

HD-II TABLETOP

Tabletop CNC Router Manual



This document will provide a quick guide to the set up and operation of the Techno HD II Tabletop CNC Router equipped with the NCstudio controller.

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Safety Instructions

READ THESE INSTRUCTIONS THOROUGHLY BEFORE OPERATING MACHINE. DO NOT OPERATE MACHINE IF YOU ARE UNFAMILIAR WITH THESE SAFE OPERATING INSTRUCTIONS. DO NOT OPERATE MACHINE WITHOUT KNOWING WHERE THE EMERGENCY STOP SWITCH IS LOCATED.

WARNING: IMPROPER OR UNSAFE OPERATION OF THE MACHINE WILL RESULT IN PERSONAL INJURY AND/OR DAMAGE TO THE EQUIPMENT.

1. Keep fingers, hands, and all other objects away from machine while power is on.
2. Disconnect power to all system components when not in use, when changing accessories, and before servicing.
3. Do not loosen, remove, or adjust machine parts or cables while power is on.
4. Exercise care with machine controls and around keyboard to avoid unintentional starting.
5. Make sure voltage supplied is appropriate to specifications of components.
6. Machines must be plugged into three-pronged grounded outlets. Do not remove the grounding plug or connect into an ungrounded extension cord.
7. Keep cables and cords away from heat, oil, and sharp edges. Do not overstretch or run them under other objects or over work surfaces.
8. Use proper fixtures and clamps to secure work. Never use hands to secure work.
9. Do not attempt to exceed limits of machine.
10. Do not attempt to use machine for purposes other than what is intended.
11. Use machine only in clean, well-lit areas free from flammable liquids and excessive moisture.
12. Stay alert at all times when operating the machine.
13. Always wear safety goggles.
14. Do not wear loose-fitting clothing when operating machine. Long hair should be protected.
15. Always maintain proper balance and footing when working around the machine.
16. Maintain equipment with care. Keep cutting tools clean and sharp. Lubricate and change accessories when necessary. Cables and cords should be inspected regularly. Keep controls clean and dry.
17. Before using, check for damaged parts. An authorized service center should perform all repairs. Only identical or authorized replacement parts should be used.
18. Remove any adjusting keys and wrenches before turning machine on.
19. Do not operate the machine unattended.
20. Follow all safety instructions and processing instructions in the MSDS for the material being processed.
21. Use proper precautions with dust collection systems to prevent sparks and fire hazards.
22. Make sure to have proper fire extinguishing equipment on hand at all times.

PREVENT FIRE HAZARDS by using the proper feeds, speeds, and tooling while operating your Techno machine. For example, setting feeds and speeds too low and/or using dull tool bits creates friction at the material. The friction generates heat which can result in a fire that can be drawn through the vacuum table or dust collector without warning. Fire hazard from friction heating caused by dull tools is possible when cutting certain materials, especially composite material such as wood composites, MDF and Particleboard.

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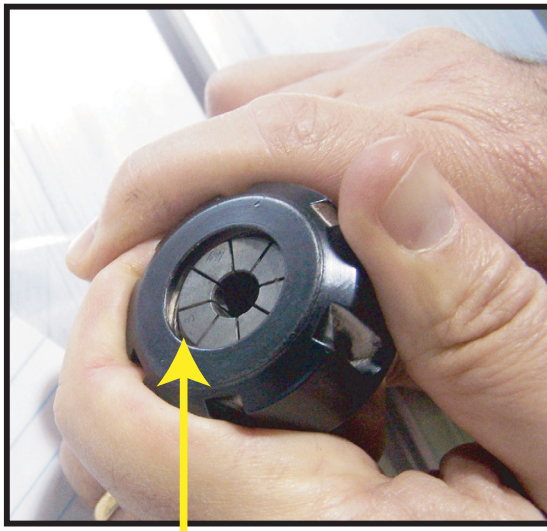


WARNING!
THE SPINDLE WILL BE DAMAGED
IF UNBALANCED EQUIPMENT IS USED.

AIR SUPPLY MUST BE FILTERED AND DRY.

COLLETING GUIDELINES

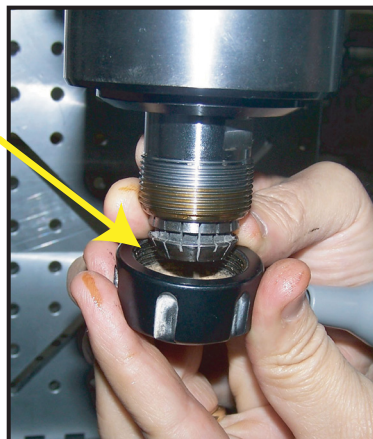
WRONG!



This picture shows an improper assembly. Notice the gap and angle of the collet in relation to the nut. The collet is not flush to the end of the collet nut. Correct this assembly before using.

**DO NOT
PUSH THE
COLLET
INTO THE
SPINDLE AT
ANY TIME!**

Only the proper assembly should be screwed onto the spindle.



RIGHT!



The picture above is how your collet nut assembly should look: the end of the collet is flush with the bottom surface of the collet nut. You will hear and feel a "SNAP" as the collet properly goes into the collet nut. Once it is assembled, then "SCREW" the nut onto the threaded spindle end.

**FOR TOOLCHANGE
AND FIXED COLLET
SPINDLES:**

**ONLY USE TOOLHOLDERS,
COLLET NUTS AND TOOLS
THAT ARE BALANCED TO
MEET OR EXCEED THE MAX
RATED SPEED OF
THE SPINDLE.**



I. Techno HD II Tabletop Quick Set up



Fig. 1.1

1.1 - The electronics are housed in the controller cabinet located at the back of the machine displayed in Figure 1.1. The controller box may have to be moved or handled during the unpacking of the machine. For shipping purposes, the controller box may have been moved forward.



Fig. 1.2

1.2 - Have a licensed electrician connect power to the controller. The machine requires 220V single phase 15amp power in order to operate. Plug the power cable into the rear of the machine as shown in figure 1.2. The 10ft power cable supplied must be hardwired to the power source.

Connecting the Power

The cable provided will be one of two types: brown, blue, and green/yellow wire or a cable with a black, white, and green wire. (Fig 1.3)
Power is connected as follows:
Green or Green/Yellow conductor is always ground .
The two other conductors will be the hot leads.

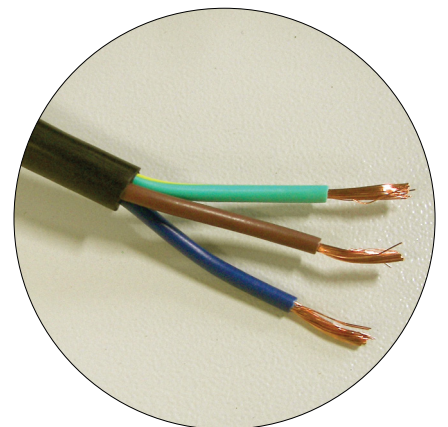
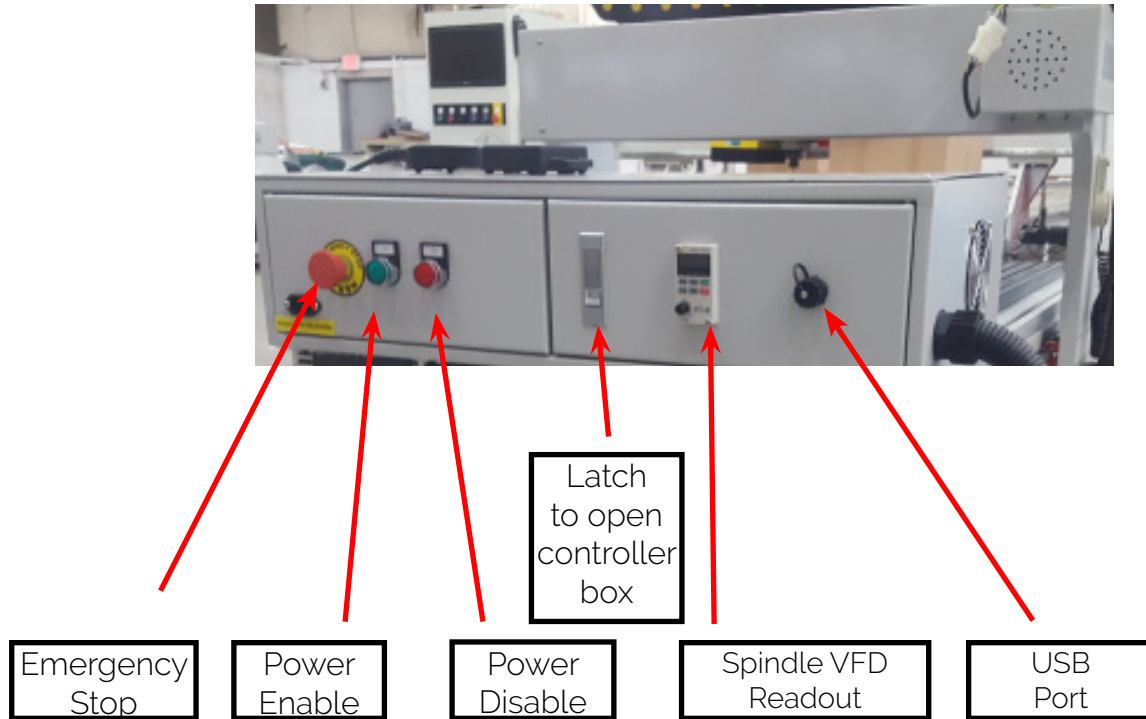


