



## 21.1 Overview

Compact helical-geared right-angle geared motors

### Technical data

i	6 – 548
$M_{2acc}$	28 – 960 Nm
$\Delta\varphi_2$	
$\eta$	$\leq 62 - 91 \%$

### Features

Power density	★★★★☆
Backlash	★★★★☆
Price category	€
Shaft load	★★★★☆
Smooth operation	★★★★☆
Torsional stiffness	★★★★☆
Mass moment of inertia	★★★★★
Helical gearing	✓
FKM seal ring at the input	✓
Reinforced output bearing	✓ (on request)
Compact and highly dynamic due to direct motor attachment	✓

Key: ★★★★★ good | ★★★★★ excellent





## 21.2 Selection tables

The technical data specified in the selection tables applies to:

- Installation altitudes up to 1000 m above sea level
- Surrounding temperatures from 0 °C to 40 °C
- Drives with convection-cooled motors (e.g. EZ401U)

You can calculate the technical data for drives with forced ventilated motors (for example EZ401B) at <http://products.stoeber.de>.

Formula symbol	Unit	Explanation
$a_{th}$	–	Parameter for calculating $K_{mot,th}$
$C_2$	Nm/ arcmin	Torsional stiffness of gear unit (final stiffness) relative to the gear unit output
$\eta$	%	Efficiency
$i$	–	Gear ratio
$i_{exakt}$	–	Mathematically exact gear ratio
$J_1$	$10^{-4}kgm^2$	Mass moment of inertia relative to the gear unit input
$m$	kg	Weight
$M_{2,0}$	Nm	Stall torque on the gear unit output
$M_{2acc}$	Nm	Maximum permitted acceleration torque on the gear unit output
$M_{2acc,max}$	Nm	Maximum permitted acceleration torque of a group of geared motors whose size and nominal torque $n_{1N}$ are the same
$M_{2N}$	Nm	Nominal torque on the gear unit output (relative to $n_{1N}$ )
$M_{2NOT}$	Nm	Gear unit emergency-off torque on the gear unit output for max. 1000 load changes
$n_{1maxDBH}$	rpm	Maximum permitted input speed of the gear unit in continuous operation Installation positions EL1, EL2 (at surrounding temperature of 20 °C)
$n_{1maxDBV}$	rpm	Maximum permitted input speed of the gear unit in continuous operation Installation positions EL3, EL4, EL5, EL6 (at surrounding temperature of 20 °C)
$n_{1maxZB}$	$min^{-1}$	Maximum permitted input speed of the gear unit in cyclic operation (at surrounding temperature of 20 °C)
$n_{1N}$	$min^{-1}$	Nominal speed at the gear unit input
$n_{2N}$	$min^{-1}$	Nominal speed at the gear unit output
$S$	–	Load value: Quotient of gear unit and motor nominal torque without regard to the thermal performance limit. Represents a value for the reserve of the geared motor.



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21.2 Selection tables



$n_{2N}$	$M_{2N}$	$M_{2,0}$	$a_{th}$	S	Type	$M_{2acc}$	$M_{2NOT}$	i	$i_{exakt}$	$n_{1max}$ DBH	$n_{1max}$ DBV	$n_{1max}$ ZB	$J_1$	$C_2$	m
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]			[rpm]	[rpm]	[rpm]	[10 <sup>-4</sup> kgm <sup>2</sup> ]	[Nm/ arcmin]	[kg]
<b>S0 (<math>n_{IN} = 3000</math> rpm, <math>M_{2acc,max} = 110</math> Nm)</b>															
30	73	75	36	1.1	S002_1000 EZ301U	110	160	100.3	702/7	3000	3000	4500	0.21	5.5	7.9
40	55	56	31	1.3	S002_0750 EZ301U	110	150	74.70	747/10	3000	3000	4500	0.22	5.5	7.9
51	44	44	26	1.6	S002_0590 EZ301U	100	140	58.50	117/2	3000	3000	4500	0.24	5.5	7.9
62	36	37	23	1.8	S002_0480 EZ301U	95	130	48.21	675/14	3000	3000	4500	0.25	5.5	7.9
62	62	65	40	1.0	S002_0480 EZ302U	95	130	48.21	675/14	3000	3000	4500	0.35	5.5	8.5
80	28	29	19	2.0	S002_0370 EZ301U	85	120	37.32	1269/34	3000	3000	4500	0.28	5.5	7.9
80	48	51	33	1.2	S002_0370 EZ302U	87	120	37.32	1269/34	3000	3000	4500	0.38	5.5	8.5
101	23	23	16	2.3	S002_0300 EZ301U	69	110	29.70	297/10	2800	2600	4500	0.32	5.5	7.9
101	39	41	28	1.4	S002_0300 EZ302U	79	110	29.70	297/10	2800	2600	4500	0.42	5.5	8.5
101	51	54	36	1.0	S002_0300 EZ303U	79	110	29.70	297/10	2800	2600	4500	0.53	5.5	9.0
128	19	20	13	3.1	S002_0230 EZ301U	58	100	23.40	117/5	3000	3000	4500	0.24	4.4	7.9
128	33	35	23	1.8	S002_0230 EZ302U	82	100	23.40	117/5	3000	3000	4500	0.34	4.4	8.5
128	43	45	30	1.4	S002_0230 EZ303U	82	100	23.40	117/5	3000	3000	4500	0.45	4.4	9.0
128	58	62	40	1.0	S002_0230 EZ401U	82	100	23.40	117/5	3000	3000	4500	0.98	4.4	10
156	16	16	12	3.6	S002_0195 EZ301U	48	100	19.29	135/7	3000	3000	4500	0.26	4.4	7.9
156	27	29	20	2.1	S002_0195 EZ302U	82	100	19.29	135/7	3000	3000	4500	0.36	4.4	8.5
156	35	38	27	1.6	S002_0195 EZ303U	82	100	19.29	135/7	3000	3000	4500	0.47	4.4	9.0
156	48	51	36	1.2	S002_0195 EZ401U	82	100	19.29	135/7	3000	3000	4500	1.0	4.4	10
201	12	13	10	4.1	S002_0150 EZ301U	37	98	14.93	1269/85	3000	3000	4500	0.30	4.4	7.9
201	21	22	18	2.4	S002_0150 EZ302U	67	98	14.93	1269/85	3000	3000	4500	0.40	4.4	8.5
201	28	29	23	1.9	S002_0150 EZ303U	77	98	14.93	1269/85	3000	3000	4500	0.51	4.4	9.0
201	37	40	31	1.4	S002_0150 EZ401U	77	100	14.93	1269/85	3000	3000	4500	1.0	4.4	10
253	9.9	10	8.7	4.7	S002_0120 EZ301U	30	79	11.88	297/25	3000	2800	4500	0.34	4.4	7.9
253	17	18	15	2.7	S002_0120 EZ302U	53	79	11.88	297/25	3000	2800	4500	0.44	4.4	8.5
253	22	23	19	2.1	S002_0120 EZ303U	63	79	11.88	297/25	3000	2800	4500	0.55	4.4	9.0
253	30	32	26	1.6	S002_0120 EZ401U	70	93	11.88	297/25	3000	2800	4500	1.1	4.4	10
312	14	15	12	3.1	S002_0096 EZ302U	44	64	9.626	1107/115	3000	2800	4500	0.50	4.4	8.5
312	18	19	16	2.4	S002_0096 EZ303U	51	64	9.626	1107/115	3000	2800	4500	0.61	4.4	9.0
312	24	26	22	1.7	S002_0096 EZ401U	64	85	9.626	1107/115	3000	2800	4500	1.1	4.4	10
312	41	45	37	1.0	S002_0096 EZ402U	64	85	9.626	1107/115	3000	2800	4500	1.8	4.4	12
405	11	11	10	3.6	S002_0074 EZ302U	34	50	7.400	37/5	2600	2300	3700	0.61	4.4	8.5
405	14	15	13	2.8	S002_0074 EZ303U	40	50	7.400	37/5	2600	2300	3700	0.72	4.4	9.0
405	19	20	18	2.0	S002_0074 EZ401U	57	77	7.400	37/5	2600	2300	3700	1.2	4.4	10
405	32	35	31	1.2	S002_0074 EZ402U	58	77	7.400	37/5	2600	2300	3700	1.9	4.4	12
500	8.8	9.3	12	3.7	S002_0060 EZ302U	28	41	6.000	6/1	2600	2300	3700	0.73	4.4	8.5
500	11	12	16	2.8	S002_0060 EZ303U	32	41	6.000	6/1	2600	2300	3700	0.84	4.4	9.0
500	15	17	22	2.4	S002_0060 EZ401U	47	73	6.000	6/1	2600	2300	3700	1.4	4.4	10
500	26	29	37	1.4	S002_0060 EZ402U	55	73	6.000	6/1	2600	2300	3700	2.1	4.4	12
<b>S1 (<math>n_{IN} = 3000</math> rpm, <math>M_{2acc,max} = 190</math> Nm)</b>															
12	144	147	42	1.0	S102_2420 EZ301U	190	290	242.0	242/1	3000	3000	4500	0.22	7.6	12
17	126	129	33	1.1	S102_1740 EZ301U	180	230	174.2	3483/20	3000	3000	4500	0.20	7.6	12
22	102	104	26	1.6	S102_1400 EZ301U	170	210	139.5	279/2	3000	3000	4500	0.21	7.6	12
26	86	88	23	1.8	S102_1170 EZ301U	190	310	116.7	3267/28	3000	3000	4500	0.22	7.6	12
34	65	66	20	2.3	S102_0870 EZ301U	190	290	87.30	873/10	3000	3000	4500	0.23	7.6	12
34	111	117	34	1.3	S102_0870 EZ302U	190	290	87.30	873/10	3000	3000	4500	0.33	7.6	12
43	52	53	17	2.7	S102_0700 EZ301U	160	280	69.75	279/4	3000	3000	4500	0.25	7.6	12
43	89	94	29	1.6	S102_0700 EZ302U	190	280	69.75	279/4	3000	3000	4500	0.35	7.6	12
43	116	123	38	1.2	S102_0700 EZ303U	190	280	69.75	279/4	3000	3000	4500	0.46	7.6	13
52	44	45	15	3.0	S102_0580 EZ301U	130	260	57.86	405/7	3000	3000	4500	0.27	7.6	12
52	75	79	26	1.8	S102_0580 EZ302U	190	260	57.86	405/7	3000	3000	4500	0.37	7.6	12
52	97	103	34	1.4	S102_0580 EZ303U	190	260	57.86	405/7	3000	3000	4500	0.48	7.6	13
52	132	141	46	1.0	S102_0580 EZ401U	190	260	57.86	405/7	3000	3000	4500	1.0	7.6	14
69	33	34	13	3.5	S102_0440 EZ301U	100	240	43.68	1485/34	3000	2800	4500	0.32	7.6	12
69	57	60	23	2.1	S102_0440 EZ302U	180	240	43.68	1485/34	3000	2800	4500	0.42	7.6	12
69	74	79	30	1.6	S102_0440 EZ303U	180	240	43.68	1485/34	3000	2800	4500	0.53	7.6	13
69	101	108	40	1.2	S102_0440 EZ401U	180	240	43.68	1485/34	3000	2800	4500	1.1	7.6	14
86	29	29	10	4.1	S102_0350 EZ301U	86	170	34.92	873/25	3000	3000	4500	0.24	5.8	12
86	49	52	18	2.4	S102_0350 EZ302U	140	170	34.92	873/25	3000	3000	4500	0.34	5.8	12
86	64	67	23	1.8	S102_0350 EZ303U	140	170	34.92	873/25	3000	3000	4500	0.45	5.8	13

