

PNEUMATIC EQUIPMENT IN MASS PRODUCTION SYSTEM FOR GRINDING

Nannikar Amolraj A.

Assistant Professor, Mechanical Engineering Dept. AITRC, Vita Sangli, Maharashtra, India

Malgave Sujit. S.

Assistant Professor, Mechanical Engineering Dept. AITRC, Vita Sangli, Maharashtra, India

Gavade Pravin. P.

Assistant Professor, Mechanical Engineering Dept. AITRC, Vita Sangli, Maharashtra, India

Bhore Harshal.S.

Assistant Professor, Mechanical Engineering Dept. AITRC, Vita Sangli, Maharashtra, India

Wadkar Vivek V.

Assistant Professor, Mechanical Engineering Dept. AITRC, Vita Sangli, Maharashtra, India

ABSTRACT

Nowadays every one focus on various pneumatic application in industrial areas because due to the continuous availability of compressed air in industry. It is possible to drive the number of applications using pneumatic circuit. So, we are also choosing the same way of study for improvement of plant efficiency. Our main objective is Experimental study on Pneumatic Grinding Machine. This study gives the better result of surface finishing of various material applications.

Grinding process is most important phenomenon to improve the equipment life in industrial as well as domestic purpose. Less power is required to drive the air compressor and easily handle the gridding tool. In industry every one focuses on reducing the production cost and improve the quality to increase the profit. So this study will definitely do this kind of work.

Further improvement in this work is to change the various tools and their size for number of application. Also easily available in market at minimum cost. The assembly of Pneumatic Grinding Machine is very simple and the working is so efficient.

INTRODUCTION

The word 'Pneuma' means breath or air. Pneumatics is application of compressed air in automation. In Pneumatic control, compressed air is used as the working medium, normally at a pressure from 6 bars to 8 bars. Using Pneumatic Control, maximum force up to 50 kN can be developed. Actuation of the controls can be manual, Pneumatic or Electrical actuation. Signal medium such as compressed air at pressure of 1-2 bar can be used [Pilot operated Pneumatics] or Electrical signals [D.C or A.C source- 24V –230V] can be used [Electro pneumatics]

THE GRINDING PROCESS:

Grinding is a material removal and surface generation process used to shape and finish components made of metals and other materials. The precision and surface finish obtained through grinding can be up to ten times better than with either turning or milling.

COMPONANTS OF PNEUMATIC GRINDING MACHINE:

1. Compressor
2. FRL unit
3. Double acting cylinder
4. Direction control valve
5. House and Fittings

1. COMPRESSOR

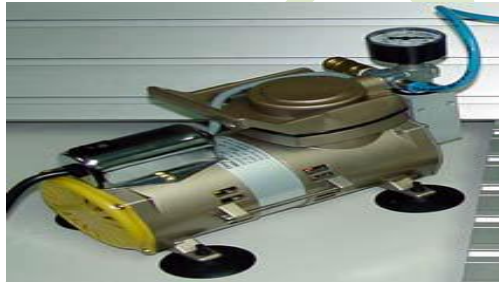


Fig 1. Compressor

Compressor is the main component of Pneumatic Grinding Machine, which compresses air. Here compressed air is used for running the Grinding Machine. This compressor have a indicator, it shows the air pressure generated is about 6 to 8 bar, which is sufficient to run our project i.e. Pneumatic Grinding Machine.

2. FRL UNIT



Fig 2. FRL Unit

FRL Unit Consist of Filter, Regulator and Lubricator, Filter is used for removing the impurities from air which is to be compressed, Regulator is used for regulate the air flow and Lubricator is used to lubricate air for smooth operation.

3. DOUBLE ACTING CYLINDER

We have selected double acting cylinder because we want a motion of piston in two directions i.e. up and down. As knob moved down the piston comes down and when knob moved upwards the piston moves to upward position.



Fig 3. Double Acting Cylinder

4. DC VALVE



Fig 4. DC Valve

DC Valve is taken to guide the air flow. DC Valves gives direction to compressed air flow in required direction.

5. HOUSE AND FITTINGS

It provide for the passage of compressed air from the compressor outlet to operating valve. Two separate pipes also connects the operating valve with the working cylinder pressure drop through and air line depends on flow rate, pie diameter, pipe length and pipe geometry. A small chaining bore size can have marked effect on pressure drop.

