

Cuts through like a knife through butter

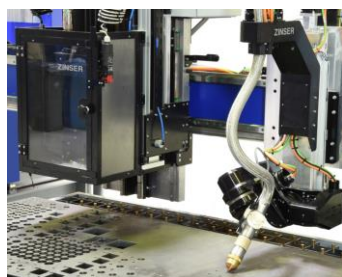
Metalworking: Zinser opts for Kollmorgen servo technology in its CNC cutting center



The ZINSEK 4125 can cope with most metalworking tasks.

Burning mixed gases, flashing arcs, or laser beams: the heat is on when metal plates are taking shape. But the cutting action needs to cut through like a knife through butter, So mechanical engineering companies combine the various processes within their processing centers, while using CNC technology to coordinate tools across three dimensions. As such, the servo drive technology required must support interpolated movement. For that reason, Zinser uses a solution from Kollmorgen, the motion control experts.

Zinser believes its type "4125" portal system can handle most things, because this all-purpose flame-cutting machine can master more than just simple cutting tasks. It can take care of steps which are otherwise performed separately – such as oxy-fuel and plasma cutting, drilling, processing of cylindrical or polygonal tubes, and chamfering of edges – and does so precisely, but without additional handling time. To help it do this, the ZINSEK 4125 has 13 CNC axes, all of which are driven by a Kollmorgen solution combining an [AKD® servo controller](#) and an [AKM® synchronous servo motor](#).



From a mechanical perspective, the high level of precision relies on a combination of motors featuring [planetary gears](#) without additional transition elements. "There are solutions on the market which use toothed belts here for cost reasons. We combine the motor, gears, and linear unit directly," explains Andreas Niklaus, Sales Manager at Zinser. There is a good reason why his company took this strategic decision: dispensing with maintenance-intensive transition elements improves machine availability, extends maintenance intervals, and therefore ensures greater overall productivity and better MTBF figures.

Fast service support

Precise for manufacturing purposes and robust during operation: these are two key criteria for Zinser when designing its machines, half of which are destined for the export market. With this in mind, the company from Albershausen looks for equipment whose technology delivers the required level of accuracy and offers good service quality. Kollmorgen's servo drive technology was scrupulously compared with the competition and managed to impress in both these areas. Two specific aspects, for example, are easy programming and the use of standard cables to connect controllers and laptop. "There is also the fast, expert support provided by Kollmorgen service personnel if we have any technical questions. The chemistry is just right," sums up Niklaus.

Oxy-fuel, plasma, and laser: all three cutting methods use heat to convert sheet metal into the desired shape. The method ultimately used for any given manufacturing job will depend on the type of material and the thickness of the sheets. This is why the ZINSER 4125 has up to 12 torch carriers, so a workpiece can be finished in a single process step. All modules form part of a portal system, which is moved in a longitudinal direction by two synchronized servo axes. The cross member accommodates the other drives, including the switch cabinet – which is suitably narrow.



This design makes it clear why, apart from supposedly "soft" factors such as engineering compatibility or easy servicing, it is also critical for servo drive technology to take up as little space as possible. "The shallow design of the switch cabinet was another key reason why our technicians opted for the AKD servo controllers," emphasizes the manager.

Drive technology with high power density

Since the three cutting methods are thermal processes and given the fact that heat rises, the drive technology must offer a highly effective form of self-ventilation to prevent it failing. During the supplier assessment process, the AKD controllers showed how well they can dissipate lost heat from the compact housing, while still offering high power density. "The advantage for us is that we do not need any air conditioning in the switch cabinet above the torches, or at least not in the more temperate climes of Europe," points out Andreas Niklaus. The synchronous servo motors in the Kollmorgen AKM range also manage to keep a cool head. "They deliver tremendous power, but manage to stay cold," enthuses the Manager when describing how the AKM motors combine power density with a high level of efficiency.



Using braking energy

It's all about efficiency: since in multi-axis arrangements (particularly those belonging to portal systems) there will always be some drives for acceleration and others for braking, a DC intermediate circuit can prove a highly effective means of exploiting regenerative energy. Losses are reduced as a result, and the braking energy does not have to be burnt up across resistors – which would further increase the heat input to the machine.

From an operator's perspective, the good thermal behavior increases profitability by reducing operating costs, extending maintenance intervals, and increasing MTBF times due to the reduced likelihood of failure. The last point represents a key selling point for the machines made in Baden-Württemberg, because flame-cutting machines are generally where bottlenecks occur in the manufacturing process at metalworking firms. Once the machine has done its job, the welders are ready and waiting for the cut parts. "When the system is at a standstill, the business is too," explains Andreas Niklaus in a nutshell, particularly since orders are often still combined at the production planning stage and there is never a stock of cut parts.

Given these requirements in regards to availability, Zinser worked together with Kollmorgen to come up with a suitable after-sales service offer. Replacement parts for the more than 4000 processing centers worldwide will still be readily available ten years after commissioning, which ultimately favor short delivery times. Another requirement is to maximize standardization, with a view to ensuring machinery configurations allow a single controller or motor type to perform several tasks. But the resulting balancing act between minimal variation and highly accurate drive dimensioning raised some challenging design issues at the configuration stage. Andreas Niklaus looks back at the close collaboration with Kollmorgen in this area. Thereafter, the choice of controllers and motors was closely based on the designs provided by Zinser – and this was the case for almost all the standard machines. Kollmorgen's Key Account Management team kept engaged and

provided an interface for in-house development questions, in addition to any issues concerning drive design. "Our machines allow us to perform the tasks our customers want, so we need technology that actually works," says Andreas Niklaus regarding the demands facing his business. "Everything went really well."



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About Kollmorgen

Kollmorgen is a leading supplier of integrated automation and driver systems, as well as related components, aimed at machine manufacturers all over the world. With over 70 years of experience in Motion Control Design and application, as well as its extensive knowledge in the areas of production standards and bespoke solutions, Kollmorgen provides prominent solutions in terms of performance, quality, reliability and ease of use. As a result, our clients gain indisputable leverage in the market. think@kollmorgen.com - www.kollmorgen.in