MANUALLY? NOT LIKELY!

MANUAL WORK IS ALL VERY WELL. BUT DOES IT REALLY HAVE TO BE PART OF SHEET METAL PROCESSING WHEN THERE ARE FIRST-CLASS AUTOMATION SOLUTIONS AVAILABLE, NOTABLY FROM BYSTRONIC?

Text: Martin Engel, Photos: Bernhard Strahm, Stephan Dürer

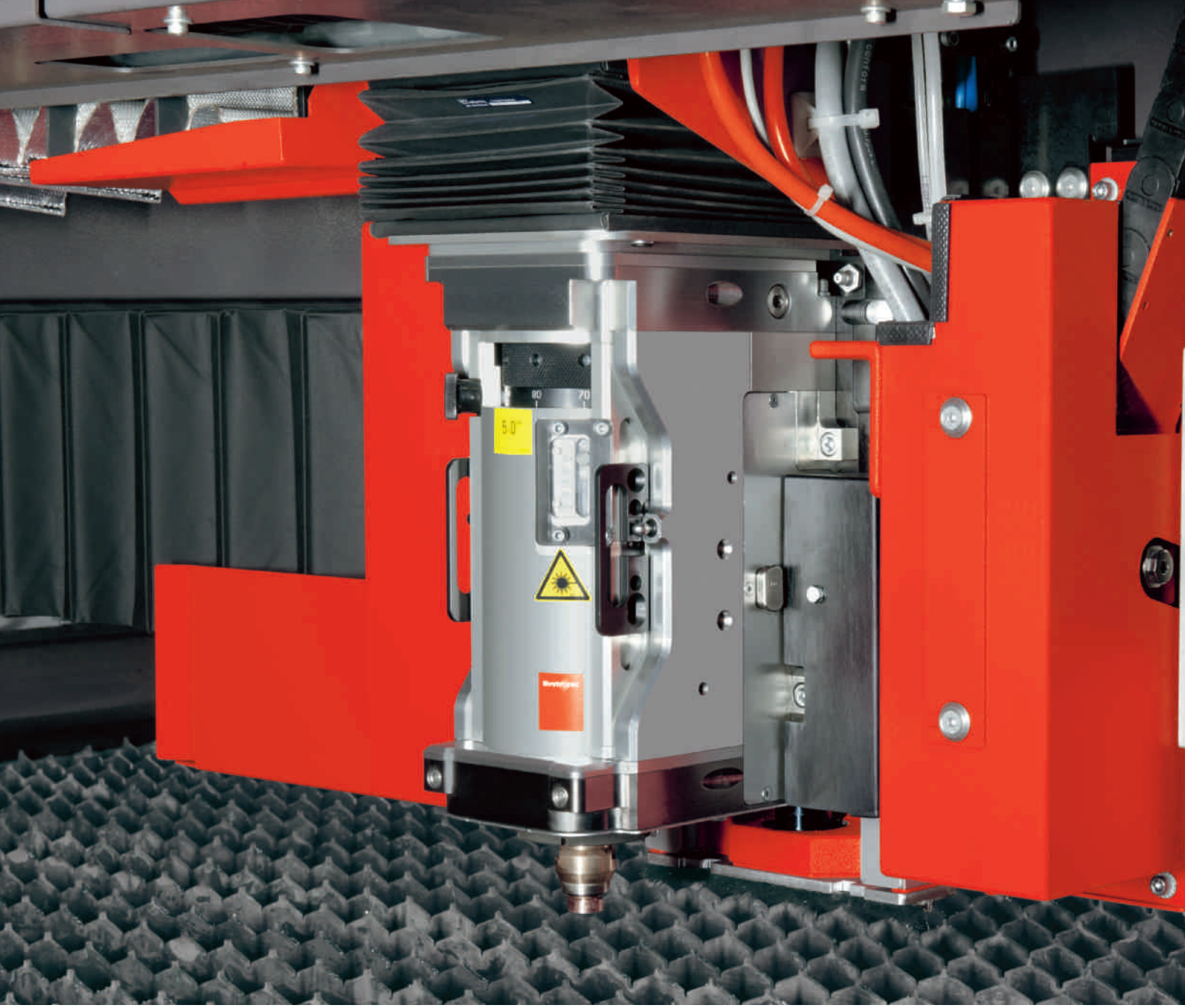
THE GERMAN FAIRY TALE of the brownies tells of tiny friendly spirits who come out at night to do the work for people. The story has just one snag: The brownies disappeared forever when the humans inadvertently came face-to-face with them. And because there are no longer any brownies, resourceful development engineers have to step in. At Bystronic, there is a whole army of such innovators at work. This means that a whole range of automation solutions for sheet metal processing are being designed.

