

COMBIVERT MOTORS

KEB

System assembly

A smooth interaction of motor and drive is necessary for high-quality, precise machine functions. KEB offer the COMBIVERT F5-Multi inverter / servo drive with the option of factory pre-setting motor data.

Complementing this KEB are able to offer both synchronous and asynchronous motor / gearbox solutions offering a variety of encoder / resolver feedback options. Gearbox options are:

- helical inline,
- shaft mounted,
- planetary
- helical worm,
- helical bevel

Optionally available with brake.

Complete solutions are therefore available for the various demands of modern machine and plant engineering. For ease of set up pre-assembled leads offer ready to connect systems.



The following pages describe the current program of closed loop synchronous and asynchronous motors.

SYNCHRONOUS MOTORS

Ideal drives for dynamic applications with low inertia and high pulse moment.

Equipped with resolvers or high-resolution SinCos encoders. Hiperface or EnDat types are also an option.

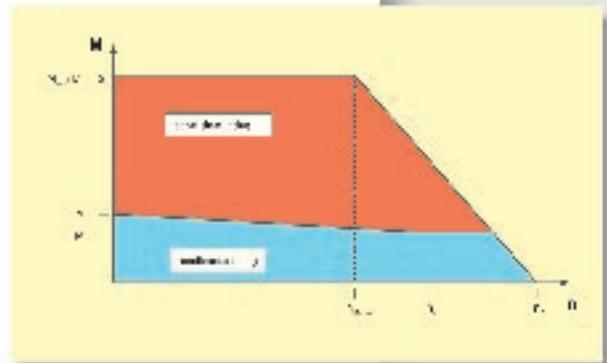
Two motor designs having up to 400 % overload capacity are available.

BASE LINE 0.2... 115 Nm

- smooth surfaces
- rear connection

DYNAMIC LINE 0.2... 70 Nm

- ripped surface with high thermal reserves
- lateral connections

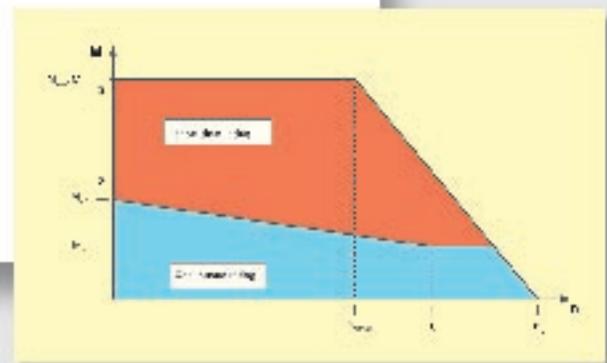


ASYNCHRONOUS SERVO MOTORS

Favoured when high inertias are to be controlled by the motor shaft. In conjunction with the KEB COMBIVERT F5-Multi and incremental or high resolution SinCos encoder feedback the motors offer a high torque ratings event at low speeds.

With the gearbox assemblies KEB COMBIGEAR the speed and torque can be ideally optimised to the requirements of the machine.

TORQUE LINE 0.12... 75 kW



BASE LINE Synchronous Servo Motors SM.200

Brushless three phase AC motors with resolver feedback for classic servo applications in all areas of machine and plant engineering. Built with NdFeB permanent magnets in the rotor and 2-pole hollow shaft resolvers the motors have encoder plugs on the B-side and are optionally available with holding brake.

Features

- Smooth housing
- Flange dimension acc. to IEC-norm fitting j6 accuracy acc. to DIN 42955 tolerances acc. to R
- Balance quality acc. to DIN ISO 2373
- Isolation class F acc. to DIN 57530
- Construction type IM B5 acc. to DIN 42950
- Shaft with keyway
- Protection type IP 64
- Integrated resolver on the B-side
- High durability due to brushless technology
- rotatable female connectors

Options

- Holding brake
- Special flanges
- Shafts without keyway
- Radial shaft seal
- Shaft end A-side precisely machined for oil assembly, tolerance k5
- Tropical isolation
- High resolving Hiperface or EnDat encoder
- Gearbox mounting



motor size	M _N [Nm]	M ₀ [Nm]	M _{max} [Nm]	n _N [rpm]
11.*	0.09	0.1	0.4	6,000
12.*	0.18	0.2	0.8	6,000
21.	0.19	0.2	0.8	4,500
22.	0.36	0.4	1.6	4,500
23.	0.55	0.6	2.4	4,500
24.	0.72	0.8	3.2	4,500
31.	0.6	0.65	2.6	3,000
32.	1.15	1.3	5.2	3,000
35.	1.6	1.9	7.6	3,000
33.	2.15	2.5	10.0	3,000
34.	2.5	3	12.0	3,000
41.	2.3	2.6	10.4	3,000
42.	4.6	5.3	21.2	3,000
43.	6.4	7.5	30.0	3,000
44.	8.5	9.5	38.0	3,000
51.	5.6	6.6	19.8	3,000
52.	8.5	10.5	31.5	3,000
53.	10.7	13.5	40.5	3,000
54.	14.5	17	51.0	3,000
55.	17.5	22	66.0	3,000
61.	10.0	13.5	40.5	3,000
62.	14.0	19	57.0	3,000
63.	16.0	22	66.0	3,000
64.	24.0	29	101.5	3,000
71.	20.0	26	78.0	3,000
72.	23.0	32	96.0	3,000
73.	26.0	40	120.0	3,000
81.	30.0	40	120.0	3,000
82.	50.0	68	204.0	3,000
83.	70.0	93	279.0	2,000
84.	85.0	115	345.0	2,000

