GagTek

C – Series Benchtop CNC

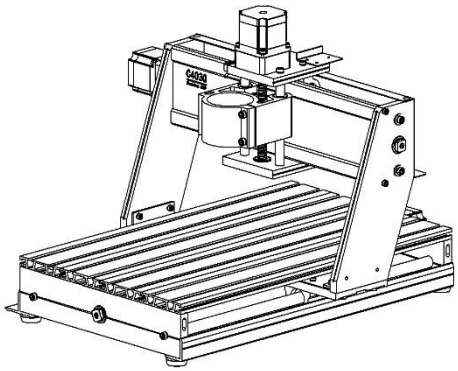
Instructions

Suitable for
C4030-800W
C4060-800W
Version 2021 V1.0

Getting Started

⚠WARNING **READ ALL SAFETY WARNINGS AND ALL INSTRUCTIONS. BEFORE START TO USE YOUR CNC MACHINE**. Failure to follow the warnings and instructions may result in electric shock, fire and/or serious injury.
SAVE ALL WARNINGS AND INSTRUCTIONS FOR FUTURE REFERENCE

General Safety Rules for Using Router/ CNC



Work area safety

Keep work area clean and well lit. Cluttered or dark areas invite accidents. **Do not operate router/ CNC in explosive atmospheres, such as in the presence of flammable liquids, gases, or dust.** CNC's motors create sparks which may ignite the dust or fumes. **Keep children and bystanders away while operating a CNC machine.** Distractions can cause you to lose control.

Electrical safety

Router/ CNC plugs must match the outlet. Never modify the plug in any way. Do not use any adapter plugs with earthed (grounded) router/ CNC. Unmodified plugs and matching outlets will reduce risk of
electric shock. There is an increased risk of electric shock if your body is earthed or grounded. **Do not expose router/ CNC to rain or wet conditions.** Water entering CNC or controller box will increase the risk of electric shock. **Do not abuse the cord. Never use the cord for carrying, pulling, or unplugging the controller. Keep cord away from heat, oil, sharp edges or moving parts.** Damaged or entangled cords increase the risk of electric shock. Strongly suggest using a Ground Fault Circuit Interrupter (GFCI) protected supply to reduce the risk of electric shock.

Personal safety

Stay alert, watch what you are doing and use common sense when operating a CNC machine. Do not use a CNC machine while you are tired or under the influence of drugs, alcohol, or medication. A moment of inattention while operating CNC machine may result in serious personal injury. **Use personal protective equipment. Always wear eye protection.** Protective equipment such as dust mask, non-skid safety shoes, hard hat, or hearing protection used for appropriate conditions will reduce personal injuries. **Prevent unintentional starting. Ensure the switch is in the off position before connecting to power source**. **Remove any adjusting tool or wrench before turning the power on.** A wrench or a tool left attached to a rotating part of the spindle motor may result in personal injury. **Do not overreach. Always keep proper footing and balance.** This enables better control of the CNC machine in unexpected situations. **Dress properly. Do not wear loose clothing or jewelry. Keep your hair, clothing, and gloves away from moving parts.** Loose clothes, jewelry or long hair can be caught in moving parts. Use of dust collection can reduce dust related hazards.

Use and care!

Do not force the router/ CNC machine. Use the correct power tool for your application. The correct power tool will do the job better and safer at the rate for which it was designed.
Do not use it if the switch does not turn it on and off. If the machine cannot be controlled with the switch is dangerous and must be repaired **Disconnect the plug from the power source before making any adjustments, changing accessories, or storing.** Such preventive safety measures reduce the risk of starting the machine accidentally. **Store idle machine out of the reach of children and do not allow persons unfamiliar with the instructions to operate the power tool.** CNC machine is dangerous in the hands of untrained users. **Maintain CNC machine. Check for misalignment or binding of moving parts, breakage of parts and any other condition that may affect the CNC ’s operation. If damaged,**
have the power tool repaired before use. Many accidents are caused by poorly maintained router/ CNC machine. **Keep cutting tools sharp and clean.** Properly maintained cutting tools with sharp cutting edges are less likely to bind and are easier to control. **Use the power tool, accessories and tool bits etc. in accordance with these instructions, taking into account the working conditions and the work to be performed.** Use of the power tool for operations different from those intended could result in a hazardous situation.

Service

Have your power tool serviced by a qualified repair person using only identical replacement parts. This will ensure that the safety of the CNC machine is maintained.

Additional Safety Warnings

⚠WARNING Some dust created by drilling, milling, cutting contains chemicals known to cause cancer, birth defects or other reproductive harm. Some examples of these chemicals are:

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

Your risk from these exposures varies, depending on how often you do this type of work. To reduce your exposure to these chemicals: work in a well-ventilated area, and work with approved safety equipment, such as
those dust masks that are specially designed to filter out microscopic particles.

Safety Rules During Operation

1) Gagtek CNC machine are for indoor use only.
2) You must be 18 years or older to operate this machine, unless supervised by knowledgeable adult who have rich experience on using CNC.
3) For C4060 we suggest user setup with two people, because C4060 is nearly 30KG.
4) Do not connect electricity during installation.
5) Well grounding is strongly suggested. Grounding the machine to avoid interference noise generated by high-speed spindle.
6) If you find out the motors, sockets, and cable is extremely hot, or wire's protective part is broken, stop using and cut off electricity. Contact support to repair the damaged part.
7) Clean and maintenance the machine periodically. Too much wooden powder or dust may cause fire.
8) Please always wear safety glasses when in the area of the milling machine.
9) No loose clothing, long hair, personal stereo wires, and jewelry may become entangled in rotating equipment leading to accident.
10) If improperly used, milling cutters may shatter. If this occurs, sharp fragments of metal will fly off a high velocity. Persons in the path of such missiles will be injured. If you do not know how to set up and use a milling cutter, ask!!
11) Milling cutters can be extremely sharp. When changing tools, always wrap the cutter in a rag.
12) Do not touch the cutting edges with your bare hands. Never touch a rotating tool bit.

13) Do not leave the machine unattended while it is operating.
14) Use clamps or other practical way to secure and support the workpiece to a stable platform. Holding the work by hand or against your body leaves it unstable and may lead to loss of control.
15) After changing the bits or making any adjustments, make sure the collet nut and any other adjustment devices are securely tightened. Loose adjustment device can unexpectedly shift, causing loss of control, loose rotating components will be violently thrown.
16) Never start the tool when the bit is engaged in the material. The bit cutting edge may grab the material causing loss of control of the cutter.
17) Never use dull or damaged bits. Sharp bits must be handled with care. Damaged bits can snap during use. Dull bits require more force to push the tool, possibly causing the bit to break.
18) Never touch the bit during or immediately after the use. After use, the bit is too hot to be touched by bare hand.

