Proceedings of the Technical Session of Institute of Physics, Sri Lanka 19 (2003) 27-34

Construction and design of a digital thickness gauge and supporting software

P. V. V. Jayaweera and K. Tennakoon,
Institute of Fundamental Studies, Hantana, Kandy.

Micrometer is a well known device, which uses the pitch of a screw thread to measure small distances. Usually the sensitivity of this type of a device is 0.01 mm. The method was designed that boosts sensitivity of a micrometer up to 0.0025 mm. It can be used to measure 0.0025 mm to 20 mm thickness. Full computer control of the device is possible by clicking the mouse. To achieve this, a stepper motor was used to rotate spindle that has 0.5 mm csrew pitch, instead of manual rotation of the conventional micrometer. The screw can accurately move 1/200 part of complete revolution on incorporation of the stepper motor. Measureing probe of this device simply touches on the sample surface that was needed to measure, without any rotary motion. Computer that counts all steps drove the stepper motor until touched measuring probe and sample under predetermine pressure. Crossing mechanism of an IR beam which incident on detector, was used for precisely determines this touching position. The setup can be connected to computer via printer port without installing hardware. Two kinds of software, compatible with DOS and Windows operating systems have been produced using QuickBasic and VisualBasic. It can be easily upgradable for any other operating systems. This setup can be upgraded to measure thickness variation along the one axis of the sample (x-y profilemetry) or to plot thickness variation on the sample surface (surface profilemetry) by using another stepper motor with moving mechanisms.