Application report

Flying Probe works speedily!

Automated testing of printed circuit boards using mini H-gantry

Small batch sizes and prototypes make the economical testing of printed circuit boards a real challenge. Visatronic, a manufacturer of electronic modules, has therefore developed an automated test system with the brand name "Visatest". This includes an integrated mini H-gantry EXCM from Festo, which came onto the market just as the project planning for Visatest was being carried out.

"The mini H-gantry has enabled us to automate all the test processes that were previously carried out manually," explains Michael Gebauer, Managing Director of Visatronic GmbH, located in Mainhausen, near Frankfurt. "There is now no longer a need for the complex and expensive test adapters which were used with small and medium batch sizes." The Flying Probe test system checks that the module in question has been produced and is operating correctly.

Michael Gebauer, General Manager of Visatronic GmbH: "EXCM is the ideal system component for modular, compact test automation.

Automated test program

Visatronic's portfolio of services ranges from the development and design through to the fitting of SMD or THT components and the final testing of finished electronic modules. The company was looking for a way of testing prototypes and small batch sizes automatically. However, all the systems available on the market were much too expensive. Without further ado, the Visatronic engineers then decided to develop their own cost-effective Flying Probe tester. The result was a machine which, thanks to the mini H-gantry from Festo, proved to be marketable at the right price.

With the Visatronic Flying Probe test system, the machine operator feeds the printed circuit boards in manually. The mini H-gantry then positions the test needle in the XY direction and the electric slide EGSK makes the contact between the test needle and the printed circuit board in the Z direction. The test program checks the first contact point and then continues by repeating the test routine for other contact points throughout the working area of the machine. At the end of the test program the EXCM returns to its starting position, allowing the machine operator to remove the tested printed circuit board.

Visatronic Flying Probe test system for quality testing of electronic modules.

Compact and precise: the compact mini H-gantry EXCM accurately guides the test needle to the test points on the electronic modules.

Compact and dynamic
The mini H-gantry EXCM from Festo is the perfect match for the test system: the drive motor for the Y-axis is installed in a fixed position and doesn't need to be carried on the moving axis. This allows a very compact design and a low moving mass. The required travel time of 2 seconds for a complete diagonal, with a positioning accuracy of 0.1 mm, is no problem for the EXCM. The mini H-gantry can even achieve speeds of up to 500 mm/s and repetition accuracies of the order of ±0.05 mm. Further arguments in favour of the EXCM are its attractive purchase price, economical operation and the ability to control it via Ethernet.

The mini H-gantry has thus made it possible to develop a slim, cost-efficient system in which all setpoints such as target positions and travel speed can be input directly. The system controls the two servo motors. This means that the motion sequences of the mini H-gantry are easy to program in terms of target positions, path speed and direction. The EXCM with its simple implementation of X/Y positioning is therefore the right system component for modular, compact test automation.

Costs down, quality up
The mini H-gantry EXCM allows an almost optimal ratio (1: 1) to be achieved between its working space and installation space, saving a great deal of space overall. As a (semi-)automated solution, it can reduce monotonous manual work and thus also unit costs. Its reproducible, automated test sequences lower the number of defective components, thereby enhancing process quality. "During the development of the mini H-gantry EXCM, we emphasised the importance of having an extremely compact design. At the same time, it was vital that, at the end of the development process, we were able to offer an efficient and yet inexpensive solution," explains Torsten Schulz of Industry Segment Management for Small Parts Assembly and Electronics at Festo.

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Precise and fast positioning even with restricted installation conditions – this is what the mini H-gantry EXCM from Festo is all about.

Jakob Meyer, Product Manager responsible for the Visatest system, praises the cooperation with his system supplier: "Particularly during commissioning, we received very good technical support from Festo. We were able to concentrate on the core area of our measurement procedures and implement the new system in a very short time. It took just six months to progress from the product concept to the production of the first series."

An economical complete package
The system solution consisting of a mini H-gantry EXCM and an electric slide EGSK for the Z-axis together with a controller CMMO has, for the first time, made it possible to test small batch sizes cost-efficiently. In short, when there is a need for fast, precise positioning and installation space is restricted, the mini H-gantry EXCM is a genuine alternative to consider during system planning. The smallest version of this planar surface gantry is no bigger than a sheet of DIN A4 paper and greatly reduces the workload of users in electronics production, thus allowing companies like Visatronic to concentrate fully on their core competencies.

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