



Inspection object with four concentric resistor tracks

### Automatic Surface Inspection

#### Application Fields

**Inspection for:**

- Surface Defects
- Print Defects
- Coating Defects
- Correct Dimensions
- Completeness

**For the final inspection in automatic production processes** of flat mass products, particularly where exact positioning is important for the inspection task.

#### The Features

The inspection device can be integrated into the production process and contains a turntable with 4 positions:

- Position 1:** Object deposition and cleaning
- Position 2:** Image grabbing with line scan camera by rotating the object
- Position 3:** Image grabbing with array camera
- Position 4:** Object removal

The turntable and the rotation device are powered electrically; the other actuators are driven pneumatically.

The cycle time is from 1 to 4 seconds depending on the inspection complexity.

Feeding of the machine is done by the handling system of the production line. For stand-alone operation and for service purposes the machine can also be driven manually. The required operating elements are integrated into the mechanical construction.

The optical resolution of the inspection system can be adjusted to each task. The illumination can be defined individually.

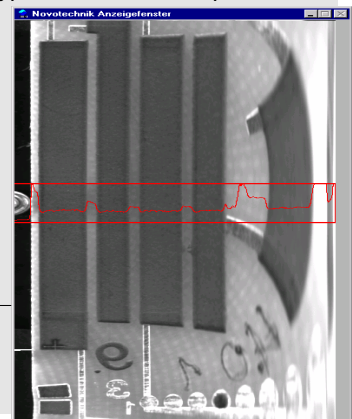
#### Typical Application: Inspection of Resistor Tracks on Potentiometers

The machine serves for inspection of several concentric resistor tracks on a potentiometer. Position and surface quality are tested. The resistor tracks are produced by screen print methods. Typical defects are spots, fluff, holes, stains, etc.

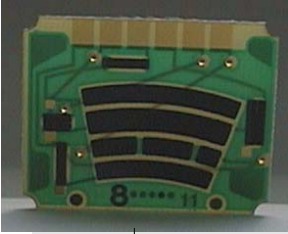
The surface is illuminated by two different light sources in two successive runs. In addition, the test of different marks of the screen print is integrated.

The resolution of the inspection system is 37 µm/pixel radial and about 30 and 50 µm/pixel tangential (about 8 lines/degree). In position 3 an array camera is used to test the distances between the four tracks.

The “good” and “bad” criteria can be adjusted using different parameters. For each defective part a documentation is created. The system is capable to store a large number of different parameter sets. The image processing methods have been tested and used by Novotechnik, Stuttgart, since 1990.



Line scan image of a test object



# SIGNUM

## Automation

### The Hardware Basis

Inspection object with  
four concentric  
resistor tracks

#### Processing System

- Standard Pentium PC with PCI Framegrabber
- Connection for all standard types of cameras: 4 x b/w (CCIR) or 2 x colour (RGB, SVHS) or 1 x line scan (digital, max. 2048 Pixel)
- Operating system Windows 2000, performing stability und nearly real-time capability in a standardised system environment
- 3 opto-isolated digital interface boards for to control the mechanics and to communicate with the PLC of the production line

#### Mechanical System

- Stepping motor control to turn the object
- All control elements integrated in one container with the complete mechanical system on top
- Fitting pins for reproducible positioning of the machine in the handling line
- Cover for camera and illumination
- Switch for manual operating mode

Inspection machine which  
can be fitted in the  
production line.  
Half-automatic operating  
mode with manual input is  
also possible.



**signum**

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