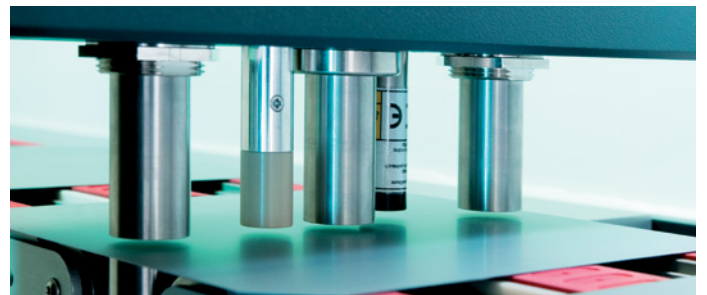
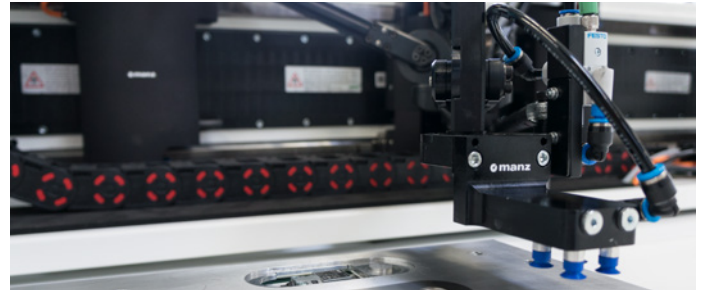




