

AUTO-MANUAL AND SENSOR CONTROL OF MOTOR BY USING PROGRAMABLE LOGIC CONTROL

Mr.G.Senthilrajan AP/EEE¹, B.Jayaprakash²,

S.Tamilselvam³, V.G.Veerappan⁴

1 Assistant Professor of Electrical and Electronics Engineering

2, 3, 4, students of Electrical and Electronics Engineering

Sengunthar Engineering College, Tiruchengode, Tamil Nad (India)

ABSTRACT

This paper describes how the present automation system comes in to existence through its various stages. In the past, automation is done through relays and contactor logics. Since the human intervention is more, the scope of errors was also more. But with the advent of microprocessors & microcontrollers several new tools as PLCs (Programmable Logic controllers) come in to use. These have reduced human intervention. This in turn has increased accuracy, precision and efficiency.

Keywords Automation, PLC, PLC based Control Panel

INTRODUCTION:

PLC is a programmable logic controller. Now a days, this kind of software is widely used for automation in industries by our program logic. It is the most advanced software for automation, so that it is used in our project. Any kind of motor can be used in this system. The motor can be controlled in both clockwise and counter clockwise direction. There are several types of controllers out of those only three have been used they are sensor type controller, automatic switch controller and manual switch controller. When the sensor type controller is sensed for the first time it runs the motor in clockwise direction and when it is sensed for second time it runs the motor in counter clockwise direction. In the automatic switch controller a preset time has been set, in that time the motor runs in both clockwise and counter clockwise direction. In manual switch controller, it has two switches out of those one is clockwise switch and the another one is counter clockwise switch.

PROGRAMMABLE LOGIC CONTROLLERS:

Programmable Logic Controllers, also called programmable controllers or PLCs, are solid-state members of the computer family, using integrated circuits instead of electromechanical devices to implement control functions. They are capable of storing instructions, such as sequencing, timing, counting, arithmetic, data manipulation, and communication, to control industrial machines and processes. A digitally operating electronic apparatus which uses a programmable memory for the internal storage of instructions by implementing specific functions such as logic sequencing, timing, counting, and arithmetic to control, through digital or analog input/output modules. A Programmable Logic Controller or Programmable Controller is a digital computer used for

automation of electromechanical processes, such as control of machinery on factory assembly. PLCs are used in many industries and machines. Unlike general- purpose computers, the PLC is designed for multiple inputs and output arrangements, extended temperature ranges, immunity to electrical noise, and resistance to vibration and impact. Programs to control machine operation are typically stored in battery-backed-up or non-volatile memory. A PLC is an example of a hard real time system since output results must be produced in response to input conditions within a limited time.

PLC LOGO:



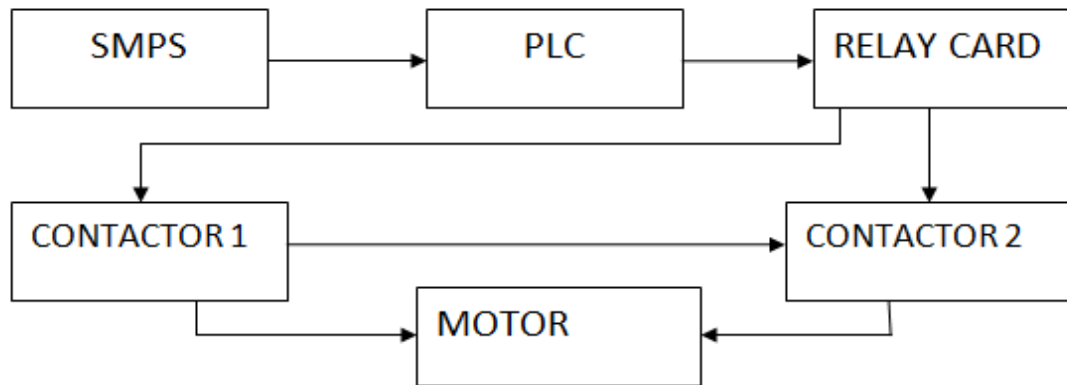
LOGIC MODULES:

LOGO!8 is the latest generation of intelligent Logic Modules from Siemens, offering a refined upgrade from the previous generation. Improvements include simplified handling, new optical indicating display and full communication functions via Ethernet across the full range of Logic Modules. Another added benefit of the LOGO!8 is that all Logic Modules come equipped with an integrated Web Server for monitoring and control with LOGO! via WLAN and the Internet; easy to configure, no HTML programming knowledge required.

