



Vogel & Plötscher

Pancake and
Wheel Hub Motors

Lightweight, compact, efficient.

Traction Drives



www.vogelundploetscher.de



Vogel & Plötscher

is a medium-sized and owner-run company in southern Germany.

The manufacture and sale, among other things, of pancake motors and wheel hub motors are part of the company's core area of expertise. High production depth, independent electronic development and software programming furthermore ensure a high level 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 by perfection in every component.

The pancake motors (permanent magnetsynchronous machine) are **ideal for use in a multitude of applications.**



Municipal technology

- Sweepers
- Slope mowers
- Transport vehicles
- Gangway drive



Logistics

- Driverless transport systems
- Heavy load transport systems
- Mobile robots
- Mecanum vehicles



Agricultural Machines

- Harvesters
- Field robots
- Stable robots
- Mowers and vehicles
- Wind technology



The TDS series is available air or water-cooled and in 5 sizes. The power range is from 1700 W to 36 kW.

Optionally available integrated wheel hub drives supplement the engine to the drive axle and allow a large number of variants in two sizes and countless transmission levels.



Two-wheeled vehicles

- E-scooters
- Cargo bikes



Other applications

- Compressor technology
- Wind technology
- Hybrid applications
- Generators



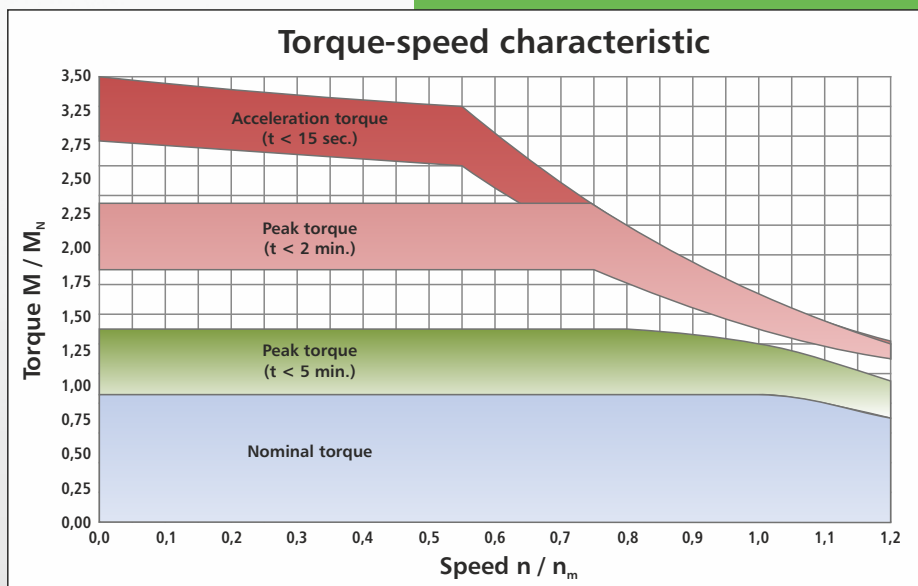
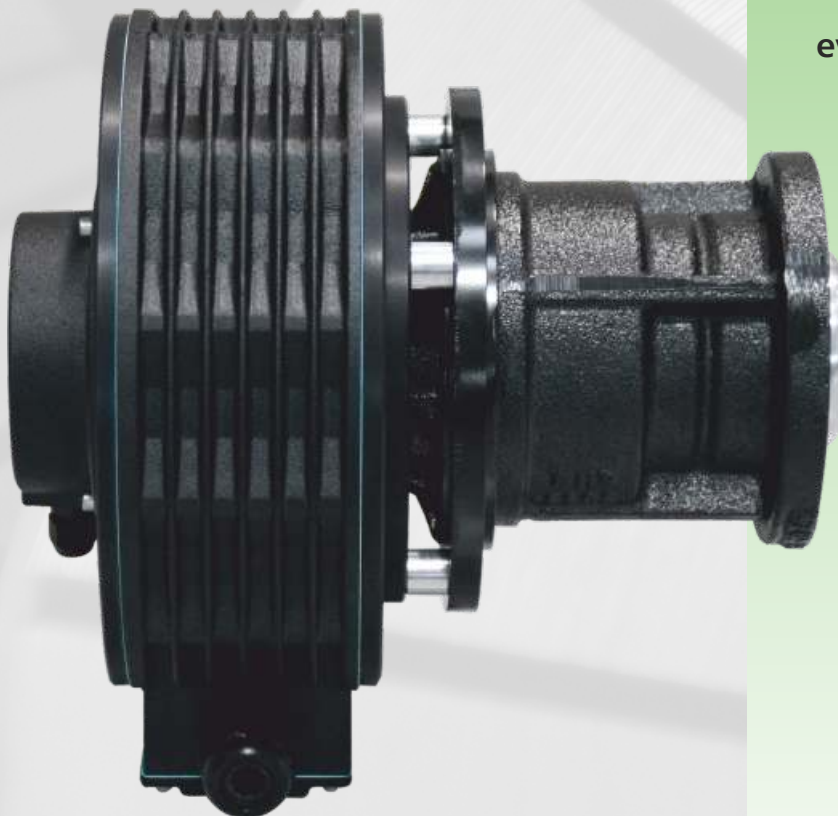
Leisure Vehicles

