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100 % Product Quality at Highest Inspection Speed: Combined AOI/AXI X7056

Case Study AOXI

X7056 – Combined Optical and X-ray Inspections Secure 100 % Product Quality at Highest Inspection Speed

Funkwerk Dabendorf is an expert in mobile communication solutions for automobiles. Not just as a contract manufacturer; the company primarily views itself as a development partner for the automotive industry. From hands-free speaking systems and navigation solutions to total fleet management, Funkwerk Dabendorf develops and manufactures innovative products applied in all premium markets as well as in the personal and utility vehicle sectors.

As a supplier to the automotive sector, the company works under very high demands for product quality. Yet the customers require more than just "zero defect"; they also look for appropriate prices. These two contingencies can only be realized with ultramodern, fully effective production, where state of the art technology is optimally deployed. Therefore, Funkwerk Dabendorf has decided on combined AOI/AXI inspection with the X7056 system from Viscom.

Funkwerk Dabendorf: The highest quality in mobile communication

Funkwerk Dabendorf is one company of the listed Funkwerk AG, headquartered in Kölleda/Thüringen. In the past years, the company has successfully established and expanded its four business divisions Traffic & Control Communication, Automotive Communication, Enterprise Communication and Security Communication. Thus, the company stands on a broad foundation and in addition to communications and management systems, also offers software to monitor and control vehicles and vehicle fleets, as well as radio technology solutions for the aerospace industries. The division Enterprise Communication concentrates the business fields, networks and voice. Security Communication specializes in solutions for personal security and video systems.

The division Automotive Communication is situated in Dabendorf at a location first developed 70 years ago, under the name "Lorenz High-Tech Radar Devices and Antennas". Thus, the company has enjoyed a high affinity for HF technology from the very start. Also, more and more innovative product solutions have been developed. Today about 140 staff are employed in Dabendorf, with 40 of these in research and development.

The company has specialized in high frequency technology to guarantee undisturbed data and speech transfer by radio, even when mobile. The automobile and utility vehicle industry places trust in the company's innovative solutions, which enable unparalleled quality for mobile calls or uninterrupted Internet access while driving.

This places Funkwerk Dabendorf in great demand as a partner to automotive suppliers. This is also underscored by the distinctions awarded the company for its accomplishments, such as the most prestigious prize for medium-sized businesses in 2003.

Bernd Schneider, Senior Production Manager, Funkwerk Dabendorf

Special demands require special solutions

Electronic assemblies for the Automotive Communications division are not only developed at the Dabendorf facility, but also manufactured. One particular challenge here is presented by the tightly populated assemblies, which are allowed very little space in the vehicle. On top of this, the high frequency technology often used here generally stipulates placing shielding covers around the assemblies, adding another layer of difficulty to quality control.

"Our customers require that we can explicitly control whether the correct components are in the correct positions and that there are no problems with the shielding

covers. The option of placing the covers only after inspection was rejected, because it would have prevented us from maintaining the requirements for the electronics", reports André Preuss, applications specialist, Funkwerk Dabendorf.

As an increasing trend toward BGAs also became apparent and production lines were faced with the task of documenting their flawless performance, it was evident: only X-ray inspection could be considered. Already by this time, the experts at Dabendorf were intensively occupied with various inspection solutions. Then, after a major customer brought a specifications sheet including the specific control of each individual component, it was time to invest in a suitable inspection solution. What was true for the products from Funkwerk, namely convenience, flexibility and quality, was also valid for the new inspection system. Thus, during their selection, the company also paid especial attention to flexibility regarding the inspected objects and the widely varying inspection tasks. Even further, the system had to be easy to operate and satisfy the highest qualitative demands.

Deciding on the appropriate inspection solution

Because BGAs and shielding covers were used, there was no other option beside X-ray inspection. Yet since AOI inspection has emerged as the standard in customers' eyes as well and still offers advantages where speed is concerned, it could not be rejected out of hand.

Because two inspection technologies running next to each other mean a doubled footprint and doubled costs, and personnel must be trained in different operation and programming software, such a solution was not satisfactory.

