

VISIONS

AUTOMOTIVE

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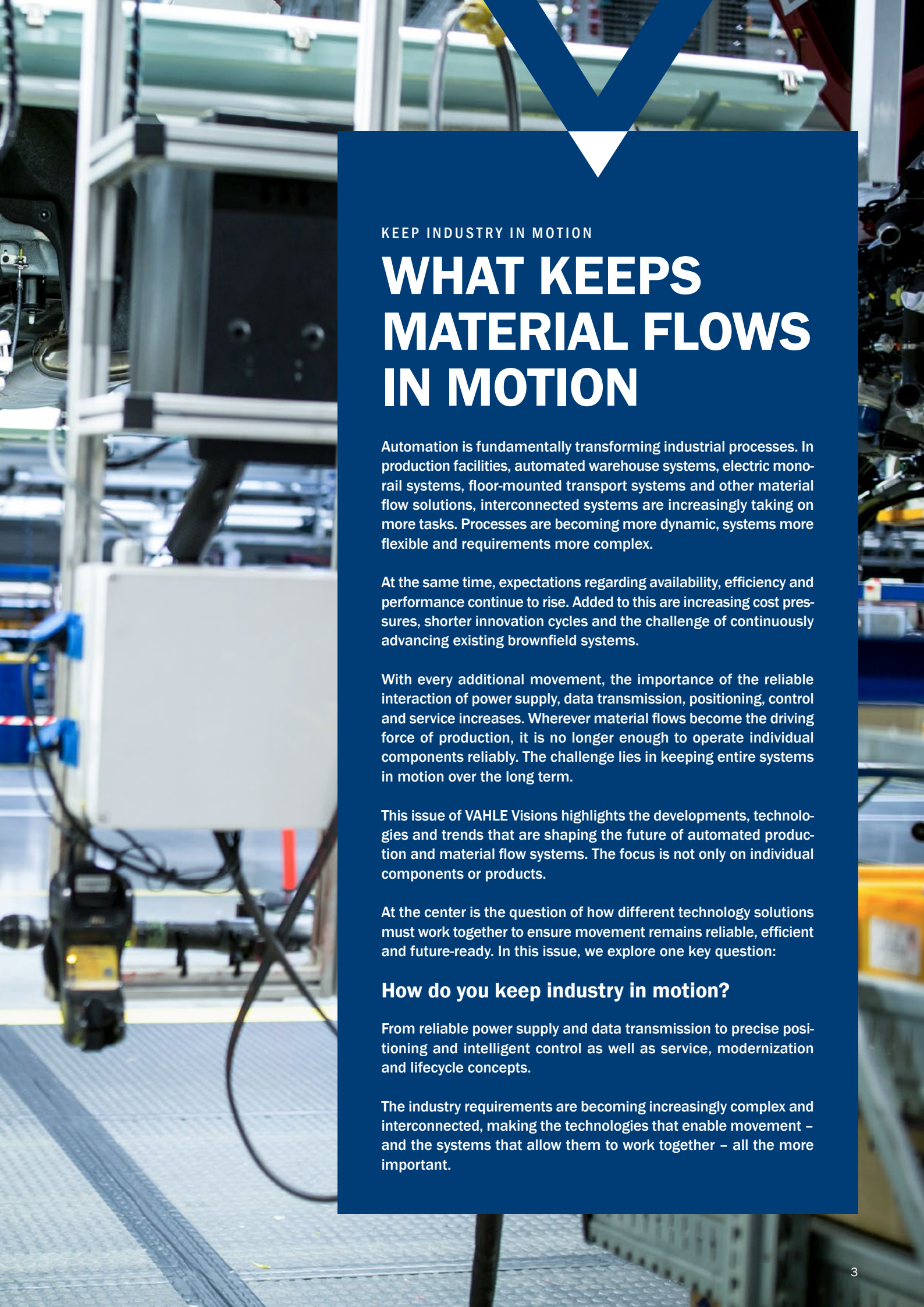
NO. 9



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KEEP INDUSTRY IN MOTION

WHAT KEEPS MATERIAL FLOWS IN MOTION

Automation is fundamentally transforming industrial processes. In production facilities, automated warehouse systems, electric mono-rail systems, floor-mounted transport systems and other material flow solutions, interconnected systems are increasingly taking on more tasks. Processes are becoming more dynamic, systems more flexible and requirements more complex.

