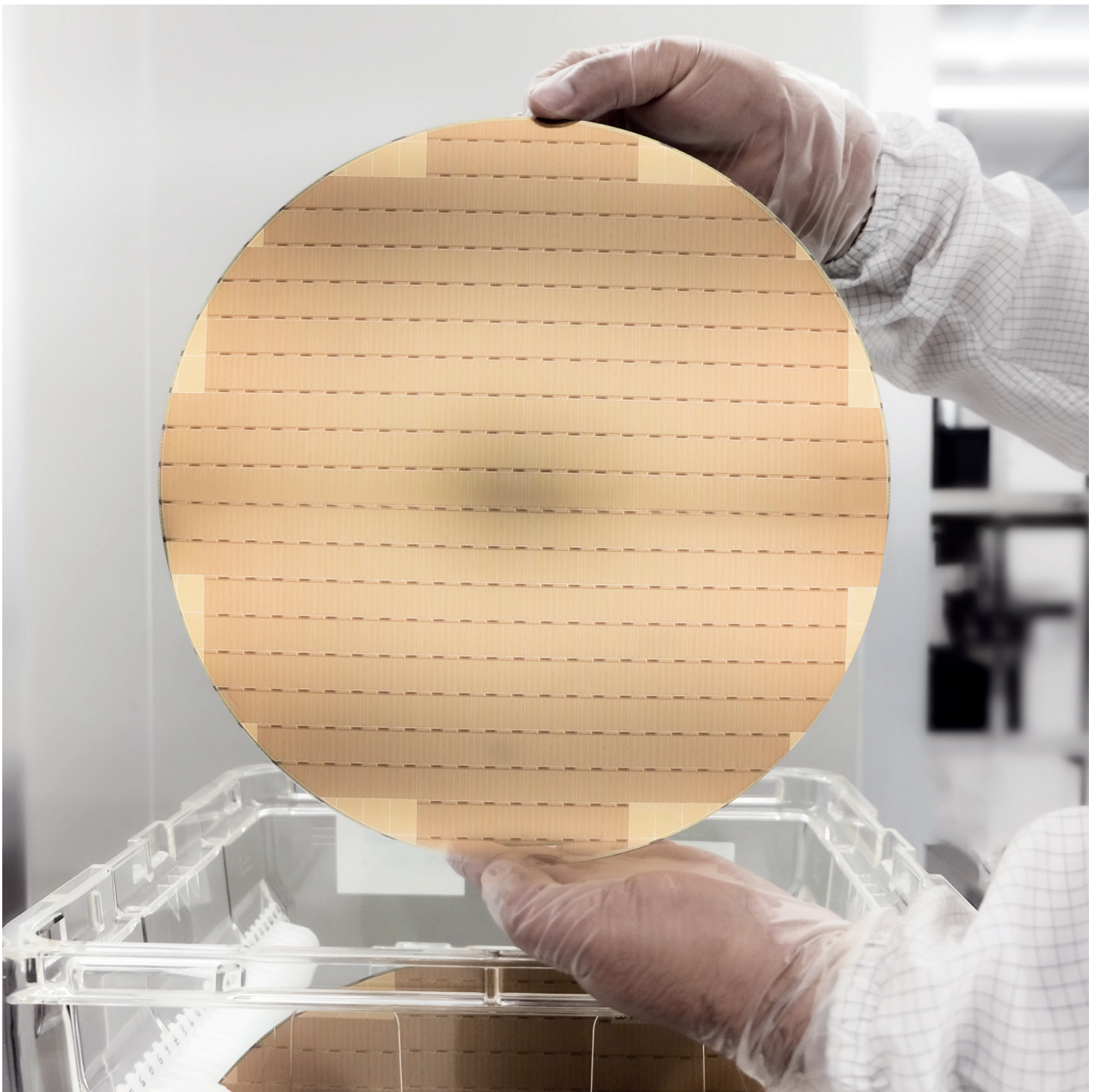


# Drive technologies and systems for the semiconductor industry



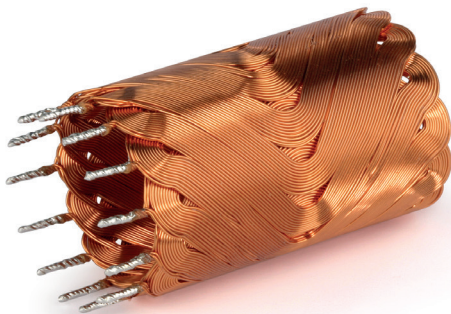
# Founded in Switzerland. Available worldwide.

