

SYSTEM KOWI 3000

Contact Resistance Test acc. to EN 60512
A standard for the quality and reliability of electrical contacts

Range of application:

- Testing of galvanic or sputtered layers
- Production control of semi-finished products and complete contact elements
- Incoming inspection of raw materials and semi-finished products
- Evaluation of the ability of soldering and welding of metal surfaces
- Research and development, e.g. testing of ROHS-compliant platings



The KOWI is approved as test bench in the reference book 'Elektrische Kontakte, Werkstoffe und Anwendungen' (Ed. E. Vinaricky) released in Springer-publishing house, ISBN 3-540-42431-8.

Mode of operation

All tests are carried out in quadrupole measurement technique with easy operation. The software (English module available) comes with a data-based laboratory data management. Preset parameters can be stored for further use. Test results can be easily recovered and evaluated.

Camera Module (optional)

Active element for the examination of the magnified surface. It simplifies the reaching of the first measuring point, e.g. with small sample dimensions. You also take snapshots of the surface.

Properties

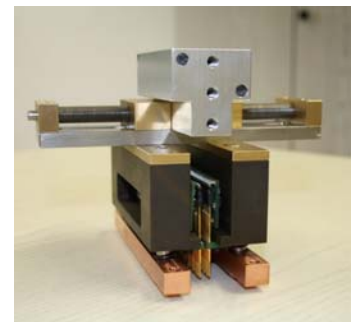
Contact-force from 0 to 20 Newton, voltage-limitation between 0 and 10 V, measuring current from 0 to 1 A

Options

- Standard resistance measurement (individual measurement)
- Resistance grid by surface-scan
- Resistance under dynamic increasing and decreasing force, voltage-limitation and measuring current

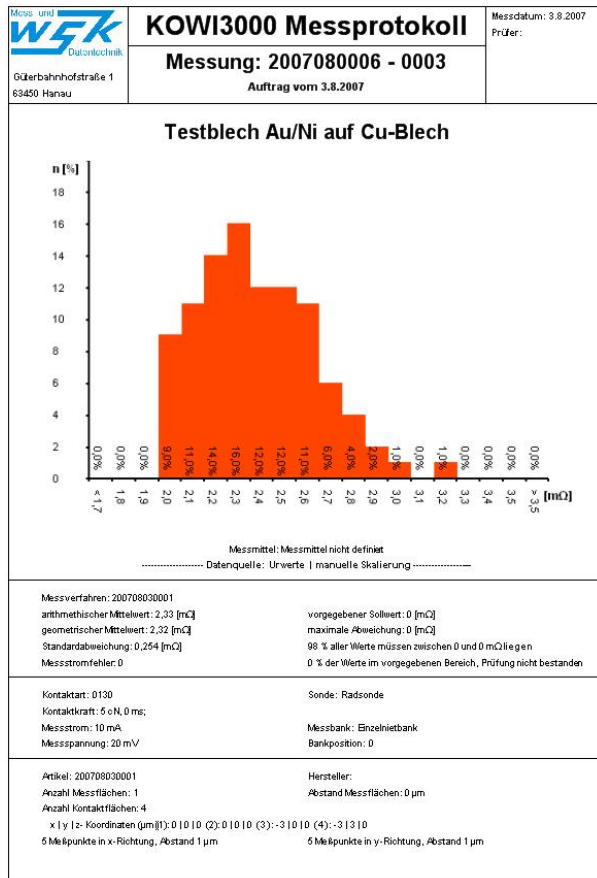
Potential for development

- multilingual software (the user can add new languages himself)
- interchangeable measuring heads, e.g. for fretting corrosion test
- measuring of surface resistance with quadrupole probe
- freely programmable test-points, selectable by mouse click from the image of the camera
- rating of welding joints with high-current equipment (special probe)
- advanced evaluations, e.g. control card (SPC) or spatial distribution of the contact resistance

