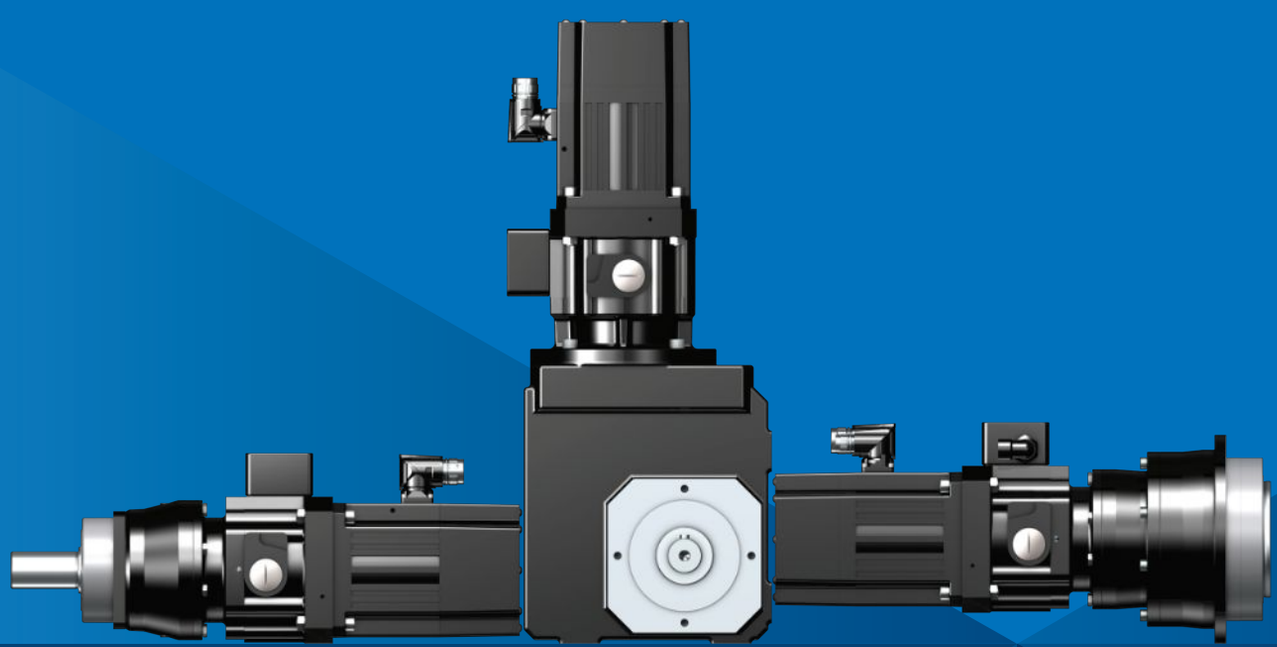


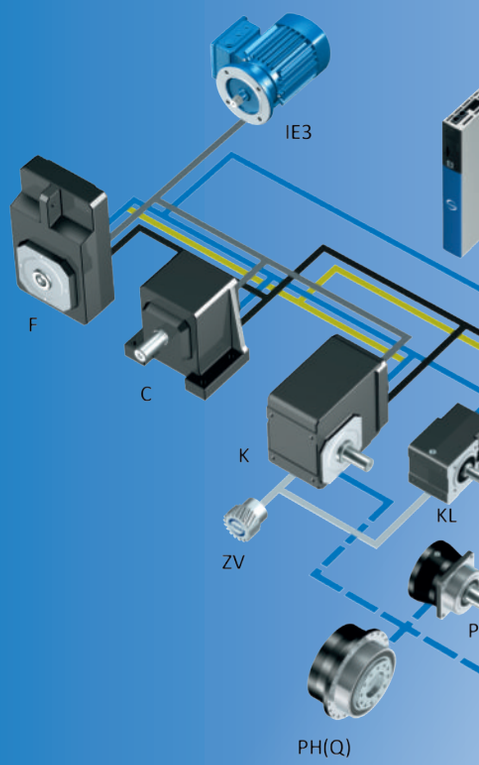
Synchronous servo geared motors with redundant brake

STÖBER

Synchronous servo geared motors with redundant brake

One partner. All the possibilities.

STOBER has developed and produced excellent drive technology since 1934 and is active internationally with around 1000 employees at 12 locations. STOBER impresses machine manufacturers in wide-ranging industries and markets around the world with tailor-made, highly efficient drive systems for demanding movements.



"Our vision is to be the preferred partner for perfect movement."

- Rainer Wegener, CEO of STOBER.

Synchronous servo geared motors with redundant brake – what you can expect!

Do you design gravity-loaded axes? You can depend on the STOBER 2-brake solution. Excellent, powerful and high-quality servo gear units – combined with extremely compact synchronous servo motors with permanent magnet and ServoStop spring-loaded brakes in the motor adapters. What makes the system safe is the combination of this solution with the STOBER SD6 drive controller, the SE6 safety module and the safe brake management system integrated into it. Contact us. We would be happy to give you advice.

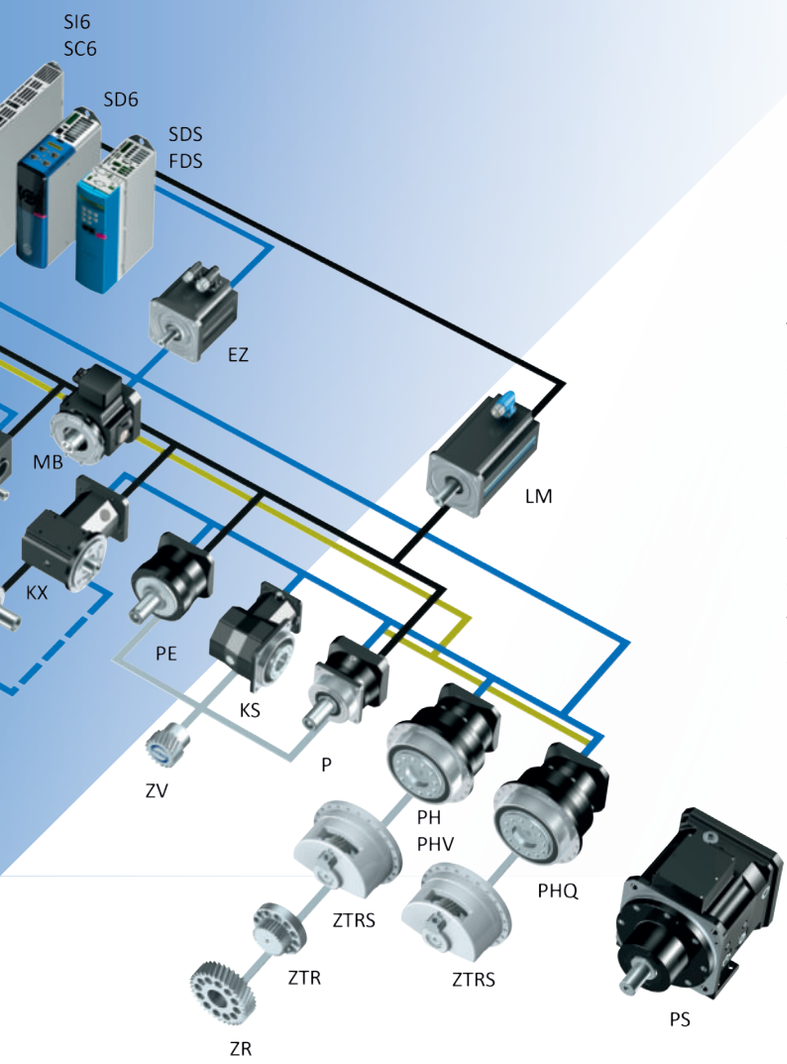
At home in the world of demanding motion

Gear units

Geared motors

Motors

Cables and drive controllers



Everything from a single source.

The STOBER drive system consisting of gear units, motors, cables and drive controllers has a modular design and is freely scalable—for tailor-made, compact and powerful machine concepts. It can be adapted to your individual requirements and combined as needed in nearly all industries and applications areas.

We check every single component and how it works together with others, taking on the responsibility for the complete drive train. For you, this means that one contact partner, certified operating safety and maximum availability are guaranteed.

Need special solutions?

Numerous one-of-a-kind product highlights and project-related adjustments make it possible. With a holistic approach to your specific task, we work together on individualized solutions that are optimally coordinated to your requirements. Dedicated and solution-oriented in the support of your visions and projects.

STOBER moves integrally and precisely.

We put ideas in motion with passion and a great deal of dedication. In the process, we rely on our decades of experience and an exceptionally broad range of products. Our customers benefit from precise, practical system solutions with uncompromising quality and expert individual consultation.

STOBER moves as a team and with personality.

As a family-owned company, it is very important to us to maintain close relationships and treat each other with trust. We put people first.

We are committed to the well-being of our employees, identify with the expectations of our customers, and show personal commitment to mutual success.

"We have installed gear units, motors and drive controllers from STOBER in nearly all our systems. STOBER supports us in new projects from the first stroke of a pencil in the design phase until commissioning. Our years of cooperation are shaped by openness and honesty and emanate a rather special spirit. The technical consulting, the support—that is real, experienced partnership"

- Jürgen Leicht, Managing Partner of Leicht Stanzautomation.

Working together. Worldwide. Successfully.

With an eye to the future, STOBER is facing the challenges of digitalization and investing in integrated solutions and a strong global presence in production, sales and service. STOBER China was founded at the end of 2019. As a result, we are present in more than 40 countries around in the world at 12 locations and with 80 service partners.

STOBER drives
Systems technology
Taicang, China.

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1 Selection tool

1.1 Inline and Offset Geared Motors

					
Product chapter	**P**	**C**	**F**	**PH**	**PHQ**
Chapter number	[▶ 2]	[▶ 5]	[▶ 6]	[▶ 3]	[▶ 4]

Technical data

M_{1Bstat}	8 – 100 Nm	8 – 100 Nm	8 – 100 Nm	8 – 100 Nm	8 – 100 Nm
i	3 – 50	2 – 70	4.3 – 56	4 – 60	5.5 – 168
M_{2acc}	84 – 3450 Nm	31 – 4800 Nm	67 – 1100 Nm	108 – 7500 Nm	153 – 19575 Nm
$\Delta\phi_2$	1 – 4 arcmin	10 – 20 arcmin	5 – 11 arcmin	1 – 3 arcmin	1 – 3 arcmin
η_{get}	95 – 97 %	97 %	97 %	93 – 96 %	90 – 96 %

An explanation of the formula symbols can be found in the chapter [▶ 15.1].

Features

Power density	★★★★☆	★☆☆☆☆	★☆☆☆☆	★★★★☆	★★★★★
Backlash	★★★★★	★★☆☆☆	★★★☆☆	★★★★★	★★★★★
Price category	€€	€	€	€€€	€€€€
Shaft load	★★★★☆	★★☆☆☆	★★★☆☆	★★★★★	★★★★★
Smooth operation	★★★★☆	★★★☆☆	★★★☆☆	★★★★☆	★★★★☆
Torsional stiffness	★★★☆☆	★★☆☆☆	★★☆☆☆	★★★★☆	★★★★★
Mass moment of inertia	★★★★☆	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Key	★☆☆☆☆ good | ★★★★★ excellent € Economy | €€€€€ Premium				
Shaft design					
Solid shaft with feather key	✓	✓	✓		
Solid shaft without feather key	✓	C0 – C5: ✓ Starting at C6: Request	✓		
Hollow shaft with keyway			✓		
Hollow shaft with shrink ring			✓		
Flange shaft				✓	✓
Bearing design					
Standard	✓	✓	✓	✓	✓
Axially reinforced	✓				
Radially reinforced	✓				
Reinforced				✓ (PH3 – PH5)	✓ (PHQ4 – PHQ5)

1 Selection tool

1.2 Right-angle geared motors

				
Product chapter	**PK**	**PHK**	**PHQK**	**K**
Chapter number	[7]	[8]	[9]	[10]
Technical data				
M_{1Bstat}	8 – 72 Nm	8 – 100 Nm	8 – 100 Nm	8 – 100 Nm
i	12 – 194	16 – 457	22 – 583	4 – 97
M_{2acc}	181 – 3105 Nm	238 – 7500 Nm	328 – 43000 Nm	62 – 7700 Nm
$\Delta\phi_2$	1.5 – 5 arcmin	1.5 – 4.5 arcmin	1.5 – 4 arcmin	1.5 – 12 arcmin
η_{get}	94 %	92 – 93 %	92 – 93 %	96 – 97 %

An explanation of the formula symbols can be found in the chapter [15.1].

Features				
Power density	★★★☆☆	★★★★☆	★★★★★	★★☆☆☆
Backlash	★★★★★	★★★★★	★★★★★	★★★☆☆
Price category	€€€	€€€€	€€€€€	€€
Shaft load	★★★★☆	★★★★★	★★★★★	★★★☆☆
Smooth operation	★★★☆☆	★★★☆☆	★★★☆☆	★★☆☆☆
Torsional stiffness	★★★☆☆	★★★★☆	★★★★★	★★☆☆☆
Mass moment of inertia	★★★★☆	★★★★☆	★★★★☆	★★★★☆
Key	★☆☆☆☆ good | ★★★★★ excellent € Economy | €€€€€ Premium			
Shaft design				
Solid shaft with feather key	✓			✓
Solid shaft without feather key	✓			K1 – K4: ✓ Starting at K5: Request
Solid shaft on both sides				✓
Hollow shaft with keyway				✓
Hollow shaft with shrink ring				✓
Flange shaft		✓	✓	✓
Bearing design				
Standard	✓	✓	✓	✓
Axially reinforced	✓			
Radially reinforced	✓			
Reinforced		✓ (PH5)	✓ (PHQ5)	

1 Selection tool

1.3 Synchronous servo motors

Product chapter	EZ
Chapter number	[▶ 11]

Technical data

M_N	0.4 – 77.2 Nm
M_0	0.44 – 94 Nm

An explanation of the formula symbols can be found in the chapter [▶ 15.1].

Shaft design	
Solid shaft without feather key	✓
Flange hollow shaft	
Encoder	
EnDat 3 One Cable Solution (OCS)	✓
EnDat 2.2	✓
EnDat 2.1	✓
Resolver	✓
Cooling	
Convection cooling	✓
Forced ventilation	✓
Brake	
Permanent magnet holding brake	✓
Marks and test symbols	
CE	✓
cURus	✓
UKCA	✓

2 P planetary geared motors

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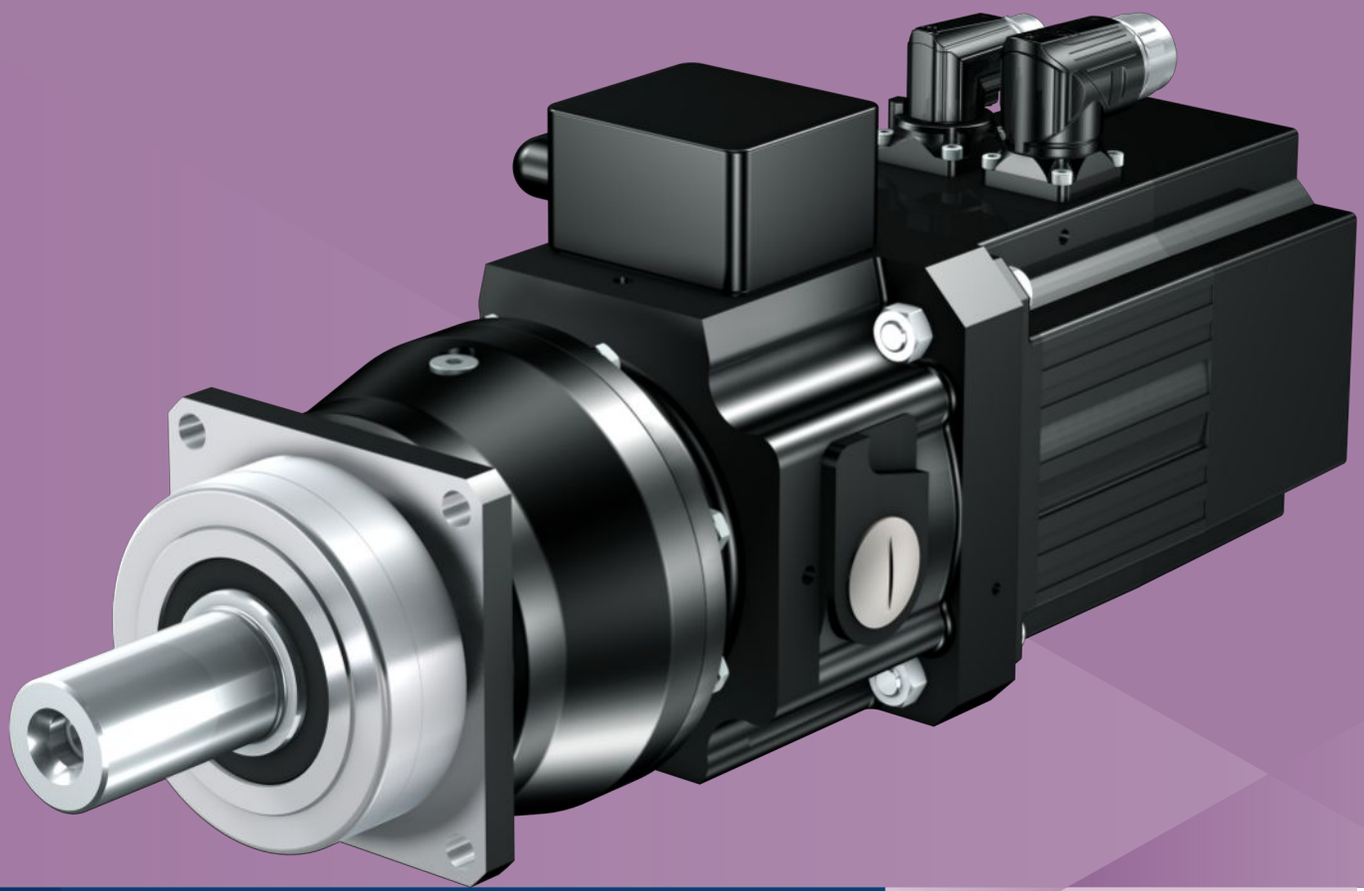


2 Planetary geared motors P

2.1 Overview

Helical precision planetary geared motors with redundant brake

Features

Power density	★★★★☆
Backlash	★★★★★
Price category	€€
Shaft load	★★★★☆
Smooth operation	★★★★☆
Torsional stiffness	★★★☆☆
Mass moment of inertia	★★★★☆
Helical gearing	✓
Any mounting position	✓
Continuous operation without cooling	✓
Reinforced output bearing	✓ (optional)
Safe braking in case of power outage	✓
Safe support of the load with gravity-loaded axes using 2 brakes	✓
Easily and safely connected to the synchronous servo motor thanks to backlash-free plug-in coupling	✓

Key ★☆☆☆☆ good | ★★★★★ excellent
€ Economy | €€€€€ Premium

Technical data

M_{1Bstat}	8 – 100 Nm
i	3 – 50
M_{2acc}	84 – 3450 Nm
$\Delta\phi_2$	1 – 4 arcmin
η_{get}	95 – 97 %

2.2 Selection tables

The technical data specified in the selection tables applies to:

- Installation altitudes up to 1000 m above sea level
- Surrounding temperatures from 0 °C to 40 °C
- Drives with convection-cooled motors (e.g. EZ401**U**)
- Without consideration of the thermal limiting performance

For the technical data on drives with forced ventilated motors (e.g. EZ401**B**), refer to https://configurator.stoeber.de/en-US/.

An explanation of the formula symbols can be found in the chapter [▶ 15.1].

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
P5 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 290 Nm)																	
300	42	46	1.6	3.4	P531_0100 MB23 EZ501U	155	155	575	10.00	10/1	8.0	8.0	3700	4000	9.9	26	19
300	42	46	1.6	3.4	P531_0100 MB23 EZ501U	155	155	575	10.00	10/1	12	8.0	3700	4000	9.9	26	19
300	42	46	1.6	3.4	P531_0100 MB23 EZ501U	155	155	575	10.00	10/1	16	8.0	3700	4000	9.9	26	19
300	46	50	1.7	3.1	P531_0100 MB23 EZ402U	155	155	575	10.00	10/1	8.0	8.0	3700	4000	8.7	26	19
300	46	50	1.7	3.1	P531_0100 MB23 EZ402U	155	155	575	10.00	10/1	12	8.0	3700	4000	8.7	26	19
300	46	50	1.7	3.1	P531_0100 MB23 EZ402U	155	155	575	10.00	10/1	16	8.0	3700	4000	8.7	26	19
300	67	83	2.5	2.1	P531_0100 MB23 EZ404U	281	281	575	10.00	10/1	8.0	8.0	3700	4000	10	26	21
300	67	83	2.5	2.1	P531_0100 MB23 EZ404U	281	281	575	10.00	10/1	12	8.0	3700	4000	10	26	21
300	67	83	2.5	2.1	P531_0100 MB23 EZ404U	281	281	575	10.00	10/1	16	8.0	3700	4000	10	26	21
300	72	78	2.7	2.0	P531_0100 MB23 EZ502U	288	288	575	10.00	10/1	8.0	8.0	3700	4000	12	26	21
300	72	78	2.7	2.0	P531_0100 MB23 EZ502U	288	288	575	10.00	10/1	12	8.0	3700	4000	12	26	21
300	72	78	2.7	2.0	P531_0100 MB23 EZ502U	288	288	575	10.00	10/1	16	8.0	3700	4000	12	26	21
300	94	108	3.5	1.5	P531_0100 MB23 EZ503U	288	288	575	10.00	10/1	8.0	15	3700	4000	16	26	23
300	94	108	3.5	1.5	P531_0100 MB23 EZ503U	288	288	575	10.00	10/1	12	15	3700	4000	16	26	23
300	131	155	4.9	1.1	P531_0100 MB23 EZ505U	288	288	575	10.00	10/1	8.0	15	3700	4000	20	26	25
300	131	155	4.9	1.1	P531_0100 MB23 EZ505U	288	288	575	10.00	10/1	12	15	3700	4000	20	26	25
375	36	40	1.8	4.8	P531_0080 MB23 EZ402U	124	124	489	8.000	8/1	8.0	8.0	3700	4000	8.7	25	19
375	36	40	1.8	4.8	P531_0080 MB23 EZ402U	124	124	489	8.000	8/1	12	8.0	3700	4000	8.7	25	19
375	36	40	1.8	4.8	P531_0080 MB23 EZ402U	124	124	489	8.000	8/1	16	8.0	3700	4000	8.7	25	19
375	54	67	2.7	3.3	P531_0080 MB23 EZ404U	225	225	489	8.000	8/1	8.0	8.0	3700	4000	10	25	21
375	54	67	2.7	3.3	P531_0080 MB23 EZ404U	225	225	489	8.000	8/1	12	8.0	3700	4000	10	25	21
375	54	67	2.7	3.3	P531_0080 MB23 EZ404U	225	225	489	8.000	8/1	16	8.0	3700	4000	10	25	21
375	57	62	2.9	3.0	P531_0080 MB23 EZ502U	241	241	489	8.000	8/1	8.0	8.0	3700	4000	12	25	21
375	57	62	2.9	3.0	P531_0080 MB23 EZ502U	241	241	489	8.000	8/1	12	8.0	3700	4000	12	25	21
375	57	62	2.9	3.0	P531_0080 MB23 EZ502U	241	241	489	8.000	8/1	16	8.0	3700	4000	12	25	21
375	75	86	3.8	2.3	P531_0080 MB23 EZ503U	291	291	489	8.000	8/1	8.0	15	3700	4000	16	25	23
375	75	86	3.8	2.3	P531_0080 MB23 EZ503U	291	291	489	8.000	8/1	12	15	3700	4000	16	25	23
375	105	124	5.3	1.7	P531_0080 MB23 EZ505U	291	291	489	8.000	8/1	8.0	15	3700	4000	20	25	25
375	105	124	5.3	1.7	P531_0080 MB23 EZ505U	291	291	489	8.000	8/1	12	15	3700	4000	20	25	25
429	47	58	3.0	3.9	P531_0070 MB23 EZ404U	197	197	428	7.000	7/1	8.0	8.0	3700	4000	10	31	21
429	47	58	3.0	3.9	P531_0070 MB23 EZ404U	197	197	428	7.000	7/1	12	8.0	3700	4000	10	31	21
429	47	58	3.0	3.9	P531_0070 MB23 EZ404U	197	197	428	7.000	7/1	16	8.0	3700	4000	10	31	21
429	50	54	3.2	3.7	P531_0070 MB23 EZ502U	210	210	428	7.000	7/1	8.0	8.0	3700	4000	12	31	21
429	50	54	3.2	3.7	P531_0070 MB23 EZ502U	210	210	428	7.000	7/1	12	8.0	3700	4000	12	31	21
429	50	54	3.2	3.7	P531_0070 MB23 EZ502U	210	210	428	7.000	7/1	16	8.0	3700	4000	12	31	21
429	66	75	4.2	2.8	P531_0070 MB23 EZ503U	255	255	428	7.000	7/1	8.0	15	3700	4000	16	31	23
429	66	75	4.2	2.8	P531_0070 MB23 EZ503U	255	255	428	7.000	7/1	12	15	3700	4000	16	31	23
429	92	109	5.9	2.0	P531_0070 MB23 EZ505U	255	255	428	7.000	7/1	8.0	15	3700	4000	21	31	25
429	92	109	5.9	2.0	P531_0070 MB23 EZ505U	255	255	428	7.000	7/1	12	15	3700	4000	21	31	25
600	47	54	6.4	3.9	P531_0050 MB23 EZ503U	182	182	306	5.000	5/1	8.0	15	3500	4000	16	35	23
600	47	54	6.4	3.9	P531_0050 MB23 EZ503U	182	182	306	5.000	5/1	12	15	3500	4000	16	35	23
600	65	78	8.9	2.8	P531_0050 MB23 EZ505U	182	182	306	5.000	5/1	8.0	15	3500	4000	21	35	25
600	65	78	8.9	2.8	P531_0050 MB23 EZ505U	182	182	306	5.000	5/1	12	15	3500	4000	21	35	25
750	38	43	10	3.9	P531_0040 MB23 EZ503U	146	146	244	4.000	4/1	8.0	15	3000	4000	17	35	23
750	38	43	10	3.9	P531_0040 MB23 EZ503U	146	146	244	4.000	4/1	12	15	3000	4000	17	35	23
750	52	62	14	2.8	P531_0040 MB23 EZ505U	146	146	244	4.000	4/1	8.0	15	3000	4000	21	35	25
750	52	62	14	2.8	P531_0040 MB23 EZ505U	146	146	244	4.000	4/1	12	15	3000	4000	21	35	25
1000	22	23	16	4.9	P531_0030 MB23 EZ502U	90	90	183	3.000	3/1	8.0	8.0	2500	4000	15	35	21
1000	22	23	16	4.9	P531_0030 MB23 EZ502U	90	90	183	3.000	3/1	12	8.0	2500	4000	15	35	21
1000	22	23	16	4.9	P531_0030 MB23 EZ502U	90	90	183	3.000	3/1	16	8.0	2500	4000	15	35	21
1000	28	32	20	3.7	P531_0030 MB23 EZ503U	109	109	183	3.000	3/1	8.0	15	2500	4000	18	35	23
1000	28	32	20	3.7	P531_0030 MB23 EZ503U	109	109	183	3.000	3/1	12	15	2500	4000	18	35	23

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
P5 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 290 Nm)																	
1000	39	47	28	2.7	P531_0030 MB23 EZ505U	109	109	183	3.000	3/1	8.0	15	2500	4000	23	35	25
1000	39	47	28	2.7	P531_0030 MB23 EZ505U	109	109	183	3.000	3/1	12	15	2500	4000	23	35	25
P7 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 810 Nm)																	
86	143	156	0.9	3.8	P732_0350 MB23 EZ501U	532	532	1540	35.00	35/1	8.0	8.0	3700	4000	10	64	28
86	143	156	0.9	3.8	P732_0350 MB23 EZ501U	532	532	1540	35.00	35/1	12	8.0	3700	4000	10	64	28
86	156	173	1.0	3.5	P732_0350 MB23 EZ402U	532	532	1540	35.00	35/1	8.0	8.0	3700	4000	8.8	64	28
86	156	173	1.0	3.5	P732_0350 MB23 EZ402U	532	532	1540	35.00	35/1	12	8.0	3700	4000	8.8	64	28
86	229	286	1.5	2.4	P732_0350 MB23 EZ404U	770	805	1540	35.00	35/1	8.0	8.0	3700	4000	10	64	30
86	229	286	1.5	2.4	P732_0350 MB23 EZ404U	770	805	1540	35.00	35/1	12	8.0	3700	4000	10	64	30
86	246	266	1.6	2.2	P732_0350 MB23 EZ502U	770	805	1540	35.00	35/1	8.0	8.0	3700	4000	12	64	30
86	246	266	1.6	2.2	P732_0350 MB23 EZ502U	770	805	1540	35.00	35/1	12	8.0	3700	4000	12	64	30
86	323	369	2.1	1.7	P732_0350 MB23 EZ503U	770	805	1540	35.00	35/1	8.0	15	3700	4000	16	64	32
86	449	532	2.9	1.2	P732_0350 MB23 EZ505U	770	805	1540	35.00	35/1	8.0	15	3700	4000	20	64	35
94	131	143	1.1	3.6	P732_0320 MB23 EZ501U	486	486	1460	32.00	32/1	8.0	8.0	3000	4000	11	57	28
94	131	143	1.1	3.6	P732_0320 MB23 EZ501U	486	486	1460	32.00	32/1	12	8.0	3000	4000	11	57	28
94	131	143	1.1	3.6	P732_0320 MB23 EZ501U	486	486	1460	32.00	32/1	16	8.0	3000	4000	11	57	28
94	143	158	1.2	3.3	P732_0320 MB23 EZ402U	486	486	1460	32.00	32/1	8.0	8.0	3000	4000	9.3	57	28
94	143	158	1.2	3.3	P732_0320 MB23 EZ402U	486	486	1460	32.00	32/1	12	8.0	3000	4000	9.3	57	28
94	143	158	1.2	3.3	P732_0320 MB23 EZ402U	486	486	1460	32.00	32/1	16	8.0	3000	4000	9.3	57	28
94	210	261	1.8	2.2	P732_0320 MB23 EZ404U	730	730	1460	32.00	32/1	8.0	8.0	3000	4000	11	57	30
94	210	261	1.8	2.2	P732_0320 MB23 EZ404U	730	730	1460	32.00	32/1	12	8.0	3000	4000	11	57	30
94	210	261	1.8	2.2	P732_0320 MB23 EZ404U	730	730	1460	32.00	32/1	16	8.0	3000	4000	11	57	30
94	225	243	1.9	2.1	P732_0320 MB23 EZ502U	730	730	1460	32.00	32/1	8.0	8.0	3000	4000	13	57	30
94	225	243	1.9	2.1	P732_0320 MB23 EZ502U	730	730	1460	32.00	32/1	12	8.0	3000	4000	13	57	30
94	225	243	1.9	2.1	P732_0320 MB23 EZ502U	730	730	1460	32.00	32/1	16	8.0	3000	4000	13	57	30
94	295	337	2.5	1.6	P732_0320 MB23 EZ503U	730	730	1460	32.00	32/1	8.0	15	3000	4000	16	57	32
94	410	486	3.5	1.1	P732_0320 MB23 EZ505U	730	730	1460	32.00	32/1	8.0	15	3000	4000	21	57	35
107	114	125	1.0	4.7	P732_0280 MB23 EZ501U	426	426	1400	28.00	28/1	8.0	8.0	3700	4000	10	64	28
107	114	125	1.0	4.7	P732_0280 MB23 EZ501U	426	426	1400	28.00	28/1	12	8.0	3700	4000	10	64	28
107	125	138	1.1	4.3	P732_0280 MB23 EZ402U	426	426	1400	28.00	28/1	8.0	8.0	3700	4000	8.8	64	28
107	125	138	1.1	4.3	P732_0280 MB23 EZ402U	426	426	1400	28.00	28/1	12	8.0	3700	4000	8.8	64	28
107	184	229	1.7	2.9	P732_0280 MB23 EZ404U	700	700	1400	28.00	28/1	8.0	8.0	3700	4000	10	64	30
107	184	229	1.7	2.9	P732_0280 MB23 EZ404U	700	700	1400	28.00	28/1	12	8.0	3700	4000	10	64	30
107	197	213	1.8	2.7	P732_0280 MB23 EZ502U	700	700	1400	28.00	28/1	8.0	8.0	3700	4000	12	64	30
107	197	213	1.8	2.7	P732_0280 MB23 EZ502U	700	700	1400	28.00	28/1	12	8.0	3700	4000	12	64	30
107	258	295	2.3	2.1	P732_0280 MB23 EZ503U	700	700	1400	28.00	28/1	8.0	15	3700	4000	16	64	32
107	359	426	3.2	1.5	P732_0280 MB23 EZ505U	700	700	1400	28.00	28/1	8.0	15	3700	4000	21	64	35
120	102	112	1.2	4.9	P732_0250 MB23 EZ501U	380	380	1496	25.00	25/1	8.0	8.0	3500	4000	10	64	28
120	102	112	1.2	4.9	P732_0250 MB23 EZ501U	380	380	1496	25.00	25/1	12	8.0	3500	4000	10	64	28
120	102	112	1.2	4.9	P732_0250 MB23 EZ501U	380	380	1496	25.00	25/1	16	8.0	3500	4000	10	64	28
120	112	124	1.3	4.5	P732_0250 MB23 EZ402U	380	380	1496	25.00	25/1	8.0	8.0	3500	4000	9.1	64	28
120	112	124	1.3	4.5	P732_0250 MB23 EZ402U	380	380	1496	25.00	25/1	12	8.0	3500	4000	9.1	64	28
120	112	124	1.3	4.5	P732_0250 MB23 EZ402U	380	380	1496	25.00	25/1	16	8.0	3500	4000	9.1	64	28
120	164	204	1.9	3.1	P732_0250 MB23 EZ404U	689	689	1496	25.00	25/1	8.0	8.0	3500	4000	10	64	30
120	164	204	1.9	3.1	P732_0250 MB23 EZ404U	689	689	1496	25.00	25/1	12	8.0	3500	4000	10	64	30
120	164	204	1.9	3.1	P732_0250 MB23 EZ404U	689	689	1496	25.00	25/1	16	8.0	3500	4000	10	64	30
120	176	190	2.0	2.8	P732_0250 MB23 EZ502U	736	736	1496	25.00	25/1	8.0	8.0	3500	4000	13	64	30
120	176	190	2.0	2.8	P732_0250 MB23 EZ502U	736	736	1496	25.00	25/1	12	8.0	3500	4000	13	64	30
120	176	190	2.0	2.8	P732_0250 MB23 EZ502U	736	736	1496	25.00	25/1	16	8.0	3500	4000	13	64	30
120	230	264	2.7	2.2	P732_0250 MB23 EZ503U	805	805	1496	25.00	25/1	8.0	15	3500	4000	16	64	32
120	230	264	2.7	2.2	P732_0250 MB23 EZ503U	805	805	1496	25.00	25/1	12	15	3500	4000	16	64	32
120	321	380	3.7	1.6	P732_0250 MB23 EZ505U	805	805	1496	25.00	25/1	8.0	15	3500	4000	21	64	35
120	321	380	3.7	1.6	P732_0250 MB23 EZ505U	805	805	1496	25.00	25/1	12	15	3500	4000	21	64	35
150	131	163	2.3	3.5	P732_0200 MB23 EZ404U	551	551	1197	20.00	20/1	8.0	8.0	3000	4000	11	64	30
150	131	163	2.3	3.5	P732_0200 MB23 EZ404U	551	551	1197	20.00	20/1	12	8.0	3000	4000	11	64	30
150	131	163	2.3	3.5	P732_0200 MB23 EZ404U	551	551	1197	20.00	20/1	16	8.0	3000	4000	11	64	30
150	141	152	2.5	3.3	P732_0200 MB23 EZ502U	589	589	1197	20.00	20/1	8.0	8.0	3000	4000	13	64	30
150	141	152	2.5	3.3	P732_0200 MB23 EZ502U	589	589	1197	20.00	20/1	12	8.0	3000	4000	13	64	30
150	141	152	2.5	3.3	P732_0200 MB23 EZ502U	589	589	1197	20.00	20/1	16	8.0	3000	4000	13	64	30
150	184	211	3.2	2.5	P732_0200 MB23 EZ503U	713	713	1197	20.00	20/1	8.0	15	3000	4000	17	64	32
150	184	211	3.2	2.5	P732_0200 MB23 EZ503U	713	713	1197	20.00	20/1	12	15	3000	4000	17	64	32
150	257	304	4.5	1.8	P732_0200 MB23 EZ505U	713	713	1197	20.00	20/1	8.0	15	3000	4000	21	64	35
150	257	304	4.5	1.8	P732_0200 MB23 EZ505U	713	713	1197	20.00	20/1	12	15	3000	4000	21	64	35
188	105	131	2.6	4.3	P732_0160 MB23 EZ404U	441	441	958	16.00	16/1	8.0	8.0	3000	4000	11	65	30
188	105	131	2.6	4.3	P732_0160 MB23 EZ404U	441	441	958	16.00	16/1	12	8.0	3000	4000	11	65	30

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
P7 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 810 Nm)																	
188	105	131	2.6	4.3	P732_0160 MB23 EZ404U	441	441	958	16.00	16/1	16	8.0	3000	4000	11	65	30
188	112	122	2.8	4.0	P732_0160 MB23 EZ502U	471	471	958	16.00	16/1	8.0	8.0	3000	4000	13	65	30
188	112	122	2.8	4.0	P732_0160 MB23 EZ502U	471	471	958	16.00	16/1	12	8.0	3000	4000	13	65	30
188	112	122	2.8	4.0	P732_0160 MB23 EZ502U	471	471	958	16.00	16/1	16	8.0	3000	4000	13	65	30
188	147	169	3.7	3.1	P732_0160 MB23 EZ503U	570	570	958	16.00	16/1	8.0	15	3000	4000	17	65	32
188	147	169	3.7	3.1	P732_0160 MB23 EZ503U	570	570	958	16.00	16/1	12	15	3000	4000	17	65	32
188	205	243	5.1	2.2	P732_0160 MB23 EZ505U	570	570	958	16.00	16/1	8.0	15	3000	4000	21	65	35
188	205	243	5.1	2.2	P732_0160 MB23 EZ505U	570	570	958	16.00	16/1	12	15	3000	4000	21	65	35
250	79	98	4.6	3.8	P732_0120 MB23 EZ404U	331	331	718	12.00	12/1	8.0	8.0	2500	4000	11	62	30
250	79	98	4.6	3.8	P732_0120 MB23 EZ404U	331	331	718	12.00	12/1	12	8.0	2500	4000	11	62	30
250	79	98	4.6	3.8	P732_0120 MB23 EZ404U	331	331	718	12.00	12/1	16	8.0	2500	4000	11	62	30
250	84	91	5.0	3.5	P732_0120 MB23 EZ502U	353	353	718	12.00	12/1	8.0	8.0	2500	4000	13	62	30
250	84	91	5.0	3.5	P732_0120 MB23 EZ502U	353	353	718	12.00	12/1	12	8.0	2500	4000	13	62	30
250	84	91	5.0	3.5	P732_0120 MB23 EZ502U	353	353	718	12.00	12/1	16	8.0	2500	4000	13	62	30
250	111	127	6.5	2.7	P732_0120 MB23 EZ503U	428	428	718	12.00	12/1	8.0	15	2500	4000	17	62	32
250	111	127	6.5	2.7	P732_0120 MB23 EZ503U	428	428	718	12.00	12/1	12	15	2500	4000	17	62	32
250	154	182	9.0	1.9	P732_0120 MB23 EZ505U	428	428	718	12.00	12/1	8.0	15	2500	4000	22	62	35
250	154	182	9.0	1.9	P732_0120 MB23 EZ505U	428	428	718	12.00	12/1	12	15	2500	4000	22	62	35
300	72	81	1.7	3.9	P731_0100 MB33 EZ701U	194	194	1150	10.00	10/1	16	15	3000	4000	36	55	35
300	72	81	1.7	3.9	P731_0100 MB33 EZ701U	194	194	1150	10.00	10/1	24	15	3000	4000	36	55	35
300	72	81	1.7	3.9	P731_0100 MB33 EZ701U	194	194	1150	10.00	10/1	32	15	3000	4000	36	55	35
300	72	81	1.7	3.9	P731_0100 MB33 EZ701U	194	194	1150	10.00	10/1	45	15	3000	4000	36	55	35
300	116	140	2.7	2.4	P731_0100 MB33 EZ702U	398	398	1150	10.00	10/1	16	15	3000	4000	42	55	37
300	116	140	2.7	2.4	P731_0100 MB33 EZ702U	398	398	1150	10.00	10/1	24	15	3000	4000	42	55	37
300	116	140	2.7	2.4	P731_0100 MB33 EZ702U	398	398	1150	10.00	10/1	32	15	3000	4000	42	55	37
300	116	140	2.7	2.4	P731_0100 MB33 EZ702U	398	398	1150	10.00	10/1	45	15	3000	4000	42	55	37
300	160	202	3.7	1.7	P731_0100 MB33 EZ703U	575	575	1150	10.00	10/1	16	32	3000	4000	53	55	40
300	160	202	3.7	1.7	P731_0100 MB33 EZ703U	575	575	1150	10.00	10/1	24	32	3000	4000	53	55	40
300	207	293	4.8	1.3	P731_0100 MB33 EZ705U	575	575	1150	10.00	10/1	16	32	3000	4000	66	55	46
300	207	293	4.8	1.3	P731_0100 MB33 EZ705U	575	575	1150	10.00	10/1	24	32	3000	4000	66	55	46
375	93	112	2.8	3.8	P731_0080 MB33 EZ702U	318	318	1336	8.000	8/1	16	15	3000	4000	42	58	37
375	93	112	2.8	3.8	P731_0080 MB33 EZ702U	318	318	1336	8.000	8/1	24	15	3000	4000	42	58	37
375	93	112	2.8	3.8	P731_0080 MB33 EZ702U	318	318	1336	8.000	8/1	32	15	3000	4000	42	58	37
375	93	112	2.8	3.8	P731_0080 MB33 EZ702U	318	318	1336	8.000	8/1	45	15	3000	4000	42	58	37
375	128	161	3.9	2.7	P731_0080 MB33 EZ703U	504	504	1336	8.000	8/1	16	32	3000	4000	54	58	40
375	128	161	3.9	2.7	P731_0080 MB33 EZ703U	504	504	1336	8.000	8/1	24	32	3000	4000	54	58	40
375	128	161	3.9	2.7	P731_0080 MB33 EZ703U	504	504	1336	8.000	8/1	32	32	3000	4000	54	58	40
375	128	161	3.9	2.7	P731_0080 MB33 EZ703U	504	504	1336	8.000	8/1	45	32	3000	4000	54	58	40
375	165	234	5.0	2.1	P731_0080 MB33 EZ705U	668	700	1336	8.000	8/1	16	32	3000	4000	66	58	46
375	165	234	5.0	2.1	P731_0080 MB33 EZ705U	668	700	1336	8.000	8/1	24	32	3000	4000	66	58	46
375	165	234	5.0	2.1	P731_0080 MB33 EZ705U	668	700	1336	8.000	8/1	32	32	3000	4000	66	58	46
375	165	234	5.0	2.1	P731_0080 MB33 EZ705U	668	700	1336	8.000	8/1	45	32	3000	4000	66	58	46
429	81	98	3.0	4.7	P731_0070 MB33 EZ702U	278	278	1283	7.000	7/1	16	15	3000	4000	42	61	37
429	81	98	3.0	4.7	P731_0070 MB33 EZ702U	278	278	1283	7.000	7/1	24	15	3000	4000	42	61	37
429	81	98	3.0	4.7	P731_0070 MB33 EZ702U	278	278	1283	7.000	7/1	32	15	3000	4000	42	61	37
429	81	98	3.0	4.7	P731_0070 MB33 EZ702U	278	278	1283	7.000	7/1	45	15	3000	4000	42	61	37
429	112	141	4.1	3.4	P731_0070 MB33 EZ703U	441	441	1283	7.000	7/1	16	32	3000	4000	54	61	40
429	112	141	4.1	3.4	P731_0070 MB33 EZ703U	441	441	1283	7.000	7/1	24	32	3000	4000	54	61	40
429	112	141	4.1	3.4	P731_0070 MB33 EZ703U	441	441	1283	7.000	7/1	32	32	3000	4000	54	61	40
429	112	141	4.1	3.4	P731_0070 MB33 EZ703U	441	441	1283	7.000	7/1	45	32	3000	4000	54	61	40
429	145	205	5.3	2.7	P731_0070 MB33 EZ705U	679	679	1283	7.000	7/1	16	32	3000	4000	66	61	46
429	145	205	5.3	2.7	P731_0070 MB33 EZ705U	679	679	1283	7.000	7/1	24	32	3000	4000	66	61	46
429	145	205	5.3	2.7	P731_0070 MB33 EZ705U	679	679	1283	7.000	7/1	32	32	3000	4000	66	61	46
429	145	205	5.3	2.7	P731_0070 MB33 EZ705U	679	679	1283	7.000	7/1	45	32	3000	4000	66	61	46
600	80	101	6.2	4.8	P731_0050 MB33 EZ703U	315	315	917	5.000	5/1	16	32	2700	4000	55	67	40
600	80	101	6.2	4.8	P731_0050 MB33 EZ703U	315	315	917	5.000	5/1	24	32	2700	4000	55	67	40
600	80	101	6.2	4.8	P731_0050 MB33 EZ703U	315	315	917	5.000	5/1	32	32	2700	4000	55	67	40
600	80	101	6.2	4.8	P731_0050 MB33 EZ703U	315	315	917	5.000	5/1	45	32	2700	4000	55	67	40
600	103	146	7.9	3.7	P731_0050 MB33 EZ705U	485	485	917	5.000	5/1	16	32	2700	4000	68	67	46
600	103	146	7.9	3.7	P731_0050 MB33 EZ705U	485	485	917	5.000	5/1	24	32	2700	4000	68	67	46
600	103	146	7.9	3.7	P731_0050 MB33 EZ705U	485	485	917	5.000	5/1	32	32	2700	4000	68	67	46
600	103	146	7.9	3.7	P731_0050 MB33 EZ705U	485	485	917	5.000	5/1	45	32	2700	4000	68	67	46
750	83	117	10	4.7	P731_0040 MB33 EZ705U	388	388	733	4.000	4/1	16	32	2500	4000	69	69	46
750	83	117	10	4.7	P731_0040 MB33 EZ705U	388	388	733	4.000	4/1	24	32	2500	4000	69	69	46
750	83	117	10	4.7	P731_0040 MB33 EZ705U	388	388	733	4.000	4/1	32	32	2500	4000	69	69	46

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
P7 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 810 Nm)																	
750	83	117	10	4.7	P731_0040 MB33 EZ705U	388	388	733	4.000	4/1	45	32	2500	4000	69	69	46
1000	62	88	23	3.9	P731_0030 MB33 EZ705U	291	291	550	3.000	3/1	16	32	2200	4000	74	68	46
1000	62	88	23	3.9	P731_0030 MB33 EZ705U	291	291	550	3.000	3/1	24	32	2200	4000	74	68	46
1000	62	88	23	3.9	P731_0030 MB33 EZ705U	291	291	550	3.000	3/1	32	32	2200	4000	74	68	46
1000	62	88	23	3.9	P731_0030 MB33 EZ705U	291	291	550	3.000	3/1	45	32	2200	4000	74	68	46
P8 (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 1500 Nm)																	
200	424	641	3.8	1.8	P831_0100 MB43 EZ805U	1380	1380	2760	10.00	10/1	50	115	2800	3000	260	150	104
250	339	513	4.8	2.4	P831_0080 MB43 EZ805U	1500	1500	2607	8.000	8/1	50	115	2800	3000	262	162	104
286	297	449	4.5	3.4	P831_0070 MB43 EZ805U	1392	1392	2281	7.000	7/1	50	115	2800	3000	263	170	104
400	212	321	6.9	4.6	P831_0050 MB43 EZ805U	994	994	1630	5.000	5/1	50	115	2500	3000	268	185	104
500	170	256	11	4.6	P831_0040 MB43 EZ805U	795	795	1304	4.000	4/1	50	115	2000	3000	276	187	104
667	127	192	21	4.6	P831_0030 MB43 EZ805U	597	597	978	3.000	3/1	50	115	1800	3000	299	190	104
P8 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1840 Nm)																	
60	352	394	0.6	3.6	P832_0500 MB33 EZ701U	950	950	3230	50.00	50/1	16	15	3000	4000	36	173	55
60	570	684	1.0	2.2	P832_0500 MB33 EZ702U	1840	1948	3230	50.00	50/1	16	15	3000	4000	42	173	58
75	281	315	0.9	3.6	P832_0400 MB33 EZ701U	760	760	3200	40.00	40/1	16	15	3000	4000	36	168	55
75	456	547	1.4	2.2	P832_0400 MB33 EZ702U	1558	1558	3200	40.00	40/1	16	15	3000	4000	42	168	58
86	399	479	1.2	3.2	P832_0350 MB33 EZ702U	1363	1363	3230	35.00	35/1	16	15	3000	4000	42	176	58
86	399	479	1.2	3.2	P832_0350 MB33 EZ702U	1363	1363	3230	35.00	35/1	24	15	3000	4000	42	176	58
86	399	479	1.2	3.2	P832_0350 MB33 EZ702U	1363	1363	3230	35.00	35/1	32	15	3000	4000	42	176	58
86	549	692	1.6	2.3	P832_0350 MB33 EZ703U	1840	2000	3230	35.00	35/1	16	32	3000	4000	54	176	60
86	708	1004	2.1	1.8	P832_0350 MB33 EZ705U	1840	2000	3230	35.00	35/1	16	32	3000	4000	66	176	66
94	225	252	1.0	4.5	P832_0320 MB33 EZ701U	608	608	3049	32.00	32/1	16	15	2700	4000	39	159	55
94	225	252	1.0	4.5	P832_0320 MB33 EZ701U	608	608	3049	32.00	32/1	24	15	2700	4000	39	159	55
94	225	252	1.0	4.5	P832_0320 MB33 EZ701U	608	608	3049	32.00	32/1	32	15	2700	4000	39	159	55
94	365	438	1.6	2.8	P832_0320 MB33 EZ702U	1246	1246	3049	32.00	32/1	16	15	2700	4000	45	159	58
94	365	438	1.6	2.8	P832_0320 MB33 EZ702U	1246	1246	3049	32.00	32/1	24	15	2700	4000	45	159	58
94	365	438	1.6	2.8	P832_0320 MB33 EZ702U	1246	1246	3049	32.00	32/1	32	15	2700	4000	45	159	58
94	502	632	2.1	2.0	P832_0320 MB33 EZ703U	1525	1595	3049	32.00	32/1	16	32	2700	4000	56	159	60
94	648	918	2.8	1.6	P832_0320 MB33 EZ705U	1525	1595	3049	32.00	32/1	16	32	2700	4000	69	159	66
107	319	383	1.7	3.2	P832_0280 MB33 EZ702U	1091	1091	3200	28.00	28/1	16	15	3000	4000	42	172	58
107	319	383	1.7	3.2	P832_0280 MB33 EZ702U	1091	1091	3200	28.00	28/1	24	15	3000	4000	42	172	58
107	319	383	1.7	3.2	P832_0280 MB33 EZ702U	1091	1091	3200	28.00	28/1	32	15	3000	4000	42	172	58
107	439	553	2.3	2.3	P832_0280 MB33 EZ703U	1600	1600	3200	28.00	28/1	16	32	3000	4000	54	172	60
107	567	803	3.0	1.8	P832_0280 MB33 EZ705U	1600	1600	3200	28.00	28/1	16	32	3000	4000	67	172	66
120	285	342	1.4	4.4	P832_0250 MB33 EZ702U	974	974	3230	25.00	25/1	16	15	2900	4000	43	177	58
120	285	342	1.4	4.4	P832_0250 MB33 EZ702U	974	974	3230	25.00	25/1	24	15	2900	4000	43	177	58
120	285	342	1.4	4.4	P832_0250 MB33 EZ702U	974	974	3230	25.00	25/1	32	15	2900	4000	43	177	58
120	285	342	1.4	4.4	P832_0250 MB33 EZ702U	974	974	3230	25.00	25/1	45	15	2900	4000	43	177	58
120	392	494	1.9	3.2	P832_0250 MB33 EZ703U	1544	1544	3230	25.00	25/1	16	32	2900	4000	55	177	60
120	392	494	1.9	3.2	P832_0250 MB33 EZ703U	1544	1544	3230	25.00	25/1	24	32	2900	4000	55	177	60
120	392	494	1.9	3.2	P832_0250 MB33 EZ703U	1544	1544	3230	25.00	25/1	32	32	2900	4000	55	177	60
120	506	717	2.5	2.5	P832_0250 MB33 EZ705U	1840	2000	3230	25.00	25/1	16	32	2900	4000	68	177	66
120	506	717	2.5	2.5	P832_0250 MB33 EZ705U	1840	2000	3230	25.00	25/1	24	32	2900	4000	68	177	66
120	506	717	2.5	2.5	P832_0250 MB33 EZ705U	1840	2000	3230	25.00	25/1	32	32	2900	4000	68	177	66
150	314	395	2.2	4.0	P832_0200 MB33 EZ703U	1235	1235	3230	20.00	20/1	16	32	2700	4000	57	177	60
150	314	395	2.2	4.0	P832_0200 MB33 EZ703U	1235	1235	3230	20.00	20/1	24	32	2700	4000	57	177	60
150	314	395	2.2	4.0	P832_0200 MB33 EZ703U	1235	1235	3230	20.00	20/1	32	32	2700	4000	57	177	60
150	314	395	2.2	4.0	P832_0200 MB33 EZ703U	1235	1235	3230	20.00	20/1	45	32	2700	4000	57	177	60
150	405	574	2.8	3.1	P832_0200 MB33 EZ705U	1840	1900	3230	20.00	20/1	16	32	2700	4000	69	177	66
150	405	574	2.8	3.1	P832_0200 MB33 EZ705U	1840	1900	3230	20.00	20/1	24	32	2700	4000	69	177	66
150	405	574	2.8	3.1	P832_0200 MB33 EZ705U	1840	1900	3230	20.00	20/1	32	32	2700	4000	69	177	66
150	405	574	2.8	3.1	P832_0200 MB33 EZ705U	1840	1900	3230	20.00	20/1	45	32	2700	4000	69	177	66
188	251	316	3.0	4.0	P832_0160 MB33 EZ703U	988	988	2873	16.00	16/1	16	32	2700	4000	57	174	60
188	251	316	3.0	4.0	P832_0160 MB33 EZ703U	988	988	2873	16.00	16/1	24	32	2700	4000	57	174	60
188	251	316	3.0	4.0	P832_0160 MB33 EZ703U	988	988	2873	16.00	16/1	32	32	2700	4000	57	174	60
188	251	316	3.0	4.0	P832_0160 MB33 EZ703U	988	988	2873	16.00	16/1	45	32	2700	4000	57	174	60
188	324	459	3.9	3.1	P832_0160 MB33 EZ705U	1520	1520	2873	16.00	16/1	16	32	2700	4000	70	174	66
188	324	459	3.9	3.1	P832_0160 MB33 EZ705U	1520	1520	2873	16.00	16/1	24	32	2700	4000	70	174	66
188	324	459	3.9	3.1	P832_0160 MB33 EZ705U	1520	1520	2873	16.00	16/1	32	32	2700	4000	70	174	66
188	324	459	3.9	3.1	P832_0160 MB33 EZ705U	1520	1520	2873	16.00	16/1	45	32	2700	4000	70	174	66
250	188	237	4.4	4.3	P832_0120 MB33 EZ703U	741	741	2155	12.00	12/1	16	32	2200	4000	59	168	60
250	188	237	4.4	4.3	P832_0120 MB33 EZ703U	741	741	2155	12.00	12/1	24	32	2200	4000	59	168	60
250	188	237	4.4	4.3	P832_0120 MB33 EZ703U	741	741	2155	12.00	12/1	32	32	2200	4000	59	168	60
250	188	237	4.4	4.3	P832_0120 MB33 EZ703U	741	741	2155	12.00	12/1	45	32	2200	4000	59	168	60

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
P8 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1840 Nm)																	
250	243	344	5.7	3.3	P832_0120 MB33 EZ705U	1140	1140	2155	12.00	12/1	16	32	2200	4000	71	168	66
250	243	344	5.7	3.3	P832_0120 MB33 EZ705U	1140	1140	2155	12.00	12/1	24	32	2200	4000	71	168	66
250	243	344	5.7	3.3	P832_0120 MB33 EZ705U	1140	1140	2155	12.00	12/1	32	32	2200	4000	71	168	66
250	243	344	5.7	3.3	P832_0120 MB33 EZ705U	1140	1140	2155	12.00	12/1	45	32	2200	4000	71	168	66
300	258	468	2.7	2.6	P831_0100 MB43 EZ803U	1380	1380	2760	10.00	10/1	50	65	2800	3000	172	150	88
300	258	468	2.7	2.6	P831_0100 MB43 EZ803U	1380	1380	2760	10.00	10/1	72	65	2800	3000	172	150	88
300	258	468	2.7	2.6	P831_0100 MB43 EZ803U	1380	1380	2760	10.00	10/1	100	65	2800	3000	172	150	88
375	206	374	3.4	3.4	P831_0080 MB43 EZ803U	1125	1125	2607	8.000	8/1	50	65	2800	3000	173	162	88
375	206	374	3.4	3.4	P831_0080 MB43 EZ803U	1125	1125	2607	8.000	8/1	72	65	2800	3000	173	162	88
375	206	374	3.4	3.4	P831_0080 MB43 EZ803U	1125	1125	2607	8.000	8/1	100	65	2800	3000	173	162	88
429	181	327	3.2	4.8	P831_0070 MB43 EZ803U	985	985	2281	7.000	7/1	50	65	2800	3000	175	170	88
429	181	327	3.2	4.8	P831_0070 MB43 EZ803U	985	985	2281	7.000	7/1	72	65	2800	3000	175	170	88
429	181	327	3.2	4.8	P831_0070 MB43 EZ803U	985	985	2281	7.000	7/1	100	65	2800	3000	175	170	88
P9 (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 3450 Nm)																	
100	830	1256	3.1	3.0	P932_0200 MB43 EZ805U	3450	–	6384	20.00	20/1	50	115	2000	3000	276	407	138
125	664	1005	4.4	3.0	P932_0160 MB43 EZ805U	3000	–	5107	16.00	16/1	50	115	2000	3000	277	406	138
P9 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 3300 Nm)																	
86	884	1603	1.5	2.7	P932_0350 MB43 EZ803U	3300	–	6600	35.00	35/1	50	65	2800	3000	175	404	122
107	708	1282	1.8	3.2	P932_0280 MB43 EZ803U	3000	–	6000	28.00	28/1	50	65	2800	3000	175	402	122
120	632	1145	1.7	3.9	P932_0250 MB43 EZ803U	3300	–	6600	25.00	25/1	50	65	2500	3000	180	407	122
120	632	1145	1.7	3.9	P932_0250 MB43 EZ803U	3300	–	6600	25.00	25/1	72	65	2500	3000	180	407	122
150	505	916	1.9	4.9	P932_0200 MB43 EZ803U	2755	–	6384	20.00	20/1	50	65	2000	3000	187	407	122
150	505	916	1.9	4.9	P932_0200 MB43 EZ803U	2755	–	6384	20.00	20/1	72	65	2000	3000	187	407	122
150	505	916	1.9	4.9	P932_0200 MB43 EZ803U	2755	–	6384	20.00	20/1	100	65	2000	3000	187	407	122
188	404	733	2.7	4.9	P932_0160 MB43 EZ803U	2204	–	5107	16.00	16/1	50	65	2000	3000	188	406	122
188	404	733	2.7	4.9	P932_0160 MB43 EZ803U	2204	–	5107	16.00	16/1	72	65	2000	3000	188	406	122
188	404	733	2.7	4.9	P932_0160 MB43 EZ803U	2204	–	5107	16.00	16/1	100	65	2000	3000	188	406	122

2.3 Dimensional drawings

In this chapter, you can find the dimensions of the geared motors with redundant brake.

There is a dimensional drawing for every possible shaft/housing design, each with the tables for gear unit dimensions, motor adapter dimensions, motor dimensions and geared motor dimensions.

Dimensions can exceed the specifications of ISO 2768-mK due to casting tolerances or accumulation of individual tolerances.

We reserve the right to make dimensional changes due to ongoing technical development.

You can download 3D models of our standard drives at https://configurator.stoeber.de/en-US/.

Combination options and the dimensions of forced ventilated geared motors can also be found at https://configurator.stoeber.de/en-US/.

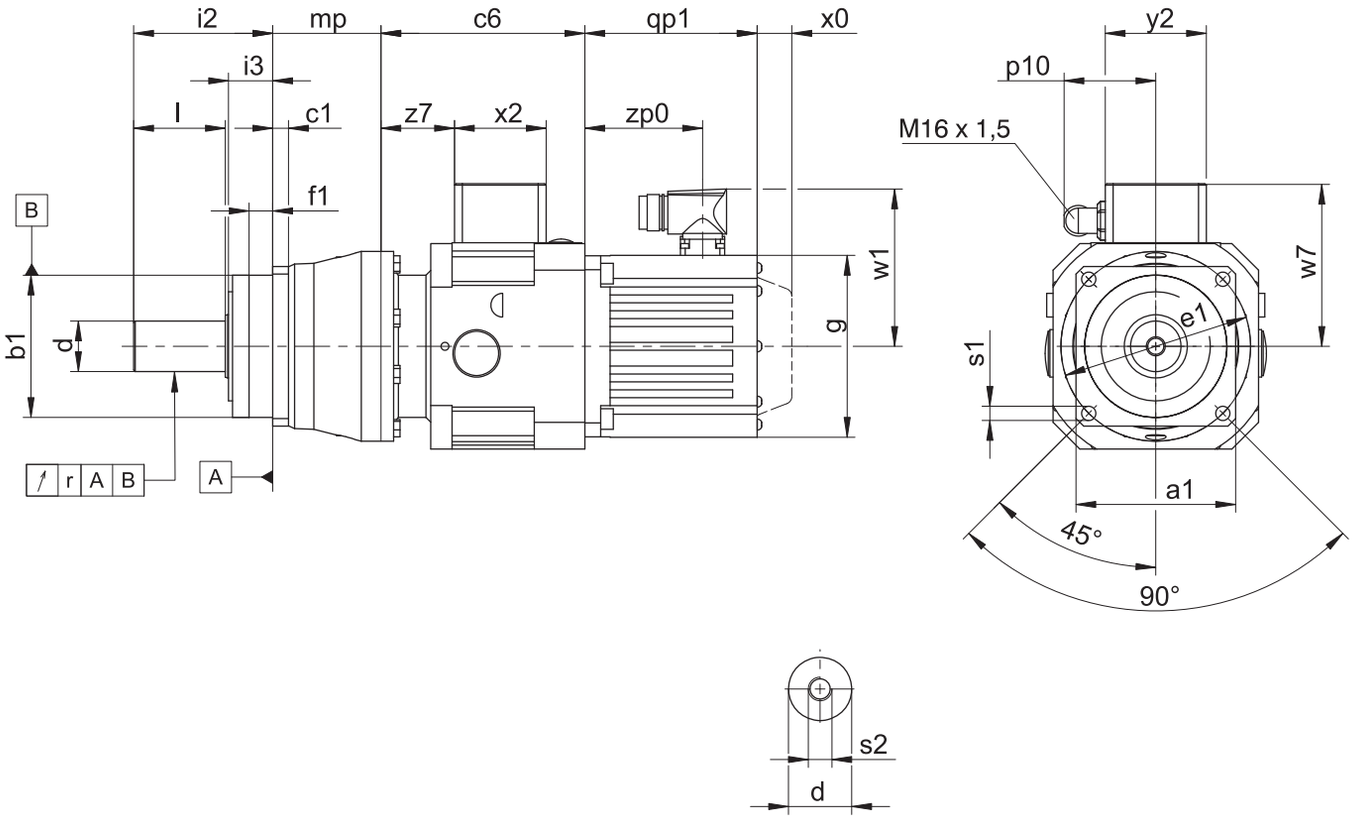
Tolerances

Solid shaft	Tolerance
Fit	ISO k6
Feather keys	DIN 6885-1, high form A
Balancing	With half feather key

Centering holes in solid shafts in accordance with DIN 332-2, DR shape

Thread size	M4	M5	M6	M8	M10	M12	M16	M20	M24
Thread depth [mm]	10	12.5	16	19	22	28	36	42	50

2.3.1 G shaft design (solid shaft without feather key)



qp1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▷ 11.4]	–	The radial runout specification applies only to the reinforced bearing D.

Dimensions of gear units

Type	□a1	Øb1	c1	Ød	Øe1	f1	i2	i3	l	r	Øs1	s2
P531	101	90_{h6}	10	32_{k6}	120	15.0	88	28	58	0.030	9.0	M12
P731	144	130_{h6}	15	40_{k6}	165	3.5	112	27	82	0.035	11.0	M16
P732	144	130_{h6}	15	40_{k6}	165	3.5	112	27	82	0.035	11.0	M16
P831	190	160_{h6}	15	55_{k6}	215	10.0	112	27	82	0.035	13.5	M20
P832	190	160_{h6}	15	55_{k6}	215	10.0	112	27	82	0.035	13.5	M20
P932	212	180_{h6}	17	75_{k6}	250	10.0	143	34	105	0.040	17.5	M20

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
P_MB23	129	59	102.9	58	64	46.5
P_MB33	147	59	115.4	58	64	57.0
P_MB43	176	59	134.9	58	64	75.5

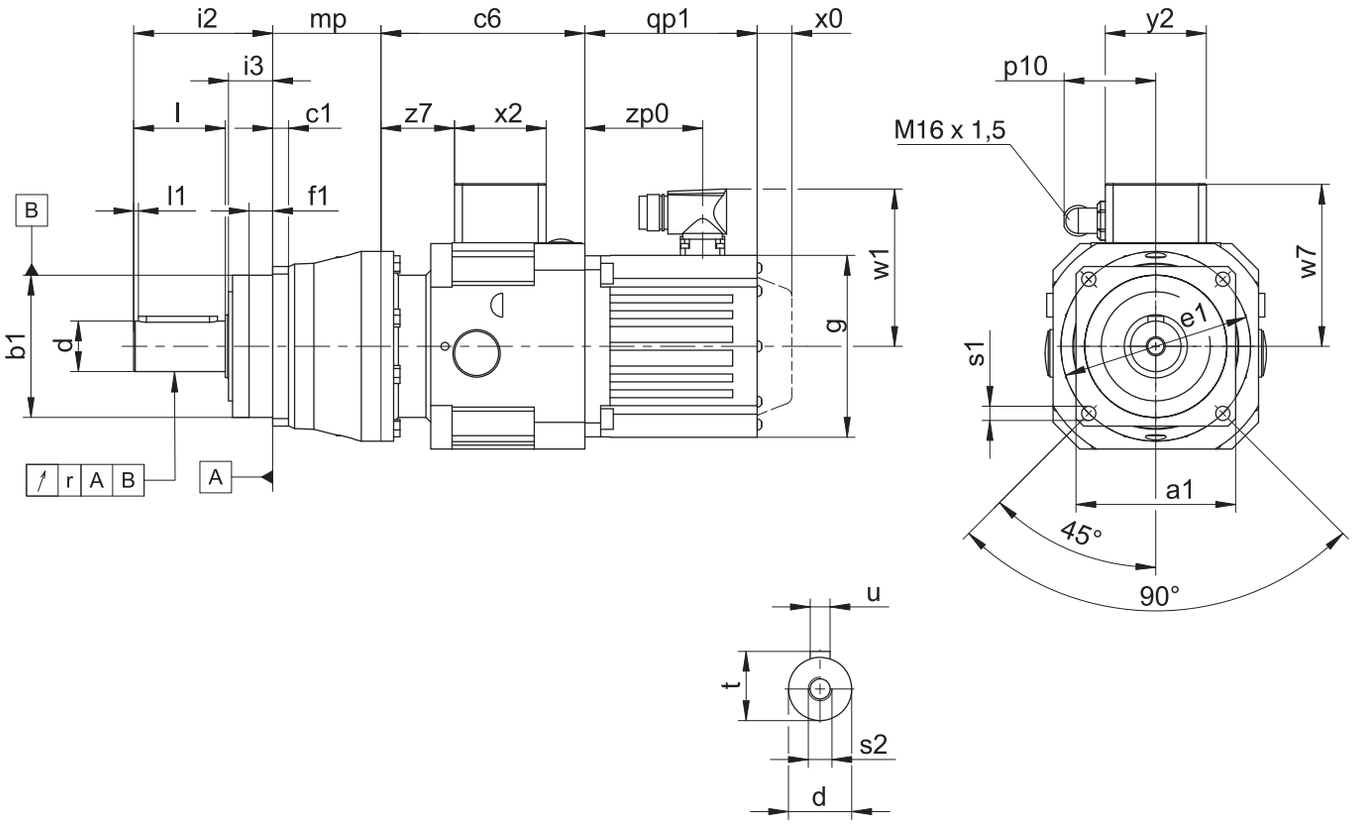
Dimensions of motors

Type	□g	qp1	w1	x0	zp0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4	MB23_EZ5	MB33_EZ7	MB43_EZ8
	mp	mp	mp	mp
P531	68.5	68.5	–	–
P731	–	–	86.5	–
P732	136.5	136.5	–	–
P831	–	–	–	119.0
P832	–	–	178.5	–
P932	–	–	–	240.0

2.3.2 P shaft design (solid shaft with feather key)



qp1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]	–	The radial runout specification applies only to the reinforced bearing D.

Dimensions of gear units

Type	□a1	Øb1	c1	Ød	Øe1	f1	i2	i3	l	l1	r	Øs1	s2	t	u
P531	101	90_{h6}	10	32_{k6}	120	15.0	88	28	58	3	0.030	9.0	M12	35.0	A10×8×50
P731	144	130_{h6}	15	40_{k6}	165	3.5	112	27	82	4	0.035	11.0	M16	43.0	A12×8×70
P732	144	130_{h6}	15	40_{k6}	165	3.5	112	27	82	4	0.035	11.0	M16	43.0	A12×8×70
P831	190	160_{h6}	15	55_{k6}	215	10.0	112	27	82	6	0.035	13.5	M20	59.0	A16×10×70
P832	190	160_{h6}	15	55_{k6}	215	10.0	112	27	82	6	0.035	13.5	M20	59.0	A16×10×70
P932	212	180_{h6}	17	75_{k6}	250	10.0	143	34	105	7	0.040	17.5	M20	79.5	A20×12×90

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
P_MB23	129	59	102.9	58	64	46.5
P_MB33	147	59	115.4	58	64	57.0
P_MB43	176	59	134.9	58	64	75.5

Dimensions of motors

Type	□g	qp1	w1	x0	zp0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4	MB23_EZ5	MB33_EZ7	MB43_EZ8
	mp	mp	mp	mp
P531	68.5	68.5	–	–
P731	–	–	86.5	–
P732	136.5	136.5	–	–
P831	–	–	–	119.0
P832	–	–	178.5	–
P932	–	–	–	240.0

2.4 Type designation

This chapter shows you an explanation of the type designation with the associated options.

Additional ordering information not included in the type designation can be found at the end of the chapter.

Example code

P	5	3	1	S	G	S	S	0100	MB23	EZ501U

Explanation

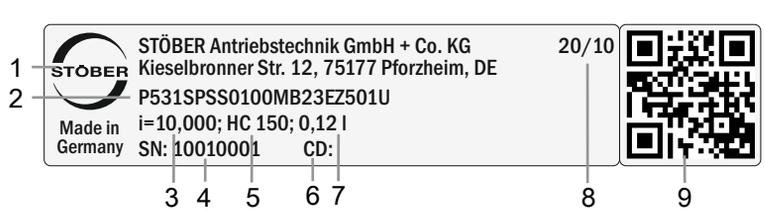
Code	Designation	Design
P	Type	Planetary gear unit
5	Size	5 (example)
3	Generation	Generation 3
1	Stages	Single-stage
2		Two-stage
S	Housing	Standard
G	Shaft	Solid shaft without feather key
P		Solid shaft with feather key
S	Bearing	Standard bearing
D		Axially reinforced bearing (P3 – P9)
Z		Radially reinforced bearing (P3 – P9)[1]
S	Backlash	Standard
R		Reduced
0100	Transmission ratio (i x 10)	i = 10 (example)
MB	Motor adapter	ServoStop motor adapter with brake
2	Size	2 (example)
3	Generation	Generation 3
EZ501U	Motor	EZ synchronous servo motor

To complete the type designation, also specify the following in your order:

- A detailed type designation of the motor, see the chapter [▶ 11]
- Radial shaft seal rings at the output made of NBR or FKM (option), see the chapter [▶ 2.6.3]
- Position of the plug connectors, see the chapter [▶ 2.5.5]
- For reverse operation of the output shaft from ±20° to ±90° and horizontal installation, see the chapter [▶ 2.6.4]

2.4.1 Nameplate

An example geared motor nameplate is explained in the figure below.



Code	Designation
1	Name of manufacturer
2	Type designation
3	Gear ratio of the gear unit
4	Serial number of the gear unit
5	Lubricant specification
6	Customer-specific data
7	Lubricant fill volume
8	Date of manufacture (year/calendar week)
9	QR code (link to product information)

[1] Not for reduced-backlash option.

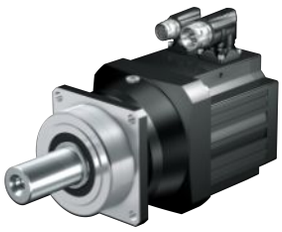
2.5 Product description

2.5.1 Input options

MB motor adapter + EZ synchronous servo motor

Catalog ID 443311_en

EZ synchronous servo motor



Catalog ID 442437_en

LM Lean motor

Catalog ID 443016_en

The corresponding catalogs can be found at http://www.stoeber.de/en/downloads/

Enter the ID of the catalog in the Search term field.

2.5.2 ServoStop motor adapter with brake (MB)

In this chapter, you will find the description and technical data of the motor adapter with brake.

2.5.2.1 Properties

- Electrically actuated spring-loaded brake for dry running
- Featuring backlash-free plug-in coupling (jaw coupling) for easy removal of the motor with the axis braked in any position
- Electrical release monitoring in the terminal box of the motor adapter
- Manual monitoring of wear via air gap checks with a feeler gauge
- Manual release (optional)
- Radial shaft seal rings made of FKM with two sealing lips
- Four oil drain holes to protect the brake from oiling up in case of leakage
- Diverse-redundant system in accordance with EN ISO 13849-1

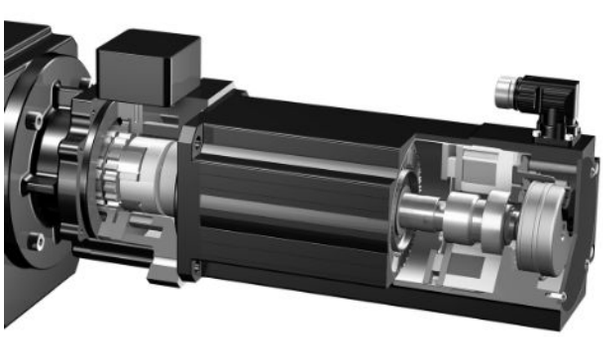


Fig. 1: Motor adapter with ServoStop brake and directly attached EZ synchronous servo motor

2.5.2.2 Brake

A quiescent current brake is integrated into the motor adapter. It has the function of a holding brake. Braking from full speed, e.g. in case of a voltage drop or an emergency off in hazard situations, is still possible.

The brake can be used as a single brake or together with the motor brake as a redundant brake system.

Function

The brakes installed in the motor adapter are electrically actuated spring-loaded brakes for dry running. In the de-energized state, braking takes place using spring force. The brake is released by an electromagnetic DC coil before the motor is switched on. The switch-on time t_{2B} (release time) is the time until the anchor plate releases from the axially moving brake disc and is magnetically held to the coil body. In this state, the brake is released and the coupling hub can rotate. In order to switch off (motor and brake), the residual magnetic flux of the iron parts (anchor and coil body) must be reduced; the associated time t_{11B} until the start of torque generation is defined as a response delay when linking. The link time t_{1B} is the time until the braking torque has built up to the nominal braking torque.

Manual release

Optionally, the brake can be equipped with a manual release.

Pressing the manual release deactivates the electronic actuation of the brake. Before pressing the manual release, you must establish the safety of the machine (e.g. protection against falling).

2.5.2.3 Electrical connection

- Terminal box (standard)
- Plug connector (optional, not possible in combination with release monitoring)

2.5.2.4 Monitoring

For monitoring the brake system, there are generally two options:

- Manual monitoring of wear via air gap checks with a feeler gauge
- Electrical release monitoring in the terminal box with a non-contact and wear-free proximity switch

2.5.2.5 Brake technical data

Technical data for operation at 24 V DC (±10%)

Type	M_{1Bstat} [Nm]	J_1 [kgcm²]	m [kg]	$\Delta\phi_B$ [arcmin]	$t_{1B,DC}$ [ms]	t_{2B} [ms]	$P_{N,B}$ [W]
MB23	8.0	6.3	8.5	32.0	65	55	30
MB23	12	6.3	8.5	32.0	55	80	30
MB33	16	26	14	26.0	150	60	37
MB33	24	26	14	26.0	120	85	37
MB33	32	26	14	26.0	95	100	37
MB33	45	26	14	26.0	80	120	37
MB43	50	69	26	19.0	150	100	55
MB43	72	69	26	19.0	120	150	55
MB43	100	69	26	19.0	90	200	55
MB53	200	236	61	17.0	200	250	86

$\Delta\phi_B$: With the brake closed, a higher total backlash results ($\Delta\phi_{tot} = \Delta\phi_2 + \Delta\phi_B / i$).

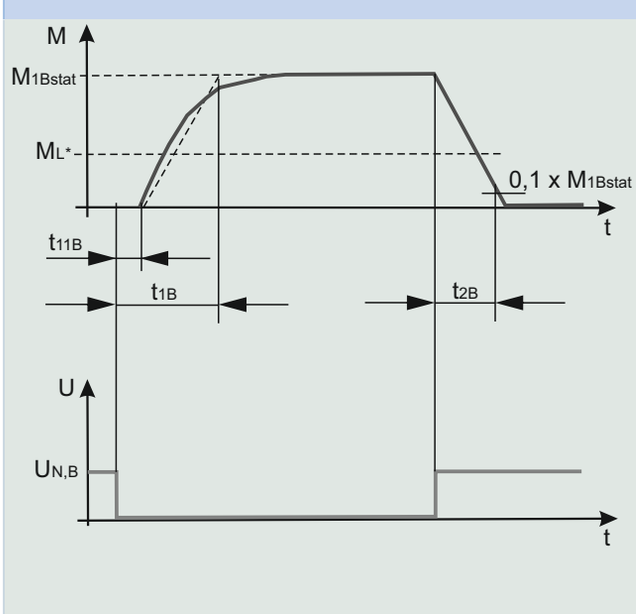
Technical data for operation with high-speed rectifier 104 V DC (supply voltage U_{LINE} 220 – 275 V AC ± 5%, 50/60 Hz)

Type	M_{1Bstat} [Nm]	J_1 [kgcm²]	m [kg]	$\Delta\phi_B$ [arcmin]	$t_{1B,DC}$ [ms]	$t_{1B,AC}$ [ms]	t_{2B} [ms]	$P_{O,B}$ [W]	P_{holdB} [W]
MB23	8.0	6.3	8.5	32.0	65	360	20	101	26
MB23	12	6.3	8.5	32.0	55	280	25	101	26
MB23	16	6.3	8.5	32.0	50	230	35	101	26
MB23	24	6.3	8.5	32.0	45	180	50	101	26
MB23	30	6.3	8.5	32.0	40	160	60	101	26
MB33	16	26	14	26.0	150	800	25	125	32
MB33	24	26	14	26.0	120	650	35	125	32
MB33	32	26	14	26.0	95	500	40	125	32
MB33	45	26	14	26.0	80	400	50	125	32
MB33	90	26	14	26.0	50	250	90	125	32
MB43	50	69	26	19.0	150	900	50	148	38
MB43	72	69	26	19.0	120	700	75	148	38
MB43	100	69	26	19.0	90	500	100	148	38
MB43	160	69	26	19.0	60	300	150	148	38
MB53	200	236	61	17.0	200	800	110	200	50
MB53	300	236	61	17.0	170	600	150	200	50
MB53	400	236	61	17.0	120	400	200	200	50

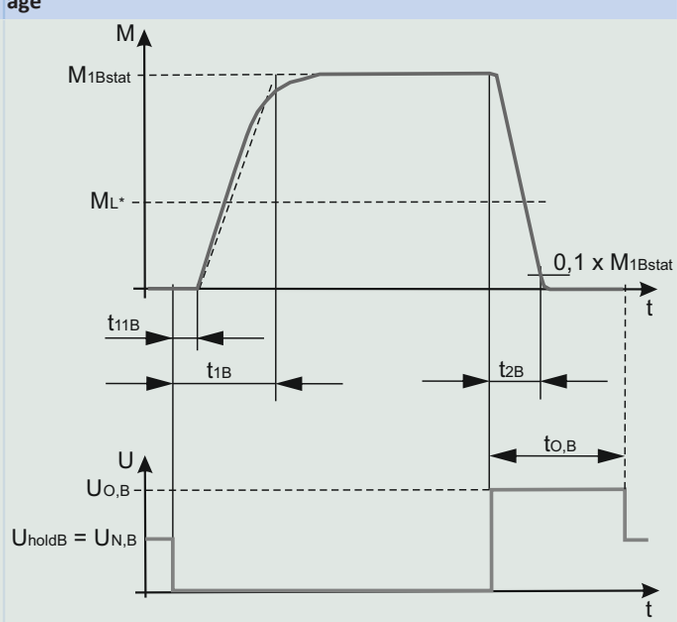
$\Delta\phi_B$: With the brake closed, a higher total backlash results ($\Delta\phi_{tot} = \Delta\phi_2 + \Delta\phi_B$ / i).

2.5.2.6 Brake switching times

Switching times in case of brake operation with nominal voltage



Switching times in case of brake operation with overexcitation voltage



2.5.3 Installation conditions

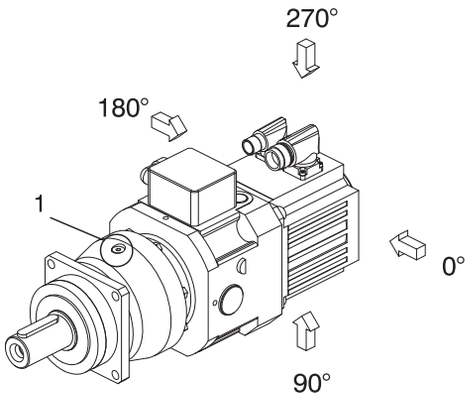
The specified torques and forces only apply when gear units are fastened on the machine side using screws of strength class 12.9. In addition, the gear housings must be adjusted at the pilot. The machine-side fit must be H7.

2.5.4 Lubricants

STOBER fills the gear units with the amount and type of lubricant specified on the nameplate.

You will receive lubricants for use in the food industry upon request.

2.5.5 Position of the plug connectors/terminal box



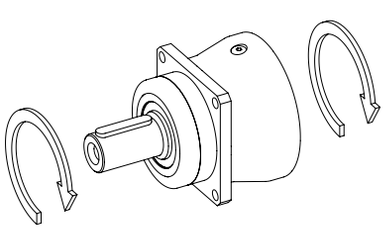
In the standard version, the plug connectors of the motor or the terminal box/plug connectors of the motor adapter are mounted in the 270° position (in relation to the oil drain plug (1) of the planetary gear unit). The position of the terminal box/plug connector of the motor adapter can be selected separately from the position of the motor plug connectors.
Indicate variations for your geared motor in the order.

2.5.6 Other product features

Feature	Value
Max. permitted gear unit temperature (on the surface of the gear unit)	≤ 90 °C
Paint	Black RAL 9005
Explosion-proof design in accordance with (ATEX) Directive 2014/34/EU (optional)	Not available
Efficiency:	
η_{get} single-stage	97%
η_{get} two-stage	95%
Protection class:[2]	
Gear unit	IP65
Motor	IP56, optionally IP66

2.5.7 Direction of rotation

The input and output rotate in the same direction.



2.6 Project configuration

Project your drives using our SERVOsoft designing software. Download SERVOsoft for free at https://www.stoeber.de/en/ServoSoft.

It is the most convenient and reliable method of drive selection, as the entire torque/speed curve of the application is displayed and evaluated here in the curve of the geared motor.

In this chapter, only limit values for specific operating points can be taken into consideration for manual drive selection.

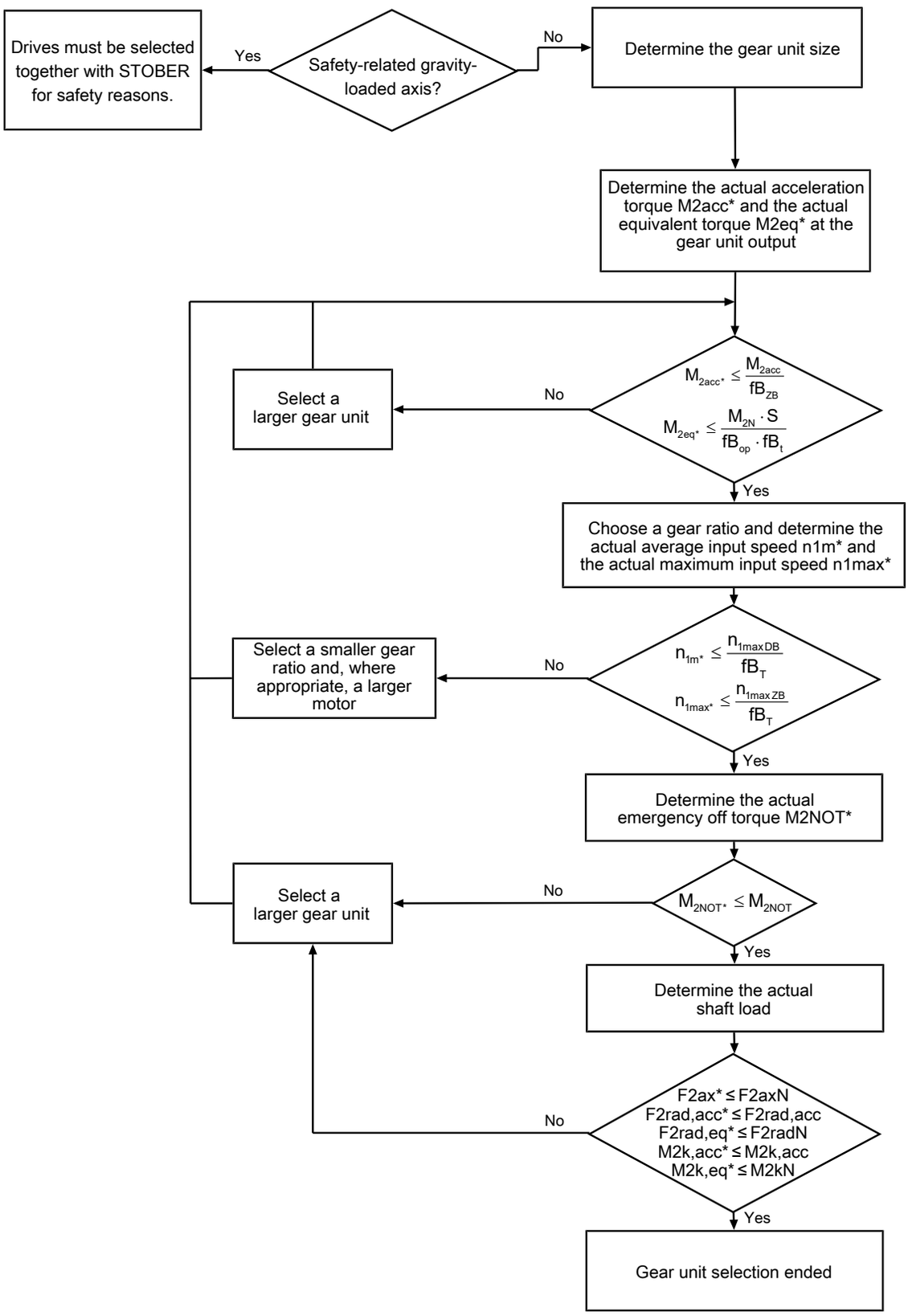
An explanation of the formula symbols can be found in Chapter Symbols in formulas.

The formula symbols for values actually present in the application are marked with *.

[2] Observe the protection class of all the components.

2.6.1 Drive selection

Drive selection for gear units

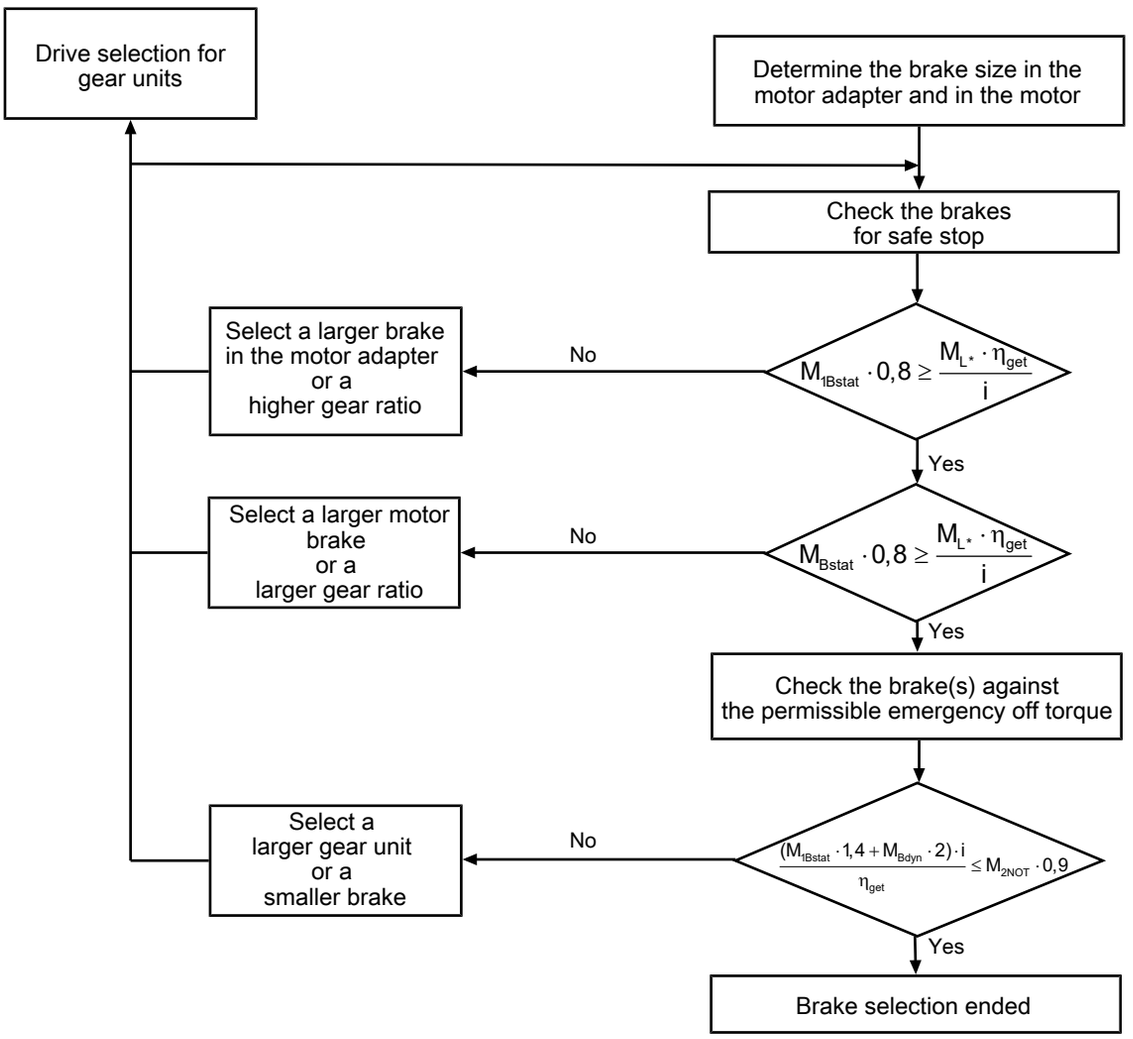


Calculate the forces and tilting torques in the chapter Permitted shaft loads.

Refer to the selection tables for the values for i, n_{1maxDB}, n_{1maxZB}, M_{2acc} (M_{2accHT} for reduced backlash), M_{2NOT}, M_{2N} and S.

The values for fB_T, fB_{op}, fB_t and fB_{ZB} can be found in the corresponding tables in this chapter.

Drive selection for brakes

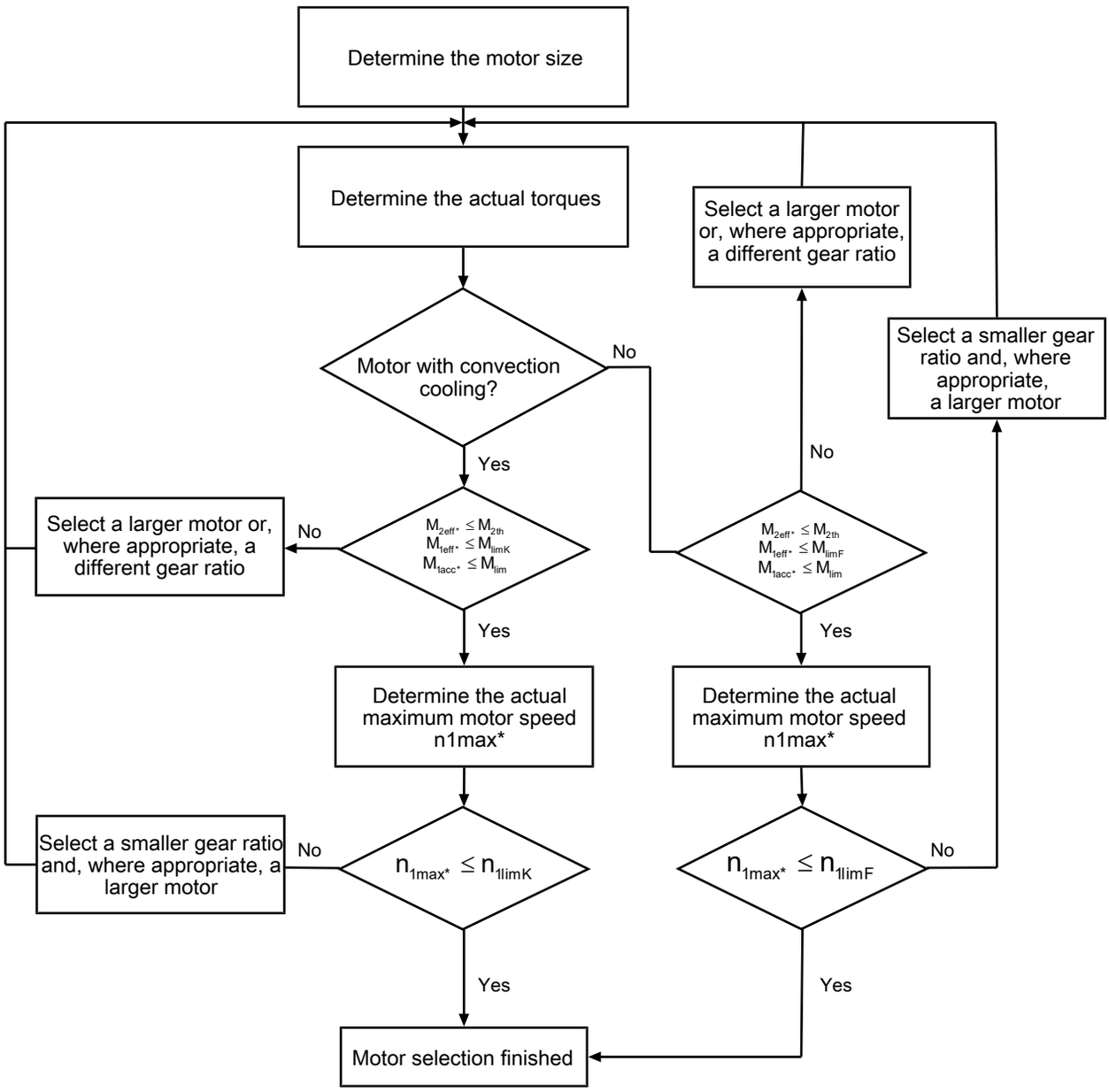


Refer to the selection tables for the values for i, M_{1Bstat}, M_{Bstat} and M_{2NOT}.

Refer to the Technical data table in the chapter [▷ 11.6.7] for the values for M_{Bdyn}.

Refer to the chapter Other product features for the values for η_{get}.

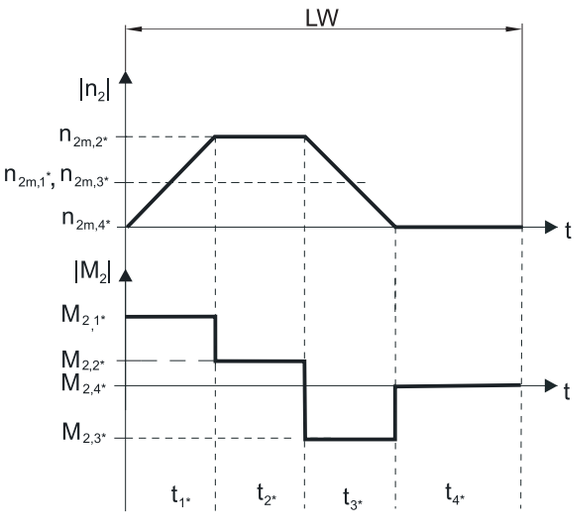
Drive selection for motors



The value for M_{lim}, M_{limK}, M_{limF}, n_{1limK} and n_{1limF} can be found in the motor characteristic curve in the chapter [▷ 11.3]. Note the size, nominal speed n_N and cooling type of the motor.

Example of cyclic operation

The following calculations are based on a representation of the power taken from the output based in accordance with the following example:



Calculation of the actual maximum acceleration torques

$$M_{2acc*} = J_{tot} \cdot \frac{\Delta n_2}{9{,}55 \cdot \Delta t} + M_{L*}$$

$$M_{1acc*} = \frac{M_{2acc*}}{i \cdot \eta_{get}} + J_1 \cdot \frac{\Delta n_1}{9{,}55 \cdot \Delta t}$$

Calculation of the actual average input speed

$$n_{1m*} = n_{2m*} \cdot i$$

$$n_{2m*} = \frac{\left|n_{2m,1*}\right| \cdot t_{1*} + \ldots + \left|n_{2m,n*}\right| \cdot t_{n*}}{t_{1*} + \ldots + t_{n*}}$$

If $t_{1*} + \ldots + t_{3*} \geq 6$ min, calculate n_{2m*} without the rest phase t_{4*}.

The values for the ratio i can be found in the selection tables.

Calculation of the actual effective torque

$$M_{2eff*} = \sqrt{\frac{t_{1*} \cdot M_{2,1*}{}^2 + \ldots + t_{n*} \cdot M_{2,n*}{}^2}{t_{1*} + \ldots + t_{n*}}}$$

Calculation of the actual emergency-off torque

$$M_{2NOT*} = J_{tot} \cdot \frac{\Delta n_2}{9.55 \cdot \Delta t} + M_{L*}$$

Calculation of the actual equivalent torque

$$M_{2eq*} = \sqrt[3]{\frac{\left|n_{2m,1*}\right| \cdot t_{1*} \cdot \left|M_{2,1*}{}^3\right| + \ldots + \left|n_{2m,n*}\right| \cdot t_{n*} \cdot \left|M_{2,n*}{}^3\right|}{\left|n_{2m,1*}\right| \cdot t_{1*} + \ldots + \left|n_{2m,n*}\right| \cdot t_{n*}}}$$

Calculation of the thermal limit torque

Calculate the thermal limit torque M_{2th} for a duty cycle $ED_{10} > 50\%$ and the actual average input speed n_{1m*}. (At $K_{mot,th} \leq 0$ you must reduce the average input speed n_{1m*} accordingly or select another geared motor size.)

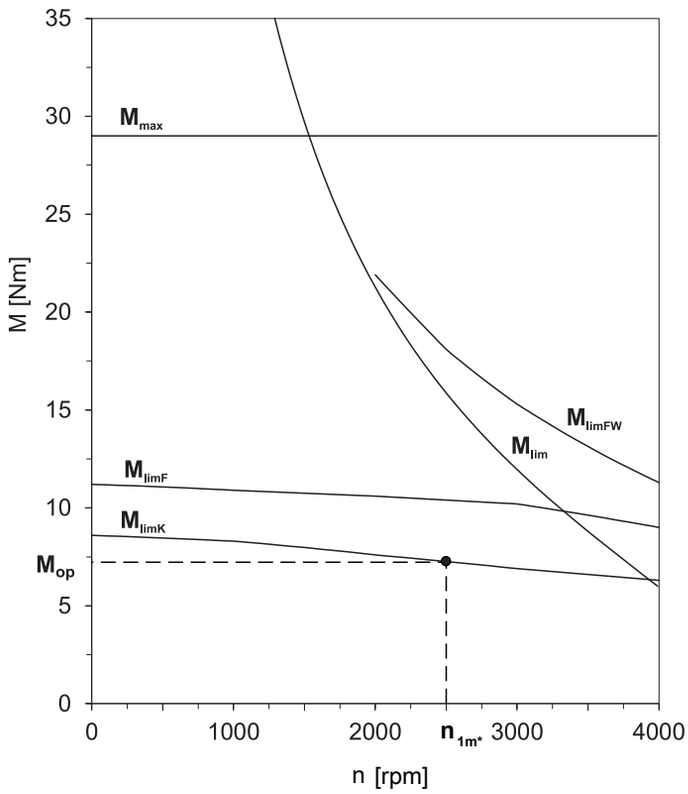
$$M_{2th} = M_{op} \cdot i \cdot K_{mot,th}$$

$$K_{mot,th} = 0{,}95 - \frac{a_{th}}{1000} \cdot fB_T \cdot \left(\frac{n_{1m*}}{1000}\right)^3$$

Refer to the selection tables for the values of i and a_{th}.

The values for fB_T can be found in the corresponding table in this chapter.

The value for the torque of the motor at operating point M_{op} with the determined average input speed n_{1m*} can be found in the motor characteristic curve in the chapter [▶ 11.3]. Note the size, nominal speed n_N and cooling type of the motor. The figure below shows an example of reading the torque M_{op} of a motor with convection cooling at the operating point.



Operating factors

Operating mode	fB_{op}
Uniform continuous operation	1.00
Cyclic operation	1.00
Reversing load cyclic operation	1.00

Run time	fB_t
Daily runtime ≤ 8 h	1.00
Daily runtime ≤ 16 h	1.15
Daily runtime ≤ 24 h	1.20

Cyclic operation	fB_{ZB}
≤ 1000 load changes/hour (LW/h)	1.00
> 1000 load changes/hour (LW/h)	1.15

Temperature		fB_T
Motor cooling	**Surrounding temperature**	
Motor with forced ventilation	≤ 20 °C	0.9
	≤ 30 °C	1.0
	≤ 40 °C	1.15
Motor with convection cooling	≤ 20 °C	1.0
	≤ 30 °C	1.1
	≤ 40 °C	1.25

Notes

- The maximum permitted gear unit temperature (see the "Other product features" chapter) must not be exceeded. Doing so may result in damage to the geared motor.
- For braking from full speed (for example when the power fails or when setting up the machine), note the permitted gear unit torques (M_{2acc}, M_{2NOT}) in the selection tables.

2.6.2 Permitted shaft loads for the output shaft

The values specified in the tables apply to the permitted shaft loads:

- For shaft dimensions in accordance with the catalog
- For output speeds $n_{2m*} \leq 100$ rpm ($F^{2axN} = F_{2ax100}$; $F_{2radN} = F_{2rad100}$; $M_{2kN} = M_{2k100}$)
- Only if radial forces on the gear unit are stabilized by its pilots (housing, flange shaft)

Permitted shaft loads for standard bearing S

Type	z_2 [mm]	F_{2ax100} [N]	$F_{2rad100}$ [N]	$F_{2rad,acc}$ [N]	M_{2k100} [Nm]	$M_{2k,acc}$ [Nm]
P2	17.0	500	1200	1300	34	36
P3	17.5	1000	2500	2500	79	79
P4	18.5	1500	4000	4500	146	164
P5	19.5	2300	6500	7000	315	340
P7	23.0	2900	8500	9000	544	576
P8	24.5	4700	13000	18000	852	1179
P9	33.0	6000	18000	27000	1539	2309

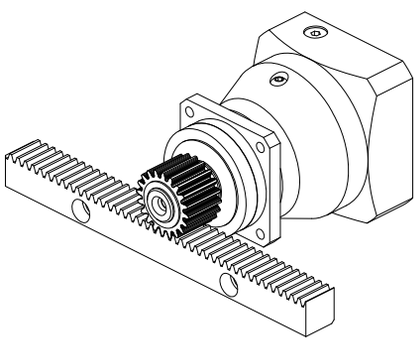


Fig. 2: Recommendation for bearing assignment S (e.g. for straight-cut gearing)

Permitted shaft loads for axially reinforced bearing D

Type	z_2 [mm]	F_{2ax100} [N]	$F_{2rad100}$ [N]	$F_{2rad,acc}$ [N]	M_{2k100} [Nm]	$M_{2k,acc}$ [Nm]
P3	20.0	2500	2750	2750	94	94
P4	22.5	4000	4500	5000	182	203
P5	25.5	6000	7000	8000	382	436
P7	29.0	10000	9500	10000	665	700
P8	32.0	15500	15000	18000	1095	1314
P9	44.0	25000	20000	30000	1930	2895

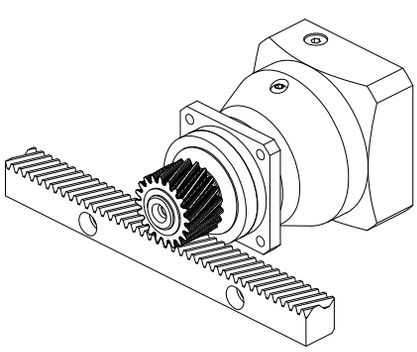


Fig. 3: Recommendation for bearing assignment D (e.g. for helical gearing)

Permitted shaft loads for radially reinforced bearing Z

Type	z_2	F_{2ax100}	$F_{2rad100}$	$F_{2rad,acc}$	M_{2k100}	$M_{2k,acc}$
	[mm]	[N]	[N]	[N]	[Nm]	[Nm]
P3	17.5	600	3000	3000	95	95
P4	18.5	1000	5000	5000	183	183
P5	19.5	1600	8000	8000	388	388
P7	23.0	2000	10000	10000	640	640
P8	24.5	3600	18000	18000	1179	1179
P9	33.0	5000	27000	35000	2309	2993

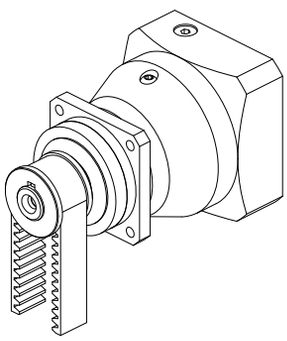


Fig. 4: Recommendation for bearing assignment Z (e.g. for belt drives)

For other output speeds, download diagrams at https://configurator.stoeber.de/en-US/.

The following applies to output speeds n_{2m*} > 100 rpm:

$$F_{2axN} = \frac{F_{2ax100}}{\sqrt[3]{\frac{n_{2m*}}{100\ \text{rpm}}}} \qquad F_{2radN} = \frac{F_{2rad100}}{\sqrt[3]{\frac{n_{2m*}}{100\ \text{rpm}}}} \qquad M_{2kN} = \frac{M_{2k100}}{\sqrt[3]{\frac{n_{2m*}}{100\ \text{rpm}}}}$$

The values for F_{2ax100}, $F_{2rad100}$ and M_{2k100} can be found in the table "Permitted shaft loads" in this chapter.

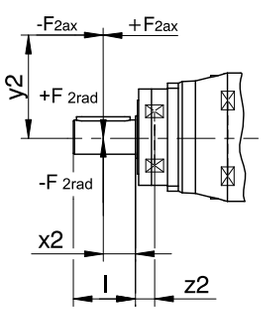


Fig. 5: Force application points

The specified values for $F_{2rad100}$ and $F_{2rad,acc}$ refer to an application of force at the center of the output shaft: $x_2 = l/2$.

Shaft dimensions can be found in the "Dimensional drawings" chapter.

The following applies to other force application points:

$$M_{2k,acc*} = \frac{2 \cdot F_{2ax*} \cdot y_2 + F_{2rad,acc*} \cdot (x_2 + z_2)}{1000}$$

For applications with multiple axial and/or radial forces, you must add the forces as vectors.

In the event of EMERGENCY OFF operation (max. 1000 load changes), you can multiply the permitted forces and torques for F_{2ax100}, $F_{2rad100}$ and M_{2k100} by a factor of two.

Also note the calculation for equivalent values:

$$M_{2k,eq*} = \sqrt[3]{\frac{|n_{2m,1*}| \cdot t_{1*} \cdot |M_{2k,acc,1*}^{\ 3}| + \ldots + |n_{2m,n*}| \cdot t_{n*} \cdot |M_{2k,acc,n*}^{\ 3}|}{|n_{2m,1*}| \cdot t_{1*} + \ldots + |n_{2m,n*}| \cdot t_{n*}}}$$

$$F_{2rad,eq^*} = \sqrt[3]{\frac{\left|n_{2m,1^*}\right| \cdot t_{1^*} \cdot \left|F_{2rad,acc,1^*}{}^3\right| + \ldots + \left|n_{2m,n^*}\right| \cdot t_{n^*} \cdot \left|F_{2rad,acc,n^*}{}^3\right|}{\left|n_{2m,1^*}\right| \cdot t_{1^*} + \ldots + \left|n_{2m,n^*}\right| \cdot t_{n^*}}}$$

The following apply to the bearing service life L_{10h} ($ED_{10} \leq 40\%$):

$L_{10h} > 10000$ h with $1 < M_{2kN}/M_{2k^*} < 1.25$

$L_{10h} > 20000$ h with $1.25 < M_{2kN}/M_{2k^*} < 1.5$

$L_{10h} > 30000$ h with $1.5 < M_{2kN}/M_{2k^*}$

For different duty cycles:

$$L_{10h} > L_{10h(ED_{10}=40\%)} \cdot \frac{40\%}{ED_{10}}$$

2.6.3 Recommendation for radial shaft seal rings

For a duty cycle > 60% and higher surrounding temperatures, we recommend radial shaft seal rings made of FKM at the output.

Properties:

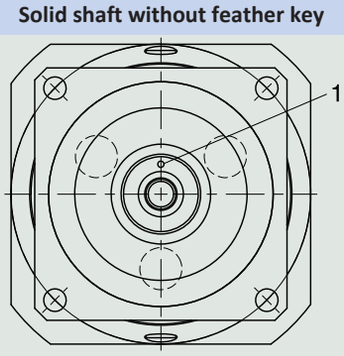
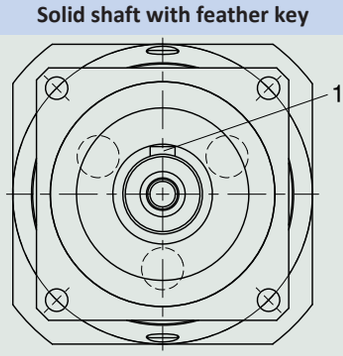
- Excellent temperature resistance
- High chemical stability
- Very good resistance to aging
- Excellent resistance in oils and greases
- For use in the food, beverage and pharmaceutical industries

Leak-proofness

Our gear units are equipped with high-quality radial shaft seal rings and checked for leaks. However, a leak cannot be fully ruled out over the length of use of a gear unit. If you use a gear unit with goods incompatible with the lubricant, you must take measures to prevent direct contact with the gear unit lubricant in case of a leak.

2.6.4 Reverse operation

To ensure lubrication for circulating gearing parts during cyclic reverse operation from ± 20° to ± 90° at the output, pay careful attention to the position of the output shaft for the horizontal mounting of the gear unit, as shown in the diagrams below. The images show the center position of reverse operation. Cyclic reverse operation ≤ ± 20° on request.

Solid shaft without feather key	Solid shaft with feather key
	
1 Position of the mark: top	1 Position of the feather key: top

Notes

- If you use the solid shaft without a feather key (G), you must note the position of the mark during assembly.
- As an alternative, you can use the solid shaft with a feather key (P). In that case, the feather key functions for position orientation. For a backlash-free connection, also use a clamp.

2.7 Additional documentation

Additional documentation related to the product can be found at
http://www.stoeber.de/en/downloads/

Enter the ID of the documentation in the Search term field.

Documentation	ID
Operating manual gear units, geared motors P23 – P93	443356_en

3 PH planetary geared motors

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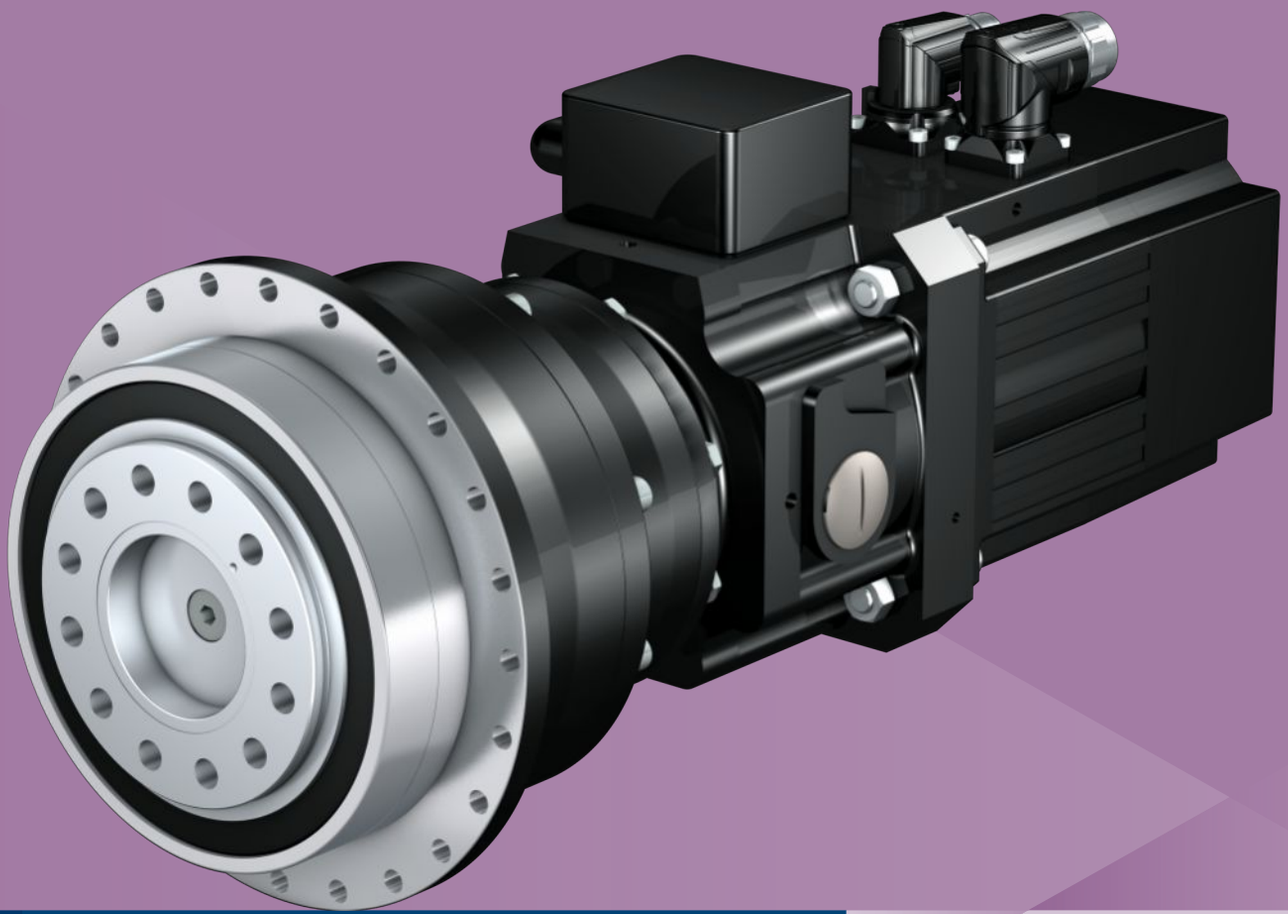


3 Planetary geared motors PH

3.1 Overview

High-performance precision planetary geared motors with redundant brake

Features

Power density	★★★★☆
Backlash	★★★★★
Price category	€€€
Shaft load	★★★★★
Smooth operation	★★★★☆
Torsional stiffness	★★★★☆
Mass moment of inertia	★★★★☆
Helical gearing	✓
Any mounting position	✓
Continuous operation without cooling	✓
Stiff output bearings due to pretension	✓
Reinforced output bearing (PH3 – PH5)	✓ (optional)
Safe braking in case of power outage	✓
Safe support of the load with gravity-loaded axes using 2 brakes	✓
Easily and safely connected to the synchronous servo motor thanks to backlash-free plug-in coupling	✓

Key ★☆☆☆☆ good | ★★★★★ excellent
€ Economy | €€€€€ Premium

Technical data

M_{1Bstat}	8 – 100 Nm
i	4 – 60
M_{2acc}	108 – 7500 Nm
$\Delta\phi_2$	1 – 3 arcmin
η_{get}	93 – 96 %

3.2 Selection tables

The technical data specified in the selection tables applies to:

- Installation altitudes up to 1000 m above sea level
- Surrounding temperatures from 0 °C to 40 °C
- Drives with convection-cooled motors (e.g. EZ401**U**)
- Without consideration of the thermal limiting performance

For the technical data on drives with forced ventilated motors (e.g. EZ401**B**), refer to https://configurator.stoeber.de/en-US/

The maximum permitted input speed n_{1maxZB} is reduced for the design with a reinforced bearing and gear ratios ≤ 5. You can find values at https://configurator.stoeber.de/en-US/

An explanation of the formula symbols can be found in the chapter [▶ 15.1].

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PH5 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 290 Nm)																	
300	41	45	1.7	3.5	PH531_0100 MB23 EZ501U	154	154	575	10.00	10/1	8.0	8.0	3300	4000	10	53	20
300	41	45	1.7	3.5	PH531_0100 MB23 EZ501U	154	154	575	10.00	10/1	12	8.0	3300	4000	10	53	20
300	41	45	1.7	3.5	PH531_0100 MB23 EZ501U	154	154	575	10.00	10/1	16	8.0	3300	4000	10	53	20
300	45	50	1.9	3.2	PH531_0100 MB23 EZ402U	154	154	575	10.00	10/1	8.0	8.0	3300	4000	8.8	53	19
300	45	50	1.9	3.2	PH531_0100 MB23 EZ402U	154	154	575	10.00	10/1	12	8.0	3300	4000	8.8	53	19
300	45	50	1.9	3.2	PH531_0100 MB23 EZ402U	154	154	575	10.00	10/1	16	8.0	3300	4000	8.8	53	19
300	66	83	2.8	2.2	PH531_0100 MB23 EZ404U	278	278	575	10.00	10/1	8.0	8.0	3300	4000	10	53	22
300	66	83	2.8	2.2	PH531_0100 MB23 EZ404U	278	278	575	10.00	10/1	12	8.0	3300	4000	10	53	22
300	66	83	2.8	2.2	PH531_0100 MB23 EZ404U	278	278	575	10.00	10/1	16	8.0	3300	4000	10	53	22
300	71	77	3.0	2.0	PH531_0100 MB23 EZ502U	288	288	575	10.00	10/1	8.0	8.0	3300	4000	12	53	21
300	71	77	3.0	2.0	PH531_0100 MB23 EZ502U	288	288	575	10.00	10/1	12	8.0	3300	4000	12	53	21
300	71	77	3.0	2.0	PH531_0100 MB23 EZ502U	288	288	575	10.00	10/1	16	8.0	3300	4000	12	53	21
300	93	107	3.9	1.5	PH531_0100 MB23 EZ503U	288	288	575	10.00	10/1	8.0	15	3300	4000	16	53	23
300	93	107	3.9	1.5	PH531_0100 MB23 EZ503U	288	288	575	10.00	10/1	12	15	3300	4000	16	53	23
300	130	154	5.4	1.1	PH531_0100 MB23 EZ505U	288	288	575	10.00	10/1	8.0	15	3300	4000	20	53	26
300	130	154	5.4	1.1	PH531_0100 MB23 EZ505U	288	288	575	10.00	10/1	12	15	3300	4000	20	53	26
429	46	58	3.3	4.0	PH531_0070 MB23 EZ404U	195	195	423	7.000	7/1	8.0	8.0	3000	4000	10	77	22
429	46	58	3.3	4.0	PH531_0070 MB23 EZ404U	195	195	423	7.000	7/1	12	8.0	3000	4000	10	77	22
429	46	58	3.3	4.0	PH531_0070 MB23 EZ404U	195	195	423	7.000	7/1	16	8.0	3000	4000	10	77	22
429	50	54	3.6	3.7	PH531_0070 MB23 EZ502U	208	208	423	7.000	7/1	8.0	8.0	3000	4000	13	77	21
429	50	54	3.6	3.7	PH531_0070 MB23 EZ502U	208	208	423	7.000	7/1	12	8.0	3000	4000	13	77	21
429	50	54	3.6	3.7	PH531_0070 MB23 EZ502U	208	208	423	7.000	7/1	16	8.0	3000	4000	13	77	21
429	65	75	4.7	2.8	PH531_0070 MB23 EZ503U	252	252	423	7.000	7/1	8.0	15	3000	4000	16	77	23
429	65	75	4.7	2.8	PH531_0070 MB23 EZ503U	252	252	423	7.000	7/1	12	15	3000	4000	16	77	23
429	91	108	6.5	2.0	PH531_0070 MB23 EZ505U	252	252	423	7.000	7/1	8.0	15	3000	4000	21	77	26
429	91	108	6.5	2.0	PH531_0070 MB23 EZ505U	252	252	423	7.000	7/1	12	15	3000	4000	21	77	26
600	47	53	7.1	3.9	PH531_0050 MB23 EZ503U	180	180	302	5.000	5/1	8.0	15	2500	4000	17	97	23
600	47	53	7.1	3.9	PH531_0050 MB23 EZ503U	180	180	302	5.000	5/1	12	15	2500	4000	17	97	23
600	65	77	9.9	2.8	PH531_0050 MB23 EZ505U	180	180	302	5.000	5/1	8.0	15	2500	4000	21	97	26
600	65	77	9.9	2.8	PH531_0050 MB23 EZ505U	180	180	302	5.000	5/1	12	15	2500	4000	21	97	26
750	37	43	12	3.9	PH531_0040 MB23 EZ503U	144	144	242	4.000	4/1	8.0	15	2200	4000	17	100	23
750	37	43	12	3.9	PH531_0040 MB23 EZ503U	144	144	242	4.000	4/1	12	15	2200	4000	17	100	23
750	52	61	16	2.8	PH531_0040 MB23 EZ505U	144	144	242	4.000	4/1	8.0	15	2200	4000	22	100	26
750	52	61	16	2.8	PH531_0040 MB23 EZ505U	144	144	242	4.000	4/1	12	15	2200	4000	22	100	26
PH7 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 870 Nm)																	
86	140	153	1.1	3.9	PH732_0350 MB23 EZ501U	521	521	1720	35.00	35/1	8.0	8.0	3700	4000	10	183	28
86	140	153	1.1	3.9	PH732_0350 MB23 EZ501U	521	521	1720	35.00	35/1	12	8.0	3700	4000	10	183	28
86	153	169	1.1	3.5	PH732_0350 MB23 EZ402U	521	521	1720	35.00	35/1	8.0	8.0	3700	4000	9.1	183	28
86	153	169	1.1	3.5	PH732_0350 MB23 EZ402U	521	521	1720	35.00	35/1	12	8.0	3700	4000	9.1	183	28
86	225	280	1.7	2.4	PH732_0350 MB23 EZ404U	866	908	1720	35.00	35/1	8.0	8.0	3700	4000	10	183	30
86	225	280	1.7	2.4	PH732_0350 MB23 EZ404U	866	908	1720	35.00	35/1	12	8.0	3700	4000	10	183	30
86	241	260	1.8	2.2	PH732_0350 MB23 EZ502U	866	908	1720	35.00	35/1	8.0	8.0	3700	4000	13	183	29
86	241	260	1.8	2.2	PH732_0350 MB23 EZ502U	866	908	1720	35.00	35/1	12	8.0	3700	4000	13	183	29
107	112	122	1.2	4.8	PH732_0280 MB23 EZ501U	417	417	1540	28.00	28/1	8.0	8.0	3700	4000	11	194	28
107	112	122	1.2	4.8	PH732_0280 MB23 EZ501U	417	417	1540	28.00	28/1	12	8.0	3700	4000	11	194	28
107	122	135	1.3	4.4	PH732_0280 MB23 EZ402U	417	417	1540	28.00	28/1	8.0	8.0	3700	4000	9.4	194	28
107	122	135	1.3	4.4	PH732_0280 MB23 EZ402U	417	417	1540	28.00	28/1	12	8.0	3700	4000	9.4	194	28
107	180	224	1.9	3.0	PH732_0280 MB23 EZ404U	755	755	1540	28.00	28/1	8.0	8.0	3700	4000	11	194	30
107	180	224	1.9	3.0	PH732_0280 MB23 EZ404U	755	755	1540	28.00	28/1	12	8.0	3700	4000	11	194	30

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2.0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PH7 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 870 Nm)																	
107	193	208	2.0	2.8	PH732_0280 MB23 EZ502U	770	807	1540	28.00	28/1	8.0	8.0	3700	4000	13	194	29
107	193	208	2.0	2.8	PH732_0280 MB23 EZ502U	770	807	1540	28.00	28/1	12	8.0	3700	4000	13	194	29
120	109	121	1.5	4.6	PH732_0250 MB23 EZ402U	372	372	1465	25.00	25/1	8.0	8.0	3500	4000	9.1	186	28
120	109	121	1.5	4.6	PH732_0250 MB23 EZ402U	372	372	1465	25.00	25/1	12	8.0	3500	4000	9.1	186	28
120	109	121	1.5	4.6	PH732_0250 MB23 EZ402U	372	372	1465	25.00	25/1	16	8.0	3500	4000	9.1	186	28
120	160	200	2.2	3.1	PH732_0250 MB23 EZ404U	674	674	1465	25.00	25/1	8.0	8.0	3500	4000	10	186	30
120	160	200	2.2	3.1	PH732_0250 MB23 EZ404U	674	674	1465	25.00	25/1	12	8.0	3500	4000	10	186	30
120	160	200	2.2	3.1	PH732_0250 MB23 EZ404U	674	674	1465	25.00	25/1	16	8.0	3500	4000	10	186	30
120	172	186	2.3	2.9	PH732_0250 MB23 EZ502U	721	721	1465	25.00	25/1	8.0	8.0	3500	4000	13	186	29
120	172	186	2.3	2.9	PH732_0250 MB23 EZ502U	721	721	1465	25.00	25/1	12	8.0	3500	4000	13	186	29
120	172	186	2.3	2.9	PH732_0250 MB23 EZ502U	721	721	1465	25.00	25/1	16	8.0	3500	4000	13	186	29
120	226	258	3.0	2.2	PH732_0250 MB23 EZ503U	866	872	1465	25.00	25/1	8.0	15	3500	4000	16	186	31
120	226	258	3.0	2.2	PH732_0250 MB23 EZ503U	866	872	1465	25.00	25/1	12	15	3500	4000	16	186	31
120	314	372	4.2	1.6	PH732_0250 MB23 EZ505U	866	872	1465	25.00	25/1	8.0	15	3500	4000	21	186	34
120	314	372	4.2	1.6	PH732_0250 MB23 EZ505U	866	872	1465	25.00	25/1	12	15	3500	4000	21	186	34
150	128	160	2.6	3.6	PH732_0200 MB23 EZ404U	539	539	1172	20.00	20/1	8.0	8.0	3000	4000	11	188	30
150	128	160	2.6	3.6	PH732_0200 MB23 EZ404U	539	539	1172	20.00	20/1	12	8.0	3000	4000	11	188	30
150	128	160	2.6	3.6	PH732_0200 MB23 EZ404U	539	539	1172	20.00	20/1	16	8.0	3000	4000	11	188	30
150	138	149	2.8	3.3	PH732_0200 MB23 EZ502U	577	577	1172	20.00	20/1	8.0	8.0	3000	4000	13	188	29
150	138	149	2.8	3.3	PH732_0200 MB23 EZ502U	577	577	1172	20.00	20/1	12	8.0	3000	4000	13	188	29
150	138	149	2.8	3.3	PH732_0200 MB23 EZ502U	577	577	1172	20.00	20/1	16	8.0	3000	4000	13	188	29
150	180	206	3.7	2.6	PH732_0200 MB23 EZ503U	698	698	1172	20.00	20/1	8.0	15	3000	4000	16	188	31
150	180	206	3.7	2.6	PH732_0200 MB23 EZ503U	698	698	1172	20.00	20/1	12	15	3000	4000	16	188	31
150	251	298	5.1	1.8	PH732_0200 MB23 EZ505U	698	698	1172	20.00	20/1	8.0	15	3000	4000	21	188	34
150	251	298	5.1	1.8	PH732_0200 MB23 EZ505U	698	698	1172	20.00	20/1	12	15	3000	4000	21	188	34
188	103	128	3.0	4.4	PH732_0160 MB23 EZ404U	432	432	937	16.00	16/1	8.0	8.0	3000	4000	11	202	30
188	103	128	3.0	4.4	PH732_0160 MB23 EZ404U	432	432	937	16.00	16/1	12	8.0	3000	4000	11	202	30
188	103	128	3.0	4.4	PH732_0160 MB23 EZ404U	432	432	937	16.00	16/1	16	8.0	3000	4000	11	202	30
188	110	119	3.2	4.1	PH732_0160 MB23 EZ502U	461	461	937	16.00	16/1	8.0	8.0	3000	4000	13	202	29
188	110	119	3.2	4.1	PH732_0160 MB23 EZ502U	461	461	937	16.00	16/1	12	8.0	3000	4000	13	202	29
188	110	119	3.2	4.1	PH732_0160 MB23 EZ502U	461	461	937	16.00	16/1	16	8.0	3000	4000	13	202	29
188	144	165	4.2	3.1	PH732_0160 MB23 EZ503U	558	558	937	16.00	16/1	8.0	15	3000	4000	17	202	31
188	144	165	4.2	3.1	PH732_0160 MB23 EZ503U	558	558	937	16.00	16/1	12	15	3000	4000	17	202	31
188	201	238	5.9	2.2	PH732_0160 MB23 EZ505U	558	558	937	16.00	16/1	8.0	15	3000	4000	21	202	34
188	201	238	5.9	2.2	PH732_0160 MB23 EZ505U	558	558	937	16.00	16/1	12	15	3000	4000	21	202	34
300	71	80	1.8	3.9	PH731_0100 MB33 EZ701U	192	192	1150	10.00	10/1	16	15	2500	4000	37	125	34
300	71	80	1.8	3.9	PH731_0100 MB33 EZ701U	192	192	1150	10.00	10/1	24	15	2500	4000	37	125	34
300	71	80	1.8	3.9	PH731_0100 MB33 EZ701U	192	192	1150	10.00	10/1	32	15	2500	4000	37	125	34
300	71	80	1.8	3.9	PH731_0100 MB33 EZ701U	192	192	1150	10.00	10/1	45	15	2500	4000	37	125	34
300	115	138	3.0	2.4	PH731_0100 MB33 EZ702U	394	394	1150	10.00	10/1	16	15	2500	4000	42	125	36
300	115	138	3.0	2.4	PH731_0100 MB33 EZ702U	394	394	1150	10.00	10/1	24	15	2500	4000	42	125	36
300	115	138	3.0	2.4	PH731_0100 MB33 EZ702U	394	394	1150	10.00	10/1	32	15	2500	4000	42	125	36
300	115	138	3.0	2.4	PH731_0100 MB33 EZ702U	394	394	1150	10.00	10/1	45	15	2500	4000	42	125	36
300	158	200	4.1	1.8	PH731_0100 MB33 EZ703U	575	575	1150	10.00	10/1	16	32	2500	4000	54	125	39
300	158	200	4.1	1.8	PH731_0100 MB33 EZ703U	575	575	1150	10.00	10/1	24	32	2500	4000	54	125	39
300	204	290	5.3	1.4	PH731_0100 MB33 EZ705U	575	575	1150	10.00	10/1	16	32	2500	4000	66	125	45
300	204	290	5.3	1.4	PH731_0100 MB33 EZ705U	575	575	1150	10.00	10/1	24	32	2500	4000	66	125	45
429	81	97	3.3	4.8	PH731_0070 MB33 EZ702U	276	276	1270	7.000	7/1	16	15	2500	4000	43	166	36
429	81	97	3.3	4.8	PH731_0070 MB33 EZ702U	276	276	1270	7.000	7/1	24	15	2500	4000	43	166	36
429	81	97	3.3	4.8	PH731_0070 MB33 EZ702U	276	276	1270	7.000	7/1	32	15	2500	4000	43	166	36
429	81	97	3.3	4.8	PH731_0070 MB33 EZ702U	276	276	1270	7.000	7/1	45	15	2500	4000	43	166	36
429	111	140	4.5	3.5	PH731_0070 MB33 EZ703U	437	437	1270	7.000	7/1	16	32	2500	4000	54	166	39
429	111	140	4.5	3.5	PH731_0070 MB33 EZ703U	437	437	1270	7.000	7/1	24	32	2500	4000	54	166	39
429	111	140	4.5	3.5	PH731_0070 MB33 EZ703U	437	437	1270	7.000	7/1	32	32	2500	4000	54	166	39
429	111	140	4.5	3.5	PH731_0070 MB33 EZ703U	437	437	1270	7.000	7/1	45	32	2500	4000	54	166	39
429	143	203	5.9	2.7	PH731_0070 MB33 EZ705U	672	672	1270	7.000	7/1	16	32	2500	4000	67	166	45
429	143	203	5.9	2.7	PH731_0070 MB33 EZ705U	672	672	1270	7.000	7/1	24	32	2500	4000	67	166	45
429	143	203	5.9	2.7	PH731_0070 MB33 EZ705U	672	672	1270	7.000	7/1	32	32	2500	4000	67	166	45
429	143	203	5.9	2.7	PH731_0070 MB33 EZ705U	672	672	1270	7.000	7/1	45	32	2500	4000	67	166	45
600	79	100	6.8	4.9	PH731_0050 MB33 EZ703U	312	312	907	5.000	5/1	16	32	2200	4000	56	208	39
600	79	100	6.8	4.9	PH731_0050 MB33 EZ703U	312	312	907	5.000	5/1	24	32	2200	4000	56	208	39
600	79	100	6.8	4.9	PH731_0050 MB33 EZ703U	312	312	907	5.000	5/1	32	32	2200	4000	56	208	39
600	79	100	6.8	4.9	PH731_0050 MB33 EZ703U	312	312	907	5.000	5/1	45	32	2200	4000	56	208	39
600	102	145	8.8	3.8	PH731_0050 MB33 EZ705U	480	480	907	5.000	5/1	16	32	2200	4000	68	208	45
600	102	145	8.8	3.8	PH731_0050 MB33 EZ705U	480	480	907	5.000	5/1	24	32	2200	4000	68	208	45

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2.0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PH7 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 870 Nm)																	
600	102	145	8.8	3.8	PH731_0050 MB33 EZ705U	480	480	907	5.000	5/1	32	32	2200	4000	68	208	45
600	102	145	8.8	3.8	PH731_0050 MB33 EZ705U	480	480	907	5.000	5/1	45	32	2200	4000	68	208	45
750	82	116	12	4.7	PH731_0040 MB33 EZ705U	384	384	726	4.000	4/1	16	32	1900	4000	70	243	45
750	82	116	12	4.7	PH731_0040 MB33 EZ705U	384	384	726	4.000	4/1	24	32	1900	4000	70	243	45
750	82	116	12	4.7	PH731_0040 MB33 EZ705U	384	384	726	4.000	4/1	32	32	1900	4000	70	243	45
750	82	116	12	4.7	PH731_0040 MB33 EZ705U	384	384	726	4.000	4/1	45	32	1900	4000	70	243	45
PH8 (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 1390 Nm)																	
200	420	635	4.2	1.8	PH831_0100 MB43 EZ805U	1392	1392	2784	10.00	10/1	50	115	2200	3000	262	344	106
286	294	444	5.0	3.4	PH831_0070 MB43 EZ805U	1378	1378	2258	7.000	7/1	50	115	2000	3000	266	463	106
400	210	317	7.7	4.6	PH831_0050 MB43 EZ805U	984	984	1613	5.000	5/1	50	115	1600	3000	274	604	106
500	168	254	13	4.6	PH831_0040 MB43 EZ805U	787	787	1290	4.000	4/1	50	115	1400	3000	284	620	106
PH8 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 2100 Nm)																	
60	344	386	0.7	3.7	PH832_0500 MB33 EZ701U	930	930	4200	50.00	50/1	16	15	3000	4000	38	491	58
60	558	670	1.1	2.3	PH832_0500 MB33 EZ702U	1907	1907	4200	50.00	50/1	16	15	3000	4000	43	491	60
75	275	309	1.0	3.7	PH832_0400 MB33 EZ701U	744	744	3840	40.00	40/1	16	15	3000	4000	39	453	58
75	446	536	1.6	2.3	PH832_0400 MB33 EZ702U	1525	1525	3840	40.00	40/1	16	15	3000	4000	45	453	60
86	391	469	1.4	3.2	PH832_0350 MB33 EZ702U	1335	1335	4200	35.00	35/1	16	15	3000	4000	43	511	60
86	391	469	1.4	3.2	PH832_0350 MB33 EZ702U	1335	1335	4200	35.00	35/1	24	15	3000	4000	43	511	60
86	391	469	1.4	3.2	PH832_0350 MB33 EZ702U	1335	1335	4200	35.00	35/1	32	15	3000	4000	43	511	60
107	312	375	1.9	3.2	PH832_0280 MB33 EZ702U	1068	1068	3929	28.00	28/1	16	15	3000	4000	45	480	60
107	312	375	1.9	3.2	PH832_0280 MB33 EZ702U	1068	1068	3929	28.00	28/1	24	15	3000	4000	45	480	60
107	312	375	1.9	3.2	PH832_0280 MB33 EZ702U	1068	1068	3929	28.00	28/1	32	15	3000	4000	45	480	60
120	279	335	1.6	4.5	PH832_0250 MB33 EZ702U	953	953	4200	25.00	25/1	16	15	2700	4000	44	521	60
120	279	335	1.6	4.5	PH832_0250 MB33 EZ702U	953	953	4200	25.00	25/1	24	15	2700	4000	44	521	60
120	279	335	1.6	4.5	PH832_0250 MB33 EZ702U	953	953	4200	25.00	25/1	32	15	2700	4000	44	521	60
120	279	335	1.6	4.5	PH832_0250 MB33 EZ702U	953	953	4200	25.00	25/1	45	15	2700	4000	44	521	60
120	384	484	2.2	3.3	PH832_0250 MB33 EZ703U	1511	1511	4200	25.00	25/1	16	32	2700	4000	55	521	63
120	384	484	2.2	3.3	PH832_0250 MB33 EZ703U	1511	1511	4200	25.00	25/1	24	32	2700	4000	55	521	63
120	384	484	2.2	3.3	PH832_0250 MB33 EZ703U	1511	1511	4200	25.00	25/1	32	32	2700	4000	55	521	63
120	495	702	2.9	2.5	PH832_0250 MB33 EZ705U	2100	2300	4200	25.00	25/1	16	32	2700	4000	68	521	69
120	495	702	2.9	2.5	PH832_0250 MB33 EZ705U	2100	2300	4200	25.00	25/1	24	32	2700	4000	68	521	69
120	495	702	2.9	2.5	PH832_0250 MB33 EZ705U	2100	2300	4200	25.00	25/1	32	32	2700	4000	68	521	69
150	307	387	2.5	4.1	PH832_0200 MB33 EZ703U	1209	1209	3515	20.00	20/1	16	32	2500	4000	56	526	63
150	307	387	2.5	4.1	PH832_0200 MB33 EZ703U	1209	1209	3515	20.00	20/1	24	32	2500	4000	56	526	63
150	307	387	2.5	4.1	PH832_0200 MB33 EZ703U	1209	1209	3515	20.00	20/1	32	32	2500	4000	56	526	63
150	307	387	2.5	4.1	PH832_0200 MB33 EZ703U	1209	1209	3515	20.00	20/1	45	32	2500	4000	56	526	63
150	396	562	3.2	3.2	PH832_0200 MB33 EZ705U	1860	1860	3515	20.00	20/1	16	32	2500	4000	68	526	69
150	396	562	3.2	3.2	PH832_0200 MB33 EZ705U	1860	1860	3515	20.00	20/1	24	32	2500	4000	68	526	69
150	396	562	3.2	3.2	PH832_0200 MB33 EZ705U	1860	1860	3515	20.00	20/1	32	32	2500	4000	68	526	69
150	396	562	3.2	3.2	PH832_0200 MB33 EZ705U	1860	1860	3515	20.00	20/1	45	32	2500	4000	68	526	69
188	246	310	3.5	4.1	PH832_0160 MB33 EZ703U	967	967	2812	16.00	16/1	16	32	2500	4000	58	501	63
188	246	310	3.5	4.1	PH832_0160 MB33 EZ703U	967	967	2812	16.00	16/1	24	32	2500	4000	58	501	63
188	246	310	3.5	4.1	PH832_0160 MB33 EZ703U	967	967	2812	16.00	16/1	32	32	2500	4000	58	501	63
188	246	310	3.5	4.1	PH832_0160 MB33 EZ703U	967	967	2812	16.00	16/1	45	32	2500	4000	58	501	63
188	317	449	4.5	3.2	PH832_0160 MB33 EZ705U	1488	1488	2812	16.00	16/1	16	32	2500	4000	70	501	69
188	317	449	4.5	3.2	PH832_0160 MB33 EZ705U	1488	1488	2812	16.00	16/1	24	32	2500	4000	70	501	69
188	317	449	4.5	3.2	PH832_0160 MB33 EZ705U	1488	1488	2812	16.00	16/1	32	32	2500	4000	70	501	69
188	317	449	4.5	3.2	PH832_0160 MB33 EZ705U	1488	1488	2812	16.00	16/1	45	32	2500	4000	70	501	69
300	255	463	2.9	2.6	PH831_0100 MB43 EZ803U	1392	1392	2784	10.00	10/1	50	65	2200	3000	173	344	90
300	255	463	2.9	2.6	PH831_0100 MB43 EZ803U	1392	1392	2784	10.00	10/1	72	65	2200	3000	173	344	90
300	255	463	2.9	2.6	PH831_0100 MB43 EZ803U	1392	1392	2784	10.00	10/1	100	65	2200	3000	173	344	90
429	179	324	3.5	4.9	PH831_0070 MB43 EZ803U	974	974	2258	7.000	7/1	50	65	2000	3000	178	463	90
429	179	324	3.5	4.9	PH831_0070 MB43 EZ803U	974	974	2258	7.000	7/1	72	65	2000	3000	178	463	90
429	179	324	3.5	4.9	PH831_0070 MB43 EZ803U	974	974	2258	7.000	7/1	100	65	2000	3000	178	463	90
PH9 (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 5000 Nm)																	
67	1219	1844	2.2	2.7	PH942_0300 MB43 EZ805U	5000	5000	9374	30.00	30/1	50	115	2500	3000	269	1117	144
71	1138	1721	2.2	3.1	PH942_0280 MB43 EZ805U	5000	5000	8749	28.00	28/1	50	115	2800	3000	265	1156	144
83	975	1475	2.7	3.1	PH942_0240 MB43 EZ805U	4576	4576	7500	24.00	24/1	50	115	2000	3000	277	1124	144
100	813	1229	3.0	3.7	PH942_0200 MB43 EZ805U	3813	3813	6250	20.00	20/1	50	115	2500	3000	271	1193	144
111	732	1107	3.1	4.1	PH942_0180 MB43 EZ805U	3432	3432	5625	18.00	18/1	50	115	1800	3000	302	1141	144
125	650	984	3.3	4.6	PH942_0160 MB43 EZ805U	3050	3050	5000	16.00	16/1	50	115	2000	3000	280	1211	144
167	488	738	5.1	4.6	PH942_0120 MB43 EZ805U	2288	2288	3750	12.00	12/1	50	115	1800	3000	308	1256	144

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2.0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PH9 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 5000 Nm)																	
63	1187	2152	1.0	2.9	PH942_0480 MB43 EZ803U	5000	5000	10000	48.00	48/1	50	65	2800	3000	174	1084	127
63	1187	2152	1.0	2.9	PH942_0480 MB43 EZ803U	5000	5000	10000	48.00	48/1	72	65	2800	3000	174	1084	127
71	1039	1883	1.1	3.4	PH942_0420 MB43 EZ803U	5000	5000	10000	42.00	42/1	50	65	2800	3000	175	1103	127
71	1039	1883	1.1	3.4	PH942_0420 MB43 EZ803U	5000	5000	10000	42.00	42/1	72	65	2800	3000	175	1103	127
75	990	1793	1.5	2.6	PH942_0400 MB43 EZ803U	4600	4600	9200	40.00	40/1	50	65	2800	3000	173	1068	127
94	792	1434	1.6	3.4	PH942_0320 MB43 EZ803U	4315	4315	9200	32.00	32/1	50	65	2800	3000	175	1112	127
94	792	1434	1.6	3.4	PH942_0320 MB43 EZ803U	4315	4315	9200	32.00	32/1	72	65	2800	3000	175	1112	127
100	742	1345	1.3	4.4	PH942_0300 MB43 EZ803U	4046	4046	9374	30.00	30/1	50	65	2500	3000	181	1117	127
100	742	1345	1.3	4.4	PH942_0300 MB43 EZ803U	4046	4046	9374	30.00	30/1	72	65	2500	3000	181	1117	127
100	742	1345	1.3	4.4	PH942_0300 MB43 EZ803U	4046	4046	9374	30.00	30/1	100	65	2500	3000	181	1117	127
107	693	1255	1.4	4.8	PH942_0280 MB43 EZ803U	3776	3776	8749	28.00	28/1	50	65	2800	3000	176	1156	127
107	693	1255	1.4	4.8	PH942_0280 MB43 EZ803U	3776	3776	8749	28.00	28/1	72	65	2800	3000	176	1156	127
107	693	1255	1.4	4.8	PH942_0280 MB43 EZ803U	3776	3776	8749	28.00	28/1	100	65	2800	3000	176	1156	127
PH10 (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 7500 Nm)																	
48	1707	2582	1.3	2.9	PH1042_0420 MB43 EZ805U	7500	–	13124	42.00	42/1	50	115	2800	3000	264	1702	159
67	1219	1844	1.6	4.1	PH1042_0300 MB43 EZ805U	5720	–	9374	30.00	30/1	50	115	2500	3000	270	1737	159
83	975	1475	1.9	4.6	PH1042_0240 MB43 EZ805U	4576	–	7500	24.00	24/1	50	115	2000	3000	278	1754	159
111	732	1107	3.0	4.6	PH1042_0180 MB43 EZ805U	3432	–	5625	18.00	18/1	50	115	1800	3000	304	1778	159
PH10 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 7000 Nm)																	
50	1484	2690	0.9	2.6	PH1042_0600 MB43 EZ803U	7000	–	14000	60.00	60/1	50	65	2800	3000	172	1615	143
71	1039	1883	0.8	4.8	PH1042_0420 MB43 EZ803U	5664	–	13124	42.00	42/1	50	65	2800	3000	176	1702	143
71	1039	1883	0.8	4.8	PH1042_0420 MB43 EZ803U	5664	–	13124	42.00	42/1	72	65	2800	3000	176	1702	143
71	1039	1883	0.8	4.8	PH1042_0420 MB43 EZ803U	5664	–	13124	42.00	42/1	100	65	2800	3000	176	1702	143

3.3 Dimensional drawings

In this chapter, you can find the dimensions of the geared motors with redundant brake.

There is a dimensional drawing for every possible shaft/housing design, each with the tables for gear unit dimensions, motor adapter dimensions, motor dimensions and geared motor dimensions.

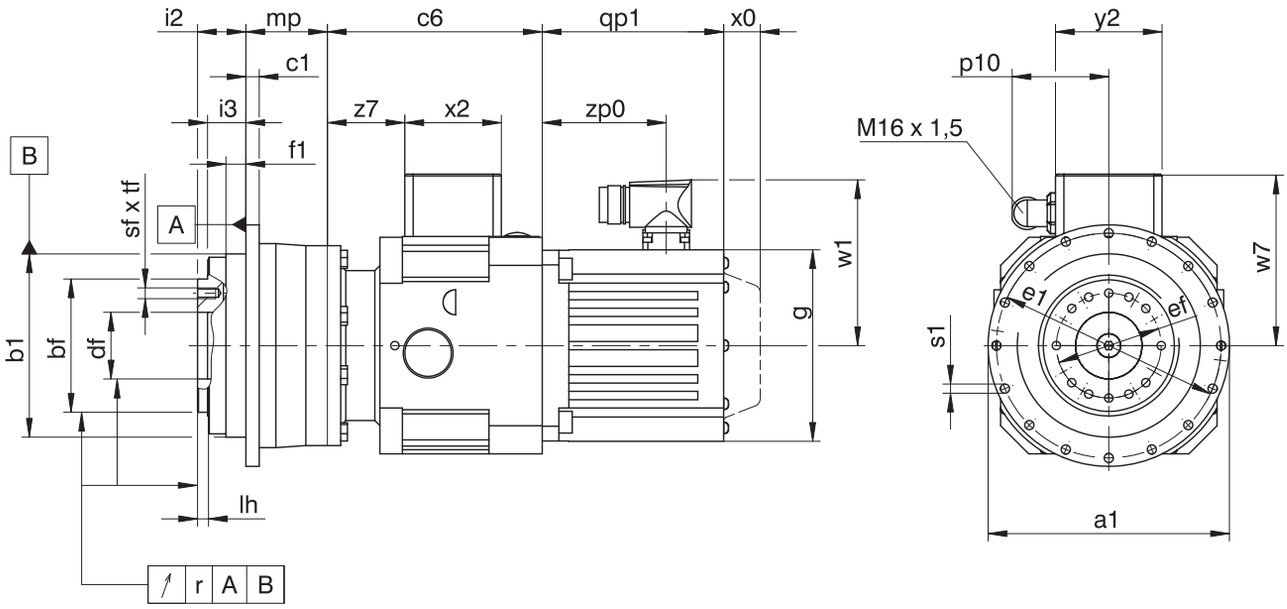
Dimensions can exceed the specifications of ISO 2768-mK due to casting tolerances or accumulation of individual tolerances.

We reserve the right to make dimensional changes due to ongoing technical development.

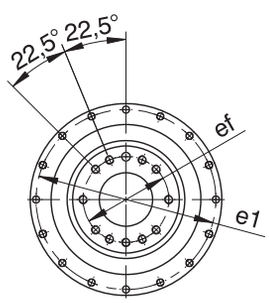
You can download 3D models of our standard drives at https://configurator.stoeber.de/en-US/.

Combination options and the dimensions of forced ventilated geared motors can also be found at https://configurator.stoeber.de/en-US/.

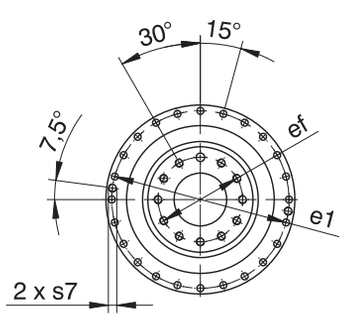
3.3.1 F shaft design (flange shaft)



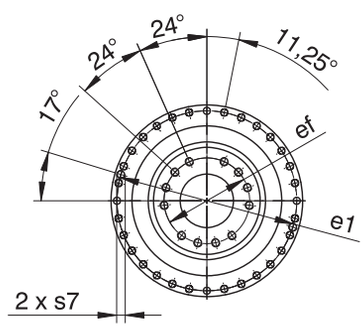
PH5



PH7/PH8



PH9/PH10



qp1 Applies to motors with brake.

w1 Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]

x0 Applies to encoders using an optical measuring method.

Dimensions of gear units

Type	Øa1	Øb1	Øbf	c1	Ødf	Øe1	Øef	f1	i2	i3	lh	r	Øs1	s7	sf	tf
PH531	145_{h7}	110_{h7}	80_{h7}	8	40.0^{H6}	135	63.0	12	29.0	23.0	6	0.020	5.5	–	M6	11
PH731	179_{h7}	140_{h7}	100_{h7}	10	50.0^{H6}	168	80.0	12	38.0	32.0	6	0.025	6.6	–	M8	14
PH732	179_{h7}	140_{h7}	100_{h7}	10	50.0^{H6}	168	80.0	12	38.0	32.0	6	0.025	6.6	–	M8	14
PH831	247_{h7}	200_{h7}	160_{h7}	12	80.0^{H6}	233	125.0	15	50.0	42.0	8	0.030	9.0	M10	M10	18
PH832	247_{h7}	200_{h7}	160_{h7}	12	80.0^{H6}	233	125.0	15	50.0	42.0	8	0.030	9.0	M10	M10	18
PH942	300	255_{h7}	180_{h7}	18	90.0^{H6}	280	140.0	20	66.0	55.0	12	0.030	13.5	M8	M16	24
PH1042	330	285_{h7}	200_{h7}	20	95.0^{H6}	310	160.0	20	75.0	60.0	10	0.040	13.5	M10	M20	28

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
PH_MB23	129	59	102.9	58	64	46.5
PH_MB33	147	59	115.4	58	64	57.0
PH_MB43	176	59	134.9	58	64	75.5

Dimensions of motors

Type	□g	qp1	w1	x0	zp0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4	MB23_EZ5	MB33_EZ7	MB43_EZ8
	mp	mp	mp	mp
PH531	49.0	49.0	–	–
PH731	–	–	57.0	–
PH732	107.0	107.0	–	–
PH831	–	–	–	87.5
PH832	–	–	147.0	–
PH942	–	–	–	188.0
PH1042	–	–	–	195.0

3.4 Type designation

This chapter shows you an explanation of the type designation for sizes PH3 – PH8 with the associated options.

Additional ordering information not included in the type designation can be found at the end of the chapter.

Example code

PH	5	3	1	S	F	S	S	0100	MB23	EZ501U

Explanation

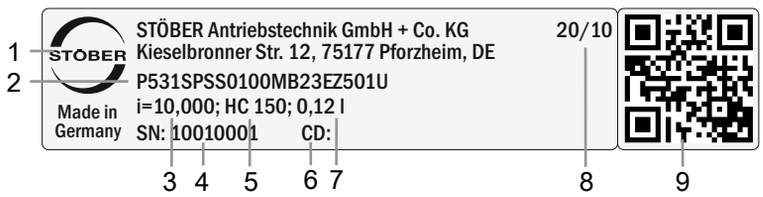
Code	Designation	Design
PH	Type	Planetary gear unit
5	Size	5 (example)
3	Generation	Generation 3
4		Generation 4
1	Stages	Single-stage
2		Two-stage
S	Housing	Standard
F	Shaft	Flange shaft
S	Bearing	Standard bearing
V		Reinforced bearing (PH3 – PH5)
S	Backlash	Standard
R		Reduced (PH3 – PH9)
0100	Transmission ratio (i x 10)	i = 10 (example)
MB	Motor adapter	ServoStop motor adapter with brake
2	Size	2 (example)
3	Generation	Generation 3
EZ501U	Motor	EZ synchronous servo motor

To complete the type designation, also specify the following in your order:

- A detailed type designation of the motor, see the chapter [▶ 11]
- Radial shaft seal rings at the output made of NBR or FKM (option), see the chapter [▶ 3.6.3]
- For reverse operation of the output shaft from ±20° to ±90° and horizontal installation, see the chapter [▶ 3.6.4]

3.4.1 Nameplate

An example geared motor nameplate is explained in the figure below.

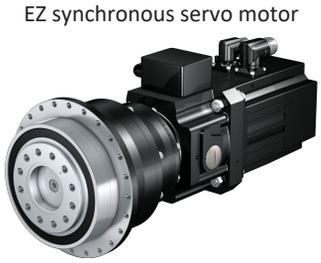


Code	Designation
1	Name of manufacturer
2	Type designation
3	Gear ratio of the gear unit
4	Serial number of the gear unit
5	Lubricant specification
6	Customer-specific data
7	Lubricant fill volume
8	Date of manufacture (year/calendar week)
9	QR code (link to product information)

3.5 Product description

3.5.1 Input options

MB motor adapter + EZ synchronous servo motor



Catalog ID 443311_en

EZ synchronous servo motor

Catalog ID 442437_en

The corresponding catalogs can be found at http://www.stoeber.de/en/downloads/

Enter the ID of the catalog in the Search term field.

3.5.2 ServoStop motor adapter with brake (MB)

In this chapter, you will find the description and technical data of the motor adapter with brake.

3.5.2.1 Properties

- Electrically actuated spring-loaded brake for dry running
- Featuring backlash-free plug-in coupling (jaw coupling) for easy removal of the motor with the axis braked in any position
- Electrical release monitoring in the terminal box of the motor adapter
- Manual monitoring of wear via air gap checks with a feeler gauge
- Manual release (optional)
- Radial shaft seal rings made of FKM with two sealing lips
- Four oil drain holes to protect the brake from oiling up in case of leakage
- Diverse-redundant system in accordance with EN ISO 13849-1

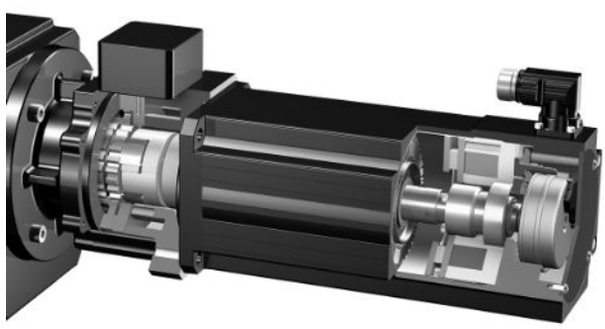


Fig. 1: Motor adapter with ServoStop brake and directly attached EZ synchronous servo motor

3.5.2.2 Brake

A quiescent current brake is integrated into the motor adapter. It has the function of a holding brake. Braking from full speed, e.g. in case of a voltage drop or an emergency off in hazard situations, is still possible.

The brake can be used as a single brake or together with the motor brake as a redundant brake system.

Function

The brakes installed in the motor adapter are electrically actuated spring-loaded brakes for dry running. In the de-energized state, braking takes place using spring force. The brake is released by an electromagnetic DC coil before the motor is switched on. The switch-on time t_{2B} (release time) is the time until the anchor plate releases from the axially moving brake disc and is magnetically held to the coil body. In this state, the brake is released and the coupling hub can rotate. In order to switch off (motor and brake), the residual magnetic flux of the iron parts (anchor and coil body) must be reduced; the associated time t_{11B} until the start of torque generation is defined as a response delay when linking. The link time t_{1B} is the time until the braking torque has built up to the nominal braking torque.

Manual release

Optionally, the brake can be equipped with a manual release.

Pressing the manual release deactivates the electronic actuation of the brake. Before pressing the manual release, you must establish the safety of the machine (e.g. protection against falling).

3.5.2.3 Electrical connection

- Terminal box (standard)
- Plug connector (optional, not possible in combination with release monitoring)

3.5.2.4 Monitoring

For monitoring the brake system, there are generally two options:

- Manual monitoring of wear via air gap checks with a feeler gauge
- Electrical release monitoring in the terminal box with a non-contact and wear-free proximity switch

3.5.2.5 Brake technical data

Technical data for operation at 24 V DC (±10%)

Type	M_{1Bstat} [Nm]	J_1 [kgcm²]	m [kg]	$\Delta\phi_B$ [arcmin]	$t_{1B,DC}$ [ms]	t_{2B} [ms]	$P_{N,B}$ [W]
MB23	8.0	6.3	8.5	32.0	65	55	30
MB23	12	6.3	8.5	32.0	55	80	30
MB33	16	26	14	26.0	150	60	37
MB33	24	26	14	26.0	120	85	37
MB33	32	26	14	26.0	95	100	37
MB33	45	26	14	26.0	80	120	37
MB43	50	69	26	19.0	150	100	55
MB43	72	69	26	19.0	120	150	55
MB43	100	69	26	19.0	90	200	55
MB53	200	236	61	17.0	200	250	86

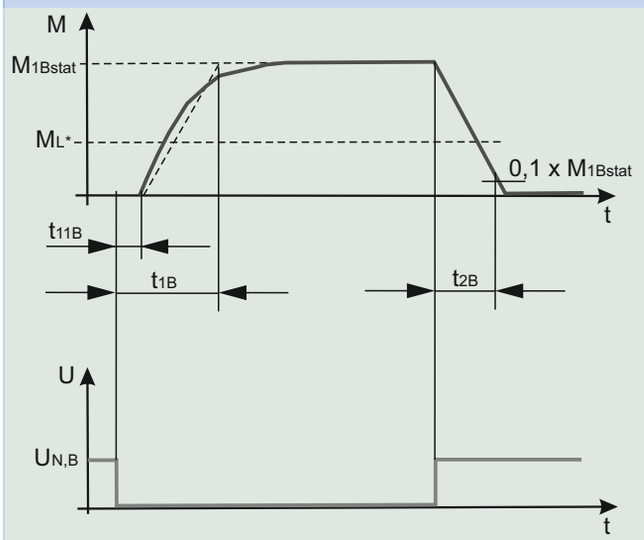
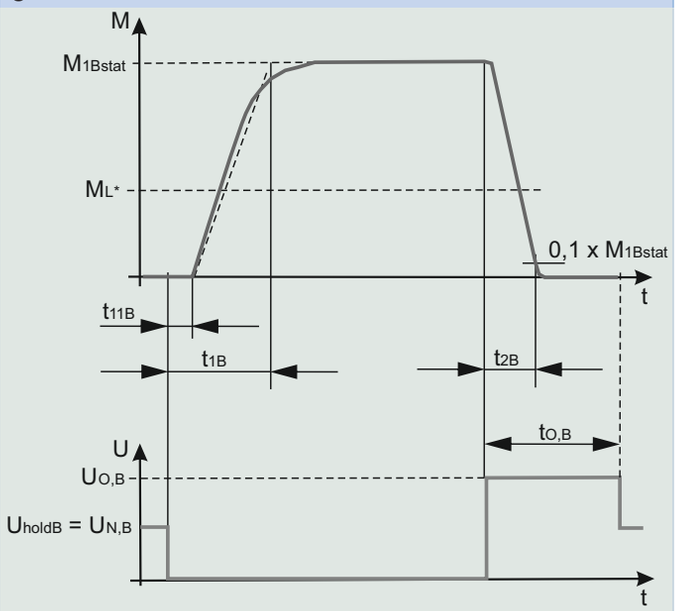
$\Delta\phi_B$: With the brake closed, a higher total backlash results ($\Delta\phi_{tot} = \Delta\phi_2 + \Delta\phi_B / i$).

Technical data for operation with high-speed rectifier 104 V DC (supply voltage U_{LINE} 220 – 275 V AC ± 5%, 50/60 Hz)

Type	M_{1Bstat} [Nm]	J_1 [kgcm²]	m [kg]	$\Delta\phi_B$ [arcmin]	$t_{1B,DC}$ [ms]	$t_{1B,AC}$ [ms]	t_{2B} [ms]	$P_{O,B}$ [W]	P_{holdB} [W]
MB23	8.0	6.3	8.5	32.0	65	360	20	101	26
MB23	12	6.3	8.5	32.0	55	280	25	101	26
MB23	16	6.3	8.5	32.0	50	230	35	101	26
MB23	24	6.3	8.5	32.0	45	180	50	101	26
MB23	30	6.3	8.5	32.0	40	160	60	101	26
MB33	16	26	14	26.0	150	800	25	125	32
MB33	24	26	14	26.0	120	650	35	125	32
MB33	32	26	14	26.0	95	500	40	125	32
MB33	45	26	14	26.0	80	400	50	125	32
MB33	90	26	14	26.0	50	250	90	125	32
MB43	50	69	26	19.0	150	900	50	148	38
MB43	72	69	26	19.0	120	700	75	148	38
MB43	100	69	26	19.0	90	500	100	148	38
MB43	160	69	26	19.0	60	300	150	148	38
MB53	200	236	61	17.0	200	800	110	200	50
MB53	300	236	61	17.0	170	600	150	200	50
MB53	400	236	61	17.0	120	400	200	200	50

$\Delta\phi_B$: With the brake closed, a higher total backlash results ($\Delta\phi_{tot} = \Delta\phi_2 + \Delta\phi_B / i$).

3.5.2.6 Brake switching times

Switching times in case of brake operation with nominal voltage	Switching times in case of brake operation with overexcitation voltage
	

3.5.3 Installation conditions

The torque and force values listed in this catalog are valid under the following conditions:

- When the flange shaft and gear housing are fastened on the machine side using screws of strength class 12.9
- When the gear housings are adjusted at pilot øb1. The machine-side fit must be H7.
- When the flange shaft is adjusted using the connecting element at pilot øbf or ødf

3.5.4 Lubricants

STOBER fills the gear units with the amount and type of lubricant specified on the nameplate.

You will receive lubricants for use in the food industry upon request.

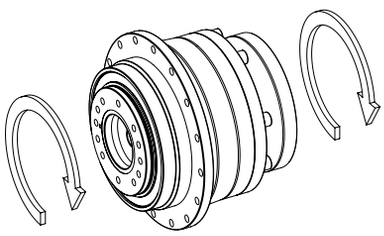
3.5.5 Other product features

Feature	Value
Max. permitted gear unit temperature (on the surface of the gear unit)	≤ 90 °C
Paint	Black RAL 9005
Explosion-proof design in accordance with (ATEX) Directive 2014/34/EU (optional)	Not available
Efficiency:	
η_{get} single-stage	96%
η_{get} two-stage	93%
Protection class:[1]	
Gear unit	IP65
Motor	IP56, optionally IP66

[1] Observe the protection class of all the components.

3.5.6 Direction of rotation

The input and output rotate in the same direction.



3.6 Project configuration

Project your drives using our SERVOsoft designing software. Download SERVOsoft for free at https://www.stoeber.de/en/ServoSoft.

It is the most convenient and reliable method of drive selection, as the entire torque/speed curve of the application is displayed and evaluated here in the curve of the geared motor.

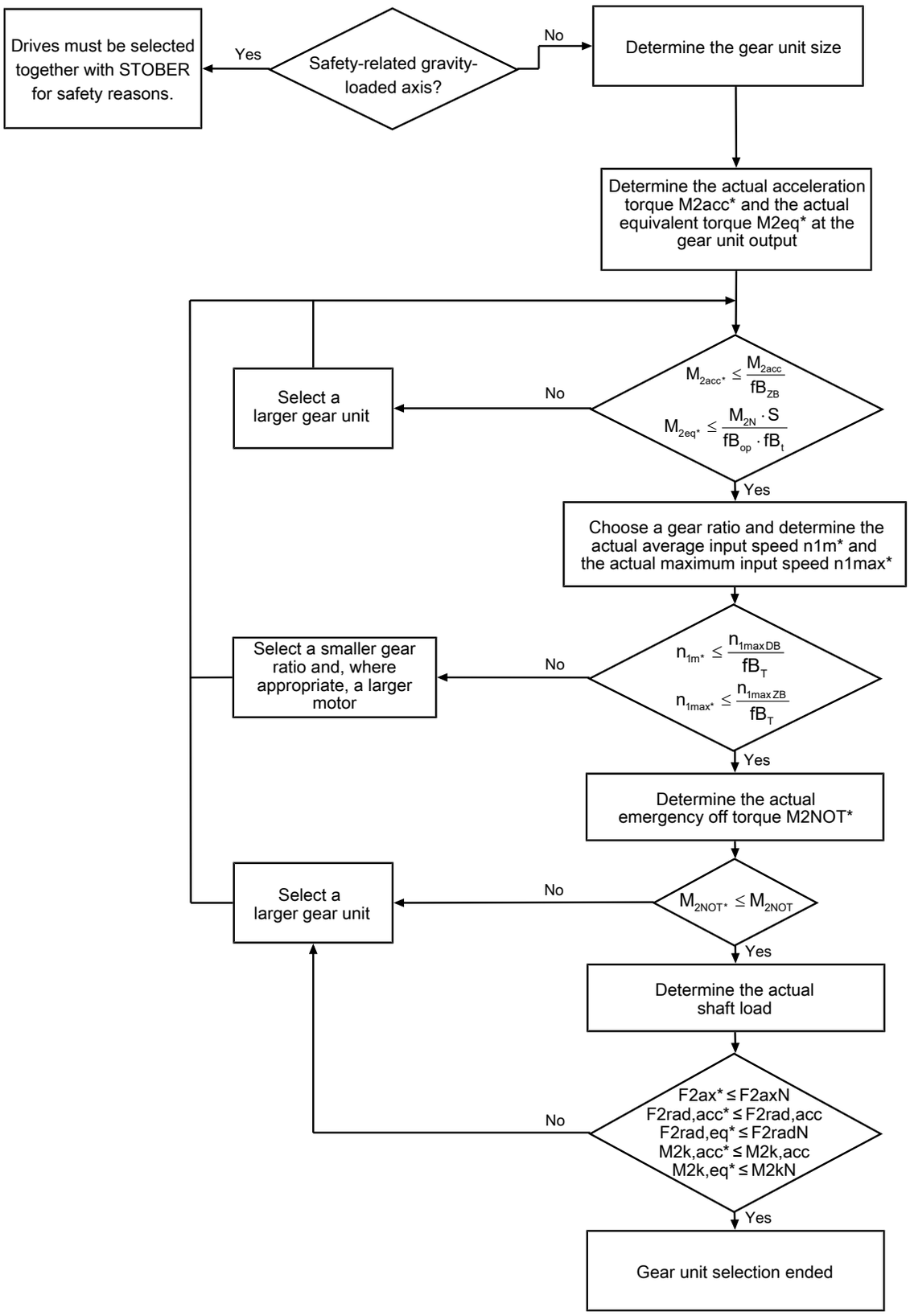
In this chapter, only limit values for specific operating points can be taken into consideration for manual drive selection.

An explanation of the formula symbols can be found in Chapter Symbols in formulas.

The formula symbols for values actually present in the application are marked with *.

3.6.1 Drive selection

Drive selection for gear units

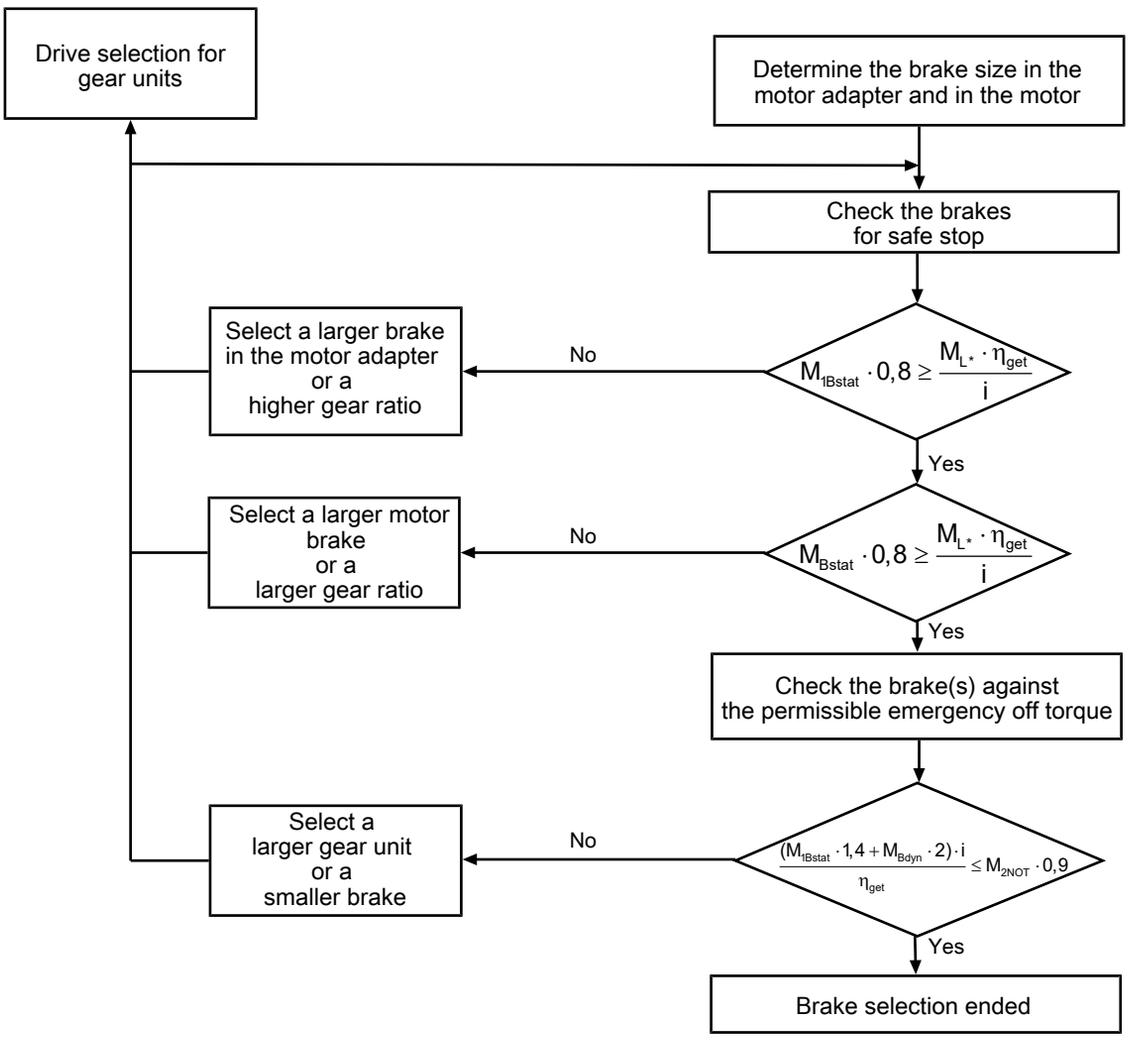


Calculate the forces and tilting torques in the chapter Permitted shaft loads.

Refer to the selection tables for the values for i, n_{1maxDB}, n_{1maxZB}, M_{2acc} (M_{2accHT} for reduced backlash), M_{2NOT}, M_{2N} and S.

The values for fB_T, fB_{op}, fB_t and fB_{ZB} can be found in the corresponding tables in this chapter.

Drive selection for brakes

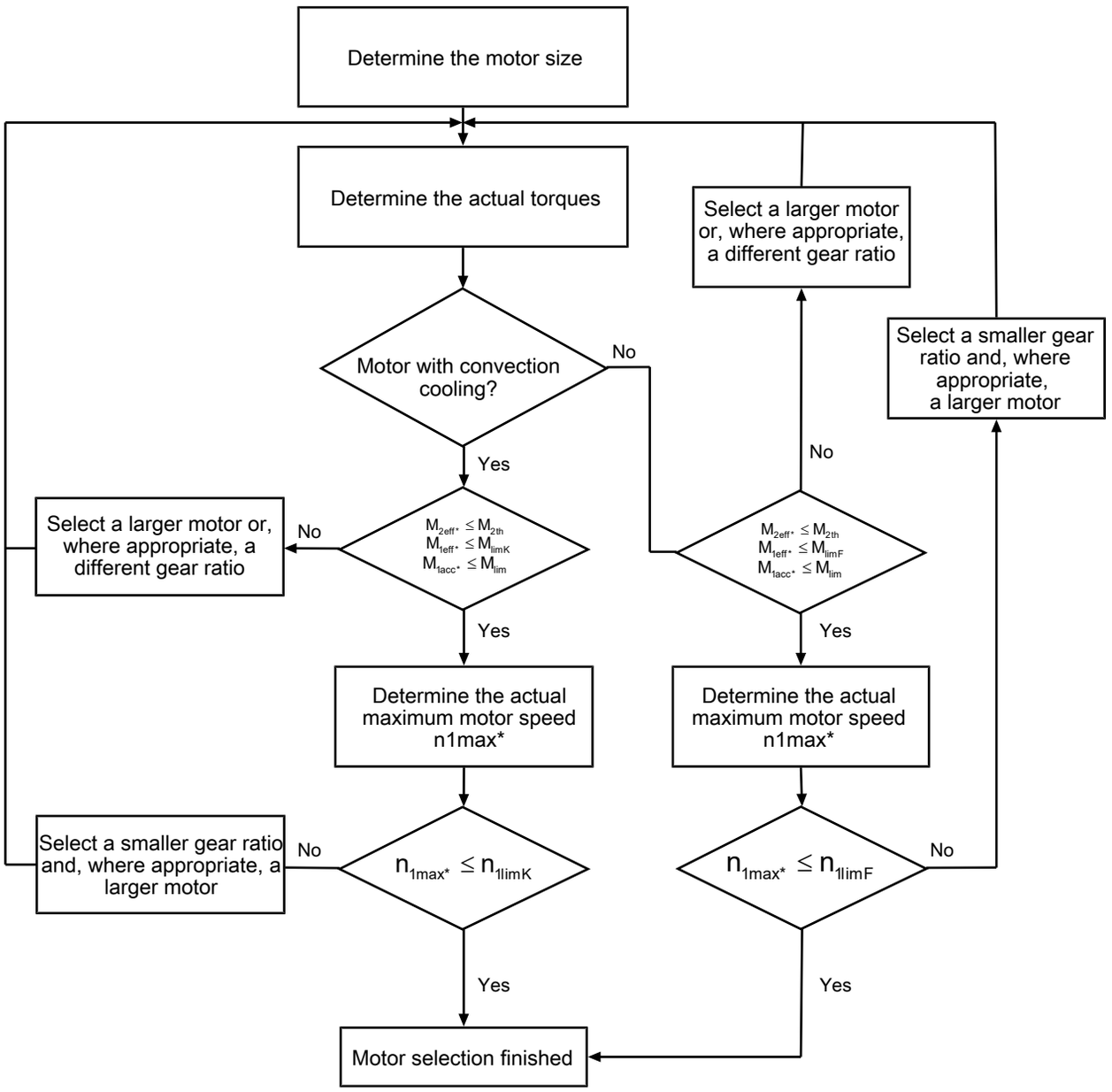


Refer to the selection tables for the values for i, M_{1Bstat}, M_{Bstat} and M_{2NOT}.

Refer to the Technical data table in the chapter [▷ 11.6.7] for the values for M_{Bdyn}.

Refer to the chapter Other product features for the values for η_{get}.

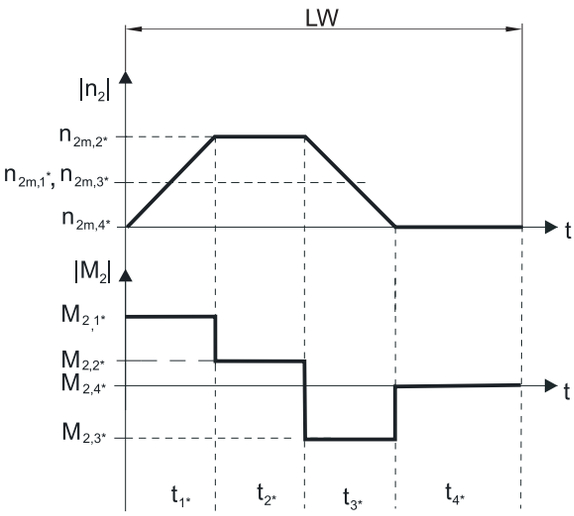
Drive selection for motors



The value for M_{lim}, M_{limK}, M_{limF}, n_{1limK} and n_{1limF} can be found in the motor characteristic curve in the chapter [▷ 11.3]. Note the size, nominal speed n_N and cooling type of the motor.

Example of cyclic operation

The following calculations are based on a representation of the power taken from the output based in accordance with the following example:



Calculation of the actual maximum acceleration torques

$$M_{2acc*} = J_{tot} \cdot \frac{\Delta n_2}{9{,}55 \cdot \Delta t} + M_{L*}$$

$$M_{1acc*} = \frac{M_{2acc*}}{i \cdot \eta_{get}} + J_1 \cdot \frac{\Delta n_1}{9{,}55 \cdot \Delta t}$$

Calculation of the actual average input speed

$$n_{1m*} = n_{2m*} \cdot i$$

$$n_{2m*} = \frac{\left|n_{2m,1*}\right| \cdot t_{1*} + \ldots + \left|n_{2m,n*}\right| \cdot t_{n*}}{t_{1*} + \ldots + t_{n*}}$$

If $t_{1*} + \ldots + t_{3*} \geq 6$ min, calculate n_{2m*} without the rest phase t_{4*}.

The values for the ratio i can be found in the selection tables.

Calculation of the actual effective torque

$$M_{2eff*} = \sqrt{\frac{t_{1*} \cdot M_{2,1*}{}^2 + \ldots + t_{n*} \cdot M_{2,n*}{}^2}{t_{1*} + \ldots + t_{n*}}}$$

Calculation of the actual emergency-off torque

$$M_{2NOT*} = J_{tot} \cdot \frac{\Delta n_2}{9.55 \cdot \Delta t} + M_{L*}$$

Calculation of the actual equivalent torque

$$M_{2eq*} = \sqrt[3]{\frac{\left|n_{2m,1*}\right| \cdot t_{1*} \cdot \left|M_{2,1*}{}^3\right| + \ldots + \left|n_{2m,n*}\right| \cdot t_{n*} \cdot \left|M_{2,n*}{}^3\right|}{\left|n_{2m,1*}\right| \cdot t_{1*} + \ldots + \left|n_{2m,n*}\right| \cdot t_{n*}}}$$

Calculation of the thermal limit torque

Calculate the thermal limit torque M_{2th} for a duty cycle $ED_{10} > 50\%$ and the actual average input speed n_{1m*}. (At $K_{mot,th} \leq 0$ you must reduce the average input speed n_{1m*} accordingly or select another geared motor size.)

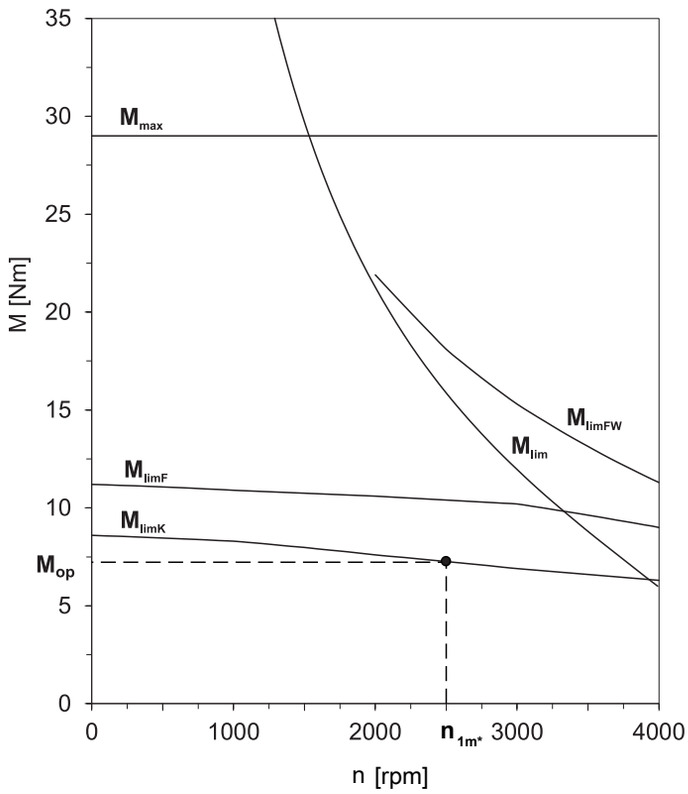
$$M_{2th} = M_{op} \cdot i \cdot K_{mot,th}$$

$$K_{mot,th} = 0{,}93 - \frac{a_{th}}{1000} \cdot fB_T \cdot \left(\frac{n_{1m*}}{1000}\right)^3$$

Refer to the selection tables for the values of i and a_{th}.

The values for fB_T can be found in the corresponding table in this chapter.

The value for the torque of the motor at operating point M_{op} with the determined average input speed n_{1m*} can be found in the motor characteristic curve in the chapter [▶ 11.3]. Note the size, nominal speed n_N and cooling type of the motor. The figure below shows an example of reading the torque M_{op} of a motor with convection cooling at the operating point.



Operating factors

Operating mode	fB_{op}
Uniform continuous operation	1.00
Cyclic operation	1.00
Reversing load cyclic operation	1.00

Run time	fB_t
Daily runtime ≤ 8 h	1.00
Daily runtime ≤ 16 h	1.15
Daily runtime ≤ 24 h	1.20

Cyclic operation	fB_{ZB}
≤ 1000 load changes/hour (LW/h)	1.00
> 1000 load changes/hour (LW/h)	1.15

Temperature		fB_T
Motor cooling	**Surrounding temperature**	
Motor with forced ventilation	≤ 20 °C	0.9
	≤ 30 °C	1.0
	≤ 40 °C	1.15
Motor with convection cooling	≤ 20 °C	1.0
	≤ 30 °C	1.1
	≤ 40 °C	1.25

Notes

- The maximum permitted gear unit temperature (see the "Other product features" chapter) must not be exceeded. Doing so may result in damage to the geared motor.
- For braking from full speed (for example when the power fails or when setting up the machine), note the permitted gear unit torques (M_{2acc}, M_{2NOT}) in the selection tables.

3.6.2 Permitted shaft loads for the output shaft

The values specified in the tables apply to the permitted shaft loads:

- For shaft dimensions in accordance with the catalog
- For output speeds $n_{2m*} \leq 100$ rpm ($F^{2axN} = F_{2ax100}$; $F_{2radN} = F_{2rad100}$; $M_{2kN} = M_{2k100}$)
- Only if radial forces on the gear unit are stabilized by its pilots (housing, flange shaft)

Permitted shaft loads for standard bearing S

Type	z_2 [mm]	F_{2ax100} [N]	$F_{2rad100}$ [N]	$F_{2rad,acc}$ [N]	M_{2k100} [Nm]	$M_{2k,acc}$ [Nm]	C_{2k} [Nm/ arcmin]
PH3	62.5	1650	1613	1613	101	101	75
PH4	83.0	2150	3095	3571	257	296	192
PH5	97.0	4150	4536	4897	440	475	429
PH7	86.0	6150	17045	17045	1466	1466	500
PH8	125.5	10050	27778	27778	3486	3486	1550
PH9	155.0	33000	48387	70968	7500	11000	7500
PH10	171.0	50000	51462	73099	8800	12500	9500

Permitted shaft loads for reinforced bearing V

Type	z_2 [mm]	F_{2ax100} [N]	$F_{2rad100}$ [N]	$F_{2rad,acc}$ [N]	M_{2k100} [Nm]	$M_{2k,acc}$ [Nm]	C_{2k} [Nm/ arcmin]
PH3	66.5	2200	2250	2250	150	150	80
PH4	88.5	2900	4000	4000	354	354	217
PH5	104.0	5000	5500	5500	572	572	478

For other output speeds, download diagrams at https://configurator.stoeber.de/en-US/.

The following applies to output speeds $n_{2m*} > 100$ rpm:

$$F_{2axN} = \frac{F_{2ax100}}{\sqrt[3]{\frac{n_{2m*}}{100\ \text{rpm}}}} \qquad F_{2radN} = \frac{F_{2rad100}}{\sqrt[3]{\frac{n_{2m*}}{100\ \text{rpm}}}} \qquad M_{2kN} = \frac{M_{2k100}}{\sqrt[3]{\frac{n_{2m*}}{100\ \text{rpm}}}}$$

The values for F_{2ax100}, $F_{2rad100}$ and M_{2k100} can be found in the table "Permitted shaft loads" in this chapter.

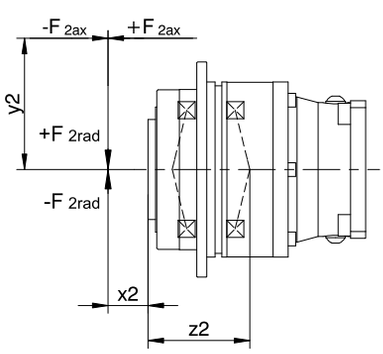


Fig. 2: Force application points

You can determine the permitted radial forces from the permitted tilting torque M_{2kN} and $M_{2k,acc}$. The actual radial forces may not exceed the permitted radial forces. The permitted radial forces pertain to the shaft end (x2 = 0).

$$M_{2k,acc*} = \frac{2 \cdot F_{2ax*} \cdot y_2 + F_{2rad,acc*} \cdot (x_2 + z_2)}{1000}$$

For applications with multiple axial and/or radial forces, you must add the forces as vectors.

In the event of EMERGENCY OFF operation (max. 1000 load changes), you can multiply the permitted forces and torques for F_{2ax100}, $F_{2rad100}$ and M_{2k100} by a factor of two.

Also note the calculation for equivalent values:

$$M_{2k,eq^*} = \sqrt[3]{\frac{\left|n_{2m,1^*}\right| \cdot t_{1^*} \cdot \left|M_{2k,acc,1^*}{}^3\right| + \ldots + \left|n_{2m,n^*}\right| \cdot t_{n^*} \cdot \left|M_{2k,acc,n^*}{}^3\right|}{\left|n_{2m,1^*}\right| \cdot t_{1^*} + \ldots + \left|n_{2m,n^*}\right| \cdot t_{n^*}}}$$

$$F_{2rad,eq^*} = \sqrt[3]{\frac{\left|n_{2m,1^*}\right| \cdot t_{1^*} \cdot \left|F_{2rad,acc,1^*}{}^3\right| + \ldots + \left|n_{2m,n^*}\right| \cdot t_{n^*} \cdot \left|F_{2rad,acc,n^*}{}^3\right|}{\left|n_{2m,1^*}\right| \cdot t_{1^*} + \ldots + \left|n_{2m,n^*}\right| \cdot t_{n^*}}}$$

The following apply to the bearing service life L_{10h} ($ED_{10} \leq 40\%$):

$L_{10h} > 10000$ h with $1 < M_{2kN}/M_{2k^*} < 1.25$

$L_{10h} > 20000$ h with $1.25 < M_{2kN}/M_{2k^*} < 1.5$

$L_{10h} > 30000$ h with $1.5 < M_{2kN}/M_{2k^*}$

For different duty cycles:

$$L_{10h} > L_{10h(ED_{10}=40\%)} \cdot \frac{40\%}{ED_{10}}$$

3.6.3 Recommendation for radial shaft seal rings

For a duty cycle > 60% and higher surrounding temperatures, we recommend radial shaft seal rings made of FKM at the output.

Properties:

- Excellent temperature resistance
- High chemical stability
- Very good resistance to aging
- Excellent resistance in oils and greases
- For use in the food, beverage and pharmaceutical industries

Leak-proofness

Our gear units are equipped with high-quality radial shaft seal rings and checked for leaks. However, a leak cannot be fully ruled out over the length of use of a gear unit. If you use a gear unit with goods incompatible with the lubricant, you must take measures to prevent direct contact with the gear unit lubricant in case of a leak.

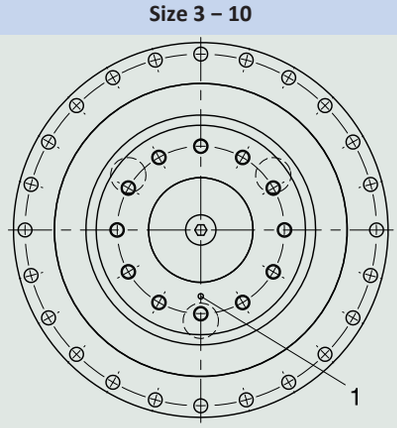
3.6.4 Reverse operation

To ensure lubrication for circulating gearing parts during cyclic reverse operation from ± 20° to ± 90° at the output, pay careful attention to the position of the output shaft for the horizontal mounting of the gear unit, as shown in the diagrams below.

The images show the center position of reverse operation.

Cyclic reverse operation ≤ ± 20° on request.

Size 3 – 10



1 Position of the mark: bottom

Please note that the hole pattern may be different, depending on the size of the planetary gear unit.

3.7 Additional documentation

Additional documentation related to the product can be found at
http://www.stoeber.de/en/downloads/

Enter the ID of the documentation in the Search term field.

Documentation	ID
Operating manual gear units, geared motors PH33 – PH83, PH94 – PH104	443354_de

4 PHQ planetary geared motors

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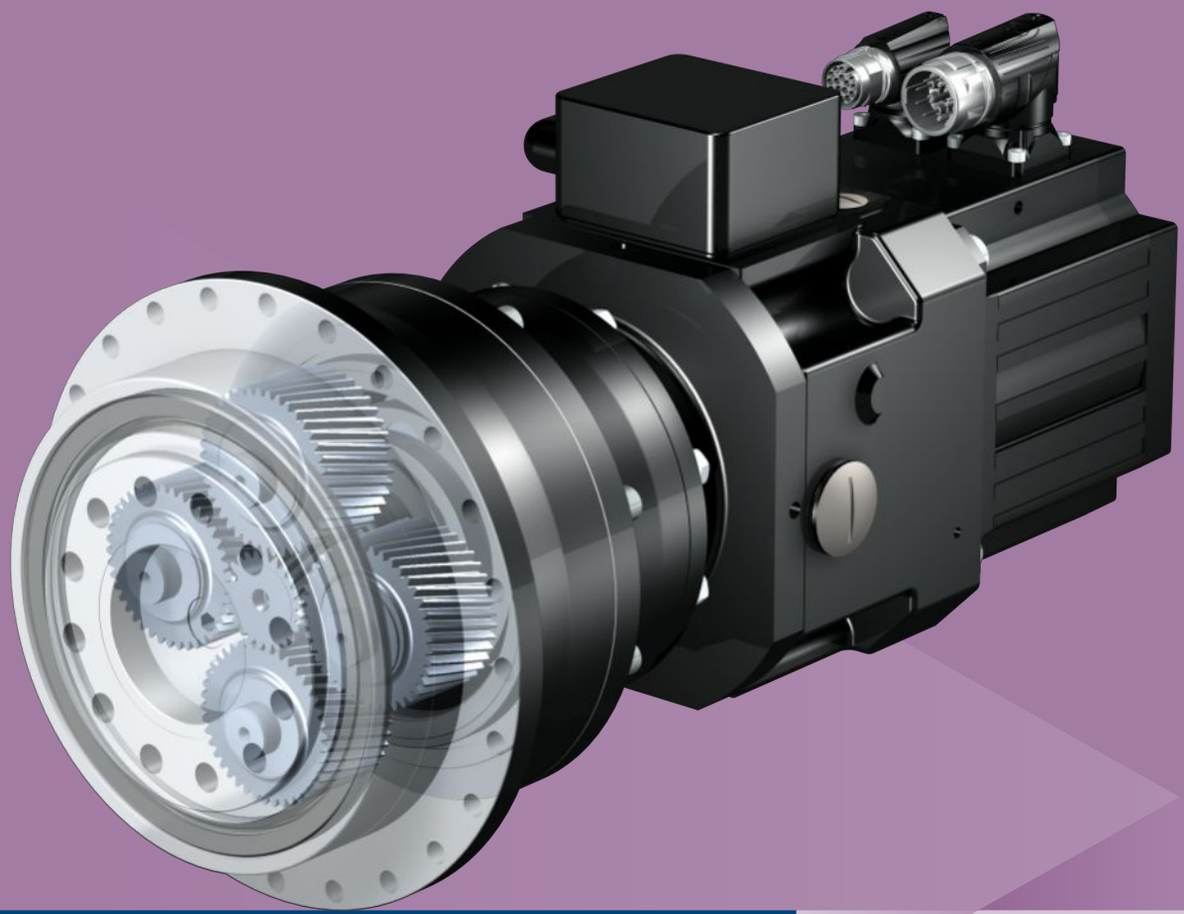


4 Planetary geared motors PHQ

4.1 Overview

Quattro power for maximum power density with redundant brake

Features

Power density	★★★★★
Backlash	★★★★★
Price category	€€€€
Shaft load	★★★★★
Smooth operation	★★★★☆
Torsional stiffness	★★★★★
Mass moment of inertia	★★★★☆
Helical gearing	✓
Any mounting position (single/two stage)	✓
High power density	✓
Continuous operation without cooling	✓
Stiff output bearings due to pretension	✓
Reinforced output bearing (PHQ4 – PHQ5)	✓ (optional)
Safe braking in case of power outage	✓
Safe support of the load with gravity-loaded axes using 2 brakes	✓
Easily and safely connected to the synchronous servo motor thanks to backlash-free plug-in coupling	✓

Key ★☆☆☆☆ good | ★★★★★ excellent
€ Economy | €€€€€ Premium

Technical data

M_{1Bstat}	8 – 100 Nm
i	5.5 – 168
M_{2acc}	153 – 19575 Nm
$\Delta\phi_2$	1 – 3 arcmin
η_{get}	90 – 96 %

4.2 Selection tables

The technical data specified in the selection tables applies to:

- Installation altitudes up to 1000 m above sea level
- Surrounding temperatures from 0 °C to 40 °C
- Drives with convection-cooled motors (e.g. EZ401**U**)
- Without consideration of the thermal limiting performance

For the technical data on drives with forced ventilated motors (e.g. EZ401**B**), refer to https://configurator.stoeber.de/en-US/

The maximum permitted input speed n_{1maxZB} is reduced for the design with a reinforced bearing and gear ratios ≤ 5. You can find values at https://configurator.stoeber.de/en-US/

An explanation of the formula symbols can be found in the chapter [▶ 15.1].

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PHQ5 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 200 Nm)																	
545	51	59	5.8	3.9	PHQ531_0055 MB23 EZ503U	198	198	333	5.500	11/2	8.0	15	2500	4000	16	107	23
545	51	59	5.8	3.9	PHQ531_0055 MB23 EZ503U	198	198	333	5.500	11/2	12	15	2500	4000	16	107	23
545	71	84	8.0	2.8	PHQ531_0055 MB23 EZ505U	198	198	333	5.500	11/2	8.0	15	2500	4000	21	107	26
545	71	84	8.0	2.8	PHQ531_0055 MB23 EZ505U	198	198	333	5.500	11/2	12	15	2500	4000	21	107	26
PHQ7 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1050 Nm)																	
78	154	168	0.8	4.4	PHQ732_0390 MB23 EZ501U	573	573	2100	38.50	77/2	8.0	8.0	3700	4000	10	221	28
78	154	168	0.8	4.4	PHQ732_0390 MB23 EZ501U	573	573	2100	38.50	77/2	12	8.0	3700	4000	10	221	28
78	168	186	0.9	4.0	PHQ732_0390 MB23 EZ402U	573	573	2100	38.50	77/2	8.0	8.0	3700	4000	8.8	221	28
78	168	186	0.9	4.0	PHQ732_0390 MB23 EZ402U	573	573	2100	38.50	77/2	12	8.0	3700	4000	8.8	221	28
78	247	308	1.3	2.8	PHQ732_0390 MB23 EZ404U	1038	1038	2100	38.50	77/2	8.0	8.0	3700	4000	10	221	30
78	247	308	1.3	2.8	PHQ732_0390 MB23 EZ404U	1038	1038	2100	38.50	77/2	12	8.0	3700	4000	10	221	30
78	265	286	1.4	2.6	PHQ732_0390 MB23 EZ502U	1050	1050	2100	38.50	77/2	8.0	8.0	3700	4000	12	221	29
78	265	286	1.4	2.6	PHQ732_0390 MB23 EZ502U	1050	1050	2100	38.50	77/2	12	8.0	3700	4000	12	221	29
109	176	220	1.6	3.7	PHQ732_0280 MB23 EZ404U	742	742	1611	27.50	55/2	8.0	8.0	3500	4000	10	224	30
109	176	220	1.6	3.7	PHQ732_0280 MB23 EZ404U	742	742	1611	27.50	55/2	12	8.0	3500	4000	10	224	30
109	176	220	1.6	3.7	PHQ732_0280 MB23 EZ404U	742	742	1611	27.50	55/2	16	8.0	3500	4000	10	224	30
109	189	205	1.7	3.4	PHQ732_0280 MB23 EZ502U	793	793	1611	27.50	55/2	8.0	8.0	3500	4000	13	224	29
109	189	205	1.7	3.4	PHQ732_0280 MB23 EZ502U	793	793	1611	27.50	55/2	12	8.0	3500	4000	13	224	29
109	189	205	1.7	3.4	PHQ732_0280 MB23 EZ502U	793	793	1611	27.50	55/2	16	8.0	3500	4000	13	224	29
109	248	284	2.2	2.6	PHQ732_0280 MB23 EZ503U	959	959	1611	27.50	55/2	8.0	15	3500	4000	16	224	31
109	248	284	2.2	2.6	PHQ732_0280 MB23 EZ503U	959	959	1611	27.50	55/2	12	15	3500	4000	16	224	31
109	345	409	3.1	1.9	PHQ732_0280 MB23 EZ505U	959	959	1611	27.50	55/2	8.0	15	3500	4000	21	224	34
109	345	409	3.1	1.9	PHQ732_0280 MB23 EZ505U	959	959	1611	27.50	55/2	12	15	3500	4000	21	224	34
136	141	176	1.8	4.6	PHQ732_0220 MB23 EZ404U	593	593	1289	22.00	22/1	8.0	8.0	3000	4000	11	226	30
136	141	176	1.8	4.6	PHQ732_0220 MB23 EZ404U	593	593	1289	22.00	22/1	12	8.0	3000	4000	11	226	30
136	141	176	1.8	4.6	PHQ732_0220 MB23 EZ404U	593	593	1289	22.00	22/1	16	8.0	3000	4000	11	226	30
136	151	164	1.9	4.3	PHQ732_0220 MB23 EZ502U	634	634	1289	22.00	22/1	8.0	8.0	3000	4000	13	226	29
136	151	164	1.9	4.3	PHQ732_0220 MB23 EZ502U	634	634	1289	22.00	22/1	12	8.0	3000	4000	13	226	29
136	151	164	1.9	4.3	PHQ732_0220 MB23 EZ502U	634	634	1289	22.00	22/1	16	8.0	3000	4000	13	226	29
136	198	227	2.5	3.3	PHQ732_0220 MB23 EZ503U	767	767	1289	22.00	22/1	8.0	15	3000	4000	17	226	31
136	198	227	2.5	3.3	PHQ732_0220 MB23 EZ503U	767	767	1289	22.00	22/1	12	15	3000	4000	17	226	31
136	276	327	3.5	2.4	PHQ732_0220 MB23 EZ505U	767	767	1289	22.00	22/1	8.0	15	3000	4000	21	226	34
136	276	327	3.5	2.4	PHQ732_0220 MB23 EZ505U	767	767	1289	22.00	22/1	12	15	3000	4000	21	226	34
545	112	159	6.3	4.2	PHQ731_0055 MB33 EZ705U	528	528	998	5.500	11/2	16	32	2200	4000	68	235	45
545	112	159	6.3	4.2	PHQ731_0055 MB33 EZ705U	528	528	998	5.500	11/2	24	32	2200	4000	68	235	45
545	112	159	6.3	4.2	PHQ731_0055 MB33 EZ705U	528	528	998	5.500	11/2	32	32	2200	4000	68	235	45
545	112	159	6.3	4.2	PHQ731_0055 MB33 EZ705U	528	528	998	5.500	11/2	45	32	2200	4000	68	235	45
PHQ8 (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 1080 Nm)																	
364	231	349	6.3	4.6	PHQ831_0055 MB43 EZ805U	1082	1082	1774	5.500	11/2	50	115	1500	3000	271	699	106
PHQ8 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 2560 Nm)																	
34	341	372	0.2	5.0	PHQ833_0880 MB23 EZ501U	1267	1267	4964	88.00	88/1	8.0	8.0	3000	4000	11	712	50
34	372	412	0.2	4.6	PHQ833_0880 MB23 EZ402U	1267	1267	4964	88.00	88/1	8.0	8.0	3000	4000	9.6	712	49
34	546	681	0.4	3.1	PHQ833_0880 MB23 EZ404U	2297	2297	4964	88.00	88/1	8.0	8.0	3000	4000	11	712	51
34	586	634	0.4	2.9	PHQ833_0880 MB23 EZ502U	2455	2455	4964	88.00	88/1	8.0	8.0	3000	4000	13	712	51
55	379	425	0.5	4.5	PHQ832_0550 MB33 EZ701U	1023	1023	4964	55.00	55/1	16	15	3000	4000	36	670	59
55	614	737	0.8	2.8	PHQ832_0550 MB33 EZ702U	2097	2097	4964	55.00	55/1	16	15	3000	4000	42	670	61
78	430	516	1.0	4.0	PHQ832_0390 MB33 EZ702U	1468	1468	4964	38.50	77/2	16	15	3000	4000	42	701	61
78	430	516	1.0	4.0	PHQ832_0390 MB33 EZ702U	1468	1468	4964	38.50	77/2	24	15	3000	4000	42	701	61
78	430	516	1.0	4.0	PHQ832_0390 MB33 EZ702U	1468	1468	4964	38.50	77/2	32	15	3000	4000	42	701	61

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PHQ8 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 2560 Nm)																	
109	422	532	1.6	4.0	PHQ832_0280 MB33 EZ703U	1662	1662	4834	27.50	55/2	16	32	2700	4000	55	715	64
109	422	532	1.6	4.0	PHQ832_0280 MB33 EZ703U	1662	1662	4834	27.50	55/2	24	32	2700	4000	55	715	64
109	545	772	2.0	3.1	PHQ832_0280 MB33 EZ705U	2558	2558	4834	27.50	55/2	16	32	2700	4000	68	715	69
109	545	772	2.0	3.1	PHQ832_0280 MB33 EZ705U	2558	2558	4834	27.50	55/2	24	32	2700	4000	68	715	69
136	436	618	2.3	3.9	PHQ832_0220 MB33 EZ705U	2046	2046	3867	22.00	22/1	16	32	2500	4000	69	720	69
136	436	618	2.3	3.9	PHQ832_0220 MB33 EZ705U	2046	2046	3867	22.00	22/1	24	32	2500	4000	69	720	69
136	436	618	2.3	3.9	PHQ832_0220 MB33 EZ705U	2046	2046	3867	22.00	22/1	32	32	2500	4000	69	720	69
136	436	618	2.3	3.9	PHQ832_0220 MB33 EZ705U	2046	2046	3867	22.00	22/1	45	32	2500	4000	69	720	69
PHQ9 (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 6600 Nm)																	
48	1707	2582	1.4	2.6	PHQ942_0420 MB43 EZ805U	6600	6600	13124	42.00	42/1	50	115	2800	3000	264	1195	154
67	1219	1844	1.7	3.4	PHQ942_0300 MB43 EZ805U	5720	5720	9374	30.00	30/1	50	115	2500	3000	269	1214	154
83	975	1475	2.1	3.9	PHQ942_0240 MB43 EZ805U	4576	4576	7500	24.00	24/1	50	115	2000	3000	277	1225	154
111	732	1107	2.8	4.6	PHQ942_0180 MB43 EZ805U	3432	3432	5625	18.00	18/1	50	115	1800	3000	302	1237	154
PHQ9 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 6600 Nm)																	
18	1119	1255	0.1	3.4	PHQ943_1680 MB33 EZ701U	3024	3024	13200	168.0	168/1	16	15	3000	4000	37	1204	106
18	1814	2177	0.2	2.1	PHQ943_1680 MB33 EZ702U	6199	6199	13200	168.0	168/1	16	15	3000	4000	42	1204	108
20	999	1121	0.1	4.2	PHQ943_1500 MB33 EZ701U	2700	2700	13200	150.0	150/1	16	15	2700	4000	38	1202	106
20	999	1121	0.1	4.2	PHQ943_1500 MB33 EZ701U	2700	2700	13200	150.0	150/1	24	15	2700	4000	38	1202	106
20	1620	1944	0.2	2.6	PHQ943_1500 MB33 EZ702U	5535	5535	13200	150.0	150/1	16	15	2700	4000	43	1202	108
20	1620	1944	0.2	2.6	PHQ943_1500 MB33 EZ702U	5535	5535	13200	150.0	150/1	24	15	2700	4000	43	1202	108
25	1296	1555	0.2	3.2	PHQ943_1200 MB33 EZ702U	4428	4428	13200	120.0	120/1	16	15	2500	4000	45	1203	108
25	1296	1555	0.2	3.2	PHQ943_1200 MB33 EZ702U	4428	4428	13200	120.0	120/1	24	15	2500	4000	45	1203	108
25	1296	1555	0.2	3.2	PHQ943_1200 MB33 EZ702U	4428	4428	13200	120.0	120/1	32	15	2500	4000	45	1203	108
31	1037	1244	0.3	3.7	PHQ943_0960 MB33 EZ702U	3542	3542	13200	96.00	96/1	16	15	2500	4000	46	1207	108
31	1037	1244	0.3	3.7	PHQ943_0960 MB33 EZ702U	3542	3542	13200	96.00	96/1	24	15	2500	4000	46	1207	108
31	1037	1244	0.3	3.7	PHQ943_0960 MB33 EZ702U	3542	3542	13200	96.00	96/1	32	15	2500	4000	46	1207	108
31	1037	1244	0.3	3.7	PHQ943_0960 MB33 EZ702U	3542	3542	13200	96.00	96/1	45	15	2500	4000	46	1207	108
31	1426	1797	0.4	2.7	PHQ943_0960 MB33 EZ703U	5616	5616	13200	96.00	96/1	16	32	2500	4000	57	1207	111
31	1426	1797	0.4	2.7	PHQ943_0960 MB33 EZ703U	5616	5616	13200	96.00	96/1	24	32	2500	4000	57	1207	111
31	1840	2609	0.5	2.1	PHQ943_0960 MB33 EZ705U	6600	6600	13200	96.00	96/1	16	32	2500	4000	70	1207	117
31	1840	2609	0.5	2.1	PHQ943_0960 MB33 EZ705U	6600	6600	13200	96.00	96/1	24	32	2500	4000	70	1207	117
42	778	933	0.3	4.9	PHQ943_0720 MB33 EZ702U	2657	2657	12247	72.00	72/1	16	15	2200	4000	47	1205	108
42	778	933	0.3	4.9	PHQ943_0720 MB33 EZ702U	2657	2657	12247	72.00	72/1	24	15	2200	4000	47	1205	108
42	778	933	0.3	4.9	PHQ943_0720 MB33 EZ702U	2657	2657	12247	72.00	72/1	32	15	2200	4000	47	1205	108
42	778	933	0.3	4.9	PHQ943_0720 MB33 EZ702U	2657	2657	12247	72.00	72/1	45	15	2200	4000	47	1205	108
42	1069	1348	0.5	3.6	PHQ943_0720 MB33 EZ703U	4212	4212	12247	72.00	72/1	16	32	2200	4000	59	1205	111
42	1069	1348	0.5	3.6	PHQ943_0720 MB33 EZ703U	4212	4212	12247	72.00	72/1	24	32	2200	4000	59	1205	111
42	1069	1348	0.5	3.6	PHQ943_0720 MB33 EZ703U	4212	4212	12247	72.00	72/1	32	32	2200	4000	59	1205	111
42	1069	1348	0.5	3.6	PHQ943_0720 MB33 EZ703U	4212	4212	12247	72.00	72/1	45	32	2200	4000	59	1205	111
42	1380	1957	0.6	2.8	PHQ943_0720 MB33 EZ705U	6480	6480	12247	72.00	72/1	16	32	2200	4000	71	1205	117
42	1380	1957	0.6	2.8	PHQ943_0720 MB33 EZ705U	6480	6480	12247	72.00	72/1	24	32	2200	4000	71	1205	117
42	1380	1957	0.6	2.8	PHQ943_0720 MB33 EZ705U	6480	6480	12247	72.00	72/1	32	32	2200	4000	71	1205	117
42	1380	1957	0.6	2.8	PHQ943_0720 MB33 EZ705U	6480	6480	12247	72.00	72/1	45	32	2200	4000	71	1205	117
50	1484	2690	0.9	2.4	PHQ942_0600 MB43 EZ803U	6600	6600	13200	60.00	60/1	50	65	2800	3000	172	1149	138
71	1039	1883	0.8	4.3	PHQ942_0420 MB43 EZ803U	5664	5664	13124	42.00	42/1	50	65	2800	3000	175	1195	138
71	1039	1883	0.8	4.3	PHQ942_0420 MB43 EZ803U	5664	5664	13124	42.00	42/1	72	65	2800	3000	175	1195	138
71	1039	1883	0.8	4.3	PHQ942_0420 MB43 EZ803U	5664	5664	13124	42.00	42/1	100	65	2800	3000	175	1195	138
PHQ11 (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 17710 Nm)																	
21	3776	5711	0.3	3.4	PHQ1143_0960 MB43 EZ805U	17712	–	29030	96.00	96/1	50	115	2000	3000	283	3533	311
PHQ11 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 19580 Nm)																	
20	3591	6507	0.2	3.6	PHQ1143_1500 MB43 EZ803U	19575	–	40000	150.0	150/1	50	65	2500	3000	183	3511	294
25	2873	5206	0.2	4.5	PHQ1143_1200 MB43 EZ803U	15660	–	36288	120.0	120/1	50	65	2000	3000	192	3514	294
25	2873	5206	0.2	4.5	PHQ1143_1200 MB43 EZ803U	15660	–	36288	120.0	120/1	72	65	2000	3000	192	3514	294

4.3 Dimensional drawings

In this chapter, you can find the dimensions of the geared motors with redundant brake.

There is a dimensional drawing for every possible shaft/housing design, each with the tables for gear unit dimensions, motor adapter dimensions, motor dimensions and geared motor dimensions.

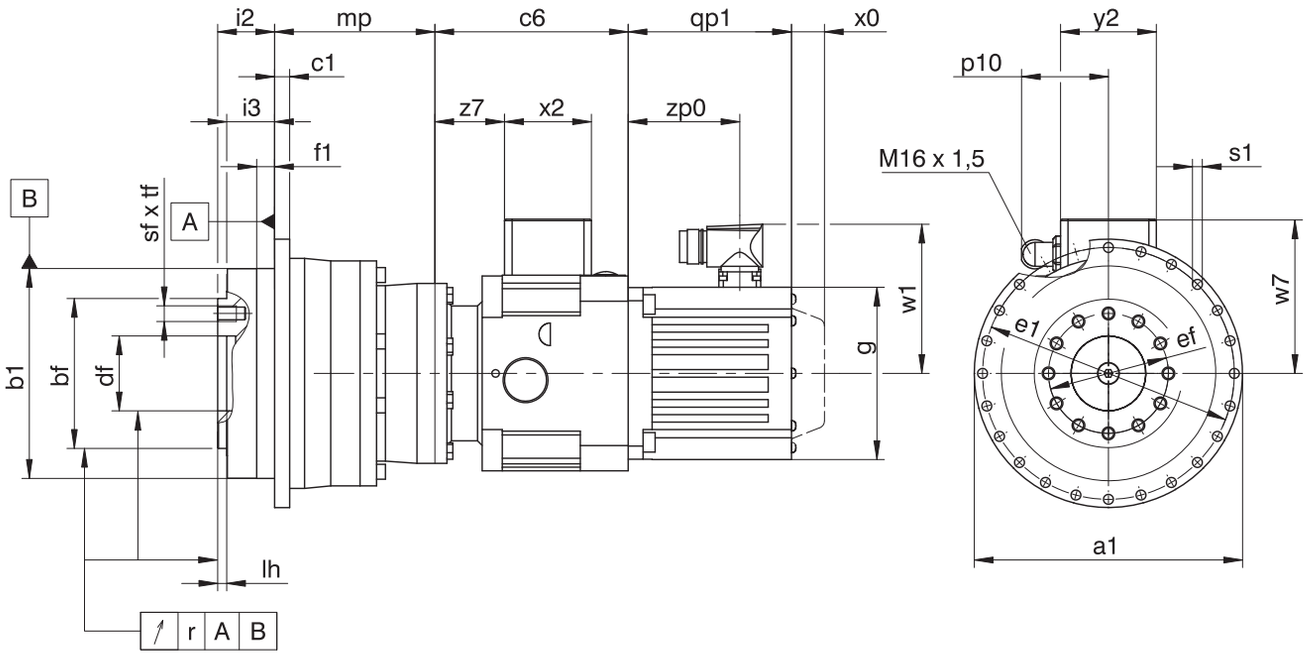
Dimensions can exceed the specifications of ISO 2768-mK due to casting tolerances or accumulation of individual tolerances.

We reserve the right to make dimensional changes due to ongoing technical development.

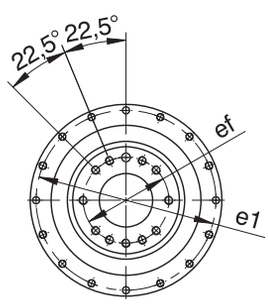
You can download 3D models of our standard drives at https://configurator.stoeber.de/en-US/.

Combination options and the dimensions of forced ventilated geared motors can also be found at https://configurator.stoeber.de/en-US/.

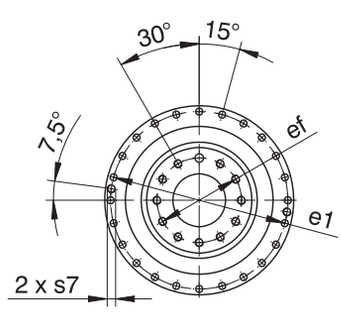
4.3.1 PHQ5 – PHQ9 F shaft design (flange shaft)



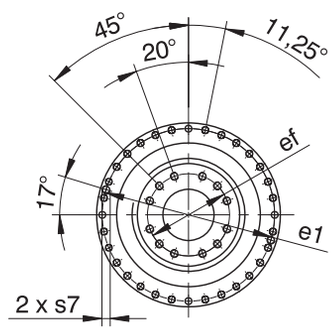
PHQ5



PHQ7/PHQ8



PHQ9



qp1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]		

Dimensions of gear units

Type	Øa1	Øb1	Øbf	c1	Ødf	Øe1	Øef	f1	i2	i3	lh	r	Øs1	s7	sf	tf
PHQ531	145_{h7}	110_{h7}	80_{h7}	8	40^{H6}	135	63	12	29	23	6	0.020	5.5	–	M8	12
PHQ731	179_{h7}	140_{h7}	100_{h7}	10	50^{H6}	168	80	12	38	32	6	0.025	6.6	–	M10	16
PHQ732	179_{h7}	140_{h7}	100_{h7}	10	50^{H6}	168	80	12	38	32	6	0.025	6.6	–	M10	16
PHQ831	247_{h7}	200_{h7}	160_{h7}	12	80^{H6}	233	125	15	50	42	8	0.030	9.0	M10	M12	17
PHQ832	247_{h7}	200_{h7}	160_{h7}	12	80^{H6}	233	125	15	50	42	8	0.030	9.0	M10	M12	17
PHQ833	247_{h7}	200_{h7}	160_{h7}	12	80^{H6}	233	125	15	50	42	8	0.030	9.0	M10	M12	17
PHQ942	300_{h7}	255_{h7}	180_{h7}	18	90^{H6}	280	145	20	66	55	12	0.030	13.5	M8	M20	28
PHQ943	300_{h7}	255_{h7}	180_{h7}	18	90^{H6}	280	145	20	66	55	12	0.030	13.5	M8	M20	28

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
PHQ531_MB23	129	59	102.9	58	64	46.5
PHQ731_MB33	147	59	115.4	58	64	57.0
PHQ732_MB23	129	59	102.9	58	64	46.5
PHQ831_MB43	176	59	134.9	58	64	75.5
PHQ832_MB33	147	59	115.4	58	64	57.0
PHQ833_MB23	129	59	102.9	58	64	46.5
PHQ942_MB43	176	59	134.9	58	64	75.5
PHQ943_MB33	147	59	115.4	58	64	57.0

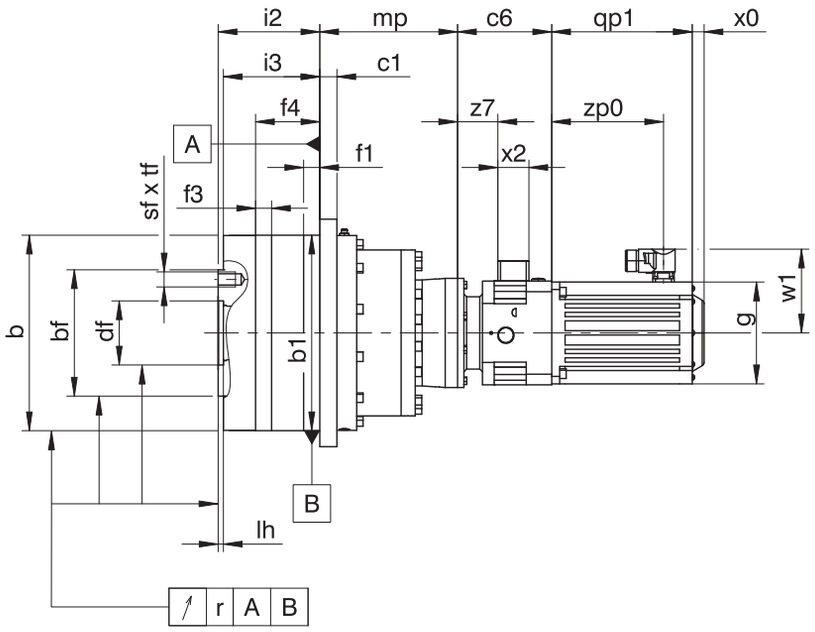
Dimensions of motors

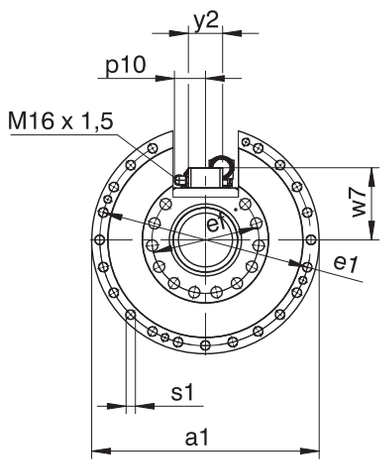
Type	□g	qp1	w1	x0	zp0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

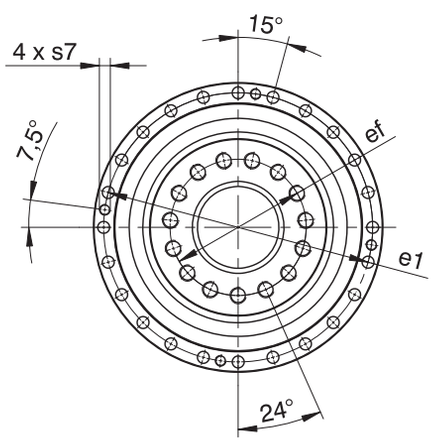
Type	MB23_EZ4	MB23_EZ5	MB33_EZ7	MB43_EZ8
	mp	mp	mp	mp
PHQ531	–	49.0	–	–
PHQ731	–	–	57.0	–
PHQ732	107.0	107.0	–	–
PHQ831	–	–	–	87.5
PHQ832	–	–	147.0	–
PHQ833	197.0	197.0	–	–
PHQ942	–	–	–	188.0
PHQ943	–	–	247.5	–

4.3.2 PHQ11 F shaft design (flange shaft)





PHQ11



qp1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]		

Dimensions of gear units

Type	Øa1	Øb	Øb1	Øbf	c1	Ødf	Øe1	Øef	f1	f3	f4	i2	i3	lh	r	Øs1	s7	sf	tf
PHQ1143	425	365_{g6}	365_{h6}	260_{h7}	32	120^{H6}	395	200	30	30	120	190	180	10	0.040	17.5	M16	M24	35.5

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
PHQ1143_MB43	176	59	134.9	58	64	75.5

Dimensions of motors

Type	□g	qp1	w1	x0	zp0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB43_EZ8
	mp
PHQ1143	257.5

4.4 Type designation

This chapter shows you an explanation of the type designation for sizes PHQ4 – PHQ8 with the associated options.

Additional ordering information not included in the type designation can be found at the end of the chapter.

Example code

PHQ	8	3	3	S	F	S	S	0880	MB23	EZ501U

Explanation

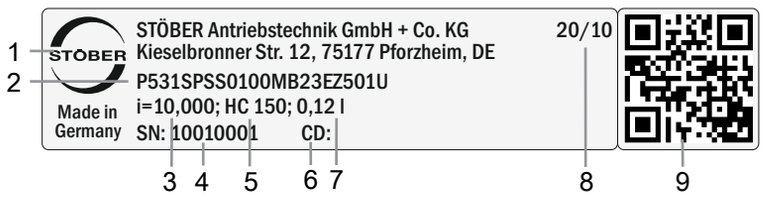
Code	Designation	Design
PHQ	Type	Planetary gear unit
8	Size	8 (example)
3	Generation	Generation 3
4		Generation 4
1	Stages	Single-stage
2		Two-stage
3		Three-stage
S	Housing	Standard
F	Shaft	Flange shaft
S	Bearing	Standard bearing
V		Reinforced bearing (PHQ4 – PHQ5)
S	Backlash	Standard
R		Reduced (PHQ4 – PHQ9)
0880	Transmission ratio (i x 10)	i = 88 (example)
MB	Motor adapter	ServoStop motor adapter with brake
2	Size	2 (example)
3	Generation	Generation 3
EZ501U	Motor	EZ synchronous servo motor

To complete the type designation, also specify the following in your order:

- A detailed type designation of the motor, see the chapter [▶ 11]
- Mounting position (for three-stage gear units), see the chapter [▶ 4.5.4]
- Radial shaft seal rings at the output made of NBR or FKM (option), see the chapter [▶ 4.6.3]
- For reverse operation of the output shaft from ±20° to ±90° and horizontal installation, see the chapter [▶ 4.6.4]

4.4.1 Nameplate

An example geared motor nameplate is explained in the figure below.



Code	Designation
1	Name of manufacturer
2	Type designation
3	Gear ratio of the gear unit
4	Serial number of the gear unit
5	Lubricant specification
6	Customer-specific data
7	Lubricant fill volume
8	Date of manufacture (year/calendar week)
9	QR code (link to product information)

4.5 Product description

4.5.1 Input options

MB motor adapter + EZ synchronous servo motor

Catalog ID 443311_en

EZ synchronous servo motor

Catalog ID 442437_en

The corresponding catalogs can be found at http://www.stoeber.de/en/downloads/

Enter the ID of the catalog in the Search term field.

4.5.2 ServoStop motor adapter with brake (MB)

In this chapter, you will find the description and technical data of the motor adapter with brake.

4.5.2.1 Properties

- Electrically actuated spring-loaded brake for dry running
- Featuring backlash-free plug-in coupling (jaw coupling) for easy removal of the motor with the axis braked in any position
- Electrical release monitoring in the terminal box of the motor adapter
- Manual monitoring of wear via air gap checks with a feeler gauge
- Manual release (optional)
- Radial shaft seal rings made of FKM with two sealing lips
- Four oil drain holes to protect the brake from oiling up in case of leakage
- Diverse-redundant system in accordance with EN ISO 13849-1

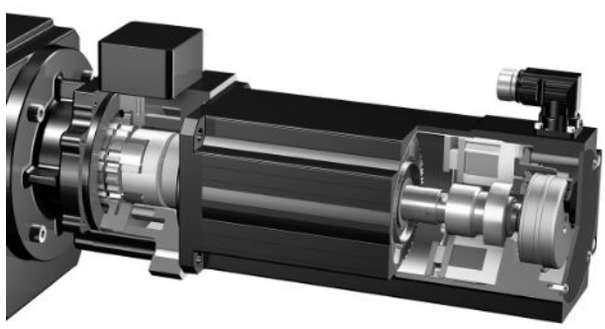


Fig. 1: Motor adapter with ServoStop brake and directly attached EZ synchronous servo motor

4.5.2.2 Brake

A quiescent current brake is integrated into the motor adapter. It has the function of a holding brake. Braking from full speed, e.g. in case of a voltage drop or an emergency off in hazard situations, is still possible.

The brake can be used as a single brake or together with the motor brake as a redundant brake system.

Function

The brakes installed in the motor adapter are electrically actuated spring-loaded brakes for dry running. In the de-energized state, braking takes place using spring force. The brake is released by an electromagnetic DC coil before the motor is switched on. The switch-on time t_{2B} (release time) is the time until the anchor plate releases from the axially moving brake disc and is magnetically held to the coil body. In this state, the brake is released and the coupling hub can rotate. In order to switch off (motor and brake), the residual magnetic flux of the iron parts (anchor and coil body) must be reduced; the associated time t_{11B} until the start of torque generation is defined as a response delay when linking. The link time t_{1B} is the time until the braking torque has built up to the nominal braking torque.

Manual release

Optionally, the brake can be equipped with a manual release.

Pressing the manual release deactivates the electronic actuation of the brake. Before pressing the manual release, you must establish the safety of the machine (e.g. protection against falling).

4.5.2.3 Electrical connection

- Terminal box (standard)
- Plug connector (optional, not possible in combination with release monitoring)

4.5.2.4 Monitoring

For monitoring the brake system, there are generally two options:

- Manual monitoring of wear via air gap checks with a feeler gauge
- Electrical release monitoring in the terminal box with a non-contact and wear-free proximity switch

4.5.2.5 Brake technical data

Technical data for operation at 24 V DC (±10%)

Type	M_{1Bstat} [Nm]	J_1 [kgcm²]	m [kg]	$\Delta\phi_B$ [arcmin]	$t_{1B,DC}$ [ms]	t_{2B} [ms]	$P_{N,B}$ [W]
MB23	8.0	6.3	8.5	32.0	65	55	30
MB23	12	6.3	8.5	32.0	55	80	30
MB33	16	26	14	26.0	150	60	37
MB33	24	26	14	26.0	120	85	37
MB33	32	26	14	26.0	95	100	37
MB33	45	26	14	26.0	80	120	37
MB43	50	69	26	19.0	150	100	55
MB43	72	69	26	19.0	120	150	55
MB43	100	69	26	19.0	90	200	55
MB53	200	236	61	17.0	200	250	86

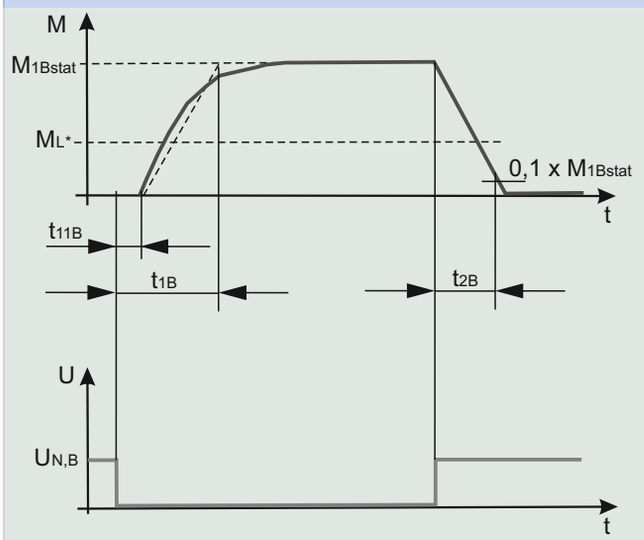
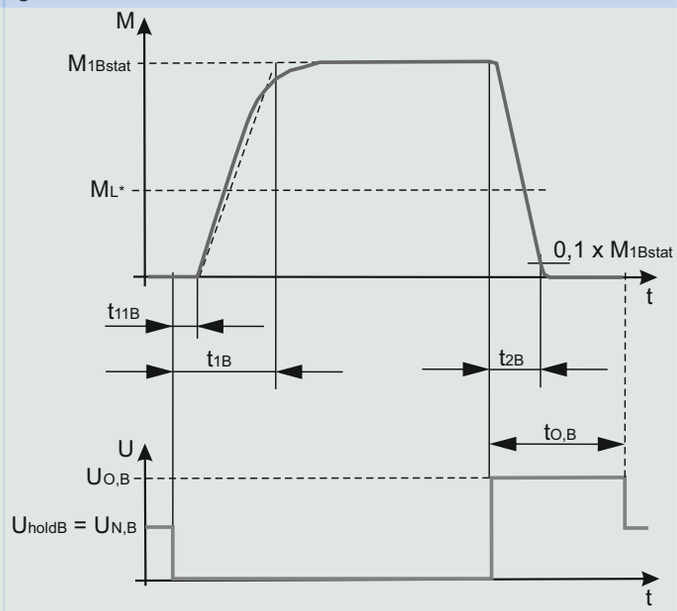
$\Delta\phi_B$: With the brake closed, a higher total backlash results ($\Delta\phi_{tot} = \Delta\phi_2 + \Delta\phi_B / i$).

Technical data for operation with high-speed rectifier 104 V DC (supply voltage U_{LINE} 220 – 275 V AC ± 5%, 50/60 Hz)

Type	M_{1Bstat} [Nm]	J_1 [kgcm²]	m [kg]	$\Delta\phi_B$ [arcmin]	$t_{1B,DC}$ [ms]	$t_{1B,AC}$ [ms]	t_{2B} [ms]	$P_{O,B}$ [W]	P_{holdB} [W]
MB23	8.0	6.3	8.5	32.0	65	360	20	101	26
MB23	12	6.3	8.5	32.0	55	280	25	101	26
MB23	16	6.3	8.5	32.0	50	230	35	101	26
MB23	24	6.3	8.5	32.0	45	180	50	101	26
MB23	30	6.3	8.5	32.0	40	160	60	101	26
MB33	16	26	14	26.0	150	800	25	125	32
MB33	24	26	14	26.0	120	650	35	125	32
MB33	32	26	14	26.0	95	500	40	125	32
MB33	45	26	14	26.0	80	400	50	125	32
MB33	90	26	14	26.0	50	250	90	125	32
MB43	50	69	26	19.0	150	900	50	148	38
MB43	72	69	26	19.0	120	700	75	148	38
MB43	100	69	26	19.0	90	500	100	148	38
MB43	160	69	26	19.0	60	300	150	148	38
MB53	200	236	61	17.0	200	800	110	200	50
MB53	300	236	61	17.0	170	600	150	200	50
MB53	400	236	61	17.0	120	400	200	200	50

$\Delta\phi_B$: With the brake closed, a higher total backlash results ($\Delta\phi_{tot} = \Delta\phi_2 + \Delta\phi_B / i$).

4.5.2.6 Brake switching times

Switching times in case of brake operation with nominal voltage	Switching times in case of brake operation with overexcitation voltage
	

4.5.3 Installation conditions

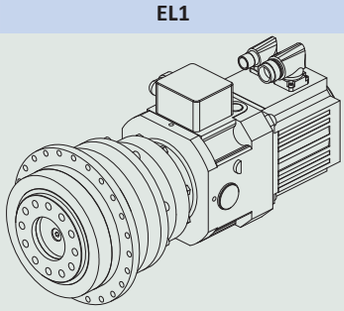
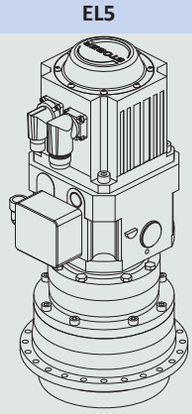
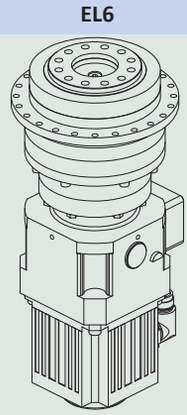
The torque and force values listed in this catalog are valid under the following conditions:

- When the flange shaft and gear housing are fastened on the machine side using screws of strength class 12.9
- When the gear housings are adjusted at pilot øb1, and also at pilot Øb for size PHQ11. The machine-side fit must be H7.
- When the flange shaft is adjusted using the connecting element at pilot øbf or ødf

4.5.4 Mounting positions

The following table shows the standard mounting positions.

Please indicate the mounting position when ordering three-stage geared motors.

EL1	EL5	EL6
		
Horizontal output	Vertical downward output	Vertical upward output

4.5.5 Lubricants

STOBER fills the gear units with the amount and type of lubricant specified on the nameplate. The filling volume and the structure of the gear units depend on the mounting position.

Only install the gear units in the intended mounting position! Reposition the gear units only after consulting STOBER. Otherwise, STOBER assumes no liability for the gear units.

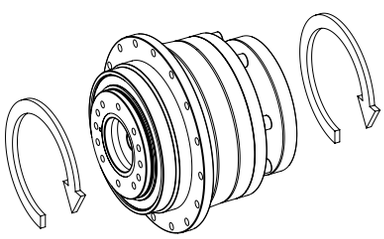
You will receive lubricants for use in the food industry upon request.

4.5.6 Other product features

Feature	Value
Max. permitted gear unit temperature (on the surface of the gear unit)	≤ 90 °C
Paint	Black RAL 9005
Explosion-proof design in accordance with (ATEX) Directive 2014/34/EU (optional)	Not available
Efficiency:	
η_{get} single-stage	96%
η_{get} two-stage	93%
η_{get} three-stage	90%
Protection class:[1]	
Gear unit	IP65
Motor	IP56, optionally IP66

4.5.7 Direction of rotation

The input and output rotate in the same direction.



4.6 Project configuration

Project your drives using our SERVOsoft designing software. Download SERVOsoft for free at https://www.stoeber.de/en/ServoSoft.

It is the most convenient and reliable method of drive selection, as the entire torque/speed curve of the application is displayed and evaluated here in the curve of the geared motor.

In this chapter, only limit values for specific operating points can be taken into consideration for manual drive selection.

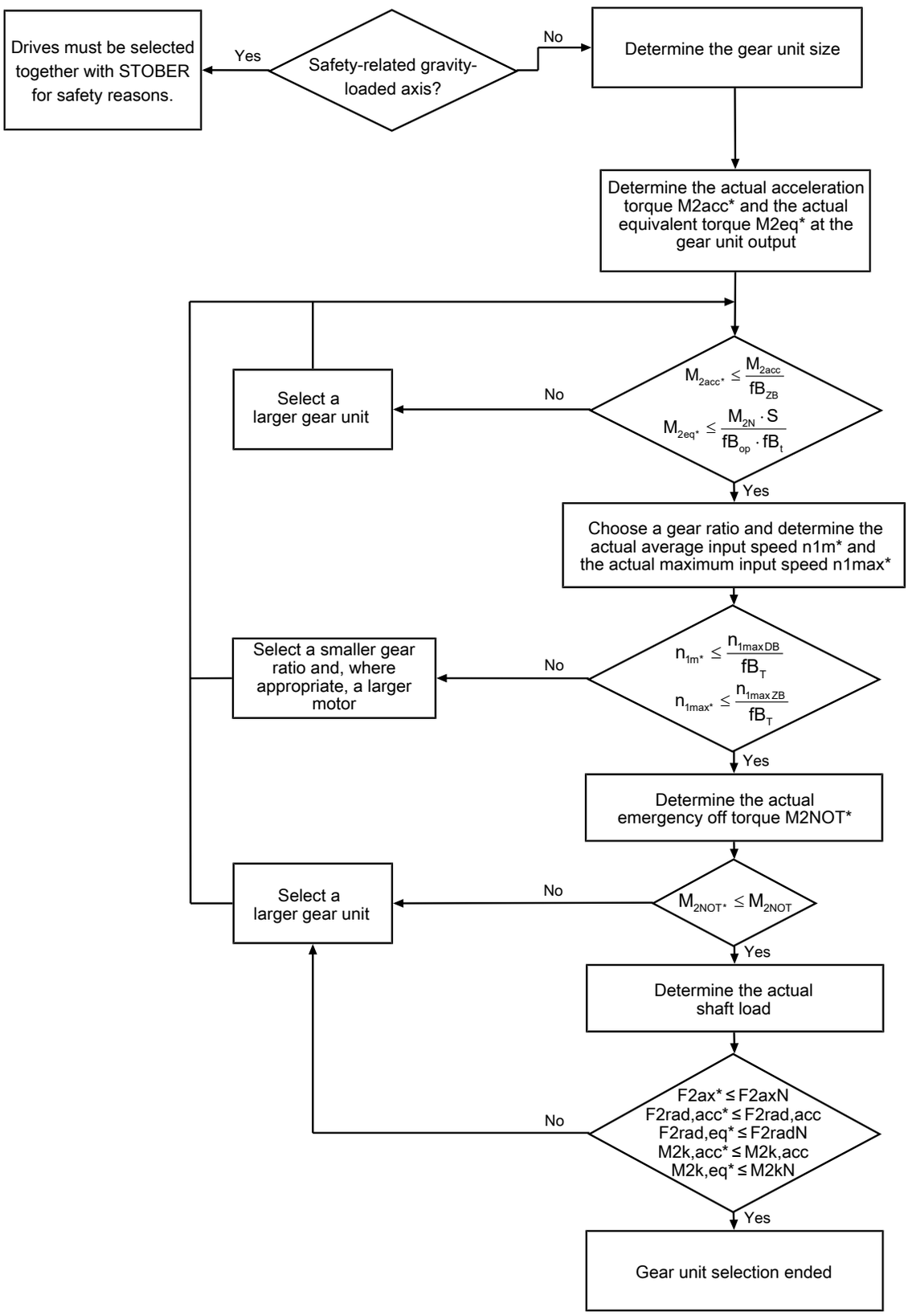
An explanation of the formula symbols can be found in Chapter Symbols in formulas.

The formula symbols for values actually present in the application are marked with *.

[1] Observe the protection class of all the components.

4.6.1 Drive selection

Drive selection for gear units

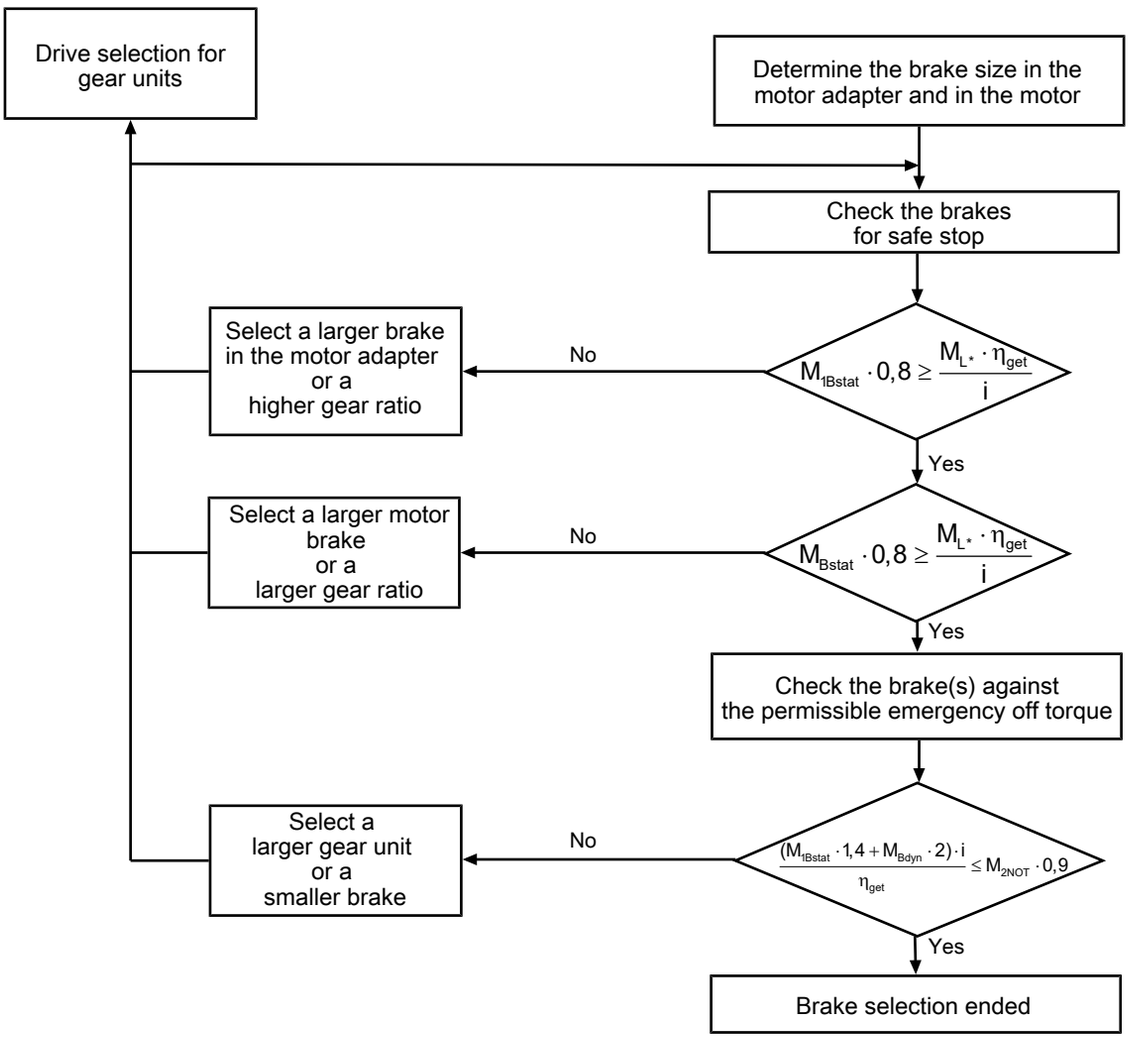


Calculate the forces and tilting torques in the chapter Permitted shaft loads.

Refer to the selection tables for the values for i, n_{1maxDB}, n_{1maxZB}, M_{2acc} (M_{2accHT} for reduced backlash), M_{2NOT}, M_{2N} and S.

The values for fB_T, fB_{op}, fB_t and fB_{ZB} can be found in the corresponding tables in this chapter.

