


# Programmable Logic Controller

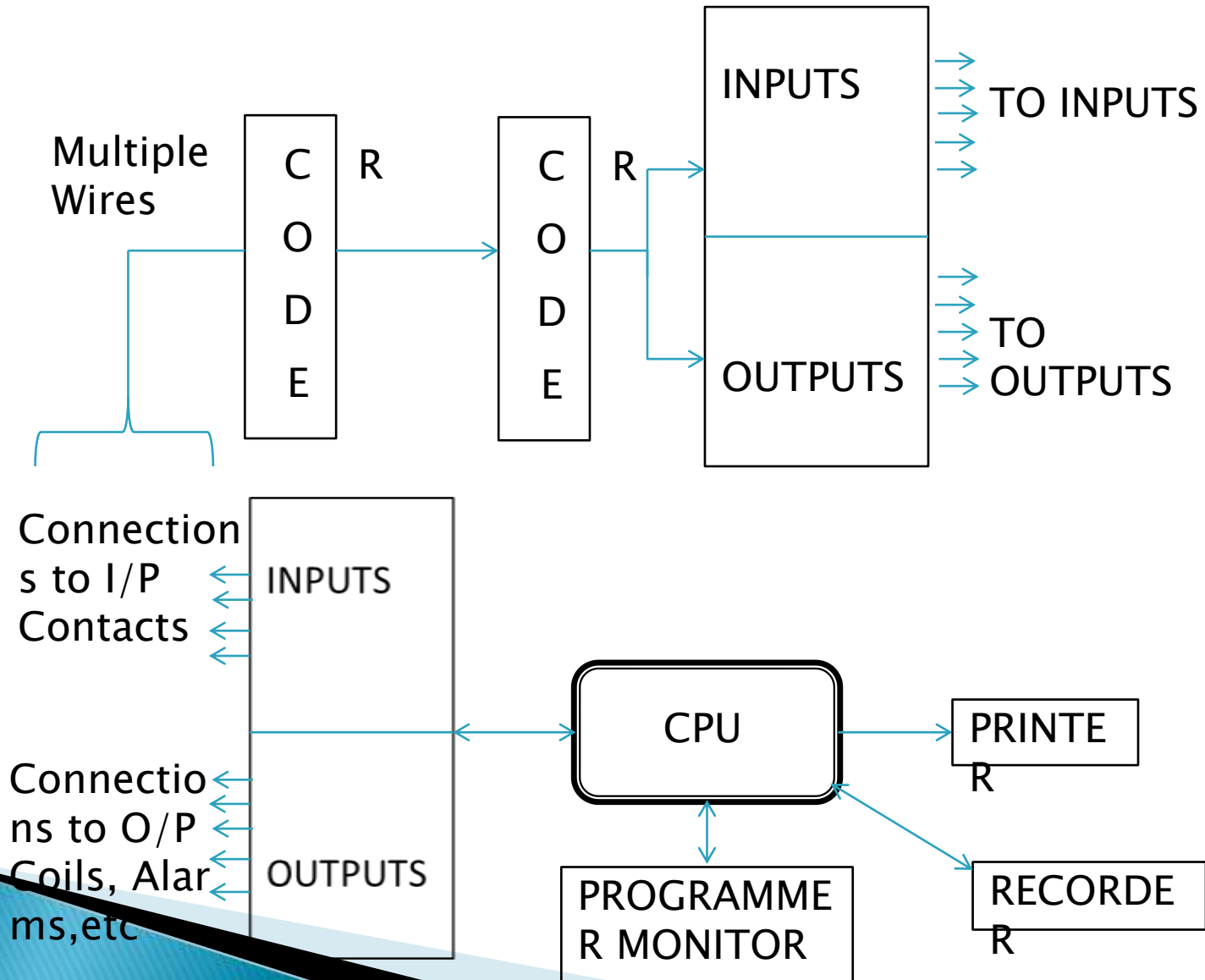
# Definition

- ▶ A PLC is a digitally operational electronic equipment which uses programmable memory of internal storage of instructions to implement a specific function.