Fig. 1.3

Control Panel Functions



1.6 Enabling The Machine.

First make sure the Emergency Stop is not pressed by giving it a ¼ turn clockwise. Then, activate the machine by pressing the green POWER button. Power is now applied to the machine. The green light will illuminate.

**IF EQUIPPED WITH SAFETY ENCLOSURE,
CHECK E-STOP ON THE FRONT OF THE
MACHINE NEAR THE DOOR!**

II. HDII Tabletop Startup

When the machine first powers on, the display on the controller will light up and say "Starting System". (Fig. 2.1a)



Fig. 2.1a

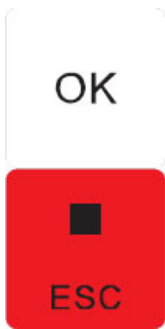
Once the system has booted it will ask the user "Back to reference point?" Fig 2.2b



Fig. 2.2b

This is also known as 'homing' the machine. It refers to the process of the machine finding its mechanical home position.

From this point, the user has two options; Home the machine or cancel the homing process. We recommend that you home the machine every time you start up.



Pressing "OK" will initiate the homing process. The machine will first move the Z-axis to the top of travel and then the X and Y axis will move simultaneously until both are at the home / reference position at the front left corner of the machine bed.

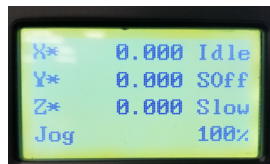
Press "ESC" will skip the homing process.

WARNING: There will be no reference position and break points, offsets and all functions that rely on a reference position will be invalid.

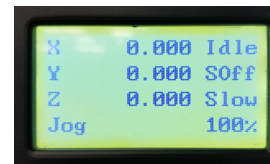
NOTE: The homing procedure can be aborted at anytime by pressing ESC.

Once the machine has moved to its homing position on each axis, it will stop and enter an IDLE state and will be ready to use.

Main Screens:



This picture shows that the machine **has** been homed due to the X* Y* Z* symbols



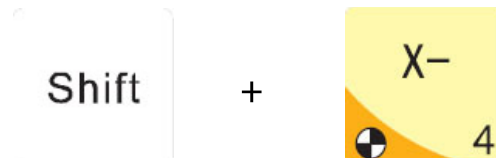
This picture shows that the machine **has not** been homed due to the X Y Z symbols (there are no *'s next to the symbols)

ADVANCED HOMING:

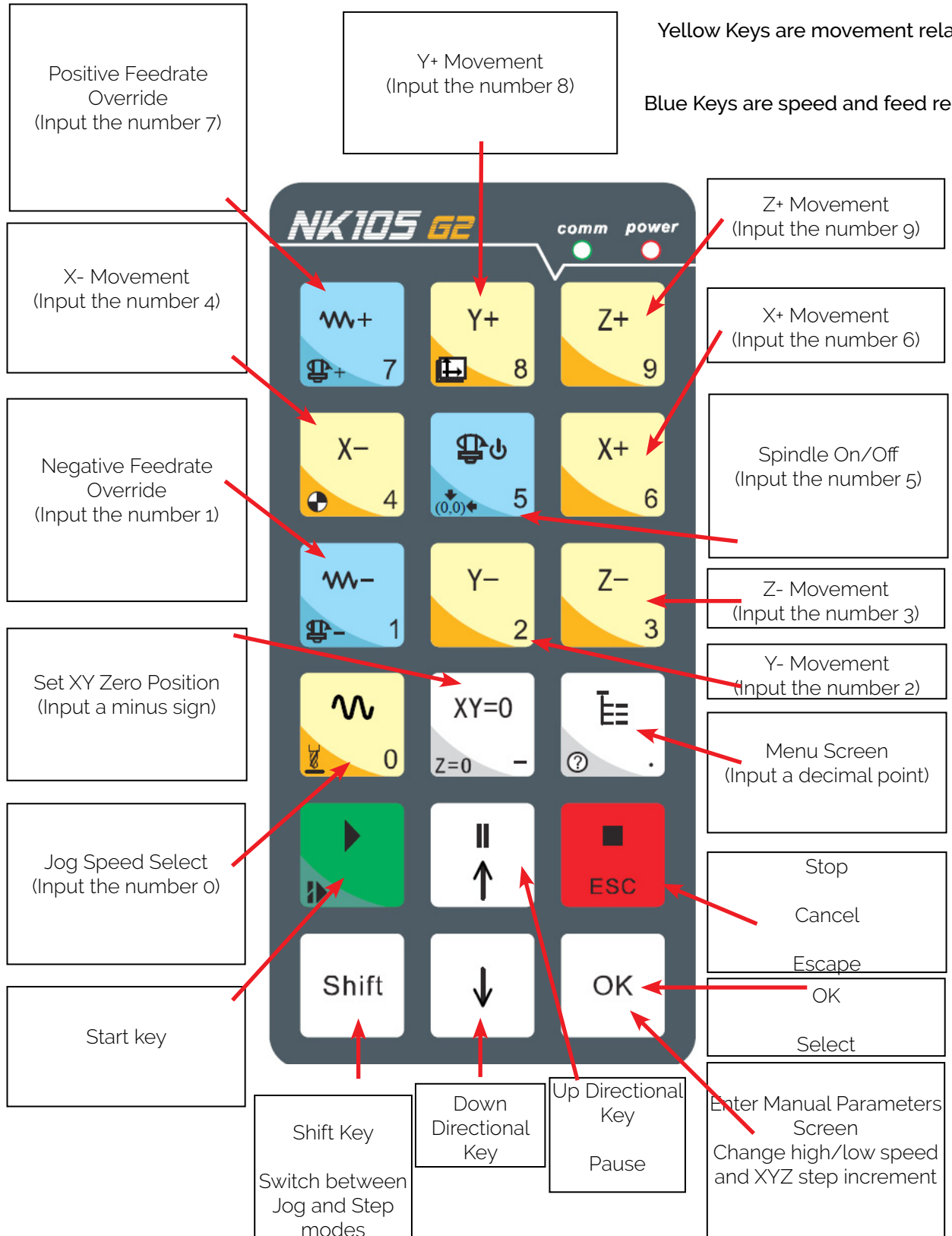
If you hit "ESC" by accident, or would like to reindicate the axes, there are two ways to "Home" again.