At the same time, expectations regarding availability, efficiency and performance continue to rise. Added to this are increasing cost pressures, shorter innovation cycles and the challenge of continuously advancing existing brownfield systems.

With every additional movement, the importance of the reliable interaction of power supply, data transmission, positioning, control and service increases. Wherever material flows become the driving force of production, it is no longer enough to operate individual components reliably. The challenge lies in keeping entire systems in motion over the long term.

This issue of VAHLE Visions highlights the developments, technologies and trends that are shaping the future of automated production and material flow systems. The focus is not only on individual components or products.

At the center is the question of how different technology solutions must work together to ensure movement remains reliable, efficient and future-ready. In this issue, we explore one key question:

How do you keep industry in motion?

From reliable power supply and data transmission to precise positioning and intelligent control as well as service, modernization and lifecycle concepts.

The industry requirements are becoming increasingly complex and interconnected, making the technologies that enable movement – and the systems that allow them to work together – all the more important.

MORE THAN ENERGY TRANSMISSION

THE FOUNDATION OF EVERY MOVEMENT

When processes are in motion and automation drives efficiency, reliable power is critical for success.

For more than 100 years, VAHLE has been developing technologies for power transmission in mobile industrial applications. What once began with conductor rails for crane systems now forms the foundation of countless material flow and production systems around the world.

Whether it is an electric monorail system, floor conveyor system, automated warehouse or automated guided vehicle system: without a reliable power supply, movement comes to a standstill.

But modern applications place ever-increasing demands on technology. Systems are becoming more dynamic, processes more flexible and expectations for availability, efficiency and sustainability continue to rise. At the

same time, operators must modernize existing systems, integrate new technologies and make optimal use of available resources.

Modern energy transmission must therefore deliver far more than power supply alone. It must adapt to a wide range of applications, operate reliably and grow with the evolving requirements of industry over the long term.

THE RIGHT SOLUTION FOR EVERY APPLICATION

While each environment is unique and every application has specific needs, one thing always remains the same: energy is required to power movement.



VCL

Compact by design, flexible by concept

The modular VCL conductor system offers maximum flexibility for modern intralogistics applications.

Due to its modular design, it is ideally suited for automated warehouses, shuttle systems and dynamic material flow applications.

For more information, scan the QR code.



U10

Reliability every step of the way

For decades, the U10 conductor rail has been one of the proven solutions for electric monorail systems and floor conveyor systems.

Its robustness and reliability have made it the benchmark for countless applications in continuous material flow worldwide.

For more information, scan the QR code.



CHARGING CONTACTS

Charge when the process allows

Where particularly flexible power transfer is required, charging contacts offer a wide range of applications.

Whether for an automated guided vehicle, a mobile platform or a customized customer application, they enable efficient and demand-based power supply exactly where it is needed.

For more information, scan the QR code.



MORE THAN ENERGY

The requirements may vary. The goal is always the same: delivering power exactly where movement is created. For more than a century, this principle has been at the heart of the VAHLE success story.

At the same time, it is the foundation for everything that goes beyond it today: data communication, positioning, control and intelligent process optimization. Only when all components work together perfectly can the ideal fit for the application be achieved.

THE RIGHT SOLUTION FOR EVERY APPLICATION

NO TWO SYSTEMS ARE ALIKE

Production lines, electric monorail systems, floor conveyor systems, automated warehouses and automated guided vehicles place different demands on energy supply, communication, positioning and control. At the same time, expectations regarding efficiency, availability and flexibility continue to rise. Operators must continuously optimize existing processes and seamlessly integrate new technologies.

FOUR BUILDING BLOCKS. ONE GOAL.

Because success is not determined by individual components but by their perfect combination.

Every application is different. That is why VAHLE does not rely on standard solutions but on the intelligent interaction of energy transmission, data communication, positioning and control. Guided by the principle "Generate the Perfect Fit" solutions are created that are precisely tailored to the requirements of each individual process.



ENERGY TRANSMISSION

Reliable energy transmission for mobile applications

From conductor rails and conductor systems to charging solutions for mobile systems, VAHLE ensures that energy is reliably available wherever movement takes place.



