

SMM

SERVO MOTORS

MADE
IN
GERMANY



Modular drive system: **KEB Servo** motor

KEB **Servo** motor describes the actual program of the closed-loop synchronous motors with special suitability for all dynamic drive tasks.

Efficient drive systems result in combination with the servo inverter series **KEB COMBIVERT F5** which can be optimally preset by web-based system configuration.

Complete solutions for different requirements in machine and plant engineering result in addition with the proper encoder system for the application, optional **KEB** holding brake and a mechanical adaption of torque/speed characteristic by different gear boxes.

Pre-assembled cables form ready for connection systems and are the base for a simple installation, fast start-up and trouble-free operation.

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Synchronous motors

are ideal drives for dynamic movements and offer in comparison to robust asynchronous drives significant lower mass inertia and high pulse torque.

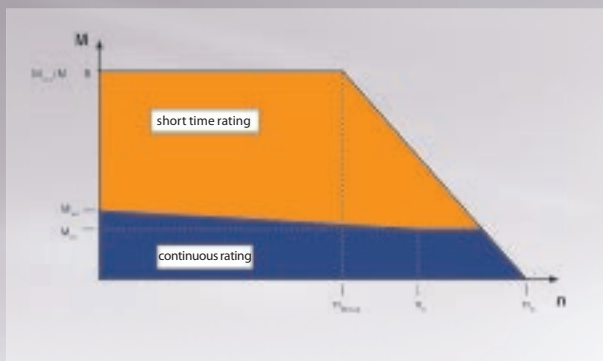
Equipped with resolver or high-resolution SinCos encoders inclusive absolute information and electronic type plate, two series are available with up to 500% overload for all systems of rotating applications.

Synchronous motors offer a great energy optimization in machines and systems with efficiencies clearly above 95%.

DYNAMIC LINE I 0,2... 70 Nm

the approved series for general mechanical engineering

- ribbed surface with high thermal reserves
- lateral connections for encoder system and power



DYNAMIC LINE II 0,5... 50 Nm

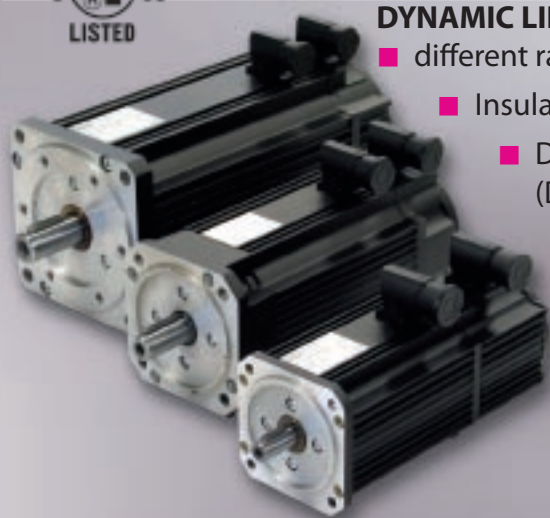
by latest manufacturing technology increased component packaging density for special compact requirements in robotics, handling, bearing technology ...

- smooth housing surface
- parallel power and encoder connections



DYNAMIC LINE I - Synchronous servo motors SM.0

Servo motors of the series **SM.0** are permanent-field, electronic commutated synchronous motors for applications with highest requirements at simultaneously small unit volume and weight. 6-pole motors with NdFeB permanent magnets and three-phase winding for sine commutation captivate through impressed dynamics and a compact design.



DYNAMIC LINE I - motors are available with

- different rated speed
- Insulation class F
- Degree of protection IP65 (DIN EN 60034-5)
- Resolver or
- high-resolution Hiperface- / Endat- / SSI encoder

Rotating connection socket for power and feedback are general standards.