FEATURES AND BENEFITS

Integrated web server refined screen giving a new look and feel to the logic module 6 line display with 16 characters per line meaning more specific messages can be used via text optical emphasis of alarms catered for thanks to the selectable white, orange & red backlighting logic modules are compatible for all voltages . simatic s7 communication made possible thanks to integrated ethernet connectivity across the logo!8 range . text message communication for alerts and control via smartphone is made possible using the logo! cmr module. this can provide status updates, value adjustments and synchronize timezones

BLOCK DIAGRAM:



SWITCHED MODE POWER SUPPLY:

A switched-mode power supply is an electronic power supply that incorporates a switching regulator to convert electrical power efficiently. Like other power supplies, an SMPS transfers power from a source, like mains power, to a load, such as a personal computer, while converting voltage and current characteristics. An SMPS is usually employed to efficiently provide a regulated

Output voltage, typically at a level different from the input voltage.

RELAY:

When current is supplied to the coil, the resulting magnetic field pulls the armature and the contacts toward the coil. The relay is in energized position when the armature is fully seated. Contacts that were open are now closed. These contacts are referred to as the normally open (NO) contacts. Contacts that were closed are now open. These contacts are called the normally closed (NC) contacts. Therefore, the terms normally open and normally closed refer to the condition of the contacts when the relay coil is DE energized. A relay may have one or both types of contacts and may also have multiple sets of contacts for controlling several circuits at once. When the coil circuit is opened, current cannot flow in the coil, the magnetic field collapses, and the relay de-energizes. A spring attached to the armature returns the contacts to their normal positions.

CONTACTOR LOGIC:

A contactor is an electrically controlled switch (relay) used for switching a power circuit. A contactor is activated by a control input which is a lower voltage / current than that which the contactor is switching. Contactors come in many forms with varying capacities and features. Unlike a circuit breaker a contractor is not intended to interrupt a short circuit current. Basic Features of Contactor Logic are as follows: A contactor is composed of three different systems. The contact system is the current carrying part of the contactor. This includes Power Contacts, Auxiliary Contacts, and Contact Springs. The electromagnet system provides the driving force to close the contacts. The enclosure system is a frame housing the contact and the electromagnet. Enclosures are made of insulating materials like Bakelite, Nylon 6, and thermosetting plastics to protect and insulate the contacts and to provide some measure of protection against personnel touching the contacts. Open-

frame contactors may have a further enclosure to protect against dust, oil, explosion hazards and weather. The major disadvantage of relays and controller logic is that it does not have any redundant system it means that if system fails then, it does not have any controlling system to continue its controlling and monitoring process. So if system fails then we have to rectify the control system so that controlling & monitoring could be restarted.

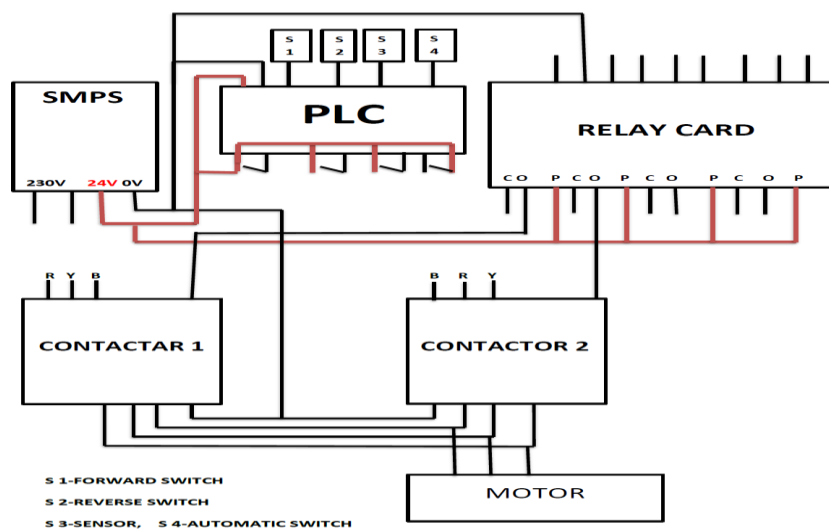
EXISTING SYSTEM:

The electrical control panel comprises of circuit breakers and relay boards, IC, LCD display, microcontroller. More number of wires have been used, because of that wiring of the circuit gets complicated. It is very difficult to detect the fault and also difficult to change the program. The timing of the circuit gets complicated.

PROPOSED SYSTEM:

The electrical control panel comprises of contactor, relay card, SMPS, PLC Siemens logo. Due to the usage of less number of wires the circuit is easy to handle. In this fault can be easily detected. The program can be changed easily. During running condition the timing can be altered. This program is used friendly and is widely used in industries.

CIRCUIT DIAGRAM:



ADVANTAGES:

- Reduce human intervention
- Increasing accuracy
- Improve efficiency
- High precision

APPLICATION:

- Industrial auto machine
- Spinning mill
- Conveyors
- Automobile Manufacturing
- Automatic car parking system

CONCLUSION:

The PLC has been used in the industries for automation process. Since the human intervention is more, the scope of errors was also more. But with the advent of microprocessors & microcontrollers several new tools as PLCs (Programmable Logic controllers) come in to use. These have reduced human intervention. This in turn has increased accuracy, precision and efficiency.

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