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The Encoder Experts

Automated guided vehicles (AVGs)

Safety through intelligent sensor technology

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5 YEARS WARRANTY

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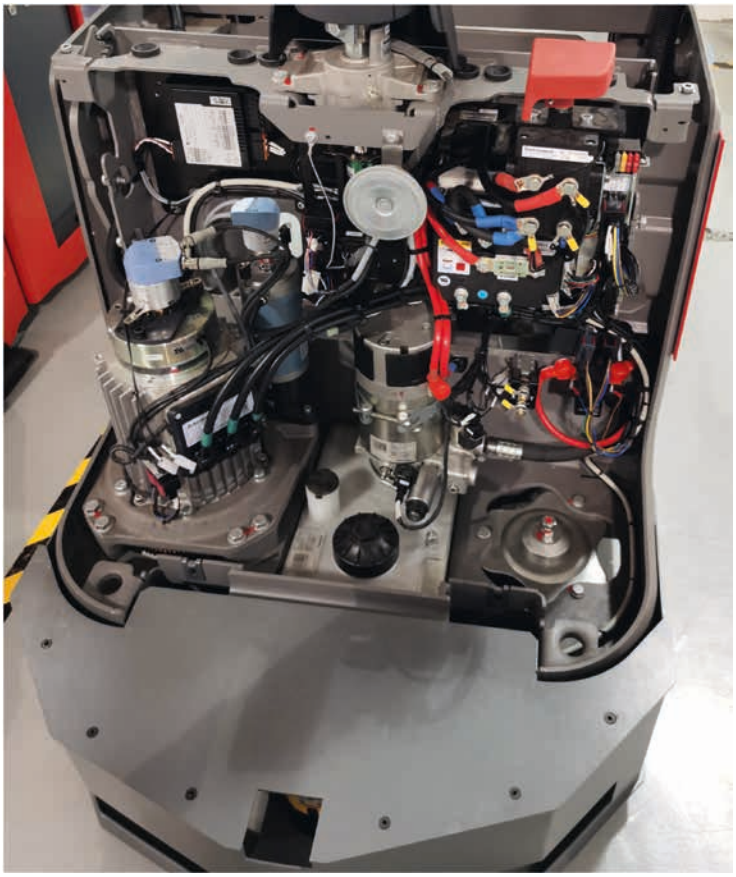
Increase of service life
Optimisation of safety
Reliable speed control
Exact angle of rotation for steering system
Precise height position



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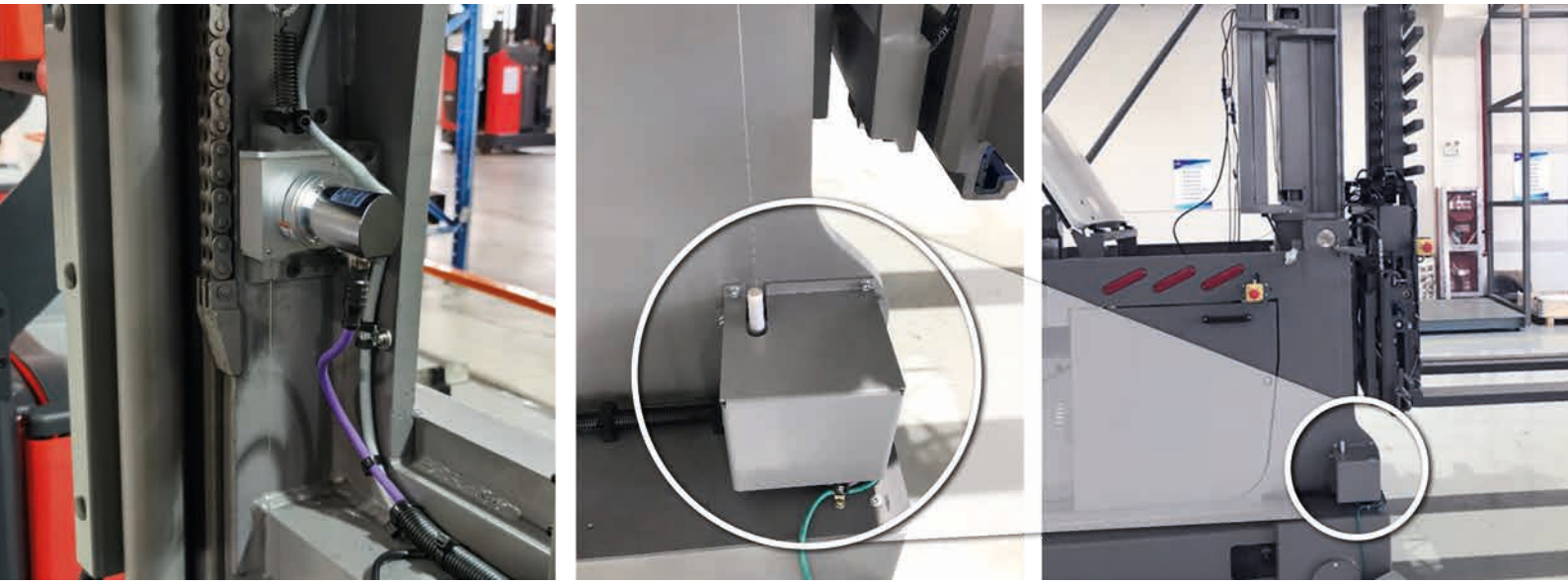

