13.1 Overview

Precision right-angle servo geared motors

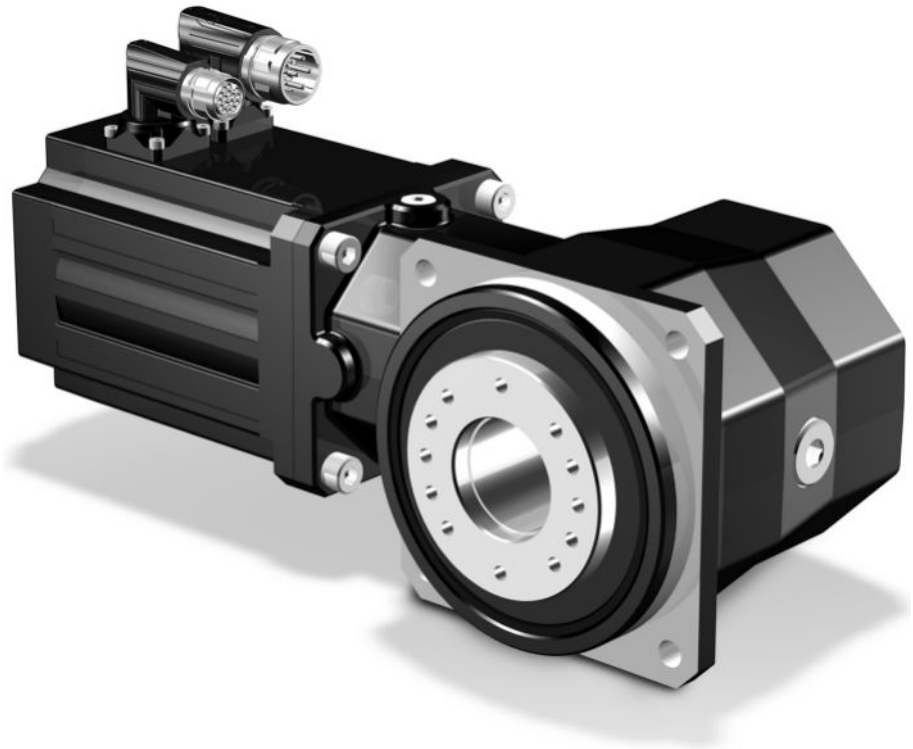
Technical Data

i	6 – 100
M_{2acc}	27 – 400 Nm
$\Delta\varphi_2$	4 – 6 arcmin
η	≤ 93 – 95 %

Features

Power density	★★★☆☆
Backlash	★★★☆☆
Price category	€€€
Shaft load	★★★★★
Smooth running	★★★★☆
Torsional stiffness	★★★☆☆
Mass moment of inertia	★★★★★
Helical gearing	✓
Maintenance-free	✓
FKM sealing ring on the input	✓
Reinforced output bearing (optional)	✓

Key: ★☆☆☆☆ good | ★★★★★ excellent



13.2 Selection tables

The technical data specified in the selection tables applies for:

- 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**)

To calculate the technical data for drives with forced ventilated motors (for example EZ401**B**) or water-cooled motors (for example EZ401**W**) visit http://products.stoeber.de.

Formula symbols	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
		Values apply for shaft design F. Values for other shaft designs, see section [▶ 13.6.3]
$\Delta\varphi_2$	arcmin	Backlash on the output shaft with the input blocked
η	%	Efficiency
i	–	Gear ratio
i_{exakt}	–	Mathematically accurate gear transmission ratio
J_1	$10^{-4}kgm^2$	Mass moment of inertia relative to the gear unit input
m	kg	Weight
$M_{2.0}$	Nm	Standstill 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 motor having the same size and nominal speed n_{1N}
M_{2N}	Nm	Nominal torque on the gear unit output (relative to n_{1N})
M_{2NOT}	Nm	Emergency off torque of the gear unit at gear unit output for max. 1000 load changes
n_{1maxDB}	rpm	Maximum permitted input speed of the gear unit in continuous operation
		(for surrounding temperature of 20 °C)
n_{1maxZB}	rpm	Maximum permitted input speed of the gear unit in cyclic operation
		(for surrounding temperature of 20 °C)
n_{1N}	rpm	Nominal speed on the gear unit input
n_{2N}	rpm	Nominal speed on the gear unit output
S	–	Characteristic load value: quotient of nominal gear unit and motor torque without taking the thermal output limit into consideration. Represents a dimension 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]
KS4 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 90 Nm)															
60	43	44	0.2	1.2	KS403_0500 EZ301U	90	140	50.00	50/1	4000	6000	0.23	6	8.5	9.0
75	35	35	0.3	1.5	KS403_0400 EZ301U	90	140	40.00	40/1	3500	6000	0.26	6	8.5	9.0
94	28	28	0.4	1.9	KS403_0320 EZ301U	83	140	32.00	32/1	3500	6000	0.27	6	8.5	9.0
94	47	50	0.6	1.1	KS403_0320 EZ302U	90	140	32.00	32/1	3500	6000	0.37	6	8.5	9.6
125	21	21	0.5	2.5	KS403_0240 EZ301U	62	140	24.00	24/1	3500	6000	0.29	6	8.5	9.0
125	35	37	0.9	1.5	KS403_0240 EZ302U	90	140	24.00	24/1	3500	6000	0.39	6	8.5	9.6
125	46	49	1.2	1.1	KS403_0240 EZ303U	90	140	24.00	24/1	3500	6000	0.50	6	8.5	10
150	18	18	0.7	2.9	KS402_0200 EZ301U	53	140	20.00	20/1	4000	6000	0.24	6	8.5	8.5
150	30	32	1.2	1.7	KS402_0200 EZ302U	90	140	20.00	20/1	4000	6000	0.34	6	8.5	9.1
150	39	42	1.5	1.3	KS402_0200 EZ303U	90	140	20.00	20/1	4000	6000	0.45	6	8.5	9.6
214	12	13	1.0	4.2	KS402_0140 EZ301U	37	140	14.00	14/1	4000	6000	0.28	6	8.5	8.5
214	21	22	1.8	2.4	KS402_0140 EZ302U	67	140	14.00	14/1	4000	6000	0.38	6	8.5	9.1
214	28	29	2.3	1.9	KS402_0140 EZ303U	90	140	14.00	14/1	4000	6000	0.49	6	8.5	9.6
214	37	40	3.1	1.4	KS402_0140 EZ401U	90	140	14.00	14/1	4000	6000	1.0	6	8.5	11
300	15	16	2.6	3.4	KS402_0100 EZ302U	48	140	10.00	10/1	3800	6000	0.49	6	8.5	9.1
300	20	21	3.4	2.6	KS402_0100 EZ303U	67	140	10.00	10/1	3800	6000	0.60	6	8.5	9.6
300	27	29	4.7	1.9	KS402_0100 EZ401U	81	140	10.00	10/1	3800	6000	1.1	6	8.5	11
300	41	45	7.2	1.3	KS402_0100 EZ501U	90	140	10.00	10/1	3800	6000	3.1	6	8.5	12
300	45	49	7.8	1.2	KS402_0100 EZ402U	90	140	10.00	10/1	3800	6000	1.8	6	8.5	12
375	12	13	3.5	4.3	KS402_0080 EZ302U	38	140	8.000	8/1	3500	6000	0.62	6	8.5	9.1
375	16	17	4.5	3.3	KS402_0080 EZ303U	53	140	8.000	8/1	3500	6000	0.73	6	8.5	9.6
375	21	23	6.1	2.4	KS402_0080 EZ401U	65	140	8.000	8/1	3500	6000	1.3	6	8.5	11
375	33	36	9.3	1.6	KS402_0080 EZ501U	90	140	8.000	8/1	3500	6000	3.2	6	8.5	12
375	36	40	10	1.4	KS402_0080 EZ402U	90	140	8.000	8/1	3500	6000	2.0	6	8.5	12
500	12	12	6.4	4.4	KS402_0060 EZ303U	40	140	6.000	6/1	3000	6000	1.1	6	8.5	9.6
500	16	17	8.6	3.2	KS402_0060 EZ401U	48	140	6.000	6/1	3000	6000	1.6	6	8.5	11
500	25	27	13	2.1	KS402_0060 EZ501U	90	140	6.000	6/1	3000	6000	3.6	6	8.5	12
500	27	30	14	1.9	KS402_0060 EZ402U	90	140	6.000	6/1	3000	6000	2.3	6	8.5	12
500	39	49	21	1.3	KS402_0060 EZ404U	90	140	6.000	6/1	3000	6000	3.7	6	8.5	14
500	42	46	23	1.2	KS402_0060 EZ502U	90	140	6.000	6/1	3000	6000	5.9	6	8.5	14
KS4 (n_{1N} = 6000 rpm, $M_{2acc,max}$ = 90 Nm)															
150	33	35	0.3	1.2	KS403_0400 EZ301U	90	140	40.00	40/1	3500	6000	0.26	6	8.5	9.0
188	26	28	0.5	1.5	KS403_0320 EZ301U	83	140	32.00	32/1	3500	6000	0.27	6	8.5	9.0
250	20	21	0.6	2.1	KS403_0240 EZ301U	62	140	24.00	24/1	3500	6000	0.29	6	8.5	9.0
250	33	37	1.1	1.2	KS403_0240 EZ302U	90	140	24.00	24/1	3500	6000	0.39	6	8.5	9.6
300	17	18	0.8	2.4	KS402_0200 EZ301U	53	140	20.00	20/1	4000	6000	0.24	6	8.5	8.5
300	29	32	1.4	1.4	KS402_0200 EZ302U	90	140	20.00	20/1	4000	6000	0.34	6	8.5	9.1
300	37	43	1.8	1.1	KS402_0200 EZ303U	90	140	20.00	20/1	4000	6000	0.45	6	8.5	9.6
429	12	13	1.2	3.5	KS402_0140 EZ301U	37	140	14.00	14/1	4000	6000	0.28	6	8.5	8.5
429	20	22	2.1	2.1	KS402_0140 EZ302U	67	140	14.00	14/1	4000	6000	0.38	6	8.5	9.1
429	26	30	2.7	1.6	KS402_0140 EZ303U	90	140	14.00	14/1	4000	6000	0.49	6	8.5	9.6
429	31	37	3.2	1.3	KS402_0140 EZ401U	90	140	14.00	14/1	4000	6000	1.0	6	8.5	11
600	8.5	9.0	1.9	4.8	KS402_0100 EZ301U	27	140	10.00	10/1	3800	6000	0.39	6	8.5	8.5
600	14	16	3.1	2.9	KS402_0100 EZ302U	48	140	10.00	10/1	3800	6000	0.49	6	8.5	9.1
600	19	21	4.1	2.2	KS402_0100 EZ303U	67	140	10.00	10/1	3800	6000	0.60	6	8.5	9.6
600	22	27	4.8	1.9	KS402_0100 EZ401U	81	140	10.00	10/1	3800	6000	1.1	6	8.5	11
600	32	42	7.1	1.3	KS402_0100 EZ501U	90	140	10.00	10/1	3800	6000	3.1	6	8.5	12
600	33	47	7.3	1.2	KS402_0100 EZ402U	90	140	10.00	10/1	3800	6000	1.8	6	8.5	12
750	11	13	4.1	3.6	KS402_0080 EZ302U	38	140	8.000	8/1	3500	6000	0.62	6	8.5	9.1
750	15	17	5.4	2.7	KS402_0080 EZ303U	53	140	8.000	8/1	3500	6000	0.73	6	8.5	9.6
750	17	21	6.3	2.3	KS402_0080 EZ401U	65	140	8.000	8/1	3500	6000	1.3	6	8.5	11
750	26	33	9.3	1.6	KS402_0080 EZ501U	90	140	8.000	8/1	3500	6000	3.2	6	8.5	12
750	27	37	9.6	1.5	KS402_0080 EZ402U	90	140	8.000	8/1	3500	6000	2.0	6	8.5	12
750	40	59	14	1.0	KS402_0080 EZ502U	90	140	8.000	8/1	3500	6000	5.5	6	8.5	14
1000	8.6	9.6	5.8	4.8	KS402_0060 EZ302U	29	140	6.000	6/1	3000	6000	0.97	6	8.5	9.1
1000	11	13	7.6	3.7	KS402_0060 EZ303U	40	140	6.000	6/1	3000	6000	1.1	6	8.5	9.6
1000	13	16	8.9	3.1	KS402_0060 EZ401U	48	140	6.000	6/1	3000	6000	1.6	6	8.5	11
1000	19	25	13	2.1	KS402_0060 EZ501U	90	140	6.000	6/1	3000	6000	3.6	6	8.5	12
1000	20	28	14	2.1	KS402_0060 EZ402U	90	140	6.000	6/1	3000	6000	2.3	6	8.5	12

