Machine Tending 101

The appropriate type of automation for your process

Hand in hand for tomorrow

For greater efficiency, productivity and competitiveness

In times where efficiency and maximum autonomous machine running times become more and more important, machine tending offers considerable benefits for companies of all sizes. Global competitive pressure is increasing, while there is a shortage of skilled workers everywhere. Increasing variance, ever decreasing batch sizes and fluctuating demand also call for optimized processes with the help of the latest technologies. Machine tending is an important step towards a „Healthy Factory“ – a healthy company that makes processes more productive and, at the same time, relieves the burden on people and the environment. SCHUNK will be happy to accompany you on this journey.

Advantages of machine tending:

- **Increased productivity**
  Automated systems can operate 24/7 without a pause, increase production capacity, and reduce set-up times and machine downtimes.
- **Cost savings**
  Labor costs and rework can be reduced by less manual intervention and precise automation. The operator controls the process, and the work is done by the automation system.
- **Improved quality**
  Higher process accuracy and repeatability ensure more consistent product quality and reduce the number of errors.
- **Flexibility**
  Allows fast adaptation to different production requirements and easy integration of new products.
- **Enhanced competitiveness**
  Shorter product throughput times result in faster delivery times and therefore increase customer satisfaction.

Your entry into machine tending

We support you right from the beginning and ensure that you understand Machine Tending 101 and that you can use it in the best possible way. What are the options? Which solution is the right one for your manufacturing process? And what are the advantages of each approach? Together, we will find the optimal type of automation for you.

Depending on the workpiece, lot size, manufacturing process and machine, there are five types of automation available.

Lean automation

Workpiece variance	●○○○○
Workpiece complexity	●○○○○
Lot size	●○○○○

Workpiece automation

Workpiece variance	●●●○○
Workpiece complexity	●●○○○
Lot size	●●●●●

Pallet automation

Workpiece variance	●●●●○
Workpiece complexity	●●●●●
Lot size	●●○○○

Workpiece and pallet automation

Workpiece variance	●●●●○
Workpiece complexity	●●●○○
Lot size	●●●●○

Flexible manufacturing system

Workpiece variance	●●●●●
Workpiece complexity	●●●●○
Lot size	●●●○○

Workpiece variance
= how many different workpieces are loaded

Workpiece complexity
= how demanding is clamping the workpiece

Lot size
= Amount of identical workpieces, that can be produced without interruption

Lean automation

Lean automation describes a flexible and affordable method of automated machine loading by using available functions of the machine tool intelligently. The raw and finished parts tray is located within the travel area of the machine. With the help of a gripper with spindle interface, workpiece handling can take place within the machine workspace. A clamping station facilitates the manual changeover of raw and finished parts as well as clamping devices.

Your advantages:

- **Low acquisition costs**
- **No additional knowledge required for operation**
- **No additional space required in front of the machine**
- **Dual working is easily possible**