Such tools handle the jobs that otherwise would have to be done manually. This offers benefits. In this way, in lightly manned night and weekend shifts, orders can continue to be fulfilled in the absence of the employees. The machine's capacity is thus put to better use, it works more productively, and consequently increases the company's profits. Further advantages: Anyone who possesses high-quality automation solutions also has higher process reliability and a better material flow.

No wonder that Bystronic has systematically expanded its range in this field over recent years. Thus, as recently as June of this year, the storage tower ByTower and the automatic nozzle centering were launched. Based on these examples, it becomes clear that Bystronic is approaching the automation of the processes from two angles: Firstly, with the attached modules for handling the metal sheets such as the ByTower. And secondly, with elements such as the automatic centering of the nozzle, which are integrated into the machine and further improve process reliability. Together, they convert a Bystronic laser cutting system into a fully automated laser cutting cell.

AUTOMATION ON THE MACHINE

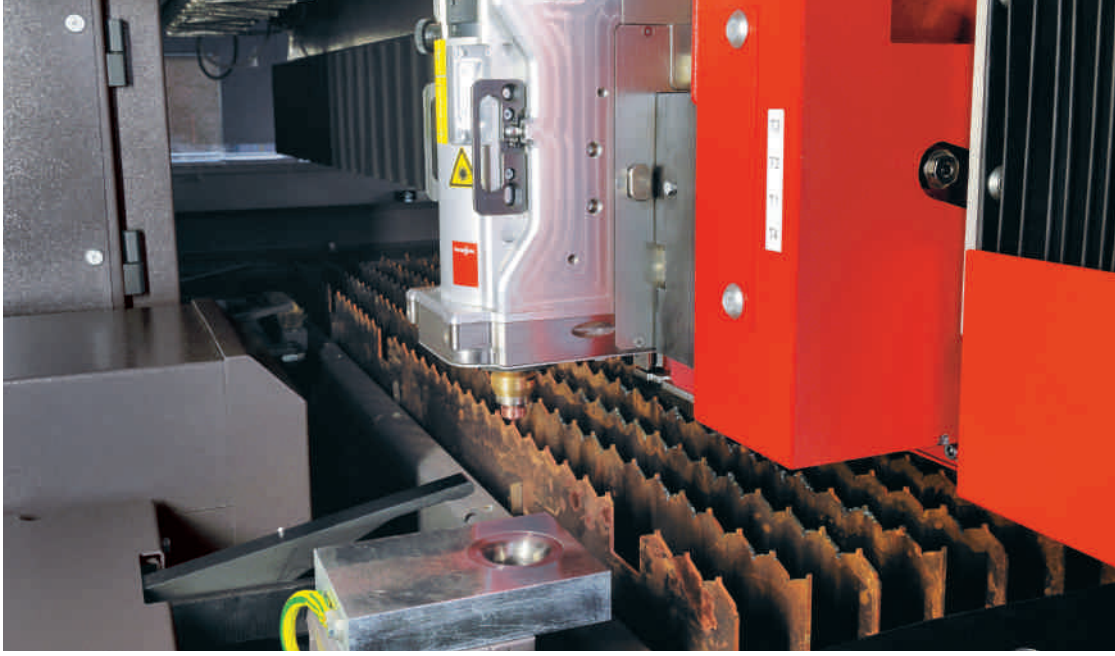
Let us follow this conversion based on the example of a BySpeed Pro. This laser cutting system that was launched on the market in 2010 is an obvious choice to illustrate the process, since it is equipped with a completely new cutting head. It serves as the platform for a further expansion of the machine's autonomy. Already in its standard version, the BySpeed Pro reacts extremely dynamically and powerfully and ensures a reliable high level of parts output. But why should one be satisfied with this? Thus, we equip our protagonist with a number of additional elements.

