

PROFILE

NAME: Taylor Guitars
LOCATION: El Cajon, CA
FOUNDED: 1974
WEBSITE: taylorguitars.com

CHALLENGE

With growing demand for its premium products, Taylor Guitars sought automated technology to speed production while maintaining consistent quality.

SOLUTION

Epson's High-Speed G3-Series SCARA robots with RC+ Software enable precision processes with exceptional repeatability and reliability, delivering on Taylor's brand promise of hand-crafted excellence.

Craftsmanship Meets Technology

Taylor Guitars Amps Up Production with Epson's G3-Series SCARA Robots

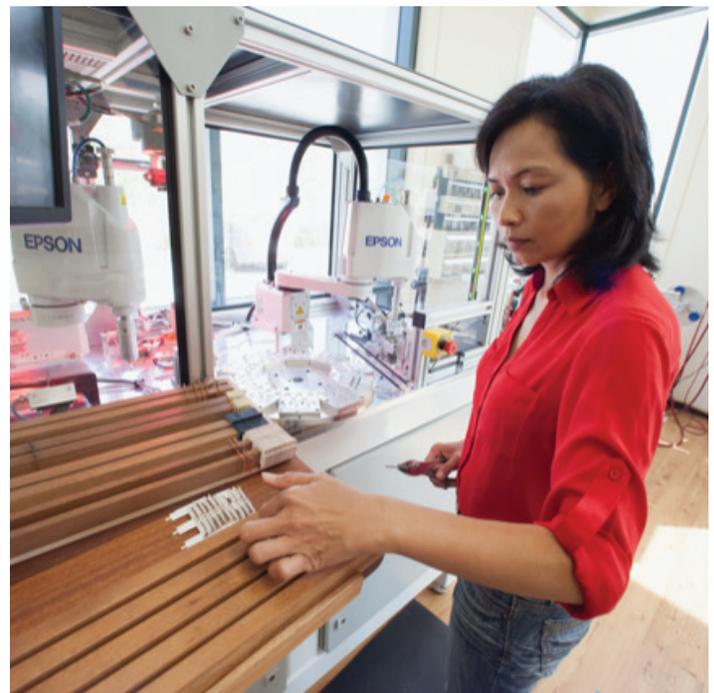
Musicians have coveted hand-crafted Taylor brand guitars since the company's founding in 1974. The company's premium acoustic guitars have inspired passionate artists around the world, from Alan Jackson and George Strait to Taylor Swift and Jewel.

Today, Taylor employs over 900 people and currently produces hundreds of guitars per day in its state-of-the-art factories in El Cajon, California, and Tecate, Mexico. Renowned for blending innovative manufacturing techniques with an artisan's attention to detail, Taylor guitars are widely considered among the best sounding and easiest to play in the world.

Pioneering Innovation

Taylor Guitars' sought-after designs and performance credit an innovative manufacturing process that combines quality craftsmanship and robotics, working hand in hand to improve production efficiency, maintain consistent quality and overcome ergonomic challenges.

Taylor pioneered the use of CNC milling (computer numerical-controlled machining), laser cutting and robotics in guitar construction. Large-payload robots assist with polyurethane spray application and buffing of wood finishes while compact, high-speed robots assemble guitar electronics.



Taylor and Epson: Perfect Harmony

Even with all this technology, hand craftsmanship is still the hallmark of this nearly 45-year-old brand. But steadily growing demand for its products required the company to automate its groundbreaking designs and the manufacturing processes required to produce guitars of world-class caliber. Taylor turned to robotic technology from Epson Robots.

“Epson G3 robots have delivered precision and repeatability over the last five years.”

—TYLER ROBERTSON, ROBOTICS ENGINEER,
TAYLOR GUITARS



Acoustic pickups, in particular, were exceptionally time-consuming to produce manually.

“I was making them by hand and I could make 10 or 20 a day,” said David Judd, Taylor Guitars Product Developer. “At first, we needed a hundred a day and now we’ve ramped to almost 600 a day. We wouldn’t have been able to do it without automation,” he noted.

Epson G3-Series SCARA robots are the reliable choice for high-precision applications. The rigid arm design reduces vibration, yielding high-performance results in a compact form factor. Epson has one of the broadest lines of SCARA robots in the industry, with more than 300 models. All are renowned for their repeatability, reliability and ease of use.

Precision With Repeatability

Today, Epson’s high-precision G3 SCARA robots handle the intricate assembly of Taylor’s acoustic pickup—small but complex devices that are critical to the guitar’s trademark sound. A guitar pickup acts like a microphone that creates vibrations when the strings are played. Taylor’s pickup uses the compression from piezo-electric material to sense vibrations and translates them into signals that can then be amplified.