Drive selection for brakes

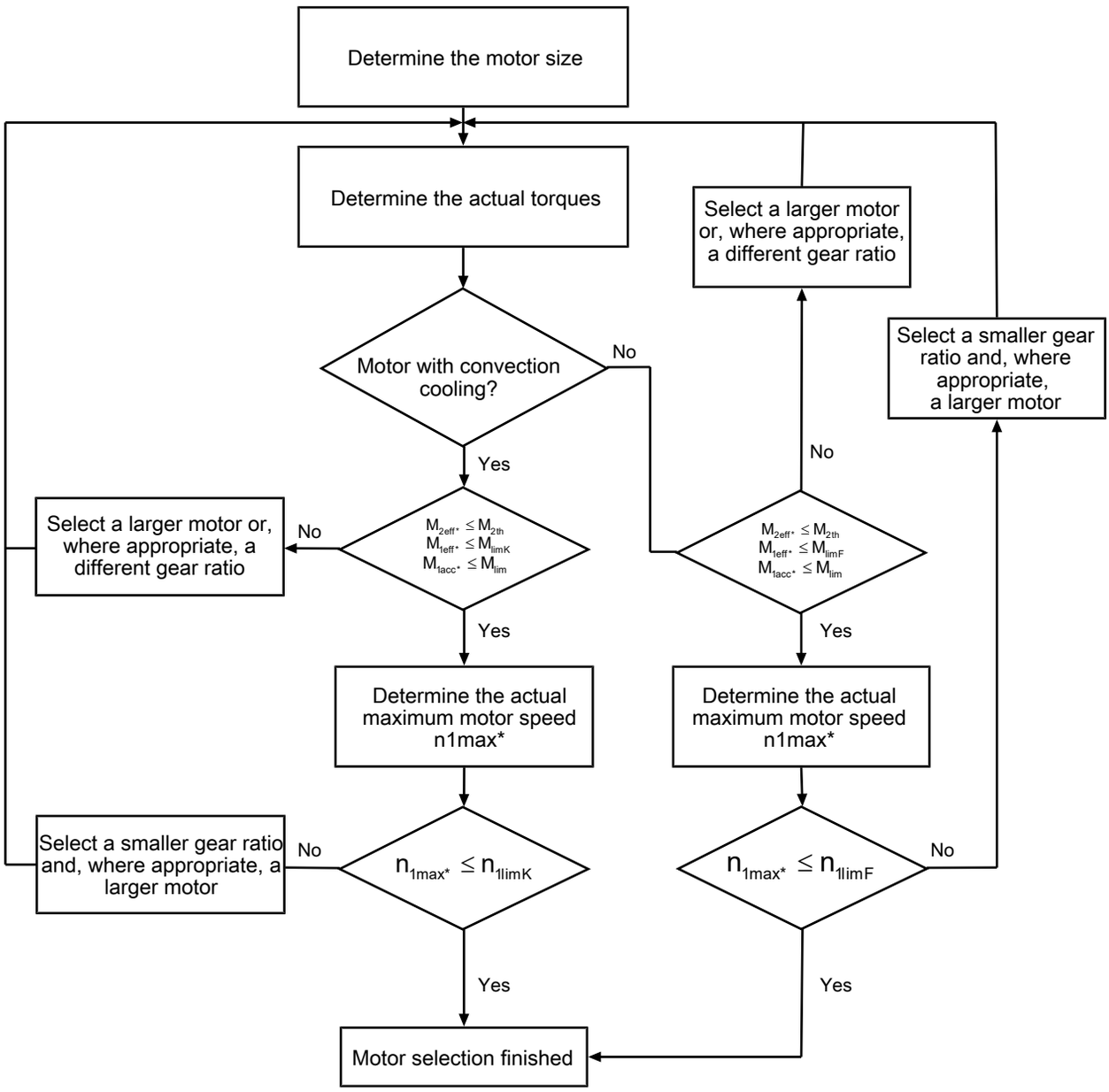


Refer to the selection tables for the values for i, M_{1Bstat}, M_{Bstat} and M_{2NOT}.

Refer to the Technical data table in the chapter [▷ 11.6.7] for the values for M_{Bdyn}.

Refer to the chapter Other product features for the values for η_{get}.

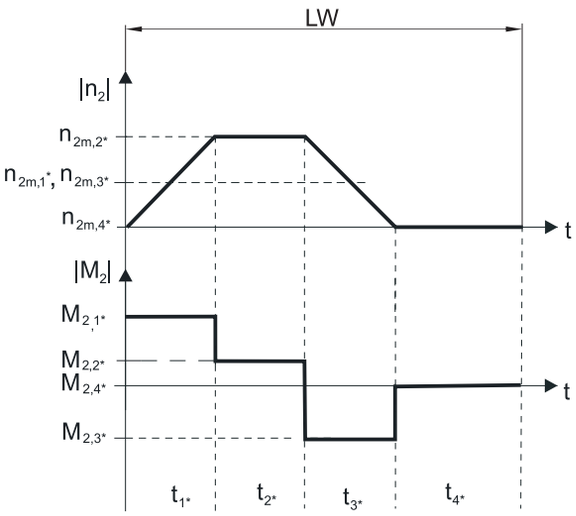
Drive selection for motors



The value for M_{lim}, M_{limK}, M_{limF}, n_{1limK} and n_{1limF} can be found in the motor characteristic curve in the chapter [▷ 11.3]. Note the size, nominal speed n_N and cooling type of the motor.

Example of cyclic operation

The following calculations are based on a representation of the power taken from the output based in accordance with the following example:



Calculation of the actual maximum acceleration torques

$$M_{2acc*} = J_{tot} \cdot \frac{\Delta n_2}{9{,}55 \cdot \Delta t} + M_{L*}$$

$$M_{1acc*} = \frac{M_{2acc*}}{i \cdot \eta_{get}} + J_1 \cdot \frac{\Delta n_1}{9{,}55 \cdot \Delta t}$$

Calculation of the actual average input speed

$$n_{1m*} = n_{2m*} \cdot i$$

$$n_{2m*} = \frac{\left|n_{2m,1*}\right| \cdot t_{1*} + \ldots + \left|n_{2m,n*}\right| \cdot t_{n*}}{t_{1*} + \ldots + t_{n*}}$$

If $t_{1*} + \ldots + t_{3*} \geq 6$ min, calculate n_{2m*} without the rest phase t_{4*}.

The values for the ratio i can be found in the selection tables.

Calculation of the actual effective torque

$$M_{2eff*} = \sqrt{\frac{t_{1*} \cdot M_{2,1*}{}^2 + \ldots + t_{n*} \cdot M_{2,n*}{}^2}{t_{1*} + \ldots + t_{n*}}}$$

Calculation of the actual emergency-off torque

$$M_{2NOT*} = J_{tot} \cdot \frac{\Delta n_2}{9.55 \cdot \Delta t} + M_{L*}$$

Calculation of the actual equivalent torque

$$M_{2eq*} = \sqrt[3]{\frac{\left|n_{2m,1*}\right| \cdot t_{1*} \cdot \left|M_{2,1*}{}^3\right| + \ldots + \left|n_{2m,n*}\right| \cdot t_{n*} \cdot \left|M_{2,n*}{}^3\right|}{\left|n_{2m,1*}\right| \cdot t_{1*} + \ldots + \left|n_{2m,n*}\right| \cdot t_{n*}}}$$

Calculation of the thermal limit torque

Calculate the thermal limit torque M_{2th} for a duty cycle $ED_{10} > 50\%$ and the actual average input speed n_{1m*}. (At $K_{mot,th} \leq 0$ you must reduce the average input speed n_{1m*} accordingly or select another geared motor size.)

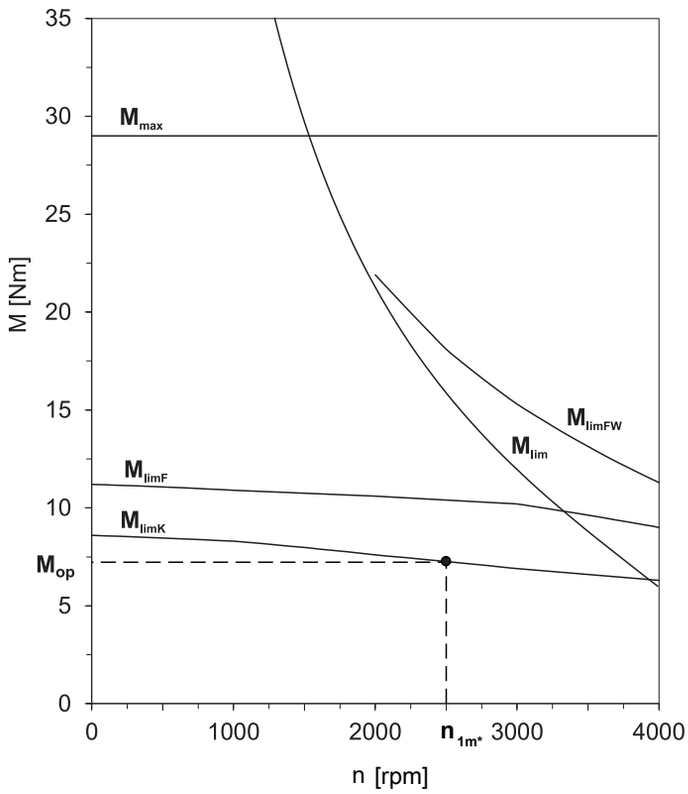
$$M_{2th} = M_{op} \cdot i \cdot K_{mot,th}$$

$$K_{mot,th} = 0{,}93 - \frac{a_{th}}{1000} \cdot fB_T \cdot \left(\frac{n_{1m*}}{1000}\right)^3$$

Refer to the selection tables for the values of i and a_{th}.

The values for fB_T can be found in the corresponding table in this chapter.

The value for the torque of the motor at operating point M_{op} with the determined average input speed n_{1m*} can be found in the motor characteristic curve in the chapter [▶ 11.3]. Note the size, nominal speed n_N and cooling type of the motor. The figure below shows an example of reading the torque M_{op} of a motor with convection cooling at the operating point.



Operating factors

Operating mode	fB_{op}
Uniform continuous operation	1.00
Cyclic operation	1.00
Reversing load cyclic operation	1.00

Run time	fB_t
Daily runtime ≤ 8 h	1.00
Daily runtime ≤ 16 h	1.15
Daily runtime ≤ 24 h	1.20

Cyclic operation	fB_{ZB}
≤ 1000 load changes/hour (LW/h)	1.00
> 1000 load changes/hour (LW/h)	1.15

Temperature		fB_T
Motor cooling	**Surrounding temperature**	
Motor with forced ventilation	≤ 20 °C	0.9
	≤ 30 °C	1.0
	≤ 40 °C	1.15
Motor with convection cooling	≤ 20 °C	1.0
	≤ 30 °C	1.1
	≤ 40 °C	1.25

Notes

- The maximum permitted gear unit temperature (see the "Other product features" chapter) must not be exceeded. Doing so may result in damage to the geared motor.
- For braking from full speed (for example when the power fails or when setting up the machine), note the permitted gear unit torques (M_{2acc}, M_{2NOT}) in the selection tables.

4.6.2 Permitted shaft loads for the output shaft

The values specified in the tables apply to the permitted shaft loads:

- For shaft dimensions in accordance with the catalog
- For output speeds $n_{2m*} \leq 100$ rpm ($F^{2axN} = F_{2ax100}$; $F_{2radN} = F_{2rad100}$; $M_{2kN} = M_{2k100}$)
- Only if radial forces on the gear unit are stabilized by its pilots (housing, flange shaft)

Permitted shaft loads for standard bearing S

Type	z_2 [mm]	F_{2ax100} [N]	$F_{2rad100}$ [N]	$F_{2rad,acc}$ [N]	M_{2k100} [Nm]	$M_{2k,acc}$ [Nm]	C_{2k} [Nm/ arcmin]
PHQ4	83.0	2150	3095	3929	257	326	192
PHQ5	97.0	4150	4536	4897	440	475	429
PHQ7	86.0	6150	17045	17045	1466	1466	500
PHQ8	125.5	10050	27778	33333	3486	4183	1550
PHQ9	155.0	33000	48387	70968	7500	11000	7500
PHQ10	171.0	50000	51462	73099	8800	12500	9500
PHQ11	231.0	60000	47619	69264	11000	16000	11500
PHQ12	281.0	70000	64057	106761	18000	30000	14000

Permitted shaft loads for reinforced bearing V

Type	z_2 [mm]	F_{2ax100} [N]	$F_{2rad100}$ [N]	$F_{2rad,acc}$ [N]	M_{2k100} [Nm]	$M_{2k,acc}$ [Nm]	C_{2k} [Nm/ arcmin]
PHQ4	88.5	2900	4000	4000	354	354	217
PHQ5	104.0	5000	5500	5500	572	572	478

For other output speeds, download diagrams at https://configurator.stoeber.de/en-US/.

The following applies to output speeds $n_{2m*} > 100$ rpm:

$$F_{2axN} = \frac{F_{2ax100}}{\sqrt[3]{\frac{n_{2m*}}{100\ \text{rpm}}}} \qquad F_{2radN} = \frac{F_{2rad100}}{\sqrt[3]{\frac{n_{2m*}}{100\ \text{rpm}}}} \qquad M_{2kN} = \frac{M_{2k100}}{\sqrt[3]{\frac{n_{2m*}}{100\ \text{rpm}}}}$$

The values for F_{2ax100}, $F_{2rad100}$ and M_{2k100} can be found in the table "Permitted shaft loads" in this chapter.

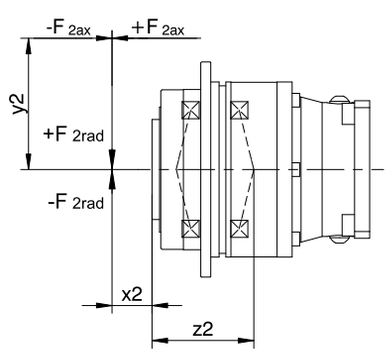


Fig. 2: Force application points

You can determine the permitted radial forces from the permitted tilting torque M_{2kN} and $M_{2k,acc}$. The actual radial forces may not exceed the permitted radial forces. The permitted radial forces pertain to the shaft end (x2 = 0).

$$M_{2k,acc*} = \frac{2 \cdot F_{2ax*} \cdot y_2 + F_{2rad,acc*} \cdot (x_2 + z_2)}{1000}$$

For applications with multiple axial and/or radial forces, you must add the forces as vectors.

In the event of EMERGENCY OFF operation (max. 1000 load changes), you can multiply the permitted forces and torques for F_{2ax100}, $F_{2rad100}$ and M_{2k100} by a factor of two.

Also note the calculation for equivalent values:

$$M_{2k,eq^*} = \sqrt[3]{\frac{\left|n_{2m,1^*}\right| \cdot t_{1^*} \cdot \left|M_{2k,acc,1^*}{}^3\right| + \ldots + \left|n_{2m,n^*}\right| \cdot t_{n^*} \cdot \left|M_{2k,acc,n^*}{}^3\right|}{\left|n_{2m,1^*}\right| \cdot t_{1^*} + \ldots + \left|n_{2m,n^*}\right| \cdot t_{n^*}}}$$

$$F_{2rad,eq^*} = \sqrt[3]{\frac{\left|n_{2m,1^*}\right| \cdot t_{1^*} \cdot \left|F_{2rad,acc,1^*}{}^3\right| + \ldots + \left|n_{2m,n^*}\right| \cdot t_{n^*} \cdot \left|F_{2rad,acc,n^*}{}^3\right|}{\left|n_{2m,1^*}\right| \cdot t_{1^*} + \ldots + \left|n_{2m,n^*}\right| \cdot t_{n^*}}}$$

The following apply to the bearing service life L_{10h} ($ED_{10} \leq 40\%$):

$L_{10h} > 10000$ h with $1 < M_{2kN}/M_{2k^*} < 1.25$

$L_{10h} > 20000$ h with $1.25 < M_{2kN}/M_{2k^*} < 1.5$

$L_{10h} > 30000$ h with $1.5 < M_{2kN}/M_{2k^*}$

For different duty cycles:

$$L_{10h} > L_{10h(ED_{10}=40\%)} \cdot \frac{40\%}{ED_{10}}$$

4.6.3 Recommendation for radial shaft seal rings

For a duty cycle > 60% and higher surrounding temperatures, we recommend radial shaft seal rings made of FKM at the output.

Properties:

- Excellent temperature resistance
- High chemical stability
- Very good resistance to aging
- Excellent resistance in oils and greases
- For use in the food, beverage and pharmaceutical industries

Leak-proofness

Our gear units are equipped with high-quality radial shaft seal rings and checked for leaks. However, a leak cannot be fully ruled out over the length of use of a gear unit. If you use a gear unit with goods incompatible with the lubricant, you must take measures to prevent direct contact with the gear unit lubricant in case of a leak.

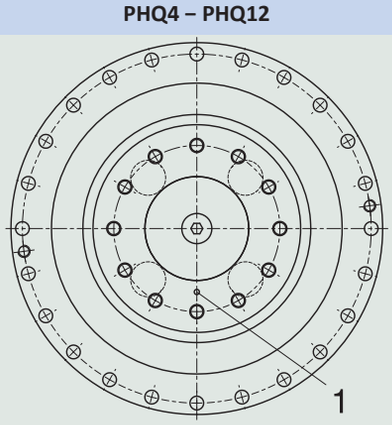
4.6.4 Reverse operation

To ensure lubrication for circulating gearing parts during cyclic reverse operation from ± 20° to ± 90° at the output, pay careful attention to the position of the output shaft for the horizontal mounting of the gear unit, as shown in the diagrams below.

The images show the center position of reverse operation.

Cyclic reverse operation ≤ ± 20° on request.

PHQ4 – PHQ12



1 Position of the mark: bottom

Please note that the hole pattern may be different, depending on the size of the planetary gear unit.

4.7 Additional documentation

Additional documentation related to the product can be found at
http://www.stoeber.de/en/downloads/

Enter the ID of the documentation in the Search term field.

Documentation	ID
Operating manual gear units, geared motors PHQ43 – PHQ83, PHQ94 – PHQ124	443353_de

5 C helical geared motors

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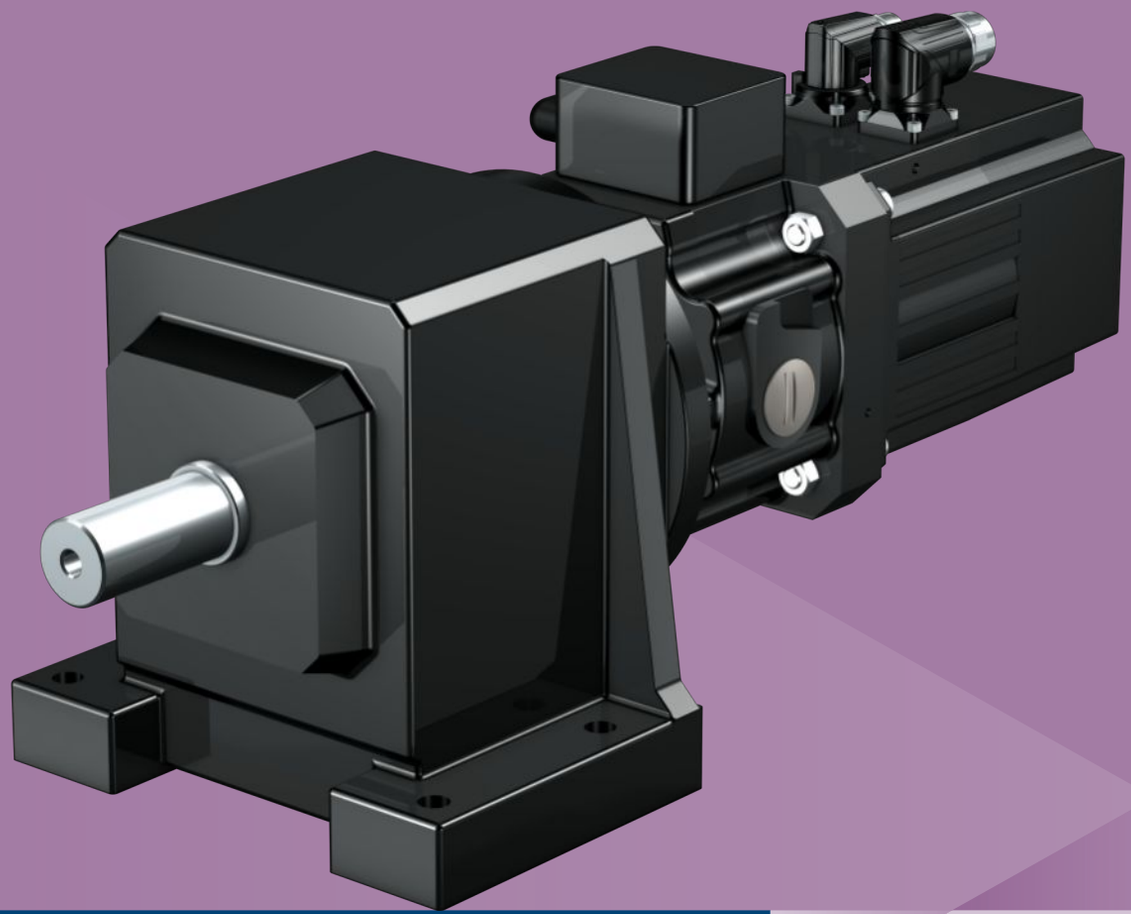


5 Helical geared motors

C

5.1 Overview

Compact helical geared motors with redundant brake

Features

Power density	★☆☆☆☆
Backlash	★★☆☆☆
Price category	€
Shaft load	★★☆☆☆
Smooth operation	★★★☆☆
Torsional stiffness	★★☆☆☆
Mass moment of inertia	★★★★☆
Helical gearing	✓
FKM seal ring at the input	✓
Reinforced output bearing	✓ (on request)
Safe braking in case of power outage	✓
Safe support of the load with gravity-loaded axes using 2 brakes	✓
Easily and safely connected to the synchronous servo motor thanks to backlash-free plug-in coupling	✓

Key ★☆☆☆☆ good | ★★★★★ excellent
€ Economy | €€€€€ Premium

Technical data

M_{1Bstat}	8 – 100 Nm
i	2 – 70
M_{2acc}	31 – 4800 Nm
$\Delta\phi_2$	10 – 20 arcmin
η_{get}	97 %

5.2 Selection tables

The technical data specified in the selection tables applies to:

- Installation altitudes up to 1000 m above sea level
- Surrounding temperatures from 0 °C to 40 °C
- Drives with convection-cooled motors (e.g. EZ401**U**)
- Weight specification for mounting position EL1, housing design N
- Without consideration of the thermal limiting performance

For the technical data on drives with forced ventilated motors (e.g. EZ401**B**), refer to https://configurator.stoeber.de/en-US/.

An explanation of the formula symbols can be found in the chapter [▶ 15.1].

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
C0 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 60 Nm)																	
904	14	15	4.2	2.4	C002_0033 MB23 EZ501U	51	110	3.318	1702/513	8.0	8.0	3700	3600	4000	11	1.3	22
904	15	17	4.6	2.2	C002_0033 MB23 EZ402U	51	110	3.318	1702/513	8.0	8.0	3700	3600	4000	9.4	1.3	22
978	13	14	4.1	2.5	C002_0031 MB23 EZ501U	48	110	3.067	46/15	8.0	8.0	3700	3600	4000	11	1.3	22
978	13	14	4.1	2.5	C002_0031 MB23 EZ501U	48	110	3.067	46/15	12	8.0	3700	3600	4000	11	1.3	22
978	14	15	4.5	2.3	C002_0031 MB23 EZ402U	48	110	3.067	46/15	8.0	8.0	3700	3600	4000	9.4	1.3	22
978	14	15	4.5	2.3	C002_0031 MB23 EZ402U	48	110	3.067	46/15	12	8.0	3700	3600	4000	9.4	1.3	22
978	21	26	6.7	1.5	C002_0031 MB23 EZ404U	60	110	3.067	46/15	8.0	8.0	3700	3600	4000	11	1.3	24
978	21	26	6.7	1.5	C002_0031 MB23 EZ404U	60	110	3.067	46/15	12	8.0	3700	3600	4000	11	1.3	24
1083	12	13	4.1	2.7	C002_0028 MB23 EZ501U	43	110	2.769	36/13	8.0	8.0	3500	3000	4000	11	1.3	22
1083	12	13	4.1	2.7	C002_0028 MB23 EZ501U	43	110	2.769	36/13	12	8.0	3500	3000	4000	11	1.3	22
1083	13	14	4.5	2.4	C002_0028 MB23 EZ402U	43	110	2.769	36/13	8.0	8.0	3500	3000	4000	9.4	1.3	22
1083	13	14	4.5	2.4	C002_0028 MB23 EZ402U	43	110	2.769	36/13	12	8.0	3500	3000	4000	9.4	1.3	22
1083	19	23	6.5	1.7	C002_0028 MB23 EZ404U	58	110	2.769	36/13	8.0	8.0	3500	3000	4000	11	1.3	24
1083	19	23	6.5	1.7	C002_0028 MB23 EZ404U	58	110	2.769	36/13	12	8.0	3500	3000	4000	11	1.3	24
1083	20	21	7.0	1.5	C002_0028 MB23 EZ502U	58	110	2.769	36/13	8.0	8.0	3500	3000	4000	13	1.3	24
1083	20	21	7.0	1.5	C002_0028 MB23 EZ502U	58	110	2.769	36/13	12	8.0	3500	3000	4000	13	1.3	24
1502	8.3	9.1	3.9	3.3	C002_0020 MB23 EZ501U	31	110	1.997	1480/741	8.0	8.0	3500	3000	4000	11	1.3	22
1502	8.3	9.1	3.9	3.3	C002_0020 MB23 EZ501U	31	110	1.997	1480/741	12	8.0	3500	3000	4000	11	1.3	22
1502	8.3	9.1	3.9	3.3	C002_0020 MB23 EZ501U	31	110	1.997	1480/741	16	8.0	3500	3000	4000	11	1.3	22
1502	9.1	10	4.2	3.0	C002_0020 MB23 EZ402U	31	110	1.997	1480/741	8.0	8.0	3500	3000	4000	9.7	1.3	22
1502	9.1	10	4.2	3.0	C002_0020 MB23 EZ402U	31	110	1.997	1480/741	12	8.0	3500	3000	4000	9.7	1.3	22
1502	9.1	10	4.2	3.0	C002_0020 MB23 EZ402U	31	110	1.997	1480/741	16	8.0	3500	3000	4000	9.7	1.3	22
1502	13	17	6.2	2.1	C002_0020 MB23 EZ404U	52	110	1.997	1480/741	8.0	8.0	3500	3000	4000	11	1.3	24
1502	13	17	6.2	2.1	C002_0020 MB23 EZ404U	52	110	1.997	1480/741	12	8.0	3500	3000	4000	11	1.3	24
1502	13	17	6.2	2.1	C002_0020 MB23 EZ404U	52	110	1.997	1480/741	16	8.0	3500	3000	4000	11	1.3	24
1502	14	15	6.6	1.9	C002_0020 MB23 EZ502U	52	110	1.997	1480/741	8.0	8.0	3500	3000	4000	13	1.3	24
1502	14	15	6.6	1.9	C002_0020 MB23 EZ502U	52	110	1.997	1480/741	12	8.0	3500	3000	4000	13	1.3	24
1502	14	15	6.6	1.9	C002_0020 MB23 EZ502U	52	110	1.997	1480/741	16	8.0	3500	3000	4000	13	1.3	24
C1 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 140 Nm)																	
363	34	38	2.3	3.0	C102_0083 MB23 EZ501U	128	240	8.263	1537/186	8.0	8.0	3600	3100	4000	11	3.9	27
363	38	42	2.5	2.8	C102_0083 MB23 EZ402U	128	240	8.263	1537/186	8.0	8.0	3600	3100	4000	9.7	3.9	27
363	55	69	3.7	1.9	C102_0083 MB23 EZ404U	138	240	8.263	1537/186	8.0	8.0	3600	3100	4000	11	3.9	29
363	59	64	4.0	1.8	C102_0083 MB23 EZ502U	138	240	8.263	1537/186	8.0	8.0	3600	3100	4000	13	3.9	29
473	26	29	2.6	3.1	C102_0063 MB23 EZ501U	98	220	6.338	507/80	8.0	8.0	3800	3500	4000	11	3.1	27
473	29	32	2.8	2.8	C102_0063 MB23 EZ402U	98	220	6.338	507/80	8.0	8.0	3800	3500	4000	9.4	3.1	27
473	42	53	4.2	1.9	C102_0063 MB23 EZ404U	130	220	6.338	507/80	8.0	8.0	3800	3500	4000	11	3.1	29
473	45	49	4.5	1.8	C102_0063 MB23 EZ502U	130	220	6.338	507/80	8.0	8.0	3800	3500	4000	13	3.1	29
511	25	27	2.6	3.2	C102_0059 MB23 EZ501U	91	220	5.875	47/8	8.0	8.0	3800	3500	4000	11	3.1	27
511	25	27	2.6	3.2	C102_0059 MB23 EZ501U	91	220	5.875	47/8	12	8.0	3800	3500	4000	11	3.1	27
511	27	30	2.8	2.9	C102_0059 MB23 EZ402U	91	220	5.875	47/8	8.0	8.0	3800	3500	4000	9.4	3.1	27
511	27	30	2.8	2.9	C102_0059 MB23 EZ402U	91	220	5.875	47/8	12	8.0	3800	3500	4000	9.4	3.1	27
511	39	49	4.1	2.0	C102_0059 MB23 EZ404U	130	220	5.875	47/8	8.0	8.0	3800	3500	4000	11	3.1	29
511	39	49	4.1	2.0	C102_0059 MB23 EZ404U	130	220	5.875	47/8	12	8.0	3800	3500	4000	11	3.1	29
511	42	46	4.4	1.9	C102_0059 MB23 EZ502U	130	220	5.875	47/8	8.0	8.0	3800	3500	4000	13	3.1	29
511	42	46	4.4	1.9	C102_0059 MB23 EZ502U	130	220	5.875	47/8	12	8.0	3800	3500	4000	13	3.1	29
597	21	23	2.5	3.6	C102_0050 MB23 EZ501U	78	220	5.025	201/40	8.0	8.0	3800	3500	4000	11	3.1	27
597	21	23	2.5	3.6	C102_0050 MB23 EZ501U	78	220	5.025	201/40	12	8.0	3800	3500	4000	11	3.1	27
597	21	23	2.5	3.6	C102_0050 MB23 EZ501U	78	220	5.025	201/40	16	8.0	3800	3500	4000	11	3.1	27
597	23	25	2.7	3.3	C102_0050 MB23 EZ402U	78	220	5.025	201/40	8.0	8.0	3800	3500	4000	9.5	3.1	27

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
C1 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 140 Nm)																	
597	23	25	2.7	3.3	C102_0050 MB23 EZ402U	78	220	5.025	201/40	12	8.0	3800	3500	4000	9.5	3.1	27
597	23	25	2.7	3.3	C102_0050 MB23 EZ402U	78	220	5.025	201/40	16	8.0	3800	3500	4000	9.5	3.1	27
597	34	42	4.0	2.2	C102_0050 MB23 EZ404U	130	220	5.025	201/40	8.0	8.0	3800	3500	4000	11	3.1	29
597	34	42	4.0	2.2	C102_0050 MB23 EZ404U	130	220	5.025	201/40	12	8.0	3800	3500	4000	11	3.1	29
597	34	42	4.0	2.2	C102_0050 MB23 EZ404U	130	220	5.025	201/40	16	8.0	3800	3500	4000	11	3.1	29
597	36	39	4.3	2.1	C102_0050 MB23 EZ502U	130	220	5.025	201/40	8.0	8.0	3800	3500	4000	13	3.1	29
597	36	39	4.3	2.1	C102_0050 MB23 EZ502U	130	220	5.025	201/40	12	8.0	3800	3500	4000	13	3.1	29
597	36	39	4.3	2.1	C102_0050 MB23 EZ502U	130	220	5.025	201/40	16	8.0	3800	3500	4000	13	3.1	29
597	47	54	5.6	1.6	C102_0050 MB23 EZ503U	130	220	5.025	201/40	8.0	15	3800	3500	4000	17	3.1	31
644	19	21	2.5	3.8	C102_0047 MB23 EZ501U	72	220	4.658	3149/676	8.0	8.0	3800	3500	4000	11	3.1	27
644	19	21	2.5	3.8	C102_0047 MB23 EZ501U	72	220	4.658	3149/676	12	8.0	3800	3500	4000	11	3.1	27
644	19	21	2.5	3.8	C102_0047 MB23 EZ501U	72	220	4.658	3149/676	16	8.0	3800	3500	4000	11	3.1	27
644	21	23	2.7	3.4	C102_0047 MB23 EZ402U	72	220	4.658	3149/676	8.0	8.0	3800	3500	4000	9.5	3.1	27
644	21	23	2.7	3.4	C102_0047 MB23 EZ402U	72	220	4.658	3149/676	12	8.0	3800	3500	4000	9.5	3.1	27
644	21	23	2.7	3.4	C102_0047 MB23 EZ402U	72	220	4.658	3149/676	16	8.0	3800	3500	4000	9.5	3.1	27
644	31	39	4.0	2.3	C102_0047 MB23 EZ404U	130	220	4.658	3149/676	8.0	8.0	3800	3500	4000	11	3.1	29
644	31	39	4.0	2.3	C102_0047 MB23 EZ404U	130	220	4.658	3149/676	12	8.0	3800	3500	4000	11	3.1	29
644	31	39	4.0	2.3	C102_0047 MB23 EZ404U	130	220	4.658	3149/676	16	8.0	3800	3500	4000	11	3.1	29
644	33	36	4.3	2.2	C102_0047 MB23 EZ502U	130	220	4.658	3149/676	8.0	8.0	3800	3500	4000	13	3.1	29
644	33	36	4.3	2.2	C102_0047 MB23 EZ502U	130	220	4.658	3149/676	12	8.0	3800	3500	4000	13	3.1	29
644	33	36	4.3	2.2	C102_0047 MB23 EZ502U	130	220	4.658	3149/676	16	8.0	3800	3500	4000	13	3.1	29
644	44	50	5.6	1.7	C102_0047 MB23 EZ503U	130	220	4.658	3149/676	8.0	15	3800	3500	4000	17	3.1	31
644	44	50	5.6	1.7	C102_0047 MB23 EZ503U	130	220	4.658	3149/676	12	15	3800	3500	4000	17	3.1	31
716	17	19	2.4	4.0	C102_0042 MB23 EZ501U	65	220	4.189	377/90	8.0	8.0	3600	3100	4000	11	3.1	27
716	17	19	2.4	4.0	C102_0042 MB23 EZ501U	65	220	4.189	377/90	12	8.0	3600	3100	4000	11	3.1	27
716	17	19	2.4	4.0	C102_0042 MB23 EZ501U	65	220	4.189	377/90	16	8.0	3600	3100	4000	11	3.1	27
716	19	21	2.7	3.7	C102_0042 MB23 EZ402U	65	220	4.189	377/90	8.0	8.0	3600	3100	4000	9.7	3.1	27
716	19	21	2.7	3.7	C102_0042 MB23 EZ402U	65	220	4.189	377/90	12	8.0	3600	3100	4000	9.7	3.1	27
716	19	21	2.7	3.7	C102_0042 MB23 EZ402U	65	220	4.189	377/90	16	8.0	3600	3100	4000	9.7	3.1	27
716	28	35	3.9	2.5	C102_0042 MB23 EZ404U	118	220	4.189	377/90	8.0	8.0	3600	3100	4000	11	3.1	29
716	28	35	3.9	2.5	C102_0042 MB23 EZ404U	118	220	4.189	377/90	12	8.0	3600	3100	4000	11	3.1	29
716	28	35	3.9	2.5	C102_0042 MB23 EZ404U	118	220	4.189	377/90	16	8.0	3600	3100	4000	11	3.1	29
716	30	33	4.2	2.3	C102_0042 MB23 EZ502U	126	220	4.189	377/90	8.0	8.0	3600	3100	4000	13	3.1	29
716	30	33	4.2	2.3	C102_0042 MB23 EZ502U	126	220	4.189	377/90	12	8.0	3600	3100	4000	13	3.1	29
716	30	33	4.2	2.3	C102_0042 MB23 EZ502U	126	220	4.189	377/90	16	8.0	3600	3100	4000	13	3.1	29
716	39	45	5.5	1.8	C102_0042 MB23 EZ503U	130	220	4.189	377/90	8.0	15	3600	3100	4000	17	3.1	31
716	39	45	5.5	1.8	C102_0042 MB23 EZ503U	130	220	4.189	377/90	12	15	3600	3100	4000	17	3.1	31
773	16	18	2.4	4.2	C102_0039 MB23 EZ501U	60	220	3.883	1363/351	8.0	8.0	3600	3100	4000	11	3.1	27
773	16	18	2.4	4.2	C102_0039 MB23 EZ501U	60	220	3.883	1363/351	12	8.0	3600	3100	4000	11	3.1	27
773	16	18	2.4	4.2	C102_0039 MB23 EZ501U	60	220	3.883	1363/351	16	8.0	3600	3100	4000	11	3.1	27
773	18	20	2.6	3.9	C102_0039 MB23 EZ402U	60	220	3.883	1363/351	8.0	8.0	3600	3100	4000	9.7	3.1	27
773	18	20	2.6	3.9	C102_0039 MB23 EZ402U	60	220	3.883	1363/351	12	8.0	3600	3100	4000	9.7	3.1	27
773	18	20	2.6	3.9	C102_0039 MB23 EZ402U	60	220	3.883	1363/351	16	8.0	3600	3100	4000	9.7	3.1	27
773	26	32	3.8	2.6	C102_0039 MB23 EZ404U	109	220	3.883	1363/351	8.0	8.0	3600	3100	4000	11	3.1	29
773	26	32	3.8	2.6	C102_0039 MB23 EZ404U	109	220	3.883	1363/351	12	8.0	3600	3100	4000	11	3.1	29
773	26	32	3.8	2.6	C102_0039 MB23 EZ404U	109	220	3.883	1363/351	16	8.0	3600	3100	4000	11	3.1	29
773	28	30	4.1	2.5	C102_0039 MB23 EZ502U	117	220	3.883	1363/351	8.0	8.0	3600	3100	4000	13	3.1	29
773	28	30	4.1	2.5	C102_0039 MB23 EZ502U	117	220	3.883	1363/351	12	8.0	3600	3100	4000	13	3.1	29
773	28	30	4.1	2.5	C102_0039 MB23 EZ502U	117	220	3.883	1363/351	16	8.0	3600	3100	4000	13	3.1	29
773	28	31	4.1	2.5	C102_0039 MB33 EZ701U	75	220	3.883	1363/351	16	15	3600	3100	4000	38	3.1	38
773	37	42	5.4	1.9	C102_0039 MB23 EZ503U	130	220	3.883	1363/351	8.0	15	3600	3100	4000	17	3.1	31
773	37	42	5.4	1.9	C102_0039 MB23 EZ503U	130	220	3.883	1363/351	12	15	3600	3100	4000	17	3.1	31
773	45	54	6.7	1.5	C102_0039 MB33 EZ702U	130	220	3.883	1363/351	16	15	3600	3100	4000	43	3.1	41
900	14	15	2.3	4.7	C102_0033 MB23 EZ501U	52	204	3.334	2067/620	8.0	8.0	3600	3100	4000	11	3.1	27
900	14	15	2.3	4.7	C102_0033 MB23 EZ501U	52	204	3.334	2067/620	12	8.0	3600	3100	4000	11	3.1	27
900	14	15	2.3	4.7	C102_0033 MB23 EZ501U	52	204	3.334	2067/620	16	8.0	3600	3100	4000	11	3.1	27
900	15	17	2.6	4.3	C102_0033 MB23 EZ402U	52	204	3.334	2067/620	8.0	8.0	3600	3100	4000	10	3.1	27
900	15	17	2.6	4.3	C102_0033 MB23 EZ402U	52	204	3.334	2067/620	12	8.0	3600	3100	4000	10	3.1	27
900	15	17	2.6	4.3	C102_0033 MB23 EZ402U	52	204	3.334	2067/620	16	8.0	3600	3100	4000	10	3.1	27
900	22	28	3.7	2.9	C102_0033 MB23 EZ404U	94	204	3.334	2067/620	8.0	8.0	3600	3100	4000	11	3.1	29
900	22	28	3.7	2.9	C102_0033 MB23 EZ404U	94	204	3.334	2067/620	12	8.0	3600	3100	4000	11	3.1	29
900	22	28	3.7	2.9	C102_0033 MB23 EZ404U	94	204	3.334	2067/620	16	8.0	3600	3100	4000	11	3.1	29
900	24	26	4.0	2.7	C102_0033 MB23 EZ502U	100	204	3.334	2067/620	8.0	8.0	3600	3100	4000	14	3.1	29
900	24	26	4.0	2.7	C102_0033 MB23 EZ502U	100	204	3.334	2067/620	12	8.0	3600	3100	4000	14	3.1	29

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
C1 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 140 Nm)																	
900	24	26	4.0	2.7	C102_0033 MB23 EZ502U	100	204	3.334	2067/620	16	8.0	3600	3100	4000	14	3.1	29
900	24	27	4.0	2.7	C102_0033 MB33 EZ701U	65	220	3.334	2067/620	16	15	3600	3100	4000	39	3.1	38
900	24	27	4.0	2.7	C102_0033 MB33 EZ701U	65	220	3.334	2067/620	24	15	3600	3100	4000	39	3.1	38
900	31	36	5.3	2.1	C102_0033 MB23 EZ503U	121	204	3.334	2067/620	8.0	15	3600	3100	4000	17	3.1	31
900	31	36	5.3	2.1	C102_0033 MB23 EZ503U	121	204	3.334	2067/620	12	15	3600	3100	4000	17	3.1	31
900	39	47	6.5	1.7	C102_0033 MB33 EZ702U	123	220	3.334	2067/620	16	15	3600	3100	4000	44	3.1	41
900	39	47	6.5	1.7	C102_0033 MB33 EZ702U	123	220	3.334	2067/620	24	15	3600	3100	4000	44	3.1	41
971	13	14	2.3	4.9	C102_0031 MB23 EZ501U	48	189	3.091	2491/806	8.0	8.0	3600	3100	4000	11	3.1	27
971	13	14	2.3	4.9	C102_0031 MB23 EZ501U	48	189	3.091	2491/806	12	8.0	3600	3100	4000	11	3.1	27
971	13	14	2.3	4.9	C102_0031 MB23 EZ501U	48	189	3.091	2491/806	16	8.0	3600	3100	4000	11	3.1	27
971	14	16	2.5	4.5	C102_0031 MB23 EZ402U	48	189	3.091	2491/806	8.0	8.0	3600	3100	4000	10	3.1	27
971	14	16	2.5	4.5	C102_0031 MB23 EZ402U	48	189	3.091	2491/806	12	8.0	3600	3100	4000	10	3.1	27
971	14	16	2.5	4.5	C102_0031 MB23 EZ402U	48	189	3.091	2491/806	16	8.0	3600	3100	4000	10	3.1	27
971	21	26	3.7	3.1	C102_0031 MB23 EZ404U	87	189	3.091	2491/806	8.0	8.0	3600	3100	4000	11	3.1	29
971	21	26	3.7	3.1	C102_0031 MB23 EZ404U	87	189	3.091	2491/806	12	8.0	3600	3100	4000	11	3.1	29
971	21	26	3.7	3.1	C102_0031 MB23 EZ404U	87	189	3.091	2491/806	16	8.0	3600	3100	4000	11	3.1	29
971	22	24	4.0	2.9	C102_0031 MB23 EZ502U	93	189	3.091	2491/806	8.0	8.0	3600	3100	4000	14	3.1	29
971	22	24	4.0	2.9	C102_0031 MB23 EZ502U	93	189	3.091	2491/806	12	8.0	3600	3100	4000	14	3.1	29
971	22	24	4.0	2.9	C102_0031 MB23 EZ502U	93	189	3.091	2491/806	16	8.0	3600	3100	4000	14	3.1	29
971	22	25	4.0	2.9	C102_0031 MB33 EZ701U	60	220	3.091	2491/806	16	15	3600	3100	4000	39	3.1	38
971	22	25	4.0	2.9	C102_0031 MB33 EZ701U	60	220	3.091	2491/806	24	15	3600	3100	4000	39	3.1	38
971	29	33	5.2	2.2	C102_0031 MB23 EZ503U	112	189	3.091	2491/806	8.0	15	3600	3100	4000	17	3.1	31
971	29	33	5.2	2.2	C102_0031 MB23 EZ503U	112	189	3.091	2491/806	12	15	3600	3100	4000	17	3.1	31
971	36	43	6.4	1.8	C102_0031 MB33 EZ702U	120	220	3.091	2491/806	16	15	3600	3100	4000	44	3.1	41
971	36	43	6.4	1.8	C102_0031 MB33 EZ702U	120	220	3.091	2491/806	24	15	3600	3100	4000	44	3.1	41
971	40	48	7.2	1.6	C102_0031 MB23 EZ505U	112	189	3.091	2491/806	8.0	15	3600	3100	4000	22	3.1	34
971	40	48	7.2	1.6	C102_0031 MB23 EZ505U	112	189	3.091	2491/806	12	15	3600	3100	4000	22	3.1	34
1162	17	22	3.6	3.5	C102_0026 MB23 EZ404U	73	158	2.582	1911/740	8.0	8.0	3100	2600	4000	12	3.1	29
1162	17	22	3.6	3.5	C102_0026 MB23 EZ404U	73	158	2.582	1911/740	12	8.0	3100	2600	4000	12	3.1	29
1162	17	22	3.6	3.5	C102_0026 MB23 EZ404U	73	158	2.582	1911/740	16	8.0	3100	2600	4000	12	3.1	29
1162	19	20	3.9	3.2	C102_0026 MB23 EZ502U	78	158	2.582	1911/740	8.0	8.0	3100	2600	4000	14	3.1	29
1162	19	20	3.9	3.2	C102_0026 MB23 EZ502U	78	158	2.582	1911/740	12	8.0	3100	2600	4000	14	3.1	29
1162	19	20	3.9	3.2	C102_0026 MB23 EZ502U	78	158	2.582	1911/740	16	8.0	3100	2600	4000	14	3.1	29
1162	19	21	3.9	3.2	C102_0026 MB33 EZ701U	50	220	2.582	1911/740	16	15	3100	2600	4000	39	3.1	38
1162	19	21	3.9	3.2	C102_0026 MB33 EZ701U	50	220	2.582	1911/740	24	15	3100	2600	4000	39	3.1	38
1162	19	21	3.9	3.2	C102_0026 MB33 EZ701U	50	220	2.582	1911/740	32	15	3100	2600	4000	39	3.1	38
1162	24	28	5.0	2.5	C102_0026 MB23 EZ503U	94	158	2.582	1911/740	8.0	15	3100	2600	4000	18	3.1	31
1162	24	28	5.0	2.5	C102_0026 MB23 EZ503U	94	158	2.582	1911/740	12	15	3100	2600	4000	18	3.1	31
1162	30	36	6.2	2.0	C102_0026 MB33 EZ702U	103	220	2.582	1911/740	16	15	3100	2600	4000	44	3.1	41
1162	30	36	6.2	2.0	C102_0026 MB33 EZ702U	103	220	2.582	1911/740	24	15	3100	2600	4000	44	3.1	41
1162	30	36	6.2	2.0	C102_0026 MB33 EZ702U	103	220	2.582	1911/740	32	15	3100	2600	4000	44	3.1	41
1162	34	40	7.0	1.8	C102_0026 MB23 EZ505U	94	158	2.582	1911/740	8.0	15	3100	2600	4000	22	3.1	34
1162	34	40	7.0	1.8	C102_0026 MB23 EZ505U	94	158	2.582	1911/740	12	15	3100	2600	4000	22	3.1	34
1253	16	20	3.5	3.6	C102_0024 MB23 EZ404U	67	146	2.394	2303/962	8.0	8.0	3100	2600	4000	12	3.1	29
1253	16	20	3.5	3.6	C102_0024 MB23 EZ404U	67	146	2.394	2303/962	12	8.0	3100	2600	4000	12	3.1	29
1253	16	20	3.5	3.6	C102_0024 MB23 EZ404U	67	146	2.394	2303/962	16	8.0	3100	2600	4000	12	3.1	29
1253	17	19	3.8	3.4	C102_0024 MB23 EZ502U	72	146	2.394	2303/962	8.0	8.0	3100	2600	4000	14	3.1	29
1253	17	19	3.8	3.4	C102_0024 MB23 EZ502U	72	146	2.394	2303/962	12	8.0	3100	2600	4000	14	3.1	29
1253	17	19	3.8	3.4	C102_0024 MB23 EZ502U	72	146	2.394	2303/962	16	8.0	3100	2600	4000	14	3.1	29
1253	17	19	3.8	3.4	C102_0024 MB33 EZ701U	46	214	2.394	2303/962	16	15	3100	2600	4000	39	3.1	38
1253	17	19	3.8	3.4	C102_0024 MB33 EZ701U	46	214	2.394	2303/962	24	15	3100	2600	4000	39	3.1	38
1253	17	19	3.8	3.4	C102_0024 MB33 EZ701U	46	214	2.394	2303/962	32	15	3100	2600	4000	39	3.1	38
1253	23	26	5.0	2.6	C102_0024 MB23 EZ503U	87	146	2.394	2303/962	8.0	15	3100	2600	4000	18	3.1	31
1253	23	26	5.0	2.6	C102_0024 MB23 EZ503U	87	146	2.394	2303/962	12	15	3100	2600	4000	18	3.1	31
1253	28	33	6.2	2.1	C102_0024 MB33 EZ702U	95	214	2.394	2303/962	16	15	3100	2600	4000	44	3.1	41
1253	28	33	6.2	2.1	C102_0024 MB33 EZ702U	95	214	2.394	2303/962	24	15	3100	2600	4000	44	3.1	41
1253	28	33	6.2	2.1	C102_0024 MB33 EZ702U	95	214	2.394	2303/962	32	15	3100	2600	4000	44	3.1	41
1253	31	37	6.9	1.9	C102_0024 MB23 EZ505U	87	146	2.394	2303/962	8.0	15	3100	2600	4000	22	3.1	34
1253	31	37	6.9	1.9	C102_0024 MB23 EZ505U	87	146	2.394	2303/962	12	15	3100	2600	4000	22	3.1	34
1378	15	18	3.5	3.9	C102_0022 MB23 EZ404U	61	133	2.177	468/215	8.0	8.0	3100	2600	4000	12	3.1	29
1378	15	18	3.5	3.9	C102_0022 MB23 EZ404U	61	133	2.177	468/215	12	8.0	3100	2600	4000	12	3.1	29
1378	15	18	3.5	3.9	C102_0022 MB23 EZ404U	61	133	2.177	468/215	16	8.0	3100	2600	4000	12	3.1	29
1378	16	17	3.7	3.6	C102_0022 MB23 EZ502U	65	133	2.177	468/215	8.0	8.0	3100	2600	4000	14	3.1	29
1378	16	17	3.7	3.6	C102_0022 MB23 EZ502U	65	133	2.177	468/215	12	8.0	3100	2600	4000	14	3.1	29

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
C1 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 140 Nm)																	
1378	16	17	3.7	3.6	C102_0022 MB23 EZ502U	65	133	2.177	468/215	16	8.0	3100	2600	4000	14	3.1	29
1378	16	18	3.7	3.6	C102_0022 MB33 EZ701U	42	220	2.177	468/215	16	15	3100	2600	4000	39	3.1	38
1378	16	18	3.7	3.6	C102_0022 MB33 EZ701U	42	220	2.177	468/215	24	15	3100	2600	4000	39	3.1	38
1378	16	18	3.7	3.6	C102_0022 MB33 EZ701U	42	220	2.177	468/215	32	15	3100	2600	4000	39	3.1	38
1378	16	18	3.7	3.6	C102_0022 MB33 EZ701U	42	220	2.177	468/215	45	15	3100	2600	4000	39	3.1	38
1378	20	23	4.9	2.8	C102_0022 MB23 EZ503U	79	133	2.177	468/215	8.0	15	3100	2600	4000	18	3.1	31
1378	20	23	4.9	2.8	C102_0022 MB23 EZ503U	79	133	2.177	468/215	12	15	3100	2600	4000	18	3.1	31
1378	25	30	6.1	2.2	C102_0022 MB33 EZ702U	87	220	2.177	468/215	16	15	3100	2600	4000	45	3.1	41
1378	25	30	6.1	2.2	C102_0022 MB33 EZ702U	87	220	2.177	468/215	24	15	3100	2600	4000	45	3.1	41
1378	25	30	6.1	2.2	C102_0022 MB33 EZ702U	87	220	2.177	468/215	32	15	3100	2600	4000	45	3.1	41
1378	25	30	6.1	2.2	C102_0022 MB33 EZ702U	87	220	2.177	468/215	45	15	3100	2600	4000	45	3.1	41
1378	29	34	6.8	2.0	C102_0022 MB23 EZ505U	79	133	2.177	468/215	8.0	15	3100	2600	4000	23	3.1	34
1378	29	34	6.8	2.0	C102_0022 MB23 EZ505U	79	133	2.177	468/215	12	15	3100	2600	4000	23	3.1	34
1378	35	44	8.3	1.6	C102_0022 MB33 EZ703U	107	220	2.177	468/215	16	32	3100	2600	4000	56	3.1	44
1487	14	17	3.4	4.1	C102_0020 MB23 EZ404U	57	123	2.018	1128/559	8.0	8.0	3100	2600	4000	12	3.1	29
1487	14	17	3.4	4.1	C102_0020 MB23 EZ404U	57	123	2.018	1128/559	12	8.0	3100	2600	4000	12	3.1	29
1487	14	17	3.4	4.1	C102_0020 MB23 EZ404U	57	123	2.018	1128/559	16	8.0	3100	2600	4000	12	3.1	29
1487	14	16	3.7	3.8	C102_0020 MB23 EZ502U	61	123	2.018	1128/559	8.0	8.0	3100	2600	4000	14	3.1	29
1487	14	16	3.7	3.8	C102_0020 MB23 EZ502U	61	123	2.018	1128/559	12	8.0	3100	2600	4000	14	3.1	29
1487	14	16	3.7	3.8	C102_0020 MB23 EZ502U	61	123	2.018	1128/559	16	8.0	3100	2600	4000	14	3.1	29
1487	14	16	3.7	3.8	C102_0020 MB33 EZ701U	39	214	2.018	1128/559	16	15	3100	2600	4000	39	3.1	38
1487	14	16	3.7	3.8	C102_0020 MB33 EZ701U	39	214	2.018	1128/559	24	15	3100	2600	4000	39	3.1	38
1487	14	16	3.7	3.8	C102_0020 MB33 EZ701U	39	214	2.018	1128/559	32	15	3100	2600	4000	39	3.1	38
1487	14	16	3.7	3.8	C102_0020 MB33 EZ701U	39	214	2.018	1128/559	45	15	3100	2600	4000	39	3.1	38
1487	19	22	4.8	2.9	C102_0020 MB23 EZ503U	73	123	2.018	1128/559	8.0	15	3100	2600	4000	18	3.1	31
1487	19	22	4.8	2.9	C102_0020 MB23 EZ503U	73	123	2.018	1128/559	12	15	3100	2600	4000	18	3.1	31
1487	23	28	6.0	2.3	C102_0020 MB33 EZ702U	80	214	2.018	1128/559	16	15	3100	2600	4000	45	3.1	41
1487	23	28	6.0	2.3	C102_0020 MB33 EZ702U	80	214	2.018	1128/559	24	15	3100	2600	4000	45	3.1	41
1487	23	28	6.0	2.3	C102_0020 MB33 EZ702U	80	214	2.018	1128/559	32	15	3100	2600	4000	45	3.1	41
1487	23	28	6.0	2.3	C102_0020 MB33 EZ702U	80	214	2.018	1128/559	45	15	3100	2600	4000	45	3.1	41
1487	26	31	6.7	2.1	C102_0020 MB23 EZ505U	73	123	2.018	1128/559	8.0	15	3100	2600	4000	23	3.1	34
1487	26	31	6.7	2.1	C102_0020 MB23 EZ505U	73	123	2.018	1128/559	12	15	3100	2600	4000	23	3.1	34
1487	32	41	8.2	1.7	C102_0020 MB33 EZ703U	104	214	2.018	1128/559	16	32	3100	2600	4000	56	3.1	44
1487	32	41	8.2	1.7	C102_0020 MB33 EZ703U	104	214	2.018	1128/559	24	32	3100	2600	4000	56	3.1	44
C2 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 230 Nm)																	
244	51	56	1.6	3.8	C202_0125 MB23 EZ501U	191	400	12.32	665/54	8.0	8.0	3700	3500	4000	11	8.3	31
244	56	62	1.8	3.5	C202_0125 MB23 EZ402U	191	400	12.32	665/54	8.0	8.0	3700	3500	4000	9.9	8.3	31
244	82	103	2.6	2.4	C202_0125 MB23 EZ404U	230	400	12.32	665/54	8.0	8.0	3700	3500	4000	11	8.3	33
244	88	96	2.8	2.2	C202_0125 MB23 EZ502U	230	400	12.32	665/54	8.0	8.0	3700	3500	4000	13	8.3	33
255	49	54	1.6	3.9	C202_0120 MB23 EZ501U	183	400	11.76	294/25	8.0	8.0	3500	3100	4000	11	8.3	31
255	54	59	1.8	3.6	C202_0120 MB23 EZ402U	183	400	11.76	294/25	8.0	8.0	3500	3100	4000	10	8.3	31
255	79	98	2.6	2.4	C202_0120 MB23 EZ404U	230	400	11.76	294/25	8.0	8.0	3500	3100	4000	11	8.3	33
255	84	91	2.8	2.3	C202_0120 MB23 EZ502U	230	400	11.76	294/25	8.0	8.0	3500	3100	4000	14	8.3	33
292	43	47	1.6	4.3	C202_0105 MB23 EZ501U	159	400	10.26	513/50	8.0	8.0	3500	3100	4000	11	8.3	31
292	43	47	1.6	4.3	C202_0105 MB23 EZ501U	159	400	10.26	513/50	12	8.0	3500	3100	4000	11	8.3	31
292	47	52	1.7	3.9	C202_0105 MB23 EZ402U	159	400	10.26	513/50	8.0	8.0	3500	3100	4000	10	8.3	31
292	47	52	1.7	3.9	C202_0105 MB23 EZ402U	159	400	10.26	513/50	12	8.0	3500	3100	4000	10	8.3	31
292	69	86	2.6	2.7	C202_0105 MB23 EZ404U	230	400	10.26	513/50	8.0	8.0	3500	3100	4000	11	8.3	33
292	69	86	2.6	2.7	C202_0105 MB23 EZ404U	230	400	10.26	513/50	12	8.0	3500	3100	4000	11	8.3	33
292	74	80	2.7	2.5	C202_0105 MB23 EZ502U	230	400	10.26	513/50	8.0	8.0	3500	3100	4000	14	8.3	33
292	74	80	2.7	2.5	C202_0105 MB23 EZ502U	230	400	10.26	513/50	12	8.0	3500	3100	4000	14	8.3	33
320	39	43	1.6	4.6	C202_0094 MB23 EZ501U	146	400	9.387	2450/261	8.0	8.0	3500	3100	4000	12	8.3	31
320	39	43	1.6	4.6	C202_0094 MB23 EZ501U	146	400	9.387	2450/261	12	8.0	3500	3100	4000	12	8.3	31
320	39	43	1.6	4.6	C202_0094 MB23 EZ501U	146	400	9.387	2450/261	16	8.0	3500	3100	4000	12	8.3	31
320	43	47	1.7	4.2	C202_0094 MB23 EZ402U	146	400	9.387	2450/261	8.0	8.0	3500	3100	4000	10	8.3	31
320	43	47	1.7	4.2	C202_0094 MB23 EZ402U	146	400	9.387	2450/261	12	8.0	3500	3100	4000	10	8.3	31
320	43	47	1.7	4.2	C202_0094 MB23 EZ402U	146	400	9.387	2450/261	16	8.0	3500	3100	4000	10	8.3	31
320	63	78	2.5	2.8	C202_0094 MB23 EZ404U	230	400	9.387	2450/261	8.0	8.0	3500	3100	4000	12	8.3	33
320	63	78	2.5	2.8	C202_0094 MB23 EZ404U	230	400	9.387	2450/261	12	8.0	3500	3100	4000	12	8.3	33
320	63	78	2.5	2.8	C202_0094 MB23 EZ404U	230	400	9.387	2450/261	16	8.0	3500	3100	4000	12	8.3	33
320	67	73	2.7	2.7	C202_0094 MB23 EZ502U	230	400	9.387	2450/261	8.0	8.0	3500	3100	4000	14	8.3	33
320	67	73	2.7	2.7	C202_0094 MB23 EZ502U	230	400	9.387	2450/261	12	8.0	3500	3100	4000	14	8.3	33
320	67	73	2.7	2.7	C202_0094 MB23 EZ502U	230	400	9.387	2450/261	16	8.0	3500	3100	4000	14	8.3	33
320	88	101	3.5	2.0	C202_0094 MB23 EZ503U	230	400	9.387	2450/261	8.0	15	3500	3100	4000	18	8.3	35

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
C2 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 230 Nm)																	
366	34	37	1.5	5.0	C202_0082 MB23 EZ501U	127	400	8.190	475/58	8.0	8.0	3500	3100	4000	12	8.3	31
366	34	37	1.5	5.0	C202_0082 MB23 EZ501U	127	400	8.190	475/58	12	8.0	3500	3100	4000	12	8.3	31
366	34	37	1.5	5.0	C202_0082 MB23 EZ501U	127	400	8.190	475/58	16	8.0	3500	3100	4000	12	8.3	31
366	37	41	1.7	4.6	C202_0082 MB23 EZ402U	127	400	8.190	475/58	8.0	8.0	3500	3100	4000	11	8.3	31
366	37	41	1.7	4.6	C202_0082 MB23 EZ402U	127	400	8.190	475/58	12	8.0	3500	3100	4000	11	8.3	31
366	37	41	1.7	4.6	C202_0082 MB23 EZ402U	127	400	8.190	475/58	16	8.0	3500	3100	4000	11	8.3	31
366	55	68	2.5	3.1	C202_0082 MB23 EZ404U	230	400	8.190	475/58	8.0	8.0	3500	3100	4000	12	8.3	33
366	55	68	2.5	3.1	C202_0082 MB23 EZ404U	230	400	8.190	475/58	12	8.0	3500	3100	4000	12	8.3	33
366	55	68	2.5	3.1	C202_0082 MB23 EZ404U	230	400	8.190	475/58	16	8.0	3500	3100	4000	12	8.3	33
366	59	64	2.6	2.9	C202_0082 MB23 EZ502U	230	400	8.190	475/58	8.0	8.0	3500	3100	4000	14	8.3	33
366	59	64	2.6	2.9	C202_0082 MB23 EZ502U	230	400	8.190	475/58	12	8.0	3500	3100	4000	14	8.3	33
366	59	64	2.6	2.9	C202_0082 MB23 EZ502U	230	400	8.190	475/58	16	8.0	3500	3100	4000	14	8.3	33
366	77	88	3.5	2.2	C202_0082 MB23 EZ503U	230	400	8.190	475/58	8.0	15	3500	3100	4000	18	8.3	35
366	77	88	3.5	2.2	C202_0082 MB23 EZ503U	230	400	8.190	475/58	12	15	3500	3100	4000	18	8.3	35
366	107	127	4.8	1.6	C202_0082 MB23 EZ505U	230	400	8.190	475/58	8.0	15	3500	3100	4000	22	8.3	38
366	107	127	4.8	1.6	C202_0082 MB23 EZ505U	230	400	8.190	475/58	12	15	3500	3100	4000	22	8.3	38
385	33	36	1.9	4.1	C202_0078 MB23 EZ501U	121	350	7.800	39/5	8.0	8.0	4000	3900	4000	11	6.0	31
385	33	36	1.9	4.1	C202_0078 MB23 EZ501U	121	350	7.800	39/5	12	8.0	4000	3900	4000	11	6.0	31
385	33	36	1.9	4.1	C202_0078 MB23 EZ501U	121	350	7.800	39/5	16	8.0	4000	3900	4000	11	6.0	31
385	36	39	2.1	3.7	C202_0078 MB23 EZ402U	121	350	7.800	39/5	8.0	8.0	4000	3900	4000	9.5	6.0	31
385	36	39	2.1	3.7	C202_0078 MB23 EZ402U	121	350	7.800	39/5	12	8.0	4000	3900	4000	9.5	6.0	31
385	36	39	2.1	3.7	C202_0078 MB23 EZ402U	121	350	7.800	39/5	16	8.0	4000	3900	4000	9.5	6.0	31
385	52	65	3.1	2.5	C202_0078 MB23 EZ404U	200	350	7.800	39/5	8.0	8.0	4000	3900	4000	11	6.0	33
385	52	65	3.1	2.5	C202_0078 MB23 EZ404U	200	350	7.800	39/5	12	8.0	4000	3900	4000	11	6.0	33
385	52	65	3.1	2.5	C202_0078 MB23 EZ404U	200	350	7.800	39/5	16	8.0	4000	3900	4000	11	6.0	33
385	56	61	3.3	2.4	C202_0078 MB23 EZ502U	200	350	7.800	39/5	8.0	8.0	4000	3900	4000	13	6.0	33
385	56	61	3.3	2.4	C202_0078 MB23 EZ502U	200	350	7.800	39/5	12	8.0	4000	3900	4000	13	6.0	33
385	56	61	3.3	2.4	C202_0078 MB23 EZ502U	200	350	7.800	39/5	16	8.0	4000	3900	4000	13	6.0	33
385	73	84	4.4	1.8	C202_0078 MB23 EZ503U	200	350	7.800	39/5	8.0	15	4000	3900	4000	17	6.0	35
477	26	29	1.9	4.7	C202_0063 MB23 EZ501U	98	350	6.295	3330/529	8.0	8.0	3700	3500	4000	11	6.0	31
477	26	29	1.9	4.7	C202_0063 MB23 EZ501U	98	350	6.295	3330/529	12	8.0	3700	3500	4000	11	6.0	31
477	26	29	1.9	4.7	C202_0063 MB23 EZ501U	98	350	6.295	3330/529	16	8.0	3700	3500	4000	11	6.0	31
477	29	32	2.0	4.3	C202_0063 MB23 EZ402U	98	350	6.295	3330/529	8.0	8.0	3700	3500	4000	9.8	6.0	31
477	29	32	2.0	4.3	C202_0063 MB23 EZ402U	98	350	6.295	3330/529	12	8.0	3700	3500	4000	9.8	6.0	31
477	29	32	2.0	4.3	C202_0063 MB23 EZ402U	98	350	6.295	3330/529	16	8.0	3700	3500	4000	9.8	6.0	31
477	42	53	3.0	2.9	C202_0063 MB23 EZ404U	177	350	6.295	3330/529	8.0	8.0	3700	3500	4000	11	6.0	33
477	42	53	3.0	2.9	C202_0063 MB23 EZ404U	177	350	6.295	3330/529	12	8.0	3700	3500	4000	11	6.0	33
477	42	53	3.0	2.9	C202_0063 MB23 EZ404U	177	350	6.295	3330/529	16	8.0	3700	3500	4000	11	6.0	33
477	45	49	3.2	2.7	C202_0063 MB23 EZ502U	189	350	6.295	3330/529	8.0	8.0	3700	3500	4000	13	6.0	33
477	45	49	3.2	2.7	C202_0063 MB23 EZ502U	189	350	6.295	3330/529	12	8.0	3700	3500	4000	13	6.0	33
477	45	49	3.2	2.7	C202_0063 MB23 EZ502U	189	350	6.295	3330/529	16	8.0	3700	3500	4000	13	6.0	33
477	45	51	3.2	2.7	C202_0063 MB33 EZ701U	122	350	6.295	3330/529	16	15	3700	3500	4000	38	6.0	42
477	59	68	4.2	2.1	C202_0063 MB23 EZ503U	200	350	6.295	3330/529	8.0	15	3700	3500	4000	17	6.0	35
477	59	68	4.2	2.1	C202_0063 MB23 EZ503U	200	350	6.295	3330/529	12	15	3700	3500	4000	17	6.0	35
477	73	88	5.2	1.7	C202_0063 MB33 EZ702U	200	350	6.295	3330/529	16	15	3700	3500	4000	44	6.0	45
518	24	26	1.8	5.0	C202_0058 MB23 EZ501U	90	350	5.791	666/115	8.0	8.0	3700	3500	4000	11	6.0	31
518	24	26	1.8	5.0	C202_0058 MB23 EZ501U	90	350	5.791	666/115	12	8.0	3700	3500	4000	11	6.0	31
518	24	26	1.8	5.0	C202_0058 MB23 EZ501U	90	350	5.791	666/115	16	8.0	3700	3500	4000	11	6.0	31
518	26	29	2.0	4.5	C202_0058 MB23 EZ402U	90	350	5.791	666/115	8.0	8.0	3700	3500	4000	9.8	6.0	31
518	26	29	2.0	4.5	C202_0058 MB23 EZ402U	90	350	5.791	666/115	12	8.0	3700	3500	4000	9.8	6.0	31
518	26	29	2.0	4.5	C202_0058 MB23 EZ402U	90	350	5.791	666/115	16	8.0	3700	3500	4000	9.8	6.0	31
518	39	48	3.0	3.1	C202_0058 MB23 EZ404U	163	350	5.791	666/115	8.0	8.0	3700	3500	4000	11	6.0	33
518	39	48	3.0	3.1	C202_0058 MB23 EZ404U	163	350	5.791	666/115	12	8.0	3700	3500	4000	11	6.0	33
518	39	48	3.0	3.1	C202_0058 MB23 EZ404U	163	350	5.791	666/115	16	8.0	3700	3500	4000	11	6.0	33
518	42	45	3.2	2.9	C202_0058 MB23 EZ502U	174	350	5.791	666/115	8.0	8.0	3700	3500	4000	13	6.0	33
518	42	45	3.2	2.9	C202_0058 MB23 EZ502U	174	350	5.791	666/115	12	8.0	3700	3500	4000	13	6.0	33
518	42	45	3.2	2.9	C202_0058 MB23 EZ502U	174	350	5.791	666/115	16	8.0	3700	3500	4000	13	6.0	33
518	42	47	3.2	2.9	C202_0058 MB33 EZ701U	112	350	5.791	666/115	16	15	3700	3500	4000	38	6.0	42
518	54	62	4.2	2.2	C202_0058 MB23 EZ503U	200	350	5.791	666/115	8.0	15	3700	3500	4000	17	6.0	35
518	54	62	4.2	2.2	C202_0058 MB23 EZ503U	200	350	5.791	666/115	12	15	3700	3500	4000	17	6.0	35
518	67	81	5.1	1.8	C202_0058 MB33 EZ702U	200	350	5.791	666/115	16	15	3700	3500	4000	44	6.0	45
518	76	90	5.8	1.6	C202_0058 MB23 EZ505U	200	350	5.791	666/115	8.0	15	3700	3500	4000	21	6.0	38
518	76	90	5.8	1.6	C202_0058 MB23 EZ505U	200	350	5.791	666/115	12	15	3700	3500	4000	21	6.0	38
591	23	26	2.0	5.0	C202_0051 MB23 EZ402U	79	310	5.072	350/69	8.0	8.0	3700	3500	4000	10	6.0	31

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
C2 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 230 Nm)																	
591	23	26	2.0	5.0	C202_0051 MB23 EZ402U	79	310	5.072	350/69	12	8.0	3700	3500	4000	10	6.0	31
591	23	26	2.0	5.0	C202_0051 MB23 EZ402U	79	310	5.072	350/69	16	8.0	3700	3500	4000	10	6.0	31
591	34	42	2.9	3.4	C202_0051 MB23 EZ404U	143	310	5.072	350/69	8.0	8.0	3700	3500	4000	11	6.0	33
591	34	42	2.9	3.4	C202_0051 MB23 EZ404U	143	310	5.072	350/69	12	8.0	3700	3500	4000	11	6.0	33
591	34	42	2.9	3.4	C202_0051 MB23 EZ404U	143	310	5.072	350/69	16	8.0	3700	3500	4000	11	6.0	33
591	36	39	3.1	3.1	C202_0051 MB23 EZ502U	153	310	5.072	350/69	8.0	8.0	3700	3500	4000	14	6.0	33
591	36	39	3.1	3.1	C202_0051 MB23 EZ502U	153	310	5.072	350/69	12	8.0	3700	3500	4000	14	6.0	33
591	36	39	3.1	3.1	C202_0051 MB23 EZ502U	153	310	5.072	350/69	16	8.0	3700	3500	4000	14	6.0	33
591	36	41	3.1	3.1	C202_0051 MB33 EZ701U	98	350	5.072	350/69	16	15	3700	3500	4000	39	6.0	42
591	36	41	3.1	3.1	C202_0051 MB33 EZ701U	98	350	5.072	350/69	24	15	3700	3500	4000	39	6.0	42
591	48	55	4.1	2.4	C202_0051 MB23 EZ503U	184	310	5.072	350/69	8.0	15	3700	3500	4000	17	6.0	35
591	48	55	4.1	2.4	C202_0051 MB23 EZ503U	184	310	5.072	350/69	12	15	3700	3500	4000	17	6.0	35
591	59	71	5.0	1.9	C202_0051 MB33 EZ702U	200	350	5.072	350/69	16	15	3700	3500	4000	44	6.0	45
591	59	71	5.0	1.9	C202_0051 MB33 EZ702U	200	350	5.072	350/69	24	15	3700	3500	4000	44	6.0	45
591	66	79	5.7	1.7	C202_0051 MB23 EZ505U	184	310	5.072	350/69	8.0	15	3700	3500	4000	22	6.0	38
591	66	79	5.7	1.7	C202_0051 MB23 EZ505U	184	310	5.072	350/69	12	15	3700	3500	4000	22	6.0	38
643	31	39	2.9	3.6	C202_0047 MB23 EZ404U	131	285	4.667	14/3	8.0	8.0	3700	3500	4000	11	6.0	33
643	31	39	2.9	3.6	C202_0047 MB23 EZ404U	131	285	4.667	14/3	12	8.0	3700	3500	4000	11	6.0	33
643	31	39	2.9	3.6	C202_0047 MB23 EZ404U	131	285	4.667	14/3	16	8.0	3700	3500	4000	11	6.0	33
643	34	36	3.1	3.3	C202_0047 MB23 EZ502U	140	285	4.667	14/3	8.0	8.0	3700	3500	4000	14	6.0	33
643	34	36	3.1	3.3	C202_0047 MB23 EZ502U	140	285	4.667	14/3	12	8.0	3700	3500	4000	14	6.0	33
643	34	36	3.1	3.3	C202_0047 MB23 EZ502U	140	285	4.667	14/3	16	8.0	3700	3500	4000	14	6.0	33
643	34	38	3.1	3.3	C202_0047 MB33 EZ701U	91	350	4.667	14/3	16	15	3700	3500	4000	39	6.0	42
643	34	38	3.1	3.3	C202_0047 MB33 EZ701U	91	350	4.667	14/3	24	15	3700	3500	4000	39	6.0	42
643	44	50	4.0	2.5	C202_0047 MB23 EZ503U	170	285	4.667	14/3	8.0	15	3700	3500	4000	17	6.0	35
643	44	50	4.0	2.5	C202_0047 MB23 EZ503U	170	285	4.667	14/3	12	15	3700	3500	4000	17	6.0	35
643	54	65	5.0	2.1	C202_0047 MB33 EZ702U	186	350	4.667	14/3	16	15	3700	3500	4000	44	6.0	45
643	54	65	5.0	2.1	C202_0047 MB33 EZ702U	186	350	4.667	14/3	24	15	3700	3500	4000	44	6.0	45
643	61	72	5.6	1.8	C202_0047 MB23 EZ505U	170	285	4.667	14/3	8.0	15	3700	3500	4000	22	6.0	38
643	61	72	5.6	1.8	C202_0047 MB23 EZ505U	170	285	4.667	14/3	12	15	3700	3500	4000	22	6.0	38
710	28	35	2.8	3.8	C202_0042 MB23 EZ404U	119	258	4.226	486/115	8.0	8.0	3500	3100	4000	12	6.0	33
710	28	35	2.8	3.8	C202_0042 MB23 EZ404U	119	258	4.226	486/115	12	8.0	3500	3100	4000	12	6.0	33
710	28	35	2.8	3.8	C202_0042 MB23 EZ404U	119	258	4.226	486/115	16	8.0	3500	3100	4000	12	6.0	33
710	30	33	3.0	3.6	C202_0042 MB23 EZ502U	127	258	4.226	486/115	8.0	8.0	3500	3100	4000	14	6.0	33
710	30	33	3.0	3.6	C202_0042 MB23 EZ502U	127	258	4.226	486/115	12	8.0	3500	3100	4000	14	6.0	33
710	30	33	3.0	3.6	C202_0042 MB23 EZ502U	127	258	4.226	486/115	16	8.0	3500	3100	4000	14	6.0	33
710	30	34	3.0	3.6	C202_0042 MB33 EZ701U	82	350	4.226	486/115	16	15	3500	3100	4000	39	6.0	42
710	30	34	3.0	3.6	C202_0042 MB33 EZ701U	82	350	4.226	486/115	24	15	3500	3100	4000	39	6.0	42
710	30	34	3.0	3.6	C202_0042 MB33 EZ701U	82	350	4.226	486/115	32	15	3500	3100	4000	39	6.0	42
710	40	46	3.9	2.7	C202_0042 MB23 EZ503U	154	258	4.226	486/115	8.0	15	3500	3100	4000	18	6.0	35
710	40	46	3.9	2.7	C202_0042 MB23 EZ503U	154	258	4.226	486/115	12	15	3500	3100	4000	18	6.0	35
710	49	59	4.9	2.2	C202_0042 MB33 EZ702U	168	350	4.226	486/115	16	15	3500	3100	4000	44	6.0	45
710	49	59	4.9	2.2	C202_0042 MB33 EZ702U	168	350	4.226	486/115	24	15	3500	3100	4000	44	6.0	45
710	49	59	4.9	2.2	C202_0042 MB33 EZ702U	168	350	4.226	486/115	32	15	3500	3100	4000	44	6.0	45
710	55	66	5.5	1.9	C202_0042 MB23 EZ505U	154	258	4.226	486/115	8.0	15	3500	3100	4000	22	6.0	38
710	55	66	5.5	1.9	C202_0042 MB23 EZ505U	154	258	4.226	486/115	12	15	3500	3100	4000	22	6.0	38
772	26	32	2.8	4.0	C202_0039 MB23 EZ404U	109	238	3.888	486/125	8.0	8.0	3500	3100	4000	12	6.0	33
772	26	32	2.8	4.0	C202_0039 MB23 EZ404U	109	238	3.888	486/125	12	8.0	3500	3100	4000	12	6.0	33
772	26	32	2.8	4.0	C202_0039 MB23 EZ404U	109	238	3.888	486/125	16	8.0	3500	3100	4000	12	6.0	33
772	28	30	3.0	3.8	C202_0039 MB23 EZ502U	117	238	3.888	486/125	8.0	8.0	3500	3100	4000	14	6.0	33
772	28	30	3.0	3.8	C202_0039 MB23 EZ502U	117	238	3.888	486/125	12	8.0	3500	3100	4000	14	6.0	33
772	28	30	3.0	3.8	C202_0039 MB23 EZ502U	117	238	3.888	486/125	16	8.0	3500	3100	4000	14	6.0	33
772	28	31	3.0	3.8	C202_0039 MB33 EZ701U	75	350	3.888	486/125	16	15	3500	3100	4000	39	6.0	42
772	28	31	3.0	3.8	C202_0039 MB33 EZ701U	75	350	3.888	486/125	24	15	3500	3100	4000	39	6.0	42
772	28	31	3.0	3.8	C202_0039 MB33 EZ701U	75	350	3.888	486/125	32	15	3500	3100	4000	39	6.0	42
772	37	42	3.9	2.9	C202_0039 MB23 EZ503U	141	238	3.888	486/125	8.0	15	3500	3100	4000	18	6.0	35
772	37	42	3.9	2.9	C202_0039 MB23 EZ503U	141	238	3.888	486/125	12	15	3500	3100	4000	18	6.0	35
772	45	54	4.8	2.3	C202_0039 MB33 EZ702U	155	350	3.888	486/125	16	15	3500	3100	4000	44	6.0	45
772	45	54	4.8	2.3	C202_0039 MB33 EZ702U	155	350	3.888	486/125	24	15	3500	3100	4000	44	6.0	45
772	45	54	4.8	2.3	C202_0039 MB33 EZ702U	155	350	3.888	486/125	32	15	3500	3100	4000	44	6.0	45
772	51	60	5.4	2.1	C202_0039 MB23 EZ505U	141	238	3.888	486/125	8.0	15	3500	3100	4000	22	6.0	38
772	51	60	5.4	2.1	C202_0039 MB23 EZ505U	141	238	3.888	486/125	12	15	3500	3100	4000	22	6.0	38
772	62	78	6.6	1.7	C202_0039 MB33 EZ703U	198	350	3.888	486/125	16	32	3500	3100	4000	56	6.0	48
889	23	28	2.7	4.4	C202_0034 MB23 EZ404U	95	206	3.373	2250/667	8.0	8.0	3500	3100	4000	12	6.0	33

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
C2 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 230 Nm)																	
889	23	28	2.7	4.4	C202_0034 MB23 EZ404U	95	206	3.373	2250/667	12	8.0	3500	3100	4000	12	6.0	33
889	23	28	2.7	4.4	C202_0034 MB23 EZ404U	95	206	3.373	2250/667	16	8.0	3500	3100	4000	12	6.0	33
889	24	26	2.9	4.1	C202_0034 MB23 EZ502U	101	206	3.373	2250/667	8.0	8.0	3500	3100	4000	15	6.0	33
889	24	26	2.9	4.1	C202_0034 MB23 EZ502U	101	206	3.373	2250/667	12	8.0	3500	3100	4000	15	6.0	33
889	24	26	2.9	4.1	C202_0034 MB23 EZ502U	101	206	3.373	2250/667	16	8.0	3500	3100	4000	15	6.0	33
889	24	27	2.9	4.1	C202_0034 MB33 EZ701U	65	350	3.373	2250/667	16	15	3500	3100	4000	40	6.0	42
889	24	27	2.9	4.1	C202_0034 MB33 EZ701U	65	350	3.373	2250/667	24	15	3500	3100	4000	40	6.0	42
889	24	27	2.9	4.1	C202_0034 MB33 EZ701U	65	350	3.373	2250/667	32	15	3500	3100	4000	40	6.0	42
889	24	27	2.9	4.1	C202_0034 MB33 EZ701U	65	350	3.373	2250/667	45	15	3500	3100	4000	40	6.0	42
889	32	36	3.8	3.2	C202_0034 MB23 EZ503U	123	206	3.373	2250/667	8.0	15	3500	3100	4000	18	6.0	35
889	32	36	3.8	3.2	C202_0034 MB23 EZ503U	123	206	3.373	2250/667	12	15	3500	3100	4000	18	6.0	35
889	39	47	4.7	2.5	C202_0034 MB33 EZ702U	134	350	3.373	2250/667	16	15	3500	3100	4000	45	6.0	45
889	39	47	4.7	2.5	C202_0034 MB33 EZ702U	134	350	3.373	2250/667	24	15	3500	3100	4000	45	6.0	45
889	39	47	4.7	2.5	C202_0034 MB33 EZ702U	134	350	3.373	2250/667	32	15	3500	3100	4000	45	6.0	45
889	39	47	4.7	2.5	C202_0034 MB33 EZ702U	134	350	3.373	2250/667	45	15	3500	3100	4000	45	6.0	45
889	44	52	5.3	2.3	C202_0034 MB23 EZ505U	123	206	3.373	2250/667	8.0	15	3500	3100	4000	23	6.0	38
889	44	52	5.3	2.3	C202_0034 MB23 EZ505U	123	206	3.373	2250/667	12	15	3500	3100	4000	23	6.0	38
889	54	68	6.5	1.9	C202_0034 MB33 EZ703U	189	350	3.373	2250/667	16	32	3500	3100	4000	57	6.0	48
889	54	68	6.5	1.9	C202_0034 MB33 EZ703U	189	350	3.373	2250/667	24	32	3500	3100	4000	57	6.0	48
967	21	26	2.7	4.7	C202_0031 MB23 EZ404U	87	190	3.103	90/29	8.0	8.0	3500	3100	4000	12	6.0	33
967	21	26	2.7	4.7	C202_0031 MB23 EZ404U	87	190	3.103	90/29	12	8.0	3500	3100	4000	12	6.0	33
967	21	26	2.7	4.7	C202_0031 MB23 EZ404U	87	190	3.103	90/29	16	8.0	3500	3100	4000	12	6.0	33
967	22	24	2.9	4.4	C202_0031 MB23 EZ502U	93	190	3.103	90/29	8.0	8.0	3500	3100	4000	15	6.0	33
967	22	24	2.9	4.4	C202_0031 MB23 EZ502U	93	190	3.103	90/29	12	8.0	3500	3100	4000	15	6.0	33
967	22	24	2.9	4.4	C202_0031 MB23 EZ502U	93	190	3.103	90/29	16	8.0	3500	3100	4000	15	6.0	33
967	22	25	2.9	4.4	C202_0031 MB33 EZ701U	60	348	3.103	90/29	16	15	3500	3100	4000	40	6.0	42
967	22	25	2.9	4.4	C202_0031 MB33 EZ701U	60	348	3.103	90/29	24	15	3500	3100	4000	40	6.0	42
967	22	25	2.9	4.4	C202_0031 MB33 EZ701U	60	348	3.103	90/29	32	15	3500	3100	4000	40	6.0	42
967	22	25	2.9	4.4	C202_0031 MB33 EZ701U	60	348	3.103	90/29	45	15	3500	3100	4000	40	6.0	42
967	29	33	3.7	3.3	C202_0031 MB23 EZ503U	113	190	3.103	90/29	8.0	15	3500	3100	4000	18	6.0	35
967	29	33	3.7	3.3	C202_0031 MB23 EZ503U	113	190	3.103	90/29	12	15	3500	3100	4000	18	6.0	35
967	36	43	4.6	2.7	C202_0031 MB33 EZ702U	123	348	3.103	90/29	16	15	3500	3100	4000	45	6.0	45
967	36	43	4.6	2.7	C202_0031 MB33 EZ702U	123	348	3.103	90/29	24	15	3500	3100	4000	45	6.0	45
967	36	43	4.6	2.7	C202_0031 MB33 EZ702U	123	348	3.103	90/29	32	15	3500	3100	4000	45	6.0	45
967	36	43	4.6	2.7	C202_0031 MB33 EZ702U	123	348	3.103	90/29	45	15	3500	3100	4000	45	6.0	45
967	41	48	5.2	2.4	C202_0031 MB23 EZ505U	113	190	3.103	90/29	8.0	15	3500	3100	4000	23	6.0	38
967	41	48	5.2	2.4	C202_0031 MB23 EZ505U	113	190	3.103	90/29	12	15	3500	3100	4000	23	6.0	38
967	50	63	6.4	2.0	C202_0031 MB33 EZ703U	184	348	3.103	90/29	16	32	3500	3100	4000	57	6.0	48
967	50	63	6.4	2.0	C202_0031 MB33 EZ703U	184	348	3.103	90/29	24	32	3500	3100	4000	57	6.0	48
967	64	91	8.2	1.5	C202_0031 MB33 EZ705U	184	348	3.103	90/29	16	32	3500	3100	4000	69	6.0	53
967	64	91	8.2	1.5	C202_0031 MB33 EZ705U	184	348	3.103	90/29	24	32	3500	3100	4000	69	6.0	53
1115	19	21	2.8	4.8	C202_0027 MB23 EZ502U	81	164	2.690	495/184	8.0	8.0	3000	2600	4000	15	6.0	33
1115	19	21	2.8	4.8	C202_0027 MB23 EZ502U	81	164	2.690	495/184	12	8.0	3000	2600	4000	15	6.0	33
1115	19	21	2.8	4.8	C202_0027 MB23 EZ502U	81	164	2.690	495/184	16	8.0	3000	2600	4000	15	6.0	33
1115	19	22	2.8	4.8	C202_0027 MB33 EZ701U	52	302	2.690	495/184	16	15	3000	2600	4000	40	6.0	42
1115	19	22	2.8	4.8	C202_0027 MB33 EZ701U	52	302	2.690	495/184	24	15	3000	2600	4000	40	6.0	42
1115	19	22	2.8	4.8	C202_0027 MB33 EZ701U	52	302	2.690	495/184	32	15	3000	2600	4000	40	6.0	42
1115	19	22	2.8	4.8	C202_0027 MB33 EZ701U	52	302	2.690	495/184	45	15	3000	2600	4000	40	6.0	42
1115	25	29	3.7	3.7	C202_0027 MB23 EZ503U	98	164	2.690	495/184	8.0	15	3000	2600	4000	19	6.0	35
1115	25	29	3.7	3.7	C202_0027 MB23 EZ503U	98	164	2.690	495/184	12	15	3000	2600	4000	19	6.0	35
1115	31	38	4.5	3.0	C202_0027 MB33 EZ702U	107	302	2.690	495/184	16	15	3000	2600	4000	46	6.0	45
1115	31	38	4.5	3.0	C202_0027 MB33 EZ702U	107	302	2.690	495/184	24	15	3000	2600	4000	46	6.0	45
1115	31	38	4.5	3.0	C202_0027 MB33 EZ702U	107	302	2.690	495/184	32	15	3000	2600	4000	46	6.0	45
1115	31	38	4.5	3.0	C202_0027 MB33 EZ702U	107	302	2.690	495/184	45	15	3000	2600	4000	46	6.0	45
1115	35	42	5.1	2.6	C202_0027 MB23 EZ505U	98	164	2.690	495/184	8.0	15	3000	2600	4000	23	6.0	38
1115	35	42	5.1	2.6	C202_0027 MB23 EZ505U	98	164	2.690	495/184	12	15	3000	2600	4000	23	6.0	38
1115	43	54	6.2	2.2	C202_0027 MB33 EZ703U	170	302	2.690	495/184	16	32	3000	2600	4000	57	6.0	48
1115	43	54	6.2	2.2	C202_0027 MB33 EZ703U	170	302	2.690	495/184	24	32	3000	2600	4000	57	6.0	48
1115	56	79	8.0	1.7	C202_0027 MB33 EZ705U	175	302	2.690	495/184	16	32	3000	2600	4000	70	6.0	53
1115	56	79	8.0	1.7	C202_0027 MB33 EZ705U	175	302	2.690	495/184	24	32	3000	2600	4000	70	6.0	53
1212	23	27	3.6	3.9	C202_0025 MB23 EZ503U	90	151	2.475	99/40	8.0	15	3000	2600	4000	19	6.0	35
1212	23	27	3.6	3.9	C202_0025 MB23 EZ503U	90	151	2.475	99/40	12	15	3000	2600	4000	19	6.0	35
1212	29	35	4.5	3.1	C202_0025 MB33 EZ702U	98	278	2.475	99/40	16	15	3000	2600	4000	46	6.0	45
1212	29	35	4.5	3.1	C202_0025 MB33 EZ702U	98	278	2.475	99/40	24	15	3000	2600	4000	46	6.0	45

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
C2 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 230 Nm)																	
1212	29	35	4.5	3.1	C202_0025 MB33 EZ702U	98	278	2.475	99/40	32	15	3000	2600	4000	46	6.0	45
1212	29	35	4.5	3.1	C202_0025 MB33 EZ702U	98	278	2.475	99/40	45	15	3000	2600	4000	46	6.0	45
1212	32	38	5.0	2.8	C202_0025 MB23 EZ505U	90	151	2.475	99/40	8.0	15	3000	2600	4000	24	6.0	38
1212	32	38	5.0	2.8	C202_0025 MB23 EZ505U	90	151	2.475	99/40	12	15	3000	2600	4000	24	6.0	38
1212	40	50	6.1	2.3	C202_0025 MB33 EZ703U	156	278	2.475	99/40	16	32	3000	2600	4000	58	6.0	48
1212	40	50	6.1	2.3	C202_0025 MB33 EZ703U	156	278	2.475	99/40	24	32	3000	2600	4000	58	6.0	48
1212	51	73	7.9	1.8	C202_0025 MB33 EZ705U	170	278	2.475	99/40	16	32	3000	2600	4000	70	6.0	53
1212	51	73	7.9	1.8	C202_0025 MB33 EZ705U	170	278	2.475	99/40	24	32	3000	2600	4000	70	6.0	53
1374	21	24	3.9	3.9	C202_0022 MB23 EZ503U	79	133	2.184	2160/989	8.0	15	3000	2600	4000	20	6.0	35
1374	21	24	3.9	3.9	C202_0022 MB23 EZ503U	79	133	2.184	2160/989	12	15	3000	2600	4000	20	6.0	35
1374	25	31	4.4	3.4	C202_0022 MB33 EZ702U	87	350	2.184	2160/989	16	15	3000	2600	4000	46	6.0	45
1374	25	31	4.4	3.4	C202_0022 MB33 EZ702U	87	350	2.184	2160/989	24	15	3000	2600	4000	46	6.0	45
1374	25	31	4.4	3.4	C202_0022 MB33 EZ702U	87	350	2.184	2160/989	32	15	3000	2600	4000	46	6.0	45
1374	25	31	4.4	3.4	C202_0022 MB33 EZ702U	87	350	2.184	2160/989	45	15	3000	2600	4000	46	6.0	45
1374	29	34	5.4	2.8	C202_0022 MB23 EZ505U	79	133	2.184	2160/989	8.0	15	3000	2600	4000	24	6.0	38
1374	29	34	5.4	2.8	C202_0022 MB23 EZ505U	79	133	2.184	2160/989	12	15	3000	2600	4000	24	6.0	38
1374	35	44	6.0	2.5	C202_0022 MB33 EZ703U	138	350	2.184	2160/989	16	32	3000	2600	4000	58	6.0	48
1374	35	44	6.0	2.5	C202_0022 MB33 EZ703U	138	350	2.184	2160/989	24	32	3000	2600	4000	58	6.0	48
1374	35	44	6.0	2.5	C202_0022 MB33 EZ703U	138	350	2.184	2160/989	32	32	3000	2600	4000	58	6.0	48
1374	35	44	6.0	2.5	C202_0022 MB33 EZ703U	138	350	2.184	2160/989	45	32	3000	2600	4000	58	6.0	48
1374	45	64	7.8	1.9	C202_0022 MB33 EZ705U	163	350	2.184	2160/989	16	32	3000	2600	4000	71	6.0	53
1374	45	64	7.8	1.9	C202_0022 MB33 EZ705U	163	350	2.184	2160/989	24	32	3000	2600	4000	71	6.0	53
1374	45	64	7.8	1.9	C202_0022 MB33 EZ705U	163	350	2.184	2160/989	32	32	3000	2600	4000	71	6.0	53
1374	45	64	7.8	1.9	C202_0022 MB33 EZ705U	163	350	2.184	2160/989	45	32	3000	2600	4000	71	6.0	53
1493	19	22	4.0	3.9	C202_0020 MB23 EZ503U	73	123	2.009	432/215	8.0	15	3000	2600	4000	20	6.0	35
1493	19	22	4.0	3.9	C202_0020 MB23 EZ503U	73	123	2.009	432/215	12	15	3000	2600	4000	20	6.0	35
1493	23	28	4.3	3.6	C202_0020 MB33 EZ702U	80	350	2.009	432/215	16	15	3000	2600	4000	47	6.0	45
1493	23	28	4.3	3.6	C202_0020 MB33 EZ702U	80	350	2.009	432/215	24	15	3000	2600	4000	47	6.0	45
1493	23	28	4.3	3.6	C202_0020 MB33 EZ702U	80	350	2.009	432/215	32	15	3000	2600	4000	47	6.0	45
1493	23	28	4.3	3.6	C202_0020 MB33 EZ702U	80	350	2.009	432/215	45	15	3000	2600	4000	47	6.0	45
1493	26	31	5.6	2.8	C202_0020 MB23 EZ505U	73	123	2.009	432/215	8.0	15	3000	2600	4000	25	6.0	38
1493	26	31	5.6	2.8	C202_0020 MB23 EZ505U	73	123	2.009	432/215	12	15	3000	2600	4000	25	6.0	38
1493	32	41	5.9	2.6	C202_0020 MB33 EZ703U	127	350	2.009	432/215	16	32	3000	2600	4000	59	6.0	48
1493	32	41	5.9	2.6	C202_0020 MB33 EZ703U	127	350	2.009	432/215	24	32	3000	2600	4000	59	6.0	48
1493	32	41	5.9	2.6	C202_0020 MB33 EZ703U	127	350	2.009	432/215	32	32	3000	2600	4000	59	6.0	48
1493	32	41	5.9	2.6	C202_0020 MB33 EZ703U	127	350	2.009	432/215	45	32	3000	2600	4000	59	6.0	48
1493	42	59	7.7	2.0	C202_0020 MB33 EZ705U	159	350	2.009	432/215	16	32	3000	2600	4000	71	6.0	53
1493	42	59	7.7	2.0	C202_0020 MB33 EZ705U	159	350	2.009	432/215	24	32	3000	2600	4000	71	6.0	53
1493	42	59	7.7	2.0	C202_0020 MB33 EZ705U	159	350	2.009	432/215	32	32	3000	2600	4000	71	6.0	53
1493	42	59	7.7	2.0	C202_0020 MB33 EZ705U	159	350	2.009	432/215	45	32	3000	2600	4000	71	6.0	53
C3 (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 270 Nm)																	
919	92	140	9.3	1.8	C302_0022 MB43 EZ805U	267	538	2.177	468/215	50	115	2700	2300	3000	270	7.1	105
990	86	130	9.2	1.8	C302_0020 MB43 EZ805U	261	499	2.020	608/301	50	115	2700	2300	3000	270	7.1	105
C3 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 400 Nm)																	
128	98	107	1.4	3.6	C302_0230 MB23 EZ501U	350	700	23.47	845/36	8.0	8.0	3800	3500	4000	11	8.7	36
128	107	118	1.5	3.3	C302_0230 MB23 EZ402U	350	700	23.47	845/36	8.0	8.0	3800	3500	4000	9.7	8.7	36
128	157	196	2.2	2.2	C302_0230 MB23 EZ404U	350	700	23.47	845/36	8.0	8.0	3800	3500	4000	11	8.7	38
128	168	182	2.4	2.1	C302_0230 MB23 EZ502U	350	700	23.47	845/36	8.0	8.0	3800	3500	4000	13	8.7	38
144	87	95	1.3	4.0	C302_0210 MB23 EZ501U	323	700	20.80	104/5	8.0	8.0	3800	3500	4000	11	8.7	36
144	95	105	1.4	3.7	C302_0210 MB23 EZ402U	323	700	20.80	104/5	8.0	8.0	3800	3500	4000	9.7	8.7	36
144	139	174	2.1	2.5	C302_0210 MB23 EZ404U	400	700	20.80	104/5	8.0	8.0	3800	3500	4000	11	8.7	38
144	149	161	2.2	2.3	C302_0210 MB23 EZ502U	400	700	20.80	104/5	8.0	8.0	3800	3500	4000	13	8.7	38
171	73	80	1.2	4.7	C302_0175 MB23 EZ501U	272	700	17.54	1105/63	8.0	8.0	3500	3100	4000	11	8.7	36
171	73	80	1.2	4.7	C302_0175 MB23 EZ501U	272	700	17.54	1105/63	12	8.0	3500	3100	4000	11	8.7	36
171	80	88	1.3	4.3	C302_0175 MB23 EZ402U	272	700	17.54	1105/63	8.0	8.0	3500	3100	4000	10	8.7	36
171	80	88	1.3	4.3	C302_0175 MB23 EZ402U	272	700	17.54	1105/63	12	8.0	3500	3100	4000	10	8.7	36
171	117	146	2.0	2.9	C302_0175 MB23 EZ404U	350	700	17.54	1105/63	8.0	8.0	3500	3100	4000	11	8.7	38
171	117	146	2.0	2.9	C302_0175 MB23 EZ404U	350	700	17.54	1105/63	12	8.0	3500	3100	4000	11	8.7	38
171	126	136	2.1	2.7	C302_0175 MB23 EZ502U	350	700	17.54	1105/63	8.0	8.0	3500	3100	4000	14	8.7	38
171	126	136	2.1	2.7	C302_0175 MB23 EZ502U	350	700	17.54	1105/63	12	8.0	3500	3100	4000	14	8.7	38
193	71	78	1.3	4.6	C302_0155 MB23 EZ402U	241	700	15.54	544/35	8.0	8.0	3500	3100	4000	10	8.7	36
193	71	78	1.3	4.6	C302_0155 MB23 EZ402U	241	700	15.54	544/35	12	8.0	3500	3100	4000	10	8.7	36
193	71	78	1.3	4.6	C302_0155 MB23 EZ402U	241	700	15.54	544/35	16	8.0	3500	3100	4000	10	8.7	36
193	104	130	1.9	3.2	C302_0155 MB23 EZ404U	400	700	15.54	544/35	8.0	8.0	3500	3100	4000	11	8.7	38

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
C3 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 400 Nm)																	
193	104	130	1.9	3.2	C302_0155 MB23 EZ404U	400	700	15.54	544/35	12	8.0	3500	3100	4000	11	8.7	38
193	104	130	1.9	3.2	C302_0155 MB23 EZ404U	400	700	15.54	544/35	16	8.0	3500	3100	4000	11	8.7	38
193	112	121	2.1	2.9	C302_0155 MB23 EZ502U	400	700	15.54	544/35	8.0	8.0	3500	3100	4000	14	8.7	38
193	112	121	2.1	2.9	C302_0155 MB23 EZ502U	400	700	15.54	544/35	12	8.0	3500	3100	4000	14	8.7	38
193	112	121	2.1	2.9	C302_0155 MB23 EZ502U	400	700	15.54	544/35	16	8.0	3500	3100	4000	14	8.7	38
193	146	167	2.7	2.2	C302_0155 MB23 EZ503U	400	700	15.54	544/35	8.0	15	3500	3100	4000	17	8.7	40
193	204	241	3.8	1.6	C302_0155 MB23 EZ505U	400	700	15.54	544/35	8.0	15	3500	3100	4000	22	8.7	43
214	64	71	1.3	5.0	C302_0140 MB23 EZ402U	217	700	13.99	2015/144	8.0	8.0	3500	3100	4000	10	8.7	36
214	64	71	1.3	5.0	C302_0140 MB23 EZ402U	217	700	13.99	2015/144	12	8.0	3500	3100	4000	10	8.7	36
214	64	71	1.3	5.0	C302_0140 MB23 EZ402U	217	700	13.99	2015/144	16	8.0	3500	3100	4000	10	8.7	36
214	94	117	1.9	3.4	C302_0140 MB23 EZ404U	350	700	13.99	2015/144	8.0	8.0	3500	3100	4000	12	8.7	38
214	94	117	1.9	3.4	C302_0140 MB23 EZ404U	350	700	13.99	2015/144	12	8.0	3500	3100	4000	12	8.7	38
214	94	117	1.9	3.4	C302_0140 MB23 EZ404U	350	700	13.99	2015/144	16	8.0	3500	3100	4000	12	8.7	38
214	100	109	2.0	3.2	C302_0140 MB23 EZ502U	350	700	13.99	2015/144	8.0	8.0	3500	3100	4000	14	8.7	38
214	100	109	2.0	3.2	C302_0140 MB23 EZ502U	350	700	13.99	2015/144	12	8.0	3500	3100	4000	14	8.7	38
214	100	109	2.0	3.2	C302_0140 MB23 EZ502U	350	700	13.99	2015/144	16	8.0	3500	3100	4000	14	8.7	38
214	132	151	2.7	2.4	C302_0140 MB23 EZ503U	350	700	13.99	2015/144	8.0	15	3500	3100	4000	18	8.7	40
214	132	151	2.7	2.4	C302_0140 MB23 EZ503U	350	700	13.99	2015/144	12	15	3500	3100	4000	18	8.7	40
214	183	217	3.7	1.7	C302_0140 MB23 EZ505U	350	700	13.99	2015/144	8.0	15	3500	3100	4000	22	8.7	43
214	183	217	3.7	1.7	C302_0140 MB23 EZ505U	350	700	13.99	2015/144	12	15	3500	3100	4000	22	8.7	43
242	83	103	1.9	3.7	C302_0125 MB23 EZ404U	349	700	12.40	62/5	8.0	8.0	3500	3100	4000	12	8.7	38
242	83	103	1.9	3.7	C302_0125 MB23 EZ404U	349	700	12.40	62/5	12	8.0	3500	3100	4000	12	8.7	38
242	83	103	1.9	3.7	C302_0125 MB23 EZ404U	349	700	12.40	62/5	16	8.0	3500	3100	4000	12	8.7	38
242	89	96	2.0	3.4	C302_0125 MB23 EZ502U	373	700	12.40	62/5	8.0	8.0	3500	3100	4000	14	8.7	38
242	89	96	2.0	3.4	C302_0125 MB23 EZ502U	373	700	12.40	62/5	12	8.0	3500	3100	4000	14	8.7	38
242	89	96	2.0	3.4	C302_0125 MB23 EZ502U	373	700	12.40	62/5	16	8.0	3500	3100	4000	14	8.7	38
242	89	100	2.0	3.4	C302_0125 MB33 EZ701U	241	700	12.40	62/5	16	15	3500	3100	4000	39	8.7	47
242	117	134	2.6	2.6	C302_0125 MB23 EZ503U	400	700	12.40	62/5	8.0	15	3500	3100	4000	18	8.7	40
242	117	134	2.6	2.6	C302_0125 MB23 EZ503U	400	700	12.40	62/5	12	15	3500	3100	4000	18	8.7	40
242	144	173	3.2	2.1	C302_0125 MB33 EZ702U	400	700	12.40	62/5	16	15	3500	3100	4000	44	8.7	50
242	162	192	3.6	1.9	C302_0125 MB23 EZ505U	400	700	12.40	62/5	8.0	15	3500	3100	4000	22	8.7	43
242	162	192	3.6	1.9	C302_0125 MB23 EZ505U	400	700	12.40	62/5	12	15	3500	3100	4000	22	8.7	43
258	78	97	1.8	3.8	C302_0115 MB23 EZ404U	327	700	11.61	325/28	8.0	8.0	3200	2800	4000	12	8.7	38
258	78	97	1.8	3.8	C302_0115 MB23 EZ404U	327	700	11.61	325/28	12	8.0	3200	2800	4000	12	8.7	38
258	78	97	1.8	3.8	C302_0115 MB23 EZ404U	327	700	11.61	325/28	16	8.0	3200	2800	4000	12	8.7	38
258	83	90	2.0	3.6	C302_0115 MB23 EZ502U	349	700	11.61	325/28	8.0	8.0	3200	2800	4000	14	8.7	38
258	83	90	2.0	3.6	C302_0115 MB23 EZ502U	349	700	11.61	325/28	12	8.0	3200	2800	4000	14	8.7	38
258	83	90	2.0	3.6	C302_0115 MB23 EZ502U	349	700	11.61	325/28	16	8.0	3200	2800	4000	14	8.7	38
258	83	93	2.0	3.6	C302_0115 MB33 EZ701U	225	700	11.61	325/28	16	15	3200	2800	4000	39	8.7	47
258	109	125	2.6	2.7	C302_0115 MB23 EZ503U	350	700	11.61	325/28	8.0	15	3200	2800	4000	18	8.7	40
258	109	125	2.6	2.7	C302_0115 MB23 EZ503U	350	700	11.61	325/28	12	15	3200	2800	4000	18	8.7	40
258	135	162	3.2	2.2	C302_0115 MB33 EZ702U	350	700	11.61	325/28	16	15	3200	2800	4000	45	8.7	50
258	152	180	3.6	2.0	C302_0115 MB23 EZ505U	350	700	11.61	325/28	8.0	15	3200	2800	4000	23	8.7	43
258	152	180	3.6	2.0	C302_0115 MB23 EZ505U	350	700	11.61	325/28	12	15	3200	2800	4000	23	8.7	43
292	69	86	1.8	4.2	C302_0105 MB23 EZ404U	289	629	10.29	72/7	8.0	8.0	3200	2800	4000	12	8.7	38
292	69	86	1.8	4.2	C302_0105 MB23 EZ404U	289	629	10.29	72/7	12	8.0	3200	2800	4000	12	8.7	38
292	69	86	1.8	4.2	C302_0105 MB23 EZ404U	289	629	10.29	72/7	16	8.0	3200	2800	4000	12	8.7	38
292	74	80	1.9	3.9	C302_0105 MB23 EZ502U	309	629	10.29	72/7	8.0	8.0	3200	2800	4000	15	8.7	38
292	74	80	1.9	3.9	C302_0105 MB23 EZ502U	309	629	10.29	72/7	12	8.0	3200	2800	4000	15	8.7	38
292	74	80	1.9	3.9	C302_0105 MB23 EZ502U	309	629	10.29	72/7	16	8.0	3200	2800	4000	15	8.7	38
292	74	83	1.9	3.9	C302_0105 MB33 EZ701U	200	700	10.29	72/7	16	15	3200	2800	4000	39	8.7	47
292	74	83	1.9	3.9	C302_0105 MB33 EZ701U	200	700	10.29	72/7	24	15	3200	2800	4000	39	8.7	47
292	97	111	2.5	3.0	C302_0105 MB23 EZ503U	374	629	10.29	72/7	8.0	15	3200	2800	4000	18	8.7	40
292	97	111	2.5	3.0	C302_0105 MB23 EZ503U	374	629	10.29	72/7	12	15	3200	2800	4000	18	8.7	40
292	120	144	3.1	2.4	C302_0105 MB33 EZ702U	400	700	10.29	72/7	16	15	3200	2800	4000	45	8.7	50
292	120	144	3.1	2.4	C302_0105 MB33 EZ702U	400	700	10.29	72/7	24	15	3200	2800	4000	45	8.7	50
292	135	160	3.5	2.1	C302_0105 MB23 EZ505U	374	629	10.29	72/7	8.0	15	3200	2800	4000	23	8.7	43
292	135	160	3.5	2.1	C302_0105 MB23 EZ505U	374	629	10.29	72/7	12	15	3200	2800	4000	23	8.7	43
322	62	78	1.8	4.4	C302_0093 MB23 EZ404U	262	569	9.310	3575/384	8.0	8.0	3200	2800	4000	13	8.7	38
322	62	78	1.8	4.4	C302_0093 MB23 EZ404U	262	569	9.310	3575/384	12	8.0	3200	2800	4000	13	8.7	38
322	62	78	1.8	4.4	C302_0093 MB23 EZ404U	262	569	9.310	3575/384	16	8.0	3200	2800	4000	13	8.7	38
322	67	72	1.9	4.1	C302_0093 MB23 EZ502U	280	569	9.310	3575/384	8.0	8.0	3200	2800	4000	15	8.7	38
322	67	72	1.9	4.1	C302_0093 MB23 EZ502U	280	569	9.310	3575/384	12	8.0	3200	2800	4000	15	8.7	38
322	67	72	1.9	4.1	C302_0093 MB23 EZ502U	280	569	9.310	3575/384	16	8.0	3200	2800	4000	15	8.7	38

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
C3 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 400 Nm)																	
322	67	75	1.9	4.1	C302_0093 MB33 EZ701U	181	700	9.310	3575/384	16	15	3200	2800	4000	40	8.7	47
322	67	75	1.9	4.1	C302_0093 MB33 EZ701U	181	700	9.310	3575/384	24	15	3200	2800	4000	40	8.7	47
322	88	100	2.5	3.2	C302_0093 MB23 EZ503U	339	569	9.310	3575/384	8.0	15	3200	2800	4000	19	8.7	40
322	88	100	2.5	3.2	C302_0093 MB23 EZ503U	339	569	9.310	3575/384	12	15	3200	2800	4000	19	8.7	40
322	108	130	3.1	2.6	C302_0093 MB33 EZ702U	350	700	9.310	3575/384	16	15	3200	2800	4000	45	8.7	50
322	108	130	3.1	2.6	C302_0093 MB33 EZ702U	350	700	9.310	3575/384	24	15	3200	2800	4000	45	8.7	50
322	122	144	3.5	2.3	C302_0093 MB23 EZ505U	339	569	9.310	3575/384	8.0	15	3200	2800	4000	23	8.7	43
322	122	144	3.5	2.3	C302_0093 MB23 EZ505U	339	569	9.310	3575/384	12	15	3200	2800	4000	23	8.7	43
364	55	69	1.7	4.8	C302_0083 MB23 EZ404U	232	504	8.250	33/4	8.0	8.0	3200	2800	4000	13	8.7	38
364	55	69	1.7	4.8	C302_0083 MB23 EZ404U	232	504	8.250	33/4	12	8.0	3200	2800	4000	13	8.7	38
364	55	69	1.7	4.8	C302_0083 MB23 EZ404U	232	504	8.250	33/4	16	8.0	3200	2800	4000	13	8.7	38
364	59	64	1.9	4.5	C302_0083 MB23 EZ502U	248	504	8.250	33/4	8.0	8.0	3200	2800	4000	15	8.7	38
364	59	64	1.9	4.5	C302_0083 MB23 EZ502U	248	504	8.250	33/4	12	8.0	3200	2800	4000	15	8.7	38
364	59	64	1.9	4.5	C302_0083 MB23 EZ502U	248	504	8.250	33/4	16	8.0	3200	2800	4000	15	8.7	38
364	59	66	1.9	4.5	C302_0083 MB33 EZ701U	160	700	8.250	33/4	16	15	3200	2800	4000	40	8.7	47
364	59	66	1.9	4.5	C302_0083 MB33 EZ701U	160	700	8.250	33/4	24	15	3200	2800	4000	40	8.7	47
364	59	66	1.9	4.5	C302_0083 MB33 EZ701U	160	700	8.250	33/4	32	15	3200	2800	4000	40	8.7	47
364	78	89	2.4	3.4	C302_0083 MB23 EZ503U	300	504	8.250	33/4	8.0	15	3200	2800	4000	19	8.7	40
364	78	89	2.4	3.4	C302_0083 MB23 EZ503U	300	504	8.250	33/4	12	15	3200	2800	4000	19	8.7	40
364	96	115	3.0	2.8	C302_0083 MB33 EZ702U	328	700	8.250	33/4	16	15	3200	2800	4000	45	8.7	50
364	96	115	3.0	2.8	C302_0083 MB33 EZ702U	328	700	8.250	33/4	24	15	3200	2800	4000	45	8.7	50
364	96	115	3.0	2.8	C302_0083 MB33 EZ702U	328	700	8.250	33/4	32	15	3200	2800	4000	45	8.7	50
364	108	128	3.4	2.5	C302_0083 MB23 EZ505U	300	504	8.250	33/4	8.0	15	3200	2800	4000	23	8.7	43
364	108	128	3.4	2.5	C302_0083 MB23 EZ505U	300	504	8.250	33/4	12	15	3200	2800	4000	23	8.7	43
383	52	65	2.1	4.1	C302_0078 MB23 EZ404U	221	479	7.841	494/63	8.0	8.0	3800	3500	4000	11	7.1	38
383	52	65	2.1	4.1	C302_0078 MB23 EZ404U	221	479	7.841	494/63	12	8.0	3800	3500	4000	11	7.1	38
383	52	65	2.1	4.1	C302_0078 MB23 EZ404U	221	479	7.841	494/63	16	8.0	3800	3500	4000	11	7.1	38
383	56	61	2.2	3.9	C302_0078 MB23 EZ502U	236	479	7.841	494/63	8.0	8.0	3800	3500	4000	13	7.1	38
383	56	61	2.2	3.9	C302_0078 MB23 EZ502U	236	479	7.841	494/63	12	8.0	3800	3500	4000	13	7.1	38
383	56	61	2.2	3.9	C302_0078 MB23 EZ502U	236	479	7.841	494/63	16	8.0	3800	3500	4000	13	7.1	38
383	56	63	2.2	3.9	C302_0078 MB33 EZ701U	152	550	7.841	494/63	16	15	3800	3500	4000	38	7.1	47
383	56	63	2.2	3.9	C302_0078 MB33 EZ701U	152	550	7.841	494/63	24	15	3800	3500	4000	38	7.1	47
383	74	84	2.9	2.9	C302_0078 MB23 EZ503U	285	479	7.841	494/63	8.0	15	3800	3500	4000	17	7.1	40
383	74	84	2.9	2.9	C302_0078 MB23 EZ503U	285	479	7.841	494/63	12	15	3800	3500	4000	17	7.1	40
383	91	110	3.6	2.4	C302_0078 MB33 EZ702U	312	550	7.841	494/63	16	15	3800	3500	4000	44	7.1	50
383	91	110	3.6	2.4	C302_0078 MB33 EZ702U	312	550	7.841	494/63	24	15	3800	3500	4000	44	7.1	50
383	103	122	4.1	2.1	C302_0078 MB23 EZ505U	285	479	7.841	494/63	8.0	15	3800	3500	4000	22	7.1	43
383	103	122	4.1	2.1	C302_0078 MB23 EZ505U	285	479	7.841	494/63	12	15	3800	3500	4000	22	7.1	43
475	42	53	2.0	4.8	C302_0063 MB23 EZ404U	178	386	6.314	221/35	8.0	8.0	3500	3100	4000	12	7.1	38
475	42	53	2.0	4.8	C302_0063 MB23 EZ404U	178	386	6.314	221/35	12	8.0	3500	3100	4000	12	7.1	38
475	42	53	2.0	4.8	C302_0063 MB23 EZ404U	178	386	6.314	221/35	16	8.0	3500	3100	4000	12	7.1	38
475	45	49	2.1	4.5	C302_0063 MB23 EZ502U	190	386	6.314	221/35	8.0	8.0	3500	3100	4000	14	7.1	38
475	45	49	2.1	4.5	C302_0063 MB23 EZ502U	190	386	6.314	221/35	12	8.0	3500	3100	4000	14	7.1	38
475	45	49	2.1	4.5	C302_0063 MB23 EZ502U	190	386	6.314	221/35	16	8.0	3500	3100	4000	14	7.1	38
475	45	51	2.1	4.5	C302_0063 MB33 EZ701U	122	550	6.314	221/35	16	15	3500	3100	4000	39	7.1	47
475	45	51	2.1	4.5	C302_0063 MB33 EZ701U	122	550	6.314	221/35	24	15	3500	3100	4000	39	7.1	47
475	45	51	2.1	4.5	C302_0063 MB33 EZ701U	122	550	6.314	221/35	32	15	3500	3100	4000	39	7.1	47
475	59	68	2.8	3.4	C302_0063 MB23 EZ503U	230	386	6.314	221/35	8.0	15	3500	3100	4000	17	7.1	40
475	59	68	2.8	3.4	C302_0063 MB23 EZ503U	230	386	6.314	221/35	12	15	3500	3100	4000	17	7.1	40
475	73	88	3.5	2.7	C302_0063 MB33 EZ702U	251	550	6.314	221/35	16	15	3500	3100	4000	44	7.1	50
475	73	88	3.5	2.7	C302_0063 MB33 EZ702U	251	550	6.314	221/35	24	15	3500	3100	4000	44	7.1	50
475	73	88	3.5	2.7	C302_0063 MB33 EZ702U	251	550	6.314	221/35	32	15	3500	3100	4000	44	7.1	50
475	83	98	3.9	2.4	C302_0063 MB23 EZ505U	230	386	6.314	221/35	8.0	15	3500	3100	4000	22	7.1	43
475	83	98	3.9	2.4	C302_0063 MB23 EZ505U	230	386	6.314	221/35	12	15	3500	3100	4000	22	7.1	43
512	42	45	2.1	4.7	C302_0059 MB23 EZ502U	176	358	5.859	2584/441	8.0	8.0	3500	3100	4000	14	7.1	38
512	42	45	2.1	4.7	C302_0059 MB23 EZ502U	176	358	5.859	2584/441	12	8.0	3500	3100	4000	14	7.1	38
512	42	45	2.1	4.7	C302_0059 MB23 EZ502U	176	358	5.859	2584/441	16	8.0	3500	3100	4000	14	7.1	38
512	42	47	2.1	4.7	C302_0059 MB33 EZ701U	114	550	5.859	2584/441	16	15	3500	3100	4000	39	7.1	47
512	42	47	2.1	4.7	C302_0059 MB33 EZ701U	114	550	5.859	2584/441	24	15	3500	3100	4000	39	7.1	47
512	42	47	2.1	4.7	C302_0059 MB33 EZ701U	114	550	5.859	2584/441	32	15	3500	3100	4000	39	7.1	47
512	55	63	2.8	3.6	C302_0059 MB23 EZ503U	213	358	5.859	2584/441	8.0	15	3500	3100	4000	18	7.1	40
512	55	63	2.8	3.6	C302_0059 MB23 EZ503U	213	358	5.859	2584/441	12	15	3500	3100	4000	18	7.1	40
512	68	82	3.4	2.9	C302_0059 MB33 EZ702U	233	550	5.859	2584/441	16	15	3500	3100	4000	44	7.1	50
512	68	82	3.4	2.9	C302_0059 MB33 EZ702U	233	550	5.859	2584/441	24	15	3500	3100	4000	44	7.1	50

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
C3 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 400 Nm)																	
512	68	82	3.4	2.9	C302_0059 MB33 EZ702U	233	550	5.859	2584/441	32	15	3500	3100	4000	44	7.1	50
512	77	91	3.9	2.6	C302_0059 MB23 EZ505U	213	358	5.859	2584/441	8.0	15	3500	3100	4000	22	7.1	43
512	77	91	3.9	2.6	C302_0059 MB23 EZ505U	213	358	5.859	2584/441	12	15	3500	3100	4000	22	7.1	43
512	94	118	4.7	2.1	C302_0059 MB33 EZ703U	330	550	5.859	2584/441	16	32	3500	3100	4000	56	7.1	53
512	121	172	6.1	1.6	C302_0059 MB33 EZ705U	330	550	5.859	2584/441	16	32	3500	3100	4000	68	7.1	58
595	47	54	2.8	3.9	C302_0050 MB23 EZ503U	183	308	5.038	403/80	8.0	15	3500	3100	4000	18	7.1	40
595	47	54	2.8	3.9	C302_0050 MB23 EZ503U	183	308	5.038	403/80	12	15	3500	3100	4000	18	7.1	40
595	59	70	3.4	3.2	C302_0050 MB33 EZ702U	200	550	5.038	403/80	16	15	3500	3100	4000	45	7.1	50
595	59	70	3.4	3.2	C302_0050 MB33 EZ702U	200	550	5.038	403/80	24	15	3500	3100	4000	45	7.1	50
595	59	70	3.4	3.2	C302_0050 MB33 EZ702U	200	550	5.038	403/80	32	15	3500	3100	4000	45	7.1	50
595	59	70	3.4	3.2	C302_0050 MB33 EZ702U	200	550	5.038	403/80	45	15	3500	3100	4000	45	7.1	50
595	66	78	3.8	2.8	C302_0050 MB23 EZ505U	183	308	5.038	403/80	8.0	15	3500	3100	4000	23	7.1	43
595	66	78	3.8	2.8	C302_0050 MB23 EZ505U	183	308	5.038	403/80	12	15	3500	3100	4000	23	7.1	43
595	81	102	4.6	2.3	C302_0050 MB33 EZ703U	318	550	5.038	403/80	16	32	3500	3100	4000	57	7.1	53
595	81	102	4.6	2.3	C302_0050 MB33 EZ703U	318	550	5.038	403/80	24	32	3500	3100	4000	57	7.1	53
595	104	148	6.0	1.8	C302_0050 MB33 EZ705U	330	550	5.038	403/80	16	32	3500	3100	4000	69	7.1	58
595	104	148	6.0	1.8	C302_0050 MB33 EZ705U	330	550	5.038	403/80	24	32	3500	3100	4000	69	7.1	58
642	44	50	2.9	3.9	C302_0047 MB23 EZ503U	170	286	4.675	589/126	8.0	15	3500	3100	4000	18	7.1	40
642	44	50	2.9	3.9	C302_0047 MB23 EZ503U	170	286	4.675	589/126	12	15	3500	3100	4000	18	7.1	40
642	54	65	3.3	3.4	C302_0047 MB33 EZ702U	186	550	4.675	589/126	16	15	3500	3100	4000	45	7.1	50
642	54	65	3.3	3.4	C302_0047 MB33 EZ702U	186	550	4.675	589/126	24	15	3500	3100	4000	45	7.1	50
642	54	65	3.3	3.4	C302_0047 MB33 EZ702U	186	550	4.675	589/126	32	15	3500	3100	4000	45	7.1	50
642	54	65	3.3	3.4	C302_0047 MB33 EZ702U	186	550	4.675	589/126	45	15	3500	3100	4000	45	7.1	50
642	61	73	4.0	2.8	C302_0047 MB23 EZ505U	170	286	4.675	589/126	8.0	15	3500	3100	4000	23	7.1	43
642	61	73	4.0	2.8	C302_0047 MB23 EZ505U	170	286	4.675	589/126	12	15	3500	3100	4000	23	7.1	43
642	75	94	4.6	2.4	C302_0047 MB33 EZ703U	295	550	4.675	589/126	16	32	3500	3100	4000	57	7.1	53
642	75	94	4.6	2.4	C302_0047 MB33 EZ703U	295	550	4.675	589/126	24	32	3500	3100	4000	57	7.1	53
642	75	94	4.6	2.4	C302_0047 MB33 EZ703U	295	550	4.675	589/126	32	32	3500	3100	4000	57	7.1	53
642	97	137	5.9	1.9	C302_0047 MB33 EZ705U	330	550	4.675	589/126	16	32	3500	3100	4000	69	7.1	58
642	97	137	5.9	1.9	C302_0047 MB33 EZ705U	330	550	4.675	589/126	24	32	3500	3100	4000	69	7.1	58
642	97	137	5.9	1.9	C302_0047 MB33 EZ705U	330	550	4.675	589/126	32	32	3500	3100	4000	69	7.1	58
718	39	45	3.0	3.9	C302_0042 MB23 EZ503U	152	255	4.179	117/28	8.0	15	3200	2800	4000	19	7.1	40
718	39	45	3.0	3.9	C302_0042 MB23 EZ503U	152	255	4.179	117/28	12	15	3200	2800	4000	19	7.1	40
718	49	58	3.2	3.6	C302_0042 MB33 EZ702U	166	550	4.179	117/28	16	15	3200	2800	4000	45	7.1	50
718	49	58	3.2	3.6	C302_0042 MB33 EZ702U	166	550	4.179	117/28	24	15	3200	2800	4000	45	7.1	50
718	49	58	3.2	3.6	C302_0042 MB33 EZ702U	166	550	4.179	117/28	32	15	3200	2800	4000	45	7.1	50
718	49	58	3.2	3.6	C302_0042 MB33 EZ702U	166	550	4.179	117/28	45	15	3200	2800	4000	45	7.1	50
718	55	65	4.2	2.8	C302_0042 MB23 EZ505U	152	255	4.179	117/28	8.0	15	3200	2800	4000	23	7.1	43
718	55	65	4.2	2.8	C302_0042 MB23 EZ505U	152	255	4.179	117/28	12	15	3200	2800	4000	23	7.1	43
718	67	84	4.5	2.6	C302_0042 MB33 EZ703U	263	550	4.179	117/28	16	32	3200	2800	4000	57	7.1	53
718	67	84	4.5	2.6	C302_0042 MB33 EZ703U	263	550	4.179	117/28	24	32	3200	2800	4000	57	7.1	53
718	67	84	4.5	2.6	C302_0042 MB33 EZ703U	263	550	4.179	117/28	32	32	3200	2800	4000	57	7.1	53
718	86	122	5.8	2.0	C302_0042 MB33 EZ705U	330	550	4.179	117/28	16	32	3200	2800	4000	70	7.1	58
718	86	122	5.8	2.0	C302_0042 MB33 EZ705U	330	550	4.179	117/28	24	32	3200	2800	4000	70	7.1	58
718	86	122	5.8	2.0	C302_0042 MB33 EZ705U	330	550	4.179	117/28	32	32	3200	2800	4000	70	7.1	58
774	36	42	3.2	3.9	C302_0039 MB23 EZ503U	141	237	3.878	190/49	8.0	15	3200	2800	4000	19	7.1	40
774	36	42	3.2	3.9	C302_0039 MB23 EZ503U	141	237	3.878	190/49	12	15	3200	2800	4000	19	7.1	40
774	45	54	3.2	3.8	C302_0039 MB33 EZ702U	154	550	3.878	190/49	16	15	3200	2800	4000	45	7.1	50
774	45	54	3.2	3.8	C302_0039 MB33 EZ702U	154	550	3.878	190/49	24	15	3200	2800	4000	45	7.1	50
774	45	54	3.2	3.8	C302_0039 MB33 EZ702U	154	550	3.878	190/49	32	15	3200	2800	4000	45	7.1	50
774	45	54	3.2	3.8	C302_0039 MB33 EZ702U	154	550	3.878	190/49	45	15	3200	2800	4000	45	7.1	50
774	51	60	4.4	2.8	C302_0039 MB23 EZ505U	141	237	3.878	190/49	8.0	15	3200	2800	4000	23	7.1	43
774	51	60	4.4	2.8	C302_0039 MB23 EZ505U	141	237	3.878	190/49	12	15	3200	2800	4000	23	7.1	43
774	62	78	4.4	2.8	C302_0039 MB33 EZ703U	245	550	3.878	190/49	16	32	3200	2800	4000	57	7.1	53
774	62	78	4.4	2.8	C302_0039 MB33 EZ703U	245	550	3.878	190/49	24	32	3200	2800	4000	57	7.1	53
774	62	78	4.4	2.8	C302_0039 MB33 EZ703U	245	550	3.878	190/49	32	32	3200	2800	4000	57	7.1	53
774	62	78	4.4	2.8	C302_0039 MB33 EZ703U	245	550	3.878	190/49	45	32	3200	2800	4000	57	7.1	53
774	80	114	5.7	2.1	C302_0039 MB33 EZ705U	324	550	3.878	190/49	16	32	3200	2800	4000	70	7.1	58
774	80	114	5.7	2.1	C302_0039 MB33 EZ705U	324	550	3.878	190/49	24	32	3200	2800	4000	70	7.1	58
774	80	114	5.7	2.1	C302_0039 MB33 EZ705U	324	550	3.878	190/49	32	32	3200	2800	4000	70	7.1	58
774	80	114	5.7	2.1	C302_0039 MB33 EZ705U	324	550	3.878	190/49	45	32	3200	2800	4000	70	7.1	58
895	32	36	3.4	3.9	C302_0034 MB23 EZ503U	122	205	3.352	429/128	8.0	15	3200	2800	4000	20	7.1	40
895	32	36	3.4	3.9	C302_0034 MB23 EZ503U	122	205	3.352	429/128	12	15	3200	2800	4000	20	7.1	40
895	39	47	3.1	4.2	C302_0034 MB33 EZ702U	133	550	3.352	429/128	16	15	3200	2800	4000	46	7.1	50

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
C3 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 400 Nm)																	
895	39	47	3.1	4.2	C302_0034 MB33 EZ702U	133	550	3.352	429/128	24	15	3200	2800	4000	46	7.1	50
895	39	47	3.1	4.2	C302_0034 MB33 EZ702U	133	550	3.352	429/128	32	15	3200	2800	4000	46	7.1	50
895	39	47	3.1	4.2	C302_0034 MB33 EZ702U	133	550	3.352	429/128	45	15	3200	2800	4000	46	7.1	50
895	44	52	4.7	2.8	C302_0034 MB23 EZ505U	122	205	3.352	429/128	8.0	15	3200	2800	4000	24	7.1	43
895	44	52	4.7	2.8	C302_0034 MB23 EZ505U	122	205	3.352	429/128	12	15	3200	2800	4000	24	7.1	43
895	54	68	4.3	3.0	C302_0034 MB33 EZ703U	211	550	3.352	429/128	16	32	3200	2800	4000	58	7.1	53
895	54	68	4.3	3.0	C302_0034 MB33 EZ703U	211	550	3.352	429/128	24	32	3200	2800	4000	58	7.1	53
895	54	68	4.3	3.0	C302_0034 MB33 EZ703U	211	550	3.352	429/128	32	32	3200	2800	4000	58	7.1	53
895	54	68	4.3	3.0	C302_0034 MB33 EZ703U	211	550	3.352	429/128	45	32	3200	2800	4000	58	7.1	53
895	69	98	5.6	2.4	C302_0034 MB33 EZ705U	309	550	3.352	429/128	16	32	3200	2800	4000	70	7.1	58
895	69	98	5.6	2.4	C302_0034 MB33 EZ705U	309	550	3.352	429/128	24	32	3200	2800	4000	70	7.1	58
895	69	98	5.6	2.4	C302_0034 MB33 EZ705U	309	550	3.352	429/128	32	32	3200	2800	4000	70	7.1	58
895	69	98	5.6	2.4	C302_0034 MB33 EZ705U	309	550	3.352	429/128	45	32	3200	2800	4000	70	7.1	58
895	86	157	6.9	1.9	C302_0034 MB43 EZ803U	309	550	3.352	429/128	50	65	3000	2800	3000	178	7.1	89
965	29	33	3.5	3.9	C302_0031 MB23 EZ503U	113	190	3.110	1045/336	8.0	15	3200	2800	4000	20	7.1	40
965	29	33	3.5	3.9	C302_0031 MB23 EZ503U	113	190	3.110	1045/336	12	15	3200	2800	4000	20	7.1	40
965	36	43	3.1	4.4	C302_0031 MB33 EZ702U	124	550	3.110	1045/336	16	15	3200	2800	4000	46	7.1	50
965	36	43	3.1	4.4	C302_0031 MB33 EZ702U	124	550	3.110	1045/336	24	15	3200	2800	4000	46	7.1	50
965	36	43	3.1	4.4	C302_0031 MB33 EZ702U	124	550	3.110	1045/336	32	15	3200	2800	4000	46	7.1	50
965	36	43	3.1	4.4	C302_0031 MB33 EZ702U	124	550	3.110	1045/336	45	15	3200	2800	4000	46	7.1	50
965	41	48	4.9	2.8	C302_0031 MB23 EZ505U	113	190	3.110	1045/336	8.0	15	3200	2800	4000	24	7.1	43
965	41	48	4.9	2.8	C302_0031 MB23 EZ505U	113	190	3.110	1045/336	12	15	3200	2800	4000	24	7.1	43
965	50	63	4.3	3.2	C302_0031 MB33 EZ703U	196	550	3.110	1045/336	16	32	3200	2800	4000	58	7.1	53
965	50	63	4.3	3.2	C302_0031 MB33 EZ703U	196	550	3.110	1045/336	24	32	3200	2800	4000	58	7.1	53
965	50	63	4.3	3.2	C302_0031 MB33 EZ703U	196	550	3.110	1045/336	32	32	3200	2800	4000	58	7.1	53
965	50	63	4.3	3.2	C302_0031 MB33 EZ703U	196	550	3.110	1045/336	45	32	3200	2800	4000	58	7.1	53
965	64	91	5.5	2.5	C302_0031 MB33 EZ705U	301	550	3.110	1045/336	16	32	3200	2800	4000	71	7.1	58
965	64	91	5.5	2.5	C302_0031 MB33 EZ705U	301	550	3.110	1045/336	24	32	3200	2800	4000	71	7.1	58
965	64	91	5.5	2.5	C302_0031 MB33 EZ705U	301	550	3.110	1045/336	32	32	3200	2800	4000	71	7.1	58
965	64	91	5.5	2.5	C302_0031 MB33 EZ705U	301	550	3.110	1045/336	45	32	3200	2800	4000	71	7.1	58
965	80	145	6.9	2.0	C302_0031 MB43 EZ803U	301	550	3.110	1045/336	50	65	3000	2800	3000	178	7.1	89
1109	31	38	3.0	4.8	C302_0027 MB33 EZ702U	108	496	2.705	1677/620	16	15	2700	2300	4000	48	7.1	50
1109	31	38	3.0	4.8	C302_0027 MB33 EZ702U	108	496	2.705	1677/620	24	15	2700	2300	4000	48	7.1	50
1109	31	38	3.0	4.8	C302_0027 MB33 EZ702U	108	496	2.705	1677/620	32	15	2700	2300	4000	48	7.1	50
1109	31	38	3.0	4.8	C302_0027 MB33 EZ702U	108	496	2.705	1677/620	45	15	2700	2300	4000	48	7.1	50
1109	43	55	4.2	3.5	C302_0027 MB33 EZ703U	171	496	2.705	1677/620	16	32	2700	2300	4000	60	7.1	53
1109	43	55	4.2	3.5	C302_0027 MB33 EZ703U	171	496	2.705	1677/620	24	32	2700	2300	4000	60	7.1	53
1109	43	55	4.2	3.5	C302_0027 MB33 EZ703U	171	496	2.705	1677/620	32	32	2700	2300	4000	60	7.1	53
1109	43	55	4.2	3.5	C302_0027 MB33 EZ703U	171	496	2.705	1677/620	45	32	2700	2300	4000	60	7.1	53
1109	56	79	5.4	2.7	C302_0027 MB33 EZ705U	262	496	2.705	1677/620	16	32	2700	2300	4000	72	7.1	58
1109	56	79	5.4	2.7	C302_0027 MB33 EZ705U	262	496	2.705	1677/620	24	32	2700	2300	4000	72	7.1	58
1109	56	79	5.4	2.7	C302_0027 MB33 EZ705U	262	496	2.705	1677/620	32	32	2700	2300	4000	72	7.1	58
1109	56	79	5.4	2.7	C302_0027 MB33 EZ705U	262	496	2.705	1677/620	45	32	2700	2300	4000	72	7.1	58
1109	70	126	6.7	2.2	C302_0027 MB43 EZ803U	287	538	2.705	1677/620	50	65	2700	2300	3000	180	7.1	89
1109	70	126	6.7	2.2	C302_0027 MB43 EZ803U	287	538	2.705	1677/620	72	65	2700	2300	3000	180	7.1	89
1195	40	51	4.1	3.7	C302_0025 MB33 EZ703U	158	460	2.510	1634/651	16	32	2700	2300	4000	60	7.1	53
1195	40	51	4.1	3.7	C302_0025 MB33 EZ703U	158	460	2.510	1634/651	24	32	2700	2300	4000	60	7.1	53
1195	40	51	4.1	3.7	C302_0025 MB33 EZ703U	158	460	2.510	1634/651	32	32	2700	2300	4000	60	7.1	53
1195	40	51	4.1	3.7	C302_0025 MB33 EZ703U	158	460	2.510	1634/651	45	32	2700	2300	4000	60	7.1	53
1195	52	74	5.3	2.9	C302_0025 MB33 EZ705U	243	460	2.510	1634/651	16	32	2700	2300	4000	72	7.1	58
1195	52	74	5.3	2.9	C302_0025 MB33 EZ705U	243	460	2.510	1634/651	24	32	2700	2300	4000	72	7.1	58
1195	52	74	5.3	2.9	C302_0025 MB33 EZ705U	243	460	2.510	1634/651	32	32	2700	2300	4000	72	7.1	58
1195	52	74	5.3	2.9	C302_0025 MB33 EZ705U	243	460	2.510	1634/651	45	32	2700	2300	4000	72	7.1	58
1195	65	117	6.6	2.3	C302_0025 MB43 EZ803U	280	499	2.510	1634/651	50	65	2700	2300	3000	180	7.1	89
1195	65	117	6.6	2.3	C302_0025 MB43 EZ803U	280	499	2.510	1634/651	72	65	2700	2300	3000	180	7.1	89
1378	35	44	4.0	4.1	C302_0022 MB33 EZ703U	137	399	2.177	468/215	16	32	2700	2300	4000	61	7.1	53
1378	35	44	4.0	4.1	C302_0022 MB33 EZ703U	137	399	2.177	468/215	24	32	2700	2300	4000	61	7.1	53
1378	35	44	4.0	4.1	C302_0022 MB33 EZ703U	137	399	2.177	468/215	32	32	2700	2300	4000	61	7.1	53
1378	35	44	4.0	4.1	C302_0022 MB33 EZ703U	137	399	2.177	468/215	45	32	2700	2300	4000	61	7.1	53
1378	45	64	5.2	3.1	C302_0022 MB33 EZ705U	211	399	2.177	468/215	16	32	2700	2300	4000	74	7.1	58
1378	45	64	5.2	3.1	C302_0022 MB33 EZ705U	211	399	2.177	468/215	24	32	2700	2300	4000	74	7.1	58
1378	45	64	5.2	3.1	C302_0022 MB33 EZ705U	211	399	2.177	468/215	32	32	2700	2300	4000	74	7.1	58
1378	45	64	5.2	3.1	C302_0022 MB33 EZ705U	211	399	2.177	468/215	45	32	2700	2300	4000	74	7.1	58
1378	56	102	6.5	2.5	C302_0022 MB43 EZ803U	267	538	2.177	468/215	50	65	2700	2300	3000	181	7.1	89

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
C3 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 400 Nm)																	
1378	56	102	6.5	2.5	C302_0022 MB43 EZ803U	267	538	2.177	468/215	72	65	2700	2300	3000	181	7.1	89
1378	56	102	6.5	2.5	C302_0022 MB43 EZ803U	267	538	2.177	468/215	100	65	2700	2300	3000	181	7.1	89
1485	32	41	4.0	4.3	C302_0020 MB33 EZ703U	127	370	2.020	608/301	16	32	2700	2300	4000	62	7.1	53
1485	32	41	4.0	4.3	C302_0020 MB33 EZ703U	127	370	2.020	608/301	24	32	2700	2300	4000	62	7.1	53
1485	32	41	4.0	4.3	C302_0020 MB33 EZ703U	127	370	2.020	608/301	32	32	2700	2300	4000	62	7.1	53
1485	32	41	4.0	4.3	C302_0020 MB33 EZ703U	127	370	2.020	608/301	45	32	2700	2300	4000	62	7.1	53
1485	42	59	5.1	3.3	C302_0020 MB33 EZ705U	196	370	2.020	608/301	16	32	2700	2300	4000	74	7.1	58
1485	42	59	5.1	3.3	C302_0020 MB33 EZ705U	196	370	2.020	608/301	24	32	2700	2300	4000	74	7.1	58
1485	42	59	5.1	3.3	C302_0020 MB33 EZ705U	196	370	2.020	608/301	32	32	2700	2300	4000	74	7.1	58
1485	42	59	5.1	3.3	C302_0020 MB33 EZ705U	196	370	2.020	608/301	45	32	2700	2300	4000	74	7.1	58
1485	52	94	6.4	2.6	C302_0020 MB43 EZ803U	261	499	2.020	608/301	50	65	2700	2300	3000	182	7.1	89
1485	52	94	6.4	2.6	C302_0020 MB43 EZ803U	261	499	2.020	608/301	72	65	2700	2300	3000	182	7.1	89
1485	52	94	6.4	2.6	C302_0020 MB43 EZ803U	261	499	2.020	608/301	100	65	2700	2300	3000	182	7.1	89
C4 (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 440 Nm)																	
645	131	199	7.3	2.0	C402_0031 MB43 EZ805U	437	838	3.099	1537/496	50	115	2900	2500	3000	271	17	115
814	104	157	7.0	2.4	C402_0025 MB43 EZ805U	405	665	2.456	609/248	50	115	2500	2100	3000	275	17	115
1016	83	126	6.8	2.7	C402_0020 MB43 EZ805U	376	533	1.968	551/280	50	115	2500	2100	3000	280	17	115
C4 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 600 Nm)																	
86	145	159	1.2	3.8	C402_0350 MB23 EZ501U	540	1100	34.82	975/28	8.0	8.0	3500	3200	4000	11	22	47
86	159	176	1.3	3.5	C402_0350 MB23 EZ402U	540	1100	34.82	975/28	8.0	8.0	3500	3200	4000	9.9	22	46
86	233	290	1.9	2.4	C402_0350 MB23 EZ404U	550	1100	34.82	975/28	8.0	8.0	3500	3200	4000	11	22	49
86	250	270	2.0	2.2	C402_0350 MB23 EZ502U	550	1100	34.82	975/28	8.0	8.0	3500	3200	4000	13	22	48
96	130	142	1.1	4.2	C402_0310 MB23 EZ501U	484	1100	31.15	405/13	8.0	8.0	3500	3200	4000	11	22	47
96	130	142	1.1	4.2	C402_0310 MB23 EZ501U	484	1100	31.15	405/13	12	8.0	3500	3200	4000	11	22	47
96	142	157	1.2	3.9	C402_0310 MB23 EZ402U	484	1100	31.15	405/13	8.0	8.0	3500	3200	4000	9.9	22	46
96	142	157	1.2	3.9	C402_0310 MB23 EZ402U	484	1100	31.15	405/13	12	8.0	3500	3200	4000	9.9	22	46
96	209	260	1.8	2.6	C402_0310 MB23 EZ404U	600	1100	31.15	405/13	8.0	8.0	3500	3200	4000	11	22	49
96	209	260	1.8	2.6	C402_0310 MB23 EZ404U	600	1100	31.15	405/13	12	8.0	3500	3200	4000	11	22	49
96	224	242	1.9	2.5	C402_0310 MB23 EZ502U	600	1100	31.15	405/13	8.0	8.0	3500	3200	4000	13	22	48
96	224	242	1.9	2.5	C402_0310 MB23 EZ502U	600	1100	31.15	405/13	12	8.0	3500	3200	4000	13	22	48
108	116	127	1.0	4.7	C402_0280 MB23 EZ501U	432	1100	27.86	195/7	8.0	8.0	3500	3200	4000	12	22	47
108	116	127	1.0	4.7	C402_0280 MB23 EZ501U	432	1100	27.86	195/7	12	8.0	3500	3200	4000	12	22	47
108	127	141	1.1	4.3	C402_0280 MB23 EZ402U	432	1100	27.86	195/7	8.0	8.0	3500	3200	4000	10	22	46
108	127	141	1.1	4.3	C402_0280 MB23 EZ402U	432	1100	27.86	195/7	12	8.0	3500	3200	4000	10	22	46
108	186	232	1.7	3.0	C402_0280 MB23 EZ404U	550	1100	27.86	195/7	8.0	8.0	3500	3200	4000	12	22	49
108	186	232	1.7	3.0	C402_0280 MB23 EZ404U	550	1100	27.86	195/7	12	8.0	3500	3200	4000	12	22	49
108	200	216	1.8	2.8	C402_0280 MB23 EZ502U	550	1100	27.86	195/7	8.0	8.0	3500	3200	4000	14	22	48
108	200	216	1.8	2.8	C402_0280 MB23 EZ502U	550	1100	27.86	195/7	12	8.0	3500	3200	4000	14	22	48
120	114	126	1.1	4.8	C402_0250 MB23 EZ402U	387	1100	24.92	324/13	8.0	8.0	3500	3200	4000	10	22	46
120	114	126	1.1	4.8	C402_0250 MB23 EZ402U	387	1100	24.92	324/13	12	8.0	3500	3200	4000	10	22	46
120	114	126	1.1	4.8	C402_0250 MB23 EZ402U	387	1100	24.92	324/13	16	8.0	3500	3200	4000	10	22	46
120	167	208	1.6	3.3	C402_0250 MB23 EZ404U	600	1100	24.92	324/13	8.0	8.0	3500	3200	4000	12	22	49
120	167	208	1.6	3.3	C402_0250 MB23 EZ404U	600	1100	24.92	324/13	12	8.0	3500	3200	4000	12	22	49
120	167	208	1.6	3.3	C402_0250 MB23 EZ404U	600	1100	24.92	324/13	16	8.0	3500	3200	4000	12	22	49
120	179	193	1.7	3.1	C402_0250 MB23 EZ502U	600	1100	24.92	324/13	8.0	8.0	3500	3200	4000	14	22	48
120	179	193	1.7	3.1	C402_0250 MB23 EZ502U	600	1100	24.92	324/13	12	8.0	3500	3200	4000	14	22	48
120	179	193	1.7	3.1	C402_0250 MB23 EZ502U	600	1100	24.92	324/13	16	8.0	3500	3200	4000	14	22	48
120	235	268	2.2	2.3	C402_0250 MB23 EZ503U	600	1100	24.92	324/13	8.0	15	3500	3200	4000	17	22	50
120	326	387	3.1	1.7	C402_0250 MB23 EZ505U	600	1100	24.92	324/13	8.0	15	3500	3200	4000	22	22	53
128	156	195	1.5	3.5	C402_0230 MB23 EZ404U	550	1100	23.36	1495/64	8.0	8.0	3500	3200	4000	12	22	49
128	156	195	1.5	3.5	C402_0230 MB23 EZ404U	550	1100	23.36	1495/64	12	8.0	3500	3200	4000	12	22	49
128	156	195	1.5	3.5	C402_0230 MB23 EZ404U	550	1100	23.36	1495/64	16	8.0	3500	3200	4000	12	22	49
128	168	181	1.6	3.3	C402_0230 MB23 EZ502U	550	1100	23.36	1495/64	8.0	8.0	3500	3200	4000	14	22	48
128	168	181	1.6	3.3	C402_0230 MB23 EZ502U	550	1100	23.36	1495/64	12	8.0	3500	3200	4000	14	22	48
128	168	181	1.6	3.3	C402_0230 MB23 EZ502U	550	1100	23.36	1495/64	16	8.0	3500	3200	4000	14	22	48
128	220	252	2.2	2.5	C402_0230 MB23 EZ503U	550	1100	23.36	1495/64	8.0	15	3500	3200	4000	18	22	50
128	220	252	2.2	2.5	C402_0230 MB23 EZ503U	550	1100	23.36	1495/64	12	15	3500	3200	4000	18	22	50
128	306	363	3.0	1.8	C402_0230 MB23 EZ505U	550	1100	23.36	1495/64	8.0	15	3500	3200	4000	22	22	53
128	306	363	3.0	1.8	C402_0230 MB23 EZ505U	550	1100	23.36	1495/64	12	15	3500	3200	4000	22	22	53
144	140	174	1.4	3.9	C402_0210 MB23 EZ404U	588	1100	20.90	4347/208	8.0	8.0	3500	3200	4000	12	22	49
144	140	174	1.4	3.9	C402_0210 MB23 EZ404U	588	1100	20.90	4347/208	12	8.0	3500	3200	4000	12	22	49
144	140	174	1.4	3.9	C402_0210 MB23 EZ404U	588	1100	20.90	4347/208	16	8.0	3500	3200	4000	12	22	49
144	150	162	1.6	3.7	C402_0210 MB23 EZ502U	600	1100	20.90	4347/208	8.0	8.0	3500	3200	4000	14	22	48
144	150	162	1.6	3.7	C402_0210 MB23 EZ502U	600	1100	20.90	4347/208	12	8.0	3500	3200	4000	14	22	48

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
C4 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 600 Nm)																	
144	150	162	1.6	3.7	C402_0210 MB23 EZ502U	600	1100	20.90	4347/208	16	8.0	3500	3200	4000	14	22	48
144	197	225	2.0	2.8	C402_0210 MB23 EZ503U	600	1100	20.90	4347/208	8.0	15	3500	3200	4000	18	22	50
144	197	225	2.0	2.8	C402_0210 MB23 EZ503U	600	1100	20.90	4347/208	12	15	3500	3200	4000	18	22	50
144	274	324	2.8	2.0	C402_0210 MB23 EZ505U	600	1100	20.90	4347/208	8.0	15	3500	3200	4000	22	22	53
144	274	324	2.8	2.0	C402_0210 MB23 EZ505U	600	1100	20.90	4347/208	12	15	3500	3200	4000	22	22	53
170	118	147	1.3	4.7	C402_0175 MB23 EZ404U	495	1076	17.60	845/48	8.0	8.0	3300	2800	4000	13	22	49
170	118	147	1.3	4.7	C402_0175 MB23 EZ404U	495	1076	17.60	845/48	12	8.0	3300	2800	4000	13	22	49
170	118	147	1.3	4.7	C402_0175 MB23 EZ404U	495	1076	17.60	845/48	16	8.0	3300	2800	4000	13	22	49
170	126	137	1.4	4.4	C402_0175 MB23 EZ502U	529	1076	17.60	845/48	8.0	8.0	3300	2800	4000	15	22	48
170	126	137	1.4	4.4	C402_0175 MB23 EZ502U	529	1076	17.60	845/48	12	8.0	3300	2800	4000	15	22	48
170	126	137	1.4	4.4	C402_0175 MB23 EZ502U	529	1076	17.60	845/48	16	8.0	3300	2800	4000	15	22	48
170	126	142	1.4	4.4	C402_0175 MB33 EZ701U	342	1100	17.60	845/48	16	15	3300	2800	4000	40	22	58
170	166	190	1.9	3.3	C402_0175 MB23 EZ503U	550	1076	17.60	845/48	8.0	15	3300	2800	4000	19	22	50
170	166	190	1.9	3.3	C402_0175 MB23 EZ503U	550	1076	17.60	845/48	12	15	3300	2800	4000	19	22	50
170	205	246	2.3	2.7	C402_0175 MB33 EZ702U	550	1100	17.60	845/48	16	15	3300	2800	4000	45	22	60
170	231	273	2.6	2.4	C402_0175 MB23 EZ505U	550	1076	17.60	845/48	8.0	15	3300	2800	4000	23	22	53
170	231	273	2.6	2.4	C402_0175 MB23 EZ505U	550	1076	17.60	845/48	12	15	3300	2800	4000	23	22	53
190	113	122	1.3	4.9	C402_0160 MB23 EZ502U	474	962	15.75	63/4	8.0	8.0	3300	2800	4000	15	22	48
190	113	122	1.3	4.9	C402_0160 MB23 EZ502U	474	962	15.75	63/4	12	8.0	3300	2800	4000	15	22	48
190	113	122	1.3	4.9	C402_0160 MB23 EZ502U	474	962	15.75	63/4	16	8.0	3300	2800	4000	15	22	48
190	113	127	1.3	4.9	C402_0160 MB33 EZ701U	306	1100	15.75	63/4	16	15	3300	2800	4000	40	22	58
190	113	127	1.3	4.9	C402_0160 MB33 EZ701U	306	1100	15.75	63/4	24	15	3300	2800	4000	40	22	58
190	148	170	1.8	3.7	C402_0160 MB23 EZ503U	573	962	15.75	63/4	8.0	15	3300	2800	4000	19	22	50
190	148	170	1.8	3.7	C402_0160 MB23 EZ503U	573	962	15.75	63/4	12	15	3300	2800	4000	19	22	50
190	183	220	2.2	3.0	C402_0160 MB33 EZ702U	600	1100	15.75	63/4	16	15	3300	2800	4000	45	22	60
190	183	220	2.2	3.0	C402_0160 MB33 EZ702U	600	1100	15.75	63/4	24	15	3300	2800	4000	45	22	60
190	206	244	2.5	2.7	C402_0160 MB23 EZ505U	573	962	15.75	63/4	8.0	15	3300	2800	4000	23	22	53
190	206	244	2.5	2.7	C402_0160 MB23 EZ505U	573	962	15.75	63/4	12	15	3300	2800	4000	23	22	53
214	132	151	1.8	3.9	C402_0140 MB23 EZ503U	509	855	13.99	2015/144	8.0	15	3300	2800	4000	19	22	50
214	132	151	1.8	3.9	C402_0140 MB23 EZ503U	509	855	13.99	2015/144	12	15	3300	2800	4000	19	22	50
214	163	195	2.1	3.3	C402_0140 MB33 EZ702U	550	1100	13.99	2015/144	16	15	3300	2800	4000	46	22	60
214	163	195	2.1	3.3	C402_0140 MB33 EZ702U	550	1100	13.99	2015/144	24	15	3300	2800	4000	46	22	60
214	183	217	2.5	2.8	C402_0140 MB23 EZ505U	509	855	13.99	2015/144	8.0	15	3300	2800	4000	24	22	53
214	183	217	2.5	2.8	C402_0140 MB23 EZ505U	509	855	13.99	2015/144	12	15	3300	2800	4000	24	22	53
240	118	135	1.9	3.9	C402_0125 MB23 EZ503U	455	765	12.52	651/52	8.0	15	3300	2800	4000	20	22	50
240	118	135	1.9	3.9	C402_0125 MB23 EZ503U	455	765	12.52	651/52	12	15	3300	2800	4000	20	22	50
240	146	175	2.1	3.5	C402_0125 MB33 EZ702U	498	1100	12.52	651/52	16	15	3300	2800	4000	46	22	60
240	146	175	2.1	3.5	C402_0125 MB33 EZ702U	498	1100	12.52	651/52	24	15	3300	2800	4000	46	22	60
240	146	175	2.1	3.5	C402_0125 MB33 EZ702U	498	1100	12.52	651/52	32	15	3300	2800	4000	46	22	60
240	164	194	2.6	2.8	C402_0125 MB23 EZ505U	455	765	12.52	651/52	8.0	15	3300	2800	4000	24	22	53
240	164	194	2.6	2.8	C402_0125 MB23 EZ505U	455	765	12.52	651/52	12	15	3300	2800	4000	24	22	53
258	109	125	2.0	3.9	C402_0115 MB23 EZ503U	423	711	11.64	1885/162	8.0	15	2900	2500	4000	20	22	50
258	109	125	2.0	3.9	C402_0115 MB23 EZ503U	423	711	11.64	1885/162	12	15	2900	2500	4000	20	22	50
258	135	163	2.1	3.7	C402_0115 MB33 EZ702U	463	1100	11.64	1885/162	16	15	2900	2500	4000	47	22	60
258	135	163	2.1	3.7	C402_0115 MB33 EZ702U	463	1100	11.64	1885/162	24	15	2900	2500	4000	47	22	60
258	135	163	2.1	3.7	C402_0115 MB33 EZ702U	463	1100	11.64	1885/162	32	15	2900	2500	4000	47	22	60
258	152	181	2.7	2.8	C402_0115 MB23 EZ505U	423	711	11.64	1885/162	8.0	15	2900	2500	4000	25	22	53
258	152	181	2.7	2.8	C402_0115 MB23 EZ505U	423	711	11.64	1885/162	12	15	2900	2500	4000	25	22	53
258	186	235	2.8	2.7	C402_0115 MB33 EZ703U	550	1100	11.64	1885/162	16	32	2900	2500	4000	59	22	63
258	240	341	3.7	2.1	C402_0115 MB33 EZ705U	550	1100	11.64	1885/162	16	32	2900	2500	4000	71	22	68
288	98	112	2.1	3.9	C402_0105 MB23 EZ503U	379	636	10.41	406/39	8.0	15	2900	2500	4000	20	22	50
288	98	112	2.1	3.9	C402_0105 MB23 EZ503U	379	636	10.41	406/39	12	15	2900	2500	4000	20	22	50
288	121	145	2.0	4.0	C402_0105 MB33 EZ702U	414	1100	10.41	406/39	16	15	2900	2500	4000	47	22	60
288	121	145	2.0	4.0	C402_0105 MB33 EZ702U	414	1100	10.41	406/39	24	15	2900	2500	4000	47	22	60
288	121	145	2.0	4.0	C402_0105 MB33 EZ702U	414	1100	10.41	406/39	32	15	2900	2500	4000	47	22	60
288	121	145	2.0	4.0	C402_0105 MB33 EZ702U	414	1100	10.41	406/39	45	15	2900	2500	4000	47	22	60
288	136	162	2.9	2.8	C402_0105 MB23 EZ505U	379	636	10.41	406/39	8.0	15	2900	2500	4000	25	22	53
288	136	162	2.9	2.8	C402_0105 MB23 EZ505U	379	636	10.41	406/39	12	15	2900	2500	4000	25	22	53
288	167	210	2.8	2.9	C402_0105 MB33 EZ703U	600	1100	10.41	406/39	16	32	2900	2500	4000	59	22	63
288	167	210	2.8	2.9	C402_0105 MB33 EZ703U	600	1100	10.41	406/39	24	32	2900	2500	4000	59	22	63
288	215	305	3.6	2.2	C402_0105 MB33 EZ705U	600	1100	10.41	406/39	16	32	2900	2500	4000	71	22	68
288	215	305	3.6	2.2	C402_0105 MB33 EZ705U	600	1100	10.41	406/39	24	32	2900	2500	4000	71	22	68
324	108	129	2.0	4.3	C402_0093 MB33 EZ702U	368	1100	9.261	3445/372	16	15	2900	2500	4000	49	22	60
324	108	129	2.0	4.3	C402_0093 MB33 EZ702U	368	1100	9.261	3445/372	24	15	2900	2500	4000	49	22	60

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
C4 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 600 Nm)																	
324	108	129	2.0	4.3	C402_0093 MB33 EZ702U	368	1100	9.261	3445/372	32	15	2900	2500	4000	49	22	60
324	108	129	2.0	4.3	C402_0093 MB33 EZ702U	368	1100	9.261	3445/372	45	15	2900	2500	4000	49	22	60
324	148	187	2.7	3.1	C402_0093 MB33 EZ703U	550	1100	9.261	3445/372	16	32	2900	2500	4000	60	22	63
324	148	187	2.7	3.1	C402_0093 MB33 EZ703U	550	1100	9.261	3445/372	24	32	2900	2500	4000	60	22	63
324	148	187	2.7	3.1	C402_0093 MB33 EZ703U	550	1100	9.261	3445/372	32	32	2900	2500	4000	60	22	63
324	191	271	3.5	2.4	C402_0093 MB33 EZ705U	550	1100	9.261	3445/372	16	32	2900	2500	4000	73	22	68
324	191	271	3.5	2.4	C402_0093 MB33 EZ705U	550	1100	9.261	3445/372	24	32	2900	2500	4000	73	22	68
324	191	271	3.5	2.4	C402_0093 MB33 EZ705U	550	1100	9.261	3445/372	32	32	2900	2500	4000	73	22	68
362	96	116	1.9	4.6	C402_0083 MB33 EZ702U	329	1100	8.285	3339/403	16	15	2900	2500	4000	49	22	60
362	96	116	1.9	4.6	C402_0083 MB33 EZ702U	329	1100	8.285	3339/403	24	15	2900	2500	4000	49	22	60
362	96	116	1.9	4.6	C402_0083 MB33 EZ702U	329	1100	8.285	3339/403	32	15	2900	2500	4000	49	22	60
362	96	116	1.9	4.6	C402_0083 MB33 EZ702U	329	1100	8.285	3339/403	45	15	2900	2500	4000	49	22	60
362	133	167	2.7	3.4	C402_0083 MB33 EZ703U	522	1100	8.285	3339/403	16	32	2900	2500	4000	61	22	63
362	133	167	2.7	3.4	C402_0083 MB33 EZ703U	522	1100	8.285	3339/403	24	32	2900	2500	4000	61	22	63
362	133	167	2.7	3.4	C402_0083 MB33 EZ703U	522	1100	8.285	3339/403	32	32	2900	2500	4000	61	22	63
362	171	243	3.5	2.6	C402_0083 MB33 EZ705U	600	1100	8.285	3339/403	16	32	2900	2500	4000	73	22	68
362	171	243	3.5	2.6	C402_0083 MB33 EZ705U	600	1100	8.285	3339/403	24	32	2900	2500	4000	73	22	68
362	171	243	3.5	2.6	C402_0083 MB33 EZ705U	600	1100	8.285	3339/403	32	32	2900	2500	4000	73	22	68
384	56	61	2.0	4.7	C402_0078 MB23 EZ502U	235	478	7.816	2001/256	8.0	8.0	3500	3200	4000	15	17	48
384	56	61	2.0	4.7	C402_0078 MB23 EZ502U	235	478	7.816	2001/256	12	8.0	3500	3200	4000	15	17	48
384	56	61	2.0	4.7	C402_0078 MB23 EZ502U	235	478	7.816	2001/256	16	8.0	3500	3200	4000	15	17	48
384	74	84	2.6	3.6	C402_0078 MB23 EZ503U	284	478	7.816	2001/256	8.0	15	3500	3200	4000	18	17	50
384	74	84	2.6	3.6	C402_0078 MB23 EZ503U	284	478	7.816	2001/256	12	15	3500	3200	4000	18	17	50
384	91	109	2.7	3.5	C402_0078 MB33 EZ702U	311	850	7.816	2001/256	16	15	3500	3200	4000	45	17	60
384	91	109	2.7	3.5	C402_0078 MB33 EZ702U	311	850	7.816	2001/256	24	15	3500	3200	4000	45	17	60
384	91	109	2.7	3.5	C402_0078 MB33 EZ702U	311	850	7.816	2001/256	32	15	3500	3200	4000	45	17	60
384	91	109	2.7	3.5	C402_0078 MB33 EZ702U	311	850	7.816	2001/256	45	15	3500	3200	4000	45	17	60
384	102	121	3.6	2.6	C402_0078 MB23 EZ505U	284	478	7.816	2001/256	8.0	15	3500	3200	4000	23	17	53
384	102	121	3.6	2.6	C402_0078 MB23 EZ505U	284	478	7.816	2001/256	12	15	3500	3200	4000	23	17	53
384	125	158	3.7	2.5	C402_0078 MB33 EZ703U	493	850	7.816	2001/256	16	32	3500	3200	4000	57	17	63
384	125	158	3.7	2.5	C402_0078 MB33 EZ703U	493	850	7.816	2001/256	24	32	3500	3200	4000	57	17	63
384	161	229	4.8	2.0	C402_0078 MB33 EZ705U	550	850	7.816	2001/256	16	32	3500	3200	4000	69	17	68
384	161	229	4.8	2.0	C402_0078 MB33 EZ705U	550	850	7.816	2001/256	24	32	3500	3200	4000	69	17	68
509	55	63	2.8	3.9	C402_0059 MB23 EZ503U	214	360	5.891	377/64	8.0	15	3300	2800	4000	19	17	50
509	55	63	2.8	3.9	C402_0059 MB23 EZ503U	214	360	5.891	377/64	12	15	3300	2800	4000	19	17	50
509	69	82	2.6	4.2	C402_0059 MB33 EZ702U	234	850	5.891	377/64	16	15	3300	2800	4000	46	17	60
509	69	82	2.6	4.2	C402_0059 MB33 EZ702U	234	850	5.891	377/64	24	15	3300	2800	4000	46	17	60
509	69	82	2.6	4.2	C402_0059 MB33 EZ702U	234	850	5.891	377/64	32	15	3300	2800	4000	46	17	60
509	69	82	2.6	4.2	C402_0059 MB33 EZ702U	234	850	5.891	377/64	45	15	3300	2800	4000	46	17	60
509	77	91	3.9	2.8	C402_0059 MB23 EZ505U	214	360	5.891	377/64	8.0	15	3300	2800	4000	24	17	53
509	77	91	3.9	2.8	C402_0059 MB23 EZ505U	214	360	5.891	377/64	12	15	3300	2800	4000	24	17	53
509	94	119	3.5	3.0	C402_0059 MB33 EZ703U	371	850	5.891	377/64	16	32	3300	2800	4000	58	17	63
509	94	119	3.5	3.0	C402_0059 MB33 EZ703U	371	850	5.891	377/64	24	32	3300	2800	4000	58	17	63
509	94	119	3.5	3.0	C402_0059 MB33 EZ703U	371	850	5.891	377/64	32	32	3300	2800	4000	58	17	63
509	94	119	3.5	3.0	C402_0059 MB33 EZ703U	371	850	5.891	377/64	45	32	3300	2800	4000	58	17	63
509	122	173	4.5	2.4	C402_0059 MB33 EZ705U	542	850	5.891	377/64	16	32	3300	2800	4000	70	17	68
509	122	173	4.5	2.4	C402_0059 MB33 EZ705U	542	850	5.891	377/64	24	32	3300	2800	4000	70	17	68
509	122	173	4.5	2.4	C402_0059 MB33 EZ705U	542	850	5.891	377/64	32	32	3300	2800	4000	70	17	68
509	122	173	4.5	2.4	C402_0059 MB33 EZ705U	542	850	5.891	377/64	45	32	3300	2800	4000	70	17	68
641	44	50	3.1	3.9	C402_0047 MB23 EZ503U	170	286	4.682	899/192	8.0	15	3300	2800	4000	21	17	50
641	44	50	3.1	3.9	C402_0047 MB23 EZ503U	170	286	4.682	899/192	12	15	3300	2800	4000	21	17	50
641	54	65	2.5	4.9	C402_0047 MB33 EZ702U	186	850	4.682	899/192	16	15	3300	2800	4000	47	17	60
641	54	65	2.5	4.9	C402_0047 MB33 EZ702U	186	850	4.682	899/192	24	15	3300	2800	4000	47	17	60
641	54	65	2.5	4.9	C402_0047 MB33 EZ702U	186	850	4.682	899/192	32	15	3300	2800	4000	47	17	60
641	54	65	2.5	4.9	C402_0047 MB33 EZ702U	186	850	4.682	899/192	45	15	3300	2800	4000	47	17	60
641	61	73	4.3	2.8	C402_0047 MB23 EZ505U	170	286	4.682	899/192	8.0	15	3300	2800	4000	25	17	53
641	61	73	4.3	2.8	C402_0047 MB23 EZ505U	170	286	4.682	899/192	12	15	3300	2800	4000	25	17	53
641	75	94	3.4	3.5	C402_0047 MB33 EZ703U	295	850	4.682	899/192	16	32	3300	2800	4000	59	17	63
641	75	94	3.4	3.5	C402_0047 MB33 EZ703U	295	850	4.682	899/192	24	32	3300	2800	4000	59	17	63
641	75	94	3.4	3.5	C402_0047 MB33 EZ703U	295	850	4.682	899/192	32	32	3300	2800	4000	59	17	63
641	75	94	3.4	3.5	C402_0047 MB33 EZ703U	295	850	4.682	899/192	45	32	3300	2800	4000	59	17	63
641	97	137	4.4	2.7	C402_0047 MB33 EZ705U	454	850	4.682	899/192	16	32	3300	2800	4000	72	17	68
641	97	137	4.4	2.7	C402_0047 MB33 EZ705U	454	850	4.682	899/192	24	32	3300	2800	4000	72	17	68
641	97	137	4.4	2.7	C402_0047 MB33 EZ705U	454	850	4.682	899/192	32	32	3300	2800	4000	72	17	68

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
C4 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 600 Nm)																	
641	97	137	4.4	2.7	C402_0047 MB33 EZ705U	454	850	4.682	899/192	45	32	3300	2800	4000	72	17	68
641	121	219	5.5	2.2	C402_0047 MB43 EZ803U	502	850	4.682	899/192	50	65	3000	2800	3000	179	17	99
770	37	42	3.4	3.9	C402_0039 MB23 EZ503U	142	238	3.894	841/216	8.0	15	2900	2500	4000	22	17	50
770	37	42	3.4	3.9	C402_0039 MB23 EZ503U	142	238	3.894	841/216	12	15	2900	2500	4000	22	17	50
770	51	60	4.7	2.8	C402_0039 MB23 EZ505U	142	238	3.894	841/216	8.0	15	2900	2500	4000	27	17	53
770	51	60	4.7	2.8	C402_0039 MB23 EZ505U	142	238	3.894	841/216	12	15	2900	2500	4000	27	17	53
770	62	79	3.3	4.0	C402_0039 MB33 EZ703U	246	714	3.894	841/216	16	32	2900	2500	4000	61	17	63
770	62	79	3.3	4.0	C402_0039 MB33 EZ703U	246	714	3.894	841/216	24	32	2900	2500	4000	61	17	63
770	62	79	3.3	4.0	C402_0039 MB33 EZ703U	246	714	3.894	841/216	32	32	2900	2500	4000	61	17	63
770	62	79	3.3	4.0	C402_0039 MB33 EZ703U	246	714	3.894	841/216	45	32	2900	2500	4000	61	17	63
770	80	114	4.2	3.1	C402_0039 MB33 EZ705U	378	714	3.894	841/216	16	32	2900	2500	4000	73	17	68
770	80	114	4.2	3.1	C402_0039 MB33 EZ705U	378	714	3.894	841/216	24	32	2900	2500	4000	73	17	68
770	80	114	4.2	3.1	C402_0039 MB33 EZ705U	378	714	3.894	841/216	32	32	2900	2500	4000	73	17	68
770	80	114	4.2	3.1	C402_0039 MB33 EZ705U	378	714	3.894	841/216	45	32	2900	2500	4000	73	17	68
770	100	182	5.3	2.5	C402_0039 MB43 EZ803U	472	850	3.894	841/216	50	65	2900	2500	3000	181	17	99
770	100	182	5.3	2.5	C402_0039 MB43 EZ803U	472	850	3.894	841/216	72	65	2900	2500	3000	181	17	99
968	50	63	3.2	4.7	C402_0031 MB33 EZ703U	195	568	3.099	1537/496	16	32	2900	2500	4000	63	17	63
968	50	63	3.2	4.7	C402_0031 MB33 EZ703U	195	568	3.099	1537/496	24	32	2900	2500	4000	63	17	63
968	50	63	3.2	4.7	C402_0031 MB33 EZ703U	195	568	3.099	1537/496	32	32	2900	2500	4000	63	17	63
968	50	63	3.2	4.7	C402_0031 MB33 EZ703U	195	568	3.099	1537/496	45	32	2900	2500	4000	63	17	63
968	64	91	4.1	3.6	C402_0031 MB33 EZ705U	301	568	3.099	1537/496	16	32	2900	2500	4000	75	17	68
968	64	91	4.1	3.6	C402_0031 MB33 EZ705U	301	568	3.099	1537/496	24	32	2900	2500	4000	75	17	68
968	64	91	4.1	3.6	C402_0031 MB33 EZ705U	301	568	3.099	1537/496	32	32	2900	2500	4000	75	17	68
968	64	91	4.1	3.6	C402_0031 MB33 EZ705U	301	568	3.099	1537/496	45	32	2900	2500	4000	75	17	68
968	80	145	5.1	2.9	C402_0031 MB43 EZ803U	436	838	3.099	1537/496	50	65	2900	2500	3000	183	17	99
968	80	145	5.1	2.9	C402_0031 MB43 EZ803U	436	838	3.099	1537/496	72	65	2900	2500	3000	183	17	99
968	80	145	5.1	2.9	C402_0031 MB43 EZ803U	436	838	3.099	1537/496	100	65	2900	2500	3000	183	17	99
1221	51	72	3.9	4.2	C402_0025 MB33 EZ705U	238	450	2.456	609/248	16	32	2500	2100	3500	79	17	68
1221	51	72	3.9	4.2	C402_0025 MB33 EZ705U	238	450	2.456	609/248	24	32	2500	2100	3500	79	17	68
1221	51	72	3.9	4.2	C402_0025 MB33 EZ705U	238	450	2.456	609/248	32	32	2500	2100	3500	79	17	68
1221	51	72	3.9	4.2	C402_0025 MB33 EZ705U	238	450	2.456	609/248	45	32	2500	2100	3500	79	17	68
1221	63	115	4.9	3.4	C402_0025 MB43 EZ803U	345	665	2.456	609/248	50	65	2500	2100	3000	187	17	99
1221	63	115	4.9	3.4	C402_0025 MB43 EZ803U	345	665	2.456	609/248	72	65	2500	2100	3000	187	17	99
1221	63	115	4.9	3.4	C402_0025 MB43 EZ803U	345	665	2.456	609/248	100	65	2500	2100	3000	187	17	99
1524	41	58	3.9	4.7	C402_0020 MB33 EZ705U	191	361	1.968	551/280	16	32	2500	2100	3500	84	17	68
1524	41	58	3.9	4.7	C402_0020 MB33 EZ705U	191	361	1.968	551/280	24	32	2500	2100	3500	84	17	68
1524	41	58	3.9	4.7	C402_0020 MB33 EZ705U	191	361	1.968	551/280	32	32	2500	2100	3500	84	17	68
1524	41	58	3.9	4.7	C402_0020 MB33 EZ705U	191	361	1.968	551/280	45	32	2500	2100	3500	84	17	68
1524	51	92	4.7	3.9	C402_0020 MB43 EZ803U	277	533	1.968	551/280	50	65	2500	2100	3000	192	17	99
1524	51	92	4.7	3.9	C402_0020 MB43 EZ803U	277	533	1.968	551/280	72	65	2500	2100	3000	192	17	99
1524	51	92	4.7	3.9	C402_0020 MB43 EZ803U	277	533	1.968	551/280	100	65	2500	2100	3000	192	17	99
C5 (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 700 Nm)																	
432	196	297	5.4	2.4	C502_0046 MB43 EZ805U	775	1236	4.629	162/35	50	115	3000	2700	3000	271	21	127
517	164	248	5.3	2.7	C502_0039 MB43 EZ805U	730	1047	3.867	58/15	50	115	2800	2400	3000	274	21	127
650	130	197	5.1	3.1	C502_0031 MB43 EZ805U	612	834	3.077	477/155	50	115	2800	2400	3000	278	21	127
1012	84	127	4.7	4.2	C502_0020 MB43 EZ805U	393	644	1.976	81/41	50	115	2400	2000	3000	293	21	127
C5 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 920 Nm)																	
60	208	227	1.0	3.9	C502_0500 MB23 EZ501U	773	1600	49.82	1943/39	8.0	8.0	3400	3000	4000	11	23	58
60	227	251	1.1	3.5	C502_0500 MB23 EZ402U	773	1600	49.82	1943/39	8.0	8.0	3400	3000	4000	9.7	23	58
60	333	416	1.7	2.4	C502_0500 MB23 EZ404U	920	1600	49.82	1943/39	8.0	8.0	3400	3000	4000	11	23	60
60	358	387	1.8	2.2	C502_0500 MB23 EZ502U	920	1600	49.82	1943/39	8.0	8.0	3400	3000	4000	13	23	60
64	195	213	1.0	4.1	C502_0470 MB23 EZ501U	725	1600	46.72	1495/32	8.0	8.0	3400	3000	4000	11	23	58
64	213	236	1.1	3.8	C502_0470 MB23 EZ402U	725	1600	46.72	1495/32	8.0	8.0	3400	3000	4000	10	23	58
64	313	390	1.6	2.6	C502_0470 MB23 EZ404U	850	1600	46.72	1495/32	8.0	8.0	3400	3000	4000	11	23	60
64	335	363	1.7	2.4	C502_0470 MB23 EZ502U	850	1600	46.72	1495/32	8.0	8.0	3400	3000	4000	14	23	60
72	174	190	0.9	4.6	C502_0420 MB23 EZ501U	647	1600	41.69	667/16	8.0	8.0	3400	3000	4000	11	23	58
72	174	190	0.9	4.6	C502_0420 MB23 EZ501U	647	1600	41.69	667/16	12	8.0	3400	3000	4000	11	23	58
72	190	210	1.0	4.2	C502_0420 MB23 EZ402U	647	1600	41.69	667/16	8.0	8.0	3400	3000	4000	10	23	58
72	190	210	1.0	4.2	C502_0420 MB23 EZ402U	647	1600	41.69	667/16	12	8.0	3400	3000	4000	10	23	58
72	279	348	1.5	2.9	C502_0420 MB23 EZ404U	920	1600	41.69	667/16	8.0	8.0	3400	3000	4000	11	23	60
72	279	348	1.5	2.9	C502_0420 MB23 EZ404U	920	1600	41.69	667/16	12	8.0	3400	3000	4000	11	23	60
72	299	323	1.6	2.7	C502_0420 MB23 EZ502U	920	1600	41.69	667/16	8.0	8.0	3400	3000	4000	14	23	60
72	299	323	1.6	2.7	C502_0420 MB23 EZ502U	920	1600	41.69	667/16	12	8.0	3400	3000	4000	14	23	60
86	234	292	1.4	3.4	C502_0350 MB23 EZ404U	850	1600	35.00	35/1	8.0	8.0	3400	3000	4000	12	23	60

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
C5 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 920 Nm)																	
86	234	292	1.4	3.4	C502_0350 MB23 EZ404U	850	1600	35.00	35/1	12	8.0	3400	3000	4000	12	23	60
86	234	292	1.4	3.4	C502_0350 MB23 EZ404U	850	1600	35.00	35/1	16	8.0	3400	3000	4000	12	23	60
86	251	272	1.5	3.2	C502_0350 MB23 EZ502U	850	1600	35.00	35/1	8.0	8.0	3400	3000	4000	14	23	60
86	251	272	1.5	3.2	C502_0350 MB23 EZ502U	850	1600	35.00	35/1	12	8.0	3400	3000	4000	14	23	60
86	251	272	1.5	3.2	C502_0350 MB23 EZ502U	850	1600	35.00	35/1	16	8.0	3400	3000	4000	14	23	60
86	329	377	1.9	2.4	C502_0350 MB23 EZ503U	850	1600	35.00	35/1	8.0	15	3400	3000	4000	18	23	62
86	458	543	2.7	1.7	C502_0350 MB23 EZ505U	850	1600	35.00	35/1	8.0	15	3400	3000	4000	22	23	65
96	209	261	1.3	3.8	C502_0310 MB23 EZ404U	879	1600	31.23	406/13	8.0	8.0	3400	3000	4000	12	23	60
96	209	261	1.3	3.8	C502_0310 MB23 EZ404U	879	1600	31.23	406/13	12	8.0	3400	3000	4000	12	23	60
96	209	261	1.3	3.8	C502_0310 MB23 EZ404U	879	1600	31.23	406/13	16	8.0	3400	3000	4000	12	23	60
96	224	242	1.4	3.6	C502_0310 MB23 EZ502U	920	1600	31.23	406/13	8.0	8.0	3400	3000	4000	14	23	60
96	224	242	1.4	3.6	C502_0310 MB23 EZ502U	920	1600	31.23	406/13	12	8.0	3400	3000	4000	14	23	60
96	224	242	1.4	3.6	C502_0310 MB23 EZ502U	920	1600	31.23	406/13	16	8.0	3400	3000	4000	14	23	60
96	294	336	1.8	2.7	C502_0310 MB23 EZ503U	920	1600	31.23	406/13	8.0	15	3400	3000	4000	18	23	62
96	294	336	1.8	2.7	C502_0310 MB23 EZ503U	920	1600	31.23	406/13	12	15	3400	3000	4000	18	23	62
96	409	485	2.6	2.0	C502_0310 MB23 EZ505U	920	1600	31.23	406/13	8.0	15	3400	3000	4000	22	23	65
96	409	485	2.6	2.0	C502_0310 MB23 EZ505U	920	1600	31.23	406/13	12	15	3400	3000	4000	22	23	65
107	188	234	1.2	4.3	C502_0280 MB23 EZ404U	790	1600	28.10	5395/192	8.0	8.0	3400	3000	4000	13	23	60
107	188	234	1.2	4.3	C502_0280 MB23 EZ404U	790	1600	28.10	5395/192	12	8.0	3400	3000	4000	13	23	60
107	188	234	1.2	4.3	C502_0280 MB23 EZ404U	790	1600	28.10	5395/192	16	8.0	3400	3000	4000	13	23	60
107	202	218	1.3	4.0	C502_0280 MB23 EZ502U	845	1600	28.10	5395/192	8.0	8.0	3400	3000	4000	15	23	60
107	202	218	1.3	4.0	C502_0280 MB23 EZ502U	845	1600	28.10	5395/192	12	8.0	3400	3000	4000	15	23	60
107	202	218	1.3	4.0	C502_0280 MB23 EZ502U	845	1600	28.10	5395/192	16	8.0	3400	3000	4000	15	23	60
107	202	226	1.3	4.0	C502_0280 MB33 EZ701U	545	1600	28.10	5395/192	16	15	3400	3000	4000	40	23	69
107	264	303	1.7	3.0	C502_0280 MB23 EZ503U	850	1600	28.10	5395/192	8.0	15	3400	3000	4000	18	23	62
107	264	303	1.7	3.0	C502_0280 MB23 EZ503U	850	1600	28.10	5395/192	12	15	3400	3000	4000	18	23	62
107	327	392	2.2	2.4	C502_0280 MB33 EZ702U	850	1600	28.10	5395/192	16	15	3400	3000	4000	45	23	72
107	368	436	2.4	2.2	C502_0280 MB23 EZ505U	850	1600	28.10	5395/192	8.0	15	3400	3000	4000	23	23	65
107	368	436	2.4	2.2	C502_0280 MB23 EZ505U	850	1600	28.10	5395/192	12	15	3400	3000	4000	23	23	65
120	168	209	1.2	4.8	C502_0250 MB23 EZ404U	705	1532	25.07	2407/96	8.0	8.0	3400	3000	4000	13	23	60
120	168	209	1.2	4.8	C502_0250 MB23 EZ404U	705	1532	25.07	2407/96	12	8.0	3400	3000	4000	13	23	60
120	168	209	1.2	4.8	C502_0250 MB23 EZ404U	705	1532	25.07	2407/96	16	8.0	3400	3000	4000	13	23	60
120	180	195	1.3	4.4	C502_0250 MB23 EZ502U	754	1532	25.07	2407/96	8.0	8.0	3400	3000	4000	15	23	60
120	180	195	1.3	4.4	C502_0250 MB23 EZ502U	754	1532	25.07	2407/96	12	8.0	3400	3000	4000	15	23	60
120	180	195	1.3	4.4	C502_0250 MB23 EZ502U	754	1532	25.07	2407/96	16	8.0	3400	3000	4000	15	23	60
120	180	202	1.3	4.4	C502_0250 MB33 EZ701U	486	1600	25.07	2407/96	16	15	3400	3000	4000	40	23	69
120	236	270	1.6	3.4	C502_0250 MB23 EZ503U	912	1532	25.07	2407/96	8.0	15	3400	3000	4000	18	23	62
120	236	270	1.6	3.4	C502_0250 MB23 EZ503U	912	1532	25.07	2407/96	12	15	3400	3000	4000	18	23	62
120	292	350	2.0	2.7	C502_0250 MB33 EZ702U	920	1600	25.07	2407/96	16	15	3400	3000	4000	45	23	72
120	328	389	2.3	2.4	C502_0250 MB23 EZ505U	912	1532	25.07	2407/96	8.0	15	3400	3000	4000	23	23	65
120	328	389	2.3	2.4	C502_0250 MB23 EZ505U	912	1532	25.07	2407/96	12	15	3400	3000	4000	23	23	65
128	168	181	1.2	4.8	C502_0230 MB23 EZ502U	702	1427	23.36	1495/64	8.0	8.0	3400	3000	4000	16	23	60
128	168	181	1.2	4.8	C502_0230 MB23 EZ502U	702	1427	23.36	1495/64	12	8.0	3400	3000	4000	16	23	60
128	168	181	1.2	4.8	C502_0230 MB23 EZ502U	702	1427	23.36	1495/64	16	8.0	3400	3000	4000	16	23	60
128	168	188	1.2	4.8	C502_0230 MB33 EZ701U	453	1600	23.36	1495/64	16	15	3400	3000	4000	41	23	69
128	168	188	1.2	4.8	C502_0230 MB33 EZ701U	453	1600	23.36	1495/64	24	15	3400	3000	4000	41	23	69
128	220	252	1.6	3.6	C502_0230 MB23 EZ503U	850	1427	23.36	1495/64	8.0	15	3400	3000	4000	19	23	62
128	220	252	1.6	3.6	C502_0230 MB23 EZ503U	850	1427	23.36	1495/64	12	15	3400	3000	4000	19	23	62
128	272	326	2.0	2.9	C502_0230 MB33 EZ702U	850	1600	23.36	1495/64	16	15	3400	3000	4000	46	23	72
128	272	326	2.0	2.9	C502_0230 MB33 EZ702U	850	1600	23.36	1495/64	24	15	3400	3000	4000	46	23	72
128	306	363	2.2	2.6	C502_0230 MB23 EZ505U	850	1427	23.36	1495/64	8.0	15	3400	3000	4000	24	23	65
128	306	363	2.2	2.6	C502_0230 MB23 EZ505U	850	1427	23.36	1495/64	12	15	3400	3000	4000	24	23	65
144	196	224	1.6	3.9	C502_0210 MB23 EZ503U	758	1274	20.84	667/32	8.0	15	3400	3000	4000	19	23	62
144	196	224	1.6	3.9	C502_0210 MB23 EZ503U	758	1274	20.84	667/32	12	15	3400	3000	4000	19	23	62
144	243	291	1.9	3.3	C502_0210 MB33 EZ702U	829	1600	20.84	667/32	16	15	3400	3000	4000	46	23	72
144	243	291	1.9	3.3	C502_0210 MB33 EZ702U	829	1600	20.84	667/32	24	15	3400	3000	4000	46	23	72
144	273	323	2.2	2.8	C502_0210 MB23 EZ505U	758	1274	20.84	667/32	8.0	15	3400	3000	4000	24	23	65
144	273	323	2.2	2.8	C502_0210 MB23 EZ505U	758	1274	20.84	667/32	12	15	3400	3000	4000	24	23	65
170	205	246	1.7	3.9	C502_0175 MB33 EZ702U	700	1600	17.60	845/48	16	15	3100	2700	4000	47	23	72
170	205	246	1.7	3.9	C502_0175 MB33 EZ702U	700	1600	17.60	845/48	24	15	3100	2700	4000	47	23	72
170	205	246	1.7	3.9	C502_0175 MB33 EZ702U	700	1600	17.60	845/48	32	15	3100	2700	4000	47	23	72
170	282	355	2.4	2.8	C502_0175 MB33 EZ703U	850	1600	17.60	845/48	16	32	3100	2700	4000	59	23	75
170	364	516	3.0	2.2	C502_0175 MB33 EZ705U	850	1600	17.60	845/48	16	32	3100	2700	4000	72	23	80
191	183	219	1.6	4.4	C502_0155 MB33 EZ702U	625	1600	15.71	377/24	16	15	3100	2700	4000	47	23	72

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
C5 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 920 Nm)																	
191	183	219	1.6	4.4	C502_0155 MB33 EZ702U	625	1600	15.71	377/24	24	15	3100	2700	4000	47	23	72
191	183	219	1.6	4.4	C502_0155 MB33 EZ702U	625	1600	15.71	377/24	32	15	3100	2700	4000	47	23	72
191	183	219	1.6	4.4	C502_0155 MB33 EZ702U	625	1600	15.71	377/24	45	15	3100	2700	4000	47	23	72
191	251	317	2.2	3.2	C502_0155 MB33 EZ703U	920	1600	15.71	377/24	16	32	3100	2700	4000	59	23	75
191	325	460	2.9	2.5	C502_0155 MB33 EZ705U	920	1600	15.71	377/24	16	32	3100	2700	4000	72	23	80
215	131	150	1.9	3.9	C502_0140 MB23 EZ503U	507	851	13.93	195/14	8.0	15	3100	2700	4000	22	23	62
215	131	150	1.9	3.9	C502_0140 MB23 EZ503U	507	851	13.93	195/14	12	15	3100	2700	4000	22	23	62
215	162	195	1.5	4.9	C502_0140 MB33 EZ702U	554	1600	13.93	195/14	16	15	3100	2700	4000	49	23	72
215	162	195	1.5	4.9	C502_0140 MB33 EZ702U	554	1600	13.93	195/14	24	15	3100	2700	4000	49	23	72
215	162	195	1.5	4.9	C502_0140 MB33 EZ702U	554	1600	13.93	195/14	32	15	3100	2700	4000	49	23	72
215	162	195	1.5	4.9	C502_0140 MB33 EZ702U	554	1600	13.93	195/14	45	15	3100	2700	4000	49	23	72
215	182	216	2.7	2.8	C502_0140 MB23 EZ505U	507	851	13.93	195/14	8.0	15	3100	2700	4000	27	23	65
215	182	216	2.7	2.8	C502_0140 MB23 EZ505U	507	851	13.93	195/14	12	15	3100	2700	4000	27	23	65
215	223	281	2.1	3.6	C502_0140 MB33 EZ703U	850	1600	13.93	195/14	16	32	3100	2700	4000	61	23	75
215	223	281	2.1	3.6	C502_0140 MB33 EZ703U	850	1600	13.93	195/14	24	32	3100	2700	4000	61	23	75
215	288	408	2.7	2.8	C502_0140 MB33 EZ705U	850	1600	13.93	195/14	16	32	3100	2700	4000	73	23	80
215	288	408	2.7	2.8	C502_0140 MB33 EZ705U	850	1600	13.93	195/14	24	32	3100	2700	4000	73	23	80
241	117	134	2.1	3.9	C502_0125 MB23 EZ503U	452	760	12.43	87/7	8.0	15	3100	2700	4000	22	23	62
241	117	134	2.1	3.9	C502_0125 MB23 EZ503U	452	760	12.43	87/7	12	15	3100	2700	4000	22	23	62
241	163	193	2.9	2.8	C502_0125 MB23 EZ505U	452	760	12.43	87/7	8.0	15	3100	2700	4000	27	23	65
241	163	193	2.9	2.8	C502_0125 MB23 EZ505U	452	760	12.43	87/7	12	15	3100	2700	4000	27	23	65
241	199	251	2.1	3.9	C502_0125 MB33 EZ703U	784	1600	12.43	87/7	16	32	3100	2700	4000	61	23	75
241	199	251	2.1	3.9	C502_0125 MB33 EZ703U	784	1600	12.43	87/7	24	32	3100	2700	4000	61	23	75
241	199	251	2.1	3.9	C502_0125 MB33 EZ703U	784	1600	12.43	87/7	32	32	3100	2700	4000	61	23	75
241	257	364	2.7	3.0	C502_0125 MB33 EZ705U	920	1600	12.43	87/7	16	32	3100	2700	4000	73	23	80
241	257	364	2.7	3.0	C502_0125 MB33 EZ705U	920	1600	12.43	87/7	24	32	3100	2700	4000	73	23	80
241	257	364	2.7	3.0	C502_0125 MB33 EZ705U	920	1600	12.43	87/7	32	32	3100	2700	4000	73	23	80
258	186	235	2.0	4.0	C502_0115 MB33 EZ703U	734	1600	11.64	1885/162	16	32	2800	2400	4000	63	23	75
258	186	235	2.0	4.0	C502_0115 MB33 EZ703U	734	1600	11.64	1885/162	24	32	2800	2400	4000	63	23	75
258	186	235	2.0	4.0	C502_0115 MB33 EZ703U	734	1600	11.64	1885/162	32	32	2800	2400	4000	63	23	75
258	186	235	2.0	4.0	C502_0115 MB33 EZ703U	734	1600	11.64	1885/162	45	32	2800	2400	4000	63	23	75
258	240	341	2.6	3.1	C502_0115 MB33 EZ705U	850	1600	11.64	1885/162	16	32	2800	2400	4000	75	23	80
258	240	341	2.6	3.1	C502_0115 MB33 EZ705U	850	1600	11.64	1885/162	24	32	2800	2400	4000	75	23	80
258	240	341	2.6	3.1	C502_0115 MB33 EZ705U	850	1600	11.64	1885/162	32	32	2800	2400	4000	75	23	80
258	240	341	2.6	3.1	C502_0115 MB33 EZ705U	850	1600	11.64	1885/162	45	32	2800	2400	4000	75	23	80
289	166	209	2.0	4.4	C502_0105 MB33 EZ703U	655	1600	10.38	841/81	16	32	2800	2400	4000	63	23	75
289	166	209	2.0	4.4	C502_0105 MB33 EZ703U	655	1600	10.38	841/81	24	32	2800	2400	4000	63	23	75
289	166	209	2.0	4.4	C502_0105 MB33 EZ703U	655	1600	10.38	841/81	32	32	2800	2400	4000	63	23	75
289	166	209	2.0	4.4	C502_0105 MB33 EZ703U	655	1600	10.38	841/81	45	32	2800	2400	4000	63	23	75
289	215	304	2.6	3.4	C502_0105 MB33 EZ705U	920	1600	10.38	841/81	16	32	2800	2400	4000	75	23	80
289	215	304	2.6	3.4	C502_0105 MB33 EZ705U	920	1600	10.38	841/81	24	32	2800	2400	4000	75	23	80
289	215	304	2.6	3.4	C502_0105 MB33 EZ705U	920	1600	10.38	841/81	32	32	2800	2400	4000	75	23	80
289	215	304	2.6	3.4	C502_0105 MB33 EZ705U	920	1600	10.38	841/81	45	32	2800	2400	4000	75	23	80
324	148	187	2.0	4.7	C502_0093 MB33 EZ703U	584	1600	9.261	3445/372	16	32	2800	2400	4000	65	23	75
324	148	187	2.0	4.7	C502_0093 MB33 EZ703U	584	1600	9.261	3445/372	24	32	2800	2400	4000	65	23	75
324	148	187	2.0	4.7	C502_0093 MB33 EZ703U	584	1600	9.261	3445/372	32	32	2800	2400	4000	65	23	75
324	148	187	2.0	4.7	C502_0093 MB33 EZ703U	584	1600	9.261	3445/372	45	32	2800	2400	4000	65	23	75
324	191	271	2.5	3.6	C502_0093 MB33 EZ705U	850	1600	9.261	3445/372	16	32	2800	2400	4000	78	23	80
324	191	271	2.5	3.6	C502_0093 MB33 EZ705U	850	1600	9.261	3445/372	24	32	2800	2400	4000	78	23	80
324	191	271	2.5	3.6	C502_0093 MB33 EZ705U	850	1600	9.261	3445/372	32	32	2800	2400	4000	78	23	80
324	191	271	2.5	3.6	C502_0093 MB33 EZ705U	850	1600	9.261	3445/372	45	32	2800	2400	4000	78	23	80
324	239	433	3.2	2.9	C502_0093 MB43 EZ803U	850	1600	9.261	3445/372	50	65	2800	2400	3000	185	23	111
363	171	242	2.5	3.9	C502_0083 MB33 EZ705U	802	1515	8.263	1537/186	16	32	2800	2400	4000	78	23	80
363	171	242	2.5	3.9	C502_0083 MB33 EZ705U	802	1515	8.263	1537/186	24	32	2800	2400	4000	78	23	80
363	171	242	2.5	3.9	C502_0083 MB33 EZ705U	802	1515	8.263	1537/186	32	32	2800	2400	4000	78	23	80
363	171	242	2.5	3.9	C502_0083 MB33 EZ705U	802	1515	8.263	1537/186	45	32	2800	2400	4000	78	23	80
363	213	386	3.1	3.1	C502_0083 MB43 EZ803U	920	1600	8.263	1537/186	50	65	2800	2400	3000	186	23	111
386	73	84	2.6	3.9	C502_0078 MB23 EZ503U	282	474	7.763	621/80	8.0	15	3400	3000	4000	20	21	62
386	73	84	2.6	3.9	C502_0078 MB23 EZ503U	282	474	7.763	621/80	12	15	3400	3000	4000	20	21	62
386	102	120	3.6	2.8	C502_0078 MB23 EZ505U	282	474	7.763	621/80	8.0	15	3400	3000	4000	24	21	65
386	102	120	3.6	2.8	C502_0078 MB23 EZ505U	282	474	7.763	621/80	12	15	3400	3000	4000	24	21	65
386	124	157	2.6	3.9	C502_0078 MB33 EZ703U	489	1250	7.763	621/80	16	32	3400	3000	4000	58	21	75
386	124	157	2.6	3.9	C502_0078 MB33 EZ703U	489	1250	7.763	621/80	24	32	3400	3000	4000	58	21	75
386	124	157	2.6	3.9	C502_0078 MB33 EZ703U	489	1250	7.763	621/80	32	32	3400	3000	4000	58	21	75

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
C5 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 920 Nm)																	
386	124	157	2.6	3.9	C502_0078 MB33 EZ703U	489	1250	7.763	621/80	45	32	3400	3000	4000	58	21	75
386	160	227	3.3	3.0	C502_0078 MB33 EZ705U	753	1250	7.763	621/80	16	32	3400	3000	4000	71	21	80
386	160	227	3.3	3.0	C502_0078 MB33 EZ705U	753	1250	7.763	621/80	24	32	3400	3000	4000	71	21	80
386	160	227	3.3	3.0	C502_0078 MB33 EZ705U	753	1250	7.763	621/80	32	32	3400	3000	4000	71	21	80
386	160	227	3.3	3.0	C502_0078 MB33 EZ705U	753	1250	7.763	621/80	45	32	3400	3000	4000	71	21	80
386	200	363	4.1	2.4	C502_0078 MB43 EZ803U	800	1250	7.763	621/80	50	65	3000	3000	3000	179	21	111
513	94	118	2.4	4.7	C502_0059 MB33 EZ703U	369	1072	5.850	117/20	16	32	3100	2700	4000	60	21	75
513	94	118	2.4	4.7	C502_0059 MB33 EZ703U	369	1072	5.850	117/20	24	32	3100	2700	4000	60	21	75
513	94	118	2.4	4.7	C502_0059 MB33 EZ703U	369	1072	5.850	117/20	32	32	3100	2700	4000	60	21	75
513	94	118	2.4	4.7	C502_0059 MB33 EZ703U	369	1072	5.850	117/20	45	32	3100	2700	4000	60	21	75
513	121	171	3.2	3.7	C502_0059 MB33 EZ705U	567	1072	5.850	117/20	16	32	3100	2700	4000	73	21	80
513	121	171	3.2	3.7	C502_0059 MB33 EZ705U	567	1072	5.850	117/20	24	32	3100	2700	4000	73	21	80
513	121	171	3.2	3.7	C502_0059 MB33 EZ705U	567	1072	5.850	117/20	32	32	3100	2700	4000	73	21	80
513	121	171	3.2	3.7	C502_0059 MB33 EZ705U	567	1072	5.850	117/20	45	32	3100	2700	4000	73	21	80
513	151	274	3.9	2.9	C502_0059 MB43 EZ803U	800	1250	5.850	117/20	50	65	3000	2700	3000	181	21	111
513	151	274	3.9	2.9	C502_0059 MB43 EZ803U	800	1250	5.850	117/20	72	65	3000	2700	3000	181	21	111
648	44	50	3.4	3.9	C502_0046 MB23 EZ503U	168	283	4.629	162/35	8.0	15	3100	2700	4000	24	21	62
648	44	50	3.4	3.9	C502_0046 MB23 EZ503U	168	283	4.629	162/35	12	15	3100	2700	4000	24	21	62
648	61	72	4.7	2.8	C502_0046 MB23 EZ505U	168	283	4.629	162/35	8.0	15	3100	2700	4000	29	21	65
648	61	72	4.7	2.8	C502_0046 MB23 EZ505U	168	283	4.629	162/35	12	15	3100	2700	4000	29	21	65
648	96	136	3.0	4.3	C502_0046 MB33 EZ705U	449	849	4.629	162/35	16	32	3100	2700	4000	75	21	80
648	96	136	3.0	4.3	C502_0046 MB33 EZ705U	449	849	4.629	162/35	24	32	3100	2700	4000	75	21	80
648	96	136	3.0	4.3	C502_0046 MB33 EZ705U	449	849	4.629	162/35	32	32	3100	2700	4000	75	21	80
648	96	136	3.0	4.3	C502_0046 MB33 EZ705U	449	849	4.629	162/35	45	32	3100	2700	4000	75	21	80
648	119	216	3.8	3.4	C502_0046 MB43 EZ803U	651	1236	4.629	162/35	50	65	3000	2700	3000	183	21	111
648	119	216	3.8	3.4	C502_0046 MB43 EZ803U	651	1236	4.629	162/35	72	65	3000	2700	3000	183	21	111
648	119	216	3.8	3.4	C502_0046 MB43 EZ803U	651	1236	4.629	162/35	100	65	3000	2700	3000	183	21	111
776	80	113	3.0	4.7	C502_0039 MB33 EZ705U	375	709	3.867	58/15	16	32	2800	2400	4000	78	21	80
776	80	113	3.0	4.7	C502_0039 MB33 EZ705U	375	709	3.867	58/15	24	32	2800	2400	4000	78	21	80
776	80	113	3.0	4.7	C502_0039 MB33 EZ705U	375	709	3.867	58/15	32	32	2800	2400	4000	78	21	80
776	80	113	3.0	4.7	C502_0039 MB33 EZ705U	375	709	3.867	58/15	45	32	2800	2400	4000	78	21	80
776	100	181	3.7	3.9	C502_0039 MB43 EZ803U	544	1047	3.867	58/15	50	65	2800	2400	3000	186	21	111
776	100	181	3.7	3.9	C502_0039 MB43 EZ803U	544	1047	3.867	58/15	72	65	2800	2400	3000	186	21	111
776	100	181	3.7	3.9	C502_0039 MB43 EZ803U	544	1047	3.867	58/15	100	65	2800	2400	3000	186	21	111
975	64	90	3.4	4.7	C502_0031 MB33 EZ705U	298	564	3.077	477/155	16	32	2800	2400	4000	82	21	80
975	64	90	3.4	4.7	C502_0031 MB33 EZ705U	298	564	3.077	477/155	24	32	2800	2400	4000	82	21	80
975	64	90	3.4	4.7	C502_0031 MB33 EZ705U	298	564	3.077	477/155	32	32	2800	2400	4000	82	21	80
975	64	90	3.4	4.7	C502_0031 MB33 EZ705U	298	564	3.077	477/155	45	32	2800	2400	4000	82	21	80
975	79	144	3.5	4.5	C502_0031 MB43 EZ803U	433	834	3.077	477/155	50	65	2800	2400	3000	190	21	111
975	79	144	3.5	4.5	C502_0031 MB43 EZ803U	433	834	3.077	477/155	72	65	2800	2400	3000	190	21	111
975	79	144	3.5	4.5	C502_0031 MB43 EZ803U	433	834	3.077	477/155	100	65	2800	2400	3000	190	21	111
1518	41	58	4.2	4.7	C502_0020 MB33 EZ705U	192	362	1.976	81/41	16	32	2400	2000	3200	97	21	80
1518	41	58	4.2	4.7	C502_0020 MB33 EZ705U	192	362	1.976	81/41	24	32	2400	2000	3200	97	21	80
1518	41	58	4.2	4.7	C502_0020 MB33 EZ705U	192	362	1.976	81/41	32	32	2400	2000	3200	97	21	80
1518	41	58	4.2	4.7	C502_0020 MB33 EZ705U	192	362	1.976	81/41	45	32	2400	2000	3200	97	21	80
C6 (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 1650 Nm)																	
198	429	648	3.6	2.6	C612_0100 MB43 EZ805U	1650	2900	10.11	3721/368	50	115	3000	2600	3000	278	74	142
219	387	585	3.5	2.8	C612_0091 MB43 EZ805U	1380	2600	9.118	848/93	50	115	2700	2300	3000	286	74	142
244	347	525	3.5	3.0	C612_0082 MB43 EZ805U	1629	2669	8.190	1769/216	50	115	2700	2300	3000	282	74	142
281	301	456	3.4	3.3	C612_0071 MB43 EZ805U	1380	2318	7.111	64/9	50	115	2300	1900	3000	295	74	142
307	276	418	3.3	3.5	C612_0065 MB43 EZ805U	1296	2124	6.518	3233/496	50	115	2700	2300	3000	289	74	142
342	248	375	3.3	3.8	C612_0059 MB43 EZ805U	1164	1908	5.854	240/41	50	115	2300	1900	3000	305	74	142
393	215	326	3.2	4.2	C612_0051 MB43 EZ805U	1011	1657	5.083	61/12	50	115	2300	1900	3000	299	74	142
478	177	268	3.2	4.6	C612_0042 MB43 EZ805U	832	1364	4.184	2745/656	50	115	2300	1900	3000	310	74	142
C6 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1650 Nm)																	
66	325	365	1.1	4.0	C612_0450 MB33 EZ701U	879	2600	45.33	136/3	16	15	3200	2900	4000	40	74	84
66	528	633	1.8	2.5	C612_0450 MB33 EZ702U	1380	2600	45.33	136/3	16	15	3200	2900	4000	45	74	87
76	283	317	1.1	4.3	C612_0390 MB33 EZ701U	764	2441	39.40	1891/48	16	15	3200	2900	4000	39	74	84
76	459	550	1.8	2.7	C612_0390 MB33 EZ702U	1465	2441	39.40	1891/48	16	15	3200	2900	4000	44	74	87
86	406	487	1.6	3.2	C612_0350 MB33 EZ702U	1380	2600	34.87	1360/39	16	15	3200	2900	4000	46	74	87
86	406	487	1.6	3.2	C612_0350 MB33 EZ702U	1380	2600	34.87	1360/39	24	15	3200	2900	4000	46	74	87
93	377	453	1.5	3.5	C612_0320 MB33 EZ702U	1289	2900	32.41	1037/32	16	15	3200	2900	4000	45	74	87
93	377	453	1.5	3.5	C612_0320 MB33 EZ702U	1289	2900	32.41	1037/32	24	15	3200	2900	4000	45	74	87
93	377	453	1.5	3.5	C612_0320 MB33 EZ702U	1289	2900	32.41	1037/32	32	15	3200	2900	4000	45	74	87

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
C6 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1650 Nm)																	
109	319	383	1.4	4.1	C612_0270 MB33 EZ702U	1091	2600	27.43	192/7	16	15	3200	2900	4000	48	74	87
109	319	383	1.4	4.1	C612_0270 MB33 EZ702U	1091	2600	27.43	192/7	24	15	3200	2900	4000	48	74	87
109	319	383	1.4	4.1	C612_0270 MB33 EZ702U	1091	2600	27.43	192/7	32	15	3200	2900	4000	48	74	87
109	439	553	1.9	3.0	C612_0270 MB33 EZ703U	1380	2600	27.43	192/7	16	32	3200	2900	4000	60	74	90
109	567	804	2.5	2.3	C612_0270 MB33 EZ705U	1380	2600	27.43	192/7	16	32	3200	2900	4000	72	74	95
120	290	348	1.4	4.4	C612_0250 MB33 EZ702U	991	2900	24.93	5185/208	16	15	3200	2900	4000	46	74	87
120	290	348	1.4	4.4	C612_0250 MB33 EZ702U	991	2900	24.93	5185/208	24	15	3200	2900	4000	46	74	87
120	290	348	1.4	4.4	C612_0250 MB33 EZ702U	991	2900	24.93	5185/208	32	15	3200	2900	4000	46	74	87
120	290	348	1.4	4.4	C612_0250 MB33 EZ702U	991	2900	24.93	5185/208	45	15	3200	2900	4000	46	74	87
120	399	503	1.9	3.2	C612_0250 MB33 EZ703U	1572	2900	24.93	5185/208	16	32	3200	2900	4000	58	74	90
120	399	503	1.9	3.2	C612_0250 MB33 EZ703U	1572	2900	24.93	5185/208	24	32	3200	2900	4000	58	74	90
120	399	503	1.9	3.2	C612_0250 MB33 EZ703U	1572	2900	24.93	5185/208	32	32	3200	2900	4000	58	74	90
120	515	730	2.4	2.5	C612_0250 MB33 EZ705U	1650	2900	24.93	5185/208	16	32	3200	2900	4000	71	74	95
120	515	730	2.4	2.5	C612_0250 MB33 EZ705U	1650	2900	24.93	5185/208	24	32	3200	2900	4000	71	74	95
120	515	730	2.4	2.5	C612_0250 MB33 EZ705U	1650	2900	24.93	5185/208	32	32	3200	2900	4000	71	74	95
132	264	317	1.3	4.9	C612_0230 MB33 EZ702U	901	2600	22.67	68/3	16	15	3200	2900	4000	50	74	87
132	264	317	1.3	4.9	C612_0230 MB33 EZ702U	901	2600	22.67	68/3	24	15	3200	2900	4000	50	74	87
132	264	317	1.3	4.9	C612_0230 MB33 EZ702U	901	2600	22.67	68/3	32	15	3200	2900	4000	50	74	87
132	264	317	1.3	4.9	C612_0230 MB33 EZ702U	901	2600	22.67	68/3	45	15	3200	2900	4000	50	74	87
132	363	457	1.8	3.6	C612_0230 MB33 EZ703U	1380	2600	22.67	68/3	16	32	3200	2900	4000	61	74	90
132	363	457	1.8	3.6	C612_0230 MB33 EZ703U	1380	2600	22.67	68/3	24	32	3200	2900	4000	61	74	90
132	468	664	2.3	2.8	C612_0230 MB33 EZ705U	1380	2600	22.67	68/3	16	32	3200	2900	4000	74	74	95
132	468	664	2.3	2.8	C612_0230 MB33 EZ705U	1380	2600	22.67	68/3	24	32	3200	2900	4000	74	74	95
153	314	396	1.7	3.9	C612_0195 MB33 EZ703U	1236	2900	19.61	549/28	16	32	3200	2900	4000	60	74	90
153	314	396	1.7	3.9	C612_0195 MB33 EZ703U	1236	2900	19.61	549/28	24	32	3200	2900	4000	60	74	90
153	314	396	1.7	3.9	C612_0195 MB33 EZ703U	1236	2900	19.61	549/28	32	32	3200	2900	4000	60	74	90
153	314	396	1.7	3.9	C612_0195 MB33 EZ703U	1236	2900	19.61	549/28	45	32	3200	2900	4000	60	74	90
153	405	574	2.3	3.0	C612_0195 MB33 EZ705U	1650	2900	19.61	549/28	16	32	3200	2900	4000	72	74	95
153	405	574	2.3	3.0	C612_0195 MB33 EZ705U	1650	2900	19.61	549/28	24	32	3200	2900	4000	72	74	95
153	405	574	2.3	3.0	C612_0195 MB33 EZ705U	1650	2900	19.61	549/28	32	32	3200	2900	4000	72	74	95
153	405	574	2.3	3.0	C612_0195 MB33 EZ705U	1650	2900	19.61	549/28	45	32	3200	2900	4000	72	74	95
170	282	355	1.7	4.2	C612_0175 MB33 EZ703U	1110	2600	17.60	88/5	16	32	3000	2600	4000	65	74	90
170	282	355	1.7	4.2	C612_0175 MB33 EZ703U	1110	2600	17.60	88/5	24	32	3000	2600	4000	65	74	90
170	282	355	1.7	4.2	C612_0175 MB33 EZ703U	1110	2600	17.60	88/5	32	32	3000	2600	4000	65	74	90
170	282	355	1.7	4.2	C612_0175 MB33 EZ703U	1110	2600	17.60	88/5	45	32	3000	2600	4000	65	74	90
170	364	516	2.2	3.3	C612_0175 MB33 EZ705U	1380	2600	17.60	88/5	16	32	3000	2600	4000	77	74	95
170	364	516	2.2	3.3	C612_0175 MB33 EZ705U	1380	2600	17.60	88/5	24	32	3000	2600	4000	77	74	95
170	364	516	2.2	3.3	C612_0175 MB33 EZ705U	1380	2600	17.60	88/5	32	32	3000	2600	4000	77	74	95
170	364	516	2.2	3.3	C612_0175 MB33 EZ705U	1380	2600	17.60	88/5	45	32	3000	2600	4000	77	74	95
185	259	327	1.7	4.5	C612_0160 MB33 EZ703U	1022	2900	16.20	1037/64	16	32	3200	2900	4000	62	74	90
185	259	327	1.7	4.5	C612_0160 MB33 EZ703U	1022	2900	16.20	1037/64	24	32	3200	2900	4000	62	74	90
185	259	327	1.7	4.5	C612_0160 MB33 EZ703U	1022	2900	16.20	1037/64	32	32	3200	2900	4000	62	74	90
185	259	327	1.7	4.5	C612_0160 MB33 EZ703U	1022	2900	16.20	1037/64	45	32	3200	2900	4000	62	74	90
185	335	475	2.2	3.5	C612_0160 MB33 EZ705U	1572	2900	16.20	1037/64	16	32	3200	2900	4000	74	74	95
185	335	475	2.2	3.5	C612_0160 MB33 EZ705U	1572	2900	16.20	1037/64	24	32	3200	2900	4000	74	74	95
185	335	475	2.2	3.5	C612_0160 MB33 EZ705U	1572	2900	16.20	1037/64	32	32	3200	2900	4000	74	74	95
185	335	475	2.2	3.5	C612_0160 MB33 EZ705U	1572	2900	16.20	1037/64	45	32	3200	2900	4000	74	74	95
185	418	758	2.7	2.8	C612_0160 MB43 EZ803U	1650	2900	16.20	1037/64	50	65	3000	2900	3000	182	74	126
212	226	285	1.6	4.9	C612_0140 MB33 EZ703U	892	2593	14.15	976/69	16	32	3000	2600	4000	68	74	90
212	226	285	1.6	4.9	C612_0140 MB33 EZ703U	892	2593	14.15	976/69	24	32	3000	2600	4000	68	74	90
212	226	285	1.6	4.9	C612_0140 MB33 EZ703U	892	2593	14.15	976/69	32	32	3000	2600	4000	68	74	90
212	226	285	1.6	4.9	C612_0140 MB33 EZ703U	892	2593	14.15	976/69	45	32	3000	2600	4000	68	74	90
212	292	414	2.1	3.8	C612_0140 MB33 EZ705U	1372	2593	14.15	976/69	16	32	3000	2600	4000	81	74	95
212	292	414	2.1	3.8	C612_0140 MB33 EZ705U	1372	2593	14.15	976/69	24	32	3000	2600	4000	81	74	95
212	292	414	2.1	3.8	C612_0140 MB33 EZ705U	1372	2593	14.15	976/69	32	32	3000	2600	4000	81	74	95
212	292	414	2.1	3.8	C612_0140 MB33 EZ705U	1372	2593	14.15	976/69	45	32	3000	2600	4000	81	74	95
212	365	661	2.6	3.0	C612_0140 MB43 EZ803U	1380	2600	14.15	976/69	50	65	3000	2600	3000	189	74	126
238	260	369	2.1	4.1	C612_0125 MB33 EZ705U	1220	2306	12.58	2013/160	16	32	3000	2600	4000	78	74	95
238	260	369	2.1	4.1	C612_0125 MB33 EZ705U	1220	2306	12.58	2013/160	24	32	3000	2600	4000	78	74	95
238	260	369	2.1	4.1	C612_0125 MB33 EZ705U	1220	2306	12.58	2013/160	32	32	3000	2600	4000	78	74	95
238	260	369	2.1	4.1	C612_0125 MB33 EZ705U	1220	2306	12.58	2013/160	45	32	3000	2600	4000	78	74	95
238	325	588	2.6	3.3	C612_0125 MB43 EZ803U	1650	2900	12.58	2013/160	50	65	3000	2600	3000	186	74	126
238	325	588	2.6	3.3	C612_0125 MB43 EZ803U	1650	2900	12.58	2013/160	72	65	3000	2600	3000	186	74	126
262	237	336	2.0	4.4	C612_0115 MB33 EZ705U	1111	2100	11.46	928/81	16	32	2700	2300	3800	85	74	95

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
C6 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1650 Nm)																	
262	237	336	2.0	4.4	C612_0115 MB33 EZ705U	1111	2100	11.46	928/81	24	32	2700	2300	3800	85	74	95
262	237	336	2.0	4.4	C612_0115 MB33 EZ705U	1111	2100	11.46	928/81	32	32	2700	2300	3800	85	74	95
262	237	336	2.0	4.4	C612_0115 MB33 EZ705U	1111	2100	11.46	928/81	45	32	2700	2300	3800	85	74	95
262	296	536	2.5	3.5	C612_0115 MB43 EZ803U	1380	2600	11.46	928/81	50	65	2700	2300	3000	192	74	126
262	296	536	2.5	3.5	C612_0115 MB43 EZ803U	1380	2600	11.46	928/81	72	65	2700	2300	3000	192	74	126
297	209	296	2.0	4.7	C612_0100 MB33 EZ705U	981	1854	10.11	3721/368	16	32	3000	2600	4000	82	74	95
297	209	296	2.0	4.7	C612_0100 MB33 EZ705U	981	1854	10.11	3721/368	24	32	3000	2600	4000	82	74	95
297	209	296	2.0	4.7	C612_0100 MB33 EZ705U	981	1854	10.11	3721/368	32	32	3000	2600	4000	82	74	95
297	209	296	2.0	4.7	C612_0100 MB33 EZ705U	981	1854	10.11	3721/368	45	32	3000	2600	4000	82	74	95
297	261	473	2.5	3.8	C612_0100 MB43 EZ803U	1422	2900	10.11	3721/368	50	65	3000	2600	3000	189	74	126
297	261	473	2.5	3.8	C612_0100 MB43 EZ803U	1422	2900	10.11	3721/368	72	65	3000	2600	3000	189	74	126
297	261	473	2.5	3.8	C612_0100 MB43 EZ803U	1422	2900	10.11	3721/368	100	65	3000	2600	3000	189	74	126
329	188	267	2.1	4.7	C612_0091 MB33 EZ705U	884	1672	9.118	848/93	16	32	2700	2300	3800	90	74	95
329	188	267	2.1	4.7	C612_0091 MB33 EZ705U	884	1672	9.118	848/93	24	32	2700	2300	3800	90	74	95
329	188	267	2.1	4.7	C612_0091 MB33 EZ705U	884	1672	9.118	848/93	32	32	2700	2300	3800	90	74	95
329	188	267	2.1	4.7	C612_0091 MB33 EZ705U	884	1672	9.118	848/93	45	32	2700	2300	3800	90	74	95
329	235	426	2.4	4.1	C612_0091 MB43 EZ803U	1282	2600	9.118	848/93	50	65	2700	2300	3000	198	74	126
329	235	426	2.4	4.1	C612_0091 MB43 EZ803U	1282	2600	9.118	848/93	72	65	2700	2300	3000	198	74	126
329	235	426	2.4	4.1	C612_0091 MB43 EZ803U	1282	2600	9.118	848/93	100	65	2700	2300	3000	198	74	126
366	169	240	2.2	4.7	C612_0082 MB33 EZ705U	794	1501	8.190	1769/216	16	32	2700	2300	3800	86	74	95
366	169	240	2.2	4.7	C612_0082 MB33 EZ705U	794	1501	8.190	1769/216	24	32	2700	2300	3800	86	74	95
366	169	240	2.2	4.7	C612_0082 MB33 EZ705U	794	1501	8.190	1769/216	32	32	2700	2300	3800	86	74	95
366	169	240	2.2	4.7	C612_0082 MB33 EZ705U	794	1501	8.190	1769/216	45	32	2700	2300	3800	86	74	95
366	211	383	2.4	4.4	C612_0082 MB43 EZ803U	1152	2669	8.190	1769/216	50	65	2700	2300	3000	194	74	126
366	211	383	2.4	4.4	C612_0082 MB43 EZ803U	1152	2669	8.190	1769/216	72	65	2700	2300	3000	194	74	126
366	211	383	2.4	4.4	C612_0082 MB43 EZ803U	1152	2669	8.190	1769/216	100	65	2700	2300	3000	194	74	126
422	183	332	2.4	4.8	C612_0071 MB43 EZ803U	1000	2318	7.111	64/9	50	65	2300	1900	3000	207	74	126
422	183	332	2.4	4.8	C612_0071 MB43 EZ803U	1000	2318	7.111	64/9	72	65	2300	1900	3000	207	74	126
422	183	332	2.4	4.8	C612_0071 MB43 EZ803U	1000	2318	7.111	64/9	100	65	2300	1900	3000	207	74	126
460	135	191	2.5	4.7	C612_0065 MB33 EZ705U	632	1195	6.518	3233/496	16	32	2700	2300	3800	93	74	95
460	135	191	2.5	4.7	C612_0065 MB33 EZ705U	632	1195	6.518	3233/496	24	32	2700	2300	3800	93	74	95
460	135	191	2.5	4.7	C612_0065 MB33 EZ705U	632	1195	6.518	3233/496	32	32	2700	2300	3800	93	74	95
460	135	191	2.5	4.7	C612_0065 MB33 EZ705U	632	1195	6.518	3233/496	45	32	2700	2300	3800	93	74	95
C7 (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 2760 Nm)																	
120	709	1073	2.5	3.1	C712_0165 MB43 EZ805U	2760	4800	16.73	1071/64	50	115	3000	2900	3000	278	122	178
146	582	880	2.5	3.4	C712_0135 MB43 EZ805U	2300	4000	13.73	4380/319	50	115	2900	2600	3000	293	122	178
152	559	845	2.4	3.7	C712_0130 MB43 EZ805U	2621	4296	13.18	4851/368	50	115	2900	2600	3000	285	122	178
170	499	754	2.4	3.9	C712_0120 MB43 EZ805U	2300	3833	11.76	1035/88	50	115	2600	2300	3000	299	122	178
202	420	636	2.3	4.4	C712_0099 MB43 EZ805U	1971	3231	9.912	4599/464	50	115	2900	2600	3000	295	122	178
236	360	544	2.4	4.6	C712_0085 MB43 EZ805U	1688	2767	8.490	4347/512	50	115	2600	2300	3000	301	122	178
272	312	472	2.5	4.6	C712_0074 MB43 EZ805U	1463	2398	7.357	3480/473	50	115	2200	1900	2800	328	122	178
377	225	341	3.0	4.6	C712_0053 MB43 EZ805U	1056	1731	5.311	1827/344	50	115	2200	1900	2800	334	122	178
470	181	273	3.3	4.6	C712_0043 MB43 EZ805U	847	1388	4.259	477/112	50	115	2200	1900	2800	359	122	178
C7 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 2760 Nm)																	
43	499	560	1.0	4.0	C712_0700 MB33 EZ701U	1349	4000	69.55	765/11	16	15	3100	2900	4000	40	122	120
43	810	971	1.6	2.5	C712_0700 MB33 EZ702U	2300	4000	69.55	765/11	16	15	3100	2900	4000	45	122	122
53	408	457	0.9	4.9	C712_0570 MB33 EZ701U	1102	4000	56.82	625/11	16	15	3100	2900	4000	41	122	120
53	408	457	0.9	4.9	C712_0570 MB33 EZ701U	1102	4000	56.82	625/11	24	15	3100	2900	4000	41	122	120
53	661	794	1.4	3.0	C712_0570 MB33 EZ702U	2260	4000	56.82	625/11	16	15	3100	2900	4000	46	122	122
53	661	794	1.4	3.0	C712_0570 MB33 EZ702U	2260	4000	56.82	625/11	24	15	3100	2900	4000	46	122	122
64	545	654	1.3	3.7	C712_0470 MB33 EZ702U	1862	4000	46.82	515/11	16	15	3100	2900	4000	48	122	122
64	545	654	1.3	3.7	C712_0470 MB33 EZ702U	1862	4000	46.82	515/11	24	15	3100	2900	4000	48	122	122
64	545	654	1.3	3.7	C712_0470 MB33 EZ702U	1862	4000	46.82	515/11	32	15	3100	2900	4000	48	122	122
73	477	573	1.4	3.5	C712_0410 MB33 EZ702U	1631	4189	41.02	2625/64	16	15	3100	2900	4000	46	122	122
73	477	573	1.4	3.5	C712_0410 MB33 EZ702U	1631	4189	41.02	2625/64	24	15	3100	2900	4000	46	122	122
73	477	573	1.4	3.5	C712_0410 MB33 EZ702U	1631	4189	41.02	2625/64	32	15	3100	2900	4000	46	122	122
73	477	573	1.4	3.5	C712_0410 MB33 EZ702U	1631	4189	41.02	2625/64	45	15	3100	2900	4000	46	122	122
73	656	828	2.0	2.5	C712_0410 MB33 EZ703U	2514	4189	41.02	2625/64	16	32	3100	2900	4000	58	122	125
73	847	1202	2.6	1.9	C712_0410 MB33 EZ705U	2514	4189	41.02	2625/64	16	32	3100	2900	4000	70	122	131
86	408	490	1.1	4.9	C712_0350 MB33 EZ702U	1395	4000	35.07	2700/77	16	15	3100	2900	4000	50	122	122
86	408	490	1.1	4.9	C712_0350 MB33 EZ702U	1395	4000	35.07	2700/77	24	15	3100	2900	4000	50	122	122
86	408	490	1.1	4.9	C712_0350 MB33 EZ702U	1395	4000	35.07	2700/77	32	15	3100	2900	4000	50	122	122
86	408	490	1.1	4.9	C712_0350 MB33 EZ702U	1395	4000	35.07	2700/77	45	15	3100	2900	4000	50	122	122
86	561	707	1.5	3.6	C712_0350 MB33 EZ703U	2211	4000	35.07	2700/77	16	32	3100	2900	4000	62	122	125

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
C7 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 2760 Nm)																	
86	561	707	1.5	3.6	C712_0350 MB33 EZ703U	2211	4000	35.07	2700/77	24	32	3100	2900	4000	62	122	125
86	724	1027	2.0	2.8	C712_0350 MB33 EZ705U	2300	4000	35.07	2700/77	16	32	3100	2900	4000	75	122	131
86	724	1027	2.0	2.8	C712_0350 MB33 EZ705U	2300	4000	35.07	2700/77	24	32	3100	2900	4000	75	122	131
89	393	472	1.4	4.1	C712_0340 MB33 EZ702U	1344	4800	33.80	2163/64	16	15	3100	2900	4000	48	122	122
89	393	472	1.4	4.1	C712_0340 MB33 EZ702U	1344	4800	33.80	2163/64	24	15	3100	2900	4000	48	122	122
89	393	472	1.4	4.1	C712_0340 MB33 EZ702U	1344	4800	33.80	2163/64	32	15	3100	2900	4000	48	122	122
89	393	472	1.4	4.1	C712_0340 MB33 EZ702U	1344	4800	33.80	2163/64	45	15	3100	2900	4000	48	122	122
89	541	682	1.9	3.0	C712_0340 MB33 EZ703U	2131	4800	33.80	2163/64	16	32	3100	2900	4000	59	122	125
89	541	682	1.9	3.0	C712_0340 MB33 EZ703U	2131	4800	33.80	2163/64	24	32	3100	2900	4000	59	122	125
89	541	682	1.9	3.0	C712_0340 MB33 EZ703U	2131	4800	33.80	2163/64	32	32	3100	2900	4000	59	122	125
89	541	682	1.9	3.0	C712_0340 MB33 EZ703U	2131	4800	33.80	2163/64	45	32	3100	2900	4000	59	122	125
89	698	990	2.4	2.3	C712_0340 MB33 EZ705U	2760	4800	33.80	2163/64	16	32	3100	2900	4000	72	122	131
89	698	990	2.4	2.3	C712_0340 MB33 EZ705U	2760	4800	33.80	2163/64	24	32	3100	2900	4000	72	122	131
89	698	990	2.4	2.3	C712_0340 MB33 EZ705U	2760	4800	33.80	2163/64	32	32	3100	2900	4000	72	122	131
89	698	990	2.4	2.3	C712_0340 MB33 EZ705U	2760	4800	33.80	2163/64	45	32	3100	2900	4000	72	122	131
105	458	578	1.4	4.4	C712_0290 MB33 EZ703U	1806	4000	28.64	315/11	16	32	3100	2900	4000	65	122	125
105	458	578	1.4	4.4	C712_0290 MB33 EZ703U	1806	4000	28.64	315/11	24	32	3100	2900	4000	65	122	125
105	458	578	1.4	4.4	C712_0290 MB33 EZ703U	1806	4000	28.64	315/11	32	32	3100	2900	4000	65	122	125
105	458	578	1.4	4.4	C712_0290 MB33 EZ703U	1806	4000	28.64	315/11	45	32	3100	2900	4000	65	122	125
105	592	839	1.8	3.4	C712_0290 MB33 EZ705U	2300	4000	28.64	315/11	16	32	3100	2900	4000	77	122	131
105	592	839	1.8	3.4	C712_0290 MB33 EZ705U	2300	4000	28.64	315/11	24	32	3100	2900	4000	77	122	131
105	592	839	1.8	3.4	C712_0290 MB33 EZ705U	2300	4000	28.64	315/11	32	32	3100	2900	4000	77	122	131
105	592	839	1.8	3.4	C712_0290 MB33 EZ705U	2300	4000	28.64	315/11	45	32	3100	2900	4000	77	122	131
119	405	511	1.7	3.8	C712_0250 MB33 EZ703U	1596	4641	25.31	405/16	16	32	3100	2900	4000	62	122	125
119	405	511	1.7	3.8	C712_0250 MB33 EZ703U	1596	4641	25.31	405/16	24	32	3100	2900	4000	62	122	125
119	405	511	1.7	3.8	C712_0250 MB33 EZ703U	1596	4641	25.31	405/16	32	32	3100	2900	4000	62	122	125
119	405	511	1.7	3.8	C712_0250 MB33 EZ703U	1596	4641	25.31	405/16	45	32	3100	2900	4000	62	122	125
119	523	742	2.1	3.0	C712_0250 MB33 EZ705U	2455	4641	25.31	405/16	16	32	3100	2900	4000	75	122	131
119	523	742	2.1	3.0	C712_0250 MB33 EZ705U	2455	4641	25.31	405/16	24	32	3100	2900	4000	75	122	131
119	523	742	2.1	3.0	C712_0250 MB33 EZ705U	2455	4641	25.31	405/16	32	32	3100	2900	4000	75	122	131
119	523	742	2.1	3.0	C712_0250 MB33 EZ705U	2455	4641	25.31	405/16	45	32	3100	2900	4000	75	122	131
119	653	1183	1.9	3.4	C712_0250 MB43 EZ803U	2760	4800	25.31	405/16	50	65	3000	2900	3000	183	122	161
129	479	679	1.6	4.2	C712_0230 MB33 EZ705U	2249	4000	23.18	255/11	16	32	3100	2900	4000	81	122	131
129	479	679	1.6	4.2	C712_0230 MB33 EZ705U	2249	4000	23.18	255/11	24	32	3100	2900	4000	81	122	131
129	479	679	1.6	4.2	C712_0230 MB33 EZ705U	2249	4000	23.18	255/11	32	32	3100	2900	4000	81	122	131
129	479	679	1.6	4.2	C712_0230 MB33 EZ705U	2249	4000	23.18	255/11	45	32	3100	2900	4000	81	122	131
129	598	1084	2.0	3.3	C712_0230 MB43 EZ803U	2300	4000	23.18	255/11	50	65	3000	2900	3000	189	122	161
145	331	417	1.6	4.4	C712_0210 MB33 EZ703U	1303	3790	20.67	1323/64	16	32	3100	2900	4000	65	122	125
145	331	417	1.6	4.4	C712_0210 MB33 EZ703U	1303	3790	20.67	1323/64	24	32	3100	2900	4000	65	122	125
145	331	417	1.6	4.4	C712_0210 MB33 EZ703U	1303	3790	20.67	1323/64	32	32	3100	2900	4000	65	122	125
145	331	417	1.6	4.4	C712_0210 MB33 EZ703U	1303	3790	20.67	1323/64	45	32	3100	2900	4000	65	122	125
145	427	606	2.0	3.4	C712_0210 MB33 EZ705U	2005	3790	20.67	1323/64	16	32	3100	2900	4000	78	122	131
145	427	606	2.0	3.4	C712_0210 MB33 EZ705U	2005	3790	20.67	1323/64	24	32	3100	2900	4000	78	122	131
145	427	606	2.0	3.4	C712_0210 MB33 EZ705U	2005	3790	20.67	1323/64	32	32	3100	2900	4000	78	122	131
145	427	606	2.0	3.4	C712_0210 MB33 EZ705U	2005	3790	20.67	1323/64	45	32	3100	2900	4000	78	122	131
145	533	966	1.8	3.9	C712_0210 MB43 EZ803U	2760	4800	20.67	1323/64	50	65	3000	2900	3000	186	122	161
145	533	966	1.8	3.9	C712_0210 MB43 EZ803U	2760	4800	20.67	1323/64	72	65	3000	2900	3000	186	122	161
164	377	535	1.6	4.7	C712_0185 MB33 EZ705U	1771	3348	18.26	420/23	16	32	2900	2600	4000	88	122	131
164	377	535	1.6	4.7	C712_0185 MB33 EZ705U	1771	3348	18.26	420/23	24	32	2900	2600	4000	88	122	131
164	377	535	1.6	4.7	C712_0185 MB33 EZ705U	1771	3348	18.26	420/23	32	32	2900	2600	4000	88	122	131
164	377	535	1.6	4.7	C712_0185 MB33 EZ705U	1771	3348	18.26	420/23	45	32	2900	2600	4000	88	122	131
164	471	854	1.8	4.2	C712_0185 MB43 EZ803U	2300	4000	18.26	420/23	50	65	2900	2600	3000	195	122	161
164	471	854	1.8	4.2	C712_0185 MB43 EZ803U	2300	4000	18.26	420/23	72	65	2900	2600	3000	195	122	161
179	346	490	1.9	4.2	C712_0165 MB33 EZ705U	1623	3068	16.73	1071/64	16	32	3100	2900	4000	82	122	131
179	346	490	1.9	4.2	C712_0165 MB33 EZ705U	1623	3068	16.73	1071/64	24	32	3100	2900	4000	82	122	131
179	346	490	1.9	4.2	C712_0165 MB33 EZ705U	1623	3068	16.73	1071/64	32	32	3100	2900	4000	82	122	131
179	346	490	1.9	4.2	C712_0165 MB33 EZ705U	1623	3068	16.73	1071/64	45	32	3100	2900	4000	82	122	131
179	432	782	1.7	4.5	C712_0165 MB43 EZ803U	2354	4800	16.73	1071/64	50	65	3000	2900	3000	190	122	161
179	432	782	1.7	4.5	C712_0165 MB43 EZ803U	2354	4800	16.73	1071/64	72	65	3000	2900	3000	190	122	161
179	432	782	1.7	4.5	C712_0165 MB43 EZ803U	2354	4800	16.73	1071/64	100	65	3000	2900	3000	190	122	161
219	284	402	1.8	4.7	C712_0135 MB33 EZ705U	1332	2517	13.73	4380/319	16	32	2900	2600	4000	97	122	131
219	284	402	1.8	4.7	C712_0135 MB33 EZ705U	1332	2517	13.73	4380/319	24	32	2900	2600	4000	97	122	131
219	284	402	1.8	4.7	C712_0135 MB33 EZ705U	1332	2517	13.73	4380/319	32	32	2900	2600	4000	97	122	131
219	284	402	1.8	4.7	C712_0135 MB33 EZ705U	1332	2517	13.73	4380/319	45	32	2900	2600	4000	97	122	131

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
C7 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 2760 Nm)																	
228	272	386	1.9	4.7	C712_0130 MB33 EZ705U	1279	2417	13.18	4851/368	16	32	2900	2600	4000	89	122	131
228	272	386	1.9	4.7	C712_0130 MB33 EZ705U	1279	2417	13.18	4851/368	24	32	2900	2600	4000	89	122	131
228	272	386	1.9	4.7	C712_0130 MB33 EZ705U	1279	2417	13.18	4851/368	32	32	2900	2600	4000	89	122	131
228	272	386	1.9	4.7	C712_0130 MB33 EZ705U	1279	2417	13.18	4851/368	45	32	2900	2600	4000	89	122	131
303	205	290	2.2	4.7	C712_0099 MB33 EZ705U	961	1817	9.912	4599/464	16	32	2900	2600	4000	98	122	131
303	205	290	2.2	4.7	C712_0099 MB33 EZ705U	961	1817	9.912	4599/464	24	32	2900	2600	4000	98	122	131
303	205	290	2.2	4.7	C712_0099 MB33 EZ705U	961	1817	9.912	4599/464	32	32	2900	2600	4000	98	122	131
303	205	290	2.2	4.7	C712_0099 MB33 EZ705U	961	1817	9.912	4599/464	45	32	2900	2600	4000	98	122	131
C8 (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 4800 Nm)																	
60	1424	2153	2.3	2.5	C812_0340 MB43 EZ805U	4800	8400	33.59	2183/65	50	115	2900	2700	3000	275	145	237
73	1164	1761	2.1	3.1	C812_0270 MB43 EZ805U	4140	7200	27.47	412/15	50	115	2900	2700	3000	289	204	237
77	1105	1671	2.1	3.1	C812_0260 MB43 EZ805U	4800	8400	26.06	3127/120	50	115	2900	2700	3000	281	145	237
86	983	1487	1.9	3.7	C812_0230 MB43 EZ805U	4140	7200	23.19	1600/69	50	115	2900	2700	3000	297	204	237
99	859	1299	2.0	3.9	C812_0200 MB43 EZ805U	4028	6602	20.26	6077/300	50	115	2900	2700	3000	290	145	237
116	733	1108	1.8	4.6	C812_0175 MB43 EZ805U	3438	5634	17.29	1504/87	50	115	2700	2400	3000	314	204	237
117	725	1096	1.9	4.4	C812_0170 MB43 EZ805U	3401	5574	17.10	1180/69	50	115	2900	2700	3000	298	145	237
145	583	882	2.0	4.6	C812_0140 MB43 EZ805U	2737	4486	13.76	1280/93	50	115	2700	2400	3000	332	204	237
157	540	817	2.1	4.6	C812_0125 MB43 EZ805U	2535	4155	12.75	5546/435	50	115	2700	2400	3000	317	145	237
197	430	651	2.3	4.6	C812_0100 MB43 EZ805U	2019	3308	10.15	944/93	50	115	2700	2400	3000	337	145	237
221	383	580	2.4	4.6	C812_0090 MB43 EZ805U	1798	2947	9.043	208/23	50	115	2500	2200	3000	384	204	237
300	283	428	2.8	4.6	C812_0067 MB43 EZ805U	1326	2174	6.670	767/115	50	115	2500	2200	3000	395	145	237
C8 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 4720 Nm)																	
75	1030	1867	1.7	3.2	C812_0400 MB43 EZ803U	4542	7570	39.94	2596/65	50	65	2900	2700	3000	184	145	221
85	912	1652	1.4	3.9	C812_0350 MB43 EZ803U	4140	7200	35.33	106/3	50	65	2900	2700	3000	192	204	221
85	912	1652	1.4	3.9	C812_0350 MB43 EZ803U	4140	7200	35.33	106/3	72	65	2900	2700	3000	192	204	221
89	867	1570	1.6	3.6	C812_0340 MB43 EZ803U	4724	8400	33.59	2183/65	50	65	2900	2700	3000	187	145	221
89	867	1570	1.6	3.6	C812_0340 MB43 EZ803U	4724	8400	33.59	2183/65	72	65	2900	2700	3000	187	145	221
89	867	1570	1.6	3.6	C812_0340 MB43 EZ803U	4724	8400	33.59	2183/65	100	65	2900	2700	3000	187	145	221
115	672	1218	1.5	4.5	C812_0260 MB43 EZ803U	3665	8400	26.06	3127/120	50	65	2900	2700	3000	193	145	221
115	672	1218	1.5	4.5	C812_0260 MB43 EZ803U	3665	8400	26.06	3127/120	72	65	2900	2700	3000	193	145	221
115	672	1218	1.5	4.5	C812_0260 MB43 EZ803U	3665	8400	26.06	3127/120	100	65	2900	2700	3000	193	145	221

5.3 Dimensional drawings

In this chapter, you can find the dimensions of the geared motors with redundant brake.

There is a dimensional drawing for every possible shaft/housing design, each with the tables for gear unit dimensions, motor adapter dimensions, motor dimensions and geared motor dimensions.

Dimensions can exceed the specifications of ISO 2768-mK due to casting tolerances or accumulation of individual tolerances.

We reserve the right to make dimensional changes due to ongoing technical development.

You can download 3D models of our standard drives at https://configurator.stoeber.de/en-US/.

Combination options and the dimensions of forced ventilated geared motors can also be found at https://configurator.stoeber.de/en-US/.

Tolerances

Axis height in accordance with DIN 747	Tolerance
Up to 50 mm	-0.4 mm
Up to 250 mm	-0.5 mm
Up to 630 mm	-0.6 mm

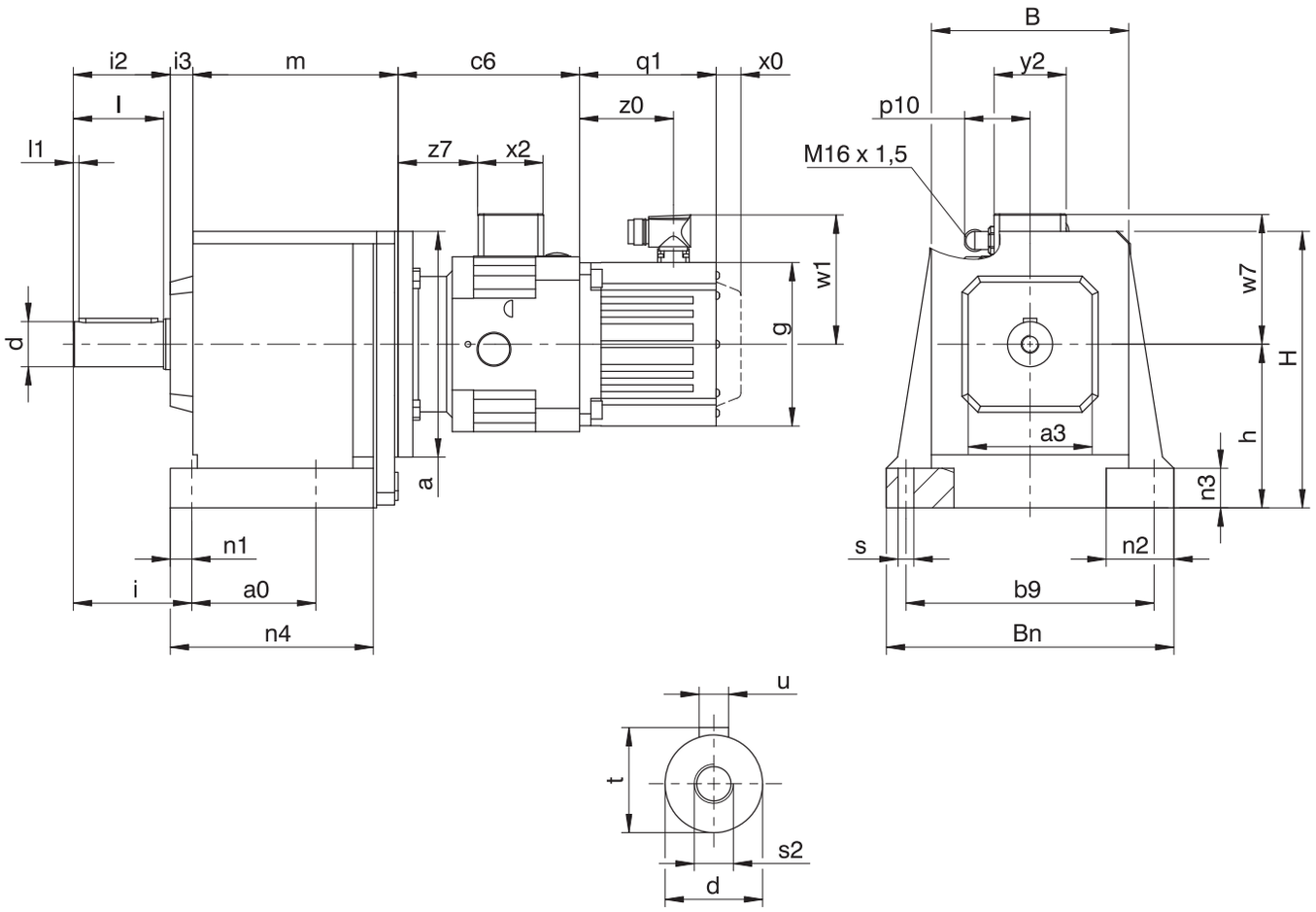
Solid shaft	Tolerance
Shaft ∅ fit ≤ 50 mm	DIN 748-1, ISO k6
Shaft ∅ fit > 50 mm	DIN 748-1, ISO m6
Feather keys	DIN 6885-1, high form A

Flange	Pilot tolerance
Up to 300 mm	ISO j6
Starting at 350 mm	ISO h6

Centering holes in solid shafts in accordance with DIN 332-2, DR shape

Thread size	M4	M5	M6	M8	M10	M12	M16	M20	M24
Thread depth [mm]	10	12.5	16	19	22	28	36	42	50

5.3.1 Solid shaft design with feather key, N housing design (foot)



q1 Applies to motors with brake.

x0 Applies to encoders using an optical measuring method.

w1 Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]

C612: Motor adapter and gear unit are sometimes non-coaxial.

Options: C0 – C5 also available with solid shaft without feather key; on request starting at C6.