55 mm



70 mm



92 mm



110 mm



140 mm



190 mm

Motor size	M _N [Nm]
A1.SM	0.32
A2.SM	0.48
A3.SM	0.6
A4.SM	0.8
B1.SM	0.6
B2.SM	0.5
B2.SM	1.3
B3.SM	1.0
B3.SM	2.0
B3.SM	1.5
C1.SM	0.8
C1.SM	0.75
C1.SM	0.7
C2.SM	2.4
C2.SM	2.2
C2.SM	2.0
C3.SM	3.9
C3.SM	3.5
C3.SM	2.8
C4.SM	5.0
C4.SM	4.5
C4.SM	3.0
D1.SM	3.7/5.5
D1.SM	3.5/5.1
D1.SM	3.0/4.2
D2.SM	6.1/8.7
D2.SM	5.8/8.4
D2.SM	3.8/7.5
D3.SM	8.4/12.2
D3.SM	7.6/12.0
D3.SM	5.0/10.5
D4.SM	9.9/15.6
D4.SM	8.6/15.5
E1.SM	7.0/11.2
E1.SM	6.5/10.3
E1.SM	5.2/9.3
E2.SM	12.2/18.7
E2.SM	11.0/17.1
E2.SM	7.6/15.5
E3.SM	16.5/26.0
E3.SM	14.6/23.8
E3.SM	8.7/21.6
E4.SM	21.4/33.0
E4.SM	15.5/31.6
F1.SM	22.5/35.4
F1.SM	21.5/35.0
F1.SM	20.0/31.7
F1.SM	16.0/28.0
F2.SM	42.0/64.0
F2.SM	38.0/63.0
F2.SM	31.0/58.2
F3.SM	61.0/92.8
F3.SM	52.0/90.0
F3.SM	33.0/85.0

Properties

- thermal winding protection with PTC thermistor 140°C
- Shaft end with keyway
- Vibration severity grade B according to EN 60034-14
- Half-key balancing according to DIN ISO 8821 with keyway
- Flange accuracy of the grade N according to DIN 42955
- Radial groove ball bearing with high temperature resistant special grease and lifetime lubrication
- Rating designed for operating mode S1
- Ambient temperature range of -20 to +40°C
- site altitude 1000m above sea level no derating

Options

- **KEB** holding brake
- Built-on gearbox
- Special shaft
- External ventilation

