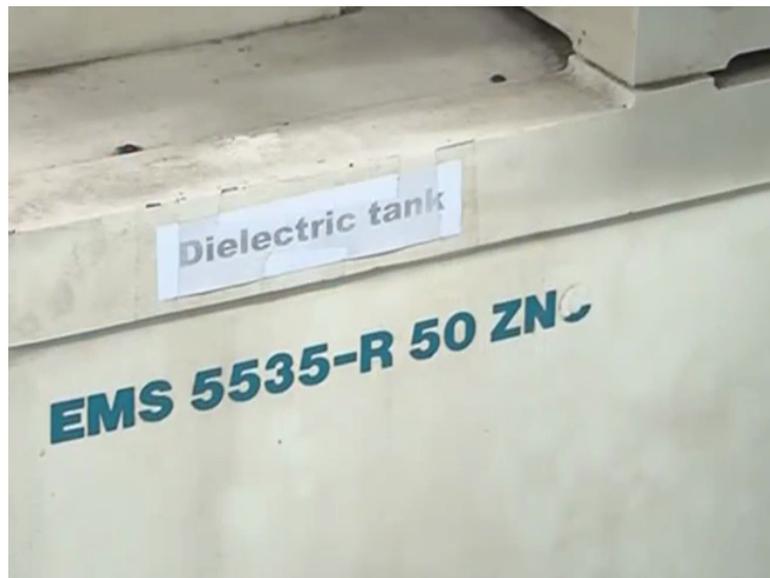


Advanced Machining Processes
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Lecture No 13

Hello everybody my name is Ajay Sitpara I am here as research (0:19) at mechanical engineering Department IIT Kanpur. Today going to give you brief deflection of electro discharge machining process and shortly it is called EDM process.

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This electric discharge machining has 4 basic components 1st component is the dielectric tank in which the dielectric materials is kept inside and which is circulated by this pump, so that the dielectric can get filled and material removal can take place after that machine and 2nd is

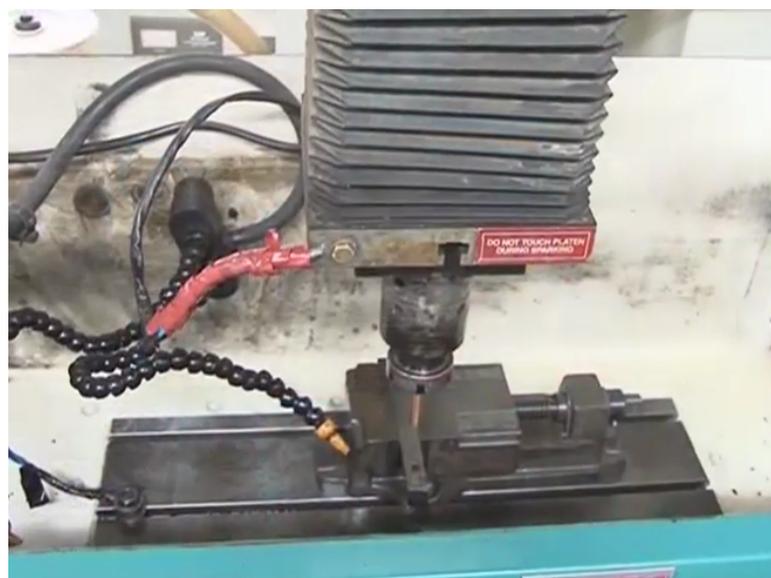
the machining chamber in which the workpiece and tools are kept on a positive negative terminal that I will show you later on.

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This is the machining chamber in which the Z axis of CNC machine head is attached and in this compartment here the tool is attached on the negative terminal and the workpiece is attached to the positive terminal, I will show you later on this regard also. In this this is the Control Panel on which the old processing parameter and be shared so that the (())(1:16) machining collision can be performed and material removal takes place according to our desired accuracy.

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This is the machining chamber in that you can see this is the workpiece material and this is the tool attached to the Z axis of this machine and this Z axis of the machine is connected with the negative terminal of the power supply and this workpiece is connected to the positive terminal of the power supply and once this directive chamber is sealed, after that you can start machining.