1) Press Menu > 3. Operations > 1. Back REF Point > 1. All Home







2) Shortcut



Single Keystroke Functions on the Handheld Pendant



















Key icon	Key name	Function
	Override+	Increase feedrate override; input the number 7
	Y+	Move Y axis in the positive direction (rear of table); input the number 8
	Z+	Move Z axis in the positive direction (top of travel); input the number 9
	X-	Move X axis in the negative direction (left of table); input the number 4
	Spindle ON/ OFF	Manually turn spindle on/off; input the number 5
	X+	Move X axis in the positive direction (right of table); input the number 4
	Override-	Decrease feedrate override; input the number 1
	Y-	Move Y axis in the negative direction (front of table); input the number 2
	Z-	Move Z axis in negative direction (bottom of travel); input the number 3
	Speed switchover	Toggle between manual jog high/slow speeds; input the number 0
	Clearing	Set XY=0 point (XY origin); input a minus sign
	Menu	Open the main menu; input a decimal point

Key icon	Key name	Function
	Start	Start machining
	Up	Pause machining; Up direction arrow when navigating menus
	ESC	Stop machining; Cancel; Escape
	Shift	Switch between jog and stepping modes; Auxilliary key
	Down	Down direction arrow when navigating menus
	OK	OK; Select; Open manual jog/step adjustment screen

Shift Commands / Combination Keystrokes

To use the shift commands, you must press and hold the shift key and then select a second key.

Key icon	Function
 + 	Increase spindle RPM
 + 	Switch between work (relative) and machine (absolute) coordinates When it reads X1 Y1 Z1, that is relative. When it reads X* Y* Z*, that means absolute.
 + 	Go to XYZ home (mechanical origin)
 + 	Go to current work origin (relative origin)
 + 	Decrease spindle RPM
 + 	Set ZO position using touch-off pad
 + 	Set ZO position manually
 + 	Resume from breakpoint MO command

III. Operating Tutorials

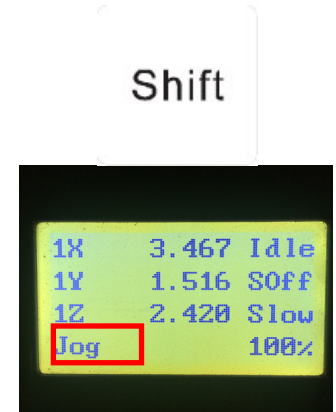
3.0- Switching Movement to Step or Jog.

There are two modes that allow the user to control the movement of the machine: Jog and Step. To switch between these modes press the "Shift" button. The mode will be displayed on the bottom left of the screen.

Jog- Also known as continuous mode. When a directional arrow is pressed, the machine will move in that direction until the button is released.

Stepping- Also known as step mode. When a directional arrow is pressed, the machine will move an exact amount, as dictated by the manual parameters page. To move again, you must release the button and press it again.

NOTE: See section 3.3 to learn how to change jog speeds and step sizes.



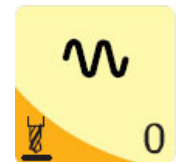
3.1- Jogging the machine and changing from High/Low Jog Speed.

To Jog the machine, hold down one of the Yellow directional keys on the keypad while in Jog mode. The keypad has X+,X-,Y+,Y-,Z+,Z- printed on the keys to indicate direction.

The machine has two speeds, High and Slow. When the machine starts it will be in the Slow speed.

To toggle between low and high speed press the Jog Speed Select Button. You can only toggle speed when in Jog Mode. The LCD will display High or Slow on the right of the screen.

Press 'OK' to change the default high and slow speeds, see section 3.3.

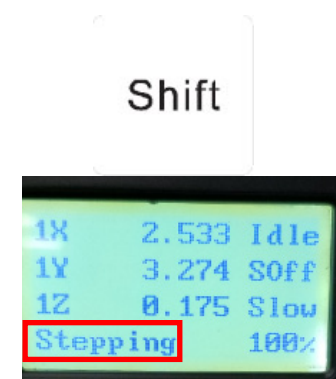


Select between high and slow Jog speeds

3.2- Stepping the machine.

To move the machine in increments, press the shift key once so that the controller indicates "stepping". When in stepping mode, press down one of the Yellow directional keys on the keypad. The keypad has X+,X-,Y+,Y-,Z+,Z- printed on the keys to indicate direction.

This will move the machine in predetermined increments for the axis selected. By default, the X and Y axes will move in .005 inches and the Z axis will move in .001 inches.

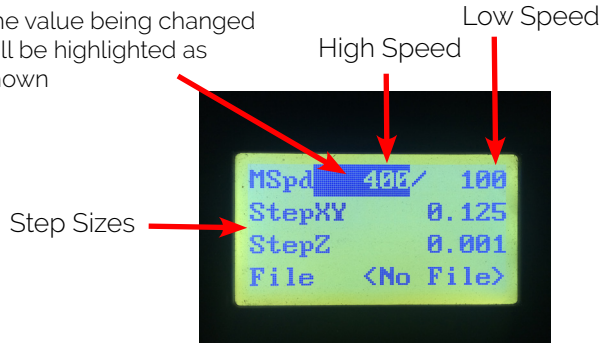


3.3- Modifying the Jog Speed and Step Size.

The machine can be jogged at two speeds, slow and high. You can also change the increments in which the machine will move in Step mode. These speeds are set in the Manual Parameters page.

To access the Manual Parameters page press OK from the Main Screen (Not menu)

The value being changed will be highlighted as shown



To move the cursor, use the Up and Down directional arrows.

Enter a new value.
Press OK to accept that value.



Set the High and Slow speed to a suitable value.
Adjust the Step value as needed.

To Exit out of this screen and return to the main menu press ESC.



⚠ WARNING:

Adjust the step size carefully. If you set the step size to an excessive value, the machine will move by that value and could damage the machine.

When inputting a decimal increment, you must enter the value as 0.### <Zero+decimal+(your increment)>

3.4- Feedrate Override.

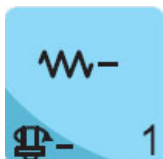
While running a G-Code file, the user can manually override the feedrate or cutting speed of the program. The range of the override goes from 0% to 120% of the original feedrate.

Example: 50% of 100 IPM = 50 IPM

The user can override the feedrate using the following keys:



Increase Feedrate



Decrease Feedrate

**DO NOT MAKE
0% OR
THE MACHINE
WILL NOT MOVE**

3.5- Adjusting the XYZ Zero position/WCS/User Origin.

XYZ zero position, Working Coordinate System (WCS), and User Origin are all the same thing.

Different CAM systems and users just name the concept differently. For convenience XYZ zero position will be used in the rest of this manual.

XYZ zero position is the location point on a drawing in a CAD/CAM package where X,Y and Z all equal zero.

Generally, XY zero is on the bottom left corner and Z zero is the top of the part. In fig 3.5a the letters are located away from the XY zero, all points representing positive integers.

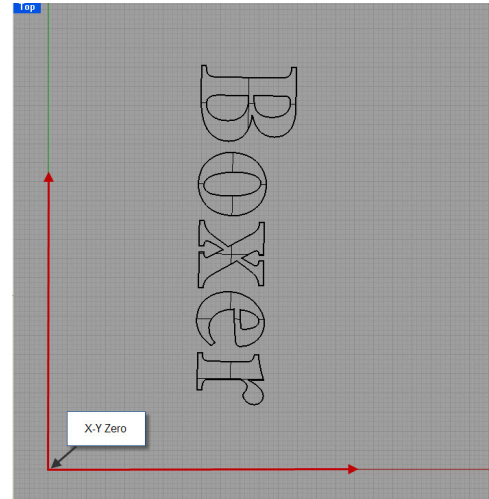


Fig. 3.5a

In Fig 3.5b the object represents the material the letters will be cut from. The machine should be jogged to the corner of the material by using the directional arrows on the keypad. Once the machine is in location press to set XY zero. The coordinates on the controller will change to 0,0.XY zero is now set.