1 Gripper with shank interface

2 Quick-change pallet system


1

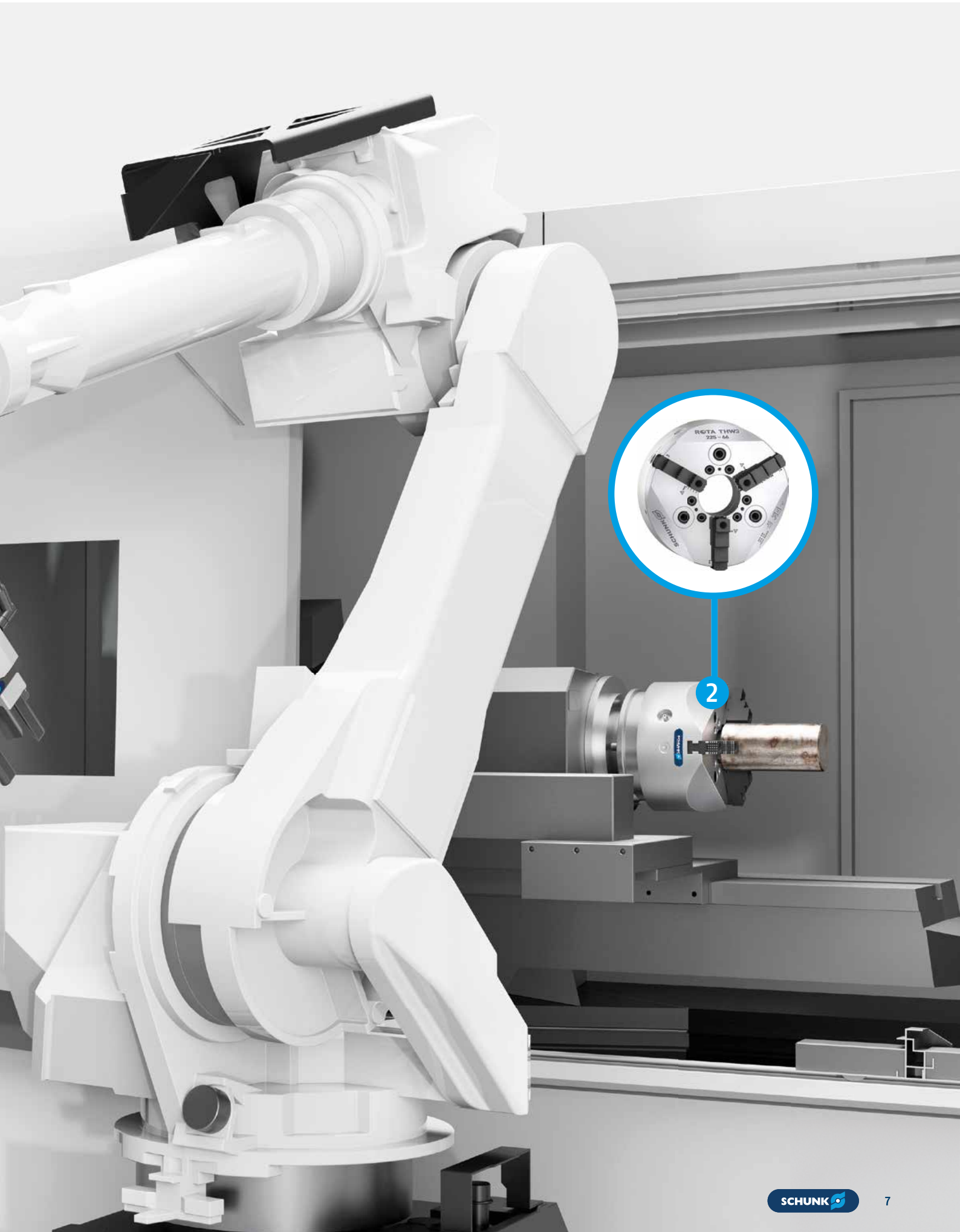
Workpiece automation

In workpiece automation, raw parts are taken out of an external storage unit and loaded into the machine tool's clamping device with the help of a handling device. After machining, the finished and semi-finished parts can be removed from the clamping device and stored in the storage unit.

Your advantages:

- **Long unattended machine running times can be achieved**
- **Fast loading und unloading times thanks to automation that is perfectly adapted to the workpiece and the process**
- **Optimal for interlinked process steps**
- **Can also be used in unfavorable ambient conditions**

