

# WHAT YOU NEED TO KNOW BEFORE YOU BUY A CNC ROUTER

## Commonly asked questions about our CNC Routers

### WHAT'S THE DIFFERENCE BETWEEN A HELICAL RACK AND BALL SCREW ASSEMBLY?

A helical rack assembly has a long linear-shaped gear that meshes with a rotating helical gear to provide linear motion. The X- and Y-axes on the CNT 900 and the Y-axis on the CNT 1000 are helical rack-driven.



A ball screw assembly (as used on CNT's Z-axis assemblies) consists of a screw spindle and a nut, integrated with balls and the balls' return mechanism. The screw rotates to convert rotary motion into linear motion, or torque to thrust, and vice versa. The X-axis on the CNT 1000 is a rotating nut ball screw assembly where the nut rotates to create linear motion, while the screw is stationary.



### WHAT'S THE DIFFERENCE BETWEEN A STEPPER AND SERVO?

Both stepper and servo drives provide basically the same cutting results. The primary difference between the two is that a stepper is what's called an "open-loop" system, and a servo is a "closed-loop" system. In a closed-loop system, there is constant signal feedback from the encoder (or motor) to the servo drive. This feedback tells the servo drive exactly where it is within its move. Thus, the servo drive can adjust its power output, if necessary, to complete the move. The servo is more powerful, has quicker acceleration time and a quicker positioning speed. All of CNT Motion's CNC routers are servo-driven.

### WHAT SIZE MACHINES DO YOU OFFER?

Both the CNT 900 and 1000 Series offer 48" X 96" and 60" X 120" standard cutting areas. Special requests for custom lengths and widths on both models will be handled on an individual basis.

### HOW FAST WILL MY MACHINE GO? HOW FAST CAN IT CUT MY PARTS?

CNT Motion's 900 Series routers have *positioning* speeds of up to 1000 inches-per-minute. The 1000 Series can move transversely at up to 2000 inches-per-minute. However, your cutting speed (feed rate) will depend upon various factors, including:

- **Rigidity of Set-Up**—Vibration is a major source of tool wear and poor finish. The less vibration you have, the quicker you can feed your cutting tool, and, consequently, the smoother finish you will get.
- **Router Environment**—Other variables that affect every routing application are spindle horsepower, rigidity and runout, collet condition, fixturing system and tool sharpness.
- **Number of Flutes**—Single flute tools should generally be fed at a slightly higher rate (approximately 10%) than double flute tools.
- **Bit Diameter**—A 3/8" bit can be fed 10% faster than a 1/4" bit. A 1/2" bit can be fed 20% faster than a 1/4" bit.
- **Depth of Cut**—Your feed rate should be decreased approximately 25% for each multiple of the depth of cut. (If depth is two times, reduce by 25%; if depth is three times, reduce by 50%.)
- **Spindle Speed**—The faster the RPM of your spindle, the quicker you can cut your parts.

Tooling catalogs (like Onsrud Cutter) typically provide CNC router feed charts as a reference tool. When buying tools, these guides can prove to be an invaluable resource.

### WHAT HP SPINDLE DO I NEED?

As with most subjective questions, the type and thickness of your material, the type of tooling you're using and the nature of your part(s) will determine what type of spindle you need. CNT Motion will happily assist you to determine the ideal spindle for your needs.



### HOW ACCURATE ARE YOUR MACHINES?

Each of CNT Motion's machines have a *positioning* accuracy of ±.002 inches over the entire length of the machine. However, improper tooling and feed rates may affect the accuracy.

### HOW MUCH Z-AXIS TRAVEL DISTANCE IS THERE? CAN YOU MAKE IT LONGER?

The standard Z-axis throat clearance is 11" on the CNT 1000 Series. On the CNT 900 Series, throat clearances of 7" and 11" are available. However, the thickness of your decking material will reduce these amounts accordingly. Special requests for custom Z-travel distances will be addressed on an individual basis.

### HOW DO YOU PROGRAM THE MACHINE TO CUT PARTS? IS IT EASY TO DO?

CNC Controller, the motion control software we use, is based on standard G-codes. The G-codes provide a source code comprised of inches and axis movements which can be edited and understood by others. Most CAM packages will generate G-codes from the drawings you create. It's actually quite simple.

### WHAT OTHER SOFTWARE, OTHER THAN WHAT'S INCLUDED WITH THE MACHINE, DO I NEED?

No extra software is needed to actually *run* the CNC router. However, your specific needs will determine if you need any specialized software (AutoCAD, etc.) to create your part files and CAM them.

### HOW DO I FIXTURE MY MATERIAL?

The size of your part, type of material and production goals will determine the most suitable method. Generally, a vacuum system is the most efficient method of fixturing your material. CNT Motion offers vacuum systems with either a regenerative blower or claw pump. A rotary blower is usually better for smaller parts.

You can also mechanically fixture your material with clamps, screws or double-stick tape. These methods

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