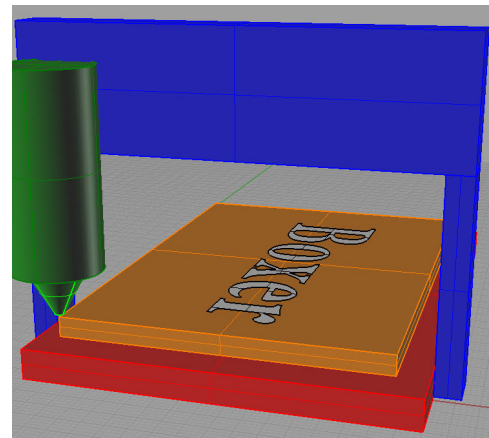
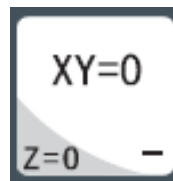


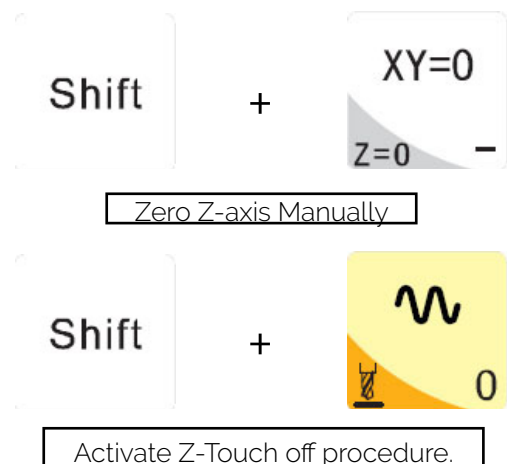
Fig.3.5b

There are two methods for setting the Z-axis zero position:

1. Manual Method: Use the Z-axis directional arrows on the keypad to move the router to the top of the material. Switch to Step Mode to slowly move the machine into position. When the router bit is in position press shift/aux and the Z=0 button as shown.

2. Tool Calibration Pad: Place the touch off pad on top of the material and under the cutter. Press shift and 0 simultaneously. The spindle will slowly move down until it touches the touchpad. The Z axis will now be set to the top of the material.

The Z coordinate will now read 'Z 0.000', according to the Relative Work Origin.



3.6- Loading a G-code File.

Press the Menu button.



Select "2.USB files" to access the flash drive.
Only a G-code file with an "nc" extension will show.

Scroll through the files with

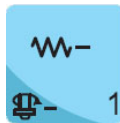


and



Select file by pressing OK.

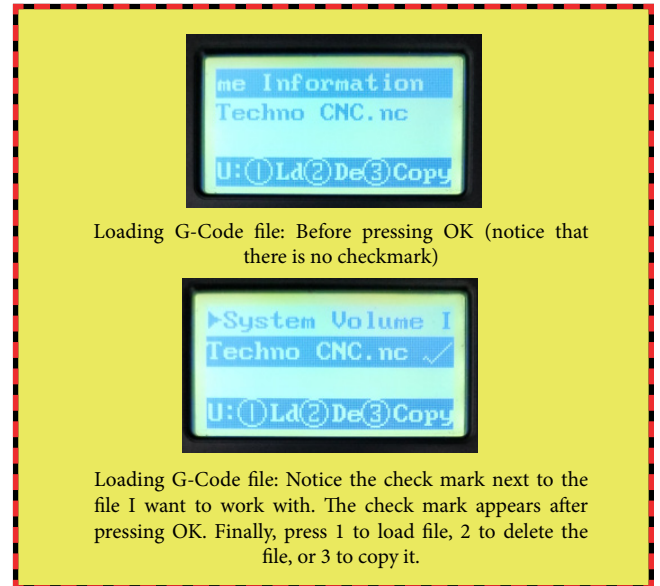
Then load the file by pressing 1.



Note:

Files can be copied from this USB to the controller using the "2" button
Local disk space is limited!

Once a file is copied locally, it can also be selected from the jog speed /step size screen



3.7- Running a G-code file.

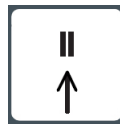
Once the XYZ origin has been set as per section 3.5 and the file has been loaded as per section 3.6, the user is ready to run the G-code file.

To run the G-code file simply press the start button



Once the spindle has reached its programmed speed, the machine will move into position to start the first cut.

The file can be paused while running by pressing the pause button.



To resume the file press



To abort the file at any time press



NOTE: When the machine pauses, the spindle will stop and the Z axis will move to the Z clearance/Safe height to allow inspection of the part.


If the machine is jogged off the part during a pause, it will lose its position and when the file is resumed it will start from the new position.




IV. Advanced Tutorials.

4.1- Alternating between Override and Programmed Feedrates.




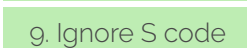
The controller can run G-code files with speed set by the user on the keypad, override speed, or with speed set in the CAM package/G-code file, programmed speeds.

To determine what speed protocol will be used, do the following:

In the main screen, press menu  to enter the menu screen .

Use the  and  key to scroll the cursor and highlight 

Press OK to select.

Use the  and  key scroll the cursor and highlight 


Press OK to select.


NOTE:




The F or S Option. F stands for Feed rates, and S stands for Spindle RPMs.

Highly Recommended "No" means speed in the G-code file will be obeyed.



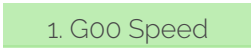


"Yes" means speed will be overrode by the controller.

4.2 Setting the Override Speed for a G-code file.

From the main screen, press Menu  to access the Menu screen.

Use the up and down   to move the cursor and highlight 

Press OK to select this option and enter the Operations Parameters screen

Use the up and down keys to move between each option +   press enter to select the option. 

Press OK to edit the data and use the number keys to enter data.
Press OK to save data and Cancel to exit out of the screen.
Keep pressing cancel until you return to the main screen. 

G00 Speed is the rapid speed, or the speed the machine moves when the cutter is above the material.
GXX Speed is the speed the machine moves when the cutter is in the material.

This speed will vary with cutter size, material, cutter type, etc. Great care must be taken when setting feedrates and spindle RPM, otherwise risk broken tools and loss of material.

7.5 How to Use all 6 Work Coordinates

This controller allows a user to have up to 6 work coordinates saved at a time. They are labeled as G54, G55, G56, G57, G58, and G59. The controller should be automatically set for G54 (work coordinate system 1) because next to X, Y and Z on the main screen should be a number 1. In order for the controller to use another coordinate system like G55 (work coordinate system 2), there needs to be another number next to X, Y, and Z, and in this case that would be number 2. In order to change between each coordinate system go to the Main Menu, 3.Operations, and finally 6.Select WCS.

From the main screen, press Menu to access the Menu screen.



Use the up and down



to move the cursor and highlight

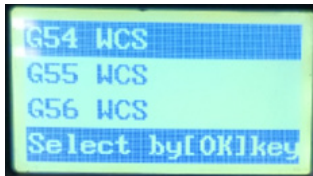
3. Operations

Use the up and down

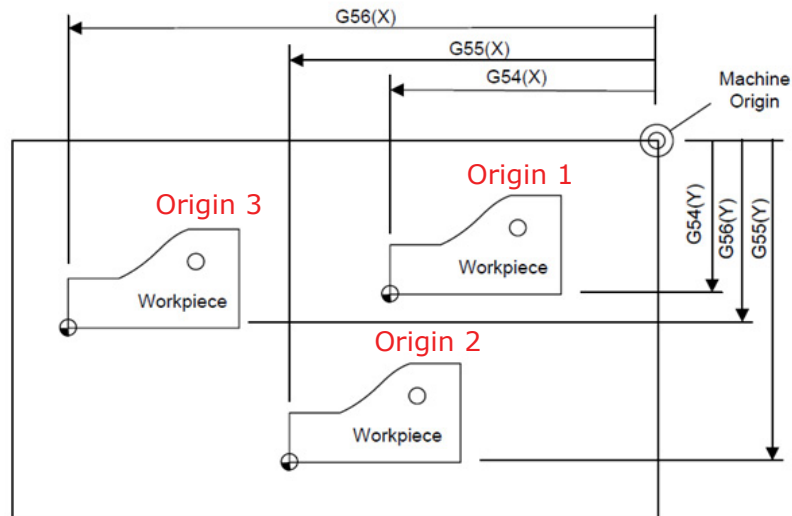


to move the cursor and highlight

6. Select WCS



Scroll through each of the WCS and press OK to the work coordinate system that needs to be used.



