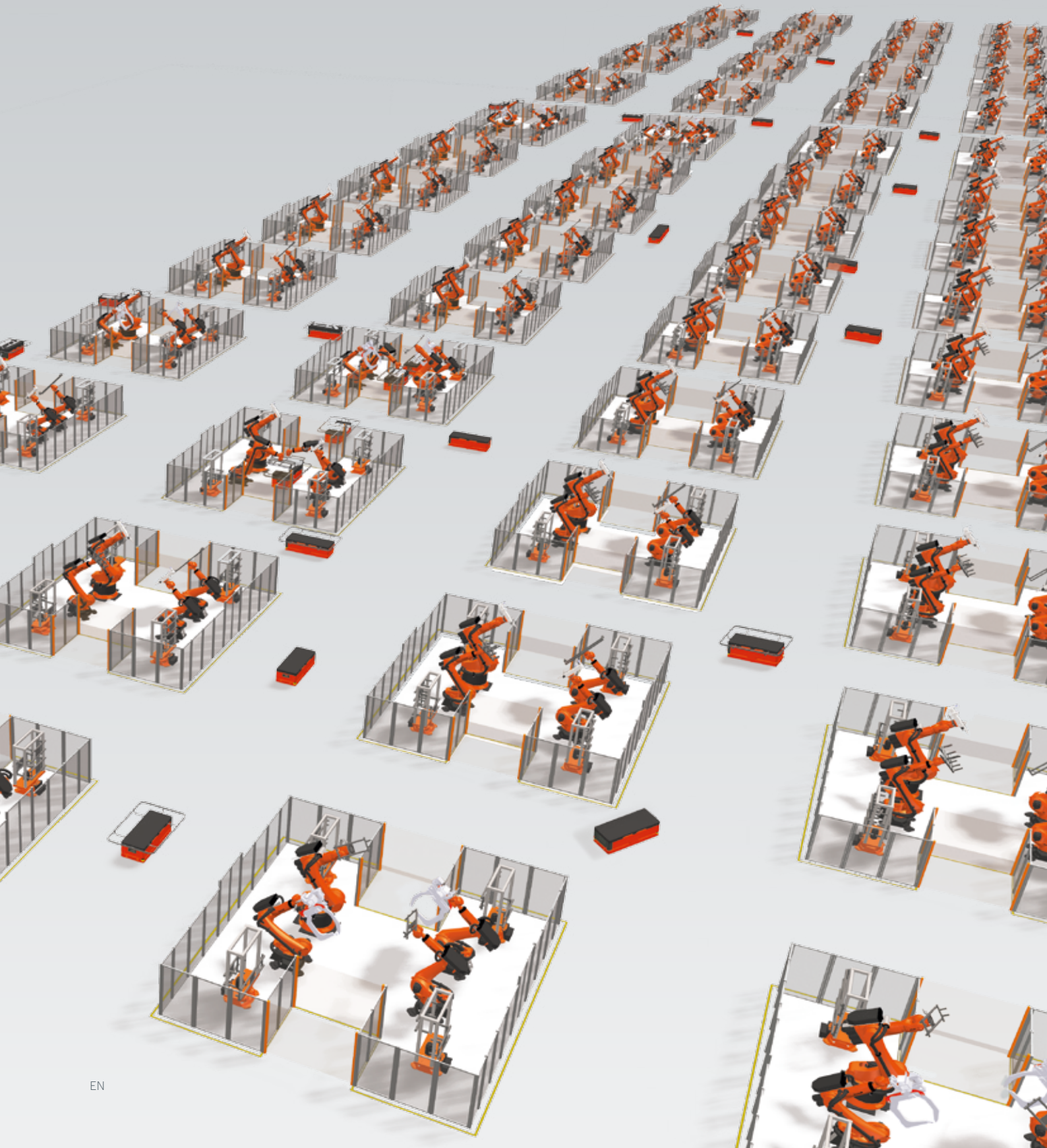