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]
KS4 (n_{1N} = 6000 rpm, $M_{2acc,max}$ = 90 Nm)															
1000	30	44	20	1.4	KS402_0060 EZ502U	90	140	6.000	6/1	3000	6000	5.9	6	8.5	14
1000	33	48	22	1.2	KS402_0060 EZ404U	90	140	6.000	6/1	3000	6000	3.7	6	8.5	14
1000	35	60	24	1.2	KS402_0060 EZ503U	90	140	6.000	6/1	3000	6000	8.3	6	8.5	15
KS5 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 200 Nm)															
30	86	88	0.1	1.1	KS503_1000 EZ301U	200	300	100.0	100/1	4200	6000	0.22	5	17	15
38	69	71	0.1	1.4	KS503_0800 EZ301U	200	300	80.00	80/1	4200	6000	0.22	5	17	15
43	61	62	0.1	1.6	KS503_0700 EZ301U	180	300	70.00	70/1	4200	6000	0.24	5	17	15
60	43	44	0.1	2.3	KS503_0500 EZ301U	130	300	50.00	50/1	3500	6000	0.31	5	17	15
60	74	78	0.2	1.3	KS503_0500 EZ302U	200	300	50.00	50/1	3500	6000	0.41	5	17	15
60	96	102	0.3	1.0	KS503_0500 EZ303U	200	300	50.00	50/1	3500	6000	0.52	5	17	16
75	35	35	0.2	2.9	KS503_0400 EZ301U	100	300	40.00	40/1	3100	6000	0.39	5	17	15
75	59	62	0.3	1.7	KS503_0400 EZ302U	190	300	40.00	40/1	3100	6000	0.49	5	17	15
75	77	81	0.4	1.3	KS503_0400 EZ303U	200	300	40.00	40/1	3100	6000	0.60	5	17	16
94	28	28	0.2	3.6	KS503_0320 EZ301U	83	300	32.00	32/1	3100	6000	0.41	5	17	15
94	47	50	0.4	2.1	KS503_0320 EZ302U	150	300	32.00	32/1	3100	6000	0.51	5	17	15
94	62	65	0.5	1.6	KS503_0320 EZ303U	200	300	32.00	32/1	3100	6000	0.62	5	17	16
94	83	89	0.7	1.2	KS503_0320 EZ401U	200	300	32.00	32/1	3100	6000	1.2	5	17	17
125	21	21	0.3	4.8	KS503_0240 EZ301U	62	300	24.00	24/1	3100	6000	0.45	5	17	15
125	35	37	0.6	2.8	KS503_0240 EZ302U	110	300	24.00	24/1	3100	6000	0.55	5	17	15
125	46	49	0.7	2.1	KS503_0240 EZ303U	160	300	24.00	24/1	3100	6000	0.66	5	17	16
125	62	67	1.0	1.6	KS503_0240 EZ401U	190	300	24.00	24/1	3100	6000	1.2	5	17	17
125	96	105	1.5	1.0	KS503_0240 EZ501U	200	300	24.00	24/1	3100	6000	3.2	5	17	18
150	53	57	1.2	1.9	KS502_0200 EZ401U	160	300	20.00	20/1	3500	6000	1.0	5	17	16
150	82	89	1.9	1.2	KS502_0200 EZ501U	200	300	20.00	20/1	3500	6000	3.0	5	17	17
150	89	99	2.1	1.1	KS502_0200 EZ402U	200	300	20.00	20/1	3500	6000	1.7	5	17	17
214	37	40	1.9	2.7	KS502_0140 EZ401U	110	300	14.00	14/1	3200	6000	1.2	5	17	16
214	57	63	2.9	1.7	KS502_0140 EZ501U	200	300	14.00	14/1	3200	6000	3.2	5	17	17
214	63	69	3.2	1.6	KS502_0140 EZ402U	200	300	14.00	14/1	3200	6000	1.9	5	17	17
214	92	114	4.7	1.1	KS502_0140 EZ404U	200	300	14.00	14/1	3200	6000	3.3	5	17	19
214	98	106	5.0	1.0	KS502_0140 EZ502U	200	300	14.00	14/1	3200	6000	5.5	5	17	18
300	27	29	2.9	3.7	KS502_0100 EZ401U	81	300	10.00	10/1	3000	6000	1.6	5	17	16
300	41	45	4.4	2.4	KS502_0100 EZ501U	150	300	10.00	10/1	3000	6000	3.5	5	17	17
300	45	49	4.8	2.2	KS502_0100 EZ402U	150	300	10.00	10/1	3000	6000	2.3	5	17	17
300	66	82	7.0	1.5	KS502_0100 EZ404U	200	300	10.00	10/1	3000	6000	3.6	5	17	19
300	70	76	7.6	1.4	KS502_0100 EZ502U	200	300	10.00	10/1	3000	6000	5.8	5	17	18
300	70	79	7.6	1.4	KS502_0100 EZ701U	190	300	10.00	10/1	3000	6000	9.1	5	17	20
300	92	105	9.9	1.1	KS502_0100 EZ503U	200	300	10.00	10/1	3000	6000	8.2	5	17	20
375	21	23	3.7	4.7	KS502_0080 EZ401U	65	300	8.000	8/1	2800	6000	1.9	5	17	16
375	33	36	5.7	3.0	KS502_0080 EZ501U	120	300	8.000	8/1	2800	6000	3.9	5	17	17
375	36	40	6.3	2.8	KS502_0080 EZ402U	120	300	8.000	8/1	2800	6000	2.6	5	17	17
375	52	65	9.2	1.9	KS502_0080 EZ404U	200	300	8.000	8/1	2800	6000	4.0	5	17	19
375	56	61	9.9	1.8	KS502_0080 EZ502U	200	300	8.000	8/1	2800	6000	6.2	5	17	18
375	56	63	9.9	1.8	KS502_0080 EZ701U	150	300	8.000	8/1	2800	6000	9.5	5	17	20
375	74	84	13	1.3	KS502_0080 EZ503U	200	300	8.000	8/1	2800	6000	8.6	5	17	20
375	91	109	16	1.1	KS502_0080 EZ702U	200	300	8.000	8/1	2800	6000	15	5	17	22
500	25	27	9.2	3.6	KS502_0060 EZ501U	91	300	6.000	6/1	2500	5500	4.5	5	17	17
500	27	30	10	3.3	KS502_0060 EZ402U	91	300	6.000	6/1	2500	5500	3.3	5	17	17
500	39	49	15	2.2	KS502_0060 EZ404U	170	300	6.000	6/1	2500	5500	4.6	5	17	19
500	42	46	16	2.1	KS502_0060 EZ502U	180	300	6.000	6/1	2500	5500	6.8	5	17	18
500	42	47	16	2.1	KS502_0060 EZ701U	110	300	6.000	6/1	2500	5500	10	5	17	20
500	55	63	21	1.6	KS502_0060 EZ503U	200	300	6.000	6/1	2500	5500	9.2	5	17	20
500	68	82	26	1.3	KS502_0060 EZ702U	200	300	6.000	6/1	2500	5500	15	5	17	22
500	77	91	29	1.1	KS502_0060 EZ505U	200	300	6.000	6/1	2500	5500	14	5	17	22
KS5 (n_{1N} = 4500 rpm, $M_{2acc,max}$ = 200 Nm)															
563	72	116	15	1.2	KS502_0080 EZ505U	200	300	8.000	8/1	2800	6000	13	5	17	22
750	54	87	23	1.4	KS502_0060 EZ505U	200	300	6.000	6/1	2500	5500	14	5	17	22
750	69	114	30	1.1	KS502_0060 EZ703U	200	300	6.000	6/1	2500	5500	23	5	17	24

