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Wolf Maschinenbau uses AMKmotion's hybrid drive technology in its rotary and linear transfer machines:

Efficiency meets compactness

The complex Wolf TSM 280 rotary transfer machine is designed for medium and large batch sizes. Wolf Maschinenbau AG has adopted AMKmotion's hybrid drive technology for the new generation of this series. It combines centralized and decentralized drive solutions, allowing both concepts to be leveraged to full effect. This increases both energy efficiency and flexibility. At the same time, it simplifies cabling and frees up space in the switch cabinet. CNC control is provided by sm motion control. The two companies developed this efficient overall solution in record time.

"Our customers include many successful small and mid-sized suppliers serving very different industries – ranging from automotive and medical technology to electrical engineering. Their machines not only have to deliver high precision: more than anything they have to be reliable," says Andreas Weber, Technical Director at Wolf Maschinenbau AG in Brackenheim, just a few miles from Heilbronn. Other factors have also gained increasing importance in recent years, such as energy efficiency and rapid retooling for small batch sizes.

With 35 employees, Wolf Maschinenbau builds state-of-the-art rotary and linear transfer machines together with matching peripheral equipment. Users benefit from compact, flexible, and high-precision machines that can process metallic rings and bar stock, turned parts, tubes, and even cold-extruded components. "Our scope of services covers the development, design, production, sales, and maintenance of these customer-specific automation solutions," Weber explains. "The trend toward customization clearly plays to our strengths as a builder of special machines."

One example is the Wolf TSM 280 rotary indexing table machine, a highly flexible production unit for complex manufacturing processes. The indexing table advances workpieces from one station to the next, where stationary, non-rotating parts are machined simultaneously by powered tools. The modular design allows processes to be configured to meet individual

requirements. “The machine can be set up quickly and provides excellent accessibility for tool changes,” Weber adds. “This enables users to produce a wide range of different parts on the same machine.” At its core is a vertically arranged clamping table with either eight or sixteen hydraulically actuated workpiece holders.

The right partners on board

“At Wolf Maschinenbau, we carry out a high level of in-house production – from the machine base frames to the individual assemblies – essentially everything that comes into contact with customer parts and needs to be customized,” says Weber. Not everything can be manufactured internally, however. Here the company makes use of selected suppliers – preferably local ones, since they offer better availability. For many years, the company used drive and automation systems from a major supplier, but supply shortages became a problem during the COVID-19 pandemic. At that point, drive specialist AMKmotion stepped in: based in Kirchheim unter Teck about 90 kilometers away, it has been a partner ever since.

Saving space with hybrid drive technology

The new machine generation of the Wolf TSM 280 was to be converted entirely to AMKmotion drive technology. In the previous version, the entire drive and control technology was housed in a switch cabinet. This drove up installation costs and effort, consumed a great deal of space, and in some cases even required two switch cabinets, depending on machine complexity. As such, tailoring to individual needs was difficult to achieve.

“That’s exactly what our hybrid drive technology is designed for,” says AMKmotion expert Fabian Georg, who works with Wolf Maschinenbau. “It’s a combination of centralized and decentralized drive technology.” In this setup, some drive components are installed in the switch cabinet, while others are mounted directly on the machine. The movement of the axes is handled by high-pole synchronous servo motors of the DT series. These are designed for high torque and a high moment of inertia. They are also capable of accelerating larger loads without a gear as a direct drive, thereby boosting the machine’s overall efficiency. In addition, the ihXT3 synchronous servo motor with integrated inverter is used, which is ideal for applications where space is

limited. Equipped with a hybrid cable, it transmits power, STO (Safe Torque Off), 24 volts, and communication data simultaneously, connecting all ihXT3 components in a daisy chain, thereby significantly reducing installation effort.

“The centralized drive technology in the machine is the KE/KW system, which consists of two components,” Georg explains. “The compact power supply KE generates the DC bus voltage and supplies power to the compact inverters KW.” Here, the hybrid distributor KHY simplifies the merging of various signals and supply voltages from the centralized drive system, serving as an intelligent interface between the centralized and the decentralized drive environment. Real-time communication also runs via the hybrid distributor’s smart interface.

In addition, the KHY monitors the DC bus current and the decentralized drive train via an I^2t counter. Its switch-off response can be configured individually. The KHY is daisy-chained to the synchronous servo motors with integrated inverters (ihXT). “We can now build much more compact machines. Even if additional axes need to be controlled, there’s no need for a second switch cabinet,” explains Fabian Georg. “We also completely redesigned the machine’s main axis.” A compact angular planetary gearbox is now installed, replacing the previously more complex bevel spur gearbox.

The perfect partner for perfect control

For the complex control systems in its machines, Wolf Maschinenbau draws on the expertise of sm motion control – a specialist in control technology and system integration. Smaller and mid-sized machine builders in particular benefit from the flexible solutions provided by the company, which is based in Villingen-Schwenningen. “We deliver perfect motion for machines,” says Markus Grimm, member of the executive management team at sm motion control. “Our expertise spans control technology, drive components, and software.” Grimm has implemented numerous projects with AMKmotion account manager Fabian Georg – and this is how the collaboration with Wolf Maschinenbau came about.

