

AUTOMATIC DRILLING MACHINE USING PCB

Chaudhari Shivaji¹, Shinde Pooja², Jagtap Pratibha³, Chaure Namrata⁴, Tamboli Shirin⁵.

¹Chaudhari Shivaji, Mechanical engineering department, PREC LONI, Maharashtra, India

²Shinde Pooja Mechanical engineering department, PREC LONI, Maharashtra, India

³Jagtap Pratibha Mechanical engineering department, PREC LONI, Maharashtra, India

⁴Chaure Namrata Mechanical engineering department, PREC LONI, Maharashtra, India

⁵Tamboli Shirin, Mechanical engineering department, PREC LONI, Maharashtra, India

ABSTRACT

In PCB drilling machines, the location of the drill apertures are virtual into the machine and the PCB will be drilled at the corresponding coordinates. This paper presents the design of a PCB drilling machine, where the drill apertures are automatically detected from an image of the circuit eliminating the desideratum to manually enter the drill aperture coordinates. Today the Industrial magnification is pristinely depends up on latest machines; ergo the subject of drilling machines is elongated too widely, because today wide varieties of drilling machines are designed for sundry purport. Machine kinetic's is in two plane. Precision 25% more than manual operated machine is achieved. Cooling system atomization is done to resist wear and tear of the implement and to ameliorate life of the implement. Chip is abstracted.

Keyword: - PCB, Drill, Seamless pipe, Lead screw etc...

INTRODUCTION

Drilling machine can be defined as an instrument which is utilized to drill apertures. Drilling machine plays a consequential role in mechanical workshops. The purport of this project work is to get hold of consummate information pertaining to drilling machines. A drilling machine comes in many shapes and sizes, from diminutive hand-held power drills to bench mounted and conclusively floor-mounted models.

To drill the aperture, drilling depth cannot be estimated opportunely, job may spoil due to human errors, and different size apertures cannot be drilled without transmuted the drill bit. Consumes lot of time for doing reiterated multiple jobs, these all are the drawbacks. To surmount all these quandaries, this automated drilling machine is designed which is aimed to drill the apertures automatically over a job according to the drilling depth data programmed on printed circuit board. The main concept of this machine is to drill the apertures over particular jobs perpetually at different depths, sequence is maintained. As the machine contains drill motor, the kineticism is controlled accurately. The mechanical transmission section is controlled with stepper motor, predicated on the drilling depth programmed through PCB the microcontroller restricts the forms of kineticism of drill motor through stepper motor.

2. PRINTED CIRCUIT BOARD

The PCB is an oeuvre printed circuit consist of conductive circuit applied to one or both the side of insulating base, depending on that it is called either single sided or dibble sided PCB. The performance of electronic circuit depend apron the layout and design of the PCB. They are habituated to route the electrical current and signal through copper tracks which are determinately bounded to an insulating base. The Printed Circuit Board (PCB) is utilized to mechanically support and electrically connect electronic components utilizing conductive pathways, tracks pristine traces etched from copper sheets laminated onto a non-conductive substrate. Printed circuit boards manufactured now a days can be built utilizing the following four items:-

- Copper-clad laminates.
- Resin impregnated B-stage cloth
- Copper foil.
- Laminates.

Majority of printed circuit boards are made from purchased laminate material with copper applied to both sides. The non-subsidary copper is abstracted by sundry methods leaving only the desired copper traces, this is called subtractive. Apertures through a PCB are typically drilled with minuscule-diameter drill bits composed of solid coated tungsten carbide. Coated tungsten carbide is utilized since board materials are very abrasive and drilling must be done at high RPM and high aliment to be cost efficacious. Drill bits should remain sharp so as not to tear the traces. Drilling with HSS implement is simply not feasible since the drill bits will dull expeditiously and thus tear the copper and ruin the boards. The drilling operation done by automated drilling machines with placement controlled by a drill tape or drill file. These computer-engendered files are withal kened as numerically controlled drill. These apertures are often filled with annular rings (hollow rivets) to engender vias. The most paramount electrical contrivance utilized in the project work is Stepper motor. Today stepper motors are widely utilized for many applications concretely in the field of mechatronics & robots these motors are playing a major role. The stepper Motor utilized in this project work is indigenous one. The stepper motor is a facile and reliable contrivance to convert electrical energy into mechanical kineticism. Since each input change causes precisely one step rotation, a stepper motor may be operated in an open loop system

