

MCNC Creator I-23/I-24 Owner's Manual



LAGUNA

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Scope of This Manual

This manual outlines the basic procedures for the Creator I-23 and I-24 CNC Router with a RichAuto B18E Handheld Controller.

For detailed instructions and videos, please go to www.lagunatools.com. Refer to www.laguna.tools.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.

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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

The Creator CNC performs multiple functions, thereby reducing the number of machines needed to complete projects. A properly maintained machine will supply years of service.

Please read this Owner's Manual in entirety prior to assembly or operation. Refer to www.laguna.tools.com for the latest manual revision.

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 Safety Information

The Creator CNC 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.

The Creator CNC 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 Creator I-23/I-24 should not operate the machine until properly trained.

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

1.3.1 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 Creator 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 Creator CNC machine away from sinks, faucets, or other water supplies or storage to prevent splash-out that can damage the spoil boards and control system components.
7. Provide adequate room between the Creator 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 Creator CNC machine.
9. Store cutting tools in a dry location and prevent contact to preserve the cutting edge.

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

1.3.3 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.

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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.

1.3.4 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.

1.3.5 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.

1.3.6 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.
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. Be sure that the adjusting wrenches have been removed and are secured before turning on the power.

2.0 Setup and Assembly

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

2.1 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.

2.2 Packaging Contents

- Two (2) Stand Uprights (Front and Back)
- Two (2) Cross Braces
- One (1) Shelf Plate
- One (1) Router Table Assembly
- One (1) Electrical Control Box
- One (1) RichAuto B18E Handheld Controller
- One (1) Controller Cable
- One (1) Tool Touch-Off Puck
- One (1) Top Stepper Motor Cover
- Four (4) Rubber Bushings
- Four (4) Hex Bolts (M17x45)
- Four (4) Washers (M17)
- One (1) 2mm Allen Key
- Stand Hardware Package

2.3 Hardware

- Two (2) Shoulder Bolts (M8)
- Eight (8) M5x25
- Ten (10) M3x20
- Six (6) M5x10
- Twenty-four (24) M6x12
- Four (4) M10x55
- Two (2) M3x6
- Two (2) M4x8
- Thirty-two (32) M6
- Four (4) M10

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.

2.4 Tools Required for Assembly

- #2 Philips Screwdriver
- 10mm, 13mm, and 17mm Sockets, and Socket Wrench
- 24mm Open-End Wrench
- 2mm and 3mm Allen Key
- Level

2.5 Assembling the Stand

The stand for the Creator CNC should be fully assembled before unboxing the machine. Please verify all parts, accessories, and necessary tools are present prior to beginning assembly. Assembly will be easier and safer with two (2) people.

NOTE

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

1. Connect the two (2) rails to the two (2) frame ends with thirty-two (32) bolts and thirty-two (32) hex nuts. Grommets on the long rail should be facing down.
2. Install the Shelf Plate with eight (8) bolts, eight (8) washers, and eight (8) hex nuts.
3. Turn the frame upside down. Install each of the four (4) casters with four (4) bolts, four (4) washers, and four (4) cut washers.
4. Screw the four (4) leveling feet into to the bottom of the frame. Screw down until just below the casters and tighten with a wrench.
5. Turn the frame right side up.



Figure 2-1: I-23/I-24 Frame

2.6 Installing the Router Table on the Stand

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

To avoid damage, be careful to 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.

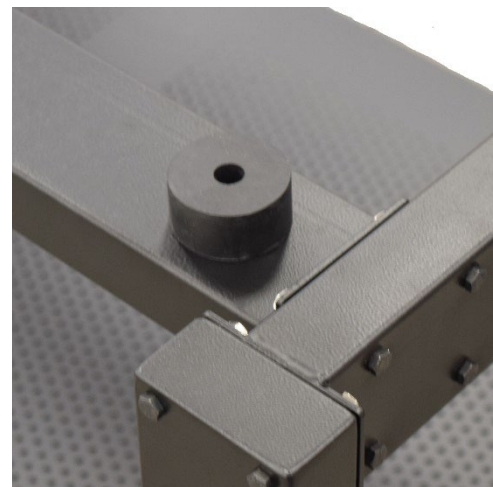


Figure 2-2: Bushing on Stand

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2. Position router over the stand and align holes on router mounting flanges and stand uprights. Being careful to make sure the stand is properly oriented with the machine front.
3. Place one (1) rubber bushing over each of the holes on top of the stand. Lower the machine to sit on the bushings.
 - a. Attach the machine to the stand using one (1) M10 hex bolt, one (1) washer at each corner.
 - b. Insert the bolt/washer through the machine mounting flange and the rubber bushings.
 - c. Thread the bolt loosely into the stand mounting holes. Do not tighten until all bolts have been threaded.
 - d. Remove the forklift and tighten bolts evenly.
4. Place a level on the router table, then level the assembled machine by adjusting the leveling feet. Level the machine in all directions.

2.7 Finishing Machine Assembly

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

1. Raise the gantry and secure with one (1) M3x6 bolt and four (4) M5x25 bolts for each support.
2. Remove the six (6) screws from the top and bottom of the spindle mounting plate.
3. Attach the Z-Axis spindle to the mounting plate. Replace the six (6) mounting plate screws from Step 2. The spindle may be raised or lowered manually to reach the screws. Verify the spindle is flush and tight on the mounting plate.
4. Install the gantry side covers with the ten (10) provided screws.
5. Insert the control box into the front right cavity of the toolbox or for a stand without a toolbox sit the control box on the shelf. Power and communication cables will run through the lower hole in the back of the toolbox.
6. Insert the cable connectors into their corresponding female receptacles and twist the collar to tighten. The receptacles are keyed so the plugs will only insert one way.



Figure 2-3: I-23/I-24 Gantry

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7. Verify the position of the electrical cord through the back of the stand safely, so it will not be run over by the castors and to prevent tripping hazards.
8. Attach the metal end of the controller cable to the front of the control box.
9. Connect the handheld controller securely to the opposite cable end. Be careful not to overtighten the screws.

3.0 Electrical Components

WARNING

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

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

The Creator Model CNC machines are rated for 220V +/- 10% having an operational range of 200-240V. The machines come pre-wired with a NEMA 6-20 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 6-20 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.

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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 should be 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.

3.2 Operations

Before getting started with the machine, become familiar with the handheld controller for operation of the machine, setting up a job, and processing a file.

3.3 Controller

Toolpaths, that are created in the design software are communicated to the CNC router through the handheld controller. In the case of the Creator and Creator Pro series machines, this is done through the RichAuto B18E controller.

Processing toolpaths or jobs is performed either by using a USB flash drive (USB 2.0 or 8GB or smaller) or from internal memory.

4.0 Operations

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

4.1 Controller

Toolpaths that are created in the design software are communicated to the CNC router through the handheld controller. In the case of the Creator series machines, this is done through the RichAuto B18E handheld controller.

Processing toolpaths or jobs is performed either by using a USB flash drive (USB 2.0 of 8GB or smaller) or from internal memory.

Internal memory is recommended for jobs of one (1) hour run time or longer and any files that will be used frequently.

The RichAuto B18E keypad, which is seen here, is either.

Single touch functions where buttons may perform once of many single tasks or if held down, will perform a task continuously (such as machine movement).

Combination functions, where two (2) keys are pressed at the same time.



Figure 4-1: B18E Handheld Controller

4.2 Operating Procedure

Machine operation may be done several ways; either through the controller keypad or through the design files (toolpaths) which can be downloaded to the controller through the USB (U-Disk) or ran from internal memory.

Before performing an operation

1. Verify the machine stand leveling feet (if available) have been lowered to prevent the machine from moving.
2. Ensure that the workpiece is securely held to the table which can be done using any of the following:

- a. Clamps
 - b. Fixtures
 - c. Vacuum hold-downs (optional accessory)
 - d. Double-sided tape
3. Turn on the machine by rotating the green 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.
 4. Once done loading, a HOME operation must be performed before any other function.

4.3 HOME Position

When turning on the machine, once the controller has finished loading, the following message will be displayed:

At this point, the controller can be used to scroll up and down the list using the X+/X- buttons. The top option of "All axis home" should be selected using the ORIGIN/OK button.

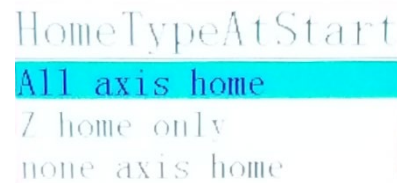


Figure 4-2: HomeTypeAtStart

Home position is determined by a set of magnetic proximity sensors, one of which can be found on each axis. These sensors can be calibrated; however, their position should not change.

