



Vogel & Plötscher

# Traction Drives

In axial flux technology



Lightweight

Compact

Efficient





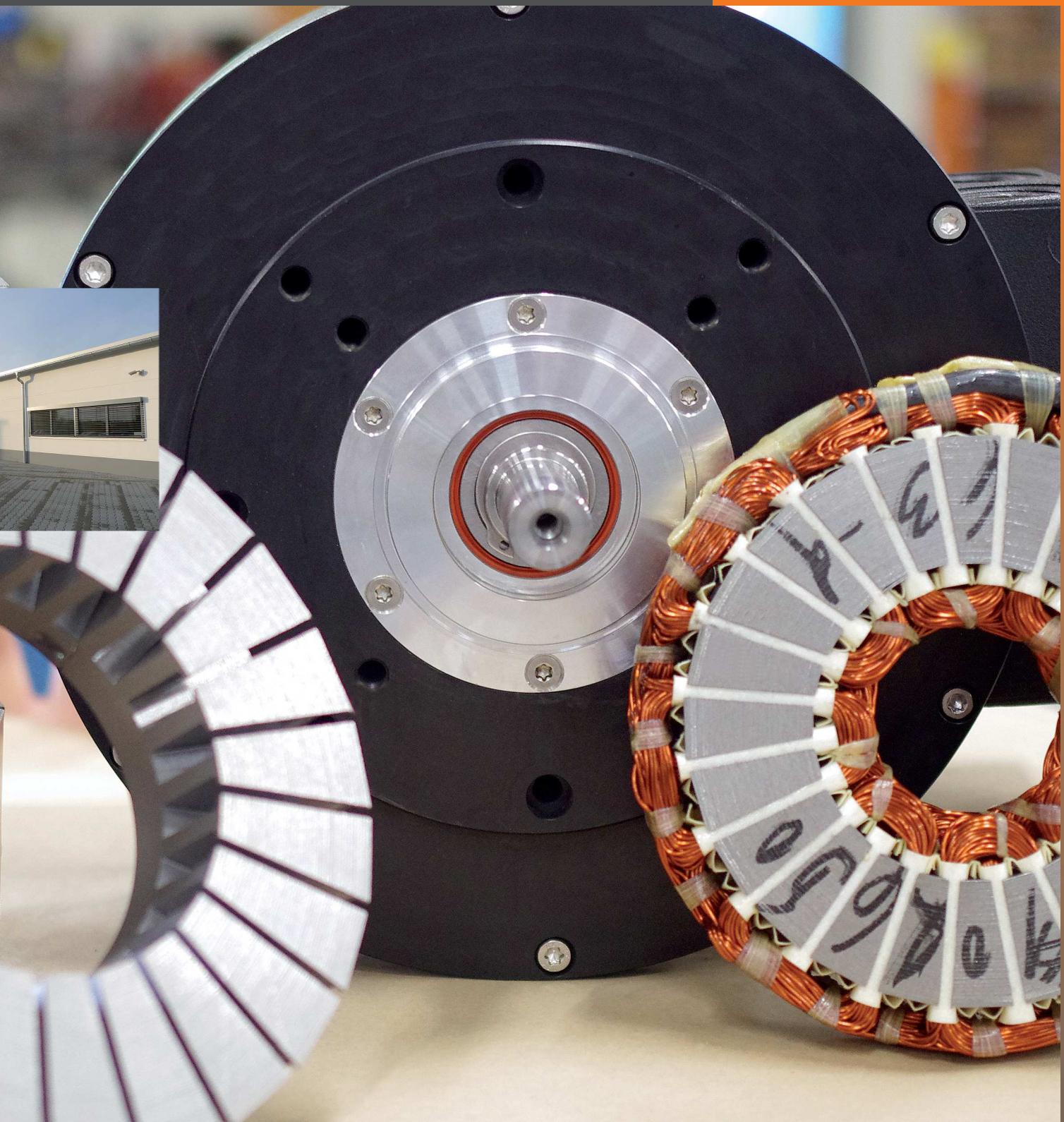
## Vogel & Plötscher

is a medium-sized company and part of ROBEL Group in southern Germany.

The manufacture and sale of pancake motors, wheel hub motors as well as punching and winding machines are part of the company's core expertise.