* Motor without thermo contact, connection to open motors



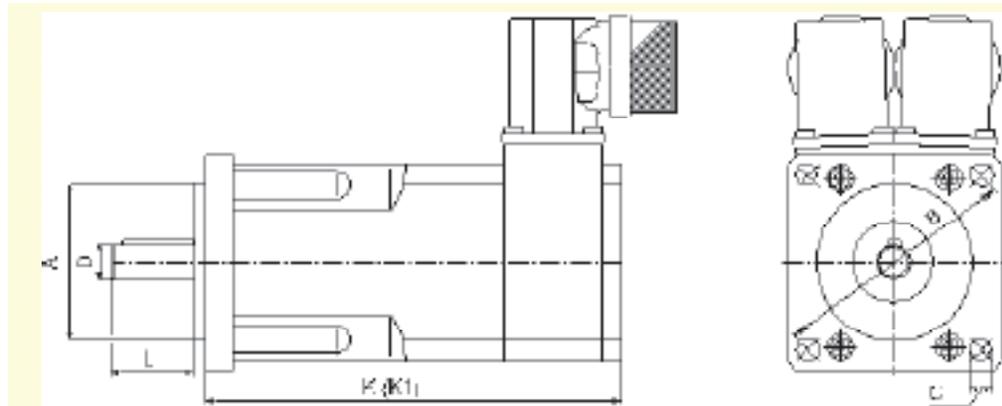
n_{max} [rpm]	J_L [kgcm ²]	200V				400V			
		$I_0/200V$ [A]	$I_N/200V$ [A]	$I_{max}/200V$ [A]	**recommended amplifier size	$I_0/400V$ [A]	$I_N/400V$ [A]	$I_{max}/400V$ [A]	**recommended amplifier size
12,000	0.06	0.6	0.6	2.5	05.				
12,000	0.08	0.93	0.9	4.2	05.				
8,000	0.06	0.6	0.6	2.5	05.	0.4	0.5	1.9	07.
6,000	0.08	0.9	0.9	3.9	05.	0.5	0.5	2.3	07.
6,000	0.11	1.2	1.1	5.0	05.	0.7	0.7	3.1	07.
6,000	0.13	1.5	1.5	6.5	05.	0.9	0.9	3.6	07.
4,000	0.39	1.1	1.0	4.6	05.	0.7	0.6	2.8	07.
4,000	0.65	1.7	1.6	7.2	05.	1.0	1.0	4.3	07.
4,000	0.92					1.4	1.3	6.1	07.
4,000	1.2	3.0	2.7	13.0	07.	1.8	1.6	7.7	07.
4,000	1.5					2.1	1.8	9.0	07.
4,000	1.9	3.1	3.0	18.9	07.	1.9	1.9	11.6	07.
4,000	2.65	6.5	5.9	39.5	10.	4.1	3.8	25.1	10.
4,000	4.15					4.8	4.4	29.4	12.
4,000	6.05					6.4	6.0	38.3	12.
4,000	6.05					4.7	4.2	23.4	12.
4,000	9.3					7.2	6.2	35.9	12.
4,000	10.6					9.2	7.7	45.7	13.
4,000	9.5					10.6	9.3	52.8	14.
3,600	11.7					12.8	10.5	63.7	14.
4,000	10.8					10.6	8.4	53.0	13.
4,000	15.7					13.4	10.8	66.8	14.
4,000	18.8					15.0	11.8	74.8	14.
3,800	29.5					17.2	14.7	84.0	16.
4,000	67					16.9	14.1	65.9	15.
4,000	81					21.3	16.8	82.9	16.
3,800	101					23.9	17.3	93.0	16.
3,500	76.1					21.8	17.8	85.0	16.
3,400	113.6					35.8	27.8	139.4	18.
2,200	152.6					33.1	26.0	129.0	19.
2,200	190.1					42.1	32.4	164.3	19.

motors and encoder cables $l = 1.5$ m

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

BASE LINE Synchronous Servo Motors SM.200

Dimensions



Motor size	A	B	C	D	K	L	m		K1		data permanent magnet brake										
							motor [kg]	brake [kg]	M_{brake} [Nm]	J_{brake} [kgcm ²]	n_{max} [rpm]	$U_{nom.}$ [V]	$I_{nom.}$ [A]	t_1 [ms]	t_2 [ms]	type					
	all dimensions in mm																				
11.	25	32	M3x7	6	83	16	0.8	0.14	113	0.4	0.032	10,000	24	0.33	6	10	01.P1				
12.	25	32	M3x7	6	98		0.8	0.14	128	0.4	0.032	10,000	24	0.33	6	10	01.P1				
21.	40	63	5.8	9	106	24	0.9	0.18	139	2	0.068	10,000	24	0.46	6	25	03.P1				
22.	40	63	5.8	9	121		1.1	0.18	154	2	0.068	10,000	24	0.46	6	25	03.P1				
23.	40	63	5.8	9	136		1.25	0.18	169	2	0.068	10,000	24	0.46	6	25	03.P1				
24.	40	63	5.8	9	151		1.45	0.18	184	2	0.068	10,000	24	0.46	6	25	03.P1				
31.	80	100	7	14	115	30	1.9	0.35	148	4.5	0.18	10,000	24	0.5	7	35	05.P1				
32.	80	100	7	14	133		2.3	0.35	166	4.5	0.18	10,000	24	0.5	7	35	05.P1				
33.	80	100	7	14	169		2.5	0.35	202	4.5	0.18	10,000	24	0.5	7	35	05.P1				
34.	80	100	7	14	187		3.3	0.35	220	4.5	0.18	10,000	24	0.5	7	35	05.P1				
35.	80	100	7	14	151		4.0	0.35	184	4.5	0.18	10,000	24	0.5	7	35	05.P1				
41.	95	115	9	19	155	40	4.5	0.52	187	9	0.54	10,000	24	0.75	7	40	06.P1				
42.	95	115	9	19	185		5.7	0.52	217	9	0.54	10,000	24	0.75	7	40	06.P1				
43.	95	115	9	19	230		7.6	0.52	262	9	0.54	10,000	24	0.75	7	40	06.P1				
44.	95	115	9	19	286		8.7	0.52	318	9	0.54	10,000	24	0.75	7	40	06.P1				
51.	130	165	12	24	186	50	8.0	1.0	229	18	1.66	10,000	24	0.83	10	50	07.P1				
52.	130	165	12	24	220		9.8	1.0	263	18	1.66	10,000	24	0.83	10	50	07.P1				
53.	130	165	12	24	237		11.2	1.0	280	18	1.66	10,000	24	0.83	10	50	07.P1				
54.	130	165	12	24	230		14.0	1.0	314	18	1.66	10,000	24	0.83	10	50	07.P1				
55.	130	165	12	24	286		17.0	1.0	348	18	1.66	10,000	24	0.83	10	50	07.P1				
61.	180	215	13	24	192	50	11.9	1.95	238	36	5.9	10,000	24	1.09	22	90	08.P1				
62.	180	215	13	24	226		18.3	1.95	272	36	5.9	10,000	24	1.09	22	90	08.P1				
63.	180	215	13	24	243		21.5	1.95	289	36	5.9	10,000	24	1.09	22	90	08.P1				
64.	180	215	13	24	311		27.5	1.95	357	36	5.9	10,000	24	1.09	22	90	08.P1				
71.	180	215	15	28	240	58	28.0	1.95	284	36	5.9	10,000	24	1.09	22	90	08.P1				
72.	180	215	15	28	263		32.5	1.95	307	36	5.9	10,000	24	1.09	22	90	08.P1				
73.	180	215	15	28	298		40.0	1.95	342	36	5.9	10,000	24	1.09	22	90	08.P1				
81.	230	265	14.5	38	311	80	43.0	5.35	379	145	39	8,000	24	2.1	65	190	10.P1				
82.	230	265	14.5	38	379		54.0	5.35	447	145	39	8,000	24	2.1	65	190	10.P1				
83.	230	265	14.5	42	447		74.0	5.35	515	145	39	8,000	24	2.1	65	190	10.P1				
84.	230	265	14.5	42	515		93.0	5.35	583	145	39	8,000	24	2.1	65	190	10.P1				

Legend:

K (K1) with resolver

t_1 release time $I_{nom.}$ rated current
 t_2 engagement time $U_{nom.}$ nominal voltage
 (+6% / -10 %)

Connection Technology BASE- and DYNAMIC LINE

Allocation of converted wiring and plugs

Connection Resolver

Plug contact no.	description	conductor coloring
1	SIN_LO	red
2	COS_LO	pink
5	SIN_REF_LO	yellow
7	SIN-REF	green
10	SIN	blue
11	COS	grey

contacts 3, 4, 6, 8, 9 and 12 are not assigned.



