

# A BALANCING ACT: Efficient & flexible

How Kaeser Kompressoren SE combines individual customer products with the highest quality standards

**KAESER  
KOMPRESSOREN**

It is quiet and concentrated as we enter the new production halls for Kaeser Kompressoren SE screw compressors at the company's headquarters in Coburg. As you would expect from a hidden champion, products of world renown are assembled here without any excitement. This reputation obliges the company to provide the highest quality while maintaining its innovative edge. But what does this actually mean for a smart production IT system that has to be efficient and flexible at the same time, and what decisive role does the digital twin play here?



Highly efficient, robust, industry 4.0-compatible, low-maintenance and flexible – these are the demands Kaeser places on its own products and therefore the expectations of its customers worldwide. In order to meet the growing demand for these products, new production facilities for screw compressors have been put into operation, which can meet this growing demand in a scalable manner. At the same time, production should allow for the flexibility in model diversity and division of labour that an Industry 4.0 requires. In addition to flexibility, the aim is to optimize the value stream in terms of efficiency in such a way that throughput time and inventory are reduced and on-time delivery is further increased. It quickly became clear that this would only work as an almost paperless, digitalized process.

The implementation was initially approached in building blocks along the value flow “assembly” and “quality inspection”. Based on this, the information supply of the worker with 3-D visualized work instructions is to be realized.

## **Making assembly more flexible**

The challenge is the complex assembly, based on customer-configured products. Whether air or water cooling, with or without dryer, with additional heat recovery for even more sustainable energy efficiency classes, in combination with different performance parameters, the result is lot size-1. The basis for this is the maximum bill of materials and the maximum work plan in SAP ERP, in other words, in



“The digital twin of the customer’s compressed air system is at the heart of the digital supply chain. With the introduction of SAP Manufacturing Execution in production, we are taking a decisive step towards building the digital twin.”

**Falko Lameter,**  
CIO, Kaeser Kompressoren SE

Kaeser Compressors  
production hall

principle the digital twin. This serves as a template to provide the work instruction for the variant to be assembled at the workstation within the one piece “flow” line. The work to be performed is displayed and documented for each workstation. At each workstation, however, the work list of the upstream or downstream station can also be called up for orientation or mutual support. Trebing + Himstedt realized this with SAP Manufacturing Execution (SAP ME). The strict simplification and standardization of the user interfaces now allows flexible deployment of the workers. Within a line, for example, the colleagues of downstream steps can “help out” at the front or help out on other assembly lines. This corresponds more to a pull principle than to push, i.e. an agile approach. The aim is to keep the flow going without a great deal of training and familiarization effort. New workers can also be quickly trained “on the job” thanks to the reduced, standardized interfaces. As a side-effect of the digitalization of the value-added chain, a start has been made on involving suppliers to provide the data for the easy scanning of supplier parts.

### **Automate quality inspection**

To be used by customers, Kaeser’s quality products have to deliver one thing above all: reliable compressed air. Quality control is therefore a decisive factor before delivery to the customer. However, the safety check, function test and pre-commissioning, including parameterisation and configuration of the control system, are small-scale and complex. With the help of SAP ME, this could be automated to a large extent, despite the large number of variants. The basis for this, analogous to the bill of materials and work plan, is also the maximum test plan as a digital twin, which provides the required test routines depending on the variant. Once the compressor has been connected and wired manually, the automatic test sequence can be started reliably. All test results are reported and documented. Only in the case of test results outside the tolerance is the operator informed and must still intervene manually. The parallelism of the tests could thus be increased. Now nothing stands in the way of delivery of the thoroughly tested, customer-specific product.

“In our opinion, this fully integrated data flow with the digital twin at its centre was only possible with SAP,” says Michael Karsch, Application Manager Logistics / IT/Organisation at Kaeser Kompressoren SE. “Processes & master data are the key and basic requirement for a functioning digital twin,” Karsch continues. By linking the data centrally, it is therefore also possible to access this data from the digital CV file in the after-sales service, which ultimately makes the service more efficient.



### **How does the journey continue?**

The vision is to make this digital twin available to the customer in a collaborative way. But first, the visualization of the information supply is on the agenda. In the co-innovation project with SAP, work is being done on making the work instructions at the assembly station available in 3-D format in batch size 1 from the maximum CAD model. This will make Industry 4.0 a real experience for the worker and not only noticeable in the processes. And I understand the enthusiasm to finally reach this next milestone.