## maxon – a strong global brand

maxon, with headquarters in Sachseln/Central Switzerland, has production sites in Switzerland, Germany, Hungary, South Korea, USA, France, Netherlands, Great Britain and China as well as sales companies in more than 30 countries. Our machines and product lines are developed in-house to guarantee cost-effective manufacturing of our products and enables us to create custom solutions to fit your specific application needs.

## Precision Drive Systems

maxon develops and builds precision drive systems. Our brushless and brushed DC motors with ironless windings are among the best in the world. Flat motors with iron cores complete our modular product portfolio. maxon's modular system includes planetary and spur gearheads, spindle drives, as well as encoders and control electronics.





# maxon is a reliable partner to the semiconductor industry



1



2

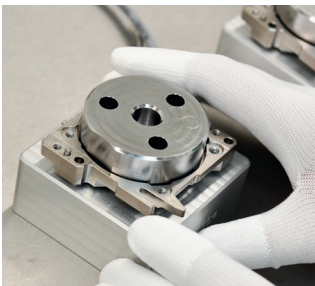
«Our production site in the Netherlands has specialized in the development and manufacturing of drives and systems for the semiconductor industry for over 20 years.»

Semiconductor manufacturing requires complex machines and process systems to produce wafers and microchips efficiently, in high volumes and flawlessly.

As a provider of high-precision drive solutions, maxon is an ideal partner to the semiconductor industry. maxon offers turnkey drive components as well as development and manufacturing services which give the equipment and machine manufacturers access to customized drive systems for peak performance.

For over 60 years, maxon has been a leader in drive technology. Today, maxon supports its customers worldwide with a global network of development and production sites.

Our customers have access to off-the-shelf standard solutions like brushed and brushless DC motors, sensors, positioning and multi-axis controllers as well as frameless direct drive solutions. Our products are ideal for use in the semiconductor industry (vacuum, high temperatures, low electromagnetic interference, special materials, and long service life).



3

maxon production site in the Netherlands

- 1 Clean room
- 2 Assembly line
- 3 Assembly

# Metrology and inspection

## Optical instruments



The manufacturing of semiconductor wafers is a time-consuming process of up to 600 steps. To minimize the amount of scrap produced, it is important that faults or deviations in the process are detected at an early stage.



Opto-mechatronic module with zero backlash for fast focusing.

In order to do this, maxon developed a zero-backlash spindle drive according to customer specifications. This unit delivers precise positioning around the clock. Our ceramic spindles with the patented zero-backlash technology offer the highest reliability and performance.

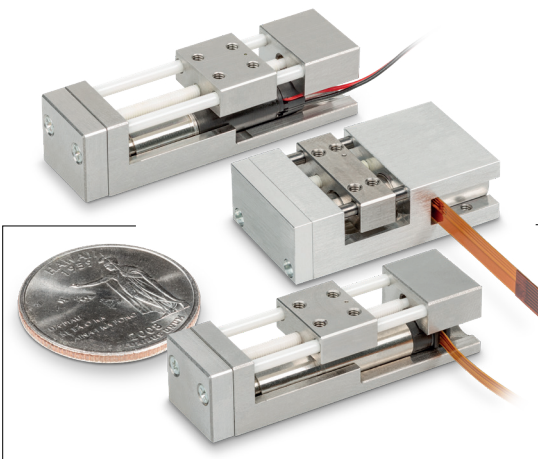
The spindle drive delivers precise positioning around the clock.



