# Technical report June 24, 2024

Increase in production with automated machine loading

**Automation that works**

**Increasing the spindle running time up to 8,000 hours per year? This is almost possible with customized automation. SCHUNK the automation expert offers a comprehensive portfolio with all the necessary components, but also the experience and know-how for efficient automation solutions for any requirement.**

An ongoing shortage of skilled workers, small batch sizes with a high part variance, increasing quality requirements, time and cost pressure: The list of challenges facing manufacturing companies today is long. The answer on many of the problems is short: Customized automation of machine tools significantly increased the number of spindle hours - the measurable, real machine running time. Productivity increases - with the same number of machines and employees. The emphasis is on tailor-made, because automation should be just as individual as each production process.

The range of automation options is huge now, ranging form simple entry-level to high-end solutions. It is not easy to keep an overview here. SCHUNK, the specialist for toolholding and workholding, gripping and automation technology, has recognized the high demand for advice on this important topic and supports customers with in-depth know-how of components and applications and how to implement everything in the automated production. "We have a comprehensive portfolio of components that are required within the machine for automating production," explains Markus Michelberger, Head of Sales at SCHUNK in Mengen. "And we offer everything related to robot-assisted part loading and unloading. Therefore, SCHUNK meets all the requirements that are essential for the implementation of individualized automation. Together with various system integrators we can also implement complex solutions."

**Easy entry-level solutions**

Under the influence of digitalization and the pressure of an increasing shortage of skilled workers, solutions have become established that enable automated production in virtually all areas of manufacturing. "For being successful on the highly competitive market, customers have to manufacture more productively and cost-efficiently, but they also have to create an attractive and healthy working environment due to the labor market situation in order to attract and retain employees in the long term. Automation is the key to this," says Michelberger.

However, efficient and successful automation in the long term requires a considerable amount of planning and investment, which small and medium-sized companies in particular are often unable to afford. "For them, simple entry-level solutions can already make the decisive difference and quickly create real added value," says Michelberger, adding: "With automation components from SCHUNK, which can be easily retrofitted to existing machines, production become considerably more flexible." In the next step, automated and robot-assisted set-up processes will bring even more speed to production. They free up employees for other value-adding tasks and enable extended production cycles in the evenings and at weekends.

**Five options for suitable automation**

In order to offer the right solution to every customer, SCHUNK has clearly divided its range of automation options into five expansion stages. Lean Automation is perfect for a cost-effective entry into the world of automation. In the next step, workpiece automation enables unmanned machine loading. Pallet automation is the solution for clamping and loading complex and heavy parts. The clever combination of workpiece and pallet automation offers high flexibility and enables six-sided machining of components without manual intervention. SCHUNK supplies the appropriate clamping technology for efficient operation of flexible manufacturing systems (FMS) for customers, who want to map their entire production. The SCHUNK specialists determine which solution is the most suitable in close dialog with the customer. They analyze the existing machines, the products and the production environment.

**Lean Automation: using existing resources**

With SCHUNK Lean Automation, customers can get started easily and cost-effectively by using the existing resources of their machines for automated loading. The raw and finished part storage area is located within the travel range of the system and workpiece handling takes place within the machine with the help of a gripper with spindle interface. Intelligent and flexible tools such as the GSW-B spindle gripper, the TENDO Silver, which is compatible with all machine tool spindles, or a clamping force block from the TANDEM series require no special operating knowledge, no additional space requirements, and no high investment costs.

**Workpiece Automation: automatic loading and unloading**

Unmanned machine running times can be implemented with workpiece automation. Even in difficult ambient conditions it is possible to load the machine with blank parts from an external storage unit via a robot and to store the parts in the storage unit again after processing. This is possible by using the MTB application kits from SCHUNK. They enable the machine to be loaded and unloaded up to 50 percent faster and ensure better capacity utilization. The BSWS-R jaw quick-change system also increases speed. It enables robots to change fingers independently on the gripper flexilby and automatically during the process, depending on the part variance.

**Pallet Automation: flexible, precise and sophisticated clamping**

If you should need even more flexibility in the production of sophisticated components, opt for pallet automation. Here, workpieces are set up on pallets outside the machine and then loaded into the system as a complete package. The workpieces can be loaded and unloaded into the clamping device manually or automatically. Different clamping concepts can be implemented with pallet automation - for small batches, for example. However, the automation concept is also the right choice for clamping heavy and complex workpieces and for achieving high clamping accuracy requirements. The VERO-S modular quick-change pallet system from SCHUNK, for example, allows workpieces, clamping devices and fixtures to be converted quickly and precisely. The modular system offers over 1,000 variants of workpiece clamping. The KONTEC KSC-D manual double clamping vises KONTEC KSC-D also offer flexibility. As part of the large KSC modular system, they can be quickly and easily adapted to new clamping tasks. By means of a convenient third-hand function, two workpieces can be inserted next to each other, fixed, and securely clamped.

