

RECENT AND FUTURE DEVELOPMENT OF PLC IN INDUSTRY

POOJA. S. KORADE

U. G. Student, Department of Electrical Engineering
Marathwada Mitra Mandal's College of Engineering Karvenagar, Pune, M.S., 411052
Email: koradepoojas@gmail.com

P.R.CHOUBE

Assistant Professor, Department of Electrical Engineering
Marathwada Mitra Mandal's College of Engineering, Karvenagar, Pune, M.S., 411052

ABSTRACT:

From 1983 the industry started using PLC on small scale but after development in industry. the plc became the most important part of industry .for achieving industry 4.0 opportunities PLC played important role in automation and controlling different process as the necessities of automation increase day by day the control system need easily ,reliable, cheap programmable device and these done by using programmable logic controller. The now in different industry the PLC easily communicate with HMI and performed the various process of with less time without operator for e.g. Counting of engine in mechanical company. Sun tracking, motor control etc. in electrical company done by the PLC. In this paper authors studied the overview of the necessities and application of PLC in industry .The purpose of this study is to knowing about recent and future trends in PLC. With these information how authors can improve the recent trends with help our fresh knowledge.

KEYWORDS: PLC logic, Industrial development in PLC, Control system etc.

I. INTRODUCTION

Now days Time is very important for industry as well as for human being. We all require quality in product that we are used in daily life e.g. Car manufacturing, solar tracking, wind energy, HVAC control all these process need automation and control system. The control system control all process automatically we don't required to handle manually. After globalization vast change in industry and used different device for controlling process. Like industry 4.0 published by German government. In India all process controlling with the help of programmable logic controller (PLC).first PLC used by automotive industry in 1969.

A. INDUSTRY AND PLC:

In this paper authors understood overview and importance of Contribution of PLC in industry and with the help of present information future development in PLC. PLC are computer based and capable for controlling many process at same time .PLC communicate through its input and output the input and output can be electrical, mechanical or any power electronics device like sensors, push button, relay, Tohnichi etc. mostly Modern PLC are computer based device designed to control process it relate information coming from sensors that monitor the states of process with these status of some actuators active and give some action. For giving automation PLC required to program in specific manner there are two types 1) hardwired programming 2) Software programming.

II. LITERATURE REVIEW:

In hardwired programming if one of the input or output fails then it is very difficult for design engineer to change it. So PLC uses software programming PLC programmed in ladder diagram language. PLC is similar to PC .before PLC uses in industry according to requirement the virtually simulation is done on the computer if programming is right then pc download the program in PLC through Ethernet cable or RS232 cable. In actual shop flour the using of computer is not effective due to dust, dirt so PLC uses human machine interface (HMI) for communication. HMI is flat screen display to show process. The PLC and HMI communicate with each other by the programmer. In recent development PLC are widely accepted because of their advantages and features. Most of the device used PLC to connect with computer to check each activity in industry.

III. BLOCK DIAGRAM:

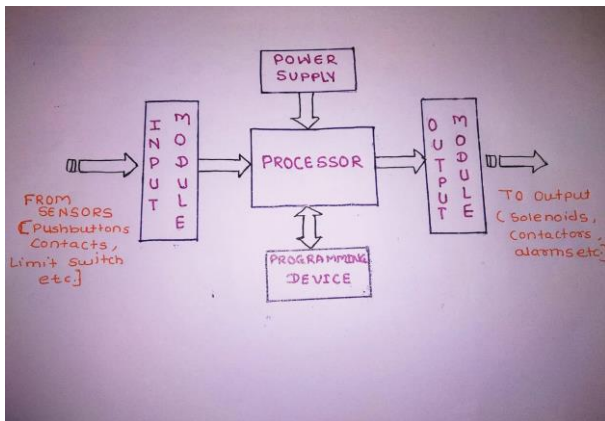


Fig.1. Block diagram of PLC

1) Central processor unit (CPU) - The CPU is the brain of PLC which consists of RAM,ROM, logic solver and user memory CPU makes decision and execute control instruction based on program instruction which are available in memory and done by the programmer according to requirement.