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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]
KS5 (n_{1N} = 6000 rpm, $M_{2acc,max}$ = 200 Nm)															
75	66	71	0.1	1.2	KS503_0800 EZ301U	200	300	80.00	80/1	4200	6000	0.22	5	17	15
86	58	62	0.1	1.4	KS503_0700 EZ301U	180	300	70.00	70/1	4200	6000	0.24	5	17	15
120	41	44	0.2	1.9	KS503_0500 EZ301U	130	300	50.00	50/1	3500	6000	0.31	5	17	15
120	70	78	0.3	1.1	KS503_0500 EZ302U	200	300	50.00	50/1	3500	6000	0.41	5	17	15
150	33	35	0.2	2.4	KS503_0400 EZ301U	100	300	40.00	40/1	3100	6000	0.39	5	17	15
150	56	62	0.4	1.4	KS503_0400 EZ302U	190	300	40.00	40/1	3100	6000	0.49	5	17	15
150	73	84	0.5	1.1	KS503_0400 EZ303U	200	300	40.00	40/1	3100	6000	0.60	5	17	16
188	26	28	0.3	3.0	KS503_0320 EZ301U	83	300	32.00	32/1	3100	6000	0.41	5	17	15
188	45	50	0.5	1.8	KS503_0320 EZ302U	150	300	32.00	32/1	3100	6000	0.51	5	17	15
188	58	67	0.6	1.4	KS503_0320 EZ303U	200	300	32.00	32/1	3100	6000	0.62	5	17	16
188	68	83	0.7	1.2	KS503_0320 EZ401U	200	300	32.00	32/1	3100	6000	1.2	5	17	17
250	20	21	0.4	4.0	KS503_0240 EZ301U	62	300	24.00	24/1	3100	6000	0.45	5	17	15
250	33	37	0.7	2.4	KS503_0240 EZ302U	110	300	24.00	24/1	3100	6000	0.55	5	17	15
250	44	50	0.9	1.8	KS503_0240 EZ303U	160	300	24.00	24/1	3100	6000	0.66	5	17	16
250	51	62	1.0	1.5	KS503_0240 EZ401U	190	300	24.00	24/1	3100	6000	1.2	5	17	17
250	76	98	1.5	1.0	KS503_0240 EZ501U	200	300	24.00	24/1	3100	6000	3.2	5	17	18
250	78	109	1.5	1.0	KS503_0240 EZ402U	200	300	24.00	24/1	3100	6000	1.9	5	17	18
300	44	53	1.3	1.8	KS502_0200 EZ401U	160	300	20.00	20/1	3500	6000	1.0	5	17	16
300	65	84	1.9	1.2	KS502_0200 EZ501U	200	300	20.00	20/1	3500	6000	3.0	5	17	17
300	67	93	2.0	1.2	KS502_0200 EZ402U	200	300	20.00	20/1	3500	6000	1.7	5	17	17
429	31	37	2.0	2.6	KS502_0140 EZ401U	110	300	14.00	14/1	3200	6000	1.2	5	17	16
429	45	59	2.9	1.7	KS502_0140 EZ501U	200	300	14.00	14/1	3200	6000	3.2	5	17	17
429	47	65	3.0	1.7	KS502_0140 EZ402U	200	300	14.00	14/1	3200	6000	1.9	5	17	17
429	69	104	4.5	1.1	KS502_0140 EZ502U	200	300	14.00	14/1	3200	6000	5.5	5	17	18
429	77	112	5.0	1.0	KS502_0140 EZ404U	200	300	14.00	14/1	3200	6000	3.3	5	17	19
600	22	27	3.0	3.6	KS502_0100 EZ401U	81	300	10.00	10/1	3000	6000	1.6	5	17	16
600	32	42	4.4	2.4	KS502_0100 EZ501U	150	300	10.00	10/1	3000	6000	3.5	5	17	17
600	33	47	4.5	2.4	KS502_0100 EZ402U	150	300	10.00	10/1	3000	6000	2.3	5	17	17
600	49	74	6.7	1.6	KS502_0100 EZ502U	200	300	10.00	10/1	3000	6000	5.8	5	17	18
600	49	75	6.7	1.6	KS502_0100 EZ701U	190	300	10.00	10/1	3000	6000	9.1	5	17	20
600	55	80	7.5	1.4	KS502_0100 EZ404U	200	300	10.00	10/1	3000	6000	3.6	5	17	19
600	59	101	8.0	1.3	KS502_0100 EZ503U	200	300	10.00	10/1	3000	6000	8.2	5	17	20
600	68	136	9.3	1.2	KS502_0100 EZ702U	200	300	10.00	10/1	3000	6000	14	5	17	22
750	17	21	3.9	4.5	KS502_0080 EZ401U	65	300	8.000	8/1	2800	6000	1.9	5	17	16
750	26	33	5.7	3.0	KS502_0080 EZ501U	120	300	8.000	8/1	2800	6000	3.9	5	17	17
750	27	37	5.9	3.0	KS502_0080 EZ402U	120	300	8.000	8/1	2800	6000	2.6	5	17	17
750	40	59	8.7	2.0	KS502_0080 EZ502U	200	300	8.000	8/1	2800	6000	6.2	5	17	18
750	40	60	8.7	2.0	KS502_0080 EZ701U	150	300	8.000	8/1	2800	6000	9.5	5	17	20
750	44	64	9.7	1.8	KS502_0080 EZ404U	200	300	8.000	8/1	2800	6000	4.0	5	17	19
750	47	81	10	1.7	KS502_0080 EZ503U	200	300	8.000	8/1	2800	6000	8.6	5	17	20
750	55	109	12	1.4	KS502_0080 EZ702U	200	300	8.000	8/1	2800	6000	15	5	17	22
KS7 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 400 Nm)															
43	182	195	0.2	1.1	KS703_0700 EZ401U	400	600	70.00	70/1	3500	6000	1.1	4	42	30
60	130	140	0.3	1.5	KS703_0500 EZ401U	400	600	50.00	50/1	3200	6000	1.2	4	42	30
75	104	112	0.3	1.9	KS703_0400 EZ401U	320	600	40.00	40/1	3000	6000	1.4	4	42	30
75	160	175	0.5	1.2	KS703_0400 EZ501U	400	600	40.00	40/1	3000	6000	3.4	4	42	31
75	175	193	0.6	1.1	KS703_0400 EZ402U	400	600	40.00	40/1	3000	6000	2.1	4	42	31
94	83	89	0.5	2.4	KS703_0320 EZ401U	250	600	32.00	32/1	3000	6000	1.5	4	42	30
94	128	140	0.7	1.6	KS703_0320 EZ501U	400	600	32.00	32/1	3000	6000	3.5	4	42	31
94	140	155	0.8	1.4	KS703_0320 EZ402U	400	600	32.00	32/1	3000	6000	2.2	4	42	31
125	62	67	0.6	3.2	KS703_0240 EZ401U	190	600	24.00	24/1	3000	6000	1.7	4	42	30
125	96	105	1.0	2.1	KS703_0240 EZ501U	360	600	24.00	24/1	3000	6000	3.7	4	42	31
125	105	116	1.1	1.9	KS703_0240 EZ402U	360	600	24.00	24/1	3000	6000	2.4	4	42	31
125	154	192	1.6	1.3	KS703_0240 EZ404U	400	600	24.00	24/1	3000	6000	3.7	4	42	33
125	165	179	1.7	1.2	KS703_0240 EZ502U	400	600	24.00	24/1	3000	6000	6.0	4	42	33
125	165	185	1.7	1.2	KS703_0240 EZ701U	400	600	24.00	24/1	3000	6000	9.3	4	42	34
150	82	89	2.7	2.4	KS702_0200 EZ501U	300	600	20.00	20/1	3200	6000	3.3	4	42	28
150	141	152	4.6	1.4	KS702_0200 EZ502U	400	600	20.00	20/1	3200	6000	5.6	4	42	30
150	141	158	4.6	1.4	KS702_0200 EZ701U	380	600	20.00	20/1	3200	6000	8.9	4	42	31

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]
KS7 (n_{1N} = 3000 rpm, $M_{2acc,max}$ = 400 Nm)															
150	184	211	6.0	1.1	KS702_0200 EZ503U	400	600	20.00	20/1	3200	6000	8.0	4	42	31
214	57	63	4.1	3.5	KS702_0140 EZ501U	210	600	14.00	14/1	3000	6000	3.8	4	42	28
214	98	106	7.0	2.0	KS702_0140 EZ502U	400	600	14.00	14/1	3000	6000	6.1	4	42	30
214	98	110	7.0	2.0	KS702_0140 EZ701U	270	600	14.00	14/1	3000	6000	9.4	4	42	31
214	129	148	9.2	1.5	KS702_0140 EZ503U	400	600	14.00	14/1	3000	6000	8.4	4	42	31
214	160	192	11	1.2	KS702_0140 EZ702U	400	600	14.00	14/1	3000	6000	15	4	42	34
214	180	213	13	1.1	KS702_0140 EZ505U	400	600	14.00	14/1	3000	6000	13	4	42	34
300	41	45	6.1	4.9	KS702_0100 EZ501U	150	600	10.00	10/1	2800	6000	4.7	4	42	28
300	70	76	10	2.8	KS702_0100 EZ502U	290	600	10.00	10/1	2800	6000	7.0	4	42	30
300	70	79	10	2.8	KS702_0100 EZ701U	190	600	10.00	10/1	2800	6000	10	4	42	31
300	92	105	14	2.2	KS702_0100 EZ503U	400	600	10.00	10/1	2800	6000	9.4	4	42	31
300	114	137	17	1.7	KS702_0100 EZ702U	390	600	10.00	10/1	2800	6000	16	4	42	34
300	128	152	19	1.5	KS702_0100 EZ505U	400	600	10.00	10/1	2800	6000	14	4	42	34
300	157	198	23	1.3	KS702_0100 EZ703U	400	600	10.00	10/1	2800	6000	23	4	42	36
375	56	61	14	3.5	KS702_0080 EZ502U	240	600	8.000	8/1	2500	5000	8.1	4	42	30
375	56	63	14	3.5	KS702_0080 EZ701U	150	600	8.000	8/1	2500	5000	11	4	42	31
375	74	84	18	2.7	KS702_0080 EZ503U	330	600	8.000	8/1	2500	5000	10	4	42	31
375	91	109	22	2.2	KS702_0080 EZ702U	310	600	8.000	8/1	2500	5000	17	4	42	34
375	103	122	25	1.9	KS702_0080 EZ505U	400	600	8.000	8/1	2500	5000	15	4	42	34
375	125	158	31	1.6	KS702_0080 EZ703U	400	600	8.000	8/1	2500	5000	25	4	42	36
375	162	230	39	1.2	KS702_0080 EZ705U	400	600	8.000	8/1	2500	5000	37	4	42	41
375	169	282	41	1.2	KS702_0080 EZ802U	400	600	8.000	8/1	2500	5000	61	4	42	50
500	42	46	19	4.7	KS702_0060 EZ502U	180	600	6.000	6/1	2100	4500	11	4	42	30
500	42	47	19	4.7	KS702_0060 EZ701U	110	600	6.000	6/1	2100	4500	14	4	42	31
500	55	63	25	3.6	KS702_0060 EZ503U	250	600	6.000	6/1	2100	4500	13	4	42	31
500	68	82	31	2.9	KS702_0060 EZ702U	230	600	6.000	6/1	2100	4500	19	4	42	34
500	77	91	35	2.6	KS702_0060 EZ505U	380	600	6.000	6/1	2100	4500	18	4	42	34
500	94	119	43	2.1	KS702_0060 EZ703U	370	600	6.000	6/1	2100	4500	27	4	42	36
500	121	172	56	1.6	KS702_0060 EZ705U	400	600	6.000	6/1	2100	4500	40	4	42	41
500	127	211	58	1.6	KS702_0060 EZ802U	400	600	6.000	6/1	2100	4500	64	4	42	50
KS7 (n_{1N} = 4500 rpm, $M_{2acc,max}$ = 400 Nm)															
321	126	203	10	1.4	KS702_0140 EZ505U	400	600	14.00	14/1	3000	6000	13	4	42	34
321	161	266	13	1.1	KS702_0140 EZ703U	400	600	14.00	14/1	3000	6000	22	4	42	36
450	90	145	15	1.9	KS702_0100 EZ505U	400	600	10.00	10/1	2800	6000	14	4	42	34
450	115	190	20	1.5	KS702_0100 EZ703U	400	600	10.00	10/1	2800	6000	23	4	42	36
450	156	285	27	1.1	KS702_0100 EZ705U	400	600	10.00	10/1	2800	6000	36	4	42	41
563	72	116	20	2.4	KS702_0080 EZ505U	400	600	8.000	8/1	2500	5000	15	4	42	34
563	80	262	22	2.2	KS702_0080 EZ802U	400	600	8.000	8/1	2500	5000	61	4	42	50
563	92	152	26	1.9	KS702_0080 EZ703U	400	600	8.000	8/1	2500	5000	25	4	42	36
563	125	228	35	1.4	KS702_0080 EZ705U	400	600	8.000	8/1	2500	5000	37	4	42	41
750	54	87	28	3.2	KS702_0060 EZ505U	380	600	6.000	6/1	2100	4500	18	4	42	34
750	60	197	31	2.9	KS702_0060 EZ802U	400	600	6.000	6/1	2100	4500	64	4	42	50
750	69	114	36	2.5	KS702_0060 EZ703U	370	600	6.000	6/1	2100	4500	27	4	42	36
750	93	171	49	1.9	KS702_0060 EZ705U	400	600	6.000	6/1	2100	4500	40	4	42	41
KS7 (n_{1N} = 6000 rpm, $M_{2acc,max}$ = 400 Nm)															
86	150	182	0.2	1.1	KS703_0700 EZ401U	400	600	70.00	70/1	3500	6000	1.1	4	42	30
120	107	130	0.3	1.5	KS703_0500 EZ401U	400	600	50.00	50/1	3200	6000	1.2	4	42	30
150	86	104	0.4	1.8	KS703_0400 EZ401U	320	600	40.00	40/1	3000	6000	1.4	4	42	30
150	126	164	0.5	1.2	KS703_0400 EZ501U	400	600	40.00	40/1	3000	6000	3.4	4	42	31
150	130	182	0.5	1.2	KS703_0400 EZ402U	400	600	40.00	40/1	3000	6000	2.1	4	42	31
188	68	83	0.5	2.3	KS703_0320 EZ401U	250	600	32.00	32/1	3000	6000	1.5	4	42	30
188	101	131	0.7	1.6	KS703_0320 EZ501U	400	600	32.00	32/1	3000	6000	3.5	4	42	31
188	104	146	0.7	1.5	KS703_0320 EZ402U	400	600	32.00	32/1	3000	6000	2.2	4	42	31
188	155	232	1.1	1.0	KS703_0320 EZ502U	400	600	32.00	32/1	3000	6000	5.8	4	42	33
188	155	235	1.1	1.0	KS703_0320 EZ701U	400	600	32.00	32/1	3000	6000	9.1	4	42	34
250	51	62	0.7	3.1	KS703_0240 EZ401U	190	600	24.00	24/1	3000	6000	1.7	4	42	30
250	76	98	1.0	2.1	KS703_0240 EZ501U	360	600	24.00	24/1	3000	6000	3.7	4	42	31
250	78	109	1.0	2.0	KS703_0240 EZ402U	360	600	24.00	24/1	3000	6000	2.4	4	42	31
250	116	174	1.5	1.4	KS703_0240 EZ502U	400	600	24.00	24/1	3000	6000	6.0	4	42	33