During a HOME operation the following will occur:

1. First the Z-Axis will rise to the top of the axis travel.
2. Then the X and Y-Axes will travel, simultaneously, to the front left corner of the machine.
3. When completed, the controller will display the coordinate screen.

The Coordinate screen will display the coordinate state the controller is currently using and the position of the router in relation to the programmed Origin (0,0 point).

It is important that a HOME operation is performed at every start-up to ensure that the limit switches and internal software settings are working properly. All machine movements are software driven and based upon the HOME position.

At any time during a machine operation, the HOME operation can be selected to run from the controller using the HOME button (must be done from the main coordinate screen).

Selecting the HOME button will display the HOME Type menu where several options are available, such as:

1. Home all
2. Home X (X-Axis only)
3. Home Y (Y-Axis only)
4. Home Z (Z-Axis only)

During troubleshooting, each axis may be selected individually to test the position and operation of the Home sensors.

The B18E handheld controller can also control a 4th Axis. The controls for the 4th Axis are indicated by an "A" on the 4 and 8 buttons. If the A-Axis is active on the homing procedure but the 4th Axis (A) is not present, the process will not be completed.

In order to remove the A-Axis path:

1. Select MENU.
2. Select MACHINE SETUP.
3. Select HOME SETUP.
4. Select HOME ORDER.
5. Select Z, X, and Y.
6. Select OK.
7. To return to the Coordinates Screen, press STOP/CANCEL. Continue to press STOP/CANCEL until the Coordinates Screen appears.

4.4 Moving the Router (Spindle) Head

Movement of the router or spindle head can be done manually in one of four (4) ways. Three (3) of which can be toggled between using the MODE button (chosen mode will be displayed on the lower portion of the controller screen).

Continuous and Stop 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 (LSP or FSP). 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, on the far right, third row down. To switch between these two (2) modes, use the High/Low button.

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Low Speed (LSP) – has a grid of 0.1mm for positional movements and a continuous speed that is **set** at 1500mm/min default.

High Speed (FSP) – has a grid of 0.5mm for positional movements and a continuous speed that is set at 2500mm/min default.

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. 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.
 - c. While in continuous mode, the machine will always stop on a grid position.
2. **Step mode** – Tap (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. Low speed (LSP) default is 0.1mm grid.
 - c. High speed (FSP) default is 0.5mm grid.
3. **Distance mode** – Allows the input of a set distance to which the router will move. To use the distance mode:
 - a. Press MODE, 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.
 - c. Tap any of the directional buttons to move the router head the programmed distance in that direction.
4. **GoTo Position** – Allows a unique ability to move to a specified point (in relation to the programmed Origin). Press Mode + Menu simultaneously to bring up the GoTo Pos screen.
 - a. The controller will display the GoTo coordinate screen.
 - b. Use the up and down arrows found on the X+/- buttons to scroll up and down the list.
 - c. With an axis highlighted, use the Delete button to remove the existing coordinate.
 - d. Enter the desired coordinates for the chosen axis and press OK.

- e. When all axes have been set, press OK a final time to approve the movement.

Once the movement has been approved, all three (3) axes will move simultaneously to the specified locations. Be mindful of fixtures and any hold-downs that may become obstructions during movement.

4.5 Setting Work Origin

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.

To set the Origin:

1. Verify the tooling is properly secured within the collet. Use only ER-16 collets of the correct size matching the shaft diameter of the selecting tooling. The machine ships with 1/4" and 1/8" collets (standard sizes for imperial router bits).
2. Move the spindle or router to the desired location using the X and Y directional buttons.
 - a. Remember that the controller can be switched between movements speeds using the FSP and LSP settings. Step mode or grid movements can be used to place the bit more accurately for the Origin placement.
 - b. This location is typically one of the corners of the work material or the exact center point.
3. Press XY-0 to set the Origin for the X and Y axes. This will instantly change the displayed coordinates of the X and Y axes to 0.00.
4. There are several ways to set the Z-0 or Z-Axis Origin, which may change depending on the material or router bit that is being used.
 - a. Using the provided tool touch-off device (plugs into the female connector on the left side of the Z-Axis stepper motor cover).
 - i. Place the device on top of the material, centered under the cutting tool. 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.

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- ii. 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.
 - b. Once the device is in place and centered under the bit, press the Menu and Spindle to start the touch of procedure. If done correctly, the router head will slowly lower until the bit contacts the device and then return to a raised position. The Z-Axis Origin is now programmed.
 - i. With combination commands, it may be easier to hold down Menu, press Spindle and then let go of both together.
 - ii. It may be noted that a delay occurs during touch-off. The bit may make contact, raise just slightly and slowly lower again to calibrate. This is a normal occurrence and may happen randomly.
 - c. 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-0 point manually.
 - i. Place the controller into Step mode and slowly lower the router head while rotating the tooling by hand until resistance is felt as the bit contracts the workpiece.
 - ii. For more precise placement, use a thin piece of paper. Slide the paper back and forth on the material until drag is felt as the tooling presses against the paper and material.
 - iii. Once lowered to the desired location, use the Z-0 button to program the Z-Axis 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.

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.

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.

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.

4.6 Programming Additional Origin

The RichAuto controller allows multiple offsets (Origins) to be programmed. By default, the coordinate screen will show the following:

Where the #1 found before each axis identifies the coordinate state the controller is in. Each coordinate state can have a unique programmed Origin. In the example, the #1 coordinate state is being used.

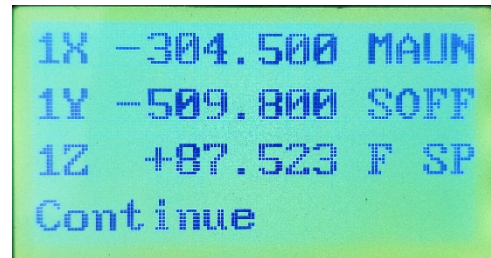


Figure 4-3: Coordinates Screen

To switch between coordinate states, press MENU and (any number 1-9). The coordinate screen will change and show that set of coordinates.

This feature is useful when creating fixtures or when separating the machine surface into quadrants for specific tasks.

All Origins are in reference to the same HOME and can be alternated as needed.

For example:

If using a 48-inch work area, to perform jobs that are less than 24-inch in size. The surface can be set up as two (2) 24-inch areas. Using the same HOME.

In the Menu + 1 area (coordinate state #1), the Origin would be set for the first piece of material.

In the Menu + 1 area (coordinate state #2), the Origin would be set for the second piece of material.

The materials can be loaded onto the machine, preferably using a fixture for ease of referencing. The first job can be performed from the #1 state. Then the controller can be switched to the #2 state and the second piece of material can be machine.

4.7 Setting Spindle RPM

The Creator Pro machine is equipped with a Delta VFD-m inverter for spindle RPM control. This can be found on the front of the white control box.

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

This can be adjusted at any time. Included during a machine operation. Allowing RPM to be dialed dynamically as needed.

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

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



Figure 4-4: Adjust the RPM

4.8 Processing a file

Once the Origin is placed (all axes) and the RPM is set, the file can be selected and machining can begin.

To ease the use of a USB flash drive (U-Disk), once files are saved to the U-Disk always select to Eject the drive to safely remove it from the computer. This will help ensure that the controller will recognize the U-Disk when it is inserted.

To begin (from the coordinate screen):

1. Press the RUN/PAUSE/DELETE button.
2. Select either the U-Disk or internal memory recently used file (must be one current U-disk or a in memory):
 - a. Use the X+/- arrows to scroll up or down the list.
 - b. Highlight the desired selection and press OK to select.
3. The files in that directory will be displayed.
 - a. Display shows three (3) files at a time.
 - b. X+/- will scroll one item at a time.

- c. Y+/- will scroll one page at a time.
 - d. Highlight the desired toolpath (.mmg filetype), press OK to select.
4. The controller will display a set of working parameters for the file.
 - a. **Work Speed** – Similar to feed-rate. This can be ignored as the controller is set up by default to take the feed-rate settings from the software. Settings can be changed to allow feed-rate to be set here.
 - b. **Fast Speed** – Shuttle speed. This is the speed the machine will travel between cutting locations.
 - c. **Speed Scale** – A percentage of the feed-rate (see Speed Scale Adjustment).
 5. Press OK to begin the toolpath operation.
 - a. After a short countdown (4 seconds) during which the spindle will come up to speed, the file will begin.

During file operation, the lower line of the screen will rotate through a list of information. Including: current G-code line (source number), operating time, speed (mm/min), and file name. Use the Mode button to manually scroll this list.

4.9 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.

4.10 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 RUN/PAUSE button during operation.
 - a. The machine movement will immediately stop.
 - b. Spindle remains active.
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 and in Low speed (LSP).
3. After making the adjustments, press RUN/PAUSE to continue the file operation. The display will show a Restore Position? prompt.
 - a. Press OK to resume using the modified settings.
 - b. Press Cancel to resume using the previous settings.