DATA COMMUNICATION

Secure communication for connected processes

Material flows are becoming smarter. As a result, requirements for the reliable exchange of information between vehicles, systems and control systems continue to increase.



POSITIONING

Precise positioning for controlled processes

Automated processes require exact position data. It forms the foundation for safe movements, repeatable processes and maximum process reliability.



CONTROL

Intelligence for coordinated processes

Only the interaction of energy, data and positioning enables the reliable control of complex material flow applications.

NEW GENERATIONS. MORE POSSIBILITIES.

DIGITALIZATION ON THE

Communication, positioning and digitalization continue to evolve.



SMG 2.0

The next generation of industrial communication

SMG 2.0 is VAHLE's next generation of industrial communication. The new platform supports increasing data volumes, meets future security requirements and enables the gradual modernization of existing systems.

Highlights at a glance

- Future-proof platform for next-generation communication standards
- Up to 1 Gbit/s for data-intensive applications
- CRA*-ready and Secure Boot for enhanced cybersecurity
- Gradual migration without production interruptions
- Mixed operation with existing SMG systems possible
- Ideal for retrofit projects and protecting existing investments

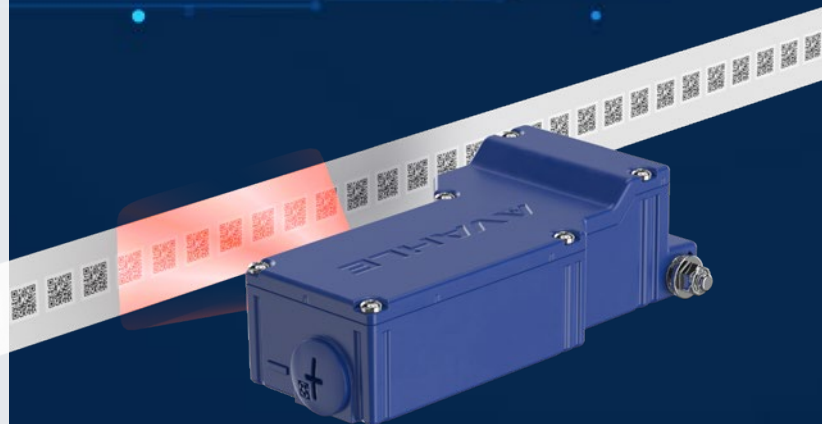
APOS OPTIC 2.0

The next generation of optical positioning

APOS Optic 2.0 combines the highest positioning accuracy with a modern platform architecture. Users benefit from maximum investment protection, easy integration and a powerful foundation for future automation solutions.

Highlights at a glance

- Up to 5 times greater tolerance range for maximum installation flexibility
- Full compatibility with existing APOS systems and code bands
- Absolute positioning over distances of up to 10 km
- Retrofit-ready for modernization projects
- High system availability through blind spot compensation and excellent interference resistance
- Compact integration into PROFINET and SSI control architectures



NEXT LEVEL



APOS MAGNETIC GLIDING 19-BIT

Absolute positioning over more than 2 km of travel

With APOS Magnetic 19-Bit, VAHLE expands its positioning portfolio with the next generation of magnetic positioning technology. The system combines maximum robustness with absolute positioning over distances of more than 2,000 meters and ensures maximum system availability even under demanding industrial conditions.

Highlights at a glance

- Absolute positioning over distances of up to 2,000m
- Position values immediately available without a reference run
- Reliable operation in dust, dirt and environments with optical interference
- Integrated diagnostics and configuration functions

POWERNET

The simplest connection between power and data

PowerNet enhances existing conductor rail systems with Ethernet-based data communication. This creates the foundation for digitalization and automation without the need to install additional data infrastructure.

Highlights at a glance

- Data transmission via conductor rails
- No additional data infrastructure required
- Reduced installation effort and costs
- Plug-and-play for rapid integration
- Ideal for retrofit and modernization projects
- Combination of power, data and positioning in a single system



Ready for the next generation of automation?

Discover how SMG 2.0, APOS Optic 2.0, APOS Magnetic 19-Bit and PowerNet can make your processes more efficient. Contact us today. Scan the QR code or visit vahle.com/request





AVAILABILITY THROUGHOUT THE ENTIRE LIFECYCLE

SERVICES FOR LONG-TERM SYSTEM AVAILABILITY

A high-performance system must do more than function at the time of commissioning. What matters is its long-term availability throughout the entire lifecycle. Especially in automated production and intralogistics processes, unplanned downtime can have a significant impact on productivity, delivery performance and profitability.

