CONVEYOR LOADING CONTRL & OBJECT SORTING BY USING PROGRAMMABLE LOGIC CONTROLLER

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ABSTRACT: In modern globalization, many technologists are trying to update a new development based on automation which works very rigidly, high effectively and within short time period. The progressive invention in auto weighing system is becoming an important task especially because of rising demand of products and declining labor availability in industry. In industry the production speed should be high because demand of the product is more. But when we check the weight of the object manually then it will take more time for checking the weight and overall speed of the production will decrease. Hence the purpose of this project is to develop a automation technique using PLCBy using this project we can save electricity automatically.
Index Terms: PLC, Motor, Conveyer belt, LCD, Mechanical Part

I. INTRODUCTION

Rising labor costs across the world automation of repetitive manual tasks is inevitable. Automation increases productivity, precision and speed of such tasks. A typically industrial weighing system operates on manual mode and requires a large time. Also some human mistakes occur, hence the production of material is less? And also one problem occurs in the handling of these objects for example, some chemical industries manufacture products which are toxic to humans. In such cases, safety of people in the plant is top priority, so humans cannot directly handle toxic materials. Such handling is to be done by conveyor system, which is automated. Separation and sorting

1.1. CONCEPTS OF LOW COST AUTOMATION:

Low-cost automation is defined as a technology that creates some degree of automation around the existing equipment, tools, and methods, using mostly the standard equipment available in the market. Any manufacturing activity such as loading, feeding, clamping, machining, welding, forming gauging, assembling, and packing can be subjected to a LCA system adoption. Besides, LCA can be can be done by a size of the product. Sensors can be used for sorting of objects. The aim of project is to sort boxes of different heights. This type of sorting is used in many industries. By this process, we are able to sort out the different classes of objects. With the advent of Liberalization and globalization, it is necessary that industries explore method of enhancing automation and productivity to acquire greater competitiveness. In the regard, low cost Automation (LCA) is technology that promises to be very useful for any manufacturing.

1.2 LITERATURE SURVEY

With the advent of liberalization and globalization, it is necessary that industries explore methods of enhancing automation and productivity to acquire greater competitiveness. In this regard low cost Automation (LCA) is a technology that promises to be very useful for any kind of manufacturing organization. Any manufacturing activity such as loading, feeding, clamping, machining, welding, forming, gauging, assembling and packing can be subjected to LCA system adoption. Besides, LCA can be very useful for process industries like pharmaceuticals, chemicals and oils. Finally, many operations in food processing industries which used to be carried out under totally hygienic conditions can be rendered easily through LCA system to sort boxes of different heights. We have used pneumatic power for this LCA system. This low cost automation system is controlled by programmable logic controller (PLC). Sensors are used to sense the height of boxes and actuate sensors and disc for sorting. This box sorting system is very much useful in packing industries.

1.3. AUTOMATED SORTING SYSTEM:

Sorting procedures are required in many industrial fields, e.g., in manufacturing, where a strict quality control has to be maintained. All sorting processes, although different, generally consist of looking at the objects distributed on a moving conveyor belt, localizing any single item, recognizing the relevant features that make it acceptable or not and, if applicable, gripping it to perform the necessary separation. A wide variety of systems are available for deployment in LCA systems. In this, pneumatic circuits are extremely popular for LCA systems due to their low cost, ease of fabrication and safe operation. Even though oil hydraulic systems are generally costlier than pneumatics they are useful in places where large control valve and 5/2 solenoid operated direction control valves are used. The setup consists of a belt conveyor moving at an optimum speed. This belt conveyor is loaded with boxes of three different heights. There are two different sensors at suitable heights to sense the boxes. The top two heights will be sensed by the sensors. These sensors in turn give signals to the respective cylinders resulting in actuation of the cylinders. Therefore the top two height boxes will be sorted at two stations. The smallest of the three boxes will not be sensed by any of the sensors and will be let go along the conveyor. very useful for process industries like pharmaceuticals, chemicals, and oils. Finally, many operations in food processing industries, which use to be carried out under very hygienic conditions, can be rendered easily through LCA systems.

