



16.1 Overview

High-performance precision right-angle planetary geared motors

Technical data

i	4 – 210
M_{2acc}	26 – 7500 Nm
$\Delta\phi_2$	3 – 6 arcmin
η	$\leq 92 - 95 \%$

Features

Power density	★★★★★
Backlash	★★★★☆
Price category	€€€€
Shaft load	★★★★★
Smooth operation	★★★☆☆
Torsional stiffness	★★★★☆
Mass moment of inertia	★★★☆☆
Helical gearing	✓
Maintenance-free	✓
Small installation space	✓
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-gear rack and pinion drives	✓
Compact and highly dynamic due to direct motor attachment	✓

PHKX

Key: ★★★☆☆ good | ★★★★★ excellent





16.2 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. EZ401U)

You can calculate the technical data for drives with forced ventilated motors (for example EZ401B) 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
$n_{1maxDBEL1,2,5,6}$	rpm	Maximum permitted input speed of the gear unit in continuous operation Installation positions EL1, EL2, EL5, EL6 (at surrounding temperature of 20 °C)
$n_{1maxDBEL3,4}$	rpm	Maximum permitted input speed of the gear unit in continuous operation Installation positions EL3, EL4 (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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16.2 Selection tables



n_{2N}	M_{2N}	$M_{2,0}$	a_{th}	S	Type	M_{2acc}	M_{2NOT}	i	i_{exakt}	n_{1max} DB EL1,2,5,6 [rpm]	n_{1max} DB EL3,4 [rpm]	n_{1max} ZB [rpm]	J_1 [10 ⁻⁴ kgm ²]	$\Delta\phi_2$ [arcmin]	C_2 [Nm/ arcmin]	m [kg]
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]									
PH3KX ($n_{1N} = 3000$ rpm, $M_{2acc,max} = 65$ Nm)																
60	43	44	54	1.1	PH322F0250 KX301VF0020 MF EZ301U	65	130	50.00	50/1	3500	3000	5500	1.0	4.5	14	5.4
75	34	35	43	1.3	PH322F0200 KX301VF0020 MF EZ301U	65	130	40.00	40/1	3500	3000	5500	1.0	4.5	14	5.4
86	30	30	64	1.5	PH322F0350 KX301VF0010 MF EZ301U	65	130	35.00	35/1	3000	2500	4500	1.2	4.5	14	5.4
100	26	27	37	1.1	PH321F0100 KX301VF0030 MF EZ301U	50	100	30.00	30/1	3500	3500	6000	0.94	5	9.0	4.9
143	18	19	17	2.4	PH321F0070 KX301VF0030 MF EZ301U	56	130	21.00	21/1	3500	3500	6000	0.94	5.5	8.9	4.9
143	32	33	30	1.4	PH321F0070 KX301VF0030 MF EZ302U	60	130	21.00	21/1	3500	3500	6000	1.0	5.5	8.9	5.5
143	41	43	38	1.1	PH321F0070 KX301VF0030 MF EZ303U	60	130	21.00	21/1	3500	3500	6000	1.1	5.5	8.9	6.0
150	18	18	33	1.7	PH321F0100 KX301VF0020 MF EZ301U	50	100	20.00	20/1	3500	3000	5500	1.0	5	9.0	4.9
200	13	13	13	3.2	PH321F0050 KX301VF0030 MF EZ301U	40	130	15.00	15/1	3500	3500	6000	0.94	6	7.0	4.9
200	23	24	23	1.9	PH321F0050 KX301VF0030 MF EZ302U	62	130	15.00	15/1	3500	3500	6000	1.0	6	7.0	5.5
200	29	31	29	1.4	PH321F0050 KX301VF0030 MF EZ303U	62	130	15.00	15/1	3500	3500	6000	1.2	6	7.0	6.0
200	40	43	40	1.1	PH321F0050 KX301VF0030 MF EZ401U	62	130	15.00	15/1	3500	3500	6000	1.7	6	7.0	7.4
214	12	13	16	3.7	PH321F0070 KX301VF0020 MF EZ301U	37	130	14.00	14/1	3500	3000	5500	1.0	5.5	8.9	4.9
214	21	22	27	2.1	PH321F0070 KX301VF0020 MF EZ302U	60	130	14.00	14/1	3500	3000	5500	1.1	5.5	8.9	5.5
214	27	29	35	1.6	PH321F0070 KX301VF0020 MF EZ303U	60	130	14.00	14/1	3500	3000	5500	1.2	5.5	8.9	6.0
214	37	40	47	1.2	PH321F0070 KX301VF0020 MF EZ401U	60	130	14.00	14/1	3500	3000	5500	1.7	5.5	8.9	7.4
300	8.8	9.0	12	4.8	PH321F0050 KX301VF0020 MF EZ301U	26	130	10.00	10/1	3500	3000	5500	1.0	6	7.0	4.9
300	15	16	20	2.8	PH321F0050 KX301VF0020 MF EZ302U	47	130	10.00	10/1	3500	3000	5500	1.1	6	7.0	5.5
300	20	21	27	2.1	PH321F0050 KX301VF0020 MF EZ303U	62	130	10.00	10/1	3500	3000	5500	1.2	6	7.0	6.0
300	26	28	36	1.6	PH321F0050 KX301VF0020 MF EZ401U	62	130	10.00	10/1	3500	3000	5500	1.8	6	7.0	7.4
429	11	11	26	3.7	PH321F0070 KX301VF0010 MF EZ302U	33	130	7.000	7/1	3000	2500	4500	1.3	5.5	8.9	5.5
429	14	14	33	2.9	PH321F0070 KX301VF0010 MF EZ303U	46	130	7.000	7/1	3000	2500	4500	1.4	5.5	8.9	6.0
429	19	20	45	2.1	PH321F0070 KX301VF0010 MF EZ401U	56	130	7.000	7/1	3000	2500	4500	2.0	5.5	8.9	7.4
429	31	34	76	1.3	PH321F0070 KX301VF0010 MF EZ402U	60	130	7.000	7/1	3000	2500	4500	2.7	5.5	8.9	8.5
600	9.8	10	24	4.0	PH321F0050 KX301VF0010 MF EZ303U	33	110	5.000	5/1	3000	2500	4500	1.5	6	7.0	6.0
600	13	14	32	3.0	PH321F0050 KX301VF0010 MF EZ401U	40	110	5.000	5/1	3000	2500	4500	2.0	6	7.0	7.4
600	22	25	54	1.8	PH321F0050 KX301VF0010 MF EZ402U	62	110	5.000	5/1	3000	2500	4500	2.7	6	7.0	8.5
600	33	41	80	1.2	PH321F0050 KX301VF0010 MF EZ404U	62	110	5.000	5/1	3000	2500	4500	4.1	6	7.0	11
PH3KX ($n_{1N} = 6000$ rpm, $M_{2acc,max} = 62$ Nm)																
200	25	27	35	1.2	PH321F0100 KX301VF0030 MF EZ301U	50	100	30.00	30/1	3500	3500	6000	0.94	5	9.0	4.9
286	18	19	17	2.5	PH321F0070 KX301VF0030 MF EZ301U	56	130	21.00	21/1	3500	3500	6000	0.94	5.5	8.9	4.9
286	30	33	28	1.5	PH321F0070 KX301VF0030 MF EZ302U	60	130	21.00	21/1	3500	3500	6000	1.0	5.5	8.9	5.5
286	39	45	36	1.2	PH321F0070 KX301VF0030 MF EZ303U	60	130	21.00	21/1	3500	3500	6000	1.1	5.5	8.9	6.0
400	13	13	16	2.6	PH321F0050 KX301VF0030 MF EZ301U	40	130	15.00	15/1	3500	3500	6000	0.94	6	7.0	4.9
400	21	24	27	1.6	PH321F0050 KX301VF0030 MF EZ302U	62	130	15.00	15/1	3500	3500	6000	1.0	6	7.0	5.5
400	28	32	35	1.2	PH321F0050 KX301VF0030 MF EZ303U	62	130	15.00	15/1	3500	3500	6000	1.2	6	7.0	6.0
400	33	40	41	1.0	PH321F0050 KX301VF0030 MF EZ401U	62	130	15.00	15/1	3500	3500	6000	1.7	6	7.0	7.4
PH4KX ($n_{1N} = 3000$ rpm, $M_{2acc,max} = 130$ Nm)																
29	89	91	42	1.0	PH422F0350 KX301VF0030 MF EZ301U	130	240	105.0	105/1	3500	3500	6000	0.94	3.5	26	7.8
30	85	87	54	1.1	PH422F0500 KX301VF0020 MF EZ301U	130	240	100.0	100/1	3500	3000	5500	1.0	3	26	7.8
36	72	73	33	1.3	PH422F0280 KX301VF0030 MF EZ301U	130	240	84.00	84/1	3500	3500	6000	0.94	3.5	24	7.8
38	68	70	43	1.3	PH422F0400 KX301VF0020 MF EZ301U	130	240	80.00	80/1	3500	3000	5500	1.0	3.5	24	7.8
40	64	65	30	1.4	PH422F0250 KX301VF0030 MF EZ301U	130	240	75.00	75/1	3500	3500	6000	0.95	3.5	26	7.8
43	60	61	38	1.5	PH422F0350 KX301VF0020 MF EZ301U	130	240	70.00	70/1	3500	3000	5500	1.0	3.5	26	7.8
50	51	52	24	1.8	PH422F0200 KX301VF0030 MF EZ301U	130	240	60.00	60/1	3500	3500	6000	0.95	3.5	25	7.8
50	87	92	41	1.0	PH422F0200 KX301VF0030 MF EZ302U	130	240	60.00	60/1	3500	3500	6000	1.1	3.5	25	8.4
54	48	49	30	1.9	PH422F0280 KX301VF0020 MF EZ301U	130	240	56.00	56/1	3500	3000	5500	1.0	3.5	24	7.8
54	82	86	52	1.1	PH422F0280 KX301VF0020 MF EZ302U	130	240	56.00	56/1	3500	3000	5500	1.1	3.5	24	8.4
60	43	44	27	2.1	PH422F0250 KX301VF0020 MF EZ301U	130	240	50.00	50/1	3500	3000	5500	1.0	3.5	26	7.8
60	73	77	46	1.2	PH422F0250 KX301VF0020 MF EZ302U	130	240	50.00	50/1	3500	3000	5500	1.1	3.5	26	8.4
63	41	42	19	2.2	PH422F0160 KX301VF0030 MF EZ301U	120	240	48.00	48/1	3500	3500	6000	0.95	3.5	22	7.8
63	70	74	33	1.3	PH422F0160 KX301VF0030 MF EZ302U	130	240	48.00	48/1	3500	3500	6000	1.1	3.5	22	8.4
75	34	35	22	2.6	PH422F0200 KX301VF0020 MF EZ301U	100	240	40.00	40/1	3500	3000	5500	1.0	3.5	25	7.8
75	58	62	37	1.5	PH422F0200 KX301VF0020 MF EZ302U	130	240	40.00	40/1	3500	3000	5500	1.1	3.5	25	8.4
75	76	80	48	1.2	PH422F0200 KX301VF0020 MF EZ303U	130	240	40.00	40/1	3500	3000	5500	1.2	3.5	25	8.9
86	30	30	32	3.0	PH422F0350 KX301VF0010 MF EZ301U	90	240	35.00	35/1	3000	2500	4500	1.2	3.5	26	7.8
86	51	54	54	1.8	PH422F0350 KX301VF0010 MF EZ302U	130	240	35.00	35/1	3000	2500	4500	1.3	3.5	26	8.4
86	66	70	71	1.4	PH422F0350 KX301VF0010 MF EZ303U	130	240	35.00	35/1	3000	2500	4500	1.4	3.5	26	8.9
86	90	96	96	1.0	PH422F0350 KX301VF0010 MF EZ401U	130	240	35.00	35/1	3000	2500	4500	2.0	3.5	26	10

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16.2 Selection tables



n_{2N}	M_{2N}	$M_{2,0}$	a_{in}	S	Type	M_{2acc}	M_{2NOT}	i	i_{exakt}	n_{1max}	n_{1max}	n_{1max}	J_1	$\Delta\varphi_2$	C_2	m
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]			DB	DB	ZB	[10^{-4} kgm ²]	[arcmin]	[Nm/arcmin]	[kg]
										EL1,2,5,6	EL3,4	[rpm]				
										[rpm]	[rpm]					
PH4KX ($n_{1N} = 3000$ rpm, $M_{2acc,max} = 130$ Nm)																
94	27	28	17	3.3	PH422F0160 KX301VF0020 MF EZ301U	82	240	32.00	32/1	3500	3000	5500	1.0	3.5	22	7.8
94	47	49	30	1.9	PH422F0160 KX301VF0020 MF EZ302U	130	240	32.00	32/1	3500	3000	5500	1.1	3.5	22	8.4
94	61	64	38	1.5	PH422F0160 KX301VF0020 MF EZ303U	130	240	32.00	32/1	3500	3000	5500	1.2	3.5	22	8.9
94	82	88	52	1.1	PH422F0160 KX301VF0020 MF EZ401U	130	240	32.00	32/1	3500	3000	5500	1.8	3.5	22	10
100	26	27	21	2.3	PH421F0100 KX401VF0030 MF EZ301U	79	200	30.00	30/1	3000	3000	5500	1.6	4	17	8.2
100	45	48	36	1.3	PH421F0100 KX401VF0030 MF EZ302U	100	200	30.00	30/1	3000	3000	5500	1.7	4	17	8.8
100	59	62	46	1.0	PH421F0100 KX401VF0030 MF EZ303U	100	200	30.00	30/1	3000	3000	5500	1.8	4	17	9.3
143	18	19	9.7	4.9	PH421F0070 KX401VF0030 MF EZ301U	56	240	21.00	21/1	3000	3000	5500	1.6	4.5	19	8.2
143	32	33	17	2.9	PH421F0070 KX401VF0030 MF EZ302U	99	240	21.00	21/1	3000	3000	5500	1.7	4.5	19	8.8
143	41	43	22	2.2	PH421F0070 KX401VF0030 MF EZ303U	110	240	21.00	21/1	3000	3000	5500	1.8	4.5	19	9.3
143	56	60	29	1.6	PH421F0070 KX401VF0030 MF EZ401U	110	240	21.00	21/1	3000	3000	5500	2.4	4.5	19	11
150	18	18	19	3.4	PH421F0100 KX401VF0020 MF EZ301U	53	200	20.00	20/1	2500	2500	5000	1.8	4	17	8.2
150	30	32	32	2.0	PH421F0100 KX401VF0020 MF EZ302U	95	200	20.00	20/1	2500	2500	5000	1.9	4	17	8.8
150	39	41	42	1.5	PH421F0100 KX401VF0020 MF EZ303U	100	200	20.00	20/1	2500	2500	5000	2.0	4	17	9.3
150	53	57	57	1.1	PH421F0100 KX401VF0020 MF EZ401U	100	200	20.00	20/1	2500	2500	5000	2.6	4	17	11
200	23	24	13	3.7	PH421F0050 KX401VF0030 MF EZ302U	71	240	15.00	15/1	3000	3000	5500	1.8	5	15	8.8
200	29	31	17	2.9	PH421F0050 KX401VF0030 MF EZ303U	99	240	15.00	15/1	3000	3000	5500	1.9	5	15	9.3
200	40	43	22	2.1	PH421F0050 KX401VF0030 MF EZ401U	120	240	15.00	15/1	3000	3000	5500	2.4	5	15	11
200	61	67	34	1.4	PH421F0050 KX401VF0030 MF EZ501U	120	240	15.00	15/1	3000	3000	5500	4.4	5	15	12
200	67	74	38	1.3	PH421F0050 KX401VF0030 MF EZ402U	120	240	15.00	15/1	3000	3000	5500	3.1	5	15	12
214	21	22	15	4.3	PH421F0070 KX401VF0020 MF EZ302U	66	240	14.00	14/1	2500	2500	5000	2.0	4.5	19	8.8
214	27	29	20	3.3	PH421F0070 KX401VF0020 MF EZ303U	93	240	14.00	14/1	2500	2500	5000	2.1	4.5	19	9.3
214	37	40	26	2.4	PH421F0070 KX401VF0020 MF EZ401U	110	240	14.00	14/1	2500	2500	5000	2.6	4.5	19	11
214	57	62	41	1.6	PH421F0070 KX401VF0020 MF EZ501U	110	240	14.00	14/1	2500	2500	5000	4.6	4.5	19	12
214	62	69	44	1.4	PH421F0070 KX401VF0020 MF EZ402U	110	240	14.00	14/1	2500	2500	5000	3.3	4.5	19	12
250	18	19	13	3.7	PH421F0040 KX401VF0030 MF EZ302U	57	210	12.00	12/1	3000	3000	5500	1.8	5.5	11	8.8
250	23	25	17	2.9	PH421F0040 KX401VF0030 MF EZ303U	79	210	12.00	12/1	3000	3000	5500	1.9	5.5	11	9.3
250	32	34	22	2.1	PH421F0040 KX401VF0030 MF EZ401U	96	210	12.00	12/1	3000	3000	5500	2.4	5.5	11	11
250	49	53	34	1.4	PH421F0040 KX401VF0030 MF EZ501U	96	210	12.00	12/1	3000	3000	5500	4.4	5.5	11	12
250	53	59	38	1.3	PH421F0040 KX401VF0030 MF EZ402U	96	210	12.00	12/1	3000	3000	5500	3.1	5.5	11	12
300	20	21	15	4.3	PH421F0050 KX401VF0020 MF EZ303U	66	240	10.00	10/1	2500	2500	5000	2.1	5	15	9.3
300	26	28	20	3.2	PH421F0050 KX401VF0020 MF EZ401U	80	240	10.00	10/1	2500	2500	5000	2.6	5	15	11
300	41	44	31	2.1	PH421F0050 KX401VF0020 MF EZ501U	120	240	10.00	10/1	2500	2500	5000	4.6	5	15	12
300	44	49	34	1.9	PH421F0050 KX401VF0020 MF EZ402U	120	240	10.00	10/1	2500	2500	5000	3.3	5	15	12
300	65	81	50	1.3	PH421F0050 KX401VF0020 MF EZ404U	120	240	10.00	10/1	2500	2500	5000	4.7	5	15	14
300	70	76	54	1.2	PH421F0050 KX401VF0020 MF EZ502U	120	240	10.00	10/1	2500	2500	5000	6.9	5	15	13
300	70	78	54	1.2	PH421F0050 KX401VF0020 MF EZ701U	120	240	10.00	10/1	2500	2500	5000	10	5	15	15
375	16	17	15	4.3	PH421F0040 KX401VF0020 MF EZ303U	53	210	8.000	8/1	2500	2500	5000	2.1	5.5	11	9.3
375	21	23	20	3.2	PH421F0040 KX401VF0020 MF EZ401U	64	210	8.000	8/1	2500	2500	5000	2.7	5.5	11	11
375	33	36	31	2.1	PH421F0040 KX401VF0020 MF EZ501U	96	210	8.000	8/1	2500	2500	5000	4.6	5.5	11	12
375	36	39	34	1.9	PH421F0040 KX401VF0020 MF EZ402U	96	210	8.000	8/1	2500	2500	5000	3.4	5.5	11	12
375	52	65	50	1.3	PH421F0040 KX401VF0020 MF EZ404U	96	210	8.000	8/1	2500	2500	5000	4.7	5.5	11	14
375	56	61	54	1.2	PH421F0040 KX401VF0020 MF EZ502U	96	210	8.000	8/1	2500	2500	5000	6.9	5.5	11	13
375	56	63	54	1.2	PH421F0040 KX401VF0020 MF EZ701U	96	210	8.000	8/1	2500	2500	5000	10	5.5	11	15
429	19	20	27	4.0	PH421F0070 KX401VF0010 MF EZ401U	56	240	7.000	7/1	2500	2000	4000	3.4	4.5	19	11
429	28	31	41	2.6	PH421F0070 KX401VF0010 MF EZ501U	110	240	7.000	7/1	2500	2000	4000	5.4	4.5	19	12
429	31	34	45	2.4	PH421F0070 KX401VF0010 MF EZ402U	110	240	7.000	7/1	2500	2000	4000	4.1	4.5	19	12
429	46	57	66	1.6	PH421F0070 KX401VF0010 MF EZ404U	110	240	7.000	7/1	2500	2000	4000	5.5	4.5	19	14
429	49	53	71	1.5	PH421F0070 KX401VF0010 MF EZ502U	110	240	7.000	7/1	2500	2000	4000	7.7	4.5	19	13
429	49	55	71	1.5	PH421F0070 KX401VF0010 MF EZ701U	110	240	7.000	7/1	2500	2000	4000	11	4.5	19	15
429	64	73	93	1.2	PH421F0070 KX401VF0010 MF EZ503U	110	240	7.000	7/1	2500	2000	4000	10	4.5	19	15
600	20	22	30	3.7	PH421F0050 KX401VF0010 MF EZ501U	76	240	5.000	5/1	2500	2000	4000	5.6	5	15	12
600	22	25	32	3.3	PH421F0050 KX401VF0010 MF EZ402U	76	240	5.000	5/1	2500	2000	4000	4.3	5	15	12
600	33	41	47	2.3	PH421F0050 KX401VF0010 MF EZ404U	120	240	5.000	5/1	2500	2000	4000	5.6	5	15	14
600	35	38	51	2.1	PH421F0050 KX401VF0010 MF EZ502U	120	240	5.000	5/1	2500	2000	4000	7.9	5	15	13
600	35	39	51	2.1	PH421F0050 KX401VF0010 MF EZ701U	95	240	5.000	5/1	2500	2000	4000	11	5	15	15
600	46	52	67	1.6	PH421F0050 KX401VF0010 MF EZ503U	120	240	5.000	5/1	2500	2000	4000	10	5	15	15
600	57	68	83	1.3	PH421F0050 KX401VF0010 MF EZ702U	120	240	5.000	5/1	2500	2000	4000	16	5	15	18
600	64	76	93	1.2	PH421F0050 KX401VF0010 MF EZ505U	120	240	5.000	5/1	2500	2000	4000	15	5	15	18