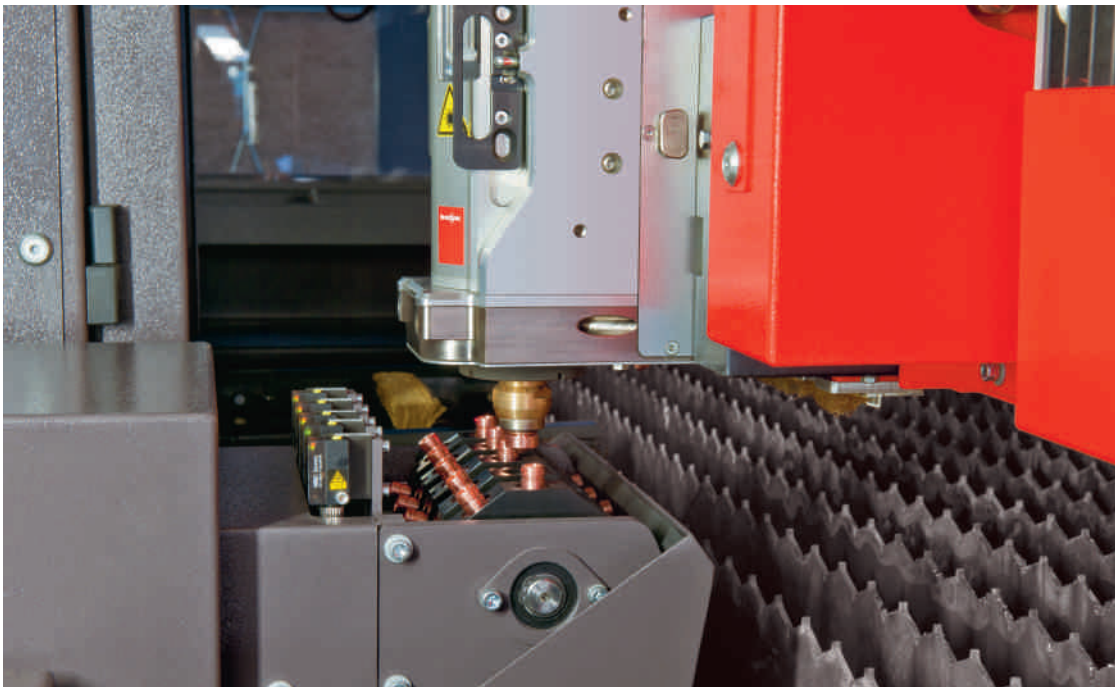


Let us start with the automatic nozzle centering already mentioned above. This ensures the process reliability of operation of the laser cutting system, even when the operator is busy with other work or is absent from the machine. If during this time a collision occurs between the cutting head and, for example, a part that is sticking out, this is recognized immediately and the cutting process is interrupted. In a further step, sensors detect if the nozzle or the body of the nozzle has been torn off. If this is not the case, the cutting head travels to the centering unit without any manual intervention, where the nozzle is precisely readjusted. Incidentally, the new set-up data is stored for later use by other processes. Following the nozzle centering, the cutting process restarts itself. Thus, the machine does not have to wait until the machine operator discovers the collision, appraises the situation, and realigns the nozzle.

Furthermore, no time-consuming checks have to be carried out, for example, once a cutting plan has been completed or when a change of operator or shift takes place. In practice, the machine settings were often checked for safety reasons in such cases. Centering of the nozzle is no longer necessary, since it is done automatically and with high precision by the machine.

The same applies to a change in the focal length. In this case, too, our BySpeed Pro carries out the change itself. When doing this, the lens cassette is positioned with maximum accuracy so that the subsequent automatic nozzle centering can take place with precisely the same accuracy. In short: While other manufacturers' machines are still carrying out checks and centering, the Bystronic user can already carry on cutting – and earning money.





The BySpeed Pro has a new cutting head (left) that allows automatic changing and centering of nozzles (right). Previous page: The BySort automatically removes, sorts, and stacks laser parts.

But nozzles should not only be centered automatically, they should be changed without manual intervention, for instance prior to starting a new order, or preemptively after a certain number of piercings. This can be determined by the operator and programmed into the software. The change takes place very rapidly in just 15 seconds. And since the optimum nozzle is automatically chosen for each cutting plan, the flexibility of the system is increased on the one hand, while on the other, process reliability and the quality of the parts are improved. Process reliability is additionally supported by a monitoring function. This firstly checks that there is actually a nozzle in place at the foreseen position, and secondly ensures that it is subsequently correctly fitted.

