

# The world of micro drives.

maxon micro drive



EDITION 5/2010

**maxon motor**  
driven by precision

## For use on the move.

Mobile applications such as laser distance measuring equipment, thermal imaging cameras or micro-pumps place specific requirements on a drive system: for instance, it must use as little energy as possible, resist large temperature fluctuations and also operate quietly.

The robust design, power density and energy efficiency of maxon micro drives make them ideally suited for mobile use.

## For medical technology.

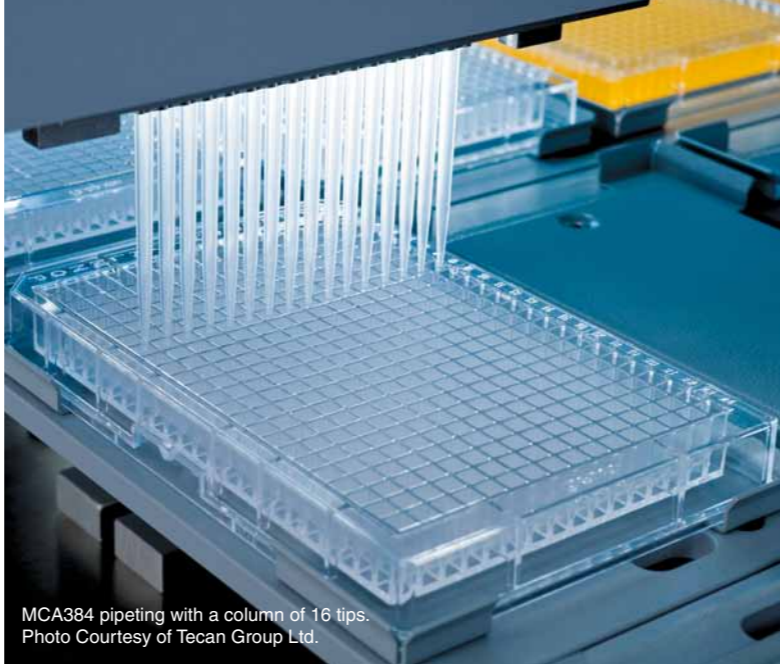
Ophthalmology equipment, radiation machinery, endoscopes, prostheses or portable medication pumps demand the highest standards in terms of quality and reliability.

maxon medical has the medical norm ISO 13485 certification. This certificate confirms that maxon medical meets the fundamental requirements of the medical technology sector. Traceability is guaranteed. maxon motor covers every kind of medical drive requirement thank to its broad range of different micro drives.

## For high precision in a tiny space.

Laboratory robots, analysis equipment, measuring and testing apparatus or micro grip tongs offer more and more functionalities in increasingly miniaturized form. Tasks such as optical lens correction, dosing minute quantities of liquid or positioning of calipers must be carried out quickly, with great precision and very smoothly.

The ironless winding design of maxon micro drives makes them the ideal choice for fulfilling these requirements (more on technology on page 4). This means that we give you compact system solutions with integrated sensors without compromising dynamics.



MCA384 pipeting with a column of 16 tips.  
Photo Courtesy of Tecan Group Ltd.

# When it really matters.

## Why you can rely on maxon's micro drives.

Precision drives from maxon motor are used in numerous applications. The most famous comes from the world of space travel: the NASA Mars Rovers demonstrate that maxon drives perform with absolute reliability even under the most extreme conditions. It comes as no surprise then that they are in such wide use here on earth.

They make possible, for instance, smooth operation of antennae in mobile radio, ship and aircraft, assist eye surgeons in correcting visual disorders, enable security cameras to capture the best viewing angles, simplify everyday tasks in household appliances, optimize the actions of shock absorbers to increase driving safety on winding roads and advance automation in industrial manufacture.

