

Interview on PC-based control in laser cutting technology

“TwinCAT and CAM connections increase the productivity of fiber laser machining centers”



János Imrei, service manager of Plasma-Tech Systems, in front of the PTL 4001 fiber laser cutting machine.

Plasma-Tech Systems, based in Csongrád, Hungary, manufactures custom laser equipment and specialized machines. With the PTL 4001, a fully automatic processing center using a fiber laser was developed and automated with PC-based control and advanced NC technology from Beckhoff. The editors of the CNCMedia trade portal spoke with János Imrei, service manager at Plasma-Tech, about the challenging project.

What exactly is the business focus of Plasma-Tech Systems?

János Imrei: We mainly develop and manufacture laser-based processing and custom machines, and since 2016 we have been part of the Vesz-Mont Group with three business areas: production and development of industrial lasers, automation of highly customized machines, and the actual mechanical engineering, including construction and assembly of the equipment. The great advantage of Plasma-Tech is that we produce the essential components of our systems ourselves and do not have them manufactured by outside sources. We do this in our own cutting workshop, metalworking shop and powder coating plant. We therefore have expertise in all technologies so that we can offer complete solutions from a single source. It helps that we have a

3,500 m² production hall, where we can also implement larger systems with special requirements. All this enables us to meet the strict rules and standards of the automotive industry, which is considered the most demanding industry in Hungary.

You have switched from classic plasma to fiber lasers for your machining center. Why don't you rely on CO₂ lasers like others do?

János Imrei: Everyone who has been working in the industry for some time realizes that there is no universal solution. None of the technologies are better or worse. As far as we are concerned, there is one argument that counts: CO₂

lasers require much more service, and the technology is significantly more sensitive. To operate them, the user must have more expertise and a different infrastructure. Fiber laser technology, on the other hand, offers a simple plug-and-play solution.

What is special about the Plasma-Tech fiber laser machine?

János Imrei: In our opinion, an important unique selling point is that the systems are wholly developed and manufactured in Hungary – based on our own expertise. Other manufacturers in our price segment equip their machines with rack and pinion drives. By contrast, we use linear motors that show virtually no mechanical wear. In addition, we keep spare laser sources and cutting heads in stock so that the customer can quickly obtain spare parts in the event of a fault. We can replace these components within 24 hours, keeping user productivity high. To ensure high productivity, it is just as important to support the user on the software side. We know very well that highly automated machines like ours cannot reach their potential without the right CAM software. So, the corresponding software is also integrated into our machine control system. This is what we mean by a complete solution; and if required, this includes additional support for optimizing cutting processes.

How do you automate your machines?

János Imrei: Experience has shown that the highest possible level of automation makes the machine easier and more reliable to operate. That is why the machines are 100% automated, preventing problems due to improper handling or incorrect manual settings. Powerful Beckhoff controllers and the fast and flexible EtherCAT communication system provide the technological foundation for this. It is also very important that the I/O system can be expanded easily and in just a few minutes by adding the corresponding EtherCAT Terminals. We received a lot of support from Beckhoff during the design and implementation of our control concept; as a result, our programmers were able to migrate to TwinCAT 3 without any problems.

Automation requirements

Plasma-Tech Systems was developing a new laser cutting machine in 2016 and had high expectations for the automation solution to be used, from the control and I/O system to the drive technology. PC-based control from Beckhoff was able to fulfill all of these expectations. The most important feature was the openness at both the software and hardware level. A special feature of automation technology was that, in addition to implementing the interpolated movements in TwinCAT CNC, an interface to Plasma-Tech's application software had to be provided. Furthermore, it had to be possible to combine EtherCAT with other communication protocols if required, which is easy to achieve with PC-based control. In addition, the AX5000 Servo Drives had to harmonize with the linear motors, which required flexibility with regard to the encoder types.

Why did you choose Beckhoff technology?

János Imrei: We had a thorough look around and came to the conclusion that we would obtain an excellent price/performance ratio for our machines with PC-based control from Beckhoff. This gives Plasma-Tech a competitive edge in Hungary.

What are Plasma-Tech's development plans for laser processing centers?

János Imrei: The developments we are working on are often invisible to customers. This is because in laser cutting, the laser technology requires certain key parameters that cannot be changed. On the other hand, we can optimize any non-productive time, e.g., accelerate the pallet change and increase the speed of the transition. Only then does the user notice that the cutting time has become shorter by a few seconds in total. We are constantly working on improving these kinds of details, thereby increasing productivity.

This interview was conducted by the editorial staff of CNCMedia, www.cnc.hu



The control core of the PTL 4001 fiber laser cutting system comprises a CX5130 Embedded PC with TwinCAT 3 software and a wide range of EtherCAT Terminals, such as EL1904 TwinSAFE Terminals and EL3161 analog input terminals.



The AX5000 Servo Drives ensure dynamic and precise shaft movements of the laser head.

More information:

www.plasmatechsystems.hu

www.beckhoff.com/machine-tools