TECHNOLOGY Cutting

Everything about the ByAutonom, Bystronic’s secret EuroBLECH highlight

Best of Bystronic

By Günter Kögel, Photos: Bystronic

With the ByAutonom, Bystronic has designed a new platform for the highest degree of productivity, maximum parts output, low operating costs, comprehensive process automation and autonomous operation.

Highest level of productivity and maximum parts output based on linear drives and lightweight construction. Low operating costs thanks to the use of highly efficient laser sources with low gas consumption. Comprehensive process automation and hence processing steps that run autonomously. Bystronic has united all this in one system. The marvel is called ByAutonom and will be presented for the first time at the EuroBLECH. Here, exclusively, the first details.

Bystronic will publish information on its most recent laser development only one week before the beginning of EuroBLECH. However, for the EuroLaser magazine, the Swiss company made an exception. At the company’s headquarters in Niederönz, CTO and Head of R&D Dr. Jürgen Hohnhaus and Project Manager Thomas Schenk show us what had been kept top secret until just before the exhibition: the ByAutonom 3015, a laser cutting system for the high-end CO2 market with 4.4 kW or 6 kW.
Jürgen Hohnhaus on the main focus of the development: “We wanted to establish a new, highly productive and visually appealing machine platform that is equipped with the latest technology. That is exactly what we have achieved. And because, in addition, the machine also sets new standards with regard to autonomous operation, we gave it the name ByAutonom.”

Project Manager Thomas Schenk comments on the details: “We designed the ByAutonom specifically as a machine that operates autonomously, which in combination with an automation system such as the ByTrans, ByTower, or Bycell, can be operated lightly-manned. And we incorporated everything into the ByAutonom that we offer in terms of machine automation – and that is a great deal: The ByAutonom can not only change the nozzles and the focal lengths completely automatically, it can also automatically center the nozzle without intervention by the operator.”

Some of these systems are already successfully employed in other Bystronic machines. For example, the changing of focal lengths was already presented on the BySpeed Pro at EuroBLECH 2010. Others are new or have been greatly enhanced. According to Jürgen Hohnhaus, this is particularly true for the nozzle centering system: “We have further enhanced the nozzle centering and are now able to center the nozzles completely automatically – without any intervention by the operator.”

The ByAutonom’s further distinctions: The machine is a completely new design and from the outset, everything has been undertaken in order for all these systems to interact perfectly.

The result for the user: The ByAutonom can even be operated lightly-manned, when the thickness or the type of material has to be changed. The laser cutting system simply picks up the suitable focal length and the corresponding nozzle, centers automatically and carries on cutting.

In combination with sophisticated sensors, the terror has even been taken out of a cutting head crash with a toppled or tilted sheet metal part; an event that can never be ruled out entirely. Thomas Schenk. “A tilted part does not pose a problem to the ByAutonom: The
crash detector in the cutting head detects when the head collides with such a part and immediately stops. Then, the ByAutonom automatically moves to the centering station and realigns the nozzle to the laser beam. In addition, the machine control memorizes where the crash took place, skips that part and moves to the next one. With this solution, we have taken a further major step towards maximum process reliability.”

The machine’s productivity was a further highly prioritized focus of development. The clear guideline by the Head of Development: “We wanted to bring a system to market that achieves a maximum output of parts and thereby reduces the cost per part – and in this too, we have succeeded.” Next to process reliability it is primarily the ByAutonom’s dynamism, which is achieved through the use of the latest technology, which is responsible for reaching this objective. Thomas Schenk: “The most recent generation of linear motors in combination with torque motors, the extremely rigid machine bed and a lightweight bridge ensure that the machine is as dynamic as possible. With the accelerations that we can achieve while cutting with the ByAutonom, we even surpass the output of the BySpeed Pro – and this while offering accessibility that almost matches the level of a Bystar.”

CO2 laser with 4.4 and 6 kW
The lasers that are used are Bystronic’s well-known CO2 lasers with 4.4 and 6 kW output. For the first time at Bystronic, in order to cut thick sheet metal of 20 or 25 mm, a 9” cutting head is included in the standard configuration of the 6 kW laser.

Matching the ByAutonom, the 4.4 and 6 kW CO2 lasers also present themselves in the new Bystronic design.

With regard to the placement of the laser unit, the ByAutonom allows several layouts, in order to be even better able to adapt to the conditions on site. For example, the beam source can be installed next to or behind the cutting system. Independent of the laser’s placement, the alignment of the laser beam is very simple, which ensures short installation times – a further item that was very high on the list of requirements.

A further feature that ensures a simple and fast installation at the customer’s premises is that the control cabinet is integrated into the machine frame; this greatly simplifies transport and also eliminates many plug-in connectors – and thereby possible sources of faults. The bridge can also be left on the machine during transport, which also considerably speeds up the installation. Since all the adjustments can be performed at the factory, which simplifies the assembly at the customer’s premises.

With regard to operating the machine, Bystronic also paid a great deal of attention to ergonomics. On the ByAutonom, the operator stands very close to the machine and can...
work with very little effort. All the parts that are necessary for operation, such as cutting heads or nozzles, are stored cleanly and neatly in easily accessible drawers – and are hence readily retrievable. The large 22” monitor can be vertically adjusted and pivoted. Hence it can be adapted optimally to operator requirements.

The machine controller is based on the current ByVision, but has been developed further and several innovations have been added. Jürgen Hohnhaus on this topic: “Our Condition Messenger is an absolute innovation, with which we are now able to graphically display the current status of the individual components. Amongst other things this applies to the laser, the nozzle changer, the focal length changer and the beam path. If, for example, the bellows are perforated and the beam path is therefore no longer sealed, the machine detects this and displays it graphically in the Condition Messenger. Depending on how serious the current problem is, the corresponding bar graph switches from green to yellow or red. In addition, the operator receives appropriate warning messages and can prepare and schedule the required maintenance work. However, in order to prevent compromising productivity with unnecessary stops, we leave it to the operator to react to the messages and do not stop the machine. It may well be that an important job is being processed, which the operator wants to complete before performing maintenance.”

The Maintenance Manager is another innovation: From now on with the ByAutonom and the other laser systems, the maintenance manual is integrated in the machine control package, in addition to being supplied as a paper version; incidentally, this is also true for Bystronic’s bending machines. The Maintenance Manager displays all the necessary maintenance jobs.

In order to put the machine through its paces before the start of series production, Bystronic installed several ByAutonom systems for field tests with selected customers. The feedback: extremely positive. Thomas Schenk: “All the test customers were delighted with the machine. The ByAutonom ran absolutely stable and the parts output is immense. One of the test customers set up the ByAutonom and started running three shifts on it from day one. We specifically pointed out to him that it is a test machine and that problems may arise – but there were none.” This is also true for tests under difficult climatic conditions and with operators from other nations, which Bystronic carried out with a customer in South Korea. There too, the developers received a very positive feedback. Therefore, nothing should stand in the way of a successful market launch at the EuroBLECH.