty-four (24) hours of delivery.

Please contact our Customer Service Department for more information. Only NEW machines sold to the original owner are covered by this warranty.

For warranty repair information, call 1-800-332-4094.

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No Modifications Allowed or Sold

Laguna Tools, Inc. is not responsible for additional tools or modifications sold or performed (other than from/by Laguna Tools, Inc.) on any Laguna Tools, Inc. woodworking machine. The warranty may be voided upon the addition of such described tools and/or modifications, determined on a case-by-case basis. Normal user alignment, adjustment, tuning, and machine settings are not covered by this warranty. It is the responsibility of the user to understand basic woodworking machinery settings and procedures and to properly maintain the equipment in accordance with the standards provided by the manufacturer. Parts, under warranty, are shipped at Laguna Tools, Inc.'s cost either by common carrier, FEDEX ground service or a similar method. Technical support to install replacement parts is primarily provided by phone, fax, e-mail, or Laguna Tools Customer Support Website. The labor required to install replacement parts is the responsibility of the user. Laguna Tools is not responsible for damage or loss caused by a freight company or other circumstances not in our control. All claims for loss or damaged goods must be notified to Laguna Tools within twenty-four (24) hours of delivery. Please contact our Customer Service Department for more information. Only new machines sold to the original owner are covered by this warranty.

For warranty repair information call 1-800-332-4094.

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Laguna Tools Warranty

WARRANTY & REGISTRATION

Thank You!

Welcome to the Laguna Tools® group of discriminating industrial machinery owners. We understand that you have a choice of where to purchase your machines and appreciate the confidence you have in the Laguna Tools® brand.

Through hands-on experience, Laguna Tools® is constantly working hard to make innovative, precision products. Products that inspire you to create works of art are a joy to operate and encourage your best work.

Laguna Tools®
Imagination, Innovation, and Invention at Work

Warranty & Registration

Every product sold is warranted to be free of manufacturer's defective workmanship, parts, and materials. For any questions about this produce, the intended use or what it was designed for, customer service, or replacement parts, please contact our customer service department:

Laguna Tools® Customer Service
744 Refuge Way, Grand Prairie, Texas 75050, USA
1-800-234-1976
customerservice@lagunatools.com
www.lagunatools.com/why/customer-service/
8AM. To 5PM PSF. Monday through Friday

For warranty claims or to report damage upon receiving-please reach out to our warranty department:

Laguna Tools® Warranty Service
744 Refuge Way, Grand Prairie, Texas 75050, USA
1-800-234-1976
customerservice@lagunatools.com
www.lagunatools.com/policies/warranty
8AM to 5PM PST, Monday through Friday

Registration

To prevent voiding this warranty, all products sold must be registered within thirty (30) days of receiving the product. Registering the product will enable the original purchaser to receive notifications about important product changes, receive customer service, and be able to file a warranty claim against defective workmanship, parts, or materials.



Who is Covered

The applicable warranty covers only the initial purchaser of the product from the date of receiving the product. To file such claims, the original purchaser must present the original receipt as proof of purchase.

What is Covered

The warranty covers any defects in the workmanship of all parts and materials that make up the machine unless otherwise specified. Any part determined by Laguna Tools® to have a defect will be repaired or replaced (and shipped), without charge. The defective item/part must be returned to Laguna Tools® with the complaint and proof of purchase in the original packaging that it was received in. In the event the item/part is determined to be not covered by this warranty, the customer will be responsible for the cost to replace the item/part and all related shipping charges.

Warranty Limitations

This limited warranty does not apply to natural disasters, acts of terrorism, normal wear and tear, product failure due to lack of maintenance or cleaning, damage caused by accident, neglect, or lack of inadequate dust collection. The warranty may be voided against proof of misuse/abuse, damage caused where repair or alterations have been made or attempted by others, using the product for purposes other than those described as intended use (unless with consent by Laguna Tools®), modification to the product, or use with an accessory that was not designed for the product. It is the responsibility of the user to understand basic woodworking machinery settings and procedures and to properly maintain the equipment in accordance with the standards provided in this manual.

Length of Warranty

All new machines and optional accessories sold through an authorized dealer carry a two-year warranty effective from the date of receiving the product. Machines sold for either commercial or industrial use have a one-year warranty. Wearable parts like throat plates, bandsaw guides, etc., have a ninety-day warranty.

Table A-1 Warranty Lengths

2 Year – New Machines Sold Through an Authorized Dealer
2 Year – Accessories Sold as Machine Options (excluding blades)
1 Year – Machines Sold for Commercial or Industrial Use
1 Year – Blades and Accessories outside of Machine Options
90 Days – Wearable Parts

Aside from being free of defects upon receiving, consumable parts, like cutters and abrasives, are not covered by this warranty unless otherwise stated by Laguna Tools®. These parts are designed to be used at the expense of the operator and are available for replacement or inventory purchase. The determination of a consumable part will be made on a case-by-case basis by Laguna Tools®.

Shipping Damage

Laguna Tools® is not responsible for damage or loss caused by a freight company or other circumstances not in the direct control of Laguna Tools®. All shipping-related claims for loss or damage to goods must be made to Laguna Tools® within twenty-four hours of delivery.

How to Receive Support

To file a warranty-claim please contact the warranty department at 1-800-234-1976. To receive customer service or technical support please contact the customer service or technical support please contact the customer service department at 1-800-332-4094. Parts, under warranty, are shipped at the expense of Laguna Tools® either by common carrier, FedEx ground services or similar method. Technical support to install replacement parts is primarily provided by phone, fax, email, or the Laguna Tools® Customer Service Support Website.



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Laguna Tools, Inc.

744 Refuge Way, Suite 200

Grand Prairie, TX 75050

1-800-234-1976

www.lagunatools.com

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