- Go-Karts
- Golf Carts
- Leisure park vehicles

The „Kraftwerk“

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

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



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



Technical Data/Features

Model	AC permanent magnet excited synchronous motor (Axial magnetic flux motor design)
Operating mode	S1 (continuous operation)
Cooling	Forced air-cooling with at least 5m/s
Magnets	Permanent magnets
Model flange	IM B14 (customisable on request)
IP protection class	IP 54 higher protection classes possible
Thermal class	Insulation class F (155°C) - IEC 60034
Dielectric strength	in accordance with IEC EN 60034
Ambient conditions	Operating temperature range (-10 °C to +40°C) Transport (-20°C to + 60°C)
Motor protection (temperature sensor)	KTY 84 - 130 series
Connections	Standard with cable - length ~ 1m (optional) plug
Motor Feedback (depending on motor controller)	- 8-bit encoder with sin/cos output - Resolver Re15 (1 pole pair) (optional)
Motor shaft	- shaft with keyway in accordance with DIN 6885-A - Tooth shaft in accordance with DIN 5480 or more

TDS 130FA forced air-cooled

Cooling: Forced air-cooling with at least 5 m/s • weight: ~6,9 kg • diameter: 194 mm



Voltage	Rated output (SI mode)	Nominal speed	Max. Speed (in the case of nominal voltage)	Rated torque (SI mode)	Acceleration torque ($t < 15$ sec.)	Nominal motor speed	Voltage constant	Torque constant
	P_N [kW]	n_N [rpm]	n_{Max} [rpm]	M_N [Nm]	M_{Acc} [Nm]	I_N [Arms]	K_e [V/krpm]	K_m [Nm/A]
24 V DC	1,7	3000	3500	5,41	18,8	91,1	3,96	0,059
	1,8	4500	5000	3,82	18,3	96,1	2,64	0,039
	2,0	6000	6400	3,18	15,2	96,5	2,21	0,033
36 V DC	1,7	3000	3400	5,41	19,3	57,4	6,35	0,094
	2,5	4500	5000	5,31	18,2	84,4	4,23	0,062
	2,7	6000	6400	4,30	15,0	90,2	3,30	0,049
48 V DC	1,9	3000	3300	6,0	19,7	46,2	8,68	0,130
	2,7	4500	4900	5,7	18,1	63,8	5,97	0,089
	2,7	6000	6500	4,31	15,1	68,5	4,33	0,063
320 V DC	1,9	3000	3500	6,05	21,2	7,3	53,82	0,825
	2,7	4500	5200	5,73	20,0	10,5	35,9	0,545
	2,7	6000	6300	4,30	15,6	10,9	27,02	0,408

TDS 150FA forced air-cooled

Cooling: Forced air-cooling with at least 5 m/s • weight: ~8,5 kg • diameter: 216 mm



	P_N [kW]	n_N [rpm]	n_{Max} [rpm]	M_N [Nm]	M_{Acc} [Nm]	I_N [Arms]	K_e [V/krpm]	K_m [Nm/A]
36 V DC	2,5	3000	3400	7,96	24,8	90,2	6,83	0,088
	2,8	4500	4900	5,94	22,9	96,0	4,86	0,062
	3,3	6000	6500	5,25	18,4	105,6	3,31	0,049
48 V DC	2,3	3000	3300	7,3	24,5	55,4	8,75	0,132
	3,4	4500	4900	7,2	23,7	80,8	5,91	0,089
	3,6	6000	6500	5,7	18,6	85,5	4,47	0,065
320 V DC	2,3	3000	3400	7,32	24,0	8,4	56,27	0,867
	3,4	4500	5200	7,21	24,0	13,2	35,79	0,548
	3,6	6000	6600	5,73	20,0	13,0	30,23	0,458

Other capacities by request. We reserve the right of error and technical modifications.