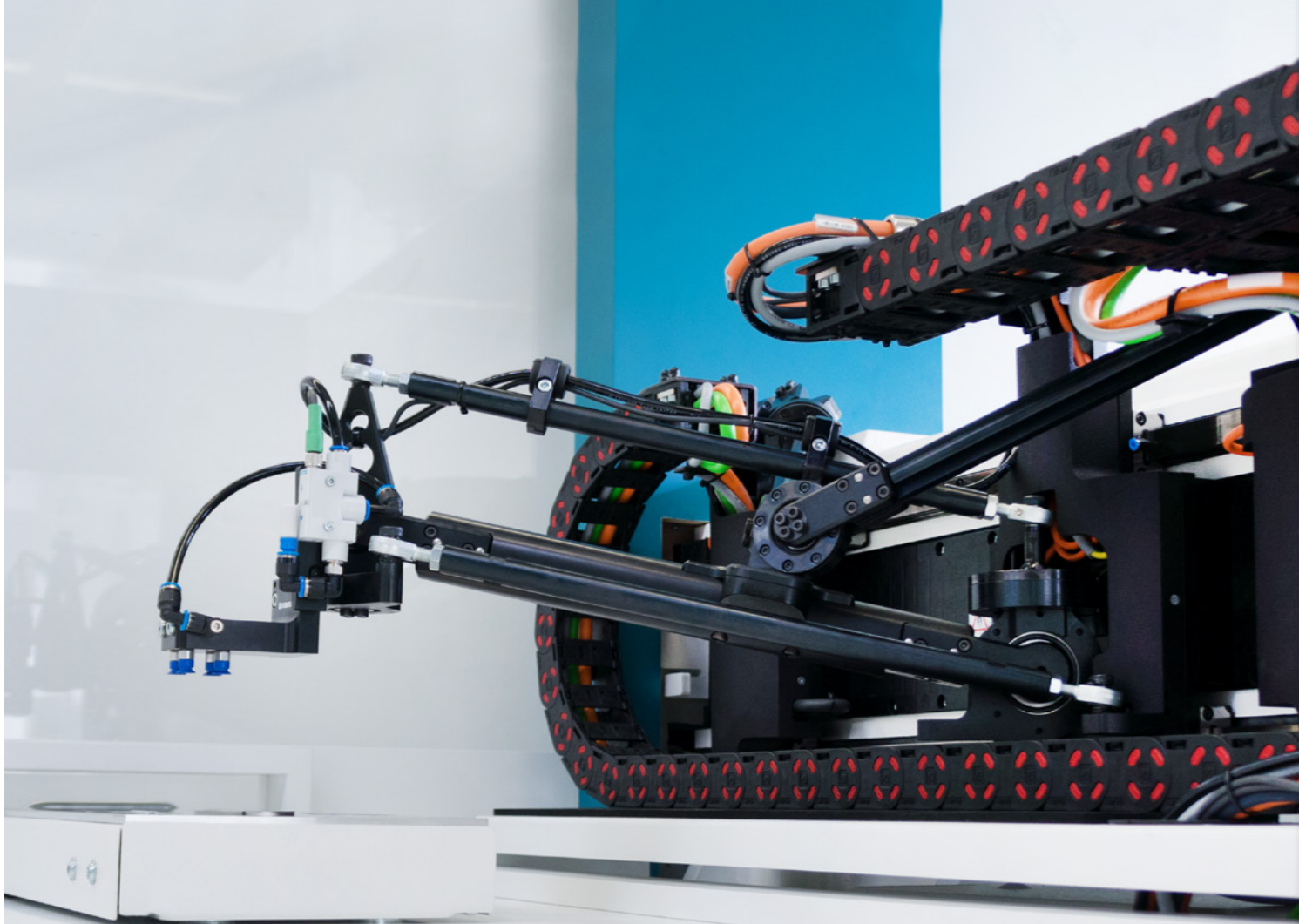
AUTOMATION & METROLOGY



Automation & Metrology
Key technologies for high-tech production



THE STANDARDS OF TOMORROW GROW FROM THE IDEAS AND ENTHUSIASM OF TODAY



Manz AG

Founded in 1987
 Headquarters in Reutlingen, Germany.
 Additional locations in Slovakia, Hungary,
 Italy, China, Taiwan, the United States,
 and India.

Employees

approx. 1,700 employees worldwide,
 including around 500 engineers

Core technologies

Automation
 Metrology
 Laser processing
 Wet chemistry
 Roll-to-roll

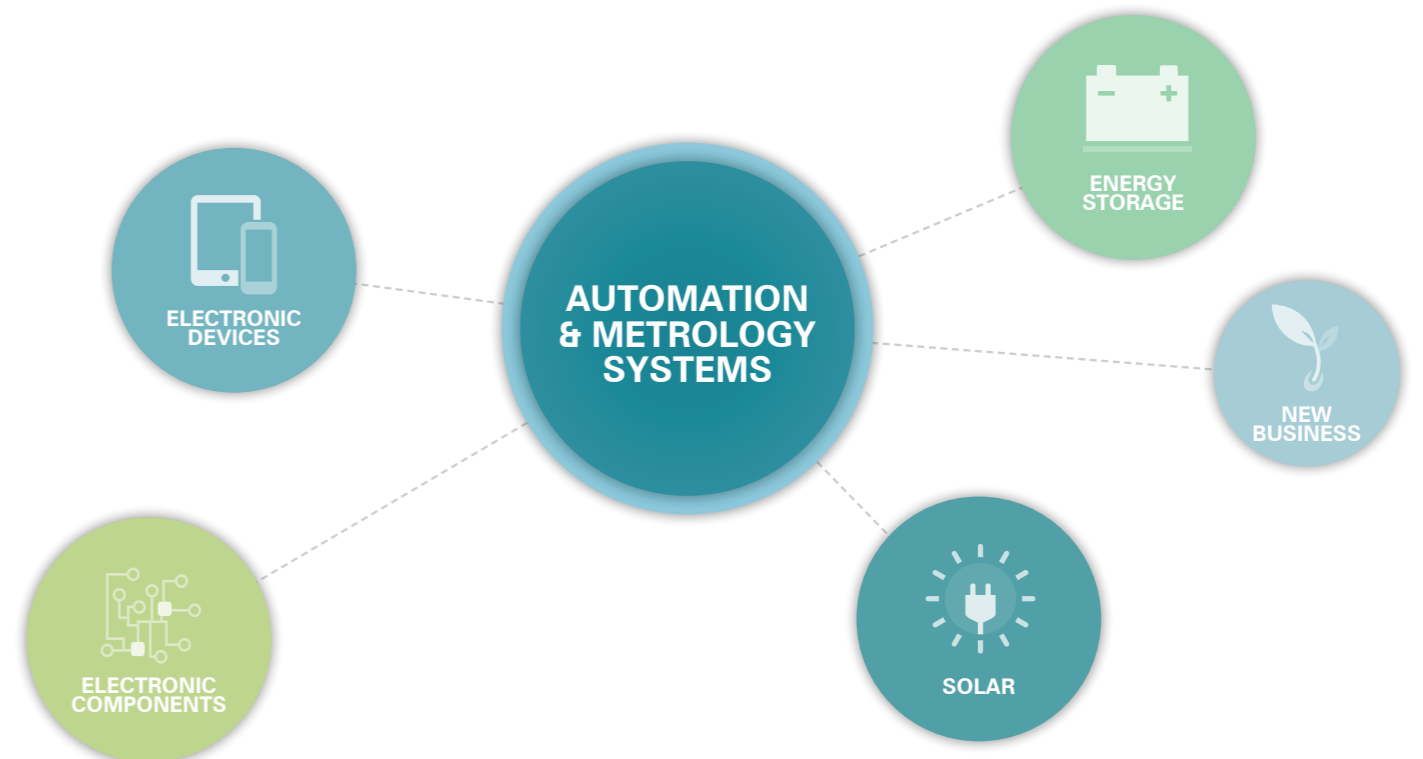
Automation & Metrology Solutions for Multiple Industries