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16.2 Selection tables



n_{2N}	M_{2N}	$M_{2,0}$	a_{th}	S	Type	M_{2acc}	M_{2NOT}	i	i_{exakt}	n_{1max}	n_{1max}	n_{1max}	J_1	$\Delta\phi_2$	C_2	m
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]			DB	DB	ZB	[10 ⁻⁴	[arcmin]	[Nm/	[kg]
										EL1,2,5,6	EL3,4	[rpm]	kgm ²]		arcmin]	
PH4KX ($n_{1N} = 3000$ rpm, $M_{2acc,max} = 130$ Nm)																
750	16	18	26	4.1	PH421F0040 KX401VF0010 MF EZ501U	61	210	4.000	4/1	2500	2000	4000	5.7	5.5	11	12
750	18	20	29	3.8	PH421F0040 KX401VF0010 MF EZ402U	61	210	4.000	4/1	2500	2000	4000	4.5	5.5	11	12
750	26	33	42	2.6	PH421F0040 KX401VF0010 MF EZ404U	96	210	4.000	4/1	2500	2000	4000	5.8	5.5	11	14
750	28	30	45	2.4	PH421F0040 KX401VF0010 MF EZ502U	96	210	4.000	4/1	2500	2000	4000	8.0	5.5	11	13
750	28	31	45	2.4	PH421F0040 KX401VF0010 MF EZ701U	76	210	4.000	4/1	2500	2000	4000	11	5.5	11	15
750	37	42	59	1.8	PH421F0040 KX401VF0010 MF EZ503U	96	210	4.000	4/1	2500	2000	4000	10	5.5	11	15
750	45	54	73	1.5	PH421F0040 KX401VF0010 MF EZ702U	96	210	4.000	4/1	2500	2000	4000	17	5.5	11	18
750	51	61	82	1.3	PH421F0040 KX401VF0010 MF EZ505U	96	210	4.000	4/1	2500	2000	4000	15	5.5	11	18
PH4KX ($n_{1N} = 6000$ rpm, $M_{2acc,max} = 130$ Nm)																
57	86	91	40	1.1	PH422F0350 KX301VF0030 MF EZ301U	130	240	105.0	105/1	3500	3500	6000	0.94	3.5	26	7.8
71	68	73	32	1.3	PH422F0280 KX301VF0030 MF EZ301U	130	240	84.00	84/1	3500	3500	6000	0.94	3.5	24	7.8
80	61	65	29	1.5	PH422F0250 KX301VF0030 MF EZ301U	130	240	75.00	75/1	3500	3500	6000	0.95	3.5	26	7.8
100	49	52	23	1.8	PH422F0200 KX301VF0030 MF EZ301U	130	240	60.00	60/1	3500	3500	6000	0.95	3.5	25	7.8
100	82	92	39	1.1	PH422F0200 KX301VF0030 MF EZ302U	130	240	60.00	60/1	3500	3500	6000	1.1	3.5	25	8.4
125	39	42	18	2.3	PH422F0160 KX301VF0030 MF EZ301U	120	240	48.00	48/1	3500	3500	6000	0.95	3.5	22	7.8
125	66	74	31	1.4	PH422F0160 KX301VF0030 MF EZ302U	130	240	48.00	48/1	3500	3500	6000	1.1	3.5	22	8.4
125	86	99	40	1.0	PH422F0160 KX301VF0030 MF EZ303U	130	240	48.00	48/1	3500	3500	6000	1.2	3.5	22	8.9
PH5KX ($n_{1N} = 3000$ rpm, $M_{2acc,max} = 320$ Nm)																
14	179	183	40	1.2	PH522F0700 KX401VF0030 MF EZ301U	270	600	210.0	210/1	3000	3000	5500	1.6	3	65	12
20	128	131	28	1.7	PH522F0500 KX401VF0030 MF EZ301U	320	600	150.0	150/1	3000	3000	5500	1.6	3	64	12
20	218	231	47	1.0	PH522F0500 KX401VF0030 MF EZ302U	320	600	150.0	150/1	3000	3000	5500	1.7	3	64	13
21	119	122	36	1.8	PH522F0700 KX401VF0020 MF EZ301U	270	600	140.0	140/1	2500	2500	5000	1.8	3	65	12
25	102	104	23	2.1	PH522F0400 KX401VF0030 MF EZ301U	310	600	120.0	120/1	3000	3000	5500	1.6	3.5	56	12
25	175	185	39	1.2	PH522F0400 KX401VF0030 MF EZ302U	320	600	120.0	120/1	3000	3000	5500	1.7	3.5	56	13
29	89	91	19	2.5	PH522F0350 KX401VF0030 MF EZ301U	270	600	105.0	105/1	3000	3000	5500	1.6	3.5	64	12
29	153	162	33	1.4	PH522F0350 KX401VF0030 MF EZ302U	320	600	105.0	105/1	3000	3000	5500	1.7	3.5	64	13
29	199	211	43	1.1	PH522F0350 KX401VF0030 MF EZ303U	320	600	105.0	105/1	3000	3000	5500	1.8	3.5	64	14
30	85	87	25	2.6	PH522F0500 KX401VF0020 MF EZ301U	260	600	100.0	100/1	2500	2500	5000	1.8	3	64	12
30	146	154	43	1.5	PH522F0500 KX401VF0020 MF EZ302U	320	600	100.0	100/1	2500	2500	5000	1.9	3	64	13
30	190	201	55	1.2	PH522F0500 KX401VF0020 MF EZ303U	320	600	100.0	100/1	2500	2500	5000	2.0	3	64	14
36	72	73	16	2.9	PH522F0280 KX401VF0030 MF EZ301U	220	600	84.00	84/1	3000	3000	5500	1.6	3.5	57	12
36	122	129	28	1.7	PH522F0280 KX401VF0030 MF EZ302U	320	600	84.00	84/1	3000	3000	5500	1.7	3.5	57	13
36	159	169	36	1.3	PH522F0280 KX401VF0030 MF EZ303U	320	600	84.00	84/1	3000	3000	5500	1.8	3.5	57	14
38	68	70	21	3.1	PH522F0400 KX401VF0020 MF EZ301U	210	600	80.00	80/1	2500	2500	5000	1.8	3.5	56	12
38	117	123	36	1.8	PH522F0400 KX401VF0020 MF EZ302U	320	600	80.00	80/1	2500	2500	5000	1.9	3.5	56	13
38	152	160	46	1.4	PH522F0400 KX401VF0020 MF EZ303U	320	600	80.00	80/1	2500	2500	5000	2.0	3.5	56	14
38	205	220	63	1.0	PH522F0400 KX401VF0020 MF EZ401U	320	600	80.00	80/1	2500	2500	5000	2.6	3.5	56	15
40	64	65	14	3.4	PH522F0250 KX401VF0030 MF EZ301U	190	600	75.00	75/1	3000	3000	5500	1.6	3.5	63	12
40	109	115	24	2.0	PH522F0250 KX401VF0030 MF EZ302U	320	600	75.00	75/1	3000	3000	5500	1.7	3.5	63	13
40	142	150	31	1.5	PH522F0250 KX401VF0030 MF EZ303U	320	600	75.00	75/1	3000	3000	5500	1.9	3.5	63	14
40	192	206	41	1.1	PH522F0250 KX401VF0030 MF EZ401U	320	600	75.00	75/1	3000	3000	5500	2.4	3.5	63	15
43	60	61	17	3.7	PH522F0350 KX401VF0020 MF EZ301U	180	600	70.00	70/1	2500	2500	5000	1.8	3.5	64	12
43	102	108	30	2.2	PH522F0350 KX401VF0020 MF EZ302U	320	600	70.00	70/1	2500	2500	5000	1.9	3.5	64	13
43	133	140	39	1.7	PH522F0350 KX401VF0020 MF EZ303U	320	600	70.00	70/1	2500	2500	5000	2.0	3.5	64	14
43	180	192	52	1.2	PH522F0350 KX401VF0020 MF EZ401U	320	600	70.00	70/1	2500	2500	5000	2.6	3.5	64	15
50	51	52	11	4.3	PH522F0200 KX401VF0030 MF EZ301U	150	600	60.00	60/1	3000	3000	5500	1.7	3.5	60	12
50	87	92	19	2.5	PH522F0200 KX401VF0030 MF EZ302U	270	600	60.00	60/1	3000	3000	5500	1.8	3.5	60	13
50	114	120	24	1.9	PH522F0200 KX401VF0030 MF EZ303U	320	600	60.00	60/1	3000	3000	5500	1.9	3.5	60	14
50	154	165	33	1.4	PH522F0200 KX401VF0030 MF EZ401U	320	600	60.00	60/1	3000	3000	5500	2.4	3.5	60	15
54	48	49	15	4.4	PH522F0280 KX401VF0020 MF EZ301U	140	600	56.00	56/1	2500	2500	5000	1.8	3.5	57	12
54	82	86	25	2.6	PH522F0280 KX401VF0020 MF EZ302U	260	600	56.00	56/1	2500	2500	5000	1.9	3.5	57	13
54	106	112	32	2.0	PH522F0280 KX401VF0020 MF EZ303U	320	600	56.00	56/1	2500	2500	5000	2.0	3.5	57	14
54	144	154	44	1.5	PH522F0280 KX401VF0020 MF EZ401U	320	600	56.00	56/1	2500	2500	5000	2.6	3.5	57	15
60	73	77	21	3.0	PH522F0250 KX401VF0020 MF EZ302U	230	600	50.00	50/1	2500	2500	5000	2.0	3.5	63	13
60	95	100	28	2.3	PH522F0250 KX401VF0020 MF EZ303U	320	600	50.00	50/1	2500	2500	5000	2.1	3.5	63	14
60	128	137	37	1.7	PH522F0250 KX401VF0020 MF EZ401U	320	600	50.00	50/1	2500	2500	5000	2.6	3.5	63	15
60	197	215	57	1.1	PH522F0250 KX401VF0020 MF EZ501U	320	600	50.00	50/1	2500	2500	5000	4.6	3.5	63	16
60	215	238	63	1.0	PH522F0250 KX401VF0020 MF EZ402U	320	600	50.00	50/1	2500	2500	5000	3.3	3.5	63	16
63	70	74	16	3.0	PH522F0160 KX401VF0030 MF EZ302U	220	600	48.00	48/1	3000	3000	5500	1.8	3.5	52	13

