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18.1 Overview

Quattro-Power precision right-angle planetary geared motors

Technical data

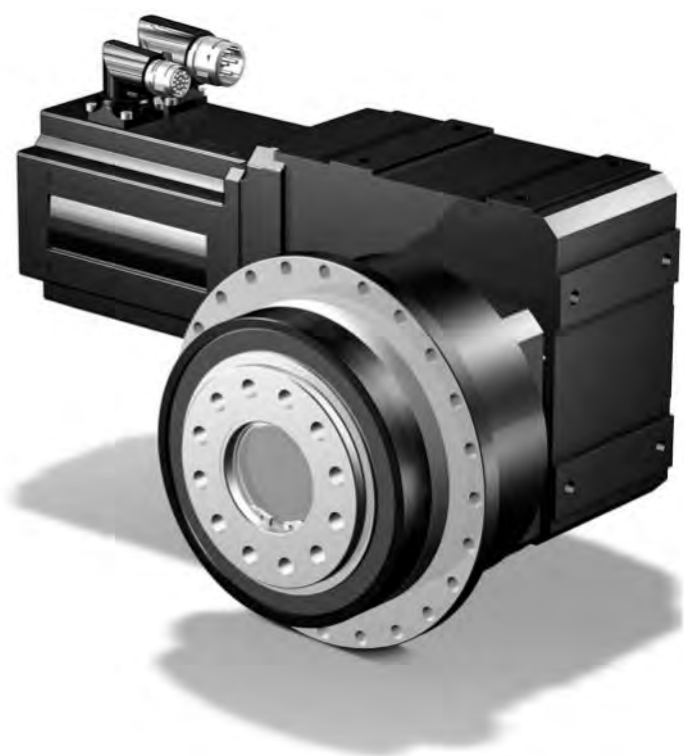
i	22 – 2242
M_{2acc}	123 – 43000 Nm
$\Delta\varphi_2$	3.5 – 4 arcmin
η	≤ 90 – 93 %

Features

Power density	★★★★★
Backlash	★★★★☆
Price category	€€€€€
Shaft load	★★★★★
Smooth operation	★★★☆☆
Torsional stiffness	★★★★★
Mass moment of inertia	★★★★★
Helical gearing	✓
Maintenance-free	✓
High power density (four-stage planetary system)	✓
Continuous operation without cooling (FKM sealing ring at the input)	✓
Pretensioned angular contact bearings at the output in an O-arrangement, ideally suited for helical-geared rack and pinion drives	✓
Compact and highly dynamic due to direct motor attachment	✓

Key: ★☆☆☆☆ good | ★★★★★ excellent

PHQK



18.2 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**)

You can calculate the technical data for drives with forced ventilated motors (for example EZ401**B**) at http://products.stoeber.de.

Formula symbol	Unit	Explanation
a_{th}	–	Parameter for calculating $K_{mot,th}$
C_2	Nm/ arcmin	Torsional stiffness of gear unit (final stiffness) relative to the gear unit output
$\Delta\varphi_2$	arcmin	Backlash at the output shaft with a blocked input
η	%	Efficiency
i	–	Gear ratio
i_{exakt}	–	Mathematically exact gear ratio
J_1	10^{-4}kgm^2	Mass moment of inertia relative to the gear unit input
m	kg	Weight
$M_{2.0}$	Nm	Stall torque on the gear unit output
M_{2acc}	Nm	Maximum permitted 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_{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
$n_{1maxDBH}$	rpm	Maximum permitted input speed of the gear unit in continuous operation Installation positions EL1, EL2
		(at surrounding temperature of 20 °C)
$n_{1maxDBV}$	rpm	Maximum permitted input speed of the gear unit in continuous operation Installation positions EL3, EL4, 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}	min^{-1}	Nominal speed at the gear unit input
n_{2N}	min^{-1}	Nominal speed at the gear unit output
S	–	Load value: Quotient of gear unit and motor nominal torque without regard to the thermal performance limit. Represents a value for the reserve of the geared motor.

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n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	n_{1max} DBH [rpm]	n_{1max} DBV [rpm]	n_{1max} ZB [rpm]	J_1 [10^{-4} kgm²]	$\Delta\varphi_2$ [arcmin]	C_2 [Nm/arcmin]	m [kg]
PHQ5K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 430 Nm)																
9.7	267	273	10	1.0	PHQ521F0055 K102VF0560 EZ301U	430	620	308.5	6479/21	4000	4000	6000	0.21	4	70	16
12	223	228	10	1.3	PHQ521F0055 K102VF0470 EZ301U	430	800	258.0	25289/98	4000	4000	6000	0.22	4	70	16
14	192	196	9.6	1.5	PHQ521F0055 K102VF0400 EZ301U	330	440	221.7	4433/20	4000	4000	6000	0.21	4	70	16
16	167	171	9.3	1.7	PHQ521F0055 K102VF0350 EZ301U	430	800	193.1	20273/105	4000	4000	6000	0.23	4	70	16
16	161	164	9.2	1.7	PHQ521F0055 K102VF0340 EZ301U	430	800	185.4	51909/280	4000	4000	6000	0.22	4	70	16
16	274	290	16	1.0	PHQ521F0055 K102VF0340 EZ302U	430	800	185.4	51909/280	4000	4000	6000	0.32	4	70	16
19	134	136	8.8	2.1	PHQ521F0055 K102VF0280 EZ301U	400	800	154.3	6479/42	4000	4000	6000	0.26	4	70	16
19	228	241	15	1.2	PHQ521F0055 K102VF0280 EZ302U	430	800	154.3	6479/42	4000	4000	6000	0.36	4	70	16
22	120	123	8.6	2.3	PHQ521F0055 K102VF0250 EZ301U	360	800	138.7	13871/100	4000	4000	6000	0.24	4	70	16
22	205	217	15	1.4	PHQ521F0055 K102VF0250 EZ302U	430	800	138.7	13871/100	4000	4000	6000	0.34	4	70	16
22	267	283	19	1.0	PHQ521F0055 K102VF0250 EZ303U	430	800	138.7	13871/100	4000	4000	6000	0.45	4	70	17
23	111	113	8.4	2.5	PHQ521F0055 K102VF0230 EZ301U	330	800	128.0	6270/49	4000	4000	6000	0.28	4	70	16
23	189	200	14	1.5	PHQ521F0055 K102VF0230 EZ302U	430	800	128.0	6270/49	4000	4000	6000	0.38	4	70	16
23	247	261	19	1.1	PHQ521F0055 K102VF0230 EZ303U	430	800	128.0	6270/49	4000	4000	6000	0.49	4	70	17
27	96	98	8.1	2.9	PHQ521F0055 K102VF0200 EZ301U	290	690	110.8	4433/40	4000	4000	6000	0.26	4	70	16
27	164	173	14	1.7	PHQ521F0055 K102VF0200 EZ302U	430	690	110.8	4433/40	4000	4000	6000	0.36	4	70	16
27	214	226	18	1.3	PHQ521F0055 K102VF0200 EZ303U	430	690	110.8	4433/40	4000	4000	6000	0.47	4	70	17
31	84	85	7.8	3.3	PHQ521F0055 K102VF0175 EZ301U	250	730	96.60	11495/119	4000	3800	5500	0.32	4	70	16
31	143	151	13	2.0	PHQ521F0055 K102VF0175 EZ302U	430	730	96.60	11495/119	4000	3800	5500	0.42	4	70	16
31	186	197	17	1.5	PHQ521F0055 K102VF0175 EZ303U	430	730	96.60	11495/119	4000	3800	5500	0.53	4	70	17
31	252	270	24	1.1	PHQ521F0055 K102VF0175 EZ401U	430	800	96.60	11495/119	4000	3800	5500	1.1	4	70	18
33	80	81	7.7	3.5	PHQ521F0055 K102VF0165 EZ301U	240	650	91.93	1287/14	4000	4000	6000	0.29	4	70	16
33	136	144	13	2.1	PHQ521F0055 K102VF0165 EZ302U	430	650	91.93	1287/14	4000	4000	6000	0.39	4	70	16
33	177	187	17	1.6	PHQ521F0055 K102VF0165 EZ303U	430	650	91.93	1287/14	4000	4000	6000	0.50	4	70	17
33	240	257	23	1.2	PHQ521F0055 K102VF0165 EZ401U	430	800	91.93	1287/14	4000	4000	6000	1.0	4	70	18
39	67	69	7.4	4.2	PHQ521F0055 K102VF0140 EZ301U	200	590	77.63	2717/35	4000	3800	5500	0.37	4	70	16
39	115	121	13	2.4	PHQ521F0055 K102VF0140 EZ302U	360	590	77.63	2717/35	4000	3800	5500	0.47	4	70	16
39	150	158	17	1.9	PHQ521F0055 K102VF0140 EZ303U	430	590	77.63	2717/35	4000	3800	5500	0.58	4	70	17
39	202	217	22	1.4	PHQ521F0055 K102VF0140 EZ401U	430	800	77.63	2717/35	4000	3800	5500	1.1	4	70	18
43	60	61	7.2	4.7	PHQ521F0055 K102VF0125 EZ301U	180	530	69.40	4719/68	4000	3800	5500	0.35	4	70	16
43	103	109	12	2.7	PHQ521F0055 K102VF0125 EZ302U	320	530	69.40	4719/68	4000	3800	5500	0.45	4	70	16
43	134	142	16	2.1	PHQ521F0055 K102VF0125 EZ303U	390	530	69.40	4719/68	4000	3800	5500	0.56	4	70	17
43	181	194	22	1.5	PHQ521F0055 K102VF0125 EZ401U	430	800	69.40	4719/68	4000	3800	5500	1.1	4	70	18
43	278	304	33	1.0	PHQ521F0055 K102VF0125 EZ501U	430	800	69.40	4719/68	4000	3800	5500	3.1	4	70	19
47	55	56	7.1	3.0	PHQ521F0055 K102VF0115 EZ301U	170	220	63.61	1463/23	3600	3300	5000	0.43	4	70	16
47	94	100	12	3.0	PHQ521F0055 K102VF0115 EZ302U	300	480	63.61	1463/23	3600	3300	5000	0.53	4	70	16
47	123	130	16	2.3	PHQ521F0055 K102VF0115 EZ303U	360	480	63.61	1463/23	3600	3300	5000	0.64	4	70	17
47	166	178	21	1.7	PHQ521F0055 K102VF0115 EZ401U	430	800	63.61	1463/23	3600	3300	5000	1.2	4	70	18
47	255	278	33	1.1	PHQ521F0055 K102VF0115 EZ501U	430	800	63.61	1463/23	3600	3300	5000	3.1	4	70	19
47	278	308	36	1.0	PHQ521F0055 K102VF0115 EZ402U	430	800	63.61	1463/23	3600	3300	5000	1.9	4	70	19
54	83	87	12	3.4	PHQ521F0055 K102VF0100 EZ302U	260	420	55.77	5577/100	4000	3800	5500	0.51	4	70	16
54	108	114	15	2.6	PHQ521F0055 K102VF0100 EZ303U	310	420	55.77	5577/100	4000	3800	5500	0.62	4	70	17
54	145	156	21	1.9	PHQ521F0055 K102VF0100 EZ401U	430	800	55.77	5577/100	4000	3800	5500	1.2	4	70	18
54	223	244	32	1.3	PHQ521F0055 K102VF0100 EZ501U	430	800	55.77	5577/100	4000	3800	5500	3.1	4	70	19
54	244	270	35	1.1	PHQ521F0055 K102VF0100 EZ402U	430	800	55.77	5577/100	4000	3800	5500	1.9	4	70	19
59	75	80	11	3.7	PHQ521F0055 K102VF0092 EZ302U	240	390	50.87	9614/189	3600	3300	5000	0.63	4	70	16
59	98	104	15	2.9	PHQ521F0055 K102VF0092 EZ303U	280	390	50.87	9614/189	3600	3300	5000	0.74	4	70	17
59	133	142	20	2.1	PHQ521F0055 K102VF0092 EZ401U	400	770	50.87	9614/189	3600	3300	5000	1.3	4	70	18
59	204	223	31	1.4	PHQ521F0055 K102VF0092 EZ501U	430	800	50.87	9614/189	3600	3300	5000	3.2	4	70	19
59	223	246	34	1.3	PHQ521F0055 K102VF0092 EZ402U	430	770	50.87	9614/189	3600	3300	5000	2.0	4	70	19
66	68	71	11	3.8	PHQ521F0055 K102VF0083 EZ302U	210	350	45.70	21021/460	3600	3300	5000	0.59	4	70	16
66	88	93	14	2.9	PHQ521F0055 K102VF0083 EZ303U	260	350	45.70	21021/460	3600	3300	5000	0.70	4	70	17
66	119	128	20	2.4	PHQ521F0055 K102VF0083 EZ401U	360	690	45.70	21021/460	3600	3300	5000	1.2	4	70	18
66	183	200	30	1.5	PHQ521F0055 K102VF0083 EZ501U	430	800	45.70	21021/460	3600	3300	5000	3.2	4	70	19
66	200	221	33	1.4	PHQ521F0055 K102VF0083 EZ402U	430	690	45.70	21021/460	3600	3300	5000	1.9	4	70	19
82	54	57	11	3.8	PHQ521F0055 K102VF0066 EZ302U	170	280	36.54	3289/90	3600	3300	5000	0.71	4	70	16
82	70	75	14	2.9	PHQ521F0055 K102VF0066 EZ303U	200	280	36.54	3289/90	3600	3300	5000	0.82	4	70	17
82	95	102	18	2.9	PHQ521F0055 K102VF0066 EZ401U	290	550	36.54	3289/90	3600	3300	5000	1.4	4	70	18
82	146	160	28	1.9	PHQ521F0055 K102VF0066 EZ501U	430	800	36.54	3289/90	3600	3300	5000	3.3	4	70	19

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n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	n_{1max} DBH [rpm]	n_{1max} DBV [rpm]	n_{1max} ZB [rpm]	J_1 [10^{-4} kgm²]	$\Delta\varphi_2$ [arcmin]	C_2 [Nm/arcmin]	m [kg]
PHQ5K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 430 Nm)																
82	160	177	31	1.8	PHQ521F0055 K102VF0066 EZ402U	410	550	36.54	3289/90	3600	3300	5000	2.1	4	70	19
82	235	293	46	1.2	PHQ521F0055 K102VF0066 EZ404U	430	800	36.54	3289/90	3600	3300	5000	3.4	4	70	21
82	252	272	49	1.1	PHQ521F0055 K102VF0066 EZ502U	430	800	36.54	3289/90	3600	3300	5000	5.6	4	70	21
82	252	282	49	1.1	PHQ521F0055 K102VF0066 EZ701U	430	800	36.54	3289/90	3600	3300	5000	8.9	4	70	23
91	49	52	10	3.8	PHQ521F0055 K102VF0060 EZ302U	150	250	33.00	33/1	3300	2800	4500	0.79	4	70	16
91	64	67	13	2.9	PHQ521F0055 K102VF0060 EZ303U	180	250	33.00	33/1	3300	2800	4500	0.90	4	70	17
91	86	92	18	3.3	PHQ521F0055 K102VF0060 EZ401U	260	500	33.00	33/1	3300	2800	4500	1.4	4	70	18
91	132	144	28	2.1	PHQ521F0055 K102VF0060 EZ501U	430	800	33.00	33/1	3300	2800	4500	3.4	4	70	19
91	144	160	30	1.9	PHQ521F0055 K102VF0060 EZ402U	370	500	33.00	33/1	3300	2800	4500	2.1	4	70	19
91	212	264	44	1.3	PHQ521F0055 K102VF0060 EZ404U	430	800	33.00	33/1	3300	2800	4500	3.5	4	70	21
91	227	246	48	1.2	PHQ521F0055 K102VF0060 EZ502U	430	800	33.00	33/1	3300	2800	4500	5.7	4	70	21
91	227	255	48	1.2	PHQ521F0055 K102VF0060 EZ701U	430	800	33.00	33/1	3300	2800	4500	9.0	4	70	23
98	45	48	10	3.8	PHQ521F0055 K102VF0056 EZ302U	140	230	30.62	8360/273	3300	2800	4500	0.97	4	70	16
98	59	62	13	2.9	PHQ521F0055 K102VF0056 EZ303U	170	230	30.62	8360/273	3300	2800	4500	1.1	4	70	17
98	80	86	18	3.5	PHQ521F0055 K102VF0056 EZ401U	240	460	30.62	8360/273	3300	2800	4500	1.6	4	70	18
98	123	134	27	2.3	PHQ521F0055 K102VF0056 EZ501U	430	800	30.62	8360/273	3300	2800	4500	3.6	4	70	19
98	134	148	30	2.1	PHQ521F0055 K102VF0056 EZ402U	340	460	30.62	8360/273	3300	2800	4500	2.3	4	70	19
98	197	245	44	1.4	PHQ521F0055 K102VF0056 EZ404U	430	800	30.62	8360/273	3300	2800	4500	3.7	4	70	21
98	211	228	47	1.3	PHQ521F0055 K102VF0056 EZ502U	430	800	30.62	8360/273	3300	2800	4500	5.9	4	70	21
98	211	237	47	1.3	PHQ521F0055 K102VF0056 EZ701U	430	800	30.62	8360/273	3300	2800	4500	9.2	4	70	23
98	277	317	61	1.0	PHQ521F0055 K102VF0056 EZ503U	430	800	30.62	8360/273	3300	2800	4500	8.3	4	70	22
136	42	45	12	2.9	PHQ521F0055 K102VF0040 EZ303U	120	170	22.00	22/1	3300	2800	4500	1.3	4	70	17
136	57	61	17	4.3	PHQ521F0055 K102VF0040 EZ401U	170	330	22.00	22/1	3300	2800	4500	1.9	4	70	18
136	88	96	26	3.1	PHQ521F0055 K102VF0040 EZ501U	330	670	22.00	22/1	3300	2800	4500	3.8	4	70	19
136	96	107	28	2.6	PHQ521F0055 K102VF0040 EZ402U	250	330	22.00	22/1	3300	2800	4500	2.6	4	70	19
136	141	176	41	1.9	PHQ521F0055 K102VF0040 EZ404U	430	670	22.00	22/1	3300	2800	4500	3.9	4	70	21
136	152	164	44	1.8	PHQ521F0055 K102VF0040 EZ502U	430	670	22.00	22/1	3300	2800	4500	6.1	4	70	21
136	152	170	44	1.8	PHQ521F0055 K102VF0040 EZ701U	410	670	22.00	22/1	3300	2800	4500	9.4	4	70	23
136	199	227	58	1.4	PHQ521F0055 K102VF0040 EZ503U	430	670	22.00	22/1	3300	2800	4500	8.5	4	70	22
PHQ5K (n_{1N} = 6000 rpm, $M_{2acc,max}$ = 430 Nm)																
19	256	273	10	1.1	PHQ521F0055 K102VF0560 EZ301U	430	620	308.5	6479/21	4000	4000	6000	0.21	4	70	16
23	214	228	9.6	1.3	PHQ521F0055 K102VF0470 EZ301U	430	800	258.0	25289/98	4000	4000	6000	0.22	4	70	16
27	184	196	9.2	1.5	PHQ521F0055 K102VF0400 EZ301U	330	440	221.7	4433/20	4000	4000	6000	0.21	4	70	16
31	160	171	8.9	1.8	PHQ521F0055 K102VF0350 EZ301U	430	800	193.1	20273/105	4000	4000	6000	0.23	4	70	16
31	270	302	15	1.0	PHQ521F0055 K102VF0350 EZ302U	430	800	193.1	20273/105	4000	4000	6000	0.33	4	70	16
32	154	164	8.8	1.8	PHQ521F0055 K102VF0340 EZ301U	430	800	185.4	51909/280	4000	4000	6000	0.22	4	70	16
32	259	290	15	1.1	PHQ521F0055 K102VF0340 EZ302U	430	800	185.4	51909/280	4000	4000	6000	0.32	4	70	16
39	128	136	8.4	2.2	PHQ521F0055 K102VF0280 EZ301U	400	800	154.3	6479/42	4000	4000	6000	0.26	4	70	16
39	215	241	14	1.3	PHQ521F0055 K102VF0280 EZ302U	430	800	154.3	6479/42	4000	4000	6000	0.36	4	70	16
43	115	123	8.2	2.4	PHQ521F0055 K102VF0250 EZ301U	360	800	138.7	13871/100	4000	4000	6000	0.24	4	70	16
43	194	217	14	1.4	PHQ521F0055 K102VF0250 EZ302U	430	800	138.7	13871/100	4000	4000	6000	0.34	4	70	16
43	253	291	18	1.1	PHQ521F0055 K102VF0250 EZ303U	430	800	138.7	13871/100	4000	4000	6000	0.45	4	70	17
47	106	113	8.0	2.6	PHQ521F0055 K102VF0230 EZ301U	330	800	128.0	6270/49	4000	4000	6000	0.28	4	70	16
47	179	200	14	1.6	PHQ521F0055 K102VF0230 EZ302U	430	800	128.0	6270/49	4000	4000	6000	0.38	4	70	16
47	234	268	18	1.2	PHQ521F0055 K102VF0230 EZ303U	430	800	128.0	6270/49	4000	4000	6000	0.49	4	70	17
54	92	98	7.8	3.0	PHQ521F0055 K102VF0200 EZ301U	290	690	110.8	4433/40	4000	4000	6000	0.26	4	70	16
54	155	173	13	1.8	PHQ521F0055 K102VF0200 EZ302U	430	690	110.8	4433/40	4000	4000	6000	0.36	4	70	16
54	202	232	17	1.4	PHQ521F0055 K102VF0200 EZ303U	430	690	110.8	4433/40	4000	4000	6000	0.47	4	70	17
54	237	289	20	1.2	PHQ521F0055 K102VF0200 EZ401U	430	800	110.8	4433/40	4000	4000	6000	1.0	4	70	18
65	76	81	7.4	3.7	PHQ521F0055 K102VF0165 EZ301U	240	650	91.93	1287/14	4000	4000	6000	0.29	4	70	16
65	128	144	12	2.2	PHQ521F0055 K102VF0165 EZ302U	430	650	91.93	1287/14	4000	4000	6000	0.39	4	70	16
65	168	193	16	1.7	PHQ521F0055 K102VF0165 EZ303U	430	650	91.93	1287/14	4000	4000	6000	0.50	4	70	17
65	197	240	19	1.4	PHQ521F0055 K102VF0165 EZ401U	430	800	91.93	1287/14	4000	4000	6000	1.0	4	70	18
PHQ7K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 950 Nm)																
7.9	565	597	9.0	1.2	PHQ721F0055 K202VF0690 EZ302U	840	1520	381.8	73315/192	4000	3900	5500	0.33	4	136	28
9.8	452	478	8.6	1.4	PHQ721F0055 K202VF0560 EZ302U	950	1580	305.5	14663/48	4000	3900	5500	0.34	4	136	28
9.8	589	623	11	1.1	PHQ721F0055 K202VF0560 EZ303U	950	1580	305.5	14663/48	4000	3900	5500	0.45	4	136	29
11	411	434	11	1.2	PHQ721F0055 K202VF0500 EZ302U	610	1100	277.7	6665/24	4000	3900	5500	0.33	4	136	28
12	376	398	8.2	1.7	PHQ721F0055 K202VF0460 EZ302U	950	1470	254.2	20339/80	4000	3900	5500	0.36	4	136	28