While Taylor’s patented behind-the-saddle pickup improves the guitar’s amplified tone and responsiveness, its location makes assembly more difficult for human fingers. If done by hand, each assembly step increases the possibility of damaging materials. The Epson G3 robot delivers precision, every time.

The Automated Process

The pickup assembly process starts with piezo-electric material feeding onto a conveyor. A worker inspects and places pieces of the assembly in Taylor machined fixtures. The Epson G3 robot then picks up the assembly pieces and locates them for adhesion. A second Epson robot is equipped with custom end-of-arm tooling to locate and pick piezo elements from the conveyor and place them in pickup assembly. Once the piezo blocks and all pickup components are located correctly, the pickup assembly is folded and an Epson robot transports the completed assembly to a wrapping station.

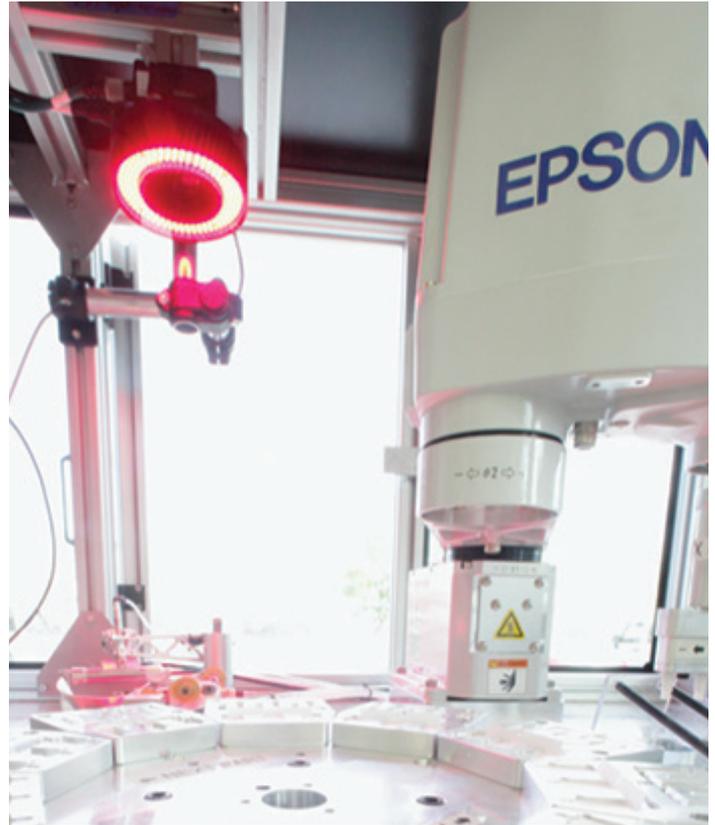
Throughout the assembly process, a combination of machine vision cameras and photoelectric sensors are used to verify correct placement of the piezo blocks, assess final assembly and confirm the presence of components in the pickup assembly.

Rapid Software Development

Engineers cite Epson's RC+ development software as a key benefit of using the Epson robots. An intuitive graphical interface and easy-to-use options, including integrated vision, force guidance, conveyor tracking, and a GUI builder reduce overall development time.

"The programming language is flexible enough that we have been able to integrate third party vision systems without much effort, as well as Ethernet communication, which allowed us to avoid a lot of wiring and make integration of the vision system quite a bit easier," cited Tyler Robertson, Taylor Robotics Engineer. "And, if you don't need a teach pendant you can operate the robot's motion and create programs directly from a PC." Robertson also noted the robot's reliability. "Epson G3 robots have delivered precision and repeatability over the last five years. We haven't had to replace any parts, and we've done virtually no maintenance whatsoever."

Looking forward to the future, Taylor Guitars will implement new tooling and equipment as part of its continuous improvement effort. Taylor is also readying a new robot cell for applying adhesives, which will also use an Epson G3 robot as the main motion system. Company executives see an ongoing fusion of craftsmanship and technology in the future. "We have to listen to the craftsmen and look at new technologies and continue to marry the two," noted VP of Development Ed Granero. "For us, that's going to happen well into the future. Our logo says 'Taylor quality guitars' and we take that very seriously."



"We haven't had to replace any parts, and we've done virtually no maintenance whatsoever."

—TYLER ROBERTSON, ROBOTICS ENGINEER,
TAYLOR GUITARS

The views and opinions expressed in this article are those of the individual. Individuals were not compensated for this article.