A high level of vertical integration, independent electronic development and software programming ensure a high degree of flexibility and also enable the implementation of customised (special) solutions.

On the following pages, we will present our pancake motors in detail. Our drive solutions impress with perfection in every component.



## Axial Flux Technology

... is the basis for the pancake motors. Our competence in the production and development of these motors has ripened over the years and has been continuously expanded.

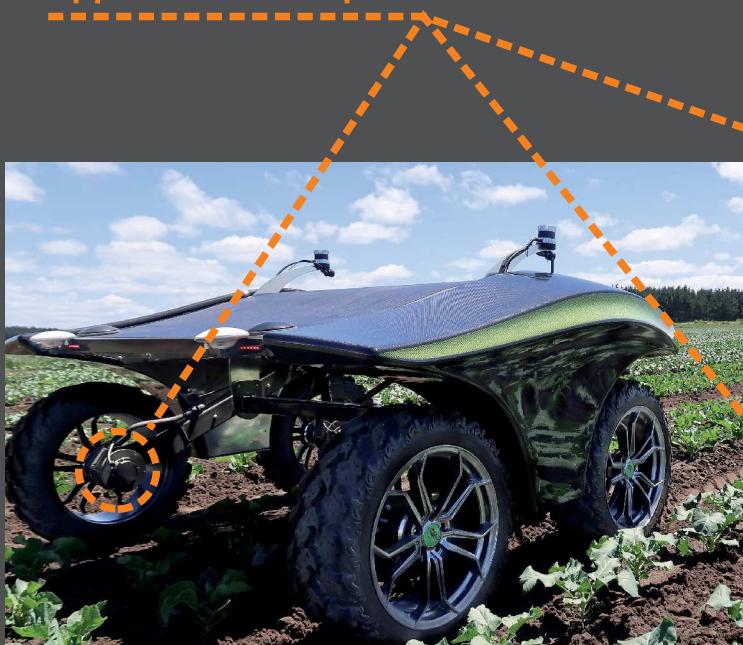


# Pancake Motors

A good drive is characterised by the fact that it is not defined by its appearance but rather by its ability to reliably fulfill its function. Like a "Kraftwerk" (literally power plant in German), it continuously provides power, ensuring that the machine it powers always works and exactly as you would expect it to day after day.

All pancake motors from Vogel & Plötscher also impress with their compact, lightweight – yet robust – and efficient design.

## Application examples



Our pancake motors (permanent magnet synchronous motors in axial flux technology) are ideally suited for a wide range of applications and are particularly popular as traction drives.