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n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	n_{1max} DBH [rpm]	n_{1max} DBV [rpm]	n_{1max} ZB [rpm]	J_1 [10^{-4} kgm²]	$\Delta\varphi_2$ [arcmin]	C_2 [Nm/ arcmin]	m [kg]
PHQ7K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 950 Nm)																
12	490	518	11	1.3	PHQ721F0055 K202VF0460 EZ303U	950	1470	254.2	20339/80	4000	3900	5500	0.47	4	136	29
14	329	348	8.4	1.9	PHQ721F0055 K202VF0400 EZ302U	730	1150	222.2	1333/6	4000	3900	5500	0.35	4	136	28
14	428	453	11	1.4	PHQ721F0055 K202VF0400 EZ303U	730	1150	222.2	1333/6	4000	3900	5500	0.46	4	136	29
16	281	297	7.6	2.3	PHQ721F0055 K202VF0350 EZ302U	880	1230	190.0	21285/112	4000	3900	5500	0.41	4	136	28
16	366	388	9.9	1.8	PHQ721F0055 K202VF0350 EZ303U	900	1230	190.0	21285/112	4000	3900	5500	0.52	4	136	29
16	496	531	13	1.3	PHQ721F0055 K202VF0350 EZ401U	950	1700	190.0	21285/112	4000	3900	5500	1.1	4	136	30
16	274	289	7.5	2.4	PHQ721F0055 K202VF0340 EZ302U	790	1070	184.9	1849/10	4000	3900	5500	0.37	4	136	28
16	356	377	9.8	1.8	PHQ721F0055 K202VF0340 EZ303U	790	1070	184.9	1849/10	4000	3900	5500	0.48	4	136	29
16	482	517	13	1.3	PHQ721F0055 K202VF0340 EZ401U	950	1700	184.9	1849/10	4000	3900	5500	1.0	4	136	30
20	228	240	7.2	2.9	PHQ721F0055 K202VF0280 EZ302U	720	1160	153.7	6149/40	4000	3900	5500	0.47	4	136	28
20	296	313	9.4	2.2	PHQ721F0055 K202VF0280 EZ303U	850	1160	153.7	6149/40	4000	3900	5500	0.58	4	136	29
20	401	429	13	1.6	PHQ721F0055 K202VF0280 EZ401U	950	1700	153.7	6149/40	4000	3900	5500	1.1	4	136	30
20	616	673	19	1.1	PHQ721F0055 K202VF0280 EZ501U	950	1700	153.7	6149/40	4000	3900	5500	3.1	4	136	31
22	205	216	7.0	3.2	PHQ721F0055 K202VF0250 EZ302U	640	890	138.2	1935/14	4000	3900	5500	0.43	4	136	28
22	266	282	9.1	2.4	PHQ721F0055 K202VF0250 EZ303U	660	890	138.2	1935/14	4000	3900	5500	0.54	4	136	29
22	360	386	12	1.8	PHQ721F0055 K202VF0250 EZ401U	950	1700	138.2	1935/14	4000	3900	5500	1.1	4	136	30
22	553	605	19	1.2	PHQ721F0055 K202VF0250 EZ501U	950	1700	138.2	1935/14	4000	3900	5500	3.0	4	136	31
22	605	669	21	1.1	PHQ721F0055 K202VF0250 EZ402U	950	1700	138.2	1935/14	4000	3900	5500	1.8	4	136	31
24	189	199	6.9	3.4	PHQ721F0055 K202VF0230 EZ302U	590	970	127.5	32637/256	4000	3900	5500	0.53	4	136	28
24	246	260	8.9	2.6	PHQ721F0055 K202VF0230 EZ303U	710	970	127.5	32637/256	4000	3900	5500	0.64	4	136	29
24	332	356	12	2.0	PHQ721F0055 K202VF0230 EZ401U	950	1700	127.5	32637/256	4000	3900	5500	1.2	4	136	30
24	510	558	19	1.3	PHQ721F0055 K202VF0230 EZ501U	950	1700	127.5	32637/256	4000	3900	5500	3.1	4	136	31
24	558	617	20	1.2	PHQ721F0055 K202VF0230 EZ402U	950	1700	127.5	32637/256	4000	3900	5500	1.9	4	136	31
27	166	175	6.7	3.7	PHQ721F0055 K202VF0200 EZ302U	520	840	111.8	559/5	4000	3900	5500	0.49	4	136	28
27	216	228	8.7	2.9	PHQ721F0055 K202VF0200 EZ303U	620	840	111.8	559/5	4000	3900	5500	0.60	4	136	29
27	291	312	12	2.2	PHQ721F0055 K202VF0200 EZ401U	880	1580	111.8	559/5	4000	3900	5500	1.1	4	136	30
27	448	489	18	1.5	PHQ721F0055 K202VF0200 EZ501U	950	1700	111.8	559/5	4000	3900	5500	3.1	4	136	31
27	489	541	20	1.3	PHQ721F0055 K202VF0200 EZ402U	950	1580	111.8	559/5	4000	3900	5500	1.8	4	136	31
31	142	150	6.4	3.8	PHQ721F0055 K202VF0175 EZ302U	450	730	96.08	6149/64	3900	3500	5000	0.66	4	136	28
31	185	196	8.3	2.9	PHQ721F0055 K202VF0175 EZ303U	540	730	96.08	6149/64	3900	3500	5000	0.77	4	136	29
31	251	268	11	2.6	PHQ721F0055 K202VF0175 EZ401U	760	1460	96.08	6149/64	3900	3500	5000	1.3	4	136	30
31	385	421	17	1.7	PHQ721F0055 K202VF0175 EZ501U	950	1700	96.08	6149/64	3900	3500	5000	3.3	4	136	31
31	421	465	19	1.5	PHQ721F0055 K202VF0175 EZ402U	950	1460	96.08	6149/64	3900	3500	5000	2.0	4	136	31
32	137	145	6.3	3.8	PHQ721F0055 K202VF0170 EZ302U	430	700	92.72	2967/32	4000	3900	5500	0.56	4	136	28
32	179	189	8.3	2.9	PHQ721F0055 K202VF0170 EZ303U	520	700	92.72	2967/32	4000	3900	5500	0.67	4	136	29
32	242	259	11	2.7	PHQ721F0055 K202VF0170 EZ401U	730	1410	92.72	2967/32	4000	3900	5500	1.2	4	136	30
32	371	406	17	1.8	PHQ721F0055 K202VF0170 EZ501U	950	1700	92.72	2967/32	4000	3900	5500	3.2	4	136	31
32	406	449	19	1.6	PHQ721F0055 K202VF0170 EZ402U	950	1410	92.72	2967/32	4000	3900	5500	1.9	4	136	31
32	639	691	30	1.0	PHQ721F0055 K202VF0170 EZ502U	950	1700	92.72	2967/32	4000	3900	5500	5.5	4	136	33
32	639	717	30	1.0	PHQ721F0055 K202VF0170 EZ701U	950	1700	92.72	2967/32	4000	3900	5500	8.8	4	136	35
39	113	119	6.0	3.8	PHQ721F0055 K202VF0140 EZ302U	350	580	76.18	31691/416	3900	3500	5000	0.80	4	136	28
39	147	155	7.9	2.9	PHQ721F0055 K202VF0140 EZ303U	430	580	76.18	31691/416	3900	3500	5000	0.91	4	136	29
39	199	213	11	3.3	PHQ721F0055 K202VF0140 EZ401U	600	1150	76.18	31691/416	3900	3500	5000	1.4	4	136	30
39	305	333	16	2.1	PHQ721F0055 K202VF0140 EZ501U	950	1700	76.18	31691/416	3900	3500	5000	3.4	4	136	31
39	333	369	18	2.0	PHQ721F0055 K202VF0140 EZ402U	850	1150	76.18	31691/416	3900	3500	5000	2.1	4	136	31
39	489	610	26	1.3	PHQ721F0055 K202VF0140 EZ404U	950	1700	76.18	31691/416	3900	3500	5000	3.5	4	136	34
39	525	568	28	1.2	PHQ721F0055 K202VF0140 EZ502U	950	1700	76.18	31691/416	3900	3500	5000	5.7	4	136	33
39	525	589	28	1.2	PHQ721F0055 K202VF0140 EZ701U	950	1700	76.18	31691/416	3900	3500	5000	9.0	4	136	35
43	103	109	5.9	3.8	PHQ721F0055 K202VF0125 EZ302U	330	530	69.88	559/8	3900	3500	5000	0.71	4	136	28
43	135	143	7.7	2.9	PHQ721F0055 K202VF0125 EZ303U	390	530	69.88	559/8	3900	3500	5000	0.82	4	136	29
43	182	195	10	3.6	PHQ721F0055 K202VF0125 EZ401U	550	1060	69.88	559/8	3900	3500	5000	1.4	4	136	30
43	280	306	16	2.3	PHQ721F0055 K202VF0125 EZ501U	950	1700	69.88	559/8	3900	3500	5000	3.3	4	136	31
43	306	338	17	2.1	PHQ721F0055 K202VF0125 EZ402U	780	1060	69.88	559/8	3900	3500	5000	2.1	4	136	31
43	449	560	26	1.4	PHQ721F0055 K202VF0125 EZ404U	950	1700	69.88	559/8	3900	3500	5000	3.4	4	136	34
43	482	521	28	1.4	PHQ721F0055 K202VF0125 EZ502U	950	1700	69.88	559/8	3900	3500	5000	5.6	4	136	33
43	482	540	28	1.4	PHQ721F0055 K202VF0125 EZ701U	950	1700	69.88	559/8	3900	3500	5000	8.9	4	136	35
43	631	722	36	1.0	PHQ721F0055 K202VF0125 EZ503U	950	1700	69.88	559/8	3900	3500	5000	8.0	4	136	34
47	94	99	5.8	3.8	PHQ721F0055 K202VF0115 EZ302U	300	480	63.50	13717/216	3500	3100	4500	0.97	4	136	28
47	122	130	7.5	2.9	PHQ721F0055 K202VF0115 EZ303U	350	480	63.50	13717/216	3500	3100	4500	1.1	4	136	29

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	n_{1max} DBH [rpm]	n_{1max} DBV [rpm]	n_{1max} ZB [rpm]	J_1 [10^{-4} kgm²]	$\Delta\varphi_2$ [arcmin]	C_2 [Nm/arcmin]	m [kg]
PHQ7K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 950 Nm)																
47	166	177	10	3.9	PHQ721F0055 K202VF0115 EZ401U	500	960	63.50	13717/216	3500	3100	4500	1.6	4	136	30
47	254	278	16	2.6	PHQ721F0055 K202VF0115 EZ501U	950	1700	63.50	13717/216	3500	3100	4500	3.6	4	136	31
47	278	307	17	2.3	PHQ721F0055 K202VF0115 EZ402U	710	960	63.50	13717/216	3500	3100	4500	2.3	4	136	31
47	408	509	25	1.6	PHQ721F0055 K202VF0115 EZ404U	950	1700	63.50	13717/216	3500	3100	4500	3.7	4	136	34
47	438	473	27	1.5	PHQ721F0055 K202VF0115 EZ502U	950	1700	63.50	13717/216	3500	3100	4500	5.9	4	136	33
47	438	491	27	1.5	PHQ721F0055 K202VF0115 EZ701U	950	1700	63.50	13717/216	3500	3100	4500	9.2	4	136	35
47	574	656	35	1.1	PHQ721F0055 K202VF0115 EZ503U	950	1700	63.50	13717/216	3500	3100	4500	8.3	4	136	34
54	82	87	5.6	3.8	PHQ721F0055 K202VF0100 EZ302U	260	420	55.40	2881/52	3900	3500	5000	0.89	4	136	28
54	107	113	7.3	2.9	PHQ721F0055 K202VF0100 EZ303U	310	420	55.40	2881/52	3900	3500	5000	1.0	4	136	29
54	144	155	9.8	4.3	PHQ721F0055 K202VF0100 EZ401U	440	840	55.40	2881/52	3900	3500	5000	1.5	4	136	30
54	222	242	15	2.9	PHQ721F0055 K202VF0100 EZ501U	830	1680	55.40	2881/52	3900	3500	5000	3.5	4	136	31
54	242	268	16	2.6	PHQ721F0055 K202VF0100 EZ402U	620	840	55.40	2881/52	3900	3500	5000	2.2	4	136	31
54	356	444	24	1.8	PHQ721F0055 K202VF0100 EZ404U	950	1680	55.40	2881/52	3900	3500	5000	3.6	4	136	34
54	382	413	26	1.7	PHQ721F0055 K202VF0100 EZ502U	950	1680	55.40	2881/52	3900	3500	5000	5.8	4	136	33
54	382	428	26	1.7	PHQ721F0055 K202VF0100 EZ701U	950	1700	55.40	2881/52	3900	3500	5000	9.1	4	136	35
54	500	573	34	1.3	PHQ721F0055 K202VF0100 EZ503U	950	1680	55.40	2881/52	3900	3500	5000	8.2	4	136	34
59	97	103	7.2	2.9	PHQ721F0055 K202VF0092 EZ303U	280	380	50.55	25069/496	3500	3100	4500	1.3	4	136	29
59	132	141	9.7	4.3	PHQ721F0055 K202VF0092 EZ401U	400	770	50.55	25069/496	3500	3100	4500	1.9	4	136	30
59	202	221	15	3.2	PHQ721F0055 K202VF0092 EZ501U	750	1530	50.55	25069/496	3500	3100	4500	3.8	4	136	31
59	221	245	16	2.6	PHQ721F0055 K202VF0092 EZ402U	560	770	50.55	25069/496	3500	3100	4500	2.6	4	136	31
59	325	405	24	2.0	PHQ721F0055 K202VF0092 EZ404U	950	1530	50.55	25069/496	3500	3100	4500	3.9	4	136	34
59	348	377	26	1.8	PHQ721F0055 K202VF0092 EZ502U	950	1530	50.55	25069/496	3500	3100	4500	6.1	4	136	33
59	348	391	26	1.8	PHQ721F0055 K202VF0092 EZ701U	940	1700	50.55	25069/496	3500	3100	4500	9.4	4	136	35
59	457	522	34	1.4	PHQ721F0055 K202VF0092 EZ503U	950	1530	50.55	25069/496	3500	3100	4500	8.5	4	136	34
59	565	678	42	1.1	PHQ721F0055 K202VF0092 EZ702U	950	1700	50.55	25069/496	3500	3100	4500	15	4	136	37
65	89	94	7.2	2.9	PHQ721F0055 K202VF0084 EZ303U	260	350	46.18	1247/27	3500	3100	4500	1.2	4	136	29
65	120	129	9.8	4.3	PHQ721F0055 K202VF0084 EZ401U	370	700	46.18	1247/27	3500	3100	4500	1.7	4	136	30
65	185	202	15	3.4	PHQ721F0055 K202VF0084 EZ501U	690	1400	46.18	1247/27	3500	3100	4500	3.7	4	136	31
65	202	224	16	2.6	PHQ721F0055 K202VF0084 EZ402U	520	700	46.18	1247/27	3500	3100	4500	2.4	4	136	31
65	297	370	24	2.1	PHQ721F0055 K202VF0084 EZ404U	950	1400	46.18	1247/27	3500	3100	4500	3.8	4	136	34
65	318	344	26	2.0	PHQ721F0055 K202VF0084 EZ502U	950	1400	46.18	1247/27	3500	3100	4500	6.0	4	136	33
65	318	357	26	2.0	PHQ721F0055 K202VF0084 EZ701U	860	1700	46.18	1247/27	3500	3100	4500	9.3	4	136	35
65	417	477	34	1.5	PHQ721F0055 K202VF0084 EZ503U	950	1400	46.18	1247/27	3500	3100	4500	8.4	4	136	34
65	516	619	42	1.2	PHQ721F0055 K202VF0084 EZ702U	950	1700	46.18	1247/27	3500	3100	4500	15	4	136	37
65	581	688	47	1.1	PHQ721F0055 K202VF0084 EZ505U	950	1700	46.18	1247/27	3500	3100	4500	13	4	136	37
77	157	171	15	3.8	PHQ721F0055 K202VF0071 EZ501U	580	1190	39.15	23177/592	3000	2600	4000	4.3	4	136	31
77	252	314	24	2.3	PHQ721F0055 K202VF0071 EZ404U	870	1190	39.15	23177/592	3000	2600	4000	4.4	4	136	34
77	270	292	26	2.2	PHQ721F0055 K202VF0071 EZ502U	870	1190	39.15	23177/592	3000	2600	4000	6.6	4	136	33
77	270	303	26	2.2	PHQ721F0055 K202VF0071 EZ701U	730	1700	39.15	23177/592	3000	2600	4000	9.9	4	136	35
77	354	405	34	1.7	PHQ721F0055 K202VF0071 EZ503U	870	1190	39.15	23177/592	3000	2600	4000	9.0	4	136	34
77	437	525	42	1.4	PHQ721F0055 K202VF0071 EZ702U	950	1700	39.15	23177/592	3000	2600	4000	15	4	136	37
77	492	583	48	1.2	PHQ721F0055 K202VF0071 EZ505U	950	1700	39.15	23177/592	3000	2600	4000	14	4	136	37
82	71	75	7.4	2.9	PHQ721F0055 K202VF0067 EZ303U	210	280	36.76	2279/62	3500	3100	4500	1.5	4	136	29
82	96	103	10	4.3	PHQ721F0055 K202VF0067 EZ401U	290	560	36.76	2279/62	3500	3100	4500	2.1	4	136	30
82	147	161	15	3.9	PHQ721F0055 K202VF0067 EZ501U	550	1110	36.76	2279/62	3500	3100	4500	4.0	4	136	31
82	161	178	17	2.6	PHQ721F0055 K202VF0067 EZ402U	410	560	36.76	2279/62	3500	3100	4500	2.8	4	136	31
82	236	294	25	2.4	PHQ721F0055 K202VF0067 EZ404U	820	1110	36.76	2279/62	3500	3100	4500	4.1	4	136	34
82	253	274	26	2.3	PHQ721F0055 K202VF0067 EZ502U	820	1110	36.76	2279/62	3500	3100	4500	6.3	4	136	33
82	253	284	26	2.3	PHQ721F0055 K202VF0067 EZ701U	680	1700	36.76	2279/62	3500	3100	4500	9.6	4	136	35
82	332	380	35	1.7	PHQ721F0055 K202VF0067 EZ503U	820	1110	36.76	2279/62	3500	3100	4500	8.7	4	136	34
82	411	493	43	1.4	PHQ721F0055 K202VF0067 EZ702U	950	1700	36.76	2279/62	3500	3100	4500	15	4	136	37
82	462	548	48	1.3	PHQ721F0055 K202VF0067 EZ505U	950	1700	36.76	2279/62	3500	3100	4500	13	4	136	37
82	565	712	59	1.0	PHQ721F0055 K202VF0067 EZ703U	950	1700	36.76	2279/62	3500	3100	4500	23	4	136	39
91	86	92	10	4.3	PHQ721F0055 K202VF0060 EZ401U	260	500	33.00	33/1	3000	2600	4000	2.7	4	136	30
91	132	144	15	4.2	PHQ721F0055 K202VF0060 EZ501U	490	1000	33.00	33/1	3000	2600	4000	4.7	4	136	31
91	144	160	17	2.6	PHQ721F0055 K202VF0060 EZ402U	370	500	33.00	33/1	3000	2600	4000	3.4	4	136	31
91	212	264	25	2.6	PHQ721F0055 K202VF0060 EZ404U	740	1000	33.00	33/1	3000	2600	4000	4.7	4	136	34
91	227	246	27	2.5	PHQ721F0055 K202VF0060 EZ502U	740	1000	33.00	33/1	3000	2600	4000	7.0	4	136	33
91	227	255	27	2.5	PHQ721F0055 K202VF0060 EZ701U	610	1700	33.00	33/1	3000	2600	4000	10	4	136	35