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## 21.2 Selection tables



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$n_{2N}$	$M_{2N}$	$M_{2,0}$	$a_{th}$	S	Type	$M_{2acc}$	$M_{2NOT}$	i	$i_{exakt}$	$n_{1max}$	$n_{1max}$	$n_{1max}$	$J_1$	$C_2$	m
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]			DBH	DBV	ZB	[ $10^{-4}$ kgm <sup>2</sup> ]	[Nm/ arcmin]	[kg]
<b>S1 (<math>n_{1N} = 3000</math> rpm, <math>M_{2acc,max} = 190</math> Nm)</b>															
86	86	92	31	1.4	S102_0350 EZ401U	150	230	34.92	873/25	3000	3000	4500	0.98	5.8	14
108	23	23	9.6	2.5	S102_0280 EZ301U	58	73	27.90	279/10	3000	3000	4500	0.26	5.8	12
108	39	42	16	3.1	S102_0280 EZ302U	120	150	27.90	279/10	3000	3000	4500	0.36	5.8	12
108	51	54	21	2.4	S102_0280 EZ303U	120	150	27.90	279/10	3000	3000	4500	0.47	5.8	13
108	69	74	29	1.7	S102_0280 EZ401U	150	240	27.90	279/10	3000	3000	4500	1.0	5.8	14
108	106	116	44	1.1	S102_0280 EZ501U	150	240	27.90	279/10	3000	3000	4500	3.0	5.8	15
130	19	20	9.1	2.9	S102_0230 EZ301U	55	69	23.14	162/7	3000	3000	4500	0.29	5.8	12
130	33	35	16	3.5	S102_0230 EZ302U	100	140	23.14	162/7	3000	3000	4500	0.39	5.8	12
130	43	45	20	2.7	S102_0230 EZ303U	110	140	23.14	162/7	3000	3000	4500	0.50	5.8	13
130	58	62	27	2.0	S102_0230 EZ401U	150	230	23.14	162/7	3000	3000	4500	1.0	5.8	14
130	89	97	42	1.3	S102_0230 EZ501U	150	230	23.14	162/7	3000	3000	4500	3.0	5.8	15
130	97	107	46	1.2	S102_0230 EZ402U	150	230	23.14	162/7	3000	3000	4500	1.7	5.8	15
172	15	15	8.5	3.0	S102_0175 EZ301U	43	54	17.47	297/17	3000	3000	4500	0.34	5.8	12
172	25	26	14	3.7	S102_0175 EZ302U	78	120	17.47	297/17	3000	3000	4500	0.44	5.8	12
172	32	34	19	2.8	S102_0175 EZ303U	92	120	17.47	297/17	3000	3000	4500	0.55	5.8	13
172	44	47	25	2.3	S102_0175 EZ401U	130	200	17.47	297/17	3000	3000	4500	1.1	5.8	14
172	67	74	39	1.5	S102_0175 EZ501U	150	200	17.47	297/17	3000	3000	4500	3.1	5.8	15
172	74	82	43	1.4	S102_0175 EZ402U	150	200	17.47	297/17	3000	3000	4500	1.8	5.8	15
214	20	21	14	3.7	S102_0140 EZ302U	63	93	14.04	351/25	3000	3000	4500	0.50	5.8	12
214	26	28	18	2.8	S102_0140 EZ303U	75	93	14.04	351/25	3000	3000	4500	0.61	5.8	13
214	35	38	24	2.4	S102_0140 EZ401U	110	170	14.04	351/25	3000	3000	4500	1.1	5.8	14
214	55	60	37	1.6	S102_0140 EZ501U	130	170	14.04	351/25	3000	3000	4500	3.1	5.8	15
214	60	66	40	1.5	S102_0140 EZ402U	130	170	14.04	351/25	3000	3000	4500	1.8	5.8	15
261	17	18	13	3.7	S102_0115 EZ302U	52	77	11.50	1323/115	3000	2600	4000	0.57	5.8	12
261	22	23	17	2.8	S102_0115 EZ303U	61	77	11.50	1323/115	3000	2600	4000	0.68	5.8	13
261	29	31	23	2.6	S102_0115 EZ401U	89	150	11.50	1323/115	3000	2600	4000	1.2	5.8	14
261	45	49	35	1.7	S102_0115 EZ501U	110	150	11.50	1323/115	3000	2600	4000	3.2	5.8	15
261	49	54	38	1.5	S102_0115 EZ402U	110	150	11.50	1323/115	3000	2600	4000	1.9	5.8	15
326	13	14	12	3.7	S102_0092 EZ302U	42	62	9.200	46/5	3000	2600	4000	0.68	5.8	12
326	17	18	16	2.8	S102_0092 EZ303U	49	62	9.200	46/5	3000	2600	4000	0.79	5.8	13
326	24	25	22	2.7	S102_0092 EZ401U	71	120	9.200	46/5	3000	2600	4000	1.3	5.8	14
326	36	40	33	1.8	S102_0092 EZ501U	96	130	9.200	46/5	3000	2600	4000	3.3	5.8	15
326	40	44	36	1.6	S102_0092 EZ402U	96	120	9.200	46/5	3000	2600	4000	2.0	5.8	15
326	58	72	53	1.1	S102_0092 EZ404U	96	130	9.200	46/5	3000	2600	4000	3.4	5.8	18
326	62	67	57	1.0	S102_0092 EZ502U	96	130	9.200	46/5	3000	2600	4000	5.6	5.8	17
326	62	70	57	1.0	S102_0092 EZ701U	96	130	9.200	46/5	3000	2600	4000	8.9	5.8	19
<b>S2 (<math>n_{1N} = 3000</math> rpm, <math>M_{2acc,max} = 360</math> Nm)</b>															
8.8	245	250	33	1.2	S203_3400 EZ301U	360	600	339.9	19035/56	3000	3000	4500	0.24	11	22
11	199	203	27	1.5	S203_2750 EZ301U	360	600	275.0	5499/20	3000	3000	4500	0.25	11	22
13	166	169	23	1.8	S203_2280 EZ301U	360	600	228.0	29187/128	3000	3000	4500	0.25	11	22
17	222	234	33	1.2	S202_1740 EZ302U	360	530	174.4	1395/8	3000	3000	4500	0.33	11	20
17	215	227	32	1.4	S203_1720 EZ302U	360	600	171.8	5499/32	3000	3000	4500	0.36	11	23
22	178	189	28	1.7	S202_1400 EZ302U	360	560	139.5	279/2	3000	3000	4500	0.34	11	20
22	232	246	37	1.3	S202_1400 EZ303U	360	560	139.5	279/2	3000	3000	4500	0.45	11	20
22	172	182	27	1.7	S203_1360 EZ302U	360	590	136.3	28341/208	3000	3000	4500	0.37	11	23
22	224	237	36	1.3	S203_1360 EZ303U	360	590	136.3	28341/208	3000	3000	4500	0.48	11	23
26	149	158	25	1.9	S202_1160 EZ302U	360	530	116.1	1161/10	3000	3000	4500	0.36	11	20
26	195	206	33	1.5	S202_1160 EZ303U	360	530	116.1	1161/10	3000	3000	4500	0.47	11	20
26	263	282	44	1.1	S202_1160 EZ401U	360	580	116.1	1161/10	3000	3000	4500	1.0	11	22
35	113	119	22	2.4	S202_0870 EZ302U	350	440	86.79	1215/14	3000	3000	4500	0.41	11	20
35	147	155	28	1.8	S202_0870 EZ303U	350	440	86.79	1215/14	3000	3000	4500	0.52	11	20
35	199	213	38	1.4	S202_0870 EZ401U	360	540	86.79	1215/14	3000	3000	4500	1.0	11	22
43	92	97	19	2.8	S202_0700 EZ302U	290	420	70.20	351/5	3000	3000	4500	0.46	11	20
43	120	127	25	2.1	S202_0700 EZ303U	340	420	70.20	351/5	3000	3000	4500	0.57	11	20
43	162	174	34	1.6	S202_0700 EZ401U	360	510	70.20	351/5	3000	3000	4500	1.1	11	22
43	249	272	52	1.0	S202_0700 EZ501U	360	510	70.20	351/5	3000	3000	4500	3.1	11	23
52	77	81	17	3.1	S202_0580 EZ302U	240	350	58.22	1863/32	3000	3000	4500	0.51	11	20
52	100	106	22	2.4	S202_0580 EZ303U	280	350	58.22	1863/32	3000	3000	4500	0.62	11	20
52	135	145	30	1.7	S202_0580 EZ401U	360	470	58.22	1863/32	3000	3000	4500	1.2	11	22



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21.2 Selection tables



$n_{2N}$	$M_{2N}$	$M_{2,0}$	$a_{th}$	S	Type	$M_{2acc}$	$M_{2NOT}$	i	$i_{exakt}$	$n_{1max}$ DBH	$n_{1max}$ DBV	$n_{1max}$ ZB	$J_1$	$C_2$	m
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]			[rpm]	[rpm]	[rpm]	[10 <sup>-4</sup> kgm <sup>2</sup> ]	[Nm/ arcmin]	[kg]
<b>S2 (<math>n_{IN} = 3000</math> rpm, <math>M_{2acc,max} = 360</math> Nm)</b>															
52	208	227	46	1.1	S202_0580 EZ501U	360	470	58.22	1863/32	3000	3000	4500	3.1	11	23
52	227	252	51	1.0	S202_0580 EZ402U	360	470	58.22	1863/32	3000	3000	4500	1.9	11	23
68	59	62	15	3.5	S202_0440 EZ302U	180	270	43.88	351/8	3000	2700	4200	0.63	11	20
68	76	81	19	2.7	S202_0440 EZ303U	220	270	43.88	351/8	3000	2700	4200	0.74	11	20
68	103	111	26	2.0	S202_0440 EZ401U	310	420	43.88	351/8	3000	2700	4200	1.3	11	22
68	159	173	40	1.3	S202_0440 EZ501U	310	420	43.88	351/8	3000	2700	4200	3.2	11	23
68	173	192	44	1.2	S202_0440 EZ402U	310	420	43.88	351/8	3000	2700	4200	2.0	11	23
86	49	52	10	3.2	S202_0350 EZ302U	150	190	34.71	243/7	3000	3000	4500	0.42	9.5	20
86	64	67	13	2.4	S202_0350 EZ303U	150	190	34.71	243/7	3000	3000	4500	0.53	9.5	20
86	86	92	18	2.7	S202_0350 EZ401U	260	370	34.71	243/7	3000	3000	4500	1.1	9.5	22
86	132	144	28	1.8	S202_0350 EZ501U	310	470	34.71	243/7	3000	3000	4500	3.0	9.5	23
86	144	160	31	1.6	S202_0350 EZ402U	300	370	34.71	243/7	3000	3000	4500	1.8	9.5	23
107	40	42	9.6	3.7	S202_0280 EZ302U	120	180	28.08	702/25	3000	3000	4500	0.48	9.5	20
107	52	55	12	2.8	S202_0280 EZ303U	150	180	28.08	702/25	3000	3000	4500	0.59	9.5	20
107	70	75	17	3.2	S202_0280 EZ401U	210	340	28.08	702/25	3000	3000	4500	1.1	9.5	22
107	107	117	26	2.1	S202_0280 EZ501U	310	450	28.08	702/25	3000	3000	4500	3.1	9.5	23
107	117	130	28	1.9	S202_0280 EZ402U	270	340	28.08	702/25	3000	3000	4500	1.8	9.5	23
107	172	215	41	1.3	S202_0280 EZ404U	310	450	28.08	702/25	3000	3000	4500	3.2	9.5	25
107	185	200	44	1.2	S202_0280 EZ502U	310	450	28.08	702/25	3000	3000	4500	5.4	9.5	24
107	185	207	44	1.2	S202_0280 EZ701U	310	450	28.08	702/25	3000	3000	4500	8.7	9.5	26
129	33	35	9.0	3.7	S202_0230 EZ302U	100	150	23.29	1863/80	3000	3000	4500	0.55	9.5	20
129	43	46	12	2.8	S202_0230 EZ303U	120	150	23.29	1863/80	3000	3000	4500	0.66	9.5	20
129	58	62	16	3.7	S202_0230 EZ401U	180	310	23.29	1863/80	3000	3000	4500	1.2	9.5	22
129	90	98	24	2.4	S202_0230 EZ501U	310	430	23.29	1863/80	3000	3000	4500	3.2	9.5	23
129	98	108	27	2.2	S202_0230 EZ402U	250	310	23.29	1863/80	3000	3000	4500	1.9	9.5	23
129	144	179	39	1.5	S202_0230 EZ404U	310	430	23.29	1863/80	3000	3000	4500	3.2	9.5	25
129	154	167	42	1.4	S202_0230 EZ502U	310	430	23.29	1863/80	3000	3000	4500	5.5	9.5	24
129	154	173	42	1.4	S202_0230 EZ701U	310	430	23.29	1863/80	3000	3000	4500	8.8	9.5	26
129	202	231	55	1.1	S202_0230 EZ503U	310	430	23.29	1863/80	3000	3000	4500	7.8	9.5	26
171	25	27	8.3	3.7	S202_0175 EZ302U	79	120	17.55	351/20	3000	3000	4500	0.70	9.5	20
171	33	35	11	2.8	S202_0175 EZ303U	93	120	17.55	351/20	3000	3000	4500	0.81	9.5	20
171	44	47	15	4.2	S202_0175 EZ401U	130	230	17.55	351/20	3000	3000	4500	1.3	9.5	22
171	68	74	23	2.8	S202_0175 EZ501U	250	380	17.55	351/20	3000	3000	4500	3.3	9.5	23
171	74	82	25	2.5	S202_0175 EZ402U	190	230	17.55	351/20	3000	3000	4500	2.0	9.5	23
171	109	136	36	1.7	S202_0175 EZ404U	280	380	17.55	351/20	3000	3000	4500	3.4	9.5	25
171	117	127	39	1.6	S202_0175 EZ502U	280	380	17.55	351/20	3000	3000	4500	5.6	9.5	24
171	117	131	39	1.6	S202_0175 EZ701U	280	380	17.55	351/20	3000	3000	4500	8.9	9.5	26
171	154	176	51	1.2	S202_0175 EZ503U	280	380	17.55	351/20	3000	3000	4500	8.0	9.5	26
216	20	21	7.8	3.7	S202_0140 EZ302U	63	93	13.92	1809/130	3000	3000	4500	0.87	9.5	20
216	26	28	10	2.8	S202_0140 EZ303U	74	93	13.92	1809/130	3000	3000	4500	0.98	9.5	20
216	35	38	14	4.2	S202_0140 EZ401U	110	190	13.92	1809/130	3000	3000	4500	1.5	9.5	22
216	54	59	21	3.0	S202_0140 EZ501U	200	330	13.92	1809/130	3000	3000	4500	3.5	9.5	23
216	59	66	23	2.5	S202_0140 EZ402U	150	190	13.92	1809/130	3000	3000	4500	2.2	9.5	23
216	87	109	34	1.9	S202_0140 EZ404U	250	330	13.92	1809/130	3000	3000	4500	3.6	9.5	25
216	93	101	36	1.8	S202_0140 EZ502U	250	330	13.92	1809/130	3000	3000	4500	5.8	9.5	24
216	93	105	36	1.8	S202_0140 EZ701U	250	330	13.92	1809/130	3000	3000	4500	9.1	9.5	26
216	123	140	48	1.3	S202_0140 EZ503U	250	330	13.92	1809/130	3000	3000	4500	8.2	9.5	26
216	152	182	59	1.1	S202_0140 EZ702U	250	330	13.92	1809/130	3000	3000	4500	14	9.5	29
259	22	23	9.6	2.8	S202_0115 EZ303U	62	78	11.60	58/5	2800	2500	3900	1.2	9.5	20
259	30	32	13	4.2	S202_0115 EZ401U	90	160	11.60	58/5	2800	2500	3900	1.7	9.5	22
259	46	50	20	3.2	S202_0115 EZ501U	170	290	11.60	58/5	2800	2500	3900	3.7	9.5	23
259	50	55	22	2.5	S202_0115 EZ402U	120	160	11.60	58/5	2800	2500	3900	2.4	9.5	23
259	73	91	32	2.0	S202_0115 EZ404U	220	290	11.60	58/5	2800	2500	3900	3.8	9.5	25
259	78	85	34	1.9	S202_0115 EZ502U	220	290	11.60	58/5	2800	2500	3900	6.0	9.5	24
259	78	88	34	1.9	S202_0115 EZ701U	210	290	11.60	58/5	2800	2500	3900	9.3	9.5	26
259	103	118	45	1.4	S202_0115 EZ503U	220	290	11.60	58/5	2800	2500	3900	8.4	9.5	26
259	127	152	56	1.2	S202_0115 EZ702U	220	290	11.60	58/5	2800	2500	3900	15	9.5	29
259	143	169	63	1.0	S202_0115 EZ505U	220	290	11.60	58/5	2800	2500	3900	13	9.5	29
325	18	19	9.0	2.8	S202_0092 EZ303U	50	62	9.232	1431/155	2800	2500	3900	1.5	9.5	20

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## 21 S helical worm geared motors