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]
KS7 (n_{1N} = 6000 rpm, $M_{2acc,max}$ = 400 Nm)															
250	116	176	1.5	1.4	KS703_0240 EZ701U	400	600	24.00	24/1	3000	6000	9.3	4	42	34
250	129	187	1.7	1.2	KS703_0240 EZ404U	400	600	24.00	24/1	3000	6000	3.7	4	42	33
250	138	237	1.8	1.1	KS703_0240 EZ503U	400	600	24.00	24/1	3000	6000	8.3	4	42	34
300	65	84	2.6	2.4	KS702_0200 EZ501U	300	600	20.00	20/1	3200	6000	3.3	4	42	28
300	99	148	4.0	1.6	KS702_0200 EZ502U	400	600	20.00	20/1	3200	6000	5.6	4	42	30
300	99	150	4.0	1.6	KS702_0200 EZ701U	380	600	20.00	20/1	3200	6000	8.9	4	42	31
300	118	201	4.8	1.3	KS702_0200 EZ503U	400	600	20.00	20/1	3200	6000	8.0	4	42	31
300	137	272	5.6	1.2	KS702_0200 EZ702U	400	600	20.00	20/1	3200	6000	14	4	42	34
429	45	59	4.1	3.5	KS702_0140 EZ501U	210	600	14.00	14/1	3000	6000	3.8	4	42	28
429	69	104	6.2	2.3	KS702_0140 EZ502U	400	600	14.00	14/1	3000	6000	6.1	4	42	30
429	69	105	6.2	2.3	KS702_0140 EZ701U	270	600	14.00	14/1	3000	6000	9.4	4	42	31
429	82	141	7.4	1.9	KS702_0140 EZ503U	400	600	14.00	14/1	3000	6000	8.4	4	42	31
429	96	190	8.6	1.6	KS702_0140 EZ702U	400	600	14.00	14/1	3000	6000	15	4	42	34
600	32	42	6.1	4.9	KS702_0100 EZ501U	150	600	10.00	10/1	2800	6000	4.7	4	42	28
600	49	74	9.3	3.2	KS702_0100 EZ502U	290	600	10.00	10/1	2800	6000	7.0	4	42	30
600	49	75	9.3	3.2	KS702_0100 EZ701U	190	600	10.00	10/1	2800	6000	10	4	42	31
600	59	101	11	2.7	KS702_0100 EZ503U	400	600	10.00	10/1	2800	6000	9.4	4	42	31
600	68	136	13	2.3	KS702_0100 EZ702U	390	600	10.00	10/1	2800	6000	16	4	42	34

13.3 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 may exceed the requirements of ISO 2768-mK due to casting tolerances or the sum of additional tolerances.

We reserve the right to make modifications to the dimensions due to technical advances.

You can download CAD model of our standard drives from http://cad.stoeber.de.

Combined options and the dimensions of forced ventilated or water-cooled geared motors can be found at http://cad.stoeber.de.

Tolerances

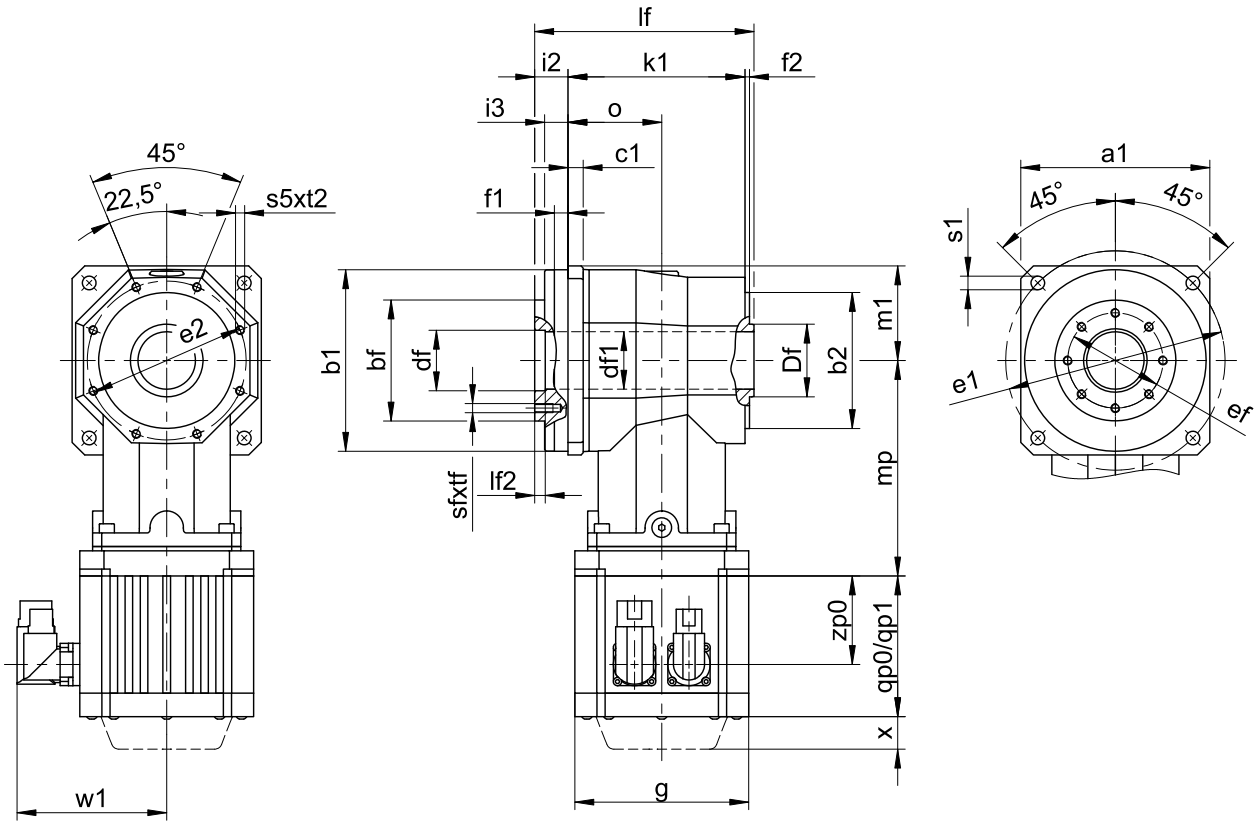
Solid shaft	Tolerance
Shaft end fit ∅ ≤ 50 mm	DIN 748-1, ISO k6
Shaft end fit ∅ > 50 mm	DIN 748-1, ISO m6
Feather keys	DIN 6885-1, high shape A

Hollow shaft	Tolerance
Hollow shaft hole fit	ISO H7

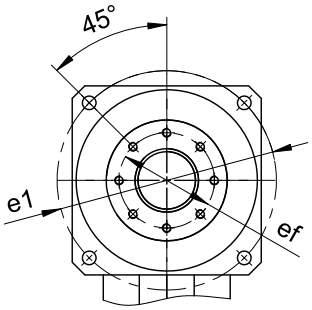
Centering holes in solid shafts according to DIN 332-2, shape DR

Thread size	M8	M12	M16
Thread depth	19	28	36

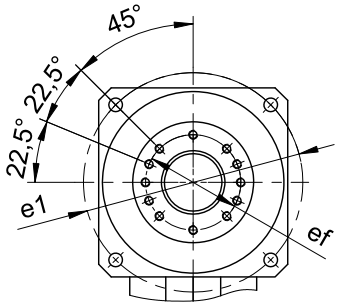
13.3.1 Shaft design F (flange hollow shaft)



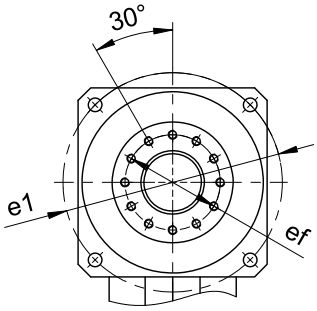
KS4



KS5



KS7



qp0	Applies to motors without brake.	qp1	Applies to motors with brake.
x	Applies to encoders based on optical measuring principle.		