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16.2 Selection tables



n_{2N}	M_{2N}	$M_{2,0}$	a_{in}	S	Type	M_{2acc}	M_{2NOT}	i	i_{exakt}	n_{1max}	n_{1max}	n_{1max}	J_1	$\Delta\varphi_2$	C_2	m
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]			DB	DB	ZB	[10^{-4} kgm ²]	[arcmin]	[Nm/arcmin]	[kg]
										EL1,2,5,6	EL3,4	[rpm]				
										[rpm]	[rpm]					
PH5KX ($n_{1N} = 3000$ rpm, $M_{2acc,max} = 320$ Nm)																
63	91	96	21	2.3	PH522F0160 KX401VF0030 MF EZ303U	310	600	48.00	48/1	3000	3000	5500	1.9	3.5	52	14
63	123	132	28	1.7	PH522F0160 KX401VF0030 MF EZ401U	320	600	48.00	48/1	3000	3000	5500	2.4	3.5	52	15
63	189	207	43	1.1	PH522F0160 KX401VF0030 MF EZ501U	320	600	48.00	48/1	3000	3000	5500	4.4	3.5	52	16
63	207	229	47	1.0	PH522F0160 KX401VF0030 MF EZ402U	320	600	48.00	48/1	3000	3000	5500	3.1	3.5	52	16
75	58	62	17	3.8	PH522F0200 KX401VF0020 MF EZ302U	180	600	40.00	40/1	2500	2500	5000	2.0	3.5	60	13
75	76	80	22	2.9	PH522F0200 KX401VF0020 MF EZ303U	260	600	40.00	40/1	2500	2500	5000	2.1	3.5	60	14
75	103	110	30	2.1	PH522F0200 KX401VF0020 MF EZ401U	310	600	40.00	40/1	2500	2500	5000	2.6	3.5	60	15
75	158	172	46	1.4	PH522F0200 KX401VF0020 MF EZ501U	320	600	40.00	40/1	2500	2500	5000	4.6	3.5	60	16
75	172	191	50	1.3	PH522F0200 KX401VF0020 MF EZ402U	320	600	40.00	40/1	2500	2500	5000	3.3	3.5	60	16
86	51	54	25	4.3	PH522F0350 KX401VF0010 MF EZ302U	160	600	35.00	35/1	2500	2000	4000	2.8	3.5	64	13
86	66	70	33	3.3	PH522F0350 KX401VF0010 MF EZ303U	220	600	35.00	35/1	2500	2000	4000	2.9	3.5	64	14
86	90	96	44	2.5	PH522F0350 KX401VF0010 MF EZ401U	270	600	35.00	35/1	2500	2000	4000	3.4	3.5	64	15
86	138	151	68	1.6	PH522F0350 KX401VF0010 MF EZ501U	320	600	35.00	35/1	2500	2000	4000	5.4	3.5	64	16
86	151	167	74	1.5	PH522F0350 KX401VF0010 MF EZ402U	320	600	35.00	35/1	2500	2000	4000	4.1	3.5	64	16
94	47	49	14	4.5	PH522F0160 KX401VF0020 MF EZ302U	150	600	32.00	32/1	2500	2500	5000	2.0	3.5	52	13
94	61	64	19	3.5	PH522F0160 KX401VF0020 MF EZ303U	210	600	32.00	32/1	2500	2500	5000	2.1	3.5	52	14
94	82	88	25	2.6	PH522F0160 KX401VF0020 MF EZ401U	250	600	32.00	32/1	2500	2500	5000	2.6	3.5	52	15
94	126	138	39	1.7	PH522F0160 KX401VF0020 MF EZ501U	320	600	32.00	32/1	2500	2500	5000	4.6	3.5	52	16
94	138	152	42	1.5	PH522F0160 KX401VF0020 MF EZ402U	320	600	32.00	32/1	2500	2500	5000	3.3	3.5	52	16
100	79	85	30	1.8	PH521F0100 KX501VF0030 MF EZ401U	240	500	30.00	30/1	3000	3000	5000	5.7	4	45	17
100	122	133	46	1.1	PH521F0100 KX501VF0030 MF EZ501U	250	500	30.00	30/1	3000	3000	5000	7.7	4	45	18
100	133	148	50	1.1	PH521F0100 KX501VF0030 MF EZ402U	250	500	30.00	30/1	3000	3000	5000	6.4	4	45	18
143	56	60	14	3.8	PH521F0070 KX501VF0030 MF EZ401U	170	600	21.00	21/1	3000	3000	5000	5.8	4.5	47	17
143	85	93	21	2.5	PH521F0070 KX501VF0030 MF EZ501U	270	600	21.00	21/1	3000	3000	5000	7.7	4.5	47	18
143	93	103	23	2.3	PH521F0070 KX501VF0030 MF EZ402U	270	600	21.00	21/1	3000	3000	5000	6.5	4.5	47	18
143	137	171	34	1.5	PH521F0070 KX501VF0030 MF EZ404U	270	600	21.00	21/1	3000	3000	5000	7.8	4.5	47	20
143	147	159	37	1.4	PH521F0070 KX501VF0030 MF EZ502U	270	600	21.00	21/1	3000	3000	5000	10	4.5	47	19
143	147	165	37	1.4	PH521F0070 KX501VF0030 MF EZ701U	270	600	21.00	21/1	3000	3000	5000	13	4.5	47	21
150	53	57	27	2.6	PH521F0100 KX501VF0020 MF EZ401U	160	500	20.00	20/1	2500	2500	4500	6.3	4	45	17
150	81	89	41	1.7	PH521F0100 KX501VF0020 MF EZ501U	250	500	20.00	20/1	2500	2500	4500	8.2	4	45	18
150	89	98	45	1.6	PH521F0100 KX501VF0020 MF EZ402U	250	500	20.00	20/1	2500	2500	4500	7.0	4	45	18
150	130	163	66	1.1	PH521F0100 KX501VF0020 MF EZ404U	250	500	20.00	20/1	2500	2500	4500	8.3	4	45	20
150	140	151	71	1.0	PH521F0100 KX501VF0020 MF EZ502U	250	500	20.00	20/1	2500	2500	4500	11	4	45	19
150	140	157	71	1.0	PH521F0100 KX501VF0020 MF EZ701U	250	500	20.00	20/1	2500	2500	4500	14	4	45	21
200	61	67	15	3.4	PH521F0050 KX501VF0030 MF EZ501U	230	600	15.00	15/1	3000	3000	5000	7.8	5	36	18
200	67	74	17	3.1	PH521F0050 KX501VF0030 MF EZ402U	230	600	15.00	15/1	3000	3000	5000	6.5	5	36	18
200	98	122	25	2.1	PH521F0050 KX501VF0030 MF EZ404U	300	600	15.00	15/1	3000	3000	5000	7.9	5	36	20
200	105	113	26	2.0	PH521F0050 KX501VF0030 MF EZ502U	300	600	15.00	15/1	3000	3000	5000	10	5	36	19
200	105	118	26	2.0	PH521F0050 KX501VF0030 MF EZ701U	280	600	15.00	15/1	3000	3000	5000	13	5	36	21
200	138	157	35	1.5	PH521F0050 KX501VF0030 MF EZ503U	300	600	15.00	15/1	3000	3000	5000	12	5	36	21
200	170	204	43	1.2	PH521F0050 KX501VF0030 MF EZ702U	300	600	15.00	15/1	3000	3000	5000	19	5	36	24
200	191	227	48	1.1	PH521F0050 KX501VF0030 MF EZ505U	300	600	15.00	15/1	3000	3000	5000	17	5	36	24
214	57	62	19	3.7	PH521F0070 KX501VF0020 MF EZ501U	210	600	14.00	14/1	2500	2500	4500	8.3	4.5	47	18
214	62	69	21	3.4	PH521F0070 KX501VF0020 MF EZ402U	210	600	14.00	14/1	2500	2500	4500	7.0	4.5	47	18
214	91	114	31	2.3	PH521F0070 KX501VF0020 MF EZ404U	270	600	14.00	14/1	2500	2500	4500	8.4	4.5	47	20
214	98	106	33	2.1	PH521F0070 KX501VF0020 MF EZ502U	270	600	14.00	14/1	2500	2500	4500	11	4.5	47	19
214	98	110	33	2.1	PH521F0070 KX501VF0020 MF EZ701U	260	600	14.00	14/1	2500	2500	4500	14	4.5	47	21
214	128	147	44	1.6	PH521F0070 KX501VF0020 MF EZ503U	270	600	14.00	14/1	2500	2500	4500	13	4.5	47	21
214	159	191	54	1.3	PH521F0070 KX501VF0020 MF EZ702U	270	600	14.00	14/1	2500	2500	4500	19	4.5	47	24
250	49	53	15	3.4	PH521F0040 KX501VF0030 MF EZ501U	180	520	12.00	12/1	3000	3000	5000	7.8	5.5	28	18
250	53	59	17	3.1	PH521F0040 KX501VF0030 MF EZ402U	180	520	12.00	12/1	3000	3000	5000	6.6	5.5	28	18
250	78	98	25	2.1	PH521F0040 KX501VF0030 MF EZ404U	240	520	12.00	12/1	3000	3000	5000	7.9	5.5	28	20
250	84	91	26	2.0	PH521F0040 KX501VF0030 MF EZ502U	240	520	12.00	12/1	3000	3000	5000	10	5.5	28	19
250	84	94	26	2.0	PH521F0040 KX501VF0030 MF EZ701U	230	520	12.00	12/1	3000	3000	5000	13	5.5	28	21
250	110	126	35	1.5	PH521F0040 KX501VF0030 MF EZ503U	240	520	12.00	12/1	3000	3000	5000	13	5.5	28	21
250	136	163	43	1.2	PH521F0040 KX501VF0030 MF EZ702U	240	520	12.00	12/1	3000	3000	5000	19	5.5	28	24
250	153	182	48	1.1	PH521F0040 KX501VF0030 MF EZ505U	240	520	12.00	12/1	3000	3000	5000	17	5.5	28	24
300	44	49	15	4.7	PH521F0050 KX501VF0020 MF EZ402U	150	600	10.00	10/1	2500	2500	4500	7.1	5	36	18
300	65	81	22	3.2	PH521F0050 KX501VF0020 MF EZ404U	270	600	10.00	10/1	2500	2500	4500	8.5	5	36	20



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16.2 Selection tables



n_{2N}	M_{2N}	$M_{2,0}$	a_{th}	S	Type	M_{2acc}	M_{2NOT}	i	i_{exakt}	n_{1max} DB EL1,2,5,6 [rpm]	n_{1max} DB EL3,4 [rpm]	n_{1max} ZB [rpm]	J_1 [10 ⁻⁴ kgm ²]	$\Delta\phi_2$ [arcmin]	C_2 [Nm/ arcmin]	m [kg]
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]									
PH5KX ($n_{IN} = 3000$ rpm, $M_{2acc,max} = 320$ Nm)																
300	70	76	24	3.0	PH521F0050 KX501VF0020 MF EZ502U	290	600	10.00	10/1	2500	2500	4500	11	5	36	19
300	70	78	24	3.0	PH521F0050 KX501VF0020 MF EZ701U	190	600	10.00	10/1	2500	2500	4500	14	5	36	21
300	92	105	31	2.3	PH521F0050 KX501VF0020 MF EZ503U	300	600	10.00	10/1	2500	2500	4500	13	5	36	21
300	113	136	39	1.8	PH521F0050 KX501VF0020 MF EZ702U	300	600	10.00	10/1	2500	2500	4500	19	5	36	24
300	128	151	43	1.6	PH521F0050 KX501VF0020 MF EZ505U	300	600	10.00	10/1	2500	2500	4500	18	5	36	24
300	156	197	53	1.3	PH521F0050 KX501VF0020 MF EZ703U	300	600	10.00	10/1	2500	2500	4500	27	5	36	26
375	36	39	15	4.7	PH521F0040 KX501VF0020 MF EZ402U	120	520	8.000	8/1	2500	2500	4500	7.3	5.5	28	18
375	52	65	22	3.2	PH521F0040 KX501VF0020 MF EZ404U	220	520	8.000	8/1	2500	2500	4500	8.6	5.5	28	20
375	56	61	24	3.0	PH521F0040 KX501VF0020 MF EZ502U	230	520	8.000	8/1	2500	2500	4500	11	5.5	28	19
375	56	63	24	3.0	PH521F0040 KX501VF0020 MF EZ701U	150	520	8.000	8/1	2500	2500	4500	14	5.5	28	21
375	73	84	31	2.3	PH521F0040 KX501VF0020 MF EZ503U	240	520	8.000	8/1	2500	2500	4500	13	5.5	28	21
375	91	109	39	1.8	PH521F0040 KX501VF0020 MF EZ702U	240	520	8.000	8/1	2500	2500	4500	19	5.5	28	24
375	102	121	43	1.6	PH521F0040 KX501VF0020 MF EZ505U	240	520	8.000	8/1	2500	2500	4500	18	5.5	28	24
375	125	157	53	1.3	PH521F0040 KX501VF0020 MF EZ703U	240	520	8.000	8/1	2500	2500	4500	27	5.5	28	26
429	46	57	30	4.0	PH521F0070 KX501VF0010 MF EZ404U	190	600	7.000	7/1	2500	2000	3500	11	4.5	47	20
429	49	53	32	3.7	PH521F0070 KX501VF0010 MF EZ502U	210	600	7.000	7/1	2500	2000	3500	13	4.5	47	19
429	49	55	32	3.7	PH521F0070 KX501VF0010 MF EZ701U	130	600	7.000	7/1	2500	2000	3500	16	4.5	47	21
429	64	73	42	2.9	PH521F0070 KX501VF0010 MF EZ503U	270	600	7.000	7/1	2500	2000	3500	16	4.5	47	21
429	79	95	52	2.3	PH521F0070 KX501VF0010 MF EZ702U	270	600	7.000	7/1	2500	2000	3500	22	4.5	47	24
429	89	106	58	2.1	PH521F0070 KX501VF0010 MF EZ505U	270	600	7.000	7/1	2500	2000	3500	20	4.5	47	24
429	109	138	71	1.7	PH521F0070 KX501VF0010 MF EZ703U	270	600	7.000	7/1	2500	2000	3500	30	4.5	47	26
429	141	200	92	1.3	PH521F0070 KX501VF0010 MF EZ705U	270	600	7.000	7/1	2500	2000	3500	42	4.5	47	31
600	46	52	30	4.0	PH521F0050 KX501VF0010 MF EZ503U	200	600	5.000	5/1	2500	2000	3500	16	5	36	21
600	57	68	37	3.2	PH521F0050 KX501VF0010 MF EZ702U	190	600	5.000	5/1	2500	2000	3500	22	5	36	24
600	64	76	42	2.9	PH521F0050 KX501VF0010 MF EZ505U	300	600	5.000	5/1	2500	2000	3500	21	5	36	24
600	78	98	51	2.4	PH521F0050 KX501VF0010 MF EZ703U	300	600	5.000	5/1	2500	2000	3500	30	5	36	26
600	101	143	66	1.8	PH521F0050 KX501VF0010 MF EZ705U	300	600	5.000	5/1	2500	2000	3500	42	5	36	31
750	37	42	26	4.6	PH521F0040 KX501VF0010 MF EZ503U	160	520	4.000	4/1	2500	2000	3500	17	5.5	28	21
750	45	54	32	3.7	PH521F0040 KX501VF0010 MF EZ702U	160	520	4.000	4/1	2500	2000	3500	23	5.5	28	24
750	51	61	37	3.3	PH521F0040 KX501VF0010 MF EZ505U	240	520	4.000	4/1	2500	2000	3500	21	5.5	28	24
750	62	79	45	2.7	PH521F0040 KX501VF0010 MF EZ703U	240	520	4.000	4/1	2500	2000	3500	31	5.5	28	26
750	81	114	58	2.1	PH521F0040 KX501VF0010 MF EZ705U	240	520	4.000	4/1	2500	2000	3500	43	5.5	28	31
PH5KX ($n_{IN} = 4500$ rpm, $M_{2acc,max} = 300$ Nm)																
300	135	217	39	1.4	PH521F0050 KX501VF0030 MF EZ505U	300	600	15.00	15/1	3000	3000	5000	17	5	36	24
321	126	203	44	1.6	PH521F0070 KX501VF0020 MF EZ505U	270	600	14.00	14/1	2500	2500	4500	18	4.5	47	24
375	108	174	39	1.4	PH521F0040 KX501VF0030 MF EZ505U	240	520	12.00	12/1	3000	3000	5000	17	5.5	28	24
450	90	145	35	2.0	PH521F0050 KX501VF0020 MF EZ505U	300	600	10.00	10/1	2500	2500	4500	18	5	36	24
450	114	189	45	1.6	PH521F0050 KX501VF0020 MF EZ703U	300	600	10.00	10/1	2500	2500	4500	27	5	36	26
563	72	116	35	2.0	PH521F0040 KX501VF0020 MF EZ505U	240	520	8.000	8/1	2500	2500	4500	18	5.5	28	24
563	92	151	45	1.6	PH521F0040 KX501VF0020 MF EZ703U	240	520	8.000	8/1	2500	2500	4500	27	5.5	28	26
PH7KX ($n_{IN} = 2000$ rpm, $M_{2acc,max} = 650$ Nm)																
286	289	438	237	1.5	PH721F0070 KX701VF0010 MF EZ805U	650	1240	7.000	7/1	1800	1600	3000	159	4.5	119	69
400	207	313	169	2.1	PH721F0050 KX701VF0010 MF EZ805U	600	1150	5.000	5/1	1800	1600	3000	160	5	104	69
500	165	250	155	2.3	PH721F0040 KX701VF0010 MF EZ805U	480	920	4.000	4/1	1800	1600	3000	162	5.5	83	69
PH7KX ($n_{IN} = 3000$ rpm, $M_{2acc,max} = 700$ Nm)																
20	385	412	46	1.1	PH722F0500 KX501VF0030 MF EZ401U	700	1400	150.0	150/1	3000	3000	5000	5.7	3	139	25
21	359	385	58	1.2	PH722F0700 KX501VF0020 MF EZ401U	650	1240	140.0	140/1	2500	2500	4500	6.2	3	140	25
25	308	330	37	1.4	PH722F0400 KX501VF0030 MF EZ401U	700	1370	120.0	120/1	3000	3000	5000	5.7	3.5	122	25
29	269	289	32	1.6	PH722F0350 KX501VF0030 MF EZ401U	700	1400	105.0	105/1	3000	3000	5000	5.7	3.5	139	25
29	414	452	49	1.1	PH722F0350 KX501VF0030 MF EZ501U	700	1400	105.0	105/1	3000	3000	5000	7.7	3.5	139	26
30	256	275	42	1.7	PH722F0500 KX501VF0020 MF EZ401U	700	1400	100.0	100/1	2500	2500	4500	6.2	3	139	25
30	394	431	64	1.1	PH722F0500 KX501VF0020 MF EZ501U	700	1400	100.0	100/1	2500	2500	4500	8.2	3	139	26
30	431	476	70	1.0	PH722F0500 KX501VF0020 MF EZ402U	700	1400	100.0	100/1	2500	2500	4500	6.9	3	139	26
36	215	231	26	2.0	PH722F0280 KX501VF0030 MF EZ401U	650	1370	84.00	84/1	3000	3000	5000	5.7	3.5	122	25
36	331	362	40	1.3	PH722F0280 KX501VF0030 MF EZ501U	700	1370	84.00	84/1	3000	3000	5000	7.7	3.5	122	26
36	362	400	43	1.2	PH722F0280 KX501VF0030 MF EZ402U	700	1370	84.00	84/1	3000	3000	5000	6.4	3.5	122	26
38	205	220	33	2.1	PH722F0400 KX501VF0020 MF EZ401U	620	1370	80.00	80/1	2500	2500	4500	6.3	3.5	122	25
38	315	344	51	1.4	PH722F0400 KX501VF0020 MF EZ501U	700	1370	80.00	80/1	2500	2500	4500	8.2	3.5	122	26
38	344	381	56	1.3	PH722F0400 KX501VF0020 MF EZ402U	700	1370	80.00	80/1	2500	2500	4500	7.0	3.5	122	26