Dimensions of gear units

Type	a0	a3	b9	B	Bn	Ød	h	H	i	i2	i3	l	l1	n1	n2	n3	n4	Øs	s2	t	u
C0	62	60	110	92	132	20_{k6}	82	144	55	44	13	40	3	11	35	20	95.0	7	M6	22.5	A6×6×32
C1	70	80	150	124	176	25_{k6}	102	177	67	54	15	50	5	13	42	25	117.5	9	M10	28.0	A8×7×40
C2	85	95	170	138	200	30_{k6}	115	195	79	65	21	60	5	14	50	30	134.5	11	M10	33.0	A8×7×50
C3	105	95	185	150	215	30_{k6}	130	215	79	65	20	60	5	14	50	30	153.5	11	M10	33.0	A8×7×50
C4	110	110	220	175	255	40_{k6}	145	245	105	86	20	80	5	19	60	35	180.0	14	M16	43.0	A12×8×70
C5	130	130	245	192	290	40_{k6}	170	290	108	86	21	80	5	22	70	40	197.0	18	M16	43.0	A12×8×70
C6	215	177	245	225	300	50_{k6}	200	315	130	106	47	100	5	25	75	40	265.0	18	M16	53.5	A14×9×90
C7	235	192	300	265	365	60_{m6}	235	375	163	127	58	120	5	25	90	50	285.0	18	M20	64.0	A18×11×100
C8	300	223	340	310	435	70_{m6}	290	450	190	148	70	140	5	29	95	55	360.0	22	M20	74.5	A20×12×125

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
C_MB23	140	59	102.9	58	64	57.5
C_MB33	161	59	115.4	58	64	71.0
C_MB43	194	59	134.9	58	64	93.5

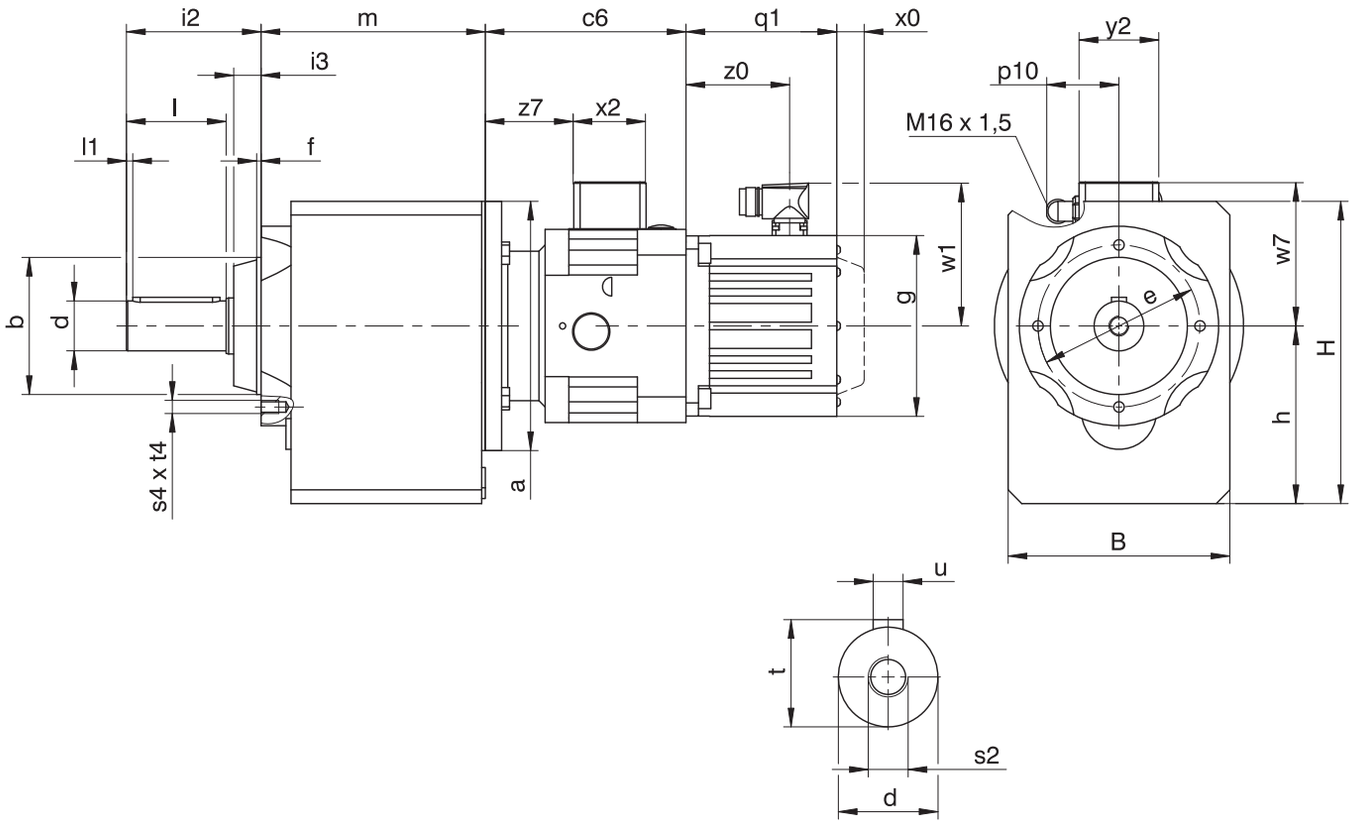
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

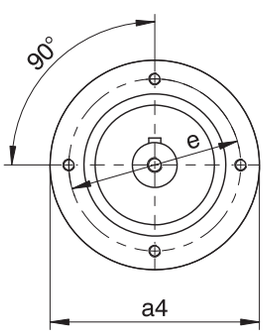
Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
C002	∅160	101.5	–	∅160	101.5	–	–	–	–	–	–	–
C102	∅160	122.0	–	∅160	122.0	–	∅200	124.0	–	–	–	–
C202	∅160	133.0	–	∅160	133.0	–	∅200	135.0	–	–	–	–
C302	∅160	152.5	–	∅160	152.5	–	∅200	154.5	–	∅250	157.5	–
C402	∅160	180.0	–	∅160	180.0	–	∅200	182.0	–	∅250	185.0	–
C502	∅160	200.0	–	∅160	200.0	–	∅200	202.0	–	∅250	205.0	–
C612	–	–	–	–	–	–	∅200	180.0	6	∅250	183.0	6
C712	–	–	–	–	–	–	∅200	201.0	–	∅250	203.0	–
C812	–	–	–	–	–	–	–	–	–	∅250	237.0	–

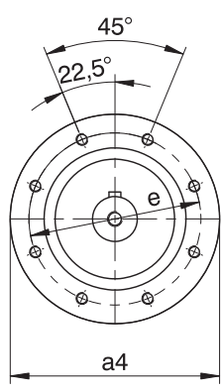
5.3.2 Solid shaft design with feather key, G housing design (pitch circle diameter)



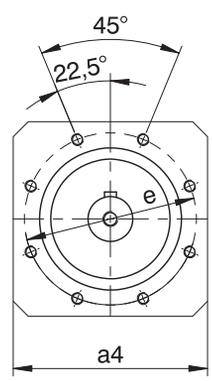
C0 – C4



C5



C6 – C8



q1 Applies to motors with brake.

w1 Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]

x0 Applies to encoders using an optical measuring method.

C612: Motor adapter and gear unit are sometimes non-coaxial.

Options: C0 – C5 also available with solid shaft without feather key; on request starting at C6.

Dimensions of gear units

Type	a4	Øb_{j6}	B	Ød_{k6}	Øe_{k6}	f	h	H	i2	i3	l	l1	s2	s4	t	t4	u
C0	∅87	55_{j6}	97	20_{k6}	75	3.0	79.0	141.0	58	14	40	3	M6	M6	22.5	10	A6×6×32
C1	∅120	80_{j6}	130	25_{k6}	100	3.0	100.0	175.0	71	17	50	5	M10	M6	28.0	13	A8×7×40
C2	∅140	95_{j6}	142	30_{k6}	115	3.0	112.0	192.0	87	22	60	5	M10	M8	33.0	13	A8×7×50
C3	∅140	95_{j6}	154	30_{k6}	115	3.0	127.0	212.0	87	22	60	5	M10	M8	33.0	13	A8×7×50
C4	∅160	110_{j6}	178	40_{k6}	130	3.5	142.5	242.5	108	22	80	5	M16	M10	43.0	16	A12×8×70
C5	∅192	130_{j6}	195	40_{k6}	165	3.5	166.0	286.0	109	23	80	5	M16	M10	43.0	16	A12×8×70
C6	□180	140_{j6}	225	50_{k6}	165	5.0	195.0	310.0	136	30	100	5	M16	M10	53.5	16	A14×9×90
C7	□195	155_{j6}	265	60_{m6}	185	8.0	231.0	371.0	164	37	120	5	M20	M12	64.0	19	A18×11×100
C8	□226	185_{j6}	310	70_{m6}	215	5.0	285.0	445.0	185	37	140	5	M20	M12	74.5	19	A20×12×125

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
C_MB23	140	59	102.9	58	64	57.5
C_MB33	161	59	115.4	58	64	71.0
C_MB43	194	59	134.9	58	64	93.5

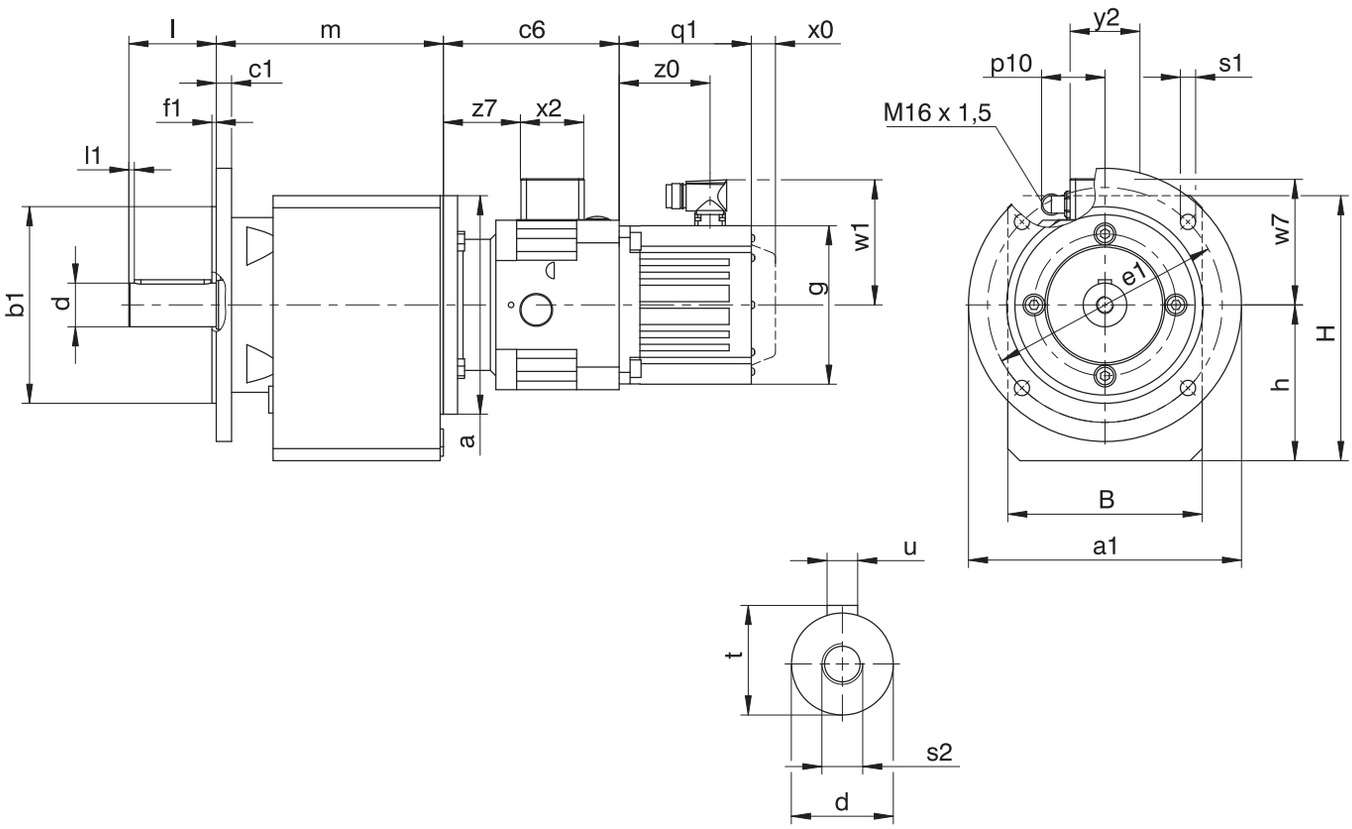
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4		MB23_EZ5		MB33_EZ7		MB43_EZ8	
	a	m	a	m	a	m	a	m
C002	∅160	100	∅160	100	–	–	–	–
C102	∅160	120	∅160	120	∅200	122	–	–
C202	∅160	132	∅160	132	∅200	134	–	–
C302	∅160	151	∅160	151	∅200	153	∅250	156
C402	∅160	178	∅160	178	∅200	180	∅250	183
C502	∅160	198	∅160	198	∅200	200	∅250	203
C612	–	–	–	–	∅200	197	∅250	200
C712	–	–	–	–	∅200	222	∅250	224
C812	–	–	–	–	–	–	∅250	270

5.3.3 Solid shaft design with feather key, F housing design (round flange)



q1 Applies to motors with brake.

w1 Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]

x0 Applies to encoders using an optical measuring method.

C612: Motor adapter and gear unit are sometimes non-coaxial.

Options: C0 – C5 also available with solid shaft without feather key; on request starting at C6.

Dimensions of gear units

Type	Øa1	Øb1	B	c1	Ød	Øe1	f1	h	H	l	l1	Øs1	s2	t	u
C0	160	110_{j6}	97	10	20_{k6}	130	3.0	79.0	141.0	40	3	9	M6	22.5	A6×6×32
C1	200	130_{j6}	130	12	25_{k6}	165	3.5	100.0	175.0	50	5	11	M10	28.0	A8×7×40
C2	200	130_{j6}	142	12	30_{k6}	165	3.5	112.0	192.0	60	5	11	M10	33.0	A8×7×50
C3	250	180_{j6}	154	12	30_{k6}	215	4.0	127.0	212.0	60	5	14	M10	33.0	A8×7×50
C4	250	180_{j6}	178	14	40_{k6}	215	4.0	142.5	242.5	80	5	14	M16	43.0	A12×8×70
C5	300	230_{j6}	195	16	40_{k6}	265	4.0	166.0	286.0	80	5	14	M16	43.0	A12×8×70
C6	300	230_{j6}	225	17	50_{k6}	265	4.0	195.0	310.0	100	5	14	M16	53.5	A14×9×90
C7	350	250_{h6}	265	18	60_{m6}	300	5.0	231.0	371.0	120	5	18	M20	64.0	A18×11×100
C8	400	300_{h6}	310	20	70_{m6}	350	5.0	285.0	445.0	140	5	18	M20	74.5	A20×12×125

Dimensions of additional round flanges

Type	Øa1	Øb1	c1	Øe1	f1	Øs1
C0	120	80_{j6}	10	100	3.0	7
C0	140	95_{j6}	10	115	3.0	9
C1	140	95_{j6}	8	115	3.5	9
C1	160	110_{j6}	10	130	3.5	9
C2	160	110_{j6}	10	130	3.5	9
C2	250	180_{j6}	12	215	4.0	14
C3	160	110_{j6}	10	130	3.5	9
C3	200	130_{j6}	12	165	3.5	11
C4	200	130_{j6}	14	165	3.5	11
C4	300	230_{j6}	14	265	4.0	14
C5	250	180_{j6}	14	215	4.0	14
C8	350	250_{h6}	18	300	5.0	18
C8	450	350_{h6}	20	400	5.0	18

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
C_MB23	140	59	102.9	58	64	57.5
C_MB33	161	59	115.4	58	64	71.0
C_MB43	194	59	134.9	58	64	93.5

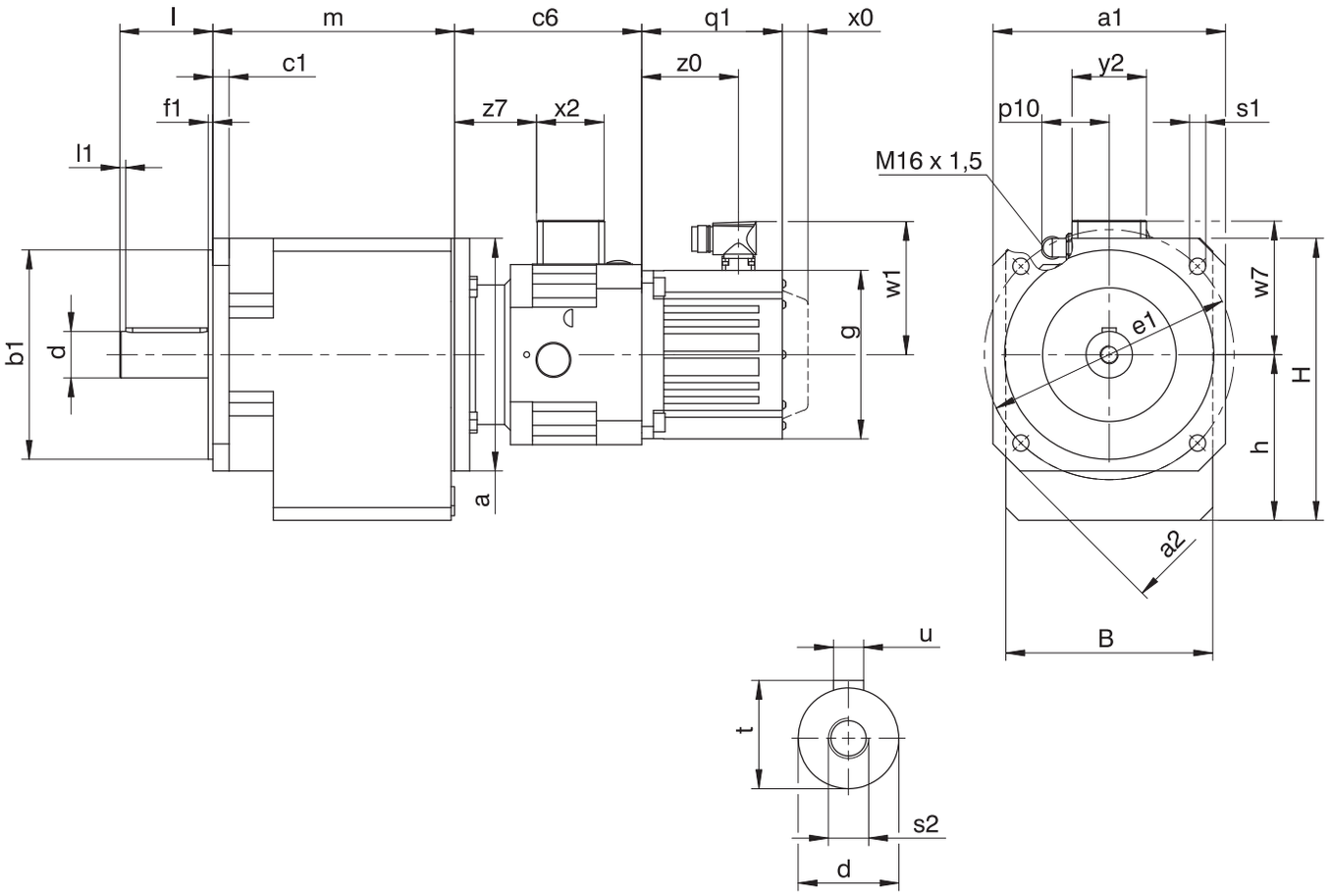
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4		MB23_EZ5		MB33_EZ7		MB43_EZ8	
	a	m	a	m	a	m	a	m
C002	∅160	118	∅160	118	–	–	–	–
C102	∅160	141	∅160	141	∅200	143	–	–
C202	∅160	159	∅160	159	∅200	161	–	–
C302	∅160	178	∅160	178	∅200	180	∅250	183
C402	∅160	206	∅160	206	∅200	208	∅250	211
C502	∅160	227	∅160	227	∅200	229	∅250	232
C612	–	–	–	–	∅200	233	∅250	236
C712	–	–	–	–	∅200	266	∅250	268
C812	–	–	–	–	–	–	∅250	315

5.3.4 Solid shaft design with feather key, Q housing design (square flange)



q1 Applies to motors with brake.

w1 Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]

x0 Applies to encoders using an optical measuring method.

Options: C0 – C4 also available with solid shaft without feather key.

Dimensions of gear units

Type	□a1	□a2	Øb1	B	c1	Ød	Øe1	f1	h	H	l	l1	Øs1	s2	t	u
C0	124	160	110_{j6}	97	9	20_{k6}	130	3.0	79.0	141.0	40	3	9	M6	22.5	A6×6×32
C1	145	192	130_{j6}	130	11	25_{k6}	165	3.5	100.0	175.0	50	5	11	M10	28.0	A8×7×40
C2	145	192	130_{j6}	142	11	30_{k6}	165	3.5	112.0	192.0	60	5	11	M10	33.0	A8×7×50
C3	200	250	180_{j6}	154	14	30_{k6}	215	4.0	127.0	212.0	60	5	14	M10	33.0	A8×7×50
C4	200	250	180_{j6}	178	14	40_{k6}	215	4.0	142.5	242.5	80	5	14	M16	43.0	A12×8×70

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
C_MB23	140	59	102.9	58	64	57.5
C_MB33	161	59	115.4	58	64	71.0
C_MB43	194	59	134.9	58	64	93.5

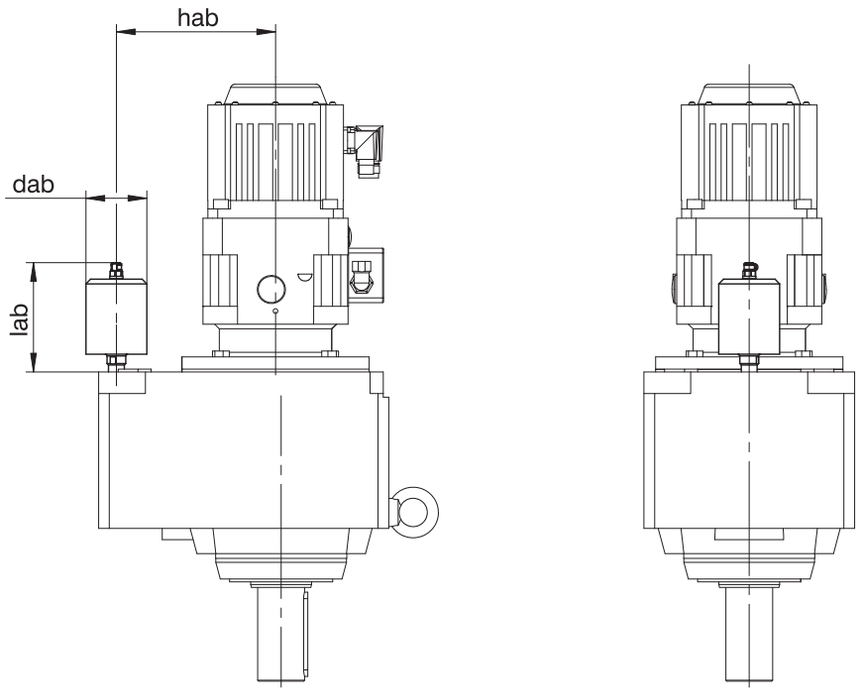
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4		MB23_EZ5		MB33_EZ7		MB43_EZ8	
	a	m	a	m	a	m	a	m
C002	∅160	118	∅160	118	–	–	–	–
C102	∅160	141	∅160	141	∅200	143	–	–
C202	∅160	159	∅160	159	∅200	161	–	–
C302	∅160	178	∅160	178	∅200	180	∅250	183
C402	∅160	206	∅160	206	∅200	208	∅250	211

5.3.5 Oil expansion tank



Dimensions

Type	MB33_EZ7			MB43_EZ8		
	dab	hab	lab	dab	hab	lab
C612	65	170	114.5	65	170	115.5
C712	73	205	129.5	73	205	129.5

More information can be found in the chapter [▷ 5.6.4]

5.4 Type designation

This chapter shows you an explanation of the type designation with the associated options.

Additional ordering information not included in the type designation can be found at the end of the chapter.

Example code

C	2	0	2	N	0120	MB23	EZ501U

Explanation

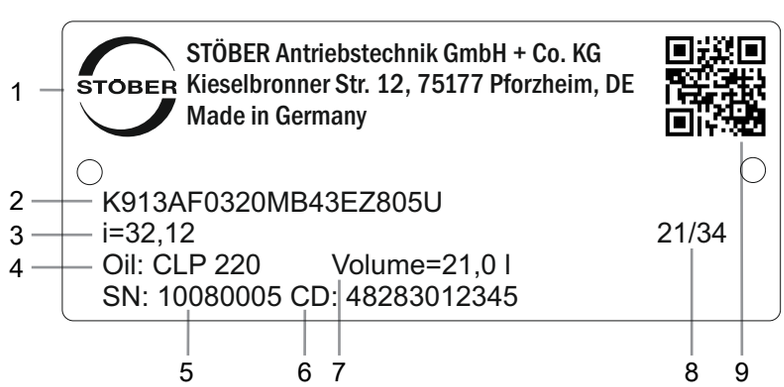
Code	Designation	Design
C	Type	Helical gear unit
2	Size	2 (example)
0	Generation	Generation 0
1		Generation 1
2	Stages	Two-stage
3		Three-stage
G	Housing	Pitch circle diameter
F		Round flange
Q		Square flange
N		Foot
0120	Transmission ratio (i x 10)	i = 12 (example)
MB	Motor adapter	ServoStop motor adapter with brake
2	Size	2 (example)
3	Generation	Generation 3
EZ501U	Motor	EZ synchronous servo motor

To complete the type designation, also specify the following in your order:

- A detailed type designation of the motor, see the chapter [▶ 11]
- Mounting position, see the chapter [▶ 5.5.6]
- Position of the plug connectors, see the chapter [▶ 5.5.8]
- Oil expansion tank (option, recommended for gear units in mounting position EL5), see the chapter [▶ 5.6.4]

5.4.1 Nameplate

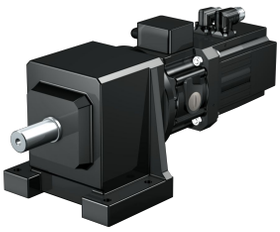
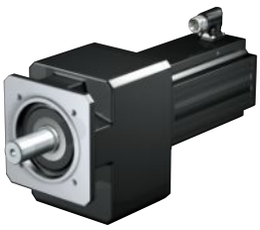
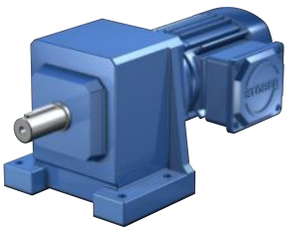
An example gear unit nameplate is explained in the figure below.



Code	Designation
1	Name of manufacturer
2	Type designation
3	Gear ratio of the gear unit
4	Lubricant specification
5	Serial number of the gear unit
6	Customer-specific data
7	Lubricant fill volume
8	Date of manufacture (year/calendar week)
9	QR code (link to product information)

5.5 Product description

5.5.1 Input options

MB motor adapter + EZ synchronous servo motor	EZ synchronous servo motor	LM Lean motor	Asynchronous motor
			
Catalog ID 443311_en	Catalog ID 442437_en	Catalog ID 443016_en	Catalog ID 443136_en

The corresponding catalogs can be found at http://www.stoeber.de/en/downloads/

Enter the ID of the catalog in the Search term field.

5.5.2 ServoStop motor adapter with brake (MB)

In this chapter, you will find the description and technical data of the motor adapter with brake.

5.5.2.1 Properties

- Electrically actuated spring-loaded brake for dry running
- Featuring backlash-free plug-in coupling (jaw coupling) for easy removal of the motor with the axis braked in any position
- Electrical release monitoring in the terminal box of the motor adapter
- Manual monitoring of wear via air gap checks with a feeler gauge
- Manual release (optional)
- Radial shaft seal rings made of FKM with two sealing lips
- Four oil drain holes to protect the brake from oiling up in case of leakage
- Diverse-redundant system in accordance with EN ISO 13849-1

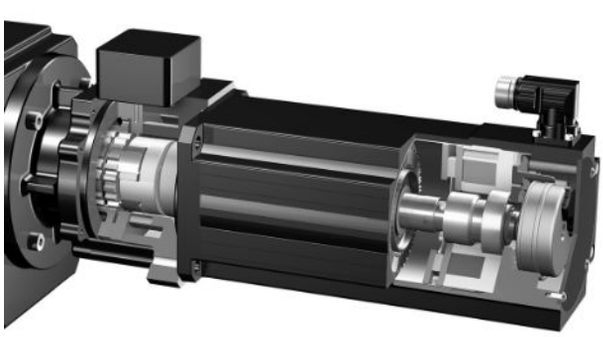


Fig. 1: Motor adapter with ServoStop brake and directly attached EZ synchronous servo motor

5.5.2.2 Brake

A quiescent current brake is integrated into the motor adapter. It has the function of a holding brake. Braking from full speed, e.g. in case of a voltage drop or an emergency off in hazard situations, is still possible.

The brake can be used as a single brake or together with the motor brake as a redundant brake system.

Function

The brakes installed in the motor adapter are electrically actuated spring-loaded brakes for dry running. In the de-energized state, braking takes place using spring force. The brake is released by an electromagnetic DC coil before the motor is switched on. The switch-on time t_{2B} (release time) is the time until the anchor plate releases from the axially moving brake disc and is magnetically held to the coil body. In this state, the brake is released and the coupling hub can rotate. In order to switch off (motor and brake), the residual magnetic flux of the iron parts (anchor and coil body) must be reduced; the associated time t_{11B} until the start of torque generation is defined as a response delay when linking. The link time t_{1B} is the time until the braking torque has built up to the nominal braking torque.

Manual release

Optionally, the brake can be equipped with a manual release.

Pressing the manual release deactivates the electronic actuation of the brake. Before pressing the manual release, you must establish the safety of the machine (e.g. protection against falling).

5.5.2.3 Electrical connection

- Terminal box (standard)
- Plug connector (optional, not possible in combination with release monitoring)

5.5.2.4 Monitoring

For monitoring the brake system, there are generally two options:

- Manual monitoring of wear via air gap checks with a feeler gauge
- Electrical release monitoring in the terminal box with a non-contact and wear-free proximity switch

5.5.2.5 Brake technical data

Technical data for operation at 24 V DC (±10%)

Type	M_{1Bstat} [Nm]	J_1 [kgcm²]	m [kg]	$\Delta\phi_B$ [arcmin]	$t_{1B,DC}$ [ms]	t_{2B} [ms]	$P_{N,B}$ [W]
MB23	8.0	6.3	8.5	32.0	65	55	30
MB23	12	6.3	8.5	32.0	55	80	30
MB33	16	26	14	26.0	150	60	37
MB33	24	26	14	26.0	120	85	37
MB33	32	26	14	26.0	95	100	37
MB33	45	26	14	26.0	80	120	37
MB43	50	69	26	19.0	150	100	55
MB43	72	69	26	19.0	120	150	55
MB43	100	69	26	19.0	90	200	55
MB53	200	236	61	17.0	200	250	86

$\Delta\phi_B$: With the brake closed, a higher total backlash results ($\Delta\phi_{tot} = \Delta\phi_2 + \Delta\phi_B / i$).

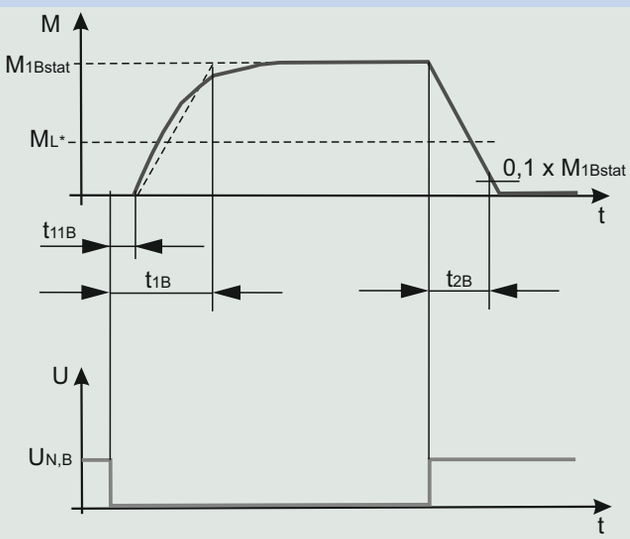
Technical data for operation with high-speed rectifier 104 V DC (supply voltage U_{LINE} 220 – 275 V AC ± 5%, 50/60 Hz)

Type	M_{1Bstat} [Nm]	J_1 [kgcm²]	m [kg]	$\Delta\phi_B$ [arcmin]	$t_{1B,DC}$ [ms]	$t_{1B,AC}$ [ms]	t_{2B} [ms]	$P_{O,B}$ [W]	P_{holdB} [W]
MB23	8.0	6.3	8.5	32.0	65	360	20	101	26
MB23	12	6.3	8.5	32.0	55	280	25	101	26
MB23	16	6.3	8.5	32.0	50	230	35	101	26
MB23	24	6.3	8.5	32.0	45	180	50	101	26
MB23	30	6.3	8.5	32.0	40	160	60	101	26
MB33	16	26	14	26.0	150	800	25	125	32
MB33	24	26	14	26.0	120	650	35	125	32
MB33	32	26	14	26.0	95	500	40	125	32
MB33	45	26	14	26.0	80	400	50	125	32
MB33	90	26	14	26.0	50	250	90	125	32
MB43	50	69	26	19.0	150	900	50	148	38
MB43	72	69	26	19.0	120	700	75	148	38
MB43	100	69	26	19.0	90	500	100	148	38
MB43	160	69	26	19.0	60	300	150	148	38
MB53	200	236	61	17.0	200	800	110	200	50
MB53	300	236	61	17.0	170	600	150	200	50
MB53	400	236	61	17.0	120	400	200	200	50

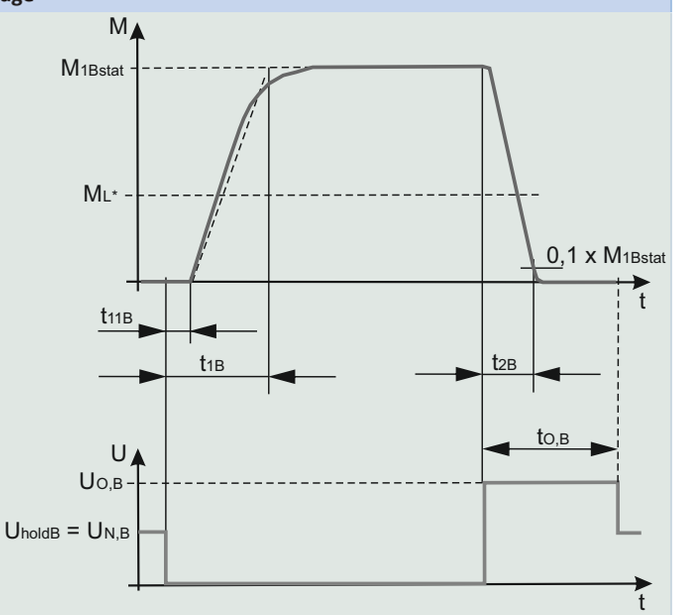
$\Delta\phi_B$: With the brake closed, a higher total backlash results ($\Delta\phi_{tot} = \Delta\phi_2 + \Delta\phi_B$ / i).

5.5.2.6 Brake switching times

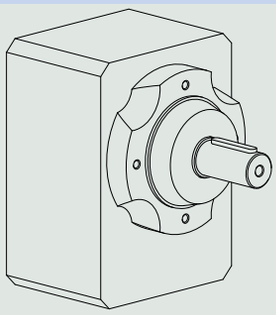
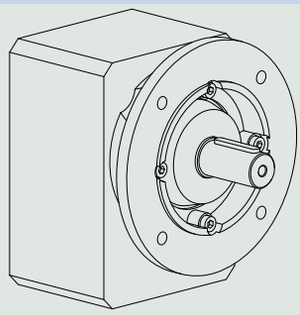
Switching times in case of brake operation with nominal voltage

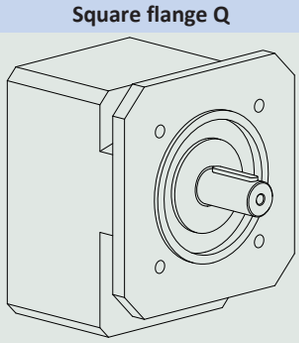
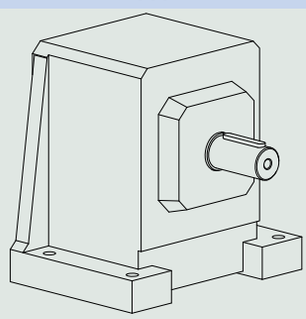


Switching times in case of brake operation with overexcitation voltage



5.5.3 Housing design

Pitch circle diameter G	Round flange F
	

Square flange Q	Foot N
	

	G	F	Q	N
C0	✓	✓	✓	✓
C1	✓	✓	✓	✓
C2	✓	✓	✓	✓
C3	✓	✓	✓	✓
C4	✓	✓	✓	✓
C5	✓	✓	–	✓
C6	✓	✓	–	✓
C7	✓	✓	–	✓
C8	✓	✓	–	✓
C9	✓	✓	–	✓

5.5.4 Shaft design

Gear units in sizes C0 – C9 come standard with a solid shaft with feather key.

Gear units in sizes C0 – C5 can be ordered with the option of a solid shaft without feather key. Only upon request starting at size C6.

5.5.5 Installation conditions

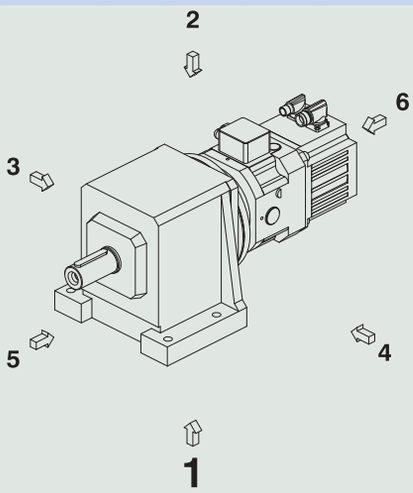
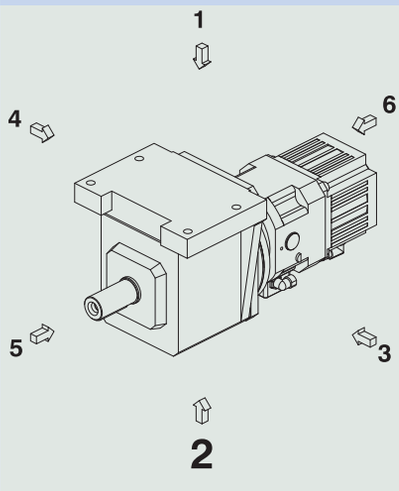
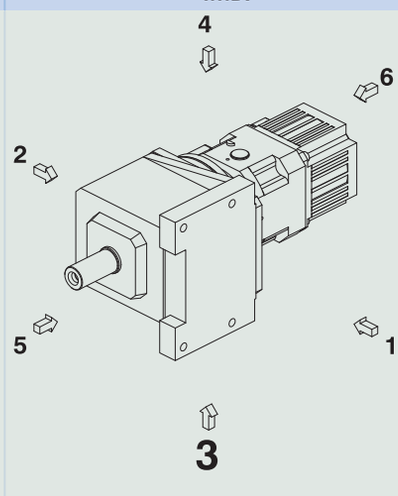
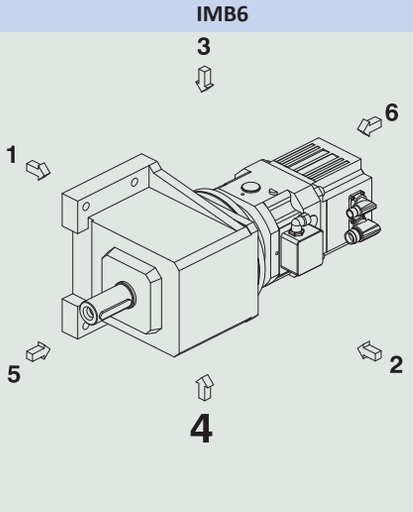
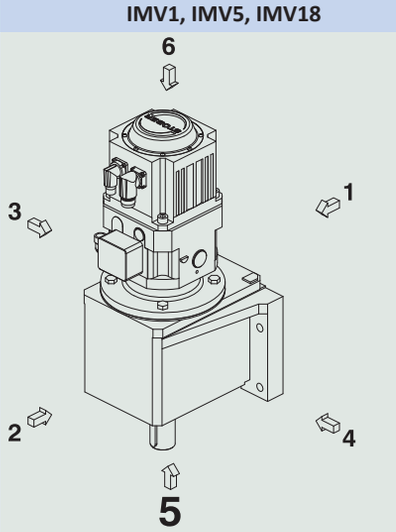
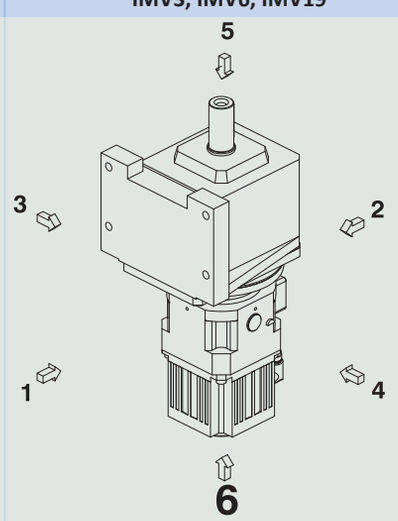
Fastening the gear units on the machine side using the pitch circle diameter

The specified torques and forces only apply when gear units are fastened on the machine side using screws of strength class 10.9. In addition, the gear housings must be adjusted at the pilot. The machine-side fit must be H7.

5.5.6 Mounting positions

The following table shows the standard mounting positions.

The numbers identify the gear unit sides. The mounting position is defined by the gear side facing downwards.

EL1 IMB3, IMB5, IMB14, IMB34, IMB35	EL2 IMB8	EL3 IMB7
		
EL4 **IMB6**	**EL5** **IMV1, IMV5, IMV18**	**EL6** **IMV3, IMV6, IMV19**
		

Since the lubricant filling volume of the gear unit depends on the mounting position, the mounting position must be specified when ordering.

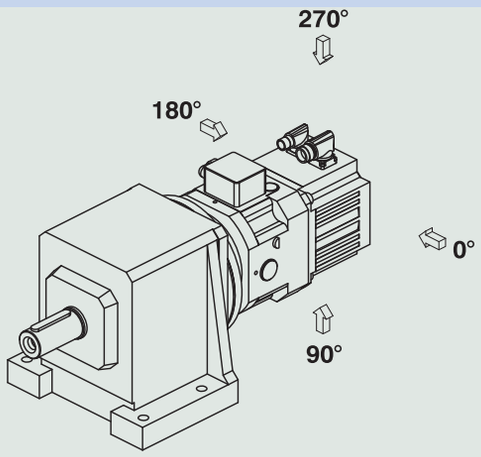
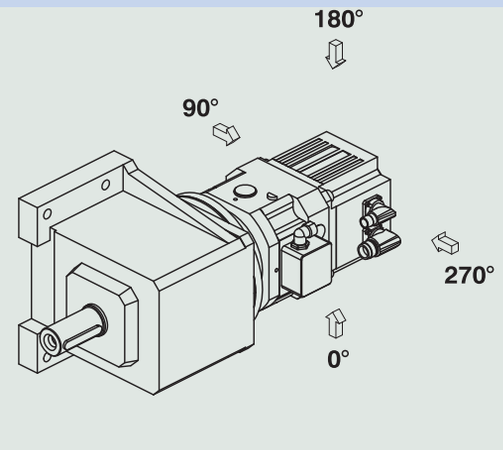
5.5.7 Lubricants

STOBER fills the gear units with the amount and type of lubricant specified on the nameplate. The filling volume and the structure of the gear units depend on the mounting position.

Only install the gear units in the intended mounting position! Reposition the gear units only after consulting STOBER. Otherwise, STOBER assumes no liability for the gear units.

You will receive lubricants for use in the food industry upon request.

5.5.8 Position of the plug connectors/terminal box

Mounting position EL1	Mounting position EL4
Plug connector/terminal box in 270° position (standard)	Plug connector/terminal box in 270° position (standard)
	

As standard, the plug connectors of the motor or the terminal box/plug connector of the motor adapter are mounted in the 270° position. The position of the terminal box/plug connector of the motor adapter can be selected separately from the position of the motor plug connectors.
Indicate variations for your geared motor in the order.

Note that the plug connector position rotates along with the geared motor if the geared motor is in another mounting position.

5.5.9 Other product features

Feature	Value
Max. permitted gear unit temperature (on the surface of the gear unit)	≤ 80 °C
Paint	Black RAL 9005
Explosion-proof design in accordance with (ATEX) Directive 2014/34/EU (optional)	Not available
Efficiency:	
η_{get} two-stage	97%
η_{get} three-stage	96%
Protection class:[1]	
Gear unit	IP65
Motor	IP56, optionally IP66

5.5.10 Maintenance

The instructions for maintenance can be found in the operating manual, ID 443027_en, at http://www.stoeber.de/en/downloads/. Enter the ID of the documentation in the Search... field.

Ventilation

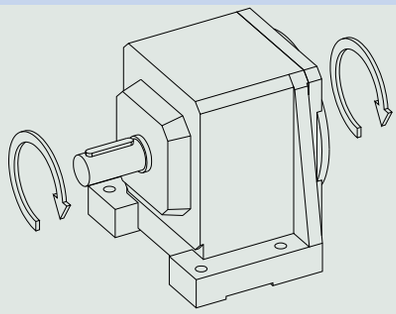
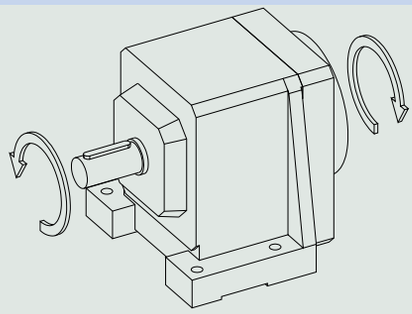
Air release valves are fitted as a standard feature and independently of installation position for gear unit sizes C6 to C9.

For the position and dimensions of the air release valve, refer to the 3D model.

Download the 3D model at https://configurator.stoeber.de/en-US/.

[1] Observe the protection class of all the components.

5.5.11 Direction of rotation

C002 – C912	C103 – C913
	
The input and output rotate in the same direction.	The input and output rotate in opposite directions.

The pictures show mounting position EL1.

5.6 Project configuration

Project your drives using our SERVOsoft designing software. Download SERVOsoft for free at https://www.stoeber.de/en/ServoSoft.

It is the most convenient and reliable method of drive selection, as the entire torque/speed curve of the application is displayed and evaluated here in the curve of the geared motor.

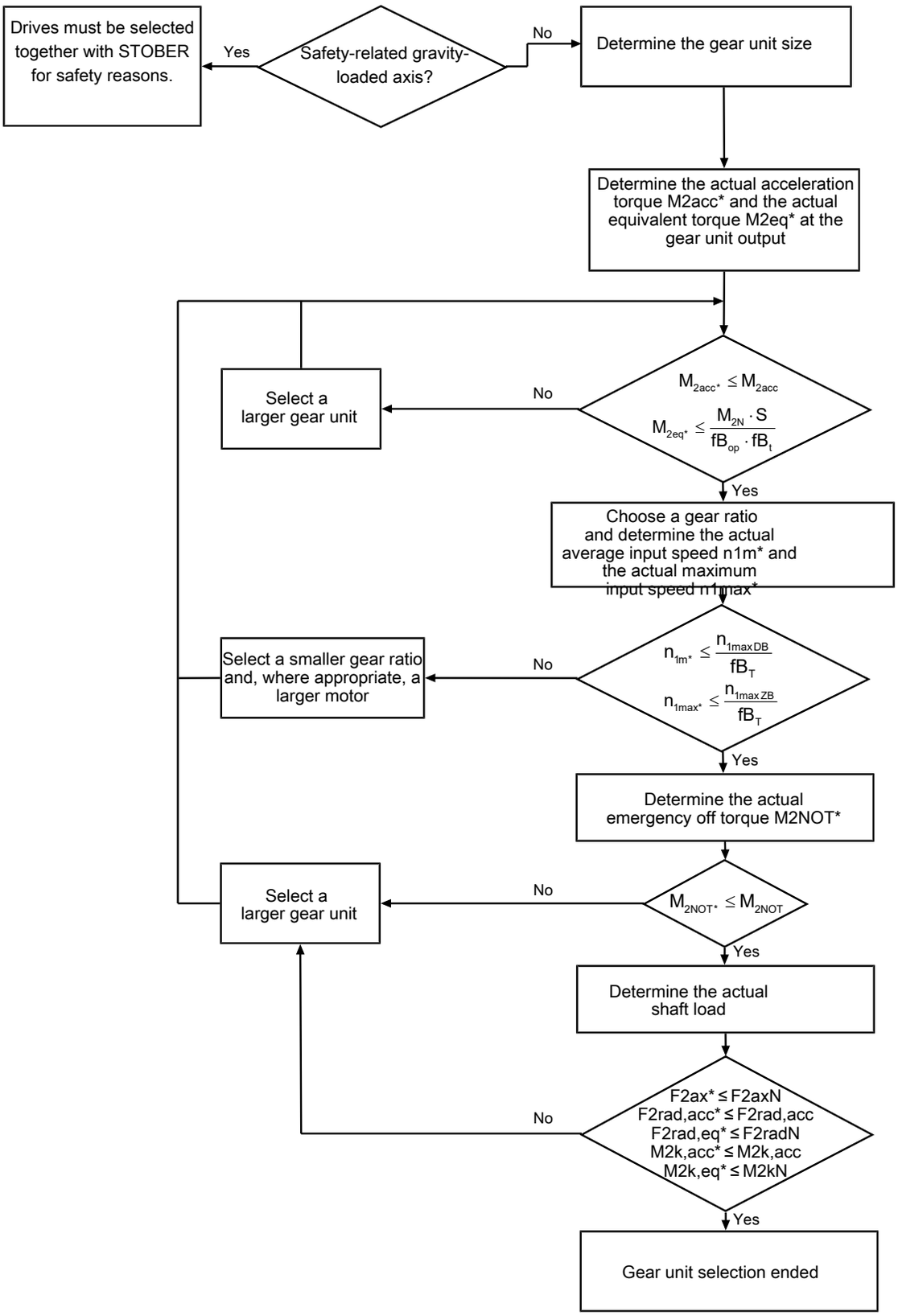
In this chapter, only limit values for specific operating points can be taken into consideration for manual drive selection.

An explanation of the formula symbols can be found in Chapter Symbols in formulas.

The formula symbols for values actually present in the application are marked with *.

5.6.1 Drive selection

Drive selection for gear units

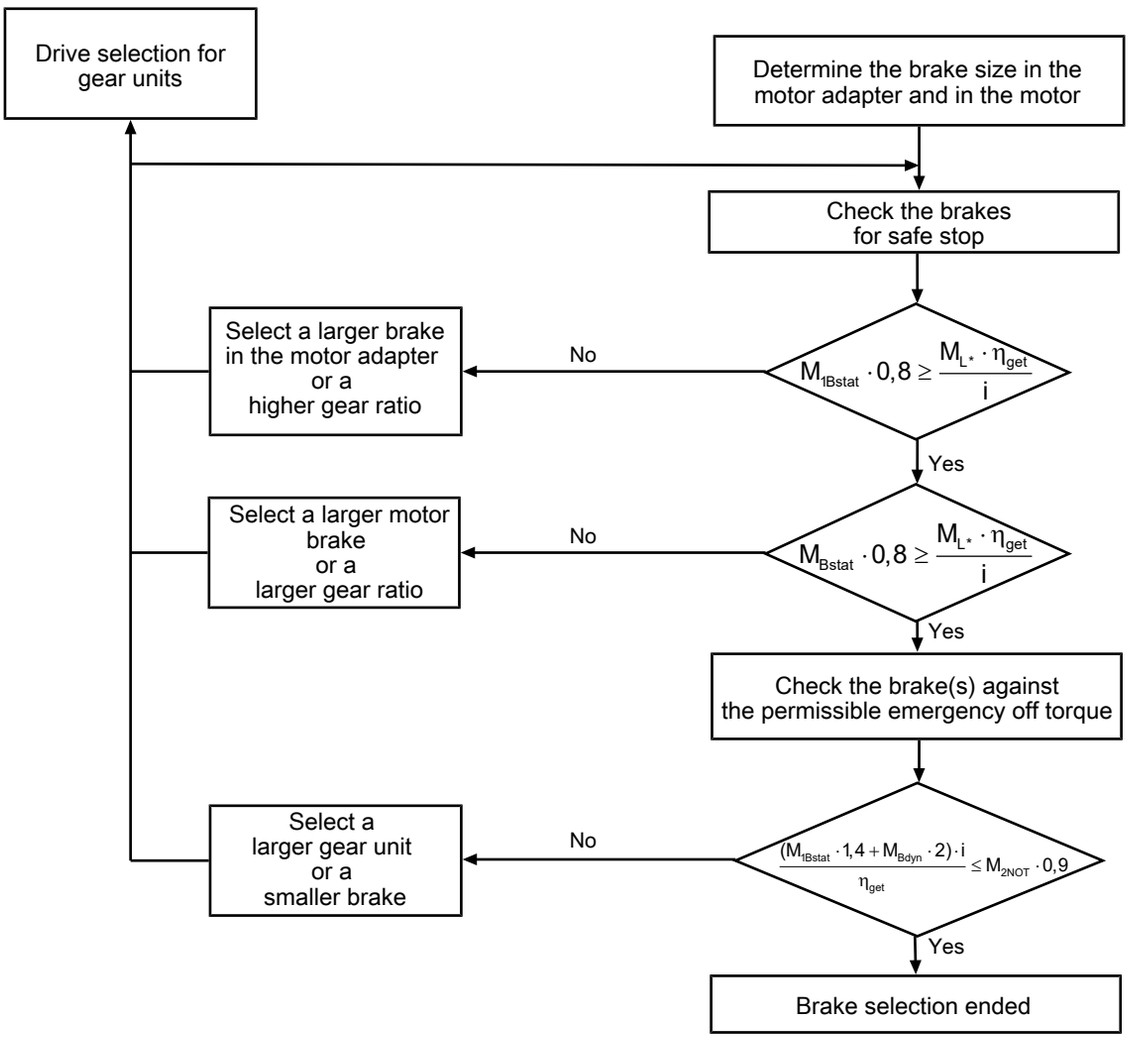


Calculate the forces and tilting torques in the chapter Permitted shaft loads.

Refer to the selection tables for the values for i, n_{1maxDB}, n_{1maxZB}, M_{2acc}, M_{2NOT}, M_{2N} and S.

The values for fB_T, fB_{op} and fB_t can be found in the corresponding tables in this chapter.

Drive selection for brakes

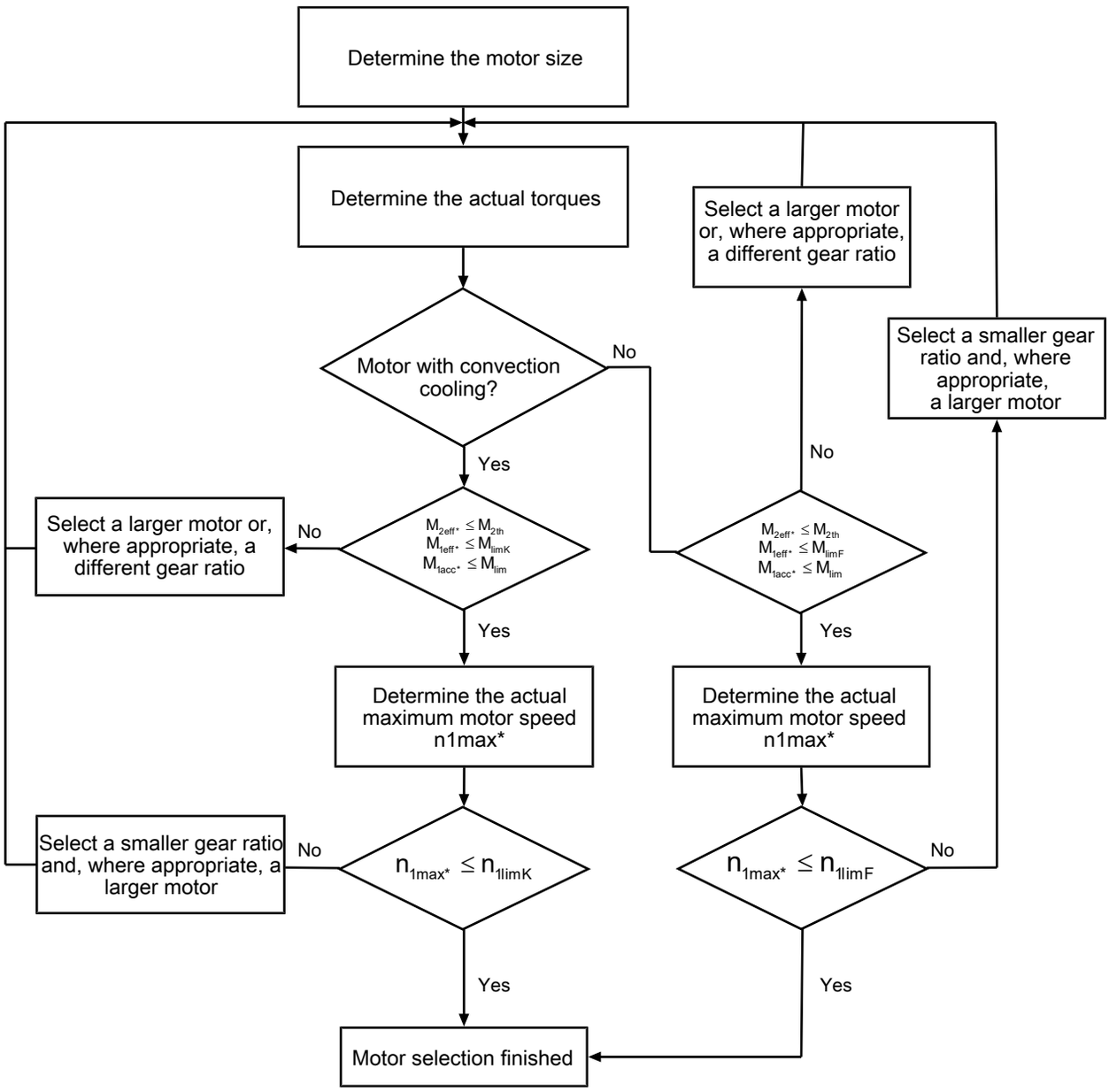


Refer to the selection tables for the values for i, M_{1Bstat}, M_{Bstat} and M_{2NOT}.

Refer to the Technical data table in the chapter [▷ 11.6.7] for the values for M_{Bdyn}.

Refer to the chapter Other product features for the values for η_{get}.

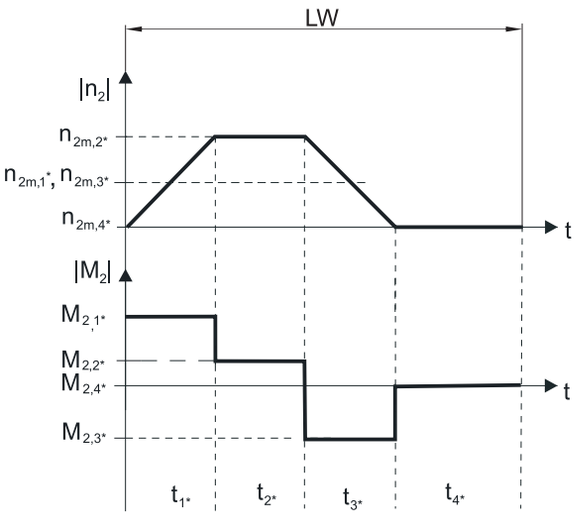
Drive selection for motors



The value for M_{lim}, M_{limK}, M_{limF}, n_{1limK} and n_{1limF} can be found in the motor characteristic curve in the chapter [▷ 11.3]. Note the size, nominal speed n_N and cooling type of the motor.

Example of cyclic operation

The following calculations are based on a representation of the power taken from the output based in accordance with the following example:



Calculation of the actual maximum acceleration torques

$$M_{2acc*} = J_{tot} \cdot \frac{\Delta n_2}{9{,}55 \cdot \Delta t} + M_{L*}$$

$$M_{1acc*} = \frac{M_{2acc*}}{i \cdot \eta_{get}} + J_1 \cdot \frac{\Delta n_1}{9{,}55 \cdot \Delta t}$$

Calculation of the actual average input speed

$$n_{1m*} = n_{2m*} \cdot i$$

$$n_{2m*} = \frac{\left|n_{2m,1*}\right| \cdot t_{1*} + \ldots + \left|n_{2m,n*}\right| \cdot t_{n*}}{t_{1*} + \ldots + t_{n*}}$$

If $t_{1*} + \ldots + t_{3*} \geq 6$ min, calculate n_{2m*} without the rest phase t_{4*}.

The values for the ratio i can be found in the selection tables.

Calculation of the actual effective torque

$$M_{2eff*} = \sqrt{\frac{t_{1*} \cdot M_{2,1*}{}^2 + \ldots + t_{n*} \cdot M_{2,n*}{}^2}{t_{1*} + \ldots + t_{n*}}}$$

Calculation of the actual emergency-off torque

$$M_{2NOT*} = J_{tot} \cdot \frac{\Delta n_2}{9.55 \cdot \Delta t} + M_{L*}$$

Calculation of the actual equivalent torque

$$M_{2eq*} = \sqrt[3]{\frac{\left|n_{2m,1*}\right| \cdot t_{1*} \cdot \left|M_{2,1*}{}^3\right| + \ldots + \left|n_{2m,n*}\right| \cdot t_{n*} \cdot \left|M_{2,n*}{}^3\right|}{\left|n_{2m,1*}\right| \cdot t_{1*} + \ldots + \left|n_{2m,n*}\right| \cdot t_{n*}}}$$

Calculation of the thermal limit torque

Calculate the thermal limit torque M_{2th} for a duty cycle $ED_{10} > 50\%$ and the actual average input speed n_{1m*}. (At $K_{mot,th} \leq 0$ you must reduce the average input speed n_{1m*} accordingly or select another geared motor size.)

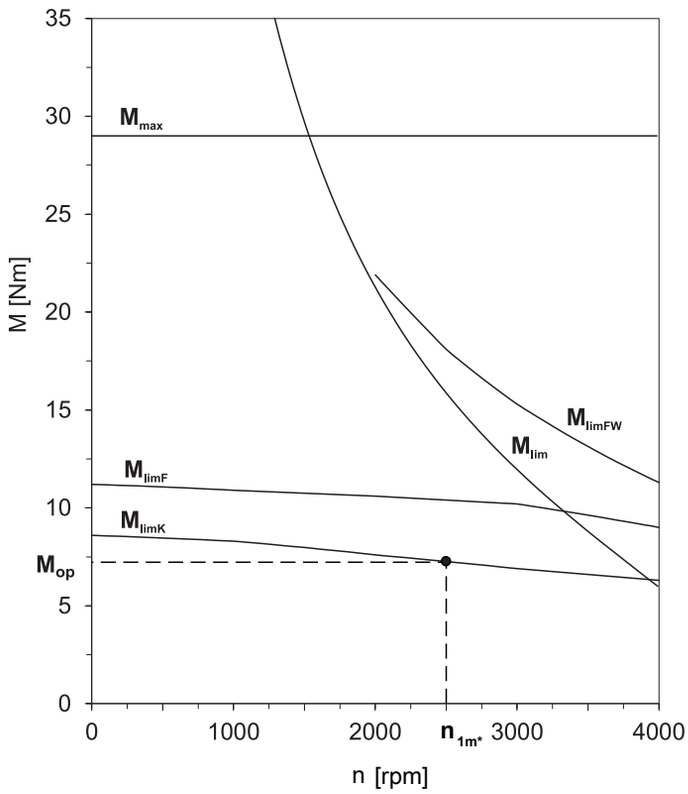
$$M_{2th} = M_{op} \cdot i \cdot K_{mot,th}$$

$$K_{mot,th} = 0{,}95 - \frac{a_{th}}{1000} \cdot athEL \cdot fB_T \cdot \left(\frac{n_{1m*}}{1000}\right)^3$$

The values for i and a_{th} can be found in the selection tables.

The values for a_{thEL} and fB_T can be found in the corresponding tables in this chapter.

The value for the torque of the motor at operating point M_{op} with the determined average input speed n_{1m*} can be found in the motor characteristic curve in the chapter Torque/speed curves. Note the size, nominal speed n_N and cooling type of the motor. The figure below shows an example of reading the torque M_{op} of a motor with convection cooling at the operating point.



Operating factors

Parameter a_{thEL}

Mounting position	a_{thEL}
EL1, 2, 5, 6	1.0
EL3, 4	1.1

Operating mode	fB_{op}
Uniform continuous operation	1.00
Cyclic operation	1.25
Reversing load cyclic operation	1.40

Run time	fB_t
Daily runtime ≤ 8 h	1.00
Daily runtime ≤ 16 h	1.15
Daily runtime ≤ 24 h	1.20

Temperature		fB_T
Motor cooling	**Surrounding temperature**	
Motor with forced ventilation	≤ 20 °C	0.9
	≤ 30 °C	1.0
	≤ 40 °C	1.15
Motor with convection cooling	≤ 20 °C	1.0
	≤ 30 °C	1.1
	≤ 40 °C	1.25

Notes

- The maximum permitted gear unit temperature (see the "Other product features" chapter) must not be exceeded. Doing so may result in damage to the geared motor.
- For braking from full speed (for example when the power fails or when setting up the machine), note the permitted gear unit torques (M_{2acc}, M_{2NOT}) in the selection tables.

5.6.2 Permitted shaft loads for the output shaft

The values specified in the tables apply to the permitted shaft loads:

- For shaft dimensions in accordance with the catalog
- For output speeds $n_{2m*} \leq 20$ rpm ($F_{2axN} = F_{2ax20}$; $F_{2radN} = F_{2rad20}$; $M_{2kN} = M_{2k20}$)
- Only if radial forces on the gear unit are stabilized by its pilots for the pitch circle diameter and flange housing design

Permitted shaft loads

Type	z_2	F_{2ax20}	F_{2rad20}	$F_{2rad,acc}$	M_{2k20}	$M_{2k,acc}$
	[mm]	[N]	[N]	[N]	[Nm]	[Nm]
C0	20.0	500	1900	1900	80	80
C1	30.0	850	3400	3400	190	190
C2	30.0	1050	4200	4200	260	260
C3	30.0	1400	5650	5650	350	350
C4	35.0	2400	9700	9700	750	750
C5	42.0	3000	11000	11000	900	900
C6	40.0	4000	16000	16000	1500	1500
C7	45.0	5500	22000	22000	2400	2400
C8	50.0	7500	30000	30000	3700	3700
C9	55.0	9500	37000	37000	5200	5200

For other output speeds, download diagrams at https://configurator.stoeber.de/en-US/.

The following applies to output speeds $n_{2m*} > 20$ rpm:

$$F_{2axN} = \frac{F_{2ax20}}{\sqrt[3]{\frac{n_{2m*}}{20\ \text{rpm}}}} \qquad F_{2radN} = \frac{F_{2rad20}}{\sqrt[3]{\frac{n_{2m*}}{20\ \text{rpm}}}} \qquad M_{2kN} = \frac{M_{2k20}}{\sqrt[3]{\frac{n_{2m*}}{20\ \text{rpm}}}}$$

The values for F_{2ax20}, F_{2rad20} and M_{2k20} can be found in the table "Permitted shaft loads" in this chapter.

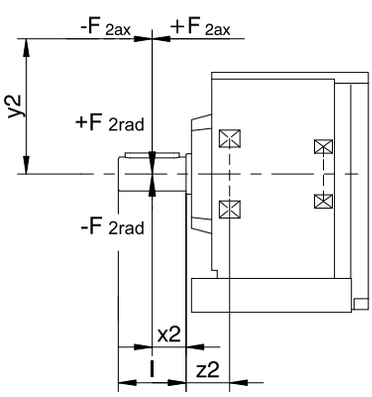


Fig. 2: Force application points

The specified values for F_{2rad20} and $F_{2rad,acc}$ refer to an application of force at the center of the output shaft: $x_2 = l/2$.

Shaft dimensions can be found in the "Dimensional drawings" chapter.

The following applies to other force application points:

$$M_{2k,acc*} = \frac{2 \cdot F_{2ax*} \cdot y_2 + F_{2rad,acc*} \cdot (x_2 + z_2)}{1000}$$

For applications with multiple axial and/or radial forces, you must add the forces as vectors.

In the event of EMERGENCY OFF operation (max. 1000 load changes), you can multiply the permitted forces and torques for F_{2ax20}, F_{2rad20} and M_{2k20} by a factor of two.

Also note the calculation for equivalent values:

$$M_{2k,eq^*} = \sqrt[3]{\frac{\left|n_{2m,1^*}\right| \cdot t_{1^*} \cdot \left|M_{2k,acc,1^*}{}^3\right| + \ldots + \left|n_{2m,n^*}\right| \cdot t_{n^*} \cdot \left|M_{2k,acc,n^*}{}^3\right|}{\left|n_{2m,1^*}\right| \cdot t_{1^*} + \ldots + \left|n_{2m,n^*}\right| \cdot t_{n^*}}}$$

$$F_{2rad,eq^*} = \sqrt[3]{\frac{\left|n_{2m,1^*}\right| \cdot t_{1^*} \cdot \left|F_{2rad,acc,1^*}{}^3\right| + \ldots + \left|n_{2m,n^*}\right| \cdot t_{n^*} \cdot \left|F_{2rad,acc,n^*}{}^3\right|}{\left|n_{2m,1^*}\right| \cdot t_{1^*} + \ldots + \left|n_{2m,n^*}\right| \cdot t_{n^*}}}$$

5.6.3 Radial shaft seal rings

Leak-proofness

Our gear units are equipped with high-quality radial shaft seal rings and checked for leaks. However, a leak cannot be fully ruled out over the length of use of a gear unit. If you use a gear unit with goods incompatible with the lubricant, you must take measures to prevent direct contact with the gear unit lubricant in case of a leak.

5.6.4 Oil expansion tank

The gear units have a higher fill level in mounting position EL5. The oil expansion tank prevents oil from escaping out of the gear unit.

Notes

- We recommend using an oil expansion tank in mounting position EL5 (additional cost) for fast running gear units with an input speed $n_1 > 1750$ rpm and gear ratios $i < 20$.
- It is not possible to use an oil expansion tank if the plug connector is at 90°!

5.7 Additional documentation

Additional documentation related to the product can be found at
http://www.stoeber.de/en/downloads/

Enter the ID of the documentation in the Search term field.

Documentation	ID
Operating manual gear units, geared motors C	443365_en

6 F offset helical geared motors

Table of contents

6 Offset helical geared motors F

6.1 Overview

Offset helical geared motors with large axis distance and redundant brake

Features

Power density	★☆☆☆☆
Backlash	★★★☆☆
Price category	€
Shaft load	★★★☆☆
Smooth operation	★★★☆☆
Torsional stiffness	★★☆☆☆
Mass moment of inertia	★★★★☆
Helical gearing	✓
FKM seal ring at the input	✓
Large axial distances, suitable for confined situations	✓
Safe braking in case of power outage	✓
Safe support of the load with gravity-loaded axes using 2 brakes	✓
Easily and safely connected to the synchronous servo motor thanks to backlash-free plug-in coupling	✓

Key ★☆☆☆☆ good | ★★★★★ excellent
€ Economy | €€€€€ Premium

Technical data

M_{1Bstat}	8 – 100 Nm
i	4.3 – 56
M_{2acc}	67 – 1100 Nm
$\Delta\phi_2$	5 – 11 arcmin
η_{get}	97 %

6.2 Selection tables

The technical data specified in the selection tables applies to:

- Installation altitudes up to 1000 m above sea level
- Surrounding temperatures from 0 °C to 40 °C
- Drives with convection-cooled motors (e.g. EZ401**U**)
- Weight specification for mounting position EL1, housing design G
- Without consideration of the thermal limiting performance

For the technical data on drives with forced ventilated motors (e.g. EZ401**B**), refer to https://configurator.stoeber.de/en-US/.

An explanation of the formula symbols can be found in the chapter [▶ 15.1].

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
F1 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 100 Nm)																	
464	27	29	3.4	2.3	F102_0065 MB23 EZ501U	100	200	6.462	84/13	8.0	8.0	3500	3000	4000	11	6.5	28
464	29	33	3.7	2.1	F102_0065 MB23 EZ402U	100	200	6.462	84/13	8.0	8.0	3500	3000	4000	9.8	6.5	27
696	18	20	3.2	3.0	F102_0043 MB23 EZ501U	67	200	4.308	56/13	8.0	8.0	3500	3000	4000	12	6.5	28
696	18	20	3.2	3.0	F102_0043 MB23 EZ501U	67	200	4.308	56/13	12	8.0	3500	3000	4000	12	6.5	28
696	18	20	3.2	3.0	F102_0043 MB23 EZ501U	67	200	4.308	56/13	16	8.0	3500	3000	4000	12	6.5	28
696	20	22	3.5	2.8	F102_0043 MB23 EZ402U	67	200	4.308	56/13	8.0	8.0	3500	3000	4000	11	6.5	27
696	20	22	3.5	2.8	F102_0043 MB23 EZ402U	67	200	4.308	56/13	12	8.0	3500	3000	4000	11	6.5	27
696	20	22	3.5	2.8	F102_0043 MB23 EZ402U	67	200	4.308	56/13	16	8.0	3500	3000	4000	11	6.5	27
696	29	36	5.1	1.9	F102_0043 MB23 EZ404U	103	200	4.308	56/13	8.0	8.0	3500	3000	4000	12	6.5	30
696	29	36	5.1	1.9	F102_0043 MB23 EZ404U	103	200	4.308	56/13	12	8.0	3500	3000	4000	12	6.5	30
696	29	36	5.1	1.9	F102_0043 MB23 EZ404U	103	200	4.308	56/13	16	8.0	3500	3000	4000	12	6.5	30
696	31	33	5.5	1.8	F102_0043 MB23 EZ502U	103	200	4.308	56/13	8.0	8.0	3500	3000	4000	14	6.5	29
696	31	33	5.5	1.8	F102_0043 MB23 EZ502U	103	200	4.308	56/13	12	8.0	3500	3000	4000	14	6.5	29
696	31	33	5.5	1.8	F102_0043 MB23 EZ502U	103	200	4.308	56/13	16	8.0	3500	3000	4000	14	6.5	29
F2 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 210 Nm)																	
220	57	62	2.1	2.8	F202_0135 MB23 EZ501U	210	400	13.63	109/8	8.0	8.0	3800	3500	4000	11	16	36
220	62	69	2.3	2.6	F202_0135 MB23 EZ402U	210	400	13.63	109/8	8.0	8.0	3800	3500	4000	9.6	16	36
220	91	114	3.4	1.7	F202_0135 MB23 EZ404U	210	400	13.63	109/8	8.0	8.0	3800	3500	4000	11	16	38
220	98	106	3.7	1.6	F202_0135 MB23 EZ502U	210	400	13.63	109/8	8.0	8.0	3800	3500	4000	13	16	37
278	45	49	2.0	3.3	F202_0110 MB23 EZ501U	168	400	10.80	7303/676	8.0	8.0	3800	3500	4000	11	16	36
278	45	49	2.0	3.3	F202_0110 MB23 EZ501U	168	400	10.80	7303/676	12	8.0	3800	3500	4000	11	16	36
278	49	54	2.2	3.0	F202_0110 MB23 EZ402U	168	400	10.80	7303/676	8.0	8.0	3800	3500	4000	9.9	16	36
278	49	54	2.2	3.0	F202_0110 MB23 EZ402U	168	400	10.80	7303/676	12	8.0	3800	3500	4000	9.9	16	36
278	72	90	3.3	2.0	F202_0110 MB23 EZ404U	210	400	10.80	7303/676	8.0	8.0	3800	3500	4000	11	16	38
278	72	90	3.3	2.0	F202_0110 MB23 EZ404U	210	400	10.80	7303/676	12	8.0	3800	3500	4000	11	16	38
278	78	84	3.5	1.9	F202_0110 MB23 EZ502U	210	400	10.80	7303/676	8.0	8.0	3800	3500	4000	14	16	37
278	78	84	3.5	1.9	F202_0110 MB23 EZ502U	210	400	10.80	7303/676	12	8.0	3800	3500	4000	14	16	37
333	38	41	2.0	3.7	F202_0090 MB23 EZ501U	140	400	9.006	3161/351	8.0	8.0	3600	3100	4000	12	16	36
333	38	41	2.0	3.7	F202_0090 MB23 EZ501U	140	400	9.006	3161/351	12	8.0	3600	3100	4000	12	16	36
333	38	41	2.0	3.7	F202_0090 MB23 EZ501U	140	400	9.006	3161/351	16	8.0	3600	3100	4000	12	16	36
333	41	45	2.2	3.4	F202_0090 MB23 EZ402U	140	400	9.006	3161/351	8.0	8.0	3600	3100	4000	10	16	36
333	41	45	2.2	3.4	F202_0090 MB23 EZ402U	140	400	9.006	3161/351	12	8.0	3600	3100	4000	10	16	36
333	41	45	2.2	3.4	F202_0090 MB23 EZ402U	140	400	9.006	3161/351	16	8.0	3600	3100	4000	10	16	36
333	60	75	3.2	2.3	F202_0090 MB23 EZ404U	210	400	9.006	3161/351	8.0	8.0	3600	3100	4000	12	16	38
333	60	75	3.2	2.3	F202_0090 MB23 EZ404U	210	400	9.006	3161/351	12	8.0	3600	3100	4000	12	16	38
333	60	75	3.2	2.3	F202_0090 MB23 EZ404U	210	400	9.006	3161/351	16	8.0	3600	3100	4000	12	16	38
333	65	70	3.4	2.1	F202_0090 MB23 EZ502U	210	400	9.006	3161/351	8.0	8.0	3600	3100	4000	14	16	37
333	65	70	3.4	2.1	F202_0090 MB23 EZ502U	210	400	9.006	3161/351	12	8.0	3600	3100	4000	14	16	37
333	65	70	3.4	2.1	F202_0090 MB23 EZ502U	210	400	9.006	3161/351	16	8.0	3600	3100	4000	14	16	37
333	85	97	4.5	1.6	F202_0090 MB23 EZ503U	210	400	9.006	3161/351	8.0	15	3600	3100	4000	17	16	39
419	30	33	1.9	4.3	F202_0072 MB23 EZ501U	111	400	7.167	5777/806	8.0	8.0	3600	3100	4000	12	16	36
419	30	33	1.9	4.3	F202_0072 MB23 EZ501U	111	400	7.167	5777/806	12	8.0	3600	3100	4000	12	16	36
419	30	33	1.9	4.3	F202_0072 MB23 EZ501U	111	400	7.167	5777/806	16	8.0	3600	3100	4000	12	16	36
419	33	36	2.1	3.9	F202_0072 MB23 EZ402U	111	400	7.167	5777/806	8.0	8.0	3600	3100	4000	11	16	36
419	33	36	2.1	3.9	F202_0072 MB23 EZ402U	111	400	7.167	5777/806	12	8.0	3600	3100	4000	11	16	36
419	33	36	2.1	3.9	F202_0072 MB23 EZ402U	111	400	7.167	5777/806	16	8.0	3600	3100	4000	11	16	36
419	48	60	3.1	2.7	F202_0072 MB23 EZ404U	202	400	7.167	5777/806	8.0	8.0	3600	3100	4000	12	16	38
419	48	60	3.1	2.7	F202_0072 MB23 EZ404U	202	400	7.167	5777/806	12	8.0	3600	3100	4000	12	16	38
419	48	60	3.1	2.7	F202_0072 MB23 EZ404U	202	400	7.167	5777/806	16	8.0	3600	3100	4000	12	16	38

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
F2 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 210 Nm)																	
419	51	56	3.3	2.5	F202_0072 MB23 EZ502U	210	400	7.167	5777/806	8.0	8.0	3600	3100	4000	15	16	37
419	51	56	3.3	2.5	F202_0072 MB23 EZ502U	210	400	7.167	5777/806	12	8.0	3600	3100	4000	15	16	37
419	51	56	3.3	2.5	F202_0072 MB23 EZ502U	210	400	7.167	5777/806	16	8.0	3600	3100	4000	15	16	37
419	51	58	3.3	2.5	F202_0072 MB33 EZ701U	139	400	7.167	5777/806	16	15	3600	3100	4000	39	16	47
419	67	77	4.3	1.9	F202_0072 MB23 EZ503U	210	400	7.167	5777/806	8.0	15	3600	3100	4000	18	16	39
419	67	77	4.3	1.9	F202_0072 MB23 EZ503U	210	400	7.167	5777/806	12	15	3600	3100	4000	18	16	39
419	83	100	5.3	1.5	F202_0072 MB33 EZ702U	210	400	7.167	5777/806	16	15	3600	3100	4000	45	16	49
540	25	28	2.0	4.7	F202_0056 MB23 EZ402U	86	339	5.552	5341/962	8.0	8.0	3100	2600	4000	12	16	36
540	25	28	2.0	4.7	F202_0056 MB23 EZ402U	86	339	5.552	5341/962	12	8.0	3100	2600	4000	12	16	36
540	25	28	2.0	4.7	F202_0056 MB23 EZ402U	86	339	5.552	5341/962	16	8.0	3100	2600	4000	12	16	36
540	37	46	2.9	3.2	F202_0056 MB23 EZ404U	156	339	5.552	5341/962	8.0	8.0	3100	2600	4000	13	16	38
540	37	46	2.9	3.2	F202_0056 MB23 EZ404U	156	339	5.552	5341/962	12	8.0	3100	2600	4000	13	16	38
540	37	46	2.9	3.2	F202_0056 MB23 EZ404U	156	339	5.552	5341/962	16	8.0	3100	2600	4000	13	16	38
540	40	43	3.2	3.0	F202_0056 MB23 EZ502U	167	339	5.552	5341/962	8.0	8.0	3100	2600	4000	16	16	37
540	40	43	3.2	3.0	F202_0056 MB23 EZ502U	167	339	5.552	5341/962	12	8.0	3100	2600	4000	16	16	37
540	40	43	3.2	3.0	F202_0056 MB23 EZ502U	167	339	5.552	5341/962	16	8.0	3100	2600	4000	16	16	37
540	40	45	3.2	3.0	F202_0056 MB33 EZ701U	108	400	5.552	5341/962	16	15	3100	2600	4000	41	16	47
540	40	45	3.2	3.0	F202_0056 MB33 EZ701U	108	400	5.552	5341/962	24	15	3100	2600	4000	41	16	47
540	52	60	4.1	2.3	F202_0056 MB23 EZ503U	202	339	5.552	5341/962	8.0	15	3100	2600	4000	19	16	39
540	52	60	4.1	2.3	F202_0056 MB23 EZ503U	202	339	5.552	5341/962	12	15	3100	2600	4000	19	16	39
540	65	78	5.1	1.8	F202_0056 MB33 EZ702U	210	400	5.552	5341/962	16	15	3100	2600	4000	46	16	49
540	65	78	5.1	1.8	F202_0056 MB33 EZ702U	210	400	5.552	5341/962	24	15	3100	2600	4000	46	16	49
540	73	86	5.8	1.6	F202_0056 MB23 EZ505U	202	339	5.552	5341/962	8.0	15	3100	2600	4000	24	16	42
540	73	86	5.8	1.6	F202_0056 MB23 EZ505U	202	339	5.552	5341/962	12	15	3100	2600	4000	24	16	42
641	31	39	2.9	3.6	F202_0047 MB23 EZ404U	132	286	4.680	2616/559	8.0	8.0	3100	2600	4000	14	16	38
641	31	39	2.9	3.6	F202_0047 MB23 EZ404U	132	286	4.680	2616/559	12	8.0	3100	2600	4000	14	16	38
641	31	39	2.9	3.6	F202_0047 MB23 EZ404U	132	286	4.680	2616/559	16	8.0	3100	2600	4000	14	16	38
641	34	36	3.1	3.3	F202_0047 MB23 EZ502U	141	286	4.680	2616/559	8.0	8.0	3100	2600	4000	17	16	37
641	34	36	3.1	3.3	F202_0047 MB23 EZ502U	141	286	4.680	2616/559	12	8.0	3100	2600	4000	17	16	37
641	34	36	3.1	3.3	F202_0047 MB23 EZ502U	141	286	4.680	2616/559	16	8.0	3100	2600	4000	17	16	37
641	34	38	3.1	3.3	F202_0047 MB33 EZ701U	91	400	4.680	2616/559	16	15	3100	2600	4000	42	16	47
641	34	38	3.1	3.3	F202_0047 MB33 EZ701U	91	400	4.680	2616/559	24	15	3100	2600	4000	42	16	47
641	34	38	3.1	3.3	F202_0047 MB33 EZ701U	91	400	4.680	2616/559	32	15	3100	2600	4000	42	16	47
641	44	50	4.0	2.5	F202_0047 MB23 EZ503U	170	286	4.680	2616/559	8.0	15	3100	2600	4000	20	16	39
641	44	50	4.0	2.5	F202_0047 MB23 EZ503U	170	286	4.680	2616/559	12	15	3100	2600	4000	20	16	39
641	54	65	5.0	2.0	F202_0047 MB33 EZ702U	186	400	4.680	2616/559	16	15	3100	2600	4000	47	16	49
641	54	65	5.0	2.0	F202_0047 MB33 EZ702U	186	400	4.680	2616/559	24	15	3100	2600	4000	47	16	49
641	54	65	5.0	2.0	F202_0047 MB33 EZ702U	186	400	4.680	2616/559	32	15	3100	2600	4000	47	16	49
641	61	73	5.6	1.8	F202_0047 MB23 EZ505U	170	286	4.680	2616/559	8.0	15	3100	2600	4000	25	16	42
641	61	73	5.6	1.8	F202_0047 MB23 EZ505U	170	286	4.680	2616/559	12	15	3100	2600	4000	25	16	42
F3 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 450 Nm)																	
128	98	107	1.5	3.2	F302_0240 MB23 EZ501U	365	800	23.52	588/25	8.0	8.0	3500	3100	4000	12	22	43
128	107	119	1.7	3.0	F302_0240 MB23 EZ402U	365	800	23.52	588/25	8.0	8.0	3500	3100	4000	10	22	43
128	157	196	2.5	2.0	F302_0240 MB23 EZ404U	450	800	23.52	588/25	8.0	8.0	3500	3100	4000	12	22	45
128	169	183	2.6	1.9	F302_0240 MB23 EZ502U	450	800	23.52	588/25	8.0	8.0	3500	3100	4000	14	22	45
160	78	86	1.5	3.8	F302_0190 MB23 EZ501U	291	800	18.77	4900/261	8.0	8.0	3500	3100	4000	12	22	43
160	78	86	1.5	3.8	F302_0190 MB23 EZ501U	291	800	18.77	4900/261	12	8.0	3500	3100	4000	12	22	43
160	78	86	1.5	3.8	F302_0190 MB23 EZ501U	291	800	18.77	4900/261	16	8.0	3500	3100	4000	12	22	43
160	86	95	1.6	3.4	F302_0190 MB23 EZ402U	291	800	18.77	4900/261	8.0	8.0	3500	3100	4000	11	22	43
160	86	95	1.6	3.4	F302_0190 MB23 EZ402U	291	800	18.77	4900/261	12	8.0	3500	3100	4000	11	22	43
160	86	95	1.6	3.4	F302_0190 MB23 EZ402U	291	800	18.77	4900/261	16	8.0	3500	3100	4000	11	22	43
160	126	157	2.4	2.3	F302_0190 MB23 EZ404U	450	800	18.77	4900/261	8.0	8.0	3500	3100	4000	12	22	45
160	126	157	2.4	2.3	F302_0190 MB23 EZ404U	450	800	18.77	4900/261	12	8.0	3500	3100	4000	12	22	45
160	126	157	2.4	2.3	F302_0190 MB23 EZ404U	450	800	18.77	4900/261	16	8.0	3500	3100	4000	12	22	45
160	135	146	2.5	2.2	F302_0190 MB23 EZ502U	450	800	18.77	4900/261	8.0	8.0	3500	3100	4000	14	22	45
160	135	146	2.5	2.2	F302_0190 MB23 EZ502U	450	800	18.77	4900/261	12	8.0	3500	3100	4000	14	22	45
160	135	146	2.5	2.2	F302_0190 MB23 EZ502U	450	800	18.77	4900/261	16	8.0	3500	3100	4000	14	22	45
160	177	202	3.3	1.7	F302_0190 MB23 EZ503U	450	800	18.77	4900/261	8.0	15	3500	3100	4000	18	22	47
224	56	61	1.4	4.7	F302_0135 MB23 EZ501U	208	650	13.38	7696/575	8.0	8.0	3700	3500	4000	12	20	43
224	56	61	1.4	4.7	F302_0135 MB23 EZ501U	208	650	13.38	7696/575	12	8.0	3700	3500	4000	12	20	43
224	56	61	1.4	4.7	F302_0135 MB23 EZ501U	208	650	13.38	7696/575	16	8.0	3700	3500	4000	12	20	43
224	61	68	1.5	4.3	F302_0135 MB23 EZ402U	208	650	13.38	7696/575	8.0	8.0	3700	3500	4000	10	20	43
224	61	68	1.5	4.3	F302_0135 MB23 EZ402U	208	650	13.38	7696/575	12	8.0	3700	3500	4000	10	20	43
224	61	68	1.5	4.3	F302_0135 MB23 EZ402U	208	650	13.38	7696/575	16	8.0	3700	3500	4000	10	20	43

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
F3 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 450 Nm)																	
224	90	112	2.2	2.9	F302_0135 MB23 EZ404U	350	650	13.38	7696/575	8.0	8.0	3700	3500	4000	12	20	45
224	90	112	2.2	2.9	F302_0135 MB23 EZ404U	350	650	13.38	7696/575	12	8.0	3700	3500	4000	12	20	45
224	90	112	2.2	2.9	F302_0135 MB23 EZ404U	350	650	13.38	7696/575	16	8.0	3700	3500	4000	12	20	45
224	96	104	2.4	2.7	F302_0135 MB23 EZ502U	350	650	13.38	7696/575	8.0	8.0	3700	3500	4000	14	20	45
224	96	104	2.4	2.7	F302_0135 MB23 EZ502U	350	650	13.38	7696/575	12	8.0	3700	3500	4000	14	20	45
224	96	104	2.4	2.7	F302_0135 MB23 EZ502U	350	650	13.38	7696/575	16	8.0	3700	3500	4000	14	20	45
224	126	144	3.1	2.1	F302_0135 MB23 EZ503U	350	650	13.38	7696/575	8.0	15	3700	3500	4000	17	20	47
224	126	144	3.1	2.1	F302_0135 MB23 EZ503U	350	650	13.38	7696/575	12	15	3700	3500	4000	17	20	47
224	175	208	4.4	1.5	F302_0135 MB23 EZ505U	350	650	13.38	7696/575	8.0	15	3700	3500	4000	22	20	50
224	175	208	4.4	1.5	F302_0135 MB23 EZ505U	350	650	13.38	7696/575	12	15	3700	3500	4000	22	20	50
278	49	54	1.5	5.0	F302_0110 MB23 EZ402U	167	650	10.79	1456/135	8.0	8.0	3700	3500	4000	11	20	43
278	49	54	1.5	5.0	F302_0110 MB23 EZ402U	167	650	10.79	1456/135	12	8.0	3700	3500	4000	11	20	43
278	49	54	1.5	5.0	F302_0110 MB23 EZ402U	167	650	10.79	1456/135	16	8.0	3700	3500	4000	11	20	43
278	72	90	2.2	3.4	F302_0110 MB23 EZ404U	303	650	10.79	1456/135	8.0	8.0	3700	3500	4000	12	20	45
278	72	90	2.2	3.4	F302_0110 MB23 EZ404U	303	650	10.79	1456/135	12	8.0	3700	3500	4000	12	20	45
278	72	90	2.2	3.4	F302_0110 MB23 EZ404U	303	650	10.79	1456/135	16	8.0	3700	3500	4000	12	20	45
278	77	84	2.3	3.2	F302_0110 MB23 EZ502U	324	650	10.79	1456/135	8.0	8.0	3700	3500	4000	14	20	45
278	77	84	2.3	3.2	F302_0110 MB23 EZ502U	324	650	10.79	1456/135	12	8.0	3700	3500	4000	14	20	45
278	77	84	2.3	3.2	F302_0110 MB23 EZ502U	324	650	10.79	1456/135	16	8.0	3700	3500	4000	14	20	45
278	77	87	2.3	3.2	F302_0110 MB33 EZ701U	209	650	10.79	1456/135	16	15	3700	3500	4000	39	20	54
278	101	116	3.0	2.4	F302_0110 MB23 EZ503U	350	650	10.79	1456/135	8.0	15	3700	3500	4000	18	20	47
278	101	116	3.0	2.4	F302_0110 MB23 EZ503U	350	650	10.79	1456/135	12	15	3700	3500	4000	18	20	47
278	126	151	3.7	2.0	F302_0110 MB33 EZ702U	350	650	10.79	1456/135	16	15	3700	3500	4000	45	20	57
278	141	167	4.2	1.7	F302_0110 MB23 EZ505U	350	650	10.79	1456/135	8.0	15	3700	3500	4000	23	20	50
278	141	167	4.2	1.7	F302_0110 MB23 EZ505U	350	650	10.79	1456/135	12	15	3700	3500	4000	23	20	50
334	60	75	2.1	3.8	F302_0090 MB23 EZ404U	253	549	8.986	5616/625	8.0	8.0	3500	3100	4000	13	20	45
334	60	75	2.1	3.8	F302_0090 MB23 EZ404U	253	549	8.986	5616/625	12	8.0	3500	3100	4000	13	20	45
334	60	75	2.1	3.8	F302_0090 MB23 EZ404U	253	549	8.986	5616/625	16	8.0	3500	3100	4000	13	20	45
334	65	70	2.2	3.6	F302_0090 MB23 EZ502U	270	549	8.986	5616/625	8.0	8.0	3500	3100	4000	15	20	45
334	65	70	2.2	3.6	F302_0090 MB23 EZ502U	270	549	8.986	5616/625	12	8.0	3500	3100	4000	15	20	45
334	65	70	2.2	3.6	F302_0090 MB23 EZ502U	270	549	8.986	5616/625	16	8.0	3500	3100	4000	15	20	45
334	65	72	2.2	3.6	F302_0090 MB33 EZ701U	174	650	8.986	5616/625	16	15	3500	3100	4000	40	20	54
334	65	72	2.2	3.6	F302_0090 MB33 EZ701U	174	650	8.986	5616/625	24	15	3500	3100	4000	40	20	54
334	85	97	2.9	2.7	F302_0090 MB23 EZ503U	327	549	8.986	5616/625	8.0	15	3500	3100	4000	19	20	47
334	85	97	2.9	2.7	F302_0090 MB23 EZ503U	327	549	8.986	5616/625	12	15	3500	3100	4000	19	20	47
334	105	126	3.6	2.2	F302_0090 MB33 EZ702U	350	650	8.986	5616/625	16	15	3500	3100	4000	45	20	57
334	105	126	3.6	2.2	F302_0090 MB33 EZ702U	350	650	8.986	5616/625	24	15	3500	3100	4000	45	20	57
334	118	139	4.1	2.0	F302_0090 MB23 EZ505U	327	549	8.986	5616/625	8.0	15	3500	3100	4000	23	20	50
334	118	139	4.1	2.0	F302_0090 MB23 EZ505U	327	549	8.986	5616/625	12	15	3500	3100	4000	23	20	50
418	48	60	2.0	4.5	F302_0072 MB23 EZ404U	202	438	7.172	208/29	8.0	8.0	3500	3100	4000	14	20	45
418	48	60	2.0	4.5	F302_0072 MB23 EZ404U	202	438	7.172	208/29	12	8.0	3500	3100	4000	14	20	45
418	48	60	2.0	4.5	F302_0072 MB23 EZ404U	202	438	7.172	208/29	16	8.0	3500	3100	4000	14	20	45
418	51	56	2.2	4.2	F302_0072 MB23 EZ502U	216	438	7.172	208/29	8.0	8.0	3500	3100	4000	16	20	45
418	51	56	2.2	4.2	F302_0072 MB23 EZ502U	216	438	7.172	208/29	12	8.0	3500	3100	4000	16	20	45
418	51	56	2.2	4.2	F302_0072 MB23 EZ502U	216	438	7.172	208/29	16	8.0	3500	3100	4000	16	20	45
418	51	58	2.2	4.2	F302_0072 MB33 EZ701U	139	650	7.172	208/29	16	15	3500	3100	4000	41	20	54
418	51	58	2.2	4.2	F302_0072 MB33 EZ701U	139	650	7.172	208/29	24	15	3500	3100	4000	41	20	54
418	51	58	2.2	4.2	F302_0072 MB33 EZ701U	139	650	7.172	208/29	32	15	3500	3100	4000	41	20	54
418	67	77	2.8	3.2	F302_0072 MB23 EZ503U	261	438	7.172	208/29	8.0	15	3500	3100	4000	20	20	47
418	67	77	2.8	3.2	F302_0072 MB23 EZ503U	261	438	7.172	208/29	12	15	3500	3100	4000	20	20	47
418	83	100	3.5	2.6	F302_0072 MB33 EZ702U	285	650	7.172	208/29	16	15	3500	3100	4000	47	20	57
418	83	100	3.5	2.6	F302_0072 MB33 EZ702U	285	650	7.172	208/29	24	15	3500	3100	4000	47	20	57
418	83	100	3.5	2.6	F302_0072 MB33 EZ702U	285	650	7.172	208/29	32	15	3500	3100	4000	47	20	57
418	94	111	3.9	2.3	F302_0072 MB23 EZ505U	261	438	7.172	208/29	8.0	15	3500	3100	4000	25	20	50
418	94	111	3.9	2.3	F302_0072 MB23 EZ505U	261	438	7.172	208/29	12	15	3500	3100	4000	25	20	50
418	115	145	4.8	1.9	F302_0072 MB33 EZ703U	350	650	7.172	208/29	16	32	3500	3100	4000	58	20	60
524	41	44	2.1	4.8	F302_0057 MB23 EZ502U	172	350	5.720	143/25	8.0	8.0	3000	2600	4000	18	20	45
524	41	44	2.1	4.8	F302_0057 MB23 EZ502U	172	350	5.720	143/25	12	8.0	3000	2600	4000	18	20	45
524	41	44	2.1	4.8	F302_0057 MB23 EZ502U	172	350	5.720	143/25	16	8.0	3000	2600	4000	18	20	45
524	41	46	2.1	4.8	F302_0057 MB33 EZ701U	111	642	5.720	143/25	16	15	3000	2600	4000	43	20	54
524	41	46	2.1	4.8	F302_0057 MB33 EZ701U	111	642	5.720	143/25	24	15	3000	2600	4000	43	20	54
524	41	46	2.1	4.8	F302_0057 MB33 EZ701U	111	642	5.720	143/25	32	15	3000	2600	4000	43	20	54
524	41	46	2.1	4.8	F302_0057 MB33 EZ701U	111	642	5.720	143/25	45	15	3000	2600	4000	43	20	54
524	54	62	2.7	3.7	F302_0057 MB23 EZ503U	208	350	5.720	143/25	8.0	15	3000	2600	4000	22	20	47

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
F3 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 450 Nm)																	
524	54	62	2.7	3.7	F302_0057 MB23 EZ503U	208	350	5.720	143/25	12	15	3000	2600	4000	22	20	47
524	67	80	3.4	3.0	F302_0057 MB33 EZ702U	227	642	5.720	143/25	16	15	3000	2600	4000	48	20	57
524	67	80	3.4	3.0	F302_0057 MB33 EZ702U	227	642	5.720	143/25	24	15	3000	2600	4000	48	20	57
524	67	80	3.4	3.0	F302_0057 MB33 EZ702U	227	642	5.720	143/25	32	15	3000	2600	4000	48	20	57
524	67	80	3.4	3.0	F302_0057 MB33 EZ702U	227	642	5.720	143/25	45	15	3000	2600	4000	48	20	57
524	75	89	3.8	2.6	F302_0057 MB23 EZ505U	208	350	5.720	143/25	8.0	15	3000	2600	4000	26	20	50
524	75	89	3.8	2.6	F302_0057 MB23 EZ505U	208	350	5.720	143/25	12	15	3000	2600	4000	26	20	50
524	92	115	4.6	2.2	F302_0057 MB33 EZ703U	350	642	5.720	143/25	16	32	3000	2600	4000	60	20	60
524	92	115	4.6	2.2	F302_0057 MB33 EZ703U	350	642	5.720	143/25	24	32	3000	2600	4000	60	20	60
524	118	168	6.0	1.7	F302_0057 MB33 EZ705U	350	642	5.720	143/25	16	32	3000	2600	4000	73	20	65
524	118	168	6.0	1.7	F302_0057 MB33 EZ705U	350	642	5.720	143/25	24	32	3000	2600	4000	73	20	65
646	44	50	2.9	3.9	F302_0046 MB23 EZ503U	169	284	4.644	4992/1075	8.0	15	3000	2600	4000	24	20	47
646	44	50	2.9	3.9	F302_0046 MB23 EZ503U	169	284	4.644	4992/1075	12	15	3000	2600	4000	24	20	47
646	54	65	3.3	3.4	F302_0046 MB33 EZ702U	185	650	4.644	4992/1075	16	15	3000	2600	4000	51	20	57
646	54	65	3.3	3.4	F302_0046 MB33 EZ702U	185	650	4.644	4992/1075	24	15	3000	2600	4000	51	20	57
646	54	65	3.3	3.4	F302_0046 MB33 EZ702U	185	650	4.644	4992/1075	32	15	3000	2600	4000	51	20	57
646	54	65	3.3	3.4	F302_0046 MB33 EZ702U	185	650	4.644	4992/1075	45	15	3000	2600	4000	51	20	57
646	61	72	4.0	2.8	F302_0046 MB23 EZ505U	169	284	4.644	4992/1075	8.0	15	3000	2600	4000	29	20	50
646	61	72	4.0	2.8	F302_0046 MB23 EZ505U	169	284	4.644	4992/1075	12	15	3000	2600	4000	29	20	50
646	74	94	4.5	2.5	F302_0046 MB33 EZ703U	293	650	4.644	4992/1075	16	32	3000	2600	4000	63	20	60
646	74	94	4.5	2.5	F302_0046 MB33 EZ703U	293	650	4.644	4992/1075	24	32	3000	2600	4000	63	20	60
646	74	94	4.5	2.5	F302_0046 MB33 EZ703U	293	650	4.644	4992/1075	32	32	3000	2600	4000	63	20	60
646	74	94	4.5	2.5	F302_0046 MB33 EZ703U	293	650	4.644	4992/1075	45	32	3000	2600	4000	63	20	60
646	96	136	5.8	1.9	F302_0046 MB33 EZ705U	349	650	4.644	4992/1075	16	32	3000	2600	4000	75	20	65
646	96	136	5.8	1.9	F302_0046 MB33 EZ705U	349	650	4.644	4992/1075	24	32	3000	2600	4000	75	20	65
646	96	136	5.8	1.9	F302_0046 MB33 EZ705U	349	650	4.644	4992/1075	32	32	3000	2600	4000	75	20	65
646	96	136	5.8	1.9	F302_0046 MB33 EZ705U	349	650	4.644	4992/1075	45	32	3000	2600	4000	75	20	65
F4 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 700 Nm)																	
64	196	214	1.1	3.4	F402_0470 MB23 EZ501U	700	1400	46.94	845/18	8.0	8.0	3800	3500	4000	11	39	52
64	214	237	1.2	3.1	F402_0470 MB23 EZ402U	700	1400	46.94	845/18	8.0	8.0	3800	3500	4000	9.8	39	52
64	314	392	1.8	2.1	F402_0470 MB23 EZ404U	700	1400	46.94	845/18	8.0	8.0	3800	3500	4000	11	39	54
64	337	364	1.9	2.0	F402_0470 MB23 EZ502U	700	1400	46.94	845/18	8.0	8.0	3800	3500	4000	13	39	53
86	146	160	1.1	4.1	F402_0350 MB23 EZ501U	544	1400	35.08	2210/63	8.0	8.0	3500	3100	4000	12	39	52
86	146	160	1.1	4.1	F402_0350 MB23 EZ501U	544	1400	35.08	2210/63	12	8.0	3500	3100	4000	12	39	52
86	160	177	1.2	3.7	F402_0350 MB23 EZ402U	544	1400	35.08	2210/63	8.0	8.0	3500	3100	4000	10	39	52
86	160	177	1.2	3.7	F402_0350 MB23 EZ402U	544	1400	35.08	2210/63	12	8.0	3500	3100	4000	10	39	52
86	235	293	1.7	2.6	F402_0350 MB23 EZ404U	700	1400	35.08	2210/63	8.0	8.0	3500	3100	4000	12	39	54
86	235	293	1.7	2.6	F402_0350 MB23 EZ404U	700	1400	35.08	2210/63	12	8.0	3500	3100	4000	12	39	54
86	252	272	1.8	2.4	F402_0350 MB23 EZ502U	700	1400	35.08	2210/63	8.0	8.0	3500	3100	4000	14	39	53
86	252	272	1.8	2.4	F402_0350 MB23 EZ502U	700	1400	35.08	2210/63	12	8.0	3500	3100	4000	14	39	53
107	117	128	1.0	4.8	F402_0280 MB23 EZ501U	434	1400	27.99	2015/72	8.0	8.0	3500	3100	4000	12	39	52
107	117	128	1.0	4.8	F402_0280 MB23 EZ501U	434	1400	27.99	2015/72	12	8.0	3500	3100	4000	12	39	52
107	117	128	1.0	4.8	F402_0280 MB23 EZ501U	434	1400	27.99	2015/72	16	8.0	3500	3100	4000	12	39	52
107	128	141	1.1	4.4	F402_0280 MB23 EZ402U	434	1400	27.99	2015/72	8.0	8.0	3500	3100	4000	11	39	52
107	128	141	1.1	4.4	F402_0280 MB23 EZ402U	434	1400	27.99	2015/72	12	8.0	3500	3100	4000	11	39	52
107	128	141	1.1	4.4	F402_0280 MB23 EZ402U	434	1400	27.99	2015/72	16	8.0	3500	3100	4000	11	39	52
107	187	233	1.7	3.0	F402_0280 MB23 EZ404U	700	1400	27.99	2015/72	8.0	8.0	3500	3100	4000	12	39	54
107	187	233	1.7	3.0	F402_0280 MB23 EZ404U	700	1400	27.99	2015/72	12	8.0	3500	3100	4000	12	39	54
107	187	233	1.7	3.0	F402_0280 MB23 EZ404U	700	1400	27.99	2015/72	16	8.0	3500	3100	4000	12	39	54
107	201	217	1.8	2.8	F402_0280 MB23 EZ502U	700	1400	27.99	2015/72	8.0	8.0	3500	3100	4000	14	39	53
107	201	217	1.8	2.8	F402_0280 MB23 EZ502U	700	1400	27.99	2015/72	12	8.0	3500	3100	4000	14	39	53
107	201	217	1.8	2.8	F402_0280 MB23 EZ502U	700	1400	27.99	2015/72	16	8.0	3500	3100	4000	14	39	53
107	263	301	2.3	2.1	F402_0280 MB23 EZ503U	700	1400	27.99	2015/72	8.0	15	3500	3100	4000	18	39	55
107	263	301	2.3	2.1	F402_0280 MB23 EZ503U	700	1400	27.99	2015/72	12	15	3500	3100	4000	18	39	55
107	366	434	3.2	1.5	F402_0280 MB23 EZ505U	700	1400	27.99	2015/72	8.0	15	3500	3100	4000	22	39	58
107	366	434	3.2	1.5	F402_0280 MB23 EZ505U	700	1400	27.99	2015/72	12	15	3500	3100	4000	22	39	58
129	106	117	1.1	4.9	F402_0230 MB23 EZ402U	360	1400	23.21	325/14	8.0	8.0	3200	2800	4000	11	39	52
129	106	117	1.1	4.9	F402_0230 MB23 EZ402U	360	1400	23.21	325/14	12	8.0	3200	2800	4000	11	39	52
129	106	117	1.1	4.9	F402_0230 MB23 EZ402U	360	1400	23.21	325/14	16	8.0	3200	2800	4000	11	39	52
129	155	194	1.6	3.4	F402_0230 MB23 EZ404U	653	1400	23.21	325/14	8.0	8.0	3200	2800	4000	13	39	54
129	155	194	1.6	3.4	F402_0230 MB23 EZ404U	653	1400	23.21	325/14	12	8.0	3200	2800	4000	13	39	54
129	155	194	1.6	3.4	F402_0230 MB23 EZ404U	653	1400	23.21	325/14	16	8.0	3200	2800	4000	13	39	54
129	167	180	1.7	3.1	F402_0230 MB23 EZ502U	698	1400	23.21	325/14	8.0	8.0	3200	2800	4000	15	39	53
129	167	180	1.7	3.1	F402_0230 MB23 EZ502U	698	1400	23.21	325/14	12	8.0	3200	2800	4000	15	39	53

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
F4 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 700 Nm)																	
129	167	180	1.7	3.1	F402_0230 MB23 EZ502U	698	1400	23.21	325/14	16	8.0	3200	2800	4000	15	39	53
129	167	187	1.7	3.1	F402_0230 MB33 EZ701U	450	1400	23.21	325/14	16	15	3200	2800	4000	40	39	63
129	218	250	2.3	2.4	F402_0230 MB23 EZ503U	700	1400	23.21	325/14	8.0	15	3200	2800	4000	18	39	55
129	218	250	2.3	2.4	F402_0230 MB23 EZ503U	700	1400	23.21	325/14	12	15	3200	2800	4000	18	39	55
129	270	324	2.8	1.9	F402_0230 MB33 EZ702U	700	1400	23.21	325/14	16	15	3200	2800	4000	45	39	65
129	304	360	3.1	1.7	F402_0230 MB23 EZ505U	700	1400	23.21	325/14	8.0	15	3200	2800	4000	23	39	58
129	304	360	3.1	1.7	F402_0230 MB23 EZ505U	700	1400	23.21	325/14	12	15	3200	2800	4000	23	39	58
161	125	155	1.5	3.9	F402_0185 MB23 EZ404U	524	1138	18.62	3575/192	8.0	8.0	3200	2800	4000	14	39	54
161	125	155	1.5	3.9	F402_0185 MB23 EZ404U	524	1138	18.62	3575/192	12	8.0	3200	2800	4000	14	39	54
161	125	155	1.5	3.9	F402_0185 MB23 EZ404U	524	1138	18.62	3575/192	16	8.0	3200	2800	4000	14	39	54
161	134	144	1.7	3.6	F402_0185 MB23 EZ502U	560	1138	18.62	3575/192	8.0	8.0	3200	2800	4000	16	39	53
161	134	144	1.7	3.6	F402_0185 MB23 EZ502U	560	1138	18.62	3575/192	12	8.0	3200	2800	4000	16	39	53
161	134	144	1.7	3.6	F402_0185 MB23 EZ502U	560	1138	18.62	3575/192	16	8.0	3200	2800	4000	16	39	53
161	134	150	1.7	3.6	F402_0185 MB33 EZ701U	361	1400	18.62	3575/192	16	15	3200	2800	4000	41	39	63
161	134	150	1.7	3.6	F402_0185 MB33 EZ701U	361	1400	18.62	3575/192	24	15	3200	2800	4000	41	39	63
161	175	200	2.2	2.8	F402_0185 MB23 EZ503U	677	1138	18.62	3575/192	8.0	15	3200	2800	4000	19	39	55
161	175	200	2.2	2.8	F402_0185 MB23 EZ503U	677	1138	18.62	3575/192	12	15	3200	2800	4000	19	39	55
161	217	260	2.7	2.2	F402_0185 MB33 EZ702U	700	1400	18.62	3575/192	16	15	3200	2800	4000	46	39	65
161	217	260	2.7	2.2	F402_0185 MB33 EZ702U	700	1400	18.62	3575/192	24	15	3200	2800	4000	46	39	65
161	244	289	3.0	2.0	F402_0185 MB23 EZ505U	677	1138	18.62	3575/192	8.0	15	3200	2800	4000	24	39	58
161	244	289	3.0	2.0	F402_0185 MB23 EZ505U	677	1138	18.62	3575/192	12	15	3200	2800	4000	24	39	58
221	91	113	1.5	4.8	F402_0135 MB23 EZ404U	382	829	13.57	5984/441	8.0	8.0	3500	3100	4000	13	39	54
221	91	113	1.5	4.8	F402_0135 MB23 EZ404U	382	829	13.57	5984/441	12	8.0	3500	3100	4000	13	39	54
221	91	113	1.5	4.8	F402_0135 MB23 EZ404U	382	829	13.57	5984/441	16	8.0	3500	3100	4000	13	39	54
221	97	105	1.6	4.5	F402_0135 MB23 EZ502U	408	829	13.57	5984/441	8.0	8.0	3500	3100	4000	15	39	53
221	97	105	1.6	4.5	F402_0135 MB23 EZ502U	408	829	13.57	5984/441	12	8.0	3500	3100	4000	15	39	53
221	97	105	1.6	4.5	F402_0135 MB23 EZ502U	408	829	13.57	5984/441	16	8.0	3500	3100	4000	15	39	53
221	97	109	1.6	4.5	F402_0135 MB33 EZ701U	263	1100	13.57	5984/441	16	15	3500	3100	4000	40	39	63
221	97	109	1.6	4.5	F402_0135 MB33 EZ701U	263	1100	13.57	5984/441	24	15	3500	3100	4000	40	39	63
221	97	109	1.6	4.5	F402_0135 MB33 EZ701U	263	1100	13.57	5984/441	32	15	3500	3100	4000	40	39	63
221	128	146	2.1	3.4	F402_0135 MB23 EZ503U	494	829	13.57	5984/441	8.0	15	3500	3100	4000	18	39	55
221	128	146	2.1	3.4	F402_0135 MB23 EZ503U	494	829	13.57	5984/441	12	15	3500	3100	4000	18	39	55
221	158	190	2.6	2.8	F402_0135 MB33 EZ702U	540	1100	13.57	5984/441	16	15	3500	3100	4000	45	39	65
221	158	190	2.6	2.8	F402_0135 MB33 EZ702U	540	1100	13.57	5984/441	24	15	3500	3100	4000	45	39	65
221	158	190	2.6	2.8	F402_0135 MB33 EZ702U	540	1100	13.57	5984/441	32	15	3500	3100	4000	45	39	65
221	178	211	2.9	2.5	F402_0135 MB23 EZ505U	494	829	13.57	5984/441	8.0	15	3500	3100	4000	23	39	58
221	178	211	2.9	2.5	F402_0135 MB23 EZ505U	494	829	13.57	5984/441	12	15	3500	3100	4000	23	39	58
277	102	117	2.0	3.9	F402_0110 MB23 EZ503U	394	662	10.83	682/63	8.0	15	3500	3100	4000	20	39	55
277	102	117	2.0	3.9	F402_0110 MB23 EZ503U	394	662	10.83	682/63	12	15	3500	3100	4000	20	39	55
277	126	151	2.5	3.2	F402_0110 MB33 EZ702U	431	1100	10.83	682/63	16	15	3500	3100	4000	46	39	65
277	126	151	2.5	3.2	F402_0110 MB33 EZ702U	431	1100	10.83	682/63	24	15	3500	3100	4000	46	39	65
277	126	151	2.5	3.2	F402_0110 MB33 EZ702U	431	1100	10.83	682/63	32	15	3500	3100	4000	46	39	65
277	126	151	2.5	3.2	F402_0110 MB33 EZ702U	431	1100	10.83	682/63	45	15	3500	3100	4000	46	39	65
277	142	168	2.8	2.8	F402_0110 MB23 EZ505U	394	662	10.83	682/63	8.0	15	3500	3100	4000	24	39	58
277	142	168	2.8	2.8	F402_0110 MB23 EZ505U	394	662	10.83	682/63	12	15	3500	3100	4000	24	39	58
277	173	218	3.4	2.3	F402_0110 MB33 EZ703U	550	1100	10.83	682/63	16	32	3500	3100	4000	58	39	68
277	224	317	4.4	1.8	F402_0110 MB33 EZ705U	550	1100	10.83	682/63	16	32	3500	3100	4000	70	39	74
334	84	97	2.2	3.9	F402_0090 MB23 EZ503U	327	549	8.980	440/49	8.0	15	3200	2800	4000	21	39	55
334	84	97	2.2	3.9	F402_0090 MB23 EZ503U	327	549	8.980	440/49	12	15	3200	2800	4000	21	39	55
334	105	125	2.4	3.6	F402_0090 MB33 EZ702U	357	1100	8.980	440/49	16	15	3200	2800	4000	48	39	65
334	105	125	2.4	3.6	F402_0090 MB33 EZ702U	357	1100	8.980	440/49	24	15	3200	2800	4000	48	39	65
334	105	125	2.4	3.6	F402_0090 MB33 EZ702U	357	1100	8.980	440/49	32	15	3200	2800	4000	48	39	65
334	105	125	2.4	3.6	F402_0090 MB33 EZ702U	357	1100	8.980	440/49	45	15	3200	2800	4000	48	39	65
334	118	139	3.1	2.8	F402_0090 MB23 EZ505U	327	549	8.980	440/49	8.0	15	3200	2800	4000	25	39	58
334	118	139	3.1	2.8	F402_0090 MB23 EZ505U	327	549	8.980	440/49	12	15	3200	2800	4000	25	39	58
334	144	181	3.3	2.6	F402_0090 MB33 EZ703U	550	1100	8.980	440/49	16	32	3200	2800	4000	59	39	68
334	144	181	3.3	2.6	F402_0090 MB33 EZ703U	550	1100	8.980	440/49	24	32	3200	2800	4000	59	39	68
334	144	181	3.3	2.6	F402_0090 MB33 EZ703U	550	1100	8.980	440/49	32	32	3200	2800	4000	59	39	68
334	186	263	4.2	2.1	F402_0090 MB33 EZ705U	550	1100	8.980	440/49	16	32	3200	2800	4000	72	39	74
334	186	263	4.2	2.1	F402_0090 MB33 EZ705U	550	1100	8.980	440/49	24	32	3200	2800	4000	72	39	74
334	186	263	4.2	2.1	F402_0090 MB33 EZ705U	550	1100	8.980	440/49	32	32	3200	2800	4000	72	39	74
417	68	78	2.5	3.9	F402_0072 MB23 EZ503U	262	440	7.202	605/84	8.0	15	3200	2800	4000	23	39	55
417	68	78	2.5	3.9	F402_0072 MB23 EZ503U	262	440	7.202	605/84	12	15	3200	2800	4000	23	39	55
417	84	101	2.3	4.2	F402_0072 MB33 EZ702U	286	1100	7.202	605/84	16	15	3200	2800	4000	50	39	65

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
F4 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 700 Nm)																	
417	84	101	2.3	4.2	F402_0072 MB33 EZ702U	286	1100	7.202	605/84	24	15	3200	2800	4000	50	39	65
417	84	101	2.3	4.2	F402_0072 MB33 EZ702U	286	1100	7.202	605/84	32	15	3200	2800	4000	50	39	65
417	84	101	2.3	4.2	F402_0072 MB33 EZ702U	286	1100	7.202	605/84	45	15	3200	2800	4000	50	39	65
417	94	112	3.5	2.8	F402_0072 MB23 EZ505U	262	440	7.202	605/84	8.0	15	3200	2800	4000	28	39	58
417	94	112	3.5	2.8	F402_0072 MB23 EZ505U	262	440	7.202	605/84	12	15	3200	2800	4000	28	39	58
417	115	145	3.2	3.1	F402_0072 MB33 EZ703U	454	1100	7.202	605/84	16	32	3200	2800	4000	62	39	68
417	115	145	3.2	3.1	F402_0072 MB33 EZ703U	454	1100	7.202	605/84	24	32	3200	2800	4000	62	39	68
417	115	145	3.2	3.1	F402_0072 MB33 EZ703U	454	1100	7.202	605/84	32	32	3200	2800	4000	62	39	68
417	115	145	3.2	3.1	F402_0072 MB33 EZ703U	454	1100	7.202	605/84	45	32	3200	2800	4000	62	39	68
417	149	211	4.1	2.4	F402_0072 MB33 EZ705U	550	1100	7.202	605/84	16	32	3200	2800	4000	74	39	74
417	149	211	4.1	2.4	F402_0072 MB33 EZ705U	550	1100	7.202	605/84	24	32	3200	2800	4000	74	39	74
417	149	211	4.1	2.4	F402_0072 MB33 EZ705U	550	1100	7.202	605/84	32	32	3200	2800	4000	74	39	74
417	149	211	4.1	2.4	F402_0072 MB33 EZ705U	550	1100	7.202	605/84	45	32	3200	2800	4000	74	39	74
516	68	81	2.2	4.9	F402_0058 MB33 EZ702U	231	1066	5.813	3784/651	16	15	2700	2300	4000	53	39	65
516	68	81	2.2	4.9	F402_0058 MB33 EZ702U	231	1066	5.813	3784/651	24	15	2700	2300	4000	53	39	65
516	68	81	2.2	4.9	F402_0058 MB33 EZ702U	231	1066	5.813	3784/651	32	15	2700	2300	4000	53	39	65
516	68	81	2.2	4.9	F402_0058 MB33 EZ702U	231	1066	5.813	3784/651	45	15	2700	2300	4000	53	39	65
516	93	117	3.1	3.5	F402_0058 MB33 EZ703U	367	1066	5.813	3784/651	16	32	2700	2300	4000	65	39	68
516	93	117	3.1	3.5	F402_0058 MB33 EZ703U	367	1066	5.813	3784/651	24	32	2700	2300	4000	65	39	68
516	93	117	3.1	3.5	F402_0058 MB33 EZ703U	367	1066	5.813	3784/651	32	32	2700	2300	4000	65	39	68
516	93	117	3.1	3.5	F402_0058 MB33 EZ703U	367	1066	5.813	3784/651	45	32	2700	2300	4000	65	39	68
516	120	170	3.9	2.7	F402_0058 MB33 EZ705U	550	1066	5.813	3784/651	16	32	2700	2300	4000	77	39	74
516	120	170	3.9	2.7	F402_0058 MB33 EZ705U	550	1066	5.813	3784/651	24	32	2700	2300	4000	77	39	74
516	120	170	3.9	2.7	F402_0058 MB33 EZ705U	550	1066	5.813	3784/651	32	32	2700	2300	4000	77	39	74
516	120	170	3.9	2.7	F402_0058 MB33 EZ705U	550	1066	5.813	3784/651	45	32	2700	2300	4000	77	39	74
516	150	272	4.9	2.2	F402_0058 MB43 EZ803U	550	1100	5.813	3784/651	50	65	2700	2300	3000	185	39	104
641	75	94	2.9	4.1	F402_0047 MB33 EZ703U	295	858	4.678	1408/301	16	32	2700	2300	4000	69	39	68
641	75	94	2.9	4.1	F402_0047 MB33 EZ703U	295	858	4.678	1408/301	24	32	2700	2300	4000	69	39	68
641	75	94	2.9	4.1	F402_0047 MB33 EZ703U	295	858	4.678	1408/301	32	32	2700	2300	4000	69	39	68
641	75	94	2.9	4.1	F402_0047 MB33 EZ703U	295	858	4.678	1408/301	45	32	2700	2300	4000	69	39	68
641	97	137	3.8	3.2	F402_0047 MB33 EZ705U	454	858	4.678	1408/301	16	32	2700	2300	4000	82	39	74
641	97	137	3.8	3.2	F402_0047 MB33 EZ705U	454	858	4.678	1408/301	24	32	2700	2300	4000	82	39	74
641	97	137	3.8	3.2	F402_0047 MB33 EZ705U	454	858	4.678	1408/301	32	32	2700	2300	4000	82	39	74
641	97	137	3.8	3.2	F402_0047 MB33 EZ705U	454	858	4.678	1408/301	45	32	2700	2300	4000	82	39	74
641	121	219	4.7	2.5	F402_0047 MB43 EZ803U	550	1100	4.678	1408/301	50	65	2700	2300	3000	190	39	104
641	121	219	4.7	2.5	F402_0047 MB43 EZ803U	550	1100	4.678	1408/301	72	65	2700	2300	3000	190	39	104
F6 (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 880 Nm)																	
353	240	364	4.9	2.6	F602_0057 MB43 EZ805U	1000	1537	5.673	1407/248	50	115	2500	2100	3000	287	73	147
440	193	291	4.7	3.0	F602_0045 MB43 EZ805U	904	1232	4.546	1273/280	50	115	2500	2100	3000	299	73	147
F6 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1100 Nm)																	
54	232	254	0.8	4.7	F602_0560 MB23 EZ501U	865	2000	55.71	390/7	8.0	8.0	3500	3200	4000	12	77	79
54	232	254	0.8	4.7	F602_0560 MB23 EZ501U	865	2000	55.71	390/7	12	8.0	3500	3200	4000	12	77	79
54	254	281	0.9	4.3	F602_0560 MB23 EZ402U	865	2000	55.71	390/7	8.0	8.0	3500	3200	4000	10	77	79
54	254	281	0.9	4.3	F602_0560 MB23 EZ402U	865	2000	55.71	390/7	12	8.0	3500	3200	4000	10	77	79
54	373	465	1.4	3.0	F602_0560 MB23 EZ404U	1100	2000	55.71	390/7	8.0	8.0	3500	3200	4000	12	77	81
54	373	465	1.4	3.0	F602_0560 MB23 EZ404U	1100	2000	55.71	390/7	12	8.0	3500	3200	4000	12	77	81
54	400	432	1.5	2.8	F602_0560 MB23 EZ502U	1100	2000	55.71	390/7	8.0	8.0	3500	3200	4000	14	77	80
54	400	432	1.5	2.8	F602_0560 MB23 EZ502U	1100	2000	55.71	390/7	12	8.0	3500	3200	4000	14	77	80
64	313	390	1.2	3.5	F602_0470 MB23 EZ404U	1100	2000	46.72	1495/32	8.0	8.0	3500	3200	4000	12	77	81
64	313	390	1.2	3.5	F602_0470 MB23 EZ404U	1100	2000	46.72	1495/32	12	8.0	3500	3200	4000	12	77	81
64	313	390	1.2	3.5	F602_0470 MB23 EZ404U	1100	2000	46.72	1495/32	16	8.0	3500	3200	4000	12	77	81
64	335	363	1.3	3.3	F602_0470 MB23 EZ502U	1100	2000	46.72	1495/32	8.0	8.0	3500	3200	4000	15	77	80
64	335	363	1.3	3.3	F602_0470 MB23 EZ502U	1100	2000	46.72	1495/32	12	8.0	3500	3200	4000	15	77	80
64	335	363	1.3	3.3	F602_0470 MB23 EZ502U	1100	2000	46.72	1495/32	16	8.0	3500	3200	4000	15	77	80
64	440	503	1.8	2.5	F602_0470 MB23 EZ503U	1100	2000	46.72	1495/32	8.0	15	3500	3200	4000	18	77	82
64	612	725	2.4	1.8	F602_0470 MB23 EZ505U	1100	2000	46.72	1495/32	8.0	15	3500	3200	4000	23	77	85
85	236	294	1.2	4.3	F602_0350 MB23 EZ404U	990	2000	35.21	845/24	8.0	8.0	3300	2800	4000	13	77	81
85	236	294	1.2	4.3	F602_0350 MB23 EZ404U	990	2000	35.21	845/24	12	8.0	3300	2800	4000	13	77	81
85	236	294	1.2	4.3	F602_0350 MB23 EZ404U	990	2000	35.21	845/24	16	8.0	3300	2800	4000	13	77	81
85	253	273	1.3	4.0	F602_0350 MB23 EZ502U	1059	2000	35.21	845/24	8.0	8.0	3300	2800	4000	16	77	80
85	253	273	1.3	4.0	F602_0350 MB23 EZ502U	1059	2000	35.21	845/24	12	8.0	3300	2800	4000	16	77	80
85	253	273	1.3	4.0	F602_0350 MB23 EZ502U	1059	2000	35.21	845/24	16	8.0	3300	2800	4000	16	77	80
85	253	283	1.3	4.0	F602_0350 MB33 EZ701U	683	2000	35.21	845/24	16	15	3300	2800	4000	41	77	90
85	331	379	1.7	3.0	F602_0350 MB23 EZ503U	1100	2000	35.21	845/24	8.0	15	3300	2800	4000	19	77	82

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
F6 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1100 Nm)																	
85	331	379	1.7	3.0	F602_0350 MB23 EZ503U	1100	2000	35.21	845/24	12	15	3300	2800	4000	19	77	82
85	410	492	2.1	2.4	F602_0350 MB33 EZ702U	1100	2000	35.21	845/24	16	15	3300	2800	4000	46	77	92
85	461	546	2.3	2.2	F602_0350 MB23 EZ505U	1100	2000	35.21	845/24	8.0	15	3300	2800	4000	24	77	85
85	461	546	2.3	2.2	F602_0350 MB23 EZ505U	1100	2000	35.21	845/24	12	15	3300	2800	4000	24	77	85
107	187	233	1.1	5.0	F602_0280 MB23 EZ404U	787	1710	27.99	2015/72	8.0	8.0	3300	2800	4000	15	77	81
107	187	233	1.1	5.0	F602_0280 MB23 EZ404U	787	1710	27.99	2015/72	12	8.0	3300	2800	4000	15	77	81
107	187	233	1.1	5.0	F602_0280 MB23 EZ404U	787	1710	27.99	2015/72	16	8.0	3300	2800	4000	15	77	81
107	201	217	1.2	4.6	F602_0280 MB23 EZ502U	842	1710	27.99	2015/72	8.0	8.0	3300	2800	4000	17	77	80
107	201	217	1.2	4.6	F602_0280 MB23 EZ502U	842	1710	27.99	2015/72	12	8.0	3300	2800	4000	17	77	80
107	201	217	1.2	4.6	F602_0280 MB23 EZ502U	842	1710	27.99	2015/72	16	8.0	3300	2800	4000	17	77	80
107	201	225	1.2	4.6	F602_0280 MB33 EZ701U	543	2000	27.99	2015/72	16	15	3300	2800	4000	42	77	90
107	201	225	1.2	4.6	F602_0280 MB33 EZ701U	543	2000	27.99	2015/72	24	15	3300	2800	4000	42	77	90
107	263	301	1.6	3.5	F602_0280 MB23 EZ503U	1018	1710	27.99	2015/72	8.0	15	3300	2800	4000	20	77	82
107	263	301	1.6	3.5	F602_0280 MB23 EZ503U	1018	1710	27.99	2015/72	12	15	3300	2800	4000	20	77	82
107	326	391	2.0	2.9	F602_0280 MB33 EZ702U	1100	2000	27.99	2015/72	16	15	3300	2800	4000	47	77	92
107	326	391	2.0	2.9	F602_0280 MB33 EZ702U	1100	2000	27.99	2015/72	24	15	3300	2800	4000	47	77	92
107	366	434	2.2	2.5	F602_0280 MB23 EZ505U	1018	1710	27.99	2015/72	8.0	15	3300	2800	4000	25	77	85
107	366	434	2.2	2.5	F602_0280 MB23 EZ505U	1018	1710	27.99	2015/72	12	15	3300	2800	4000	25	77	85
129	219	251	1.6	3.9	F602_0230 MB23 EZ503U	847	1422	23.27	1885/81	8.0	15	2900	2500	4000	22	77	82
129	219	251	1.6	3.9	F602_0230 MB23 EZ503U	847	1422	23.27	1885/81	12	15	2900	2500	4000	22	77	82
129	271	325	1.9	3.2	F602_0230 MB33 EZ702U	926	2000	23.27	1885/81	16	15	2900	2500	4000	48	77	92
129	271	325	1.9	3.2	F602_0230 MB33 EZ702U	926	2000	23.27	1885/81	24	15	2900	2500	4000	48	77	92
129	271	325	1.9	3.2	F602_0230 MB33 EZ702U	926	2000	23.27	1885/81	32	15	2900	2500	4000	48	77	92
129	305	361	2.2	2.8	F602_0230 MB23 EZ505U	847	1422	23.27	1885/81	8.0	15	2900	2500	4000	26	77	85
129	305	361	2.2	2.8	F602_0230 MB23 EZ505U	847	1422	23.27	1885/81	12	15	2900	2500	4000	26	77	85
162	216	259	1.9	3.8	F602_0185 MB33 EZ702U	737	2000	18.52	3445/186	16	15	2900	2500	4000	50	77	92
162	216	259	1.9	3.8	F602_0185 MB33 EZ702U	737	2000	18.52	3445/186	24	15	2900	2500	4000	50	77	92
162	216	259	1.9	3.8	F602_0185 MB33 EZ702U	737	2000	18.52	3445/186	32	15	2900	2500	4000	50	77	92
162	216	259	1.9	3.8	F602_0185 MB33 EZ702U	737	2000	18.52	3445/186	45	15	2900	2500	4000	50	77	92
162	296	374	2.6	2.7	F602_0185 MB33 EZ703U	1100	2000	18.52	3445/186	16	32	2900	2500	4000	62	77	95
162	296	374	2.6	2.7	F602_0185 MB33 EZ703U	1100	2000	18.52	3445/186	24	32	2900	2500	4000	62	77	95
162	383	543	3.3	2.1	F602_0185 MB33 EZ705U	1100	2000	18.52	3445/186	16	32	2900	2500	4000	75	77	101
162	383	543	3.3	2.1	F602_0185 MB33 EZ705U	1100	2000	18.52	3445/186	24	32	2900	2500	4000	75	77	101
220	128	147	2.1	3.9	F602_0135 MB23 EZ503U	495	832	13.61	871/64	8.0	15	3300	2800	4000	21	73	82
220	128	147	2.1	3.9	F602_0135 MB23 EZ503U	495	832	13.61	871/64	12	15	3300	2800	4000	21	73	82
220	158	190	1.8	4.6	F602_0135 MB33 EZ702U	541	1600	13.61	871/64	16	15	3300	2800	4000	48	73	92
220	158	190	1.8	4.6	F602_0135 MB33 EZ702U	541	1600	13.61	871/64	24	15	3300	2800	4000	48	73	92
220	158	190	1.8	4.6	F602_0135 MB33 EZ702U	541	1600	13.61	871/64	32	15	3300	2800	4000	48	73	92
220	158	190	1.8	4.6	F602_0135 MB33 EZ702U	541	1600	13.61	871/64	45	15	3300	2800	4000	48	73	92
220	178	211	2.9	2.8	F602_0135 MB23 EZ505U	495	832	13.61	871/64	8.0	15	3300	2800	4000	26	73	85
220	178	211	2.9	2.8	F602_0135 MB23 EZ505U	495	832	13.61	871/64	12	15	3300	2800	4000	26	73	85
220	218	275	2.4	3.4	F602_0135 MB33 EZ703U	858	1600	13.61	871/64	16	32	3300	2800	4000	60	73	95
220	218	275	2.4	3.4	F602_0135 MB33 EZ703U	858	1600	13.61	871/64	24	32	3300	2800	4000	60	73	95
220	218	275	2.4	3.4	F602_0135 MB33 EZ703U	858	1600	13.61	871/64	32	32	3300	2800	4000	60	73	95
220	281	399	3.1	2.6	F602_0135 MB33 EZ705U	1000	1600	13.61	871/64	16	32	3300	2800	4000	72	73	101
220	281	399	3.1	2.6	F602_0135 MB33 EZ705U	1000	1600	13.61	871/64	24	32	3300	2800	4000	72	73	101
220	281	399	3.1	2.6	F602_0135 MB33 EZ705U	1000	1600	13.61	871/64	32	32	3300	2800	4000	72	73	101
277	102	116	2.4	3.9	F602_0110 MB23 EZ503U	394	661	10.82	2077/192	8.0	15	3300	2800	4000	24	73	82
277	102	116	2.4	3.9	F602_0110 MB23 EZ503U	394	661	10.82	2077/192	12	15	3300	2800	4000	24	73	82
277	142	168	3.3	2.8	F602_0110 MB23 EZ505U	394	661	10.82	2077/192	8.0	15	3300	2800	4000	29	73	85
277	142	168	3.3	2.8	F602_0110 MB23 EZ505U	394	661	10.82	2077/192	12	15	3300	2800	4000	29	73	85
277	173	218	2.3	3.9	F602_0110 MB33 EZ703U	682	1600	10.82	2077/192	16	32	3300	2800	4000	63	73	95
277	173	218	2.3	3.9	F602_0110 MB33 EZ703U	682	1600	10.82	2077/192	24	32	3300	2800	4000	63	73	95
277	173	218	2.3	3.9	F602_0110 MB33 EZ703U	682	1600	10.82	2077/192	32	32	3300	2800	4000	63	73	95
277	173	218	2.3	3.9	F602_0110 MB33 EZ703U	682	1600	10.82	2077/192	45	32	3300	2800	4000	63	73	95
277	224	317	3.0	3.0	F602_0110 MB33 EZ705U	1000	1600	10.82	2077/192	16	32	3300	2800	4000	75	73	101
277	224	317	3.0	3.0	F602_0110 MB33 EZ705U	1000	1600	10.82	2077/192	24	32	3300	2800	4000	75	73	101
277	224	317	3.0	3.0	F602_0110 MB33 EZ705U	1000	1600	10.82	2077/192	32	32	3300	2800	4000	75	73	101
277	224	317	3.0	3.0	F602_0110 MB33 EZ705U	1000	1600	10.82	2077/192	45	32	3300	2800	4000	75	73	101
334	85	97	2.6	3.9	F602_0090 MB23 EZ503U	327	550	8.995	1943/216	8.0	15	2900	2500	4000	27	73	82
334	85	97	2.6	3.9	F602_0090 MB23 EZ503U	327	550	8.995	1943/216	12	15	2900	2500	4000	27	73	82
334	118	140	3.6	2.8	F602_0090 MB23 EZ505U	327	550	8.995	1943/216	8.0	15	2900	2500	4000	32	73	85
334	118	140	3.6	2.8	F602_0090 MB23 EZ505U	327	550	8.995	1943/216	12	15	2900	2500	4000	32	73	85
334	144	181	2.3	4.4	F602_0090 MB33 EZ703U	567	1600	8.995	1943/216	16	32	2900	2500	4000	65	73	95

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2,3,4 [rpm]	n_{1maxDB} EL5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
F6 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1100 Nm)																	
334	144	181	2.3	4.4	F602_0090 MB33 EZ703U	567	1600	8.995	1943/216	24	32	2900	2500	4000	65	73	95
334	144	181	2.3	4.4	F602_0090 MB33 EZ703U	567	1600	8.995	1943/216	32	32	2900	2500	4000	65	73	95
334	144	181	2.3	4.4	F602_0090 MB33 EZ703U	567	1600	8.995	1943/216	45	32	2900	2500	4000	65	73	95
334	186	264	2.9	3.4	F602_0090 MB33 EZ705U	873	1600	8.995	1943/216	16	32	2900	2500	4000	78	73	101
334	186	264	2.9	3.4	F602_0090 MB33 EZ705U	873	1600	8.995	1943/216	24	32	2900	2500	4000	78	73	101
334	186	264	2.9	3.4	F602_0090 MB33 EZ705U	873	1600	8.995	1943/216	32	32	2900	2500	4000	78	73	101
334	186	264	2.9	3.4	F602_0090 MB33 EZ705U	873	1600	8.995	1943/216	45	32	2900	2500	4000	78	73	101
334	232	421	3.7	2.7	F602_0090 MB43 EZ803U	1000	1600	8.995	1943/216	50	65	2900	2500	3000	186	73	131
419	148	210	2.8	4.0	F602_0072 MB33 EZ705U	694	1312	7.159	3551/496	16	32	2900	2500	4000	83	73	101
419	148	210	2.8	4.0	F602_0072 MB33 EZ705U	694	1312	7.159	3551/496	24	32	2900	2500	4000	83	73	101
419	148	210	2.8	4.0	F602_0072 MB33 EZ705U	694	1312	7.159	3551/496	32	32	2900	2500	4000	83	73	101
419	148	210	2.8	4.0	F602_0072 MB33 EZ705U	694	1312	7.159	3551/496	45	32	2900	2500	4000	83	73	101
419	185	335	3.5	3.2	F602_0072 MB43 EZ803U	1000	1600	7.159	3551/496	50	65	2900	2500	3000	191	73	131
419	185	335	3.5	3.2	F602_0072 MB43 EZ803U	1000	1600	7.159	3551/496	72	65	2900	2500	3000	191	73	131
529	117	166	2.7	4.7	F602_0057 MB33 EZ705U	550	1040	5.673	1407/248	16	32	2500	2100	3500	91	73	101
529	117	166	2.7	4.7	F602_0057 MB33 EZ705U	550	1040	5.673	1407/248	24	32	2500	2100	3500	91	73	101
529	117	166	2.7	4.7	F602_0057 MB33 EZ705U	550	1040	5.673	1407/248	32	32	2500	2100	3500	91	73	101
529	117	166	2.7	4.7	F602_0057 MB33 EZ705U	550	1040	5.673	1407/248	45	32	2500	2100	3500	91	73	101
529	146	265	3.4	3.7	F602_0057 MB43 EZ803U	798	1537	5.673	1407/248	50	65	2500	2100	3000	199	73	131
529	146	265	3.4	3.7	F602_0057 MB43 EZ803U	798	1537	5.673	1407/248	72	65	2500	2100	3000	199	73	131
529	146	265	3.4	3.7	F602_0057 MB43 EZ803U	798	1537	5.673	1407/248	100	65	2500	2100	3000	199	73	131
660	94	133	3.0	4.7	F602_0045 MB33 EZ705U	441	833	4.546	1273/280	16	32	2500	2100	3500	103	73	101
660	94	133	3.0	4.7	F602_0045 MB33 EZ705U	441	833	4.546	1273/280	24	32	2500	2100	3500	103	73	101
660	94	133	3.0	4.7	F602_0045 MB33 EZ705U	441	833	4.546	1273/280	32	32	2500	2100	3500	103	73	101
660	94	133	3.0	4.7	F602_0045 MB33 EZ705U	441	833	4.546	1273/280	45	32	2500	2100	3500	103	73	101
660	117	213	3.3	4.3	F602_0045 MB43 EZ803U	639	1232	4.546	1273/280	50	65	2500	2100	3000	211	73	131
660	117	213	3.3	4.3	F602_0045 MB43 EZ803U	639	1232	4.546	1273/280	72	65	2500	2100	3000	211	73	131
660	117	213	3.3	4.3	F602_0045 MB43 EZ803U	639	1232	4.546	1273/280	100	65	2500	2100	3000	211	73	131

6.3 Dimensional drawings

In this chapter, you can find the dimensions of the geared motors with redundant brake.

There is a dimensional drawing for every possible shaft/housing design, each with the tables for gear unit dimensions, motor adapter dimensions, motor dimensions and geared motor dimensions.

Dimensions can exceed the specifications of ISO 2768-mK due to casting tolerances or accumulation of individual tolerances.

We reserve the right to make dimensional changes due to ongoing technical development.

You can download 3D models of our standard drives at https://configurator.stoeber.de/en-US/.

Combination options and the dimensions of forced ventilated geared motors can also be found at https://configurator.stoeber.de/en-US/.

Tolerances

Axis height in accordance with DIN 747	Tolerance
Up to 50 mm	-0.4 mm
Up to 250 mm	-0.5 mm
Up to 630 mm	-0.6 mm

Solid shaft	Tolerance
Shaft ∅ fit ≤ 50 mm	DIN 748-1, ISO k6
Shaft ∅ fit > 50 mm	DIN 748-1, ISO m6
Feather keys	DIN 6885-1, high form A

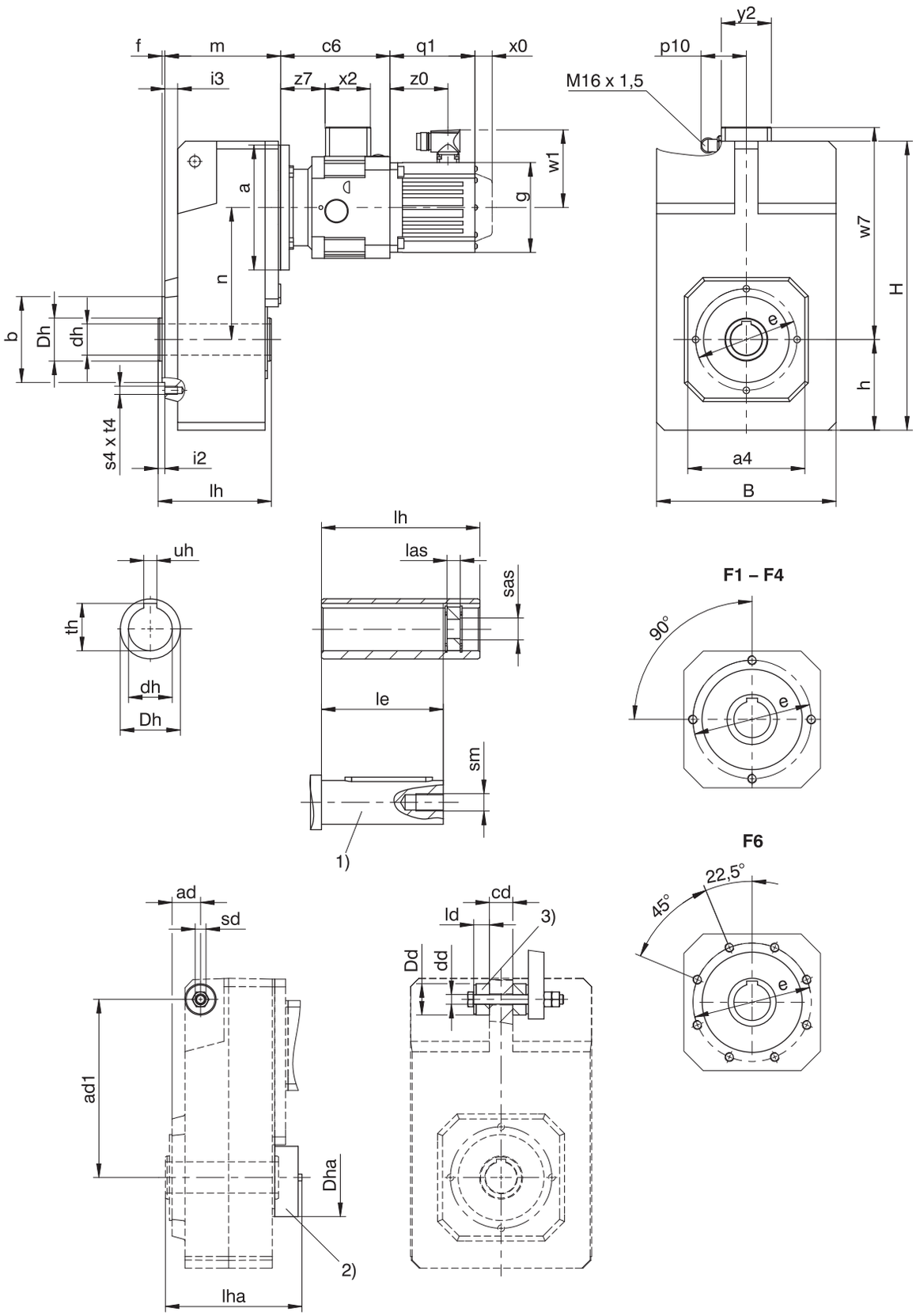
Hollow shaft	Tolerance
Hollow shaft hole fit	ISO H7
Feather keys	DIN 6885-1, high form

Flange	Pilot tolerance
Up to 300 mm	ISO j6
Starting at 350 mm	ISO h6

Centering holes in solid shafts in accordance with DIN 332-2, DR shape

Thread size	M4	M5	M6	M8	M10	M12	M16	M20	M24
Thread depth [mm]	10	12.5	16	19	22	28	36	42	50

6.3.1 A shaft design (hollow shaft), G housing design (pitch circle diameter)



q1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]	1)	The length of the machine shaft must be at least 2.2 x ∅dh and the length of the feather key must be at least 2 x ∅dh.
2)	Cover (optional)	3)	Rubber buffer for torque arm bracket (optional). Dimension ∅Dd = outer diameter of the rubber buffer when not tensioned.

Dimensions of gear units

Type	□a4	ad	ad1	Øb	B	cd	Ødd	Ødh	ØDd	ØDh	ØDha	Øe	f	h	H	i2	i3	ld	le	lh	las	lha	s4	sd	sm	sas	t4	th	uh
F1	100	28.5	150	70_{j6}	145	20	$11.0^{+0,5}$	20^{H7}	30	35	70	85	2.5	74	238.0	6.5	12.5	15	73	95	12	112	M8	M10	M6	M8	13	22.8	6^{JS9}
F2	130	32.0	181	95_{j6}	180	22	$11.0^{+0,5}$	25^{H7}	30	45	82	115	3.0	93	299.0	8.0	15.0	15	92	115	12	132	M8	M10	M10	M12	13	28.3	8^{JS9}
F3	150	36.5	205	110_{j6}	206	30	$14.0^{+0,5}$	30^{H7}	37	50	88	130	3.5	106	335.5	8.5	16.5	20	103	130	12	157	M10	M12	M10	M12	16	33.3	8^{JS9}
F4	150	36.5	228	110_{j6}	230	30	$14.0^{+0,5}$	40^{H7}	37	55	100	130	3.5	116	370.0	8.5	16.5	20	114	145	12	175	M10	M12	M16	M20	16	43.3	12^{JS9}
F6	180	44.5	270	130_{j6}	265	35	$22.0^{+0,5}$	50^{H7}	60	70	115	165	3.5	137	433.0	10.5	20.5	30	143	180	12	194	M10	M20	M16	M20	16	53.8	14^{JS9}

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
F_MB23	140	59	102.9	58	64	57.5
F_MB33	161	59	115.4	58	64	71.0
F_MB43	194	59	134.9	58	64	93.5

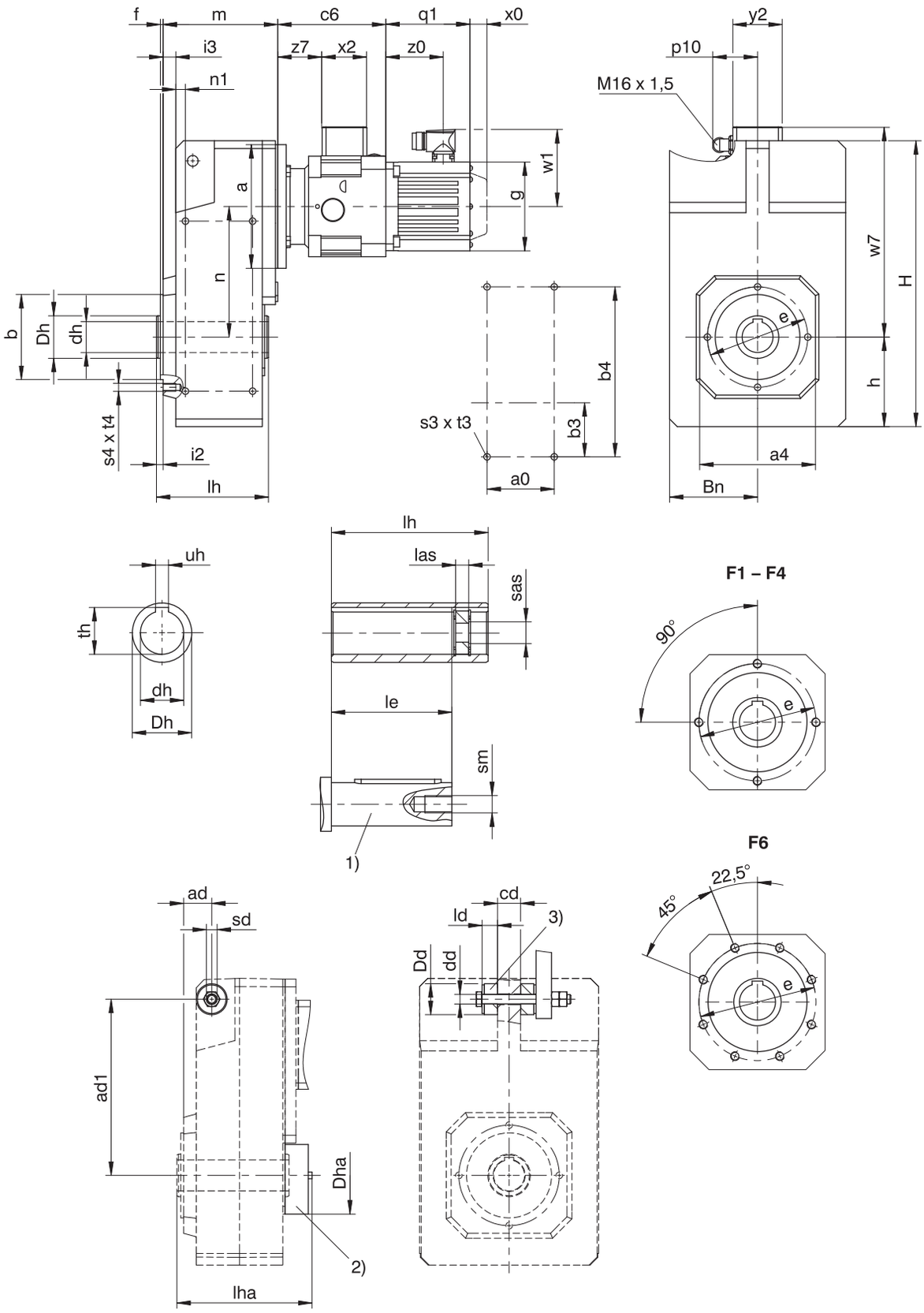
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
F102	∅160	101.5	102.0	∅160	101.5	102.0	–	–	–	–	–	–
F202	∅160	119.0	131.0	∅160	119.0	131.0	∅200	121.0	131.0	–	–	–
F302	∅160	133.5	149.5	∅160	133.5	149.5	∅200	135.5	149.5	–	–	–
F402	∅160	148.5	169.0	∅160	148.5	169.0	∅200	150.5	169.0	∅250	153.5	169.0
F602	∅160	179.5	196.0	∅160	179.5	196.0	∅200	181.5	196.0	∅250	184.5	196.0

6.3.2 A shaft design (hollow shaft), GN housing design (pitch circle diameter + side fastening)



q1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]	1)	The length of the machine shaft must be at least 2.2 x ∅dh and the length of the feather key must be at least 2 x ∅dh.
2)	Cover (optional)	3)	Rubber buffer for torque arm bracket (optional). Dimension ∅Dd = outer diameter of the rubber buffer when not tensioned.

Dimensions of gear units

Type	a0	□a4	ad	ad1	Øb	b3	b4	Bn	cd	Ødd	Ødh	ØDd	ØDh	ØDha	Øe	f	h	H
F1	50	100	28.5	150	70_{j6}	40	140	71	20	$11.0^{+0,5}$	20^{H7}	30	35	70	85	2.5	74	238.0
F2	64	130	32.0	181	95_{j6}	55	175	88	22	$11.0^{+0,5}$	25^{H7}	30	45	82	115	3.0	93	299.0
F3	72	150	36.5	205	110_{j6}	60	200	102	30	$14.0^{+0,5}$	30^{H7}	37	50	88	130	3.5	106	335.5
F4	87	150	36.5	228	110_{j6}	70	220	114	30	$14.0^{+0,5}$	40^{H7}	37	55	100	130	3.5	116	370.0
F6	108	180	44.5	270	130_{j6}	85	270	131	35	$22.0^{+0,5}$	50^{H7}	60	70	115	165	3.5	137	433.0

Type	i2	i3	ld	le	lh	las	lha	n1	s3	s4	sd	sm	sas	t3	t4	th	uh
F1	6.5	12.5	15	73	95	12	112	10.0	M6	M8	M10	M6	M8	11	13	22.8	6^{JS9}
F2	8.0	15.0	15	92	115	12	132	10.5	M8	M8	M10	M10	M12	13	13	28.3	8^{JS9}
F3	8.5	16.5	20	103	130	12	157	12.5	M10	M10	M12	M10	M12	16	16	33.3	8^{JS9}
F4	8.5	16.5	20	114	145	12	175	12.5	M10	M10	M12	M16	M20	16	16	43.3	12^{JS9}
F6	10.5	20.5	30	143	180	12	194	15.5	M12	M10	M20	M16	M20	19	16	53.8	14^{JS9}

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
F_MB23	140	59	102.9	58	64	57.5
F_MB33	161	59	115.4	58	64	71.0
F_MB43	194	59	134.9	58	64	93.5

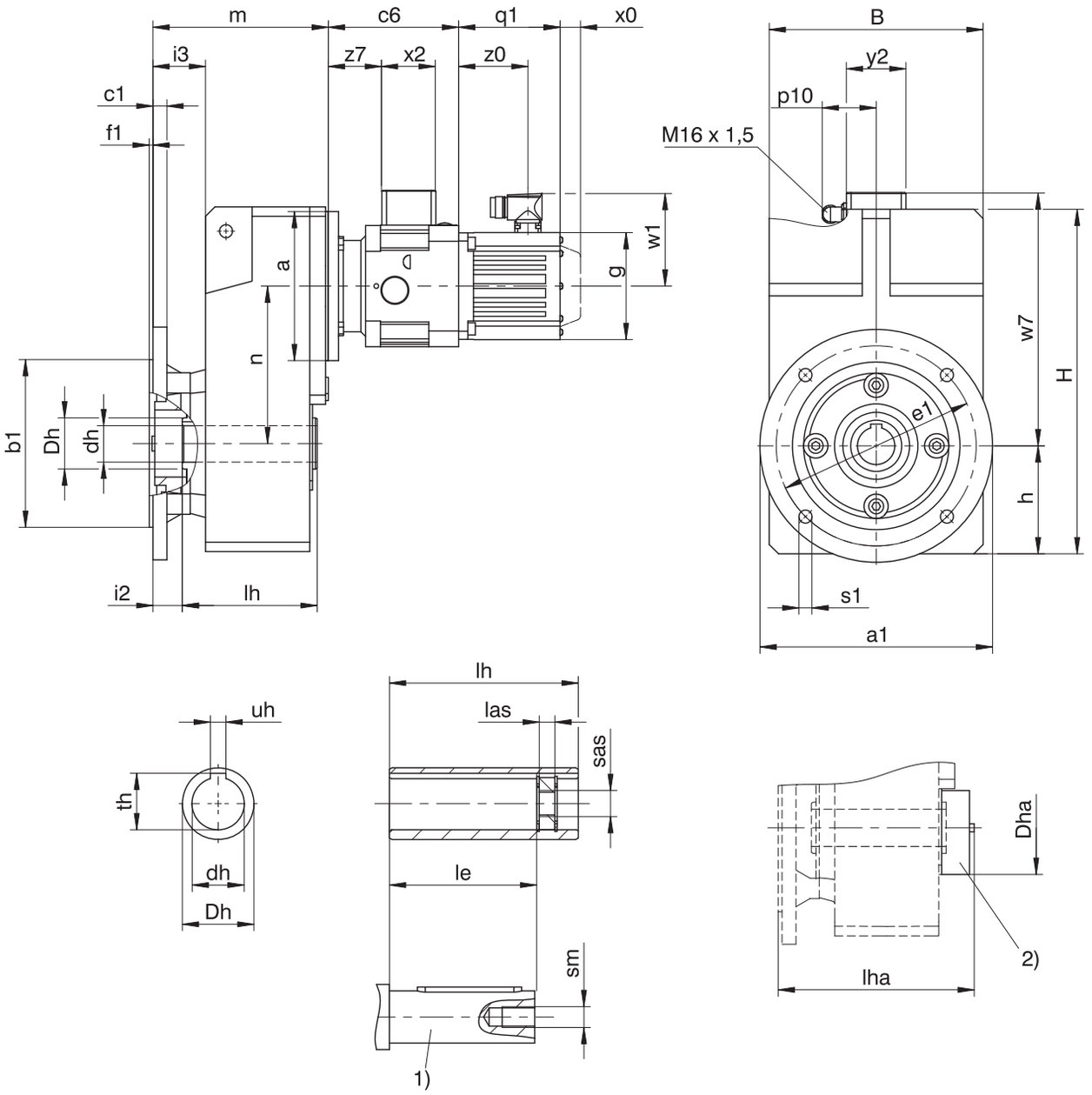
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
F102	∅160	101.5	102.0	∅160	101.5	102.0	–	–	–	–	–	–
F202	∅160	119.0	131.0	∅160	119.0	131.0	∅200	121.0	131.0	–	–	–
F302	∅160	133.5	149.5	∅160	133.5	149.5	∅200	135.5	149.5	–	–	–
F402	∅160	148.5	169.0	∅160	148.5	169.0	∅200	150.5	169.0	∅250	153.5	169.0
F602	∅160	179.5	196.0	∅160	179.5	196.0	∅200	181.5	196.0	∅250	184.5	196.0

6.3.3 A shaft design (hollow shaft), F housing design (round flange)



q1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]	1)	The length of the machine shaft must be at least 2.2 x ∅dh and the length of the feather key must be at least 2 x ∅dh.
2)	Cover (optional)		

Dimensions of gear units

Type	Øa1	Øb1	B	c1	Ødh	ØDh	ØDha	Øe1	f1	h	H	i2	i3	le	lh	las	lha	Øs1	sm	sas	th	uh
F1	160	110_{j6}	145	10	20^{H7}	35	70	130	3.5	74	238.0	25.5	44.5	73	95	12	112	9	M6	M8	22.8	6^{JS9}
F2	200	130_{j6}	180	14	25^{H7}	45	82	165	3.5	93	299.0	30.0	53.0	92	115	12	132	11	M10	M12	28.3	8^{JS9}
F3	250	180_{j6}	206	15	30^{H7}	50	88	215	4.0	106	335.5	31.5	56.5	103	130	12	157	14	M10	M12	33.3	8^{JS9}
F4	250	180_{j6}	230	15	40^{H7}	55	100	215	4.0	116	370.0	31.5	56.5	114	145	12	175	14	M16	M20	43.3	12^{JS9}
F6	300	230_{j6}	265	17	50^{H7}	70	115	265	4.0	137	433.0	29.5	60.5	143	180	12	194	14	M16	M20	53.8	14^{JS9}

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
F_MB23	140	59	102.9	58	64	57.5
F_MB33	161	59	115.4	58	64	71.0
F_MB43	194	59	134.9	58	64	93.5

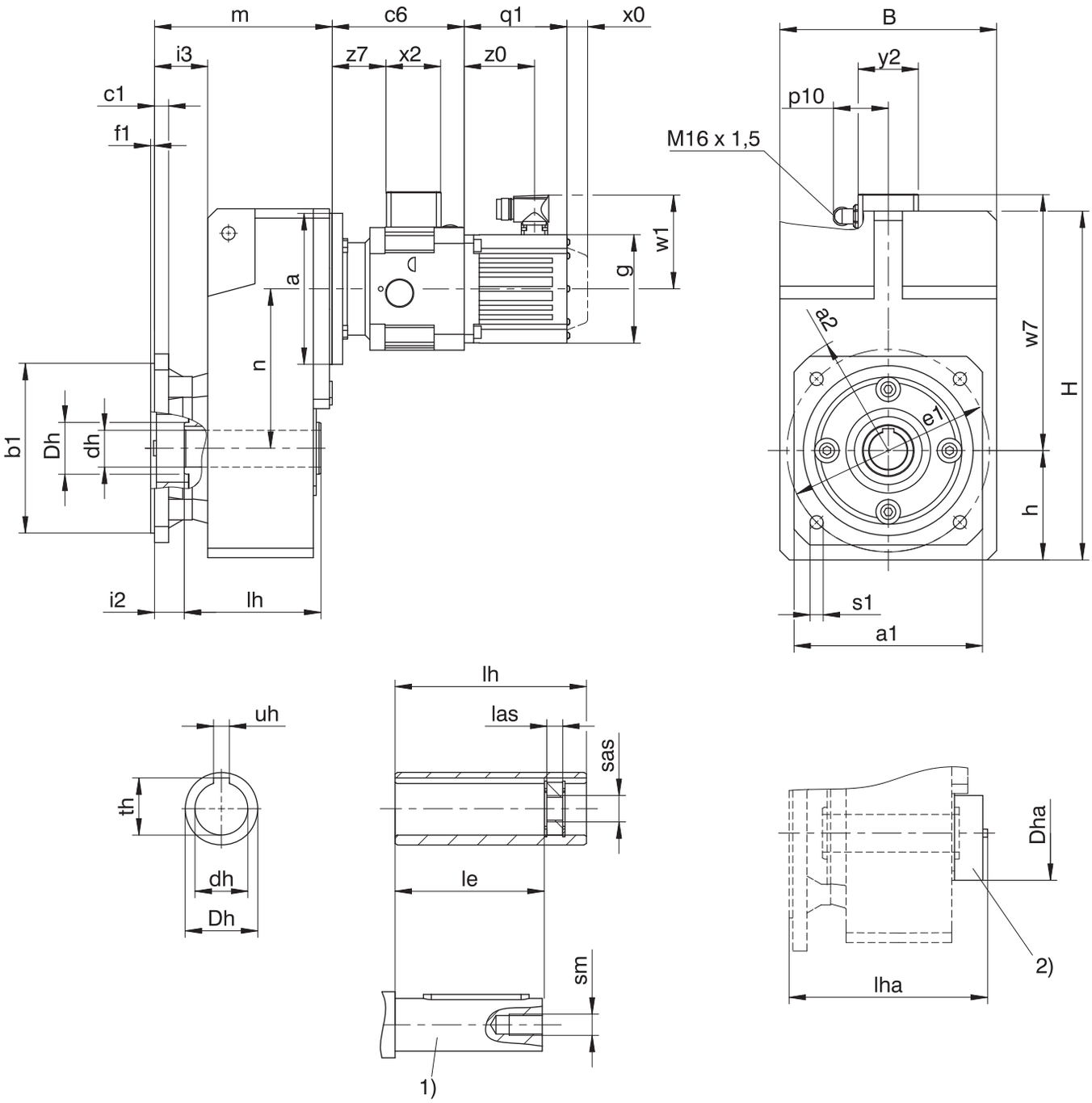
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
F102	∅160	133.5	102.0	∅160	133.5	102.0	–	–	–	–	–	–
F202	∅160	157.0	131.0	∅160	157.0	131.0	∅200	159.0	131.0	–	–	–
F302	∅160	173.5	149.5	∅160	173.5	149.5	∅200	175.5	149.5	–	–	–
F402	∅160	188.5	169.0	∅160	188.5	169.0	∅200	190.5	169.0	∅250	193.5	169.0
F602	∅160	219.5	196.0	∅160	219.5	196.0	∅200	221.5	196.0	∅250	224.5	196.0

6.3.4 A shaft design (hollow shaft), Q housing design (square flange)



q1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]	1)	The length of the machine shaft must be at least 2.2 x ∅dh and the length of the feather key must be at least 2 x ∅dh.
2)	Cover (optional)		

Dimensions of gear units

Type	□a1	□a2	Øb1	B	c1	Ødh	ØDh	ØDha	Øe1	f1	h	H	i2	i3	le	lh	las	lha	Øs1	sm	sas	th	uh
F1	125	160	110_{j6}	145	10	20^{H7}	35	70	130	3.5	74	238.0	25.5	44.5	73	95	12	112	9	M6	M8	22.8	6^{JS9}
F2	150	195	130_{j6}	180	14	25^{H7}	45	82	165	3.5	93	299.0	30.0	53.0	92	115	12	132	11	M10	M12	28.3	8^{JS9}
F3	200	260	180_{j6}	206	15	30^{H7}	50	88	215	4.0	106	335.5	31.5	56.5	103	130	12	157	14	M10	M12	33.3	8^{JS9}
F4	200	260	180_{j6}	230	15	40^{H7}	55	100	215	4.0	116	370.0	31.5	56.5	114	145	12	175	14	M16	M20	43.3	12^{JS9}
F6	250	325	230_{j6}	265	17	50^{H7}	70	115	265	4.0	137	433.0	29.5	60.5	143	180	12	194	14	M16	M20	53.8	14^{JS9}

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
F_MB23	140	59	102.9	58	64	57.5
F_MB33	161	59	115.4	58	64	71.0
F_MB43	194	59	134.9	58	64	93.5

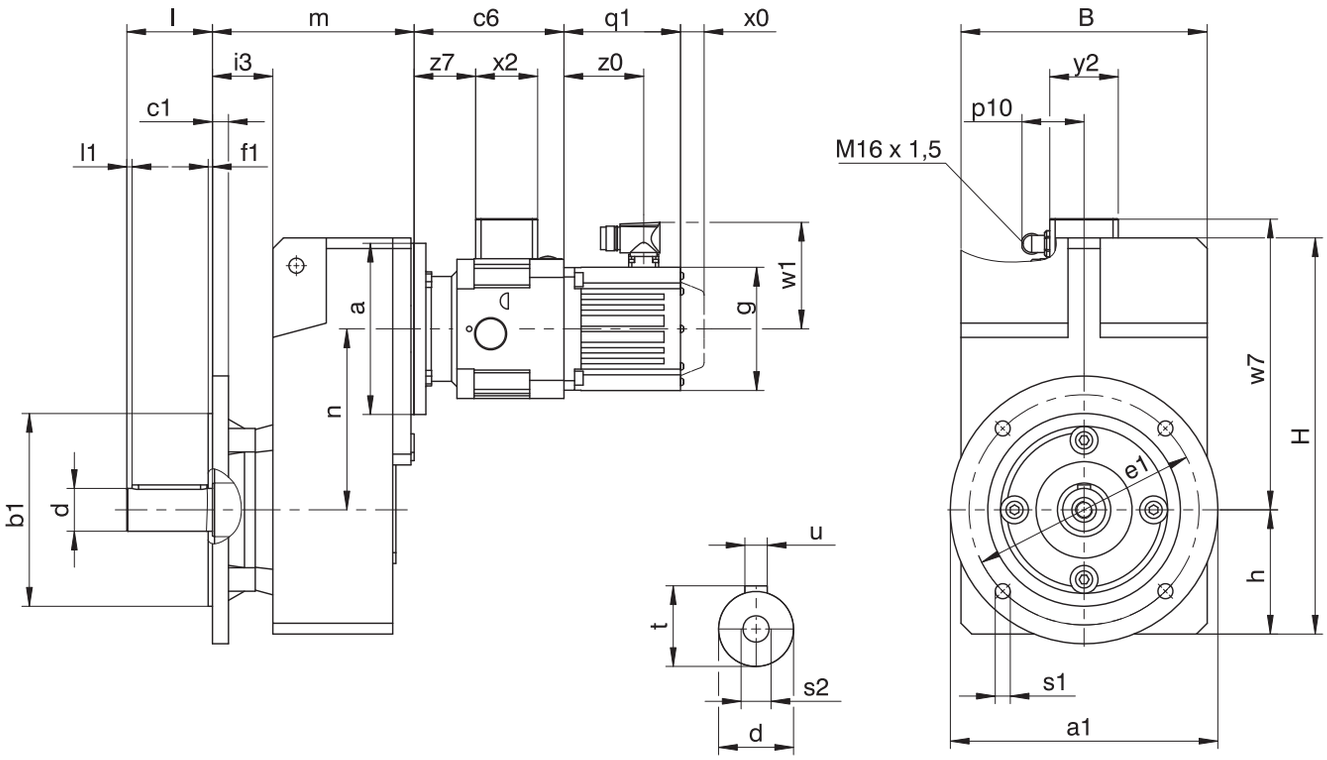
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
F102	∅160	133.5	102.0	∅160	133.5	102.0	–	–	–	–	–	–
F202	∅160	157.0	131.0	∅160	157.0	131.0	∅200	159.0	131.0	–	–	–
F302	∅160	173.5	149.5	∅160	173.5	149.5	∅200	175.5	149.5	–	–	–
F402	∅160	188.5	169.0	∅160	188.5	169.0	∅200	190.5	169.0	∅250	193.5	169.0
F602	∅160	219.5	196.0	∅160	219.5	196.0	∅200	221.5	196.0	∅250	224.5	196.0

6.3.5 V shaft design (solid shaft), F housing design (round flange)



q1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]		

Dimensions of gear units

Type	Øa1	Øb1	B	c1	Ød	Øe1	f1	h	H	i3	l	l1	Øs1	s2	t	u
F1	160	110_{j6}	145	10	25_{k6}	130	3.5	74	238.0	44.5	50	5	9	M10	28.0	A8×7×40
F2	200	130_{j6}	180	14	30_{k6}	165	3.5	93	299.0	53.0	60	5	11	M10	33.0	A8×7×50
F3	250	180_{j6}	206	15	35_{k6}	215	4.0	106	335.5	56.5	70	5	14	M12	38.0	A10×8×60
F4	250	180_{j6}	230	15	40_{k6}	215	4.0	116	370.0	56.5	80	5	14	M16	43.0	A12×8×70
F6	300	230_{j6}	265	17	50_{k6}	265	4.0	137	433.0	60.5	100	5	14	M16	53.5	A14×9×90

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
F_MB23	140	59	102.9	58	64	57.5
F_MB33	161	59	115.4	58	64	71.0
F_MB43	194	59	134.9	58	64	93.5

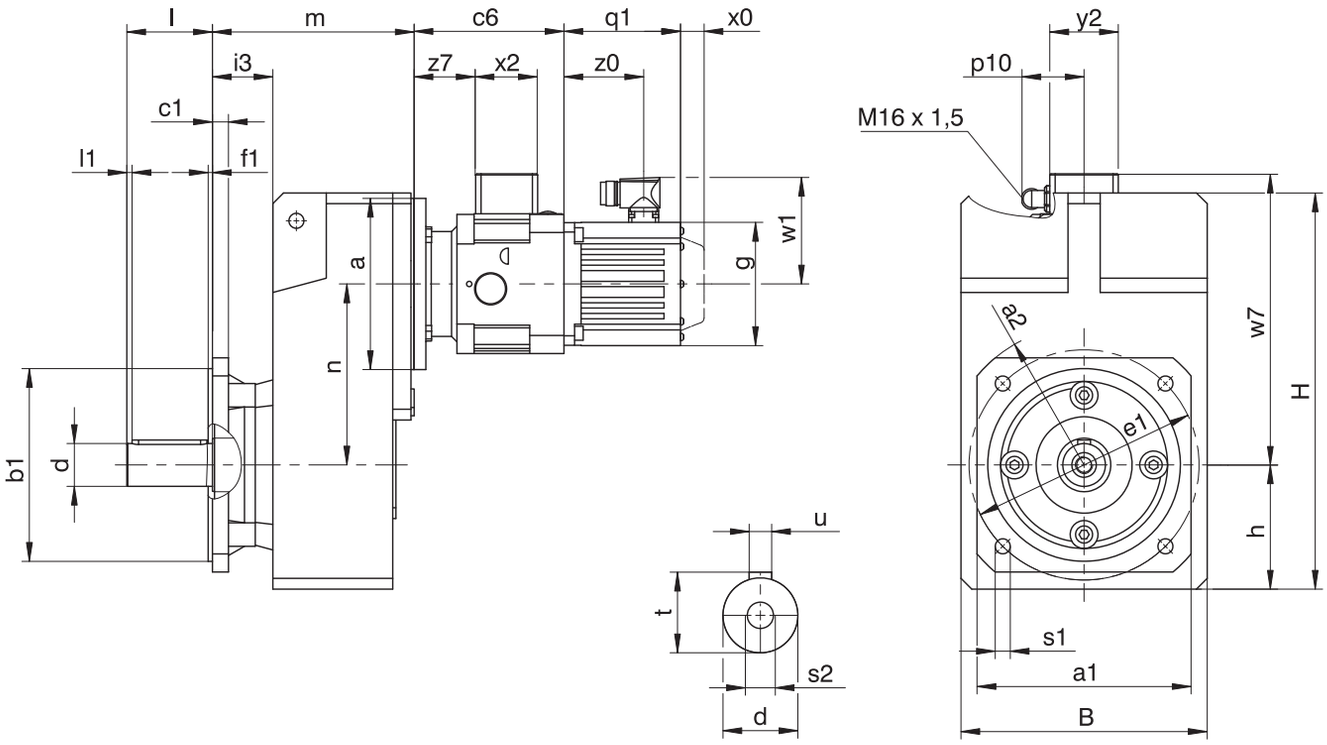
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
F102	∅160	133.5	102.0	∅160	133.5	102.0	–	–	–	–	–	–
F202	∅160	157.0	131.0	∅160	157.0	131.0	∅200	159.0	131.0	–	–	–
F302	∅160	173.5	149.5	∅160	173.5	149.5	∅200	175.5	149.5	–	–	–
F402	∅160	188.5	169.0	∅160	188.5	169.0	∅200	190.5	169.0	∅250	193.5	169.0
F602	∅160	219.5	196.0	∅160	219.5	196.0	∅200	221.5	196.0	∅250	224.5	196.0

6.3.6 V shaft design (solid shaft), Q housing design (square flange)



q1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]		

Dimensions of gear units

Type	□a1	□a2	Øb1	c1	B	Ød	Øe1	f1	h	H	i3	l	l1	Øs1	s2	t	u
F1	125	160	110_{j6}	10	145	25_{k6}	130	3.5	74	238.0	44.5	50	5	9	M10	28.0	A8×7×40
F2	150	195	130_{j6}	14	180	30_{k6}	165	3.5	93	299.0	53.0	60	5	11	M10	33.0	A8×7×50
F3	200	260	180_{j6}	15	206	35_{k6}	215	4.0	106	335.5	56.5	70	5	14	M12	38.0	A10×8×60
F4	200	260	180_{j6}	15	230	40_{k6}	215	4.0	116	370.0	56.5	80	5	14	M16	43.0	A12×8×70
F6	250	325	230_{j6}	17	265	50_{k6}	265	4.0	137	433.0	60.5	100	5	14	M16	53.5	A14×9×90

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
F_MB23	140	59	102.9	58	64	57.5
F_MB33	161	59	115.4	58	64	71.0
F_MB43	194	59	134.9	58	64	93.5

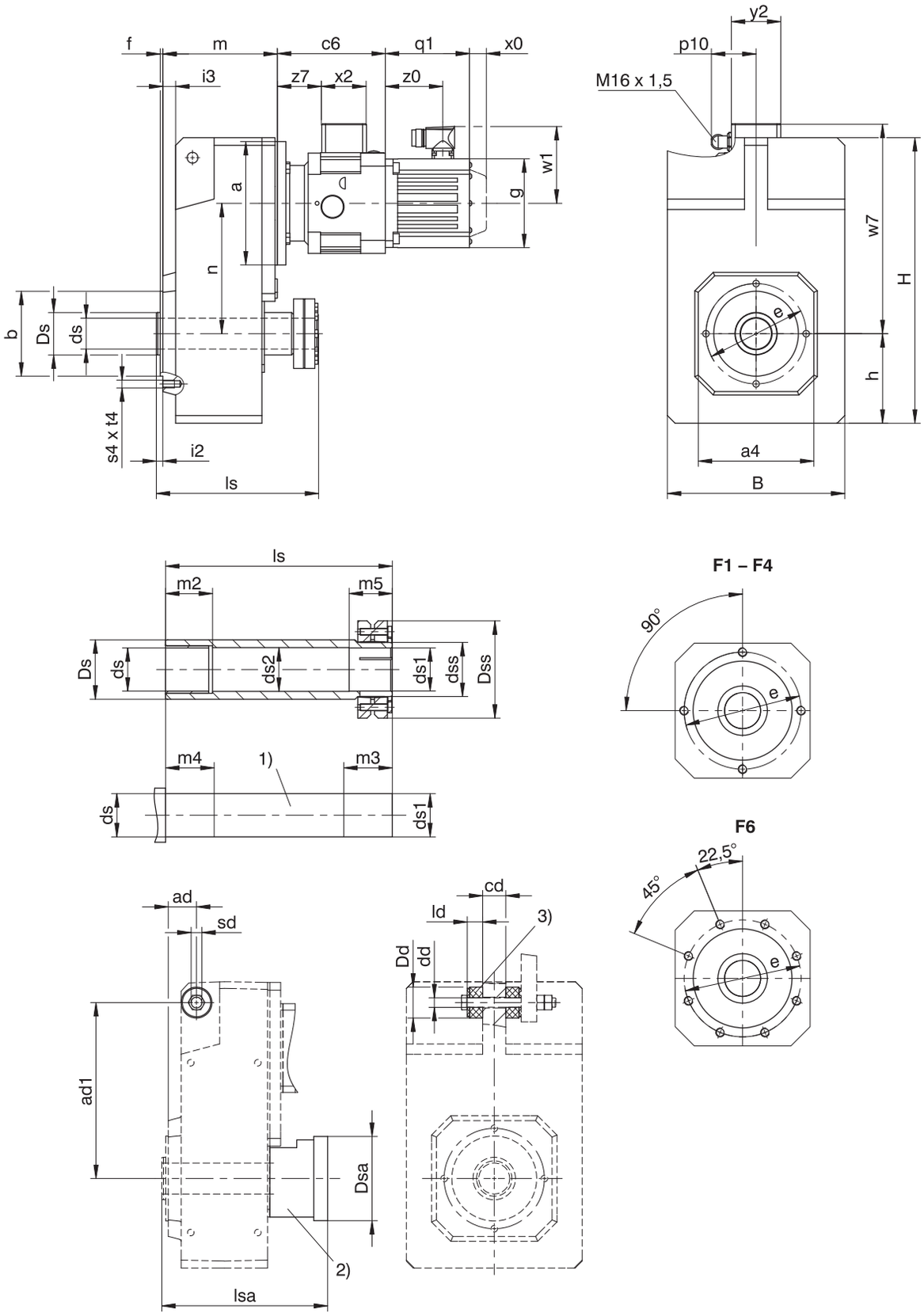
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
F102	∅160	133.5	102.0	∅160	133.5	102.0	–	–	–	–	–	–
F202	∅160	157.0	131.0	∅160	157.0	131.0	∅200	159.0	131.0	–	–	–
F302	∅160	173.5	149.5	∅160	173.5	149.5	∅200	175.5	149.5	–	–	–
F402	∅160	188.5	169.0	∅160	188.5	169.0	∅200	190.5	169.0	∅250	193.5	169.0
F602	∅160	219.5	196.0	∅160	219.5	196.0	∅200	221.5	196.0	∅250	224.5	196.0

6.3.7 S shaft design (hollow shaft with shrink ring), G housing design (pitch circle diameter)



q1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]	1)	Machine shaft: The dimension ls must meet or exceed the specified value.
2)	Cover (optional)	3)	Rubber buffer for torque arm bracket (optional). Dimension ∅Dd = outer diameter of the rubber buffer when not tensioned.

Dimensions of gear units

Type	□a4	ad	ad1	Øb	B	cd	Ødd	Øds	Ødds1	Ødds2	Ødss	ØDd	ØDs	ØDsa	ØDss	Øe	f	h	H	i2	i3	ld	ls	lsa	m2	m3	m4	m5	s4	sd	t4
F1	100	28.5	150	70_{j6}	145	20	$11.0^{+0,5}$	20_{h9}	$20_{h9}{}^{H7}$	20.5	24	30	35	63	50	85	2.5	74	238.0	6.5	12.5	15	146	150	20	31	25	26	M8	M10	13
F2	130	32.0	181	95_{j6}	180	22	$11.0^{+0,5}$	25_{h9}	$25_{h9}{}^{H7}$	25.5	30	30	45	73	60	115	3.0	93	299.0	8.0	15.0	15	175	180	20	37	25	32	M8	M10	13
F3	150	36.5	205	110_{j6}	206	30	$14.0^{+0,5}$	30_{h9}	$30_{h9}{}^{H7}$	30.5	36	37	50	83	72	130	3.5	106	335.5	8.5	16.5	20	192	196	25	37	30	32	M10	M12	16
F4	150	36.5	228	110_{j6}	230	30	$14.0^{+0,5}$	40_{h9}	$40_{h9}{}^{H7}$	40.5	50	37	55	108	90	130	3.5	116	370.0	8.5	16.5	20	210	215	40	45	45	40	M10	M12	16
F6	180	44.5	270	130_{j6}	265	35	$22.0^{+0,5}$	50_{h9}	$50_{h9}{}^{H7}$	50.5	62	60	70	128	106	165	3.5	137	433.0	10.5	20.5	30	248	251	40	47	45	42	M10	M20	16

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
F_MB23	140	59	102.9	58	64	57.5
F_MB33	161	59	115.4	58	64	71.0
F_MB43	194	59	134.9	58	64	93.5

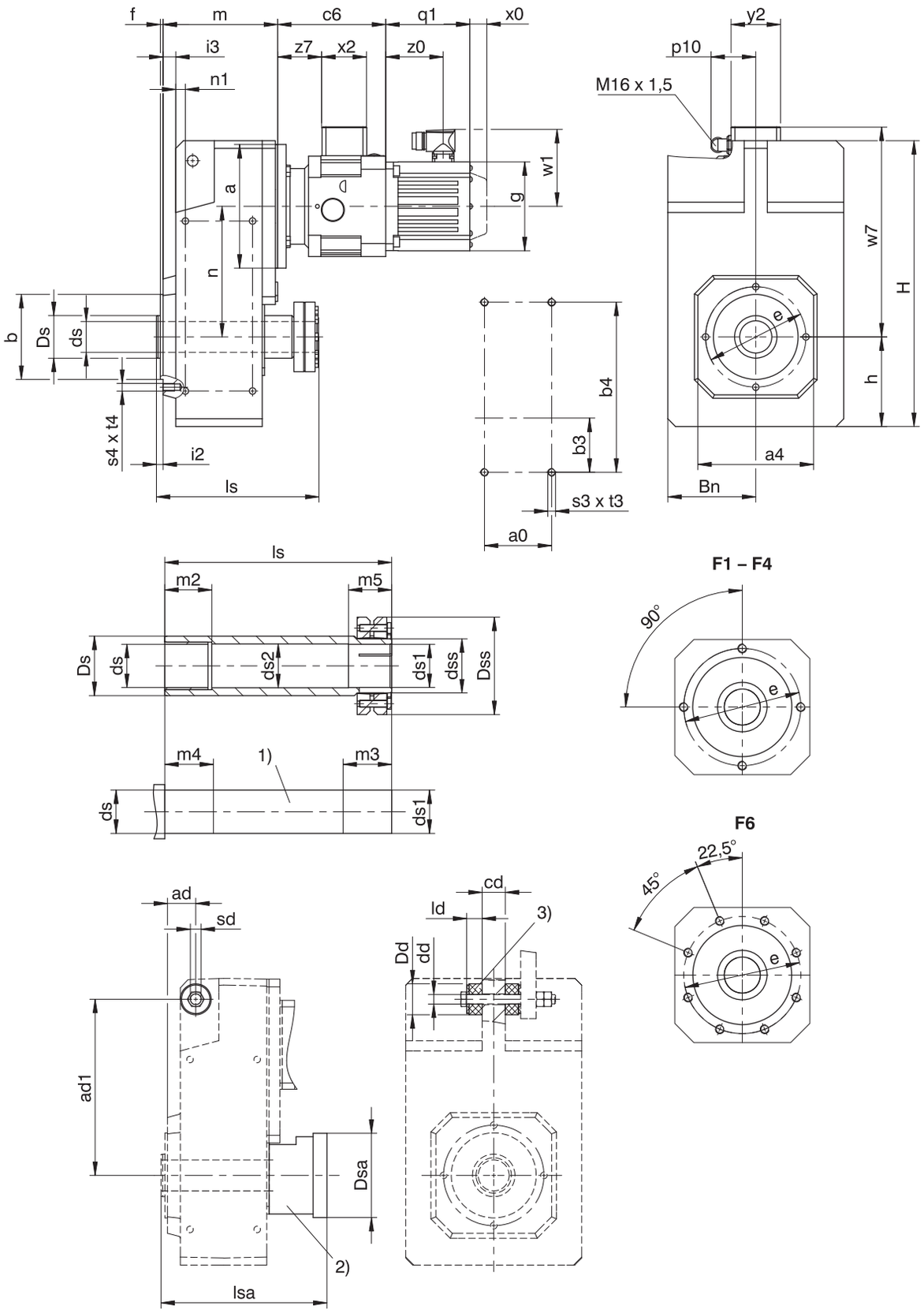
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
F102	∅160	101.5	102.0	∅160	101.5	102.0	–	–	–	–	–	–
F202	∅160	119.0	131.0	∅160	119.0	131.0	∅200	121.0	131.0	–	–	–
F302	∅160	133.5	149.5	∅160	133.5	149.5	∅200	135.5	149.5	–	–	–
F402	∅160	148.5	169.0	∅160	148.5	169.0	∅200	150.5	169.0	∅250	153.5	169.0
F602	∅160	179.5	196.0	∅160	179.5	196.0	∅200	181.5	196.0	∅250	184.5	196.0

6.3.8 S shaft design (hollow shaft with shrink ring), GN housing design (pitch circle diameter + side fastening)



q1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]	1)	Machine shaft: The dimension ls must meet or exceed the specified value.
2)	Cover (optional)	3)	Rubber buffer for torque arm bracket (optional). Dimension ∅Dd = outer diameter of the rubber buffer when not tensioned.

Dimensions of gear units

Type	a0	□a4	ad	ad1	Øb	b3	b4	Bn	cd	Ødd	Øds	Øds1	Øds2	Ødss	ØDd	ØDs	ØDsa	ØDss
F1	50	100	28.5	150	70_{j6}	40	140	71	20	$11.0^{+0,5}$	20_{h9}	20_{h9}^{H7}	20.5	24	30	63	63	50
F2	64	130	32.0	181	95_{j6}	55	175	88	22	$11.0^{+0,5}$	25_{h9}	25_{h9}^{H7}	25.5	30	30	73	73	60
F3	72	150	36.5	205	110_{j6}	60	200	102	30	$14.0^{+0,5}$	30_{h9}	30_{h9}^{H7}	30.5	36	37	83	83	72
F4	87	150	36.5	228	110_{j6}	70	220	114	30	$14.0^{+0,5}$	40_{h9}	40_{h9}^{H7}	40.5	50	37	108	108	90
F6	108	180	44.5	270	130_{j6}	85	270	131	35	$22.0^{+0,5}$	50_{h9}	50_{h9}^{H7}	50.5	62	60	128	128	106

Type	Øe	f	h	H	i2	i3	ld	ls	lsa	n1	m2	m3	m4	m5	s3	s4	sd	t3	t4
F1	85	2.5	74	238.0	6.5	12.5	15	146	150	10	20	31	25	26	M6	M8	M10	11	13
F2	115	3.0	93	299.0	8.0	15.0	15	175	180	10.5	20	37	25	32	M8	M8	M10	13	13
F3	130	3.5	106	335.5	8.5	16.5	20	192	196	12.5	25	37	30	32	M10	M10	M12	16	16
F4	130	3.5	116	370.0	8.5	16.5	20	210	215	12.5	40	45	45	40	M10	M10	M12	16	16
F6	165	3.5	137	433.0	10.5	20.5	30	248	251	15.5	40	47	45	42	M12	M10	M20	19	16

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
F_MB23	140	59	102.9	58	64	57.5
F_MB33	161	59	115.4	58	64	71.0
F_MB43	194	59	134.9	58	64	93.5

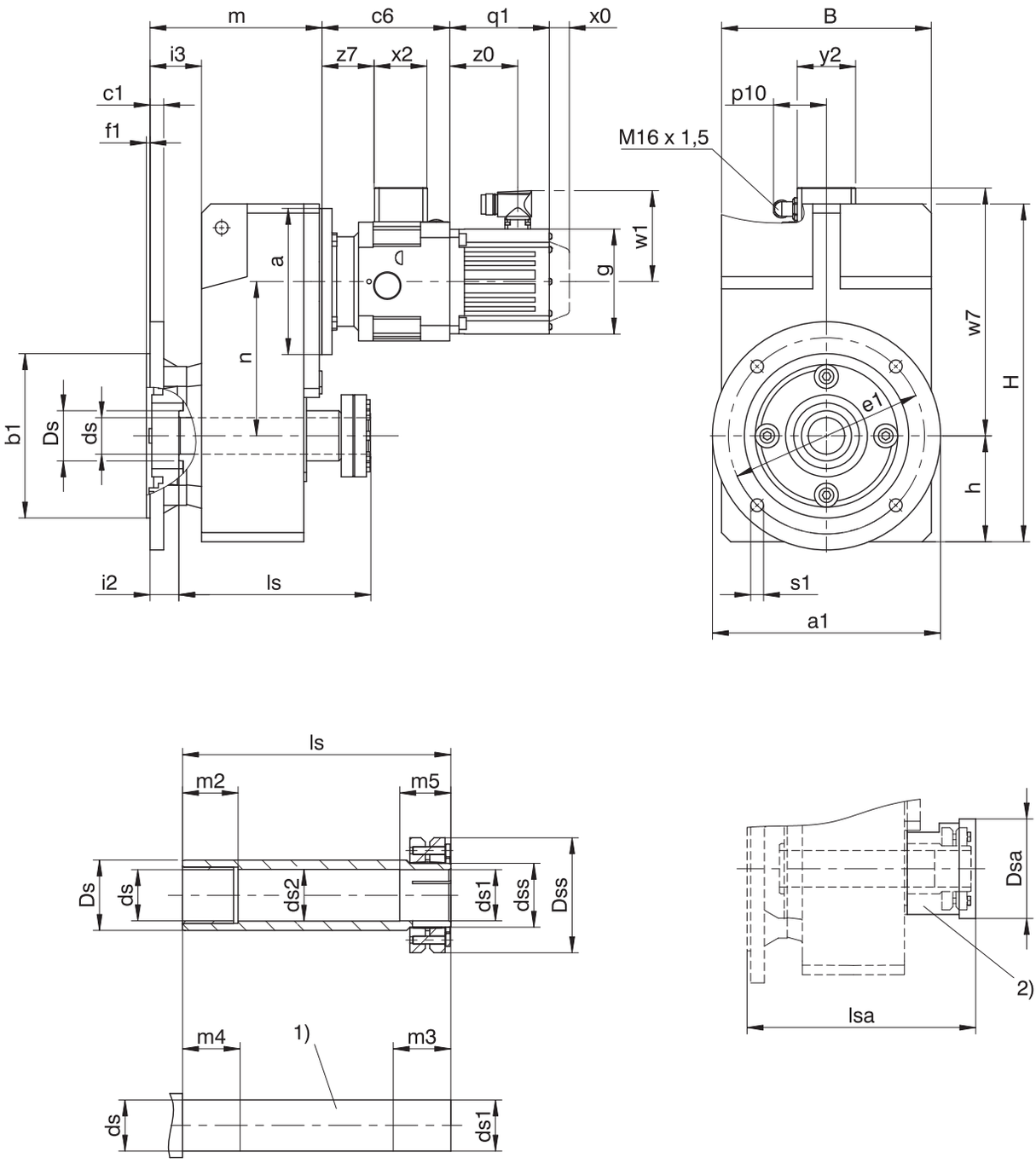
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
F102	∅160	101.5	102.0	∅160	101.5	102.0	–	–	–	–	–	–
F202	∅160	119.0	131.0	∅160	119.0	131.0	∅200	121.0	131.0	–	–	–
F302	∅160	133.5	149.5	∅160	133.5	149.5	∅200	135.5	149.5	–	–	–
F402	∅160	148.5	169.0	∅160	148.5	169.0	∅200	150.5	169.0	∅250	153.5	169.0
F602	∅160	179.5	196.0	∅160	179.5	196.0	∅200	181.5	196.0	∅250	184.5	196.0

6.3.9 S shaft design (hollow shaft with shrink ring), F housing design (round flange)



q1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]	1)	Machine shaft: The dimension ls must meet or exceed the specified value.
2)	Cover (optional)		

Dimensions of gear units

Type	Øa1	Øb1	B	c1	Øds	Øds1	Øds2	Ødss	ØDs	ØDsa	ØDss	Øe1	f1	h	H	i2	i3	ls	lsa	m2	m3	m4	m5	Øs1
F1	160	110_{j6}	145	10	20_{h9}	20_{h9}^{H7}	20.5	24	35	63	50	130	3.5	74	238.0	25.5	44.5	146	150	20	31	25	26	9
F2	200	130_{j6}	180	14	25_{h9}	25_{h9}^{H7}	25.5	30	45	73	60	165	3.5	93	299.0	30.0	53.0	175	180	20	37	25	32	11
F3	250	180_{j6}	206	15	30_{h9}	30_{h9}^{H7}	30.5	36	50	83	72	215	4.0	106	335.5	31.5	56.5	192	196	25	37	30	32	14
F4	250	180_{j6}	230	15	40_{h9}	40_{h9}^{H7}	40.5	50	55	108	90	215	4.0	116	370.0	31.5	56.5	210	215	40	45	45	40	14
F6	300	230_{j6}	265	17	50_{h9}	50_{h9}^{H7}	50.5	62	70	128	106	265	4.0	137	433.0	29.5	60.5	248	251	40	47	45	42	14

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
F_MB23	140	59	102.9	58	64	57.5
F_MB33	161	59	115.4	58	64	71.0
F_MB43	194	59	134.9	58	64	93.5

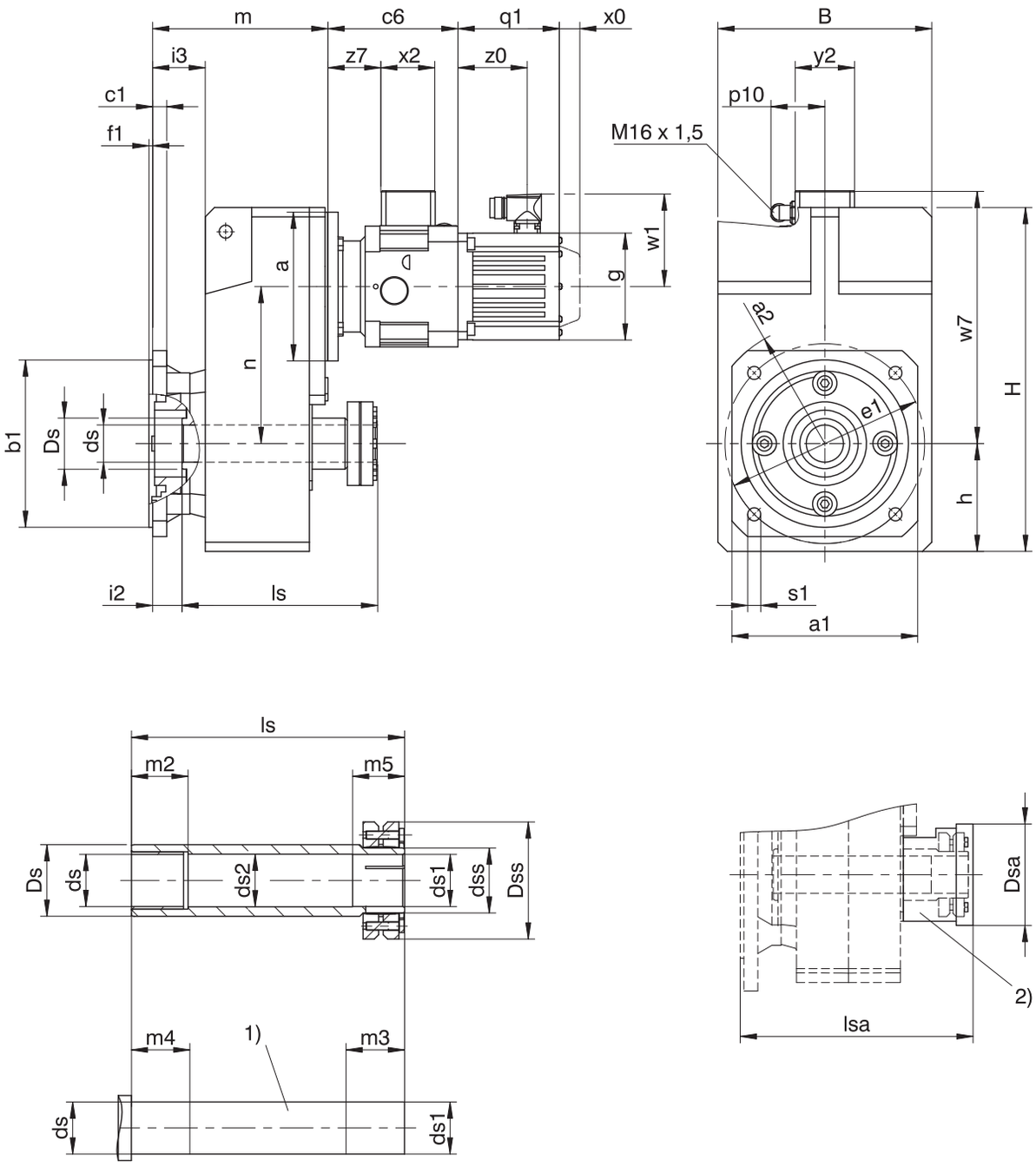
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
F102	∅160	133.5	102.0	∅160	133.5	102.0	–	–	–	–	–	–
F202	∅160	157.0	131.0	∅160	157.0	131.0	∅200	159.0	131.0	–	–	–
F302	∅160	173.5	149.5	∅160	173.5	149.5	∅200	175.5	149.5	–	–	–
F402	∅160	188.5	169.0	∅160	188.5	169.0	∅200	190.5	169.0	∅250	193.5	169.0
F602	∅160	219.5	196.0	∅160	219.5	196.0	∅200	221.5	196.0	∅250	224.5	196.0

6.3.10 S shaft design (hollow shaft with shrink ring), Q housing design (square flange)



q1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]	1)	Machine shaft: The dimension ls must meet or exceed the specified value.
2)	Cover (optional)		

Dimensions of gear units

Type	□a1	□a2	Øb1	B	c1	Ød	Ød1	Ød2	Ødss	ØDs	ØDsa	ØDss	Øe1	f1	h	H	i2	i3	ls	lsa	m2	m3	m4	m5	Øs1
F1	125	160	110_{j6}	145	10	20_{h9}	20_{h9}^{H7}	20.5	24	35	63	50	130	3.5	74	238.0	25.5	44.5	146	150	20	31	25	26	9
F2	150	195	130_{j6}	180	14	25_{h9}	25_{h9}^{H7}	25.5	30	45	73	60	165	3.5	93	299.0	30.0	53.0	175	180	20	37	25	32	11
F3	200	260	180_{j6}	206	15	30_{h9}	30_{h9}^{H7}	30.5	36	50	83	72	215	4.0	106	335.5	31.5	56.5	192	196	25	37	30	32	14
F4	200	260	180_{j6}	230	15	40_{h9}	40_{h9}^{H7}	40.5	50	55	108	90	215	4.0	116	370.0	31.5	56.5	210	215	40	45	45	40	14
F6	250	325	230_{j6}	265	17	50_{h9}	50_{h9}^{H7}	50.5	62	70	128	106	265	4.0	137	433.0	29.5	60.5	248	251	40	47	45	42	14

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
F_MB23	140	59	102.9	58	64	57.5
F_MB33	161	59	115.4	58	64	71.0
F_MB43	194	59	134.9	58	64	93.5

Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
F102	∅160	133.5	102.0	∅160	133.5	102.0	–	–	–	–	–	–
F202	∅160	157.0	131.0	∅160	157.0	131.0	∅200	159.0	131.0	–	–	–
F302	∅160	173.5	149.5	∅160	173.5	149.5	∅200	175.5	149.5	–	–	–
F402	∅160	188.5	169.0	∅160	188.5	169.0	∅200	190.5	169.0	∅250	193.5	169.0
F602	∅160	219.5	196.0	∅160	219.5	196.0	∅200	221.5	196.0	∅250	224.5	196.0

6.4 Type designation

This chapter shows you an explanation of the type designation with the associated options.

Additional ordering information not included in the type designation can be found at the end of the chapter.

Example code

F	6	0	2	A	G	0560	MB23	EZ501U

Explanation

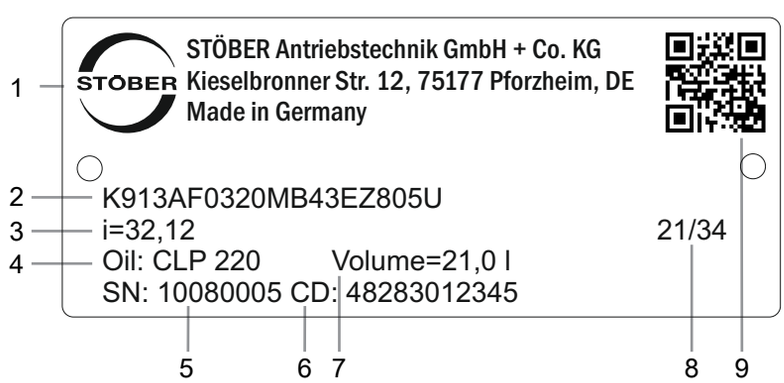
Code	Designation	Design
F	Type	Offset helical gear unit
6	Size	6 (example)
0	Generation	Generation 0
2	Stages	Two-stage
3		Three-stage
A	Shaft	Hollow shaft with keyway
S		Hollow shaft with shrink ring
V		Solid shaft
G	Housing	Pitch circle diameter
F		Round flange
Q		Square flange
GN		Pitch circle diameter + side fastening
0560	Transmission ratio (i x 10 rounded)	i = 55.71 (example)
MB	Motor adapter	ServoStop motor adapter with brake
2	Size	2 (example)
3	Generation	Generation 3
EZ501U	Motor	EZ synchronous servo motor

To complete the type designation, also specify the following in your order:

- A detailed type designation of the motor, see the chapter [▷ 11]
- Mounting position, see the chapter [▷ 6.5.6]
- Position of the plug connectors, see the chapter [▷ 6.5.8]

6.4.1 Nameplate

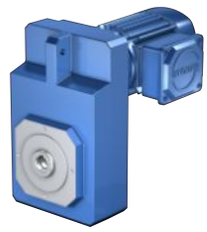
An example gear unit nameplate is explained in the figure below.



Code	Designation
1	Name of manufacturer
2	Type designation
3	Gear ratio of the gear unit
4	Lubricant specification
5	Serial number of the gear unit
6	Customer-specific data
7	Lubricant fill volume
8	Date of manufacture (year/calendar week)
9	QR code (link to product information)

6.5 Product description

6.5.1 Input options

MB motor adapter + EZ synchronous servo motor	EZ synchronous servo motor	LM Lean motor	Asynchronous motor
			
Catalog ID 443311_en	Catalog ID 442437_en	Catalog ID 443016_en	Catalog ID 443136_en

The corresponding catalogs can be found at http://www.stoeber.de/en/downloads/

Enter the ID of the catalog in the Search term field.

6.5.2 ServoStop motor adapter with brake (MB)

In this chapter, you will find the description and technical data of the motor adapter with brake.

6.5.2.1 Properties

- Electrically actuated spring-loaded brake for dry running
- Featuring backlash-free plug-in coupling (jaw coupling) for easy removal of the motor with the axis braked in any position
- Electrical release monitoring in the terminal box of the motor adapter
- Manual monitoring of wear via air gap checks with a feeler gauge
- Manual release (optional)
- Radial shaft seal rings made of FKM with two sealing lips
- Four oil drain holes to protect the brake from oiling up in case of leakage
- Diverse-redundant system in accordance with EN ISO 13849-1

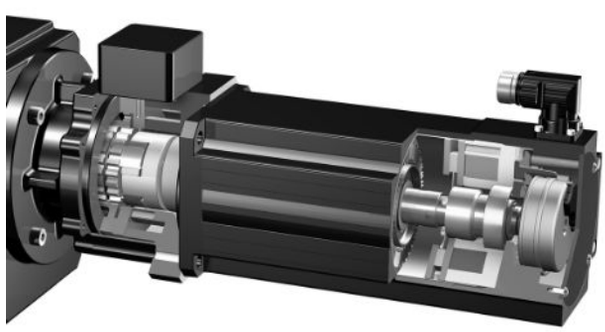


Fig. 1: Motor adapter with ServoStop brake and directly attached EZ synchronous servo motor

6.5.2.2 Brake

A quiescent current brake is integrated into the motor adapter. It has the function of a holding brake. Braking from full speed, e.g. in case of a voltage drop or an emergency off in hazard situations, is still possible.

The brake can be used as a single brake or together with the motor brake as a redundant brake system.

Function

The brakes installed in the motor adapter are electrically actuated spring-loaded brakes for dry running. In the de-energized state, braking takes place using spring force. The brake is released by an electromagnetic DC coil before the motor is switched on. The switch-on time t_{2B} (release time) is the time until the anchor plate releases from the axially moving brake disc and is magnetically held to the coil body. In this state, the brake is released and the coupling hub can rotate. In order to switch off (motor and brake), the residual magnetic flux of the iron parts (anchor and coil body) must be reduced; the associated time t_{11B} until the start of torque generation is defined as a response delay when linking. The link time t_{1B} is the time until the braking torque has built up to the nominal braking torque.

Manual release

Optionally, the brake can be equipped with a manual release.

Pressing the manual release deactivates the electronic actuation of the brake. Before pressing the manual release, you must establish the safety of the machine (e.g. protection against falling).

6.5.2.3 Electrical connection

- Terminal box (standard)
- Plug connector (optional, not possible in combination with release monitoring)

6.5.2.4 Monitoring

For monitoring the brake system, there are generally two options:

- Manual monitoring of wear via air gap checks with a feeler gauge
- Electrical release monitoring in the terminal box with a non-contact and wear-free proximity switch

6.5.2.5 Brake technical data

Technical data for operation at 24 V DC (±10%)

Type	M_{1Bstat} [Nm]	J_1 [kgcm²]	m [kg]	$\Delta\phi_B$ [arcmin]	$t_{1B,DC}$ [ms]	t_{2B} [ms]	$P_{N,B}$ [W]
MB23	8.0	6.3	8.5	32.0	65	55	30
MB23	12	6.3	8.5	32.0	55	80	30
MB33	16	26	14	26.0	150	60	37
MB33	24	26	14	26.0	120	85	37
MB33	32	26	14	26.0	95	100	37
MB33	45	26	14	26.0	80	120	37
MB43	50	69	26	19.0	150	100	55
MB43	72	69	26	19.0	120	150	55
MB43	100	69	26	19.0	90	200	55
MB53	200	236	61	17.0	200	250	86

$\Delta\phi_B$: With the brake closed, a higher total backlash results ($\Delta\phi_{tot} = \Delta\phi_2 + \Delta\phi_B / i$).

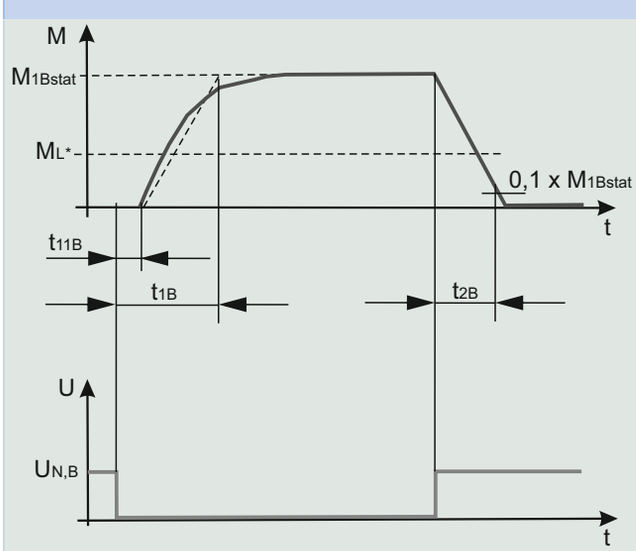
Technical data for operation with high-speed rectifier 104 V DC (supply voltage U_{LINE} 220 – 275 V AC ± 5%, 50/60 Hz)

Type	M_{1Bstat} [Nm]	J_1 [kgcm²]	m [kg]	$\Delta\phi_B$ [arcmin]	$t_{1B,DC}$ [ms]	$t_{1B,AC}$ [ms]	t_{2B} [ms]	$P_{O,B}$ [W]	P_{holdB} [W]
MB23	8.0	6.3	8.5	32.0	65	360	20	101	26
MB23	12	6.3	8.5	32.0	55	280	25	101	26
MB23	16	6.3	8.5	32.0	50	230	35	101	26
MB23	24	6.3	8.5	32.0	45	180	50	101	26
MB23	30	6.3	8.5	32.0	40	160	60	101	26
MB33	16	26	14	26.0	150	800	25	125	32
MB33	24	26	14	26.0	120	650	35	125	32
MB33	32	26	14	26.0	95	500	40	125	32
MB33	45	26	14	26.0	80	400	50	125	32
MB33	90	26	14	26.0	50	250	90	125	32
MB43	50	69	26	19.0	150	900	50	148	38
MB43	72	69	26	19.0	120	700	75	148	38
MB43	100	69	26	19.0	90	500	100	148	38
MB43	160	69	26	19.0	60	300	150	148	38
MB53	200	236	61	17.0	200	800	110	200	50
MB53	300	236	61	17.0	170	600	150	200	50
MB53	400	236	61	17.0	120	400	200	200	50

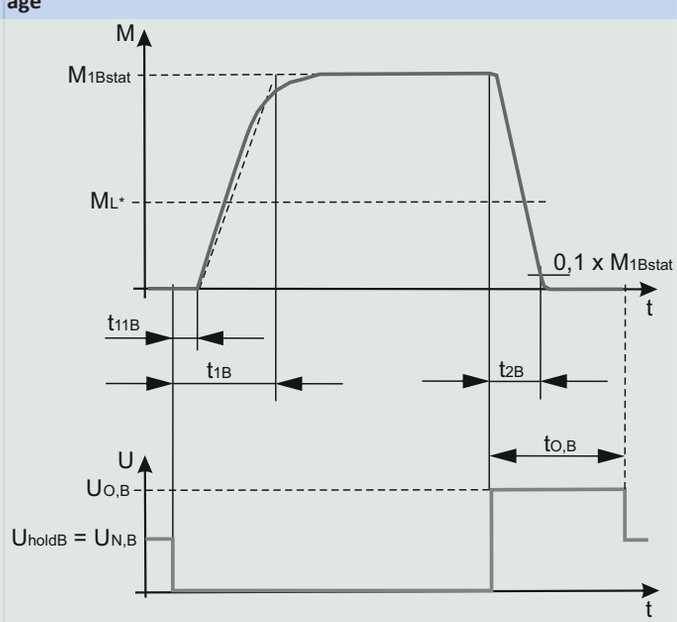
$\Delta\phi_B$: With the brake closed, a higher total backlash results ($\Delta\phi_{tot} = \Delta\phi_2 + \Delta\phi_B / i$).

6.5.2.6 Brake switching times

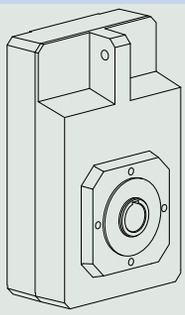
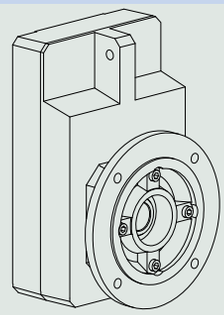
Switching times in case of brake operation with nominal voltage

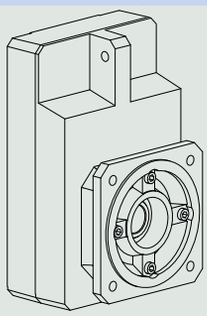
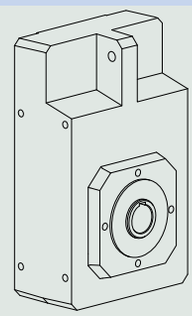


Switching times in case of brake operation with overexcitation voltage



6.5.3 Housing design

Pitch circle diameter G	Round flange F
	

Square flange Q	Pitch circle diameter + side fastening GN
	

	G	F	Q	GN
F1	✓	✓	✓	✓
F2	✓	✓	✓	✓
F3	✓	✓	✓	✓
F4	✓	✓	✓	✓
F6	✓	✓	✓	✓

6.5.4 Combinatorial shaft/housing design

		Housing design			
Shaft design	**Code**	**G**	**F**	**Q**	**GN**
Hollow shaft with keyway	**A**	AG	AF	AQ	AGN
Hollow shaft with shrink ring	**S**	SG	SF	SQ	SGN
Solid shaft	**V**	–	VF	VQ	–

6.5.5 Installation conditions

Hollow shaft

The hollow shaft hole tolerance is ISO H7. The tolerance of the machine shaft must be ISO k6.

Take care to align the machine shaft with the gear unit hollow shaft when attaching the gear unit.

Maximum deviation ≤ 0.03 mm.

For simpler assembly and disassembly of the machine shaft, the hollow shafts are equipped with a spiral groove (as a grease deposit).

A hardened, threaded keeper plate is included in the scope of delivery. You also have the option to order the hollow shaft without a keeper plate.

Hollow shaft with shrink ring

The tolerance of the hollow shaft hole is ISO H7.

The machine shaft must be ISO h9.

Select a material for the machine shaft with a permitted surface pressure of $p \geq 325\ N/mm^2$.

Possible materials:

- C45E +QT
- 42CrMo4

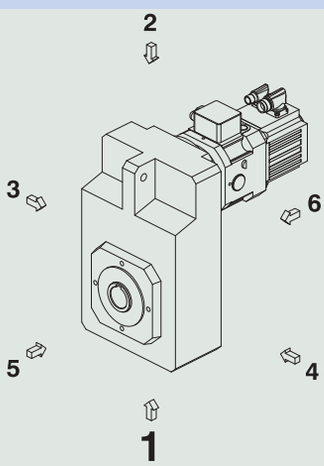
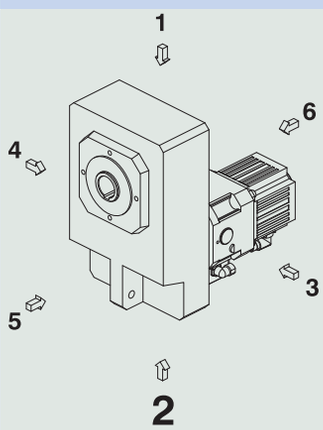
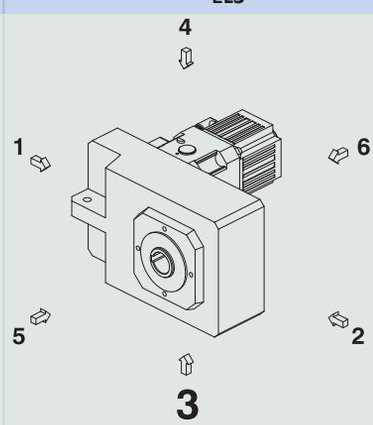
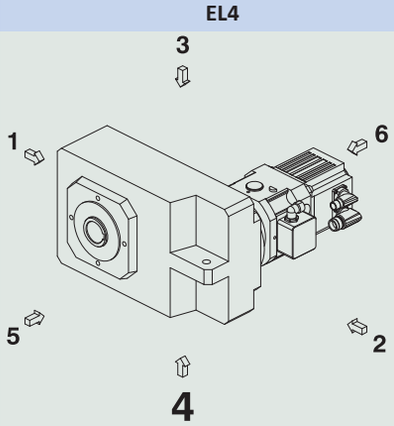
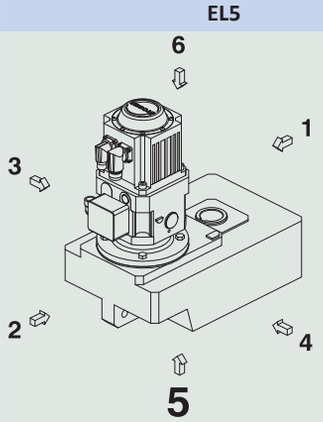
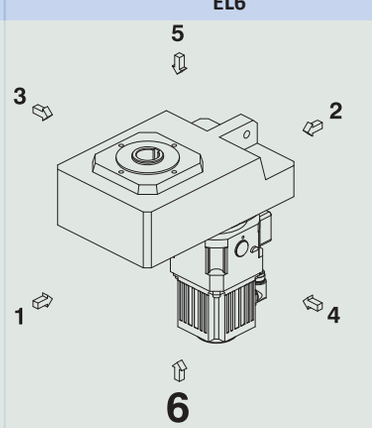
Fastening the gear units on the machine side using the pitch circle diameter

The specified torques and forces only apply when gear units are fastened on the machine side using screws of strength class 10.9. In addition, the gear housings must be adjusted at the pilot. The machine-side fit must be H7.

6.5.6 Mounting positions

The following table shows the standard mounting positions.

The numbers identify the gear unit sides. The mounting position is defined by the gear side facing downwards.

EL1	EL2	EL3
		
EL4	**EL5**	**EL6**
		

Since the lubricant filling volume of the gear unit depends on the mounting position, the mounting position must be specified when ordering.

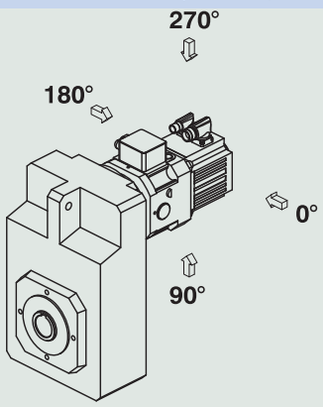
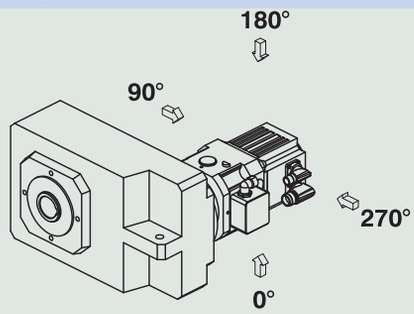
6.5.7 Lubricants

STOBER fills the gear units with the amount and type of lubricant specified on the nameplate. The filling volume and the structure of the gear units depend on the mounting position.

Only install the gear units in the intended mounting position! Reposition the gear units only after consulting STOBER. Otherwise, STOBER assumes no liability for the gear units.

You will receive lubricants for use in the food industry upon request.

6.5.8 Position of the plug connectors/terminal box

Mounting position EL1	Mounting position EL4
Plug connector in 270° position (standard)	Plug connector in 270° position (standard)
	

As standard, the plug connectors of the motor or the terminal box/plug connector of the motor adapter are mounted in the 270° position. The position of the terminal box/plug connector of the motor adapter can be selected separately from the position of the motor plug connectors.
Indicate variations for your geared motor in the order.

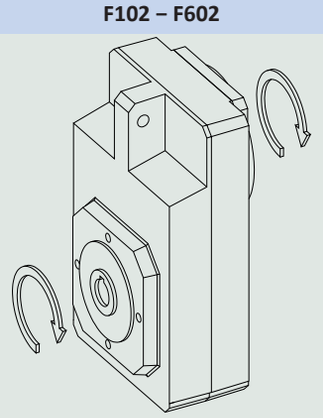
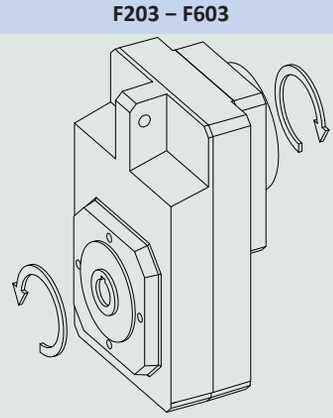
Note that the plug connector position rotates along with the geared motor if the geared motor is in another mounting position.

6.5.9 Other product features

Feature	Value
Max. permitted gear unit temperature (on the surface of the gear unit)	≤ 80 °C
Paint	Black RAL 9005
Explosion-proof design in accordance with (ATEX) Directive 2014/34/EU (optional)	Not available
Efficiency:	
η_{get} two-stage	97%
η_{get} three-stage	96%
Protection class:[1]	
Gear unit	IP65
Motor	IP56, optionally IP66

6.5.10 Direction of rotation

Solid shaft (V), hollow shaft with keyway (A), hollow shaft with shrink ring (S)

F102 – F602	F203 – F603
	
The input and output rotate in the same direction.	The input and output rotate in opposite directions.

The pictures show mounting position EL1.

[1] Observe the protection class of all the components.

6.6 Project configuration

Project your drives using our SERVOsoft designing software. Download SERVOsoft for free at https://www.stoeber.de/en/ServoSoft.

It is the most convenient and reliable method of drive selection, as the entire torque/speed curve of the application is displayed and evaluated here in the curve of the geared motor.

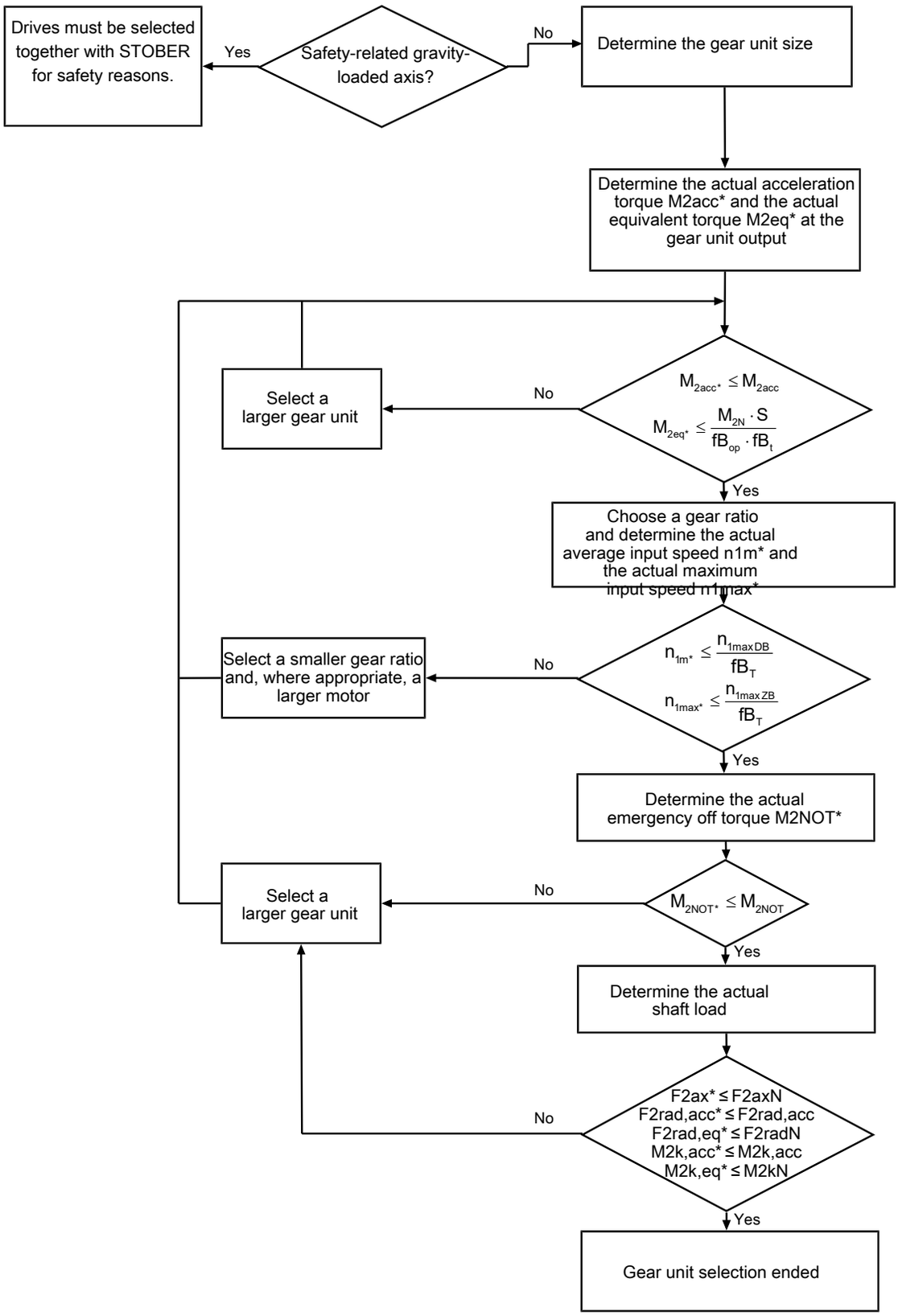
In this chapter, only limit values for specific operating points can be taken into consideration for manual drive selection.

An explanation of the formula symbols can be found in Chapter Symbols in formulas.

The formula symbols for values actually present in the application are marked with *.

6.6.1 Drive selection

Drive selection for gear units

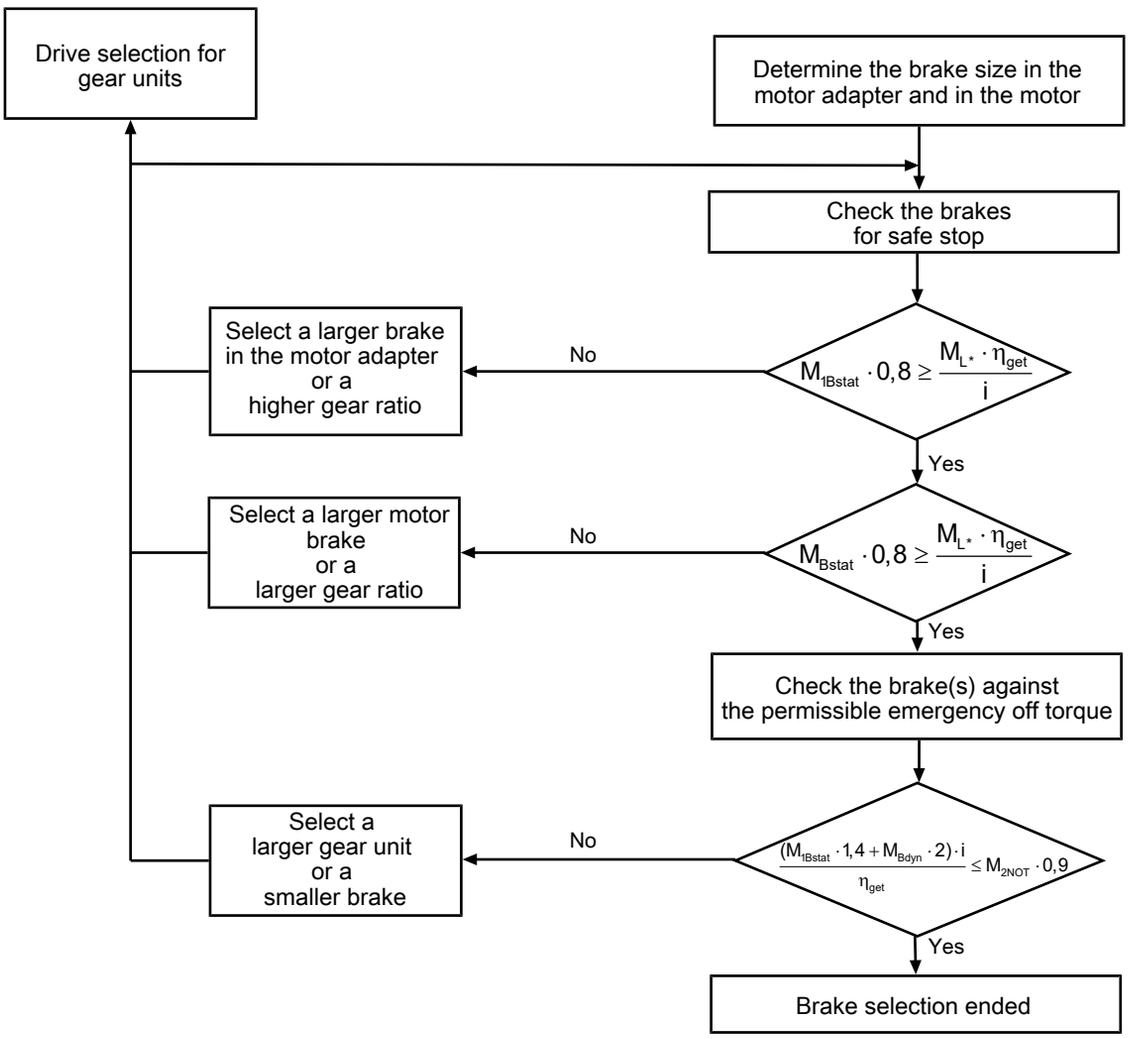


Calculate the forces and tilting torques in the chapter Permitted shaft loads.

Refer to the selection tables for the values for i, n_{1maxDB}, n_{1maxZB}, M_{2acc}, M_{2NOT}, M_{2N} and S.

The values for fB_T, fB_{op} and fB_t can be found in the corresponding tables in this chapter.

Drive selection for brakes

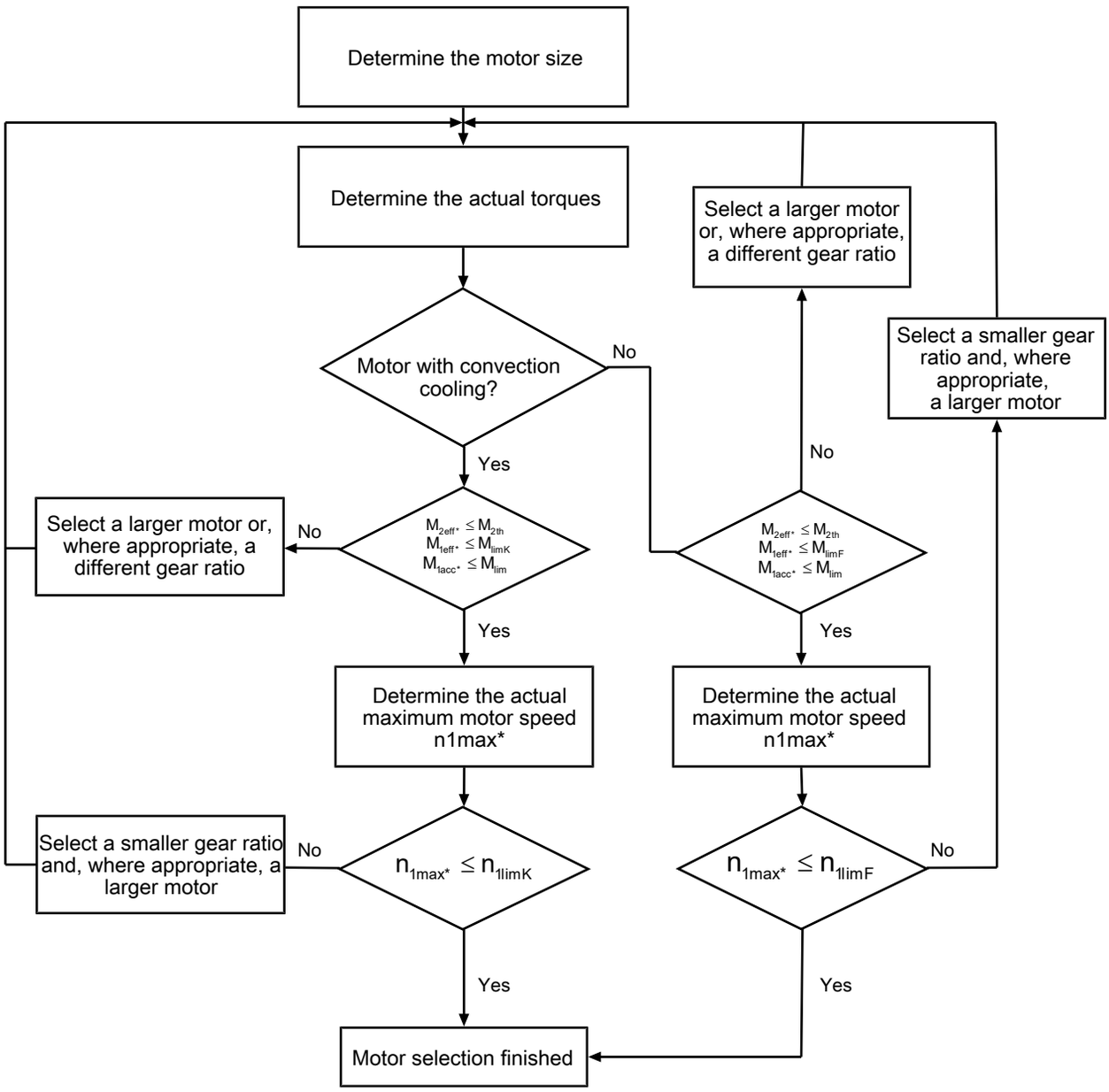


Refer to the selection tables for the values for i, M_{1Bstat}, M_{Bstat} and M_{2NOT}.

Refer to the Technical data table in the chapter [▷ 11.6.7] for the values for M_{Bdyn}.

Refer to the chapter Other product features for the values for η_{get}.

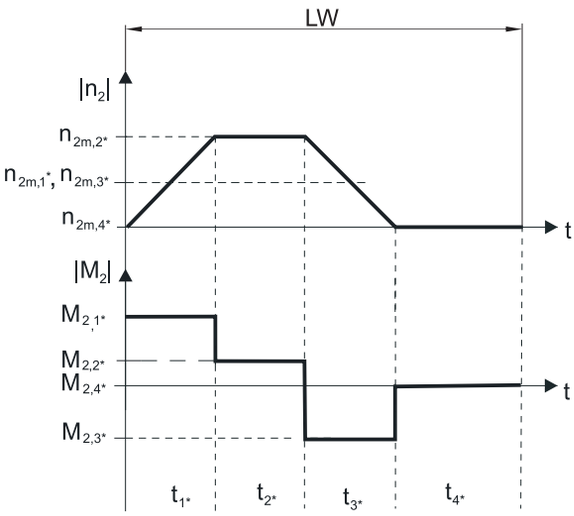
Drive selection for motors



The value for M_{lim}, M_{limK}, M_{limF}, n_{1limK} and n_{1limF} can be found in the motor characteristic curve in the chapter [▶ 11.3]. Note the size, nominal speed n_N and cooling type of the motor.

Example of cyclic operation

The following calculations are based on a representation of the power taken from the output based in accordance with the following example:



Calculation of the actual maximum acceleration torques

$$M_{2acc*} = J_{tot} \cdot \frac{\Delta n_2}{9{,}55 \cdot \Delta t} + M_{L*}$$

$$M_{1acc*} = \frac{M_{2acc*}}{i \cdot \eta_{get}} + J_1 \cdot \frac{\Delta n_1}{9{,}55 \cdot \Delta t}$$

Calculation of the actual average input speed

$$n_{1m*} = n_{2m*} \cdot i$$

$$n_{2m*} = \frac{\left|n_{2m,1*}\right| \cdot t_{1*} + \ldots + \left|n_{2m,n*}\right| \cdot t_{n*}}{t_{1*} + \ldots + t_{n*}}$$

If $t_{1*} + \ldots + t_{3*} \geq 6$ min, calculate n_{2m*} without the rest phase t_{4*}.

The values for the ratio i can be found in the selection tables.

Calculation of the actual effective torque

$$M_{2eff*} = \sqrt{\frac{t_{1*} \cdot M_{2,1*}{}^2 + \ldots + t_{n*} \cdot M_{2,n*}{}^2}{t_{1*} + \ldots + t_{n*}}}$$

Calculation of the actual emergency-off torque

$$M_{2NOT*} = J_{tot} \cdot \frac{\Delta n_2}{9.55 \cdot \Delta t} + M_{L*}$$

Calculation of the actual equivalent torque

$$M_{2eq*} = \sqrt[3]{\frac{\left|n_{2m,1*}\right| \cdot t_{1*} \cdot \left|M_{2,1*}{}^3\right| + \ldots + \left|n_{2m,n*}\right| \cdot t_{n*} \cdot \left|M_{2,n*}{}^3\right|}{\left|n_{2m,1*}\right| \cdot t_{1*} + \ldots + \left|n_{2m,n*}\right| \cdot t_{n*}}}$$

Calculation of the thermal limit torque

Calculate the thermal limit torque M_{2th} for a duty cycle $ED_{10} > 50\%$ and the actual average input speed n_{1m*}. (At $K_{mot,th} \leq 0$ you must reduce the average input speed n_{1m*} accordingly or select another geared motor size.)

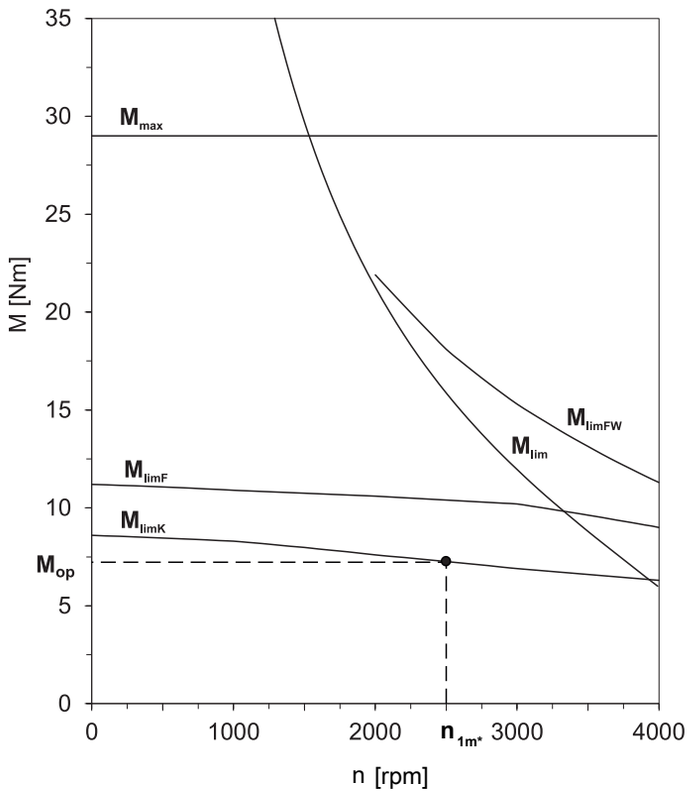
$$M_{2th} = M_{op} \cdot i \cdot K_{mot,th}$$

$$K_{mot,th} = 0{,}95 - \frac{a_{th}}{1000} \cdot athEL \cdot fB_T \cdot \left(\frac{n_{1m*}}{1000}\right)^3$$

The values for i and a_{th} can be found in the selection tables.

The values for a_{thEL} and fB_T can be found in the corresponding tables in this chapter.

The value for the torque of the motor at operating point M_{op} with the determined average input speed n_{1m*} can be found in the motor characteristic curve in the chapter Torque/speed curves. Note the size, nominal speed n_N and cooling type of the motor. The figure below shows an example of reading the torque M_{op} of a motor with convection cooling at the operating point.



Operating factors

Parameter a_{thEL}

Mounting position	a_{thEL}
EL1, 2, 5, 6	1.0
EL3, 4	1.1

Operating mode	fB_{op}
Uniform continuous operation	1.00
Cyclic operation	1.25
Reversing load cyclic operation	1.40

Run time	fB_t
Daily runtime ≤ 8 h	1.00
Daily runtime ≤ 16 h	1.15
Daily runtime ≤ 24 h	1.20

Temperature		fB_T
Motor cooling	**Surrounding temperature**	
Motor with forced ventilation	≤ 20 °C	0.9
	≤ 30 °C	1.0
	≤ 40 °C	1.15
Motor with convection cooling	≤ 20 °C	1.0
	≤ 30 °C	1.1
	≤ 40 °C	1.25

Notes

- The maximum permitted gear unit temperature (see the "Other product features" chapter) must not be exceeded. Doing so may result in damage to the geared motor.

- For braking from full speed (for example when the power fails or when setting up the machine), note the permitted gear unit torques (M_{2acc}, M_{2NOT}) in the selection tables.

6.6.2 Permitted shaft loads for the output shaft

The values specified in the tables apply to the permitted shaft loads:

- For shaft dimensions in accordance with the catalog
- For output speeds $n_{2m*} \leq 20$ rpm ($F_{2axN} = F_{2ax20}$; $F_{2radN} = F_{2rad20}$; $M_{2kN} = M_{2k20}$)
- Only if radial forces on the gear unit are stabilized by its pilots for the pitch circle diameter and flange housing design

6.6.2.1 V shaft design

Permitted shaft loads for V shaft design (solid shaft)

Type	z_2	F_{2ax20}	F_{2rad20}	$F_{2rad,acc}$	M_{2k20}	$M_{2k,acc}$
	[mm]	[N]	[N]	[N]	[Nm]	[Nm]
F1	35.0	1100	4200	4200	260	260
F2	41.0	1400	5400	5400	400	400
F3	43.0	1900	7500	7500	600	600
F4	44.0	2350	9250	9250	800	800
F6	44.0	3100	12500	12500	1200	1200

For other output speeds, download diagrams at https://configurator.stoeber.de/en-US/.

The following applies to output speeds $n_{2m*} > 20$ rpm:

$$F_{2axN} = \frac{F_{2ax20}}{\sqrt[3]{\frac{n_{2m*}}{20\ \text{rpm}}}} \qquad F_{2radN} = \frac{F_{2rad20}}{\sqrt[3]{\frac{n_{2m*}}{20\ \text{rpm}}}} \qquad M_{2kN} = \frac{M_{2k20}}{\sqrt[3]{\frac{n_{2m*}}{20\ \text{rpm}}}}$$

The values for F_{2ax20}, F_{2rad20} and M_{2k20} can be found in the table "Permitted shaft loads" in this chapter.

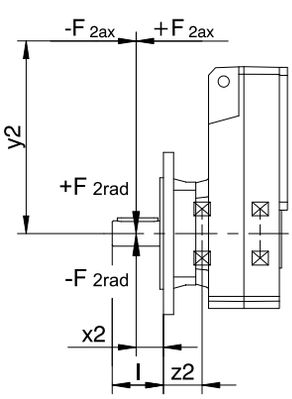


Fig. 2: Force application points for solid shaft

The specified values for F_{2rad20} and $F_{2rad,acc}$ refer to an application of force at the center of the output shaft: $x_2 = l/2$.

Shaft dimensions can be found in the "Dimensional drawings" chapter.

The following applies to other force application points:

$$M_{2k,acc*} = \frac{2 \cdot F_{2ax*} \cdot y_2 + F_{2rad,acc*} \cdot (x_2 + z_2)}{1000}$$

For applications with multiple axial and/or radial forces, you must add the forces as vectors.

In the event of EMERGENCY OFF operation (max. 1000 load changes), you can multiply the permitted forces and torques for F_{2ax20}, F_{2rad20} and M_{2k20} by a factor of two.

Also note the calculation for equivalent values:

$$M_{2k,eq^*} = \sqrt[3]{\frac{|n_{2m,1^*}| \cdot t_{1^*} \cdot |M_{2k,acc,1^*}|^3 + \ldots + |n_{2m,n^*}| \cdot t_{n^*} \cdot |M_{2k,acc,n^*}|^3}{|n_{2m,1^*}| \cdot t_{1^*} + \ldots + |n_{2m,n^*}| \cdot t_{n^*}}}$$

$$F_{2rad,eq^*} = \sqrt[3]{\frac{|n_{2m,1^*}| \cdot t_{1^*} \cdot |F_{2rad,acc,1^*}|^3 + \ldots + |n_{2m,n^*}| \cdot t_{n^*} \cdot |F_{2rad,acc,n^*}|^3}{|n_{2m,1^*}| \cdot t_{1^*} + \ldots + |n_{2m,n^*}| \cdot t_{n^*}}}$$

6.6.2.2 A and S shaft design

Permitted shaft loads for A shaft design (hollow shaft with keyway)

Type	z_2	F_{2ax20}	F_{2rad20}	$F_{2rad,acc}$	M_{2k20}	$M_{2k,acc}$
	[mm]	[N]	[N]	[N]	[Nm]	[Nm]
F1	30.0	900	4200	4200	175	175
F2	33.0	1200	5400	5400	250	250
F3	33.0	1350	7500	7500	375	375
F4	39.0	1900	9250	9250	550	550
F6	45.0	2200	12500	12500	800	800

Permitted shaft loads for S shaft design (hollow shaft with shrink ring)

Type	z_2	F_{2ax20}	F_{2rad20}	$F_{2rad,acc}$	M_{2k20}	$M_{2k,acc}$
	[mm]	[N]	[N]	[N]	[Nm]	[Nm]
F1	30.0	900	4200	4200	175	175
F2	33.0	1200	5400	5400	250	250
F3	33.0	1350	7500	7500	375	375
F4	39.0	1900	9250	9250	550	550
F6	45.0	2200	12500	12500	800	800

For other output speeds, download diagrams at https://configurator.stoeber.de/en-US/.

The following applies to output speeds n_{2m^*} > 20 rpm:

$$F_{2axN} = \frac{F_{2ax20}}{\sqrt[3]{\frac{n_{2m^*}}{20\,\text{rpm}}}} \qquad F_{2radN} = \frac{F_{2rad20}}{\sqrt[3]{\frac{n_{2m^*}}{20\,\text{rpm}}}} \qquad M_{2kN} = \frac{M_{2k20}}{\sqrt[3]{\frac{n_{2m^*}}{20\,\text{rpm}}}}$$

The values for F_{2ax20}, F_{2rad20} and M_{2k20} can be found in the table "Permitted shaft loads" in this chapter.