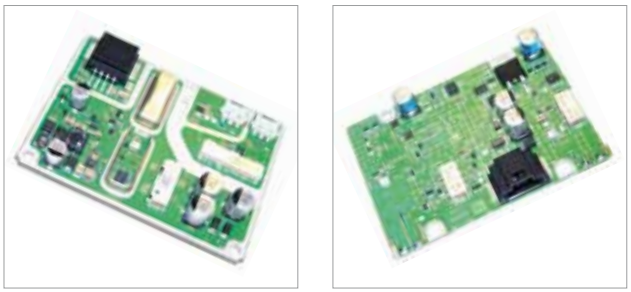
"For us, high demands on cycle time are especially decisive", says production manager Bernd Schneider. "One important selection criteria was, naturally, cost-effectiveness. Each investment must prove itself on this point in the overall calculations." A combined solution such as the X7056 from Viscom, which combines AOI and X-ray inspections in one in-line process step, was convincing. "Instead of two inspection systems, two rework stations and two handling systems, everything is provided by one system. This is most effective. And as far as inspection depth, cycle time and price-performance ratio were concerned, X7056 emerged from our research as the best that was currently on the market. We did check a number of different systems", he explains. "The small footprint and the fact that both the AOI and X-ray inspection run with a unified user interface was a compelling advantage for us", adds Bernd Schneider.

What benefits does the X7056 bring production?

Especially in the area of high frequency technology, miniaturization is already very high and rising. Due to the minuscule dimensions and fine structures, humans are hardly capable of conducting an adequately reliable quality control. "And also there, where it is still possible, an attempt was made to exclude human error and so reliably ensure quality, with repeatable accuracy", comments Bernd Schneider.

Production in Dabendorf

With in-line AOI inspection by the X7056, Funkwerk Dabendorf controls everything that can be seen. "For example, presence, soldering, displacement, lifted leads and polarity; depending on the requirement, we inspect with the orthogonal and/or the angled cameras, which also manages to considerably increase inspection depth", according to André Preuss.



Products from Funkwerk Dabendorf

AXI is deployed to X-ray the components beneath the shielding covers. Even components with concealed leads, such as QFAs or BGAs: everything is 100 % X-rayed, in-line. André Preuss sums up the case: "We have now safeguarded the entire matter of concealed connections. It is also now possible to react promptly to developing defects and maintain short control cycles. Processes can now be run up at a significantly faster pace; we no longer have to wait for the final inspection to have the feedback we need."

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In addition to straight defect detection, the entire process can be optimized with the X7056. To better recognize defect tendencies, Funkwerk Dabendorf will employ the statistical process control VPC (Viscom Process Control) even more intensively.

Another important benefit of the system is its capability for random sample analysis. The AOI/AXI combi-system X7056 offers an outstanding possibility for a follow-up check of AOI peculiarities. "With this, we can use AXI at specific points to verify whether an abnormality under AOI is actually a real defect, or a false call", says André Preuss. "In this way, we get a 100 % reliable statement for non-standard components. The false alarm rate is further reduced at the same time, because the AXI inspection will either confirm an abnormality that showed up under AOI or explicitly identify it as a non-existent defect. And while the AOI is running, the AXI doesn't have to stand idle", says Preuss. "Having the AOI and AXI systems run simultaneously, as with the X7056 system, is a great advantage."

Currently, 50 % of all products manufactured at Dabendorf already run through the system; requests for random sample checks from other locations round out the system's workload.

Bernd Schneider summarizes, "in the final analysis, the product quality that emerges from this process is dependent on the quality of the inspection system. The high inspection depth this combi-system brings to the process has already returned 50 % to us. We are currently below 100 dpm, which is very good indeed."

F. l. t. r.: Bernd Schneider, Senior Production Manager, Funkwerk Dabendorf; Wolfgang Herbig, HERBIG TECHNOLOGIES and André Preuss, Specialist of Applications, Funkwerk Dabendorf

A tour through production at Funkwerk Dabendorf makes clear: Only an efficient production that delivers no-compromise quality can exist in a high-wage country, a crucial point for Bernd Schneider. He states, "we are here to prove that a company can successfully produce in Germany. Not only as a moral claim, but also as an economic success. Systems such as the AOI/AXI inspection concept from Viscom have a place here. They make successful production in Germany, thanks to its excellent economics, a real possibility." He adds, "this way we can achieve similar economics to those in China. Thus, we secure the quality and delivery reliability that is honored by our customers."

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.

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