Kirchheim unter Teck, 28 March 2024

For its laser cutting machines, Bystronic has opted for hybrid drive technology by AMKmotion:

**For a clean cut**

**Swiss machine manufacturer Bystronic was looking for an economical drive solution for its ByCut Eco laser cutting machine – and found that AMKmotion had just what it was looking for. The specialist for electrical drive, control and industrial automation technology supplied a hybrid drive technology set comprising the iDT5 synchronous servo motor with integrated iX5 inverter, the DT5 synchronous servo motor, the iX5 servo inverter, the ihXT4 synchronous servo motor with integrated inverter, the KEN power supply module and the KHY hybrid distributor. This system not only works extremely dynamically and accurately, it also simplifies cabling and frees up space in the switch cabinet.**

Based in Niederönz/Switzerland, Bystronic develops and builds systems for sheet metal processing. Its main focus is automating the entire material and data flow in the cutting and bending process chain. The company employs a workforce of over 3,600 staff at more than 40 sites worldwide, generating sales of around one billion euros in 2022.

“Networking our laser cutting systems and press brakes with innovative automation, software and service solutions is the key to the comprehensive digitalization of the sheet metal industry,” says Stefan Züger, Global Media Relations & Product Communication Manager at Bystronic. “Our customers expect us to provide clever solutions and high-performance products.”

One of these is the ByCut Eco laser cutting machine. For this entry-level machine, Bystronic was looking for a new drive system that moves the cutting head in the X, Y and Z directions. “It had to offer a high level of dynamic performance, enabling the necessary path and part accuracy during laser cutting and offering greater economic efficiency than the one previously used,” says Adrian Krebs, who was jointly responsible for the project with Stefan Jacobi, Head of Systems Engineering at Bystronic. “I had a decentralized system in mind as a solution,” says Jacobi. Since he had gained positive experience of AMKmotion and its technology in connection with a previous project, the Bystronic team once again turned to the drive specialists in Kirchheim unter Teck with their request, along with a rough plan.

**Developing the solution together**

Andreas Ochs is team leader for drive design and commissioning at AMKmotion: he and his team were happy to take on the challenge. “We started out with a basic design and worked our way forward bit by bit from there, so to speak,” says Ochs. As a result of close collaboration between Bystronic and the gearbox manufacturer, the right solution was developed in a process lasting around two months that involved regular visits to Niederönz.

An iDT5 synchronous servo motor with integrated inverter takes care of the movement on the Y-axis. This combines the iX inverter with the DT servo motor, with the two wired directly to each other. “Like the individual components, the mechatronic functional unit sits in a metal housing that protects the shock- and vibration-resistant inverter and servo motor from dust and moisture in accordance with protection class IP65”, explains Ochs. The cutting head is located on a gantry system on the X-axis. “In order to be able to move this synchronously and with the necessary dynamics, we use more powerful motors,” says the team leader. “We installed two DT5 synchronous servo motors, each with a decentralized iX5 servo inverter.” The high-pole servo motors are designed for high levels of torque and have increased moments of inertia. This means they can also accelerate larger loads extremely dynamically without a gear as a direct drive, thereby increasing the productivity of the machine. The magnets in the rotor are inserted and fixed by means of a plastic overmolding. This additionally protects them from dust, gases and moisture – and guarantees permanently stable magnetic values. The Z-axis is positioned by an ihXT4 synchronous servo motor with integrated inverter. The shock- and vibration-resistant drive unit with a torque of 2.6 newton-meters sits in an IP65-protected housing, so it is suitable for direct installation in the machine. Functional safety in the form of Safe Torque Off (STO) is on board as standard.

The switch cabinet only contains the space-saving KEN power supply module, which generates the DC bus voltage and supplies the connected decentralized compact inverters with power via the KHY hybrid distributor. The latter simplifies the combination of different signals and supply voltages from the central drive, serving as an intelligent interface from the centralized to the decentralized drive environment. Meanwhile the DC bus, the drive-integrated safety function STO and 24 volts are looped to other decentralized controllers via the iX. Real-time communication takes place via a separate fieldbus cable. The standardized interface is designed as a module, thereby enabling simple expansion of central switch cabinet devices. Safety fuses are integrated for short-circuit and overload protection. In addition, the KHY monitors the DC bus current and the decentralized drive train via an I²t counter. Its switch-off response can be configured individually. The KHY is wired to the decentralized servo inverters of the synchronous servo motors according to the daisy chain system.