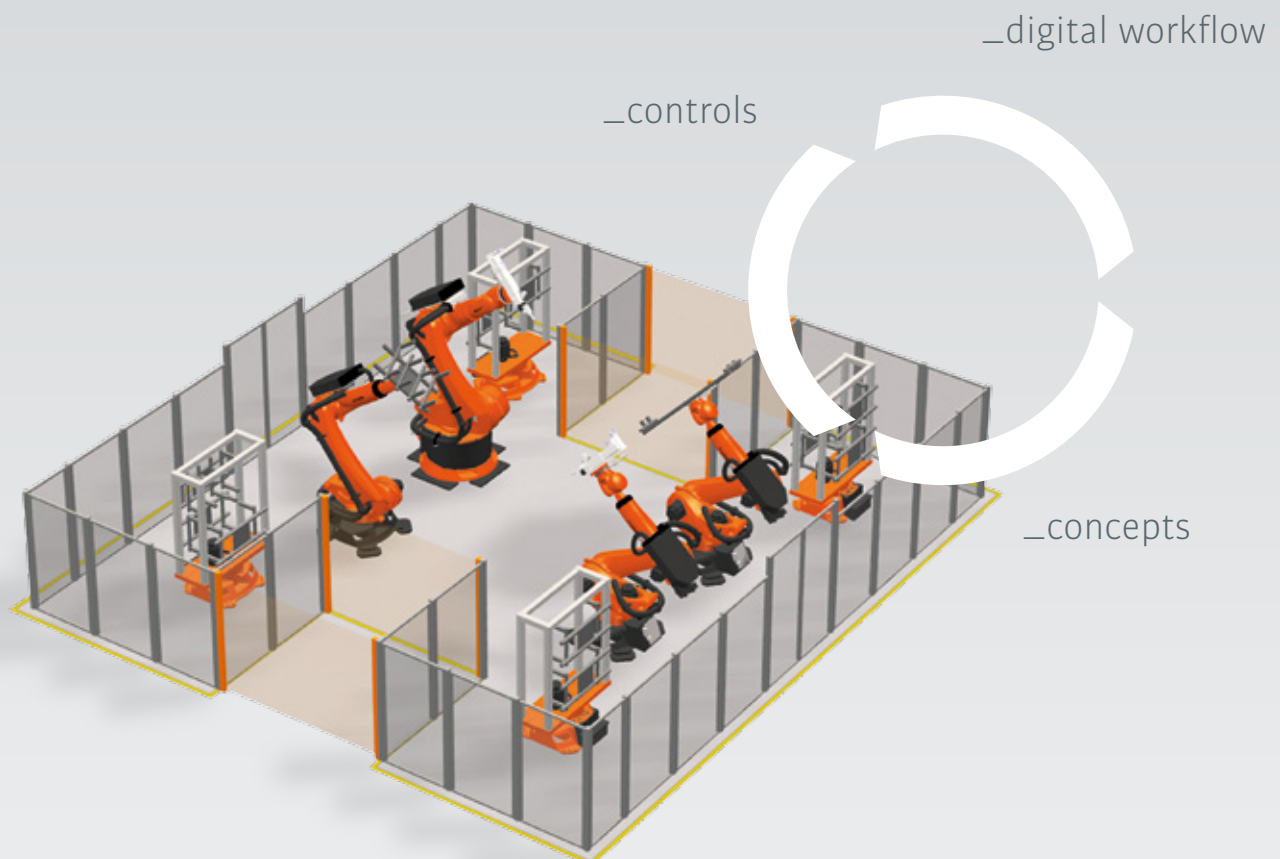