### 21.2 Selection tables

$n_{2N}$	$M_{2N}$	$M_{2,0}$	$a_{th}$	S	Type	$M_{2acc}$	$M_{2NOT}$	i	$i_{exakt}$	$n_{1max}$	$n_{1max}$	$n_{1max}$	$J_1$	$C_2$	m
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]			DBH	DBV	ZB	[ $10^{-4}$ kgm <sup>2</sup> ]	[Nm/ arcmin]	[kg]
<b>S2 (<math>n_{1N} = 3000</math> rpm, <math>M_{2acc,max} = 360</math> Nm)</b>															
325	24	25	12	4.2	S202_0092 EZ401U	72	120	9.232	1431/155	2800	2500	3900	2.0	9.5	22
325	36	40	19	3.4	S202_0092 EZ501U	140	250	9.232	1431/155	2800	2500	3900	4.0	9.5	23
325	40	44	20	2.5	S202_0092 EZ402U	100	120	9.232	1431/155	2800	2500	3900	2.7	9.5	23
325	59	73	30	2.1	S202_0092 EZ404U	190	250	9.232	1431/155	2800	2500	3900	4.1	9.5	25
325	63	68	32	2.0	S202_0092 EZ502U	190	250	9.232	1431/155	2800	2500	3900	6.3	9.5	24
325	63	70	32	2.0	S202_0092 EZ701U	170	250	9.232	1431/155	2800	2500	3900	9.6	9.5	26
325	82	94	42	1.5	S202_0092 EZ503U	190	250	9.232	1431/155	2800	2500	3900	8.7	9.5	26
325	102	122	52	1.2	S202_0092 EZ702U	190	250	9.232	1431/155	2800	2500	3900	15	9.5	29
325	115	136	59	1.1	S202_0092 EZ505U	190	250	9.232	1431/155	2800	2500	3900	13	9.5	29
<b>S2 (<math>n_{1N} = 4500</math> rpm, <math>M_{2acc,max} = 250</math> Nm)</b>															
323	121	196	62	1.4	S202_0140 EZ505U	250	330	13.92	1809/130	3000	3000	4500	13	9.5	29
<b>S3 (<math>n_{1N} = 3000</math> rpm, <math>M_{2acc,max} = 660</math> Nm)</b>															
8.8	426	450	34	1.3	S303_3420 EZ302U	660	1100	341.7	8883/26	3000	2700	4000	0.35	26	34
11	344	363	28	1.6	S303_2740 EZ302U	660	1100	274.3	35109/128	3000	2700	4000	0.36	26	34
11	448	474	36	1.2	S303_2740 EZ303U	660	1100	274.3	35109/128	3000	2700	4000	0.47	26	35
13	289	305	24	1.9	S303_2290 EZ302U	660	1100	229.1	1833/8	3000	2700	4000	0.37	26	34
13	376	397	31	1.5	S303_2290 EZ303U	660	1100	229.1	1833/8	3000	2700	4000	0.48	26	35
17	225	237	23	1.9	S302_1740 EZ302U	510	630	174.4	1395/8	3000	2700	4000	0.37	26	29
17	293	310	29	1.5	S302_1740 EZ303U	510	630	174.4	1395/8	3000	2700	4000	0.48	26	30
18	216	228	19	2.5	S303_1700 EZ302U	660	900	170.1	15651/92	3000	2700	4000	0.38	26	34
18	281	298	25	2.0	S303_1700 EZ303U	660	900	170.1	15651/92	3000	2700	4000	0.49	26	35
18	380	408	33	1.4	S303_1700 EZ401U	660	900	170.1	15651/92	3000	2700	4000	1.0	26	36
21	182	192	17	2.6	S302_1400 EZ302U	480	600	139.9	1539/11	3000	2700	4000	0.40	26	29
21	236	250	22	2.0	S302_1400 EZ303U	480	600	139.9	1539/11	3000	2700	4000	0.51	26	30
21	320	342	30	1.7	S302_1400 EZ401U	660	1080	139.9	1539/11	3000	2700	4000	1.0	26	31
22	175	185	16	3.1	S303_1370 EZ302U	550	730	137.1	1645/12	3000	2700	4000	0.40	26	34
22	228	241	21	2.4	S303_1370 EZ303U	580	730	137.1	1645/12	3000	2700	4000	0.51	26	35
22	309	331	29	1.8	S303_1370 EZ401U	580	730	137.1	1645/12	3000	2700	4000	1.0	26	36
22	468	512	44	1.2	S303_1350 EZ501U	660	1090	135.3	406/3	3000	2700	4000	3.1	26	37
26	152	160	15	2.6	S302_1160 EZ302U	400	500	116.1	1161/10	3000	2700	4000	0.45	26	29
26	197	209	19	2.0	S302_1160 EZ303U	400	500	116.1	1161/10	3000	2700	4000	0.56	26	30
26	267	286	26	2.0	S302_1160 EZ401U	660	1060	116.1	1161/10	3000	2700	4000	1.1	26	31
26	410	448	40	1.3	S302_1160 EZ501U	660	1060	116.1	1161/10	3000	2700	4000	3.1	26	32
26	448	496	44	1.2	S302_1160 EZ402U	660	1060	116.1	1161/10	3000	2700	4000	1.8	26	32
34	115	122	13	3.3	S302_0870 EZ302U	360	480	87.23	1134/13	3000	2700	4000	0.54	26	29
34	150	159	17	2.5	S302_0870 EZ303U	380	480	87.23	1134/13	3000	2700	4000	0.65	26	30
34	203	217	23	2.5	S302_0870 EZ401U	620	890	87.23	1134/13	3000	2700	4000	1.2	26	31
34	311	340	35	1.6	S302_0870 EZ501U	660	1010	87.23	1134/13	3000	2700	4000	3.2	26	32
34	340	376	38	1.5	S302_0870 EZ402U	660	890	87.23	1134/13	3000	2700	4000	1.9	26	32
43	93	98	11	3.7	S302_0700 EZ302U	290	430	70.03	2241/32	3000	2700	4000	0.65	26	29
43	121	128	15	2.8	S302_0700 EZ303U	340	430	70.03	2241/32	3000	2700	4000	0.76	26	30
43	164	176	20	2.9	S302_0700 EZ401U	500	860	70.03	2241/32	3000	2700	4000	1.3	26	31
43	252	275	30	1.9	S302_0700 EZ501U	660	950	70.03	2241/32	3000	2700	4000	3.3	26	32
43	275	305	33	1.7	S302_0700 EZ402U	660	860	70.03	2241/32	3000	2700	4000	2.0	26	32
43	404	504	49	1.2	S302_0700 EZ404U	660	950	70.03	2241/32	3000	2700	4000	3.3	26	34
43	434	469	52	1.1	S302_0700 EZ502U	660	950	70.03	2241/32	3000	2700	4000	5.6	26	34
43	434	486	52	1.1	S302_0700 EZ701U	660	950	70.03	2241/32	3000	2700	4000	8.9	26	35
51	78	83	10	3.7	S302_0590 EZ302U	250	360	58.50	117/2	3000	2700	4000	0.77	26	29
51	102	108	13	2.8	S302_0590 EZ303U	290	360	58.50	117/2	3000	2700	4000	0.88	26	30
51	138	148	18	3.2	S302_0590 EZ401U	420	720	58.50	117/2	3000	2700	4000	1.4	26	31
51	212	232	28	2.1	S302_0590 EZ501U	660	900	58.50	117/2	3000	2700	4000	3.4	26	32
51	232	257	30	1.9	S302_0590 EZ402U	580	720	58.50	117/2	3000	2700	4000	2.1	26	32
51	340	424	44	1.3	S302_0590 EZ404U	660	900	58.50	117/2	3000	2700	4000	3.5	26	34
51	365	395	47	1.2	S302_0590 EZ502U	660	900	58.50	117/2	3000	2700	4000	5.7	26	34
51	365	409	47	1.2	S302_0590 EZ701U	660	900	58.50	117/2	3000	2700	4000	9.0	26	35
69	104	111	16	3.8	S302_0430 EZ401U	320	540	43.44	999/23	2900	2400	3800	1.7	26	31
69	160	174	24	2.5	S302_0430 EZ501U	590	790	43.44	999/23	2900	2400	3800	3.6	26	32
69	174	193	26	2.3	S302_0430 EZ402U	430	540	43.44	999/23	2900	2400	3800	2.4	26	32
69	256	319	39	1.5	S302_0430 EZ404U	590	790	43.44	999/23	2900	2400	3800	3.7	26	34



21 S helical worm geared motors  
21.2 Selection tables



$n_{2N}$	$M_{2N}$	$M_{2,0}$	$a_{th}$	S	Type	$M_{2acc}$	$M_{2NOT}$	i	$i_{exakt}$	$n_{1max}$ DBH	$n_{1max}$ DBV	$n_{1max}$ ZB	$J_1$ [10 <sup>-4</sup> kgm <sup>2</sup> ]	$C_2$ [Nm/ arcmin]	m [kg]
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]			[rpm]	[rpm]	[rpm]			
<b>S3 (<math>n_{IN} = 3000</math> rpm, <math>M_{2acc,max} = 660</math> Nm)</b>															
69	275	297	42	1.4	S302_0430 EZ502U	590	790	43.44	999/23	2900	2400	3800	5.9	26	34
69	275	308	42	1.4	S302_0430 EZ701U	590	790	43.44	999/23	2900	2400	3800	9.2	26	35
69	360	412	54	1.1	S302_0430 EZ503U	590	790	43.44	999/23	2900	2400	3800	8.3	26	35
86	50	52	6.2	3.3	S302_0350 EZ302U	160	210	34.89	2268/65	3000	3000	4000	0.60	20	29
86	64	68	8.1	2.6	S302_0350 EZ303U	170	210	34.89	2268/65	3000	3000	4000	0.71	20	30
86	87	93	11	3.6	S302_0350 EZ401U	260	390	34.89	2268/65	3000	3000	4000	1.2	20	31
86	134	146	17	3.2	S302_0350 EZ501U	500	750	34.89	2268/65	3000	3000	4000	3.2	20	32
86	146	162	18	2.1	S302_0350 EZ402U	310	390	34.89	2268/65	3000	3000	4000	1.9	20	32
86	215	268	27	2.0	S302_0350 EZ404U	520	750	34.89	2268/65	3000	3000	4000	3.3	20	34
86	230	249	29	1.9	S302_0350 EZ502U	520	750	34.89	2268/65	3000	3000	4000	5.5	20	34
86	230	259	29	1.9	S302_0350 EZ701U	520	750	34.89	2268/65	3000	3000	4000	8.8	20	35
86	302	346	38	1.4	S302_0350 EZ503U	520	750	34.89	2268/65	3000	3000	4000	7.9	20	35
107	40	42	5.9	3.7	S302_0280 EZ302U	130	190	28.01	2241/80	3000	3000	4000	0.73	20	29
107	52	55	7.7	2.8	S302_0280 EZ303U	150	190	28.01	2241/80	3000	3000	4000	0.84	20	30
107	70	75	10	4.2	S302_0280 EZ401U	210	370	28.01	2241/80	3000	3000	4000	1.4	20	31
107	108	118	16	3.9	S302_0280 EZ501U	400	640	28.01	2241/80	3000	3000	4000	3.3	20	32
107	118	131	18	2.5	S302_0280 EZ402U	300	370	28.01	2241/80	3000	3000	4000	2.1	20	32
107	174	216	26	2.4	S302_0280 EZ404U	520	640	28.01	2241/80	3000	3000	4000	3.4	20	34
107	186	201	28	2.3	S302_0280 EZ502U	520	640	28.01	2241/80	3000	3000	4000	5.6	20	34
107	186	209	28	2.3	S302_0280 EZ701U	500	840	28.01	2241/80	3000	3000	4000	8.9	20	35
107	244	279	36	1.7	S302_0280 EZ503U	520	640	28.01	2241/80	3000	3000	4000	8.0	20	35
107	302	362	45	1.4	S302_0280 EZ702U	520	840	28.01	2241/80	3000	3000	4000	14	20	38
107	339	402	50	1.2	S302_0280 EZ505U	520	840	28.01	2241/80	3000	3000	4000	13	20	38
128	34	35	6.0	3.7	S302_0230 EZ302U	110	160	23.40	117/5	3000	3000	4000	0.89	20	29
128	44	46	7.8	2.8	S302_0230 EZ303U	120	160	23.40	117/5	3000	3000	4000	1.0	20	30
128	59	63	10	4.2	S302_0230 EZ401U	180	310	23.40	117/5	3000	3000	4000	1.5	20	31
128	91	99	16	4.4	S302_0230 EZ501U	340	590	23.40	117/5	3000	3000	4000	3.5	20	32
128	99	110	18	2.5	S302_0230 EZ402U	250	310	23.40	117/5	3000	3000	4000	2.2	20	32
128	146	182	26	2.7	S302_0230 EZ404U	470	590	23.40	117/5	3000	3000	4000	3.6	20	34
128	156	169	28	2.5	S302_0230 EZ502U	470	590	23.40	117/5	3000	3000	4000	5.8	20	34
128	156	175	28	2.5	S302_0230 EZ701U	420	790	23.40	117/5	3000	3000	4000	9.1	20	35
128	205	234	36	1.9	S302_0230 EZ503U	470	590	23.40	117/5	3000	3000	4000	8.2	20	35
128	253	304	45	1.6	S302_0230 EZ702U	520	790	23.40	117/5	3000	3000	4000	14	20	38
128	285	338	51	1.4	S302_0230 EZ505U	520	790	23.40	117/5	3000	3000	4000	13	20	38
173	44	47	11	4.2	S302_0175 EZ401U	130	230	17.37	1998/115	3000	3000	4000	1.9	20	31
173	68	74	16	2.7	S302_0175 EZ501U	190	230	17.37	1998/115	3000	3000	4000	3.9	20	32
173	74	82	18	2.5	S302_0175 EZ402U	190	230	17.37	1998/115	3000	3000	4000	2.6	20	32
173	109	136	26	3.2	S302_0175 EZ404U	370	470	17.37	1998/115	3000	3000	4000	3.9	20	34
173	117	126	28	3.0	S302_0175 EZ502U	370	470	17.37	1998/115	3000	3000	4000	6.2	20	34
173	117	131	28	3.0	S302_0175 EZ701U	320	700	17.37	1998/115	3000	3000	4000	9.5	20	35
173	153	175	37	2.3	S302_0175 EZ503U	370	470	17.37	1998/115	3000	3000	4000	8.5	20	35
173	190	228	45	1.8	S302_0175 EZ702U	520	700	17.37	1998/115	3000	3000	4000	15	20	38
173	213	253	51	1.6	S302_0175 EZ505U	520	700	17.37	1998/115	3000	3000	4000	13	20	38
173	261	329	62	1.3	S302_0175 EZ703U	520	700	17.37	1998/115	3000	3000	4000	23	20	40
214	88	110	26	3.4	S302_0140 EZ404U	300	380	14.00	14/1	3000	3000	4000	4.3	20	34
214	95	102	28	3.1	S302_0140 EZ502U	300	380	14.00	14/1	3000	3000	4000	6.5	20	34
214	95	106	28	3.1	S302_0140 EZ701U	260	590	14.00	14/1	3000	3000	4000	9.8	20	35
214	124	142	37	2.4	S302_0140 EZ503U	300	380	14.00	14/1	3000	3000	4000	8.9	20	35
214	154	184	46	1.9	S302_0140 EZ702U	450	590	14.00	14/1	3000	3000	4000	15	20	38
214	173	205	51	1.7	S302_0140 EZ505U	450	590	14.00	14/1	3000	3000	4000	13	20	38
214	211	266	63	1.4	S302_0140 EZ703U	450	590	14.00	14/1	3000	3000	4000	23	20	40
257	74	92	26	3.3	S302_0115 EZ404U	250	320	11.66	1458/125	2600	2300	3600	4.8	20	34
257	79	86	28	3.1	S302_0115 EZ502U	250	320	11.66	1458/125	2600	2300	3600	7.0	20	34
257	79	89	28	3.1	S302_0115 EZ701U	210	490	11.66	1458/125	2600	2300	3600	10	20	35
257	104	119	37	2.4	S302_0115 EZ503U	250	320	11.66	1458/125	2600	2300	3600	9.4	20	35
257	129	154	46	1.9	S302_0115 EZ702U	370	490	11.66	1458/125	2600	2300	3600	16	20	38
257	145	172	52	1.7	S302_0115 EZ505U	370	490	11.66	1458/125	2600	2300	3600	14	20	38
257	177	223	63	1.4	S302_0115 EZ703U	370	490	11.66	1458/125	2600	2300	3600	23	20	40
322	59	74	27	3.3	S302_0093 EZ404U	200	250	9.310	270/29	2600	2300	3600	5.6	20	34

