10.1 Overview

Cost-efficient helical-geared planetary geared motors

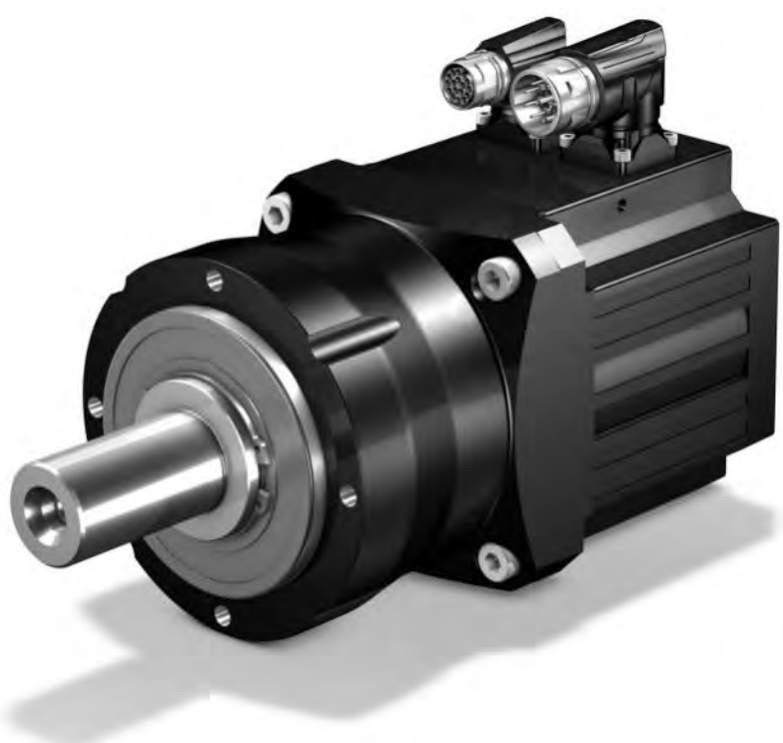
Technical data

i	3 – 28
M_{2acc}	11 – 310 Nm
$\Delta\varphi_2$	8 – 10 arcmin
η	≤ 95 – 97 %

Features

Power density	★★★☆☆
Backlash	★★★☆☆
Price category	€
Shaft load	★★☆☆☆
Smooth operation	★★★☆☆
Torsional stiffness	★★★☆☆
Mass moment of inertia	★★★★★
Helical gearing	✓
Maintenance-free	✓
Any installation position	✓
Non-contact sealing at the input	✓
Compact and highly dynamic due to direct motor attachment	✓

Key: ★☆☆☆☆ good | ★★★★★ excellent



10.2 Selection tables

The technical data specified in the selection tables applies to:

- Installation altitudes up to 1000 m above sea level
- Surrounding temperatures from 0 °C to 40 °C
- Drives with convection-cooled motors (e.g. EZ401**U**)