Connection SIN/COS-encoder

Plug contact no.	description	conductor coloring
1	A (+)	green
2	A (-)	yellow
3	R (+)	grey
4	D (-)	purple
5	C (+)	white
6	C (-)	brown
7	GND	white/green
10	+ 5 V	grey/pink
11	B (+)	blue
12	B (-)	red
13	R (-)	pink
14	D (+)	black

contacts 8, 9, 15, 16 and 17 are not assigned.



Connection Hiperface-encoder

Plug contact no.	description	conductor coloring
4	REFSIN	red
5	REFCOS	yellow
6	DATA (+)	grey
7	DATA (-)	pink
8	SIN (+)	blue
9	COS (+)	green
10	+ 12 V	brown
11	GND	white

contacts 1 - 3 and 12 are not assigned.



Connection EnDat-encoder

Plug contact no.	description	conductor coloring
7	+ 5 V	brown
8	Takt (+)	black
9	Takt (-)	purple
10	GND	white
12	B (+)	blue
13	B (-)	red
14	Data (+)	grey
15	A (+)	green
16	A (-)	yellow
17	Data (-)	pink

contacts 1 - 6 and 11 are not assigned.



Connection performance plug

plug contact no.	description	cable/conductor. no.
1	U	1
4	V	2
3	W	3
2	PE	green/yellow
A	brake (+)	5
B	brake (-)	6
C	PTC-contact	7
D	PTC-contact	8



Converted wiring for

resolver

00.F5.0C1- 1 _ _ _

Sin/Cos

00.S4.209-0 _ _ _

Hiperface

00.S4.809-0 _ _ _

EnDat

00.F5.0C1- 4 _ _ _



performance connection

cross section part-no.

1,5 mm² 00.S4.019-0 _ _ _

2,5 mm² 00.S4.119-0 _ _ _

4 mm² 00.S4.219-0 _ _ _

available standard length:

2 m, 3 m, 5 m,

7 m, 10 m, 15 m,

20 m, 30 m, 50 m



DYNAMIC LINE Synchronous Servo Motors SM.000

are permanently excited, electronically commutated synchronous motors for applications with high demands on quality and positioning accuracy. Offering compact construction, size and weight. The 6 pole motors have NdFeB permanent magnets (high remanence and field strength) and 3 phase winding for sine wave commutation.



- various nominal speeds
- isolation class F
- protection type IP65 (DIN EN 60034-5)
- flange mounted motor and resolver/encoder connections for
 - resolver or
 - high resolution Hiperface, Endat or SSI encoder

Features:

- Thermal winding protection with sensor to 145 DegC
- Shaft with keyway
- Vibration R according to DIN VDE 0530-14
- Half spine balancing according to DIN ISO 8821 with keyway
- Flange accuracy grade R according to DIN 42955
- Radial grooved bearings with high temperature resistant grease and lifetime lubrication
- Ambient temperature from -20 ... +40 DegC
- Evaluation data dimensioned for operation mode S1
- Usage above 1000 M with no loss of performance

Options

- Holding brake
- Gear mounting
- Special shafts
- forced cooling

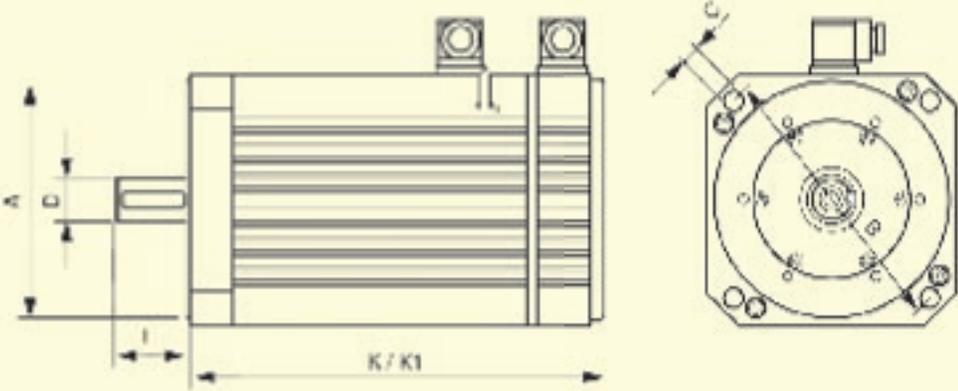
motor size	M_N [Nm]	M_0 [Nm]	
 55 mm	A1.SM	0.32	0.34
	A2.SM	0.48	0.5
	A3.SM	0.6	0.65
	A4.SM	0.8	1.0
 70 mm	B1.SM	0.6	0.65
	B2.SM	1.3	1.5
	B3.SM	2.0	2.3
 92 mm	C1.SM	0.8	0.95
	C2.SM	2.4	2.7
	C3.SM	3.9	4.5
	C4.SM	5.0	6.0
 110 mm	D1.SM	3.7/5.5	4.2/6.2
	D2.SM	6.1/8.7	7.0/10.5
	D3.SM	8.4/12.2	10.0/14.5
	D4.SM	9.9/15.6	12/18.0
 140 mm	E1.SM	7.0/11.2	8.5/12.9
	E2.SM	12.2/18.7	14/21.5
	E3.SM	16.5/26.0	19/30
	E4.SM	21.4/33.0	27/42
 190 mm	F1.SM	22.5/35.4	25/39
	F2.SM	42.0/64.0	50/75
	F3.SM	61.0/92.8	70/110

