

MACHINE BUILD WITH ENHANCED DATA ACQUISITION AND ANALYTICS FOR ELECTRIC MOTOR COMPONENTS

Sciometric's Design, Build, and Integration Services

Manufacturer achieves improved test accuracy, reliability, enables data acquisition and analytics capabilities, and boosts throughput by 10% with Sciometric custom-built test machine.

A manufacturer of electric motor components was struggling with the accuracy and repeatability of a variety of tests required in the manufacturing of their e-stator part. In addition to achieving more reliable test results, they also wanted enhanced data acquisition capabilities to collect data during each part of the manufacturing processes for quality assurance and analysis.

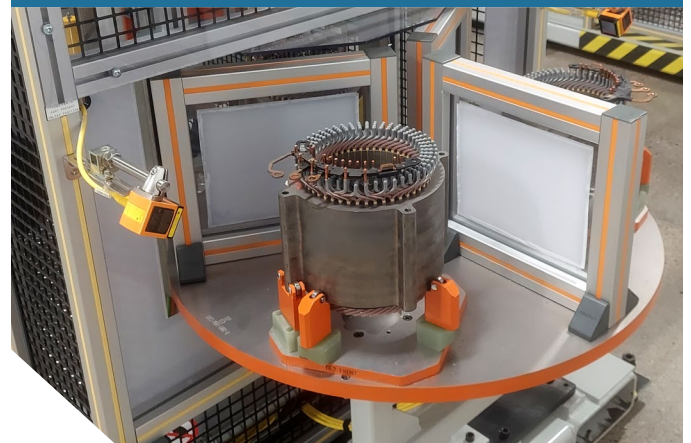
A key part of this project was to provide a simple integration experience for the manufacturer. Though their current test machine wasn't meeting all their needs, they still wanted to preserve certain instruments to maintain commonality across their lines. They needed the new turnkey test machine to be quick, efficient, and easily integrate into their line with minimal disruption to their current operations.

Sciometric's ISD (Integrated Systems Division) design-build and integration team was up to the challenge. Sciometric's team is skilled in custom assembly and test machine builds, equipment retools, expansions, retrofits, and upgrades. We will strive to find the most efficient and economical solution to meet your requirements. Equipped with Sciometric's data acquisition and data management solutions built for flexibility, able to communicate with nearly any system, the Sciometric team was well-poised to deliver the machines that accomplished the manufacturer's needs.



WHAT IS AN E-STATOR?

An e-stator is a stator used in electric motors. It is a stationary part of the rotary system, providing a magnetic field that drives the rotating armature, creating a current to generate torque for the vehicle. Its function is fundamental to the operation of an electric vehicle, making accurate, reliable monitoring and testing during the manufacturing process of the utmost importance.



SCIEMETRIC DELIVERED TWO FULLY AUTOMATIC STATIONS POSITIONED FOR ROBOTIC LOAD AND UNLOAD

The manufacturer required two fully automatic test stations; one for in-process testing, the other for end-of-line testing (with the addition of temperature measurement). The sequence of operations for the in-process test machine was designed as follows:

- 1 E-stator is loaded by robot into turn table load position, and turn table indexes motor into test position.
- 2 The grounding probe is advanced, and bar code label is read via Cognex camera. This information is sent to Sciometric's data system to be recorded in the birth history of the part.
- 3 Servo motors advance three phase electrical contacts into position. Using servo drives instead of pneumatics for this operation allows for better flexibility and the accommodation of different part types.
- 4 An electrical gripper actuates to contact on the part terminals, then the electrical tests are performed as follows:
 - Winding resistance
 - Inductance
 - Capacitance
 - Partial discharge
 - AC hipot
 - Surge
 - Surge energy loss
 - Insulation resistance
- 5 The pass/fail results are identified and recorded by the sigPOD, and precise process data measurements are fed to QualityWorX, Sciometric's data collection system.
- 6 E-stator electrical terminals are ungripped. Servo motors return contacts to home position. Grounding probe is returned home.
- 7 The part is indexed to the robot offload position as the next part is simultaneously transferred into test position. The part is automatically offloaded from the dial fixture nest.

The number of tests and the order of tests for each part is determined by the manufacturer's testing matrix, controlled via the Sciometric sigPOD.