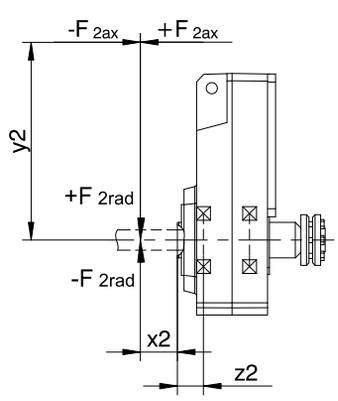


Fig. 3: Force application points for hollow shaft

You can determine the permitted radial forces from the permitted tilting torque M_{2kN} and $M_{2k,acc}$. The actual radial forces may not exceed the permitted radial forces. The permitted radial forces pertain to the shaft end (x2 = 0).

$$M_{2k,acc^*} = \frac{2 \cdot F_{2ax^*} \cdot y_2 + F_{2rad,acc^*} \cdot (x_2 + z_2)}{1000}$$

For applications with multiple axial and/or radial forces, you must add the forces as vectors.

In the event of EMERGENCY OFF operation (max. 1000 load changes), you can multiply the permitted forces and torques for F_{2ax20}, F_{2rad20} and M_{2k20} by a factor of two.

Also note the calculation for equivalent values:

$$M_{2k,eq^*} = \sqrt[3]{\frac{|n_{2m,1^*}| \cdot t_{1^*} \cdot |M_{2k,acc,1^*}{}^3| + \ldots + |n_{2m,n^*}| \cdot t_{n^*} \cdot |M_{2k,acc,n^*}{}^3|}{|n_{2m,1^*}| \cdot t_{1^*} + \ldots + |n_{2m,n^*}| \cdot t_{n^*}}}$$

$$F_{2rad,eq^*} = \sqrt[3]{\frac{|n_{2m,1^*}| \cdot t_{1^*} \cdot |F_{2rad,acc,1^*}{}^3| + \ldots + |n_{2m,n^*}| \cdot t_{n^*} \cdot |F_{2rad,acc,n^*}{}^3|}{|n_{2m,1^*}| \cdot t_{1^*} + \ldots + |n_{2m,n^*}| \cdot t_{n^*}}}$$

6.6.3 Radial shaft seal rings

Leak-proofness

Our gear units are equipped with high-quality radial shaft seal rings and checked for leaks. However, a leak cannot be fully ruled out over the length of use of a gear unit. If you use a gear unit with goods incompatible with the lubricant, you must take measures to prevent direct contact with the gear unit lubricant in case of a leak.

6.7 Additional documentation

Additional documentation related to the product can be found at
http://www.stoeber.de/en/downloads/

Enter the ID of the documentation in the Search term field.

Documentation	ID
Operating manual gear units, geared motors F	443366_en

7 PK right-angle planetary geared motors

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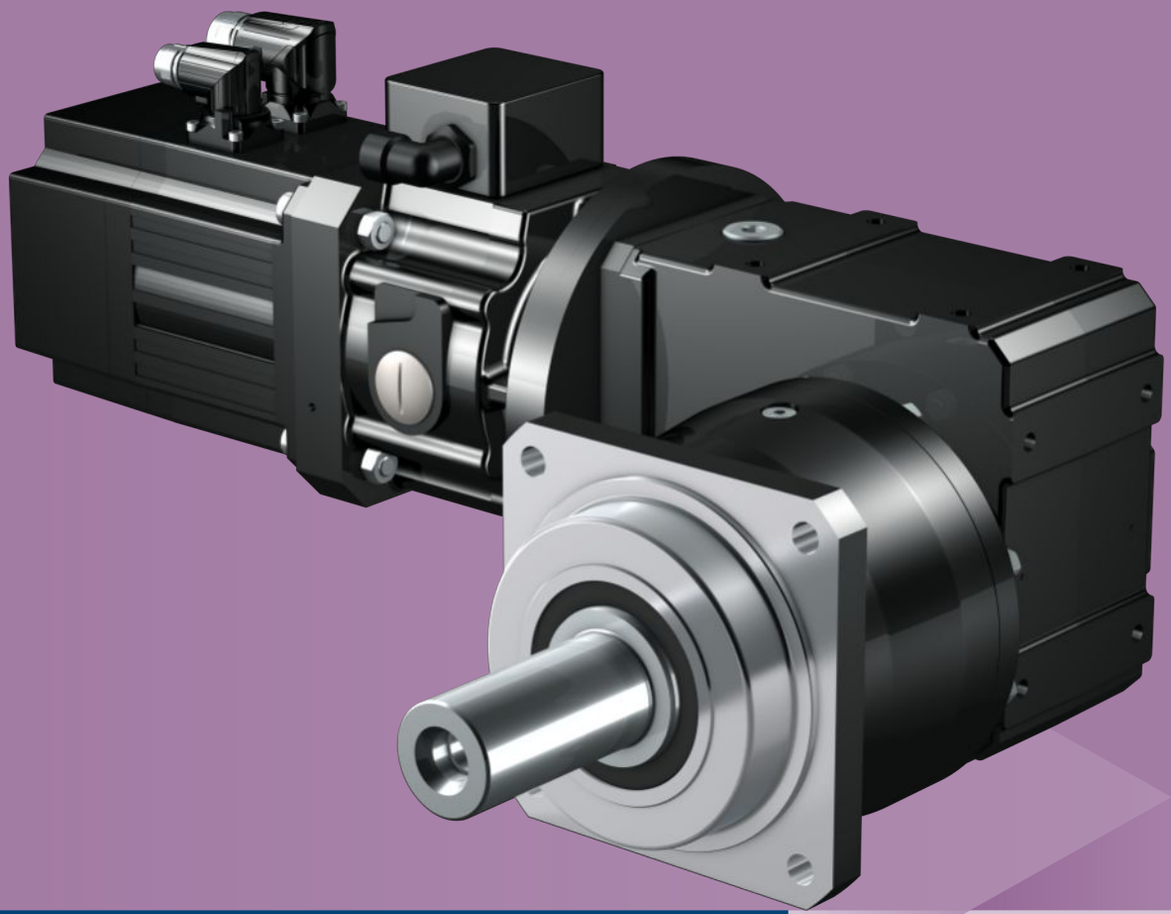


7

Right-angle planetary geared motors

PK

7.1 Overview

Helical precision right-angle planetary geared motors with redundant brake

Features

Power density	★★★☆☆
Backlash	★★★★★
Price category	€€€
Shaft load	★★★★☆
Smooth operation	★★★☆☆
Torsional stiffness	★★★☆☆
Mass moment of inertia	★★★★☆
Helical gearing	✓
Continuous operation without cooling	✓
Reinforced output bearing	✓ (optional)
Safe braking in case of power outage	✓
Safe support of the load with gravity-loaded axes using 2 brakes	✓
Easily and safely connected to the synchronous servo motor thanks to backlash-free plug-in coupling	✓

Key ★☆☆☆☆ good | ★★★★★ excellent
€ Economy | €€€€€ Premium

Technical data

M_{1Bstat}	8 – 72 Nm
i	12 – 194
M_{2acc}	181 – 3105 Nm
$\Delta\phi_2$	1.5 – 5 arcmin
η_{get}	94 %

7.2 Selection tables

The technical data specified in the selection tables applies to:

- Installation altitudes up to 1000 m above sea level
- Surrounding temperatures from 0 °C to 40 °C
- Drives with convection-cooled motors (e.g. EZ401**U**)
- Without consideration of the thermal limiting performance

For the technical data on drives with forced ventilated motors (e.g. EZ401**B**), refer to https://configurator.stoeber.de/en-US/.

An explanation of the formula symbols can be found in the chapter [▶ 15.1].

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
P531K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 350 Nm)																		
150	81	88	29	2.7	P531_0050K102_0040 MB23 EZ501U	301	300	700	20.00	20/1	8.0	8.0	3300	2800	4000	11	29	32
150	88	98	32	2.5	P531_0050K102_0040 MB23 EZ402U	301	300	700	20.00	20/1	8.0	8.0	3300	2800	4000	9.9	29	31
150	130	162	47	1.7	P531_0050K102_0040 MB23 EZ404U	350	390	700	20.00	20/1	8.0	8.0	3300	2800	4000	11	29	33
150	139	151	50	1.6	P531_0050K102_0040 MB23 EZ502U	350	390	700	20.00	20/1	8.0	8.0	3300	2800	4000	13	29	33
188	65	71	26	3.1	P531_0040K102_0040 MB23 EZ501U	241	240	600	16.00	16/1	8.0	8.0	3300	2800	4000	11	27	32
188	65	71	26	3.1	P531_0040K102_0040 MB23 EZ501U	241	240	600	16.00	16/1	12	8.0	3300	2800	4000	11	27	32
188	71	78	28	2.8	P531_0040K102_0040 MB23 EZ402U	241	240	600	16.00	16/1	8.0	8.0	3300	2800	4000	9.9	27	31
188	71	78	28	2.8	P531_0040K102_0040 MB23 EZ402U	241	240	600	16.00	16/1	12	8.0	3300	2800	4000	9.9	27	31
188	104	129	41	1.9	P531_0040K102_0040 MB23 EZ404U	300	320	600	16.00	16/1	8.0	8.0	3300	2800	4000	11	27	33
188	104	129	41	1.9	P531_0040K102_0040 MB23 EZ404U	300	320	600	16.00	16/1	12	8.0	3300	2800	4000	11	27	33
188	111	120	44	1.8	P531_0040K102_0040 MB23 EZ502U	300	320	600	16.00	16/1	8.0	8.0	3300	2800	4000	14	27	33
188	111	120	44	1.8	P531_0040K102_0040 MB23 EZ502U	300	320	600	16.00	16/1	12	8.0	3300	2800	4000	14	27	33
250	49	53	32	2.5	P531_0030K102_0040 MB23 EZ501U	181	180	400	12.00	12/1	8.0	8.0	3300	2800	4000	11	22	32
250	53	59	35	2.3	P531_0030K102_0040 MB23 EZ402U	181	180	400	12.00	12/1	8.0	8.0	3300	2800	4000	10	22	31
250	78	97	52	1.5	P531_0030K102_0040 MB23 EZ404U	200	200	400	12.00	12/1	8.0	8.0	3300	2800	4000	11	22	33
250	84	90	55	1.4	P531_0030K102_0040 MB23 EZ502U	200	200	400	12.00	12/1	8.0	8.0	3300	2800	4000	14	22	33
P731K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 810 Nm)																		
65	188	206	25	2.2	P731_0070K102_0066 MB23 EZ501U	700	700	1561	46.51	2093/45	8.0	8.0	3600	3300	4000	11	52	38
65	206	228	27	2.0	P731_0070K102_0066 MB23 EZ402U	700	700	1561	46.51	2093/45	8.0	8.0	3600	3300	4000	9.4	52	38
65	302	376	39	1.4	P731_0070K102_0066 MB23 EZ404U	786	790	1561	46.51	2093/45	8.0	8.0	3600	3300	4000	11	52	40
65	324	350	42	1.3	P731_0070K102_0066 MB23 EZ502U	786	790	1561	46.51	2093/45	8.0	8.0	3600	3300	4000	13	52	40
65	186	203	20	2.4	P731_0050K202_0092 MB23 EZ501U	692	690	1610	45.95	11395/248	8.0	8.0	3500	3100	4000	11	53	46
65	203	225	22	2.2	P731_0050K202_0092 MB23 EZ402U	692	690	1610	45.95	11395/248	8.0	8.0	3500	3100	4000	9.9	53	46
65	298	372	32	1.5	P731_0050K202_0092 MB23 EZ404U	805	840	1610	45.95	11395/248	8.0	8.0	3500	3100	4000	11	53	48
65	320	346	34	1.4	P731_0050K202_0092 MB23 EZ502U	805	840	1610	45.95	11395/248	8.0	8.0	3500	3100	4000	14	53	47
71	170	186	25	2.4	P731_0070K102_0060 MB23 EZ501U	632	630	1561	42.00	42/1	8.0	8.0	3300	2800	4000	11	52	38
71	170	186	25	2.4	P731_0070K102_0060 MB23 EZ501U	632	630	1561	42.00	42/1	12	8.0	3300	2800	4000	11	52	38
71	186	205	27	2.2	P731_0070K102_0060 MB23 EZ402U	632	630	1561	42.00	42/1	8.0	8.0	3300	2800	4000	9.5	52	38
71	186	205	27	2.2	P731_0070K102_0060 MB23 EZ402U	632	630	1561	42.00	42/1	12	8.0	3300	2800	4000	9.5	52	38
71	273	340	40	1.5	P731_0070K102_0060 MB23 EZ404U	760	760	1561	42.00	42/1	8.0	8.0	3300	2800	4000	11	52	40
71	273	340	40	1.5	P731_0070K102_0060 MB23 EZ404U	760	760	1561	42.00	42/1	12	8.0	3300	2800	4000	11	52	40
71	292	316	43	1.4	P731_0070K102_0060 MB23 EZ502U	760	760	1561	42.00	42/1	8.0	8.0	3300	2800	4000	13	52	40
71	292	316	43	1.4	P731_0070K102_0060 MB23 EZ502U	760	760	1561	42.00	42/1	12	8.0	3300	2800	4000	13	52	40
71	170	186	20	2.6	P731_0050K202_0084 MB23 EZ501U	632	630	1610	41.99	12470/297	8.0	8.0	3500	3100	4000	11	53	46
71	170	186	20	2.6	P731_0050K202_0084 MB23 EZ501U	632	630	1610	41.99	12470/297	12	8.0	3500	3100	4000	11	53	46
71	186	205	21	2.4	P731_0050K202_0084 MB23 EZ402U	632	630	1610	41.99	12470/297	8.0	8.0	3500	3100	4000	9.8	53	46
71	186	205	21	2.4	P731_0050K202_0084 MB23 EZ402U	632	630	1610	41.99	12470/297	12	8.0	3500	3100	4000	9.8	53	46
71	273	340	31	1.6	P731_0050K202_0084 MB23 EZ404U	805	840	1610	41.99	12470/297	8.0	8.0	3500	3100	4000	11	53	48
71	273	340	31	1.6	P731_0050K202_0084 MB23 EZ404U	805	840	1610	41.99	12470/297	12	8.0	3500	3100	4000	11	53	48
71	292	316	34	1.5	P731_0050K202_0084 MB23 EZ502U	805	840	1610	41.99	12470/297	8.0	8.0	3500	3100	4000	13	53	47
71	292	316	34	1.5	P731_0050K202_0084 MB23 EZ502U	805	840	1610	41.99	12470/297	12	8.0	3500	3100	4000	13	53	47
77	158	172	25	2.5	P731_0070K102_0056 MB23 EZ501U	587	590	1561	38.98	1520/39	8.0	8.0	3300	2800	4000	11	52	38
77	158	172	25	2.5	P731_0070K102_0056 MB23 EZ501U	587	590	1561	38.98	1520/39	12	8.0	3300	2800	4000	11	52	38
77	172	191	27	2.3	P731_0070K102_0056 MB23 EZ402U	587	590	1561	38.98	1520/39	8.0	8.0	3300	2800	4000	9.7	52	38
77	172	191	27	2.3	P731_0070K102_0056 MB23 EZ402U	587	590	1561	38.98	1520/39	12	8.0	3300	2800	4000	9.7	52	38
77	253	315	40	1.5	P731_0070K102_0056 MB23 EZ404U	741	740	1561	38.98	1520/39	8.0	8.0	3300	2800	4000	11	52	40
77	253	315	40	1.5	P731_0070K102_0056 MB23 EZ404U	741	740	1561	38.98	1520/39	12	8.0	3300	2800	4000	11	52	40
77	271	293	43	1.4	P731_0070K102_0056 MB23 EZ502U	741	740	1561	38.98	1520/39	8.0	8.0	3300	2800	4000	13	52	40
77	271	293	43	1.4	P731_0070K102_0056 MB23 EZ502U	741	740	1561	38.98	1520/39	12	8.0	3300	2800	4000	13	52	40
90	135	148	18	3.3	P731_0050K202_0067 MB23 EZ501U	503	500	1610	33.42	11395/341	8.0	8.0	3500	3100	4000	11	53	46
90	135	148	18	3.3	P731_0050K202_0067 MB23 EZ501U	503	500	1610	33.42	11395/341	12	8.0	3500	3100	4000	11	53	46

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
P731K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 810 Nm)																		
90	135	148	18	3.3	P731_0050K202_0067 MB23 EZ501U	503	500	1610	33.42	11395/341	16	8.0	3500	3100	4000	11	53	46
90	148	163	20	3.0	P731_0050K202_0067 MB23 EZ402U	503	500	1610	33.42	11395/341	8.0	8.0	3500	3100	4000	10	53	46
90	148	163	20	3.0	P731_0050K202_0067 MB23 EZ402U	503	500	1610	33.42	11395/341	12	8.0	3500	3100	4000	10	53	46
90	148	163	20	3.0	P731_0050K202_0067 MB23 EZ402U	503	500	1610	33.42	11395/341	16	8.0	3500	3100	4000	10	53	46
90	217	270	30	2.0	P731_0050K202_0067 MB23 EZ404U	805	840	1610	33.42	11395/341	8.0	8.0	3500	3100	4000	11	53	48
90	217	270	30	2.0	P731_0050K202_0067 MB23 EZ404U	805	840	1610	33.42	11395/341	12	8.0	3500	3100	4000	11	53	48
90	217	270	30	2.0	P731_0050K202_0067 MB23 EZ404U	805	840	1610	33.42	11395/341	16	8.0	3500	3100	4000	11	53	48
90	233	252	32	1.9	P731_0050K202_0067 MB23 EZ502U	805	840	1610	33.42	11395/341	8.0	8.0	3500	3100	4000	14	53	47
90	233	252	32	1.9	P731_0050K202_0067 MB23 EZ502U	805	840	1610	33.42	11395/341	12	8.0	3500	3100	4000	14	53	47
90	233	252	32	1.9	P731_0050K202_0067 MB23 EZ502U	805	840	1610	33.42	11395/341	16	8.0	3500	3100	4000	14	53	47
90	305	349	42	1.4	P731_0050K202_0067 MB23 EZ503U	805	840	1610	33.42	11395/341	8.0	15	3500	3100	4000	17	53	49
90	305	349	42	1.4	P731_0050K202_0067 MB23 EZ503U	805	840	1610	33.42	11395/341	12	15	3500	3100	4000	17	53	49
90	424	503	58	1.0	P731_0050K202_0067 MB23 EZ505U	805	840	1610	33.42	11395/341	8.0	15	3500	3100	4000	22	53	52
90	424	503	58	1.0	P731_0050K202_0067 MB23 EZ505U	805	840	1610	33.42	11395/341	12	15	3500	3100	4000	22	53	52
100	121	133	18	3.6	P731_0050K202_0060 MB23 EZ501U	452	450	1610	30.00	30/1	8.0	8.0	3000	2600	4000	12	53	46
100	121	133	18	3.6	P731_0050K202_0060 MB23 EZ501U	452	450	1610	30.00	30/1	12	8.0	3000	2600	4000	12	53	46
100	121	133	18	3.6	P731_0050K202_0060 MB23 EZ501U	452	450	1610	30.00	30/1	16	8.0	3000	2600	4000	12	53	46
100	133	147	20	3.3	P731_0050K202_0060 MB23 EZ402U	452	450	1610	30.00	30/1	8.0	8.0	3000	2600	4000	11	53	46
100	133	147	20	3.3	P731_0050K202_0060 MB23 EZ402U	452	450	1610	30.00	30/1	12	8.0	3000	2600	4000	11	53	46
100	133	147	20	3.3	P731_0050K202_0060 MB23 EZ402U	452	450	1610	30.00	30/1	16	8.0	3000	2600	4000	11	53	46
100	195	243	29	2.3	P731_0050K202_0060 MB23 EZ404U	805	820	1610	30.00	30/1	8.0	8.0	3000	2600	4000	12	53	48
100	195	243	29	2.3	P731_0050K202_0060 MB23 EZ404U	805	820	1610	30.00	30/1	12	8.0	3000	2600	4000	12	53	48
100	195	243	29	2.3	P731_0050K202_0060 MB23 EZ404U	805	820	1610	30.00	30/1	16	8.0	3000	2600	4000	12	53	48
100	209	226	31	2.1	P731_0050K202_0060 MB23 EZ502U	805	840	1610	30.00	30/1	8.0	8.0	3000	2600	4000	14	53	47
100	209	226	31	2.1	P731_0050K202_0060 MB23 EZ502U	805	840	1610	30.00	30/1	12	8.0	3000	2600	4000	14	53	47
100	209	226	31	2.1	P731_0050K202_0060 MB23 EZ502U	805	840	1610	30.00	30/1	16	8.0	3000	2600	4000	14	53	47
100	274	313	41	1.6	P731_0050K202_0060 MB23 EZ503U	805	840	1610	30.00	30/1	8.0	15	3000	2600	4000	18	53	49
100	274	313	41	1.6	P731_0050K202_0060 MB23 EZ503U	805	840	1610	30.00	30/1	12	15	3000	2600	4000	18	53	49
100	381	452	56	1.2	P731_0050K202_0060 MB23 EZ505U	805	840	1610	30.00	30/1	8.0	15	3000	2600	4000	22	53	52
100	381	452	56	1.2	P731_0050K202_0060 MB23 EZ505U	805	840	1610	30.00	30/1	12	15	3000	2600	4000	22	53	52
107	113	124	26	3.1	P731_0070K102_0040 MB23 EZ501U	422	420	1561	28.00	28/1	8.0	8.0	3300	2800	4000	11	52	38
107	113	124	26	3.1	P731_0070K102_0040 MB23 EZ501U	422	420	1561	28.00	28/1	12	8.0	3300	2800	4000	11	52	38
107	113	124	26	3.1	P731_0070K102_0040 MB23 EZ501U	422	420	1561	28.00	28/1	16	8.0	3300	2800	4000	11	52	38
107	124	137	28	2.8	P731_0070K102_0040 MB23 EZ402U	422	420	1561	28.00	28/1	8.0	8.0	3300	2800	4000	9.9	52	38
107	124	137	28	2.8	P731_0070K102_0040 MB23 EZ402U	422	420	1561	28.00	28/1	12	8.0	3300	2800	4000	9.9	52	38
107	124	137	28	2.8	P731_0070K102_0040 MB23 EZ402U	422	420	1561	28.00	28/1	16	8.0	3300	2800	4000	9.9	52	38
107	182	227	41	1.9	P731_0070K102_0040 MB23 EZ404U	664	660	1561	28.00	28/1	8.0	8.0	3300	2800	4000	11	52	40
107	182	227	41	1.9	P731_0070K102_0040 MB23 EZ404U	664	660	1561	28.00	28/1	12	8.0	3300	2800	4000	11	52	40
107	182	227	41	1.9	P731_0070K102_0040 MB23 EZ404U	664	660	1561	28.00	28/1	16	8.0	3300	2800	4000	11	52	40
107	195	211	44	1.8	P731_0070K102_0040 MB23 EZ502U	664	660	1561	28.00	28/1	8.0	8.0	3300	2800	4000	14	52	40
107	195	211	44	1.8	P731_0070K102_0040 MB23 EZ502U	664	660	1561	28.00	28/1	12	8.0	3300	2800	4000	14	52	40
107	195	211	44	1.8	P731_0070K102_0040 MB23 EZ502U	664	660	1561	28.00	28/1	16	8.0	3300	2800	4000	14	52	40
107	256	292	58	1.4	P731_0070K102_0040 MB23 EZ503U	664	660	1561	28.00	28/1	8.0	15	3300	2800	4000	17	52	42
107	256	292	58	1.4	P731_0070K102_0040 MB23 EZ503U	664	660	1561	28.00	28/1	12	15	3300	2800	4000	17	52	42
116	105	114	17	4.2	P731_0050K202_0052 MB23 EZ501U	390	390	1534	25.89	10535/407	8.0	8.0	3000	2600	4000	12	53	46
116	105	114	17	4.2	P731_0050K202_0052 MB23 EZ501U	390	390	1534	25.89	10535/407	12	8.0	3000	2600	4000	12	53	46
116	105	114	17	4.2	P731_0050K202_0052 MB23 EZ501U	390	390	1534	25.89	10535/407	16	8.0	3000	2600	4000	12	53	46
116	114	127	19	3.8	P731_0050K202_0052 MB23 EZ402U	390	390	1534	25.89	10535/407	8.0	8.0	3000	2600	4000	11	53	46
116	114	127	19	3.8	P731_0050K202_0052 MB23 EZ402U	390	390	1534	25.89	10535/407	12	8.0	3000	2600	4000	11	53	46
116	114	127	19	3.8	P731_0050K202_0052 MB23 EZ402U	390	390	1534	25.89	10535/407	16	8.0	3000	2600	4000	11	53	46
116	168	209	28	2.6	P731_0050K202_0052 MB23 EZ404U	706	710	1534	25.89	10535/407	8.0	8.0	3000	2600	4000	12	53	48
116	168	209	28	2.6	P731_0050K202_0052 MB23 EZ404U	706	710	1534	25.89	10535/407	12	8.0	3000	2600	4000	12	53	48
116	168	209	28	2.6	P731_0050K202_0052 MB23 EZ404U	706	710	1534	25.89	10535/407	16	8.0	3000	2600	4000	12	53	48
116	180	195	30	2.4	P731_0050K202_0052 MB23 EZ502U	755	760	1534	25.89	10535/407	8.0	8.0	3000	2600	4000	14	53	47
116	180	195	30	2.4	P731_0050K202_0052 MB23 EZ502U	755	760	1534	25.89	10535/407	12	8.0	3000	2600	4000	14	53	47
116	180	195	30	2.4	P731_0050K202_0052 MB23 EZ502U	755	760	1534	25.89	10535/407	16	8.0	3000	2600	4000	14	53	47
116	180	202	30	2.4	P731_0050K202_0052 MB33 EZ701U	487	490	1610	25.89	10535/407	16	15	3000	2600	4000	39	53	57
116	236	270	39	1.9	P731_0050K202_0052 MB23 EZ503U	805	840	1534	25.89	10535/407	8.0	15	3000	2600	4000	18	53	49
116	236	270	39	1.9	P731_0050K202_0052 MB23 EZ503U	805	840	1534	25.89	10535/407	12	15	3000	2600	4000	18	53	49
116	292	351	48	1.5	P731_0050K202_0052 MB33 EZ702U	805	840	1610	25.89	10535/407	16	15	3000	2600	4000	44	53	59
116	329	390	54	1.3	P731_0050K202_0052 MB23 EZ505U	805	840	1534	25.89	10535/407	8.0	15	3000	2600	4000	22	53	52
116	329	390	54	1.3	P731_0050K202_0052 MB23 EZ505U	805	840	1534	25.89	10535/407	12	15	3000	2600	4000	22	53	52
150	88	98	18	5.0	P731_0050K202_0040 MB23 EZ402U	301	300	1186	20.00	20/1	8.0	8.0	3000	2600	4000	12	53	46
150	88	98	18	5.0	P731_0050K202_0040 MB23 EZ402U	301	300	1186	20.00	20/1	12	8.0	3000	2600	4000	12	53	46

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
P731K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 810 Nm)																		
150	88	98	18	5.0	P731_0050K202_0040 MB23 EZ402U	301	300	1186	20.00	20/1	16	8.0	3000	2600	4000	12	53	46
150	130	162	26	3.4	P731_0050K202_0040 MB23 EZ404U	546	550	1186	20.00	20/1	8.0	8.0	3000	2600	4000	13	53	48
150	130	162	26	3.4	P731_0050K202_0040 MB23 EZ404U	546	550	1186	20.00	20/1	12	8.0	3000	2600	4000	13	53	48
150	130	162	26	3.4	P731_0050K202_0040 MB23 EZ404U	546	550	1186	20.00	20/1	16	8.0	3000	2600	4000	13	53	48
150	139	151	28	3.2	P731_0050K202_0040 MB23 EZ502U	583	580	1186	20.00	20/1	8.0	8.0	3000	2600	4000	15	53	47
150	139	151	28	3.2	P731_0050K202_0040 MB23 EZ502U	583	580	1186	20.00	20/1	12	8.0	3000	2600	4000	15	53	47
150	139	151	28	3.2	P731_0050K202_0040 MB23 EZ502U	583	580	1186	20.00	20/1	16	8.0	3000	2600	4000	15	53	47
150	139	156	28	3.2	P731_0050K202_0040 MB33 EZ701U	376	380	1610	20.00	20/1	16	15	3000	2600	4000	40	53	57
150	139	156	28	3.2	P731_0050K202_0040 MB33 EZ701U	376	380	1610	20.00	20/1	24	15	3000	2600	4000	40	53	57
150	183	209	37	2.4	P731_0050K202_0040 MB23 EZ503U	706	710	1186	20.00	20/1	8.0	15	3000	2600	4000	19	53	49
150	183	209	37	2.4	P731_0050K202_0040 MB23 EZ503U	706	710	1186	20.00	20/1	12	15	3000	2600	4000	19	53	49
150	226	271	45	1.9	P731_0050K202_0040 MB33 EZ702U	772	770	1610	20.00	20/1	16	15	3000	2600	4000	45	53	59
150	226	271	45	1.9	P731_0050K202_0040 MB33 EZ702U	772	770	1610	20.00	20/1	24	15	3000	2600	4000	45	53	59
150	254	301	51	1.7	P731_0050K202_0040 MB23 EZ505U	706	710	1186	20.00	20/1	8.0	15	3000	2600	4000	23	53	52
150	254	301	51	1.7	P731_0050K202_0040 MB23 EZ505U	706	710	1186	20.00	20/1	12	15	3000	2600	4000	23	53	52
188	104	129	26	3.4	P731_0040K202_0040 MB23 EZ404U	437	440	948	16.00	16/1	8.0	8.0	3000	2600	4000	13	49	48
188	104	129	26	3.4	P731_0040K202_0040 MB23 EZ404U	437	440	948	16.00	16/1	12	8.0	3000	2600	4000	13	49	48
188	104	129	26	3.4	P731_0040K202_0040 MB23 EZ404U	437	440	948	16.00	16/1	16	8.0	3000	2600	4000	13	49	48
188	111	120	27	3.2	P731_0040K202_0040 MB23 EZ502U	467	470	948	16.00	16/1	8.0	8.0	3000	2600	4000	15	49	47
188	111	120	27	3.2	P731_0040K202_0040 MB23 EZ502U	467	470	948	16.00	16/1	12	8.0	3000	2600	4000	15	49	47
188	111	120	27	3.2	P731_0040K202_0040 MB23 EZ502U	467	470	948	16.00	16/1	16	8.0	3000	2600	4000	15	49	47
188	111	125	27	3.2	P731_0040K202_0040 MB33 EZ701U	301	300	1400	16.00	16/1	16	15	3000	2600	4000	40	49	57
188	111	125	27	3.2	P731_0040K202_0040 MB33 EZ701U	301	300	1400	16.00	16/1	24	15	3000	2600	4000	40	49	57
188	111	125	27	3.2	P731_0040K202_0040 MB33 EZ701U	301	300	1400	16.00	16/1	32	15	3000	2600	4000	40	49	57
188	146	167	36	2.5	P731_0040K202_0040 MB23 EZ503U	565	560	948	16.00	16/1	8.0	15	3000	2600	4000	19	49	49
188	146	167	36	2.5	P731_0040K202_0040 MB23 EZ503U	565	560	948	16.00	16/1	12	15	3000	2600	4000	19	49	49
188	181	217	45	2.0	P731_0040K202_0040 MB33 EZ702U	617	620	1400	16.00	16/1	16	15	3000	2600	4000	45	49	59
188	181	217	45	2.0	P731_0040K202_0040 MB33 EZ702U	617	620	1400	16.00	16/1	24	15	3000	2600	4000	45	49	59
188	181	217	45	2.0	P731_0040K202_0040 MB33 EZ702U	617	620	1400	16.00	16/1	32	15	3000	2600	4000	45	49	59
188	203	241	50	1.8	P731_0040K202_0040 MB23 EZ505U	565	560	948	16.00	16/1	8.0	15	3000	2600	4000	23	49	52
188	203	241	50	1.8	P731_0040K202_0040 MB23 EZ505U	565	560	948	16.00	16/1	12	15	3000	2600	4000	23	49	52
250	78	97	26	3.4	P731_0030K202_0040 MB23 EZ404U	327	330	711	12.00	12/1	8.0	8.0	3000	2600	4000	13	40	48
250	78	97	26	3.4	P731_0030K202_0040 MB23 EZ404U	327	330	711	12.00	12/1	12	8.0	3000	2600	4000	13	40	48
250	78	97	26	3.4	P731_0030K202_0040 MB23 EZ404U	327	330	711	12.00	12/1	16	8.0	3000	2600	4000	13	40	48
250	84	90	27	3.2	P731_0030K202_0040 MB23 EZ502U	350	350	711	12.00	12/1	8.0	8.0	3000	2600	4000	16	40	47
250	84	90	27	3.2	P731_0030K202_0040 MB23 EZ502U	350	350	711	12.00	12/1	12	8.0	3000	2600	4000	16	40	47
250	84	90	27	3.2	P731_0030K202_0040 MB23 EZ502U	350	350	711	12.00	12/1	16	8.0	3000	2600	4000	16	40	47
250	84	94	27	3.2	P731_0030K202_0040 MB33 EZ701U	226	230	1000	12.00	12/1	16	15	3000	2600	4000	41	40	57
250	84	94	27	3.2	P731_0030K202_0040 MB33 EZ701U	226	230	1000	12.00	12/1	24	15	3000	2600	4000	41	40	57
250	84	94	27	3.2	P731_0030K202_0040 MB33 EZ701U	226	230	1000	12.00	12/1	32	15	3000	2600	4000	41	40	57
250	110	125	36	2.5	P731_0030K202_0040 MB23 EZ503U	423	420	711	12.00	12/1	8.0	15	3000	2600	4000	19	40	49
250	110	125	36	2.5	P731_0030K202_0040 MB23 EZ503U	423	420	711	12.00	12/1	12	15	3000	2600	4000	19	40	49
250	135	163	45	2.0	P731_0030K202_0040 MB33 EZ702U	463	460	1000	12.00	12/1	16	15	3000	2600	4000	46	40	59
250	135	163	45	2.0	P731_0030K202_0040 MB33 EZ702U	463	460	1000	12.00	12/1	24	15	3000	2600	4000	46	40	59
250	135	163	45	2.0	P731_0030K202_0040 MB33 EZ702U	463	460	1000	12.00	12/1	32	15	3000	2600	4000	46	40	59
250	152	181	50	1.8	P731_0030K202_0040 MB23 EZ505U	423	420	711	12.00	12/1	8.0	15	3000	2600	4000	24	40	52
250	152	181	50	1.8	P731_0030K202_0040 MB23 EZ505U	423	420	711	12.00	12/1	12	15	3000	2600	4000	24	40	52
P831K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1840 Nm)																		
31	392	429	14	2.4	P831_0070K202_0140 MB23 EZ501U	1460	1460	2887	96.96	20167/208	8.0	8.0	3900	3500	4000	11	128	61
31	429	474	16	2.2	P831_0070K202_0140 MB23 EZ402U	1460	1460	2887	96.96	20167/208	8.0	8.0	3900	3500	4000	9.5	128	61
31	629	785	23	1.5	P831_0070K202_0140 MB23 EZ404U	1494	1490	2887	96.96	20167/208	8.0	8.0	3900	3500	4000	11	128	63
31	675	730	25	1.4	P831_0070K202_0140 MB23 EZ502U	1494	1490	2887	96.96	20167/208	8.0	8.0	3900	3500	4000	13	128	63
33	372	406	21	2.3	P831_0100K202_0092 MB23 EZ501U	1380	1380	2760	91.90	11395/124	8.0	8.0	3500	3100	4000	11	132	61
33	406	450	23	2.1	P831_0100K202_0092 MB23 EZ402U	1380	1380	2760	91.90	11395/124	8.0	8.0	3500	3100	4000	9.9	132	61
33	597	744	33	1.4	P831_0100K202_0092 MB23 EZ404U	1380	1380	2760	91.90	11395/124	8.0	8.0	3500	3100	4000	11	132	63
33	640	692	36	1.3	P831_0100K202_0092 MB23 EZ502U	1380	1380	2760	91.90	11395/124	8.0	8.0	3500	3100	4000	14	132	63
34	360	393	15	2.6	P831_0070K202_0125 MB23 EZ501U	1339	1340	2887	88.94	3913/44	8.0	8.0	3900	3500	4000	11	128	61
34	393	435	16	2.3	P831_0070K202_0125 MB23 EZ402U	1339	1340	2887	88.94	3913/44	8.0	8.0	3900	3500	4000	9.4	128	61
34	577	720	23	1.6	P831_0070K202_0125 MB23 EZ404U	1494	1490	2887	88.94	3913/44	8.0	8.0	3900	3500	4000	11	128	63
34	619	669	25	1.5	P831_0070K202_0125 MB23 EZ502U	1494	1490	2887	88.94	3913/44	8.0	8.0	3900	3500	4000	13	128	63
35	350	382	10	3.1	P831_0050K302_0175 MB23 EZ501U	1302	1300	3230	86.47	7955/92	8.0	8.0	3500	3100	4000	11	128	66
35	350	382	10	3.1	P831_0050K302_0175 MB23 EZ501U	1302	1300	3230	86.47	7955/92	12	8.0	3500	3100	4000	11	128	66
35	382	423	11	2.9	P831_0050K302_0175 MB23 EZ402U	1302	1300	3230	86.47	7955/92	8.0	8.0	3500	3100	4000	9.8	128	66
35	382	423	11	2.9	P831_0050K302_0175 MB23 EZ402U	1302	1300	3230	86.47	7955/92	12	8.0	3500	3100	4000	9.8	128	66

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
P831K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1840 Nm)																		
35	561	700	17	2.0	P831_0050K302_0175 MB23 EZ404U	1840	1870	3230	86.47	7955/92	8.0	8.0	3500	3100	4000	11	128	68
35	561	700	17	2.0	P831_0050K302_0175 MB23 EZ404U	1840	1870	3230	86.47	7955/92	12	8.0	3500	3100	4000	11	128	68
35	602	651	18	1.8	P831_0050K302_0175 MB23 EZ502U	1840	1870	3230	86.47	7955/92	8.0	8.0	3500	3100	4000	13	128	68
35	602	651	18	1.8	P831_0050K302_0175 MB23 EZ502U	1840	1870	3230	86.47	7955/92	12	8.0	3500	3100	4000	13	128	68
36	340	371	20	2.5	P831_0100K202_0084 MB23 EZ501U	1264	1260	2760	83.97	24940/297	8.0	8.0	3500	3100	4000	11	132	61
36	371	411	22	2.3	P831_0100K202_0084 MB23 EZ402U	1264	1260	2760	83.97	24940/297	8.0	8.0	3500	3100	4000	9.8	132	61
36	545	679	33	1.6	P831_0100K202_0084 MB23 EZ404U	1380	1380	2760	83.97	24940/297	8.0	8.0	3500	3100	4000	11	132	63
36	585	632	35	1.5	P831_0100K202_0084 MB23 EZ502U	1380	1380	2760	83.97	24940/297	8.0	8.0	3500	3100	4000	13	132	63
37	327	357	15	2.7	P831_0070K202_0115 MB23 EZ501U	1217	1220	2887	80.82	8729/108	8.0	8.0	3500	3100	4000	11	128	61
37	357	395	16	2.5	P831_0070K202_0115 MB23 EZ402U	1217	1220	2887	80.82	8729/108	8.0	8.0	3500	3100	4000	9.7	128	61
37	525	654	23	1.7	P831_0070K202_0115 MB23 EZ404U	1494	1490	2887	80.82	8729/108	8.0	8.0	3500	3100	4000	11	128	63
37	563	608	25	1.6	P831_0070K202_0115 MB23 EZ502U	1494	1490	2887	80.82	8729/108	8.0	8.0	3500	3100	4000	13	128	63
43	285	312	15	3.0	P831_0070K202_0100 MB23 EZ501U	1062	1060	2887	70.51	20167/286	8.0	8.0	3900	3500	4000	11	128	61
43	285	312	15	3.0	P831_0070K202_0100 MB23 EZ501U	1062	1060	2887	70.51	20167/286	12	8.0	3900	3500	4000	11	128	61
43	312	345	16	2.7	P831_0070K202_0100 MB23 EZ402U	1062	1060	2887	70.51	20167/286	8.0	8.0	3900	3500	4000	9.6	128	61
43	312	345	16	2.7	P831_0070K202_0100 MB23 EZ402U	1062	1060	2887	70.51	20167/286	12	8.0	3900	3500	4000	9.6	128	61
43	458	571	24	1.9	P831_0070K202_0100 MB23 EZ404U	1494	1490	2887	70.51	20167/286	8.0	8.0	3900	3500	4000	11	128	63
43	458	571	24	1.9	P831_0070K202_0100 MB23 EZ404U	1494	1490	2887	70.51	20167/286	12	8.0	3900	3500	4000	11	128	63
43	491	531	25	1.7	P831_0070K202_0100 MB23 EZ502U	1494	1490	2887	70.51	20167/286	8.0	8.0	3900	3500	4000	13	128	63
43	491	531	25	1.7	P831_0070K202_0100 MB23 EZ502U	1494	1490	2887	70.51	20167/286	12	8.0	3900	3500	4000	13	128	63
43	282	308	9.8	3.9	P831_0050K302_0140 MB23 EZ501U	1049	1050	3230	69.68	7525/108	8.0	8.0	3500	3100	4000	11	128	66
43	282	308	9.8	3.9	P831_0050K302_0140 MB23 EZ501U	1049	1050	3230	69.68	7525/108	12	8.0	3500	3100	4000	11	128	66
43	282	308	9.8	3.9	P831_0050K302_0140 MB23 EZ501U	1049	1050	3230	69.68	7525/108	16	8.0	3500	3100	4000	11	128	66
43	308	341	11	3.6	P831_0050K302_0140 MB23 EZ402U	1049	1050	3230	69.68	7525/108	8.0	8.0	3500	3100	4000	10	128	66
43	308	341	11	3.6	P831_0050K302_0140 MB23 EZ402U	1049	1050	3230	69.68	7525/108	12	8.0	3500	3100	4000	10	128	66
43	308	341	11	3.6	P831_0050K302_0140 MB23 EZ402U	1049	1050	3230	69.68	7525/108	16	8.0	3500	3100	4000	10	128	66
43	452	564	16	2.4	P831_0050K302_0140 MB23 EZ404U	1840	1870	3230	69.68	7525/108	8.0	8.0	3500	3100	4000	11	128	68
43	452	564	16	2.4	P831_0050K302_0140 MB23 EZ404U	1840	1870	3230	69.68	7525/108	12	8.0	3500	3100	4000	11	128	68
43	452	564	16	2.4	P831_0050K302_0140 MB23 EZ404U	1840	1870	3230	69.68	7525/108	16	8.0	3500	3100	4000	11	128	68
43	485	524	17	2.3	P831_0050K302_0140 MB23 EZ502U	1840	1870	3230	69.68	7525/108	8.0	8.0	3500	3100	4000	14	128	68
43	485	524	17	2.3	P831_0050K302_0140 MB23 EZ502U	1840	1870	3230	69.68	7525/108	12	8.0	3500	3100	4000	14	128	68
43	485	524	17	2.3	P831_0050K302_0140 MB23 EZ502U	1840	1870	3230	69.68	7525/108	16	8.0	3500	3100	4000	14	128	68
43	636	728	22	1.7	P831_0050K302_0140 MB23 EZ503U	1840	1870	3230	69.68	7525/108	8.0	15	3500	3100	4000	17	128	70
43	885	1049	31	1.2	P831_0050K302_0140 MB23 EZ505U	1840	1870	3230	69.68	7525/108	8.0	15	3500	3100	4000	22	128	73
45	270	296	19	3.1	P831_0100K202_0067 MB23 EZ501U	1006	1010	2760	66.83	22790/341	8.0	8.0	3500	3100	4000	11	132	61
45	270	296	19	3.1	P831_0100K202_0067 MB23 EZ501U	1006	1010	2760	66.83	22790/341	12	8.0	3500	3100	4000	11	132	61
45	296	327	21	2.9	P831_0100K202_0067 MB23 EZ402U	1006	1010	2760	66.83	22790/341	8.0	8.0	3500	3100	4000	10	132	61
45	296	327	21	2.9	P831_0100K202_0067 MB23 EZ402U	1006	1010	2760	66.83	22790/341	12	8.0	3500	3100	4000	10	132	61
45	434	541	31	2.0	P831_0100K202_0067 MB23 EZ404U	1380	1380	2760	66.83	22790/341	8.0	8.0	3500	3100	4000	11	132	63
45	434	541	31	2.0	P831_0100K202_0067 MB23 EZ404U	1380	1380	2760	66.83	22790/341	12	8.0	3500	3100	4000	11	132	63
45	465	503	33	1.8	P831_0100K202_0067 MB23 EZ502U	1380	1380	2760	66.83	22790/341	8.0	8.0	3500	3100	4000	14	132	63
45	465	503	33	1.8	P831_0100K202_0067 MB23 EZ502U	1380	1380	2760	66.83	22790/341	12	8.0	3500	3100	4000	14	132	63
47	260	284	15	3.2	P831_0070K202_0092 MB23 EZ501U	968	970	2887	64.33	15953/248	8.0	8.0	3500	3100	4000	11	128	61
47	260	284	15	3.2	P831_0070K202_0092 MB23 EZ501U	968	970	2887	64.33	15953/248	12	8.0	3500	3100	4000	11	128	61
47	260	284	15	3.2	P831_0070K202_0092 MB23 EZ501U	968	970	2887	64.33	15953/248	16	8.0	3500	3100	4000	11	128	61
47	284	315	16	2.9	P831_0070K202_0092 MB23 EZ402U	968	970	2887	64.33	15953/248	8.0	8.0	3500	3100	4000	10	128	61
47	284	315	16	2.9	P831_0070K202_0092 MB23 EZ402U	968	970	2887	64.33	15953/248	12	8.0	3500	3100	4000	10	128	61
47	284	315	16	2.9	P831_0070K202_0092 MB23 EZ402U	968	970	2887	64.33	15953/248	16	8.0	3500	3100	4000	10	128	61
47	418	521	24	2.0	P831_0070K202_0092 MB23 EZ404U	1494	1490	2887	64.33	15953/248	8.0	8.0	3500	3100	4000	11	128	63
47	418	521	24	2.0	P831_0070K202_0092 MB23 EZ404U	1494	1490	2887	64.33	15953/248	12	8.0	3500	3100	4000	11	128	63
47	418	521	24	2.0	P831_0070K202_0092 MB23 EZ404U	1494	1490	2887	64.33	15953/248	16	8.0	3500	3100	4000	11	128	63
47	448	484	26	1.8	P831_0070K202_0092 MB23 EZ502U	1494	1490	2887	64.33	15953/248	8.0	8.0	3500	3100	4000	14	128	63
47	448	484	26	1.8	P831_0070K202_0092 MB23 EZ502U	1494	1490	2887	64.33	15953/248	12	8.0	3500	3100	4000	14	128	63
47	448	484	26	1.8	P831_0070K202_0092 MB23 EZ502U	1494	1490	2887	64.33	15953/248	16	8.0	3500	3100	4000	14	128	63
47	587	672	34	1.4	P831_0070K202_0092 MB23 EZ503U	1494	1490	2887	64.33	15953/248	8.0	15	3500	3100	4000	17	128	65
47	817	968	47	1.0	P831_0070K202_0092 MB23 EZ505U	1494	1490	2887	64.33	15953/248	8.0	15	3500	3100	4000	22	128	68
50	243	265	19	3.5	P831_0100K202_0060 MB23 EZ501U	903	900	2760	60.00	60/1	8.0	8.0	3000	2600	4000	12	132	61
50	243	265	19	3.5	P831_0100K202_0060 MB23 EZ501U	903	900	2760	60.00	60/1	12	8.0	3000	2600	4000	12	132	61
50	243	265	19	3.5	P831_0100K202_0060 MB23 EZ501U	903	900	2760	60.00	60/1	16	8.0	3000	2600	4000	12	132	61
50	265	294	20	3.2	P831_0100K202_0060 MB23 EZ402U	903	900	2760	60.00	60/1	8.0	8.0	3000	2600	4000	11	132	61
50	265	294	20	3.2	P831_0100K202_0060 MB23 EZ402U	903	900	2760	60.00	60/1	12	8.0	3000	2600	4000	11	132	61
50	265	294	20	3.2	P831_0100K202_0060 MB23 EZ402U	903	900	2760	60.00	60/1	16	8.0	3000	2600	4000	11	132	61
50	390	486	30	2.2	P831_0100K202_0060 MB23 EZ404U	1380	1380	2760	60.00	60/1	8.0	8.0	3000	2600	4000	12	132	63
50	390	486	30	2.2	P831_0100K202_0060 MB23 EZ404U	1380	1380	2760	60.00	60/1	12	8.0	3000	2600	4000	12	132	63

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
P831K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1840 Nm)																		
50	390	486	30	2.2	P831_0100K202_0060 MB23 EZ404U	1380	1380	2760	60.00	60/1	16	8.0	3000	2600	4000	12	132	63
50	418	452	32	2.0	P831_0100K202_0060 MB23 EZ502U	1380	1380	2760	60.00	60/1	8.0	8.0	3000	2600	4000	14	132	63
50	418	452	32	2.0	P831_0100K202_0060 MB23 EZ502U	1380	1380	2760	60.00	60/1	12	8.0	3000	2600	4000	14	132	63
50	418	452	32	2.0	P831_0100K202_0060 MB23 EZ502U	1380	1380	2760	60.00	60/1	16	8.0	3000	2600	4000	14	132	63
50	548	627	42	1.6	P831_0100K202_0060 MB23 EZ503U	1380	1380	2760	60.00	60/1	8.0	15	3000	2600	4000	18	132	65
50	762	903	58	1.1	P831_0100K202_0060 MB23 EZ505U	1380	1380	2760	60.00	60/1	8.0	15	3000	2600	4000	22	132	68
51	238	260	15	3.4	P831_0070K202_0084 MB23 EZ501U	885	880	2887	58.78	17458/297	8.0	8.0	3500	3100	4000	11	128	61
51	238	260	15	3.4	P831_0070K202_0084 MB23 EZ501U	885	880	2887	58.78	17458/297	12	8.0	3500	3100	4000	11	128	61
51	238	260	15	3.4	P831_0070K202_0084 MB23 EZ501U	885	880	2887	58.78	17458/297	16	8.0	3500	3100	4000	11	128	61
51	260	288	16	3.1	P831_0070K202_0084 MB23 EZ402U	885	880	2887	58.78	17458/297	8.0	8.0	3500	3100	4000	9.8	128	61
51	260	288	16	3.1	P831_0070K202_0084 MB23 EZ402U	885	880	2887	58.78	17458/297	12	8.0	3500	3100	4000	9.8	128	61
51	260	288	16	3.1	P831_0070K202_0084 MB23 EZ402U	885	880	2887	58.78	17458/297	16	8.0	3500	3100	4000	9.8	128	61
51	382	476	24	2.1	P831_0070K202_0084 MB23 EZ404U	1494	1490	2887	58.78	17458/297	8.0	8.0	3500	3100	4000	11	128	63
51	382	476	24	2.1	P831_0070K202_0084 MB23 EZ404U	1494	1490	2887	58.78	17458/297	12	8.0	3500	3100	4000	11	128	63
51	382	476	24	2.1	P831_0070K202_0084 MB23 EZ404U	1494	1490	2887	58.78	17458/297	16	8.0	3500	3100	4000	11	128	63
51	409	442	26	2.0	P831_0070K202_0084 MB23 EZ502U	1494	1490	2887	58.78	17458/297	8.0	8.0	3500	3100	4000	13	128	63
51	409	442	26	2.0	P831_0070K202_0084 MB23 EZ502U	1494	1490	2887	58.78	17458/297	12	8.0	3500	3100	4000	13	128	63
51	409	442	26	2.0	P831_0070K202_0084 MB23 EZ502U	1494	1490	2887	58.78	17458/297	16	8.0	3500	3100	4000	13	128	63
51	536	614	34	1.5	P831_0070K202_0084 MB23 EZ503U	1494	1490	2887	58.78	17458/297	8.0	15	3500	3100	4000	17	128	65
51	536	614	34	1.5	P831_0070K202_0084 MB23 EZ503U	1494	1490	2887	58.78	17458/297	12	15	3500	3100	4000	17	128	65
51	747	885	47	1.1	P831_0070K202_0084 MB23 EZ505U	1494	1490	2887	58.78	17458/297	8.0	15	3500	3100	4000	22	128	68
51	747	885	47	1.1	P831_0070K202_0084 MB23 EZ505U	1494	1490	2887	58.78	17458/297	12	15	3500	3100	4000	22	128	68
52	235	257	9.3	4.7	P831_0050K302_0115 MB23 EZ501U	874	870	3230	58.05	1161/20	8.0	8.0	3200	2800	4000	12	128	66
52	235	257	9.3	4.7	P831_0050K302_0115 MB23 EZ501U	874	870	3230	58.05	1161/20	12	8.0	3200	2800	4000	12	128	66
52	235	257	9.3	4.7	P831_0050K302_0115 MB23 EZ501U	874	870	3230	58.05	1161/20	16	8.0	3200	2800	4000	12	128	66
52	257	284	10	4.3	P831_0050K302_0115 MB23 EZ402U	874	870	3230	58.05	1161/20	8.0	8.0	3200	2800	4000	10	128	66
52	257	284	10	4.3	P831_0050K302_0115 MB23 EZ402U	874	870	3230	58.05	1161/20	12	8.0	3200	2800	4000	10	128	66
52	257	284	10	4.3	P831_0050K302_0115 MB23 EZ402U	874	870	3230	58.05	1161/20	16	8.0	3200	2800	4000	10	128	66
52	377	470	15	2.9	P831_0050K302_0115 MB23 EZ404U	1584	1580	3230	58.05	1161/20	8.0	8.0	3200	2800	4000	12	128	68
52	377	470	15	2.9	P831_0050K302_0115 MB23 EZ404U	1584	1580	3230	58.05	1161/20	12	8.0	3200	2800	4000	12	128	68
52	377	470	15	2.9	P831_0050K302_0115 MB23 EZ404U	1584	1580	3230	58.05	1161/20	16	8.0	3200	2800	4000	12	128	68
52	404	437	16	2.7	P831_0050K302_0115 MB23 EZ502U	1693	1690	3230	58.05	1161/20	8.0	8.0	3200	2800	4000	14	128	68
52	404	437	16	2.7	P831_0050K302_0115 MB23 EZ502U	1693	1690	3230	58.05	1161/20	12	8.0	3200	2800	4000	14	128	68
52	404	437	16	2.7	P831_0050K302_0115 MB23 EZ502U	1693	1690	3230	58.05	1161/20	16	8.0	3200	2800	4000	14	128	68
52	404	453	16	2.7	P831_0050K302_0115 MB33 EZ701U	1092	1090	3230	58.05	1161/20	16	15	3200	2800	4000	39	128	77
52	530	606	21	2.1	P831_0050K302_0115 MB23 EZ503U	1840	1870	3230	58.05	1161/20	8.0	15	3200	2800	4000	18	128	70
52	530	606	21	2.1	P831_0050K302_0115 MB23 EZ503U	1840	1870	3230	58.05	1161/20	12	15	3200	2800	4000	18	128	70
52	655	787	26	1.7	P831_0050K302_0115 MB33 EZ702U	1840	1870	3230	58.05	1161/20	16	15	3200	2800	4000	44	128	80
52	737	874	29	1.5	P831_0050K302_0115 MB23 EZ505U	1840	1870	3230	58.05	1161/20	8.0	15	3200	2800	4000	22	128	73
52	737	874	29	1.5	P831_0050K302_0115 MB23 EZ505U	1840	1870	3230	58.05	1161/20	12	15	3200	2800	4000	22	128	73
58	209	229	18	4.1	P831_0100K202_0052 MB23 EZ501U	779	780	2760	51.77	21070/407	8.0	8.0	3000	2600	4000	12	132	61
58	209	229	18	4.1	P831_0100K202_0052 MB23 EZ501U	779	780	2760	51.77	21070/407	12	8.0	3000	2600	4000	12	132	61
58	209	229	18	4.1	P831_0100K202_0052 MB23 EZ501U	779	780	2760	51.77	21070/407	16	8.0	3000	2600	4000	12	132	61
58	229	253	20	3.7	P831_0100K202_0052 MB23 EZ402U	779	780	2760	51.77	21070/407	8.0	8.0	3000	2600	4000	11	132	61
58	229	253	20	3.7	P831_0100K202_0052 MB23 EZ402U	779	780	2760	51.77	21070/407	12	8.0	3000	2600	4000	11	132	61
58	229	253	20	3.7	P831_0100K202_0052 MB23 EZ402U	779	780	2760	51.77	21070/407	16	8.0	3000	2600	4000	11	132	61
58	336	419	29	2.5	P831_0100K202_0052 MB23 EZ404U	1380	1380	2760	51.77	21070/407	8.0	8.0	3000	2600	4000	12	132	63
58	336	419	29	2.5	P831_0100K202_0052 MB23 EZ404U	1380	1380	2760	51.77	21070/407	12	8.0	3000	2600	4000	12	132	63
58	336	419	29	2.5	P831_0100K202_0052 MB23 EZ404U	1380	1380	2760	51.77	21070/407	16	8.0	3000	2600	4000	12	132	63
58	360	390	31	2.4	P831_0100K202_0052 MB23 EZ502U	1380	1380	2760	51.77	21070/407	8.0	8.0	3000	2600	4000	14	132	63
58	360	390	31	2.4	P831_0100K202_0052 MB23 EZ502U	1380	1380	2760	51.77	21070/407	12	8.0	3000	2600	4000	14	132	63
58	360	390	31	2.4	P831_0100K202_0052 MB23 EZ502U	1380	1380	2760	51.77	21070/407	16	8.0	3000	2600	4000	14	132	63
58	472	541	40	1.8	P831_0100K202_0052 MB23 EZ503U	1380	1380	2760	51.77	21070/407	8.0	15	3000	2600	4000	18	132	65
58	472	541	40	1.8	P831_0100K202_0052 MB23 EZ503U	1380	1380	2760	51.77	21070/407	12	15	3000	2600	4000	18	132	65
58	658	779	56	1.3	P831_0100K202_0052 MB23 EZ505U	1380	1380	2760	51.77	21070/407	8.0	15	3000	2600	4000	22	132	68
58	658	779	56	1.3	P831_0100K202_0052 MB23 EZ505U	1380	1380	2760	51.77	21070/407	12	15	3000	2600	4000	22	132	68
60	202	220	15	3.8	P831_0070K202_0071 MB23 EZ501U	750	750	2887	49.83	14749/296	8.0	8.0	3000	2600	4000	12	128	61
60	202	220	15	3.8	P831_0070K202_0071 MB23 EZ501U	750	750	2887	49.83	14749/296	12	8.0	3000	2600	4000	12	128	61
60	202	220	15	3.8	P831_0070K202_0071 MB23 EZ501U	750	750	2887	49.83	14749/296	16	8.0	3000	2600	4000	12	128	61
60	220	244	17	3.4	P831_0070K202_0071 MB23 EZ402U	750	750	2887	49.83	14749/296	8.0	8.0	3000	2600	4000	10	128	61
60	220	244	17	3.4	P831_0070K202_0071 MB23 EZ402U	750	750	2887	49.83	14749/296	12	8.0	3000	2600	4000	10	128	61
60	220	244	17	3.4	P831_0070K202_0071 MB23 EZ402U	750	750	2887	49.83	14749/296	16	8.0	3000	2600	4000	10	128	61
60	323	403	24	2.3	P831_0070K202_0071 MB23 EZ404U	1360	1360	2887	49.83	14749/296	8.0	8.0	3000	2600	4000	12	128	63
60	323	403	24	2.3	P831_0070K202_0071 MB23 EZ404U	1360	1360	2887	49.83	14749/296	12	8.0	3000	2600	4000	12	128	63

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
P831K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1840 Nm)																		
60	323	403	24	2.3	P831_0070K202_0071 MB23 EZ404U	1360	1360	2887	49.83	14749/296	16	8.0	3000	2600	4000	12	128	63
60	347	375	26	2.2	P831_0070K202_0071 MB23 EZ502U	1436	1440	2887	49.83	14749/296	8.0	8.0	3000	2600	4000	14	128	63
60	347	375	26	2.2	P831_0070K202_0071 MB23 EZ502U	1436	1440	2887	49.83	14749/296	12	8.0	3000	2600	4000	14	128	63
60	347	375	26	2.2	P831_0070K202_0071 MB23 EZ502U	1436	1440	2887	49.83	14749/296	16	8.0	3000	2600	4000	14	128	63
60	347	389	26	2.2	P831_0070K202_0071 MB33 EZ701U	938	940	2887	49.83	14749/296	16	15	3000	2600	4000	39	128	72
60	455	520	34	1.7	P831_0070K202_0071 MB23 EZ503U	1436	1440	2887	49.83	14749/296	8.0	15	3000	2600	4000	18	128	65
60	455	520	34	1.7	P831_0070K202_0071 MB23 EZ503U	1436	1440	2887	49.83	14749/296	12	15	3000	2600	4000	18	128	65
60	563	675	42	1.4	P831_0070K202_0071 MB33 EZ702U	1436	1440	2887	49.83	14749/296	16	15	3000	2600	4000	44	128	75
60	633	750	48	1.2	P831_0070K202_0071 MB23 EZ505U	1436	1440	2887	49.83	14749/296	8.0	15	3000	2600	4000	22	128	68
60	633	750	48	1.2	P831_0070K202_0071 MB23 EZ505U	1436	1440	2887	49.83	14749/296	12	15	3000	2600	4000	22	128	68
64	189	207	15	3.9	P831_0070K202_0067 MB23 EZ501U	704	700	2773	46.78	15953/341	8.0	8.0	3500	3100	4000	11	128	61
64	189	207	15	3.9	P831_0070K202_0067 MB23 EZ501U	704	700	2773	46.78	15953/341	12	8.0	3500	3100	4000	11	128	61
64	189	207	15	3.9	P831_0070K202_0067 MB23 EZ501U	704	700	2773	46.78	15953/341	16	8.0	3500	3100	4000	11	128	61
64	207	229	17	3.6	P831_0070K202_0067 MB23 EZ402U	704	700	2773	46.78	15953/341	8.0	8.0	3500	3100	4000	10	128	61
64	207	229	17	3.6	P831_0070K202_0067 MB23 EZ402U	704	700	2773	46.78	15953/341	12	8.0	3500	3100	4000	10	128	61
64	207	229	17	3.6	P831_0070K202_0067 MB23 EZ402U	704	700	2773	46.78	15953/341	16	8.0	3500	3100	4000	10	128	61
64	304	379	25	2.4	P831_0070K202_0067 MB23 EZ404U	1276	1280	2773	46.78	15953/341	8.0	8.0	3500	3100	4000	12	128	63
64	304	379	25	2.4	P831_0070K202_0067 MB23 EZ404U	1276	1280	2773	46.78	15953/341	12	8.0	3500	3100	4000	12	128	63
64	304	379	25	2.4	P831_0070K202_0067 MB23 EZ404U	1276	1280	2773	46.78	15953/341	16	8.0	3500	3100	4000	12	128	63
64	326	352	26	2.3	P831_0070K202_0067 MB23 EZ502U	1365	1360	2773	46.78	15953/341	8.0	8.0	3500	3100	4000	14	128	63
64	326	352	26	2.3	P831_0070K202_0067 MB23 EZ502U	1365	1360	2773	46.78	15953/341	12	8.0	3500	3100	4000	14	128	63
64	326	352	26	2.3	P831_0070K202_0067 MB23 EZ502U	1365	1360	2773	46.78	15953/341	16	8.0	3500	3100	4000	14	128	63
64	326	365	26	2.3	P831_0070K202_0067 MB33 EZ701U	880	880	2887	46.78	15953/341	16	15	3500	3100	4000	39	128	72
64	427	489	35	1.7	P831_0070K202_0067 MB23 EZ503U	1406	1410	2773	46.78	15953/341	8.0	15	3500	3100	4000	17	128	65
64	427	489	35	1.7	P831_0070K202_0067 MB23 EZ503U	1406	1410	2773	46.78	15953/341	12	15	3500	3100	4000	17	128	65
64	528	634	43	1.4	P831_0070K202_0067 MB33 EZ702U	1406	1410	2887	46.78	15953/341	16	15	3500	3100	4000	44	128	75
64	594	704	48	1.3	P831_0070K202_0067 MB23 EZ505U	1406	1410	2773	46.78	15953/341	8.0	15	3500	3100	4000	22	128	68
64	594	704	48	1.3	P831_0070K202_0067 MB23 EZ505U	1406	1410	2773	46.78	15953/341	12	15	3500	3100	4000	22	128	68
65	301	375	15	3.5	P831_0050K302_0093 MB23 EZ404U	1264	1260	2747	46.34	5375/116	8.0	8.0	3200	2800	4000	12	128	68
65	301	375	15	3.5	P831_0050K302_0093 MB23 EZ404U	1264	1260	2747	46.34	5375/116	12	8.0	3200	2800	4000	12	128	68
65	301	375	15	3.5	P831_0050K302_0093 MB23 EZ404U	1264	1260	2747	46.34	5375/116	16	8.0	3200	2800	4000	12	128	68
65	323	349	16	3.2	P831_0050K302_0093 MB23 EZ502U	1351	1350	2747	46.34	5375/116	8.0	8.0	3200	2800	4000	15	128	68
65	323	349	16	3.2	P831_0050K302_0093 MB23 EZ502U	1351	1350	2747	46.34	5375/116	12	8.0	3200	2800	4000	15	128	68
65	323	349	16	3.2	P831_0050K302_0093 MB23 EZ502U	1351	1350	2747	46.34	5375/116	16	8.0	3200	2800	4000	15	128	68
65	323	362	16	3.2	P831_0050K302_0093 MB33 EZ701U	872	870	3230	46.34	5375/116	16	15	3200	2800	4000	40	128	77
65	323	362	16	3.2	P831_0050K302_0093 MB33 EZ701U	872	870	3230	46.34	5375/116	24	15	3200	2800	4000	40	128	77
65	423	484	21	2.5	P831_0050K302_0093 MB23 EZ503U	1635	1630	2747	46.34	5375/116	8.0	15	3200	2800	4000	18	128	70
65	423	484	21	2.5	P831_0050K302_0093 MB23 EZ503U	1635	1630	2747	46.34	5375/116	12	15	3200	2800	4000	18	128	70
65	523	628	26	2.0	P831_0050K302_0093 MB33 EZ702U	1787	1790	3230	46.34	5375/116	16	15	3200	2800	4000	45	128	80
65	523	628	26	2.0	P831_0050K302_0093 MB33 EZ702U	1787	1790	3230	46.34	5375/116	24	15	3200	2800	4000	45	128	80
65	589	698	29	1.8	P831_0050K302_0093 MB23 EZ505U	1635	1630	2747	46.34	5375/116	8.0	15	3200	2800	4000	23	128	73
65	589	698	29	1.8	P831_0050K302_0093 MB23 EZ505U	1635	1630	2747	46.34	5375/116	12	15	3200	2800	4000	23	128	73
71	170	186	15	4.2	P831_0070K202_0060 MB23 EZ501U	632	630	2490	42.00	42/1	8.0	8.0	3000	2600	4000	12	128	61
71	170	186	15	4.2	P831_0070K202_0060 MB23 EZ501U	632	630	2490	42.00	42/1	12	8.0	3000	2600	4000	12	128	61
71	170	186	15	4.2	P831_0070K202_0060 MB23 EZ501U	632	630	2490	42.00	42/1	16	8.0	3000	2600	4000	12	128	61
71	186	205	17	3.9	P831_0070K202_0060 MB23 EZ402U	632	630	2490	42.00	42/1	8.0	8.0	3000	2600	4000	11	128	61
71	186	205	17	3.9	P831_0070K202_0060 MB23 EZ402U	632	630	2490	42.00	42/1	12	8.0	3000	2600	4000	11	128	61
71	186	205	17	3.9	P831_0070K202_0060 MB23 EZ402U	632	630	2490	42.00	42/1	16	8.0	3000	2600	4000	11	128	61
71	273	340	25	2.6	P831_0070K202_0060 MB23 EZ404U	1146	1150	2490	42.00	42/1	8.0	8.0	3000	2600	4000	12	128	63
71	273	340	25	2.6	P831_0070K202_0060 MB23 EZ404U	1146	1150	2490	42.00	42/1	12	8.0	3000	2600	4000	12	128	63
71	273	340	25	2.6	P831_0070K202_0060 MB23 EZ404U	1146	1150	2490	42.00	42/1	16	8.0	3000	2600	4000	12	128	63
71	292	316	27	2.5	P831_0070K202_0060 MB23 EZ502U	1225	1230	2490	42.00	42/1	8.0	8.0	3000	2600	4000	14	128	63
71	292	316	27	2.5	P831_0070K202_0060 MB23 EZ502U	1225	1230	2490	42.00	42/1	12	8.0	3000	2600	4000	14	128	63
71	292	316	27	2.5	P831_0070K202_0060 MB23 EZ502U	1225	1230	2490	42.00	42/1	16	8.0	3000	2600	4000	14	128	63
71	292	328	27	2.5	P831_0070K202_0060 MB33 EZ701U	790	790	2887	42.00	42/1	16	15	3000	2600	4000	39	128	72
71	292	328	27	2.5	P831_0070K202_0060 MB33 EZ701U	790	790	2887	42.00	42/1	24	15	3000	2600	4000	39	128	72
71	383	439	35	1.9	P831_0070K202_0060 MB23 EZ503U	1356	1360	2490	42.00	42/1	8.0	15	3000	2600	4000	18	128	65
71	383	439	35	1.9	P831_0070K202_0060 MB23 EZ503U	1356	1360	2490	42.00	42/1	12	15	3000	2600	4000	18	128	65
71	474	569	43	1.5	P831_0070K202_0060 MB33 EZ702U	1356	1360	2887	42.00	42/1	16	15	3000	2600	4000	45	128	75
71	474	569	43	1.5	P831_0070K202_0060 MB33 EZ702U	1356	1360	2887	42.00	42/1	24	15	3000	2600	4000	45	128	75
71	533	632	48	1.3	P831_0070K202_0060 MB23 EZ505U	1356	1360	2490	42.00	42/1	8.0	15	3000	2600	4000	23	128	68
71	533	632	48	1.3	P831_0070K202_0060 MB23 EZ505U	1356	1360	2490	42.00	42/1	12	15	3000	2600	4000	23	128	68
75	177	196	18	4.8	P831_0100K202_0040 MB23 EZ402U	602	600	2371	40.00	40/1	8.0	8.0	3000	2600	4000	12	132	61
75	177	196	18	4.8	P831_0100K202_0040 MB23 EZ402U	602	600	2371	40.00	40/1	12	8.0	3000	2600	4000	12	132	61

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
P831K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1840 Nm)																		
75	177	196	18	4.8	P831_0100K202_0040 MB23 EZ402U	602	600	2371	40.00	40/1	16	8.0	3000	2600	4000	12	132	61
75	260	324	27	3.3	P831_0100K202_0040 MB23 EZ404U	1091	1090	2371	40.00	40/1	8.0	8.0	3000	2600	4000	13	132	63
75	260	324	27	3.3	P831_0100K202_0040 MB23 EZ404U	1091	1090	2371	40.00	40/1	12	8.0	3000	2600	4000	13	132	63
75	260	324	27	3.3	P831_0100K202_0040 MB23 EZ404U	1091	1090	2371	40.00	40/1	16	8.0	3000	2600	4000	13	132	63
75	279	301	29	3.1	P831_0100K202_0040 MB23 EZ502U	1167	1170	2371	40.00	40/1	8.0	8.0	3000	2600	4000	15	132	63
75	279	301	29	3.1	P831_0100K202_0040 MB23 EZ502U	1167	1170	2371	40.00	40/1	12	8.0	3000	2600	4000	15	132	63
75	279	301	29	3.1	P831_0100K202_0040 MB23 EZ502U	1167	1170	2371	40.00	40/1	16	8.0	3000	2600	4000	15	132	63
75	279	312	29	3.1	P831_0100K202_0040 MB33 EZ701U	753	750	2760	40.00	40/1	16	15	3000	2600	4000	40	132	72
75	279	312	29	3.1	P831_0100K202_0040 MB33 EZ701U	753	750	2760	40.00	40/1	24	15	3000	2600	4000	40	132	72
75	365	418	38	2.3	P831_0100K202_0040 MB23 EZ503U	1380	1380	2371	40.00	40/1	8.0	15	3000	2600	4000	19	132	65
75	365	418	38	2.3	P831_0100K202_0040 MB23 EZ503U	1380	1380	2371	40.00	40/1	12	15	3000	2600	4000	19	132	65
75	452	542	47	1.9	P831_0100K202_0040 MB33 EZ702U	1380	1380	2760	40.00	40/1	16	15	3000	2600	4000	45	132	75
75	452	542	47	1.9	P831_0100K202_0040 MB33 EZ702U	1380	1380	2760	40.00	40/1	24	15	3000	2600	4000	45	132	75
75	508	602	53	1.7	P831_0100K202_0040 MB23 EZ505U	1380	1380	2371	40.00	40/1	8.0	15	3000	2600	4000	23	132	68
75	508	602	53	1.7	P831_0100K202_0040 MB23 EZ505U	1380	1380	2371	40.00	40/1	12	15	3000	2600	4000	23	132	68
81	240	299	15	4.0	P831_0050K302_0074 MB23 EZ404U	1008	1010	2191	36.96	2365/64	8.0	8.0	2700	2300	4000	13	128	68
81	240	299	15	4.0	P831_0050K302_0074 MB23 EZ404U	1008	1010	2191	36.96	2365/64	12	8.0	2700	2300	4000	13	128	68
81	240	299	15	4.0	P831_0050K302_0074 MB23 EZ404U	1008	1010	2191	36.96	2365/64	16	8.0	2700	2300	4000	13	128	68
81	257	278	16	3.7	P831_0050K302_0074 MB23 EZ502U	1078	1080	2191	36.96	2365/64	8.0	8.0	2700	2300	4000	15	128	68
81	257	278	16	3.7	P831_0050K302_0074 MB23 EZ502U	1078	1080	2191	36.96	2365/64	12	8.0	2700	2300	4000	15	128	68
81	257	278	16	3.7	P831_0050K302_0074 MB23 EZ502U	1078	1080	2191	36.96	2365/64	16	8.0	2700	2300	4000	15	128	68
81	257	289	16	3.7	P831_0050K302_0074 MB33 EZ701U	695	700	3230	36.96	2365/64	16	15	2700	2300	4000	40	128	77
81	257	289	16	3.7	P831_0050K302_0074 MB33 EZ701U	695	700	3230	36.96	2365/64	24	15	2700	2300	4000	40	128	77
81	257	289	16	3.7	P831_0050K302_0074 MB33 EZ701U	695	700	3230	36.96	2365/64	32	15	2700	2300	4000	40	128	77
81	337	386	22	2.9	P831_0050K302_0074 MB23 EZ503U	1304	1300	2191	36.96	2365/64	8.0	15	2700	2300	4000	19	128	70
81	337	386	22	2.9	P831_0050K302_0074 MB23 EZ503U	1304	1300	2191	36.96	2365/64	12	15	2700	2300	4000	19	128	70
81	417	501	27	2.3	P831_0050K302_0074 MB33 EZ702U	1426	1430	3230	36.96	2365/64	16	15	2700	2300	4000	46	128	80
81	417	501	27	2.3	P831_0050K302_0074 MB33 EZ702U	1426	1430	3230	36.96	2365/64	24	15	2700	2300	4000	46	128	80
81	417	501	27	2.3	P831_0050K302_0074 MB33 EZ702U	1426	1430	3230	36.96	2365/64	32	15	2700	2300	4000	46	128	80
81	469	556	30	2.1	P831_0050K302_0074 MB23 EZ505U	1304	1300	2191	36.96	2365/64	8.0	15	2700	2300	4000	23	128	73
81	469	556	30	2.1	P831_0050K302_0074 MB23 EZ505U	1304	1300	2191	36.96	2365/64	12	15	2700	2300	4000	23	128	73
83	147	160	16	4.7	P831_0070K202_0052 MB23 EZ501U	546	550	2148	36.24	14749/407	8.0	8.0	3000	2600	4000	12	128	61
83	147	160	16	4.7	P831_0070K202_0052 MB23 EZ501U	546	550	2148	36.24	14749/407	12	8.0	3000	2600	4000	12	128	61
83	147	160	16	4.7	P831_0070K202_0052 MB23 EZ501U	546	550	2148	36.24	14749/407	16	8.0	3000	2600	4000	12	128	61
83	160	177	17	4.3	P831_0070K202_0052 MB23 EZ402U	546	550	2148	36.24	14749/407	8.0	8.0	3000	2600	4000	11	128	61
83	160	177	17	4.3	P831_0070K202_0052 MB23 EZ402U	546	550	2148	36.24	14749/407	12	8.0	3000	2600	4000	11	128	61
83	160	177	17	4.3	P831_0070K202_0052 MB23 EZ402U	546	550	2148	36.24	14749/407	16	8.0	3000	2600	4000	11	128	61
83	235	293	25	2.9	P831_0070K202_0052 MB23 EZ404U	989	990	2148	36.24	14749/407	8.0	8.0	3000	2600	4000	12	128	63
83	235	293	25	2.9	P831_0070K202_0052 MB23 EZ404U	989	990	2148	36.24	14749/407	12	8.0	3000	2600	4000	12	128	63
83	235	293	25	2.9	P831_0070K202_0052 MB23 EZ404U	989	990	2148	36.24	14749/407	16	8.0	3000	2600	4000	12	128	63
83	252	273	27	2.7	P831_0070K202_0052 MB23 EZ502U	1057	1060	2148	36.24	14749/407	8.0	8.0	3000	2600	4000	14	128	63
83	252	273	27	2.7	P831_0070K202_0052 MB23 EZ502U	1057	1060	2148	36.24	14749/407	12	8.0	3000	2600	4000	14	128	63
83	252	273	27	2.7	P831_0070K202_0052 MB23 EZ502U	1057	1060	2148	36.24	14749/407	16	8.0	3000	2600	4000	14	128	63
83	252	283	27	2.7	P831_0070K202_0052 MB33 EZ701U	682	680	2887	36.24	14749/407	16	15	3000	2600	4000	39	128	72
83	252	283	27	2.7	P831_0070K202_0052 MB33 EZ701U	682	680	2887	36.24	14749/407	24	15	3000	2600	4000	39	128	72
83	331	378	35	2.1	P831_0070K202_0052 MB23 EZ503U	1279	1280	2148	36.24	14749/407	8.0	15	3000	2600	4000	18	128	65
83	331	378	35	2.1	P831_0070K202_0052 MB23 EZ503U	1279	1280	2148	36.24	14749/407	12	15	3000	2600	4000	18	128	65
83	409	491	44	1.7	P831_0070K202_0052 MB33 EZ702U	1291	1290	2887	36.24	14749/407	16	15	3000	2600	4000	45	128	75
83	409	491	44	1.7	P831_0070K202_0052 MB33 EZ702U	1291	1290	2887	36.24	14749/407	24	15	3000	2600	4000	45	128	75
83	460	546	49	1.5	P831_0070K202_0052 MB23 EZ505U	1279	1280	2148	36.24	14749/407	8.0	15	3000	2600	4000	23	128	68
83	460	546	49	1.5	P831_0070K202_0052 MB23 EZ505U	1279	1280	2148	36.24	14749/407	12	15	3000	2600	4000	23	128	68
98	135	149	17	4.8	P831_0070K202_0044 MB23 EZ402U	460	460	1811	30.55	336/11	8.0	8.0	3000	2600	4000	11	128	61
98	135	149	17	4.8	P831_0070K202_0044 MB23 EZ402U	460	460	1811	30.55	336/11	12	8.0	3000	2600	4000	11	128	61
98	135	149	17	4.8	P831_0070K202_0044 MB23 EZ402U	460	460	1811	30.55	336/11	16	8.0	3000	2600	4000	11	128	61
98	198	247	25	3.3	P831_0070K202_0044 MB23 EZ404U	834	830	1811	30.55	336/11	8.0	8.0	3000	2600	4000	13	128	63
98	198	247	25	3.3	P831_0070K202_0044 MB23 EZ404U	834	830	1811	30.55	336/11	12	8.0	3000	2600	4000	13	128	63
98	198	247	25	3.3	P831_0070K202_0044 MB23 EZ404U	834	830	1811	30.55	336/11	16	8.0	3000	2600	4000	13	128	63
98	213	230	27	3.0	P831_0070K202_0044 MB23 EZ502U	891	890	1811	30.55	336/11	8.0	8.0	3000	2600	4000	15	128	63
98	213	230	27	3.0	P831_0070K202_0044 MB23 EZ502U	891	890	1811	30.55	336/11	12	8.0	3000	2600	4000	15	128	63
98	213	230	27	3.0	P831_0070K202_0044 MB23 EZ502U	891	890	1811	30.55	336/11	16	8.0	3000	2600	4000	15	128	63
98	213	239	27	3.0	P831_0070K202_0044 MB33 EZ701U	575	570	2887	30.55	336/11	16	15	3000	2600	4000	40	128	72
98	213	239	27	3.0	P831_0070K202_0044 MB33 EZ701U	575	570	2887	30.55	336/11	24	15	3000	2600	4000	40	128	72
98	213	239	27	3.0	P831_0070K202_0044 MB33 EZ701U	575	570	2887	30.55	336/11	32	15	3000	2600	4000	40	128	72
98	279	319	36	2.3	P831_0070K202_0044 MB23 EZ503U	1078	1080	1811	30.55	336/11	8.0	15	3000	2600	4000	18	128	65

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
P831K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1840 Nm)																		
98	279	319	36	2.3	P831_0070K202_0044 MB23 EZ503U	1078	1080	1811	30.55	336/11	12	15	3000	2600	4000	18	128	65
98	345	414	44	1.9	P831_0070K202_0044 MB33 EZ702U	1178	1180	2887	30.55	336/11	16	15	3000	2600	4000	45	128	75
98	345	414	44	1.9	P831_0070K202_0044 MB33 EZ702U	1178	1180	2887	30.55	336/11	24	15	3000	2600	4000	45	128	75
98	345	414	44	1.9	P831_0070K202_0044 MB33 EZ702U	1178	1180	2887	30.55	336/11	32	15	3000	2600	4000	45	128	75
98	388	460	50	1.7	P831_0070K202_0044 MB23 EZ505U	1078	1080	1811	30.55	336/11	8.0	15	3000	2600	4000	23	128	68
98	388	460	50	1.7	P831_0070K202_0044 MB23 EZ505U	1078	1080	1811	30.55	336/11	12	15	3000	2600	4000	23	128	68
98	474	598	61	1.4	P831_0070K202_0044 MB33 EZ703U	1220	1220	2887	30.55	336/11	16	32	3000	2600	4000	57	128	77
98	612	868	79	1.1	P831_0070K202_0044 MB33 EZ705U	1220	1220	2887	30.55	336/11	16	32	3000	2600	4000	69	128	83
100	195	243	16	4.6	P831_0050K302_0060 MB23 EZ404U	819	820	1778	30.00	30/1	8.0	8.0	2700	2300	4000	14	128	68
100	195	243	16	4.6	P831_0050K302_0060 MB23 EZ404U	819	820	1778	30.00	30/1	12	8.0	2700	2300	4000	14	128	68
100	195	243	16	4.6	P831_0050K302_0060 MB23 EZ404U	819	820	1778	30.00	30/1	16	8.0	2700	2300	4000	14	128	68
100	209	226	17	4.3	P831_0050K302_0060 MB23 EZ502U	875	880	1778	30.00	30/1	8.0	8.0	2700	2300	4000	16	128	68
100	209	226	17	4.3	P831_0050K302_0060 MB23 EZ502U	875	880	1778	30.00	30/1	12	8.0	2700	2300	4000	16	128	68
100	209	226	17	4.3	P831_0050K302_0060 MB23 EZ502U	875	880	1778	30.00	30/1	16	8.0	2700	2300	4000	16	128	68
100	209	234	17	4.3	P831_0050K302_0060 MB33 EZ701U	565	560	3230	30.00	30/1	16	15	2700	2300	4000	41	128	77
100	209	234	17	4.3	P831_0050K302_0060 MB33 EZ701U	565	560	3230	30.00	30/1	24	15	2700	2300	4000	41	128	77
100	209	234	17	4.3	P831_0050K302_0060 MB33 EZ701U	565	560	3230	30.00	30/1	32	15	2700	2300	4000	41	128	77
100	209	234	17	4.3	P831_0050K302_0060 MB33 EZ701U	565	560	3230	30.00	30/1	45	15	2700	2300	4000	41	128	77
100	274	313	22	3.3	P831_0050K302_0060 MB23 EZ503U	1059	1060	1778	30.00	30/1	8.0	15	2700	2300	4000	20	128	70
100	274	313	22	3.3	P831_0050K302_0060 MB23 EZ503U	1059	1060	1778	30.00	30/1	12	15	2700	2300	4000	20	128	70
100	339	406	27	2.7	P831_0050K302_0060 MB33 EZ702U	1157	1160	3230	30.00	30/1	16	15	2700	2300	4000	47	128	80
100	339	406	27	2.7	P831_0050K302_0060 MB33 EZ702U	1157	1160	3230	30.00	30/1	24	15	2700	2300	4000	47	128	80
100	339	406	27	2.7	P831_0050K302_0060 MB33 EZ702U	1157	1160	3230	30.00	30/1	32	15	2700	2300	4000	47	128	80
100	339	406	27	2.7	P831_0050K302_0060 MB33 EZ702U	1157	1160	3230	30.00	30/1	45	15	2700	2300	4000	47	128	80
100	381	452	30	2.4	P831_0050K302_0060 MB23 EZ505U	1059	1060	1778	30.00	30/1	8.0	15	2700	2300	4000	24	128	73
100	381	452	30	2.4	P831_0050K302_0060 MB23 EZ505U	1059	1060	1778	30.00	30/1	12	15	2700	2300	4000	24	128	73
100	466	587	37	1.9	P831_0050K302_0060 MB33 EZ703U	1697	1700	3230	30.00	30/1	16	32	2700	2300	4000	58	128	82
100	466	587	37	1.9	P831_0050K302_0060 MB33 EZ703U	1697	1700	3230	30.00	30/1	24	32	2700	2300	4000	58	128	82
100	601	852	48	1.5	P831_0050K302_0060 MB33 EZ705U	1697	1700	3230	30.00	30/1	16	32	2700	2300	4000	71	128	88
100	601	852	48	1.5	P831_0050K302_0060 MB33 EZ705U	1697	1700	3230	30.00	30/1	24	32	2700	2300	4000	71	128	88
107	182	227	26	3.4	P831_0070K202_0040 MB23 EZ404U	764	760	1660	28.00	28/1	8.0	8.0	3000	2600	4000	13	128	63
107	182	227	26	3.4	P831_0070K202_0040 MB23 EZ404U	764	760	1660	28.00	28/1	12	8.0	3000	2600	4000	13	128	63
107	182	227	26	3.4	P831_0070K202_0040 MB23 EZ404U	764	760	1660	28.00	28/1	16	8.0	3000	2600	4000	13	128	63
107	195	211	27	3.2	P831_0070K202_0040 MB23 EZ502U	817	820	1660	28.00	28/1	8.0	8.0	3000	2600	4000	15	128	63
107	195	211	27	3.2	P831_0070K202_0040 MB23 EZ502U	817	820	1660	28.00	28/1	12	8.0	3000	2600	4000	15	128	63
107	195	211	27	3.2	P831_0070K202_0040 MB23 EZ502U	817	820	1660	28.00	28/1	16	8.0	3000	2600	4000	15	128	63
107	195	219	27	3.2	P831_0070K202_0040 MB33 EZ701U	527	530	2887	28.00	28/1	16	15	3000	2600	4000	40	128	72
107	195	219	27	3.2	P831_0070K202_0040 MB33 EZ701U	527	530	2887	28.00	28/1	24	15	3000	2600	4000	40	128	72
107	195	219	27	3.2	P831_0070K202_0040 MB33 EZ701U	527	530	2887	28.00	28/1	32	15	3000	2600	4000	40	128	72
107	195	219	27	3.2	P831_0070K202_0040 MB33 EZ701U	527	530	2887	28.00	28/1	45	15	3000	2600	4000	40	128	72
107	256	292	36	2.5	P831_0070K202_0040 MB23 EZ503U	988	990	1660	28.00	28/1	8.0	15	3000	2600	4000	19	128	65
107	256	292	36	2.5	P831_0070K202_0040 MB23 EZ503U	988	990	1660	28.00	28/1	12	15	3000	2600	4000	19	128	65
107	316	379	45	2.0	P831_0070K202_0040 MB33 EZ702U	1080	1080	2887	28.00	28/1	16	15	3000	2600	4000	46	128	75
107	316	379	45	2.0	P831_0070K202_0040 MB33 EZ702U	1080	1080	2887	28.00	28/1	24	15	3000	2600	4000	46	128	75
107	316	379	45	2.0	P831_0070K202_0040 MB33 EZ702U	1080	1080	2887	28.00	28/1	32	15	3000	2600	4000	46	128	75
107	316	379	45	2.0	P831_0070K202_0040 MB33 EZ702U	1080	1080	2887	28.00	28/1	45	15	3000	2600	4000	46	128	75
107	356	422	50	1.8	P831_0070K202_0040 MB23 EZ505U	988	990	1660	28.00	28/1	8.0	15	3000	2600	4000	23	128	68
107	356	422	50	1.8	P831_0070K202_0040 MB23 EZ505U	988	990	1660	28.00	28/1	12	15	3000	2600	4000	23	128	68
107	435	548	61	1.4	P831_0070K202_0040 MB33 EZ703U	1185	1180	2887	28.00	28/1	16	32	3000	2600	4000	57	128	77
107	561	796	79	1.1	P831_0070K202_0040 MB33 EZ705U	1185	1180	2887	28.00	28/1	16	32	3000	2600	4000	70	128	83
112	174	217	16	5.0	P831_0050K302_0054 MB23 EZ404U	733	730	1593	26.88	215/8	8.0	8.0	2700	2300	4000	14	128	68
112	174	217	16	5.0	P831_0050K302_0054 MB23 EZ404U	733	730	1593	26.88	215/8	12	8.0	2700	2300	4000	14	128	68
112	174	217	16	5.0	P831_0050K302_0054 MB23 EZ404U	733	730	1593	26.88	215/8	16	8.0	2700	2300	4000	14	128	68
112	187	202	17	4.6	P831_0050K302_0054 MB23 EZ502U	784	780	1593	26.88	215/8	8.0	8.0	2700	2300	4000	16	128	68
112	187	202	17	4.6	P831_0050K302_0054 MB23 EZ502U	784	780	1593	26.88	215/8	12	8.0	2700	2300	4000	16	128	68
112	187	202	17	4.6	P831_0050K302_0054 MB23 EZ502U	784	780	1593	26.88	215/8	16	8.0	2700	2300	4000	16	128	68
112	187	210	17	4.6	P831_0050K302_0054 MB33 EZ701U	506	510	3108	26.88	215/8	16	15	2700	2300	4000	41	128	77
112	187	210	17	4.6	P831_0050K302_0054 MB33 EZ701U	506	510	3108	26.88	215/8	24	15	2700	2300	4000	41	128	77
112	187	210	17	4.6	P831_0050K302_0054 MB33 EZ701U	506	510	3108	26.88	215/8	32	15	2700	2300	4000	41	128	77
112	187	210	17	4.6	P831_0050K302_0054 MB33 EZ701U	506	510	3108	26.88	215/8	45	15	2700	2300	4000	41	128	77
112	245	281	22	3.5	P831_0050K302_0054 MB23 EZ503U	948	950	1593	26.88	215/8	8.0	15	2700	2300	4000	20	128	70
112	245	281	22	3.5	P831_0050K302_0054 MB23 EZ503U	948	950	1593	26.88	215/8	12	15	2700	2300	4000	20	128	70
112	303	364	27	2.9	P831_0050K302_0054 MB33 EZ702U	1037	1040	3108	26.88	215/8	16	15	2700	2300	4000	46	128	80
112	303	364	27	2.9	P831_0050K302_0054 MB33 EZ702U	1037	1040	3108	26.88	215/8	24	15	2700	2300	4000	46	128	80

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
P831K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1840 Nm)																		
112	303	364	27	2.9	P831_0050K302_0054 MB33 EZ702U	1037	1040	3108	26.88	215/8	32	15	2700	2300	4000	46	128	80
112	303	364	27	2.9	P831_0050K302_0054 MB33 EZ702U	1037	1040	3108	26.88	215/8	45	15	2700	2300	4000	46	128	80
112	341	405	31	2.5	P831_0050K302_0054 MB23 EZ505U	948	950	1593	26.88	215/8	8.0	15	2700	2300	4000	24	128	73
112	341	405	31	2.5	P831_0050K302_0054 MB23 EZ505U	948	950	1593	26.88	215/8	12	15	2700	2300	4000	24	128	73
112	417	526	38	2.1	P831_0050K302_0054 MB33 EZ703U	1636	1640	3108	26.88	215/8	16	32	2700	2300	4000	58	128	82
112	417	526	38	2.1	P831_0050K302_0054 MB33 EZ703U	1636	1640	3108	26.88	215/8	24	32	2700	2300	4000	58	128	82
112	539	764	48	1.6	P831_0050K302_0054 MB33 EZ705U	1636	1640	3108	26.88	215/8	16	32	2700	2300	4000	71	128	88
112	539	764	48	1.6	P831_0050K302_0054 MB33 EZ705U	1636	1640	3108	26.88	215/8	24	32	2700	2300	4000	71	128	88
150	183	209	25	3.9	P831_0050K302_0040 MB23 EZ503U	706	710	1186	20.00	20/1	8.0	15	2700	2300	4000	22	128	70
150	183	209	25	3.9	P831_0050K302_0040 MB23 EZ503U	706	710	1186	20.00	20/1	12	15	2700	2300	4000	22	128	70
150	226	271	28	3.5	P831_0050K302_0040 MB33 EZ702U	772	770	3230	20.00	20/1	16	15	2700	2300	4000	48	128	80
150	226	271	28	3.5	P831_0050K302_0040 MB33 EZ702U	772	770	3230	20.00	20/1	24	15	2700	2300	4000	48	128	80
150	226	271	28	3.5	P831_0050K302_0040 MB33 EZ702U	772	770	3230	20.00	20/1	32	15	2700	2300	4000	48	128	80
150	226	271	28	3.5	P831_0050K302_0040 MB33 EZ702U	772	770	3230	20.00	20/1	45	15	2700	2300	4000	48	128	80
150	254	301	35	2.8	P831_0050K302_0040 MB23 EZ505U	706	710	1186	20.00	20/1	8.0	15	2700	2300	4000	26	128	73
150	254	301	35	2.8	P831_0050K302_0040 MB23 EZ505U	706	710	1186	20.00	20/1	12	15	2700	2300	4000	26	128	73
150	310	391	38	2.5	P831_0050K302_0040 MB33 EZ703U	1223	1220	3230	20.00	20/1	16	32	2700	2300	4000	60	128	82
150	310	391	38	2.5	P831_0050K302_0040 MB33 EZ703U	1223	1220	3230	20.00	20/1	24	32	2700	2300	4000	60	128	82
150	310	391	38	2.5	P831_0050K302_0040 MB33 EZ703U	1223	1220	3230	20.00	20/1	32	32	2700	2300	4000	60	128	82
150	310	391	38	2.5	P831_0050K302_0040 MB33 EZ703U	1223	1220	3230	20.00	20/1	45	32	2700	2300	4000	60	128	82
150	401	568	50	2.0	P831_0050K302_0040 MB33 EZ705U	1482	1480	3230	20.00	20/1	16	32	2700	2300	4000	73	128	88
150	401	568	50	2.0	P831_0050K302_0040 MB33 EZ705U	1482	1480	3230	20.00	20/1	24	32	2700	2300	4000	73	128	88
150	401	568	50	2.0	P831_0050K302_0040 MB33 EZ705U	1482	1480	3230	20.00	20/1	32	32	2700	2300	4000	73	128	88
150	401	568	50	2.0	P831_0050K302_0040 MB33 EZ705U	1482	1480	3230	20.00	20/1	45	32	2700	2300	4000	73	128	88
188	146	167	25	3.9	P831_0040K302_0040 MB23 EZ503U	565	560	948	16.00	16/1	8.0	15	2700	2300	4000	22	109	70
188	146	167	25	3.9	P831_0040K302_0040 MB23 EZ503U	565	560	948	16.00	16/1	12	15	2700	2300	4000	22	109	70
188	181	217	28	3.5	P831_0040K302_0040 MB33 EZ702U	617	620	2845	16.00	16/1	16	15	2700	2300	4000	49	109	80
188	181	217	28	3.5	P831_0040K302_0040 MB33 EZ702U	617	620	2845	16.00	16/1	24	15	2700	2300	4000	49	109	80
188	181	217	28	3.5	P831_0040K302_0040 MB33 EZ702U	617	620	2845	16.00	16/1	32	15	2700	2300	4000	49	109	80
188	181	217	28	3.5	P831_0040K302_0040 MB33 EZ702U	617	620	2845	16.00	16/1	45	15	2700	2300	4000	49	109	80
188	203	241	35	2.8	P831_0040K302_0040 MB23 EZ505U	565	560	948	16.00	16/1	8.0	15	2700	2300	4000	27	109	73
188	203	241	35	2.8	P831_0040K302_0040 MB23 EZ505U	565	560	948	16.00	16/1	12	15	2700	2300	4000	27	109	73
188	248	313	38	2.5	P831_0040K302_0040 MB33 EZ703U	979	980	2845	16.00	16/1	16	32	2700	2300	4000	61	109	82
188	248	313	38	2.5	P831_0040K302_0040 MB33 EZ703U	979	980	2845	16.00	16/1	24	32	2700	2300	4000	61	109	82
188	248	313	38	2.5	P831_0040K302_0040 MB33 EZ703U	979	980	2845	16.00	16/1	32	32	2700	2300	4000	61	109	82
188	248	313	38	2.5	P831_0040K302_0040 MB33 EZ703U	979	980	2845	16.00	16/1	45	32	2700	2300	4000	61	109	82
188	321	455	50	2.0	P831_0040K302_0040 MB33 EZ705U	1186	1190	2845	16.00	16/1	16	32	2700	2300	4000	73	109	88
188	321	455	50	2.0	P831_0040K302_0040 MB33 EZ705U	1186	1190	2845	16.00	16/1	24	32	2700	2300	4000	73	109	88
188	321	455	50	2.0	P831_0040K302_0040 MB33 EZ705U	1186	1190	2845	16.00	16/1	32	32	2700	2300	4000	73	109	88
188	321	455	50	2.0	P831_0040K302_0040 MB33 EZ705U	1186	1190	2845	16.00	16/1	45	32	2700	2300	4000	73	109	88
250	110	125	25	3.9	P831_0030K302_0040 MB23 EZ503U	423	420	711	12.00	12/1	8.0	15	2700	2300	4000	24	83	70
250	110	125	25	3.9	P831_0030K302_0040 MB23 EZ503U	423	420	711	12.00	12/1	12	15	2700	2300	4000	24	83	70
250	135	163	28	3.5	P831_0030K302_0040 MB33 EZ702U	463	460	2134	12.00	12/1	16	15	2700	2300	4000	50	83	80
250	135	163	28	3.5	P831_0030K302_0040 MB33 EZ702U	463	460	2134	12.00	12/1	24	15	2700	2300	4000	50	83	80
250	135	163	28	3.5	P831_0030K302_0040 MB33 EZ702U	463	460	2134	12.00	12/1	32	15	2700	2300	4000	50	83	80
250	135	163	28	3.5	P831_0030K302_0040 MB33 EZ702U	463	460	2134	12.00	12/1	45	15	2700	2300	4000	50	83	80
250	152	181	35	2.8	P831_0030K302_0040 MB23 EZ505U	423	420	711	12.00	12/1	8.0	15	2700	2300	4000	28	83	73
250	152	181	35	2.8	P831_0030K302_0040 MB23 EZ505U	423	420	711	12.00	12/1	12	15	2700	2300	4000	28	83	73
250	186	235	38	2.5	P831_0030K302_0040 MB33 EZ703U	734	730	2134	12.00	12/1	16	32	2700	2300	4000	62	83	82
250	186	235	38	2.5	P831_0030K302_0040 MB33 EZ703U	734	730	2134	12.00	12/1	24	32	2700	2300	4000	62	83	82
250	186	235	38	2.5	P831_0030K302_0040 MB33 EZ703U	734	730	2134	12.00	12/1	32	32	2700	2300	4000	62	83	82
250	186	235	38	2.5	P831_0030K302_0040 MB33 EZ703U	734	730	2134	12.00	12/1	45	32	2700	2300	4000	62	83	82
250	240	341	50	2.0	P831_0030K302_0040 MB33 EZ705U	889	890	2134	12.00	12/1	16	32	2700	2300	4000	75	83	88
250	240	341	50	2.0	P831_0030K302_0040 MB33 EZ705U	889	890	2134	12.00	12/1	24	32	2700	2300	4000	75	83	88
250	240	341	50	2.0	P831_0030K302_0040 MB33 EZ705U	889	890	2134	12.00	12/1	32	32	2700	2300	4000	75	83	88
250	240	341	50	2.0	P831_0030K302_0040 MB33 EZ705U	889	890	2134	12.00	12/1	45	32	2700	2300	4000	75	83	88
P931K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 3110 Nm)																		
15	787	860	9.3	2.7	P931_0070K402_0280 MB23 EZ501U	2927	–	6210	194.4	9331/48	8.0	8.0	3600	3300	4000	11	305	92
15	860	951	10	2.4	P931_0070K402_0280 MB23 EZ402U	2927	–	6210	194.4	9331/48	8.0	8.0	3600	3300	4000	9.7	305	91
15	1262	1573	15	1.7	P931_0070K402_0280 MB23 EZ404U	3105	–	6210	194.4	9331/48	8.0	8.0	3600	3300	4000	11	305	94
15	1354	1463	16	1.6	P931_0070K402_0280 MB23 EZ502U	3105	–	6210	194.4	9331/48	8.0	8.0	3600	3300	4000	13	305	93
17	716	783	9.1	2.9	P931_0070K402_0250 MB23 EZ501U	2664	–	6210	177.0	29197/165	8.0	8.0	3600	3300	4000	11	305	92
17	783	866	9.9	2.7	P931_0070K402_0250 MB23 EZ402U	2664	–	6210	177.0	29197/165	8.0	8.0	3600	3300	4000	9.5	305	91
17	1149	1432	15	1.8	P931_0070K402_0250 MB23 EZ404U	3105	–	6210	177.0	29197/165	8.0	8.0	3600	3300	4000	11	305	94

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
P931K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 3110 Nm)																		
17	1232	1332	16	1.7	P931_0070K402_0250 MB23 EZ502U	3105	–	6210	177.0	29197/165	8.0	8.0	3600	3300	4000	13	305	93
18	660	721	8.9	3.2	P931_0070K402_0230 MB23 EZ501U	2455	–	6210	163.0	3913/24	8.0	8.0	3600	3300	4000	11	305	92
18	660	721	8.9	3.2	P931_0070K402_0230 MB23 EZ501U	2455	–	6210	163.0	3913/24	12	8.0	3600	3300	4000	11	305	92
18	721	798	9.7	2.9	P931_0070K402_0230 MB23 EZ402U	2455	–	6210	163.0	3913/24	8.0	8.0	3600	3300	4000	9.9	305	91
18	721	798	9.7	2.9	P931_0070K402_0230 MB23 EZ402U	2455	–	6210	163.0	3913/24	12	8.0	3600	3300	4000	9.9	305	91
18	1059	1319	14	2.0	P931_0070K402_0230 MB23 EZ404U	3105	–	6210	163.0	3913/24	8.0	8.0	3600	3300	4000	11	305	94
18	1059	1319	14	2.0	P931_0070K402_0230 MB23 EZ404U	3105	–	6210	163.0	3913/24	12	8.0	3600	3300	4000	11	305	94
18	1135	1227	15	1.9	P931_0070K402_0230 MB23 EZ502U	3105	–	6210	163.0	3913/24	8.0	8.0	3600	3300	4000	13	305	93
18	1135	1227	15	1.9	P931_0070K402_0230 MB23 EZ502U	3105	–	6210	163.0	3913/24	12	8.0	3600	3300	4000	13	305	93
21	572	625	8.6	3.7	P931_0070K402_0200 MB23 EZ501U	2128	–	6210	141.4	9331/66	8.0	8.0	3600	3300	4000	11	305	92
21	572	625	8.6	3.7	P931_0070K402_0200 MB23 EZ501U	2128	–	6210	141.4	9331/66	12	8.0	3600	3300	4000	11	305	92
21	572	625	8.6	3.7	P931_0070K402_0200 MB23 EZ501U	2128	–	6210	141.4	9331/66	16	8.0	3600	3300	4000	11	305	92
21	625	692	9.4	3.4	P931_0070K402_0200 MB23 EZ402U	2128	–	6210	141.4	9331/66	8.0	8.0	3600	3300	4000	9.8	305	91
21	625	692	9.4	3.4	P931_0070K402_0200 MB23 EZ402U	2128	–	6210	141.4	9331/66	12	8.0	3600	3300	4000	9.8	305	91
21	625	692	9.4	3.4	P931_0070K402_0200 MB23 EZ402U	2128	–	6210	141.4	9331/66	16	8.0	3600	3300	4000	9.8	305	91
21	918	1144	14	2.3	P931_0070K402_0200 MB23 EZ404U	3105	–	6210	141.4	9331/66	8.0	8.0	3600	3300	4000	11	305	94
21	918	1144	14	2.3	P931_0070K402_0200 MB23 EZ404U	3105	–	6210	141.4	9331/66	12	8.0	3600	3300	4000	11	305	94
21	918	1144	14	2.3	P931_0070K402_0200 MB23 EZ404U	3105	–	6210	141.4	9331/66	16	8.0	3600	3300	4000	11	305	94
21	984	1064	15	2.1	P931_0070K402_0200 MB23 EZ502U	3105	–	6210	141.4	9331/66	8.0	8.0	3600	3300	4000	13	305	93
21	984	1064	15	2.1	P931_0070K402_0200 MB23 EZ502U	3105	–	6210	141.4	9331/66	12	8.0	3600	3300	4000	13	305	93
21	984	1064	15	2.1	P931_0070K402_0200 MB23 EZ502U	3105	–	6210	141.4	9331/66	16	8.0	3600	3300	4000	13	305	93
21	1290	1477	19	1.6	P931_0070K402_0200 MB23 EZ503U	3105	–	6210	141.4	9331/66	8.0	15	3600	3300	4000	17	305	95
21	1796	2128	27	1.2	P931_0070K402_0200 MB23 EZ505U	3105	–	6210	141.4	9331/66	8.0	15	3600	3300	4000	21	305	98
25	493	539	8.3	4.3	P931_0070K402_0175 MB23 EZ501U	1834	–	6210	121.8	731/6	8.0	8.0	3400	3000	4000	12	305	92
25	493	539	8.3	4.3	P931_0070K402_0175 MB23 EZ501U	1834	–	6210	121.8	731/6	12	8.0	3400	3000	4000	12	305	92
25	493	539	8.3	4.3	P931_0070K402_0175 MB23 EZ501U	1834	–	6210	121.8	731/6	16	8.0	3400	3000	4000	12	305	92
25	539	596	9.0	3.9	P931_0070K402_0175 MB23 EZ402U	1834	–	6210	121.8	731/6	8.0	8.0	3400	3000	4000	10	305	91
25	539	596	9.0	3.9	P931_0070K402_0175 MB23 EZ402U	1834	–	6210	121.8	731/6	12	8.0	3400	3000	4000	10	305	91
25	539	596	9.0	3.9	P931_0070K402_0175 MB23 EZ402U	1834	–	6210	121.8	731/6	16	8.0	3400	3000	4000	10	305	91
25	791	986	13	2.7	P931_0070K402_0175 MB23 EZ404U	3105	–	6210	121.8	731/6	8.0	8.0	3400	3000	4000	12	305	94
25	791	986	13	2.7	P931_0070K402_0175 MB23 EZ404U	3105	–	6210	121.8	731/6	12	8.0	3400	3000	4000	12	305	94
25	791	986	13	2.7	P931_0070K402_0175 MB23 EZ404U	3105	–	6210	121.8	731/6	16	8.0	3400	3000	4000	12	305	94
25	848	917	14	2.5	P931_0070K402_0175 MB23 EZ502U	3105	–	6210	121.8	731/6	8.0	8.0	3400	3000	4000	14	305	93
25	848	917	14	2.5	P931_0070K402_0175 MB23 EZ502U	3105	–	6210	121.8	731/6	12	8.0	3400	3000	4000	14	305	93
25	848	917	14	2.5	P931_0070K402_0175 MB23 EZ502U	3105	–	6210	121.8	731/6	16	8.0	3400	3000	4000	14	305	93
25	1112	1272	19	1.9	P931_0070K402_0175 MB23 EZ503U	3105	–	6210	121.8	731/6	8.0	15	3400	3000	4000	18	305	95
25	1112	1272	19	1.9	P931_0070K402_0175 MB23 EZ503U	3105	–	6210	121.8	731/6	12	15	3400	3000	4000	18	305	95
25	1548	1834	26	1.4	P931_0070K402_0175 MB23 EZ505U	3105	–	6210	121.8	731/6	8.0	15	3400	3000	4000	22	305	98
25	1548	1834	26	1.4	P931_0070K402_0175 MB23 EZ505U	3105	–	6210	121.8	731/6	12	15	3400	3000	4000	22	305	98
25	480	524	8.2	4.4	P931_0070K402_0170 MB23 EZ501U	1785	–	6210	118.6	3913/33	8.0	8.0	3600	3300	4000	11	305	92
25	480	524	8.2	4.4	P931_0070K402_0170 MB23 EZ501U	1785	–	6210	118.6	3913/33	12	8.0	3600	3300	4000	11	305	92
25	480	524	8.2	4.4	P931_0070K402_0170 MB23 EZ501U	1785	–	6210	118.6	3913/33	16	8.0	3600	3300	4000	11	305	92
25	524	580	9.0	4.0	P931_0070K402_0170 MB23 EZ402U	1785	–	6210	118.6	3913/33	8.0	8.0	3600	3300	4000	10	305	91
25	524	580	9.0	4.0	P931_0070K402_0170 MB23 EZ402U	1785	–	6210	118.6	3913/33	12	8.0	3600	3300	4000	10	305	91
25	524	580	9.0	4.0	P931_0070K402_0170 MB23 EZ402U	1785	–	6210	118.6	3913/33	16	8.0	3600	3300	4000	10	305	91
25	770	959	13	2.7	P931_0070K402_0170 MB23 EZ404U	3105	–	6210	118.6	3913/33	8.0	8.0	3600	3300	4000	11	305	94
25	770	959	13	2.7	P931_0070K402_0170 MB23 EZ404U	3105	–	6210	118.6	3913/33	12	8.0	3600	3300	4000	11	305	94
25	770	959	13	2.7	P931_0070K402_0170 MB23 EZ404U	3105	–	6210	118.6	3913/33	16	8.0	3600	3300	4000	11	305	94
25	826	893	14	2.5	P931_0070K402_0170 MB23 EZ502U	3105	–	6210	118.6	3913/33	8.0	8.0	3600	3300	4000	14	305	93
25	826	893	14	2.5	P931_0070K402_0170 MB23 EZ502U	3105	–	6210	118.6	3913/33	12	8.0	3600	3300	4000	14	305	93
25	826	893	14	2.5	P931_0070K402_0170 MB23 EZ502U	3105	–	6210	118.6	3913/33	16	8.0	3600	3300	4000	14	305	93
25	1082	1238	19	1.9	P931_0070K402_0170 MB23 EZ503U	3105	–	6210	118.6	3913/33	8.0	15	3600	3300	4000	17	305	95
25	1082	1238	19	1.9	P931_0070K402_0170 MB23 EZ503U	3105	–	6210	118.6	3913/33	12	15	3600	3300	4000	17	305	95
25	1506	1785	26	1.4	P931_0070K402_0170 MB23 EZ505U	3105	–	6210	118.6	3913/33	8.0	15	3600	3300	4000	22	305	98
25	1506	1785	26	1.4	P931_0070K402_0170 MB23 EZ505U	3105	–	6210	118.6	3913/33	12	15	3600	3300	4000	22	305	98
31	430	476	8.5	4.9	P931_0070K402_0140 MB23 EZ402U	1463	–	5761	97.20	9331/96	8.0	8.0	3400	3000	4000	11	305	91
31	430	476	8.5	4.9	P931_0070K402_0140 MB23 EZ402U	1463	–	5761	97.20	9331/96	12	8.0	3400	3000	4000	11	305	91
31	430	476	8.5	4.9	P931_0070K402_0140 MB23 EZ402U	1463	–	5761	97.20	9331/96	16	8.0	3400	3000	4000	11	305	91
31	631	786	13	3.3	P931_0070K402_0140 MB23 EZ404U	2652	–	5761	97.20	9331/96	8.0	8.0	3400	3000	4000	12	305	94
31	631	786	13	3.3	P931_0070K402_0140 MB23 EZ404U	2652	–	5761	97.20	9331/96	12	8.0	3400	3000	4000	12	305	94
31	631	786	13	3.3	P931_0070K402_0140 MB23 EZ404U	2652	–	5761	97.20	9331/96	16	8.0	3400	3000	4000	12	305	94
31	677	732	13	3.1	P931_0070K402_0140 MB23 EZ502U	2835	–	5761	97.20	9331/96	8.0	8.0	3400	3000	4000	15	305	93
31	677	732	13	3.1	P931_0070K402_0140 MB23 EZ502U	2835	–	5761	97.20	9331/96	12	8.0	3400	3000	4000	15	305	93
31	677	732	13	3.1	P931_0070K402_0140 MB23 EZ502U	2835	–	5761	97.20	9331/96	16	8.0	3400	3000	4000	15	305	93

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
P931K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 3110 Nm)																		
31	677	759	13	3.1	P931_0070K402_0140 MB33 EZ701U	1829	–	6210	97.20	9331/96	16	15	3400	3000	4000	40	305	103
31	887	1015	18	2.4	P931_0070K402_0140 MB23 EZ503U	3105	–	5761	97.20	9331/96	8.0	15	3400	3000	4000	18	305	95
31	887	1015	18	2.4	P931_0070K402_0140 MB23 EZ503U	3105	–	5761	97.20	9331/96	12	15	3400	3000	4000	18	305	95
31	1097	1317	22	1.9	P931_0070K402_0140 MB33 EZ702U	3105	–	6210	97.20	9331/96	16	15	3400	3000	4000	45	305	105
31	1235	1463	25	1.7	P931_0070K402_0140 MB23 EZ505U	3105	–	5761	97.20	9331/96	8.0	15	3400	3000	4000	23	305	98
31	1235	1463	25	1.7	P931_0070K402_0140 MB23 EZ505U	3105	–	5761	97.20	9331/96	12	15	3400	3000	4000	23	305	98
34	575	717	12	3.7	P931_0070K402_0125 MB23 EZ404U	2418	–	5252	88.61	2924/33	8.0	8.0	3400	3000	4000	12	305	94
34	575	717	12	3.7	P931_0070K402_0125 MB23 EZ404U	2418	–	5252	88.61	2924/33	12	8.0	3400	3000	4000	12	305	94
34	575	717	12	3.7	P931_0070K402_0125 MB23 EZ404U	2418	–	5252	88.61	2924/33	16	8.0	3400	3000	4000	12	305	94
34	617	667	13	3.4	P931_0070K402_0125 MB23 EZ502U	2584	–	5252	88.61	2924/33	8.0	8.0	3400	3000	4000	14	305	93
34	617	667	13	3.4	P931_0070K402_0125 MB23 EZ502U	2584	–	5252	88.61	2924/33	12	8.0	3400	3000	4000	14	305	93
34	617	667	13	3.4	P931_0070K402_0125 MB23 EZ502U	2584	–	5252	88.61	2924/33	16	8.0	3400	3000	4000	14	305	93
34	617	692	13	3.4	P931_0070K402_0125 MB33 EZ701U	1667	–	6210	88.61	2924/33	16	15	3400	3000	4000	39	305	103
34	617	692	13	3.4	P931_0070K402_0125 MB33 EZ701U	1667	–	6210	88.61	2924/33	24	15	3400	3000	4000	39	305	103
34	809	925	17	2.6	P931_0070K402_0125 MB23 EZ503U	3105	–	5252	88.61	2924/33	8.0	15	3400	3000	4000	18	305	95
34	809	925	17	2.6	P931_0070K402_0125 MB23 EZ503U	3105	–	5252	88.61	2924/33	12	15	3400	3000	4000	18	305	95
34	1000	1201	21	2.1	P931_0070K402_0125 MB33 EZ702U	3105	–	6210	88.61	2924/33	16	15	3400	3000	4000	44	305	105
34	1000	1201	21	2.1	P931_0070K402_0125 MB33 EZ702U	3105	–	6210	88.61	2924/33	24	15	3400	3000	4000	44	305	105
34	1125	1334	24	1.9	P931_0070K402_0125 MB23 EZ505U	3105	–	5252	88.61	2924/33	8.0	15	3400	3000	4000	22	305	98
34	1125	1334	24	1.9	P931_0070K402_0125 MB23 EZ505U	3105	–	5252	88.61	2924/33	12	15	3400	3000	4000	22	305	98
37	523	652	12	4.0	P931_0070K402_0115 MB23 EZ404U	2200	–	4779	80.63	645/8	8.0	8.0	3000	2600	4000	13	305	94
37	523	652	12	4.0	P931_0070K402_0115 MB23 EZ404U	2200	–	4779	80.63	645/8	12	8.0	3000	2600	4000	13	305	94
37	523	652	12	4.0	P931_0070K402_0115 MB23 EZ404U	2200	–	4779	80.63	645/8	16	8.0	3000	2600	4000	13	305	94
37	561	607	13	3.7	P931_0070K402_0115 MB23 EZ502U	2352	–	4779	80.63	645/8	8.0	8.0	3000	2600	4000	15	305	93
37	561	607	13	3.7	P931_0070K402_0115 MB23 EZ502U	2352	–	4779	80.63	645/8	12	8.0	3000	2600	4000	15	305	93
37	561	607	13	3.7	P931_0070K402_0115 MB23 EZ502U	2352	–	4779	80.63	645/8	16	8.0	3000	2600	4000	15	305	93
37	561	630	13	3.7	P931_0070K402_0115 MB33 EZ701U	1517	–	6210	80.63	645/8	16	15	3000	2600	4000	40	305	103
37	561	630	13	3.7	P931_0070K402_0115 MB33 EZ701U	1517	–	6210	80.63	645/8	24	15	3000	2600	4000	40	305	103
37	736	842	17	2.9	P931_0070K402_0115 MB23 EZ503U	2845	–	4779	80.63	645/8	8.0	15	3000	2600	4000	19	305	95
37	736	842	17	2.9	P931_0070K402_0115 MB23 EZ503U	2845	–	4779	80.63	645/8	12	15	3000	2600	4000	19	305	95
37	910	1092	21	2.3	P931_0070K402_0115 MB33 EZ702U	3105	–	6210	80.63	645/8	16	15	3000	2600	4000	45	305	105
37	910	1092	21	2.3	P931_0070K402_0115 MB33 EZ702U	3105	–	6210	80.63	645/8	24	15	3000	2600	4000	45	305	105
37	1024	1214	23	2.1	P931_0070K402_0115 MB23 EZ505U	2845	–	4779	80.63	645/8	8.0	15	3000	2600	4000	23	305	98
37	1024	1214	23	2.1	P931_0070K402_0115 MB23 EZ505U	2845	–	4779	80.63	645/8	12	15	3000	2600	4000	23	305	98
42	459	572	12	4.6	P931_0070K402_0100 MB23 EZ404U	1929	–	4190	70.69	9331/132	8.0	8.0	3400	3000	4000	13	305	94
42	459	572	12	4.6	P931_0070K402_0100 MB23 EZ404U	1929	–	4190	70.69	9331/132	12	8.0	3400	3000	4000	13	305	94
42	459	572	12	4.6	P931_0070K402_0100 MB23 EZ404U	1929	–	4190	70.69	9331/132	16	8.0	3400	3000	4000	13	305	94
42	492	532	12	4.3	P931_0070K402_0100 MB23 EZ502U	2062	–	4190	70.69	9331/132	8.0	8.0	3400	3000	4000	15	305	93
42	492	532	12	4.3	P931_0070K402_0100 MB23 EZ502U	2062	–	4190	70.69	9331/132	12	8.0	3400	3000	4000	15	305	93
42	492	532	12	4.3	P931_0070K402_0100 MB23 EZ502U	2062	–	4190	70.69	9331/132	16	8.0	3400	3000	4000	15	305	93
42	492	552	12	4.3	P931_0070K402_0100 MB33 EZ701U	1330	–	6210	70.69	9331/132	16	15	3400	3000	4000	40	305	103
42	492	552	12	4.3	P931_0070K402_0100 MB33 EZ701U	1330	–	6210	70.69	9331/132	24	15	3400	3000	4000	40	305	103
42	492	552	12	4.3	P931_0070K402_0100 MB33 EZ701U	1330	–	6210	70.69	9331/132	32	15	3400	3000	4000	40	305	103
42	645	738	16	3.3	P931_0070K402_0100 MB23 EZ503U	2494	–	4190	70.69	9331/132	8.0	15	3400	3000	4000	18	305	95
42	645	738	16	3.3	P931_0070K402_0100 MB23 EZ503U	2494	–	4190	70.69	9331/132	12	15	3400	3000	4000	18	305	95
42	798	958	20	2.6	P931_0070K402_0100 MB33 EZ702U	2727	–	6210	70.69	9331/132	16	15	3400	3000	4000	45	305	105
42	798	958	20	2.6	P931_0070K402_0100 MB33 EZ702U	2727	–	6210	70.69	9331/132	24	15	3400	3000	4000	45	305	105
42	798	958	20	2.6	P931_0070K402_0100 MB33 EZ702U	2727	–	6210	70.69	9331/132	32	15	3400	3000	4000	45	305	105
42	898	1064	23	2.3	P931_0070K402_0100 MB23 EZ505U	2494	–	4190	70.69	9331/132	8.0	15	3400	3000	4000	23	305	98
42	898	1064	23	2.3	P931_0070K402_0100 MB23 EZ505U	2494	–	4190	70.69	9331/132	12	15	3400	3000	4000	23	305	98
46	450	487	12	4.7	P931_0070K402_0092 MB23 EZ502U	1886	–	3833	64.67	16555/256	8.0	8.0	3000	2600	4000	16	305	93
46	450	487	12	4.7	P931_0070K402_0092 MB23 EZ502U	1886	–	3833	64.67	16555/256	12	8.0	3000	2600	4000	16	305	93
46	450	487	12	4.7	P931_0070K402_0092 MB23 EZ502U	1886	–	3833	64.67	16555/256	16	8.0	3000	2600	4000	16	305	93
46	450	505	12	4.7	P931_0070K402_0092 MB33 EZ701U	1217	–	6210	64.67	16555/256	16	15	3000	2600	4000	41	305	103
46	450	505	12	4.7	P931_0070K402_0092 MB33 EZ701U	1217	–	6210	64.67	16555/256	24	15	3000	2600	4000	41	305	103
46	450	505	12	4.7	P931_0070K402_0092 MB33 EZ701U	1217	–	6210	64.67	16555/256	32	15	3000	2600	4000	41	305	103
46	590	675	16	3.6	P931_0070K402_0092 MB23 EZ503U	2282	–	3833	64.67	16555/256	8.0	15	3000	2600	4000	20	305	95
46	590	675	16	3.6	P931_0070K402_0092 MB23 EZ503U	2282	–	3833	64.67	16555/256	12	15	3000	2600	4000	20	305	95
46	730	876	20	2.9	P931_0070K402_0092 MB33 EZ702U	2495	–	6210	64.67	16555/256	16	15	3000	2600	4000	47	305	105
46	730	876	20	2.9	P931_0070K402_0092 MB33 EZ702U	2495	–	6210	64.67	16555/256	24	15	3000	2600	4000	47	305	105
46	730	876	20	2.9	P931_0070K402_0092 MB33 EZ702U	2495	–	6210	64.67	16555/256	32	15	3000	2600	4000	47	305	105
46	821	974	22	2.6	P931_0070K402_0092 MB23 EZ505U	2282	–	3833	64.67	16555/256	8.0	15	3000	2600	4000	24	305	98
46	821	974	22	2.6	P931_0070K402_0092 MB23 EZ505U	2282	–	3833	64.67	16555/256	12	15	3000	2600	4000	24	305	98
46	1004	1266	27	2.1	P931_0070K402_0092 MB33 EZ703U	3105	–	6210	64.67	16555/256	16	32	3000	2600	4000	58	305	108

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
P931K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 3110 Nm)																		
46	1296	1837	35	1.6	P931_0070K402_0092 MB33 EZ705U	3105	–	6210	64.67	16555/256	16	32	3000	2600	4000	71	305	113
51	535	612	16	3.9	P931_0070K402_0084 MB23 EZ503U	2069	–	3476	58.64	645/11	8.0	15	3000	2600	4000	19	305	95
51	535	612	16	3.9	P931_0070K402_0084 MB23 EZ503U	2069	–	3476	58.64	645/11	12	15	3000	2600	4000	19	305	95
51	662	794	19	3.2	P931_0070K402_0084 MB33 EZ702U	2262	–	6210	58.64	645/11	16	15	3000	2600	4000	46	305	105
51	662	794	19	3.2	P931_0070K402_0084 MB33 EZ702U	2262	–	6210	58.64	645/11	24	15	3000	2600	4000	46	305	105
51	662	794	19	3.2	P931_0070K402_0084 MB33 EZ702U	2262	–	6210	58.64	645/11	32	15	3000	2600	4000	46	305	105
51	662	794	19	3.2	P931_0070K402_0084 MB33 EZ702U	2262	–	6210	58.64	645/11	45	15	3000	2600	4000	46	305	105
51	745	883	22	2.8	P931_0070K402_0084 MB23 EZ505U	2069	–	3476	58.64	645/11	8.0	15	3000	2600	4000	24	305	98
51	745	883	22	2.8	P931_0070K402_0084 MB23 EZ505U	2069	–	3476	58.64	645/11	12	15	3000	2600	4000	24	305	98
51	910	1148	26	2.3	P931_0070K402_0084 MB33 EZ703U	3105	–	6210	58.64	645/11	16	32	3000	2600	4000	58	305	108
51	910	1148	26	2.3	P931_0070K402_0084 MB33 EZ703U	3105	–	6210	58.64	645/11	24	32	3000	2600	4000	58	305	108
51	1175	1666	34	1.8	P931_0070K402_0084 MB33 EZ705U	3105	–	6210	58.64	645/11	16	32	3000	2600	4000	70	305	113
51	1175	1666	34	1.8	P931_0070K402_0084 MB33 EZ705U	3105	–	6210	58.64	645/11	24	32	3000	2600	4000	70	305	113
57	589	707	19	3.4	P931_0070K402_0075 MB33 EZ702U	2013	–	6210	52.19	12943/248	16	15	2600	2200	3800	48	305	105
57	589	707	19	3.4	P931_0070K402_0075 MB33 EZ702U	2013	–	6210	52.19	12943/248	24	15	2600	2200	3800	48	305	105
57	589	707	19	3.4	P931_0070K402_0075 MB33 EZ702U	2013	–	6210	52.19	12943/248	32	15	2600	2200	3800	48	305	105
57	589	707	19	3.4	P931_0070K402_0075 MB33 EZ702U	2013	–	6210	52.19	12943/248	45	15	2600	2200	3800	48	305	105
57	810	1021	27	2.5	P931_0070K402_0075 MB33 EZ703U	3105	–	6210	52.19	12943/248	16	32	2600	2200	3800	60	305	108
57	810	1021	27	2.5	P931_0070K402_0075 MB33 EZ703U	3105	–	6210	52.19	12943/248	24	32	2600	2200	3800	60	305	108
57	810	1021	27	2.5	P931_0070K402_0075 MB33 EZ703U	3105	–	6210	52.19	12943/248	32	32	2600	2200	3800	60	305	108
57	1046	1483	34	1.9	P931_0070K402_0075 MB33 EZ705U	3105	–	6210	52.19	12943/248	16	32	2600	2200	3800	72	305	113
57	1046	1483	34	1.9	P931_0070K402_0075 MB33 EZ705U	3105	–	6210	52.19	12943/248	24	32	2600	2200	3800	72	305	113
57	1046	1483	34	1.9	P931_0070K402_0075 MB33 EZ705U	3105	–	6210	52.19	12943/248	32	32	2600	2200	3800	72	305	113
64	429	491	19	3.9	P931_0070K402_0067 MB23 EZ503U	1660	–	2788	47.03	1505/32	8.0	15	3000	2600	4000	21	305	95
64	429	491	19	3.9	P931_0070K402_0067 MB23 EZ503U	1660	–	2788	47.03	1505/32	12	15	3000	2600	4000	21	305	95
64	531	637	19	3.7	P931_0070K402_0067 MB33 EZ702U	1814	–	6210	47.03	1505/32	16	15	3000	2600	4000	47	305	105
64	531	637	19	3.7	P931_0070K402_0067 MB33 EZ702U	1814	–	6210	47.03	1505/32	24	15	3000	2600	4000	47	305	105
64	531	637	19	3.7	P931_0070K402_0067 MB33 EZ702U	1814	–	6210	47.03	1505/32	32	15	3000	2600	4000	47	305	105
64	531	637	19	3.7	P931_0070K402_0067 MB33 EZ702U	1814	–	6210	47.03	1505/32	45	15	3000	2600	4000	47	305	105
64	597	708	26	2.8	P931_0070K402_0067 MB23 EZ505U	1660	–	2788	47.03	1505/32	8.0	15	3000	2600	4000	25	305	98
64	597	708	26	2.8	P931_0070K402_0067 MB23 EZ505U	1660	–	2788	47.03	1505/32	12	15	3000	2600	4000	25	305	98
64	730	920	27	2.7	P931_0070K402_0067 MB33 EZ703U	2876	–	6210	47.03	1505/32	16	32	3000	2600	4000	59	305	108
64	730	920	27	2.7	P931_0070K402_0067 MB33 EZ703U	2876	–	6210	47.03	1505/32	24	32	3000	2600	4000	59	305	108
64	730	920	27	2.7	P931_0070K402_0067 MB33 EZ703U	2876	–	6210	47.03	1505/32	32	32	3000	2600	4000	59	305	108
64	943	1336	35	2.1	P931_0070K402_0067 MB33 EZ705U	3105	–	6210	47.03	1505/32	16	32	3000	2600	4000	72	305	113
64	943	1336	35	2.1	P931_0070K402_0067 MB33 EZ705U	3105	–	6210	47.03	1505/32	24	32	3000	2600	4000	72	305	113
64	943	1336	35	2.1	P931_0070K402_0067 MB33 EZ705U	3105	–	6210	47.03	1505/32	32	32	3000	2600	4000	72	305	113
71	474	569	20	4.0	P931_0070K402_0060 MB33 EZ702U	1620	–	6210	42.00	42/1	16	15	2600	2200	3800	50	305	105
71	474	569	20	4.0	P931_0070K402_0060 MB33 EZ702U	1620	–	6210	42.00	42/1	24	15	2600	2200	3800	50	305	105
71	474	569	20	4.0	P931_0070K402_0060 MB33 EZ702U	1620	–	6210	42.00	42/1	32	15	2600	2200	3800	50	305	105
71	474	569	20	4.0	P931_0070K402_0060 MB33 EZ702U	1620	–	6210	42.00	42/1	45	15	2600	2200	3800	50	305	105
71	652	822	27	2.9	P931_0070K402_0060 MB33 EZ703U	2569	–	6210	42.00	42/1	16	32	2600	2200	3800	62	305	108
71	652	822	27	2.9	P931_0070K402_0060 MB33 EZ703U	2569	–	6210	42.00	42/1	24	32	2600	2200	3800	62	305	108
71	652	822	27	2.9	P931_0070K402_0060 MB33 EZ703U	2569	–	6210	42.00	42/1	32	32	2600	2200	3800	62	305	108
71	652	822	27	2.9	P931_0070K402_0060 MB33 EZ703U	2569	–	6210	42.00	42/1	45	32	2600	2200	3800	62	305	108
71	842	1193	35	2.2	P931_0070K402_0060 MB33 EZ705U	3105	–	6210	42.00	42/1	16	32	2600	2200	3800	74	305	113
71	842	1193	35	2.2	P931_0070K402_0060 MB33 EZ705U	3105	–	6210	42.00	42/1	24	32	2600	2200	3800	74	305	113
71	842	1193	35	2.2	P931_0070K402_0060 MB33 EZ705U	3105	–	6210	42.00	42/1	32	32	2600	2200	3800	74	305	113
71	842	1193	35	2.2	P931_0070K402_0060 MB33 EZ705U	3105	–	6210	42.00	42/1	45	32	2600	2200	3800	74	305	113
79	429	514	20	4.3	P931_0070K402_0054 MB33 EZ702U	1464	–	6210	37.95	12943/341	16	15	2600	2200	3800	49	305	105
79	429	514	20	4.3	P931_0070K402_0054 MB33 EZ702U	1464	–	6210	37.95	12943/341	24	15	2600	2200	3800	49	305	105
79	429	514	20	4.3	P931_0070K402_0054 MB33 EZ702U	1464	–	6210	37.95	12943/341	32	15	2600	2200	3800	49	305	105
79	429	514	20	4.3	P931_0070K402_0054 MB33 EZ702U	1464	–	6210	37.95	12943/341	45	15	2600	2200	3800	49	305	105
79	589	743	27	3.1	P931_0070K402_0054 MB33 EZ703U	2321	–	6210	37.95	12943/341	16	32	2600	2200	3800	61	305	108
79	589	743	27	3.1	P931_0070K402_0054 MB33 EZ703U	2321	–	6210	37.95	12943/341	24	32	2600	2200	3800	61	305	108
79	589	743	27	3.1	P931_0070K402_0054 MB33 EZ703U	2321	–	6210	37.95	12943/341	32	32	2600	2200	3800	61	305	108
79	589	743	27	3.1	P931_0070K402_0054 MB33 EZ703U	2321	–	6210	37.95	12943/341	45	32	2600	2200	3800	61	305	108
79	761	1078	35	2.4	P931_0070K402_0054 MB33 EZ705U	3105	–	6210	37.95	12943/341	16	32	2600	2200	3800	73	305	113
79	761	1078	35	2.4	P931_0070K402_0054 MB33 EZ705U	3105	–	6210	37.95	12943/341	24	32	2600	2200	3800	73	305	113
79	761	1078	35	2.4	P931_0070K402_0054 MB33 EZ705U	3105	–	6210	37.95	12943/341	32	32	2600	2200	3800	73	305	113
79	761	1078	35	2.4	P931_0070K402_0054 MB33 EZ705U	3105	–	6210	37.95	12943/341	45	32	2600	2200	3800	73	305	113
98	345	414	20	4.9	P931_0070K402_0044 MB33 EZ702U	1178	–	5432	30.55	336/11	16	15	2600	2200	3800	52	305	105
98	345	414	20	4.9	P931_0070K402_0044 MB33 EZ702U	1178	–	5432	30.55	336/11	24	15	2600	2200	3800	52	305	105
98	345	414	20	4.9	P931_0070K402_0044 MB33 EZ702U	1178	–	5432	30.55	336/11	32	15	2600	2200	3800	52	305	105

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
P931K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 3110 Nm)																		
98	345	414	20	4.9	P931_0070K402_0044 MB33 EZ702U	1178	–	5432	30.55	336/11	45	15	2600	2200	3800	52	305	105
98	474	598	28	3.6	P931_0070K402_0044 MB33 EZ703U	1868	–	5432	30.55	336/11	16	32	2600	2200	3800	64	305	108
98	474	598	28	3.6	P931_0070K402_0044 MB33 EZ703U	1868	–	5432	30.55	336/11	24	32	2600	2200	3800	64	305	108
98	474	598	28	3.6	P931_0070K402_0044 MB33 EZ703U	1868	–	5432	30.55	336/11	32	32	2600	2200	3800	64	305	108
98	474	598	28	3.6	P931_0070K402_0044 MB33 EZ703U	1868	–	5432	30.55	336/11	45	32	2600	2200	3800	64	305	108
98	612	868	36	2.8	P931_0070K402_0044 MB33 EZ705U	2874	–	5432	30.55	336/11	16	32	2600	2200	3800	76	305	113
98	612	868	36	2.8	P931_0070K402_0044 MB33 EZ705U	2874	–	5432	30.55	336/11	24	32	2600	2200	3800	76	305	113
98	612	868	36	2.8	P931_0070K402_0044 MB33 EZ705U	2874	–	5432	30.55	336/11	32	32	2600	2200	3800	76	305	113
98	612	868	36	2.8	P931_0070K402_0044 MB33 EZ705U	2874	–	5432	30.55	336/11	45	32	2600	2200	3800	76	305	113
98	765	1385	45	2.2	P931_0070K402_0044 MB43 EZ803U	3105	–	6210	30.55	336/11	50	65	2600	2200	3000	184	305	144
98	765	1385	45	2.2	P931_0070K402_0044 MB43 EZ803U	3105	–	6210	30.55	336/11	72	65	2600	2200	3000	184	305	144
107	435	548	28	3.8	P931_0070K402_0040 MB33 EZ703U	1712	–	4979	28.00	28/1	16	32	2600	2200	3800	65	305	108
107	435	548	28	3.8	P931_0070K402_0040 MB33 EZ703U	1712	–	4979	28.00	28/1	24	32	2600	2200	3800	65	305	108
107	435	548	28	3.8	P931_0070K402_0040 MB33 EZ703U	1712	–	4979	28.00	28/1	32	32	2600	2200	3800	65	305	108
107	435	548	28	3.8	P931_0070K402_0040 MB33 EZ703U	1712	–	4979	28.00	28/1	45	32	2600	2200	3800	65	305	108
107	561	796	36	2.9	P931_0070K402_0040 MB33 EZ705U	2635	–	4979	28.00	28/1	16	32	2600	2200	3800	78	305	113
107	561	796	36	2.9	P931_0070K402_0040 MB33 EZ705U	2635	–	4979	28.00	28/1	24	32	2600	2200	3800	78	305	113
107	561	796	36	2.9	P931_0070K402_0040 MB33 EZ705U	2635	–	4979	28.00	28/1	32	32	2600	2200	3800	78	305	113
107	561	796	36	2.9	P931_0070K402_0040 MB33 EZ705U	2635	–	4979	28.00	28/1	45	32	2600	2200	3800	78	305	113
107	701	1270	45	2.4	P931_0070K402_0040 MB43 EZ803U	3105	–	6210	28.00	28/1	50	65	2600	2200	3000	185	305	144
107	701	1270	45	2.4	P931_0070K402_0040 MB43 EZ803U	3105	–	6210	28.00	28/1	72	65	2600	2200	3000	185	305	144

7.3 Dimensional drawings

In this chapter, you can find the dimensions of the geared motors with redundant brake.

There is a dimensional drawing for every possible shaft/housing design, each with the tables for gear unit dimensions, motor adapter dimensions, motor dimensions and geared motor dimensions.

Dimensions can exceed the specifications of ISO 2768-mK due to casting tolerances or accumulation of individual tolerances.

We reserve the right to make dimensional changes due to ongoing technical development.

You can download 3D models of our standard drives at https://configurator.stoeber.de/en-US/.

Combination options and the dimensions of forced ventilated geared motors can also be found at https://configurator.stoeber.de/en-US/.

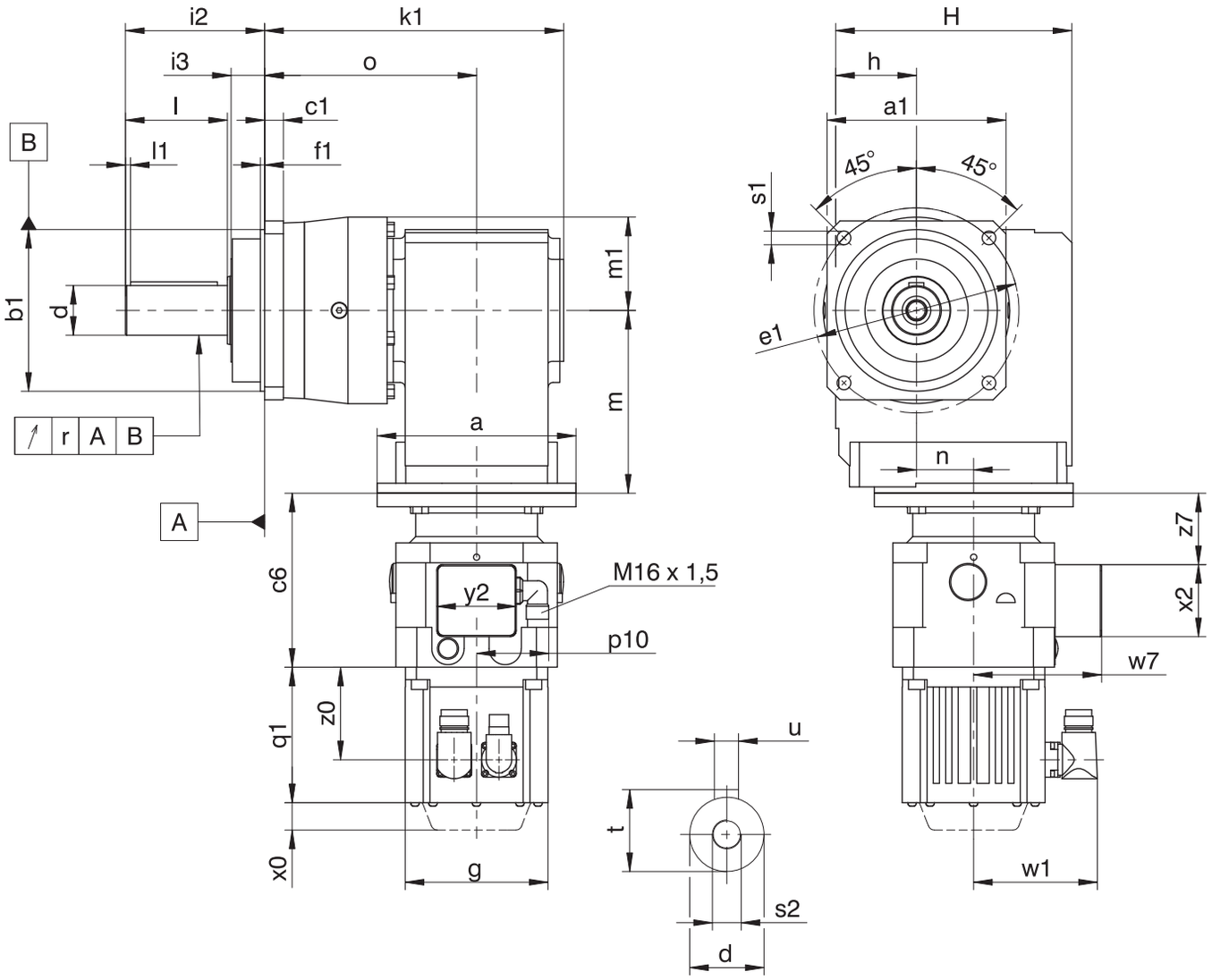
Tolerances

Solid shaft	Tolerance
Fit	ISO k6
Feather keys	DIN 6885-1, high form A
Balancing	With half feather key

Centering holes in solid shafts in accordance with DIN 332-2, DR shape

Thread size	M4	M5	M6	M8	M10	M12	M16	M20	M24
Thread depth [mm]	10	12.5	16	19	22	28	36	42	50

7.3.1 P shaft design (solid shaft with feather key)



q1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]	–	The radial runout specification applies only to the reinforced bearing D.

Dimensions of gear units

Type	□a1	Øb1	c1	Ød	Øe1	f1	h	H	i2	i3	k1	l	l1	m1	o	r	Øs1	s2	t	u
P531_K102_	101	90_{h6}	10	32_{k6}	120	15.0	60	160	88	28	199.5	58	3	60	143.5	0.030	9.0	M12	35.0	A10×8×50
P731_K102_	144	130_{h6}	15	40_{k6}	165	3.5	60	160	112	27	212.5	82	4	75	156.5	0.035	11.0	M16	43.0	A12×8×70
P731_K202_	144	130_{h6}	15	40_{k6}	165	3.5	65	190	112	27	240.5	82	4	75	170.5	0.035	11.0	M16	43.0	A12×8×70
P831_K202_	190	160_{h6}	15	55_{k6}	215	10.0	65	190	112	27	277.5	82	6	102	207.5	0.035	13.5	M20	59.0	A16×10×70
P831_K302_	190	160_{h6}	15	55_{k6}	215	10.0	75	213	112	27	291.0	82	6	102	215.0	0.035	13.5	M20	59.0	A16×10×70
P931_K402_	212	180_{h6}	17	75_{k6}	250	10.0	90	240	143	34	350.5	105	7	115	260.5	0.040	17.5	M20	79.5	A20×12×90

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
PK_MB23	140	59	102.9	58	64	57.5
PK_MB33	161	59	115.4	58	64	71.0
PK_MB43	194	59	134.9	58	64	93.5

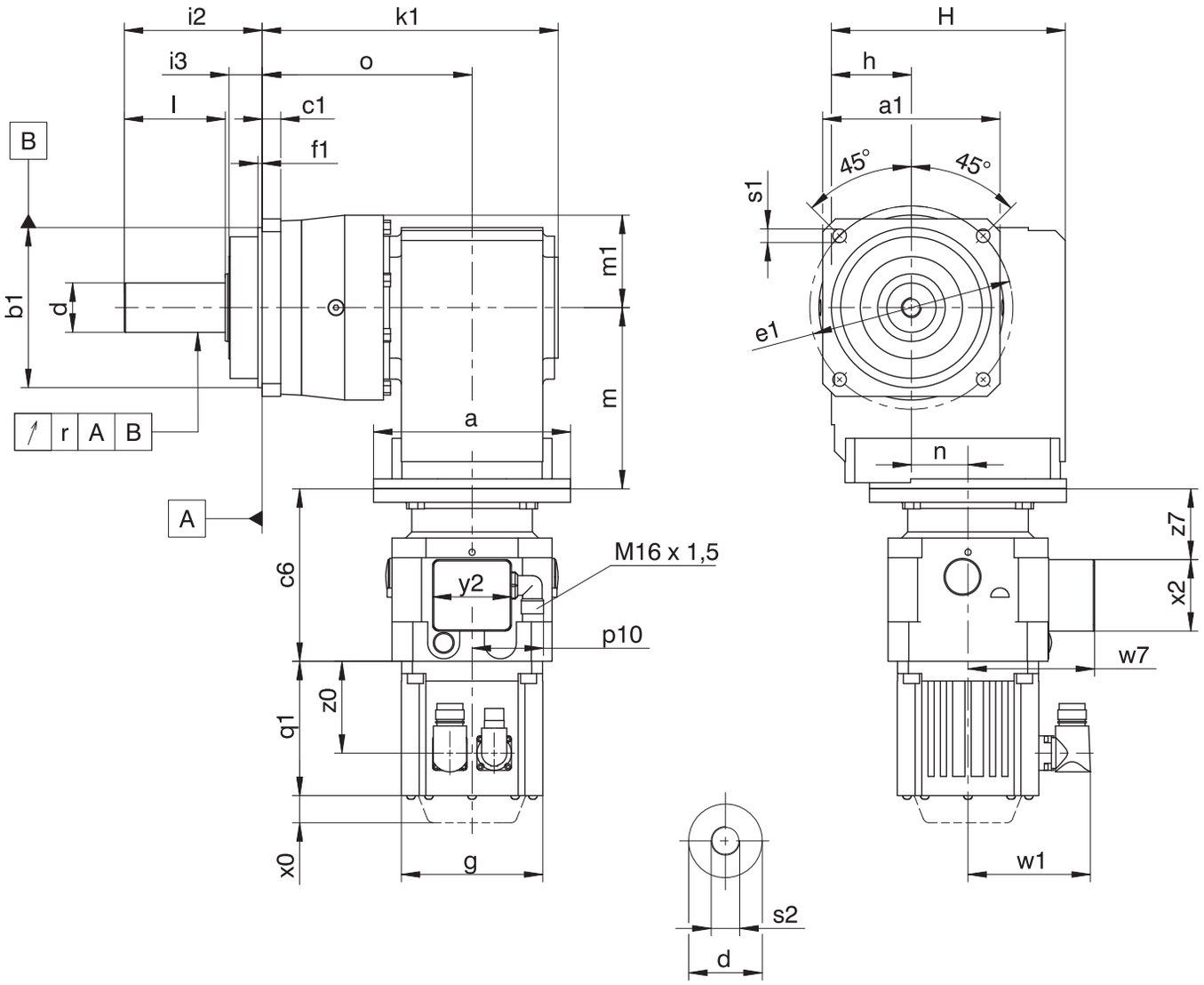
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0

Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
P531_K102_	∅160	128	36.0	∅160	128	36.0	–	–	–	–	–	–
P731_K102_	∅160	128	36.0	∅160	128	36.0	–	–	–	–	–	–
P731_K202_	∅160	147	46.0	∅160	147	46.0	∅200	149	46.0	–	–	–
P831_K202_	∅160	147	46.0	∅160	147	46.0	∅200	149	46.0	–	–	–
P831_K302_	∅160	167	52.5	∅160	167	52.5	∅200	169	52.5	–	–	–
P931_K402_	∅160	187	60.0	∅160	187	60.0	∅200	189	60.0	∅250	192	60.0

7.3.2 G shaft design (solid shaft without feather key)



q1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]	–	The radial runout specification applies only to the reinforced bearing D.

Dimensions of gear units

Type	□a1	Øb1	c1	Ød	Øe1	f1	h	H	i2	i3	k1	l	m1	o	r	Øs1	s2
P531_K102_	101	90_{h6}	10	32_{k6}	120	15.0	60	160	88	28	199.5	58	60.0	143.5	0.030	9.0	M12
P731_K102_	144	130_{h6}	15	40_{k6}	165	3.5	60	160	112	27	212.5	82	75.0	156.5	0.035	11.0	M16
P731_K202_	144	130_{h6}	15	40_{k6}	165	3.5	65	190	112	27	240.5	82	75.0	170.5	0.035	11.0	M16
P831_K202_	190	160_{h6}	15	55_{k6}	215	10.0	65	190	112	27	277.5	82	102.0	207.5	0.035	13.5	M20
P831_K302_	190	160_{h6}	15	55_{k6}	215	10.0	75	213	112	27	291.0	82	102.0	215.0	0.035	13.5	M20
P931_K402_	212	180_{h6}	17	75_{k6}	250	10.0	90	240	143	34	350.5	105	115.0	260.5	0.040	17.5	M20

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
PK_MB23	140	59	102.9	58	64	57.5
PK_MB33	161	59	115.4	58	64	71.0
PK_MB43	194	59	134.9	58	64	93.5

Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0

Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
P531_K102_	∅160	128	36.0	∅160	128	36.0	–	–	–	–	–	–
P731_K102_	∅160	128	36.0	∅160	128	36.0	–	–	–	–	–	–
P731_K202_	∅160	147	46.0	∅160	147	46.0	∅200	149	46.0	–	–	–
P831_K202_	∅160	147	46.0	∅160	147	46.0	∅200	149	46.0	–	–	–
P831_K302_	∅160	167	52.5	∅160	167	52.5	∅200	169	52.5	–	–	–
P931_K402_	∅160	187	60.0	∅160	187	60.0	∅200	189	60.0	∅250	192	60.0

7.4 Type designation

This chapter shows you an explanation of the type designation with the associated options.

Additional ordering information not included in the type designation can be found at the end of the chapter.

Example code

P	5	3	1	S	G	S	S	0050	K102VF	0040	MB23	EZ501U

Explanation

Code	Designation	Design
P	Type	Planetary gear unit
5	Size	5 (example)
3	Generation	Generation 3
1	Stages	Single-stage
S	Housing	Standard
G	Shaft	Solid shaft without feather key
P		Solid shaft with feather key
S	Bearing	Standard bearing
D		Axially reinforced bearing (P3 – P9)
Z		Radially reinforced bearing (P3 – P9)[1]
S	Backlash	Standard
R		Reduced
0050	Transmission ratio of output (i x 10)	i = 5 (example)
K102VF	Input	K1 right-angle geared motor (example)
0040	Transmission ratio of input (i x 10)	i = 4 (example)
MB	Motor adapter	ServoStop motor adapter with brake
2	Size	2 (example)
3	Generation	Generation 3
EZ501U	Motor	EZ synchronous servo motor

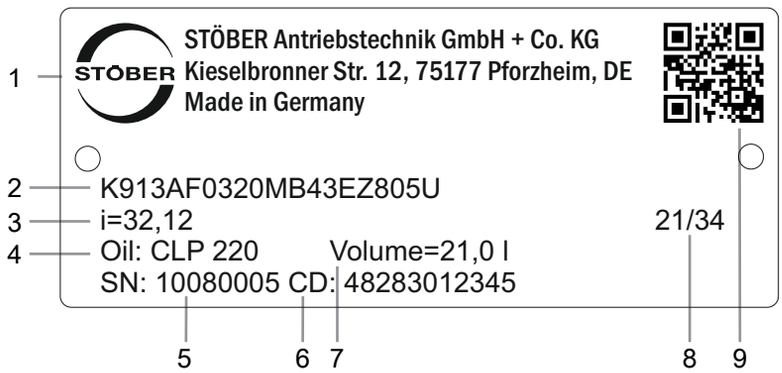
To complete the type designation, also specify the following in your order:

- A detailed type designation of the motor, see the chapter [▶ 11]
- Mounting position, see the chapter [▶ 4.5.4]
- Output gear unit side 3 or 4, see the chapter [▶ 4.5.4]
- Radial shaft seal rings at the output made of NBR or FKM (option), see the chapter [▶ 7.6.3]
- Position of the plug connectors, see the chapter [▶ 7.5.6]
- For reverse operation of the output shaft from ±20° to ±90° and horizontal installation, see the chapter [▶ 7.6.4]

[1] Not for reduced-backlash option.

7.4.1 Nameplate

An example gear unit nameplate is explained in the figure below.

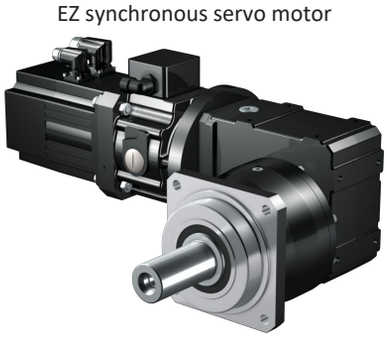


Code	Designation
1	Name of manufacturer
2	Type designation
3	Gear ratio of the gear unit
4	Lubricant specification
5	Serial number of the gear unit
6	Customer-specific data
7	Lubricant fill volume
8	Date of manufacture (year/calendar week)
9	QR code (link to product information)

7.5 Product description

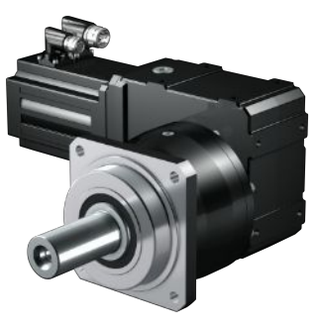
7.5.1 Input options

MB motor adapter +
EZ synchronous servo motor



Catalog ID 443311_en

EZ synchronous servo motor



Catalog ID 442437_en

The corresponding catalogs can be found at http://www.stoeber.de/en/downloads/

Enter the ID of the catalog in the Search term field.

7.5.2 ServoStop motor adapter with brake (MB)

In this chapter, you will find the description and technical data of the motor adapter with brake.

7.5.2.1 Properties

- Electrically actuated spring-loaded brake for dry running
- Featuring backlash-free plug-in coupling (jaw coupling) for easy removal of the motor with the axis braked in any position
- Electrical release monitoring in the terminal box of the motor adapter
- Manual monitoring of wear via air gap checks with a feeler gauge
- Manual release (optional)
- Radial shaft seal rings made of FKM with two sealing lips
- Four oil drain holes to protect the brake from oiling up in case of leakage
- Diverse-redundant system in accordance with EN ISO 13849-1

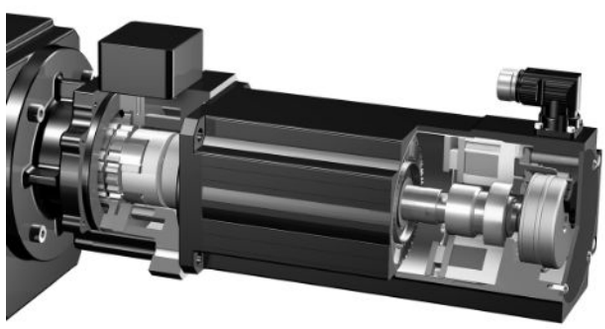


Fig. 1: Motor adapter with ServoStop brake and directly attached EZ synchronous servo motor

7.5.2.2 Brake

A quiescent current brake is integrated into the motor adapter. It has the function of a holding brake. Braking from full speed, e.g. in case of a voltage drop or an emergency off in hazard situations, is still possible.

The brake can be used as a single brake or together with the motor brake as a redundant brake system.

Function

The brakes installed in the motor adapter are electrically actuated spring-loaded brakes for dry running. In the de-energized state, braking takes place using spring force. The brake is released by an electromagnetic DC coil before the motor is switched on. The switch-on time t_{2B} (release time) is the time until the anchor plate releases from the axially moving brake disc and is magnetically held to the coil body. In this state, the brake is released and the coupling hub can rotate. In order to switch off (motor and brake), the residual magnetic flux of the iron parts (anchor and coil body) must be reduced; the associated time t_{11B} until the start of torque generation is defined as a response delay when linking. The link time t_{1B} is the time until the braking torque has built up to the nominal braking torque.

Manual release

Optionally, the brake can be equipped with a manual release.

Pressing the manual release deactivates the electronic actuation of the brake. Before pressing the manual release, you must establish the safety of the machine (e.g. protection against falling).

7.5.2.3 Electrical connection

- Terminal box (standard)
- Plug connector (optional, not possible in combination with release monitoring)

7.5.2.4 Monitoring

For monitoring the brake system, there are generally two options:

- Manual monitoring of wear via air gap checks with a feeler gauge
- Electrical release monitoring in the terminal box with a non-contact and wear-free proximity switch

7.5.2.5 Brake technical data

Technical data for operation at 24 V DC (±10%)

Type	M_{1Bstat} [Nm]	J_1 [kgcm²]	m [kg]	$\Delta\phi_B$ [arcmin]	$t_{1B,DC}$ [ms]	t_{2B} [ms]	$P_{N,B}$ [W]
MB23	8.0	6.3	8.5	32.0	65	55	30
MB23	12	6.3	8.5	32.0	55	80	30
MB33	16	26	14	26.0	150	60	37
MB33	24	26	14	26.0	120	85	37
MB33	32	26	14	26.0	95	100	37
MB33	45	26	14	26.0	80	120	37
MB43	50	69	26	19.0	150	100	55
MB43	72	69	26	19.0	120	150	55
MB43	100	69	26	19.0	90	200	55
MB53	200	236	61	17.0	200	250	86

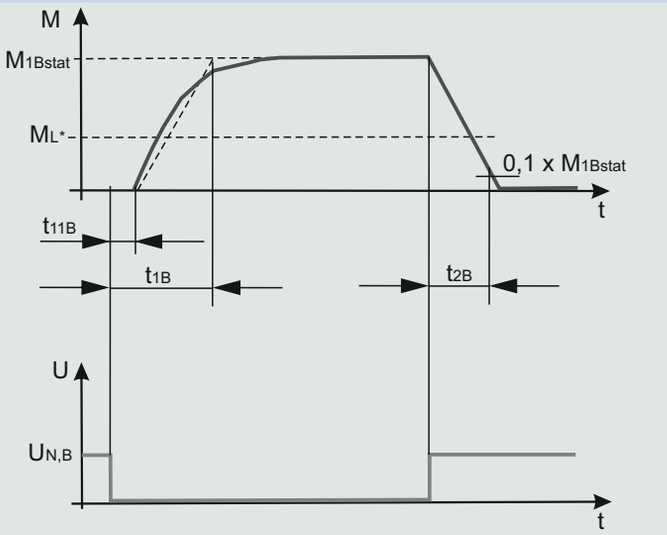
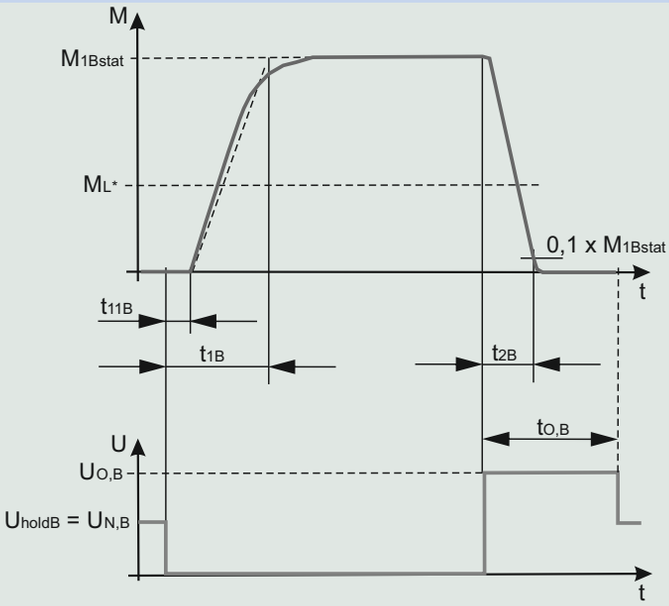
$\Delta\phi_B$: With the brake closed, a higher total backlash results ($\Delta\phi_{tot} = \Delta\phi_2 + \Delta\phi_B / i$).

Technical data for operation with high-speed rectifier 104 V DC (supply voltage U_{LINE} 220 – 275 V AC ± 5%, 50/60 Hz)

Type	M_{1Bstat} [Nm]	J_1 [kgcm²]	m [kg]	$\Delta\phi_B$ [arcmin]	$t_{1B,DC}$ [ms]	$t_{1B,AC}$ [ms]	t_{2B} [ms]	$P_{O,B}$ [W]	P_{holdB} [W]
MB23	8.0	6.3	8.5	32.0	65	360	20	101	26
MB23	12	6.3	8.5	32.0	55	280	25	101	26
MB23	16	6.3	8.5	32.0	50	230	35	101	26
MB23	24	6.3	8.5	32.0	45	180	50	101	26
MB23	30	6.3	8.5	32.0	40	160	60	101	26
MB33	16	26	14	26.0	150	800	25	125	32
MB33	24	26	14	26.0	120	650	35	125	32
MB33	32	26	14	26.0	95	500	40	125	32
MB33	45	26	14	26.0	80	400	50	125	32
MB33	90	26	14	26.0	50	250	90	125	32
MB43	50	69	26	19.0	150	900	50	148	38
MB43	72	69	26	19.0	120	700	75	148	38
MB43	100	69	26	19.0	90	500	100	148	38
MB43	160	69	26	19.0	60	300	150	148	38
MB53	200	236	61	17.0	200	800	110	200	50
MB53	300	236	61	17.0	170	600	150	200	50
MB53	400	236	61	17.0	120	400	200	200	50

$\Delta\phi_B$: With the brake closed, a higher total backlash results ($\Delta\phi_{tot} = \Delta\phi_2 + \Delta\phi_B / i$).

7.5.2.6 Brake switching times

Switching times in case of brake operation with nominal voltage	Switching times in case of brake operation with overexcitation voltage
	

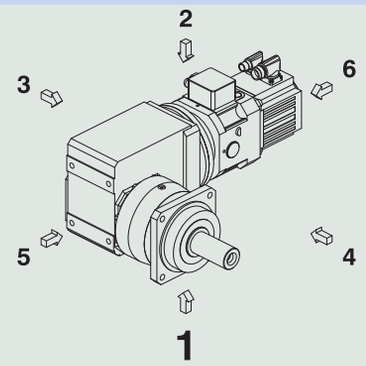
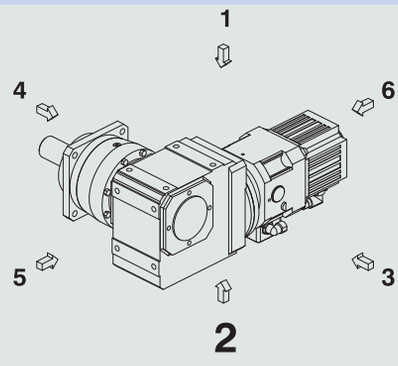
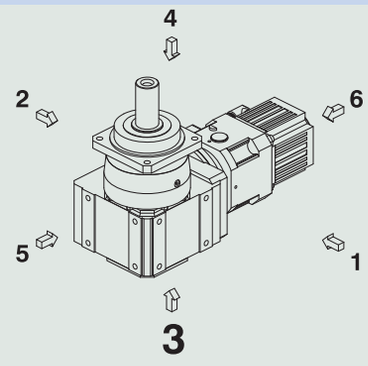
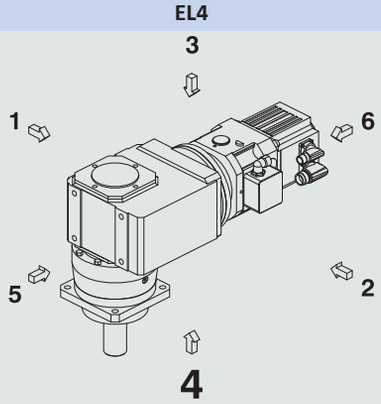
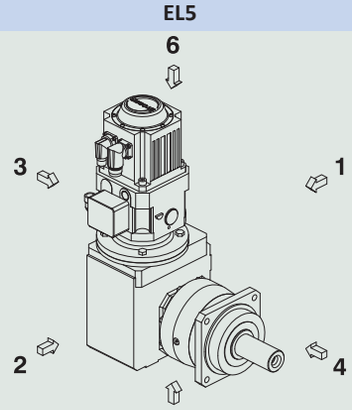
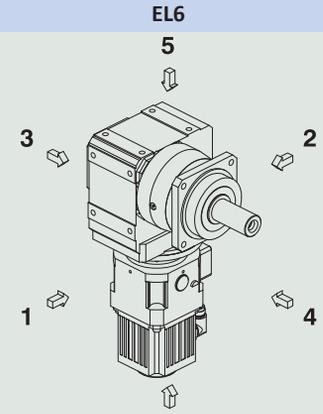
7.5.3 Installation conditions

The specified torques and forces only apply when gear units are fastened on the machine side using screws of strength class 12.9. In addition, the gear housings must be adjusted at the pilot. The machine-side fit must be H7.

7.5.4 Mounting positions

The following table shows the standard mounting positions.

The numbers identify the gear unit sides. The mounting position is defined by the gear side facing downwards.

EL1	EL2	EL3
		
EL4	**EL5**	**EL6**
		

Since the lubricant filling volume of the gear unit depends on the mounting position, the mounting position must be specified when ordering.

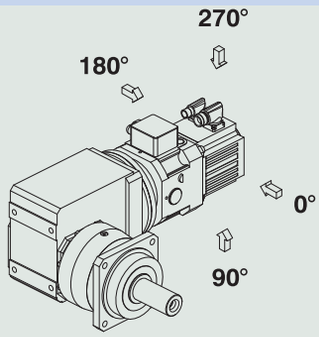
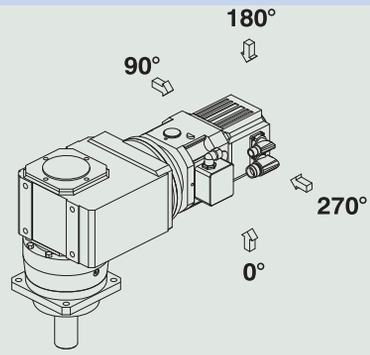
7.5.5 Lubricants

STOBER fills the gear units with the amount and type of lubricant specified on the nameplate. The filling volume and the structure of the gear units depend on the mounting position.

Only install the gear units in the intended mounting position! Reposition the gear units only after consulting STOBER. Otherwise, STOBER assumes no liability for the gear units.

You will receive lubricants for use in the food industry upon request.

7.5.6 Position of the plug connectors/terminal box

Mounting position EL1	Mounting position EL4
Plug connector in 270° position (standard)	Plug connector in 270° position (standard)
	

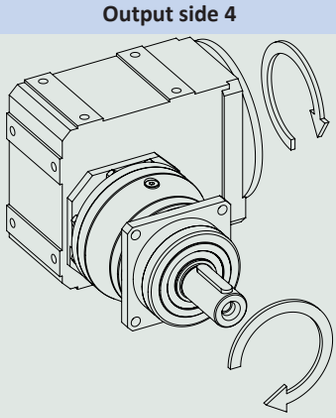
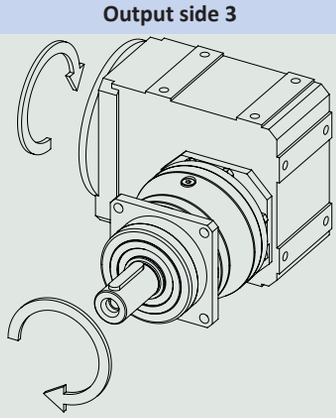
As standard, the plug connectors of the motor or the terminal box/plug connector of the motor adapter are mounted in the 270° position. The position of the terminal box/plug connector of the motor adapter can be selected separately from the position of the motor plug connectors.
Indicate variations for your geared motor in the order.

Note that the plug connector position rotates along with the geared motor if the geared motor is in another mounting position.

7.5.7 Other product features

Feature	Value
Max. permitted gear unit temperature (on the surface of the gear unit)	≤ 90 °C
Paint	Black RAL 9005
Explosion-proof design in accordance with (ATEX) Directive 2014/34/EU (optional)	Not available
Efficiency:	
η_{get} three-stage	94%
Protection class:[2]	
Gear unit	IP65
Motor	IP56, optionally IP66

7.5.8 Direction of rotation

Output side 4	Output side 3
	

The pictures show mounting position EL1.

[2] Observe the protection class of all the components.

7.6 Project configuration

Project your drives using our SERVOsoft designing software. Download SERVOsoft for free at https://www.stoeber.de/en/ServoSoft.

It is the most convenient and reliable method of drive selection, as the entire torque/speed curve of the application is displayed and evaluated here in the curve of the geared motor.

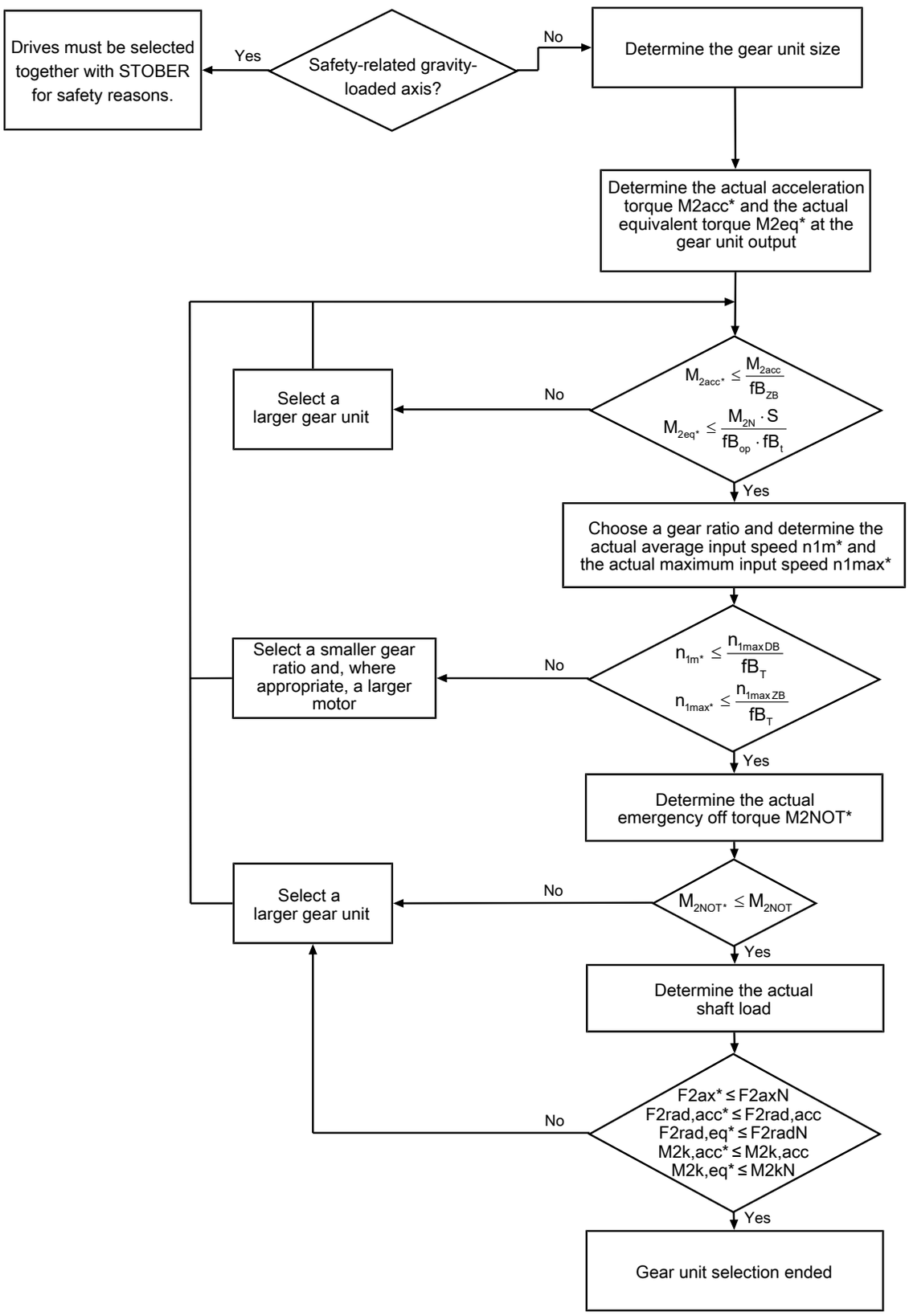
In this chapter, only limit values for specific operating points can be taken into consideration for manual drive selection.

An explanation of the formula symbols can be found in Chapter Symbols in formulas.

The formula symbols for values actually present in the application are marked with *.

7.6.1 Drive selection

Drive selection for gear units

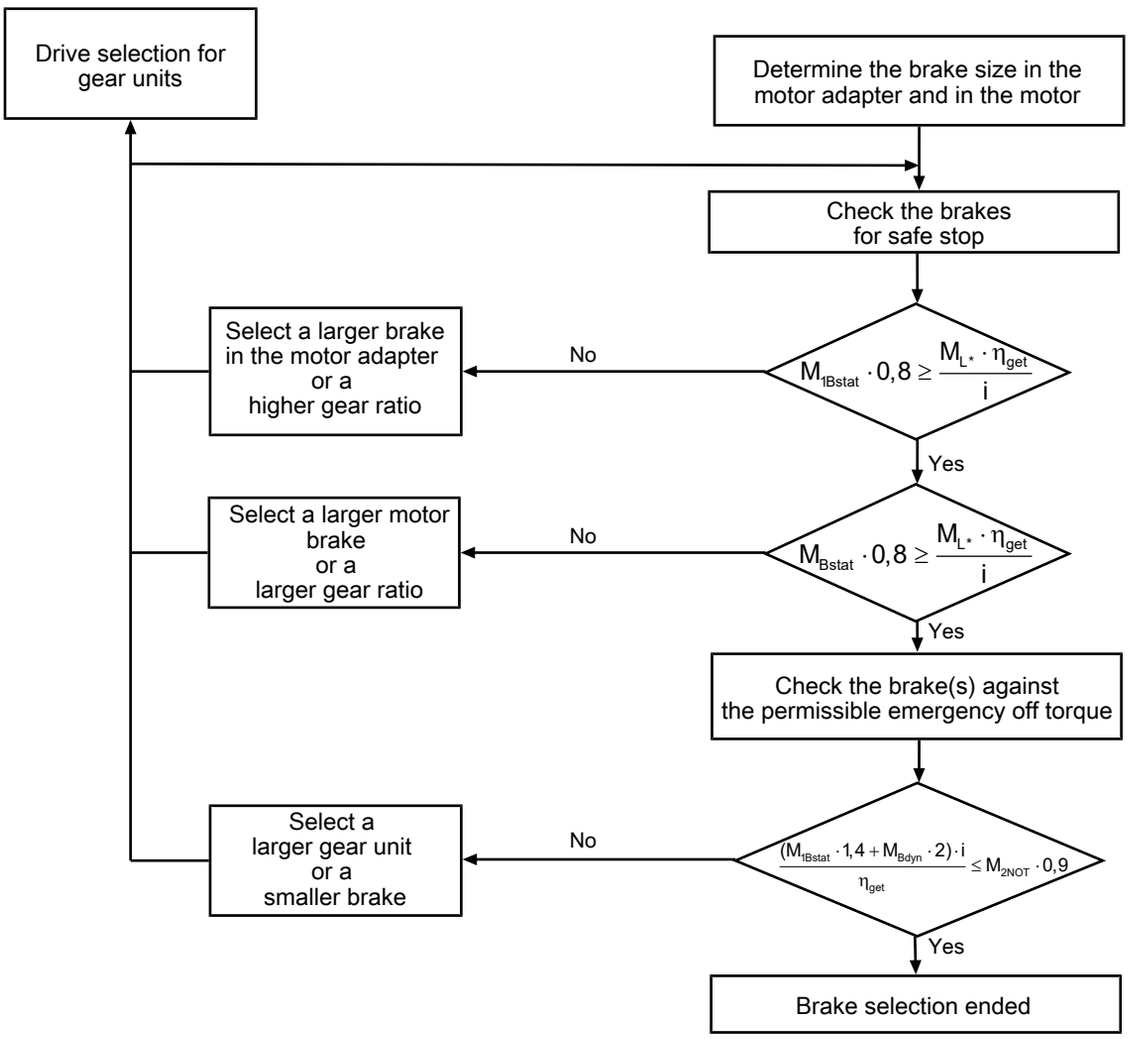


Calculate the forces and tilting torques in the chapter Permitted shaft loads.

Refer to the selection tables for the values for i, n_{1maxDB}, n_{1maxZB}, M_{2acc} (M_{2accHT} for reduced backlash), M_{2NOT}, M_{2N} and S.

The values for fB_T, fB_{op}, fB_t and fB_{ZB} can be found in the corresponding tables in this chapter.

Drive selection for brakes

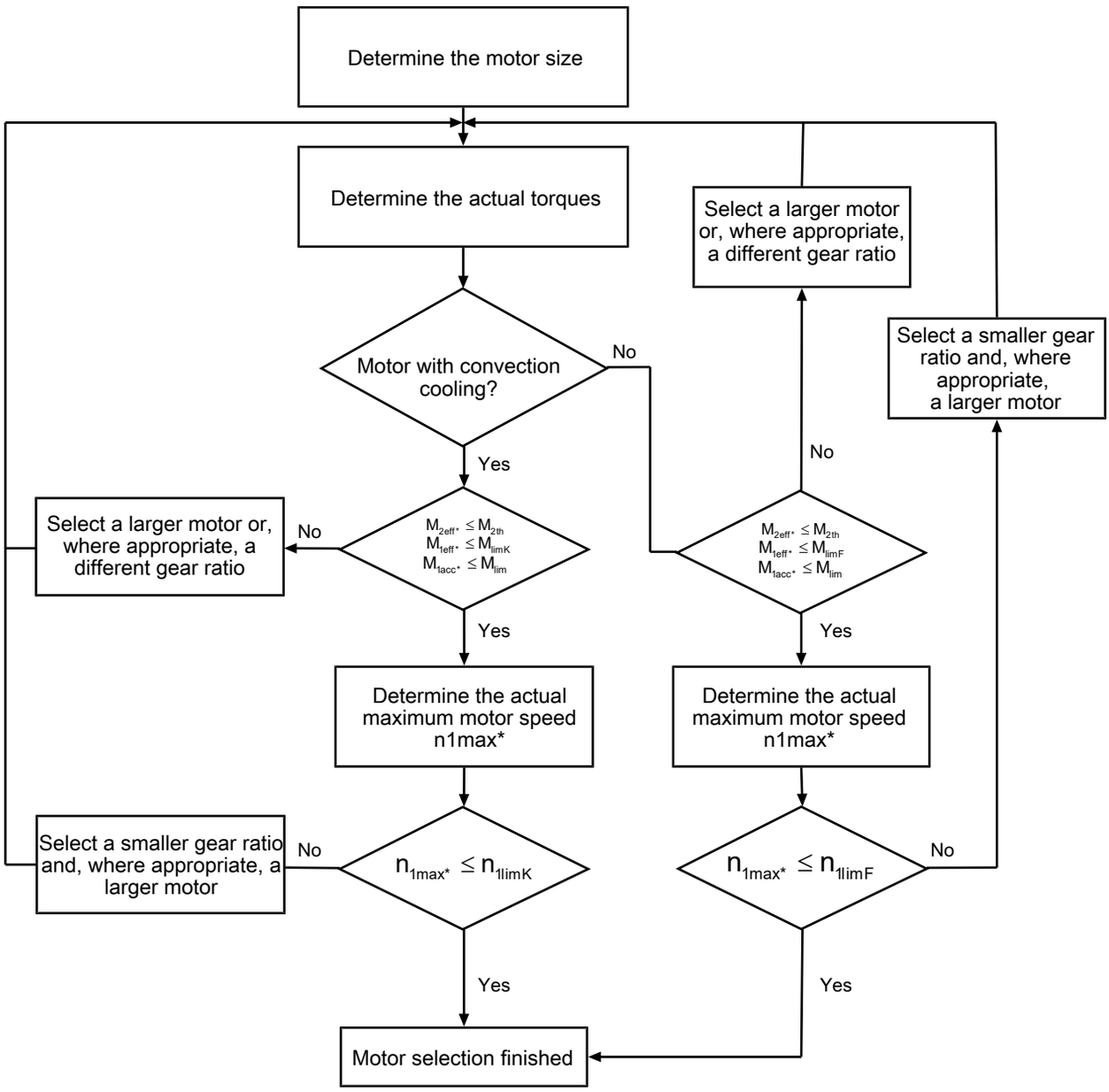


Refer to the selection tables for the values for i, M_{1Bstat}, M_{Bstat} and M_{2NOT}.

Refer to the Technical data table in the chapter [▷ 11.6.7] for the values for M_{Bdyn}.

Refer to the chapter Other product features for the values for η_{get}.

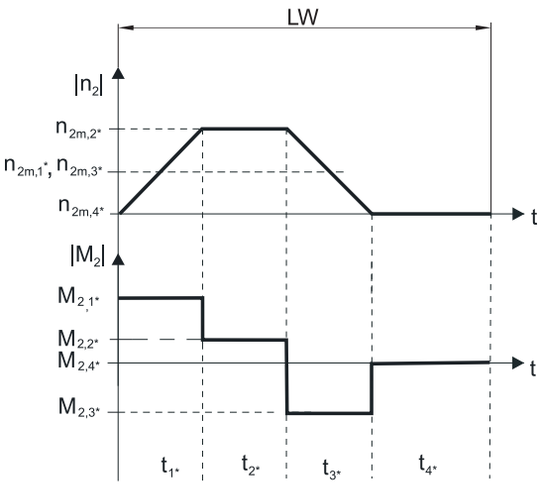
Drive selection for motors



The value for M_{lim}, M_{limK}, M_{limF}, n_{1limK} and n_{1limF} can be found in the motor characteristic curve in the chapter [▶ 11.3]. Note the size, nominal speed n_N and cooling type of the motor.

Example of cyclic operation

The following calculations are based on a representation of the power taken from the output based in accordance with the following example:



Calculation of the actual maximum acceleration torques

$$M_{2acc*} = J_{tot} \cdot \frac{\Delta n_2}{9{,}55 \cdot \Delta t} + M_{L*}$$

$$M_{1acc*} = \frac{M_{2acc*}}{i \cdot \eta_{get}} + J_1 \cdot \frac{\Delta n_1}{9{,}55 \cdot \Delta t}$$

Calculation of the actual average input speed

$$n_{1m*} = n_{2m*} \cdot i$$

$$n_{2m*} = \frac{|n_{2m,1*}| \cdot t_{1*} + \ldots + |n_{2m,n*}| \cdot t_{n*}}{t_{1*} + \ldots + t_{n*}}$$

If $t_{1*} + \ldots + t_{3*} \geq 6$ min, calculate n_{2m*} without the rest phase t_{4*}.

The values for the ratio i can be found in the selection tables.

Calculation of the actual effective torque

$$M_{2eff*} = \sqrt{\frac{t_{1*} \cdot M_{2,1*}{}^2 + \ldots + t_{n*} \cdot M_{2,n*}{}^2}{t_{1*} + \ldots + t_{n*}}}$$

Calculation of the actual emergency-off torque

$$M_{2NOT*} = J_{tot} \cdot \frac{\Delta n_2}{9.55 \cdot \Delta t} + M_{L*}$$

Calculation of the actual equivalent torque

$$M_{2eq*} = \sqrt[3]{\frac{|n_{2m,1*}| \cdot t_{1*} \cdot |M_{2,1*}{}^3| + \ldots + |n_{2m,n*}| \cdot t_{n*} \cdot |M_{2,n*}{}^3|}{|n_{2m,1*}| \cdot t_{1*} + \ldots + |n_{2m,n*}| \cdot t_{n*}}}$$

Calculation of the thermal limit torque

Calculate the thermal limit torque M_{2th} for a duty cycle $ED_{10} > 50\%$ and the actual average input speed n_{1m*}. (At $K_{mot,th} \leq 0$ you must reduce the average input speed n_{1m*} accordingly or select another geared motor size.)

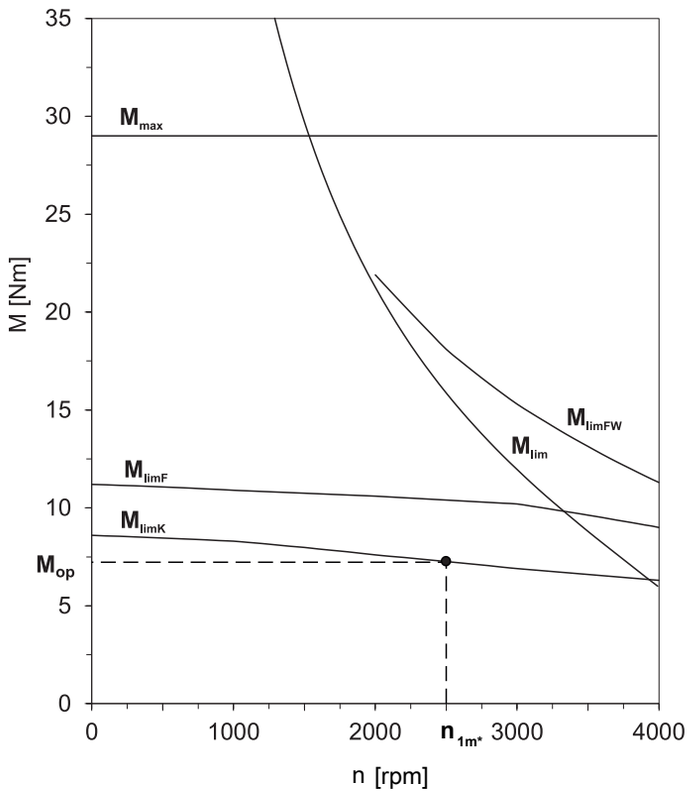
$$M_{2th} = M_{op} \cdot i \cdot K_{mot,th}$$

$$K_{mot,th} = 0{,}95 - \frac{a_{th}}{1000} \cdot athEL \cdot fB_T \cdot \left(\frac{n_{1m*}}{1000}\right)^2$$

The values for i and a_{th} can be found in the selection tables.

The values for a_{thEL} and fB_T can be found in the corresponding tables in this chapter.

The value for the torque of the motor at operating point M_{op} with the determined average input speed n_{1m*} can be found in the motor characteristic curve in the chapter Torque/speed curves. Note the size, nominal speed n_N and cooling type of the motor. The figure below shows an example of reading the torque M_{op} of a motor with convection cooling at the operating point.



Operating factors

Parameter a_{thEL}

Mounting position	a_{thEL}
EL1, 2	1.0
EL3, 4, 5, 6	1.1

Operating mode	fB_{op}
Uniform continuous operation	1.00
Cyclic operation	1.25
Reversing load cyclic operation	1.40

Run time	fB_t
Daily runtime ≤ 8 h	1.00
Daily runtime ≤ 16 h	1.15
Daily runtime ≤ 24 h	1.20

Cyclic operation	fB_{ZB}
≤ 1000 load changes/hour (LW/h)	1.00
> 1000 load changes/hour (LW/h)	1.15

Temperature		fB_T
Motor cooling	**Surrounding temperature**	
Motor with forced ventilation	≤ 20 °C	0.9
	≤ 30 °C	1.0
	≤ 40 °C	1.15
Motor with convection cooling	≤ 20 °C	1.0
	≤ 30 °C	1.1
	≤ 40 °C	1.25

Notes

- The maximum permitted gear unit temperature (see the "Other product features" chapter) must not be exceeded. Doing so may result in damage to the geared motor.
- For braking from full speed (for example when the power fails or when setting up the machine), note the permitted gear unit torques (M_{2acc}, M_{2NOT}) in the selection tables.

7.6.2 Permitted shaft loads for the output shaft

The values specified in the tables apply to the permitted shaft loads:

- For shaft dimensions in accordance with the catalog
- For output speeds $n_{2m*} \leq 100$ rpm ($F^{2axN} = F_{2ax100}$; $F_{2radN} = F_{2rad100}$; $M_{2kN} = M_{2k100}$)
- Only if radial forces on the gear unit are stabilized by its pilots (housing, flange shaft)

Permitted shaft loads for standard bearing S

Type	z_2	F_{2ax100}	$F_{2rad100}$	$F_{2rad,acc}$	M_{2k100}	$M_{2k,acc}$
	[mm]	[N]	[N]	[N]	[Nm]	[Nm]
P2	17.0	500	1200	1300	34	36
P3	17.5	1000	2500	2500	79	79
P4	18.5	1500	4000	4500	146	164
P5	19.5	2300	6500	7000	315	340
P7	23.0	2900	8500	9000	544	576
P8	24.5	4700	13000	18000	852	1179
P9	33.0	6000	18000	27000	1539	2309

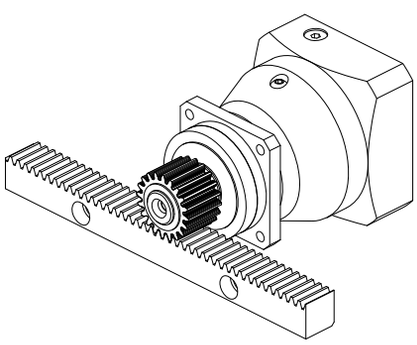


Fig. 2: Recommendation for bearing assignment S (e.g. for straight-cut gearing)

Permitted shaft loads for axially reinforced bearing D

Type	z_2	F_{2ax100}	$F_{2rad100}$	$F_{2rad,acc}$	M_{2k100}	$M_{2k,acc}$
	[mm]	[N]	[N]	[N]	[Nm]	[Nm]
P3	20.0	2500	2750	2750	94	94
P4	22.5	4000	4500	5000	182	203
P5	25.5	6000	7000	8000	382	436
P7	29.0	10000	9500	10000	665	700
P8	32.0	15500	15000	18000	1095	1314
P9	44.0	25000	20000	30000	1930	2895

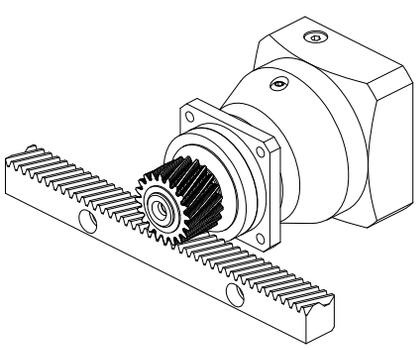


Fig. 3: Recommendation for bearing assignment D (e.g. for helical gearing)

Permitted shaft loads for radially reinforced bearing Z

Type	z_2 [mm]	F_{2ax100} [N]	$F_{2rad100}$ [N]	$F_{2rad,acc}$ [N]	M_{2k100} [Nm]	$M_{2k,acc}$ [Nm]
P3	17.5	600	3000	3000	95	95
P4	18.5	1000	5000	5000	183	183
P5	19.5	1600	8000	8000	388	388
P7	23.0	2000	10000	10000	640	640
P8	24.5	3600	18000	18000	1179	1179
P9	33.0	5000	27000	35000	2309	2993

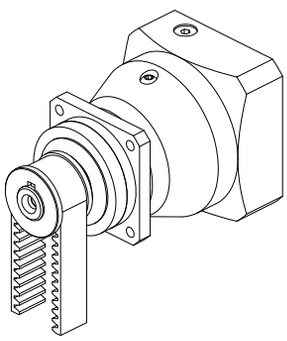


Fig. 4: Recommendation for bearing assignment Z (e.g. for belt drives)

For other output speeds, download diagrams at https://configurator.stoeber.de/en-US/.

The following applies to output speeds n_{2m*} > 100 rpm:

$$F_{2axN} = \frac{F_{2ax100}}{\sqrt[3]{\frac{n_{2m*}}{100\ rpm}}} \qquad F_{2radN} = \frac{F_{2rad100}}{\sqrt[3]{\frac{n_{2m*}}{100\ rpm}}} \qquad M_{2kN} = \frac{M_{2k100}}{\sqrt[3]{\frac{n_{2m*}}{100\ rpm}}}$$

The values for F_{2ax100}, $F_{2rad100}$ and M_{2k100} can be found in the table "Permitted shaft loads" in this chapter.

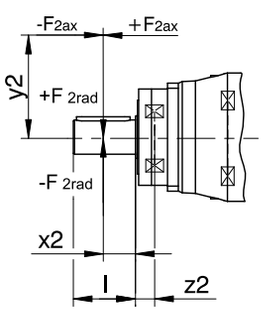


Fig. 5: Force application points

The specified values for $F_{2rad100}$ and $F_{2rad,acc}$ refer to an application of force at the center of the output shaft: $x_2 = l/2$.

Shaft dimensions can be found in the "Dimensional drawings" chapter.

The following applies to other force application points:

$$M_{2k,acc*} = \frac{2 \cdot F_{2ax*} \cdot y_2 + F_{2rad,acc*} \cdot (x_2 + z_2)}{1000}$$

For applications with multiple axial and/or radial forces, you must add the forces as vectors.

In the event of EMERGENCY OFF operation (max. 1000 load changes), you can multiply the permitted forces and torques for F_{2ax100}, $F_{2rad100}$ and M_{2k100} by a factor of two.

Also note the calculation for equivalent values:

$$M_{2k,eq*} = \sqrt[3]{\frac{|n_{2m,1*}| \cdot t_{1*} \cdot |M_{2k,acc,1*}|^3 + \ldots + |n_{2m,n*}| \cdot t_{n*} \cdot |M_{2k,acc,n*}|^3}{|n_{2m,1*}| \cdot t_{1*} + \ldots + |n_{2m,n*}| \cdot t_{n*}}}$$

$$F_{2rad,eq^*} = \sqrt[3]{\frac{\left|n_{2m,1^*}\right| \cdot t_{1^*} \cdot \left|F_{2rad,acc,1^*}{}^3\right| + \ldots + \left|n_{2m,n^*}\right| \cdot t_{n^*} \cdot \left|F_{2rad,acc,n^*}{}^3\right|}{\left|n_{2m,1^*}\right| \cdot t_{1^*} + \ldots + \left|n_{2m,n^*}\right| \cdot t_{n^*}}}$$

The following apply to the bearing service life L_{10h} ($ED_{10} \leq 40\%$):

$L_{10h} > 10000$ h with $1 < M_{2kN}/M_{2k^*} < 1.25$

$L_{10h} > 20000$ h with $1.25 < M_{2kN}/M_{2k^*} < 1.5$

$L_{10h} > 30000$ h with $1.5 < M_{2kN}/M_{2k^*}$

For different duty cycles:

$$L_{10h} > L_{10h(ED_{10}=40\%)} \cdot \frac{40\%}{ED_{10}}$$

7.6.3 Recommendation for radial shaft seal rings

For a duty cycle > 60% and higher surrounding temperatures, we recommend radial shaft seal rings made of FKM at the output.

Properties:

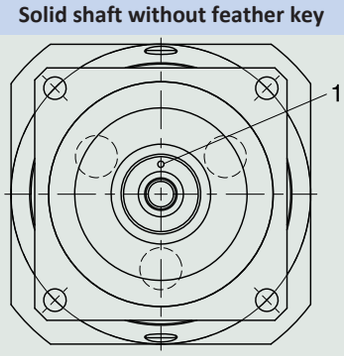
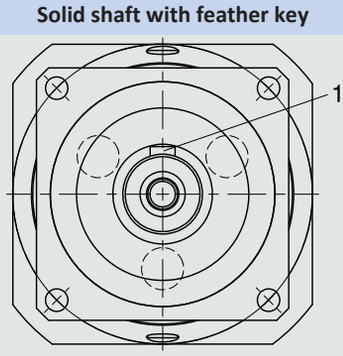
- Excellent temperature resistance
- High chemical stability
- Very good resistance to aging
- Excellent resistance in oils and greases
- For use in the food, beverage and pharmaceutical industries

Leak-proofness

Our gear units are equipped with high-quality radial shaft seal rings and checked for leaks. However, a leak cannot be fully ruled out over the length of use of a gear unit. If you use a gear unit with goods incompatible with the lubricant, you must take measures to prevent direct contact with the gear unit lubricant in case of a leak.

7.6.4 Reverse operation

To ensure lubrication for circulating gearing parts during cyclic reverse operation from ± 20° to ± 90° at the output, pay careful attention to the position of the output shaft for the horizontal mounting of the gear unit, as shown in the diagrams below. The images show the center position of reverse operation. Cyclic reverse operation ≤ ± 20° on request.

Solid shaft without feather key	Solid shaft with feather key
	
1 Position of the mark: top	1 Position of the feather key: top

Notes

- If you use the solid shaft without a feather key (G), you must note the position of the mark during assembly.
- As an alternative, you can use the solid shaft with a feather key (P). In that case, the feather key functions for position orientation. For a backlash-free connection, also use a clamp.

7.7 Additional documentation

Additional documentation related to the product can be found at
http://www.stoeber.de/en/downloads/

Enter the ID of the documentation in the Search term field.

Documentation	ID
Operating manual gear units, geared motors P53K – P93K	443360_en

8 PHK right-angle planetary geared motors

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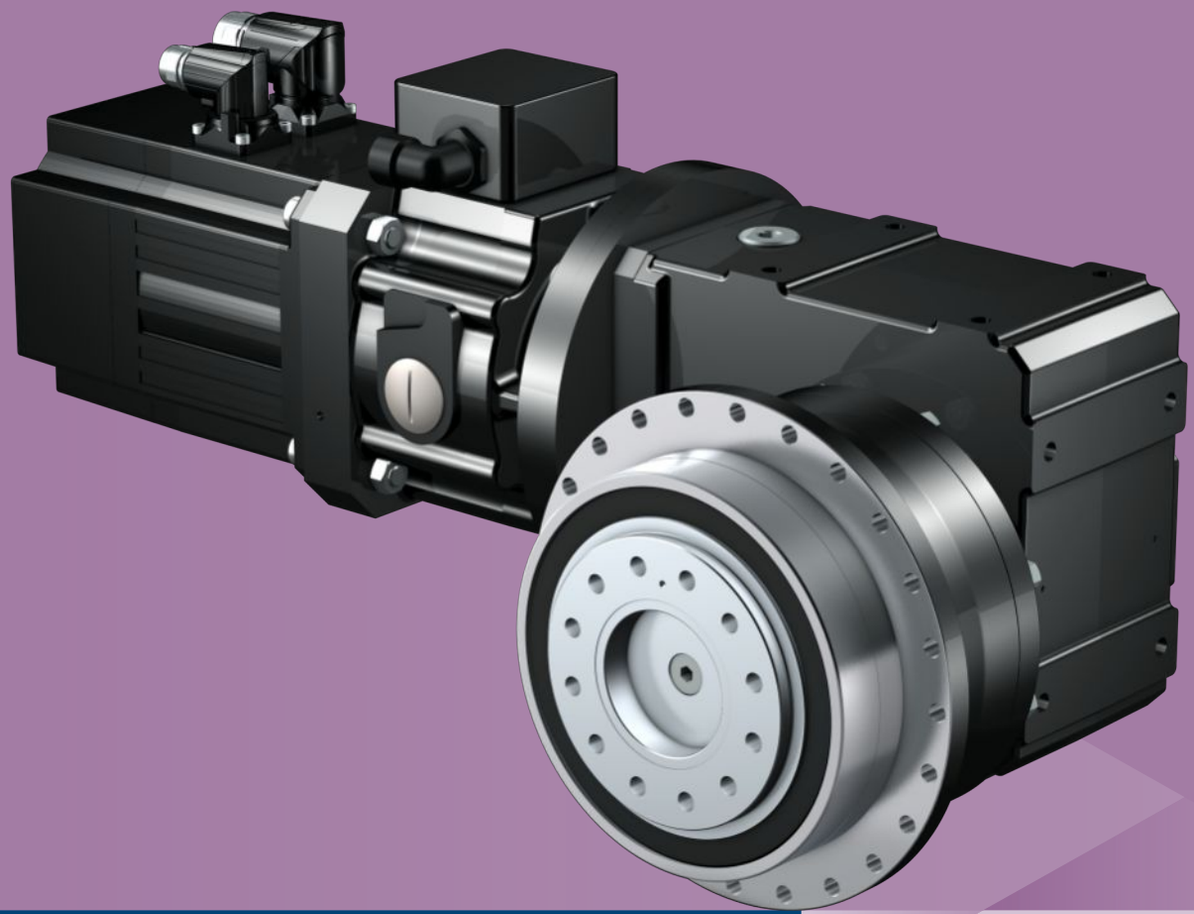


8

Right-angle planetary geared motors

PHK

8.1 Overview

High-performance precision right-angle planetary geared motors with redundant brake

Features

Power density	★★★★☆
Backlash	★★★★★
Price category	€€€€
Shaft load	★★★★★
Smooth operation	★★★☆☆
Torsional stiffness	★★★★☆
Mass moment of inertia	★★★★☆
Helical gearing	✓
Continuous operation without cooling	✓
Stiff output bearings due to pretension	✓
Reinforced output bearing (PH3 – PH5)	✓ (optional)
Safe braking in case of power outage	✓
Safe support of the load with gravity-loaded axes using 2 brakes	✓
Easily and safely connected to the synchronous servo motor thanks to backlash-free plug-in coupling	✓

Key ★☆☆☆☆ good | ★★★★★ excellent
€ Economy | €€€€€ Premium

Technical data

M_{1Bstat}	8 – 100 Nm
i	16 – 457
M_{2acc}	238 – 7500 Nm
$\Delta\phi_2$	1.5 – 4.5 arcmin
η_{get}	92 – 93 %

8.2 Selection tables

The technical data specified in the selection tables applies to:

- Installation altitudes up to 1000 m above sea level
- Surrounding temperatures from 0 °C to 40 °C
- Drives with convection-cooled motors (e.g. EZ401**U**)
- Without consideration of the thermal limiting performance

For the technical data on drives with forced ventilated motors (e.g. EZ401**B**), refer to https://configurator.stoeber.de/en-US/

An explanation of the formula symbols can be found in the chapter [▶ 15.1].

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PH531K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 390 Nm)																		
150	80	88	29	2.7	PH531_0050K102_0040 MB23 EZ501U	298	300	705	20.00	20/1	8.0	8.0	3300	2800	4000	11	62	32
150	88	97	32	2.5	PH531_0050K102_0040 MB23 EZ402U	298	300	705	20.00	20/1	8.0	8.0	3300	2800	4000	9.9	62	32
150	129	160	46	1.7	PH531_0050K102_0040 MB23 EZ404U	385	400	705	20.00	20/1	8.0	8.0	3300	2800	4000	11	62	34
150	138	149	50	1.6	PH531_0050K102_0040 MB23 EZ502U	385	400	705	20.00	20/1	8.0	8.0	3300	2800	4000	14	62	33
188	64	70	26	3.1	PH531_0040K102_0040 MB23 EZ501U	238	240	696	16.00	16/1	8.0	8.0	3300	2800	4000	11	52	32
188	64	70	26	3.1	PH531_0040K102_0040 MB23 EZ501U	238	240	696	16.00	16/1	12	8.0	3300	2800	4000	11	52	32
188	64	70	26	3.1	PH531_0040K102_0040 MB23 EZ501U	238	240	696	16.00	16/1	16	8.0	3300	2800	4000	11	52	32
188	70	77	28	2.8	PH531_0040K102_0040 MB23 EZ402U	238	240	696	16.00	16/1	8.0	8.0	3300	2800	4000	10	52	32
188	70	77	28	2.8	PH531_0040K102_0040 MB23 EZ402U	238	240	696	16.00	16/1	12	8.0	3300	2800	4000	10	52	32
188	70	77	28	2.8	PH531_0040K102_0040 MB23 EZ402U	238	240	696	16.00	16/1	16	8.0	3300	2800	4000	10	52	32
188	103	128	41	1.9	PH531_0040K102_0040 MB23 EZ404U	355	380	696	16.00	16/1	8.0	8.0	3300	2800	4000	11	52	34
188	103	128	41	1.9	PH531_0040K102_0040 MB23 EZ404U	355	380	696	16.00	16/1	12	8.0	3300	2800	4000	11	52	34
188	103	128	41	1.9	PH531_0040K102_0040 MB23 EZ404U	355	380	696	16.00	16/1	16	8.0	3300	2800	4000	11	52	34
188	110	119	44	1.8	PH531_0040K102_0040 MB23 EZ502U	355	380	696	16.00	16/1	8.0	8.0	3300	2800	4000	14	52	33
188	110	119	44	1.8	PH531_0040K102_0040 MB23 EZ502U	355	380	696	16.00	16/1	12	8.0	3300	2800	4000	14	52	33
188	110	119	44	1.8	PH531_0040K102_0040 MB23 EZ502U	355	380	696	16.00	16/1	16	8.0	3300	2800	4000	14	52	33
188	145	165	58	1.4	PH531_0040K102_0040 MB23 EZ503U	355	380	696	16.00	16/1	8.0	15	3300	2800	4000	17	52	35
PH731K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 880 Nm)																		
65	186	204	25	2.2	PH731_0070K102_0066 MB23 EZ501U	693	690	1545	46.51	2093/45	8.0	8.0	3600	3300	4000	11	111	37
65	204	225	27	2.0	PH731_0070K102_0066 MB23 EZ402U	693	690	1545	46.51	2093/45	8.0	8.0	3600	3300	4000	9.4	111	37
65	299	372	39	1.4	PH731_0070K102_0066 MB23 EZ404U	778	780	1545	46.51	2093/45	8.0	8.0	3600	3300	4000	11	111	39
65	320	346	42	1.3	PH731_0070K102_0066 MB23 EZ502U	778	780	1545	46.51	2093/45	8.0	8.0	3600	3300	4000	13	111	39
65	184	201	20	2.4	PH731_0050K202_0092 MB23 EZ501U	685	680	1720	45.95	11395/248	8.0	8.0	3500	3100	4000	11	117	45
65	184	201	20	2.4	PH731_0050K202_0092 MB23 EZ501U	685	680	1720	45.95	11395/248	12	8.0	3500	3100	4000	11	117	45
65	201	223	22	2.2	PH731_0050K202_0092 MB23 EZ402U	685	680	1720	45.95	11395/248	8.0	8.0	3500	3100	4000	10	117	45
65	201	223	22	2.2	PH731_0050K202_0092 MB23 EZ402U	685	680	1720	45.95	11395/248	12	8.0	3500	3100	4000	10	117	45
65	295	368	32	1.5	PH731_0050K202_0092 MB23 EZ404U	882	920	1720	45.95	11395/248	8.0	8.0	3500	3100	4000	11	117	47
65	295	368	32	1.5	PH731_0050K202_0092 MB23 EZ404U	882	920	1720	45.95	11395/248	12	8.0	3500	3100	4000	11	117	47
65	317	342	34	1.4	PH731_0050K202_0092 MB23 EZ502U	882	920	1720	45.95	11395/248	8.0	8.0	3500	3100	4000	14	117	46
65	317	342	34	1.4	PH731_0050K202_0092 MB23 EZ502U	882	920	1720	45.95	11395/248	12	8.0	3500	3100	4000	14	117	46
71	168	184	25	2.4	PH731_0070K102_0060 MB23 EZ501U	626	630	1545	42.00	42/1	8.0	8.0	3300	2800	4000	11	111	37
71	168	184	25	2.4	PH731_0070K102_0060 MB23 EZ501U	626	630	1545	42.00	42/1	12	8.0	3300	2800	4000	11	111	37
71	184	203	27	2.2	PH731_0070K102_0060 MB23 EZ402U	626	630	1545	42.00	42/1	8.0	8.0	3300	2800	4000	9.5	111	37
71	184	203	27	2.2	PH731_0070K102_0060 MB23 EZ402U	626	630	1545	42.00	42/1	12	8.0	3300	2800	4000	9.5	111	37
71	270	336	40	1.5	PH731_0070K102_0060 MB23 EZ404U	752	750	1545	42.00	42/1	8.0	8.0	3300	2800	4000	11	111	39
71	270	336	40	1.5	PH731_0070K102_0060 MB23 EZ404U	752	750	1545	42.00	42/1	12	8.0	3300	2800	4000	11	111	39
71	289	313	43	1.4	PH731_0070K102_0060 MB23 EZ502U	752	750	1545	42.00	42/1	8.0	8.0	3300	2800	4000	13	111	39
71	289	313	43	1.4	PH731_0070K102_0060 MB23 EZ502U	752	750	1545	42.00	42/1	12	8.0	3300	2800	4000	13	111	39
71	168	184	19	2.6	PH731_0050K202_0084 MB23 EZ501U	626	630	1720	41.99	12470/297	8.0	8.0	3500	3100	4000	11	117	45
71	168	184	19	2.6	PH731_0050K202_0084 MB23 EZ501U	626	630	1720	41.99	12470/297	12	8.0	3500	3100	4000	11	117	45
71	184	203	21	2.4	PH731_0050K202_0084 MB23 EZ402U	626	630	1720	41.99	12470/297	8.0	8.0	3500	3100	4000	9.8	117	45
71	184	203	21	2.4	PH731_0050K202_0084 MB23 EZ402U	626	630	1720	41.99	12470/297	12	8.0	3500	3100	4000	9.8	117	45
71	270	336	31	1.6	PH731_0050K202_0084 MB23 EZ404U	882	920	1720	41.99	12470/297	8.0	8.0	3500	3100	4000	11	117	47
71	270	336	31	1.6	PH731_0050K202_0084 MB23 EZ404U	882	920	1720	41.99	12470/297	12	8.0	3500	3100	4000	11	117	47
71	289	313	33	1.5	PH731_0050K202_0084 MB23 EZ502U	882	920	1720	41.99	12470/297	8.0	8.0	3500	3100	4000	13	117	46
71	289	313	33	1.5	PH731_0050K202_0084 MB23 EZ502U	882	920	1720	41.99	12470/297	12	8.0	3500	3100	4000	13	117	46
77	156	171	25	2.5	PH731_0070K102_0056 MB23 EZ501U	581	580	1545	38.98	1520/39	8.0	8.0	3300	2800	4000	11	111	37
77	156	171	25	2.5	PH731_0070K102_0056 MB23 EZ501U	581	580	1545	38.98	1520/39	12	8.0	3300	2800	4000	11	111	37
77	171	189	27	2.3	PH731_0070K102_0056 MB23 EZ402U	581	580	1545	38.98	1520/39	8.0	8.0	3300	2800	4000	9.7	111	37
77	171	189	27	2.3	PH731_0070K102_0056 MB23 EZ402U	581	580	1545	38.98	1520/39	12	8.0	3300	2800	4000	9.7	111	37
77	250	312	40	1.5	PH731_0070K102_0056 MB23 EZ404U	733	730	1545	38.98	1520/39	8.0	8.0	3300	2800	4000	11	111	39

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PH731K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 880 Nm)																		
77	250	312	40	1.5	PH731_0070K102_0056 MB23 EZ404U	733	730	1545	38.98	1520/39	12	8.0	3300	2800	4000	11	111	39
77	269	290	43	1.4	PH731_0070K102_0056 MB23 EZ502U	733	730	1545	38.98	1520/39	8.0	8.0	3300	2800	4000	13	111	39
77	269	290	43	1.4	PH731_0070K102_0056 MB23 EZ502U	733	730	1545	38.98	1520/39	12	8.0	3300	2800	4000	13	111	39
90	134	146	18	3.3	PH731_0050K202_0067 MB23 EZ501U	498	500	1720	33.42	11395/341	8.0	8.0	3500	3100	4000	11	117	45
90	134	146	18	3.3	PH731_0050K202_0067 MB23 EZ501U	498	500	1720	33.42	11395/341	12	8.0	3500	3100	4000	11	117	45
90	134	146	18	3.3	PH731_0050K202_0067 MB23 EZ501U	498	500	1720	33.42	11395/341	16	8.0	3500	3100	4000	11	117	45
90	146	162	20	3.0	PH731_0050K202_0067 MB23 EZ402U	498	500	1720	33.42	11395/341	8.0	8.0	3500	3100	4000	10	117	45
90	146	162	20	3.0	PH731_0050K202_0067 MB23 EZ402U	498	500	1720	33.42	11395/341	12	8.0	3500	3100	4000	10	117	45
90	146	162	20	3.0	PH731_0050K202_0067 MB23 EZ402U	498	500	1720	33.42	11395/341	16	8.0	3500	3100	4000	10	117	45
90	215	268	29	2.0	PH731_0050K202_0067 MB23 EZ404U	882	900	1720	33.42	11395/341	8.0	8.0	3500	3100	4000	12	117	47
90	215	268	29	2.0	PH731_0050K202_0067 MB23 EZ404U	882	900	1720	33.42	11395/341	12	8.0	3500	3100	4000	12	117	47
90	215	268	29	2.0	PH731_0050K202_0067 MB23 EZ404U	882	900	1720	33.42	11395/341	16	8.0	3500	3100	4000	12	117	47
90	230	249	31	1.9	PH731_0050K202_0067 MB23 EZ502U	882	920	1720	33.42	11395/341	8.0	8.0	3500	3100	4000	14	117	46
90	230	249	31	1.9	PH731_0050K202_0067 MB23 EZ502U	882	920	1720	33.42	11395/341	12	8.0	3500	3100	4000	14	117	46
90	230	249	31	1.9	PH731_0050K202_0067 MB23 EZ502U	882	920	1720	33.42	11395/341	16	8.0	3500	3100	4000	14	117	46
90	302	345	41	1.5	PH731_0050K202_0067 MB23 EZ503U	882	920	1720	33.42	11395/341	8.0	15	3500	3100	4000	17	117	48
90	302	345	41	1.5	PH731_0050K202_0067 MB23 EZ503U	882	920	1720	33.42	11395/341	12	15	3500	3100	4000	17	117	48
90	420	498	57	1.0	PH731_0050K202_0067 MB23 EZ505U	882	920	1720	33.42	11395/341	8.0	15	3500	3100	4000	22	117	51
90	420	498	57	1.0	PH731_0050K202_0067 MB23 EZ505U	882	920	1720	33.42	11395/341	12	15	3500	3100	4000	22	117	51
100	120	131	18	3.7	PH731_0050K202_0060 MB23 EZ501U	447	450	1720	30.00	30/1	8.0	8.0	3000	2600	4000	12	117	45
100	120	131	18	3.7	PH731_0050K202_0060 MB23 EZ501U	447	450	1720	30.00	30/1	12	8.0	3000	2600	4000	12	117	45
100	120	131	18	3.7	PH731_0050K202_0060 MB23 EZ501U	447	450	1720	30.00	30/1	16	8.0	3000	2600	4000	12	117	45
100	131	145	19	3.4	PH731_0050K202_0060 MB23 EZ402U	447	450	1720	30.00	30/1	8.0	8.0	3000	2600	4000	11	117	45
100	131	145	19	3.4	PH731_0050K202_0060 MB23 EZ402U	447	450	1720	30.00	30/1	12	8.0	3000	2600	4000	11	117	45
100	131	145	19	3.4	PH731_0050K202_0060 MB23 EZ402U	447	450	1720	30.00	30/1	16	8.0	3000	2600	4000	11	117	45
100	193	240	29	2.3	PH731_0050K202_0060 MB23 EZ404U	810	810	1720	30.00	30/1	8.0	8.0	3000	2600	4000	12	117	47
100	193	240	29	2.3	PH731_0050K202_0060 MB23 EZ404U	810	810	1720	30.00	30/1	12	8.0	3000	2600	4000	12	117	47
100	193	240	29	2.3	PH731_0050K202_0060 MB23 EZ404U	810	810	1720	30.00	30/1	16	8.0	3000	2600	4000	12	117	47
100	207	223	31	2.1	PH731_0050K202_0060 MB23 EZ502U	866	870	1720	30.00	30/1	8.0	8.0	3000	2600	4000	14	117	46
100	207	223	31	2.1	PH731_0050K202_0060 MB23 EZ502U	866	870	1720	30.00	30/1	12	8.0	3000	2600	4000	14	117	46
100	207	223	31	2.1	PH731_0050K202_0060 MB23 EZ502U	866	870	1720	30.00	30/1	16	8.0	3000	2600	4000	14	117	46
100	207	232	31	2.1	PH731_0050K202_0060 MB33 EZ701U	559	560	1720	30.00	30/1	16	15	3000	2600	4000	39	117	56
100	271	310	40	1.6	PH731_0050K202_0060 MB23 EZ503U	882	920	1720	30.00	30/1	8.0	15	3000	2600	4000	18	117	48
100	271	310	40	1.6	PH731_0050K202_0060 MB23 EZ503U	882	920	1720	30.00	30/1	12	15	3000	2600	4000	18	117	48
100	335	402	50	1.3	PH731_0050K202_0060 MB33 EZ702U	882	920	1720	30.00	30/1	16	15	3000	2600	4000	45	117	58
100	377	447	56	1.2	PH731_0050K202_0060 MB23 EZ505U	882	920	1720	30.00	30/1	8.0	15	3000	2600	4000	22	117	51
100	377	447	56	1.2	PH731_0050K202_0060 MB23 EZ505U	882	920	1720	30.00	30/1	12	15	3000	2600	4000	22	117	51
107	112	123	26	3.1	PH731_0070K102_0040 MB23 EZ501U	417	420	1545	28.00	28/1	8.0	8.0	3300	2800	4000	11	111	37
107	112	123	26	3.1	PH731_0070K102_0040 MB23 EZ501U	417	420	1545	28.00	28/1	12	8.0	3300	2800	4000	11	111	37
107	112	123	26	3.1	PH731_0070K102_0040 MB23 EZ501U	417	420	1545	28.00	28/1	16	8.0	3300	2800	4000	11	111	37
107	123	136	28	2.8	PH731_0070K102_0040 MB23 EZ402U	417	420	1545	28.00	28/1	8.0	8.0	3300	2800	4000	10	111	37
107	123	136	28	2.8	PH731_0070K102_0040 MB23 EZ402U	417	420	1545	28.00	28/1	12	8.0	3300	2800	4000	10	111	37
107	123	136	28	2.8	PH731_0070K102_0040 MB23 EZ402U	417	420	1545	28.00	28/1	16	8.0	3300	2800	4000	10	111	37
107	180	224	41	1.9	PH731_0070K102_0040 MB23 EZ404U	657	660	1545	28.00	28/1	8.0	8.0	3300	2800	4000	11	111	39
107	180	224	41	1.9	PH731_0070K102_0040 MB23 EZ404U	657	660	1545	28.00	28/1	12	8.0	3300	2800	4000	11	111	39
107	180	224	41	1.9	PH731_0070K102_0040 MB23 EZ404U	657	660	1545	28.00	28/1	16	8.0	3300	2800	4000	11	111	39
107	193	209	44	1.8	PH731_0070K102_0040 MB23 EZ502U	657	660	1545	28.00	28/1	8.0	8.0	3300	2800	4000	14	111	39
107	193	209	44	1.8	PH731_0070K102_0040 MB23 EZ502U	657	660	1545	28.00	28/1	12	8.0	3300	2800	4000	14	111	39
107	193	209	44	1.8	PH731_0070K102_0040 MB23 EZ502U	657	660	1545	28.00	28/1	16	8.0	3300	2800	4000	14	111	39
107	253	289	58	1.4	PH731_0070K102_0040 MB23 EZ503U	657	660	1545	28.00	28/1	8.0	15	3300	2800	4000	17	111	41
107	253	289	58	1.4	PH731_0070K102_0040 MB23 EZ503U	657	660	1545	28.00	28/1	12	15	3300	2800	4000	17	111	41
116	104	113	17	4.2	PH731_0050K202_0052 MB23 EZ501U	386	390	1519	25.89	10535/407	8.0	8.0	3000	2600	4000	12	117	45
116	104	113	17	4.2	PH731_0050K202_0052 MB23 EZ501U	386	390	1519	25.89	10535/407	12	8.0	3000	2600	4000	12	117	45
116	104	113	17	4.2	PH731_0050K202_0052 MB23 EZ501U	386	390	1519	25.89	10535/407	16	8.0	3000	2600	4000	12	117	45
116	113	125	19	3.9	PH731_0050K202_0052 MB23 EZ402U	386	390	1519	25.89	10535/407	8.0	8.0	3000	2600	4000	11	117	45
116	113	125	19	3.9	PH731_0050K202_0052 MB23 EZ402U	386	390	1519	25.89	10535/407	12	8.0	3000	2600	4000	11	117	45
116	113	125	19	3.9	PH731_0050K202_0052 MB23 EZ402U	386	390	1519	25.89	10535/407	16	8.0	3000	2600	4000	11	117	45
116	166	207	28	2.6	PH731_0050K202_0052 MB23 EZ404U	699	700	1519	25.89	10535/407	8.0	8.0	3000	2600	4000	12	117	47
116	166	207	28	2.6	PH731_0050K202_0052 MB23 EZ404U	699	700	1519	25.89	10535/407	12	8.0	3000	2600	4000	12	117	47
116	166	207	28	2.6	PH731_0050K202_0052 MB23 EZ404U	699	700	1519	25.89	10535/407	16	8.0	3000	2600	4000	12	117	47
116	178	193	30	2.5	PH731_0050K202_0052 MB23 EZ502U	747	750	1519	25.89	10535/407	8.0	8.0	3000	2600	4000	14	117	46
116	178	193	30	2.5	PH731_0050K202_0052 MB23 EZ502U	747	750	1519	25.89	10535/407	12	8.0	3000	2600	4000	14	117	46
116	178	193	30	2.5	PH731_0050K202_0052 MB23 EZ502U	747	750	1519	25.89	10535/407	16	8.0	3000	2600	4000	14	117	46
116	178	200	30	2.5	PH731_0050K202_0052 MB33 EZ701U	482	480	1720	25.89	10535/407	16	15	3000	2600	4000	39	117	56

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PH731K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 880 Nm)																		
116	234	268	39	1.9	PH731_0050K202_0052 MB23 EZ503U	882	900	1519	25.89	10535/407	8.0	15	3000	2600	4000	18	117	48
116	234	268	39	1.9	PH731_0050K202_0052 MB23 EZ503U	882	900	1519	25.89	10535/407	12	15	3000	2600	4000	18	117	48
116	289	347	48	1.5	PH731_0050K202_0052 MB33 EZ702U	882	910	1720	25.89	10535/407	16	15	3000	2600	4000	45	117	58
116	325	386	54	1.4	PH731_0050K202_0052 MB23 EZ505U	882	900	1519	25.89	10535/407	8.0	15	3000	2600	4000	22	117	51
116	325	386	54	1.4	PH731_0050K202_0052 MB23 EZ505U	882	900	1519	25.89	10535/407	12	15	3000	2600	4000	22	117	51
150	129	160	26	3.4	PH731_0050K202_0040 MB23 EZ404U	540	540	1173	20.00	20/1	8.0	8.0	3000	2600	4000	13	117	47
150	129	160	26	3.4	PH731_0050K202_0040 MB23 EZ404U	540	540	1173	20.00	20/1	12	8.0	3000	2600	4000	13	117	47
150	129	160	26	3.4	PH731_0050K202_0040 MB23 EZ404U	540	540	1173	20.00	20/1	16	8.0	3000	2600	4000	13	117	47
150	138	149	28	3.2	PH731_0050K202_0040 MB23 EZ502U	577	580	1173	20.00	20/1	8.0	8.0	3000	2600	4000	15	117	46
150	138	149	28	3.2	PH731_0050K202_0040 MB23 EZ502U	577	580	1173	20.00	20/1	12	8.0	3000	2600	4000	15	117	46
150	138	149	28	3.2	PH731_0050K202_0040 MB23 EZ502U	577	580	1173	20.00	20/1	16	8.0	3000	2600	4000	15	117	46
150	138	155	28	3.2	PH731_0050K202_0040 MB33 EZ701U	372	370	1720	20.00	20/1	16	15	3000	2600	4000	40	117	56
150	138	155	28	3.2	PH731_0050K202_0040 MB33 EZ701U	372	370	1720	20.00	20/1	24	15	3000	2600	4000	40	117	56
150	138	155	28	3.2	PH731_0050K202_0040 MB33 EZ701U	372	370	1720	20.00	20/1	32	15	3000	2600	4000	40	117	56
150	181	207	36	2.4	PH731_0050K202_0040 MB23 EZ503U	698	700	1173	20.00	20/1	8.0	15	3000	2600	4000	19	117	48
150	181	207	36	2.4	PH731_0050K202_0040 MB23 EZ503U	698	700	1173	20.00	20/1	12	15	3000	2600	4000	19	117	48
150	223	268	45	2.0	PH731_0050K202_0040 MB33 EZ702U	764	760	1720	20.00	20/1	16	15	3000	2600	4000	45	117	58
150	223	268	45	2.0	PH731_0050K202_0040 MB33 EZ702U	764	760	1720	20.00	20/1	24	15	3000	2600	4000	45	117	58
150	223	268	45	2.0	PH731_0050K202_0040 MB33 EZ702U	764	760	1720	20.00	20/1	32	15	3000	2600	4000	45	117	58
150	251	298	51	1.8	PH731_0050K202_0040 MB23 EZ505U	698	700	1173	20.00	20/1	8.0	15	3000	2600	4000	23	117	51
150	251	298	51	1.8	PH731_0050K202_0040 MB23 EZ505U	698	700	1173	20.00	20/1	12	15	3000	2600	4000	23	117	51
188	103	128	26	3.4	PH731_0040K202_0040 MB23 EZ404U	432	430	939	16.00	16/1	8.0	8.0	3000	2600	4000	13	100	47
188	103	128	26	3.4	PH731_0040K202_0040 MB23 EZ404U	432	430	939	16.00	16/1	12	8.0	3000	2600	4000	13	100	47
188	103	128	26	3.4	PH731_0040K202_0040 MB23 EZ404U	432	430	939	16.00	16/1	16	8.0	3000	2600	4000	13	100	47
188	110	119	27	3.2	PH731_0040K202_0040 MB23 EZ502U	462	460	939	16.00	16/1	8.0	8.0	3000	2600	4000	15	100	46
188	110	119	27	3.2	PH731_0040K202_0040 MB23 EZ502U	462	460	939	16.00	16/1	12	8.0	3000	2600	4000	15	100	46
188	110	119	27	3.2	PH731_0040K202_0040 MB23 EZ502U	462	460	939	16.00	16/1	16	8.0	3000	2600	4000	15	100	46
188	110	124	27	3.2	PH731_0040K202_0040 MB33 EZ701U	298	300	1667	16.00	16/1	16	15	3000	2600	4000	40	100	56
188	110	124	27	3.2	PH731_0040K202_0040 MB33 EZ701U	298	300	1667	16.00	16/1	24	15	3000	2600	4000	40	100	56
188	110	124	27	3.2	PH731_0040K202_0040 MB33 EZ701U	298	300	1667	16.00	16/1	32	15	3000	2600	4000	40	100	56
188	110	124	27	3.2	PH731_0040K202_0040 MB33 EZ701U	298	300	1667	16.00	16/1	45	15	3000	2600	4000	40	100	56
188	145	165	36	2.5	PH731_0040K202_0040 MB23 EZ503U	559	560	939	16.00	16/1	8.0	15	3000	2600	4000	19	100	48
188	145	165	36	2.5	PH731_0040K202_0040 MB23 EZ503U	559	560	939	16.00	16/1	12	15	3000	2600	4000	19	100	48
188	179	215	45	2.0	PH731_0040K202_0040 MB33 EZ702U	611	610	1667	16.00	16/1	16	15	3000	2600	4000	46	100	58
188	179	215	45	2.0	PH731_0040K202_0040 MB33 EZ702U	611	610	1667	16.00	16/1	24	15	3000	2600	4000	46	100	58
188	179	215	45	2.0	PH731_0040K202_0040 MB33 EZ702U	611	610	1667	16.00	16/1	32	15	3000	2600	4000	46	100	58
188	179	215	45	2.0	PH731_0040K202_0040 MB33 EZ702U	611	610	1667	16.00	16/1	45	15	3000	2600	4000	46	100	58
188	201	238	50	1.8	PH731_0040K202_0040 MB23 EZ505U	559	560	939	16.00	16/1	8.0	15	3000	2600	4000	23	100	51
188	201	238	50	1.8	PH731_0040K202_0040 MB23 EZ505U	559	560	939	16.00	16/1	12	15	3000	2600	4000	23	100	51
188	246	310	61	1.4	PH731_0040K202_0040 MB33 EZ703U	670	670	1667	16.00	16/1	16	32	3000	2600	4000	57	100	61
188	317	450	79	1.1	PH731_0040K202_0040 MB33 EZ705U	670	670	1667	16.00	16/1	16	32	3000	2600	4000	70	100	66
PH831K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1850 Nm)																		
26	466	510	11	2.4	PH831_0050K302_0230 MB23 EZ501U	1735	1740	3646	116.5	2795/24	8.0	8.0	3800	3500	4000	11	245	68
26	510	564	12	2.2	PH831_0050K302_0230 MB23 EZ402U	1735	1740	3646	116.5	2795/24	8.0	8.0	3800	3500	4000	9.5	245	68
26	748	933	18	1.5	PH831_0050K302_0230 MB23 EZ404U	1848	1850	3646	116.5	2795/24	8.0	8.0	3800	3500	4000	11	245	70
26	803	868	19	1.4	PH831_0050K302_0230 MB23 EZ502U	1848	1850	3646	116.5	2795/24	8.0	8.0	3800	3500	4000	13	245	70
31	388	424	14	2.4	PH831_0070K202_0140 MB23 EZ501U	1445	1440	2917	96.96	20167/208	8.0	8.0	3900	3500	4000	11	245	63
31	424	469	16	2.2	PH831_0070K202_0140 MB23 EZ402U	1445	1440	2917	96.96	20167/208	8.0	8.0	3900	3500	4000	9.5	245	63
31	623	776	23	1.5	PH831_0070K202_0140 MB23 EZ404U	1478	1480	2917	96.96	20167/208	8.0	8.0	3900	3500	4000	11	245	65
31	668	722	25	1.4	PH831_0070K202_0140 MB23 EZ502U	1478	1480	2917	96.96	20167/208	8.0	8.0	3900	3500	4000	13	245	65
33	368	402	21	2.3	PH831_0100K202_0092 MB23 EZ501U	1369	1370	2784	91.90	11395/124	8.0	8.0	3500	3100	4000	11	260	63
33	402	445	22	2.1	PH831_0100K202_0092 MB23 EZ402U	1369	1370	2784	91.90	11395/124	8.0	8.0	3500	3100	4000	10	260	63
33	590	736	33	1.4	PH831_0100K202_0092 MB23 EZ404U	1392	1390	2784	91.90	11395/124	8.0	8.0	3500	3100	4000	11	260	65
33	633	685	35	1.3	PH831_0100K202_0092 MB23 EZ502U	1392	1390	2784	91.90	11395/124	8.0	8.0	3500	3100	4000	14	260	65
34	356	389	15	2.6	PH831_0070K202_0125 MB23 EZ501U	1325	1330	2917	88.94	3913/44	8.0	8.0	3900	3500	4000	11	245	63
34	389	431	16	2.3	PH831_0070K202_0125 MB23 EZ402U	1325	1330	2917	88.94	3913/44	8.0	8.0	3900	3500	4000	9.5	245	63
34	571	712	23	1.6	PH831_0070K202_0125 MB23 EZ404U	1478	1480	2917	88.94	3913/44	8.0	8.0	3900	3500	4000	11	245	65
34	613	663	25	1.5	PH831_0070K202_0125 MB23 EZ502U	1478	1480	2917	88.94	3913/44	8.0	8.0	3900	3500	4000	13	245	65
35	346	378	10	3.2	PH831_0050K302_0175 MB23 EZ501U	1288	1290	3646	86.47	7955/92	8.0	8.0	3500	3100	4000	11	245	68
35	346	378	10	3.2	PH831_0050K302_0175 MB23 EZ501U	1288	1290	3646	86.47	7955/92	12	8.0	3500	3100	4000	11	245	68
35	378	419	11	2.9	PH831_0050K302_0175 MB23 EZ402U	1288	1290	3646	86.47	7955/92	8.0	8.0	3500	3100	4000	9.8	245	68
35	378	419	11	2.9	PH831_0050K302_0175 MB23 EZ402U	1288	1290	3646	86.47	7955/92	12	8.0	3500	3100	4000	9.8	245	68
35	556	692	16	2.0	PH831_0050K302_0175 MB23 EZ404U	1848	1850	3646	86.47	7955/92	8.0	8.0	3500	3100	4000	11	245	70
35	556	692	16	2.0	PH831_0050K302_0175 MB23 EZ404U	1848	1850	3646	86.47	7955/92	12	8.0	3500	3100	4000	11	245	70

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PH831K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1850 Nm)																		
35	596	644	18	1.8	PH831_0050K302_0175 MB23 EZ502U	1848	1850	3646	86.47	7955/92	8.0	8.0	3500	3100	4000	13	245	70
35	596	644	18	1.8	PH831_0050K302_0175 MB23 EZ502U	1848	1850	3646	86.47	7955/92	12	8.0	3500	3100	4000	13	245	70
35	781	894	23	1.4	PH831_0050K302_0175 MB23 EZ503U	1848	1850	3646	86.47	7955/92	8.0	15	3500	3100	4000	17	245	71
35	1087	1288	32	1.0	PH831_0050K302_0175 MB23 EZ505U	1848	1850	3646	86.47	7955/92	8.0	15	3500	3100	4000	21	245	74
36	336	368	20	2.5	PH831_0100K202_0084 MB23 EZ501U	1251	1250	2784	83.97	24940/297	8.0	8.0	3500	3100	4000	11	260	63
36	368	407	22	2.3	PH831_0100K202_0084 MB23 EZ402U	1251	1250	2784	83.97	24940/297	8.0	8.0	3500	3100	4000	9.8	260	63
36	540	672	32	1.6	PH831_0100K202_0084 MB23 EZ404U	1392	1390	2784	83.97	24940/297	8.0	8.0	3500	3100	4000	11	260	65
36	579	626	35	1.5	PH831_0100K202_0084 MB23 EZ502U	1392	1390	2784	83.97	24940/297	8.0	8.0	3500	3100	4000	13	260	65
37	324	354	15	2.7	PH831_0070K202_0115 MB23 EZ501U	1204	1200	2917	80.82	8729/108	8.0	8.0	3500	3100	4000	11	245	63
37	354	391	16	2.5	PH831_0070K202_0115 MB23 EZ402U	1204	1200	2917	80.82	8729/108	8.0	8.0	3500	3100	4000	9.7	245	63
37	519	647	23	1.7	PH831_0070K202_0115 MB23 EZ404U	1478	1480	2917	80.82	8729/108	8.0	8.0	3500	3100	4000	11	245	65
37	557	602	25	1.6	PH831_0070K202_0115 MB23 EZ502U	1478	1480	2917	80.82	8729/108	8.0	8.0	3500	3100	4000	13	245	65
43	282	309	15	3.0	PH831_0070K202_0100 MB23 EZ501U	1051	1050	2917	70.51	20167/286	8.0	8.0	3900	3500	4000	11	245	63
43	282	309	15	3.0	PH831_0070K202_0100 MB23 EZ501U	1051	1050	2917	70.51	20167/286	12	8.0	3900	3500	4000	11	245	63
43	309	341	16	2.7	PH831_0070K202_0100 MB23 EZ402U	1051	1050	2917	70.51	20167/286	8.0	8.0	3900	3500	4000	9.7	245	63
43	309	341	16	2.7	PH831_0070K202_0100 MB23 EZ402U	1051	1050	2917	70.51	20167/286	12	8.0	3900	3500	4000	9.7	245	63
43	453	565	24	1.9	PH831_0070K202_0100 MB23 EZ404U	1478	1480	2917	70.51	20167/286	8.0	8.0	3900	3500	4000	11	245	65
43	453	565	24	1.9	PH831_0070K202_0100 MB23 EZ404U	1478	1480	2917	70.51	20167/286	12	8.0	3900	3500	4000	11	245	65
43	486	525	25	1.7	PH831_0070K202_0100 MB23 EZ502U	1478	1480	2917	70.51	20167/286	8.0	8.0	3900	3500	4000	13	245	65
43	486	525	25	1.7	PH831_0070K202_0100 MB23 EZ502U	1478	1480	2917	70.51	20167/286	12	8.0	3900	3500	4000	13	245	65
43	279	305	9.7	3.9	PH831_0050K302_0140 MB23 EZ501U	1038	1040	3646	69.68	7525/108	8.0	8.0	3500	3100	4000	11	245	68
43	279	305	9.7	3.9	PH831_0050K302_0140 MB23 EZ501U	1038	1040	3646	69.68	7525/108	12	8.0	3500	3100	4000	11	245	68
43	279	305	9.7	3.9	PH831_0050K302_0140 MB23 EZ501U	1038	1040	3646	69.68	7525/108	16	8.0	3500	3100	4000	11	245	68
43	305	337	11	3.6	PH831_0050K302_0140 MB23 EZ402U	1038	1040	3646	69.68	7525/108	8.0	8.0	3500	3100	4000	10	245	68
43	305	337	11	3.6	PH831_0050K302_0140 MB23 EZ402U	1038	1040	3646	69.68	7525/108	12	8.0	3500	3100	4000	10	245	68
43	305	337	11	3.6	PH831_0050K302_0140 MB23 EZ402U	1038	1040	3646	69.68	7525/108	16	8.0	3500	3100	4000	10	245	68
43	448	558	16	2.5	PH831_0050K302_0140 MB23 EZ404U	1848	1850	3646	69.68	7525/108	8.0	8.0	3500	3100	4000	11	245	70
43	448	558	16	2.5	PH831_0050K302_0140 MB23 EZ404U	1848	1850	3646	69.68	7525/108	12	8.0	3500	3100	4000	11	245	70
43	448	558	16	2.5	PH831_0050K302_0140 MB23 EZ404U	1848	1850	3646	69.68	7525/108	16	8.0	3500	3100	4000	11	245	70
43	480	519	17	2.3	PH831_0050K302_0140 MB23 EZ502U	1848	1850	3646	69.68	7525/108	8.0	8.0	3500	3100	4000	14	245	70
43	480	519	17	2.3	PH831_0050K302_0140 MB23 EZ502U	1848	1850	3646	69.68	7525/108	12	8.0	3500	3100	4000	14	245	70
43	480	519	17	2.3	PH831_0050K302_0140 MB23 EZ502U	1848	1850	3646	69.68	7525/108	16	8.0	3500	3100	4000	14	245	70
43	629	720	22	1.7	PH831_0050K302_0140 MB23 EZ503U	1848	1850	3646	69.68	7525/108	8.0	15	3500	3100	4000	17	245	71
43	629	720	22	1.7	PH831_0050K302_0140 MB23 EZ503U	1848	1850	3646	69.68	7525/108	12	15	3500	3100	4000	17	245	71
43	876	1038	30	1.3	PH831_0050K302_0140 MB23 EZ505U	1848	1850	3646	69.68	7525/108	8.0	15	3500	3100	4000	22	245	74
43	876	1038	30	1.3	PH831_0050K302_0140 MB23 EZ505U	1848	1850	3646	69.68	7525/108	12	15	3500	3100	4000	22	245	74
45	268	292	19	3.2	PH831_0100K202_0067 MB23 EZ501U	996	1000	2784	66.83	22790/341	8.0	8.0	3500	3100	4000	11	260	63
45	268	292	19	3.2	PH831_0100K202_0067 MB23 EZ501U	996	1000	2784	66.83	22790/341	12	8.0	3500	3100	4000	11	260	63
45	292	324	21	2.9	PH831_0100K202_0067 MB23 EZ402U	996	1000	2784	66.83	22790/341	8.0	8.0	3500	3100	4000	10	260	63
45	292	324	21	2.9	PH831_0100K202_0067 MB23 EZ402U	996	1000	2784	66.83	22790/341	12	8.0	3500	3100	4000	10	260	63
45	429	535	30	2.0	PH831_0100K202_0067 MB23 EZ404U	1392	1390	2784	66.83	22790/341	8.0	8.0	3500	3100	4000	12	260	65
45	429	535	30	2.0	PH831_0100K202_0067 MB23 EZ404U	1392	1390	2784	66.83	22790/341	12	8.0	3500	3100	4000	12	260	65
45	461	498	33	1.8	PH831_0100K202_0067 MB23 EZ502U	1392	1390	2784	66.83	22790/341	8.0	8.0	3500	3100	4000	14	260	65
45	461	498	33	1.8	PH831_0100K202_0067 MB23 EZ502U	1392	1390	2784	66.83	22790/341	12	8.0	3500	3100	4000	14	260	65
47	258	282	15	3.2	PH831_0070K202_0092 MB23 EZ501U	958	960	2917	64.33	15953/248	8.0	8.0	3500	3100	4000	11	245	63
47	258	282	15	3.2	PH831_0070K202_0092 MB23 EZ501U	958	960	2917	64.33	15953/248	12	8.0	3500	3100	4000	11	245	63
47	258	282	15	3.2	PH831_0070K202_0092 MB23 EZ501U	958	960	2917	64.33	15953/248	16	8.0	3500	3100	4000	11	245	63
47	282	312	16	2.9	PH831_0070K202_0092 MB23 EZ402U	958	960	2917	64.33	15953/248	8.0	8.0	3500	3100	4000	10	245	63
47	282	312	16	2.9	PH831_0070K202_0092 MB23 EZ402U	958	960	2917	64.33	15953/248	12	8.0	3500	3100	4000	10	245	63
47	282	312	16	2.9	PH831_0070K202_0092 MB23 EZ402U	958	960	2917	64.33	15953/248	16	8.0	3500	3100	4000	10	245	63
47	413	515	24	2.0	PH831_0070K202_0092 MB23 EZ404U	1478	1480	2917	64.33	15953/248	8.0	8.0	3500	3100	4000	11	245	65
47	413	515	24	2.0	PH831_0070K202_0092 MB23 EZ404U	1478	1480	2917	64.33	15953/248	12	8.0	3500	3100	4000	11	245	65
47	413	515	24	2.0	PH831_0070K202_0092 MB23 EZ404U	1478	1480	2917	64.33	15953/248	16	8.0	3500	3100	4000	11	245	65
47	443	479	26	1.8	PH831_0070K202_0092 MB23 EZ502U	1478	1480	2917	64.33	15953/248	8.0	8.0	3500	3100	4000	14	245	65
47	443	479	26	1.8	PH831_0070K202_0092 MB23 EZ502U	1478	1480	2917	64.33	15953/248	12	8.0	3500	3100	4000	14	245	65
47	443	479	26	1.8	PH831_0070K202_0092 MB23 EZ502U	1478	1480	2917	64.33	15953/248	16	8.0	3500	3100	4000	14	245	65
47	581	665	34	1.4	PH831_0070K202_0092 MB23 EZ503U	1478	1480	2917	64.33	15953/248	8.0	15	3500	3100	4000	17	245	66
47	809	958	47	1.0	PH831_0070K202_0092 MB23 EZ505U	1478	1480	2917	64.33	15953/248	8.0	15	3500	3100	4000	22	245	69
50	240	263	18	3.5	PH831_0100K202_0060 MB23 EZ501U	894	890	2784	60.00	60/1	8.0	8.0	3000	2600	4000	12	260	63
50	240	263	18	3.5	PH831_0100K202_0060 MB23 EZ501U	894	890	2784	60.00	60/1	12	8.0	3000	2600	4000	12	260	63
50	240	263	18	3.5	PH831_0100K202_0060 MB23 EZ501U	894	890	2784	60.00	60/1	16	8.0	3000	2600	4000	12	260	63
50	263	291	20	3.2	PH831_0100K202_0060 MB23 EZ402U	894	890	2784	60.00	60/1	8.0	8.0	3000	2600	4000	11	260	63
50	263	291	20	3.2	PH831_0100K202_0060 MB23 EZ402U	894	890	2784	60.00	60/1	12	8.0	3000	2600	4000	11	260	63
50	263	291	20	3.2	PH831_0100K202_0060 MB23 EZ402U	894	890	2784	60.00	60/1	16	8.0	3000	2600	4000	11	260	63