Dimensions of gear units

Type	□a1	Øb1	Øb2	bf	c1	Ødf	Ødf1	ØDf	Øe1	Øe2	ef	f1	f2	i2	i3	k1	lf	lf2	m1	o	Øs1	s5	sf	t2	tf
KS402	101	95_{h6}	75_{h6}	63_{h7}	10	31.5^{H7}	30	40_{d9}	120	88	50	8	3	20	14.0	104	127	6.0	50.5	53	6.6	M5	M6	9	11
KS403	101	95_{h6}	75_{h6}	63_{h7}	10	31.5^{H7}	30	40_{d9}	120	88	50	8	3	20	14.0	104	127	6.0	50.5	53	6.6	M5	M6	9	11
KS502	125	120_{h6}	90_{h6}	80_{h7}	10	40.0^{H7}	38	48_{d9}	145	105	63	9	3	22	15.5	120	145	6.5	62.5	62	9.0	M6	M6	11	12
KS503	125	120_{h6}	90_{h6}	80_{h7}	10	40.0^{H7}	38	48_{d9}	145	105	63	9	3	22	15.5	120	145	6.5	62.5	62	9.0	M6	M6	11	12
KS702	155	150_{h6}	110_{h6}	100_{h7}	15	50.0^{H7}	49	60_{d9}	180	130	80	10	3	27	20.0	148	178	7.0	77.5	78	11.0	M8	M8	14	15
KS703	155	150_{h6}	110_{h6}	100_{h7}	15	50.0^{H7}	49	60_{d9}	180	130	80	10	3	27	20.0	148	178	7.0	77.5	78	11.0	M8	M8	14	15

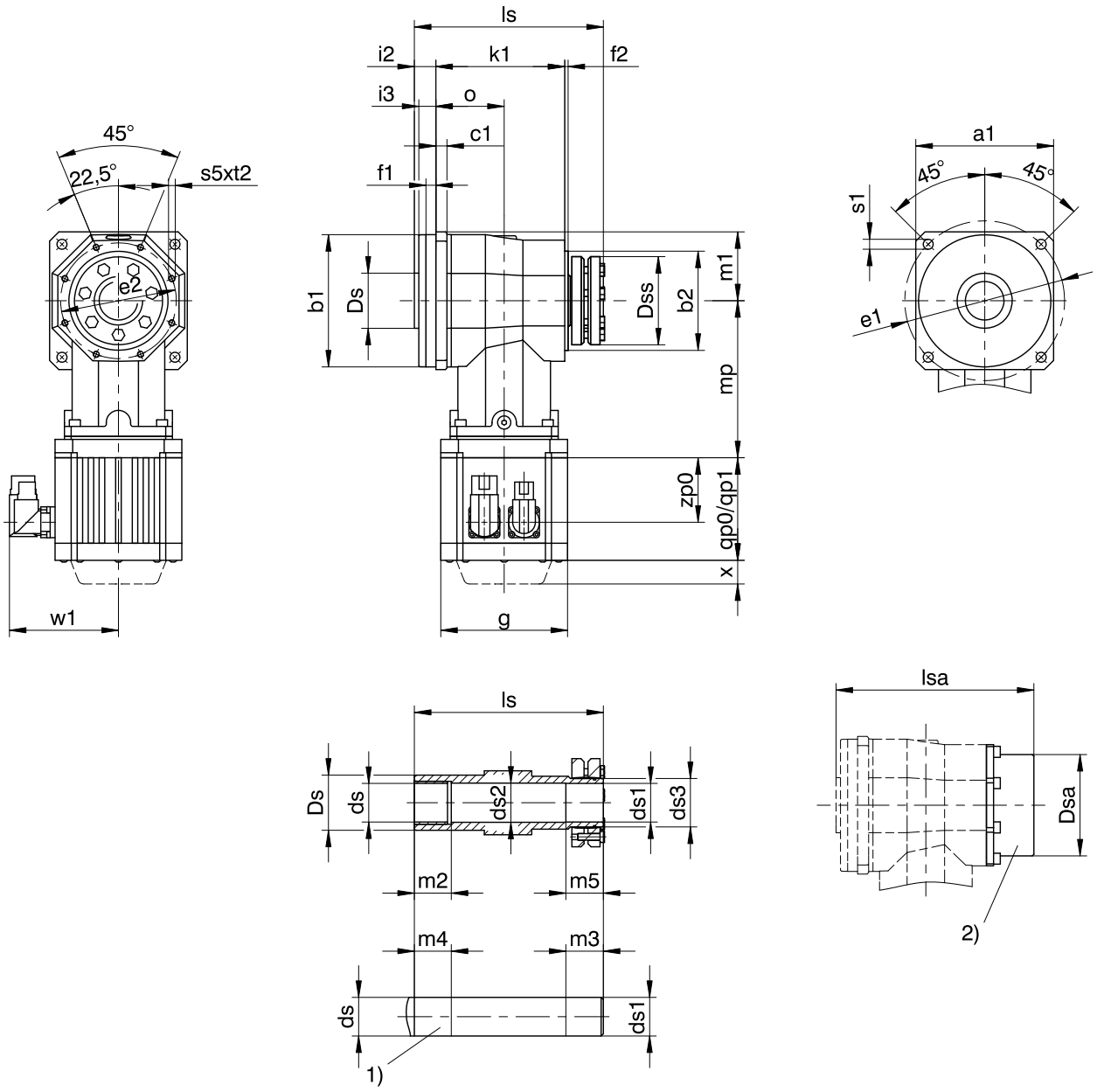
Dimensions of motors

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	EZ8
	mp	mp	mp	mp	mp
KS402	124.0	120.5	123.0	–	–
KS403	164.0	–	–	–	–
KS502	–	140.0	142.5	148.5	–
KS503	192.0	188.5	191.0	–	–
KS702	–	–	167.0	173.0	188.0
KS703	–	222.5	225.0	231.0	–

13.3.2 Shaft design S (hollow shaft with shrink disk)



qp0	Applies to motors without brake.	qp1	Applies to motors with brake.
x	Applies to encoders based on optical measuring principle.	1)	Machine shaft: must not be less than the specified dimension.
2)	Cover (optional)		

Dimensions of gear units

Type	□a1	Øb1	Øb2	c1	Øds	Øds1	Øds2	Øds3	ØDs	ØDsa	ØDss	Øe1	Øe2	f1	f2	i2	i3	k1	ls	lsa	m1	m2	m3	m4	m5	o	Øs1	s5	t2
KS402	101	95_{h6}	75_{h6}	10	25_{h6}	25_{h6}^{H7}	25.5	30	40	72	60	120	88	8	3	18.0	14.0	104	151.0	158.0	50.5	20	34	25	29	53	6.6	M5	9
KS403	101	95_{h6}	75_{h6}	10	25_{h6}	25_{h6}^{H7}	25.5	30	40	72	60	120	88	8	3	18.0	14.0	104	151.0	158.0	50.5	20	34	25	29	53	6.6	M5	9
KS502	125	120_{h6}	90_{h6}	10	35_{h6}	35_{h6}^{H7}	35.5	44	50	92	80	145	105	9	3	19.5	15.5	120	171.5	179.5	62.5	30	39	35	34	62	9.0	M6	11
KS503	125	120_{h6}	90_{h6}	10	35_{h6}	35_{h6}^{H7}	35.5	44	50	92	80	145	105	9	3	19.5	15.5	120	171.5	179.5	62.5	30	39	35	34	62	9.0	M6	11
KS702	155	150_{h6}	110_{h6}	15	45_{h6}	45_{h6}^{H7}	45.5	55	65	112	100	180	130	10	3	24.0	20.0	148	211.0	218.0	77.5	40	42	45	37	78	11.0	M8	14
KS703	155	150_{h6}	110_{h6}	15	45_{h6}	45_{h6}^{H7}	45.5	55	65	112	100	180	130	10	3	24.0	20.0	148	211.0	218.0	77.5	40	42	45	37	78	11.0	M8	14

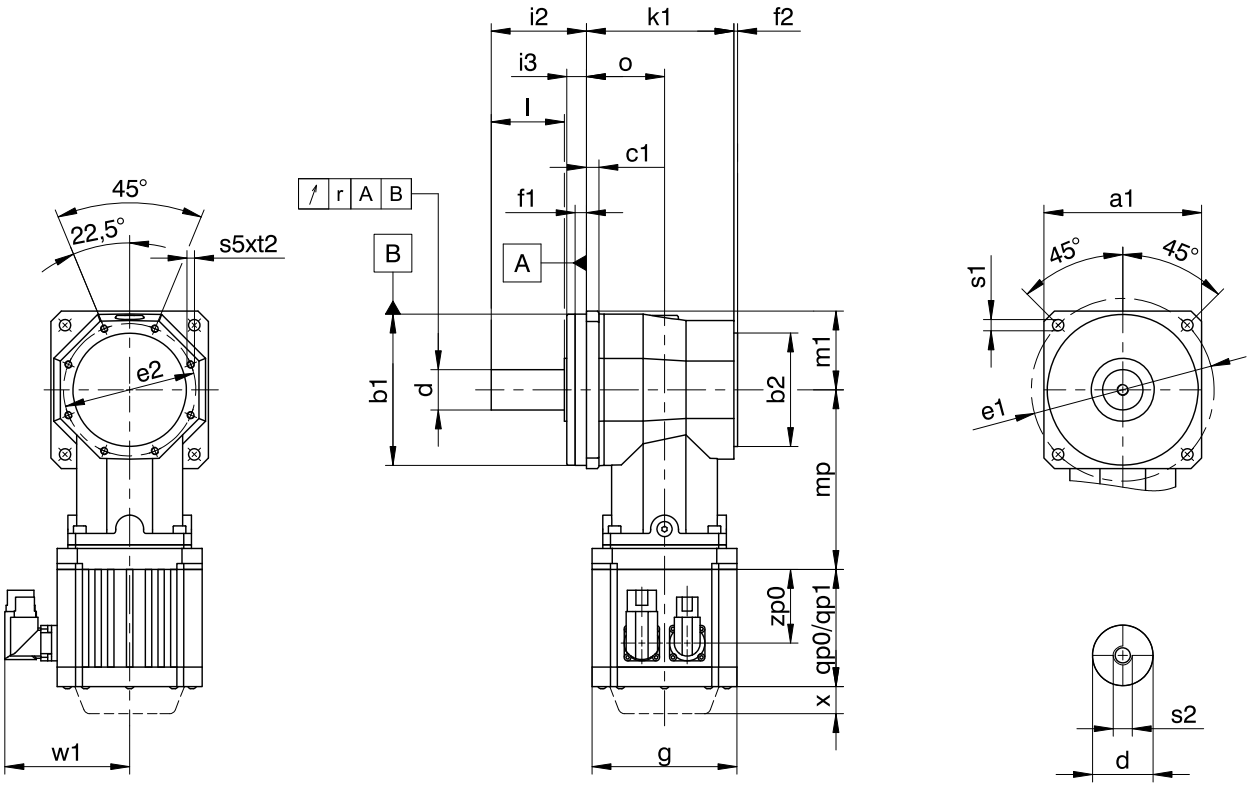
Dimensions of motors

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	EZ8
	mp	mp	mp	mp	mp
KS402	124.0	120.5	123.0	–	–
KS403	164.0	–	–	–	–
KS502	–	140.0	142.5	148.5	–
KS503	192.0	188.5	191.0	–	–
KS702	–	–	167.0	173.0	188.0
KS703	–	222.5	225.0	231.0	–

13.3.3 Shaft version G (solid shaft without feather key)



qp0	Applies to motors without brake.	qp1	Applies to motors with brake.
x	Applies to encoders based on optical measuring principle.		