■ with forced cooling

M_{max} [Nm]	n_N [rpm]	n_{max} [rpm]	J_L [kgcm ²]	1/3 ph. 230 V (180... 260 V)				3 ph. 400 V (305... 500 V)			
				$I_0/200V$ [A]	$I_N/200V$ [A]	$I_{max}/200V$ [A]	** recommended amplifier size	$I_0/400V$ [A]	$I_N/400V$ [A]	$I_{max}/400V$ [A]	** recommended amplifier size
1.7	6,000	9,000	0.17	1.2	1.0	7.1	05.	0.85	0.8	5.0	07.
2.5	6,000	9,000	0.24	1.5	1.5	9.0	05.	1.0	0.9	6.0	07.
3.2	6,000	9,000	0.31	2.0	2.0	10.8	07.	1.2	1.1	6.5	07.
5.0	6,000	9,000	0.45	3.2	2.9	17.0	07.	1.6	1.4	8.5	07.
3.1	4,000	9,000	0.22	1.9	2.0	11.4	07.	0.9	0.9	5.4	07.
3.1	6,000	9,000	0.22	2.6	2.5	15.6	07.	1.3	1.2	7.8	07.
7.2	4,000	9,000	0.36	3.2	2.9	19.2	07.	1.6	1.4	9.6	07.
7.2	6,000	9,000	0.36	5.0	4.4	30.0	09.	2.4	2.1	14.4	09.
11.0	4,000	9,000	0.57	5.5	4.7	33.0	10.	2.4	2.0	14.4	07.
11.0	6,000	9,000	0.57	7.7	6.6	46.2	12.	3.5	3.0	21.0	09.
4.3	3,000	6,000	1.2	1.5	1.4	7.5	05.	0.8	0.75	4.0	07.
4.3	4,000	6,000	1.2	2.0	1.8	10.0	05.	1.1	0.9	5.4	07.
	6,000	6,000	1.2	3.0	2.4	15.0	07.	1.6	1.3	8.0	07.
	3,000	6,000	2.7	3.2	3.0	16.0	07.	1.9	1.8	9.4	07.
12.2	4,000	6,000	2.7	4.3	3.6	21.5	09.	2.5	2.1	12.4	09.
	6,000	6,000	2.7	6.5	5.3	32.5	10.	3.7	3.0	18.5	09.
	3,000	6,000	4.2	5.1	4.6	25.5	09.	2.9	2.7	14.5	09.
20.3	4,000	6,000	4.2	6.7	5.5	33.4	10.	3.8	3.1	19.0	09.
	6,000	6,000	4.2	9.9	6.7	49.5	10.	5.6	3.8	27.9	10.
	3,000	6,000	5.4	7.1	6.3	35.5	10.	4.2	3.7	21.0	10.
27.0	4,000	6,000	5.4	9.1	7.3	45.5	12.	5.5	4.4	27.5	12.
	6,000	6,000	5.4	13.7	7.9	68.4	12.	7.8	4.5	39.0	12.
18.9	3,000	6,000	4.8	5.3/-	4.9/-	25.4/-	09.	3.0/4.1	2.8/4.2	14.4	09./12.
	4,000	6,000	4.8	7.0/-	6.1/-	33.6/-	10.	4.0/5.4	3.5/5.0	19.2	10./12.
	6,000	6,000	4.8	10.2/-	8.2/-	48.9/-	12.	6.0/8.1	4.8/6.7	28.8	12./13.
	3,000	6,000	7.4	8.5/-	8.1/-	40.8/-	12.	4.8/6.8	4.5/6.4	23.0	12./13.
31.5	4,000	6,000	7.4	11.6/-	10.5/-	55.7/-	12.	6.4/9.2	5.8/8.4	30.7	12./14.
	6,000	6,000	7.4	16.0/-	9.6/-	76.8/-	12.	9.9/14.2	5.9/11.7	47.5	13./15.
	3,000	6,000	9.8	12.4/-	10.9/-	59.5/-	12.	7.2/10.4	6.3/9.2	34.5	12./14.
45.0	4,000	6,000	9.8	17.0/-	13.5/-	81.6/-	13.	9.7/14.1	7.7/12.2	46.5	13./15.
	6,000	6,000	9.8	22.6/-	12.7/-	108.0/-	13.	13.6/19.7	7.6/16.0	65.3	14./16.
54.0	3,000	6,000	12.7	14.2/-	12.2/-	68.1/-	13.	8.5/12.3	7.3/11.5	40.8	13./15.
	4,000	6,000	12.7	18.2/-	13.5/-	87.3/-	13.	11.6/16.8	8.6/14.7	55.7	13./16.
42	2,000	4,000	12.3	5.3/-	4.4/-	28/-	09.	3.1/4.7	2.6/4.2	16	09./12.
	3,000	4,000	12.3	8.0/-	6.4/-	42/-	10.	4.7/7.1	3.8/5.9	25	10./12.
	4,000	4,000	12.3	10.7/-	6.9/-	57/-	12.	6.2/9.3	4.0/7.2	33	12./13.
	2,000	4,000	19.5	8.6/-	7.5/-	46/-	12.	4.7/6.5	4.1/6.3	25	10./12.
70	3,000	4,000	19.5	13.3/-	10.4/-	71/-	12.	7.5/9.7	5.8/9.1	40	12./14.
	4,000	4,000	19.5	17.8/-	9.7/-	94/-	13.	10.0/12.7	5.4/11.1	53	13./15.
	2,000	4,000	26.7	11.7/-	10.6/-	56/-	12.	6.8/10.7	6.1/9.6	33	12./14.
85	3,000	4,000	26.7	17.6/-	14.0/-	84/-	13.	10.3/16.3	8.3/13.4	49	13./15.
	4,000	4,000	26.7	21.9/-	10.4/-	105/-	13.	13.5/21.3	6.4/15.9	65	14./16.
121	2,000	3,000	36.0	16.5/-	13.0/-	79/-	12.	9.9/12.7	7.8/12.1	47	13./15.
	3,000	3,000	36.0	23.2/-	13.3/-	111/-	13.	14.4/18.5	8.3/16.8	69	14./16.
88	1,500	4,000	84.0					8.2/12.3	7.5/11.8	29	13./15.
	2,000	4,000	84.0					11.1/16.6	9.7/15.8	39	14./16.
	3,000	4,000	84.0					17.0/25.4	13.8/21.9	60	15./17.
	4,000	4,000	84.0					22.2/33.2	14.8/25.5	78	16./18.
175	1,500	4,000	147					17.0/25.5	14.5/22.1	60	16./17.
	2,000	4,000	147					22.3/33.5	17.2/28.5	78	16./19.
	3,000	4,000	147					32.2/48.3	20.6/38.7	113	17./20.
245	1,500	4,000	210					23.1/34.8	20.9/31.8	81	17./19.
	2,000	4,000	210					30.8/46.0	23.7/41.1	108	17./20.
	3,000	4,000	210					46.2/69.0	22.9/56.0	162	17./22.