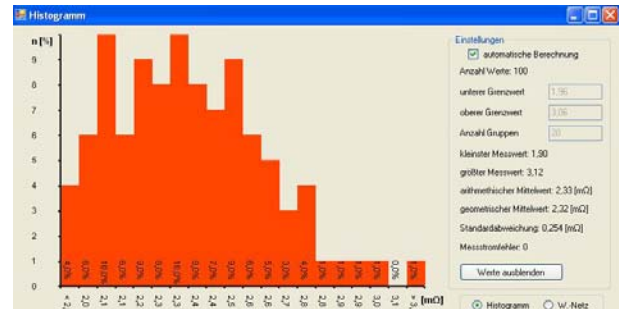


Evaluations

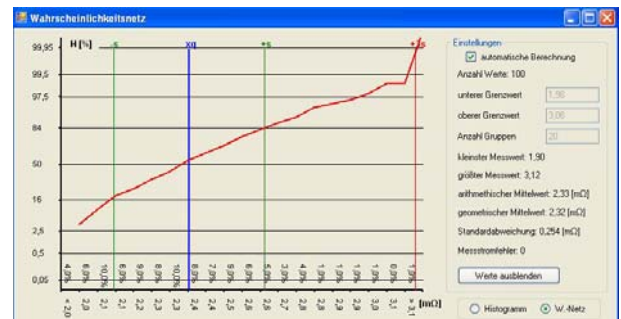
Standard Test Record



Frequency Distribution

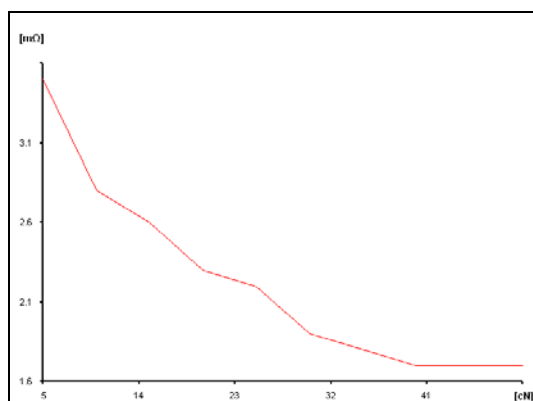


The histogram offers a good overview over the constancy of the resistance-allocation or rather a conclusion about the kind of allocation of the resistance values.



In the form of a probability grid the frequency distribution grants a direct comparison with the Gaussian distribution.

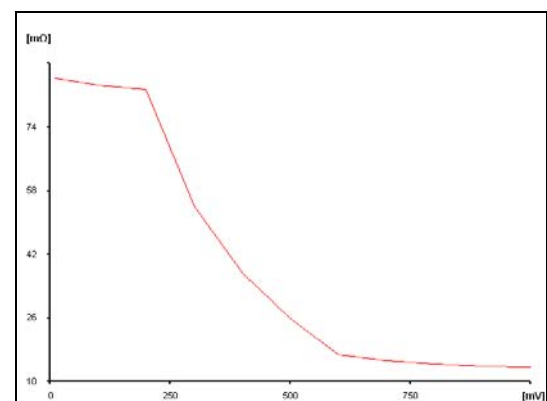
Resistance-Force-Distribution



On a clean contact surface the junction resistance decreases continuous with increasing force.

If there are layers on the contact surface that can't be bursted until a definite force is reached you will get a distribution with a step at the bursting of the layer. The needed bursting force is an important characteristic for the evaluation of the ability of soldering and welding of metal surfaces.

Resistance-Voltage-Distribution



On contaminated surfaces a voltage assembles at the layer, which decreases quite clearly after the burst.

On other commercially available resistance measuring devices you have to figure on the destruction of surface layers in most cases due to a relative high off-load voltage before the actual measuring has started.

Worth knowing about the topic contact resistance measuring



Contact resistance (more precisely: contact junction resistance) means the electrical resistance of mating face between two electrical contacts. Cause surfaces in physical sense are never exactly plane (surface roughness), the mating face of two contacts is never continuous, but is limited to many snippy mating faces. The size of these micro areas depends on the roughness as well as the force, thereby the contact areas are pressed together. In consideration of the specific resistance of the used material by constriction of the current paths in those micro areas results the so called constriction resistance. Unlike the ohmic resistance it is strongly addicted to the current flow. Hence the measurement current is a relevant parameter in comparison of different measurements of the contact junction resistance. Under atmospheric conditions the mating faces are almost covered by pollution layers (oxidation, corrosion) of varying thickness. Additional pollution layers can be generated by contamination during the production

process.

In practise the relevant contact resistance presents as the sum of the constriction resistance and the resistance of the pollution layer:

The **KOWI 3000** - the instrument for measurement of these resistances – permits a free selectable off-load voltage from 0 to 10 V to avoid welding of mating faces or the destruction of pollution layers and barrier layers on the surface. In this way the distortion of the constriction resistance and the pollution layer resistance by the measurement is prevented.

To eliminate circuit resistivity the **KOWI 3000** works strictly with quadrupole measurement technique. The benches are solid gilded and the standard measuring probes consists of solid gold. By this measures the distortion of the results brought about by cables and terminals is prevented. Voltages rising from thermocouples are considered.

ROHS

By the EC Directive 2002/95/EC (Directive on the Restriction of the Use of Certain Hazardous Substances in electrical and electronic equipment, ROHS) the knowledge about the condition of galvanic treated surfaces regarding to the ability of soldering and welding will take on a whole new dimension.

The new – very low – limiting values for lead, mercury, cadmium and hexavalent chromium causes conversion of production on well established processes with solid problems on its implementation. The knowledge of contact junction- and surface resistance resp. the changing of the resistance values according to the contact force and the bursting voltage allows the evaluation of production processes regarding to the measures on the improvement of the surface quality.