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Semi Automated WeldingMachine Using PLC

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Abstract: In this project, we will be doing Design,Analysis & Manufacturing automation for circular parts welding with uniform weld structure usingPLC. We will be designing & manufacturing the turntable, which will be rotating at specific requiredspeed depending upon the requirement of fillet material to be added. Further, the electrode nozzle iskept stationary, which will be in contact with the surface of components to be welded. Therefore, thisproject proposed a detailed design for the conversionof the conventional MIG welding machine (ARC) into an automated machine for welding round components. Together with this main modification, the existing MIG welding machine – (a stationary, downward-facing ARG – HEAD, which has provisions for horizontal and upward movements) isto be modified into portable robotic weldingmachine.

I. INTRODUCTION

In today's age of mass production, it is often necessary to automate manufacturing processes that were previously carried out manually. In presence various welding technique is used for the welding purpose such as CO2 welding or Electric arc welding, TIG (tungsten inert gas welding), in that various fixture is use for various welding, but in many application, we use some techniques which does not work efficiently & accurately.

Moving the electrode along the welding line is a skill full work and especially for circular component become much more difficult. To avoid such problems, we use a welding rotator, a special device that can rotate the deposit at a fixed speed to support the welding process for round components and ensure a good profile and a homogeneous weld. Many different energy sources can be used for welding, including agas flame, electric arc, laser, electron beam, friction and ultrasonic. Although it is often an industrial process, welding can be carried out in many different environments, including outdoors, underwater and in space. Regardless of location, welding remains dangerous, and precautions are taken to avoid burns, electric shock, eye damage, poisonous fumes, and overexposure to ultraviolet light.

II. PROBLEM STATEMENT

In CO2, welding or sometimes electric arc welding the need often arises for welding of circular shape components, where the welding is carried outon the entire periphery or a partial arc length of the job. The electrode is thus moved along this circular path in the conventional method. However, movement of the electrode is much more difficult and it is much easier to index the job. For welding the current work piece Cycle, time is higher.i.e. 45- 60 sec. So, need to develop such a system for easy work piece loading and & auto welding gun positioning. Auto ON/OFF the switches of welding machine to achieve the smooth working.

III. OBJECTIVES

1) Reduce operator effort and increaseefficiency
2) Multi field application that is industry,household, agriculture, etc.
3) Generation of smooth & finish job piece
4) Multi-purpose application that is system to be Compactable with other applications suchas Sand blasting, Spray painting etc.

IV. FUTURE SCOPE

It plays an important role in mass production and in the following processes such as painting, air washing, wire winding, circle marking, welding of any geometricshape, as an indexer, CO2 welding of circularor staggered welded joints, electric arc welding of circular or staggered welded joints, plastic moulding for multiple positiondies, bottle filing plants. Etc.

V. LITERATURE SURVEY

1) Fu-senRen Xiao-zehad developed a new type of special welding robot, which mixed design method of series and parallel and realized the integrated design of organization for robot and anchor. The robot kinematics is build and realized the real time control of welding torch position, orientation and welding speed during welding process.

2) A.M. Vaidya and P. M. Padole had calculated the flexibility of the limbs and the stiffness of the joints.

3) Zhao Yang has investigated the effects of the scanning frequency of the plasma torch on the temperature. Distribution at molten pool surface. In simulation plasma torch power is 750 kW, melting rate is 300kg/hr the torch scanning frequency changes from 0.0833 Hz to 0.5 Hz.

4) ION Lucaciu had worked on welding head enables vertical positioning of welding wire relative to electrode position, adjusting the lead angle when entering into metal bath or turning device to bring the welding rod in front of or behind the torch, depending on the welding direction

5) Irfan Sheikh, Studied the MIG welding parameters are the most important factors affecting the quality, productivity and cost of welded joint, Weld bead size, shape and penetration depend on number of parameters. The quality of a weld seam is directly influenced by the input parameters of the weld.

6) Mithari Ranjeet, Describes the welding positioner with automatic indexing, which is very important for mass production in the circular welding industry.

7) Ganguly Arghya, Describes a PLC based Control System for Hardening and Tempering Furnace in Heat Treatment Plant as implemented at the Siddheshwar unit for Mahindra Automobiles Limited, which is one of India's largest vehicle manufacturing corporation. The proposed system deals with the design of a PLC-based control system for a hardening and tempering furnace. This paper provides the description of the components implemented for the control system along with the flow of working of various required components. The system is controlled with the help of measurement PLC.

8) Prof. Sawant P.R, Discuss the case study and compare the productivity of a component drilled and tapped using aconventional radial drilling machine and a special purpose machine (SPM).