At the same time, requirements for availability, transparency and efficiency continue to increase. Operators face the challenge of reliably running existing systems, strategically planning maintenance activities and protecting investments over the long term. VAHLE Lifecycle Services help companies maintain system performance, minimize downtime risks and ensure sustainable system availability.

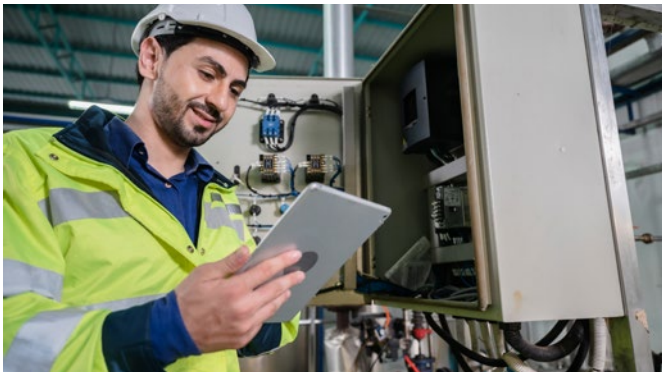
LIFECYCLE SERVICES

No two systems are the same. That's why VAHLE offers fully customizable lifecycle services as part of our portfolio. Individual services can be combined as needed or implemented as a comprehensive service concept.

- | | |
|--|--|
| <p> Installation & commissioning
Professional commissioning and expert integration of new systems.</p> | <p> Spare parts & after-sales service
Fast availability of relevant spare parts and long-term support for installed systems.</p> |
| <p> Inspection & maintenance
Regular inspections and preventive maintenance to ensure availability and system performance.</p> | <p> Support & troubleshooting
Expert support for malfunctions, technical questions and optimization opportunities.</p> |
| <p> Cleaning & condition analysis
Targeted cleaning and condition assessment as the foundation for reliable operation.</p> | <p> Modernization & retrofit
Technological modernization of existing systems to ensure future readiness and protect investments.</p> |

VAHLE PROTECT: PREDICTABLE SERVICES FROM THE MANUFACTURER

As a manufacturer with extensive system and application expertise, VAHLE understands the requirements of its solutions down to the last detail. With VAHLE Protect, inspection, maintenance and service activities can be planned and performed on a regular basis. This creates structured service intervals that reduce unplanned downtime, extend system life and support long-term availability.



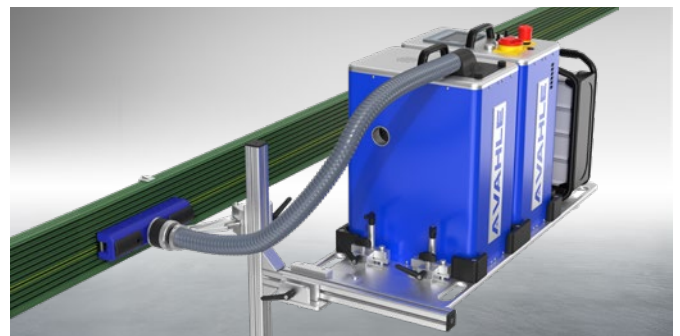
MONITOR. MAINTAIN. OPTIMIZE. From traditional service to data-driven maintenance

- Transparency into the condition of critical system components through digital monitoring solutions
- Early detection of changes and maintenance requirements
- Targeted planning of measures to improve availability and operational reliability

RAIL CARE

Clean systems. Reliable performance.

- Removal of deposits and contamination to maintain system performance
- Manufacturer-developed cleaning and service concepts tailored to the application
- Preservation of the optimal condition of components and systems



MONITOR & PREDICT

Detect early. Make informed decisions. Plan with confidence.

- Continuous monitoring of relevant operating and condition data
- Early detection of changes and potential risks
- Predictive planning of maintenance and service activities
- Documented wear and service life analysis including manufacturer recommendations from VAHLE

Because no one knows your systems better than the manufacturer

With VAHLE Protect, you benefit from our manufacturing expertise to sustainably ensure system availability and make service planning predictable. Scan the QR code or visit vahle.com/globalservice, enter your system information and request your customized manufacturer-supported service concept.