PHKX



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16.2 Selection tables



n_{2N}	M_{2N}	$M_{2,0}$	a_{in}	S	Type	M_{2acc}	M_{2NOT}	i	i_{exakt}	n_{1max}	n_{1max}	n_{1max}	J_1	$\Delta\varphi_2$	C_2	m
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]			DB	DB	ZB	[10 ⁻⁴ kgm ²]	[arcmin]	[Nm/arcmin]	[kg]
										EL1,2,5,6	EL3,4	[rpm]				
										[rpm]	[rpm]					
PH7KX ($n_{1N} = 3000$ rpm, $M_{2acc,max} = 700$ Nm)																
40	192	206	23	2.3	PH722F0250 KX501VF0030 MF EZ401U	580	1400	75.00	75/1	3000	3000	5000	5.8	3.5	135	25
40	295	323	35	1.5	PH722F0250 KX501VF0030 MF EZ501U	700	1400	75.00	75/1	3000	3000	5000	7.8	3.5	135	26
40	323	357	39	1.4	PH722F0250 KX501VF0030 MF EZ402U	700	1400	75.00	75/1	3000	3000	5000	6.5	3.5	135	26
43	180	192	29	2.5	PH722F0350 KX501VF0020 MF EZ401U	550	1400	70.00	70/1	2500	2500	4500	6.3	3.5	139	25
43	276	301	45	1.6	PH722F0350 KX501VF0020 MF EZ501U	700	1400	70.00	70/1	2500	2500	4500	8.3	3.5	139	26
43	301	333	49	1.5	PH722F0350 KX501VF0020 MF EZ402U	700	1400	70.00	70/1	2500	2500	4500	7.0	3.5	139	26
50	154	165	18	2.9	PH722F0200 KX501VF0030 MF EZ401U	470	1400	60.00	60/1	3000	3000	5000	5.8	3.5	129	25
50	236	258	28	1.9	PH722F0200 KX501VF0030 MF EZ501U	700	1400	60.00	60/1	3000	3000	5000	7.8	3.5	129	26
50	258	286	31	1.7	PH722F0200 KX501VF0030 MF EZ402U	700	1400	60.00	60/1	3000	3000	5000	6.5	3.5	129	26
50	379	473	45	1.2	PH722F0200 KX501VF0030 MF EZ404U	700	1400	60.00	60/1	3000	3000	5000	7.9	3.5	129	28
50	407	440	49	1.1	PH722F0200 KX501VF0030 MF EZ502U	700	1400	60.00	60/1	3000	3000	5000	10	3.5	129	27
50	407	456	49	1.1	PH722F0200 KX501VF0030 MF EZ701U	700	1400	60.00	60/1	3000	3000	5000	13	3.5	129	29
54	144	154	23	3.1	PH722F0280 KX501VF0020 MF EZ401U	440	1370	56.00	56/1	2500	2500	4500	6.3	3.5	122	25
54	221	241	36	2.0	PH722F0280 KX501VF0020 MF EZ501U	700	1370	56.00	56/1	2500	2500	4500	8.3	3.5	122	26
54	241	267	39	1.8	PH722F0280 KX501VF0020 MF EZ402U	700	1370	56.00	56/1	2500	2500	4500	7.0	3.5	122	26
54	354	441	57	1.2	PH722F0280 KX501VF0020 MF EZ404U	700	1370	56.00	56/1	2500	2500	4500	8.3	3.5	122	28
54	380	410	62	1.2	PH722F0280 KX501VF0020 MF EZ502U	700	1370	56.00	56/1	2500	2500	4500	11	3.5	122	27
54	380	426	62	1.2	PH722F0280 KX501VF0020 MF EZ701U	700	1370	56.00	56/1	2500	2500	4500	14	3.5	122	29
60	128	137	21	3.4	PH722F0250 KX501VF0020 MF EZ401U	390	1400	50.00	50/1	2500	2500	4500	6.4	3.5	135	25
60	197	215	32	2.2	PH722F0250 KX501VF0020 MF EZ501U	700	1400	50.00	50/1	2500	2500	4500	8.3	3.5	135	26
60	215	238	35	2.0	PH722F0250 KX501VF0020 MF EZ402U	700	1400	50.00	50/1	2500	2500	4500	7.1	3.5	135	26
60	316	394	51	1.4	PH722F0250 KX501VF0020 MF EZ404U	700	1400	50.00	50/1	2500	2500	4500	8.4	3.5	135	28
60	339	366	55	1.3	PH722F0250 KX501VF0020 MF EZ502U	700	1400	50.00	50/1	2500	2500	4500	11	3.5	135	27
60	339	380	55	1.3	PH722F0250 KX501VF0020 MF EZ701U	700	1400	50.00	50/1	2500	2500	4500	14	3.5	135	29
63	123	132	15	3.6	PH722F0160 KX501VF0030 MF EZ401U	370	1370	48.00	48/1	3000	3000	5000	5.8	3.5	111	25
63	189	207	23	2.3	PH722F0160 KX501VF0030 MF EZ501U	700	1370	48.00	48/1	3000	3000	5000	7.8	3.5	111	26
63	207	229	25	2.1	PH722F0160 KX501VF0030 MF EZ402U	700	1370	48.00	48/1	3000	3000	5000	6.5	3.5	111	26
63	303	378	36	1.5	PH722F0160 KX501VF0030 MF EZ404U	700	1370	48.00	48/1	3000	3000	5000	7.9	3.5	111	28
63	325	352	39	1.4	PH722F0160 KX501VF0030 MF EZ502U	700	1370	48.00	48/1	3000	3000	5000	10	3.5	111	27
63	325	365	39	1.4	PH722F0160 KX501VF0030 MF EZ701U	700	1370	48.00	48/1	3000	3000	5000	13	3.5	111	29
63	427	488	51	1.0	PH722F0160 KX501VF0030 MF EZ503U	700	1370	48.00	48/1	3000	3000	5000	12	3.5	111	29
75	103	110	17	4.3	PH722F0200 KX501VF0020 MF EZ401U	310	1400	40.00	40/1	2500	2500	4500	6.5	3.5	129	25
75	158	172	26	2.8	PH722F0200 KX501VF0020 MF EZ501U	590	1400	40.00	40/1	2500	2500	4500	8.4	3.5	129	26
75	172	191	28	2.6	PH722F0200 KX501VF0020 MF EZ402U	590	1400	40.00	40/1	2500	2500	4500	7.2	3.5	129	26
75	253	315	41	1.7	PH722F0200 KX501VF0020 MF EZ404U	700	1400	40.00	40/1	2500	2500	4500	8.5	3.5	129	28
75	271	293	44	1.6	PH722F0200 KX501VF0020 MF EZ502U	700	1400	40.00	40/1	2500	2500	4500	11	3.5	129	27
75	271	304	44	1.6	PH722F0200 KX501VF0020 MF EZ701U	700	1400	40.00	40/1	2500	2500	4500	14	3.5	129	29
75	355	407	58	1.2	PH722F0200 KX501VF0020 MF EZ503U	700	1400	40.00	40/1	2500	2500	4500	13	3.5	129	29
75	440	528	71	1.0	PH722F0200 KX501VF0020 MF EZ702U	700	1400	40.00	40/1	2500	2500	4500	19	3.5	129	32
86	90	96	24	4.9	PH722F0350 KX501VF0010 MF EZ401U	270	1400	35.00	35/1	2500	2000	3500	8.7	3.5	139	25
86	138	151	38	3.2	PH722F0350 KX501VF0010 MF EZ501U	510	1400	35.00	35/1	2500	2000	3500	11	3.5	139	26
86	151	167	41	2.9	PH722F0350 KX501VF0010 MF EZ402U	510	1400	35.00	35/1	2500	2000	3500	9.4	3.5	139	26
86	221	276	60	2.0	PH722F0350 KX501VF0010 MF EZ404U	700	1400	35.00	35/1	2500	2000	3500	11	3.5	139	28
86	237	256	65	1.9	PH722F0350 KX501VF0010 MF EZ502U	700	1400	35.00	35/1	2500	2000	3500	13	3.5	139	27
86	237	266	65	1.9	PH722F0350 KX501VF0010 MF EZ701U	640	1400	35.00	35/1	2500	2000	3500	16	3.5	139	29
86	311	356	85	1.4	PH722F0350 KX501VF0010 MF EZ503U	700	1400	35.00	35/1	2500	2000	3500	15	3.5	139	29
86	385	462	105	1.1	PH722F0350 KX501VF0010 MF EZ702U	700	1400	35.00	35/1	2500	2000	3500	22	3.5	139	32
86	433	513	118	1.0	PH722F0350 KX501VF0010 MF EZ505U	700	1400	35.00	35/1	2500	2000	3500	20	3.5	139	32
94	126	138	20	3.5	PH722F0160 KX501VF0020 MF EZ501U	470	1370	32.00	32/1	2500	2500	4500	8.5	3.5	111	26
94	138	152	22	3.2	PH722F0160 KX501VF0020 MF EZ402U	470	1370	32.00	32/1	2500	2500	4500	7.2	3.5	111	26
94	202	252	33	2.2	PH722F0160 KX501VF0020 MF EZ404U	700	1370	32.00	32/1	2500	2500	4500	8.6	3.5	111	28
94	217	235	35	2.0	PH722F0160 KX501VF0020 MF EZ502U	700	1370	32.00	32/1	2500	2500	4500	11	3.5	111	27
94	217	243	35	2.0	PH722F0160 KX501VF0020 MF EZ701U	590	1370	32.00	32/1	2500	2500	4500	14	3.5	111	29
94	284	325	46	1.5	PH722F0160 KX501VF0020 MF EZ503U	700	1370	32.00	32/1	2500	2500	4500	13	3.5	111	29
94	352	422	57	1.3	PH722F0160 KX501VF0020 MF EZ702U	700	1370	32.00	32/1	2500	2500	4500	19	3.5	111	32
94	396	469	64	1.1	PH722F0160 KX501VF0020 MF EZ505U	700	1370	32.00	32/1	2500	2500	4500	18	3.5	111	32
100	122	133	64	2.5	PH721F0100 KX701VF0030 MF EZ501U	450	1000	30.00	30/1	2100	2100	4000	15	4	104	29
100	210	227	111	1.4	PH721F0100 KX701VF0030 MF EZ502U	500	1000	30.00	30/1	2100	2100	4000	18	4	104	30
100	210	235	111	1.4	PH721F0100 KX701VF0030 MF EZ701U	500	1000	30.00	30/1	2100	2100	4000	21	4	104	32



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16.2 Selection tables



n_{2N}	M_{2N}	$M_{2,0}$	a_{th}	S	Type	M_{2acc}	M_{2NOT}	i	i_{exakt}	n_{1max} DB EL1,2,5,6 [rpm]	n_{1max} DB EL3,4 [rpm]	n_{1max} ZB [rpm]	J_1 [10 ⁻⁴ kgm ²]	$\Delta\phi_2$ [arcmin]	C_2 [Nm/ arcmin]	m [kg]
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]									
PH7KX ($n_{1N} = 3000$ rpm, $M_{2acc,max} = 700$ Nm)																
100	275	315	145	1.1	PH721F0100 KX701VF0030 MF EZ503U	500	1000	30.00	30/1	2100	2100	4000	20	4	104	32
143	147	159	53	3.0	PH721F0070 KX701VF0030 MF EZ502U	620	1240	21.00	21/1	2100	2100	4000	18	4.5	119	30
143	147	165	53	3.0	PH721F0070 KX701VF0030 MF EZ701U	400	1240	21.00	21/1	2100	2100	4000	21	4.5	119	32
143	193	220	69	2.3	PH721F0070 KX701VF0030 MF EZ503U	650	1240	21.00	21/1	2100	2100	4000	20	4.5	119	32
143	238	286	86	1.8	PH721F0070 KX701VF0030 MF EZ702U	650	1240	21.00	21/1	2100	2100	4000	26	4.5	119	34
143	268	318	96	1.6	PH721F0070 KX701VF0030 MF EZ505U	650	1240	21.00	21/1	2100	2100	4000	25	4.5	119	34
143	328	413	118	1.3	PH721F0070 KX701VF0030 MF EZ703U	650	1240	21.00	21/1	2100	2100	4000	34	4.5	119	36
150	81	89	58	3.7	PH721F0100 KX701VF0020 MF EZ501U	300	1000	20.00	20/1	1800	1800	3500	18	4	104	29
150	140	151	100	2.1	PH721F0100 KX701VF0020 MF EZ502U	500	1000	20.00	20/1	1800	1800	3500	20	4	104	30
150	140	157	100	2.1	PH721F0100 KX701VF0020 MF EZ701U	380	1000	20.00	20/1	1800	1800	3500	23	4	104	32
150	183	210	131	1.6	PH721F0100 KX701VF0020 MF EZ503U	500	1000	20.00	20/1	1800	1800	3500	22	4	104	32
150	227	272	162	1.3	PH721F0100 KX701VF0020 MF EZ702U	500	1000	20.00	20/1	1800	1800	3500	29	4	104	34
150	255	303	182	1.2	PH721F0100 KX701VF0020 MF EZ505U	500	1000	20.00	20/1	1800	1800	3500	27	4	104	34
200	105	113	40	4.0	PH721F0050 KX701VF0030 MF EZ502U	440	1300	15.00	15/1	2100	2100	4000	18	5	104	30
200	105	118	40	4.0	PH721F0050 KX701VF0030 MF EZ701U	280	1300	15.00	15/1	2100	2100	4000	21	5	104	32
200	138	157	52	3.0	PH721F0050 KX701VF0030 MF EZ503U	600	1300	15.00	15/1	2100	2100	4000	20	5	104	32
200	170	204	64	2.5	PH721F0050 KX701VF0030 MF EZ702U	580	1300	15.00	15/1	2100	2100	4000	26	5	104	34
200	191	227	72	2.2	PH721F0050 KX701VF0030 MF EZ505U	600	1300	15.00	15/1	2100	2100	4000	25	5	104	34
200	234	295	88	1.8	PH721F0050 KX701VF0030 MF EZ703U	600	1300	15.00	15/1	2100	2100	4000	34	5	104	36
200	302	428	114	1.4	PH721F0050 KX701VF0030 MF EZ705U	600	1300	15.00	15/1	2100	2100	4000	47	5	104	42
214	98	106	48	4.5	PH721F0070 KX701VF0020 MF EZ502U	410	1240	14.00	14/1	1800	1800	3500	20	4.5	119	30
214	98	110	48	4.5	PH721F0070 KX701VF0020 MF EZ701U	260	1240	14.00	14/1	1800	1800	3500	24	4.5	119	32
214	128	147	62	3.4	PH721F0070 KX701VF0020 MF EZ503U	570	1240	14.00	14/1	1800	1800	3500	23	4.5	119	32
214	159	191	77	2.8	PH721F0070 KX701VF0020 MF EZ702U	540	1240	14.00	14/1	1800	1800	3500	29	4.5	119	34
214	179	212	87	2.5	PH721F0070 KX701VF0020 MF EZ505U	650	1240	14.00	14/1	1800	1800	3500	27	4.5	119	34
214	218	275	106	2.0	PH721F0070 KX701VF0020 MF EZ703U	650	1240	14.00	14/1	1800	1800	3500	37	4.5	119	36
214	282	400	137	1.6	PH721F0070 KX701VF0020 MF EZ705U	650	1240	14.00	14/1	1800	1800	3500	49	4.5	119	42
214	295	491	144	1.5	PH721F0070 KX701VF0020 MF EZ802U	650	1240	14.00	14/1	1800	1800	3500	73	4.5	119	50
250	84	91	40	4.0	PH721F0040 KX701VF0030 MF EZ502U	350	1040	12.00	12/1	2100	2100	4000	18	5.5	83	30
250	84	94	40	4.0	PH721F0040 KX701VF0030 MF EZ701U	230	1040	12.00	12/1	2100	2100	4000	21	5.5	83	32
250	110	126	52	3.0	PH721F0040 KX701VF0030 MF EZ503U	480	1040	12.00	12/1	2100	2100	4000	21	5.5	83	32
250	136	163	64	2.5	PH721F0040 KX701VF0030 MF EZ702U	470	1040	12.00	12/1	2100	2100	4000	27	5.5	83	34
250	153	182	72	2.2	PH721F0040 KX701VF0030 MF EZ505U	480	1040	12.00	12/1	2100	2100	4000	25	5.5	83	34
250	187	236	88	1.8	PH721F0040 KX701VF0030 MF EZ703U	480	1040	12.00	12/1	2100	2100	4000	35	5.5	83	36
250	242	343	114	1.4	PH721F0040 KX701VF0030 MF EZ705U	480	1040	12.00	12/1	2100	2100	4000	47	5.5	83	42
300	92	105	47	4.6	PH721F0050 KX701VF0020 MF EZ503U	410	1300	10.00	10/1	1800	1800	3500	23	5	104	32
300	113	136	58	3.7	PH721F0050 KX701VF0020 MF EZ702U	390	1300	10.00	10/1	1800	1800	3500	29	5	104	34
300	128	151	65	3.3	PH721F0050 KX701VF0020 MF EZ505U	600	1300	10.00	10/1	1800	1800	3500	28	5	104	34
300	156	197	80	2.7	PH721F0050 KX701VF0020 MF EZ703U	600	1300	10.00	10/1	1800	1800	3500	37	5	104	36
300	201	286	103	2.1	PH721F0050 KX701VF0020 MF EZ705U	600	1300	10.00	10/1	1800	1800	3500	49	5	104	42
300	211	351	108	2.0	PH721F0050 KX701VF0020 MF EZ802U	600	1300	10.00	10/1	1800	1800	3500	73	5	104	50
300	252	456	128	1.7	PH721F0050 KX701VF0020 MF EZ803U	600	1300	10.00	10/1	1800	1800	3500	99	5	104	56
375	73	84	47	4.6	PH721F0040 KX701VF0020 MF EZ503U	330	1040	8.000	8/1	1800	1800	3500	23	5.5	83	32
375	91	109	58	3.7	PH721F0040 KX701VF0020 MF EZ702U	310	1040	8.000	8/1	1800	1800	3500	30	5.5	83	34
375	102	121	65	3.3	PH721F0040 KX701VF0020 MF EZ505U	480	1040	8.000	8/1	1800	1800	3500	28	5.5	83	34
375	125	157	80	2.7	PH721F0040 KX701VF0020 MF EZ703U	480	1040	8.000	8/1	1800	1800	3500	38	5.5	83	36
375	161	228	103	2.1	PH721F0040 KX701VF0020 MF EZ705U	480	1040	8.000	8/1	1800	1800	3500	50	5.5	83	42
375	169	281	108	2.0	PH721F0040 KX701VF0020 MF EZ802U	480	1040	8.000	8/1	1800	1800	3500	74	5.5	83	50
375	201	365	128	1.7	PH721F0040 KX701VF0020 MF EZ803U	480	1040	8.000	8/1	1800	1800	3500	99	5.5	83	56
429	79	95	74	4.8	PH721F0070 KX701VF0010 MF EZ702U	270	1240	7.000	7/1	1800	1600	3000	40	4.5	119	34
429	89	106	84	4.3	PH721F0070 KX701VF0010 MF EZ505U	440	1240	7.000	7/1	1800	1600	3000	38	4.5	119	34
429	109	138	102	3.5	PH721F0070 KX701VF0010 MF EZ703U	430	1240	7.000	7/1	1800	1600	3000	48	4.5	119	36
429	141	200	132	2.7	PH721F0070 KX701VF0010 MF EZ705U	650	1240	7.000	7/1	1800	1600	3000	60	4.5	119	42
429	148	246	138	2.6	PH721F0070 KX701VF0010 MF EZ802U	650	1240	7.000	7/1	1800	1600	3000	84	4.5	119	50
429	176	319	165	2.2	PH721F0070 KX701VF0010 MF EZ803U	650	1240	7.000	7/1	1800	1600	3000	110	4.5	119	56
600	78	98	73	4.9	PH721F0050 KX701VF0010 MF EZ703U	310	1150	5.000	5/1	1800	1600	3000	49	5	104	36
600	101	143	94	3.8	PH721F0050 KX701VF0010 MF EZ705U	490	1150	5.000	5/1	1800	1600	3000	62	5	104	42
600	105	175	99	3.6	PH721F0050 KX701VF0010 MF EZ802U	470	1150	5.000	5/1	1800	1600	3000	86	5	104	50
600	126	228	118	3.1	PH721F0050 KX701VF0010 MF EZ803U	600	1150	5.000	5/1	1800	1600	3000	111	5	104	56