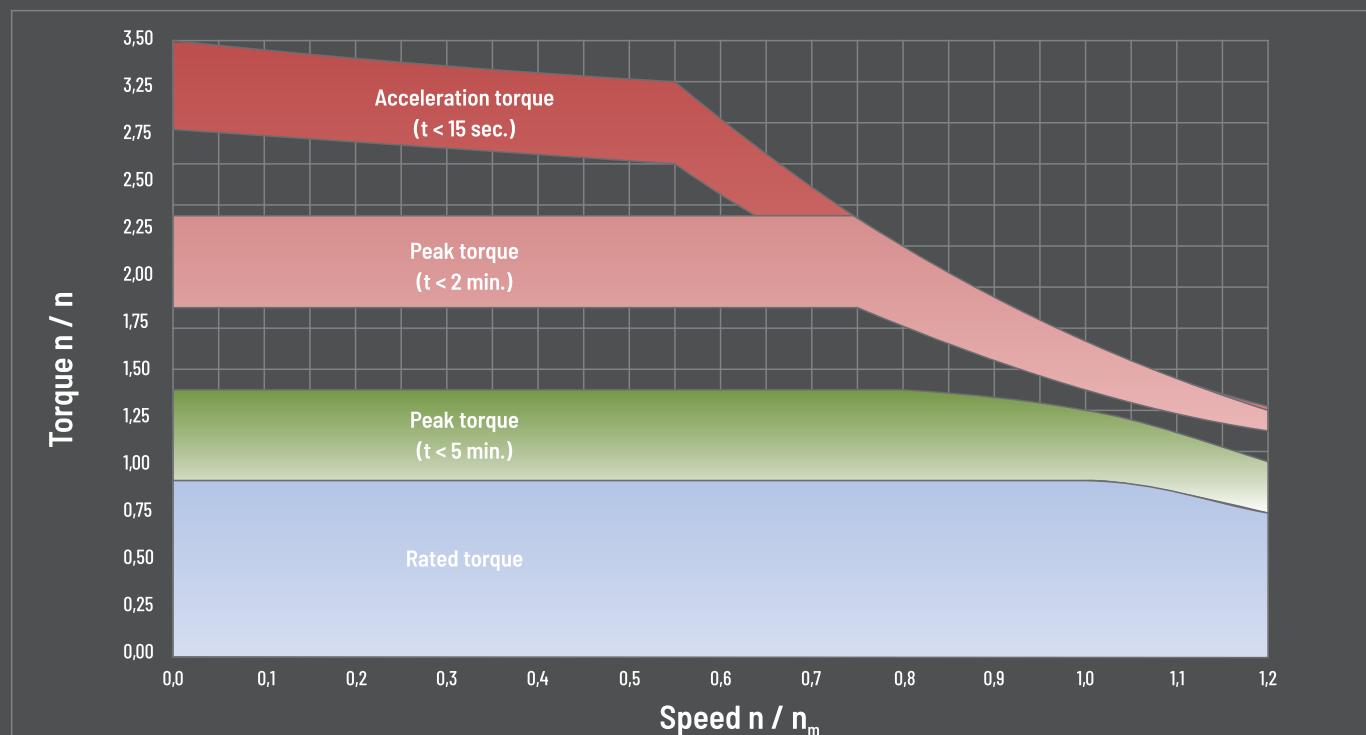
AGRICULTURE /  
MUNICIPAL

CONSTRUCTION  
MACHINERY

LOGISTIK  
LOGISTIC

FIREFIGHTING

## Torque speed diagram



## Technical data / Features

<b>Model</b>	AC permanent magnet excited synchronous motor (Axial magnetic flux motor design)
<b>Operating mode</b>	S1 (continuous operation)
<b>Cooling</b>	Air-cooled; Forced cooling with min. 5 m/s
<b>Magnets</b>	NdFeB - neodymium iron boron
<b>Model flange</b>	IM B14 (customisable on request)
<b>IP protection class</b>	IP 54 higher protection classes possible
<b>Thermal class</b>	Insulation class F (155°C) - IEC 60034
<b>Dielectric strength</b>	in accordance with IEC EN 60034
<b>Ambient conditions</b>	Operating temperature range (-10 °C to +40 °C), transport (-20 °C to +60 °C)
<b>Motor protection (temperature sensor)</b>	KTY 84 - 130 series
<b>Connections</b>	standard with cable - length ~ 1m (optional) plug
<b>Motor Feedback (depending on motor controller)</b>	<ul style="list-style-type: none"> <li>- 8-bit encoder with sin/cos output</li> <li>- Resolver Re15 (1 pole pair) (optional)</li> </ul>
<b>Motor shaft</b>	<ul style="list-style-type: none"> <li>- shaft with feather key groove</li> <li>- Tooth shaft in accordance with DIN 5480 or more</li> </ul>



AUTOMOTIVE



AVIONICS



FAN



CUSTOMIZED  
APPLICATIONS



- + High power density
- + Compact design
- + Low moment of inertia for rapid acceleration
- + Smooth running even at low speeds

## The TDS motors at a glance

The TDS series includes 5 sizes in air-cooled design. Some sizes are also available as water-cooled versions.

Optionally available, integrated wheel hub gears complete the motor to the drive axle and enable a wide range of variants in two frame sizes and countless transmission ratios.