1 Universal gripper 2 Lathe chuck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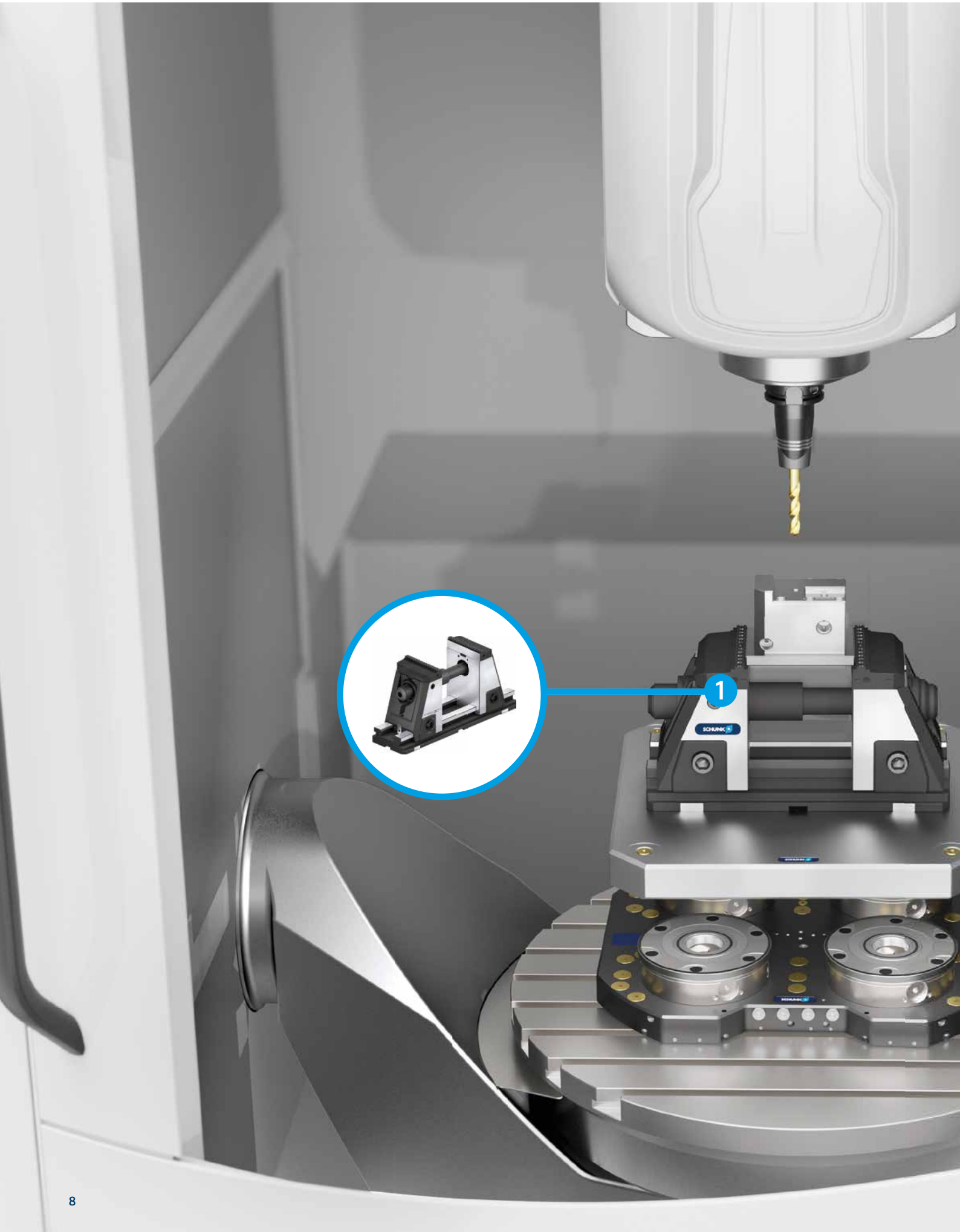