Part Description

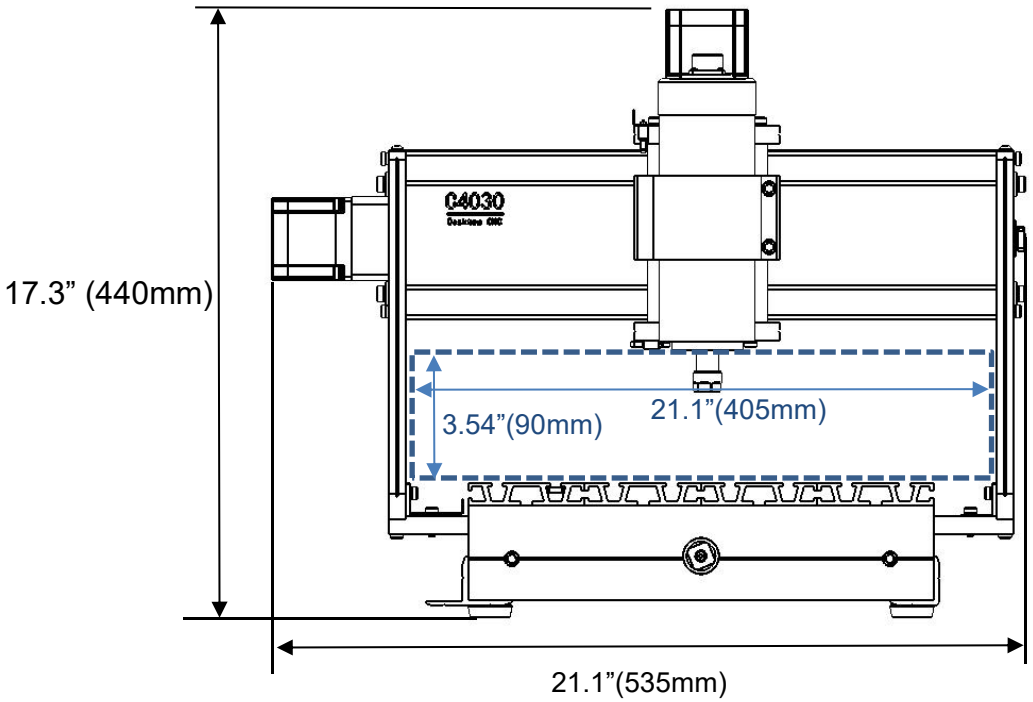
Machine:

Features & Benefits

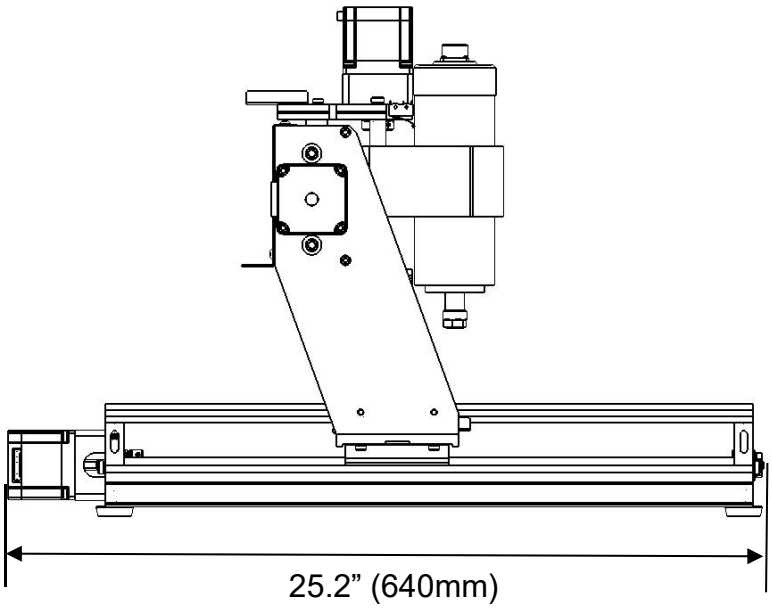
1) Ballscrew-driven on all axes for high accuracy and repeatability.
2) Integrated aluminum T-slot hold down table.
3) 95% assembly product, ~20 minutes installation time.
4) 90% Molded stretching aluminum structure, with high accuracy and rigid structure. Making it can easy working with a host of materials, from plastic to aluminum and other non-ferrous metals.
5) Include an independent C-Series Controller Box, work without PC.
6) Code programmable spindle speed control.

C4030 Machine Dimensions:

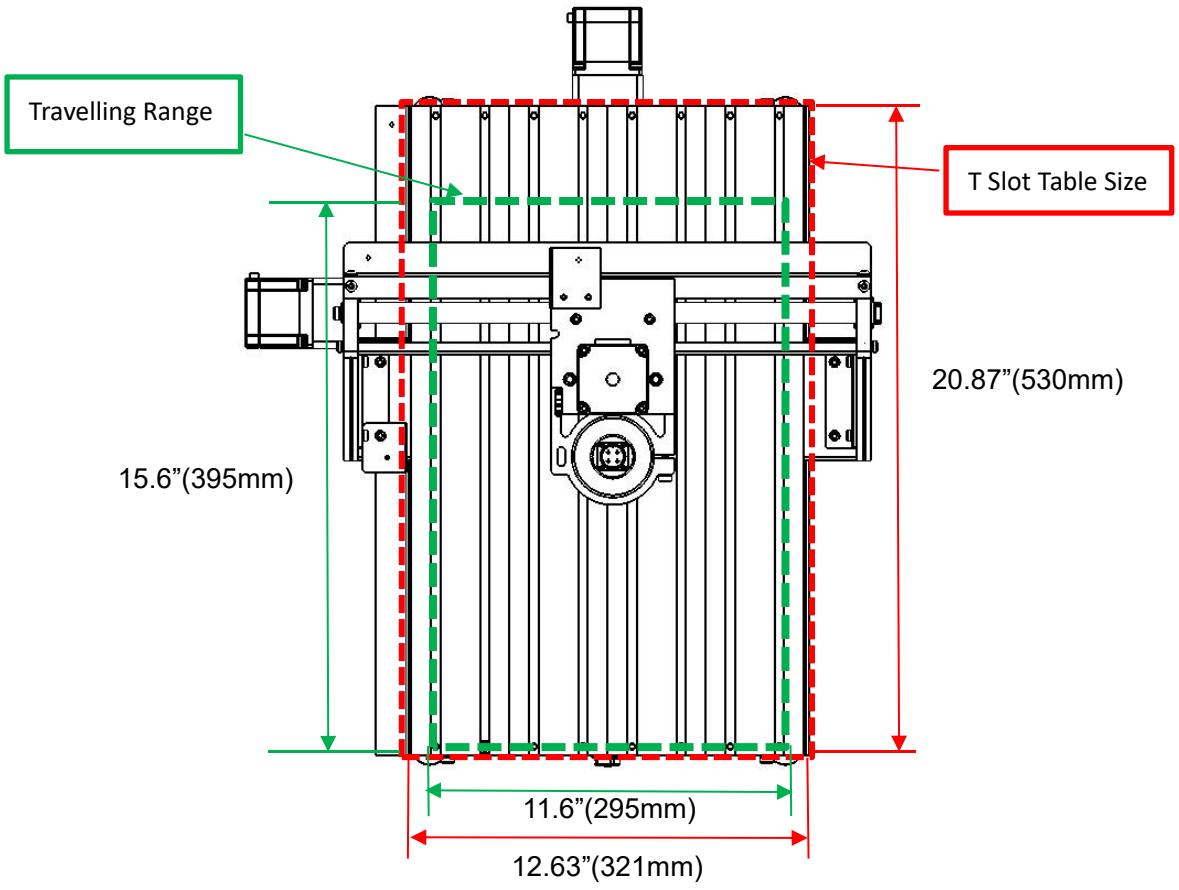
Top View:



Side View

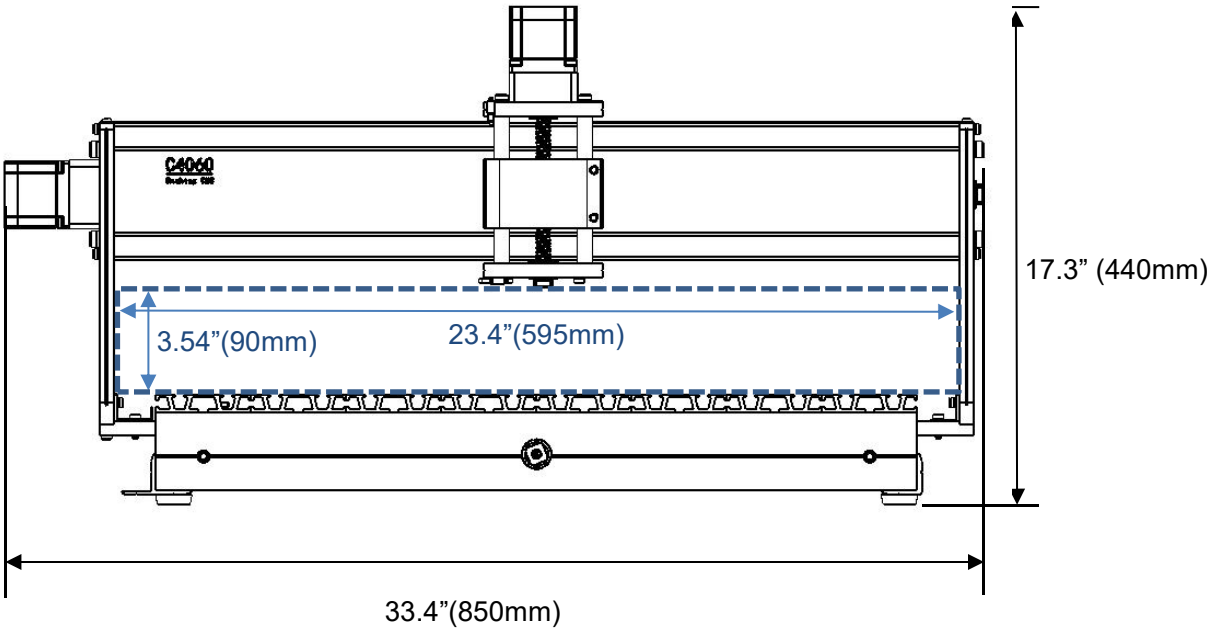


Top View

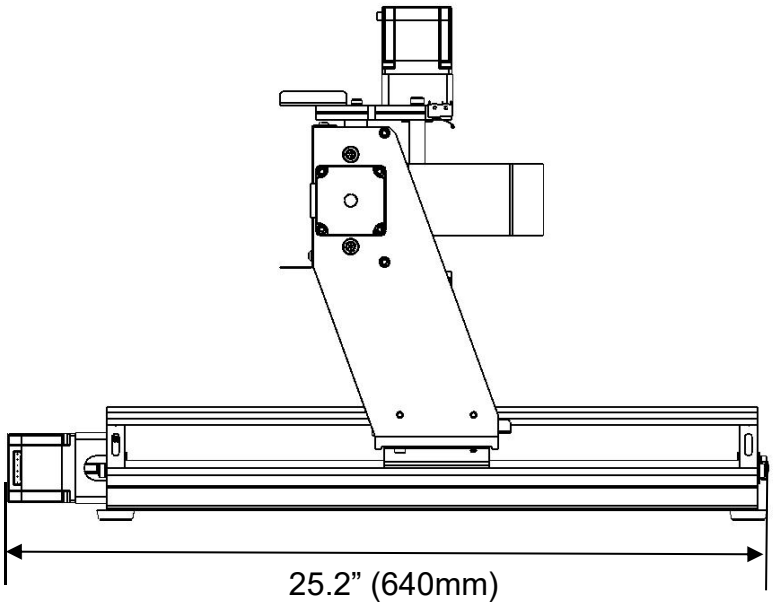


C4060 Machine Dimensions:

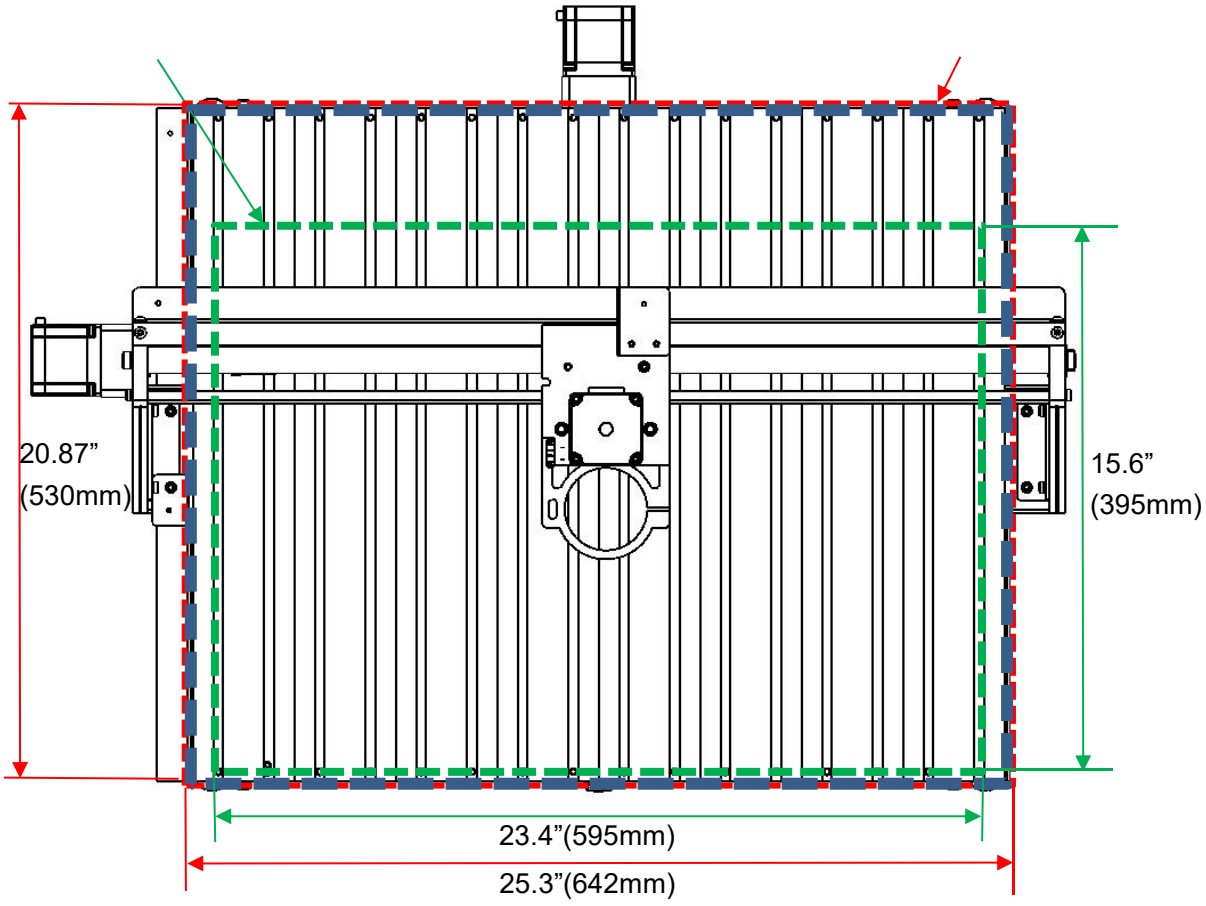
Top View:



Side View

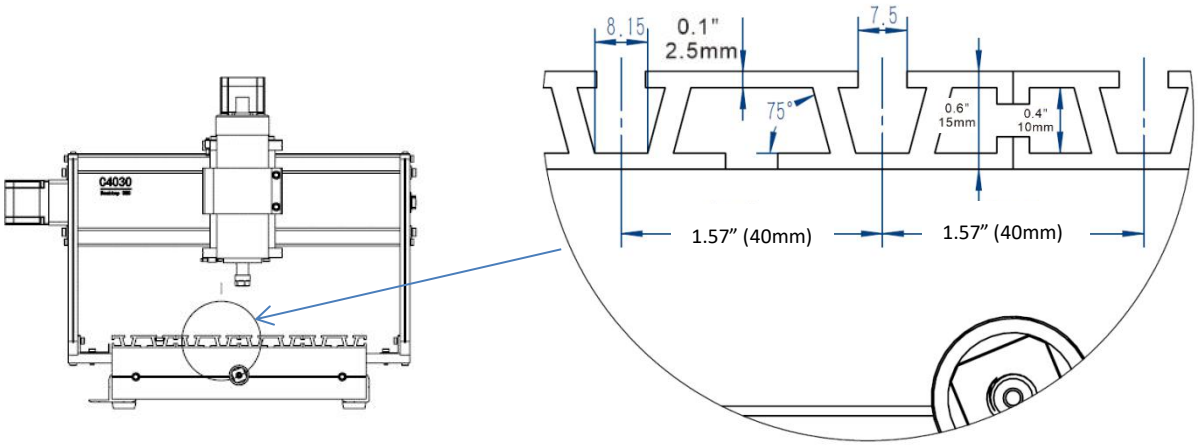


Top View

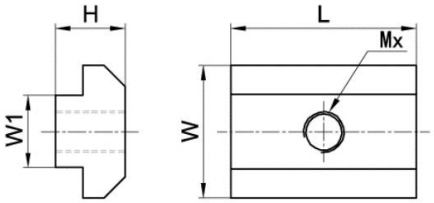


Aluminum T Slot table

T Slot table are more flexible for user to clamp or fix the workpiece by using our clamps or vise-clamps.



T slot support European 20 Series T-Slot M6 screw nut:



H=4.5mm
L=20mm
W=9.8mm
W1=5.8mm

Specifications

	C4030-800W	C4060-800W
Travelling Range	X:11.6” (295mm)	X:23.4” (595mm)
	Y:15.6” (395mm)	Y:15.6” (395mm)
	Z:2.2” (55mm)	Z: 2.2” (55mm)
Workpiece Pass Range	X:11.6” (295mm)	X:23.4” (595mm)
	Y: No Limitation	Y: No Limitation
	Z:2.2” (55mm)	Z: 2.2” (55mm)
Width	21.1” (535mm)	33.5” (850mm)
Length	25.2” (640mm)	25.2” (640mm)
Height	17.3” (440mm)	17.3” (440mm)
Weight	22.0KG	30.0KG
Rapid Speed	150 IPM (3500mm/min)	150 IPM (3500mm/min)
Drive System	Precision Ballscrews	Precision Ballscrews
Rail System	X, Y: 16mm Hardened Chrome Linear Rail Rod Shaft Z: 12mm Hardened Chrome Linear Rail Rod Shaft	X: 20mm Hardened Chrome Linear Rail Rod Shaft Y: 16mm Hardened Chrome Linear Rail Rod Shaft Z: 12mm Hardened Chrome Linear Rail Rod Shaft
Drive Motor	1.5NM NEMA23/ 57 Stepper	1.5NM NEMA23/ 57 Stepper
Spindle	800W 24000rpm ER11 High Speed Type	800W 24000rpm ER11 High Speed Type
Spindle Cooling	Air	Air
Resolution	0.0001” (0.001mm)	0.0001” (0.001mm)
Repeatability	0.0005” (0.01mm)	0.0005” (0.01mm)
Accuracy	0.004” (0.1mm)	0.004” (0.1mm)
Home Switch	3x Mechanical Switches (X, Y, Z)	3x Mechanical Switches (X, Y, Z)
Soft Safety Limit	Support	Support
Cable length from machine	39” (100cm)	50” (130cm)

Controller Box

Features & Benefits

1) C-Series Independent Controller Box, including CNC running core processing board with stepper driver, an android high performance capacitive touch-screen panel and a VFD spindle driver.
2) No external PC is needed to run the machine.
3) Android panel is used as user-interface with capacitive touch screen, using our application JCNC, making it easier to control the machine. And easy to upgrade the app with new function from our website.
4) Wi-Fi is embedded and transfer the g-code in user's Cloud Storage.
5) Internal 4GB flash memory and have one external USB Flash drive port.
6) One NPN output can direct drive relay, LED light, buzzer.
7) One auto check port for tool checking.
8) Small size can place next to the machine.
9) Quick power on ~30s, much faster than PC
10) High stability can engrave extra-large g-code more than million g-code lines.
11) A Power Switch / Emergency Switch at the right side of the controller

Specifications:

C3- CNC Controller

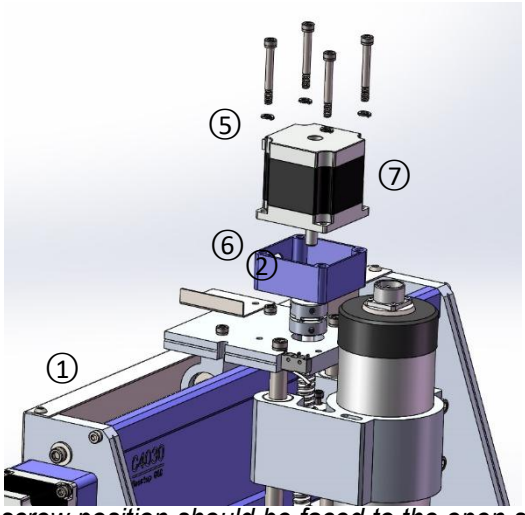
Motion System	GRBL1.1 motion board
User Interface Software	JCNC V1.2 Android APP (GagTek Self-developed)
G-code file format	txt, nc, ncc, tap, ngc
Spindle Driver	VFD 400Hz 800W spindle driver
Input Power #1 (For Stepper Motor and controller PCBA)	24V 8A DC Adapter
Input Power #2 (For Spindle Driver)	110 8A/ 220V 4A Electrical cord
Stepper Driver Port	3 port: X, Y and Z axis, 24V 2.5A
Spindle Port	1 x 800W VFD Spindle
Limit Port	X, Y and Z Homing Switches
Laser Port	12V Maximum 2A PWM type Laser Module (Laser Module is not included)
Output Port	1X NPN output Max. 200mA
Probe Input Port	1X For probe (Z height Check)
USB Port	1x USB flash drive port
Weight:	3.2KG
External 24V Adapter weight:	0.88KG
Width	8.66”(22cm)
Length	9.84”(25cm)
Height	5.5”(14cm)

ANDROID Panel Specification:

Android System	ANDROID 6.0
Processor	4 Core 1.5Ghz
LCD	7”, 1024X600 TFT
Touch Screen	5 points capacitive panel
WIFI	WIFI 802.11b/g/n
RAM	1GB
FLASH	4GB (System need around 2.5GB, ~1.5GB remains)
Sound	2W, single channel

Z axis Stepper Installation Procedure

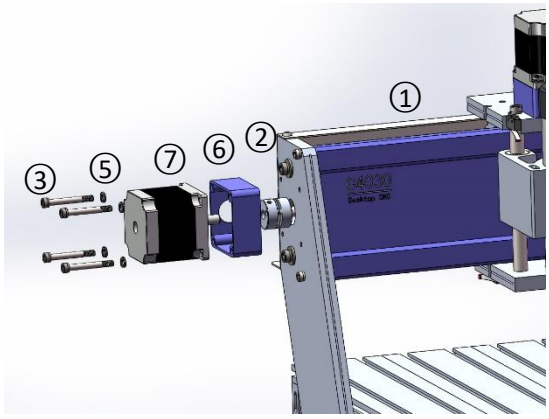
1) Install the coupler into Z axis leadscrew. The Set screw should face to the back of the machine.
2) Place the Stepper Motor Mount, and make sure the open side face to the back of the machine.
3) Place the Stepper Motor on the mount and then insert the 4pcs M5X50mm screws.
4) Tighten the M5X50 screws and then tighten the two set screws of the coupler.
5) Connect the stepper socket.



**Suggested Coupler set-screw position should be faced to the open side of the mount:*

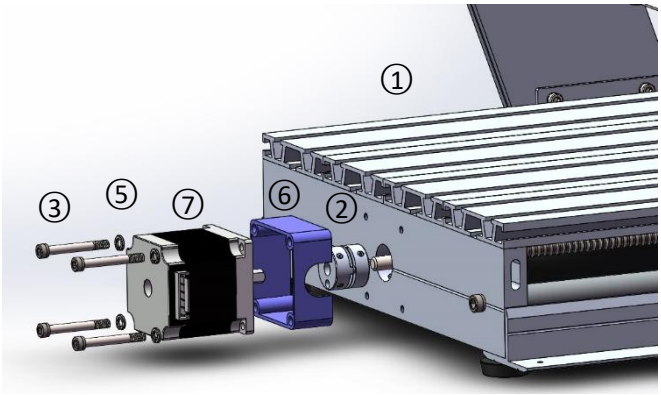
X axis Stepper Installation Procedure

1) Install the coupler into X axis leadscrew. The Set screw should face to the back of the machine.
2) Place the Stepper Motor Mount, and make sure the open side face to the back of the machine.
3) Place the Stepper Motor on the mount and then insert the 4pcs M5X50mm screws.
4) Tighten the M5X50 screws and then tighten the two setscrews of the coupler.
5) Connect the stepper socket.



Y axis Stepper Installation Procedure

1) Install the coupler into Y axis leadscrew. The Set screw should face to the left of the machine.
2) Place the Stepper Motor Mount, and make sure the open side face to the left of the machine.
3) Place the Stepper Motor on the mount and then insert the 4pcs M5X50mm screws.
4) Tighten the M5X50 screws and then tighten the two setscrews of the coupler.
5) Connect the stepper socket.



Spindle Installation

WARNING **To prevent personal injury, always remove the plug from power source before installing.**

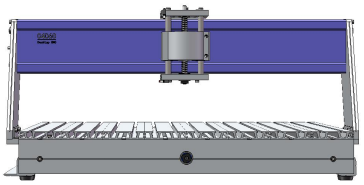
You will need:

⑬ 4mm Allen Wrench

④ 2pcs M5X25 mm Socket Cap Screw

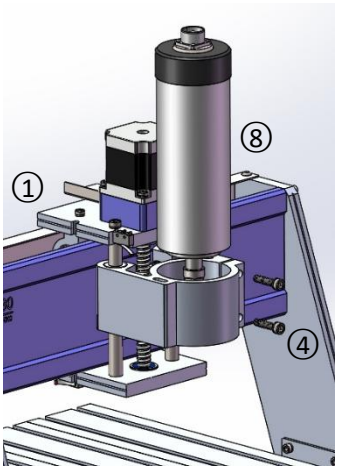
⑧ VFD Spindle

① CNC Router (Some Parts need to be assembled)

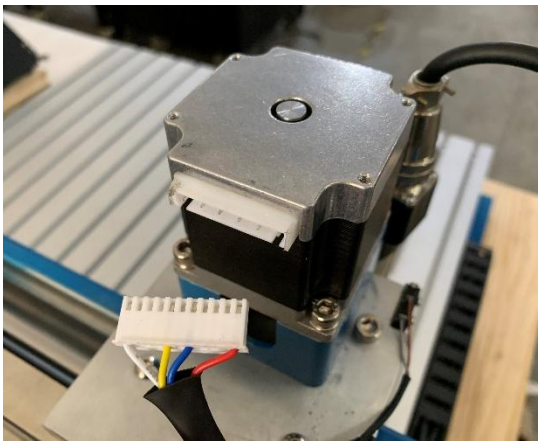


Spindle Installation Procedure

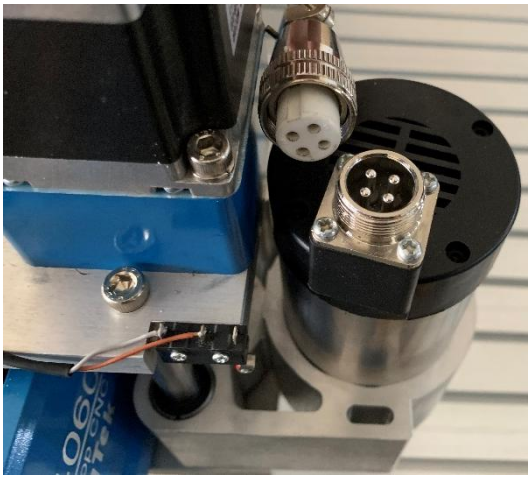
1) Place the spindle into the spindle mount, the spindle position will be depended on the workpiece.
2) Tighten the 2 pcs M5X25 mm screws.
3) Connect the spindle socket.