Dimensions of gear units

Type	□a1	Ø$b1_{h6}$	Ø$b2_{h6}$	c1	Ød_{k6}	Øe1	Øe2	f1	f2	i2	i3	l	k1	m1	o	r	Øs1	s2	s5	t2
KS402	101	95_{h6}	75_{h6}	10	22_{k6}	120	88	8	3	52.0	14.0	36	104	50.5	53	0.020	6.6	M8	M5	9
KS403	101	95_{h6}	75_{h6}	10	22_{k6}	120	88	8	3	52.0	14.0	36	104	50.5	53	0.020	6.6	M8	M5	9
KS502	125	120_{h6}	90_{h6}	10	32_{k6}	145	105	9	3	75.5	15.5	58	120	62.5	62	0.020	9.0	M12	M6	11
KS503	125	120_{h6}	90_{h6}	10	32_{k6}	145	105	9	3	75.5	15.5	58	120	62.5	62	0.020	9.0	M12	M6	11
KS702	155	150_{h6}	110_{h6}	15	40_{k6}	180	130	10	3	105.0	20.0	82	148	77.5	78	0.025	11.0	M16	M8	14
KS703	155	150_{h6}	110_{h6}	15	40_{k6}	180	130	10	3	105.0	20.0	82	148	77.5	78	0.025	11.0	M16	M8	14

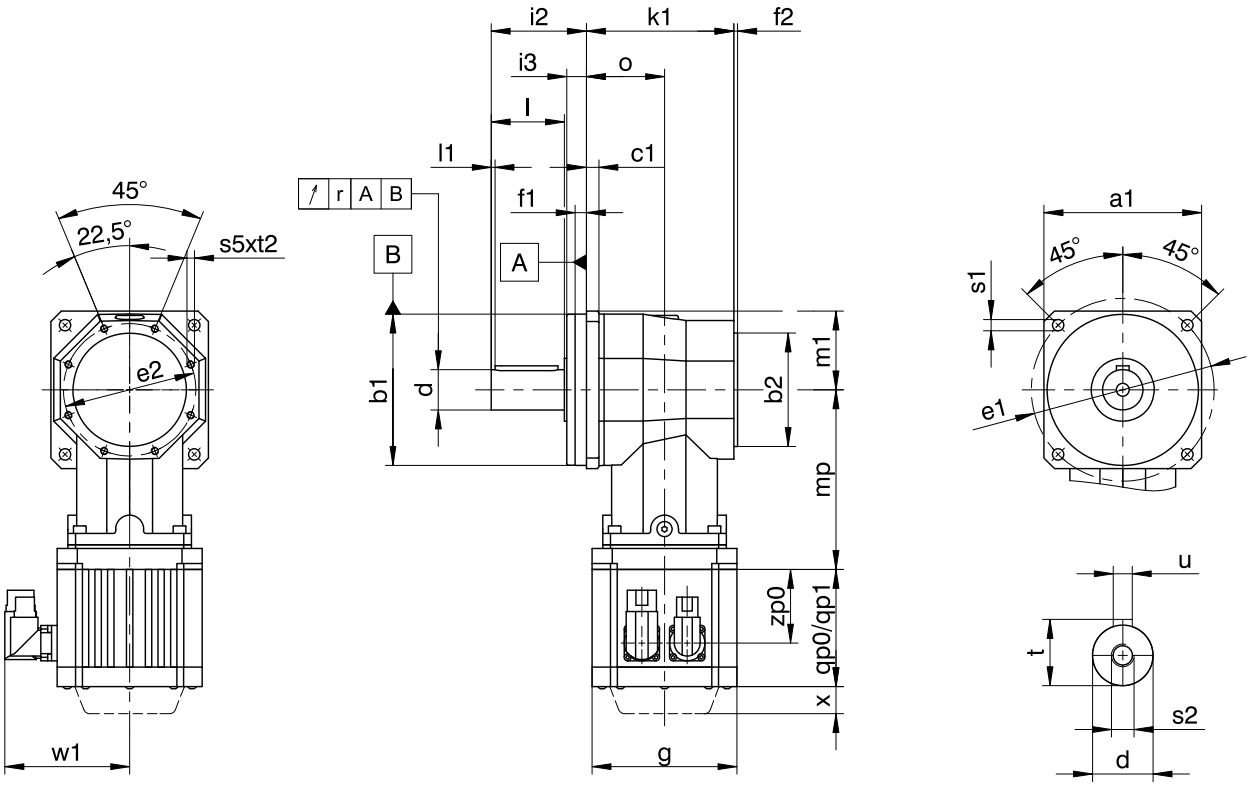
Dimensions of motors

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	EZ8
	mp	mp	mp	mp	mp
KS402	124.0	120.5	123.0	–	–
KS403	164.0	–	–	–	–
KS502	–	140.0	142.5	148.5	–
KS503	192.0	188.5	191.0	–	–
KS702	–	–	167.0	173.0	188.0
KS703	–	222.5	225.0	231.0	–

13.3.4 Shaft version P (solid shaft with feather key)



qp0	Applies to motors without brake.	qp1	Applies to motors with brake.
x	Applies to encoders based on optical measuring principle.		

Dimensions of gear units

Type	□a1	Øb1	Øb2	c1	Ød	Øe1	Øe2	f1	f2	i2	i3	l	l1	k1	m1	o	r	Øs1	s2	s5	t	t2	u
KS402	101	95_{h6}	75_{h6}	10	22_{k6}	120	88	8	3	52.0	14.0	36	3	104	50.5	53	0.020	6.6	M8	M5	24.5	9	A6x6x28
KS403	101	95_{h6}	75_{h6}	10	22_{k6}	120	88	8	3	52.0	14.0	36	3	104	50.5	53	0.020	6.6	M8	M5	24.5	9	A6x6x28
KS502	125	120_{h6}	90_{h6}	10	32_{k6}	145	105	9	3	75.5	15.5	58	3	120	62.5	62	0.020	9.0	M12	M6	35.0	11	A10x8x50
KS503	125	120_{h6}	90_{h6}	10	32_{k6}	145	105	9	3	75.5	15.5	58	3	120	62.5	62	0.020	9.0	M12	M6	35.0	11	A10x8x50
KS702	155	150_{h6}	110_{h6}	15	40_{k6}	180	130	10	3	105.0	20.0	82	4	148	77.5	78	0.025	11.0	M16	M8	43.0	14	A12x8x70
KS703	155	150_{h6}	110_{h6}	15	40_{k6}	180	130	10	3	105.0	20.0	82	4	148	77.5	78	0.025	11.0	M16	M8	43.0	14	A12x8x70

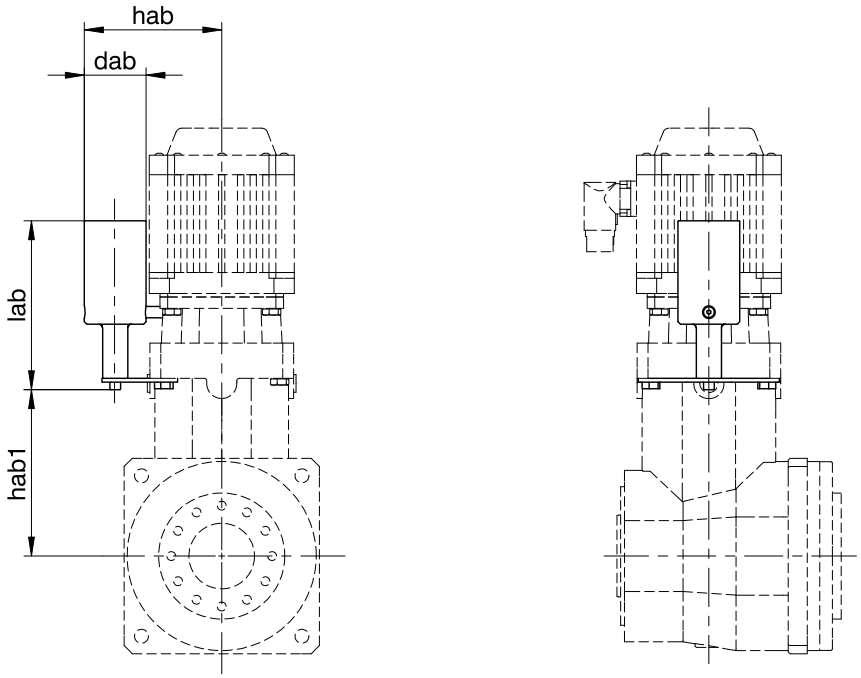
Dimensions of motors

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	EZ8
	mp	mp	mp	mp	mp
KS402	124.0	120.5	123.0	–	–
KS403	164.0	–	–	–	–
KS502	–	140.0	142.5	148.5	–
KS503	192.0	188.5	191.0	–	–
KS702	–	–	167.0	173.0	188.0
KS703	–	222.5	225.0	231.0	–

13.3.5 Oil expansion tank



Dimensions

Type	EZ3				EZ4				EZ5				EZ7			
	dab	lab	hab	hab1	dab	lab	hab	hab1	dab	lab	hab	hab1	dab	lab	hab	hab1
KS403	34	100	74.5	85	–	–	–	–	–	–	–	–	–	–	–	–
KS503	39	122	92.0	105	39	122	92.0	105	39	122	92.0	105	–	–	–	–
KS703	–	–	–	–	49	134	109.5	132	49	134	109.5	132	49	134	109.5	132

For more information, see section [▸ 13.6.5]

13.4 Type designation

In this chapter you can find an explanation of the type designation with the associated options.

You can find other order details that do not appear in the type designation at the end of the section.

Sample code

KS	5	0	2	G	F	0200	EZ401U

Explanation

Code	Designation	Design
KS	Type	Right-Angle Servo Gear Unit
5	Size	5 (example)
0	Generation	Generation 0
2 3	Stages	2-stage 3-stage
F S **G** P	Shaft	Flange hollow shaft Hollow shaft with shrink disk Solid shaft without feather key Solid shaft with feather key
F	Housing	Standard
0200	Transmission ratio (i x 10)	i = 20 (example)
EZ401U	Motor	Synchronous servo motor EZ

To complete the type designation, please indicate the following in addition:

- For a detailed type designation of the motor, see section [▷ 22]
- Installation position, see section [▷ 13.5.2]
- Radial shaft seal rings on the output made of FKM or NBR, see section [▷ 13.6.4]
- For the position of the plug connectors see section [▷ 13.5.4]
- Attachment of oil expansion tank on gear unit side 1 or 2 (required without exception for 3-stage gear units in installation position EL5), see section [▷ 13.6.5]

13.5 Product description

13.5.1 Installation conditions

When fastening the gear unit in place, make certain the machine shaft is aligned with the gear unit hollow shaft.

Maximum deviation ≤ 0.03 mm.

Hollow shaft with shrink disk

The tolerance of the hollow shaft hole is ISO H7.

The machine shaft must be ISO h6.

Select a material for the machine shaft with a permitted surface pressure p ≥ 325 N/mm^2.