TDS 172FA forced air-cooled

Cooling: Forced air-cooling with at least 6 m/s • weight: ~15,7 kg • diameter: 242 mm



Voltage	Rated output (SI mode)	Nominal speed	Max. Speed (in the case of nominal voltage)	Rated torque (SI mode)	Acceleration torque ($t < 15$ sec.)	Nominal motor speed	Voltage constant	Torque constant
	P_N [kW]	n_N [rpm]	n_{Max} [rpm]	M_N [Nm]	M_{Acc} [Nm]	I_N [Arms]	K_e [V/krpm]	K_m [Nm/A]
48 VDC	5,5	3000	3500	17,5	59,7	131,8	8,58	0,132
	6,1	4500	5200	12,9	48,8	145,3	5,79	0,089
	7,0	6000	6400	11,1	41,8	171,5	4,27	0,064
72 V DC / 80 V DC	5,5	3000	3400	17,5	59,5	76,3	14,91	0,229
	7,5	4500	4980	15,9	55,5	105,3	9,82	0,151
	8,0	6000	6300	12,7	45,1	118,2	8,48	0,107
96 V DC	5,5	3000	3200	17,5	57,6	65,6	20,55	0,271
	7,6	4500	4900	16,1	56,3	93,4	13,36	0,172
	8,0	6000	6600	12,7	44,1	98,1	8,53	0,129
320 V DC	5,7	3000	3400	18,1	58,6	21,0	56,14	0,863
	7,8	4500	5200	16,1	56,3	29,3	37,07	0,571
	8,0	6000	6600	12,7	44,5	28,1	29,56	0,453

TDS 172W water-cooled

Cooling: Water-cooling with at least 6 l/s flow rate • weight: ~17,8 kg • diameter: 245 mm

	P_N [kW]	n_N [rpm]	n_{Max} [rpm]	M_N [Nm]	M_{Acc} [Nm]	I_N [Arms]	K_e [V/krpm]	K_m [Nm/A]
72 V DC / 80 V DC	6,3	3000	3200	20,1	60,8	86,7	14,91	0,231
	11,0	4500	4850	23,3	59,5	168,3	8,92	0,138
	13,0	6000	6300	20,7	54,1	177,0	7,53	0,116
96 V DC	7,0	3000	3200	22,3	56,5	83,7	16,96	0,266
	11,0	4500	4800	23,3	58,0	128,1	11,60	0,182
	13,0	6000	6500	20,7	54,5	158,8	8,38	0,130
320 V DC	7,0	3000	3300	22,3	59,2	25,5	56,14	0,873
	10,0	4500	4900	21,2	55,5	35,5	38,63	0,598
	13,0	6000	6600	20,7	52,1	46,0	29,03	0,450

Other capacities by request. We reserve the right of error and technical modifications.

TDS 192FA forced air-cooled

Cooling: Forced air-cooling with at least 6 m/s • weight: ~28,2 kg • diameter: 282 mm



Voltage	Rated output (SI mode)	Nominal speed	Max. Speed (in the case of nominal voltage)	Rated torque (SI mode)	Acceleration torque ($t < 15$ sec.)	Nominal motor speed	Voltage constant	Torque constant
	P_N [kW]	n_N [rpm]	n_{Max} [rpm]	M_N [Nm]	M_{Acc} [Nm]	I_N [Arms]	K_e [V/krpm]	K_m [Nm/A]
96 V DC	11,6	3000	3400	31,8	100	119,3	16,76	0,266
	13,6	4500	4900	28,9	91	177	11,00	0,162
	14,5	6000	6400	21,2	77	183	8,39	0,126
320 V DC	12,0	3000	3400	31,8	105	35,8	55,85	0,890
	17,3	4500	5000	31,8	81	50,5	37,23	0,588
	16,4	6000	6400	22,3	77	50,7	28,49	0,439
560 V DC	12,0	3000	3300	38,2	99,0	24,9	97,76	1,533
	16,0	4500	4800	30,8	80	29,9	67,47	1,028
	15,4	6000	6400	22,3	78	30,5	49,66	0,731