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_{1maxDB}	min^{-1}	Maximum permitted input speed of the gear unit in continuous operation
		(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} DB [rpm]	n_{1max} ZB [rpm]	J_1 [10^{-4} kgm²]	$\Delta\varphi_2$ [arcmin]	C_2 [Nm/ arcmin]	m [kg]
PE2 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 14 Nm)															
600	4.5	4.6	4.4	1.3	PE211_0050 EZ301U	14	26	5.000	5/1	4000	8000	0.20	10	1.4	2.1
750	3.6	3.7	6.1	1.5	PE211_0040 EZ301U	11	26	4.000	4/1	4000	8000	0.20	10	1.4	2.1
PE2 (n_{1N} = 6000 rpm, $M_{2acc,max}$ = 14 Nm)															
1200	4.3	4.6	5.3	1.1	PE211_0050 EZ301U	14	26	5.000	5/1	4000	8000	0.20	10	1.4	2.1
1500	3.5	3.7	7.4	1.3	PE211_0040 EZ301U	11	26	4.000	4/1	4000	8000	0.20	10	1.4	2.1
PE3 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 55 Nm)															
107	25	25	2.7	1.2	PE312_0280 EZ301U	55	75	28.00	28/1	4000	6000	0.20	10	4.2	3.7
120	22	23	3.7	1.0	PE312_0250 EZ301U	40	75	25.00	25/1	3700	6000	0.25	10	4.0	3.7
150	18	18	3.2	1.7	PE312_0200 EZ301U	53	75	20.00	20/1	3700	6000	0.25	10	4.2	3.7
188	14	14	3.5	2.1	PE312_0160 EZ301U	43	75	16.00	16/1	3700	6000	0.24	10	4.2	3.7
188	24	26	6.0	1.2	PE312_0160 EZ302U	55	75	16.00	16/1	3700	6000	0.34	10	4.2	4.3
200	13	14	4.8	1.7	PE312_0150 EZ301U	40	75	15.00	15/1	3700	6000	0.29	10	4.0	3.7
200	23	24	8.1	1.0	PE312_0150 EZ302U	40	75	15.00	15/1	3700	6000	0.39	10	4.0	4.3
250	11	11	4.1	2.8	PE312_0120 EZ301U	32	75	12.00	12/1	3700	6000	0.30	10	4.2	3.7
250	18	19	7.0	1.7	PE312_0120 EZ302U	55	75	12.00	12/1	3700	6000	0.40	10	4.2	4.3
250	24	25	9.1	1.3	PE312_0120 EZ303U	55	75	12.00	12/1	3700	6000	0.51	10	4.2	4.8
300	9.0	9.2	1.0	1.7	PE311_0100 EZ301U	27	75	10.00	10/1	4000	6000	0.20	8	3.4	3.1
429	6.3	6.5	1.2	2.9	PE311_0070 EZ301U	19	75	7.000	7/1	4000	6000	0.21	8	3.8	3.1
429	11	11	2.1	1.7	PE311_0070 EZ302U	34	75	7.000	7/1	4000	6000	0.31	8	3.8	3.7
429	14	15	2.7	1.3	PE311_0070 EZ303U	40	75	7.000	7/1	4000	6000	0.42	8	3.8	4.2
600	4.5	4.6	1.8	4.0	PE311_0050 EZ301U	14	75	5.000	5/1	3700	6000	0.26	8	4.1	3.1
600	7.7	8.1	3.1	2.4	PE311_0050 EZ302U	24	75	5.000	5/1	3700	6000	0.36	8	4.1	3.7
600	10	11	4.1	1.8	PE311_0050 EZ303U	34	75	5.000	5/1	3700	6000	0.47	8	4.1	4.2
600	14	15	5.5	1.3	PE311_0050 EZ401U	40	75	5.000	5/1	3700	6000	1.0	8	4.1	5.6
750	3.6	3.7	2.5	4.8	PE311_0040 EZ301U	11	75	4.000	4/1	3700	6000	0.26	8	4.2	3.1
750	6.2	6.5	4.3	2.8	PE311_0040 EZ302U	19	75	4.000	4/1	3700	6000	0.36	8	4.2	3.7
750	8.0	8.5	5.6	2.2	PE311_0040 EZ303U	27	75	4.000	4/1	3700	6000	0.47	8	4.2	4.2
750	11	12	7.5	1.6	PE311_0040 EZ401U	33	75	4.000	4/1	3700	6000	1.0	8	4.2	5.6
750	17	18	12	1.0	PE311_0040 EZ501U	42	75	4.000	4/1	3700	6000	3.0	8	4.2	6.6
1000	4.6	4.9	6.3	3.6	PE311_0030 EZ302U	15	64	3.000	3/1	3500	6000	0.41	8	3.6	3.7
1000	6.0	6.4	8.2	2.8	PE311_0030 EZ303U	20	64	3.000	3/1	3500	6000	0.52	8	3.6	4.2
1000	8.1	8.7	11	2.0	PE311_0030 EZ401U	25	65	3.000	3/1	3500	6000	1.1	8	3.6	5.6
1000	13	14	17	1.3	PE311_0030 EZ501U	40	65	3.000	3/1	3500	6000	3.0	8	3.6	6.6
1000	14	15	19	1.2	PE311_0030 EZ402U	40	65	3.000	3/1	3500	6000	1.8	8	3.6	6.7
PE3 (n_{1N} = 6000 rpm, $M_{2acc,max}$ = 55 Nm)															
214	24	25	2.6	1.3	PE312_0280 EZ301U	55	75	28.00	28/1	4000	6000	0.20	10	4.2	3.7
240	21	23	3.5	1.1	PE312_0250 EZ301U	40	75	25.00	25/1	3700	6000	0.25	10	4.0	3.7
300	17	18	3.0	1.8	PE312_0200 EZ301U	53	75	20.00	20/1	3700	6000	0.25	10	4.2	3.7
300	29	32	5.1	1.1	PE312_0200 EZ302U	55	75	20.00	20/1	3700	6000	0.35	10	4.2	4.3
375	14	14	3.4	2.2	PE312_0160 EZ301U	43	75	16.00	16/1	3700	6000	0.24	10	4.2	3.7
375	23	26	5.7	1.3	PE312_0160 EZ302U	55	75	16.00	16/1	3700	6000	0.34	10	4.2	4.3
375	30	34	7.4	1.0	PE312_0160 EZ303U	55	75	16.00	16/1	3700	6000	0.45	10	4.2	4.8
400	13	14	5.0	1.6	PE312_0150 EZ301U	40	75	15.00	15/1	3700	6000	0.29	10	4.0	3.7
500	10	11	4.3	2.7	PE312_0120 EZ301U	32	75	12.00	12/1	3700	6000	0.30	10	4.2	3.7
500	17	19	7.2	1.6	PE312_0120 EZ302U	55	75	12.00	12/1	3700	6000	0.40	10	4.2	4.3
500	22	26	9.5	1.2	PE312_0120 EZ303U	55	75	12.00	12/1	3700	6000	0.51	10	4.2	4.8
500	26	32	11	1.0	PE312_0120 EZ401U	55	75	12.00	12/1	3700	6000	1.0	10	4.2	6.2
600	8.6	9.2	1.2	1.4	PE311_0100 EZ301U	27	75	10.00	10/1	4000	6000	0.20	8	3.4	3.1
857	6.0	6.5	1.5	2.4	PE311_0070 EZ301U	19	75	7.000	7/1	4000	6000	0.21	8	3.8	3.1
857	10	11	2.5	1.4	PE311_0070 EZ302U	34	75	7.000	7/1	4000	6000	0.31	8	3.8	3.7
857	13	15	3.2	1.1	PE311_0070 EZ303U	40	75	7.000	7/1	4000	6000	0.42	8	3.8	4.2
1200	4.3	4.6	2.2	3.4	PE311_0050 EZ301U	14	75	5.000	5/1	3700	6000	0.26	8	4.1	3.1
1200	7.3	8.1	3.7	2.0	PE311_0050 EZ302U	24	75	5.000	5/1	3700	6000	0.36	8	4.1	3.7
1200	9.5	11	4.9	1.5	PE311_0050 EZ303U	34	75	5.000	5/1	3700	6000	0.47	8	4.1	4.2
1200	11	14	5.7	1.3	PE311_0050 EZ401U	40	75	5.000	5/1	3700	6000	1.0	8	4.1	5.6
1500	3.5	3.7	3.0	4.0	PE311_0040 EZ301U	11	75	4.000	4/1	3700	6000	0.26	8	4.2	3.1
1500	5.8	6.5	5.1	2.4	PE311_0040 EZ302U	19	75	4.000	4/1	3700	6000	0.36	8	4.2	3.7
1500	7.6	8.7	6.6	1.8	PE311_0040 EZ303U	27	75	4.000	4/1	3700	6000	0.47	8	4.2	4.2
1500	8.9	11	7.8	1.6	PE311_0040 EZ401U	33	75	4.000	4/1	3700	6000	1.0	8	4.2	5.6