# Features of PLC

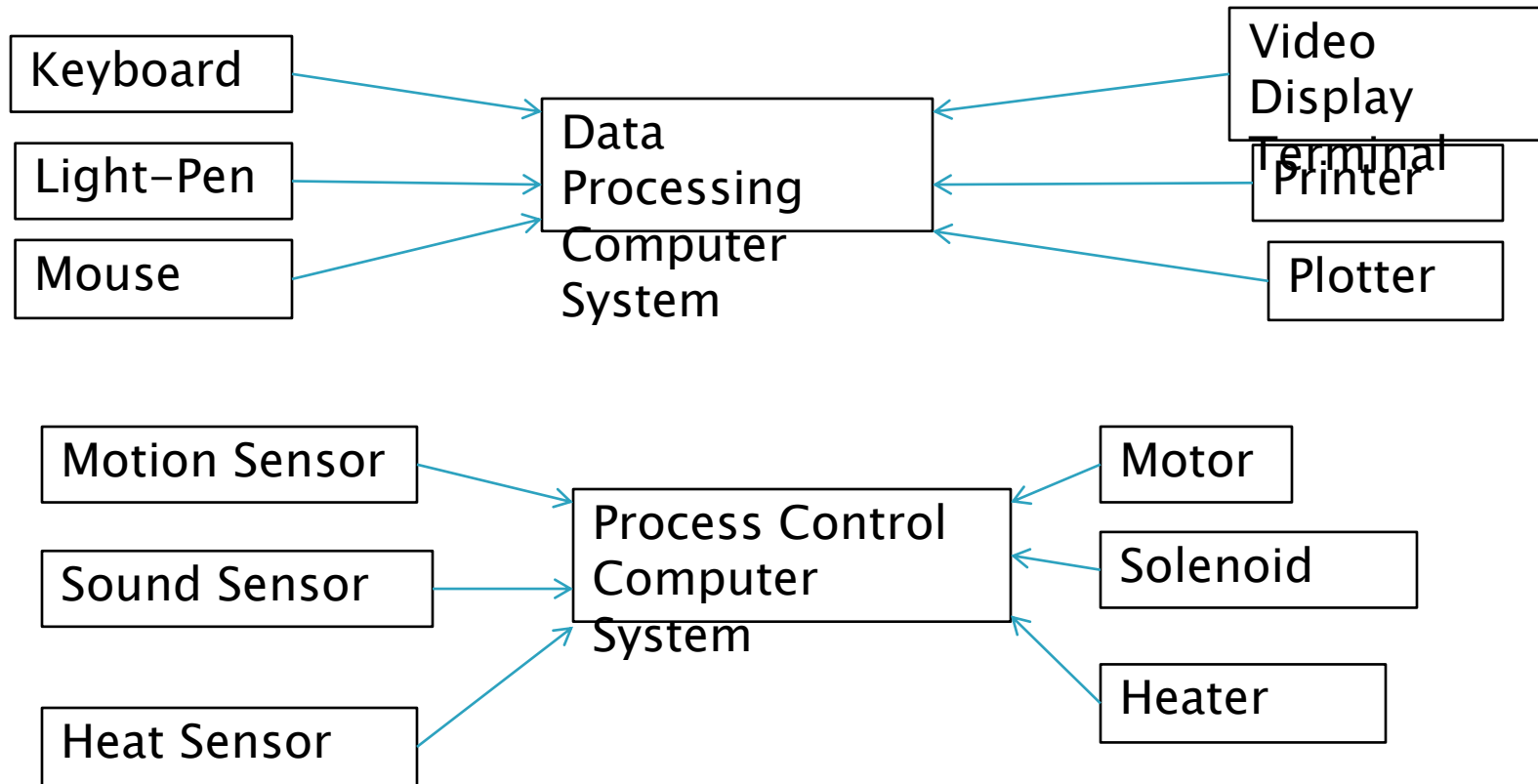
1. Flexibility: can run many types of machines at the same time with their own distinct programs.
  2. Easy implementation of changed and correction of errors.
  3. Large no. of contact coils available for programming.
  4. Its cost effective.
  5. It has pilot running feature enabling the pre-run and evaluation of a program in the office or lab.
  6. Its speed of operation can be determined through its scan time.
  7. The programming method is through ladder logic using Boolean logic.
  8. It is more reliable and easy to maintain as compared to solid-state components
  9. Ease of documentation of PLC Circuit.
  10. Fail safe operation.
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# PLC System Layout



