

Unit - II

Advanced Electro & Laser machining process

2. Electrical energy Based Processes

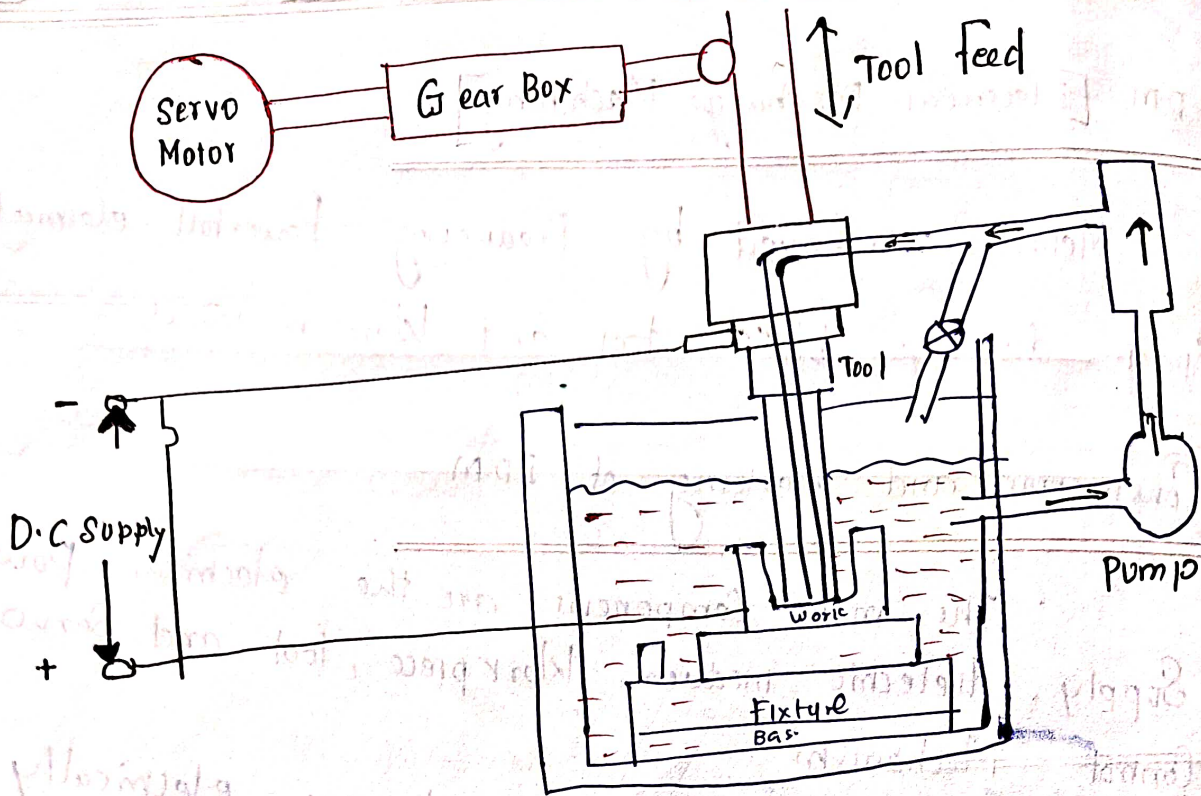


EDM [Electrical Discharge Machining]

Metal is removed by producing Powerful electrical Spark discharge b/w tool and Work materials

Construction and Working of EDM

- The main Components are the electrical Power Supply, dielectric medium, Work piece, tool and Servo Control Mechanism
- Work piece and the tool are electrically Connected to a D.C Power Supply, dielectric medium, Workpiece, tool and a Servo Control Mechanism.
- The tool and workpiece are submerged in a dielectric fluid medium such as Para Fin, White Spirit or transformer oil having Poor electrical Conductivity.
- The function of the Servo mechanism is to maintain a very small gap, known as 'spark gap' ranges of 0.005 to 0.05 mm b/w the workpiece and the tool.



Working :-

- When the D.C. Supply is given to Circuit, Spark is produced across the gap b/w the tool and the work piece.
- When the Voltage across the gap becomes sufficiently large, the high power Spark is produced. So dielectric breaks down and electrons are emitted from the cathode and tool gap is Ionized.
- Spark occur occurs in an interval of 10 to 30 microseconds and with current density of 15 - 500 A per mm² approximately. So thousand of Spark discharge occur per seconds across the gap b/w tool & work.
- At this high pressure and temperature, work piece metal melted, eroded and some of it is vaporized. In this way the metal is removed from the work piece.

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The removed fine material particles are carried away by dielectric fluid circulated around it.

Metal removal depends on the spark gap maintained. When voltage drops to about 12 volts, the spark discharge extinguishes and dielectric fluid once again deionized.

Applications.

- It is highly economical for machining of very hard material as tool wear is independent of hardness of work piece materials.
- It is very useful in tool manufacturing.
- It is widely used for die making as complex cavities are made in the die making.

Advantages:

- It is very much economical for machining very hard materials.
- Complicated geometries can be produced which are very difficult otherwise.
- Fine holes can be drilled easily and accurately.