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} DB [rpm]	n_{1max} ZB [rpm]	J_1 [10^{-4} kgm²]	$\Delta\varphi_2$ [arcmin]	C_2 [Nm/ arcmin]	m [kg]
PE3 (n_{1N} = 6000 rpm, $M_{2acc,max}$ = 55 Nm)															
1500	13	17	12	1.1	PE311_0040 EZ501U	42	75	4.000	4/1	3700	6000	3.0	8	4.2	6.6
1500	14	19	12	1.0	PE311_0040 EZ402U	42	75	4.000	4/1	3700	6000	1.7	8	4.2	6.7
2000	4.4	4.9	7.5	3.0	PE311_0030 EZ302U	15	64	3.000	3/1	3500	6000	0.41	8	3.6	3.7
2000	5.7	6.5	9.8	2.3	PE311_0030 EZ303U	20	64	3.000	3/1	3500	6000	0.52	8	3.6	4.2
2000	6.7	8.1	12	2.0	PE311_0030 EZ401U	25	65	3.000	3/1	3500	6000	1.1	8	3.6	5.6
2000	9.9	13	17	1.3	PE311_0030 EZ501U	40	65	3.000	3/1	3500	6000	3.0	8	3.6	6.6
2000	10	14	18	1.3	PE311_0030 EZ402U	40	65	3.000	3/1	3500	6000	1.8	8	3.6	6.7
PE4 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 120 Nm)															
150	53	57	4.9	1.2	PE412_0200 EZ401U	120	190	20.00	20/1	3400	6000	1.2	10	14	8.3
188	43	46	5.5	1.5	PE412_0160 EZ401U	120	190	16.00	16/1	3400	6000	1.1	10	14	8.3
200	40	43	7.4	1.3	PE412_0150 EZ401U	100	190	15.00	15/1	3400	6000	1.3	10	12	8.3
250	32	34	6.4	2.0	PE412_0120 EZ401U	97	190	12.00	12/1	3400	5500	1.3	10	14	8.3
250	49	54	9.8	1.3	PE412_0120 EZ501U	120	190	12.00	12/1	3400	5500	3.3	10	14	9.3
250	54	59	11	1.2	PE412_0120 EZ402U	120	190	12.00	12/1	3400	5500	2.0	10	14	9.4
300	27	29	1.5	1.3	PE411_0100 EZ401U	82	190	10.00	10/1	3600	6000	0.97	8	10	7.1
429	19	20	2.1	2.1	PE411_0070 EZ401U	58	190	7.000	7/1	3600	6000	1.0	8	12	7.1
429	29	32	3.2	1.4	PE411_0070 EZ501U	100	190	7.000	7/1	3600	6000	3.0	8	12	8.1
429	32	35	3.5	1.2	PE411_0070 EZ402U	100	190	7.000	7/1	3600	6000	1.7	8	12	8.2
600	14	15	3.1	2.9	PE411_0050 EZ401U	41	190	5.000	5/1	3400	6000	1.2	8	13	7.1
600	21	23	4.7	1.9	PE411_0050 EZ501U	78	190	5.000	5/1	3400	6000	3.2	8	13	8.1
600	23	25	5.2	1.7	PE411_0050 EZ402U	78	190	5.000	5/1	3400	6000	1.9	8	13	8.2
600	33	42	7.6	1.2	PE411_0050 EZ404U	100	190	5.000	5/1	3400	6000	3.3	8	13	10
600	36	39	8.2	1.1	PE411_0050 EZ502U	100	190	5.000	5/1	3400	6000	5.5	8	13	9.6
600	36	40	8.2	1.1	PE411_0050 EZ701U	97	190	5.000	5/1	3400	6000	8.8	8	13	11
750	11	12	4.0	3.7	PE411_0040 EZ401U	33	160	4.000	4/1	3400	6000	1.2	8	14	7.1
750	17	18	6.2	2.4	PE411_0040 EZ501U	62	190	4.000	4/1	3400	6000	3.2	8	14	8.1
750	18	20	6.8	2.2	PE411_0040 EZ402U	62	160	4.000	4/1	3400	6000	1.9	8	14	8.2
750	27	33	10	1.5	PE411_0040 EZ404U	100	190	4.000	4/1	3400	6000	3.3	8	14	10
750	29	31	11	1.4	PE411_0040 EZ502U	100	190	4.000	4/1	3400	6000	5.5	8	14	9.6
750	29	32	11	1.4	PE411_0040 EZ701U	78	190	4.000	4/1	3400	6000	8.8	8	14	11
750	38	43	14	1.1	PE411_0040 EZ503U	100	190	4.000	4/1	3400	6000	7.9	8	14	11
1000	8.1	8.7	6.3	4.4	PE411_0030 EZ401U	25	120	3.000	3/1	3000	5500	1.5	8	13	7.1
1000	13	14	9.7	2.9	PE411_0030 EZ501U	47	180	3.000	3/1	3000	5500	3.4	8	13	8.1
1000	14	15	11	2.6	PE411_0030 EZ402U	47	120	3.000	3/1	3000	5500	2.2	8	13	8.2
1000	20	25	16	1.8	PE411_0030 EZ404U	84	180	3.000	3/1	3000	5500	3.5	8	13	10
1000	22	23	17	1.7	PE411_0030 EZ502U	90	180	3.000	3/1	3000	5500	5.7	8	13	9.6
1000	22	24	17	1.7	PE411_0030 EZ701U	58	180	3.000	3/1	3000	5500	9.0	8	13	11
1000	28	32	22	1.3	PE411_0030 EZ503U	90	180	3.000	3/1	3000	5500	8.1	8	13	11
1000	35	42	27	1.0	PE411_0030 EZ702U	90	180	3.000	3/1	3000	5500	14	8	13	14
PE4 (n_{1N} = 4500 rpm, $M_{2acc,max}$ = 90 Nm)															
1500	28	45	25	1.1	PE411_0030 EZ505U	90	180	3.000	3/1	3000	5500	13	8	13	14
PE4 (n_{1N} = 6000 rpm, $M_{2acc,max}$ = 120 Nm)															
214	61	74	3.4	1.1	PE412_0280 EZ401U	120	190	28.00	28/1	3600	6000	0.99	10	13	8.3
300	44	53	4.1	1.5	PE412_0200 EZ401U	120	190	20.00	20/1	3400	6000	1.2	10	14	8.3
300	65	84	6.0	1.0	PE412_0200 EZ501U	120	190	20.00	20/1	3400	6000	3.1	10	14	9.3
375	35	43	4.5	1.9	PE412_0160 EZ401U	120	190	16.00	16/1	3400	6000	1.1	10	14	8.3
375	52	67	6.7	1.3	PE412_0160 EZ501U	120	190	16.00	16/1	3400	6000	3.1	10	14	9.3
375	53	74	6.9	1.2	PE412_0160 EZ402U	120	190	16.00	16/1	3400	6000	1.8	10	14	9.4
400	33	40	6.7	1.4	PE412_0150 EZ401U	100	190	15.00	15/1	3400	6000	1.3	10	12	8.3
600	22	27	1.5	1.3	PE411_0100 EZ401U	82	190	10.00	10/1	3600	6000	0.97	8	10	7.1
857	16	19	2.1	2.0	PE411_0070 EZ401U	58	190	7.000	7/1	3600	6000	1.0	8	12	7.1
857	23	30	3.2	1.4	PE411_0070 EZ501U	100	190	7.000	7/1	3600	6000	3.0	8	12	8.1
857	24	33	3.3	1.3	PE411_0070 EZ402U	100	190	7.000	7/1	3600	6000	1.7	8	12	8.2
1200	11	14	3.2	2.8	PE411_0050 EZ401U	41	190	5.000	5/1	3400	6000	1.2	8	13	7.1
1200	16	21	4.7	1.9	PE411_0050 EZ501U	78	190	5.000	5/1	3400	6000	3.2	8	13	8.1
1200	17	24	4.9	1.9	PE411_0050 EZ402U	78	190	5.000	5/1	3400	6000	1.9	8	13	8.2
1200	25	38	7.2	1.2	PE411_0050 EZ502U	100	190	5.000	5/1	3400	6000	5.5	8	13	9.6
1200	25	38	7.2	1.2	PE411_0050 EZ701U	97	190	5.000	5/1	3400	6000	8.8	8	13	11
1200	28	41	8.1	1.1	PE411_0050 EZ404U	100	190	5.000	5/1	3400	6000	3.3	8	13	10