M_0 [Nm]	M_{max} [Nm]	n_N [rpm]	n_{max} [rpm]	J_L [kgcm ²]	$I_{N/400V}$ [A]	$I_{0/400V}$ [A]	$I_{max/400V}$ [A]	** recommended controller size	$I_{N/200V}$ [A]	$I_{0/200V}$ [A]	$I_{max/200V}$ [A]	** recommended controller size
0.34	1.7	6,000	9,000	0.17	0.8	0.85	5.0	07.	1.0	1.2	7.1	05.
0.5	2.5	6,000	9,000	0.24	0.9	1.0	6.0	07.	1.5	1.5	9.0	05.
0.65	3.2	6,000	9,000	0.31	1.1	1.2	6.5	07.	2.0	2.0	10.8	07.
1.0	5.0	6,000	9,000	0.45	1.4	1.6	8.5	07.	2.9	3.2	17.0	07.
0.65	3.1	4,000	9,000	0.22	0.9	0.9	5.4	07.	2.0	1.9	11.4	07.
	3.1	6,000	9,000	0.22	1.2	1.3	7.8	07.	2.5	2.6	15.6	07.
1.5	7.2	4,000	9,000	0.36	1.4	1.6	9.6	07.	2.9	3.2	19.2	07.
	7.2	6,000	9,000	0.36	2.1	2.4	14.4	09.	4.4	5.0	30.0	09.
2.3	11.0	4,000	9,000	0.57	2.0	2.4	14.4	07.	4.7	5.5	33.0	10.
	11.0	6,000	9,000	0.57	3.0	3.5	21.0	09.	6.6	7.7	46.2	12.
0.95	4.3	3,000	6,000	1.2	0.75	0.8	4.0	07.	1.4	1.5	7.5	05.
		4,000	6,000	1.2	0.9	1.1	5.4	07.	1.8	2.0	10.0	05.
		6,000	6,000	1.2	1.3	1.6	8.0	07.	2.4	3.0	15.0	07.
		3,000	6,000	2.7	1.8	1.9	9.4	07.	3.0	3.2	16.0	07.
2.7	12.2	4,000	6,000	2.7	2.1	2.5	12.4	09.	3.6	4.3	21.5	09.
		6,000	6,000	2.7	3.0	3.7	18.5	09.	5.3	6.5	32.5	10.
		3,000	6,000	4.2	2.7	2.9	14.5	09.	4.6	5.1	25.5	09.
4.5	20.3	4,000	6,000	4.2	3.1	3.8	19.0	09.	5.5	6.7	33.4	10.
		6,000	6,000	4.2	3.8	5.6	27.9	10.	6.7	9.9	49.5	10.
		3,000	6,000	5.4	3.7	4.2	21.0	10.	6.3	7.1	35.5	10.
6.0	27.0	4,000	6,000	5.4	4.4	5.5	27.5	12.	7.3	9.1	45.5	12.
		6,000	6,000	5.4	4.5	7.8	39.0	12.	7.9	13.7	68.4	12.
4.2/6.2	18.9	3,000	6,000	4.8	2.8/4.2	3.0/4.1	14.4	09./12.	4.9/-	5.3/-	25.4/-	09.
		4,000	6,000	4.8	3.5/5.0	4.0/5.4	19.2	10./12.	6.1/-	7.0/-	33.6/-	10.
		6,000	6,000	4.8	4.8/6.7	6.0/8.1	28.8	12./13.	8.2/-	10.2/-	48.9/-	12.
		3,000	6,000	7.4	4.5/6.4	4.8/6.8	23.0	12./13.	8.1/-	8.5/-	40.8/-	12.
7.0/10.5	31.5	4,000	6,000	7.4	5.8/8.4	6.4/9.2	30.7	12./14.	10.5/-	11.6/-	55.7/-	12.
		6,000	6,000	7.4	5.9/11.7	9.9/14.2	47.5	13./15.	9.6/-	16.0/-	76.8/-	12.
		3,000	6,000	9.8	6.3/9.2	7.2/10.4	34.5	12./14.	10.9/-	12.4/-	59.5/-	12.
10.0/14.5	45.0	4,000	6,000	9.8	7.7/12.2	9.7/14.1	46.5	13./15.	13.5/-	17.0/-	81.6/-	13.
		6,000	6,000	9.8	7.6/16.0	13.6/19.7	65.3	14./16.	12.7/-	22.6/-	108.0/-	13.
		3,000	6,000	12.7	7.3/11.5	8.5/12.3	40.8	13./15.	12.2/-	14.2/-	68.1/-	13.
12/18.0	54.0	4,000	6,000	12.7	8.6/14.7	11.6/16.8	55.7	13./16.	13.5/-	18.2/-	87.3/-	13.
8.5/12.9	42	2,000	4,000	12.3	2.6/4.2	3.1/4.7	16	09./12.	4.4/-	5.3/-	28/-	09.
		3,000	4,000	12.3	3.8/5.9	4.7/7.1	25	10./12.	6.4/-	8.0/-	42/-	10.
		4,000	4,000	12.3	4.0/7.2	6.2/9.3	33	12./13.	6.9/-	10.7/-	57/-	12.
		2,000	4,000	19.5	4.1/6.3	4.7/6.5	25	10./12.	7.5/-	8.6/-	46/-	12.
14/21.5	70	3,000	4,000	19.5	5.8/9.1	7.5/9.7	40	12./14.	10.4/-	13.3/-	71/-	12.
		4,000	4,000	19.5	5.4/11.1	10.0/12.7	53	13./15.	9.7/-	17.8/-	94/-	13.
		2,000	4,000	26.7	6.1/9.6	6.8/10.7	33	12./14.	10.6/-	11.7/-	56/-	12.
19/30	85	3,000	4,000	26.7	8.3/13.4	10.3/16.3	49	13./15.	14.0/-	17.6/-	84/-	13.
		4,000	4,000	26.7	6.4/15.9	13.5/21.3	65	14./16.	10.4/-	21.9/-	105/-	13.
		2,000	3,000	36.0	7.8/12.1	9.9/12.7	47	13./15.	13.0/-	16.5/-	79/-	13.
27/42	121	3,000	3,000	36.0	8.3/16.8	14.4/18.5	69	15./16.	13.3/-	23.2/-	111/-	13.
25/39	88	1,500	4,000	84.0	7.5/11.8	8.2/12.3	29	13./15.				
		2,000	4,000	84.0	9.7/15.8	11.1/16.6	39	14./16.				
		3,000	4,000	84.0	13.8/21.9	17.0/25.4	60	15./17.				
		4,000	4,000	84.0	14.8/25.5	22.2/33.2	78	16./18.				
		1,500	4,000	147	14.5/22.1	17.0/25.5	60	16./17.				
50/75	175	2,000	4,000	147	17.2/28.5	22.3/33.5	78	16./19.				
		3,000	4,000	147	20.6/38.7	32.2/48.3	113	17./20.				
		1,500	4,000	210	20.9/31.8	23.1/34.8	81	17./19.				
70/110	245	2,000	4,000	210	23.7/41.1	30.8/46.0	108	17./20.				
		3,000	4,000	210	22.9/56.0	46.2/69.0	162	17./22.				