Labeled here is the multiple work coordinate origins that can be saved for certain parts or fixtures. G54 represents Origin 1, G55 represents Origin 2, and G56 represents origin 3, etc

4.4 How to Use the Select Line Number Function

A file that is currently loaded to the machine may be ran using only certain line numbers of the G-Code if the operator chooses to do so. If the operator accidentally presses STOP, they can use this function to run from the last ran G-code line number (For ex: N100). This can be done by using the select line number function on the controller.

First, **turn the spindle on**. Then, go to the Main Menu, then go to the 3.Operations, then go to 3.Select Line No., and then type in the corresponding line numbers you would like to start and stop at.

From the main screen, press Menu to access the Menu screen.



Use the up and down



to move the cursor and highlight

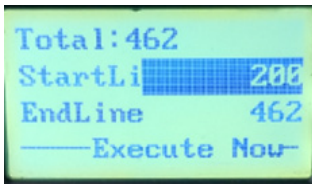
3. Operations

Use the up and down

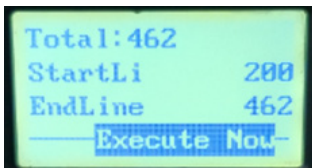


to move the cursor and highlight

3. Select Line No.



Go to the Start Line and End Line and enter in where you would like to start and end the file. The End Line will automatically be set as the last line in the G-Code unless you decide to change it. Scroll down to Execute Now and press OK for the file to run from the Start Line to the End Line.



200	G1X0.176Y8.369	433	G1X0.162Y14.260
201	G1X0.162Y8.246	434	G1X0.175Y14.138
202	G1X0.151Y8.123	435	G1X0.190Y14.017
203	G1X0.142Y8.000	436	G1X0.208Y13.897
204	G1X0.134Y7.876	437	G1X0.227Y13.777
205	G1X0.129Y7.751	438	G1X0.248Y13.657
206	G1X0.126Y7.626	439	G1X0.271Y13.538
207	G1X0.125Y7.499	440	G1X0.296Y13.420
208	G3X7.500Y0.125I7.375OJ0.0005	441	G1X0.323Y13.302
209	G3X14.875Y7.499I0.0000J7.3750	442	G1X0.351Y13.185
210	G1X14.874Y7.624	443	G1X0.382Y13.069
211	G1X14.871Y7.748	444	G1X0.414Y12.953
212	G1X14.866Y7.871	445	G1X0.448Y12.838
213	G1X14.859Y7.994	446	G1X0.485Y12.723
214	G1X14.849Y8.116	447	G1X0.522Y12.610
215	G1X14.838Y8.238	448	G1X0.562Y12.497
216	G1X14.825Y8.359	449	G1X0.604Y12.385
217	G1X14.810Y8.480	450	G1X0.647Y12.274
218	G1X14.793Y8.601	451	G1X0.692Y12.163
219	G1X14.774Y8.721	452	G1X0.739Y12.054
220	G1X14.753Y8.840	453	G1X0.787Y11.945
221	G1X14.730Y8.959	454	G1X0.837Y11.837
222	G1X14.705Y9.077	455	G1X0.889Y11.730
223	G1X14.678Y9.195	456	G1X0.943Y11.624
224	G1X14.649Y9.312	457	G1X0.998Y11.519
225	G1X14.619Y9.428	458	G1X1.055Y11.415
226	G1X14.587Y9.544	459	G1X1.114Y11.311
227	G1X14.552Y9.659	460	G0Z0.750
228	G1X14.516Y9.773	461	G0Z0.755
229	G1X14.478Y9.887	462	M5
230	G1X14.439Y10.000	463	M30

If we take a look at this G-code, we can see that we will be starting from line 200 and ending the G-code file at line 463

USING THE 4TH AXIS ON THE TECHNO HD II Tabletop TABLETOP MACHINES:

Note: The 4th axis on the Techno HDII Tabletop machine is not a true 4th axis. You can only use this to do "wrapping" tool paths. This means that the file is designed as a regular, flat, 3-axis file, which is scaled so that the width matches the circumference of round stock. Then, instead of cutting flat, the rotary is substituted for the X-axis and the cut follows the circumference of the stock, as if it is being "wrapped" around it.

To change from normal 3-axis operation to rotary operation, you must change some settings in the controller:

1. Press the menu button on the keypad. Go to and press OK to select "5. MFR Param". The password is 33587550.

2. Go to and press OK to select "3. Pulse Equiv". Make note of the X-axis value, it should be 0.0031250.

3. Calculate the new pulse equivalent value based on the diameter of the cylindrical stock being used through the following equation:

$$\text{Rotary Pulse Equivalent} = (25.4 * \pi * D) / 80,000$$

Where D is the diameter of the rotary stock in inches.

5. MFR Param

3. Pulse equiv

4. Enter the calculated value for Rotary Pulse Equivalent in the location for X under Pulse Equiv. To input a decimal number, please press 0 (zero) first, then the button for the decimal point and then the numbers.

5. Exit the menu and restart the machine. The new settings will now be applied.

6. Now jog to your starting point and set your X and Y origin. This position should be above the rotary part. Note: The X-axis will most likely move at a different speed than normal and the coordinates will not look right.

7. Flip the switch in the front of the machine into Rotary mode.

8. Run your part

To revert back to normal 3-axis operation, follow the first two steps and then put the original value, 0.0031250, into the X-axis pulse equivalent variable, then reboot the machine to apply the changes.

Notes On the G-code File

If a part requires multiple tools, it is best to output a different file for each part.

If the G-code file references a tool number higher than T10, then the controller will give an error at the start of the file. M6 T1 to M6 T10 are allowed.

In general it is best to remove T commands by telling the CAM package that the machine is not a tool changer machine, or insuring that the Tool number does not exceed 10.

G92 is the Axis presetting command, when this command is encountered in the G-code file the XYZ zero position is set at the position the machine is in at that time.

In general it is best to remove this from the G-code file, or if it is in the G-code file, make sure the machine is at the origin before you press start.

The controller will recognise G54 to G59 offset commands.

1. Input Site
 - Input Park Site
 - X: 0
 - Y: 0
 - Z: -1.00
2. Select Site
 - Select Current Position As
 - Park Pos by [OK] Key
 - Return ny [ES] Key
6. Select WCS
 - G54 WCS
 - G55 WCS
 - G56WCS
 - G57WCS
 - G58WCS
 - G59WCS
 - Select by [OK]
7. Array Process
 - File
 - Rows 2
 - Columns 2
 - Row Space 1.969
 - Col Space 1.969
 - Delay 50
 - LOAD NOW
8. Origin Last
 - 1 X:0 Y:0 Z:0
 - 2 ---- , ----
 - 3 ---- , ---- (repeats through 8)
9. Nearby Process
4. Oper Param
 1. G00 Speed May vary
200.00 in/min (HD II Tabletop)
 2. GXX Speed
100.00 in/min (HD II Tabletop)
 3. Back REF First
NO
 4. Lifts on Pause*
1.81
 5. Offset →
 1. Public Offset
 1. X = 0
 2. Y = 0
 3. Z = 0
 2. Work Offset

1. G54 Offset →	G55 to G59 Offset →
1. X = 0	1. X = 0
2. Y = 0	2. Y = 0
3. Z = -2.021	3. Z = -4.273
6. Cycle Process →
 1. Cycle Process
NO
 2. Cycle Times
2
 3. Cycle Interval

