

PATENT NO. 327068

AN ONLINE MICRO-TOOL DIAMETER MEASURING SYSTEM FOR MICRO-ELECTROCHEMICAL /MICRO-ELECTRO DISCHARGE MACHINE

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APPLICANT

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ABSTRACT

The present invention relates to an online micro-tool diameter measuring system for micro-electrochemical/micro-electro-discharge machining set-up wherein the micro-tool is required to be manufactured in-situ before the actual machining operation can be carried out with it. The system automatically measures the reduction of diameter of the micro tool from time to time on demand or at equal intervals, without stopping the machine while the machining operation is carried out the machining operation is stopped automatically and when the diameter equals the desired diameter. Advantageously, the lead time for machining is reduced to a great extent. The micro-tool is machined in-situ eliminating handling and mounting problem. The numerical value of reduction in diameter is directly displayed on the computer screen eliminating human error. This system is suitable for different non contact micro tool based micromachining setup favouring wide application of such system in research laboratories / industry / commercial purposes etc based on user needs.

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CLAIM 1

An online micro-tool diameter measuring system for micro-electrochemical(micro-ECM)/micro-electro-discharge(micro-EDM) machines comprising a laser source with visible wavelength for providing a shadow of micro electrode/tool placed on the path of laser beam;
a small voltage source, applied across a light dependent resistor (LDR);
a fiber optic cable of which one end there is a coupler to receive the laser beam and the other end coupler placed in front of said light dependent resistor (LDR) in a small dark chamber such that there occurs a change in voltage across said LDR due to the change in intensity of laser beam carried through the optical fiber and incident on said LDR;
a micrometer with stepper motor having a driver means operatively connected to the receiving end of the optic coupler to travel across the beam for tool diameter measurement;
a data acquisition (DAQ) card adapted to measure the average change in voltage across said LDR and compare with a chosen preset value using a control program resident in a computer in such as to detect the receiving end when it moves from light to dark or vice versa to generate a voltage pulse, the path traversed by the receiving end of the fibre optic cable being measured by counting the number of steps the stepper motor is rotated.