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

4.11 Setting a Breakpoint

Like the Pause button function, a Breakpoint or Stop can also be used. In this case, the Breakpoint operation can be used for extended periods including saving the location and returning to finish a job even days later after restarting the machine.

To create a Breakpoint:

1. Press the STOP/CANCEL button during an operation.
 - a. Pressing a 2nd time will cancel the Save Break function and the position will be lost.
 - b. When the Save Break prompt appears, press OK.
2. The display will show the available locations (1-8).
 - a. Previously stored Breakpoints can be overwritten.
 - b. Use the X+/- buttons to scroll through the list.
 - c. Use the OK button to select the desired location.

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Before resuming from a Breakpoint, a HOME operation needs to have been performed if the machine was just restarted.

3. When ready to resume working from the stored Breakpoint, press RUN/PAUSE + (1-8) together. The saved location number (1-8) should be the number used.
 - a. The controller will display the same Save Break locations seen before.
 - b. Use the X+/- buttons to highlight the desired file and press OK to select.
 - c. The current G-code position for that break will be displayed. The G-code lines can be scrolled through at this point and break resumed anywhere in the list.
 - d. If that G-Code position is acceptable, press OK.
 - e. The display will have moved on to the file parameters that appear before all file operations. Once these are approved the file will begin at the saved location.

4.12 Power Failures

During an accidental power failure, a soft version of a Breakpoint is set where the current parameters and coordinates are automatically saved by the system. This information will become available to resume at the next immediate start of the machine.

The information is not saved permanently, thus if it is not resumed at the next start of the machine, the information will be lost.

When power is returned to the machine, perform a HOME operation. Afterwards the Want to Restore prompt will be displayed.

Press OK to restart the unfinished file operation.

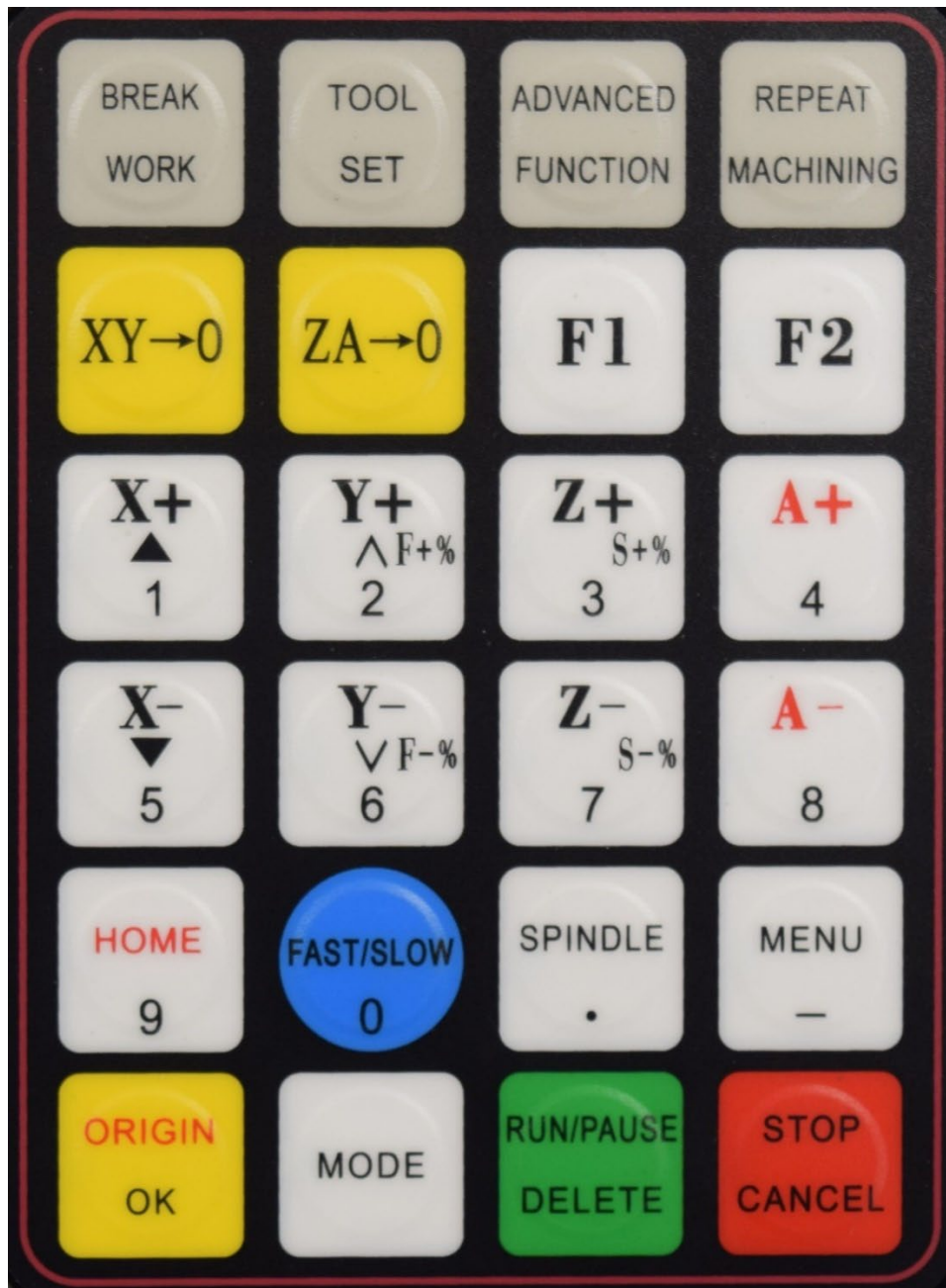


If the operation is canceled, the ability to resume from the saved location will be permanently lost.

5.0 RichAuto B18E Functions

1. The RichAuto motion control system uses 1-button and 2-button combination functions.
2. Only the most used button functions are covered in this section.
3. The RichAuto B18E Handheld Controller (HHC) features the following buttons (from top left):

5.1 B18E Keypad



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Keypad Functions (from upper left to bottom right)

BREAK WORK – Resumes work from saved break point.

TOOL SET – Enables Z-Axis automatic toolset function.

ADVANCED FUNCTION – Advanced Process menu.

REPEAT MACHINING – Repeat last machining process.

XY->0 – Sets X-Axis and Y-Axis Origin.

ZA->0 – Sets the Z-Axis or A-Axis to Origin.

F1 – User-defined function key.

F2 – User defined function key.

X+ (1) – X-Axis positive movement (Right) or Scroll Up (one line) or Number 1 input.

Y+ (2) – Y-Axis positive movement (Backwards) or Increase feed rate (10% increment) or Scroll Up (Whole page or Number 2 output).

Z+ (3) – Z-Axis positive movement (Upwards) or Number 3 input.

A+ (4) – A-Axis positive movement (Clockwise) or Number 4 input.

X- (5) – X-Axis negative movement (Left) or Scroll Down (one line) or Number 5 input.

Y- (6) – Y-Axis negative movement (Forwards) or Decrease feed rate (10% increments) or Scroll Down (Whole page) or Number 6 input.

Z- (7) – Z-Axis negative movement (Downward) or Number 7 input.

A- (8) – A-Axis negative movement (Counterclockwise) or Number 8 input.

HOME (9) – Spindle to Home (Front Left Corner) or Number 9 Input.

FAST/SLOW (0) – Manual movement (FSP or LSP) or Number 0 input.

SPINDLE (.) – Spindle start/stop or Decimal input.

MENU (_) – Menu access or Negative symbol input.

ORIGIN OK – X and Y-Axes move to Origin and Z-Axis raise to minimum safe height or Confirm commands.

MODE – Movement selection (continuous, step, or distance)

RUN/PAUSE/DELETE – Run Tool-path/Pause operation or Delete inputs.

STOP/CANCEL – Stops operation or Cancel commands or Move back one Menu screen.

