



All You Need To Know About CNC Lathe Machines

CNC machining plays a huge role in shaping today's advanced industrial development. We are now capable of developing most complex of parts and products with absolute perfection, and with minimum of effort.

Whether it's about creating 3D, 4D or 5D machined parts, CNC technology has provided us with a sure shot way to convert our 'mechanical fantasies' into a tangible reality!

Now, there are multiple types of CNC machining process. All of them have different functionalities and operations; CNC turning uses a helix path to cut through the material, while [CNC milling](#) uses rotary cutters to remove excess material. All of them require specific machining tools that enable the workpiece to work do the desired work. CNC lathe is one such important tool. In fact, the lathe is seen as the pioneer for being the machine for metal cutting.

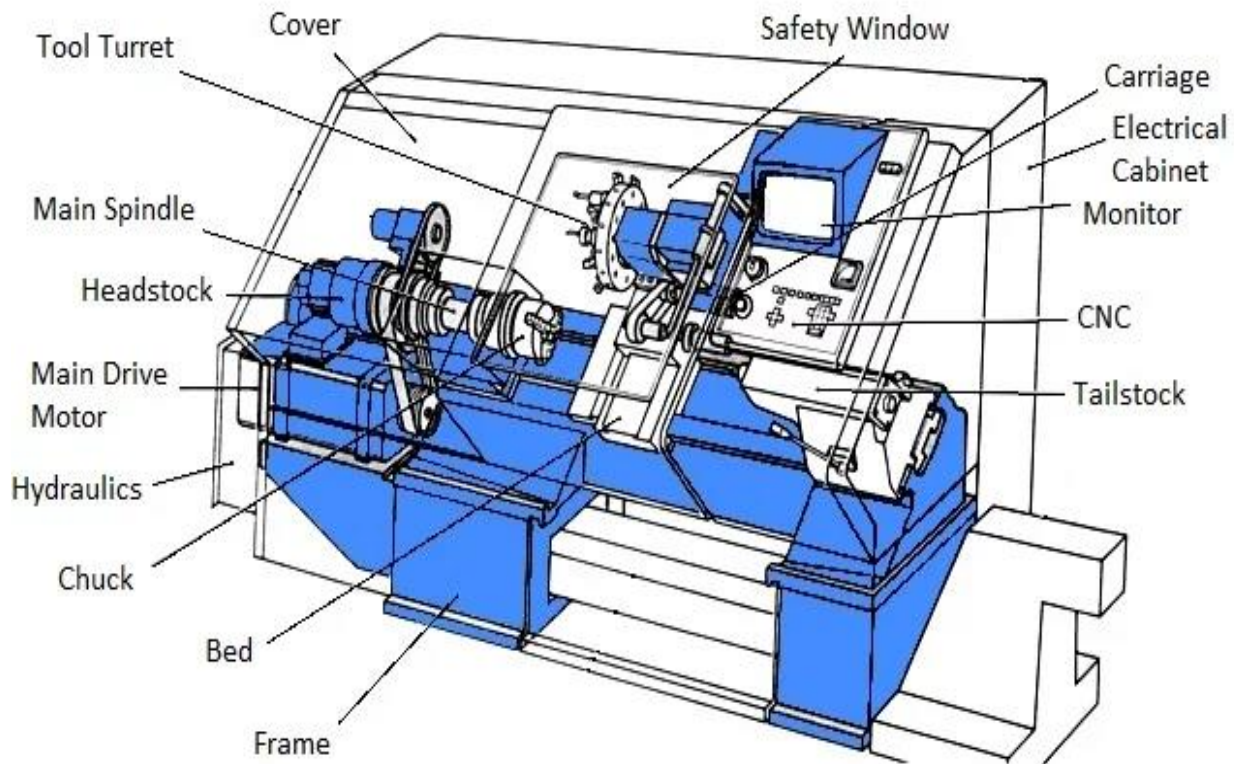
Sounds interesting, right? Let's delve deep into the functioning, properties, and types of CNC lathe machine.

Introduction

A lathe machine is typically used for shaping the material into the desired form by removing the excess material from a given workpiece (generally cylindrical). Apart from serving as cutting and facing machine, a lathe is also used to perform complex operations such as knurling, deformation, metal spinning, woodturning, thermal spraying, metalworking and more.