S

# 21 S helical worm geared motors

## 21.2 Selection tables



**STÖBER**

$n_{2N}$	$M_{2N}$	$M_{2,0}$	$a_{th}$	S	Type	$M_{zacc}$	$M_{2NOT}$	i	$i_{exakt}$	$n_{1max}$	$n_{1max}$	$n_{1max}$	$J_1$	$C_2$	m
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]			DBH	DBV	ZB	[10 <sup>-4</sup> kgm <sup>2</sup> ]	[Nm/ arcmin]	[kg]
<b>S3 (<math>n_{1N} = 3000</math> rpm, <math>M_{zacc,max} = 660</math> Nm)</b>															
322	64	69	28	3.1	S302_0093 EZ502U	200	250	9.310	270/29	2600	2300	3600	7.8	20	34
322	64	72	28	3.1	S302_0093 EZ701U	170	390	9.310	270/29	2600	2300	3600	11	20	35
322	84	96	37	2.4	S302_0093 EZ503U	200	250	9.310	270/29	2600	2300	3600	10	20	35
322	103	124	46	1.9	S302_0093 EZ702U	300	390	9.310	270/29	2600	2300	3600	16	20	38
322	116	138	52	1.7	S302_0093 EZ505U	300	390	9.310	270/29	2600	2300	3600	15	20	38
322	142	179	63	1.4	S302_0093 EZ703U	300	390	9.310	270/29	2600	2300	3600	24	20	40
<b>S4 (<math>n_{1N} = 3000</math> rpm, <math>M_{zacc,max} = 960</math> Nm)</b>															
5.5	684	722	41	1.2	S403_5480 EZ302U	960	1680	548.0	24111/44	2800	2600	4000	0.35	36	43
6.6	570	603	34	1.4	S403_4560 EZ302U	960	1700	455.5	5922/13	2800	2600	4000	0.35	36	43
8.8	431	455	26	1.9	S403_3420 EZ302U	960	1630	341.9	13677/40	2800	2600	4000	0.36	36	43
8.8	560	593	34	1.4	S403_3420 EZ303U	960	1630	341.9	13677/40	2800	2600	4000	0.47	36	43
11	450	476	27	1.8	S403_2730 EZ303U	960	1440	273.2	4371/16	2800	2600	4000	0.48	36	43
11	609	652	37	1.3	S403_2730 EZ401U	960	1440	273.2	4371/16	2800	2600	4000	1.0	36	44
13	379	401	23	2.1	S403_2290 EZ303U	960	1210	229.1	1833/8	2800	2600	4000	0.50	36	43
13	513	550	31	1.6	S403_2290 EZ401U	960	1210	229.1	1833/8	2800	2600	4000	1.0	36	44
17	613	670	39	1.2	S402_1740 EZ501U	960	1230	174.2	3483/20	2800	2600	4000	3.0	36	41
18	286	302	18	2.5	S403_1710 EZ303U	730	910	171.2	2397/14	2800	2600	4000	0.53	36	43
18	386	414	25	1.9	S403_1710 EZ401U	730	910	171.2	2397/14	2800	2600	4000	1.1	36	44
18	586	641	38	1.4	S403_1690 EZ501U	960	1660	169.0	5916/35	2800	2600	4000	3.1	36	45
21	496	542	34	1.6	S402_1400 EZ501U	960	1630	139.9	1539/11	2800	2600	4000	3.1	36	41
22	471	515	32	1.7	S403_1350 EZ501U	960	1620	134.9	2697/20	2800	2600	4000	3.2	36	45
26	415	453	30	1.9	S402_1160 EZ501U	960	1580	116.3	1512/13	2800	2600	4000	3.2	36	41
34	314	344	26	2.4	S402_0870 EZ501U	960	1500	87.30	873/10	2800	2600	4000	3.3	36	41
34	541	585	44	1.4	S402_0870 EZ502U	960	1500	87.30	873/10	2800	2600	4000	5.6	36	43
34	541	607	44	1.4	S402_0870 EZ701U	960	1500	87.30	873/10	2800	2600	4000	8.9	36	45
43	253	277	23	2.8	S402_0700 EZ501U	940	1410	69.75	279/4	2800	2600	4000	3.5	36	41
43	436	472	39	1.6	S402_0700 EZ502U	960	1410	69.75	279/4	2800	2600	4000	5.8	36	43
43	436	489	39	1.6	S402_0700 EZ701U	960	1410	69.75	279/4	2800	2600	4000	9.1	36	45
43	572	654	51	1.2	S402_0700 EZ503U	960	1410	69.75	279/4	2800	2600	4000	8.2	36	44
51	214	234	21	3.1	S402_0590 EZ501U	800	1330	58.50	117/2	2800	2600	4000	3.7	36	41
51	368	398	35	1.8	S402_0590 EZ502U	960	1330	58.50	117/2	2800	2600	4000	6.0	36	43
51	368	413	35	1.8	S402_0590 EZ701U	960	1330	58.50	117/2	2800	2600	4000	9.3	36	45
51	483	553	46	1.4	S402_0590 EZ503U	960	1330	58.50	117/2	2800	2600	4000	8.4	36	44
51	598	717	57	1.1	S402_0590 EZ702U	960	1330	58.50	117/2	2800	2600	4000	15	36	47
69	162	177	18	3.6	S402_0440 EZ501U	600	1100	43.71	306/7	2600	2300	3600	4.1	36	41
69	279	301	31	2.1	S402_0440 EZ502U	880	1100	43.71	306/7	2600	2300	3600	6.4	36	43
69	279	313	31	2.1	S402_0440 EZ701U	750	1170	43.71	306/7	2600	2300	3600	9.7	36	45
69	365	418	40	1.6	S402_0440 EZ503U	880	1100	43.71	306/7	2600	2300	3600	8.8	36	44
69	452	542	50	1.3	S402_0440 EZ702U	880	1170	43.71	306/7	2600	2300	3600	15	36	47
69	509	603	56	1.1	S402_0440 EZ505U	880	1170	43.71	306/7	2600	2300	3600	13	36	47
86	134	147	12	4.4	S402_0350 EZ501U	500	740	34.92	873/25	3000	3000	4000	3.4	29	41
86	231	250	21	2.5	S402_0350 EZ502U	590	740	34.92	873/25	3000	3000	4000	5.7	29	43
86	231	259	21	2.7	S402_0350 EZ701U	630	1200	34.92	873/25	3000	3000	4000	9.0	29	45
86	303	347	27	1.9	S402_0350 EZ503U	590	740	34.92	873/25	3000	3000	4000	8.1	29	44
86	375	450	34	1.6	S402_0350 EZ702U	720	1200	34.92	873/25	3000	3000	4000	14	29	47
86	422	500	38	1.5	S402_0350 EZ505U	720	1200	34.92	873/25	3000	3000	4000	13	29	47
108	108	118	11	2.7	S402_0280 EZ501U	300	370	27.90	279/10	3000	3000	4000	3.7	29	41
108	186	201	20	2.9	S402_0280 EZ502U	550	680	27.90	279/10	3000	3000	4000	6.0	29	43
108	186	209	20	3.4	S402_0280 EZ701U	500	1200	27.90	279/10	3000	3000	4000	9.3	29	45
108	244	279	26	2.2	S402_0280 EZ503U	550	680	27.90	279/10	3000	3000	4000	8.3	29	44
108	302	362	32	2.1	S402_0280 EZ702U	720	1200	27.90	279/10	3000	3000	4000	14	29	47
108	339	402	36	1.9	S402_0280 EZ505U	720	1200	27.90	279/10	3000	3000	4000	13	29	47
108	415	523	44	1.5	S402_0280 EZ703U	720	1200	27.90	279/10	3000	3000	4000	22	29	49
128	157	169	20	3.2	S402_0230 EZ502U	500	620	23.40	117/5	3000	3000	4000	6.2	29	43
128	157	176	20	3.8	S402_0230 EZ701U	420	1200	23.40	117/5	3000	3000	4000	9.5	29	45
128	205	235	26	2.4	S402_0230 EZ503U	500	620	23.40	117/5	3000	3000	4000	8.6	29	44
128	254	305	32	2.4	S402_0230 EZ702U	720	1200	23.40	117/5	3000	3000	4000	15	29	47
128	286	339	36	2.1	S402_0230 EZ505U	720	1200	23.40	117/5	3000	3000	4000	13	29	47
128	349	441	44	1.7	S402_0230 EZ703U	720	1200	23.40	117/5	3000	3000	4000	23	29	49





21 S helical worm geared motors  
21.2 Selection tables



$n_{2N}$	$M_{2N}$	$M_{2,0}$	$a_{th}$	S	Type	$M_{2acc}$	$M_{2NOT}$	i	$i_{exakt}$	$n_{1max}$ DBH	$n_{1max}$ DBV	$n_{1max}$ ZB	$J_1$	$C_2$	m
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]			[rpm]	[rpm]	[rpm]	[10 <sup>-4</sup> kgm <sup>2</sup> ]	[Nm/ arcmin]	[kg]
<b>S4 (<math>n_{IN} = 3000</math> rpm, <math>M_{2acc,max} = 960</math> Nm)</b>															
172	118	128	19	3.2	S402_0175 EZ502U	380	470	17.49	612/35	2800	2500	3800	6.9	29	43
172	118	132	19	4.5	S402_0175 EZ701U	320	1060	17.49	612/35	2800	2500	3800	10	29	45
172	155	177	25	2.4	S402_0175 EZ503U	380	470	17.49	612/35	2800	2500	3800	9.3	29	44
172	191	230	31	2.8	S402_0175 EZ702U	650	1060	17.49	612/35	2800	2500	3800	15	29	47
172	215	255	35	2.5	S402_0175 EZ505U	720	1060	17.49	612/35	2800	2500	3800	14	29	47
172	263	332	43	2.0	S402_0175 EZ703U	720	1060	17.49	612/35	2800	2500	3800	23	29	49
172	340	482	56	1.6	S402_0175 EZ705U	720	1060	17.49	612/35	2800	2500	3800	36	29	55
215	95	106	19	4.8	S402_0140 EZ701U	260	910	13.95	279/20	2800	2500	3800	11	29	45
215	154	184	31	2.9	S402_0140 EZ702U	530	910	13.95	279/20	2800	2500	3800	16	29	47
215	173	205	35	2.6	S402_0140 EZ505U	680	910	13.95	279/20	2800	2500	3800	15	29	47
215	211	266	43	2.1	S402_0140 EZ703U	680	910	13.95	279/20	2800	2500	3800	24	29	49
215	273	387	55	1.7	S402_0140 EZ705U	680	910	13.95	279/20	2800	2500	3800	36	29	55
215	286	475	58	1.6	S402_0140 EZ802U	680	910	13.95	279/20	2800	2500	3800	60	29	63
259	79	89	19	4.8	S402_0115 EZ701U	210	760	11.57	81/7	2400	2100	3200	12	29	45
259	128	154	31	3.0	S402_0115 EZ702U	440	760	11.57	81/7	2400	2100	3200	17	29	47
259	144	171	35	2.6	S402_0115 EZ505U	570	760	11.57	81/7	2400	2100	3200	15	29	47
259	176	222	42	2.2	S402_0115 EZ703U	570	760	11.57	81/7	2400	2100	3200	25	29	49
259	228	323	55	1.7	S402_0115 EZ705U	570	760	11.57	81/7	2400	2100	3200	37	29	55
259	238	396	57	1.6	S402_0115 EZ802U	570	760	11.57	81/7	2400	2100	3200	61	29	63
323	64	72	19	4.9	S402_0093 EZ701U	170	620	9.281	297/32	2400	2100	3200	13	29	45
323	103	124	30	3.0	S402_0093 EZ702U	350	620	9.281	297/32	2400	2100	3200	18	29	47
323	116	138	34	2.7	S402_0093 EZ505U	470	620	9.281	297/32	2400	2100	3200	17	29	47
323	142	179	42	2.2	S402_0093 EZ703U	470	620	9.281	297/32	2400	2100	3200	26	29	49
323	184	260	54	1.7	S402_0093 EZ705U	470	620	9.281	297/32	2400	2100	3200	39	29	55
323	192	320	57	1.6	S402_0093 EZ802U	470	620	9.281	297/32	2400	2100	3200	63	29	63





## 21.3 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

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

Solid shaft	Tolerance
Fit of shaft end $\varnothing \leq 50$ mm	DIN 748-1, ISO k6
Fit of shaft end $\varnothing > 50$ mm	DIN 748-1, ISO m6
Feather keys	DIN 6885-1, high form A

Hollow shaft	Tolerance
Hollow shaft hole fit	ISO H7

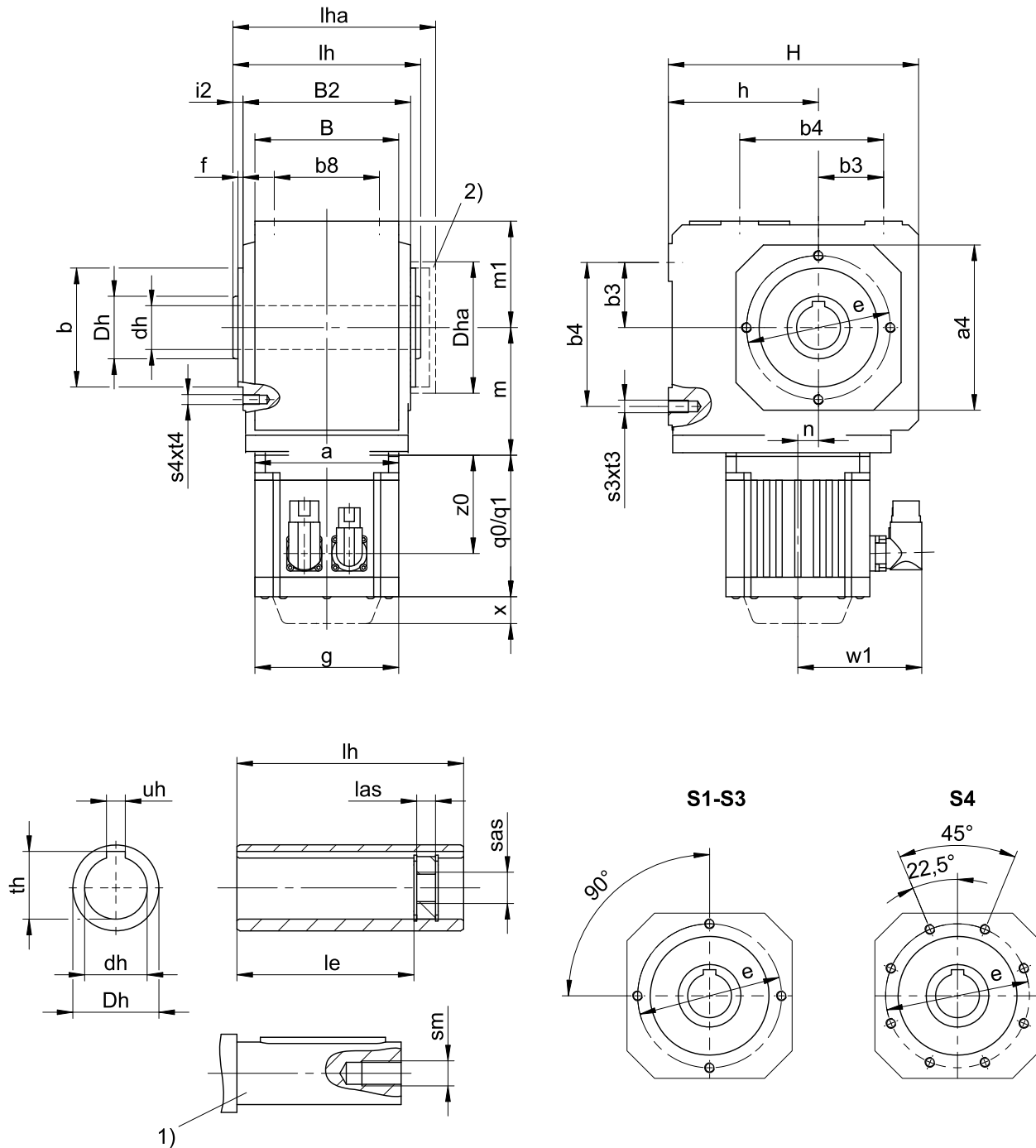
Flange	Pilot tolerance
Up to 300 mm	ISO j6
Starting at 350 mm	ISO h6

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

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



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



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter <a href="#">[ 22.4 ]</a>
1)	The length of the machine shaft must be at least $2.2 \times \varnothing dh$ and the length of the feather key must be at least $2 \times \varnothing dh$ .	2)	Cover (optional)



