

Dear Reader,

The Mercedes-Benz Kassel plant in Germany manufactures truck axles using a mobile shuttle pallet network equipped with SEW-EURODRIVE's MOVIGEAR® decentralized drive system to transport the components. It is a genuine mechatronic product that combines the gear unit, motor, frequency inverter, control and communication in one compact housing. Thanks to its optimized overall efficiency, this drive solution is particularly suitable for the energy-efficient operation of horizontal conveyor systems.

To know more about this product and how it might be useful for you, please read the article below.

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Drive technology TODAY

Efficient, smart and safe

Mechatronic drives in automobile production

► Kassel, North Hesse's up-and-coming major city and home to the documenta art exhibition, is not far off the geographical center of Germany. The Mercedes-Benz Kassel plant is located in the city's Rothenditmold district. Truck axles are manufactured here using a mobile shuttle pallet network equipped with SEW-EURODRIVE's MOVIGEAR® decentralized drive system to transport the components.

► In many sectors that use conveying processes, the requirements placed on materials handling systems are becoming more demanding and increasingly specific. Bruchsal-based drive automation expert SEW-EURODRIVE developed its compact MOVIGEAR® drive system in order to meet these needs. It is a genuine mechatronic product that combines the gear unit, motor, frequency inverter, control and communication in one compact housing. Thanks to its optimized overall efficiency, this drive solution is particularly suitable for the energy-efficient operation of horizontal conveyor systems. The field in question covers networked transportation systems with numerous drives and many different individual applications. This includes small machines and simple conveyors requiring a drive that provides a reliable and energy-saving solution that can be simply installed on site.

Shuttle pallet

The Mercedes-Benz plant in Kassel houses the competence center for axle systems and gearing components for manufacturing the axles, articulated shafts and gear sets that form part of many trucks. These components need transporting between different processing stations throughout the plant. For example, gear sets have to be transported 100 m along a decoupling module from the production area to the assembly point. Daimler uses shuttle pallets to transport the gear sets (bevel gear drives and bevel gears) to an assembly line. In total, 26 of these vehicles are driven along the rail system installed in the floor. The busbars for the power supply are also attached to these rails. The vehicles are driven by SEW-EURODRIVE's MOVIGEAR® DBC-B mechatronic drive unit, which



transfers the power via a hollow shaft to a Vulkollan-coated drive wheel. This design enables each 125 kg shuttle pallet to transport material weighing up to 300 kg. The pallet accelerates at 0.5 m/s² to a variable speed of between 1.5 and 18 m/min and positions itself to an accuracy of +/- 1 mm. Professional engineer Stefan Kattner from the sales team in the SEW-EURODRIVE technical office in Kassel explains: "The large setting range of the mechatronic system, with the option of an expanded control range (ECR), offers a significant benefit to the customer."

Safety functions

Each vehicle is equipped with sensors, safety technology and an emergency stop for the integrated STO safety function to PLe according to EN ISO 13849-1. This provides "safe torque off" in accordance with IEC 61800-5-2 by disconnecting the STO input on the MOVIGEAR®. The caravan of vehicles is set into delayed motion using the IPOS positioning and sequence control, which is integrated into the mechatronic drive system. An ultrasonic sensor regulates the distance between the vehicles and the speed levels are modified using adjustable cam trays.

Impressive properties

Whereas external rotor motors were used for similar transportation projects in the past, nowadays Daimler AG opts for decentralized, intelligent drives that also attain the highest energy efficiency class Ie4. The company was looking for a gearmotor with a decentralized inverter that needed to have binary control and be able to regulate distances along the caravan of traffic.

SEW-EURODRIVE developed MOVIGEAR® as a technically highly innovative, decentralized mechatronic drive system. It offers excellent networking features, independently assists with monitoring and maintenance tasks, and helps reduce startup times. The drive unit fulfills all the key requirements with its compact design, binary control, integrated positioning and sequence control system, and integrated STO safety function. In terms of

MOVIGEAR® DBC-B mechatronic drive system – benefits at a glance

The MOVIGEAR® mechatronic drive unit from SEW-EURODRIVE is the next logical step in the development of the economically and technically successful concept of decentralized drive systems. The MOVIGEAR® DBC-B (Direct Binary Communication) is specially designed for stand-alone applications, for example in the automotive sector. DIP switches and potentiometers allow for simple and fast startup without the need for a PC. Parameterized fixed speeds and ramps can be set on the device for applications that require constant speeds. Binary inputs mean the mechatronic drive unit can be controlled using a central PLC or in local or manual mode. There is also an interface for configuration and diagnostics. All MOVIGEAR® units are equipped as standard with an integrated STO safety function compliant with DIN ISO IEC 61800-5-2 (safe stop) for applications that call for safety precautions.

