

EMBEDDED BASED CONTROL PANEL FOR SORTING APPLICATION

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Abstract:

Design the automated control panel using conveyor belt is a very complex process. This field needed in many manufacturing industry. This is an industrial automation based application. In this project we are using embedded system and also use conveyor belt, it has ability to sort the object. Atmega16A is used & controls the relay & motor according to output of sensor. Inductive & capacitive sensors are used for detection. The object that are metal & non metal passed through the conveyor belt. This belt is controlled by the controller. According to the specification of sensors. Sensor senses the metal & non metal object & it will sort them developing such a control panel replaced the human efforts & it also prevented the accident which are occurs in the industry.

Keywords: Automatic, Conveyor Belt, Sensors, embedded system.

Introduction-

Design the automated technology need the manufacturing industry in many fields is a very complicated process. The system needs to satisfy industry requisition. This is an industrial automation based application. Electrical control panel is very important in the automation industry. The main task to develop is to sort the product manufactured in the industry. The purpose of the developing project is to save the time and to reduce the efforts of the workers in material handling.

Control panel is also consist of the conveyor belt, which conveyor is also start it will pass the object one point to the another & sensor will senses the object & it will sort them. The objects are like metal or non metal. Sorting is done when metal object is gone to the metallic side & non metal object is gone to the non metallic side. By using this project it reduce the efforts of the workers in the automation industry.

Block Diagram:

Block diagram of electrical control panel using the conveyor belt is as given in fig 1.

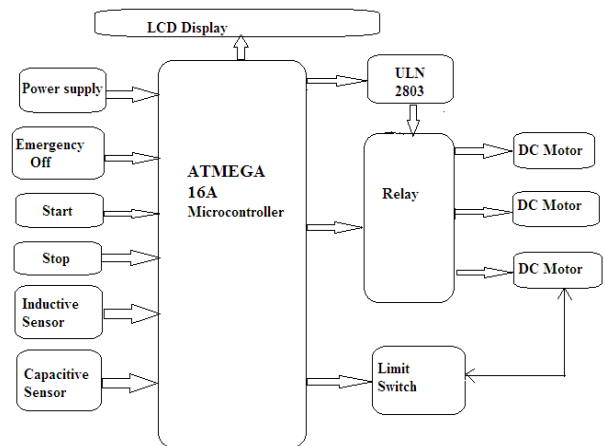


Fig 1: Block Diagram of control panel

All the unit consist of control panel & mechanical hardware that is conveyor belt system. In the control panel ATMEGA 16A can be used which is interfacing with a sensors, relays, motors & limit switch. Three input buttons mounted on the control panel. Relay card is used. Which can drive the motor. Conveyor belt consist of two pulleys are powered, moving the belt & the material on the belt forward. Inductive sensor & capacitive sensor mounted on the conveyor system. so they can sense the object & it will sort the material.

Flowchart of the system working:

Flowchart of this project is as given in fig2

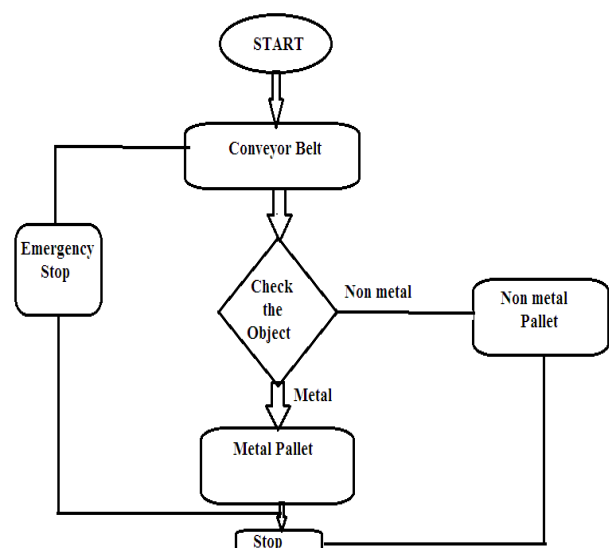


Fig 2: flowchart of system

When start button is press, system will start& also the conveyor belt is start. Product is situated on the conveyor belt & product will travel on to the conveyor belt. When product will be metal object then it will sense the inductive sensor& pallet will sort the metal object to the metal side& when non metal product is travelled on to the conveyor belt then capacitive sensor will sense that product & pallet will sort them to the non metal side. It has also facility to stop the process emergently by using emergency stop switch. Control panel consist of start, stop, emergency stop, Reset, Belt speed LCD Display,

