

# THREE AXIS PNEUMATIC AUTOMATIC WELDING MACHINE

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**Abstract** – In our research replacement of manual effort by the mechanical power. This mechanism introduce to welding the various components automatically. Three pneumatic cylinder and solenoid valve is used. One cylinder used for vertical movement, another one cylinder for arm lifting and one cylinder for the rotary motion by using rack and pinion assembly.

**Key Words:** Cylinder-horizontal, vertical, rotary, rack and pinion, solenoid valve, direction control valve, air compressor.

## 1. INTRODUCTION

In our mechanism to achieve automation by using pneumatic power and mechanical arrangement in welding operation. The pneumatic system attractive for low cost, simplicity and less hazardous operations. There are several reasons for considering the use of pneumatic system over hydraulic system.

Automation is important in mass production operations decides the sequence of machining. The machines designed for producing a particular product are called transfer machines.

Nowadays all the machines are being atomized in order to product the human being. The automatic machine being atomized for the following reasons,

- To achieve high safely operation and increased production rate.
- To reduce human involvement in welding operation.

### 1.1. Problem Identification

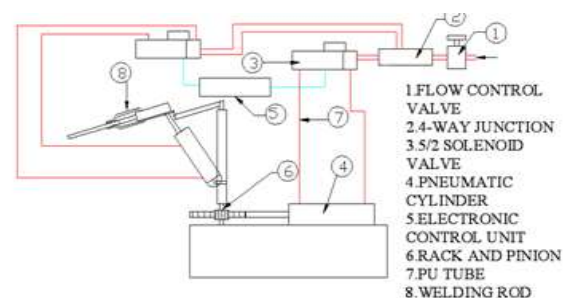
The current state in small scale industries is that they still use manual welding and machining methods due to lack of economic resource and infrastructure. And the uniformity and quality of the weld cannot be ensured, not to mention the work hours put in and the expenditure spent on the labours. Also there is a persistent risk of causing hazards to the operator through fumes, fires, spatter flying off those machines.

## 2. MAIN COMPONENTS USED

- Welding machine
- Solenoid valve
- Pneumatic double acting cylinders
- Rack and pinion gear assembly
- Flow control valve

## 3. PRINCIPLE AND WORKING

- The compressed air from the compressor reaches the direction control valve. The direction control valve changes the direction of flow according to the valve position handle.
- The compressed air pass through the direction control valve and it is admitted into the front end of the cylinder block. The air pushes the piston for the lifting stroke. At the end of the lifting stroke air from the valve reaches the rear end of the cylinder block. The pressure remains the same but the area is less due to the presence of piston rod. This exerts greater pressure on the piston, pushing it at a faster rate thus enabling faster return stroke.
- The stroke length of the piston can be changed by making suitable adjustment in the hand liver valve operating position.



**Fig -1:** Experimental set up layout

The experimental setup consist of two cylinders, all are of double acting type. The cylinder1 is used to actuate rack and pinion assembly, piston rod of cylinder 1 is connected to rack, which is meshed with the pinion. By operating the cylinder1, rack and pinion turns the whole assembly for moves 180 degree.

By varying the length of the rack the turning angle can be altered. Vertical cylinder or cylinder2 is used to increase the height of the setup. The height is limited to piston rod length. There are two 5/2 solenoid valve is used for each cylinder. The electronic timing control unit will activate the 5/2 solenoid (rotary cylinder) valve so that the double acting cylinder-1 will rotate from 0 degree to 180 degree. The speed of the cylinder is controlled by the flow control valve.

Next the control unit will on the next 5/2 solenoid valve (up/down cylinder) so that the pneumatic cylinder will from down position to upward motion. The path of the welding is changed by adjusting the flow control valve and control unit. After that the cylinder once again goes to original position then this operation repeats again and again.

#### 4. SUMMERY

With analysis of working and with the help of pneumatic system. Three axis moveable operations can be easily carried out without much effort. This mechanism is not only applicable welding but also for various applications. Thus we have developed a three axis moveable automatic pneumatic machine which helps to know how to achieve low cost automation. The operating procedure of this system is very simple so, person can operate. By using more techniques, they can be modified and developed according to the applications. Further modifications and working limitation will put this work in the main league of use.

#### REFERENCES

- [1] Nawal Kishore, Nitin Shokeen, sunali, "Automatic double axis welding machine," vol. 6, April. 2019, pp. 5370-5371.
- [2] Mr.Sateesh.R, Sreenithi.R.M, Tamilmani.R, Tamil Selvan.v, Vasanthakumar.A, "Fabrication of automatic pneumatic double axis welding machine",vol. 4, Fab.2018, pp.1201-1206.
- [3] B.Babu, V. Muthu Kumar, S. R. Mohan, "Design and fabrication of pneumatic four axis material handling robot", vol. 7, Sep.2017, pp. 40-44.
- [4] Seayon S. Dmello, Jebin Biju, Shashank S. Hegde, Anand V. Ganoo, "Design and fabrication of automated 2-axis welding machine", vol. 8, March. 2017, pp 236-244.
- [5] Shaik Shahed Ahamed, Shaik Mujeeb, Valdas Ravi Kumar, Jakkarigari Vijay Kumar, "Fabrication of pneumatic three axis dumping trolley", Vol. 4, February 2017, pp. 672-676.
- [6] Patel Umang M. ,Patel Shailesh H. ,Patel Sandip J. ,Mr. Rahul M Desai, "Three axis pneumatic trailer", Vol. 4, March 2018, pp. 53-63.