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PH831K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1850 Nm)																		
50	386	480	30	2.2	PH831_0100K202_0060 MB23 EZ404U	1392	1390	2784	60.00	60/1	8.0	8.0	3000	2600	4000	12	260	65
50	386	480	30	2.2	PH831_0100K202_0060 MB23 EZ404U	1392	1390	2784	60.00	60/1	12	8.0	3000	2600	4000	12	260	65
50	386	480	30	2.2	PH831_0100K202_0060 MB23 EZ404U	1392	1390	2784	60.00	60/1	16	8.0	3000	2600	4000	12	260	65
50	413	447	32	2.1	PH831_0100K202_0060 MB23 EZ502U	1392	1390	2784	60.00	60/1	8.0	8.0	3000	2600	4000	14	260	65
50	413	447	32	2.1	PH831_0100K202_0060 MB23 EZ502U	1392	1390	2784	60.00	60/1	12	8.0	3000	2600	4000	14	260	65
50	413	447	32	2.1	PH831_0100K202_0060 MB23 EZ502U	1392	1390	2784	60.00	60/1	16	8.0	3000	2600	4000	14	260	65
50	542	620	42	1.6	PH831_0100K202_0060 MB23 EZ503U	1392	1390	2784	60.00	60/1	8.0	15	3000	2600	4000	18	260	66
50	754	894	58	1.1	PH831_0100K202_0060 MB23 EZ505U	1392	1390	2784	60.00	60/1	8.0	15	3000	2600	4000	22	260	69
51	235	257	15	3.4	PH831_0070K202_0084 MB23 EZ501U	876	880	2917	58.78	17458/297	8.0	8.0	3500	3100	4000	11	245	63
51	235	257	15	3.4	PH831_0070K202_0084 MB23 EZ501U	876	880	2917	58.78	17458/297	12	8.0	3500	3100	4000	11	245	63
51	235	257	15	3.4	PH831_0070K202_0084 MB23 EZ501U	876	880	2917	58.78	17458/297	16	8.0	3500	3100	4000	11	245	63
51	257	285	16	3.1	PH831_0070K202_0084 MB23 EZ402U	876	880	2917	58.78	17458/297	8.0	8.0	3500	3100	4000	9.9	245	63
51	257	285	16	3.1	PH831_0070K202_0084 MB23 EZ402U	876	880	2917	58.78	17458/297	12	8.0	3500	3100	4000	9.9	245	63
51	257	285	16	3.1	PH831_0070K202_0084 MB23 EZ402U	876	880	2917	58.78	17458/297	16	8.0	3500	3100	4000	9.9	245	63
51	378	471	24	2.1	PH831_0070K202_0084 MB23 EZ404U	1478	1480	2917	58.78	17458/297	8.0	8.0	3500	3100	4000	11	245	65
51	378	471	24	2.1	PH831_0070K202_0084 MB23 EZ404U	1478	1480	2917	58.78	17458/297	12	8.0	3500	3100	4000	11	245	65
51	378	471	24	2.1	PH831_0070K202_0084 MB23 EZ404U	1478	1480	2917	58.78	17458/297	16	8.0	3500	3100	4000	11	245	65
51	405	438	26	2.0	PH831_0070K202_0084 MB23 EZ502U	1478	1480	2917	58.78	17458/297	8.0	8.0	3500	3100	4000	13	245	65
51	405	438	26	2.0	PH831_0070K202_0084 MB23 EZ502U	1478	1480	2917	58.78	17458/297	12	8.0	3500	3100	4000	13	245	65
51	405	438	26	2.0	PH831_0070K202_0084 MB23 EZ502U	1478	1480	2917	58.78	17458/297	16	8.0	3500	3100	4000	13	245	65
51	531	608	34	1.5	PH831_0070K202_0084 MB23 EZ503U	1478	1480	2917	58.78	17458/297	8.0	15	3500	3100	4000	17	245	66
51	531	608	34	1.5	PH831_0070K202_0084 MB23 EZ503U	1478	1480	2917	58.78	17458/297	12	15	3500	3100	4000	17	245	66
51	739	876	47	1.1	PH831_0070K202_0084 MB23 EZ505U	1478	1480	2917	58.78	17458/297	8.0	15	3500	3100	4000	22	245	69
51	739	876	47	1.1	PH831_0070K202_0084 MB23 EZ505U	1478	1480	2917	58.78	17458/297	12	15	3500	3100	4000	22	245	69
52	232	254	9.2	4.7	PH831_0050K302_0115 MB23 EZ501U	865	860	3406	58.05	1161/20	8.0	8.0	3200	2800	4000	12	245	68
52	232	254	9.2	4.7	PH831_0050K302_0115 MB23 EZ501U	865	860	3406	58.05	1161/20	12	8.0	3200	2800	4000	12	245	68
52	232	254	9.2	4.7	PH831_0050K302_0115 MB23 EZ501U	865	860	3406	58.05	1161/20	16	8.0	3200	2800	4000	12	245	68
52	254	281	10	4.3	PH831_0050K302_0115 MB23 EZ402U	865	860	3406	58.05	1161/20	8.0	8.0	3200	2800	4000	10	245	68
52	254	281	10	4.3	PH831_0050K302_0115 MB23 EZ402U	865	860	3406	58.05	1161/20	12	8.0	3200	2800	4000	10	245	68
52	254	281	10	4.3	PH831_0050K302_0115 MB23 EZ402U	865	860	3406	58.05	1161/20	16	8.0	3200	2800	4000	10	245	68
52	373	465	15	2.9	PH831_0050K302_0115 MB23 EZ404U	1568	1570	3406	58.05	1161/20	8.0	8.0	3200	2800	4000	12	245	70
52	373	465	15	2.9	PH831_0050K302_0115 MB23 EZ404U	1568	1570	3406	58.05	1161/20	12	8.0	3200	2800	4000	12	245	70
52	373	465	15	2.9	PH831_0050K302_0115 MB23 EZ404U	1568	1570	3406	58.05	1161/20	16	8.0	3200	2800	4000	12	245	70
52	400	432	16	2.8	PH831_0050K302_0115 MB23 EZ502U	1676	1680	3406	58.05	1161/20	8.0	8.0	3200	2800	4000	14	245	70
52	400	432	16	2.8	PH831_0050K302_0115 MB23 EZ502U	1676	1680	3406	58.05	1161/20	12	8.0	3200	2800	4000	14	245	70
52	400	432	16	2.8	PH831_0050K302_0115 MB23 EZ502U	1676	1680	3406	58.05	1161/20	16	8.0	3200	2800	4000	14	245	70
52	400	449	16	2.8	PH831_0050K302_0115 MB33 EZ701U	1081	1080	3646	58.05	1161/20	16	15	3200	2800	4000	39	245	79
52	524	600	21	2.1	PH831_0050K302_0115 MB23 EZ503U	1848	1850	3406	58.05	1161/20	8.0	15	3200	2800	4000	18	245	71
52	524	600	21	2.1	PH831_0050K302_0115 MB23 EZ503U	1848	1850	3406	58.05	1161/20	12	15	3200	2800	4000	18	245	71
52	649	778	26	1.7	PH831_0050K302_0115 MB33 EZ702U	1848	1850	3646	58.05	1161/20	16	15	3200	2800	4000	44	245	81
52	730	865	29	1.5	PH831_0050K302_0115 MB23 EZ505U	1848	1850	3406	58.05	1161/20	8.0	15	3200	2800	4000	22	245	74
52	730	865	29	1.5	PH831_0050K302_0115 MB23 EZ505U	1848	1850	3406	58.05	1161/20	12	15	3200	2800	4000	22	245	74
58	207	227	18	4.1	PH831_0100K202_0052 MB23 EZ501U	771	770	2784	51.77	21070/407	8.0	8.0	3000	2600	4000	12	260	63
58	207	227	18	4.1	PH831_0100K202_0052 MB23 EZ501U	771	770	2784	51.77	21070/407	12	8.0	3000	2600	4000	12	260	63
58	207	227	18	4.1	PH831_0100K202_0052 MB23 EZ501U	771	770	2784	51.77	21070/407	16	8.0	3000	2600	4000	12	260	63
58	227	251	19	3.8	PH831_0100K202_0052 MB23 EZ402U	771	770	2784	51.77	21070/407	8.0	8.0	3000	2600	4000	11	260	63
58	227	251	19	3.8	PH831_0100K202_0052 MB23 EZ402U	771	770	2784	51.77	21070/407	12	8.0	3000	2600	4000	11	260	63
58	227	251	19	3.8	PH831_0100K202_0052 MB23 EZ402U	771	770	2784	51.77	21070/407	16	8.0	3000	2600	4000	11	260	63
58	333	415	29	2.6	PH831_0100K202_0052 MB23 EZ404U	1392	1390	2784	51.77	21070/407	8.0	8.0	3000	2600	4000	12	260	65
58	333	415	29	2.6	PH831_0100K202_0052 MB23 EZ404U	1392	1390	2784	51.77	21070/407	12	8.0	3000	2600	4000	12	260	65
58	333	415	29	2.6	PH831_0100K202_0052 MB23 EZ404U	1392	1390	2784	51.77	21070/407	16	8.0	3000	2600	4000	12	260	65
58	357	386	31	2.4	PH831_0100K202_0052 MB23 EZ502U	1392	1390	2784	51.77	21070/407	8.0	8.0	3000	2600	4000	14	260	65
58	357	386	31	2.4	PH831_0100K202_0052 MB23 EZ502U	1392	1390	2784	51.77	21070/407	12	8.0	3000	2600	4000	14	260	65
58	357	386	31	2.4	PH831_0100K202_0052 MB23 EZ502U	1392	1390	2784	51.77	21070/407	16	8.0	3000	2600	4000	14	260	65
58	468	535	40	1.8	PH831_0100K202_0052 MB23 EZ503U	1392	1390	2784	51.77	21070/407	8.0	15	3000	2600	4000	18	260	66
58	468	535	40	1.8	PH831_0100K202_0052 MB23 EZ503U	1392	1390	2784	51.77	21070/407	12	15	3000	2600	4000	18	260	66
58	651	771	56	1.3	PH831_0100K202_0052 MB23 EZ505U	1392	1390	2784	51.77	21070/407	8.0	15	3000	2600	4000	22	260	69
58	651	771	56	1.3	PH831_0100K202_0052 MB23 EZ505U	1392	1390	2784	51.77	21070/407	12	15	3000	2600	4000	22	260	69
60	200	218	15	3.8	PH831_0070K202_0071 MB23 EZ501U	742	740	2917	49.83	14749/296	8.0	8.0	3000	2600	4000	12	245	63
60	200	218	15	3.8	PH831_0070K202_0071 MB23 EZ501U	742	740	2917	49.83	14749/296	12	8.0	3000	2600	4000	12	245	63
60	200	218	15	3.8	PH831_0070K202_0071 MB23 EZ501U	742	740	2917	49.83	14749/296	16	8.0	3000	2600	4000	12	245	63
60	218	241	17	3.4	PH831_0070K202_0071 MB23 EZ402U	742	740	2917	49.83	14749/296	8.0	8.0	3000	2600	4000	11	245	63
60	218	241	17	3.4	PH831_0070K202_0071 MB23 EZ402U	742	740	2917	49.83	14749/296	12	8.0	3000	2600	4000	11	245	63
60	218	241	17	3.4	PH831_0070K202_0071 MB23 EZ402U	742	740	2917	49.83	14749/296	16	8.0	3000	2600	4000	11	245	63

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PH831K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1850 Nm)																		
60	320	399	24	2.3	PH831_0070K202_0071 MB23 EZ404U	1346	1350	2917	49.83	14749/296	8.0	8.0	3000	2600	4000	12	245	65
60	320	399	24	2.3	PH831_0070K202_0071 MB23 EZ404U	1346	1350	2917	49.83	14749/296	12	8.0	3000	2600	4000	12	245	65
60	320	399	24	2.3	PH831_0070K202_0071 MB23 EZ404U	1346	1350	2917	49.83	14749/296	16	8.0	3000	2600	4000	12	245	65
60	343	371	26	2.2	PH831_0070K202_0071 MB23 EZ502U	1421	1420	2917	49.83	14749/296	8.0	8.0	3000	2600	4000	14	245	65
60	343	371	26	2.2	PH831_0070K202_0071 MB23 EZ502U	1421	1420	2917	49.83	14749/296	12	8.0	3000	2600	4000	14	245	65
60	343	371	26	2.2	PH831_0070K202_0071 MB23 EZ502U	1421	1420	2917	49.83	14749/296	16	8.0	3000	2600	4000	14	245	65
60	343	385	26	2.2	PH831_0070K202_0071 MB33 EZ701U	928	930	2917	49.83	14749/296	16	15	3000	2600	4000	39	245	74
60	450	515	34	1.7	PH831_0070K202_0071 MB23 EZ503U	1421	1420	2917	49.83	14749/296	8.0	15	3000	2600	4000	18	245	66
60	450	515	34	1.7	PH831_0070K202_0071 MB23 EZ503U	1421	1420	2917	49.83	14749/296	12	15	3000	2600	4000	18	245	66
60	557	668	42	1.4	PH831_0070K202_0071 MB33 EZ702U	1421	1420	2917	49.83	14749/296	16	15	3000	2600	4000	44	245	76
60	626	742	48	1.2	PH831_0070K202_0071 MB23 EZ505U	1421	1420	2917	49.83	14749/296	8.0	15	3000	2600	4000	22	245	69
60	626	742	48	1.2	PH831_0070K202_0071 MB23 EZ505U	1421	1420	2917	49.83	14749/296	12	15	3000	2600	4000	22	245	69
64	187	205	15	3.9	PH831_0070K202_0067 MB23 EZ501U	697	700	2744	46.78	15953/341	8.0	8.0	3500	3100	4000	12	245	63
64	187	205	15	3.9	PH831_0070K202_0067 MB23 EZ501U	697	700	2744	46.78	15953/341	12	8.0	3500	3100	4000	12	245	63
64	187	205	15	3.9	PH831_0070K202_0067 MB23 EZ501U	697	700	2744	46.78	15953/341	16	8.0	3500	3100	4000	12	245	63
64	205	227	17	3.6	PH831_0070K202_0067 MB23 EZ402U	697	700	2744	46.78	15953/341	8.0	8.0	3500	3100	4000	10	245	63
64	205	227	17	3.6	PH831_0070K202_0067 MB23 EZ402U	697	700	2744	46.78	15953/341	12	8.0	3500	3100	4000	10	245	63
64	205	227	17	3.6	PH831_0070K202_0067 MB23 EZ402U	697	700	2744	46.78	15953/341	16	8.0	3500	3100	4000	10	245	63
64	301	375	25	2.4	PH831_0070K202_0067 MB23 EZ404U	1263	1260	2744	46.78	15953/341	8.0	8.0	3500	3100	4000	12	245	65
64	301	375	25	2.4	PH831_0070K202_0067 MB23 EZ404U	1263	1260	2744	46.78	15953/341	12	8.0	3500	3100	4000	12	245	65
64	301	375	25	2.4	PH831_0070K202_0067 MB23 EZ404U	1263	1260	2744	46.78	15953/341	16	8.0	3500	3100	4000	12	245	65
64	322	349	26	2.3	PH831_0070K202_0067 MB23 EZ502U	1350	1350	2744	46.78	15953/341	8.0	8.0	3500	3100	4000	14	245	65
64	322	349	26	2.3	PH831_0070K202_0067 MB23 EZ502U	1350	1350	2744	46.78	15953/341	12	8.0	3500	3100	4000	14	245	65
64	322	349	26	2.3	PH831_0070K202_0067 MB23 EZ502U	1350	1350	2744	46.78	15953/341	16	8.0	3500	3100	4000	14	245	65
64	322	362	26	2.3	PH831_0070K202_0067 MB33 EZ701U	871	870	2917	46.78	15953/341	16	15	3500	3100	4000	39	245	74
64	423	484	35	1.7	PH831_0070K202_0067 MB23 EZ503U	1391	1390	2744	46.78	15953/341	8.0	15	3500	3100	4000	17	245	66
64	423	484	35	1.7	PH831_0070K202_0067 MB23 EZ503U	1391	1390	2744	46.78	15953/341	12	15	3500	3100	4000	17	245	66
64	523	627	43	1.4	PH831_0070K202_0067 MB33 EZ702U	1391	1390	2917	46.78	15953/341	16	15	3500	3100	4000	44	245	76
64	588	697	48	1.3	PH831_0070K202_0067 MB23 EZ505U	1391	1390	2744	46.78	15953/341	8.0	15	3500	3100	4000	22	245	69
64	588	697	48	1.3	PH831_0070K202_0067 MB23 EZ505U	1391	1390	2744	46.78	15953/341	12	15	3500	3100	4000	22	245	69
65	298	371	15	3.5	PH831_0050K302_0093 MB23 EZ404U	1251	1250	2718	46.34	5375/116	8.0	8.0	3200	2800	4000	12	245	70
65	298	371	15	3.5	PH831_0050K302_0093 MB23 EZ404U	1251	1250	2718	46.34	5375/116	12	8.0	3200	2800	4000	12	245	70
65	298	371	15	3.5	PH831_0050K302_0093 MB23 EZ404U	1251	1250	2718	46.34	5375/116	16	8.0	3200	2800	4000	12	245	70
65	319	345	16	3.2	PH831_0050K302_0093 MB23 EZ502U	1338	1340	2718	46.34	5375/116	8.0	8.0	3200	2800	4000	15	245	70
65	319	345	16	3.2	PH831_0050K302_0093 MB23 EZ502U	1338	1340	2718	46.34	5375/116	12	8.0	3200	2800	4000	15	245	70
65	319	345	16	3.2	PH831_0050K302_0093 MB23 EZ502U	1338	1340	2718	46.34	5375/116	16	8.0	3200	2800	4000	15	245	70
65	319	358	16	3.2	PH831_0050K302_0093 MB33 EZ701U	863	860	3646	46.34	5375/116	16	15	3200	2800	4000	40	245	79
65	319	358	16	3.2	PH831_0050K302_0093 MB33 EZ701U	863	860	3646	46.34	5375/116	24	15	3200	2800	4000	40	245	79
65	419	479	21	2.5	PH831_0050K302_0093 MB23 EZ503U	1618	1620	2718	46.34	5375/116	8.0	15	3200	2800	4000	18	245	71
65	419	479	21	2.5	PH831_0050K302_0093 MB23 EZ503U	1618	1620	2718	46.34	5375/116	12	15	3200	2800	4000	18	245	71
65	518	621	26	2.0	PH831_0050K302_0093 MB33 EZ702U	1769	1770	3646	46.34	5375/116	16	15	3200	2800	4000	45	245	81
65	518	621	26	2.0	PH831_0050K302_0093 MB33 EZ702U	1769	1770	3646	46.34	5375/116	24	15	3200	2800	4000	45	245	81
65	582	690	29	1.8	PH831_0050K302_0093 MB23 EZ505U	1618	1620	2718	46.34	5375/116	8.0	15	3200	2800	4000	23	245	74
65	582	690	29	1.8	PH831_0050K302_0093 MB23 EZ505U	1618	1620	2718	46.34	5375/116	12	15	3200	2800	4000	23	245	74
71	168	184	15	4.2	PH831_0070K202_0060 MB23 EZ501U	626	630	2464	42.00	42/1	8.0	8.0	3000	2600	4000	12	245	63
71	168	184	15	4.2	PH831_0070K202_0060 MB23 EZ501U	626	630	2464	42.00	42/1	12	8.0	3000	2600	4000	12	245	63
71	168	184	15	4.2	PH831_0070K202_0060 MB23 EZ501U	626	630	2464	42.00	42/1	16	8.0	3000	2600	4000	12	245	63
71	184	203	17	3.9	PH831_0070K202_0060 MB23 EZ402U	626	630	2464	42.00	42/1	8.0	8.0	3000	2600	4000	11	245	63
71	184	203	17	3.9	PH831_0070K202_0060 MB23 EZ402U	626	630	2464	42.00	42/1	12	8.0	3000	2600	4000	11	245	63
71	184	203	17	3.9	PH831_0070K202_0060 MB23 EZ402U	626	630	2464	42.00	42/1	16	8.0	3000	2600	4000	11	245	63
71	270	336	25	2.6	PH831_0070K202_0060 MB23 EZ404U	1134	1130	2464	42.00	42/1	8.0	8.0	3000	2600	4000	12	245	65
71	270	336	25	2.6	PH831_0070K202_0060 MB23 EZ404U	1134	1130	2464	42.00	42/1	12	8.0	3000	2600	4000	12	245	65
71	270	336	25	2.6	PH831_0070K202_0060 MB23 EZ404U	1134	1130	2464	42.00	42/1	16	8.0	3000	2600	4000	12	245	65
71	289	313	27	2.5	PH831_0070K202_0060 MB23 EZ502U	1212	1210	2464	42.00	42/1	8.0	8.0	3000	2600	4000	15	245	65
71	289	313	27	2.5	PH831_0070K202_0060 MB23 EZ502U	1212	1210	2464	42.00	42/1	12	8.0	3000	2600	4000	15	245	65
71	289	313	27	2.5	PH831_0070K202_0060 MB23 EZ502U	1212	1210	2464	42.00	42/1	16	8.0	3000	2600	4000	15	245	65
71	289	325	27	2.5	PH831_0070K202_0060 MB33 EZ701U	782	780	2917	42.00	42/1	16	15	3000	2600	4000	39	245	74
71	289	325	27	2.5	PH831_0070K202_0060 MB33 EZ701U	782	780	2917	42.00	42/1	24	15	3000	2600	4000	39	245	74
71	379	434	35	1.9	PH831_0070K202_0060 MB23 EZ503U	1342	1340	2464	42.00	42/1	8.0	15	3000	2600	4000	18	245	66
71	379	434	35	1.9	PH831_0070K202_0060 MB23 EZ503U	1342	1340	2464	42.00	42/1	12	15	3000	2600	4000	18	245	66
71	469	563	43	1.5	PH831_0070K202_0060 MB33 EZ702U	1342	1340	2917	42.00	42/1	16	15	3000	2600	4000	45	245	76
71	469	563	43	1.5	PH831_0070K202_0060 MB33 EZ702U	1342	1340	2917	42.00	42/1	24	15	3000	2600	4000	45	245	76
71	528	626	48	1.3	PH831_0070K202_0060 MB23 EZ505U	1342	1340	2464	42.00	42/1	8.0	15	3000	2600	4000	23	245	69
71	528	626	48	1.3	PH831_0070K202_0060 MB23 EZ505U	1342	1340	2464	42.00	42/1	12	15	3000	2600	4000	23	245	69

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PH831K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1850 Nm)																		
75	175	194	18	4.9	PH831_0100K202_0040 MB23 EZ402U	596	600	2347	40.00	40/1	8.0	8.0	3000	2600	4000	12	260	63
75	175	194	18	4.9	PH831_0100K202_0040 MB23 EZ402U	596	600	2347	40.00	40/1	12	8.0	3000	2600	4000	12	260	63
75	175	194	18	4.9	PH831_0100K202_0040 MB23 EZ402U	596	600	2347	40.00	40/1	16	8.0	3000	2600	4000	12	260	63
75	257	320	27	3.3	PH831_0100K202_0040 MB23 EZ404U	1080	1080	2347	40.00	40/1	8.0	8.0	3000	2600	4000	13	260	65
75	257	320	27	3.3	PH831_0100K202_0040 MB23 EZ404U	1080	1080	2347	40.00	40/1	12	8.0	3000	2600	4000	13	260	65
75	257	320	27	3.3	PH831_0100K202_0040 MB23 EZ404U	1080	1080	2347	40.00	40/1	16	8.0	3000	2600	4000	13	260	65
75	276	298	29	3.1	PH831_0100K202_0040 MB23 EZ502U	1155	1150	2347	40.00	40/1	8.0	8.0	3000	2600	4000	15	260	65
75	276	298	29	3.1	PH831_0100K202_0040 MB23 EZ502U	1155	1150	2347	40.00	40/1	12	8.0	3000	2600	4000	15	260	65
75	276	298	29	3.1	PH831_0100K202_0040 MB23 EZ502U	1155	1150	2347	40.00	40/1	16	8.0	3000	2600	4000	15	260	65
75	276	309	29	3.1	PH831_0100K202_0040 MB33 EZ701U	745	740	2784	40.00	40/1	16	15	3000	2600	4000	40	260	74
75	276	309	29	3.1	PH831_0100K202_0040 MB33 EZ701U	745	740	2784	40.00	40/1	24	15	3000	2600	4000	40	260	74
75	361	413	38	2.4	PH831_0100K202_0040 MB23 EZ503U	1392	1390	2347	40.00	40/1	8.0	15	3000	2600	4000	19	260	66
75	361	413	38	2.4	PH831_0100K202_0040 MB23 EZ503U	1392	1390	2347	40.00	40/1	12	15	3000	2600	4000	19	260	66
75	447	536	46	1.9	PH831_0100K202_0040 MB33 EZ702U	1392	1390	2784	40.00	40/1	16	15	3000	2600	4000	45	260	76
75	447	536	46	1.9	PH831_0100K202_0040 MB33 EZ702U	1392	1390	2784	40.00	40/1	24	15	3000	2600	4000	45	260	76
75	503	596	52	1.7	PH831_0100K202_0040 MB23 EZ505U	1392	1390	2347	40.00	40/1	8.0	15	3000	2600	4000	23	260	69
75	503	596	52	1.7	PH831_0100K202_0040 MB23 EZ505U	1392	1390	2347	40.00	40/1	12	15	3000	2600	4000	23	260	69
81	237	296	15	4.0	PH831_0050K302_0074 MB23 EZ404U	998	1000	2168	36.96	2365/64	8.0	8.0	2700	2300	4000	13	245	70
81	237	296	15	4.0	PH831_0050K302_0074 MB23 EZ404U	998	1000	2168	36.96	2365/64	12	8.0	2700	2300	4000	13	245	70
81	237	296	15	4.0	PH831_0050K302_0074 MB23 EZ404U	998	1000	2168	36.96	2365/64	16	8.0	2700	2300	4000	13	245	70
81	255	275	16	3.7	PH831_0050K302_0074 MB23 EZ502U	1067	1070	2168	36.96	2365/64	8.0	8.0	2700	2300	4000	16	245	70
81	255	275	16	3.7	PH831_0050K302_0074 MB23 EZ502U	1067	1070	2168	36.96	2365/64	12	8.0	2700	2300	4000	16	245	70
81	255	275	16	3.7	PH831_0050K302_0074 MB23 EZ502U	1067	1070	2168	36.96	2365/64	16	8.0	2700	2300	4000	16	245	70
81	255	286	16	3.7	PH831_0050K302_0074 MB33 EZ701U	688	690	3646	36.96	2365/64	16	15	2700	2300	4000	40	245	79
81	255	286	16	3.7	PH831_0050K302_0074 MB33 EZ701U	688	690	3646	36.96	2365/64	24	15	2700	2300	4000	40	245	79
81	255	286	16	3.7	PH831_0050K302_0074 MB33 EZ701U	688	690	3646	36.96	2365/64	32	15	2700	2300	4000	40	245	79
81	334	382	22	2.9	PH831_0050K302_0074 MB23 EZ503U	1290	1290	2168	36.96	2365/64	8.0	15	2700	2300	4000	19	245	71
81	334	382	22	2.9	PH831_0050K302_0074 MB23 EZ503U	1290	1290	2168	36.96	2365/64	12	15	2700	2300	4000	19	245	71
81	413	496	27	2.3	PH831_0050K302_0074 MB33 EZ702U	1411	1410	3646	36.96	2365/64	16	15	2700	2300	4000	46	245	81
81	413	496	27	2.3	PH831_0050K302_0074 MB33 EZ702U	1411	1410	3646	36.96	2365/64	24	15	2700	2300	4000	46	245	81
81	413	496	27	2.3	PH831_0050K302_0074 MB33 EZ702U	1411	1410	3646	36.96	2365/64	32	15	2700	2300	4000	46	245	81
81	465	551	30	2.1	PH831_0050K302_0074 MB23 EZ505U	1290	1290	2168	36.96	2365/64	8.0	15	2700	2300	4000	24	245	74
81	465	551	30	2.1	PH831_0050K302_0074 MB23 EZ505U	1290	1290	2168	36.96	2365/64	12	15	2700	2300	4000	24	245	74
81	568	716	37	1.7	PH831_0050K302_0074 MB33 EZ703U	1800	1800	3646	36.96	2365/64	16	32	2700	2300	4000	58	245	84
81	733	1039	47	1.3	PH831_0050K302_0074 MB33 EZ705U	1800	1800	3646	36.96	2365/64	16	32	2700	2300	4000	70	245	90
83	145	159	16	4.7	PH831_0070K202_0052 MB23 EZ501U	540	540	2126	36.24	14749/407	8.0	8.0	3000	2600	4000	12	245	63
83	145	159	16	4.7	PH831_0070K202_0052 MB23 EZ501U	540	540	2126	36.24	14749/407	12	8.0	3000	2600	4000	12	245	63
83	145	159	16	4.7	PH831_0070K202_0052 MB23 EZ501U	540	540	2126	36.24	14749/407	16	8.0	3000	2600	4000	12	245	63
83	159	175	17	4.3	PH831_0070K202_0052 MB23 EZ402U	540	540	2126	36.24	14749/407	8.0	8.0	3000	2600	4000	11	245	63
83	159	175	17	4.3	PH831_0070K202_0052 MB23 EZ402U	540	540	2126	36.24	14749/407	12	8.0	3000	2600	4000	11	245	63
83	159	175	17	4.3	PH831_0070K202_0052 MB23 EZ402U	540	540	2126	36.24	14749/407	16	8.0	3000	2600	4000	11	245	63
83	233	290	25	2.9	PH831_0070K202_0052 MB23 EZ404U	979	980	2126	36.24	14749/407	8.0	8.0	3000	2600	4000	12	245	65
83	233	290	25	2.9	PH831_0070K202_0052 MB23 EZ404U	979	980	2126	36.24	14749/407	12	8.0	3000	2600	4000	12	245	65
83	233	290	25	2.9	PH831_0070K202_0052 MB23 EZ404U	979	980	2126	36.24	14749/407	16	8.0	3000	2600	4000	12	245	65
83	250	270	27	2.7	PH831_0070K202_0052 MB23 EZ502U	1046	1050	2126	36.24	14749/407	8.0	8.0	3000	2600	4000	15	245	65
83	250	270	27	2.7	PH831_0070K202_0052 MB23 EZ502U	1046	1050	2126	36.24	14749/407	12	8.0	3000	2600	4000	15	245	65
83	250	270	27	2.7	PH831_0070K202_0052 MB23 EZ502U	1046	1050	2126	36.24	14749/407	16	8.0	3000	2600	4000	15	245	65
83	250	280	27	2.7	PH831_0070K202_0052 MB33 EZ701U	675	670	2917	36.24	14749/407	16	15	3000	2600	4000	40	245	74
83	250	280	27	2.7	PH831_0070K202_0052 MB33 EZ701U	675	670	2917	36.24	14749/407	24	15	3000	2600	4000	40	245	74
83	327	375	35	2.1	PH831_0070K202_0052 MB23 EZ503U	1265	1270	2126	36.24	14749/407	8.0	15	3000	2600	4000	18	245	66
83	327	375	35	2.1	PH831_0070K202_0052 MB23 EZ503U	1265	1270	2126	36.24	14749/407	12	15	3000	2600	4000	18	245	66
83	405	486	44	1.7	PH831_0070K202_0052 MB33 EZ702U	1278	1280	2917	36.24	14749/407	16	15	3000	2600	4000	45	245	76
83	405	486	44	1.7	PH831_0070K202_0052 MB33 EZ702U	1278	1280	2917	36.24	14749/407	24	15	3000	2600	4000	45	245	76
83	456	540	49	1.5	PH831_0070K202_0052 MB23 EZ505U	1265	1270	2126	36.24	14749/407	8.0	15	3000	2600	4000	23	245	69
83	456	540	49	1.5	PH831_0070K202_0052 MB23 EZ505U	1265	1270	2126	36.24	14749/407	12	15	3000	2600	4000	23	245	69
98	134	148	17	4.8	PH831_0070K202_0044 MB23 EZ402U	455	460	1792	30.55	336/11	8.0	8.0	3000	2600	4000	12	245	63
98	134	148	17	4.8	PH831_0070K202_0044 MB23 EZ402U	455	460	1792	30.55	336/11	12	8.0	3000	2600	4000	12	245	63
98	134	148	17	4.8	PH831_0070K202_0044 MB23 EZ402U	455	460	1792	30.55	336/11	16	8.0	3000	2600	4000	12	245	63
98	196	245	25	3.3	PH831_0070K202_0044 MB23 EZ404U	825	820	1792	30.55	336/11	8.0	8.0	3000	2600	4000	13	245	65
98	196	245	25	3.3	PH831_0070K202_0044 MB23 EZ404U	825	820	1792	30.55	336/11	12	8.0	3000	2600	4000	13	245	65
98	196	245	25	3.3	PH831_0070K202_0044 MB23 EZ404U	825	820	1792	30.55	336/11	16	8.0	3000	2600	4000	13	245	65
98	211	228	27	3.0	PH831_0070K202_0044 MB23 EZ502U	882	880	1792	30.55	336/11	8.0	8.0	3000	2600	4000	15	245	65
98	211	228	27	3.0	PH831_0070K202_0044 MB23 EZ502U	882	880	1792	30.55	336/11	12	8.0	3000	2600	4000	15	245	65
98	211	228	27	3.0	PH831_0070K202_0044 MB23 EZ502U	882	880	1792	30.55	336/11	16	8.0	3000	2600	4000	15	245	65

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PH831K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1850 Nm)																		
98	211	236	27	3.0	PH831_0070K202_0044 MB33 EZ701U	569	570	2917	30.55	336/11	16	15	3000	2600	4000	40	245	74
98	211	236	27	3.0	PH831_0070K202_0044 MB33 EZ701U	569	570	2917	30.55	336/11	24	15	3000	2600	4000	40	245	74
98	211	236	27	3.0	PH831_0070K202_0044 MB33 EZ701U	569	570	2917	30.55	336/11	32	15	3000	2600	4000	40	245	74
98	276	316	36	2.3	PH831_0070K202_0044 MB23 EZ503U	1067	1070	1792	30.55	336/11	8.0	15	3000	2600	4000	19	245	66
98	276	316	36	2.3	PH831_0070K202_0044 MB23 EZ503U	1067	1070	1792	30.55	336/11	12	15	3000	2600	4000	19	245	66
98	341	410	44	1.9	PH831_0070K202_0044 MB33 EZ702U	1166	1170	2917	30.55	336/11	16	15	3000	2600	4000	45	245	76
98	341	410	44	1.9	PH831_0070K202_0044 MB33 EZ702U	1166	1170	2917	30.55	336/11	24	15	3000	2600	4000	45	245	76
98	341	410	44	1.9	PH831_0070K202_0044 MB33 EZ702U	1166	1170	2917	30.55	336/11	32	15	3000	2600	4000	45	245	76
98	384	455	50	1.7	PH831_0070K202_0044 MB23 EZ505U	1067	1070	1792	30.55	336/11	8.0	15	3000	2600	4000	23	245	69
98	384	455	50	1.7	PH831_0070K202_0044 MB23 EZ505U	1067	1070	1792	30.55	336/11	12	15	3000	2600	4000	23	245	69
98	469	592	61	1.4	PH831_0070K202_0044 MB33 EZ703U	1207	1210	2917	30.55	336/11	16	32	3000	2600	4000	57	245	79
98	606	859	79	1.1	PH831_0070K202_0044 MB33 EZ705U	1207	1210	2917	30.55	336/11	16	32	3000	2600	4000	70	245	85
100	193	240	16	4.6	PH831_0050K302_0060 MB23 EZ404U	810	810	1760	30.00	30/1	8.0	8.0	2700	2300	4000	14	245	70
100	193	240	16	4.6	PH831_0050K302_0060 MB23 EZ404U	810	810	1760	30.00	30/1	12	8.0	2700	2300	4000	14	245	70
100	193	240	16	4.6	PH831_0050K302_0060 MB23 EZ404U	810	810	1760	30.00	30/1	16	8.0	2700	2300	4000	14	245	70
100	207	223	17	4.3	PH831_0050K302_0060 MB23 EZ502U	866	870	1760	30.00	30/1	8.0	8.0	2700	2300	4000	17	245	70
100	207	223	17	4.3	PH831_0050K302_0060 MB23 EZ502U	866	870	1760	30.00	30/1	12	8.0	2700	2300	4000	17	245	70
100	207	223	17	4.3	PH831_0050K302_0060 MB23 EZ502U	866	870	1760	30.00	30/1	16	8.0	2700	2300	4000	17	245	70
100	207	232	17	4.3	PH831_0050K302_0060 MB33 EZ701U	559	560	3646	30.00	30/1	16	15	2700	2300	4000	41	245	79
100	207	232	17	4.3	PH831_0050K302_0060 MB33 EZ701U	559	560	3646	30.00	30/1	24	15	2700	2300	4000	41	245	79
100	207	232	17	4.3	PH831_0050K302_0060 MB33 EZ701U	559	560	3646	30.00	30/1	32	15	2700	2300	4000	41	245	79
100	207	232	17	4.3	PH831_0050K302_0060 MB33 EZ701U	559	560	3646	30.00	30/1	45	15	2700	2300	4000	41	245	79
100	271	310	22	3.3	PH831_0050K302_0060 MB23 EZ503U	1048	1050	1760	30.00	30/1	8.0	15	2700	2300	4000	20	245	71
100	271	310	22	3.3	PH831_0050K302_0060 MB23 EZ503U	1048	1050	1760	30.00	30/1	12	15	2700	2300	4000	20	245	71
100	335	402	27	2.7	PH831_0050K302_0060 MB33 EZ702U	1145	1150	3646	30.00	30/1	16	15	2700	2300	4000	47	245	81
100	335	402	27	2.7	PH831_0050K302_0060 MB33 EZ702U	1145	1150	3646	30.00	30/1	24	15	2700	2300	4000	47	245	81
100	335	402	27	2.7	PH831_0050K302_0060 MB33 EZ702U	1145	1150	3646	30.00	30/1	32	15	2700	2300	4000	47	245	81
100	335	402	27	2.7	PH831_0050K302_0060 MB33 EZ702U	1145	1150	3646	30.00	30/1	45	15	2700	2300	4000	47	245	81
100	377	447	30	2.4	PH831_0050K302_0060 MB23 EZ505U	1048	1050	1760	30.00	30/1	8.0	15	2700	2300	4000	25	245	74
100	377	447	30	2.4	PH831_0050K302_0060 MB23 EZ505U	1048	1050	1760	30.00	30/1	12	15	2700	2300	4000	25	245	74
100	461	581	37	1.9	PH831_0050K302_0060 MB33 EZ703U	1679	1680	3646	30.00	30/1	16	32	2700	2300	4000	59	245	84
100	461	581	37	1.9	PH831_0050K302_0060 MB33 EZ703U	1679	1680	3646	30.00	30/1	24	32	2700	2300	4000	59	245	84
100	461	581	37	1.9	PH831_0050K302_0060 MB33 EZ703U	1679	1680	3646	30.00	30/1	32	32	2700	2300	4000	59	245	84
100	595	844	48	1.5	PH831_0050K302_0060 MB33 EZ705U	1679	1680	3646	30.00	30/1	16	32	2700	2300	4000	71	245	90
100	595	844	48	1.5	PH831_0050K302_0060 MB33 EZ705U	1679	1680	3646	30.00	30/1	24	32	2700	2300	4000	71	245	90
100	595	844	48	1.5	PH831_0050K302_0060 MB33 EZ705U	1679	1680	3646	30.00	30/1	32	32	2700	2300	4000	71	245	90
107	180	224	26	3.4	PH831_0070K202_0040 MB23 EZ404U	756	760	1643	28.00	28/1	8.0	8.0	3000	2600	4000	13	245	65
107	180	224	26	3.4	PH831_0070K202_0040 MB23 EZ404U	756	760	1643	28.00	28/1	12	8.0	3000	2600	4000	13	245	65
107	180	224	26	3.4	PH831_0070K202_0040 MB23 EZ404U	756	760	1643	28.00	28/1	16	8.0	3000	2600	4000	13	245	65
107	193	209	27	3.2	PH831_0070K202_0040 MB23 EZ502U	808	810	1643	28.00	28/1	8.0	8.0	3000	2600	4000	16	245	65
107	193	209	27	3.2	PH831_0070K202_0040 MB23 EZ502U	808	810	1643	28.00	28/1	12	8.0	3000	2600	4000	16	245	65
107	193	209	27	3.2	PH831_0070K202_0040 MB23 EZ502U	808	810	1643	28.00	28/1	16	8.0	3000	2600	4000	16	245	65
107	193	216	27	3.2	PH831_0070K202_0040 MB33 EZ701U	521	520	2917	28.00	28/1	16	15	3000	2600	4000	41	245	74
107	193	216	27	3.2	PH831_0070K202_0040 MB33 EZ701U	521	520	2917	28.00	28/1	24	15	3000	2600	4000	41	245	74
107	193	216	27	3.2	PH831_0070K202_0040 MB33 EZ701U	521	520	2917	28.00	28/1	32	15	3000	2600	4000	41	245	74
107	193	216	27	3.2	PH831_0070K202_0040 MB33 EZ701U	521	520	2917	28.00	28/1	45	15	3000	2600	4000	41	245	74
107	253	289	36	2.5	PH831_0070K202_0040 MB23 EZ503U	978	980	1643	28.00	28/1	8.0	15	3000	2600	4000	19	245	66
107	253	289	36	2.5	PH831_0070K202_0040 MB23 EZ503U	978	980	1643	28.00	28/1	12	15	3000	2600	4000	19	245	66
107	313	375	45	2.0	PH831_0070K202_0040 MB33 EZ702U	1069	1070	2917	28.00	28/1	16	15	3000	2600	4000	46	245	76
107	313	375	45	2.0	PH831_0070K202_0040 MB33 EZ702U	1069	1070	2917	28.00	28/1	24	15	3000	2600	4000	46	245	76
107	313	375	45	2.0	PH831_0070K202_0040 MB33 EZ702U	1069	1070	2917	28.00	28/1	32	15	3000	2600	4000	46	245	76
107	313	375	45	2.0	PH831_0070K202_0040 MB33 EZ702U	1069	1070	2917	28.00	28/1	45	15	3000	2600	4000	46	245	76
107	352	417	50	1.8	PH831_0070K202_0040 MB23 EZ505U	978	980	1643	28.00	28/1	8.0	15	3000	2600	4000	24	245	69
107	352	417	50	1.8	PH831_0070K202_0040 MB23 EZ505U	978	980	1643	28.00	28/1	12	15	3000	2600	4000	24	245	69
107	430	542	61	1.4	PH831_0070K202_0040 MB33 EZ703U	1173	1170	2917	28.00	28/1	16	32	3000	2600	4000	58	245	79
107	555	787	79	1.1	PH831_0070K202_0040 MB33 EZ705U	1173	1170	2917	28.00	28/1	16	32	3000	2600	4000	70	245	85
112	173	215	16	5.0	PH831_0050K302_0054 MB23 EZ404U	726	730	1577	26.88	215/8	8.0	8.0	2700	2300	4000	14	245	70
112	173	215	16	5.0	PH831_0050K302_0054 MB23 EZ404U	726	730	1577	26.88	215/8	12	8.0	2700	2300	4000	14	245	70
112	173	215	16	5.0	PH831_0050K302_0054 MB23 EZ404U	726	730	1577	26.88	215/8	16	8.0	2700	2300	4000	14	245	70
112	185	200	17	4.6	PH831_0050K302_0054 MB23 EZ502U	776	780	1577	26.88	215/8	8.0	8.0	2700	2300	4000	16	245	70
112	185	200	17	4.6	PH831_0050K302_0054 MB23 EZ502U	776	780	1577	26.88	215/8	12	8.0	2700	2300	4000	16	245	70
112	185	200	17	4.6	PH831_0050K302_0054 MB23 EZ502U	776	780	1577	26.88	215/8	16	8.0	2700	2300	4000	16	245	70
112	185	208	17	4.6	PH831_0050K302_0054 MB33 EZ701U	501	500	3140	26.88	215/8	16	15	2700	2300	4000	41	245	79
112	185	208	17	4.6	PH831_0050K302_0054 MB33 EZ701U	501	500	3140	26.88	215/8	24	15	2700	2300	4000	41	245	79

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PH831K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1850 Nm)																		
112	185	208	17	4.6	PH831_0050K302_0054 MB33 EZ701U	501	500	3140	26.88	215/8	32	15	2700	2300	4000	41	245	79
112	185	208	17	4.6	PH831_0050K302_0054 MB33 EZ701U	501	500	3140	26.88	215/8	45	15	2700	2300	4000	41	245	79
112	243	278	22	3.5	PH831_0050K302_0054 MB23 EZ503U	938	940	1577	26.88	215/8	8.0	15	2700	2300	4000	20	245	71
112	243	278	22	3.5	PH831_0050K302_0054 MB23 EZ503U	938	940	1577	26.88	215/8	12	15	2700	2300	4000	20	245	71
112	300	360	27	2.9	PH831_0050K302_0054 MB33 EZ702U	1026	1030	3140	26.88	215/8	16	15	2700	2300	4000	47	245	81
112	300	360	27	2.9	PH831_0050K302_0054 MB33 EZ702U	1026	1030	3140	26.88	215/8	24	15	2700	2300	4000	47	245	81
112	300	360	27	2.9	PH831_0050K302_0054 MB33 EZ702U	1026	1030	3140	26.88	215/8	32	15	2700	2300	4000	47	245	81
112	300	360	27	2.9	PH831_0050K302_0054 MB33 EZ702U	1026	1030	3140	26.88	215/8	45	15	2700	2300	4000	47	245	81
112	338	400	31	2.5	PH831_0050K302_0054 MB23 EZ505U	938	940	1577	26.88	215/8	8.0	15	2700	2300	4000	24	245	74
112	338	400	31	2.5	PH831_0050K302_0054 MB23 EZ505U	938	940	1577	26.88	215/8	12	15	2700	2300	4000	24	245	74
112	413	521	38	2.1	PH831_0050K302_0054 MB33 EZ703U	1619	1620	3140	26.88	215/8	16	32	2700	2300	4000	58	245	84
112	413	521	38	2.1	PH831_0050K302_0054 MB33 EZ703U	1619	1620	3140	26.88	215/8	24	32	2700	2300	4000	58	245	84
112	533	756	48	1.6	PH831_0050K302_0054 MB33 EZ705U	1619	1620	3140	26.88	215/8	16	32	2700	2300	4000	71	245	90
112	533	756	48	1.6	PH831_0050K302_0054 MB33 EZ705U	1619	1620	3140	26.88	215/8	24	32	2700	2300	4000	71	245	90
150	181	207	25	3.9	PH831_0050K302_0040 MB23 EZ503U	698	700	1173	20.00	20/1	8.0	15	2700	2300	4000	22	245	71
150	181	207	25	3.9	PH831_0050K302_0040 MB23 EZ503U	698	700	1173	20.00	20/1	12	15	2700	2300	4000	22	245	71
150	223	268	28	3.5	PH831_0050K302_0040 MB33 EZ702U	764	760	3520	20.00	20/1	16	15	2700	2300	4000	49	245	81
150	223	268	28	3.5	PH831_0050K302_0040 MB33 EZ702U	764	760	3520	20.00	20/1	24	15	2700	2300	4000	49	245	81
150	223	268	28	3.5	PH831_0050K302_0040 MB33 EZ702U	764	760	3520	20.00	20/1	32	15	2700	2300	4000	49	245	81
150	223	268	28	3.5	PH831_0050K302_0040 MB33 EZ702U	764	760	3520	20.00	20/1	45	15	2700	2300	4000	49	245	81
150	251	298	35	2.8	PH831_0050K302_0040 MB23 EZ505U	698	700	1173	20.00	20/1	8.0	15	2700	2300	4000	27	245	74
150	251	298	35	2.8	PH831_0050K302_0040 MB23 EZ505U	698	700	1173	20.00	20/1	12	15	2700	2300	4000	27	245	74
150	307	387	38	2.5	PH831_0050K302_0040 MB33 EZ703U	1211	1210	3520	20.00	20/1	16	32	2700	2300	4000	61	245	84
150	307	387	38	2.5	PH831_0050K302_0040 MB33 EZ703U	1211	1210	3520	20.00	20/1	24	32	2700	2300	4000	61	245	84
150	307	387	38	2.5	PH831_0050K302_0040 MB33 EZ703U	1211	1210	3520	20.00	20/1	32	32	2700	2300	4000	61	245	84
150	307	387	38	2.5	PH831_0050K302_0040 MB33 EZ703U	1211	1210	3520	20.00	20/1	45	32	2700	2300	4000	61	245	84
150	397	562	50	2.0	PH831_0050K302_0040 MB33 EZ705U	1467	1470	3520	20.00	20/1	16	32	2700	2300	4000	73	245	90
150	397	562	50	2.0	PH831_0050K302_0040 MB33 EZ705U	1467	1470	3520	20.00	20/1	24	32	2700	2300	4000	73	245	90
150	397	562	50	2.0	PH831_0050K302_0040 MB33 EZ705U	1467	1470	3520	20.00	20/1	32	32	2700	2300	4000	73	245	90
150	397	562	50	2.0	PH831_0050K302_0040 MB33 EZ705U	1467	1470	3520	20.00	20/1	45	32	2700	2300	4000	73	245	90
188	145	165	25	3.9	PH831_0040K302_0040 MB23 EZ503U	559	560	939	16.00	16/1	8.0	15	2700	2300	4000	23	185	71
188	145	165	25	3.9	PH831_0040K302_0040 MB23 EZ503U	559	560	939	16.00	16/1	12	15	2700	2300	4000	23	185	71
188	179	215	28	3.5	PH831_0040K302_0040 MB33 EZ702U	611	610	2816	16.00	16/1	16	15	2700	2300	4000	49	185	81
188	179	215	28	3.5	PH831_0040K302_0040 MB33 EZ702U	611	610	2816	16.00	16/1	24	15	2700	2300	4000	49	185	81
188	179	215	28	3.5	PH831_0040K302_0040 MB33 EZ702U	611	610	2816	16.00	16/1	32	15	2700	2300	4000	49	185	81
188	179	215	28	3.5	PH831_0040K302_0040 MB33 EZ702U	611	610	2816	16.00	16/1	45	15	2700	2300	4000	49	185	81
188	201	238	35	2.8	PH831_0040K302_0040 MB23 EZ505U	559	560	939	16.00	16/1	8.0	15	2700	2300	4000	27	185	74
188	201	238	35	2.8	PH831_0040K302_0040 MB23 EZ505U	559	560	939	16.00	16/1	12	15	2700	2300	4000	27	185	74
188	246	310	38	2.5	PH831_0040K302_0040 MB33 EZ703U	968	970	2816	16.00	16/1	16	32	2700	2300	4000	61	185	84
188	246	310	38	2.5	PH831_0040K302_0040 MB33 EZ703U	968	970	2816	16.00	16/1	24	32	2700	2300	4000	61	185	84
188	246	310	38	2.5	PH831_0040K302_0040 MB33 EZ703U	968	970	2816	16.00	16/1	32	32	2700	2300	4000	61	185	84
188	246	310	38	2.5	PH831_0040K302_0040 MB33 EZ703U	968	970	2816	16.00	16/1	45	32	2700	2300	4000	61	185	84
188	317	450	50	2.0	PH831_0040K302_0040 MB33 EZ705U	1174	1170	2816	16.00	16/1	16	32	2700	2300	4000	74	185	90
188	317	450	50	2.0	PH831_0040K302_0040 MB33 EZ705U	1174	1170	2816	16.00	16/1	24	32	2700	2300	4000	74	185	90
188	317	450	50	2.0	PH831_0040K302_0040 MB33 EZ705U	1174	1170	2816	16.00	16/1	32	32	2700	2300	4000	74	185	90
188	317	450	50	2.0	PH831_0040K302_0040 MB33 EZ705U	1174	1170	2816	16.00	16/1	45	32	2700	2300	4000	74	185	90
PH941K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 5000 Nm)																		
10	1140	1246	10	2.6	PH941_0060K513_0480 MB23 EZ501U	4243	4240	10000	289.0	8091/28	8.0	8.0	3400	3000	4000	11	730	103
10	1246	1379	11	2.4	PH941_0060K513_0480 MB23 EZ402U	4243	4240	10000	289.0	8091/28	8.0	8.0	3400	3000	4000	10	730	103
10	1830	2281	16	1.6	PH941_0060K513_0480 MB23 EZ404U	5000	5000	10000	289.0	8091/28	8.0	8.0	3400	3000	4000	11	730	105
10	1962	2122	17	1.5	PH941_0060K513_0480 MB23 EZ502U	5000	5000	10000	289.0	8091/28	8.0	8.0	3400	3000	4000	14	730	104
13	912	997	9.4	3.3	PH941_0060K513_0390 MB23 EZ501U	3395	3390	10000	231.2	8091/35	8.0	8.0	3400	3000	4000	12	730	103
13	912	997	9.4	3.3	PH941_0060K513_0390 MB23 EZ501U	3395	3390	10000	231.2	8091/35	12	8.0	3400	3000	4000	12	730	103
13	997	1103	10	3.0	PH941_0060K513_0390 MB23 EZ402U	3395	3390	10000	231.2	8091/35	8.0	8.0	3400	3000	4000	10	730	103
13	997	1103	10	3.0	PH941_0060K513_0390 MB23 EZ402U	3395	3390	10000	231.2	8091/35	12	8.0	3400	3000	4000	10	730	103
13	1464	1825	15	2.0	PH941_0060K513_0390 MB23 EZ404U	5000	5000	10000	231.2	8091/35	8.0	8.0	3400	3000	4000	12	730	105
13	1464	1825	15	2.0	PH941_0060K513_0390 MB23 EZ404U	5000	5000	10000	231.2	8091/35	12	8.0	3400	3000	4000	12	730	105
13	1570	1697	16	1.9	PH941_0060K513_0390 MB23 EZ502U	5000	5000	10000	231.2	8091/35	8.0	8.0	3400	3000	4000	14	730	104
13	1570	1697	16	1.9	PH941_0060K513_0390 MB23 EZ502U	5000	5000	10000	231.2	8091/35	12	8.0	3400	3000	4000	14	730	104
13	2058	2355	21	1.5	PH941_0060K513_0390 MB23 EZ503U	5000	5000	10000	231.2	8091/35	8.0	15	3400	3000	4000	18	730	106
13	2864	3395	30	1.0	PH941_0060K513_0390 MB23 EZ505U	5000	5000	10000	231.2	8091/35	8.0	15	3400	3000	4000	22	730	109
15	765	836	9.0	3.9	PH941_0060K513_0320 MB23 EZ501U	2846	2850	10000	193.8	62031/320	8.0	8.0	3400	3000	4000	12	730	103
15	765	836	9.0	3.9	PH941_0060K513_0320 MB23 EZ501U	2846	2850	10000	193.8	62031/320	12	8.0	3400	3000	4000	12	730	103
15	765	836	9.0	3.9	PH941_0060K513_0320 MB23 EZ501U	2846	2850	10000	193.8	62031/320	16	8.0	3400	3000	4000	12	730	103

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PH941K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 5000 Nm)																		
15	836	925	9.8	3.6	PH941_0060K513_0320 MB23 EZ402U	2846	2850	10000	193.8	62031/320	8.0	8.0	3400	3000	4000	11	730	103
15	836	925	9.8	3.6	PH941_0060K513_0320 MB23 EZ402U	2846	2850	10000	193.8	62031/320	12	8.0	3400	3000	4000	11	730	103
15	836	925	9.8	3.6	PH941_0060K513_0320 MB23 EZ402U	2846	2850	10000	193.8	62031/320	16	8.0	3400	3000	4000	11	730	103
15	1228	1530	14	2.4	PH941_0060K513_0320 MB23 EZ404U	5000	5000	10000	193.8	62031/320	8.0	8.0	3400	3000	4000	12	730	105
15	1228	1530	14	2.4	PH941_0060K513_0320 MB23 EZ404U	5000	5000	10000	193.8	62031/320	12	8.0	3400	3000	4000	12	730	105
15	1228	1530	14	2.4	PH941_0060K513_0320 MB23 EZ404U	5000	5000	10000	193.8	62031/320	16	8.0	3400	3000	4000	12	730	105
15	1317	1423	15	2.3	PH941_0060K513_0320 MB23 EZ502U	5000	5000	10000	193.8	62031/320	8.0	8.0	3400	3000	4000	15	730	104
15	1317	1423	15	2.3	PH941_0060K513_0320 MB23 EZ502U	5000	5000	10000	193.8	62031/320	12	8.0	3400	3000	4000	15	730	104
15	1317	1423	15	2.3	PH941_0060K513_0320 MB23 EZ502U	5000	5000	10000	193.8	62031/320	16	8.0	3400	3000	4000	15	730	104
15	1726	1975	20	1.7	PH941_0060K513_0320 MB23 EZ503U	5000	5000	10000	193.8	62031/320	8.0	15	3400	3000	4000	18	730	106
15	1726	1975	20	1.7	PH941_0060K513_0320 MB23 EZ503U	5000	5000	10000	193.8	62031/320	12	15	3400	3000	4000	18	730	106
15	2402	2846	28	1.2	PH941_0060K513_0320 MB23 EZ505U	5000	5000	10000	193.8	62031/320	8.0	15	3400	3000	4000	23	730	109
15	2402	2846	28	1.2	PH941_0060K513_0320 MB23 EZ505U	5000	5000	10000	193.8	62031/320	12	15	3400	3000	4000	23	730	109
21	630	697	9.0	4.8	PH941_0060K513_0240 MB23 EZ402U	2145	2150	8447	146.1	11687/80	8.0	8.0	2800	2500	4000	12	730	103
21	630	697	9.0	4.8	PH941_0060K513_0240 MB23 EZ402U	2145	2150	8447	146.1	11687/80	12	8.0	2800	2500	4000	12	730	103
21	630	697	9.0	4.8	PH941_0060K513_0240 MB23 EZ402U	2145	2150	8447	146.1	11687/80	16	8.0	2800	2500	4000	12	730	103
21	925	1153	13	3.2	PH941_0060K513_0240 MB23 EZ404U	3888	3890	8447	146.1	11687/80	8.0	8.0	2800	2500	4000	13	730	105
21	925	1153	13	3.2	PH941_0060K513_0240 MB23 EZ404U	3888	3890	8447	146.1	11687/80	12	8.0	2800	2500	4000	13	730	105
21	925	1153	13	3.2	PH941_0060K513_0240 MB23 EZ404U	3888	3890	8447	146.1	11687/80	16	8.0	2800	2500	4000	13	730	105
21	992	1073	14	3.0	PH941_0060K513_0240 MB23 EZ502U	4156	4160	8447	146.1	11687/80	8.0	8.0	2800	2500	4000	16	730	104
21	992	1073	14	3.0	PH941_0060K513_0240 MB23 EZ502U	4156	4160	8447	146.1	11687/80	12	8.0	2800	2500	4000	16	730	104
21	992	1073	14	3.0	PH941_0060K513_0240 MB23 EZ502U	4156	4160	8447	146.1	11687/80	16	8.0	2800	2500	4000	16	730	104
21	992	1113	14	3.0	PH941_0060K513_0240 MB33 EZ701U	2681	2680	10000	146.1	11687/80	16	15	2800	2500	4000	41	730	114
21	1301	1488	19	2.3	PH941_0060K513_0240 MB23 EZ503U	5000	5000	8447	146.1	11687/80	8.0	15	2800	2500	4000	19	730	106
21	1301	1488	19	2.3	PH941_0060K513_0240 MB23 EZ503U	5000	5000	8447	146.1	11687/80	12	15	2800	2500	4000	19	730	106
21	1609	1931	23	1.9	PH941_0060K513_0240 MB33 EZ702U	5000	5000	10000	146.1	11687/80	16	15	2800	2500	4000	46	730	116
21	1810	2145	26	1.7	PH941_0060K513_0240 MB23 EZ505U	5000	5000	8447	146.1	11687/80	8.0	15	2800	2500	4000	24	730	109
21	1810	2145	26	1.7	PH941_0060K513_0240 MB23 EZ505U	5000	5000	8447	146.1	11687/80	12	15	2800	2500	4000	24	730	109
26	735	916	12	4.1	PH941_0060K513_0195 MB23 EZ404U	3090	3090	6714	116.1	27869/240	8.0	8.0	2800	2500	4000	14	730	105
26	735	916	12	4.1	PH941_0060K513_0195 MB23 EZ404U	3090	3090	6714	116.1	27869/240	12	8.0	2800	2500	4000	14	730	105
26	735	916	12	4.1	PH941_0060K513_0195 MB23 EZ404U	3090	3090	6714	116.1	27869/240	16	8.0	2800	2500	4000	14	730	105
26	789	853	13	3.8	PH941_0060K513_0195 MB23 EZ502U	3304	3300	6714	116.1	27869/240	8.0	8.0	2800	2500	4000	17	730	104
26	789	853	13	3.8	PH941_0060K513_0195 MB23 EZ502U	3304	3300	6714	116.1	27869/240	12	8.0	2800	2500	4000	17	730	104
26	789	853	13	3.8	PH941_0060K513_0195 MB23 EZ502U	3304	3300	6714	116.1	27869/240	16	8.0	2800	2500	4000	17	730	104
26	789	885	13	3.8	PH941_0060K513_0195 MB33 EZ701U	2131	2130	10000	116.1	27869/240	16	15	2800	2500	4000	42	730	114
26	789	885	13	3.8	PH941_0060K513_0195 MB33 EZ701U	2131	2130	10000	116.1	27869/240	24	15	2800	2500	4000	42	730	114
26	789	885	13	3.8	PH941_0060K513_0195 MB33 EZ701U	2131	2130	10000	116.1	27869/240	32	15	2800	2500	4000	42	730	114
26	1034	1183	17	2.9	PH941_0060K513_0195 MB23 EZ503U	3996	4000	6714	116.1	27869/240	8.0	15	2800	2500	4000	20	730	106
26	1034	1183	17	2.9	PH941_0060K513_0195 MB23 EZ503U	3996	4000	6714	116.1	27869/240	12	15	2800	2500	4000	20	730	106
26	1279	1535	21	2.3	PH941_0060K513_0195 MB33 EZ702U	4369	4370	10000	116.1	27869/240	16	15	2800	2500	4000	47	730	116
26	1279	1535	21	2.3	PH941_0060K513_0195 MB33 EZ702U	4369	4370	10000	116.1	27869/240	24	15	2800	2500	4000	47	730	116
26	1279	1535	21	2.3	PH941_0060K513_0195 MB33 EZ702U	4369	4370	10000	116.1	27869/240	32	15	2800	2500	4000	47	730	116
26	1439	1705	24	2.1	PH941_0060K513_0195 MB23 EZ505U	3996	4000	6714	116.1	27869/240	8.0	15	2800	2500	4000	25	730	109
26	1439	1705	24	2.1	PH941_0060K513_0195 MB23 EZ505U	3996	4000	6714	116.1	27869/240	12	15	2800	2500	4000	25	730	109
31	611	762	12	4.9	PH941_0060K513_0160 MB23 EZ404U	2570	2570	5583	96.56	26071/270	8.0	8.0	2300	2200	3600	16	730	105
31	611	762	12	4.9	PH941_0060K513_0160 MB23 EZ404U	2570	2570	5583	96.56	26071/270	12	8.0	2300	2200	3600	16	730	105
31	611	762	12	4.9	PH941_0060K513_0160 MB23 EZ404U	2570	2570	5583	96.56	26071/270	16	8.0	2300	2200	3600	16	730	105
31	656	709	13	4.6	PH941_0060K513_0160 MB23 EZ502U	2747	2750	5583	96.56	26071/270	8.0	8.0	2300	2200	3600	18	730	104
31	656	709	13	4.6	PH941_0060K513_0160 MB23 EZ502U	2747	2750	5583	96.56	26071/270	12	8.0	2300	2200	3600	18	730	104
31	656	709	13	4.6	PH941_0060K513_0160 MB23 EZ502U	2747	2750	5583	96.56	26071/270	16	8.0	2300	2200	3600	18	730	104
31	656	736	13	4.6	PH941_0060K513_0160 MB33 EZ701U	1772	1770	10000	96.56	26071/270	16	15	2300	2200	3600	43	730	114
31	656	736	13	4.6	PH941_0060K513_0160 MB33 EZ701U	1772	1770	10000	96.56	26071/270	24	15	2300	2200	3600	43	730	114
31	656	736	13	4.6	PH941_0060K513_0160 MB33 EZ701U	1772	1770	10000	96.56	26071/270	32	15	2300	2200	3600	43	730	114
31	860	984	16	3.5	PH941_0060K513_0160 MB23 EZ503U	3323	3320	5583	96.56	26071/270	8.0	15	2300	2200	3600	22	730	106
31	860	984	16	3.5	PH941_0060K513_0160 MB23 EZ503U	3323	3320	5583	96.56	26071/270	12	15	2300	2200	3600	22	730	106
31	1063	1276	20	2.8	PH941_0060K513_0160 MB33 EZ702U	3633	3630	10000	96.56	26071/270	16	15	2300	2200	3600	48	730	116
31	1063	1276	20	2.8	PH941_0060K513_0160 MB33 EZ702U	3633	3630	10000	96.56	26071/270	24	15	2300	2200	3600	48	730	116
31	1063	1276	20	2.8	PH941_0060K513_0160 MB33 EZ702U	3633	3630	10000	96.56	26071/270	32	15	2300	2200	3600	48	730	116
31	1196	1418	23	2.5	PH941_0060K513_0160 MB23 EZ505U	3323	3320	5583	96.56	26071/270	8.0	15	2300	2200	3600	26	730	109
31	1196	1418	23	2.5	PH941_0060K513_0160 MB23 EZ505U	3323	3320	5583	96.56	26071/270	12	15	2300	2200	3600	26	730	109
31	1462	1843	28	2.1	PH941_0060K513_0160 MB33 EZ703U	5000	5000	10000	96.56	26071/270	16	32	2300	2200	3600	60	730	119
31	1888	2676	36	1.6	PH941_0060K513_0160 MB33 EZ705U	5000	5000	10000	96.56	26071/270	16	32	2300	2200	3600	72	730	125
39	846	1016	19	3.5	PH941_0060K513_0130 MB33 EZ702U	2892	2890	10000	76.85	1537/20	16	15	2300	2200	3600	50	730	116
39	846	1016	19	3.5	PH941_0060K513_0130 MB33 EZ702U	2892	2890	10000	76.85	1537/20	24	15	2300	2200	3600	50	730	116

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PH941K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 5000 Nm)																		
39	846	1016	19	3.5	PH941_0060K513_0130 MB33 EZ702U	2892	2890	10000	76.85	1537/20	32	15	2300	2200	3600	50	730	116
39	846	1016	19	3.5	PH941_0060K513_0130 MB33 EZ702U	2892	2890	10000	76.85	1537/20	45	15	2300	2200	3600	50	730	116
39	1164	1467	26	2.6	PH941_0060K513_0130 MB33 EZ703U	4584	4580	10000	76.85	1537/20	16	32	2300	2200	3600	62	730	119
39	1164	1467	26	2.6	PH941_0060K513_0130 MB33 EZ703U	4584	4580	10000	76.85	1537/20	24	32	2300	2200	3600	62	730	119
39	1164	1467	26	2.6	PH941_0060K513_0130 MB33 EZ703U	4584	4580	10000	76.85	1537/20	32	32	2300	2200	3600	62	730	119
39	1502	2130	34	2.0	PH941_0060K513_0130 MB33 EZ705U	5000	5000	10000	76.85	1537/20	16	32	2300	2200	3600	75	730	125
39	1502	2130	34	2.0	PH941_0060K513_0130 MB33 EZ705U	5000	5000	10000	76.85	1537/20	24	32	2300	2200	3600	75	730	125
39	1502	2130	34	2.0	PH941_0060K513_0130 MB33 EZ705U	5000	5000	10000	76.85	1537/20	32	32	2300	2200	3600	75	730	125
49	671	805	18	4.5	PH941_0060K513_0100 MB33 EZ702U	2292	2290	10000	60.90	609/10	16	15	1900	1800	3200	53	730	116
49	671	805	18	4.5	PH941_0060K513_0100 MB33 EZ702U	2292	2290	10000	60.90	609/10	24	15	1900	1800	3200	53	730	116
49	671	805	18	4.5	PH941_0060K513_0100 MB33 EZ702U	2292	2290	10000	60.90	609/10	32	15	1900	1800	3200	53	730	116
49	671	805	18	4.5	PH941_0060K513_0100 MB33 EZ702U	2292	2290	10000	60.90	609/10	45	15	1900	1800	3200	53	730	116
49	922	1163	24	3.3	PH941_0060K513_0100 MB33 EZ703U	3633	3630	10000	60.90	609/10	16	32	1900	1800	3200	65	730	119
49	922	1163	24	3.3	PH941_0060K513_0100 MB33 EZ703U	3633	3630	10000	60.90	609/10	24	32	1900	1800	3200	65	730	119
49	922	1163	24	3.3	PH941_0060K513_0100 MB33 EZ703U	3633	3630	10000	60.90	609/10	32	32	1900	1800	3200	65	730	119
49	922	1163	24	3.3	PH941_0060K513_0100 MB33 EZ703U	3633	3630	10000	60.90	609/10	45	32	1900	1800	3200	65	730	119
49	1190	1688	31	2.5	PH941_0060K513_0100 MB33 EZ705U	5000	5000	10000	60.90	609/10	16	32	1900	1800	3200	78	730	125
49	1190	1688	31	2.5	PH941_0060K513_0100 MB33 EZ705U	5000	5000	10000	60.90	609/10	24	32	1900	1800	3200	78	730	125
49	1190	1688	31	2.5	PH941_0060K513_0100 MB33 EZ705U	5000	5000	10000	60.90	609/10	32	32	1900	1800	3200	78	730	125
49	1190	1688	31	2.5	PH941_0060K513_0100 MB33 EZ705U	5000	5000	10000	60.90	609/10	45	32	1900	1800	3200	78	730	125
61	739	932	23	4.1	PH941_0060K513_0081 MB33 EZ703U	2911	2910	8465	48.80	17081/350	16	32	1900	1800	3200	69	730	119
61	739	932	23	4.1	PH941_0060K513_0081 MB33 EZ703U	2911	2910	8465	48.80	17081/350	24	32	1900	1800	3200	69	730	119
61	739	932	23	4.1	PH941_0060K513_0081 MB33 EZ703U	2911	2910	8465	48.80	17081/350	32	32	1900	1800	3200	69	730	119
61	739	932	23	4.1	PH941_0060K513_0081 MB33 EZ703U	2911	2910	8465	48.80	17081/350	45	32	1900	1800	3200	69	730	119
61	954	1353	29	3.1	PH941_0060K513_0081 MB33 EZ705U	4479	4480	8465	48.80	17081/350	16	32	1900	1800	3200	82	730	125
61	954	1353	29	3.1	PH941_0060K513_0081 MB33 EZ705U	4479	4480	8465	48.80	17081/350	24	32	1900	1800	3200	82	730	125
61	954	1353	29	3.1	PH941_0060K513_0081 MB33 EZ705U	4479	4480	8465	48.80	17081/350	32	32	1900	1800	3200	82	730	125
61	954	1353	29	3.1	PH941_0060K513_0081 MB33 EZ705U	4479	4480	8465	48.80	17081/350	45	32	1900	1800	3200	82	730	125
61	1191	2159	37	2.5	PH941_0060K513_0081 MB43 EZ803U	5000	5000	10000	48.80	17081/350	50	65	1900	1800	3000	190	730	155
74	615	775	21	3.8	PH941_0040K513_0100 MB33 EZ703U	2422	2420	7042	40.60	203/5	16	32	1900	1800	3200	66	525	119
74	615	775	21	3.8	PH941_0040K513_0100 MB33 EZ703U	2422	2420	7042	40.60	203/5	24	32	1900	1800	3200	66	525	119
74	615	775	21	3.8	PH941_0040K513_0100 MB33 EZ703U	2422	2420	7042	40.60	203/5	32	32	1900	1800	3200	66	525	119
74	615	775	21	3.8	PH941_0040K513_0100 MB33 EZ703U	2422	2420	7042	40.60	203/5	45	32	1900	1800	3200	66	525	119
74	794	1125	27	3.0	PH941_0040K513_0100 MB33 EZ705U	3726	3730	7042	40.60	203/5	16	32	1900	1800	3200	78	525	125
74	794	1125	27	3.0	PH941_0040K513_0100 MB33 EZ705U	3726	3730	7042	40.60	203/5	24	32	1900	1800	3200	78	525	125
74	794	1125	27	3.0	PH941_0040K513_0100 MB33 EZ705U	3726	3730	7042	40.60	203/5	32	32	1900	1800	3200	78	525	125
74	794	1125	27	3.0	PH941_0040K513_0100 MB33 EZ705U	3726	3730	7042	40.60	203/5	45	32	1900	1800	3200	78	525	125
74	991	1796	33	2.4	PH941_0040K513_0100 MB43 EZ803U	3840	3840	7500	40.60	203/5	50	65	1900	1800	3000	186	525	155
92	493	621	21	4.4	PH941_0040K513_0081 MB33 EZ703U	1941	1940	5644	32.54	17081/525	16	32	1900	1800	3200	70	525	119
92	493	621	21	4.4	PH941_0040K513_0081 MB33 EZ703U	1941	1940	5644	32.54	17081/525	24	32	1900	1800	3200	70	525	119
92	493	621	21	4.4	PH941_0040K513_0081 MB33 EZ703U	1941	1940	5644	32.54	17081/525	32	32	1900	1800	3200	70	525	119
92	493	621	21	4.4	PH941_0040K513_0081 MB33 EZ703U	1941	1940	5644	32.54	17081/525	45	32	1900	1800	3200	70	525	119
92	636	902	27	3.4	PH941_0040K513_0081 MB33 EZ705U	2986	2990	5644	32.54	17081/525	16	32	1900	1800	3200	83	525	125
92	636	902	27	3.4	PH941_0040K513_0081 MB33 EZ705U	2986	2990	5644	32.54	17081/525	24	32	1900	1800	3200	83	525	125
92	636	902	27	3.4	PH941_0040K513_0081 MB33 EZ705U	2986	2990	5644	32.54	17081/525	32	32	1900	1800	3200	83	525	125
92	636	902	27	3.4	PH941_0040K513_0081 MB33 EZ705U	2986	2990	5644	32.54	17081/525	45	32	1900	1800	3200	83	525	125
92	794	1439	33	2.8	PH941_0040K513_0081 MB43 EZ803U	3840	3840	7500	32.54	17081/525	50	65	1900	1800	3000	190	525	155
92	794	1439	33	2.8	PH941_0040K513_0081 MB43 EZ803U	3840	3840	7500	32.54	17081/525	72	65	1900	1800	3000	190	525	155
PH1041K (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 7500 Nm)																		
41	1951	2951	40	2.5	PH1041_0060K613_0081 MB43 EZ805U	7500	–	15000	48.64	255285/5248	50	115	1800	1700	3000	291	1210	216
PH1041K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 7500 Nm)																		
6.6	1803	1971	7.6	2.8	PH1041_0060K613_0760 MB23 EZ501U	6708	–	15000	456.8	380091/832	8.0	8.0	3100	2800	4000	11	1210	147
6.6	1971	2180	8.4	2.5	PH1041_0060K613_0760 MB23 EZ402U	6708	–	15000	456.8	380091/832	8.0	8.0	3100	2800	4000	9.8	1210	147
6.6	2893	3606	12	1.7	PH1041_0060K613_0760 MB23 EZ404U	7500	–	15000	456.8	380091/832	8.0	8.0	3100	2800	4000	11	1210	149
6.6	3103	3354	13	1.6	PH1041_0060K613_0760 MB23 EZ502U	7500	–	15000	456.8	380091/832	8.0	8.0	3100	2800	4000	13	1210	149
7.8	1509	1649	7.2	3.3	PH1041_0060K613_0640 MB23 EZ501U	5613	–	15000	382.3	391437/1024	8.0	8.0	3100	2800	4000	11	1210	147
7.8	1509	1649	7.2	3.3	PH1041_0060K613_0640 MB23 EZ501U	5613	–	15000	382.3	391437/1024	12	8.0	3100	2800	4000	11	1210	147
7.8	1649	1824	7.9	3.0	PH1041_0060K613_0640 MB23 EZ402U	5613	–	15000	382.3	391437/1024	8.0	8.0	3100	2800	4000	10	1210	147
7.8	1649	1824	7.9	3.0	PH1041_0060K613_0640 MB23 EZ402U	5613	–	15000	382.3	391437/1024	12	8.0	3100	2800	4000	10	1210	147
7.8	2421	3017	12	2.1	PH1041_0060K613_0640 MB23 EZ404U	7500	–	15000	382.3	391437/1024	8.0	8.0	3100	2800	4000	11	1210	149
7.8	2421	3017	12	2.1	PH1041_0060K613_0640 MB23 EZ404U	7500	–	15000	382.3	391437/1024	12	8.0	3100	2800	4000	11	1210	149
7.8	2596	2807	12	1.9	PH1041_0060K613_0640 MB23 EZ502U	7500	–	15000	382.3	391437/1024	8.0	8.0	3100	2800	4000	14	1210	149
7.8	2596	2807	12	1.9	PH1041_0060K613_0640 MB23 EZ502U	7500	–	15000	382.3	391437/1024	12	8.0	3100	2800	4000	14	1210	149
10	1130	1235	6.6	4.4	PH1041_0060K613_0480 MB23 EZ501U	4205	–	15000	286.4	119133/416	8.0	8.0	3100	2800	4000	12	1210	147

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PH1041K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 7500 Nm)																		
10	1130	1235	6.6	4.4	PH1041_0060K613_0480 MB23 EZ501U	4205	–	15000	286.4	119133/416	12	8.0	3100	2800	4000	12	1210	147
10	1130	1235	6.6	4.4	PH1041_0060K613_0480 MB23 EZ501U	4205	–	15000	286.4	119133/416	16	8.0	3100	2800	4000	12	1210	147
10	1235	1367	7.3	4.0	PH1041_0060K613_0480 MB23 EZ402U	4205	–	15000	286.4	119133/416	8.0	8.0	3100	2800	4000	11	1210	147
10	1235	1367	7.3	4.0	PH1041_0060K613_0480 MB23 EZ402U	4205	–	15000	286.4	119133/416	12	8.0	3100	2800	4000	11	1210	147
10	1235	1367	7.3	4.0	PH1041_0060K613_0480 MB23 EZ402U	4205	–	15000	286.4	119133/416	16	8.0	3100	2800	4000	11	1210	147
10	1814	2260	11	2.8	PH1041_0060K613_0480 MB23 EZ404U	7500	–	15000	286.4	119133/416	8.0	8.0	3100	2800	4000	12	1210	149
10	1814	2260	11	2.8	PH1041_0060K613_0480 MB23 EZ404U	7500	–	15000	286.4	119133/416	12	8.0	3100	2800	4000	12	1210	149
10	1814	2260	11	2.8	PH1041_0060K613_0480 MB23 EZ404U	7500	–	15000	286.4	119133/416	16	8.0	3100	2800	4000	12	1210	149
10	1945	2103	11	2.6	PH1041_0060K613_0480 MB23 EZ502U	7500	–	15000	286.4	119133/416	8.0	8.0	3100	2800	4000	14	1210	149
10	1945	2103	11	2.6	PH1041_0060K613_0480 MB23 EZ502U	7500	–	15000	286.4	119133/416	12	8.0	3100	2800	4000	14	1210	149
10	1945	2103	11	2.6	PH1041_0060K613_0480 MB23 EZ502U	7500	–	15000	286.4	119133/416	16	8.0	3100	2800	4000	14	1210	149
10	2549	2917	15	2.0	PH1041_0060K613_0480 MB23 EZ503U	7500	–	15000	286.4	119133/416	8.0	15	3100	2800	4000	18	1210	151
10	2549	2917	15	2.0	PH1041_0060K613_0480 MB23 EZ503U	7500	–	15000	286.4	119133/416	12	15	3100	2800	4000	18	1210	151
10	3548	4205	21	1.4	PH1041_0060K613_0480 MB23 EZ505U	7500	–	15000	286.4	119133/416	8.0	15	3100	2800	4000	23	1210	154
10	3548	4205	21	1.4	PH1041_0060K613_0480 MB23 EZ505U	7500	–	15000	286.4	119133/416	12	15	3100	2800	4000	23	1210	154
13	1456	1815	10	3.4	PH1041_0060K613_0380 MB23 EZ404U	6119	–	13293	229.9	470859/2048	8.0	8.0	3100	2800	4000	13	1210	149
13	1456	1815	10	3.4	PH1041_0060K613_0380 MB23 EZ404U	6119	–	13293	229.9	470859/2048	12	8.0	3100	2800	4000	13	1210	149
13	1456	1815	10	3.4	PH1041_0060K613_0380 MB23 EZ404U	6119	–	13293	229.9	470859/2048	16	8.0	3100	2800	4000	13	1210	149
13	1561	1688	11	3.2	PH1041_0060K613_0380 MB23 EZ502U	6541	–	13293	229.9	470859/2048	8.0	8.0	3100	2800	4000	15	1210	149
13	1561	1688	11	3.2	PH1041_0060K613_0380 MB23 EZ502U	6541	–	13293	229.9	470859/2048	12	8.0	3100	2800	4000	15	1210	149
13	1561	1688	11	3.2	PH1041_0060K613_0380 MB23 EZ502U	6541	–	13293	229.9	470859/2048	16	8.0	3100	2800	4000	15	1210	149
13	1561	1751	11	3.2	PH1041_0060K613_0380 MB33 EZ701U	4220	–	15000	229.9	470859/2048	16	15	3100	2800	4000	40	1210	158
13	2047	2342	14	2.4	PH1041_0060K613_0380 MB23 EZ503U	7500	–	13293	229.9	470859/2048	8.0	15	3100	2800	4000	19	1210	151
13	2047	2342	14	2.4	PH1041_0060K613_0380 MB23 EZ503U	7500	–	13293	229.9	470859/2048	12	15	3100	2800	4000	19	1210	151
13	2532	3038	17	2.0	PH1041_0060K613_0380 MB33 EZ702U	7500	–	15000	229.9	470859/2048	16	15	3100	2800	4000	45	1210	161
13	2849	3376	20	1.8	PH1041_0060K613_0380 MB23 EZ505U	7500	–	13293	229.9	470859/2048	8.0	15	3100	2800	4000	23	1210	154
13	2849	3376	20	1.8	PH1041_0060K613_0380 MB23 EZ505U	7500	–	13293	229.9	470859/2048	12	15	3100	2800	4000	23	1210	154
16	1210	1509	9.4	4.1	PH1041_0060K613_0320 MB23 EZ404U	5087	–	11051	191.1	391437/2048	8.0	8.0	3100	2800	4000	14	1210	149
16	1210	1509	9.4	4.1	PH1041_0060K613_0320 MB23 EZ404U	5087	–	11051	191.1	391437/2048	12	8.0	3100	2800	4000	14	1210	149
16	1210	1509	9.4	4.1	PH1041_0060K613_0320 MB23 EZ404U	5087	–	11051	191.1	391437/2048	16	8.0	3100	2800	4000	14	1210	149
16	1298	1403	10	3.9	PH1041_0060K613_0320 MB23 EZ502U	5438	–	11051	191.1	391437/2048	8.0	8.0	3100	2800	4000	16	1210	149
16	1298	1403	10	3.9	PH1041_0060K613_0320 MB23 EZ502U	5438	–	11051	191.1	391437/2048	12	8.0	3100	2800	4000	16	1210	149
16	1298	1403	10	3.9	PH1041_0060K613_0320 MB23 EZ502U	5438	–	11051	191.1	391437/2048	16	8.0	3100	2800	4000	16	1210	149
16	1298	1456	10	3.9	PH1041_0060K613_0320 MB33 EZ701U	3508	–	15000	191.1	391437/2048	16	15	3100	2800	4000	41	1210	158
16	1298	1456	10	3.9	PH1041_0060K613_0320 MB33 EZ701U	3508	–	15000	191.1	391437/2048	24	15	3100	2800	4000	41	1210	158
16	1701	1947	13	2.9	PH1041_0060K613_0320 MB23 EZ503U	6578	–	11051	191.1	391437/2048	8.0	15	3100	2800	4000	20	1210	151
16	1701	1947	13	2.9	PH1041_0060K613_0320 MB23 EZ503U	6578	–	11051	191.1	391437/2048	12	15	3100	2800	4000	20	1210	151
16	2105	2526	16	2.4	PH1041_0060K613_0320 MB33 EZ702U	7192	–	15000	191.1	391437/2048	16	15	3100	2800	4000	46	1210	161
16	2105	2526	16	2.4	PH1041_0060K613_0320 MB33 EZ702U	7192	–	15000	191.1	391437/2048	24	15	3100	2800	4000	46	1210	161
16	2368	2807	18	2.1	PH1041_0060K613_0320 MB23 EZ505U	6578	–	11051	191.1	391437/2048	8.0	15	3100	2800	4000	24	1210	154
16	2368	2807	18	2.1	PH1041_0060K613_0320 MB23 EZ505U	6578	–	11051	191.1	391437/2048	12	15	3100	2800	4000	24	1210	154
21	1586	1904	15	3.2	PH1041_0060K613_0240 MB33 EZ702U	5420	–	15000	144.0	73749/512	16	15	2600	2300	4000	48	1210	161
21	1586	1904	15	3.2	PH1041_0060K613_0240 MB33 EZ702U	5420	–	15000	144.0	73749/512	24	15	2600	2300	4000	48	1210	161
21	1586	1904	15	3.2	PH1041_0060K613_0240 MB33 EZ702U	5420	–	15000	144.0	73749/512	32	15	2600	2300	4000	48	1210	161
21	2181	2750	21	2.3	PH1041_0060K613_0240 MB33 EZ703U	7500	–	15000	144.0	73749/512	16	32	2600	2300	4000	60	1210	164
21	2816	3992	27	1.8	PH1041_0060K613_0240 MB33 EZ705U	7500	–	15000	144.0	73749/512	16	32	2600	2300	4000	73	1210	169
26	1015	1161	14	3.9	PH1041_0060K613_0190 MB23 EZ503U	3922	–	6589	114.0	51057/448	8.0	15	2600	2300	4000	24	1210	151
26	1015	1161	14	3.9	PH1041_0060K613_0190 MB23 EZ503U	3922	–	6589	114.0	51057/448	12	15	2600	2300	4000	24	1210	151
26	1255	1506	14	4.0	PH1041_0060K613_0190 MB33 EZ702U	4288	–	15000	114.0	51057/448	16	15	2600	2300	4000	51	1210	161
26	1255	1506	14	4.0	PH1041_0060K613_0190 MB33 EZ702U	4288	–	15000	114.0	51057/448	24	15	2600	2300	4000	51	1210	161
26	1255	1506	14	4.0	PH1041_0060K613_0190 MB33 EZ702U	4288	–	15000	114.0	51057/448	32	15	2600	2300	4000	51	1210	161
26	1255	1506	14	4.0	PH1041_0060K613_0190 MB33 EZ702U	4288	–	15000	114.0	51057/448	45	15	2600	2300	4000	51	1210	161
26	1412	1673	20	2.8	PH1041_0060K613_0190 MB23 EZ505U	3922	–	6589	114.0	51057/448	8.0	15	2600	2300	4000	28	1210	154
26	1412	1673	20	2.8	PH1041_0060K613_0190 MB23 EZ505U	3922	–	6589	114.0	51057/448	12	15	2600	2300	4000	28	1210	154
26	1726	2176	19	2.9	PH1041_0060K613_0190 MB33 EZ703U	6798	–	15000	114.0	51057/448	16	32	2600	2300	4000	62	1210	164
26	1726	2176	19	2.9	PH1041_0060K613_0190 MB33 EZ703U	6798	–	15000	114.0	51057/448	24	32	2600	2300	4000	62	1210	164
26	1726	2176	19	2.9	PH1041_0060K613_0190 MB33 EZ703U	6798	–	15000	114.0	51057/448	32	32	2600	2300	4000	62	1210	164
26	2228	3159	25	2.2	PH1041_0060K613_0190 MB33 EZ705U	7500	–	15000	114.0	51057/448	16	32	2600	2300	4000	75	1210	169
26	2228	3159	25	2.2	PH1041_0060K613_0190 MB33 EZ705U	7500	–	15000	114.0	51057/448	24	32	2600	2300	4000	75	1210	169
26	2228	3159	25	2.2	PH1041_0060K613_0190 MB33 EZ705U	7500	–	15000	114.0	51057/448	32	32	2600	2300	4000	75	1210	169
32	1049	1258	13	4.8	PH1041_0060K613_0160 MB33 EZ702U	3583	–	15000	95.21	54839/576	16	15	2200	2000	3500	53	1210	161
32	1049	1258	13	4.8	PH1041_0060K613_0160 MB33 EZ702U	3583	–	15000	95.21	54839/576	24	15	2200	2000	3500	53	1210	161
32	1049	1258	13	4.8	PH1041_0060K613_0160 MB33 EZ702U	3583	–	15000	95.21	54839/576	32	15	2200	2000	3500	53	1210	161
32	1049	1258	13	4.8	PH1041_0060K613_0160 MB33 EZ702U	3583	–	15000	95.21	54839/576	45	15	2200	2000	3500	53	1210	161

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PH1041K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 7500 Nm)																		
32	1442	1817	18	3.5	PH1041_0060K613_0160 MB33 EZ703U	5680	–	15000	95.21	54839/576	16	32	2200	2000	3500	65	1210	164
32	1442	1817	18	3.5	PH1041_0060K613_0160 MB33 EZ703U	5680	–	15000	95.21	54839/576	24	32	2200	2000	3500	65	1210	164
32	1442	1817	18	3.5	PH1041_0060K613_0160 MB33 EZ703U	5680	–	15000	95.21	54839/576	32	32	2200	2000	3500	65	1210	164
32	1442	1817	18	3.5	PH1041_0060K613_0160 MB33 EZ703U	5680	–	15000	95.21	54839/576	45	32	2200	2000	3500	65	1210	164
32	1861	2639	24	2.7	PH1041_0060K613_0160 MB33 EZ705U	7500	–	15000	95.21	54839/576	16	32	2200	2000	3500	77	1210	169
32	1861	2639	24	2.7	PH1041_0060K613_0160 MB33 EZ705U	7500	–	15000	95.21	54839/576	24	32	2200	2000	3500	77	1210	169
32	1861	2639	24	2.7	PH1041_0060K613_0160 MB33 EZ705U	7500	–	15000	95.21	54839/576	32	32	2200	2000	3500	77	1210	169
32	1861	2639	24	2.7	PH1041_0060K613_0160 MB33 EZ705U	7500	–	15000	95.21	54839/576	45	32	2200	2000	3500	77	1210	169
40	1147	1446	17	4.4	PH1041_0060K613_0125 MB33 EZ703U	4520	–	13144	75.77	9699/128	16	32	2200	2000	3500	69	1210	164
40	1147	1446	17	4.4	PH1041_0060K613_0125 MB33 EZ703U	4520	–	13144	75.77	9699/128	24	32	2200	2000	3500	69	1210	164
40	1147	1446	17	4.4	PH1041_0060K613_0125 MB33 EZ703U	4520	–	13144	75.77	9699/128	32	32	2200	2000	3500	69	1210	164
40	1147	1446	17	4.4	PH1041_0060K613_0125 MB33 EZ703U	4520	–	13144	75.77	9699/128	45	32	2200	2000	3500	69	1210	164
40	1481	2100	22	3.4	PH1041_0060K613_0125 MB33 EZ705U	6954	–	13144	75.77	9699/128	16	32	2200	2000	3500	81	1210	169
40	1481	2100	22	3.4	PH1041_0060K613_0125 MB33 EZ705U	6954	–	13144	75.77	9699/128	24	32	2200	2000	3500	81	1210	169
40	1481	2100	22	3.4	PH1041_0060K613_0125 MB33 EZ705U	6954	–	13144	75.77	9699/128	32	32	2200	2000	3500	81	1210	169
40	1481	2100	22	3.4	PH1041_0060K613_0125 MB33 EZ705U	6954	–	13144	75.77	9699/128	45	32	2200	2000	3500	81	1210	169
40	1850	3352	28	2.7	PH1041_0060K613_0125 MB43 EZ803U	7500	–	15000	75.77	9699/128	50	65	2200	2000	3000	189	1210	200
62	951	1348	22	4.6	PH1041_0060K613_0081 MB33 EZ705U	4464	–	8437	48.64	255285/5248	16	32	1800	1700	3000	95	1210	169
62	951	1348	22	4.6	PH1041_0060K613_0081 MB33 EZ705U	4464	–	8437	48.64	255285/5248	24	32	1800	1700	3000	95	1210	169
62	951	1348	22	4.6	PH1041_0060K613_0081 MB33 EZ705U	4464	–	8437	48.64	255285/5248	32	32	1800	1700	3000	95	1210	169
62	951	1348	22	4.6	PH1041_0060K613_0081 MB33 EZ705U	4464	–	8437	48.64	255285/5248	45	32	1800	1700	3000	95	1210	169
62	1187	2152	28	3.7	PH1041_0060K613_0081 MB43 EZ803U	6473	–	15000	48.64	255285/5248	50	65	1800	1700	3000	203	1210	200
62	1187	2152	28	3.7	PH1041_0060K613_0081 MB43 EZ803U	6473	–	15000	48.64	255285/5248	72	65	1800	1700	3000	203	1210	200
62	1187	2152	28	3.7	PH1041_0060K613_0081 MB43 EZ803U	6473	–	15000	48.64	255285/5248	100	65	1800	1700	3000	203	1210	200

8.3 Dimensional drawings

In this chapter, you can find the dimensions of the geared motors with redundant brake.

There is a dimensional drawing for every possible shaft/housing design, each with the tables for gear unit dimensions, motor adapter dimensions, motor dimensions and geared motor dimensions.

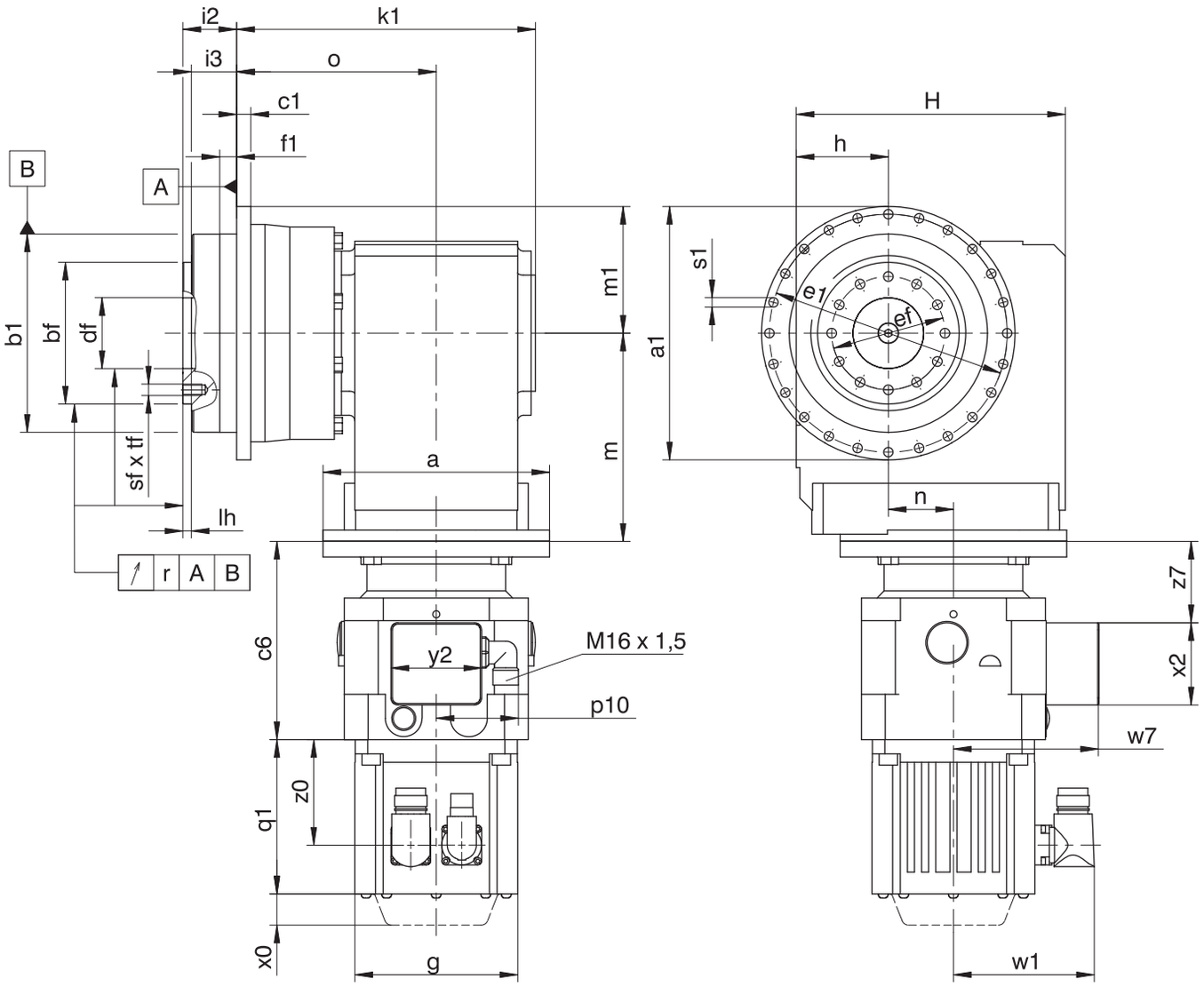
Dimensions can exceed the specifications of ISO 2768-mK due to casting tolerances or accumulation of individual tolerances.

We reserve the right to make dimensional changes due to ongoing technical development.

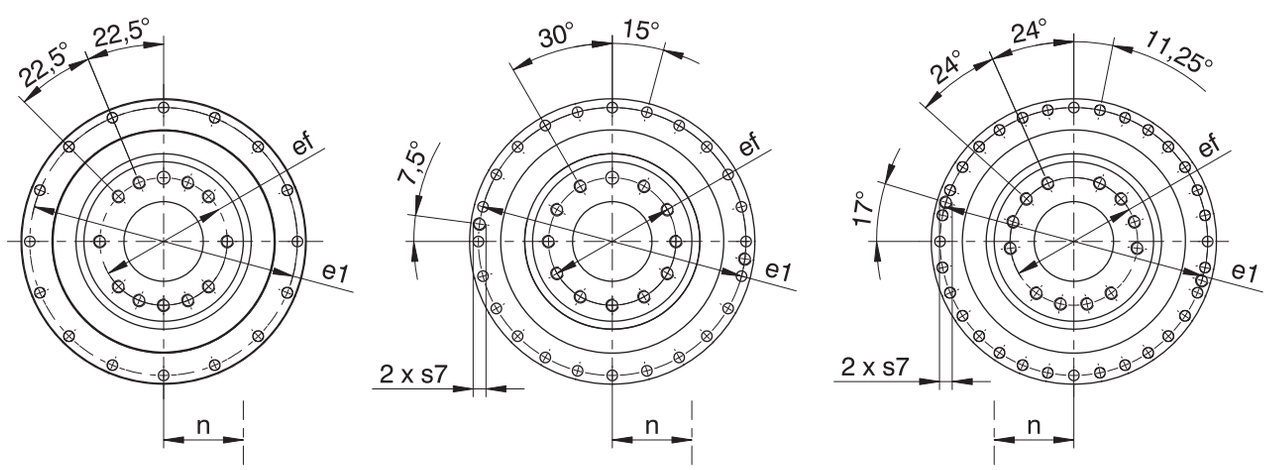
You can download 3D models of our standard drives at https://configurator.stoeber.de/en-US/.

Combination options and the dimensions of forced ventilated geared motors can also be found at https://configurator.stoeber.de/en-US/.

8.3.1 F shaft design (flange shaft)



PH5 **PH7/PH8** **PH9/PH10**



q1 Applies to motors with brake.

x0 Applies to encoders using an optical measuring method.

w1 Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]

Dimensions of gear units

Type	Øa1	Øb1	Øbf	c1	Ødf	Øe1	Øef	f1	h	H	i2	i3	k1	lh	m1	o	r	Øs1	s7	sf	tf
PH531_K102_	145_{h7}	110_{h7}	80_{h7}	8	40^{H6}	135	63	12	60	160	29	23	180.0	6	72.5	124.0	0.020	5.5	–	M6	11
PH731_K102_	179_{h7}	140_{h7}	100_{h7}	10	50^{H6}	168	80	12	60	160	38	32	183.0	6	89.5	127.0	0.025	6.6	–	M8	14
PH731_K202_	179_{h7}	140_{h7}	100_{h7}	10	50^{H6}	168	80	12	65	190	38	32	211.0	6	89.5	141.0	0.025	6.6	–	M8	14
PH831_K202_	247_{h7}	200_{h7}	160_{h7}	12	80^{H6}	233	125	15	65	190	50	42	246.0	8	123.5	176.0	0.030	9.0	M10	M10	18
PH831_K302_	247_{h7}	200_{h7}	160_{h7}	12	80^{H6}	233	125	15	75	213	50	42	259.5	8	123.5	183.5	0.030	9.0	M10	M10	18
PH941_K513_	300	255_{h7}	180_{h7}	18	90^{H6}	280	140	20	160	260	66	55	292.5	12	150.0	196.5	0.030	13.5	M8	M16	24
PH1041_K613_	330	285_{h7}	200_{h7}	20	95^{H6}	310	160	20	190	310	75	60	318.5	10	165.0	215.0	0.040	13.5	M10	M20	28

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
PHK_MB23	140	59	102.9	58	64	57.5
PHK_MB33	161	59	115.4	58	64	71.0
PHK_MB43	194	59	134.9	58	64	93.5

Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
PH531_K102_	∅160	128	36.0	∅160	128	36.0	–	–	–	–	–	–
PH731_K102_	∅160	128	36.0	∅160	128	36.0	–	–	–	–	–	–
PH731_K202_	∅160	147	46.0	∅160	147	46.0	∅200	149	46.0	–	–	–
PH831_K202_	∅160	147	46.0	∅160	147	46.0	∅200	149	46.0	–	–	–
PH831_K302_	∅160	167	52.5	∅160	167	52.5	∅200	169	52.5	–	–	–
PH941_K513_	∅160	172	15.0	∅160	172	15.0	∅200	174	15.0	∅250	177	15.0
PH1041_K613_	∅160	191	18.0	∅160	191	18.0	∅200	193	18.0	∅250	196	18.0

8.4 Type designation

This chapter shows you an explanation of the type designation with the associated options.

Additional ordering information not included in the type designation can be found at the end of the chapter.

Example code

PH	7	3	1	S	F	S	S	0050	K202VF	0060	MB23	EZ501U

Explanation

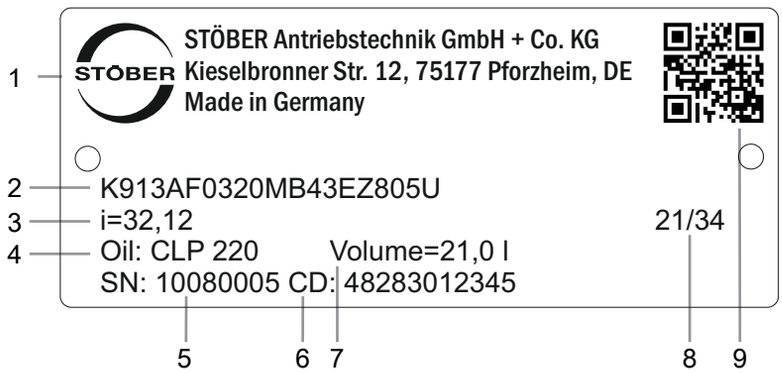
Code	Designation	Design
PH	Type	Planetary gear unit
7	Size	7 (example)
3 4	Generation	Generation 3 Generation 4
1	Stages	Single-stage
S	Housing	Standard
F	Shaft	Flange shaft
S V	Bearing	Standard bearing Reinforced bearing (PH3 – PH5)
S R	Backlash	Standard Reduced (PH3 – PH9)
0050	Transmission ratio (i x 10)	i = 5 (example)
K202VF	Input	K2 right-angle geared motor (example)
0060	Transmission ratio of input (i x 10)	i = 6 (example)
MB	Motor adapter	ServoStop motor adapter with brake
2	Size	2 (example)
3	Generation	Generation 3
EZ501U	Motor	EZ synchronous servo motor

To complete the type designation, also specify the following in your order:

- A detailed type designation of the motor, see the chapter [▶ 11]
- Mounting position, see the chapter [▶ 8.5.4]
- Output gear unit side 3 or 4, see the chapter [▶ 8.5.4]
- Radial shaft seal rings at the output made of NBR or FKM (option), see the chapter [▶ 8.6.3]
- Position of the plug connectors, see the chapter [▶ 8.5.6]
- For reverse operation of the output shaft from ±20° to ±90° and horizontal installation, see the chapter [▶ 8.6.4]

8.4.1 Nameplate

An example gear unit nameplate is explained in the figure below.

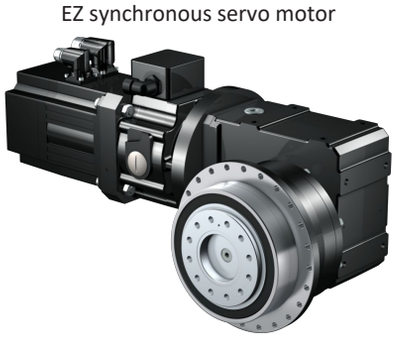


Code	Designation
1	Name of manufacturer
2	Type designation
3	Gear ratio of the gear unit
4	Lubricant specification
5	Serial number of the gear unit
6	Customer-specific data
7	Lubricant fill volume
8	Date of manufacture (year/calendar week)
9	QR code (link to product information)

8.5 Product description

8.5.1 Input options

MB motor adapter +
EZ synchronous servo motor



Catalog ID 443311_en

EZ synchronous servo motor

Catalog ID 442437_en

The corresponding catalogs can be found at http://www.stoeber.de/en/downloads/

Enter the ID of the catalog in the Search term field.

8.5.2 ServoStop motor adapter with brake (MB)

In this chapter, you will find the description and technical data of the motor adapter with brake.

8.5.2.1 Properties

- Electrically actuated spring-loaded brake for dry running
- Featuring backlash-free plug-in coupling (jaw coupling) for easy removal of the motor with the axis braked in any position
- Electrical release monitoring in the terminal box of the motor adapter
- Manual monitoring of wear via air gap checks with a feeler gauge
- Manual release (optional)
- Radial shaft seal rings made of FKM with two sealing lips
- Four oil drain holes to protect the brake from oiling up in case of leakage
- Diverse-redundant system in accordance with EN ISO 13849-1

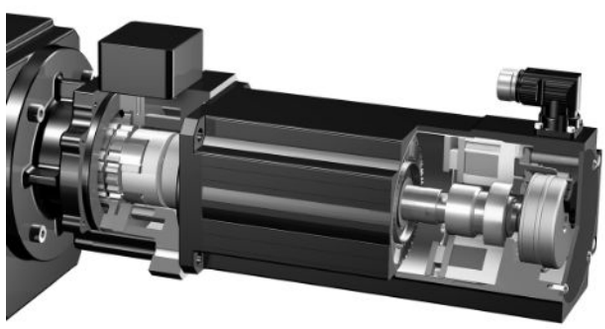


Fig. 1: Motor adapter with ServoStop brake and directly attached EZ synchronous servo motor

8.5.2.2 Brake

A quiescent current brake is integrated into the motor adapter. It has the function of a holding brake. Braking from full speed, e.g. in case of a voltage drop or an emergency off in hazard situations, is still possible.

The brake can be used as a single brake or together with the motor brake as a redundant brake system.

Function

The brakes installed in the motor adapter are electrically actuated spring-loaded brakes for dry running. In the de-energized state, braking takes place using spring force. The brake is released by an electromagnetic DC coil before the motor is switched on. The switch-on time t_{2B} (release time) is the time until the anchor plate releases from the axially moving brake disc and is magnetically held to the coil body. In this state, the brake is released and the coupling hub can rotate. In order to switch off (motor and brake), the residual magnetic flux of the iron parts (anchor and coil body) must be reduced; the associated time t_{11B} until the start of torque generation is defined as a response delay when linking. The link time t_{1B} is the time until the braking torque has built up to the nominal braking torque.

Manual release

Optionally, the brake can be equipped with a manual release.

Pressing the manual release deactivates the electronic actuation of the brake. Before pressing the manual release, you must establish the safety of the machine (e.g. protection against falling).

8.5.2.3 Electrical connection

- Terminal box (standard)
- Plug connector (optional, not possible in combination with release monitoring)

8.5.2.4 Monitoring

For monitoring the brake system, there are generally two options:

- Manual monitoring of wear via air gap checks with a feeler gauge
- Electrical release monitoring in the terminal box with a non-contact and wear-free proximity switch

8.5.2.5 Brake technical data

Technical data for operation at 24 V DC (±10%)

Type	M_{1Bstat} [Nm]	J_1 [kgcm²]	m [kg]	$\Delta\phi_B$ [arcmin]	$t_{1B,DC}$ [ms]	t_{2B} [ms]	$P_{N,B}$ [W]
MB23	8.0	6.3	8.5	32.0	65	55	30
MB23	12	6.3	8.5	32.0	55	80	30
MB33	16	26	14	26.0	150	60	37
MB33	24	26	14	26.0	120	85	37
MB33	32	26	14	26.0	95	100	37
MB33	45	26	14	26.0	80	120	37
MB43	50	69	26	19.0	150	100	55
MB43	72	69	26	19.0	120	150	55
MB43	100	69	26	19.0	90	200	55
MB53	200	236	61	17.0	200	250	86

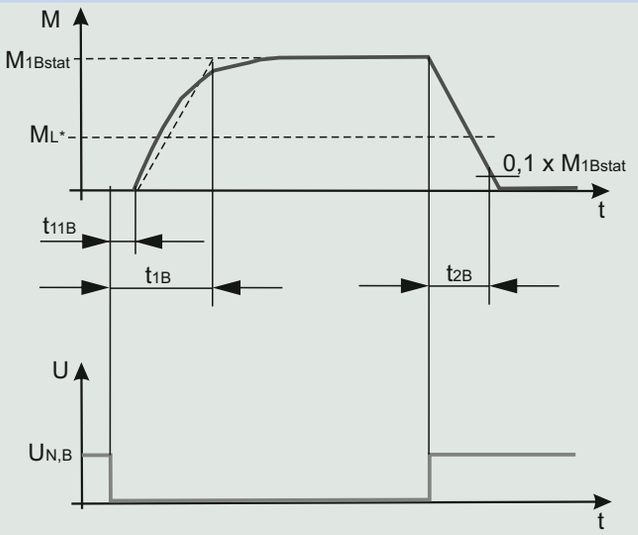
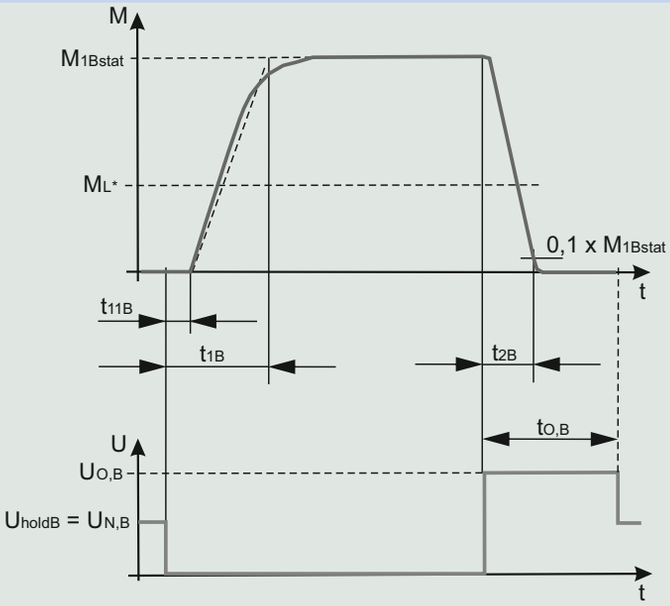
$\Delta\phi_B$: With the brake closed, a higher total backlash results ($\Delta\phi_{tot} = \Delta\phi_2 + \Delta\phi_B / i$).

Technical data for operation with high-speed rectifier 104 V DC (supply voltage U_{LINE} 220 – 275 V AC ± 5%, 50/60 Hz)

Type	M_{1Bstat} [Nm]	J_1 [kgcm²]	m [kg]	$\Delta\phi_B$ [arcmin]	$t_{1B,DC}$ [ms]	$t_{1B,AC}$ [ms]	t_{2B} [ms]	$P_{O,B}$ [W]	P_{holdB} [W]
MB23	8.0	6.3	8.5	32.0	65	360	20	101	26
MB23	12	6.3	8.5	32.0	55	280	25	101	26
MB23	16	6.3	8.5	32.0	50	230	35	101	26
MB23	24	6.3	8.5	32.0	45	180	50	101	26
MB23	30	6.3	8.5	32.0	40	160	60	101	26
MB33	16	26	14	26.0	150	800	25	125	32
MB33	24	26	14	26.0	120	650	35	125	32
MB33	32	26	14	26.0	95	500	40	125	32
MB33	45	26	14	26.0	80	400	50	125	32
MB33	90	26	14	26.0	50	250	90	125	32
MB43	50	69	26	19.0	150	900	50	148	38
MB43	72	69	26	19.0	120	700	75	148	38
MB43	100	69	26	19.0	90	500	100	148	38
MB43	160	69	26	19.0	60	300	150	148	38
MB53	200	236	61	17.0	200	800	110	200	50
MB53	300	236	61	17.0	170	600	150	200	50
MB53	400	236	61	17.0	120	400	200	200	50

$\Delta\phi_B$: With the brake closed, a higher total backlash results ($\Delta\phi_{tot} = \Delta\phi_2 + \Delta\phi_B / i$).

8.5.2.6 Brake switching times

Switching times in case of brake operation with nominal voltage	Switching times in case of brake operation with overexcitation voltage
	

8.5.3 Installation conditions

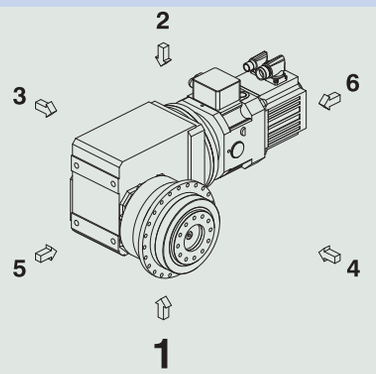
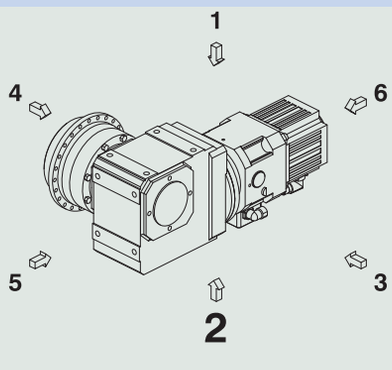
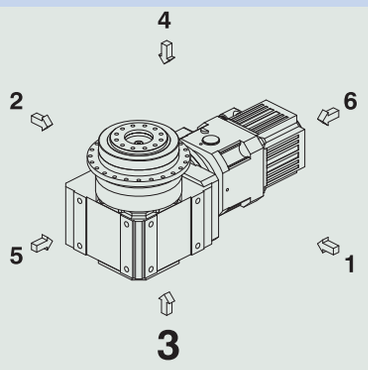
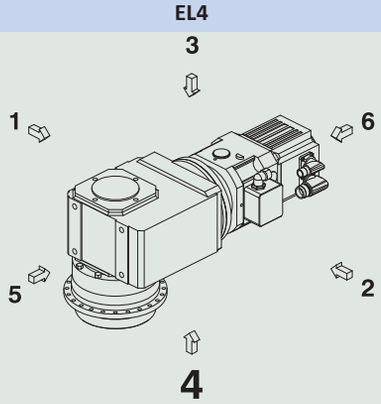
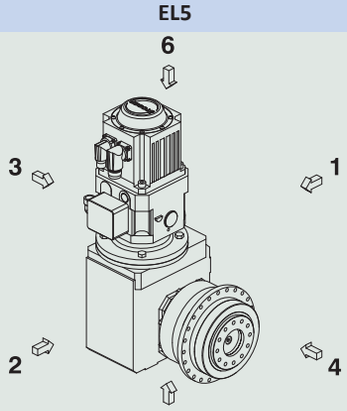
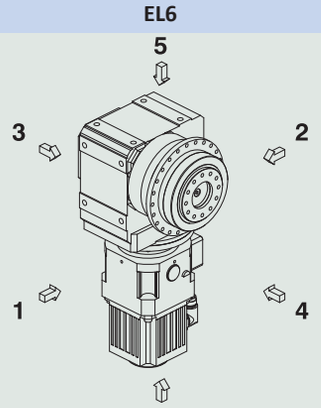
The torque and force values listed in this catalog are valid under the following conditions:

- When the flange shaft and gear housing are fastened on the machine side using screws of strength class 12.9
- When the gear housings are adjusted at pilot øb1. The machine-side fit must be H7.
- When the flange shaft is adjusted using the connecting element at pilot øbf or ødf

8.5.4 Mounting positions

The following table shows the standard mounting positions.

The numbers identify the gear unit sides. The mounting position is defined by the gear side facing downwards.

EL1	EL2	EL3
		
EL4	**EL5**	**EL6**
		

Since the lubricant filling volume of the gear unit depends on the mounting position, the mounting position must be specified when ordering.

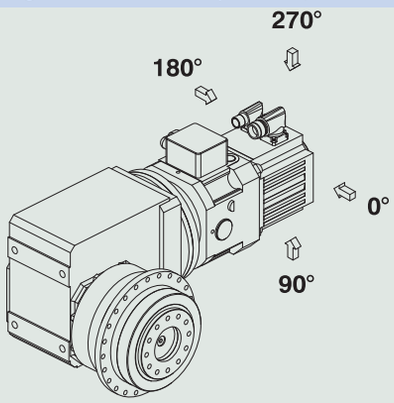
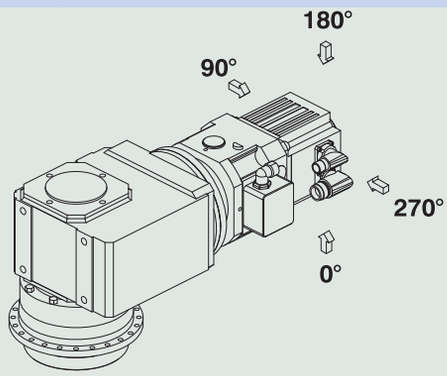
8.5.5 Lubricants

STOBER fills the gear units with the amount and type of lubricant specified on the nameplate. The filling volume and the structure of the gear units depend on the mounting position.

Only install the gear units in the intended mounting position! Reposition the gear units only after consulting STOBER. Otherwise, STOBER assumes no liability for the gear units.

You will receive lubricants for use in the food industry upon request.

8.5.6 Position of the plug connectors/terminal box

Mounting position EL1	Mounting position EL4
Plug connector in 270° position (standard)	Plug connector in 270° position (standard)
	

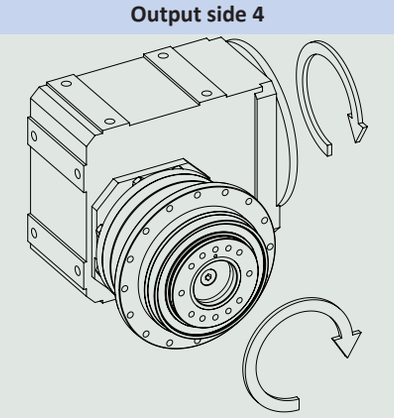
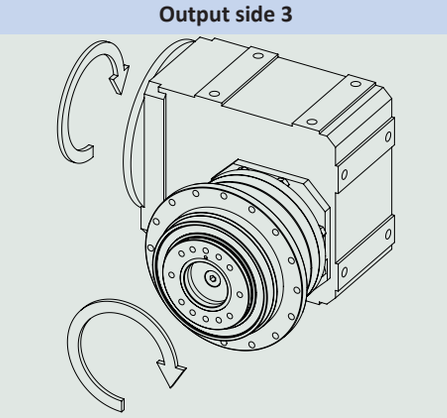
As standard, the plug connectors of the motor or the terminal box/plug connector of the motor adapter are mounted in the 270° position. The position of the terminal box/plug connector of the motor adapter can be selected separately from the position of the motor plug connectors.
Indicate variations for your geared motor in the order.

Note that the plug connector position rotates along with the geared motor if the geared motor is in another mounting position.

8.5.7 Other product features

Feature	Value
Max. permitted gear unit temperature (on the surface of the gear unit)	≤ 90 °C
Paint	Black RAL 9005
Explosion-proof design in accordance with (ATEX) Directive 2014/34/EU (optional)	Not available
Efficiency:	
η_{get} three-stage	93%
η_{get} four-stage	92%
Protection class:[1]	
Gear unit	IP65
Motor	IP56, optionally IP66

8.5.8 Direction of rotation

Output side 4	Output side 3
	

The pictures show mounting position EL1.

[1] Observe the protection class of all the components.

8.6 Project configuration

Project your drives using our SERVOsoft designing software. Download SERVOsoft for free at https://www.stoeber.de/en/ServoSoft.

It is the most convenient and reliable method of drive selection, as the entire torque/speed curve of the application is displayed and evaluated here in the curve of the geared motor.

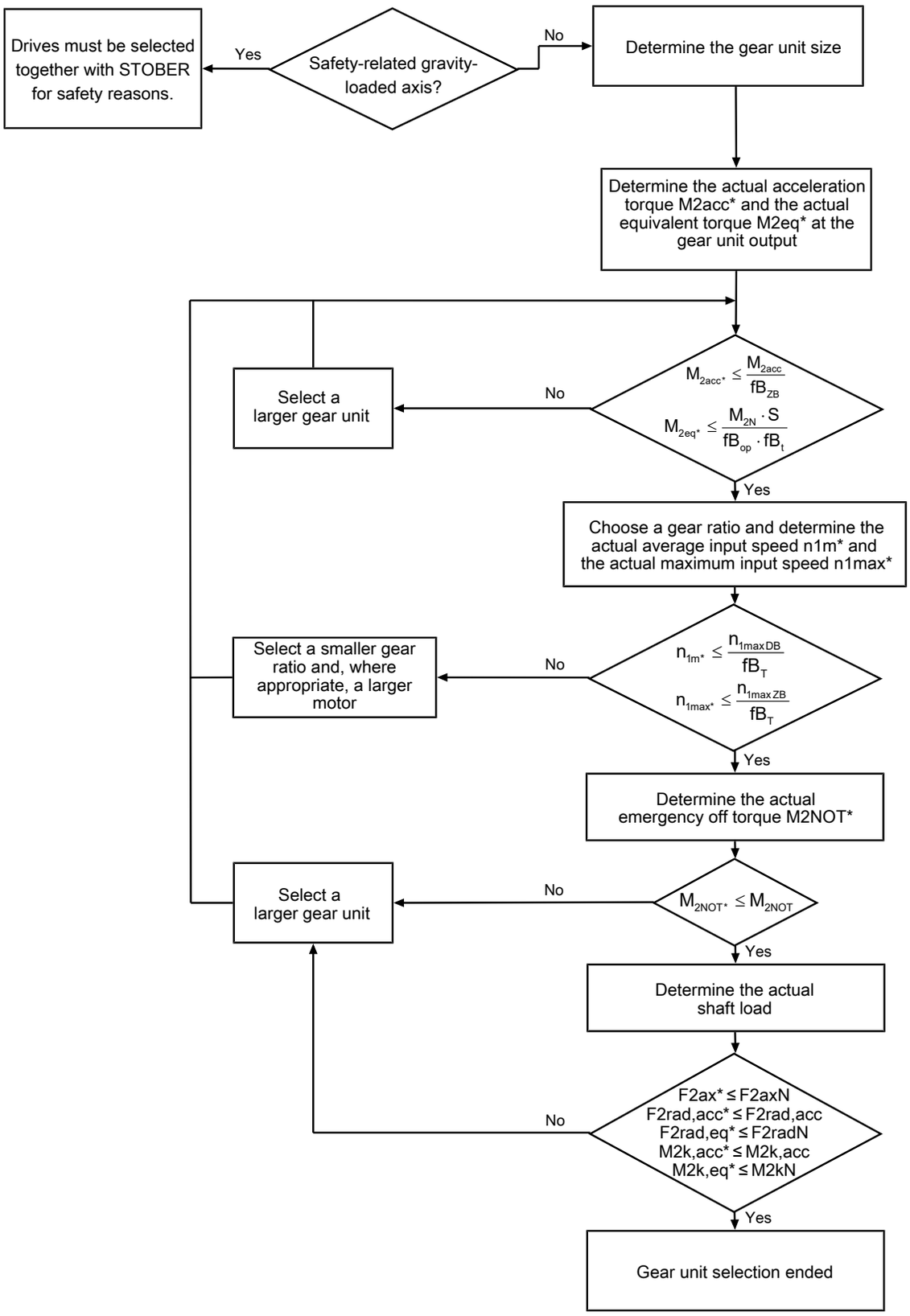
In this chapter, only limit values for specific operating points can be taken into consideration for manual drive selection.

An explanation of the formula symbols can be found in Chapter Symbols in formulas.

The formula symbols for values actually present in the application are marked with *.

8.6.1 Drive selection

Drive selection for gear units

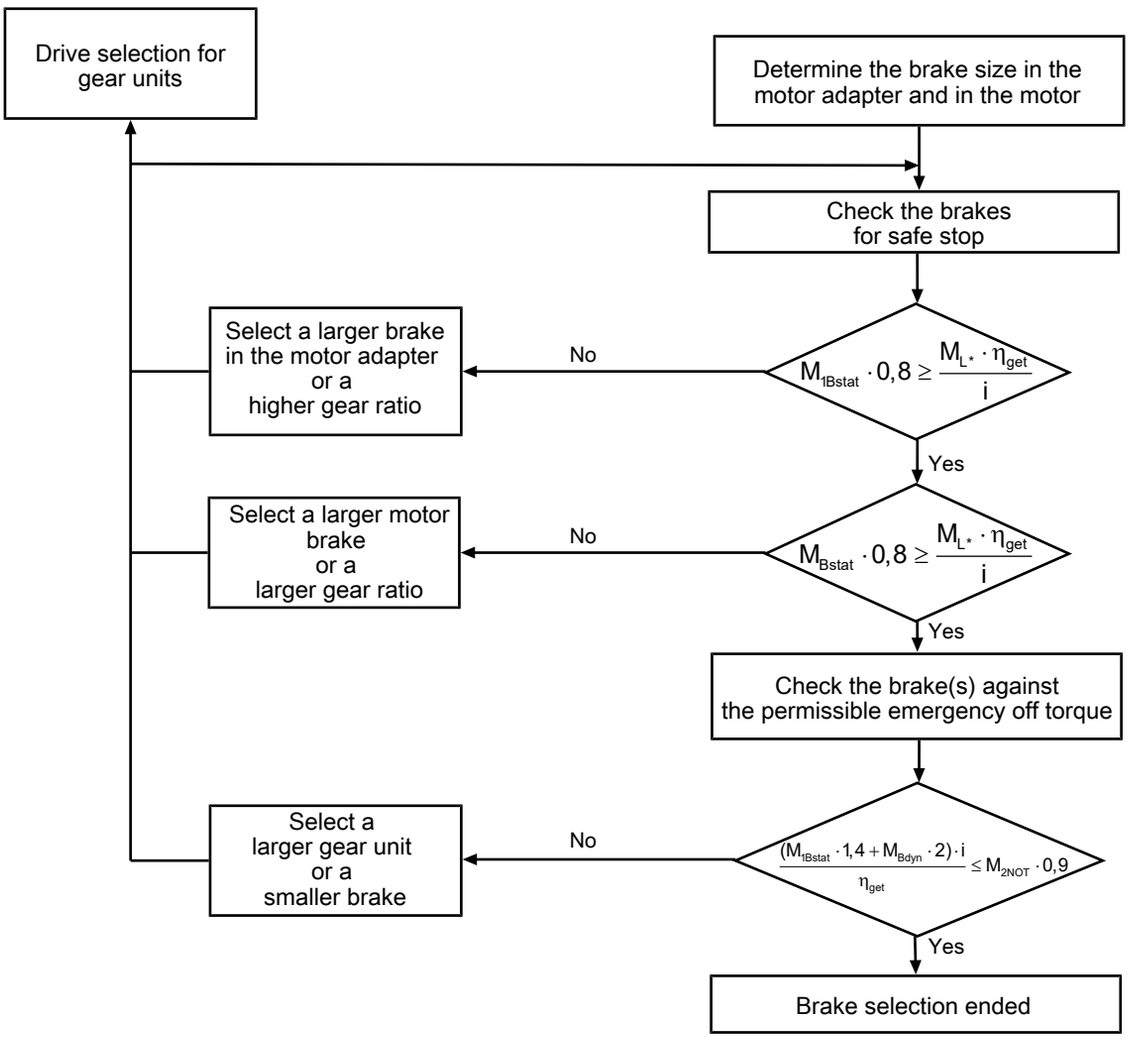


Calculate the forces and tilting torques in the chapter Permitted shaft loads.

Refer to the selection tables for the values for i, n_{1maxDB}, n_{1maxZB}, M_{2acc} (M_{2accHT} for reduced backlash), M_{2NOT}, M_{2N} and S.

The values for fB_T, fB_{op}, fB_t and fB_{ZB} can be found in the corresponding tables in this chapter.

Drive selection for brakes

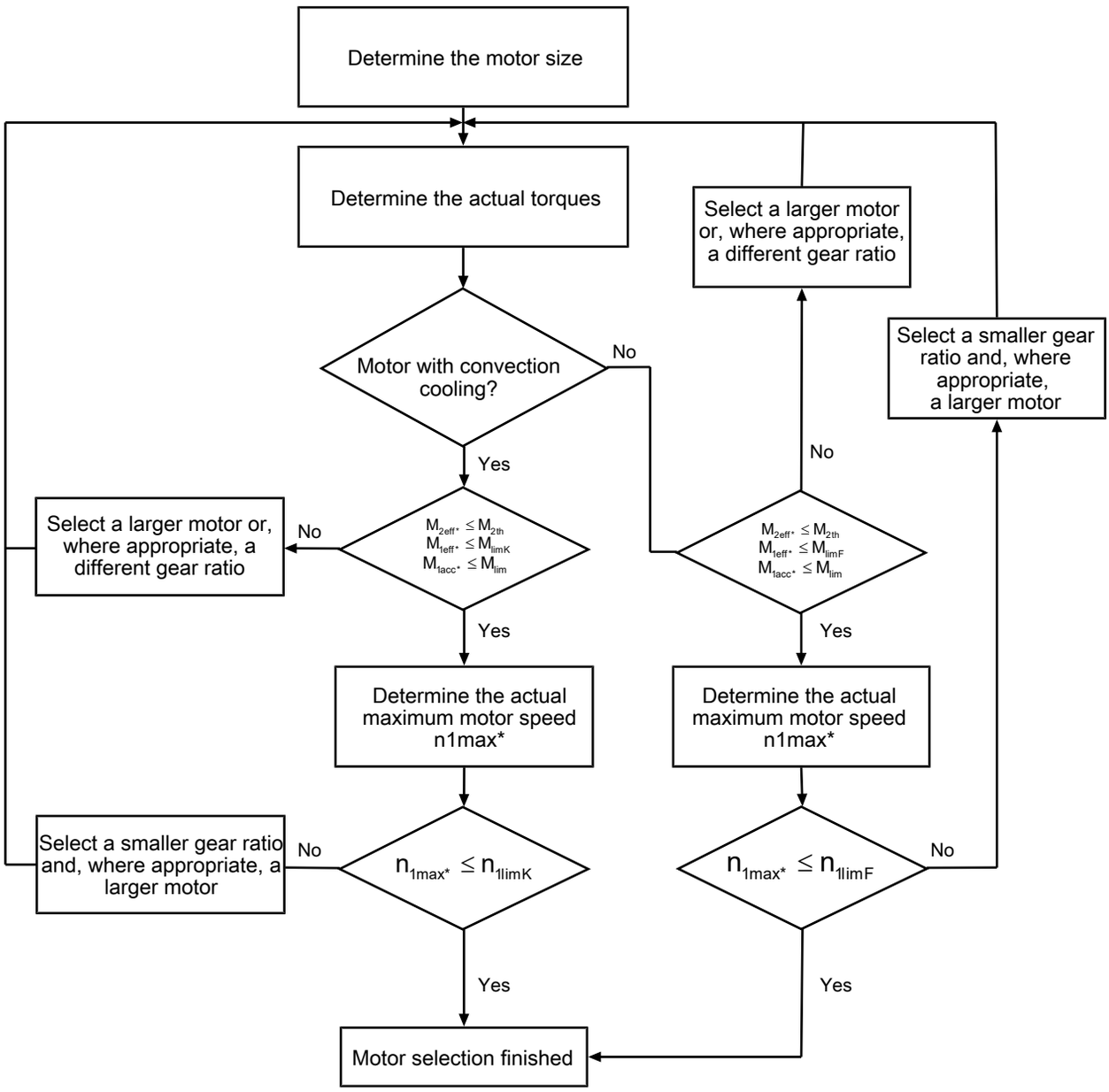


Refer to the selection tables for the values for i, M_{1Bstat}, M_{Bstat} and M_{2NOT}.

Refer to the Technical data table in the chapter [▷ 11.6.7] for the values for M_{Bdyn}.

Refer to the chapter Other product features for the values for η_{get}.

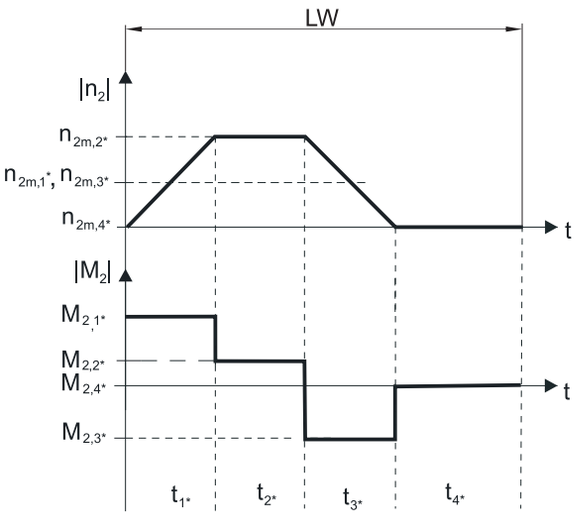
Drive selection for motors



The value for M_{lim}, M_{limK}, M_{limF}, n_{1limK} and n_{1limF} can be found in the motor characteristic curve in the chapter [▶ 11.3]. Note the size, nominal speed n_N and cooling type of the motor.

Example of cyclic operation

The following calculations are based on a representation of the power taken from the output based in accordance with the following example:



Calculation of the actual maximum acceleration torques

$$M_{2acc*} = J_{tot} \cdot \frac{\Delta n_2}{9{,}55 \cdot \Delta t} + M_{L*}$$

$$M_{1acc*} = \frac{M_{2acc*}}{i \cdot \eta_{get}} + J_1 \cdot \frac{\Delta n_1}{9{,}55 \cdot \Delta t}$$

Calculation of the actual average input speed

$$n_{1m*} = n_{2m*} \cdot i$$

$$n_{2m*} = \frac{\left|n_{2m,1*}\right| \cdot t_{1*} + \ldots + \left|n_{2m,n*}\right| \cdot t_{n*}}{t_{1*} + \ldots + t_{n*}}$$

If $t_{1*} + \ldots + t_{3*} \geq 6$ min, calculate n_{2m*} without the rest phase t_{4*}.

The values for the ratio i can be found in the selection tables.

Calculation of the actual effective torque

$$M_{2eff*} = \sqrt{\frac{t_{1*} \cdot M_{2,1*}{}^2 + \ldots + t_{n*} \cdot M_{2,n*}{}^2}{t_{1*} + \ldots + t_{n*}}}$$

Calculation of the actual emergency-off torque

$$M_{2NOT*} = J_{tot} \cdot \frac{\Delta n_2}{9.55 \cdot \Delta t} + M_{L*}$$

Calculation of the actual equivalent torque

$$M_{2eq*} = \sqrt[3]{\frac{\left|n_{2m,1*}\right| \cdot t_{1*} \cdot \left|M_{2,1*}{}^3\right| + \ldots + \left|n_{2m,n*}\right| \cdot t_{n*} \cdot \left|M_{2,n*}{}^3\right|}{\left|n_{2m,1*}\right| \cdot t_{1*} + \ldots + \left|n_{2m,n*}\right| \cdot t_{n*}}}$$

Calculation of the thermal limit torque

Calculate the thermal limit torque M_{2th} for a duty cycle $ED_{10} > 50\%$ and the actual average input speed n_{1m*}. (At $K_{mot,th} \leq 0$ you must reduce the average input speed n_{1m*} accordingly or select another geared motor size.)

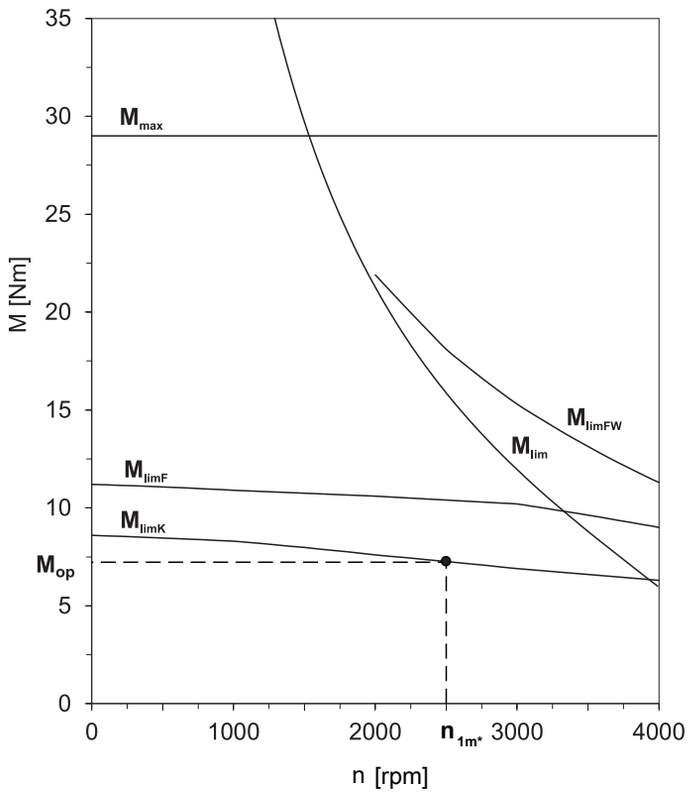
$$M_{2th} = M_{op} \cdot i \cdot K_{mot,th}$$

$$K_{mot,th} = 0{,}93 - \frac{a_{th}}{1000} \cdot athEL \cdot fB_T \cdot \left(\frac{n_{1m*}}{1000}\right)^2$$

The values for i and a_{th} can be found in the selection tables.

The values for a_{thEL} and fB_T can be found in the corresponding tables in this chapter.

The value for the torque of the motor at operating point M_{op} with the determined average input speed n_{1m*} can be found in the motor characteristic curve in the chapter Torque/speed curves. Note the size, nominal speed n_N and cooling type of the motor. The figure below shows an example of reading the torque M_{op} of a motor with convection cooling at the operating point.



Operating factors

Parameter a_{thEL}

Mounting position	a_{thEL}
EL1, 2	1.0
EL3, 4, 5, 6	1.1

Operating mode	fB_{op}
Uniform continuous operation	1.00
Cyclic operation	1.25
Reversing load cyclic operation	1.40

Run time	fB_t
Daily runtime ≤ 8 h	1.00
Daily runtime ≤ 16 h	1.15
Daily runtime ≤ 24 h	1.20

Cyclic operation	fB_{ZB}
≤ 1000 load changes/hour (LW/h)	1.00
> 1000 load changes/hour (LW/h)	1.15

Temperature		fB_T
Motor cooling	**Surrounding temperature**	
Motor with forced ventilation	≤ 20 °C	0.9
	≤ 30 °C	1.0
	≤ 40 °C	1.15
Motor with convection cooling	≤ 20 °C	1.0
	≤ 30 °C	1.1
	≤ 40 °C	1.25

Notes

- The maximum permitted gear unit temperature (see the "Other product features" chapter) must not be exceeded. Doing so may result in damage to the geared motor.
- For braking from full speed (for example when the power fails or when setting up the machine), note the permitted gear unit torques (M_{2acc}, M_{2NOT}) in the selection tables.

8.6.2 Permitted shaft loads for the output shaft

The values specified in the tables apply to the permitted shaft loads:

- For shaft dimensions in accordance with the catalog
- For output speeds $n_{2m*} \leq 100$ rpm ($F^{2axN} = F_{2ax100}$; $F_{2radN} = F_{2rad100}$; $M_{2kN} = M_{2k100}$)
- Only if radial forces on the gear unit are stabilized by its pilots (housing, flange shaft)

Permitted shaft loads for standard bearing S

Type	z_2 [mm]	F_{2ax100} [N]	$F_{2rad100}$ [N]	$F_{2rad,acc}$ [N]	M_{2k100} [Nm]	$M_{2k,acc}$ [Nm]	C_{2k} [Nm/ arcmin]
PH3	62.5	1650	1613	1613	101	101	75
PH4	83.0	2150	3095	3571	257	296	192
PH5	97.0	4150	4536	4897	440	475	429
PH7	86.0	6150	17045	17045	1466	1466	500
PH8	125.5	10050	27778	27778	3486	3486	1550
PH9	155.0	33000	48387	70968	7500	11000	7500
PH10	171.0	50000	51462	73099	8800	12500	9500

Permitted shaft loads for reinforced bearing V

Type	z_2 [mm]	F_{2ax100} [N]	$F_{2rad100}$ [N]	$F_{2rad,acc}$ [N]	M_{2k100} [Nm]	$M_{2k,acc}$ [Nm]	C_{2k} [Nm/ arcmin]
PH3	66.5	2200	2250	2250	150	150	80
PH4	88.5	2900	4000	4000	354	354	217
PH5	104.0	5000	5500	5500	572	572	478

For other output speeds, download diagrams at https://configurator.stoeber.de/en-US/.

The following applies to output speeds $n_{2m*} > 100$ rpm:

$$F_{2axN} = \frac{F_{2ax100}}{\sqrt[3]{\frac{n_{2m*}}{100\ \text{rpm}}}} \qquad F_{2radN} = \frac{F_{2rad100}}{\sqrt[3]{\frac{n_{2m*}}{100\ \text{rpm}}}} \qquad M_{2kN} = \frac{M_{2k100}}{\sqrt[3]{\frac{n_{2m*}}{100\ \text{rpm}}}}$$

The values for F_{2ax100}, $F_{2rad100}$ and M_{2k100} can be found in the table "Permitted shaft loads" in this chapter.

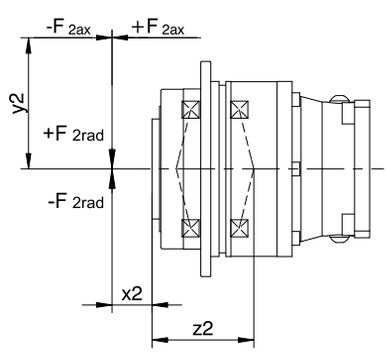


Fig. 2: Force application points

You can determine the permitted radial forces from the permitted tilting torque M_{2kN} and $M_{2k,acc}$. The actual radial forces may not exceed the permitted radial forces. The permitted radial forces pertain to the shaft end (x2 = 0).

$$M_{2k,acc^*} = \frac{2 \cdot F_{2ax^*} \cdot y_2 + F_{2rad,acc^*} \cdot (x_2 + z_2)}{1000}$$

For applications with multiple axial and/or radial forces, you must add the forces as vectors.

In the event of EMERGENCY OFF operation (max. 1000 load changes), you can multiply the permitted forces and torques for F_{2ax100}, $F_{2rad100}$ and M_{2k100} by a factor of two.

Also note the calculation for equivalent values:

$$M_{2k,eq^*} = \sqrt[3]{\frac{|n_{2m,1^*}| \cdot t_{1^*} \cdot |M_{2k,acc,1^*}^3| + \ldots + |n_{2m,n^*}| \cdot t_{n^*} \cdot |M_{2k,acc,n^*}^3|}{|n_{2m,1^*}| \cdot t_{1^*} + \ldots + |n_{2m,n^*}| \cdot t_{n^*}}}$$

$$F_{2rad,eq^*} = \sqrt[3]{\frac{|n_{2m,1^*}| \cdot t_{1^*} \cdot |F_{2rad,acc,1^*}^3| + \ldots + |n_{2m,n^*}| \cdot t_{n^*} \cdot |F_{2rad,acc,n^*}^3|}{|n_{2m,1^*}| \cdot t_{1^*} + \ldots + |n_{2m,n^*}| \cdot t_{n^*}}}$$

The following apply to the bearing service life L_{10h} ($ED_{10} \leq 40\%$):

$L_{10h} > 10000$ h with $1 < M_{2kN}/M_{2k^*} < 1.25$

$L_{10h} > 20000$ h with $1.25 < M_{2kN}/M_{2k^*} < 1.5$

$L_{10h} > 30000$ h with $1.5 < M_{2kN}/M_{2k^*}$

For different duty cycles:

$$L_{10h} > L_{10h(ED_{10}=40\%)} \cdot \frac{40\%}{ED_{10}}$$

8.6.3 Recommendation for radial shaft seal rings

For a duty cycle > 60% and higher surrounding temperatures, we recommend radial shaft seal rings made of FKM at the output.

Properties:

- Excellent temperature resistance
- High chemical stability
- Very good resistance to aging
- Excellent resistance in oils and greases
- For use in the food, beverage and pharmaceutical industries

Leak-proofness

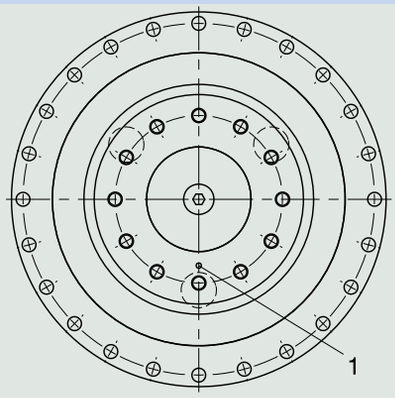
Our gear units are equipped with high-quality radial shaft seal rings and checked for leaks. However, a leak cannot be fully ruled out over the length of use of a gear unit. If you use a gear unit with goods incompatible with the lubricant, you must take measures to prevent direct contact with the gear unit lubricant in case of a leak.

8.6.4 Reverse operation

To ensure lubrication for circulating gearing parts during cyclic reverse operation from ± 20° to ± 90° at the output, pay careful attention to the position of the output shaft for the horizontal mounting of the gear unit, as shown in the diagrams below.

The images show the center position of reverse operation.

Cyclic reverse operation ≤ ± 20° on request.

Size 3 – 10

1 Position of the mark: bottom

Please note that the hole pattern may be different, depending on the size of the planetary gear unit.

8.7 Additional documentation

Additional documentation related to the product can be found at
http://www.stoeber.de/en/downloads/

Enter the ID of the documentation in the Search term field.

Documentation	ID
Operating manual gear units, geared motors PH53K – PH83K, PH94K – PH104K	443358_en

9 PHQK right-angle planetary geared motors

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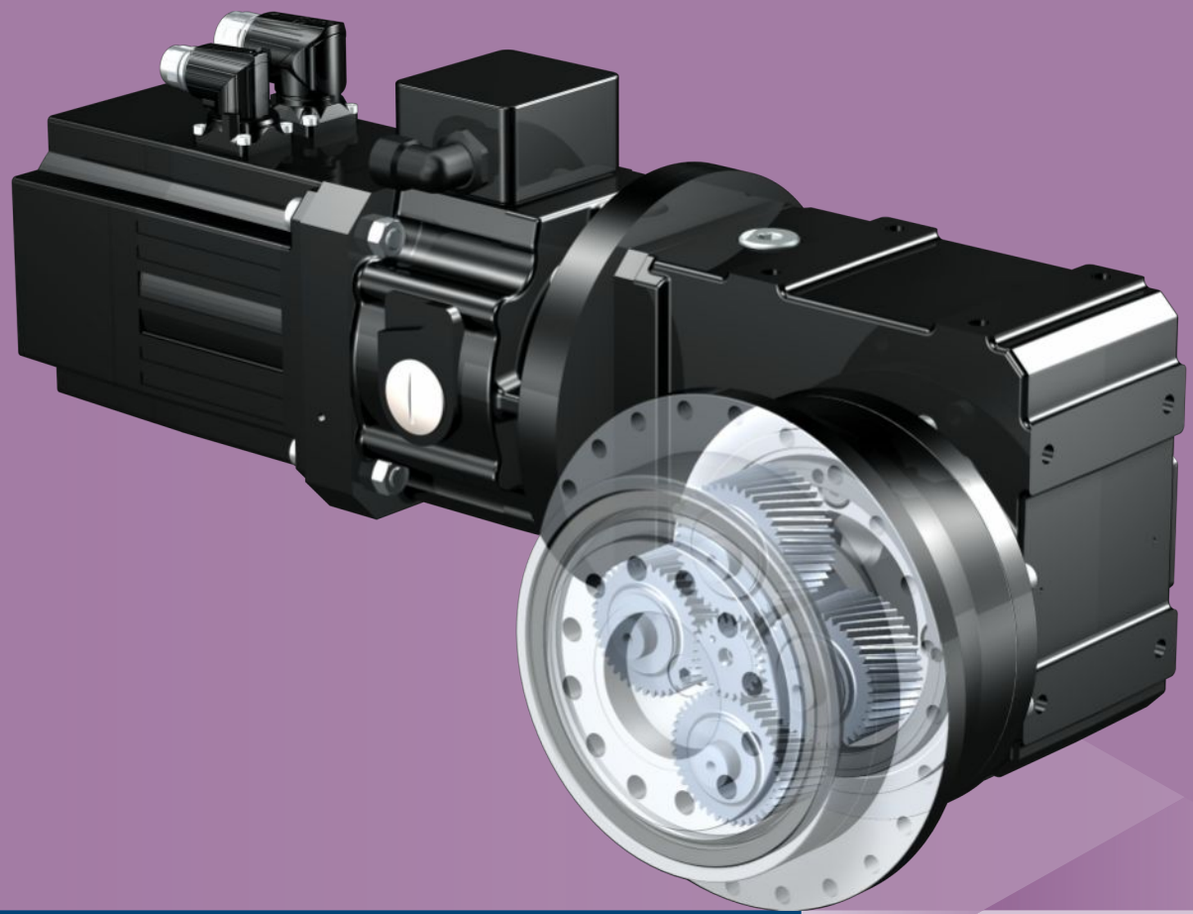


9

Right-angle planetary geared motors

PHQK

9.1 Overview

Quattro power precision right-angle planetary geared motors with redundant brake

Features

Power density	★★★★★
Backlash	★★★★★
Price category	€€€€€
Shaft load	★★★★★
Smooth operation	★★★☆☆
Torsional stiffness	★★★★★
Mass moment of inertia	★★★★☆
Helical gearing	✓
High power density	✓
Continuous operation without cooling	✓
Stiff output bearings due to pretension	✓
Reinforced output bearing (PHQ4 – PHQ5)	✓ (optional)
Safe braking in case of power outage	✓
Safe support of the load with gravity-loaded axes using 2 brakes	✓
Easily and safely connected to the synchronous servo motor thanks to backlash-free plug-in coupling	✓

Key ★☆☆☆☆ good | ★★★★★ excellent
€ Economy | €€€€€ Premium

Technical data

M_{1Bstat}	8 – 100 Nm
i	22 – 583
M_{2acc}	328 – 43000 Nm
$\Delta\phi_2$	1.5 – 4 arcmin
η_{get}	92 – 93 %

9.2 Selection tables

The technical data specified in the selection tables applies to:

- Installation altitudes up to 1000 m above sea level
- Surrounding temperatures from 0 °C to 40 °C
- Drives with convection-cooled motors (e.g. EZ401**U**)
- Without consideration of the thermal limiting performance

For the technical data on drives with forced ventilated motors (e.g. EZ401**B**), refer to https://configurator.stoeber.de/en-US/

An explanation of the formula symbols can be found in the chapter [▶ 15.1].

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/arcmin]	m [kg]
PHQ531K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 550 Nm)																		
98	123	134	27	2.3	PHQ531_0055K102_0056 MB23 EZ501U	456	460	948	30.62	8360/273	8.0	8.0	3300	2800	4000	11	70	32
98	134	148	30	2.1	PHQ531_0055K102_0056 MB23 EZ402U	456	460	948	30.62	8360/273	8.0	8.0	3300	2800	4000	9.7	70	32
98	197	245	44	1.4	PHQ531_0055K102_0056 MB23 EZ404U	550	550	948	30.62	8360/273	8.0	8.0	3300	2800	4000	11	70	34
98	211	228	47	1.3	PHQ531_0055K102_0056 MB23 EZ502U	550	550	948	30.62	8360/273	8.0	8.0	3300	2800	4000	13	70	33
136	88	96	26	3.1	PHQ531_0055K102_0040 MB23 EZ501U	328	330	948	22.00	22/1	8.0	8.0	3300	2800	4000	11	70	32
136	88	96	26	3.1	PHQ531_0055K102_0040 MB23 EZ501U	328	330	948	22.00	22/1	12	8.0	3300	2800	4000	11	70	32
136	96	107	28	2.8	PHQ531_0055K102_0040 MB23 EZ402U	328	330	948	22.00	22/1	8.0	8.0	3300	2800	4000	9.9	70	32
136	96	107	28	2.8	PHQ531_0055K102_0040 MB23 EZ402U	328	330	948	22.00	22/1	12	8.0	3300	2800	4000	9.9	70	32
136	141	176	41	1.9	PHQ531_0055K102_0040 MB23 EZ404U	516	520	948	22.00	22/1	8.0	8.0	3300	2800	4000	11	70	34
136	141	176	41	1.9	PHQ531_0055K102_0040 MB23 EZ404U	516	520	948	22.00	22/1	12	8.0	3300	2800	4000	11	70	34
136	152	164	44	1.8	PHQ531_0055K102_0040 MB23 EZ502U	516	520	948	22.00	22/1	8.0	8.0	3300	2800	4000	13	70	33
136	152	164	44	1.8	PHQ531_0055K102_0040 MB23 EZ502U	516	520	948	22.00	22/1	12	8.0	3300	2800	4000	13	70	33
136	199	227	58	1.4	PHQ531_0055K102_0040 MB23 EZ503U	516	520	948	22.00	22/1	8.0	15	3300	2800	4000	17	70	35
PHQ731K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1050 Nm)																		
47	254	278	20	2.0	PHQ731_0055K202_0115 MB23 EZ501U	946	950	2100	63.50	13717/216	8.0	8.0	3500	3100	4000	11	136	45
47	278	307	22	1.8	PHQ731_0055K202_0115 MB23 EZ402U	946	950	2100	63.50	13717/216	8.0	8.0	3500	3100	4000	9.7	136	45
47	408	509	33	1.2	PHQ731_0055K202_0115 MB23 EZ404U	1050	1050	2100	63.50	13717/216	8.0	8.0	3500	3100	4000	11	136	47
47	438	473	35	1.1	PHQ731_0055K202_0115 MB23 EZ502U	1050	1050	2100	63.50	13717/216	8.0	8.0	3500	3100	4000	13	136	46
54	222	242	20	2.3	PHQ731_0055K202_0100 MB23 EZ501U	825	830	2100	55.40	2881/52	8.0	8.0	3900	3500	4000	11	136	45
54	222	242	20	2.3	PHQ731_0055K202_0100 MB23 EZ501U	825	830	2100	55.40	2881/52	12	8.0	3900	3500	4000	11	136	45
54	242	268	21	2.1	PHQ731_0055K202_0100 MB23 EZ402U	825	830	2100	55.40	2881/52	8.0	8.0	3900	3500	4000	9.6	136	45
54	242	268	21	2.1	PHQ731_0055K202_0100 MB23 EZ402U	825	830	2100	55.40	2881/52	12	8.0	3900	3500	4000	9.6	136	45
54	356	444	31	1.4	PHQ731_0055K202_0100 MB23 EZ404U	1050	1050	2100	55.40	2881/52	8.0	8.0	3900	3500	4000	11	136	47
54	356	444	31	1.4	PHQ731_0055K202_0100 MB23 EZ404U	1050	1050	2100	55.40	2881/52	12	8.0	3900	3500	4000	11	136	47
54	382	413	34	1.3	PHQ731_0055K202_0100 MB23 EZ502U	1050	1050	2100	55.40	2881/52	8.0	8.0	3900	3500	4000	13	136	46
54	382	413	34	1.3	PHQ731_0055K202_0100 MB23 EZ502U	1050	1050	2100	55.40	2881/52	12	8.0	3900	3500	4000	13	136	46
59	202	221	19	2.5	PHQ731_0055K202_0092 MB23 EZ501U	753	750	2100	50.55	25069/496	8.0	8.0	3500	3100	4000	11	136	45
59	202	221	19	2.5	PHQ731_0055K202_0092 MB23 EZ501U	753	750	2100	50.55	25069/496	12	8.0	3500	3100	4000	11	136	45
59	221	245	21	2.3	PHQ731_0055K202_0092 MB23 EZ402U	753	750	2100	50.55	25069/496	8.0	8.0	3500	3100	4000	9.9	136	45
59	221	245	21	2.3	PHQ731_0055K202_0092 MB23 EZ402U	753	750	2100	50.55	25069/496	12	8.0	3500	3100	4000	9.9	136	45
59	325	405	31	1.5	PHQ731_0055K202_0092 MB23 EZ404U	1050	1050	2100	50.55	25069/496	8.0	8.0	3500	3100	4000	11	136	47
59	325	405	31	1.5	PHQ731_0055K202_0092 MB23 EZ404U	1050	1050	2100	50.55	25069/496	12	8.0	3500	3100	4000	11	136	47
59	348	377	33	1.4	PHQ731_0055K202_0092 MB23 EZ502U	1050	1050	2100	50.55	25069/496	8.0	8.0	3500	3100	4000	14	136	46
59	348	377	33	1.4	PHQ731_0055K202_0092 MB23 EZ502U	1050	1050	2100	50.55	25069/496	12	8.0	3500	3100	4000	14	136	46
65	185	202	19	2.7	PHQ731_0055K202_0084 MB23 EZ501U	688	690	2100	46.18	1247/27	8.0	8.0	3500	3100	4000	11	136	45
65	185	202	19	2.7	PHQ731_0055K202_0084 MB23 EZ501U	688	690	2100	46.18	1247/27	12	8.0	3500	3100	4000	11	136	45
65	185	202	19	2.7	PHQ731_0055K202_0084 MB23 EZ501U	688	690	2100	46.18	1247/27	16	8.0	3500	3100	4000	11	136	45
65	202	224	20	2.5	PHQ731_0055K202_0084 MB23 EZ402U	688	690	2100	46.18	1247/27	8.0	8.0	3500	3100	4000	9.8	136	45
65	202	224	20	2.5	PHQ731_0055K202_0084 MB23 EZ402U	688	690	2100	46.18	1247/27	12	8.0	3500	3100	4000	9.8	136	45
65	202	224	20	2.5	PHQ731_0055K202_0084 MB23 EZ402U	688	690	2100	46.18	1247/27	16	8.0	3500	3100	4000	9.8	136	45
65	297	370	30	1.7	PHQ731_0055K202_0084 MB23 EZ404U	1050	1050	2100	46.18	1247/27	8.0	8.0	3500	3100	4000	11	136	47
65	297	370	30	1.7	PHQ731_0055K202_0084 MB23 EZ404U	1050	1050	2100	46.18	1247/27	12	8.0	3500	3100	4000	11	136	47
65	297	370	30	1.7	PHQ731_0055K202_0084 MB23 EZ404U	1050	1050	2100	46.18	1247/27	16	8.0	3500	3100	4000	11	136	47
65	318	344	32	1.6	PHQ731_0055K202_0084 MB23 EZ502U	1050	1050	2100	46.18	1247/27	8.0	8.0	3500	3100	4000	13	136	46
65	318	344	32	1.6	PHQ731_0055K202_0084 MB23 EZ502U	1050	1050	2100	46.18	1247/27	12	8.0	3500	3100	4000	13	136	46
65	318	344	32	1.6	PHQ731_0055K202_0084 MB23 EZ502U	1050	1050	2100	46.18	1247/27	16	8.0	3500	3100	4000	13	136	46
65	417	477	42	1.2	PHQ731_0055K202_0084 MB23 EZ503U	1050	1050	2100	46.18	1247/27	8.0	15	3500	3100	4000	17	136	48
77	157	171	18	3.2	PHQ731_0055K202_0071 MB23 EZ501U	583	580	2100	39.15	23177/592	8.0	8.0	3000	2600	4000	12	136	45
77	157	171	18	3.2	PHQ731_0055K202_0071 MB23 EZ501U	583	580	2100	39.15	23177/592	12	8.0	3000	2600	4000	12	136	45
77	157	171	18	3.2	PHQ731_0055K202_0071 MB23 EZ501U	583	580	2100	39.15	23177/592	16	8.0	3000	2600	4000	12	136	45
77	171	190	20	2.9	PHQ731_0055K202_0071 MB23 EZ402U	583	580	2100	39.15	23177/592	8.0	8.0	3000	2600	4000	10	136	45

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PHQ731K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1050 Nm)																		
77	171	190	20	2.9	PHQ731_0055K202_0071 MB23 EZ402U	583	580	2100	39.15	23177/592	12	8.0	3000	2600	4000	10	136	45
77	171	190	20	2.9	PHQ731_0055K202_0071 MB23 EZ402U	583	580	2100	39.15	23177/592	16	8.0	3000	2600	4000	10	136	45
77	252	314	29	2.0	PHQ731_0055K202_0071 MB23 EZ404U	1050	1050	2100	39.15	23177/592	8.0	8.0	3000	2600	4000	12	136	47
77	252	314	29	2.0	PHQ731_0055K202_0071 MB23 EZ404U	1050	1050	2100	39.15	23177/592	12	8.0	3000	2600	4000	12	136	47
77	252	314	29	2.0	PHQ731_0055K202_0071 MB23 EZ404U	1050	1050	2100	39.15	23177/592	16	8.0	3000	2600	4000	12	136	47
77	270	292	31	1.9	PHQ731_0055K202_0071 MB23 EZ502U	1050	1050	2100	39.15	23177/592	8.0	8.0	3000	2600	4000	14	136	46
77	270	292	31	1.9	PHQ731_0055K202_0071 MB23 EZ502U	1050	1050	2100	39.15	23177/592	12	8.0	3000	2600	4000	14	136	46
77	270	292	31	1.9	PHQ731_0055K202_0071 MB23 EZ502U	1050	1050	2100	39.15	23177/592	16	8.0	3000	2600	4000	14	136	46
77	354	405	41	1.4	PHQ731_0055K202_0071 MB23 EZ503U	1050	1050	2100	39.15	23177/592	8.0	15	3000	2600	4000	17	136	48
77	354	405	41	1.4	PHQ731_0055K202_0071 MB23 EZ503U	1050	1050	2100	39.15	23177/592	12	15	3000	2600	4000	17	136	48
77	492	583	56	1.0	PHQ731_0055K202_0071 MB23 EZ505U	1050	1050	2100	39.15	23177/592	8.0	15	3000	2600	4000	22	136	51
77	492	583	56	1.0	PHQ731_0055K202_0071 MB23 EZ505U	1050	1050	2100	39.15	23177/592	12	15	3000	2600	4000	22	136	51
82	147	161	18	3.4	PHQ731_0055K202_0067 MB23 EZ501U	548	550	2100	36.76	2279/62	8.0	8.0	3500	3100	4000	11	136	45
82	147	161	18	3.4	PHQ731_0055K202_0067 MB23 EZ501U	548	550	2100	36.76	2279/62	12	8.0	3500	3100	4000	11	136	45
82	147	161	18	3.4	PHQ731_0055K202_0067 MB23 EZ501U	548	550	2100	36.76	2279/62	16	8.0	3500	3100	4000	11	136	45
82	161	178	19	3.1	PHQ731_0055K202_0067 MB23 EZ402U	548	550	2100	36.76	2279/62	8.0	8.0	3500	3100	4000	10	136	45
82	161	178	19	3.1	PHQ731_0055K202_0067 MB23 EZ402U	548	550	2100	36.76	2279/62	12	8.0	3500	3100	4000	10	136	45
82	161	178	19	3.1	PHQ731_0055K202_0067 MB23 EZ402U	548	550	2100	36.76	2279/62	16	8.0	3500	3100	4000	10	136	45
82	236	294	28	2.1	PHQ731_0055K202_0067 MB23 EZ404U	993	990	2100	36.76	2279/62	8.0	8.0	3500	3100	4000	11	136	47
82	236	294	28	2.1	PHQ731_0055K202_0067 MB23 EZ404U	993	990	2100	36.76	2279/62	12	8.0	3500	3100	4000	11	136	47
82	236	294	28	2.1	PHQ731_0055K202_0067 MB23 EZ404U	993	990	2100	36.76	2279/62	16	8.0	3500	3100	4000	11	136	47
82	253	274	30	2.0	PHQ731_0055K202_0067 MB23 EZ502U	1050	1050	2100	36.76	2279/62	8.0	8.0	3500	3100	4000	14	136	46
82	253	274	30	2.0	PHQ731_0055K202_0067 MB23 EZ502U	1050	1050	2100	36.76	2279/62	12	8.0	3500	3100	4000	14	136	46
82	253	274	30	2.0	PHQ731_0055K202_0067 MB23 EZ502U	1050	1050	2100	36.76	2279/62	16	8.0	3500	3100	4000	14	136	46
82	253	284	30	2.0	PHQ731_0055K202_0067 MB33 EZ701U	685	680	2100	36.76	2279/62	16	15	3500	3100	4000	39	136	56
82	332	380	40	1.5	PHQ731_0055K202_0067 MB23 EZ503U	1050	1050	2100	36.76	2279/62	8.0	15	3500	3100	4000	17	136	48
82	332	380	40	1.5	PHQ731_0055K202_0067 MB23 EZ503U	1050	1050	2100	36.76	2279/62	12	15	3500	3100	4000	17	136	48
82	411	493	49	1.2	PHQ731_0055K202_0067 MB33 EZ702U	1050	1050	2100	36.76	2279/62	16	15	3500	3100	4000	44	136	58
82	462	548	56	1.1	PHQ731_0055K202_0067 MB23 EZ505U	1050	1050	2100	36.76	2279/62	8.0	15	3500	3100	4000	22	136	51
82	462	548	56	1.1	PHQ731_0055K202_0067 MB23 EZ505U	1050	1050	2100	36.76	2279/62	12	15	3500	3100	4000	22	136	51
91	132	144	17	3.8	PHQ731_0055K202_0060 MB23 EZ501U	492	490	1936	33.00	33/1	8.0	8.0	3000	2600	4000	12	136	45
91	132	144	17	3.8	PHQ731_0055K202_0060 MB23 EZ501U	492	490	1936	33.00	33/1	12	8.0	3000	2600	4000	12	136	45
91	132	144	17	3.8	PHQ731_0055K202_0060 MB23 EZ501U	492	490	1936	33.00	33/1	16	8.0	3000	2600	4000	12	136	45
91	144	160	19	3.5	PHQ731_0055K202_0060 MB23 EZ402U	492	490	1936	33.00	33/1	8.0	8.0	3000	2600	4000	11	136	45
91	144	160	19	3.5	PHQ731_0055K202_0060 MB23 EZ402U	492	490	1936	33.00	33/1	12	8.0	3000	2600	4000	11	136	45
91	144	160	19	3.5	PHQ731_0055K202_0060 MB23 EZ402U	492	490	1936	33.00	33/1	16	8.0	3000	2600	4000	11	136	45
91	212	264	28	2.4	PHQ731_0055K202_0060 MB23 EZ404U	891	890	1936	33.00	33/1	8.0	8.0	3000	2600	4000	12	136	47
91	212	264	28	2.4	PHQ731_0055K202_0060 MB23 EZ404U	891	890	1936	33.00	33/1	12	8.0	3000	2600	4000	12	136	47
91	212	264	28	2.4	PHQ731_0055K202_0060 MB23 EZ404U	891	890	1936	33.00	33/1	16	8.0	3000	2600	4000	12	136	47
91	227	246	30	2.2	PHQ731_0055K202_0060 MB23 EZ502U	953	950	1936	33.00	33/1	8.0	8.0	3000	2600	4000	14	136	46
91	227	246	30	2.2	PHQ731_0055K202_0060 MB23 EZ502U	953	950	1936	33.00	33/1	12	8.0	3000	2600	4000	14	136	46
91	227	246	30	2.2	PHQ731_0055K202_0060 MB23 EZ502U	953	950	1936	33.00	33/1	16	8.0	3000	2600	4000	14	136	46
91	227	255	30	2.2	PHQ731_0055K202_0060 MB33 EZ701U	615	610	2100	33.00	33/1	16	15	3000	2600	4000	39	136	56
91	298	341	39	1.7	PHQ731_0055K202_0060 MB23 EZ503U	1050	1050	1936	33.00	33/1	8.0	15	3000	2600	4000	18	136	48
91	298	341	39	1.7	PHQ731_0055K202_0060 MB23 EZ503U	1050	1050	1936	33.00	33/1	12	15	3000	2600	4000	18	136	48
91	369	443	48	1.4	PHQ731_0055K202_0060 MB33 EZ702U	1050	1050	2100	33.00	33/1	16	15	3000	2600	4000	45	136	58
91	415	492	54	1.2	PHQ731_0055K202_0060 MB23 EZ505U	1050	1050	1936	33.00	33/1	8.0	15	3000	2600	4000	22	136	51
91	415	492	54	1.2	PHQ731_0055K202_0060 MB23 EZ505U	1050	1050	1936	33.00	33/1	12	15	3000	2600	4000	22	136	51
105	114	125	17	4.4	PHQ731_0055K202_0052 MB23 EZ501U	424	420	1670	28.47	2107/74	8.0	8.0	3000	2600	4000	12	136	45
105	114	125	17	4.4	PHQ731_0055K202_0052 MB23 EZ501U	424	420	1670	28.47	2107/74	12	8.0	3000	2600	4000	12	136	45
105	114	125	17	4.4	PHQ731_0055K202_0052 MB23 EZ501U	424	420	1670	28.47	2107/74	16	8.0	3000	2600	4000	12	136	45
105	125	138	18	4.0	PHQ731_0055K202_0052 MB23 EZ402U	424	420	1670	28.47	2107/74	8.0	8.0	3000	2600	4000	11	136	45
105	125	138	18	4.0	PHQ731_0055K202_0052 MB23 EZ402U	424	420	1670	28.47	2107/74	12	8.0	3000	2600	4000	11	136	45
105	125	138	18	4.0	PHQ731_0055K202_0052 MB23 EZ402U	424	420	1670	28.47	2107/74	16	8.0	3000	2600	4000	11	136	45
105	183	228	27	2.7	PHQ731_0055K202_0052 MB23 EZ404U	769	770	1670	28.47	2107/74	8.0	8.0	3000	2600	4000	12	136	47
105	183	228	27	2.7	PHQ731_0055K202_0052 MB23 EZ404U	769	770	1670	28.47	2107/74	12	8.0	3000	2600	4000	12	136	47
105	183	228	27	2.7	PHQ731_0055K202_0052 MB23 EZ404U	769	770	1670	28.47	2107/74	16	8.0	3000	2600	4000	12	136	47
105	196	212	29	2.5	PHQ731_0055K202_0052 MB23 EZ502U	822	820	1670	28.47	2107/74	8.0	8.0	3000	2600	4000	14	136	46
105	196	212	29	2.5	PHQ731_0055K202_0052 MB23 EZ502U	822	820	1670	28.47	2107/74	12	8.0	3000	2600	4000	14	136	46
105	196	212	29	2.5	PHQ731_0055K202_0052 MB23 EZ502U	822	820	1670	28.47	2107/74	16	8.0	3000	2600	4000	14	136	46
105	196	220	29	2.5	PHQ731_0055K202_0052 MB33 EZ701U	530	530	2100	28.47	2107/74	16	15	3000	2600	4000	39	136	56
105	196	220	29	2.5	PHQ731_0055K202_0052 MB33 EZ701U	530	530	2100	28.47	2107/74	24	15	3000	2600	4000	39	136	56
105	257	294	37	1.9	PHQ731_0055K202_0052 MB23 EZ503U	994	990	1670	28.47	2107/74	8.0	15	3000	2600	4000	18	136	48
105	257	294	37	1.9	PHQ731_0055K202_0052 MB23 EZ503U	994	990	1670	28.47	2107/74	12	15	3000	2600	4000	18	136	48

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PHQ731K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1050 Nm)																		
105	318	382	46	1.6	PHQ731_0055K202_0052 MB33 EZ702U	1004	1000	2100	28.47	2107/74	16	15	3000	2600	4000	44	136	58
105	318	382	46	1.6	PHQ731_0055K202_0052 MB33 EZ702U	1004	1000	2100	28.47	2107/74	24	15	3000	2600	4000	44	136	58
105	358	424	52	1.4	PHQ731_0055K202_0052 MB23 EZ505U	994	990	1670	28.47	2107/74	8.0	15	3000	2600	4000	22	136	51
105	358	424	52	1.4	PHQ731_0055K202_0052 MB23 EZ505U	994	990	1670	28.47	2107/74	12	15	3000	2600	4000	22	136	51
125	105	116	17	4.8	PHQ731_0055K202_0044 MB23 EZ402U	358	360	1408	24.00	24/1	8.0	8.0	3000	2600	4000	11	136	45
125	105	116	17	4.8	PHQ731_0055K202_0044 MB23 EZ402U	358	360	1408	24.00	24/1	12	8.0	3000	2600	4000	11	136	45
125	105	116	17	4.8	PHQ731_0055K202_0044 MB23 EZ402U	358	360	1408	24.00	24/1	16	8.0	3000	2600	4000	11	136	45
125	154	192	26	3.2	PHQ731_0055K202_0044 MB23 EZ404U	648	650	1408	24.00	24/1	8.0	8.0	3000	2600	4000	13	136	47
125	154	192	26	3.2	PHQ731_0055K202_0044 MB23 EZ404U	648	650	1408	24.00	24/1	12	8.0	3000	2600	4000	13	136	47
125	154	192	26	3.2	PHQ731_0055K202_0044 MB23 EZ404U	648	650	1408	24.00	24/1	16	8.0	3000	2600	4000	13	136	47
125	165	179	27	3.0	PHQ731_0055K202_0044 MB23 EZ502U	693	690	1408	24.00	24/1	8.0	8.0	3000	2600	4000	15	136	46
125	165	179	27	3.0	PHQ731_0055K202_0044 MB23 EZ502U	693	690	1408	24.00	24/1	12	8.0	3000	2600	4000	15	136	46
125	165	179	27	3.0	PHQ731_0055K202_0044 MB23 EZ502U	693	690	1408	24.00	24/1	16	8.0	3000	2600	4000	15	136	46
125	165	186	27	3.0	PHQ731_0055K202_0044 MB33 EZ701U	447	450	2100	24.00	24/1	16	15	3000	2600	4000	40	136	56
125	165	186	27	3.0	PHQ731_0055K202_0044 MB33 EZ701U	447	450	2100	24.00	24/1	24	15	3000	2600	4000	40	136	56
125	165	186	27	3.0	PHQ731_0055K202_0044 MB33 EZ701U	447	450	2100	24.00	24/1	32	15	3000	2600	4000	40	136	56
125	217	248	36	2.3	PHQ731_0055K202_0044 MB23 EZ503U	838	840	1408	24.00	24/1	8.0	15	3000	2600	4000	18	136	48
125	217	248	36	2.3	PHQ731_0055K202_0044 MB23 EZ503U	838	840	1408	24.00	24/1	12	15	3000	2600	4000	18	136	48
125	268	322	44	1.9	PHQ731_0055K202_0044 MB33 EZ702U	916	920	2100	24.00	24/1	16	15	3000	2600	4000	45	136	58
125	268	322	44	1.9	PHQ731_0055K202_0044 MB33 EZ702U	916	920	2100	24.00	24/1	24	15	3000	2600	4000	45	136	58
125	268	322	44	1.9	PHQ731_0055K202_0044 MB33 EZ702U	916	920	2100	24.00	24/1	32	15	3000	2600	4000	45	136	58
125	302	358	50	1.7	PHQ731_0055K202_0044 MB23 EZ505U	838	840	1408	24.00	24/1	8.0	15	3000	2600	4000	23	136	51
125	302	358	50	1.7	PHQ731_0055K202_0044 MB23 EZ505U	838	840	1408	24.00	24/1	12	15	3000	2600	4000	23	136	51
136	141	176	26	3.4	PHQ731_0055K202_0040 MB23 EZ404U	594	590	1291	22.00	22/1	8.0	8.0	3000	2600	4000	13	136	47
136	141	176	26	3.4	PHQ731_0055K202_0040 MB23 EZ404U	594	590	1291	22.00	22/1	12	8.0	3000	2600	4000	13	136	47
136	141	176	26	3.4	PHQ731_0055K202_0040 MB23 EZ404U	594	590	1291	22.00	22/1	16	8.0	3000	2600	4000	13	136	47
136	152	164	27	3.2	PHQ731_0055K202_0040 MB23 EZ502U	635	640	1291	22.00	22/1	8.0	8.0	3000	2600	4000	15	136	46
136	152	164	27	3.2	PHQ731_0055K202_0040 MB23 EZ502U	635	640	1291	22.00	22/1	12	8.0	3000	2600	4000	15	136	46
136	152	164	27	3.2	PHQ731_0055K202_0040 MB23 EZ502U	635	640	1291	22.00	22/1	16	8.0	3000	2600	4000	15	136	46
136	152	170	27	3.2	PHQ731_0055K202_0040 MB33 EZ701U	410	410	2100	22.00	22/1	16	15	3000	2600	4000	40	136	56
136	152	170	27	3.2	PHQ731_0055K202_0040 MB33 EZ701U	410	410	2100	22.00	22/1	24	15	3000	2600	4000	40	136	56
136	152	170	27	3.2	PHQ731_0055K202_0040 MB33 EZ701U	410	410	2100	22.00	22/1	32	15	3000	2600	4000	40	136	56
136	199	227	36	2.5	PHQ731_0055K202_0040 MB23 EZ503U	768	770	1291	22.00	22/1	8.0	15	3000	2600	4000	19	136	48
136	199	227	36	2.5	PHQ731_0055K202_0040 MB23 EZ503U	768	770	1291	22.00	22/1	12	15	3000	2600	4000	19	136	48
136	246	295	45	2.0	PHQ731_0055K202_0040 MB33 EZ702U	840	840	2100	22.00	22/1	16	15	3000	2600	4000	45	136	58
136	246	295	45	2.0	PHQ731_0055K202_0040 MB33 EZ702U	840	840	2100	22.00	22/1	24	15	3000	2600	4000	45	136	58
136	246	295	45	2.0	PHQ731_0055K202_0040 MB33 EZ702U	840	840	2100	22.00	22/1	32	15	3000	2600	4000	45	136	58
136	277	328	50	1.8	PHQ731_0055K202_0040 MB23 EZ505U	768	770	1291	22.00	22/1	8.0	15	3000	2600	4000	23	136	51
136	277	328	50	1.8	PHQ731_0055K202_0040 MB23 EZ505U	768	770	1291	22.00	22/1	12	15	3000	2600	4000	23	136	51
136	338	426	61	1.4	PHQ731_0055K202_0040 MB33 EZ703U	921	920	2100	22.00	22/1	16	32	3000	2600	4000	57	136	61
136	436	619	79	1.1	PHQ731_0055K202_0040 MB33 EZ705U	921	920	2100	22.00	22/1	16	32	3000	2600	4000	70	136	66
PHQ831K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 2800 Nm)																		
20	612	668	11	2.3	PHQ831_0055K402_0280 MB23 EZ501U	2276	2280	4964	152.7	14663/96	8.0	8.0	3600	3300	4000	11	400	82
20	668	740	12	2.1	PHQ831_0055K402_0280 MB23 EZ402U	2276	2280	4964	152.7	14663/96	8.0	8.0	3600	3300	4000	9.7	400	82
20	981	1223	17	1.4	PHQ831_0055K402_0280 MB23 EZ404U	2800	3170	4964	152.7	14663/96	8.0	8.0	3600	3300	4000	11	400	84
20	1053	1138	19	1.3	PHQ831_0055K402_0280 MB23 EZ502U	2800	3170	4964	152.7	14663/96	8.0	8.0	3600	3300	4000	13	400	83
22	557	609	11	2.5	PHQ831_0055K402_0250 MB23 EZ501U	2072	2070	4964	139.0	4171/30	8.0	8.0	3600	3300	4000	11	400	82
22	609	673	12	2.3	PHQ831_0055K402_0250 MB23 EZ402U	2072	2070	4964	139.0	4171/30	8.0	8.0	3600	3300	4000	9.5	400	82
22	893	1113	17	1.6	PHQ831_0055K402_0250 MB23 EZ404U	2800	3170	4964	139.0	4171/30	8.0	8.0	3600	3300	4000	11	400	84
22	958	1036	18	1.5	PHQ831_0055K402_0250 MB23 EZ502U	2800	3170	4964	139.0	4171/30	8.0	8.0	3600	3300	4000	13	400	83
23	513	561	10	2.7	PHQ831_0055K402_0230 MB23 EZ501U	1909	1910	4964	128.1	6149/48	8.0	8.0	3600	3300	4000	11	400	82
23	513	561	10	2.7	PHQ831_0055K402_0230 MB23 EZ501U	1909	1910	4964	128.1	6149/48	12	8.0	3600	3300	4000	11	400	82
23	561	620	11	2.5	PHQ831_0055K402_0230 MB23 EZ402U	1909	1910	4964	128.1	6149/48	8.0	8.0	3600	3300	4000	9.9	400	82
23	561	620	11	2.5	PHQ831_0055K402_0230 MB23 EZ402U	1909	1910	4964	128.1	6149/48	12	8.0	3600	3300	4000	9.9	400	82
23	823	1026	17	1.7	PHQ831_0055K402_0230 MB23 EZ404U	2800	3170	4964	128.1	6149/48	8.0	8.0	3600	3300	4000	11	400	84
23	823	1026	17	1.7	PHQ831_0055K402_0230 MB23 EZ404U	2800	3170	4964	128.1	6149/48	12	8.0	3600	3300	4000	11	400	84
23	883	954	18	1.6	PHQ831_0055K402_0230 MB23 EZ502U	2800	3170	4964	128.1	6149/48	8.0	8.0	3600	3300	4000	13	400	83
23	883	954	18	1.6	PHQ831_0055K402_0230 MB23 EZ502U	2800	3170	4964	128.1	6149/48	12	8.0	3600	3300	4000	13	400	83
27	445	486	10	3.1	PHQ831_0055K402_0200 MB23 EZ501U	1655	1660	4964	111.1	1333/12	8.0	8.0	3600	3300	4000	11	400	82
27	445	486	10	3.1	PHQ831_0055K402_0200 MB23 EZ501U	1655	1660	4964	111.1	1333/12	12	8.0	3600	3300	4000	11	400	82
27	445	486	10	3.1	PHQ831_0055K402_0200 MB23 EZ501U	1655	1660	4964	111.1	1333/12	16	8.0	3600	3300	4000	11	400	82
27	486	538	11	2.9	PHQ831_0055K402_0200 MB23 EZ402U	1655	1660	4964	111.1	1333/12	8.0	8.0	3600	3300	4000	9.8	400	82
27	486	538	11	2.9	PHQ831_0055K402_0200 MB23 EZ402U	1655	1660	4964	111.1	1333/12	12	8.0	3600	3300	4000	9.8	400	82
27	486	538	11	2.9	PHQ831_0055K402_0200 MB23 EZ402U	1655	1660	4964	111.1	1333/12	16	8.0	3600	3300	4000	9.8	400	82

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PHQ831K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 2800 Nm)																		
27	714	890	16	2.0	PHQ831_0055K402_0200 MB23 EZ404U	2800	3000	4964	111.1	1333/12	8.0	8.0	3600	3300	4000	11	400	84
27	714	890	16	2.0	PHQ831_0055K402_0200 MB23 EZ404U	2800	3000	4964	111.1	1333/12	12	8.0	3600	3300	4000	11	400	84
27	714	890	16	2.0	PHQ831_0055K402_0200 MB23 EZ404U	2800	3000	4964	111.1	1333/12	16	8.0	3600	3300	4000	11	400	84
27	765	828	17	1.8	PHQ831_0055K402_0200 MB23 EZ502U	2800	3170	4964	111.1	1333/12	8.0	8.0	3600	3300	4000	13	400	83
27	765	828	17	1.8	PHQ831_0055K402_0200 MB23 EZ502U	2800	3170	4964	111.1	1333/12	12	8.0	3600	3300	4000	13	400	83
27	765	828	17	1.8	PHQ831_0055K402_0200 MB23 EZ502U	2800	3170	4964	111.1	1333/12	16	8.0	3600	3300	4000	13	400	83
27	1003	1148	23	1.4	PHQ831_0055K402_0200 MB23 EZ503U	2800	3170	4964	111.1	1333/12	8.0	15	3600	3300	4000	17	400	85
27	1396	1655	31	1.0	PHQ831_0055K402_0200 MB23 EZ505U	2800	3170	4964	111.1	1333/12	8.0	15	3600	3300	4000	21	400	88
31	383	419	9.6	3.7	PHQ831_0055K402_0175 MB23 EZ501U	1426	1430	4964	95.73	8041/84	8.0	8.0	3400	3000	4000	12	400	82
31	383	419	9.6	3.7	PHQ831_0055K402_0175 MB23 EZ501U	1426	1430	4964	95.73	8041/84	12	8.0	3400	3000	4000	12	400	82
31	383	419	9.6	3.7	PHQ831_0055K402_0175 MB23 EZ501U	1426	1430	4964	95.73	8041/84	16	8.0	3400	3000	4000	12	400	82
31	419	464	11	3.3	PHQ831_0055K402_0175 MB23 EZ402U	1426	1430	4964	95.73	8041/84	8.0	8.0	3400	3000	4000	10	400	82
31	419	464	11	3.3	PHQ831_0055K402_0175 MB23 EZ402U	1426	1430	4964	95.73	8041/84	12	8.0	3400	3000	4000	10	400	82
31	419	464	11	3.3	PHQ831_0055K402_0175 MB23 EZ402U	1426	1430	4964	95.73	8041/84	16	8.0	3400	3000	4000	10	400	82
31	615	767	15	2.3	PHQ831_0055K402_0175 MB23 EZ404U	2585	2590	4964	95.73	8041/84	8.0	8.0	3400	3000	4000	12	400	84
31	615	767	15	2.3	PHQ831_0055K402_0175 MB23 EZ404U	2585	2590	4964	95.73	8041/84	12	8.0	3400	3000	4000	12	400	84
31	615	767	15	2.3	PHQ831_0055K402_0175 MB23 EZ404U	2585	2590	4964	95.73	8041/84	16	8.0	3400	3000	4000	12	400	84
31	660	713	17	2.1	PHQ831_0055K402_0175 MB23 EZ502U	2763	2760	4964	95.73	8041/84	8.0	8.0	3400	3000	4000	14	400	83
31	660	713	17	2.1	PHQ831_0055K402_0175 MB23 EZ502U	2763	2760	4964	95.73	8041/84	12	8.0	3400	3000	4000	14	400	83
31	660	713	17	2.1	PHQ831_0055K402_0175 MB23 EZ502U	2763	2760	4964	95.73	8041/84	16	8.0	3400	3000	4000	14	400	83
31	865	989	22	1.6	PHQ831_0055K402_0175 MB23 EZ503U	2800	3170	4964	95.73	8041/84	8.0	15	3400	3000	4000	18	400	85
31	865	989	22	1.6	PHQ831_0055K402_0175 MB23 EZ503U	2800	3170	4964	95.73	8041/84	12	15	3400	3000	4000	18	400	85
31	1203	1426	30	1.2	PHQ831_0055K402_0175 MB23 EZ505U	2800	3170	4964	95.73	8041/84	8.0	15	3400	3000	4000	22	400	88
31	1203	1426	30	1.2	PHQ831_0055K402_0175 MB23 EZ505U	2800	3170	4964	95.73	8041/84	12	15	3400	3000	4000	22	400	88
32	373	408	9.6	3.8	PHQ831_0055K402_0170 MB23 EZ501U	1388	1390	4964	93.16	559/6	8.0	8.0	3600	3300	4000	11	400	82
32	373	408	9.6	3.8	PHQ831_0055K402_0170 MB23 EZ501U	1388	1390	4964	93.16	559/6	12	8.0	3600	3300	4000	11	400	82
32	373	408	9.6	3.8	PHQ831_0055K402_0170 MB23 EZ501U	1388	1390	4964	93.16	559/6	16	8.0	3600	3300	4000	11	400	82
32	408	451	10	3.4	PHQ831_0055K402_0170 MB23 EZ402U	1388	1390	4964	93.16	559/6	8.0	8.0	3600	3300	4000	10	400	82
32	408	451	10	3.4	PHQ831_0055K402_0170 MB23 EZ402U	1388	1390	4964	93.16	559/6	12	8.0	3600	3300	4000	10	400	82
32	408	451	10	3.4	PHQ831_0055K402_0170 MB23 EZ402U	1388	1390	4964	93.16	559/6	16	8.0	3600	3300	4000	10	400	82
32	599	746	15	2.3	PHQ831_0055K402_0170 MB23 EZ404U	2516	2520	4964	93.16	559/6	8.0	8.0	3600	3300	4000	11	400	84
32	599	746	15	2.3	PHQ831_0055K402_0170 MB23 EZ404U	2516	2520	4964	93.16	559/6	12	8.0	3600	3300	4000	11	400	84
32	599	746	15	2.3	PHQ831_0055K402_0170 MB23 EZ404U	2516	2520	4964	93.16	559/6	16	8.0	3600	3300	4000	11	400	84
32	642	694	16	2.2	PHQ831_0055K402_0170 MB23 EZ502U	2689	2690	4964	93.16	559/6	8.0	8.0	3600	3300	4000	14	400	83
32	642	694	16	2.2	PHQ831_0055K402_0170 MB23 EZ502U	2689	2690	4964	93.16	559/6	12	8.0	3600	3300	4000	14	400	83
32	642	694	16	2.2	PHQ831_0055K402_0170 MB23 EZ502U	2689	2690	4964	93.16	559/6	16	8.0	3600	3300	4000	14	400	83
32	842	963	22	1.7	PHQ831_0055K402_0170 MB23 EZ503U	2800	3170	4964	93.16	559/6	8.0	15	3600	3300	4000	17	400	85
32	842	963	22	1.7	PHQ831_0055K402_0170 MB23 EZ503U	2800	3170	4964	93.16	559/6	12	15	3600	3300	4000	17	400	85
32	1171	1388	30	1.2	PHQ831_0055K402_0170 MB23 EZ505U	2800	3170	4964	93.16	559/6	8.0	15	3600	3300	4000	22	400	88
32	1171	1388	30	1.2	PHQ831_0055K402_0170 MB23 EZ505U	2800	3170	4964	93.16	559/6	12	15	3600	3300	4000	22	400	88
39	306	334	9.1	4.6	PHQ831_0055K402_0140 MB23 EZ501U	1138	1140	4480	76.37	14663/192	8.0	8.0	3400	3000	4000	12	400	82
39	306	334	9.1	4.6	PHQ831_0055K402_0140 MB23 EZ501U	1138	1140	4480	76.37	14663/192	12	8.0	3400	3000	4000	12	400	82
39	306	334	9.1	4.6	PHQ831_0055K402_0140 MB23 EZ501U	1138	1140	4480	76.37	14663/192	16	8.0	3400	3000	4000	12	400	82
39	334	370	10	4.2	PHQ831_0055K402_0140 MB23 EZ402U	1138	1140	4480	76.37	14663/192	8.0	8.0	3400	3000	4000	11	400	82
39	334	370	10	4.2	PHQ831_0055K402_0140 MB23 EZ402U	1138	1140	4480	76.37	14663/192	12	8.0	3400	3000	4000	11	400	82
39	334	370	10	4.2	PHQ831_0055K402_0140 MB23 EZ402U	1138	1140	4480	76.37	14663/192	16	8.0	3400	3000	4000	11	400	82
39	491	612	15	2.9	PHQ831_0055K402_0140 MB23 EZ404U	2062	2060	4480	76.37	14663/192	8.0	8.0	3400	3000	4000	12	400	84
39	491	612	15	2.9	PHQ831_0055K402_0140 MB23 EZ404U	2062	2060	4480	76.37	14663/192	12	8.0	3400	3000	4000	12	400	84
39	491	612	15	2.9	PHQ831_0055K402_0140 MB23 EZ404U	2062	2060	4480	76.37	14663/192	16	8.0	3400	3000	4000	12	400	84
39	526	569	16	2.7	PHQ831_0055K402_0140 MB23 EZ502U	2205	2200	4480	76.37	14663/192	8.0	8.0	3400	3000	4000	15	400	83
39	526	569	16	2.7	PHQ831_0055K402_0140 MB23 EZ502U	2205	2200	4480	76.37	14663/192	12	8.0	3400	3000	4000	15	400	83
39	526	569	16	2.7	PHQ831_0055K402_0140 MB23 EZ502U	2205	2200	4480	76.37	14663/192	16	8.0	3400	3000	4000	15	400	83
39	526	590	16	2.7	PHQ831_0055K402_0140 MB33 EZ701U	1422	1420	4964	76.37	14663/192	16	15	3400	3000	4000	40	400	93
39	690	789	21	2.0	PHQ831_0055K402_0140 MB23 EZ503U	2667	2670	4480	76.37	14663/192	8.0	15	3400	3000	4000	18	400	85
39	690	789	21	2.0	PHQ831_0055K402_0140 MB23 EZ503U	2667	2670	4480	76.37	14663/192	12	15	3400	3000	4000	18	400	85
39	853	1024	25	1.6	PHQ831_0055K402_0140 MB33 EZ702U	2800	2920	4964	76.37	14663/192	16	15	3400	3000	4000	45	400	95
39	960	1138	29	1.5	PHQ831_0055K402_0140 MB23 EZ505U	2667	2670	4480	76.37	14663/192	8.0	15	3400	3000	4000	23	400	88
39	960	1138	29	1.5	PHQ831_0055K402_0140 MB23 EZ505U	2667	2670	4480	76.37	14663/192	12	15	3400	3000	4000	23	400	88
43	305	337	9.7	4.6	PHQ831_0055K402_0125 MB23 EZ402U	1037	1040	4084	69.62	1462/21	8.0	8.0	3400	3000	4000	11	400	82
43	305	337	9.7	4.6	PHQ831_0055K402_0125 MB23 EZ402U	1037	1040	4084	69.62	1462/21	12	8.0	3400	3000	4000	11	400	82
43	305	337	9.7	4.6	PHQ831_0055K402_0125 MB23 EZ402U	1037	1040	4084	69.62	1462/21	16	8.0	3400	3000	4000	11	400	82
43	447	558	14	3.1	PHQ831_0055K402_0125 MB23 EZ404U	1880	1880	4084	69.62	1462/21	8.0	8.0	3400	3000	4000	12	400	84
43	447	558	14	3.1	PHQ831_0055K402_0125 MB23 EZ404U	1880	1880	4084	69.62	1462/21	12	8.0	3400	3000	4000	12	400	84
43	447	558	14	3.1	PHQ831_0055K402_0125 MB23 EZ404U	1880	1880	4084	69.62	1462/21	16	8.0	3400	3000	4000	12	400	84

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PHQ831K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 2800 Nm)																		
43	480	519	15	2.9	PHQ831_0055K402_0125 MB23 EZ502U	2010	2010	4084	69.62	1462/21	8.0	8.0	3400	3000	4000	14	400	83
43	480	519	15	2.9	PHQ831_0055K402_0125 MB23 EZ502U	2010	2010	4084	69.62	1462/21	12	8.0	3400	3000	4000	14	400	83
43	480	519	15	2.9	PHQ831_0055K402_0125 MB23 EZ502U	2010	2010	4084	69.62	1462/21	16	8.0	3400	3000	4000	14	400	83
43	480	538	15	2.9	PHQ831_0055K402_0125 MB33 EZ701U	1297	1300	4964	69.62	1462/21	16	15	3400	3000	4000	39	400	93
43	480	538	15	2.9	PHQ831_0055K402_0125 MB33 EZ701U	1297	1300	4964	69.62	1462/21	24	15	3400	3000	4000	39	400	93
43	629	720	20	2.2	PHQ831_0055K402_0125 MB23 EZ503U	2431	2430	4084	69.62	1462/21	8.0	15	3400	3000	4000	18	400	85
43	629	720	20	2.2	PHQ831_0055K402_0125 MB23 EZ503U	2431	2430	4084	69.62	1462/21	12	15	3400	3000	4000	18	400	85
43	778	934	25	1.8	PHQ831_0055K402_0125 MB33 EZ702U	2658	2660	4964	69.62	1462/21	16	15	3400	3000	4000	44	400	95
43	778	934	25	1.8	PHQ831_0055K402_0125 MB33 EZ702U	2658	2660	4964	69.62	1462/21	24	15	3400	3000	4000	44	400	95
43	875	1037	28	1.6	PHQ831_0055K402_0125 MB23 EZ505U	2431	2430	4084	69.62	1462/21	8.0	15	3400	3000	4000	22	400	88
43	875	1037	28	1.6	PHQ831_0055K402_0125 MB23 EZ505U	2431	2430	4084	69.62	1462/21	12	15	3400	3000	4000	22	400	88
47	407	507	14	3.4	PHQ831_0055K402_0115 MB23 EZ404U	1711	1710	3716	63.35	7095/112	8.0	8.0	3000	2600	4000	13	400	84
47	407	507	14	3.4	PHQ831_0055K402_0115 MB23 EZ404U	1711	1710	3716	63.35	7095/112	12	8.0	3000	2600	4000	13	400	84
47	407	507	14	3.4	PHQ831_0055K402_0115 MB23 EZ404U	1711	1710	3716	63.35	7095/112	16	8.0	3000	2600	4000	13	400	84
47	437	472	15	3.2	PHQ831_0055K402_0115 MB23 EZ502U	1829	1830	3716	63.35	7095/112	8.0	8.0	3000	2600	4000	15	400	83
47	437	472	15	3.2	PHQ831_0055K402_0115 MB23 EZ502U	1829	1830	3716	63.35	7095/112	12	8.0	3000	2600	4000	15	400	83
47	437	472	15	3.2	PHQ831_0055K402_0115 MB23 EZ502U	1829	1830	3716	63.35	7095/112	16	8.0	3000	2600	4000	15	400	83
47	437	490	15	3.2	PHQ831_0055K402_0115 MB33 EZ701U	1180	1180	4964	63.35	7095/112	16	15	3000	2600	4000	40	400	93
47	437	490	15	3.2	PHQ831_0055K402_0115 MB33 EZ701U	1180	1180	4964	63.35	7095/112	24	15	3000	2600	4000	40	400	93
47	572	655	20	2.4	PHQ831_0055K402_0115 MB23 EZ503U	2212	2210	3716	63.35	7095/112	8.0	15	3000	2600	4000	19	400	85
47	572	655	20	2.4	PHQ831_0055K402_0115 MB23 EZ503U	2212	2210	3716	63.35	7095/112	12	15	3000	2600	4000	19	400	85
47	708	849	24	2.0	PHQ831_0055K402_0115 MB33 EZ702U	2419	2420	4964	63.35	7095/112	16	15	3000	2600	4000	45	400	95
47	708	849	24	2.0	PHQ831_0055K402_0115 MB33 EZ702U	2419	2420	4964	63.35	7095/112	24	15	3000	2600	4000	45	400	95
47	796	944	27	1.8	PHQ831_0055K402_0115 MB23 EZ505U	2212	2210	3716	63.35	7095/112	8.0	15	3000	2600	4000	23	400	88
47	796	944	27	1.8	PHQ831_0055K402_0115 MB23 EZ505U	2212	2210	3716	63.35	7095/112	12	15	3000	2600	4000	23	400	88
54	357	445	14	3.9	PHQ831_0055K402_0100 MB23 EZ404U	1500	1500	3258	55.54	1333/24	8.0	8.0	3400	3000	4000	13	400	84
54	357	445	14	3.9	PHQ831_0055K402_0100 MB23 EZ404U	1500	1500	3258	55.54	1333/24	12	8.0	3400	3000	4000	13	400	84
54	357	445	14	3.9	PHQ831_0055K402_0100 MB23 EZ404U	1500	1500	3258	55.54	1333/24	16	8.0	3400	3000	4000	13	400	84
54	383	414	14	3.7	PHQ831_0055K402_0100 MB23 EZ502U	1603	1600	3258	55.54	1333/24	8.0	8.0	3400	3000	4000	15	400	83
54	383	414	14	3.7	PHQ831_0055K402_0100 MB23 EZ502U	1603	1600	3258	55.54	1333/24	12	8.0	3400	3000	4000	15	400	83
54	383	414	14	3.7	PHQ831_0055K402_0100 MB23 EZ502U	1603	1600	3258	55.54	1333/24	16	8.0	3400	3000	4000	15	400	83
54	383	429	14	3.7	PHQ831_0055K402_0100 MB33 EZ701U	1034	1030	4964	55.54	1333/24	16	15	3400	3000	4000	40	400	93
54	383	429	14	3.7	PHQ831_0055K402_0100 MB33 EZ701U	1034	1030	4964	55.54	1333/24	24	15	3400	3000	4000	40	400	93
54	383	429	14	3.7	PHQ831_0055K402_0100 MB33 EZ701U	1034	1030	4964	55.54	1333/24	32	15	3400	3000	4000	40	400	93
54	502	574	19	2.8	PHQ831_0055K402_0100 MB23 EZ503U	1939	1940	3258	55.54	1333/24	8.0	15	3400	3000	4000	18	400	85
54	502	574	19	2.8	PHQ831_0055K402_0100 MB23 EZ503U	1939	1940	3258	55.54	1333/24	12	15	3400	3000	4000	18	400	85
54	621	745	23	2.3	PHQ831_0055K402_0100 MB33 EZ702U	2120	2120	4964	55.54	1333/24	16	15	3400	3000	4000	45	400	95
54	621	745	23	2.3	PHQ831_0055K402_0100 MB33 EZ702U	2120	2120	4964	55.54	1333/24	24	15	3400	3000	4000	45	400	95
54	621	745	23	2.3	PHQ831_0055K402_0100 MB33 EZ702U	2120	2120	4964	55.54	1333/24	32	15	3400	3000	4000	45	400	95
54	698	827	26	2.0	PHQ831_0055K402_0100 MB23 EZ505U	1939	1940	3258	55.54	1333/24	8.0	15	3400	3000	4000	23	400	88
54	698	827	26	2.0	PHQ831_0055K402_0100 MB23 EZ505U	1939	1940	3258	55.54	1333/24	12	15	3400	3000	4000	23	400	88
59	326	407	13	4.3	PHQ831_0055K402_0092 MB23 EZ404U	1372	1370	2981	50.81	26015/512	8.0	8.0	3000	2600	4000	14	400	84
59	326	407	13	4.3	PHQ831_0055K402_0092 MB23 EZ404U	1372	1370	2981	50.81	26015/512	12	8.0	3000	2600	4000	14	400	84
59	326	407	13	4.3	PHQ831_0055K402_0092 MB23 EZ404U	1372	1370	2981	50.81	26015/512	16	8.0	3000	2600	4000	14	400	84
59	350	379	14	4.0	PHQ831_0055K402_0092 MB23 EZ502U	1467	1470	2981	50.81	26015/512	8.0	8.0	3000	2600	4000	16	400	83
59	350	379	14	4.0	PHQ831_0055K402_0092 MB23 EZ502U	1467	1470	2981	50.81	26015/512	12	8.0	3000	2600	4000	16	400	83
59	350	379	14	4.0	PHQ831_0055K402_0092 MB23 EZ502U	1467	1470	2981	50.81	26015/512	16	8.0	3000	2600	4000	16	400	83
59	350	393	14	4.0	PHQ831_0055K402_0092 MB33 EZ701U	946	950	4964	50.81	26015/512	16	15	3000	2600	4000	41	400	93
59	350	393	14	4.0	PHQ831_0055K402_0092 MB33 EZ701U	946	950	4964	50.81	26015/512	24	15	3000	2600	4000	41	400	93
59	350	393	14	4.0	PHQ831_0055K402_0092 MB33 EZ701U	946	950	4964	50.81	26015/512	32	15	3000	2600	4000	41	400	93
59	459	525	19	3.1	PHQ831_0055K402_0092 MB23 EZ503U	1774	1770	2981	50.81	26015/512	8.0	15	3000	2600	4000	20	400	85
59	459	525	19	3.1	PHQ831_0055K402_0092 MB23 EZ503U	1774	1770	2981	50.81	26015/512	12	15	3000	2600	4000	20	400	85
59	568	681	23	2.5	PHQ831_0055K402_0092 MB33 EZ702U	1940	1940	4964	50.81	26015/512	16	15	3000	2600	4000	46	400	95
59	568	681	23	2.5	PHQ831_0055K402_0092 MB33 EZ702U	1940	1940	4964	50.81	26015/512	24	15	3000	2600	4000	46	400	95
59	568	681	23	2.5	PHQ831_0055K402_0092 MB33 EZ702U	1940	1940	4964	50.81	26015/512	32	15	3000	2600	4000	46	400	95
59	639	757	26	2.2	PHQ831_0055K402_0092 MB23 EZ505U	1774	1770	2981	50.81	26015/512	8.0	15	3000	2600	4000	24	400	88
59	639	757	26	2.2	PHQ831_0055K402_0092 MB23 EZ505U	1774	1770	2981	50.81	26015/512	12	15	3000	2600	4000	24	400	88
59	781	984	32	1.8	PHQ831_0055K402_0092 MB33 EZ703U	2800	3080	4964	50.81	26015/512	16	32	3000	2600	4000	58	400	98
59	1008	1429	41	1.4	PHQ831_0055K402_0092 MB33 EZ705U	2800	3170	4964	50.81	26015/512	16	32	3000	2600	4000	71	400	103
65	296	369	13	4.7	PHQ831_0055K402_0084 MB23 EZ404U	1244	1240	2703	46.07	645/14	8.0	8.0	3000	2600	4000	14	400	84
65	296	369	13	4.7	PHQ831_0055K402_0084 MB23 EZ404U	1244	1240	2703	46.07	645/14	12	8.0	3000	2600	4000	14	400	84
65	296	369	13	4.7	PHQ831_0055K402_0084 MB23 EZ404U	1244	1240	2703	46.07	645/14	16	8.0	3000	2600	4000	14	400	84
65	317	343	14	4.4	PHQ831_0055K402_0084 MB23 EZ502U	1330	1330	2703	46.07	645/14	8.0	8.0	3000	2600	4000	16	400	83
65	317	343	14	4.4	PHQ831_0055K402_0084 MB23 EZ502U	1330	1330	2703	46.07	645/14	12	8.0	3000	2600	4000	16	400	83

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PHQ831K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 2800 Nm)																		
65	317	343	14	4.4	PHQ831_0055K402_0084 MB23 EZ502U	1330	1330	2703	46.07	645/14	16	8.0	3000	2600	4000	16	400	83
65	317	356	14	4.4	PHQ831_0055K402_0084 MB33 EZ701U	858	860	4964	46.07	645/14	16	15	3000	2600	4000	41	400	93
65	317	356	14	4.4	PHQ831_0055K402_0084 MB33 EZ701U	858	860	4964	46.07	645/14	24	15	3000	2600	4000	41	400	93
65	317	356	14	4.4	PHQ831_0055K402_0084 MB33 EZ701U	858	860	4964	46.07	645/14	32	15	3000	2600	4000	41	400	93
65	317	356	14	4.4	PHQ831_0055K402_0084 MB33 EZ701U	858	860	4964	46.07	645/14	45	15	3000	2600	4000	41	400	93
65	416	476	18	3.4	PHQ831_0055K402_0084 MB23 EZ503U	1609	1610	2703	46.07	645/14	8.0	15	3000	2600	4000	19	400	85
65	416	476	18	3.4	PHQ831_0055K402_0084 MB23 EZ503U	1609	1610	2703	46.07	645/14	12	15	3000	2600	4000	19	400	85
65	515	618	22	2.7	PHQ831_0055K402_0084 MB33 EZ702U	1759	1760	4964	46.07	645/14	16	15	3000	2600	4000	46	400	95
65	515	618	22	2.7	PHQ831_0055K402_0084 MB33 EZ702U	1759	1760	4964	46.07	645/14	24	15	3000	2600	4000	46	400	95
65	515	618	22	2.7	PHQ831_0055K402_0084 MB33 EZ702U	1759	1760	4964	46.07	645/14	32	15	3000	2600	4000	46	400	95
65	515	618	22	2.7	PHQ831_0055K402_0084 MB33 EZ702U	1759	1760	4964	46.07	645/14	45	15	3000	2600	4000	46	400	95
65	579	686	25	2.4	PHQ831_0055K402_0084 MB23 EZ505U	1609	1610	2703	46.07	645/14	8.0	15	3000	2600	4000	24	400	88
65	579	686	25	2.4	PHQ831_0055K402_0084 MB23 EZ505U	1609	1610	2703	46.07	645/14	12	15	3000	2600	4000	24	400	88
65	708	892	31	2.0	PHQ831_0055K402_0084 MB33 EZ703U	2789	2790	4964	46.07	645/14	16	32	3000	2600	4000	58	400	98
65	708	892	31	2.0	PHQ831_0055K402_0084 MB33 EZ703U	2789	2790	4964	46.07	645/14	24	32	3000	2600	4000	58	400	98
65	914	1296	40	1.5	PHQ831_0055K402_0084 MB33 EZ705U	2800	3100	4964	46.07	645/14	16	32	3000	2600	4000	70	400	103
65	914	1296	40	1.5	PHQ831_0055K402_0084 MB33 EZ705U	2800	3100	4964	46.07	645/14	24	32	3000	2600	4000	70	400	103
73	283	317	13	5.0	PHQ831_0055K402_0075 MB33 EZ701U	764	760	4964	41.01	20339/496	16	15	2600	2200	3800	43	400	93
73	283	317	13	5.0	PHQ831_0055K402_0075 MB33 EZ701U	764	760	4964	41.01	20339/496	24	15	2600	2200	3800	43	400	93
73	283	317	13	5.0	PHQ831_0055K402_0075 MB33 EZ701U	764	760	4964	41.01	20339/496	32	15	2600	2200	3800	43	400	93
73	283	317	13	5.0	PHQ831_0055K402_0075 MB33 EZ701U	764	760	4964	41.01	20339/496	45	15	2600	2200	3800	43	400	93
73	458	550	22	3.1	PHQ831_0055K402_0075 MB33 EZ702U	1566	1570	4964	41.01	20339/496	16	15	2600	2200	3800	48	400	95
73	458	550	22	3.1	PHQ831_0055K402_0075 MB33 EZ702U	1566	1570	4964	41.01	20339/496	24	15	2600	2200	3800	48	400	95
73	458	550	22	3.1	PHQ831_0055K402_0075 MB33 EZ702U	1566	1570	4964	41.01	20339/496	32	15	2600	2200	3800	48	400	95
73	458	550	22	3.1	PHQ831_0055K402_0075 MB33 EZ702U	1566	1570	4964	41.01	20339/496	45	15	2600	2200	3800	48	400	95
73	630	794	30	2.2	PHQ831_0055K402_0075 MB33 EZ703U	2482	2480	4964	41.01	20339/496	16	32	2600	2200	3800	60	400	98
73	630	794	30	2.2	PHQ831_0055K402_0075 MB33 EZ703U	2482	2480	4964	41.01	20339/496	24	32	2600	2200	3800	60	400	98
73	630	794	30	2.2	PHQ831_0055K402_0075 MB33 EZ703U	2482	2480	4964	41.01	20339/496	32	32	2600	2200	3800	60	400	98
73	813	1153	39	1.7	PHQ831_0055K402_0075 MB33 EZ705U	2800	2980	4964	41.01	20339/496	16	32	2600	2200	3800	72	400	103
73	813	1153	39	1.7	PHQ831_0055K402_0075 MB33 EZ705U	2800	2980	4964	41.01	20339/496	24	32	2600	2200	3800	72	400	103
73	813	1153	39	1.7	PHQ831_0055K402_0075 MB33 EZ705U	2800	2980	4964	41.01	20339/496	32	32	2600	2200	3800	72	400	103
81	334	382	19	3.9	PHQ831_0055K402_0067 MB23 EZ503U	1290	1290	2168	36.95	2365/64	8.0	15	3000	2600	4000	21	400	85
81	334	382	19	3.9	PHQ831_0055K402_0067 MB23 EZ503U	1290	1290	2168	36.95	2365/64	12	15	3000	2600	4000	21	400	85
81	413	496	21	3.4	PHQ831_0055K402_0067 MB33 EZ702U	1411	1410	4964	36.95	2365/64	16	15	3000	2600	4000	47	400	95
81	413	496	21	3.4	PHQ831_0055K402_0067 MB33 EZ702U	1411	1410	4964	36.95	2365/64	24	15	3000	2600	4000	47	400	95
81	413	496	21	3.4	PHQ831_0055K402_0067 MB33 EZ702U	1411	1410	4964	36.95	2365/64	32	15	3000	2600	4000	47	400	95
81	413	496	21	3.4	PHQ831_0055K402_0067 MB33 EZ702U	1411	1410	4964	36.95	2365/64	45	15	3000	2600	4000	47	400	95
81	465	551	26	2.8	PHQ831_0055K402_0067 MB23 EZ505U	1290	1290	2168	36.95	2365/64	8.0	15	3000	2600	4000	25	400	88
81	465	551	26	2.8	PHQ831_0055K402_0067 MB23 EZ505U	1290	1290	2168	36.95	2365/64	12	15	3000	2600	4000	25	400	88
81	568	716	29	2.5	PHQ831_0055K402_0067 MB33 EZ703U	2237	2240	4964	36.95	2365/64	16	32	3000	2600	4000	59	400	98
81	568	716	29	2.5	PHQ831_0055K402_0067 MB33 EZ703U	2237	2240	4964	36.95	2365/64	24	32	3000	2600	4000	59	400	98
81	568	716	29	2.5	PHQ831_0055K402_0067 MB33 EZ703U	2237	2240	4964	36.95	2365/64	32	32	3000	2600	4000	59	400	98
81	733	1039	38	1.9	PHQ831_0055K402_0067 MB33 EZ705U	2800	2880	4964	36.95	2365/64	16	32	3000	2600	4000	71	400	103
81	733	1039	38	1.9	PHQ831_0055K402_0067 MB33 EZ705U	2800	2880	4964	36.95	2365/64	24	32	3000	2600	4000	71	400	103
81	733	1039	38	1.9	PHQ831_0055K402_0067 MB33 EZ705U	2800	2880	4964	36.95	2365/64	32	32	3000	2600	4000	71	400	103
91	369	443	21	3.8	PHQ831_0055K402_0060 MB33 EZ702U	1260	1260	4964	33.00	33/1	16	15	2600	2200	3800	50	400	95
91	369	443	21	3.8	PHQ831_0055K402_0060 MB33 EZ702U	1260	1260	4964	33.00	33/1	24	15	2600	2200	3800	50	400	95
91	369	443	21	3.8	PHQ831_0055K402_0060 MB33 EZ702U	1260	1260	4964	33.00	33/1	32	15	2600	2200	3800	50	400	95
91	369	443	21	3.8	PHQ831_0055K402_0060 MB33 EZ702U	1260	1260	4964	33.00	33/1	45	15	2600	2200	3800	50	400	95
91	507	639	28	2.8	PHQ831_0055K402_0060 MB33 EZ703U	1997	2000	4964	33.00	33/1	16	32	2600	2200	3800	62	400	98
91	507	639	28	2.8	PHQ831_0055K402_0060 MB33 EZ703U	1997	2000	4964	33.00	33/1	24	32	2600	2200	3800	62	400	98
91	507	639	28	2.8	PHQ831_0055K402_0060 MB33 EZ703U	1997	2000	4964	33.00	33/1	32	32	2600	2200	3800	62	400	98
91	507	639	28	2.8	PHQ831_0055K402_0060 MB33 EZ703U	1997	2000	4964	33.00	33/1	45	32	2600	2200	3800	62	400	98
91	655	928	37	2.1	PHQ831_0055K402_0060 MB33 EZ705U	2772	2770	4964	33.00	33/1	16	32	2600	2200	3800	74	400	103
91	655	928	37	2.1	PHQ831_0055K402_0060 MB33 EZ705U	2772	2770	4964	33.00	33/1	24	32	2600	2200	3800	74	400	103
91	655	928	37	2.1	PHQ831_0055K402_0060 MB33 EZ705U	2772	2770	4964	33.00	33/1	32	32	2600	2200	3800	74	400	103
91	655	928	37	2.1	PHQ831_0055K402_0060 MB33 EZ705U	2772	2770	4964	33.00	33/1	45	32	2600	2200	3800	74	400	103
101	333	400	20	4.2	PHQ831_0055K402_0054 MB33 EZ702U	1139	1140	4964	29.82	1849/62	16	15	2600	2200	3800	49	400	95
101	333	400	20	4.2	PHQ831_0055K402_0054 MB33 EZ702U	1139	1140	4964	29.82	1849/62	24	15	2600	2200	3800	49	400	95
101	333	400	20	4.2	PHQ831_0055K402_0054 MB33 EZ702U	1139	1140	4964	29.82	1849/62	32	15	2600	2200	3800	49	400	95
101	333	400	20	4.2	PHQ831_0055K402_0054 MB33 EZ702U	1139	1140	4964	29.82	1849/62	45	15	2600	2200	3800	49	400	95
101	458	578	28	3.1	PHQ831_0055K402_0054 MB33 EZ703U	1805	1810	4964	29.82	1849/62	16	32	2600	2200	3800	61	400	98
101	458	578	28	3.1	PHQ831_0055K402_0054 MB33 EZ703U	1805	1810	4964	29.82	1849/62	24	32	2600	2200	3800	61	400	98
101	458	578	28	3.1	PHQ831_0055K402_0054 MB33 EZ703U	1805	1810	4964	29.82	1849/62	32	32	2600	2200	3800	61	400	98

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PHQ831K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 2800 Nm)																		
101	458	578	28	3.1	PHQ831_0055K402_0054 MB33 EZ703U	1805	1810	4964	29.82	1849/62	45	32	2600	2200	3800	61	400	98
101	591	839	36	2.4	PHQ831_0055K402_0054 MB33 EZ705U	2680	2680	4964	29.82	1849/62	16	32	2600	2200	3800	73	400	103
101	591	839	36	2.4	PHQ831_0055K402_0054 MB33 EZ705U	2680	2680	4964	29.82	1849/62	24	32	2600	2200	3800	73	400	103
101	591	839	36	2.4	PHQ831_0055K402_0054 MB33 EZ705U	2680	2680	4964	29.82	1849/62	32	32	2600	2200	3800	73	400	103
101	591	839	36	2.4	PHQ831_0055K402_0054 MB33 EZ705U	2680	2680	4964	29.82	1849/62	45	32	2600	2200	3800	73	400	103
125	268	322	20	4.9	PHQ831_0055K402_0044 MB33 EZ702U	916	920	4224	24.00	24/1	16	15	2600	2200	3800	52	400	95
125	268	322	20	4.9	PHQ831_0055K402_0044 MB33 EZ702U	916	920	4224	24.00	24/1	24	15	2600	2200	3800	52	400	95
125	268	322	20	4.9	PHQ831_0055K402_0044 MB33 EZ702U	916	920	4224	24.00	24/1	32	15	2600	2200	3800	52	400	95
125	268	322	20	4.9	PHQ831_0055K402_0044 MB33 EZ702U	916	920	4224	24.00	24/1	45	15	2600	2200	3800	52	400	95
125	369	465	28	3.6	PHQ831_0055K402_0044 MB33 EZ703U	1453	1450	4224	24.00	24/1	16	32	2600	2200	3800	64	400	98
125	369	465	28	3.6	PHQ831_0055K402_0044 MB33 EZ703U	1453	1450	4224	24.00	24/1	24	32	2600	2200	3800	64	400	98
125	369	465	28	3.6	PHQ831_0055K402_0044 MB33 EZ703U	1453	1450	4224	24.00	24/1	32	32	2600	2200	3800	64	400	98
125	369	465	28	3.6	PHQ831_0055K402_0044 MB33 EZ703U	1453	1450	4224	24.00	24/1	45	32	2600	2200	3800	64	400	98
125	476	675	36	2.8	PHQ831_0055K402_0044 MB33 EZ705U	2235	2240	4224	24.00	24/1	16	32	2600	2200	3800	76	400	103
125	476	675	36	2.8	PHQ831_0055K402_0044 MB33 EZ705U	2235	2240	4224	24.00	24/1	24	32	2600	2200	3800	76	400	103
125	476	675	36	2.8	PHQ831_0055K402_0044 MB33 EZ705U	2235	2240	4224	24.00	24/1	32	32	2600	2200	3800	76	400	103
125	476	675	36	2.8	PHQ831_0055K402_0044 MB33 EZ705U	2235	2240	4224	24.00	24/1	45	32	2600	2200	3800	76	400	103
125	595	1077	45	2.2	PHQ831_0055K402_0044 MB43 EZ803U	2493	2490	4964	24.00	24/1	50	65	2600	2200	3000	184	400	134
125	595	1077	45	2.2	PHQ831_0055K402_0044 MB43 EZ803U	2493	2490	4964	24.00	24/1	72	65	2600	2200	3000	184	400	134
136	338	426	28	3.8	PHQ831_0055K402_0040 MB33 EZ703U	1332	1330	3872	22.00	22/1	16	32	2600	2200	3800	65	400	98
136	338	426	28	3.8	PHQ831_0055K402_0040 MB33 EZ703U	1332	1330	3872	22.00	22/1	24	32	2600	2200	3800	65	400	98
136	338	426	28	3.8	PHQ831_0055K402_0040 MB33 EZ703U	1332	1330	3872	22.00	22/1	32	32	2600	2200	3800	65	400	98
136	338	426	28	3.8	PHQ831_0055K402_0040 MB33 EZ703U	1332	1330	3872	22.00	22/1	45	32	2600	2200	3800	65	400	98
136	436	619	36	2.9	PHQ831_0055K402_0040 MB33 EZ705U	2049	2050	3872	22.00	22/1	16	32	2600	2200	3800	77	400	103
136	436	619	36	2.9	PHQ831_0055K402_0040 MB33 EZ705U	2049	2050	3872	22.00	22/1	24	32	2600	2200	3800	77	400	103
136	436	619	36	2.9	PHQ831_0055K402_0040 MB33 EZ705U	2049	2050	3872	22.00	22/1	32	32	2600	2200	3800	77	400	103
136	436	619	36	2.9	PHQ831_0055K402_0040 MB33 EZ705U	2049	2050	3872	22.00	22/1	45	32	2600	2200	3800	77	400	103
136	545	987	45	2.4	PHQ831_0055K402_0040 MB43 EZ803U	2421	2420	4964	22.00	22/1	50	65	2600	2200	3000	185	400	134
136	545	987	45	2.4	PHQ831_0055K402_0040 MB43 EZ803U	2421	2420	4964	22.00	22/1	72	65	2600	2200	3000	185	400	134
PHQ941K (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 5760 Nm)																		
45	1768	2674	48	2.1	PHQ941_0060K513_0073 MB43 EZ805U	5760	5760	11250	44.08	1102/25	50	115	1900	1800	3000	280	771	173
PHQ941K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 5760 Nm)																		
8.6	1380	1509	8.4	2.8	PHQ941_0060K513_0580 MB23 EZ501U	5136	5140	11250	349.8	22736/65	8.0	8.0	3400	3000	4000	11	771	104
8.6	1509	1669	9.2	2.5	PHQ941_0060K513_0580 MB23 EZ402U	5136	5140	11250	349.8	22736/65	8.0	8.0	3400	3000	4000	9.6	771	104
8.6	2215	2761	14	1.7	PHQ941_0060K513_0580 MB23 EZ404U	5760	5760	11250	349.8	22736/65	8.0	8.0	3400	3000	4000	11	771	106
8.6	2376	2568	15	1.6	PHQ941_0060K513_0580 MB23 EZ502U	5760	5760	11250	349.8	22736/65	8.0	8.0	3400	3000	4000	13	771	105
10	1140	1246	8.0	3.3	PHQ941_0060K513_0480 MB23 EZ501U	4243	4240	11250	289.0	8091/28	8.0	8.0	3400	3000	4000	11	771	104
10	1140	1246	8.0	3.3	PHQ941_0060K513_0480 MB23 EZ501U	4243	4240	11250	289.0	8091/28	12	8.0	3400	3000	4000	11	771	104
10	1246	1379	8.7	3.0	PHQ941_0060K513_0480 MB23 EZ402U	4243	4240	11250	289.0	8091/28	8.0	8.0	3400	3000	4000	10	771	104
10	1246	1379	8.7	3.0	PHQ941_0060K513_0480 MB23 EZ402U	4243	4240	11250	289.0	8091/28	12	8.0	3400	3000	4000	10	771	104
10	1830	2281	13	2.1	PHQ941_0060K513_0480 MB23 EZ404U	5760	5760	11250	289.0	8091/28	8.0	8.0	3400	3000	4000	11	771	106
10	1830	2281	13	2.1	PHQ941_0060K513_0480 MB23 EZ404U	5760	5760	11250	289.0	8091/28	12	8.0	3400	3000	4000	11	771	106
10	1962	2122	14	1.9	PHQ941_0060K513_0480 MB23 EZ502U	5760	5760	11250	289.0	8091/28	8.0	8.0	3400	3000	4000	14	771	105
10	1962	2122	14	1.9	PHQ941_0060K513_0480 MB23 EZ502U	5760	5760	11250	289.0	8091/28	12	8.0	3400	3000	4000	14	771	105
11	1030	1126	7.7	3.7	PHQ941_0060K513_0440 MB23 EZ501U	3833	3830	11250	261.0	261/1	8.0	8.0	3400	3000	4000	11	771	104
11	1030	1126	7.7	3.7	PHQ941_0060K513_0440 MB23 EZ501U	3833	3830	11250	261.0	261/1	12	8.0	3400	3000	4000	11	771	104
11	1126	1246	8.5	3.4	PHQ941_0060K513_0440 MB23 EZ402U	3833	3830	11250	261.0	261/1	8.0	8.0	3400	3000	4000	10	771	104
11	1126	1246	8.5	3.4	PHQ941_0060K513_0440 MB23 EZ402U	3833	3830	11250	261.0	261/1	12	8.0	3400	3000	4000	10	771	104
11	1653	2060	12	2.3	PHQ941_0060K513_0440 MB23 EZ404U	5760	5760	11250	261.0	261/1	8.0	8.0	3400	3000	4000	11	771	106
11	1653	2060	12	2.3	PHQ941_0060K513_0440 MB23 EZ404U	5760	5760	11250	261.0	261/1	12	8.0	3400	3000	4000	11	771	106
11	1773	1916	13	2.1	PHQ941_0060K513_0440 MB23 EZ502U	5760	5760	11250	261.0	261/1	8.0	8.0	3400	3000	4000	14	771	105
11	1773	1916	13	2.1	PHQ941_0060K513_0440 MB23 EZ502U	5760	5760	11250	261.0	261/1	12	8.0	3400	3000	4000	14	771	105
11	2323	2659	17	1.6	PHQ941_0060K513_0440 MB23 EZ503U	5760	5760	11250	261.0	261/1	8.0	15	3400	3000	4000	17	771	107
11	3234	3833	24	1.2	PHQ941_0060K513_0440 MB23 EZ505U	5760	5760	11250	261.0	261/1	8.0	15	3400	3000	4000	22	771	110
13	912	997	7.5	4.2	PHQ941_0060K513_0390 MB23 EZ501U	3395	3390	11250	231.2	8091/35	8.0	8.0	3400	3000	4000	12	771	104
13	912	997	7.5	4.2	PHQ941_0060K513_0390 MB23 EZ501U	3395	3390	11250	231.2	8091/35	12	8.0	3400	3000	4000	12	771	104
13	912	997	7.5	4.2	PHQ941_0060K513_0390 MB23 EZ501U	3395	3390	11250	231.2	8091/35	16	8.0	3400	3000	4000	12	771	104
13	997	1103	8.1	3.8	PHQ941_0060K513_0390 MB23 EZ402U	3395	3390	11250	231.2	8091/35	8.0	8.0	3400	3000	4000	10	771	104
13	997	1103	8.1	3.8	PHQ941_0060K513_0390 MB23 EZ402U	3395	3390	11250	231.2	8091/35	12	8.0	3400	3000	4000	10	771	104
13	997	1103	8.1	3.8	PHQ941_0060K513_0390 MB23 EZ402U	3395	3390	11250	231.2	8091/35	16	8.0	3400	3000	4000	10	771	104
13	1464	1825	12	2.6	PHQ941_0060K513_0390 MB23 EZ404U	5760	5760	11250	231.2	8091/35	8.0	8.0	3400	3000	4000	12	771	106
13	1464	1825	12	2.6	PHQ941_0060K513_0390 MB23 EZ404U	5760	5760	11250	231.2	8091/35	12	8.0	3400	3000	4000	12	771	106
13	1464	1825	12	2.6	PHQ941_0060K513_0390 MB23 EZ404U	5760	5760	11250	231.2	8091/35	16	8.0	3400	3000	4000	12	771	106
13	1570	1697	13	2.4	PHQ941_0060K513_0390 MB23 EZ502U	5760	5760	11250	231.2	8091/35	8.0	8.0	3400	3000	4000	14	771	105

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PHQ941K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 5760 Nm)																		
13	1570	1697	13	2.4	PHQ941_0060K513_0390 MB23 EZ502U	5760	5760	11250	231.2	8091/35	12	8.0	3400	3000	4000	14	771	105
13	1570	1697	13	2.4	PHQ941_0060K513_0390 MB23 EZ502U	5760	5760	11250	231.2	8091/35	16	8.0	3400	3000	4000	14	771	105
13	2058	2355	17	1.8	PHQ941_0060K513_0390 MB23 EZ503U	5760	5760	11250	231.2	8091/35	8.0	15	3400	3000	4000	18	771	107
13	2864	3395	23	1.3	PHQ941_0060K513_0390 MB23 EZ505U	5760	5760	11250	231.2	8091/35	8.0	15	3400	3000	4000	22	771	110
14	824	901	7.2	4.6	PHQ941_0060K513_0350 MB23 EZ501U	3066	3070	11250	208.8	1044/5	8.0	8.0	3400	3000	4000	12	771	104
14	824	901	7.2	4.6	PHQ941_0060K513_0350 MB23 EZ501U	3066	3070	11250	208.8	1044/5	12	8.0	3400	3000	4000	12	771	104
14	824	901	7.2	4.6	PHQ941_0060K513_0350 MB23 EZ501U	3066	3070	11250	208.8	1044/5	16	8.0	3400	3000	4000	12	771	104
14	901	996	7.9	4.2	PHQ941_0060K513_0350 MB23 EZ402U	3066	3070	11250	208.8	1044/5	8.0	8.0	3400	3000	4000	11	771	104
14	901	996	7.9	4.2	PHQ941_0060K513_0350 MB23 EZ402U	3066	3070	11250	208.8	1044/5	12	8.0	3400	3000	4000	11	771	104
14	901	996	7.9	4.2	PHQ941_0060K513_0350 MB23 EZ402U	3066	3070	11250	208.8	1044/5	16	8.0	3400	3000	4000	11	771	104
14	1322	1648	12	2.9	PHQ941_0060K513_0350 MB23 EZ404U	5557	5560	11250	208.8	1044/5	8.0	8.0	3400	3000	4000	12	771	106
14	1322	1648	12	2.9	PHQ941_0060K513_0350 MB23 EZ404U	5557	5560	11250	208.8	1044/5	12	8.0	3400	3000	4000	12	771	106
14	1322	1648	12	2.9	PHQ941_0060K513_0350 MB23 EZ404U	5557	5560	11250	208.8	1044/5	16	8.0	3400	3000	4000	12	771	106
14	1418	1533	12	2.7	PHQ941_0060K513_0350 MB23 EZ502U	5760	5760	11250	208.8	1044/5	8.0	8.0	3400	3000	4000	14	771	105
14	1418	1533	12	2.7	PHQ941_0060K513_0350 MB23 EZ502U	5760	5760	11250	208.8	1044/5	12	8.0	3400	3000	4000	14	771	105
14	1418	1533	12	2.7	PHQ941_0060K513_0350 MB23 EZ502U	5760	5760	11250	208.8	1044/5	16	8.0	3400	3000	4000	14	771	105
14	1859	2127	16	2.0	PHQ941_0060K513_0350 MB23 EZ503U	5760	5760	11250	208.8	1044/5	8.0	15	3400	3000	4000	18	771	107
14	1859	2127	16	2.0	PHQ941_0060K513_0350 MB23 EZ503U	5760	5760	11250	208.8	1044/5	12	15	3400	3000	4000	18	771	107
14	2587	3066	23	1.5	PHQ941_0060K513_0350 MB23 EZ505U	5760	5760	11250	208.8	1044/5	8.0	15	3400	3000	4000	22	771	110
14	2587	3066	23	1.5	PHQ941_0060K513_0350 MB23 EZ505U	5760	5760	11250	208.8	1044/5	12	15	3400	3000	4000	22	771	110
15	765	836	7.1	5.0	PHQ941_0060K513_0320 MB23 EZ501U	2846	2850	11208	193.8	62031/320	8.0	8.0	3400	3000	4000	12	771	104
15	765	836	7.1	5.0	PHQ941_0060K513_0320 MB23 EZ501U	2846	2850	11208	193.8	62031/320	12	8.0	3400	3000	4000	12	771	104
15	765	836	7.1	5.0	PHQ941_0060K513_0320 MB23 EZ501U	2846	2850	11208	193.8	62031/320	16	8.0	3400	3000	4000	12	771	104
15	836	925	7.7	4.5	PHQ941_0060K513_0320 MB23 EZ402U	2846	2850	11208	193.8	62031/320	8.0	8.0	3400	3000	4000	11	771	104
15	836	925	7.7	4.5	PHQ941_0060K513_0320 MB23 EZ402U	2846	2850	11208	193.8	62031/320	12	8.0	3400	3000	4000	11	771	104
15	836	925	7.7	4.5	PHQ941_0060K513_0320 MB23 EZ402U	2846	2850	11208	193.8	62031/320	16	8.0	3400	3000	4000	11	771	104
15	1228	1530	11	3.1	PHQ941_0060K513_0320 MB23 EZ404U	5159	5160	11208	193.8	62031/320	8.0	8.0	3400	3000	4000	12	771	106
15	1228	1530	11	3.1	PHQ941_0060K513_0320 MB23 EZ404U	5159	5160	11208	193.8	62031/320	12	8.0	3400	3000	4000	12	771	106
15	1228	1530	11	3.1	PHQ941_0060K513_0320 MB23 EZ404U	5159	5160	11208	193.8	62031/320	16	8.0	3400	3000	4000	12	771	106
15	1317	1423	12	2.9	PHQ941_0060K513_0320 MB23 EZ502U	5515	5520	11208	193.8	62031/320	8.0	8.0	3400	3000	4000	15	771	105
15	1317	1423	12	2.9	PHQ941_0060K513_0320 MB23 EZ502U	5515	5520	11208	193.8	62031/320	12	8.0	3400	3000	4000	15	771	105
15	1317	1423	12	2.9	PHQ941_0060K513_0320 MB23 EZ502U	5515	5520	11208	193.8	62031/320	16	8.0	3400	3000	4000	15	771	105
15	1317	1477	12	2.9	PHQ941_0060K513_0320 MB33 EZ701U	3558	3560	11250	193.8	62031/320	16	15	3400	3000	4000	39	771	115
15	1726	1975	16	2.2	PHQ941_0060K513_0320 MB23 EZ503U	5760	5760	11208	193.8	62031/320	8.0	15	3400	3000	4000	18	771	107
15	1726	1975	16	2.2	PHQ941_0060K513_0320 MB23 EZ503U	5760	5760	11208	193.8	62031/320	12	15	3400	3000	4000	18	771	107
15	2135	2562	20	1.8	PHQ941_0060K513_0320 MB33 EZ702U	5760	5760	11250	193.8	62031/320	16	15	3400	3000	4000	45	771	117
15	2402	2846	22	1.6	PHQ941_0060K513_0320 MB23 EZ505U	5760	5760	11208	193.8	62031/320	8.0	15	3400	3000	4000	23	771	110
15	2402	2846	22	1.6	PHQ941_0060K513_0320 MB23 EZ505U	5760	5760	11208	193.8	62031/320	12	15	3400	3000	4000	23	771	110
17	1109	1382	11	3.4	PHQ941_0060K513_0290 MB23 EZ404U	4660	4660	10123	175.1	14007/80	8.0	8.0	3400	3000	4000	12	771	106
17	1109	1382	11	3.4	PHQ941_0060K513_0290 MB23 EZ404U	4660	4660	10123	175.1	14007/80	12	8.0	3400	3000	4000	12	771	106
17	1109	1382	11	3.4	PHQ941_0060K513_0290 MB23 EZ404U	4660	4660	10123	175.1	14007/80	16	8.0	3400	3000	4000	12	771	106
17	1189	1285	12	3.2	PHQ941_0060K513_0290 MB23 EZ502U	4981	4980	10123	175.1	14007/80	8.0	8.0	3400	3000	4000	15	771	105
17	1189	1285	12	3.2	PHQ941_0060K513_0290 MB23 EZ502U	4981	4980	10123	175.1	14007/80	12	8.0	3400	3000	4000	15	771	105
17	1189	1285	12	3.2	PHQ941_0060K513_0290 MB23 EZ502U	4981	4980	10123	175.1	14007/80	16	8.0	3400	3000	4000	15	771	105
17	1189	1334	12	3.2	PHQ941_0060K513_0290 MB33 EZ701U	3214	3210	11250	175.1	14007/80	16	15	3400	3000	4000	40	771	115
17	1559	1784	15	2.4	PHQ941_0060K513_0290 MB23 EZ503U	5760	5760	10123	175.1	14007/80	8.0	15	3400	3000	4000	18	771	107
17	1559	1784	15	2.4	PHQ941_0060K513_0290 MB23 EZ503U	5760	5760	10123	175.1	14007/80	12	15	3400	3000	4000	18	771	107
17	1928	2314	19	2.0	PHQ941_0060K513_0290 MB33 EZ702U	5760	5760	11250	175.1	14007/80	16	15	3400	3000	4000	45	771	117
17	2169	2571	22	1.8	PHQ941_0060K513_0290 MB23 EZ505U	5760	5760	10123	175.1	14007/80	8.0	15	3400	3000	4000	23	771	110
17	2169	2571	22	1.8	PHQ941_0060K513_0290 MB23 EZ505U	5760	5760	10123	175.1	14007/80	12	15	3400	3000	4000	23	771	110
21	925	1153	10	4.1	PHQ941_0060K513_0240 MB23 EZ404U	3888	3890	8447	146.1	11687/80	8.0	8.0	2800	2500	4000	13	771	106
21	925	1153	10	4.1	PHQ941_0060K513_0240 MB23 EZ404U	3888	3890	8447	146.1	11687/80	12	8.0	2800	2500	4000	13	771	106
21	925	1153	10	4.1	PHQ941_0060K513_0240 MB23 EZ404U	3888	3890	8447	146.1	11687/80	16	8.0	2800	2500	4000	13	771	106
21	992	1073	11	3.8	PHQ941_0060K513_0240 MB23 EZ502U	4156	4160	8447	146.1	11687/80	8.0	8.0	2800	2500	4000	16	771	105
21	992	1073	11	3.8	PHQ941_0060K513_0240 MB23 EZ502U	4156	4160	8447	146.1	11687/80	12	8.0	2800	2500	4000	16	771	105
21	992	1073	11	3.8	PHQ941_0060K513_0240 MB23 EZ502U	4156	4160	8447	146.1	11687/80	16	8.0	2800	2500	4000	16	771	105
21	992	1113	11	3.8	PHQ941_0060K513_0240 MB33 EZ701U	2681	2680	11250	146.1	11687/80	16	15	2800	2500	4000	41	771	115
21	992	1113	11	3.8	PHQ941_0060K513_0240 MB33 EZ701U	2681	2680	11250	146.1	11687/80	24	15	2800	2500	4000	41	771	115
21	1301	1488	15	2.9	PHQ941_0060K513_0240 MB23 EZ503U	5028	5030	8447	146.1	11687/80	8.0	15	2800	2500	4000	19	771	107
21	1301	1488	15	2.9	PHQ941_0060K513_0240 MB23 EZ503U	5028	5030	8447	146.1	11687/80	12	15	2800	2500	4000	19	771	107
21	1609	1931	18	2.4	PHQ941_0060K513_0240 MB33 EZ702U	5497	5500	11250	146.1	11687/80	16	15	2800	2500	4000	46	771	117
21	1609	1931	18	2.4	PHQ941_0060K513_0240 MB33 EZ702U	5497	5500	11250	146.1	11687/80	24	15	2800	2500	4000	46	771	117
21	1810	2145	20	2.1	PHQ941_0060K513_0240 MB23 EZ505U	5028	5030	8447	146.1	11687/80	8.0	15	2800	2500	4000	24	771	110
21	1810	2145	20	2.1	PHQ941_0060K513_0240 MB23 EZ505U	5028	5030	8447	146.1	11687/80	12	15	2800	2500	4000	24	771	110

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PHQ941K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 5760 Nm)																		
23	836	1041	10	4.5	PHQ941_0060K513_0220 MB23 EZ404U	3512	3510	7629	132.0	2639/20	8.0	8.0	2800	2500	4000	14	771	106
23	836	1041	10	4.5	PHQ941_0060K513_0220 MB23 EZ404U	3512	3510	7629	132.0	2639/20	12	8.0	2800	2500	4000	14	771	106
23	836	1041	10	4.5	PHQ941_0060K513_0220 MB23 EZ404U	3512	3510	7629	132.0	2639/20	16	8.0	2800	2500	4000	14	771	106
23	896	969	11	4.2	PHQ941_0060K513_0220 MB23 EZ502U	3754	3750	7629	132.0	2639/20	8.0	8.0	2800	2500	4000	16	771	105
23	896	969	11	4.2	PHQ941_0060K513_0220 MB23 EZ502U	3754	3750	7629	132.0	2639/20	12	8.0	2800	2500	4000	16	771	105
23	896	969	11	4.2	PHQ941_0060K513_0220 MB23 EZ502U	3754	3750	7629	132.0	2639/20	16	8.0	2800	2500	4000	16	771	105
23	896	1005	11	4.2	PHQ941_0060K513_0220 MB33 EZ701U	2422	2420	11250	132.0	2639/20	16	15	2800	2500	4000	41	771	115
23	896	1005	11	4.2	PHQ941_0060K513_0220 MB33 EZ701U	2422	2420	11250	132.0	2639/20	24	15	2800	2500	4000	41	771	115
23	896	1005	11	4.2	PHQ941_0060K513_0220 MB33 EZ701U	2422	2420	11250	132.0	2639/20	32	15	2800	2500	4000	41	771	115
23	1175	1344	14	3.2	PHQ941_0060K513_0220 MB23 EZ503U	4541	4540	7629	132.0	2639/20	8.0	15	2800	2500	4000	19	771	107
23	1175	1344	14	3.2	PHQ941_0060K513_0220 MB23 EZ503U	4541	4540	7629	132.0	2639/20	12	15	2800	2500	4000	19	771	107
23	1453	1744	18	2.6	PHQ941_0060K513_0220 MB33 EZ702U	4965	4970	11250	132.0	2639/20	16	15	2800	2500	4000	46	771	117
23	1453	1744	18	2.6	PHQ941_0060K513_0220 MB33 EZ702U	4965	4970	11250	132.0	2639/20	24	15	2800	2500	4000	46	771	117
23	1453	1744	18	2.6	PHQ941_0060K513_0220 MB33 EZ702U	4965	4970	11250	132.0	2639/20	32	15	2800	2500	4000	46	771	117
23	1635	1938	20	2.3	PHQ941_0060K513_0220 MB23 EZ505U	4541	4540	7629	132.0	2639/20	8.0	15	2800	2500	4000	24	771	110
23	1635	1938	20	2.3	PHQ941_0060K513_0220 MB23 EZ505U	4541	4540	7629	132.0	2639/20	12	15	2800	2500	4000	24	771	110
26	789	853	10	4.8	PHQ941_0060K513_0195 MB23 EZ502U	3304	3300	6714	116.1	27869/240	8.0	8.0	2800	2500	4000	17	771	105
26	789	853	10	4.8	PHQ941_0060K513_0195 MB23 EZ502U	3304	3300	6714	116.1	27869/240	12	8.0	2800	2500	4000	17	771	105
26	789	853	10	4.8	PHQ941_0060K513_0195 MB23 EZ502U	3304	3300	6714	116.1	27869/240	16	8.0	2800	2500	4000	17	771	105
26	789	885	10	4.8	PHQ941_0060K513_0195 MB33 EZ701U	2131	2130	11250	116.1	27869/240	16	15	2800	2500	4000	42	771	115
26	789	885	10	4.8	PHQ941_0060K513_0195 MB33 EZ701U	2131	2130	11250	116.1	27869/240	24	15	2800	2500	4000	42	771	115
26	789	885	10	4.8	PHQ941_0060K513_0195 MB33 EZ701U	2131	2130	11250	116.1	27869/240	32	15	2800	2500	4000	42	771	115
26	1034	1183	14	3.7	PHQ941_0060K513_0195 MB23 EZ503U	3996	4000	6714	116.1	27869/240	8.0	15	2800	2500	4000	20	771	107
26	1034	1183	14	3.7	PHQ941_0060K513_0195 MB23 EZ503U	3996	4000	6714	116.1	27869/240	12	15	2800	2500	4000	20	771	107
26	1279	1535	17	3.0	PHQ941_0060K513_0195 MB33 EZ702U	4369	4370	11250	116.1	27869/240	16	15	2800	2500	4000	47	771	117
26	1279	1535	17	3.0	PHQ941_0060K513_0195 MB33 EZ702U	4369	4370	11250	116.1	27869/240	24	15	2800	2500	4000	47	771	117
26	1279	1535	17	3.0	PHQ941_0060K513_0195 MB33 EZ702U	4369	4370	11250	116.1	27869/240	32	15	2800	2500	4000	47	771	117
26	1439	1705	19	2.6	PHQ941_0060K513_0195 MB23 EZ505U	3996	4000	6714	116.1	27869/240	8.0	15	2800	2500	4000	25	771	110
26	1439	1705	19	2.6	PHQ941_0060K513_0195 MB23 EZ505U	3996	4000	6714	116.1	27869/240	12	15	2800	2500	4000	25	771	110
26	1758	2217	23	2.2	PHQ941_0060K513_0195 MB33 EZ703U	5760	5760	11250	116.1	27869/240	16	32	2800	2500	4000	59	771	120
26	2270	3218	30	1.7	PHQ941_0060K513_0195 MB33 EZ705U	5760	5760	11250	116.1	27869/240	16	32	2800	2500	4000	71	771	126
29	934	1068	14	3.9	PHQ941_0060K513_0175 MB23 EZ503U	3610	3610	6064	104.9	6293/60	8.0	15	2800	2500	4000	21	771	107
29	934	1068	14	3.9	PHQ941_0060K513_0175 MB23 EZ503U	3610	3610	6064	104.9	6293/60	12	15	2800	2500	4000	21	771	107
29	1155	1386	16	3.3	PHQ941_0060K513_0175 MB33 EZ702U	3947	3950	11250	104.9	6293/60	16	15	2800	2500	4000	47	771	117
29	1155	1386	16	3.3	PHQ941_0060K513_0175 MB33 EZ702U	3947	3950	11250	104.9	6293/60	24	15	2800	2500	4000	47	771	117
29	1155	1386	16	3.3	PHQ941_0060K513_0175 MB33 EZ702U	3947	3950	11250	104.9	6293/60	32	15	2800	2500	4000	47	771	117
29	1155	1386	16	3.3	PHQ941_0060K513_0175 MB33 EZ702U	3947	3950	11250	104.9	6293/60	45	15	2800	2500	4000	47	771	117
29	1300	1540	19	2.8	PHQ941_0060K513_0175 MB23 EZ505U	3610	3610	6064	104.9	6293/60	8.0	15	2800	2500	4000	25	771	110
29	1300	1540	19	2.8	PHQ941_0060K513_0175 MB23 EZ505U	3610	3610	6064	104.9	6293/60	12	15	2800	2500	4000	25	771	110
29	1588	2002	23	2.4	PHQ941_0060K513_0175 MB33 EZ703U	5760	5760	11250	104.9	6293/60	16	32	2800	2500	4000	59	771	120
29	2050	2907	29	1.9	PHQ941_0060K513_0175 MB33 EZ705U	5760	5760	11250	104.9	6293/60	16	32	2800	2500	4000	71	771	126
31	860	984	15	3.9	PHQ941_0060K513_0160 MB23 EZ503U	3323	3320	5583	96.56	26071/270	8.0	15	2300	2200	3600	22	771	107
31	860	984	15	3.9	PHQ941_0060K513_0160 MB23 EZ503U	3323	3320	5583	96.56	26071/270	12	15	2300	2200	3600	22	771	107
31	1063	1276	16	3.6	PHQ941_0060K513_0160 MB33 EZ702U	3633	3630	11250	96.56	26071/270	16	15	2300	2200	3600	48	771	117
31	1063	1276	16	3.6	PHQ941_0060K513_0160 MB33 EZ702U	3633	3630	11250	96.56	26071/270	24	15	2300	2200	3600	48	771	117
31	1063	1276	16	3.6	PHQ941_0060K513_0160 MB33 EZ702U	3633	3630	11250	96.56	26071/270	32	15	2300	2200	3600	48	771	117
31	1063	1276	16	3.6	PHQ941_0060K513_0160 MB33 EZ702U	3633	3630	11250	96.56	26071/270	45	15	2300	2200	3600	48	771	117
31	1196	1418	21	2.8	PHQ941_0060K513_0160 MB23 EZ505U	3323	3320	5583	96.56	26071/270	8.0	15	2300	2200	3600	26	771	110
31	1196	1418	21	2.8	PHQ941_0060K513_0160 MB23 EZ505U	3323	3320	5583	96.56	26071/270	12	15	2300	2200	3600	26	771	110
31	1462	1843	22	2.6	PHQ941_0060K513_0160 MB33 EZ703U	5760	5760	11250	96.56	26071/270	16	32	2300	2200	3600	60	771	120
31	1462	1843	22	2.6	PHQ941_0060K513_0160 MB33 EZ703U	5760	5760	11250	96.56	26071/270	24	32	2300	2200	3600	60	771	120
31	1888	2676	28	2.0	PHQ941_0060K513_0160 MB33 EZ705U	5760	5760	11250	96.56	26071/270	16	32	2300	2200	3600	72	771	126
31	1888	2676	28	2.0	PHQ941_0060K513_0160 MB33 EZ705U	5760	5760	11250	96.56	26071/270	24	32	2300	2200	3600	72	771	126
34	776	888	16	3.9	PHQ941_0060K513_0145 MB23 EZ503U	3002	3000	5043	87.22	11774/135	8.0	15	2300	2200	3600	22	771	107
34	776	888	16	3.9	PHQ941_0060K513_0145 MB23 EZ503U	3002	3000	5043	87.22	11774/135	12	15	2300	2200	3600	22	771	107
34	961	1153	16	4.0	PHQ941_0060K513_0145 MB33 EZ702U	3282	3280	11250	87.22	11774/135	16	15	2300	2200	3600	49	771	117
34	961	1153	16	4.0	PHQ941_0060K513_0145 MB33 EZ702U	3282	3280	11250	87.22	11774/135	24	15	2300	2200	3600	49	771	117
34	961	1153	16	4.0	PHQ941_0060K513_0145 MB33 EZ702U	3282	3280	11250	87.22	11774/135	32	15	2300	2200	3600	49	771	117
34	961	1153	16	4.0	PHQ941_0060K513_0145 MB33 EZ702U	3282	3280	11250	87.22	11774/135	45	15	2300	2200	3600	49	771	117
34	1081	1281	22	2.8	PHQ941_0060K513_0145 MB23 EZ505U	3002	3000	5043	87.22	11774/135	8.0	15	2300	2200	3600	27	771	110
34	1081	1281	22	2.8	PHQ941_0060K513_0145 MB23 EZ505U	3002	3000	5043	87.22	11774/135	12	15	2300	2200	3600	27	771	110
34	1321	1665	21	2.9	PHQ941_0060K513_0145 MB33 EZ703U	5203	5200	11250	87.22	11774/135	16	32	2300	2200	3600	60	771	120
34	1321	1665	21	2.9	PHQ941_0060K513_0145 MB33 EZ703U	5203	5200	11250	87.22	11774/135	24	32	2300	2200	3600	60	771	120
34	1321	1665	21	2.9	PHQ941_0060K513_0145 MB33 EZ703U	5203	5200	11250	87.22	11774/135	32	32	2300	2200	3600	60	771	120