Automated guided vehicles (AGVs)
Safety through intelligent sensor technology

They have long been standard in modern warehouses. The logistics industry is currently experiencing a major upturn as a result of increasing automation and constant technical progress. Using automated guided vehicles is becoming more and more commonplace. Driverless transport vehicles are used when a driver can be removed. Applications include, for example, automated industrial trucks or transporting different goods within a warehouse. This disruptive development will change infrastructure and quality of life worldwide.

Automated Guided Vehicles (AGV) are self-propelled transport systems. They are guided without contact and controlled automatically.

Wachendorff Automation is a specialist in the development of encoders and measurement systems based on these. Wachendorff is a medium-sized, owner-managed company based in the Rheingau near Frankfurt/Main.

Rotary encoders are used in a variety of applications in AGVs. With different encoders that are optimally adapted to the different requirements of autonomous AGVs, many problems can be solved simply and intelligently.

Height Position

Precise positioning of the system is required, for example, to determine the exact height of a forklift truck when filling shelves. With a high-precision SZG165 draw-wire system and a WDGA 36A absolute encoder with lateral cable outlet, the measurement can be integrated into the rail. Position and speed are transmitted via CANopen or a proprietary CAN.

The exact position is determined by the highly accurate QuattroMag® single-turn technology. Using a patented calculation algorithm and four Hall sensors, the singleturn position of a magnetic absolute encoder can be calculated. The measured value is cross-correlated with the reference value to produce a more accurate value. A suitable calculation of the magnetic field generated by a diametrical magnet cancels out any interference from the Hall sensors. This allows the use of magnetic singleturn technology in dynamic and high precision applications.

Figure 1:
SZG165 draw-wire system for precise positioning

Absolute encoders are available in singleturn and multiturn versions. Singleturn encoders can output an exact position within one rotation. Multiturn encoders can also output an exact number of rotations.
The patented EnDra® technology makes it possible to build encoders without a battery or gearbox that can detect and record rotations even in a de-energised state. This is achieved using the proven Wiegand effect.

Speed control
Reliable speed control is essential for an AGV. Depending on the speed, the protective fields of the AGV are also extended. As soon as the protective field is disturbed, the AGV must safely reduce its speed. A WDGI 58A incremental encoder can be used to determine a safe speed value. The encoder is mounted directly on the wheel and the values are compared with the controller. Wachendorff also offers redundant incremental encoders with integrated optical and magnetic independent sensor systems.

