

# *Antrieb für eine grüne Zukunft*

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# Drives & Generators Technologies/Applications

## Asynchronous

Areas of application:

- ▶ conveyor technology
- ▶ fans and air conditioning
- ▶ compressors
- ▶ pumps
- ▶ mixers and kneading machines
- ▶ hoisting technology
- ▶ machine tools
- ▶ traction drives



## Synchronous

Areas of application:

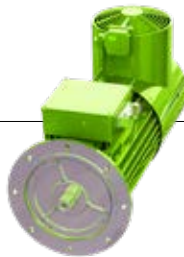
- ▶ paper industry
- ▶ cleaning facilities
- ▶ belt drives
- ▶ synchronism
- ▶ parallel operation w/o feedback



## Direct current

Areas of application:

- ▶ wind power industry
- ▶ textile industry



## Torque

Areas of application:

- ▶ radar systems
- ▶ rotary plate for machine tools
- ▶ powerful rotary drives
- ▶ construction machinery
- ▶ tunnel boring machine



## Servo

Areas of application:

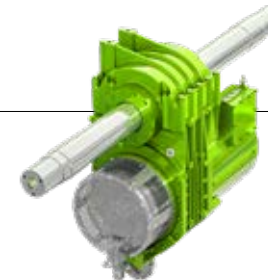
- ▶ machine tools
- ▶ for very limited installation space
- ▶ compressor / extruder
- ▶ highly dynamic applications
- ▶ travel drives



## Geared motors

Areas of application:

- ▶ cleaning facilities
- ▶ rail vehicles
- ▶ conveyor technology
- ▶ textile industry



# Technologies/Applications

## Drives & Generators

parameters	drive motors					generators
	synchronous	asynchronous	servo	torque	direct current	a-/synchronous
power [p]	up to 1MW	up to 600 kW	up to 1 MW	application-specific	up to 20 kW	up to 500 kW
rotational speed	20.000 rpm	30.000 rpm	20.000 rpm	application-specific	application-specific	up to 1.800 rpm
voltage	0-500 VAC	0-500 VAC	0-500 VAC	0-500 VAC	0-500 VAC	application-specific
torque	1 Nm- 10 kNm	1 Nm- 10 kNm	1 Nm- 10 kNm	20 kNm	application-specific	application-specific
efficiency	up to 97%	up to 95%	up to 97%	application-specific	application-specific	up to 97%
Torque density	high	good	high	very high	low	high
advantages	<ul style="list-style-type: none"> <li>+ light and compact design</li> <li>+ efficient in relation to size</li> <li>+ high efficiency with small rotational speeds</li> <li>+ grid operation possible</li> </ul>	<ul style="list-style-type: none"> <li>+ cost-effective</li> <li>+ very long service life</li> <li>+ low maintenance</li> <li>+ high rotational speed</li> <li>+ can deliver 3 times the rated capacity for a short time</li> </ul>	<ul style="list-style-type: none"> <li>+ high positioning accuracy</li> <li>+ high acceleration capacity</li> <li>+ light and compact design</li> <li>+ efficient in relation to size</li> </ul>	<ul style="list-style-type: none"> <li>+ very high rotational speed</li> <li>+ compact design (packet lengths)</li> <li>+ high positioning accuracy</li> </ul>	<ul style="list-style-type: none"> <li>+ direct battery emergency operation in case of power failure</li> <li>+ high starting torque</li> </ul>	<ul style="list-style-type: none"> <li>+ high efficiency (synchronous)</li> <li>+ rotational speed independent of load (synchronous)</li> <li>+ low maintenance</li> </ul>
limits	<ul style="list-style-type: none"> <li>- frequency inverter required for rotational speed variance</li> <li>- limited rotational speed due to rotor design</li> </ul>	<ul style="list-style-type: none"> <li>- size</li> <li>- no braking torque in case of power failure</li> <li>- no speed stability without recirculation</li> </ul>	<ul style="list-style-type: none"> <li>- frequency inverter required</li> <li>- limited rotational speed due to rotor design</li> <li>- peripheral costs (permanent magnets)</li> </ul>	<ul style="list-style-type: none"> <li>- high iron losses</li> <li>- expensive periphery</li> <li>- peripheral costs (permanent magnets)</li> </ul>	<ul style="list-style-type: none"> <li>- relatively maintenance-intensive</li> <li>- limited rotational speed due to collector</li> <li>- limited efficiency</li> </ul>	<ul style="list-style-type: none"> <li>- expensive permanent magnets necessary</li> <li>- increased acquisition costs</li> <li>- peripheral costs (permanent magnets)</li> </ul>

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