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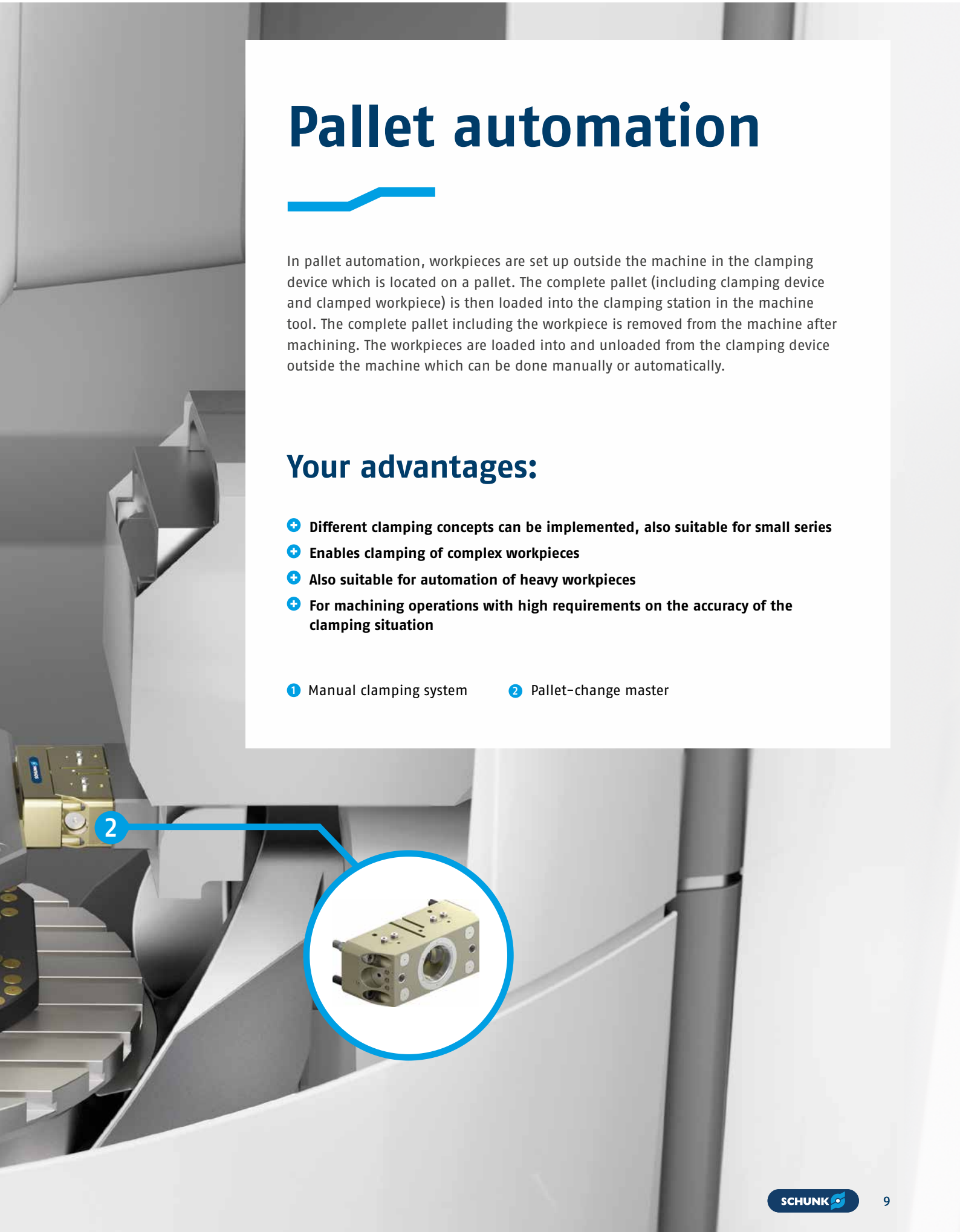
Pallet automation

