Research Paper On Study Of CNC Machine

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ABSTRACT

The main purpose of this article is to learn about CNC Computer Numerical Control machines for mass production. This article also mentions programme functions, safety and part programming which help by reducing the production time and increasing the productivity and efficiency. Movement of the machine is done by giving commands. All the operations are carried out by codes (G-code & M-code) like speed, feed, depth of cut, etc. For every operation separate code is available. The warning system is available to save guard the various operations and components.
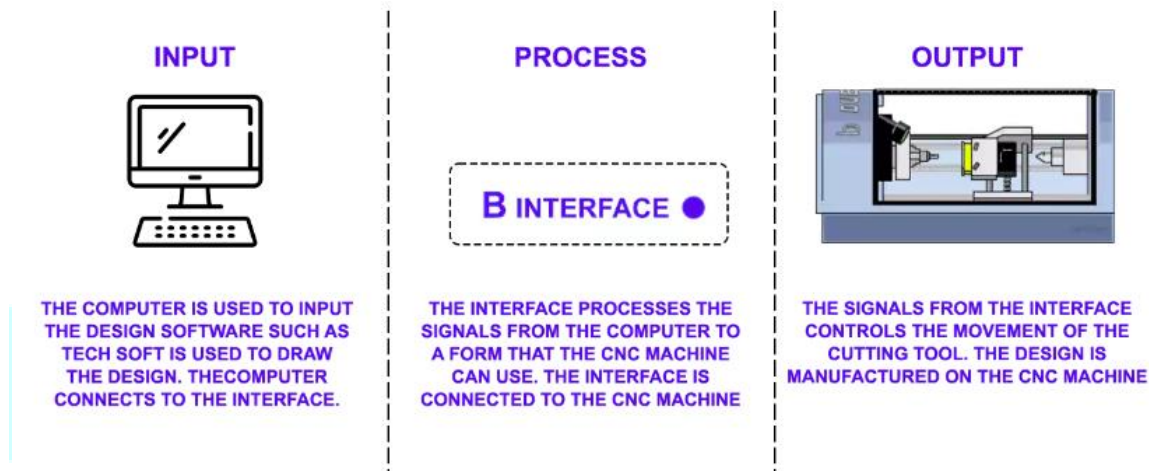
Keywords: CNC Machine, Programming, Code Commands, Study of CNC, Different Operations.

1. INTRODUCTION

1. The design is uploaded to the computer connected to the CNC machine. The computer converts the design into specific numbers (numbers) that control how the CNC cuts and produces the material.
2. Attach the block this must be done carefully so that it does not fall off the block during operation.
3. The block is then placed on a vise on the CNC. It should be kept very well. If the machine is not stable when it starts cutting the material, it may come out of the vise. When the machine starts working, it will move up, down, right and left according to the vise design.
4. The officers are in place. It protects the operator when the material is pulled from the vice by the force of the cutting machine. For safety reasons, the engine will not start if the guard is not in place.
5. The CNC turns on and cuts the shape of the product. When the cutting machine stops, the work piece can be removed from the vise.

1.1 CNC Machine – Input Ideas, actions, outputs. We can define the complete CNC machining process by the following blocks.

1. **Computer**: It is used to draw patterns. But the design is just a picture and the CNC machine cannot use it to produce the product. The computer software must also convert the drawings into numbers (coordinates) that the CNC machine can use when it begins cutting and fastening parts.
2. **Interface**: The computer cannot be directly connected to the CNC machine tool. The computer is connected to the interface. It converts the signal coming from the computer into a form that the CNC machine can understand. When the signals are sent to the CNC machine too l, they are digital signals.
3. **Computer Numerical Control (CNC)**: Machine Signals from the interface control the motors of the CNC machine. This signal determines how th e vise moves. The vise moves in three directions: X, Y and Z (horizontal, vertical and depth). This signal also controls the speed of the cutting tool.