“For the TSM 280, we use our smmx.tp15hd controller with an integrated 15-inch color touch panel,” says Grimm: “The controller family is based on an RT Linux operating system with hard real-time properties. We have integrated the open automation platform CODESYS V3 into this, along with our own CNC

core.” It’s a combination that offers clear advantages: the widely used open automation platform CODESYS provides PLC functionality and visualization, while sm motion control’s CNC core makes it possible to integrate not only the standard command set (DIN 66025) but also customer-specific special commands that optimize machine performance or simplify programming. Merging the CNC core with CODESYS creates a shared variable space for PLC, CNC, and visualization. This allows all three functions to be linked simply and directly. Wolf Maschinenbau required each of the up to 16 stations of its TSM 280 to be controlled flexibly via CNC functions. Grimm explains: “We fitted the stations with configurable function units, the so-called CNC units – each with its own programming editor, manual and automatic modes, and program and recipe management.” In the past this would have required 16 individual controllers. The units can be freely configured, depending on features. Grimm’s team was also able to integrate all optional functions – such as web visualization or OPC UA communication – into a single device. This is possible due to the enormous efficiency of the integrated quad-core 1.6 GHz processor.

Development in record time

“Of course we were delighted when Wolf Maschinenbau first got in touch with us,” Grimm recalls. But he was in for a shock when he asked about the timeline: the first machine was to be showcased at EMO in September. “This was in June – just a few weeks before the trade show,” says Grimm. But together with AMKmotion, they managed to implement the project successfully. “The machine wasn’t ready for sale yet, but it was running,” says Fabian Georg, clearly satisfied with the accomplishment. “That alone was remarkable – we developed an entirely new drive system and control technology for a highly complex machine capable of moving up to 34 axes on a footprint of just under 2.5 square meters.”

Service for editorial departments:

Meta-Title: *Wolf Maschinenbau deploys hybrid drive technology by AMKmotion*

Meta Description: *Wolf Maschinenbau AG uses AMKmotion's hybrid drive technology in its rotary and linear transfer machines.*

Challenge: *For the new generation of the Wolf TSM 280, the company set out to completely redesign both the drive and control technology. The goal was greater flexibility while reducing installation effort and the space required in the switch cabinet.*

Solution: *Combined with control systems by sm motion control, AMKmotion's hybrid drive technology not only meets all requirements for flexibility and cost efficiency, it also simplifies cabling and frees up space in the switch cabinet.*

Social media: *Designed for medium to large batch sizes, the new generation of the TSM 280 rotary transfer machine by Wolf Maschinenbau AG delivers not only precision but also smart technology. Thanks to AMKmotion's hybrid drive technology, cabling is simplified and space is saved in the switch cabinet. Control is handled by modern CNC technology by sm motion control. The result: a highly efficient overall solution developed in record time – the first functional model was running within just a few weeks.*

Captions

Image 1: Wolf Maschinenbau relies on hybrid drive technology from AMKmotion for the new generation of the TSM 280 rotary transfer machine.

This combines centralized and decentralized drive solutions to leverage the advantages of both concepts.

Image 2: The combination of centralized and decentralized drive solutions increases both the flexibility and energy efficiency of the machine.

Image 3: The ihXT synchronous servo motors with integrated inverter and hybrid cable connection are optimized for tight installation spaces – and they reduce cabling costs, too.

Image 4: The movement of the axes is handled by high-pole synchronous servo motors of the DT series. including the DT3 and DT4 product lines ...

Image 5: … and the synchronous servo motors of the DT4 series.

Image 6: The servo drive system KE/KW consists of the compact inverter KW and the compact power supply KE.

Image 7: The hybrid distributor KHY serves as the intelligent interface between the centralized and decentralized drive environment.

Image 8: The functionality of the pluggable KW-R controller cards can be tailored precisely to individual application requirements.

Image 9: The TSM 280 features the smmx.tp15hd controller with a high-resolution 15-inch color touch panel.

Image 10: At the heart of the Wolf TSM 280 is a vertically arranged clamping table with eight or sixteen hydraulically actuated workpiece holders.

Image 11: The indexing table advances workpieces from one station to the next, where stationary, non-rotating parts are machined simultaneously by powered tools.

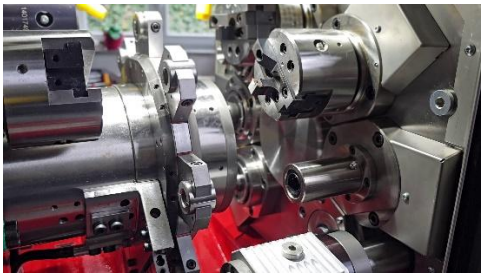

Image 12: Each station of the TSM 280 is controlled flexibly via CNC functions and fitted with configurable function units.

Image 13: The smmx automation controller family by sm motion control: this open automation platform is based on an RT Linux operating system, with CODESYS and a proprietary CNC core.

Image credits – Image 1 to 8: AMKmotion GmbH + Co KG

Image credits – Image 9 to 12: Wolf Maschinenbau AG

Image credits – Image 13: sm motion control gmbh

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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