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n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	n_{1max} DBH [rpm]	n_{1max} DBV [rpm]	n_{1max} ZB [rpm]	J_1 [10^{-4} kgm²]	$\Delta\varphi_2$ [arcmin]	C_2 [Nm/ arcmin]	m [kg]
PHQ7K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 950 Nm)																
91	298	341	35	1.9	PHQ721F0055 K202VF0060 EZ503U	740	1000	33.00	33/1	3000	2600	4000	9.3	4	136	34
91	369	443	43	1.5	PHQ721F0055 K202VF0060 EZ702U	950	1700	33.00	33/1	3000	2600	4000	15	4	136	37
91	415	492	48	1.3	PHQ721F0055 K202VF0060 EZ505U	950	1700	33.00	33/1	3000	2600	4000	14	4	136	37
91	507	639	59	1.1	PHQ721F0055 K202VF0060 EZ703U	950	1700	33.00	33/1	3000	2600	4000	23	4	136	39
105	114	125	16	4.7	PHQ721F0055 K202VF0052 EZ501U	420	860	28.47	2107/74	3000	2600	4000	4.6	4	136	31
105	183	228	25	2.9	PHQ721F0055 K202VF0052 EZ404U	640	860	28.47	2107/74	3000	2600	4000	4.7	4	136	34
105	196	212	27	2.7	PHQ721F0055 K202VF0052 EZ502U	640	860	28.47	2107/74	3000	2600	4000	6.9	4	136	33
105	196	220	27	2.7	PHQ721F0055 K202VF0052 EZ701U	530	1700	28.47	2107/74	3000	2600	4000	10	4	136	35
105	257	294	35	2.1	PHQ721F0055 K202VF0052 EZ503U	640	860	28.47	2107/74	3000	2600	4000	9.3	4	136	34
105	318	382	44	1.7	PHQ721F0055 K202VF0052 EZ702U	950	1700	28.47	2107/74	3000	2600	4000	15	4	136	37
105	358	424	49	1.5	PHQ721F0055 K202VF0052 EZ505U	950	1700	28.47	2107/74	3000	2600	4000	14	4	136	37
105	437	552	60	1.2	PHQ721F0055 K202VF0052 EZ703U	950	1700	28.47	2107/74	3000	2600	4000	23	4	136	39
125	63	67	10	4.3	PHQ721F0055 K202VF0044 EZ401U	190	360	24.00	24/1	3000	2600	4000	3.1	4	136	30
125	96	105	16	2.8	PHQ721F0055 K202VF0044 EZ501U	270	360	24.00	24/1	3000	2600	4000	5.1	4	136	31
125	105	116	17	2.6	PHQ721F0055 K202VF0044 EZ402U	270	360	24.00	24/1	3000	2600	4000	3.8	4	136	31
125	154	192	25	3.3	PHQ721F0055 K202VF0044 EZ404U	540	730	24.00	24/1	3000	2600	4000	5.2	4	136	34
125	165	179	27	3.0	PHQ721F0055 K202VF0044 EZ502U	540	730	24.00	24/1	3000	2600	4000	7.4	4	136	33
125	165	186	27	3.0	PHQ721F0055 K202VF0044 EZ701U	450	1700	24.00	24/1	3000	2600	4000	11	4	136	35
125	217	248	36	2.3	PHQ721F0055 K202VF0044 EZ503U	540	730	24.00	24/1	3000	2600	4000	9.8	4	136	34
125	268	322	44	1.9	PHQ721F0055 K202VF0044 EZ702U	920	1700	24.00	24/1	3000	2600	4000	16	4	136	37
125	302	358	50	1.7	PHQ721F0055 K202VF0044 EZ505U	950	1700	24.00	24/1	3000	2600	4000	14	4	136	37
125	369	465	61	1.4	PHQ721F0055 K202VF0044 EZ703U	950	1700	24.00	24/1	3000	2600	4000	24	4	136	39
136	57	61	10	4.3	PHQ721F0055 K202VF0040 EZ401U	170	330	22.00	22/1	3000	2600	4000	3.5	4	136	30
136	88	96	16	2.8	PHQ721F0055 K202VF0040 EZ501U	250	330	22.00	22/1	3000	2600	4000	5.5	4	136	31
136	96	107	17	2.6	PHQ721F0055 K202VF0040 EZ402U	250	330	22.00	22/1	3000	2600	4000	4.2	4	136	31
136	141	176	26	3.4	PHQ721F0055 K202VF0040 EZ404U	490	670	22.00	22/1	3000	2600	4000	5.5	4	136	34
136	152	164	27	3.2	PHQ721F0055 K202VF0040 EZ502U	490	670	22.00	22/1	3000	2600	4000	7.8	4	136	33
136	152	170	27	3.2	PHQ721F0055 K202VF0040 EZ701U	410	1670	22.00	22/1	3000	2600	4000	11	4	136	35
136	199	227	36	2.5	PHQ721F0055 K202VF0040 EZ503U	490	670	22.00	22/1	3000	2600	4000	10	4	136	34
136	246	295	45	2.0	PHQ721F0055 K202VF0040 EZ702U	840	1670	22.00	22/1	3000	2600	4000	16	4	136	37
136	277	328	50	1.8	PHQ721F0055 K202VF0040 EZ505U	920	1670	22.00	22/1	3000	2600	4000	15	4	136	37
136	338	426	61	1.4	PHQ721F0055 K202VF0040 EZ703U	920	1670	22.00	22/1	3000	2600	4000	24	4	136	39
PHQ7K (n_{1N} = 4500 rpm, $M_{2acc,max}$ = 950 Nm)																
89	447	720	38	1.3	PHQ721F0055 K202VF0092 EZ505U	950	1700	50.55	25069/496	3500	3100	4500	13	4	136	37
97	409	658	38	1.3	PHQ721F0055 K202VF0084 EZ505U	950	1700	46.18	1247/27	3500	3100	4500	13	4	136	37
122	325	524	39	1.6	PHQ721F0055 K202VF0067 EZ505U	950	1700	36.76	2279/62	3500	3100	4500	13	4	136	37
122	414	685	49	1.2	PHQ721F0055 K202VF0067 EZ703U	950	1700	36.76	2279/62	3500	3100	4500	23	4	136	39
PHQ8K (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 2600 Nm)																
67	1214	1836	63	1.3	PHQ821F0055 K402VF0054 EZ805U	2600	4000	29.82	1849/62	2600	2200	3500	139	3.5	400	108
83	977	1477	64	1.5	PHQ821F0055 K402VF0044 EZ805U	2490	4000	24.00	24/1	2600	2200	3500	142	3.5	400	108
91	895	1354	65	1.6	PHQ821F0055 K402VF0040 EZ805U	2420	4000	22.00	22/1	2600	2200	3500	143	3.5	400	108
PHQ8K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 2600 Nm)																
7.9	1527	1669	11	1.1	PHQ821F0055 K402VF0690 EZ501U	2350	3390	381.4	61017/160	3600	3300	5000	3.0	3.5	400	67
9.8	1227	1341	11	1.4	PHQ821F0055 K402VF0560 EZ501U	2600	4000	306.4	2451/8	3600	3300	5000	3.1	3.5	400	67
11	1111	1214	12	1.3	PHQ821F0055 K402VF0500 EZ501U	1710	2470	277.3	5547/20	3600	3300	5000	3.1	3.5	400	67
12	1020	1115	10	1.7	PHQ821F0055 K402VF0460 EZ501U	2600	4000	254.7	3311/13	3600	3300	5000	3.2	3.5	400	67
13	892	975	10	1.8	PHQ821F0055 K402VF0410 EZ501U	1950	3530	222.8	2451/11	3600	3300	5000	3.1	3.5	400	67
16	765	837	9.4	2.2	PHQ821F0055 K402VF0350 EZ501U	2600	4000	191.2	45881/240	3600	3300	5000	3.4	3.5	400	67
16	1317	1424	16	1.3	PHQ821F0055 K402VF0350 EZ502U	2600	4000	191.2	45881/240	3600	3300	5000	5.7	3.5	400	68
16	1317	1478	16	1.3	PHQ821F0055 K402VF0350 EZ701U	2600	4000	191.2	45881/240	3600	3300	5000	9.0	3.5	400	70
16	742	811	9.4	2.3	PHQ821F0055 K402VF0340 EZ501U	2460	4000	185.2	2408/13	3600	3300	5000	3.2	3.5	400	67
16	1276	1380	16	1.3	PHQ821F0055 K402VF0340 EZ502U	2460	4000	185.2	2408/13	3600	3300	5000	5.5	3.5	400	68
16	1276	1432	16	1.3	PHQ821F0055 K402VF0340 EZ701U	2460	4000	185.2	2408/13	3600	3300	5000	8.8	3.5	400	70
20	612	668	8.9	2.8	PHQ821F0055 K402VF0280 EZ501U	2280	4000	152.7	14663/96	3600	3300	5000	3.6	3.5	400	67
20	1053	1138	15	1.6	PHQ821F0055 K402VF0280 EZ502U	2600	4000	152.7	14663/96	3600	3300	5000	5.9	3.5	400	68
20	1053	1181	15	1.6	PHQ821F0055 K402VF0280 EZ701U	2600	4000	152.7	14663/96	3600	3300	5000	9.2	3.5	400	70
20	1380	1579	20	1.2	PHQ821F0055 K402VF0280 EZ503U	2600	4000	152.7	14663/96	3600	3300	5000	8.2	3.5	400	70
22	557	609	8.7	3.1	PHQ821F0055 K402VF0250 EZ501U	2070	3360	139.0	4171/30	3600	3300	5000	3.4	3.5	400	67
22	958	1036	15	1.8	PHQ821F0055 K402VF0250 EZ502U	2480	3360	139.0	4171/30	3600	3300	5000	5.7	3.5	400	68

PHQK

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	n_{1max} DBH [rpm]	n_{1max} DBV [rpm]	n_{1max} ZB [rpm]	J_1 [10^{-4} kgm²]	$\Delta\varphi_2$ [arcmin]	C_2 [Nm/arcmin]	m [kg]
PHQ8K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 2600 Nm)																
22	958	1075	15	1.8	PHQ821F0055 K402VF0250 EZ701U	2590	4000	139.0	4171/30	3600	3300	5000	9.0	3.5	400	70
22	1256	1437	20	1.4	PHQ821F0055 K402VF0250 EZ503U	2480	3360	139.0	4171/30	3600	3300	5000	8.1	3.5	400	70
22	1554	1864	24	1.1	PHQ821F0055 K402VF0250 EZ702U	2600	4000	139.0	4171/30	3600	3300	5000	14	3.5	400	73
23	513	561	8.5	3.3	PHQ821F0055 K402VF0230 EZ501U	1910	3880	128.1	6149/48	3600	3300	5000	3.8	3.5	400	67
23	883	954	15	1.9	PHQ821F0055 K402VF0230 EZ502U	2600	3880	128.1	6149/48	3600	3300	5000	6.1	3.5	400	68
23	883	990	15	1.9	PHQ821F0055 K402VF0230 EZ701U	2390	4000	128.1	6149/48	3600	3300	5000	9.4	3.5	400	70
23	1157	1324	19	1.5	PHQ821F0055 K402VF0230 EZ503U	2600	3880	128.1	6149/48	3600	3300	5000	8.5	3.5	400	70
23	1432	1718	24	1.2	PHQ821F0055 K402VF0230 EZ702U	2600	4000	128.1	6149/48	3600	3300	5000	15	3.5	400	73
23	1610	1909	27	1.1	PHQ821F0055 K402VF0230 EZ505U	2600	4000	128.1	6149/48	3600	3300	5000	13	3.5	400	73
27	445	486	8.2	3.8	PHQ821F0055 K402VF0200 EZ501U	1660	3110	111.1	1333/12	3600	3300	5000	3.7	3.5	400	67
27	765	828	14	2.2	PHQ821F0055 K402VF0200 EZ502U	2290	3110	111.1	1333/12	3600	3300	5000	6.0	3.5	400	68
27	765	859	14	2.2	PHQ821F0055 K402VF0200 EZ701U	2070	4000	111.1	1333/12	3600	3300	5000	9.3	3.5	400	70
27	1003	1148	19	1.7	PHQ821F0055 K402VF0200 EZ503U	2290	3110	111.1	1333/12	3600	3300	5000	8.3	3.5	400	70
27	1241	1490	23	1.4	PHQ821F0055 K402VF0200 EZ702U	2600	4000	111.1	1333/12	3600	3300	5000	14	3.5	400	73
27	1396	1655	26	1.2	PHQ821F0055 K402VF0200 EZ505U	2600	4000	111.1	1333/12	3600	3300	5000	13	3.5	400	73
31	383	419	7.9	4.4	PHQ821F0055 K402VF0175 EZ501U	1430	2900	95.73	8041/84	3400	3000	4500	4.3	3.5	400	67
31	660	713	14	2.6	PHQ821F0055 K402VF0175 EZ502U	2140	2900	95.73	8041/84	3400	3000	4500	6.6	3.5	400	68
31	660	740	14	2.6	PHQ821F0055 K402VF0175 EZ701U	1780	4000	95.73	8041/84	3400	3000	4500	9.9	3.5	400	70
31	865	989	18	2.0	PHQ821F0055 K402VF0175 EZ503U	2140	2900	95.73	8041/84	3400	3000	4500	9.0	3.5	400	70
31	1070	1284	22	1.6	PHQ821F0055 K402VF0175 EZ702U	2600	4000	95.73	8041/84	3400	3000	4500	15	3.5	400	73
31	1203	1426	25	1.4	PHQ821F0055 K402VF0175 EZ505U	2600	4000	95.73	8041/84	3400	3000	4500	14	3.5	400	73
31	1471	1854	30	1.2	PHQ821F0055 K402VF0175 EZ703U	2600	4000	95.73	8041/84	3400	3000	4500	23	3.5	400	75
32	373	408	7.9	4.6	PHQ821F0055 K402VF0170 EZ501U	1390	2820	93.16	559/6	3600	3300	5000	3.9	3.5	400	67
32	642	694	14	2.6	PHQ821F0055 K402VF0170 EZ502U	2080	2820	93.16	559/6	3600	3300	5000	6.2	3.5	400	68
32	642	720	14	2.6	PHQ821F0055 K402VF0170 EZ701U	1740	4000	93.16	559/6	3600	3300	5000	9.5	3.5	400	70
32	842	963	18	2.0	PHQ821F0055 K402VF0170 EZ503U	2080	2820	93.16	559/6	3600	3300	5000	8.6	3.5	400	70
32	1041	1249	22	1.6	PHQ821F0055 K402VF0170 EZ702U	2600	4000	93.16	559/6	3600	3300	5000	15	3.5	400	73
32	1171	1388	25	1.5	PHQ821F0055 K402VF0170 EZ505U	2600	4000	93.16	559/6	3600	3300	5000	13	3.5	400	73
32	1431	1804	30	1.2	PHQ821F0055 K402VF0170 EZ703U	2600	4000	93.16	559/6	3600	3300	5000	23	3.5	400	75
39	526	590	13	3.2	PHQ821F0055 K402VF0140 EZ701U	1420	4000	76.37	14663/192	3400	3000	4500	11	3.5	400	70
39	853	1024	21	2.0	PHQ821F0055 K402VF0140 EZ702U	2600	4000	76.37	14663/192	3400	3000	4500	16	3.5	400	73
39	960	1138	24	1.8	PHQ821F0055 K402VF0140 EZ505U	2600	4000	76.37	14663/192	3400	3000	4500	14	3.5	400	73
39	1173	1479	29	1.4	PHQ821F0055 K402VF0140 EZ703U	2600	4000	76.37	14663/192	3400	3000	4500	24	3.5	400	75
43	480	519	13	3.2	PHQ821F0055 K402VF0125 EZ502U	1560	2110	69.62	1462/21	3400	3000	4500	6.9	3.5	400	68
43	480	538	13	3.5	PHQ821F0055 K402VF0125 EZ701U	1300	4000	69.62	1462/21	3400	3000	4500	10	3.5	400	70
43	629	720	17	2.5	PHQ821F0055 K402VF0125 EZ503U	1560	2110	69.62	1462/21	3400	3000	4500	9.2	3.5	400	70
43	778	934	20	2.2	PHQ821F0055 K402VF0125 EZ702U	2600	4000	69.62	1462/21	3400	3000	4500	15	3.5	400	73
43	875	1037	23	1.9	PHQ821F0055 K402VF0125 EZ505U	2600	4000	69.62	1462/21	3400	3000	4500	14	3.5	400	73
43	1070	1348	28	1.6	PHQ821F0055 K402VF0125 EZ703U	2600	4000	69.62	1462/21	3400	3000	4500	23	3.5	400	75
43	1381	1958	36	1.2	PHQ821F0055 K402VF0125 EZ705U	2600	4000	69.62	1462/21	3400	3000	4500	36	3.5	400	80
47	437	490	12	3.9	PHQ821F0055 K402VF0115 EZ701U	1180	4000	63.35	7095/112	3000	2600	4000	11	3.5	400	70
47	708	849	20	2.4	PHQ821F0055 K402VF0115 EZ702U	2420	4000	63.35	7095/112	3000	2600	4000	16	3.5	400	73
47	796	944	22	2.1	PHQ821F0055 K402VF0115 EZ505U	2600	4000	63.35	7095/112	3000	2600	4000	15	3.5	400	73
47	973	1227	27	1.7	PHQ821F0055 K402VF0115 EZ703U	2600	4000	63.35	7095/112	3000	2600	4000	24	3.5	400	75
47	1257	1782	35	1.4	PHQ821F0055 K402VF0115 EZ705U	2600	4000	63.35	7095/112	3000	2600	4000	37	3.5	400	80
54	383	429	12	4.4	PHQ821F0055 K402VF0100 EZ701U	1030	4000	55.54	1333/24	3400	3000	4500	11	3.5	400	70
54	621	745	19	2.7	PHQ821F0055 K402VF0100 EZ702U	2120	4000	55.54	1333/24	3400	3000	4500	16	3.5	400	73
54	698	827	22	2.4	PHQ821F0055 K402VF0100 EZ505U	2600	4000	55.54	1333/24	3400	3000	4500	15	3.5	400	73
54	853	1076	27	2.0	PHQ821F0055 K402VF0100 EZ703U	2600	4000	55.54	1333/24	3400	3000	4500	24	3.5	400	75
54	1102	1562	34	1.5	PHQ821F0055 K402VF0100 EZ705U	2600	4000	55.54	1333/24	3400	3000	4500	36	3.5	400	80
54	1153	1919	36	1.5	PHQ821F0055 K402VF0100 EZ802U	2600	4000	55.54	1333/24	3400	3000	4500	60	3.5	400	89
59	350	393	12	4.8	PHQ821F0055 K402VF0092 EZ701U	950	3850	50.81	26015/512	3000	2600	4000	12	3.5	400	70
59	568	681	19	3.0	PHQ821F0055 K402VF0092 EZ702U	1940	3850	50.81	26015/512	3000	2600	4000	17	3.5	400	73
59	639	757	21	2.7	PHQ821F0055 K402VF0092 EZ505U	2600	3850	50.81	26015/512	3000	2600	4000	16	3.5	400	73
59	781	984	26	2.2	PHQ821F0055 K402VF0092 EZ703U	2600	3850	50.81	26015/512	3000	2600	4000	25	3.5	400	75
59	1008	1429	34	1.7	PHQ821F0055 K402VF0092 EZ705U	2600	4000	50.81	26015/512	3000	2600	4000	38	3.5	400	80
59	1055	1755	35	1.6	PHQ821F0055 K402VF0092 EZ802U	2600	4000	50.81	26015/512	3000	2600	4000	62	3.5	400	89
65	515	618	19	3.2	PHQ821F0055 K402VF0084 EZ702U	1760	3490	46.07	645/14	3000	2600	4000	17	3.5	400	73
65	579	686	22	2.8	PHQ821F0055 K402VF0084 EZ505U	2570	3490	46.07	645/14	3000	2600	4000	15	3.5	400	73