# The Central Processing Unit

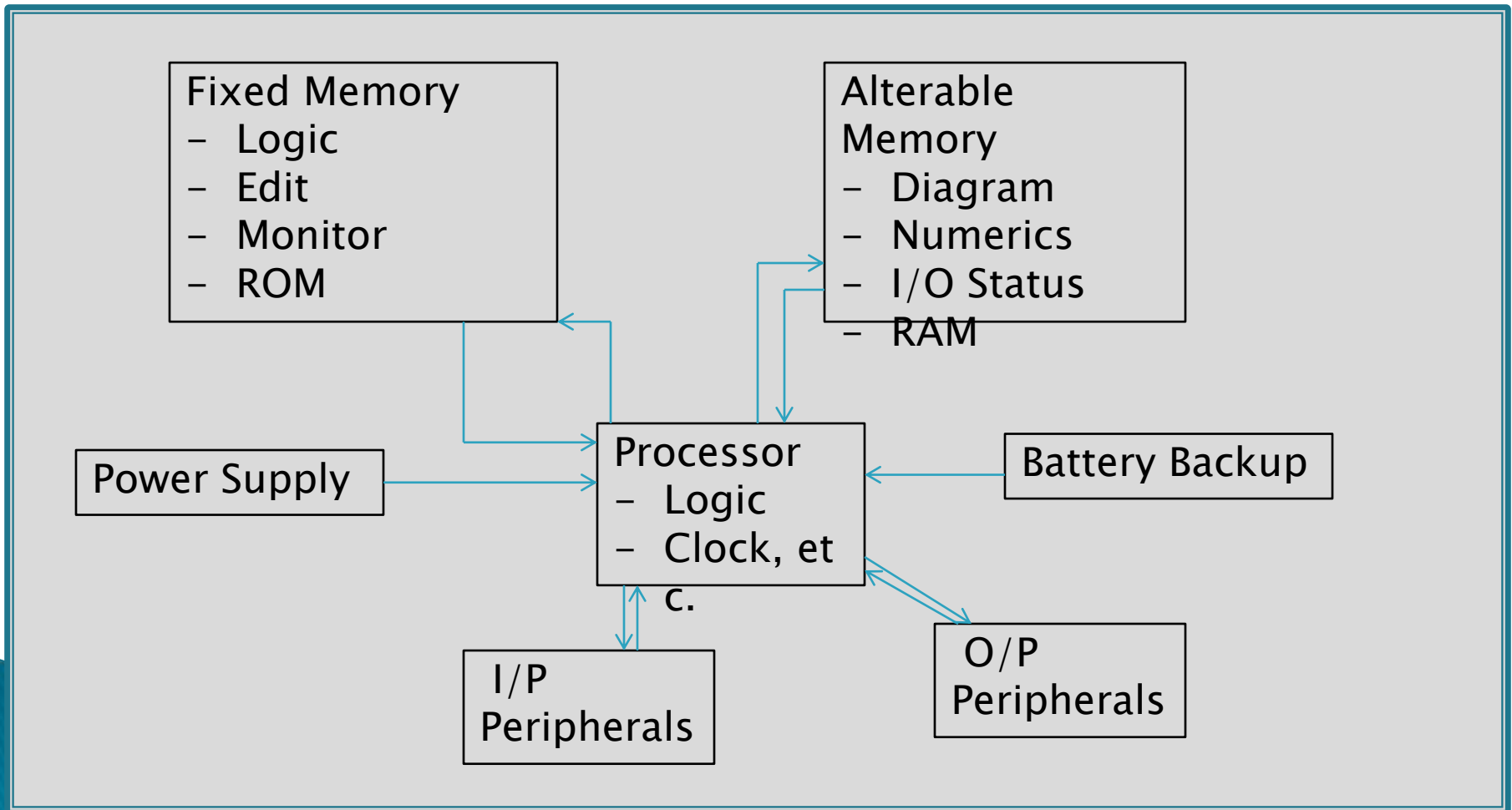
## ► Data processing and Process Control Computer