2) Input and Output module : The input module is moderate between input device and CPU similar the output module is step in between output device and CPU.

3) Power supply: Power supply is provided to CPU input output module unit . most of the PLC operate on 0 to 24V DC supply.

4) Memory section : When product is come to the PLC it scan by the barcode and then HMI shoes the information of that product and these information stored in memory.

5) Programming device: Various type of programming device are used to change the PLC program. These devices consist of handheld and PC based device

IV. SCAN CYCLE:

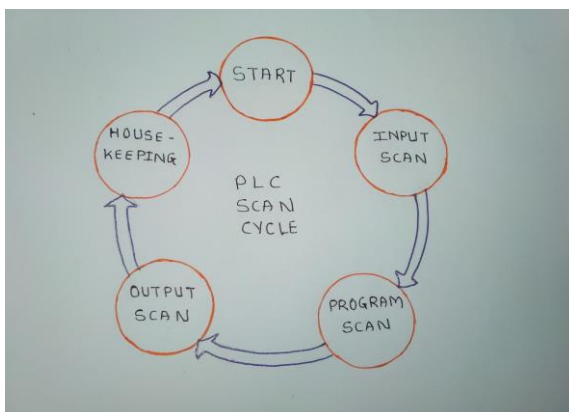


Fig.2. Scan cycle of PLC

While the PLC running its scan the process and update output according to the programming done in it. Scan cycle means time required to scan the process and

update the output .the scan time is vary from 1 millisecond to 20 millisecond.

- 1) **Input scan :** In this cycle CPU reads the status of input.
- 2) **Program scan:** start the execution of ladder program logic using status of input.
- 3) **Output scan:** after scanning of program the output signals is updated and ON or OFF corresponding device.
- 4) **Housekeeping:** This step includes communication, internal memory.

V. RESULT WORK:

Communication between PLC and HMI

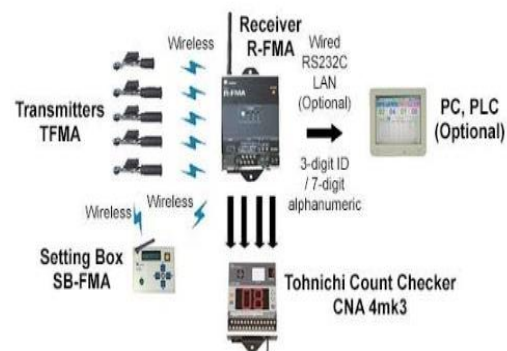


Fig 3) communication diagram

PLC programmed with ladder programming .Different PLC manufacturers uses different software for Ladder programming .and then PLC start communication with Human machine interface (HMI). Between the PLC and HMI one mediator is placed by the industry which help for communication to HMI and PLC. Mediator is a controller send bits to the PLC when required action completed. E.g. If required action not completed or there is some mistake done by operator the controller does not send the signal to PLC and PLC cannot give any output or product for other work.

Following are the communication chart between PLC and CMES (Mediator) of Cummins Company for assembly of engine.

PLC and CMES Bits

Steps	PLC	CMES (HMI)
Empty Station	0	0
Engine arrival	1	0
Fail safe sent	1	1024
Fail safe sent	17	1024
Assembly complete	49	1024
MES complete	49	128
Engine Complete	53	128
Data received	53	512
Engine depart	55	512
Clear MES	55	0
Clear PLC	0	0

VI. FUTURE WORK:

In Electrical and mechanical sector there is huge future work can be done in future? Some recent development is:

- 1) Sun-tracking
- 2) Wind energy
- 3) Photovoltaic application
- 4) HVAC control
- 5) Industrial control at time of Manufacturing of Engine.

Also in smart grid, Energy research for traffic control authors can improvement in this development.

VII. CONCLUSION:

PLC first used in 60s and now it has become most important in automation and control system from review of PLC has been done PLC can be easily applicable for industrial application , controlling various system also easily communication between HMI and PLC are done .now in the market most of the PLC come with software programming using ladder logic language with this logic PLC can control all activity we conclude with the PLC can be used for simply or complicated system .but in future due to this automation there may be is a chance of unemployment .

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