TDS 192W water-cooled

Cooling: Water-cooling with at least 8 l/s flow rate • weight: ~33,5 kg • diameter: 284 mm

	P_N [kW]	n_N [rpm]	n_{Max} [rpm]	M_N [Nm]	M_{Acc} [Nm]	I_N [A]	K_e [V/krpm]	K_m [Nm/A]
96 V DC	13,0	3300	3300	41,4	100	156,6	16,76	0,265
	18,5*	4500	5000	39,3	95	212,9	11,60	0,184
	20,0*	6000	6400	31,8	80	231,6	8,65	0,137
320 V DC	13,5	3000	3300	41,4	100	48,2	55,82	0,891
	20,0	4500	5000	42,4	96	70,0	37,96	0,606
	24,0	6000	6300	38,2	80	86,2	28,47	0,443
560 V DC	15,0	3000	3300	47,7	100	31,2	97,76	1,530
	20,0	4500	5100	42,4	96	41,7	66,53	1,016
	24,0	6000	6400	38,2	80	51,9	49,55	0,735

Other capacities by request. We reserve the right of error and technical modifications.

*Limitation caused by controller or cable cross section possible.

TDS 220FA forced air-cooled

Cooling: Forced air-cooling with at least 8 m/s • weight: ~36,9 kg • diameter: 310 mm

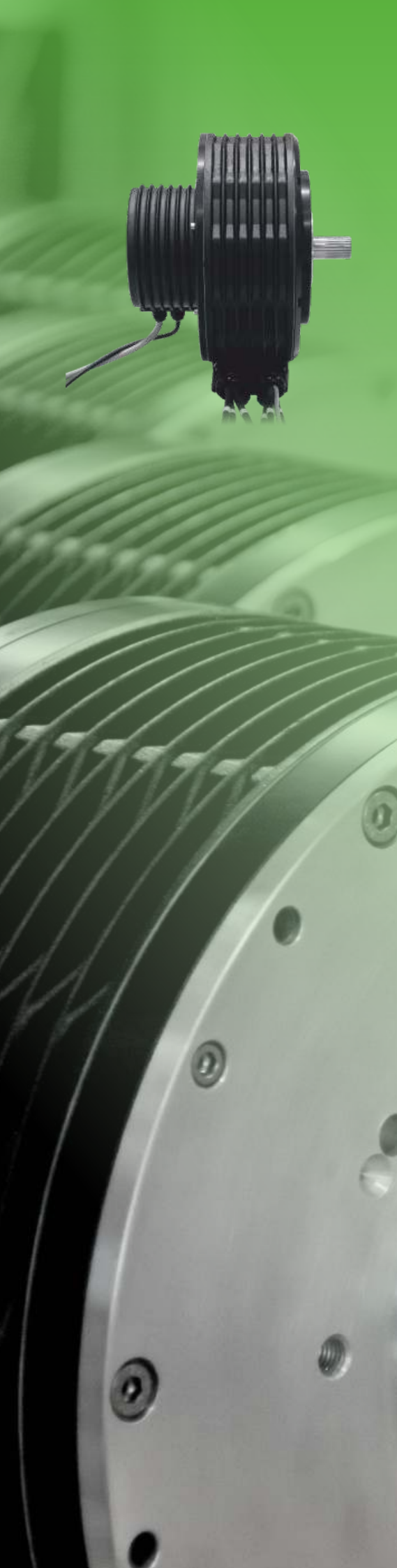
Voltage	Rated output (SI mode)	Nominal speed	Max. Speed (in the case of nominal voltage)	Rated torque (SI mode)	Acceleration torque ($t < 15$ sec.)	Nominal motor speed	Voltage constant	Torque constant
	P_N [kW]	n_N [rpm]	n_{Max} [rpm]	M_N [Nm]	M_{Acc} [Nm]	I_N [A]	K_e [V/krpm]	K_m [Nm/A]
320 V DC	14,5	3000	3700	46,2	130	61,5	48,0	0,705
	19,5	4500	5200	41,4	126	77,7	34,7	0,500
	23,0	5600	6400	39,2	120	98,6	25,9	0,374
560 V DC	17,0	3000	3500	54,1	140	38,1	90,6	1,33
	22,0	4500	5600	46,7	131	54,2	56,0	0,81
	23,0	5600	6200	39,2	120	52,3	48,8	0,71