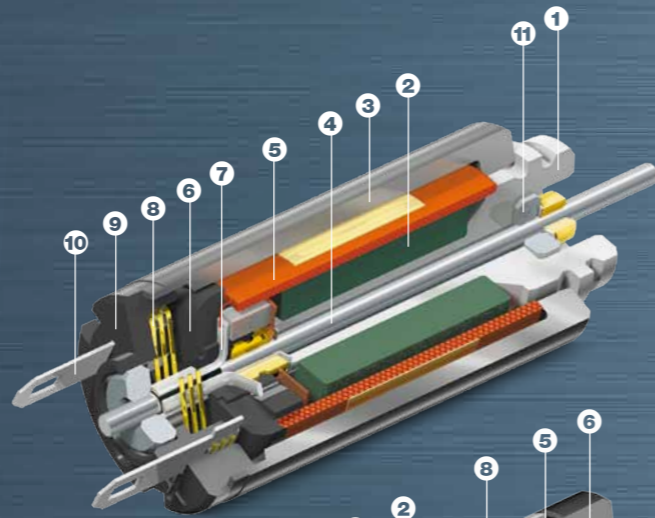
maxon drives are as diverse as their uses. Learn more on the page opposite about the typical uses of maxon micro drives.



#### maxon DC motor

DC motors with moving coil rotor and strong permanent magnets.

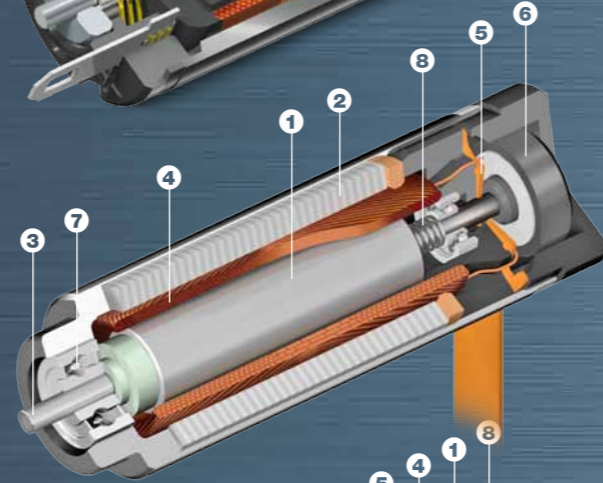
- 1 Flange
- 2 Permanent magnet
- 3 Housing (magnetic return)
- 4 Shaft
- 5 Winding
- 6 Commutator plate
- 7 Commutator
- 8 Precious metal brushes
- 9 Cover
- 10 Electrical connection
- 11 Sintered sleeve bearing



#### maxon EC motor

Brushless DC motors with maximum service life.

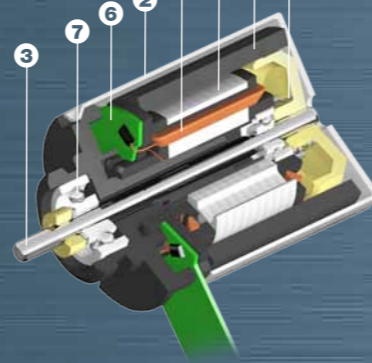
- 1 Permanent magnet
- 2 Laminated steel stack
- 3 Shaft
- 4 Winding
- 5 Print with Hall sensors
- 6 Control magnet
- 7 Ball bearing
- 8 Spring (bearing preload)



#### maxon flat motor

High torque brushless DC motors with outer or inner rotor.

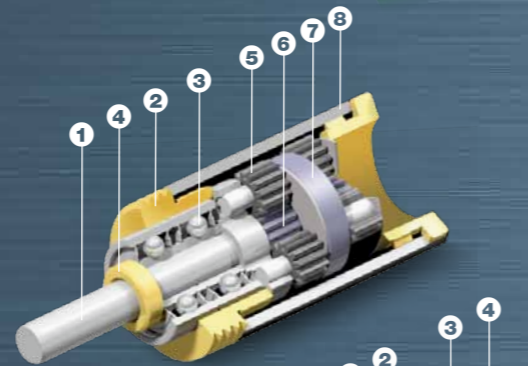
- 1 Permanent magnet
- 2 Housing
- 3 Shaft
- 4 Laminated steel stack
- 5 Winding
- 6 Print with Hall sensors
- 7 Ball bearing
- 8 Spring (bearing preload)



#### maxon gear

Customized special gears as well as standard spur and planetary gearheads.