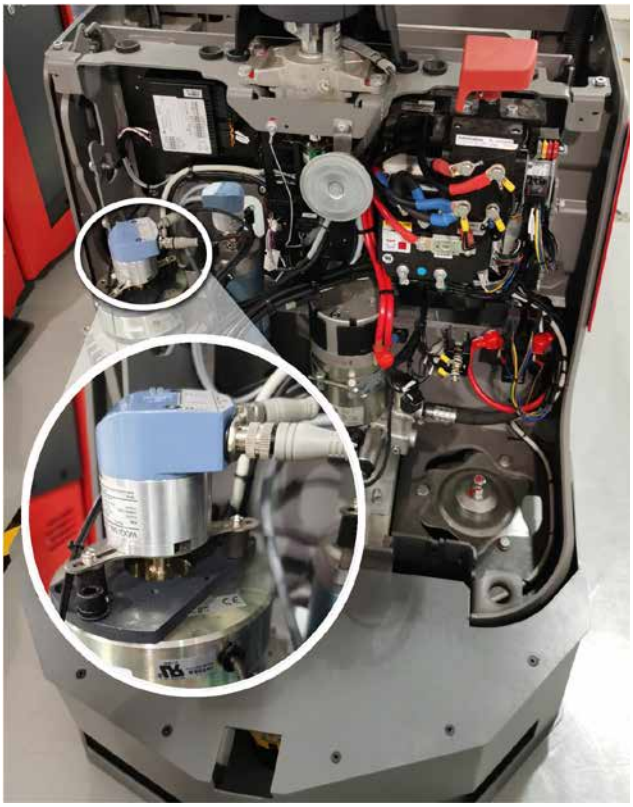

Figure 2:
Redundant encoder WDGR 58B for speed detection.

The diversity of the WDGR 58B encoder provides two independent signals that are matched in the control system. The combination of the measuring principles of a magnetic and an optical encoder increases reliability. The encoder has a high immunity to interference and can withstand high bearing loads. With the redundant encoder, signal generation and power supply are completely independent. The redundancy gives the encoder a multi-channel capability, which provides two values. This provides a hardware fault tolerance of one. The system is therefore safer than a standard encoder and less expensive than two standard encoders. The multiple redundancy protects against a common cause of failure (CCF). The advantage of redundant encoders is that the required level of safety can be achieved with the appropriate concept and safety control.

Angle of rotation
The correct angle of rotation of the steering system is important for precise steering of the autonomous vehicle. The space-saving WDGA 58E absolute hollow shaft encoder is mounted on the head of the steering motor to continuously measure the angular position of the steering wheel. Depending on the concept, one signal is enough, for example CAN or PROFINET, which is synchronised with the distance sensors for the safety of the environment. The use of a redundant encoder is also possible.
The high bearing loads of Wachendorff encoders are particularly in demand when the user envisages connection to a gear wheel.
The sizes are very compact and the variants are easy to implement for precise adaptation even to small installation dimensions.
By using a Field Programmable Gate Array (FPGA), Wachendorff‘s Universal-IE encoder can activate an Industrial Ethernet protocol via a web server. The choice is between the three most common protocols such as PROFINET, EtherCAT and Ethernet/IP. By using a single hardware for all protocols, the user has maximum flexibility. Future updates can also be imported via the integrated web server. Protocol selection is quick and easy.

Figure 3:
WDGA 58E for detecting the angle of rotation of the steering motors.

The increasing level of automation is a challenge for many operators. Wachendorff's value promise is high-precision, flexibly mountable and compact encoders. Their robustness and high vibration resistance make them highly reliable. These technical features make them ideal sensors for use in AGV driverless transport systems.

Any Questions? Just call us at +49 (0) 67 22 / 99 65 414, send us an E-Mail to support-wa@wachendorff.de or call your local distributor: **www.wachendorff-automation.com/distri**

WACHENDORFF
The Encoder Experts

Wachendorff Automation GmbH & Co. KG
Industriestrasse 7 • D-65366 Geisenheim

Tel.: +49 (0) 67 22 / 99 65 - 25
E-Mail: sales-wa@wachendorff.de
www.wachendorff-automation.com

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