Industrie 4.0_Matrix production



Matrix production is characterized by flexibly configurable production cells, which are linked together by means of freely programmable workpiece logistics. Automated guided vehicles (AGVs) automatically load the production cells with the necessary tools and grippers and safely reach their targets using free navigation – even in changing environments. Thanks to intelligent and comprehensively digital networking across the entire value chain, new products can be implemented quickly and easily in the manufacturing cells without disrupting production.



Matrix production

Highly flexible production is becoming reality

Increasing customization is changing production. Volatile markets are making the cost-effective production of small batch sizes ever more important. Increasingly, the challenge is to produce an ever greater number of different variants and models in variable batch sizes – for example in the automotive industry. The matrix production concept enables extremely versatile production on an industrial scale and networked throughout the process chain. The system can automatically convert itself “on the fly” to changing product types. It will thus become possible to implement the manufacture of highly customized series in the context of industrial mass production.

Matrix production is based on standardized production cells that can be arranged in virtually any number in a grid layout. All cells are equipped with process-neutral equipment and type-neutral basic functions. Examples include production robots and turntables for the provision of tools required for executing the desired processes. These production cells can then be equipped with type-specific equipment. Workpieces and tools are transported by AGVs, which navigate to the individual cells.

Your advantages:

- Scalability of the overall capacity: variable in stages along with the system size
- Scalability in the range of variants: Matrix concept allows for type flexibility
- Scalability in the product mix: to compensate for fluctuations in demand
- Versatility: simple, risk-free integration of new products
- Modularity: reduced service expense due to high availability, familiarity with system equipment, easy servicing, and a spare parts depot based on a small number of variants



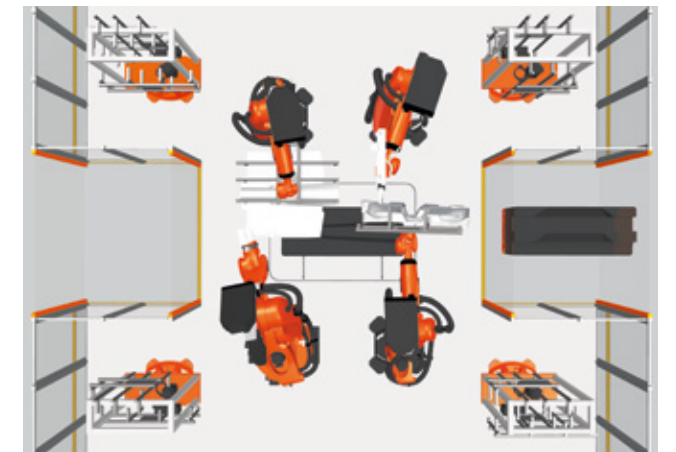
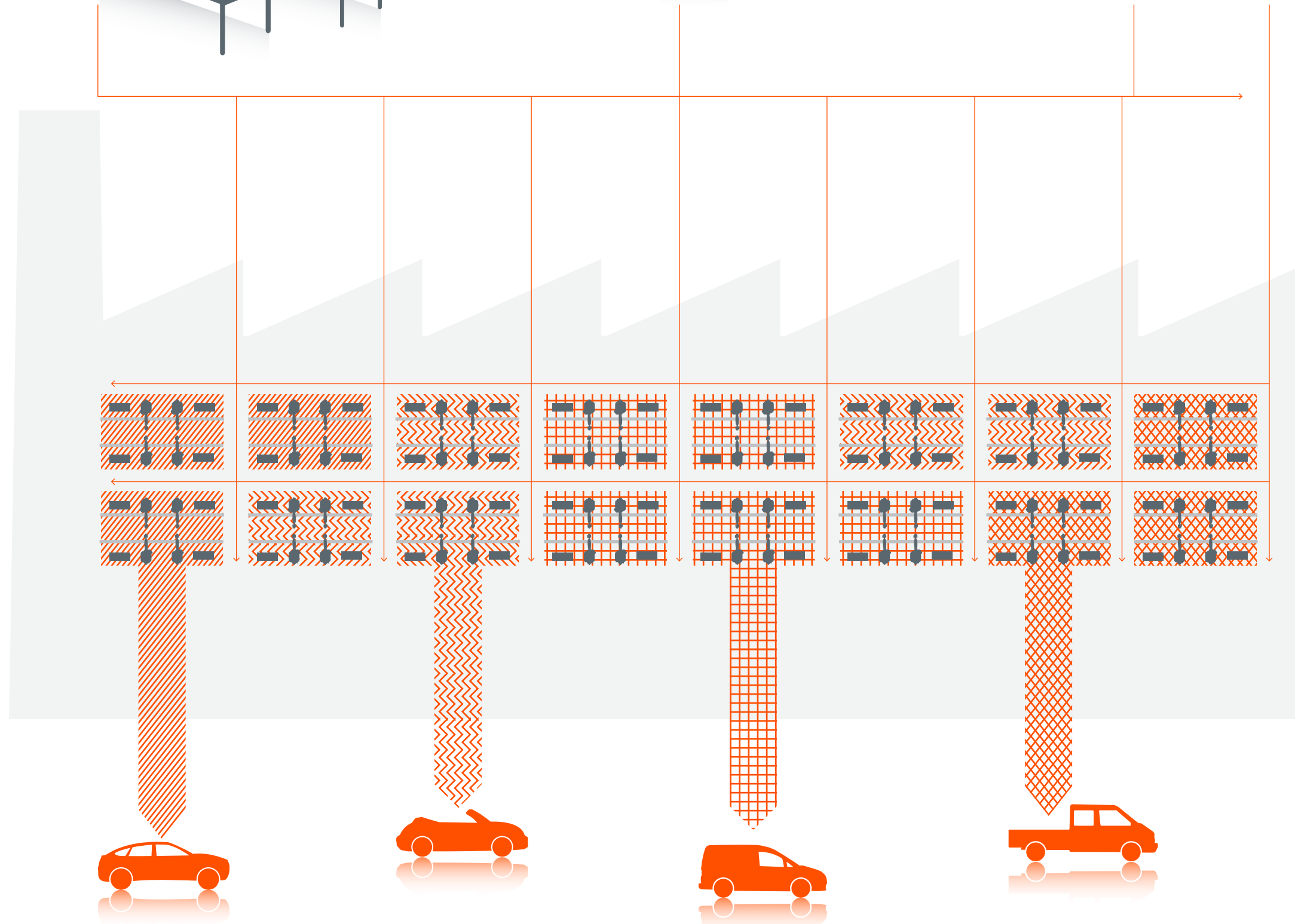
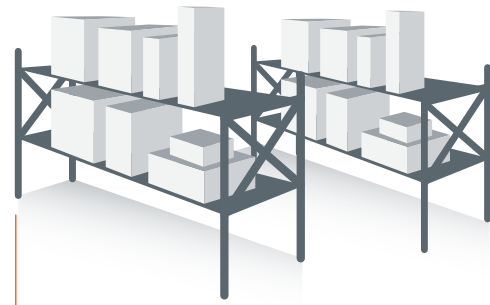
All workpieces relevant for production are stored in the warehouse. They are fetched by AGVs and transported to the production cell.