Stepper Motor Socket:



Spindle Motor Socket:



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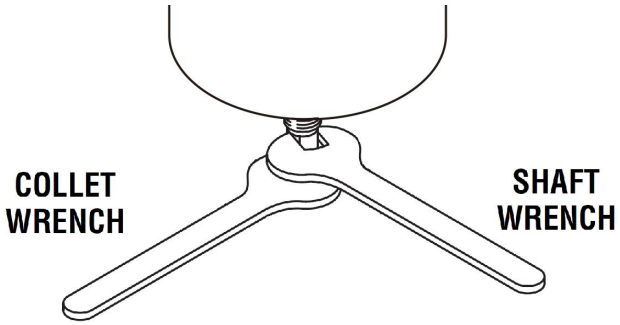
Installing a Router Bit

⚠WARNING To prevent personal injury, before removing or installing bits or accessories.

Make sure the spindle stop rotating and no other person will start the spindle during installing.



To tighten or loosen collet nut, hold both wrenches in one hand and squeeze the wrenches together.

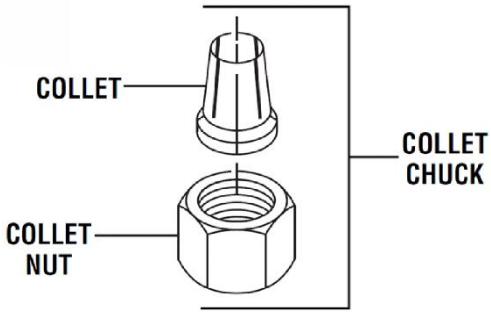
1) Hold the armature shaft in place with the shaft wrench.
2) Next, use the collet wrench to loosen the collet chuck assembly in counterclockwise. direction (viewed from under the router).
3) Once you have verified that the bit's shank is of the proper diameter for the collet to be used, insert the shank of the router bit into the collet chuck assembly as far as it will go, then back the shank out until the
   cutters are approximately 1/8" (3mm) to 1/4" (6mm) away from the collet nut face.
4) With the router bit inserted and the shaft wrench holding the armature shaft, use the collet wrench to firmly tighten the collet chuck assembly in a clockwise direction (viewed from under the router). To ensure proper gripping of the router bit and minimize run-out, the shank of the router bit must be inserted at least 5/8" (15mm).

Removing Router Bit

1) Use the shaft and collet chuck wrenches as described earlier and turn the collet-chuck assembly in a counter-clockwise direction.
2) Once the collet chuck assembly is loosened continue to turn the collet chuck assembly until it pulls the collet free from its taper, and the router bit can be removed.

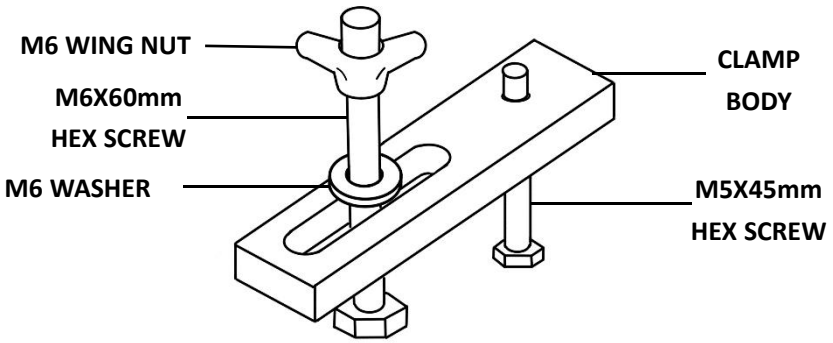
NOTE: The collet chuck is self-extracting; it is NOT necessary to strike the collet chuck to free the router bit.

Collet – Chuck Care



With the router bit removed, continue to turn the collet chuck counterclockwise until it is free of the shaft. To assure a firm grip, occasionally blow out the collet chuck with compressed air, and clean the taper in the armature assembly shaft with a tissue or fine brush. The collet chuck is made up of two component parts as illustrated; check to see that the collet is properly seated in the collet chuck nut and lightly thread the collet chuck back onto the armature shaft. Replace worn or damaged collet chucks immediately.

Clamps



Setup the clamp set according to the above structure.

It is including:

1 X Clamp body

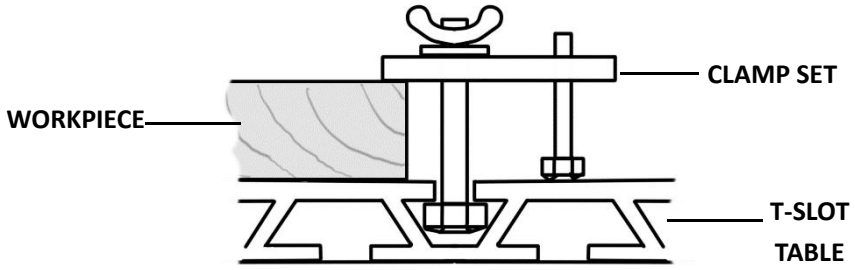
1 X M6 Wing Nut

1 X M6x60mm Hex Screw

1 X M6 Washer

1 X M5x45mm Hex Screw.

How to use a Clamp?



The above figure shows how to use a clamp, we use the M5X45 hex screw as the support.
M6x60mm Hex Screw to press the workpiece.
Insert the M6 Hex Screw to the T-Slot of the T-Slot table, place the M5 support screw on the surface of the T-Slot table.
Tight the Wing Nut clockwise to press the workpiece.

Electrical Wiring

⚠WARNING **To prevent personal injury, always remove the plug from power source before installing.**

1) Connect 5 cables (X, Y, Z, LIMIT and SPINDLE) to the correct socket on the back of the controller box. And there is a label on each cable for matching.
2) Plug in the 24V DC power socket
3) Plug in the 110V/220V power cord.
4) Connect the Auto-Check if you need for Z probe.
5) OUT1 is a 200mA, 24V NPN type output, can directly drive 24V relay solenoid, 24V LED or 24V buzzer. And using G-code “M8” to control on off. **BE CAREFUL**, do not short circuit the OUT1, driving over 200mA may damage the driver.
   Red socket: DC 24V+
   Black socket: 200mA NPN Output.