**Reliable collaboration on an equal footing**

As Jacobi sums up: “The decentralized design means we save space in the switch cabinet and have eleven fewer cables in the energy chain, so we need less cabling overall and can make the entire surrounding environment leaner – while still meeting our requirements in terms of dynamics and precision.” “Thanks to the fact that we have a direct line to the development department at AMKmotion, the collaboration was excellent – absolutely straightforward and always on an equal footing,” says Krebs. “Particular praise also goes to Mr. Ochs himself. He was always very supportive in helping us find a solution,” he adds, also noting that another plus point is AMKmotion’s adherence to delivery deadlines. “This is a very important aspect: after all, delays in the construction of a machine due to missing components have a direct impact on subsequent orders. With AMKmotion at our side, we’re able to reliably meet our delivery deadlines,” says Markus Beier, electrical parts buyer at Bystronic.

*6.454 Zeichen inkl. Leerzeichen*

***Service for editorial departments:***

***Meta-Title:*** *For the ByCut Eco, Bystronic has opted for hybrid drive technology by AMKmotion*

***Meta Description:*** *Bystronic has opted for hybrid drive technology by AMKmotion for use in its laser cutting machine ByCut Eco.*

***Challenge:*** *For its laser cutting machine ByCut Eco, Bystronic was looking for an economical drive solution that would meet all requirements in terms of dynamics and accuracy.*

***Solution:*** *AMKmotion’s hybrid drive technology not only meets all requirements in terms of dynamics, accuracy and cost-effectiveness, it also simplifies cabling and creates space in the switch cabinet**.*

***Social media:*** *Machine manufacturer Bystronic was looking for an economical drive system for its laser cutting machine ByCut Eco. The solution: hybrid drive technology by AMKmotion. This not only creates space in the switch cabinet and simplifies cabling, it also meets the requirements for dynamics, accuracy and cost-effectiveness.*

**Captions**

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**Image 1:** For its laser cutting machine ByCut Eco, Bystronic was looking for an economical drive solution that would meet all requirements in terms of dynamics and accuracy.



**Image 2:** AMKmotion’s hybrid drive technology not only meets all requirements in terms of dynamics, accuracy and cost-effectiveness, it also simplifies cabling and creates space in the switch cabinet.

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**Image 3:** The Bystronic team took a close look at AMKmotion’s technology.

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**Image 4:** An iDT5 synchronous servo motor with integrated inverter takes care of movement on the Y-axis.

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**Image 5:** Two DT5 synchronous servo motors move the X-axis.



**Image 6:** The DT5 synchronous servo motor can also accelerate larger loads dynamically without a gear as a direct drive, thereby increasing the productivity of the machine.



**Image 7:** The servo inverter iX can be wired according to the daisy-chain system.

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**Image 8:** The Z-axis is positioned by an ihXT4 synchronous servo motor with integrated inverter.

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**Image 9:** The switch cabinet only contains the space-saving KEN power supply module, which generates the DC bus voltage and supplies the connected decentralized compact inverters with power via the KHY hybrid distributor.

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**Image 10:** The hybrid distributor KHY is wired to the decentralized servo inverters of the synchronous servo motors according to the daisy-chain system.

**Image credits:**

**Images 1 to 5:** Bystronic Laser AG

**Images 6 to 10:** AMKmotion GmbH + Co KG

**About AMKmotion**

AMKmotion specializes in the development and manufacture of electric drive systems and sees itself as a long-term partner in the field of industrial mechanical engineering and plant engineering. The company’s aim is to help its customers achieve technological leadership by integrating individual and sustainable solutions.

The basis for this is AMKmotion’s hands-on mentality, combined with expertise acquired in more than 60 years of company history. We attach particular importance to personal advice and trusting cooperation with customers.

The company was founded in 1963 as AMK Arnold Müller GmbH & Co. KG. It has belonged to the Arburg family since 2021 and has operated under the name AMKmotion GmbH + Co KG since then. The portfolio includes electric drive technology, control technology and industrial automation technology. AMKmotion has a total workforce of 500. In addition to its headquarters in Kirchheim unter Teck, AMKmotion has production sites in Weida (Thuringia) and in Gabrovo, Bulgaria, as well as twelve branch offices around the world.

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