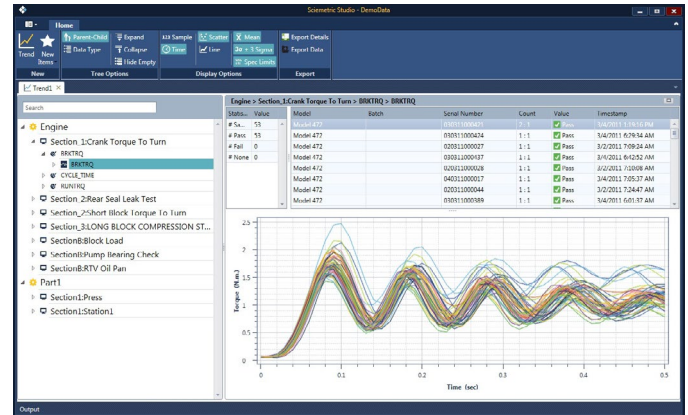
ENABLING ENHANCED DATA ACQUISITION AND ANALYTICS CAPABILITY

The flexibility of Sciometric's data acquisition and analytics solution was a huge part of the manufacturer's requirement. The system allowed for simple and efficient communication with the new machine, capable of communicating with nearly any process or system on the manufacturing line.

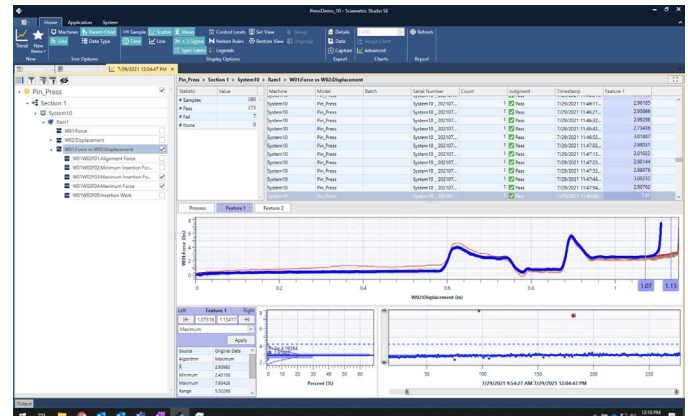


sigPOD

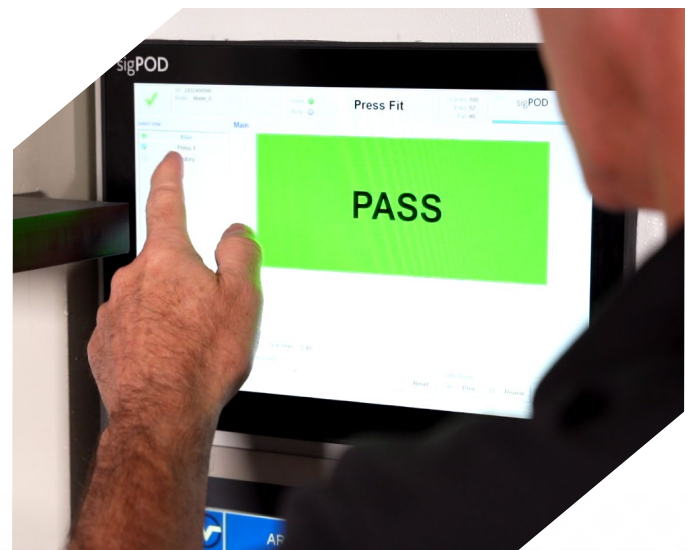
The use of Sciometric's sigPOD in the machine design enabled real-time process monitoring and data acquisition, sending comprehensive process data from each test to Sciometric's QualityWorX system. The QualityWorX data collection system records and archives the data, organized by serial number for simple retrieval as needed. The data is then made available for enhanced analysis in Sciometric Studio, Sciometric's most advanced data analytics software. Using Sciometric Studio, the manufacturer now has the ability to investigate process issues and optimize tests at any time, with access to a complete birth history record for each part and numerous comparison and analytics tools, such as SPC reports, waveform overlay, and more.



Sciometric Studio



Sciometric Studio



SCIEMETRIC'S NEW MACHINE IMPROVES TEST ACCURACY AND RELIABILITY, ENABLES DATA ACQUISITION AND ANALYTICS CAPABILITIES, AND BOOSTS THROUGHPUT BY 10%

The new machine build and addition of Sciometric's data collection and management tools delivered the improved accuracy and repeatability the manufacturer needed to feel confident in their testing, as well as access to the process data they needed to be able to analyze their tests for quality assurance and continual process improvement over time.

With this new machine design, the manufacturer was able to process 500 parts per shift—approximately 10% better efficiency than their previous machine capability. After experiencing the success of the station and the streamlined process of working with Sciometric's ISD team, the manufacturer will be extending the solution internationally across its other plants.



Contact Sciometric to see how our solutions can help you achieve the most reliable manufacturing defect detection, saving you time and money!

For more information, visit [sciometric.com](https://www.sciometric.com) or email us at inquiries@sciometric.com.

Since 1981, Sciometric has been working with the world's top manufacturers to improve product quality and production efficiency through process monitoring, measurement, and data analysis. With locations across the globe, Sciometric is available with local experts to provide the expertise and advice you need to improve your product quality and production efficiency.