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Common Combination Keypad Commands

OK + MENU – Update Controller Software

MENU + 0 – Machine Coordinate State (identified by prefix A)

MENU + (1-9) – Workpiece Coordinate States (store up to nine different systems)

MENU + MODE – Enter Coordinates for Go To Position

MENU + SPINDLE – Z-Axis automatic tool setting

RUN + (1-8) – Begin break processing

RUN + FAST/SLOW Begin advanced processing

ON/OFF + Z+ Increase spindle speed while working

ON/OFF + Z- Decrease spindle speed while working

RUN + 9 Repeat last process

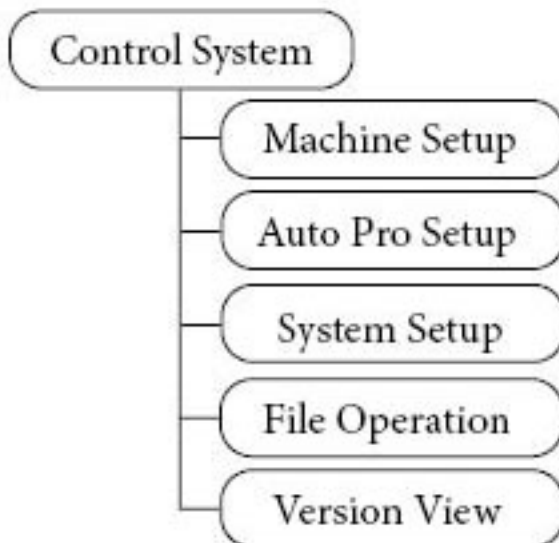
OK + MODE Power on to U-Disk mode

OK + C Help information

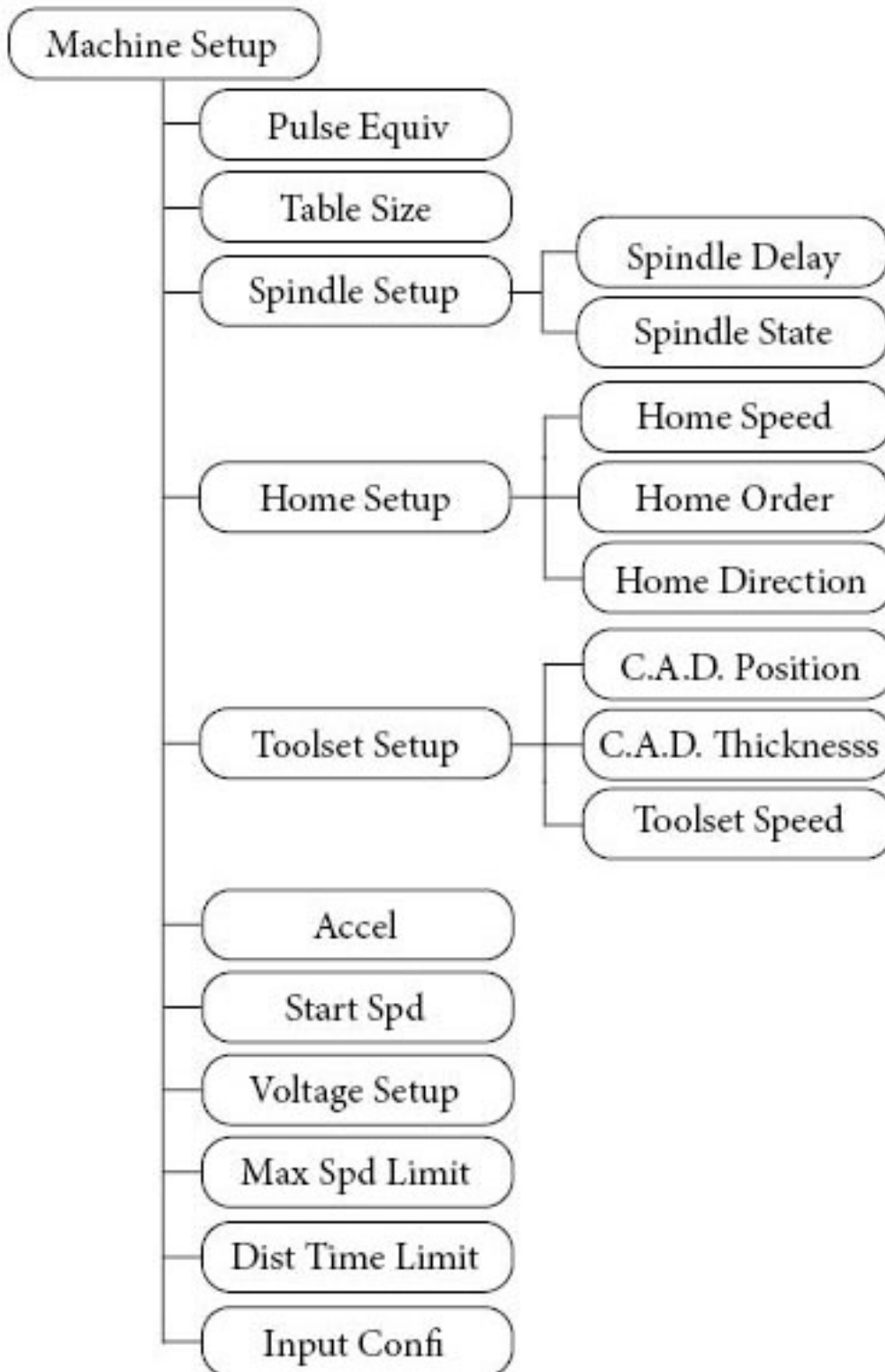
OK + STOP Quick buttons check

5.2 B18E Menu Paths

Press the MENU key on the B18E Handheld Controller to access the Control System Menu.



5.2.1 Machine Setup



NOTE

The parameters in Machine Setup are set by the manufacturer. It is normally not necessary to change the default settings. Please consult a Laguna Tools technician before making any changes.

Pulse Equiv (Pulse Equivalence) - Set the number of pulses sent to the motor for every 1 mm of movement.

Table Size – Establish the machine table size as the soft limit values to prevent overtravel.

Spindle Setup – Set the Spindle Delay and Spindle State.

Spindle Delay – Set the time delay in microseconds between reading the file and starting or stopping the spindle.

Spindle State – Set the signal control parameters of the spindle.

Home Setup – Set Home Speed and Home Order.

Home Speed – Set the spindle speed for each axis. Default X/Y speed: 3000 mm/min, default Z speed: 1800 mm/min.

Home Order – Set the sequence in which the spindle homes.

Home Direction – Set the positive or negative direction for each axis.

Toolset Setup – Set C.A.D. Position, C.A.D. Thickness, and Toolset Speed.

C.A.D. Position – Set the placement of the Z-Axis.

C.A.D. Thickness – Set the thickness of the Touch-Off puck. Default is 25.000 mm.

Toolset Speed – Set the speed of the Z-Axis during toolset operations.

Accel (Acceleration) – Set the acceleration speed. Default acceleration is 800 mm/s².

Start Spd (Start Speed) – Set speed of skip and completion.

Voltage Setup – Set input and output terminal status.

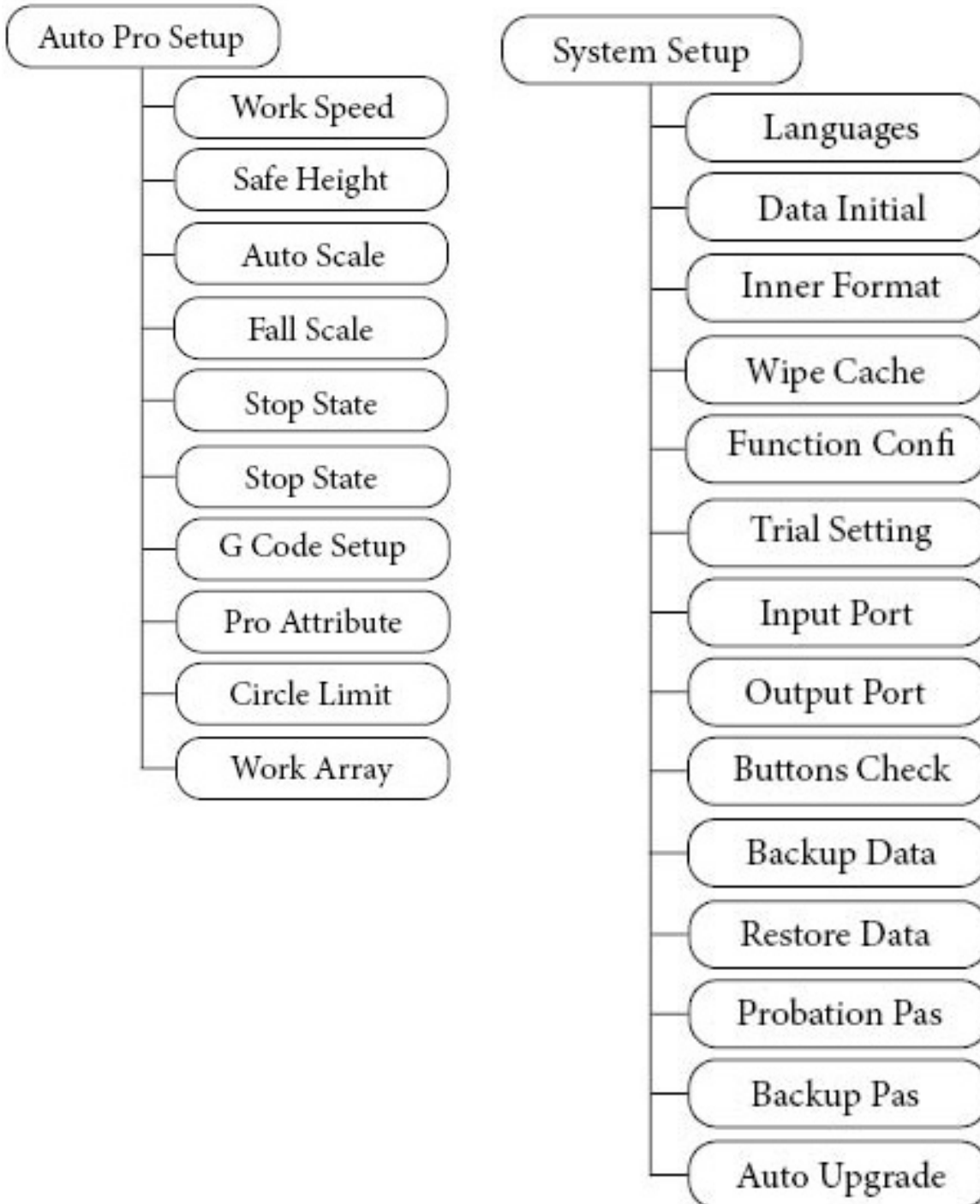
Max Spd Limit (Maximum Speed Limit) – Set the maximum speed of the router head. Default X/Y speed: 60,000,000, default Z+: 1800, default Z-: 3000.

