

# CNC TECHNOLOGY

## UNIT - I INTRODUCTION TO CNC MACHINE TOOL

---

CNC (Computer Numerical Control), the instructions are stored as a program in a micro-computer attached to the machine. The computer will also handle much of the control logic of the machine, making it more adaptable than earlier hard-wired controllers

# EVOLUTION OF CNC TECHNOLOGY

Early CNC machines in the 1940s and 1950s used punched tape, which was then commonly used in telecommunications and data storage.

This technology was replaced by analog computing technologies. From the 1960s into the 1970s, digital technologies emerged, making the production process automated and more efficient.



Punched Tape

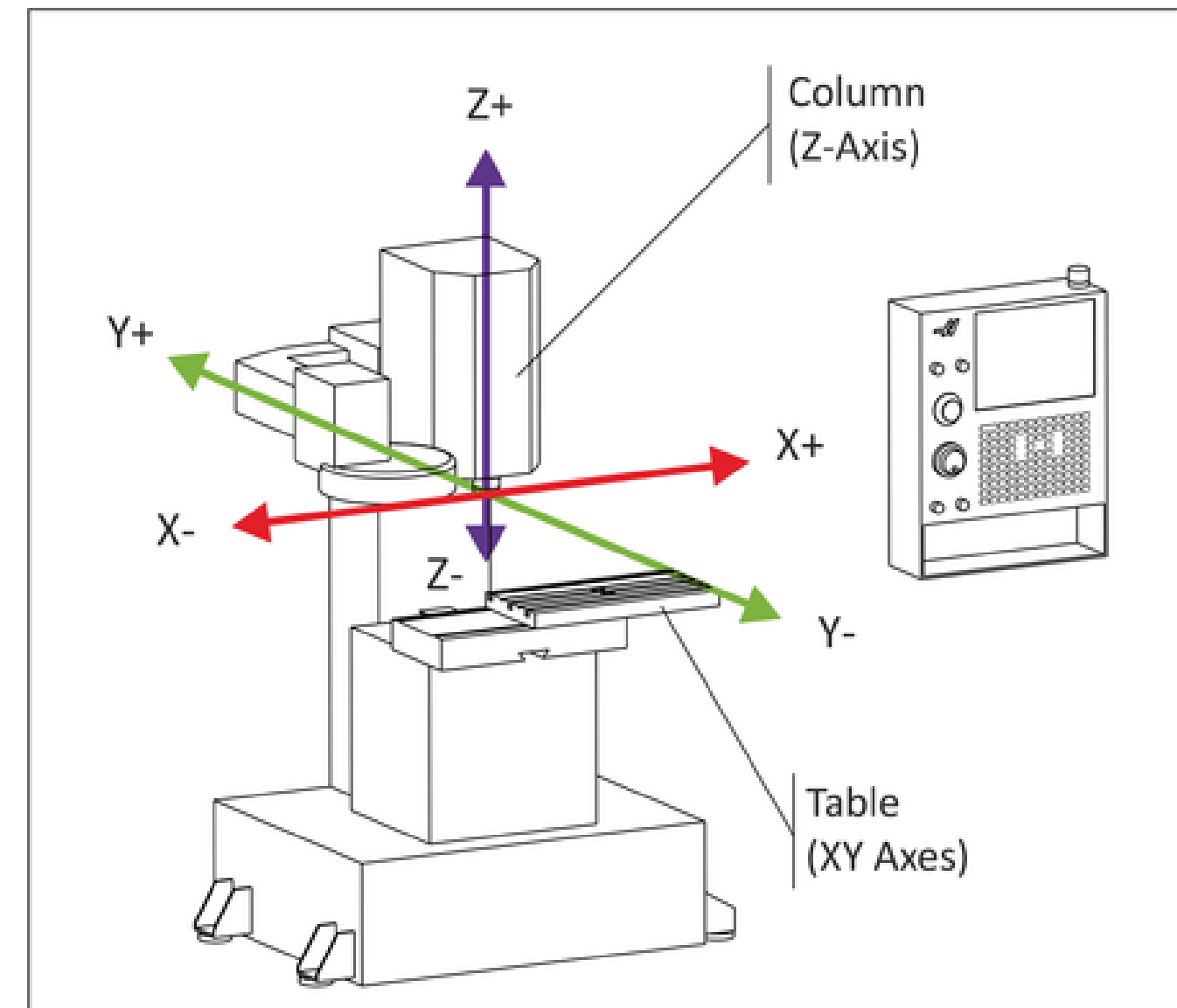


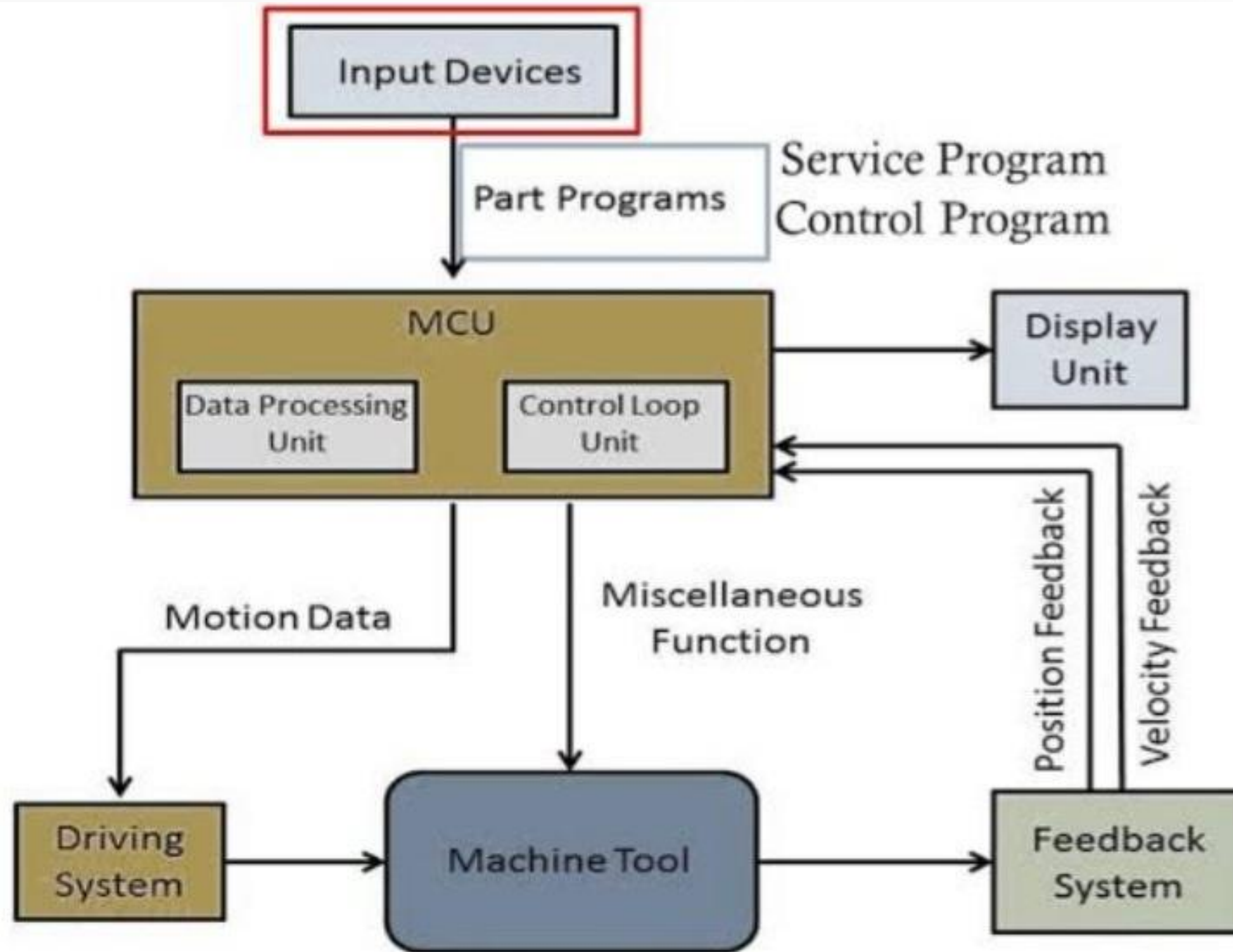
# PRINCIPLE OF CNC MACHINES

The control system of CNC machining center can generally control the machine tool to stop, change direction and speed automatically according to the digital program instruction. It can automatically control the feed speed, direction and processing path to process.

By controlling the relative movements between the tool and the work piece geometrical shapes are machined. Control of these relative movements through coded letters numbers is known as Numerical Control of machine tools.

A CNC axis machine is a computer-controlled device that moves along linear or rotary axes to perform various tasks, such as cutting or drilling. A CNC machine has typically three axes: the X-axis, the Y-axis, and the Z-axis.





# BLOCK DIAGRAM

# COMMON FEATURES IN CNC MACHINES

---

The tool or material moves.

Tools can operate in 1-5 axes.

Larger machines have a machine control unit (MCU) which manages operations.