6. SEALS

Seal is an important component of a pneumatic system and is used to prevent air leakage through the joints. This project passes the static seal which are used to prevent air leakage through the stationary surface.

PNEUMATIC CIRCUIT:

ABOUT CIRCUIT:

1. The compressed air from the compressor reaches the direction control valve through FRL Unit. In FRL Unit the compressed air gets filtered, air pressure is regulated as per requirement and air gets lubricated.

2. The direction control valve changes the direction of flow according to the instructions from up down handle, whenever operator wants to move tool bit in up or down direction.

3. The compressed air pass through the D.C. valve and it is admitted into the inlet of cylinder. It exerts pressure on piston block, thus piston rod moves upward or downward depending upon the operator's instruction.

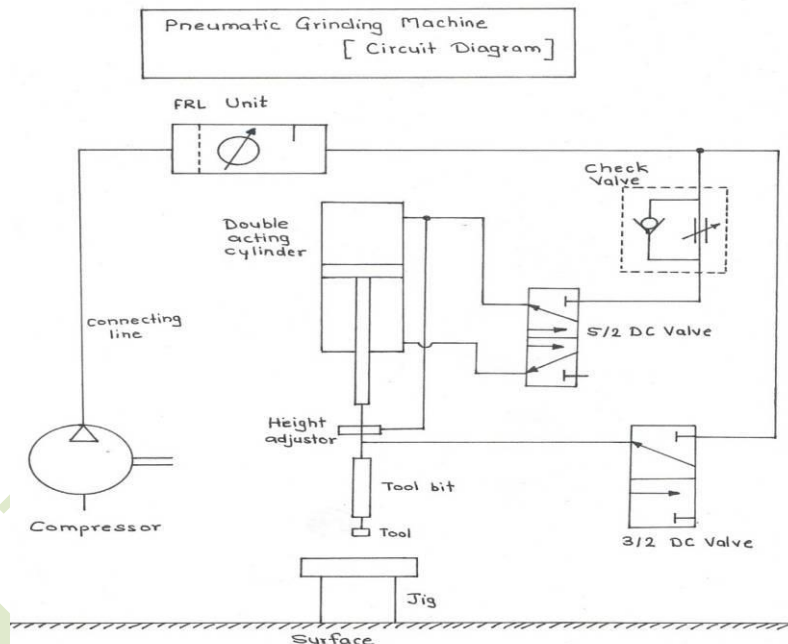


Fig.5 Circuit Diagram of Pneumatic Grinding Machine

4. For downward motion of tool bit, air enters through upper inlet and exerts pressure and vice versa for upward movement of tool bit, air enters through lower inlet of cylinder.

5. And hence by using tool bit attaching to lower end of piston rod we do grinding process.

CONSTRUCTION:

1. The frame for all components of Pneumatic Grinding Machine is made. On this frame plywood is attached for attaching the pneumatic components. For supporting the work-piece the jig is made and attached on this frame, for this welding operation is done.

2. FRL Unit is mounted at the left side at upper corner. At right upper corner, there is a junction of connecting lines.

3. At the right side there is a check valve attached to connecting lines, the check valve is non return type check valve.

4. From the junction two connecting lines comes, one of them goes to check valve and another one goes to 3/2 DC Valve (which is for drilling purpose).

5. Connecting line from check valve is then attached to 5/2 DC Valve. The outlet connecting line is connected to upper inlet of double acting cylinder. There is a junction and one another connecting line is attached to height adjustor, which is used for getting required movement of piston.

6. Another connecting line from 5/2 DC Valve is attached to lower inlet of double acting cylinder.

7. A connecting line from 3/2 DC Valve is connected to connecting rod, it is for drilling purpose.

8. A tool bit is attached to connecting rod. We have various types of grinding tools, attaché the required tool to tool bit.



Fig. 6 Pneumatic Grinding Machine

ADVANTAGES

1. It is environment friendly.
2. Running cost of project is very less
3. Unskilled worker can be work
4. Manufacturing cost is less.
5. Less maintenance.

LIMITATIONS

1. Possibility of leakages.
2. It operates on limited pressure so high torque generation is not possible.

APPLICATIONS

1. Used in foundries.
2. Used in machine shops.

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