According to machine historians, the manual lathe was first used by the reformers in the Ancient Egypt and Greece. The European nation widely utilized two-person lathe variety, with the former turning the workpiece (wood) and the latter cutting off the excess material with a single point cutting tool. With the Industrial Revolution came the modern lathe; advanced, fast, and better!

Main Parts of a CNC Lathe Machine



Before moving on to the functioning of a lathe machine, let's quickly go through the primary components of a [lathe machine](#):

1. Bed: As the name suggests, the bed of a lathe serves as the base of the whole machine where the different components are mounted. Generally heavily rigid in structure, the lathe beds are made from a 9:1 combination melting of toughened cast iron (semi-steel) and steel scrap. This method helps lathe bed to perform a sliding action easily.

While single-bed lathe machines are quite popular, we also get two-three pieced beds, pieces bolted together to meet the desired length. The beds have a high damping capacity to absorb the vibrations produced by the working machine.

2. Carriage: Used for mounting and moving the cutting tools, a carriage moves the tool horizontally and vertically on the bed for a smooth cutting process.



- 3. Chuck:** A chuck is responsible for holding the workpiece. This component is attached to the spindle that rotates both the chuck and workpiece.
- 4. CNC Control Panel:** The storage center of the machine, CNC control panel stores all the CNC programs and instructions. The CNC expert operates the machine by controlling the keys on the panel, instructing the machine to produce the desired results.
- 5. Headstock:** This part functions as a holding device for the other components of the lathe like gear chain, spindle, driving pulley and more.
- 6. Main Spindle:** The main feeding center of the machine. Stock is fed via the headstock.
- 7. Main Drive Motor:** The drive motor helps rotate the chuck, thus driving the entire machine.
- 8. Tailstock:** A tailstock is usually used to conduct drilling operations and support the system.
- 9. Tool Turret:** A tool turret is used a tool carrier for the machine. The shape and the size of the turret is determined by the number of tools that'll be mounted on them.

CNC Lathe Machine: How Does It Work?

As discussed in the last part, a typical lathe comprises of a bed, headstock, tailstock, chuck, tool turret, carriage and a spindle for feeding purposes. The following steps define how this particular machine works:

- 1. First Step:** After checking the machine for the working faults, a cylindrical workpiece is attached to the chuck. Its position can differ as per requirement.
- 2. Second Step:** We now set the spindle on the desired speed, thus rotating the chuck and the workpiece. Major attention needs to be paid on the spindle speed as any discrepancy can cause cutting errors. Check if the workpiece is turning properly.
- 3. Third Step:** Now locate the cutting tool at the desired feed by moving the tool turret and carriage. Pay special attention to feeding speed.
- 4. Fourth Step:** Remove all the excess metal by moving the carriage to get the finished [CNC products](#).



Types of Lathe Machines

Just like every other machine, a lathe machine also has different varieties that are used to fulfill different work requirements. Let's have a look at the major types of the CNC lathe machine:

Engine Lathes

Pretty popular amongst manufacturers, an engine lathe perfectly suitable for low-power operations. But that doesn't mean that it cannot be used for high-power operations. This device is very reliable and versatile, operating on a wide range of speed & feed ratios. This type is perfect for manufacturers looking for a machine that works with different metals.

Centre Lathe

Centre lathe is a lathe type where the spindle speed is managed via a set of gears that are operated by using a lever.

Gap Bed Lathe

This type of lathe machine contains a removable bed section to accommodate the larger diameter of a workpiece, hence the name gap bed lathe. Generally, the part next to the headstock is removable.

Speed Lathes

A simpler version of a lathe machine, the speed lathe only has a headstock, tailstock, and tool turret. This type is generally used for light machine work as it can only operate in three or four speeds.

Bench Lathe

Smaller in size, a bench lathe can be mounted on a workbench for conducted lighter jobs.

Tool Room Lathes

This type is known for providing the best finishing. Tool room lathe is highly versatile, working in a number of speeds and feeds.

Turret Lathes

A turret lathe is ideal for quick and sequential workings. With the tool holder in the vicinity, performing multiple operations on a single workpiece becomes several folds easier.

Special Purpose Lathes

These special purpose lathes are used to perform heavy-duty production of identical parts. Some of the popular special purpose lathes include automatic lathes, crankshaft lathes, bench-type jewelers' lathes, duplicating lathes, and multi-spindle lathes.