

VISIONS

INTRALOGISTICS

| NO. 7



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RETHINKING INTRALOGISTICS

EFFICIENCY ALONG THE ENTIRE LINE

Dear readers,

intralogistics is undergoing a profound transformation: Automated Guided Vehicles (AGVs) are taking over more and more tasks, systems are operating nearly around the clock and, at the same time, expectations for flexibility, availability and efficiency continue to rise. To keep modern material-flow processes stable, more than isolated solutions are required — well-designed overall concepts are needed that combine energy transmission, data communication, control systems and service throughout the entire lifecycle.

In this issue, we show how process-integrated charging strategies can increase the productivity of AGV fleets, prevent downtimes and significantly improve cost efficiency. We also highlight why holistic system partnerships — from planning to operation through modernization — are now essential for successfully addressing the growing challenges in intralogistics. From modern charging infrastructures to innovative service models and data-driven predictive maintenance, we provide insights into technologies that offer true future-readiness for facility operators.

Enjoy reading and discovering!

Your Vision. Our Solution.



ENERGY SUPPLY THAT KEEPS PROCESSES STABLE

AGVs IN 24/7 OPERATION: USING ENERGY SMARTLY, AVOIDING DOWNTIME

Automated Guided Vehicles (AGVs) take on central tasks in today's modern logistics and production environments. To reliably fulfill their transport orders, a dependable and predictable energy supply is essential. In practice, however, bottlenecks occur repeatedly, delaying the material flow. Unplanned stops in particular significantly increase organizational effort and have a direct impact on the entire process.

Some of the biggest challenges include energy bottlenecks during peak times, the complex planning of charging windows and increasing demands on system availability. If an AGV fails, the fleet must be scaled up accordingly so vehicles can be taken out of operation for charging.

At the same time, larger batteries increase vehicle weight and costs, while maintenance requirements at mechanical contact points or plug-in connections grow. In many applications, system operators aim for uptime rates above 99 percent. Every charging interruption and maintenance activity

must therefore be carefully planned — or avoided altogether — to keep the transport process running without disruption.

Process-Integrated Charging Infrastructure: Increasing Productivity, Reducing Fleet Size

Simulation results show that the type of energy supply has a direct impact on the performance of AGV fleets. In the analysis of an industrial project, fleet productivity was increased by up to 50 percent, while the required fleet size was reduced by around 30 percent at constant throughput.¹⁾

This makes one thing clear: A process-integrated charging infrastructure increases productivity because vehicles can recharge during natural waiting times, eliminating the need for additional vehicles. To keep the material flow consistently stable, companies must choose the right charging strategy. The following sections take a closer look at the two established approaches — continuous charging and opportunity charging.

CONTINUOUS CHARGING OR CHARGING PAUSES – TWO PATHS TO MAXIMUM AVAILABILITY

When it comes to powering Automated Guided Vehicles (AGVs), two strategies have become established, each offering different advantages depending on the application. The optimal solution is determined by the interplay of availability requirements, layout, process dynamics and available charging windows – and ultimately defines the efficiency of the entire system.



Continuous Charging

How it works

Vehicles are supplied with energy while in motion, typically via inductive primary cables embedded in the floor that generate an alternating magnetic field. A pickup on the vehicle receives the energy contactlessly. This allows AGVs to recharge during operation without stopping for charging breaks.

The result is high availability and an uninterrupted material flow. This approach is especially suitable for fixed, clearly defined travel paths where smooth operation is the top priority.

Advantages

- Maximum operational reliability
- Uninterrupted processes
- Lower requirements for buffer batteries



Opportunity Charging

How it works

Here, vehicles charge in a targeted way at stationary charging contacts whenever the process naturally provides stopping points – for example, at transfer stations, buffer zones or waiting areas. Energy is transferred via robust contact surfaces.

This solution is particularly suitable for dynamic environments where travel routes remain flexible or are frequently adapted. At the same time, investment costs are manageable and the infrastructure can be expanded easily.

Advantages

- Flexible adaptation to changing layouts
- Manageable investment costs
- Simple expansion



Decision Criteria

- **Vehicle utilization:** How frequently are the AGVs active?
- **Layout flexibility:** How dynamically do routes and process stations change?
- **Availability targets:** What operating times and level of reliability are required?

These criteria help determine whether continuous charging or opportunity charging is the better fit for a given application. Depending on the requirements, different technical implementations emerge.

The following sections present proven solutions that efficiently support both strategies.