Possible materials:

- C45E +QT
- 42CrMo4

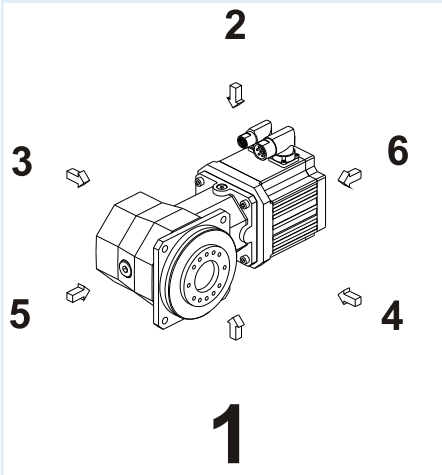
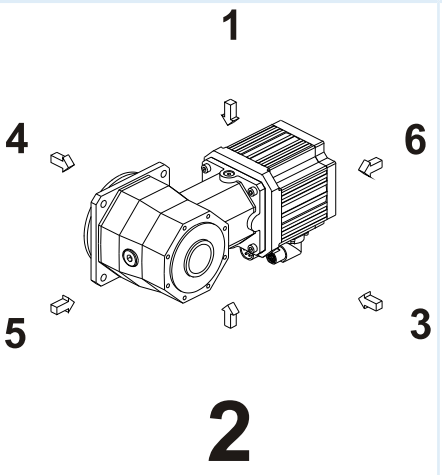
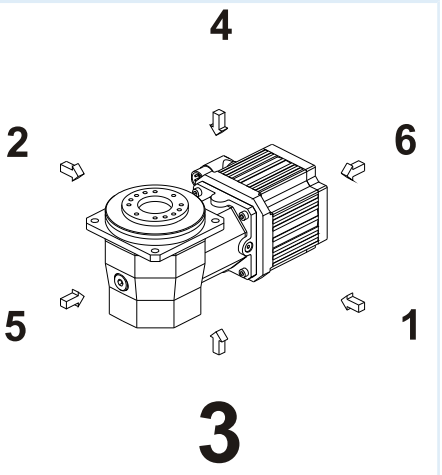
Attaching the gear units using the pitch circle diameter on the machine side

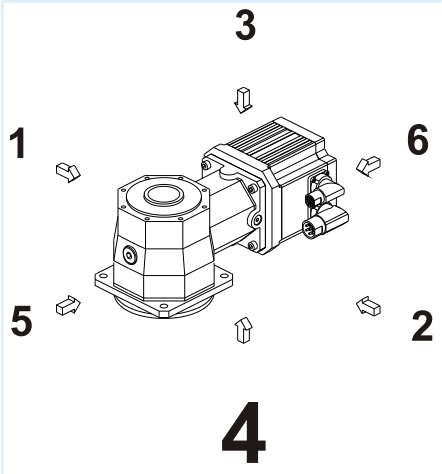
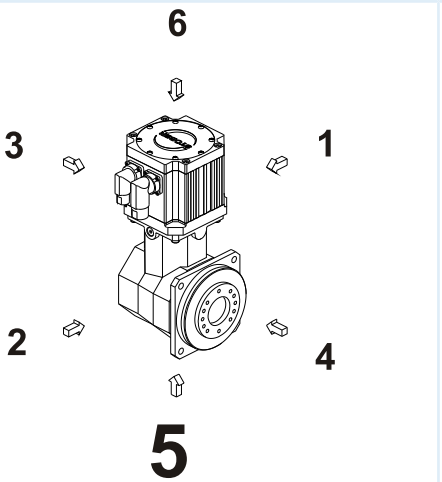
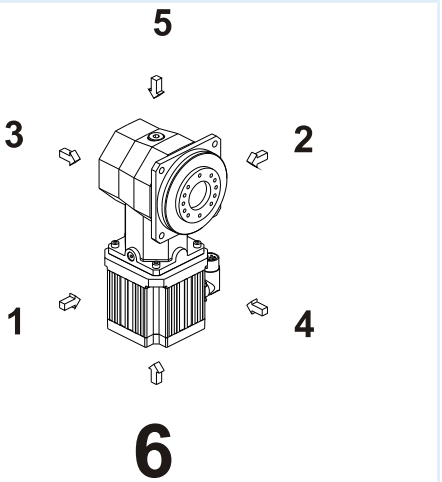
The torques and forces specified only apply for the attachment of gear units on the machine side using screws of quality 10.9. In addition, the gear housing must be adjusted at the pilot (H7).

13.5.2 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 pointing downwards.

EL1	EL2	EL3
		
1	**2**	**3**

EL4	EL5	EL6
		
4	**5**	**6**

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

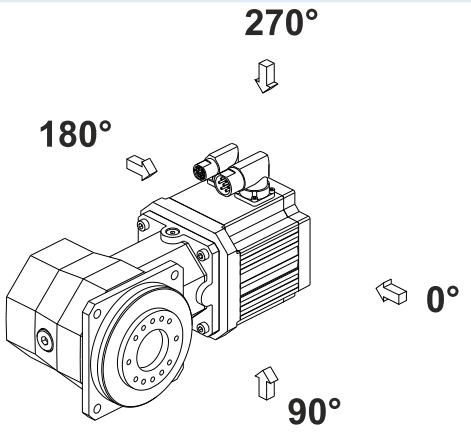
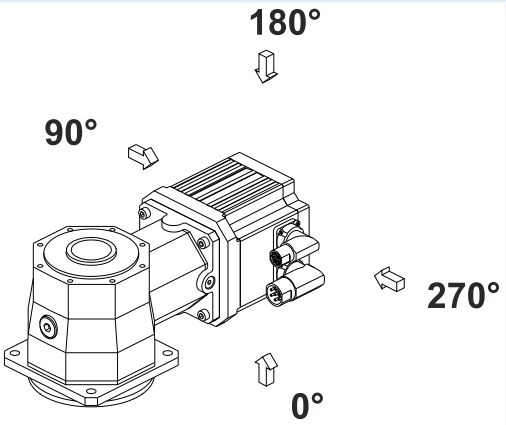
13.5.3 Lubricants

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

Use the gear units only in the intended installation position! Gear units may only be converted after prior consultation with STOBER. Otherwise STOBER shall assume no liability for the gear units.

The Quantity of lubricant for gear units, document ID 441871, can be found online at http://www.stoeber.de

13.5.4 Position of the plug connectors

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

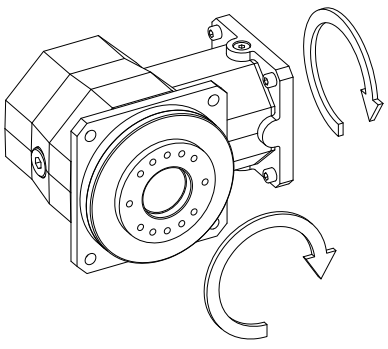
Indicate deviations for your geared motor in the purchase order.

Note that the position of the plug connector also rotates when the geared motor is rotated to another installation position.

13.5.5 Other product features

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

13.5.6 Direction of rotation



The pictures show installation position EL1.

13.5.7 Possible combinations of KS gear units with water-cooled EZ motor

Type	EZ4_W	EZ5_W	EZ7_W	EZ8_W
KS402	✓	✓	–	–
KS502	✓	✓	✓	–
KS503	✓	–	–	–

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

Type	EZ4_W	EZ5_W	EZ7_W	EZ8_W
KS702	–	✓	✓	✓
KS703	✓	✓	✓	–

13.6 Projecting

You can project your drives with our SERVOsoft design software. SERVOsoft is available at no cost from your consultant in one of our sales centers. Note the limit conditions in this section for a safe design of your drives.

The formula symbols for values actually present in the application are identified by a *.

Formula symbols	Unit	Explanation
a_{th}	–	Parameter for calculating $K_{mot,th}$
ED	%	Duty cycle relative to 20 minutes
fB_{op}	–	Operational factor – operation mode
fB_t	–	Operational factor – runtime
fB_T	–	Operational factor – temperature
F_{2ax*}	N	Existing axial force on the gear unit output
$F_{2ax,eq*}$	N	Actual equivalent axial force on the gear unit output
F_{2ax100}	N	Permitted axial force on the gear unit output for $n_{2m*} \leq 100$ rpm
F_{2axN}	N	Permitted nominal axial force on the gear unit output
$F_{2rad,acc}$	N	Permitted radial acceleration force on the gear unit output
$F_{2rad,acc*}$	N	Actual radial acceleration force on the gear unit output
$F_{2rad,acc,1*}$	N	Actual radial acceleration force on the gear unit output in the first time segment
$F_{2rad,acc,n*}$	N	Actual radial acceleration force on the gear unit output in the n-th time segment
$F_{2rad,eq*}$	N	Existing equivalent force on the gear unit output
$F_{2rad100}$	N	Permitted radial force on the gear unit output for $n_{2m*} \leq 100$ rpm
F_{2radN}	N	Permitted nominal axial force on the gear unit output
i	–	Gear ratio
$K_{mot,th}$	–	Factor for determining the thermal limit torque
l	mm	Length of the output shaft
M_{op}	Nm	Torque of motor in the operating point from the motor characteristics for n_{1m*}
$\|M_2\|$	Nm	Amount of the torque on the output
$M_{2.1*} – M_{2.6*}$	Nm	Existing torque in the relevant time segment (1 to 6)
$M_{2,n*}$	Nm	Existing torque in the n-th time segment
M_{2acc}	Nm	Maximum permitted acceleration torque on the gear unit output
M_{2acc*}	Nm	Existing acceleration torque on the gear unit output
M_{2eff*}	Nm	Existing effective torque on the gear unit output
M_{2eq*}	Nm	Existing equivalent torque 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	Existing breakdown torque on the gear unit output

Formula symbols	Unit	Explanation
$M_{2k,acc}$	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	Existing 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	Emergency off torque of the gear unit at gear unit output for max. 1000 load changes
M_{2NOT*}	Nm	Existing 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	Existing average input speed
n_{1max*}	rpm	Existing maximum input speed
n_{1maxDB}	rpm	Maximum permitted input speed of the gear unit in continuous operation
n_{1maxZB}	rpm	Maximum permitted input speed of the gear unit in cyclic operation
$\|n_2\|$	rpm	Amount of the output speed
n_{2m*}	rpm	Existing average output speed
$n_{2m,1*} – n_{2m,6*}$	rpm	Existing average output speed in the respective time segment (1 bis 6)
$n_{2m,n*}$	rpm	Existing average output speed in the n-th time segment
t	s	Time
$t_{1*} – t_{6*}$	s	Duration of the relevant time segment (1 to 6)
t_{n*}	s	Duration of the n-th time segment
S	–	Characteristic load value: quotient of nominal gear unit and motor torque without taking the thermal output limit into consideration. Represents a dimension for the reserve of the geared motor.
x_2	mm	Distance from shaft shoulder to the point of application of force
y_2	mm	Distance from shaft axes to the point of application of axial force
z_2	mm	Distance from shaft shoulder to the center of the output bearing