Dimensions of gear units

Type	a4	Øb	b3	b4	b8	B	B2	Ødh	ØDh	□Dha	Øe	f	h	H	i2	le	lh	las	lha	m1	s3	s4	sm	sas	t3	t4	th	uh
S1	□105	75 <sub>6</sub>	40	90	70	90	106	20 <sup>H7</sup>	40	105	90	3.0	100	167	7.0	98.0	120	12	127.0	70	M8	M8	M10	M12	13	13	22.8	6 <sup>JS9</sup>
S1	□105	75 <sub>6</sub>	40	90	70	90	106	25 <sup>H7</sup>	40	105	90	3.0	100	167	7.0	98.0	120	12	127.0	70	M8	M8	M10	M12	13	13	28.3	8 <sup>JS9</sup>
S2	□132	95 <sub>6</sub>	52	115	90	115	134	30 <sup>H7</sup>	50	132	115	4.0	120	200	8.0	123.5	150	12	157.0	85	M10	M8	M10	M12	16	13	33.3	8 <sup>JS9</sup>
S2	□132	95 <sub>6</sub>	52	115	90	115	134	35 <sup>H7</sup>	50	132	115	4.0	120	200	8.0	119.0	150	12	157.0	85	M10	M8	M12	M16	16	13	38.3	10 <sup>JS9</sup>
S3	□152	110 <sub>6</sub>	52	130	105	130	153	40 <sup>H7</sup>	55	152	130	3.5	140	233	7.5	136.0	168	12	177.5	100	M10	M10	M16	M20	16	16	43.3	12 <sup>JS9</sup>
S4	□145	110 <sub>6</sub>	67	155	120	148	173	50 <sup>H7</sup>	65	145	130	3.5	160	263	8.5	153.0	190	12	198.5	110	M12	M10	M16	M20	19	16	53.8	14 <sup>JS9</sup>

Dimensions of motors

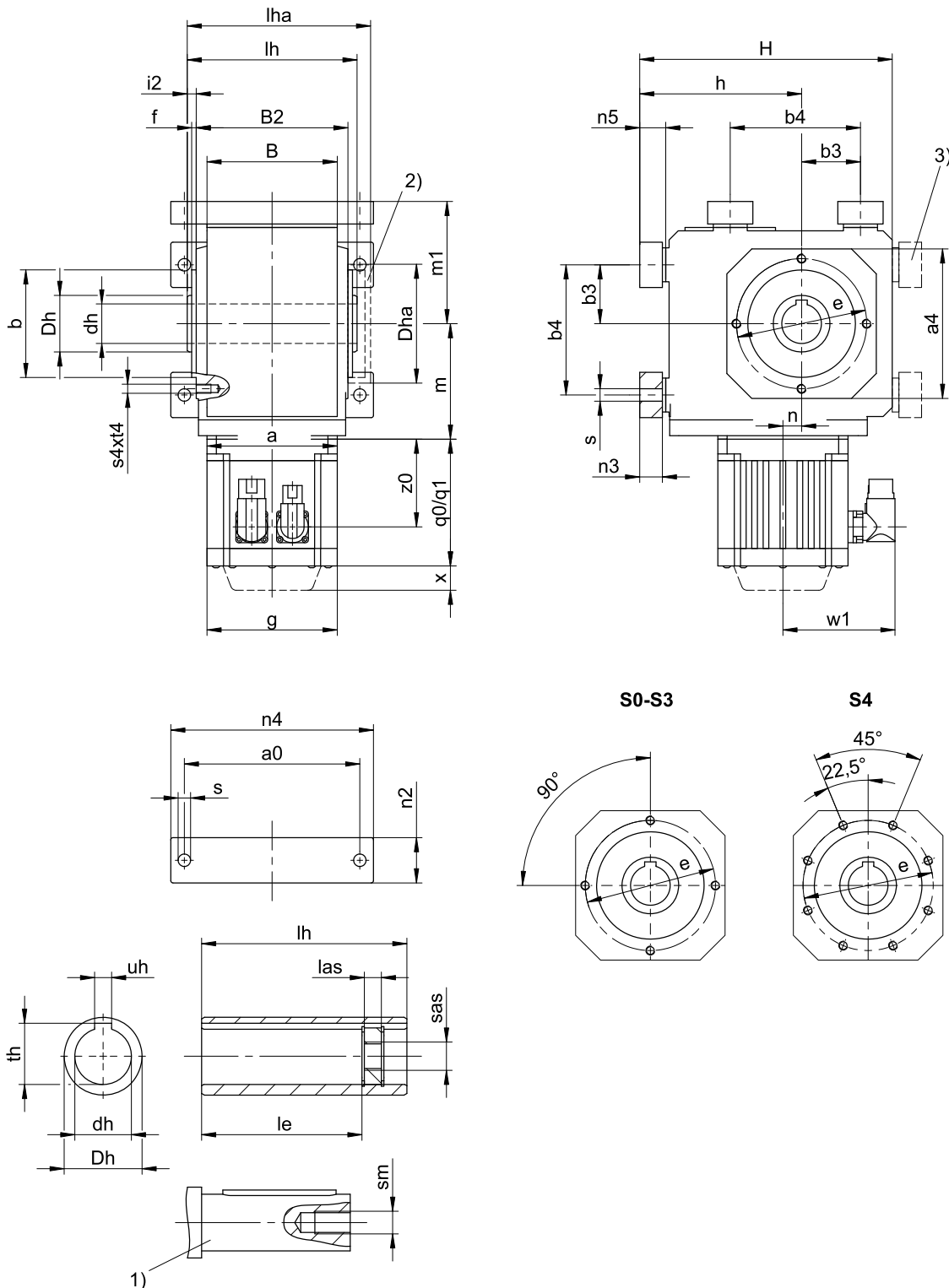
Type	□g	q0	q1	w1	x	z0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
EZ503U	115	162.0	216.5	100.0	22	127.5
EZ505U	115	212.0	266.5	100.0	22	177.5
EZ701U	145	125.0	184.0	115.0	22	87.0
EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5

Dimensions of geared motors

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
S102	□72	83	14.0	□98	83	14.0	□115	87	14.0	□145	89	14.0	-	-	-
S202	□72	98	17.0	□98	98	17.0	□115	102	17.0	□145	104	17.0	-	-	-
S203	Ø140	135	17.0	-	-	-	-	-	-	-	-	-	-	-	-
S302	Ø140	113	25.5	Ø140	113	25.5	□115	117	25.5	□145	119	25.5	-	-	-
S303	Ø140	150	25.5	Ø140	150	25.5	Ø160	160	62.0	-	-	-	-	-	-
S402	-	-	-	-	-	-	Ø160	129	30.0	□145	131	30.0	□190	134	30.0
S403	Ø140	162	30.0	Ø140	162	30.0	Ø160	172	67.0	-	-	-	-	-	-



### 21.3.2 A shaft design (hollow shaft), NG housing design (base + pitch circle diameter)



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter <a href="#">▶ 22.4</a>
1)	The length of the machine shaft must be at least 2.2 x Ødh and the length of the feather key must be at least 2 x Ødh.	2)	Cover (optional)



3) Only for S0

Dimensions of gear units

Type	a0	a4	Øb	b3	b4	B	B2	Ødh	ØDh	□Dha	Øe	f	h	H	i2	le	lh	las	lha	m1	n2	n3	n4	n5	Øs	s4	sm	sas	t4	th	uh
S0	75	Ø85	75 <sub>6</sub>	40	80	92	94	20 <sup>H7</sup>	40	102	90	3.0	80	143	7.0	86.0	108	12	117.0	72	22	9	92	9	6.6	M6	M6	M8	13	22.8	6 <sup>JS9</sup>
S0	75	Ø85	75 <sub>6</sub>	40	80	92	94	25 <sup>H7</sup>	40	102	90	3.0	80	143	7.0	86.0	108	12	117.0	72	22	9	92	9	6.6	M6	M10	M12	13	28.3	8 <sup>JS9</sup>
S1	115	□105	75 <sub>6</sub>	40	90	90	106	20 <sup>H7</sup>	40	105	90	3.0	115	182	7.0	98.0	120	12	127.0	85	30	13	140	15	9.0	M8	M10	M12	13	22.8	6 <sup>JS9</sup>
S1	115	□105	75 <sub>6</sub>	40	90	90	106	25 <sup>H7</sup>	40	105	90	3.0	115	182	7.0	98.0	120	12	127.0	85	30	13	140	15	9.0	M8	M10	M12	13	28.3	8 <sup>JS9</sup>
S2	155	□132	95 <sub>6</sub>	52	115	115	134	30 <sup>H7</sup>	50	132	115	4.0	143	223	8.0	123.5	150	12	157.0	108	40	20	185	23	11.0	M8	M10	M12	13	33.3	8 <sup>JS9</sup>
S2	155	□132	95 <sub>6</sub>	52	115	115	134	35 <sup>H7</sup>	50	132	115	4.0	143	223	8.0	119.0	150	12	157.0	108	40	20	185	23	11.0	M8	M12	M16	13	38.3	10 <sup>JS9</sup>
S3	170	□152	110 <sub>6</sub>	52	130	130	153	40 <sup>H7</sup>	55	152	130	3.5	163	256	7.5	136.0	168	12	177.5	123	45	20	200	23	11.0	M10	M16	M20	16	43.3	12 <sup>JS9</sup>
S4	200	□145	110 <sub>6</sub>	67	155	148	173	50 <sup>H7</sup>	65	145	130	3.5	185	288	8.5	153.0	190	12	198.5	135	50	22	230	25	14.0	M10	M16	M20	16	53.8	14 <sup>JS9</sup>

Dimensions of motors

Type	□g	q0	q1	w1	x	z0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
EZ503U	115	162.0	216.5	100.0	22	127.5
EZ505U	115	212.0	266.5	100.0	22	177.5
EZ701U	145	125.0	184.0	115.0	22	87.0
EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5

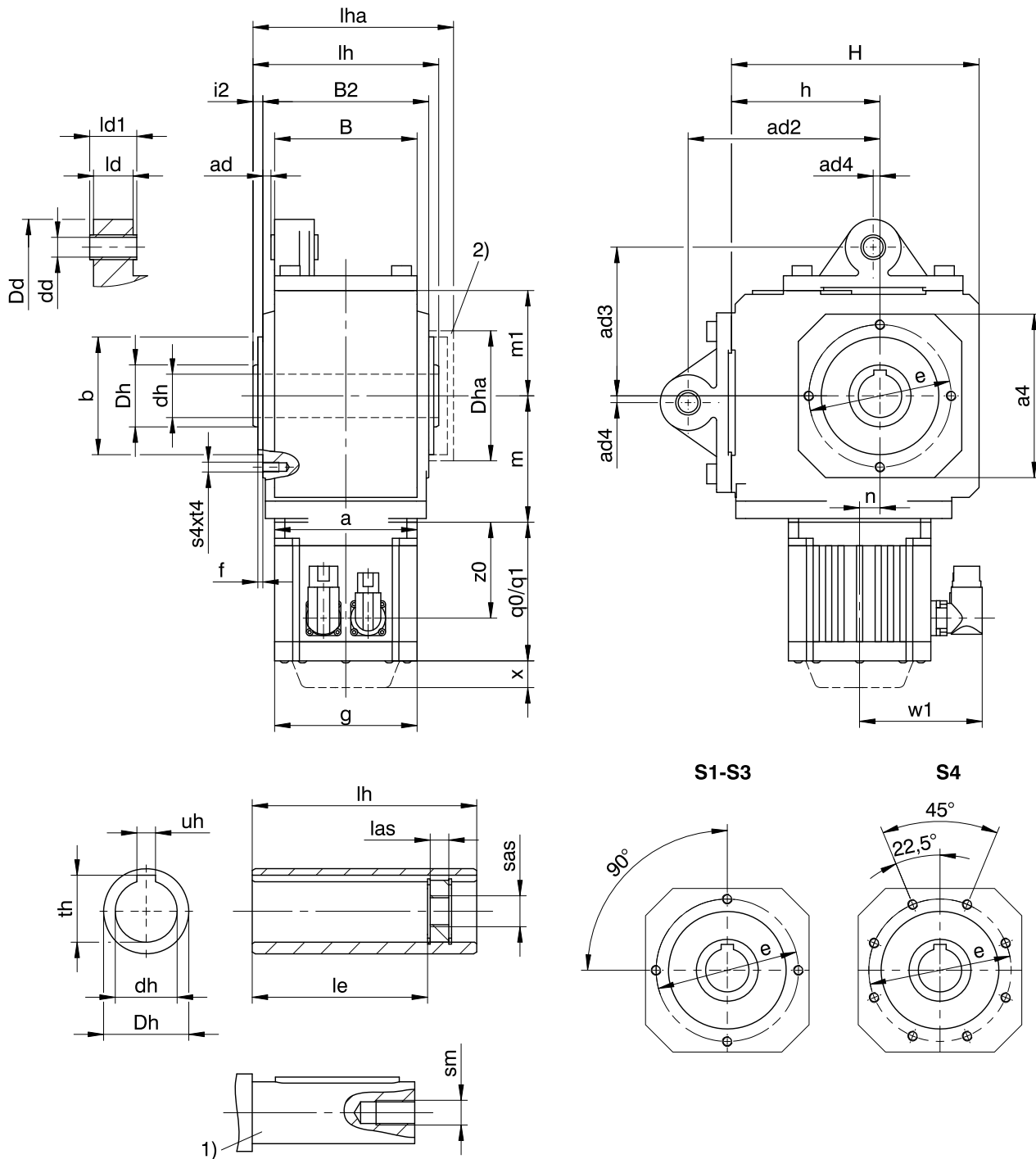
Dimensions of geared motors

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
S002	Ø140	70	8.5	Ø140	70	8.5	-	-	-	-	-	-	-	-	-
S102	□72	83	14.0	□98	83	14.0	□115	87	14.0	□145	89	14.0	-	-	-
S202	□72	98	17.0	□98	98	17.0	□115	102	17.0	□145	104	17.0	-	-	-
S203	Ø140	135	17.0	-	-	-	-	-	-	-	-	-	-	-	-
S302	Ø140	113	25.5	Ø140	113	25.5	□115	117	25.5	□145	119	25.5	-	-	-
S303	Ø140	150	25.5	Ø140	150	25.5	Ø160	160	62.0	-	-	-	-	-	-
S402	-	-	-	-	-	-	Ø160	129	30.0	□145	131	30.0	□190	134	30.0
S403	Ø140	162	30.0	Ø140	162	30.0	Ø160	172	67.0	-	-	-	-	-	-

S



### 21.3.3 A shaft design (hollow shaft), GD housing design (pitch circle diameter + torque arm)



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter <a href="#">[ 22.4 ]</a>
1)	The length of the machine shaft must be at least $2.2 \times \varnothing d_h$ and the length of the feather key must be at least $2 \times \varnothing d_h$ .	2)	Cover (optional)





**Dimensions of gear units**

Type	a4	ad	ad2	ad3	ad4	Øb	B	B2	Ødd	Ødh	ØDd	ØDh	□Dha	Øe	f	h	H	i2	ld	ld1	le	lh	las	lha	m1	s4	sm	sas	t4	th	uh
S1	□105	13.0	130	100	5.0	75 <sub>β</sub>	90	106	12 <sup>H9</sup>	20 <sup>H7</sup>	43	40	105	90	3.0	100	167	7.0	24	28	98.0	120	12	127.0	70	M8	M10	M12	13	22.8	6 <sup>JS9</sup>
S1	□105	13.0	130	100	5.0	75 <sub>β</sub>	90	106	12 <sup>H9</sup>	25 <sup>H7</sup>	43	40	105	90	3.0	100	167	7.0	24	28	98.0	120	12	127.0	70	M8	M10	M12	13	28.3	8 <sup>JS9</sup>
S2	□132	14.5	155	120	5.5	95 <sub>β</sub>	115	134	16 <sup>H9</sup>	30 <sup>H7</sup>	45	50	132	115	4.0	120	200	8.0	32	38	123.5	150	12	157.0	85	M8	M10	M12	13	33.3	8 <sup>JS9</sup>
S2	□132	14.5	155	120	5.5	95 <sub>β</sub>	115	134	16 <sup>H9</sup>	35 <sup>H7</sup>	45	50	132	115	4.0	120	200	8.0	32	38	119.0	150	12	157.0	85	M8	M12	M16	13	38.3	10 <sup>JS9</sup>
S3	□152	16.0	185	145	13.0	110 <sub>β</sub>	130	153	16 <sup>H9</sup>	40 <sup>H7</sup>	45	55	152	130	3.5	140	233	7.5	32	38	136.0	168	12	177.5	100	M10	M16	M20	16	43.3	12 <sup>JS9</sup>
S4	□145	18.0	220	170	10.5	110 <sub>β</sub>	148	173	20 <sup>H9</sup>	50 <sup>H7</sup>	55	65	145	130	3.5	160	263	8.5	40	46	153.0	190	12	198.5	110	M10	M16	M20	16	53.8	14 <sup>JS9</sup>