STOBER

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	n_{1max} DBH [rpm]	n_{1max} DBV [rpm]	n_{1max} ZB [rpm]	J_1 [10^{-4} kgm²]	$\Delta\varphi_2$ [arcmin]	C_2 [Nm/arcmin]	m [kg]
PHQ8K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 2600 Nm)																
65	708	892	26	2.3	PHQ821F0055 K402VF0084 EZ703U	2570	3490	46.07	645/14	3000	2600	4000	25	3.5	400	75
65	914	1296	34	1.8	PHQ821F0055 K402VF0084 EZ705U	2600	4000	46.07	645/14	3000	2600	4000	37	3.5	400	80
65	957	1592	36	1.7	PHQ821F0055 K402VF0084 EZ802U	2600	4000	46.07	645/14	3000	2600	4000	61	3.5	400	89
73	458	550	19	3.4	PHQ821F0055 K402VF0075 EZ702U	1570	3110	41.01	20339/496	2600	2200	3500	19	3.5	400	73
73	516	611	22	3.1	PHQ821F0055 K402VF0075 EZ505U	2290	3110	41.01	20339/496	2600	2200	3500	17	3.5	400	73
73	630	794	27	2.5	PHQ821F0055 K402VF0075 EZ703U	2290	3110	41.01	20339/496	2600	2200	3500	27	3.5	400	75
73	813	1153	34	1.9	PHQ821F0055 K402VF0075 EZ705U	2600	4000	41.01	20339/496	2600	2200	3500	39	3.5	400	80
73	852	1417	36	1.9	PHQ821F0055 K402VF0075 EZ802U	2600	4000	41.01	20339/496	2600	2200	3500	63	3.5	400	89
73	1016	1841	43	1.6	PHQ821F0055 K402VF0075 EZ803U	2600	4000	41.01	20339/496	2600	2200	3500	89	3.5	400	95
81	413	496	19	3.7	PHQ821F0055 K402VF0067 EZ702U	1410	2800	36.95	2365/64	3000	2600	4000	18	3.5	400	73
81	465	551	22	3.3	PHQ821F0055 K402VF0067 EZ505U	2060	2800	36.95	2365/64	3000	2600	4000	17	3.5	400	73
81	568	716	27	2.7	PHQ821F0055 K402VF0067 EZ703U	2060	2800	36.95	2365/64	3000	2600	4000	26	3.5	400	75
81	733	1039	35	2.1	PHQ821F0055 K402VF0067 EZ705U	2600	4000	36.95	2365/64	3000	2600	4000	39	3.5	400	80
81	767	1277	36	2.0	PHQ821F0055 K402VF0067 EZ802U	2600	4000	36.95	2365/64	3000	2600	4000	63	3.5	400	89
81	915	1659	43	1.7	PHQ821F0055 K402VF0067 EZ803U	2600	4000	36.95	2365/64	3000	2600	4000	88	3.5	400	95
91	227	246	12	3.2	PHQ821F0055 K402VF0060 EZ502U	740	1000	33.00	33/1	2600	2200	3500	12	3.5	400	68
91	227	255	12	3.2	PHQ821F0055 K402VF0060 EZ701U	610	1000	33.00	33/1	2600	2200	3500	16	3.5	400	70
91	298	341	16	2.5	PHQ821F0055 K402VF0060 EZ503U	740	1000	33.00	33/1	2600	2200	3500	15	3.5	400	70
91	369	443	20	4.0	PHQ821F0055 K402VF0060 EZ702U	1260	2500	33.00	33/1	2600	2200	3500	21	3.5	400	73
91	415	492	22	3.5	PHQ821F0055 K402VF0060 EZ505U	1840	2500	33.00	33/1	2600	2200	3500	19	3.5	400	73
91	507	639	27	2.9	PHQ821F0055 K402VF0060 EZ703U	1840	2500	33.00	33/1	2600	2200	3500	29	3.5	400	75
91	655	928	35	2.2	PHQ821F0055 K402VF0060 EZ705U	2600	4000	33.00	33/1	2600	2200	3500	41	3.5	400	80
91	685	1140	37	2.1	PHQ821F0055 K402VF0060 EZ802U	2600	4000	33.00	33/1	2600	2200	3500	65	3.5	400	89
91	817	1481	44	1.8	PHQ821F0055 K402VF0060 EZ803U	2600	4000	33.00	33/1	2600	2200	3500	91	3.5	400	95
101	333	400	20	4.3	PHQ821F0055 K402VF0054 EZ702U	1140	2260	29.82	1849/62	2600	2200	3500	20	3.5	400	73
101	375	444	22	3.8	PHQ821F0055 K402VF0054 EZ505U	1670	2260	29.82	1849/62	2600	2200	3500	19	3.5	400	73
101	458	578	27	3.1	PHQ821F0055 K402VF0054 EZ703U	1670	2260	29.82	1849/62	2600	2200	3500	28	3.5	400	75
101	591	839	35	2.4	PHQ821F0055 K402VF0054 EZ705U	2600	4000	29.82	1849/62	2600	2200	3500	40	3.5	400	80
101	619	1030	37	2.3	PHQ821F0055 K402VF0054 EZ802U	2600	4000	29.82	1849/62	2600	2200	3500	65	3.5	400	89
101	739	1338	44	1.9	PHQ821F0055 K402VF0054 EZ803U	2600	4000	29.82	1849/62	2600	2200	3500	90	3.5	400	95
125	165	179	12	3.2	PHQ821F0055 K402VF0044 EZ502U	540	730	24.00	24/1	2600	2200	3500	14	3.5	400	68
125	165	186	12	3.2	PHQ821F0055 K402VF0044 EZ701U	450	730	24.00	24/1	2600	2200	3500	18	3.5	400	70
125	217	248	16	2.5	PHQ821F0055 K402VF0044 EZ503U	540	730	24.00	24/1	2600	2200	3500	17	3.5	400	70
125	268	322	20	4.9	PHQ821F0055 K402VF0044 EZ702U	920	1820	24.00	24/1	2600	2200	3500	23	3.5	400	73
125	302	358	23	4.4	PHQ821F0055 K402VF0044 EZ505U	1340	1820	24.00	24/1	2600	2200	3500	21	3.5	400	73
125	369	465	28	3.6	PHQ821F0055 K402VF0044 EZ703U	1340	1820	24.00	24/1	2600	2200	3500	31	3.5	400	75
125	476	675	36	2.8	PHQ821F0055 K402VF0044 EZ705U	2320	4000	24.00	24/1	2600	2200	3500	43	3.5	400	80
125	498	829	38	2.6	PHQ821F0055 K402VF0044 EZ802U	2240	4000	24.00	24/1	2600	2200	3500	67	3.5	400	89
125	595	1077	45	2.2	PHQ821F0055 K402VF0044 EZ803U	2490	4000	24.00	24/1	2600	2200	3500	93	3.5	400	95
136	246	295	20	5.0	PHQ821F0055 K402VF0040 EZ702U	840	1670	22.00	22/1	2600	2200	3500	24	3.5	400	73
136	277	328	23	4.4	PHQ821F0055 K402VF0040 EZ505U	1230	1670	22.00	22/1	2600	2200	3500	23	3.5	400	73
136	338	426	28	3.6	PHQ821F0055 K402VF0040 EZ703U	1230	1670	22.00	22/1	2600	2200	3500	32	3.5	400	75
136	436	619	36	2.9	PHQ821F0055 K402VF0040 EZ705U	2130	4000	22.00	22/1	2600	2200	3500	44	3.5	400	80
136	457	760	38	2.8	PHQ821F0055 K402VF0040 EZ802U	2050	4000	22.00	22/1	2600	2200	3500	69	3.5	400	89
136	545	987	45	2.4	PHQ821F0055 K402VF0040 EZ803U	2420	4000	22.00	22/1	2600	2200	3500	94	3.5	400	95
PHQ8K (n_{1N} = 4500 rpm, $M_{2acc,max}$ = 2600 Nm)																
32	1230	1981	19	1.4	PHQ821F0055 K402VF0250 EZ505U	2600	4000	139.0	4171/30	3600	3300	5000	13	3.5	400	73
35	1133	1825	19	1.5	PHQ821F0055 K402VF0230 EZ505U	2600	4000	128.1	6149/48	3600	3300	5000	13	3.5	400	73
41	983	1583	18	1.7	PHQ821F0055 K402VF0200 EZ505U	2600	4000	111.1	1333/12	3600	3300	5000	13	3.5	400	73
47	847	1364	18	2.0	PHQ821F0055 K402VF0175 EZ505U	2600	4000	95.73	8041/84	3400	3000	4500	14	3.5	400	73
47	1079	1783	22	1.6	PHQ821F0055 K402VF0175 EZ703U	2600	4000	95.73	8041/84	3400	3000	4500	23	3.5	400	75
48	824	1327	17	2.1	PHQ821F0055 K402VF0170 EZ505U	2600	4000	93.16	559/6	3600	3300	5000	13	3.5	400	73
48	1050	1735	22	1.6	PHQ821F0055 K402VF0170 EZ703U	2600	4000	93.16	559/6	3600	3300	5000	23	3.5	400	75
59	676	1088	17	2.5	PHQ821F0055 K402VF0140 EZ505U	2600	4000	76.37	14663/192	3400	3000	4500	14	3.5	400	73
59	860	1422	21	2.0	PHQ821F0055 K402VF0140 EZ703U	2600	4000	76.37	14663/192	3400	3000	4500	24	3.5	400	75
65	616	992	17	2.7	PHQ821F0055 K402VF0125 EZ505U	2600	4000	69.62	1462/21	3400	3000	4500	14	3.5	400	73
65	784	1297	21	2.1	PHQ821F0055 K402VF0125 EZ703U	2600	4000	69.62	1462/21	3400	3000	4500	23	3.5	400	75
65	1063	1945	29	1.5	PHQ821F0055 K402VF0125 EZ705U	2600	4000	69.62	1462/21	3400	3000	4500	36	3.5	400	80
81	491	791	17	3.1	PHQ821F0055 K402VF0100 EZ505U	2600	4000	55.54	1333/24	3400	3000	4500	15	3.5	400	73

PHQK

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	n_{1max} DBH [rpm]	n_{1max} DBV [rpm]	n_{1max} ZB [rpm]	J_1 [10^{-4} kgm²]	$\Delta\varphi_2$ [arcmin]	C_2 [Nm/arcmin]	m [kg]
PHQ8K (n_{1N} = 4500 rpm, $M_{2acc,max}$ = 2600 Nm)																
81	543	1784	19	2.8	PHQ821F0055 K402VF0100 EZ802U	2600	4000	55.54	1333/24	3400	3000	4500	60	3.5	400	89
81	626	1034	22	2.4	PHQ821F0055 K402VF0100 EZ703U	2600	4000	55.54	1333/24	3400	3000	4500	24	3.5	400	75
81	848	1552	29	1.8	PHQ821F0055 K402VF0100 EZ705U	2600	4000	55.54	1333/24	3400	3000	4500	36	3.5	400	80
PHQ9K (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 5760 Nm)																
29	2784	4211	53	1.4	PHQ931F0060 K513VF0115 EZ805U	5760	11250	69.41	10759/155	2300	2200	3600	141	4	771	133
33	2442	3694	51	1.6	PHQ931F0060 K513VF0100 EZ805U	5760	11250	60.90	609/10	1900	1800	3000	143	4	771	133
36	2206	3337	49	1.7	PHQ931F0060 K513VF0092 EZ805U	5760	10960	55.01	8526/155	1900	1800	3000	145	4	771	133
41	1957	2961	48	1.9	PHQ931F0060 K513VF0081 EZ805U	5760	9720	48.80	17081/350	1900	1800	3000	147	4	771	133
45	1768	2674	48	2.1	PHQ931F0060 K513VF0073 EZ805U	5760	8780	44.08	1102/25	1900	1800	3000	149	4	771	133
PHQ9K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 5760 Nm)																
5.2	2288	2501	9.8	1.7	PHQ931F0060 K513VF0970 EZ501U	5280	9110	579.9	115971/200	3400	3000	4500	3.2	4	771	93
5.7	2067	2259	9.5	1.8	PHQ931F0060 K513VF0870 EZ501U	4760	8230	523.7	26187/50	3400	3000	4500	3.2	4	771	93
6.4	1837	2008	9.2	2.1	PHQ931F0060 K513VF0780 EZ501U	5760	8840	465.6	26071/56	3400	3000	4500	3.3	4	771	93
6.4	3162	3418	16	1.2	PHQ931F0060 K513VF0780 EZ502U	5760	8840	465.6	26071/56	3400	3000	4500	5.6	4	771	94
6.4	3162	3546	16	1.2	PHQ931F0060 K513VF0780 EZ701U	5760	8840	465.6	26071/56	3400	3000	4500	8.9	4	771	96
7.1	1659	1814	8.9	2.3	PHQ931F0060 K513VF0700 EZ501U	5670	7980	420.5	841/2	3400	3000	4500	3.4	4	771	93
7.1	2856	3087	15	1.3	PHQ931F0060 K513VF0700 EZ502U	5670	7980	420.5	841/2	3400	3000	4500	5.7	4	771	94
7.1	2856	3203	15	1.3	PHQ931F0060 K513VF0700 EZ701U	5670	7980	420.5	841/2	3400	3000	4500	9.0	4	771	96
7.1	3743	4284	20	1.0	PHQ931F0060 K513VF0700 EZ503U	5670	7980	420.5	841/2	3400	3000	4500	8.0	4	771	96
7.7	1528	1670	8.7	2.5	PHQ931F0060 K513VF0650 EZ501U	5690	7950	387.3	25172/65	3400	3000	4500	3.5	4	771	93
7.7	2630	2843	15	1.4	PHQ931F0060 K513VF0650 EZ502U	5760	7950	387.3	25172/65	3400	3000	4500	5.8	4	771	94
7.7	2630	2950	15	1.4	PHQ931F0060 K513VF0650 EZ701U	5760	11250	387.3	25172/65	3400	3000	4500	9.1	4	771	96
7.7	3448	3945	20	1.1	PHQ931F0060 K513VF0650 EZ503U	5760	7950	387.3	25172/65	3400	3000	4500	8.2	4	771	96
8.6	1380	1509	8.4	2.8	PHQ931F0060 K513VF0580 EZ501U	5140	7180	349.8	22736/65	3400	3000	4500	3.5	4	771	93
8.6	2376	2568	15	1.6	PHQ931F0060 K513VF0580 EZ502U	5300	7180	349.8	22736/65	3400	3000	4500	5.8	4	771	94
8.6	2376	2664	15	1.6	PHQ931F0060 K513VF0580 EZ701U	5760	11250	349.8	22736/65	3400	3000	4500	9.1	4	771	96
8.6	3114	3563	19	1.2	PHQ931F0060 K513VF0580 EZ503U	5300	7180	349.8	22736/65	3400	3000	4500	8.2	4	771	96
10	1140	1246	8.0	3.3	PHQ931F0060 K513VF0480 EZ501U	4240	6760	289.0	8091/28	3400	3000	4500	3.9	4	771	93
10	1962	2122	14	1.9	PHQ931F0060 K513VF0480 EZ502U	4990	6760	289.0	8091/28	3400	3000	4500	6.2	4	771	94
10	1962	2201	14	1.9	PHQ931F0060 K513VF0480 EZ701U	5300	11250	289.0	8091/28	3400	3000	4500	9.5	4	771	96
10	2572	2944	18	1.5	PHQ931F0060 K513VF0480 EZ503U	4990	6760	289.0	8091/28	3400	3000	4500	8.6	4	771	96
10	3182	3819	22	1.2	PHQ931F0060 K513VF0480 EZ702U	5760	11250	289.0	8091/28	3400	3000	4500	15	4	771	98
10	3580	4243	25	1.1	PHQ931F0060 K513VF0480 EZ505U	5760	11250	289.0	8091/28	3400	3000	4500	13	4	771	98
11	1030	1126	7.7	3.7	PHQ931F0060 K513VF0440 EZ501U	3830	6110	261.0	261/1	3400	3000	4500	4.0	4	771	93
11	1773	1916	13	2.1	PHQ931F0060 K513VF0440 EZ502U	4500	6110	261.0	261/1	3400	3000	4500	6.3	4	771	94
11	1773	1988	13	2.1	PHQ931F0060 K513VF0440 EZ701U	4790	11250	261.0	261/1	3400	3000	4500	9.6	4	771	96
11	2323	2659	17	1.6	PHQ931F0060 K513VF0440 EZ503U	4500	6110	261.0	261/1	3400	3000	4500	8.6	4	771	96
11	2874	3449	22	1.3	PHQ931F0060 K513VF0440 EZ702U	5760	11250	261.0	261/1	3400	3000	4500	15	4	771	98
11	3234	3833	24	1.2	PHQ931F0060 K513VF0440 EZ505U	5760	11250	261.0	261/1	3400	3000	4500	13	4	771	98
13	912	997	7.5	4.2	PHQ931F0060 K513VF0390 EZ501U	3390	6270	231.2	8091/35	3400	3000	4500	4.4	4	771	93
13	1570	1697	13	2.4	PHQ931F0060 K513VF0390 EZ502U	4620	6270	231.2	8091/35	3400	3000	4500	6.7	4	771	94
13	1570	1761	13	2.4	PHQ931F0060 K513VF0390 EZ701U	4240	11250	231.2	8091/35	3400	3000	4500	10	4	771	96
13	2058	2355	17	1.8	PHQ931F0060 K513VF0390 EZ503U	4620	6270	231.2	8091/35	3400	3000	4500	9.1	4	771	96
13	2546	3055	21	1.5	PHQ931F0060 K513VF0390 EZ702U	5760	11250	231.2	8091/35	3400	3000	4500	15	4	771	98
13	2864	3395	23	1.3	PHQ931F0060 K513VF0390 EZ505U	5760	11250	231.2	8091/35	3400	3000	4500	14	4	771	98
13	3501	4413	29	1.1	PHQ931F0060 K513VF0390 EZ703U	5760	11250	231.2	8091/35	3400	3000	4500	23	4	771	100
14	824	901	7.2	4.6	PHQ931F0060 K513VF0350 EZ501U	3070	5660	208.8	1044/5	3400	3000	4500	4.5	4	771	93
14	1418	1533	12	2.7	PHQ931F0060 K513VF0350 EZ502U	4170	5660	208.8	1044/5	3400	3000	4500	6.8	4	771	94
14	1418	1591	12	2.7	PHQ931F0060 K513VF0350 EZ701U	3830	11130	208.8	1044/5	3400	3000	4500	10	4	771	96
14	1859	2127	16	2.0	PHQ931F0060 K513VF0350 EZ503U	4170	5660	208.8	1044/5	3400	3000	4500	9.1	4	771	96
14	2300	2759	20	1.7	PHQ931F0060 K513VF0350 EZ702U	5760	11130	208.8	1044/5	3400	3000	4500	15	4	771	98
14	2587	3066	23	1.5	PHQ931F0060 K513VF0350 EZ505U	5760	11130	208.8	1044/5	3400	3000	4500	14	4	771	98
14	3162	3986	28	1.2	PHQ931F0060 K513VF0350 EZ703U	5760	11130	208.8	1044/5	3400	3000	4500	23	4	771	100
15	1317	1477	12	2.9	PHQ931F0060 K513VF0320 EZ701U	3560	11250	193.8	62031/320	3400	3000	4500	10	4	771	96
15	2135	2562	20	1.8	PHQ931F0060 K513VF0320 EZ702U	5760	11250	193.8	62031/320	3400	3000	4500	16	4	771	98
15	2402	2846	22	1.6	PHQ931F0060 K513VF0320 EZ505U	5760	11250	193.8	62031/320	3400	3000	4500	14	4	771	98
15	2935	3700	27	1.3	PHQ931F0060 K513VF0320 EZ703U	5760	11250	193.8	62031/320	3400	3000	4500	24	4	771	100
17	1189	1334	12	3.2	PHQ931F0060 K513VF0290 EZ701U	3210	10350	175.1	14007/80	3400	3000	4500	11	4	771	96
17	1928	2314	19	2.0	PHQ931F0060 K513VF0290 EZ702U	5760	10350	175.1	14007/80	3400	3000	4500	16	4	771	98