■ with external ventilation

** recommended controller size F5-M/-S for M_{max} = approx. $2.5 \times M_N$

DYNAMIC LINE II - Synchronous servo motors SM.5

The new synchronous motors **DYNAMIC LINE II** are characterised by increased packaging density and thereby especially predestinated for tasks with special requirements on size/volume and weight.

UL listed motors are characterised by small inertia and high overload torque and they are available alternatively also with **KEB** brake. Parallel arranged and rotating plug connections for power and position offer universal application in the mechanics. In addition to the basic version with resolver feedbacks, BISS encoder are available in single- and multiturn version.



Together with preassembled cables and the electronic type plate there is a minimum start-up time. The complete solution reduces the assembly error potential and secures high availability and best service.

Properties

- thermal winding protection with PTC thermistor 150°C
- smooth shaft end
- Vibration severity grade B according to EN 60034-14
- Degree of protection IP65 (shaft seal IP64)
- Flange accuracy of the grade N according to DIN 42955
- Radial groove ball bearing with high temperature resistant special grease and lifetime lubrication
- Rating designed for operating mode S1
- Ambient temperature range of -20 to +40°C
- site altitude 1000m above sea level no derating

Options

- **KEB** holding brake
- Gear assembly
- Special shaft
- External ventilation
- Half-key balancing according to DIN ISO 8821 with keyway