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

Dimensions



Motor-size	A	B	C	D	K	L	m	K1	data permanent magnet brake								
									M_{brake} [Nm]	J_{brake} [kgcm ²]	n_{max} [rpm]	$U_{nom.}$ [V]	$I_{nom.}$ [A]	t_1 [ms]	t_2 [ms]	type	
	all dimensions in mm							motor	brake								
							[kg]	[kg]									
A1.SM	40	63	5.8	9	121		1.0	0.18	145	2	0.068	9,000	24	0.46	6	25	03.P1
A2.SM	40	63	5.8	9	133	20	1.2	0.18	157	2	0.068	9,000	24	0.46	6	25	03.P1
A3.SM	40	63	5.8	9	145		1.4	0.18	169	2	0.068	9,000	24	0.46	6	25	03.P1
A4.SM	40	63	5.8	9	170		1.8	0.18	194	2	0.068	9,000	24	0.46	6	25	03.P1
B1.SM	60	75	5.8	11	136		1.5	0.30	164	2.5	0.18	9,000	24	0.50	7	35	05.P1
B2.SM	60	75	5.8	11	160	23	2.1	0.30	188	2.5	0.18	9,000	24	0.50	7	35	05.P1
B3.SM	60	75	5.8	11	196		2.9	0.30	223	2.5	0.18	9,000	24	0.50	7	35	05.P1
C1.SM	80	100	7	14	156		2.7	0.50	202	9	0.6	6,000	24	0.75	7	40	06.P1
C2.SM	80	100	7	14	180	30	3.9	0.50	226	9	0.6	6,000	24	0.75	7	40	06.P1
C3.SM	80	100	7	14	214		5.2	0.50	260	9	0.6	6,000	24	0.75	7	40	06.P1
C4.SM	80	100	7	14	248		6.6	0.50	294	9	0.6	6,000	24	0.75	7	40	06.P1
D1.SM	95	115	9	19	218		6.3	0.78	226	11	2.3	6,000	24	0.84	22	90	08.P1
D2.SM	95	115	9	19	248	40	7.9	0.78	56	11	2.3	6,000	24	0.84	22	90	08.P1
D3.SM	95	115	9	19	278		9.6	0.78	286	11	2.3	6,000	24	0.84	22	90	08.P1
D4.SM	95	115	9	19	308		11.2	0.78	316	11	2.3	6,000	24	0.84	22	90	08.P1
E1.SM	130	165	11	24	231		10.2	1.63	276	35	5.9	4,000	24	1.1	22	90	08.P1
E2.SM	130	165	11	24	261	50	12.3	1.63	306	35	5.9	4,000	24	1.1	22	90	08.P1
E3.SM	130	165	11	24	291		15.5	1.63	336	35	5.9	4,000	24	1.1	22	90	08.P1
E4.SM	130	165	11	24	336		20.4	1.63	381	35	5.9	3,000	24	1.1	22	90	08.P1
F1.SM	180	215	14	32	348		30.5	3.80	348	85	17.6	4,000	24	1.5	25	140	09.P1
F2.SM	180	215	14	32	428	58	44.0	3.80	428	85	17.6	4,000	24	1.5	25	140	09.P1
F3.SM	180	215	14	32	508		57.5	3.80	508	85	17.6	4,000	24	1.5	25	140	09.P1

Legend:

K (K1) with resolver

t_1 release time

t_2 engagement time

$I_{nom.}$ rated current
 $U_{nom.}$ nominal voltage
 (+ 6 % / - 10 %)

SERVOGEAR *Planetary gears SG.AL*

The value planetary type SG.AL provides designers with an economical, precision planetary gearbox that is perfect for today's stepper and emerging low cost servo motors.

The design incorporates single or two stages of planetary gearing to create four frames sizes with rated torque from 6 Nm up to 100 Nm. Standard backlash is 15 arc minutes with low backlash of 12 arc minutes.

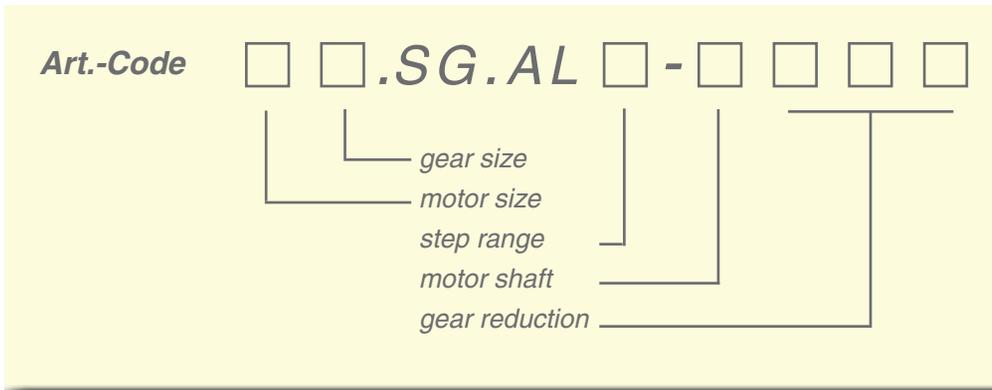
The AL reducer is available in eight standard ratios from 3:1 to 100:1. The cylindrical housing is supplied with either face mounted holes or a square NEMA flange making it a versatile gearbox for global installation.

- high reliability and overload safety
- large gear reduction range $i = 3 \dots 100$
- lifetime lubrication
- low running noise
- optimal efficiency > 95 %
- output shaft with feather key
- easy direct attachment of motor

for **BASE LINE** and **DYNAMIC LINE**



The economically efficient gearbox in compact design!

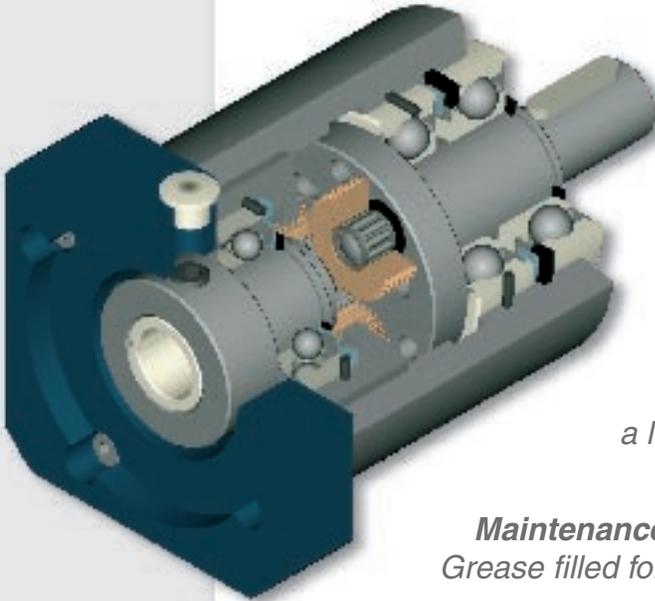


SERVOGEAR

Planetary gears SG.AL

One Piece Construction

Steel body with hardened, integral crown gear provides strength and precision in a small diameter



Universal Servo Interface

Flexible slotted bolt circle and oversized pilot equal easy motor installation and no adapters.