INPUT	PROCESS	OUTPUT
B INTERFACE ●		
THE COMPUTER IS USED TO INPUT THE DESIGN SOFTWARE SUCH AS TECH SOFT IS USED TO DRAW THE DESIGN. THECOMPUTER CONNECTS TO THE INTERFACE.	THE INTERFACE PROCESSES THE SIGNALS FROM THE COMPUTER TO A FORM THAT THE CNC MACHINE CAN USE. THE INTERFACE IS CONNECTED TO THE CNC MACHINE	THE SIGNALS FROM THE INTERFACE CONTROLS THE MOVEMENT OF THE CUTTING TOOL. THE DESIGN IS MANUFACTURED ON THE CNC MACHINE

1.2 CNC control panel: CNC machine tools are usually controlled by computers and software. However, most CNC machine tools have manual controls. The use of CNC machine tools is rare because simple operations are best done on cheap/simple/manual machines. When a CNC machine too l is used manually, it is used well below its capabilities and specifications.

Reset Button: The most important control button is usually the Reset button. When the CNC machine is this will reset the tool and move it to coordinates 0, 0, 0 in the X, Y and Z axes. In short, t he reset button moves the cutter towards the corner of the machine, towards the top of the bench. If the reset button is not pressed, the

CNC machine may start cutting the part in the wrong direction or even miss the cut part and move it to the working position. Turned on, the machine tool operator presses the reset button.

Manual Control: The cutting machine can be controlled manually, although it is not very necessary. The x and y buttons control the movement of the tool across the horizontal surface. -Z - Button that controls depth and up/down movement.

Stop Button: Most control panels have a stop button. When these keys are pressed, the machine will stop quickly.

Speed and feed: In some CNC machine tools, the speed and feed of the tool can be changed.

2. ADJUSTING THE CUTTING TOOL TO THE ACCURATE LENGTH

One of the few tasks the operator performs is changing Use a special depth gauge to complete the cutting tool. This "rule" applies to all CNC cutting tool. Every CNC machine tool has a cutting tool. Flat cutters, chamfered V-groove cutters, and radius cutters are some examples. If the design is detailed, the cutting tool must be changed at least once during the production process. It is important that all tools in the mirror are adjusted for a long season. If this is not done, the product will be handled incorrectly but different techniques may be used depending on the type of CNC machine. Use a wrench to loosen the collect and lock nut. The cutting tool can be removed and the new tool placed in place. When the depth gauge is used to check the distance from the tip of the cutting tool to the chuck, Use the wrench again to tighten the collect and lock nut.

The cutting tool can be removed and the new tool placed in place. When the depth gauge is used to check the distance from the tip of the cutting tool to the chuck,

2.1 CNC machine tools and safety: CNC machine tools are very safe to use because they are designed to be as safe as possible. One of the most important advantages of CNC machine tools is that they are safer than mechanical tools.

1. Most CNC machine tools today are designed so that the cutting tool will not work unless the guard is in place. Also, the best CNC equipment can lock the guard in place while the machine is cutting the material. The protective cover opens only when the device is stopped.

2. Students/apprentices/machine operators should receive "good" training before attempting CNC equipment.

3. CNC mills are used to create materials such as wood and plastic and can be used in extraction. Dust can be very harmful if inhaled and cause eye irritation. The CNC mill shown above has an outlet for the extractor. Since the router is completely insulated, dust cannot escape into the environment. Dust can be removed if a

dust removal device is installed. Most handmade routers have a very small exhaust system that leaves some dust in the air.

4. The CNC mill above has a power level. Older machines such as manual milling machines and center lathes have three power levels. Single phase power can be "plugged" into any existing electrical outlet. The power supply of the machine is provided by Residual Current Circuit Breaker (RCB). In case of power outage, RCB will cut off the electricity immediately.

5. Single- stage CNC machine tools can be moved more easily because they can be easily removed and reused. Three-phase systems are specially connected to electricity by a professional electrician and cannot be disconnected.

6. CNC machine tools often operate behind guards or even with transparent doors. T his means the operator will not be injured by "flying" fragments of sharp/hot objects.

7. Common sense applies to the use of all machines, including CNC machines. Basic safety training for working in the workshop and using other machines also applies to CNC machines.

3. PROGRAMMABLE FUNCTIONS

The programmer must know the functions of the programmable CNC machine tool (and the instructions for the programmable functions). With low- quality CNC equipment, most machine operations often need to be started manually. For example, in some CNC milling machines, the only feature that can be programmed is axis movement. Everything except must be initialized by the operator.