TDS 220W water-cooled

Cooling: Water-cooling with at least 8 l/s flow rate • weight: ~43,2 kg • diameter: 310 mm

	P_N [kW]	n_N [rpm]	n_{Max} [rpm]	M_N [Nm]	M_{Acc} [Nm]	I_N [A]	K_e [V/krpm]	K_m [Nm/A]
320 V DC	17,5	3000	3700	55,7	140	74,2	48,0	0,705
	28,5	4500	5200	60,5	142	113,0	34,7	0,503
	32,0	5600	6300	54,6	136	126,9	27,9	0,404
560 V DC	20,0	3000	3400	63,7	149	44,9	90,6	1,333
	28,5	4500	5400	60,5	142	69,9	56,0	0,813
	36,0	5600	6000	61,4	144	71,0	56,0	0,813

Other capacities by request. We reserve the right of error and technical modifications.

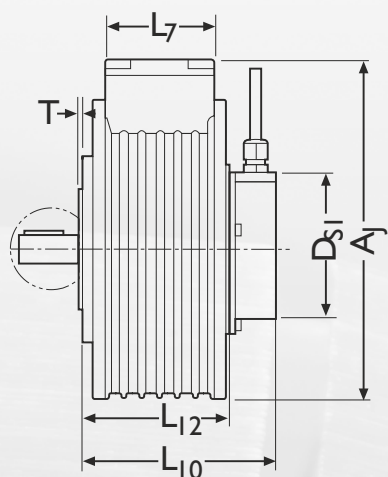
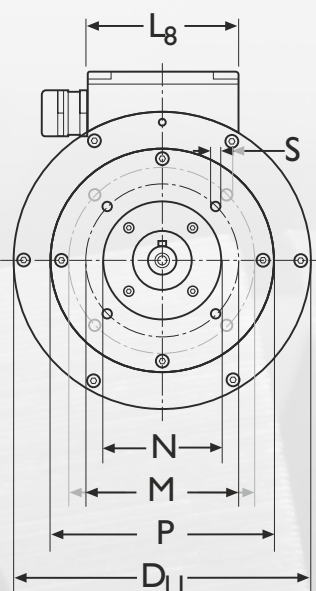


Compact, robust and efficient – drive solutions from Vogel & Plötscher

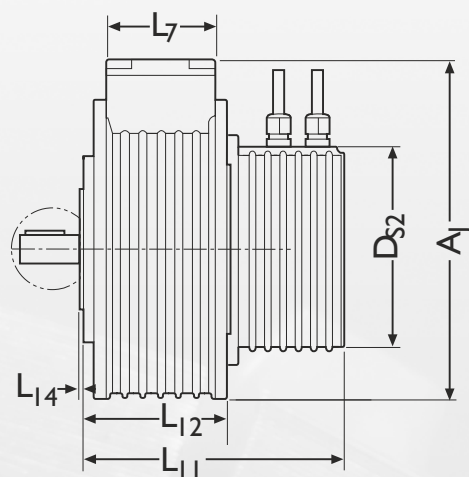
Freely configurable and therefore flexible to use, our drives offer variable solutions for a wide variety of applications. Manufactured in Germany, customer-specific and high-quality motors are also produced on demand in cooperation with our development department on site.

N	Ø (j6)
M	Ø
S	
P	Ø
AC	Ø
AJ	
DS1	Ø
DS2	Ø
L7	
L8	
L10	
L11	
L12	
T	
D	Ø (k6)
E	
G4	(DIN 332-D)
Other	
Water connection	
Power connection	

Dimensions



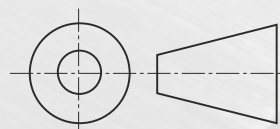
with encoder



with encoder and brake



Centre hole acc.
DIN 332-D

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All possibilities for a perfect drive.

Our motors and gears are freely combinable and thus optimally fulfil the most diverse requirements and specifications. Completed by the right controller, you will be provided with a ready-to-install drive solution for your vehicle. We will be happy to advise you on a solution tailored to your specific needs and its integration into your project.

Just contact us on **+49 7667 / 946100** or e-mail: **info@voploe.de**.