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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} DB [rpm]	n_{1max} ZB [rpm]	J_1 [10^{-4} kgm²]	$\Delta\varphi_2$ [arcmin]	C_2 [Nm/ arcmin]	m [kg]
PE4 (n_{1N} = 6000 rpm, $M_{2acc,max}$ = 120 Nm)															
1200	30	51	8.6	1.0	PE411_0050 EZ503U	100	190	5.000	5/1	3400	6000	7.9	8	13	11
1500	8.9	11	4.2	3.5	PE411_0040 EZ401U	33	160	4.000	4/1	3400	6000	1.2	8	14	7.1
1500	13	17	6.2	2.4	PE411_0040 EZ501U	62	190	4.000	4/1	3400	6000	3.2	8	14	8.1
1500	14	19	6.4	2.3	PE411_0040 EZ402U	62	160	4.000	4/1	3400	6000	1.9	8	14	8.2
1500	20	30	9.5	1.6	PE411_0040 EZ502U	100	190	4.000	4/1	3400	6000	5.5	8	14	9.6
1500	20	31	9.5	1.6	PE411_0040 EZ701U	78	190	4.000	4/1	3400	6000	8.8	8	14	11
1500	23	33	11	1.4	PE411_0040 EZ404U	100	190	4.000	4/1	3400	6000	3.3	8	14	10
1500	24	41	11	1.3	PE411_0040 EZ503U	100	190	4.000	4/1	3400	6000	7.9	8	14	11
1500	28	55	13	1.1	PE411_0040 EZ702U	100	190	4.000	4/1	3400	6000	14	8	14	14
PE5 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 310 Nm)															
107	114	125	2.9	1.4	PE512_0280 EZ501U	310	480	28.00	28/1	2800	5000	3.1	10	35	13
120	102	112	3.8	1.3	PE512_0250 EZ501U	250	480	25.00	25/1	2600	5000	3.3	10	33	13
150	82	89	3.4	2.0	PE512_0200 EZ501U	300	480	20.00	20/1	2600	5000	3.3	10	35	13
150	141	152	5.9	1.1	PE512_0200 EZ502U	310	480	20.00	20/1	2600	5000	5.6	10	35	15
150	141	158	5.9	1.1	PE512_0200 EZ701U	310	480	20.00	20/1	2600	5000	8.9	10	35	17
188	65	71	3.8	2.4	PE512_0160 EZ501U	240	480	16.00	16/1	2600	5000	3.6	10	35	13
188	112	122	6.6	1.4	PE512_0160 EZ502U	310	480	16.00	16/1	2600	5000	5.9	10	35	15
188	112	126	6.6	1.4	PE512_0160 EZ701U	300	480	16.00	16/1	2600	5000	9.2	10	35	17
188	147	169	8.6	1.1	PE512_0160 EZ503U	310	480	16.00	16/1	2600	5000	8.3	10	35	16
200	61	67	4.9	2.1	PE512_0150 EZ501U	230	480	15.00	15/1	2500	4500	4.2	10	33	13
200	105	114	8.4	1.2	PE512_0150 EZ502U	250	480	15.00	15/1	2500	4500	6.5	10	33	15
200	105	118	8.4	1.2	PE512_0150 EZ701U	250	480	15.00	15/1	2500	4500	9.8	10	33	17
250	49	54	4.4	3.3	PE512_0120 EZ501U	180	480	12.00	12/1	2500	4500	4.2	10	35	13
250	84	91	7.6	1.9	PE512_0120 EZ502U	310	480	12.00	12/1	2500	4500	6.5	10	35	15
250	84	95	7.6	1.9	PE512_0120 EZ701U	230	480	12.00	12/1	2500	4500	9.8	10	35	17
250	111	127	10	1.4	PE512_0120 EZ503U	310	480	12.00	12/1	2500	4500	8.9	10	35	16
250	137	164	12	1.2	PE512_0120 EZ702U	310	480	12.00	12/1	2500	4500	15	10	35	19
250	154	182	14	1.0	PE512_0120 EZ505U	310	480	12.00	12/1	2500	4500	13	10	35	19
300	42	46	2.6	2.1	PE511_0100 EZ501U	160	400	10.00	10/1	3000	5000	3.0	8	27	11
300	72	78	4.4	1.2	PE511_0100 EZ502U	220	400	10.00	10/1	3000	5000	5.3	8	27	13
300	72	81	4.4	1.2	PE511_0100 EZ701U	190	400	10.00	10/1	3000	5000	8.6	8	27	14
429	29	32	3.3	3.5	PE511_0070 EZ501U	110	400	7.000	7/1	2800	5000	3.1	8	31	11
429	50	54	5.7	2.1	PE511_0070 EZ502U	210	400	7.000	7/1	2800	5000	5.4	8	31	13
429	50	56	5.7	2.1	PE511_0070 EZ701U	140	400	7.000	7/1	2800	5000	8.7	8	31	14
429	66	75	7.5	1.6	PE511_0070 EZ503U	250	400	7.000	7/1	2800	5000	7.7	8	31	14
429	81	98	9.3	1.3	PE511_0070 EZ702U	250	400	7.000	7/1	2800	5000	14	8	31	17
429	92	109	10	1.1	PE511_0070 EZ505U	250	400	7.000	7/1	2800	5000	12	8	31	17
600	21	23	5.0	4.9	PE511_0050 EZ501U	78	390	5.000	5/1	2600	5000	3.2	8	34	11
600	36	39	8.6	2.9	PE511_0050 EZ502U	150	390	5.000	5/1	2600	5000	5.5	8	34	13
600	36	40	8.6	2.9	PE511_0050 EZ701U	97	400	5.000	5/1	2600	5000	8.8	8	34	14
600	47	54	11	2.2	PE511_0050 EZ503U	210	390	5.000	5/1	2600	5000	7.9	8	34	14
600	58	70	14	1.8	PE511_0050 EZ702U	200	400	5.000	5/1	2600	5000	14	8	34	17
600	65	78	16	1.6	PE511_0050 EZ505U	250	400	5.000	5/1	2600	5000	12	8	34	17
600	80	101	19	1.3	PE511_0050 EZ703U	250	400	5.000	5/1	2600	5000	22	8	34	19
750	29	31	11	3.6	PE511_0040 EZ502U	120	310	4.000	4/1	2600	5000	5.7	8	35	13
750	29	32	11	3.6	PE511_0040 EZ701U	78	400	4.000	4/1	2600	5000	9.0	8	35	14
750	38	43	15	2.7	PE511_0040 EZ503U	170	310	4.000	4/1	2600	5000	8.1	8	35	14
750	47	56	18	2.2	PE511_0040 EZ702U	160	400	4.000	4/1	2600	5000	14	8	35	17
750	52	62	20	2.0	PE511_0040 EZ505U	250	400	4.000	4/1	2600	5000	13	8	35	17
750	64	81	25	1.6	PE511_0040 EZ703U	250	400	4.000	4/1	2600	5000	22	8	35	19
750	83	117	32	1.2	PE511_0040 EZ705U	250	400	4.000	4/1	2600	5000	35	8	35	24
750	87	144	34	1.2	PE511_0040 EZ802U	250	400	4.000	4/1	2600	5000	59	8	35	33
1000	22	23	23	3.3	PE511_0030 EZ502U	90	240	3.000	3/1	2500	4500	5.3	8	35	13
1000	22	24	23	3.3	PE511_0030 EZ701U	58	390	3.000	3/1	2500	4500	8.6	8	35	14
1000	28	32	30	2.5	PE511_0030 EZ503U	130	240	3.000	3/1	2500	4500	7.7	8	35	14
1000	35	42	37	2.0	PE511_0030 EZ702U	120	390	3.000	3/1	2500	4500	14	8	35	17
1000	39	47	42	1.8	PE511_0030 EZ505U	180	390	3.000	3/1	2500	4500	12	8	35	17
1000	48	61	51	1.5	PE511_0030 EZ703U	180	390	3.000	3/1	2500	4500	22	8	35	19