In pallet automation, workpieces are set up outside the machine in the clamping device which is located on a pallet. The complete pallet (including clamping device and clamped workpiece) is then loaded into the clamping station in the machine tool. The complete pallet including the workpiece is removed from the machine after machining. The workpieces are loaded into and unloaded from the clamping device outside the machine which can be done manually or automatically.

Your advantages:

- **Different clamping concepts can be implemented, also suitable for small series**
- **Enables clamping of complex workpieces**
- **Also suitable for automation of heavy workpieces**
- **For machining operations with high requirements on the accuracy of the clamping situation**



1 Manual clamping system

2 Pallet-change master

Workpiece and pallet automation

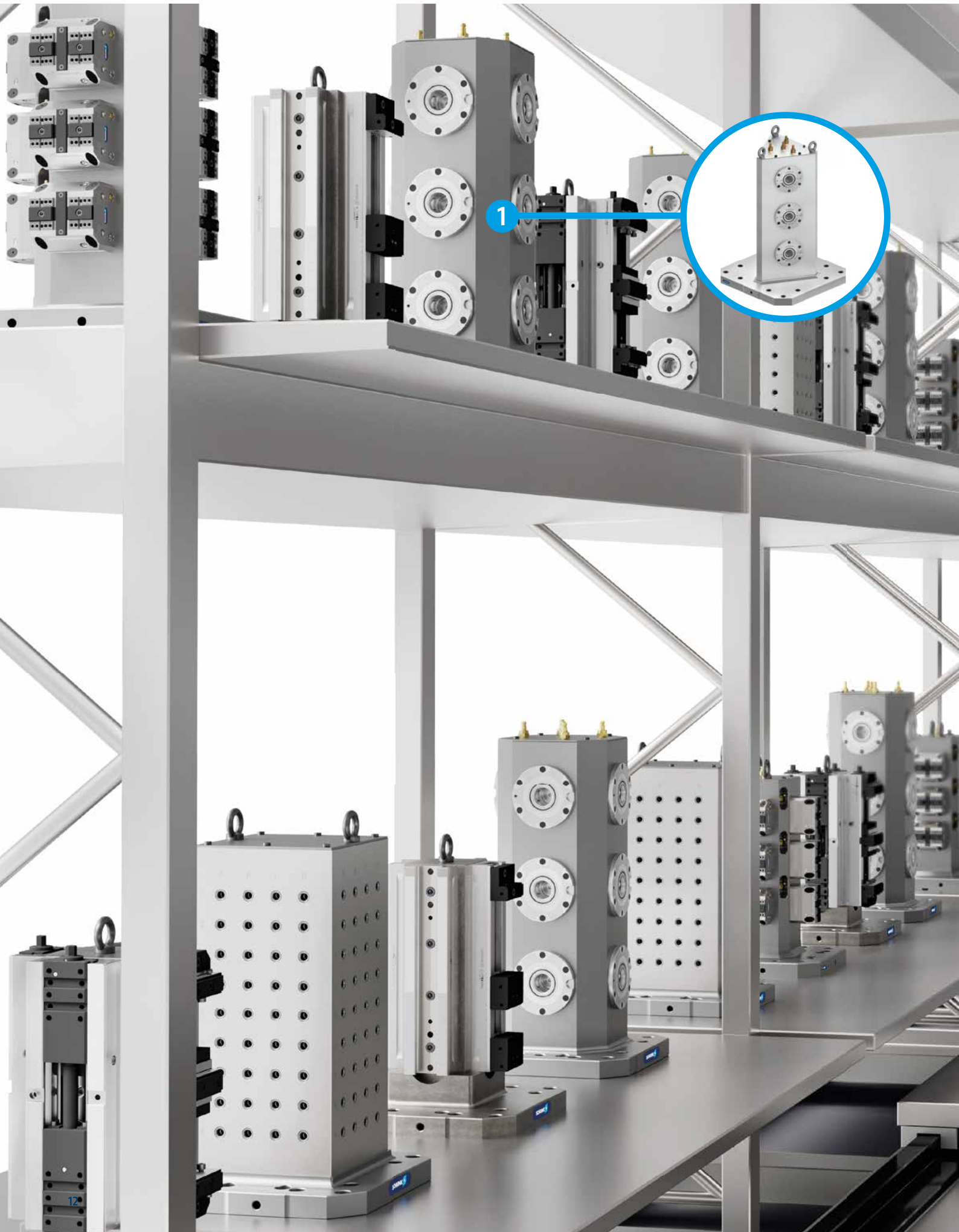
R-C2 is an example of an automation solution that combines features of both workpiece and pallet automation. The workpiece in the storage rack is gripped and clamped with the R-C2 at the same time. The clamping force block with the clamped workpiece is then loaded into the quick-change pallet system of the machine like a pallet. After machining, the R-C2 including the clamped workpiece is removed from the machine. The workpiece can now be set up again, clamped, and loaded for processing the second side. After production, the R-C2 including the workpiece is removed again, and the finish-machined workpiece is deposited.

Your advantages:

- **High level of flexibility**
- **Less set-up work**
- **6-sided machining without manual intervention while maintaining high accuracy**

1 Clamping force block R-C2 2 Hydraulic expansion toolholder


2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Flexible manu-facturing system

Flexible manufacturing systems are multi-machine systems for machining workpieces. The individual machine tools are connected to each other via a connected transport and storage system to enable an automated material flow. In addition to the machine tools, there are transfer stations where the raw parts are prepared, the clamping devices are loaded and unloaded, and the finished parts are deposited.

Your advantages:

- **Perfect utilization of the machine, increased spindle running time**
- **Large number of avialable pallet spaces**
- **Perfect organization and logistics of production through stockpiling of raw parts, clamping devices and tools**
- **High flexibility in the selection of the production sequence**

1 Tombstone

2 Clamping force block

Your neutral partner for machine tending

We at SCHUNK are specialized in gripping and automation technology, toolholding and workholding. High-quality, sophisticated components that are used in the vicinity of your machine tool. Based on this experience, we understand what is crucial for effective machine tending. Regardless of the robot type and machine tool, we offer you neutral advice, and together, we will select the right type of automation for your application. If you do not plan and commission the entire system yourself, you can involve a system integrator or machine manufacturer.

Achieving a Healthy Factory through automation

Those who act economically, ecologically, and ergonomically responsibly make processes „healthier“ and their companies more successful. At SCHUNK, we see the solution in targeted automation of manufacturing processes. This makes growth more stable, relieves the environment, and employees benefit from more ergonomic and safer working conditions. SCHUNK is pleased to support you on your journey to a Healthy Factory – for greater sustainability and a better tomorrow for everyone.

You can find video examples in our machine tending playlist on YouTube.

schunk.com/machine-tending-playlist

Did we pique your interest?

We will be happy to explain you the Machine Tending 101 in a personal meeting. Contact us and let‘s work together to shape the future.

For further information, please visit: **schunk.com/machine-tending**

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