13.6.1 Calculation of the operating point

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

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

$$n_{1max*} \leq \frac{n_{1maxZB}}{fB_T}$$

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

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

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

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

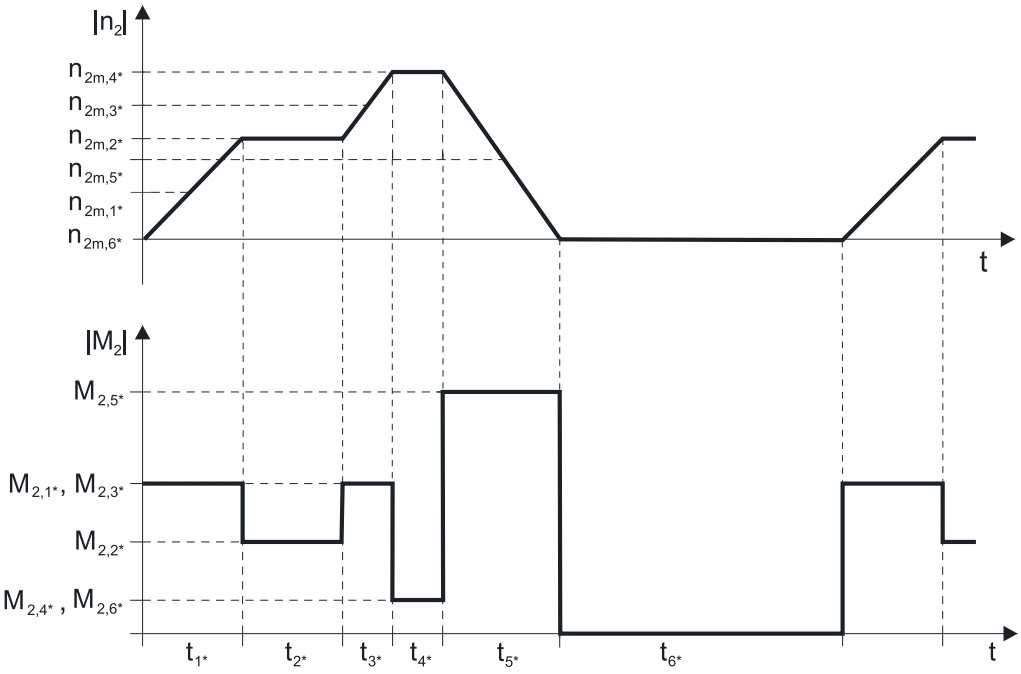
The values for n_{1maxDB}, n_{1maxZB}, M_{2acc}, M_{2NOT}, M_{2N} and S can be found in the selection tables.

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

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

Example of cycle sequence

The following calculations refer to a representation of the power consumed on the output based on the following example:



Calculation of the existing 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, determine n_{2m^*} without pause t_{6^*}.

For the values for the gear ratio i, see the selection tables.

Calculation of the existing 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 existing 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

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

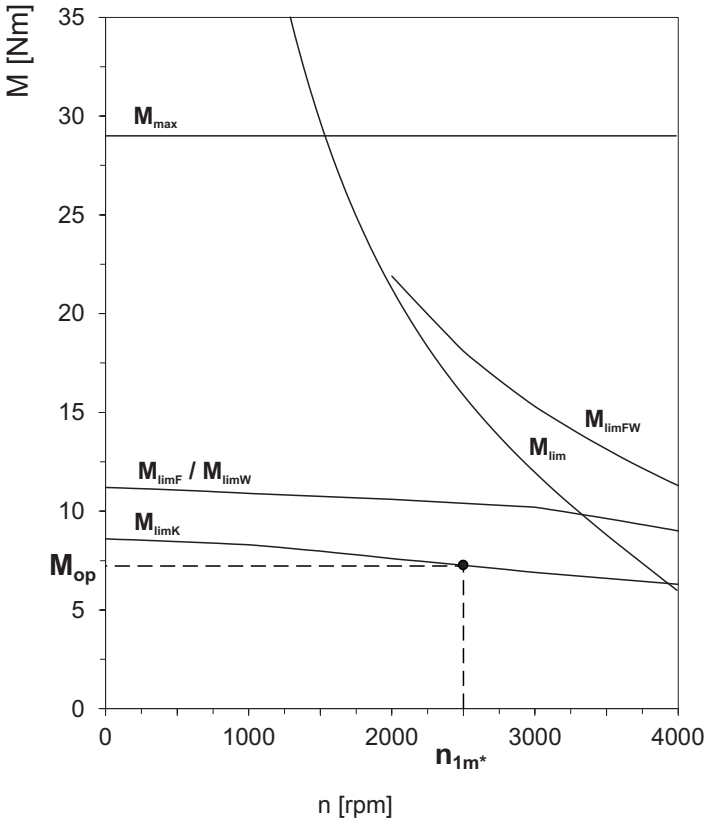
$$M_{2th} = M_{op} \cdot i \cdot K_{mot,th}$$

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

For the values for i and a_{th}, see the selection tables.

The values for fB_T can be found in the relevant tables in this section.

The motor characteristics can found in section [▷ 22.3], including the value for the torque of the motor in the operating point M_{op} at the determined average input speed n_{1m*}. Note the size, nominal speed n_N and cooling type of the motor. The illustration below shows an example of reading the torque M_{op} of a motor with convection cooling in the operating point.



Operating factors

Operation mode	fB_{op}
Consistent continuous operation	1.00
Cyclic operation	1.00
Cyclic operation - reversing load	1.00

Runtime	fB_t
Daily runtime ≤ 8 h	1.00
Daily runtime ≤ 16 h	1.15
Daily runtime ≤ 24 h	1.20

Temperature		fB_T
Motor cooling	**Surrounding temperature**	
Motor with forced ventilation/water cooling	≤ 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

Instructions

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

13.6.2 Permissible shaft loads for output shaft

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

- For shaft dimensions according to the catalog
- For output speeds $n_{2m*} \leq 100$ rpm ($F_{2axN} = F_{2ax100}$; $F_{2radN} = F_{2rad100}$; $M_{2kN} = M_{2k100}$)
- Only if the lateral forces acting on the gear unit are supported by its pilot (housing, flange shaft)

KS

13.6.2.1 Shaft design F

Permitted shaft loads for shaft design F (flange hollow shaft)

Typ	z_2 [mm]	F_{2ax100} [N]	$F_{2rad100}$ [N]	$F_{2rad,acc}$ [N]	M_{2k100} [Nm]	$M_{2k,acc}$ [Nm]
KS4	38.0	4000	6842	10263	260	390
KS5	45.0	6000	12222	18333	550	825
KS7	55.0	10000	16727	25091	920	1380

You can download the diagrams for other output speeds at http://products.stoeber.de.

The following applies for 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 of permissible shaft loads in this section.

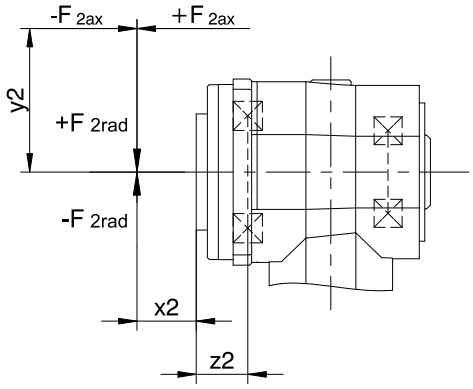


Illustration 1: Application of force points for flange hollow shaft

The permitted lateral forces can be determined from the permissible breakdown torque M_{2kN} and $M_{2k,acc}$. The existing lateral forces must not exceed the permissible lateral forces. The permitted lateral forces refer to the end of the hollow shaft (x2 = 0).

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

In applications with multiple axial and/or radial forces, the forces must be added vectorially.

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

Note also the calculation for equivalent values:

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

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

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

13.6.2.2 Shaft design S

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

Typ	z_2 [mm]	F_{2ax100} [N]	$F_{2rad100}$ [N]	$F_{2rad,acc}$ [N]	M_{2k100} [Nm]	$M_{2k,acc}$ [Nm]
KS4	36.0	4000	5000	5000	260	260
KS5	42.0	6000	8000	8000	550	550
KS7	52.0	10000	10000	10000	920	920

You can download the diagrams for other output speeds at http://products.stoeber.de.

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

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

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

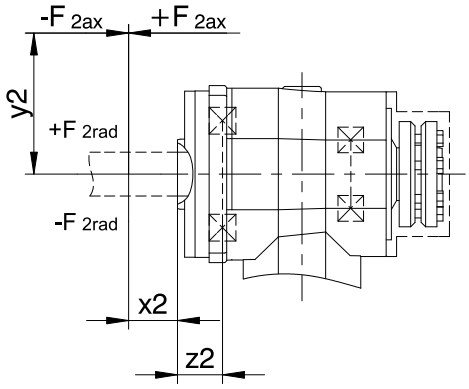


Illustration 2: Application of force points for the hollow shaft with shrink disk

The permitted lateral forces can be determined from the permissible breakdown torque M_{2kN} and $M_{2k,acc}$. The existing lateral forces must not exceed the permissible lateral forces. The permitted lateral forces refer to the end of the hollow shaft (x2 = 0).

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

In applications with multiple axial and/or radial forces, the forces must be added vectorially.

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

Note also the calculation for equivalent values:

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

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

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

13.6.2.3 Shaft designs G, P

Permitted shaft loads for shaft designs G, P (solid shaft)

Typ	z_2 [mm]	F_{2ax100} [N]	$F_{2rad100}$ [N]	$F_{2rad,acc}$ [N]	M_{2k100} [Nm]	$M_{2k,acc}$ [Nm]
KS4	34.0	4000	5000	5000	260	260
KS5	40.0	6000	8000	8000	550	550
KS7	51.0	10000	10000	10000	920	920

You can download the diagrams for other output speeds at http://products.stoeber.de.

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

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

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

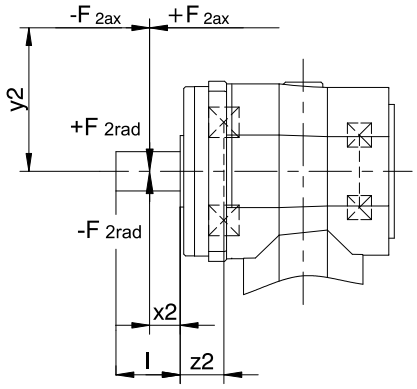


Illustration 3: Application of force points for the solid shaft

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

You can find the shaft dimensions in the Dimensional drawings section.

The following formula applies to other points of application of force:

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

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

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

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

In applications with multiple axial and/or radial forces, the forces must be added vectorially.

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

Note also the calculation for equivalent values:

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

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

13.6.3 Torsional rigidity of gear unit

The torsional rigidity of the gear unit C_2 depends on the shaft design. Details for shaft design F can be found in the selection tables.

For details regarding shaft designs G, P and S refer to the following table:

	Torsional rigidity of the gear unit C2 Shaft designs G, P	Torsional rigidity of the gear unit C2 Shaft design S
KS4	6.5	7.1
KS5	15	16
KS7	32	36

13.6.4 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 aging resistance
- Excellent resistance in mineral oils and greases
- For use in the food, beverage and pharmaceutical industries

Leakage protection

Our gear units are equipped with high-quality radial shaft seal rings and are checked for leakage protection. Nevertheless, the possibility of leaks during the service life of the gear units cannot be completely excluded. If you are using gear units with lubricant-compatible goods, you will have to take measures to prevent direct contact with the gear unit lubricant in case of leaks.

13.6.5 Oil expansion tank

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

Instructions

- 3-stage KS gear units in installation position EL5 can only be used in combination with an oil expansion tank!
- It is not possible to use an oil expansion tank if the plug connector and oil expansion tank are on the same side!
- Please specify the attachment side (gear unit side 1 or 2) in the purchase order.

13.7 More documentation

More documentation concerning the product can be found at http://www.stoeber.de/en/stoeber_global/service/downloads/downloadcenter.html

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

Documentation	ID
Operating manual gear units and geared motors	441972
Quantity of lubricant for gear units	441871