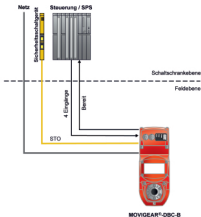
MOVIGEAR® is an intelligent drive system with an integrated control concept. Its excellent networking features reduce startup times and support monitoring and maintenance tasks. The systematic development of all components ensures a high degree of reliability. Furthermore, MOVIGEAR® simplifies plant planning and engineering. The reduced number of variants means lower storage costs, and the high efficiency level of all the components reduces energy costs considerably. The mechatronic drive system's motor, gear unit and electronics are enclosed in a single, compact housing, which can be easily integrated into today's conveyor systems. It also enables new developments to be implemented from a completely new perspective.



maintenance, the quick diagnosis of operational and error states indicated on its LED display is particularly popular. The MOVIGEAR® mechatronic drive unit's fan-free operation, high-grade IP65 protection and smooth surface make it perfectly suited for industrial use in rough environments.

History

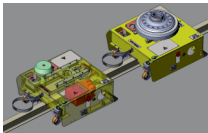
The mobile shuttles for the Mercedes-Benz plant were developed, manufactured and put into operation by Kassel-based company AuE. SEW-EURODRIVE's technical office in Kassel presented its MOVIGEAR® mechatronic drive system to this systems manufacturer at the beginning of 2011. About six months later, AuE conducted its first trial using two prototype vehicles on a test track on its own premises. The results were very promising. "The customer was particularly pleased with the simple startup procedure using DIP switches and correspondingly short time required," explains engineer Stefan Kattner. That September, AuE ordered 26 units from SEWEURODRIVE, and by January 2012 the transportation system was in place. It has continued to operate to the customer's complete satisfaction since the start. "We are currently contemplating expanding the system," Stefan Kattner reveals. "And we have already demonstrated it to other interested parties."



The installation principle of the MOVIGEAR® DBC-B mechatronic drive system with direct binary communication.

Mercedes-Benz plant in Kassel – competence center for axle systems and gear units

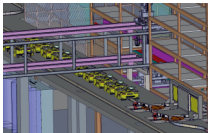
In 1810, Georg Christian Carl Henschel set up a canon and bell foundry in Kassel. The first locomotive went into service here in 1848. The fire-spewing iron horse was named the "Dragon." By 1910, ten thousand locomotives had left the factory gates, and in 1924 Henschel started manufacturing trucks as well. Following the virtual decimation of the Henschel works during World War II, first the locomotive and truck repair service, then also vehicle manufacturing, were reinstated during the post-war years. In 1969, Hanomag-Henschel-Fahrzeugwerke AG was founded in conjunction with Daimler-Benz AG. During the years that followed, the Kassel plant gradually switched from truck manufacturing to axle production. The last flatbed truck rolled off the production line in Kassel in 1980 and axle production reached the five-million milestone in 1989. In 1995, drive trains became an independent division and in 2007 the 435 000 m² plant was renamed "Mercedes-Benz Kassel – a Daimler AG plant." This is where the competence center for axle systems and gear units is based. Nowadays, a workforce of around 2 900 manufactures axles, axle systems for trucks, vans and trailers, and articulated shafts in Kassel. High quality state-of-the-art and environmentally- friendly production processes are used, such as dry processing, laser welding, top coating and cathodic dip priming.



Shuttles are specially constructed to suit the goods they need to transport. They are driven by the MOVISEAR® mechatronic drive unit. The loop at the rear functions as a trigger for the following shuttle pallet's ultrasonic sensor in order to maintain the correct distance. It ensures that the ultrasonic sensor recognizes the shuttle pallet in front without fail – even around bends. (Graphics: AuE)



Higher-level control generates the individual orders. These orders prompt the shuttle pallets to travel to the transfer points, collect workpieces and transport them to the target positions. (Graphics: AuE)



The pallets are driven along a rail system, which also carries bushbars for transmitting the drive power and control strips. (Graphics: AuE)

AuE Kassel – assembly system solutions

The roots of the company now known as AuE – Automation und Engineering – reach back to a special department of the Wegmann Group that was founded in 1980. Following several restructures, in 2001 the company moved into axle assembly and started supplying full assembly lines in 2006. The following year heralded its first assembly lines for gear units and axle components for trucks. In 2009, the operation was renamed AuE Kassel GmbH and incorporated into the Strama-MPS GmbH group of specialist mechanical engineering companies. AuE cooperates closely with its customers in the automotive and supply sector to combine mechanical, electrical and control engineering with higher-level IT and logistics systems for all manufacturing tasks related to axles and traveling gear. The company also specializes in axle adjustment systems, which are now used by all automakers. Furthermore, it provides a comprehensive range of services covering maintenance, repairs, remote maintenance and call-outs.

www.aue-kassel.de