Interchangeability

Mechanically interchangeable with many of today's metric gearboxes or supplied with a NEMA flange.

Outstanding value

Precise, simple design offers good backlash at a low cost.

Maintenance Free Operation

Grease filled for life; never needs service

Output Bearing

Forward output bearing construction allows for higher bearing loads and serves as a pilot helping to provide a more economical package.

classification table

DYNAMIC LINE

	flange	shaft	hole circle	recess
A1 .. A4. SM.	55	9 x20	63	40
B1 .. B3. SM.0	70	11 x23	75	60
C1 .. C4. SM.0	92	14x30	100	80
D1 ..D4. SM.0	110	19x40	115	95
E1 ..E4. SM.0	140	24x50	165	130

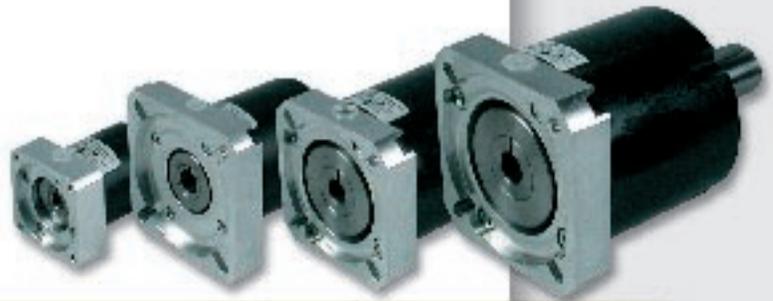
BASE LINE

	flange	shaft	hole circle	recess
21 ...24. SM.0	55	9x24	63	40
31 ...35. SM.0	86	14x30	100	80
41 ...44. SM.0	102	19x40	115	95
51 ...55. SM.0	142	24x50	165	130

_1.SG.AL _2.SG.AL _3.SG.AL _4.SG.AL

•	-	-	-
•	•	-	-
-	•	•	-
-	-	•	•
-	-	-	•
•	-	-	-
-	•	•	-
-	-	•	•
-	-	-	•

Technical data



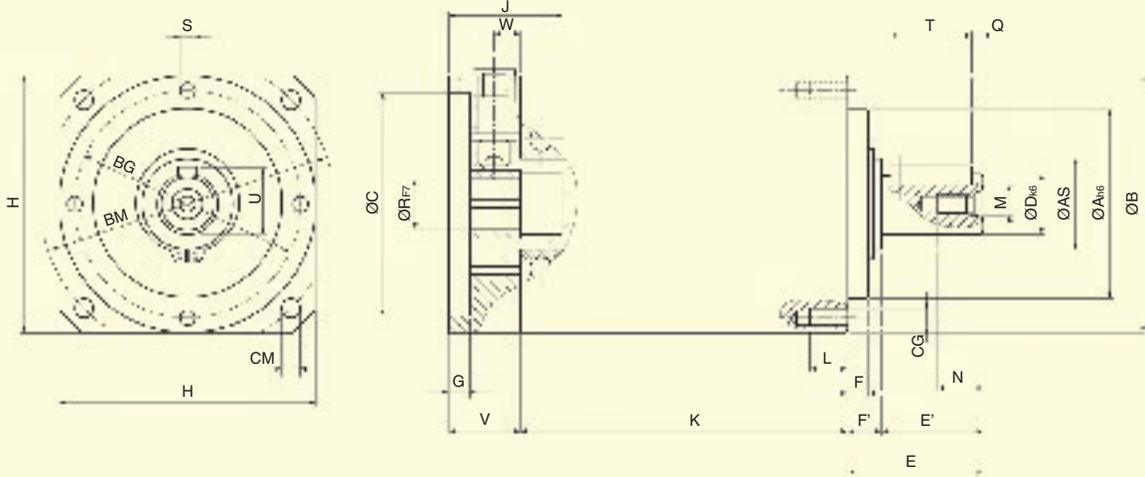
				_1.SG.AL	_2.SG.AL	_3.SG.AL	_4.SG.AL
Peak Output Torque ¹⁾	T_{max}	Nm	3/5/15/25/30/ 50	12	44	80	200
			10 / 100	11	40	74	180
Rated Output Torque ²⁾	$T_{nom.}$	Nm	3/5/15/25/30/ 50	6	22	40	100
			10 / 100	5.5	20	37	90
ratio	i		1 stage	5 / 10	3 / 5 / 10		
			2 stage	25/50/100	15/25/30/50/100		
backlash	j_t	arcmin	1 stage	<=12			
			1 stage	<=15			
torsional stiffness	C_t	Nm / arcmin	3/5/15/25/30/ 50	0.9	3.3	9	24
			10 / 100	0.75	2.8	7.5	20.5
continuous input speed	$n_{1 nom}$	rpm		4000	3700	3400	2600
maximum input speed	$n_{1 max.}$	rpm		8000	6000	6000	4800
maximum radial load ³⁾	$Fr_{2 max.}$	N		650	1450	2400	4600
maximum axial load ³⁾	$Fa_{2 max.}$	N		700	1550	1900	4000
efficiency	η	%	1 stage	> 97			
			2 stage	> 95			
input inertia	J_1	kgcm ²	1 stage	0.060	0.29	1.73	5.5
			2 stage	0.052	0.26	1.48	4.6
weight	m	kg	1 stage	0.75	1.7	4.0	8.8
			2 stage	0.92	2.1	4.9	10.9
noise level	L_{PA}	dB (A)	measured $n_1 = 3000$ rpm	≤ 69	≤ 70	≤ 72	≤ 74
life	L_h	H	20000				
lubrication	grease						
orientation	any						