Further benefits of the nozzle changer are its high capacity and the simple handling. It consists of five magazine wheels upon which a total of forty nozzles can be positioned for changing. The individual wheels can be exchanged very simply with very little effort.

AUTOMATION NEXT TO THE MACHINE

Let us now take a look at the periphery of our example system. Our first measure: We equip the system with a ByTrans, a module that is modestly described in the brochures as a loading and unloading unit. In view of the amount of work it handles, however, it is anything but modest, which is an automatic bonus for Bystronic users. Thus, the ByTrans initially takes over the material flow, which means it loads and unloads the shuttle table. Over and above this, however, the module is also a simple buffer store, in which material for orders that are to be processed can be held ready. For this

Loading and removal unit ByTrans Extended.

Even more space with the ByTower unit.

BySort handles the output of the laser cutting array.

purpose, ByTrans was equipped with a single cassette, and even with two cassettes in the ByTrans Extended version.

The second cassette of the ByTrans Extended considerably extends its scope of operation: If parts are being cut that must not be scratched, (plastic) protection sheets can be stored there. Following suitable programming, these are automatically placed between the individual processed sheets. The protective sheets also make it easier to separate the sheets later and can also be used to mark the start and the end of an order. Second benefit: ByTrans Extended also supports the handling of large parts. In this case, ByTrans Extended automatically removes the cut parts, places them in the second cassette, and places the skeleton on the correct storage area.

The ByTower storage tower offers even more space than ByTrans and ByTrans Extended. It is available in three sizes with eleven, eight, and six cassette positions. The advantage: During lightly manned shifts, completely different types of orders, which demand a large number of different types and thicknesses of sheets, can be processed. Thanks to the ByTower, the corresponding material is to be found where it is required, namely right next to the machine, and is thus available in the shortest possible time. Hence, a higher number of parts can be cut per unit time, and sheet metal processing becomes even more flexible.

Over and above this, the ingenious drive system and the simple operation play their part in ensuring that the ByTower works extremely quickly. A further advantage: The user can decide for himself how many cassettes are to be used for storing the raw materials and how many for the return transfer of the cut parts. The sheets can be stored in the cassettes either with or without the wooden palettes. And the ByTower saves space. Thanks to its compact vertical construction, the available floor space is used economically.

BYSORT

While the ByTower takes care of the input, BySort looks after the output of the laser cutting system. After all, it is the dream of every sheet metal processor to close the factory doors on a Friday night and to return early Monday morning to find as many cut parts as possible sorted and ready for delivery next to the machine. Admittedly: Not even Bystronic can provide an all-embracing solution that can automatically remove, sort, and stack even the smallest and most complicated of parts. But – and this is the good news – with BySort, the user has a module at his disposal that provides excellent service in this respect. Therefore, we will equip our example system with this module and deal with other tasks while it carries out its work without any assistance from us.

In doing this, BySort operates with restraint in two respects: It spares our resources, since parts no longer have to be sorted and stacked manually,