## TDS 130FA air cooled

Diameter: 194 mm, forced cooled

Voltage	Rated speed	Maximum speed	Traction power	Rated torque	Max. torque (2min)	Weight	Cooling
24 - 320 VDC	3000 - 6000 rpm	up to 6300 rpm	1,7 - 2,7 kW	3,1 - 5,7 Nm	8,1 - 13,5 Nm	6,9 kg	Air 5 m/s

## TDS 150FA air cooled

Diameter: 216 mm, forced cooled

Voltage	Rated speed	Maximum speed	Traction power	Rated torque	Max. torque (2min)	Weight	Cooling
24 - 320 VDC	3000 - 5500 rpm	up to 6000 rpm	2,5 - 3,6 kW	6 - 8 Nm	13 - 15 Nm	10,2 kg	Air 5 m/s

## TDS 172FA air cooled

Diameter: 242 mm, forced cooled

Voltage	Rated speed	Maximum speed	Traction power	Rated torque	Max. torque (2min)	Weight	Cooling
48 - 96 VDC	3000 - 5500 rpm	up to 6000 rpm	5,2 - 7 kW	10 - 16,5 Nm	28 - 41 Nm	15,7 kg	Air 6 m/s

## TDS 192FA air cooled

Diameter: 282 mm, forced cooled

Voltage	Rated speed	Maximum speed	Traction power	Rated torque	Max. torque (2min)	Weight	Cooling
72 - 560 VDC	3000 - 5500 rpm	up to 6000 rpm	8,3 - 15 kW	22,5 - 27,3 Nm	71 - 82 Nm	28,2 kg	Air 6 m/s