PHKX



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16.2 Selection tables



n_{2N}	M_{2N}	$M_{2,0}$	a_{in}	S	Type	M_{2acc}	M_{2NOT}	i	i_{exakt}	n_{1max}	n_{1max}	n_{1max}	J_1	$\Delta\varphi_2$	C_2	m
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]			DB	DB	ZB	[10 ⁻⁴	[arcmin]	[Nm/	[kg]
										EL1,2,5,6	EL3,4	[rpm]	kgm ²]		arcmin]	
PH7KX ($n_{1N} = 3000$ rpm, $M_{2acc,max} = 700$ Nm)																
750	81	114	86	4.2	PH721F0040 KX701VF0010 MF EZ705U	390	920	4.000	4/1	1800	1600	3000	64	5.5	83	42
750	84	140	91	4.0	PH721F0040 KX701VF0010 MF EZ802U	380	920	4.000	4/1	1800	1600	3000	88	5.5	83	50
750	101	182	108	3.3	PH721F0040 KX701VF0010 MF EZ803U	480	920	4.000	4/1	1800	1600	3000	113	5.5	83	56
PH7KX ($n_{1N} = 4500$ rpm, $M_{2acc,max} = 700$ Nm)																
141	278	448	45	1.6	PH722F0160 KX501VF0020 MF EZ505U	700	1370	32.00	32/1	2500	2500	4500	18	3.5	111	32
PH8KX ($n_{1N} = 2000$ rpm, $M_{2acc,max} = 1600$ Nm)																
133	620	938	110	1.5	PH821F0050 KX801VF0030 MF EZ805U	1320	2600	15.00	15/1	1300	1300	3000	178	5	226	102
143	579	875	134	1.7	PH821F0070 KX801VF0020 MF EZ805U	1600	2770	14.00	14/1	1100	1100	2500	184	4.5	288	102
167	496	750	110	1.5	PH821F0040 KX801VF0030 MF EZ805U	1060	2080	12.00	12/1	1300	1300	3000	179	5.5	174	102
200	413	625	100	2.3	PH821F0050 KX801VF0020 MF EZ805U	1320	2600	10.00	10/1	1100	1100	2500	185	5	226	102
250	331	500	100	2.3	PH821F0040 KX801VF0020 MF EZ805U	1060	2080	8.000	8/1	1100	1100	2500	188	5.5	174	102
286	289	438	113	3.5	PH821F0070 KX801VF0010 MF EZ805U	1360	2770	7.000	7/1	1000	750	2000	218	4.5	288	102
400	207	313	84	4.6	PH821F0050 KX801VF0010 MF EZ805U	970	2190	5.000	5/1	1000	750	2000	225	5	226	102
500	165	250	84	4.6	PH821F0040 KX801VF0010 MF EZ805U	780	1750	4.000	4/1	1000	750	2000	234	5.5	174	102
PH8KX ($n_{1N} = 3000$ rpm, $M_{2acc,max} = 2000$ Nm)																
14	827	904	131	1.2	PH822F0700 KX701VF0030 MF EZ501U	1600	2770	210.0	210/1	2100	2100	4000	15	3	417	56
15	788	861	211	1.0	PH822F1000 KX701VF0020 MF EZ501U	1200	2400	200.0	200/1	1800	1800	3500	18	3	304	56
20	591	646	75	2.1	PH822F0500 KX701VF0030 MF EZ501U	2000	3200	150.0	150/1	2100	2100	4000	15	3	428	56
20	1017	1099	129	1.2	PH822F0500 KX701VF0030 MF EZ502U	2000	3200	150.0	150/1	2100	2100	4000	18	3	428	58
20	1017	1140	129	1.2	PH822F0500 KX701VF0030 MF EZ701U	2000	3200	150.0	150/1	2100	2100	4000	21	3	428	59
21	551	603	118	1.8	PH822F0700 KX701VF0020 MF EZ501U	1600	2770	140.0	140/1	1800	1800	3500	18	3	417	56
21	949	1026	203	1.1	PH822F0700 KX701VF0020 MF EZ502U	1600	2770	140.0	140/1	1800	1800	3500	20	3	417	58
21	949	1064	203	1.1	PH822F0700 KX701VF0020 MF EZ701U	1600	2770	140.0	140/1	1800	1800	3500	23	3	417	59
25	473	517	68	2.3	PH822F0400 KX701VF0030 MF EZ501U	1760	3150	120.0	120/1	2100	2100	4000	15	3.5	406	56
25	813	879	117	1.4	PH822F0400 KX701VF0030 MF EZ502U	1920	3150	120.0	120/1	2100	2100	4000	18	3.5	406	58
25	813	912	117	1.4	PH822F0400 KX701VF0030 MF EZ701U	1920	3150	120.0	120/1	2100	2100	4000	21	3.5	406	59
25	1066	1220	153	1.0	PH822F0400 KX701VF0030 MF EZ503U	1920	3150	120.0	120/1	2100	2100	4000	20	3.5	406	59
29	414	452	52	3.0	PH822F0350 KX701VF0030 MF EZ501U	1540	3200	105.0	105/1	2100	2100	4000	15	3.5	432	56
29	712	769	90	1.8	PH822F0350 KX701VF0030 MF EZ502U	2000	3200	105.0	105/1	2100	2100	4000	18	3.5	432	58
29	712	798	90	1.8	PH822F0350 KX701VF0030 MF EZ701U	1920	3200	105.0	105/1	2100	2100	4000	21	3.5	432	59
29	933	1068	118	1.3	PH822F0350 KX701VF0030 MF EZ503U	2000	3200	105.0	105/1	2100	2100	4000	20	3.5	432	59
29	1154	1385	146	1.1	PH822F0350 KX701VF0030 MF EZ702U	2000	3200	105.0	105/1	2100	2100	4000	26	3.5	432	62
30	394	431	67	3.2	PH822F0500 KX701VF0020 MF EZ501U	1470	3200	100.0	100/1	1800	1800	3500	18	3	428	56
30	678	733	116	1.8	PH822F0500 KX701VF0020 MF EZ502U	2000	3200	100.0	100/1	1800	1800	3500	20	3	428	58
30	678	760	116	1.8	PH822F0500 KX701VF0020 MF EZ701U	1830	3200	100.0	100/1	1800	1800	3500	23	3	428	59
30	889	1017	152	1.4	PH822F0500 KX701VF0020 MF EZ503U	2000	3200	100.0	100/1	1800	1800	3500	22	3	428	59
30	1099	1319	188	1.1	PH822F0500 KX701VF0020 MF EZ702U	2000	3200	100.0	100/1	1800	1800	3500	29	3	428	62
30	1237	1466	212	1.0	PH822F0500 KX701VF0020 MF EZ505U	2000	3200	100.0	100/1	1800	1800	3500	27	3	428	62
36	331	362	48	3.3	PH822F0280 KX701VF0030 MF EZ501U	1230	3150	84.00	84/1	2100	2100	4000	15	3.5	411	56
36	569	616	82	1.9	PH822F0280 KX701VF0030 MF EZ502U	2000	3150	84.00	84/1	2100	2100	4000	18	3.5	411	58
36	569	639	82	1.9	PH822F0280 KX701VF0030 MF EZ701U	1540	3150	84.00	84/1	2100	2100	4000	21	3.5	411	59
36	746	854	107	1.5	PH822F0280 KX701VF0030 MF EZ503U	2000	3150	84.00	84/1	2100	2100	4000	20	3.5	411	59
36	923	1108	133	1.2	PH822F0280 KX701VF0030 MF EZ702U	2000	3150	84.00	84/1	2100	2100	4000	26	3.5	411	62
36	1039	1231	149	1.1	PH822F0280 KX701VF0030 MF EZ505U	2000	3150	84.00	84/1	2100	2100	4000	25	3.5	411	62
38	315	344	61	3.5	PH822F0400 KX701VF0020 MF EZ501U	1170	3150	80.00	80/1	1800	1800	3500	18	3.5	406	56
38	542	586	106	2.0	PH822F0400 KX701VF0020 MF EZ502U	1920	3150	80.00	80/1	1800	1800	3500	20	3.5	406	58
38	542	608	106	2.0	PH822F0400 KX701VF0020 MF EZ701U	1470	3150	80.00	80/1	1800	1800	3500	23	3.5	406	59
38	711	813	138	1.5	PH822F0400 KX701VF0020 MF EZ503U	1920	3150	80.00	80/1	1800	1800	3500	22	3.5	406	59
38	879	1055	171	1.3	PH822F0400 KX701VF0020 MF EZ702U	1920	3150	80.00	80/1	1800	1800	3500	29	3.5	406	62
38	989	1173	192	1.1	PH822F0400 KX701VF0020 MF EZ505U	1920	3150	80.00	80/1	1800	1800	3500	27	3.5	406	62
40	295	323	37	4.2	PH822F0250 KX701VF0030 MF EZ501U	1100	3200	75.00	75/1	2100	2100	4000	16	3.5	448	56
40	508	550	64	2.5	PH822F0250 KX701VF0030 MF EZ502U	2000	3200	75.00	75/1	2100	2100	4000	18	3.5	448	58
40	508	570	64	2.5	PH822F0250 KX701VF0030 MF EZ701U	1370	3200	75.00	75/1	2100	2100	4000	21	3.5	448	59
40	666	763	84	1.9	PH822F0250 KX701VF0030 MF EZ503U	2000	3200	75.00	75/1	2100	2100	4000	20	3.5	448	59
40	824	989	104	1.5	PH822F0250 KX701VF0030 MF EZ702U	2000	3200	75.00	75/1	2100	2100	4000	26	3.5	448	62
40	928	1099	117	1.3	PH822F0250 KX701VF0030 MF EZ505U	2000	3200	75.00	75/1	2100	2100	4000	25	3.5	448	62
40	1134	1429	143	1.1	PH822F0250 KX701VF0030 MF EZ703U	2000	3200	75.00	75/1	2100	2100	4000	34	3.5	448	64
43	276	301	47	4.5	PH822F0350 KX701VF0020 MF EZ501U	1030	3200	70.00	70/1	1800	1800	3500	18	3.5	432	56
43	475	513	81	2.6	PH822F0350 KX701VF0020 MF EZ502U	1990	3200	70.00	70/1	1800	1800	3500	20	3.5	432	58