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} DB [rpm]	n_{1max} ZB [rpm]	J_1 [10^{-4} kgm²]	$\Delta\varphi_2$ [arcmin]	C_2 [Nm/ arcmin]	m [kg]
PE5 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 310 Nm)															
1000	62	88	66	1.2	PE511_0030 EZ705U	180	390	3.000	3/1	2500	4500	34	8	35	24
1000	65	108	69	1.1	PE511_0030 EZ802U	180	390	3.000	3/1	2500	4500	58	8	35	33
PE5 (n_{1N} = 4500 rpm, $M_{2acc,max}$ = 310 Nm)															
281	144	233	8.5	1.1	PE512_0160 EZ505U	310	480	16.00	16/1	2600	5000	13	10	35	19
375	108	174	9.8	1.5	PE512_0120 EZ505U	310	480	12.00	12/1	2500	4500	13	10	35	19
375	138	228	12	1.2	PE512_0120 EZ703U	310	480	12.00	12/1	2500	4500	23	10	35	21
643	65	104	8.4	1.4	PE511_0070 EZ505U	250	400	7.000	7/1	2800	5000	12	8	31	17
643	82	136	11	1.1	PE511_0070 EZ703U	250	400	7.000	7/1	2800	5000	22	8	31	19
900	46	74	13	2.0	PE511_0050 EZ505U	250	400	5.000	5/1	2600	5000	12	8	34	17
900	51	167	14	1.8	PE511_0050 EZ802U	250	400	5.000	5/1	2600	5000	58	8	34	33
900	59	97	16	1.5	PE511_0050 EZ703U	250	400	5.000	5/1	2600	5000	22	8	34	19
900	80	146	22	1.1	PE511_0050 EZ705U	250	400	5.000	5/1	2600	5000	34	8	34	24
1125	37	59	16	2.4	PE511_0040 EZ505U	250	400	4.000	4/1	2600	5000	13	8	35	17
1125	41	134	18	2.2	PE511_0040 EZ802U	250	400	4.000	4/1	2600	5000	59	8	35	33
1125	47	78	21	1.9	PE511_0040 EZ703U	250	400	4.000	4/1	2600	5000	22	8	35	19
1125	64	116	28	1.4	PE511_0040 EZ705U	250	400	4.000	4/1	2600	5000	35	8	35	24
1500	28	45	34	2.3	PE511_0030 EZ505U	180	390	3.000	3/1	2500	4500	12	8	35	17
1500	31	100	37	2.0	PE511_0030 EZ802U	180	390	3.000	3/1	2500	4500	58	8	35	33
1500	35	58	43	1.8	PE511_0030 EZ703U	180	390	3.000	3/1	2500	4500	22	8	35	19
1500	48	87	58	1.3	PE511_0030 EZ705U	180	390	3.000	3/1	2500	4500	34	8	35	24