Automation is a critical factor for production success. Only excellent automation solutions make it possible to achieve consistent high quality, high throughput, low production costs, thus competitive prices. With 30 years of experience in countless applications, Manz has become a market leader in this area. Manz solutions handle sensitive materials, such as silicon wafers or glass, ceramics, plastics and even paper.

Measurement technology replaces and expands human visual inspection to increase production line efficiency and quality and decrease manufacturing costs. For 30 years our customers have relied on our integrated optical control systems, physical measurement systems and integrated analytical instruments.

Manz—your one-stop solution provider:

Manz offers a range of process technologies in combination with automation and integrated metrology. Only these integrated equipment solutions enable our clients to meet highest speed and precision requirements for their applications.



Automation

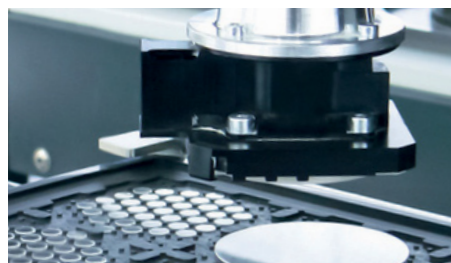
MANZ' EXCELLENT AUTOMATION SOLUTIONS MAKE IT POSSIBLE TO ACHIEVE CONSISTENT HIGH QUALITY, HIGH THROUGHPUT, LOW PRODUCTION COSTS AND COMPETITIVE PRICES

Assembly

Our modular and fully automatic assembly systems, like the Manz *LightAssembly*, build on our decades of technological expertise in PC-based control, robotics, motion control and peripherals.

Manz's standardization of machine components offers an excellent cost/benefit ratio and short delivery times. At the same time, our equipment's modular structure makes it simple to reuse machines over several generations of end products. These qualities are crucial to our customers' investment decisions, because short product cycles are given in their market. Our high-precision, fully automated assembly systems comprise an integrated alignment function. During loading, transport and unloading, the components are fastened to workpiece carriers and transported through the system.

Among other process steps, our assembly equipment can be designed for incoming/outgoing components and end product quality control, automatic parts matching to achieve maximum quality, dispensing & bonding of parts, auto-screwing, labeling, laser marking and laser welding.