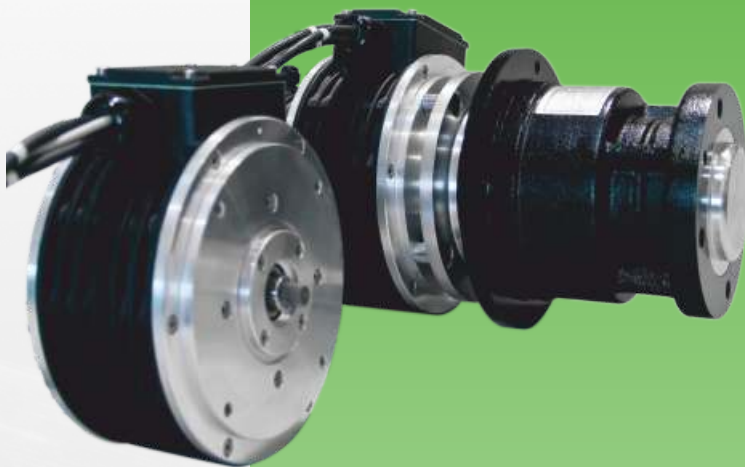
We look forward to providing you with the perfect drive!

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.

NEW: Many gear transmissions are optionally available with helical teeth. Some of the gears can also be provided in disengagable versions.

Contact us.



Technical data

		RN 700			RN 2100			
Wheel load		700			2100			[kg]
Stages		1	2	3	1	2	3	
Ratio ⁷	i	4 ⁹	16 ⁹	96 ⁹	5 ⁹	25 ⁹	100 ⁹	
		7	24 ⁹	144 ⁹	8	40 ⁹	150 ⁹	
			42	252 ⁹		64	240 ⁹	
				504			384	
Efficiency	η	96	94	93	96	94	93	[%]
Approx. mass	m	6,9	7,3	8,4	14	15,5	17,5	[kg]
Rated output torque	T _{2N}	160			800			[Nm]
Acceleration output torque	T _{2A}	450			1600			[Nm]
Peak output torque ¹	T _{2S}	500			2000			[Nm]
Permissible average drive speed ²	n _{IN}	3000			3000			[min ⁻¹]
Maximum speed ³	n _{I max}	6000			6000			[min ⁻¹]
Axial force ⁴	F _{2A max}	2500			5000			[N]
Radial force ⁴	F _{2R max}	7000			21 000			[N]
Operational lifetime ^{5, 6}	L _h	20000			20000			[h]
Oper. noise emission at n _I = 3000 min ⁻¹	L _p	<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 coating						
Casing colour ⁷		similar to RAL 9005						

¹ Permitted fewer than 1000 times

² At 20°C ambient temperature

³ briefly

⁴ Referenced to the rim flange area at $n_2 = 100\ min^{-1}$

⁵ Referenced to $n_2 = 100\ min^{-1}$, $KA = 1$

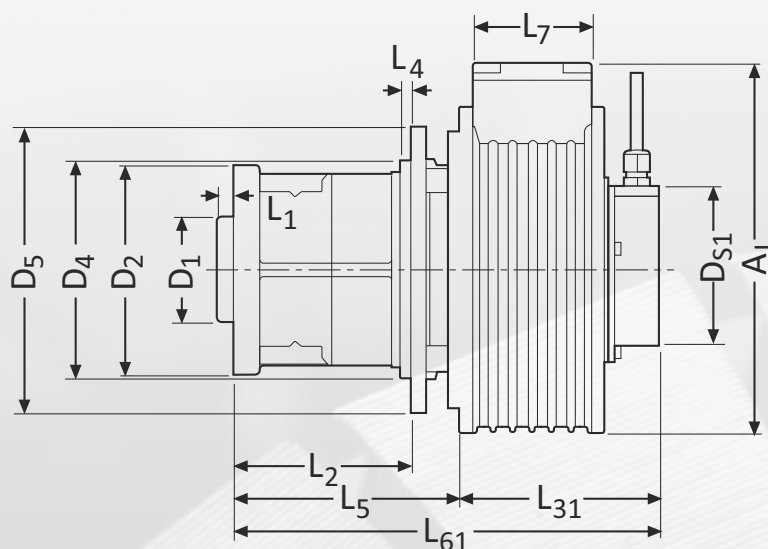
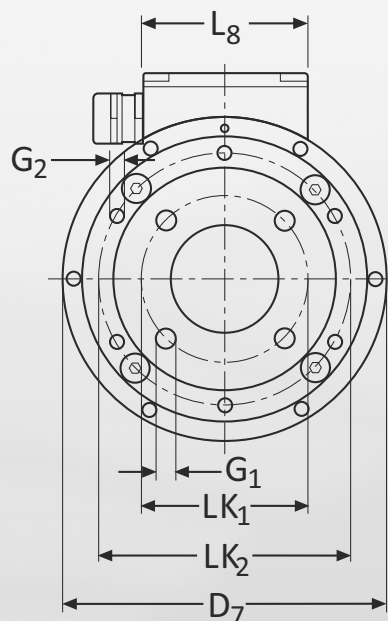
⁶ Application dependent