STOBER

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	n_{1max} DBH [rpm]	n_{1max} DBV [rpm]	n_{1max} ZB [rpm]	J_1 [10^{-4} kgm²]	$\Delta\varphi_2$ [arcmin]	C_2 [Nm/arcmin]	m [kg]
PHQ9K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 5760 Nm)																
17	2169	2571	22	1.8	PHQ931F0060 K513VF0290 EZ505U	5760	10350	175.1	14007/80	3400	3000	4500	14	4	771	98
17	2651	3342	26	1.4	PHQ931F0060 K513VF0290 EZ703U	5760	10350	175.1	14007/80	3400	3000	4500	24	4	771	100
21	992	1113	11	3.8	PHQ931F0060 K513VF0240 EZ701U	2680	10140	146.1	11687/80	2800	2500	4000	11	4	771	96
21	1609	1931	18	2.4	PHQ931F0060 K513VF0240 EZ702U	5500	10140	146.1	11687/80	2800	2500	4000	17	4	771	98
21	1810	2145	20	2.1	PHQ931F0060 K513VF0240 EZ505U	5760	10140	146.1	11687/80	2800	2500	4000	15	4	771	98
21	2212	2789	25	1.7	PHQ931F0060 K513VF0240 EZ703U	5760	10140	146.1	11687/80	2800	2500	4000	25	4	771	100
21	2856	4049	32	1.3	PHQ931F0060 K513VF0240 EZ705U	5760	11250	146.1	11687/80	2800	2500	4000	37	4	771	106
23	896	1005	11	4.2	PHQ931F0060 K513VF0220 EZ701U	2420	9160	132.0	2639/20	2800	2500	4000	12	4	771	96
23	1453	1744	18	2.6	PHQ931F0060 K513VF0220 EZ702U	4970	9160	132.0	2639/20	2800	2500	4000	17	4	771	98
23	1635	1938	20	2.3	PHQ931F0060 K513VF0220 EZ505U	5760	9160	132.0	2639/20	2800	2500	4000	15	4	771	98
23	1998	2519	24	1.9	PHQ931F0060 K513VF0220 EZ703U	5760	9160	132.0	2639/20	2800	2500	4000	25	4	771	100
23	2579	3657	31	1.5	PHQ931F0060 K513VF0220 EZ705U	5760	11250	132.0	2639/20	2800	2500	4000	37	4	771	106
26	789	885	10	4.8	PHQ931F0060 K513VF0195 EZ701U	2130	8670	116.1	27869/240	2800	2500	4000	13	4	771	96
26	1279	1535	17	3.0	PHQ931F0060 K513VF0195 EZ702U	4370	8670	116.1	27869/240	2800	2500	4000	18	4	771	98
26	1439	1705	19	2.6	PHQ931F0060 K513VF0195 EZ505U	5760	8670	116.1	27869/240	2800	2500	4000	16	4	771	98
26	1758	2217	23	2.2	PHQ931F0060 K513VF0195 EZ703U	5760	8670	116.1	27869/240	2800	2500	4000	26	4	771	100
26	2270	3218	30	1.7	PHQ931F0060 K513VF0195 EZ705U	5760	11250	116.1	27869/240	2800	2500	4000	38	4	771	106
26	2376	3954	31	1.6	PHQ931F0060 K513VF0195 EZ802U	5760	11250	116.1	27869/240	2800	2500	4000	62	4	771	114
29	1155	1386	16	3.3	PHQ931F0060 K513VF0175 EZ702U	3950	7830	104.9	6293/60	2800	2500	4000	18	4	771	98
29	1300	1540	18	2.9	PHQ931F0060 K513VF0175 EZ505U	5760	7830	104.9	6293/60	2800	2500	4000	17	4	771	98
29	1588	2002	23	2.4	PHQ931F0060 K513VF0175 EZ703U	5760	7830	104.9	6293/60	2800	2500	4000	26	4	771	100
29	2050	2907	29	1.9	PHQ931F0060 K513VF0175 EZ705U	5760	11250	104.9	6293/60	2800	2500	4000	38	4	771	106
29	2147	3571	30	1.8	PHQ931F0060 K513VF0175 EZ802U	5760	11250	104.9	6293/60	2800	2500	4000	63	4	771	114
31	1063	1276	16	3.6	PHQ931F0060 K513VF0160 EZ702U	3630	7210	96.56	26071/270	2300	2200	3600	19	4	771	98
31	1196	1418	18	3.2	PHQ931F0060 K513VF0160 EZ505U	5320	7210	96.56	26071/270	2300	2200	3600	18	4	771	98
31	1462	1843	22	2.6	PHQ931F0060 K513VF0160 EZ703U	5320	7210	96.56	26071/270	2300	2200	3600	27	4	771	100
31	1888	2676	28	2.0	PHQ931F0060 K513VF0160 EZ705U	5760	11250	96.56	26071/270	2300	2200	3600	39	4	771	106
31	1976	3288	30	1.9	PHQ931F0060 K513VF0160 EZ802U	5760	11250	96.56	26071/270	2300	2200	3600	63	4	771	114
31	2357	4271	35	1.6	PHQ931F0060 K513VF0160 EZ803U	5760	11250	96.56	26071/270	2300	2200	3600	89	4	771	120
34	961	1153	16	4.0	PHQ931F0060 K513VF0145 EZ702U	3280	6510	87.22	11774/135	2300	2200	3600	20	4	771	98
34	1081	1281	17	3.5	PHQ931F0060 K513VF0145 EZ505U	4800	6510	87.22	11774/135	2300	2200	3600	18	4	771	98
34	1321	1665	21	2.9	PHQ931F0060 K513VF0145 EZ703U	4800	6510	87.22	11774/135	2300	2200	3600	28	4	771	100
34	1705	2417	28	2.2	PHQ931F0060 K513VF0145 EZ705U	5760	11250	87.22	11774/135	2300	2200	3600	40	4	771	106
34	1785	2970	29	2.1	PHQ931F0060 K513VF0145 EZ802U	5760	11250	87.22	11774/135	2300	2200	3600	64	4	771	114
34	2129	3858	34	1.8	PHQ931F0060 K513VF0145 EZ803U	5760	11250	87.22	11774/135	2300	2200	3600	89	4	771	120
39	1502	2130	27	2.5	PHQ931F0060 K513VF0130 EZ705U	5760	11250	76.85	1537/20	2300	2200	3600	42	4	771	106
39	1573	2617	28	2.4	PHQ931F0060 K513VF0130 EZ802U	5760	11250	76.85	1537/20	2300	2200	3600	66	4	771	114
39	1876	3399	33	2.0	PHQ931F0060 K513VF0130 EZ803U	5760	11250	76.85	1537/20	2300	2200	3600	91	4	771	120
43	1357	1924	26	2.7	PHQ931F0060 K513VF0115 EZ705U	5760	11250	69.41	10759/155	2300	2200	3600	42	4	771	106
43	1421	2363	28	2.6	PHQ931F0060 K513VF0115 EZ802U	5760	11250	69.41	10759/155	2300	2200	3600	66	4	771	114
43	1695	3071	33	2.2	PHQ931F0060 K513VF0115 EZ803U	5760	11250	69.41	10759/155	2300	2200	3600	92	4	771	120
49	1190	1688	27	3.0	PHQ931F0060 K513VF0100 EZ705U	5760	11250	60.90	609/10	1900	1800	3000	45	4	771	106
49	1246	2074	28	2.8	PHQ931F0060 K513VF0100 EZ802U	5590	11250	60.90	609/10	1900	1800	3000	69	4	771	114
49	1487	2694	33	2.4	PHQ931F0060 K513VF0100 EZ803U	5760	11250	60.90	609/10	1900	1800	3000	94	4	771	120
55	1075	1525	27	3.2	PHQ931F0060 K513VF0092 EZ705U	5250	10960	55.01	8526/155	1900	1800	3000	46	4	771	106
55	1126	1873	28	3.0	PHQ931F0060 K513VF0092 EZ802U	5050	10960	55.01	8526/155	1900	1800	3000	70	4	771	114
55	1343	2433	33	2.5	PHQ931F0060 K513VF0092 EZ803U	5760	10960	55.01	8526/155	1900	1800	3000	95	4	771	120
61	954	1353	27	3.4	PHQ931F0060 K513VF0081 EZ705U	4660	9720	48.80	17081/350	1900	1800	3000	49	4	771	106
61	999	1662	28	3.3	PHQ931F0060 K513VF0081 EZ802U	4480	9720	48.80	17081/350	1900	1800	3000	73	4	771	114
61	1191	2159	33	2.8	PHQ931F0060 K513VF0081 EZ803U	5760	9720	48.80	17081/350	1900	1800	3000	98	4	771	120
68	862	1222	27	3.7	PHQ931F0060 K513VF0073 EZ705U	4210	8780	44.08	1102/25	1900	1800	3000	51	4	771	106
68	902	1501	28	3.5	PHQ931F0060 K513VF0073 EZ802U	4050	8780	44.08	1102/25	1900	1800	3000	75	4	771	114
68	1076	1950	34	3.0	PHQ931F0060 K513VF0073 EZ803U	5760	8780	44.08	1102/25	1900	1800	3000	100	4	771	120
PHQ9K (n_{1N} = 4500 rpm, $M_{2acc,max}$ = 5760 Nm)																
16	2519	4058	18	1.5	PHQ931F0060 K513VF0480 EZ505U	5760	11250	289.0	8091/28	3400	3000	4500	13	4	771	98
17	2276	3665	17	1.7	PHQ931F0060 K513VF0440 EZ505U	5760	11250	261.0	261/1	3400	3000	4500	13	4	771	98
19	2016	3246	16	1.9	PHQ931F0060 K513VF0390 EZ505U	5760	11250	231.2	8091/35	3400	3000	4500	14	4	771	98
19	2567	4243	21	1.5	PHQ931F0060 K513VF0390 EZ703U	5760	11250	231.2	8091/35	3400	3000	4500	23	4	771	100
22	1820	2932	16	2.1	PHQ931F0060 K513VF0350 EZ505U	5760	11130	208.8	1044/5	3400	3000	4500	14	4	771	98

PHQK

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	n_{1max} DBH [rpm]	n_{1max} DBV [rpm]	n_{1max} ZB [rpm]	J_1 [10^{-4} kgm²]	$\Delta\varphi_2$ [arcmin]	C_2 [Nm/ arcmin]	m [kg]
PHQ9K (n_{1N} = 4500 rpm, $M_{2acc,max}$ = 5760 Nm)																
22	2319	3833	20	1.6	PHQ931F0060 K513VF0350 EZ703U	5760	11130	208.8	1044/5	3400	3000	4500	23	4	771	100
23	1690	2722	16	2.2	PHQ931F0060 K513VF0320 EZ505U	5760	11250	193.8	62031/320	3400	3000	4500	14	4	771	98
23	2153	3558	20	1.8	PHQ931F0060 K513VF0320 EZ703U	5760	11250	193.8	62031/320	3400	3000	4500	24	4	771	100
26	1527	2459	15	2.5	PHQ931F0060 K513VF0290 EZ505U	5760	10350	175.1	14007/80	3400	3000	4500	14	4	771	98
26	1944	3214	19	2.0	PHQ931F0060 K513VF0290 EZ703U	5760	10350	175.1	14007/80	3400	3000	4500	24	4	771	100
PHQ10K (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 10000 Nm)																
16	4869	7364	44	1.3	PHQ1031F0060 K713VF0200 EZ805U	10000	20000	121.4	357399/2944	2400	2200	3400	149	4	1561	193
18	4398	6652	42	1.5	PHQ1031F0060 K713VF0185 EZ805U	10000	20000	109.7	80703/736	2400	2200	3400	150	4	1561	193
20	3944	5965	41	1.6	PHQ1031F0060 K713VF0165 EZ805U	10000	20000	98.33	6293/64	2000	1900	3000	154	4	1561	193
23	3562	5388	40	1.8	PHQ1031F0060 K713VF0150 EZ805U	10000	20000	88.81	1421/16	2000	1900	3000	155	4	1561	193
26	3139	4747	38	2.1	PHQ1031F0060 K713VF0130 EZ805U	10000	20000	78.26	10017/128	2000	1900	3000	162	4	1561	193
28	2835	4288	37	2.3	PHQ1031F0060 K713VF0120 EZ805U	10000	20000	70.69	70119/992	2000	1900	3000	164	4	1561	193
33	2448	3702	36	2.7	PHQ1031F0060 K713VF0100 EZ805U	10000	20000	61.03	1953/32	1700	1600	2700	175	4	1561	193
36	2211	3344	35	2.9	PHQ1031F0060 K713VF0092 EZ805U	10000	20000	55.13	441/8	1700	1600	2700	178	4	1561	193
40	2015	3048	34	3.2	PHQ1031F0060 K713VF0084 EZ805U	9450	18760	50.24	263655/5248	1700	1600	2700	189	4	1561	193
44	1820	2753	33	3.6	PHQ1031F0060 K713VF0076 EZ805U	8540	16950	45.38	59535/1312	1700	1600	2700	193	4	1561	193
PHQ10K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 10000 Nm)																
5.1	4015	4504	12	1.6	PHQ1031F0060 K713VF0990 EZ701U	10000	20000	591.2	302715/512	2900	2600	3800	9.7	4	1561	156
5.6	3627	4068	12	1.8	PHQ1031F0060 K713VF0890 EZ701U	9800	18790	534.0	68355/128	2900	2600	3800	9.7	4	1561	156
5.6	5881	7058	19	1.1	PHQ1031F0060 K713VF0890 EZ702U	10000	18790	534.0	68355/128	2900	2600	3800	15	4	1561	158
6.3	3212	3603	11	2.0	PHQ1031F0060 K713VF0790 EZ701U	8680	19700	473.0	60543/128	2900	2600	3800	10	4	1561	156
6.3	5209	6251	18	1.2	PHQ1031F0060 K713VF0790 EZ702U	10000	19700	473.0	60543/128	2900	2600	3800	16	4	1561	158
7.0	2901	3254	11	2.2	PHQ1031F0060 K713VF0710 EZ701U	7840	17790	427.2	13671/32	2900	2600	3800	10	4	1561	156
7.0	4705	5646	18	1.4	PHQ1031F0060 K713VF0710 EZ702U	10000	17790	427.2	13671/32	2900	2600	3800	16	4	1561	158
7.7	2642	2964	11	2.5	PHQ1031F0060 K713VF0650 EZ701U	7140	17680	389.1	99603/256	2900	2600	3800	11	4	1561	156
7.7	4285	5142	17	1.5	PHQ1031F0060 K713VF0650 EZ702U	10000	17680	389.1	99603/256	2900	2600	3800	16	4	1561	158
7.7	5892	7427	23	1.1	PHQ1031F0060 K713VF0650 EZ703U	10000	17680	389.1	99603/256	2900	2600	3800	24	4	1561	160
8.5	2387	2677	10	2.7	PHQ1031F0060 K713VF0590 EZ701U	6450	15970	351.4	22491/64	2900	2600	3800	11	4	1561	156
8.5	3870	4644	17	1.7	PHQ1031F0060 K713VF0590 EZ702U	10000	15970	351.4	22491/64	2900	2600	3800	16	4	1561	158
8.5	5322	6708	23	1.2	PHQ1031F0060 K713VF0590 EZ703U	10000	15970	351.4	22491/64	2900	2600	3800	24	4	1561	160
10	2033	2280	9.7	3.2	PHQ1031F0060 K713VF0500 EZ701U	5490	15150	299.3	498015/1664	2900	2600	3800	12	4	1561	156
10	3296	3955	16	2.0	PHQ1031F0060 K713VF0500 EZ702U	10000	15150	299.3	498015/1664	2900	2600	3800	18	4	1561	158
10	4532	5713	22	1.4	PHQ1031F0060 K713VF0500 EZ703U	10000	15150	299.3	498015/1664	2900	2600	3800	26	4	1561	160
11	1836	2059	9.4	3.5	PHQ1031F0060 K713VF0450 EZ701U	4960	13680	270.3	112455/416	2900	2600	3800	13	4	1561	156
11	2977	3573	15	2.2	PHQ1031F0060 K713VF0450 EZ702U	10000	13680	270.3	112455/416	2900	2600	3800	18	4	1561	158
11	4094	5160	21	1.6	PHQ1031F0060 K713VF0450 EZ703U	10000	13680	270.3	112455/416	2900	2600	3800	26	4	1561	160
11	5284	7492	27	1.2	PHQ1031F0060 K713VF0450 EZ705U	10000	20000	270.3	112455/416	2900	2600	3800	38	4	1561	166
13	1599	1793	9.0	4.1	PHQ1031F0060 K713VF0390 EZ701U	4320	14060	235.4	7533/32	2900	2600	3800	14	4	1561	156
13	2593	3111	15	2.5	PHQ1031F0060 K713VF0390 EZ702U	8860	14060	235.4	7533/32	2900	2600	3800	20	4	1561	158
13	3565	4494	20	1.8	PHQ1031F0060 K713VF0390 EZ703U	10000	14060	235.4	7533/32	2900	2600	3800	27	4	1561	160
13	4602	6525	26	1.4	PHQ1031F0060 K713VF0390 EZ705U	10000	20000	235.4	7533/32	2900	2600	3800	40	4	1561	166
14	1444	1620	8.8	4.5	PHQ1031F0060 K713VF0350 EZ701U	3900	12700	212.6	1701/8	2900	2600	3800	15	4	1561	156
14	2342	2810	14	2.8	PHQ1031F0060 K713VF0350 EZ702U	8000	12700	212.6	1701/8	2900	2600	3800	20	4	1561	158
14	3220	4059	20	2.0	PHQ1031F0060 K713VF0350 EZ703U	9370	12700	212.6	1701/8	2900	2600	3800	28	4	1561	160
14	4157	5893	25	1.6	PHQ1031F0060 K713VF0350 EZ705U	10000	20000	212.6	1701/8	2900	2600	3800	40	4	1561	166
14	4352	7240	26	1.5	PHQ1031F0060 K713VF0350 EZ802U	10000	20000	212.6	1701/8	2900	2600	3800	64	4	1561	174
15	1321	1482	8.5	4.9	PHQ1031F0060 K713VF0320 EZ701U	3570	12620	194.5	99603/512	2900	2600	3800	16	4	1561	156
15	2142	2571	14	3.0	PHQ1031F0060 K713VF0320 EZ702U	7320	12620	194.5	99603/512	2900	2600	3800	22	4	1561	158
15	2946	3714	19	2.2	PHQ1031F0060 K713VF0320 EZ703U	9300	12620	194.5	99603/512	2900	2600	3800	29	4	1561	160
15	3803	5392	25	1.7	PHQ1031F0060 K713VF0320 EZ705U	10000	20000	194.5	99603/512	2900	2600	3800	42	4	1561	166
15	3981	6624	26	1.6	PHQ1031F0060 K713VF0320 EZ802U	10000	20000	194.5	99603/512	2900	2600	3800	66	4	1561	174
17	1935	2322	13	3.4	PHQ1031F0060 K713VF0290 EZ702U	6610	11390	175.7	22491/128	2900	2600	3800	22	4	1561	158
17	2661	3354	18	2.4	PHQ1031F0060 K713VF0290 EZ703U	8400	11390	175.7	22491/128	2900	2600	3800	30	4	1561	160
17	3435	4870	24	1.9	PHQ1031F0060 K713VF0290 EZ705U	10000	20000	175.7	22491/128	2900	2600	3800	42	4	1561	166
17	3596	5983	25	1.8	PHQ1031F0060 K713VF0290 EZ802U	10000	20000	175.7	22491/128	2900	2600	3800	66	4	1561	174
20	2953	4187	23	2.2	PHQ1031F0060 K713VF0250 EZ705U	10000	20000	151.1	193347/1280	2400	2200	3400	46	4	1561	166
20	3091	5143	24	2.1	PHQ1031F0060 K713VF0250 EZ802U	10000	20000	151.1	193347/1280	2400	2200	3400	70	4	1561	174
20	3687	6682	28	1.8	PHQ1031F0060 K713VF0250 EZ803U	10000	20000	151.1	193347/1280	2400	2200	3400	95	4	1561	180
22	2667	3781	22	2.4	PHQ1031F0060 K713VF0230 EZ705U	10000	20000	136.4	43659/320	2400	2200	3400	46	4	1561	166

