

DaimlerChrysler opts for Control Techniques Drives



More than 800 AC drives, supplied by the Control Techniques Drive Centre in Chemnitz have been installed in the new "Sprinter" production facility in DaimlerChrysler's Ludwigsfelde plant, near Berlin.

All drives above 1.1 kW used in the vast, new factory – which was built specifically for a new model of the Mercedes "Sprinter" – are supplied by Control Techniques. Why? "Programming flexibility and openness are the main reasons", says the Technical Engineer, Mr Wagner. "We had already gained a lot of experience with Control Techniques Unidrive and Commander SE drives on the "Vaneo" project", he explained, "and we particularly liked the Unidrive SP's versatility".

Around 600 Control Techniques drives were used in the "Vaneo" production facility in Ludwigsfelde, and production was optimised by direct communication between PLCs and the drives.

After the decision was made to produce a new Sprinter model in the Ludwigsfelde plant, Unidrive SP was specified as the standard for all applications over 1.1 kW. These included open loop and closed loop applications – for both synchronous motors and induction motors, and all position-controlled axes in the entire facility. This embraces a tremendously wide range of different tasks, from control of conveyor belts, scissor lifts, automated guided transport vehicles and advanced compact storage systems, up to ventilation and extraction systems.

Control Techniques drives control essential functions throughout the three core areas of the facility: body shop, paint shop and final assembly.

In the body shop, the Sprinter bodies are built from preformed sheet metal, using welding robots and a fully-automatic material transport system. Over 200 Unidrive SP drives are used in this area. They are operated in open loop mode for transport tasks (in the buffer store, for example, where up to 86 bodysells are stored temporarily on eleven rails) and in closed loop mode for hoist units. A typical precision application can be seen in the automatic welding cells where two Unidrive SPs, coupled with servo motors are used in a master/slave configuration for the lifting mechanism, synchronised with a third Unidrive SP with Unimotor in position control.

Most of the Unidrive SP drives in the Ludwigsfelde plant are fitted with an application module for additional onboard processing and Interbus communication. Profibus DP or CANOpen bus protocol is used on some axes, this depends on



KEY BENEFITS

- DRIVE OPENNESS & VERSATILITY
- PROGRAMMING FLEXIBILITY
- OPEN & CLOSED LOOP FUNCTIONALITY
- COMMUNICATION OPTIONS



the particular controller type used. Others have an additional encoder module to enable a second transmitter signal, from a laser measuring instrument, for example, to be processed.

Around 200 more drives – rated at up to 110 kW – are used in the Dürr paint shop for ventilation and extraction tasks. Added to this, a number of blowers and pumps for hydraulic axes have to be controlled. Most of these drives run in open loop mode, with Interbus communication links to the corresponding PLCs. Synchronous motors with resolver feedback to the controlling Unidrive SP drives are used in the 15-workstation cathodic electro dip coating plant, not only for forward movement, but also to rotate the body shells within the dip. In this section, Profibus communication is used for all drives, including the open-loop elevator drives.

But the most demanding drive applications are found in the final assembly, where approximately 400 Unidrive SPs are used, in both open-loop and closed-loop mode.

Each of the open-loop transport units in the overhead conveyor system is supplied with DC power for its onboard drive / motor system via a specially designed busbar system that also enables CANbus communication. The Unidrive SP drives were installed using through-panel mounting technology, to keep the control cabinets very shallow.

Automated guided transport vehicles, used for carrying components such as the complete power transmission system of a Sprinter – engine, gearbox, drive shaft and axles - are supplied by induction from conductors laid in the floor. In addition, the 6 Unidrive SP inverters (1.1 to 1.5 kW) are supplied at 500 V DC. Two induction motors are used for movement and steering, whereas two Unimotor type 142 UMD synchronous servo motors are required for the scissor lift, and two Unimotor type 115 UMD motors for trim. Control signals are picked up from feed points let into the floor, so the vehicle is instructed when it should move and which movement profile it should follow. A CANbus/Interbus gateway is located in the interior of the vehicle and communication with all six inverters takes place via Interbus.

Two high density storage systems employ Unidrive SP AC drives for the automated storage / retrieval systems.

A bodyshell storage facility with 198 positions over two tracks and four-high racks is used as a call-off point between the painting and assembly operations, and demands precision movements in three axes. The axes comprise lifting (55 kW), travelling motion (37 kW) and lateral motion (2.2 kW) and are all controlled in closed loop mode with encoder feedback. Additional feedback signals are provided for both longitudinal and lifting axes – a long-range laser for the distance along the rail and an absolute encoder fitted on a wheel of the lifting axis, which both enable monitoring and error correction, where necessary. Any significant deviation between these signals and the position feedback at the motor results in a fault trip.

In the small components storage system, around 10,000 different components are accommodated in four magazines. Two vehicles are used there, each fitted with four Unidrive SP giving 3 axis servo control (18.5 kW for lifting, 11 kW for longitudinal and lateral motion) as well as a small, integral 1.5 kW conveyor for the picking process. Here too, all inverters have an application module for processing and Interbus communication.

"We like the flexibility and openness of the Unidrive SP range. It enabled us to use a standard equipment range for all relevant applications and allowed us to use our own process expertise in the form of a standard user programme".

"To simplify maintenance, we have restricted ourselves to one make and one type of frequency converter for all applications over 1.1 kW, and the system was designed to eliminate long downtimes", says Mr Wagner, in conclusion. "Our experience has shown that the Unidrive SP is very reliable and also very flexible in its configuration."



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