

RAL

DESIGN & DISCOVERY

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RUTHERFORD APPLETON LABORATORY

SCIENCE AND ENGINEERING RESEARCH COUNCIL

METROLOGY SECTION, TECHNOLOGY DEPARTMENT

EXHIBITION OF METHODS OF CONTACT AND NON-CONTACT MEASURING

CONTACT MEASURING

The LK80 - 3 axis measuring machine incorporates in its construction an all granite, all air bearing design and is mechanically very simple.

The machine is driven by stepping motors giving a fine adjustment facility and ideal control when using electronic probes. It can be driven manually by keyboard commands or programmed to run under computer control. All these features combine to give repeatable accuracy of measurement on large or small components.

A JCMT Panel is a typical component which would be difficult to measure without the use of such a machine.

The demonstration shows the machine being driven by the computer to measure the positions of supporting holes, overall panel dimensions and deviations of the surface from the theoretical shape. The results can be stored on disc or printed directly.

NON-CONTACT MEASURING

Two methods of non-contact measuring are displayed:

1. Mondo - 3 Axis Measuring Machine

This machine employs a video camera with zoom lens to view the workpiece. The workstage is granite and has the stability of high grade linear bearings to control the 'x' and 'y' motions. It is driven manually using Heidenhien Gratings 4 digital readouts to record movements. When linked to a computer it allows datum points to be established and measurements of the workpiece features to be computed without any need for precise alignment.

Essentially, the machine is suited for measuring plastics, electronic components or items which cannot be handled because of their cleanliness or fragility. It also has the added facility to photograph the component details and produce a print.

2. Shadowgraph Projector

This machine employs parallel lines of light to project the outline of the workpiece through a magnifying lens. This projects the image of a workpiece onto a screen several times larger than the original.

The worktable can be moved in horizontal (x) and vertical (y) axes. By using Heidenhien Gratings, these movements are transferred to a digital readout. Angles can be measured by rotating the screen, changes in angle being shown on a digital display.

This machine is mainly suited to checking forms, dimension between hole centres and thread profiles. An added feature is the surface illumination which produces excellent images of surfaces sufficiently detailed to allow micro-electronics to be inspected.

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