II. PROPOSED SYSTEM BLOCK DIGRAM
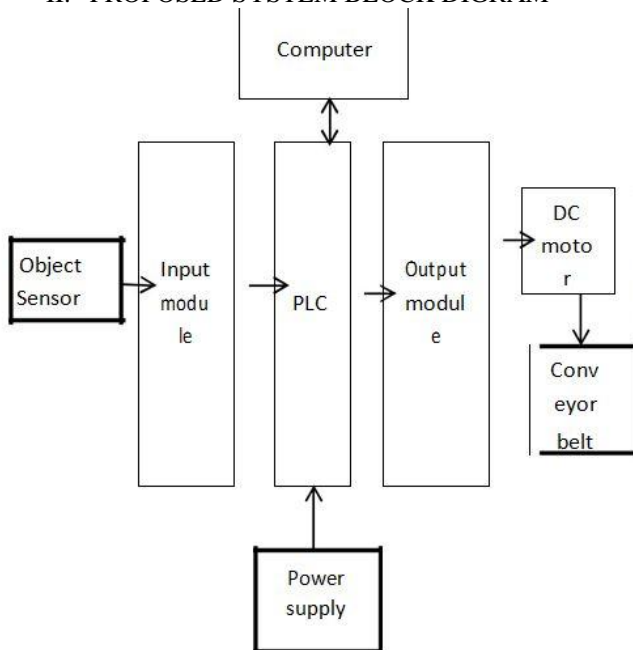
III. BLOCK SPECIFICATIONS

3.1. SIEMENS PLC unit:

A PLC can be defined as a digital electronic device that uses a programmable memory to store instructions such as logic, sequencing, timing, counting and arithmetic to control machines or processes. The purpose of a PLC was to directly replace electromechanical relays as logic elements, substituting instead a solid digital computer with a stored program, able to emulate the interconnection of many relays to perform certain logical tasks. A PLC can be defined as a digital electronic device that uses a programmable memory to store instructions such as logic, sequencing, timing, counting, and arithmetic to control machines or processes. It is a software-based instrument and hence it can be programmed using easyto-learn programming languages.

3.2 CENTRAL PROCESSING UNIT:

The CPU receives input signals from the various input modules and based on the programs stored in the memory, decides on the appropriate signals, which it transmits to the respective output modules. Such as computerized devices, there is a Central Processing Unit (CPU) in a PLC.

3.3 INPUT MODULE:

The input and output modules provide the necessary interfacing between the PLC and the system. The input modules translate the incoming signals (for example, from limit switches, pressure switches, temperature switches) to 5V DC, on which the PLC can work. The output modules on the other hand translate the low current 5V DC signals coming from the PLC to high voltage current signals required to actuate the various devices of the fluid power circuit. The I/O modules are available for different voltages such as 115V AC, 230 V AC, 24V DC and 5V DC etc. They are usually packaged in units of 4, 8 or even more. In smaller PLCs the inputs are normally built in and are specified when purchasing the PLC. For larger PLCs the inputs are purchased as modules, or cards, with 8 or 16 inputs of the same type on each card. For discussion purposes we will discuss all inputs as if they have been purchased as cards.

3.4. OUTPUT MODULE:

Output devices can also consist of digital or analog types. A digital output card either turns a device on or off such as lights, LED's, small motors, and relays. An analog output card will convert a digital number sent by the CPU to its real world voltage or current. Typical outputs signals can range from 0-10 VDC or 4-20mA and are used to drive mass flow controllers, pressure regulators and position controls.

3.5 POWER SUPPLY

There are two areas to be considered when determining the power required to operate a CLICK PLC system. The first area is the power required by the CLICK CPU, along with the internal logic side power that the CPU provides to its own I/O and any connected I/O modules that are powered through the CPU's expansion port; plus any device, such as a C more Micro-Graphic panel, that is powered through one of the CPU's communication ports. The second area is the power required by all externally connected I/O devices.

