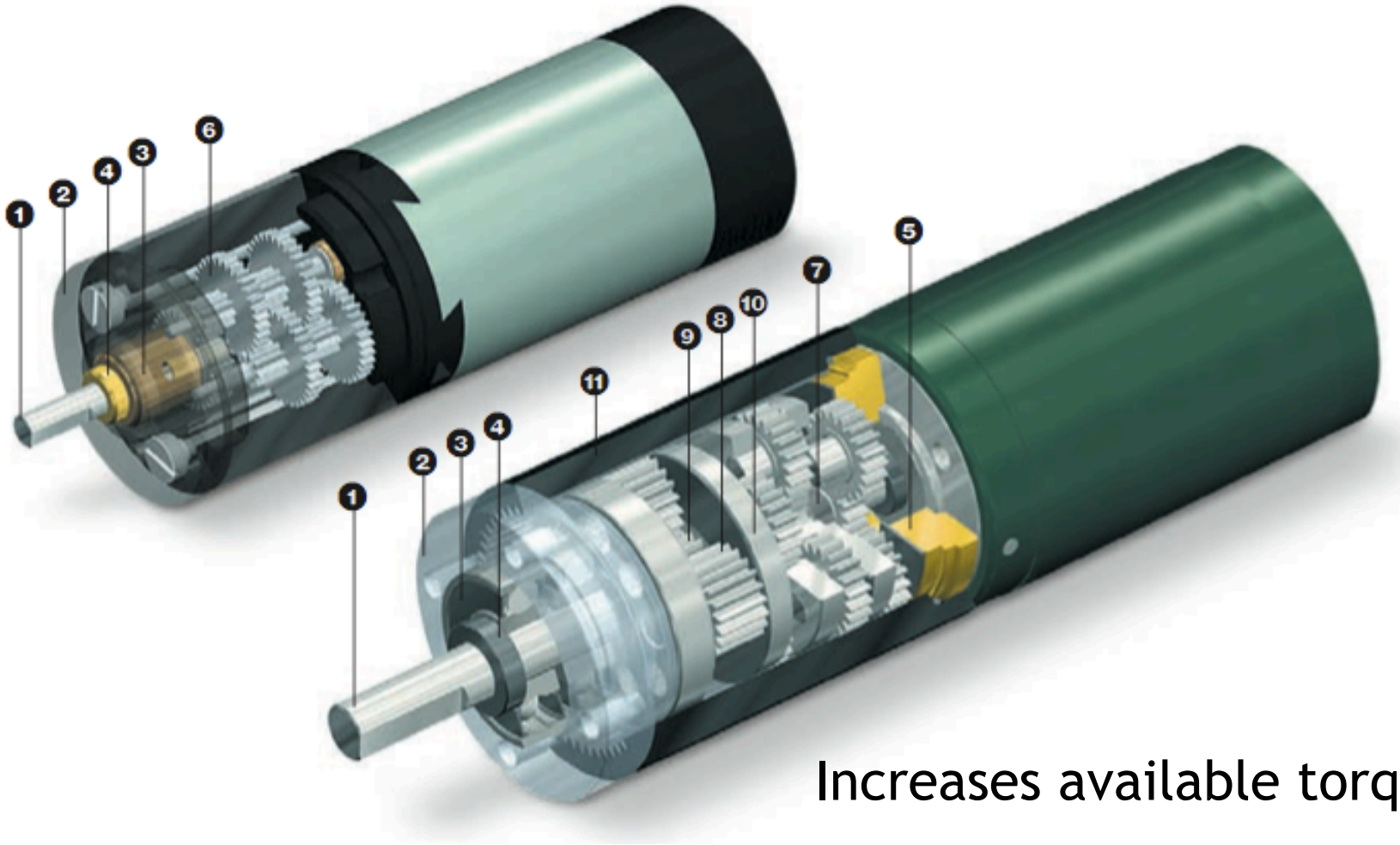
ROCO222: Intro to sensors and actuators

Lecture 7

Maxon gearboxes

Maxon motors with gearing



Increases available torque

Maxon spur gear head

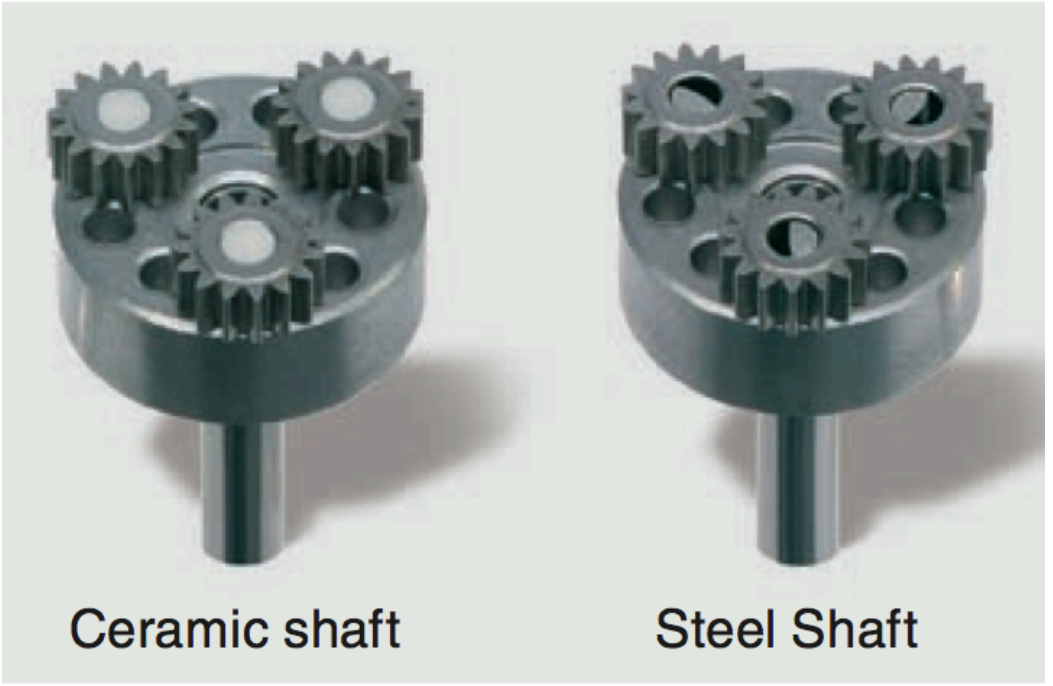
- Favorably priced
- For low torques
- Output torque up to 2 Nm
- Ratios of 6:1 to 5752:1
- Low noise level
- High efficiency

Maxon planetary gear head

- For transferring high torques up to 180 Nm
- Reduction ratios of 4:1 to 6285:1
- External diameter 6 - 81 mm
- High performance in a small space
- High reduction ratio in a small space
- Concentric gear input and output

Ceramic versus steel gears

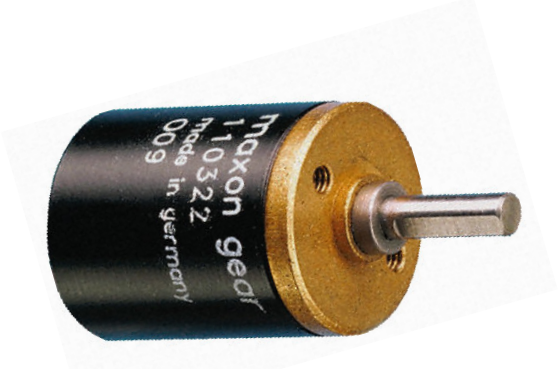
- Ceramic has longer service life
- Wear much less than steel
- Higher continuous torques
- Higher intermittent torques
- Higher input speeds



Spur versus planetary gearboxes

	Spur Gearheads	Planetary Gearheads
Power Transfer per volume	Low	High
High Power option	None	Ceramic
Price	Favourable	Expensive
Low price option	Plastic also available	Plastic also available
Noise level	Lower	Higher
Efficiency	Very high	High

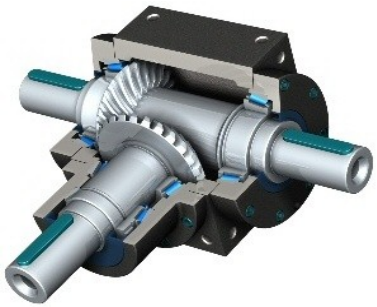
Gearbox mechanical losses



Spur Gear
efficiency: 85% typical

Worm gear
efficiency: 50-90%

Planetary Gear
efficiency: 75% typical



Bevel gear
efficiency: typical 90%

- Energy is wasted in the forms of
- Heat (from friction of gears meshing)
- Noise

Gearboxes losses increases with stages