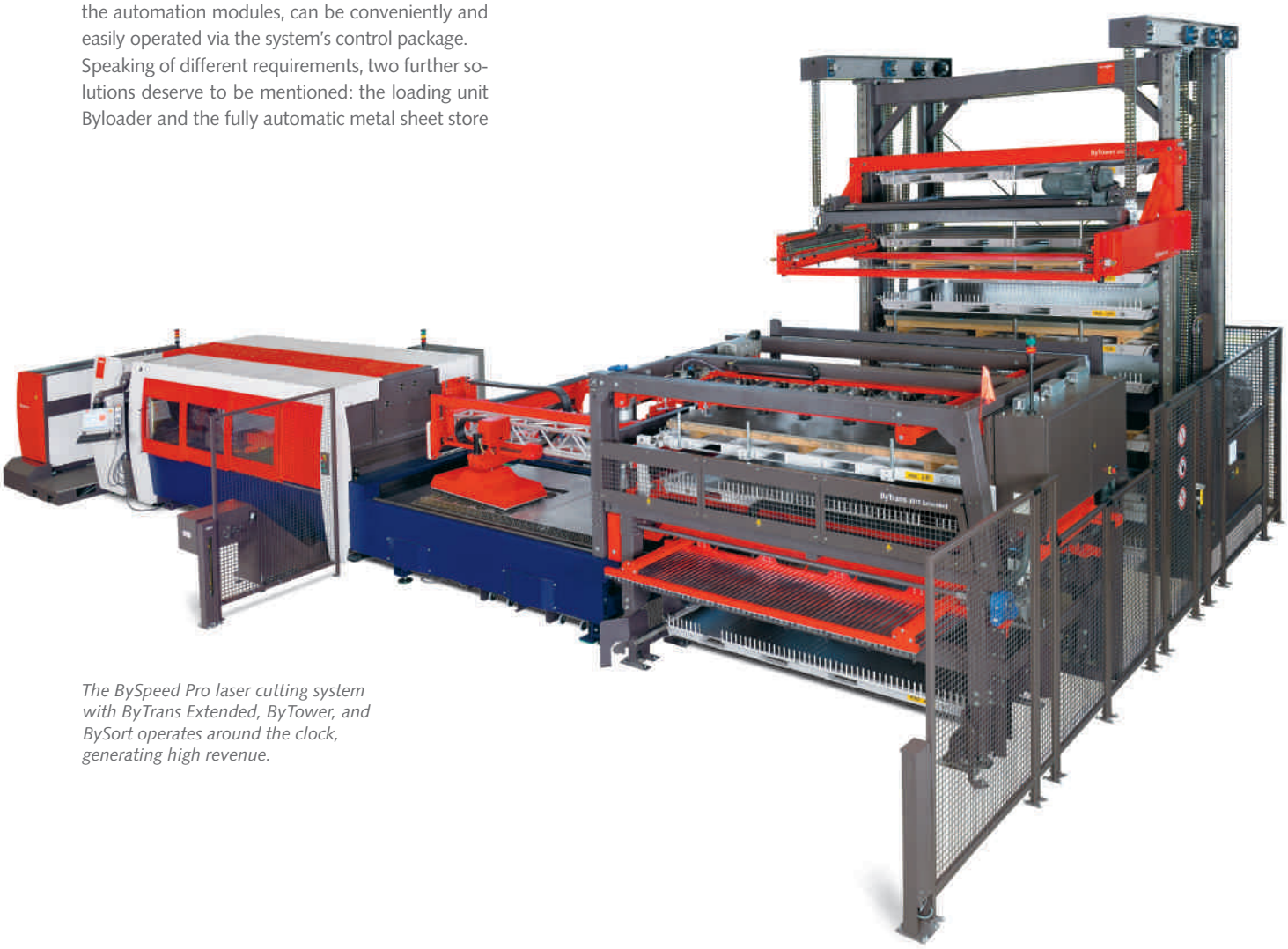
but it also handles the materials carefully. Parts are removed using suction devices and are hence no longer scratched by the fork system. And because BySort automatically removes, sorts, and stacks the products, the transition to any possible follow-on processes is simplified considerably. But what if a single part has to be cut urgently? Doesn't BySort rather get in the way in such cases? The answer is no. Unrestricted access to the shuttle table is still possible if the BySort is not required.

One of the trademarks of the Bystronic automation package is its modular construction. The customer should be flexible in what he purchases. After all, not every user requires a completely automated laser cell including BySort, ByTower, and ByTrans. In this way, automation next to the machine can be configured to meet the requirements of the situation, and can be extended step-by-step. And because against this background great value has been placed on simple and powerful interfaces, the individual modules operate on the plug-and-work principle. The whole system, including all the automation modules, can be conveniently and easily operated via the system's control package.

Speaking of different requirements, two further solutions deserve to be mentioned: the loading unit Byloader and the fully automatic metal sheet store Bycell. The latter offers extended functions compared to the ByTower. With its virtually unlimited number of cassette positions, it is used not as buffer store, but rather as a comprehensive material store.

BySort, ByTower, and ByTrans/ByTrans Extended can incidentally be connected to any Bystronic laser cutting system that has a cutting area of 3 by 1.5 meters. Beyond this, Byloader and Bycell cover the metal sheet format of 4 by 2 meters. The automatic changing of the lens cassette and the cutting nozzles as well as the automatic nozzle centering are currently available for use exclusively with the BySpeed Pro.

In conclusion, we may well ask: With this range of automation solutions, who is going to miss having the brownies around?



The BySpeed Pro laser cutting system with ByTrans Extended, ByTower, and BySort operates around the clock, generating high revenue.