10.3 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.

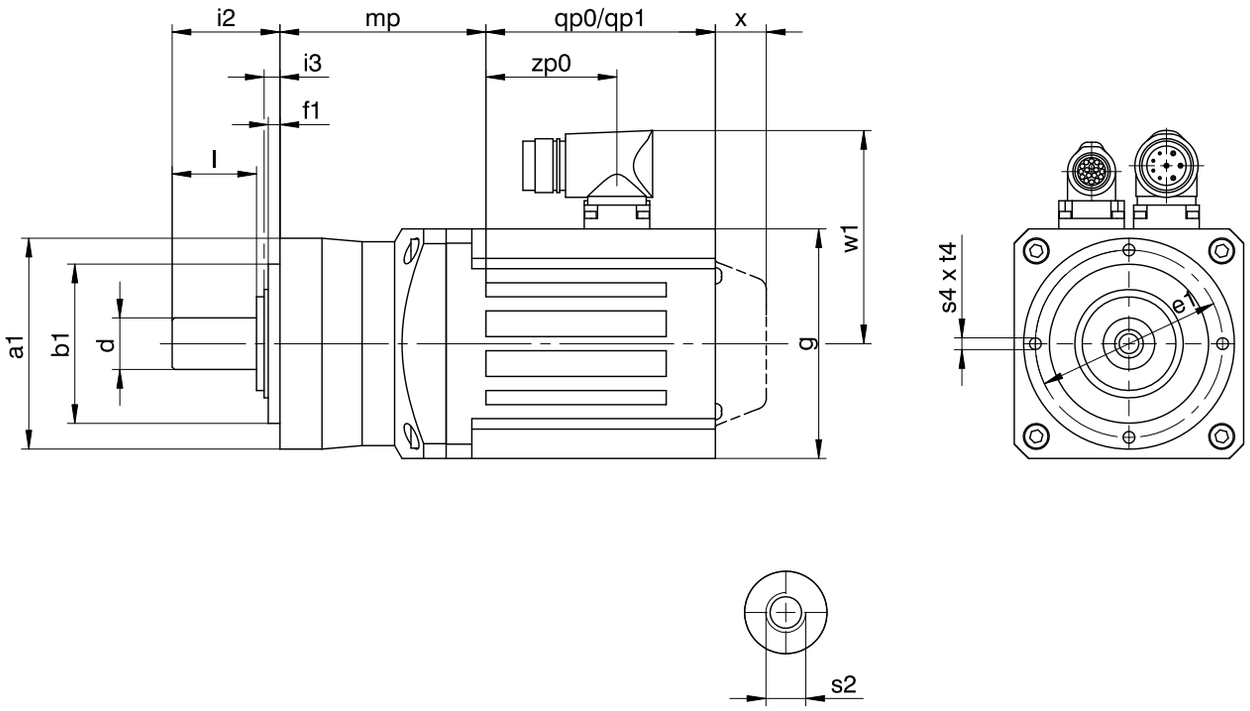
Tolerances

Solid shaft	Tolerance
Fit of shaft end Ø ≤ 50 mm	DIN 748-1, ISO k6
Fit of shaft end ∅ > 50 mm	DIN 748-1, ISO m6
Feather keys	DIN 6885-1, high form A
Balance quality	Q 2.5 (balanced with half feather key)

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

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

10.3.1 G shaft design (solid shaft without feather key)



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	Ød	Øe1	f1	i2	i3	l	s2	s4	t4
PE211	50	35_{h6}	12_{k6}	44	4	24.5	4	18	M4	M4	8
PE311	70	52_{h6}	16_{k6}	62	5	36.0	5	28	M5	M5	10
PE411	90	68_{h6}	22_{k6}	80	5	46.0	5	36	M8	M6	13
PE511	120	90_{h6}	32_{k6}	108	6	70.0	6	58	M12	M8	16