# Etching

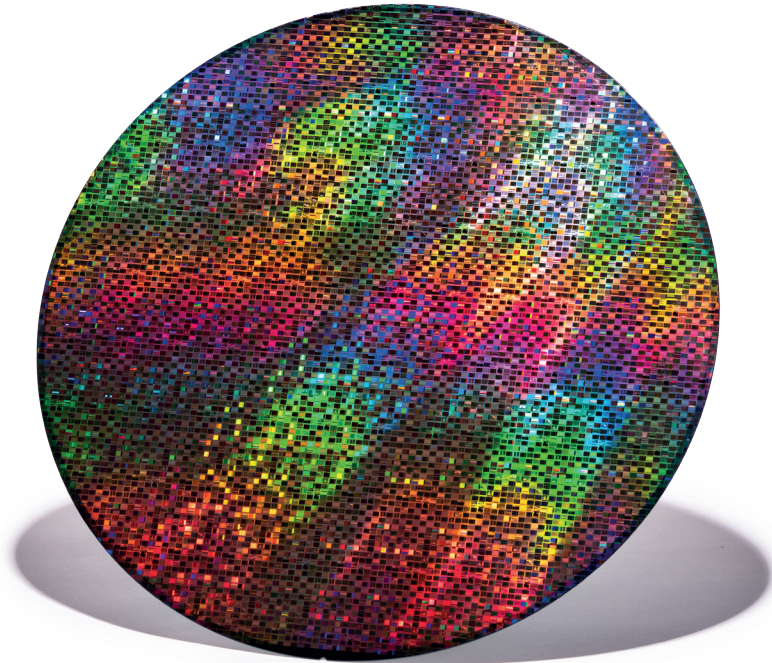
Measurement and testing systems play a critical role in the etching of conductors, since even the most minor deviations can result in an electrical defect. These processes are constantly checked to guarantee repeatability and accuracy.

maxon solutions are successfully used in systems for conducting measurements on electric circuits, determining the exact position of fiducials, or analyzing the thickness of surface layers.



maxon developed and produced these micro linear drives specifically for semiconductor customers. The stroke is 5 mm with a resolution of 9  $\mu\text{m}$ . In addition, the units are equipped with ceramic spindles that guarantee a long service life and precision.

# Wafer lifting



The manufacture and processing of wafers is an important production step in the microelectronics industry. Semiconductor substrates must be free from any foreign particles, so wafers are manufactured in vacuum chambers.

The company VAT is a world leader in industrial vacuum technology. One of its products is the pin lifter, which moves the wafer vertically in a vacuum chamber and aligns it precisely for further processing.




The pin lifter is the result of a partnership between VAT and maxon.

Due to the high requirements for precision and dimensions, maxon supplies the high-precision mechatronic drive system (including housing, spindle, motor shaft, and insulation components) as a tested unit. The system-oriented approach is what makes such a solution possible in the first place, since it facilitates the elimination of risks and supports the development of an optimal solution.

Three of these pin lifters move a wafer into the vacuum chamber.



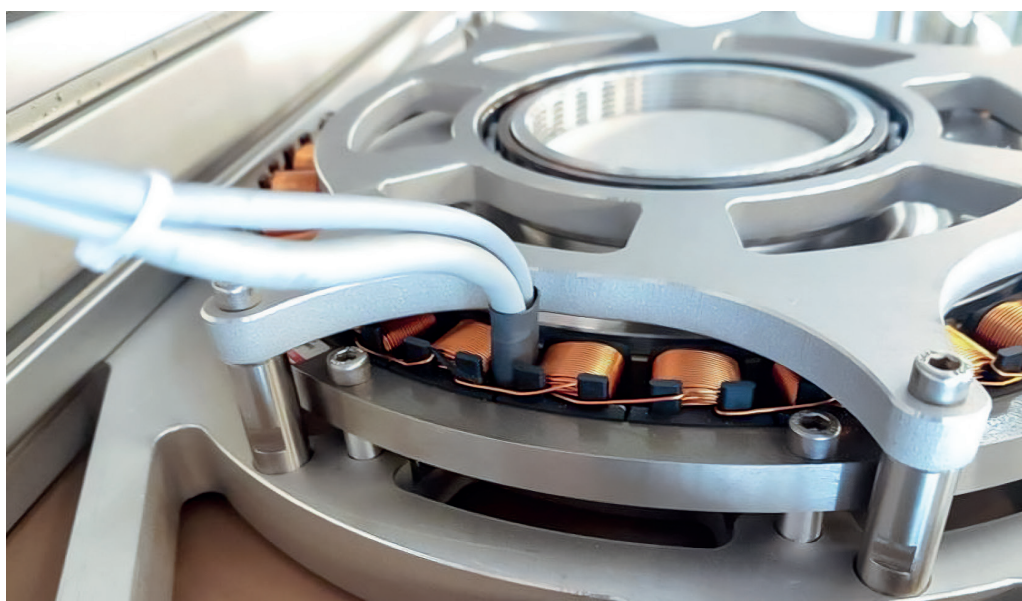


Semiconductor manufacturing requires complex machines and process systems to produce wafers and microchips efficiently and in high volumes without any faults.