- 0 ms
- 4. S-Off in Interv
NO
- 7. G73-G83 Retract
0.0 inch
- 8. Ignore F Code
NO
- 9. Ignore S Code
NO
- 10. Spindle Stop →
 - 1. S off at Pause*
YES
 - 2. S off at Stop*
YES
 - 3. S off at End
YES
- 11. Ratio on Manu*
YES
- 12. DXF Params →
 - 1. Lifting Height
0.039
 - 2. Process Depth
-0.039
 - 3. 1st Point as 0*
YES
 - 4. Shape Process*
NO
 - 5. Bottom Process*
NO
 - 6. Metric Size*
NO
- 13. ENG Params →
 - 1. Lifting Height*
0.039
 - 2. Tool Change Tip*
YES
 - 3. Cycle Times*
1
 - 4. Deep Hole Mode*
0
 - 5. Retract Amount*
0.039
 - 6. Select Tool No*
YES
- 14. PLT Params →
 - 1. Lifting Height
0.197
 - 2. Plt Unit
40
 - 3. Tool Step
0.001
 - 4. Process depth
-0.039 in
- 15. Tool Change →
 - 1. ATC Capacity*

```

10
2. Current Tool No
1
3. Tool Offset
1. Tool 1
X: 0
Y: 0
Z: 0 (settings repeat through tool 10)

4. Tool Change Tip
NO
5. Cali Coordinates
1. X Cali Coor = 0
2. Y Cali Coor = 0
3. Z Cali Coor = -0.039
16. Process End Tip
NO
17. Cali Height
.512
18. ENG Unit
YES
5. MFR Param
1. Velocity →
1. Decel Dist
0.394 inch
2. Approach Speed
20.00 in/min
3. Run Acc
20.00 in/sec^2
4. Dry Run Acc
20.00 in/sec^2
5. Max Turn Acc
30.00 in/sec^2
6. Jerk
300.00 in/sec^3
7. Max Speed
X = 276.00 in/min Y = 276.00 in/min Z = 118.00 in/min
8. Short Seg Spd Lmt
YES
9. SPDLMT Length
0.1 inch
10. Z Down Option
0
11. Z Plunge Cut Spd
11.8 in/min
12. REF Circle Radius
0.1 inch
13. REF Circle Speed
100 in/min
14. Jump Speed
0
15. Look Ahead IS
0
2. Axis Output Dir* →
X: Negative

```

PASSWORD: 33587550

- Y: Negative
Z: Positive
3. Pulse Equiv* → **DO NOT CHANGE**
X: 0.0031250 (HD II Tabletop)
Y: 0.0031250 (HD II Tabletop)
Z: 0.0031250 (HD II Tabletop)
 4. Machine Stroke → **May Vary**
 1. Strk Upper Lmt →
X: 23.071
Y: 35.039
Z: 0.100
 2. Strk Lower Lmt →
X: 0.787
Y: 0.000
Z: 8.465
 5. Change Stroke →
 1. Strk Upper Lmt →
X: 15.748
Y: 15.748
Z: 0
 2. Strk Lower Lmt →
X: 0
Y: 0
Z: -3.937
 6. Ref Point Set →
 1. RefP Speed →
X: 70 in/min
Y: 70 in/min
Z: 60 in/min
 2. RefPDir
X: Negative
Y: Negative
Z: Positive
 3. Retract Dist
 1. X Retract Dist
0.079 inch
 2. Y Retract Dist
0.079 inch
 3. Z Retract Dist
-0.079 inch
 7. Spindle Set →
 1. Spindle Gears*
7
 2. On/Off Delay
5000 ms
 3. Initial Gear*
6
 4. Max Spdl Speed*
18000
 8. Y Rotary Axis →
 1. Y as Rotary Axis*
NO
 2. Rotary Y Pulse
0.006 deg/pulse
 3. MM as Unit

- NO
 - 4. Rev Work Radius
0.394
 - 5. Rotary Takeoff
0.291 rad/s
 - 6. Rotary Y Acc
6.98 rad/s²
 - 7. Max Rotary Vel
30 r/min
 - 9. Compensation
 - 1. Screw Error Comp
NO
 - 2. Enable Backlash
NO
 - 3. Axis Backlash* →
X: 0.0
Y: 0.0
Z: 0.0
 - 10. Calib Thickness
0.669 inch *(will vary slightly)*
 - 11. Algorithm
YES
 - 12. Arc Increment
YES
 - 13. Arc Tolerance
0.079
 - 14. Forward Look Seg
50
 - 15. Sign of BK REF
YES
 - 16. Safety Height*
1.81
 - 17. Lube →
 - 1. Enable Auto Lube
NO
 - 2. Time Interval
5000s
 - 3. Duration
5s
 - 18. Goo Feed 100%*
YES
 - 19. Smoothing Time
0.0s
 - 20. Corner Option
0
 - 21. Corner Tolerance
0.004
 - 22. Control Cycle
NO
 - 23. Soft Limit Time
0.500
 - 24. User Param
1. user param 2
YES
6. Param Upkeep

1. Backup Params
2. Restore Params
3. Factory Params
4. Export Params
5. Import Params
6. Import Err Data
7. System Upkeep
 1. Language
 1. Chinese
 2. English
 2. Export Log
 3. System Update
 4. Register
 5. Help
 - Spec: Help Message Show Delay
 - Value: -1
 - Unit: s
 6. Reboot
 7. Exit
 8. Delete Log
 9. Disk Space
 10. Delete Info
 11. Modify Code
8. Diagnosis
 1. System Info
 1. Software Version NK105G3L_20_72f2
 2. Card No WHNC-0105-TD56-10C4
 3. Remaining Time Limitless
 4. Register Times 1
 2. Port List
 3. Keypress Diag
 4. Import Diag
 5. Outport Diag

V. HDII Machine Lubrication.

NOTE: AVOID A BUILD UP OF DEBRIS ON MOVING PARTS. CLEAN OFF ANY DEBRIS TO AVOID DAMAGING THE MACHINE.

The X and Y axis should be lubricated every 100 hours of use, the Z axis lubricated every 200 hours.

Before applying lubrication, clean off any debris from the machine and parts to be lubricated.

Apply oil with a clean cloth or brush.

Do not put a heavy amount of oil on the machine, just a light layer will be sufficient.

Lubricating the X Axis.

The grease fitting for the X axis ballnut is located on the rear face of the gantry head.



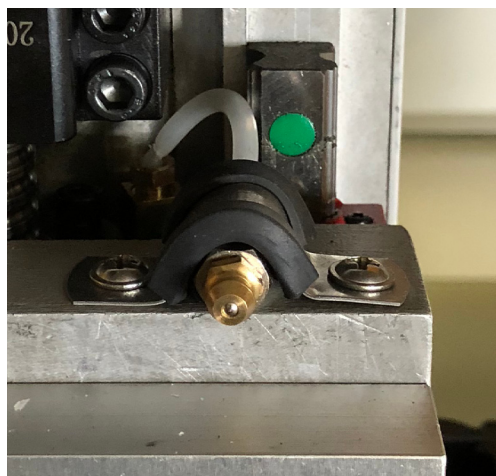
Lubricating the Y Axis.

The grease fitting for the Y axis ballnut is located on under the table on the gantry beam. Jog the Y axis to the middle of travel to find it.



Lubricating the Z Axis.

The grease fitting for the Z axis ballnut is located on the top of the spindle plate



Recommended Lubricants.

Oil:
Vactra No. 2(mobile)
Tonner Oil or Equivalent.
Techno Part No.
Hg0200-LUBE002