Movement is controlled by a motors (actuators).

Feedback is provided by sensors (transducers)

Tool magazines are used to change tools



- **HIGH ADAPTABILITY**

Using CNC machine to produce different components always decided by different program. It doesn't need to produce and change too many tooling and clamp like general machine. So CNC machining is more used for small batch production, new products development, etc. It can help reducing the production time and costs.

- **HIGH PRECISION**

The precision by CNC machining can reach to 0.005-0.01mm. The CNC machine is controlled by numeric signal. When the numeric equipment output a impulse signal, the machine moves workpiece moving a pulse equivalent (about 0.001mm).

- **STABILIZATION AND RELIABLE**

Using the same CNC machine with the same tooling and program to produce a batch of components, the cutting path is absolutely the same for each workpiece. So the production components is all the same.

- **HIGH PRODUCTIVITY**

Automation allows machines to perform different tasks instead of spreading production processes across multiple machines. The time will get reduced by manufacturing the product in automation process. And get faster productivity compare to human works.

- **IMPROVING WORKING CONDITION**

After adjustment of CNC machine, input the program and then start the machine, the machine can produce workpiece automatically and continuously. The operator just need to input the program, edit, clamp and remove the workpiece, preparing tooling, watching the processing and inspecting the workpiece

- **GOOD FOR PROCESSING CONTROL**

Runsom Precision is your good partner for CNC milling and CNC turning.