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PHQ941K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 5760 Nm)																		
34	1705	2417	28	2.2	PHQ941_0060K513_0145 MB33 EZ705U	5760	5760	11250	87.22	11774/135	16	32	2300	2200	3600	73	771	126
34	1705	2417	28	2.2	PHQ941_0060K513_0145 MB33 EZ705U	5760	5760	11250	87.22	11774/135	24	32	2300	2200	3600	73	771	126
34	1705	2417	28	2.2	PHQ941_0060K513_0145 MB33 EZ705U	5760	5760	11250	87.22	11774/135	32	32	2300	2200	3600	73	771	126
39	846	1016	15	4.5	PHQ941_0060K513_0130 MB33 EZ702U	2892	2890	11250	76.85	1537/20	16	15	2300	2200	3600	50	771	117
39	846	1016	15	4.5	PHQ941_0060K513_0130 MB33 EZ702U	2892	2890	11250	76.85	1537/20	24	15	2300	2200	3600	50	771	117
39	846	1016	15	4.5	PHQ941_0060K513_0130 MB33 EZ702U	2892	2890	11250	76.85	1537/20	32	15	2300	2200	3600	50	771	117
39	846	1016	15	4.5	PHQ941_0060K513_0130 MB33 EZ702U	2892	2890	11250	76.85	1537/20	45	15	2300	2200	3600	50	771	117
39	1164	1467	21	3.3	PHQ941_0060K513_0130 MB33 EZ703U	4584	4580	11250	76.85	1537/20	16	32	2300	2200	3600	62	771	120
39	1164	1467	21	3.3	PHQ941_0060K513_0130 MB33 EZ703U	4584	4580	11250	76.85	1537/20	24	32	2300	2200	3600	62	771	120
39	1164	1467	21	3.3	PHQ941_0060K513_0130 MB33 EZ703U	4584	4580	11250	76.85	1537/20	32	32	2300	2200	3600	62	771	120
39	1164	1467	21	3.3	PHQ941_0060K513_0130 MB33 EZ703U	4584	4580	11250	76.85	1537/20	45	32	2300	2200	3600	62	771	120
39	1502	2130	27	2.5	PHQ941_0060K513_0130 MB33 EZ705U	5760	5760	11250	76.85	1537/20	16	32	2300	2200	3600	75	771	126
39	1502	2130	27	2.5	PHQ941_0060K513_0130 MB33 EZ705U	5760	5760	11250	76.85	1537/20	24	32	2300	2200	3600	75	771	126
39	1502	2130	27	2.5	PHQ941_0060K513_0130 MB33 EZ705U	5760	5760	11250	76.85	1537/20	32	32	2300	2200	3600	75	771	126
39	1502	2130	27	2.5	PHQ941_0060K513_0130 MB33 EZ705U	5760	5760	11250	76.85	1537/20	45	32	2300	2200	3600	75	771	126
43	764	917	15	4.8	PHQ941_0060K513_0115 MB33 EZ702U	2612	2610	11250	69.41	10759/155	16	15	2300	2200	3600	51	771	117
43	764	917	15	4.8	PHQ941_0060K513_0115 MB33 EZ702U	2612	2610	11250	69.41	10759/155	24	15	2300	2200	3600	51	771	117
43	764	917	15	4.8	PHQ941_0060K513_0115 MB33 EZ702U	2612	2610	11250	69.41	10759/155	32	15	2300	2200	3600	51	771	117
43	764	917	15	4.8	PHQ941_0060K513_0115 MB33 EZ702U	2612	2610	11250	69.41	10759/155	45	15	2300	2200	3600	51	771	117
43	1051	1325	21	3.5	PHQ941_0060K513_0115 MB33 EZ703U	4141	4140	11250	69.41	10759/155	16	32	2300	2200	3600	63	771	120
43	1051	1325	21	3.5	PHQ941_0060K513_0115 MB33 EZ703U	4141	4140	11250	69.41	10759/155	24	32	2300	2200	3600	63	771	120
43	1051	1325	21	3.5	PHQ941_0060K513_0115 MB33 EZ703U	4141	4140	11250	69.41	10759/155	32	32	2300	2200	3600	63	771	120
43	1051	1325	21	3.5	PHQ941_0060K513_0115 MB33 EZ703U	4141	4140	11250	69.41	10759/155	45	32	2300	2200	3600	63	771	120
43	1357	1924	26	2.7	PHQ941_0060K513_0115 MB33 EZ705U	5760	5760	11250	69.41	10759/155	16	32	2300	2200	3600	75	771	126
43	1357	1924	26	2.7	PHQ941_0060K513_0115 MB33 EZ705U	5760	5760	11250	69.41	10759/155	24	32	2300	2200	3600	75	771	126
43	1357	1924	26	2.7	PHQ941_0060K513_0115 MB33 EZ705U	5760	5760	11250	69.41	10759/155	32	32	2300	2200	3600	75	771	126
43	1357	1924	26	2.7	PHQ941_0060K513_0115 MB33 EZ705U	5760	5760	11250	69.41	10759/155	45	32	2300	2200	3600	75	771	126
49	922	1163	21	3.8	PHQ941_0060K513_0100 MB33 EZ703U	3633	3630	10564	60.90	609/10	16	32	1900	1800	3200	65	771	120
49	922	1163	21	3.8	PHQ941_0060K513_0100 MB33 EZ703U	3633	3630	10564	60.90	609/10	24	32	1900	1800	3200	65	771	120
49	922	1163	21	3.8	PHQ941_0060K513_0100 MB33 EZ703U	3633	3630	10564	60.90	609/10	32	32	1900	1800	3200	65	771	120
49	922	1163	21	3.8	PHQ941_0060K513_0100 MB33 EZ703U	3633	3630	10564	60.90	609/10	45	32	1900	1800	3200	65	771	120
49	1190	1688	27	3.0	PHQ941_0060K513_0100 MB33 EZ705U	5589	5590	10564	60.90	609/10	16	32	1900	1800	3200	78	771	126
49	1190	1688	27	3.0	PHQ941_0060K513_0100 MB33 EZ705U	5589	5590	10564	60.90	609/10	24	32	1900	1800	3200	78	771	126
49	1190	1688	27	3.0	PHQ941_0060K513_0100 MB33 EZ705U	5589	5590	10564	60.90	609/10	32	32	1900	1800	3200	78	771	126
49	1190	1688	27	3.0	PHQ941_0060K513_0100 MB33 EZ705U	5589	5590	10564	60.90	609/10	45	32	1900	1800	3200	78	771	126
49	1487	2694	33	2.4	PHQ941_0060K513_0100 MB43 EZ803U	5760	5760	11250	60.90	609/10	50	65	1900	1800	3000	186	771	157
55	833	1050	21	4.1	PHQ941_0060K513_0092 MB33 EZ703U	3281	3280	9542	55.01	8526/155	16	32	1900	1800	3200	67	771	120
55	833	1050	21	4.1	PHQ941_0060K513_0092 MB33 EZ703U	3281	3280	9542	55.01	8526/155	24	32	1900	1800	3200	67	771	120
55	833	1050	21	4.1	PHQ941_0060K513_0092 MB33 EZ703U	3281	3280	9542	55.01	8526/155	32	32	1900	1800	3200	67	771	120
55	833	1050	21	4.1	PHQ941_0060K513_0092 MB33 EZ703U	3281	3280	9542	55.01	8526/155	45	32	1900	1800	3200	67	771	120
55	1075	1525	27	3.2	PHQ941_0060K513_0092 MB33 EZ705U	5048	5050	9542	55.01	8526/155	16	32	1900	1800	3200	79	771	126
55	1075	1525	27	3.2	PHQ941_0060K513_0092 MB33 EZ705U	5048	5050	9542	55.01	8526/155	24	32	1900	1800	3200	79	771	126
55	1075	1525	27	3.2	PHQ941_0060K513_0092 MB33 EZ705U	5048	5050	9542	55.01	8526/155	32	32	1900	1800	3200	79	771	126
55	1075	1525	27	3.2	PHQ941_0060K513_0092 MB33 EZ705U	5048	5050	9542	55.01	8526/155	45	32	1900	1800	3200	79	771	126
55	1343	2433	33	2.5	PHQ941_0060K513_0092 MB43 EZ803U	5760	5760	11250	55.01	8526/155	50	65	1900	1800	3000	187	771	157
61	739	932	21	4.4	PHQ941_0060K513_0081 MB33 EZ703U	2911	2910	8465	48.80	17081/350	16	32	1900	1800	3200	69	771	120
61	739	932	21	4.4	PHQ941_0060K513_0081 MB33 EZ703U	2911	2910	8465	48.80	17081/350	24	32	1900	1800	3200	69	771	120
61	739	932	21	4.4	PHQ941_0060K513_0081 MB33 EZ703U	2911	2910	8465	48.80	17081/350	32	32	1900	1800	3200	69	771	120
61	739	932	21	4.4	PHQ941_0060K513_0081 MB33 EZ703U	2911	2910	8465	48.80	17081/350	45	32	1900	1800	3200	69	771	120
61	954	1353	27	3.4	PHQ941_0060K513_0081 MB33 EZ705U	4479	4480	8465	48.80	17081/350	16	32	1900	1800	3200	82	771	126
61	954	1353	27	3.4	PHQ941_0060K513_0081 MB33 EZ705U	4479	4480	8465	48.80	17081/350	24	32	1900	1800	3200	82	771	126
61	954	1353	27	3.4	PHQ941_0060K513_0081 MB33 EZ705U	4479	4480	8465	48.80	17081/350	32	32	1900	1800	3200	82	771	126
61	954	1353	27	3.4	PHQ941_0060K513_0081 MB33 EZ705U	4479	4480	8465	48.80	17081/350	45	32	1900	1800	3200	82	771	126
61	1191	2159	33	2.8	PHQ941_0060K513_0081 MB43 EZ803U	5760	5760	11250	48.80	17081/350	50	65	1900	1800	3000	190	771	157
61	1191	2159	33	2.8	PHQ941_0060K513_0081 MB43 EZ803U	5760	5760	11250	48.80	17081/350	72	65	1900	1800	3000	190	771	157
68	668	841	21	4.8	PHQ941_0060K513_0073 MB33 EZ703U	2630	2630	7646	44.08	1102/25	16	32	1900	1800	3200	71	771	120
68	668	841	21	4.8	PHQ941_0060K513_0073 MB33 EZ703U	2630	2630	7646	44.08	1102/25	24	32	1900	1800	3200	71	771	120
68	668	841	21	4.8	PHQ941_0060K513_0073 MB33 EZ703U	2630	2630	7646	44.08	1102/25	32	32	1900	1800	3200	71	771	120
68	668	841	21	4.8	PHQ941_0060K513_0073 MB33 EZ703U	2630	2630	7646	44.08	1102/25	45	32	1900	1800	3200	71	771	120
68	862	1222	27	3.7	PHQ941_0060K513_0073 MB33 EZ705U	4046	4050	7646	44.08	1102/25	16	32	1900	1800	3200	84	771	126
68	862	1222	27	3.7	PHQ941_0060K513_0073 MB33 EZ705U	4046	4050	7646	44.08	1102/25	24	32	1900	1800	3200	84	771	126
68	862	1222	27	3.7	PHQ941_0060K513_0073 MB33 EZ705U	4046	4050	7646	44.08	1102/25	32	32	1900	1800	3200	84	771	126
68	862	1222	27	3.7	PHQ941_0060K513_0073 MB33 EZ705U	4046	4050	7646	44.08	1102/25	45	32	1900	1800	3200	84	771	126
68	1076	1950	34	3.0	PHQ941_0060K513_0073 MB43 EZ803U	5760	5760	11250	44.08	1102/25	50	65	1900	1800	3000	191	771	157

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PHQ941K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 5760 Nm)																		
68	1076	1950	34	3.0	PHQ941_0060K513_0073 MB43 EZ803U	5760	5760	11250	44.08	1102/25	72	65	1900	1800	3000	191	771	157
68	1076	1950	34	3.0	PHQ941_0060K513_0073 MB43 EZ803U	5760	5760	11250	44.08	1102/25	100	65	1900	1800	3000	191	771	157
PHQ1041K (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 10000 Nm)																		
26	3139	4747	38	2.1	PHQ1041_0060K713_0130 MB43 EZ805U	10000	–	20000	78.26	10017/128	50	115	2000	1900	3000	293	1561	232
28	2835	4288	37	2.3	PHQ1041_0060K713_0120 MB43 EZ805U	10000	–	20000	70.69	70119/992	50	115	2000	1900	3000	294	1561	232
33	2448	3702	36	2.7	PHQ1041_0060K713_0100 MB43 EZ805U	10000	–	18820	61.03	1953/32	50	115	1700	1600	2700	305	1561	232
36	2211	3344	35	2.9	PHQ1041_0060K713_0092 MB43 EZ805U	10000	–	17000	55.13	441/8	50	115	1700	1600	2700	308	1561	232
40	2015	3048	34	3.2	PHQ1041_0060K713_0084 MB43 EZ805U	9452	–	15492	50.24	263655/5248	50	115	1700	1600	2700	319	1561	232
44	1820	2753	33	3.6	PHQ1041_0060K713_0076 MB43 EZ805U	8537	–	13993	45.38	59535/1312	50	115	1700	1600	2700	323	1561	232
PHQ1041K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 10000 Nm)																		
8.5	2387	2677	10	2.7	PHQ1041_0060K713_0590 MB33 EZ701U	6450	–	20000	351.4	22491/64	16	15	2900	2600	4000	40	1561	175
8.5	3870	4644	17	1.7	PHQ1041_0060K713_0590 MB33 EZ702U	10000	–	20000	351.4	22491/64	16	15	2900	2600	4000	45	1561	177
10	2033	2280	9.7	3.2	PHQ1041_0060K713_0500 MB33 EZ701U	5493	–	20000	299.3	498015/1664	16	15	2900	2600	4000	41	1561	175
10	3296	3955	16	2.0	PHQ1041_0060K713_0500 MB33 EZ702U	10000	–	20000	299.3	498015/1664	16	15	2900	2600	4000	47	1561	177
11	1836	2059	9.4	3.5	PHQ1041_0060K713_0450 MB33 EZ701U	4962	–	20000	270.3	112455/416	16	15	2900	2600	4000	42	1561	175
11	1836	2059	9.4	3.5	PHQ1041_0060K713_0450 MB33 EZ701U	4962	–	20000	270.3	112455/416	24	15	2900	2600	4000	42	1561	175
11	2977	3573	15	2.2	PHQ1041_0060K713_0450 MB33 EZ702U	10000	–	20000	270.3	112455/416	16	15	2900	2600	4000	47	1561	177
11	2977	3573	15	2.2	PHQ1041_0060K713_0450 MB33 EZ702U	10000	–	20000	270.3	112455/416	24	15	2900	2600	4000	47	1561	177
13	1599	1793	9.0	4.1	PHQ1041_0060K713_0390 MB33 EZ701U	4321	–	20000	235.4	7533/32	16	15	2900	2600	4000	43	1561	175
13	1599	1793	9.0	4.1	PHQ1041_0060K713_0390 MB33 EZ701U	4321	–	20000	235.4	7533/32	24	15	2900	2600	4000	43	1561	175
13	1599	1793	9.0	4.1	PHQ1041_0060K713_0390 MB33 EZ701U	4321	–	20000	235.4	7533/32	32	15	2900	2600	4000	43	1561	175
13	2593	3111	15	2.5	PHQ1041_0060K713_0390 MB33 EZ702U	8858	–	20000	235.4	7533/32	16	15	2900	2600	4000	49	1561	177
13	2593	3111	15	2.5	PHQ1041_0060K713_0390 MB33 EZ702U	8858	–	20000	235.4	7533/32	24	15	2900	2600	4000	49	1561	177
13	2593	3111	15	2.5	PHQ1041_0060K713_0390 MB33 EZ702U	8858	–	20000	235.4	7533/32	32	15	2900	2600	4000	49	1561	177
14	1444	1620	8.8	4.5	PHQ1041_0060K713_0350 MB33 EZ701U	3903	–	20000	212.6	1701/8	16	15	2900	2600	4000	44	1561	175
14	1444	1620	8.8	4.5	PHQ1041_0060K713_0350 MB33 EZ701U	3903	–	20000	212.6	1701/8	24	15	2900	2600	4000	44	1561	175
14	1444	1620	8.8	4.5	PHQ1041_0060K713_0350 MB33 EZ701U	3903	–	20000	212.6	1701/8	32	15	2900	2600	4000	44	1561	175
14	2342	2810	14	2.8	PHQ1041_0060K713_0350 MB33 EZ702U	8001	–	20000	212.6	1701/8	16	15	2900	2600	4000	49	1561	177
14	2342	2810	14	2.8	PHQ1041_0060K713_0350 MB33 EZ702U	8001	–	20000	212.6	1701/8	24	15	2900	2600	4000	49	1561	177
14	2342	2810	14	2.8	PHQ1041_0060K713_0350 MB33 EZ702U	8001	–	20000	212.6	1701/8	32	15	2900	2600	4000	49	1561	177
15	1321	1482	8.5	4.9	PHQ1041_0060K713_0320 MB33 EZ701U	3571	–	20000	194.5	99603/512	16	15	2900	2600	4000	45	1561	175
15	1321	1482	8.5	4.9	PHQ1041_0060K713_0320 MB33 EZ701U	3571	–	20000	194.5	99603/512	24	15	2900	2600	4000	45	1561	175
15	1321	1482	8.5	4.9	PHQ1041_0060K713_0320 MB33 EZ701U	3571	–	20000	194.5	99603/512	32	15	2900	2600	4000	45	1561	175
15	2142	2571	14	3.0	PHQ1041_0060K713_0320 MB33 EZ702U	7320	–	20000	194.5	99603/512	16	15	2900	2600	4000	51	1561	177
15	2142	2571	14	3.0	PHQ1041_0060K713_0320 MB33 EZ702U	7320	–	20000	194.5	99603/512	24	15	2900	2600	4000	51	1561	177
15	2142	2571	14	3.0	PHQ1041_0060K713_0320 MB33 EZ702U	7320	–	20000	194.5	99603/512	32	15	2900	2600	4000	51	1561	177
15	2946	3714	19	2.2	PHQ1041_0060K713_0320 MB33 EZ703U	10000	–	20000	194.5	99603/512	16	32	2900	2600	4000	62	1561	180
15	3803	5392	25	1.7	PHQ1041_0060K713_0320 MB33 EZ705U	10000	–	20000	194.5	99603/512	16	32	2900	2600	4000	75	1561	186
17	1935	2322	13	3.4	PHQ1041_0060K713_0290 MB33 EZ702U	6612	–	20000	175.7	22491/128	16	15	2900	2600	4000	51	1561	177
17	1935	2322	13	3.4	PHQ1041_0060K713_0290 MB33 EZ702U	6612	–	20000	175.7	22491/128	24	15	2900	2600	4000	51	1561	177
17	1935	2322	13	3.4	PHQ1041_0060K713_0290 MB33 EZ702U	6612	–	20000	175.7	22491/128	32	15	2900	2600	4000	51	1561	177
17	1935	2322	13	3.4	PHQ1041_0060K713_0290 MB33 EZ702U	6612	–	20000	175.7	22491/128	45	15	2900	2600	4000	51	1561	177
17	2661	3354	18	2.4	PHQ1041_0060K713_0290 MB33 EZ703U	10000	–	20000	175.7	22491/128	16	32	2900	2600	4000	63	1561	180
17	2661	3354	18	2.4	PHQ1041_0060K713_0290 MB33 EZ703U	10000	–	20000	175.7	22491/128	24	32	2900	2600	4000	63	1561	180
17	3435	4870	24	1.9	PHQ1041_0060K713_0290 MB33 EZ705U	10000	–	20000	175.7	22491/128	16	32	2900	2600	4000	75	1561	186
17	3435	4870	24	1.9	PHQ1041_0060K713_0290 MB33 EZ705U	10000	–	20000	175.7	22491/128	24	32	2900	2600	4000	75	1561	186
20	1664	1996	13	3.9	PHQ1041_0060K713_0250 MB33 EZ702U	5684	–	20000	151.1	193347/1280	16	15	2400	2200	3600	55	1561	177
20	1664	1996	13	3.9	PHQ1041_0060K713_0250 MB33 EZ702U	5684	–	20000	151.1	193347/1280	24	15	2400	2200	3600	55	1561	177
20	1664	1996	13	3.9	PHQ1041_0060K713_0250 MB33 EZ702U	5684	–	20000	151.1	193347/1280	32	15	2400	2200	3600	55	1561	177
20	1664	1996	13	3.9	PHQ1041_0060K713_0250 MB33 EZ702U	5684	–	20000	151.1	193347/1280	45	15	2400	2200	3600	55	1561	177
20	2287	2883	18	2.8	PHQ1041_0060K713_0250 MB33 EZ703U	9011	–	20000	151.1	193347/1280	16	32	2400	2200	3600	66	1561	180
20	2287	2883	18	2.8	PHQ1041_0060K713_0250 MB33 EZ703U	9011	–	20000	151.1	193347/1280	24	32	2400	2200	3600	66	1561	180
20	2287	2883	18	2.8	PHQ1041_0060K713_0250 MB33 EZ703U	9011	–	20000	151.1	193347/1280	32	32	2400	2200	3600	66	1561	180
20	2953	4187	23	2.2	PHQ1041_0060K713_0250 MB33 EZ705U	10000	–	20000	151.1	193347/1280	16	32	2400	2200	3600	79	1561	186
20	2953	4187	23	2.2	PHQ1041_0060K713_0250 MB33 EZ705U	10000	–	20000	151.1	193347/1280	24	32	2400	2200	3600	79	1561	186
20	2953	4187	23	2.2	PHQ1041_0060K713_0250 MB33 EZ705U	10000	–	20000	151.1	193347/1280	32	32	2400	2200	3600	79	1561	186
22	1503	1803	12	4.3	PHQ1041_0060K713_0230 MB33 EZ702U	5134	–	20000	136.4	43659/320	16	15	2400	2200	3600	55	1561	177
22	1503	1803	12	4.3	PHQ1041_0060K713_0230 MB33 EZ702U	5134	–	20000	136.4	43659/320	24	15	2400	2200	3600	55	1561	177
22	1503	1803	12	4.3	PHQ1041_0060K713_0230 MB33 EZ702U	5134	–	20000	136.4	43659/320	32	15	2400	2200	3600	55	1561	177
22	1503	1803	12	4.3	PHQ1041_0060K713_0230 MB33 EZ702U	5134	–	20000	136.4	43659/320	45	15	2400	2200	3600	55	1561	177
22	2066	2604	17	3.1	PHQ1041_0060K713_0230 MB33 EZ703U	8139	–	20000	136.4	43659/320	16	32	2400	2200	3600	67	1561	180
22	2066	2604	17	3.1	PHQ1041_0060K713_0230 MB33 EZ703U	8139	–	20000	136.4	43659/320	24	32	2400	2200	3600	67	1561	180
22	2066	2604	17	3.1	PHQ1041_0060K713_0230 MB33 EZ703U	8139	–	20000	136.4	43659/320	32	32	2400	2200	3600	67	1561	180
22	2066	2604	17	3.1	PHQ1041_0060K713_0230 MB33 EZ703U	8139	–	20000	136.4	43659/320	45	32	2400	2200	3600	67	1561	180

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PHQ1041K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 10000 Nm)																		
22	2667	3781	22	2.4	PHQ1041_0060K713_0230 MB33 EZ705U	10000	–	20000	136.4	43659/320	16	32	2400	2200	3600	79	1561	186
22	2667	3781	22	2.4	PHQ1041_0060K713_0230 MB33 EZ705U	10000	–	20000	136.4	43659/320	24	32	2400	2200	3600	79	1561	186
22	2667	3781	22	2.4	PHQ1041_0060K713_0230 MB33 EZ705U	10000	–	20000	136.4	43659/320	32	32	2400	2200	3600	79	1561	186
22	2667	3781	22	2.4	PHQ1041_0060K713_0230 MB33 EZ705U	10000	–	20000	136.4	43659/320	45	32	2400	2200	3600	79	1561	186
25	1337	1604	12	4.9	PHQ1041_0060K713_0200 MB33 EZ702U	4568	–	20000	121.4	357399/2944	16	15	2400	2200	3600	59	1561	177
25	1337	1604	12	4.9	PHQ1041_0060K713_0200 MB33 EZ702U	4568	–	20000	121.4	357399/2944	24	15	2400	2200	3600	59	1561	177
25	1337	1604	12	4.9	PHQ1041_0060K713_0200 MB33 EZ702U	4568	–	20000	121.4	357399/2944	32	15	2400	2200	3600	59	1561	177
25	1337	1604	12	4.9	PHQ1041_0060K713_0200 MB33 EZ702U	4568	–	20000	121.4	357399/2944	45	15	2400	2200	3600	59	1561	177
25	1838	2317	17	3.5	PHQ1041_0060K713_0200 MB33 EZ703U	7242	–	20000	121.4	357399/2944	16	32	2400	2200	3600	71	1561	180
25	1838	2317	17	3.5	PHQ1041_0060K713_0200 MB33 EZ703U	7242	–	20000	121.4	357399/2944	24	32	2400	2200	3600	71	1561	180
25	1838	2317	17	3.5	PHQ1041_0060K713_0200 MB33 EZ703U	7242	–	20000	121.4	357399/2944	32	32	2400	2200	3600	71	1561	180
25	1838	2317	17	3.5	PHQ1041_0060K713_0200 MB33 EZ703U	7242	–	20000	121.4	357399/2944	45	32	2400	2200	3600	71	1561	180
25	2373	3365	21	2.7	PHQ1041_0060K713_0200 MB33 EZ705U	10000	–	20000	121.4	357399/2944	16	32	2400	2200	3600	83	1561	186
25	2373	3365	21	2.7	PHQ1041_0060K713_0200 MB33 EZ705U	10000	–	20000	121.4	357399/2944	24	32	2400	2200	3600	83	1561	186
25	2373	3365	21	2.7	PHQ1041_0060K713_0200 MB33 EZ705U	10000	–	20000	121.4	357399/2944	32	32	2400	2200	3600	83	1561	186
25	2373	3365	21	2.7	PHQ1041_0060K713_0200 MB33 EZ705U	10000	–	20000	121.4	357399/2944	45	32	2400	2200	3600	83	1561	186
27	1660	2093	16	3.9	PHQ1041_0060K713_0185 MB33 EZ703U	6541	–	19020	109.7	80703/736	16	32	2400	2200	3600	72	1561	180
27	1660	2093	16	3.9	PHQ1041_0060K713_0185 MB33 EZ703U	6541	–	19020	109.7	80703/736	24	32	2400	2200	3600	72	1561	180
27	1660	2093	16	3.9	PHQ1041_0060K713_0185 MB33 EZ703U	6541	–	19020	109.7	80703/736	32	32	2400	2200	3600	72	1561	180
27	1660	2093	16	3.9	PHQ1041_0060K713_0185 MB33 EZ703U	6541	–	19020	109.7	80703/736	45	32	2400	2200	3600	72	1561	180
27	2143	3039	21	3.0	PHQ1041_0060K713_0185 MB33 EZ705U	10000	–	19020	109.7	80703/736	16	32	2400	2200	3600	84	1561	186
27	2143	3039	21	3.0	PHQ1041_0060K713_0185 MB33 EZ705U	10000	–	19020	109.7	80703/736	24	32	2400	2200	3600	84	1561	186
27	2143	3039	21	3.0	PHQ1041_0060K713_0185 MB33 EZ705U	10000	–	19020	109.7	80703/736	32	32	2400	2200	3600	84	1561	186
27	2143	3039	21	3.0	PHQ1041_0060K713_0185 MB33 EZ705U	10000	–	19020	109.7	80703/736	45	32	2400	2200	3600	84	1561	186
27	2677	4850	26	2.4	PHQ1041_0060K713_0185 MB43 EZ803U	10000	–	20000	109.7	80703/736	50	65	2400	2200	3000	192	1561	216
31	1489	1877	16	4.4	PHQ1041_0060K713_0165 MB33 EZ703U	5866	–	17056	98.33	6293/64	16	32	2000	1900	3200	76	1561	180
31	1489	1877	16	4.4	PHQ1041_0060K713_0165 MB33 EZ703U	5866	–	17056	98.33	6293/64	24	32	2000	1900	3200	76	1561	180
31	1489	1877	16	4.4	PHQ1041_0060K713_0165 MB33 EZ703U	5866	–	17056	98.33	6293/64	32	32	2000	1900	3200	76	1561	180
31	1489	1877	16	4.4	PHQ1041_0060K713_0165 MB33 EZ703U	5866	–	17056	98.33	6293/64	45	32	2000	1900	3200	76	1561	180
31	1922	2725	20	3.4	PHQ1041_0060K713_0165 MB33 EZ705U	9024	–	17056	98.33	6293/64	16	32	2000	1900	3200	88	1561	186
31	1922	2725	20	3.4	PHQ1041_0060K713_0165 MB33 EZ705U	9024	–	17056	98.33	6293/64	24	32	2000	1900	3200	88	1561	186
31	1922	2725	20	3.4	PHQ1041_0060K713_0165 MB33 EZ705U	9024	–	17056	98.33	6293/64	32	32	2000	1900	3200	88	1561	186
31	1922	2725	20	3.4	PHQ1041_0060K713_0165 MB33 EZ705U	9024	–	17056	98.33	6293/64	45	32	2000	1900	3200	88	1561	186
31	2400	4350	25	2.7	PHQ1041_0060K713_0165 MB43 EZ803U	10000	–	20000	98.33	6293/64	50	65	2000	1900	3000	196	1561	216
34	1345	1695	15	4.8	PHQ1041_0060K713_0150 MB33 EZ703U	5298	–	15405	88.81	1421/16	16	32	2000	1900	3200	77	1561	180
34	1345	1695	15	4.8	PHQ1041_0060K713_0150 MB33 EZ703U	5298	–	15405	88.81	1421/16	24	32	2000	1900	3200	77	1561	180
34	1345	1695	15	4.8	PHQ1041_0060K713_0150 MB33 EZ703U	5298	–	15405	88.81	1421/16	32	32	2000	1900	3200	77	1561	180
34	1345	1695	15	4.8	PHQ1041_0060K713_0150 MB33 EZ703U	5298	–	15405	88.81	1421/16	45	32	2000	1900	3200	77	1561	180
34	1736	2462	19	3.7	PHQ1041_0060K713_0150 MB33 EZ705U	8151	–	15405	88.81	1421/16	16	32	2000	1900	3200	90	1561	186
34	1736	2462	19	3.7	PHQ1041_0060K713_0150 MB33 EZ705U	8151	–	15405	88.81	1421/16	24	32	2000	1900	3200	90	1561	186
34	1736	2462	19	3.7	PHQ1041_0060K713_0150 MB33 EZ705U	8151	–	15405	88.81	1421/16	32	32	2000	1900	3200	90	1561	186
34	1736	2462	19	3.7	PHQ1041_0060K713_0150 MB33 EZ705U	8151	–	15405	88.81	1421/16	45	32	2000	1900	3200	90	1561	186
34	2168	3929	24	3.0	PHQ1041_0060K713_0150 MB43 EZ803U	10000	–	20000	88.81	1421/16	50	65	2000	1900	3000	197	1561	216
34	2168	3929	24	3.0	PHQ1041_0060K713_0150 MB43 EZ803U	10000	–	20000	88.81	1421/16	72	65	2000	1900	3000	197	1561	216
38	1530	2169	19	4.2	PHQ1041_0060K713_0130 MB33 EZ705U	7182	–	13574	78.26	10017/128	16	32	2000	1900	3200	96	1561	186
38	1530	2169	19	4.2	PHQ1041_0060K713_0130 MB33 EZ705U	7182	–	13574	78.26	10017/128	24	32	2000	1900	3200	96	1561	186
38	1530	2169	19	4.2	PHQ1041_0060K713_0130 MB33 EZ705U	7182	–	13574	78.26	10017/128	32	32	2000	1900	3200	96	1561	186
38	1530	2169	19	4.2	PHQ1041_0060K713_0130 MB33 EZ705U	7182	–	13574	78.26	10017/128	45	32	2000	1900	3200	96	1561	186
38	1910	3462	23	3.4	PHQ1041_0060K713_0130 MB43 EZ803U	10000	–	20000	78.26	10017/128	50	65	2000	1900	3000	204	1561	216
38	1910	3462	23	3.4	PHQ1041_0060K713_0130 MB43 EZ803U	10000	–	20000	78.26	10017/128	72	65	2000	1900	3000	204	1561	216
38	1910	3462	23	3.4	PHQ1041_0060K713_0130 MB43 EZ803U	10000	–	20000	78.26	10017/128	100	65	2000	1900	3000	204	1561	216
42	1382	1959	18	4.7	PHQ1041_0060K713_0120 MB33 EZ705U	6487	–	12261	70.69	70119/992	16	32	2000	1900	3200	98	1561	186
42	1382	1959	18	4.7	PHQ1041_0060K713_0120 MB33 EZ705U	6487	–	12261	70.69	70119/992	24	32	2000	1900	3200	98	1561	186
42	1382	1959	18	4.7	PHQ1041_0060K713_0120 MB33 EZ705U	6487	–	12261	70.69	70119/992	32	32	2000	1900	3200	98	1561	186
42	1382	1959	18	4.7	PHQ1041_0060K713_0120 MB33 EZ705U	6487	–	12261	70.69	70119/992	45	32	2000	1900	3200	98	1561	186
42	1726	3127	23	3.8	PHQ1041_0060K713_0120 MB43 EZ803U	9407	–	20000	70.69	70119/992	50	65	2000	1900	3000	206	1561	216
42	1726	3127	23	3.8	PHQ1041_0060K713_0120 MB43 EZ803U	9407	–	20000	70.69	70119/992	72	65	2000	1900	3000	206	1561	216
42	1726	3127	23	3.8	PHQ1041_0060K713_0120 MB43 EZ803U	9407	–	20000	70.69	70119/992	100	65	2000	1900	3000	206	1561	216
PHQ1141K (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 22000 Nm)																		
13	6139	9286	25	2.1	PHQ1141_0060K813_0260 MB43 EZ805U	22000	–	44000	153.1	140833/920	50	115	2300	2100	3000	288	2623	373
14	5545	8388	25	2.3	PHQ1141_0060K813_0230 MB43 EZ805U	22000	–	42636	138.3	31801/230	50	115	2300	2100	3000	290	2623	373
17	4616	6982	23	2.8	PHQ1141_0060K813_0190 MB43 EZ805U	21655	–	35492	115.1	133517/1160	50	115	2300	2100	3000	301	2623	373
19	4170	6307	23	3.1	PHQ1141_0060K813_0175 MB43 EZ805U	19559	–	32058	104.0	30149/290	50	115	2300	2100	3000	304	2623	373
20	3954	5981	22	3.3	PHQ1141_0060K813_0165 MB43 EZ805U	18549	–	30403	98.59	126201/1280	50	115	1900	1800	3000	310	2623	373

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PHQ1141K (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 22000 Nm)																		
22	3572	5402	22	3.6	PHQ1141_0060K813_0150 MB43 EZ805U	16754	–	27461	89.05	28497/320	50	115	1900	1800	3000	314	2623	373
32	2474	3741	22	4.6	PHQ1141_0060K813_0105 MB43 EZ805U	11603	–	19018	61.67	53041/860	50	115	1600	1500	2600	358	2623	373
36	2234	3379	24	4.6	PHQ1141_0060K813_0093 MB43 EZ805U	10480	–	17177	55.70	11977/215	50	115	1600	1500	2600	367	2623	373
40	1984	3000	26	4.6	PHQ1141_0060K813_0082 MB43 EZ805U	9305	–	15251	49.46	96937/1960	50	115	1600	1500	2600	395	2623	373
45	1792	2710	28	4.6	PHQ1141_0060K813_0074 MB43 EZ805U	8404	–	13775	44.67	3127/70	50	115	1600	1500	2600	409	2623	373
PHQ1141K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 22000 Nm)																		
5.1	3959	4441	6.4	3.3	PHQ1141_0060K813_0970 MB33 EZ701U	10701	–	38819	583.0	93279/160	16	15	2800	2500	4000	40	2623	315
5.1	6421	7705	10	2.0	PHQ1141_0060K813_0970 MB33 EZ702U	21465	–	38819	583.0	93279/160	16	15	2800	2500	4000	45	2623	318
5.7	3576	4011	6.2	3.6	PHQ1141_0060K813_0880 MB33 EZ701U	9665	–	35060	526.6	21063/40	16	15	2800	2500	4000	40	2623	315
5.7	5799	6959	10	2.2	PHQ1141_0060K813_0880 MB33 EZ702U	19387	–	35060	526.6	21063/40	16	15	2800	2500	4000	46	2623	318
6.3	3235	3628	6.1	4.0	PHQ1141_0060K813_0790 MB33 EZ701U	8743	–	44000	476.3	45725/96	16	15	2800	2500	4000	41	2623	315
6.3	3235	3628	6.1	4.0	PHQ1141_0060K813_0790 MB33 EZ701U	8743	–	44000	476.3	45725/96	24	15	2800	2500	4000	41	2623	315
6.3	3235	3628	6.1	4.0	PHQ1141_0060K813_0790 MB33 EZ701U	8743	–	44000	476.3	45725/96	32	15	2800	2500	4000	41	2623	315
6.3	5246	6295	9.8	2.5	PHQ1141_0060K813_0790 MB33 EZ702U	17922	–	44000	476.3	45725/96	16	15	2800	2500	4000	47	2623	318
6.3	5246	6295	9.8	2.5	PHQ1141_0060K813_0790 MB33 EZ702U	17922	–	44000	476.3	45725/96	24	15	2800	2500	4000	47	2623	318
6.3	5246	6295	9.8	2.5	PHQ1141_0060K813_0790 MB33 EZ702U	17922	–	44000	476.3	45725/96	32	15	2800	2500	4000	47	2623	318
7.0	2922	3277	5.9	4.4	PHQ1141_0060K813_0720 MB33 EZ701U	7897	–	44000	430.2	10325/24	16	15	2800	2500	4000	42	2623	315
7.0	2922	3277	5.9	4.4	PHQ1141_0060K813_0720 MB33 EZ701U	7897	–	44000	430.2	10325/24	24	15	2800	2500	4000	42	2623	315
7.0	2922	3277	5.9	4.4	PHQ1141_0060K813_0720 MB33 EZ701U	7897	–	44000	430.2	10325/24	32	15	2800	2500	4000	42	2623	315
7.0	4738	5685	9.5	2.7	PHQ1141_0060K813_0720 MB33 EZ702U	16188	–	44000	430.2	10325/24	16	15	2800	2500	4000	47	2623	318
7.0	4738	5685	9.5	2.7	PHQ1141_0060K813_0720 MB33 EZ702U	16188	–	44000	430.2	10325/24	24	15	2800	2500	4000	47	2623	318
7.0	4738	5685	9.5	2.7	PHQ1141_0060K813_0720 MB33 EZ702U	16188	–	44000	430.2	10325/24	32	15	2800	2500	4000	47	2623	318
7.0	6515	8212	13	2.0	PHQ1141_0060K813_0720 MB33 EZ703U	22000	–	44000	430.2	10325/24	16	32	2800	2500	4000	59	2623	320
7.0	8410	11924	17	1.5	PHQ1141_0060K813_0720 MB33 EZ705U	22000	–	44000	430.2	10325/24	16	32	2800	2500	4000	71	2623	326
7.6	2665	2990	5.7	4.9	PHQ1141_0060K813_0650 MB33 EZ701U	7204	–	44000	392.5	188387/480	16	15	2800	2500	4000	43	2623	315
7.6	2665	2990	5.7	4.9	PHQ1141_0060K813_0650 MB33 EZ701U	7204	–	44000	392.5	188387/480	24	15	2800	2500	4000	43	2623	315
7.6	2665	2990	5.7	4.9	PHQ1141_0060K813_0650 MB33 EZ701U	7204	–	44000	392.5	188387/480	32	15	2800	2500	4000	43	2623	315
7.6	2665	2990	5.7	4.9	PHQ1141_0060K813_0650 MB33 EZ701U	7204	–	44000	392.5	188387/480	45	15	2800	2500	4000	43	2623	315
7.6	4322	5187	9.3	3.0	PHQ1141_0060K813_0650 MB33 EZ702U	14768	–	44000	392.5	188387/480	16	15	2800	2500	4000	48	2623	318
7.6	4322	5187	9.3	3.0	PHQ1141_0060K813_0650 MB33 EZ702U	14768	–	44000	392.5	188387/480	24	15	2800	2500	4000	48	2623	318
7.6	4322	5187	9.3	3.0	PHQ1141_0060K813_0650 MB33 EZ702U	14768	–	44000	392.5	188387/480	32	15	2800	2500	4000	48	2623	318
7.6	4322	5187	9.3	3.0	PHQ1141_0060K813_0650 MB33 EZ702U	14768	–	44000	392.5	188387/480	45	15	2800	2500	4000	48	2623	318
7.6	5943	7492	13	2.2	PHQ1141_0060K813_0650 MB33 EZ703U	22000	–	44000	392.5	188387/480	16	32	2800	2500	4000	60	2623	320
7.6	5943	7492	13	2.2	PHQ1141_0060K813_0650 MB33 EZ703U	22000	–	44000	392.5	188387/480	24	32	2800	2500	4000	60	2623	320
7.6	7672	10878	16	1.7	PHQ1141_0060K813_0650 MB33 EZ705U	22000	–	44000	392.5	188387/480	16	32	2800	2500	4000	72	2623	326
7.6	7672	10878	16	1.7	PHQ1141_0060K813_0650 MB33 EZ705U	22000	–	44000	392.5	188387/480	24	32	2800	2500	4000	72	2623	326
8.5	3904	4685	9.0	3.3	PHQ1141_0060K813_0590 MB33 EZ702U	13339	–	44000	354.5	42539/120	16	15	2800	2500	4000	48	2623	318
8.5	3904	4685	9.0	3.3	PHQ1141_0060K813_0590 MB33 EZ702U	13339	–	44000	354.5	42539/120	24	15	2800	2500	4000	48	2623	318
8.5	3904	4685	9.0	3.3	PHQ1141_0060K813_0590 MB33 EZ702U	13339	–	44000	354.5	42539/120	32	15	2800	2500	4000	48	2623	318
8.5	3904	4685	9.0	3.3	PHQ1141_0060K813_0590 MB33 EZ702U	13339	–	44000	354.5	42539/120	45	15	2800	2500	4000	48	2623	318
8.5	5368	6767	12	2.4	PHQ1141_0060K813_0590 MB33 EZ703U	21147	–	44000	354.5	42539/120	16	32	2800	2500	4000	60	2623	320
8.5	5368	6767	12	2.4	PHQ1141_0060K813_0590 MB33 EZ703U	21147	–	44000	354.5	42539/120	24	32	2800	2500	4000	60	2623	320
8.5	5368	6767	12	2.4	PHQ1141_0060K813_0590 MB33 EZ703U	21147	–	44000	354.5	42539/120	32	32	2800	2500	4000	60	2623	320
8.5	6930	9825	16	1.9	PHQ1141_0060K813_0590 MB33 EZ705U	22000	–	44000	354.5	42539/120	16	32	2800	2500	4000	73	2623	326
8.5	6930	9825	16	1.9	PHQ1141_0060K813_0590 MB33 EZ705U	22000	–	44000	354.5	42539/120	24	32	2800	2500	4000	73	2623	326
8.5	6930	9825	16	1.9	PHQ1141_0060K813_0590 MB33 EZ705U	22000	–	44000	354.5	42539/120	32	32	2800	2500	4000	73	2623	326
10	3237	3885	8.5	4.0	PHQ1141_0060K813_0490 MB33 EZ702U	11061	–	44000	293.9	16461/56	16	15	2800	2500	4000	52	2623	318
10	3237	3885	8.5	4.0	PHQ1141_0060K813_0490 MB33 EZ702U	11061	–	44000	293.9	16461/56	24	15	2800	2500	4000	52	2623	318
10	3237	3885	8.5	4.0	PHQ1141_0060K813_0490 MB33 EZ702U	11061	–	44000	293.9	16461/56	32	15	2800	2500	4000	52	2623	318
10	3237	3885	8.5	4.0	PHQ1141_0060K813_0490 MB33 EZ702U	11061	–	44000	293.9	16461/56	45	15	2800	2500	4000	52	2623	318
10	4451	5611	12	2.9	PHQ1141_0060K813_0490 MB33 EZ703U	17535	–	44000	293.9	16461/56	16	32	2800	2500	4000	63	2623	320
10	4451	5611	12	2.9	PHQ1141_0060K813_0490 MB33 EZ703U	17535	–	44000	293.9	16461/56	24	32	2800	2500	4000	63	2623	320
10	4451	5611	12	2.9	PHQ1141_0060K813_0490 MB33 EZ703U	17535	–	44000	293.9	16461/56	32	32	2800	2500	4000	63	2623	320
10	4451	5611	12	2.9	PHQ1141_0060K813_0490 MB33 EZ703U	17535	–	44000	293.9	16461/56	45	32	2800	2500	4000	63	2623	320
10	5746	8147	15	2.3	PHQ1141_0060K813_0490 MB33 EZ705U	22000	–	44000	293.9	16461/56	16	32	2800	2500	4000	76	2623	326
10	5746	8147	15	2.3	PHQ1141_0060K813_0490 MB33 EZ705U	22000	–	44000	293.9	16461/56	24	32	2800	2500	4000	76	2623	326
10	5746	8147	15	2.3	PHQ1141_0060K813_0490 MB33 EZ705U	22000	–	44000	293.9	16461/56	32	32	2800	2500	4000	76	2623	326
10	5746	8147	15	2.3	PHQ1141_0060K813_0490 MB33 EZ705U	22000	–	44000	293.9	16461/56	45	32	2800	2500	4000	76	2623	326
11	2924	3509	8.2	4.4	PHQ1141_0060K813_0440 MB33 EZ702U	9990	–	44000	265.5	531/2	16	15	2800	2500	4000	52	2623	318
11	2924	3509	8.2	4.4	PHQ1141_0060K813_0440 MB33 EZ702U	9990	–	44000	265.5	531/2	24	15	2800	2500	4000	52	2623	318
11	2924	3509	8.2	4.4	PHQ1141_0060K813_0440 MB33 EZ702U	9990	–	44000	265.5	531/2	32	15	2800	2500	4000	52	2623	318
11	2924	3509	8.2	4.4	PHQ1141_0060K813_0440 MB33 EZ702U	9990	–	44000	265.5	531/2	45	15	2800	2500	4000	52	2623	318
11	4020	5068	11	3.2	PHQ1141_0060K813_0440 MB33 EZ703U	15838	–	44000	265.5	531/2	16	32	2800	2500	4000	64	2623	320
11	4020	5068	11	3.2	PHQ1141_0060K813_0440 MB33 EZ703U	15838	–	44000	265.5	531/2	24	32	2800	2500	4000	64	2623	320

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PHQ1141K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 22000 Nm)																		
11	4020	5068	11	3.2	PHQ1141_0060K813_0440 MB33 EZ703U	15838	–	44000	265.5	531/2	32	32	2800	2500	4000	64	2623	320
11	4020	5068	11	3.2	PHQ1141_0060K813_0440 MB33 EZ703U	15838	–	44000	265.5	531/2	45	32	2800	2500	4000	64	2623	320
11	5190	7359	15	2.5	PHQ1141_0060K813_0440 MB33 EZ705U	22000	–	44000	265.5	531/2	16	32	2800	2500	4000	76	2623	326
11	5190	7359	15	2.5	PHQ1141_0060K813_0440 MB33 EZ705U	22000	–	44000	265.5	531/2	24	32	2800	2500	4000	76	2623	326
11	5190	7359	15	2.5	PHQ1141_0060K813_0440 MB33 EZ705U	22000	–	44000	265.5	531/2	32	32	2800	2500	4000	76	2623	326
11	5190	7359	15	2.5	PHQ1141_0060K813_0440 MB33 EZ705U	22000	–	44000	265.5	531/2	45	32	2800	2500	4000	76	2623	326
12	2644	3172	8.0	4.9	PHQ1141_0060K813_0400 MB33 EZ702U	9033	–	41639	240.1	38409/160	16	15	2800	2500	4000	55	2623	318
12	2644	3172	8.0	4.9	PHQ1141_0060K813_0400 MB33 EZ702U	9033	–	41639	240.1	38409/160	24	15	2800	2500	4000	55	2623	318
12	2644	3172	8.0	4.9	PHQ1141_0060K813_0400 MB33 EZ702U	9033	–	41639	240.1	38409/160	32	15	2800	2500	4000	55	2623	318
12	2644	3172	8.0	4.9	PHQ1141_0060K813_0400 MB33 EZ702U	9033	–	41639	240.1	38409/160	45	15	2800	2500	4000	55	2623	318
12	3635	4582	11	3.6	PHQ1141_0060K813_0400 MB33 EZ703U	14320	–	41639	240.1	38409/160	16	32	2800	2500	4000	67	2623	320
12	3635	4582	11	3.6	PHQ1141_0060K813_0400 MB33 EZ703U	14320	–	41639	240.1	38409/160	24	32	2800	2500	4000	67	2623	320
12	3635	4582	11	3.6	PHQ1141_0060K813_0400 MB33 EZ703U	14320	–	41639	240.1	38409/160	32	32	2800	2500	4000	67	2623	320
12	3635	4582	11	3.6	PHQ1141_0060K813_0400 MB33 EZ703U	14320	–	41639	240.1	38409/160	45	32	2800	2500	4000	67	2623	320
12	4693	6653	14	2.8	PHQ1141_0060K813_0400 MB33 EZ705U	22000	–	41639	240.1	38409/160	16	32	2800	2500	4000	79	2623	326
12	4693	6653	14	2.8	PHQ1141_0060K813_0400 MB33 EZ705U	22000	–	41639	240.1	38409/160	24	32	2800	2500	4000	79	2623	326
12	4693	6653	14	2.8	PHQ1141_0060K813_0400 MB33 EZ705U	22000	–	41639	240.1	38409/160	32	32	2800	2500	4000	79	2623	326
12	4693	6653	14	2.8	PHQ1141_0060K813_0400 MB33 EZ705U	22000	–	41639	240.1	38409/160	45	32	2800	2500	4000	79	2623	326
12	5860	10619	18	2.2	PHQ1141_0060K813_0400 MB43 EZ803U	22000	–	44000	240.1	38409/160	50	65	2800	2500	3000	187	2623	357
14	3283	4139	11	4.0	PHQ1141_0060K813_0360 MB33 EZ703U	12935	–	37610	216.8	8673/40	16	32	2800	2500	4000	68	2623	320
14	3283	4139	11	4.0	PHQ1141_0060K813_0360 MB33 EZ703U	12935	–	37610	216.8	8673/40	24	32	2800	2500	4000	68	2623	320
14	3283	4139	11	4.0	PHQ1141_0060K813_0360 MB33 EZ703U	12935	–	37610	216.8	8673/40	32	32	2800	2500	4000	68	2623	320
14	3283	4139	11	4.0	PHQ1141_0060K813_0360 MB33 EZ703U	12935	–	37610	216.8	8673/40	45	32	2800	2500	4000	68	2623	320
14	4239	6010	14	3.1	PHQ1141_0060K813_0360 MB33 EZ705U	19900	–	37610	216.8	8673/40	16	32	2800	2500	4000	80	2623	326
14	4239	6010	14	3.1	PHQ1141_0060K813_0360 MB33 EZ705U	19900	–	37610	216.8	8673/40	24	32	2800	2500	4000	80	2623	326
14	4239	6010	14	3.1	PHQ1141_0060K813_0360 MB33 EZ705U	19900	–	37610	216.8	8673/40	32	32	2800	2500	4000	80	2623	326
14	4239	6010	14	3.1	PHQ1141_0060K813_0360 MB33 EZ705U	19900	–	37610	216.8	8673/40	45	32	2800	2500	4000	80	2623	326
14	5293	9592	17	2.5	PHQ1141_0060K813_0360 MB43 EZ803U	22000	–	44000	216.8	8673/40	50	65	2800	2500	3000	188	2623	357
15	2943	3710	10	4.4	PHQ1141_0060K813_0320 MB33 EZ703U	11593	–	33709	194.3	31093/160	16	32	2800	2500	4000	72	2623	320
15	2943	3710	10	4.4	PHQ1141_0060K813_0320 MB33 EZ703U	11593	–	33709	194.3	31093/160	24	32	2800	2500	4000	72	2623	320
15	2943	3710	10	4.4	PHQ1141_0060K813_0320 MB33 EZ703U	11593	–	33709	194.3	31093/160	32	32	2800	2500	4000	72	2623	320
15	2943	3710	10	4.4	PHQ1141_0060K813_0320 MB33 EZ703U	11593	–	33709	194.3	31093/160	45	32	2800	2500	4000	72	2623	320
15	3799	5386	13	3.4	PHQ1141_0060K813_0320 MB33 EZ705U	17835	–	33709	194.3	31093/160	16	32	2800	2500	4000	84	2623	326
15	3799	5386	13	3.4	PHQ1141_0060K813_0320 MB33 EZ705U	17835	–	33709	194.3	31093/160	24	32	2800	2500	4000	84	2623	326
15	3799	5386	13	3.4	PHQ1141_0060K813_0320 MB33 EZ705U	17835	–	33709	194.3	31093/160	32	32	2800	2500	4000	84	2623	326
15	3799	5386	13	3.4	PHQ1141_0060K813_0320 MB33 EZ705U	17835	–	33709	194.3	31093/160	45	32	2800	2500	4000	84	2623	326
15	4744	8597	17	2.7	PHQ1141_0060K813_0320 MB43 EZ803U	22000	–	44000	194.3	31093/160	50	65	2800	2500	3000	192	2623	357
15	4744	8597	17	2.7	PHQ1141_0060K813_0320 MB43 EZ803U	22000	–	44000	194.3	31093/160	72	65	2800	2500	3000	192	2623	357
17	2658	3351	10	4.9	PHQ1141_0060K813_0290 MB33 EZ703U	10471	–	30446	175.5	7021/40	16	32	2800	2500	4000	73	2623	320
17	2658	3351	10	4.9	PHQ1141_0060K813_0290 MB33 EZ703U	10471	–	30446	175.5	7021/40	24	32	2800	2500	4000	73	2623	320
17	2658	3351	10	4.9	PHQ1141_0060K813_0290 MB33 EZ703U	10471	–	30446	175.5	7021/40	32	32	2800	2500	4000	73	2623	320
17	2658	3351	10	4.9	PHQ1141_0060K813_0290 MB33 EZ703U	10471	–	30446	175.5	7021/40	45	32	2800	2500	4000	73	2623	320
17	3431	4865	13	3.8	PHQ1141_0060K813_0290 MB33 EZ705U	16109	–	30446	175.5	7021/40	16	32	2800	2500	4000	85	2623	326
17	3431	4865	13	3.8	PHQ1141_0060K813_0290 MB33 EZ705U	16109	–	30446	175.5	7021/40	24	32	2800	2500	4000	85	2623	326
17	3431	4865	13	3.8	PHQ1141_0060K813_0290 MB33 EZ705U	16109	–	30446	175.5	7021/40	32	32	2800	2500	4000	85	2623	326
17	3431	4865	13	3.8	PHQ1141_0060K813_0290 MB33 EZ705U	16109	–	30446	175.5	7021/40	45	32	2800	2500	4000	85	2623	326
17	4285	7764	16	3.0	PHQ1141_0060K813_0290 MB43 EZ803U	22000	–	44000	175.5	7021/40	50	65	2800	2500	3000	193	2623	357
17	4285	7764	16	3.0	PHQ1141_0060K813_0290 MB43 EZ803U	22000	–	44000	175.5	7021/40	72	65	2800	2500	3000	193	2623	357
20	2992	4243	12	4.3	PHQ1141_0060K813_0260 MB33 EZ705U	14049	–	26552	153.1	140833/920	16	32	2300	2100	3500	92	2623	326
20	2992	4243	12	4.3	PHQ1141_0060K813_0260 MB33 EZ705U	14049	–	26552	153.1	140833/920	24	32	2300	2100	3500	92	2623	326
20	2992	4243	12	4.3	PHQ1141_0060K813_0260 MB33 EZ705U	14049	–	26552	153.1	140833/920	32	32	2300	2100	3500	92	2623	326
20	2992	4243	12	4.3	PHQ1141_0060K813_0260 MB33 EZ705U	14049	–	26552	153.1	140833/920	45	32	2300	2100	3500	92	2623	326
20	3737	6772	15	3.5	PHQ1141_0060K813_0260 MB43 EZ803U	20371	–	44000	153.1	140833/920	50	65	2300	2100	3000	200	2623	357
20	3737	6772	15	3.5	PHQ1141_0060K813_0260 MB43 EZ803U	20371	–	44000	153.1	140833/920	72	65	2300	2100	3000	200	2623	357
20	3737	6772	15	3.5	PHQ1141_0060K813_0260 MB43 EZ803U	20371	–	44000	153.1	140833/920	100	65	2300	2100	3000	200	2623	357
22	2703	3832	12	4.7	PHQ1141_0060K813_0230 MB33 EZ705U	12689	–	23983	138.3	31801/230	16	32	2300	2100	3500	94	2623	326
22	2703	3832	12	4.7	PHQ1141_0060K813_0230 MB33 EZ705U	12689	–	23983	138.3	31801/230	24	32	2300	2100	3500	94	2623	326
22	2703	3832	12	4.7	PHQ1141_0060K813_0230 MB33 EZ705U	12689	–	23983	138.3	31801/230	32	32	2300	2100	3500	94	2623	326
22	2703	3832	12	4.7	PHQ1141_0060K813_0230 MB33 EZ705U	12689	–	23983	138.3	31801/230	45	32	2300	2100	3500	94	2623	326
22	3375	6116	15	3.9	PHQ1141_0060K813_0230 MB43 EZ803U	18400	–	42636	138.3	31801/230	50	65	2300	2100	3000	202	2623	357
22	3375	6116	15	3.9	PHQ1141_0060K813_0230 MB43 EZ803U	18400	–	42636	138.3	31801/230	72	65	2300	2100	3000	202	2623	357
22	3375	6116	15	3.9	PHQ1141_0060K813_0230 MB43 EZ803U	18400	–	42636	138.3	31801/230	100	65	2300	2100	3000	202	2623	357
26	2250	3190	14	4.7	PHQ1141_0060K813_0190 MB33 EZ705U	10563	–	19965	115.1	133517/1160	16	32	2300	2100	3500	105	2623	326
26	2250	3190	14	4.7	PHQ1141_0060K813_0190 MB33 EZ705U	10563	–	19965	115.1	133517/1160	24	32	2300	2100	3500	105	2623	326

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2accHT} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
PHQ1141K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 22000 Nm)																		
26	2250	3190	14	4.7	PHQ1141_0060K813_0190 MB33 EZ705U	10563	–	19965	115.1	133517/1160	32	32	2300	2100	3500	105	2623	326
26	2250	3190	14	4.7	PHQ1141_0060K813_0190 MB33 EZ705U	10563	–	19965	115.1	133517/1160	45	32	2300	2100	3500	105	2623	326
26	2810	5091	14	4.6	PHQ1141_0060K813_0190 MB43 EZ803U	15317	–	35492	115.1	133517/1160	50	65	2300	2100	3000	213	2623	357
26	2810	5091	14	4.6	PHQ1141_0060K813_0190 MB43 EZ803U	15317	–	35492	115.1	133517/1160	72	65	2300	2100	3000	213	2623	357
26	2810	5091	14	4.6	PHQ1141_0060K813_0190 MB43 EZ803U	15317	–	35492	115.1	133517/1160	100	65	2300	2100	3000	213	2623	357
29	2032	2881	15	4.7	PHQ1141_0060K813_0175 MB33 EZ705U	9541	–	18033	104.0	30149/290	16	32	2300	2100	3500	108	2623	326
29	2032	2881	15	4.7	PHQ1141_0060K813_0175 MB33 EZ705U	9541	–	18033	104.0	30149/290	24	32	2300	2100	3500	108	2623	326
29	2032	2881	15	4.7	PHQ1141_0060K813_0175 MB33 EZ705U	9541	–	18033	104.0	30149/290	32	32	2300	2100	3500	108	2623	326
29	2032	2881	15	4.7	PHQ1141_0060K813_0175 MB33 EZ705U	9541	–	18033	104.0	30149/290	45	32	2300	2100	3500	108	2623	326
PHQ1241K (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 43000 Nm)																		
6.8	11776	17812	17	2.1	PHQ1241_0060K913_0490 MB43 EZ805U	43000	–	80000	293.6	300669/1024	50	115	2600	2500	3000	283	4665	620
8.8	9154	13847	16	2.7	PHQ1241_0060K913_0380 MB43 EZ805U	42944	–	70385	228.3	584319/2560	50	115	2600	2500	3000	294	4665	620
10	7728	11690	15	3.2	PHQ1241_0060K913_0320 MB43 EZ805U	36254	–	59421	192.7	141825/736	50	115	2600	2500	3000	303	4665	620
14	5762	8715	14	4.3	PHQ1241_0060K913_0240 MB43 EZ805U	27028	–	44299	143.7	266631/1856	50	115	2200	2100	3000	325	4665	620
17	4587	6939	15	4.6	PHQ1241_0060K913_0190 MB43 EZ805U	21519	–	35270	114.4	915/8	50	115	2200	2100	3000	350	4665	620
27	3014	4559	21	4.6	PHQ1241_0060K913_0125 MB43 EZ805U	14139	–	23174	75.15	221247/2944	50	115	1800	1800	2800	426	4665	620
PHQ1241K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 43000 Nm)																		
6.7	10986	19907	12	2.3	PHQ1241_0060K913_0750 MB43 EZ803U	43000	–	80000	450.0	187209/416	50	65	2600	2500	3000	185	4665	604
7.9	9238	16740	11	2.7	PHQ1241_0060K913_0630 MB43 EZ803U	43000	–	80000	378.4	629703/1664	50	65	2600	2500	3000	188	4665	604
7.9	9238	16740	11	2.7	PHQ1241_0060K913_0630 MB43 EZ803U	43000	–	80000	378.4	629703/1664	72	65	2600	2500	3000	188	4665	604
10	7168	12989	11	3.5	PHQ1241_0060K913_0490 MB43 EZ803U	39074	–	80000	293.6	300669/1024	50	65	2600	2500	3000	195	4665	604
10	7168	12989	11	3.5	PHQ1241_0060K913_0490 MB43 EZ803U	39074	–	80000	293.6	300669/1024	72	65	2600	2500	3000	195	4665	604
10	7168	12989	11	3.5	PHQ1241_0060K913_0490 MB43 EZ803U	39074	–	80000	293.6	300669/1024	100	65	2600	2500	3000	195	4665	604
13	5572	10097	9.8	4.5	PHQ1241_0060K913_0380 MB43 EZ803U	30375	–	70385	228.3	584319/2560	50	65	2600	2500	3000	205	4665	604
13	5572	10097	9.8	4.5	PHQ1241_0060K913_0380 MB43 EZ803U	30375	–	70385	228.3	584319/2560	72	65	2600	2500	3000	205	4665	604
13	5572	10097	9.8	4.5	PHQ1241_0060K913_0380 MB43 EZ803U	30375	–	70385	228.3	584319/2560	100	65	2600	2500	3000	205	4665	604

9.3 Dimensional drawings

In this chapter, you can find the dimensions of the geared motors with redundant brake.

There is a dimensional drawing for every possible shaft/housing design, each with the tables for gear unit dimensions, motor adapter dimensions, motor dimensions and geared motor dimensions.

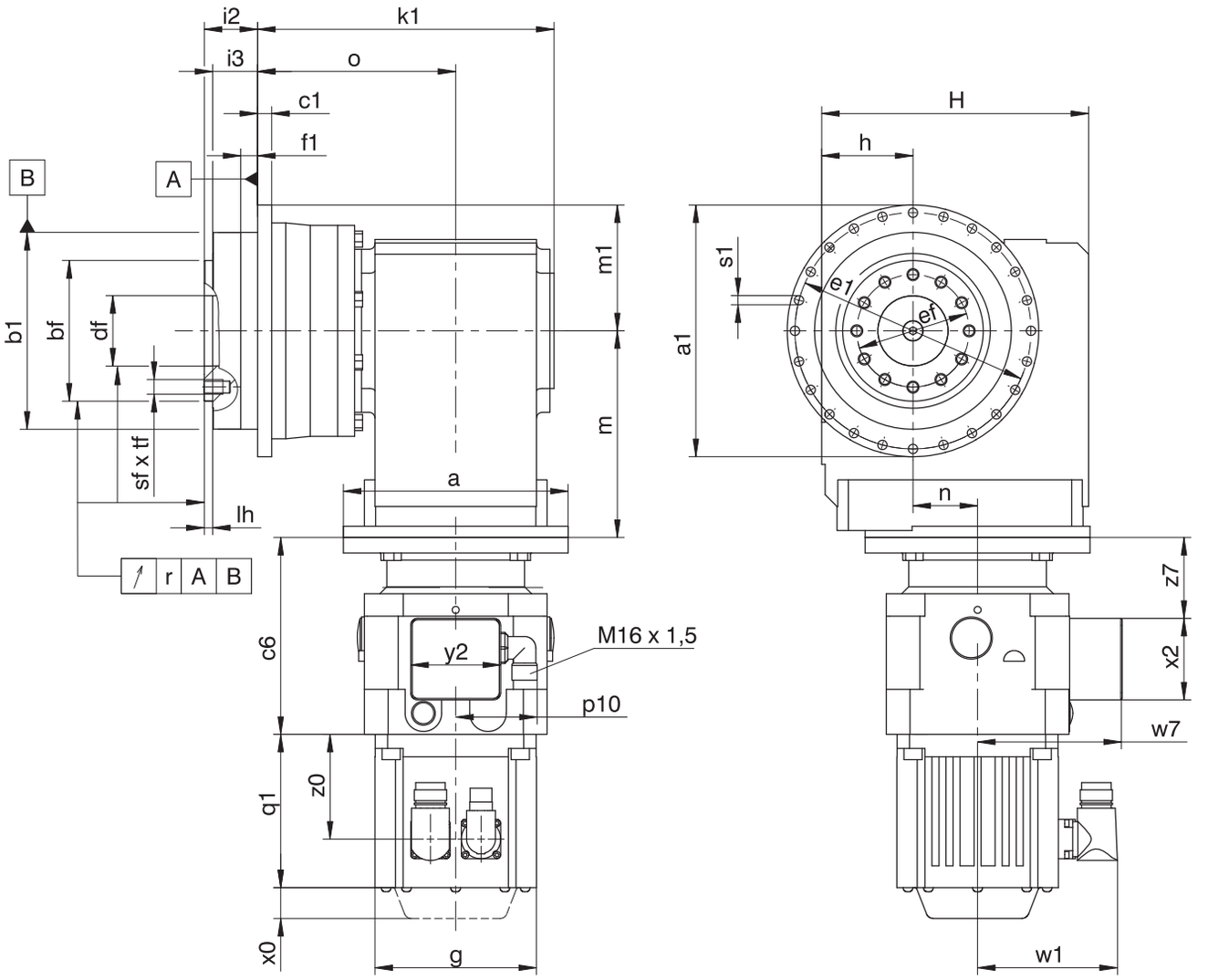
Dimensions can exceed the specifications of ISO 2768-mK due to casting tolerances or accumulation of individual tolerances.

We reserve the right to make dimensional changes due to ongoing technical development.

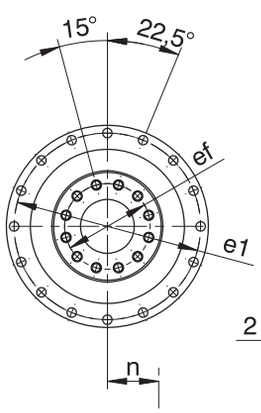
You can download 3D models of our standard drives at https://configurator.stoeber.de/en-US/.

Combination options and the dimensions of forced ventilated geared motors can also be found at https://configurator.stoeber.de/en-US/.

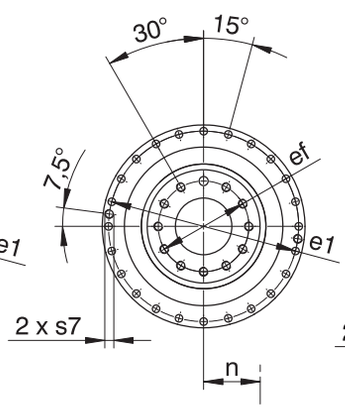
9.3.1 PHQ5 – PHQ10 F shaft design (flange shaft)



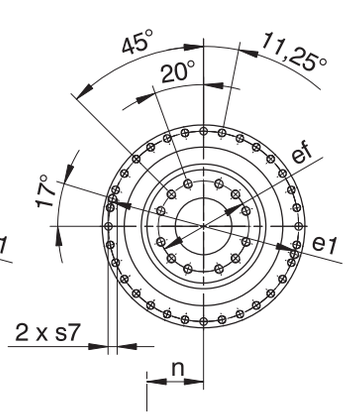
PHQ5



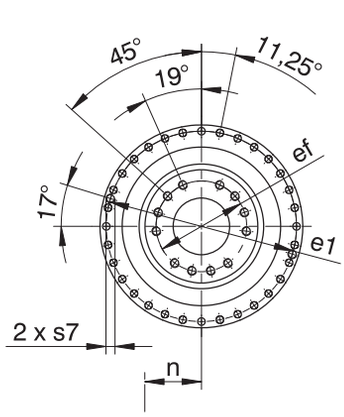
PHQ7/PHQ8



PHQ9



PHQ10



q1 Applies to motors with brake.

w1 Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]

x0 Applies to encoders using an optical measuring method.

Dimensions of gear units

Type	Øa1	Øb1	Øbf	c1	Ødf	Øe1	Øef	f1	h	H	i2	i3	k1	lh	m1	o	r	Øs1	s7	sf	tf
PHQ531_K102_	145_{h7}	110_{h7}	80_{h7}	8	40^{H6}	135	63	12	60	160	29	23	180.0	6	72.5	124.0	0.020	5.5	–	M8	12
PHQ731_K202_	179_{h7}	140_{h7}	100_{h7}	10	50^{H6}	168	80	12	65	190	38	32	211.0	6	89.5	141.0	0.025	6.6	–	M10	16
PHQ831_K402_	247_{h7}	200_{h7}	160_{h7}	12	80^{H6}	233	125	15	90	240	50	42	289.0	8	123.5	199.0	0.030	9.0	M10	M12	17
PHQ941_K513_	300_{h7}	255_{h7}	180_{h7}	18	90^{H6}	280	145	20	160	260	66	55	292.5	12	150.0	196.5	0.030	13.5	M8	M20	28
PHQ1041_K713_	330_{h7}	285_{h7}	200_{h7}	20	95^{H6}	310	166	20	212	342	75	60	354.5	10	165.0	238.0	0.040	13.5	M10	M24	35

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
PHQK_MB23	140	59	102.9	58	64	57.5
PHQK_MB33	161	59	115.4	58	64	71.0
PHQK_MB43	194	59	134.9	58	64	93.5

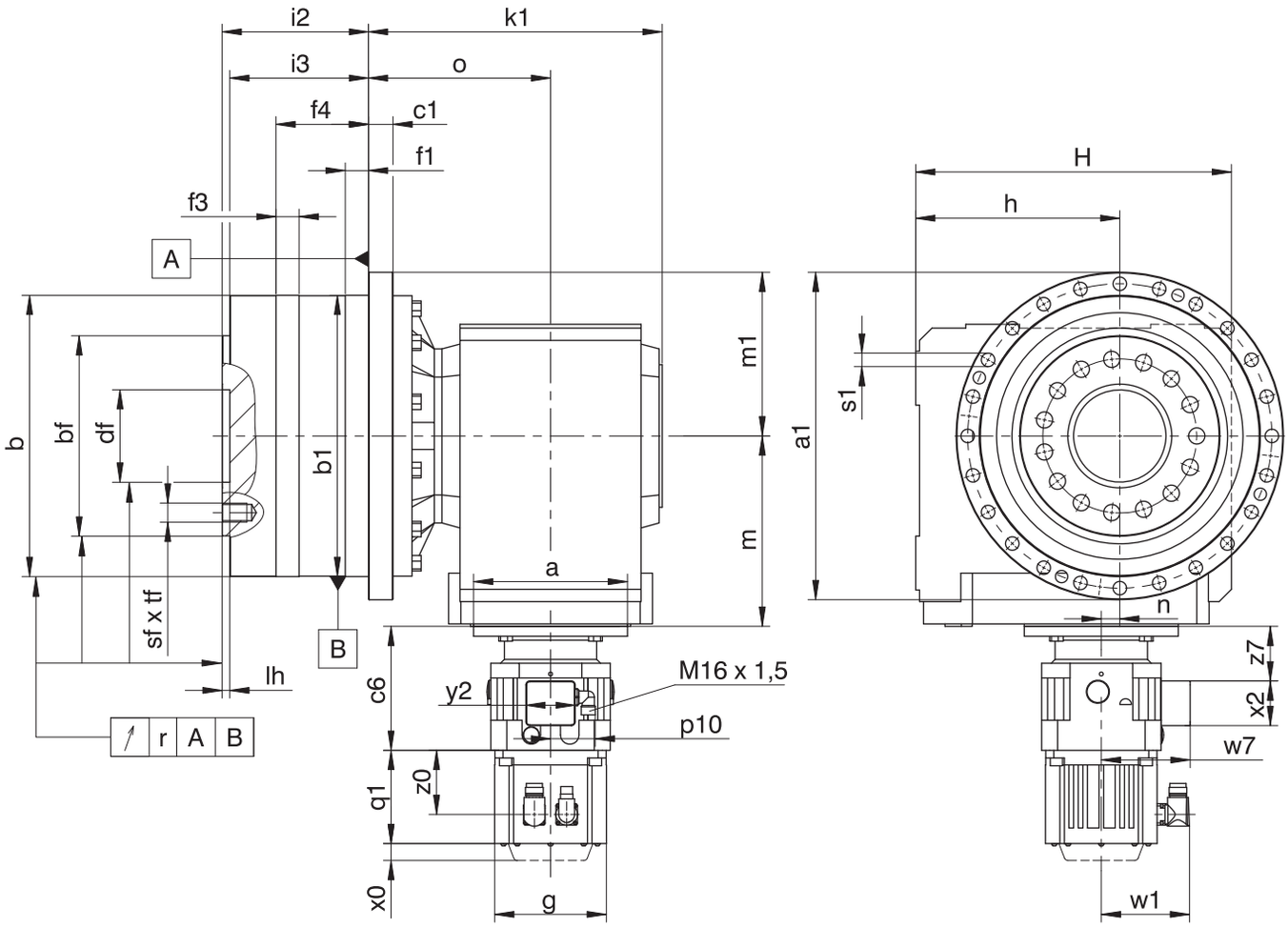
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

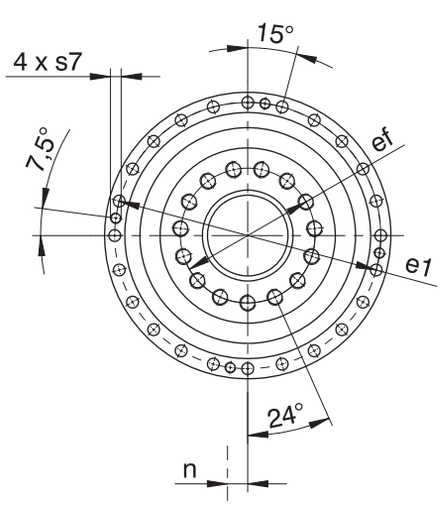
Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
PHQ531_K102_	∅160	128	36.0	∅160	128	36.0	–	–	–	–	–	–
PHQ731_K202_	∅160	147	46.0	∅160	147	46.0	∅200	149	46.0	–	–	–
PHQ831_K402_	∅160	187	60.0	∅160	187	60.0	∅200	189	60.0	∅250	192	60.0
PHQ941_K513_	∅160	172	15.0	∅160	172	15.0	∅200	174	15.0	∅250	177	15.0
PHQ1041_K713_	–	–	–	–	–	–	∅200	221	20.0	∅250	224	20.0

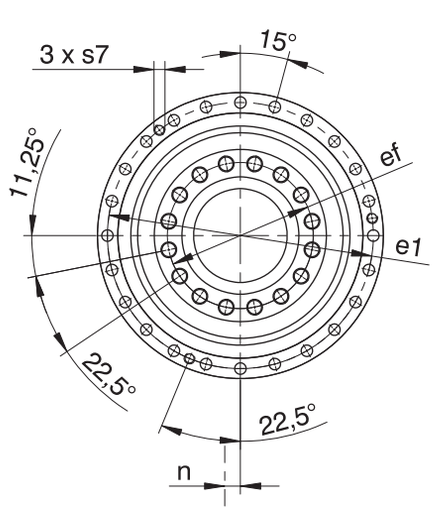
9.3.2 PHQ11 – PHQ12 F shaft design (flange shaft)



PHQ11



PHQ12



q1 Applies to motors with brake.

w1 Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]

x0 Applies to encoders using an optical measuring method.

Dimensions of gear units

Type	Øa1	Øb	Øb1	Øbf	c1	Ødf	Øe1	Øef	f1	f3	f4	h	H	i2	i3	k1	lh	m1	o	r	Øs1	s7	sf	tf
PHQ1141_K813_	425	365_{g6}	365_{h6}	260_{h7}	32	120^{H6}	395	200	30	30	120	265	410	190	180	381.5	10	212.5	236.5	0.040	17.5	M16	M24	35.5
PHQ1241_K913_	550	470_{g6}	470_{h6}	330_{h7}	45	180^{H7}	510	280	30	30	145	315	495	206.5	195.5	452.0	10	275.0	282.0	0.040	22.0	M16	M30	47.0

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
PHQK_MB33	161	59	115.4	58	64	71.0
PHQK_MB43	194	59	134.9	58	64	93.5

Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n
PHQ1141_K813_	∅200	247	24	∅250	249	24
PHQ1241_K913_	–	–	–	∅250	294	25

9.4 Type designation

This chapter shows you an explanation of the type designation with the associated options.

Additional ordering information not included in the type designation can be found at the end of the chapter.

Example code

PHQ	7	3	1	S	F	S	S	0055	K202VF	0115	MB23	EZ501U

Explanation

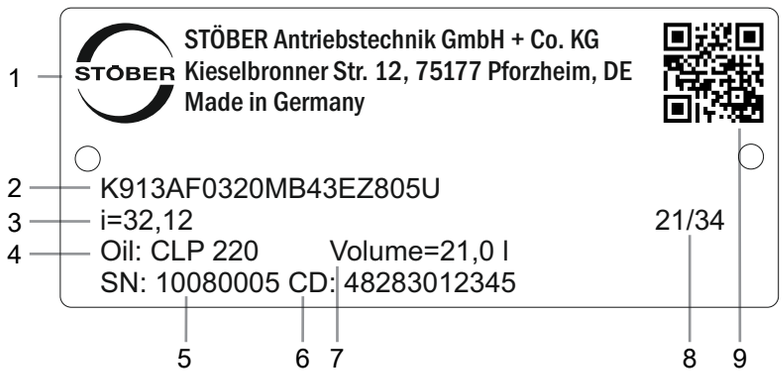
Code	Designation	Design
PHQ	Type	Planetary gear unit
7	Size	7 (example)
3 4	Generation	Generation 3 Generation 4
1	Stages	Single-stage
S	Housing	Standard
F	Shaft	Flange shaft
S V	Bearing	Standard bearing Reinforced bearing (PHQ4 – PHQ5)
S R	Backlash	Standard Reduced (PHQ4 – PHQ9)
0055	Transmission ratio of output (i x 10)	i = 5.5 (example)
K202VF	Input	K2 right-angle geared motor (example)
0115	Transmission ratio of input (i x 10 rounded)	i = 11.57 (example)
MB	Motor adapter	ServoStop motor adapter with brake
2	Size	2 (example)
3	Generation	Generation 3
EZ501U	Motor	EZ synchronous servo motor

To complete the type designation, also specify the following in your order:

- A detailed type designation of the motor, see the chapter [▶ 11]
- Mounting position, see the chapter [▶ 9.5.4]
- Output gear unit side 3 or 4, see the chapter [▶ 9.5.4]
- Radial shaft seal rings at the output made of NBR or FKM (option), see the chapter [▶ 9.6.3]
- Position of the plug connectors, see the chapter [▶ 9.5.6]
- For reverse operation of the output shaft from ±20° to ±90° and horizontal installation, see the chapter [▶ 9.6.4]

9.4.1 Nameplate

An example gear unit nameplate is explained in the figure below.

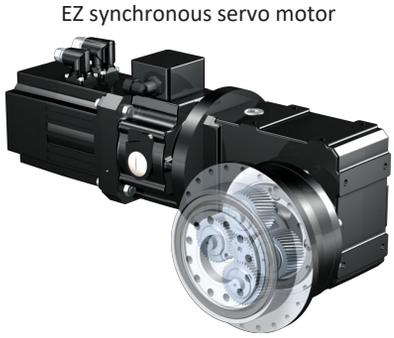


Code	Designation
1	Name of manufacturer
2	Type designation
3	Gear ratio of the gear unit
4	Lubricant specification
5	Serial number of the gear unit
6	Customer-specific data
7	Lubricant fill volume
8	Date of manufacture (year/calendar week)
9	QR code (link to product information)

9.5 Product description

9.5.1 Input options

MB motor adapter +
EZ synchronous servo motor



Catalog ID 443311_en

EZ synchronous servo motor

Catalog ID 442437_en

The corresponding catalogs can be found at http://www.stoeber.de/en/downloads/

Enter the ID of the catalog in the Search term field.

9.5.2 ServoStop motor adapter with brake (MB)

In this chapter, you will find the description and technical data of the motor adapter with brake.

9.5.2.1 Properties

- Electrically actuated spring-loaded brake for dry running
- Featuring backlash-free plug-in coupling (jaw coupling) for easy removal of the motor with the axis braked in any position
- Electrical release monitoring in the terminal box of the motor adapter
- Manual monitoring of wear via air gap checks with a feeler gauge
- Manual release (optional)
- Radial shaft seal rings made of FKM with two sealing lips
- Four oil drain holes to protect the brake from oiling up in case of leakage
- Diverse-redundant system in accordance with EN ISO 13849-1

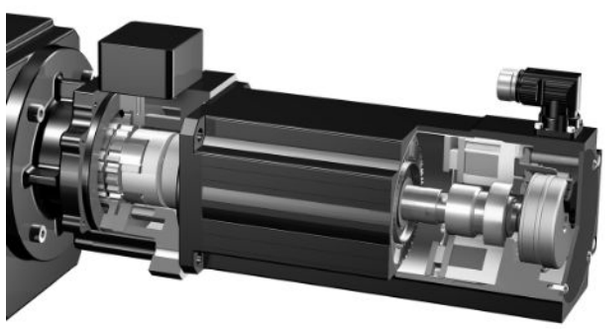


Fig. 1: Motor adapter with ServoStop brake and directly attached EZ synchronous servo motor

9.5.2.2 Brake

A quiescent current brake is integrated into the motor adapter. It has the function of a holding brake. Braking from full speed, e.g. in case of a voltage drop or an emergency off in hazard situations, is still possible.

The brake can be used as a single brake or together with the motor brake as a redundant brake system.

Function

The brakes installed in the motor adapter are electrically actuated spring-loaded brakes for dry running. In the de-energized state, braking takes place using spring force. The brake is released by an electromagnetic DC coil before the motor is switched on. The switch-on time t_{2B} (release time) is the time until the anchor plate releases from the axially moving brake disc and is magnetically held to the coil body. In this state, the brake is released and the coupling hub can rotate. In order to switch off (motor and brake), the residual magnetic flux of the iron parts (anchor and coil body) must be reduced; the associated time t_{11B} until the start of torque generation is defined as a response delay when linking. The link time t_{1B} is the time until the braking torque has built up to the nominal braking torque.

Manual release

Optionally, the brake can be equipped with a manual release.

Pressing the manual release deactivates the electronic actuation of the brake. Before pressing the manual release, you must establish the safety of the machine (e.g. protection against falling).

9.5.2.3 Electrical connection

- Terminal box (standard)
- Plug connector (optional, not possible in combination with release monitoring)

9.5.2.4 Monitoring

For monitoring the brake system, there are generally two options:

- Manual monitoring of wear via air gap checks with a feeler gauge
- Electrical release monitoring in the terminal box with a non-contact and wear-free proximity switch

9.5.2.5 Brake technical data

Technical data for operation at 24 V DC (±10%)

Type	M_{1Bstat} [Nm]	J_1 [kgcm²]	m [kg]	$\Delta\phi_B$ [arcmin]	$t_{1B,DC}$ [ms]	t_{2B} [ms]	$P_{N,B}$ [W]
MB23	8.0	6.3	8.5	32.0	65	55	30
MB23	12	6.3	8.5	32.0	55	80	30
MB33	16	26	14	26.0	150	60	37
MB33	24	26	14	26.0	120	85	37
MB33	32	26	14	26.0	95	100	37
MB33	45	26	14	26.0	80	120	37
MB43	50	69	26	19.0	150	100	55
MB43	72	69	26	19.0	120	150	55
MB43	100	69	26	19.0	90	200	55
MB53	200	236	61	17.0	200	250	86

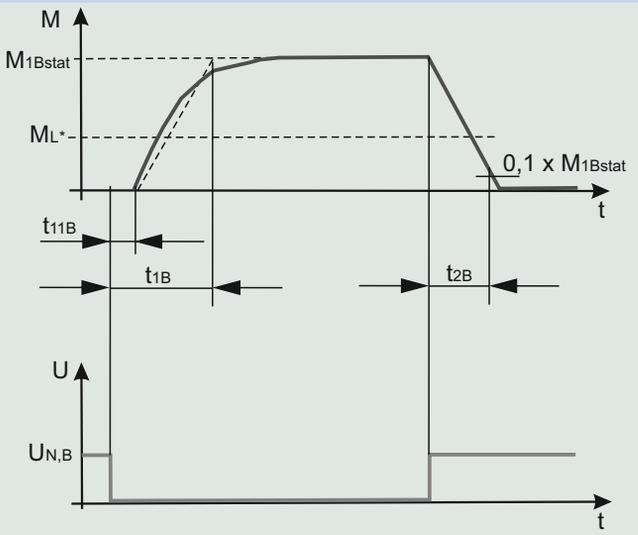
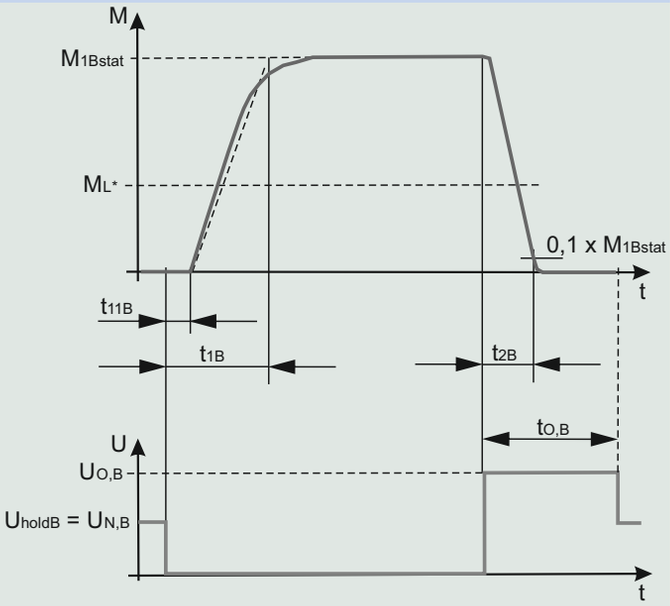
$\Delta\phi_B$: With the brake closed, a higher total backlash results ($\Delta\phi_{tot} = \Delta\phi_2 + \Delta\phi_B / i$).

Technical data for operation with high-speed rectifier 104 V DC (supply voltage U_{LINE} 220 – 275 V AC ± 5%, 50/60 Hz)

Type	M_{1Bstat} [Nm]	J_1 [kgcm²]	m [kg]	$\Delta\phi_B$ [arcmin]	$t_{1B,DC}$ [ms]	$t_{1B,AC}$ [ms]	t_{2B} [ms]	$P_{O,B}$ [W]	P_{holdB} [W]
MB23	8.0	6.3	8.5	32.0	65	360	20	101	26
MB23	12	6.3	8.5	32.0	55	280	25	101	26
MB23	16	6.3	8.5	32.0	50	230	35	101	26
MB23	24	6.3	8.5	32.0	45	180	50	101	26
MB23	30	6.3	8.5	32.0	40	160	60	101	26
MB33	16	26	14	26.0	150	800	25	125	32
MB33	24	26	14	26.0	120	650	35	125	32
MB33	32	26	14	26.0	95	500	40	125	32
MB33	45	26	14	26.0	80	400	50	125	32
MB33	90	26	14	26.0	50	250	90	125	32
MB43	50	69	26	19.0	150	900	50	148	38
MB43	72	69	26	19.0	120	700	75	148	38
MB43	100	69	26	19.0	90	500	100	148	38
MB43	160	69	26	19.0	60	300	150	148	38
MB53	200	236	61	17.0	200	800	110	200	50
MB53	300	236	61	17.0	170	600	150	200	50
MB53	400	236	61	17.0	120	400	200	200	50

$\Delta\phi_B$: With the brake closed, a higher total backlash results ($\Delta\phi_{tot} = \Delta\phi_2 + \Delta\phi_B / i$).

9.5.2.6 Brake switching times

Switching times in case of brake operation with nominal voltage	Switching times in case of brake operation with overexcitation voltage
	

9.5.3 Installation conditions

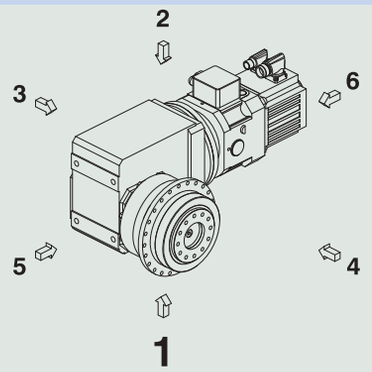
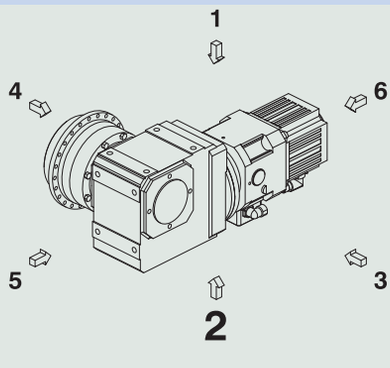
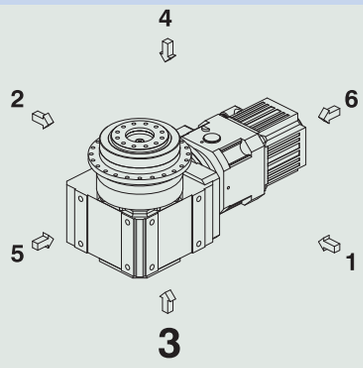
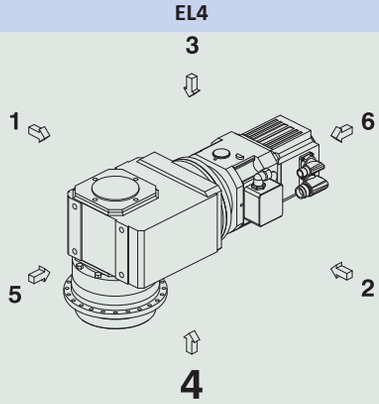
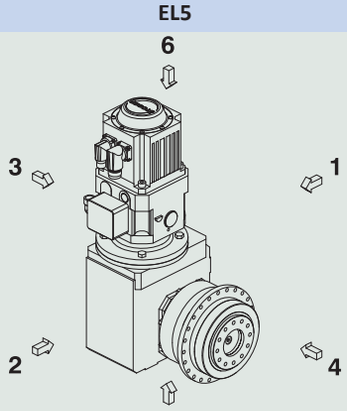
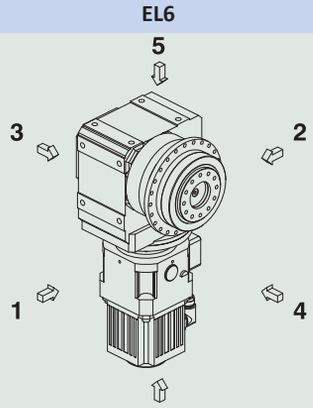
The torque and force values listed in this catalog are valid under the following conditions:

- When the flange shaft and gear housing are fastened on the machine side using screws of strength class 12.9
- When the gear housings are adjusted at pilot øb1, and also at pilot Øb for sizes PHQ11 and PHQ12. The machine-side fit must be H7.
- When the flange shaft is adjusted using the connecting element at pilot øbf or ødf

9.5.4 Mounting positions

The following table shows the standard mounting positions.

The numbers identify the gear unit sides. The mounting position is defined by the gear side facing downwards.

EL1	EL2	EL3
		
EL4	**EL5**	**EL6**
		

Since the lubricant filling volume of the gear unit depends on the mounting position, the mounting position must be specified when ordering.

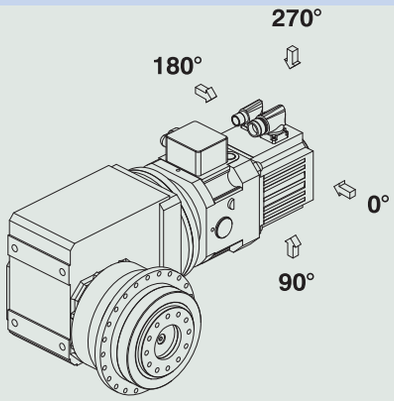
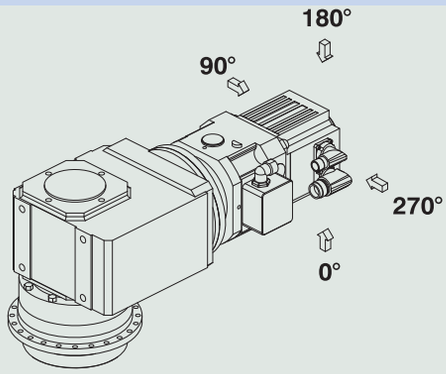
9.5.5 Lubricants

STOBER fills the gear units with the amount and type of lubricant specified on the nameplate. The filling volume and the structure of the gear units depend on the mounting position.

Only install the gear units in the intended mounting position! Reposition the gear units only after consulting STOBER. Otherwise, STOBER assumes no liability for the gear units.

You will receive lubricants for use in the food industry upon request.

9.5.6 Position of the plug connectors/terminal box

Mounting position EL1	Mounting position EL4
Plug connector in 270° position (standard)	Plug connector in 270° position (standard)
	

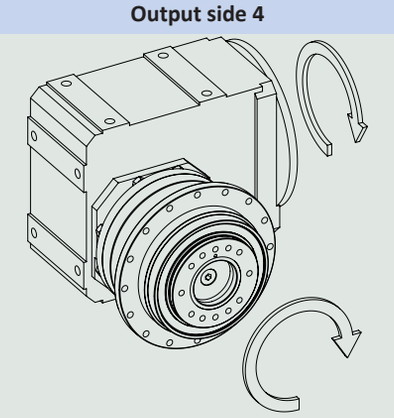
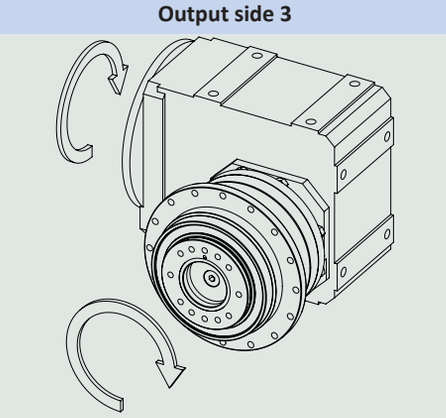
As standard, the plug connectors of the motor or the terminal box/plug connector of the motor adapter are mounted in the 270° position. The position of the terminal box/plug connector of the motor adapter can be selected separately from the position of the motor plug connectors.
Indicate variations for your geared motor in the order.

Note that the plug connector position rotates along with the geared motor if the geared motor is in another mounting position.

9.5.7 Other product features

Feature	Value
Max. permitted gear unit temperature (on the surface of the gear unit)	≤ 90 °C
Paint	Black RAL 9005
Explosion-proof design in accordance with (ATEX) Directive 2014/34/EU (optional)	Not available
Efficiency:	
η_{get} three-stage	93%
η_{get} four-stage	92%
η_{get} five-stage	90%
Protection class:[1]	
Gear unit	IP65
Motor	IP56, optionally IP66

9.5.8 Direction of rotation

Output side 4	Output side 3
	

The pictures show mounting position EL1.

[1] Observe the protection class of all the components.

9.6 Project configuration

Project your drives using our SERVOsoft designing software. Download SERVOsoft for free at https://www.stoeber.de/en/ServoSoft.

It is the most convenient and reliable method of drive selection, as the entire torque/speed curve of the application is displayed and evaluated here in the curve of the geared motor.

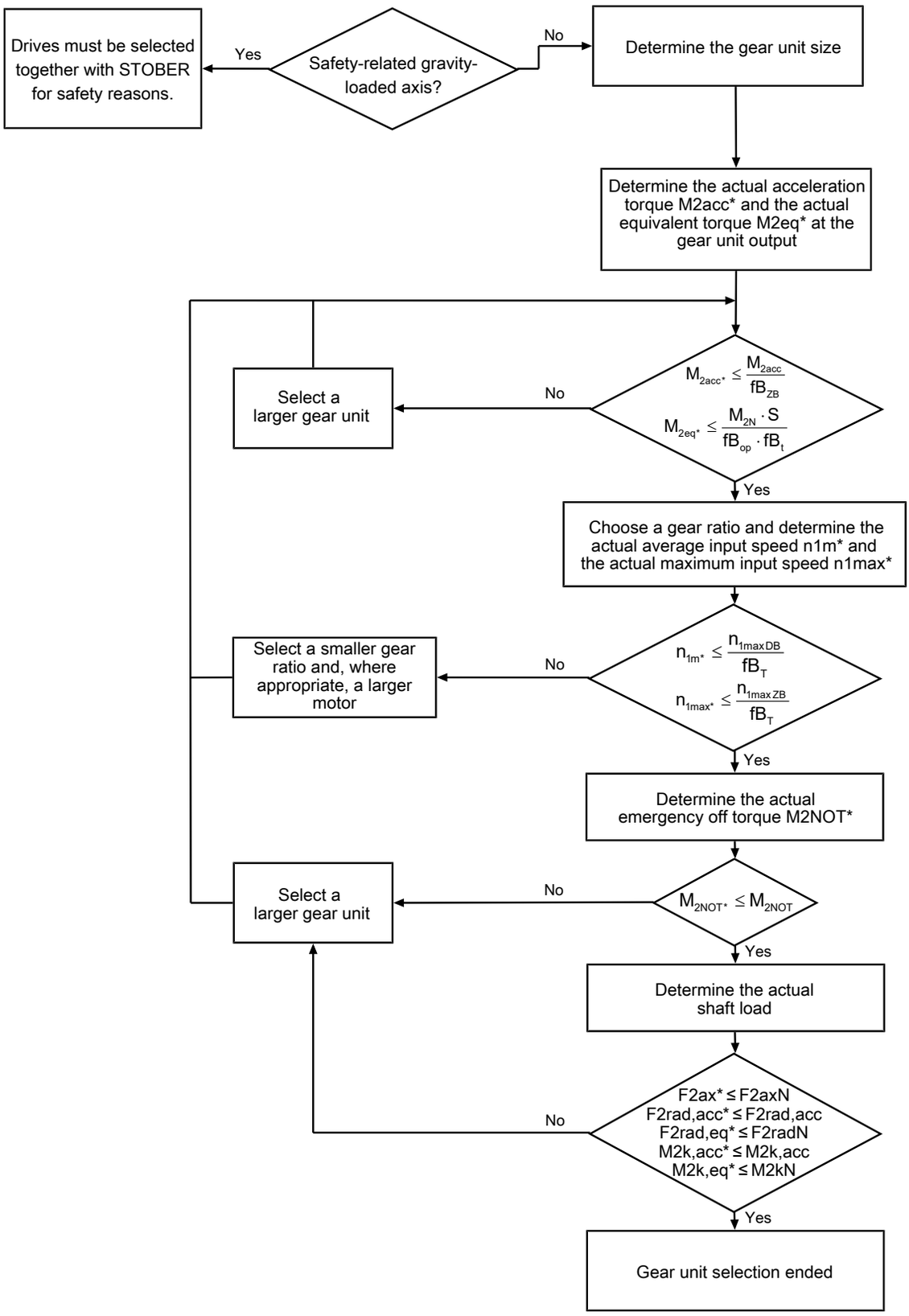
In this chapter, only limit values for specific operating points can be taken into consideration for manual drive selection.

An explanation of the formula symbols can be found in Chapter Symbols in formulas.

The formula symbols for values actually present in the application are marked with *.

9.6.1 Drive selection

Drive selection for gear units

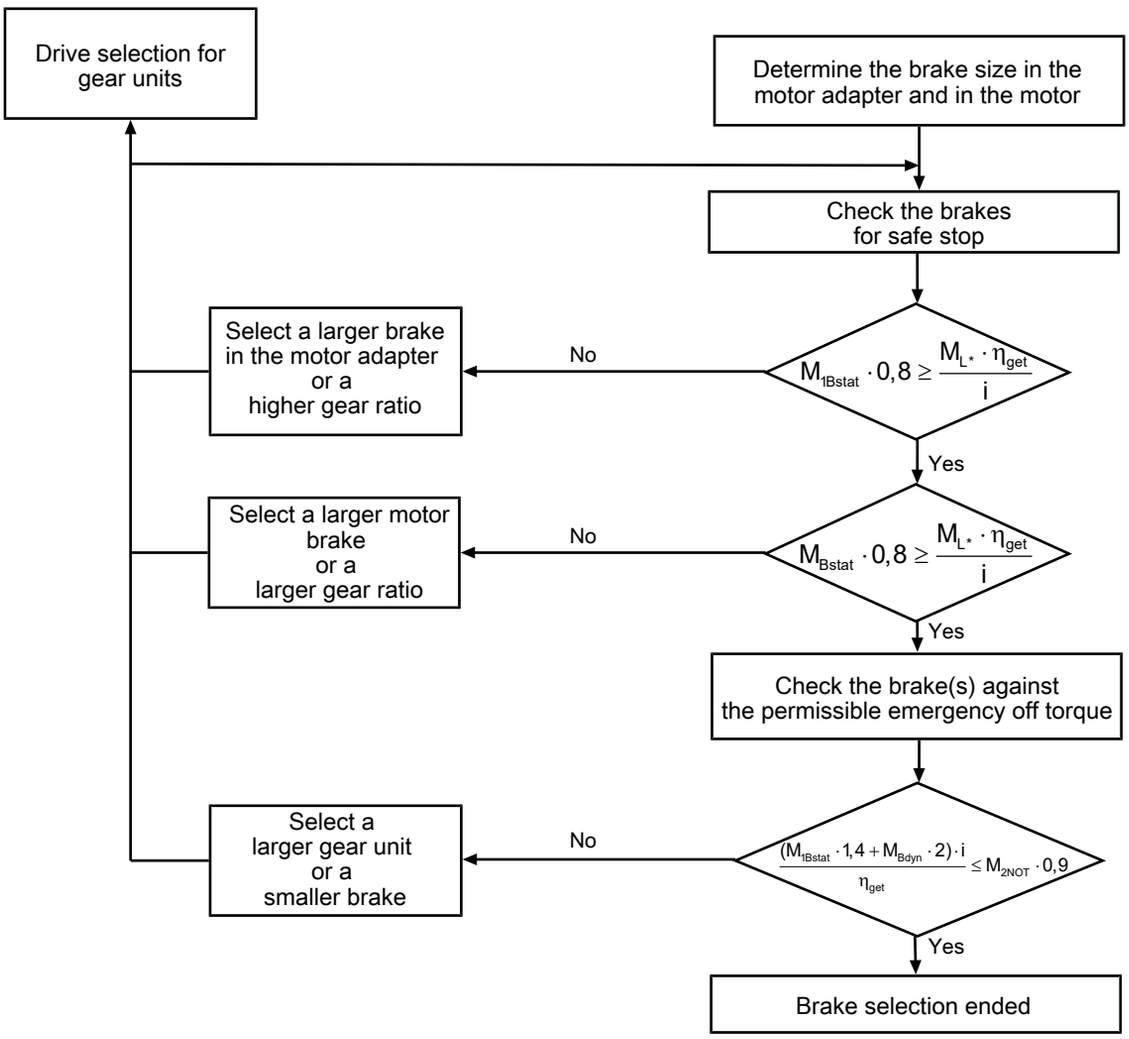


Calculate the forces and tilting torques in the chapter Permitted shaft loads.

Refer to the selection tables for the values for i, n_{1maxDB}, n_{1maxZB}, M_{2acc} (M_{2accHT} for reduced backlash), M_{2NOT}, M_{2N} and S.

The values for fB_T, fB_{op}, fB_t and fB_{ZB} can be found in the corresponding tables in this chapter.

Drive selection for brakes

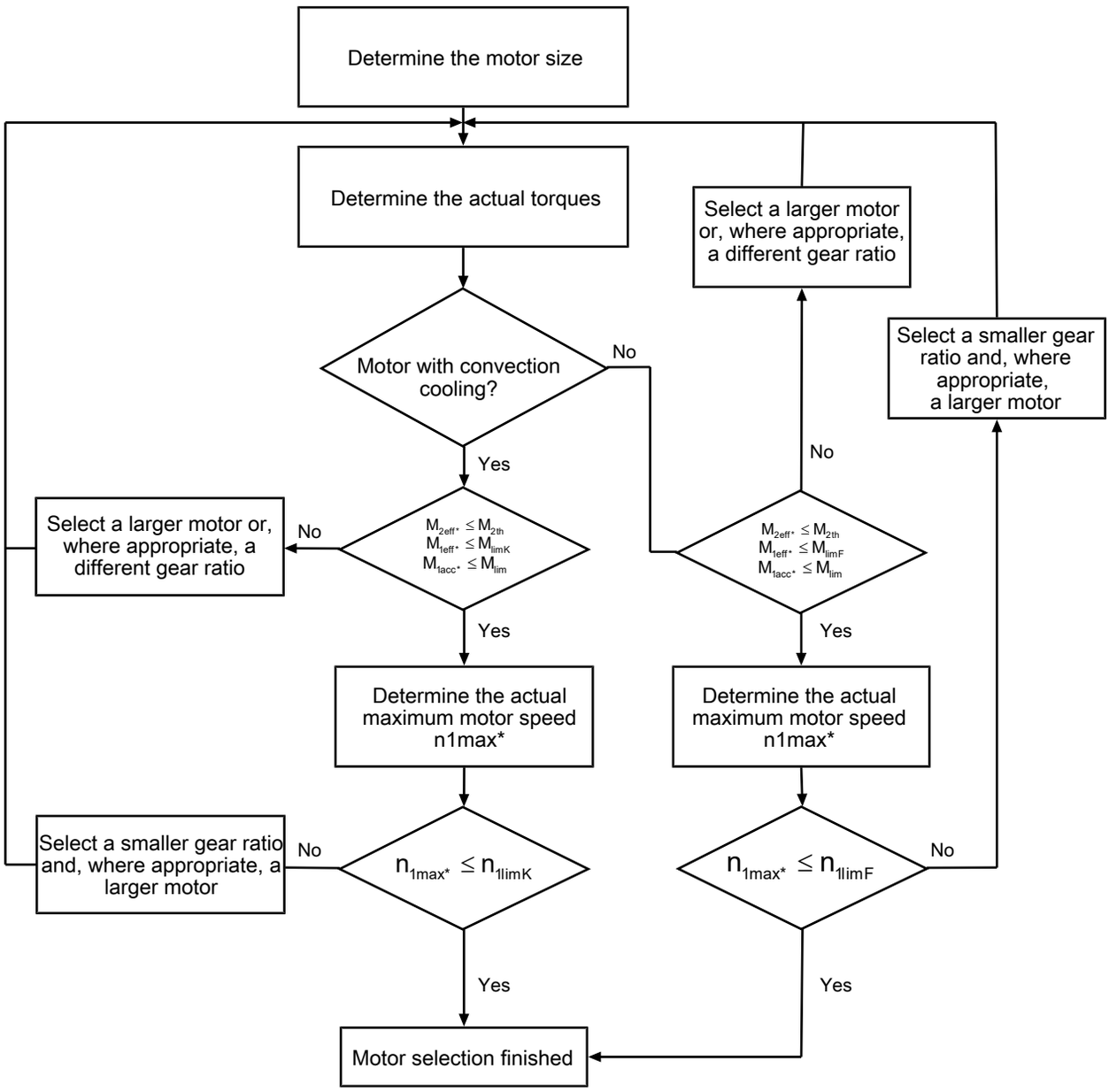


Refer to the selection tables for the values for i, M_{1Bstat}, M_{Bstat} and M_{2NOT}.

Refer to the Technical data table in the chapter [▷ 11.6.7] for the values for M_{Bdyn}.

Refer to the chapter Other product features for the values for η_{get}.

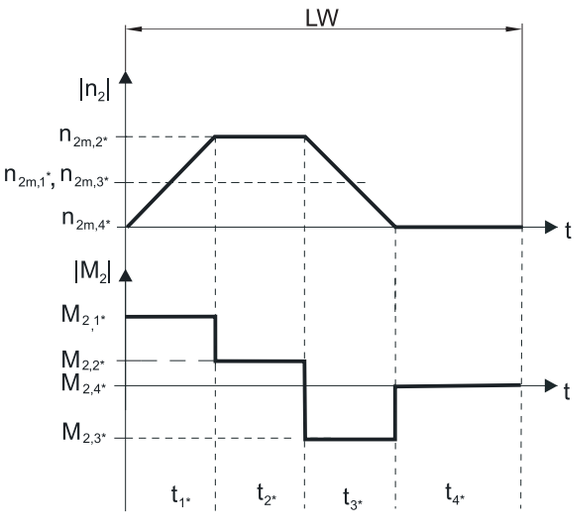
Drive selection for motors



The value for M_{lim}, M_{limK}, M_{limF}, n_{1limK} and n_{1limF} can be found in the motor characteristic curve in the chapter [▶ 11.3]. Note the size, nominal speed n_N and cooling type of the motor.

Example of cyclic operation

The following calculations are based on a representation of the power taken from the output based in accordance with the following example:



Calculation of the actual maximum acceleration torques

$$M_{2acc*} = J_{tot} \cdot \frac{\Delta n_2}{9{,}55 \cdot \Delta t} + M_{L*}$$

$$M_{1acc*} = \frac{M_{2acc*}}{i \cdot \eta_{get}} + J_1 \cdot \frac{\Delta n_1}{9{,}55 \cdot \Delta t}$$

Calculation of the actual average input speed

$$n_{1m*} = n_{2m*} \cdot i$$

$$n_{2m*} = \frac{\left|n_{2m,1*}\right| \cdot t_{1*} + \ldots + \left|n_{2m,n*}\right| \cdot t_{n*}}{t_{1*} + \ldots + t_{n*}}$$

If $t_{1*} + \ldots + t_{3*} \geq 6$ min, calculate n_{2m*} without the rest phase t_{4*}.

The values for the ratio i can be found in the selection tables.

Calculation of the actual effective torque

$$M_{2eff*} = \sqrt{\frac{t_{1*} \cdot M_{2,1*}{}^2 + \ldots + t_{n*} \cdot M_{2,n*}{}^2}{t_{1*} + \ldots + t_{n*}}}$$

Calculation of the actual emergency-off torque

$$M_{2NOT*} = J_{tot} \cdot \frac{\Delta n_2}{9.55 \cdot \Delta t} + M_{L*}$$

Calculation of the actual equivalent torque

$$M_{2eq*} = \sqrt[3]{\frac{\left|n_{2m,1*}\right| \cdot t_{1*} \cdot \left|M_{2,1*}{}^3\right| + \ldots + \left|n_{2m,n*}\right| \cdot t_{n*} \cdot \left|M_{2,n*}{}^3\right|}{\left|n_{2m,1*}\right| \cdot t_{1*} + \ldots + \left|n_{2m,n*}\right| \cdot t_{n*}}}$$

Calculation of the thermal limit torque

Calculate the thermal limit torque M_{2th} for a duty cycle $ED_{10} > 50\%$ and the actual average input speed n_{1m*}. (At $K_{mot,th} \leq 0$ you must reduce the average input speed n_{1m*} accordingly or select another geared motor size.)

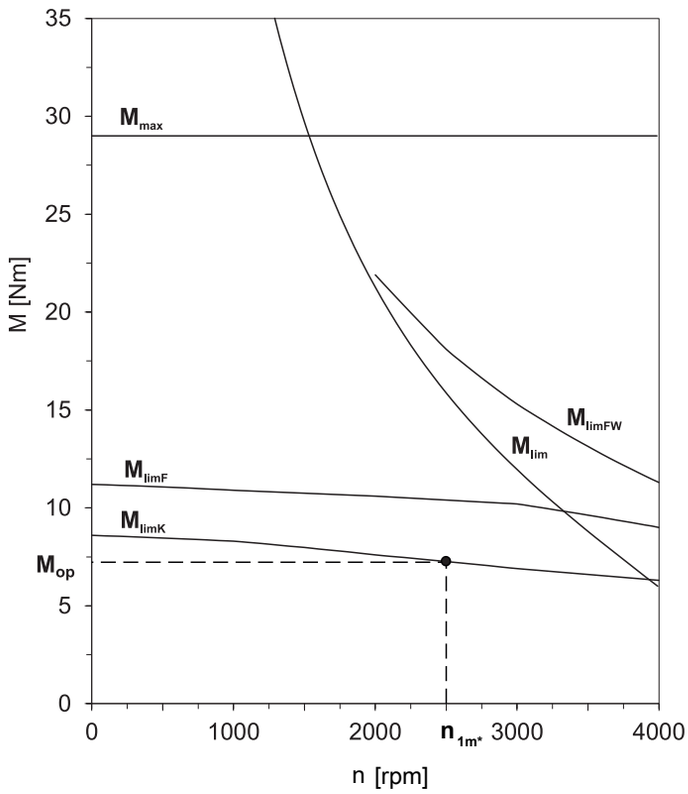
$$M_{2th} = M_{op} \cdot i \cdot K_{mot,th}$$

$$K_{mot,th} = 0{,}93 - \frac{a_{th}}{1000} \cdot athEL \cdot fB_T \cdot \left(\frac{n_{1m*}}{1000}\right)^2$$

The values for i and a_{th} can be found in the selection tables.

The values for a_{thEL} and fB_T can be found in the corresponding tables in this chapter.

The value for the torque of the motor at operating point M_{op} with the determined average input speed n_{1m*} can be found in the motor characteristic curve in the chapter Torque/speed curves. Note the size, nominal speed n_N and cooling type of the motor. The figure below shows an example of reading the torque M_{op} of a motor with convection cooling at the operating point.



Operating factors

Parameter a_{thEL}

Mounting position	a_{thEL}
EL1, 2	1.0
EL3, 4, 5, 6	1.1

Operating mode	fB_{op}
Uniform continuous operation	1.00
Cyclic operation	1.25
Reversing load cyclic operation	1.40

Run time	fB_t
Daily runtime ≤ 8 h	1.00
Daily runtime ≤ 16 h	1.15
Daily runtime ≤ 24 h	1.20

Cyclic operation	fB_{ZB}
≤ 1000 load changes/hour (LW/h)	1.00
> 1000 load changes/hour (LW/h)	1.15

Temperature		fB_T
Motor cooling	**Surrounding temperature**	
Motor with forced ventilation	≤ 20 °C	0.9
	≤ 30 °C	1.0
	≤ 40 °C	1.15
Motor with convection cooling	≤ 20 °C	1.0
	≤ 30 °C	1.1
	≤ 40 °C	1.25

Notes

- The maximum permitted gear unit temperature (see the "Other product features" chapter) must not be exceeded. Doing so may result in damage to the geared motor.
- For braking from full speed (for example when the power fails or when setting up the machine), note the permitted gear unit torques (M_{2acc}, M_{2NOT}) in the selection tables.

9.6.2 Permitted shaft loads for the output shaft

The values specified in the tables apply to the permitted shaft loads:

- For shaft dimensions in accordance with the catalog
- For output speeds $n_{2m*} \leq 100$ rpm ($F^{2axN} = F_{2ax100}$; $F_{2radN} = F_{2rad100}$; $M_{2kN} = M_{2k100}$)
- Only if radial forces on the gear unit are stabilized by its pilots (housing, flange shaft)

Permitted shaft loads for standard bearing S

Type	z_2 [mm]	F_{2ax100} [N]	$F_{2rad100}$ [N]	$F_{2rad,acc}$ [N]	M_{2k100} [Nm]	$M_{2k,acc}$ [Nm]	C_{2k} [Nm/ arcmin]
PHQ4	83.0	2150	3095	3929	257	326	192
PHQ5	97.0	4150	4536	4897	440	475	429
PHQ7	86.0	6150	17045	17045	1466	1466	500
PHQ8	125.5	10050	27778	33333	3486	4183	1550
PHQ9	155.0	33000	48387	70968	7500	11000	7500
PHQ10	171.0	50000	51462	73099	8800	12500	9500
PHQ11	231.0	60000	47619	69264	11000	16000	11500
PHQ12	281.0	70000	64057	106761	18000	30000	14000

Permitted shaft loads for reinforced bearing V

Type	z_2 [mm]	F_{2ax100} [N]	$F_{2rad100}$ [N]	$F_{2rad,acc}$ [N]	M_{2k100} [Nm]	$M_{2k,acc}$ [Nm]	C_{2k} [Nm/ arcmin]
PHQ4	88.5	2900	4000	4000	354	354	217
PHQ5	104.0	5000	5500	5500	572	572	478

For other output speeds, download diagrams at https://configurator.stoeber.de/en-US/.

The following applies to output speeds $n_{2m*} > 100$ rpm:

$$F_{2axN} = \frac{F_{2ax100}}{\sqrt[3]{\frac{n_{2m*}}{100\ \text{rpm}}}} \qquad F_{2radN} = \frac{F_{2rad100}}{\sqrt[3]{\frac{n_{2m*}}{100\ \text{rpm}}}} \qquad M_{2kN} = \frac{M_{2k100}}{\sqrt[3]{\frac{n_{2m*}}{100\ \text{rpm}}}}$$

The values for F_{2ax100}, $F_{2rad100}$ and M_{2k100} can be found in the table "Permitted shaft loads" in this chapter.

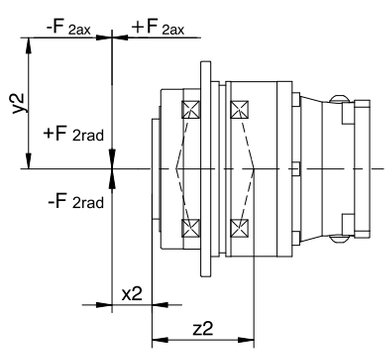


Fig. 2: Force application points

You can determine the permitted radial forces from the permitted tilting torque M_{2kN} and $M_{2k,acc}$. The actual radial forces may not exceed the permitted radial forces. The permitted radial forces pertain to the shaft end (x2 = 0).

$$M_{2k,acc^*} = \frac{2 \cdot F_{2ax^*} \cdot y_2 + F_{2rad,acc^*} \cdot (x_2 + z_2)}{1000}$$

For applications with multiple axial and/or radial forces, you must add the forces as vectors.

In the event of EMERGENCY OFF operation (max. 1000 load changes), you can multiply the permitted forces and torques for F_{2ax100}, $F_{2rad100}$ and M_{2k100} by a factor of two.

Also note the calculation for equivalent values:

$$M_{2k,eq^*} = \sqrt[3]{\frac{|n_{2m,1^*}| \cdot t_{1^*} \cdot |M_{2k,acc,1^*}^3| + \ldots + |n_{2m,n^*}| \cdot t_{n^*} \cdot |M_{2k,acc,n^*}^3|}{|n_{2m,1^*}| \cdot t_{1^*} + \ldots + |n_{2m,n^*}| \cdot t_{n^*}}}$$

$$F_{2rad,eq^*} = \sqrt[3]{\frac{|n_{2m,1^*}| \cdot t_{1^*} \cdot |F_{2rad,acc,1^*}^3| + \ldots + |n_{2m,n^*}| \cdot t_{n^*} \cdot |F_{2rad,acc,n^*}^3|}{|n_{2m,1^*}| \cdot t_{1^*} + \ldots + |n_{2m,n^*}| \cdot t_{n^*}}}$$

The following apply to the bearing service life L_{10h} ($ED_{10} \leq 40\%$):

$L_{10h} > 10000$ h with $1 < M_{2kN}/M_{2k^*} < 1.25$

$L_{10h} > 20000$ h with $1.25 < M_{2kN}/M_{2k^*} < 1.5$

$L_{10h} > 30000$ h with $1.5 < M_{2kN}/M_{2k^*}$

For different duty cycles:

$$L_{10h} > L_{10h(ED_{10}=40\%)} \cdot \frac{40\%}{ED_{10}}$$

9.6.3 Recommendation for radial shaft seal rings

For a duty cycle > 60% and higher surrounding temperatures, we recommend radial shaft seal rings made of FKM at the output.

Properties:

- Excellent temperature resistance
- High chemical stability
- Very good resistance to aging
- Excellent resistance in oils and greases
- For use in the food, beverage and pharmaceutical industries

Leak-proofness

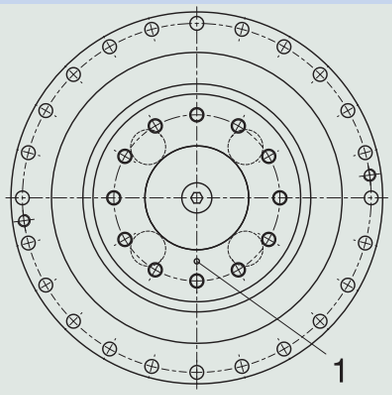
Our gear units are equipped with high-quality radial shaft seal rings and checked for leaks. However, a leak cannot be fully ruled out over the length of use of a gear unit. If you use a gear unit with goods incompatible with the lubricant, you must take measures to prevent direct contact with the gear unit lubricant in case of a leak.

9.6.4 Reverse operation

To ensure lubrication for circulating gearing parts during cyclic reverse operation from ± 20° to ± 90° at the output, pay careful attention to the position of the output shaft for the horizontal mounting of the gear unit, as shown in the diagrams below.

The images show the center position of reverse operation.

Cyclic reverse operation ≤ ± 20° on request.

PHQ4 – PHQ12

1 Position of the mark: bottom

Please note that the hole pattern may be different, depending on the size of the planetary gear unit.

9.7 Additional documentation

Additional documentation related to the product can be found at
http://www.stoeber.de/en/downloads/

Enter the ID of the documentation in the Search term field.

Documentation	ID
Operating manual gear units, geared motors PHQ53K – PHQ83K, PHQ94K – PHQ124K	443357_en

10 K helical bevel geared motors

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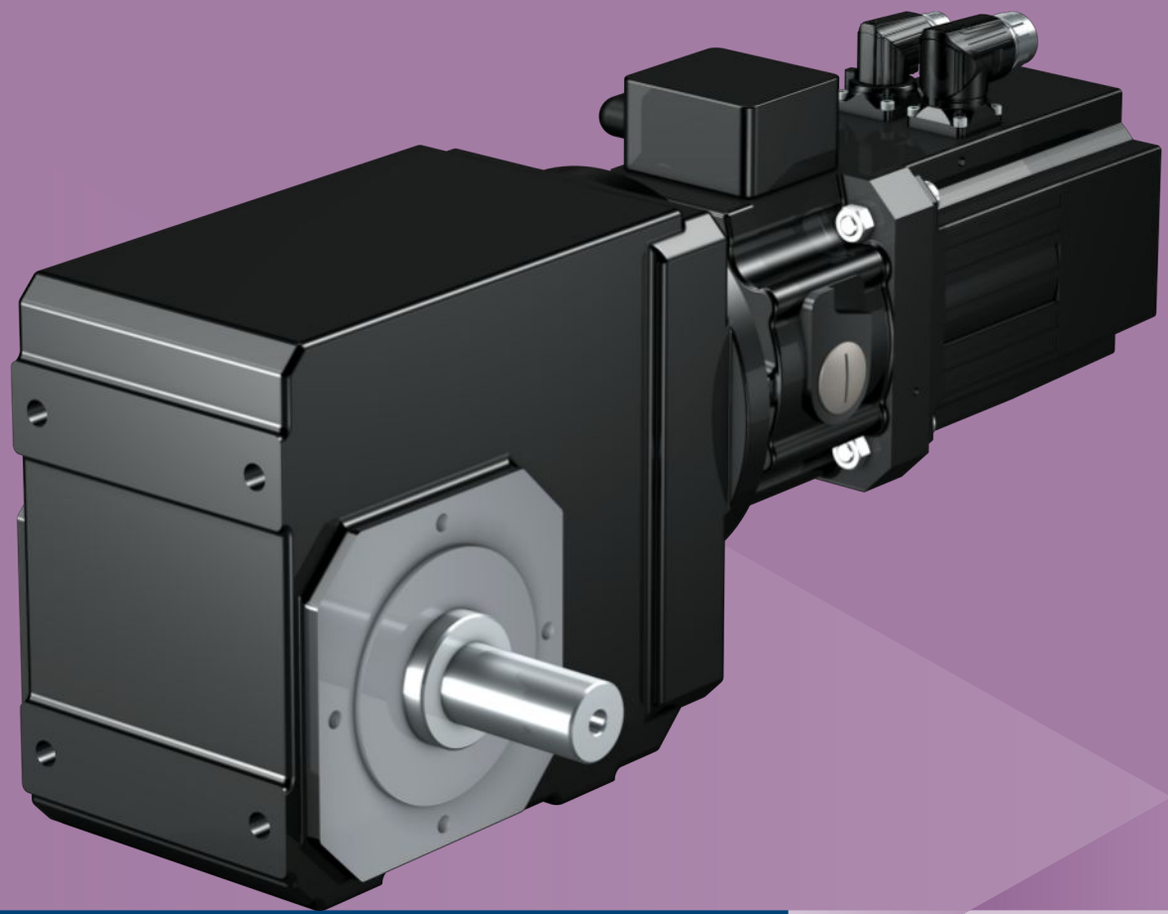


10 Helical bevel geared motors K

10.1 Overview

Highly rigid helical right-angle geared motors with redundant brake

Features

Power density	★★☆☆☆
Backlash	★★★☆☆
Price category	€€
Shaft load	★★★☆☆
Smooth operation	★★★☆☆
Torsional stiffness	★★☆☆☆
Mass moment of inertia	★★★★☆
Helical gearing	✓
FKM seal ring at the input	✓
Reinforced output bearing (K5 – K8)	✓ (on request)
Safe braking in case of power outage	✓
Safe support of the load with gravity-loaded axes using 2 brakes	✓
Easily and safely connected to the synchronous servo motor thanks to backlash-free plug-in coupling	✓

Key ★☆☆☆☆ good | ★★★★★ excellent
€ Economy | €€€€€ Premium

Technical data

M_{1Bstat}	8 – 100 Nm
i	4 – 97
M_{2acc}	62 – 7700 Nm
$\Delta\phi_2$	1.5 – 12 arcmin
η_{get}	96 – 97 %

10.2 Selection tables

The technical data specified in the selection tables applies to:

- Installation altitudes up to 1000 m above sea level
- Surrounding temperatures from 0 °C to 40 °C
- Drives with convection-cooled motors (e.g. EZ401**U**)
- Weight specification for mounting position EL1, housing design G
- Without consideration of the thermal limiting performance

For the technical data on drives with forced ventilated motors (e.g. EZ401**B**), refer to https://configurator.stoeber.de/en-US/.

An explanation of the formula symbols can be found in the chapter [▶ 15.1].

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/arcmin]	m [kg]
K1 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 110 Nm)																	
452	28	30	25	2.2	K102_0066 MB23 EZ501U	103	220	6.644	299/45	8.0	8.0	3600	3300	4000	11	6.8	26
452	30	34	27	2.0	K102_0066 MB23 EZ402U	103	220	6.644	299/45	8.0	8.0	3600	3300	4000	9.4	6.8	26
500	25	27	25	2.4	K102_0060 MB23 EZ501U	93	220	6.000	6/1	8.0	8.0	3300	2800	4000	11	6.8	26
500	25	27	25	2.4	K102_0060 MB23 EZ501U	93	220	6.000	6/1	12	8.0	3300	2800	4000	11	6.8	26
500	27	30	27	2.2	K102_0060 MB23 EZ402U	93	220	6.000	6/1	8.0	8.0	3300	2800	4000	9.5	6.8	26
500	27	30	27	2.2	K102_0060 MB23 EZ402U	93	220	6.000	6/1	12	8.0	3300	2800	4000	9.5	6.8	26
539	23	25	25	2.5	K102_0056 MB23 EZ501U	86	240	5.568	1520/273	8.0	8.0	3300	2800	4000	11	6.8	26
539	23	25	25	2.5	K102_0056 MB23 EZ501U	86	240	5.568	1520/273	12	8.0	3300	2800	4000	11	6.8	26
539	23	25	25	2.5	K102_0056 MB23 EZ501U	86	240	5.568	1520/273	16	8.0	3300	2800	4000	11	6.8	26
539	25	28	27	2.3	K102_0056 MB23 EZ402U	86	240	5.568	1520/273	8.0	8.0	3300	2800	4000	9.7	6.8	26
539	25	28	27	2.3	K102_0056 MB23 EZ402U	86	240	5.568	1520/273	12	8.0	3300	2800	4000	9.7	6.8	26
539	25	28	27	2.3	K102_0056 MB23 EZ402U	86	240	5.568	1520/273	16	8.0	3300	2800	4000	9.7	6.8	26
539	37	46	40	1.5	K102_0056 MB23 EZ404U	109	240	5.568	1520/273	8.0	8.0	3300	2800	4000	11	6.8	28
539	37	46	40	1.5	K102_0056 MB23 EZ404U	109	240	5.568	1520/273	12	8.0	3300	2800	4000	11	6.8	28
539	37	46	40	1.5	K102_0056 MB23 EZ404U	109	240	5.568	1520/273	16	8.0	3300	2800	4000	11	6.8	28
750	17	18	26	3.1	K102_0040 MB23 EZ501U	62	220	4.000	4/1	8.0	8.0	3300	2800	4000	11	6.8	26
750	17	18	26	3.1	K102_0040 MB23 EZ501U	62	220	4.000	4/1	12	8.0	3300	2800	4000	11	6.8	26
750	17	18	26	3.1	K102_0040 MB23 EZ501U	62	220	4.000	4/1	16	8.0	3300	2800	4000	11	6.8	26
750	18	20	28	2.8	K102_0040 MB23 EZ402U	62	220	4.000	4/1	8.0	8.0	3300	2800	4000	9.9	6.8	26
750	18	20	28	2.8	K102_0040 MB23 EZ402U	62	220	4.000	4/1	12	8.0	3300	2800	4000	9.9	6.8	26
750	18	20	28	2.8	K102_0040 MB23 EZ402U	62	220	4.000	4/1	16	8.0	3300	2800	4000	9.9	6.8	26
750	27	33	41	1.9	K102_0040 MB23 EZ404U	98	220	4.000	4/1	8.0	8.0	3300	2800	4000	11	6.8	28
750	27	33	41	1.9	K102_0040 MB23 EZ404U	98	220	4.000	4/1	12	8.0	3300	2800	4000	11	6.8	28
750	27	33	41	1.9	K102_0040 MB23 EZ404U	98	220	4.000	4/1	16	8.0	3300	2800	4000	11	6.8	28
750	29	31	44	1.8	K102_0040 MB23 EZ502U	98	220	4.000	4/1	8.0	8.0	3300	2800	4000	13	6.8	28
750	29	31	44	1.8	K102_0040 MB23 EZ502U	98	220	4.000	4/1	12	8.0	3300	2800	4000	13	6.8	28
750	29	31	44	1.8	K102_0040 MB23 EZ502U	98	220	4.000	4/1	16	8.0	3300	2800	4000	13	6.8	28
K2 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 220 Nm)																	
217	58	63	14	2.4	K202_0140 MB23 EZ501U	215	400	13.85	2881/208	8.0	8.0	3900	3500	4000	11	11	34
217	63	70	16	2.2	K202_0140 MB23 EZ402U	215	400	13.85	2881/208	8.0	8.0	3900	3500	4000	9.5	11	33
217	93	116	23	1.5	K202_0140 MB23 EZ404U	220	400	13.85	2881/208	8.0	8.0	3900	3500	4000	11	11	36
236	53	58	15	2.6	K202_0125 MB23 EZ501U	197	400	12.71	559/44	8.0	8.0	3900	3500	4000	11	11	34
236	58	64	16	2.3	K202_0125 MB23 EZ402U	197	400	12.71	559/44	8.0	8.0	3900	3500	4000	9.4	11	33
236	85	106	23	1.6	K202_0125 MB23 EZ404U	220	400	12.71	559/44	8.0	8.0	3900	3500	4000	11	11	36
260	48	53	15	2.7	K202_0115 MB23 EZ501U	179	400	11.55	1247/108	8.0	8.0	3500	3100	4000	11	11	34
260	53	58	16	2.5	K202_0115 MB23 EZ402U	179	400	11.55	1247/108	8.0	8.0	3500	3100	4000	9.7	11	33
260	77	96	23	1.7	K202_0115 MB23 EZ404U	220	400	11.55	1247/108	8.0	8.0	3500	3100	4000	11	11	36
260	83	90	25	1.6	K202_0115 MB23 EZ502U	220	400	11.55	1247/108	8.0	8.0	3500	3100	4000	13	11	35
298	42	46	15	3.0	K202_0100 MB23 EZ501U	156	400	10.07	2881/286	8.0	8.0	3900	3500	4000	11	11	34
298	42	46	15	3.0	K202_0100 MB23 EZ501U	156	400	10.07	2881/286	12	8.0	3900	3500	4000	11	11	34
298	46	51	16	2.7	K202_0100 MB23 EZ402U	156	400	10.07	2881/286	8.0	8.0	3900	3500	4000	9.6	11	33
298	46	51	16	2.7	K202_0100 MB23 EZ402U	156	400	10.07	2881/286	12	8.0	3900	3500	4000	9.6	11	33
298	67	84	24	1.9	K202_0100 MB23 EZ404U	220	400	10.07	2881/286	8.0	8.0	3900	3500	4000	11	11	36
298	67	84	24	1.9	K202_0100 MB23 EZ404U	220	400	10.07	2881/286	12	8.0	3900	3500	4000	11	11	36
298	72	78	25	1.7	K202_0100 MB23 EZ502U	220	400	10.07	2881/286	8.0	8.0	3900	3500	4000	13	11	35
298	72	78	25	1.7	K202_0100 MB23 EZ502U	220	400	10.07	2881/286	12	8.0	3900	3500	4000	13	11	35
326	38	42	15	3.2	K202_0092 MB23 EZ501U	143	400	9.190	2279/248	8.0	8.0	3500	3100	4000	11	11	34
326	38	42	15	3.2	K202_0092 MB23 EZ501U	143	400	9.190	2279/248	12	8.0	3500	3100	4000	11	11	34
326	38	42	15	3.2	K202_0092 MB23 EZ501U	143	400	9.190	2279/248	16	8.0	3500	3100	4000	11	11	34

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
K2 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 220 Nm)																	
326	42	46	16	2.9	K202_0092 MB23 EZ402U	143	400	9.190	2279/248	8.0	8.0	3500	3100	4000	9.9	11	33
326	42	46	16	2.9	K202_0092 MB23 EZ402U	143	400	9.190	2279/248	12	8.0	3500	3100	4000	9.9	11	33
326	42	46	16	2.9	K202_0092 MB23 EZ402U	143	400	9.190	2279/248	16	8.0	3500	3100	4000	9.9	11	33
326	62	77	24	2.0	K202_0092 MB23 EZ404U	220	400	9.190	2279/248	8.0	8.0	3500	3100	4000	11	11	36
326	62	77	24	2.0	K202_0092 MB23 EZ404U	220	400	9.190	2279/248	12	8.0	3500	3100	4000	11	11	36
326	62	77	24	2.0	K202_0092 MB23 EZ404U	220	400	9.190	2279/248	16	8.0	3500	3100	4000	11	11	36
326	66	71	26	1.8	K202_0092 MB23 EZ502U	220	400	9.190	2279/248	8.0	8.0	3500	3100	4000	13	11	35
326	66	71	26	1.8	K202_0092 MB23 EZ502U	220	400	9.190	2279/248	12	8.0	3500	3100	4000	13	11	35
326	66	71	26	1.8	K202_0092 MB23 EZ502U	220	400	9.190	2279/248	16	8.0	3500	3100	4000	13	11	35
357	35	38	15	3.4	K202_0084 MB23 EZ501U	130	400	8.397	2494/297	8.0	8.0	3500	3100	4000	11	11	34
357	35	38	15	3.4	K202_0084 MB23 EZ501U	130	400	8.397	2494/297	12	8.0	3500	3100	4000	11	11	34
357	35	38	15	3.4	K202_0084 MB23 EZ501U	130	400	8.397	2494/297	16	8.0	3500	3100	4000	11	11	34
357	38	42	16	3.1	K202_0084 MB23 EZ402U	130	400	8.397	2494/297	8.0	8.0	3500	3100	4000	9.8	11	33
357	38	42	16	3.1	K202_0084 MB23 EZ402U	130	400	8.397	2494/297	12	8.0	3500	3100	4000	9.8	11	33
357	38	42	16	3.1	K202_0084 MB23 EZ402U	130	400	8.397	2494/297	16	8.0	3500	3100	4000	9.8	11	33
357	56	70	24	2.1	K202_0084 MB23 EZ404U	220	400	8.397	2494/297	8.0	8.0	3500	3100	4000	11	11	36
357	56	70	24	2.1	K202_0084 MB23 EZ404U	220	400	8.397	2494/297	12	8.0	3500	3100	4000	11	11	36
357	56	70	24	2.1	K202_0084 MB23 EZ404U	220	400	8.397	2494/297	16	8.0	3500	3100	4000	11	11	36
357	60	65	26	2.0	K202_0084 MB23 EZ502U	220	400	8.397	2494/297	8.0	8.0	3500	3100	4000	13	11	35
357	60	65	26	2.0	K202_0084 MB23 EZ502U	220	400	8.397	2494/297	12	8.0	3500	3100	4000	13	11	35
357	60	65	26	2.0	K202_0084 MB23 EZ502U	220	400	8.397	2494/297	16	8.0	3500	3100	4000	13	11	35
421	30	32	15	3.8	K202_0071 MB23 EZ501U	110	400	7.118	2107/296	8.0	8.0	3000	2600	4000	12	11	34
421	30	32	15	3.8	K202_0071 MB23 EZ501U	110	400	7.118	2107/296	12	8.0	3000	2600	4000	12	11	34
421	30	32	15	3.8	K202_0071 MB23 EZ501U	110	400	7.118	2107/296	16	8.0	3000	2600	4000	12	11	34
421	32	36	17	3.4	K202_0071 MB23 EZ402U	110	400	7.118	2107/296	8.0	8.0	3000	2600	4000	10	11	33
421	32	36	17	3.4	K202_0071 MB23 EZ402U	110	400	7.118	2107/296	12	8.0	3000	2600	4000	10	11	33
421	32	36	17	3.4	K202_0071 MB23 EZ402U	110	400	7.118	2107/296	16	8.0	3000	2600	4000	10	11	33
421	48	59	24	2.3	K202_0071 MB23 EZ404U	200	400	7.118	2107/296	8.0	8.0	3000	2600	4000	12	11	36
421	48	59	24	2.3	K202_0071 MB23 EZ404U	200	400	7.118	2107/296	12	8.0	3000	2600	4000	12	11	36
421	48	59	24	2.3	K202_0071 MB23 EZ404U	200	400	7.118	2107/296	16	8.0	3000	2600	4000	12	11	36
421	51	55	26	2.2	K202_0071 MB23 EZ502U	211	400	7.118	2107/296	8.0	8.0	3000	2600	4000	14	11	35
421	51	55	26	2.2	K202_0071 MB23 EZ502U	211	400	7.118	2107/296	12	8.0	3000	2600	4000	14	11	35
421	51	55	26	2.2	K202_0071 MB23 EZ502U	211	400	7.118	2107/296	16	8.0	3000	2600	4000	14	11	35
421	51	57	26	2.2	K202_0071 MB33 EZ701U	138	400	7.118	2107/296	16	15	3000	2600	4000	39	11	45
421	67	77	34	1.7	K202_0071 MB23 EZ503U	211	400	7.118	2107/296	8.0	15	3000	2600	4000	17	11	37
421	67	77	34	1.7	K202_0071 MB23 EZ503U	211	400	7.118	2107/296	12	15	3000	2600	4000	17	11	37
449	28	30	15	3.9	K202_0067 MB23 EZ501U	104	400	6.683	2279/341	8.0	8.0	3500	3100	4000	11	11	34
449	28	30	15	3.9	K202_0067 MB23 EZ501U	104	400	6.683	2279/341	12	8.0	3500	3100	4000	11	11	34
449	28	30	15	3.9	K202_0067 MB23 EZ501U	104	400	6.683	2279/341	16	8.0	3500	3100	4000	11	11	34
449	30	34	17	3.6	K202_0067 MB23 EZ402U	104	400	6.683	2279/341	8.0	8.0	3500	3100	4000	10	11	33
449	30	34	17	3.6	K202_0067 MB23 EZ402U	104	400	6.683	2279/341	12	8.0	3500	3100	4000	10	11	33
449	30	34	17	3.6	K202_0067 MB23 EZ402U	104	400	6.683	2279/341	16	8.0	3500	3100	4000	10	11	33
449	45	56	25	2.4	K202_0067 MB23 EZ404U	188	400	6.683	2279/341	8.0	8.0	3500	3100	4000	11	11	36
449	45	56	25	2.4	K202_0067 MB23 EZ404U	188	400	6.683	2279/341	12	8.0	3500	3100	4000	11	11	36
449	45	56	25	2.4	K202_0067 MB23 EZ404U	188	400	6.683	2279/341	16	8.0	3500	3100	4000	11	11	36
449	48	52	26	2.3	K202_0067 MB23 EZ502U	201	400	6.683	2279/341	8.0	8.0	3500	3100	4000	14	11	35
449	48	52	26	2.3	K202_0067 MB23 EZ502U	201	400	6.683	2279/341	12	8.0	3500	3100	4000	14	11	35
449	48	52	26	2.3	K202_0067 MB23 EZ502U	201	400	6.683	2279/341	16	8.0	3500	3100	4000	14	11	35
449	48	54	26	2.3	K202_0067 MB33 EZ701U	130	400	6.683	2279/341	16	15	3500	3100	4000	39	11	45
449	63	72	35	1.7	K202_0067 MB23 EZ503U	207	400	6.683	2279/341	8.0	15	3500	3100	4000	17	11	37
449	63	72	35	1.7	K202_0067 MB23 EZ503U	207	400	6.683	2279/341	12	15	3500	3100	4000	17	11	37
500	25	27	15	4.2	K202_0060 MB23 EZ501U	93	367	6.000	6/1	8.0	8.0	3000	2600	4000	12	11	34
500	25	27	15	4.2	K202_0060 MB23 EZ501U	93	367	6.000	6/1	12	8.0	3000	2600	4000	12	11	34
500	25	27	15	4.2	K202_0060 MB23 EZ501U	93	367	6.000	6/1	16	8.0	3000	2600	4000	12	11	34
500	27	30	17	3.9	K202_0060 MB23 EZ402U	93	367	6.000	6/1	8.0	8.0	3000	2600	4000	11	11	33
500	27	30	17	3.9	K202_0060 MB23 EZ402U	93	367	6.000	6/1	12	8.0	3000	2600	4000	11	11	33
500	27	30	17	3.9	K202_0060 MB23 EZ402U	93	367	6.000	6/1	16	8.0	3000	2600	4000	11	11	33
500	40	50	25	2.6	K202_0060 MB23 EZ404U	169	367	6.000	6/1	8.0	8.0	3000	2600	4000	12	11	36
500	40	50	25	2.6	K202_0060 MB23 EZ404U	169	367	6.000	6/1	12	8.0	3000	2600	4000	12	11	36
500	40	50	25	2.6	K202_0060 MB23 EZ404U	169	367	6.000	6/1	16	8.0	3000	2600	4000	12	11	36
500	43	47	27	2.5	K202_0060 MB23 EZ502U	180	367	6.000	6/1	8.0	8.0	3000	2600	4000	14	11	35
500	43	47	27	2.5	K202_0060 MB23 EZ502U	180	367	6.000	6/1	12	8.0	3000	2600	4000	14	11	35
500	43	47	27	2.5	K202_0060 MB23 EZ502U	180	367	6.000	6/1	16	8.0	3000	2600	4000	14	11	35
500	43	48	27	2.5	K202_0060 MB33 EZ701U	116	400	6.000	6/1	16	15	3000	2600	4000	39	11	45

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
K2 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 220 Nm)																	
500	43	48	27	2.5	K202_0060 MB33 EZ701U	116	400	6.000	6/1	24	15	3000	2600	4000	39	11	45
500	56	65	35	1.9	K202_0060 MB23 EZ503U	200	367	6.000	6/1	8.0	15	3000	2600	4000	18	11	37
500	56	65	35	1.9	K202_0060 MB23 EZ503U	200	367	6.000	6/1	12	15	3000	2600	4000	18	11	37
500	70	84	43	1.5	K202_0060 MB33 EZ702U	200	400	6.000	6/1	16	15	3000	2600	4000	44	11	47
500	70	84	43	1.5	K202_0060 MB33 EZ702U	200	400	6.000	6/1	24	15	3000	2600	4000	44	11	47
579	22	24	16	4.7	K202_0052 MB23 EZ501U	80	316	5.177	2107/407	8.0	8.0	3000	2600	4000	12	11	34
579	22	24	16	4.7	K202_0052 MB23 EZ501U	80	316	5.177	2107/407	12	8.0	3000	2600	4000	12	11	34
579	22	24	16	4.7	K202_0052 MB23 EZ501U	80	316	5.177	2107/407	16	8.0	3000	2600	4000	12	11	34
579	24	26	17	4.3	K202_0052 MB23 EZ402U	80	316	5.177	2107/407	8.0	8.0	3000	2600	4000	11	11	33
579	24	26	17	4.3	K202_0052 MB23 EZ402U	80	316	5.177	2107/407	12	8.0	3000	2600	4000	11	11	33
579	24	26	17	4.3	K202_0052 MB23 EZ402U	80	316	5.177	2107/407	16	8.0	3000	2600	4000	11	11	33
579	35	43	25	2.9	K202_0052 MB23 EZ404U	146	316	5.177	2107/407	8.0	8.0	3000	2600	4000	12	11	36
579	35	43	25	2.9	K202_0052 MB23 EZ404U	146	316	5.177	2107/407	12	8.0	3000	2600	4000	12	11	36
579	35	43	25	2.9	K202_0052 MB23 EZ404U	146	316	5.177	2107/407	16	8.0	3000	2600	4000	12	11	36
579	37	40	27	2.7	K202_0052 MB23 EZ502U	156	316	5.177	2107/407	8.0	8.0	3000	2600	4000	14	11	35
579	37	40	27	2.7	K202_0052 MB23 EZ502U	156	316	5.177	2107/407	12	8.0	3000	2600	4000	14	11	35
579	37	40	27	2.7	K202_0052 MB23 EZ502U	156	316	5.177	2107/407	16	8.0	3000	2600	4000	14	11	35
579	37	42	27	2.7	K202_0052 MB33 EZ701U	100	400	5.177	2107/407	16	15	3000	2600	4000	39	11	45
579	37	42	27	2.7	K202_0052 MB33 EZ701U	100	400	5.177	2107/407	24	15	3000	2600	4000	39	11	45
579	49	56	35	2.1	K202_0052 MB23 EZ503U	188	316	5.177	2107/407	8.0	15	3000	2600	4000	18	11	37
579	49	56	35	2.1	K202_0052 MB23 EZ503U	188	316	5.177	2107/407	12	15	3000	2600	4000	18	11	37
579	60	72	44	1.7	K202_0052 MB33 EZ702U	190	400	5.177	2107/407	16	15	3000	2600	4000	44	11	47
579	60	72	44	1.7	K202_0052 MB33 EZ702U	190	400	5.177	2107/407	24	15	3000	2600	4000	44	11	47
687	20	22	17	4.8	K202_0044 MB23 EZ402U	68	267	4.364	48/11	8.0	8.0	3000	2600	4000	11	11	33
687	20	22	17	4.8	K202_0044 MB23 EZ402U	68	267	4.364	48/11	12	8.0	3000	2600	4000	11	11	33
687	20	22	17	4.8	K202_0044 MB23 EZ402U	68	267	4.364	48/11	16	8.0	3000	2600	4000	11	11	33
687	29	36	25	3.3	K202_0044 MB23 EZ404U	123	267	4.364	48/11	8.0	8.0	3000	2600	4000	12	11	36
687	29	36	25	3.3	K202_0044 MB23 EZ404U	123	267	4.364	48/11	12	8.0	3000	2600	4000	12	11	36
687	29	36	25	3.3	K202_0044 MB23 EZ404U	123	267	4.364	48/11	16	8.0	3000	2600	4000	12	11	36
687	31	34	27	3.0	K202_0044 MB23 EZ502U	131	267	4.364	48/11	8.0	8.0	3000	2600	4000	15	11	35
687	31	34	27	3.0	K202_0044 MB23 EZ502U	131	267	4.364	48/11	12	8.0	3000	2600	4000	15	11	35
687	31	34	27	3.0	K202_0044 MB23 EZ502U	131	267	4.364	48/11	16	8.0	3000	2600	4000	15	11	35
687	31	35	27	3.0	K202_0044 MB33 EZ701U	85	400	4.364	48/11	16	15	3000	2600	4000	40	11	45
687	31	35	27	3.0	K202_0044 MB33 EZ701U	85	400	4.364	48/11	24	15	3000	2600	4000	40	11	45
687	31	35	27	3.0	K202_0044 MB33 EZ701U	85	400	4.364	48/11	32	15	3000	2600	4000	40	11	45
687	41	47	36	2.3	K202_0044 MB23 EZ503U	159	267	4.364	48/11	8.0	15	3000	2600	4000	18	11	37
687	41	47	36	2.3	K202_0044 MB23 EZ503U	159	267	4.364	48/11	12	15	3000	2600	4000	18	11	37
687	51	61	44	1.9	K202_0044 MB33 EZ702U	174	400	4.364	48/11	16	15	3000	2600	4000	45	11	47
687	51	61	44	1.9	K202_0044 MB33 EZ702U	174	400	4.364	48/11	24	15	3000	2600	4000	45	11	47
687	51	61	44	1.9	K202_0044 MB33 EZ702U	174	400	4.364	48/11	32	15	3000	2600	4000	45	11	47
687	57	68	50	1.7	K202_0044 MB23 EZ505U	159	267	4.364	48/11	8.0	15	3000	2600	4000	23	11	40
687	57	68	50	1.7	K202_0044 MB23 EZ505U	159	267	4.364	48/11	12	15	3000	2600	4000	23	11	40
750	27	33	26	3.4	K202_0040 MB23 EZ404U	113	244	4.000	4/1	8.0	8.0	3000	2600	4000	13	11	36
750	27	33	26	3.4	K202_0040 MB23 EZ404U	113	244	4.000	4/1	12	8.0	3000	2600	4000	13	11	36
750	27	33	26	3.4	K202_0040 MB23 EZ404U	113	244	4.000	4/1	16	8.0	3000	2600	4000	13	11	36
750	29	31	27	3.2	K202_0040 MB23 EZ502U	120	244	4.000	4/1	8.0	8.0	3000	2600	4000	15	11	35
750	29	31	27	3.2	K202_0040 MB23 EZ502U	120	244	4.000	4/1	12	8.0	3000	2600	4000	15	11	35
750	29	31	27	3.2	K202_0040 MB23 EZ502U	120	244	4.000	4/1	16	8.0	3000	2600	4000	15	11	35
750	29	32	27	3.2	K202_0040 MB33 EZ701U	78	400	4.000	4/1	16	15	3000	2600	4000	40	11	45
750	29	32	27	3.2	K202_0040 MB33 EZ701U	78	400	4.000	4/1	24	15	3000	2600	4000	40	11	45
750	29	32	27	3.2	K202_0040 MB33 EZ701U	78	400	4.000	4/1	32	15	3000	2600	4000	40	11	45
750	29	32	27	3.2	K202_0040 MB33 EZ701U	78	400	4.000	4/1	45	15	3000	2600	4000	40	11	45
750	38	43	36	2.5	K202_0040 MB23 EZ503U	146	244	4.000	4/1	8.0	15	3000	2600	4000	19	11	37
750	38	43	36	2.5	K202_0040 MB23 EZ503U	146	244	4.000	4/1	12	15	3000	2600	4000	19	11	37
750	47	56	45	2.0	K202_0040 MB33 EZ702U	159	400	4.000	4/1	16	15	3000	2600	4000	45	11	47
750	47	56	45	2.0	K202_0040 MB33 EZ702U	159	400	4.000	4/1	24	15	3000	2600	4000	45	11	47
750	47	56	45	2.0	K202_0040 MB33 EZ702U	159	400	4.000	4/1	32	15	3000	2600	4000	45	11	47
750	47	56	45	2.0	K202_0040 MB33 EZ702U	159	400	4.000	4/1	45	15	3000	2600	4000	45	11	47
750	52	62	50	1.8	K202_0040 MB23 EZ505U	146	244	4.000	4/1	8.0	15	3000	2600	4000	23	11	40
750	52	62	50	1.8	K202_0040 MB23 EZ505U	146	244	4.000	4/1	12	15	3000	2600	4000	23	11	40
K3 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 390 Nm)																	
129	97	106	8.7	3.0	K302_0230 MB23 EZ501U	361	700	23.29	559/24	8.0	8.0	3800	3500	4000	11	16	39
129	106	117	9.5	2.7	K302_0230 MB23 EZ402U	361	700	23.29	559/24	8.0	8.0	3800	3500	4000	9.5	16	38
129	156	194	14	1.9	K302_0230 MB23 EZ404U	385	700	23.29	559/24	8.0	8.0	3800	3500	4000	11	16	41

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
K3 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 390 Nm)																	
129	167	181	15	1.7	K302_0230 MB23 EZ502U	385	700	23.29	559/24	8.0	8.0	3800	3500	4000	13	16	40
148	85	92	8.8	3.3	K302_0200 MB23 EZ501U	315	700	20.28	3569/176	8.0	8.0	3800	3500	4000	11	16	39
148	92	102	9.6	3.0	K302_0200 MB23 EZ402U	315	700	20.28	3569/176	8.0	8.0	3800	3500	4000	9.4	16	38
148	136	169	14	2.0	K302_0200 MB23 EZ404U	385	700	20.28	3569/176	8.0	8.0	3800	3500	4000	11	16	41
148	146	157	15	1.9	K302_0200 MB23 EZ502U	385	700	20.28	3569/176	8.0	8.0	3800	3500	4000	13	16	40
173	72	79	8.9	3.7	K302_0175 MB23 EZ501U	268	700	17.29	1591/92	8.0	8.0	3500	3100	4000	11	16	39
173	72	79	8.9	3.7	K302_0175 MB23 EZ501U	268	700	17.29	1591/92	12	8.0	3500	3100	4000	11	16	39
173	79	87	9.7	3.3	K302_0175 MB23 EZ402U	268	700	17.29	1591/92	8.0	8.0	3500	3100	4000	9.7	16	38
173	79	87	9.7	3.3	K302_0175 MB23 EZ402U	268	700	17.29	1591/92	12	8.0	3500	3100	4000	9.7	16	38
173	116	144	14	2.3	K302_0175 MB23 EZ404U	385	700	17.29	1591/92	8.0	8.0	3500	3100	4000	11	16	41
173	116	144	14	2.3	K302_0175 MB23 EZ404U	385	700	17.29	1591/92	12	8.0	3500	3100	4000	11	16	41
173	124	134	15	2.1	K302_0175 MB23 EZ502U	385	700	17.29	1591/92	8.0	8.0	3500	3100	4000	13	16	40
173	124	134	15	2.1	K302_0175 MB23 EZ502U	385	700	17.29	1591/92	12	8.0	3500	3100	4000	13	16	40
173	163	186	20	1.6	K302_0175 MB23 EZ503U	385	700	17.29	1591/92	8.0	15	3500	3100	4000	17	16	42
177	71	77	8.9	3.7	K302_0170 MB23 EZ501U	263	700	16.94	559/33	8.0	8.0	3800	3500	4000	11	16	39
177	71	77	8.9	3.7	K302_0170 MB23 EZ501U	263	700	16.94	559/33	12	8.0	3800	3500	4000	11	16	39
177	77	85	9.7	3.4	K302_0170 MB23 EZ402U	263	700	16.94	559/33	8.0	8.0	3800	3500	4000	9.5	16	38
177	77	85	9.7	3.4	K302_0170 MB23 EZ402U	263	700	16.94	559/33	12	8.0	3800	3500	4000	9.5	16	38
177	113	141	14	2.3	K302_0170 MB23 EZ404U	385	700	16.94	559/33	8.0	8.0	3800	3500	4000	11	16	41
177	113	141	14	2.3	K302_0170 MB23 EZ404U	385	700	16.94	559/33	12	8.0	3800	3500	4000	11	16	41
177	122	131	15	2.2	K302_0170 MB23 EZ502U	385	700	16.94	559/33	8.0	8.0	3800	3500	4000	13	16	40
177	122	131	15	2.2	K302_0170 MB23 EZ502U	385	700	16.94	559/33	12	8.0	3800	3500	4000	13	16	40
177	159	182	20	1.6	K302_0170 MB23 EZ503U	385	700	16.94	559/33	8.0	15	3800	3500	4000	17	16	42
215	58	64	9.0	4.2	K302_0140 MB23 EZ501U	216	700	13.94	1505/108	8.0	8.0	3500	3100	4000	11	16	39
215	58	64	9.0	4.2	K302_0140 MB23 EZ501U	216	700	13.94	1505/108	12	8.0	3500	3100	4000	11	16	39
215	58	64	9.0	4.2	K302_0140 MB23 EZ501U	216	700	13.94	1505/108	16	8.0	3500	3100	4000	11	16	39
215	64	70	9.9	3.9	K302_0140 MB23 EZ402U	216	700	13.94	1505/108	8.0	8.0	3500	3100	4000	10	16	38
215	64	70	9.9	3.9	K302_0140 MB23 EZ402U	216	700	13.94	1505/108	12	8.0	3500	3100	4000	10	16	38
215	64	70	9.9	3.9	K302_0140 MB23 EZ402U	216	700	13.94	1505/108	16	8.0	3500	3100	4000	10	16	38
215	93	116	15	2.6	K302_0140 MB23 EZ404U	385	700	13.94	1505/108	8.0	8.0	3500	3100	4000	11	16	41
215	93	116	15	2.6	K302_0140 MB23 EZ404U	385	700	13.94	1505/108	12	8.0	3500	3100	4000	11	16	41
215	93	116	15	2.6	K302_0140 MB23 EZ404U	385	700	13.94	1505/108	16	8.0	3500	3100	4000	11	16	41
215	100	108	16	2.5	K302_0140 MB23 EZ502U	385	700	13.94	1505/108	8.0	8.0	3500	3100	4000	14	16	40
215	100	108	16	2.5	K302_0140 MB23 EZ502U	385	700	13.94	1505/108	12	8.0	3500	3100	4000	14	16	40
215	100	108	16	2.5	K302_0140 MB23 EZ502U	385	700	13.94	1505/108	16	8.0	3500	3100	4000	14	16	40
215	131	150	20	1.9	K302_0140 MB23 EZ503U	385	700	13.94	1505/108	8.0	15	3500	3100	4000	17	16	42
215	131	150	20	1.9	K302_0140 MB23 EZ503U	385	700	13.94	1505/108	12	15	3500	3100	4000	17	16	42
239	52	57	9.1	4.5	K302_0125 MB23 EZ501U	195	700	12.58	3182/253	8.0	8.0	3500	3100	4000	11	16	39
239	52	57	9.1	4.5	K302_0125 MB23 EZ501U	195	700	12.58	3182/253	12	8.0	3500	3100	4000	11	16	39
239	52	57	9.1	4.5	K302_0125 MB23 EZ501U	195	700	12.58	3182/253	16	8.0	3500	3100	4000	11	16	39
239	57	63	10	4.1	K302_0125 MB23 EZ402U	195	700	12.58	3182/253	8.0	8.0	3500	3100	4000	9.8	16	38
239	57	63	10	4.1	K302_0125 MB23 EZ402U	195	700	12.58	3182/253	12	8.0	3500	3100	4000	9.8	16	38
239	57	63	10	4.1	K302_0125 MB23 EZ402U	195	700	12.58	3182/253	16	8.0	3500	3100	4000	9.8	16	38
239	84	105	15	2.8	K302_0125 MB23 EZ404U	354	700	12.58	3182/253	8.0	8.0	3500	3100	4000	11	16	41
239	84	105	15	2.8	K302_0125 MB23 EZ404U	354	700	12.58	3182/253	12	8.0	3500	3100	4000	11	16	41
239	84	105	15	2.8	K302_0125 MB23 EZ404U	354	700	12.58	3182/253	16	8.0	3500	3100	4000	11	16	41
239	90	98	16	2.6	K302_0125 MB23 EZ502U	378	700	12.58	3182/253	8.0	8.0	3500	3100	4000	13	16	40
239	90	98	16	2.6	K302_0125 MB23 EZ502U	378	700	12.58	3182/253	12	8.0	3500	3100	4000	13	16	40
239	90	98	16	2.6	K302_0125 MB23 EZ502U	378	700	12.58	3182/253	16	8.0	3500	3100	4000	13	16	40
239	90	101	16	2.6	K302_0125 MB33 EZ701U	244	700	12.58	3182/253	16	15	3500	3100	4000	38	16	50
239	118	135	21	2.0	K302_0125 MB23 EZ503U	385	700	12.58	3182/253	8.0	15	3500	3100	4000	17	16	42
239	118	135	21	2.0	K302_0125 MB23 EZ503U	385	700	12.58	3182/253	12	15	3500	3100	4000	17	16	42
239	146	176	25	1.6	K302_0125 MB33 EZ702U	385	700	12.58	3182/253	16	15	3500	3100	4000	44	16	52
258	48	53	9.2	4.8	K302_0115 MB23 EZ501U	180	700	11.61	1161/100	8.0	8.0	3200	2800	4000	12	16	39
258	48	53	9.2	4.8	K302_0115 MB23 EZ501U	180	700	11.61	1161/100	12	8.0	3200	2800	4000	12	16	39
258	48	53	9.2	4.8	K302_0115 MB23 EZ501U	180	700	11.61	1161/100	16	8.0	3200	2800	4000	12	16	39
258	53	59	10	4.4	K302_0115 MB23 EZ402U	180	700	11.61	1161/100	8.0	8.0	3200	2800	4000	10	16	38
258	53	59	10	4.4	K302_0115 MB23 EZ402U	180	700	11.61	1161/100	12	8.0	3200	2800	4000	10	16	38
258	53	59	10	4.4	K302_0115 MB23 EZ402U	180	700	11.61	1161/100	16	8.0	3200	2800	4000	10	16	38
258	78	97	15	3.0	K302_0115 MB23 EZ404U	327	700	11.61	1161/100	8.0	8.0	3200	2800	4000	12	16	41
258	78	97	15	3.0	K302_0115 MB23 EZ404U	327	700	11.61	1161/100	12	8.0	3200	2800	4000	12	16	41
258	78	97	15	3.0	K302_0115 MB23 EZ404U	327	700	11.61	1161/100	16	8.0	3200	2800	4000	12	16	41
258	83	90	16	2.8	K302_0115 MB23 EZ502U	349	700	11.61	1161/100	8.0	8.0	3200	2800	4000	14	16	40
258	83	90	16	2.8	K302_0115 MB23 EZ502U	349	700	11.61	1161/100	12	8.0	3200	2800	4000	14	16	40

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
K3 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 390 Nm)																	
258	83	90	16	2.8	K302_0115 MB23 EZ502U	349	700	11.61	1161/100	16	8.0	3200	2800	4000	14	16	40
258	83	93	16	2.8	K302_0115 MB33 EZ701U	225	700	11.61	1161/100	16	15	3200	2800	4000	39	16	50
258	109	125	21	2.1	K302_0115 MB23 EZ503U	385	700	11.61	1161/100	8.0	15	3200	2800	4000	17	16	42
258	109	125	21	2.1	K302_0115 MB23 EZ503U	385	700	11.61	1161/100	12	15	3200	2800	4000	17	16	42
258	135	162	26	1.7	K302_0115 MB33 EZ702U	385	700	11.61	1161/100	16	15	3200	2800	4000	44	16	52
258	152	180	29	1.5	K302_0115 MB23 EZ505U	385	700	11.61	1161/100	8.0	15	3200	2800	4000	22	16	45
258	152	180	29	1.5	K302_0115 MB23 EZ505U	385	700	11.61	1161/100	12	15	3200	2800	4000	22	16	45
296	46	51	10	4.8	K302_0100 MB23 EZ402U	157	619	10.14	3010/297	8.0	8.0	3500	3100	4000	10	16	38
296	46	51	10	4.8	K302_0100 MB23 EZ402U	157	619	10.14	3010/297	12	8.0	3500	3100	4000	10	16	38
296	46	51	10	4.8	K302_0100 MB23 EZ402U	157	619	10.14	3010/297	16	8.0	3500	3100	4000	10	16	38
296	68	85	15	3.3	K302_0100 MB23 EZ404U	285	619	10.14	3010/297	8.0	8.0	3500	3100	4000	12	16	41
296	68	85	15	3.3	K302_0100 MB23 EZ404U	285	619	10.14	3010/297	12	8.0	3500	3100	4000	12	16	41
296	68	85	15	3.3	K302_0100 MB23 EZ404U	285	619	10.14	3010/297	16	8.0	3500	3100	4000	12	16	41
296	73	79	16	3.0	K302_0100 MB23 EZ502U	305	619	10.14	3010/297	8.0	8.0	3500	3100	4000	14	16	40
296	73	79	16	3.0	K302_0100 MB23 EZ502U	305	619	10.14	3010/297	12	8.0	3500	3100	4000	14	16	40
296	73	79	16	3.0	K302_0100 MB23 EZ502U	305	619	10.14	3010/297	16	8.0	3500	3100	4000	14	16	40
296	73	82	16	3.0	K302_0100 MB33 EZ701U	197	700	10.14	3010/297	16	15	3500	3100	4000	39	16	50
296	73	82	16	3.0	K302_0100 MB33 EZ701U	197	700	10.14	3010/297	24	15	3500	3100	4000	39	16	50
296	95	109	21	2.3	K302_0100 MB23 EZ503U	369	619	10.14	3010/297	8.0	15	3500	3100	4000	17	16	42
296	95	109	21	2.3	K302_0100 MB23 EZ503U	369	619	10.14	3010/297	12	15	3500	3100	4000	17	16	42
296	118	142	26	1.9	K302_0100 MB33 EZ702U	385	700	10.14	3010/297	16	15	3500	3100	4000	44	16	52
296	118	142	26	1.9	K302_0100 MB33 EZ702U	385	700	10.14	3010/297	24	15	3500	3100	4000	44	16	52
296	133	157	29	1.7	K302_0100 MB23 EZ505U	369	619	10.14	3010/297	8.0	15	3500	3100	4000	22	16	45
296	133	157	29	1.7	K302_0100 MB23 EZ505U	369	619	10.14	3010/297	12	15	3500	3100	4000	22	16	45
324	62	77	15	3.5	K302_0093 MB23 EZ404U	261	566	9.267	1075/116	8.0	8.0	3200	2800	4000	12	16	41
324	62	77	15	3.5	K302_0093 MB23 EZ404U	261	566	9.267	1075/116	12	8.0	3200	2800	4000	12	16	41
324	62	77	15	3.5	K302_0093 MB23 EZ404U	261	566	9.267	1075/116	16	8.0	3200	2800	4000	12	16	41
324	67	72	16	3.2	K302_0093 MB23 EZ502U	279	566	9.267	1075/116	8.0	8.0	3200	2800	4000	14	16	40
324	67	72	16	3.2	K302_0093 MB23 EZ502U	279	566	9.267	1075/116	12	8.0	3200	2800	4000	14	16	40
324	67	72	16	3.2	K302_0093 MB23 EZ502U	279	566	9.267	1075/116	16	8.0	3200	2800	4000	14	16	40
324	67	75	16	3.2	K302_0093 MB33 EZ701U	180	700	9.267	1075/116	16	15	3200	2800	4000	39	16	50
324	67	75	16	3.2	K302_0093 MB33 EZ701U	180	700	9.267	1075/116	24	15	3200	2800	4000	39	16	50
324	87	100	21	2.5	K302_0093 MB23 EZ503U	337	566	9.267	1075/116	8.0	15	3200	2800	4000	18	16	42
324	87	100	21	2.5	K302_0093 MB23 EZ503U	337	566	9.267	1075/116	12	15	3200	2800	4000	18	16	42
324	108	129	26	2.0	K302_0093 MB33 EZ702U	369	700	9.267	1075/116	16	15	3200	2800	4000	45	16	52
324	108	129	26	2.0	K302_0093 MB33 EZ702U	369	700	9.267	1075/116	24	15	3200	2800	4000	45	16	52
324	121	144	29	1.8	K302_0093 MB23 EZ505U	337	566	9.267	1075/116	8.0	15	3200	2800	4000	23	16	45
324	121	144	29	1.8	K302_0093 MB23 EZ505U	337	566	9.267	1075/116	12	15	3200	2800	4000	23	16	45
355	57	70	15	3.7	K302_0084 MB23 EZ404U	238	516	8.444	2322/275	8.0	8.0	3200	2800	4000	12	16	41
355	57	70	15	3.7	K302_0084 MB23 EZ404U	238	516	8.444	2322/275	12	8.0	3200	2800	4000	12	16	41
355	57	70	15	3.7	K302_0084 MB23 EZ404U	238	516	8.444	2322/275	16	8.0	3200	2800	4000	12	16	41
355	61	66	16	3.4	K302_0084 MB23 EZ502U	254	516	8.444	2322/275	8.0	8.0	3200	2800	4000	14	16	40
355	61	66	16	3.4	K302_0084 MB23 EZ502U	254	516	8.444	2322/275	12	8.0	3200	2800	4000	14	16	40
355	61	66	16	3.4	K302_0084 MB23 EZ502U	254	516	8.444	2322/275	16	8.0	3200	2800	4000	14	16	40
355	61	68	16	3.4	K302_0084 MB33 EZ701U	164	700	8.444	2322/275	16	15	3200	2800	4000	39	16	50
355	61	68	16	3.4	K302_0084 MB33 EZ701U	164	700	8.444	2322/275	24	15	3200	2800	4000	39	16	50
355	61	68	16	3.4	K302_0084 MB33 EZ701U	164	700	8.444	2322/275	32	15	3200	2800	4000	39	16	50
355	79	91	21	2.6	K302_0084 MB23 EZ503U	307	516	8.444	2322/275	8.0	15	3200	2800	4000	18	16	42
355	79	91	21	2.6	K302_0084 MB23 EZ503U	307	516	8.444	2322/275	12	15	3200	2800	4000	18	16	42
355	98	118	26	2.1	K302_0084 MB33 EZ702U	336	700	8.444	2322/275	16	15	3200	2800	4000	44	16	52
355	98	118	26	2.1	K302_0084 MB33 EZ702U	336	700	8.444	2322/275	24	15	3200	2800	4000	44	16	52
355	98	118	26	2.1	K302_0084 MB33 EZ702U	336	700	8.444	2322/275	32	15	3200	2800	4000	44	16	52
355	111	131	30	1.9	K302_0084 MB23 EZ505U	307	516	8.444	2322/275	8.0	15	3200	2800	4000	22	16	45
355	111	131	30	1.9	K302_0084 MB23 EZ505U	307	516	8.444	2322/275	12	15	3200	2800	4000	22	16	45
406	49	62	15	4.0	K302_0074 MB23 EZ404U	208	452	7.391	473/64	8.0	8.0	2700	2300	4000	13	16	41
406	49	62	15	4.0	K302_0074 MB23 EZ404U	208	452	7.391	473/64	12	8.0	2700	2300	4000	13	16	41
406	49	62	15	4.0	K302_0074 MB23 EZ404U	208	452	7.391	473/64	16	8.0	2700	2300	4000	13	16	41
406	53	57	16	3.7	K302_0074 MB23 EZ502U	222	452	7.391	473/64	8.0	8.0	2700	2300	4000	15	16	40
406	53	57	16	3.7	K302_0074 MB23 EZ502U	222	452	7.391	473/64	12	8.0	2700	2300	4000	15	16	40
406	53	57	16	3.7	K302_0074 MB23 EZ502U	222	452	7.391	473/64	16	8.0	2700	2300	4000	15	16	40
406	53	60	16	3.7	K302_0074 MB33 EZ701U	143	700	7.391	473/64	16	15	2700	2300	4000	40	16	50
406	53	60	16	3.7	K302_0074 MB33 EZ701U	143	700	7.391	473/64	24	15	2700	2300	4000	40	16	50
406	53	60	16	3.7	K302_0074 MB33 EZ701U	143	700	7.391	473/64	32	15	2700	2300	4000	40	16	50
406	70	80	22	2.9	K302_0074 MB23 EZ503U	269	452	7.391	473/64	8.0	15	2700	2300	4000	19	16	42

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
K3 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 390 Nm)																	
406	70	80	22	2.9	K302_0074 MB23 EZ503U	269	452	7.391	473/64	12	15	2700	2300	4000	19	16	42
406	86	103	27	2.3	K302_0074 MB33 EZ702U	294	700	7.391	473/64	16	15	2700	2300	4000	45	16	52
406	86	103	27	2.3	K302_0074 MB33 EZ702U	294	700	7.391	473/64	24	15	2700	2300	4000	45	16	52
406	86	103	27	2.3	K302_0074 MB33 EZ702U	294	700	7.391	473/64	32	15	2700	2300	4000	45	16	52
406	97	115	30	2.1	K302_0074 MB23 EZ505U	269	452	7.391	473/64	8.0	15	2700	2300	4000	23	16	45
406	97	115	30	2.1	K302_0074 MB23 EZ505U	269	452	7.391	473/64	12	15	2700	2300	4000	23	16	45
406	118	149	37	1.7	K302_0074 MB33 EZ703U	375	700	7.391	473/64	16	32	2700	2300	4000	57	16	55
445	45	56	15	4.3	K302_0067 MB23 EZ404U	190	412	6.740	2150/319	8.0	8.0	3200	2800	4000	13	16	41
445	45	56	15	4.3	K302_0067 MB23 EZ404U	190	412	6.740	2150/319	12	8.0	3200	2800	4000	13	16	41
445	45	56	15	4.3	K302_0067 MB23 EZ404U	190	412	6.740	2150/319	16	8.0	3200	2800	4000	13	16	41
445	48	52	17	4.0	K302_0067 MB23 EZ502U	203	412	6.740	2150/319	8.0	8.0	3200	2800	4000	15	16	40
445	48	52	17	4.0	K302_0067 MB23 EZ502U	203	412	6.740	2150/319	12	8.0	3200	2800	4000	15	16	40
445	48	52	17	4.0	K302_0067 MB23 EZ502U	203	412	6.740	2150/319	16	8.0	3200	2800	4000	15	16	40
445	48	54	17	4.0	K302_0067 MB33 EZ701U	131	700	6.740	2150/319	16	15	3200	2800	4000	40	16	50
445	48	54	17	4.0	K302_0067 MB33 EZ701U	131	700	6.740	2150/319	24	15	3200	2800	4000	40	16	50
445	48	54	17	4.0	K302_0067 MB33 EZ701U	131	700	6.740	2150/319	32	15	3200	2800	4000	40	16	50
445	48	54	17	4.0	K302_0067 MB33 EZ701U	131	700	6.740	2150/319	45	15	3200	2800	4000	40	16	50
445	63	73	22	3.0	K302_0067 MB23 EZ503U	245	412	6.740	2150/319	8.0	15	3200	2800	4000	18	16	42
445	63	73	22	3.0	K302_0067 MB23 EZ503U	245	412	6.740	2150/319	12	15	3200	2800	4000	18	16	42
445	78	94	27	2.5	K302_0067 MB33 EZ702U	268	700	6.740	2150/319	16	15	3200	2800	4000	45	16	52
445	78	94	27	2.5	K302_0067 MB33 EZ702U	268	700	6.740	2150/319	24	15	3200	2800	4000	45	16	52
445	78	94	27	2.5	K302_0067 MB33 EZ702U	268	700	6.740	2150/319	32	15	3200	2800	4000	45	16	52
445	78	94	27	2.5	K302_0067 MB33 EZ702U	268	700	6.740	2150/319	45	15	3200	2800	4000	45	16	52
445	88	105	30	2.2	K302_0067 MB23 EZ505U	245	412	6.740	2150/319	8.0	15	3200	2800	4000	23	16	45
445	88	105	30	2.2	K302_0067 MB23 EZ505U	245	412	6.740	2150/319	12	15	3200	2800	4000	23	16	45
445	108	136	37	1.8	K302_0067 MB33 EZ703U	364	700	6.740	2150/319	16	32	3200	2800	4000	57	16	55
445	108	136	37	1.8	K302_0067 MB33 EZ703U	364	700	6.740	2150/319	24	32	3200	2800	4000	57	16	55
500	40	50	16	4.6	K302_0060 MB23 EZ404U	169	367	6.000	6/1	8.0	8.0	2700	2300	4000	14	16	41
500	40	50	16	4.6	K302_0060 MB23 EZ404U	169	367	6.000	6/1	12	8.0	2700	2300	4000	14	16	41
500	40	50	16	4.6	K302_0060 MB23 EZ404U	169	367	6.000	6/1	16	8.0	2700	2300	4000	14	16	41
500	43	47	17	4.3	K302_0060 MB23 EZ502U	180	367	6.000	6/1	8.0	8.0	2700	2300	4000	16	16	40
500	43	47	17	4.3	K302_0060 MB23 EZ502U	180	367	6.000	6/1	12	8.0	2700	2300	4000	16	16	40
500	43	47	17	4.3	K302_0060 MB23 EZ502U	180	367	6.000	6/1	16	8.0	2700	2300	4000	16	16	40
500	43	48	17	4.3	K302_0060 MB33 EZ701U	116	700	6.000	6/1	16	15	2700	2300	4000	41	16	50
500	43	48	17	4.3	K302_0060 MB33 EZ701U	116	700	6.000	6/1	24	15	2700	2300	4000	41	16	50
500	43	48	17	4.3	K302_0060 MB33 EZ701U	116	700	6.000	6/1	32	15	2700	2300	4000	41	16	50
500	43	48	17	4.3	K302_0060 MB33 EZ701U	116	700	6.000	6/1	45	15	2700	2300	4000	41	16	50
500	56	65	22	3.3	K302_0060 MB23 EZ503U	218	367	6.000	6/1	8.0	15	2700	2300	4000	20	16	42
500	56	65	22	3.3	K302_0060 MB23 EZ503U	218	367	6.000	6/1	12	15	2700	2300	4000	20	16	42
500	70	84	27	2.7	K302_0060 MB33 EZ702U	239	700	6.000	6/1	16	15	2700	2300	4000	46	16	52
500	70	84	27	2.7	K302_0060 MB33 EZ702U	239	700	6.000	6/1	24	15	2700	2300	4000	46	16	52
500	70	84	27	2.7	K302_0060 MB33 EZ702U	239	700	6.000	6/1	32	15	2700	2300	4000	46	16	52
500	70	84	27	2.7	K302_0060 MB33 EZ702U	239	700	6.000	6/1	45	15	2700	2300	4000	46	16	52
500	79	93	30	2.4	K302_0060 MB23 EZ505U	218	367	6.000	6/1	8.0	15	2700	2300	4000	24	16	45
500	79	93	30	2.4	K302_0060 MB23 EZ505U	218	367	6.000	6/1	12	15	2700	2300	4000	24	16	45
500	96	121	37	1.9	K302_0060 MB33 EZ703U	350	700	6.000	6/1	16	32	2700	2300	4000	58	16	55
500	96	121	37	1.9	K302_0060 MB33 EZ703U	350	700	6.000	6/1	24	32	2700	2300	4000	58	16	55
500	96	121	37	1.9	K302_0060 MB33 EZ703U	350	700	6.000	6/1	32	32	2700	2300	4000	58	16	55
558	36	45	16	5.0	K302_0054 MB23 EZ404U	151	328	5.375	43/8	8.0	8.0	2700	2300	4000	14	16	41
558	36	45	16	5.0	K302_0054 MB23 EZ404U	151	328	5.375	43/8	12	8.0	2700	2300	4000	14	16	41
558	36	45	16	5.0	K302_0054 MB23 EZ404U	151	328	5.375	43/8	16	8.0	2700	2300	4000	14	16	41
558	39	42	17	4.6	K302_0054 MB23 EZ502U	162	328	5.375	43/8	8.0	8.0	2700	2300	4000	16	16	40
558	39	42	17	4.6	K302_0054 MB23 EZ502U	162	328	5.375	43/8	12	8.0	2700	2300	4000	16	16	40
558	39	42	17	4.6	K302_0054 MB23 EZ502U	162	328	5.375	43/8	16	8.0	2700	2300	4000	16	16	40
558	39	43	17	4.6	K302_0054 MB33 EZ701U	104	603	5.375	43/8	16	15	2700	2300	4000	41	16	50
558	39	43	17	4.6	K302_0054 MB33 EZ701U	104	603	5.375	43/8	24	15	2700	2300	4000	41	16	50
558	39	43	17	4.6	K302_0054 MB33 EZ701U	104	603	5.375	43/8	32	15	2700	2300	4000	41	16	50
558	39	43	17	4.6	K302_0054 MB33 EZ701U	104	603	5.375	43/8	45	15	2700	2300	4000	41	16	50
558	51	58	22	3.5	K302_0054 MB23 EZ503U	196	328	5.375	43/8	8.0	15	2700	2300	4000	19	16	42
558	51	58	22	3.5	K302_0054 MB23 EZ503U	196	328	5.375	43/8	12	15	2700	2300	4000	19	16	42
558	63	75	27	2.9	K302_0054 MB33 EZ702U	214	603	5.375	43/8	16	15	2700	2300	4000	46	16	52
558	63	75	27	2.9	K302_0054 MB33 EZ702U	214	603	5.375	43/8	24	15	2700	2300	4000	46	16	52
558	63	75	27	2.9	K302_0054 MB33 EZ702U	214	603	5.375	43/8	32	15	2700	2300	4000	46	16	52
558	63	75	27	2.9	K302_0054 MB33 EZ702U	214	603	5.375	43/8	45	15	2700	2300	4000	46	16	52

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
K3 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 390 Nm)																	
558	70	83	31	2.5	K302_0054 MB23 EZ505U	196	328	5.375	43/8	8.0	15	2700	2300	4000	24	16	45
558	70	83	31	2.5	K302_0054 MB23 EZ505U	196	328	5.375	43/8	12	15	2700	2300	4000	24	16	45
558	86	108	38	2.1	K302_0054 MB33 EZ703U	337	603	5.375	43/8	16	32	2700	2300	4000	58	16	55
558	86	108	38	2.1	K302_0054 MB33 EZ703U	337	603	5.375	43/8	24	32	2700	2300	4000	58	16	55
558	111	157	48	1.6	K302_0054 MB33 EZ705U	337	603	5.375	43/8	16	32	2700	2300	4000	70	16	60
558	111	157	48	1.6	K302_0054 MB33 EZ705U	337	603	5.375	43/8	24	32	2700	2300	4000	70	16	60
687	41	47	24	3.9	K302_0044 MB23 EZ503U	159	267	4.364	48/11	8.0	15	2700	2300	4000	20	16	42
687	41	47	24	3.9	K302_0044 MB23 EZ503U	159	267	4.364	48/11	12	15	2700	2300	4000	20	16	42
687	51	61	28	3.3	K302_0044 MB33 EZ702U	174	700	4.364	48/11	16	15	2700	2300	4000	47	16	52
687	51	61	28	3.3	K302_0044 MB33 EZ702U	174	700	4.364	48/11	24	15	2700	2300	4000	47	16	52
687	51	61	28	3.3	K302_0044 MB33 EZ702U	174	700	4.364	48/11	32	15	2700	2300	4000	47	16	52
687	51	61	28	3.3	K302_0044 MB33 EZ702U	174	700	4.364	48/11	45	15	2700	2300	4000	47	16	52
687	57	68	33	2.8	K302_0044 MB23 EZ505U	159	267	4.364	48/11	8.0	15	2700	2300	4000	25	16	45
687	57	68	33	2.8	K302_0044 MB23 EZ505U	159	267	4.364	48/11	12	15	2700	2300	4000	25	16	45
687	70	88	38	2.4	K302_0044 MB33 EZ703U	275	700	4.364	48/11	16	32	2700	2300	4000	59	16	55
687	70	88	38	2.4	K302_0044 MB33 EZ703U	275	700	4.364	48/11	24	32	2700	2300	4000	59	16	55
687	70	88	38	2.4	K302_0044 MB33 EZ703U	275	700	4.364	48/11	32	32	2700	2300	4000	59	16	55
687	70	88	38	2.4	K302_0044 MB33 EZ703U	275	700	4.364	48/11	45	32	2700	2300	4000	59	16	55
687	90	128	49	1.8	K302_0044 MB33 EZ705U	315	700	4.364	48/11	16	32	2700	2300	4000	71	16	60
687	90	128	49	1.8	K302_0044 MB33 EZ705U	315	700	4.364	48/11	24	32	2700	2300	4000	71	16	60
687	90	128	49	1.8	K302_0044 MB33 EZ705U	315	700	4.364	48/11	32	32	2700	2300	4000	71	16	60
687	90	128	49	1.8	K302_0044 MB33 EZ705U	315	700	4.364	48/11	45	32	2700	2300	4000	71	16	60
750	38	43	25	3.9	K302_0040 MB23 EZ503U	146	244	4.000	4/1	8.0	15	2700	2300	4000	21	16	42
750	38	43	25	3.9	K302_0040 MB23 EZ503U	146	244	4.000	4/1	12	15	2700	2300	4000	21	16	42
750	47	56	28	3.5	K302_0040 MB33 EZ702U	159	700	4.000	4/1	16	15	2700	2300	4000	48	16	52
750	47	56	28	3.5	K302_0040 MB33 EZ702U	159	700	4.000	4/1	24	15	2700	2300	4000	48	16	52
750	47	56	28	3.5	K302_0040 MB33 EZ702U	159	700	4.000	4/1	32	15	2700	2300	4000	48	16	52
750	47	56	28	3.5	K302_0040 MB33 EZ702U	159	700	4.000	4/1	45	15	2700	2300	4000	48	16	52
750	52	62	35	2.8	K302_0040 MB23 EZ505U	146	244	4.000	4/1	8.0	15	2700	2300	4000	26	16	45
750	52	62	35	2.8	K302_0040 MB23 EZ505U	146	244	4.000	4/1	12	15	2700	2300	4000	26	16	45
750	64	81	38	2.5	K302_0040 MB33 EZ703U	252	700	4.000	4/1	16	32	2700	2300	4000	60	16	55
750	64	81	38	2.5	K302_0040 MB33 EZ703U	252	700	4.000	4/1	24	32	2700	2300	4000	60	16	55
750	64	81	38	2.5	K302_0040 MB33 EZ703U	252	700	4.000	4/1	32	32	2700	2300	4000	60	16	55
750	64	81	38	2.5	K302_0040 MB33 EZ703U	252	700	4.000	4/1	45	32	2700	2300	4000	60	16	55
750	83	117	50	2.0	K302_0040 MB33 EZ705U	306	700	4.000	4/1	16	32	2700	2300	4000	72	16	60
750	83	117	50	2.0	K302_0040 MB33 EZ705U	306	700	4.000	4/1	24	32	2700	2300	4000	72	16	60
750	83	117	50	2.0	K302_0040 MB33 EZ705U	306	700	4.000	4/1	32	32	2700	2300	4000	72	16	60
750	83	117	50	2.0	K302_0040 MB33 EZ705U	306	700	4.000	4/1	45	32	2700	2300	4000	72	16	60
K4 (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 470 Nm)																	
458	185	280	64	1.5	K402_0044 MB43 EZ805U	472	1078	4.364	48/11	50	115	2600	2200	3000	271	31	121
500	170	256	65	1.6	K402_0040 MB43 EZ805U	459	1078	4.000	4/1	50	115	2600	2200	3000	273	31	121
K4 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 600 Nm)																	
86	145	158	6.1	3.4	K402_0350 MB23 EZ501U	539	1100	34.76	4171/120	8.0	8.0	3600	3300	4000	11	31	52
86	158	175	6.7	3.1	K402_0350 MB23 EZ402U	539	1100	34.76	4171/120	8.0	8.0	3600	3300	4000	9.4	31	52
86	233	290	9.8	2.1	K402_0350 MB23 EZ404U	600	1100	34.76	4171/120	8.0	8.0	3600	3300	4000	11	31	54
86	249	270	10	2.0	K402_0350 MB23 EZ502U	600	1100	34.76	4171/120	8.0	8.0	3600	3300	4000	13	31	54
108	116	127	6.2	4.0	K402_0280 MB23 EZ501U	431	1100	27.77	1333/48	8.0	8.0	3600	3300	4000	11	31	52
108	116	127	6.2	4.0	K402_0280 MB23 EZ501U	431	1100	27.77	1333/48	12	8.0	3600	3300	4000	11	31	52
108	127	140	6.8	3.7	K402_0280 MB23 EZ402U	431	1100	27.77	1333/48	8.0	8.0	3600	3300	4000	9.6	31	52
108	127	140	6.8	3.7	K402_0280 MB23 EZ402U	431	1100	27.77	1333/48	12	8.0	3600	3300	4000	9.6	31	52
108	186	232	10	2.5	K402_0280 MB23 EZ404U	600	1100	27.77	1333/48	8.0	8.0	3600	3300	4000	11	31	54
108	186	232	10	2.5	K402_0280 MB23 EZ404U	600	1100	27.77	1333/48	12	8.0	3600	3300	4000	11	31	54
108	199	216	11	2.3	K402_0280 MB23 EZ502U	600	1100	27.77	1333/48	8.0	8.0	3600	3300	4000	13	31	54
108	199	216	11	2.3	K402_0280 MB23 EZ502U	600	1100	27.77	1333/48	12	8.0	3600	3300	4000	13	31	54
119	105	115	6.3	4.3	K402_0250 MB23 EZ501U	392	1001	25.28	4171/165	8.0	8.0	3600	3300	4000	11	31	52
119	105	115	6.3	4.3	K402_0250 MB23 EZ501U	392	1001	25.28	4171/165	12	8.0	3600	3300	4000	11	31	52
119	115	128	6.8	3.9	K402_0250 MB23 EZ402U	392	1001	25.28	4171/165	8.0	8.0	3600	3300	4000	9.5	31	52
119	115	128	6.8	3.9	K402_0250 MB23 EZ402U	392	1001	25.28	4171/165	12	8.0	3600	3300	4000	9.5	31	52
119	169	211	10	2.7	K402_0250 MB23 EZ404U	600	1001	25.28	4171/165	8.0	8.0	3600	3300	4000	11	31	54
119	169	211	10	2.7	K402_0250 MB23 EZ404U	600	1001	25.28	4171/165	12	8.0	3600	3300	4000	11	31	54
119	181	196	11	2.5	K402_0250 MB23 EZ502U	600	1001	25.28	4171/165	8.0	8.0	3600	3300	4000	13	31	54
119	181	196	11	2.5	K402_0250 MB23 EZ502U	600	1001	25.28	4171/165	12	8.0	3600	3300	4000	13	31	54
129	97	106	6.3	4.5	K402_0230 MB23 EZ501U	361	1100	23.29	559/24	8.0	8.0	3600	3300	4000	11	31	52
129	97	106	6.3	4.5	K402_0230 MB23 EZ501U	361	1100	23.29	559/24	12	8.0	3600	3300	4000	11	31	52

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
K4 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 600 Nm)																	
129	97	106	6.3	4.5	K402_0230 MB23 EZ501U	361	1100	23.29	559/24	16	8.0	3600	3300	4000	11	31	52
129	106	117	6.9	4.1	K402_0230 MB23 EZ402U	361	1100	23.29	559/24	8.0	8.0	3600	3300	4000	9.9	31	52
129	106	117	6.9	4.1	K402_0230 MB23 EZ402U	361	1100	23.29	559/24	12	8.0	3600	3300	4000	9.9	31	52
129	106	117	6.9	4.1	K402_0230 MB23 EZ402U	361	1100	23.29	559/24	16	8.0	3600	3300	4000	9.9	31	52
129	156	194	10	2.8	K402_0230 MB23 EZ404U	600	1100	23.29	559/24	8.0	8.0	3600	3300	4000	11	31	54
129	156	194	10	2.8	K402_0230 MB23 EZ404U	600	1100	23.29	559/24	12	8.0	3600	3300	4000	11	31	54
129	156	194	10	2.8	K402_0230 MB23 EZ404U	600	1100	23.29	559/24	16	8.0	3600	3300	4000	11	31	54
129	167	181	11	2.6	K402_0230 MB23 EZ502U	600	1100	23.29	559/24	8.0	8.0	3600	3300	4000	13	31	54
129	167	181	11	2.6	K402_0230 MB23 EZ502U	600	1100	23.29	559/24	12	8.0	3600	3300	4000	13	31	54
129	167	181	11	2.6	K402_0230 MB23 EZ502U	600	1100	23.29	559/24	16	8.0	3600	3300	4000	13	31	54
129	219	251	14	2.0	K402_0230 MB23 EZ503U	600	1100	23.29	559/24	8.0	15	3600	3300	4000	17	31	56
129	219	251	14	2.0	K402_0230 MB23 EZ503U	600	1100	23.29	559/24	12	15	3600	3300	4000	17	31	56
149	84	92	6.4	4.9	K402_0200 MB23 EZ501U	313	1100	20.20	1333/66	8.0	8.0	3600	3300	4000	11	31	52
149	84	92	6.4	4.9	K402_0200 MB23 EZ501U	313	1100	20.20	1333/66	12	8.0	3600	3300	4000	11	31	52
149	84	92	6.4	4.9	K402_0200 MB23 EZ501U	313	1100	20.20	1333/66	16	8.0	3600	3300	4000	11	31	52
149	92	102	7.0	4.5	K402_0200 MB23 EZ402U	313	1100	20.20	1333/66	8.0	8.0	3600	3300	4000	9.7	31	52
149	92	102	7.0	4.5	K402_0200 MB23 EZ402U	313	1100	20.20	1333/66	12	8.0	3600	3300	4000	9.7	31	52
149	92	102	7.0	4.5	K402_0200 MB23 EZ402U	313	1100	20.20	1333/66	16	8.0	3600	3300	4000	9.7	31	52
149	135	168	10	3.1	K402_0200 MB23 EZ404U	568	1100	20.20	1333/66	8.0	8.0	3600	3300	4000	11	31	54
149	135	168	10	3.1	K402_0200 MB23 EZ404U	568	1100	20.20	1333/66	12	8.0	3600	3300	4000	11	31	54
149	135	168	10	3.1	K402_0200 MB23 EZ404U	568	1100	20.20	1333/66	16	8.0	3600	3300	4000	11	31	54
149	145	157	11	2.9	K402_0200 MB23 EZ502U	600	1100	20.20	1333/66	8.0	8.0	3600	3300	4000	13	31	54
149	145	157	11	2.9	K402_0200 MB23 EZ502U	600	1100	20.20	1333/66	12	8.0	3600	3300	4000	13	31	54
149	145	157	11	2.9	K402_0200 MB23 EZ502U	600	1100	20.20	1333/66	16	8.0	3600	3300	4000	13	31	54
149	145	163	11	2.9	K402_0200 MB33 EZ701U	392	1100	20.20	1333/66	16	15	3600	3300	4000	38	31	63
149	190	217	14	2.2	K402_0200 MB23 EZ503U	600	1100	20.20	1333/66	8.0	15	3600	3300	4000	17	31	56
149	190	217	14	2.2	K402_0200 MB23 EZ503U	600	1100	20.20	1333/66	12	15	3600	3300	4000	17	31	56
149	235	282	18	1.8	K402_0200 MB33 EZ702U	600	1100	20.20	1333/66	16	15	3600	3300	4000	43	31	66
149	264	313	20	1.6	K402_0200 MB23 EZ505U	600	1100	20.20	1333/66	8.0	15	3600	3300	4000	21	31	58
149	264	313	20	1.6	K402_0200 MB23 EZ505U	600	1100	20.20	1333/66	12	15	3600	3300	4000	21	31	58
172	79	88	7.1	5.0	K402_0175 MB23 EZ402U	270	1064	17.41	731/42	8.0	8.0	3400	3000	4000	10	31	52
172	79	88	7.1	5.0	K402_0175 MB23 EZ402U	270	1064	17.41	731/42	12	8.0	3400	3000	4000	10	31	52
172	79	88	7.1	5.0	K402_0175 MB23 EZ402U	270	1064	17.41	731/42	16	8.0	3400	3000	4000	10	31	52
172	116	145	10	3.4	K402_0175 MB23 EZ404U	490	1064	17.41	731/42	8.0	8.0	3400	3000	4000	12	31	54
172	116	145	10	3.4	K402_0175 MB23 EZ404U	490	1064	17.41	731/42	12	8.0	3400	3000	4000	12	31	54
172	116	145	10	3.4	K402_0175 MB23 EZ404U	490	1064	17.41	731/42	16	8.0	3400	3000	4000	12	31	54
172	125	135	11	3.2	K402_0175 MB23 EZ502U	523	1064	17.41	731/42	8.0	8.0	3400	3000	4000	14	31	54
172	125	135	11	3.2	K402_0175 MB23 EZ502U	523	1064	17.41	731/42	12	8.0	3400	3000	4000	14	31	54
172	125	135	11	3.2	K402_0175 MB23 EZ502U	523	1064	17.41	731/42	16	8.0	3400	3000	4000	14	31	54
172	125	140	11	3.2	K402_0175 MB33 EZ701U	338	1100	17.41	731/42	16	15	3400	3000	4000	39	31	63
172	164	187	15	2.4	K402_0175 MB23 EZ503U	600	1064	17.41	731/42	8.0	15	3400	3000	4000	17	31	56
172	164	187	15	2.4	K402_0175 MB23 EZ503U	600	1064	17.41	731/42	12	15	3400	3000	4000	17	31	56
172	203	243	18	2.0	K402_0175 MB33 EZ702U	600	1100	17.41	731/42	16	15	3400	3000	4000	44	31	66
172	228	270	20	1.7	K402_0175 MB23 EZ505U	600	1064	17.41	731/42	8.0	15	3400	3000	4000	22	31	58
172	228	270	20	1.7	K402_0175 MB23 EZ505U	600	1064	17.41	731/42	12	15	3400	3000	4000	22	31	58
177	113	141	10	3.5	K402_0170 MB23 EZ404U	476	1035	16.94	559/33	8.0	8.0	3600	3300	4000	11	31	54
177	113	141	10	3.5	K402_0170 MB23 EZ404U	476	1035	16.94	559/33	12	8.0	3600	3300	4000	11	31	54
177	113	141	10	3.5	K402_0170 MB23 EZ404U	476	1035	16.94	559/33	16	8.0	3600	3300	4000	11	31	54
177	122	131	11	3.2	K402_0170 MB23 EZ502U	509	1035	16.94	559/33	8.0	8.0	3600	3300	4000	14	31	54
177	122	131	11	3.2	K402_0170 MB23 EZ502U	509	1035	16.94	559/33	12	8.0	3600	3300	4000	14	31	54
177	122	131	11	3.2	K402_0170 MB23 EZ502U	509	1035	16.94	559/33	16	8.0	3600	3300	4000	14	31	54
177	122	136	11	3.2	K402_0170 MB33 EZ701U	329	1100	16.94	559/33	16	15	3600	3300	4000	39	31	63
177	159	182	15	2.5	K402_0170 MB23 EZ503U	600	1035	16.94	559/33	8.0	15	3600	3300	4000	17	31	56
177	159	182	15	2.5	K402_0170 MB23 EZ503U	600	1035	16.94	559/33	12	15	3600	3300	4000	17	31	56
177	197	237	18	2.0	K402_0170 MB33 EZ702U	600	1100	16.94	559/33	16	15	3600	3300	4000	44	31	66
177	222	263	20	1.8	K402_0170 MB23 EZ505U	600	1035	16.94	559/33	8.0	15	3600	3300	4000	22	31	58
177	222	263	20	1.8	K402_0170 MB23 EZ505U	600	1035	16.94	559/33	12	15	3600	3300	4000	22	31	58
216	93	116	11	4.0	K402_0140 MB23 EZ404U	391	849	13.89	1333/96	8.0	8.0	3400	3000	4000	12	31	54
216	93	116	11	4.0	K402_0140 MB23 EZ404U	391	849	13.89	1333/96	12	8.0	3400	3000	4000	12	31	54
216	93	116	11	4.0	K402_0140 MB23 EZ404U	391	849	13.89	1333/96	16	8.0	3400	3000	4000	12	31	54
216	100	108	11	3.7	K402_0140 MB23 EZ502U	418	849	13.89	1333/96	8.0	8.0	3400	3000	4000	15	31	54
216	100	108	11	3.7	K402_0140 MB23 EZ502U	418	849	13.89	1333/96	12	8.0	3400	3000	4000	15	31	54
216	100	108	11	3.7	K402_0140 MB23 EZ502U	418	849	13.89	1333/96	16	8.0	3400	3000	4000	15	31	54
216	100	112	11	3.7	K402_0140 MB33 EZ701U	269	1100	13.89	1333/96	16	15	3400	3000	4000	39	31	63

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
K4 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 600 Nm)																	
216	100	112	11	3.7	K402_0140 MB33 EZ701U	269	1100	13.89	1333/96	24	15	3400	3000	4000	39	31	63
216	100	112	11	3.7	K402_0140 MB33 EZ701U	269	1100	13.89	1333/96	32	15	3400	3000	4000	39	31	63
216	131	150	15	2.8	K402_0140 MB23 EZ503U	505	849	13.89	1333/96	8.0	15	3400	3000	4000	18	31	56
216	131	150	15	2.8	K402_0140 MB23 EZ503U	505	849	13.89	1333/96	12	15	3400	3000	4000	18	31	56
216	162	194	18	2.3	K402_0140 MB33 EZ702U	552	1100	13.89	1333/96	16	15	3400	3000	4000	45	31	66
216	162	194	18	2.3	K402_0140 MB33 EZ702U	552	1100	13.89	1333/96	24	15	3400	3000	4000	45	31	66
216	162	194	18	2.3	K402_0140 MB33 EZ702U	552	1100	13.89	1333/96	32	15	3400	3000	4000	45	31	66
216	182	215	21	2.0	K402_0140 MB23 EZ505U	505	849	13.89	1333/96	8.0	15	3400	3000	4000	23	31	58
216	182	215	21	2.0	K402_0140 MB23 EZ505U	505	849	13.89	1333/96	12	15	3400	3000	4000	23	31	58
237	85	106	11	4.2	K402_0125 MB23 EZ404U	356	774	12.66	2924/231	8.0	8.0	3400	3000	4000	12	31	54
237	85	106	11	4.2	K402_0125 MB23 EZ404U	356	774	12.66	2924/231	12	8.0	3400	3000	4000	12	31	54
237	85	106	11	4.2	K402_0125 MB23 EZ404U	356	774	12.66	2924/231	16	8.0	3400	3000	4000	12	31	54
237	91	98	11	3.9	K402_0125 MB23 EZ502U	381	774	12.66	2924/231	8.0	8.0	3400	3000	4000	14	31	54
237	91	98	11	3.9	K402_0125 MB23 EZ502U	381	774	12.66	2924/231	12	8.0	3400	3000	4000	14	31	54
237	91	98	11	3.9	K402_0125 MB23 EZ502U	381	774	12.66	2924/231	16	8.0	3400	3000	4000	14	31	54
237	91	102	11	3.9	K402_0125 MB33 EZ701U	246	1100	12.66	2924/231	16	15	3400	3000	4000	39	31	63
237	91	102	11	3.9	K402_0125 MB33 EZ701U	246	1100	12.66	2924/231	24	15	3400	3000	4000	39	31	63
237	91	102	11	3.9	K402_0125 MB33 EZ701U	246	1100	12.66	2924/231	32	15	3400	3000	4000	39	31	63
237	119	136	15	3.0	K402_0125 MB23 EZ503U	460	774	12.66	2924/231	8.0	15	3400	3000	4000	18	31	56
237	119	136	15	3.0	K402_0125 MB23 EZ503U	460	774	12.66	2924/231	12	15	3400	3000	4000	18	31	56
237	147	177	18	2.4	K402_0125 MB33 EZ702U	503	1100	12.66	2924/231	16	15	3400	3000	4000	44	31	66
237	147	177	18	2.4	K402_0125 MB33 EZ702U	503	1100	12.66	2924/231	24	15	3400	3000	4000	44	31	66
237	147	177	18	2.4	K402_0125 MB33 EZ702U	503	1100	12.66	2924/231	32	15	3400	3000	4000	44	31	66
237	166	196	21	2.1	K402_0125 MB23 EZ505U	460	774	12.66	2924/231	8.0	15	3400	3000	4000	22	31	58
237	166	196	21	2.1	K402_0125 MB23 EZ505U	460	774	12.66	2924/231	12	15	3400	3000	4000	22	31	58
260	77	96	11	4.5	K402_0115 MB23 EZ404U	324	704	11.52	645/56	8.0	8.0	3000	2600	4000	13	31	54
260	77	96	11	4.5	K402_0115 MB23 EZ404U	324	704	11.52	645/56	12	8.0	3000	2600	4000	13	31	54
260	77	96	11	4.5	K402_0115 MB23 EZ404U	324	704	11.52	645/56	16	8.0	3000	2600	4000	13	31	54
260	83	89	11	4.2	K402_0115 MB23 EZ502U	346	704	11.52	645/56	8.0	8.0	3000	2600	4000	15	31	54
260	83	89	11	4.2	K402_0115 MB23 EZ502U	346	704	11.52	645/56	12	8.0	3000	2600	4000	15	31	54
260	83	89	11	4.2	K402_0115 MB23 EZ502U	346	704	11.52	645/56	16	8.0	3000	2600	4000	15	31	54
260	83	93	11	4.2	K402_0115 MB33 EZ701U	223	1100	11.52	645/56	16	15	3000	2600	4000	40	31	63
260	83	93	11	4.2	K402_0115 MB33 EZ701U	223	1100	11.52	645/56	24	15	3000	2600	4000	40	31	63
260	83	93	11	4.2	K402_0115 MB33 EZ701U	223	1100	11.52	645/56	32	15	3000	2600	4000	40	31	63
260	108	124	15	3.2	K402_0115 MB23 EZ503U	419	704	11.52	645/56	8.0	15	3000	2600	4000	19	31	56
260	108	124	15	3.2	K402_0115 MB23 EZ503U	419	704	11.52	645/56	12	15	3000	2600	4000	19	31	56
260	134	161	19	2.6	K402_0115 MB33 EZ702U	458	1100	11.52	645/56	16	15	3000	2600	4000	45	31	66
260	134	161	19	2.6	K402_0115 MB33 EZ702U	458	1100	11.52	645/56	24	15	3000	2600	4000	45	31	66
260	134	161	19	2.6	K402_0115 MB33 EZ702U	458	1100	11.52	645/56	32	15	3000	2600	4000	45	31	66
260	151	179	21	2.3	K402_0115 MB23 EZ505U	419	704	11.52	645/56	8.0	15	3000	2600	4000	23	31	58
260	151	179	21	2.3	K402_0115 MB23 EZ505U	419	704	11.52	645/56	12	15	3000	2600	4000	23	31	58
260	184	232	26	1.9	K402_0115 MB33 EZ703U	600	1100	11.52	645/56	16	32	3000	2600	4000	57	31	68
297	68	84	11	4.9	K402_0100 MB23 EZ404U	284	617	10.10	1333/132	8.0	8.0	3400	3000	4000	13	31	54
297	68	84	11	4.9	K402_0100 MB23 EZ404U	284	617	10.10	1333/132	12	8.0	3400	3000	4000	13	31	54
297	68	84	11	4.9	K402_0100 MB23 EZ404U	284	617	10.10	1333/132	16	8.0	3400	3000	4000	13	31	54
297	72	78	12	4.6	K402_0100 MB23 EZ502U	304	617	10.10	1333/132	8.0	8.0	3400	3000	4000	15	31	54
297	72	78	12	4.6	K402_0100 MB23 EZ502U	304	617	10.10	1333/132	12	8.0	3400	3000	4000	15	31	54
297	72	78	12	4.6	K402_0100 MB23 EZ502U	304	617	10.10	1333/132	16	8.0	3400	3000	4000	15	31	54
297	72	81	12	4.6	K402_0100 MB33 EZ701U	196	1100	10.10	1333/132	16	15	3400	3000	4000	40	31	63
297	72	81	12	4.6	K402_0100 MB33 EZ701U	196	1100	10.10	1333/132	24	15	3400	3000	4000	40	31	63
297	72	81	12	4.6	K402_0100 MB33 EZ701U	196	1100	10.10	1333/132	32	15	3400	3000	4000	40	31	63
297	72	81	12	4.6	K402_0100 MB33 EZ701U	196	1100	10.10	1333/132	45	15	3400	3000	4000	40	31	63
297	95	109	15	3.5	K402_0100 MB23 EZ503U	367	617	10.10	1333/132	8.0	15	3400	3000	4000	18	31	56
297	95	109	15	3.5	K402_0100 MB23 EZ503U	367	617	10.10	1333/132	12	15	3400	3000	4000	18	31	56
297	118	141	19	2.8	K402_0100 MB33 EZ702U	402	1100	10.10	1333/132	16	15	3400	3000	4000	45	31	66
297	118	141	19	2.8	K402_0100 MB33 EZ702U	402	1100	10.10	1333/132	24	15	3400	3000	4000	45	31	66
297	118	141	19	2.8	K402_0100 MB33 EZ702U	402	1100	10.10	1333/132	32	15	3400	3000	4000	45	31	66
297	118	141	19	2.8	K402_0100 MB33 EZ702U	402	1100	10.10	1333/132	45	15	3400	3000	4000	45	31	66
297	132	157	21	2.5	K402_0100 MB23 EZ505U	367	617	10.10	1333/132	8.0	15	3400	3000	4000	23	31	58
297	132	157	21	2.5	K402_0100 MB23 EZ505U	367	617	10.10	1333/132	12	15	3400	3000	4000	23	31	58
297	162	204	26	2.0	K402_0100 MB33 EZ703U	600	1100	10.10	1333/132	16	32	3400	3000	4000	57	31	68
297	162	204	26	2.0	K402_0100 MB33 EZ703U	600	1100	10.10	1333/132	24	32	3400	3000	4000	57	31	68
297	209	296	33	1.6	K402_0100 MB33 EZ705U	600	1100	10.10	1333/132	16	32	3400	3000	4000	69	31	74
297	209	296	33	1.6	K402_0100 MB33 EZ705U	600	1100	10.10	1333/132	24	32	3400	3000	4000	69	31	74

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
K4 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 600 Nm)																	
325	66	72	12	4.8	K402_0092 MB23 EZ502U	278	565	9.238	2365/256	8.0	8.0	3000	2600	4000	16	31	54
325	66	72	12	4.8	K402_0092 MB23 EZ502U	278	565	9.238	2365/256	12	8.0	3000	2600	4000	16	31	54
325	66	72	12	4.8	K402_0092 MB23 EZ502U	278	565	9.238	2365/256	16	8.0	3000	2600	4000	16	31	54
325	66	74	12	4.8	K402_0092 MB33 EZ701U	179	1100	9.238	2365/256	16	15	3000	2600	4000	41	31	63
325	66	74	12	4.8	K402_0092 MB33 EZ701U	179	1100	9.238	2365/256	24	15	3000	2600	4000	41	31	63
325	66	74	12	4.8	K402_0092 MB33 EZ701U	179	1100	9.238	2365/256	32	15	3000	2600	4000	41	31	63
325	66	74	12	4.8	K402_0092 MB33 EZ701U	179	1100	9.238	2365/256	45	15	3000	2600	4000	41	31	63
325	87	99	15	3.7	K402_0092 MB23 EZ503U	336	565	9.238	2365/256	8.0	15	3000	2600	4000	20	31	56
325	87	99	15	3.7	K402_0092 MB23 EZ503U	336	565	9.238	2365/256	12	15	3000	2600	4000	20	31	56
325	108	129	19	3.0	K402_0092 MB33 EZ702U	367	1100	9.238	2365/256	16	15	3000	2600	4000	46	31	66
325	108	129	19	3.0	K402_0092 MB33 EZ702U	367	1100	9.238	2365/256	24	15	3000	2600	4000	46	31	66
325	108	129	19	3.0	K402_0092 MB33 EZ702U	367	1100	9.238	2365/256	32	15	3000	2600	4000	46	31	66
325	108	129	19	3.0	K402_0092 MB33 EZ702U	367	1100	9.238	2365/256	45	15	3000	2600	4000	46	31	66
325	121	143	21	2.7	K402_0092 MB23 EZ505U	336	565	9.238	2365/256	8.0	15	3000	2600	4000	24	31	58
325	121	143	21	2.7	K402_0092 MB23 EZ505U	336	565	9.238	2365/256	12	15	3000	2600	4000	24	31	58
325	148	186	26	2.2	K402_0092 MB33 EZ703U	582	1100	9.238	2365/256	16	32	3000	2600	4000	58	31	68
325	148	186	26	2.2	K402_0092 MB33 EZ703U	582	1100	9.238	2365/256	24	32	3000	2600	4000	58	31	68
325	148	186	26	2.2	K402_0092 MB33 EZ703U	582	1100	9.238	2365/256	32	32	3000	2600	4000	58	31	68
325	191	271	34	1.7	K402_0092 MB33 EZ705U	600	1100	9.238	2365/256	16	32	3000	2600	4000	71	31	74
325	191	271	34	1.7	K402_0092 MB33 EZ705U	600	1100	9.238	2365/256	24	32	3000	2600	4000	71	31	74
325	191	271	34	1.7	K402_0092 MB33 EZ705U	600	1100	9.238	2365/256	32	32	3000	2600	4000	71	31	74
358	79	90	16	3.9	K402_0084 MB23 EZ503U	305	512	8.377	645/77	8.0	15	3000	2600	4000	19	31	56
358	79	90	16	3.9	K402_0084 MB23 EZ503U	305	512	8.377	645/77	12	15	3000	2600	4000	19	31	56
358	98	117	19	3.2	K402_0084 MB33 EZ702U	333	1100	8.377	645/77	16	15	3000	2600	4000	46	31	66
358	98	117	19	3.2	K402_0084 MB33 EZ702U	333	1100	8.377	645/77	24	15	3000	2600	4000	46	31	66
358	98	117	19	3.2	K402_0084 MB33 EZ702U	333	1100	8.377	645/77	32	15	3000	2600	4000	46	31	66
358	98	117	19	3.2	K402_0084 MB33 EZ702U	333	1100	8.377	645/77	45	15	3000	2600	4000	46	31	66
358	110	130	22	2.8	K402_0084 MB23 EZ505U	305	512	8.377	645/77	8.0	15	3000	2600	4000	24	31	58
358	110	130	22	2.8	K402_0084 MB23 EZ505U	305	512	8.377	645/77	12	15	3000	2600	4000	24	31	58
358	134	169	26	2.3	K402_0084 MB33 EZ703U	528	1100	8.377	645/77	16	32	3000	2600	4000	58	31	68
358	134	169	26	2.3	K402_0084 MB33 EZ703U	528	1100	8.377	645/77	24	32	3000	2600	4000	58	31	68
358	134	169	26	2.3	K402_0084 MB33 EZ703U	528	1100	8.377	645/77	32	32	3000	2600	4000	58	31	68
358	173	245	34	1.8	K402_0084 MB33 EZ705U	587	1100	8.377	645/77	16	32	3000	2600	4000	70	31	74
358	173	245	34	1.8	K402_0084 MB33 EZ705U	587	1100	8.377	645/77	24	32	3000	2600	4000	70	31	74
358	173	245	34	1.8	K402_0084 MB33 EZ705U	587	1100	8.377	645/77	32	32	3000	2600	4000	70	31	74
402	87	104	19	3.4	K402_0075 MB33 EZ702U	297	1100	7.456	1849/248	16	15	2600	2200	3800	48	31	66
402	87	104	19	3.4	K402_0075 MB33 EZ702U	297	1100	7.456	1849/248	24	15	2600	2200	3800	48	31	66
402	87	104	19	3.4	K402_0075 MB33 EZ702U	297	1100	7.456	1849/248	32	15	2600	2200	3800	48	31	66
402	87	104	19	3.4	K402_0075 MB33 EZ702U	297	1100	7.456	1849/248	45	15	2600	2200	3800	48	31	66
402	119	150	27	2.5	K402_0075 MB33 EZ703U	470	1100	7.456	1849/248	16	32	2600	2200	3800	60	31	68
402	119	150	27	2.5	K402_0075 MB33 EZ703U	470	1100	7.456	1849/248	24	32	2600	2200	3800	60	31	68
402	119	150	27	2.5	K402_0075 MB33 EZ703U	470	1100	7.456	1849/248	32	32	2600	2200	3800	60	31	68
402	119	150	27	2.5	K402_0075 MB33 EZ703U	470	1100	7.456	1849/248	45	32	2600	2200	3800	60	31	68
402	154	218	34	1.9	K402_0075 MB33 EZ705U	564	1100	7.456	1849/248	16	32	2600	2200	3800	72	31	74
402	154	218	34	1.9	K402_0075 MB33 EZ705U	564	1100	7.456	1849/248	24	32	2600	2200	3800	72	31	74
402	154	218	34	1.9	K402_0075 MB33 EZ705U	564	1100	7.456	1849/248	32	32	2600	2200	3800	72	31	74
402	154	218	34	1.9	K402_0075 MB33 EZ705U	564	1100	7.456	1849/248	45	32	2600	2200	3800	72	31	74
446	63	72	19	3.9	K402_0067 MB23 EZ503U	244	411	6.719	215/32	8.0	15	3000	2600	4000	20	31	56
446	63	72	19	3.9	K402_0067 MB23 EZ503U	244	411	6.719	215/32	12	15	3000	2600	4000	20	31	56
446	78	94	19	3.7	K402_0067 MB33 EZ702U	267	1100	6.719	215/32	16	15	3000	2600	4000	47	31	66
446	78	94	19	3.7	K402_0067 MB33 EZ702U	267	1100	6.719	215/32	24	15	3000	2600	4000	47	31	66
446	78	94	19	3.7	K402_0067 MB33 EZ702U	267	1100	6.719	215/32	32	15	3000	2600	4000	47	31	66
446	78	94	19	3.7	K402_0067 MB33 EZ702U	267	1100	6.719	215/32	45	15	3000	2600	4000	47	31	66
446	88	104	26	2.8	K402_0067 MB23 EZ505U	244	411	6.719	215/32	8.0	15	3000	2600	4000	25	31	58
446	88	104	26	2.8	K402_0067 MB23 EZ505U	244	411	6.719	215/32	12	15	3000	2600	4000	25	31	58
446	108	136	27	2.7	K402_0067 MB33 EZ703U	424	1100	6.719	215/32	16	32	3000	2600	4000	59	31	68
446	108	136	27	2.7	K402_0067 MB33 EZ703U	424	1100	6.719	215/32	24	32	3000	2600	4000	59	31	68
446	108	136	27	2.7	K402_0067 MB33 EZ703U	424	1100	6.719	215/32	32	32	3000	2600	4000	59	31	68
446	108	136	27	2.7	K402_0067 MB33 EZ703U	424	1100	6.719	215/32	45	32	3000	2600	4000	59	31	68
446	139	197	35	2.1	K402_0067 MB33 EZ705U	545	1100	6.719	215/32	16	32	3000	2600	4000	71	31	74
446	139	197	35	2.1	K402_0067 MB33 EZ705U	545	1100	6.719	215/32	24	32	3000	2600	4000	71	31	74
446	139	197	35	2.1	K402_0067 MB33 EZ705U	545	1100	6.719	215/32	32	32	3000	2600	4000	71	31	74
446	139	197	35	2.1	K402_0067 MB33 EZ705U	545	1100	6.719	215/32	45	32	3000	2600	4000	71	31	74
446	173	314	43	1.7	K402_0067 MB43 EZ803U	545	1100	6.719	215/32	50	65	3000	2600	3000	179	31	105

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
K4 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 600 Nm)																	
500	70	84	20	4.0	K402_0060 MB33 EZ702U	239	1100	6.000	6/1	16	15	2600	2200	3800	50	31	66
500	70	84	20	4.0	K402_0060 MB33 EZ702U	239	1100	6.000	6/1	24	15	2600	2200	3800	50	31	66
500	70	84	20	4.0	K402_0060 MB33 EZ702U	239	1100	6.000	6/1	32	15	2600	2200	3800	50	31	66
500	70	84	20	4.0	K402_0060 MB33 EZ702U	239	1100	6.000	6/1	45	15	2600	2200	3800	50	31	66
500	96	121	27	2.9	K402_0060 MB33 EZ703U	378	1100	6.000	6/1	16	32	2600	2200	3800	61	31	68
500	96	121	27	2.9	K402_0060 MB33 EZ703U	378	1100	6.000	6/1	24	32	2600	2200	3800	61	31	68
500	96	121	27	2.9	K402_0060 MB33 EZ703U	378	1100	6.000	6/1	32	32	2600	2200	3800	61	31	68
500	96	121	27	2.9	K402_0060 MB33 EZ703U	378	1100	6.000	6/1	45	32	2600	2200	3800	61	31	68
500	124	176	35	2.2	K402_0060 MB33 EZ705U	525	1100	6.000	6/1	16	32	2600	2200	3800	74	31	74
500	124	176	35	2.2	K402_0060 MB33 EZ705U	525	1100	6.000	6/1	24	32	2600	2200	3800	74	31	74
500	124	176	35	2.2	K402_0060 MB33 EZ705U	525	1100	6.000	6/1	32	32	2600	2200	3800	74	31	74
500	124	176	35	2.2	K402_0060 MB33 EZ705U	525	1100	6.000	6/1	45	32	2600	2200	3800	74	31	74
500	155	281	44	1.8	K402_0060 MB43 EZ803U	525	1100	6.000	6/1	50	65	2600	2200	3000	182	31	105
553	63	76	20	4.3	K402_0054 MB33 EZ702U	216	994	5.422	1849/341	16	15	2600	2200	3800	49	31	66
553	63	76	20	4.3	K402_0054 MB33 EZ702U	216	994	5.422	1849/341	24	15	2600	2200	3800	49	31	66
553	63	76	20	4.3	K402_0054 MB33 EZ702U	216	994	5.422	1849/341	32	15	2600	2200	3800	49	31	66
553	63	76	20	4.3	K402_0054 MB33 EZ702U	216	994	5.422	1849/341	45	15	2600	2200	3800	49	31	66
553	87	109	27	3.1	K402_0054 MB33 EZ703U	342	994	5.422	1849/341	16	32	2600	2200	3800	61	31	68
553	87	109	27	3.1	K402_0054 MB33 EZ703U	342	994	5.422	1849/341	24	32	2600	2200	3800	61	31	68
553	87	109	27	3.1	K402_0054 MB33 EZ703U	342	994	5.422	1849/341	32	32	2600	2200	3800	61	31	68
553	87	109	27	3.1	K402_0054 MB33 EZ703U	342	994	5.422	1849/341	45	32	2600	2200	3800	61	31	68
553	112	159	35	2.4	K402_0054 MB33 EZ705U	508	994	5.422	1849/341	16	32	2600	2200	3800	73	31	74
553	112	159	35	2.4	K402_0054 MB33 EZ705U	508	994	5.422	1849/341	24	32	2600	2200	3800	73	31	74
553	112	159	35	2.4	K402_0054 MB33 EZ705U	508	994	5.422	1849/341	32	32	2600	2200	3800	73	31	74
553	112	159	35	2.4	K402_0054 MB33 EZ705U	508	994	5.422	1849/341	45	32	2600	2200	3800	73	31	74
553	140	254	44	1.9	K402_0054 MB43 EZ803U	508	1078	5.422	1849/341	50	65	2600	2200	3000	181	31	105
553	140	254	44	1.9	K402_0054 MB43 EZ803U	508	1078	5.422	1849/341	72	65	2600	2200	3000	181	31	105
687	51	61	20	4.9	K402_0044 MB33 EZ702U	174	800	4.364	48/11	16	15	2600	2200	3800	51	31	66
687	51	61	20	4.9	K402_0044 MB33 EZ702U	174	800	4.364	48/11	24	15	2600	2200	3800	51	31	66
687	51	61	20	4.9	K402_0044 MB33 EZ702U	174	800	4.364	48/11	32	15	2600	2200	3800	51	31	66
687	51	61	20	4.9	K402_0044 MB33 EZ702U	174	800	4.364	48/11	45	15	2600	2200	3800	51	31	66
687	70	88	28	3.6	K402_0044 MB33 EZ703U	275	800	4.364	48/11	16	32	2600	2200	3800	63	31	68
687	70	88	28	3.6	K402_0044 MB33 EZ703U	275	800	4.364	48/11	24	32	2600	2200	3800	63	31	68
687	70	88	28	3.6	K402_0044 MB33 EZ703U	275	800	4.364	48/11	32	32	2600	2200	3800	63	31	68
687	70	88	28	3.6	K402_0044 MB33 EZ703U	275	800	4.364	48/11	45	32	2600	2200	3800	63	31	68
687	90	128	36	2.8	K402_0044 MB33 EZ705U	423	800	4.364	48/11	16	32	2600	2200	3800	75	31	74
687	90	128	36	2.8	K402_0044 MB33 EZ705U	423	800	4.364	48/11	24	32	2600	2200	3800	75	31	74
687	90	128	36	2.8	K402_0044 MB33 EZ705U	423	800	4.364	48/11	32	32	2600	2200	3800	75	31	74
687	90	128	36	2.8	K402_0044 MB33 EZ705U	423	800	4.364	48/11	45	32	2600	2200	3800	75	31	74
687	113	204	45	2.2	K402_0044 MB43 EZ803U	472	1078	4.364	48/11	50	65	2600	2200	3000	183	31	105
687	113	204	45	2.2	K402_0044 MB43 EZ803U	472	1078	4.364	48/11	72	65	2600	2200	3000	183	31	105
687	113	204	45	2.2	K402_0044 MB43 EZ803U	472	1078	4.364	48/11	100	65	2600	2200	3000	183	31	105
750	64	81	28	3.8	K402_0040 MB33 EZ703U	252	733	4.000	4/1	16	32	2600	2200	3800	64	31	68
750	64	81	28	3.8	K402_0040 MB33 EZ703U	252	733	4.000	4/1	24	32	2600	2200	3800	64	31	68
750	64	81	28	3.8	K402_0040 MB33 EZ703U	252	733	4.000	4/1	32	32	2600	2200	3800	64	31	68
750	64	81	28	3.8	K402_0040 MB33 EZ703U	252	733	4.000	4/1	45	32	2600	2200	3800	64	31	68
750	83	117	36	2.9	K402_0040 MB33 EZ705U	388	733	4.000	4/1	16	32	2600	2200	3800	77	31	74
750	83	117	36	2.9	K402_0040 MB33 EZ705U	388	733	4.000	4/1	24	32	2600	2200	3800	77	31	74
750	83	117	36	2.9	K402_0040 MB33 EZ705U	388	733	4.000	4/1	32	32	2600	2200	3800	77	31	74
750	83	117	36	2.9	K402_0040 MB33 EZ705U	388	733	4.000	4/1	45	32	2600	2200	3800	77	31	74
750	103	187	45	2.4	K402_0040 MB43 EZ803U	459	1078	4.000	4/1	50	65	2600	2200	3000	184	31	105
750	103	187	45	2.4	K402_0040 MB43 EZ803U	459	1078	4.000	4/1	72	65	2600	2200	3000	184	31	105
750	103	187	45	2.4	K402_0040 MB43 EZ803U	459	1078	4.000	4/1	100	65	2600	2200	3000	184	31	105
K5 (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 1000 Nm)																	
272	307	464	48	2.1	K513_0073 MB43 EZ805U	1000	1800	7.347	551/75	50	115	1900	1800	3000	279	50	127
K5 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1000 Nm)																	
51	240	262	6.2	3.8	K513_0580 MB23 EZ501U	892	1800	58.30	11368/195	8.0	8.0	3400	3000	4000	11	50	58
51	262	290	6.8	3.4	K513_0580 MB23 EZ402U	892	1800	58.30	11368/195	8.0	8.0	3400	3000	4000	9.6	50	58
51	385	479	9.9	2.3	K513_0580 MB23 EZ404U	1000	1800	58.30	11368/195	8.0	8.0	3400	3000	4000	11	50	60
51	412	446	11	2.2	K513_0580 MB23 EZ502U	1000	1800	58.30	11368/195	8.0	8.0	3400	3000	4000	13	50	59
62	198	216	5.8	4.5	K513_0480 MB23 EZ501U	737	1800	48.16	2697/56	8.0	8.0	3400	3000	4000	11	50	58
62	198	216	5.8	4.5	K513_0480 MB23 EZ501U	737	1800	48.16	2697/56	12	8.0	3400	3000	4000	11	50	58
62	216	239	6.4	4.2	K513_0480 MB23 EZ402U	737	1800	48.16	2697/56	8.0	8.0	3400	3000	4000	10	50	58
62	216	239	6.4	4.2	K513_0480 MB23 EZ402U	737	1800	48.16	2697/56	12	8.0	3400	3000	4000	10	50	58

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
K5 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1000 Nm)																	
62	318	396	9.4	2.8	K513_0480 MB23 EZ404U	1000	1800	48.16	2697/56	8.0	8.0	3400	3000	4000	11	50	60
62	318	396	9.4	2.8	K513_0480 MB23 EZ404U	1000	1800	48.16	2697/56	12	8.0	3400	3000	4000	11	50	60
62	341	368	10	2.6	K513_0480 MB23 EZ502U	1000	1800	48.16	2697/56	8.0	8.0	3400	3000	4000	14	50	59
62	341	368	10	2.6	K513_0480 MB23 EZ502U	1000	1800	48.16	2697/56	12	8.0	3400	3000	4000	14	50	59
69	195	216	6.2	4.6	K513_0440 MB23 EZ402U	665	1800	43.50	87/2	8.0	8.0	3400	3000	4000	10	50	58
69	195	216	6.2	4.6	K513_0440 MB23 EZ402U	665	1800	43.50	87/2	12	8.0	3400	3000	4000	10	50	58
69	287	358	9.1	3.1	K513_0440 MB23 EZ404U	1000	1800	43.50	87/2	8.0	8.0	3400	3000	4000	11	50	60
69	287	358	9.1	3.1	K513_0440 MB23 EZ404U	1000	1800	43.50	87/2	12	8.0	3400	3000	4000	11	50	60
69	308	333	9.8	2.9	K513_0440 MB23 EZ502U	1000	1800	43.50	87/2	8.0	8.0	3400	3000	4000	14	50	59
69	308	333	9.8	2.9	K513_0440 MB23 EZ502U	1000	1800	43.50	87/2	12	8.0	3400	3000	4000	14	50	59
69	403	462	13	2.2	K513_0440 MB23 EZ503U	1000	1800	43.50	87/2	8.0	15	3400	3000	4000	17	50	61
69	561	665	18	1.6	K513_0440 MB23 EZ505U	1000	1800	43.50	87/2	8.0	15	3400	3000	4000	22	50	64
78	254	317	8.8	3.5	K513_0390 MB23 EZ404U	1000	1800	38.53	2697/70	8.0	8.0	3400	3000	4000	12	50	60
78	254	317	8.8	3.5	K513_0390 MB23 EZ404U	1000	1800	38.53	2697/70	12	8.0	3400	3000	4000	12	50	60
78	254	317	8.8	3.5	K513_0390 MB23 EZ404U	1000	1800	38.53	2697/70	16	8.0	3400	3000	4000	12	50	60
78	273	295	9.4	3.3	K513_0390 MB23 EZ502U	1000	1800	38.53	2697/70	8.0	8.0	3400	3000	4000	14	50	59
78	273	295	9.4	3.3	K513_0390 MB23 EZ502U	1000	1800	38.53	2697/70	12	8.0	3400	3000	4000	14	50	59
78	273	295	9.4	3.3	K513_0390 MB23 EZ502U	1000	1800	38.53	2697/70	16	8.0	3400	3000	4000	14	50	59
78	357	409	12	2.5	K513_0390 MB23 EZ503U	1000	1800	38.53	2697/70	8.0	15	3400	3000	4000	18	50	61
78	497	589	17	1.8	K513_0390 MB23 EZ505U	1000	1800	38.53	2697/70	8.0	15	3400	3000	4000	22	50	64
86	230	286	8.5	3.9	K513_0350 MB23 EZ404U	965	1800	34.80	174/5	8.0	8.0	3400	3000	4000	12	50	60
86	230	286	8.5	3.9	K513_0350 MB23 EZ404U	965	1800	34.80	174/5	12	8.0	3400	3000	4000	12	50	60
86	230	286	8.5	3.9	K513_0350 MB23 EZ404U	965	1800	34.80	174/5	16	8.0	3400	3000	4000	12	50	60
86	246	266	9.1	3.7	K513_0350 MB23 EZ502U	1000	1800	34.80	174/5	8.0	8.0	3400	3000	4000	14	50	59
86	246	266	9.1	3.7	K513_0350 MB23 EZ502U	1000	1800	34.80	174/5	12	8.0	3400	3000	4000	14	50	59
86	246	266	9.1	3.7	K513_0350 MB23 EZ502U	1000	1800	34.80	174/5	16	8.0	3400	3000	4000	14	50	59
86	323	369	12	2.8	K513_0350 MB23 EZ503U	1000	1800	34.80	174/5	8.0	15	3400	3000	4000	18	50	61
86	323	369	12	2.8	K513_0350 MB23 EZ503U	1000	1800	34.80	174/5	12	15	3400	3000	4000	18	50	61
86	449	532	17	2.0	K513_0350 MB23 EZ505U	1000	1800	34.80	174/5	8.0	15	3400	3000	4000	22	50	64
86	449	532	17	2.0	K513_0350 MB23 EZ505U	1000	1800	34.80	174/5	12	15	3400	3000	4000	22	50	64
93	213	266	8.3	4.2	K513_0320 MB23 EZ404U	896	1800	32.31	20677/640	8.0	8.0	3400	3000	4000	12	50	60
93	213	266	8.3	4.2	K513_0320 MB23 EZ404U	896	1800	32.31	20677/640	12	8.0	3400	3000	4000	12	50	60
93	213	266	8.3	4.2	K513_0320 MB23 EZ404U	896	1800	32.31	20677/640	16	8.0	3400	3000	4000	12	50	60
93	229	247	8.9	3.9	K513_0320 MB23 EZ502U	957	1800	32.31	20677/640	8.0	8.0	3400	3000	4000	14	50	59
93	229	247	8.9	3.9	K513_0320 MB23 EZ502U	957	1800	32.31	20677/640	12	8.0	3400	3000	4000	14	50	59
93	229	247	8.9	3.9	K513_0320 MB23 EZ502U	957	1800	32.31	20677/640	16	8.0	3400	3000	4000	14	50	59
93	229	256	8.9	3.9	K513_0320 MB33 EZ701U	618	1800	32.31	20677/640	16	15	3400	3000	4000	39	50	69
93	300	343	12	3.0	K513_0320 MB23 EZ503U	1000	1800	32.31	20677/640	8.0	15	3400	3000	4000	18	50	61
93	300	343	12	3.0	K513_0320 MB23 EZ503U	1000	1800	32.31	20677/640	12	15	3400	3000	4000	18	50	61
93	371	445	14	2.4	K513_0320 MB33 EZ702U	1000	1800	32.31	20677/640	16	15	3400	3000	4000	45	50	71
93	417	494	16	2.2	K513_0320 MB23 EZ505U	1000	1800	32.31	20677/640	8.0	15	3400	3000	4000	23	50	64
93	417	494	16	2.2	K513_0320 MB23 EZ505U	1000	1800	32.31	20677/640	12	15	3400	3000	4000	23	50	64
103	192	240	8.3	4.5	K513_0290 MB23 EZ404U	809	1758	29.18	4669/160	8.0	8.0	3400	3000	4000	12	50	60
103	192	240	8.3	4.5	K513_0290 MB23 EZ404U	809	1758	29.18	4669/160	12	8.0	3400	3000	4000	12	50	60
103	192	240	8.3	4.5	K513_0290 MB23 EZ404U	809	1758	29.18	4669/160	16	8.0	3400	3000	4000	12	50	60
103	206	223	8.9	4.2	K513_0290 MB23 EZ502U	865	1758	29.18	4669/160	8.0	8.0	3400	3000	4000	15	50	59
103	206	223	8.9	4.2	K513_0290 MB23 EZ502U	865	1758	29.18	4669/160	12	8.0	3400	3000	4000	15	50	59
103	206	223	8.9	4.2	K513_0290 MB23 EZ502U	865	1758	29.18	4669/160	16	8.0	3400	3000	4000	15	50	59
103	206	232	8.9	4.2	K513_0290 MB33 EZ701U	558	1800	29.18	4669/160	16	15	3400	3000	4000	40	50	69
103	271	310	12	3.2	K513_0290 MB23 EZ503U	1000	1758	29.18	4669/160	8.0	15	3400	3000	4000	18	50	61
103	271	310	12	3.2	K513_0290 MB23 EZ503U	1000	1758	29.18	4669/160	12	15	3400	3000	4000	18	50	61
103	335	402	14	2.6	K513_0290 MB33 EZ702U	1000	1800	29.18	4669/160	16	15	3400	3000	4000	45	50	71
103	377	446	16	2.3	K513_0290 MB23 EZ505U	1000	1758	29.18	4669/160	8.0	15	3400	3000	4000	23	50	64
103	377	446	16	2.3	K513_0290 MB23 EZ505U	1000	1758	29.18	4669/160	12	15	3400	3000	4000	23	50	64
123	172	186	9.0	4.8	K513_0240 MB23 EZ502U	722	1466	24.35	11687/480	8.0	8.0	2800	2500	4000	15	50	59
123	172	186	9.0	4.8	K513_0240 MB23 EZ502U	722	1466	24.35	11687/480	12	8.0	2800	2500	4000	15	50	59
123	172	186	9.0	4.8	K513_0240 MB23 EZ502U	722	1466	24.35	11687/480	16	8.0	2800	2500	4000	15	50	59
123	172	193	9.0	4.8	K513_0240 MB33 EZ701U	466	1800	24.35	11687/480	16	15	2800	2500	4000	40	50	69
123	172	193	9.0	4.8	K513_0240 MB33 EZ701U	466	1800	24.35	11687/480	24	15	2800	2500	4000	40	50	69
123	226	258	12	3.6	K513_0240 MB23 EZ503U	873	1466	24.35	11687/480	8.0	15	2800	2500	4000	19	50	61
123	226	258	12	3.6	K513_0240 MB23 EZ503U	873	1466	24.35	11687/480	12	15	2800	2500	4000	19	50	61
123	279	335	15	2.9	K513_0240 MB33 EZ702U	954	1800	24.35	11687/480	16	15	2800	2500	4000	46	50	71
123	279	335	15	2.9	K513_0240 MB33 EZ702U	954	1800	24.35	11687/480	24	15	2800	2500	4000	46	50	71
123	314	372	16	2.6	K513_0240 MB23 EZ505U	873	1466	24.35	11687/480	8.0	15	2800	2500	4000	24	50	64

