MECTRON SQ-7500

Surface Inspection

Patent Pending

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MECTRON

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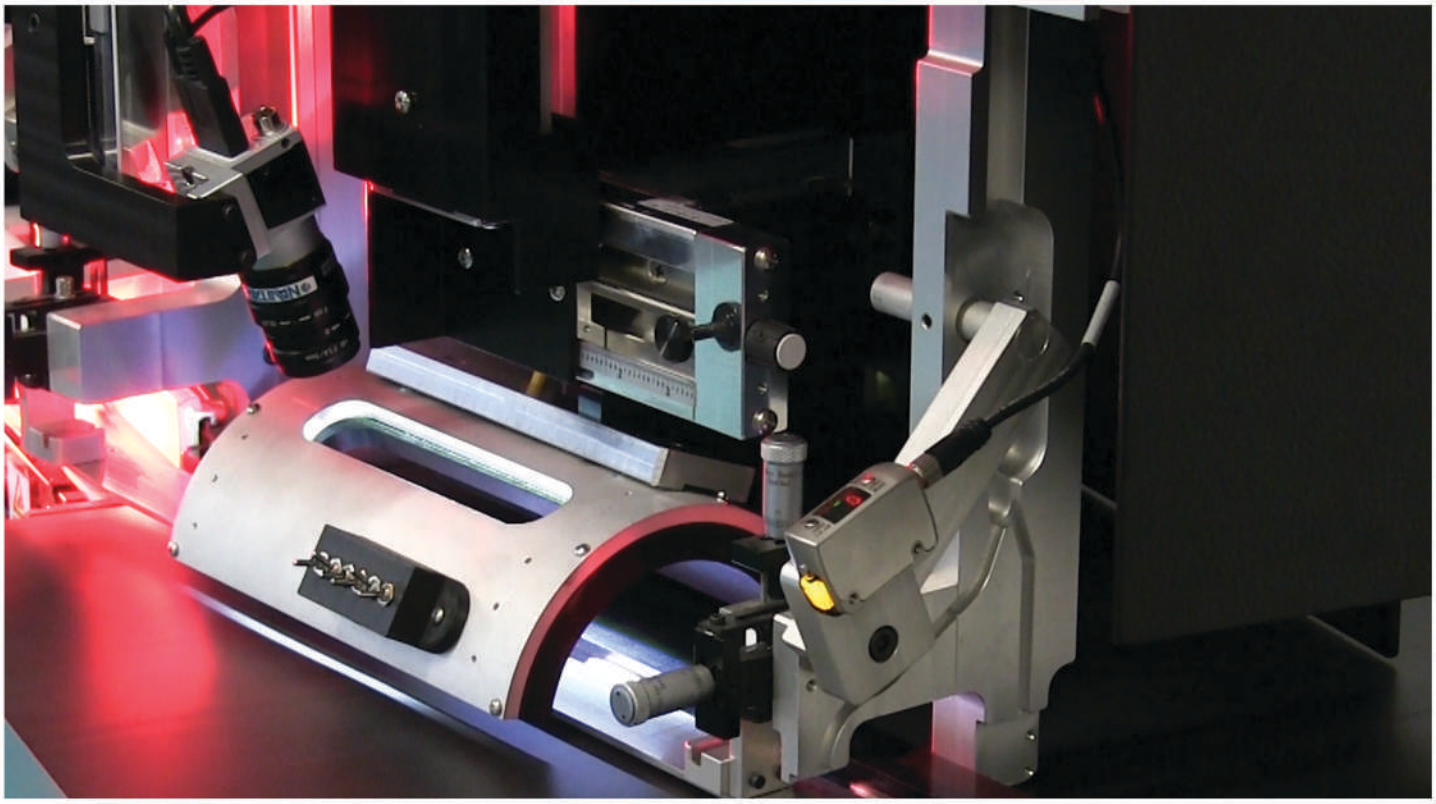
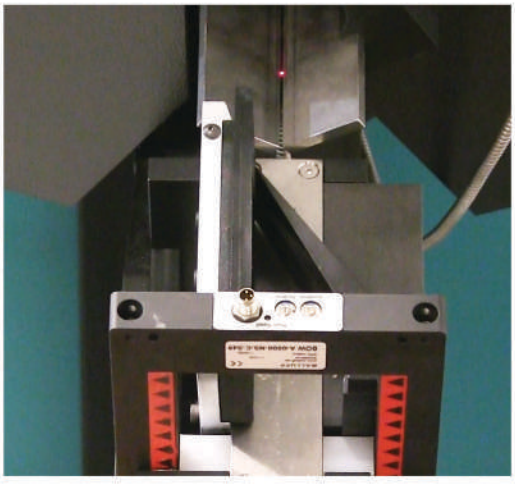
SQ-7500 Surface Qualifier



Mectron's Surface Qualifier (SQ-7500) is a camera based system that utilizes statistical learning software developed by Mectron for inspection of cylindrical parts. A conveyor system is used to traverse the parts through the inspection area and simultaneously rotate the part for full coverage. Each part passes under the illumination tunnel where up to 400 images are captured per second. A GPU (Graphics processing unit), with over 2,000 cores, processes the 98,850 data points per image taken and is hundreds of times faster than the CPU. The GPU uses statistical learning software on the 400 images and 100 million data points per second to discern between the good and bad parts inspected.