Handling of small substrates is a typical application of Manz machines

Robotics & Mechatronics

With several thousand robotic systems installed, Manz has a long, successful track record of automation solutions in the display and touch panel, solar, and lithium-ion battery industries. Manz has been able to successfully transfer this expertise to many other industries and applications.

Our product portfolio includes sophisticated, innovative handling solutions, that stand out due to their low maintenance and high process quality. Thanks to low cycle times and minimal breakage rates, the systems' low operating costs and high productivity are important factors in successful production.

Our systems are mainly used for handling customer parts ranging from small sizes of 20 × 20 mm (e.g. for smartwatches) up to 1,200 × 400 mm for larger assemblies, such as automotive products.

Furthermore, we offer automation systems for all substrate sizes used in the production of TFT-LCD, OLED, touch sensors and cover glasses, ranging from 60 mm × 125 mm to 2,200 mm × 2,600 mm.

Our solutions can easily be adapted to other applications and product sizes.

Machine Control & SCADA

Manufacturing perfect products is only possible with precisely controllable, reliable production processes. High-tech production equipment from Manz includes motion and robot controls, along with SCADA and HMI solutions, tailored to the relevant production processes — plus, easy to operate. Whether a single

robotics system for OEM customers or a fully integrated automation or process solution, the Manz group is your contact for comprehensive drive and control solutions. In close collaboration with our customers, we develop industry-specific solutions that are installed worldwide.

Simulation & Fab Planning

As a provider of integrated production lines and turnkey factories, Manz has a broad experience in material flow simulation and analysis. Not only do we call on this expertise when designing our high-tech production equipment, we also offer it as a service: We assist our customers as early as the design phase or during analysis of existing production processes. A dynamic simulation accompanies planning of production lines and factories throughout the project. The latest tools and methods are used to combine event-discrete and agent-based models. A simulation's results can show improvement potential and point out possible optimizations in an early project stage.

Data Logging

Relevant data, with regard to machine, product quality, and production process, is constantly being logged by our systems. Data logging enhances transparency about the system behaviour and can be made available through customer-specific MES interfaces.

Data evaluation enables and improves e. g. fast commissioning of the machines, qualification of processes, predictive machine maintenance, or extended machine diagnostics.

Metrology

FOR 30 YEARS OUR CUSTOMERS CAN RELY ON OUR INTEGRATED METROLOGY SYSTEMS

Vision & Optical Inspection

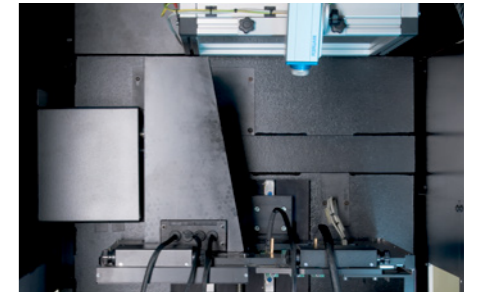
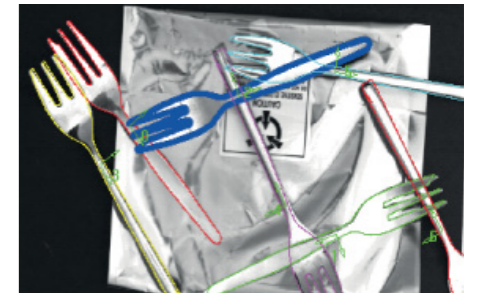
Optical inspection of intermediate and end industrial products is essential when monitoring the quality of production processes. Manz delivers top-level image processing systems. They ensure maximum efficiency in a single system or an entire production line by immediately optimizing upstream and downstream processes. As a result, improved quality and yield significantly reduce manufacturing costs.

Manz offers a variety of methods for image processing and optical inspection of a broad range of components or materials. There are numerous examples such as part and position recognition, dimension measurement, surface inspection and defect recognition, layer thickness, and 3D measurement.