VI. CONCLUSIONS

Heavy load capacity of table is 80 kg safe load Adjustable table speed (0 to 75 rpm) Auto stop feature, to start and end process operational precise positions. Multiple indexer positions, enables to make staggered welded joints. Simple operation, as the table stops automatically depending on the position of the indexer button and the next operation is started by simply pressing the jog switch. Compact, as the entire drive unit is mounted under the table and the controls are located at the front in ergonomic positions. Low power consumption (50 watts) The above report shows that both complete circular welding and spray painting at the desired angle can be carried out perfectly and efficiently in mass production.

VII. ACKNOWLEDGEMENT

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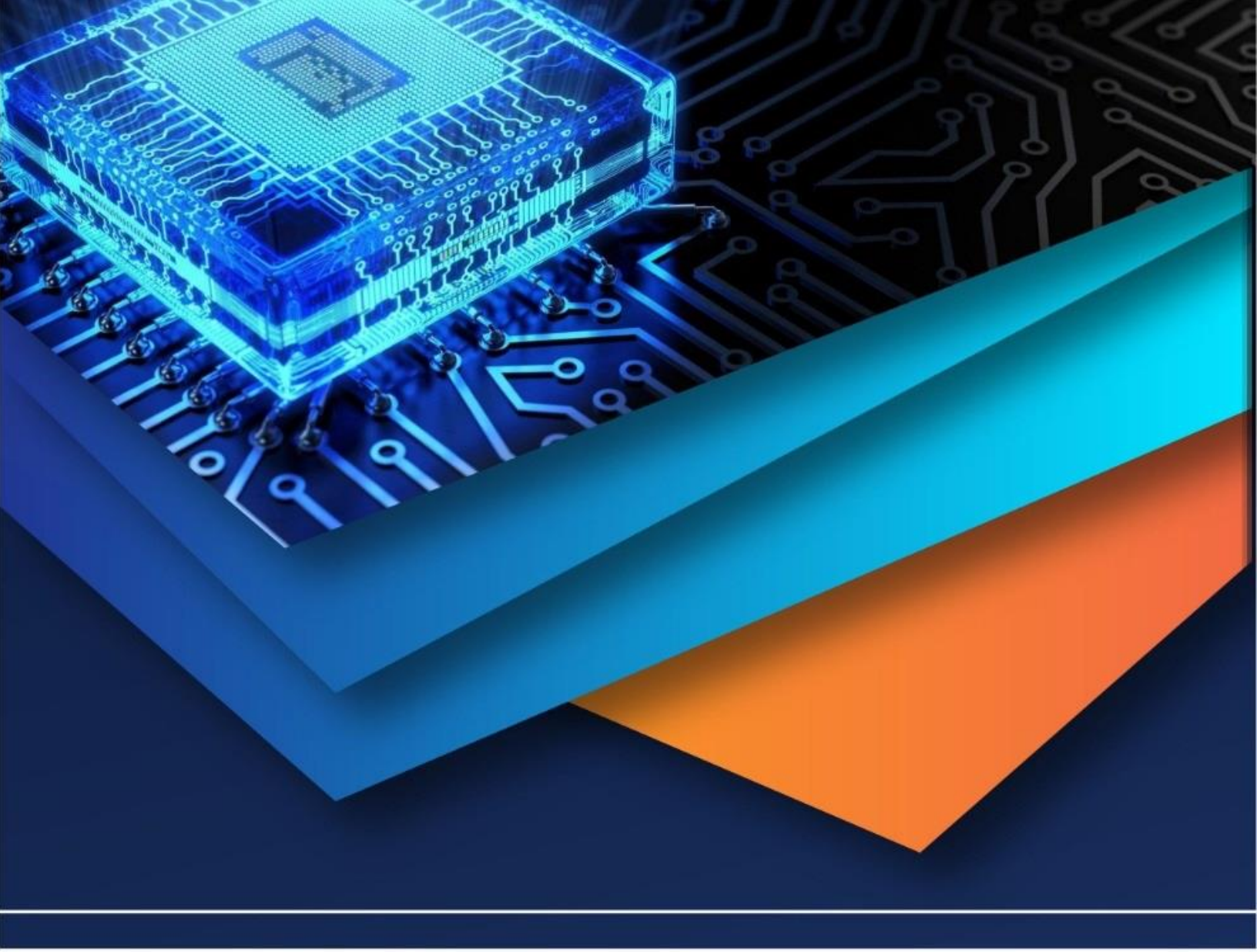

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