**Dimensions of motors**

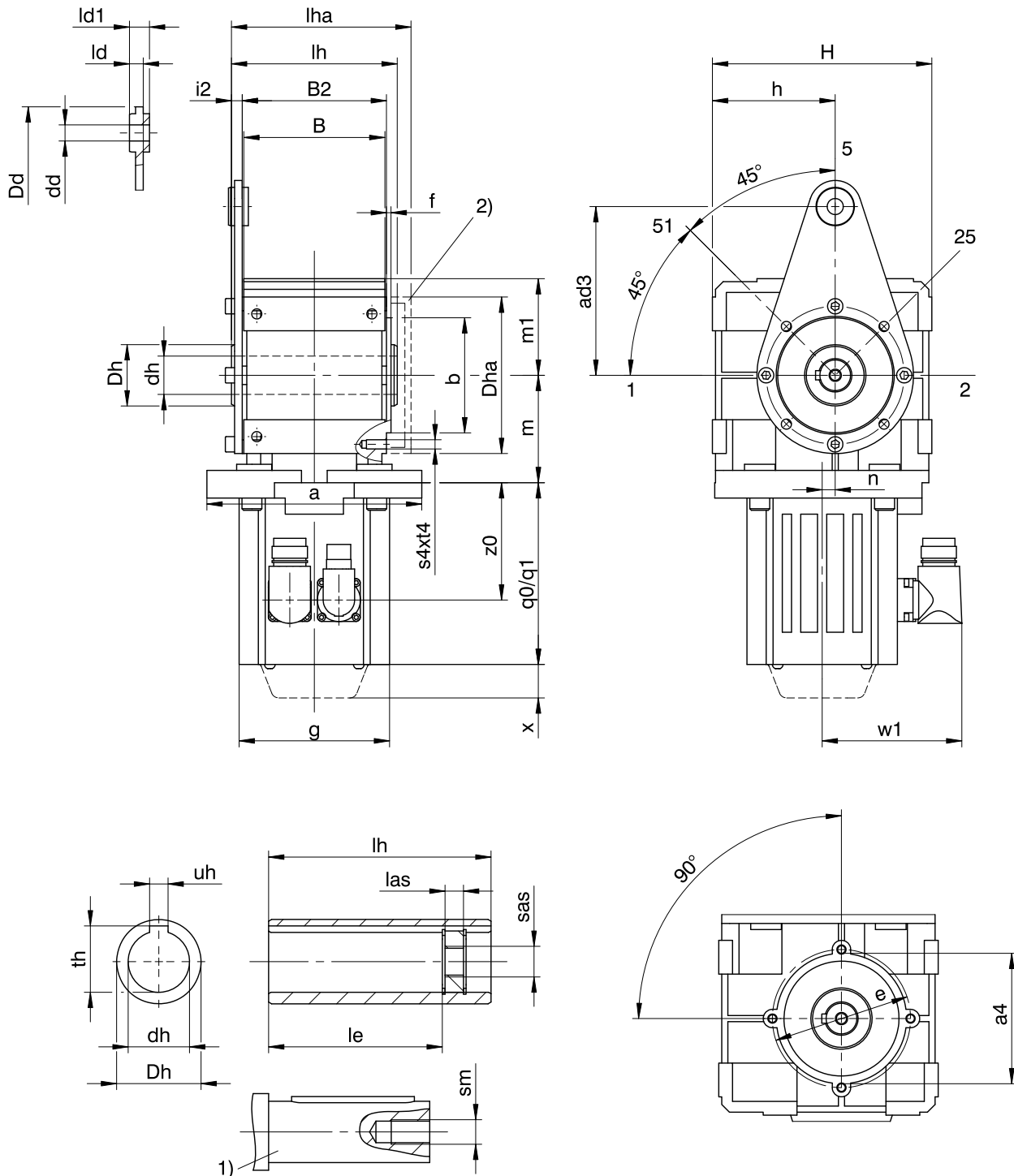
Type	□g	q0	q1	w1	x	z0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
EZ503U	115	162.0	216.5	100.0	22	127.5
EZ505U	115	212.0	266.5	100.0	22	177.5
EZ701U	145	125.0	184.0	115.0	22	87.0
EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5

**Dimensions of geared motors**

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
S102	□72	83	14.0	□98	83	14.0	□115	87	14.0	□145	89	14.0	-	-	-
S202	□72	98	17.0	□98	98	17.0	□115	102	17.0	□145	104	17.0	-	-	-
S203	Ø140	135	17.0	-	-	-	-	-	-	-	-	-	-	-	-
S302	Ø140	113	25.5	Ø140	113	25.5	□115	117	25.5	□145	119	25.5	-	-	-
S303	Ø140	150	25.5	Ø140	150	25.5	Ø160	160	62.0	-	-	-	-	-	-
S402	-	-	-	-	-	-	Ø160	129	30.0	□145	131	30.0	□190	134	30.0
S403	Ø140	162	30.0	Ø140	162	30.0	Ø160	172	67.0	-	-	-	-	-	-



### 21.3.4 A shaft design (hollow shaft), NGD housing design (base + pitch circle diameter + torque arm)



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter <a href="#">[ 22.4 ]</a>
1)	The length of the machine shaft must be at least $2.2 \times \varnothing dh$ and the length of the feather key must be at least $2 \times \varnothing dh$ .	2)	Cover (optional)



**Dimensions of gear units**

Type	a4	ad3	Øb	B	B2	Ødd	Ødh	ØDd	ØDh	□Dha	Øe	f	h	H	i2	ld	ld1	le	lh	las	lha	m1	s4	sm	sas	t4	th	uh
S0	Ø85	110	75 <sub>js</sub>	92	94	10.5	20 <sup>H7</sup>	25	40	102	90	3	80	143	7	5	13	86	108	12	117	63	M6	M6	M8	13	22.8	6 <sup>h9</sup>
S0	Ø85	110	75 <sub>js</sub>	92	94	10.5	25 <sup>H7</sup>	25	40	102	90	3	80	143	7	5	13	86	108	12	117	63	M6	M10	M12	13	28.3	8 <sup>h9</sup>

**Dimensions of motors**

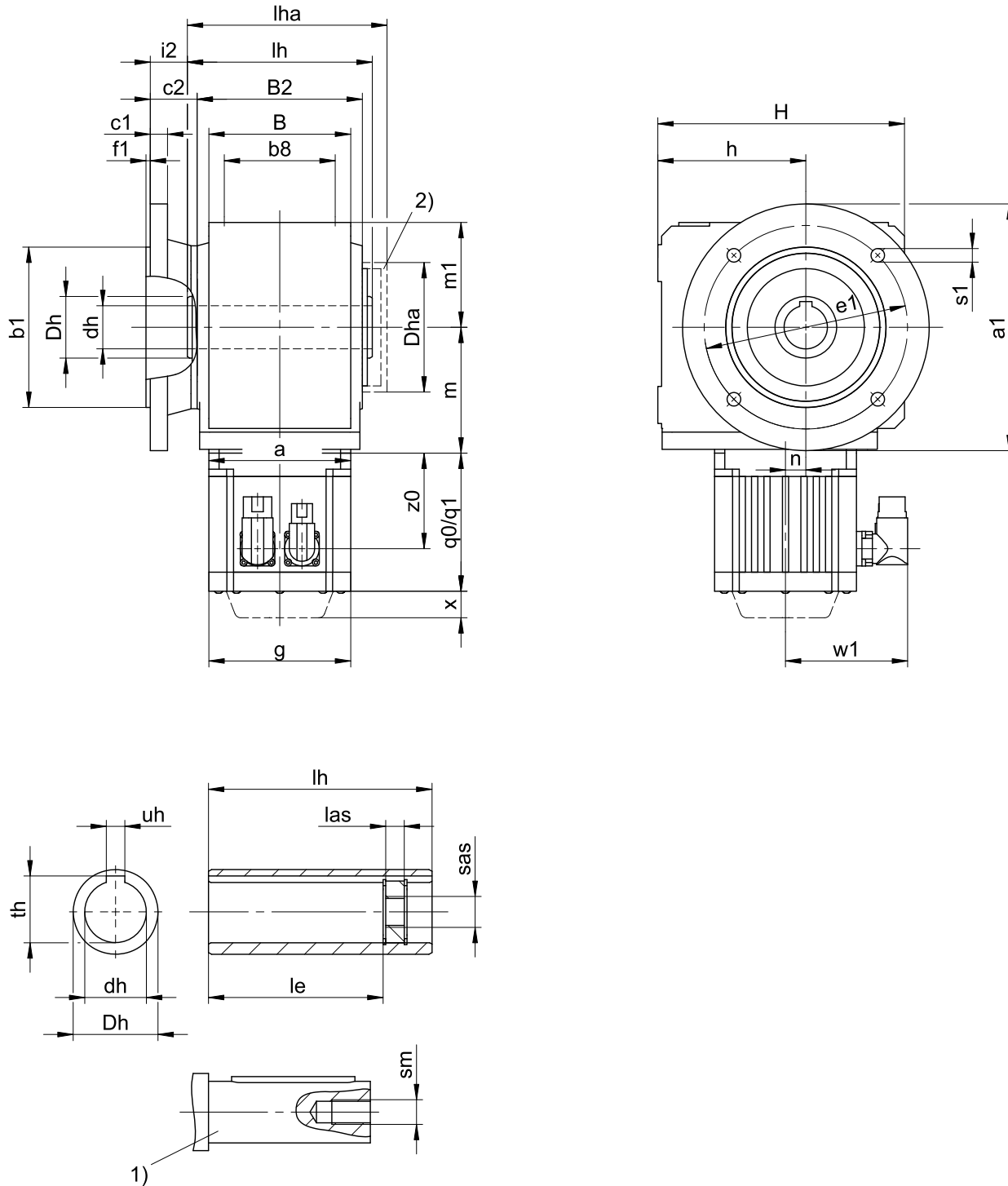
Type	□g	q0	q1	w1	x	z0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5

**Dimensions of geared motors**

Type	EZ3			EZ4		
	a	m	n	a	m	n
S002	Ø140	70	8.5	Ø140	70	8.5



### 21.3.5 A shaft design (hollow shaft), F housing design (round flange)



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter <a href="#">[ 22.4 ]</a>
1)	The length of the machine shaft must be at least $2.2 \times \varnothing dh$ and the length of the feather key must be at least $2 \times \varnothing dh$ .	2)	Cover (optional)



Dimensions of gear units

Type	Øa1	Øb1	b8	B	B2	c1	c2	Ødh	ØDh	□Dha	Øe1	f1	h	H	i2	le	lh	las	lha	m1	Øs1	sm	sas	th	uh
S1	160	110 <sub>6</sub>	70	90	106	10	32.0	20 <sup>H7</sup>	40	105	130	3.5	100	167	25.0	98.0	120	12	127.0	70	9.0	M10	M12	22.8	6 <sup>JS9</sup>
S1	160	110 <sub>6</sub>	70	90	106	10	32.0	25 <sup>H7</sup>	40	105	130	3.5	100	167	25.0	98.0	120	12	127.0	70	9.0	M10	M12	28.3	8 <sup>JS9</sup>
S2	200	130 <sub>6</sub>	90	115	134	14	38.0	30 <sup>H7</sup>	50	132	165	3.5	120	200	30.0	123.5	150	12	157.0	85	11.0	M10	M12	33.3	8 <sup>JS9</sup>
S2	200	130 <sub>6</sub>	90	115	134	14	38.0	35 <sup>H7</sup>	50	132	165	3.5	120	200	30.0	119.0	150	12	157.0	85	11.0	M12	M16	38.3	10 <sup>JS9</sup>
S3	250	180 <sub>6</sub>	105	130	153	15	40.0	40 <sup>H7</sup>	55	152	215	4.0	140	233	32.5	136.0	168	12	177.5	100	14.0	M16	M20	43.3	12 <sup>JS9</sup>
S4	250	180 <sub>6</sub>	120	148	173	15	39.5	50 <sup>H7</sup>	65	145	215	4.0	160	263	31.0	153.0	190	12	198.5	110	14.0	M16	M20	53.8	14 <sup>JS9</sup>

Dimensions of additional round flanges

Type	Øa1	Øb1	c1	Øe1	f1	Øs1
S1	140	95 <sub>6</sub>	10	115	3.0	9.0
S2	160	110 <sub>6</sub>	14	130	3.5	9.0

Dimensions of motors

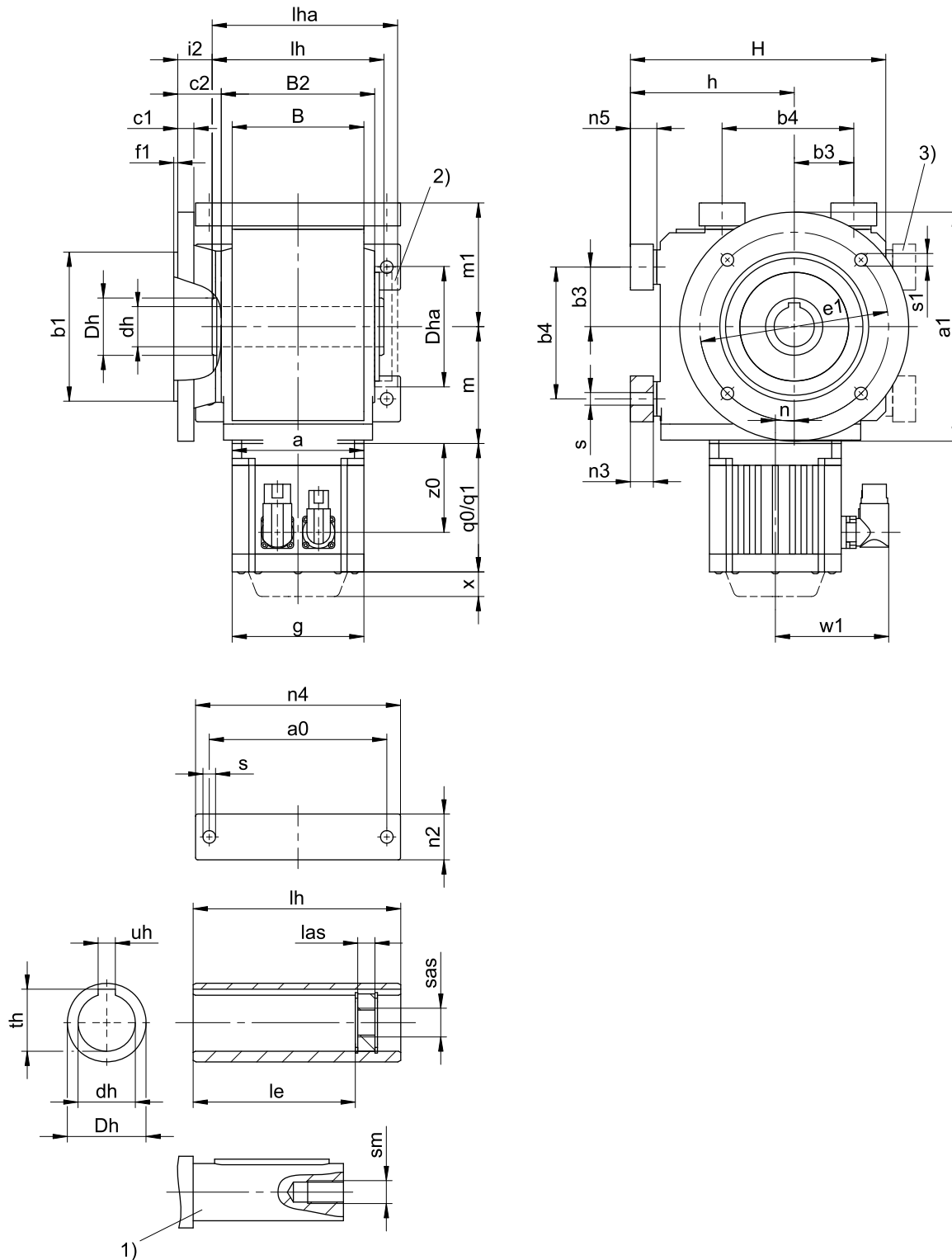
Type	□g	q0	q1	w1	x	z0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
EZ503U	115	162.0	216.5	100.0	22	127.5
EZ505U	115	212.0	266.5	100.0	22	177.5
EZ701U	145	125.0	184.0	115.0	22	87.0
EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5