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Dist Time Limit (Distance Time Limit) – Set the time the machine can be idle before returning to continuous mode. The default is 30 seconds.

Input Confi (Input Configuration) – Enable or disable the input port.

5.2.2 Auto Pro Setup



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Work Speed – Set the work speed. Default work speed: 6000 mm/min, default fast speed: 3000 mm/min.

Safe Height – Set the Z-Axis maximum lift height. Default height is 40.000 mm.

Auto Scale – Set the speed scale for toolpath movement. Set in 0.1 (10%) increments. Cannot exceed 1.0 (100%).

Fall Scale – Set the fall scale and fall height. Default fall scale: 0.200 mm, default fall height: 5.000 mm.

Stop State – Sets the stop position for the router head.

G Code Setup – Set the special code read configuration in g-code.

Pro Attribute – Set special settings for specific applications.

Circle Limit – Default: 1000.00.

Work Array – Set up the array parameter.

5.2.3 System Setup

Languages – Default language is English.

Data Initial – Restores factory system parameters.

Inner Format – Wipes the internal files but does not affect system parameters.

Wipe Cache – Cleans system errors and fragmented files.

Function Confi (Function Configuration) – Set the state of system functions. The HHC will require a reboot.

Trial Setting – Set trial passwords and password expiration time.

Input Port – List of current input port configuration.

Output Port – List of current output port configuration.

Buttons Check – Test the function of the keypad buttons.

Backup Data – Backup menu parameters.

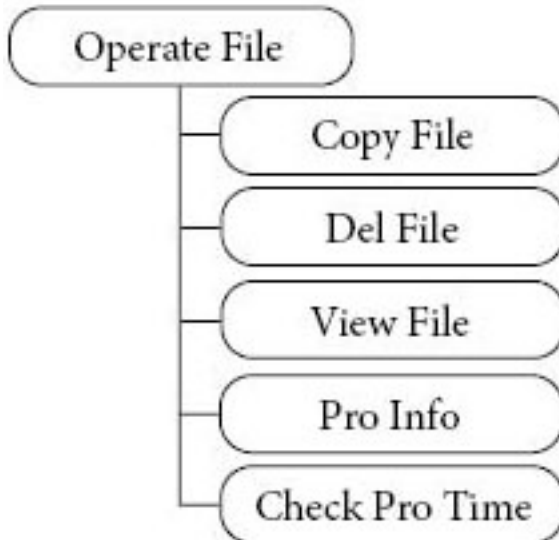
Restore Data – Restores the backup data.

Probation Pas (Probation Password) – The 20-digit password available controller manufacturer.

Backup Pas (Backup Password) – Prevents overwriting of original parameters.

Auto Upgrade – Updates the system online; does not affect system parameters.

5.2.4 Operate File



Copy File – Copy files from the U-Disk to internal memory.

Del File (Delete File) – Delete files from internal memory.

View File – View files from the U-Disk or internal memory.

Pro Info (Processing Information) – Displays the number of successfully processed files. Data clears when the HHC is powered off.

5.2.5 Version View

Displays the current controller software information preset by manufacturer.

6.0 Advanced Processing

Functions found under the Advanced Processing category serve to perform a specialized task. The Advanced Processing menu can be accessed using the key combination of RUN + HIGH/LOW.

6.1 Array

Allows multiple copies of a file to be processed along a set number of rows and columns.

Before running an Array, the parameters need to be set. Such parameters will include the row/column counts and the spacing between the rows/columns.

To set the Array parameters:

1. From the coordinate screen, press MENU.
2. Select Auto Pro Setup and scroll down to find the Work Array option.
3. The Work Array menu will be displayed and has several options (press DELETE to change these settings).
 - a. Row and Column Counts
 - b. Row and Column Spacing
 - c. Interval
4. After the parameters are setup, RUN/PAUSE/DELETE + (1-8) can be used to access the Advanced Process menu.
 - a. Select Array Work.
 - b. Then select the file to be used with the programmed settings.
 - c. The normal file parameters will be displayed, and operation will begin once approved.

6.2 Resume Work

Operates much the same as using RUN/PAUSE/DELETE + (1-8) to display the Save Break locations (for more information see Setting a Breakpoint).

6.3 Mirror Work

Allows a job to be mirrored on either the X or Y-Axis (it is recommended using an Origin point in the center of the material).

6.4 Tool Changing

While the controller does not allow automatic tool-changing as an option, there are other helpful selections available.

This option, when selected will bring the router head to the HOME position for tool-changing. The controller will display a prompt to press the OK button when finished.

This will return the router head to the previous location.

CAUTION

There will not be a prompt for a Z-Axis Tool Touch-Off. To avoid damage to the machine or job material, the Z-0 point must be set before continuing.

6.5 Stop State (Back Position)

In addition to the above option (Advanced Processing Tool-Changing), there is another option which can be more effective specifically when using fixtures.

The Stop State shares some similarities with the Origin point since it will allow a defined location that can be programmed anywhere within the machine limitations.

This point must be activated in the controller software before being programmed. Once complete, the machine will go to the programmed at the end of each process (location can be changed as needed).

To program a Stop State:

1. From the coordinate screen, press MENU.
2. Select Auto Pro Setup, then scroll down to find the Stop State.
3. The Work Stop State menu will be displayed which has several options.

- a. **FinAct (Finish Action)** – press DELETE to change the settings.
 - i. **Pickup Z** – Will leave the X and Y-Axis wherever they are at the end of the file operation, raising the Z-Axis to the set safe height (default).
 - ii. **Back to Work Origin** – Will move the X and Y axes back to the ORIGIN, while raising Z-Axis to the safe height.
 - iii. **Back Home** – Will move all axes back to the HOME position.
 - iv. **Back Position** – Will move all axes to a programmed location after the file operation is complete.
- b. Programming the Back Position can be done similarly to the Origin point. Move all axes to the desired location and height. Press MENU + Z-0 to set the location.

It is strongly recommended that the Z-Axis is raised to the highest elevation to help prevent damage as the machine travels.
- c. A specific set of coordinates can also be programmed by entering the desired location for each axis manually.

6.6 Part Work

Using this processing option allows a specific line in the G-Code from a file operation to be selected as the start and stop locations.

To setup a Part Work operation:

1. Select Part Work, then select the file. A message will be displayed prompting the input of the Start source.
 - a. Press OK.
 - b. Scroll through the list of G-Code lines to select the desired line (X+/- to move one line at a time; Y+/- to jump between the top/bottom of the list).
 - c. Press OK.
2. A message will be displayed prompting the input of the Stop source.
 - a. Press OK.
 - b. Scroll through the list of G-Code lines to select the desired line (X+/- to move one line at a time; Y+/- to jump between the top/bottom of the list).
 - c. Press OK.

3. The normal file parameters will be displayed and operation will begin once approved.

6.7 Calculate Boundaries

This application will calculate the boundaries of the file. Allowing a user to verify that an operation will fit within the machine limitations.

Will show the operation boundaries for each axis in metric units.

6.8 Auto Center

Allows a pair of individual locations to be selected along the X or Y-Axis, from which the exact center point can be located.

To use the Auto Center functions:

Allows a pair of individual locations to be selected along the X or Y-Axis from which the exact center point can be located.