Result of unit:

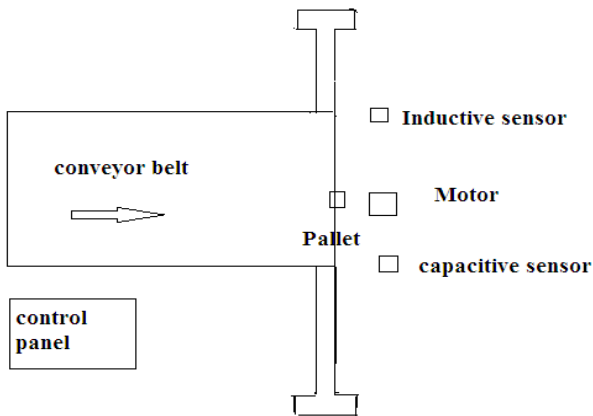


Fig2.1: Result of unit
Control Panel:

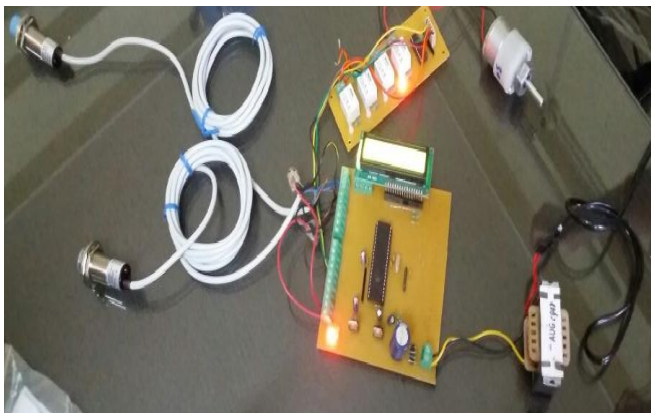


Fig 2.2: control panel

In this module consist of reset button, Belt speed button, Start button, Stop button & Emergency Stop button. This module give command to the conveyor belt, motor, relays, sensors. The sensor sense the metal object & non metal object corresponding object will be automatically sorted.

ATmega 16A– ATmega16 A is an 8-bit high performance microcontroller of Atmel's Mega AVR family with low power consumption. instruction give to the ATmega 16 A Microcontroller. and we can give the commands to the motor drives so they can perform as par the instructions.

High-performance, Low-power Atmel AVR 8-bit Microcontroller. Advanced RISC Architecture 16KBytes of In-System Self-programmable Flash program

memory.512Bytes EEPROM. 1KByte Internal SRAM
Extensive On-chip Debug Support

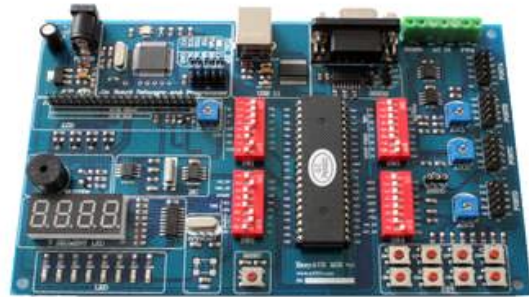


Fig 3:ATMEGA 16A

Inductive Sensor:

An inductive proximity sensor belongs to the category of non-contact electronic proximity sensor. It is used for positioning and detection of metal objects. The sensing range of an inductive switch is dependent on the type of metal being detected. Ferrous metals, such as iron and steel, allow for a longer sensing range, while nonferrous metals, such as aluminum and copper, may reduce the sensing range by up to 60 percent.

Since the output of an inductive sensor has two possible states, an inductive sensor is sometimes referred to as an inductive proximity switch



Fig3.1 Inductive sensor

Capacitive Sensor:

Capacitive proximity sensors are used for non-contact detection of metallic objects & nonmetallic objects (liquid, plastic, wooden materials and so on). Capacitive proximity sensors use the variation of capacitance between the sensor and the object being detected.



Fig3.2 Capacitive Sensor

Conclusion:

The embedded based control panel for sorting application is mainly used in small scale as well as large scale industries. The automatic sorting control panel using conveyor belt is basically useful for sorting the products in the industry. The object that are metal & non metal passed through the conveyor belt. This belt is controlled by the controller. According to the specification of sensors. Sensor senses the metal & non metal object & it will sort them.

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