Label Description

Marking	Description
X	X axis Stepper Motor
Y	Y axis Stepper Motor
Z	Z axis Stepper Motor
LIMIT	Home Switch of the X Y Z
SPINDLE	Spindle motor
LASER	Connect to the Laser Module (NOT included in standard packing)
OUT1	200mA, 24V NPN Output, (M code: M8)
AUTO-CHECK	For Z probe

Installation Final Check

1) X, Y and Z stepper motors are installed. ☐
2) Spindle motor is installed. ☐
3) X, Y and Z coupler's set screw are tightened. ☐
4) X, Y and Z stepper motor socket are connected. ☐
5) Spindle Motor socket are connected. ☐
6) X, Y, Z, Limit and Spindle cable are connected to controller box ☐
7) 24V DC adapter socket is plugged. ☐
8) Electrical power cord is plugged. ☐

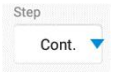
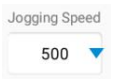
Software Instruction

Gagtek JCNC app is our own-developed software, we will keep update this software and update the app in our website. You can also click into our JCloud inside the app to get more information or tutorial video.

Main Page

Button Description:

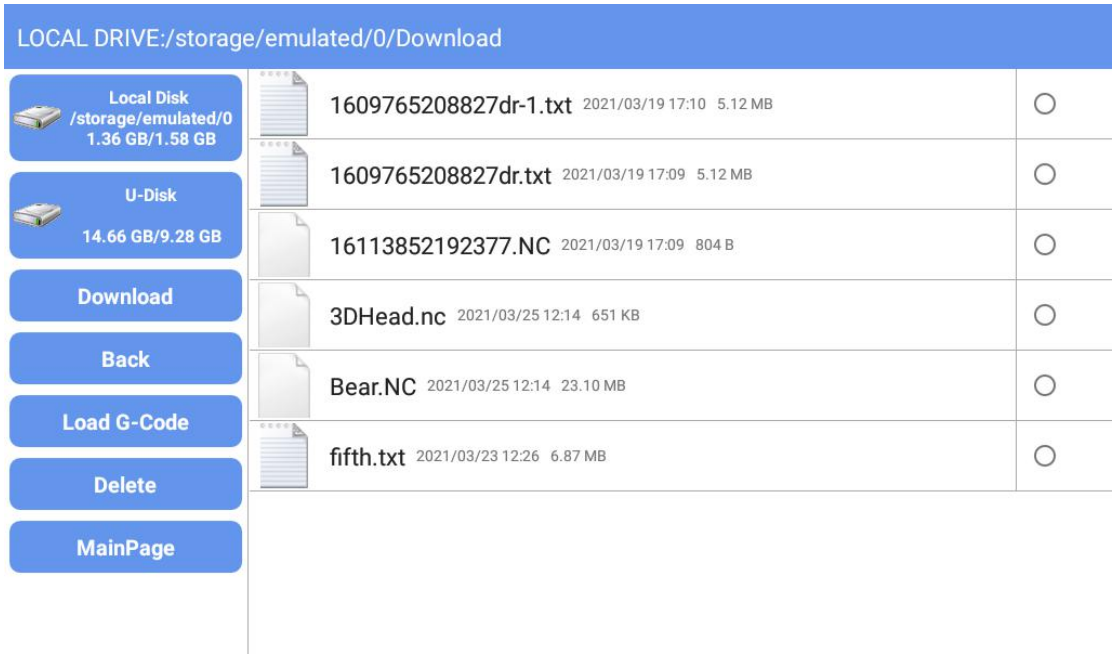
	"File" Jump to the g-code file management page	X-	"X- Jog" X negative position jogging
	"Back to Zero" Machine will move to user's working zero position.	X+	"X+ Jog" X positive position jogging
	"Probing" Start to probe the Z height, make sure you have connected the Probe before use.	Y-	"Y- Jog" Y negative position jogging
	"Setting Page" Press to jump setting page	Y+	"Y+ Jog" Y positive position jogging
	"Send Manual Code" press to send the code you entered at "Manual Input" bar.	Z-	"Z- Jog" Z negative position jogging
	"Run" Start the g-code	Z+	"Z+ Jog" Z positive position jogging

	“FeedHold”, pause the running g-code with deceleration.		“Full view” Show the full view of the 3D graphic
	“Stop”, stop the machine immediately without deceleration, machine may lose steps at emergency braking.		“Top View” Show the top of the 3D graphic
	“ZERO X” zero the x axis working position at G54		“Left View” Show the left side of the 3D graphic
	“ZERO Y” zero the y axis working position at G54		“Right View” Show the right side of the 3D graphic
	“ZERO Z” zero the Z axis working position at G54		“Step ” Jogging step. “Cont.” means continuously movement, 1 mean 1mm/inch after press Jog buttons
	“SPINDLE” Spindle/Laser on off. Long Press to power on. Short press to power off.		“Jogging Speed”, select the jogging speed.
		Feedrate Override, can real time modify the feedrate override from 10% to 200%	
		Spindle Speed Override, can real time modify the spindle rotating speed or laser power from 10% to 200%	

Motion Status

	Idle or standby mode
	Machine is running g code
	Machine is moving back to home
	Jogging motion means manual control the joystick buttons on the panel.
	Pause or feedhold, press “Run” to continue or “Stop” to standby mode. Jogging is support in this state.
	Emergencies stop or unknow critical error, may cause the position drifted because quick braking from motion
	During the soft limit is turned on, if the g code running travel out of range, will trigger machine warning.

