

# Technical Article



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## Three Requirements for Mobile Machines Going Digital

Industry 4.0 is in full force. As technology continues to advance, the digitalization movement is increasing in a variety of industries and applications. While the benefits in industrial environments such as plants and factories are becoming apparent, the advantages of IoT are extending beyond the four walls of a factory to benefit mobile machines and hydraulics as well.

Mobile machines come in many shapes and sizes with a multitude of functional movements. Not only do the machines have different requirements, but the need to access information about the condition, operation or location of the machine can be of

value for the owner/operator. Digitalization can help manufacturers address these requirements. In contrast to stationary equipment, mobile machines require that information or data (informatics) be gathered and transmitted wirelessly or via some type of telecommunication path. The need for machine location technology such as GPS or 'precision GPS' also differentiates the digitalization needs of mobile applications from its industrial counterpart. This telematics function is becoming more of a demanded feature on many mobile machines.

However, it's important to understand what "going digital" means for a mobile application. A common

myth for mobile hydraulic manufacturers is that this evolution simply involves creating electronic versions of machine specifications and manuals, and putting them online for download. From a simple business perspective and digitalization view, this would be correct. In truth, limiting oneself to that definition of digitalization closes the opportunity to gain value from the benefits that going digital offers mobile applications. In one simple view, digitalization involves sourcing data directly from machines in operation, extracting the data, and then using the data to improve overall operations. After acquiring data from day-to-day operations, mobile machine manufacturers can apply the knowledge gained from analyzing the data to improve operation moving

forward. The benefits? Greater efficiency and better performance – not just for the machine, but for the whole process in which that machine plays a part. However, going digital for mobile applications means more than just data. Digitalization is accomplished by a digital transformation in machine architecture wherein electrification via hardware and software with electro-hydraulic control is set up as state-of-the-art on these machines.

What requirements should mobile machine manufacturers going digital put on their checklist? Our experts came up with three key considerations for manufacturers of tractors and forklifts, cranes and sweepers, and other heavy-duty working vehicles.



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## Key Insights & Considerations

- **Teaming up with a knowledgeable partner is one of the most important boxes to check off the checklist when going digital**
- **The ability to scale a product according to the needs of an application is crucial for mobile machine manufacturers**
- **Mobile machine manufacturers should search for solutions that are based on open standards**

## I 1. Scalability

A trait commonly associated with the latest digital advancements is customization, or the ability to scale a product according to the needs of the application. While customization is commonly emphasized for industrial applications, this capability is no less important for mobile machine manufacturers.

Before the digital transformation encouraged a focus on customization by application, customers used to have two options when it came to product selection. The first option was a limited number of off-the-shelf products. The other option was a large number of small building blocks that allow for building systems from scratch. Neither option is ideal. One limits versatility, the other can be costly.

A better approach is to design products to be fully configurable, providing room for growth and reconfiguration as the needs of the application change. For instance, an electronic control unit might offer a set number of inputs and outputs, but they can be configured in line with the needs of the application for which it is being purposed. Going digital should never prohibit or limit the ease-of-use and scalability to work effectively in even the most challenging conditions.

## I 2. Openness

Picture this scenario: A customer wants to digitalize their mobile machinery and finds themselves faced

with two options. This time, proprietary systems that lock customers into one system architecture with one set of rules and interfaces make up the first option. The other is obtaining completely open-sourced libraries that need time and effort to keep updated across machine inventory. Neither extreme benefits the customer. Bosch Rexroth recommends searching for solutions that are based on open standards. By bringing flexibility at the lowest costs, open standards are what the mobile machine industry needs to successfully embrace the digital age.

## I 3. Easy access to technology

Complex systems need to be simple in order to make the implementation straightforward for the machine builders and easy-to-use for the operators. This is made possible by limiting the number of setting options and parameters in the system. But, at the same time, the system must remain straightforward, configurable and versatile. Bosch Rexroth addresses this challenge with an approach we call 'intelligent abstraction.' This approach enables us to set up physics-based operating parameters without reducing the adaptability of the system to different applications and environments. When making the decision to go digital, we believe that teaming up with a knowledgeable partner like Bosch Rexroth is one of the most important boxes to check off the checklist. As the process progresses, it's beneficial to have a robust product offering and breadth of expertise to tap into while navigating this complex, yet crucial transformation.

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## Conclusion

Each requirement for mobile machines is in the pursuit of mastering the digital transformation. The more that the machine architecture changes to digitalization and the demand for the data that manufacturers and operators can extract from their working vehicles, the

more intelligently it can be aggregated and analyzed. Of course, the more the data can be creatively interpreted, the greater the possibilities will be for the advancement of mobile machines and mobile hydraulics.

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### **Do you have technical advice worthy of an article?**

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