STOBER

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	n_{1max} DBH [rpm]	n_{1max} DBV [rpm]	n_{1max} ZB [rpm]	J_1 [10^{-4} kgm²]	$\Delta\varphi_2$ [arcmin]	C_2 [Nm/arcmin]	m [kg]
PHQ10K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 10000 Nm)																
22	2792	4645	23	2.3	PHQ1031F0060 K713VF0230 EZ802U	10000	20000	136.4	43659/320	2400	2200	3400	70	4	1561	174
22	3331	6035	28	2.0	PHQ1031F0060 K713VF0230 EZ803U	10000	20000	136.4	43659/320	2400	2200	3400	96	4	1561	180
25	2373	3365	21	2.7	PHQ1031F0060 K713VF0200 EZ705U	10000	20000	121.4	357399/2944	2400	2200	3400	50	4	1561	166
25	2485	4133	22	2.6	PHQ1031F0060 K713VF0200 EZ802U	10000	20000	121.4	357399/2944	2400	2200	3400	74	4	1561	174
25	2964	5370	27	2.2	PHQ1031F0060 K713VF0200 EZ803U	10000	20000	121.4	357399/2944	2400	2200	3400	100	4	1561	180
27	2143	3039	21	3.0	PHQ1031F0060 K713VF0185 EZ705U	10000	20000	109.7	80703/736	2400	2200	3400	51	4	1561	166
27	2244	3733	22	2.9	PHQ1031F0060 K713VF0185 EZ802U	10000	20000	109.7	80703/736	2400	2200	3400	75	4	1561	174
27	2677	4850	26	2.4	PHQ1031F0060 K713VF0185 EZ803U	10000	20000	109.7	80703/736	2400	2200	3400	100	4	1561	180
31	1922	2725	20	3.4	PHQ1031F0060 K713VF0165 EZ705U	9390	19530	98.33	6293/64	2000	1900	3000	55	4	1561	166
31	2012	3348	21	3.2	PHQ1031F0060 K713VF0165 EZ802U	9020	19530	98.33	6293/64	2000	1900	3000	79	4	1561	174
31	2400	4350	25	2.7	PHQ1031F0060 K713VF0165 EZ803U	10000	20000	98.33	6293/64	2000	1900	3000	105	4	1561	180
34	1736	2462	19	3.7	PHQ1031F0060 K713VF0150 EZ705U	8480	17640	88.81	1421/16	2000	1900	3000	57	4	1561	166
34	1818	3024	20	3.6	PHQ1031F0060 K713VF0150 EZ802U	8150	17640	88.81	1421/16	2000	1900	3000	81	4	1561	174
34	2168	3929	24	3.0	PHQ1031F0060 K713VF0150 EZ803U	10000	20000	88.81	1421/16	2000	1900	3000	106	4	1561	180
38	1530	2169	19	4.2	PHQ1031F0060 K713VF0130 EZ705U	7470	15590	78.26	10017/128	2000	1900	3000	63	4	1561	166
38	1602	2665	20	4.1	PHQ1031F0060 K713VF0130 EZ802U	7180	15590	78.26	10017/128	2000	1900	3000	87	4	1561	174
38	1910	3462	23	3.4	PHQ1031F0060 K713VF0130 EZ803U	10000	20000	78.26	10017/128	2000	1900	3000	113	4	1561	180
42	1382	1959	18	4.7	PHQ1031F0060 K713VF0120 EZ705U	6750	14080	70.69	70119/992	2000	1900	3000	65	4	1561	166
42	1447	2407	19	4.5	PHQ1031F0060 K713VF0120 EZ802U	6490	14080	70.69	70119/992	2000	1900	3000	89	4	1561	174
42	1726	3127	23	3.8	PHQ1031F0060 K713VF0120 EZ803U	9410	20000	70.69	70119/992	2000	1900	3000	115	4	1561	180
PHQ11K (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 22000 Nm)																
7.5	10648	16106	30	1.2	PHQ1131F0060 K813VF0440 EZ805U	22000	34120	265.5	531/2	2800	2500	3600	142	4	2623	334
8.3	9628	14563	29	1.4	PHQ1131F0060 K813VF0400 EZ805U	22000	40000	240.1	38409/160	2800	2500	3600	145	4	2623	334
9.2	8696	13154	28	1.5	PHQ1131F0060 K813VF0360 EZ805U	22000	40000	216.8	8673/40	2800	2500	3600	146	4	2623	334
10	7794	11789	27	1.7	PHQ1131F0060 K813VF0320 EZ805U	22000	40000	194.3	31093/160	2800	2500	3600	150	4	2623	334
11	7040	10648	26	1.8	PHQ1131F0060 K813VF0290 EZ805U	22000	40000	175.5	7021/40	2800	2500	3600	151	4	2623	334
13	6139	9286	25	2.1	PHQ1131F0060 K813VF0260 EZ805U	22000	40000	153.1	140833/920	2300	2100	3300	158	4	2623	334
14	5545	8388	25	2.3	PHQ1131F0060 K813VF0230 EZ805U	22000	40000	138.3	31801/230	2300	2100	3300	159	4	2623	334
17	4616	6982	23	2.8	PHQ1131F0060 K813VF0190 EZ805U	21650	40000	115.1	133517/1160	2300	2100	3300	171	4	2623	334
19	4170	6307	23	3.1	PHQ1131F0060 K813VF0175 EZ805U	19560	38820	104.0	30149/290	2300	2100	3300	173	4	2623	334
20	3954	5981	22	3.3	PHQ1131F0060 K813VF0165 EZ805U	18550	36820	98.59	126201/1280	1900	1800	2900	180	4	2623	334
22	3572	5402	22	3.6	PHQ1131F0060 K813VF0150 EZ805U	16750	33260	89.05	28497/320	1900	1800	2900	184	4	2623	334
25	3172	4798	21	4.1	PHQ1131F0060 K813VF0130 EZ805U	14880	29540	79.09	14632/185	1900	1800	2900	198	4	2623	334
28	2865	4334	20	4.5	PHQ1131F0060 K813VF0120 EZ805U	13440	26680	71.44	13216/185	1900	1800	2900	204	4	2623	334
32	2474	3741	19	3.7	PHQ1131F0060 K813VF0105 EZ805U	9060	12280	61.67	53041/860	1600	1500	2600	227	4	2623	334
36	2234	3379	19	3.7	PHQ1131F0060 K813VF0093 EZ805U	8180	11090	55.70	11977/215	1600	1500	2600	236	4	2623	334
40	1984	3000	18	3.7	PHQ1131F0060 K813VF0082 EZ805U	7260	9850	49.46	96937/1960	1600	1500	2600	265	4	2623	334
45	1792	2710	18	3.7	PHQ1131F0060 K813VF0074 EZ805U	6560	8900	44.67	3127/70	1600	1500	2600	279	4	2623	334
PHQ11K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 22000 Nm)																
5.1	3959	4441	6.4	3.3	PHQ1131F0060 K813VF0970 EZ701U	10700	22820	583.0	93279/160	2800	2500	3600	11	4	2623	296
5.1	6421	7705	10	2.0	PHQ1131F0060 K813VF0970 EZ702U	16830	22820	583.0	93279/160	2800	2500	3600	16	4	2623	299
5.1	8828	11129	14	1.5	PHQ1131F0060 K813VF0970 EZ703U	16830	22820	583.0	93279/160	2800	2500	3600	24	4	2623	301
5.7	3576	4011	6.2	3.6	PHQ1131F0060 K813VF0880 EZ701U	9670	20610	526.6	21063/40	2800	2500	3600	11	4	2623	296
5.7	5799	6959	10	2.2	PHQ1131F0060 K813VF0880 EZ702U	15200	20610	526.6	21063/40	2800	2500	3600	17	4	2623	299
5.7	7974	10052	14	1.6	PHQ1131F0060 K813VF0880 EZ703U	15200	20610	526.6	21063/40	2800	2500	3600	24	4	2623	301
6.3	3235	3628	6.1	4.0	PHQ1131F0060 K813VF0790 EZ701U	8740	20570	476.3	45725/96	2800	2500	3600	12	4	2623	296
6.3	5246	6295	9.8	2.5	PHQ1131F0060 K813VF0790 EZ702U	15170	20570	476.3	45725/96	2800	2500	3600	18	4	2623	299
6.3	7213	9092	14	1.8	PHQ1131F0060 K813VF0790 EZ703U	15170	20570	476.3	45725/96	2800	2500	3600	25	4	2623	301
6.3	9311	13201	17	1.4	PHQ1131F0060 K813VF0790 EZ705U	22000	40000	476.3	45725/96	2800	2500	3600	38	4	2623	306
6.3	9748	16218	18	1.3	PHQ1131F0060 K813VF0790 EZ802U	22000	40000	476.3	45725/96	2800	2500	3600	62	4	2623	314
7.0	2922	3277	5.9	4.4	PHQ1131F0060 K813VF0720 EZ701U	7900	18580	430.2	10325/24	2800	2500	3600	13	4	2623	296
7.0	4738	5685	9.5	2.7	PHQ1131F0060 K813VF0720 EZ702U	13700	18580	430.2	10325/24	2800	2500	3600	18	4	2623	299
7.0	6515	8212	13	2.0	PHQ1131F0060 K813VF0720 EZ703U	13700	18580	430.2	10325/24	2800	2500	3600	26	4	2623	301
7.0	8410	11924	17	1.5	PHQ1131F0060 K813VF0720 EZ705U	22000	40000	430.2	10325/24	2800	2500	3600	38	4	2623	306
7.0	8805	14648	18	1.5	PHQ1131F0060 K813VF0720 EZ802U	22000	40000	430.2	10325/24	2800	2500	3600	62	4	2623	314
7.6	2665	2990	5.7	4.9	PHQ1131F0060 K813VF0650 EZ701U	7200	17720	392.5	188387/480	2800	2500	3600	14	4	2623	296
7.6	4322	5187	9.3	3.0	PHQ1131F0060 K813VF0650 EZ702U	13060	17720	392.5	188387/480	2800	2500	3600	19	4	2623	299
7.6	5943	7492	13	2.2	PHQ1131F0060 K813VF0650 EZ703U	13060	17720	392.5	188387/480	2800	2500	3600	27	4	2623	301
7.6	7672	10878	16	1.7	PHQ1131F0060 K813VF0650 EZ705U	22000	40000	392.5	188387/480	2800	2500	3600	39	4	2623	306

PHQK

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	n_{1max} DBH [rpm]	n_{1max} DBV [rpm]	n_{1max} ZB [rpm]	J_1 [10^{-4} kgm²]	$\Delta\varphi_2$ [arcmin]	C_2 [Nm/ arcmin]	m [kg]
PHQ11K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 22000 Nm)																
7.6	8032	13363	17	1.6	PHQ1131F0060 K813VF0650 EZ802U	22000	40000	392.5	188387/480	2800	2500	3600	64	4	2623	314
8.5	2408	2700	5.5	4.9	PHQ1131F0060 K813VF0590 EZ701U	6510	16000	354.5	42539/120	2800	2500	3600	14	4	2623	296
8.5	3904	4685	9.0	3.0	PHQ1131F0060 K813VF0590 EZ702U	11800	16000	354.5	42539/120	2800	2500	3600	19	4	2623	299
8.5	5368	6767	12	2.2	PHQ1131F0060 K813VF0590 EZ703U	11800	16000	354.5	42539/120	2800	2500	3600	27	4	2623	301
8.5	6930	9825	16	1.9	PHQ1131F0060 K813VF0590 EZ705U	22000	39940	354.5	42539/120	2800	2500	3600	40	4	2623	306
8.5	7255	12070	17	1.8	PHQ1131F0060 K813VF0590 EZ802U	22000	39940	354.5	42539/120	2800	2500	3600	64	4	2623	314
8.5	8654	15681	20	1.5	PHQ1131F0060 K813VF0590 EZ803U	22000	39940	354.5	42539/120	2800	2500	3600	89	4	2623	320
10	3237	3885	8.5	3.8	PHQ1131F0060 K813VF0490 EZ702U	11060	16840	293.9	16461/56	2800	2500	3600	23	4	2623	299
10	4451	5611	12	2.8	PHQ1131F0060 K813VF0490 EZ703U	12420	16840	293.9	16461/56	2800	2500	3600	30	4	2623	301
10	5746	8147	15	2.3	PHQ1131F0060 K813VF0490 EZ705U	22000	37780	293.9	16461/56	2800	2500	3600	43	4	2623	306
10	6016	10009	16	2.2	PHQ1131F0060 K813VF0490 EZ802U	22000	37780	293.9	16461/56	2800	2500	3600	67	4	2623	314
10	7176	13003	19	1.8	PHQ1131F0060 K813VF0490 EZ803U	22000	37780	293.9	16461/56	2800	2500	3600	92	4	2623	320
11	2924	3509	8.2	3.8	PHQ1131F0060 K813VF0440 EZ702U	9990	15210	265.5	531/2	2800	2500	3600	23	4	2623	299
11	4020	5068	11	2.8	PHQ1131F0060 K813VF0440 EZ703U	11220	15210	265.5	531/2	2800	2500	3600	31	4	2623	301
11	5190	7359	15	2.5	PHQ1131F0060 K813VF0440 EZ705U	22000	34120	265.5	531/2	2800	2500	3600	43	4	2623	306
11	5434	9040	15	2.4	PHQ1131F0060 K813VF0440 EZ802U	22000	34120	265.5	531/2	2800	2500	3600	67	4	2623	314
11	6481	11745	18	2.0	PHQ1131F0060 K813VF0440 EZ803U	22000	34120	265.5	531/2	2800	2500	3600	93	4	2623	320
12	4693	6653	14	2.8	PHQ1131F0060 K813VF0400 EZ705U	22000	33620	240.1	38409/160	2800	2500	3600	46	4	2623	306
12	4913	8174	15	2.6	PHQ1131F0060 K813VF0400 EZ802U	22000	33620	240.1	38409/160	2800	2500	3600	70	4	2623	314
12	5860	10619	18	2.2	PHQ1131F0060 K813VF0400 EZ803U	22000	40000	240.1	38409/160	2800	2500	3600	96	4	2623	320
14	4239	6010	14	3.1	PHQ1131F0060 K813VF0360 EZ705U	20700	30360	216.8	8673/40	2800	2500	3600	47	4	2623	306
14	4438	7383	14	2.9	PHQ1131F0060 K813VF0360 EZ802U	19900	30360	216.8	8673/40	2800	2500	3600	71	4	2623	314
14	5293	9592	17	2.5	PHQ1131F0060 K813VF0360 EZ803U	22000	40000	216.8	8673/40	2800	2500	3600	96	4	2623	320
15	3799	5386	13	3.4	PHQ1131F0060 K813VF0320 EZ705U	18550	32430	194.3	31093/160	2800	2500	3600	51	4	2623	306
15	3977	6617	14	3.3	PHQ1131F0060 K813VF0320 EZ802U	17840	32430	194.3	31093/160	2800	2500	3600	75	4	2623	314
15	4744	8597	17	2.7	PHQ1131F0060 K813VF0320 EZ803U	22000	40000	194.3	31093/160	2800	2500	3600	101	4	2623	320
17	3431	4865	13	3.8	PHQ1131F0060 K813VF0290 EZ705U	16750	29300	175.5	7021/40	2800	2500	3600	52	4	2623	306
17	3592	5976	14	3.6	PHQ1131F0060 K813VF0290 EZ802U	16110	29300	175.5	7021/40	2800	2500	3600	76	4	2623	314
17	4285	7764	16	3.0	PHQ1131F0060 K813VF0290 EZ803U	22000	40000	175.5	7021/40	2800	2500	3600	102	4	2623	320
20	2992	4243	12	4.3	PHQ1131F0060 K813VF0260 EZ705U	14610	27110	153.1	140833/920	2300	2100	3300	59	4	2623	306
20	3133	5212	13	4.2	PHQ1131F0060 K813VF0260 EZ802U	14050	27110	153.1	140833/920	2300	2100	3300	83	4	2623	314
20	3737	6772	15	3.5	PHQ1131F0060 K813VF0260 EZ803U	20370	40000	153.1	140833/920	2300	2100	3300	109	4	2623	320
22	2703	3832	12	4.8	PHQ1131F0060 K813VF0230 EZ705U	13200	24490	138.3	31801/230	2300	2100	3300	61	4	2623	306
22	2830	4708	13	4.6	PHQ1131F0060 K813VF0230 EZ802U	12690	24490	138.3	31801/230	2300	2100	3300	85	4	2623	314
22	3375	6116	15	3.9	PHQ1131F0060 K813VF0230 EZ803U	18400	40000	138.3	31801/230	2300	2100	3300	110	4	2623	320
26	2810	5091	14	4.6	PHQ1131F0060 K813VF0190 EZ803U	15320	40000	115.1	133517/1160	2300	2100	3300	122	4	2623	320
PHQ12K (n_{1N} = 2000 rpm, $M_{2acc,max}$ = 43000 Nm)																
4.4	18049	27300	20	1.4	PHQ1231F0060 K913VF0750 EZ805U	39290	53300	450.0	187209/416	2600	2500	3400	142	4	4665	580
5.3	15177	22957	19	1.6	PHQ1231F0060 K913VF0630 EZ805U	43000	80000	378.4	629703/1664	2600	2500	3400	146	4	4665	580
6.8	11776	17812	17	2.1	PHQ1231F0060 K913VF0490 EZ805U	43000	80000	293.6	300669/1024	2600	2500	3400	153	4	4665	580
8.8	9154	13847	16	2.7	PHQ1231F0060 K913VF0380 EZ805U	42940	78170	228.3	584319/2560	2600	2500	3400	163	4	4665	580
10	7728	11690	15	3.2	PHQ1231F0060 K913VF0320 EZ805U	36250	71960	192.7	141825/736	2600	2500	3400	173	4	4665	580
14	5762	8715	14	4.3	PHQ1231F0060 K913VF0240 EZ805U	27030	53650	143.7	266631/1856	2200	2100	3100	195	4	4665	580
PHQ12K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 43000 Nm)																
1.3	14989	16812	5.3	1.7	PHQ1231F0060 K914VF3740 EZ701U	37160	57590	2242	13775935/6144	2600	2500	3400	9.4	4	4665	555
1.7	11783	13216	4.9	2.1	PHQ1231F0060 K914VF2940 EZ701U	31840	53290	1763	2932941/1664	2600	2500	3400	9.6	4	4665	555
1.7	19107	22928	8.0	1.3	PHQ1231F0060 K914VF2940 EZ702U	39290	53290	1763	2932941/1664	2600	2500	3400	15	4	4665	558
2.0	9908	11113	4.7	2.5	PHQ1231F0060 K914VF2470 EZ701U	26780	44790	1482	9865347/6656	2600	2500	3400	9.9	4	4665	555
2.0	16067	19281	7.6	1.6	PHQ1231F0060 K914VF2470 EZ702U	33020	44790	1482	9865347/6656	2600	2500	3400	15	4	4665	558
2.6	7688	8623	4.6	3.1	PHQ1231F0060 K914VF1920 EZ701U	20780	39640	1150	4710481/4096	2600	2500	3400	10	4	4665	555
2.6	12467	14960	7.4	1.9	PHQ1231F0060 K914VF1920 EZ702U	29230	39640	1150	4710481/4096	2600	2500	3400	16	4	4665	558
2.6	17142	21609	10	1.4	PHQ1231F0060 K914VF1920 EZ703U	29230	39640	1150	4710481/4096	2600	2500	3400	23	4	4665	560
3.4	5976	6703	4.5	3.8	PHQ1231F0060 K914VF1490 EZ701U	16150	35940	894.0	9154331/10240	2600	2500	3400	11	4	4665	555
3.4	9691	11629	7.3	2.3	PHQ1231F0060 K914VF1490 EZ702U	26500	35940	894.0	9154331/10240	2600	2500	3400	16	4	4665	558
3.4	13325	16798	10	1.7	PHQ1231F0060 K914VF1490 EZ703U	26500	35940	894.0	9154331/10240	2600	2500	3400	24	4	4665	560
3.4	17735	29506	12	1.4	PHQ1231F0060 K914VF1470 EZ802U	43000	78170	880.4	15776613/17920	2600	2500	3400	62	4	4665	574
4.0	5045	5659	4.4	4.3	PHQ1231F0060 K914VF1260 EZ701U	13640	30460	754.7	2221925/2944	2600	2500	3400	12	4	4665	555
4.0	8181	9818	7.2	2.6	PHQ1231F0060 K914VF1260 EZ702U	22460	30460	754.7	2221925/2944	2600	2500	3400	17	4	4665	558
4.0	11250	14181	9.9	1.9	PHQ1231F0060 K914VF1260 EZ703U	22460	30460	754.7	2221925/2944	2600	2500	3400	25	4	4665	560