Motor size

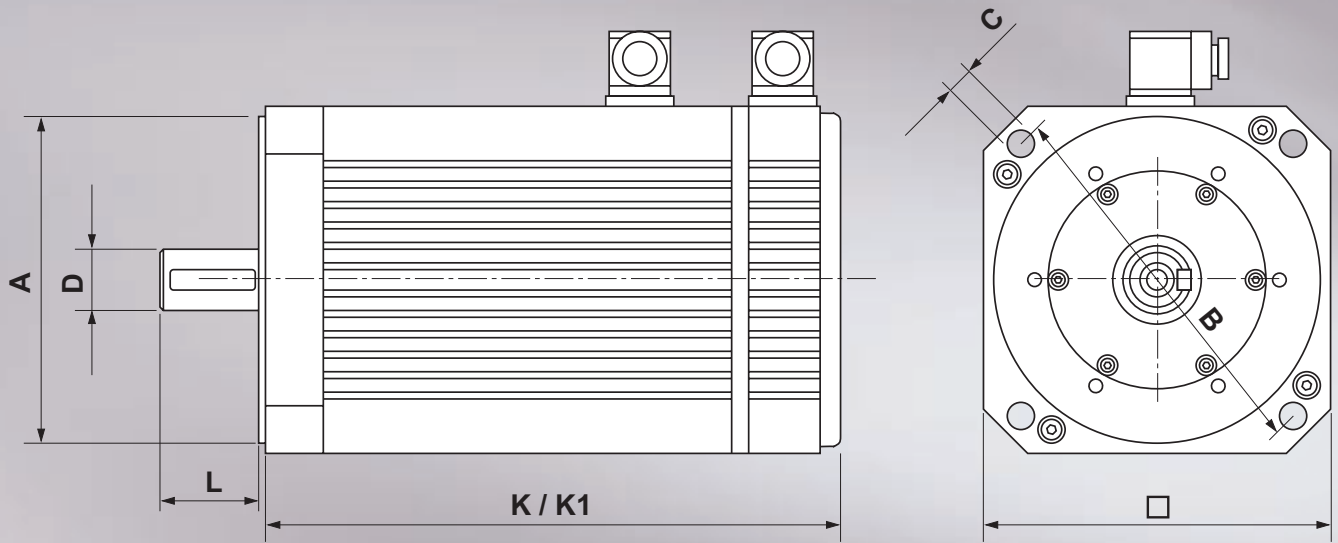
	A1.SM A2.SM A3.SM A4.SM
55 mm	B1.SM
	B2.SM
90 mm	B3.SM
	C1.SM C2.SM C3.SM
102 mm	C4.SM
	D1.SM D2.SM D3.SM
140 mm	D4.SM
	E1.SM E2.SM E3.SM
195 mm	