The SQ-7500 has two optional stations. The first is Mectron's EC-600 eddy current instrument which uses a differential eddy current probe for crack detection. Second is a CCD camera for part end inspection.



Fail safe gate

After each station has made a determination about the part, a solenoid driven lever gate is activated for good parts only. Positive acceptance allows for a fail-safe operation. An optical window after the gate gives an accurate count of the number of accepted parts. The gate can operate at over 300 parts per minute.

Helical Eddy Current Scan (Crack Detection)

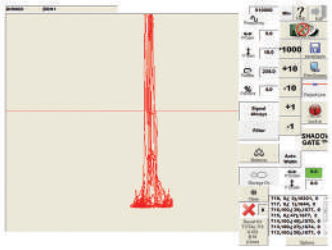


Figure 1 - Bad part with signal above threshold.

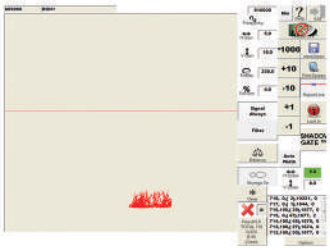
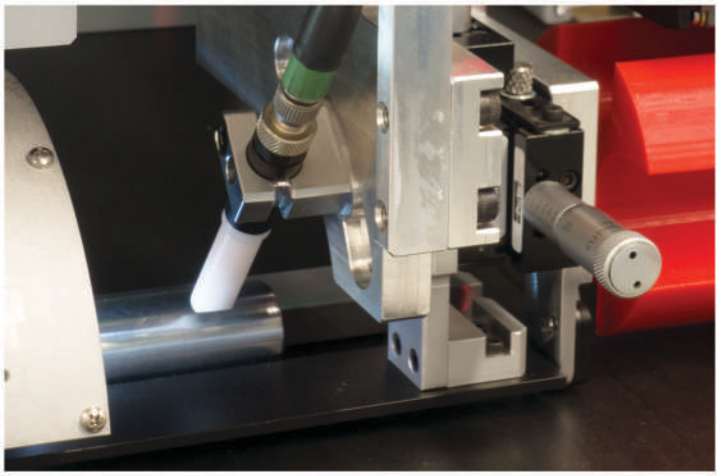


Figure 2 - Good part with signal below threshold.

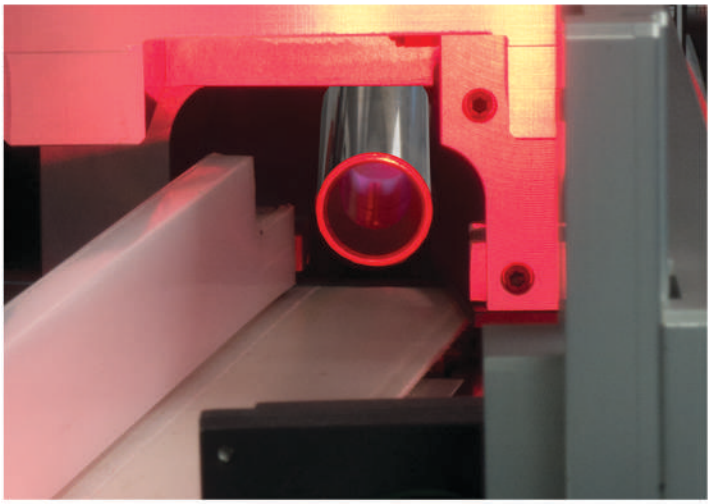


Quick connect differential eddy current probes

The EC600 is a digital eddy current instrument with specially designed software for many diverse applications. It has a usable frequency range of 2 KHz to 2 MHz. It utilizes a touch screen which allows for complete control of the impedance plane signature. The displayed eddy current signal can be easily manipulated to alter frequency, phase, horizontal gain and vertical gain. A high and low threshold can be set and altered to determine differences between good and bad parts. **Figure 1** displays a bad part with a signal that is above the set threshold, while **Figure 2** shows an example of what a good part would look like. All setups are easily saved internally to the hard drive and can be recalled at a later date.

One adjustment is needed to increase or decrease the helical eddy current pattern of a cylindrical application. Simply increase or decrease the angle of the guide rail.
This flexibility allows for crack detection to meet the end users requirements.

CCD Camera for part end inspection



High-Resolution Camera Proprietary Software

The end inspection of the part is done using a high-resolution CCD camera with Mectron proprietary software. It can check for consistency of the part for wording in the head using a master reference. The camera is triggered by an optic sensor and takes a picture for each part to ensure all defects are found. The custom lighting of the part makes small details easy for the software to find. This allows for quick and accurate inspection.

Inspection Criteria

Piston Pins
Transmission Pins
Roller Bearings

- Cracks
- Pits
- Porosity
- Grinder burns
- Grinder flats
- Dents
- Scratches

Deep Draw

- Lamination
- Chevrons
- Scratches
- Dents
- Burn marks

Munitions

- Dents
- Split case
- Scratches
- Corroded
- Stained

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