

# CHAPTER 1

## Process control system

KJE555 - PLC

## Conventional control panel

- At the outset of industrial revolution, especially during sixties and seventies, relays were used to operate automated machines, and these were interconnected using wires inside the control panel
- In some cases a control panel covered an entire wall

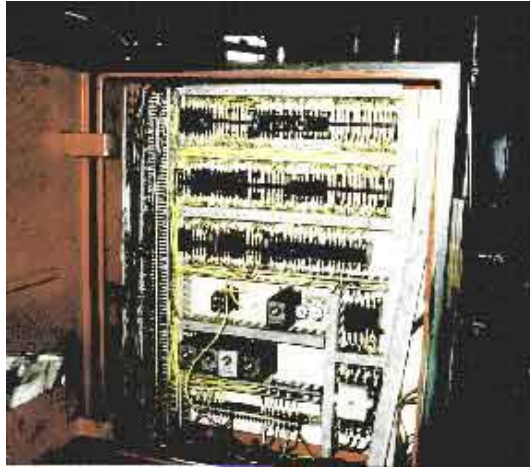
## Conventional control panel (2)

- To discover an error in the system much time was needed especially with more complex process control systems
- On top of everything, a lifetime of relay contacts was limited, so some relays had to be replaced

## Conventional control panel (3)

- If replacement was required, machine had to be stopped and production too
- Also, it could happen that there was not enough room for necessary changes
- In short, conventional control panels proved to be very inflexible
- Typical example of conventional control panel is given in the following picture

## Conventional control panel (4)



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## Conventional control panel (5)

- Most frequently mentioned disadvantages of a classic control panel are:
  - Too much work required in connecting wires
  - Difficulty with changes or replacements
  - Difficulty in finding errors; requiring skillful work force
  - When a problem occurs, hold-up time is indefinite, usually long

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## Control panel with a PLC controller

- With invention of programmable controllers, much has changed in how an process control system is designed
- Typical example of control panel with a PLC controller is given in the following picture

## Control panel with a PLC controller (2)



## Control panel with a PLC controller (3)

- Advantages of control panel that is based on a PLC controller can be presented in few basic points
  1. Compared to a conventional process control system, number of wires needed for connections is reduced by 80%
  2. Consumption is greatly reduced because a PLC consumes less than a bunch of relays
  3. Diagnostic functions of a PLC controller allow for fast and easy error detection.

## Control panel with a PLC controller (4)

- Advantages of control panel that is based on a PLC controller can be presented in few basic points:
  4. Change in operating sequence or application of a PLC controller to a different operating process can easily be accomplished by replacing a program through a console or using a PC software (not requiring changes in wiring, unless addition of some input or output device is required).
  5. Needs fewer spare parts

## Control panel with a PLC controller (5)

- Advantages of control panel that is based on a PLC controller can be presented in few basic points:
  6. It is much cheaper compared to a conventional system, especially in cases where a large number of I/O instruments are needed and when operational functions are complex
  7. Reliability of a PLC is greater than that of an electro-mechanical relay or a timer

## END OF CHAPTER 1