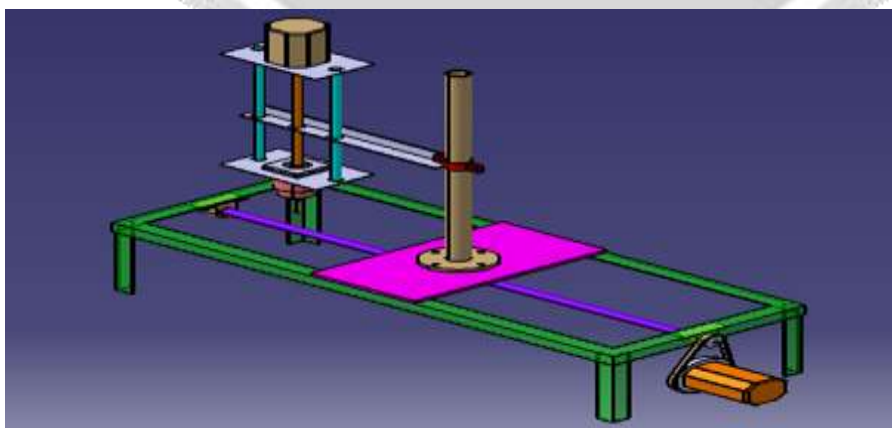


Fig -1: Automatic drilling machine

3. CONSTRUCTION AND WORKING

Our project consists of two DC motor where first DC motor is connected to the spindle and second to the lead screw. AC motor is connected for coolant purport. Step down transformer is utilized for converting 230v power supply to 12-volt DC supply. A separate panel is provided where printed circuit board is mounted. It consists transformer, capacitor, rectifier, filter, resistor and relays. Machine works on six relays, when power supply is provided first relay gets on i.e. motor is commenced and lead screw at base moves forward In second relay motor goes off then in third relay coolant pump, machine and motor gets on. While in fourth relay machine goes in downward direction and in fifth relay due to IC 555 timer object is drill and machine get reverse partialness and in sixth relay lead screw is reverse. Hence operation is consummated.

4. COMPONENT PLACEMENT

Preferably, place the compound in X-Y direction subjected to mechanical consecution. All components should be flat mounted i.e. flat placed to avoid of lead and for essay requisite showed where in case of space constraint to the compound such as resistor, diode etc. In case separate analog and digital ground. Mounted vertically this doesn't affect the performance. Oration of multi-lead component (e.g. switches, ices) should be connected between the analog and digital ground. Ample cleaner is provided around component so that incursion and supersession and rehabilitate essay. The design should such that minimum jumper are sanctioned. It is preferable that component like present, coils, and trim pots, etc. which alignment of calibration are placed in such that, they are assembly after the assembly of the PCB cabinet additionally. If the compound is not flush mounted, provided the sliver for lead.

3. ADVANTAGES

- Accident is eliminated during drilling it increments morale and efficiency of workers.
- Minimum maintenances are required.
- It can be utilized as multipurpose equipment i.e. drilling, reaming, counter, vapid, tapping etc.
- More drill can do in less time.
- Increasing productivity.
- It precision is high and preserves time.
- It required diminutive space to keep in workshop. It's facile to operate.

4. CONCLUSIONS

The current system has better performance than the precedent system. This result is achieved by superseding the both shaft for X- and Y-axis. The performance of the system can be upgraded by utilizing more minute delay for the stepper motor. The cull of cull raw material avails in machining of sundry component to very proximate tolerance their by minimizing the caliber of wear and tear need less impasses here that we have hoist no stone unturned in our potential effort during cutting, welding, filling,

& soldering work of the project model to enter gratification. Thus we concluded that automatic drilling machine utilizing pcb increases efficiency and productivity.

6. REFERENCES

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