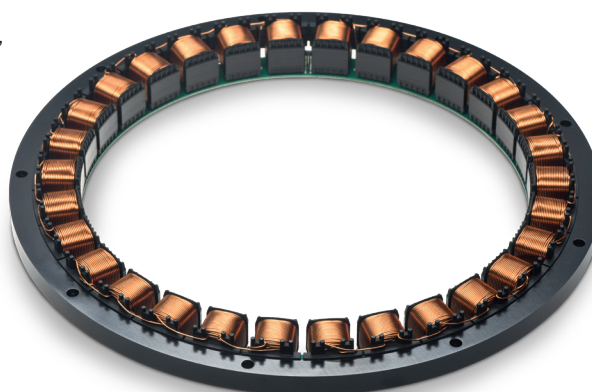
# Handling and processing of wafers

Clean room compatibility, precision, and a long product life are key requirements for a drive used in a wafer handling and processing system.

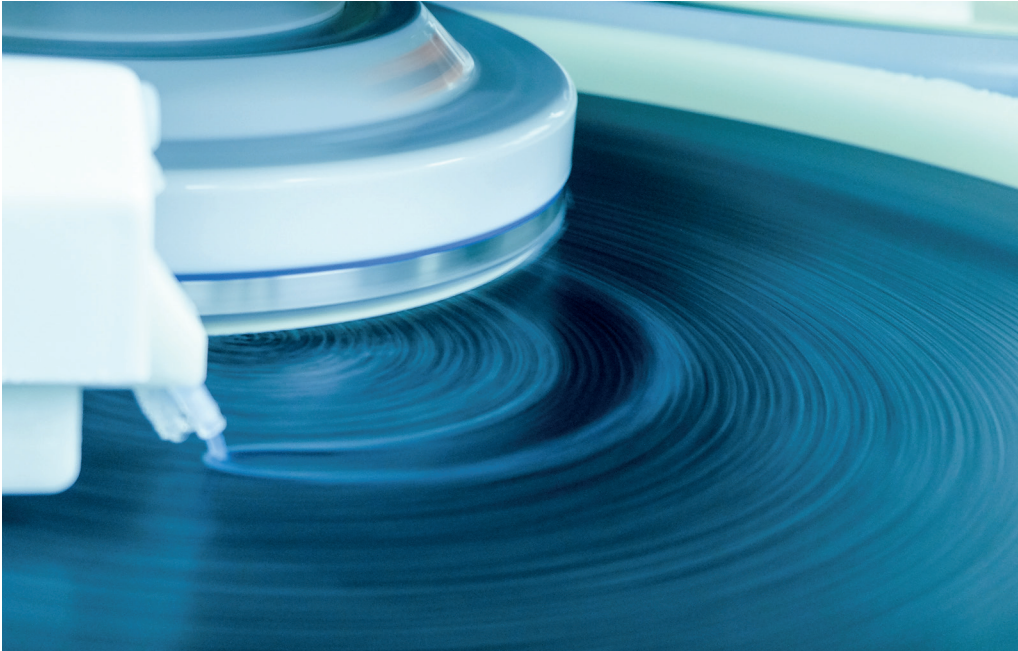


For these applications, maxon developed a brushless internal-rotor motor with a diameter of 275 mm. It features an opening through which cables etc. can be guided. The drive offers a high torque at low speed and low cogging torque. The inside diameter can be adapted to the customer's requirements. The motor can also be operated in a clean-room environment, and is ideal for applications with air bearings.

EC-i 275 frameless high torque, direct drive.



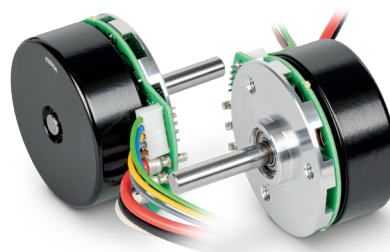
# Polishing and lapping



The planarity of a wafer is acutely critical, and must be validated and ensured in various phases of the semiconductor manufacturing process.