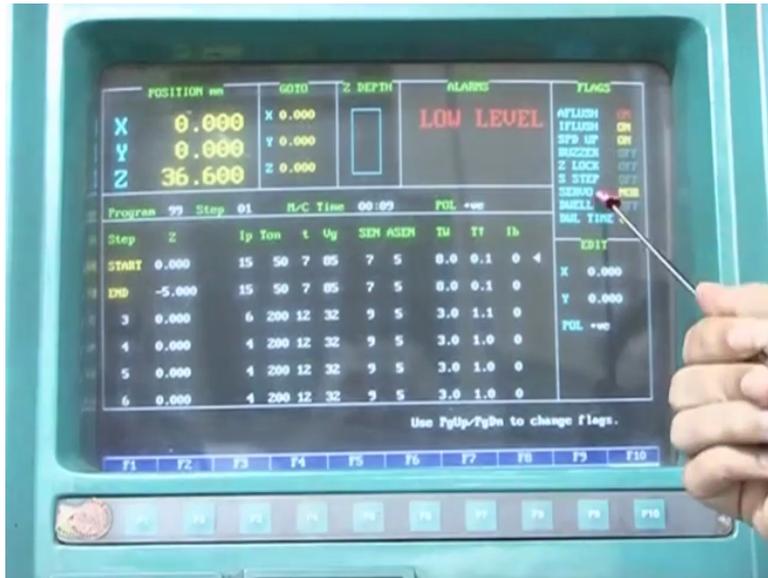
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Now I am starting this Control Panel. Now press any key to continue, now these are the various process parameters which you can control by this machine and this is the X, Y and Z position. At present X and Y position are 0 and Z axis of this tool axis is at 36.6 in positive direction.

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Now I am going to explain you how to set different parameters. In this, this is IP this is the input current, if you increase this current then the machining takes place at higher rate and the surfers roughness will increase, so according to the process requirement you can set the higher or lower current and the 2nd one is the T on time, T on time is how much time the machining can take place in a particular cycle so that the sparking can take place and 3rd one is the t which is the t of time because in EDM process there are on time and off time, off time is the part of the photon cycle in which the machining cannot be take place and the removed material can be sweep away by the directive fuel and this 4th one is the gap voltage.

This gap voltage depends on the how much gap you can control in this particular process and this is the sensitivity, sensitivity is nothing but at the moment of this servo motor, if the sensitivity is very high then the servo motor of the Z axis will move very slowly at present it

is 7 and total ranges 0 to 14 so presently it is on 50 percent and this one is the arc sensitivity in which the machining arc takes place then it will give some alarm so that you can stop machining process and work piece will not be damaged for further processing and this is the tool wear, so tool wear can govern depends on the which type of material and tool work is combination you have chosen, depending on the that combination, you can select the tool wear and this one is the T, T is nothing but a time on which the machining takes place.

So it is the total amount of time when the workpiece and tool are in near to the machining area and this is Ib, it is not particularly used for this machining process right now and now this menu gives flags, so flags is nothing but some type of alarm where some machining takes place and at the time there are some unwanted noises are there then this alarm will give this is the auto flush then speedup, buzzer, (())(4:44), bell time, dual time is there when machining takes place then you can give some dual time, so that machining can take place at a higher rate. At present there is most of this are off and this first 3 are on so that you can get some alarm if machining is not taking place at their particular choice.

Now this is the edit where you can edit by this pressing F10, so once you have press F10 then here you can see there are different parameters 1st is edit this is flag, so now flag this part is active right now then press DRO, DRO means you can set the position of X, Y and Z. Once you can top this workpiece with the tool at that time you can press 0, so that X, Y and Z all are 0 add a particular level. Now there is a program, now you can write different program in this file and edit means already written programs you can edit as per your choice. Now this F9 is the pump, pump is that you have to fill this directive chamber before start machining and this Z down is moment of Z axis, Z up is moment of the Z axis again.