DAILY MAINTENANCE

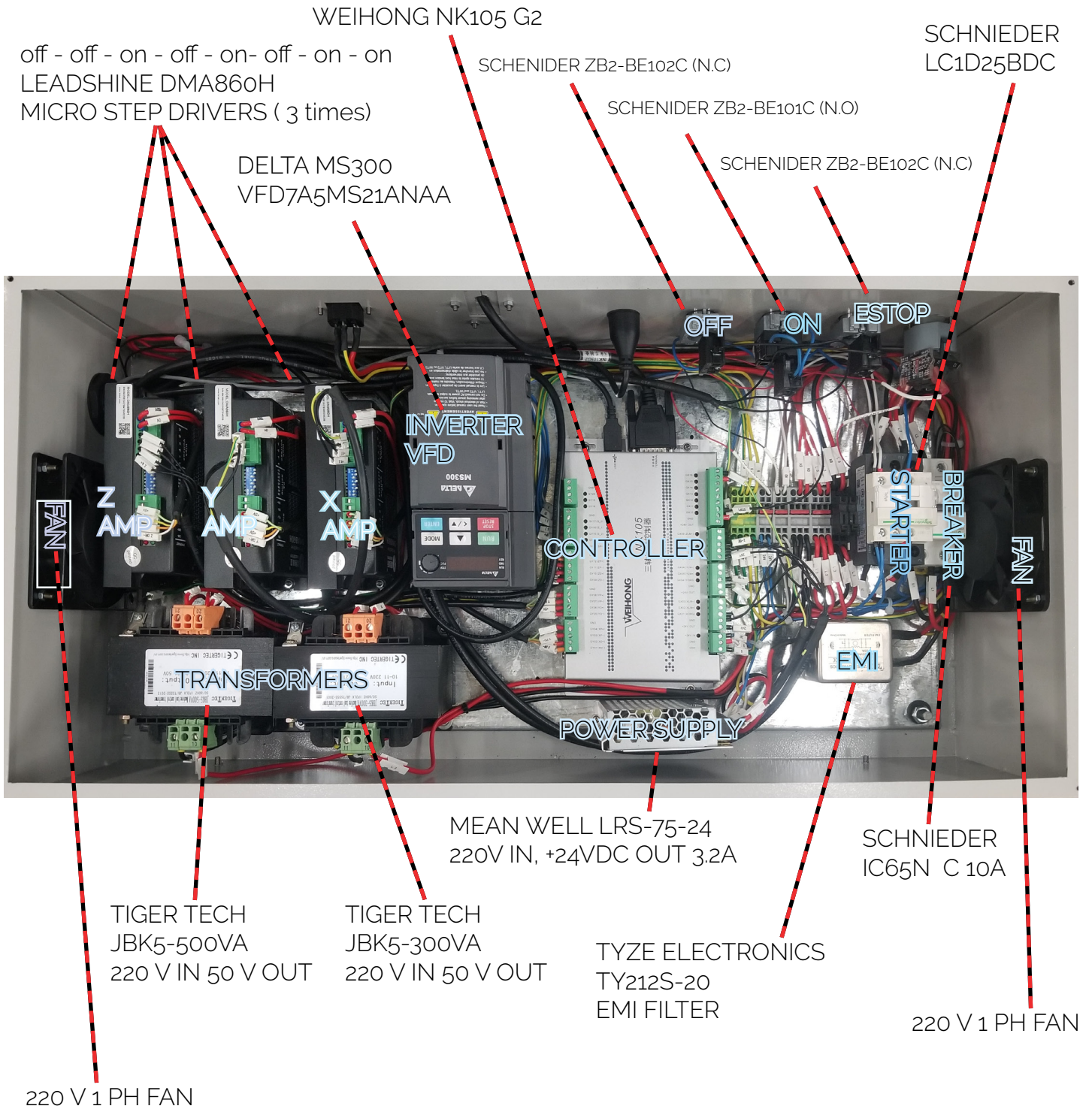
Check the machine before start up and clean it after every use.
Check to ensure chips and dust are not caught in the X, Y or Z ball screws. Dislodge all chips and thoroughly clean dust. Make sure the machine bed is clear of obstacles.

REGULAR MAINTENANCE

Generally, this maintenance should be completed every month
Moving parts on the machine may loosen or displace over time from regular operation and dust that forms during regular machine operation will often stick to the lubrication oil used on the moving parts of the machine (ballscrew, linear rails). This dust can cause premature wearing and damage to the precision bearings.
Inspect the hardware of each component on the machine, checking for loose bolts in case they have loosened over time. Pay special attention to linear rails, bearing blocks, spindle plates, limit switches and gantry uprights. Loose hardware can result in the machine going out of square, poor accuracy and repeatability, damage to components and broken wires.
Check to make sure that any wires are not being pinched or crushed by moving mechanical parts.
Listen for abnormal noises during operation, Grinding noises, squeals and/or banging sounds are NOT normal, Clean grime and any accumulated lubricating oil off the guide rail and bearing blocks.
Turn on power to the machine and move it to clean and lubricate everywhere along the guide rail and rack and pinion. Lubricate ball screw assemblies monthly to ensure peak mechanical performance.
Thoroughly clean components of any excess lubrication before fresh coating.
Ball screw assemblies should be lubricated via the grease nipple using a grease gun.
Check your machine for squareness and for backlash. Out of square machines and machines with backlash are indicative of a crash or loose hardware.

V. HDII Troubleshooting

Problem	Solution
Hand held controller display is blank with no power	Ensure the machine has power and is turned on. Ensure that the 24V power supply has its green LED indicating it is on. Make sure the NK105 controller has power. Make sure the handheld controller is plugged in. Make sure the Emergency stop switches are not pushed in. Make sure the wire harness from enclosure is plugged in.
Machine will not jog or move	If the handheld controller says "ESTOP" in the top right hand corner, the machine has moved beyond its limit. Shut down and manually push the machine off its limit switches. Ensure the feedrate override is not set to 0%
Machine crashes during homing process	To confirm the limit switches are working properly, place a metal screw driver over any of the (3) axis limit switches, and the LED light on the switch itself should turn on and off. When the machine is moving, ensure its metallic striker plate is passing close enough to the switch for it to trip.
Axis motor has loud bang or grinding sound	Motor has stalled, lower speed, re-home
Spindle will not turn on	Ensure enclosure is closed. Ensure VFD display does not display error, if so, full power restart
Touchpad is no working, spindle crashes down	Ensure touchpad works by touching pad to ground on machine and showing GX16 input tripping Wire may be broken. Spindle may have worn bearings. Tool may not be suitable for touchpad



TECHNO CNC SYSTEMS LIMITED WARRANTY & COVERAGE

Limited Warranty On Techno Brand Products

Subject to the terms and conditions set forth in this warranty document, Techno CNC Systems LLC (“Techno”) warrants its Techno brand products (“Product” or “Products”) to the original purchaser for a period of one (1) year against defects in material and workmanship under normal use and conditions (“Product Limited Warranty”). The Product Limited Warranty commences on the date of Product shipment from Techno facilities and expires one (1) year from the ship date (“Product Warranty Period”).

Spare or replacement parts (“Part” or “Parts”) for Techno Products are warranted to the original purchaser for a period of ninety (90) days against defects in material and workmanship under normal use and conditions (“Parts Limited Warranty”). A Parts Limited Warranty commences on the date of a Part shipment from Techno facilities and expires ninety (90) day from the ship date (“Parts Warranty Period”).

A Product Limited Warranty may be validly transferred to one additional party by the original purchaser provided that a reregistration fee is paid to Techno within seven (7) days of transfer of the Product and prior to the expiration of the Warranty Period. Reregistration of any Product warranty does not extend the Warranty Period. A Parts Warranty is not transferable.

Product Limited Warranty and Parts Limited Warranty are hereinafter referred to collectively as “Limited Warranty.” Product Warranty Period and Parts Warranty Period are hereinafter referred to collectively as “Warranty Period.”

What Is Covered Under The Limited Warranty

During the Warranty Period, Products and Parts that Techno deems validly subject to a warranty claim will be repaired or replaced, in Techno’s sole discretion, without charge. Repaired items may include new or refurbished replacement parts. Replaced items may be new or may be manufactured from serviceable used parts. Items that have been repaired and/or replaced will be warranted only for the unexpired portion of the applicable Warranty Period to the original purchaser.

As a condition to this Limited Warranty, customers shall have read the operator’s manual and registered the Product or Part with Techno within 30 days of purchase.

What Is Not Covered Under The Limited Warranty

Events That Are Not Covered Under This Limited Warranty Include:

- * Normal maintenance services as outlined in the operator’s manual or other operational instructions provided by Techno (such as oil change, cleaning, lubrication and adjustments).
- * Replacement of consumable items such as oil, lubricants, belts, router bits, or other items subject to normal service replacement.
- * Product/Part damage resulting from third-party parts, accessories or systems connected to or used in conjunction with the Product/Part that have adversely affected its operation, performance or durability.
- * Product/Part damage caused by normal wear, accidents, improper maintenance, improper use or abuse, alterations, or failure to follow operation and maintenance instructions contained in the operator’s manual.