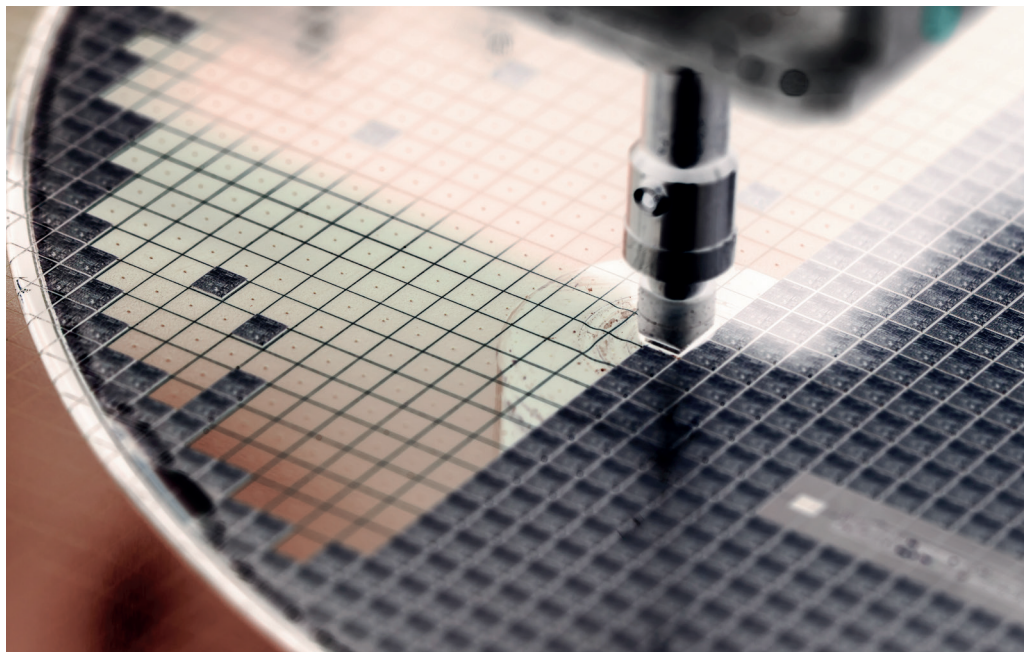
The most widely used process for planarization is chemical mechanical polishing (CMP), which is frequently combined with systems that clean and inspect the wafers during the entire process. This is a highly sensitive step, which includes abrasive surface conditioning/ polishing and chemical material interactions.

maxon solutions are integrated into various motion subsystems of polishing and lapping systems, and control critical functions like rotating plates, oscillating systems, and force application or dosing systems for slurring chemicals and abrasives. The polishing and lapping applications include various motion subsystems, which are optimized specifically for what they do.



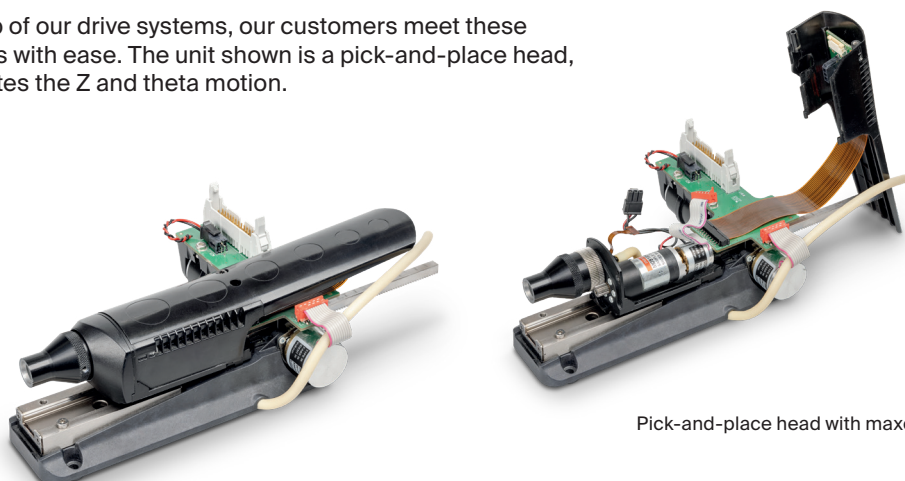
Controllers and drive units from maxon.

# Pick-and-place applications



Pick-and-place applications require the utmost precision paired with high speed.

With the help of our drive systems, our customers meet these requirements with ease. The unit shown is a pick-and-place head, which executes the Z and theta motion.