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
K5 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1000 Nm)																	
123	314	372	16	2.6	K513_0240 MB23 EZ505U	873	1466	24.35	11687/480	12	15	2800	2500	4000	24	50	64
136	204	233	12	3.9	K513_0220 MB23 EZ503U	788	1325	21.99	2639/120	8.0	15	2800	2500	4000	19	50	61
136	204	233	12	3.9	K513_0220 MB23 EZ503U	788	1325	21.99	2639/120	12	15	2800	2500	4000	19	50	61
136	252	303	15	3.1	K513_0220 MB33 EZ702U	862	1800	21.99	2639/120	16	15	2800	2500	4000	46	50	71
136	252	303	15	3.1	K513_0220 MB33 EZ702U	862	1800	21.99	2639/120	24	15	2800	2500	4000	46	50	71
136	252	303	15	3.1	K513_0220 MB33 EZ702U	862	1800	21.99	2639/120	32	15	2800	2500	4000	46	50	71
136	284	336	17	2.8	K513_0220 MB23 EZ505U	788	1325	21.99	2639/120	8.0	15	2800	2500	4000	24	50	64
136	284	336	17	2.8	K513_0220 MB23 EZ505U	788	1325	21.99	2639/120	12	15	2800	2500	4000	24	50	64
155	179	205	13	3.9	K513_0195 MB23 EZ503U	694	1166	19.35	27869/1440	8.0	15	2800	2500	4000	20	50	61
155	179	205	13	3.9	K513_0195 MB23 EZ503U	694	1166	19.35	27869/1440	12	15	2800	2500	4000	20	50	61
155	222	266	15	3.4	K513_0195 MB33 EZ702U	759	1800	19.35	27869/1440	16	15	2800	2500	4000	47	50	71
155	222	266	15	3.4	K513_0195 MB33 EZ702U	759	1800	19.35	27869/1440	24	15	2800	2500	4000	47	50	71
155	222	266	15	3.4	K513_0195 MB33 EZ702U	759	1800	19.35	27869/1440	32	15	2800	2500	4000	47	50	71
155	250	296	18	2.8	K513_0195 MB23 EZ505U	694	1166	19.35	27869/1440	8.0	15	2800	2500	4000	25	50	64
155	250	296	18	2.8	K513_0195 MB23 EZ505U	694	1166	19.35	27869/1440	12	15	2800	2500	4000	25	50	64
155	305	385	20	2.5	K513_0195 MB33 EZ703U	1000	1800	19.35	27869/1440	16	32	2800	2500	4000	59	50	74
155	394	559	26	1.9	K513_0195 MB33 EZ705U	1000	1800	19.35	27869/1440	16	32	2800	2500	4000	71	50	80
172	162	186	14	3.9	K513_0175 MB23 EZ503U	627	1053	17.48	6293/360	8.0	15	2800	2500	4000	20	50	61
172	162	186	14	3.9	K513_0175 MB23 EZ503U	627	1053	17.48	6293/360	12	15	2800	2500	4000	20	50	61
172	201	241	15	3.7	K513_0175 MB33 EZ702U	685	1800	17.48	6293/360	16	15	2800	2500	4000	47	50	71
172	201	241	15	3.7	K513_0175 MB33 EZ702U	685	1800	17.48	6293/360	24	15	2800	2500	4000	47	50	71
172	201	241	15	3.7	K513_0175 MB33 EZ702U	685	1800	17.48	6293/360	32	15	2800	2500	4000	47	50	71
172	201	241	15	3.7	K513_0175 MB33 EZ702U	685	1800	17.48	6293/360	45	15	2800	2500	4000	47	50	71
172	226	267	19	2.8	K513_0175 MB23 EZ505U	627	1053	17.48	6293/360	8.0	15	2800	2500	4000	25	50	64
172	226	267	19	2.8	K513_0175 MB23 EZ505U	627	1053	17.48	6293/360	12	15	2800	2500	4000	25	50	64
172	276	348	20	2.7	K513_0175 MB33 EZ703U	1000	1800	17.48	6293/360	16	32	2800	2500	4000	59	50	74
172	356	505	26	2.1	K513_0175 MB33 EZ705U	1000	1800	17.48	6293/360	16	32	2800	2500	4000	71	50	80
186	149	171	15	3.9	K513_0160 MB23 EZ503U	577	969	16.09	26071/1620	8.0	15	2300	2200	3600	21	50	61
186	149	171	15	3.9	K513_0160 MB23 EZ503U	577	969	16.09	26071/1620	12	15	2300	2200	3600	21	50	61
186	185	222	15	3.9	K513_0160 MB33 EZ702U	631	1800	16.09	26071/1620	16	15	2300	2200	3600	48	50	71
186	185	222	15	3.9	K513_0160 MB33 EZ702U	631	1800	16.09	26071/1620	24	15	2300	2200	3600	48	50	71
186	185	222	15	3.9	K513_0160 MB33 EZ702U	631	1800	16.09	26071/1620	32	15	2300	2200	3600	48	50	71
186	185	222	15	3.9	K513_0160 MB33 EZ702U	631	1800	16.09	26071/1620	45	15	2300	2200	3600	48	50	71
186	208	246	21	2.8	K513_0160 MB23 EZ505U	577	969	16.09	26071/1620	8.0	15	2300	2200	3600	26	50	64
186	208	246	21	2.8	K513_0160 MB23 EZ505U	577	969	16.09	26071/1620	12	15	2300	2200	3600	26	50	64
186	254	320	20	2.8	K513_0160 MB33 EZ703U	1000	1800	16.09	26071/1620	16	32	2300	2200	3600	60	50	74
186	254	320	20	2.8	K513_0160 MB33 EZ703U	1000	1800	16.09	26071/1620	24	32	2300	2200	3600	60	50	74
186	328	465	26	2.2	K513_0160 MB33 EZ705U	1000	1800	16.09	26071/1620	16	32	2300	2200	3600	72	50	80
186	328	465	26	2.2	K513_0160 MB33 EZ705U	1000	1800	16.09	26071/1620	24	32	2300	2200	3600	72	50	80
206	135	154	16	3.9	K513_0145 MB23 EZ503U	521	875	14.54	5887/405	8.0	15	2300	2200	3600	22	50	61
206	135	154	16	3.9	K513_0145 MB23 EZ503U	521	875	14.54	5887/405	12	15	2300	2200	3600	22	50	61
206	167	200	15	4.1	K513_0145 MB33 EZ702U	570	1800	14.54	5887/405	16	15	2300	2200	3600	48	50	71
206	167	200	15	4.1	K513_0145 MB33 EZ702U	570	1800	14.54	5887/405	24	15	2300	2200	3600	48	50	71
206	167	200	15	4.1	K513_0145 MB33 EZ702U	570	1800	14.54	5887/405	32	15	2300	2200	3600	48	50	71
206	167	200	15	4.1	K513_0145 MB33 EZ702U	570	1800	14.54	5887/405	45	15	2300	2200	3600	48	50	71
206	188	222	22	2.8	K513_0145 MB23 EZ505U	521	875	14.54	5887/405	8.0	15	2300	2200	3600	26	50	64
206	188	222	22	2.8	K513_0145 MB23 EZ505U	521	875	14.54	5887/405	12	15	2300	2200	3600	26	50	64
206	229	289	20	3.0	K513_0145 MB33 EZ703U	903	1800	14.54	5887/405	16	32	2300	2200	3600	60	50	74
206	229	289	20	3.0	K513_0145 MB33 EZ703U	903	1800	14.54	5887/405	24	32	2300	2200	3600	60	50	74
206	229	289	20	3.0	K513_0145 MB33 EZ703U	903	1800	14.54	5887/405	32	32	2300	2200	3600	60	50	74
206	296	420	26	2.3	K513_0145 MB33 EZ705U	1000	1800	14.54	5887/405	16	32	2300	2200	3600	73	50	80
206	296	420	26	2.3	K513_0145 MB33 EZ705U	1000	1800	14.54	5887/405	24	32	2300	2200	3600	73	50	80
206	296	420	26	2.3	K513_0145 MB33 EZ705U	1000	1800	14.54	5887/405	32	32	2300	2200	3600	73	50	80
234	147	176	15	4.5	K513_0130 MB33 EZ702U	502	1800	12.81	1537/120	16	15	2300	2200	3600	50	50	71
234	147	176	15	4.5	K513_0130 MB33 EZ702U	502	1800	12.81	1537/120	24	15	2300	2200	3600	50	50	71
234	147	176	15	4.5	K513_0130 MB33 EZ702U	502	1800	12.81	1537/120	32	15	2300	2200	3600	50	50	71
234	147	176	15	4.5	K513_0130 MB33 EZ702U	502	1800	12.81	1537/120	45	15	2300	2200	3600	50	50	71
234	202	255	20	3.3	K513_0130 MB33 EZ703U	796	1800	12.81	1537/120	16	32	2300	2200	3600	62	50	74
234	202	255	20	3.3	K513_0130 MB33 EZ703U	796	1800	12.81	1537/120	24	32	2300	2200	3600	62	50	74
234	202	255	20	3.3	K513_0130 MB33 EZ703U	796	1800	12.81	1537/120	32	32	2300	2200	3600	62	50	74
234	202	255	20	3.3	K513_0130 MB33 EZ703U	796	1800	12.81	1537/120	45	32	2300	2200	3600	62	50	74
234	261	370	26	2.5	K513_0130 MB33 EZ705U	1000	1800	12.81	1537/120	16	32	2300	2200	3600	74	50	80
234	261	370	26	2.5	K513_0130 MB33 EZ705U	1000	1800	12.81	1537/120	24	32	2300	2200	3600	74	50	80
234	261	370	26	2.5	K513_0130 MB33 EZ705U	1000	1800	12.81	1537/120	32	32	2300	2200	3600	74	50	80

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
K5 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1000 Nm)																	
234	261	370	26	2.5	K513_0130 MB33 EZ705U	1000	1800	12.81	1537/120	45	32	2300	2200	3600	74	50	80
259	133	159	15	4.8	K513_0115 MB33 EZ702U	453	1800	11.57	10759/930	16	15	2300	2200	3600	51	50	71
259	133	159	15	4.8	K513_0115 MB33 EZ702U	453	1800	11.57	10759/930	24	15	2300	2200	3600	51	50	71
259	133	159	15	4.8	K513_0115 MB33 EZ702U	453	1800	11.57	10759/930	32	15	2300	2200	3600	51	50	71
259	133	159	15	4.8	K513_0115 MB33 EZ702U	453	1800	11.57	10759/930	45	15	2300	2200	3600	51	50	71
259	182	230	21	3.5	K513_0115 MB33 EZ703U	719	1800	11.57	10759/930	16	32	2300	2200	3600	63	50	74
259	182	230	21	3.5	K513_0115 MB33 EZ703U	719	1800	11.57	10759/930	24	32	2300	2200	3600	63	50	74
259	182	230	21	3.5	K513_0115 MB33 EZ703U	719	1800	11.57	10759/930	32	32	2300	2200	3600	63	50	74
259	182	230	21	3.5	K513_0115 MB33 EZ703U	719	1800	11.57	10759/930	45	32	2300	2200	3600	63	50	74
259	236	334	26	2.7	K513_0115 MB33 EZ705U	1000	1800	11.57	10759/930	16	32	2300	2200	3600	75	50	80
259	236	334	26	2.7	K513_0115 MB33 EZ705U	1000	1800	11.57	10759/930	24	32	2300	2200	3600	75	50	80
259	236	334	26	2.7	K513_0115 MB33 EZ705U	1000	1800	11.57	10759/930	32	32	2300	2200	3600	75	50	80
259	236	334	26	2.7	K513_0115 MB33 EZ705U	1000	1800	11.57	10759/930	45	32	2300	2200	3600	75	50	80
296	160	202	21	3.8	K513_0100 MB33 EZ703U	631	1800	10.15	203/20	16	32	1900	1800	3200	65	50	74
296	160	202	21	3.8	K513_0100 MB33 EZ703U	631	1800	10.15	203/20	24	32	1900	1800	3200	65	50	74
296	160	202	21	3.8	K513_0100 MB33 EZ703U	631	1800	10.15	203/20	32	32	1900	1800	3200	65	50	74
296	160	202	21	3.8	K513_0100 MB33 EZ703U	631	1800	10.15	203/20	45	32	1900	1800	3200	65	50	74
296	207	293	27	3.0	K513_0100 MB33 EZ705U	970	1800	10.15	203/20	16	32	1900	1800	3200	77	50	80
296	207	293	27	3.0	K513_0100 MB33 EZ705U	970	1800	10.15	203/20	24	32	1900	1800	3200	77	50	80
296	207	293	27	3.0	K513_0100 MB33 EZ705U	970	1800	10.15	203/20	32	32	1900	1800	3200	77	50	80
296	207	293	27	3.0	K513_0100 MB33 EZ705U	970	1800	10.15	203/20	45	32	1900	1800	3200	77	50	80
296	258	468	33	2.4	K513_0100 MB43 EZ803U	1000	1800	10.15	203/20	50	65	1900	1800	3000	185	50	111
327	145	182	21	4.1	K513_0092 MB33 EZ703U	570	1657	9.168	1421/155	16	32	1900	1800	3200	66	50	74
327	145	182	21	4.1	K513_0092 MB33 EZ703U	570	1657	9.168	1421/155	24	32	1900	1800	3200	66	50	74
327	145	182	21	4.1	K513_0092 MB33 EZ703U	570	1657	9.168	1421/155	32	32	1900	1800	3200	66	50	74
327	145	182	21	4.1	K513_0092 MB33 EZ703U	570	1657	9.168	1421/155	45	32	1900	1800	3200	66	50	74
327	187	265	27	3.2	K513_0092 MB33 EZ705U	876	1657	9.168	1421/155	16	32	1900	1800	3200	78	50	80
327	187	265	27	3.2	K513_0092 MB33 EZ705U	876	1657	9.168	1421/155	24	32	1900	1800	3200	78	50	80
327	187	265	27	3.2	K513_0092 MB33 EZ705U	876	1657	9.168	1421/155	32	32	1900	1800	3200	78	50	80
327	187	265	27	3.2	K513_0092 MB33 EZ705U	876	1657	9.168	1421/155	45	32	1900	1800	3200	78	50	80
327	233	422	33	2.5	K513_0092 MB43 EZ803U	1000	1800	9.168	1421/155	50	65	1900	1800	3000	186	50	111
369	128	162	21	4.4	K513_0081 MB33 EZ703U	505	1470	8.134	17081/2100	16	32	1900	1800	3200	69	50	74
369	128	162	21	4.4	K513_0081 MB33 EZ703U	505	1470	8.134	17081/2100	24	32	1900	1800	3200	69	50	74
369	128	162	21	4.4	K513_0081 MB33 EZ703U	505	1470	8.134	17081/2100	32	32	1900	1800	3200	69	50	74
369	128	162	21	4.4	K513_0081 MB33 EZ703U	505	1470	8.134	17081/2100	45	32	1900	1800	3200	69	50	74
369	166	235	27	3.4	K513_0081 MB33 EZ705U	778	1470	8.134	17081/2100	16	32	1900	1800	3200	81	50	80
369	166	235	27	3.4	K513_0081 MB33 EZ705U	778	1470	8.134	17081/2100	24	32	1900	1800	3200	81	50	80
369	166	235	27	3.4	K513_0081 MB33 EZ705U	778	1470	8.134	17081/2100	32	32	1900	1800	3200	81	50	80
369	166	235	27	3.4	K513_0081 MB33 EZ705U	778	1470	8.134	17081/2100	45	32	1900	1800	3200	81	50	80
369	207	375	33	2.8	K513_0081 MB43 EZ803U	1000	1800	8.134	17081/2100	50	65	1900	1800	3000	189	50	111
369	207	375	33	2.8	K513_0081 MB43 EZ803U	1000	1800	8.134	17081/2100	72	65	1900	1800	3000	189	50	111
408	116	146	21	4.8	K513_0073 MB33 EZ703U	457	1327	7.347	551/75	16	32	1900	1800	3200	70	50	74
408	116	146	21	4.8	K513_0073 MB33 EZ703U	457	1327	7.347	551/75	24	32	1900	1800	3200	70	50	74
408	116	146	21	4.8	K513_0073 MB33 EZ703U	457	1327	7.347	551/75	32	32	1900	1800	3200	70	50	74
408	116	146	21	4.8	K513_0073 MB33 EZ703U	457	1327	7.347	551/75	45	32	1900	1800	3200	70	50	74
408	150	212	27	3.7	K513_0073 MB33 EZ705U	702	1327	7.347	551/75	16	32	1900	1800	3200	83	50	80
408	150	212	27	3.7	K513_0073 MB33 EZ705U	702	1327	7.347	551/75	24	32	1900	1800	3200	83	50	80
408	150	212	27	3.7	K513_0073 MB33 EZ705U	702	1327	7.347	551/75	32	32	1900	1800	3200	83	50	80
408	150	212	27	3.7	K513_0073 MB33 EZ705U	702	1327	7.347	551/75	45	32	1900	1800	3200	83	50	80
408	187	339	34	3.0	K513_0073 MB43 EZ803U	1000	1800	7.347	551/75	50	65	1900	1800	3000	191	50	111
408	187	339	34	3.0	K513_0073 MB43 EZ803U	1000	1800	7.347	551/75	72	65	1900	1800	3000	191	50	111
408	187	339	34	3.0	K513_0073 MB43 EZ803U	1000	1800	7.347	551/75	100	65	1900	1800	3000	191	50	111
K6 (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 1590 Nm)																	
175	477	721	40	2.0	K613_0115 MB43 EZ805U	1594	2900	11.41	22631/1984	50	115	2200	2000	3000	278	83	148
247	339	512	40	2.5	K613_0081 MB43 EZ805U	1422	2604	8.107	85095/10496	50	115	1800	1700	3000	290	83	148
273	306	463	40	2.7	K613_0073 MB43 EZ805U	1375	2352	7.323	19215/2624	50	115	1800	1700	3000	292	83	148
K6 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1600 Nm)																	
39	313	342	4.7	4.5	K613_0760 MB23 EZ501U	1165	2900	76.14	126697/1664	8.0	8.0	3100	2800	4000	11	83	79
39	313	342	4.7	4.5	K613_0760 MB23 EZ501U	1165	2900	76.14	126697/1664	12	8.0	3100	2800	4000	11	83	79
39	342	379	5.1	4.2	K613_0760 MB23 EZ402U	1165	2900	76.14	126697/1664	8.0	8.0	3100	2800	4000	9.8	83	79
39	342	379	5.1	4.2	K613_0760 MB23 EZ402U	1165	2900	76.14	126697/1664	12	8.0	3100	2800	4000	9.8	83	79
39	502	626	7.5	2.8	K613_0760 MB23 EZ404U	1600	2900	76.14	126697/1664	8.0	8.0	3100	2800	4000	11	83	81
39	502	626	7.5	2.8	K613_0760 MB23 EZ404U	1600	2900	76.14	126697/1664	12	8.0	3100	2800	4000	11	83	81
39	539	582	8.0	2.6	K613_0760 MB23 EZ502U	1600	2900	76.14	126697/1664	8.0	8.0	3100	2800	4000	13	83	81

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
K6 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1600 Nm)																	
39	539	582	8.0	2.6	K613_0760 MB23 EZ502U	1600	2900	76.14	126697/1664	12	8.0	3100	2800	4000	13	83	81
44	283	309	5.0	4.5	K613_0690 MB23 EZ501U	1052	2628	68.77	28609/416	8.0	8.0	3100	2800	4000	11	83	79
44	283	309	5.0	4.5	K613_0690 MB23 EZ501U	1052	2628	68.77	28609/416	12	8.0	3100	2800	4000	11	83	79
44	309	342	5.5	4.2	K613_0690 MB23 EZ402U	1052	2628	68.77	28609/416	8.0	8.0	3100	2800	4000	9.8	83	79
44	309	342	5.5	4.2	K613_0690 MB23 EZ402U	1052	2628	68.77	28609/416	12	8.0	3100	2800	4000	9.8	83	79
44	454	565	8.1	2.8	K613_0690 MB23 EZ404U	1577	2628	68.77	28609/416	8.0	8.0	3100	2800	4000	11	83	81
44	454	565	8.1	2.8	K613_0690 MB23 EZ404U	1577	2628	68.77	28609/416	12	8.0	3100	2800	4000	11	83	81
44	487	526	8.6	2.6	K613_0690 MB23 EZ502U	1577	2628	68.77	28609/416	8.0	8.0	3100	2800	4000	13	83	81
44	487	526	8.6	2.6	K613_0690 MB23 EZ502U	1577	2628	68.77	28609/416	12	8.0	3100	2800	4000	13	83	81
47	286	317	4.9	4.9	K613_0640 MB23 EZ402U	975	2900	63.71	130479/2048	8.0	8.0	3100	2800	4000	10	83	79
47	286	317	4.9	4.9	K613_0640 MB23 EZ402U	975	2900	63.71	130479/2048	12	8.0	3100	2800	4000	10	83	79
47	286	317	4.9	4.9	K613_0640 MB23 EZ402U	975	2900	63.71	130479/2048	16	8.0	3100	2800	4000	10	83	79
47	420	524	7.2	3.3	K613_0640 MB23 EZ404U	1600	2900	63.71	130479/2048	8.0	8.0	3100	2800	4000	11	83	81
47	420	524	7.2	3.3	K613_0640 MB23 EZ404U	1600	2900	63.71	130479/2048	12	8.0	3100	2800	4000	11	83	81
47	420	524	7.2	3.3	K613_0640 MB23 EZ404U	1600	2900	63.71	130479/2048	16	8.0	3100	2800	4000	11	83	81
47	451	487	7.7	3.1	K613_0640 MB23 EZ502U	1600	2900	63.71	130479/2048	8.0	8.0	3100	2800	4000	14	83	81
47	451	487	7.7	3.1	K613_0640 MB23 EZ502U	1600	2900	63.71	130479/2048	12	8.0	3100	2800	4000	14	83	81
47	451	487	7.7	3.1	K613_0640 MB23 EZ502U	1600	2900	63.71	130479/2048	16	8.0	3100	2800	4000	14	83	81
47	591	676	10	2.4	K613_0640 MB23 EZ503U	1600	2900	63.71	130479/2048	8.0	15	3100	2800	4000	17	83	83
47	822	975	14	1.7	K613_0640 MB23 EZ505U	1600	2900	63.71	130479/2048	8.0	15	3100	2800	4000	22	83	86
52	259	286	5.3	4.9	K613_0580 MB23 EZ402U	880	2900	57.55	29463/512	8.0	8.0	3100	2800	4000	10	83	79
52	259	286	5.3	4.9	K613_0580 MB23 EZ402U	880	2900	57.55	29463/512	12	8.0	3100	2800	4000	10	83	79
52	259	286	5.3	4.9	K613_0580 MB23 EZ402U	880	2900	57.55	29463/512	16	8.0	3100	2800	4000	10	83	79
52	380	473	7.7	3.3	K613_0580 MB23 EZ404U	1595	2900	57.55	29463/512	8.0	8.0	3100	2800	4000	12	83	81
52	380	473	7.7	3.3	K613_0580 MB23 EZ404U	1595	2900	57.55	29463/512	12	8.0	3100	2800	4000	12	83	81
52	380	473	7.7	3.3	K613_0580 MB23 EZ404U	1595	2900	57.55	29463/512	16	8.0	3100	2800	4000	12	83	81
52	407	440	8.3	3.1	K613_0580 MB23 EZ502U	1600	2900	57.55	29463/512	8.0	8.0	3100	2800	4000	14	83	81
52	407	440	8.3	3.1	K613_0580 MB23 EZ502U	1600	2900	57.55	29463/512	12	8.0	3100	2800	4000	14	83	81
52	407	440	8.3	3.1	K613_0580 MB23 EZ502U	1600	2900	57.55	29463/512	16	8.0	3100	2800	4000	14	83	81
52	534	611	11	2.4	K613_0580 MB23 EZ503U	1600	2900	57.55	29463/512	8.0	15	3100	2800	4000	17	83	83
52	534	611	11	2.4	K613_0580 MB23 EZ503U	1600	2900	57.55	29463/512	12	15	3100	2800	4000	17	83	83
52	743	880	15	1.7	K613_0580 MB23 EZ505U	1600	2900	57.55	29463/512	8.0	15	3100	2800	4000	22	83	86
52	743	880	15	1.7	K613_0580 MB23 EZ505U	1600	2900	57.55	29463/512	12	15	3100	2800	4000	22	83	86
63	315	392	7.0	4.2	K613_0480 MB23 EZ404U	1323	2875	47.73	39711/832	8.0	8.0	3100	2800	4000	12	83	81
63	315	392	7.0	4.2	K613_0480 MB23 EZ404U	1323	2875	47.73	39711/832	12	8.0	3100	2800	4000	12	83	81
63	315	392	7.0	4.2	K613_0480 MB23 EZ404U	1323	2875	47.73	39711/832	16	8.0	3100	2800	4000	12	83	81
63	338	365	7.5	3.9	K613_0480 MB23 EZ502U	1415	2875	47.73	39711/832	8.0	8.0	3100	2800	4000	14	83	81
63	338	365	7.5	3.9	K613_0480 MB23 EZ502U	1415	2875	47.73	39711/832	12	8.0	3100	2800	4000	14	83	81
63	338	365	7.5	3.9	K613_0480 MB23 EZ502U	1415	2875	47.73	39711/832	16	8.0	3100	2800	4000	14	83	81
63	338	379	7.3	4.0	K613_0480 MB33 EZ701U	913	2900	47.73	39711/832	16	15	3100	2800	4000	39	83	90
63	443	506	9.8	3.0	K613_0480 MB23 EZ503U	1600	2875	47.73	39711/832	8.0	15	3100	2800	4000	18	83	83
63	443	506	9.8	3.0	K613_0480 MB23 EZ503U	1600	2875	47.73	39711/832	12	15	3100	2800	4000	18	83	83
63	548	657	12	2.5	K613_0480 MB33 EZ702U	1600	2900	47.73	39711/832	16	15	3100	2800	4000	45	83	93
63	616	730	14	2.1	K613_0480 MB23 EZ505U	1600	2875	47.73	39711/832	8.0	15	3100	2800	4000	23	83	86
63	616	730	14	2.1	K613_0480 MB23 EZ505U	1600	2875	47.73	39711/832	12	15	3100	2800	4000	23	83	86
70	284	354	7.5	4.2	K613_0430 MB23 EZ404U	1195	2596	43.11	8967/208	8.0	8.0	3100	2800	4000	12	83	81
70	284	354	7.5	4.2	K613_0430 MB23 EZ404U	1195	2596	43.11	8967/208	12	8.0	3100	2800	4000	12	83	81
70	284	354	7.5	4.2	K613_0430 MB23 EZ404U	1195	2596	43.11	8967/208	16	8.0	3100	2800	4000	12	83	81
70	305	330	8.1	3.9	K613_0430 MB23 EZ502U	1278	2596	43.11	8967/208	8.0	8.0	3100	2800	4000	14	83	81
70	305	330	8.1	3.9	K613_0430 MB23 EZ502U	1278	2596	43.11	8967/208	12	8.0	3100	2800	4000	14	83	81
70	305	330	8.1	3.9	K613_0430 MB23 EZ502U	1278	2596	43.11	8967/208	16	8.0	3100	2800	4000	14	83	81
70	305	342	7.3	4.3	K613_0430 MB33 EZ701U	824	2900	43.11	8967/208	16	15	3100	2800	4000	39	83	90
70	305	342	7.3	4.3	K613_0430 MB33 EZ701U	824	2900	43.11	8967/208	24	15	3100	2800	4000	39	83	90
70	400	457	11	3.0	K613_0430 MB23 EZ503U	1546	2596	43.11	8967/208	8.0	15	3100	2800	4000	18	83	83
70	400	457	11	3.0	K613_0430 MB23 EZ503U	1546	2596	43.11	8967/208	12	15	3100	2800	4000	18	83	83
70	495	593	12	2.7	K613_0430 MB33 EZ702U	1600	2900	43.11	8967/208	16	15	3100	2800	4000	45	83	93
70	495	593	12	2.7	K613_0430 MB33 EZ702U	1600	2900	43.11	8967/208	24	15	3100	2800	4000	45	83	93
70	556	659	15	2.1	K613_0430 MB23 EZ505U	1546	2596	43.11	8967/208	8.0	15	3100	2800	4000	23	83	86
70	556	659	15	2.1	K613_0430 MB23 EZ505U	1546	2596	43.11	8967/208	12	15	3100	2800	4000	23	83	86
78	253	315	6.9	5.0	K613_0380 MB23 EZ404U	1062	2308	38.32	156953/4096	8.0	8.0	3100	2800	4000	13	83	81
78	253	315	6.9	5.0	K613_0380 MB23 EZ404U	1062	2308	38.32	156953/4096	12	8.0	3100	2800	4000	13	83	81
78	253	315	6.9	5.0	K613_0380 MB23 EZ404U	1062	2308	38.32	156953/4096	16	8.0	3100	2800	4000	13	83	81
78	271	293	7.4	4.7	K613_0380 MB23 EZ502U	1136	2308	38.32	156953/4096	8.0	8.0	3100	2800	4000	15	83	81
78	271	293	7.4	4.7	K613_0380 MB23 EZ502U	1136	2308	38.32	156953/4096	12	8.0	3100	2800	4000	15	83	81

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
K6 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1600 Nm)																	
78	271	293	7.4	4.7	K613_0380 MB23 EZ502U	1136	2308	38.32	156953/4096	16	8.0	3100	2800	4000	15	83	81
78	271	304	7.4	4.7	K613_0380 MB33 EZ701U	733	2900	38.32	156953/4096	16	15	3100	2800	4000	40	83	90
78	271	304	7.4	4.7	K613_0380 MB33 EZ701U	733	2900	38.32	156953/4096	24	15	3100	2800	4000	40	83	90
78	355	407	9.6	3.6	K613_0380 MB23 EZ503U	1374	2308	38.32	156953/4096	8.0	15	3100	2800	4000	19	83	83
78	355	407	9.6	3.6	K613_0380 MB23 EZ503U	1374	2308	38.32	156953/4096	12	15	3100	2800	4000	19	83	83
78	440	528	12	2.9	K613_0380 MB33 EZ702U	1502	2900	38.32	156953/4096	16	15	3100	2800	4000	45	83	93
78	440	528	12	2.9	K613_0380 MB33 EZ702U	1502	2900	38.32	156953/4096	24	15	3100	2800	4000	45	83	93
78	495	586	13	2.6	K613_0380 MB23 EZ505U	1374	2308	38.32	156953/4096	8.0	15	3100	2800	4000	23	83	86
78	495	586	13	2.6	K613_0380 MB23 EZ505U	1374	2308	38.32	156953/4096	12	15	3100	2800	4000	23	83	86
87	245	265	7.8	4.7	K613_0350 MB23 EZ502U	1026	2084	34.61	35441/1024	8.0	8.0	3100	2800	4000	15	83	81
87	245	265	7.8	4.7	K613_0350 MB23 EZ502U	1026	2084	34.61	35441/1024	12	8.0	3100	2800	4000	15	83	81
87	245	265	7.8	4.7	K613_0350 MB23 EZ502U	1026	2084	34.61	35441/1024	16	8.0	3100	2800	4000	15	83	81
87	245	275	7.4	5.0	K613_0350 MB33 EZ701U	662	2900	34.61	35441/1024	16	15	3100	2800	4000	40	83	90
87	245	275	7.4	5.0	K613_0350 MB33 EZ701U	662	2900	34.61	35441/1024	24	15	3100	2800	4000	40	83	90
87	245	275	7.4	5.0	K613_0350 MB33 EZ701U	662	2900	34.61	35441/1024	32	15	3100	2800	4000	40	83	90
87	321	367	10	3.6	K613_0350 MB23 EZ503U	1241	2084	34.61	35441/1024	8.0	15	3100	2800	4000	19	83	83
87	321	367	10	3.6	K613_0350 MB23 EZ503U	1241	2084	34.61	35441/1024	12	15	3100	2800	4000	19	83	83
87	397	476	12	3.1	K613_0350 MB33 EZ702U	1357	2900	34.61	35441/1024	16	15	3100	2800	4000	46	83	93
87	397	476	12	3.1	K613_0350 MB33 EZ702U	1357	2900	34.61	35441/1024	24	15	3100	2800	4000	46	83	93
87	397	476	12	3.1	K613_0350 MB33 EZ702U	1357	2900	34.61	35441/1024	32	15	3100	2800	4000	46	83	93
87	447	529	14	2.6	K613_0350 MB23 EZ505U	1241	2084	34.61	35441/1024	8.0	15	3100	2800	4000	23	83	86
87	447	529	14	2.6	K613_0350 MB23 EZ505U	1241	2084	34.61	35441/1024	12	15	3100	2800	4000	23	83	86
94	295	338	10	3.9	K613_0320 MB23 EZ503U	1142	1919	31.86	130479/4096	8.0	15	3100	2800	4000	20	83	83
94	295	338	10	3.9	K613_0320 MB23 EZ503U	1142	1919	31.86	130479/4096	12	15	3100	2800	4000	20	83	83
94	365	439	12	3.2	K613_0320 MB33 EZ702U	1249	2900	31.86	130479/4096	16	15	3100	2800	4000	46	83	93
94	365	439	12	3.2	K613_0320 MB33 EZ702U	1249	2900	31.86	130479/4096	24	15	3100	2800	4000	46	83	93
94	365	439	12	3.2	K613_0320 MB33 EZ702U	1249	2900	31.86	130479/4096	32	15	3100	2800	4000	46	83	93
94	411	487	14	2.8	K613_0320 MB23 EZ505U	1142	1919	31.86	130479/4096	8.0	15	3100	2800	4000	24	83	86
94	411	487	14	2.8	K613_0320 MB23 EZ505U	1142	1919	31.86	130479/4096	12	15	3100	2800	4000	24	83	86
104	267	305	11	3.9	K613_0290 MB23 EZ503U	1031	1733	28.77	29463/1024	8.0	15	3100	2800	4000	20	83	83
104	267	305	11	3.9	K613_0290 MB23 EZ503U	1031	1733	28.77	29463/1024	12	15	3100	2800	4000	20	83	83
104	330	396	12	3.5	K613_0290 MB33 EZ702U	1128	2900	28.77	29463/1024	16	15	3100	2800	4000	47	83	93
104	330	396	12	3.5	K613_0290 MB33 EZ702U	1128	2900	28.77	29463/1024	24	15	3100	2800	4000	47	83	93
104	330	396	12	3.5	K613_0290 MB33 EZ702U	1128	2900	28.77	29463/1024	32	15	3100	2800	4000	47	83	93
104	371	440	15	2.8	K613_0290 MB23 EZ505U	1031	1733	28.77	29463/1024	8.0	15	3100	2800	4000	24	83	86
104	371	440	15	2.8	K613_0290 MB23 EZ505U	1031	1733	28.77	29463/1024	12	15	3100	2800	4000	24	83	86
104	454	572	17	2.5	K613_0290 MB33 EZ703U	1600	2900	28.77	29463/1024	16	32	3100	2800	4000	58	83	96
104	586	831	21	2.0	K613_0290 MB33 EZ705U	1600	2900	28.77	29463/1024	16	32	3100	2800	4000	71	83	101
125	275	330	12	3.9	K613_0240 MB33 EZ702U	941	2900	24.01	24583/1024	16	15	2600	2300	4000	48	83	93
125	275	330	12	3.9	K613_0240 MB33 EZ702U	941	2900	24.01	24583/1024	24	15	2600	2300	4000	48	83	93
125	275	330	12	3.9	K613_0240 MB33 EZ702U	941	2900	24.01	24583/1024	32	15	2600	2300	4000	48	83	93
125	275	330	12	3.9	K613_0240 MB33 EZ702U	941	2900	24.01	24583/1024	45	15	2600	2300	4000	48	83	93
125	379	477	17	2.9	K613_0240 MB33 EZ703U	1492	2900	24.01	24583/1024	16	32	2600	2300	4000	60	83	96
125	379	477	17	2.9	K613_0240 MB33 EZ703U	1492	2900	24.01	24583/1024	24	32	2600	2300	4000	60	83	96
125	379	477	17	2.9	K613_0240 MB33 EZ703U	1492	2900	24.01	24583/1024	32	32	2600	2300	4000	60	83	96
125	489	693	22	2.2	K613_0240 MB33 EZ705U	1600	2900	24.01	24583/1024	16	32	2600	2300	4000	72	83	101
125	489	693	22	2.2	K613_0240 MB33 EZ705U	1600	2900	24.01	24583/1024	24	32	2600	2300	4000	72	83	101
125	489	693	22	2.2	K613_0240 MB33 EZ705U	1600	2900	24.01	24583/1024	32	32	2600	2300	4000	72	83	101
138	249	299	12	4.2	K613_0220 MB33 EZ702U	850	2900	21.68	5551/256	16	15	2600	2300	4000	49	83	93
138	249	299	12	4.2	K613_0220 MB33 EZ702U	850	2900	21.68	5551/256	24	15	2600	2300	4000	49	83	93
138	249	299	12	4.2	K613_0220 MB33 EZ702U	850	2900	21.68	5551/256	32	15	2600	2300	4000	49	83	93
138	249	299	12	4.2	K613_0220 MB33 EZ702U	850	2900	21.68	5551/256	45	15	2600	2300	4000	49	83	93
138	342	431	17	3.1	K613_0220 MB33 EZ703U	1347	2900	21.68	5551/256	16	32	2600	2300	4000	60	83	96
138	342	431	17	3.1	K613_0220 MB33 EZ703U	1347	2900	21.68	5551/256	24	32	2600	2300	4000	60	83	96
138	342	431	17	3.1	K613_0220 MB33 EZ703U	1347	2900	21.68	5551/256	32	32	2600	2300	4000	60	83	96
138	442	626	22	2.4	K613_0220 MB33 EZ705U	1600	2900	21.68	5551/256	16	32	2600	2300	4000	73	83	101
138	442	626	22	2.4	K613_0220 MB33 EZ705U	1600	2900	21.68	5551/256	24	32	2600	2300	4000	73	83	101
138	442	626	22	2.4	K613_0220 MB33 EZ705U	1600	2900	21.68	5551/256	32	32	2600	2300	4000	73	83	101
158	176	202	14	3.9	K613_0190 MB23 EZ503U	681	1144	18.99	17019/896	8.0	15	2600	2300	4000	24	83	83
158	176	202	14	3.9	K613_0190 MB23 EZ503U	681	1144	18.99	17019/896	12	15	2600	2300	4000	24	83	83
158	218	261	12	4.6	K613_0190 MB33 EZ702U	744	2900	18.99	17019/896	16	15	2600	2300	4000	50	83	93
158	218	261	12	4.6	K613_0190 MB33 EZ702U	744	2900	18.99	17019/896	24	15	2600	2300	4000	50	83	93
158	218	261	12	4.6	K613_0190 MB33 EZ702U	744	2900	18.99	17019/896	32	15	2600	2300	4000	50	83	93
158	218	261	12	4.6	K613_0190 MB33 EZ702U	744	2900	18.99	17019/896	45	15	2600	2300	4000	50	83	93

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
K6 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1600 Nm)																	
158	245	291	20	2.8	K613_0190 MB23 EZ505U	681	1144	18.99	17019/896	8.0	15	2600	2300	4000	28	83	86
158	245	291	20	2.8	K613_0190 MB23 EZ505U	681	1144	18.99	17019/896	12	15	2600	2300	4000	28	83	86
158	300	378	17	3.3	K613_0190 MB33 EZ703U	1180	2900	18.99	17019/896	16	32	2600	2300	4000	62	83	96
158	300	378	17	3.3	K613_0190 MB33 EZ703U	1180	2900	18.99	17019/896	24	32	2600	2300	4000	62	83	96
158	300	378	17	3.3	K613_0190 MB33 EZ703U	1180	2900	18.99	17019/896	32	32	2600	2300	4000	62	83	96
158	300	378	17	3.3	K613_0190 MB33 EZ703U	1180	2900	18.99	17019/896	45	32	2600	2300	4000	62	83	96
158	387	548	22	2.6	K613_0190 MB33 EZ705U	1600	2900	18.99	17019/896	16	32	2600	2300	4000	75	83	101
158	387	548	22	2.6	K613_0190 MB33 EZ705U	1600	2900	18.99	17019/896	24	32	2600	2300	4000	75	83	101
158	387	548	22	2.6	K613_0190 MB33 EZ705U	1600	2900	18.99	17019/896	32	32	2600	2300	4000	75	83	101
158	387	548	22	2.6	K613_0190 MB33 EZ705U	1600	2900	18.99	17019/896	45	32	2600	2300	4000	75	83	101
175	159	182	16	3.9	K613_0170 MB23 EZ503U	615	1033	17.16	549/32	8.0	15	2600	2300	4000	24	83	83
175	159	182	16	3.9	K613_0170 MB23 EZ503U	615	1033	17.16	549/32	12	15	2600	2300	4000	24	83	83
175	197	236	12	4.9	K613_0170 MB33 EZ702U	672	2900	17.16	549/32	16	15	2600	2300	4000	51	83	93
175	197	236	12	4.9	K613_0170 MB33 EZ702U	672	2900	17.16	549/32	24	15	2600	2300	4000	51	83	93
175	197	236	12	4.9	K613_0170 MB33 EZ702U	672	2900	17.16	549/32	32	15	2600	2300	4000	51	83	93
175	197	236	12	4.9	K613_0170 MB33 EZ702U	672	2900	17.16	549/32	45	15	2600	2300	4000	51	83	93
175	221	262	22	2.8	K613_0170 MB23 EZ505U	615	1033	17.16	549/32	8.0	15	2600	2300	4000	29	83	86
175	221	262	22	2.8	K613_0170 MB23 EZ505U	615	1033	17.16	549/32	12	15	2600	2300	4000	29	83	86
175	271	341	17	3.6	K613_0170 MB33 EZ703U	1066	2900	17.16	549/32	16	32	2600	2300	4000	63	83	96
175	271	341	17	3.6	K613_0170 MB33 EZ703U	1066	2900	17.16	549/32	24	32	2600	2300	4000	63	83	96
175	271	341	17	3.6	K613_0170 MB33 EZ703U	1066	2900	17.16	549/32	32	32	2600	2300	4000	63	83	96
175	271	341	17	3.6	K613_0170 MB33 EZ703U	1066	2900	17.16	549/32	45	32	2600	2300	4000	63	83	96
175	349	495	22	2.8	K613_0170 MB33 EZ705U	1600	2900	17.16	549/32	16	32	2600	2300	4000	75	83	101
175	349	495	22	2.8	K613_0170 MB33 EZ705U	1600	2900	17.16	549/32	24	32	2600	2300	4000	75	83	101
175	349	495	22	2.8	K613_0170 MB33 EZ705U	1600	2900	17.16	549/32	32	32	2600	2300	4000	75	83	101
175	349	495	22	2.8	K613_0170 MB33 EZ705U	1600	2900	17.16	549/32	45	32	2600	2300	4000	75	83	101
175	436	791	27	2.2	K613_0170 MB43 EZ803U	1600	2900	17.16	549/32	50	65	2600	2300	3000	183	83	132
189	250	316	17	3.8	K613_0160 MB33 EZ703U	986	2867	15.87	54839/3456	16	32	2200	2000	3500	65	83	96
189	250	316	17	3.8	K613_0160 MB33 EZ703U	986	2867	15.87	54839/3456	24	32	2200	2000	3500	65	83	96
189	250	316	17	3.8	K613_0160 MB33 EZ703U	986	2867	15.87	54839/3456	32	32	2200	2000	3500	65	83	96
189	250	316	17	3.8	K613_0160 MB33 EZ703U	986	2867	15.87	54839/3456	45	32	2200	2000	3500	65	83	96
189	323	458	22	2.9	K613_0160 MB33 EZ705U	1517	2867	15.87	54839/3456	16	32	2200	2000	3500	77	83	101
189	323	458	22	2.9	K613_0160 MB33 EZ705U	1517	2867	15.87	54839/3456	24	32	2200	2000	3500	77	83	101
189	323	458	22	2.9	K613_0160 MB33 EZ705U	1517	2867	15.87	54839/3456	32	32	2200	2000	3500	77	83	101
189	323	458	22	2.9	K613_0160 MB33 EZ705U	1517	2867	15.87	54839/3456	45	32	2200	2000	3500	77	83	101
189	404	731	27	2.3	K613_0160 MB43 EZ803U	1600	2900	15.87	54839/3456	50	65	2200	2000	3000	185	83	132
209	226	285	17	4.0	K613_0145 MB33 EZ703U	891	2590	14.33	12383/864	16	32	2200	2000	3500	65	83	96
209	226	285	17	4.0	K613_0145 MB33 EZ703U	891	2590	14.33	12383/864	24	32	2200	2000	3500	65	83	96
209	226	285	17	4.0	K613_0145 MB33 EZ703U	891	2590	14.33	12383/864	32	32	2200	2000	3500	65	83	96
209	226	285	17	4.0	K613_0145 MB33 EZ703U	891	2590	14.33	12383/864	45	32	2200	2000	3500	65	83	96
209	292	414	22	3.1	K613_0145 MB33 EZ705U	1370	2590	14.33	12383/864	16	32	2200	2000	3500	78	83	101
209	292	414	22	3.1	K613_0145 MB33 EZ705U	1370	2590	14.33	12383/864	24	32	2200	2000	3500	78	83	101
209	292	414	22	3.1	K613_0145 MB33 EZ705U	1370	2590	14.33	12383/864	32	32	2200	2000	3500	78	83	101
209	292	414	22	3.1	K613_0145 MB33 EZ705U	1370	2590	14.33	12383/864	45	32	2200	2000	3500	78	83	101
209	364	660	27	2.5	K613_0145 MB43 EZ803U	1600	2900	14.33	12383/864	50	65	2200	2000	3000	186	83	132
209	364	660	27	2.5	K613_0145 MB43 EZ803U	1600	2900	14.33	12383/864	72	65	2200	2000	3000	186	83	132
238	199	251	17	4.4	K613_0125 MB33 EZ703U	785	2282	12.63	3233/256	16	32	2200	2000	3500	69	83	96
238	199	251	17	4.4	K613_0125 MB33 EZ703U	785	2282	12.63	3233/256	24	32	2200	2000	3500	69	83	96
238	199	251	17	4.4	K613_0125 MB33 EZ703U	785	2282	12.63	3233/256	32	32	2200	2000	3500	69	83	96
238	199	251	17	4.4	K613_0125 MB33 EZ703U	785	2282	12.63	3233/256	45	32	2200	2000	3500	69	83	96
238	257	365	22	3.4	K613_0125 MB33 EZ705U	1207	2282	12.63	3233/256	16	32	2200	2000	3500	81	83	101
238	257	365	22	3.4	K613_0125 MB33 EZ705U	1207	2282	12.63	3233/256	24	32	2200	2000	3500	81	83	101
238	257	365	22	3.4	K613_0125 MB33 EZ705U	1207	2282	12.63	3233/256	32	32	2200	2000	3500	81	83	101
238	257	365	22	3.4	K613_0125 MB33 EZ705U	1207	2282	12.63	3233/256	45	32	2200	2000	3500	81	83	101
238	321	582	27	2.7	K613_0125 MB43 EZ803U	1600	2900	12.63	3233/256	50	65	2200	2000	3000	189	83	132
238	321	582	27	2.7	K613_0125 MB43 EZ803U	1600	2900	12.63	3233/256	72	65	2200	2000	3000	189	83	132
263	180	227	17	4.7	K613_0115 MB33 EZ703U	709	2061	11.41	22631/1984	16	32	2200	2000	3500	70	83	96
263	180	227	17	4.7	K613_0115 MB33 EZ703U	709	2061	11.41	22631/1984	24	32	2200	2000	3500	70	83	96
263	180	227	17	4.7	K613_0115 MB33 EZ703U	709	2061	11.41	22631/1984	32	32	2200	2000	3500	70	83	96
263	180	227	17	4.7	K613_0115 MB33 EZ703U	709	2061	11.41	22631/1984	45	32	2200	2000	3500	70	83	96
263	232	329	22	3.6	K613_0115 MB33 EZ705U	1091	2061	11.41	22631/1984	16	32	2200	2000	3500	82	83	101
263	232	329	22	3.6	K613_0115 MB33 EZ705U	1091	2061	11.41	22631/1984	24	32	2200	2000	3500	82	83	101
263	232	329	22	3.6	K613_0115 MB33 EZ705U	1091	2061	11.41	22631/1984	32	32	2200	2000	3500	82	83	101
263	232	329	22	3.6	K613_0115 MB33 EZ705U	1091	2061	11.41	22631/1984	45	32	2200	2000	3500	82	83	101

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
K6 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 1600 Nm)																	
263	290	526	28	2.9	K613_0115 MB43 EZ803U	1581	2900	11.41	22631/1984	50	65	2200	2000	3000	190	83	132
263	290	526	28	2.9	K613_0115 MB43 EZ803U	1581	2900	11.41	22631/1984	72	65	2200	2000	3000	190	83	132
263	290	526	28	2.9	K613_0115 MB43 EZ803U	1581	2900	11.41	22631/1984	100	65	2200	2000	3000	190	83	132
370	165	234	22	4.6	K613_0081 MB33 EZ705U	775	1465	8.107	85095/10496	16	32	1800	1700	3000	94	83	101
370	165	234	22	4.6	K613_0081 MB33 EZ705U	775	1465	8.107	85095/10496	24	32	1800	1700	3000	94	83	101
370	165	234	22	4.6	K613_0081 MB33 EZ705U	775	1465	8.107	85095/10496	32	32	1800	1700	3000	94	83	101
370	165	234	22	4.6	K613_0081 MB33 EZ705U	775	1465	8.107	85095/10496	45	32	1800	1700	3000	94	83	101
370	206	374	28	3.7	K613_0081 MB43 EZ803U	1124	2604	8.107	85095/10496	50	65	1800	1700	3000	202	83	132
370	206	374	28	3.7	K613_0081 MB43 EZ803U	1124	2604	8.107	85095/10496	72	65	1800	1700	3000	202	83	132
370	206	374	28	3.7	K613_0081 MB43 EZ803U	1124	2604	8.107	85095/10496	100	65	1800	1700	3000	202	83	132
410	149	211	23	4.7	K613_0073 MB33 EZ705U	700	1323	7.323	19215/2624	16	32	1800	1700	3000	96	83	101
410	149	211	23	4.7	K613_0073 MB33 EZ705U	700	1323	7.323	19215/2624	24	32	1800	1700	3000	96	83	101
410	149	211	23	4.7	K613_0073 MB33 EZ705U	700	1323	7.323	19215/2624	32	32	1800	1700	3000	96	83	101
410	149	211	23	4.7	K613_0073 MB33 EZ705U	700	1323	7.323	19215/2624	45	32	1800	1700	3000	96	83	101
410	186	337	28	3.9	K613_0073 MB43 EZ803U	1015	2352	7.323	19215/2624	50	65	1800	1700	3000	204	83	132
410	186	337	28	3.9	K613_0073 MB43 EZ803U	1015	2352	7.323	19215/2624	72	65	1800	1700	3000	204	83	132
410	186	337	28	3.9	K613_0073 MB43 EZ803U	1015	2352	7.323	19215/2624	100	65	1800	1700	3000	204	83	132
K7 (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 2600 Nm)																	
109	763	1155	26	2.4	K713_0185 MB43 EZ805U	2600	4800	18.28	26901/1472	50	115	2400	2200	3000	280	126	176
122	685	1036	26	2.6	K713_0165 MB43 EZ805U	2600	4800	16.39	6293/384	50	115	2000	1900	3000	284	126	176
135	618	935	26	2.8	K713_0150 MB43 EZ805U	2600	4755	14.80	1421/96	50	115	2000	1900	3000	285	126	176
153	545	824	26	3.0	K713_0130 MB43 EZ805U	2556	4190	13.04	3339/256	50	115	2000	1900	3000	292	126	176
170	492	744	26	3.2	K713_0120 MB43 EZ805U	2309	3784	11.78	23373/1984	50	115	2000	1900	3000	294	126	176
197	425	643	26	3.6	K713_0100 MB43 EZ805U	1994	3267	10.17	651/64	50	115	1700	1600	2700	305	126	176
218	384	581	27	3.8	K713_0092 MB43 EZ805U	1801	2951	9.188	147/16	50	115	1700	1600	2700	307	126	176
239	350	529	27	4.1	K713_0084 MB43 EZ805U	1641	2690	8.373	87885/10496	50	115	1700	1600	2700	318	126	176
264	316	478	27	4.4	K713_0076 MB43 EZ805U	1482	2429	7.563	19845/2624	50	115	1700	1600	2700	322	126	176
K7 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 2600 Nm)																	
38	558	626	5.2	4.3	K713_0790 MB33 EZ701U	1507	4800	78.83	20181/256	16	15	2900	2600	4000	39	126	119
38	904	1085	8.5	2.7	K713_0790 MB33 EZ702U	2600	4800	78.83	20181/256	16	15	2900	2600	4000	45	126	121
42	504	565	5.6	4.3	K713_0710 MB33 EZ701U	1361	4346	71.20	4557/64	16	15	2900	2600	4000	39	126	119
42	817	980	9.1	2.7	K713_0710 MB33 EZ702U	2600	4346	71.20	4557/64	16	15	2900	2600	4000	45	126	121
46	744	893	8.0	3.2	K713_0650 MB33 EZ702U	2542	4800	64.85	33201/512	16	15	2900	2600	4000	45	126	121
46	744	893	8.0	3.2	K713_0650 MB33 EZ702U	2542	4800	64.85	33201/512	24	15	2900	2600	4000	45	126	121
51	672	806	7.9	3.5	K713_0590 MB33 EZ702U	2296	4800	58.57	7497/128	16	15	2900	2600	4000	45	126	121
51	672	806	7.9	3.5	K713_0590 MB33 EZ702U	2296	4800	58.57	7497/128	24	15	2900	2600	4000	45	126	121
51	672	806	7.9	3.5	K713_0590 MB33 EZ702U	2296	4800	58.57	7497/128	32	15	2900	2600	4000	45	126	121
60	572	687	7.9	3.9	K713_0500 MB33 EZ702U	1955	4800	49.88	166005/3328	16	15	2900	2600	4000	47	126	121
60	572	687	7.9	3.9	K713_0500 MB33 EZ702U	1955	4800	49.88	166005/3328	24	15	2900	2600	4000	47	126	121
60	572	687	7.9	3.9	K713_0500 MB33 EZ702U	1955	4800	49.88	166005/3328	32	15	2900	2600	4000	47	126	121
60	787	992	11	2.9	K713_0500 MB33 EZ703U	2600	4800	49.88	166005/3328	16	32	2900	2600	4000	59	126	124
60	1016	1440	14	2.2	K713_0500 MB33 EZ705U	2600	4800	49.88	166005/3328	16	32	2900	2600	4000	71	126	130
67	517	620	7.9	4.2	K713_0450 MB33 EZ702U	1766	4800	45.05	37485/832	16	15	2900	2600	4000	47	126	121
67	517	620	7.9	4.2	K713_0450 MB33 EZ702U	1766	4800	45.05	37485/832	24	15	2900	2600	4000	47	126	121
67	517	620	7.9	4.2	K713_0450 MB33 EZ702U	1766	4800	45.05	37485/832	32	15	2900	2600	4000	47	126	121
67	517	620	7.9	4.2	K713_0450 MB33 EZ702U	1766	4800	45.05	37485/832	45	15	2900	2600	4000	47	126	121
67	711	896	11	3.1	K713_0450 MB33 EZ703U	2600	4800	45.05	37485/832	16	32	2900	2600	4000	59	126	124
67	711	896	11	3.1	K713_0450 MB33 EZ703U	2600	4800	45.05	37485/832	24	32	2900	2600	4000	59	126	124
67	917	1301	14	2.4	K713_0450 MB33 EZ705U	2600	4800	45.05	37485/832	16	32	2900	2600	4000	71	126	130
67	917	1301	14	2.4	K713_0450 MB33 EZ705U	2600	4800	45.05	37485/832	24	32	2900	2600	4000	71	126	130
76	450	540	7.9	4.6	K713_0390 MB33 EZ702U	1538	4800	39.23	2511/64	16	15	2900	2600	4000	49	126	121
76	450	540	7.9	4.6	K713_0390 MB33 EZ702U	1538	4800	39.23	2511/64	24	15	2900	2600	4000	49	126	121
76	450	540	7.9	4.6	K713_0390 MB33 EZ702U	1538	4800	39.23	2511/64	32	15	2900	2600	4000	49	126	121
76	450	540	7.9	4.6	K713_0390 MB33 EZ702U	1538	4800	39.23	2511/64	45	15	2900	2600	4000	49	126	121
76	619	780	11	3.4	K713_0390 MB33 EZ703U	2438	4800	39.23	2511/64	16	32	2900	2600	4000	60	126	124
76	619	780	11	3.4	K713_0390 MB33 EZ703U	2438	4800	39.23	2511/64	24	32	2900	2600	4000	60	126	124
76	619	780	11	3.4	K713_0390 MB33 EZ703U	2438	4800	39.23	2511/64	32	32	2900	2600	4000	60	126	124
76	799	1133	14	2.6	K713_0390 MB33 EZ705U	2600	4800	39.23	2511/64	16	32	2900	2600	4000	73	126	130
76	799	1133	14	2.6	K713_0390 MB33 EZ705U	2600	4800	39.23	2511/64	24	32	2900	2600	4000	73	126	130
76	799	1133	14	2.6	K713_0390 MB33 EZ705U	2600	4800	39.23	2511/64	32	32	2900	2600	4000	73	126	130
85	407	488	8.0	5.0	K713_0350 MB33 EZ702U	1389	4800	35.44	567/16	16	15	2900	2600	4000	49	126	121
85	407	488	8.0	5.0	K713_0350 MB33 EZ702U	1389	4800	35.44	567/16	24	15	2900	2600	4000	49	126	121
85	407	488	8.0	5.0	K713_0350 MB33 EZ702U	1389	4800	35.44	567/16	32	15	2900	2600	4000	49	126	121
85	407	488	8.0	5.0	K713_0350 MB33 EZ702U	1389	4800	35.44	567/16	45	15	2900	2600	4000	49	126	121

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
K7 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 2600 Nm)																	
85	559	705	11	3.6	K713_0350 MB33 EZ703U	2202	4800	35.44	567/16	16	32	2900	2600	4000	61	126	124
85	559	705	11	3.6	K713_0350 MB33 EZ703U	2202	4800	35.44	567/16	24	32	2900	2600	4000	61	126	124
85	559	705	11	3.6	K713_0350 MB33 EZ703U	2202	4800	35.44	567/16	32	32	2900	2600	4000	61	126	124
85	722	1023	14	2.8	K713_0350 MB33 EZ705U	2600	4800	35.44	567/16	16	32	2900	2600	4000	73	126	130
85	722	1023	14	2.8	K713_0350 MB33 EZ705U	2600	4800	35.44	567/16	24	32	2900	2600	4000	73	126	130
85	722	1023	14	2.8	K713_0350 MB33 EZ705U	2600	4800	35.44	567/16	32	32	2900	2600	4000	73	126	130
93	511	645	11	3.8	K713_0320 MB33 EZ703U	2015	4800	32.42	33201/1024	16	32	2900	2600	4000	62	126	124
93	511	645	11	3.8	K713_0320 MB33 EZ703U	2015	4800	32.42	33201/1024	24	32	2900	2600	4000	62	126	124
93	511	645	11	3.8	K713_0320 MB33 EZ703U	2015	4800	32.42	33201/1024	32	32	2900	2600	4000	62	126	124
93	511	645	11	3.8	K713_0320 MB33 EZ703U	2015	4800	32.42	33201/1024	45	32	2900	2600	4000	62	126	124
93	660	936	14	3.0	K713_0320 MB33 EZ705U	2600	4800	32.42	33201/1024	16	32	2900	2600	4000	75	126	130
93	660	936	14	3.0	K713_0320 MB33 EZ705U	2600	4800	32.42	33201/1024	24	32	2900	2600	4000	75	126	130
93	660	936	14	3.0	K713_0320 MB33 EZ705U	2600	4800	32.42	33201/1024	32	32	2900	2600	4000	75	126	130
93	660	936	14	3.0	K713_0320 MB33 EZ705U	2600	4800	32.42	33201/1024	45	32	2900	2600	4000	75	126	130
102	462	582	11	4.1	K713_0290 MB33 EZ703U	1820	4800	29.29	7497/256	16	32	2900	2600	4000	63	126	124
102	462	582	11	4.1	K713_0290 MB33 EZ703U	1820	4800	29.29	7497/256	24	32	2900	2600	4000	63	126	124
102	462	582	11	4.1	K713_0290 MB33 EZ703U	1820	4800	29.29	7497/256	32	32	2900	2600	4000	63	126	124
102	462	582	11	4.1	K713_0290 MB33 EZ703U	1820	4800	29.29	7497/256	45	32	2900	2600	4000	63	126	124
102	596	845	14	3.2	K713_0290 MB33 EZ705U	2600	4800	29.29	7497/256	16	32	2900	2600	4000	75	126	130
102	596	845	14	3.2	K713_0290 MB33 EZ705U	2600	4800	29.29	7497/256	24	32	2900	2600	4000	75	126	130
102	596	845	14	3.2	K713_0290 MB33 EZ705U	2600	4800	29.29	7497/256	32	32	2900	2600	4000	75	126	130
102	596	845	14	3.2	K713_0290 MB33 EZ705U	2600	4800	29.29	7497/256	45	32	2900	2600	4000	75	126	130
102	745	1349	18	2.5	K713_0290 MB43 EZ803U	2600	4800	29.29	7497/256	50	65	2900	2600	3000	183	126	160
119	397	501	11	4.5	K713_0250 MB33 EZ703U	1564	4549	25.18	64449/2560	16	32	2400	2200	3600	66	126	124
119	397	501	11	4.5	K713_0250 MB33 EZ703U	1564	4549	25.18	64449/2560	24	32	2400	2200	3600	66	126	124
119	397	501	11	4.5	K713_0250 MB33 EZ703U	1564	4549	25.18	64449/2560	32	32	2400	2200	3600	66	126	124
119	397	501	11	4.5	K713_0250 MB33 EZ703U	1564	4549	25.18	64449/2560	45	32	2400	2200	3600	66	126	124
119	513	727	14	3.5	K713_0250 MB33 EZ705U	2407	4549	25.18	64449/2560	16	32	2400	2200	3600	79	126	130
119	513	727	14	3.5	K713_0250 MB33 EZ705U	2407	4549	25.18	64449/2560	24	32	2400	2200	3600	79	126	130
119	513	727	14	3.5	K713_0250 MB33 EZ705U	2407	4549	25.18	64449/2560	32	32	2400	2200	3600	79	126	130
119	513	727	14	3.5	K713_0250 MB33 EZ705U	2407	4549	25.18	64449/2560	45	32	2400	2200	3600	79	126	130
119	640	1160	18	2.8	K713_0250 MB43 EZ803U	2600	4800	25.18	64449/2560	50	65	2400	2200	3000	186	126	160
132	359	452	11	4.8	K713_0230 MB33 EZ703U	1413	4109	22.74	14553/640	16	32	2400	2200	3600	67	126	124
132	359	452	11	4.8	K713_0230 MB33 EZ703U	1413	4109	22.74	14553/640	24	32	2400	2200	3600	67	126	124
132	359	452	11	4.8	K713_0230 MB33 EZ703U	1413	4109	22.74	14553/640	32	32	2400	2200	3600	67	126	124
132	359	452	11	4.8	K713_0230 MB33 EZ703U	1413	4109	22.74	14553/640	45	32	2400	2200	3600	67	126	124
132	463	657	14	3.8	K713_0230 MB33 EZ705U	2174	4109	22.74	14553/640	16	32	2400	2200	3600	79	126	130
132	463	657	14	3.8	K713_0230 MB33 EZ705U	2174	4109	22.74	14553/640	24	32	2400	2200	3600	79	126	130
132	463	657	14	3.8	K713_0230 MB33 EZ705U	2174	4109	22.74	14553/640	32	32	2400	2200	3600	79	126	130
132	463	657	14	3.8	K713_0230 MB33 EZ705U	2174	4109	22.74	14553/640	45	32	2400	2200	3600	79	126	130
132	578	1048	18	3.0	K713_0230 MB43 EZ803U	2600	4800	22.74	14553/640	50	65	2400	2200	3000	187	126	160
132	578	1048	18	3.0	K713_0230 MB43 EZ803U	2600	4800	22.74	14553/640	72	65	2400	2200	3000	187	126	160
148	412	584	14	4.1	K713_0200 MB33 EZ705U	1934	3656	20.23	119133/5888	16	32	2400	2200	3600	83	126	130
148	412	584	14	4.1	K713_0200 MB33 EZ705U	1934	3656	20.23	119133/5888	24	32	2400	2200	3600	83	126	130
148	412	584	14	4.1	K713_0200 MB33 EZ705U	1934	3656	20.23	119133/5888	32	32	2400	2200	3600	83	126	130
148	412	584	14	4.1	K713_0200 MB33 EZ705U	1934	3656	20.23	119133/5888	45	32	2400	2200	3600	83	126	130
148	515	932	18	3.2	K713_0200 MB43 EZ803U	2600	4800	20.23	119133/5888	50	65	2400	2200	3000	191	126	160
148	515	932	18	3.2	K713_0200 MB43 EZ803U	2600	4800	20.23	119133/5888	72	65	2400	2200	3000	191	126	160
164	372	528	14	4.3	K713_0185 MB33 EZ705U	1747	3302	18.28	26901/1472	16	32	2400	2200	3600	84	126	130
164	372	528	14	4.3	K713_0185 MB33 EZ705U	1747	3302	18.28	26901/1472	24	32	2400	2200	3600	84	126	130
164	372	528	14	4.3	K713_0185 MB33 EZ705U	1747	3302	18.28	26901/1472	32	32	2400	2200	3600	84	126	130
164	372	528	14	4.3	K713_0185 MB33 EZ705U	1747	3302	18.28	26901/1472	45	32	2400	2200	3600	84	126	130
164	465	842	18	3.5	K713_0185 MB43 EZ803U	2533	4800	18.28	26901/1472	50	65	2400	2200	3000	192	126	160
164	465	842	18	3.5	K713_0185 MB43 EZ803U	2533	4800	18.28	26901/1472	72	65	2400	2200	3000	192	126	160
164	465	842	18	3.5	K713_0185 MB43 EZ803U	2533	4800	18.28	26901/1472	100	65	2400	2200	3000	192	126	160
183	334	473	15	4.7	K713_0165 MB33 EZ705U	1567	2961	16.39	6293/384	16	32	2000	1900	3200	88	126	130
183	334	473	15	4.7	K713_0165 MB33 EZ705U	1567	2961	16.39	6293/384	24	32	2000	1900	3200	88	126	130
183	334	473	15	4.7	K713_0165 MB33 EZ705U	1567	2961	16.39	6293/384	32	32	2000	1900	3200	88	126	130
183	334	473	15	4.7	K713_0165 MB33 EZ705U	1567	2961	16.39	6293/384	45	32	2000	1900	3200	88	126	130
183	417	755	18	3.7	K713_0165 MB43 EZ803U	2272	4800	16.39	6293/384	50	65	2000	1900	3000	196	126	160
183	417	755	18	3.7	K713_0165 MB43 EZ803U	2272	4800	16.39	6293/384	72	65	2000	1900	3000	196	126	160
183	417	755	18	3.7	K713_0165 MB43 EZ803U	2272	4800	16.39	6293/384	100	65	2000	1900	3000	196	126	160
203	301	427	16	4.7	K713_0150 MB33 EZ705U	1415	2674	14.80	1421/96	16	32	2000	1900	3200	89	126	130
203	301	427	16	4.7	K713_0150 MB33 EZ705U	1415	2674	14.80	1421/96	24	32	2000	1900	3200	89	126	130

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
K7 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 2600 Nm)																	
203	301	427	16	4.7	K713_0150 MB33 EZ705U	1415	2674	14.80	1421/96	32	32	2000	1900	3200	89	126	130
203	301	427	16	4.7	K713_0150 MB33 EZ705U	1415	2674	14.80	1421/96	45	32	2000	1900	3200	89	126	130
203	376	682	18	4.0	K713_0150 MB43 EZ803U	2052	4755	14.80	1421/96	50	65	2000	1900	3000	197	126	160
203	376	682	18	4.0	K713_0150 MB43 EZ803U	2052	4755	14.80	1421/96	72	65	2000	1900	3000	197	126	160
203	376	682	18	4.0	K713_0150 MB43 EZ803U	2052	4755	14.80	1421/96	100	65	2000	1900	3000	197	126	160
230	266	377	17	4.7	K713_0130 MB33 EZ705U	1247	2357	13.04	3339/256	16	32	2000	1900	3200	96	126	130
230	266	377	17	4.7	K713_0130 MB33 EZ705U	1247	2357	13.04	3339/256	24	32	2000	1900	3200	96	126	130
230	266	377	17	4.7	K713_0130 MB33 EZ705U	1247	2357	13.04	3339/256	32	32	2000	1900	3200	96	126	130
230	266	377	17	4.7	K713_0130 MB33 EZ705U	1247	2357	13.04	3339/256	45	32	2000	1900	3200	96	126	130
230	332	601	18	4.4	K713_0130 MB43 EZ803U	1808	4190	13.04	3339/256	50	65	2000	1900	3000	204	126	160
230	332	601	18	4.4	K713_0130 MB43 EZ803U	1808	4190	13.04	3339/256	72	65	2000	1900	3000	204	126	160
230	332	601	18	4.4	K713_0130 MB43 EZ803U	1808	4190	13.04	3339/256	100	65	2000	1900	3000	204	126	160
255	240	340	18	4.7	K713_0120 MB33 EZ705U	1126	2129	11.78	23373/1984	16	32	2000	1900	3200	98	126	130
255	240	340	18	4.7	K713_0120 MB33 EZ705U	1126	2129	11.78	23373/1984	24	32	2000	1900	3200	98	126	130
255	240	340	18	4.7	K713_0120 MB33 EZ705U	1126	2129	11.78	23373/1984	32	32	2000	1900	3200	98	126	130
255	240	340	18	4.7	K713_0120 MB33 EZ705U	1126	2129	11.78	23373/1984	45	32	2000	1900	3200	98	126	130
255	300	543	18	4.7	K713_0120 MB43 EZ803U	1633	3784	11.78	23373/1984	50	65	2000	1900	3000	206	126	160
255	300	543	18	4.7	K713_0120 MB43 EZ803U	1633	3784	11.78	23373/1984	72	65	2000	1900	3000	206	126	160
255	300	543	18	4.7	K713_0120 MB43 EZ803U	1633	3784	11.78	23373/1984	100	65	2000	1900	3000	206	126	160
K8 (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 4650 Nm)																	
62	1353	2047	16	2.9	K813_0320 MB43 EZ805U	4650	8400	32.39	31093/960	50	115	2800	2500	3000	280	196	230
68	1222	1849	16	3.1	K813_0290 MB43 EZ805U	4650	8400	29.25	7021/240	50	115	2800	2500	3000	281	196	230
78	1066	1612	16	3.4	K813_0260 MB43 EZ805U	4650	8195	25.51	140833/5520	50	115	2300	2100	3000	288	196	230
87	963	1456	16	3.6	K813_0230 MB43 EZ805U	4516	7402	23.04	31801/1380	50	115	2300	2100	3000	289	196	230
104	801	1212	16	4.1	K813_0190 MB43 EZ805U	3759	6162	19.18	133517/6960	50	115	2300	2100	3000	301	196	230
115	724	1095	16	4.3	K813_0175 MB43 EZ805U	3396	5566	17.33	30149/1740	50	115	2300	2100	3000	303	196	230
122	686	1038	16	4.5	K813_0165 MB43 EZ805U	3220	5278	16.43	42067/2560	50	115	1900	1800	3000	309	196	230
135	620	938	17	4.6	K813_0150 MB43 EZ805U	2909	4767	14.84	9499/640	50	115	1900	1800	3000	313	196	230
195	429	650	22	4.6	K813_0105 MB43 EZ805U	2014	3302	10.28	53041/5160	50	115	1600	1500	2600	355	196	230
215	388	587	24	4.6	K813_0093 MB43 EZ805U	1819	2982	9.284	11977/1290	50	115	1600	1500	2600	364	196	230
243	344	521	26	4.6	K813_0082 MB43 EZ805U	1615	2648	8.243	96937/11760	50	115	1600	1500	2600	392	196	230
269	311	470	28	4.6	K813_0074 MB43 EZ805U	1459	2391	7.445	3127/420	50	115	1600	1500	2600	405	196	230
K8 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 4650 Nm)																	
31	687	771	5.0	4.5	K813_0970 MB33 EZ701U	1858	6211	97.17	31093/320	16	15	2800	2500	4000	40	196	172
31	1115	1338	8.0	2.8	K813_0970 MB33 EZ702U	3727	6211	97.17	31093/320	16	15	2800	2500	4000	45	196	175
34	621	696	5.3	4.5	K813_0880 MB33 EZ701U	1678	5610	87.76	7021/80	16	15	2800	2500	4000	40	196	172
34	1007	1208	8.6	2.8	K813_0880 MB33 EZ702U	3366	5610	87.76	7021/80	16	15	2800	2500	4000	46	196	175
38	911	1093	7.0	3.5	K813_0790 MB33 EZ702U	3112	7986	79.38	45725/576	16	15	2800	2500	4000	47	196	175
38	911	1093	7.0	3.5	K813_0790 MB33 EZ702U	3112	7986	79.38	45725/576	24	15	2800	2500	4000	47	196	175
38	911	1093	7.0	3.5	K813_0790 MB33 EZ702U	3112	7986	79.38	45725/576	32	15	2800	2500	4000	47	196	175
38	1252	1579	9.7	2.5	K813_0790 MB33 EZ703U	4650	7986	79.38	45725/576	16	32	2800	2500	4000	58	196	177
38	1616	2292	13	1.9	K813_0790 MB33 EZ705U	4650	7986	79.38	45725/576	16	32	2800	2500	4000	71	196	183
42	823	987	7.6	3.5	K813_0720 MB33 EZ702U	2810	7212	71.70	10325/144	16	15	2800	2500	4000	47	196	175
42	823	987	7.6	3.5	K813_0720 MB33 EZ702U	2810	7212	71.70	10325/144	24	15	2800	2500	4000	47	196	175
42	823	987	7.6	3.5	K813_0720 MB33 EZ702U	2810	7212	71.70	10325/144	32	15	2800	2500	4000	47	196	175
42	1131	1426	10	2.5	K813_0720 MB33 EZ703U	4327	7212	71.70	10325/144	16	32	2800	2500	4000	59	196	177
42	1460	2070	13	1.9	K813_0720 MB33 EZ705U	4327	7212	71.70	10325/144	16	32	2800	2500	4000	71	196	183
46	750	900	6.9	4.1	K813_0650 MB33 EZ702U	2564	8400	65.41	188387/2880	16	15	2800	2500	4000	48	196	175
46	750	900	6.9	4.1	K813_0650 MB33 EZ702U	2564	8400	65.41	188387/2880	24	15	2800	2500	4000	48	196	175
46	750	900	6.9	4.1	K813_0650 MB33 EZ702U	2564	8400	65.41	188387/2880	32	15	2800	2500	4000	48	196	175
46	750	900	6.9	4.1	K813_0650 MB33 EZ702U	2564	8400	65.41	188387/2880	45	15	2800	2500	4000	48	196	175
46	1032	1301	9.4	3.0	K813_0650 MB33 EZ703U	4065	8400	65.41	188387/2880	16	32	2800	2500	4000	60	196	177
46	1032	1301	9.4	3.0	K813_0650 MB33 EZ703U	4065	8400	65.41	188387/2880	24	32	2800	2500	4000	60	196	177
46	1032	1301	9.4	3.0	K813_0650 MB33 EZ703U	4065	8400	65.41	188387/2880	32	32	2800	2500	4000	60	196	177
46	1332	1889	12	2.3	K813_0650 MB33 EZ705U	4650	8400	65.41	188387/2880	16	32	2800	2500	4000	72	196	183
46	1332	1889	12	2.3	K813_0650 MB33 EZ705U	4650	8400	65.41	188387/2880	24	32	2800	2500	4000	72	196	183
46	1332	1889	12	2.3	K813_0650 MB33 EZ705U	4650	8400	65.41	188387/2880	32	32	2800	2500	4000	72	196	183
51	678	813	7.4	4.1	K813_0590 MB33 EZ702U	2316	8400	59.08	42539/720	16	15	2800	2500	4000	48	196	175
51	678	813	7.4	4.1	K813_0590 MB33 EZ702U	2316	8400	59.08	42539/720	24	15	2800	2500	4000	48	196	175
51	678	813	7.4	4.1	K813_0590 MB33 EZ702U	2316	8400	59.08	42539/720	32	15	2800	2500	4000	48	196	175
51	678	813	7.4	4.1	K813_0590 MB33 EZ702U	2316	8400	59.08	42539/720	45	15	2800	2500	4000	48	196	175
51	932	1175	10	3.0	K813_0590 MB33 EZ703U	3671	8400	59.08	42539/720	16	32	2800	2500	4000	60	196	177
51	932	1175	10	3.0	K813_0590 MB33 EZ703U	3671	8400	59.08	42539/720	24	32	2800	2500	4000	60	196	177
51	932	1175	10	3.0	K813_0590 MB33 EZ703U	3671	8400	59.08	42539/720	32	32	2800	2500	4000	60	196	177

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
K8 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 4650 Nm)																	
51	932	1175	10	3.0	K813_0590 MB33 EZ703U	3671	8400	59.08	42539/720	45	32	2800	2500	4000	60	196	177
51	1203	1706	13	2.3	K813_0590 MB33 EZ705U	4650	8400	59.08	42539/720	16	32	2800	2500	4000	73	196	183
51	1203	1706	13	2.3	K813_0590 MB33 EZ705U	4650	8400	59.08	42539/720	24	32	2800	2500	4000	73	196	183
51	1203	1706	13	2.3	K813_0590 MB33 EZ705U	4650	8400	59.08	42539/720	32	32	2800	2500	4000	73	196	183
51	1203	1706	13	2.3	K813_0590 MB33 EZ705U	4650	8400	59.08	42539/720	45	32	2800	2500	4000	73	196	183
61	773	974	8.9	3.8	K813_0490 MB33 EZ703U	3044	8400	48.99	5487/112	16	32	2800	2500	4000	63	196	177
61	773	974	8.9	3.8	K813_0490 MB33 EZ703U	3044	8400	48.99	5487/112	24	32	2800	2500	4000	63	196	177
61	773	974	8.9	3.8	K813_0490 MB33 EZ703U	3044	8400	48.99	5487/112	32	32	2800	2500	4000	63	196	177
61	773	974	8.9	3.8	K813_0490 MB33 EZ703U	3044	8400	48.99	5487/112	45	32	2800	2500	4000	63	196	177
61	998	1414	11	3.0	K813_0490 MB33 EZ705U	4650	8400	48.99	5487/112	16	32	2800	2500	4000	76	196	183
61	998	1414	11	3.0	K813_0490 MB33 EZ705U	4650	8400	48.99	5487/112	24	32	2800	2500	4000	76	196	183
61	998	1414	11	3.0	K813_0490 MB33 EZ705U	4650	8400	48.99	5487/112	32	32	2800	2500	4000	76	196	183
61	998	1414	11	3.0	K813_0490 MB33 EZ705U	4650	8400	48.99	5487/112	45	32	2800	2500	4000	76	196	183
61	1246	2257	11	3.1	K813_0490 MB43 EZ803U	4650	8400	48.99	5487/112	50	65	2800	2500	3000	184	196	214
68	698	880	9.6	3.8	K813_0440 MB33 EZ703U	2750	7995	44.25	177/4	16	32	2800	2500	4000	64	196	177
68	698	880	9.6	3.8	K813_0440 MB33 EZ703U	2750	7995	44.25	177/4	24	32	2800	2500	4000	64	196	177
68	698	880	9.6	3.8	K813_0440 MB33 EZ703U	2750	7995	44.25	177/4	32	32	2800	2500	4000	64	196	177
68	698	880	9.6	3.8	K813_0440 MB33 EZ703U	2750	7995	44.25	177/4	45	32	2800	2500	4000	64	196	177
68	901	1278	12	3.0	K813_0440 MB33 EZ705U	4230	7995	44.25	177/4	16	32	2800	2500	4000	76	196	183
68	901	1278	12	3.0	K813_0440 MB33 EZ705U	4230	7995	44.25	177/4	24	32	2800	2500	4000	76	196	183
68	901	1278	12	3.0	K813_0440 MB33 EZ705U	4230	7995	44.25	177/4	32	32	2800	2500	4000	76	196	183
68	901	1278	12	3.0	K813_0440 MB33 EZ705U	4230	7995	44.25	177/4	45	32	2800	2500	4000	76	196	183
68	1125	2039	11	3.3	K813_0440 MB43 EZ803U	4650	8400	44.25	177/4	50	65	2800	2500	3000	184	196	214
75	631	796	8.9	4.4	K813_0400 MB33 EZ703U	2486	7229	40.01	12803/320	16	32	2800	2500	4000	67	196	177
75	631	796	8.9	4.4	K813_0400 MB33 EZ703U	2486	7229	40.01	12803/320	24	32	2800	2500	4000	67	196	177
75	631	796	8.9	4.4	K813_0400 MB33 EZ703U	2486	7229	40.01	12803/320	32	32	2800	2500	4000	67	196	177
75	631	796	8.9	4.4	K813_0400 MB33 EZ703U	2486	7229	40.01	12803/320	45	32	2800	2500	4000	67	196	177
75	815	1155	11	3.4	K813_0400 MB33 EZ705U	3825	7229	40.01	12803/320	16	32	2800	2500	4000	79	196	183
75	815	1155	11	3.4	K813_0400 MB33 EZ705U	3825	7229	40.01	12803/320	24	32	2800	2500	4000	79	196	183
75	815	1155	11	3.4	K813_0400 MB33 EZ705U	3825	7229	40.01	12803/320	32	32	2800	2500	4000	79	196	183
75	815	1155	11	3.4	K813_0400 MB33 EZ705U	3825	7229	40.01	12803/320	45	32	2800	2500	4000	79	196	183
75	1017	1844	11	3.6	K813_0400 MB43 EZ803U	4650	8400	40.01	12803/320	50	65	2800	2500	3000	187	196	214
75	1017	1844	11	3.6	K813_0400 MB43 EZ803U	4650	8400	40.01	12803/320	72	65	2800	2500	3000	187	196	214
83	570	719	9.5	4.4	K813_0360 MB33 EZ703U	2246	6530	36.14	2891/80	16	32	2800	2500	4000	67	196	177
83	570	719	9.5	4.4	K813_0360 MB33 EZ703U	2246	6530	36.14	2891/80	24	32	2800	2500	4000	67	196	177
83	570	719	9.5	4.4	K813_0360 MB33 EZ703U	2246	6530	36.14	2891/80	32	32	2800	2500	4000	67	196	177
83	570	719	9.5	4.4	K813_0360 MB33 EZ703U	2246	6530	36.14	2891/80	45	32	2800	2500	4000	67	196	177
83	736	1043	12	3.4	K813_0360 MB33 EZ705U	3455	6530	36.14	2891/80	16	32	2800	2500	4000	80	196	183
83	736	1043	12	3.4	K813_0360 MB33 EZ705U	3455	6530	36.14	2891/80	24	32	2800	2500	4000	80	196	183
83	736	1043	12	3.4	K813_0360 MB33 EZ705U	3455	6530	36.14	2891/80	32	32	2800	2500	4000	80	196	183
83	736	1043	12	3.4	K813_0360 MB33 EZ705U	3455	6530	36.14	2891/80	45	32	2800	2500	4000	80	196	183
83	919	1665	11	3.8	K813_0360 MB43 EZ803U	4650	8400	36.14	2891/80	50	65	2800	2500	3000	188	196	214
83	919	1665	11	3.8	K813_0360 MB43 EZ803U	4650	8400	36.14	2891/80	72	65	2800	2500	3000	188	196	214
93	660	935	11	4.2	K813_0320 MB33 EZ705U	3096	5852	32.39	31093/960	16	32	2800	2500	4000	84	196	183
93	660	935	11	4.2	K813_0320 MB33 EZ705U	3096	5852	32.39	31093/960	24	32	2800	2500	4000	84	196	183
93	660	935	11	4.2	K813_0320 MB33 EZ705U	3096	5852	32.39	31093/960	32	32	2800	2500	4000	84	196	183
93	660	935	11	4.2	K813_0320 MB33 EZ705U	3096	5852	32.39	31093/960	45	32	2800	2500	4000	84	196	183
93	824	1492	11	4.1	K813_0320 MB43 EZ803U	4490	8400	32.39	31093/960	50	65	2800	2500	3000	192	196	214
93	824	1492	11	4.1	K813_0320 MB43 EZ803U	4490	8400	32.39	31093/960	72	65	2800	2500	3000	192	196	214
93	824	1492	11	4.1	K813_0320 MB43 EZ803U	4490	8400	32.39	31093/960	100	65	2800	2500	3000	192	196	214
103	596	845	12	4.2	K813_0290 MB33 EZ705U	2797	5286	29.25	7021/240	16	32	2800	2500	4000	85	196	183
103	596	845	12	4.2	K813_0290 MB33 EZ705U	2797	5286	29.25	7021/240	24	32	2800	2500	4000	85	196	183
103	596	845	12	4.2	K813_0290 MB33 EZ705U	2797	5286	29.25	7021/240	32	32	2800	2500	4000	85	196	183
103	596	845	12	4.2	K813_0290 MB33 EZ705U	2797	5286	29.25	7021/240	45	32	2800	2500	4000	85	196	183
103	744	1348	11	4.4	K813_0290 MB43 EZ803U	4055	8400	29.25	7021/240	50	65	2800	2500	3000	193	196	214
103	744	1348	11	4.4	K813_0290 MB43 EZ803U	4055	8400	29.25	7021/240	72	65	2800	2500	3000	193	196	214
103	744	1348	11	4.4	K813_0290 MB43 EZ803U	4055	8400	29.25	7021/240	100	65	2800	2500	3000	193	196	214
118	520	737	11	4.7	K813_0260 MB33 EZ705U	2439	4610	25.51	140833/5520	16	32	2300	2100	3500	92	196	183
118	520	737	11	4.7	K813_0260 MB33 EZ705U	2439	4610	25.51	140833/5520	24	32	2300	2100	3500	92	196	183
118	520	737	11	4.7	K813_0260 MB33 EZ705U	2439	4610	25.51	140833/5520	32	32	2300	2100	3500	92	196	183
118	520	737	11	4.7	K813_0260 MB33 EZ705U	2439	4610	25.51	140833/5520	45	32	2300	2100	3500	92	196	183
118	649	1176	11	4.8	K813_0260 MB43 EZ803U	3537	8195	25.51	140833/5520	50	65	2300	2100	3000	200	196	214
118	649	1176	11	4.8	K813_0260 MB43 EZ803U	3537	8195	25.51	140833/5520	72	65	2300	2100	3000	200	196	214
118	649	1176	11	4.8	K813_0260 MB43 EZ803U	3537	8195	25.51	140833/5520	100	65	2300	2100	3000	200	196	214

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	M_{1Bstat} [Nm]	M_{Bstat} [Nm]	n_{1maxDB} EL1,2 [rpm]	n_{1maxDB} EL3,4,5,6 [rpm]	n_{1maxZB} [rpm]	J_1 [kgcm²]	C_2 [Nm/ arcmin]	m [kg]
K8 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 4650 Nm)																	
130	469	665	12	4.7	K813_0230 MB33 EZ705U	2203	4164	23.04	31801/1380	16	32	2300	2100	3500	93	196	183
130	469	665	12	4.7	K813_0230 MB33 EZ705U	2203	4164	23.04	31801/1380	24	32	2300	2100	3500	93	196	183
130	469	665	12	4.7	K813_0230 MB33 EZ705U	2203	4164	23.04	31801/1380	32	32	2300	2100	3500	93	196	183
130	469	665	12	4.7	K813_0230 MB33 EZ705U	2203	4164	23.04	31801/1380	45	32	2300	2100	3500	93	196	183
156	391	554	14	4.7	K813_0190 MB33 EZ705U	1834	3466	19.18	133517/6960	16	32	2300	2100	3500	105	196	183
156	391	554	14	4.7	K813_0190 MB33 EZ705U	1834	3466	19.18	133517/6960	24	32	2300	2100	3500	105	196	183
156	391	554	14	4.7	K813_0190 MB33 EZ705U	1834	3466	19.18	133517/6960	32	32	2300	2100	3500	105	196	183
156	391	554	14	4.7	K813_0190 MB33 EZ705U	1834	3466	19.18	133517/6960	45	32	2300	2100	3500	105	196	183
173	353	500	15	4.7	K813_0175 MB33 EZ705U	1656	3131	17.33	30149/1740	16	32	2300	2100	3500	107	196	183
173	353	500	15	4.7	K813_0175 MB33 EZ705U	1656	3131	17.33	30149/1740	24	32	2300	2100	3500	107	196	183
173	353	500	15	4.7	K813_0175 MB33 EZ705U	1656	3131	17.33	30149/1740	32	32	2300	2100	3500	107	196	183
173	353	500	15	4.7	K813_0175 MB33 EZ705U	1656	3131	17.33	30149/1740	45	32	2300	2100	3500	107	196	183
K9 (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 7700 Nm)																	
41	2044	3092	12	3.1	K913_0490 MB43 EZ805U	7700	14000	48.94	100223/2048	50	115	2600	2500	3000	283	379	345
53	1589	2404	11	3.9	K913_0380 MB43 EZ805U	7455	12220	38.04	194773/5120	50	115	2600	2500	3000	293	379	345
62	1342	2029	11	4.4	K913_0320 MB43 EZ805U	6294	10316	32.12	47275/1472	50	115	2600	2500	3000	302	379	345
84	1000	1513	13	4.6	K913_0240 MB43 EZ805U	4692	7691	23.94	88877/3712	50	115	2200	2100	3000	324	379	345
105	796	1205	15	4.6	K913_0190 MB43 EZ805U	3736	6123	19.06	305/16	50	115	2200	2100	3000	348	379	345
160	523	791	21	4.6	K913_0125 MB43 EZ805U	2455	4023	12.53	73749/5888	50	115	1800	1800	2800	421	379	345
K9 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 7700 Nm)																	
40	1907	3456	8.7	3.2	K913_0750 MB43 EZ803U	7700	14000	75.00	62403/832	50	65	2600	2500	3000	184	379	329
48	1604	2906	8.5	3.6	K913_0630 MB43 EZ803U	7700	14000	63.07	209901/3328	50	65	2600	2500	3000	188	379	329
48	1604	2906	8.5	3.6	K913_0630 MB43 EZ803U	7700	14000	63.07	209901/3328	72	65	2600	2500	3000	188	379	329
61	1244	2255	8.2	4.5	K913_0490 MB43 EZ803U	6784	14000	48.94	100223/2048	50	65	2600	2500	3000	195	379	329
61	1244	2255	8.2	4.5	K913_0490 MB43 EZ803U	6784	14000	48.94	100223/2048	72	65	2600	2500	3000	195	379	329
61	1244	2255	8.2	4.5	K913_0490 MB43 EZ803U	6784	14000	48.94	100223/2048	100	65	2600	2500	3000	195	379	329

10.3 Dimensional drawings

In this chapter, you can find the dimensions of the geared motors with redundant brake.

There is a dimensional drawing for every possible shaft/housing design, each with the tables for gear unit dimensions, motor adapter dimensions, motor dimensions and geared motor dimensions.

Dimensions can exceed the specifications of ISO 2768-mK due to casting tolerances or accumulation of individual tolerances.

We reserve the right to make dimensional changes due to ongoing technical development.

You can download 3D models of our standard drives at https://configurator.stoeber.de/en-US/.

Combination options and the dimensions of forced ventilated geared motors can also be found at https://configurator.stoeber.de/en-US/.

Tolerances

Axis height in accordance with DIN 747	Tolerance
Up to 50 mm	-0.4 mm
Up to 250 mm	-0.5 mm
Up to 630 mm	-0.6 mm

Solid shaft	Tolerance
Shaft ∅ fit ≤ 50 mm	DIN 748-1, ISO k6
Shaft ∅ fit > 50 mm	DIN 748-1, ISO m6
Feather keys	DIN 6885-1, high form A

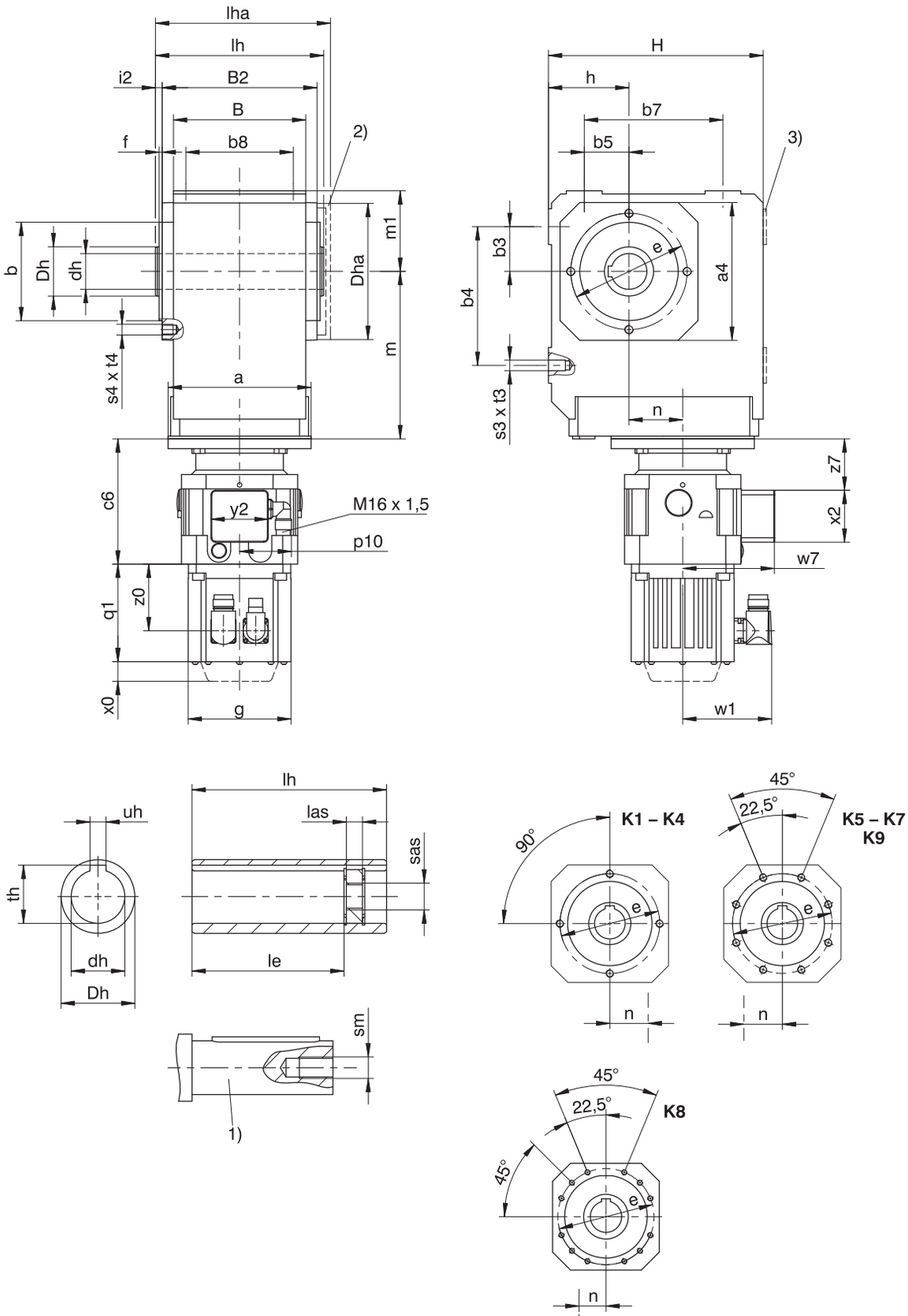
Hollow shaft	Tolerance
Hollow shaft hole fit	ISO H7
Feather keys	DIN 6885-1, high form K1 ∅30: DIN 6885-3, low form

Flange	Pilot tolerance
Up to 300 mm	ISO j6
Starting at 350 mm	ISO h6

Centering holes in solid shafts in accordance with DIN 332-2, DR shape

Thread size	M4	M5	M6	M8	M10	M12	M16	M20	M24
Thread depth [mm]	10	12.5	16	19	22	28	36	42	50

10.3.1 A shaft design (hollow shaft), G housing design (pitch circle diameter)



q1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]	1)	The length of the machine shaft must be at least 2.2 x ∅dh and the length of the feather key must be at least 2 x ∅dh.
2)	Cover (optional)	3)	Only for K1 (other sizes on request)

Dimensions of gear units

Type	□a4	Øb	b3	b4	b5	b7	b8	B	B2	Ødh	ØDh	Dha	Øe	f	h	H	i2	le	lh	las	lha	m1	s3	s4	sm	sas	t3	t4	th	uh
K1	105	75_{j6}	30	90	30	90	70	90	106	20^{H7}	40	□105	90	3.0	60	160	7.0	98.0	120	12	127.0	60	M8	M8	M6	M8	13	13	22.8	6^{JS9}
K1	105	75_{j6}	30	90	30	90	70	90	106	25^{H7}	40	□105	90	3.0	60	160	7.0	98.0	120	12	127.0	60	M8	M8	M10	M12	13	13	28.3	8^{JS9}
K1	105	75_{j6}	30	90	30	90	70	90	106	30^{H7}	40	□105	90	3.0	60	160	7.0	93.5	120	12	127.0	60	M8	M8	M10	M12	13	13	32.0	8^{JS9}
K2	116	82_{j6}	35	115	35	115	90	115	134	30^{H7}	45	□116	100	3.0	65	190	7.0	121.5	148	12	156.0	65	M10	M8	M10	M12	16	13	33.3	8^{JS9}
K3	132	95_{j6}	40	130	40	130	105	130	146	35^{H7}	50	□132	115	3.0	75	213	7.0	125.0	160	12	168.0	75	M10	M8	M12	M16	16	13	38.3	10^{JS9}
K4	152	110_{j6}	50	155	50	155	120	148	173	40^{H7}	55	□152	130	3.5	90	240	7.5	157.0	188	12	197.5	90	M12	M10	M16	M20	19	16	43.3	12^{JS9}
K5	145	110_{j6}	40	140	100	140	125	160	185	50^{H7}	65	□145	130	3.5	160	260	7.5	164.0	200	12	209.5	100	M16	M10	M16	M20	26	16	53.8	14^{JS9}
K6	180	140_{j6}	50	160	110	160	130	168	200	50^{H7}	70	∅183	165	3.5	190	310	7.5	179.0	215	12	224.5	120	M16	M10	M16	M20	26	16	53.8	14^{JS9}
K7	195	155_{j6}	55	180	125	180	145	190	226	60^{H7}	85	∅205	185	3.5	212	342	8.0	214.0	242	12	252.0	125	M20	M12	M20	M24	33	19	64.4	18^{JS9}
K8	226	185_{j6}	75	240	165	240	185	235	282	70^{H7}	100	∅184	215	4.0	265	410	9.0	263.0	300	20	311.0	145	M24	M12	M20	M24	38	19	74.9	20^{JS9}
K9	280	230_{j6}	95	280	185	280	225	285	330	90^{H7}	120	∅230	265	5.0	315	495	10.0	302.0	350	26	361.0	180	M30	M16	M24	M30	48	26	95.4	25^{JS9}

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
K_MB23	140	59	102.9	58	64	57.5
K_MB33	161	59	115.4	58	64	71.0
K_MB43	194	59	134.9	58	64	93.5

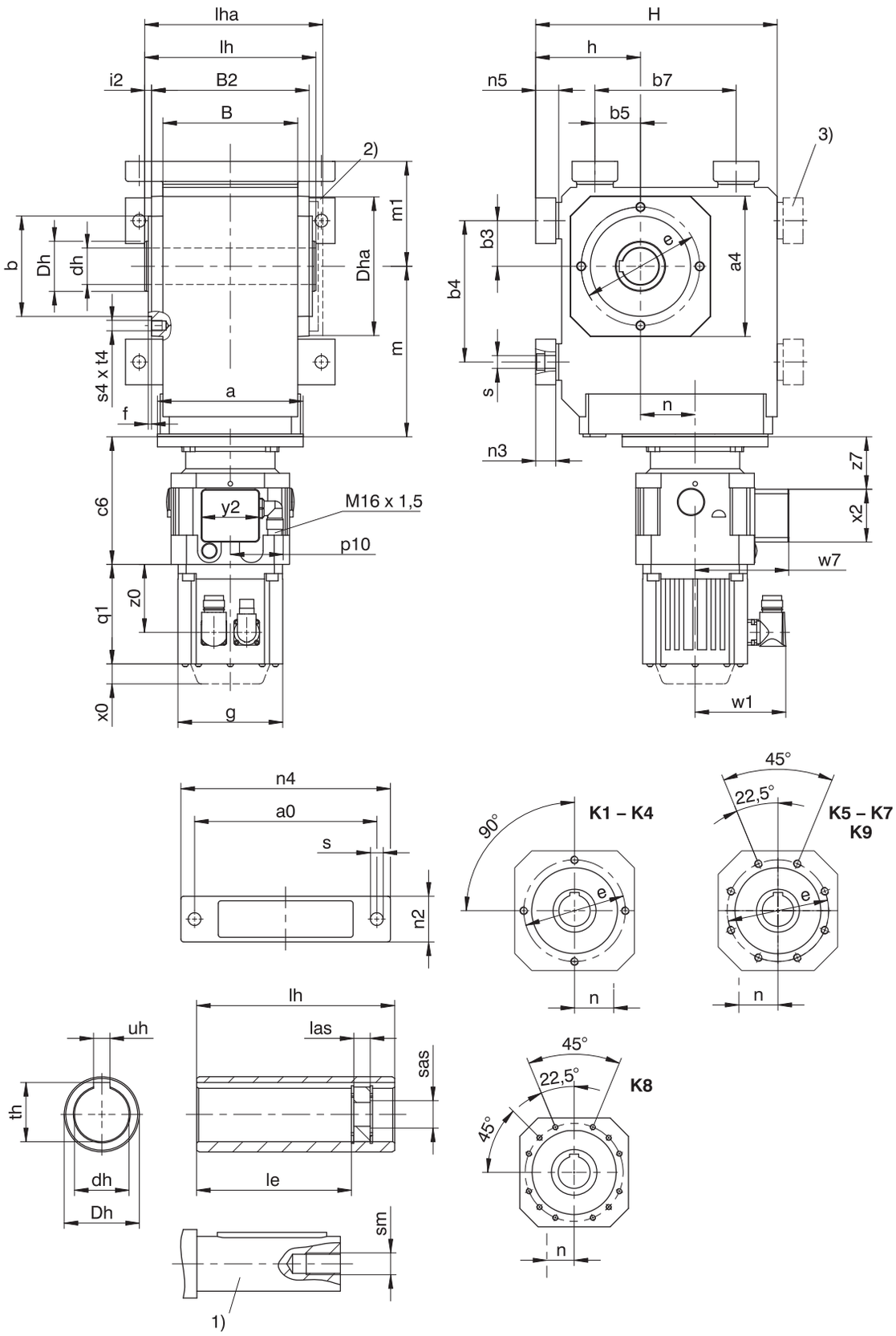
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
K102	∅160	128	36.0	∅160	128	36.0	–	–	–	–	–	–
K202	∅160	147	46.0	∅160	147	46.0	∅200	149	46.0	–	–	–
K302	∅160	167	52.5	∅160	167	52.5	∅200	169	52.5	–	–	–
K402	∅160	187	60.0	∅160	187	60.0	∅200	189	60.0	∅250	192	60.0
K513	∅160	172	15.0	∅160	172	15.0	∅200	174	15.0	∅250	177	15.0
K613	∅160	191	18.0	∅160	191	18.0	∅200	193	18.0	∅250	196	18.0
K713	–	–	–	–	–	–	∅200	221	20.0	∅250	224	20.0
K813	–	–	–	–	–	–	∅200	247	24.0	∅250	249	24.0
K913	–	–	–	–	–	–	–	–	–	∅250	294	25.0

10.3.2 A shaft design (hollow shaft), NG housing design (foot + pitch circle diameter)



q1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]	1)	The length of the machine shaft must be at least 2.2 x ∅dh and the length of the feather key must be at least 2 x ∅dh.
2)	Cover (optional)	3)	Only for K1 (other sizes on request)

Dimensions of gear units

Type	a0	□a4	Øb	b3	b4	b5	b7	B	B2	Ødh	ØDh	Dha	Øe	f	h	H	i2	le	lh	las	lha	m1	n2	n3	n4	n5	Øs	s4	sm	sas	t4	th	uh
K1	115	105	75_{j6}	30	90	30	90	90	106	20^{H7}	40	□105	90	3.0	75	175	7.0	98.0	120	12	127.0	75	30	13	140	15	9.0	M8	M6	M8	13	22.8	6^{JS9}
K1	115	105	75_{j6}	30	90	30	90	90	106	25^{H7}	40	□105	90	3.0	75	175	7.0	98.0	120	12	127.0	75	30	13	140	15	9.0	M8	M10	M12	13	28.3	8^{JS9}
K1	115	105	75_{j6}	30	90	30	90	90	106	30^{H7}	40	□105	90	3.0	75	175	7.0	93.5	120	12	127.0	75	30	13	140	15	9.0	M8	M10	M12	13	32.0	8^{JS9}
K2	155	116	82_{j6}	35	115	35	115	115	134	30^{H7}	45	□116	100	3.0	88	213	7.0	121.5	148	12	156.0	88	40	20	185	23	11.0	M8	M10	M12	13	33.3	8^{JS9}
K3	170	132	95_{j6}	40	130	40	130	130	146	35^{H7}	50	□132	115	3.0	98	236	7.0	125.0	160	12	168.0	98	45	20	200	23	11.0	M8	M12	M16	13	38.3	10^{JS9}
K4	200	152	110_{j6}	50	155	50	155	148	173	40^{H7}	55	□152	130	3.5	115	265	7.5	157.0	188	12	197.5	115	50	22	230	25	14.0	M10	M16	M20	16	43.3	12^{JS9}
K5	200	145	110_{j6}	40	140	100	140	160	185	50^{H7}	65	□145	130	3.5	190	290	7.5	164.0	200	12	209.5	130	60	27	240	30	18.0	M10	M16	M20	16	53.8	14^{JS9}
K6	210	180	140_{j6}	50	160	110	160	168	200	50^{H7}	70	∅183	165	3.5	220	340	7.5	179.0	215	12	224.5	150	65	27	250	30	18.5	M10	M16	M20	16	53.8	14^{JS9}
K7	241	195	155_{j6}	55	180	125	180	190	226	60^{H7}	85	∅205	185	3.5	250	380	8.0	214.0	242	12	252.0	163	70	35	290	38	23.0	M12	M20	M24	19	64.4	18^{JS9}
K8	300	226	185_{j6}	75	240	165	240	235	282	70^{H7}	100	∅184	215	4.0	310	455	9.0	263.0	300	20	311.0	190	85	41	360	45	27.0	M12	M20	M24	19	74.9	20^{JS9}
K9	360	280	230_{j6}	95	280	185	280	285	330	90^{H7}	120	∅230	265	5.0	365	545	10.0	302.0	350	26	361.0	230	95	46	430	50	31.0	M16	M24	M30	26	95.4	25^{JS9}

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
K_MB23	140	59	102.9	58	64	57.5
K_MB33	161	59	115.4	58	64	71.0
K_MB43	194	59	134.9	58	64	93.5

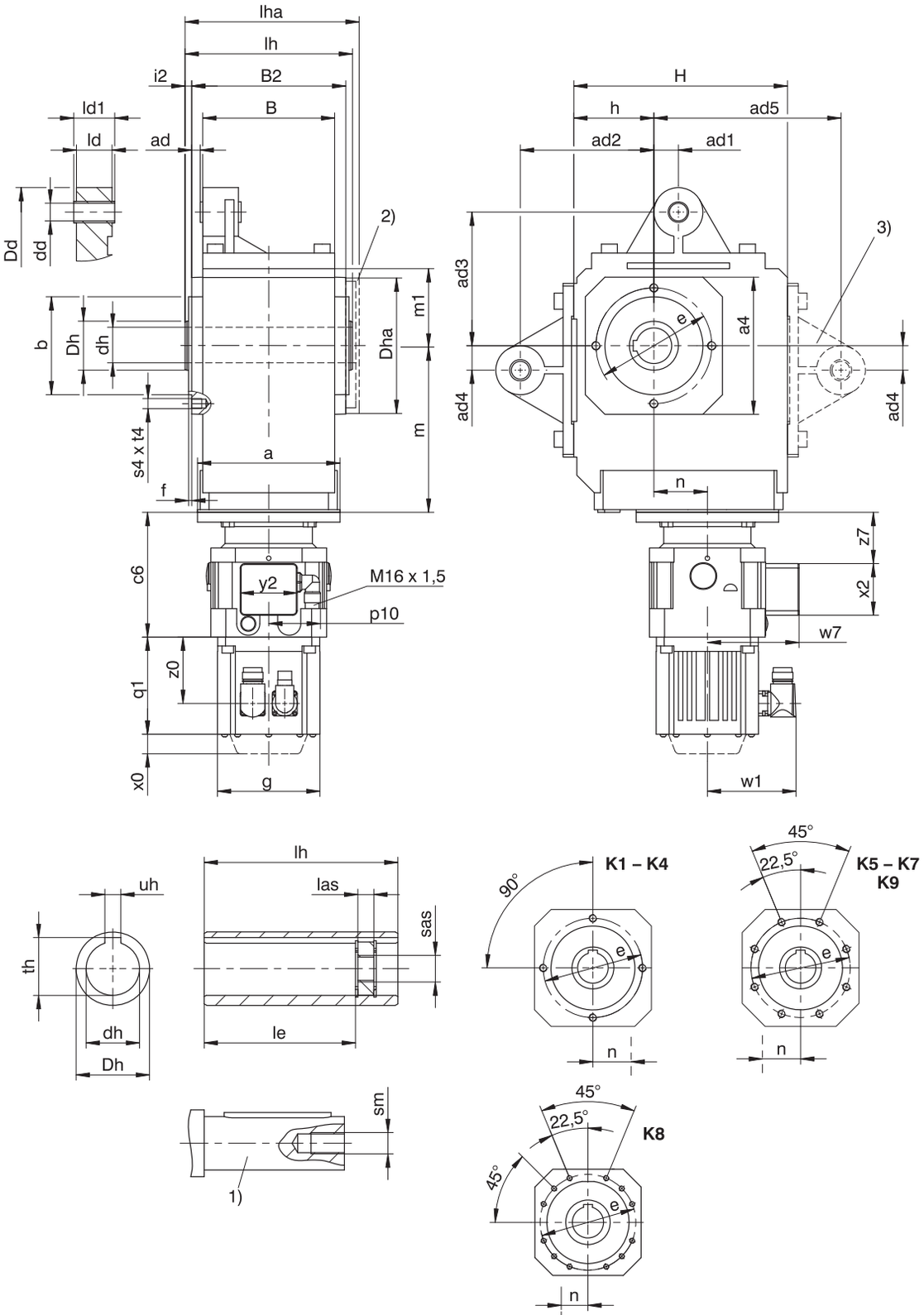
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
K102	∅160	128	36.0	∅160	128	36.0	–	–	–	–	–	–
K202	∅160	147	46.0	∅160	147	46.0	∅200	149	46.0	–	–	–
K302	∅160	167	52.5	∅160	167	52.5	∅200	169	52.5	–	–	–
K402	∅160	187	60.0	∅160	187	60.0	∅200	189	60.0	∅250	192	60.0
K513	∅160	172	15.0	∅160	172	15.0	∅200	174	15.0	∅250	177	15.0
K613	∅160	191	18.0	∅160	191	18.0	∅200	193	18.0	∅250	196	18.0
K713	–	–	–	–	–	–	∅200	221	20.0	∅250	224	20.0
K813	–	–	–	–	–	–	∅200	247	24.0	∅250	249	24.0
K913	–	–	–	–	–	–	–	–	–	∅250	294	25.0

10.3.3 A shaft design (hollow shaft), GD housing design (pitch circle diameter + torque arm bracket)



q1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]	1)	The length of the machine shaft must be at least 2.2 x ∅dh and the length of the feather key must be at least 2 x ∅dh.
2)	Cover (optional)	3)	Only for K1 (other sizes on request)
–	If you brace the gear units without the torque arm brackets provided by the manufacturer for this purpose, the dimensions for ad2 and ad3 must meet the specified value.		

Dimensions of gear units

Type	□a4	ad	ad1	ad2	ad3	ad4	ad5	Øb	B	B2	Ødd	Ødh	ØDd	ØDh	Dha	Øe	f
K1	105	6.0	15.0	90	90	15.0	130	75_{j6}	90	106	12^{H9}	20^{H7}	43	40	□105	90	3.0
K1	105	6.0	15.0	90	90	15.0	130	75_{j6}	90	106	12^{H9}	25^{H7}	43	40	□105	90	3.0
K1	105	6.0	15.0	90	90	15.0	130	75_{j6}	90	106	12^{H9}	30^{H7}	43	40	□105	90	3.0
K2	116	6.5	22.5	100	100	22.5	–	82_{j6}	115	134	16^{H9}	30^{H7}	45	45	□116	100	3.0
K3	132	5.0	25.0	120	120	25.0	–	95_{j6}	130	146	16^{H9}	35^{H7}	45	50	□132	115	3.0
K4	152	9.5	27.5	150	150	27.5	–	110_{j6}	148	173	20^{H9}	40^{H7}	55	55	□152	130	3.5
K5	145	9.5	30.0	250	190	30.0	–	110_{j6}	160	185	20^{H9}	50^{H7}	58	65	□145	130	3.5
K6	180	13.0	30.0	250	180	30.0	–	140_{j6}	168	200	20^{H9}	50^{H7}	58	70	∅183	165	3.5
K7	195	15.0	35.0	300	213	35.0	–	155_{j6}	190	226	20^{H9}	60^{H7}	68	85	∅205	185	3.5
K8	226	17.0	45.0	350	230	45.0	–	185_{j6}	235	282	24^{H9}	70^{H7}	72	100	∅184	215	4.0
K9	280	16.0	45.0	450	315	45.0	–	230_{j6}	285	330	24^{H9}	90^{H7}	75	120	∅230	265	5.0

Dimensions of gear units

Type	h	H	i2	ld	ld1	le	lh	las	lha	m1	s4	sm	sas	t4	th	uh
K1	60	160	7.0	24	28	98.0	120	12	127.0	60	M8	M6	M8	13	22.8	6^{JS9}
K1	60	160	7.0	24	28	98.0	120	12	127.0	60	M8	M10	M12	13	28.3	8^{JS9}
K1	60	160	7.0	24	28	93.5	120	12	127.0	60	M8	M10	M12	13	32.0	8^{JS9}
K2	65	190	7.0	32	38	121.5	148	12	156.0	65	M8	M10	M12	13	33.3	8^{JS9}
K3	75	213	7.0	32	38	125.0	160	12	168.0	75	M8	M12	M16	13	38.3	10^{JS9}
K4	90	240	7.5	40	46	157.0	188	12	197.5	90	M10	M16	M20	16	43.3	12^{JS9}
K5	160	260	7.5	40	46	164.0	200	12	209.5	100	M10	M16	M20	16	53.8	14^{JS9}
K6	190	310	7.5	40	46	179.0	215	12	224.5	120	M10	M16	M20	16	53.8	14^{JS9}
K7	212	342	8.0	64	70	214.0	242	12	252.0	125	M12	M20	M24	19	64.4	18^{JS9}
K8	265	410	9.0	102	115	263.0	300	20	311.0	145	M12	M20	M24	19	74.9	20^{JS9}
K9	315	495	10.0	102	115	302.0	350	26	361.0	180	M16	M24	M30	26	95.4	25^{JS9}

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
K_MB23	140	59	102.9	58	64	57.5
K_MB33	161	59	115.4	58	64	71.0
K_MB43	194	59	134.9	58	64	93.5

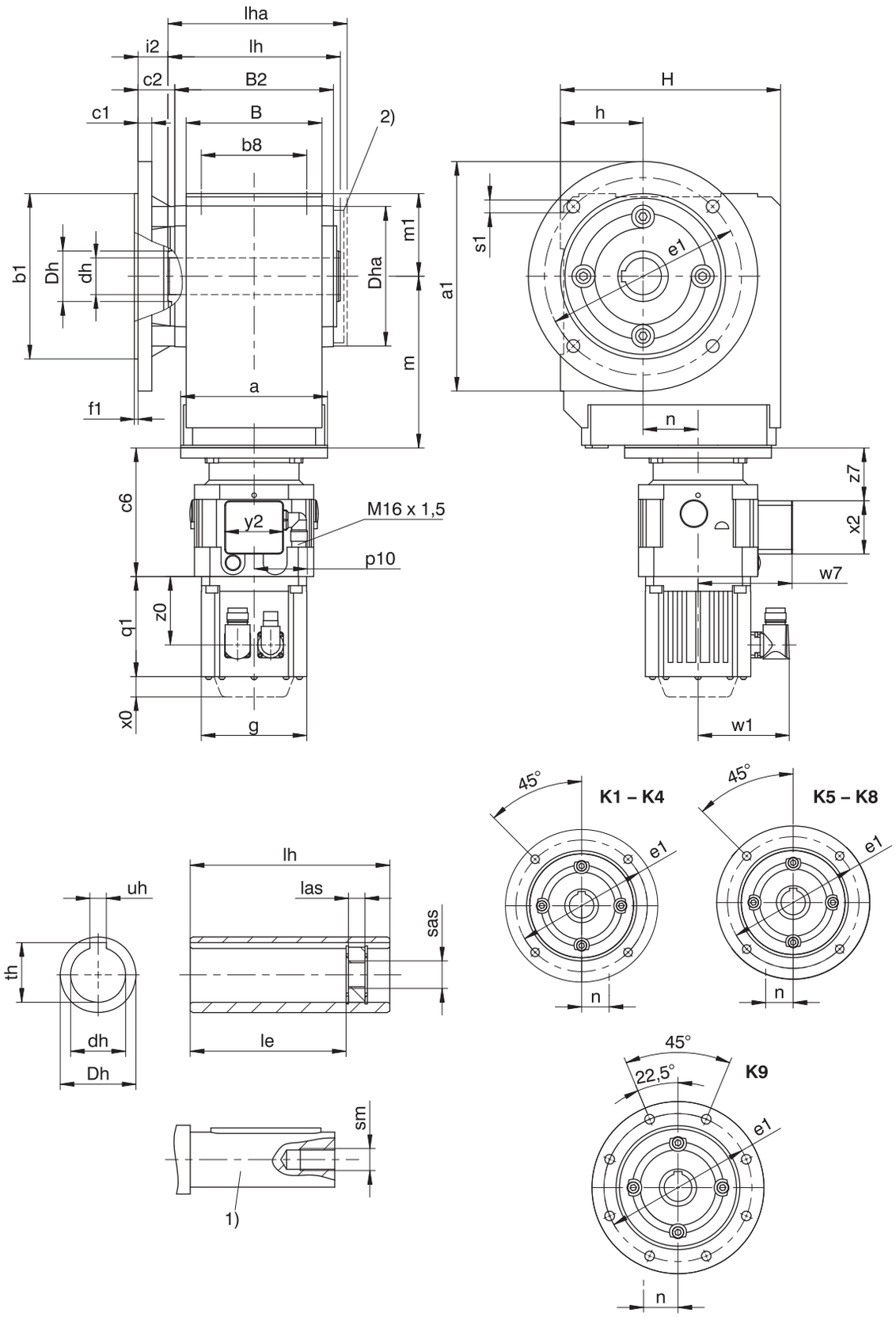
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
K102	∅160	128	36.0	∅160	128	36.0	–	–	–	–	–	–
K202	∅160	147	46.0	∅160	147	46.0	∅200	149	46.0	–	–	–
K302	∅160	167	52.5	∅160	167	52.5	∅200	169	52.5	–	–	–
K402	∅160	187	60.0	∅160	187	60.0	∅200	189	60.0	∅250	192	60.0
K513	∅160	172	15.0	∅160	172	15.0	∅200	174	15.0	∅250	177	15.0
K613	∅160	191	18.0	∅160	191	18.0	∅200	193	18.0	∅250	196	18.0
K713	–	–	–	–	–	–	∅200	221	20.0	∅250	224	20.0
K813	–	–	–	–	–	–	∅200	247	24.0	∅250	249	24.0
K913	–	–	–	–	–	–	–	–	–	∅250	294	25.0

10.3.4 A shaft design (hollow shaft), F housing design (round flange)



q1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]	1)	The length of the machine shaft must be at least 2.2 x ∅dh and the length of the feather key must be at least 2 x ∅dh.
2)	Cover (optional)		

Dimensions of gear units

Type	Øa1	Øb1	b8	B	B2	c1	c2	Ødh	ØDh	Dha	Øe1	f1	h	H	i2	le	lh	las	lha	m1	Øs1	sm	sas	th	uh
K1	160	110_{j6}	70	90	106	10	32.0	20^{H7}	40	□105	130	3.5	60	160	25.0	98.0	120	12	127.0	60	9	M6	M8	22.8	6^{JS9}
K1	160	110_{j6}	70	90	106	10	32.0	25^{H7}	40	□105	130	3.5	60	160	25.0	98.0	120	12	127.0	60	9	M10	M12	28.3	8^{JS9}
K1	160	110_{j6}	70	90	106	10	32.0	30^{H7}	40	□105	130	3.5	60	160	25.0	93.5	120	12	127.0	60	9	M10	M12	32.0	8^{JS9}
K2	200	130_{j6}	90	115	134	12	32.0	30^{H7}	45	□116	165	3.5	65	190	25.0	121.5	148	12	156.0	65	11	M10	M12	33.3	8^{JS9}
K3	200	130_{j6}	105	130	146	14	38.0	35^{H7}	50	□132	165	3.5	75	213	31.0	125.0	160	12	168.0	75	11	M12	M16	38.3	10^{JS9}
K4	250	180_{j6}	120	148	173	15	40.0	40^{H7}	55	□152	215	4.0	90	240	32.5	157.0	188	12	197.5	90	14	M16	M20	43.3	12^{JS9}
K5	250	180_{j6}	125	160	185	15	39.5	50^{H7}	65	□145	215	4.0	160	260	32.0	164.0	200	12	209.5	100	14	M16	M20	53.8	14^{JS9}
K6	300	230_{j6}	130	168	200	17	36.0	50^{H7}	70	∅183	265	4.0	190	310	28.5	179.0	215	12	224.5	120	14	M16	M20	53.8	14^{JS9}
K7	350	250_{h6}	145	190	226	18	44.0	60^{H7}	85	∅205	300	5.0	212	342	36.0	214.0	242	12	252.0	125	18	M20	M24	64.4	18^{JS9}
K8	400	300_{h6}	185	235	282	20	45.0	70^{H7}	100	∅184	350	5.0	265	410	36.0	263.0	300	20	311.0	145	18	M20	M24	74.9	20^{JS9}
K9	450	350_{h6}	225	285	330	23	50.0	90^{H7}	120	∅230	400	5.0	315	495	40.0	302.0	350	26	361.0	180	18	M24	M30	95.4	25^{JS9}

Dimensions of additional round flanges

Type	Øa1	Øb1	c1	Øe1	f1	Øs1
K1	140	95_{j6}	10	115	3.0	9
K2	160	110_{j6}	12	130	3.5	9
K3	160	110_{j6}	14	130	3.5	9
K3	250	180_{j6}	14	215	4.0	14
K8	350	250_{h6}	18	300	5.0	18
K8	450	350_{h6}	20	400	5.0	18

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
K_MB23	140	59	102.9	58	64	57.5
K_MB33	161	59	115.4	58	64	71.0
K_MB43	194	59	134.9	58	64	93.5

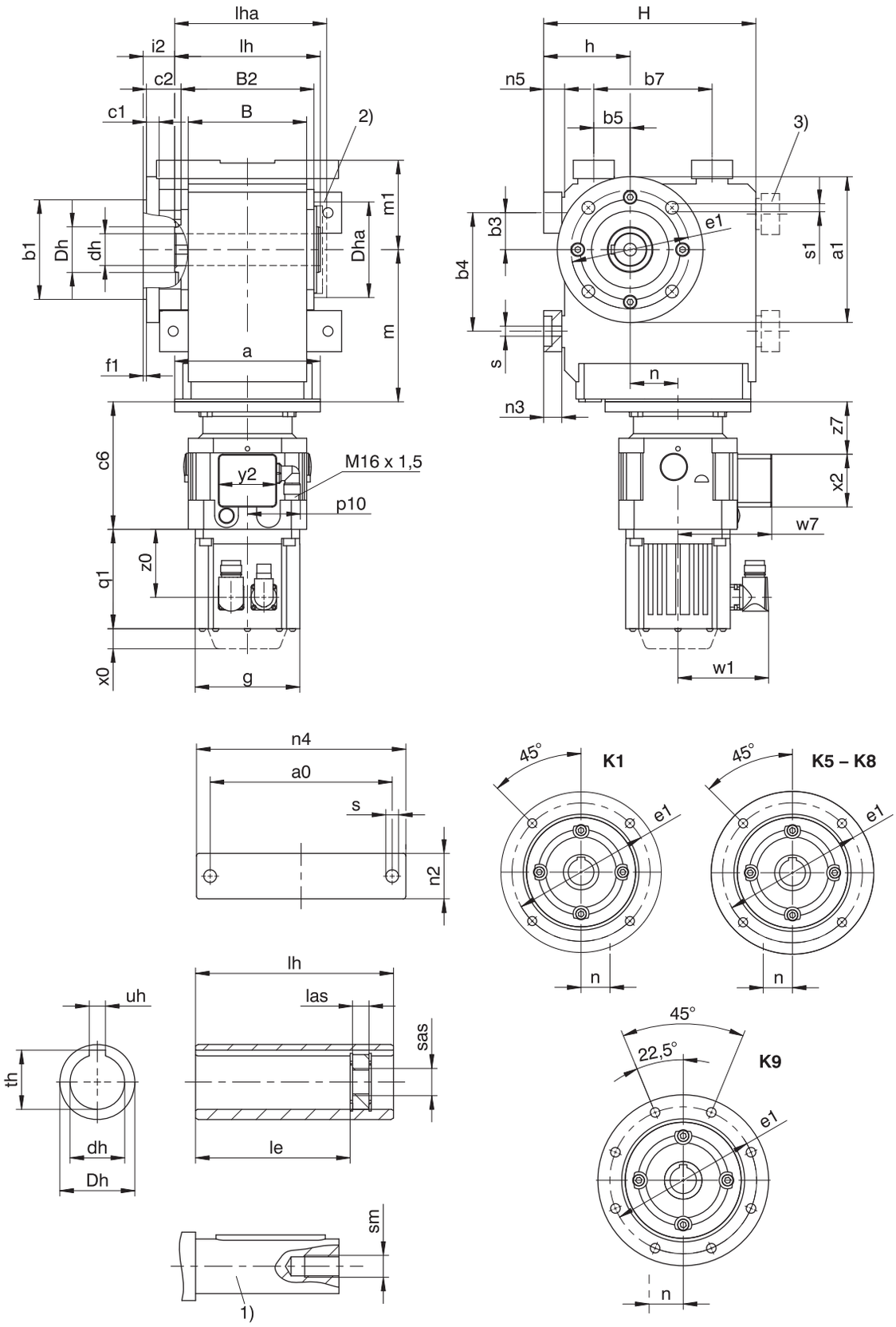
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
K102	∅160	128	36.0	∅160	128	36.0	–	–	–	–	–	–
K202	∅160	147	46.0	∅160	147	46.0	∅200	149	46.0	–	–	–
K302	∅160	167	52.5	∅160	167	52.5	∅200	169	52.5	–	–	–
K402	∅160	187	60.0	∅160	187	60.0	∅200	189	60.0	∅250	192	60.0
K513	∅160	172	15.0	∅160	172	15.0	∅200	174	15.0	∅250	177	15.0
K613	∅160	191	18.0	∅160	191	18.0	∅200	193	18.0	∅250	196	18.0
K713	–	–	–	–	–	–	∅200	221	20.0	∅250	224	20.0
K813	–	–	–	–	–	–	∅200	247	24.0	∅250	249	24.0
K913	–	–	–	–	–	–	–	–	–	∅250	294	25.0

10.3.5 A shaft design (hollow shaft), NF housing design (foot + round flange)



q1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]	1)	The length of the machine shaft must be at least 2.2 x ∅dh and the length of the feather key must be at least 2 x ∅dh.
2)	Cover (optional)	3)	Only for K1 (other sizes on request)

Dimensions of gear units

Type	a0	Øa1	Øb1	b3	b4	b5	b7	B	B2	c1	c2	Ødh	ØDh	Dha	Øe1	f1	h
K1	115	160	110_{j6}	30	90	30	90	90	106	10	32.0	20^{H7}	40	□105	130	3.5	75
K1	115	160	110_{j6}	30	90	30	90	90	106	10	32.0	25^{H7}	40	□105	130	3.5	75
K1	115	160	110_{j6}	30	90	30	90	90	106	10	32.0	30^{H7}	40	□105	130	3.5	75
K5	200	250	180_{j6}	40	140	100	140	160	185	15	39.5	50^{H7}	65	□145	215	4.0	190
K6	210	300	230_{j6}	50	160	110	160	168	200	17	36.0	50^{H7}	70	∅183	265	4.0	220
K7	241	350	250_{h6}	55	180	125	180	190	226	18	44.0	60^{H7}	85	∅205	300	5.0	250
K8	300	400	300_{h6}	75	240	165	240	235	282	20	45.0	70^{H7}	100	∅184	350	5.0	310
K9	360	450	350_{h6}	95	280	185	280	285	330	23	50.0	90^{H7}	120	∅230	400	5.0	365

Dimensions of gear units

Type	H	i2	le	lh	las	lha	m1	n2	n3	n4	n5	Øs	Øs1	sm	sas	th	uh
K1	175	25.0	98.0	120	12	127.0	75	30	13	140	15	9.0	9	M6	M8	22.8	6^{JS9}
K1	175	25.0	98.0	120	12	127.0	75	30	13	140	15	9.0	9	M10	M12	28.3	8^{JS9}
K1	175	25.0	93.5	120	12	127.0	75	30	13	140	15	9.0	9	M10	M12	32.0	8^{JS9}
K5	290	32.0	164.0	200	12	209.5	130	60	27	240	30	18.0	14	M16	M20	53.8	14^{JS9}
K6	340	28.5	179.0	215	12	224.5	150	65	27	250	30	18.5	14	M16	M20	53.8	14^{JS9}
K7	380	36.0	214.0	242	12	252.0	163	70	35	290	38	23.0	18	M20	M24	64.4	18^{JS9}
K8	455	36.0	263.0	300	20	311.0	190	85	41	360	45	27.0	18	M20	M24	74.9	20^{JS9}
K9	545	40.0	302.0	350	26	361.0	230	95	46	430	50	31.0	18	M24	M30	95.4	25^{JS9}

Dimensions of additional round flanges

Type	Øa1	Øb1	c1	Øe1	f1	Øs1
K1	140	95_{j6}	10	115	3	9
K8	350	250_{h6}	18	300	5	18
K8	450	350_{h6}	20	400	5	18

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
K_MB23	140	59	102.9	58	64	57.5
K_MB33	161	59	115.4	58	64	71.0
K_MB43	194	59	134.9	58	64	93.5

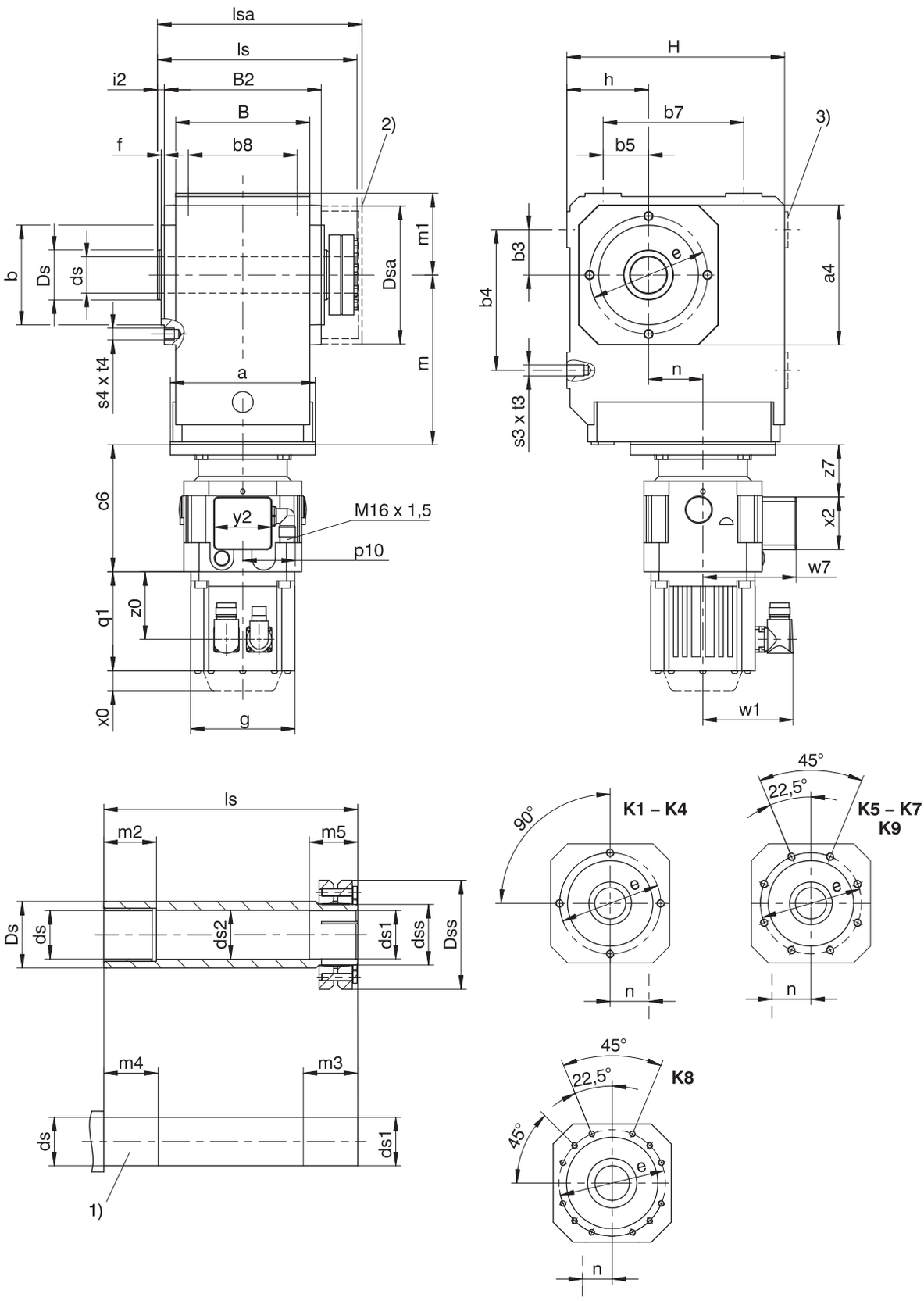
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
K102	∅160	128	36.0	∅160	128	36.0	–	–	–	–	–	–
K513	∅160	172	15.0	∅160	172	15.0	∅200	174	15.0	∅250	177	15.0
K613	∅160	191	18.0	∅160	191	18.0	∅200	193	18.0	∅250	196	18.0
K713	–	–	–	–	–	–	∅200	221	20.0	∅250	224	20.0
K813	–	–	–	–	–	–	∅200	247	24.0	∅250	249	24.0
K913	–	–	–	–	–	–	–	–	–	∅250	294	25.0

10.3.6 S shaft design (hollow shaft with shrink ring), G housing design (pitch circle diameter)



q1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]	1)	Machine shaft: The dimension ls must meet or exceed the specified value.
2)	Cover (optional)	3)	Only for K1 (other sizes on request)

Dimensions of gear units

Type	□a4	Øb	b3	b4	b5	b7	b8	B	B2	Ød	Ød1	Ød2	Ødss	ØDs	ØDsa	ØDss	Øe	f	h	H	i2	ls	lsa	m1	m2	m3	m4	m5	s3	s4	t3	t4
K1	105	75_{j6}	30	90	30	90	70	90	106	25_{h9}	25_{h9}^{H7}	25.5	30	40	80.0	60	90	3.0	60	160	7.0	149	163	60	20	34	25	29	M8	M8	13	13
K2	116	82_{j6}	35	115	35	115	90	115	134	30_{h9}	30_{h9}^{H7}	30.5	36	45	88.0	72	100	3.0	65	190	7.0	178	193	65	25	39	30	34	M10	M8	16	13
K3	132	95_{j6}	40	130	40	130	105	130	146	35_{h9}	35_{h9}^{H7}	35.5	44	50	101.0	80	115	3.0	75	213	7.0	190	206	75	30	39	35	34	M10	M8	16	13
K4	152	110_{j6}	50	155	50	155	120	148	173	40_{h9}	40_{h9}^{H7}	40.5	50	55	114.0	88	130	3.5	90	240	7.5	220	243	90	40	39	45	34	M12	M10	19	16
K5	145	110_{j6}	40	140	100	140	125	160	185	50_{h9}	50_{h9}^{H7}	50.5	62	65	116.0	106	130	3.5	160	260	7.5	237	254	100	40	44	45	39	M16	M10	26	16
K6	180	140_{j6}	50	160	110	160	130	168	200	50_{h9}	50_{h9}^{H7}	50.5	62	70	128.0	106	165	3.5	190	310	7.5	254	276	120	40	45	45	40	M16	M10	26	16
K7	195	155_{h6}	55	180	125	180	145	190	226	60_{h6}	60_{h6}^{H7}	62.0	75	85	161.5	138	185	3.5	212	342	8.0	278	314	125	40	45	45	40	M20	M12	33	19
K8	226	185_{h6}	75	240	165	240	185	235	282	70_{h6}	70_{h6}^{H7}	72.0	90	100	193.0	155	215	4.0	265	410	9.0	352	378	145	50	60	60	50	M24	M12	38	19
K9	280	230_{h6}	95	280	185	280	225	285	330	90_{h6}	90_{h6}^{H7}	92.0	120	120	244.0	200	265	5.0	315	495	10.0	418	428	180	60	70	70	60	M30	M16	48	26

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
K_MB23	140	59	102.9	58	64	57.5
K_MB33	161	59	115.4	58	64	71.0
K_MB43	194	59	134.9	58	64	93.5

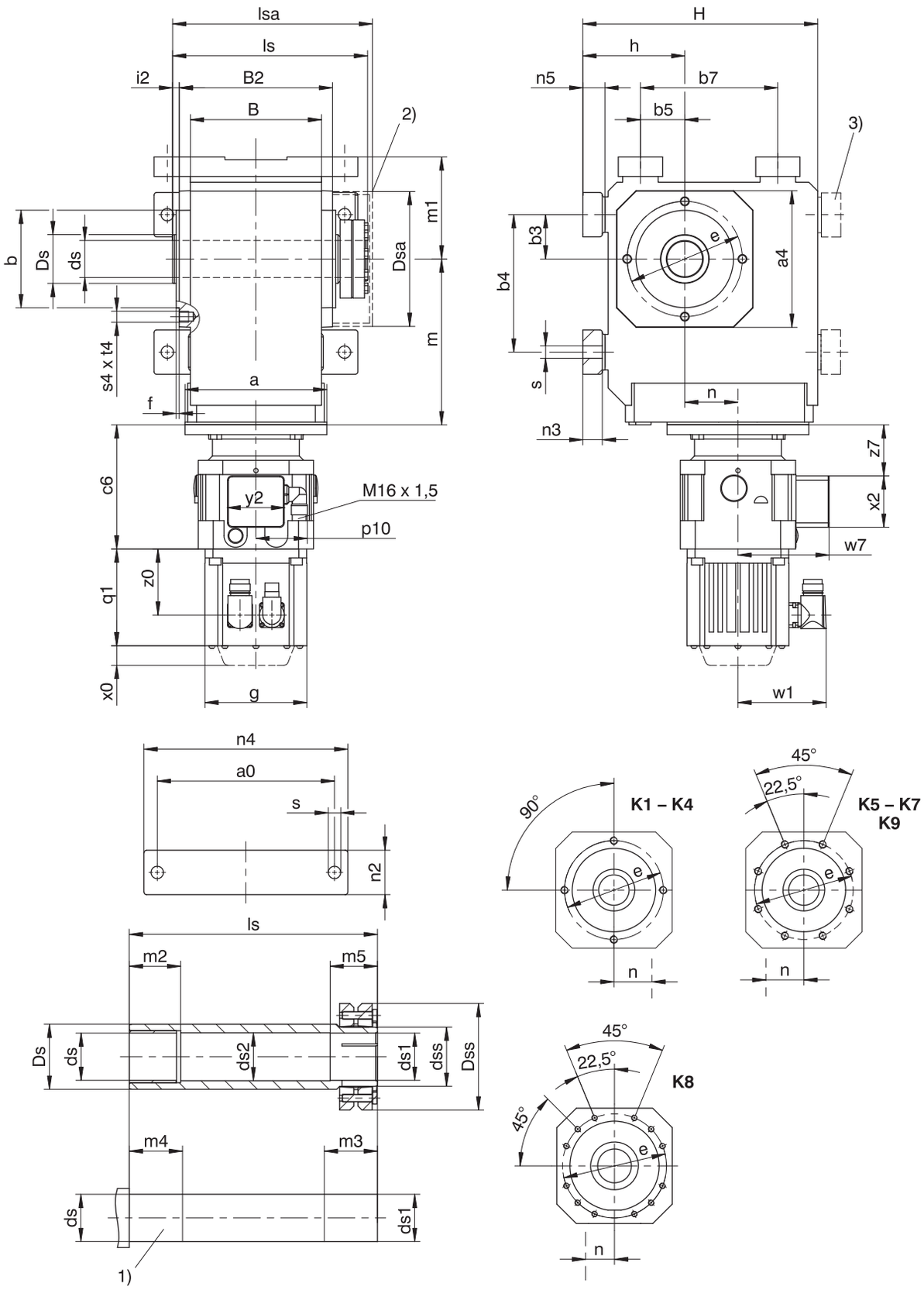
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
K102	∅160	128	36.0	∅160	128	36.0	–	–	–	–	–	–
K202	∅160	147	46.0	∅160	147	46.0	∅200	149	46.0	–	–	–
K302	∅160	167	52.5	∅160	167	52.5	∅200	169	52.5	–	–	–
K402	∅160	187	60.0	∅160	187	60.0	∅200	189	60.0	∅250	192	60.0
K513	∅160	172	15.0	∅160	172	15.0	∅200	174	15.0	∅250	177	15.0
K613	∅160	191	18.0	∅160	191	18.0	∅200	193	18.0	∅250	196	18.0
K713	–	–	–	–	–	–	∅200	221	20.0	∅250	224	20.0
K813	–	–	–	–	–	–	∅200	247	24.0	∅250	249	24.0
K913	–	–	–	–	–	–	–	–	–	∅250	294	25.0

10.3.7 S shaft design (hollow shaft with shrink ring), NG housing design (foot + pitch circle diameter)



q1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]	1)	Machine shaft: The dimension ls must meet or exceed the specified value.
2)	Cover (optional)	3)	Only for K1 (other sizes on request)

Dimensions of gear units

Type	a0	a4	Øb	b3	b4	b5	b7	B	B2	Ød$_{s}$	Ød$_{s1}$	Ød$_{s2}$	Ød$_{ss}$	ØD$_{s}$	ØD$_{sa}$
K1	115	105	75_{j6}	30	90	30	90	90	106	25_{h9}	25_{h9}^{H7}	25.5	30	40	80.0
K2	155	116	82_{j6}	35	115	35	115	115	134	30_{h9}	30_{h9}^{H7}	30.5	36	45	88.0
K3	170	132	95_{j6}	40	130	40	130	130	146	35_{h9}	35_{h9}^{H7}	35.5	44	50	101.0
K4	200	152	110_{j6}	50	155	50	155	148	173	40_{h9}	40_{h9}^{H7}	40.5	50	55	114.0
K5	200	145	110_{j6}	40	140	100	140	160	185	50_{h9}	50_{h9}^{H7}	50.5	62	65	116.0
K6	210	180	140_{j6}	50	160	110	160	168	200	50_{h9}	50_{h9}^{H7}	50.5	62	70	128.0
K7	241	195	155_{j6}	55	180	125	180	190	226	60_{h6}	60_{h6}^{H7}	62.0	75	85	161.5
K8	300	226	185_{j6}	75	240	165	240	235	282	70_{h6}	70_{h6}^{H7}	72.0	90	100	193.0
K9	360	280	230_{j6}	95	280	185	280	285	330	90_{h6}	90_{h6}^{H7}	92.0	120	120	244.0

Dimensions of gear units

Type	ØDss	Øe	f	h	H	i2	ls	lsa	m1	m2	m3	m4	m5	n2	n3	n4	n5	Øs	s4	t4
K1	60	90	3.0	75	175	7.0	149	163	75	20	34	25	29	30	13	140	15	9.0	M8	13
K2	72	100	3.0	88	213	7.0	178	193	88	25	39	30	34	40	20	185	23	11.0	M8	13
K3	80	115	3.0	98	236	7.0	190	206	98	30	39	35	34	45	20	200	23	11.0	M8	13
K4	88	130	3.5	115	265	7.5	220	243	115	40	39	45	34	50	22	230	25	14.0	M10	16
K5	106	130	3.5	190	290	7.5	237	254	130	40	44	45	39	60	27	240	30	18.0	M10	16
K6	106	165	3.5	220	340	7.5	254	276	150	40	45	45	40	65	27	250	30	18.5	M10	16
K7	138	185	3.5	250	380	8.0	278	314	163	40	45	45	40	70	35	290	38	23.0	M12	19
K8	155	215	4.0	310	455	9.0	352	378	190	50	60	60	50	85	41	360	45	27.0	M12	19
K9	200	265	5.0	365	545	10.0	418	428	230	60	70	70	60	95	46	430	50	31.0	M16	26

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
K_MB23	140	59	102.9	58	64	57.5
K_MB33	161	59	115.4	58	64	71.0
K_MB43	194	59	134.9	58	64	93.5

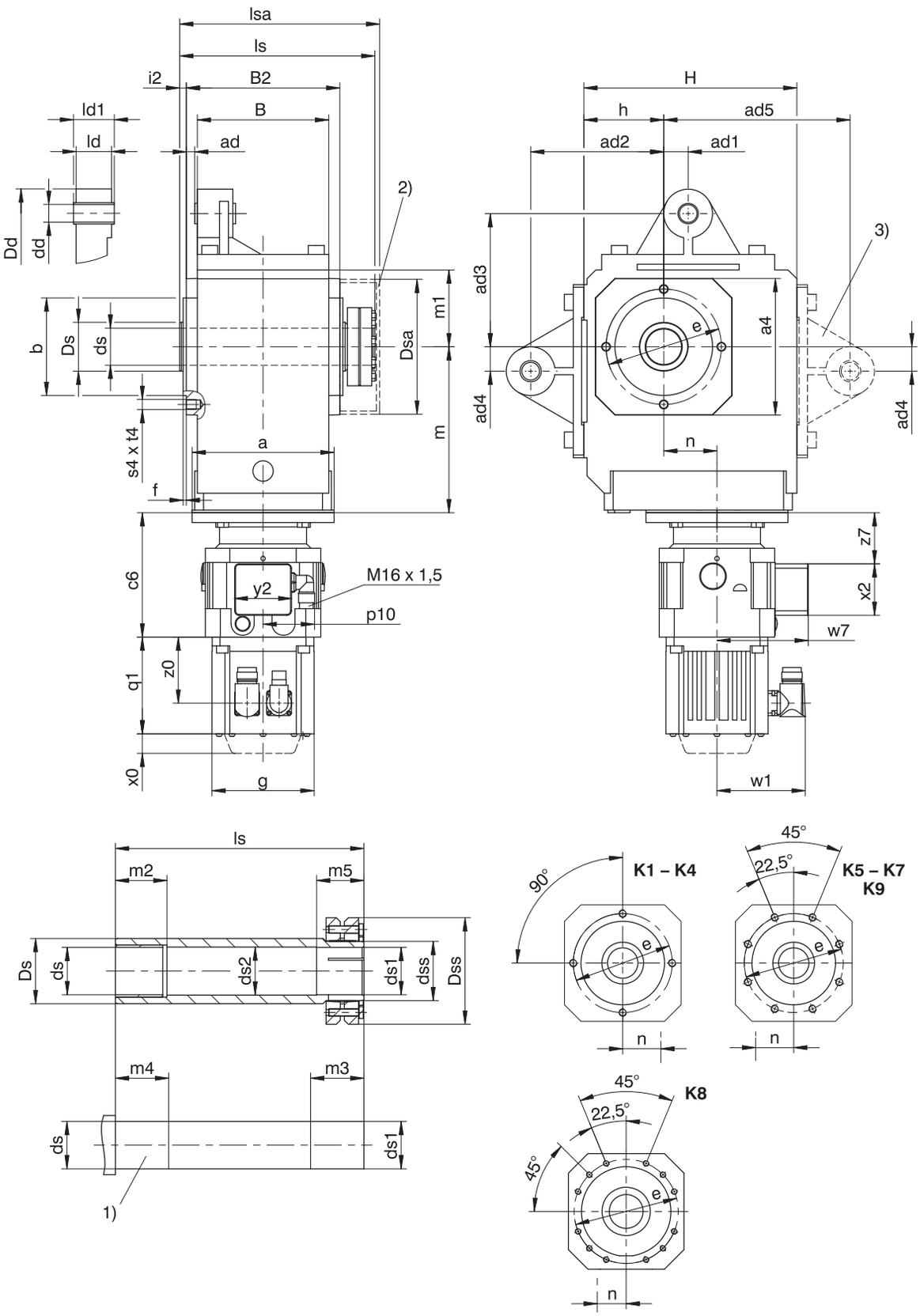
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
K102	∅160	128	36.0	∅160	128	36.0	–	–	–	–	–	–
K202	∅160	147	46.0	∅160	147	46.0	∅200	149	46.0	–	–	–
K302	∅160	167	52.5	∅160	167	52.5	∅200	169	52.5	–	–	–
K402	∅160	187	60.0	∅160	187	60.0	∅200	189	60.0	∅250	192	60.0
K513	∅160	172	15.0	∅160	172	15.0	∅200	174	15.0	∅250	177	15.0
K613	∅160	191	18.0	∅160	191	18.0	∅200	193	18.0	∅250	196	18.0
K713	–	–	–	–	–	–	∅200	221	20.0	∅250	224	20.0
K813	–	–	–	–	–	–	∅200	247	24.0	∅250	249	24.0
K913	–	–	–	–	–	–	–	–	–	∅250	294	25.0

10.3.8 S shaft design (hollow shaft with shrink ring), GD housing design (pitch circle diameter + torque arm bracket)



q1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]	1)	Machine shaft: The dimension ls must meet or exceed the specified value.
2)	Cover (optional)	3)	Only for K1 (other sizes on request)
–	If you brace the gear units without the torque arm brackets provided by the manufacturer for this purpose, the dimensions for ad2 and ad3 must meet the specified value.		

Dimensions of gear units

Type	□a4	ad	ad1	ad2	ad3	ad4	ad5	Øb	B	B2	Ødd	Øds	Øds1	Øds2	Ødss	ØDd	ØDs	ØDsa
K1	105	6.0	15.0	90	90	15.0	130	75_{j6}	90	106	12^{H9}	25_{h9}	$25_{h9}{}^{H7}$	25.5	30	43	40	80
K2	116	6.5	22.5	100	100	22.5	–	82_{j6}	115	134	16^{H9}	30_{h9}	$30_{h9}{}^{H7}$	30.5	36	45	45	88
K3	132	5.0	25.0	120	120	25.0	–	95_{j6}	130	146	16^{H9}	35_{h9}	$35_{h9}{}^{H7}$	35.5	44	45	50	101
K4	152	9.5	27.5	150	150	27.5	–	110_{j6}	148	173	20^{H9}	40_{h9}	$40_{h9}{}^{H7}$	40.5	50	55	55	114
K5	145	9.5	30.0	250	190	30.0	–	110_{j6}	160	185	20^{H9}	50_{h9}	$50_{h9}{}^{H7}$	50.5	62	58	65	116
K6	180	13.0	30.0	250	180	30.0	–	140_{j6}	168	200	20^{H9}	50_{h9}	$50_{h9}{}^{H7}$	50.5	62	58	70	128
K7	195	15.0	35.0	300	213	35.0	–	155_{h6}	190	226	20^{H9}	60_{h6}	$60_{h6}{}^{H7}$	62.0	75	68	85	161.5
K8	226	17.0	45.0	350	230	45.0	–	185_{h6}	235	282	24^{H9}	70_{h6}	$70_{h6}{}^{H7}$	72.0	90	72	100	193
K9	280	16.0	45.0	450	315	45.0	–	230_{h6}	285	330	24^{H9}	90_{h6}	$90_{h6}{}^{H7}$	92.0	120	75	120	244

Dimensions of gear units

Type	ØDss	Øe	f	h	H	i2	ld	ld1	ls	lsa	m1	m2	m3	m4	m5	s4	t4
K1	60	90	3.0	60	160	7.0	24	28	149	163	60	20	34	25	29	M8	13
K2	72	100	3.0	65	190	7.0	32	38	178	193	65	25	39	30	34	M8	13
K3	80	115	3.0	75	213	7.0	32	38	190	206	75	30	39	35	34	M8	13
K4	88	130	3.5	90	240	7.5	40	46	220	243	90	40	39	45	34	M10	16
K5	106	130	3.5	160	260	7.5	40	46	237	254	100	40	44	45	39	M10	16
K6	106	165	3.5	190	310	7.5	40	46	254	276	120	40	45	45	40	M10	16
K7	138	185	3.5	212	342	8.0	64	70	278	314	125	40	45	45	40	M12	19
K8	155	215	4.0	265	410	9.0	102	115	352	378	145	50	60	60	50	M12	19
K9	200	265	5.0	315	495	10.0	102	115	418	428	180	60	70	70	60	M16	26

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
K_MB23	140	59	102.9	58	64	57.5
K_MB33	161	59	115.4	58	64	71.0
K_MB43	194	59	134.9	58	64	93.5

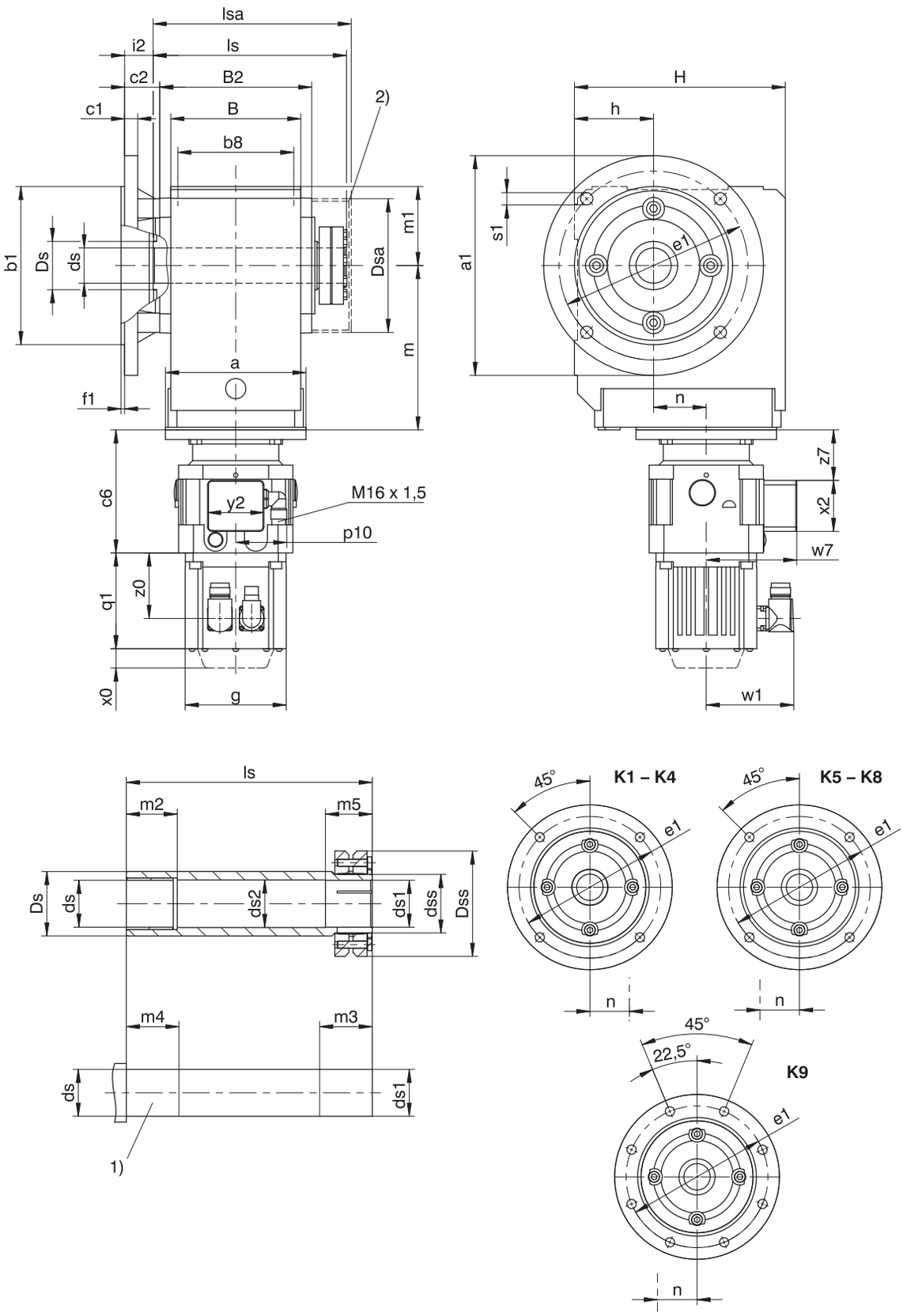
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
K102	∅160	128	36.0	∅160	128	36.0	–	–	–	–	–	–
K202	∅160	147	46.0	∅160	147	46.0	∅200	149	46.0	–	–	–
K302	∅160	167	52.5	∅160	167	52.5	∅200	169	52.5	–	–	–
K402	∅160	187	60.0	∅160	187	60.0	∅200	189	60.0	∅250	192	60.0
K513	∅160	172	15.0	∅160	172	15.0	∅200	174	15.0	∅250	177	15.0
K613	∅160	191	18.0	∅160	191	18.0	∅200	193	18.0	∅250	196	18.0
K713	–	–	–	–	–	–	∅200	221	20.0	∅250	224	20.0
K813	–	–	–	–	–	–	∅200	247	24.0	∅250	249	24.0
K913	–	–	–	–	–	–	–	–	–	∅250	294	25.0

10.3.9 S shaft design (hollow shaft with shrink ring), F housing design (round flange)



q1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]	1)	Machine shaft: The dimension ls must meet or exceed the specified value.
2)	Cover (optional)		

Dimensions of gear units

Type	Øa1	Øb1	b8	B	B2	c1	c2	Øds	Øds1	Øds2	Ødss	ØDs	ØDsa	ØDss	Øe1	f1	h	H	i2	ls	lsa	m1	m2	m3	m4	m5	Øs1
K1	160	110_{j6}	70	90	106	10	32.0	25_{h9}	25_{h9}^{H7}	25.5	30	40	80.0	60	130	3.5	60	160	25.0	149	163	60	20	34	25	29	9
K2	200	130_{j6}	90	115	134	12	32.0	30_{h9}	30_{h9}^{H7}	30.5	36	45	88.0	72	165	3.5	65	190	25.0	178	193	65	25	39	30	34	11
K3	200	130_{j6}	105	130	146	14	38.0	35_{h9}	35_{h9}^{H7}	35.5	44	50	101.0	80	165	3.5	75	213	31.0	190	206	75	30	39	35	34	11
K4	250	180_{j6}	120	148	173	15	40.0	40_{h9}	40_{h9}^{H7}	40.5	50	55	114.0	88	215	4.0	90	240	32.5	220	243	90	40	39	45	34	14
K5	250	180_{j6}	125	160	185	15	39.5	50_{h9}	50_{h9}^{H7}	50.5	62	65	116.0	106	215	4.0	160	260	32.0	237	254	100	40	44	45	39	14
K6	300	230_{j6}	130	168	200	17	36.0	50_{h9}	50_{h9}^{H7}	50.5	62	70	128.0	106	265	4.0	190	310	28.5	254	276	120	40	45	45	40	14
K7	350	250_{h6}	145	190	226	18	44.0	60_{h6}	60_{h6}^{H7}	62.0	75	85	161.5	138	300	5.0	212	342	36.0	278	314	125	40	45	45	40	18
K8	400	300_{h6}	185	235	282	20	45.0	70_{h6}	70_{h6}^{H7}	72.0	90	100	193.0	155	350	5.0	265	410	36.0	352	378	145	50	60	60	50	18
K9	450	350_{h6}	225	285	330	23	50.0	90_{h6}	90_{h6}^{H7}	92.0	120	120	244.0	200	400	5.0	315	495	40.0	418	428	180	60	70	70	60	18

Dimensions of additional round flanges

Type	Øa1	Øb1	c1	Øe1	f1	Øs1
K1	140	95_{j6}	10	115	3.0	9
K2	160	110_{j6}	12	130	3.5	9
K3	160	110_{j6}	14	130	3.5	9
K3	250	180_{j6}	14	215	4.0	14
K8	350	250_{h6}	18	300	5.0	18
K8	450	350_{h6}	20	400	5.0	18

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
K_MB23	140	59	102.9	58	64	57.5
K_MB33	161	59	115.4	58	64	71.0
K_MB43	194	59	134.9	58	64	93.5

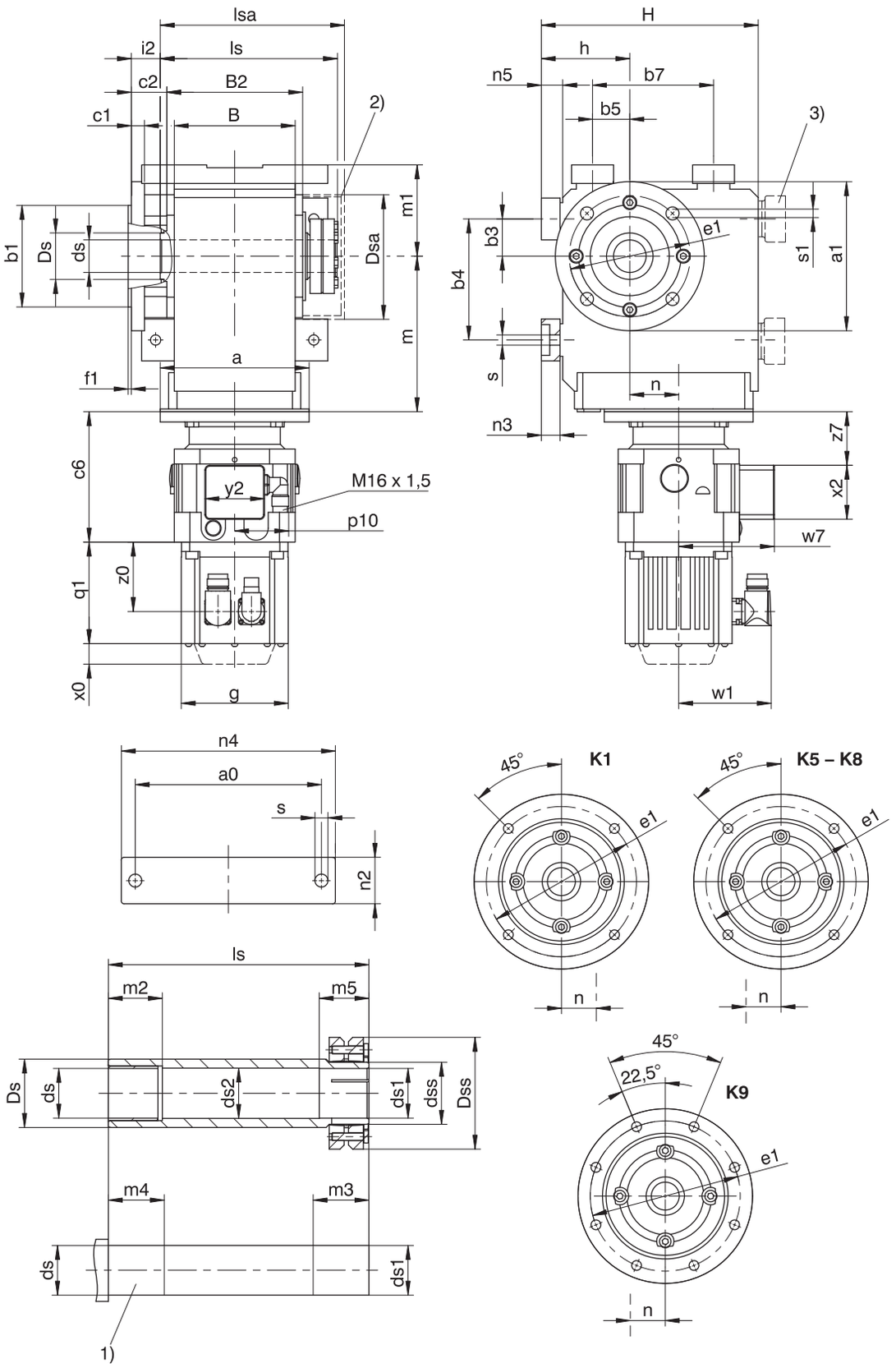
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
K102	∅160	128	36.0	∅160	128	36.0	–	–	–	–	–	–
K202	∅160	147	46.0	∅160	147	46.0	∅200	149	46.0	–	–	–
K302	∅160	167	52.5	∅160	167	52.5	∅200	169	52.5	–	–	–
K402	∅160	187	60.0	∅160	187	60.0	∅200	189	60.0	∅250	192	60.0
K513	∅160	172	15.0	∅160	172	15.0	∅200	174	15.0	∅250	177	15.0
K613	∅160	191	18.0	∅160	191	18.0	∅200	193	18.0	∅250	196	18.0
K713	–	–	–	–	–	–	∅200	221	20.0	∅250	224	20.0
K813	–	–	–	–	–	–	∅200	247	24.0	∅250	249	24.0
K913	–	–	–	–	–	–	–	–	–	∅250	294	25.0

10.3.10 S shaft design (hollow shaft with shrink ring), NF housing design (foot + round flange)



q1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]	1)	Machine shaft: The dimension ls must meet or exceed the specified value.
2)	Cover (optional)	3)	Only for K1 (other sizes on request)

Dimensions of gear units

Type	a0	Øa1	Øb1	b3	b4	b5	b7	B	B2	c1	Ød$_{s}$	Ød$_{s1}$	Ød$_{s2}$	Ød$_{ss}$	ØD$_{s}$	ØD$_{sa}$	ØD$_{ss}$
K1	115	160	110$_{j6}$	30	90	30	90	90	106	10	25$_{h9}$	25$_{h9}^{H7}$	25.5	30	40	80.0	60
K5	200	250	180$_{j6}$	40	140	100	140	160	185	15	50$_{h9}$	50$_{h9}^{H7}$	50.5	62	65	116.0	106
K6	210	300	230$_{j6}$	50	160	110	160	168	200	17	50$_{h9}$	50$_{h9}^{H7}$	50.5	62	70	128.0	106
K7	241	350	250$_{h6}$	55	180	125	180	190	226	18	60$_{h6}$	60$_{h6}^{H7}$	62.0	75	85	161.5	138
K8	300	400	300$_{h6}$	75	240	165	240	235	282	20	70$_{h6}$	70$_{h6}^{H7}$	72.0	90	100	193.0	155
K9	360	450	350$_{h6}$	95	280	185	280	285	330	23	90$_{h6}$	90$_{h6}^{H7}$	92.0	120	120	244.0	200

Dimensions of gear units

Type	Øe1	f1	h	H	i2	ls	lsa	m1	m2	m3	m4	m5	n2	n3	n4	n5	Ø$_{s}$	Ø$_{s1}$
K1	130	3.5	75	175	25.0	149	163	75	20	34	25	29	30	13	140	15	9.0	9
K5	215	4.0	190	290	32.0	237	254	130	40	44	45	39	60	27	240	30	18.0	14
K6	265	4.0	220	340	28.5	254	276	150	40	45	45	40	65	27	250	30	18.5	14
K7	300	5.0	250	380	36.0	278	314	163	40	45	45	40	70	35	290	38	23.0	18
K8	350	5.0	310	455	36.0	352	378	190	50	60	60	50	85	41	360	45	27.0	18
K9	400	5.0	365	545	40.0	418	428	230	60	70	70	60	95	46	430	50	31.0	18

Dimensions of additional round flanges

Type	Øa1	Øb1	c1	Øe1	f1	Ø$_{s1}$
K1	140	95$_{j6}$	10	115	3	9
K8	350	250$_{h6}$	18	300	5	18
K8	450	350$_{h6}$	20	400	5	18

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
K_MB23	140	59	102.9	58	64	57.5
K_MB33	161	59	115.4	58	64	71.0
K_MB43	194	59	134.9	58	64	93.5

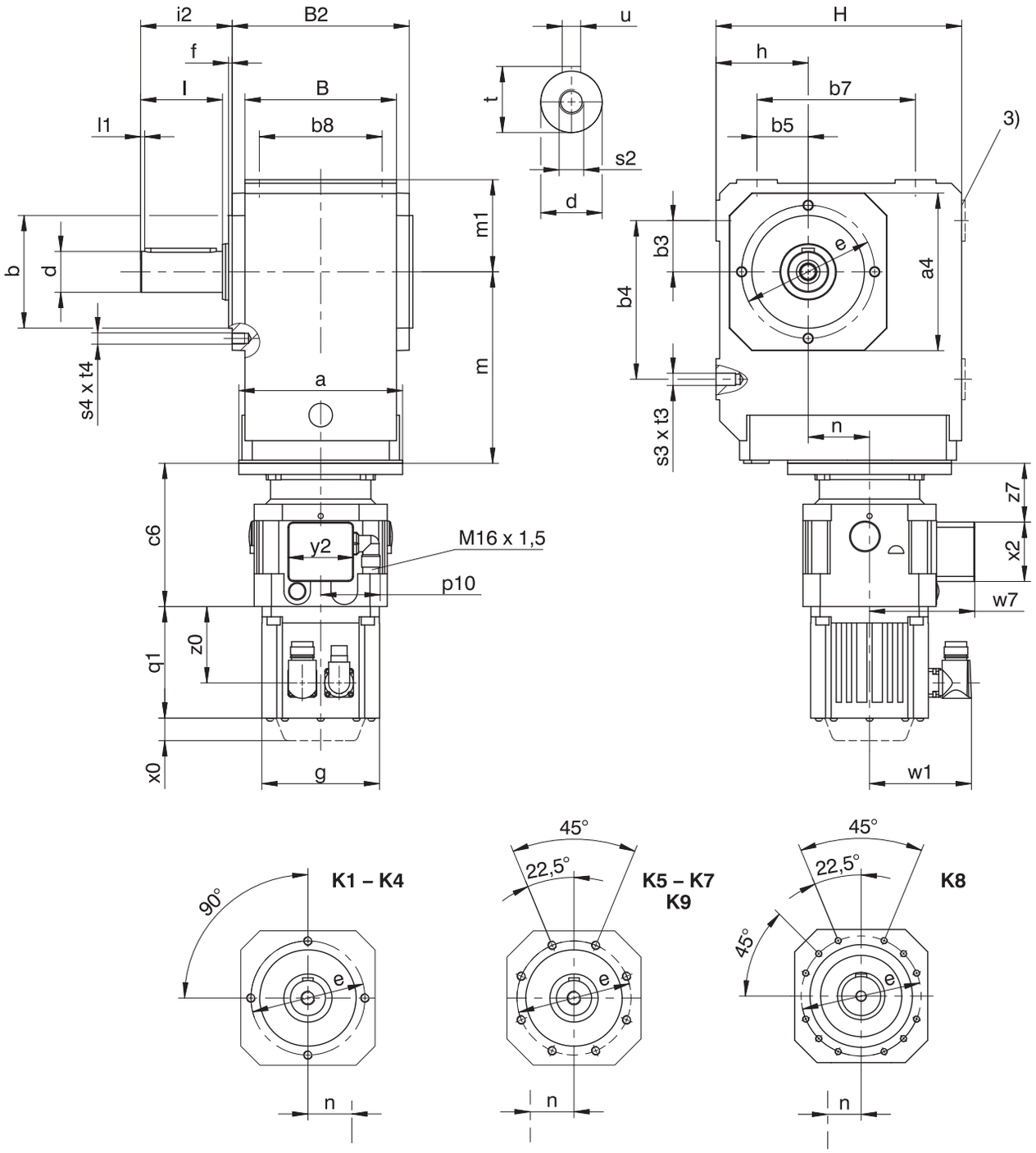
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
K102	∅160	128	36.0	∅160	128	36.0	–	–	–	–	–	–
K513	∅160	172	15.0	∅160	172	15.0	∅200	174	15.0	∅250	177	15.0
K613	∅160	191	18.0	∅160	191	18.0	∅200	193	18.0	∅250	196	18.0
K713	–	–	–	–	–	–	∅200	221	20.0	∅250	224	20.0
K813	–	–	–	–	–	–	∅200	247	24.0	∅250	249	24.0
K913	–	–	–	–	–	–	–	–	–	∅250	294	25.0

10.3.11 V shaft design (solid shaft), G housing design (pitch circle diameter)



q1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▷ 11.4]	3)	Only for K1 (other sizes on request)
–	K1 – K4: Solid shaft without feather key available, on request starting at K5.	–	K1 – K9: Solid shaft on both sides available.

Dimensions of gear units

Type	□a4	Øb_{j6}	b3	b4	b5	b7	b8	B	B2	Ød_{k6}	Øe_{m6}	f	h	H	i2	l	l1	m1	s2	s3	s4	t	t3	t4	u
K1	105	75_{j6}	30	90	30	90	70	90	106	25_{k6}	90	3.0	60	160	62.0	50	4	60	M10	M8	M8	28.0	13	13	A8×7×40
K2	116	82_{j6}	35	115	35	115	90	115	134	30_{k6}	100	3.0	65	190	68.0	60	4	65	M10	M10	M8	33.0	16	13	A8×7×50
K3	132	95_{j6}	40	130	40	130	105	130	146	30_{k6}	115	3.0	75	213	69.0	60	4	75	M10	M10	M8	33.0	16	13	A8×7×50
K4	152	110_{j6}	50	155	50	155	120	148	173	40_{k6}	130	3.5	90	240	89.5	80	4	90	M16	M12	M10	43.0	19	16	A12×8×70
K5	145	110_{j6}	40	140	100	140	125	160	185	45_{k6}	130	3.5	160	260	129.5	90	4	100	M16	M16	M10	48.5	26	16	A14×9×80
K6	180	140_{j6}	50	160	110	160	130	168	200	50_{k6}	165	3.5	190	310	136.0	100	4	120	M16	M16	M10	53.5	26	16	A14×9×90
K7	195	155_{j6}	55	180	125	180	145	190	226	60_{m6}	185	3.5	212	342	164.0	120	4	125	M20	M20	M12	64.0	33	19	A18×11×110
K8	226	185_{j6}	75	240	165	240	185	235	282	70_{m6}	215	4.0	265	410	185.0	140	5	145	M20	M24	M12	74.5	38	19	A20×12×125
K9	280	230_{j6}	95	280	185	280	225	285	330	90_{m6}	265	5.0	315	495	220.0	170	8	180	M24	M30	M16	95.0	48	26	A25×14×140

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
K_MB23	140	59	102.9	58	64	57.5
K_MB33	161	59	115.4	58	64	71.0
K_MB43	194	59	134.9	58	64	93.5

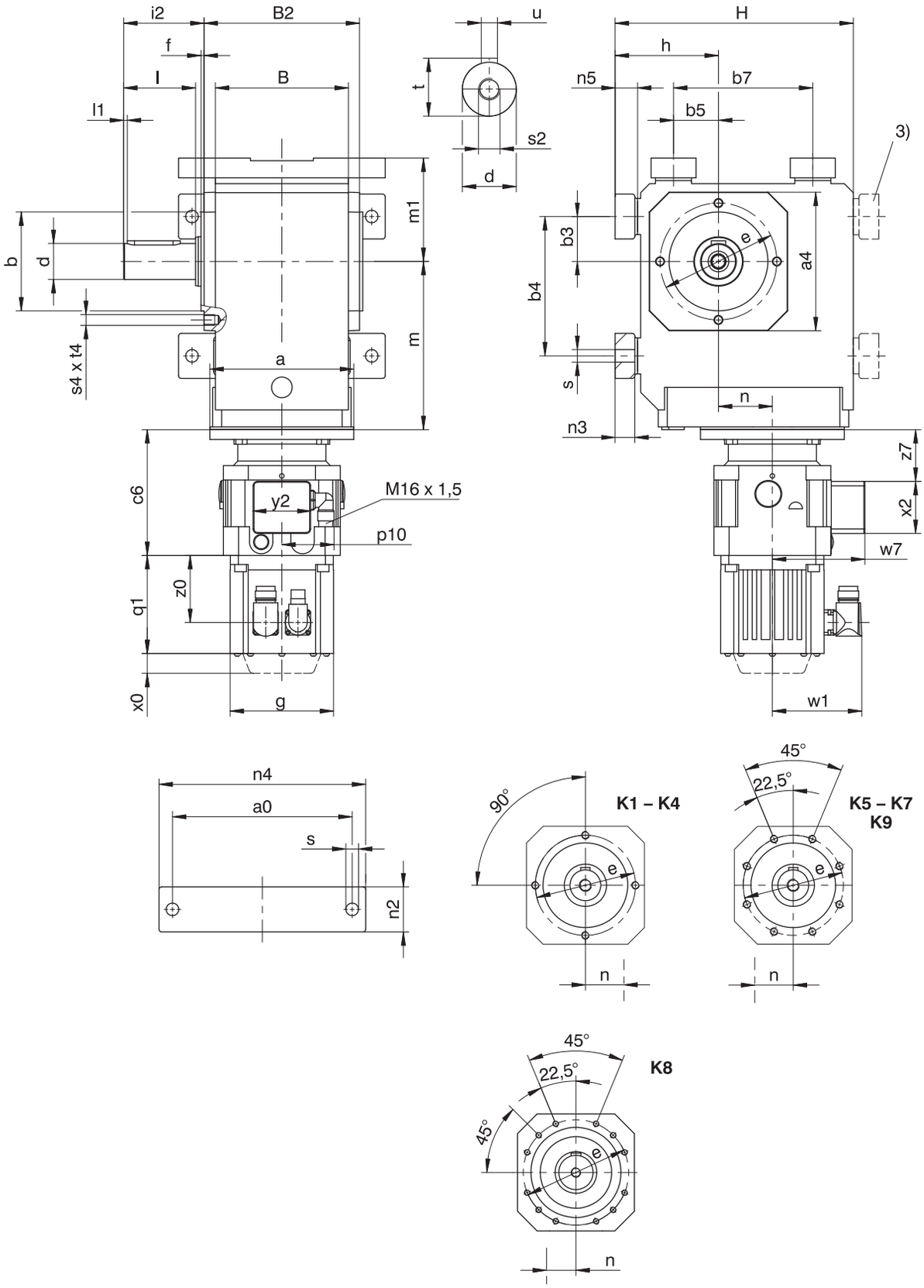
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
K102	∅160	128	36.0	∅160	128	36.0	–	–	–	–	–	–
K202	∅160	147	46.0	∅160	147	46.0	∅200	149	46.0	–	–	–
K302	∅160	167	52.5	∅160	167	52.5	∅200	169	52.5	–	–	–
K402	∅160	187	60.0	∅160	187	60.0	∅200	189	60.0	∅250	192	60.0
K513	∅160	172	15.0	∅160	172	15.0	∅200	174	15.0	∅250	177	15.0
K613	∅160	191	18.0	∅160	191	18.0	∅200	193	18.0	∅250	196	18.0
K713	–	–	–	–	–	–	∅200	221	20.0	∅250	224	20.0
K813	–	–	–	–	–	–	∅200	247	24.0	∅250	249	24.0
K913	–	–	–	–	–	–	–	–	–	∅250	294	25.0

10.3.12 V shaft design (solid shaft), NG housing design (foot + pitch circle diameter)



q1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]	3)	Only for K1 (other sizes on request)
–	K1 – K4: Solid shaft without feather key available, on request starting at K5.	–	K1 – K10: Solid shaft on both sides available.

Dimensions of gear units

Type	a0	□a4	Ød$_{j6}$	b3	b4	b5	b7	B	B2	Ød$_{k6}$	Øe	f	h	H	i2	l	l1	m1	n2	n3	n4	n5	Øs	s2	s4	t	t4	u
K1	115	105	75$_{j6}$	30	90	30	90	90	106	25$_{k6}$	90	3.0	75	175	62.0	50	4	75	30	13	140	15	9.0	M10	M8	28.0	13	A8×7×40
K2	155	116	82$_{j6}$	35	115	35	115	115	134	30$_{k6}$	100	3.0	88	213	68.0	60	4	88	40	20	185	23	11.0	M10	M8	33.0	13	A8×7×50
K3	170	132	95$_{j6}$	40	130	40	130	130	146	30$_{k6}$	115	3.0	98	236	69.0	60	4	98	45	20	200	23	11.0	M10	M8	33.0	13	A8×7×50
K4	200	152	110$_{j6}$	50	155	50	155	148	173	40$_{k6}$	130	3.5	115	265	89.5	80	4	115	50	22	230	25	14.0	M16	M10	43.0	16	A12×8×70
K5	200	145	110$_{j6}$	40	140	100	140	160	185	45$_{k6}$	130	3.5	190	290	129.5	90	4	130	60	27	240	30	18.0	M16	M10	48.5	16	A14×9×80
K6	210	180	140$_{j6}$	50	160	110	160	168	200	50$_{k6}$	165	3.5	220	340	136.0	100	4	150	65	27	250	30	18.5	M16	M10	53.5	16	A14×9×90
K7	241	195	155$_{j6}$	55	180	125	180	190	226	60$_{m6}$	185	3.5	250	380	164.0	120	4	163	70	35	290	38	23.0	M20	M12	64.0	19	A18×11×110
K8	300	226	185$_{j6}$	75	240	165	240	235	282	70$_{m6}$	215	4.0	310	455	185.0	140	5	190	85	41	360	45	27.0	M20	M12	74.5	19	A20×12×125
K9	360	280	230$_{j6}$	95	280	185	280	285	330	90$_{m6}$	265	5.0	365	545	220.0	170	8	230	95	46	430	50	31.0	M24	M16	95.0	26	A25×14×140

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
K_MB23	140	59	102.9	58	64	57.5
K_MB33	161	59	115.4	58	64	71.0
K_MB43	194	59	134.9	58	64	93.5

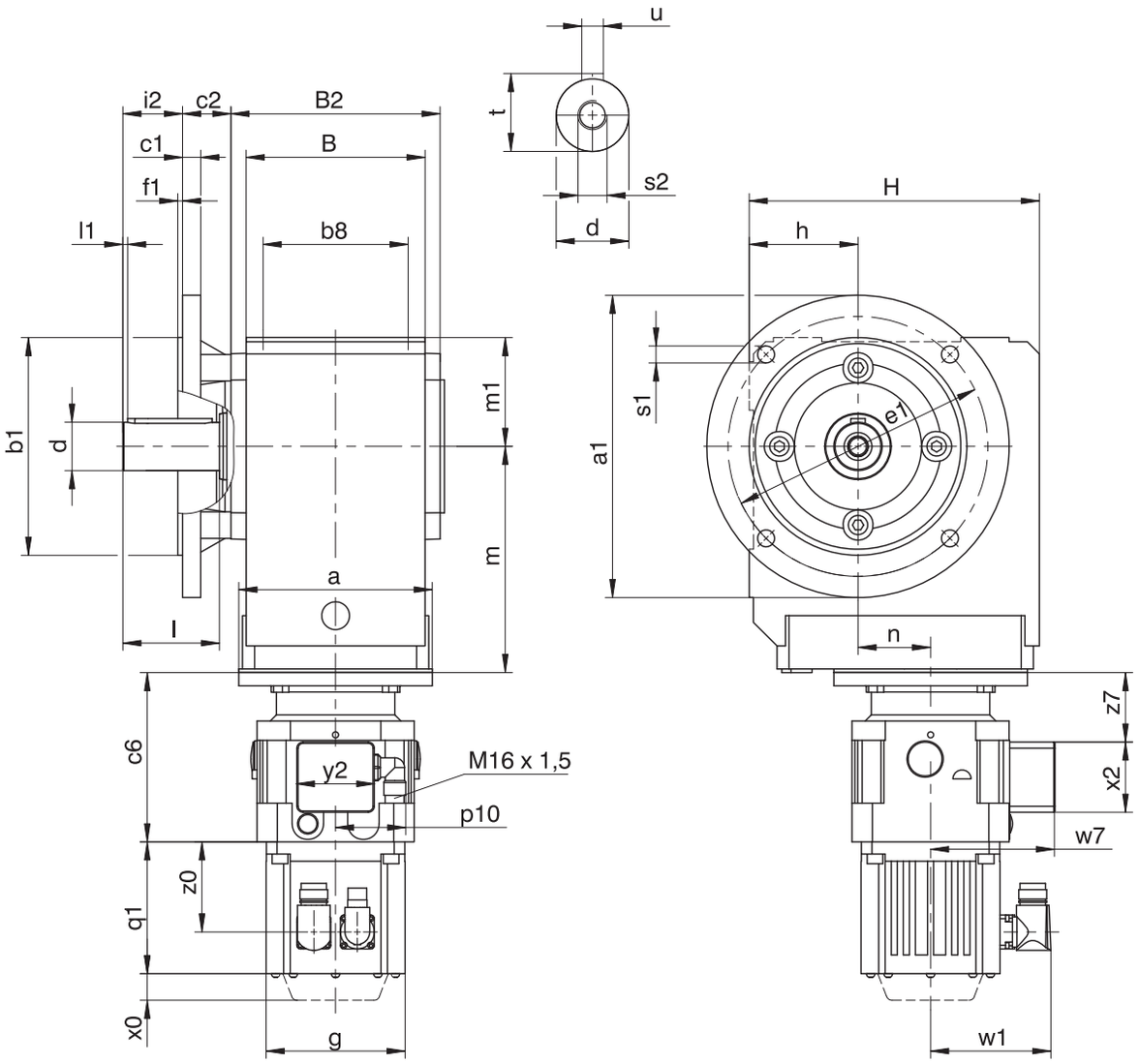
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

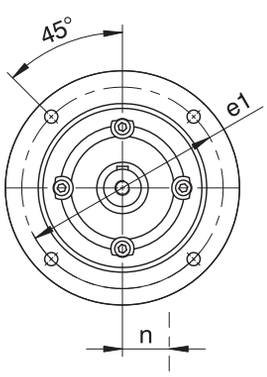
Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
K102	∅160	128	36.0	∅160	128	36.0	–	–	–	–	–	–
K202	∅160	147	46.0	∅160	147	46.0	∅200	149	46.0	–	–	–
K302	∅160	167	52.5	∅160	167	52.5	∅200	169	52.5	–	–	–
K402	∅160	187	60.0	∅160	187	60.0	∅200	189	60.0	∅250	192	60.0
K513	∅160	172	15.0	∅160	172	15.0	∅200	174	15.0	∅250	177	15.0
K613	∅160	191	18.0	∅160	191	18.0	∅200	193	18.0	∅250	196	18.0
K713	–	–	–	–	–	–	∅200	221	20.0	∅250	224	20.0
K813	–	–	–	–	–	–	∅200	247	24.0	∅250	249	24.0
K913	–	–	–	–	–	–	–	–	–	∅250	294	25.0

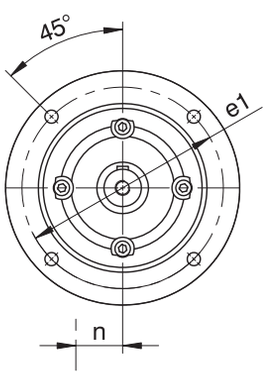
10.3.13 V shaft design (solid shaft), F housing design (round flange)



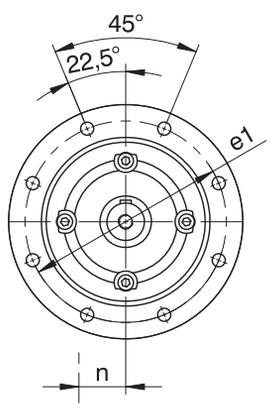
K1 – K4



K5 – K8



K9



q1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]	–	K1 – K4: Solid shaft without feather key available, on request starting at K5.
–	K1 – K9: Solid shaft on both sides available.		

Dimensions of gear units

Type	Øa1	Øb1	b8	B	B2	c1	c2	Ød	Øe1	f1	h	H	i2	l	l1	m1	Øs1	s2	t	u
K1	160	110_{j6}	70	90	106	10	32.0	25_{k6}	130	3.5	60	160	30.0	50	4	60	9	M10	28.0	A8×7×40
K2	200	130_{j6}	90	115	134	12	32.0	30_{k6}	165	3.5	65	190	36.0	60	4	65	11	M10	33.0	A8×7×50
K3	200	130_{j6}	105	130	146	14	38.0	30_{k6}	165	3.5	75	213	31.0	60	4	75	11	M10	33.0	A8×7×50
K4	250	180_{j6}	120	148	173	15	40.0	40_{k6}	215	4.0	90	240	49.5	80	4	90	14	M16	43.0	A12×8×70
K5	250	180_{j6}	125	160	185	15	39.5	45_{k6}	215	4.0	160	260	90.0	90	4	100	14	M16	48.5	A14×9×80
K6	300	230_{j6}	130	168	200	17	36.0	50_{k6}	265	4.0	190	310	100.0	100	4	120	14	M16	53.5	A14×9×90
K7	350	250_{h6}	145	190	226	18	44.0	60_{m6}	300	5.0	212	342	120.0	120	4	125	18	M20	64.0	A18×11×110
K8	400	300_{h6}	185	235	282	20	45.0	70_{m6}	350	5.0	265	410	140.0	140	5	145	18	M20	74.5	A20×12×125
K9	450	350_{h6}	225	285	330	23	50.0	90_{m6}	400	5.0	315	495	170.0	170	8	180	18	M24	95.0	A25×14×140

Dimensions of additional round flanges

Type	Øa1	Øb1	c1	Øe1	f1	Øs1
K1	140	95_{j6}	10	115	3.0	9
K2	160	110_{j6}	12	130	3.5	9
K3	160	110_{j6}	14	130	3.5	9
K3	250	180_{j6}	14	215	4.0	14
K8	350	250_{h6}	18	300	5.0	18
K8	450	350_{h6}	20	400	5.0	18

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
K_MB23	140	59	102.9	58	64	57.5
K_MB33	161	59	115.4	58	64	71.0
K_MB43	194	59	134.9	58	64	93.5

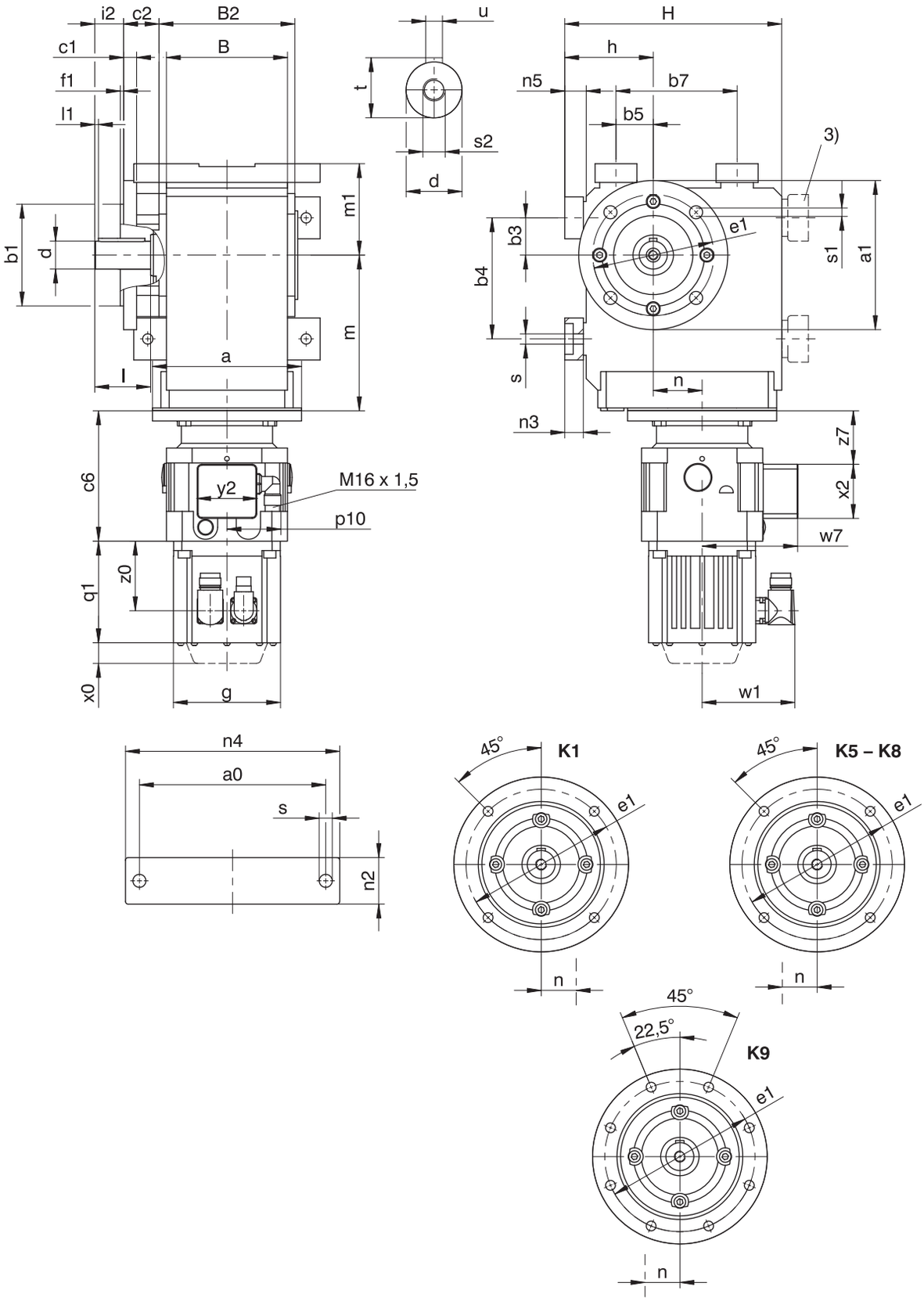
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
K102	∅160	128	36.0	∅160	128	36.0	–	–	–	–	–	–
K202	∅160	147	46.0	∅160	147	46.0	∅200	149	46.0	–	–	–
K302	∅160	167	52.5	∅160	167	52.5	∅200	169	52.5	–	–	–
K402	∅160	187	60.0	∅160	187	60.0	∅200	189	60.0	∅250	192	60.0
K513	∅160	172	15.0	∅160	172	15.0	∅200	174	15.0	∅250	177	15.0
K613	∅160	191	18.0	∅160	191	18.0	∅200	193	18.0	∅250	196	18.0
K713	–	–	–	–	–	–	∅200	221	20.0	∅250	224	20.0
K813	–	–	–	–	–	–	∅200	247	24.0	∅250	249	24.0
K913	–	–	–	–	–	–	–	–	–	∅250	294	25.0

10.3.14 V shaft design (solid shaft), NF housing design (foot + round flange)



q1	Applies to motors with brake.	x0	Applies to encoders using an optical measuring method.
w1	Different for the One Cable Solution (OCS), see the chapter [▶ 11.4]	3)	Only for K1 (other sizes on request)
–	K1 – K4: Solid shaft without feather key available, on request starting at K5.	–	K1 – K10: Solid shaft on both sides available.

Dimensions of gear units

Type	a0	Øa1	Øb1	b3	b4	b5	b7	B	B2	c1	c2	Ød	Øe1	f1	h	H	i2	l	l1	m1	n2	n3	n4	n5	Øs	Øs1	s2	t	u
K1	115	160	110_{j6}	30	90	30	90	90	106	10	32.0	25_{k6}	130	3.5	75	175	30.0	50	4	75	30	13	140	15	9.0	9	M10	28.0	A8×7×40
K5	200	250	180_{j6}	40	140	100	140	160	185	15	39.5	45_{k6}	215	4.0	190	290	90.0	90	4	130	60	27	240	30	18.0	14	M16	48.5	A14×9×80
K6	210	300	230_{j6}	50	160	110	160	168	200	17	36.0	50_{k6}	265	4.0	220	340	100.0	100	4	150	65	27	250	30	18.5	14	M16	53.5	A14×9×90
K7	241	350	250_{h6}	55	180	125	180	190	226	18	44.0	60_{m6}	300	5.0	250	380	120.0	120	4	163	70	35	290	38	23.0	18	M20	64.0	A18×11×110
K8	300	400	300_{h6}	75	240	165	240	235	282	20	45.0	70_{m6}	350	5.0	310	455	140.0	140	5	190	85	41	360	45	27.0	18	M20	74.5	A20×12×125
K9	360	450	350_{h6}	95	280	185	280	285	330	23	50.0	90_{m6}	400	5.0	365	545	170.0	170	8	230	95	46	430	50	31.0	18	M24	95.0	A25×14×140

Dimensions of additional round flanges

Type	Øa1	Øb1	c1	Øe1	f1	Øs1
K1	140	95_{j6}	10	115	3	9
K8	350	250_{h6}	18	300	5	18
K8	450	350_{h6}	20	400	5	18

Motor adapter dimensions

Type	c6	p10	w7	x2	y2	z7
K_MB23	140	59	102.9	58	64	57.5
K_MB33	161	59	115.4	58	64	71.0
K_MB43	194	59	134.9	58	64	93.5

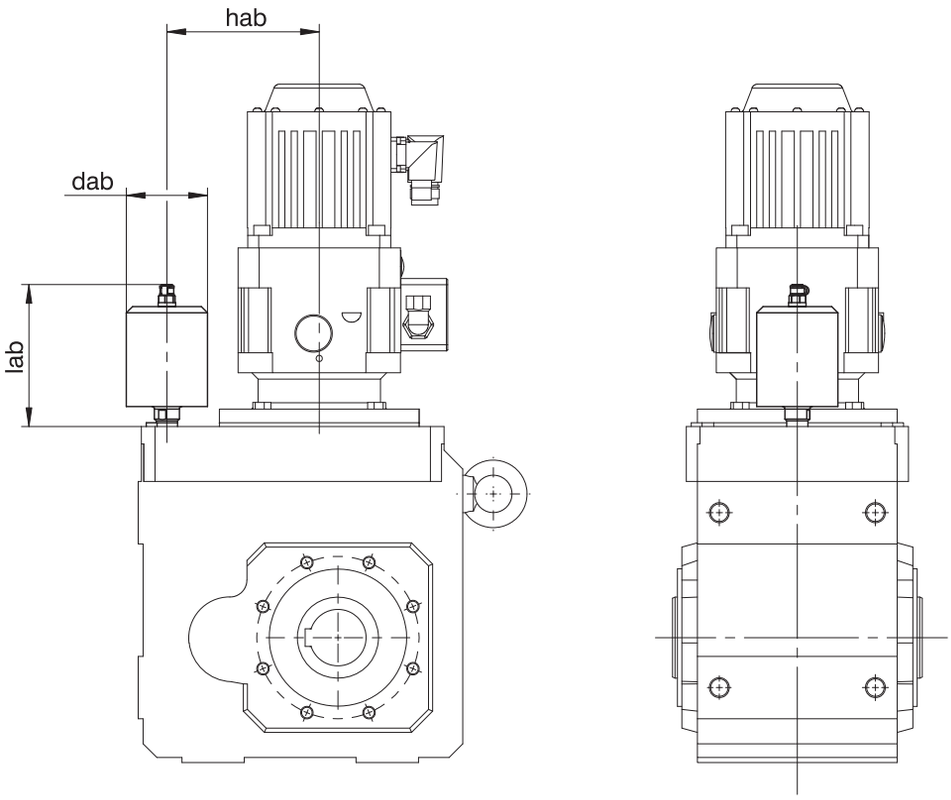
Dimensions of motors

Type	□g	q1	w1	x0	z0
EZ402U	98	192.0	91.0	22	101.5
EZ404U	98	242.0	91.0	22	151.5
EZ501U	115	163.5	100.0	22	74.5
EZ502U	115	188.5	100.0	22	99.5
EZ503U	115	213.5	100.0	22	124.5
EZ505U	115	263.5	100.0	22	174.5
EZ701U	145	180.0	115.0	22	83.0
EZ702U	145	205.0	115.0	22	108.0
EZ703U	145	230.0	115.0	22	133.0
EZ705U	145	285.0	134.0	22	184.0
EZ803U	190	340.0	156.5	22	209.0
EZ805U	190	422.0	156.5	22	291.0

Dimensions of geared motors

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n
K102	∅160	128	36.0	∅160	128	36.0	–	–	–	–	–	–
K513	∅160	172	15.0	∅160	172	15.0	∅200	174	15.0	∅250	177	15.0
K613	∅160	191	18.0	∅160	191	18.0	∅200	193	18.0	∅250	196	18.0
K713	–	–	–	–	–	–	∅200	221	20.0	∅250	224	20.0
K813	–	–	–	–	–	–	∅200	247	24.0	∅250	249	24.0
K913	–	–	–	–	–	–	–	–	–	∅250	294	25.0

10.3.15 Oil expansion tank



Dimensions

Type	MB23_EZ4			MB23_EZ5			MB33_EZ7			MB43_EZ8		
	dab	hab	lab	dab	hab	lab	dab	hab	lab	dab	hab	lab
K513	65	122.0	113.5	65	122.0	113.5	65	130.0	165.0	65	167.0	165.0
K613	65	148.5	116.5	65	148.5	116.5	65	148.5	116.5	65	198.5	165.0
K713	–	–	–	–	–	–	65	170.0	114.5	65	170.0	115.5
K813	–	–	–	–	–	–	73	205.0	129.5	73	205.0	129.5
K913	–	–	–	–	–	–	–	–	–	73	255.0	129.5

More information can be found in the chapter [▷ 10.6.4]

10.4 Type designation

This chapter shows you an explanation of the type designation with the associated options.

Additional ordering information not included in the type designation can be found at the end of the chapter.

Example code

K	4	0	2	A	G	0084	MB33	EZ703U

Explanation

Code	Designation	Design
K	Type	Helical bevel gear unit
4	Size	4 (example)
0	Generation	Generation 0
1		Generation 1
2	Stages	Two-stage
3		Three-stage
4		Four-stage
A	Shaft	Hollow shaft with keyway
S		Hollow shaft with shrink ring
V		Solid shaft
G	Housing	Pitch circle diameter
F		Round flange
NG		Foot + pitch circle diameter
NF		Foot + round flange
GD		Pitch circle diameter + torque arm bracket
NGD		Foot + pitch circle diameter + torque arm bracket
0084	Transmission ratio (i x 10 rounded)	i = 8.377 (example)
MB	Motor adapter	ServoStop motor adapter with brake
3	Size	3 (example)
3	Generation	Generation 3
EZ703U	Motor	EZ synchronous servo motor

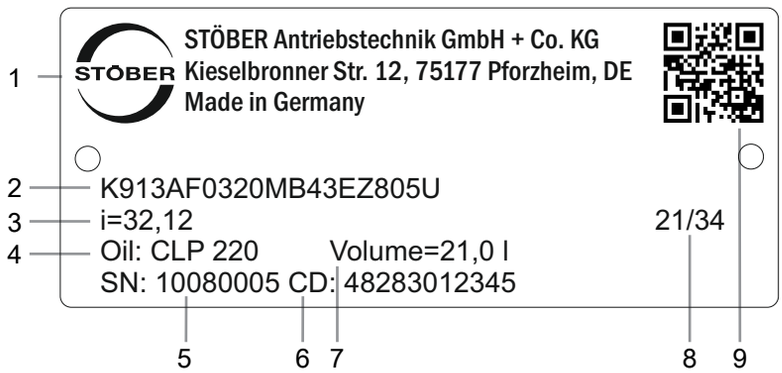
To complete the type designation, also specify the following in your order:

- A detailed type designation of the motor, see the chapter [▶ 11]
- Mounting position, see the chapter [▶ 10.5.6]
- Attachment of solid shaft: gear unit side 3 or 4; solid shaft on both sides
- Attachment of hollow shaft with keyway: entry side 3 or 4
- Attachment of hollow shaft with shrink ring: shrink ring on gear unit side 3 or 4
- Attachment of foot plates: gear unit side 1 or 5 (for K1, also on gear side 2)
- Attachment of flange: gear unit side 3 or 4
- Pitch circle diameter: gear unit side 3 or 4
- Attachment of torque arm bracket: torque arm bracket on gear unit side 1 or 5 (for K1, also on gear unit side 2), eye on gear unit side 3 or 4
- Position of the plug connectors, see the chapter [▶ 10.5.8]
- Oil expansion tank (option, recommended for gear units in mounting position EL5), see the chapter [▶ 10.6.4]
- Backlash: Standard/class II/class I. Backlash class II and class I for an additional cost.

For an explanation of the gear unit sides, see the chapter [▶ 10.5.6].

10.4.1 Nameplate

An example gear unit nameplate is explained in the figure below.

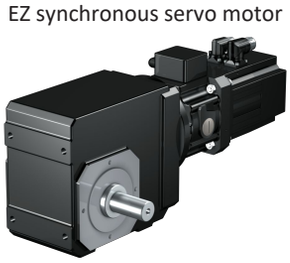


Code	Designation
1	Name of manufacturer
2	Type designation
3	Gear ratio of the gear unit
4	Lubricant specification
5	Serial number of the gear unit
6	Customer-specific data
7	Lubricant fill volume
8	Date of manufacture (year/calendar week)
9	QR code (link to product information)

10.5 Product description

10.5.1 Input options

MB motor adapter + EZ synchronous servo motor



Catalog ID 443311_en

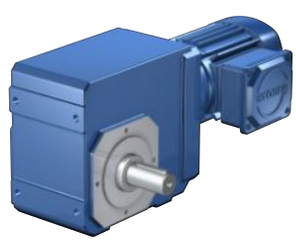
EZ synchronous servo motor

Catalog ID 442437_en

LM Lean motor

Catalog ID 443016_en

Asynchronous motor



Catalog ID 443136_en

The corresponding catalogs can be found at http://www.stoeber.de/en/downloads/

Enter the ID of the catalog in the Search term field.

10.5.2 ServoStop motor adapter with brake (MB)

In this chapter, you will find the description and technical data of the motor adapter with brake.

10.5.2.1 Properties

- Electrically actuated spring-loaded brake for dry running
- Featuring backlash-free plug-in coupling (jaw coupling) for easy removal of the motor with the axis braked in any position
- Electrical release monitoring in the terminal box of the motor adapter
- Manual monitoring of wear via air gap checks with a feeler gauge
- Manual release (optional)
- Radial shaft seal rings made of FKM with two sealing lips
- Four oil drain holes to protect the brake from oiling up in case of leakage
- Diverse-redundant system in accordance with EN ISO 13849-1

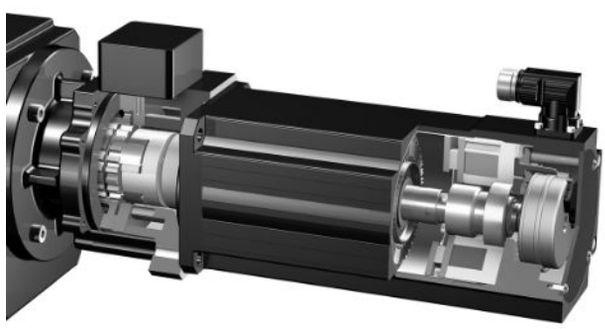


Fig. 1: Motor adapter with ServoStop brake and directly attached EZ synchronous servo motor

10.5.2.2 Brake

A quiescent current brake is integrated into the motor adapter. It has the function of a holding brake. Braking from full speed, e.g. in case of a voltage drop or an emergency off in hazard situations, is still possible.

The brake can be used as a single brake or together with the motor brake as a redundant brake system.

Function

The brakes installed in the motor adapter are electrically actuated spring-loaded brakes for dry running. In the de-energized state, braking takes place using spring force. The brake is released by an electromagnetic DC coil before the motor is switched on. The switch-on time t_{2B} (release time) is the time until the anchor plate releases from the axially moving brake disc and is magnetically held to the coil body. In this state, the brake is released and the coupling hub can rotate. In order to switch off (motor and brake), the residual magnetic flux of the iron parts (anchor and coil body) must be reduced; the associated time t_{11B} until the start of torque generation is defined as a response delay when linking. The link time t_{1B} is the time until the braking torque has built up to the nominal braking torque.

Manual release

Optionally, the brake can be equipped with a manual release.

Pressing the manual release deactivates the electronic actuation of the brake. Before pressing the manual release, you must establish the safety of the machine (e.g. protection against falling).

10.5.2.3 Electrical connection

- Terminal box (standard)
- Plug connector (optional, not possible in combination with release monitoring)

10.5.2.4 Monitoring

For monitoring the brake system, there are generally two options:

- Manual monitoring of wear via air gap checks with a feeler gauge
- Electrical release monitoring in the terminal box with a non-contact and wear-free proximity switch

10.5.2.5 Brake technical data

Technical data for operation at 24 V DC (±10%)

Type	M_{1Bstat} [Nm]	J_1 [kgcm²]	m [kg]	$\Delta\phi_B$ [arcmin]	$t_{1B,DC}$ [ms]	t_{2B} [ms]	$P_{N,B}$ [W]
MB23	8.0	6.3	8.5	32.0	65	55	30
MB23	12	6.3	8.5	32.0	55	80	30
MB33	16	26	14	26.0	150	60	37
MB33	24	26	14	26.0	120	85	37
MB33	32	26	14	26.0	95	100	37
MB33	45	26	14	26.0	80	120	37
MB43	50	69	26	19.0	150	100	55
MB43	72	69	26	19.0	120	150	55
MB43	100	69	26	19.0	90	200	55
MB53	200	236	61	17.0	200	250	86

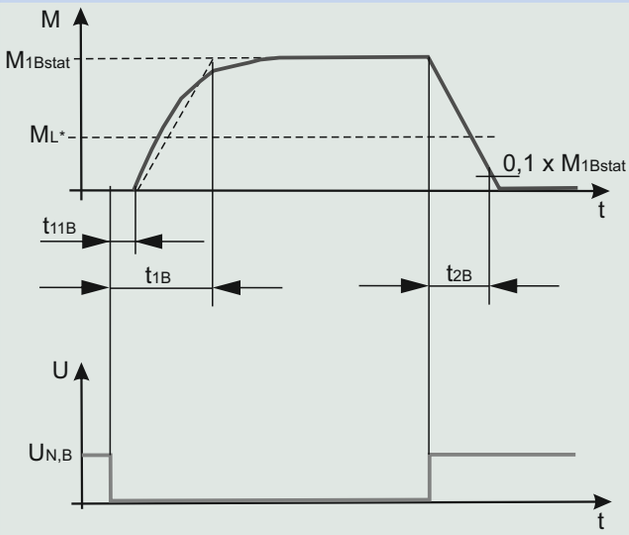
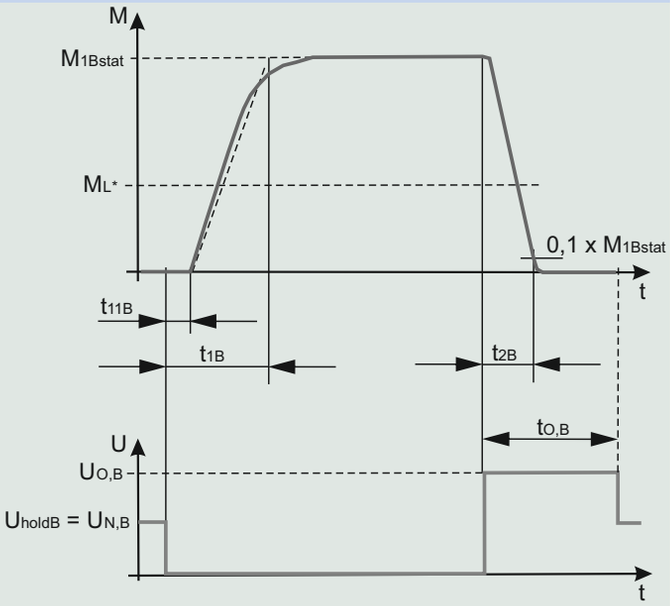
$\Delta\phi_B$: With the brake closed, a higher total backlash results ($\Delta\phi_{tot} = \Delta\phi_2 + \Delta\phi_B / i$).

Technical data for operation with high-speed rectifier 104 V DC (supply voltage U_{LINE} 220 – 275 V AC ± 5%, 50/60 Hz)

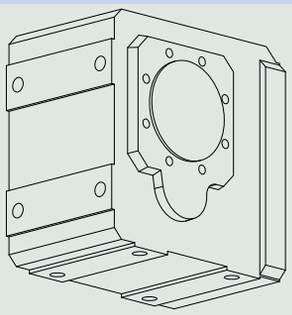
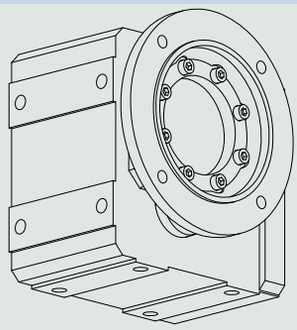
Type	M_{1Bstat} [Nm]	J_1 [kgcm²]	m [kg]	$\Delta\phi_B$ [arcmin]	$t_{1B,DC}$ [ms]	$t_{1B,AC}$ [ms]	t_{2B} [ms]	$P_{O,B}$ [W]	P_{holdB} [W]
MB23	8.0	6.3	8.5	32.0	65	360	20	101	26
MB23	12	6.3	8.5	32.0	55	280	25	101	26
MB23	16	6.3	8.5	32.0	50	230	35	101	26
MB23	24	6.3	8.5	32.0	45	180	50	101	26
MB23	30	6.3	8.5	32.0	40	160	60	101	26
MB33	16	26	14	26.0	150	800	25	125	32
MB33	24	26	14	26.0	120	650	35	125	32
MB33	32	26	14	26.0	95	500	40	125	32
MB33	45	26	14	26.0	80	400	50	125	32
MB33	90	26	14	26.0	50	250	90	125	32
MB43	50	69	26	19.0	150	900	50	148	38
MB43	72	69	26	19.0	120	700	75	148	38
MB43	100	69	26	19.0	90	500	100	148	38
MB43	160	69	26	19.0	60	300	150	148	38
MB53	200	236	61	17.0	200	800	110	200	50
MB53	300	236	61	17.0	170	600	150	200	50
MB53	400	236	61	17.0	120	400	200	200	50

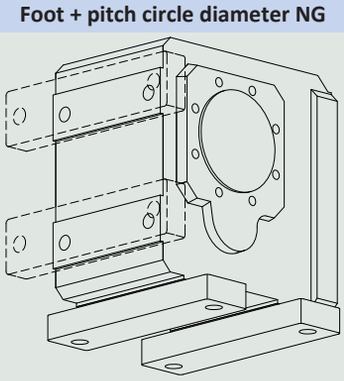
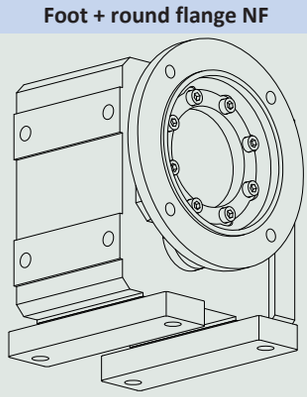
$\Delta\phi_B$: With the brake closed, a higher total backlash results ($\Delta\phi_{tot} = \Delta\phi_2 + \Delta\phi_B / i$).

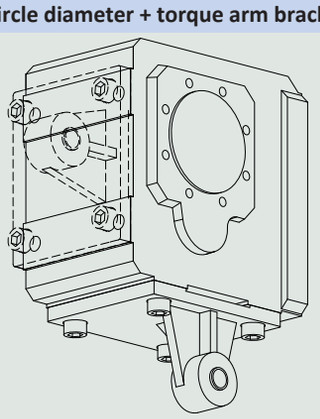
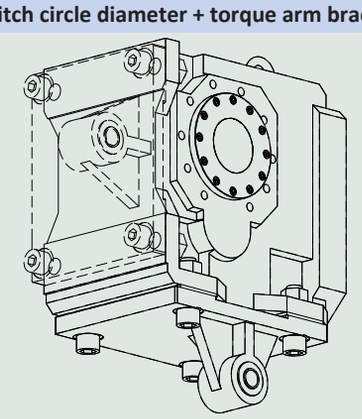
10.5.2.6 Brake switching times

Switching times in case of brake operation with nominal voltage	Switching times in case of brake operation with overexcitation voltage
	

10.5.3 Housing design

Pitch circle diameter G	Round flange F
	

Foot + pitch circle diameter NG	Foot + round flange NF
	

Pitch circle diameter + torque arm bracket GD	Foot + pitch circle diameter + torque arm bracket NGD
	

	G	F	NG	NF	GD	NGD
K1	✓	✓	✓	✓	✓	–
K2	✓	✓	✓	–	✓	–
K3	✓	✓	✓	–	✓	–
K4	✓	✓	✓	–	✓	–
K5	✓	✓	✓	✓	✓	–
K6	✓	✓	✓	✓	✓	–
K7	✓	✓	✓	✓	✓	–
K8	✓	✓	✓	✓	✓	–
K9	✓	✓	✓	✓	✓	–
K10	–	–	✓	✓	–	✓

10.5.4 Combinatorial shaft/housing design

	Housing design						
Shaft design	**Code**	**G**	**F**	**NG**	**NF**	**GD**	**NGD**
Hollow shaft with keyway	**A**	AG	AF	ANG	ANF	AGD	ANGD
Hollow shaft with shrink ring	**S**	SG	SF	SNG	SNF	SGD	SNGD
Solid shaft [1)]	**V**	VG	VF	VNG	VNF	–	–

[1)] Gear units in sizes K1 – K10 come with a solid shaft with feather key as standard. Gear units in sizes K1 – K4 can be ordered with the option of a solid shaft without feather key. Only upon request starting at size K5.

10.5.5 Installation conditions

Hollow shaft

The hollow shaft hole tolerance is ISO H7. The tolerance of the machine shaft must be ISO k6.

Take care to align the machine shaft with the gear unit hollow shaft when attaching the gear unit.

Maximum deviation ≤ 0.03 mm.

For simpler assembly and disassembly of the machine shaft, the hollow shafts are equipped with a spiral groove (as a grease deposit).

A hardened, threaded keeper plate is included in the scope of delivery. You also have the option to order the hollow shaft without a keeper plate.

Hollow shaft with shrink ring

The tolerance of the hollow shaft hole is ISO H7.

The machine shaft must be executed as follows:

Gear unit type	Tolerance
K1 to K6	ISO h9
K7 to K10	ISO h6

Select a material for the machine shaft with a permitted surface pressure of $p \geq 325\ N/mm^2$.

Possible materials:

- C45E +QT
- 42CrMo4

Fastening the gear units on the machine side using the pitch circle diameter

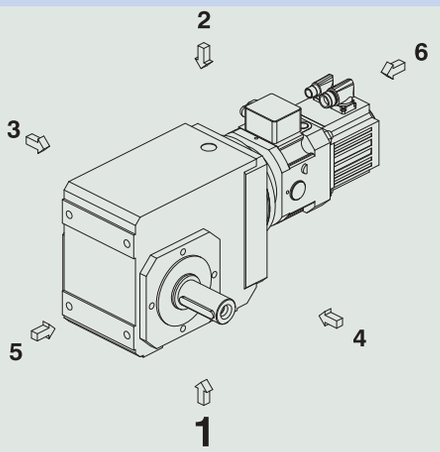
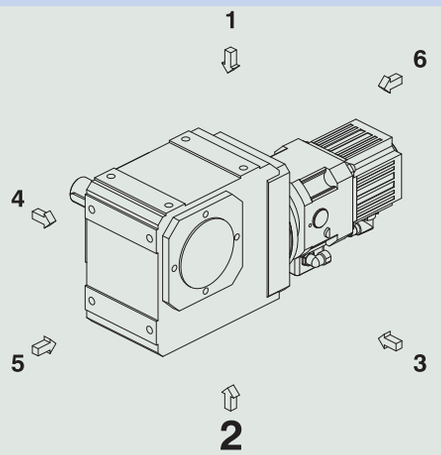
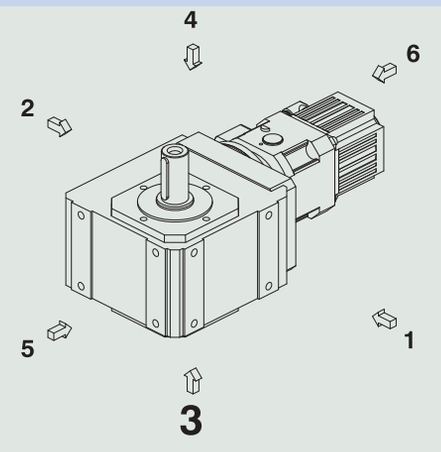
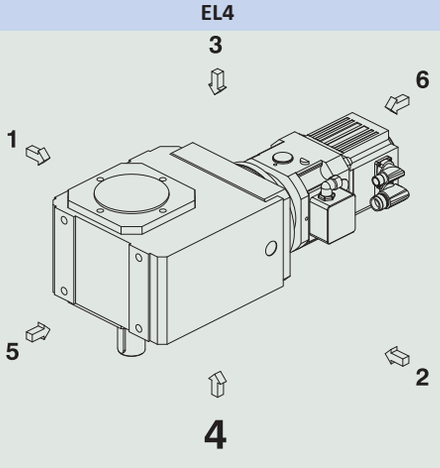
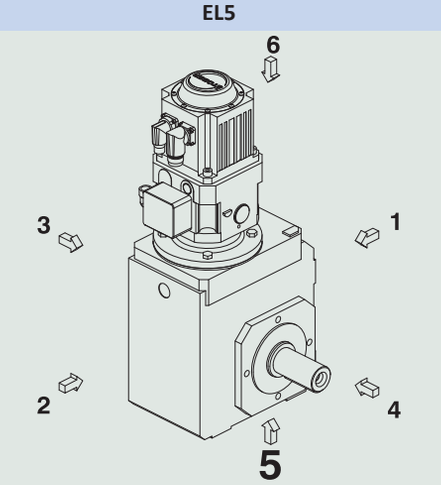
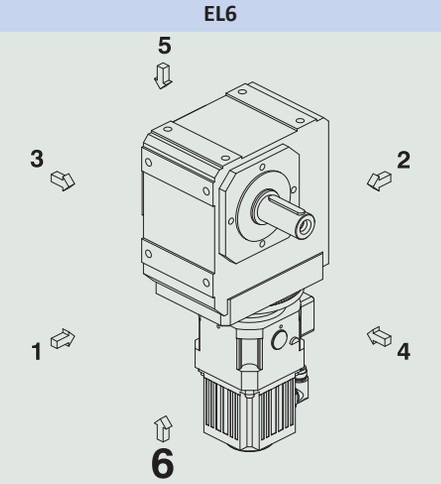
The specified torques and forces only apply when gear units are fastened on the machine side using screws of strength class 10.9. In addition, the gear housings must be adjusted at the pilot. The machine-side fit must be H7.

10.5.6 Mounting positions

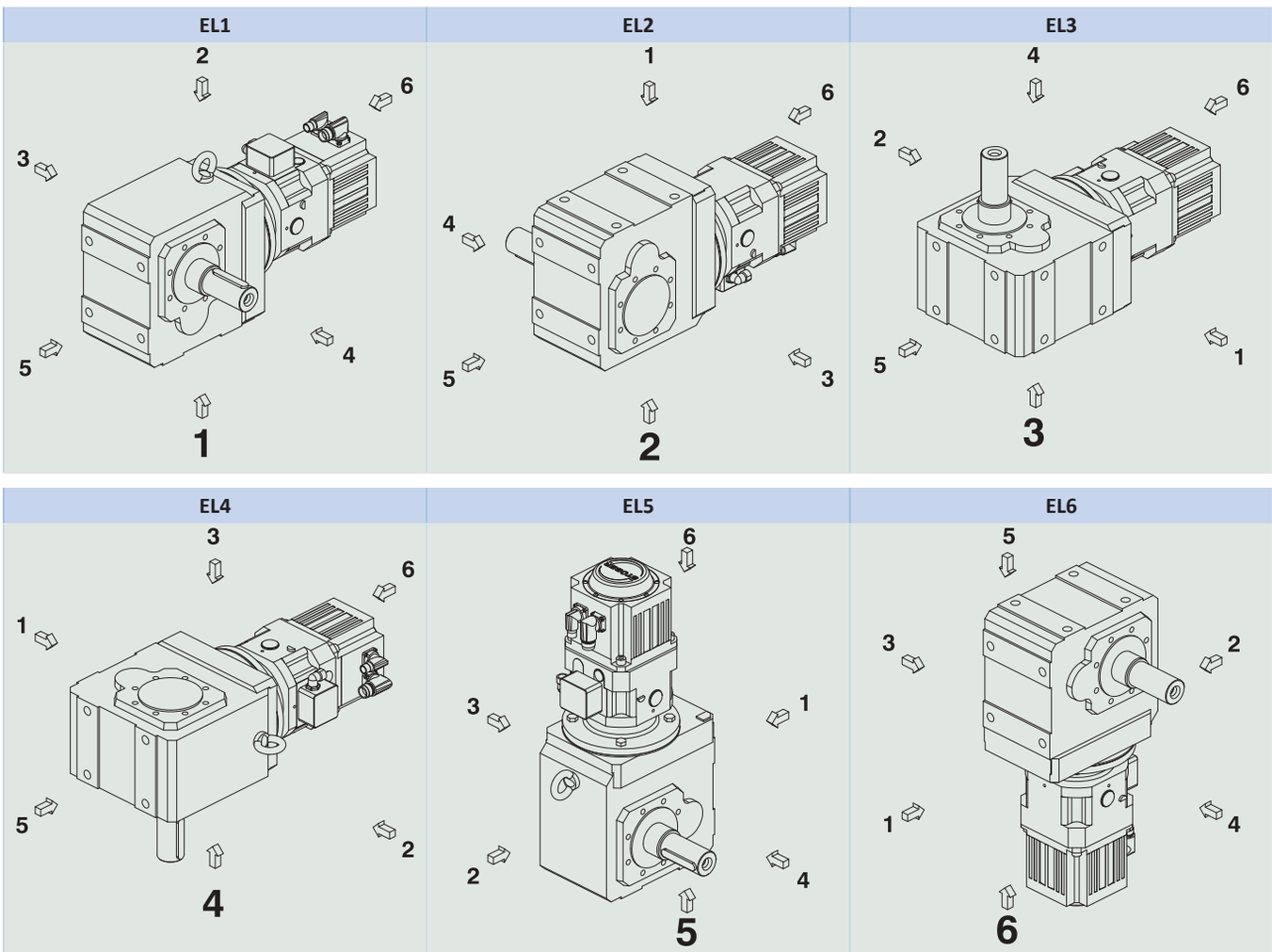
The following table shows the standard mounting positions.

The numbers identify the gear unit sides. The mounting position is defined by the gear side facing downwards.

Mounting positions for gear unit sizes K1 – K4

EL1	EL2	EL3
		
EL4	**EL5**	**EL6**
		

Mounting positions for gear unit sizes K5 – K10



Since the lubricant filling volume of the gear unit depends on the mounting position, the mounting position must be specified when ordering.

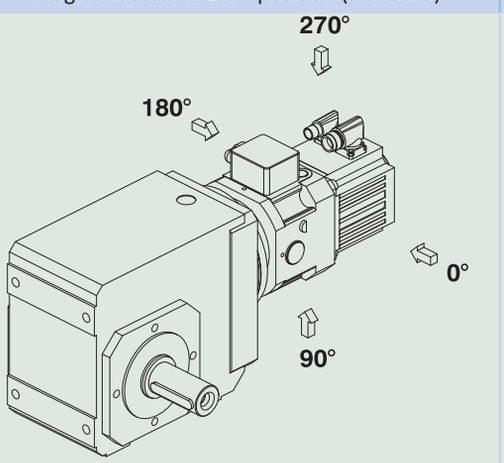
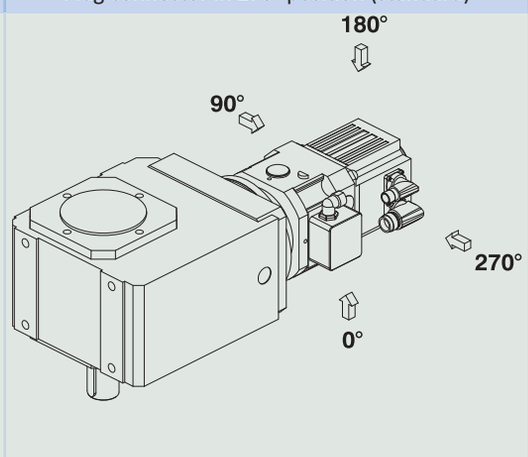
10.5.7 Lubricants

STOBER fills the gear units with the amount and type of lubricant specified on the nameplate. The filling volume and the structure of the gear units depend on the mounting position.

Only install the gear units in the intended mounting position! Reposition the gear units only after consulting STOBER. Otherwise, STOBER assumes no liability for the gear units.

You will receive lubricants for use in the food industry upon request.

10.5.8 Position of the plug connectors/terminal box

Mounting position EL1 Plug connector in 270° position (standard)	Mounting position EL4 Plug connector in 270° position (standard)
	

As standard, the plug connectors of the motor or the terminal box/plug connector of the motor adapter are mounted in the 270° position. The position of the terminal box/plug connector of the motor adapter can be selected separately from the position of the motor plug connectors.
Indicate variations for your geared motor in the order.

Note that the plug connector position rotates along with the geared motor if the geared motor is in another mounting position.

10.5.9 Other product features

Feature	Value
Max. permitted gear unit temperature (on the surface of the gear unit)	≤ 80 °C
Paint	Black RAL 9005
Explosion-proof design in accordance with (ATEX) Directive 2014/34/EU (optional)	Not available
Efficiency:	
η_{get} two-stage	97%
η_{get} three-stage	96%
η_{get} four-stage	94%
Protection class:[1]	
Gear unit	IP65
Motor	IP56, optionally IP66

10.5.10 Maintenance

The instructions for maintenance can be found in the operating manual, ID 443027_en, at http://www.stoeber.de/en/downloads/. Enter the ID of the documentation in the Search... field.

Ventilation

Air release valves are fitted as a standard feature and independently of installation position for gear unit sizes K5 to K10.

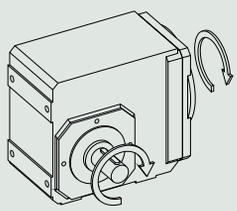
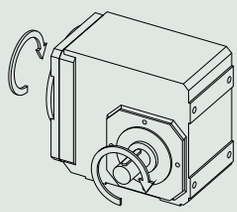
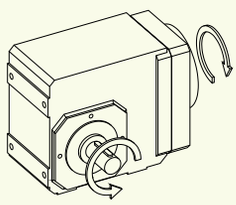
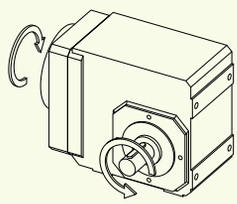
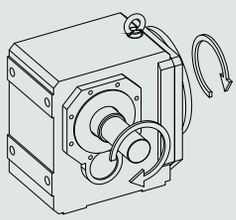
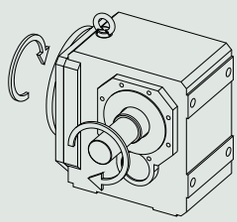
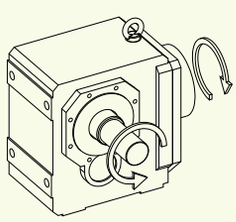
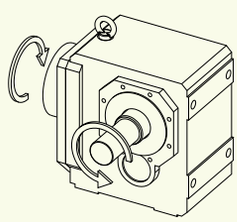
For the position and dimensions of the air release valve, refer to the 3D model.

Download the 3D model at https://configurator.stoeber.de/en-US/.

[1] Observe the protection class of all the components.

10.5.11 Direction of rotation

Solid shaft (V), solid shaft on both sides (V), hollow shaft with keyway (A)

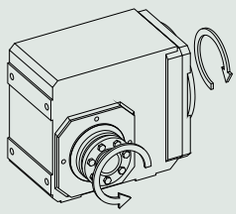
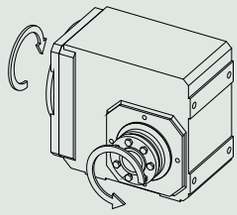
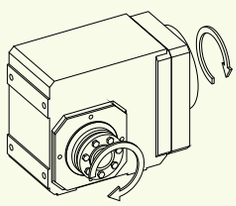
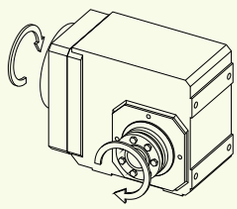
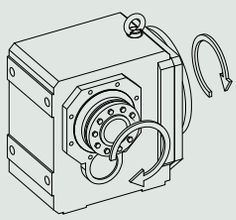
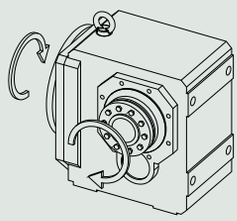
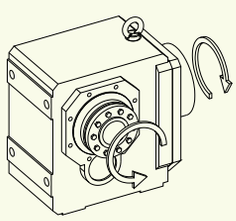
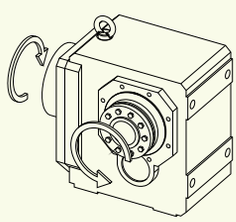
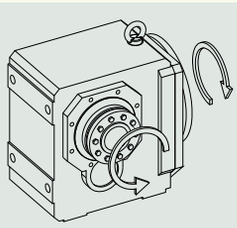
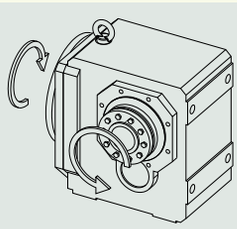
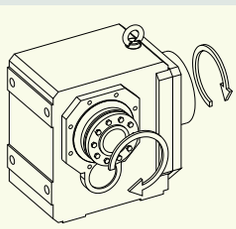
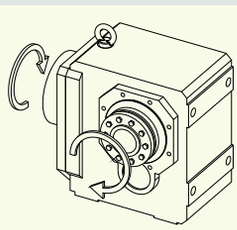
Type	Output side 4	Output side 3
K102 – K402		
K203 – K403		
K513 – K1013		
K514 – K1014		

The specified directions of rotation also apply to gear units with hollow shaft (A) if the entry side of the machine shaft corresponds to the side of the solid shaft that is shown.

The direction of rotation for the shaft design of a solid shaft on both sides corresponds to the direction of rotation for output side 4.

The pictures show mounting position EL1.

Hollow shaft with shrink ring (S)

Type	Shrink ring side 4	Shrink ring side 3
K102 – K402		
K203 – K403		
K513 – K813		
K514 – K814		
K913 – K1013		
K914 – K1014		

The pictures show mounting position EL1.

10.6 Project configuration

Project your drives using our SERVOsoft designing software. Download SERVOsoft for free at https://www.stoeber.de/en/ServoSoft.

It is the most convenient and reliable method of drive selection, as the entire torque/speed curve of the application is displayed and evaluated here in the curve of the geared motor.

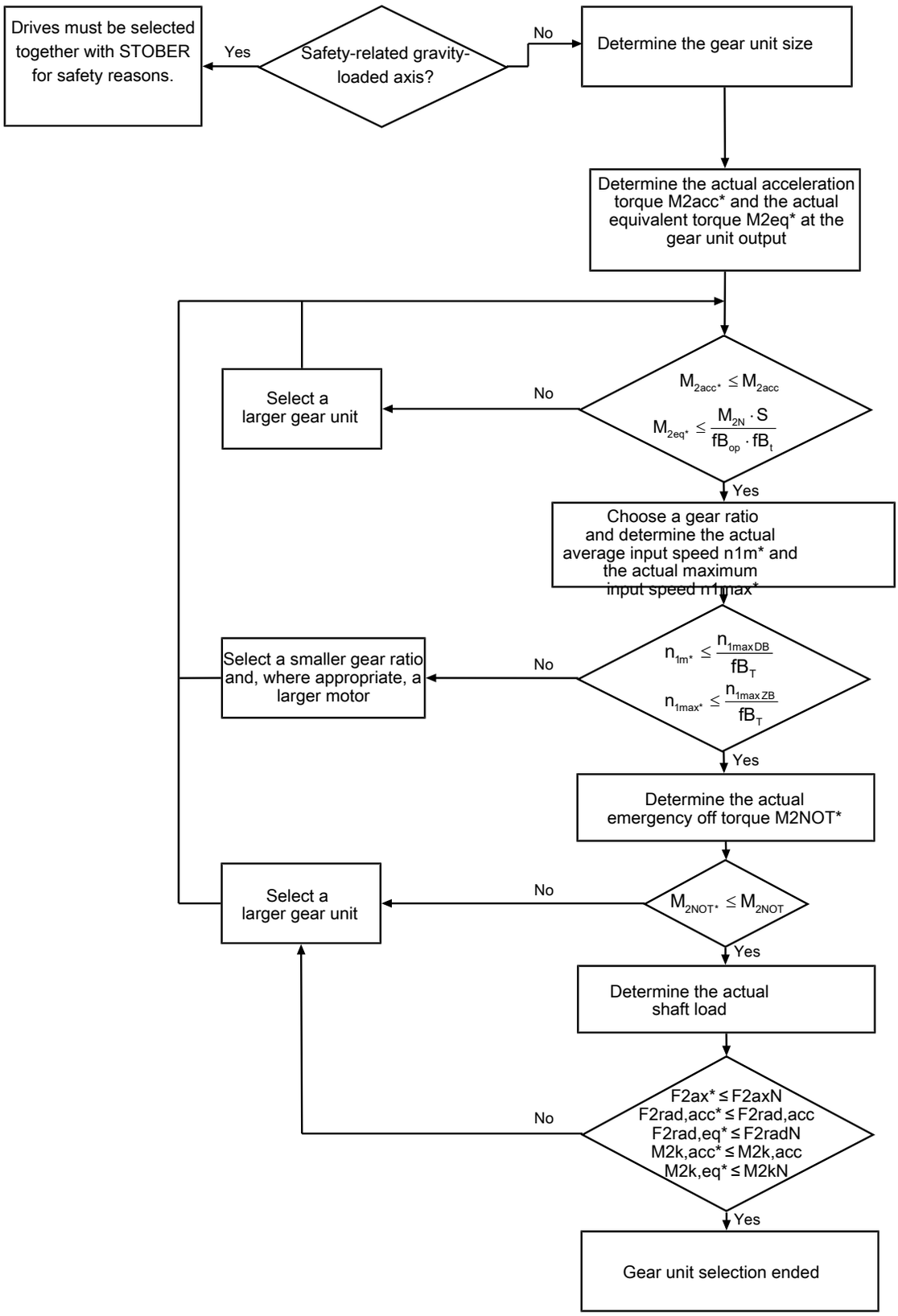
In this chapter, only limit values for specific operating points can be taken into consideration for manual drive selection.

An explanation of the formula symbols can be found in Chapter Symbols in formulas.

The formula symbols for values actually present in the application are marked with *.

10.6.1 Drive selection

Drive selection for gear units

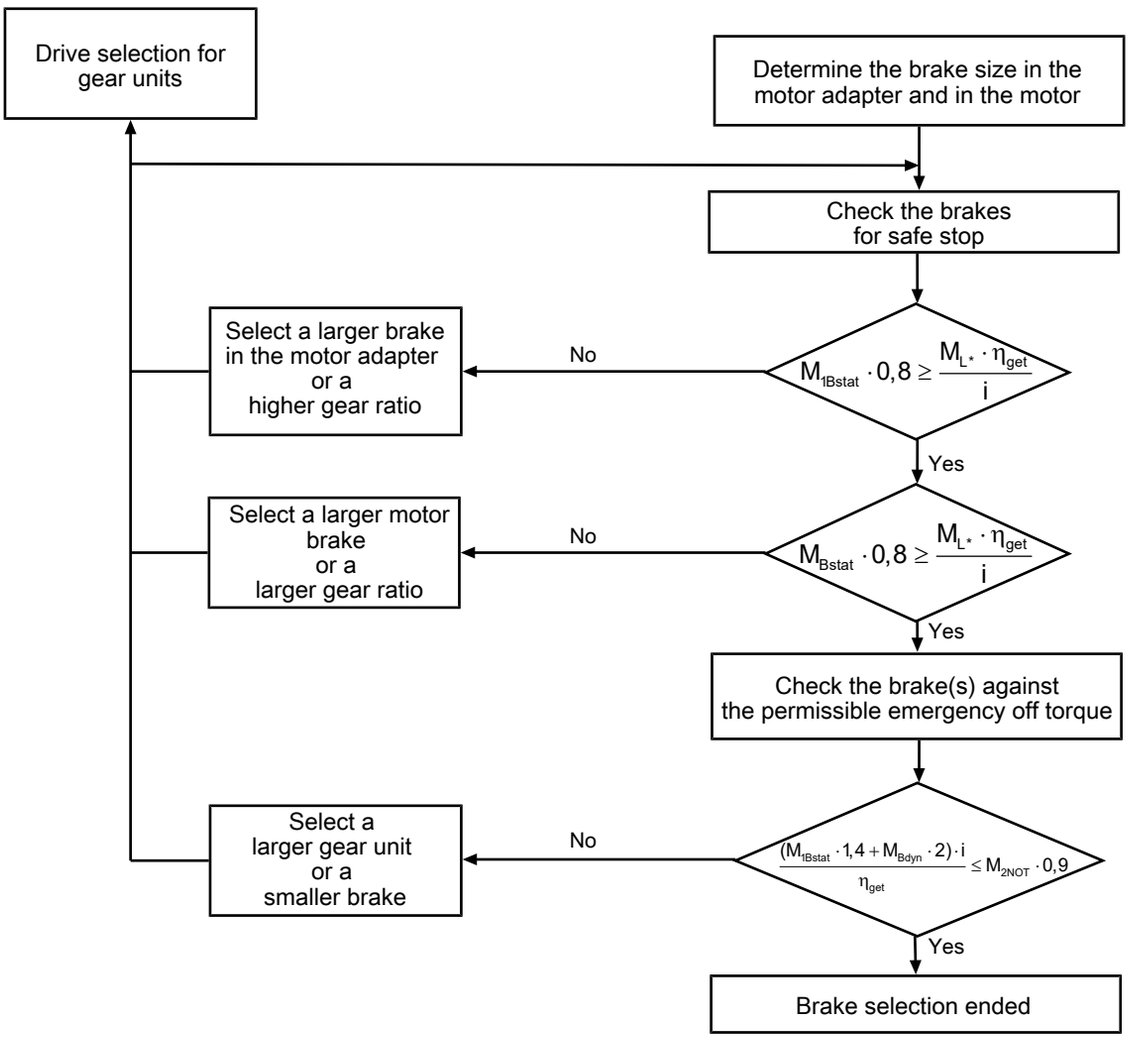


Calculate the forces and tilting torques in the chapter Permitted shaft loads.

Refer to the selection tables for the values for i, n_{1maxDB}, n_{1maxZB}, M_{2acc}, M_{2NOT}, M_{2N} and S.

The values for fB_T, fB_{op} and fB_t can be found in the corresponding tables in this chapter.

Drive selection for brakes

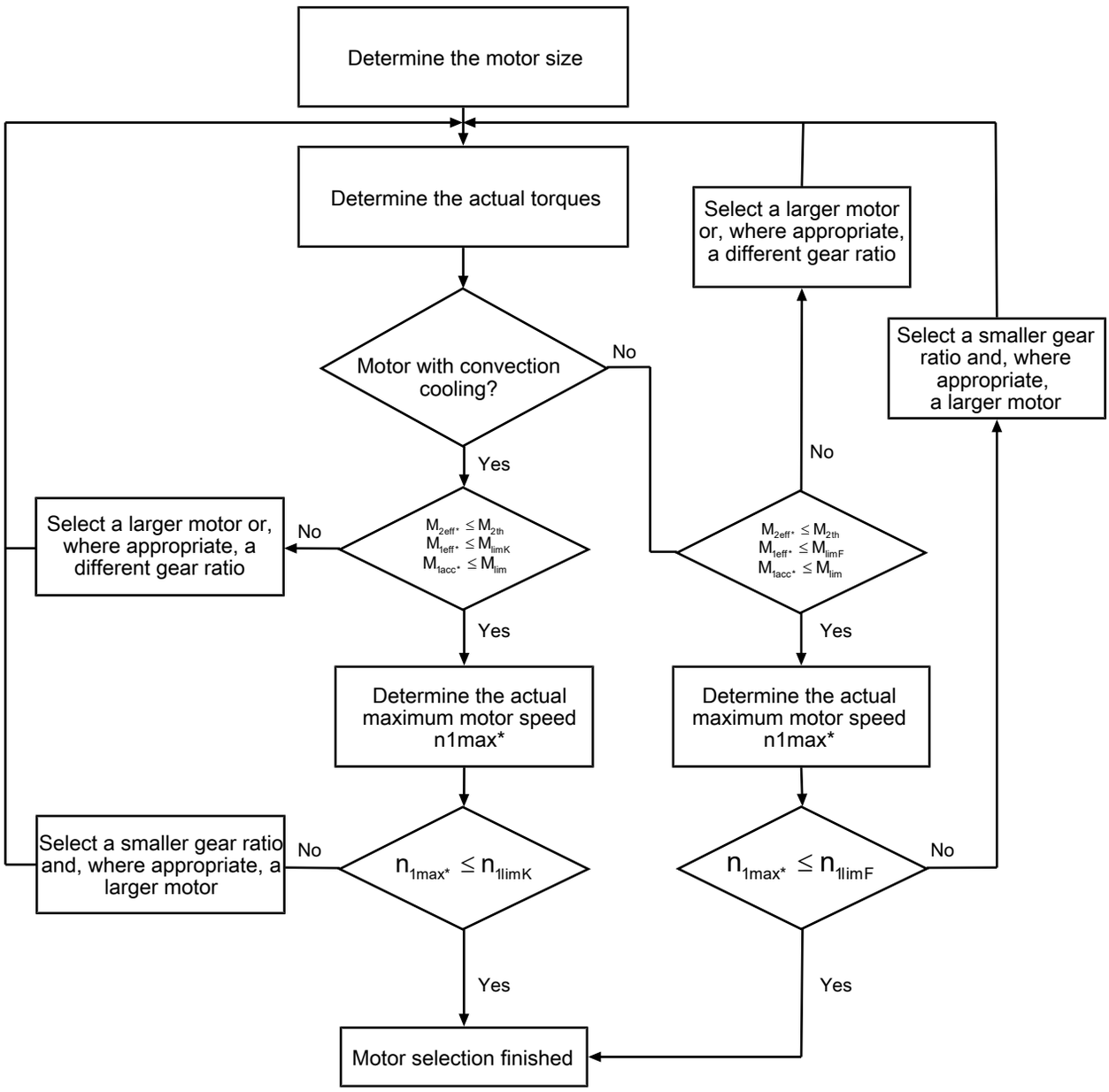


Refer to the selection tables for the values for i, M_{1Bstat}, M_{Bstat} and M_{2NOT}.

Refer to the Technical data table in the chapter [▷ 11.6.7] for the values for M_{Bdyn}.

Refer to the chapter Other product features for the values for η_{get}.

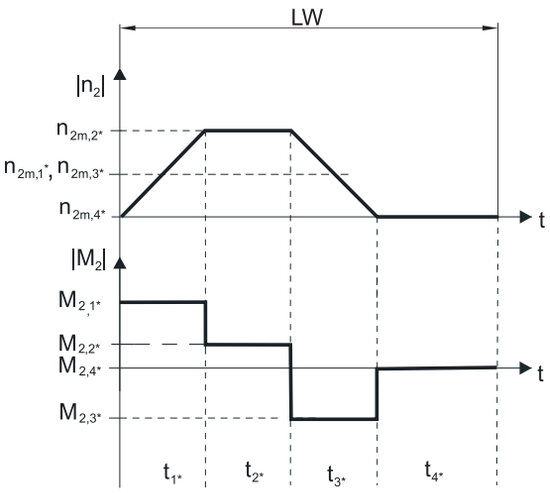
Drive selection for motors



The value for M_{lim}, M_{limK}, M_{limF}, n_{1limK} and n_{1limF} can be found in the motor characteristic curve in the chapter [▷ 11.3]. Note the size, nominal speed n_N and cooling type of the motor.

Example of cyclic operation

The following calculations are based on a representation of the power taken from the output based in accordance with the following example:



Calculation of the actual maximum acceleration torques

$$M_{2acc*} = J_{tot} \cdot \frac{\Delta n_2}{9{,}55 \cdot \Delta t} + M_{L*}$$

$$M_{1acc*} = \frac{M_{2acc*}}{i \cdot \eta_{get}} + J_1 \cdot \frac{\Delta n_1}{9{,}55 \cdot \Delta t}$$

Calculation of the actual average input speed

$$n_{1m*} = n_{2m*} \cdot i$$

$$n_{2m*} = \frac{\left|n_{2m,1*}\right| \cdot t_{1*} + \ldots + \left|n_{2m,n*}\right| \cdot t_{n*}}{t_{1*} + \ldots + t_{n*}}$$

If $t_{1*} + \ldots + t_{3*} \geq 6$ min, calculate n_{2m*} without the rest phase t_{4*}.

The values for the ratio i can be found in the selection tables.