Dimensions of geared motors

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
S102	□72	83	14.0	□98	83	14.0	□115	87	14.0	□145	89	14.0	-	-	-
S202	□72	98	17.0	□98	98	17.0	□115	102	17.0	□145	104	17.0	-	-	-
S203	Ø140	135	17.0	-	-	-	-	-	-	-	-	-	-	-	-
S302	Ø140	113	25.5	Ø140	113	25.5	□115	117	25.5	□145	119	25.5	-	-	-
S303	Ø140	150	25.5	Ø140	150	25.5	Ø160	160	62.0	-	-	-	-	-	-
S402	-	-	-	-	-	-	Ø160	129	30.0	□145	131	30.0	□190	134	30.0
S403	Ø140	162	30.0	Ø140	162	30.0	Ø160	172	67.0	-	-	-	-	-	-



### 21.3.6 A shaft design (hollow shaft), NF housing design (base + round flange)



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter <a href="#">[ 22.4 ]</a>
1)	The length of the machine shaft must be at least $2.2 \times \varnothing dh$ and the length of the feather key must be at least $2 \times \varnothing dh$ .	2)	Cover (optional)
3)	Only for S0		



Dimensions of gear units

Type	a0	Øa1	Øb1	b3	b4	B	B2	c1	c2	Ødh	ØDh	□Dha	Øe1	f1	h	H	i2	le	lh	las	lha	m1	n2	n3	n4	n5	Øs	Øs1	sm	sas	th	uh
S0	75	120	80 <sub>h6</sub>	40	80	92	94	9	28.0	20 <sup>H7</sup>	40	102	100	3.0	80	143	21.0	86.0	108	12	117.0	72	22	9	92	9	6.6	6.6	M6	M8	22.8	6 <sup>JS9</sup>
S0	75	120	80 <sub>h6</sub>	40	80	92	94	9	28.0	25 <sup>H7</sup>	40	102	100	3.0	80	143	21.0	86.0	108	12	117.0	72	22	9	92	9	6.6	6.6	M10	M12	28.3	8 <sup>JS9</sup>
S1	115	160	110 <sub>h6</sub>	40	90	90	106	10	32.0	20 <sup>H7</sup>	40	105	130	3.5	115	182	25.0	98.0	120	12	127.0	85	30	13	140	15	9.0	9.0	M10	M12	22.8	6 <sup>JS9</sup>
S1	115	160	110 <sub>h6</sub>	40	90	90	106	10	32.0	25 <sup>H7</sup>	40	105	130	3.5	115	182	25.0	98.0	120	12	127.0	85	30	13	140	15	9.0	9.0	M10	M12	28.3	8 <sup>JS9</sup>
S2	155	200	130 <sub>h6</sub>	52	115	115	134	14	38.0	30 <sup>H7</sup>	50	132	165	3.5	143	223	30.0	123.5	150	12	157.0	108	40	20	185	23	11.0	11.0	M10	M12	33.3	8 <sup>JS9</sup>
S2	155	200	130 <sub>h6</sub>	52	115	115	134	14	38.0	35 <sup>H7</sup>	50	132	165	3.5	143	223	30.0	119.0	150	12	157.0	108	40	20	185	23	11.0	11.0	M12	M16	38.3	10 <sup>JS9</sup>
S3	170	250	180 <sub>h6</sub>	52	130	130	153	15	40.0	40 <sup>H7</sup>	55	152	215	4.0	163	256	32.5	136.0	168	12	177.5	123	45	20	200	23	11.0	14.0	M16	M20	43.3	12 <sup>JS9</sup>
S4	200	250	180 <sub>h6</sub>	67	155	148	173	15	39.5	50 <sup>H7</sup>	65	145	215	4.0	185	288	31.0	153.0	190	12	198.5	135	50	22	230	25	14.0	14.0	M16	M20	53.8	14 <sup>JS9</sup>

Dimensions of additional round flanges

Type	Øa1	Øb1	c1	Øe1	f1	Øs1
S0	160	110 <sub>h6</sub>	10	130	3.5	9.0
S1	140	95 <sub>h6</sub>	10	115	3.0	9.0
S2	160	110 <sub>h6</sub>	14	130	3.5	9.0

Dimensions of motors

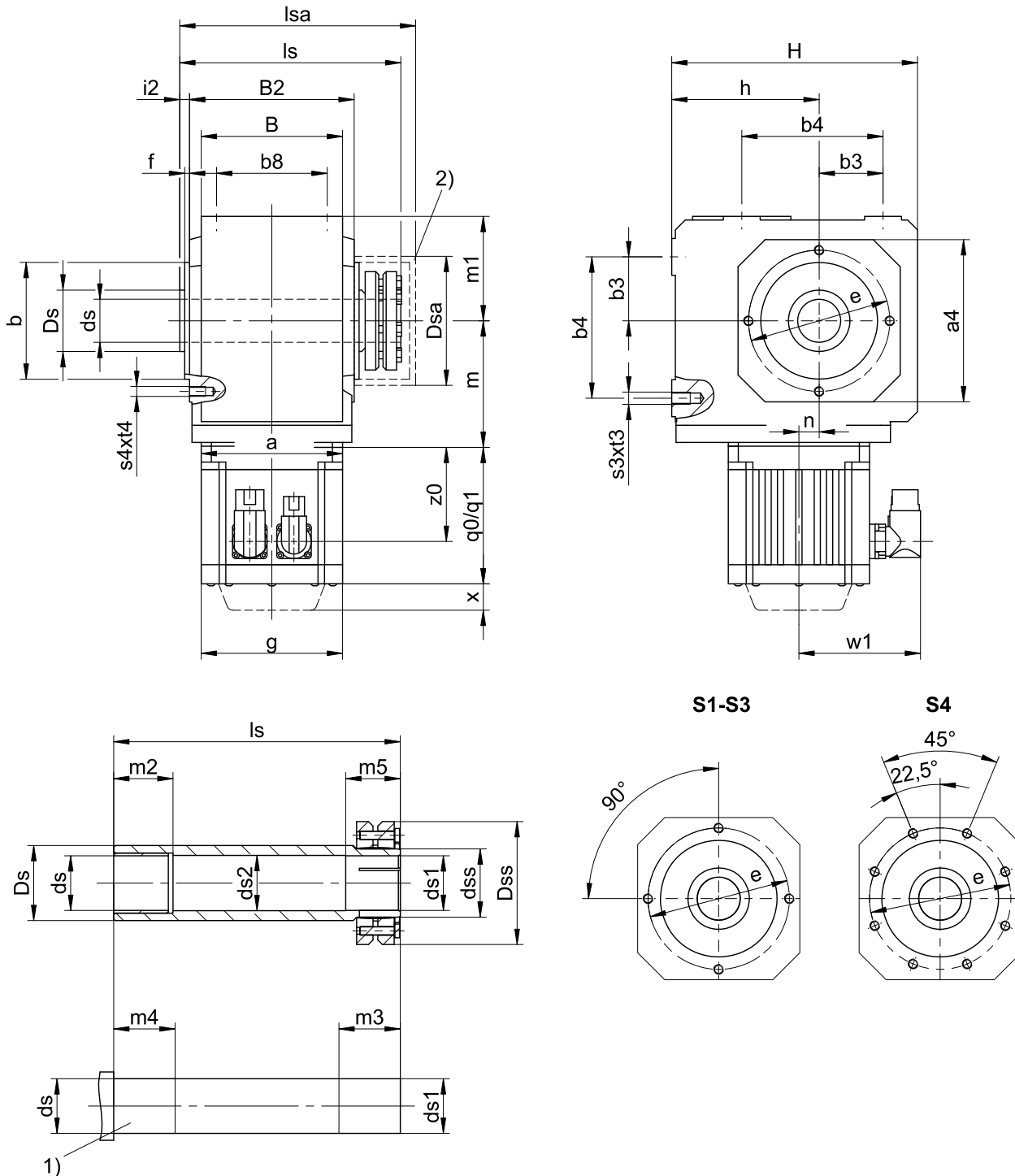
Type	□g	q0	q1	w1	x	z0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
EZ503U	115	162.0	216.5	100.0	22	127.5
EZ505U	115	212.0	266.5	100.0	22	177.5
EZ701U	145	125.0	184.0	115.0	22	87.0
EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5

Dimensions of geared motors

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
S002	Ø140	70	8.5	Ø140	70	8.5	-	-	-	-	-	-	-	-	-
S102	□72	83	14.0	□98	83	14.0	□115	87	14.0	□145	89	14.0	-	-	-
S202	□72	98	17.0	□98	98	17.0	□115	102	17.0	□145	104	17.0	-	-	-
S203	Ø140	135	17.0	-	-	-	-	-	-	-	-	-	-	-	-
S302	Ø140	113	25.5	Ø140	113	25.5	□115	117	25.5	□145	119	25.5	-	-	-
S303	Ø140	150	25.5	Ø140	150	25.5	Ø160	160	62.0	-	-	-	-	-	-
S402	-	-	-	-	-	-	Ø160	129	30.0	□145	131	30.0	□190	134	30.0
S403	Ø140	162	30.0	Ø140	162	30.0	Ø160	172	67.0	-	-	-	-	-	-



### 21.3.7 S shaft design (hollow shaft with shrink disk), G housing design (pitch circle diameter)



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter <a href="#">[ 22.4 ]</a>
1)	Machine shaft: The dimension ls must meet or exceed the specified value.	2)	Cover (optional)





**Dimensions of gear units**

Type	a4	∅b	b3	b4	b8	B	B2	∅ds	∅ds1	∅ds2	∅dss	∅Ds	∅Dsa	∅Dss	∅e	f	h	H	i2	ls	lsa	m1	m2	m3	m4	m5	s3	s4	t3	t4
S1	□105	75 <sub>js</sub>	40	90	70	90	106	25 <sub>h9</sub>	25 <sub>h9</sub> <sup>H7</sup>	25.5	30	40	80	60	90	3.0	100	167	7.0	149	163	70	20	34	25	29	M8	M8	13	13
S2	□132	95 <sub>js</sub>	52	115	90	115	134	35 <sub>h9</sub>	35 <sub>h9</sub> <sup>H7</sup>	35.5	44	50	101	80	115	4.0	120	200	8.0	180	195	85	30	37	35	32	M10	M8	16	13
S3	□152	110 <sub>js</sub>	52	130	105	130	153	40 <sub>h9</sub>	40 <sub>h9</sub> <sup>H7</sup>	40.5	50	55	114	90	130	3.5	140	233	7.5	200	222	100	40	39	45	34	M10	M10	16	16
S4	□145	110 <sub>js</sub>	67	155	120	148	173	50 <sub>h9</sub>	50 <sub>h9</sub> <sup>H7</sup>	50.5	62	65	116	106	130	3.5	160	263	8.5	227	243	110	40	44	45	39	M12	M10	19	16

**Dimensions of motors**

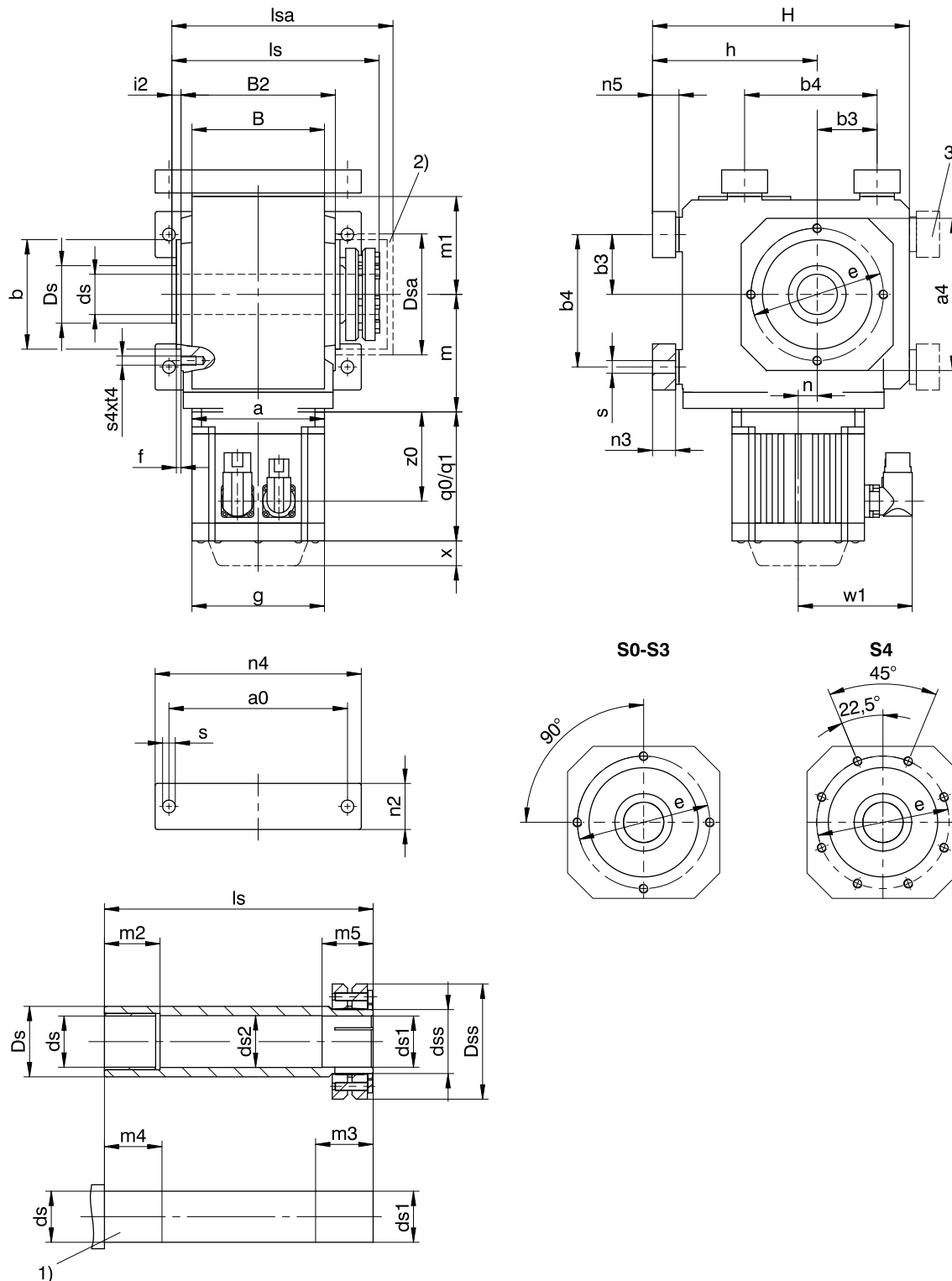
Type	□g	q0	q1	w1	x	z0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
EZ503U	115	162.0	216.5	100.0	22	127.5
EZ505U	115	212.0	266.5	100.0	22	177.5
EZ701U	145	125.0	184.0	115.0	22	87.0
EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5