Further Insights: Deepen Your Knowledge

You can find additional information on this topic on the VAHLE Knowledge Blog: "AGVs in Continuous Operation: Continuous Energy or Charging Pauses?". Scan the QR code or visit: vahle.com/en/knowledge-blog/charging-solutions-agv



TWO PROVEN APPROACHES

CONTACTLESS POWER SUPPLY WITH CPS®140 AND CHARGING CONTACTS

VAHLE supports companies in reliably and durably supplying energy to their Automated Guided Vehicles (AGVs). Depending on the process, environment and requirements, different solutions are used: contactless charging via the CPS®140 system and point-based charging via charging contacts.



Contactless Power Supply with CPS®140

CPS®140 enables contactless energy transmission along a primary cable. A pickup on the vehicle absorbs the energy and converts it into the appropriate DC voltage via a controller.

The system operates inductively and works entirely without mechanical contact surfaces. This avoids abrasion and contamination, significantly reducing maintenance requirements.

- ⊕ Compact design with considerably more power than comparable solutions
- ⊕ Minimal metal-free zones simplify the integration of CPS®140 into AGV applications
- ⊕ Optionally available as a UL-certified version and compliant with SEMI standards S2 and S23
- ⊕ Proven long-term robustness against environmental influences
- ⊕ Continuous energy supply enables smaller buffer batteries and reduces the need for charging breaks
- ⊕ The primary cable can additionally serve as a guidance track – ideal for complex layouts



Charging Contacts for Process-Integrated Charging Pauses

VAHLE charging contacts provide a robust and durable solution for intermediate charging during operation. They consist of a permanently installed contact plate and a current collector on the AGV.

Energy transmission occurs at standstill and enables short, reliable charging processes. Charging contacts are especially economical and flexible in dynamic logistics environments or in facilities with frequent layout changes.

- ⊕ Transmission voltages from 12 V to 80 V for a wide range of applications
- ⊕ Broad product range from small contact surfaces to high-performance variants for high currents
- ⊕ Available as drive-on, drive-over or pressure-activated contacts
- ⊕ Industrial-grade design optimized for robust and reliable energy transmission
- ⊕ Optionally UL-certified for increased safety and quality requirements



PRACTICAL APPLICATION AND BENEFITS IN DIRECT COMPARISON

In systems with fixed travel paths and high throughput, the CPS®140 system ensures continuous operation without interruptions: Vehicles recharge while driving and remain ready for use at all times. In more flexible systems, charging contacts are ideal because they can be easily installed, expanded or

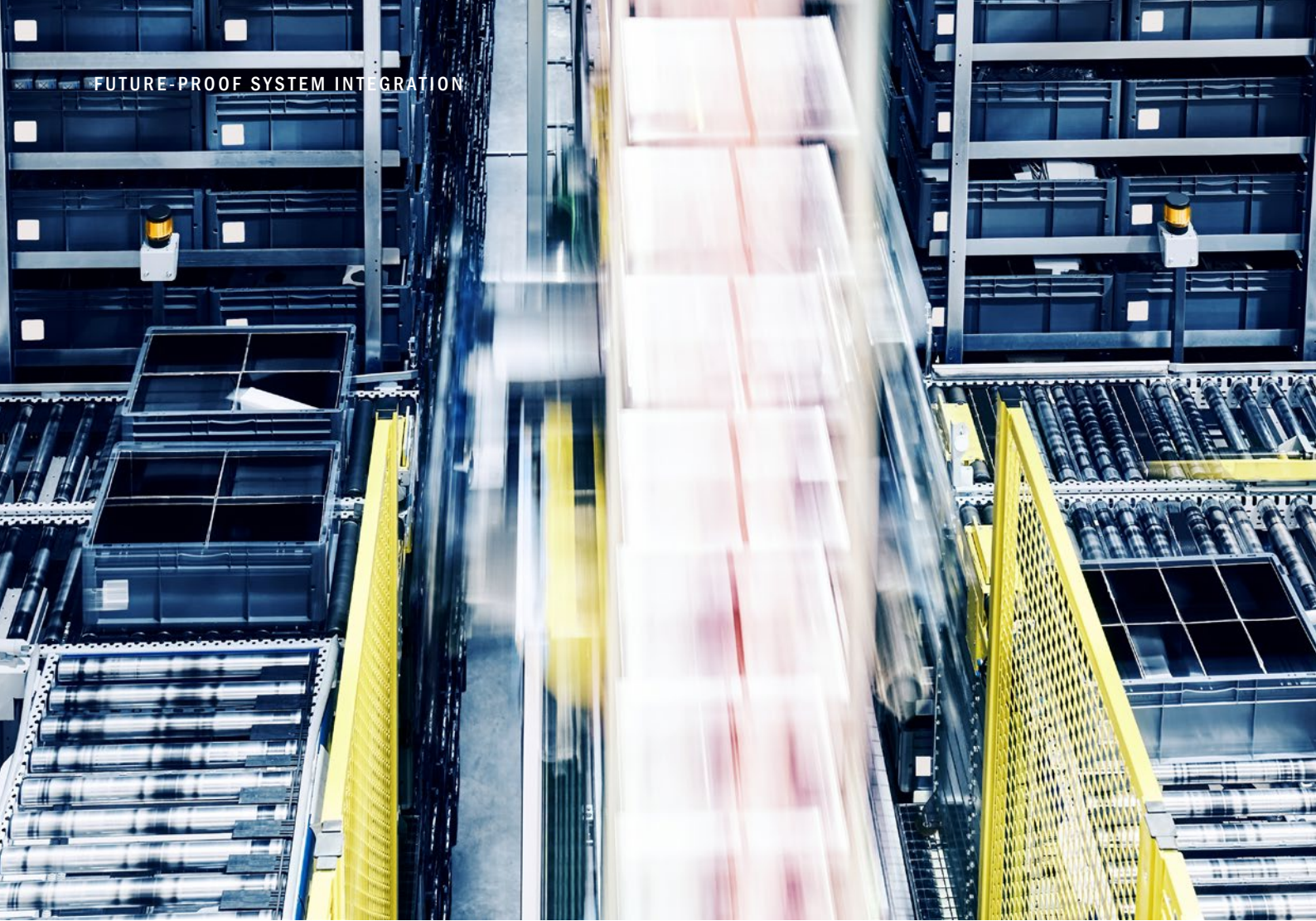
relocated. VAHLE offers both solutions from a single source and adapts them precisely to each application.