¹⁾ max. acceleration moment for cycle rating

²⁾ rated torque for continuous rating

³⁾ related to center output shaft at 100 min⁻¹

Dimensions



Size	[dimensions in mm]		1.SG.AL	2.SG.AL	3.SG.AL	4.SG.AL
housing \varnothing	B		50	70	90	120
pilot \varnothing	A	h6	35	52	68	90
output shaft \varnothing	D	k6	12	16	22	32
mounting hole circle	BG		44	62	80	108
mounting holes	CG	4x90°	M4	M5	M6	M8
shoulder \varnothing	AS		17	25	40	50
shaft length from mount face	E		24.5	36	46	70
output shaft length	E'		18	28	36	58
pilot length	F		4	5	5	6
thickness	F'		6.5	8	10	12
thread depth	L		8	10	12	16
keyway length	T		14	22	32	50
keyway position	Q		2	3	2	4
height with key	U		13.5	18	24.5	35
key width	S	h9	4	5	6	10
thread size	M		M4	M5	M8	M12
thread depth	N		8	12.5	19	28
reducer body length	K	1 stage	48	70	84	103.5
		2 stage	64	91	110	136
motor interface dimensions						
maximum motor pilot	C					
hole circle for motor	BM		see classification table			
mounting holes	CM					
max. \varnothing Motor shaft	R		14	16	24	32
min. wave length	J		18	16.5	24	26
min. square flange	H		50	70	90	120
maximum pilot length	G		4	4	4	6
position of access hole	W		6	7	8	10
flange thickness	V		20 25	16.5 19.5	20 25	26 36

Further solutions for gearboxes



motor type		gear version			
<i>BASE LINE</i>	<i>DYNAMIC LINE</i>	<i>helical</i>	<i>shaft</i>	<i>helical bevel</i>	<i>helical worm</i>
SM.200	SM.000	G	F	K	S
21 ... 24	A1 ... A4	-	-	-	-
-	B1 ... B3	•	•	•	•
31 ... 33	C1 ... C4	•	•	•	•
41 ... 43	D1 ... D4	•	•	•	•
51 ... 53	E1 ... E4	•	•	•	•
61 ... 72	F1 ... F3	•	•	•	•

Selection and dimensioning of the gears acc. to PC-Programm
KEB-DRIVE!



TORQUE LINE

Asynchronous Servo Motors

The asynchronous servo motors type DK are especially designed for closed loop operation

KEB COMBIVERT F5-Multi

and serve as an economic alternative for demanding drive tasks throughout the whole speed range

Details:

- Motor frame B3 or B5
- Forced cooling IP 55
- Thermal winding protection via PTC thermistor
- Optional spring applied brake
- Incremental encoder 2.500 I/U / RS 422, 5 V DC, 12 pole plug

Size	power [kW]	M_N [Nm]	M_0 [Nm]	M_{max} [Nm]	n_N [rpm]	n_{max} [rpm]	J_L [kgcm ²]	brake [Nm]
63	0.12	0.8	0.8	1.7	1400	3000	4.0	4
63	0.18	1.2	1.2	2.4	1405	3000	4.0	4
71	0.25	1.7	1.7	3.2	1385	3000	4.0	4
71	0.37	2.6	2.6	5.2	1370	3000	5.0	4
80	0.55	3.6	3.6	8.2	1400	3000	8.7	4/8
80	0.75	5.1	5.1	10.6	1400	3000	10.7	4/8
90	1.1	7.5	7.5	16.8	1410	3000	20.7	8/16
90	1.5	10.2	10.2	23.9	1400	3000	26.0	8/16
100	2.2	14.2	14.2	39.6	1420	3000	40.0	16/32
100	3.0	20.0	20.0	50.4	1435	3000	72.5	32/60
112	4.0	26.6	26.6	76.6	1435	3000	90.0	32/60
132	5.5	36.5	36.5	98.6	1440	3000	150	60/100
132	7.5	49.7	49.7	130	1440	3000	280	100/150
160	11	72.5	72.5	215	1450	3000	350	100/150
160	15	98.5	98.5	266	1465	3000	780	150/250
180	18.5	121	121	316	1460	3000	900	150/250
180	22	143	143	335	1465	3000	1380	250/400
200	30	195	195	421	1465	3000	1680	250/400
225	37	240	240	540	1470	3000	2750	upon request
225	45	292	292	657	1470	3000	3130	upon request
250	55	356	356	737	1475	3000	5250	upon request
280	75	484	484	958	1480	3000	9500	upon request

power > 90 kW upon request



eration with the

le speed range.



1/3 ph. 230 V (180... 260 V)

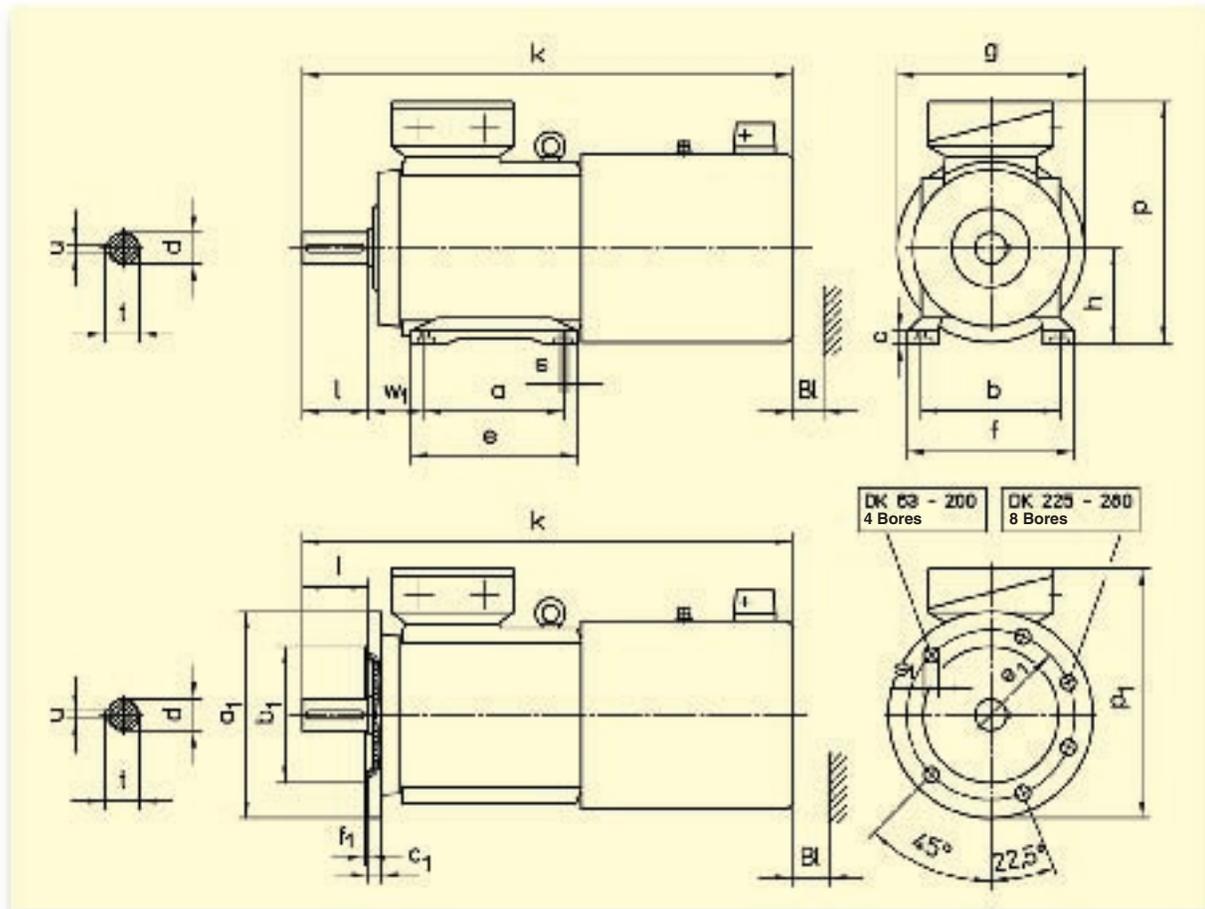
N/200V [A]	I ₀ /200V [A]	max/200V [A]	** recommended amplifier size
0.6	0.6	1.4	09.F5.M
1.0	1.0	2.3	09.F5.M
1.4	1.4	2.6	09.F5.M
1.8	1.8	3.8	09.F5.M
2.8	2.8	6.8	09.F5.M
3.6	3.6	10.7	09.F5.M
4.5	4.5	13.9	09.F5.M
5.9	5.9	18	10.F5.M
8.9	8.9	34.5	10.F5.M
upon request			