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16.2 Selection tables



n_{2N}	M_{2N}	$M_{2,0}$	a_{th}	S	Type	M_{2acc}	M_{2NOT}	i	i_{exakt}	n_{1max} DB EL1,2,5,6 [rpm]	n_{1max} DB EL3,4 [rpm]	n_{1max} ZB [rpm]	J_1 [10 ⁻⁴ kgm ²]	$\Delta\phi_2$ [arcmin]	C_2 [Nm/ arcmin]	m [kg]
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]									
PH8KX ($n_{1N} = 3000$ rpm, $M_{2acc,max} = 2000$ Nm)																
43	475	532	81	2.6	PH822F0350 KX701VF0020 MF EZ701U	1280	3200	70.00	70/1	1800	1800	3500	24	3.5	432	59
43	622	712	106	2.0	PH822F0350 KX701VF0020 MF EZ503U	2000	3200	70.00	70/1	1800	1800	3500	23	3.5	432	59
43	769	923	132	1.6	PH822F0350 KX701VF0020 MF EZ702U	2000	3200	70.00	70/1	1800	1800	3500	29	3.5	432	62
43	866	1026	148	1.4	PH822F0350 KX701VF0020 MF EZ505U	2000	3200	70.00	70/1	1800	1800	3500	27	3.5	432	62
43	1058	1334	181	1.2	PH822F0350 KX701VF0020 MF EZ703U	2000	3200	70.00	70/1	1800	1800	3500	37	3.5	432	64
50	407	440	51	3.1	PH822F0200 KX701VF0030 MF EZ502U	1700	3200	60.00	60/1	2100	2100	4000	18	3.5	410	58
50	407	456	51	3.1	PH822F0200 KX701VF0030 MF EZ701U	1100	3200	60.00	60/1	2100	2100	4000	21	3.5	410	59
50	533	610	67	2.3	PH822F0200 KX701VF0030 MF EZ503U	2000	3200	60.00	60/1	2100	2100	4000	20	3.5	410	59
50	660	791	83	1.9	PH822F0200 KX701VF0030 MF EZ702U	2000	3200	60.00	60/1	2100	2100	4000	27	3.5	410	62
50	742	879	94	1.7	PH822F0200 KX701VF0030 MF EZ505U	2000	3200	60.00	60/1	2100	2100	4000	25	3.5	410	62
50	907	1143	115	1.4	PH822F0200 KX701VF0030 MF EZ703U	2000	3200	60.00	60/1	2100	2100	4000	34	3.5	410	64
54	221	241	43	5.0	PH822F0280 KX701VF0020 MF EZ501U	820	3150	56.00	56/1	1800	1800	3500	18	3.5	411	56
54	380	410	74	2.9	PH822F0280 KX701VF0020 MF EZ502U	1590	3150	56.00	56/1	1800	1800	3500	20	3.5	411	58
54	380	426	74	2.9	PH822F0280 KX701VF0020 MF EZ701U	1030	3150	56.00	56/1	1800	1800	3500	24	3.5	411	59
54	498	569	97	2.2	PH822F0280 KX701VF0020 MF EZ503U	2000	3150	56.00	56/1	1800	1800	3500	23	3.5	411	59
54	616	739	120	1.8	PH822F0280 KX701VF0020 MF EZ702U	2000	3150	56.00	56/1	1800	1800	3500	29	3.5	411	62
54	693	821	135	1.6	PH822F0280 KX701VF0020 MF EZ505U	2000	3150	56.00	56/1	1800	1800	3500	27	3.5	411	62
54	846	1067	165	1.3	PH822F0280 KX701VF0020 MF EZ703U	2000	3150	56.00	56/1	1800	1800	3500	37	3.5	411	64
60	339	366	58	3.7	PH822F0250 KX701VF0020 MF EZ502U	1420	3200	50.00	50/1	1800	1800	3500	21	3.5	448	58
60	339	380	58	3.7	PH822F0250 KX701VF0020 MF EZ701U	920	3200	50.00	50/1	1800	1800	3500	24	3.5	448	59
60	444	508	76	2.8	PH822F0250 KX701VF0020 MF EZ503U	1970	3200	50.00	50/1	1800	1800	3500	23	3.5	448	59
60	550	660	94	2.3	PH822F0250 KX701VF0020 MF EZ702U	1880	3200	50.00	50/1	1800	1800	3500	29	3.5	448	62
60	618	733	106	2.0	PH822F0250 KX701VF0020 MF EZ505U	2000	3200	50.00	50/1	1800	1800	3500	28	3.5	448	62
60	756	953	129	1.7	PH822F0250 KX701VF0020 MF EZ703U	2000	3200	50.00	50/1	1800	1800	3500	37	3.5	448	64
60	976	1383	167	1.3	PH822F0250 KX701VF0020 MF EZ705U	2000	3200	50.00	50/1	1800	1800	3500	49	3.5	448	69
63	325	352	47	3.4	PH822F0160 KX701VF0030 MF EZ502U	1360	3150	48.00	48/1	2100	2100	4000	18	3.5	381	58
63	325	365	47	3.4	PH822F0160 KX701VF0030 MF EZ701U	880	3150	48.00	48/1	2100	2100	4000	21	3.5	381	59
63	427	488	61	2.6	PH822F0160 KX701VF0030 MF EZ503U	1860	3150	48.00	48/1	2100	2100	4000	21	3.5	381	59
63	528	633	76	2.1	PH822F0160 KX701VF0030 MF EZ702U	1800	3150	48.00	48/1	2100	2100	4000	27	3.5	381	62
63	594	704	85	1.9	PH822F0160 KX701VF0030 MF EZ505U	1860	3150	48.00	48/1	2100	2100	4000	25	3.5	381	62
63	726	915	104	1.5	PH822F0160 KX701VF0030 MF EZ703U	1860	3150	48.00	48/1	2100	2100	4000	35	3.5	381	64
63	937	1328	135	1.2	PH822F0160 KX701VF0030 MF EZ705U	1860	3150	48.00	48/1	2100	2100	4000	47	3.5	381	69
75	271	293	46	4.6	PH822F0200 KX701VF0020 MF EZ502U	1140	3200	40.00	40/1	1800	1800	3500	21	3.5	410	58
75	271	304	46	4.6	PH822F0200 KX701VF0020 MF EZ701U	730	3200	40.00	40/1	1800	1800	3500	24	3.5	410	59
75	355	407	61	3.5	PH822F0200 KX701VF0020 MF EZ503U	1580	3200	40.00	40/1	1800	1800	3500	23	3.5	410	59
75	440	528	75	2.8	PH822F0200 KX701VF0020 MF EZ702U	1500	3200	40.00	40/1	1800	1800	3500	29	3.5	410	62
75	495	586	85	2.5	PH822F0200 KX701VF0020 MF EZ505U	2000	3200	40.00	40/1	1800	1800	3500	28	3.5	410	62
75	605	762	104	2.1	PH822F0200 KX701VF0020 MF EZ703U	2000	3200	40.00	40/1	1800	1800	3500	37	3.5	410	64
75	780	1107	134	1.6	PH822F0200 KX701VF0020 MF EZ705U	2000	3200	40.00	40/1	1800	1800	3500	50	3.5	410	69
75	817	1359	140	1.5	PH822F0200 KX701VF0020 MF EZ802U	2000	3200	40.00	40/1	1800	1800	3500	74	3.5	410	78
86	311	356	90	4.0	PH822F0350 KX701VF0010 MF EZ503U	1380	3200	35.00	35/1	1800	1600	3000	34	3.5	432	59
86	385	462	111	3.2	PH822F0350 KX701VF0010 MF EZ702U	1310	3200	35.00	35/1	1800	1600	3000	40	3.5	432	62
86	433	513	125	2.9	PH822F0350 KX701VF0010 MF EZ505U	2000	3200	35.00	35/1	1800	1600	3000	38	3.5	432	62
86	529	667	152	2.4	PH822F0350 KX701VF0010 MF EZ703U	2000	3200	35.00	35/1	1800	1600	3000	48	3.5	432	64
86	683	968	197	1.8	PH822F0350 KX701VF0010 MF EZ705U	2000	3200	35.00	35/1	1800	1600	3000	60	3.5	432	69
86	715	1189	206	1.7	PH822F0350 KX701VF0010 MF EZ802U	2000	3200	35.00	35/1	1800	1600	3000	84	3.5	432	78
94	284	325	55	3.9	PH822F0160 KX701VF0020 MF EZ503U	1260	3150	32.00	32/1	1800	1800	3500	23	3.5	381	59
94	352	422	68	3.1	PH822F0160 KX701VF0020 MF EZ702U	1200	3150	32.00	32/1	1800	1800	3500	30	3.5	381	62
94	396	469	77	2.8	PH822F0160 KX701VF0020 MF EZ505U	1860	3150	32.00	32/1	1800	1800	3500	28	3.5	381	62
94	484	610	94	2.3	PH822F0160 KX701VF0020 MF EZ703U	1860	3150	32.00	32/1	1800	1800	3500	37	3.5	381	64
94	624	885	121	1.8	PH822F0160 KX701VF0020 MF EZ705U	1860	3150	32.00	32/1	1800	1800	3500	50	3.5	381	69
94	654	1088	127	1.7	PH822F0160 KX701VF0020 MF EZ802U	1860	3150	32.00	32/1	1800	1800	3500	74	3.5	381	78
94	780	1413	152	1.4	PH822F0160 KX701VF0020 MF EZ803U	1860	3150	32.00	32/1	1800	1800	3500	99	3.5	381	84
100	210	235	45	3.8	PH821F0100 KX801VF0030 MF EZ701U	570	2400	30.00	30/1	1300	1300	3000	52	4	262	64
100	340	408	73	2.4	PH821F0100 KX801VF0030 MF EZ702U	1160	2400	30.00	30/1	1300	1300	3000	57	4	262	67
100	468	590	100	1.7	PH821F0100 KX801VF0030 MF EZ703U	1200	2400	30.00	30/1	1300	1300	3000	65	4	262	69
100	604	857	129	1.3	PH821F0100 KX801VF0030 MF EZ705U	1200	2400	30.00	30/1	1300	1300	3000	78	4	262	74
143	238	286	41	4.2	PH821F0070 KX801VF0030 MF EZ702U	810	2770	21.00	21/1	1300	1300	3000	58	4.5	288	67
143	328	413	56	3.1	PH821F0070 KX801VF0030 MF EZ703U	1290	2770	21.00	21/1	1300	1300	3000	66	4.5	288	69

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16.2 Selection tables

n_{2N}	M_{2N}	$M_{2,0}$	a_{in}	S	Type	M_{2acc}	M_{2NOT}	i	i_{exakt}	n_{1max} DB EL1,2,5,6 [rpm]	n_{1max} DB EL3,4 [rpm]	n_{1max} ZB [rpm]	J_1 [10 ⁻⁴ kgm ²]	$\Delta\varphi_2$ [arcmin]	C_2 [Nm/ arcmin]	m [kg]
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]									
PH8KX ($n_{1N} = 3000$ rpm, $M_{2acc,max} = 2000$ Nm)																
143	423	600	72	2.4	PH821F0070 KX801VF0030 MF EZ705U	1600	2770	21.00	21/1	1300	1300	3000	78	4.5	288	74
143	443	737	76	2.3	PH821F0070 KX801VF0030 MF EZ802U	1600	2770	21.00	21/1	1300	1300	3000	102	4.5	288	83
143	528	957	90	1.9	PH821F0070 KX801VF0030 MF EZ803U	1600	2770	21.00	21/1	1300	1300	3000	128	4.5	288	89
200	170	204	35	4.9	PH821F0050 KX801VF0030 MF EZ702U	580	2600	15.00	15/1	1300	1300	3000	59	5	226	67
200	234	295	48	3.6	PH821F0050 KX801VF0030 MF EZ703U	920	2600	15.00	15/1	1300	1300	3000	67	5	226	69
200	302	428	62	2.8	PH821F0050 KX801VF0030 MF EZ705U	1320	2600	15.00	15/1	1300	1300	3000	79	5	226	74
200	316	526	65	2.7	PH821F0050 KX801VF0030 MF EZ802U	1320	2600	15.00	15/1	1300	1300	3000	103	5	226	83
200	377	684	77	2.2	PH821F0050 KX801VF0030 MF EZ803U	1320	2600	15.00	15/1	1300	1300	3000	128	5	226	89
250	136	163	35	4.9	PH821F0040 KX801VF0030 MF EZ702U	470	2080	12.00	12/1	1300	1300	3000	60	5.5	174	67
250	187	236	48	3.6	PH821F0040 KX801VF0030 MF EZ703U	740	2080	12.00	12/1	1300	1300	3000	68	5.5	174	69
250	242	343	62	2.8	PH821F0040 KX801VF0030 MF EZ705U	1060	2080	12.00	12/1	1300	1300	3000	80	5.5	174	74
250	253	421	65	2.7	PH821F0040 KX801VF0030 MF EZ802U	1060	2080	12.00	12/1	1300	1300	3000	104	5.5	174	83
250	302	547	77	2.2	PH821F0040 KX801VF0030 MF EZ803U	1060	2080	12.00	12/1	1300	1300	3000	129	5.5	174	89
PH9KX ($n_{1N} = 2000$ rpm, $M_{2acc,max} = 5000$ Nm)																
37	2162	3270	123	1.4	PH932F0180 KX801VF0030 MF EZ805U	4500	9000	54.00	54/1	1300	1300	3000	181	3.5	920	138
42	1922	2906	149	1.6	PH932F0240 KX801VF0020 MF EZ805U	4500	9000	48.00	48/1	1100	1100	2500	186	3.5	995	138
48	1681	2543	219	1.8	PH932F0420 KX801VF0010 MF EZ805U	4500	9000	42.00	42/1	1000	750	2000	215	3	1055	138
50	1601	2422	124	1.9	PH932F0200 KX801VF0020 MF EZ805U	5000	10000	40.00	40/1	1100	1100	2500	185	3.5	991	138
56	1441	2180	111	2.1	PH932F0180 KX801VF0020 MF EZ805U	4500	9000	36.00	36/1	1100	1100	2500	193	3.5	920	138
63	1281	1938	100	2.3	PH932F0160 KX801VF0020 MF EZ805U	4090	8600	32.00	32/1	1100	1100	2500	187	3.5	921	138
67	1201	1817	156	2.5	PH932F0300 KX801VF0010 MF EZ805U	4500	9000	30.00	30/1	1000	750	2000	220	3.5	1030	138
83	961	1453	100	2.3	PH932F0120 KX801VF0020 MF EZ805U	3070	6450	24.00	24/1	1100	1100	2500	194	4	788	138
100	801	1211	104	3.7	PH932F0200 KX801VF0010 MF EZ805U	3760	9030	20.00	20/1	1000	750	2000	222	3.5	991	138
111	721	1090	94	4.2	PH932F0180 KX801VF0010 MF EZ805U	3380	8130	18.00	18/1	1000	750	2000	254	3.5	920	138
125	641	969	84	4.6	PH932F0160 KX801VF0010 MF EZ805U	3000	7230	16.00	16/1	1000	750	2000	230	3.5	921	138
167	480	727	84	4.6	PH932F0120 KX801VF0010 MF EZ805U	2250	5420	12.00	12/1	1000	750	2000	260	4	788	138
PH9KX ($n_{1N} = 3000$ rpm, $M_{2acc,max} = 4500$ Nm)																
17	1220	1369	70	2.5	PH932F0600 KX801VF0030 MF EZ701U	3300	9000	180.0	180/1	1300	1300	3000	52	3	1040	100
17	1979	2374	113	1.5	PH932F0600 KX801VF0030 MF EZ702U	4500	9000	180.0	180/1	1300	1300	3000	57	3	1040	103
17	2721	3430	155	1.1	PH932F0600 KX801VF0030 MF EZ703U	4500	9000	180.0	180/1	1300	1300	3000	65	3	1040	105
21	976	1095	56	3.1	PH932F0480 KX801VF0030 MF EZ701U	2640	9000	144.0	144/1	1300	1300	3000	52	3	1051	100
21	1583	1900	90	1.9	PH932F0480 KX801VF0030 MF EZ702U	4500	9000	144.0	144/1	1300	1300	3000	57	3	1051	103
21	2177	2744	124	1.4	PH932F0480 KX801VF0030 MF EZ703U	4500	9000	144.0	144/1	1300	1300	3000	65	3	1051	105
24	854	958	49	3.5	PH932F0420 KX801VF0030 MF EZ701U	2310	9000	126.0	126/1	1300	1300	3000	52	3	1055	100
24	1385	1662	79	2.2	PH932F0420 KX801VF0030 MF EZ702U	4500	9000	126.0	126/1	1300	1300	3000	58	3	1055	103
24	1904	2401	109	1.6	PH932F0420 KX801VF0030 MF EZ703U	4500	9000	126.0	126/1	1300	1300	3000	65	3	1055	105
33	610	684	35	4.9	PH932F0300 KX801VF0030 MF EZ701U	1650	9000	90.00	90/1	1300	1300	3000	53	3.5	1030	100
33	989	1187	56	3.0	PH932F0300 KX801VF0030 MF EZ702U	3380	9000	90.00	90/1	1300	1300	3000	58	3.5	1030	103
33	1360	1715	78	2.2	PH932F0300 KX801VF0030 MF EZ703U	4500	9000	90.00	90/1	1300	1300	3000	66	3.5	1030	105
33	1756	2490	100	1.7	PH932F0300 KX801VF0030 MF EZ705U	4500	9000	90.00	90/1	1300	1300	3000	78	3.5	1030	110
33	1839	3059	105	1.6	PH932F0300 KX801VF0030 MF EZ802U	4500	9000	90.00	90/1	1300	1300	3000	102	3.5	1030	119
42	791	950	45	3.8	PH932F0240 KX801VF0030 MF EZ702U	2700	9000	72.00	72/1	1300	1300	3000	59	3.5	995	103
42	1088	1372	62	2.8	PH932F0240 KX801VF0030 MF EZ703U	4290	9000	72.00	72/1	1300	1300	3000	67	3.5	995	105
42	1405	1992	80	2.1	PH932F0240 KX801VF0030 MF EZ705U	4500	9000	72.00	72/1	1300	1300	3000	79	3.5	995	110
42	1471	2447	84	2.0	PH932F0240 KX801VF0030 MF EZ802U	4500	9000	72.00	72/1	1300	1300	3000	103	3.5	995	119
42	1754	3179	100	1.7	PH932F0240 KX801VF0030 MF EZ803U	4500	9000	72.00	72/1	1300	1300	3000	129	3.5	995	125
56	594	712	35	4.9	PH932F0180 KX801VF0030 MF EZ702U	2030	9000	54.00	54/1	1300	1300	3000	62	3.5	920	103
56	816	1029	48	3.6	PH932F0180 KX801VF0030 MF EZ703U	3220	9000	54.00	54/1	1300	1300	3000	70	3.5	920	105
56	1054	1494	62	2.8	PH932F0180 KX801VF0030 MF EZ705U	4500	9000	54.00	54/1	1300	1300	3000	82	3.5	920	110
56	1103	1835	65	2.7	PH932F0180 KX801VF0030 MF EZ802U	4500	9000	54.00	54/1	1300	1300	3000	106	3.5	920	119
56	1316	2384	77	2.2	PH932F0180 KX801VF0030 MF EZ803U	4500	9000	54.00	54/1	1300	1300	3000	132	3.5	920	125
PH10KX ($n_{1N} = 2000$ rpm, $M_{2acc,max} = 7500$ Nm)																
22	3603	5450	123	1.4	PH1032F0300 KX801VF0030 MF EZ805U	7500	15000	90.00	90/1	1300	1300	3000	177	3.5	1534	153
24	3363	5086	156	1.5	PH1032F0420 KX801VF0020 MF EZ805U	7500	15000	84.00	84/1	1100	1100	2500	183	3	1589	153
28	2882	4360	110	1.5	PH1032F0240 KX801VF0030 MF EZ805U	6140	12900	72.00	72/1	1300	1300	3000	178	3.5	1457	153
33	2402	3633	110	1.5	PH1032F0300 KX801VF0020 MF EZ805U	7500	15000	60.00	60/1	1100	1100	2500	184	3.5	1534	153
37	2162	3270	110	2.1	PH1032F0180 KX801VF0030 MF EZ805U	4600	9680	54.00	54/1	1300	1300	3000	181	3.5	1302	153
42	1922	2906	100	2.3	PH1032F0240 KX801VF0020 MF EZ805U	6140	12900	48.00	48/1	1100	1100	2500	186	3.5	1457	153
48	1681	2543	131	3.0	PH1032F0420 KX801VF0010 MF EZ805U	7500	15000	42.00	42/1	1000	750	2000	216	3	1589	153