M _N [Nm]	M ₀ [Nm]	M _{max} [Nm]	n _N [rpm]	n _{max} [rpm]	J _L [kgcm ²]	400 V				230 V			
						I _{N / 400V} [A]	I _{0 / 400V} [A]	I _{max / 400V} [A]	**recommen- ded controller size	I _{N / 200V} [A]	I _{0 / 200V} [A]	I _{max / 200V} [A]	**recommen- ded controller size
0.43	0.47	2.1	6,000		0.13	0.93	0.94	4.5	07.	1.66	1.81	8.9	05.
0.62	0.66	2.9	6,000	9,000	0.18	1.16	1.24	5.6	07.	1.92	2.04	10.1	05.
0.80	0.87	3.8	6,000		0.23	1.44	1.43	6.9	07.	2.54	2.52	13.2	07.
1.05	1.14	5.0	6,000		0.34	1.64	1.55	8.0	07.	3.29	3.10	17.4	07.
0.90			3,000			1.0	1.0	3.6	07.	1.7	1.6	5.9	05.
0.87	0.92	2.7	4,000	9,000	0.30	1.2	1.2	4.5	07.	2.1	2.0	7.4	05.
0.76			6,000			1.3	1.5	5.5	07.	2.4	2.8	10.1	07.
1.83			3,000			1.7	1.6	6.1	07.	3.1	2.8	11.0	07.
1.75	1.8	5.4	4,000	9,000	0.56	2.1	2.0	7.7	07.	4.2	3.9	15.4	07.
1.5			6,000			2.3	2.5	9.9	09.	4.2	4.8	18.9	09.
2.6			3,000			2.6	2.3	9.2	09.	4.3	3.9	15.2	09.
2.5	2.6	7.8	4,000	9,000	0.79	2.9	2.7	10.8	09.	4.9	4.7	18.4	09.
2.3			6,000			3.6	3.9	15.5	09.	6.5	7.1	28.0	09.
3.8/5.2			2,000			2.5/3.3	2.5/3.2	8.4	09./09.	4.1	4.3	15.3	09.
3.5/4.7	3.9/5.0	12.0	3,000	6,000	2.7	2.8/3.8	3.1/4.0	10.5	09./10.	5.7	6.2	22.4	09.
3.1/4.2			4,000			3.1/4.2	3.9/5.0	13.2	09./10.	6.2	7.7	27.6	09.
5.5/7.4			2,000			3.7/4.9	3.8/4.9	12.6	09./10.	5.8	6.2	14.8	09.
4.8/6.4	5.7/7.4	17.5	3,000	6,000	3.7	4.2/5.7	5.0/6.5	16.8	10./12.	7.1	8.8	30.6	10.
4.2/5.6			4,000			4.5/6.1	6.1/7.9	20.4	12./12.	8.4	11.7	40.8	12.
6.9/9.3			2,000			4.3/5.8	5.7/7.4	16.2	12./12.	6.8	8.9	25.5	10.
6.4/8.6	7.1/9.2	22.0	3,000	6,000	4.7	4.9/6.7	7.0/9.1	20.0	12./12.	9.6	13.8	39.4	10.
5.7/7.7			4,000			5.5/7.5	8.8/11.4	25.1	12./13.	10.8	17.3	49.3	12.
8.3/11.2			2,000			4.2/5.7	5.5/7.1	15.3	10./12.	8.1	8.8	29.7	10.
7.6/10.3	8.5/11.1	26.0	3,000	6,000	6.0	6.0/8.0	8.5/11.0	23.8	12./13.	10.8	12.9	43.5	12.
6.8/9.2			4,000			6.6/8.9	10.7/13.7	29.6	12./14.	11.9	16.1	54.4	12.
8.0/10.8			1,500			3.3/4.4	3.6/4.7	12.1	10./10.				
7.6/10.3	8.2/10.6	25.0	2,000	4,500	7.9	4.0/5.4	4.6/6.0	15.5	10./12.				
6.8/9.1			3,000			4.6/6.2	6.0/7.9	20.1	12./12.				
11.5/15.6			1,500			5.1/6.9	5.6/7.3	19.0	12./12.				
11.0/14.9	11.6/15.1	36.0	2,000	4,500	11.2	6.0/8.1	6.9/9.0	23.3	12./12.				
9.5/12.8			3,000			6.7/9.1	8.9/11.6	30.1	12./13.				
15.0/20.2			1,500			6.1/8.2	6.8/8.8	22.7	12./12.				
14.0/18.9	18.4/19.9	47.0	2,000	4,500	14.4	7.3/9.9	8.8/11.4	29.4	13./13.				
11.9/16.1			3,000			8.0/10.9	11.2/14.6	37.7	13./14.				
18.0/24.3			1,500			7.4/9.9	8.2/10.7	27.2	12./13.				
16.0/22.8	18.4/23.9	57.0	2,000	4,500	19.5	8.8/11.9	10.4/13.6	35.3	13./14.				
13.4/18.5			3,000			9.6/12.9	14.0/18.2	47.4	14./15.				
23.0/30.0			1,000			6.9/9.3	7.6/9.9	23.3	12./14.				
19.0/28.0	23.5/30.6	65.0	2,000	4,000	57.0	9.7/14.4	12.7/17.1	39.3	13./15.				
14.0/24.0			3,000			9.4/16.6	16.9/22.8	52.2	14./15.				
34.0/45.0			1,000			9.8/13.3	10.9/14.4	36.3	09./14.				
28.0/40.0	35./45.5	106.0	2,000	4,000	79.0	14.2/21.0	19.3/25.5	64.1	15./16.				
19.0/34.0			3,000			12.4/22.3	24.8/32.5	81.7	14./16.				
47.0/62.0			1,000			14.5/19.9	16.1/21.4	53.2	14./15.				
40.0/57.0	48.0/62.5	145.0	2,000	4,000	102	20.8/30.8	27.7/36.9	90.4	16./17.				
27.0/48.0			3,000			19.6/36.2	38.2/51.6	127.0	16./18.				