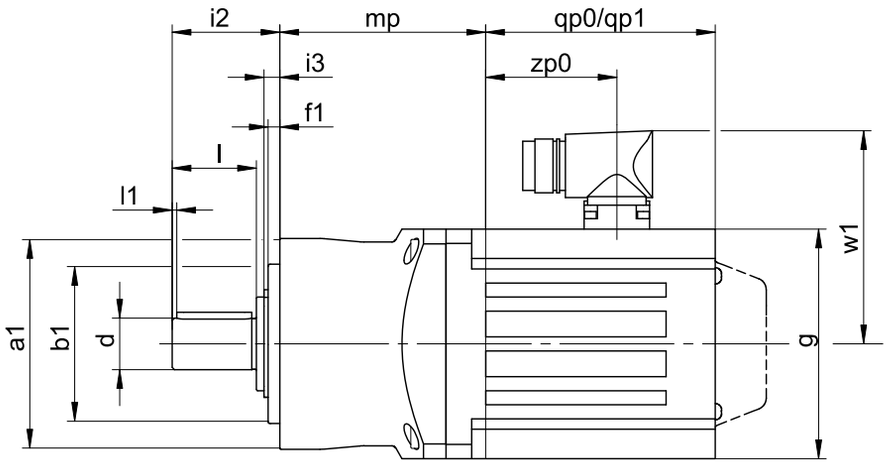
Dimensions of motors

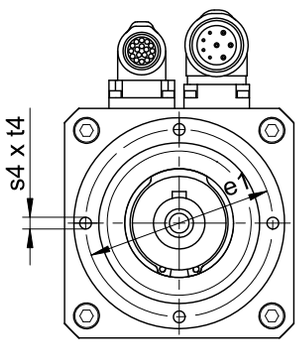
Type	□g	qp0	qp1	w1	x	zp0
EZ301U	72	90	130.0	55.5	21	54.5
EZ302U	72	112	152.0	55.5	21	76.5
EZ303U	72	134	174.0	55.5	21	98.5
EZ401U	98	98	146.5	91.0	22	56.0
EZ402U	98	123	171.5	91.0	22	81.0
EZ404U	98	173	221.5	91.0	22	131.0
EZ501U	115	93	147.5	100.0	22	58.5
EZ502U	115	118	172.5	100.0	22	83.5
EZ503U	115	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

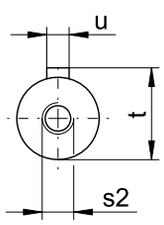
Dimensions of geared motors

Type	EZ3	EZ4	EZ5	EZ7
	mp	mp	mp	mp
PE211	72.5	–	–	–
PE311	86.0	82.5	85.0	–
PE411	–	88.0	90.5	96.5
PE511	–	–	105.5	111.5

10.3.2 P shaft design (solid shaft with feather key)







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	Ød	Øe1	f1	i2	i3	l	l1	s2	s4	t	t4	u
PE211	50	35_{h6}	12_{k6}	44	4	24.5	4	18	2	M4	M4	13.5	8	A4x4x14
PE311	70	52_{h6}	16_{k6}	62	5	36.0	5	28	2	M5	M5	18.0	10	A5x5x22
PE411	90	68_{h6}	22_{k6}	80	5	46.0	5	36	2	M8	M6	24.5	13	A6x6x32
PE511	120	90_{h6}	32_{k6}	108	6	70.0	6	58	4	M12	M8	35.0	16	A10x8x50

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

Dimensions of geared motors

Type	EZ3	EZ4	EZ5	EZ7
	mp	mp	mp	mp
PE211	72.5	–	–	–
PE311	86.0	82.5	85.0	–
PE411	–	88.0	90.5	96.5
PE511	–	–	105.5	111.5

10.4 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

PE	4	1	2	S	G	R	0200	EZ401U

Explanation

Code	Designation	Design
PE	Type	Planetary gear unit
4	Size	4 (example)
1	Generation	Generation 1
1 **2**	Stages	Single-stage Two-stage
S	Housing	Standard
G P	Shaft	Solid shaft without feather key Solid shaft with feather key
R	Bearing	Standard bearing
0200	Transmission ratio (i x 10)	i = 20 (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]

10.5 Product description

10.5.1 Installation conditions

The specified torques and forces only apply when attaching gear units at the machine side using screws of quality 10.9. In addition, the gear housing must be adjusted at the pilot (H7).

10.5.2 Lubricants

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

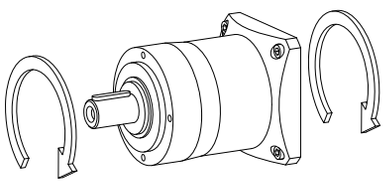
Lubricant filling quantities for gear units, document ID 441871, can be found online at http://www.stoeber.de

10.5.3 Other product features

Feature	Value
Max. permitted gear unit temperature (on the surface of the gear unit)	≤ 80 °C
Paint	Black RAL 9005
(ATEX) Directive 2014/34/EU	Not suitable
Protection class: [1] Gear unit Motor	 IP64 IP56, optionally IP66

10.5.4 Direction of rotation

The input and output rotate in the same direction.



10.6 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 $K_{mot,th}$
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_{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

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

Formula symbol	Unit	Explanation
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
$M_{2k,acc*}$	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_{1maxDB}	min^{-1}	Maximum permitted input speed of the gear unit in continuous operation
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

Formula symbol	Unit	Explanation
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