With the right charging strategy, downtime can be reduced and operating workflows can be kept stable and efficient.

Individualized Energy Transmission for Efficient AGV Processes

Find the optimal energy supply for your AGV fleet — tailored to your processes, environment and performance requirements. Get expert guidance and receive the solution that fits your operations best. Scan the QR code now or visit vahle.com/request.





NEW REALITIES IN INTERNAL MATERIAL FLOW

HOLISTIC SOLUTIONS FOR MODERN INTRALOGISTICS

Modern intralogistics systems must deliver more than ever before: They are expected to remain ready for operation at all times, respond flexibly to peak loads and integrate seamlessly into digital processes.

At the same time, operators face pressure to use resources efficiently and safeguard investments over the entire lifecycle of the system. Several developments are shaping these requirements.

Increasing Automation & Throughput
Analyses show that the global market for warehouse automation is growing by more than 10 percent per year through 2030. This growth is fueled primarily

by booming e-commerce, ongoing skilled-labor shortages and modular robotics solutions.¹⁾

Longer Operating Times of Existing Systems

High utilization is leading to postponed modernization projects. This builds up modernization backlogs that can introduce significant risks.

More Complex Interfaces

Energy, data and control technologies are becoming increasingly interconnected, while subsystems vary in age or originate from different manufacturers. This complicates troubleshooting, later expansions and stable operation.

High Costs of Unplanned Downtime

Maintenance and service resources are scarce, while unplanned outages cost an average of around 260,000 USD per hour in industrial environments, according to the Aberdeen Group.²⁾

All of these challenges share one common theme: Isolated perspectives are no longer sufficient. Planning, installation, operation and data-driven system monitoring all influence one another. The future of intralogistics systems therefore fundamentally depends on a holistic approach.

PLAN HOLISTICALLY, OPERATE INTEGRATIVELY, MODERNIZE FOR THE FUTURE

To meet modern requirements, it is no longer sufficient to optimize internal material flow at isolated points. What is needed are comprehensive solutions in which energy transmission, data communication, control and positioning are viewed as components of an integrated system. Three key pillars shape this approach:

Holistic Integration Instead of Subsystem Thinking

When subsystems – from energy supply to sensor technology – are optimally coordinated, systems operate more reliably, disturbances occur less frequently and later expansions become easier to implement. Clear responsibilities help reduce interface complexity.

Professional Support Across All Project Phases

Modern intralogistics does not end with technical handover. Planning, installation, commissioning and training establish the foundation. To ensure long-term reliability, preventive

maintenance, regular cleaning and decisions based on the system's condition are essential. Studies show that this approach can reduce maintenance costs by 18 to 25 percent and cut unplanned downtime by up to 50 percent.³⁾

Future-Ready Modernizations Instead of Complete Replacement

Many systems must be expanded or updated step-by-step without interrupting ongoing operations. Modular modernization solutions bridge old and new technologies, make investments predictable and reduce the risk of failures.

