

COMPANY
PROFILE

TEKNIC INC.

CONTROL COMPONENTS FOR OEMS

Teknic's servo motors and digital drives enable the motion of the X, Y, Z, and theta axes on a machine. (Courtesy: Teknic)



Founded in 1985, Teknic manufactures servo motion control components that include integrated servo systems, brushless servo motors, servo drives, motion controllers, and power supplies.

By KENNETH CARTER, Gear Solutions editor

Machines that make gears contain crucial parts that are important to the successful manufacturing of those gears and more.

Teknic Inc. has been designing and manufacturing these crucial components responsible for the proper functioning of all types of manufacturing machines for more 40 years.

“At our core, Teknic designs and manufacturers a range of high-performance motion control solutions,” said Wyatt Patterson, OEM applications engineer at Teknic. “We support OEM machine builders that produce both additive and subtractive manufacturing machines. While we’re not directly building these machines ourselves, we are a critical enabler for these machines in terms of their motion and IO capabilities. Some examples of the machines that our products can be found on are steel or ferrous-based machining centers such as mills, lathes, multi-axis CNCs, and non-ferrous-based machining such as router tables, non-contact machines such as laser, plasma, water jet, and all sorts of different additive manufacturing machines such as 3D printers.”

DRIVING MECHANICAL ASSEMBLIES

Basically, when it comes to the machines that create gears, Teknic’s servo motors and digital drives enable the motion of the X, Y, Z, and theta axes on a machine, according to Patterson.

“That’ll be our motors driving those mechanical assemblies,” he said.

Teknic, through its expertise in creating compact solutions for a variety of industries, including gear manufacturing, is helping OEM machine builders improve their throughput, increase reliability, and lower the cost of their machines in order to become more competitive in the global economy, according to Patterson.

“That industrial manufacturing market is a critical one for us,” he said. “We definitely pay attention to the needs of our customers in that space. One thing that we focus on is higher power density through integrated brushless motors. We’ve been doing this for a while now — we currently have a line of motors with a brushless servo motor integrated with a high-resolution encoder, a digital servo drive, and a motion controller.”

By including all these functions in the same housing, the overall electronics cabinet space and cabling decreases, while reliability increases, according to Patterson.

ADDITIONAL INDUSTRIAL COMMUNICATIONS

“Another thing we’ve done in this realm is adding support for additional industrial communications such as EtherCAT or Ethernet IP,” he said. “The goals for using these communication methods will be reducing your communication cabling as well as distributing control, leading to more capable motion solutions.”

This will greatly improve a user’s ability to monitor a machine’s productivity as well as making it simpler to operate, according to Patterson.

“One thing that comes with these industrial communication protocols is the ability to have that fast and really customizable feedback from the motors,” he said. “In addition to continuous technical improvement, something we really stress in-house is what we call ‘ease of performance.’ It’s really critical for our products to be very approachable. High performance doesn’t really mean anything if it takes a PhD to be able to use it. We design a lot of our products so that all engineers and technicians can use them quickly and efficiently and get them up and going. The goal is to allow our machine builders to have a quick time to market with their machine, come up fast on the development curve, and go to market with a competitive and cost-effective machine.”

REDUCING THE FOOTPRINT

Being able to reduce the footprint of a machine and its electrical cabinet can be a huge deal to an OEM manufacturer, according to Patterson.

“From a reliability standpoint, cabling has always been the bane of reliability in machines, and having less cabling definitely means less opportunity for electrical noise,” he said. “That’s a big thing for a lot of our customers. Another thing we often see is, as in all industries, the demand for higher performance customers is always wanting more throughput, wanting smoother motion, and wanting improved bidirectional accuracy and repeatability — pushing the limits of what is capable from a motion control standpoint to get the best quality finished product.”

PLANETARY GEARBOXES

In addition to Teknic’s servo motor solutions, the company also carries a line of planetary gearboxes sold on its website, according to Abe Amirana, senior applications engineer at Teknic.

“In the planetary gears, obviously they’re very high-



In addition to Teknic's servo motor solutions, the company also carries a line of planetary gearboxes. (Courtesy: Teknic)



Teknic, through its expertise in creating compact solutions for a variety of industries, including gear manufacturing, is helping OEM machine builders improve their throughput, increase reliability, and lower the cost of their machines. (Courtesy: Teknic)

performance planetary gear sets, and we incorporate that in all the planetary gearboxes that we carry," he said. "These planetary gearboxes are used in a wide range of industries. They are used in anything from an automatic tool changer to a CMM machine to large rotary indexing tables that are used in the gear-manufacturing process. It could be a wide range of things."

These gearboxes work in tandem with the servo motors manufactured by Teknic, according to Patterson.