n_{2N} [rpm]	M_{2N} [Nm]	$M_{2,0}$ [Nm]	a_{th}	S	Type	M_{2acc} [Nm]	M_{2NOT} [Nm]	i	i_{exakt}	n_{1max} DBH [rpm]	n_{1max} DBV [rpm]	n_{1max} ZB [rpm]	J_1 [10^{-4} kgm²]	$\Delta\varphi_2$ [arcmin]	C_2 [Nm/arcmin]	m [kg]
PHQ12K (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 43000 Nm)																
4.0	14973	24910	11	1.7	PHQ1231F0060 K914VF1240 EZ802U	43000	71960	743.3	3829275/5152	2600	2500	3400	62	4	4665	574
4.0	17860	32363	14	1.4	PHQ1231F0060 K914VF1240 EZ803U	43000	71960	743.3	3829275/5152	2600	2500	3400	88	4	4665	580
5.2	11716	19492	11	2.1	PHQ1231F0060 K913VF0950 EZ802U	37160	57590	572.5	293105/512	2600	2500	3400	64	4	4665	561
5.2	13975	25324	13	1.8	PHQ1231F0060 K913VF0950 EZ803U	37160	57590	572.5	293105/512	2600	2500	3400	90	4	4665	567
5.3	6099	7319	8.6	2.7	PHQ1231F0060 K914VF0940 EZ702U	16740	22710	562.7	4177219/7424	2600	2500	3400	18	4	4665	558
5.3	8387	10572	12	2.0	PHQ1231F0060 K914VF0940 EZ703U	16740	22710	562.7	4177219/7424	2600	2500	3400	26	4	4665	560
5.4	11163	18571	11	2.2	PHQ1231F0060 K914VF0920 EZ802U	39550	53650	554.1	7199037/12992	2600	2500	3400	64	4	4665	574
5.4	13315	24127	13	1.9	PHQ1231F0060 K914VF0920 EZ803U	39550	53650	554.1	7199037/12992	2600	2500	3400	89	4	4665	580
6.7	9210	15323	10	2.7	PHQ1231F0060 K913VF0750 EZ802U	39290	53300	450.0	187209/416	2600	2500	3400	68	4	4665	561
6.7	10986	19907	12	2.3	PHQ1231F0060 K913VF0750 EZ803U	39290	53300	450.0	187209/416	2600	2500	3400	93	4	4665	567
7.9	7745	12885	9.5	3.2	PHQ1231F0060 K913VF0630 EZ802U	33030	44790	378.4	629703/1664	2600	2500	3400	71	4	4665	561
7.9	9238	16740	11	2.7	PHQ1231F0060 K913VF0630 EZ803U	43000	80000	378.4	629703/1664	2600	2500	3400	97	4	4665	567
10	6009	9998	8.8	4.2	PHQ1231F0060 K913VF0490 EZ802U	26950	39650	293.6	300669/1024	2600	2500	3400	78	4	4665	561
10	7168	12989	11	3.5	PHQ1231F0060 K913VF0490 EZ803U	39070	80000	293.6	300669/1024	2600	2500	3400	104	4	4665	567
13	5572	10097	9.8	4.5	PHQ1231F0060 K913VF0380 EZ803U	30370	78170	228.3	584319/2560	2600	2500	3400	114	4	4665	567

18.3 Dimensional drawings

In this chapter you can find the dimensions of the geared motors.

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

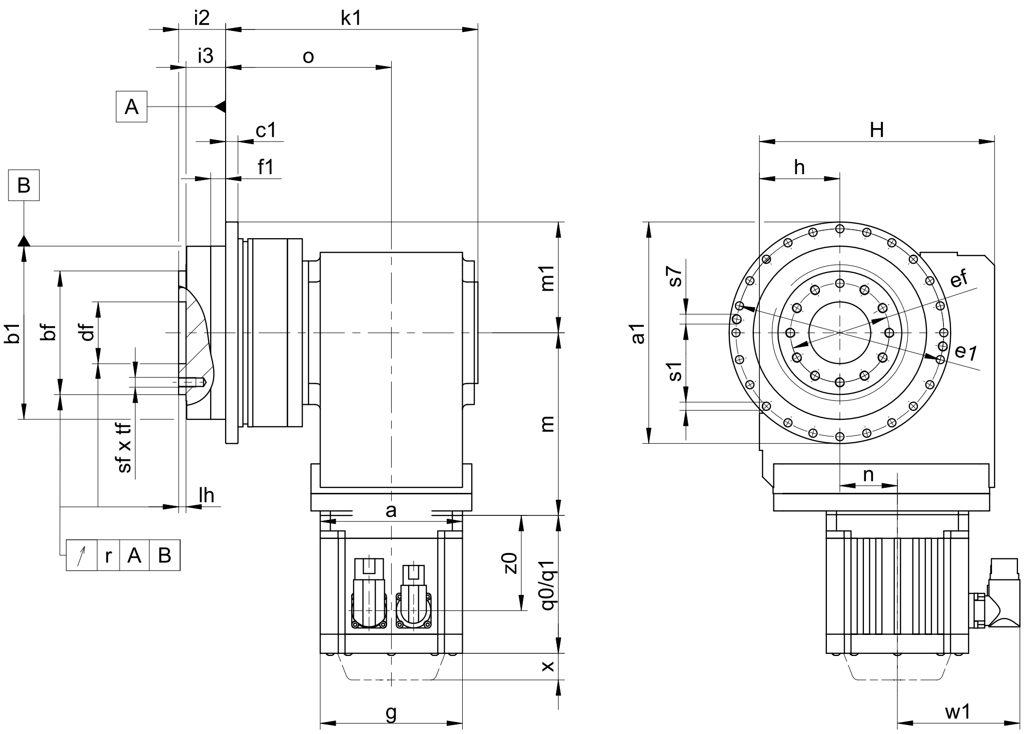
Dimensions can exceed the specifications of ISO 2768-mK due to casting tolerances or accumulation of individual tolerances.

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

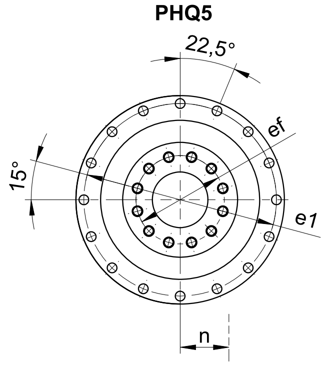
You can download CAD models of our standard drives at http://cad.stoeber.de.

Combination options and the dimensions of forced ventilated geared motors can be found at http://cad.stoeber.de.

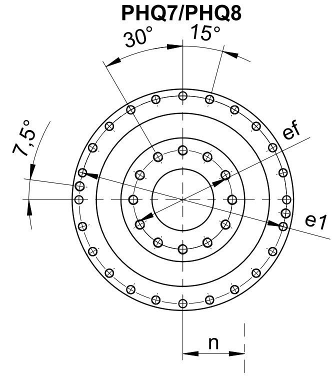
18.3.1 PHQ5 – PHQ10 F shaft design (flange shaft)



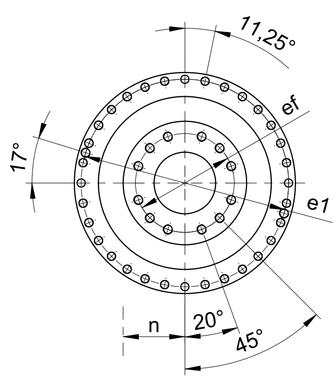
PHQ5



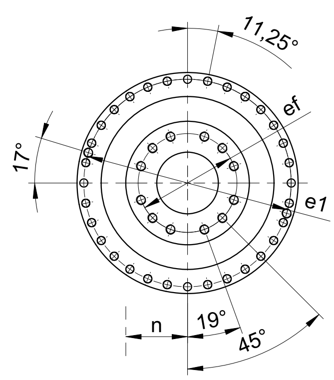
PHQ7/PHQ8



PHQ9



PHQ10



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter [▷ 22.4]

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Dimensions of gear units

Type	∅a1	∅b1	∅bf	c1	∅df	∅e1	∅ef	f1	i2	i3	k1	lh	m1	o	r	∅s1	s7	sf	tf
PHQ521_K102_	145_{h7}	110_{h7}	80_{h7}	8	40^{H6}	135	63	10	29	23	172.0	6	60	116.0	0.020	5.5	–	M8	11.0
PHQ721_K202_	179_{h7}	140_{h7}	100_{h7}	10	50^{H6}	168	80	12	38	32	204.0	6	65	134.0	0.025	6.6	–	M10	16.0
PHQ821_K402_	247_{h7}	200_{h7}	160_{h7}	12	80^{H6}	233	125	15	50	42	274.0	8	90	184.0	0.030	9.0	M10	M12	17.0
PHQ931_K513_	300_{h7}	255_{h7}	180_{h7}	18	90^{H6}	280	145	20	66	55	292.5	12	100	196.5	0.030	13.5	M8	M20	28.0
PHQ1031_K713_	330_{h7}	285_{h7}	200_{h7}	20	95^{H6}	310	166	20	75	60	344.5	10	125	228.0	0.040	13.5	M10	M24	35.0

Dimensions of motors

Type	□g	q0	q1	w1	x	z0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91	22	76.5
EZ402U	98	143.5	192.0	91	22	101.5
EZ404U	98	193.5	242.0	91	22	151.5
EZ501U	115	112.0	166.5	100	22	77.5
EZ502U	115	137.0	191.5	100	22	102.5
EZ503U	115	162.0	216.5	100	22	127.5
EZ505U	115	212.0	266.5	100	22	177.5
EZ701U	145	125.0	184.0	115	22	87.0
EZ702U	145	150.0	209.0	115	22	112.0
EZ703U	145	175.0	234.0	115	22	137.0
EZ705U	145	230.0	289.0	134	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5
EZ803U	190	273.5	350.5	156.5	22	219.5
EZ805U	190	355.5	432.5	156.5	22	301.5

Dimensions of geared motors

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
PHQ5_K1_	□72	124	36.0	□98	124	36.0	□115	128	36.0	□145	130	36.0	–	–	–
PHQ7_K2_	□72	143	46.0	□98	143	46.0	□115	147	46.0	□145	149	46.0	–	–	–
PHQ8_K4_	–	–	–	–	–	–	∅160	187	60.0	□145	189	60.0	□190	192	60.0
PHQ9_K5_	–	–	–	–	–	–	∅160	172	15.0	□145	174	15.0	□190	177	15.0
PHQ10_K7_	–	–	–	–	–	–	–	–	–	∅200	221	20.0	□190	224	20.0

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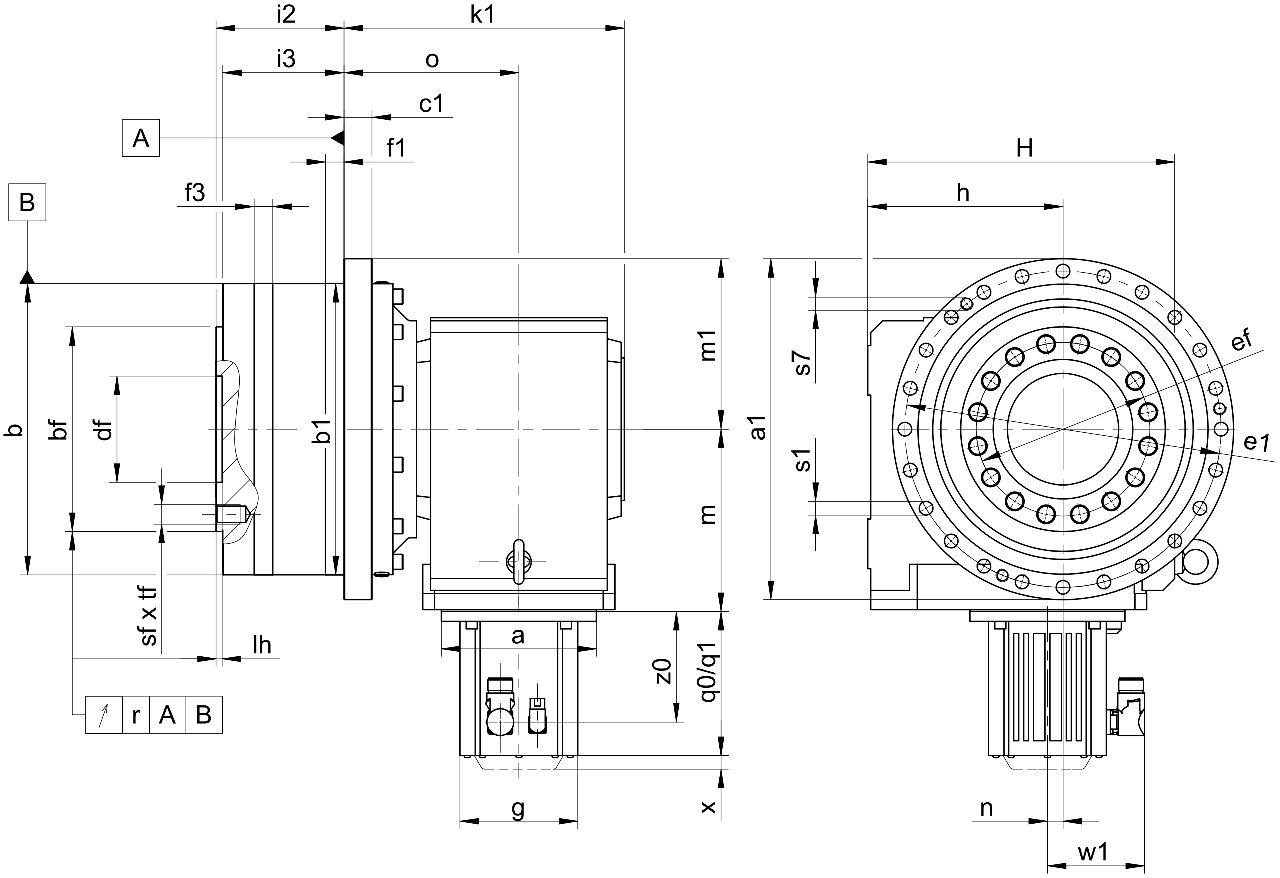
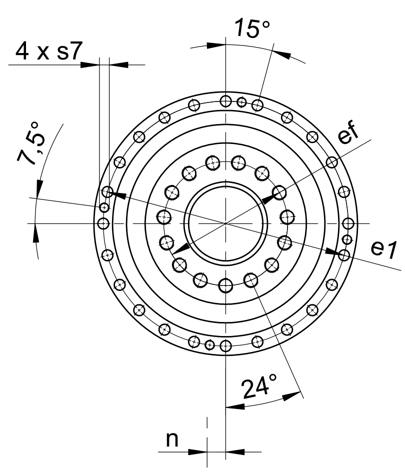
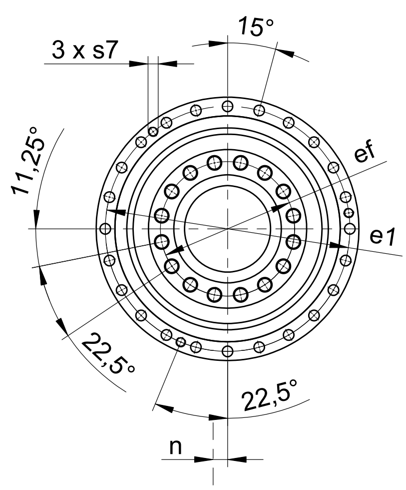
18.3.2 PHQ11 – PHQ12 F shaft design (flange shaft)



PHQ11



PHQ12



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter [▹ 22.4]

Dimensions of gear units

Type	Øa1	Øb	Øb1	Øbf	c1	Ødf	Øe1	Øef	f1	f3	i2	i3	k1	lh	m1	o	r	Øs1	s7	sf	tf
PHQ1131_K813_	425	365_{g6}	365_{h6}	260_{h7}	32	120^{H6}	395	200	30	30	190	180	381.5	10	145	236.5	0.040	17.5	M16	M24	35.5
PHQ1231_K913_	550	470_{g6}	470_{h6}	330_{h7}	45	180^{H7}	510	280	30	30	206.5	195.5	452.0	10	180	282.0	0.040	22.0	M16	M30	48.0

Dimensions of motors

Type	□g	q0	q1	w1	x	z0
EZ701U	145	125.0	184.0	115	22	87.0
EZ702U	145	150.0	209.0	115	22	112.0
EZ703U	145	175.0	234.0	115	22	137.0
EZ705U	145	230.0	289.0	134	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5
EZ803U	190	273.5	350.5	156.5	22	219.5
EZ805U	190	355.5	432.5	156.5	22	301.5

Dimensions of geared motors

Type	EZ7			EZ8		
	a	m	n	a	m	n
PHQ11_K8_	∅200	247	24.0	∅250	249	24.0
PHQ12_K9_	∅200	353	25.0	∅250	294	25.0

18.4 Type designation

In this chapter, you can find 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.