n_{2N}	M_{2N}	$M_{2,0}$	a_{th}	S	Type	M_{2acc}	M_{2NOT}	i	i_{exakt}	n_{1max} DB EL1,2,5,6 [rpm]	n_{1max} DB EL3,4 [rpm]	n_{1max} ZB [rpm]	J_1 [10 ⁻⁴ kgm ²]	$\Delta\phi_2$ [arcmin]	C_2 [Nm/ arcmin]	m [kg]
PH10KX ($n_{1N} = 2000$ rpm, $M_{2acc,max} = 7500$ Nm)																
56	1441	2180	100	2.3	PH1032F0180 KX801VF0020 MF EZ805U	4600	9680	36.00	36/1	1100	1100	2500	193	3.5	1302	153
67	1201	1817	94	4.2	PH1032F0300 KX801VF0010 MF EZ805U	5630	13550	30.00	30/1	1000	750	2000	221	3.5	1534	153
83	961	1453	84	4.6	PH1032F0240 KX801VF0010 MF EZ805U	4510	10840	24.00	24/1	1000	750	2000	228	3.5	1457	153
111	721	1090	84	4.6	PH1032F0180 KX801VF0010 MF EZ805U	3380	8130	18.00	18/1	1000	750	2000	257	3.5	1302	153
PH10KX ($n_{1N} = 3000$ rpm, $M_{2acc,max} = 7500$ Nm)																
17	1220	1369	52	3.3	PH1032F0600 KX801VF0030 MF EZ701U	3300	13820	180.0	180/1	1300	1300	3000	52	3	1556	116
17	1979	2374	84	2.0	PH1032F0600 KX801VF0030 MF EZ702U	6760	13820	180.0	180/1	1300	1300	3000	57	3	1556	118
17	2721	3430	115	1.5	PH1032F0600 KX801VF0030 MF EZ703U	6910	13820	180.0	180/1	1300	1300	3000	65	3	1556	120
17	3512	4980	149	1.1	PH1032F0600 KX801VF0030 MF EZ705U	6910	13820	180.0	180/1	1300	1300	3000	78	3	1556	126
21	976	1095	36	4.7	PH1032F0480 KX801VF0030 MF EZ701U	2640	13820	144.0	144/1	1300	1300	3000	52	3	1581	116
21	1583	1900	59	2.9	PH1032F0480 KX801VF0030 MF EZ702U	5410	13820	144.0	144/1	1300	1300	3000	57	3	1581	118
21	2177	2744	81	2.1	PH1032F0480 KX801VF0030 MF EZ703U	6910	13820	144.0	144/1	1300	1300	3000	65	3	1581	120
21	2810	3984	104	1.6	PH1032F0480 KX801VF0030 MF EZ705U	6910	13820	144.0	144/1	1300	1300	3000	78	3	1581	126
21	2942	4894	109	1.6	PH1032F0480 KX801VF0030 MF EZ802U	6910	13820	144.0	144/1	1300	1300	3000	102	3	1581	134
24	1385	1662	47	3.6	PH1032F0420 KX801VF0030 MF EZ702U	4730	15000	126.0	126/1	1300	1300	3000	58	3	1589	118
24	1904	2401	65	2.6	PH1032F0420 KX801VF0030 MF EZ703U	7500	15000	126.0	126/1	1300	1300	3000	66	3	1589	120
24	2458	3486	84	2.0	PH1032F0420 KX801VF0030 MF EZ705U	7500	15000	126.0	126/1	1300	1300	3000	78	3	1589	126
24	2574	4282	88	1.9	PH1032F0420 KX801VF0030 MF EZ802U	7500	15000	126.0	126/1	1300	1300	3000	102	3	1589	134
24	3070	5563	105	1.6	PH1032F0420 KX801VF0030 MF EZ803U	7500	15000	126.0	126/1	1300	1300	3000	127	3	1589	140
33	989	1187	35	4.9	PH1032F0300 KX801VF0030 MF EZ702U	3380	15000	90.00	90/1	1300	1300	3000	58	3.5	1534	118
33	1360	1715	48	3.6	PH1032F0300 KX801VF0030 MF EZ703U	5360	15000	90.00	90/1	1300	1300	3000	66	3.5	1534	120
33	1756	2490	62	2.8	PH1032F0300 KX801VF0030 MF EZ705U	7500	15000	90.00	90/1	1300	1300	3000	79	3.5	1534	126
33	1839	3059	65	2.7	PH1032F0300 KX801VF0030 MF EZ802U	7500	15000	90.00	90/1	1300	1300	3000	103	3.5	1534	134
33	2193	3974	77	2.2	PH1032F0300 KX801VF0030 MF EZ803U	7500	15000	90.00	90/1	1300	1300	3000	128	3.5	1534	140
42	791	950	35	4.9	PH1032F0240 KX801VF0030 MF EZ702U	2700	12900	72.00	72/1	1300	1300	3000	59	3.5	1457	118
42	1088	1372	48	3.6	PH1032F0240 KX801VF0030 MF EZ703U	4290	12900	72.00	72/1	1300	1300	3000	67	3.5	1457	120
42	1405	1992	62	2.8	PH1032F0240 KX801VF0030 MF EZ705U	6140	12900	72.00	72/1	1300	1300	3000	79	3.5	1457	126
42	1471	2447	65	2.7	PH1032F0240 KX801VF0030 MF EZ802U	6140	12900	72.00	72/1	1300	1300	3000	103	3.5	1457	134
42	1754	3179	77	2.2	PH1032F0240 KX801VF0030 MF EZ803U	6140	12900	72.00	72/1	1300	1300	3000	129	3.5	1457	140
56	594	712	35	4.9	PH1032F0180 KX801VF0030 MF EZ702U	2030	9680	54.00	54/1	1300	1300	3000	62	3.5	1302	118
56	816	1029	48	3.6	PH1032F0180 KX801VF0030 MF EZ703U	3220	9680	54.00	54/1	1300	1300	3000	70	3.5	1302	120
56	1054	1494	62	2.8	PH1032F0180 KX801VF0030 MF EZ705U	4600	9680	54.00	54/1	1300	1300	3000	82	3.5	1302	126
56	1103	1835	65	2.7	PH1032F0180 KX801VF0030 MF EZ802U	4600	9680	54.00	54/1	1300	1300	3000	107	3.5	1302	134
56	1316	2384	77	2.2	PH1032F0180 KX801VF0030 MF EZ803U	4600	9680	54.00	54/1	1300	1300	3000	132	3.5	1302	140

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16.3 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.

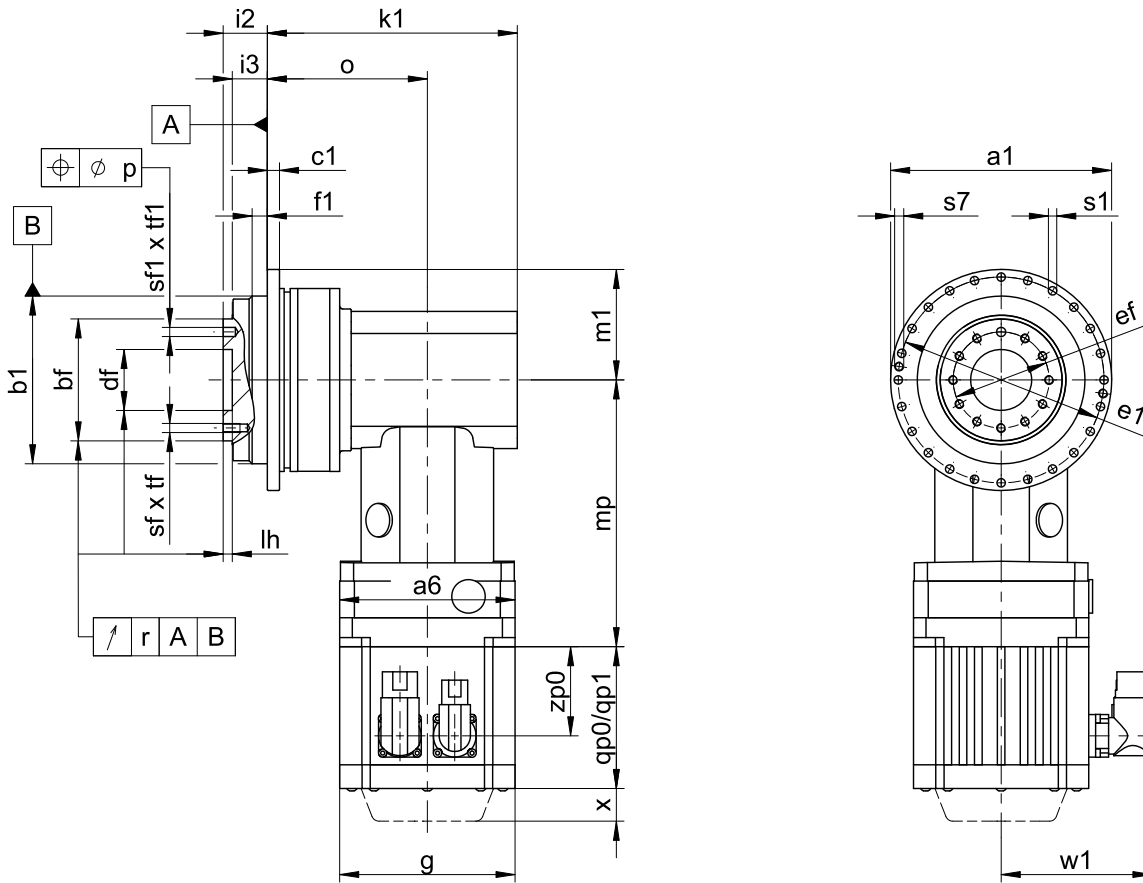
We reserve the right to make dimensional changes due to ongoing technical development.

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

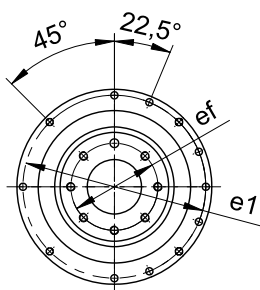
Combination options and the dimensions of forced ventilated geared motors can be found at <http://cad.stoeber.de>.



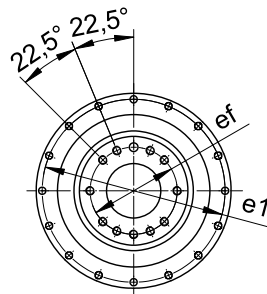
16.3.1 F shaft design (flange shaft)



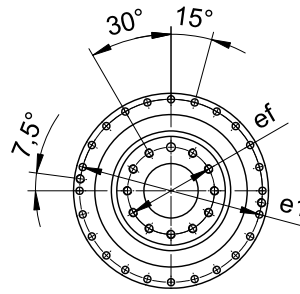
PH3 | PH4



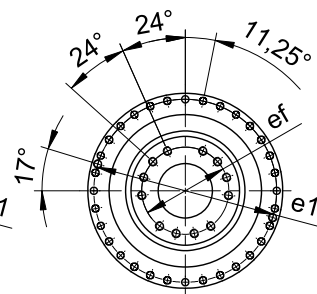
PH5



PH7/PH8



PH9/PH10



qp0	Applies to motors without brake.	qp1	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	Øb1	Øbf	c1	Ødf	Øe1	Øef	f1	i2	i3	k1	lh	m1	o	p	r	Øs1	s7	sf	Øsf1	tf	tf1
PH321_KX301_	86 _{h7}	64 _{h7}	40 _{h7}	4	20 ^{H6}	79	32	7	19.5	16.5	114.0	4	31.0	74.0	0.02	0.020	4.5	-	M5	5 ^{H7}	7	3
PH322_KX301_	86 _{h7}	64 _{h7}	40 _{h7}	4	20 ^{H6}	79	32	7	19.5	16.5	150.0	4	31.0	110.0	0.02	0.020	4.5	-	M5	5 ^{H7}	7	3
PH421_KX401_	118 _{h7}	90 _{h7}	63 _{h7}	7	32 ^{H6}	109	50	10	30.0	24.0	137.0	6	37.5	87.0	0.02	0.020	5.5	-	M6	6 ^{H7}	11	7
PH422_KX301_	118 _{h7}	90 _{h7}	63 _{h7}	7	32 ^{H6}	109	50	10	30.0	24.0	165.5	6	31.0	125.5	0.02	0.020	5.5	-	M6	6 ^{H7}	11	7
PH521_KX501_	145 _{h7}	110 _{h7}	80 _{h7}	8	40 ^{H6}	135	63	10	29.0	23.0	164.0	6	45.0	105.0	0.02	0.020	5.5	-	M6	6 ^{H7}	11	7
PH522_KX401_	145 _{h7}	110 _{h7}	80 _{h7}	8	40 ^{H6}	135	63	10	29.0	23.0	198.5	6	37.5	148.5	0.02	0.020	5.5	-	M6	6 ^{H7}	11	7
PH721_KX701_	179 _{h7}	140 _{h7}	100 _{h7}	10	50 ^{H6}	168	80	12	38.0	32.0	201.0	6	60.0	127.0	0.02	0.025	6.6	-	M8	8 ^{H7}	14	7
PH722_KX501_	179 _{h7}	140 _{h7}	100 _{h7}	10	50 ^{H6}	168	80	12	38.0	32.0	235.0	6	45.0	176.0	0.02	0.025	6.6	-	M8	8 ^{H7}	14	7
PH821_KX801_	247 _{h7}	200 _{h7}	160 _{h7}	12	80 ^{H6}	233	125	15	50.0	42.0	267.5	8	75.0	175.5	0.02	0.030	9.0	M10	M10	10 ^{H7}	18	10
PH822_KX701_	247 _{h7}	200 _{h7}	160 _{h7}	12	80 ^{H6}	233	125	15	50.0	42.0	302.0	8	60.0	228.0	0.02	0.030	9.0	M10	M10	10 ^{H7}	18	10



16 PHKX right-angle planetary geared motors

16.3 Dimensional drawings



Type	Øa1	Øb1	Øbf	c1	Ødf	Øe1	Øef	f1	i2	i3	k1	lh	m1	o	p	r	Øs1	s7	sf	Øsf1	tf	tf1
PH932_KX801_	300	255 _{h7}	180 _{h7}	18	90 ^{H6}	280	140	20	66.0	55.0	417.5	12	75.0	325.5	-	0.030	13.5	M8	M16	-	24	-
PH1032_KX801_	330	285 _{h7}	200 _{h7}	20	95 ^{H6}	310	160	20	75.0	60.0	425.0	10	75.0	333.0	-	0.040	13.5	M10	M20	-	30	-

Dimensions of motors

Type	□g	qp0	qp1	w1	x	zp0
EZ301U	72	90	130.0	55.5	21	54.5
EZ302U	72	112	152.0	55.5	21	76.5
EZ303U	72	134	174.0	55.5	21	98.5
EZ401U	98	98	146.5	91.0	22	56.0
EZ402U	98	123	171.5	91.0	22	81.0
EZ404U	98	173	221.5	91.0	22	131.0
EZ501U	115	93	147.5	100.0	22	58.5
EZ502U	115	118	172.5	100.0	22	83.5
EZ503U	115	143	197.5	100.0	22	108.5
EZ505U	115	193	247.5	100.0	22	158.5
EZ701U	145	102	161.0	115.0	22	64.0
EZ702U	145	127	186.0	115.0	22	89.0
EZ703U	145	152	211.0	115.0	22	114.0
EZ705U	145	207	266.0	134.0	22	165.0
EZ802U	190	197	274.0	156.5	22	143.0
EZ803U	190	238	315.0	156.5	22	184.0
EZ805U	190	320	397.0	156.5	22	266.0

Dimensions of geared motors

Type	EZ3		EZ4		EZ5		EZ7		EZ8	
	□a6	mp	□a6	mp	□a6	mp	□a6	mp	□a6	mp
PH321_KX301_	75	139.5	100	134.0	-	-	-	-	-	-
PH322_KX301_	75	139.5	-	-	-	-	-	-	-	-
PH421_KX401_	100	151.0	100	145.5	115	150.0	140	153.0	-	-
PH422_KX301_	75	139.5	100	134.0	-	-	-	-	-	-
PH521_KX501_	-	-	115	176.5	140	172.0	115	183.0	-	-
PH522_KX401_	100	151.0	100	145.5	115	150.0	-	-	-	-
PH721_KX701_	-	-	-	-	145	214.5	190	217.5	145	242.5
PH722_KX501_	-	-	115	176.5	140	172.0	115	183.0	-	-
PH821_KX801_	-	-	-	-	-	-	190	263.0	190	269.0
PH822_KX701_	-	-	-	-	145	214.5	190	217.5	145	242.5
PH932_KX801_	-	-	-	-	-	-	190	263.0	190	269.0
PH1032_KX801_	-	-	-	-	-	-	190	263.0	190	269.0