To use the Auto Center function:

1. Select Auto Center. Then choose to find the center along either the X-Axis or the Y-Axis.
2. The display will return to the coordinate screen.
 - a. A First of X/Y prompt will be displayed at the bottom of the screen.
 - i. Move the X-Axis to the 1st location.
 - ii. Press OK.
 - b. A Second X/Y prompt will be displayed at the bottom of the screen.
 - i. Move the X-Axis to the 2nd location.
 - ii. Press OK.
 - c. The X-Axis will automatically adjust to the exact of the two (2) locations.

6.9 Mill Plane (Surfacing Operation)

Performs a near automatic surfacing program where the user enters the X and Y limits. This does not require a toolpath or the entry of G-Code.

There are two (2) types of milling options; Scan and Encircle.

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Regardless of the type chosen, this program does not use an origin. It accepts the current position of the bit to be the starting point (0,0) with all movements based on that location. A “soft limits error” may occur if the limits entered cannot be supported from the current location.

It is suggested that a test run be performed with the Z-Axis elevated above the material.

To use the Mill Plane function:

1. Select Mill Plane. Then choose either Scan or Encircle.
 - a. Scan performs a surfacing program that follows a parallel to either the X or the Y axes.
 - i. Choose either the X-Axis or the Y-Axis.
 - ii. Enter the X and Y-Axis dimensions.
 - b. Encircle performs a surfacing program that moves in a circular pattern around the X and Y axes, slowly working its way inward.
 - i. Choose either AC or C for movement.

AC = counterclockwise

C = clockwise
 - ii. Enter the X and Y-Axis dimensions.
2. Operation should begin immediately. Verify that the Z-Axis and RPM are properly set before using this operation.

6.10 Calculate Work Time

This will operate much the same as Time Estimation tooling found within the chosen CAD/CAM Design Software. However, this function will allow you to calculate the operating time of a specific file based upon the file parameters in the toolpath and the machine controller settings (will not factor in Speed Scale adjustments).

Find Break No:

Like both Resume Work (which is also found in the Advanced Process menu) and using RUN/PAUSE + (1-8) to display the Save Break locations.

While similar to the above, this function serves two (2) purposes. It will either find the line number of a breakpoint for a specific file or gives the option to resume working from that point.

(Unlike the Save Break menu, this will not allow for the selection of a different line to resume work from).

To use the Find Break No. option, select Find Break No:

1. Select the file (either from U-Disk or internal memory).
2. Prompt will give the following instructions (use X+/- buttons to scroll).
 - a. Press OK to resume from existing break.
 - b. Press any other key to display the break line number only.
3. Approve speeds to begin machining if applicable.

6.11 Scale Work

This feature will allow for the increase or decrease in scale existing toolpaths. Origin and all other settings will remain the same.

Be sure that there is enough room within the machine limits to support the increase in scale.

To use the Scale Work option, select Scale Work:

1. Select the desired file (either from U-Disk or Internal Memory).
2. Set scale for X, Y, and Z-Axes.
3. Approve speeds to begin operation.

6.12 Step Work

This function will allow the toolpath to be operated one step (one line of G-Code) at a time.

To enter Step Mode, select Stop Mode:

1. Select the desired file (either from U-Disk or Internal Memory).
2. Prompt will give the following instructions (use X+/- buttons to scroll).
 - a. Press RUN to continue working (normal operation).
 - b. Press OK to perform steps. Each press of OK will perform one step.

7.0 Data Restoration and Updates

Factory set parameters and settings within the controller may be modified. It is generally recommended that any changes be made with caution unless advised by Laguna Tools.

These changes are easily made and may not always be intentional.

However, restoration of the factory settings is easily accomplished. Many machines have been equipped with restore files within the internal memory of the controller.

Restore files for each machine are available. If needed, Laguna Tools can email these files for emergency repair.

7.1.1 Restore/Backup Data

Backup files can be created on the machine. It would be advisable to create these and store them via internal memory for use later should the parameters need restored.

To do this, press MENU:

1. Scroll down and select System Setup.
2. Scroll down and select Backup Data. Choose where to save the file (Flash Disk or Internal Memory).
3. The Data.bak file is now created with all the current settings for use later.

If the controller needs to be restored and the necessary file is not available, contact Laguna Tools for support.

4. To use the restore files, save the file (Data.bak) to a USB flash drive:
 - a. Insert the flash drive into the controller.
 - b. Press MENU and scroll down and select System Setup.
 - c. Scroll down and select Restore Data.
 - d. Choose the location where the file can be found (either the Internal Memory or the Flash Disk).

A prompt will be displayed indicating that the parameters have been restored to the factory settings.

7.1.2 System 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.

Much like the Backup/Restore files, the current version of the firmware Update may be used to correct certain controller software settings.

To install a System Update (Emergency State Option) for use when the Menu cannot be accessed:

Save the supplied file to a USB flash drive.

1. With the machine powered OFF, insert the drive into the controller.
2. Enter the Emergency State mode by holding down the OK button as the machine is turned ON. Release the OK button once the loading screen appears.
3. Select Update System.
4. Select the location of the file (U-Disk or internal memory).
5. Select the file.

The update will begin automatically. Once complete the controller will display a prompt indicating that the update has been successful. The controller will need to be restarted to complete.

After restarting the machine, normal operation may be resumed.

7.1.3 Normal Menu Option

Save the supplied file to a USB flash drive.

1. With the machine powered ON insert the drive into the controller.
2. From the main coordinates screen, press the MENU button.
3. Scroll down and select System Setup.
 - a. Select Update System.
 - b. Select the location of the file (U-Disk or internal memory).
 - c. Select the file.

Again, the update will begin automatically. Once complete the controller will display a prompt indicating that the update has been successful, the controller will need to be restarted to complete.

After restarting the machine, normal operation may be resumed.

8.0 Maintenance

To ensure proper machine operation, it is recommended that the prismatic guides and rolled ballscrews on all axes are kept clean regularly wiped down with a light machine oil lubricant (such as 3-IN-ONE oil).

8.1 Routine Checks (performed daily with machine use)

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

9.0 Troubleshooting


9.1 Mechanical and Electrical Problems

Symptom	Possible Cause	Correction
Motor will not start, fuses blown or breakers trip.	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 box. 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	Correction
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.

9.2 Controller Functions Problems

Symptom	Possible Cause	Correction
 WARNING		
<p><i>Some connections may require a qualified electrician.</i></p>		
Controller display is blank or flickering.	Cable connections not tight.	Inspect and tighten connections between pendant and control box.
	Loose 24V connection to control board.	Check the 24V connection to the DSP board in the control box.
	Interface damaged.	Replace damaged part.
	Controller damaged.	Replace controller.

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Symptom	Possible Cause	Correction
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.
	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.