## TDS 192W water cooled

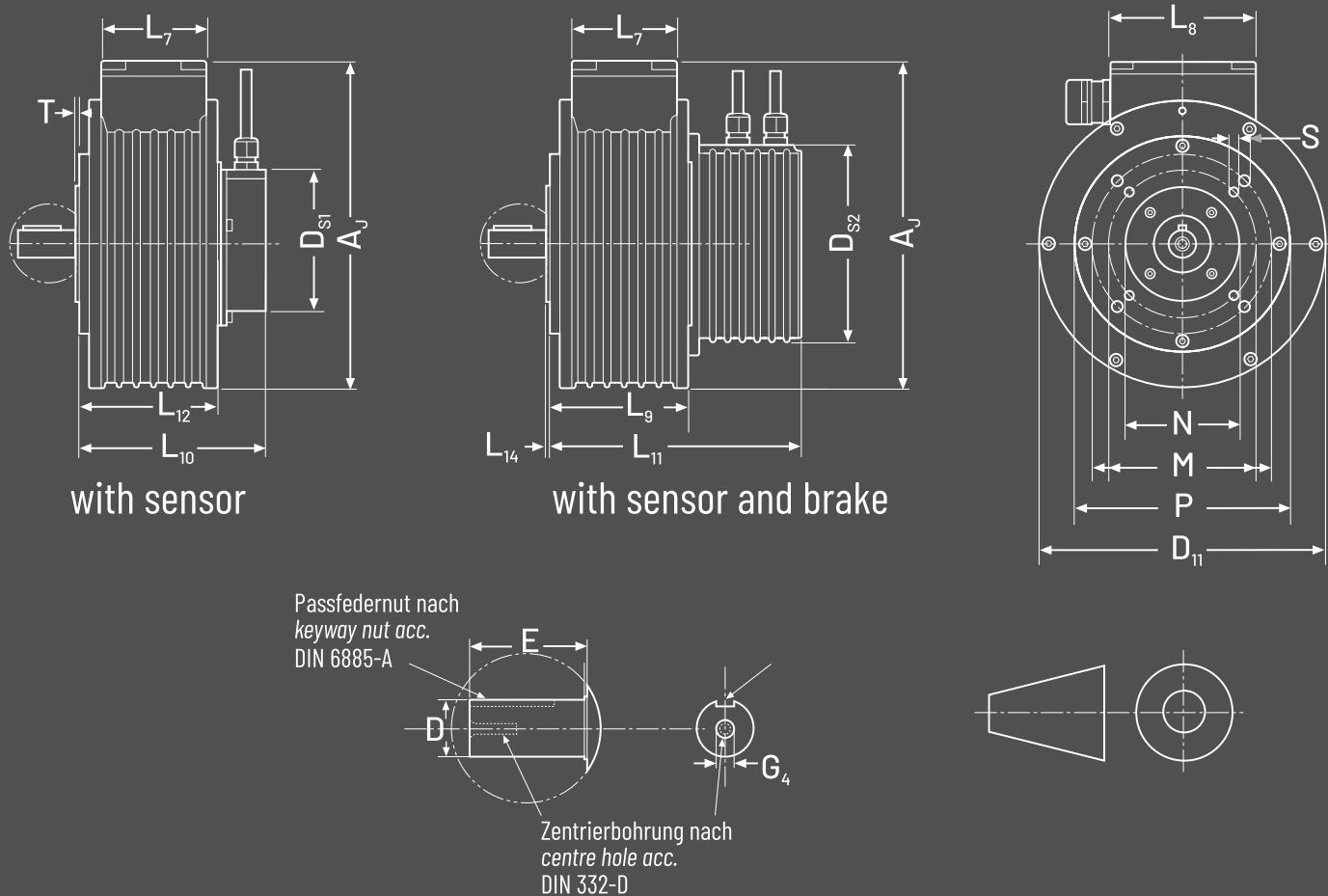
Diameter: 284 mm, water cooled

Voltage	Rated speed	Maximum speed	Traction power	Rated torque	Max. torque (2min)	Weight	Cooling
72 - 560 VDC	3000 - 5500 rpm	up to 6000 rpm	12 - 19 kW	31,8 - 42,4 Nm	70 - 82 Nm	33,5 kg	Water 8L/Min



If the size you need is not listed, please contact us!

# Dimensions



	TDS 130FA	TDS 150FA	TDS 172FA	TDS 192FA	TDS 192W
N	$\phi 52$ j6	$\phi 110$ j6 / $\phi 70$ j6	$\phi 70$ j6 / $\phi 80$ j6	$\phi 120$ j6	$\phi 100$ j6
M	$\phi 73$ / $\phi 100$	$\phi 130$ / $\phi 180$	$\phi 115$ / $\phi 150$	$\phi 150$	$\phi 150$ / $\phi 180$
S	4xM8 (10mm)	4xM8 (14mm)	4xM8 (12mm)	4xM8 (15 mm)	4xM8 (15 mm)
P	$\phi 120$	$\phi 165$ -0,25	$\phi 165$	$\phi 200$ +/-0,25 / $\phi 240$	-
D11	$\phi 194$ +/-0,5	$\phi 218$ +/-0,5	$\phi 242$ +/-0,5	$\phi 280$ +/-0,5	$\phi 280$ +/-0,5
AJ	220 +/-0,6	248,5 +/-0,6	269,3 +/-0,7	319,3 +/-0,7	321,8 +/-0,7
Ds1	103	103	102,5	103	103
Ds2	134,5	134,5	130,8 +0,8/-0,3	179	179
L7	69,5	69,5	82	110	110
L8	98	98	124	155	155
L10	124,5 +/-1	126 +/-1	144,5 +/-1	187,1 +/-1,4	196,9 +/-1,4
L11	168,1 +/-0,5	173,8 +/-0,5	190 +/-1,0,5	248,8 +/-1,4	262,9 +/-1,4
L12	93,1 +/-0,5	99 +/-0,5	114,5 +/-0,5	154,8 +/-0,9	167,4 +/-0,9
L9	93,1 +/-0,5	99 +/-0,5	114,5 +/-0,5	147,8 +/-0,9	169,9 +/-0,9
T	3,5	4	4	3,5	4
D	$\phi 19$ k6	$\phi 19$ k6	$\phi 19$ k6	$\phi 28$ j6	$\phi 28$ j6
E	40	40/41	40	40,5	45
G4 (DIN 332-D)	M6 (16 mm)	M6 (16 mm)	M6 (16 mm)	M10 (20 mm)	M10 (20 mm)
<b>Other</b>					
Water connection	n/a	n/a	n/a	n/a	$\emptyset 13$
Power connection	1 UVW each	1 UVW each	1 UVW each	2 UVW each	2 UVW each

Keyway nut acc. DIN 6885-A  
Centre hole acc. DIN 332-D



- + High power density
- + Individually configurable
- + High protection class
- + Specially adapted software

## Teamplayer. The ACS motor controllers.

The ACS inverters have been designed to be optimally equipped in mobile applications. The firmware is specially adapted for use with our axial flux motors.

With voltages between 24 and 96 V and power levels from 100 to 440 A, they are the ideal partner for our motors.

Together, they use their full potential. The high-power density, CAN bus communication and high adaptability complete the flexibility of our drives.