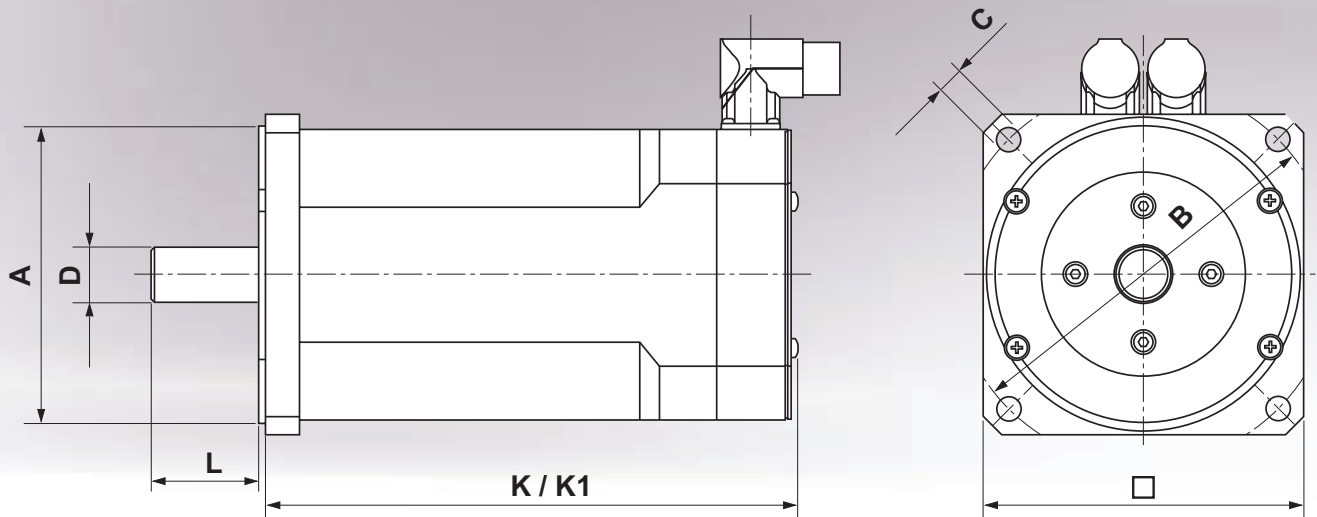
■ with external ventilation

** recommended controller size F5-M/-S for M_{max} = approx. 2,0 x M_N

DYNAMIC LINE I SM.0



DYNAMIC LINE II SM.5



PLANET GEAR SG.AL

The gears of the series **SG.AL** offer the designer a compact, economic and precise conversion of speed and torque in the machine.

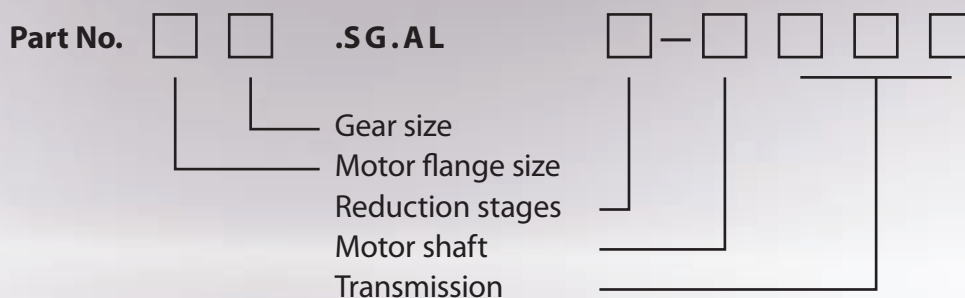
The design contains actual 4 sizes in 1 - and 2-step structure with rated output torque upto 100 Nm. The large reduction range permits an optimal adaption of motor and speed.