⁷ Others on request

⁸ Depending on the motor

⁹ Declutch optionally

Dimensions

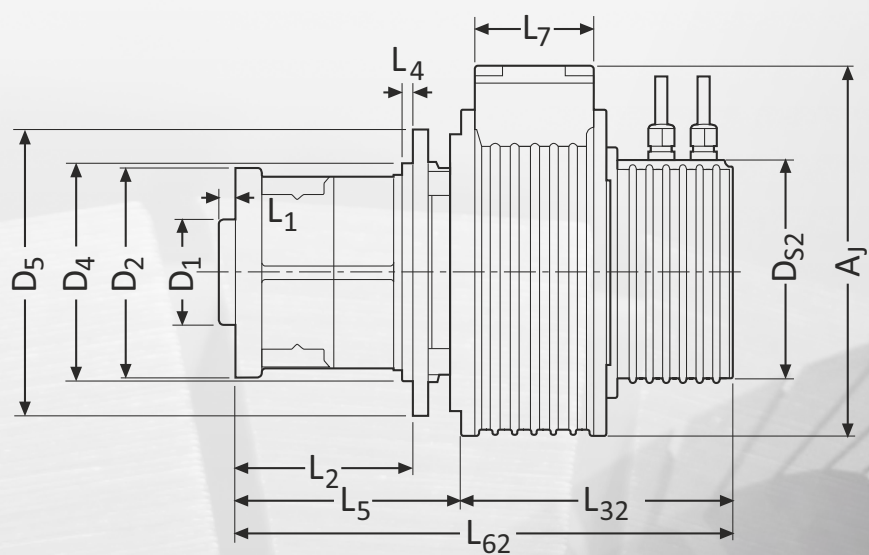


with encoder



	TDSG 130 forced air-cooled				TDSG 150 forced air-cooled				TDSG 170 forced air-cooled				
	700 (1-2 stages)	700 (3 stages)	2100 (1-2 stages)	2100 (3 stages)	700 (1-2 stages)	700 (3 stages)	2100 (1-2 stages)	2100 (3 stages)	700 (1-2 stages)	700 (3 stages)	2100 (1-2 stages)	2100 (3 stages)	
D1	63		80		63		80		63		80		mm
D2	128		158		128		158		128		158		mm
L1			10				10				10		mm
Lk1	100		130		100		130		100		130		mm
G1	M12 1,5		M14 1,5		M12 1,5		M14 1,5		M12 1,5		M14 1,5		
D4	130		160		130		160		130		160		mm
L4		5				5				5			mm
D5	170		200		170		200		170		200		mm
Lk2	150	60	180	150	150	60	180	150	150	60	180	150	mm
G2	M10 (6x)	M10 (4x)	M10 (8x)	M10 (8x)	M10 (6x)	M10 (4x)	M10 (8x)	M10 (8x)	M10 (6x)	M10 (4x)	M10 (8x)	M10 (8x)	
D7			194				216				245		mm
L2	105		138		105		138		105		138		mm
L31			123,7				126				144,5		mm
L32			167				168,5				185		mm
L5	128	155	169	200	128	155	169	200	128	155	169	200	mm
L61	251,7	278,7	292,7	323,7	254	281	295	326	254	281	313,5	344,5	mm
L62	295	322	336	367	296,5	323,5	337,5	368,5	296,5	323,5	354	385	mm
L7							69,5				84		mm
L8							98				120		mm
DS1			103				103				103		mm
DS2			135				135				135		mm
Aj			220				241				274		mm

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



with encoder and brake





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antreiben

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