The AGV pool is, so to speak, the parking garage of the production facility. All automated guided vehicles wait here until they are required. Workpieces and tools are transported to the production cells by AGVs, which navigate to the individual cells using a navigation algorithm.



The dedicated tools and process equipment are located in the tool store. As soon as needed they are transported by AGVs to the cell in which the technology, tool or production equipment is required.



The production cell for easy conversion. Four robots handle and join the parts. Tool magazines in the cells enable provision of the required tools. This enables adaptation of the cell during the cycle time.

Industrie 4.0

Prepared for transformation of the worlds of production

Smart Production, Internet of Things or Industrie 4.0. Even if the names and terms used vary from one country to another, they all share the same goal: the creation of elementary competitive advantages – at both company level and in global competition.

Work on the factory of the future is thus in full swing worldwide. This involves intelligent, networked industrial production and logistics processes on the basis of cyber-physical production systems (CPPS). Or, to put it simply: factories that, by means of advanced networking, respond intelligently to changing tasks and continuously reconfigure themselves. The factory of tomorrow should be able to organize and continuously optimize its production processes, thereby counteracting the consequences of another development: demographic change. New solutions are called for because of falling birth rates and increasingly aged populations in modern industrial societies. Without the “smart factory”, it will be simply impossible to achieve a productivity increase on this scale at the same time as effectively husbanding our existing natural resources.

In order to make new working environments both highly productive and ergonomically beneficial for the labor force, KUKA is developing central key technologies: collaborative robots, mobile assistance systems, autonomously controlled vehicles and intelligently networked automation solutions that support humans in the work setting, easing the workload in a variety of ways.

In collaboration with experts from diverse sectors, KUKA is now already implementing highly flexible, digitized manufacturing processes that will open up new opportunities in a competitive environment and lastingly change the way we work and produce.

For more information, please contact us at automotive.systems.de@kuka.com

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