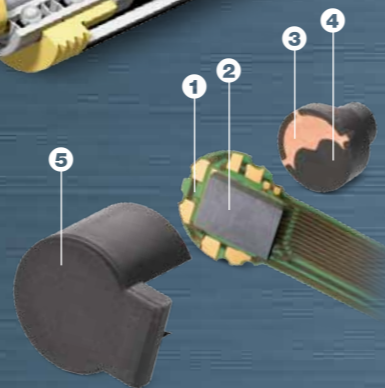
- 1 Output shaft
- 2 Flange
- 3 Ball bearing
- 4 Axial security
- 5 Planetary gearwheel
- 6 Sun gearwheel
- 7 Planet carrier
- 8 Internal gear



#### maxon sensor

High-resolution digital encoders, DC tachos and resolvers.

- 1 Print
- 2 ASIC
- 3 Solid measure
- 4 Carrier of solid measure
- 5 End cap



# Smallest dimensions, largest performance.

Thanks to the ironless rotor and a versatile product range.

The self-supporting copper coil is the "heart" of the maxon cylindrical DC motor. Brushed and brushless DC motors with ironless rotors are reliable, longer-lasting and, thanks to their 90%-plus efficiency, exceptionally high-performance. The end results are superior acceleration, long service life and reduced energy consumption.

Like the larger versions, maxon micro drives are modular by design: motor, gears, sensors and control electronics can all be combined to produce a complete system.



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# In the end, customer benefit is all that matters.

## We develop individual system-based solutions.

The best solutions come from making the right combinations. This is why our combinations are created at both customer and product level.

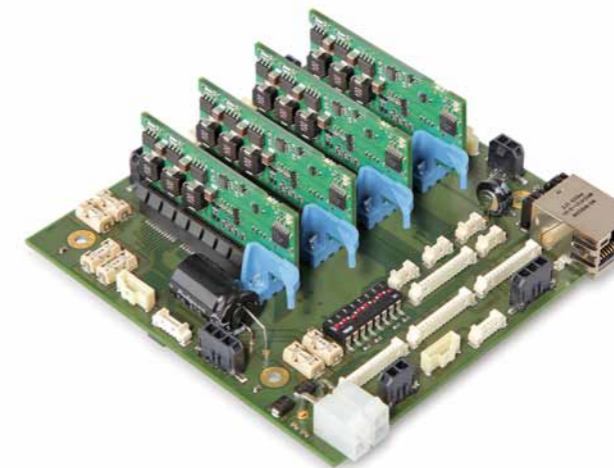
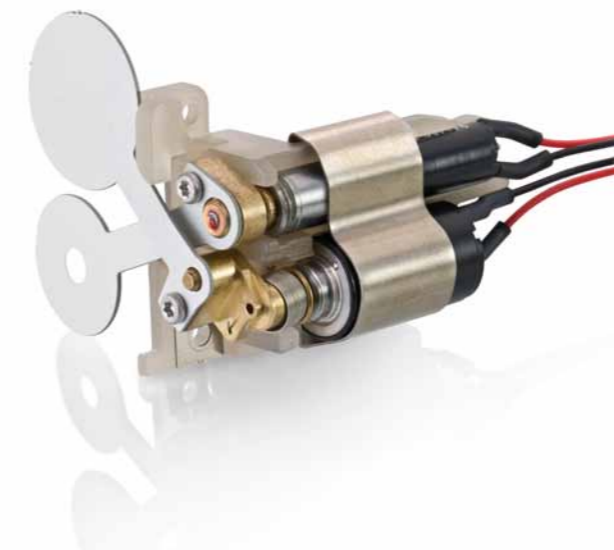
What does that mean? For us, combination means the interaction of customer ideas with maxon's years of expertise. We always see our business partners as co-developers, as it is only by understanding the detail that solutions can be created that are market-driven and based on need. We can also call on an extensive and modular product range comprising DC and EC motors, gearheads, sensors and control electronics, giving us great flexibility for interpreting customer-specific total solutions.