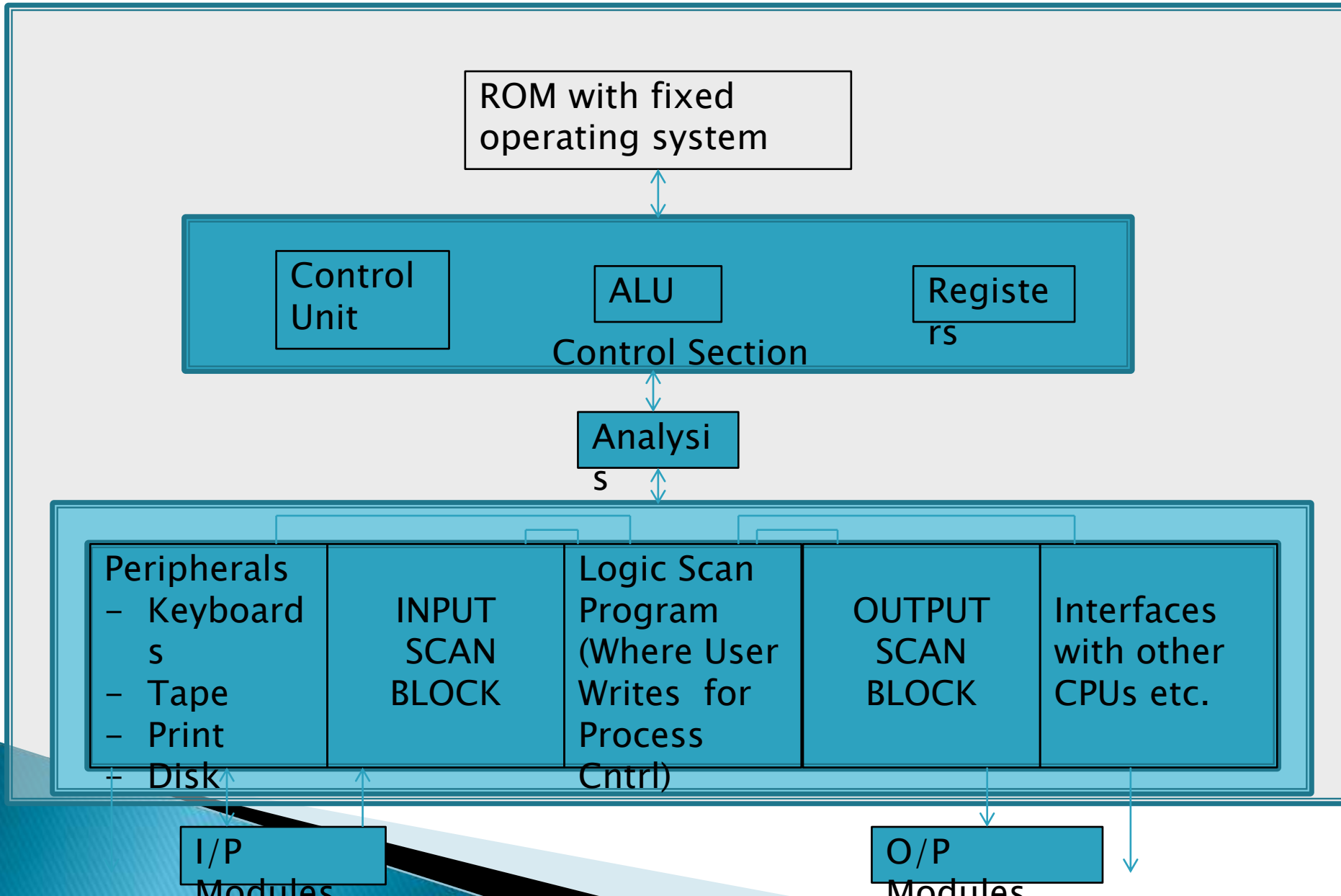
- ▶ The PLC Processor and Memory are always in the same unit called the CPU.
  - ▶ The CPU fixed memory contains the program set by the manufacturer
  - ▶ System program is set into special IC Chip called Read Only Memory (ROM), which cant be altered or erased.
  - ▶ The memory space that can be erased or programmed by the user is stored in the CPR Random Access Memory (RAM).
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# The Central Processing Unit

## ► Operational Section of PLC CPU



# The PLC Processor






# The PLC Processor

- ▶ The processor is programmable, and since it can perform many logic and arithmetic functions its also known as the Microprocessor.
- ▶ Its classified as per bit size and clock speed


S.No.	Microprocessor	Bit Size (bit)	Clock Speed (M Hz)
1	8085	8	1
2	8086	16	4.77
3	80186	16	8
4	80286	16	12.5
5	80386	32	33
6	80486	32	50

- ▶ The bit size determines the no. of bits of data the microprocessor can manipulate and clock speed determines the speed of execution of the instruction.

# The PLC Processor

- ▶ The ROM with fixed operating system program interfaces to the control section. It manages the operation of the PLC.
  - ▶ The control Section, contains a Control unit with storage registers. The Control Section determines which operating sections are to be functional, in what order and for how long.
  - ▶ The I/P Scan block, scans the I/Ps and places the I/p statuses in the Ram Memory, when required to do so.
  - ▶ After analysis the Logic Scan updates the O/P Scan Block to the Appropriate state and changes the O/P respectively.
  - ▶ The O/P Scan Block then scans the O/P and updates their statuses in the RAM.
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# Applications of PLC

- ▶ Used in typical industrial processes in manufacturing where the cost of developing and maintaining the automation system is high relative to the total cost of the automation, and where changes to the system would be expected during its operational life.
  - ▶ Used in Automotive applications.
  - ▶ Used in very complex process control, such as used in the chemical industry, may require algorithms and performance beyond the capability of even high-performance PLCs.
  - ▶ Also used in very high-speed or precision controls may also require customized solutions; for example, aircraft flight controls.
  - ▶ Programmable controllers are widely used in motion control, positioning control and torque control.
  - ▶ Some manufacturers produce motion control units to be integrated with PLC.
  - ▶ PLC with feedback is also used in temperature control units also.
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Thankyou