10.6.1 Calculation of the operating point

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

$$n_{1m^*} \leq \frac{n_{1maxDB}}{fB_T}$$

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

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

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

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

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

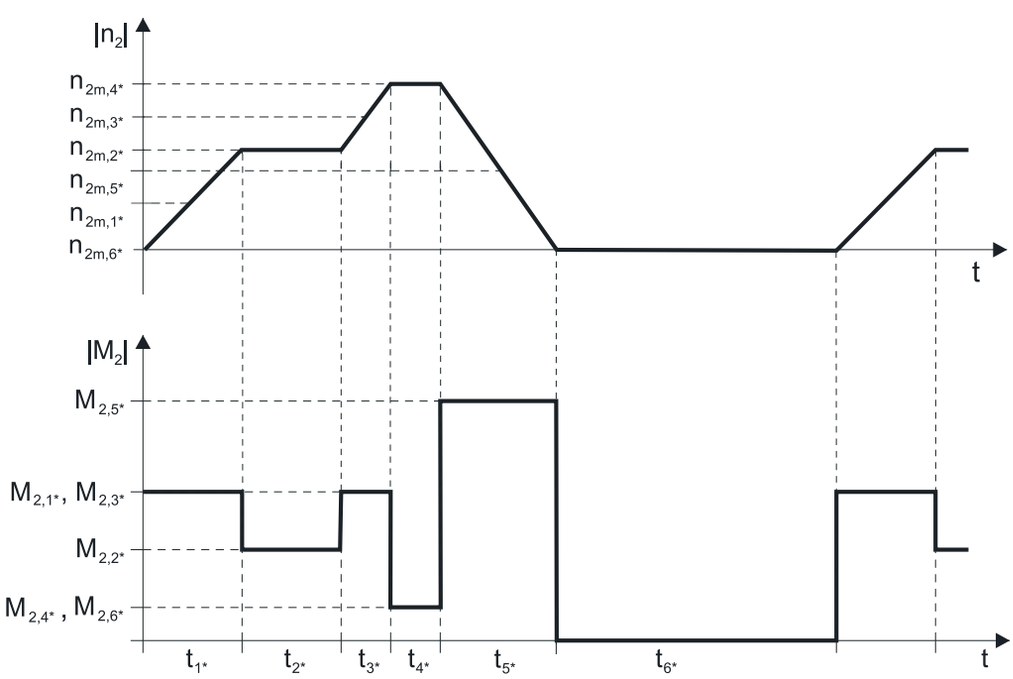
The values for n_{1maxDB}, n_{1maxZB}, M_{2acc}, M_{2NOT}, M_{2N} and S can be found in the selection tables.

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

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

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

If $t_{1^*} + \ldots + t_{5^*} \geq 20$ 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.)

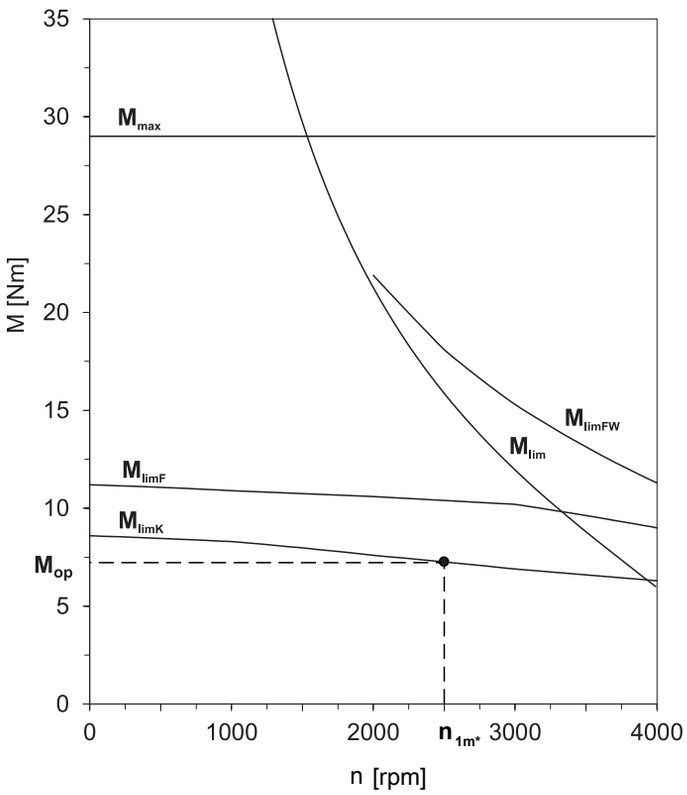
$$M_{2th} = M_{op} \cdot i \cdot K_{mot,th}$$

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

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

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

The value for the torque of the motor at operating point M_{op} with the determined average input speed n_{1m^*} can be found in the motor 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

Operating mode	Number of cycles/ hour	fB_{op}
Uniform continuous operation	–	1.00
Cyclic operation	–	1.00
Cyclic operation - reversing load[2]	≤ 1000 2000 3000 4000 ≥ 5000	1.00 1.20 1.40 1.60 1.80

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

[2] Values between 1000 and 5000 cycles per hour can be interpolated.

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.
- The values specified in the selection tables for M_{2acc} refer to the gear units with a solid shaft design without feather key (G). We recommend this shaft design in general for cyclic operation.

10.6.2 Permitted shaft loads for the output shaft

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

- For shaft dimensions in accordance with the catalog
- For output speeds $n_{2m*} \leq 100$ 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 for standard bearing R

Type	z_2 [mm]	F_{2ax100} [N]	$F_{2rad100}$ [N]	$F_{2rad,acc}$ [N]	M_{2k100} [Nm]	$M_{2k,acc}$ [Nm]
PE2	8.0	400	800	800	13	13
PE3	11.0	800	1600	1600	40	40
PE4	13.0	1900	2400	2400	73	73
PE5	16.0	4000	4600	4600	206	206

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.

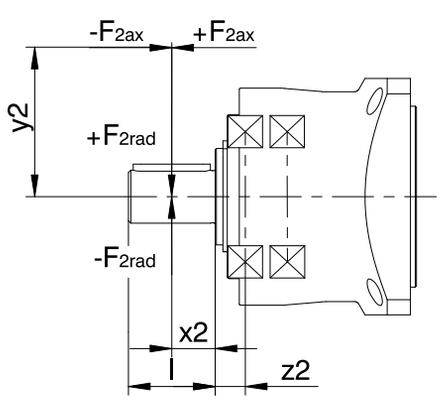


Fig. 1: Force application points

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

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

The following applies to other force application points:

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

$$F_{2rad,acc^*} \leq F_{2rad,acc}$$

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

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

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:

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

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

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 $1.5 < M_{2kN}/M_{2k^*}$

For different duty cycles:

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

10.6.3 Radial shaft seal rings

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.

10.7 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