In this machine, spindle speed and direction, coolant and tool change must be manually initiated by the operator. On the other hand, with advanced CNC equipment, almost anything can be programmed and the operator only needs to load and unload the work piece. When the loop is open, employees are free d to do other company work. Refer to the machine manufacturer's manual to find out whether your machine's features are programmable. To give you some examples of how interested you might be in programmable function ns, here are some of the most common programmable functions and their associated programming g languages.

Spindle Control The "S" word is used to indicate the spindle speed (in RPM for the machining center). M03 is used to rotate the spindle clockwise (forward). M04 rotates the spindle counterclockwise. M05 turn s off the spindle. Note that the delivery center also has a feature called speed limit, which allows the spindle speed to be specified in feet per minute (or meters per minute).

Automatic tool changer: The word "T" is used to indicate the machine that must be installed on the spindle. On most machines, M06 instructs the machine to complete the tool change. The tool changer (at the turning center) uses the four-digit "t" word to pick up the tool The first two digits of T indicate the number of the turret station, and the last two digits indicate the offset number used in the device. For example, T 0101 indicates station No. 1 and offset no. one.

Coolant Control: M08 is used to turn on the coolant. M 09 is used to turn off coolant.

Automatic Pallet Changer: M60 command is mainly used to change the pallet.

Forms of Compensation: All types of CNC machine tools require some form of compensation. Although requested for different reasons on different types of machines, each type of payment allows CNC users to include tools unrelated to program creation. Before we discuss how to get paid for CNC use, let's look at t he most common fees. Payment is used in many areas of daily life. Airplane pilots must balance wind speed and direction during flight. Competitors must pay for weather and track conditions when negotiating tracks. As the

bowling ball rolls down the lane, the bowler must pay attention to the spin of the bowling ball. The shooter firing the weapon must compensate for the distance to the target. A good example of this is the same as what happens with different payment types in CNC parts.

Offset: All payment types are related to offset. You can think of the CNC bias as the memory of an electronic computer. If your calculator has memory, you know that you can store constant values in each memory to use during calculations. This will save you from entering too many numbers and making incorrect calculations. Like the memory of an electronic calculator, offsets in a CNC controller are storage areas where values can be placed. Just as the values in the calculator's memory have no meaning until they are spoken by the user in the calculation, t he values in the offsets of the CNC control have no meaning until they are voiced by the user. Using the shooter's example, you can think of the value stored in the CNC offset as the adjustment required by the weapon sight to compensate for the distance to the target. Note that the gun should only be adjusted for a single target set away from the target. Most CNC machines require at least one offset for each tool.

4. CNC PART PROGRAMMING

CNC programming, or computer numerical control programming, is developing code, or a program of directions, for a computer to operate CNC machines and tools.
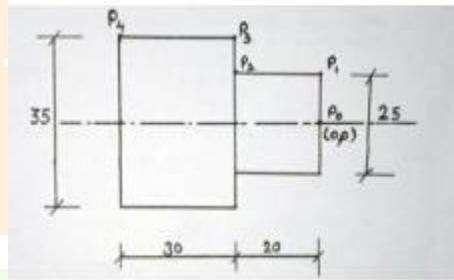
Programme 01234;

N001 G28 U00 W00;

N002 G90 G21 G95;

N003 M03 S820 M08;

N004 G00 X00 Z-2.00;

N005 G01 X00 Z00 F0.2;

N006 G01 X25 Z-20.0;

N007 G01 X35 Z-20;

N008 G01 X35 Z-50;

N009 G01 X37 Z-50;

N010 G28 U00 W00;

N011 M05;

N012 M09;

N013 M30;

5. CONCLUSION

In the study of computerized numerical control machine, production can be improved effectively and efficiently. CNC programming is a method of operating CNC machine tools. The use of CNC lathes provides many benefits such as increased productivity, accuracy and time control, but the only disadvantage is the cost. This cannot be used for all small jobs and is suitable for production and complex product. CNC lathes are designed for commercial use in mass production only and are not suitable for small businesses due to their high initial costs.

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