

# New automated test platform for Vestas PCBA testing



**“Electronic manufacturing is very competitive. For us as a factory, high quality and automation are therefore critical to stay competitive”**

- Simon Ganderup, PE developer specialist, Vestas.

**Vestas**

Vestas is one of the absolute global market leaders developing sustainable energy wind solutions.

Vestas was established in 1945 and is now employing more than 29.000 people worldwide.

## DSE WAS CHOSEN AS THE TEST SYSTEM INTEGRATOR FOR VESTAS

The newest generation of automated PCBA test system for Vestas has been installed on the Vestas Electronic Manufacturing site in Hammel, Denmark, and the Site Acceptance test has been signed with DSE.

**Some of the requirements from Vestas for the test solution were:**

- Fully automated, meaning no operator needs to have hands on the products.
- High quality - The processes are Poka-Yoke secured with 2D code scanning on products and RFID chips on test fixtures.
- Integrated into Vestas MES system for full traceability and product factory route enforcement.

In close collaboration with the Vestas test & production engineering team, DSE has designed and integrated the SW test platform, PCBA fixture and T&M instrumentation.

**“We found that DSE had great expertise within custom test solutions, and it has been a pleasure to work with DSE throughout the project - DSE also kept it within agreed budget and timeline, so it’s been a pleasure for us to sign the SAT”**



- says Simon Ganderup

The test project was quite complex and involved several stakeholders. Also, the deadlines for the project were very critical to Vestas.

A close and continuous dialogue with weekly meetings for alignment and design reviews was essential to make the project succeed. This also included risk analysis and preventive cautions for the unforeseen.

Having inhouse engineering and own mechanical- and electrical- workshops made it possible for DSE to respond and adjust to the project timeline and milestones.

A technical description of the customised test system is presented on the next page.

# A customised and **fully automated** in-line PCBA test system

Vestas required a high-quality flexible and fully automatic inline PCBA test system.

## **VESTAS REQUIRED A HIGH-QUALITY FLEXIBLE AND FULLY AUTOMATIC INLINE PCBA TEST SYSTEM.**

Vestas made the requirements and test specifications for the overall test platform and the specific products. One of the requirements was to test PCBA in panels. Another requirement was that the instrumentation and software platform were

based on accessible standard components “customised” by DSE. This allows Vestas to maintain and develop the system in the future.

Based on the test specifications from Vestas, DSE presented solutions for further dialogue and reviews before the engineering and manufacturing process.



## **INSTRUMENTATION**

The core platform for instrumentation and measurements is a standard NI PXI 18 slot chassis. PXI is a flexible solution that can adapt more than 1500 test & measurement modules. One of the most critical requirements was the need for measurement of raise time & delay in nano sec. to meet this specific requirement a NI PXIe-5162 oscilloscope (1.5 GHz, 10 bits, 5 GS/s) was chosen. Working with this level of speed/signal also required related complex switching and specialist workmanship for the physical wiring and system integrity.

## **SOFTWARE**

The overall test software platform is based on NI TestStand and LabVIEW. DSE engineered the test frame core, including:

- ✓ Instrument drivers based on Custom step types
- ✓ Interface to conveyor handler system
- ✓ Grafic user Interface
- ✓ Test data logging and traceability
- ✓ Integration to Vestas MES system
- ✓ Test sequences for specific products

The many years of experience with a proven solution like TestStand gave a relatively high offset for the project. The DSE developed source code was delivered to Vestas as part of the documentation.





## FIXTURES

The fixture cassette for the inline handler is based on a standard fixture kit. A standardised VPC mass interface connector system is used for easy and fast exchange of PCBA models to be tested. DSE customised the fixtures mechanically to fit the panels with DUT specific PCBA's - including test probes, pin guides and pressure pins. An internal PCBA fixture was designed and incorporated into the fixture to ensure stability and signal integrity. This solution also benefits cross wiring functionality reducing signal noise and the need for wiring and connectors.

DSE hardware specialists manually wired all internal connections in the fixture in the DSE workshops.

A self-test fixture was also included in the delivery as an essential part of the system use and validation.



## VALIDATION

During the project, reviews of the specific elements were made. The complete test system was pre-tested, run-in and validated at the DSE facility/project hotel. After this factory acceptance test, which also included a review of the related documentation, the equipment was transferred to the Vestas site for final installation and site acceptance test. This reduced the time and space that were used in the Vestas production area before the system went live in production.

See the entire **video case here**