Sample code

PHQ	**7**	**2**	**1**	**F**	**0055**	**K202VF**	**0115**	**EZ401U**

Explanation

Code	Designation	Design
PHQ	Type	Planetary gear unit
7	Size	7 (example)
2 3	Generation	Generation 2 Generation 3
1	Stages	Single-stage
F	Shaft	Flange shaft
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)	i = 11.5 (example)
EZ401U	Motor	EZ synchronous servo motor

In order to complete the type designation, also specify:

- A detailed type designation of the motor, see Chapter [▸ 22]
- The installation position, see Chapter [▸ 18.5.2]
- Output gear unit side 3 or 4, see Chapter [▸ 18.5.2]
- Radial shaft seal rings at the output made of FKM or NBR, see Chapter [▸ 18.6.3]
- The position of the plug connectors, see Chapter [▸ 18.5.4]
- For reverse operation of the output shaft at ± 20° to ± 90° and horizontal installation, note Chapter [▸ 18.6.4]

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18.5 Product description

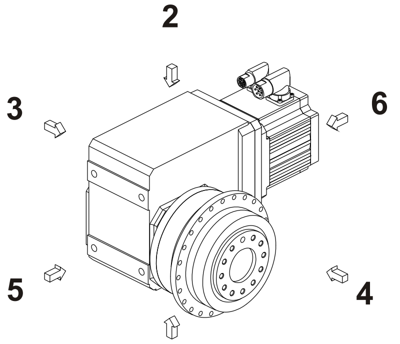
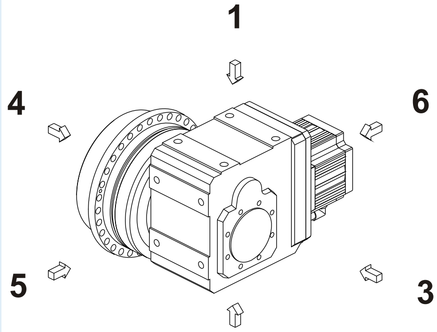
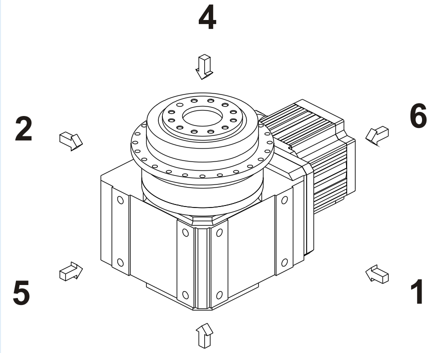
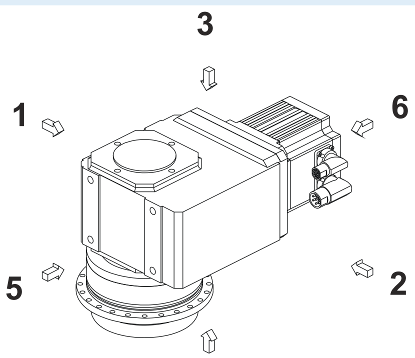
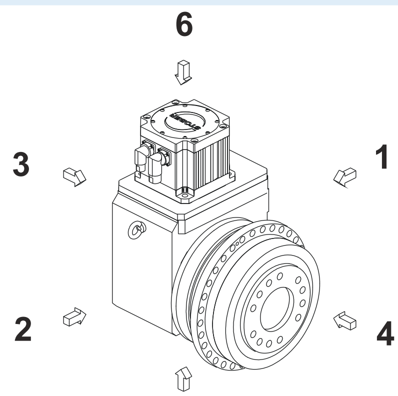
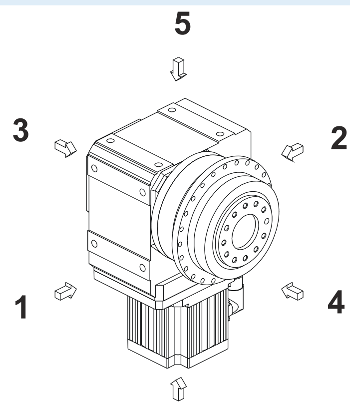
18.5.1 Installation conditions

The specified torques and forces only apply when attaching gear units on the machine side using screws of quality 12.9. In addition, the gear housing must be adjusted at pilot Øb1 and also at pilot Øb3 for size PHQ11 and PHQ12 (H7).

18.5.2 Installation positions

The following table shows the standard installation positions.

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

EL1	EL2	EL3
 1	 2	 3
EL4	**EL5**	**EL6**
 4	 5	 6

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

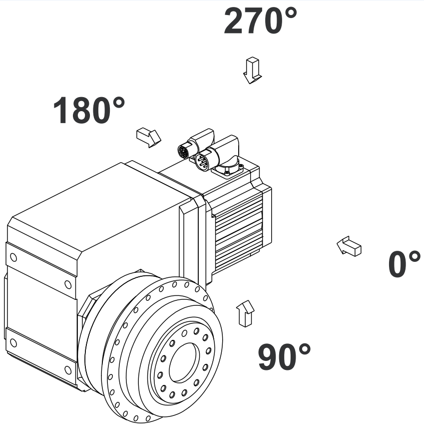
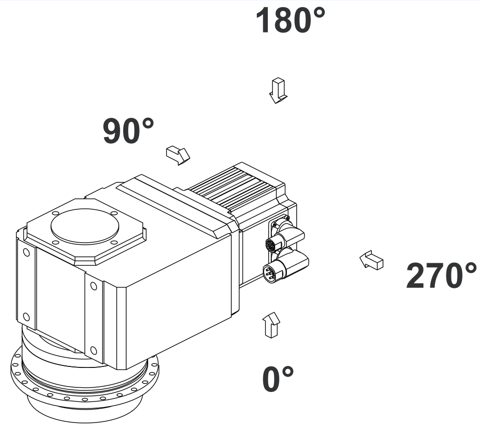
18.5.3 Lubricants

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 installation position.

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

Lubricant filling quantities for gear units, document ID 441871, can be found online at http://www.stoeber.de

18.5.4 Position of the plug connectors

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

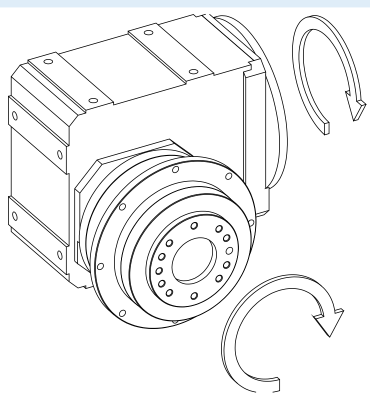
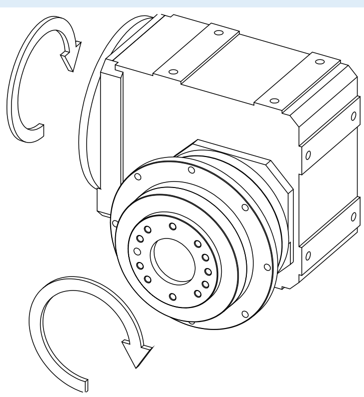
Indicate variations for your geared motor in the purchase order.

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

18.5.5 Other product features

Feature	Value
Max. permitted gear unit temperature (on the surface of the gear unit)	≤ 90 °C
Paint	Black RAL 9005
(ATEX) Directive 2014/34/EU	Not suitable
Protection class: [1] Gear unit Motor	 IP65 IP56, optionally IP66

18.5.6 Direction of rotation

Output side 4	Output side 3
	

The pictures show installation position EL1.

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

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18.6 Project configuration

Project your drive using our SERVOsoft designing software. You can receive SERVOsoft for free from your adviser at one of our sales centers. Observe the limit conditions in this chapter to ensure a safe design for your drives.

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

Formula symbol	Unit	Explanation
a_{th}	–	Parameter for calculating $K_{mot,th}$
a_{thEL}	–	Parameters for calculating $K_{mot,th}$ (dependent on the installation position)
ED	%	Duty cycle relative to 20 minutes
fB_{op}	–	Operating mode operating factor
fB_t	–	Run-time operating factor
fB_T	–	Temperature operating factor
F_{2ax*}	N	Actual axial force at the gear unit output
$F_{2ax,eq*}$	N	Actual equivalent axial force on the gear unit output
F_{2ax100}	N	Permitted axial force at the gear unit output for $n_{2m*} \leq 100$ rpm
F_{2axN}	N	Permitted nominal axial force at the gear unit output
$F_{2rad,acc}$	N	Permitted radial acceleration force at the gear unit output
$F_{2rad,acc*}$	N	Actual radial acceleration force at the gear unit output
$F_{2rad,acc,1*}$	N	Actual radial acceleration force at the gear unit output in the first time segment
$F_{2rad,acc,n*}$	N	Actual radial acceleration force at the gear unit output in the n-th time segment
$F_{2rad,eq*}$	N	Actual equivalent force at the gear unit output
$F_{2rad100}$	N	Permitted radial force at the gear unit output for $n_{2m*} \leq 100$ rpm
F_{2radN}	N	Permitted nominal radial force at the gear unit output
i	–	Gear ratio
$K_{mot,th}$	–	Factor for determining the thermal limit torque
l	mm	Length of the output shaft
L_{10h}	h	Bearing service life
M_{op}	Nm	Torque of motor at the operating point from the motor characteristic curve at n_{1m*}
$\lvert M_2 \rvert$	Nm	Amount of torque on the output
$M_{2,1*} – M_{2,6*}$	Nm	Actual torque in the respective time segment (1 to 6)
$M_{2,n*}$	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_{2eff*}	Nm	Actual effective torque on the gear unit output
M_{2eq*}	Nm	Equivalent torque present on the gear unit output
M_{2k100}	Nm	Permitted breakdown torque on the gear unit output for $n_{2m*} \leq 100$ rpm
M_{2kN}	Nm	Permitted nominal breakdown torque on the gear unit output
M_{2k*}	Nm	Actual breakdown torque on the gear unit output
$M_{2k,acc}$	Nm	Permitted acceleration breakdown torque on the gear unit output

Formula symbol	Unit	Explanation
$M_{2k,acc*}$	Nm	Actual acceleration breakdown torque on the gear unit output
$M_{2k,acc,1*}$	Nm	Actual acceleration breakdown torque on the gear unit output in the first time segment
$M_{2k,acc,n*}$	Nm	Actual acceleration breakdown torque on the gear unit output in the n-th time segment
$M_{2k,eq*}$	Nm	Actual equivalent breakdown torque on 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
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
n_{1m*}	rpm	Actual average input speed
n_{1max*}	rpm	Actual maximum input speed
$n_{1maxDBH}$	rpm	Maximum permitted input speed of the gear unit in continuous operation Installation positions EL1, EL2
$n_{1maxDBV}$	rpm	Maximum permitted input speed of the gear unit in continuous operation Installation positions EL3, EL4, EL5, EL6
n_{1maxZB}	min^{-1}	Maximum permitted input speed of the gear unit in cyclic operation
$\|n_2\|$	rpm	Value of output speed
n_{2m*}	rpm	Actual average output speed
$n_{2m,1*} – n_{2m,6*}$	rpm	Actual average output speed in the respective time segment (1 to 6)
$n_{2m,n*}$	rpm	Actual average output speed in the n-th time segment
t	s	Time
$t_{1*} – t_{6*}$	s	Duration of the respective time segment (1 to 6)
t_{n*}	s	Duration of the n-th time segment
S	–	Load value: Quotient of gear unit and motor nominal torque without regard to the thermal performance limit. Represents a value for the reserve of the geared motor.
x_2	mm	Distance of the shaft shoulder to the force application point
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

18.6.1 Calculation of the operating point

Check the following conditions for operating points other than the nominal point M_{2N} specified in the selection tables.

For continuous operation in installation positions EL1, EL2:

$$n_{1m*} \leq \frac{n_{1maxDBH}}{fB_T}$$

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For continuous operation in installation positions EL3, EL4, EL5, EL6:

$$n_{1m^*} \leq \frac{n_{1max\,DBV}}{fB_T}$$

For all installation positions:

$$n_{1max^*} \leq \frac{n_{1max\,ZB}}{fB_T}$$

$$M_{2eff^*} \leq M_{2th}$$

$$M_{2acc^*} \leq M_{2acc}$$

$$M_{2NOT^*} \leq M_{2NOT}$$

$$M_{2eq^*} \leq M_{2N} \cdot \frac{S}{fB_{op} \cdot fB_t}$$

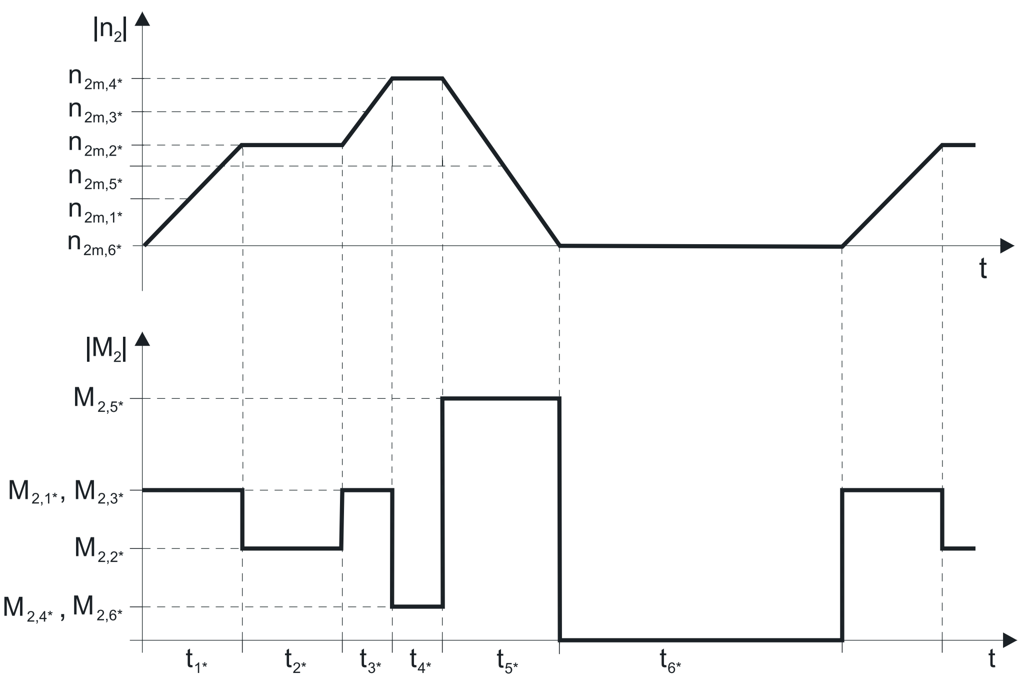
The values for $n_{1maxDBH}$ and $n_{1maxDBV}$, n_{1maxZB}, M_{2acc}, M_{2NOT}, M_{2N} and S can be found in the selection tables.

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

Calculate the thermal limit torque M_{2th} for a duty cycle > 50%.

Example of cycle sequence

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 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^*} + ... + $t_{5^*} \geq 20$ min, calculate n_{2m^*} without the rest phase t_{6^*}.

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 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 > 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.)

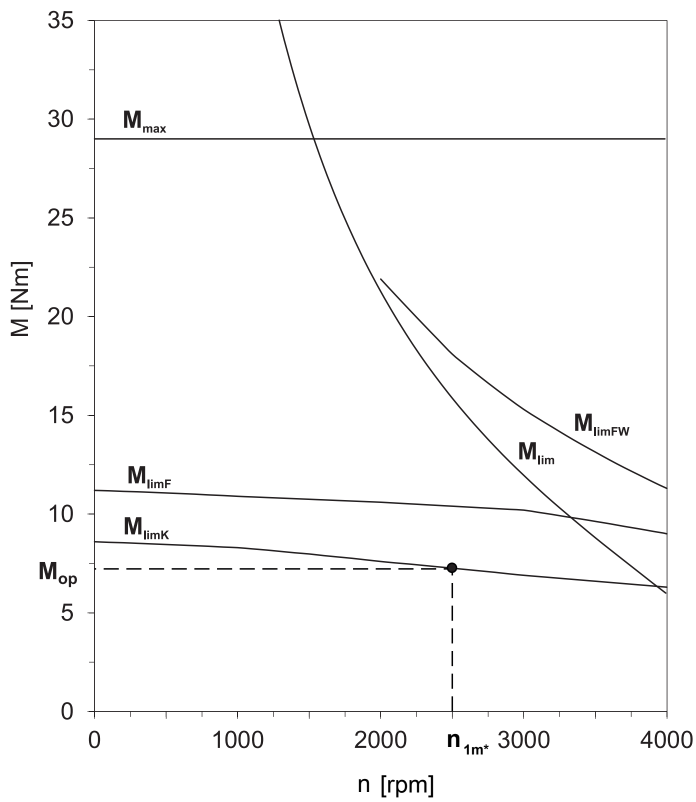
$$M_{2th} = M_{op} \cdot i \cdot K_{mot,th}$$

$$K_{mot,th} = 0{,}93 - \frac{a_{th}}{1000} \cdot athEL \cdot fB_T \cdot \left(\frac{n_{1m^*}}{1000}\right)^2$$

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 curve of Chapter [22.3]. 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

Parameter a_{thEL}

Installation 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 run time ≤ 8 h	1.00
Daily run time ≤ 16 h	1.15
Daily run time ≤ 24 h	1.20

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

18.6.2 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^*} ≤ 100 rpm ($F^{2axN} = F_{2ax100}$; $F_{2radN} = F_{2rad100}$; $M_{2kN} = M_{2k100}$)
- Only if transverse forces on the gear unit are supported via its pilots (housing, flange shaft)

Permitted shaft loads

Type	z_2 [mm]	F_{2ax100} [N]	$F_{2rad100}$ [N]	$F_{2rad,acc}$ [N]	M_{2k100} [Nm]	$M_{2k,acc}$ [Nm]
PHQ4	84.0	2150	3095	3929	260	330
PHQ5	97.0	4150	4536	4897	440	475
PHQ7	88.0	6150	17045	17045	1500	1500
PHQ8	126.0	10050	27778	33333	3500	4200
PHQ9	155.0	33000	48387	70968	7500	11000
PHQ10	171.0	50000	51462	73099	8800	12500

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Type	z_2 [mm]	F_{2ax100} [N]	$F_{2rad100}$ [N]	$F_{2rad,acc}$ [N]	M_{2k100} [Nm]	$M_{2k,acc}$ [Nm]
PHQ11	231.0	60000	47619	60606	11000	14000
PHQ12	281.0	70000	53380	71040	15000	20000

For other output speeds, download diagrams at http://products.stoeber.de.

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.

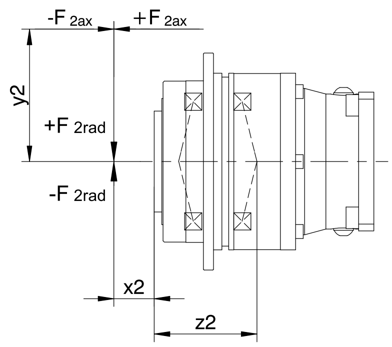


Fig. 1: Force application points

The permitted transverse forces can be determined from the permitted breakdown torque M_{2kN} and $M_{2k,acc}$. The actual transverse forces must not exceed the permitted transverse forces. The permitted transverse forces are based on the end of the hollow shaft (x2 = 0).

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

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:

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

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

$$F_{2ax,eq^*} \leq F_{2axN}$$

The following apply to the bearing service life L_{10h} (duty cycle ≤ 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*}

PHQK

For different duty cycles:

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

18.6.3 Recommendation for radial shaft seal rings

For a duty cycle > 60%, we recommend radial shaft seal rings made of FKM.

Properties:

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

Leak-proofness

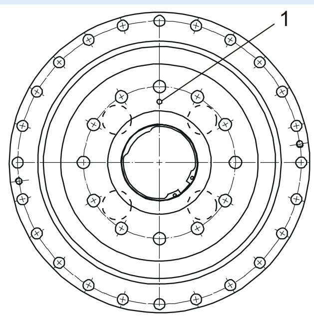
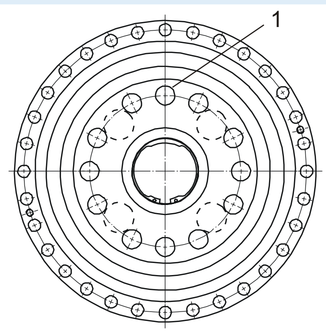
Our gear units are equipped with high-quality radial shaft seal rings and checked for leak-proofness. However, a leak cannot be fully ruled out over the length of use of the gear unit. If you use the gear unit with goods incompatible with the lubricant, you must take measures to prevent direct contact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

18.6.4 Reverse operation

To ensure lubrication of circulating geared parts during cyclic reverse operation from ± 20° to ± 90°, pay careful attention to the position of the output shaft if the gear unit is installed horizontally as shown in the images below.

The images show the center position of reverse operation.

Cyclic reverse operation ≤ ± 20° on request.

PHQ4 – PHQ8, PHQ11, PHQ12	PHQ9 – PHQ10
	
1 Position of the mark: top	1 Position of the fastening thread: as shown in the image

18.7 Additional documentation

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

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

Documentation	ID
Operating manual for planetary gear units and motors	441957
Lubricant filling quantities for gear units	441871