Physical Measurement

In addition to image processing and optical inspection, Manz also has many years of experience in physical measurement technology. Our high-precision integrated solutions stand for optimal product quality and ensure zero-defect components.

Manz offers many physical measuring processes for a wide range of components and materials, like electrical measurement, automated weighing, spectral measurement, geometric measurement, and force measurement for all kinds of markets and products.



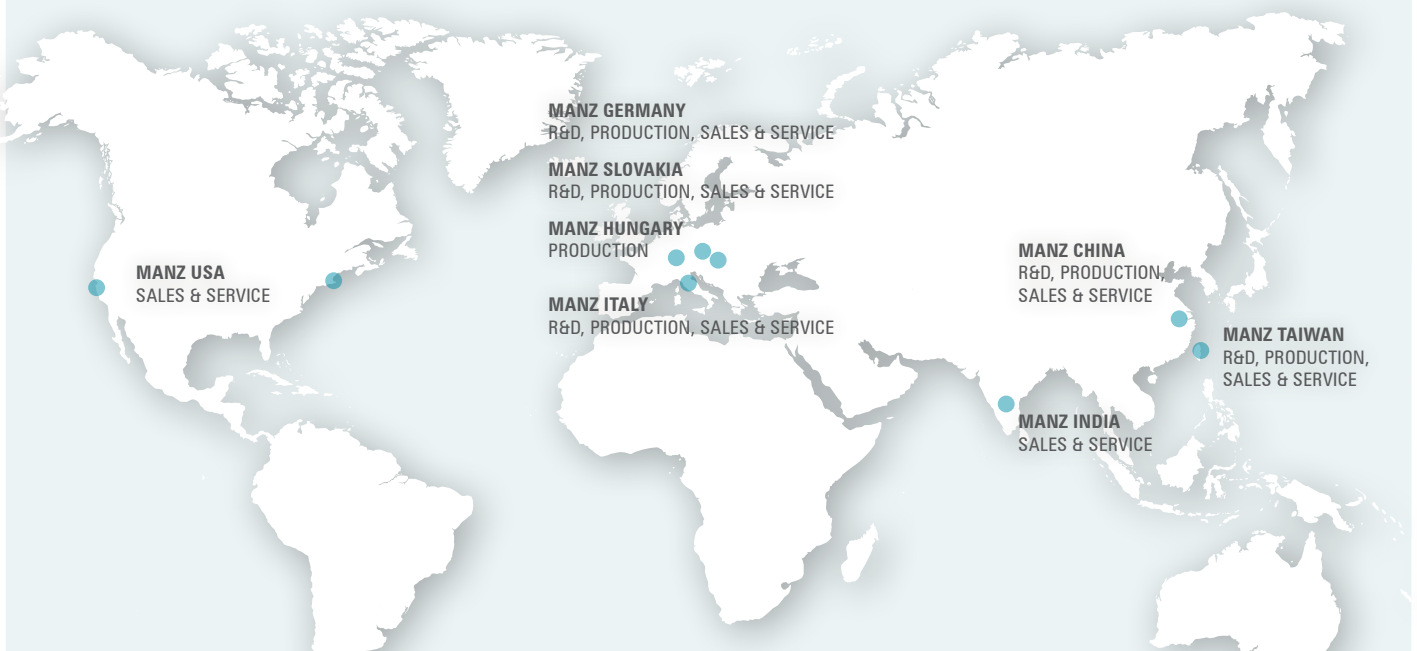
Manz offers a large variety of equipment for image processing, optical inspection, and physical measurement



Founded in 1987, Manz AG is a global high-tech equipment manufacturing company.

In addition to the CIGS*fab* turnkey production line in the Solar segment, the company focuses specifically on the automotive industry in the Electronics and Energy Storage segments.

The company, listed on the stock exchange in Germany since 2006, currently develops and manufactures in eight countries with around 1,700 employees.



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