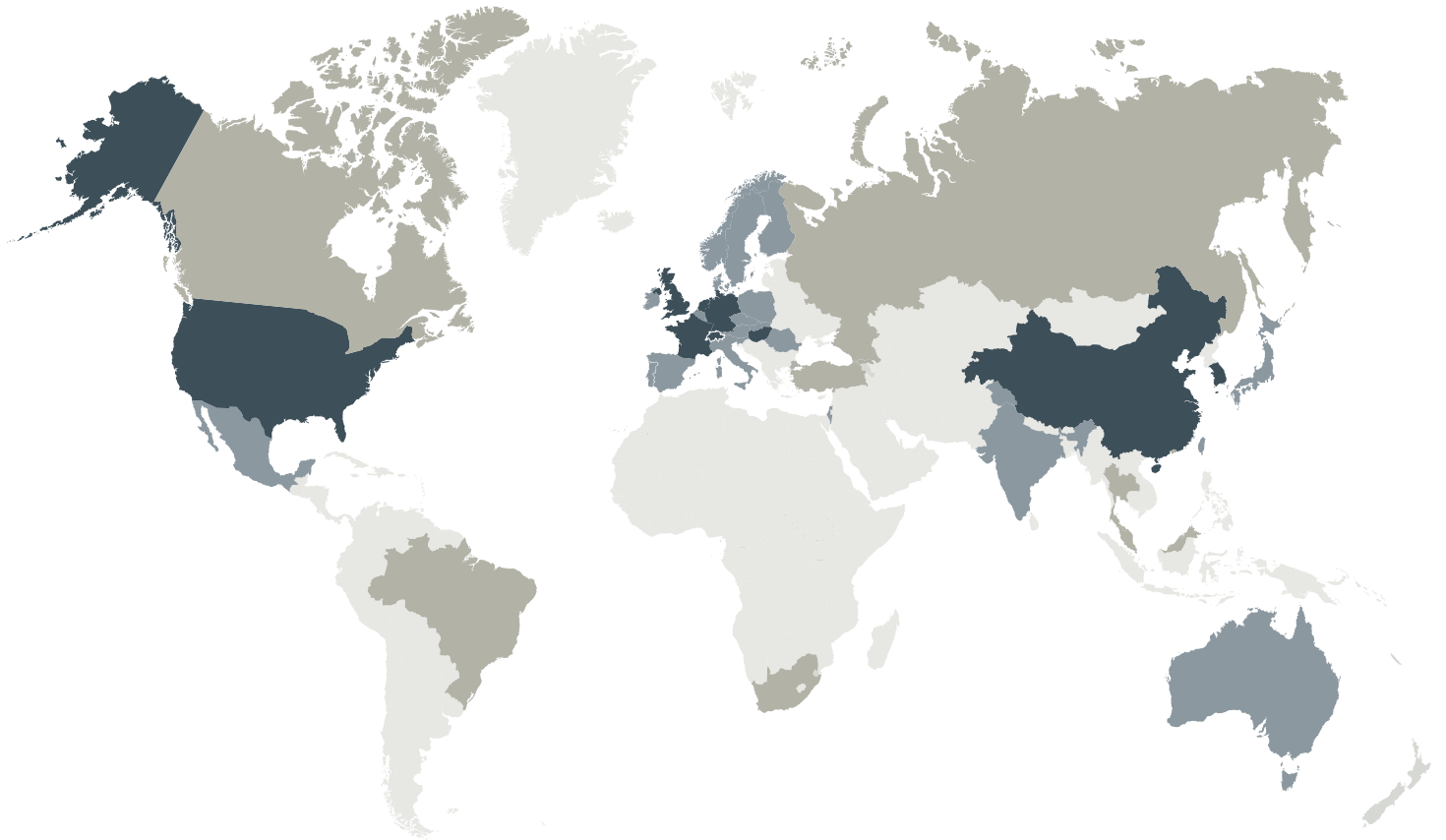


Pick-and-place head with maxon drives.

The high power density and compactness of the maxon drive systems boost the productivity of the machine without having to compromise on installation space. The manufacturing of various parts of the pick-and-place head, as well as the final assembly for the system, takes place in our factory in Sexau, Germany.



# A global network



Are you interested in working with us on your next product development project? Get in touch.

Click here to go to [industrialautomation.maxongroup.com](http://industrialautomation.maxongroup.com)



## maxon Manufacturing Companies

Switzerland (Headquarters)	South Korea	USA
Germany	France	China
Hungary	Netherlands	Great Britain

## maxon Sales Companies

Austria	Great Britain	Romania
Australia	Hungary	Serbia
Benelux	India	Sweden
Bulgaria	Ireland	Switzerland
China	Israel	Slovakia
Croatia	Italy	Singapore
Czech Republic	Japan	Slovenia
Denmark	Norway	South Korea
Finland	Mexico	Spain
France	Poland	Taiwan
Germany	Portugal	USA

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Brazil	Malaysia	Thailand
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Hong Kong	South Africa	

