

GSM based Motor Control using P. L. C.

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Abstract--- GSM Based Motor Control using P.L.C. is used for the purpose of Start and Stop the motor by message. This project will be useful in industries as well as in villages where farms are far away from farmer's house. In this project when a person who wants to start/stop his motor has to send a message for a particular operation to GSM which is interfaced with P.L.C. P.L.C. gives a signal to P.L.C. for a particular operation and then P.L.C. operates the motor. This message signal is in a code which is decoded by P.L.C. P.L.C. has an inbuilt C.P.U. so by effective programming we set the operation of the motor in P.L.C. Now, is the motor start/stop after sending the message? P.L.C. gives the status of the motor to the sender via a GSM modem. If the person wants to work with his motor for some time then he has to give time for it in his message and the motor works for that time and as the time expires then the motor will stop automatically and the sender receives a message for the motor to stop working. **Keywords:** GSM, PLC interfacing, motor control system, motor control through SMS, time saving technique

I. INTRODUCTION

"GSM based Motor Control using PLC" implements the emerging applications of the GSM technology. Remotely the system allows the user to effectively monitor and control the motor via the mobile phone set by sending commands in the form of SMS messages and receiving the motor status.

The main concept behind the project is receiving the sent SMS and processing it further as required to perform several operations. The type of the operation to be performed depends on the nature of the SMS sent. The principle in which the project is based is fairly simple. First, the sent SMS is stored and polled from the receiver mobile station and then the required control signal is generated and sent to the PLC that we have designed according to the command received in the form of the sent message.

II. SYSTEM DESIGN

A. Hardware

1) P. L. C.

A programmable logic controller (PLC), also referred to as a programmable controller, is the name given to a type of computer commonly used in commercial and industrial control applications. PLCs differ from office computers in the types of tasks that they perform and the hardware and software they require to perform these tasks. While the specific applications vary widely, all PLCs monitor inputs and other variable values, make decisions based on a stored program, and control outputs to automate a process or machine.

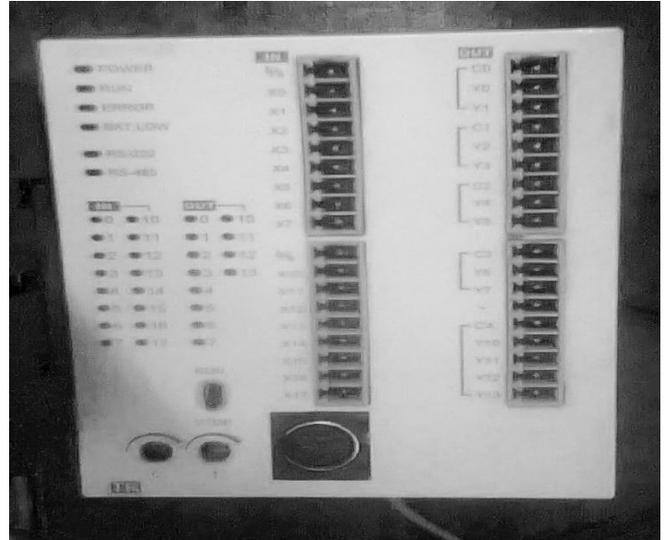


Fig. 1: DVP28SVT

The basic elements of a PLC include input modules or points, a central processing unit (CPU), output modules or points, and a programming device. The type of input modules or points used by a PLC depends upon the types of input devices used. Some input modules or points respond to digital inputs, also called discrete inputs, which are either on or off. Other modules or inputs respond to analog signals. These analog signals represent machine or process conditions as a range of voltage or current values. The primary function of a PLC's input circuitry is to convert the signals provided by these various switches and sensors into logic signals that can be used by the CPU. The CPU evaluates the status of inputs, outputs, and other variables as it executes a stored program. The CPU then sends signals to update the status of outputs. Output modules convert control signals from the CPU into digital or analog values that can be used to control various output devices.

2) G. S. M.

GSM is a global system for mobile communication. GSM is an international digital cellular telecommunication.



Fig. 2: SIM 300

3) RELAY



Fig. 3: Relay

The relay driver is used to isolate both the controlling and the controlled device. The relay is an electromagnetic device, which consists of solenoid, moving contacts (switch) and restoring spring and consumes comparatively large amount of power. Hence it is possible for the interface IC to drive the relay satisfactorily. To enable this, a driver circuitry, which will act as a buffer circuit, is to be incorporated between them. The driver circuitry senses the presence of a “high” level at the input and drives the relay from another voltage source. Hence the relay is used to switch the electrical supply to the appliances.