Calculation of the actual effective torque

$$M_{2eff*} = \sqrt{\frac{t_{1*} \cdot M_{2,1*}{}^2 + \ldots + t_{n*} \cdot M_{2,n*}{}^2}{t_{1*} + \ldots + t_{n*}}}$$

Calculation of the actual emergency-off torque

$$M_{2NOT*} = J_{tot} \cdot \frac{\Delta n_2}{9.55 \cdot \Delta t} + M_{L*}$$

Calculation of the actual equivalent torque

$$M_{2eq*} = \sqrt[3]{\frac{\left|n_{2m,1*}\right| \cdot t_{1*} \cdot \left|M_{2,1*}{}^3\right| + \ldots + \left|n_{2m,n*}\right| \cdot t_{n*} \cdot \left|M_{2,n*}{}^3\right|}{\left|n_{2m,1*}\right| \cdot t_{1*} + \ldots + \left|n_{2m,n*}\right| \cdot t_{n*}}}$$

Calculation of the thermal limit torque

Calculate the thermal limit torque M_{2th} for a duty cycle $ED_{10} > 50\%$ and the actual average input speed n_{1m*}. (At $K_{mot,th} \leq 0$ you must reduce the average input speed n_{1m*} accordingly or select another geared motor size.)

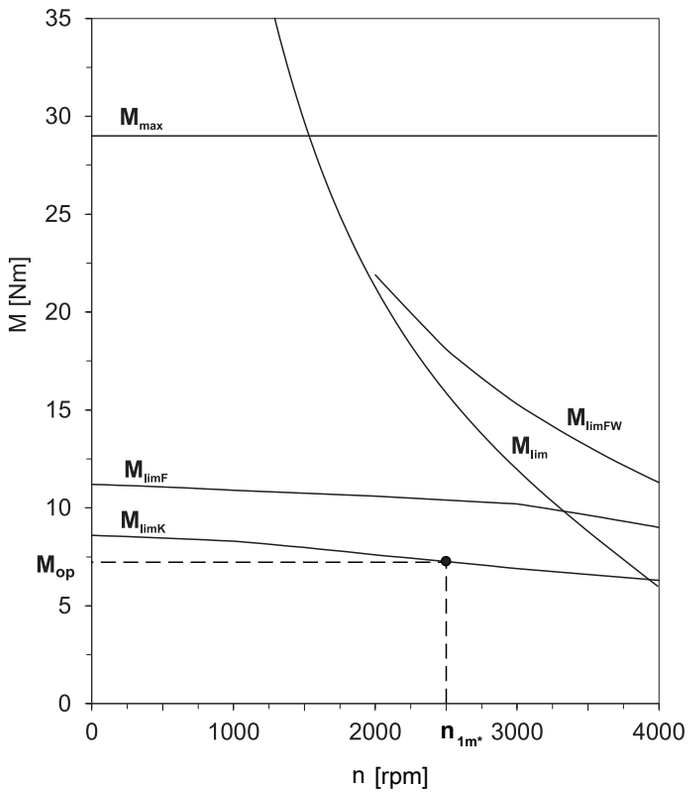
$$M_{2th} = M_{op} \cdot i \cdot K_{mot,th}$$

$$K_{mot,th} = 0{,}95 - \frac{a_{th}}{1000} \cdot athEL \cdot fB_T \cdot \left(\frac{n_{1m*}}{1000}\right)^2$$

The values for i and a_{th} can be found in the selection tables.

The values for a_{thEL} and fB_T can be found in the corresponding tables in this chapter.

The value for the torque of the motor at operating point M_{op} with the determined average input speed n_{1m*} can be found in the motor characteristic curve in the chapter Torque/speed curves. Note the size, nominal speed n_N and cooling type of the motor. The figure below shows an example of reading the torque M_{op} of a motor with convection cooling at the operating point.



Operating factors

Parameter a_{thEL}

Mounting position	a_{thEL}
EL1, 2	1.0
EL3, 4, 5, 6	1.1

Operating mode	fB_{op}
Uniform continuous operation	1.00
Cyclic operation	1.25
Reversing load cyclic operation	1.40

Run time	fB_t
Daily runtime ≤ 8 h	1.00
Daily runtime ≤ 16 h	1.15
Daily runtime ≤ 24 h	1.20

Temperature		fB_T
Motor cooling	**Surrounding temperature**	
Motor with forced ventilation	≤ 20 °C	0.9
	≤ 30 °C	1.0
	≤ 40 °C	1.15
Motor with convection cooling	≤ 20 °C	1.0
	≤ 30 °C	1.1
	≤ 40 °C	1.25

Notes

- The maximum permitted gear unit temperature (see the "Other product features" chapter) must not be exceeded. Doing so may result in damage to the geared motor.

- For braking from full speed (for example when the power fails or when setting up the machine), note the permitted gear unit torques (M_{2acc}, M_{2NOT}) in the selection tables.

10.6.2 Permitted shaft loads for the output shaft

The values specified in the tables apply to the permitted shaft loads:

- For shaft dimensions in accordance with the catalog
- For output speeds $n_{2m*} \leq 20$ rpm ($F_{2axN} = F_{2ax20}$; $F_{2radN} = F_{2rad20}$; $M_{2kN} = M_{2k20}$)
- Only if radial forces on the gear unit are stabilized by its pilots for the pitch circle diameter and flange housing design

10.6.2.1 V shaft design

Permitted shaft loads for V shaft design (solid shaft)

Type	z_2	F_{2ax20}	F_{2rad20}	$F_{2rad,acc}$	M_{2k20}	$M_{2k,acc}$
	[mm]	[N]	[N]	[N]	[Nm]	[Nm]
K1	40.0	1900	5000	5000	325	325
K2	42.0	2100	6000	6000	430	430
K3	45.0	2400	7000	7000	525	525
K4	52.0	3500	11200	11200	1050	1050
K5	72.0	3500	13450	13450	1580	1580
K6	72.0	4000	16000	16000	1960	1960
K7	85.0	5500	22000	22000	3200	3200
K8	60.0	7250	29000	29000	3800	3800
K9	87.0	16500	65000	65000	11200	11200
K10	84.0	25000	80000	80000	15200	15200

Reduced values apply in the case of a V shaft design (solid shaft) in conjunction with an NF housing design (foot + round flange):

Type	z_2	F_{2ax20}	F_{2rad20}	$F_{2rad,acc}$	M_{2k20}	$M_{2k,acc}$
	[mm]	[N]	[N]	[N]	[Nm]	[Nm]
K10	132.0	25000	64000	64000	15200	15200

For the V solid shaft design on both sides, the values for F_{2rad20} and M_{2k20} must be multiplied by a factor of 0.7.

For other output speeds, download diagrams at https://configurator.stoeber.de/en-US/.

The following applies to output speeds $n_{2m*} > 20$ rpm:

$$F_{2axN} = \frac{F_{2ax20}}{\sqrt[3]{\frac{n_{2m*}}{20\ \text{rpm}}}} \qquad F_{2radN} = \frac{F_{2rad20}}{\sqrt[3]{\frac{n_{2m*}}{20\ \text{rpm}}}} \qquad M_{2kN} = \frac{M_{2k20}}{\sqrt[3]{\frac{n_{2m*}}{20\ \text{rpm}}}}$$

The values for F_{2ax20}, F_{2rad20} and M_{2k20} can be found in the table "Permitted shaft loads" in this chapter.

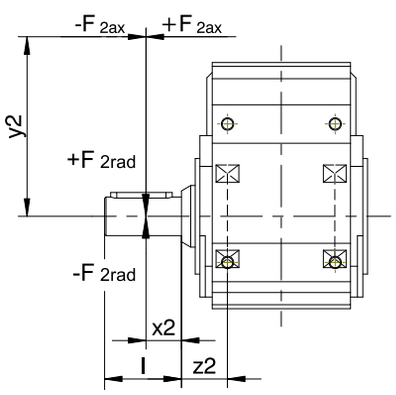


Fig. 2: Force application points for solid shaft

The specified values for F_{2rad20} and $F_{2rad,acc}$ refer to an application of force at the center of the output shaft: $x_2 = l/2$.

Shaft dimensions can be found in the "Dimensional drawings" chapter.

The following applies to other force application points:

$$M_{2k,acc^*} = \frac{2 \cdot F_{2ax^*} \cdot y_2 + F_{2rad,acc^*} \cdot (x_2 + z_2)}{1000}$$

For applications with multiple axial and/or radial forces, you must add the forces as vectors.

In the event of EMERGENCY OFF operation (max. 1000 load changes), you can multiply the permitted forces and torques for F_{2ax20}, F_{2rad20} and M_{2k20} by a factor of two.

Also note the calculation for equivalent values:

$$M_{2k,eq^*} = \sqrt[3]{\frac{|n_{2m,1^*}| \cdot t_{1^*} \cdot |M_{2k,acc,1^*}^3| + \ldots + |n_{2m,n^*}| \cdot t_{n^*} \cdot |M_{2k,acc,n^*}^3|}{|n_{2m,1^*}| \cdot t_{1^*} + \ldots + |n_{2m,n^*}| \cdot t_{n^*}}}$$

$$F_{2rad,eq^*} = \sqrt[3]{\frac{|n_{2m,1^*}| \cdot t_{1^*} \cdot |F_{2rad,acc,1^*}^3| + \ldots + |n_{2m,n^*}| \cdot t_{n^*} \cdot |F_{2rad,acc,n^*}^3|}{|n_{2m,1^*}| \cdot t_{1^*} + \ldots + |n_{2m,n^*}| \cdot t_{n^*}}}$$

10.6.2.2 A and S shaft design

Permitted shaft loads for A shaft design (hollow shaft with keyway)

Type	z_2 [mm]	F_{2ax20} [N]	F_{2rad20} [N]	$F_{2rad,acc}$ [N]	M_{2k20} [Nm]	$M_{2k,acc}$ [Nm]
K1	40.0	1900	5000	5000	240	240
K2	42.0	2100	6000	6000	310	310
K3	45.0	2400	7000	7000	380	380
K4	52.0	3500	11200	11200	740	740
K5	39.0	2500	13450	13450	1000	1000
K6	42.0	3000	16000	16000	1300	1300
K7	45.0	4100	22000	22000	2100	2100
K8	50.0	5300	29000	29000	2600	2600
K9	56.0	7000	65000	65000	3600	3600
K10	56.0	9000	80000	80000	5000	5000

Permitted shaft loads for S shaft design (hollow shaft with shrink ring)

Type	z_2 [mm]	F_{2ax20} [N]	F_{2rad20} [N]	$F_{2rad,acc}$ [N]	M_{2k20} [Nm]	$M_{2k,acc}$ [Nm]
K1	40.0	1900	5000	5000	240	240
K2	42.0	2100	6000	6000	310	310
K3	45.0	2400	7000	7000	380	380
K4	52.0	3500	11200	11200	740	740
K5	39.0	2500	13450	13450	1000	1000
K6	42.0	3000	16000	16000	1300	1300
K7	45.0	4100	22000	22000	2100	2100
K8	50.0	5300	29000	29000	2600	2600
K9	56.0	7000	65000	65000	3600	3600
K10	56.0	9000	80000	80000	5000	5000

For other output speeds, download diagrams at https://configurator.stoeber.de/en-US/.

The following applies to output speeds n_{2m^*} > 20 rpm:

$$F_{2axN} = \frac{F_{2ax20}}{\sqrt[3]{\frac{n_{2m^*}}{20\ \text{rpm}}}} \qquad F_{2radN} = \frac{F_{2rad20}}{\sqrt[3]{\frac{n_{2m^*}}{20\ \text{rpm}}}} \qquad M_{2kN} = \frac{M_{2k20}}{\sqrt[3]{\frac{n_{2m^*}}{20\ \text{rpm}}}}$$

The values for F_{2ax20}, F_{2rad20} and M_{2k20} can be found in the table "Permitted shaft loads" in this chapter.

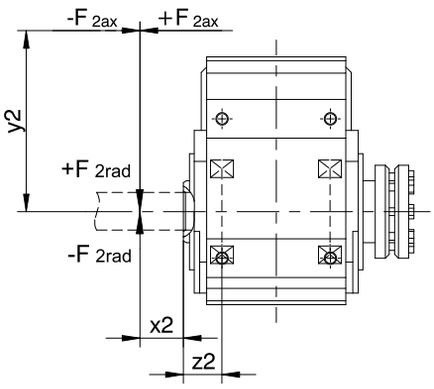


Fig. 3: Force application points for hollow shaft

You can determine the permitted radial forces from the permitted tilting torque M_{2kN} and $M_{2k,acc}$. The actual radial forces may not exceed the permitted radial forces. The permitted radial forces pertain to the shaft end (x2 = 0).

$$M_{2k,acc^*} = \frac{2 \cdot F_{2ax^*} \cdot y_2 + F_{2rad,acc^*} \cdot (x_2 + z_2)}{1000}$$

For applications with multiple axial and/or radial forces, you must add the forces as vectors.

In the event of EMERGENCY OFF operation (max. 1000 load changes), you can multiply the permitted forces and torques for F_{2ax20}, F_{2rad20} and M_{2k20} by a factor of two.

Also note the calculation for equivalent values:

$$M_{2k,eq^*} = \sqrt[3]{\frac{|n_{2m,1^*}| \cdot t_{1^*} \cdot |M_{2k,acc,1^*}^{\ 3}| + \ldots + |n_{2m,n^*}| \cdot t_{n^*} \cdot |M_{2k,acc,n^*}^{\ 3}|}{|n_{2m,1^*}| \cdot t_{1^*} + \ldots + |n_{2m,n^*}| \cdot t_{n^*}}}$$

$$F_{2rad,eq^*} = \sqrt[3]{\frac{|n_{2m,1^*}| \cdot t_{1^*} \cdot |F_{2rad,acc,1^*}^{\ 3}| + \ldots + |n_{2m,n^*}| \cdot t_{n^*} \cdot |F_{2rad,acc,n^*}^{\ 3}|}{|n_{2m,1^*}| \cdot t_{1^*} + \ldots + |n_{2m,n^*}| \cdot t_{n^*}}}$$

10.6.3 Radial shaft seal rings

Leak-proofness

Our gear units are equipped with high-quality radial shaft seal rings and checked for leaks. However, a leak cannot be fully ruled out over the length of use of a gear unit. If you use a gear unit with goods incompatible with the lubricant, you must take measures to prevent direct contact with the gear unit lubricant in case of a leak.

10.6.4 Oil expansion tank

The gear units have a higher fill level in mounting position EL5. The oil expansion tank prevents oil from escaping out of the gear unit.

Notes

- We recommend using an oil expansion tank in mounting position EL5 (additional cost) for fast running gear units with an input speed $n_1 > 1750$ rpm and gear ratios $i < 20$.
- It is not possible to use an oil expansion tank if the plug connector is at 90°!

10.7 Additional documentation

Additional documentation related to the product can be found at
http://www.stoeber.de/en/downloads/

Enter the ID of the documentation in the Search term field.

Documentation	ID
Operating manual gear units, geared motors K	443364_en

11 EZ synchronous servo motors

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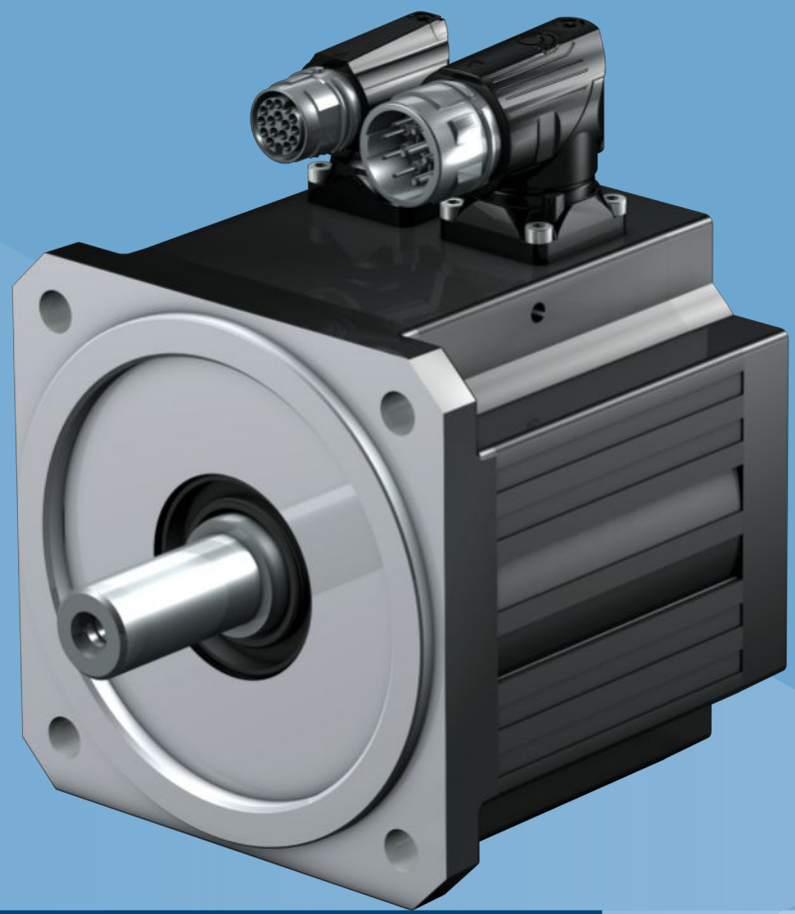


11 Synchronous servo motors EZ

11.1 Overview

Synchronous servo motors with single tooth winding

Features

High dynamics	✓
Short length	✓
Super compact due to tooth-coil winding method with the highest possible copper fill factor	✓
Backlash-free holding brake (optional)	✓
Electronic nameplate for fast and reliable commissioning	✓
Convection cooling or forced ventilation (optional)	✓
Optical, inductive EnDat absolute encoders or resolvers	✓
Elimination of referencing with multi-turn absolute encoders (optional)	✓
One Cable Solution (OCS) with EnDat 3 encoder (optional)	✓
Rotatable plug connectors with quick lock	✓

Torques

M_N	0.4 – 77.2 Nm
M_0	0.44 – 94 Nm

11.2 Selection tables

The technical data specified in the selection tables applies to:

- Installation altitudes up to 1000 m above sea level
- Surrounding temperatures from −15 °C to +40 °C
- Operation on a STOBER drive controller
- DC link voltage U_{ZK} = DC 540 V
- Coating: RAL 9005 Jet black, matte

In addition, the technical data applies to an uninsulated design with the following thermal mounting conditions:

Type	Dimensions of steel mounting flange (thickness x width x height)	Convection surface area Steel mounting flange
EZ2 – EZ5	23 x 210 x 275 mm	0.14 m^2
EZ7 – EZ8	28 x 300 x 400 mm	0.3 m^2

Note the differing ambient conditions in Chapter Derating

Formula symbols

An explanation of the formula symbols can be found in Chapter Symbols in formulas.

Observe the additional information on the following formula symbols:

- I_0 = RMS value of the line-to-line current when stall torque M_0 is generated (tolerance ±5%).
- I_{max} = RMS value of the short-term maximum permitted line-to-line current when maximum torque M_{max} is generated (tolerance ±5%). Exceeding I_{max} may lead to irreversible damage (demagnetization) of the rotor.
- I_N = RMS value of the line-to-line current when nominal torque M_N is generated at the nominal point (tolerance ±5%).
- M_0 = Torque that a motor is continuously able to deliver at a speed of 10 rpm (tolerance ±5%). At a speed of 0 rpm, a minor continuous torque has to be taken into account. Contact your STOBER customer advisor for such an application.

11.2.1 EZ motors with convection cooling

Type	K_{EM} [V/1000 rpm]	n_N [rpm]	M_N [Nm]	I_N [A]	$K_{M,N}$ [Nm/A]	P_N [kW]	M_0 [Nm]	I_0 [A]	K_{M0} [Nm/A]	M_R [Nm]	M_{max} [Nm]	I_{max} [A]	R_{U-V} [Ω]	L_{U-V} [mH]	T_{el} [ms]	J_{dyn} [kgcm²]	m_{dyn} [kg]
EZ202U	40	6000	0.40	0.99	0.41	0.25	0.44	1.03	0.45	0.03	1.48	3.48	26.00	15.80	0.61	0.13	1.43
EZ203U	40	6000	0.61	1.54	0.40	0.38	0.69	1.64	0.44	0.03	2.70	5.80	13.20	10.30	0.76	0.17	1.67
EZ301U	40	6000	0.89	1.93	0.46	0.56	0.95	2.02	0.49	0.04	2.80	12.7	11.70	39.80	3.40	0.19	1.50
EZ301U	40	3000	0.93	1.99	0.47	0.29	0.95	2.02	0.49	0.04	2.80	12.7	11.70	39.80	3.40	0.19	1.50
EZ302U	42	6000	1.50	3.18	0.47	0.94	1.68	3.48	0.49	0.04	5.00	17.8	4.50	18.70	4.16	0.29	2.10
EZ302U	86	3000	1.59	1.60	0.99	0.50	1.68	1.67	1.03	0.04	5.00	8.55	17.80	75.00	4.21	0.29	2.10
EZ303U	55	6000	1.96	3.17	0.62	1.2	2.25	3.55	0.65	0.04	7.00	16.9	4.90	21.10	4.31	0.40	2.60
EZ303U	109	3000	2.07	1.63	1.27	0.65	2.19	1.71	1.30	0.04	7.00	8.25	20.30	68.70	5.24	0.40	2.60
EZ401U	47	6000	2.30	4.56	0.50	1.4	2.80	5.36	0.53	0.04	8.50	33.0	1.94	11.52	5.94	0.93	4.00
EZ401U	96	3000	2.80	2.74	1.02	0.88	3.00	2.88	1.06	0.04	8.50	16.5	6.70	37.70	5.63	0.93	4.00
EZ402U	60	6000	3.50	5.65	0.62	2.2	4.90	7.43	0.66	0.04	16.0	43.5	1.20	8.88	7.40	1.63	5.10
EZ402U	94	3000	4.70	4.40	1.07	1.5	5.20	4.80	1.09	0.04	16.0	26.5	3.00	21.80	7.26	1.63	5.10
EZ404U	78	6000	5.80	7.18	0.81	3.6	8.40	9.78	0.86	0.04	29.0	51.0	0.89	7.07	7.94	2.98	7.20
EZ404U	116	3000	6.90	5.80	1.19	2.2	8.60	6.60	1.31	0.04	29.0	35.0	1.85	15.00	8.11	2.98	7.20
EZ501U	68	6000	3.40	4.77	0.71	2.1	4.40	5.80	0.77	0.06	16.0	31.0	2.10	12.10	5.76	2.90	5.00
EZ501U	97	3000	4.30	3.74	1.15	1.4	4.70	4.00	1.19	0.06	16.0	22.0	3.80	23.50	6.18	2.90	5.00
EZ502U	72	6000	5.20	7.35	0.71	3.3	7.80	9.80	0.80	0.06	31.0	59.0	0.76	5.60	7.37	5.20	6.50
EZ502U	121	3000	7.40	5.46	1.36	2.3	8.00	5.76	1.40	0.06	31.0	33.0	2.32	16.80	7.24	5.20	6.50
EZ503U	84	6000	6.20	7.64	0.81	3.9	10.6	11.6	0.92	0.06	43.0	63.5	0.62	5.00	8.06	7.58	8.00
EZ503U	119	3000	9.70	6.90	1.41	3.1	11.1	7.67	1.46	0.06	43.0	41.0	1.25	10.00	8.00	7.58	8.00
EZ505U	103	4500	9.50	8.94	1.06	4.5	15.3	13.4	1.15	0.06	67.0	73.0	0.50	4.47	8.94	12.2	10.9
EZ505U	141	3000	13.5	8.80	1.53	4.2	16.0	10.0	1.61	0.06	67.0	52.0	0.93	8.33	8.96	12.2	10.9
EZ701U	76	6000	5.20	6.68	0.78	3.3	7.90	9.38	0.87	0.24	20.0	31.0	0.87	8.13	9.34	8.50	8.30
EZ701U	95	3000	7.40	7.20	1.03	2.3	8.30	8.00	1.07	0.24	20.0	25.0	1.30	12.83	9.87	8.50	8.30
EZ702U	82	6000	7.20	8.96	0.80	4.5	14.3	16.5	0.88	0.24	41.0	60.5	0.34	3.90	11.47	13.7	10.8
EZ702U	133	3000	12.0	8.20	1.46	3.8	14.4	9.60	1.53	0.24	41.0	36.0	1.00	11.73	11.73	13.7	10.8
EZ703U	99	4500	12.1	11.5	1.05	5.7	20.0	17.8	1.14	0.24	65.0	78.0	0.36	4.42	12.28	21.6	12.8
EZ703U	122	3000	16.5	11.4	1.45	5.2	20.8	14.0	1.50	0.24	65.0	62.0	0.52	6.80	13.08	21.6	12.8
EZ705U	106	4500	16.4	14.8	1.11	7.7	30.0	25.2	1.20	0.24	104	114	0.22	2.76	12.55	34.0	18.3
EZ705U	140	3000	21.3	14.2	1.50	6.7	30.2	19.5	1.56	0.24	104	87.0	0.33	4.80	14.55	34.0	18.3
EZ802U	90	4500	10.5	11.2	0.94	5.0	34.5	33.3	1.05	0.30	100	135	0.13	1.90	14.60	58.0	26.6
EZ802U	136	3000	22.3	13.9	1.60	7.0	37.1	22.3	1.68	0.30	100	84.0	0.30	5.00	16.66	58.0	26.6
EZ803U	131	3000	26.6	17.7	1.50	8.4	48.2	31.1	1.56	0.30	145	124	0.18	2.79	15.50	83.5	32.7
EZ805U	142	2000	43.7	25.9	1.69	9.2	66.1	37.9	1.75	0.30	205	155	0.13	2.22	17.08	133	45.8

11.2.2 EZ motors with forced ventilation

Type	K_{EM} [V/1000 rpm]	n_N [rpm]	M_N [Nm]	I_N [A]	$K_{M,N}$ [Nm/A]	P_N [kW]	M_0 [Nm]	I_0 [A]	K_{M0} [Nm/A]	M_R [Nm]	M_{max} [Nm]	I_{max} [A]	R_{U-V} [Ω]	L_{U-V} [mH]	T_{el} [ms]	J_{dyn} [kgcm²]	m_{dyn} [kg]
EZ401B	47	6000	2.90	5.62	0.52	1.8	3.50	6.83	0.52	0.04	8.50	33.0	1.94	11.52	5.94	0.93	5.40
EZ401B	96	3000	3.40	3.40	1.00	1.1	3.70	3.60	1.04	0.04	8.50	16.5	6.70	37.70	5.63	0.93	5.40
EZ402B	60	6000	5.10	7.88	0.65	3.2	6.40	9.34	0.69	0.04	16.0	43.5	1.20	8.88	7.40	1.63	6.50
EZ402B	94	3000	5.90	5.50	1.07	1.9	6.30	5.80	1.09	0.04	16.0	26.5	3.00	21.80	7.26	1.63	6.50
EZ404B	78	6000	8.00	9.98	0.80	5.0	10.5	12.0	0.88	0.04	29.0	51.0	0.89	7.07	7.94	2.98	8.60
EZ404B	116	3000	10.2	8.20	1.24	3.2	11.2	8.70	1.29	0.04	29.0	35.0	1.85	15.00	8.11	2.98	8.60
EZ501B	68	6000	4.50	6.70	0.67	2.8	5.70	7.50	0.77	0.06	16.0	31.0	2.10	12.10	5.76	2.90	7.00
EZ501B	97	3000	5.40	4.70	1.15	1.7	5.80	5.00	1.17	0.06	16.0	22.0	3.80	23.50	6.18	2.90	7.00
EZ502B	72	6000	8.20	11.4	0.72	5.2	10.5	13.4	0.79	0.06	31.0	59.0	0.76	5.60	7.37	5.20	8.50
EZ502B	121	3000	10.3	7.80	1.32	3.2	11.2	8.16	1.38	0.06	31.0	33.0	2.32	16.80	7.24	5.20	8.50
EZ503B	84	6000	10.4	13.5	0.77	6.5	14.8	15.9	1.07	0.06	43.0	63.5	0.62	5.00	8.06	7.58	10.0
EZ503B	119	3000	14.4	10.9	1.32	4.5	15.9	11.8	1.35	0.06	43.0	41.0	1.25	10.00	8.00	7.58	10.0
EZ505B	103	4500	16.4	16.4	1.00	7.7	22.0	19.4	1.14	0.06	67.0	73.0	0.50	4.47	8.94	12.2	12.9
EZ505B	141	3000	20.2	13.7	1.47	6.4	23.4	14.7	1.60	0.06	67.0	52.0	0.93	8.33	8.96	12.2	12.9
EZ701B	76	6000	7.50	10.6	0.71	4.7	10.2	12.4	0.84	0.24	20.0	31.0	0.87	8.13	9.34	8.50	11.2
EZ701B	95	3000	9.70	9.50	1.02	3.1	10.5	10.0	1.07	0.24	20.0	25.0	1.30	12.83	9.87	8.50	11.2
EZ702B	82	6000	12.5	16.7	0.75	7.9	19.3	22.1	0.89	0.24	41.0	60.5	0.34	3.90	11.47	13.7	13.7
EZ702B	133	3000	16.6	11.8	1.41	5.2	19.3	12.9	1.51	0.24	41.0	36.0	1.00	11.73	11.73	13.7	13.7
EZ703B	99	4500	19.8	20.3	0.98	9.3	27.2	24.2	1.13	0.24	65.0	78.0	0.36	4.42	12.28	21.6	15.7
EZ703B	122	3000	24.0	18.2	1.32	7.5	28.0	20.0	1.41	0.24	65.0	62.0	0.52	6.80	13.08	21.6	15.7
EZ705B	106	4500	27.7	25.4	1.09	13	39.4	32.8	1.21	0.24	104	114	0.22	2.76	12.55	34.0	21.2
EZ705B	140	3000	33.8	22.9	1.48	11	41.8	26.5	1.59	0.24	104	87.0	0.33	4.80	14.55	34.0	21.2
EZ802B	90	4500	30.6	30.5	1.00	14	47.4	45.1	1.06	0.30	100	135	0.13	1.90	14.60	58.0	31.6
EZ802B	136	3000	34.3	26.5	1.29	11	47.9	28.9	1.67	0.30	100	84.0	0.30	5.00	16.66	58.0	31.6
EZ803B	131	3000	49.0	35.9	1.37	15	66.7	42.3	1.58	0.30	145	124	0.18	2.79	15.50	83.5	37.7
EZ805B	142	2000	77.2	45.2	1.71	16	94.0	53.9	1.75	0.30	205	155	0.13	2.22	17.08	133	51.8

11.3 Torque/speed curves

Torque/speed curves depend on the nominal speed and/or winding design of the motor and the DC link voltage of the drive controller that is used. The following torque/speed curves apply to the DC link voltage DC 540 V.

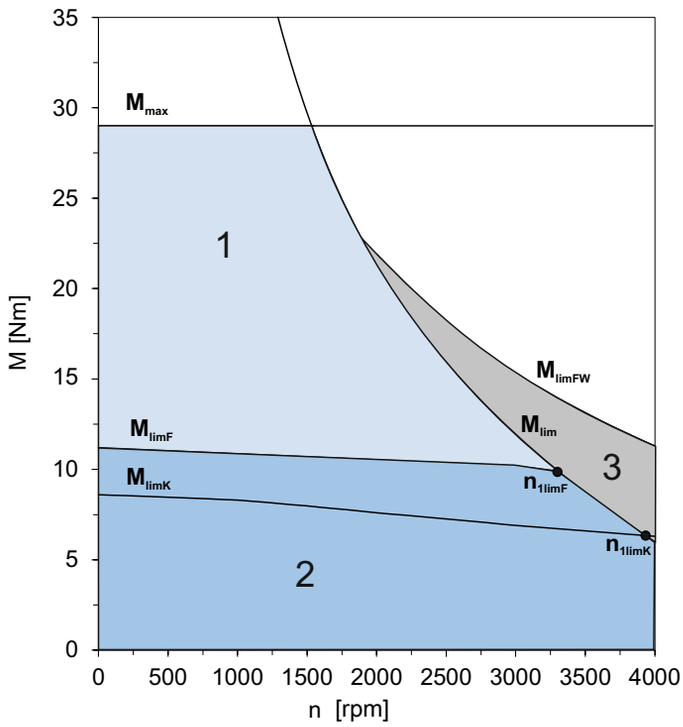
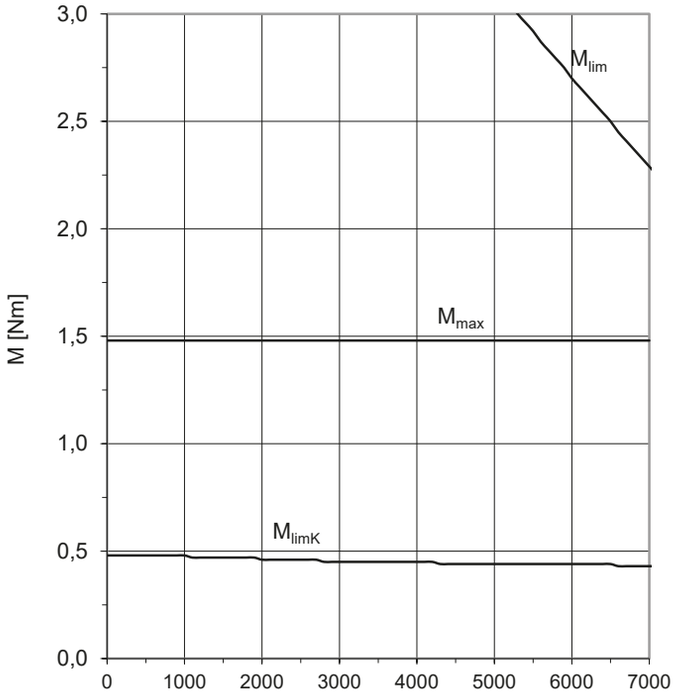


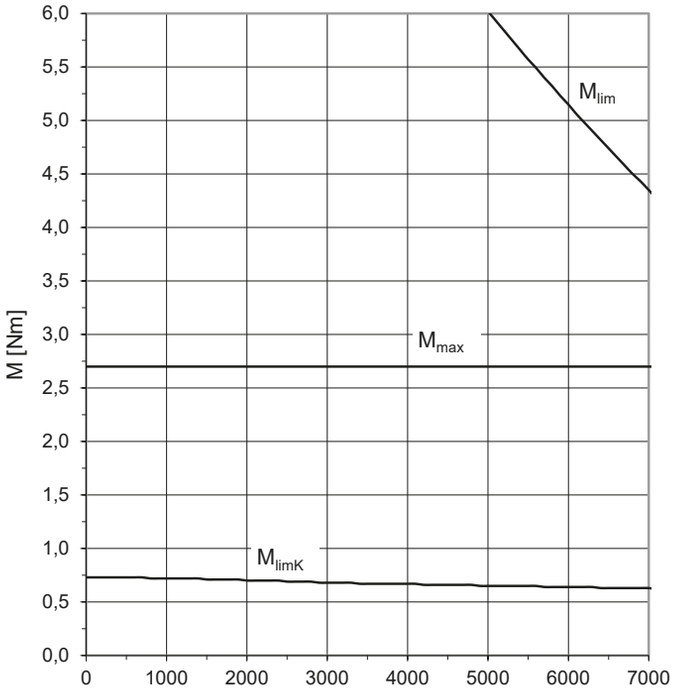
Fig. 1: Explanation of a torque/speed curve

1	Torque range for brief operation (ED_{10} < 100%) with $\Delta\vartheta$ = 100 K	2	Torque range for continuous operation with constant load (S1 mode, ED_{10} = 100%) with $\Delta\vartheta$ = 100 K
3	Field weakening range (can be used only with operation on STOBER drive controllers)		

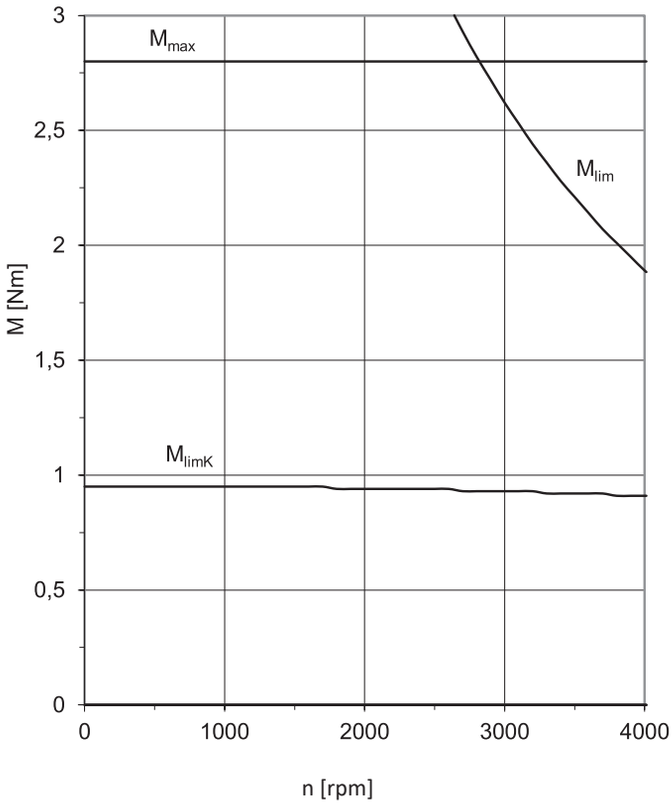
EZ202 (n_N=6000 rpm)



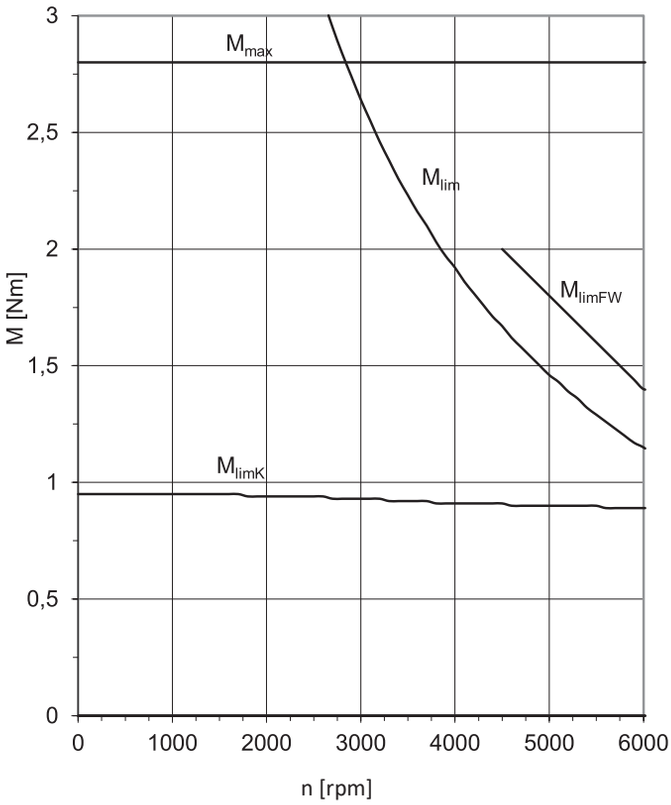
EZ203 (n_N=6000 rpm)



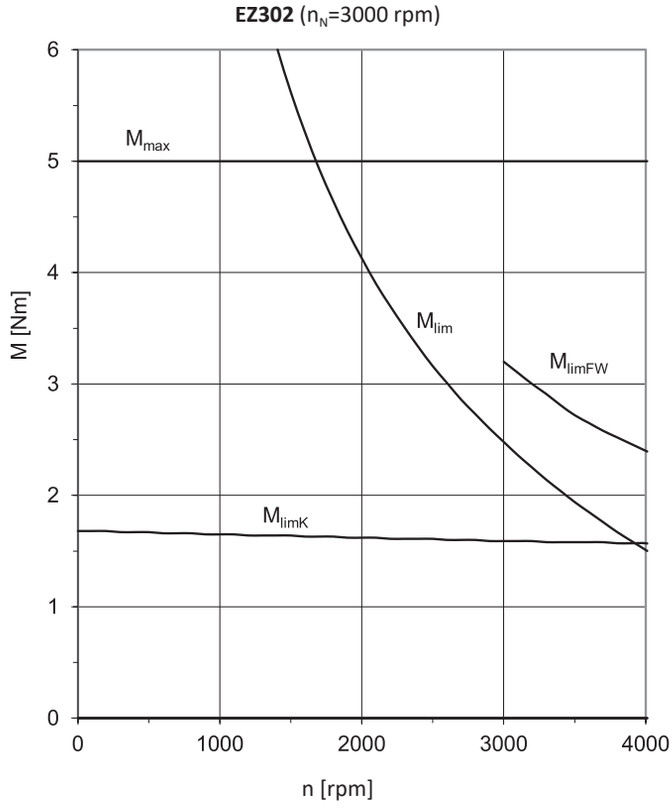
EZ301 (n_N=3000 rpm)



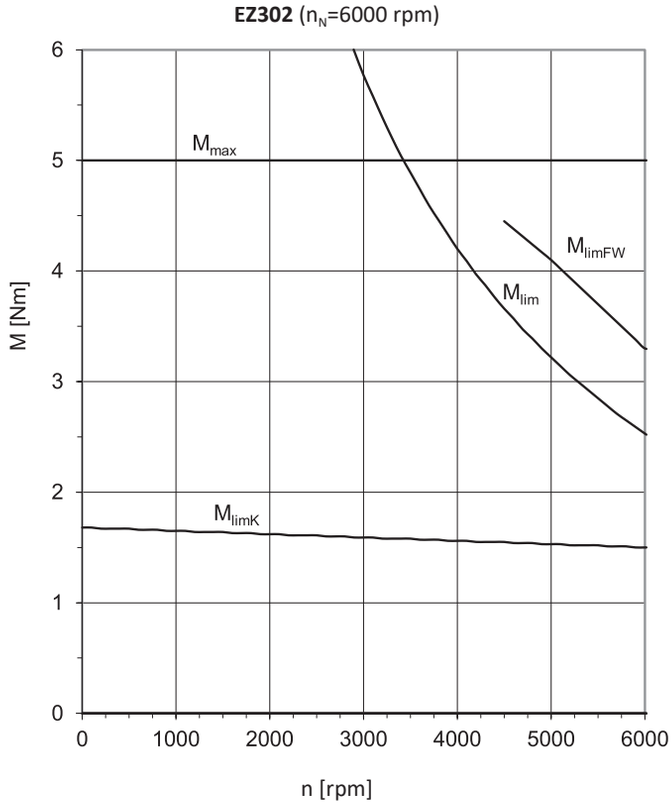
EZ301 (n_N=6000 rpm)



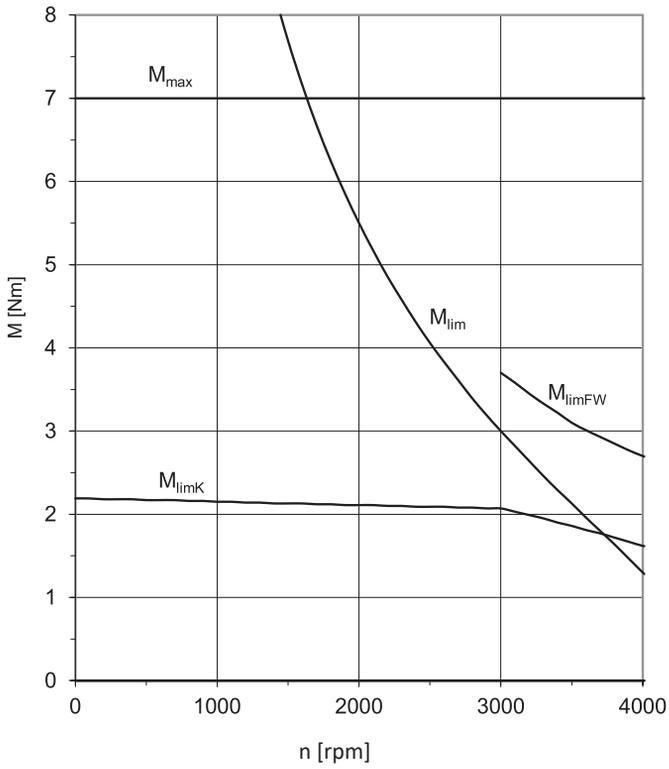
EZ302 (n_N=3000 rpm)



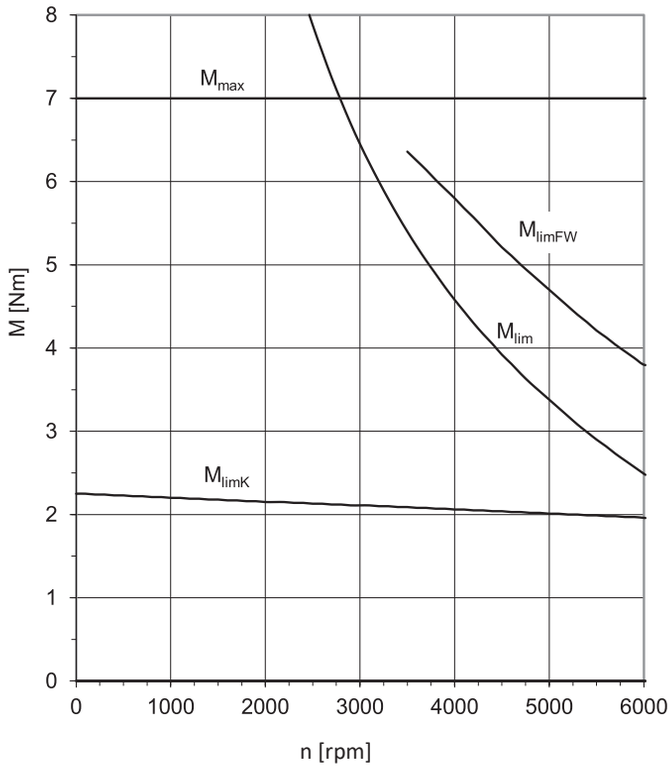
EZ302 (n_N=6000 rpm)



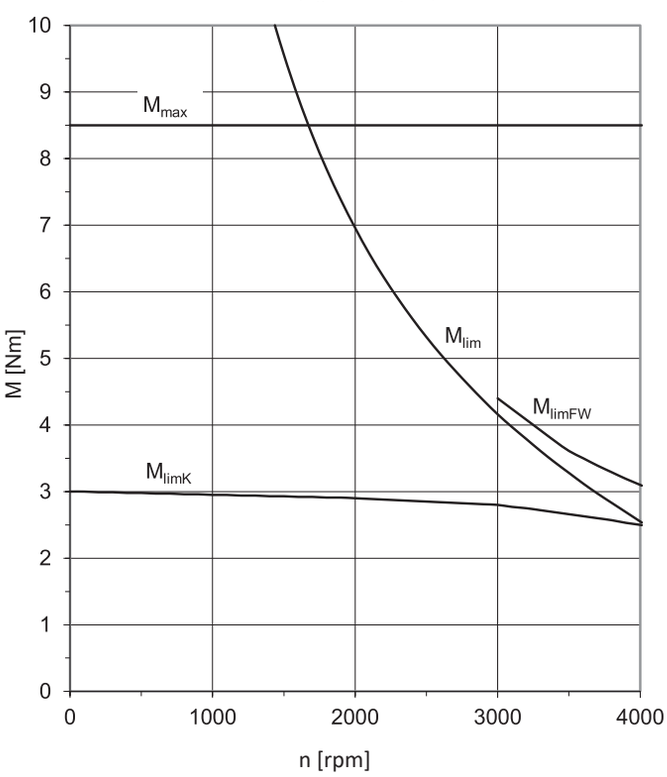
EZ303 (n_N=3000 rpm)



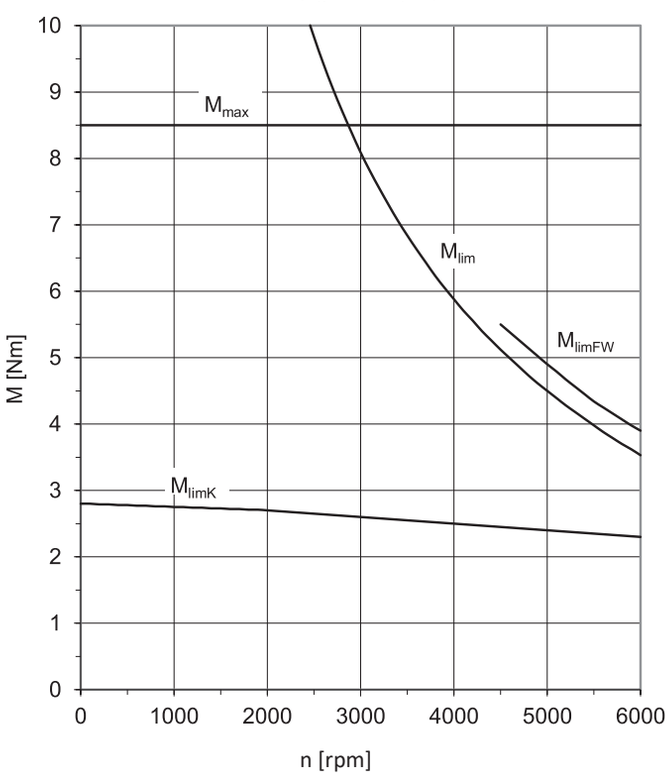
EZ303 (n_N=6000 rpm)



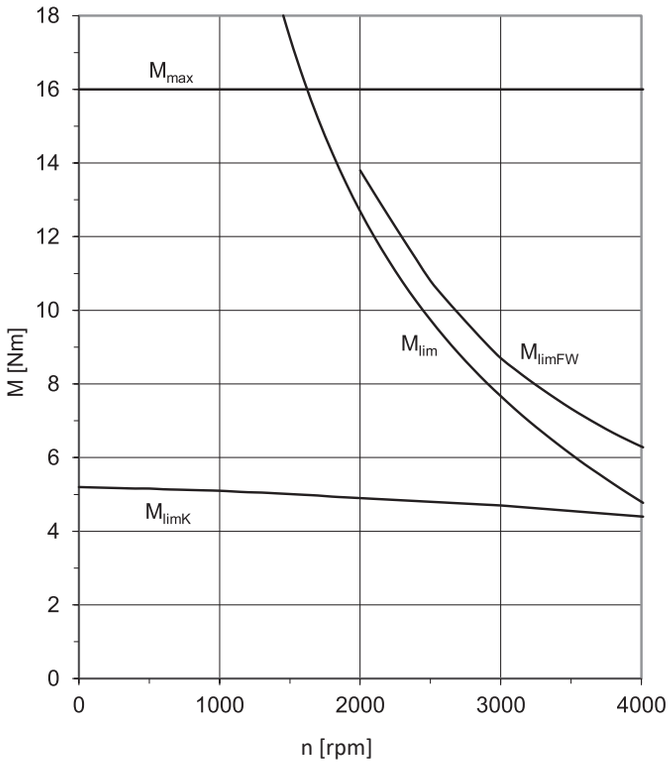
EZ401 (n_N=3000 rpm)



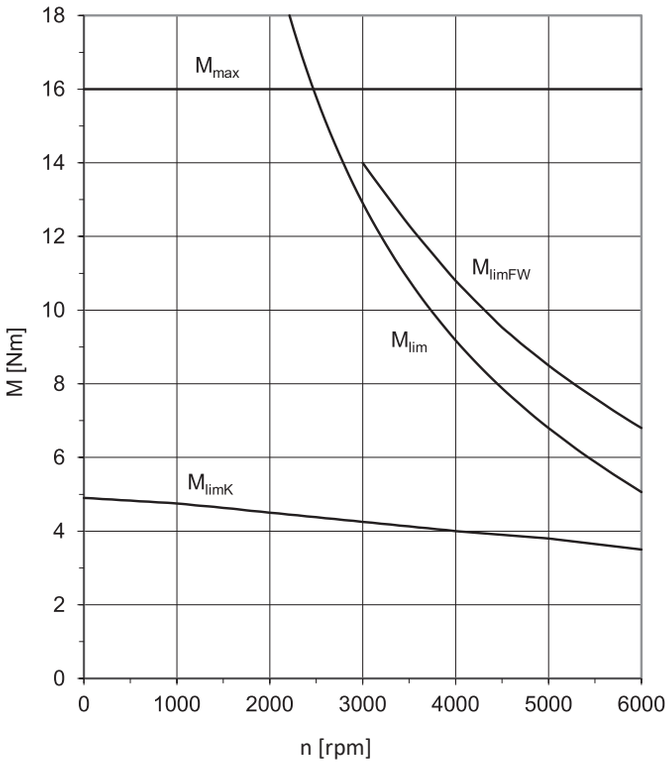
EZ401 (n_N=6000 rpm)



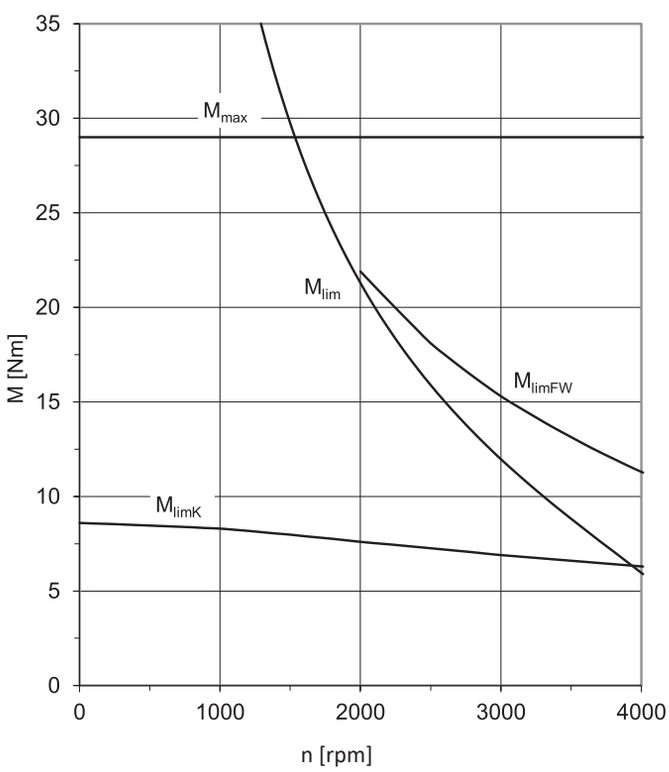
EZ402 (n_N=3000 rpm)



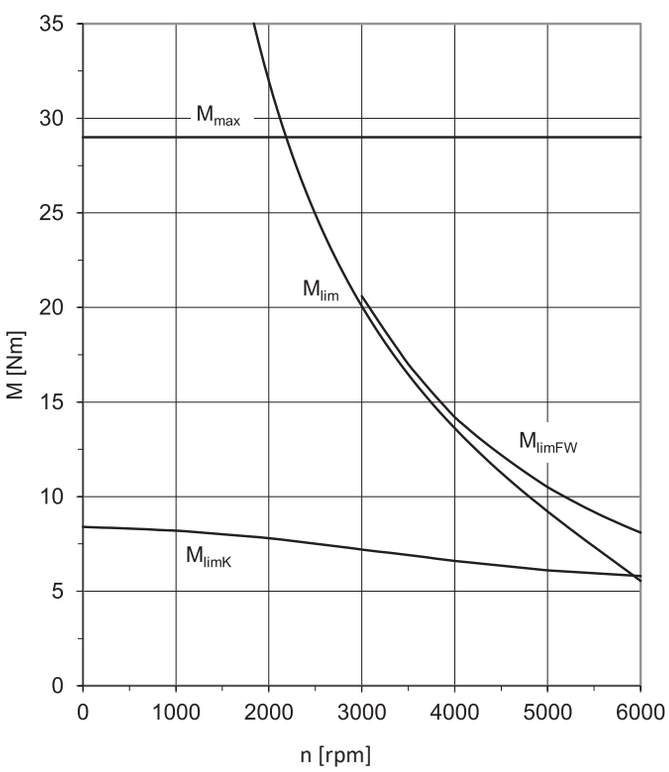
EZ402 (n_N=6000 rpm)



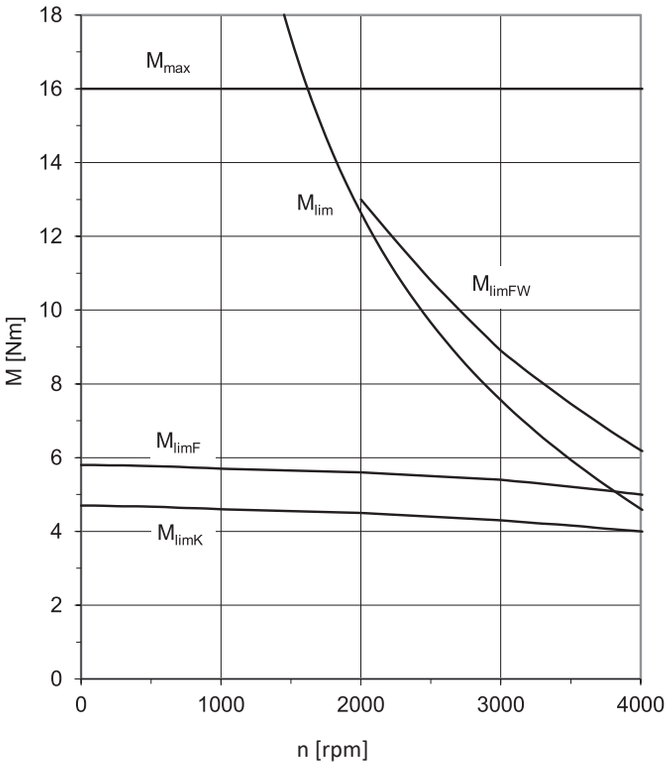
EZ404 (n_N=3000 rpm)



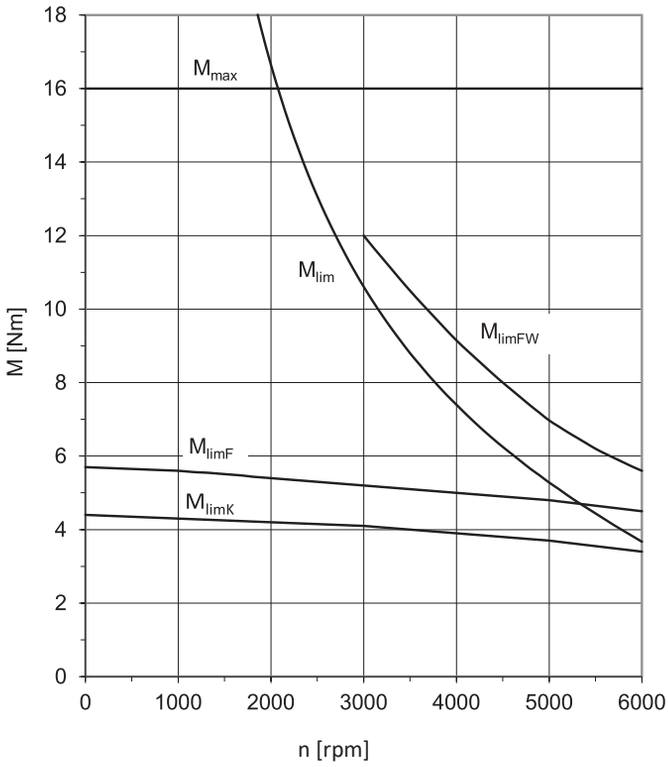
EZ404 (n_N=6000 rpm)



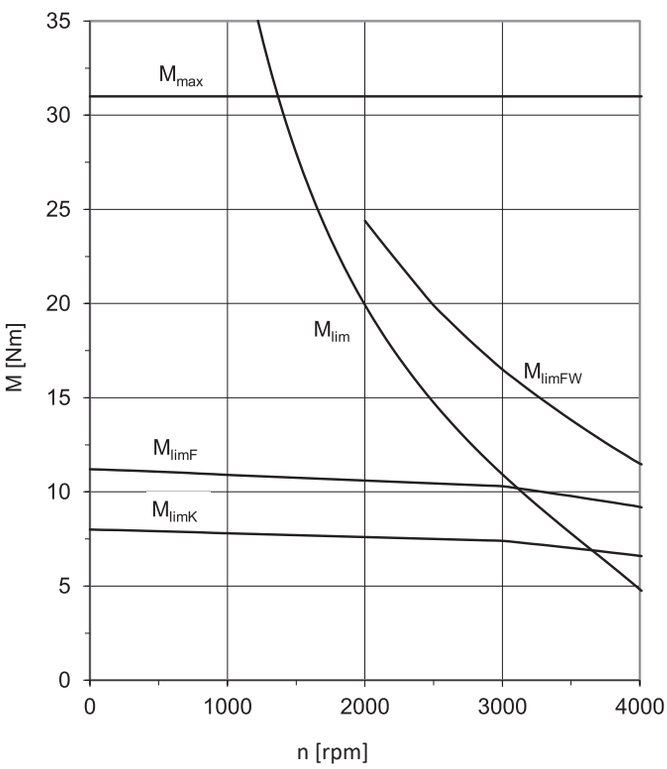
EZ501 (n_N=3000 rpm)



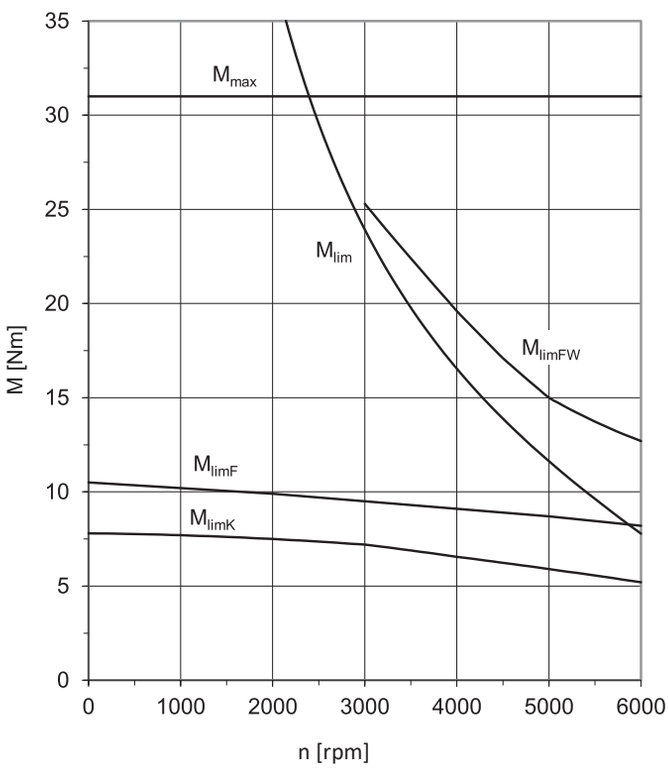
EZ501 (n_N=6000 rpm)



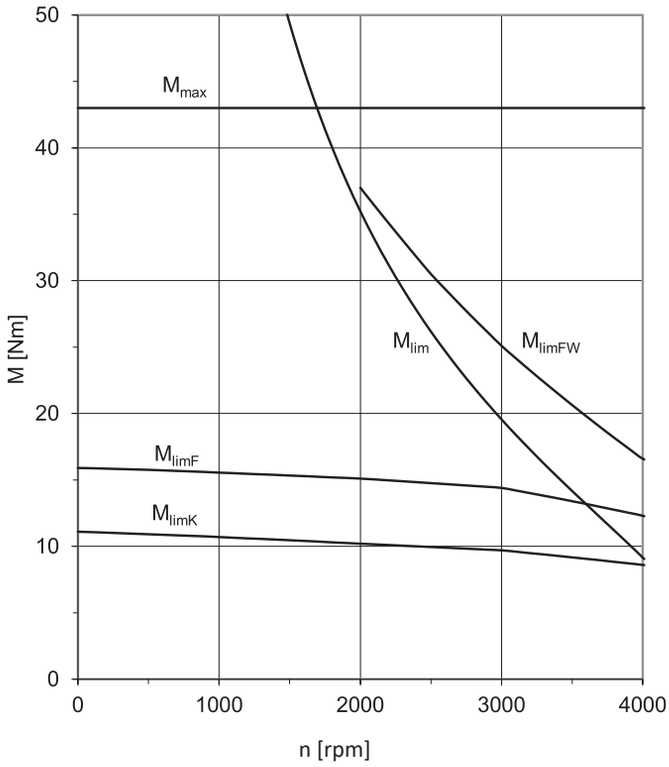
EZ502 (n_N=3000 rpm)



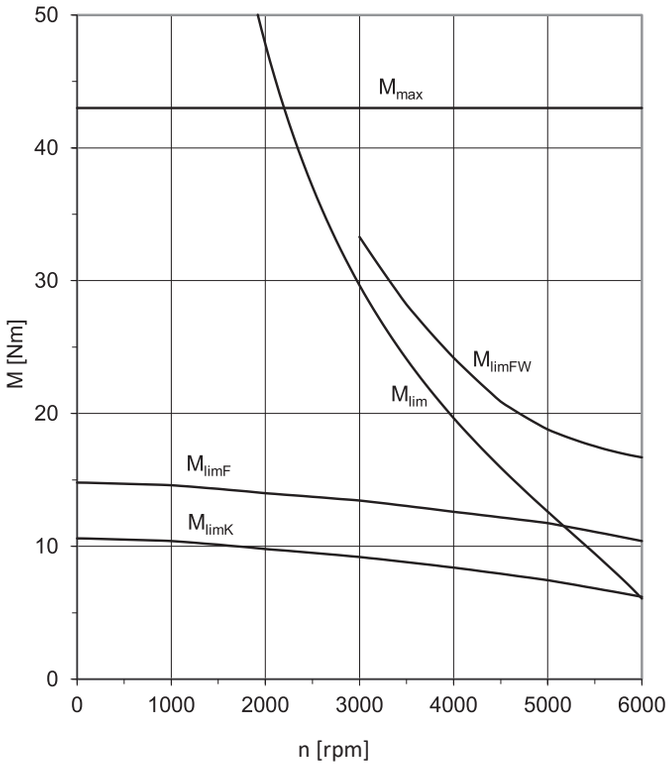
EZ502 (n_N=6000 rpm)



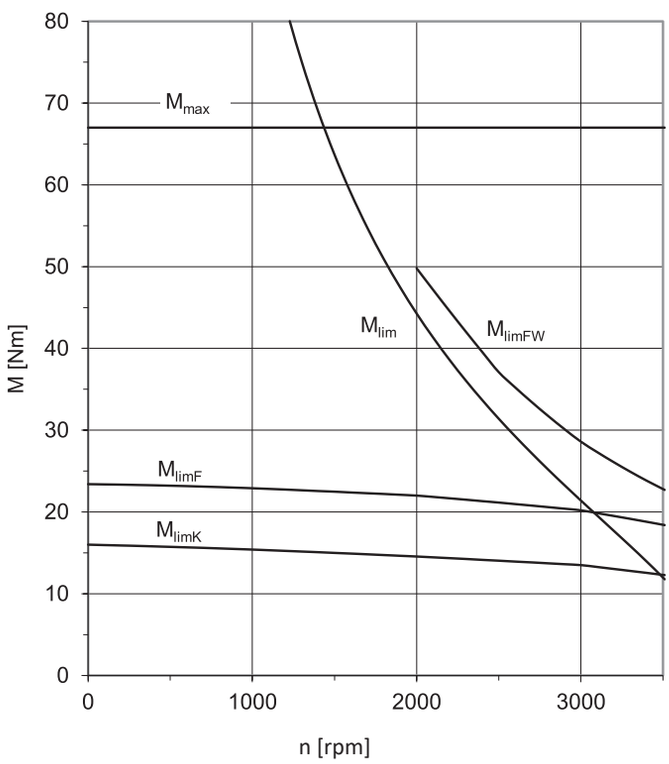
EZ503 (n_N=3000 rpm)



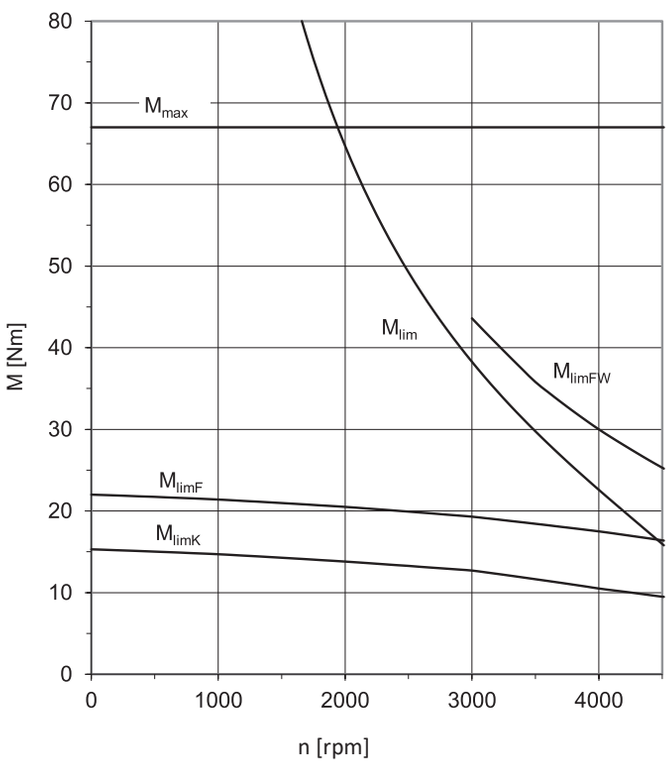
EZ503 (n_N=6000 rpm)



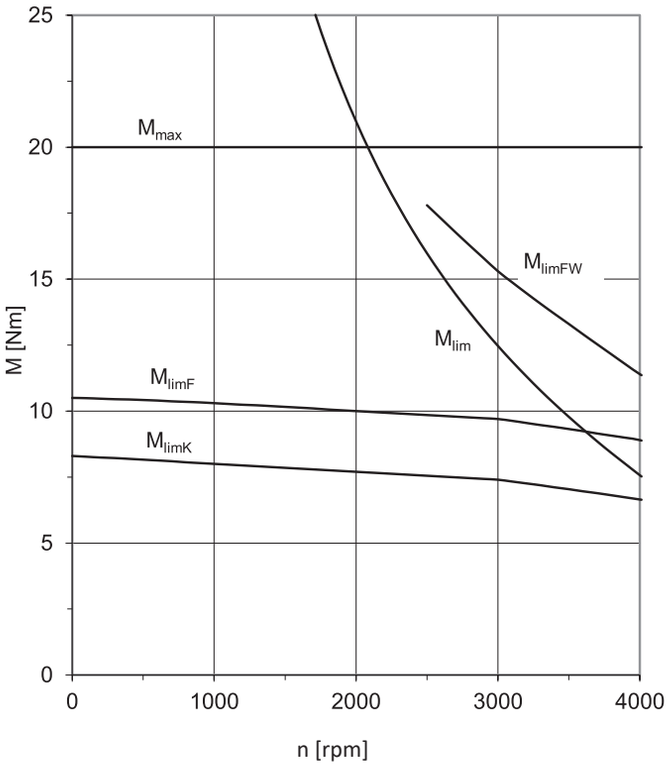
EZ505 (n_N=3000 rpm)



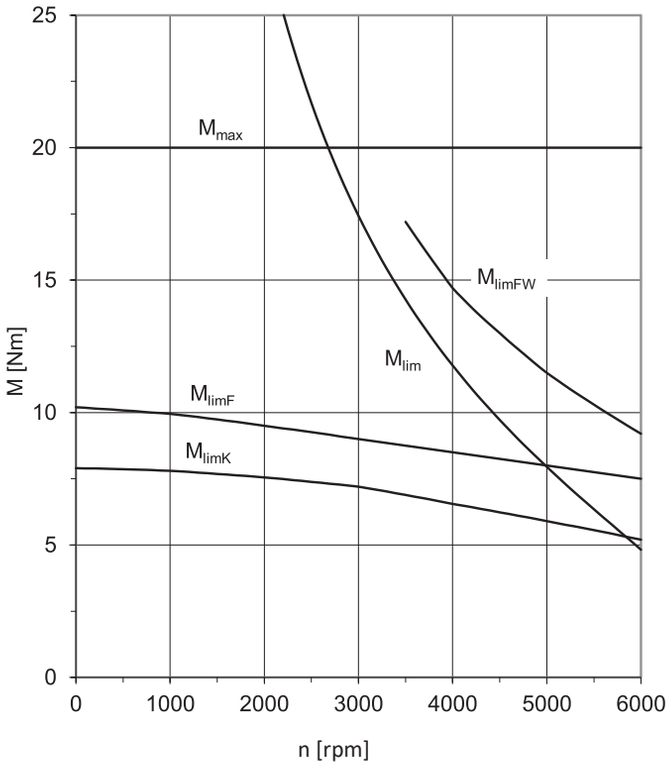
EZ505 (n_N=4500 rpm)



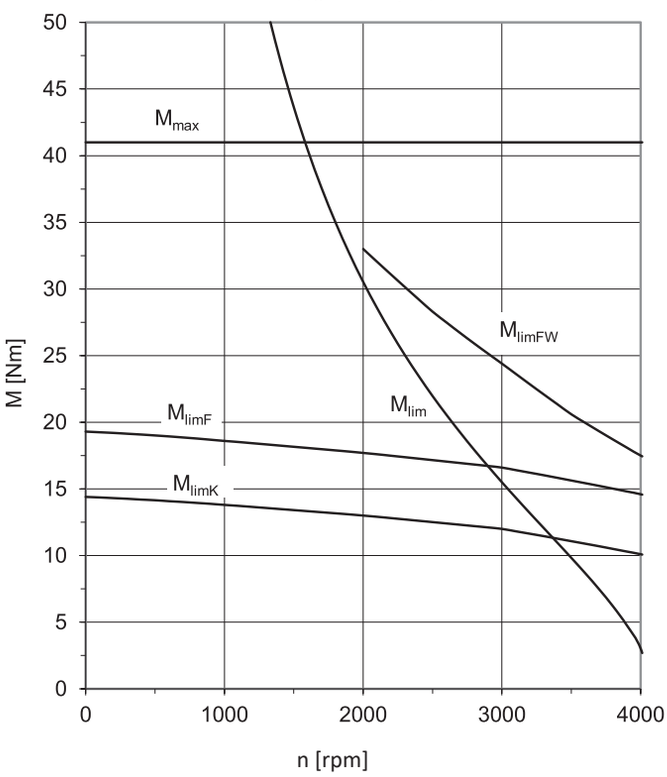
EZ701 (n_N=3000 rpm)



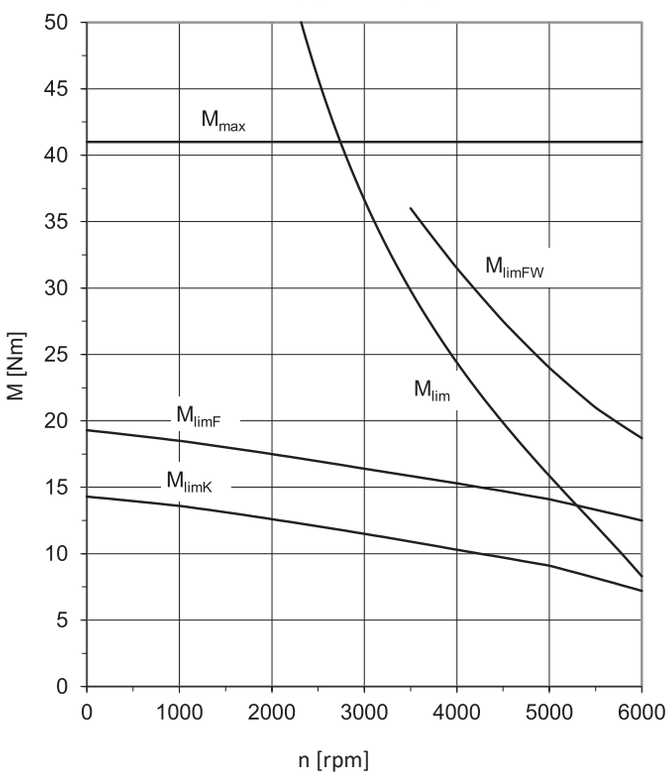
EZ701 (n_N=6000 rpm)



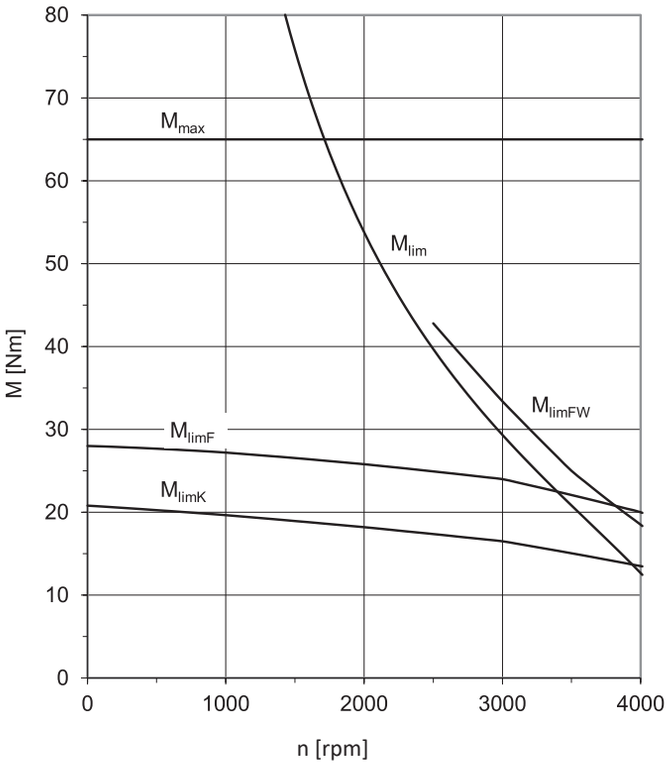
EZ702 (n_N=3000 rpm)



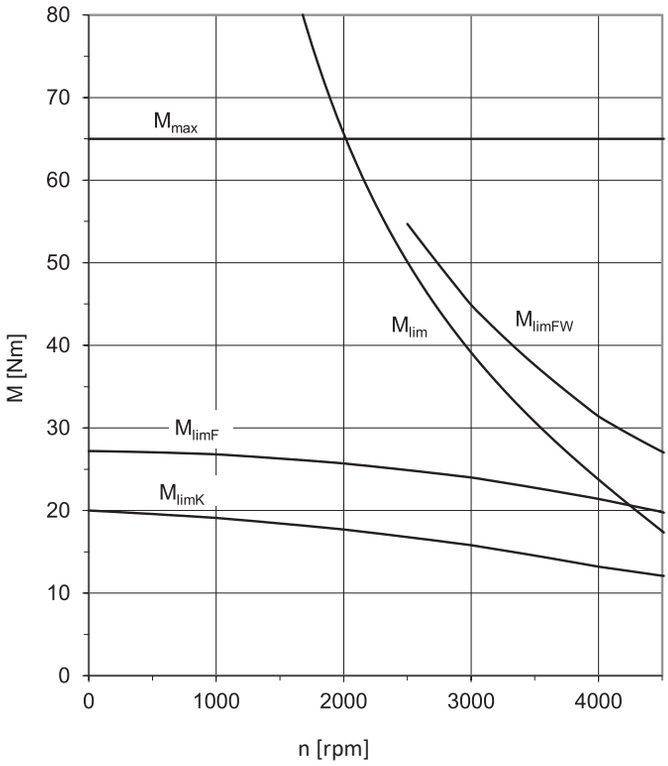
EZ702 (n_N=6000 rpm)



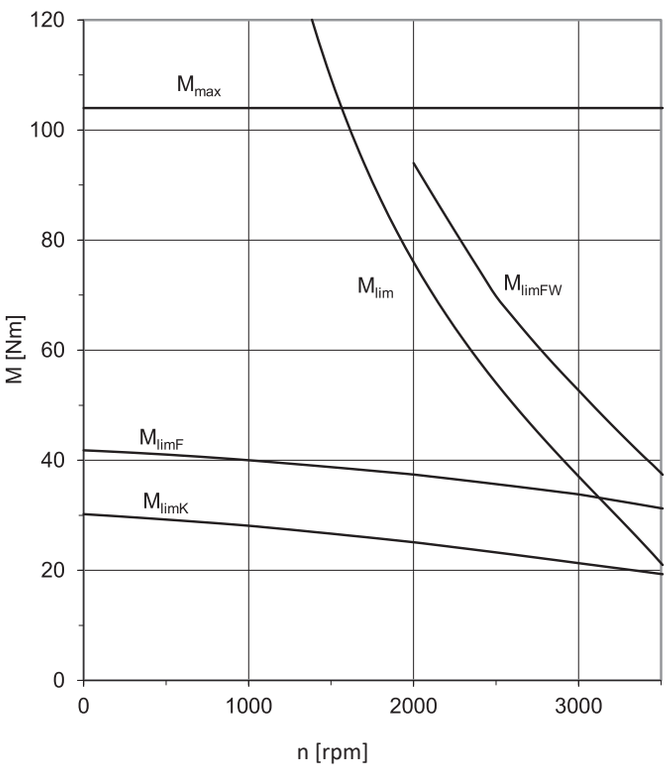
EZ703 (n_N=3000 rpm)



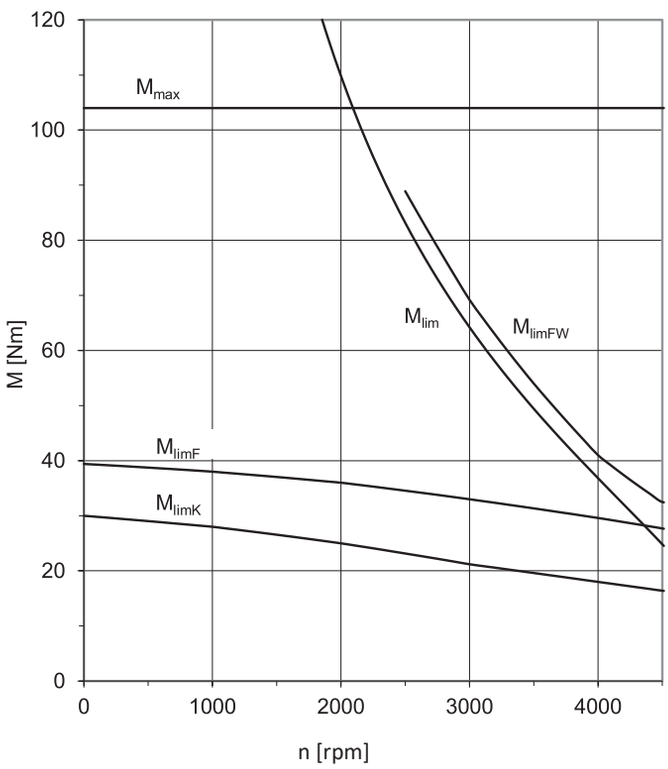
EZ703 (n_N=4500 rpm)



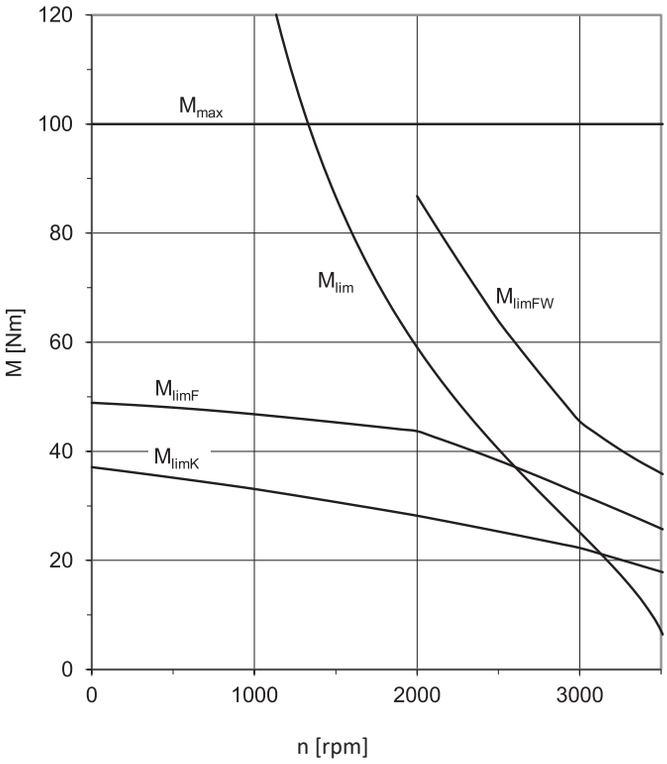
EZ705 (n_N=3000 rpm)



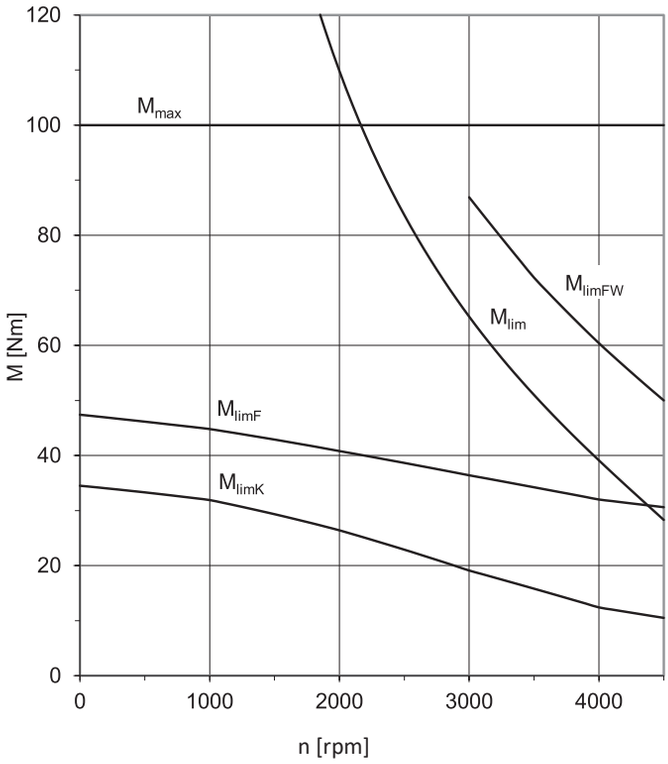
EZ705 (n_N=4500 rpm)



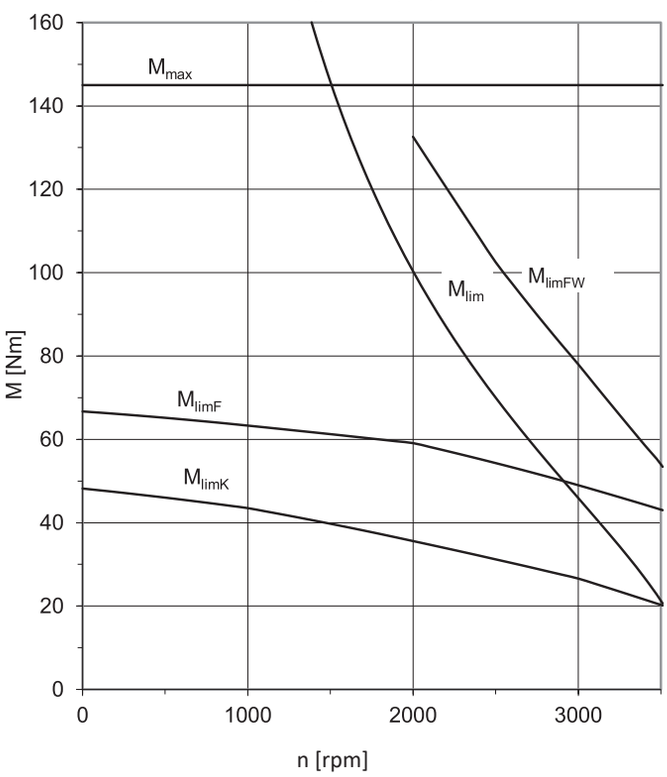
EZ802 (n_N=3000 rpm)



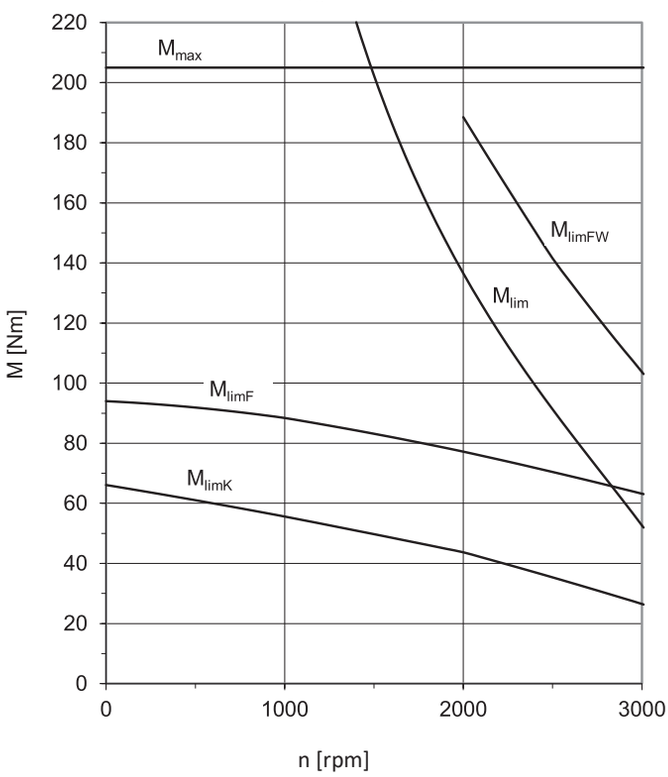
EZ802 (n_N=4500 rpm)



EZ803 (n_N=3000 rpm)



EZ805 (n_N=2000 rpm)



11.4 Dimensional drawings

In this chapter, you can find the dimensions of the motors.

Dimensions can exceed the specifications of ISO 2768-mK due to casting tolerances or accumulation of individual tolerances.

We reserve the right to make dimensional changes due to ongoing technical development.

You can download 3D models of our standard drives at https://configurator.stoeber.de/en-US/.

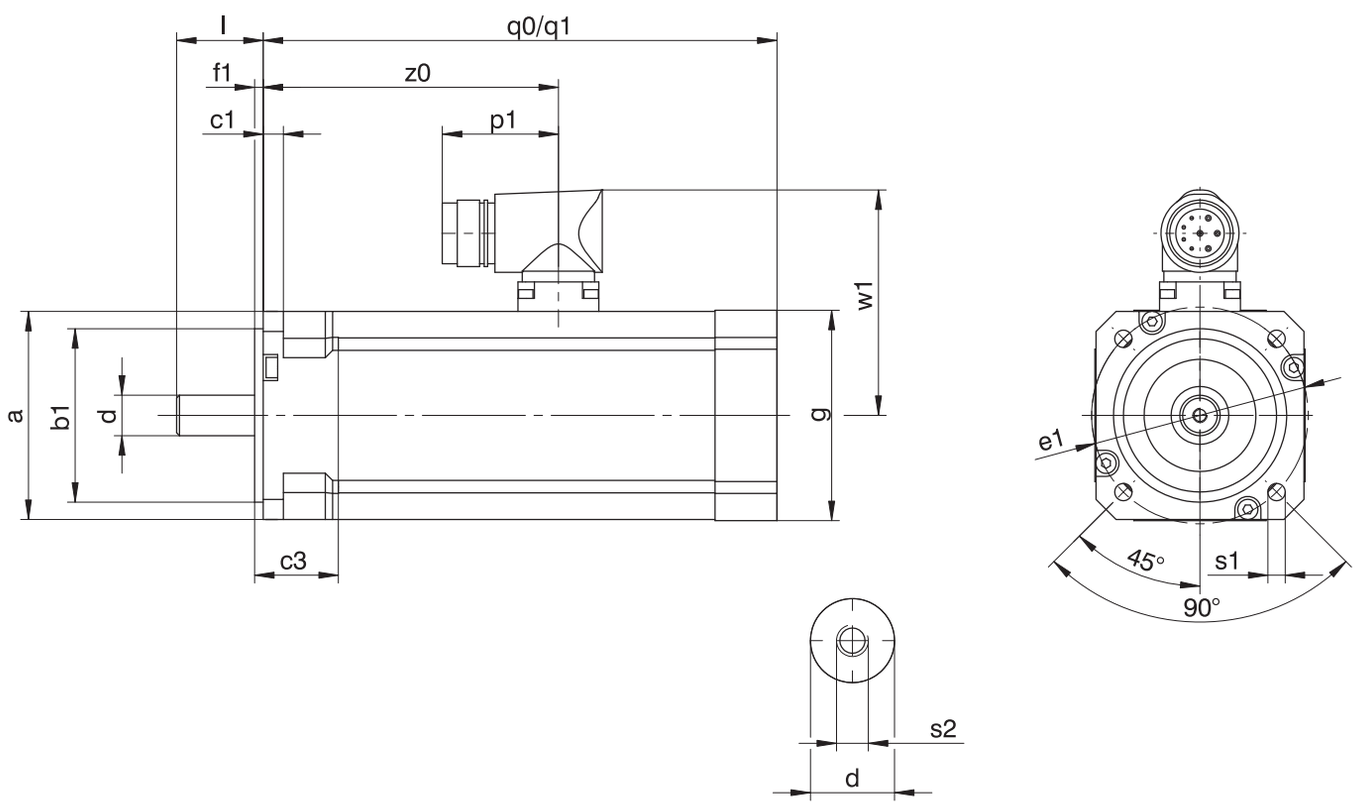
Tolerances

Solid shaft	Tolerance
Shaft ∅ fit ≤ 50 mm	DIN 748-1, ISO k6
Shaft ∅ fit > 50 mm	DIN 748-1, ISO m6

Centering holes in solid shafts in accordance with DIN 332-2, DR shape

Thread size	M4	M5	M6	M8	M10	M12	M16	M20	M24
Thread depth [mm]	10	12.5	16	19	22	28	36	42	50

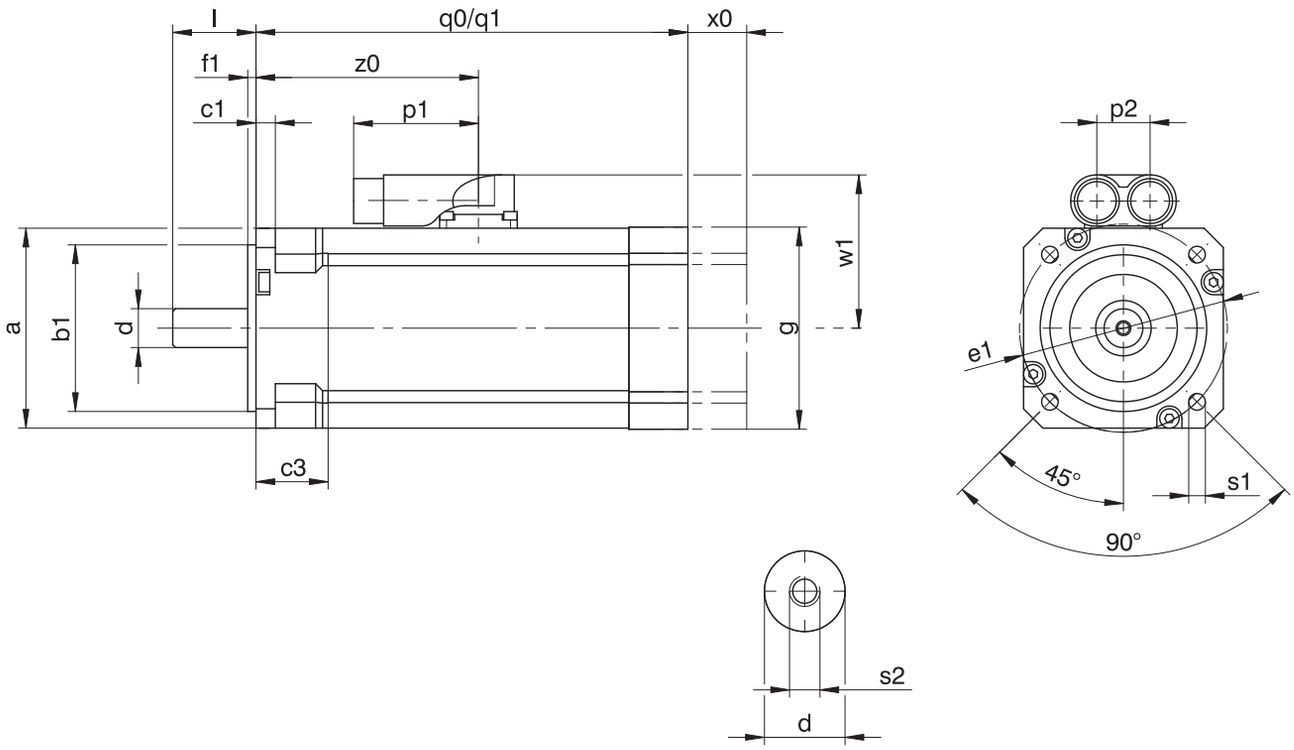
11.4.1 EZ2 – EZ3 motors (One Cable Solution)



q0 Applies to motors without holding brake q1 Applies to motors with holding brake

Type	□a	Øb1	c1	c3	Ød	Øe1	f1	□g	l	p1	q0	q1	Øs1	s2	w1	z0
EZ202U	55	40_{j6}	7	7	9_{k6}	63	3.5	55	20	40	148	157	5.8	M4	69.5	93.0
EZ203U	55	40_{j6}	7	7	9_{k6}	63	3.5	55	20	40	166	175	5.8	M4	69.5	111.0
EZ301U	72	60_{j6}	7	26	14_{k6}	75	3.0	72	30	40	116	156	6.0	M5	78.0	80.5
EZ302U	72	60_{j6}	7	26	14_{k6}	75	3.0	72	30	40	138	178	6.0	M5	78.0	102.5
EZ303U	72	60_{j6}	7	26	14_{k6}	75	3.0	72	30	40	160	200	6.0	M5	78.0	124.5

11.4.2 EZ2 – EZ3 motors



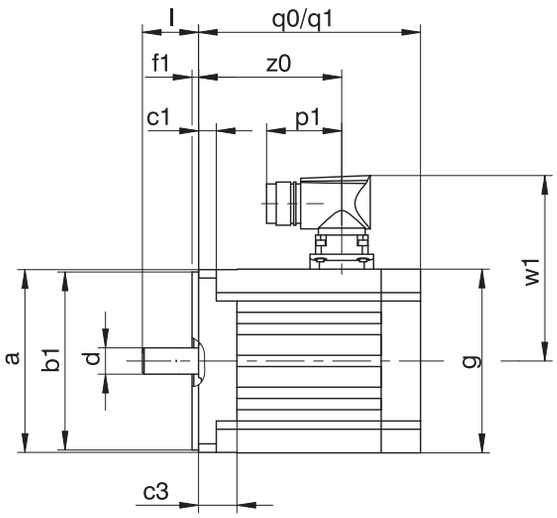
q0 Applies to motors without holding brake

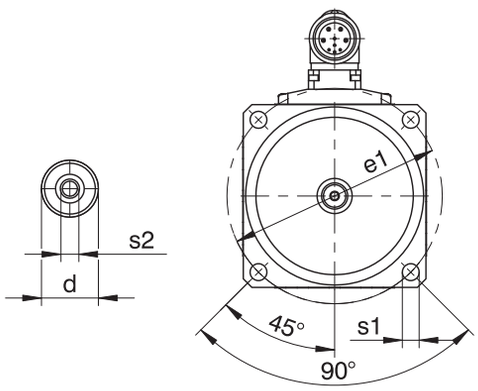
q1 Applies to motors with holding brake

x0 EZ2: Applies only to motors with holding brake and encoders using an optical or inductive measuring method
EZ3 – EZ8: Applies to encoders using an optical measuring method

Type	□a	Øb1	c1	c3	Ød	Øe1	f1	□g	l	p1	p2	q0	q1	Øs1	s2	w1	x0	z0
EZ202U	55	40_{j6}	7	7	9_{k6}	63	3.5	55	20	45	19	148	157	5.8	M4	47.0	25	93.0
EZ203U	55	40_{j6}	7	7	9_{k6}	63	3.5	55	20	45	19	166	175	5.8	M4	47.0	25	111.0
EZ301U	72	60_{j6}	7	26	14_{k6}	75	3.0	72	30	45	19	116	156	6.0	M5	55.5	21	80.5
EZ302U	72	60_{j6}	7	26	14_{k6}	75	3.0	72	30	45	19	138	178	6.0	M5	55.5	21	102.5
EZ303U	72	60_{j6}	7	26	14_{k6}	75	3.0	72	30	45	19	160	200	6.0	M5	55.5	21	124.5

11.4.3 EZ4 – EZ7 motors with convection cooling (One Cable Solution)



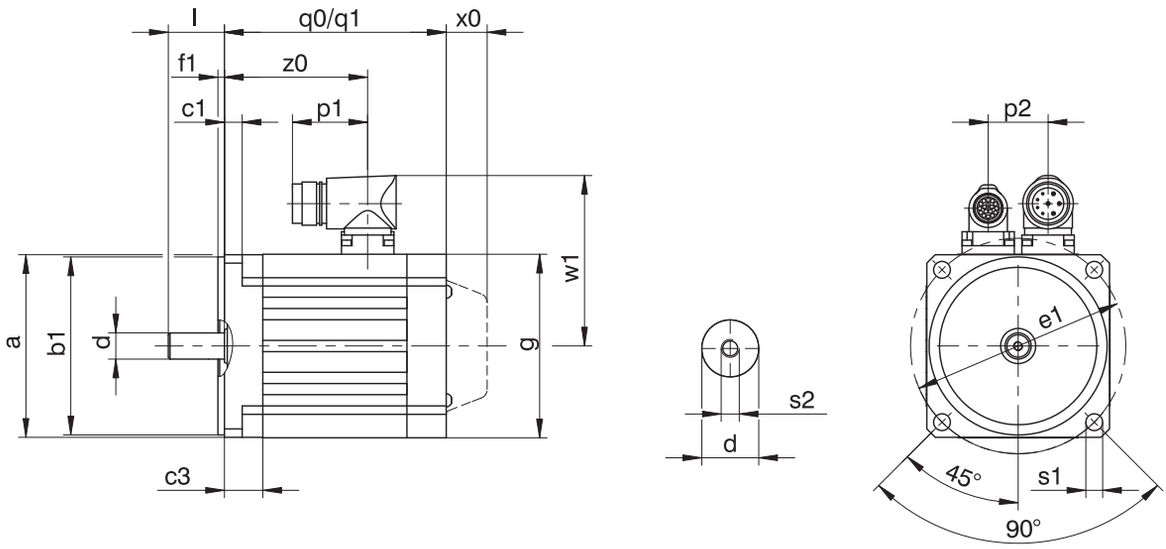


q0 Applies to motors without holding brake

q1 Applies to motors with holding brake

Type	□a	Ø$b1_{j6}$	c1	c3	Ød_{k6}	Øe1	f1	□g	l	p1	q0	q1	Øs1	s2	w1	z0
EZ401U	98	95_{j6}	9.5	20.5	14_{k6}	115	3.5	98	30	40	118.5	167.0	9	M5	99	76.5
EZ402U	98	95_{j6}	9.5	20.5	19_{k6}	115	3.5	98	40	40	143.5	192.0	9	M6	99	101.5
EZ404U	98	95_{j6}	9.5	20.5	19_{k6}	115	3.5	98	40	40	193.5	242.0	9	M6	99	151.5
EZ501U	115	110_{j6}	10.0	16.0	19_{k6}	130	3.5	115	40	40	109.0	163.5	9	M6	110	74.5
EZ502U	115	110_{j6}	10.0	16.0	19_{k6}	130	3.5	115	40	40	134.0	188.5	9	M6	110	99.5
EZ503U	115	110_{j6}	10.0	16.0	24_{k6}	130	3.5	115	50	40	159.0	213.5	9	M8	110	124.5
EZ505U	115	110_{j6}	10.0	16.0	24_{k6}	130	3.5	115	50	40	209.0	263.5	9	M8	110	174.5
EZ701U	145	130_{j6}	10.0	19.0	24_{k6}	165	3.5	145	50	40	121.0	180.0	11	M8	125	83.0
EZ702U	145	130_{j6}	10.0	19.0	24_{k6}	165	3.5	145	50	40	146.0	205.0	11	M8	125	108.0
EZ703U	145	130_{j6}	10.0	19.0	24_{k6}	165	3.5	145	50	40	171.0	230.0	11	M8	125	133.0
EZ705U	145	130_{j6}	10.0	19.0	32_{k6}	165	3.5	145	58	40	226.0	285.0	11	M12	125	184.0

11.4.4 EZ4 – EZ8 motors with convection cooling



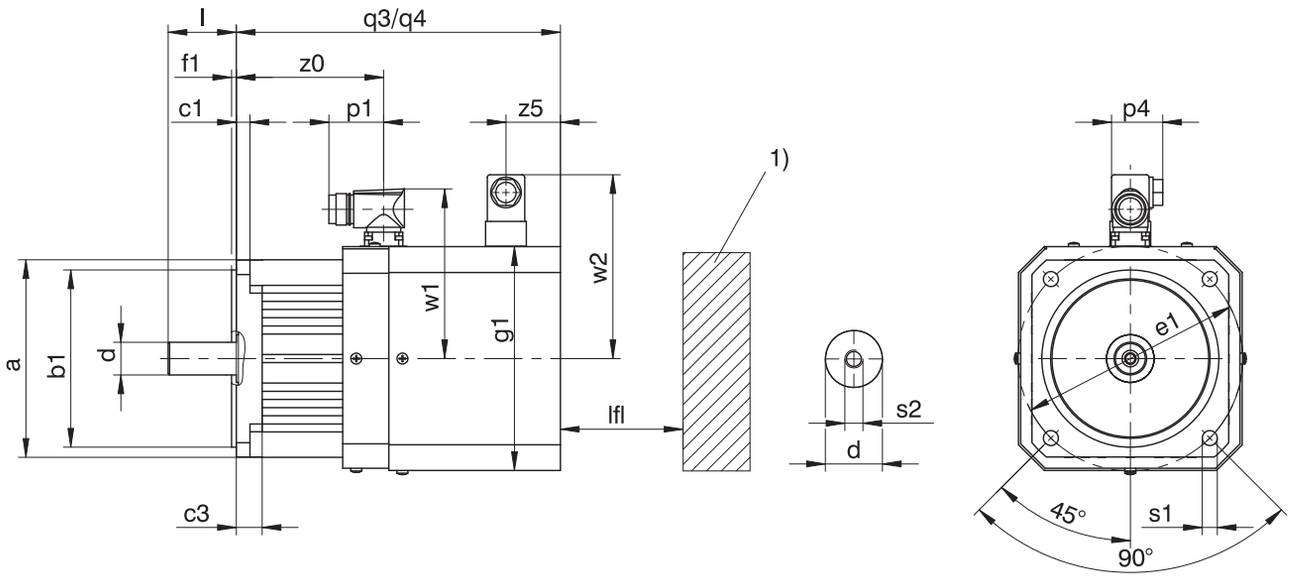
q0 Applies to motors without holding brake

q1 Applies to motors with holding brake

x0 Applies to encoders based on an optical measuring method

Type	□a	Øb1	c1	c3	Ød	Øe1	f1	□g	l	p1	p2	q0	q1	Øs1	s2	w1	x0	z0
EZ401U	98	95_{j6}	9.5	20.5	14_{k6}	115	3.5	98	30	40	32	118.5	167.0	9.0	M5	91.0	22	76.5
EZ402U	98	95_{j6}	9.5	20.5	19_{k6}	115	3.5	98	40	40	32	143.5	192.0	9.0	M6	91.0	22	101.5
EZ404U	98	95_{j6}	9.5	20.5	19_{k6}	115	3.5	98	40	40	32	193.5	242.0	9.0	M6	91.0	22	151.5
EZ501U	115	110_{j6}	10.0	16.0	19_{k6}	130	3.5	115	40	40	36	109.0	163.5	9.0	M6	100.0	22	74.5
EZ502U	115	110_{j6}	10.0	16.0	19_{k6}	130	3.5	115	40	40	36	134.0	188.5	9.0	M6	100.0	22	99.5
EZ503U	115	110_{j6}	10.0	16.0	24_{k6}	130	3.5	115	50	40	36	159.0	213.5	9.0	M8	100.0	22	124.5
EZ505U	115	110_{j6}	10.0	16.0	24_{k6}	130	3.5	115	50	40	36	209.0	263.5	9.0	M8	100.0	22	174.5
EZ701U	145	130_{j6}	10.0	19.0	24_{k6}	165	3.5	145	50	40	42	121.0	180.0	11.0	M8	115.0	22	83.0
EZ702U	145	130_{j6}	10.0	19.0	24_{k6}	165	3.5	145	50	40	42	146.0	205.0	11.0	M8	115.0	22	108.0
EZ703U	145	130_{j6}	10.0	19.0	24_{k6}	165	3.5	145	50	40	42	171.0	230.0	11.0	M8	115.0	22	133.0
EZ705U	145	130_{j6}	10.0	19.0	32_{k6}	165	3.5	145	58	71	42	226.0	285.0	11.0	M12	134.0	22	184.0
EZ802U	190	180_{j6}	15.0	25.0	32_{k6}	215	3.5	190	58	71	60	222.0	299.0	13.5	M12	156.5	22	168.0
EZ803U	190	180_{j6}	15.0	25.0	38_{k6}	215	3.5	190	80	71	60	263.0	340.0	13.5	M12	156.5	22	209.0
EZ805U	190	180_{j6}	15.0	25.0	38_{k6}	215	3.5	190	80	71	60	345.0	422.0	13.5	M12	156.5	22	291.0

11.4.5 EZ4 – EZ7 motors with forced ventilation (One Cable Solution)



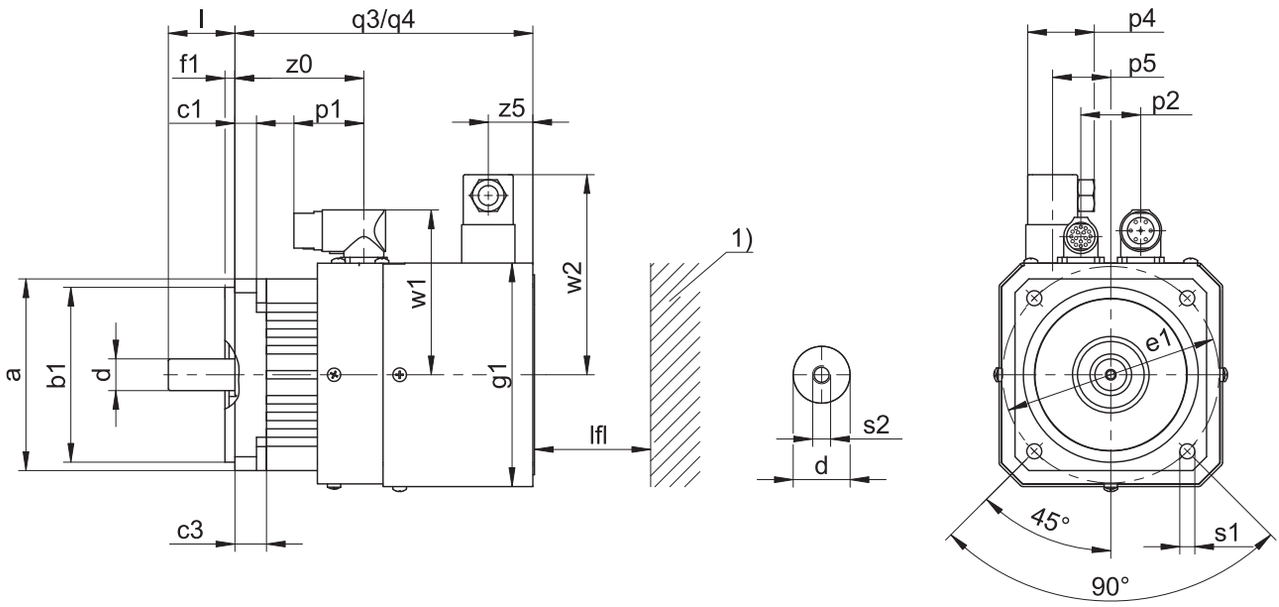
q3 Applies to motors without holding brake

q4 Applies to motors with holding brake

1) Machine wall

Type	□a	Øb1	c1	c3	Ød	Øe1	f1	□g1	l	lfl_{min}	p1	p4	q3	q4	Øs1	s2	w1	w2	z0	z5
EZ401B	98	95_{j6}	9.5	20.5	14_{k6}	115	3.5	118	30	20	40	37.5	175	224	9.0	M5	99	111	76.5	25
EZ402B	98	95_{j6}	9.5	20.5	19_{k6}	115	3.5	118	40	20	40	37.5	200	249	9.0	M6	99	111	101.5	25
EZ404B	98	95_{j6}	9.5	20.5	19_{k6}	115	3.5	118	40	20	40	37.5	250	299	9.0	M6	99	111	151.5	25
EZ501B	115	110_{j6}	10.0	16.0	19_{k6}	130	3.5	135	40	20	40	37.5	179	234	9.0	M6	110	120	74.5	25
EZ502B	115	110_{j6}	10.0	16.0	19_{k6}	130	3.5	135	40	20	40	37.5	204	259	9.0	M6	110	120	99.5	25
EZ503B	115	110_{j6}	10.0	16.0	24_{k6}	130	3.5	135	50	20	40	37.5	229	284	9.0	M8	110	120	124.5	25
EZ505B	115	110_{j6}	10.0	16.0	24_{k6}	130	3.5	135	50	20	40	37.5	279	334	9.0	M8	110	120	174.5	25
EZ701B	145	130_{j6}	10.0	19.0	24_{k6}	165	3.5	165	50	30	40	37.5	213	272	11.0	M8	125	134	83.0	40
EZ702B	145	130_{j6}	10.0	19.0	24_{k6}	165	3.5	165	50	30	40	37.5	238	297	11.0	M8	125	134	108.0	40
EZ703B	145	130_{j6}	10.0	19.0	24_{k6}	165	3.5	165	50	30	40	37.5	263	322	11.0	M8	125	134	133.0	40

11.4.6 EZ4 – EZ8 motors with forced ventilation



q3 Applies to motors without holding brake

q4 Applies to motors with holding brake

1) Machine wall

Type	□a	Øb1	c1	c3	Ød	Øe1	f1	□g1	l	lfl_{min}	p1	p2	p4	p5	q3	q4	Øs1	s2	w1	w2	z0	z5
EZ401B	98	95_{j6}	9.5	20.5	14_{k6}	115	3.5	118	30	20	40	32	37.5	0	175	224	9.0	M5	91.0	111	76.5	25
EZ402B	98	95_{j6}	9.5	20.5	19_{k6}	115	3.5	118	40	20	40	32	37.5	0	200	249	9.0	M6	91.0	111	101.5	25
EZ404B	98	95_{j6}	9.5	20.5	19_{k6}	115	3.5	118	40	20	40	32	37.5	0	250	299	9.0	M6	91.0	111	151.5	25
EZ501B	115	110_{j6}	10.0	16.0	19_{k6}	130	3.5	135	40	20	40	36	37.5	0	179	234	9.0	M6	100.0	120	74.5	25
EZ502B	115	110_{j6}	10.0	16.0	19_{k6}	130	3.5	135	40	20	40	36	37.5	0	204	259	9.0	M6	100.0	120	99.5	25
EZ503B	115	110_{j6}	10.0	16.0	24_{k6}	130	3.5	135	50	20	40	36	37.5	0	229	284	9.0	M8	100.0	120	124.5	25
EZ505B	115	110_{j6}	10.0	16.0	24_{k6}	130	3.5	135	50	20	40	36	37.5	0	279	334	9.0	M8	100.0	120	174.5	25
EZ701B	145	130_{j6}	10.0	19.0	24_{k6}	165	3.5	165	50	30	40	42	37.5	0	213	272	11.0	M8	115.0	134	83.0	40
EZ702B	145	130_{j6}	10.0	19.0	24_{k6}	165	3.5	165	50	30	40	42	37.5	0	238	297	11.0	M8	115.0	134	108.0	40
EZ703B	145	130_{j6}	10.0	19.0	24_{k6}	165	3.5	165	50	30	40	42	37.5	0	263	322	11.0	M8	115.0	134	133.0	40
EZ705B	145	130_{j6}	10.0	19.0	32_{k6}	165	3.5	165	58	30	71	42	37.5	0	318	377	11.0	M12	134.0	134	184.0	40
EZ802B	190	180_{j6}	15.0	25.0	32_{k6}	215	3.5	215	58	30	71	60	37.5	62	322	399	13.5	M12	156.5	160	168.0	40
EZ803B	190	180_{j6}	15.0	25.0	38_{k6}	215	3.5	215	80	30	71	60	37.5	62	363	440	13.5	M12	156.5	160	209.0	40
EZ805B	190	180_{j6}	15.0	25.0	38_{k6}	215	3.5	215	80	30	71	60	37.5	62	445	522	13.5	M12	156.5	160	291.0	40

11.5 Type designation

Example code

EZ	4	0	1	U	D	BB	Q7	O	096

Explanation

Code	Designation	Design
EZ	Type	Synchronous servo motor
4	Size	4 (example)
0	Generation	0
1	Length	1 (example)
U	Cooling[1]	Convection cooling
B		Forced ventilation
D	Design	Dynamic
BB	Drive controller	SI6 (example)
Q7	Encoder	EnDat 3 EQI 1131 (example)
O	Brake	Without holding brake
P		Permanent magnet holding brake
096	Voltage constant K_{EM}	96 V/1000 rpm (example)

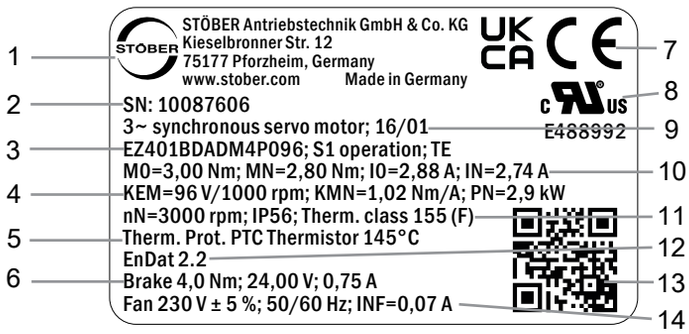
Notes

- In Chapter Encoders, you can find information about available encoders.
- In Chapter Possible combinations with drive controllers, you can find information about connecting synchronous servo motors to other drive controllers from STOBER.

[1] EZ2/EZ3 motors only available with convection cooling

11.5.1 Nameplate

An example nameplate of an EZ401 synchronous servo motor is explained in the figure below.



Line	Value	Description
1	STÖBER Antriebstechnik GmbH + Co. KG	Logo and address of the manufacturer
2	Ser. No. 10087606	Serial number of the motor
3	EZ401BDADM4P096 S1 operation TE	Type designation Operating mode Protection class in accordance with UL1004
4	KEM=96 V/1000 rpm KMN=1.02 Nm/A PN=2.9 kW	Voltage constant Torque constant Nominal power
5	Therm. prot. of PTC thermistor 145 °C	Type of temperature sensor
6	Brake 4.0 Nm 24.00 V 0.75 A	Holding brake (optional) Static braking torque at 100 °C Nominal voltage (DC) of the holding brake Nominal current of the holding brake at 20 °C
7	CE UKCA	CE mark UKCA mark
8	cURus E488992	cURus test symbol, registered under UL number E488992
9	3~ synchronous servo motor 16/01	Motor type: Three-phase synchronous servo motor Date of manufacture (year/calendar week)
10	M0=3.00 Nm MN=2.80 Nm I0=2.88 A IN=2.74 A	Stall torque Nominal torque Stall current Nominal current
11	nN=3000 rpm IP56 Therm. class 155 (F)	Nominal speed Protection class Thermal class
12	EnDat 2.2	Encoder interface
13	QR code	Link to product information
14	Fan 230 V ± 5%; 50/60 Hz INF = 0.07 A	Forced ventilation unit (optional) Nominal voltage of the forced ventilation unit Nominal current of the forced ventilation unit

11.6 Product description

11.6.1 General features

Feature	Description
Design	IM B5, IM V1, IM V3 in accordance with EN 60034-7
Protection class	IP56 / IP66 (option)
Thermal class	155 (F) in accordance with EN 60034-1 (155 °C, heating $\Delta\vartheta$ = 100 K)
Surface	Matte black as per RAL 9005
Cooling	IC 410 convection cooling (IC 416 convection cooling with forced ventilation units, optional)
Bearing	Rolling bearing with lifetime lubrication and non-contact sealing
Sealing	Radial shaft seal rings made of FKM (A side)
Shaft	Shaft without feather key, diameter quality k6
Radial runout	Normal tolerance class in accordance with IEC 60072-1
Concentricity	Normal tolerance class in accordance with IEC 60072-1
Axial runout	Normal tolerance class in accordance with IEC 60072-1
Vibration intensity	A in accordance with EN 60034-14
Noise level	Limit values in accordance with EN 60034-9

11.6.2 Electrical features

General electrical features of the motor are described in this chapter. Details can be found in the "Selection tables" chapter.

Feature	Description
DC link voltage	DC 540 V (max. 620 V) on STOBER drive controllers
Winding	Three-phase, single-tooth coil design
Circuit	Star, center not led through
Protection class	I (protective grounding) in accordance with EN 61140
Impulse voltage insulation class (IVIC)	C in accordance with DIN EN 60034-18-41 (inverter connection voltage 0 – 480 V ± 10%)
Number of pole pairs	2 (EZ2) 5 (EZ3) 7 (EZ4/EZ5/EZ7) 8 (EZ8)

11.6.3 Ambient conditions

Standard ambient conditions for transport, storage and operation of the motor are described in this chapter. Information about differing ambient conditions can be found in the chapter Derating.

Feature	Description
Surrounding temperature for transport/storage	−30 °C to +85 °C
Surrounding temperature for operation	−15 °C to +40 °C
Relative humidity	5% to 95%, no condensation
Installation altitude	≤ 1000 m above sea level
Shock load	≤ 50 m/s^2 (5 g), 6 ms in accordance with EN 60068-2-27

Notes

- STOBER synchronous servo motors are not suitable for potentially explosive atmospheres.
- Secure the power cables close to the motor so that vibrations of the cable do not place impermissible loads on the motor plug connector.
- Note that the braking torques of the holding brake (optional) may be reduced by shock loading.
- At operating temperatures below 0 °C, note that the discs of the holding brake (optional) may ice up.
- Also take into consideration the shock load of the motor due to output units (such as gear units and pumps) which are coupled with the motor.

11.6.4 Encoders

STOBER synchronous servo motors can be designed with different encoder models. The following chapters include information for choosing the optimal encoder for your application.

11.6.4.1 Encoder measuring method selection tool

The following table offers a selection tool for an encoder measuring method that is optimally suited for your application.

Feature	Absolute encoder		Resolver
Measuring method	Optical	Inductive	Electromag-netic
Temperature resistance	★★☆	★★★	★★★
Vibration strength and shock resistance	★★☆	★★★	★★★
System accuracy	★★★	★★☆	★☆☆
FMA version with fault exclusion for mechanical coupling (option with EnDat interface)	✓	✓	–
Elimination of referencing with multi-turn design (op-tional)	✓	✓	–
Simple commissioning with electronic nameplate	✓	✓	–
Key: ★☆☆ = satisfactory, ★★☆ = good, ★★★ = very good			

11.6.4.2 Selection tool for EnDat interface

The following table offers a selection tool for the EnDat interface of absolute encoders.

Feature	EnDat 2.1	EnDat 2.2	EnDat 3
Short cycle times	★★☆	★★★	★★★
Transfer of additional information along with the position value	–	✓	✓
Expanded power supply range	★★☆	★★★	★★★
One Cable Solution (OCS)	–	–	✓
Key: ★★☆ = good, ★★★ = very good			

11.6.4.3 EnDat 3 encoders

EnDat 3 is a robust, purely digital protocol that functions with minimal connection lines. EnDat 3 facilitates the One Cable Solution, which allows the connection lines between the encoder and drive controller to be routed along in the motor's power cable.

The One Cable Solution offers the following advantages:

- Significantly reduced wiring effort by eliminating the encoder cable
- For cable lengths up to 50 m, a choke between the drive controller and motor is not necessary
- Advanced safety functions possible (up to SIL2 / category 3, PLd)
- Significantly reduced space requirements by eliminating the encoder plug connector
- Transmission of measured values from the temperature sensor using the EnDat 3 protocol

A motor with the EnDat 3 encoder can be operated only on a SI6 or SC6 drive controller from STOBER.

The EnDat 3 encoder has the following features:

Encoder model	Code	Measur-ing method	Recordable revolutions	Resolu-tion	Position values per revolution	MTTF [years]	PHF [h]
EnDat 3 EQI 1131	Q7	Inductive	4096	19 bit	524288	> 100	$\leq 15 \times 10^{-9}$

11.6.4.4 EnDat 2 encoders

In this chapter, you can find detailed technical data for encoder models that can be selected with EnDat interface.

Encoders with EnDat 2.2 interface

Encoder model	Code	Measuring method	Recordable revolutions	Resolution	Position values per revolution	MTTF [years]	PHF [h]
EnDat 2.2 EQI 1131	Q6	Inductive	4096	19 bit	524288	> 100	≤ 15×10^{-9}
EnDat 2.2 EBI 1135	B0	Inductive	65536	18 bit	262144	> 100	≤ 600×10^{-9}
EnDat 2.2 ECI 1118-G2	C5	Inductive	–	18 bit	262144	> 76	≤ 1.5×10^{-6}
EnDat 2.2 EQN 1135 FMA	M3	Optical	4096	23 bit	8388608	> 100	≤ 15×10^{-9}
EnDat 2.2 EQN 1135	Q5	Optical	4096	23 bit	8388608	> 100	≤ 15×10^{-9}
EnDat 2.2 ECN 1123 FMA	M1	Optical	–	23 bit	8388608	> 100	≤ 15×10^{-9}
EnDat 2.2 ECN 1123	C7	Optical	–	23 bit	8388608	> 100	≤ 15×10^{-9}

Encoders with EnDat 2.1 interface

Encoder model	Code	Measuring method	Recordable revolutions	Resolution	Position values per revolution	Periods per revolution	MTTF [years]	PHF [h]
EnDat 2.1 EQN 1125 FMA	M2	Optical	4096	13 bit	8192	Sin/cos 512	> 57	≤ 2×10^{-6}
EnDat 2.1 EQN 1125	Q4	Optical	4096	13 bit	8192	Sin/cos 512	> 57	≤ 2×10^{-6}
EnDat 2.1 ECN 1113 FMA	M0	Optical	–	13 bit	8192	Sin/cos 512	> 57	≤ 2×10^{-6}
EnDat 2.1 ECN 1113	C6	Optical	–	13 bit	8192	Sin/cos 512	> 57	≤ 2×10^{-6}
EnDat 2.1 ECI 1118-G3	C2	Inductive	–	18 bit	262144	Sin/cos 512	> 100	≤ 6×10^{-7}

Notes

- The encoder code is a part of the type designation of the motor.
- FMA = Version with fault exclusion for mechanical coupling.
- MTTF = Average time before dangerous failure. MTTF values greater than 100 years were reduced in accordance with DIN EN ISO 13849.
- PFH = Probability of a dangerous failure per hour
- The EnDat 2.2 EBI 1135 encoder requires an external buffer battery so that absolute position information is retained after the power supply is turned off (AES option for STOBER drive controllers).
- Multiple revolutions of the motor shaft can be recorded only using multi-turn encoders.

11.6.4.5 Resolver

In this chapter, you can find detailed technical data for the resolver that can be installed as an encoder in a STOBER synchronous servo motor.

Feature	Description
Number of poles	2
Input voltage U_{1eff}	7 V ± 5%
Input frequency f_1	10 kHz
Output voltage $U_{2,S1–S3}$	$K_{tr} \cdot U_{R1–R2} \cdot \cos \theta$
Output voltage $U_{2,S2–S4}$	$K_{tr} \cdot U_{R1–R2} \cdot \sin \theta$
Transformation ratio K_{tr}	0.5 ± 5%
Electrical fault	±10 arcmin
MTTF	> 100 years
PHF	≤ 10^{-9}

11.6.4.6 Possible combinations with drive controllers

The following table shows the options for combining STOBER drive controllers with selectable encoder models.

Drive controller		SDS 5000		SD6		SI6			SC6		
Drive controller code		AA	AC	AD	AE	AP	AQ	**BB**	AU	AV	**BA**
Connection plan ID		442305	442307	442450	442451	442771	442772	**443175**	443052	443053	**443174**
Encoder	Encoder code										
EnDat 3 EQI 1131	Q7	–	–	–	–	–	–	✓	–	–	✓
EnDat 2.2 EQI 1131	Q6	✓	–	✓	–	✓	–	–	✓	–	–
EnDat 2.2 EQN 1135 FMA	M3	✓	–	✓	–	–	–	–	–	–	–
EnDat 2.2 EQN 1135	Q5	✓	–	✓	–	✓	–	–	✓	–	–
EnDat 2.2 ECN 1123 FMA	M1	✓	–	✓	–	–	–	–	–	–	–
EnDat 2.2 ECN 1123	C7	✓	–	✓	–	✓	–	–	✓	–	–
EnDat 2.2 ECI 1118-G2	C5	✓	–	✓	–	✓	–	–	✓	–	–
EnDat 2.1 EQN 1125 FMA	M2	✓	✓	✓	✓	–	–	–	–	–	–
EnDat 2.1 EQN 1125	Q4	✓	✓	✓	✓	–	–	–	–	–	–
EnDat 2.1 ECN 1113 FMA	M0	✓	✓	✓	✓	–	–	–	–	–	–
EnDat 2.1 ECN 1113	C6	✓	✓	✓	✓	–	–	–	–	–	–
Resolver	R0	✓	–	–	✓	–	✓	–	–	✓	–

Notes

- The drive controller and encoder codes are a part of the type designation of the motor (see the "Type designation" chapter).

11.6.5 Temperature sensor

In this chapter, you can find technical data for the temperature sensors that are installed in STOBER synchronous servo motors for implementing thermal winding protection. To prevent damage to the motor, always monitor the temperature sensor with appropriate devices that will turn off the motor if the maximum permitted winding temperature is exceeded.

Some encoders feature integrated temperature monitoring, the warning and switch-off thresholds of which may overlap with the corresponding values set for the temperature sensor in the drive controller. In some cases, this may result in an instance where an encoder with internal temperature monitoring forces the motor to shut down, even before the motor has reached its nominal data.

You can find information about the electrical connection of the temperature sensor in the "Connection method" chapter.

11.6.5.1 PTC thermistor

The PTC thermistor is installed as a standard temperature sensor in STOBER synchronous servo motors.

The PTC thermistor is a triple thermistor in accordance with DIN 44082 that can be used for monitoring the temperature of each winding phase. The resistance values in the following table and curve refer to a single thermistor in accordance with DIN 44081. These values must be multiplied by 3 for a triple thermistor in accordance with DIN 44082.

Feature	Description
Nominal response temperature ϑ_{NAT}	145 °C ± 5 K
Resistance R –20 °C up to ϑ_{NAT} – 20 K	≤ 250 Ω
Resistance R with ϑ_{NAT} – 5 K	≤ 550 Ω
Resistance R with ϑ_{NAT} + 5 K	≥ 1330 Ω
Resistance R with ϑ_{NAT} + 15 K	≥ 4000 Ω
Operating voltage	≤ DC 7.5 V
Thermal response time	< 5 s
Thermal class	155 (F) in accordance with EN 60034-1 (155 °C, heating $\Delta\vartheta$ = 100 K)

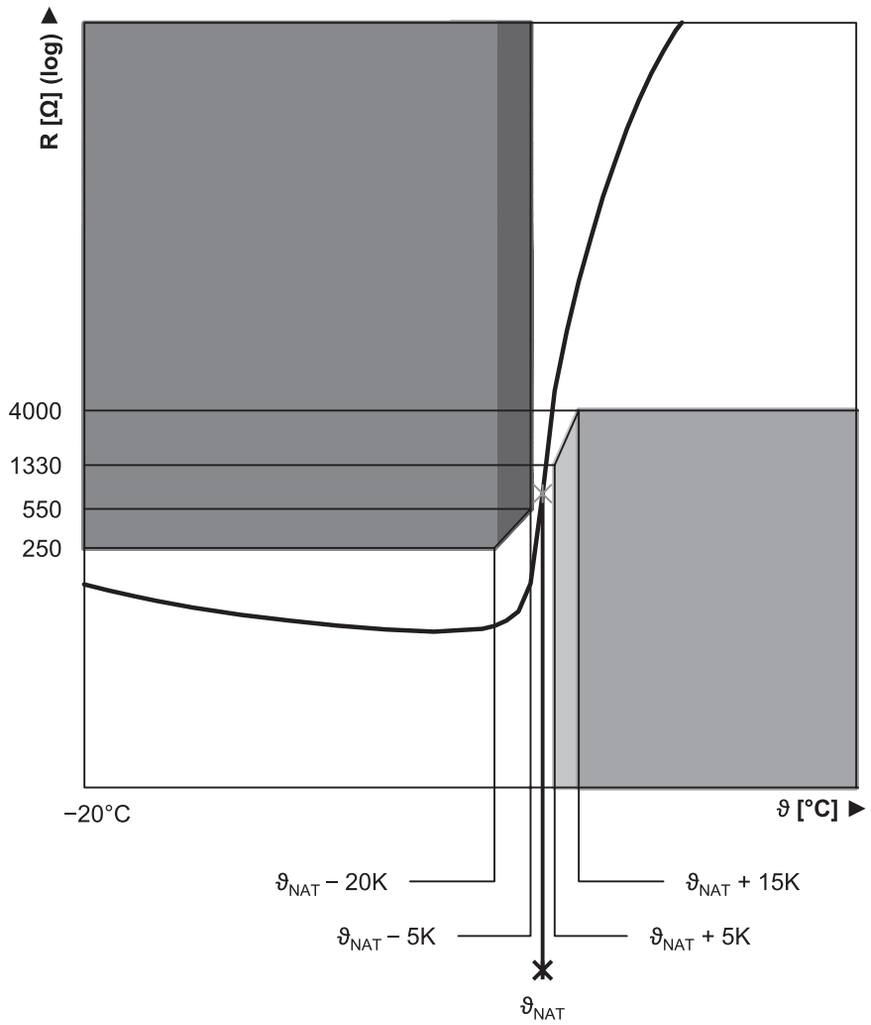


Fig. 2: PTC thermistor curve (single thermistor)

11.6.5.2 Pt1000 temperature sensor

STOBER synchronous servo motors are available in versions with a Pt1000 temperature sensor. The Pt1000 is a temperature-dependent resistor that has a resistance curve with a linear relationship with temperature. As a result, the Pt1000 allows for measurements of the winding temperature. These measurements are limited to one phase of the motor winding, however. In order to adequately protect the motor from exceeding the maximum permitted winding temperature, use a i^2t model in the drive controller to monitor the winding temperature.

Pt1000 temperature sensors can also be used with the One Cable Solution.

Avoid exceeding the specified measurement current so that the measured values are not falsified due to self-heating of the temperature sensor.

Feature	Description
Measurement current (constant)	2 mA
Resistance R for ϑ = 0 °C	1000 Ω
Resistance R for ϑ = 80 °C	1300 Ω
Resistance R for ϑ = 150 °C	1570 Ω

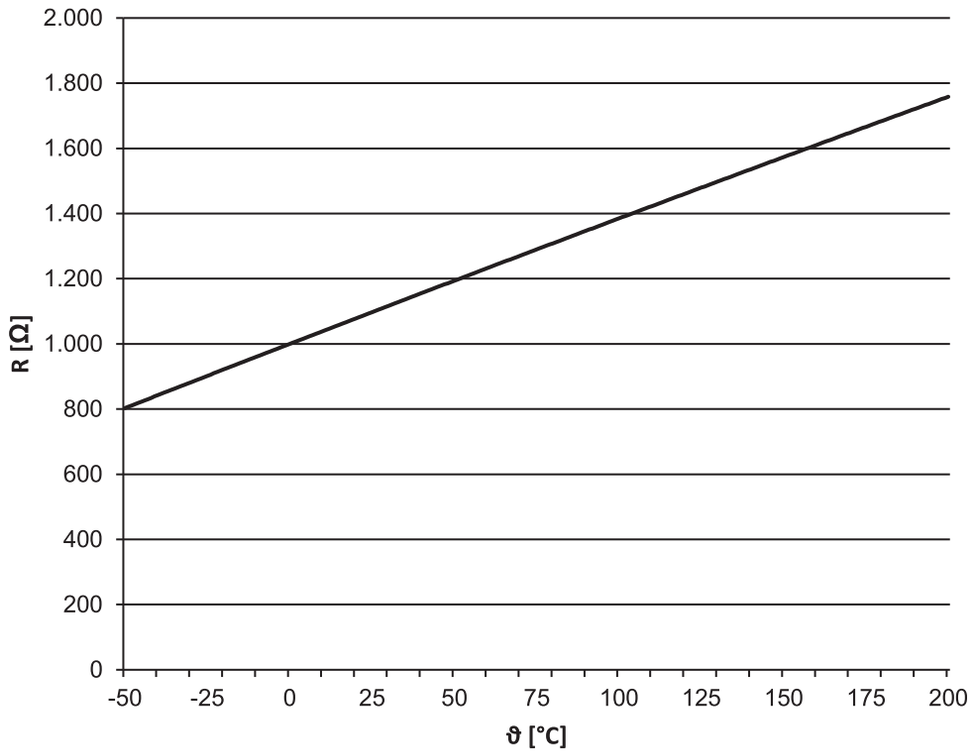


Fig. 3: Pt1000 temperature sensor characteristic curve

11.6.6 Cooling

A synchronous servo motor in the standard version is cooled by convection cooling (IC 410 in accordance with EN 60034-6). Optionally, forced ventilation can be used to cool the motor.

11.6.6.1 Forced ventilation

STOBER synchronous servo motors offer the option of being cooled with forced ventilation in order to increase performance data while maintaining the same size. Retrofitting with a forced ventilation unit is also possible in order to optimize the drive at a later date. When retrofitting, check whether the conductor cross-section of the power cable of the motor must be increased. Also take into account the dimensions of the forced ventilation unit.

The performance data for motors with forced ventilation can be found in the chapter Selection tables and the dimensions in the chapter Dimensional drawings.

Technical data

Motor	Forced ventilation unit	$U_{N,F}$ [V]	$I_{N,F}$ [A]	$P_{N,F}$ [W]	q_{vF} [m³/h]	$L_{pA,F}$ [dBA]	m_F [kg]	Protection class
EZ4_B	FL4	230 V ± 5%, 50/60 Hz	0.07	10	59	41	1.4	IP44
EZ5_B	FL5		0.10	14	160	45	1.9	IP54
EZ7_B	FL7		0.10	14	160	45	2.9	IP54
EZ8_B	FL8		0.20	26	420	54	5.0	IP55

Terminal assignment for forced ventilation unit plug connectors

Connection diagram	Pin	Connection
	1	L1 (phase)
	2	N (neutral conductor)
	3	
	⏚	Grounding conductor

11.6.7 Holding brake

STOBER synchronous servo motors can be equipped with a backlash-free holding brake using permanent magnets in order to secure the motor shaft when at a standstill. The holding brake engages automatically if the voltage drops.

The holding brake is designed for a high number of operations (B_{10} = 10 million operations, B_{10d} = 20 million operations).

Nominal voltage of permanent magnet holding brake: DC 24 V ± 5%, smoothed.

Observe the following during project configuration:

- The holding brake is designed to keep the motor shaft from moving. Activate braking processes during operation using the corresponding electrical functions of the drive controller. In exceptional circumstances, the holding brake can be used for braking from full speed (following a power failure or when setting up the machine). The maximum permitted work done by friction $W_{B,Rmax/h}$ may not be exceeded.
- Note that the braking torque M_{Bdyn} may initially be up to 50% less when braking from full speed. As a result, the braking effect has a delayed action and braking distances become longer.
- Regularly perform a brake test to ensure the functional safety of the brakes. Details can be found in the documentation of the motor and the drive controller.
- Connect a varistor of type S14 K35 (or comparable) in parallel to the brake coil to protect your machine from switching surges. (Not necessary for connecting the holding brake to STOBER drive controllers of the 5th and 6th generation with a BRS/BRM brake module).
- The holding brake of the motor does not offer adequate safety for persons in the hazardous area of gravity-loaded vertical axes. Therefore take additional measures to minimize risk, e.g. by providing a mechanical substructure for maintenance work.
- Take into consideration voltage losses in the connection cables that connect the voltage source to the holding brake connections.
- The holding torque of the brake can be reduced by shock loading. Information about shock loading can be found in the "Ambient conditions" chapter.
- At operating temperatures from −15 °C to 0 °C, a cold holding brake in the released state may cause operating noises. As the temperature of the holding brake increases, these noises decrease such that operating noises are not heard when using holding brake at operating temperature in the released state.

Calculation of work done by friction per braking process

$$W_{B,R/B} = \frac{J_{tot} \cdot n^2}{182.4} \cdot \frac{M_{Bdyn}}{M_{Bdyn} \pm M_L}, \; M_{Bdyn} > M_L$$

The sign of M_L is positive if the movement runs vertically upwards or horizontally and it is negative if the movement runs vertically down.

Calculation of the stop time

$$t_{dec} = 2.66 \cdot t_{1B} + \frac{n \cdot J_{tot}}{9.55 \cdot M_{Bdyn}}$$

Switching behavior

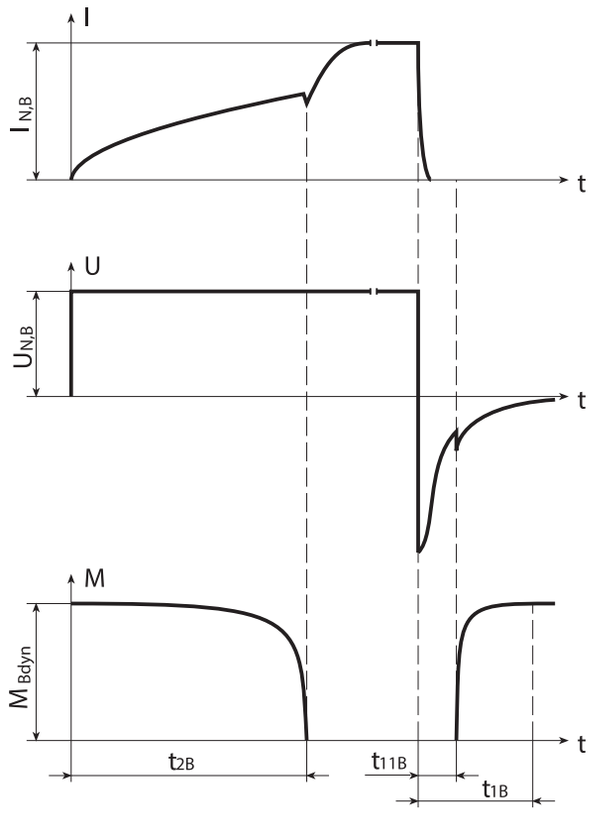


Fig. 4: Holding brake – Switching behavior

Technical data

Type	M_{Bstat} [Nm]	M_{Bdyn} [Nm]	$I_{N,B}$ [A]	$W_{B,Rmax/h}$ [kJ/h]	N_{Bstop}	J_{Bstop} [kgcm²]	$W_{B,Rlim}$ [kJ]	t_{2B} [ms]	t_{11B} [ms]	t_{1B} [ms]	$x_{B,N}$ [mm]	ΔJ_B [kgcm²]	Δm_B [kg]
EZ202	1.2	1.0	0.36	3.0	45000	0.310	70	10	2.0	5	0.15	0.03	0.25
EZ203	1.2	1.0	0.38	3.0	36000	0.390	70	10	2.0	5	0.15	0.03	0.25
EZ301	2.5	2.3	0.51	6.0	48000	0.752	180	25	3.0	20	0.20	0.19	0.55
EZ302	4.0	3.8	0.50	8.5	38000	0.952	180	44	4.0	26	0.30	0.19	0.55
EZ303	4.0	3.8	0.50	8.5	30000	1.17	180	44	4.0	26	0.30	0.19	0.55
EZ401	4.0	3.8	0.50	8.5	16000	2.24	180	44	4.0	26	0.30	0.19	0.76
EZ402	8.0	7.0	0.75	8.5	13500	4.39	300	40	2.0	20	0.30	0.57	0.97
EZ404	8.0	7.0	0.75	8.5	8500	7.09	300	40	2.0	20	0.30	0.57	0.97
EZ501	8.0	7.0	0.75	8.5	8700	6.94	300	40	2.0	20	0.30	0.57	1.19
EZ502	8.0	7.0	0.80	8.5	5200	11.5	300	40	2.0	20	0.30	0.57	1.19
EZ503	15	12	1.0	11.0	5900	18.6	550	60	5.0	30	0.30	1.72	1.62
EZ505	15	12	1.0	11.0	4000	27.8	550	60	5.0	30	0.30	1.72	1.62
EZ701	15	12	1.0	11.0	5400	20.5	550	60	5.0	30	0.30	1.74	1.94
EZ702	15	12	1.0	11.0	3600	30.9	550	60	5.0	30	0.30	1.74	1.94
EZ703	32	28	1.1	25.0	5200	54.6	1400	100	5.0	25	0.40	5.68	2.81
EZ705	32	28	1.1	25.0	3500	79.4	1400	100	5.0	25	0.40	5.68	2.81
EZ802	65	35	1.7	45.0	6000	149	2250	200	10	50	0.40	16.5	5.40
EZ803	65	35	1.7	45.0	4500	200	2250	200	10	50	0.40	16.5	5.40
EZ805	115	70	2.1	65.0	7000	376	6500	190	12	65	0.50	55.5	8.40

11.6.8 Connection method

The following chapters describe the connection technology of STOBER synchronous servo motors in the standard version on STOBER drive controllers. You can find further information relating to the drive controller type that was specified in your order in the connection plan that is delivered with every synchronous servo motor.

11.6.8.1 Connection of the motor housing to the grounding conductor system

Connect the motor housing to the grounding conductor system of the machine in order to prevent personal injury and faulty triggering of residual current protective devices.

All attachment parts required for the connection of the grounding conductor to the motor housing are delivered with the motor. The grounding screw of the motor is identified with the symbol ⏚ in accordance with IEC 60417-DB. The cross-section of the grounding conductor has to be at least as large as the cross-section of the lines in the power connection.

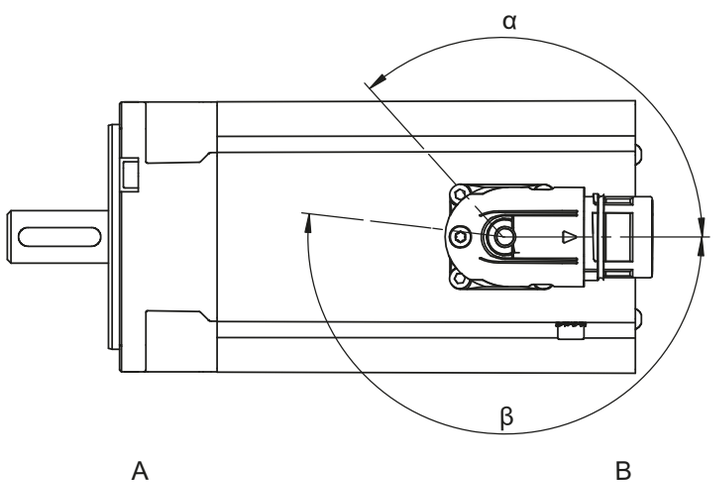
11.6.8.2 Plug connectors (One Cable Solution)

In the One Cable Solution design, the power and encoder lines are connected using a shared plug connector.

For motors with forced ventilation, avoid collisions between the motor connection cables and the plug connector of the forced ventilation unit. In the event of a collision, turn the motor plug connectors accordingly. Details regarding the position of the plug connector for the forced ventilation unit can be found in the "Dimensional drawings" chapter.

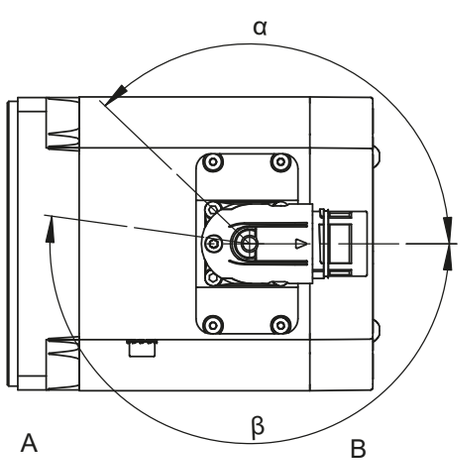
The figures represent the position of the plug connectors upon delivery.

Turning ranges of plug connectors (EZ2 – EZ3 motors)



A	Attachment or output side of the motor	B	Not output side

Turning ranges of plug connectors (EZ4 – EZ7 motors)



A	Attachment or output side of the motor	B	Not output side

Plug connector features

Motor type	Size	Connection	Turning range	
			α	β
EZ2 – EZ5, EZ701 – EZ703, EZ705U	con.23	Quick lock	130°	190°

Notes

- The number after "con." indicates the approximate external thread diameter of the plug connector in mm (for example, con.23 designates a plug connector with an external thread diameter of about 23 mm).

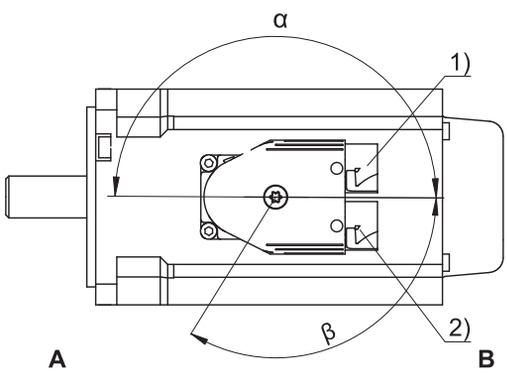
11.6.8.3 Plug connectors

STOBER synchronous servo motors are equipped with rotatable quick-lock plug connectors in the standard version. Details can be found in this chapter.

For motors with forced ventilation, avoid collisions between the motor connection cables and the plug connector of the forced ventilation unit. In the event of a collision, turn the motor plug connectors accordingly. Details regarding the position of the plug connector for the forced ventilation unit can be found in the "Dimensional drawings" chapter.

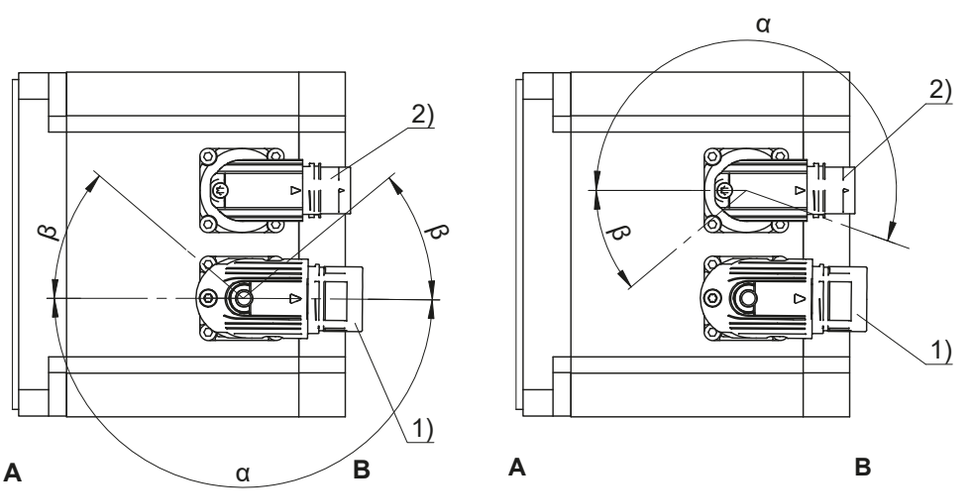
The figures represent the position of the plug connectors upon delivery.

Turning ranges of plug connectors (EZ2 – EZ3 motors)



1	Power plug connector	2	Encoder plug connector
A	Attachment or output side of the motor	B	Not output side

Turning ranges of plug connectors (EZ4 – EZ8 motors)



1	Power plug connector	2	Encoder plug connector
A	Attachment or output side of the motor	B	Not output side

Power plug connector features

Motor type	Size	Connection	Turning range	
			α	β
EZ2, EZ3	con.15	Quick lock	180°	140°
EZ4, EZ5, EZ701, EZ702, EZ703	con.23	Quick lock	180°	40°
EZ705, EZ802, EZ803, EZ805	con.40	Quick lock	180°	40°

Encoder plug connector features

Motor type	Size	Connection	Turning range	
			α	β
EZ2, EZ3	con.15	Quick lock	180°	140°
EZ4, EZ5, EZ7, EZ802, EZ803, EZ805	con.17	Quick lock	195°	35°

Notes

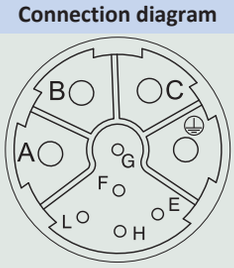
- The number after "con." indicates the approximate external thread diameter of the plug connector in mm (for example, con.23 designates a plug connector with an external thread diameter of about 23 mm).
- In turning range β, the power or encoder plug connectors can be turned only if doing so does not cause them to collide.
- For the EZ2/EZ3 motor, the power and encoder plug connectors are mechanically connected and can only be turned together.

11.6.8.4 Terminal assignment for plug connectors (One Cable Solution)

In the One Cable Solution design, the power and encoder lines are connected using a shared plug connector.

The temperature sensor of the motor is connected to the encoder internally. The measured values from the temperature sensor are transmitted via the EnDat 3 protocol of the encoder.

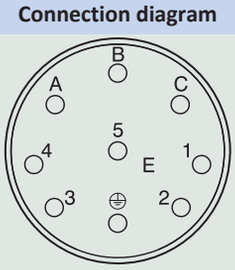
Plug connector size con.23

Connection diagram	Pin	Connection	Color
	A	U phase	BK
	B	V phase	BU
	C	W phase	RD
	E	P_SD –	YE
	F		
	G	Brake +	
	H	P_SD +	VT
	L	Brake –	
	⏚	Grounding conductor	GNYE

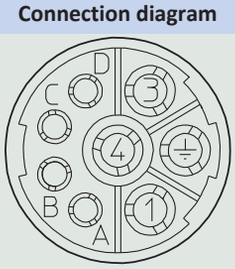
11.6.8.5 Connection assignment of the power plug connector

The size and connection plan of the power plug connector depend on the size of the motor. The colors of the connecting wires inside the motor are specified in accordance with IEC 60757.

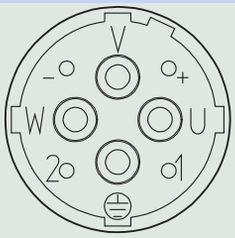
Plug connector size con.15

Connection diagram	Pin	Connection	Color
	A	U phase	BK
	B	V phase	BU
	C	W phase	RD
	1	Temperature sensor +	
	2	Temperature sensor –	
	3	Brake +	RD
	4	Brake –	BK
	⏚	Grounding conductor	GNYE

Plug connector size con.23

Connection diagram	Pin	Connection	Color
	1	U phase	BK
	3	V phase	BU
	4	W phase	RD
	A	Brake +	RD
	B	Brake –	BK
	C	Temperature sensor +	
	D	Temperature sensor –	
	⏚	Grounding conductor	GNYE

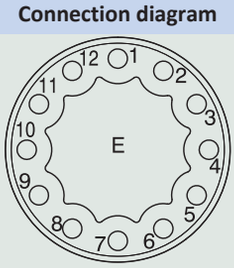
Plug connector size con.40 (1.5)

Connection diagram	Pin	Connection	Color
	U	U phase	BK
	V	V phase	BU
	W	W phase	RD
	+	Brake +	RD
	–	Brake –	BK
	1	Temperature sensor +	
	2	Temperature sensor –	
	⏚	Grounding conductor	GNYE

11.6.8.6 Connection assignment of the encoder plug connector

The size and connection assignment of the encoder plug connectors depend on the model of encoder installed and the size of the motor.

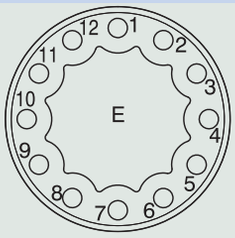
EnDat 2.1/2.2 digital encoders, plug connector size con.15

Connection diagram	Pin	Connection	Color
	1	Clock +	VT
	2	Up sense	BNGN
	3		
	4		
	5	Data –	PK
	6	Data +	GY
	7		
	8	Clock –	YE
	9		
	10	0 V GND	WHGN
	11		
	12	Up +	BNGN

EnDat 2.1/2.2 digital encoders, plug connector size con.17

Connection diagram	Pin	Connection	Color
	1	Clock +	VT
	2	Up sense	BNGN
	3		
	4		
	5	Data –	PK
	6	Data +	GY
	7		
	8	Clock –	YE
	9		
	10	0 V GND	WHGN
	11		
	12	Up +	BNGN

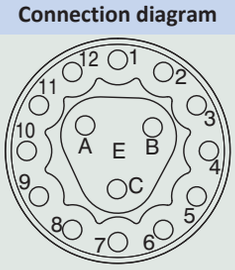
EnDat 2.2 digital encoder with battery buffering, plug connector size con.15

Connection diagram	Pin	Connection	Color
	1	Clock +	VT
	2	UBatt +	BU
	3	UBatt –	WH
	4		
	5	Data –	PK
	6	Data +	GY
	7		
	8	Clock –	YE
	9		
	10	0 V GND	WHGN
	11		
	12	Up +	BNGN
	UBatt+ = DC 3.6 V for encoder model EBI in combination with the AES option of STOBER drive controllers		

EnDat 2.2 digital encoder with battery buffering, plug connector size con.17

Connection diagram	Pin	Connection	Color
	1	Clock +	VT
	2	UBatt +	BU
	3	UBatt –	WH
	4		
	5	Data –	PK
	6	Data +	GY
	7		
	8	Clock –	YE
	9		
	10	0 V GND	WHGN
	11		
	12	Up +	BNGN
	UBatt+ = DC 3.6 V for encoder model EBI in combination with the AES option of STOBER drive controllers		

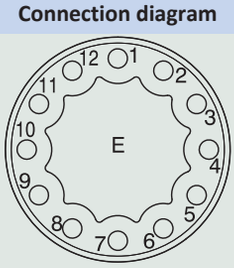
EnDat 2.1 encoder with sin/cos incremental signals, plug connector size con.15

Connection diagram	Pin	Connection	Color
	1	Up sense	BU
	2	0 V sense	WH
	3	Up +	BNGN
	4	Clock +	VT
	5	Clock –	YE
	6	0 V GND	WHGN
	7	B + (Sin +)	BUBK
	8	B – (Sin –)	RDBK
	9	Data +	GY
	10	A + (Cos +)	GNBK
	11	A – (Cos –)	YEBK
	12	Data –	PK
	A		
	B		
	C		

EnDat 2.1 encoder with sin/cos incremental signals, plug connector size con.17

Connection diagram	Pin	Connection	Color
	1	Up sense	BU
	2		
	3		
	4	0 V sense	WH
	5		
	6		
	7	Up +	BNGN
	8	Clock +	VT
	9	Clock –	YE
	10	0 V GND	WHGN
	11		
	12	B + (Sin +)	BUBK
	13	B – (Sin –)	RDBK
	14	Data +	GY
	15	A + (Cos +)	GNBK
	16	A – (Cos –)	YEBK
	17	Data –	PK

Resolver, plug connector size con.15

Connection diagram	Pin	Connection	Color
	1	S3 Cos +	BK
	2	S1 Cos –	RD
	3	S4 Sin +	BU
	4	S2 Sin –	YE
	5		
	6		
	7	R2 Ref +	YEWH/BKWH[2]
	8	R1 Ref –	RDWH
	9		
	10		
	11		
	12		

Resolver, plug connector size con.17

Connection diagram	Pin	Connection	Color
	1	S3 Cos +	BK
	2	S1 Cos –	RD
	3	S4 Sin +	BU
	4	S2 Sin –	YE
	5		
	6		
	7	R2 Ref +	YEWH/BKWH[3]
	8	R1 Ref –	RDWH
	9		
	10		
	11		
	12		

[2] (depending on the brand of the resolver)

[3] (depending on the brand of the resolver)

11.7 Project configuration

Project your drives using our SERVOsoft designing software. Download SERVOsoft for free at https://www.stoeber.de/en/ServoSoft.

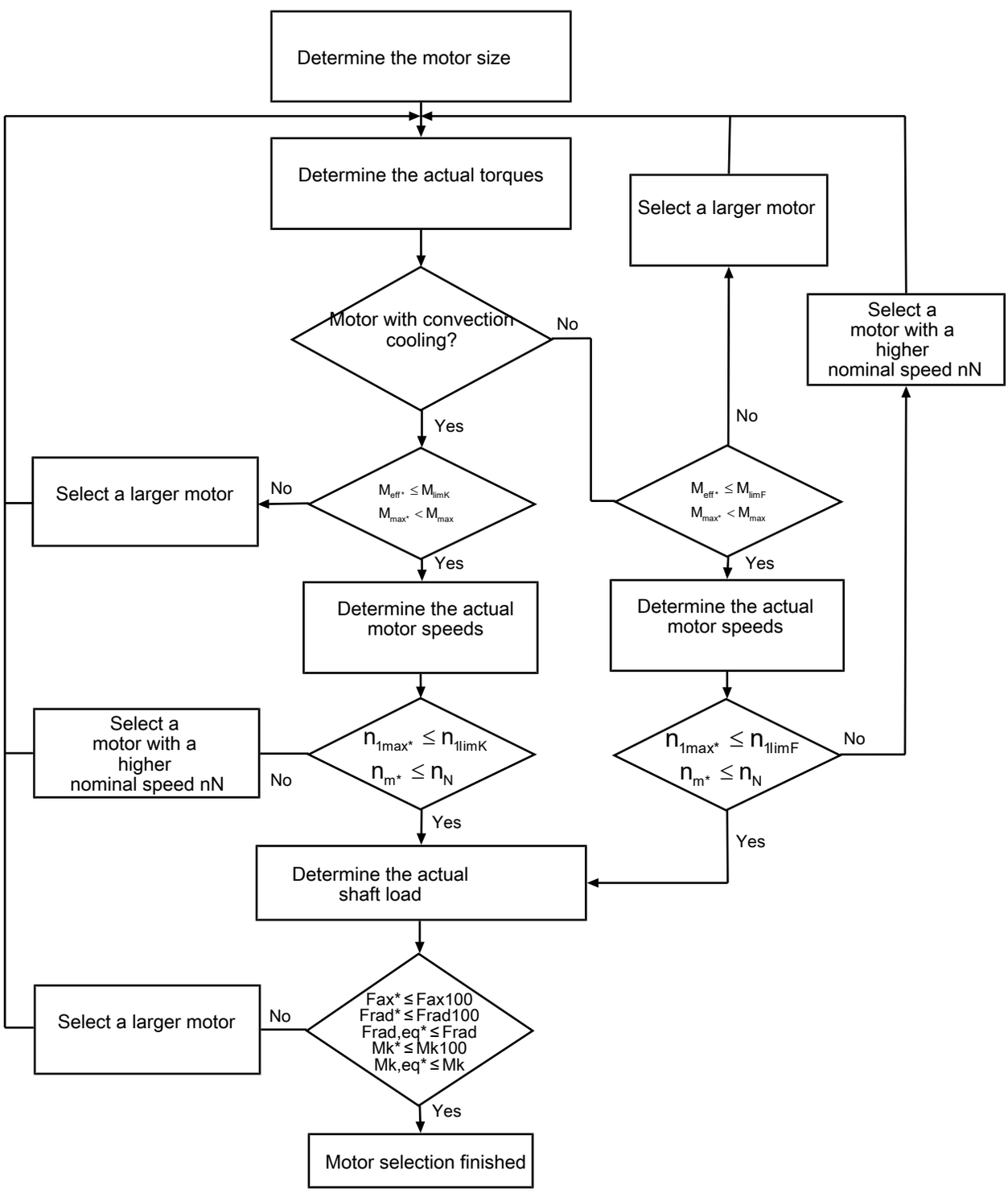
It is the most convenient and reliable method of drive selection, as the entire torque/speed curve of the application is displayed and evaluated here in the curve of the geared motor.

In this chapter, only limit values for specific operating points can be taken into consideration for manual drive selection.

An explanation of the formula symbols can be found in Chapter Symbols in formulas.

The formula symbols for values actually present in the application are marked with *.

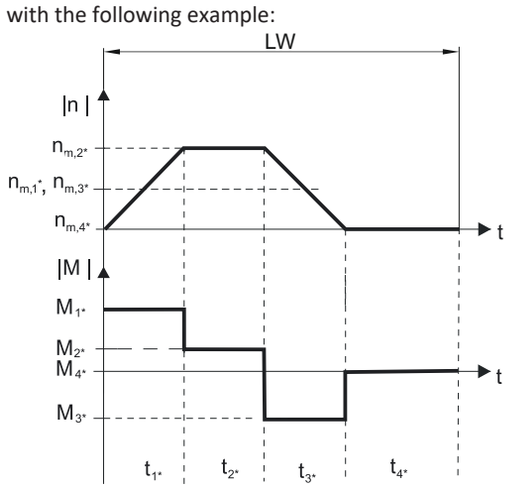
11.7.1 Drive selection



The value for M_{lim}, M_{limK}, M_{limF}, M_{max}, n_{1limK} and n_{1limF} can be found in the motor characteristic curve in the chapter [▶ 11.3]. Note the size, nominal speed n_N and cooling type of the motor.

Example of cyclic operation

The following calculations refer to a representation of the power delivered at the motor shaft in accordance with the following example:



Calculation of the actual average input speed

$$n_{m^*} = \frac{\left|n_{m,1^*}\right| \cdot t_{1^*} + \ldots + \left|n_{m,n^*}\right| \cdot t_{n^*}}{t_{1^*} + \ldots + t_{n^*}}$$

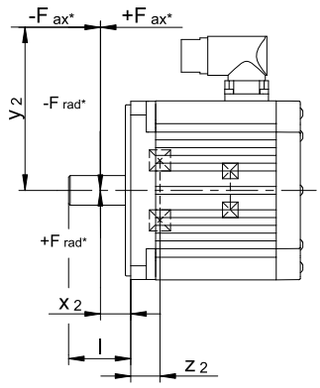
If $t_{1^*} + \ldots + t_{3^*} \geq 6$ min, determine n_{m^*} without the rest phase t_{4^*}.

Calculation of the actual effective torque

$$M_{eff^*} = \sqrt{\frac{t_{1^*} \cdot M_{1^*}{}^2 + \ldots + t_{n^*} \cdot M_{n^*}{}^2}{t_{1^*} + \ldots + t_{n^*}}}$$

11.7.2 Permitted shaft loads

This chapter contains information about the maximum permitted shaft loads of the output shaft of the motor.



Type	z_2 [mm]	F_{ax100} [N]	F_{rad100} [N]	M_{k100} [Nm]
EZ202	12.0	250	750	20
EZ203	12.0	250	750	20
EZ301	24.0	350	1000	39
EZ302	24.0	350	1000	39
EZ303	24.0	350	1000	39
EZ401	19.5	550	1800	62
EZ402	19.5	550	1800	71
EZ404	19.5	550	1800	71
EZ501	19.5	750	2000	79
EZ502	19.5	750	2400	95
EZ503	19.5	750	2400	107
EZ505	19.5	750	2400	107
EZ701	24.5	1300	3500	173
EZ702	24.5	1300	4200	208
EZ703	24.5	1300	4200	208
EZ705	24.5	1300	4200	225
EZ802	28.5	1750	5600	384
EZ803	28.5	1750	5600	384
EZ805	28.5	1750	5600	384

The values for permitted shaft loads specified in the table apply:

- For shaft dimensions in accordance with the catalog
- A force applied at the center of the output shaft: $x_2 = l / 2$ (shaft dimensions can be found in the chapter Dimensional drawings)
- Output speeds $n_{m*} \leq 100$ rpm ($F_{ax} = F_{ax100}$; $F_{rad} = F_{rad100}$; $M_k = M_{k100}$)

The following applies to output speeds $n_{m*} > 100$ rpm:

$$F_{ax} = \frac{F_{ax100}}{\sqrt[3]{\frac{n_{m*}}{100\ \text{rpm}}}} \qquad F_{rad} = \frac{F_{rad100}}{\sqrt[3]{\frac{n_{m*}}{100\ \text{rpm}}}} \qquad M_k = \frac{M_{k100}}{\sqrt[3]{\frac{n_{m*}}{100\ \text{rpm}}}}$$

The following applies to other force application points:

$$M_{k*} = \frac{2 \cdot F_{ax*} \cdot y_2 + F_{rad*} \cdot (x_2 + z_2)}{1000}$$

For applications with multiple axial and/or radial forces, you must add the forces as vectors.

Also note the calculation for equivalent values:

$$M_{k,eq^*} = \sqrt[3]{\frac{|n_{m,1^*}| \cdot t_{1^*} \cdot |M_{k,1^*}{}^3| + \ldots + |n_{m,n^*}| \cdot t_{n^*} \cdot |M_{k,n^*}{}^3|}{|n_{m,1^*}| \cdot t_{1^*} + \ldots + |n_{m,n^*}| \cdot t_{n^*}}}$$

$$F_{rad,eq^*} = \sqrt[3]{\frac{|n_{m,1^*}| \cdot t_{1^*} \cdot |F_{rad,1^*}{}^3| + \ldots + |n_{m,n^*}| \cdot t_{n^*} \cdot |F_{rad,n^*}{}^3|}{|n_{m,1^*}| \cdot t_{1^*} + \ldots + |n_{m,n^*}| \cdot t_{n^*}}}$$

11.7.3 Derating

If you use the motor under ambient conditions that differ from the standard ambient conditions, the nominal torque M_N of the motor is reduced. In this chapter, you can find information for calculating the reduced nominal torque.

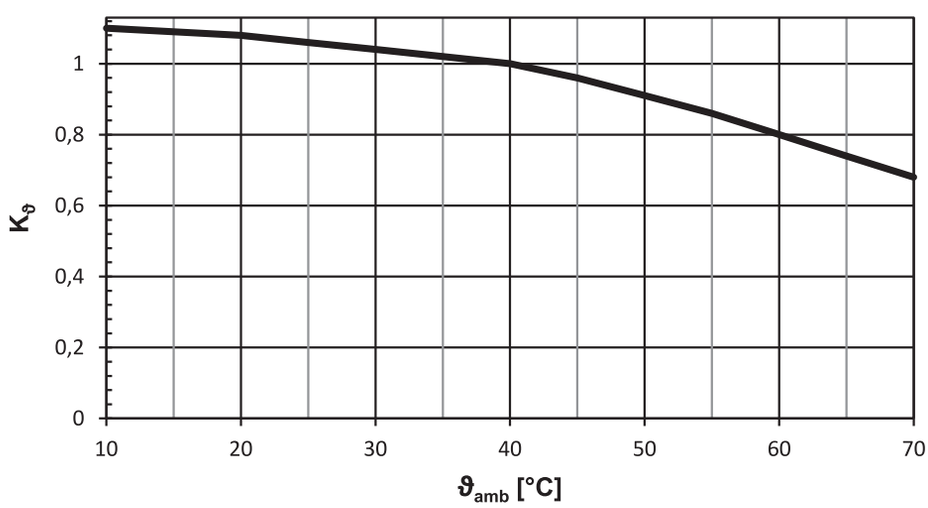


Fig. 5: Derating depending on the surrounding temperature

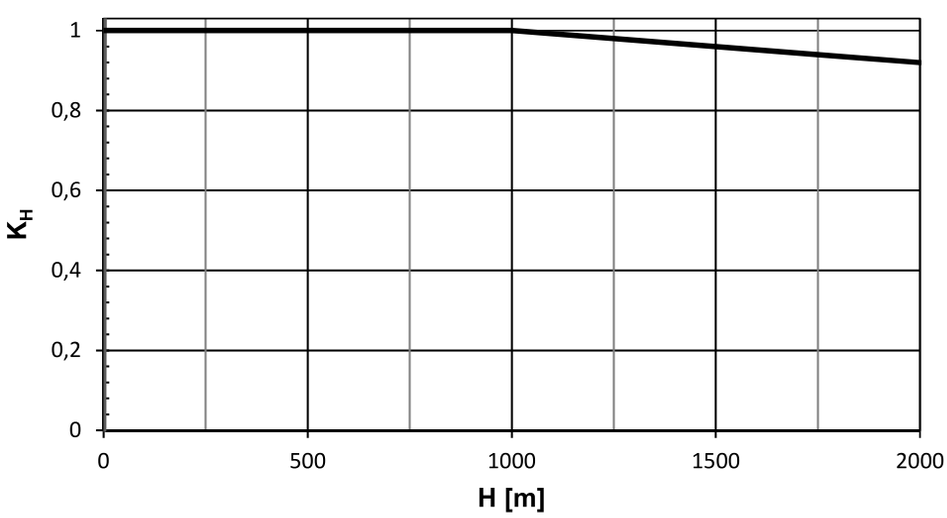


Fig. 6: Derating depending on the installation height

Calculation

If surrounding temperature ϑ_{amb} > 40 °C:

$M_{Nred} = M_N \cdot K_\vartheta$

If installation altitude H > 1000 m above sea level:

$M_{Nred} = M_N \cdot K_H$

If the surrounding temperature ϑ_{amb} > 40 °C and installation altitude H > 1000 m above sea level:

$M_{Nred} = M_N \cdot K_H \cdot K_\vartheta$

11.8 Further information

11.8.1 Directives and standards

STOBER synchronous servo motors meet the requirements of the following directives and standards:

- (Low Voltage) Directive 2014/35/EU
- EN 60034-1:2010 + Cor.:2010
- EN 60034-5:2001 + A1:2007
- EN 60034-6:1993

11.8.2 Identifiers and test symbols

STOBER synchronous servo motors have the following identifiers and test symbols:

CE mark: The product meets the requirements of EU directives.

UKCA mark: The product meets the requirements of UK directives.

cURus test symbol "Servo and Stepper Motors – Component"; registered under UL number E488992 with Underwriters Laboratories USA.

11.8.3 Additional documentation

Additional documentation related to the product can be found at
http://www.stoeber.de/en/downloads/

Enter the ID of the documentation in the Search term field.

Documentation	ID
Operating manual for EZ synchronous servo motors	443032_en

12 Safe brake management with SD6 and SE6

Do you design gravity-loaded axes? Then you can depend on the 2-brake solution from STOBER! Combine the synchronous servo geared motors with redundant brake with STOBER drive controllers of the SD6 series with integrated SE6 safety module. This combination offers you safe brake management and standard-compliant protection for your gravity-loaded axes.

Safe, state-of-the-art brakes

Gravity can cause vertical axes and their loads to fall, posing a danger to people. To prevent this, vertical axes are generally secured by brakes. However, the braking effect can be seriously impaired by contamination or wear. The state of the brakes must therefore be monitored reliably and their functionality maintained.

Safety with a system

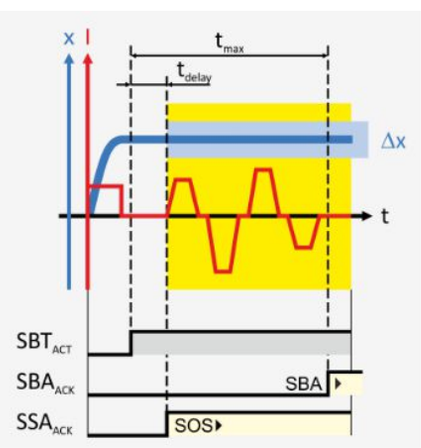
STOBER synchronous servo geared motors can be equipped with an additional ServoStop brake. This brake is integrated directly in the adapter, located between the gear unit and motor. Together with the brake of the motor, this gives you a 2-brake solution with uniquely compact dimensions.

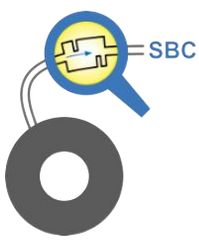
In combination with the SD6 drive controller and the SE6 safety module developed in cooperation with Pilz GmbH & Co. KG, planners and engineers get a system solution for use in safety-relevant applications up to PL e, SIL 3 in accordance with EN ISO 13849-1 and EN 61800-5-2.

PILZ
THE SPIRIT OF SAFETY

TÜV SÜD
No. Z10 18 05 84451 006

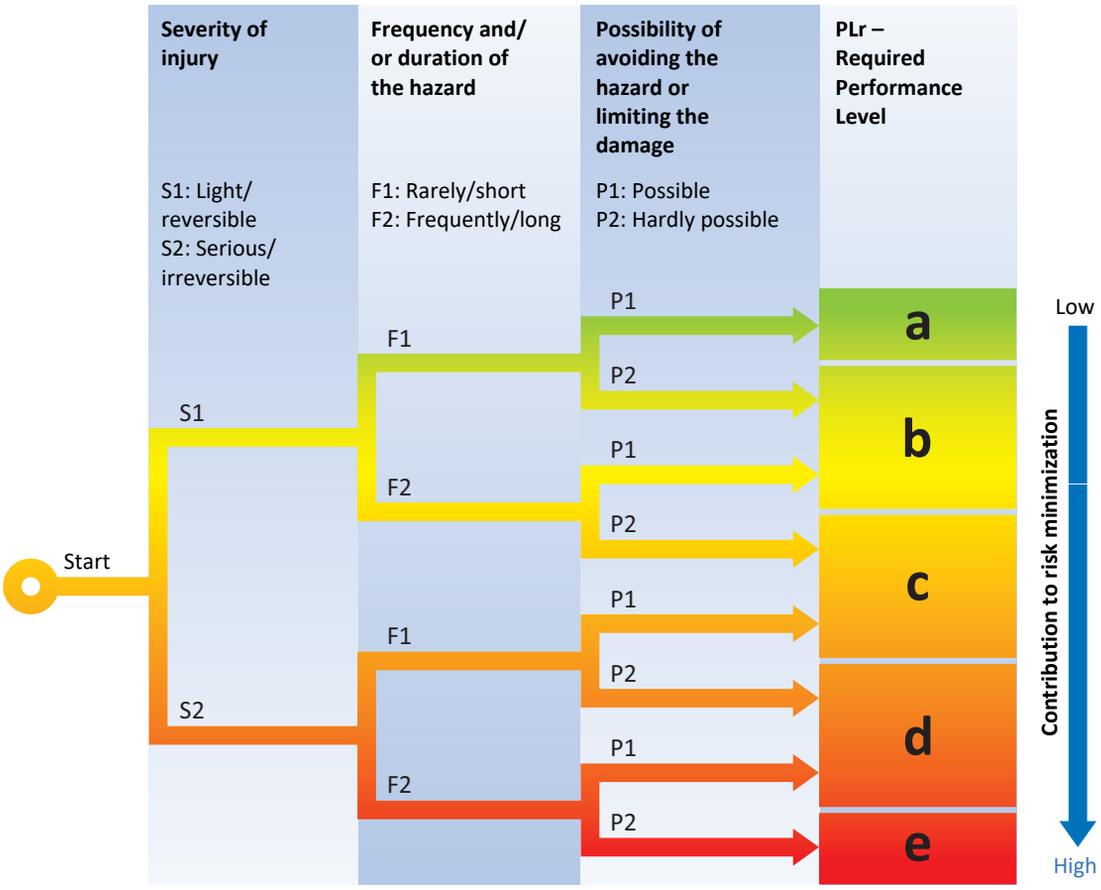
In addition to the basic Safe Torque Off (STO) safety function, SE6 provides other safety functions specified in EN 61800-5-2. In addition to the safe stop functions Safe Stop 1 (SS1) and Safe Stop 2 (SS2), these also include Safely-Limited Speed (SLS), Safe Brake Control (SBC), Safe Direction (SDI) and Safely-Limited Increment (SLI). The normative safety functions are supplemented by practical additional functions such as Safe Brake Test (SBT).





Intelligently monitored and fall-proof

The SE6 safety module reports to the controller if a brake test is required according to its respective time configuration. The controller can exit the ongoing process within the projected tolerance time and start a brake test. If the test is successful, the controller resumes normal operation until the safety module requests the next brake test when the configured time has expired.



SD6 drive controller and SE6 safety module: Your advantages

- Powerful stand-alone drive controller with advanced safety technology
- Optional CANopen, EtherCAT or PROFINET communication
- Extensive stop and movement functions such as SS1, SS2, SDI, SLI, SLS, SOS, SSR or SLP
- Safe control (SBC) and safe testing of up to two brakes with automatic test cycle monitoring
- Application-specific stopping of the drives if a limit value is exceeded or for an emergency stop
- Alternative controller- or drive-controlled stop ramps with SS1 and SS2

Additional documentation

Additional documentation related to the product can be found at
http://www.stoeber.de/en/downloads/

Enter the ID of the documentation in the Search term field.

Documentation	ID
SD6 drive controller manual	442425
SE6 safety module manual	442795

13 Connecting to drive controllers of third-party manufacturers

Table of contents

13.1 General notes

STOBER synchronous servo motors are designed for connection to STOBER drive controllers in the standard version. STOBER offers an extensive assortment of high-quality, trusted power and encoder connection cables for this purpose. However, STOBER synchronous servo motors can also be operated on drive controllers from third-party manufacturers. Notes and information for this purpose can be found in the following chapters. You can find all other information about STOBER synchronous servo motors in the corresponding chapters of this catalog.

13.1.1 Nominal data

Nominal data for synchronous servo motors specified in the selection tables of this catalog were calculated for connecting to STOBER drive controllers. Note that this nominal data may change when STOBER synchronous servo motors are connected to drive controllers of third-party manufacturers. The following drive controller plug connectors are determining factors here:

- f_{2PU}
- $f_{PWM,PU}$
- U_{ZK}
- Compensation of the field weakening range.

The maximum achievable speed of a synchronous servo motor depends on the number of pole pairs (p) of the synchronous servo motor and, if applicable, on the restriction of f_{2PU} by Regulation (EC) No. 428/2009 (EC Dual Use Regulation). Details are shown in the figure below.

Some encoders feature integrated temperature monitoring, the warning and switch-off thresholds of which may overlap with the corresponding values set for the thermal winding protection in the drive controller. In some cases, this may result in an instance where an encoder with internal temperature monitoring forces the motor to shut down, even before the motor has reached its nominal data.

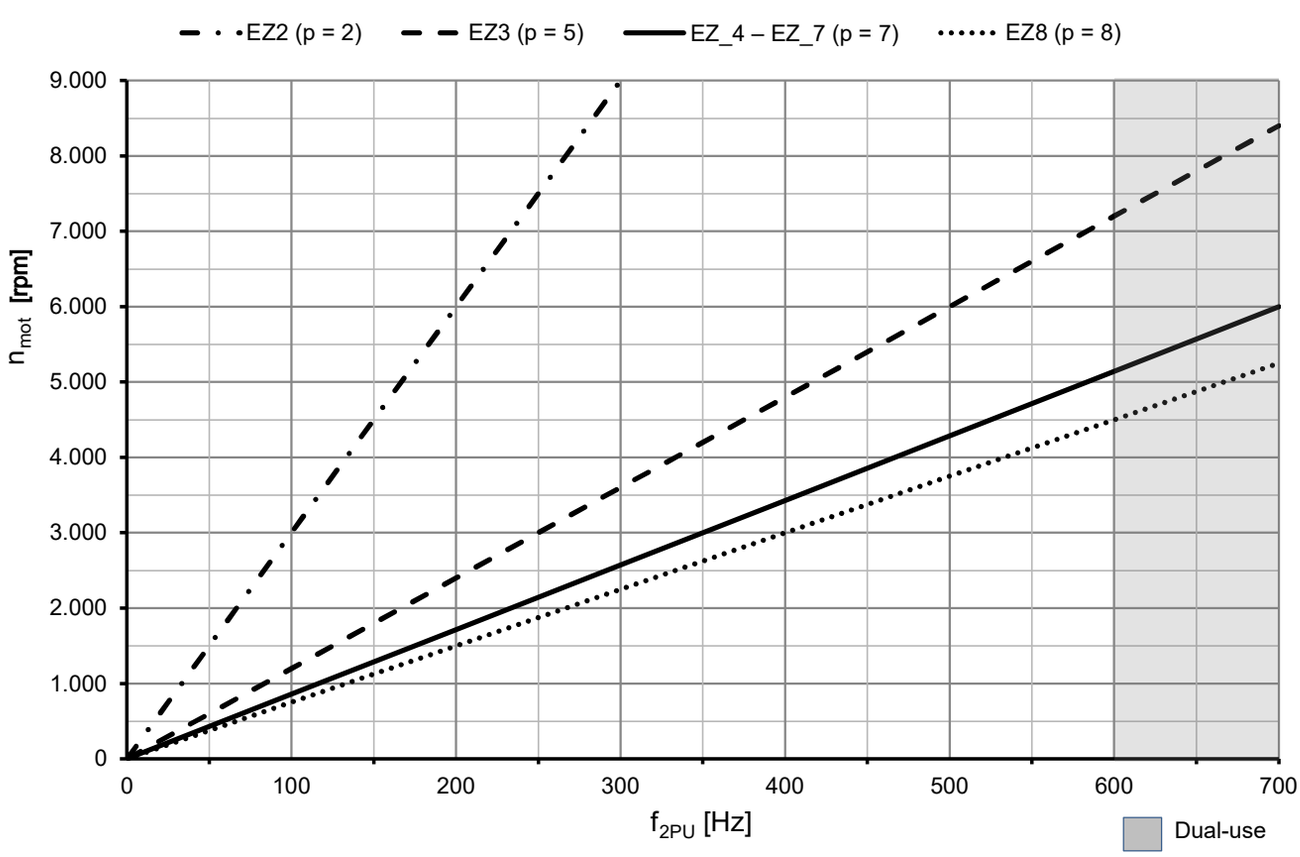


Fig. 1: Speed/frequency graph for EZ motors

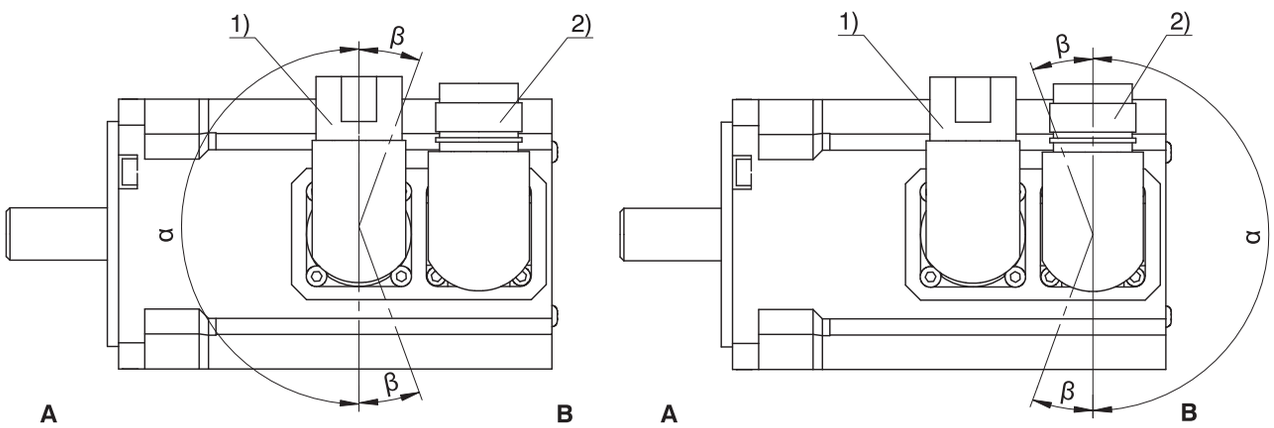
13.1.2 Plug connectors

STOBER synchronous servo motors are equipped with angled, round plug connectors (INTERCONTEC brand) for power and encoder connection in the standard version. You can find detailed technical information about the plug connectors at http://www.intercontec.biz.

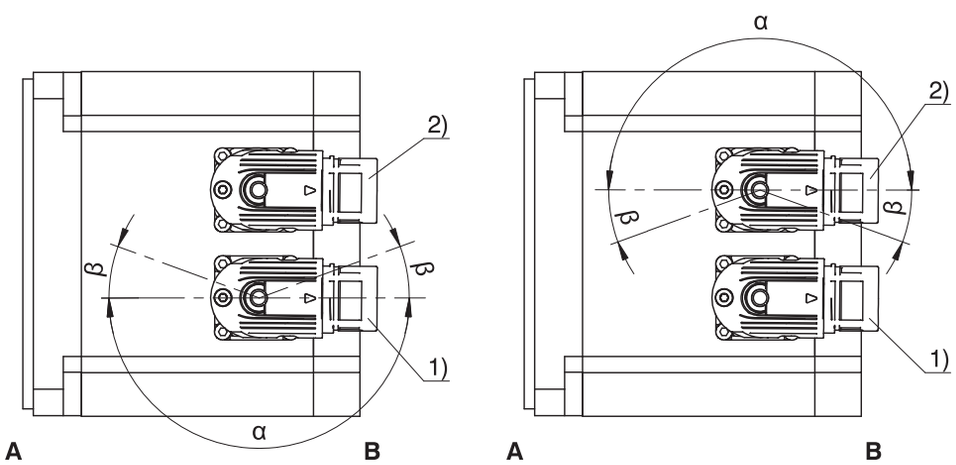
For motors with forced ventilation, avoid collisions between the motor connection cables and the plug connector of the forced ventilation unit. In the event of a collision, turn the motor plug connectors accordingly. Details regarding the position of the plug connector for the forced ventilation unit can be found in the "Dimensional drawings" chapter.

The figures represent the position of the plug connectors upon delivery.

Turning ranges of plug connectors (EZ2 – EZ3 motors)



Turning ranges of plug connectors (motors EZ4 – EZ8, EZHD, EZM, EZS)



1	Power plug connector	2	Encoder plug connector
A	Attachment or output side of the motor	B	Not output side

Power plug connector features

Motor type	Size	Connection	Turning range	
			α	β
EZ2 – EZ5, EZ701, EZ703	con.23	Quick lock	180°	40°
EZ705, EZ802, EZ803, EZ805	con.40	Quick lock	180°	40°

Encoder plug connector features

Motor type	Size	Connection	Turning range	
			α	β
EZ2 – EZ7, EZ802, EZ803, EZ805U	con.23[1]	Quick lock	180°	20°
EZ805B	con.23[2]	Quick lock	180°	0°

Notes

- In turning range β, the power or encoder plug connectors can be turned only if doing so does not cause them to collide.
- The number after "con." indicates the approximate external thread diameter of the plug connector in mm (for example, con.23 designates a plug connector with an external thread diameter of about 23 mm).

13.1.3 Connection cables

The plug connectors and connection assignment of STOBER synchronous servo motors are designed for connecting to drive controllers from third-party manufacturers in such a way that allows you to connect the original cable of the respective manufacturer. Keep the following information regarding cable quality and design in mind.

- Because the original cable from Bosch Rexroth cannot be used, STOBER offers suitable cables for this purpose. More detailed information is available from your STOBER customer consultant.
- Ensure that the cable quality and cable design is suitable for the ambient conditions at the installation location.

Electromagnetic compatibility (EMC)

Ensure compliance with statutory EMC requirements for the drive system at the installation location.

Connect the cable shields on both ends of the connection cable. Connect the grounding screw of the synchronous servo motor with the grounding at the installation location.

Power cables

Operation with unsuitable power cables may lead to inadmissibly high voltage peaks, which could damage the motor. For this reason, the capacitances and inductances must match the motor. Recommended values can be found in the table below.

The conductor cross-section of the power cable must be designed appropriately for the stall current of the motor. Details on this can be found in the table below.

Conductor cross-section [mm²]	1.0	1.5	2.5	4.0	6.0	10.0	16.0	25.0
Nominal current [A]	12.5	15.0	20.0	28.3	35.8	49.2	66.7	90.0
Maximum capacitance in accordance with test type A (core/core) [nF/km]	45	55	65	60	70	75	75	Values on request
Maximum capacitance in accordance with test type B (core/residual) [nF/km]	250	300	325	260	300	350	360	Values on request
Maximum inductance (core/core) [µH/km]	800	700	700	600	650	600	570	Values on request

Notes

- The maximum capacitance is specified in accordance with DIN VDE 0472-504. Specifications in accordance with EN 50289-1-5 in preparation.
- The maximum inductance is specified in accordance with EN 50289-1-12.

[1] con.15 for connection to B&R ACOPOSmulti with EnDat 2.2 Interface (drive controller type code GG and GY).

[2] con.15 for connection to B&R ACOPOSmulti with EnDat 2.2 Interface (drive controller type code GG and GY).

Encoder cables

When operating with unsuitable encoder cables, encoder signals can no longer be transferred free of interference. Note the recommended values in the following table.

Signal shape	Digital		Sin-Cos			Resolver	
Conductor cross-section [mm²]	0.14	0.25	0.14	0.25	0.37	0.14	0.25
Maximum capacitance in accordance with test type A (core/core) [nF/km]	30	35	60	110	130	40	50
Maximum capacitance in accordance with test type B (core/remainder) [nF/km]	110	130	300	300	325	300	300
Maximum inductance (core/core) [µH/km]	800	800	650	700	700	800	800
Shielding type of cable	Tin-plated copper braiding						
Shielding type of core pairs	–		Tin-plated copper braiding			Film + braiding	
Cover	≥ 90 %		≥ 80 %			≥ 80 %	

Notes

- The maximum capacitance is specified in accordance with DIN VDE 0472-504. Specifications in accordance with EN 50289-1-5 in preparation.
- The maximum inductance is specified in accordance with EN 50289-1-12.

13.2 Connection to B&R drive controllers

This chapter contains the information for connecting STOBER synchronous servo motors to drive controllers of the above-named manufacturer which differs from connecting to STOBER drive controllers. You can find all other information about STOBER synchronous servo motors in the respective chapter of this catalog.

STOBER has taken the following measures to minimize the effort of commissioning STOBER motors connected to B&R drive controllers and avoid errors during parameterization:

- The commutation offset of the motor was set so that calibration by the customer is not necessary.
- The electronic nameplate of the motor was designed to be compatible with the B&R controllers.

More information on commissioning EZ motors connected to B&R drive controllers can be found in the 443184_en document in the download area on the STOBER website.

13.2.1 Encoders

Encoders with EnDat 2.2 interface

Encoder model	Code	Measuring method	Recordable revolutions	Resolution	Position values per revolution	MTTF [years]	PHF [h]
EnDat 2.2 EQI 1131 FMA	M4	Inductive	4096	19 bit	524288	> 100	$\leq 15 \times 10^{-9}$
EnDat 2.2 EQI 1131	Q6	Inductive	4096	19 bit	524288	> 100	$\leq 15 \times 10^{-9}$
EnDat 2.2 EQN 1135 FMA	M3	Optical	4096	23 bit	8388608	> 100	$\leq 15 \times 10^{-9}$
EnDat 2.2 EQN 1135	Q5	Optical	4096	23 bit	8388608	> 100	$\leq 15 \times 10^{-9}$
EnDat 2.2 ECN 1123 FMA	M1	Optical	–	23 bit	8388608	> 100	$\leq 15 \times 10^{-9}$
EnDat 2.2 ECN 1123	C7	Optical	–	23 bit	8388608	> 100	$\leq 15 \times 10^{-9}$
EnDat 2.2 ECI 1118-G2	C5	Inductive	–	18 bit	262144	> 76	$\leq 1.5 \times 10^{-6}$

Encoders with EnDat 2.1 interface

Encoder model	Code	Measuring method	Recordable revolutions	Resolution	Position values per revolution	Periods per revolution	MTTF [years]	PHF [h]
EnDat 2.1 EQN 1125 FMA	M2	Optical	4096	13 bit	8192	Sin/cos 512	> 57	≤ 2 × 10^{-6}
EnDat 2.1 EQN 1125	Q4	Optical	4096	13 bit	8192	Sin/cos 512	> 57	≤ 2 × 10^{-6}
EnDat 2.1 ECN 1113 FMA	M0	Optical	–	13 bit	8192	Sin/cos 512	> 57	≤ 2 × 10^{-6}
EnDat 2.1 ECN 1113	C6	Optical	–	13 bit	8192	Sin/cos 512	> 57	≤ 2 × 10^{-6}

Notes

- The encoder code is a part of the type designation of the motor.
- FMA = Version with fault exclusion for mechanical coupling.
- Encoders with EnDat 2.2 interface and in the FMA design are ready for operation as a one-encoder solution on a safety-related position measuring system with an EnDat 2.2 interface
- Multiple revolutions of the motor shaft can be recorded only using multi-turn encoders.

13.2.2 Possible combinations with drive controllers

The following table shows the possible combinations of STOBER synchronous servo motors with drive controllers from B&R depending on the encoder model.

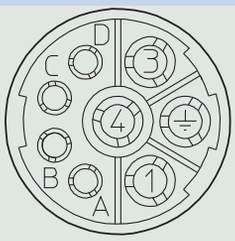
Drive controller		ACOPOS	ACOPOSmulti (EnDat 2.1)	ACOPOSmulti (EnDat 2.2)	ACOPOS P3 (EnDat 2.2)	ACOPOS P3 OCS (EnDat 2.2)	ACOPOSmulti OCS (EnDat 2.2)
Drive controller code		FG	FV	GG	GY	GP	GV
Connection plan ID		442313	442444	442677	443095	443022	443092
Encoder	**Encoder code**						
EnDat 2.2 EQI 1131 FMA	M4	–	–	EZ	EZ	EZ	EZ
EnDat 2.2 EQI 1131	Q6	–	–	EZ	EZ	EZ	EZ
EnDat 2.2 EQN 1135 FMA	M3	–	–	EZ	EZ	EZ	EZ
EnDat 2.2 EQN 1135	Q5	–	–	EZ	EZ	EZ	EZ
EnDat 2.2 ECN 1123 FMA	M1	–	–	EZ	EZ	EZ	EZ
EnDat 2.2 ECN 1123	C7	–	–	EZ	EZ	EZ	EZ
EnDat 2.2 ECI 1118-G2	C5	–	–	EZ	EZ	–	–
EnDat 2.1 EQN 1125 FMA	M2	EZ	EZ	–	–	–	–
EnDat 2.1 EQN 1125	Q4	EZ	EZ	–	–	–	–
EnDat 2.1 ECN 1113 FMA	M0	–	EZ	–	–	–	–
EnDat 2.1 ECN 1113	C6	–	EZ	–	–	–	–
Resolver	R0	EZ	EZ	–	–	–	–

The encoder and drive controller codes are a part of the type designation of the motor.

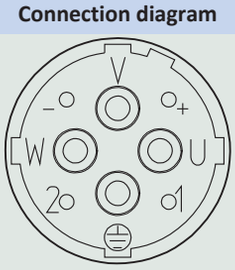
13.2.3 Connection assignment of the power plug connector

The size and connection plan of the power plug connector depend on the size of the motor. The colors of the connecting wires inside the motor are specified in accordance with IEC 60757.

Plug connector size con.23

Connection diagram	Pin	Connection	Color
	1	U phase	BK
	3	W phase	RD
	4	V phase	BU
	A	Temperature sensor +	
	B	Temperature sensor –	
	C	Brake +	RD
	D	Brake –	BK
	⏚	Grounding conductor	GNYE

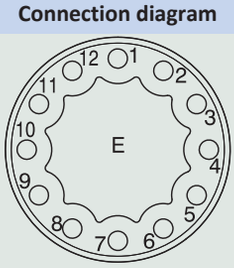
Plug connector size con.40 (1.5)

Connection diagram	Pin	Connection	Color
	U	U phase	BK
	V	V phase	BU
	W	W phase	RD
	+	Brake +	RD
	–	Brake –	BK
	1	Temperature sensor +	
	2	Temperature sensor –	
	⏚	Grounding conductor	GNYE

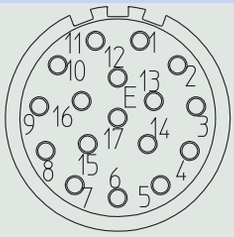
13.2.4 Connection assignment of the encoder plug connector

The size and connection assignment of the encoder plug connectors depend on the model of encoder installed and the size of the motor. The colors of the connecting wires inside the motor are specified in accordance with IEC 60757.

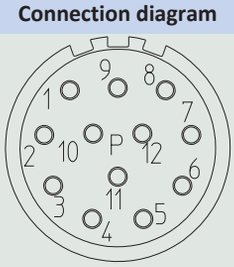
EnDat 2.2 digital encoder, plug connector size con.15

Connection diagram	Pin	Connection	Color
	1	Up +	BNGN
	2	Data +	GY
	3	Data –	PK
	4	Clock +	VT
	5	Clock –	YE
	6		
	7	0 V GND	WHGN
	8		
	9		
	10		
	11		
	12		

EnDat 2.1 encoder with sin/cos incremental signals, plug connector size con.23

Connection diagram	Pin	Connection	Color
	1	Up sense	BU
	2		
	3		
	4	0 V sense	WH
	5		
	6		
	7	Up +	BNGN
	8	Clock +	VT
	9	Clock –	YE
	10	0 V GND	WHGN
	11		
	12	B + (Sin +)	BUBK
	13	B – (Sin –)	RDBK
	14	Data +	GY
	15	A + (Cos +)	GNBK
	16	A – (Cos –)	YEBK
	17	Data –	PK

Resolver, plug connector size con.23

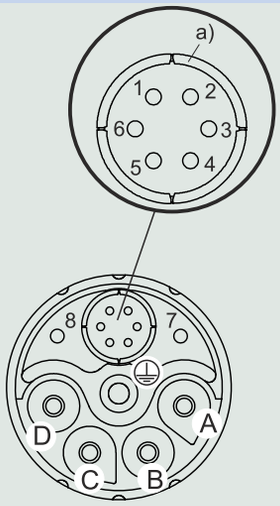
Connection diagram	Pin	Connection	Color
	1		
	2		
	3	S4 Sin +	BU
	4	S1 Cos –	RD
	5	R2 Ref +	YEWH
	6		
	7	S2 Sin –	YE
	8	S3 Cos +	BK
	9	R1 Ref –	RDWH
	10		
	11		
	12		

13.2.5 Terminal assignment for plug connectors (One Cable Solution)

In the One Cable Solution design, the power and encoder lines are connected using a shared plug connector.

The temperature sensor of the motor is connected to the encoder internally. The measured values from the temperature sensor are transmitted via the log of the encoder.

Plug connector size con.23

Connection diagram	Pin	Connection	Color
	A	U phase	black
	B	V phase	blue
	C	W phase	red
	D		
	1	Up +	browngreen
	2	0 V GND	whitegreen
	3	Data +	grey
	4	Data –	pink
	5	Clock +	violet
	6	Clock –	yellow
	7	Brake –	
	8	Brake +	
	⏚	Grounding conductor	green-yellow
a) Coaxial shield to which the shield of the encoder cores is connected			

13.3 Connection to Siemens drive controllers

This chapter contains the information for connecting STOBER synchronous servo motors to drive controllers of the above-named manufacturer which differs from connecting to STOBER drive controllers. You can find all other information about STOBER synchronous servo motors in the respective chapter of this catalog.

STOBER has taken the following measures to minimize the effort of commissioning STOBER motors connected to SINAMICS S120 drive controllers and avoid errors during parameterization:

- The commutation offset of the motor was set so that calibration by the customer is not necessary.
- Parameter lists are provided on request.

More information on commissioning EZ motors connected to SINAMICS S120 drive controllers can be found in the 443232_en document in the download area on the STOBER website.

13.3.1 Encoders

Encoders with EnDat 2.1 interface

Encoder model	Code	Measuring method	Recordable revolutions	Resolution	Position values per revolution	Periods per revolution	MTTF [years]	PHF [h]
EnDat 2.1 ECI 119	C4	Inductive	–	19 bit	524288	Sin/cos 32	> 57	$\leq 2 \times 10^{-6}$
EnDat 2.1 EQN 1125 FMA	M2	Optical	4096	13 bit	8192	Sin/cos 512	> 57	$\leq 2 \times 10^{-6}$
EnDat 2.1 EQN 1125	Q4	Optical	4096	13 bit	8192	Sin/cos 512	> 57	$\leq 2 \times 10^{-6}$
EnDat 2.1 ECN 1113 FMA	M0	Optical	–	13 bit	8192	Sin/cos 512	> 57	$\leq 2 \times 10^{-6}$
EnDat 2.1 ECN 1113	C6	Optical	–	13 bit	8192	Sin/cos 512	> 57	$\leq 2 \times 10^{-6}$

Notes

- The encoder code is a part of the type designation of the motor.
- FMA = Version with fault exclusion for mechanical coupling.
- Multiple revolutions of the motor shaft can be recorded only using multi-turn encoders.

13.3.2 Possible combinations with drive controllers

The following table shows the possible combinations of STOBER synchronous servo motors with drive controllers from Siemens depending on the encoder model.

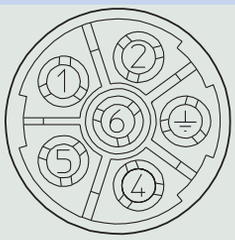
Drive controller		**SINAMICS S120** (with EnDat 2.1 and resolver interface)
Drive controller code		FJ
Connection plan ID		442315
Encoder	**Encoder code**	
EnDat 2.1 EQN 1125 FMA	M2	EZ
EnDat 2.1 EQN 1125	Q4	EZ
EnDat 2.1 ECN 1113 FMA	M0	EZ
EnDat 2.1 ECN 1113	C6	EZ
Resolver	R0	EZ

The encoder and drive controller codes are a part of the type designation of the motor.

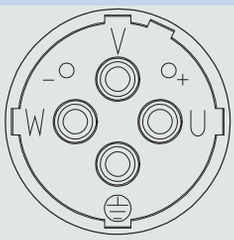
13.3.3 Connection assignment of the power plug connector

The size and connection plan of the power plug connector depend on the size of the motor. The colors of the connecting wires inside the motor are specified in accordance with IEC 60757.

Plug connector size con.23

Connection diagram	Pin	Connection	Color
	1	U phase	BK
	2	V phase	BU
	4	Brake +	RD
	5	Brake –	BK
	6	W phase	RD
	⏚	Grounding conductor	GNYE

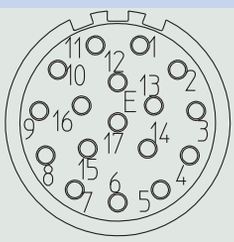
Plug connector size con.40 (1.5)

Connection diagram	Pin	Connection	Color
	U	U phase	BK
	V	V phase	BU
	W	W phase	RD
	+	Brake +	RD
	–	Brake –	BK
	⏚	Grounding conductor	GNYE

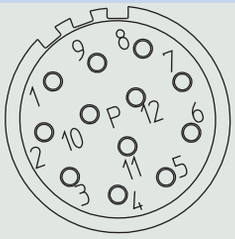
13.3.4 Connection assignment of the encoder plug connector

The size and terminal assignment of the encoder plug connectors depend on the model of encoder installed and the size of the motor.

EnDat 2.1 encoder with sin/cos incremental signals, plug connector size con.23

Connection diagram	Pin	Connection	Color
	1	A + (Cos +)	GNBK
	2	A – (Cos –)	YEBK
	3	Data +	GY
	4		
	5	Clock +	VT
	6		
	7	0 V GND	WHGN
	8	Temperature sensor +	BK/BN
	9	Temperature sensor –	WH/WH
	10	Up +	BNGN
	11	B + (Sin +)	BUBK
	12	B – (Sin –)	RDBK
	13	Data –	PK
	14	Clock –	YE
	15	0 V sense	WH
	16	Up sense	BU
	17		

Resolver, plug connector size con.23

Connection diagram	Pin	Connection	Color
	1	S4 Sin +	BU
	2	S2 Sin –	YE
	3		
	4		
	5		
	6		
	7	R1 Ref –	RDWH
	8	Temperature sensor +	BK/BN
	9	Temperature sensor –	WH/WH
	10	R2 Ref +	YEWH
	11	S3 Cos +	BK
	12	S1 Cos –	RD

13.4 Connection to Kollmorgen drive controllers

This chapter contains the information for connecting STOBER synchronous servo motors to drive controllers of the above-named manufacturer which differs from connecting to STOBER drive controllers. You can find all other information about STOBER synchronous servo motors in the respective chapter of this catalog.

STOBER has taken the following measures to minimize the effort of commissioning STOBER motors connected to Kollmorgen drive controllers and avoid errors during parameterization:

- The commutation offset of the motor was set so that calibration by the customer is not necessary.
- Parameter lists are provided on request.

More information on commissioning EZ motors connected to Kollmorgen drive controllers can be found in the 443236_en document in the download area on the STOBER website.

13.4.1 Encoders

Encoders with EnDat 2.2 interface

Encoder model	Code	Measuring method	Recordable revolutions	Resolution	Position values per revolution	MTTF [years]	PHF [h]
EnDat 2.2 EQI 1131	Q6	Inductive	4096	19 bit	524288	> 100	$\leq 15 \times 10^{-9}$
EnDat 2.2 EQI 1131 FMA	M4	Inductive	4096	19 bit	524288	> 100	$\leq 15 \times 10^{-9}$

Encoders with EnDat 2.1 interface

Encoder model	Code	Measuring method	Recordable revolutions	Resolution	Position values per revolution	Periods per revolution	MTTF [years]	PHF [h]
EnDat 2.1 EQN 1125 FMA	M2	Optical	4096	13 bit	8192	Sin/cos 512	> 57	$\leq 2 \times 10^{-6}$
EnDat 2.1 EQN 1125	Q4	Optical	4096	13 bit	8192	Sin/cos 512	> 57	$\leq 2 \times 10^{-6}$

Notes

- The encoder code is a part of the type designation of the motor.
- FMA = Version with fault exclusion for mechanical coupling.
- Multiple revolutions of the motor shaft can be recorded only using multi-turn encoders.

13.4.2 Possible combinations with drive controllers

The following table shows the possible combinations of STOBER synchronous servo motors with drive controllers from Kollmorgen depending on the encoder model.

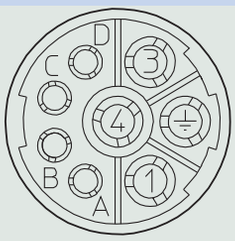
Drive controller		Servostar S300/S400/S600/S700
Drive controller code		FE
Connection plan ID		442311
Encoder	Encoder code	
EnDat 2.2 EQI 1131	Q6	EZ
EnDat 2.2 EQI 1131 FMA	M4	EZ
EnDat 2.1 EQN 1125 FMA	M2	EZ
EnDat 2.1 EQN 1125	Q4	EZ
Resolver	R0	EZ

The encoder and drive controller codes are a part of the type designation of the motor.

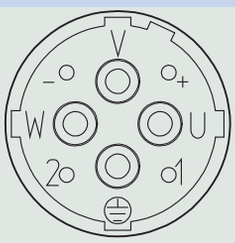
13.4.3 Connection assignment of the power plug connector

The size and connection plan of the power plug connector depend on the size of the motor. The colors of the connecting wires inside the motor are specified in accordance with IEC 60757.

Plug connector size con.23

Connection diagram	Pin	Connection	Color
	1	U phase	BK
	3	W phase	RD
	4	V phase	BU
	A	Brake +	RD
	B	Brake –	BK
	C		
	D		
	⏚	Grounding conductor	GNYE

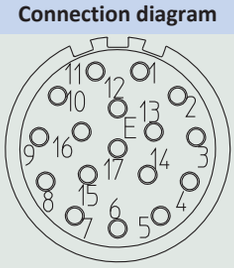
Plug connector size con.40 (1.5)

Connection diagram	Pin	Connection	Color
	U	U phase	BK
	V	V phase	BU
	W	W phase	RD
	+	Brake +	RD
	–	Brake –	BK
	1		
	2		
	⏚	Grounding conductor	GNYE

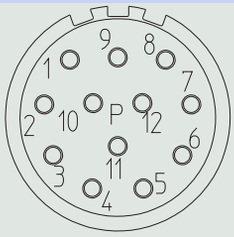
13.4.4 Connection assignment of the encoder plug connector

The size and connection assignment of the encoder plug connectors depend on the model of encoder installed and the size of the motor.

EnDat 2.1 encoder with sin/cos incremental signals, plug connector size con.23

Connection diagram	Pin	Connection	Color
	1	B – (Sin –)	RDBK
	2	0 V GND	WHGN
	3	A – (Cos –)	YEBK
	4	Up +	BNGN
	5	Data +	GY
	6		
	7	1TP1 (Temperature sensor +)	BK/RD
	8	Clock +	VT
	9	B + (Sin +)	BUBK
	10	0 V sense	WH
	11	A + (Cos +)	GNBK
	12	Up sense	BU
	13	Data –	PK
	14	1TP2 (Temperature sensor –)	WH/WH
	15	Clock –	YE
	16		
	17		

Resolver, plug connector size con.23

Connection diagram	Pin	Connection	Color
	1		
	2	1TP1 (Temperature sensor +)	BK/RD
	3	S4 Sin +	BU
	4	S3 Cos +	BK
	5	R2 Ref +	YEWH
	6	1TP2 (Temperature sensor –)	WH/WH
	7	S2 Sin –	YE
	8	S1 Cos –	RD
	9	R1 Ref –	RDWH
	10		
	11		
	12		

13.5 Connection to Bosch Rexroth drive controllers

This chapter contains the information for connecting STOBER synchronous servo motors to drive controllers of the above-named manufacturer which differs from connecting to STOBER drive controllers. You can find all other information about STOBER synchronous servo motors in the respective chapter of this catalog.

STOBER has taken the following measures to minimize the effort of commissioning STOBER motors connected to IndraDrive C/Cs drive controllers and avoid errors during parameterization:

- The commutation offset of the motor was set so that calibration by the customer is not necessary.
- Parameter lists are provided on request.

More information on commissioning EZ motors connected to IndraDrive C/Cs drive controllers can be found in the 443235_en document in the download area on the STOBER website.

13.5.1 Encoders

Encoders with EnDat 2.1 interface

Encoder model	Code	Measuring method	Recordable revolutions	Resolution	Position values per revolution	Periods per revolution	MTTF [years]	PHF [h]
EnDat 2.1 EQN 1125 FMA	M2	Optical	4096	13 bit	8192	Sin/cos 512	> 57	$\leq 2 \times 10^{-6}$
EnDat 2.1 EQN 1125	Q4	Optical	4096	13 bit	8192	Sin/cos 512	> 57	$\leq 2 \times 10^{-6}$
EnDat 2.1 ECN 1113 FMA	M0	Optical	–	13 bit	8192	Sin/cos 512	> 57	$\leq 2 \times 10^{-6}$
EnDat 2.1 ECN 1113	C6	Optical	–	13 bit	8192	Sin/cos 512	> 57	$\leq 2 \times 10^{-6}$

Notes

- The encoder code is a part of the type designation of the motor.
- FMA = Version with fault exclusion for mechanical coupling.
- Multiple revolutions of the motor shaft can be recorded only using multi-turn encoders.

13.5.2 Possible combinations with drive controllers

The following table shows the possible combinations of STOBER synchronous servo motors with drive controllers from Bosch Rexroth depending on the encoder model.

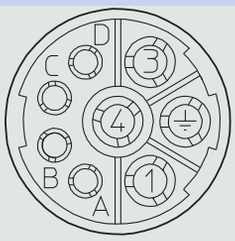
Drive controller		**IndraDrive C/Cs**
Drive controller code		FW
DC link voltage U_{ZK}		540 V
Connection plan ID		442445
Encoder	**Encoder code**	
EnDat 2.1 EQN 1125 FMA	M2	EZ
EnDat 2.1 EQN 1125	Q4	EZ
EnDat 2.1 ECN 1113 FMA	M0	EZ
EnDat 2.1 ECN 1113	C6	EZ

The encoder and drive controller codes are a part of the type designation of the motor.

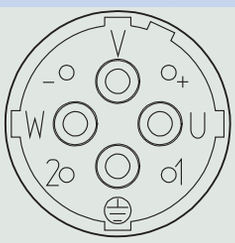
13.5.3 Connection assignment of the power plug connector

The size and connection plan of the power plug connector depend on the size of the motor. The colors of the connecting wires inside the motor are specified in accordance with IEC 60757.

Plug connector size con.23

Connection diagram	Pin	Connection	Color
	1	U phase	BK
	3	V phase	BU
	4	W phase	RD
	A	Brake +	RD
	B	Brake –	BK
	C	Temperature sensor +	
	D	Temperature sensor –	
	⏚	Grounding conductor	GNYE

Plug connector size con.40 (1.5)

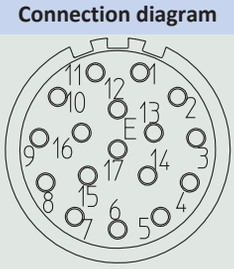
Connection diagram	Pin	Connection	Color
	U	U phase	BK
	V	V phase	BU
	W	W phase	RD
	+	Brake +	RD
	–	Brake –	BK
	1	Temperature sensor +	
	2	Temperature sensor –	
	⏚	Grounding conductor	GNYE

13.5.4 Connection assignment of the encoder plug connector

The size and connection assignment of the encoder plug connectors depend on the model of encoder installed and the size of the motor. The colors of the connecting wires inside the motor are specified in accordance with IEC 60757.

EnDat 2.1 encoder with sin/cos incremental signals, plug connector size con.23

This connection assignment only applies to the IndraDrive C/Cs drive controller.

Connection diagram	Pin	Connection	Color
	1	Up sense	BU
	2		
	3		
	4	0 V sense	WH
	5		
	6		
	7	Up +	BNGN
	8	Clock +	VT
	9	Clock –	YE
	10	0 V GND	WHGN
	11		
	12	B + (Sin +)	BUBK
	13	B – (Sin –)	RDBK
	14	Data +	GY
	15	A + (Cos +)	GNBK
	16	A – (Cos –)	YEBK
	17	Data –	PK

13.6 Connection to Beckhoff drive controllers

This chapter contains the information for connecting STOBER synchronous servo motors to drive controllers of the above-named manufacturer which differs from connecting to STOBER drive controllers. You can find all other information about STOBER synchronous servo motors in the respective chapter of this catalog.

STOBER has taken the following measures to minimize the effort of commissioning STOBER motors connected to AX5000 drive controllers and avoiding errors during parameterization:

- The commutation offset of the motor was set so that calibration by the customer is not necessary.
- Parameter files for all supported motor versions are provided.

More information on commissioning EZ motors connected to B&R drive controllers can be found in the 443185_en document in the download area on the STOBER website.

13.6.1 Encoders

Encoders with EnDat 2.1 interface

Encoder model	Code	Measuring method	Recordable revolutions	Resolution	Position values per revolution	Periods per revolution	MTTF [years]	PHF [h]
EnDat 2.1 EQN 1125 FMA	M2	Optical	4096	13 bit	8192	Sin/cos 512	> 57	$\leq 2 \times 10^{-6}$
EnDat 2.1 EQN 1125	Q4	Optical	4096	13 bit	8192	Sin/cos 512	> 57	$\leq 2 \times 10^{-6}$
EnDat 2.1 ECN 1113 FMA	M0	Optical	–	13 bit	8192	Sin/cos 512	> 57	$\leq 2 \times 10^{-6}$
EnDat 2.1 ECN 1113	C6	Optical	–	13 bit	8192	Sin/cos 512	> 57	$\leq 2 \times 10^{-6}$
EnDat 2.1 EQI 1130	Q2	Inductive	4096	12 bit	262144	Sin/cos 16	> 100	$\leq 6 \times 10^{-7}$

Notes

- The encoder code is a part of the type designation of the motor.
- FMA = Version with fault exclusion for mechanical coupling.
- Multiple revolutions of the motor shaft can be recorded only using multi-turn encoders.

13.6.2 Possible combinations with drive controllers

The following table shows the possible combinations of STOBER synchronous servo motors with drive controllers from Beckhoff depending on the encoder model.

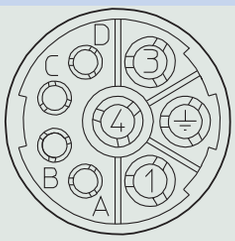
Drive controller		AX5000
Drive controller code		FM
Connection plan ID		442318
Encoder	Encoder code	
EnDat 2.1 EQN 1125 FMA	M2	EZ
EnDat 2.1 EQN 1125	Q4	EZ
EnDat 2.1 ECN 1113 FMA	M0	EZ
EnDat 2.1 ECN 1113	C6	EZ

The encoder and drive controller codes are a part of the type designation of the motor.

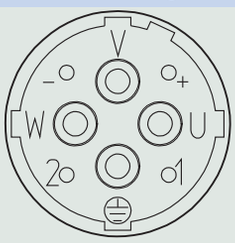
13.6.3 Connection assignment of the power plug connector

The size and connection plan of the power plug connector depend on the size of the motor. The colors of the connecting wires inside the motor are specified in accordance with IEC 60757.

Plug connector size con.23

Connection diagram	Pin	Connection	Color
	1	U phase	BK
	3	W phase	RD
	4	V phase	BU
	A	Brake +	RD
	B	Brake –	BK
	C	Temperature sensor +	
	D	Temperature sensor –	
	⏚	Grounding conductor	GNYE

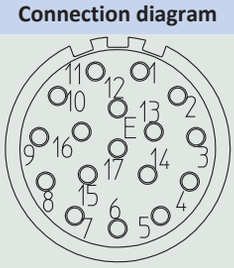
Plug connector size con.40 (1.5)

Connection diagram	Pin	Connection	Color
	U	U phase	BK
	V	V phase	BU
	W	W phase	RD
	+	Brake +	RD
	–	Brake –	BK
	1	Temperature sensor +	
	2	Temperature sensor –	
	⏚	Grounding conductor	GNYE

13.6.4 Connection assignment of the encoder plug connector

The size and connection assignment of the encoder plug connectors depend on the model of encoder installed and the size of the motor.

EnDat 2.1 encoder with sin/cos incremental signals, plug connector size con.23

Connection diagram	Pin	Connection	Color
	1	B – (Sin –)	RDBK
	2	0 V GND	WHGN
	3	A – (Cos –)	YEBK
	4	Up +	BNGN
	5	Data +	GY
	6		
	7		
	8	Clock +	VT
	9	B + (Sin +)	BUBK
	10	0 V sense	WH
	11	A + (Cos +)	GNBK
	12	Up sense	BN
	13	Data –	PK
	14		
	15	Clock –	YE
	16		
	17		

13.7 Connection to Allen-Bradley drive controllers

This chapter contains the information for connecting STOBER synchronous servo motors to drive controllers of the above-named manufacturer which differs from connecting to STOBER drive controllers. You can find all other information about STOBER synchronous servo motors in the respective chapter of this catalog.

The STOBER EZ geared motors can be parameterized to Kinetix 5500/5700/6500 drive controllers fully automatically. EZ motors without an attached gear unit and other STOBER series are excluded.

STOBER has taken the following measures to minimize the effort of commissioning STOBER motors connected to Allen-Bradley drive controllers and avoid errors during parameterization:

- The commutation offset of the motor was set so that calibration by the customer is not necessary.
- The electronic nameplate of the motor was designed to be compatible with the Kinetix 5500/5700/6500.
- STOBER tests the motor connected to Allen-Bradley drive controllers before delivery to the customer.
- Configuration files for supported motor versions are available for download.

More information on commissioning EZ motors connected to Allen-Bradley drive controllers can be found in the 443244_en document in the download area on the STOBER website.

13.7.1 Encoders

Encoders with EnDat 2.2 interface

Encoder model	Code	Measuring method	Recordable revolutions	Resolution	Position values per revolution	MTTF [years]	PHF [h]
EnDat 2.2 EQN 1135	Q5	Optical	4096	23 bit	8388608	> 100	$\leq 15 \times 10^{-9}$

Encoders with HIPERFACE interface

Encoder model	Code	Measuring method	Recordable revolutions	Resolution	Position values per revolution	MTTF [years]	PHF [h]
EDM35	H6	Optical	4096	20 bit	1048576	> 100	$\leq 31 \times 10^{-9}$

Notes

- The encoder code is a part of the type designation of the motor.
- Multiple revolutions of the motor shaft can be recorded only using multi-turn encoders.

13.7.2 Possible combinations with drive controllers

The following table shows the possible combinations of STOBER motors and geared motors with drive controllers from Allen-Bradley depending on the encoder model.

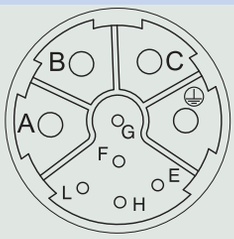
Drive controller		KINETIX 5500 (with HIPERFACE DSL)	KINETIX 5700 (with HIPERFACE DSL)	KINETIX 5700 (with EnDat 2.2)	KINETIX 6500 (with EnDat 2.2)
Drive controller code		HB	GD	HA	GC
Connection plan ID		443169	442449	443096	442448
Encoder	**Encoder code**				
EnDat 2.2 EQN 1135	Q5	–	–	EZ	EZ
EDM35	H6	EZ	EZ	–	–

The encoder and drive controller codes are a part of the type designation of the motor.

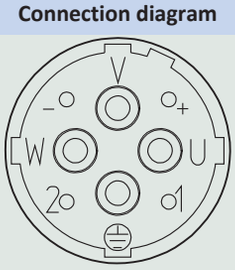
13.7.3 Terminal assignment of the power plug connector

The size and connection plan of the power plug connector depend on the size of the motor. The colors of the connecting wires inside the motor are specified in accordance with IEC 60757.

Plug connector size con.23

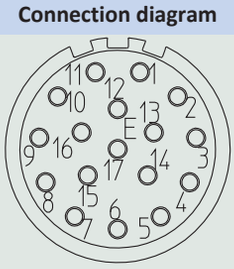
Connection diagram	Pin	Connection	Color
	A	1U1 (U phase)	BK
	B	1V1 (V phase)	RD
	C	1W1 (W phase)	BU
	F	MBRK + (1BD1)	RD
	G	MBRK – (1BD2)	BK
	E		
	H		
	L		
	⏚	PE (grounding conductor)	GNYE

Plug connector size con.40 (1.5)

Connection diagram	Pin	Connection	Color
	U	1U1 (U phase)	BK
	V	1V1 (V phase)	BU
	W	1W1 (W phase)	RD
	+	MBRK + (1BD1)	RD
	–	MBRK – (1BD2)	BK
	1		
	2		
	⏚	PE (grounding conductor)	GNYE

13.7.4 Terminal assignment of the encoder plug connector

EnDat 2.2 digital encoder, plug connector size con.23

Connection diagram	Pin	Connection	Color
	1		
	2		
	3		
	4		
	5	DATA +	GY
	6	DATA –	PK
	7	CLK + (Clock +)	VT
	8	CLK – (Clock –)	YE
	9	EPWR_5V (Up +)	BNGN
	10	ECOM (0 V)	WHGN
	11		
	12		
	13	TS + (1TP1)	BK
	14	TS – (1TP2)	WH
	15		
	16		
	17		

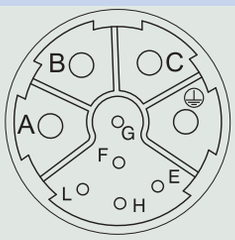
13.7.5 Terminal assignment for plug connectors (One Cable Solution)

In the One Cable Solution design, the power and encoder lines are connected using a shared plug connector.

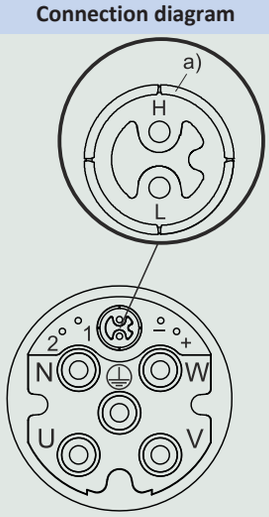
The size of the plug connector depends on the size of the motor.

The temperature sensor of the motor is connected to the encoder internally. The measured values from the temperature sensor are transmitted via the log of the encoder.

Plug connector size con.23

Connection diagram	Pin	Connection	Color
	A	1U1 (U phase)	BK
	B	1V1 (V phase)	BU
	C	1W1 (W phase)	RD
	E	DATA + (DSL +)	GY
	F	MBRK + (1BD1)	RD
	G	MBRK – (1BD2)	BK
	H	DATA – (DSL –)	GN
	L		
	⏚	PE (grounding conductor)	GNYE

Plug connector size con.40 (1.5)

Connection diagram	Pin	Connection	Color
	U	1U1 (U phase)	BK
	V	1V1 (V phase)	BU
	W	1W1 (W phase)	RD
	N		
	+		
	–		
	1	MBRK + (1BD1)	RD
	2	MBRK – (1BD2)	BK
	H	DATA – (DSL –)	GY
	L	DATA + (DSL +)	GN
	⏚	PE (grounding conductor)	GNYE

a) Coaxial shield to which the DSL shield is connected

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15 Appendix

Table of contents

15.1 Symbols in formulas

The formula symbols for values actually present in the application are marked with *.

Symbol	Unit	Explanation
a_{th}	–	Parameter for calculating $K_{mot,th}$
a_{thEL}	–	Parameters for calculating $K_{mot,th}$ (dependent on the mounting position)
B_{10}	–	Number of cycles after which 10% of components have failed
B_{10D}	–	Number of cycles until 10% of components have failed dangerously
C_2	Nm/ arcmin	Torsional stiffness relative to the gear unit output
C_{2k}	Nm/arcmin	Tilting stiffness
C_{dyn}	N	Dynamic bearing load rating
ΔJ_B	$kgcm^2$	Additive mass moment of inertia of a motor with brake
Δm_B	kg	Additive weight of a motor with brake
Δn_1	rpm	Speed difference at the input
Δn_2	rpm	Speed difference at the output
$\Delta\varphi_2$	arcmin	Backlash at the output shaft with a blocked input
$\Delta\varphi_{2red}$	arcmin	Reduced backlash at the output shaft with a blocked input
$\Delta\varphi_{2redI}$	arcmin	Reduced backlash (backlash class I) at the output shaft with a blocked input
$\Delta\varphi_{2redII}$	arcmin	Reduced backlash (backlash class II) at the output shaft with a blocked input
$\Delta\varphi_B$	arcmin	Brake backlash
$\Delta\varphi_{tot}$	arcmin	Total backlash
Δt	s	Timespan
$\Delta\vartheta$	K	Temperature difference
η_{get}	%	Efficiency of the gear unit at nominal torque
η_{gt}	%	Efficiency of the screw drive
ED_{10}	%	Duty cycle based on 10 minutes
F_{2ax*}	N	Actual axial force at the gear unit output
F_{2ax100}	N	Permitted axial force at the gear unit output for $n_{2m*} \leq 100$ rpm (without radial force)
F_{2ax20}	N	Permitted axial force at the gear unit output for $n_{2m*} \leq 20$ rpm (without radial force)
$F_{2ax,eq*}$	N	Actual equivalent axial force on the gear unit output
F_{2axN}	N	Permitted nominal axial force at the gear unit output (without radial force)
f_{2PU}	Hz	Output frequency of the power unit
$f_{PWM,PU}$	Hz	Frequency of the pulse width modulation of the power unit
F_{2rad*}	N	Actual radial force on the gear unit output
$F_{2rad100}$	N	Permitted radial force at the gear unit output for $n_{2m*} \leq 100$ rpm
F_{2rad20}	N	Permitted radial force on the gear unit output for $n_{2m*} \leq 20$ rpm
$F_{2rad,acc}$	N	Permitted radial acceleration force at the gear unit output
$F_{2rad,acc*}$	N	Radial acceleration force present at the gear unit output
$F_{2rad,acc,1*}$	N	Radial acceleration force present at the gear unit output in the first time period
$F_{2rad,acc,n*}$	N	Radial acceleration force present at the gear unit output in the nth time period
$F_{2rad,eq*}$	N	Actual equivalent force at the gear unit output
F_{2radN}	N	Permitted nominal radial force at the gear unit output
F_{ax}	N	Permitted axial force on the output
F_{ax*}	N	Actual axial force on the output
F_{ax0}	N	Permitted axial force when the motor is at a standstill for holding the load using the motor torque
$F_{ax,1*} - F_{ax,n*}$	N	Actual axial force in the respective time segment
F_{ax100}	N	Permitted axial force on the output for $n_{m*} \leq 100$ rpm
F_{ax300}	N	Permitted axial force on the output for $n_{m*} \leq 300$ rpm
$F_{ax,eff*}$	N	Actual effective axial force on the output
$F_{ax,ss}$	N	Axial force that can be transmitted by the shrink ring
fB_{op}	–	Operating mode operating factor
fB_t	–	Runtime operating factor

Symbol	Unit	Explanation
fB_T	–	Temperature operating factor
fB_{ZB}	–	Operating factor for cyclic operation
F_{rad}	N	Permitted radial force on the output
F_{rad*}	N	Actual radial force on the output
$F_{rad,1*} – F_{rad,n*}$	N	Actual radial force in the respective time segment
F_{rad100}	N	Permitted radial force on the output for $n_{m*} \leq 100$ rpm
F_{rad300}	N	Permitted radial force on the output for $n_{m*} \leq 300$ rpm
$F_{rad,eq*}$	N	Actual equivalent radial force at the output
H	m	Installation altitude above sea level
i	–	Gear ratio
i_{exact}	–	Mathematically exact gear ratio
I_0	A	Stall current
I_{max}	A	Maximum current
I_N	A	Nominal current
$I_{N,B}$	A	Nominal current of the brake at 20 °C
$I_{N,F}$	A	Nominal current of the forced ventilation unit
J_1	$kgcm^2$	Mass moment of inertia relative to the gear unit input
J_{Bstop}	$kgcm^2$	Reference mass moment of inertia when braking from full speed: $J_{Bstop} = J_{dyn} \times 2$
J_{dyn}	$kgcm^2$	Mass moment of inertia of a motor in dynamic operation
J_{tot}	kgm^2	Total mass moment of inertia (based on the motor shaft)
K_{EM}	V/1000 rpm	Voltage constant: peak value of the induced voltage between the phases U, V, W of the motor at operating temperature at a speed of 1000 rpm
K_H	–	Derating factor for installation altitude
K_{M0}	Nm/A	Torque constant: ratio of the stall torque and frictional torque to the stall current; $K_{M0} = (M_0 + M_R) / I_0$ (tolerance ±10%)
$K_{M,N}$	Nm/A	Torque constant: ratio of the nominal torque M_N to the nominal current I_N; $K_{M,N} = M_N / I_N$ (tolerance ±10%)
$K_{mot,th}$	–	Factor for determining the thermal limit torque
K_ϑ	–	Derating factor for surrounding temperature
l	mm	Length of the output shaft
L_{10}	–	Nominal bearing service life for a survival probability of 90% in 10^6 rollovers
L_{10h}	h	Bearing service life
$L_{pA,F}$	dBA	Noise level of the forced ventilation unit in the optimal operating range
L_{U-V}	mH	Winding inductance of a motor between two phases (determined in a resonant circuit)
LW	-	Load change: A load change (LW) corresponds to an acceleration and a deceleration.
m	kg	Weight (for gear units without lubricant)
M	Nm	Torque
$\|M\|$	Nm	Absolute value of torque
M_0	Nm	Stall torque: The continuous torque the motor is able to deliver at a speed of 10 rpm (tolerance ±5%)
$M_{1*} – M_{4*}$	Nm	Actual torque of the motor in the respective time segment (1 to 4)
M_{1acc*}	Nm	Actual acceleration torque at the gear unit input
M_{1Bstat}	Nm	Static braking torque of the brake in the motor adapter (tolerance +40%, −20%)
M_{1eff*}	Nm	Actual effective torque at the gear unit input
$\|M_2\|$	Nm	Absolute value of torque on the output
$M_{2.0}$	Nm	Stall torque on the gear unit output
$M_{2.1*} – M_{2.4*}$	Nm	Actual torque in the respective time segment (1 to 4)
$M_{2,n*}$	Nm	Actual torque in the n-th time segment
M_{2acc}	Nm	Maximum permitted acceleration torque on the gear unit output
M_{2acc*}	Nm	Actual acceleration torque on the gear unit output
$M_{2acc,max}$	Nm	Maximum permitted acceleration torque of a group of geared motors whose size and nominal torque n_{1N} are the same
M_{2accHT}	Nm	Maximum permitted acceleration torque on the gear unit output with reduced backlash

Symbol	Unit	Explanation
M_{2eff*}	Nm	Actual effective torque on the gear unit output
M_{2eq*}	Nm	Equivalent torque present on the gear unit output
M_{2k*}	Nm	Actual tilting torque on the gear unit output
M_{2k100}	Nm	Permitted tilting torque on the gear unit output for $n_{2m*} \leq 100$ rpm
M_{2k20}	Nm	Permitted tilting torque on the gear unit output for $n_{2m*} \leq 20$ rpm
$M_{2k,acc}$	Nm	Permitted acceleration tilting torque at the gear unit output
$M_{2k,acc*}$	Nm	Acceleration tilting torque present at the gear unit output
$M_{2k,acc,1*}$	Nm	Acceleration tilting torque present at the gear unit output in the first time period
$M_{2k,acc,n*}$	Nm	Acceleration tilting torque present at the gear unit output in the nth time period
$M_{2k,eq*}$	Nm	Actual equivalent tilting torque on the gear unit output
M_{2kN}	Nm	Permitted nominal tilting torque at the gear unit output
M_{2max}	Nm	Maximum torque at the gear unit output
M_{2N}	Nm	Nominal torque on the gear unit output (relative to n_{1N})
M_{2NOT}	Nm	Gear unit emergency-off torque on the gear unit output for max. 1000 load changes
		Without consideration of the maximum torque of the motor
M_{2NOT*}	Nm	Actual emergency off torque for the gear unit on the gear unit output
M_{2th}	Nm	Thermal limit torque on the gear unit output
M_{Bdyn}	Nm	Dynamic braking torque at 100 °C
M_{Bstat}	Nm	Static braking torque of the motor brake at 100 °C
m_{dyn}	kg	Weight of a motor in dynamic operation
M_{eff*}	Nm	Actual effective torque of the motor
m_F	kg	Weight of the forced ventilation unit
M_k	Nm	Permitted tilting torque on the output
M_{k*}	Nm	Actual tilting torque on the output
$M_{k,1*} - M_{k,n*}$	Nm	Actual tilting torque of the motor in the respective time segment
$M_{k,eq*}$	Nm	Actual equivalent tilting torque at the output
M_{k100}	Nm	Permitted tilting torque on the output for $n_{m*} \leq 100$ rpm
M_{k300}	Nm	Permitted tilting torque on the output for $n_{m*} \leq 300$ rpm
M_L	Nm	Load torque
M_{L*}	Nm	Actual load torque
M_{lim}	Nm	Torque limit without compensating for field weakening
M_{limF}	Nm	Torque curve of the motor with forced ventilation in continuous operation
M_{limFW}	Nm	Torque limit with compensation for field weakening (applies to operation on STOBER drive controllers only)
M_{limK}	Nm	Torque curve of the motor with convection cooling in continuous operation
M_{max}	Nm	Maximum torque: the maximum permitted torque the motor is able to deliver over a short period (when accelerating or decelerating) (tolerance ±10%)
M_{max*}	Nm	Actual maximum torque
m_n	mm	Module
M_{n*}	Nm	Actual torque of the motor in the n-th time segment
M_N	Nm	Nominal torque: the maximum torque of a motor in S1 mode at nominal speed n_N (tolerance ±5%)
		You can calculate other torque values as follows: $M_{N*} = K_{M0} \cdot I^* - M_R$.
M_{Nred}	Nm	Reduced nominal torque of the motor
M_{op}	Nm	Torque of motor at the operating point from the motor characteristic curve at n_{1m*}
M_R	Nm	Frictional torque (of the bearings and seals) of a motor at winding temperature $\Delta\vartheta = 100$ K
n	rpm	Speed
|n|	rpm	Absolute value of speed
n_{1limF}	rpm	Intersection of torque curve M_{lim} and torque curve with forced ventilation M_{limF}
n_{1limK}	rpm	Intersection of torque curve M_{lim} and torque curve with convection cooling M_{limK}
n_{1m*}	rpm	Actual average input speed

Symbol	Unit	Explanation
n_{1max}	rpm	Maximum permitted input speed
n_{1max*}	rpm	Actual maximum input speed
n_{1maxDB}	min^{-1}	Maximum permitted input speed of the gear unit in continuous operation
		(at surrounding temperature of 20 °C)
$n_{1maxDBEL1,2}$	rpm	Maximum permitted input speed of the gear unit in continuous operation Mounting positions EL1, EL2
		(at surrounding temperature of 20 °C)
$n_{1maxDBEL1,2,3,4}$	rpm	Maximum permitted input speed of the gear unit in continuous operation Mounting positions EL1, EL2, EL3, EL4
		(at surrounding temperature of 20 °C)
$n_{1maxDBEL1,2,5,6}$	rpm	Maximum permitted input speed of the gear unit in continuous operation Mounting positions EL1, EL2, EL5, EL6
		(at surrounding temperature of 20 °C)
$n_{1maxDBEL3,4}$	rpm	Maximum permitted input speed of the gear unit in continuous operation Mounting positions EL3, EL4
		(at surrounding temperature of 20 °C)
$n_{1maxDBEL3,4,5,6}$	rpm	Maximum permitted input speed of the gear unit in continuous operation Mounting positions EL3, EL4, EL5, EL6
		(at surrounding temperature of 20 °C)
$n_{1maxDBEL5,6}$	rpm	Maximum permitted input speed of the gear unit in continuous operation Mounting positions EL5, EL6
		(at surrounding temperature of 20 °C)
n_{1maxZB}	min^{-1}	Maximum permitted input speed of the gear unit in cyclic operation
		(at surrounding temperature of 20 °C)
n_{1N}	rpm	Nominal speed at the gear unit input
n_2	rpm	Speed at the gear unit output
$\lvert n_2 \rvert$	rpm	Absolute value of output speed
n_{2m*}	rpm	Actual average output speed
$n_{2m,1*} – n_{2m,4*}$	rpm	Actual average output speed in the respective time segment (1 to 4)
$n_{2m,n*}$	rpm	Actual average output speed in the n-th time segment
n_{2N}	min^{-1}	Nominal speed at the gear unit output
N_{Bstop}	–	Permitted number of braking processes from full speed (n = 3000 rpm) with J_{Bstop} (M_L = 0). The following applies if the values of n and J_{Bstop} differ: N_{Bstop} = $W_{B,Rlim}$ / $W_{B,R/B}$.
n_{m*}	rpm	Actual average motor speed
$n_{m,1*} – n_{m,4*}$	rpm	Actual average speed of the motor in the respective time segment (1 to 4)
$n_{m,n*}$	rpm	Actual average speed of the motor in the n-th time segment
n_{mot}	rpm	Speed of the motor
n_N	rpm	Nominal speed: The speed for which the nominal torque M_N is specified
p	–	Number of pole pairs
P_{holdB}	W	Holding capacity of the brake
P_N	kW	Nominal power: the power the motor is able to deliver long term in S1 mode at the nominal point (tolerance ±5 %)
$P_{N,B}$	W	Nominal power of the brake
$P_{N,F}$	W	Nominal output of the forced ventilation unit
$P_{O,B}$	W	Overexcitation output of the brake
P_{st}	mm	Pitch of the screw drive
R_{U-V}	Ω	Winding resistance of a motor between two phases at a winding temperature of 20 °C
q_{vF}	m^3/h	Delivery capacity of the forced ventilation unit in open air
S	–	Service factor: Quotient of the nominal torque from the gear unit and the motor without consideration for thermal limiting performance. Represents a value for the reserve of the geared motor.
t	s	Time
$t_{1*} – t_{4*}$	s	Duration of the respective time segment (1 to 4)
t_{1B}	ms	Linking time: time from when the current is turned off until the nominal braking torque is reached

Symbol	Unit	Explanation
$t_{1B,AC}$	ms	Linking time: time from when the current is turned off until the nominal braking torque is reached with AC-side switching of the brake rectifier
$t_{1B,DC}$	ms	Linking time: time from when the current is turned off until the nominal braking torque is reached with DC-side switching of the brake rectifier
t_{11B}	ms	Response delay: time from when the current is turned off until the torque increases
t_{2B}	ms	Release time (also: disengagement time); time span from when the current is switched off until the brake is completely released
t_{dec}	ms	Stop time
T_{el}	ms	Electrical time constant: ratio of the winding inductance to the winding resistance of a motor: $T_{el} = L_{U-V} / R_{U-V}$
t_{n*}	s	Duration of the n-th time segment
$t_{O,B}$	ms	Overexcitation time of the brake
ϑ_{amb}	°C	Surrounding temperature
U	V	Voltage
U_{holdB}	V	Withstand voltage of the brake
$U_{N,B}$	V	Nominal voltage of brake
$U_{N,F}$	V	Nominal voltage of the forced ventilation unit
$U_{O,B}$	V	Overexcitation voltage of the brake
U_{ZK}	V	DC link voltage: characteristic value of a drive controller
v_{ax}	mm/s	Axial velocity
$v_{ax,m*}$	mm/s	Actual average axial velocity
$v_{ax,m1*} – v_{ax,mn*}$	mm/s	Actual average axial velocity in the respective time segment
$W_{B,R/B}$	J	Work done by friction for braking
$W_{B,Rlim}$	J	Work done by friction until wear limit is reached
$W_{B,Rmax/h}$	J/h	Maximum permitted work done by friction per hour with individual braking
x_2	mm	Distance of the shaft shoulder to the force application point
$x_{B,N}$	mm	Nominal air gap of brake
y_2	mm	Distance of the shaft axis to the axial force application point
z_2	mm	Distance of the shaft shoulder to the middle of the output bearing

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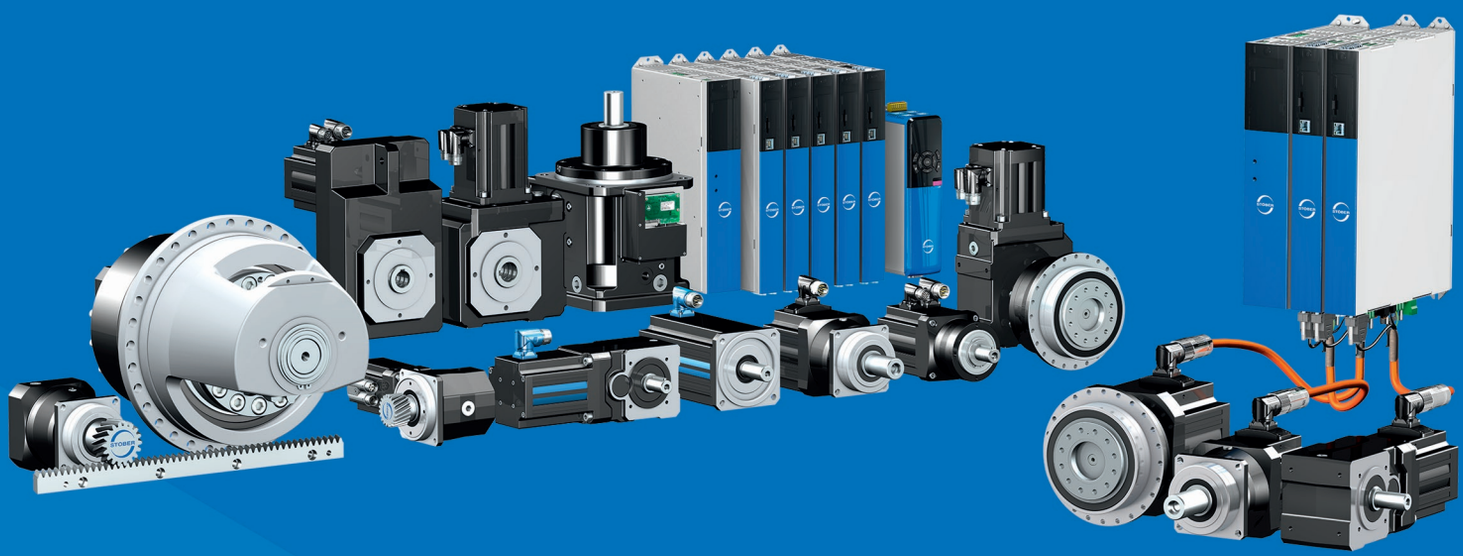
15.3 Sales terms and delivery conditions

You can find our current sales terms and delivery conditions at http://www.stoeber.de/en/gtc.



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ID 443311_en.01 04/2023