We also create special versions if more is required than a combination of standard products, in other words, optimized solutions that fulfill their function perfectly in minimal space. Please see the following three examples.

## We guarantee flexibility and quality.

Customer specifications can be recorded and realized quickly with modern systems. Any necessary changes can be incorporated immediately into the development process and their effect shown through 3D simulation. Proposed solutions are tested in a wide variety of simulation models. New solutions can be tried and tested straightaway and improved in maxon's own sample shop. Sample production means that your products can be used quickly in prototypes.

Mechanical endurance tests highlight weaknesses in specific load scenarios which can be rectified in good time. Quality not only refers to the objective properties of the products, but extends to the manner in which our employees think and act. maxon motor has ISO 9001, ISO 14001 and ISO 13485 certification.



## Accurate measuring in dosage systems.

More and more medication is being customized for patients, which means that they also have to be measured and dispensed with greater precision. In other words, zero failure tolerance is a top priority.

Small syringe pumps or control valves are typically used for dosage applications and these require micro drives.

maxon motor's modular system guarantees precise and mechanical interaction between winding spindle, gearing, motor, encoder and drive control. maxon motor also stands for quality and reliability under medical standard ISO 13485.

## Resistant aperture adjustment in infrared cameras.

Whether for firefighting or border controls in the Arctic: mobile infrared cameras are used in extreme external conditions.

The drive components therefore come under enormous pressure in terms of temperature fluctuation, resistance and reliability. In infrared equipment for example, micro drives enable the shutter to be accurately opened and closed for thermal adjustment.

maxon micro drives are also completely reliable and dynamic even when exposed to wide temperature fluctuations, producing very little heat of their own.

## Synchronous axis positioning in radiation equipment.

Modern radiation equipment has been responsible for the enormous progress made in cancer treatment. With the help of multi-leaf collimators, radiation can carefully target tumors without damaging healthy tissue.

A multi-leaf collimator comprises a large number of thin lead leaves, each with their own motor, which can be electronically controlled to penetrate the radiation field. This allows the radiation field to be accurately and individually adjusted to suit the target volume's anatomical circumstances.

In other words, it must be possible for several axes to be synchronously corrected in an extremely small area. maxon motor has also developed intelligent positioning controllers for its micro drives. For networked dynamics in tight spaces.

# maxon motor at a glance.



## maxon DC motor maxon A-max maxon RE-max

DC motors with moving coil rotor and strong permanent magnets:  
Ø6 - 65 mm,  
0.3 - 250 watts.



## maxon EC motor maxon EC-max maxon EC-4pole

Brushless DC motors with maximum service life; autoclavable versions available:  
Ø6 - 60 mm,  
1.2 - 400 watts.



## maxon motor control

Control electronics for DC and EC motors, servoamplifiers and positioning control units.



## maxon compact drive

Intelligent compact drives with a maximum 60 watts output. maxon's compact drives feature controllers, sensors and motors in a modern aluminium casing.



## maxon sensor

High-resolution digital encoders, DC tachos and resolvers.



## maxon flat motor

Brushless DC motors in a flat design with outer or inner rotor:  
Ø9.2 - 90 mm,  
0.2 - 90 watts.



## maxon gear

Customized special gears as well as standard spur and planetary gearheads.



## maxon micro drive

DC and brushless DC micro drives with diameters < 10 mm:  
Ø6 - 9.2 mm,  
0.2 - 2 watts.



## maxon spindle drive

Compact, easy to configure spindle drives as complete systems.



## maxon ceramic

Innovative, customer-specific ceramic and metal injection moulding components. For drive technology – and many other applications.

[www.maxonmotor.com](http://www.maxonmotor.com)

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