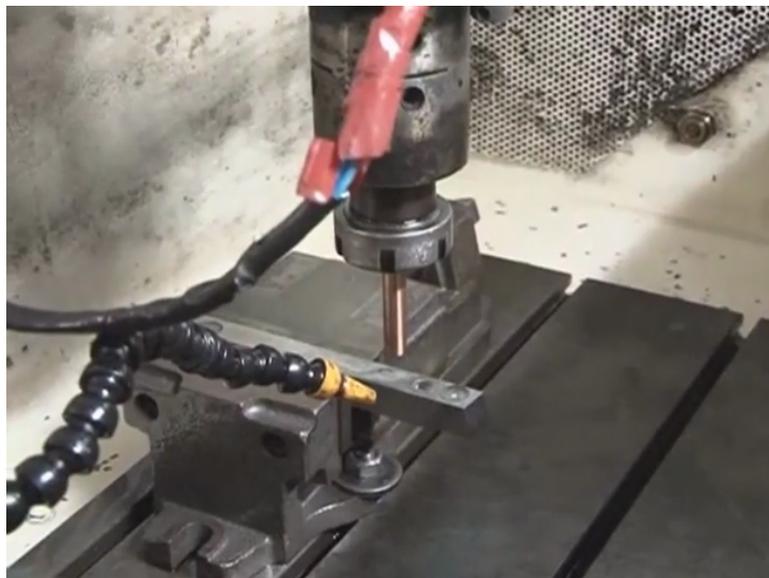
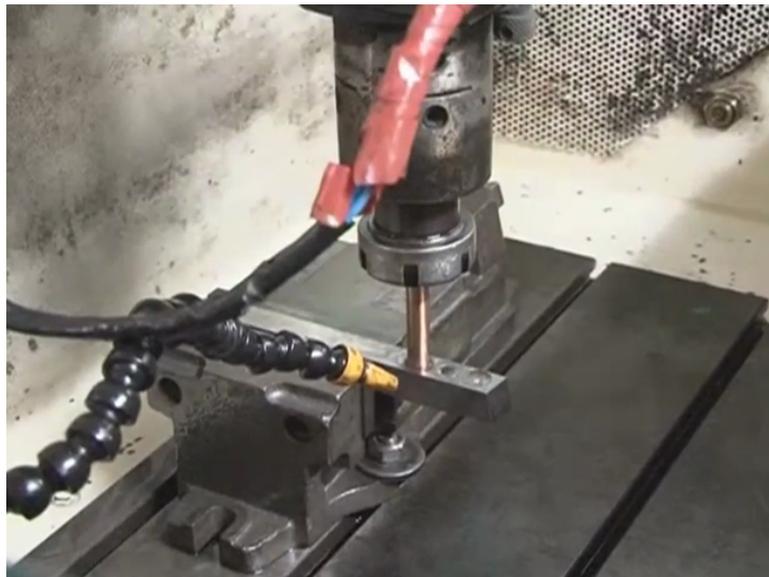
Alarm reset, if some alarm is given by this Control Panel then you can press this button to switch off that alarm and step this means if you are giving a step machining then you can set by this F5 button and standard step is F4. Auto position means once you get some particular distance between workpiece and tool after that you press this auto position so that the workpiece and tool gets set automatically there is no need to give an extra motion. Halt means once you give a machining operation at that time suppose you want to stop machining in a particular moment then you press halt then machining will seize off and sparks, sparks means machining starting time when you press F1 button then machining starts.

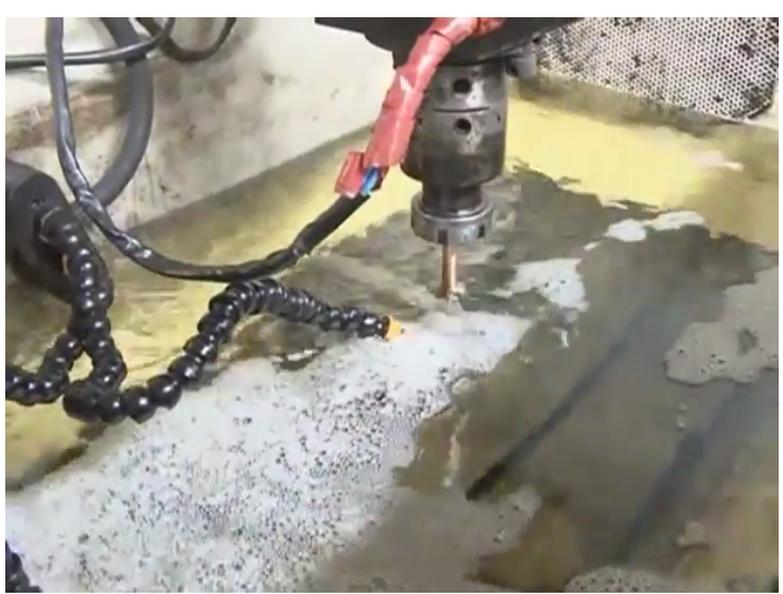
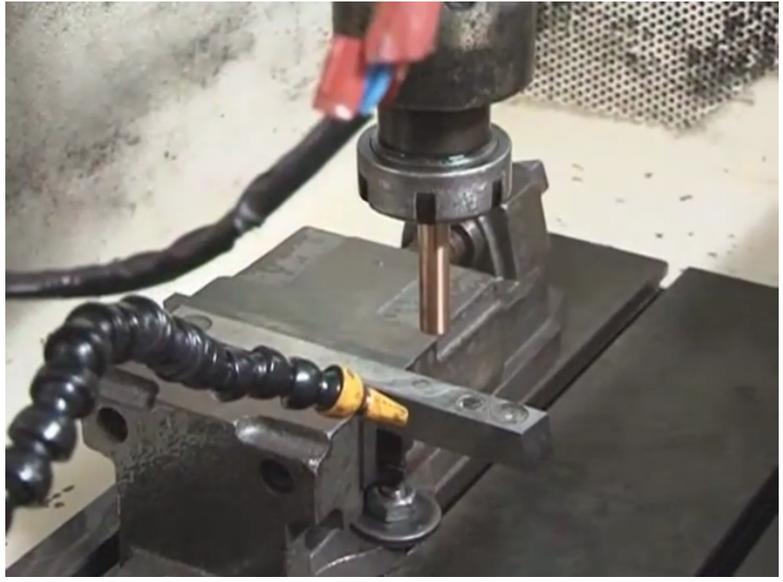
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The 1st operation before start machining is to set X, Y and Z at particular positions that is called 000 position or work position. So presently X and Y are at 0 position but there is a gap between tool and workpiece, so I will give command of auto position so that this workpiece and tool get touch here and so that I can press Z as 000. Now it is auto positioning the tool and workpiece, now tool and workpiece are in touching position, so now this is the 000 position.