3 ph. 400 V (305... 500 V)

N/400V [A]	I ₀ /400V [A]	max/400V [A]	** recommended amplifier size
0.4	0.4	0.8	09.F5.M
0.6	0.6	1.3	09.F5.M
0.8	0.8	1.5	09.F5.M
1.1	1.1	2.2	09.F5.M
1.6	1.6	3.9	09.F5.M
2.1	2.1	6.2	09.F5.M
2.6	2.6	8.0	09.F5.M
3.4	3.4	10.4	10.F5.M
5.2	5.2	19.9	12.F5.M
6.7	6.70	22.9	12.F5.M
8.8	8.80	38.0	13.F5.M
10.5	10.5	38.8	14.F5.M
15.0	15.0	50.0	15.F5.M
21.5	21.5	85.1	16.F5.M
28.5	28.5	112.9	17.F5.M
35.0	35.0	129.1	18.F5.M
42.0	42.0	136.1	19.F5.M
55.5	55.5	199.8	20.F5.M
67.0	67.0	235.2	21.F5.M
81.0	81.0	262.5	22.F5.M
98.5	98.5	310.3	23.F5.M
134	134	349.8	24.F5.M

**recommended amplifier size F5-M for $M_{max} = \text{approx. } 2 \times M_N$

Dimensions



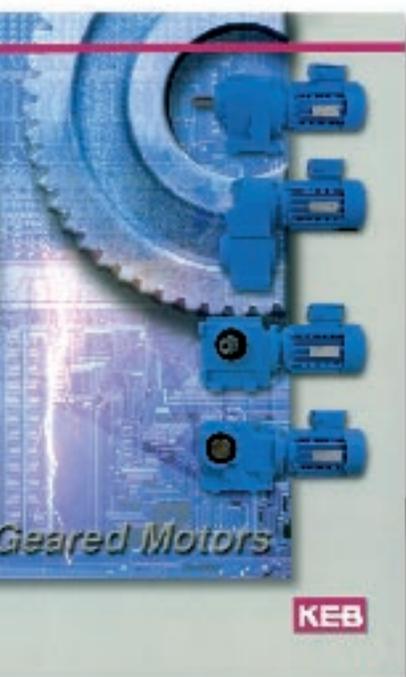
Industrial gear motors provide the adjustment of speed and torque. With the program KEB COMBIGEAR are complete assembly in the classic designs

- helical inline gear,
- helical bevel gear-,
- shaft-mounted- as well as
- helical worm gears

are available.

Main features of the series are the fine graduation of the possible ratios, the compact design and the sturdy housing out cast iron.

motor size	P [kW]	a	b	C	e	f	w1	d	l	u	h	p	g	s	t	k	kB	Bl	a1	b1	c1	e1	f1	s1	p1	
[all dimensions in mm]																										
63	0.12																									
63	0.18	80	100	7	95	120	40	11	23	4	63	167	124	8	12.5	354	354	14	140	95	9	115	3	9	174	
71	0.25																									
71	0.37	90	112	11	116	138	45	14	30	5	71	175	124	8	16	328	328	14	160	110	9	130	3.5	9	184	
80	0.55																									
80	0.75	100	125	12	125	168	50	19	40	6	80	191	139	10	21.5	384	384	16	200	130	10	165	3.5	11	211	
90	1.1																									
90	1.5	125	140	14	155	178	56	24	50	8	90	210	157	10	27	426	426	16	200	130	10	165	3.5	11	220	
100	2.2	140	160	15	175	192	63	28	60	8	100	227	177	12	31	502	502	18	250	180	11	215	4	14	252	
100	3	140	160	11	171	188	63	28	60	8	100	237	196	12	31	557	557	20	250	180	11	215	4	14	262	
112	4	140	190	18	180	224	70	28	60	8	112	249	196	12	31	591	591	20	250	180	11	215	4	14	328	
132	5.5	140	216	16	180	256	89	38	80	10	132	310	217	12	41	644	644	35	300	230	12	265	4	14	328	
132	7.5	178	216	16	218	256	89	38	80	10	132	332	258	12	41	701	701	35	300	230	12	265	4	14	350	
160	11	210	254	18	257	296	108	42	110	12	160	360	258	15	45	779	779	35	350	250	13	300	5	18	375	
160	15	254	254	18	301	296	108	42	110	12	160	402	313	15	45	853	853	35	350	250	13	300	5	18	417	
180	18.5	241	279	20	288	328	121	48	110	14	180	422	313	15	51.5	853	853	35	350	250	13	300	5	18	417	
180	22	279	279	20	326	328	121	48	110	14	180	441	351	15	51.5	969	969	35	350	250	13	300	5	18	436	
200	30	305	318	22	360	372	133	55	110	16	200	461	351	19	59	969	969	35	400	300	15	350	5	18	461	
225	37	286	356	25	343	413	149	60	140	18	225	525	390	19	64	972		40	450	350	16	400	5	18	525	
225	45	311	356	25	368	413	149	60	140	18	225	525	390	19	64	1012		40	450	350	16	400	5	18	525	
250	55	349	406	28	412	471	169	65	140	18	250	576	440	24	69	1101		45	550	450	18	500	5	18	601	
280	75	368	457	32	431	522	190	75	140	20	280	668	490	24	79.5	1179		50	550	450	18	500	5	18	663	



people in motion



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