PHKX



16.4 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

PH	7	2	1	F	0050	KX701VF	0010	MF	EZ703U
----	---	---	---	---	------	---------	------	----	--------

Explanation

Code	Designation	Design
PH	Type	Planetary gear unit
7	Size	7 (example)
2	Generation	Generation 2
1	Stages	Single-stage
2		Two-stage
F	Shaft	Flange shaft
0050	Transmission ratio of output (i x 10)	i = 5 (example)
KX701 VF	Input	KX7 right-angle geared motor (example)
0010	Transmission ratio of input (i x 10)	i = 1 (example)
MF	Attachment to EZ	MF motor adapter
EZ703U	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 [▶ 16.5.2](#)
- Radial shaft seal rings at the output made of FKM or NBR, see Chapter [▶ 16.6.3](#)
- The position of the plug connectors, see Chapter [▶ 16.5.4](#)
- For reverse operation of the output shaft at $\pm 20^\circ$ to $\pm 90^\circ$ and horizontal installation, note Chapter [▶ 16.6.4](#)

16.5 Product description

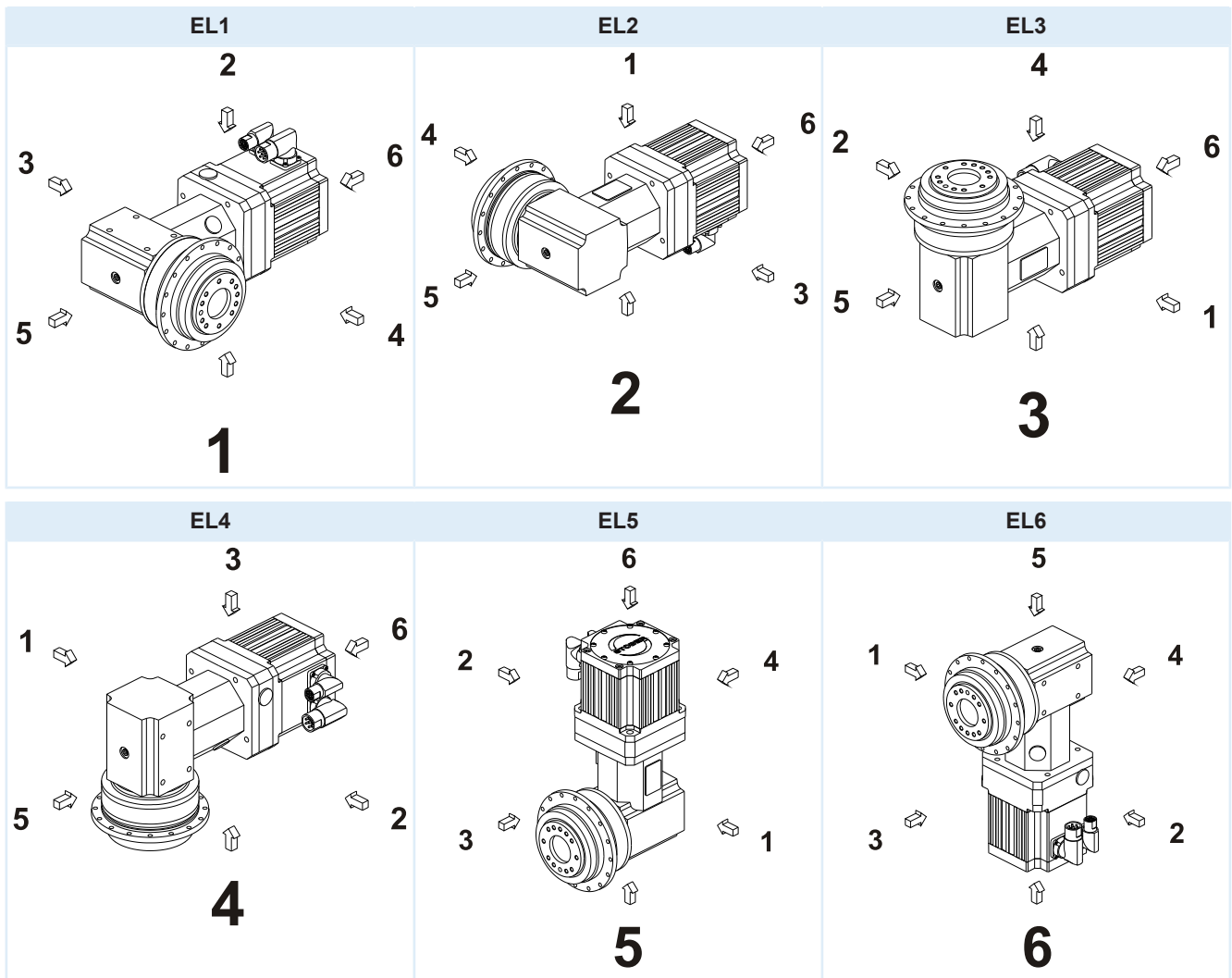
16.5.1 Installation conditions

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 $\varnothing b1$ (H7).

16.5.2 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.



PHKX

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

16.5.3 Lubricants

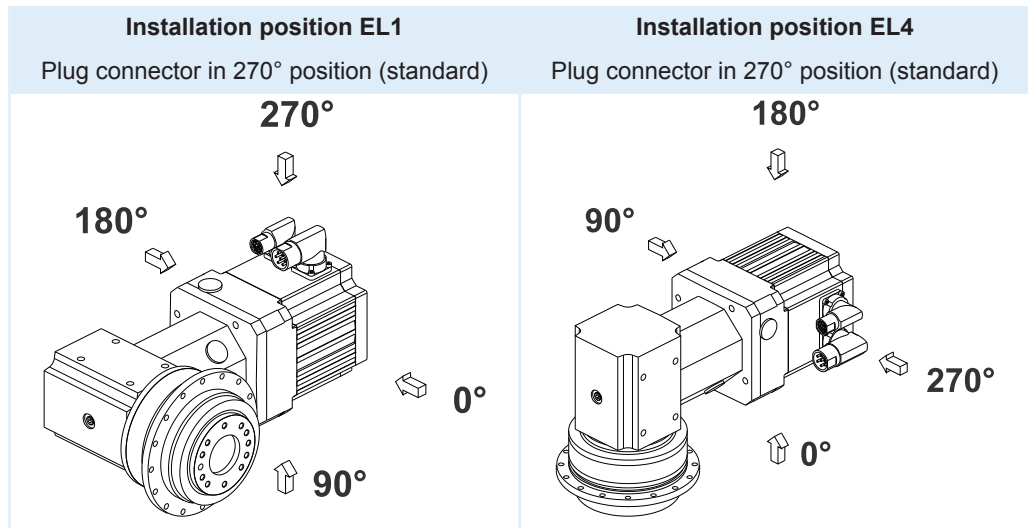
STOBER fills the gear units with the amount and type of lubricant specified on the nameplate. The filling volume and the structure of the gear units depend on the installation position.

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>



16.5.4 Position of the plug connectors



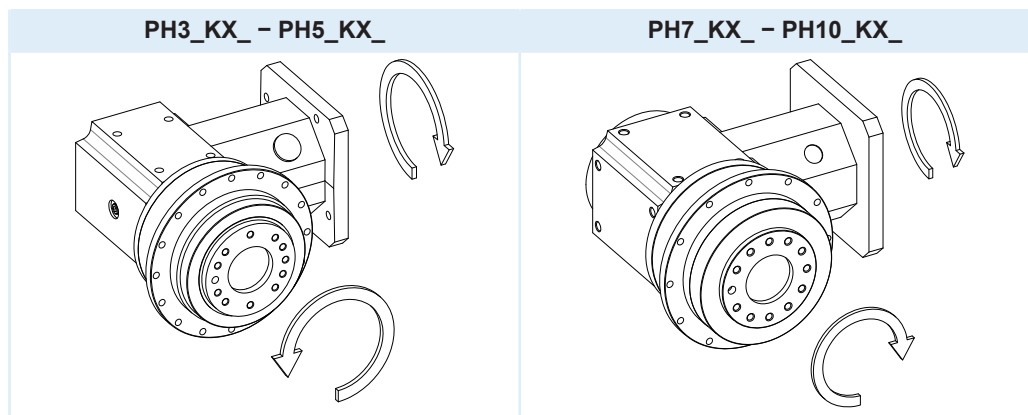
Indicate variations for your geared motor in the purchase order.

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

16.5.5 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	IP65
Motor	IP56, optionally IP66

16.5.6 Direction of rotation



The pictures show installation position EL1.

¹ Observe the protection class of all the components.



16.6 Project configuration

Project your drive using our SERVOfsoft designing software. You can receive SERVOfsoft 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}^*
$ M_2 $	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
$n_{1maxDBEL1,2,5,6}$	rpm	Maximum permitted input speed of the gear unit in continuous operation Installation positions EL1, EL2, EL5, EL6
$n_{1maxDBEL3,4}$	rpm	Maximum permitted input speed of the gear unit in continuous operation Installation positions EL3, EL4
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

16.6.1 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 installation positions EL1, EL2, EL5, EL6:

$$n_{1m}^* \leq \frac{n_{1maxDBEL1,2,5,6}}{fB_T}$$



For installation positions EL3, EL4:

$$n_{1m^*} \leq \frac{n_{1\max DBEL3,4}}{fB_T}$$

For all installation positions:

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

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

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

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

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

The values for $n_{1\max DBEL1,2,5,6^*}$, $n_{1\max DBEL3,4^*}$, $n_{1\max ZB^*}$, $M_{2\text{acc}^*}$, $M_{2\text{NOT}^*}$, M_{2N} and S can be found in the selection tables.

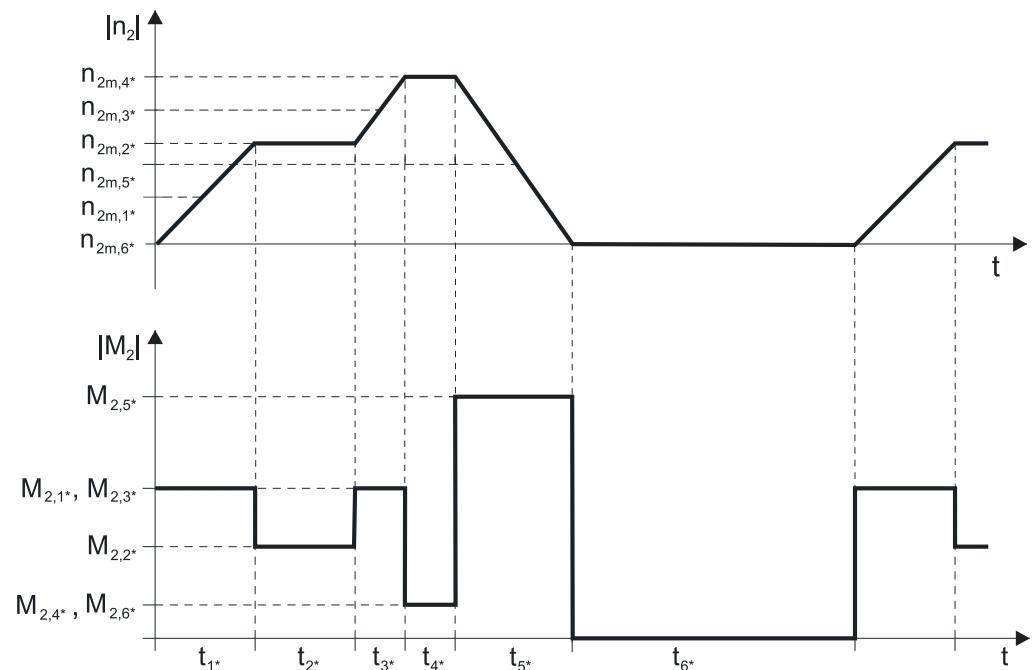
The values for fB_T , fB_{op} and fB_t can be found in the corresponding tables in this chapter.

Calculate the thermal limit torque $M_{2\text{th}}$ 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:

PHKX



Calculation of the actual average input speed

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

$$n_{2m^*} = \frac{|n_{2m,1^*}| \cdot t_{1^*} + \dots + |n_{2m,n^*}| \cdot t_{n^*}}{t_{1^*} + \dots + t_{n^*}}$$

If $t_{1^*} + \dots + t_{5^*} \geq 20 \text{ min}$, 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

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

Calculation of the actual equivalent torque

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

Calculation of the thermal limit torque

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

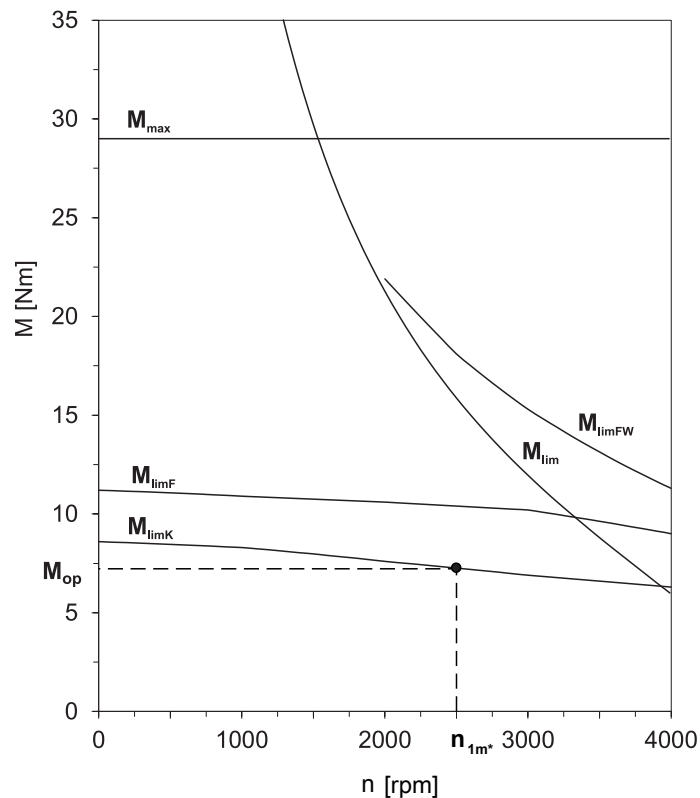
$$M_{2\text{th}} = M_{\text{op}} \cdot i \cdot K_{\text{mot,th}}$$

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

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

The values for athEL 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, 5, 6		1.0
EL3, 4		1.1
Operating mode		fB_{op}
Uniform continuous operation		1.00
Cyclic operation		1.25
Reversing load cyclic operation		1.40
Run time		fB_t
Daily 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	0.9
	≤ 30 °C	1.0
	≤ 40 °C	1.15
Motor with convection cooling	≤ 20 °C	1.0
	≤ 30 °C	1.1
	≤ 40 °C	1.25

PHKX

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.

16.6.2 Permitted shaft loads for the output shaft

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

- For shaft dimensions in accordance with the catalog
- For output speeds $n_{2m} \leq 100$ rpm ($F_{2axN} = F_{2ax100}$; $F_{2radN} = F_{2rad100}$; $M_{2kN} = M_{2k100}$)
- Only if 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]
PH3	62.0	1650	1613	1613	100	100
PH4	84.0	2150	3095	3571	260	300
PH5	97.0	4150	4536	4897	440	475
PH7	88.0	6150	17045	17045	1500	1500
PH8	126.0	10050	27778	27778	3500	3500
PH9	155.0	33000	48387	70968	7500	11000
PH10	171.0	50000	51462	73099	8800	12500



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

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

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

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

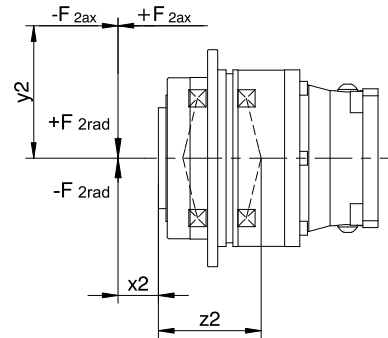


Fig. 1: Force application points

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 ($x_2 = 0$).

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

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:

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

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

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

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

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

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

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

For different duty cycles:

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



16.6.3 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.

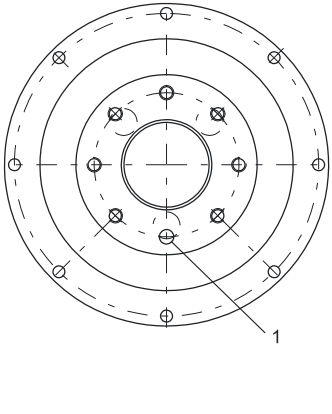
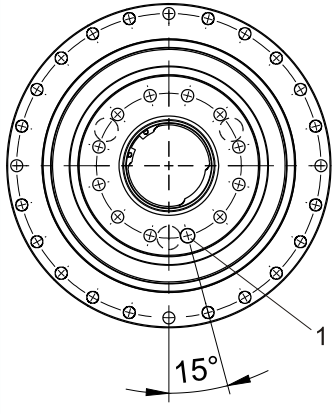
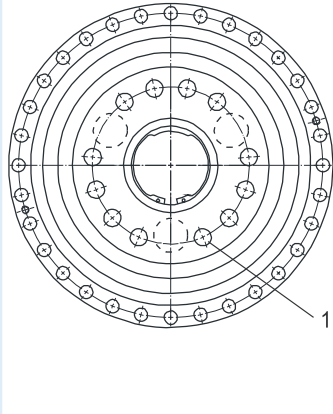


16.6.4 Reverse operation

To ensure lubrication of circulating geared parts during cyclic reverse operation from $\pm 20^\circ$ to $\pm 90^\circ$, 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 $\leq \pm 20^\circ$ on request.

Sizes 3, 4, 5, 8	Size 7	Sizes 9, 10
		
1 Position of the positioning hole: bottom	1 Position of the positioning hole: as shown in the image	1 Position of the fastening thread: as shown in the image

16.7 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