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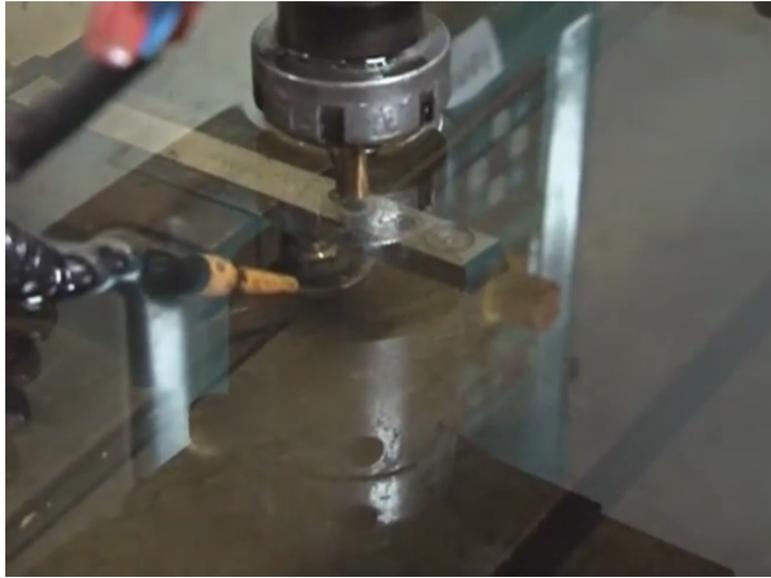