RETROFIT FOR THE NEXT MOVE

MAKING EXISTING SYSTEMS FUTURE-READY

**The question is not always: How do I keep my system running?
Sometimes the question is: How do I bring my system up to date?**

A HOLISTIC RETROFIT INSTEAD OF AN ISOLATED SOLUTION

Production and logistics systems often have long life cycles. At the same time, technologies, processes and requirements continue to evolve. In many cases, a complete replacement of the system is neither necessary nor economically viable.

Today, retrofitting means far more than replacing individual components.

Modern production and material flow systems consist of a wide range of interconnected control, communication and automation components. When individual areas are modernized, interfaces between legacy and new technologies often emerge, creating additional integration effort.

The new IC-PCM module expands VAHLE's holistic retrofit approach.

The solution enables the modernization of existing VSC1 control systems and opens up new possibilities for system retrofits by addressing both the mobile and stationary control side. This is achieved by expanding the existing communication methods, half-wave and Power-CAN-Bus (PCB), with pulse code modulation (PCM).

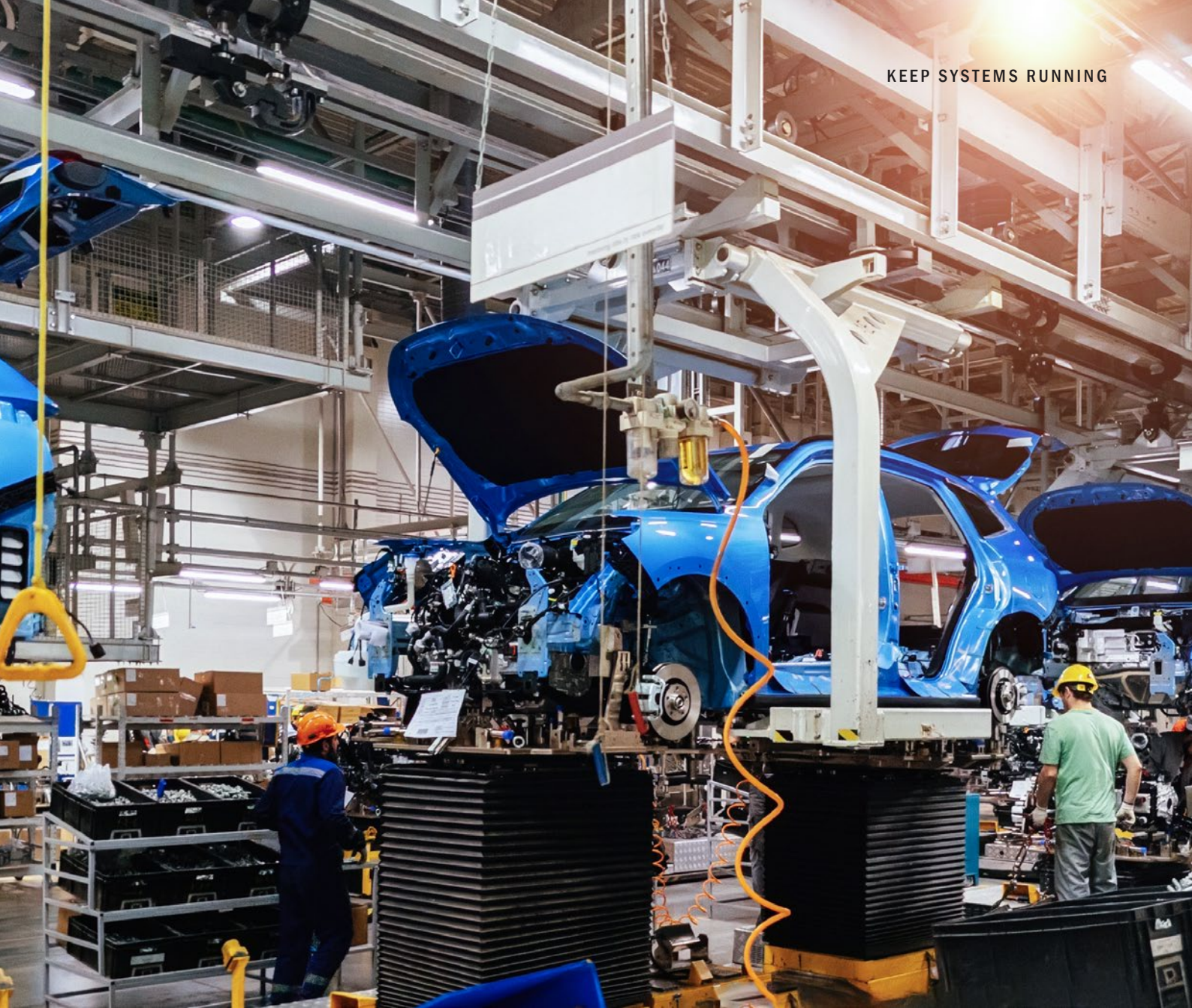
As a result, single-axis control systems can be modernized in a future-proof manner while existing systems can be flexibly adapted to current requirements. Instead of modernizing individual components in isolation, both sides of the application can be developed together and technologically aligned. This creates a retrofit concept that focuses not only on individual assemblies but on the entire control architecture.