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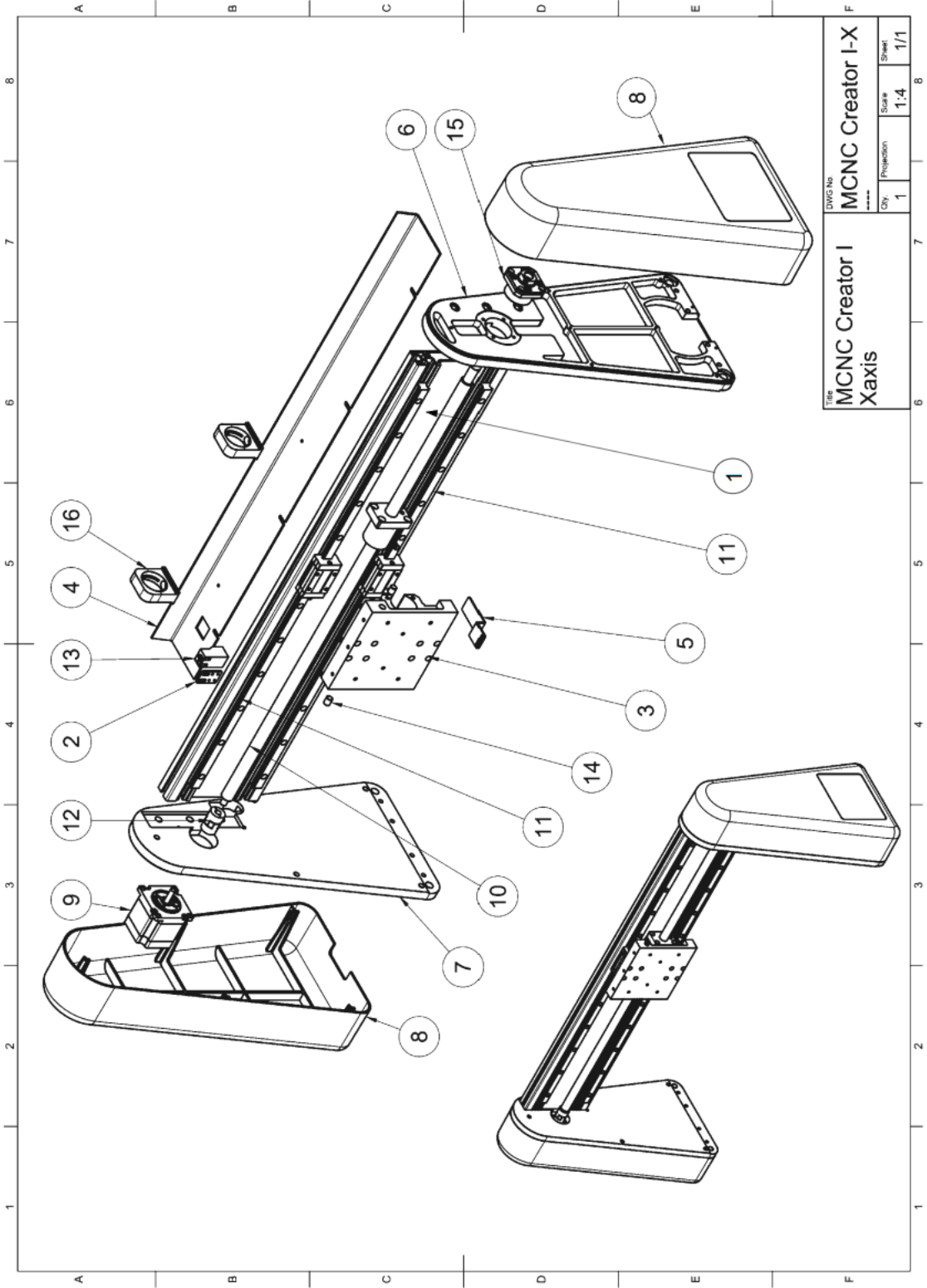
Symptom	Possible Cause	Correction
Z-Axis depth not consistent each time same file is processed and after machine homes.	Working speed exceeds Z-Axis maximum speed.	Set to safe speed in: MENU/Machine Setup/Max Speed Limit.
	Loose coupling or transmission slipping.	Tighten connecting parts.
	Incorrect 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
	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.

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Symptom	Possible Cause	Correction
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.
	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.

10.0 Parts List

10.1 X-Axis Exploded View

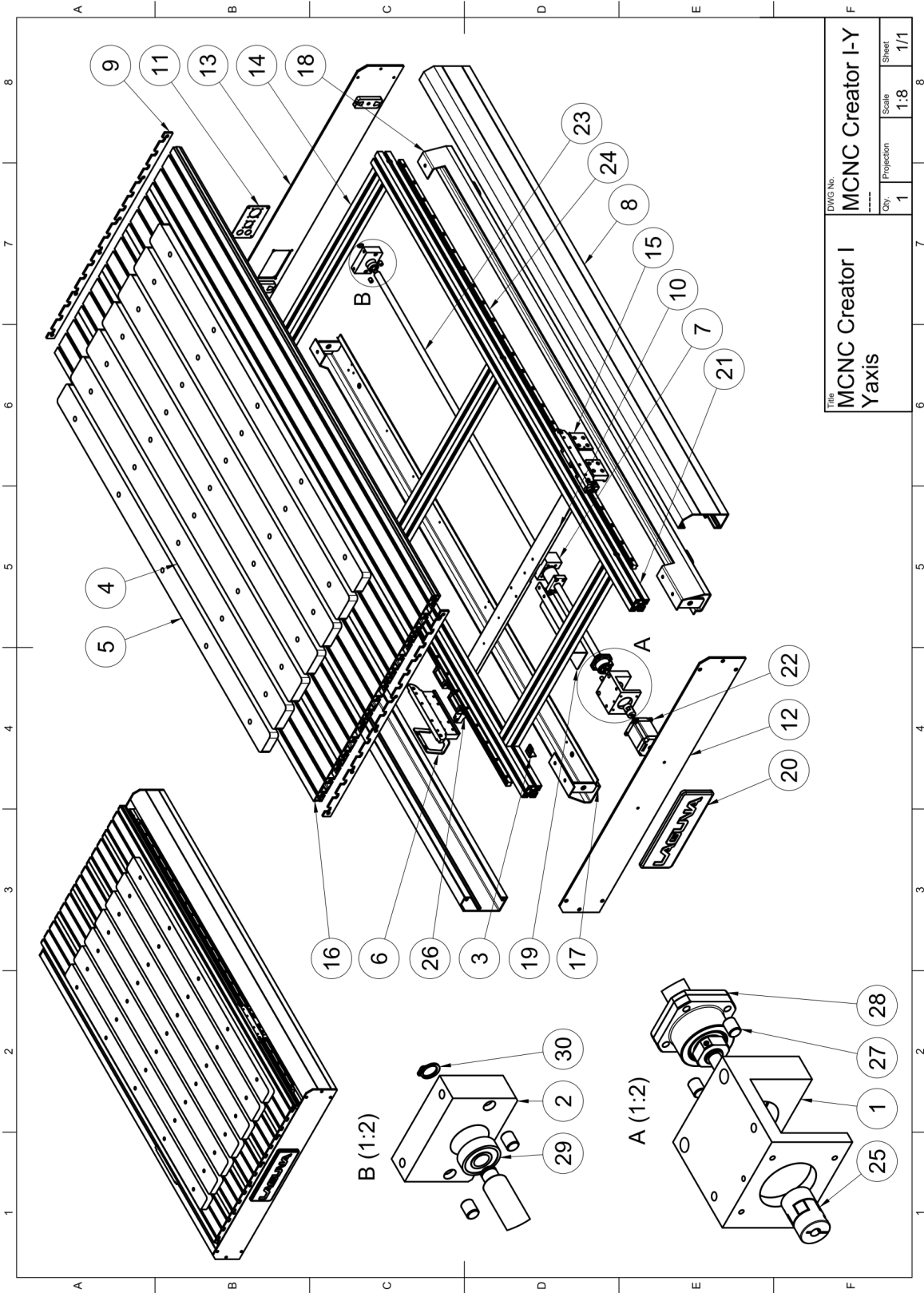


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10.1.1 X-Axis Parts List (1 of 2)

X-AXIS				
NO.	PART NO.	DESCRIPTION	QTY	SPECIFICATION
1	AX0100046A	X-AXIS ALUMINIUM EXTRUSION	1	
2	AX0100222A	SENSOR RESPONSE PLATE_A	1	
3	I20101204A	X-AXIS SLIDE BOARD	1	
4	I20101221A	DRAG CHAIN SEAT	1	
5	I20101232A	SENSOR RESPONSE	1	
6	I20101332A	RIGHT GANTRY	1	
7	I20101322A	LEFT GANTRY	1	
8	I20102920A	LEFT & RIGHT SIDE COVER	2	
9	57CM12C-3A-CZ	STEPPER MOTOR	1	
10	AX0100072A	BALL SCREW	1	795mm
11	LSD15HN1X700S20AN-M4	LINEAR SLIDE	2	700mm
12	SQR20C(6.35,8)	COUPLING	1	
13	EHRP13HC11	PROXIMITY SENSOR	1	
14	CXHK8-10	CUSHION PAD	2	
15	FK12 C7	BALLSCREW SUPPORT UNIT	1	

10.2 Y-Axis Exploded View



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10.2.1 Y-Axis Parts List (1 of 2)

Y-AXIS				
	PART NO.	DESCRIPTION	QTY	SPECIFICATION
1	AX0100126A	MOTOR BASE	1	
2	AX0100173A	Y-AXIS BEARING SEAT	1	
3	AX0100260A	SENSOR RESPONSE PLATE_B	1	
4	AX0100582A	MDF BOARD (MIDDLE)	5	24X48(I-24)
	AX0100573A	MDF BOARD (MIDDLE)	5	24X36(I-23)
	AX0100564A	MDF BOARD (MIDDLE)	5	24X24(I-22)
5	AX0100590A	MDF BOARD (EDGE)	2	24X48(I-24)
	AX0100551A	MDF BOARD (EDGE)	2	24X36(I-23)
	AX0100542A	MDF BOARD (EDGE)	2	24X24(I-22)
6	AX0103471A	CRIMPING FIXED PLATE	1	
7	I20100160A	Y-AXIS BALL SCREW SEAT	1	
8	I20100420B	Y-AXIS LEFT&RIGHT COVER	2	1569mm(I-24)
	I20100380B	Y-AXIS LEFT&RIGHT COVER	2	1269mm(I-23)
	I20100181B	Y-AXIS LEFT&RIGHT COVER	2	949mm(I-22)
9	I20101092A	Y-AXIS LEFT&RIGHT COVER	3	
10	I20101153A	Y-AXIS SLIDE BOARD	1	
11	I20101214A	BASE REAR PLATE	1	