- * Products/Parts purchased from any supplier, distributor or dealer not authorized by Techno.
- * Labor costs including, but not limited to, such costs as the removal and reinstallation of a component or assembly.
- * Insurance and packing costs for a defective items returned to Techno by the customer.
- * Product/Part damage caused by electrical surges, improper venting, flooding, fire, freezing, corrosive atmospheric elements, abnormal external temperature, or any event of force majeure such as riot or act of war.
- * Noise or vibration unless it is the result of defective material or workmanship of the Product/Part.
- * Claims of defective Products or Parts not made in conformance with Techno's return policy as set forth below.
- * Transport costs for defective items that require more than one (1) shipping to remedy a claimed defect.
- * Claims for personal injuries, incidental or consequential damages, or economic loss (profit or revenue), however caused. i.e. any other incidental, consequential, indirect, special and/or punitive damages, whether based on contract, warranty, tort (including, but not limited to, strict liability or negligence), patent infringement, or otherwise, even if advised of the possibility of such damages. Some states do not allow the exclusion or limitation of certain damages, so the above exclusion or limitation may not apply to a particular customer depending on location.
- * CLAIMS FOR PRODUCT COMPONENTS OR PARTS THAT ARE WARRANTED SEPARATELY BY THEIR RESPECTIVE MANUFACTURER(S) OR SUPPLIER(S). Available warranties covering those components are furnished with each Product and Part. Techno CNC Systems does not assume any warranty obligation or liability for components covered exclusively by the stated warranty of a component's respective manufacturer(s) or supplier(s).

Techno's Limited Warranty Shall Be Void In The Event Of An Occurrence Of Any Of The Following:

- * Failure by the Original Purchaser to register the Product within thirty (30) days of its purchase.
- * Where applicable, failure to validly reregister the Product within seven (7) days of transfer of the Product and prior to the expiration of the Warranty Period.
- * Improper installation of the Product, including but not limited to, installation in violation of applicable rules, laws or building codes, and installation for non- recommended uses.
- * Accident, abuse or misuse of the Product.
- * Failure to follow or comply with the user's operational manual.
- * Modification, alteration, addition of non-approved components, or misapplication of the Product or Part in any manner.
- * Repairs and service conducted by personnel unauthorized by Techno.
- * Modifications to, and tampering with, the Product or Part.

- * Use of non-standard parts or accessories without prior written approval from Techno.
- * Use of Product or part for purposes for which the item was not designed or intended.
- * Cancellation or recall of equipment/parts payment to Techno without specific prior written authorization from Techno.

Warranty Limitations

Techno's maximum liability hereunder is limited to the original purchase price of the Product or Part.

Techno assumes no responsibility for the selection of any Product or Part for a specific application absent Techno's written approval of such application, and makes no general representations whatsoever in respect to any such selection.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED. ALL OTHER WARRANTIES, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, WHETHER EXPRESSED, IMPLIED, OR ARISING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEALING, ARE HEREBY DISCLAIMED. THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE DESCRIPTION ON THE FACE OF THIS WARRANTY DOCUMENT.

TECHNO SHALL NOT BE LIABLE FOR INDIRECT, INCIDENTAL, SPECIAL, CONSEQUENTIAL, PUNITIVE OR OTHER SIMILAR DAMAGES THAT MAY ARISE, INCLUDING LOST PROFITS, DAMAGE TO PROPERTY OR INJURIES TO A PERSON, LOSS OF USE, INCONVENIENCE, OR LIABILITY ARISING FROM THE INSTALLATION, SERVICE OR USE OF THE PRODUCT OR PART.

UPON THE EXPIRATION OF THE LIMITED WARRANTY PERIOD, TECHNO'S LIABILITY UNDER THIS WARRANTY SHALL TERMINATE.

Some states do not allow the contractual exclusion or limitation of incidental or consequential damages or personal injury, so the limitations set forth herein may not apply to all customers in all locations.

How To Obtain Warranty Repair/Replacement

All defective items covered under the Limited Warranty must be properly returned to Techno for inspection. Techno reserves the right to not accept returns unless the returned item is accompanied by proof of original purchase, a return authorization number ("RAN") from Techno, and shipped in accordance with packaging and shipping instructions given to the customer by Techno. Claims and requests for a RAN must be made within seven (7) days of discovery of a defect. Proper packaging and insurance for transportation is solely the customer's responsibility. All returned items must be sent to the Techno facility located in Ronkonkoma, New York (or such other place as Techno specifically designates to the customer) with a statement of the problem and transportation prepaid. If, upon examination, Techno determines that a warranted defect exists, the returned item will be repaired or replaced in Techno's sole discretion at no charge, and shipped prepaid back to the customer. Return shipment will be by common carrier of Techno's choosing. If rapid delivery is requested by customer, then such transport expense shall be borne by the customer.

Warranty inspections and repairs are performed at Techno's New York facility, where all necessary diagnostic and repair equipment is available. This equipment is difficult to transport and field service is accordingly severely limited and will only be supplied at Techno's sole discretion. If field service is required, all service call expenses, including transportation, travel time, subsistence costs, and the prevailing cost per hour (eight hour minimum) are the responsibility of the customer.

In the event that support diagnostics of a covered Product or Part requires an item to be shipped more than one (1) time for any given claimed warranty defect, then the customer shall bear all transport costs.

If an out-of-warranty situation exists, the customer will be notified of the repair or replacement cost. At such time, the customer must issue a purchase order to cover the cost of the repair/replacement or authorize the item to be shipped back to the customer at the customer's expense. In all cases, a restocking charge of twenty (20%) percent will be charged to the customer on all items returned to stock.

Warranty claims will not be reviewed or remedied unless the warranty registration is received by Techno within thirty (30) days of the purchase date. All warranty issues must be handled through Techno.

Techno customer service can be reached by calling 631-648-7481.

Additional Terms & Conditions

TECHNO RESERVES THE RIGHT TO CHANGE DESIGNS, SPECIFICATIONS, PRICES AND ANY APPLICABLE DOCUMENTATION WITHOUT NOTICE TO THE CUSTOMER.

Techno is not liable for delay or failure to perform any obligation hereunder by reason of circumstances beyond Techno's reasonable control. These circumstances include, but are not limited to, accidents, acts of God, strikes or labor disputes, laws, rules, or regulations of any government or government agency, fires, floods, delays or failures in delivery of carriers or suppliers, shortages of materials, and any other event beyond Techno's control.

No legal action arising out of any claimed breach of this Limited Warranty may be brought by the more than one (1) year following date of purchase of a Product or Part. This Agreement shall be governed in all respects by the laws of the State of New York, United States of America. Any legal action brought by a customer against Techno must be brought in the state courts of the State of New York, Second Judicial Department. Some states do not allow the contractual limitation of time periods for bringing suit so the limitations set forth herein may not apply to all customers in all locations.

Once an order is placed by the purchaser, in no event shall purchaser cancel payment or any portion thereof (e.g. reverse charges on a credit card or stop payment on a check) without prior express written authorization from Techno. Failure to obtain prior express written authorization from Techno shall be an event voiding Techno's Limited Warranty on the Product or Part and purchaser shall be subject to liability for any damages sustained by Techno.

The terms and conditions contained herein shall constitute the entire agreement concerning the Limited Warranty described herein. No oral or other representations are in effect. No dealer, distributor, or individual is authorized to amend, modify, or extend this Limited Warranty in any manner and only the warranty expressed in this warranty document is extended herein by Techno. Statements made outside this warranty document, such as in dealer advertising or presentations, whether oral or written, do not constitute warranties by Techno and should not be relied upon.

Section headings contained in this warranty document are for informational purposes only and may not be used to limit the terms and conditions set forth in this warranty document. If any portion or provision contained in this Limited Warranty & Coverage shall to any extent be found to be invalid or unenforceable, the remainder of this coverage or the application of such portion or provision in circumstances other than those in which it is held invalid or unenforceable, shall not be affected thereby, and each remaining portion or portion of this Limited Warranty shall be valid and enforceable.