# Wheel hub drives

Our customers benefit from the compact, integrated gears with wheel bearings and mounting flange for the rim. You can therefore also purchase a modular version of the driven axle as a complete drive set from us as a single supplier.

- + Compact
- + Efficient
- + Durable
- + Maintenance free

## NEW:

Other sizes are available.

Some of the gears can also be provided in disengagable versions.

Contact us.

## Technical data

		PGR 500			PGR 1500			
Wheel load		700			2100			[kg]
Stages		1	2	3	1	2	3	[%]
		4 <sup>9</sup>	16 <sup>9</sup>	96 <sup>9</sup>	5 <sup>9</sup>	25 <sup>9</sup>	100 <sup>9</sup>	
Ratio <sup>7</sup>	i	7	24 <sup>9</sup>	144 <sup>9</sup>	8	40 <sup>9</sup>	150 <sup>9</sup>	
		42	42	252 <sup>9</sup>		64 <sup>9</sup>	240 <sup>9</sup>	
				504			384	
Efficiency	η	96	94	93	96	94	93	[kg]
Approx. mass	m	6,9	7,3	8,4	14	15,5	17,5	[Nm]
Rated output torque	T <sub>2N</sub>		160			800		[Nm]
Acceleration output torque	T <sub>2A</sub>		450			1600		[Nm]
Peak output torque <sup>1</sup>	T <sub>2S</sub>		500			2000		[min <sup>-1</sup> ]
Permissible average drive speed <sup>2</sup>	n <sub>IN</sub>		3000			3000		[min <sup>-1</sup> ]
Maximum speed <sup>3</sup>	n <sub>imax</sub>		6000			6000		[N]
Axial force <sup>4</sup>	F <sub>2A max</sub>		2500			5000		[N]
Radial force <sup>4</sup>	F <sub>2R max</sub>		7000			21000		[h]
Operational lifetime <sup>5, 6</sup>	L <sub>h</sub>		20000			20000		
Oper. noise emission at n1 = 3000 min <sup>-1</sup>	L <sub>p</sub>		<65			<68		[dB(A)]
Direction of rotation - input/output				counter-rotating				
Lubrication				lubricated for life				
Mounting position				horizontal				
Ambient temperature	T			-20 - +50				[°C]
Max. permissible case temperature	T			90				[°C]
Protection class				up to IP67 - depending on the motor				
Surface finish				cathodic dip-paint coated				
Casing colour <sup>7</sup>				similar to RAL 9005				