**Workpiece and pallet automation in one: clever combination saves time and money**

With the R-C2, SCHUNK offers an automation concept that combines the advantages of workpiece and pallet automation. The robot grips the workpiece in the storage rack fully automatically with an R-C2 centric clamping vise. The vise with the workpiece is then loaded in the machine like a pallet into the quick-change pallet system. With the R-C2, more workpieces can be processed without manual intervention and set-up times are significantly lower. The R-C2 is the only system of its kind worldwide that enables high-precision, unmanned complete six-sided machinng of a workpiece.

**Flexible manufacturing system (FMS): everything is under control thanks to high-end automation**

In the final expansion stage of automation, flexible manufacturing systems (FMS) can be used to map the entire automated production process. All machine tools are connected to each other via connected transport and storage systems. Transfer stations for the provision of raw parts, for locating finished parts, and for loading and unloading the clamping devices, ensure perfect machine utilization. SCHUNK offers tombstones that can be combined with the extensive clamping technology portfolio. SCHUNK specialists implement high-end automation solutions in close cooperation with system integrators that optimize material flows and makes production steps more flexible.

"Customers who decide to automate their production have already taken the most important steps," explains Markus Michelberger. "As your partners for productivity, we provide you with comprehensive advice on your options and support you during and after implementation."

**The three question format**

Very briefly, Mr. Michelberger,

**What questions should customers ask themselves when it comes to automation?**

Automation of machine tools is as diverse as the machine world itself. The key question here is also: What type of automation is best suited to my production? In principle, the parameters to be checked are very similar to those for purchasing a machine. How large are my batch sizes and how do I evaluate my part variance? Which machines do I want to automate and how long will be their running time? These factors can certainly be used to make a rough preselection for a suitable automation solution.

**Is there a right or wrong way to automate?**

Right or wrong is not quite the right wording. There is more a better or worse fit. This brings us back to the answers to the first question. Finding out the right solution in the jungle of automation solutions is certainly not easy. Advise is the be-all and end-all here. The customer must first decide which partners he trusts and who he trusts to offer him the best solution based on their expertise and experience.

**How can SCHUNK support customers?**

Intelligence and flexibility are the keys to pushing automation forward. In recent years, we have further developed many products to better meet the special requirements of automated machine tool loading. This applies to parts handling for medium and large batch sizes as well as to automation of batch size 1 with pallet handling. Our advantage is our extensive portfolio: We can offer the right components for all types of machine tool automation and we are very familiar with the applications. In short: SCHUNK offers the right components for the table, the spindle, and the robot and knows how production works. Customers receive components and know-how from a single source.

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**Captions:**

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|  | SCHUNK offers a fast and cost-efficient entry into automated manufacturing with lean automation. The machine works with the available resources. Intelligent tools can be easily retrofitted.  Image: SCHUNK |
| *Lean Automation\_GSW-B\_Anwendungsbild1\_0224.jpg* | |
|  | In workpiece automation, for example, the MTB application kits ensure that the machine can be loaded and unloaded up to 50 percent faster, thus ensuring optimal capacity utilization.  Image: SCHUNK |
| *JGP-P\_PGS3\_Anwendungsbild\_ Applikations-Kit\_MTB\_ 12\_2021 (1).jpg* | |
|  | The pallet automation concept is the right choice for clamping heavy and complex workpieces and for ensuring high clamping accuracy requirements.  Image: SCHUNK |
| *TANDEM-KRP3\_Sonderbacken\_VERO-S-NSL\_Palette\_NSR160\_Maschinenbeladung\_Anwendungsbild\_2023.jpg* | |
|  | Clamping device and gripper in one: The R-C2 from SCHUNK combines the advantages of workpiece and pallet automation. This automation concept allows more workpieces to be processed without manual intervention and reduces set-up times.  Image: SCHUNK |
| *Werkstück-und Paletten-Automation\_R-C2\_Anwendungbild2\_0224.jpg* | |
|  | High-end automation: Flexible manufacturing systems (FMS) map the entire production process. Tombstones from SCHUNK and the versatile portfolio of clamping tools are components of a complete solution that optimizes material flows and makes production steps more flexible.  Image: SCHUNK |
| *Aufspannturm\_KONTEC\_KSC\_TENDO\_E\_compact\_Anwendungsbild\_08\_2016.jpg* | |
|  | Markus Michelberger  Vertriebsleitung Spanntechnik Head of Sales Clamping Technology  H.-D. SCHUNK GmbH & Co. Spanntechnik KG  Image: SCHUNK |
| *SCHUNK\_MarkusMichelberger\_0323.jpg* | |

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