"The gearbox is often a solution to a common problem faced in the motion control industry, which is related to the difference in inertia between your load and the motor," he said. "When you've got demanding applications where you need very precise following — think of a CNC machine where the path through space is very critical to the performance of the machine. The inertia of the load can oftentimes be an issue for that motor. One way to get around this is by adding gearing to your system. Having that mechanical leverage greatly improves your ability to control the load and follow a very precise path."

When a servo motor is mechanically mounted to an input coupling to the rear of a gearbox, this combination becomes a single, unified unit, according to Amirana.

"What the gearbox does at a high level is it reduces rotational speed, but it mechanically increases mechanical torque and then it reduces the inertia that the motor effectively sees that it's controlling," he said. "If you have an application, for example, a lapping machine or a machine that's providing a fine surface finish, as you're taking off layer after layer, you're encountering a lot of torque load. You might put a planetary gearbox there to increase or amplify the torque. Or if you're using a CNC machine where you're cutting teeth on a gear as the tool bit, as it starts to wear a little bit, it

increases the torque, but the gearbox gives you the ability to amplify that torque to cut through the material.”

ESSENTIAL CUSTOMER FEEDBACK

Creating the ideal servo motor involves a lot of feedback between Teknic and its customers, according to Patterson.

“When a customer has a challenge, it all starts for us with asking a lot of questions,” he said. “As an application engineer, we’re typically interfacing with these customers and the goal is always to understand the pain they face, which allows you to better address the challenge. It is important to note that although customer challenges can often be technical in nature or be in regards to the product feature set, they can also take other forms such as supply chain needs, faster and more consistent lead times, and price stability. All of this reflects the importance of the direct engineering support that we’ve developed over the years. It’s really great to have that direct customer feedback as a source of new product enhancements and changes to our customer policy so we can better serve our customers.”



Creating the ideal servo motor involves a lot of feedback between Teknic and its customers. (Courtesy: Teknic)

40 YEARS OF EVOLUTION

Teknic has evolved quite a bit from when it began as an embedded hardware and software engineering firm in the '80s specializing in motion control applications, according to Patterson.

“At that time, virtually all motion control servo amplifiers were analog,” he said. “As we developed as an engineering firm, we also developed a tight partnership with Texas Instruments, which was a leading semiconductor vendor and manufacturer at the time, and still is today. They had just introduced a new line of digital signal processors or DSPs. These processors in particular in comparison to your typical microprocessor are smaller, more cost-effective, and excel at high-speed mathematical computations. We quickly recognized that this was a wonderful opportunity to convert analog servo amplifiers to digital servo drives and, in the process, synchronize some of the control loops for higher performance. This also lowered the number of parts involved in these systems, which increased reliability at a lower overall cost.”

From there, Teknic pivoted into OEM motion control product manufacturing instead of being a contracted engineering firm, according to Patterson.

“That’s currently what we do today — manufacture motion control products for OEM customers,” he said. “Ever since then, we’ve been growing at a pretty good pace. We just had our 40th year anniversary this year.”

CONTINUED INNOVATIVE SOLUTIONS

Keeping pace with a changing market was quintessential to some innovative solutions from Teknic during the recent COVID pandemic, according to Patterson.

“We were approached by several companies that were developing alternatives to ventilators — think of an automated AMBU bag system — to help them with the manufacturing process,” he said. “Teknic was one of the few companies that was able to rapidly produce motion con-

trol products in volume for these companies — whether that be servo motors, servo drives, motion controllers, or power supplies. A lot of these systems were shipped to hospitals, state and local governments, and even third-world countries that couldn’t source ventilators.”

That innovative approach to unexpected challenges will continue to keep Teknic on the forefront as it moves into the future, according to Patterson.

“When it comes to the motion control industry, we’re definitely seeing innovation increasing at a rapid rate,” he said. “It almost feels like it’s an exponential growth at this point. There’s little doubt that AI is going to play a big role in the motion control industry going forward. As of right now, we’re developing AI agents to improve technical service and support for our customers as well as increase efficiency of our internal processes.”

OTHER CHALLENGES

According to Patterson, there is also an industry push to develop a stronger supply chain with more on-shoring of manufacturing processes.

“This gives you direct control of the quality and gives you a more responsive supply chain, which can usually actually be more cost-effective,” he said. “We also see that there’s going to be a willingness to carry more inventory to be prepared for those events, especially if you can carry that inventory in sub-assemblies used to build a variety of different products. That was definitely critical for our success during that COVID pandemic and during semiconductor shortages. Teknic will continue to do what it always has done: We will push the envelope and provide the best products we can to our customers.”

MORE INFO

[teknic.com](https://www.teknic.com)