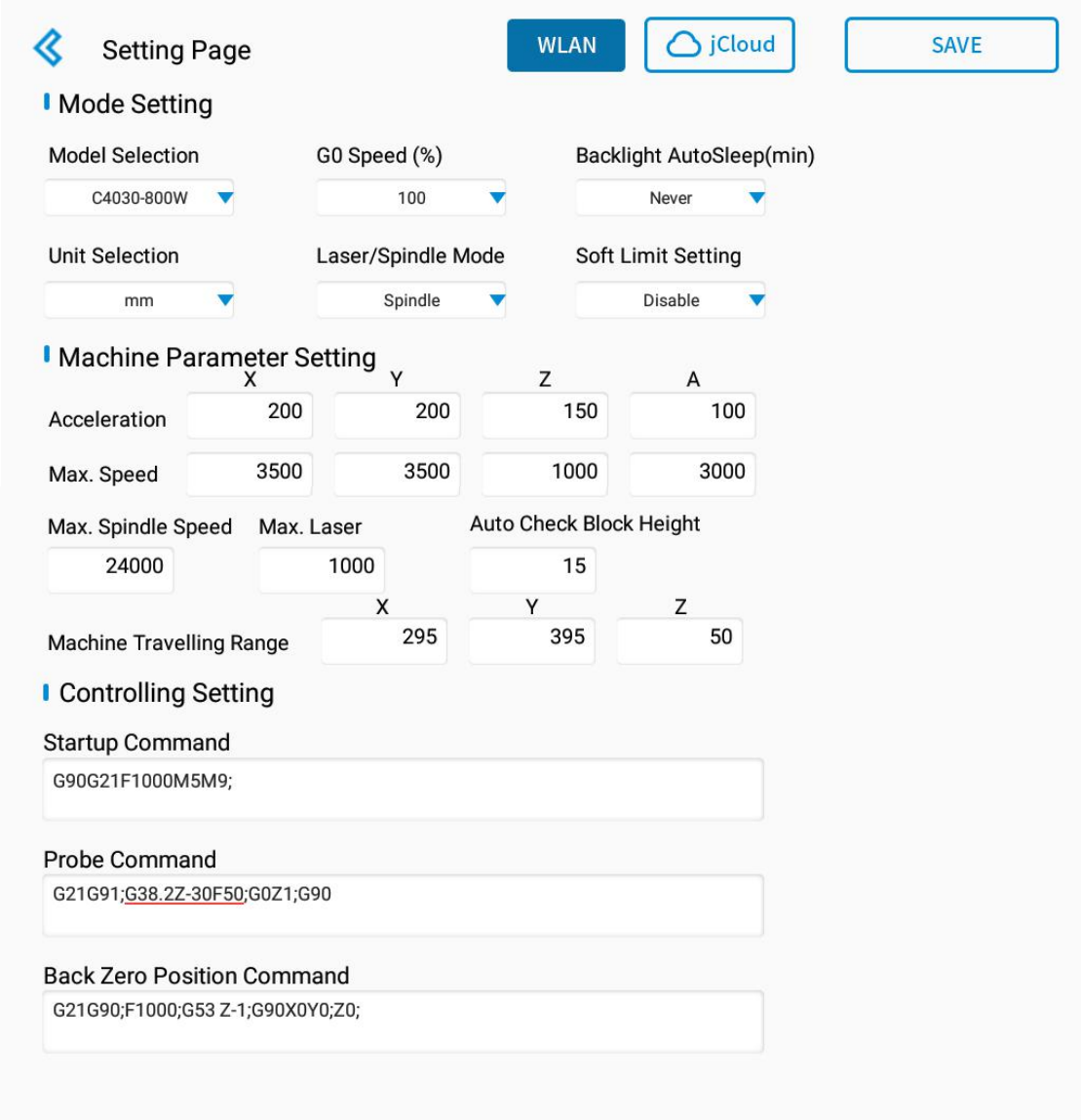
File Page



Description

Local Disk /storage/emulated/0 1.36 GB/1.58 GB	This is the android panel local storage folder; we suggest user to place g-code inside the folder to run g-code. If you download G-code in our JCloud, the file will be appeared in this folder
U-Disk 14.66 GB/9.28 GB	U-Disk is the folder of your external U Flash disk. You can select the g-code file and press “Download” button to download from U disk to Local Disk
Download	Button to download from U Disk to Local Disk
Back	Jump to upper folder.
Load G-Code	After you select a g-code file, press this button to load in Main Page.
MainPage	Press to go back to Main Page
	Selection box, you have to select one of the target file to operate the above functions

Setting Page



Description

WLAN	Setup the WIFI connection	**Laser/ Spindle Mode**	We can set the machine is using Laser or Spindle mode. At Laser mode, on/off spindle in g-code will reduce the waiting time.
jCloud	Click to GagTek cloud can see the online tutorial video and	**Soft Limit Setting**	Enable/ Disable the soft limit function. Homing Cycle must

	relevant manual		be operated before soft limit can work properly.
SAVE	After modifying any parameter in this page, you must press SAVE to apply.	**Acceleration**	Axis acceleration in mm^2/min
	Back to Main Page	**Max. Speed**	Maximum speed the axis can move in mm/min
Model Selection	Select the correct model number of your machine, we have default setting.	**Max. Spindle Speed**	Maximum spindle speed in RPM
G0 Speed (%)	G0 or rapid speed percentage	**Max. Laser**	Maximum laser power, default 1000.
Backlight AutoSleep(min)	Android panel backlight setting time, while time up the backlight will drop to 30%	**Auto Check Block Height**	The auto check height from the user zero surface. Default is 17.9mm
Unit Selection	Inch or mm display. In CNC standard need to use G20 or G21 inside g-code.	**Machine Travelling Range**	Machine travelling range is using for soft travelling limit
Startup Command	While power up will send the command to Grbl motion board.	**Probe Command**	During we press the “Probing” button in Main Page, we will send this g-code. G38.2 is recommended
Back Zero Position Command	During we press “Back to Zero” button, system will send this g-code		

Z Probe

1) Connect the AutoCheck, clip the black clamp to the tool bit.
2) And Then place the AutoCheck block under the tool bit.
3) Press “Probing”  button
4) Z axis will slowly going down until it touch the surface of the autocheck

5) And then it will stop moving and rise up for 1mm.
6) Z working axis position will be set to the block height you set in setting page.

Maintenance

Service

WARNING **Preventive maintenance performed by unauthorized personnel may result in misplacing of internal wires and components which could cause serious hazard. Please contact service support by email support@gagtek.com for the maintenance problem.**

Cleaning

WARNING **To avoid accidents always disconnect the controller box from the power supply before cleaning or performing any maintenance.**

Always wear safety goggles when cleaning with compressed air. Ventilation openings and switch levers must be kept clean and free of foreign matter. Do not a tempt to clean by inserting pointed objects through openings.

WARNING **Certain cleaning agents and solvents damage plastic parts.** Some of these are: gasoline, carbon tetrachloride, chlorinated cleaning solvents, ammonia and household detergents that contain ammonia.

Maintenance Timetable:

Develop a periodic maintenance schedule for your machine When cleaning be careful not to disassemble any portion of the machine since internal wires may be misplaced or pinched.

	Part	Period	Requirement
1	Cables and connectors	Each day before using	Check the connectors, cables have aging, damaged or loosen
2	Machine surrounding area	Anytime on or before using	Clean surrounding wooden or metal dust or powder.
3	X,Y and Z axis driving system	15 days	Keep cleaning, and regrease with suitable

			lubricant on the ball screw surface
4	X,Y and Z axis railing system	15 days	Keep cleaning, and regrease with suitable lubricant on rail the surface
5	X,Y and Z axis coupler	3 months	Check the set screw is tighten or not
6	Controller box	1 month	Clean dust, keep clean and well ventilated (Before open the case, make sure the electricity plug is removed for 1 hour or above)
7	Spindle motor	Anytime on or before using	No abnormal sound or jammed during using
8	Spindle motor cooling fan	Anytime on or before using	Clean dust, keep clean and well ventilated at the air vents

THANKS

For further information, g-code resources, and video tutorial, you can visit our website www.gagtek.com

or directly click on your android panel JCLOUD 

at setting page.

Also you can get the video tutorial in Gagtek Youtube channel:
https://www.youtube.com/channel/UCrzbyEEb2K_ziKTCk7mJlUg

If you need technique support, please email us: support@gagtek.com

LIMITED WARRANTY OF GAGTEK BENCHTOP CNC MACHINE

GagTek (“Seller”) warrants to the original purchaser only, after sales service will be free from defects in material (not including spindle motor and accessory items) or workmanship for a period of one year from date of purchase. Spindle motor warranty period is 3 months form date of purchase.

SELLER’S SOLE OBLIGATION AND YOUR EXCLUSIVE REMEDY

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