MEMS AND TELECOM & ELECTRONICS

Nikon Metrology

MEMS

In today's world increasingly miniaturised electronic products, Microelectromechanical systems (MEMS) and Nanoelectromechanical systems (NEMS) sets the standards of what can be achieved with modern engineering methods. Although these devices are typically produced using techniques analogous to those found in the semiconductor industry (such as photolithography and various deposition processes) manufacturers must be acutely aware of variances caused by the large surface to volume ratio of these devices. At these scales, the normal rules of design and production begin to blur as surface effects such as electrostatics and wetting become prevalents.

Description:

The applications and research areas for MEMS range from the exotic to the everyday but they are most commonly used for a number of 'smart' technologies including:

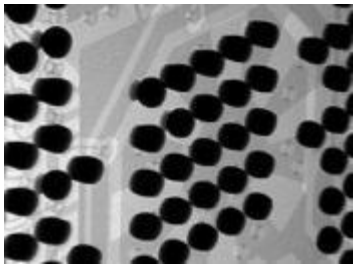
- fuel pressure gauges and airflow sensors
- brake sensors
- accelerometers for improved air bag deployment
- actuators and cantilevers
- micronozzles to direct spray in inkjet printers
- navigational gyroscopes
- microrobotics
- 'smart dust' for the detection of environmental changes

Despite having dramatically different applications, each of these technologies share common manufacturing methods and quality control processes that necessitate for example, high-resolution light microscopy

with stereomicroscopes may be used for the inspection of faults and debris; while motorized reflected light, industrial and semiconductor microscope systems may be used for a variety of general analytical techniques such as darkfield, DIC, polarizing, epi-fluorescence and double-beam interferometry.

More recently, video measuring systems have also been applied to quality control analysis in MEMS systems as they offer exceptionally high accuracy and can be easily customised to fit the specific viewing requirements of a vast range of applications.

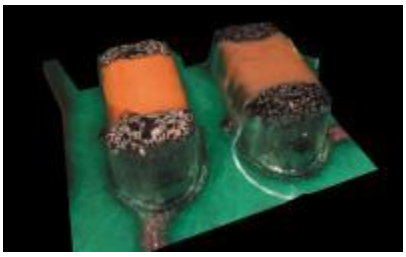
Telecom systems typically contain electronics subsystems. For mission-critical space applications, system failure is not an option. Also in other markets, telecom systems are checked inside-out through X-ray and computer tomography (CT) inspection.



By visualizing connectivity failures in electronic devices and circuit boards, or between both, the XT V160 electronics inspection system provides detailed insight into what really causes the problem. The ability to literally look inside electronic parts and systems is essential in optimizing electronics design and manufacturing practices.

On the electronics production floor, most inspection work is related to electronic connectivity issues including wire bonds, solder joints and through-layer vias. The XT V 130 inspection system is also capable of tracing more challenging defects. Angled imaging with high magnification quickly highlights shorts in the form of solder dendrites and voids scattered around ball grid array (BGA) connections.

Other metrology systems can be used to inspect features and surfaces of electronic components and assemblies that are visible from the outside. iNEXIV and NEXIV are automated video measuring systems that offer the speed and accuracy to quickly run inspection on electronic cards, devices and connectors.



Smaller individual parts can also be measured using industrial or measuring microcopes.