4) RS-232 To RS-485 Converter

It is a converter that converts the rs232 communication port to rs485 communication port. It needs the separate power supply to convert the data. At rs485 side one connection is for power supply, two connections are for ground, and remaining two are for rs485A and rs485B

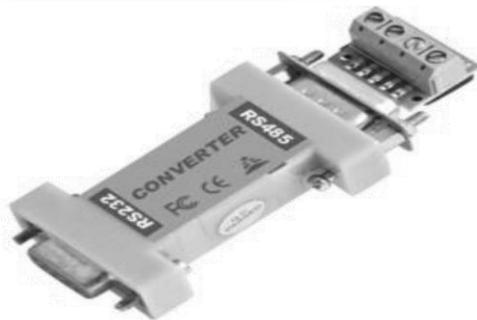


Fig. 4: RS-232 To RS-485 Converter

B. Software

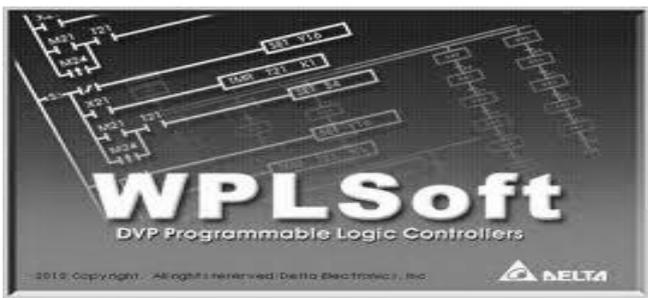


Fig. 5: Ladder Diagram (LD)

We use WPLsoft for our project. Delta provide this software for programming.

The Ladder Diagram is a graphics oriented programming language which approaches the structure of an electric circuit. The Ladder Diagram consists of a series of networks. A network is limited on the left and right sides by a left and right vertical current line. In the middle is a circuit diagram made up of contacts, coils, and connecting lines.

Each network consists on the left side of a series of contacts which pass on from left to right the condition "ON" or "OFF" which correspond to the Boolean values TRUE and FALSE. To each contact belongs a Boolean variable. If this variable is TRUE, then the condition is passed from left to right along the connecting line. Otherwise the right connection receives the value OFF.

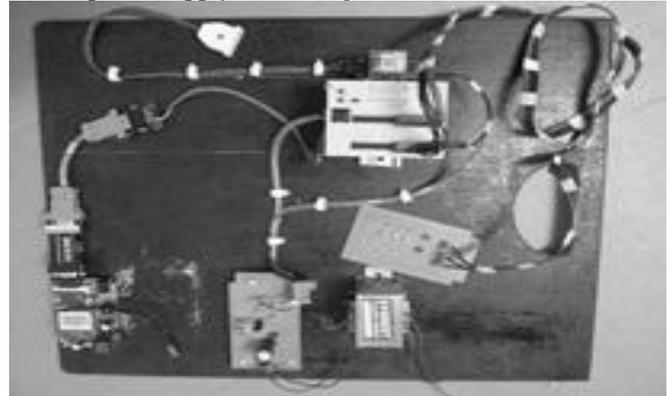
III. REQUIREMENTS OF THE SYSTEM

- 1) The control unit will have the ability to connect to the cellular network automatically.
- 2) The control unit will be able to receive text messages and will be able to parse and interpret text messages and instructions to be sent to the PLC.
- 3) The PLC within the control unit will issue its command to the electrical motor through a simple control circuit.
- 4) The control unit will control the electrical motor.

IV. EXPERIMENTAL SET-UP

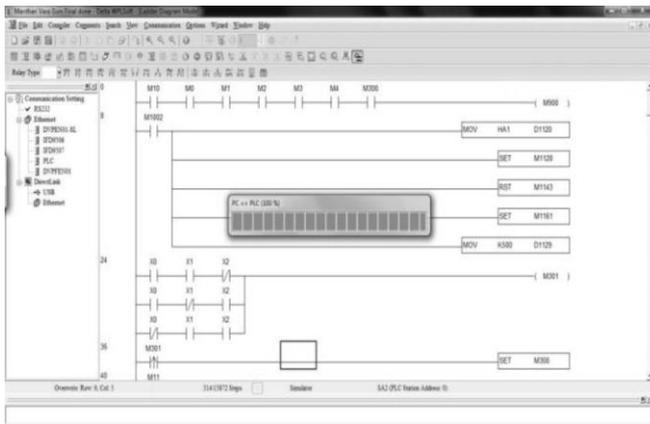
The final system consists of a P.L.C unit assembled with a GSM and A.C. motor. we need a cell phone to send and receive a message.

There is a relay used for connection of motor with P.L.C. And there is a requirement of RS-232 To RS-485 Converter to connect the GSM module with P.L.C. We need a 24 V power supply for biasing the P.L.C.



From the programming side first we have to configure the PLC in communication mode for communication purpose and that is common part for all PLC for communication. After that we have to SET memory bit (m112 for delta PLC) for every AT commands to communicate with GSM module. Then we should enter the hex code for all the command including message that we want to send to the mobile.

After this we should load the program in PLC and connect the RS485 to RS232 converter at RS485 terminal provide in PLC and other end of cable should be connected to RS232 cable whose another end will be connected to GSM module.



V. CONCLUSION

From the simulation shown above we can conclude that interfacing of GSM with PLC is done successfully and thus we can use it at any PLC based industry for wirelessly monitoring and controlling of industry process and also we can use it for agriculture processes which are based on PLC.

VI. FUTURE WORK

In the future we can extend the scope of PLC for wireless application by interfacing ZIGBEE and RF module with PLC and we can get same result as ZIGBEE and RF modules interfaced with controller.

ACKNOWLEDGMENT

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