

AOI system upgrade  
achieves 33 %  
cycle time gains



# Converting camera technology to 8M pays off

*Marquardt GmbH specializes in mechatronics and combines the highest precision mechanics with sophisticated software. Especially in the area of switching systems for the automotive industry, during the past years Marquardt has been able to prove its innovative strengths. Starting with design, through development and construction up to electronics manufacturing, at Marquardt everything is from a single source. What applies to the product development process also applies to electronics manufacturing: first and foremost it must be typically Marquardt, meaning functional and first class quality and reliability. This has allowed the company to maintain an international competitive edge, from individual components up to complex systems. To ensure the quality of these components, Marquardt relies on AOI and AXI systems from Viscom. In particular, these systems take on the demanding solder joint inspection. In order to further increase the efficiency of these inspection systems, the decision was made to upgrade the older AOI systems with 8M technology – with major advantages for the inspection speed.*

## **Marquardt GmbH – A successful family company with tradition**

For over 85 years Marquardt has operated as an independent family company and now, with 11 production and sales locations, is represented around the world. Wherever humans meet technology, switches and systems come into play. They comprise the decisive bridge between user and device. In this context, operating convenience and safety continually gain importance. Increasing digitalization has also made inroads here. Marquardt understands this as a trend which opens great opportunities for the future and significant market potential. Therefore the company views itself not only as a manufacturer but as system supplier who understands the wishes of its demanding customers and is a competent development partner at the same time.

Holger Gerst, responsible for the AOI/AXI systems at Marquardt: „We employ just in time delivery and today place about 20 million components per week on six SMT lines in Rietheim. Our lot sizes differ greatly. In some cases the lines are already converted to a new product after 20 minutes; in others, they can be occupied with the same product for over four hours. The trend, however, is in the direction of orders which are produced in less than one hour.“



Automotive parts plant Marquardt Rietheim

## **Fully automatic electronic assembly inspection with AOI and AXI**

Marquardt has employed Viscom AOI systems since 2004. Inspection system types S6055, S6056 and X7056 cover the optical and X-ray inspection of the electronic assemblies and give placement and solder joints a fully automated inspection.

Holger Gerst describes the reasons for introducing AOI and AXI as follows: „The introduction of an assembly with BGAs brought with it the decision to acquire an AXI. We have determined that processing the BGAs with the proper layout actually doesn't present any problems and so today, we use the AXI quite often for our MQ non-standard components with hidden solder joints. Cycle time is also important to us here; the complete scope of inspection must not take longer than the cycle time of the rest of the line.“

Marquardt had first deployed an AXI system from another manufacturer, but then decided on an additional system from Viscom to cover further needs. Holger Gerst: „With their AXI system X7056, Viscom could offer us a system which met our cycle times – with the major advantage that it could be programmed on the same user interface as all the previously installed AOIs. The additional effort was realised very quickly by a short training and now we have the advantage that every AOI programmer can also program the AXI.“

After the first AOI, expansion in production was accompanied by new systems. Because of the successive increase in the number of AOI systems in electronics production, to some extent the individual machines are equipped with different inspection sensor technology. In order to make the optical inspection even more effi-

cient, Marquardt decided to upgrade all systems to the latest sensor technology, with which the new systems were also retrofitted later.

## Upgrading all AOI systems to 8M technology brings major advantages

The upgrades were carried out by the Service business area at Viscom, which in addition to maintenance, service calls and training also offers modifications and upgrades. Essentially, all types of the S6055-I and S6055-II as well as the S6056 systems equipped with 4-, 5- or 6M sensor technology can be upgraded to 8M. Henning Obloch, Manager of Service at Viscom, states: „Again and again we see which advantages upgrading to the latest sensor technology brings our customers. In addition to optimized performance of the individual AOI systems, standardization of the machine park also brings other synergies. Further, the upgrade offers new possibilities for the evaluation.“

To conduct the upgrade, first the hardware is brought up to date. To accomplish this, the old sensor modules are replaced with the 8M sensor heads on all systems and the corresponding interface modules and cabling are brought to the required technological level. Also, the system computers are replaced with a newer model and the newest software release installed on them. This opens up numerous new functions as well as a higher performance potential.



Products from Marquardt

Holger Gerst summarizes the advantages of the upgrade as follows: „The decision for conversion to 8M technology followed the assessment of the advantages upgrading the Viscom AOIs to 8M camera technology presents. First and foremost, the reduction in inspection time must be stated. According to Viscom, we could expect about a 35 % reduction in cycle time. We conducted an additional analysis of the individual products and to stay on the safe side, calculated with a 30 % cycle time gain. In the end, after the upgrade we had a cycle time improvement of up to 49.8 % with certain programs. As



Fl.t.r.: Nico Schmid (Marquardt GmbH, Process Engineer responsible for AOI), Henning Obloch (Viscom AG, Manager, Service), Adela Florentina Ciobanu, (Marquardt GmbH, AOI operation), Werner Sauer (Marquardt GmbH, Manager, electronic production)

an average over all the programs, we were able to measure a 33 % improvement in cycle time.“

The following points were listed in particular as reasons for the upgrade:

- Scant loss of cycle time for inspection with angular cameras, because angular and orthogonal cameras are installed in a single housing.
- Higher resolutions can be switched to with no effect on cycle time so the smallest components can also be inspected.
- With the 8M sensor technology, now it is also possible to analyze color images which improves e. g. component body detection of SOTs.
- Thanks to the color images, this sensor technology can also be used as a „microscope“ and send images from every conceivable viewing angle to the classification station.
- New tools, such as the new video base which improves offline optimization, are available with the 8M sensor technology.
- Up to date sensor technology is the precondition for future tools and inspection strategies.

In conclusion Holger Gerst affirms, „Today we can say that all our expectations have been satisfied. We have now converted three of five locations to 8M sensor technology and were able to use the cycle time gains to optimize defect detection on SOT components. All in all it's very important for us to know our worldwide production is optimally equipped at all locations, and the uniformly high standards of the AOI and AXI systems also make a contribution to this goal.“

Upgrading the AOI systems is initially an additional expense, but one which in any case amortizes in a relatively short time. The conversion itself was accomplished in a short time. The last three from a total of six systems were upgraded one after the other within seven weeks and reintroduced to production.

Are you interested in more details on this application or do you have any question regarding combined inspection? The Viscom SP Division will be glad to help you.

**Please contact:**

**Viscom AG**

Carl-Buderus-Str. 9 - 15  
30455 Hanover · Germany  
Tel.: +49 511 94996-0  
Fax: +49 511 94996-900  
[www.viscom.com](http://www.viscom.com)

Torsten Pelzer  
Vice President Sales  
Tel.: +49 511 94996-654  
Email: [Torsten.Pelzer@viscom.de](mailto:Torsten.Pelzer@viscom.de)

**Presented by:**