- high reliability and high overload security in series
- large gear ratio $i = 3 \dots 100$
- lifetime lubrication, maintenance-free
- small operating noises
- optimal efficiency $> 95\%$
- output shaft with featherkey
- simple, direct motor connection, applicable for

DYNAMIC Line I and II



The economic gear in compact design!



Planet gears **SG.AL** AL with hardened, integrated gearing, high strength and precision at minimum dimensions offer furthermore:

Universal motor connection

to **DYNAMIC LINE** motors **I** and **II** with prepared motor flanges and clamping hubs.

Maintenance-free operation

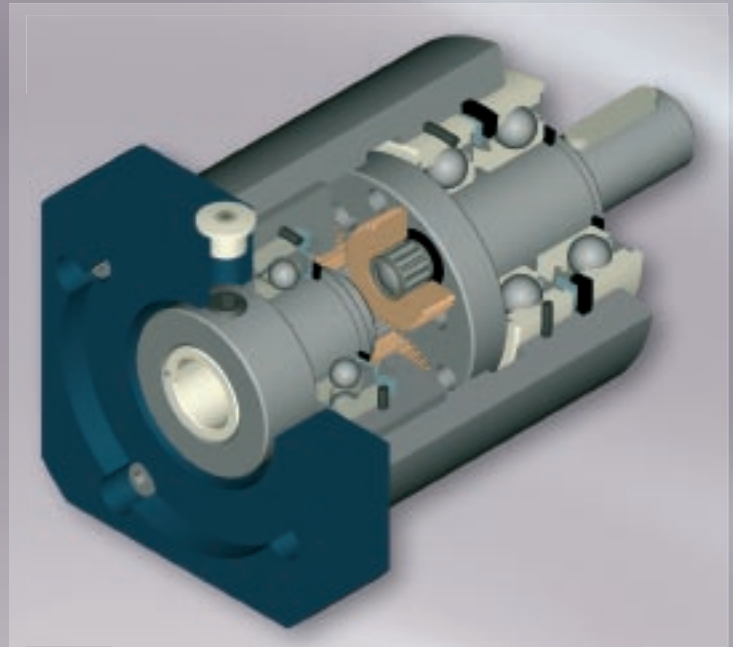
by lifetime grease packing means: no service necessary!

Balanced properties

by precise, simple design mean good torsional backlash quality at smallest costs.

Reinforced output bearing

designed for high axial and radial force at small mounting location.



Mechanical allocation table servomotors / planetary gear

Motor sizes					Gear sizes			
Dynamic Line I	Flange Ø	Shaft	Hole circle Ø	Recess Ø				
A1 .. A4. SM.	55	9 x 20	63	40	A1.SG.AL	—	—	—
B1 .. B3. SM.0	70	11 x 23	75	60	B1.SG.AL	B2.SG.AL	—	—
C1 .. C4. SM.0	92	14 x 27	100	80	—	C2.SG.AL	C3.SG.AL	—
D1 .. D4. SM.0	110	19 x 30	115	95	—	—	D3.SG.AL	D4.SG.AL
E1 .. E4. SM.0	140	24 x 50	165	130	—	—	—	E4.SG.AL
Dynamic Line II	Flange Ø	Shaft	Hole circle Ø	Recess Ø				
A1 .. A4. SM.	55	9 x 20	63	40	A1.SG.AL	—	—	—
B1 .. B3. SM.0	90	14 x 23	100	80	—	C2.SG.AL	C3.SG.AL	—
C1 .. C4. SM.0	102	19 x 30	115	95	—	—	D3.SG.AL	D4.SG.AL
D1 .. D4. SM.0	140	24 x 40	165	130	—	—	—	E4.SG.AL

[Measures in mm]

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