<sup>1</sup> Permitted fewer than 1000 times

<sup>6</sup> Application dependent

<sup>2</sup> At 20°C ambient temperature

<sup>7</sup> Others on request

<sup>3</sup> briefly

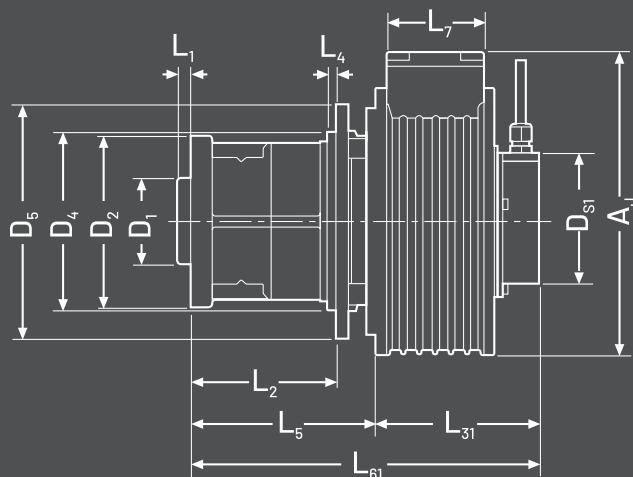
<sup>8</sup> Depending on the motor

<sup>4</sup> Referenced to the rim flange area at n2=100 min<sup>-1</sup>

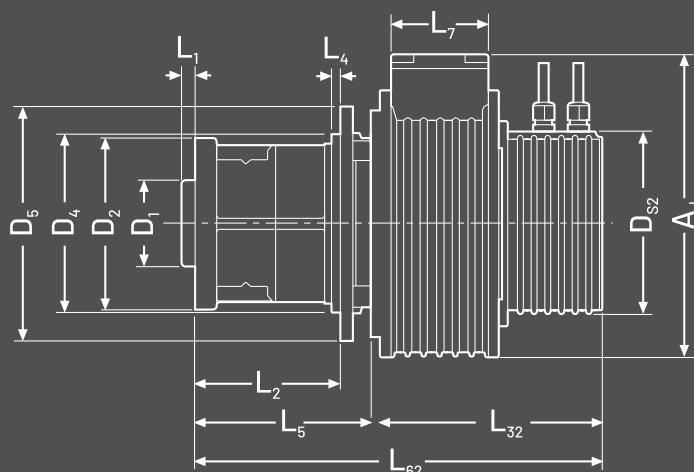
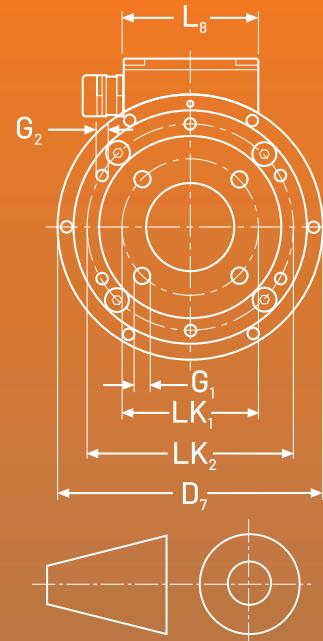
<sup>9</sup> Declutch optionally

<sup>5</sup> Referenced ton2=100 min<sup>-1</sup>, KA=1

## Dimensions



with sensor



with sensor and brake



TD SG 130 luftgekühlt			TD SG 150 luftgekühlt			TD SG 172 luftgekühlt		
700 (1-2 stages)	2100 (1-2 stages)	2100 (3 stages)	700 (1-2 stages)	2100 (1-2 stages)	2100 (3 stages)	700 (1-2 stages)	2100 (1-2 stages)	2100 (3 stages)
D1 ø60	ø80 / ø85	ø80 / ø85	ø60	ø80 / ø85	ø80 / ø85	ø60	ø80 / ø85	ø80 / ø85
D2 ø125	ø158	ø158	ø125	ø158	ø158	ø125	ø158	ø158
L1	10			10			10	
Lk1 ø100	ø130	ø130	ø100	ø130	ø130	ø100	ø130	ø130
G1 M12x1,5 (4x)	M14x1,5 (4x)	M14x1,5 (4x)	M12x1,5 (4x)	M14x1,5 (4x)	M14x1,5 (4x)	M12x1,5 (4x)	M14x1,5 (4x)	M14x1,5 (4x)
D4 ø130	ø160	ø160	ø130	ø160	ø160	ø130	ø160	ø160
L4	5			5			5	
D5 ø170	ø200	ø200	ø170	ø200	ø200	ø170	ø200	ø200
Lk2 ø150	ø180	ø150	ø150	ø180	ø150	ø150	ø180	ø150
G2 M10 (6x)	M10 (8x)	M10 (8x)	M10 (6x)	M10 (8x)	M10 (8x)	M10 (6x)	M10 (8x)	M10 (8x)
D7 ø194 +/-0,5				ø218 +/-0,5			ø242 +/-0,5	
L2 105	138	138	105	138	138	105	138	138
L31 126,2 +/-1				116 +/-1 / 118 +/-1			117,65 +/-1	
L32 169,8 +1,4/-0,9				161,8 +1,4/-0,9			183 +1,4/-0,9	
L5 128	169	199,5	128	169	199,5	128	169	200
L61 254,2	295,2	323,7	254	295,2	323,7	269,6	313,5	323,7
L62 297,9	336,8 / 338,9	367,4 / 369,4	299,9	336,8 / 338,9	367,4 / 369,4	317,6 / 323,5	358,5	389,1
L7 69,5				69,5			82	
L8 98				98			124	
DS1 103				103			103	
DS2 135,5				135,5			135,5	
Aj 220 +/-0,6				248,5 +/-0,6			269,3 +/-0,7	

We reserve the right of error and technical modifications. Please ask for binding dimensional drawings or models.



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Vogel & Plötscher  
Maß nehmen.