maxon – a strong global brand

maxon, with headquarters in Sachseln/Central Switzerland, has production sites in Switzerland, Germany, Hungary, South Korea, USA, France, Netherlands 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 enabling 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.
A unique material.

Ceramic can be used where other materials fail.

maxon develops and manufactures customizable CIM (Ceramic Injection Moulding) components in Sexau in the south-west of Germany. Our development and engineering program is based on more than 20 years experience in Powder Injection Moulding (PIM) and we work with the most up-to-date CAD technology and finite element calculation. Thanks to CIM, maxon is well-placed to produce highly complex ceramic components - providing extreme precision and supreme quality.

Our areas of application

Clock technology
Measurement technology
Audio technology
Industrial automation
Medical technology
Drive technology

[ceramic.maxongroup.com]
Clock technology
Components for mechanical clockwork

Precise and long-life.

Ceramic components for automatic clockwork

→ Extreme precision
→ For generations to come
→ High degree of wear-resistance
→ Dependable serial production
→ Completely non-magnetic

The small components of a clock mechanism have to be constructed with the utmost precision to ensure reliability. With ceramic components the intermeshing parts will maintain the same level of precision for generations to come.
Ceramic withstands adverse conditions. When used in sensor housings, it demonstrates resistance to high temperatures, abrasive gas flow dust, and chemically aggressive condensate. Its low thermal conduction protects the electronics inside the sensors. Its passive behavior in electrical and magnetic fields allows electronic sensors to be deployed.

Highly robust in extreme environmental conditions.

→ High resistance to extreme conditions
→ Low thermal conduction
→ Passive behavior in electrical and magnetic fields
→ Avoids maintenance costs and oncosts
Audio technology
Housings for high-tech in-ear headphones

Scratch-resistant ceramic for headphone housings ensures long service life and a pleasant user experience.

Ceramic surfaces impress with their scratch-resistance and surface shine. Its low thermal conduction means ceramic is warm and pleasant to the touch. The continuous development of our forming and polishing processes achieves a very special combination of aesthetics and functionality. Ceramic housings protect the high-quality technology inside and present a high-quality exterior which lasts.

→ Perfect surface finish
→ Scratch-resistant for a long service life
→ Low thermal conduction for pleasant user comfort
→ Optimal acoustic properties
Audio technology
Bearings for high-end record players

There are no compromises in the pursuit of the perfect listening experience: All the elements need to work in perfect harmony. Our ceramic components are ideal for innovative customised turntable bearings. The use of ceramics means that challenges such as magnetic fields and precision radial run-out are easily overcome. The demands in the high-end range are extremely high: Extreme precision and the highest quality in materials, manufacture and surface finishes always come first. Smooth working relationships based on trust are paramount in ensuring a first-class high-end product.

Finished parts made from technical ceramics enable precision scanning of record grooves.

→ Completely non-magnetic
→ Perfect surface finish
→ High wear-resistance

You can find additional information at www.ceramic.maxongroup.com
In industrial automation, ceramic impresses with its hardness, stability, wear-resistance and sliding characteristics.

Machine and plant availability is extremely important in the industrial sector. Ceramic impresses here with its hardness, stability, wear-resistance and outstanding sliding characteristics. A prime example of this is maxon’s ceramic spindle with its cgs (ceramic glide surface). Sockets/connectors, guides, axles and shafts are also typical ceramic insert elements. The chemically resistant and non-magnetic material can also be used where other materials reach their limits.

- High wear-resistance
- Extreme level of hardness
- Outstanding surface finish
- Excellent stability
Medical technology
Insulation components for endoscopes

Ceramic insulation components give outstanding results in the field of endoscopy: They are biocompatible and robust.

Medical technology places particularly high demands on the materials used in medical devices (e.g. endoscopes): Only optically perfect, high quality, reliable components make the grade. In addition, materials must also be biocompatible and resistant to bodily fluids.

→ Perfect surface finish
→ Biocompatible
→ Low thermal conduction
→ Highly robust

You can find additional information at www.ceramic.maxongroup.com
In drive technology, the limitations of traditional materials can become evident, depending on the application involved. So, for example, customised underwater drives require salt water resistant materials. Our ceramic spindles give outstanding service here: They are corrosion-resistant, robust, wear-resistant and at the same time extremely efficient.

**Drive technology**

**Spindles for extreme conditions**

Robust and corrosion-resistant materials are required for use in salt water.

The maxon cgs (ceramic glide surface) ceramic spindles

- Work with virtually no slip-stick effect
- Smooth-running
- Extreme hardness
- Extra long service life
- High wear-resistance
- Excellent efficiency
Techniques and Manufacturing Processes

Different processes for the manufacturing of high quality ceramic products achieve optimal outcomes.

**Zirconium oxide ZrO₂**
Mechanically high load-bearing

Zirconium oxide is a high-performance industrial ceramic, used particularly in ranges where traditional materials reach their limits.

Special properties of zirconium oxide:

- Excellent wear-resistance and hardness
- Outstanding sliding characteristics
- Excellent mechanical stability
- High degree of temperature resistance
- Superior insulation properties
- High corrosion- and chemical resistance, comprehensive acid- and alkali-resistance
- Modul of elasticity and heat expansion coefficient similar to steel
- Biocompatible und low in allergens
- Low specific weight

**Aluminium oxide Al₂O₃**
High thermal load capacity

Aluminium oxide is widely used in electrotechnology for insulation.

Special properties of aluminium oxide:

- Excellent temperature resistance
- Good thermal conductivity
- Median mechanical stability
- Low heat expansion coefficient
- High corrosion- and chemical resistance, extensive acid- and alkali-resistance
- High level hardness
- Low specific weight

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**General properties of the material**

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<th>Property</th>
<th>Zirconium oxide</th>
<th>Aluminium oxide</th>
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<td>Density</td>
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<td>Härte</td>
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<td>2000 HV</td>
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<td>Hardness Heat expansion coefficient</td>
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You can find additional information at www.ceramic.maxongroup.com
# Standard ceramic components

## Spindles

![Spindles Image](image_url)

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Standard ceramic components

Axles

1) Diameter tolerance variance: -0.008/-0.013
2) Diameter tolerance variance: -0.013/-0.018
3) Edge chamfer R 0.3 ± 0.1
4) Straightness tolerance variance: 0.02 mm
5) Straightness tolerance variance: 0.03 mm
6) Straightness tolerance variance: 0.04 mm
7) Roundness tolerance variance: 0.003 mm

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A global network

maxon Manufacturing Companies
Switzerland (Headquarters) South Korea USA
Germany France China
Hungary the Netherlands Great Britain

maxon Sales Companies
Australia Hungary Singapore
Austria India Slovakia
Benelux Ireland Slovenia
China Israel South Korea
Czechia Italy Spain
Denmark Japan Sweden
Finland Norway Switzerland
France Poland Taiwan
Germany Portugal USA
Great Britain Romania

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Canada Russia Turkey
Hong Kong South Africa

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