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12	I20101262B	Y-AXIS FRONT COVER	1	
13	I20101283B	Y-AXIS REAR COVER	1	
14	I20101301A	ALUMINIUM EXTRUSION BEAM	3	612mm
15	i20101351A	SLIDE BOARD FIXED SEAT	2	
16	I20101410A	Y-AXIS ALUMINIUM EXTRUSION	5	1570mm(I-24)
	I20101370A	Y-AXIS ALUMINIUM EXTRUSION	5	1270mm(I-23)
	I20100141A	Y-AXIS ALUMINIUM EXTRUSION	5	950mm(I-22)
17	I20101431B	RIGHT SIDE BASE	1	1569mm(I-24)
	I20101391B	RIGHT SIDE BASE	1	1269mm(I-23)
	I20101293A	RIGHT SIDE BASE	1	949mm(I-22)

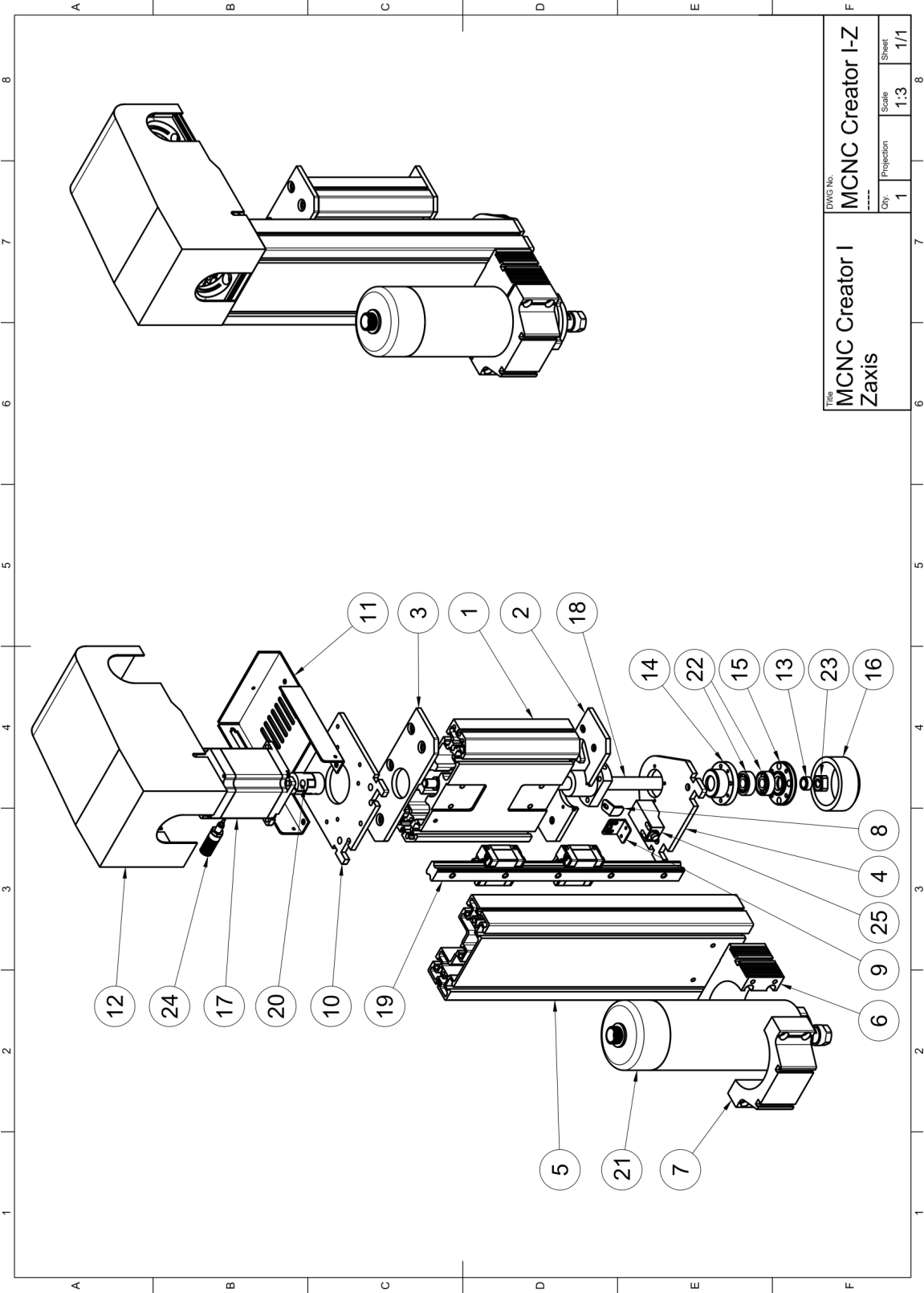
10.2.2 Y-Axis Parts List (2 of 2)

18	I20101431A	LEFT SIDE BASE	1	1569mm(I-24)
	I20101391A	LEFT SIDE BASE	1	1269mm(I-23)
	I20101273A	LEFT SIDE BASE	1	949mm(I-22)
19	i20101492A	Y-AXIS HOLDER PLATE	1	
20	I20102830B	LOGO PLATE	1	
21	I20102930C	4042 ALUMINIUM EXTRUSION	2	1569mm(I-24)
	I20102930B	4041 ALUMINIUM EXTRUSION	2	1269mm(I-23)
	I20102930A	4040 ALUMINIUM EXTRUSION	2	949mm(I-22)
22	57CM12C-4A-CZ	STEPPER MOTOR	1	

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23	AX0100393A	BALL SCREW	1	24X48(I-24)
	AX0100372A	BALL SCREW	1	24X36(I-23)
	AX0100202A	BALL SCREW	1	24X24(I-22)
24	LSD15HN2X1420S20AN-M4	LINEAR GUIDE	2	24X48(I-24)
	LSD15HN2X1120S20AN-M4	LINEAR GUIDE	2	24X36(I-23)
	LSD15HN2X820S20AN-M4	LINEAR GUIDE	2	24X24(I-22)
25	SQR20C(6.35.8)	COUPLING	1	
26	EHRP13HC11	PROXIMITY SENSOR	1	
27	CXHK8-10	CUSHION PAD	4	
28	FK12 C7	BALLSCREW SUPPORT UNIT	1	
29	6000ZZ	BEARING	1	
30	STWN10	C RING	1	

10.3 Z-Axis Exploded View



Title		DWG. No.	
MCNC Creator I Z-axis		MCNC Creator I-Z	
Qty.	Projection	Scale	Sheet
1	1	1:3	1/1

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10.3.1 Z-Axis Parts List (1 of 2)

Z-AXIS				
NO.	PART NO.	DESCRIPTION	QTY	SPECIFICATION
1	i20101022A	Z-AXIS SLIDE BOARD	1	
2	i20101052A	SLIDE BOARD LOW PLATE	1	
3	i20101062A	SLIDE BOARD TOP PLATE	1	
4	i20102190A	Z-AXIS BOTTOM COVER	1	
5	i20102201A	Z-AXIS ALUMINIUM EXTRUSION	1	
6	i20102340A	FRONT MOTOR HOLDER	1	
7	i20102350A	REAR MOTOR HOLDER	1	
8	i20102440A	SENSOR RESPONSE PLATE_D	1	
9	i20102451A	SENSOR FIXED PLATE	1	
10	I20102461A	Z-AXIS MOTOR BASE	1	
11	i20102470A	MOTOR BASE	1	
12	i20102500A	Z-AXIS TOP COVER	1	
13	AX0300070A	SPACER	1	
14	AX0300080A	BEARING SEAT	1	
15	AX0300091A	BEARING COVER	1	
16	AX0300161A	BEARING COVER	1	
17	57CM22C-4A-CZ	STEPPER MOTOR	1	
18	i20101040A	BALL SCREW	1	304mm
19	LSD15HS2X280S20AN-M4	LINEAR GUIDE	1	280mm
20	SQR20C(6.35,8)	COUPLING	1	
21	i20101780A	SPINDLE	1	

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22	708A	BEARING	2	
23	BNR8	LOCK NUT	1	
24	N1535	MILLING CUTTER GAUGE SOCKET	1	
25	EHRP13HC11	PROXIMITY SENSOR	1	

11.0 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. Warranty may be voided upon the addition of such described tools and/or modifications, determined on a case-by-case basis.

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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. 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 machinery settings and procedures and to properly maintain the equipment in accordance with the standards provided in this manual.

Length of Warranty

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

1 Year – Machines Sold for Commercial or Industrial Use
1 Year – Blades and Accessories outside or 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 1-800-332-4049. 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

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744 Refuge Way

Grand Prairie, TX 75050

800-234-1976

www.lagunatools.com

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