Machine Vision in Medical Technology: Innovative Needle Inspection System Features Basler ace GigE Cameras

Customer

MORITEX develops, manufactures and markets lighting and imaging solutions and supplies optical components and systems for machine vision and digital imaging. The Japanese company is a recognized leader in machine vision systems and one of the few providers that has a command of all of the many process levels, from system design to integrated system solutions.

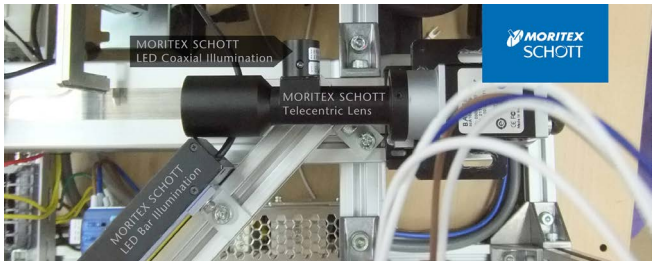
The international technology group SCHOTT, based in Mainz, Germany, holds a majority interest in MORITEX Corporation, Tokyo. Both companies have been working together since June 2007 in order to further extend their positions as the world's leading manufacturers of special types of imaging and lighting solutions.

The SCHOTT Lighting and Imaging division offers a wide range of lighting and image transmission solutions for these types of applications, especially for customers in the core industries automotive manufacturing, aviation, medical technology, machine vision, and security technology. Innovative lighting solutions and combinations of light and image transmission are developed on the basis of LED technology and fiber optics.

Application

In the fall of 2012, SCHOTT and MORITEX presented an automated inspection process as an initial development within a machine vision system for use in inspecting state-of-the-art inspection needles. It is an advanced system for this particular market and can be used to inspect and measure a variety of different needle types and geometries fully automatically on the basis of various requirements, external dimensions or grinding angle, for instance. These types of automated, flexible techniques are quite rare today. In the past, inspection has been performed in a non-automated manner using a microscope and the human eye or with the help of camera inspection.

The new MORITEX system features multiple Basler ace CCD cameras, including the lens optics, LED illumination media and a diode laser for locating the needle that needs to be inspected and any changes in angle. Its specially developed measurement software allows for the geometric data measured to be compared with stored specifications and deviations to be detected. Unlike previous systems, the software even allows for automatic detection of all parameters specified. In its current stage, it is capable of performing around 15 different types of measurements, although even more are possible. In fact, the exact light source, wavelength range, lighting format and parameters to be inspected can be selected depending on the processing conditions and goal of detection.



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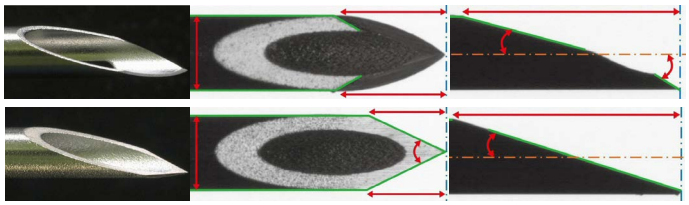
The system is available with a fully automatic needle guide and inspection of all inspection items as well as a semi-automatic inspection system or manual feeding system for automatic inspection of basic inspection items. Leading Japanese medical device manufacturers are already putting this innovative inspection system to use successfully. "We managed to reduce the inspection tact for one needle by half compared to conventional systems," reports Tomo Mizuno, Manager of International/System Sales, who is responsible for developing and marketing the new inspection system at MORITEX.

Solution and Benefits

Needles that feature specially shaped geometries of the tips, triangular lancet cuts or back tapers, for

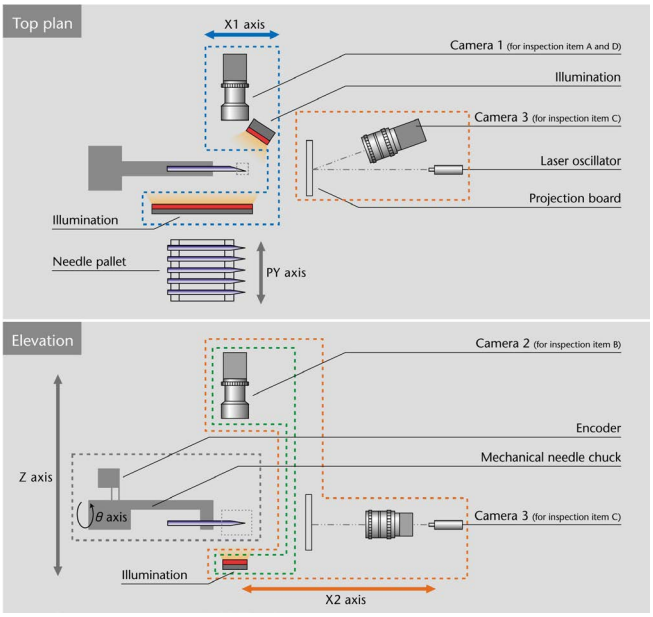
instance, increase what is referred to as the piercing quality and cause less pain during insertion. When it comes to the geometrical shape of the needle, producing an extremely precise and reproducible version of the cut in predefined angular dimensions is extremely important.



Innovative injection needles with a lancet cut (top row of photographs) or back taper (bottom row of photographs) reduce the pain caused by puncture. The MORITEX system allows for various types of needles and geometries to be inspected automatically.

With this in mind, the machine vision cameras used must support the respective sophisticated inspection processes on ensuring the quality of needle manufacturing. High inspection speeds must also be achieved to set the highest possible standards for productivity and ensure proper integration of the device into an in-line system.

As a result, the decision was made to use the Basler acA1600-20gm Gigabit Ethernet Camera (UXGA). Three Basler cameras have been installed in the needle inspection system to capture images of the objects to be inspected from three different angles (see process graphic).



Three Basler acA1600-20gm GigE cameras help to ensure a fast and effortless inspection process.

This product offers the best possible properties for meeting these demanding requirements:

- Optically precise capturing and imaging of the needle to be inspected for software-controlled basic measurement of the edge of the knife, enlarged measurement of the tip of the needle and measurement of the rotation angle. Here, the acA1600-20 camera offers image resolution of 1600 x 1200 pixels (UXGA) and is known for its outstanding image quality in accordance with the EMVA 1288 Standard.
- The acA1600-20 camera delivers 20 images per second and thus helps users achieve high inspection speeds.
- The Basler ace acA1600-20 models are currently the smallest GigE cameras that feature the popular Sony ICX 274 CCD sensor that offers Power over Ethernet functionality. For this reason, they contribute toward extremely compact system dimensions and can be integrated very easily from both a hardware and software perspective.
- The service package is made possible by using a strictly cost-optimized design that comes at an extremely attractive price. “This price-performance mix was ultimately the reason why we decided to go with the acA1600-20,” Tomo Mizuno concludes.

Technologies Used

- 3 x Basler acA1600-20gm GigE Cameras (UXGA)

More Information

http://www.moritex.co.jp

http://www.schott.com/lightingimaging

Basler ace

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