IC-PCM MODULE

The bridge between today and tomorrow

- Retrofit solution for the gradual modernization of single-axis control systems
- Modernization of the mobile and stationary control side by extending the communication methods half-wave and PCB with PCM
- Seamless integration of new functions into existing systems
- Future-ready technology without replacing the entire infrastructure
- Efficient migration to modern control and communication standards
- Maximum utilization of existing systems with minimal investment requirements



THE KEY ADVANTAGE

A holistic retrofit approach makes it possible to systematically enhance existing systems instead of replacing them completely. This allows current technologies to be integrated, investments to be protected and the performance of existing applications to be sustainably improved.

Retrofitting therefore becomes an essential component of modern lifecycle strategies and provides the foundation for high-performance production and material flow systems over the long term.

Benefits of retrofitting include:

- Modernizing existing systems in a targeted manner
- Integrating current communication and control technologies
- Considering mobile and stationary control components together
- Reducing media discontinuities between legacy and new technologies
- Improving performance and availability
- Protecting investments over the long term

Existing systems. New possibilities.

Retrofitting should not end with the replacement of individual components. With the IC-PCM module, for example, you can create the foundation for the targeted modernization of existing control systems. Want to learn more about your retrofit options? Scan the QR code or visit vahle.com/request



ENERGY. DATA. POSITIONING. CONTROL. SERVICES.

EVERYTHING THAT MAKES MOVEMENT POSSIBLE

Automated production and material flow systems place high demands on power supply, data communication, positioning, control and availability.

Each of these technologies fulfills an important role. However, their full potential can only be realized when they work together.

VAHLE combines these building blocks into an integrated portfolio for a wide range of applications in production and intralogistics. Whether it is an electric monorail system, floor conveyor system, automated warehouse or automated guided vehicle:

The perfect fit is created where technologies work together seamlessly.



**ENERGY
TRANSMISSION**

**DATA
COMMUNI-
CATION**

**VAHLE
360°
Portfolio**

POSITIONING

KEEP INDUSTRY IN MOTION

LET'S FIND YOUR PERFECT FIT TOGETHER

Successful material flows are created where technologies work together seamlessly. Together, we develop the right combination of solutions for energy transmission, data communication, positioning, control and lifecycle services, tailored to your specific application and supported throughout the entire lifecycle.



Request information with no obligation today!
Scan the QR code or visit vahle.com/request



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IMPRINT

PUBLISHER | Paul Vahle GmbH & Co. KG (left side)
REPRESENTED BY | Paul Vahle Verwaltungs GmbH (Managing and personally liable partner), this represented by Dipl.-Ing. Achim Dries (Managing Director)
REGISTRATION IN THE COMMERCIAL REGISTER | Register court: Local court Hamm, Registration number: HR B 4495
RESPONSIBLE FOR CONTENT | Dr. Andreas Jung, Paul Vahle GmbH & Co. KG (left side)
TEXT & DESIGN | Paul Vahle GmbH & Co. KG (left side)
PRINT | Druckerei Schmidt, Ley + Wiegandt GmbH + Co. KG, An der Wethmarheide 36, 44536 Lünen

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