All these measures lead to one clear conclusion: Organizations that understand energy, data and control technology as a unified system – and support it throughout the entire lifecycle – secure the availability, cost-effectiveness and competitiveness of their installations today and in the future.










POWE

COMPREHENSIVE SYSTEM EXPERTISE FOR STABLE INTRALOGISTICS

As requirements continue to rise, isolated optimization is no longer enough. What truly matters is the interplay of all systems — and the ability to manage this interaction throughout the entire lifecycle.

This is where a holistic provider comes into play, bringing together all relevant disciplines so that systems are not merely functional but are developed as an integration solution. The result: Less coordination effort, faster decisions and more reliable operation. Several layers are essential here:

-  **Application expertise**
Specialized knowledge of intralogistics applications, particularly in energy, data, positioning and control
-  **Project management competence**
For smooth execution across all processes
-  **Modernization & retrofit**
A technical sparring partner who adapts systems flexibly to new requirements
-  **Installation & commissioning**
Everything from a single source — with no losses due to interface gaps
-  **Preventive maintenance & cleaning**
To preserve the system's performance over its entire lifetime
-  **Predictive Maintenance**
For full transparency regarding system condition

-  **Service and maintenance contracts**
With clearly defined processes and response times that provide reliability

VAHLE takes on exactly this role. With a broad technology portfolio, deep application know-how and many years of experience in intralogistics, VAHLE supports system builders and operators from planning to modernization. For us, the top priority is ensuring that systems remain stable and reliable throughout their entire lifecycle.

More Than Technology: POWER ON Throughout the Entire Lifecycle

A high-performance system is created through dependable support during operation. VAHLE Service & After Sales supports all phases of a system's lifecycle — from commissioning and preventive maintenance to modernization and data-based optimization. This minimizes downtime, extends service life and secures cost-effectiveness.

VAHLE's Smart Collector is a central component for predictive maintenance.

POWER ON with VAHLE for Your Intralogistics

Scan the QR code and use our contact form at vahle.com/request – we will provide personal guidance tailored to your requirements and possibilities.



RUN

PREDICTIVE MAINTENANCE AS A FUTURE-ORIENTED SERVICE MODEL

In modern intralogistics systems, it's not only speed and precision that matter — systems must also respond flexibly to changing market conditions. To achieve this, a holistic view of the entire lifecycle is essential. Only when energy transmission, data communication, control systems and service work together seamlessly can a system remain stable, reliable and economical in the long term.

A central building block of this approach is the Smart Collector. This intelligent current collector is equipped with 3D motion sensors and an optional thermal sensor, enabling real-time monitoring of the condition of conductor systems as well as movement-relevant components. Deviations are detected immediately, wear becomes visible and precise positional and anomaly data form the basis for true Predictive Maintenance.

Thanks to this digital transparency, condition-based maintenance becomes possible — far surpassing traditional interval-based service. Operators identify critical points earlier, plan maintenance proactively and prevent failures before they occur. The Smart Collector directly addresses the core challenges of modern intralogistics: increasing availability, reducing complexity and using resources efficiently.

The Smart Collector as a Service Model

In addition to the classic purchase model, the Smart Collector is also available as a flexible rental model. This concept combines the hardware with annual license and service fees covering analytics functions, updates and optional sensor expansions — without high upfront investment.



VAHLE handles installation, calibration and continuous technical support, allowing operators to focus entirely on their material flow. Through this service model, predictive maintenance becomes part of everyday operations: Maintenance becomes predictable, downtime decreases and the system remains reliable — thanks to an integrated condition-monitoring approach.

Interested in the Smart Collector Rental Model?

- Predictable annual operating costs instead of large one-time investments
- Immediate benefits through plug-and-play integration
- Minimized risk of unplanned downtime
- Software improvements at no additional cost
- Seamless integration with VAHLE service and maintenance contracts

Benefit from flexible usage, predictable costs and state-of-the-art condition monitoring.

Contact us for personalized advice — simply scan the QR code or visit: vahle.com/globalservice



CLEAN SYSTEMS. STABLE PROCESSES.

GREATER SAFETY AND AVAILABILITY THROUGH PREVENTIVE CLEANING

Contaminated conductor systems jeopardize the reliability of your installation – unplanned failures cost time, money and production security. With preventive cleaning and regular maintenance from VAHLE, you avoid costly downtime, extend the lifespan of your systems and ensure optimal energy transmission even in demanding environments.



Get expert advice now!
Scan the QR code or visit vahle.com/globalservice



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