



Automated Testing of Raw Materials Using PLC

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Abstract-

With an increasing demand for a natural, initiative man machine interaction in an automated industry, the graphical programming with PLC is attracting many applications nowadays. This paper aims to present the development of the supervisory control theory. The manufacturing system is constituted by an industrial robot. This paper describes hybrid models of raw materials. The contribution of the work is to highlight how automation can be carried out for small activities to complete the desired task in the core field of manufacturing and testing of raw materials using the PLC, thereby reducing human effort and also down-time and ramp-up time. The main aim of this paper is to explain the functioning and working of metal detection in the industry and separation of non-defective metal pieces using robots.

Keyword: Metal detection, Programmable Logic Controller(PLC), Interfacing, Robotic arm, buzzer

I. INTRODUCTION

Automation is the use of control systems and information technologies to reduce the need for human work in the production of goods and services. Automation is a rising technology that is used in almost every industry automation means controlling the system automatically such that the same process

is repeated based on the input fed. Automation helps in reducing human labor resulting in error free functioning and operation of the system. Though automation, we can control any process based on the industrial requirements from small to large scale. Automation has facilitated all processes not in industries but also in our day to day lives where the user has to press certain buttons and the process will start and stop automatically. Nowadays, automobiles have a self-start button which is a common example of automation. Our project is based on automation in which we are sensing metal pieces and checking them for defects. In order to achieve our goal, we are using equipment like SMPS, relays, conveyor, PLC.

Magnetic sensor, capacitive sensor, inductive sensor are used for this project. Magnetic sensor is used to detect the magnetic characteristic material. Capacitive sensor is used to detect both conducting and non conducting material like plastic, wood, etc. Inductive sensor is used to detect conducting material like steel. In this project we can start with three different sensors which detect the material and the buzzer makes sound to indicate sensing. If any two sensors detect the material and LED1 is ON to indicate it. If any one sensor detects the material



which indicates the particular material we need and LED2 is ON.

II. BASIC APPROACH FOR TESTING OF RAW MATERIALS

The main objectives of our project can be summarized as follows:

1. To increase the quality of steel.
2. To reduce response time for the process.
3. To increase the production strength.
4. To reduce maintenance.

A. PLC





The first 2 relays are used for the lights and fans operation in automatic i.e. PLC mode. Likewise, other 2 relays are used for operation in manual mode with the help of switches. The push button installed on the gate for entry and exit are also switched with the help of relays, one relay for the entry purpose and the other for exit. Like wise 2 relays used for water tank filling system, one relay for low level detection and the other for high level detection. overflow can be indicated with the help of buzzer system. If the tank get overflow, then the water filling process will be stopped with the help of timer system.

D. LED

We are used 3 LED indicators in the project. The first indicator is installed with the reset switch to signify the user if he/she resets the system. The other two indicators are used with the changeover on the control box to indicate which mode he/she is using i.e. manual mode or automatic mode

E. SENSOR

Capacitive sensor

Capacitive sensors can directly sense a variety of things such as motion. Its detect the conducting and non conducting or wood or plastic. Range is 5mm. Operating voltage is 3.3v

Inductive sensor

It detects the only conducting material such as motion. Range is 5mm. Operating voltage is 5v

Magnetic sensor

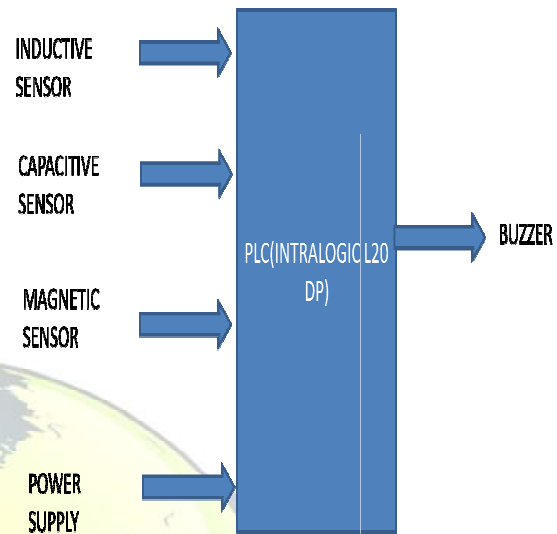
It detects the magnetic metal. Range is 5mm. Operating voltage is 5v.

IV. EXISTING SYSTEM

In previous reference papers raw materials has been tested by using microcontroller. Microcontroller has lower performance and its programming language is difficult to understand. It has 8 inputs, so we have detecting material by using more than 8 sensor is not possible. It is possible by using PLC. PLC has 228 flash card (memory). Plc has the advantage, the I/O ports are changeable. Plc can be reprogrammed. Programming of PLC is easier than wiring the relay panels.

III. PROPOSED SYSTEM

BLOCK DIAGRAM



H. PLC Programming

Ladder logic is the most common programming language used to program a PLC.

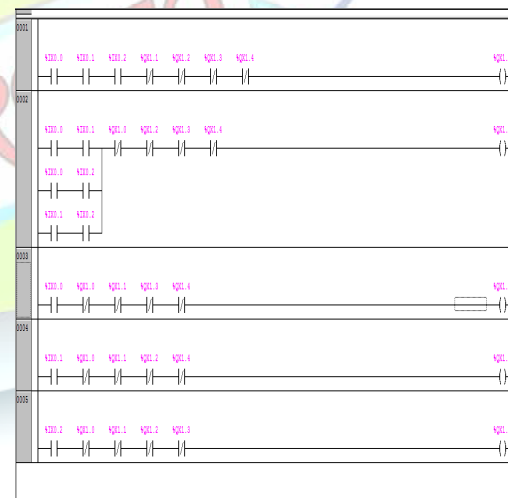


FIG: AUTOMATIC TESTING OF RAW MATERIALS

IV. FUTURE SCOPE

However, besides using PLC with advanced version of PLC i.e. SCADA (supervisory control & data acquisition), we can work on heavy machineries and



if still more heavy , then can opt for DCS(decentralized system)

DCS

Distributed Control System consists of decentralized elements and all the processes are controlled by controlled by these elements human interaction is minimized so the labor costs and injuries can be reduced

Embedded Control

In this control system, small component are attached to the industrial computer system with the help of a network and control is exercised

SCADA

Supervisory control and data acquisition refers to a centralized system and this system is composed of various subsystems like remote telemetry units, human machine interface, programmable logic control or PLC and communications

ADVANTAGES

Simplified mechanical design
Rapid machine setup
Cost effectiveness
Possibilities for adaptation during commissioning
Optimized performance,productivity,reliability

APPLICATIONS

Machine vision
Automation and robotics
Servo mechanics
Sensing and control systems
Automotive engineering,automotive equipment in the Design of subsystem such as anti-lock braking systems
Computer-machine controls, such as computer driven machines like CNC milling machines
Expert systems
Industrial goods
Consumer products

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