3.7. PROXIMITY SENSOR:
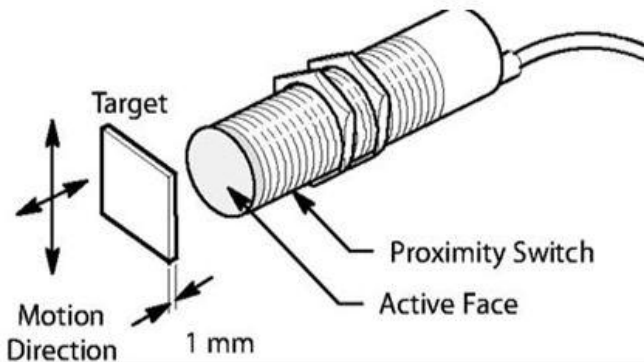
A proximity sensor often emits an electromagnetic field or a beam of electromagnetic radiation (infrared, for instance), and looks for changes in the field or return signal. The object being sensed is often referred to as the proximity sensor's target. Different proximity sensor targets demand different sensors. For example, a capacitive or photoelectric sensor might be suitable for a plastic target; an inductive proximity sensor always requires a metal target. The maximum distance that this sensor can detect is defined "nominal range". Some sensors have adjustments of the nominal range or means to report a graduated detection distance.

IV. WORKING OF THE SYSTEM

Above Fig. clearly shows that working of objects sorting system. A belt conveyor is used to feed the iron objects. It is driven by means of a the proximity sensors are use to sort the iron objects when actuated by the sensors. further the DC motor get activated and push the valve forward which push the iron object and sort the by height. Object such as boxes, packing load onto the conveyer belt. We are using for auto loader mechanism, then the different sizes objects moving toward the conveyer

V. APPLICATION

By this way the proposed report can be applicable in:
Packing Industries
Food processing
Loading
Sorting
Speed of production
Smooth material shifting
In airport for bags shifting

VI. FLOW CHART
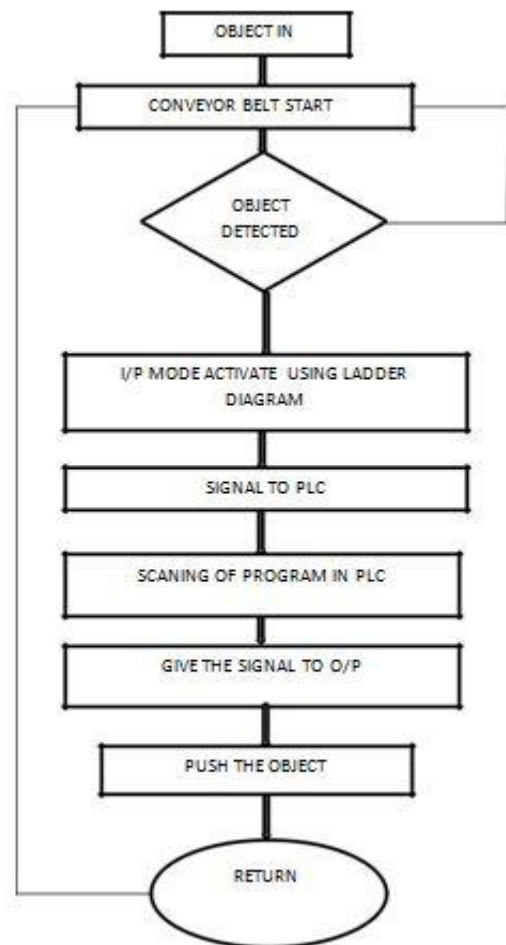
VII. CONCLUSION

The automatic sorting machine using conveyor belt is basically useful for sorting the products in the industry specially large scale industries where mass production is carried out. The machine also reduces the efforts of the workers by reducing the time spent for material handling.

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