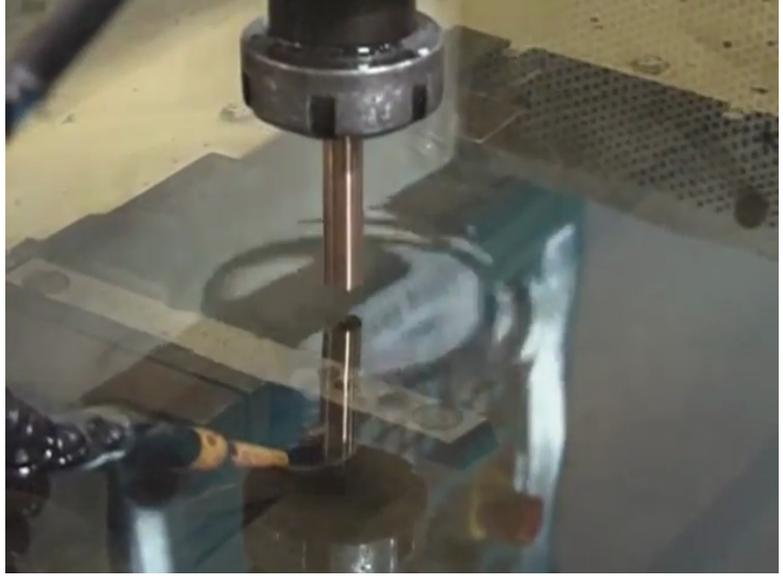


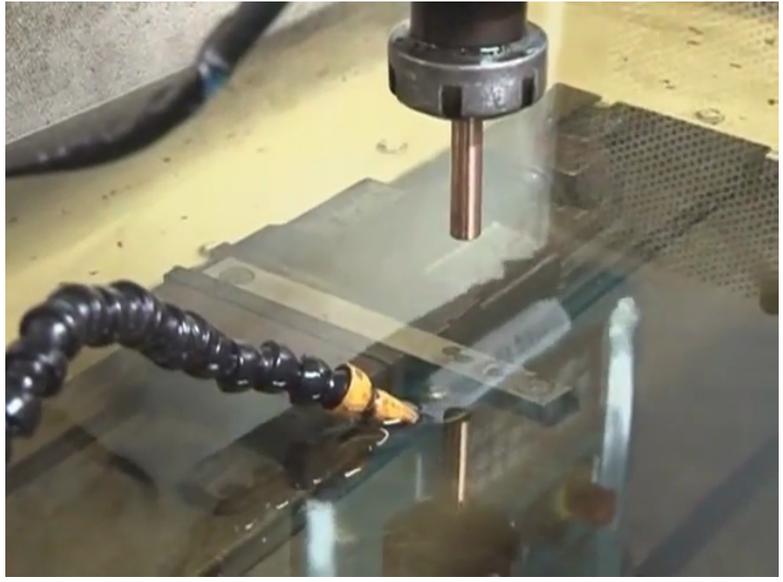


After positioning X, Y and Z axis at 000 position, now I will be deprive this Z axis. Now the 2nd step of this process is to fill up this machining chamber with dielectric. The tool and the workpiece should be submerged in the dielectric fluid. After that the machining we can start, now tool is moving towards the workpiece position, now machining has been started. Now you can clearly see the sparking between tool and workpiece.

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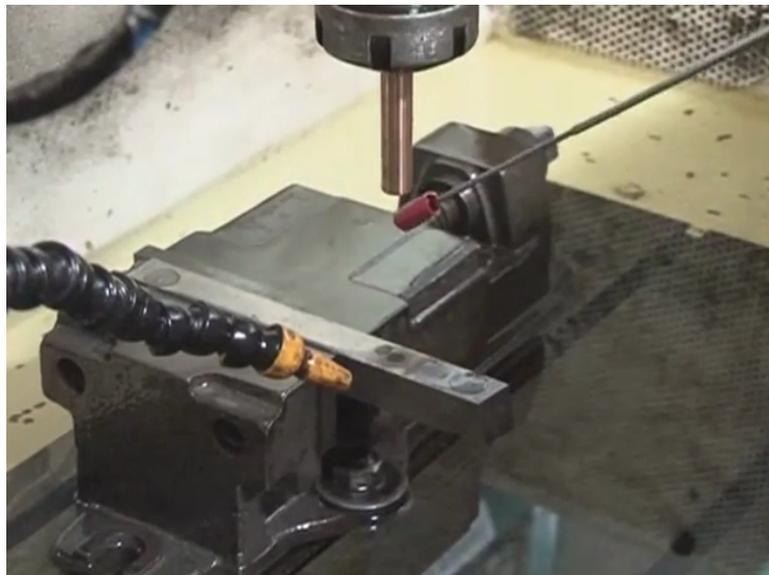






After completion of machining processes you can retrieve this z-axis at particular high-level and after that you have to remove all this dielectric fuel from the machining chamber. Now this (0)(12:41) level is very low so that we can fill up the dielectric again if we want to start processing again but there is no need at present, so I am switching off this alarm.

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Now you can see there is some material removal from the workpiece surface here because this is a thermal process in this process material removal take place from the workpiece as well as from the tool also the depends upon which type of polarity you have given in this particular process. Whichever part is connected with the negative polarity, it will remove at a lower level and which one is connected with the positive polarity, it will get removed at a more faster rate compared to the negative polarity.

Now we have just seen that the working principle of the EDM process. Now this EDM process is basically used for die and other mould manufacturer because this is the process in which you can control finishing accuracy as well as machining accuracy at a particular level and it can give a good surface finish as well as material removal and there is no any limit of

workpiece hardness but the basic problem with this processing is that this machining process can be used for conducting materials only and any hard material but it should be conductive material then only this EDM process and work. Thank you for your patience.