**Dimensions of geared motors**

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
S102	□72	83	14.0	□98	83	14.0	□115	87	14.0	□145	89	14.0	-	-	-
S202	□72	98	17.0	□98	98	17.0	□115	102	17.0	□145	104	17.0	-	-	-
S203	∅140	135	17.0	-	-	-	-	-	-	-	-	-	-	-	-
S302	∅140	113	25.5	∅140	113	25.5	□115	117	25.5	□145	119	25.5	-	-	-
S303	∅140	150	25.5	∅140	150	25.5	∅160	160	62.0	-	-	-	-	-	-
S402	-	-	-	-	-	-	∅160	129	30.0	□145	131	30.0	□190	134	30.0
S403	∅140	162	30.0	∅140	162	30.0	∅160	172	67.0	-	-	-	-	-	-



### 21.3.8 S shaft design (hollow shaft with shrink disk), NG housing design (base + pitch circle diameter)



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter <a href="#">▶ 22.4</a>
1)	Machine shaft: The dimension ls must meet or exceed the specified value.	2)	Cover (optional)
3)	Only for S0		



Dimensions of gear units

Type	a0	a4	∅b	b3	b4	B	B2	∅ds	∅ds1	∅ds2	∅dss	∅Ds	∅Dsa	∅Dss	∅e	f	h	H	i2	ls	lsa	m1	m2	m3	m4	m5	n2	n3	n4	n5	∅s	s4	t4
S0	75	∅85	75 <sub>h6</sub>	40	80	92	94	20 <sub>h9</sub>	20 <sub>h9</sub> <sup>H7</sup>	20.5	24	40	80	50	90	3.0	80	143	7.0	136	151	72	20	33	25	28	22	9	92	9	6.6	M6	13
S0	75	∅85	75 <sub>h6</sub>	40	80	92	94	25 <sub>h9</sub>	25 <sub>h9</sub> <sup>H7</sup>	25.5	30	40	80	60	90	3.0	80	143	7.0	136	151	72	20	34	25	29	22	9	92	9	6.6	M6	13
S1	115	□105	75 <sub>h6</sub>	40	90	90	106	25 <sub>h9</sub>	25 <sub>h9</sub> <sup>H7</sup>	25.5	30	40	80	60	90	3.0	115	182	7.0	149	163	85	20	34	25	29	30	13	140	15	9.0	M8	13
S2	155	□132	95 <sub>h6</sub>	52	115	115	134	35 <sub>h9</sub>	35 <sub>h9</sub> <sup>H7</sup>	35.5	44	50	101	80	115	4.0	143	223	8.0	180	195	108	30	37	35	32	40	20	185	23	11.0	M8	13
S3	170	□152	110 <sub>h6</sub>	52	130	130	153	40 <sub>h9</sub>	40 <sub>h9</sub> <sup>H7</sup>	40.5	50	55	114	90	130	3.5	163	256	7.5	200	222	123	40	39	45	34	45	20	200	23	11.0	M10	16
S4	200	□145	110 <sub>h6</sub>	67	155	148	173	50 <sub>h9</sub>	50 <sub>h9</sub> <sup>H7</sup>	50.5	62	65	116	106	130	3.5	185	288	8.5	227	243	135	40	44	45	39	50	22	230	25	14.0	M10	16

Dimensions of motors

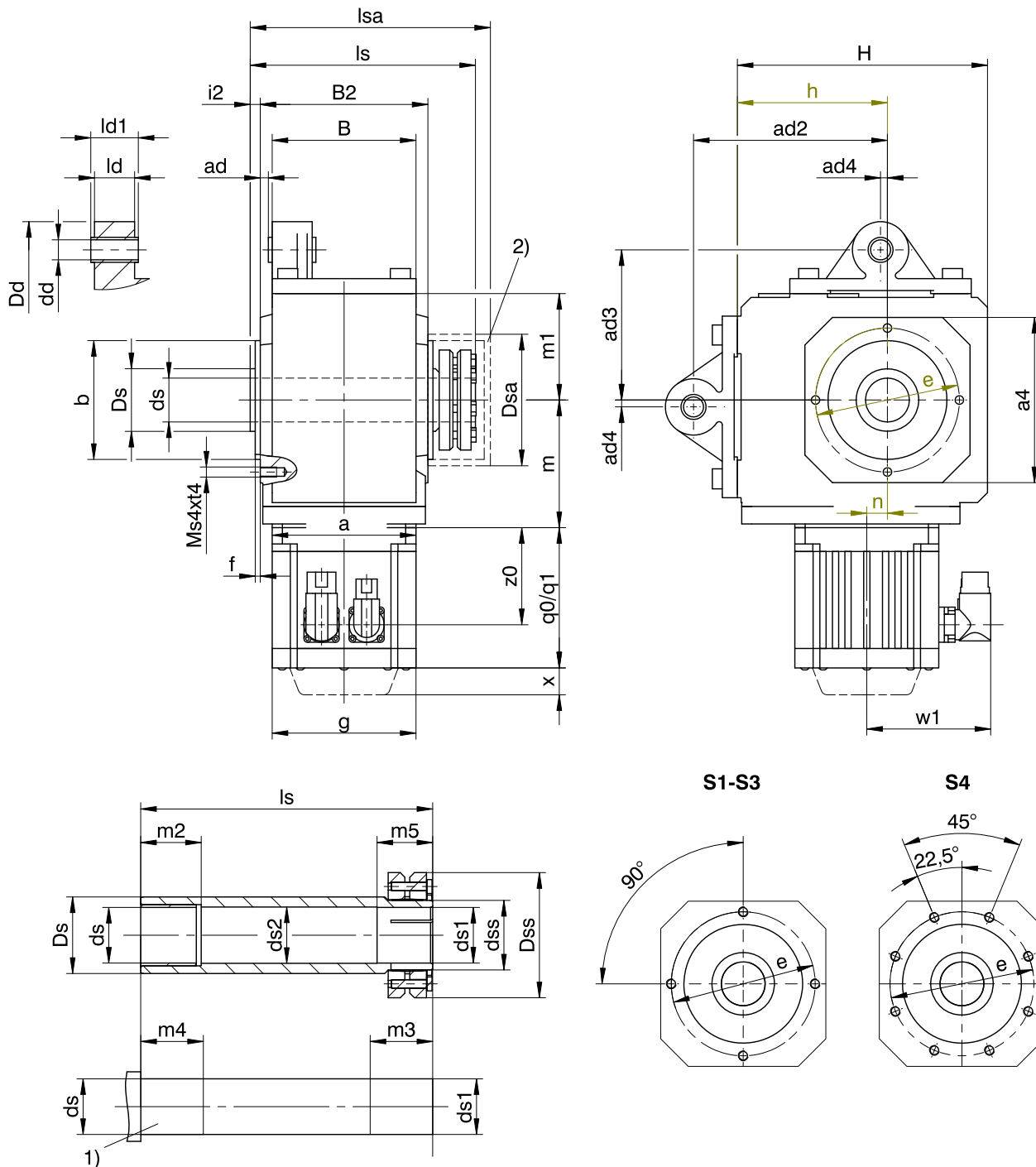
Type	□g	q0	q1	w1	x	z0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
EZ503U	115	162.0	216.5	100.0	22	127.5
EZ505U	115	212.0	266.5	100.0	22	177.5
EZ701U	145	125.0	184.0	115.0	22	87.0
EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5

Dimensions of geared motors

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
S002	∅140	70	8.5	∅140	70	8.5	-	-	-	-	-	-	-	-	-
S102	□72	83	14.0	□98	83	14.0	□115	87	14.0	□145	89	14.0	-	-	-
S202	□72	98	17.0	□98	98	17.0	□115	102	17.0	□145	104	17.0	-	-	-
S203	∅140	135	17.0	-	-	-	-	-	-	-	-	-	-	-	-
S302	∅140	113	25.5	∅140	113	25.5	□115	117	25.5	□145	119	25.5	-	-	-
S303	∅140	150	25.5	∅140	150	25.5	∅160	160	62.0	-	-	-	-	-	-
S402	-	-	-	-	-	-	∅160	129	30.0	□145	131	30.0	□190	134	30.0
S403	∅140	162	30.0	∅140	162	30.0	∅160	172	67.0	-	-	-	-	-	-



### 21.3.9 S shaft design (hollow shaft with shrink disk), GD housing design (pitch circle diameter + torque arm)



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter <a href="#">[ 22.4 ]</a>
1)	Machine shaft: The dimension ls must meet or exceed the specified value.	2)	Cover (optional)



Dimensions of gear units

Type	a4	ad	ad2	ad3	ad4	Øb	B	B2	Ødd	ØDd	Øds	Øds1	Øds2	Ødss	ØDs	ØDsa	ØDss	Øe	f	h	H	i2	ld	ld1	ls	lsa	m1	m2	m3	m4	m5	s4	t4
S1	□105	13.0	130	100	5.0	75 <sub>β</sub>	90	106	12.0 <sup>H9</sup>	43	25 <sub>h9</sub>	25 <sub>h9</sub> <sup>H7</sup>	25.5	30	40	80	60	90	3.0	100	167	7.0	24	28	149	163	70	20	34	25	29	M8	13
S2	□132	14.5	155	120	5.5	95 <sub>β</sub>	115	134	16.0 <sup>H9</sup>	45	35 <sub>h9</sub>	35 <sub>h9</sub> <sup>H7</sup>	35.5	44	50	101	80	115	4.0	120	200	8.0	32	38	180	195	85	30	37	35	32	M8	13
S3	□152	16.0	185	145	13.0	110 <sub>β</sub>	130	153	16.0 <sup>H9</sup>	45	40 <sub>h9</sub>	40 <sub>h9</sub> <sup>H7</sup>	40.5	50	55	114	90	130	3.5	140	233	7.5	32	38	200	222	100	40	39	45	34	M10	16
S4	□145	18.0	220	170	10.5	110 <sub>β</sub>	148	173	20.0 <sup>H9</sup>	55	50 <sub>h9</sub>	50 <sub>h9</sub> <sup>H7</sup>	50.5	62	65	116	106	130	3.5	160	263	8.5	40	46	227	243	110	40	44	45	39	M10	16

Dimensions of motors

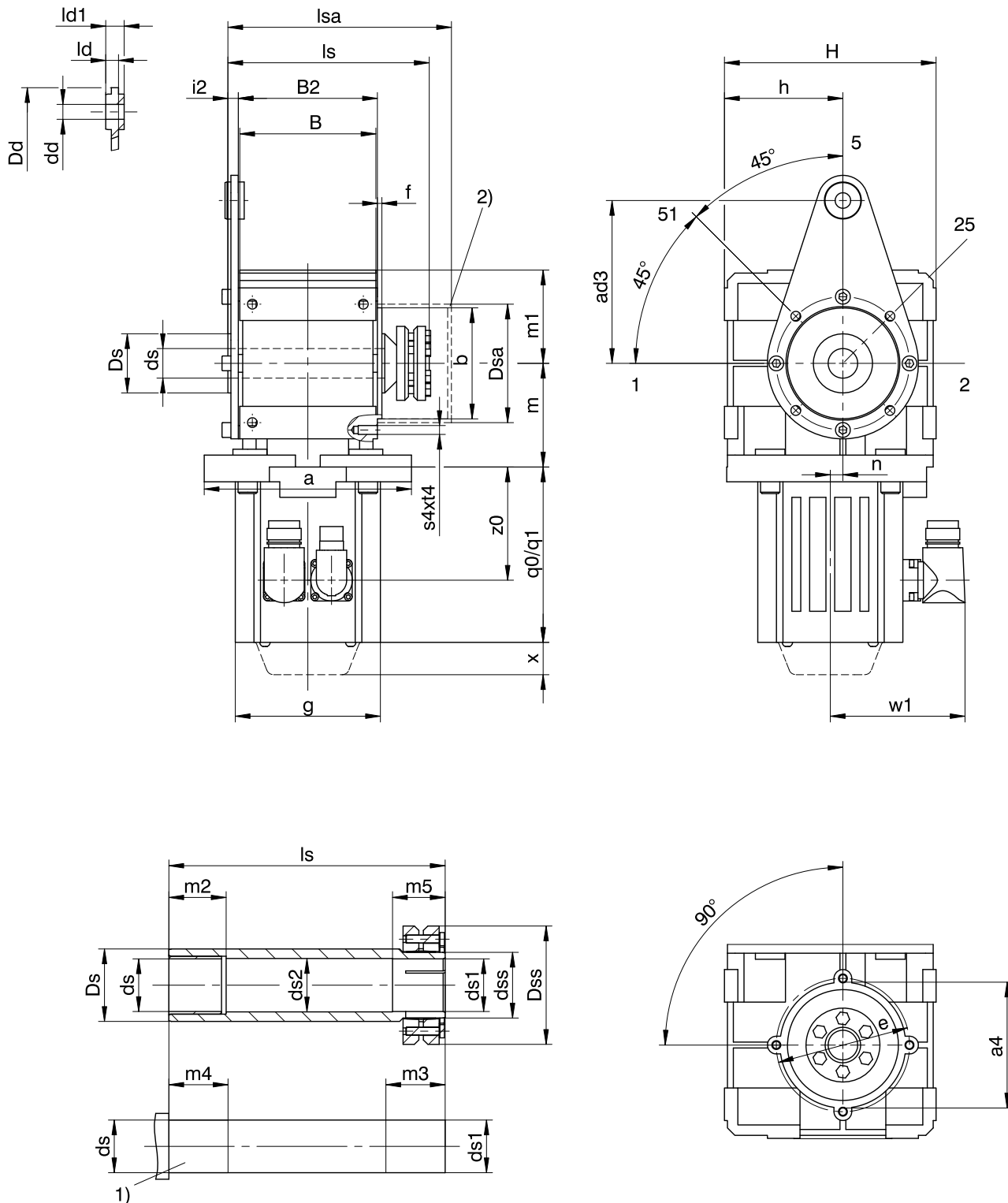
Type	□g	q0	q1	w1	x	z0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
EZ503U	115	162.0	216.5	100.0	22	127.5
EZ505U	115	212.0	266.5	100.0	22	177.5
EZ701U	145	125.0	184.0	115.0	22	87.0
EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5

Dimensions of geared motors

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
S102	□72	83	14.0	□98	83	14.0	□115	87	14.0	□145	89	14.0	-	-	-
S202	□72	98	17.0	□98	98	17.0	□115	102	17.0	□145	104	17.0	-	-	-
S203	Ø140	135	17.0	-	-	-	-	-	-	-	-	-	-	-	-
S302	Ø140	113	25.5	Ø140	113	25.5	□115	117	25.5	□145	119	25.5	-	-	-
S303	Ø140	150	25.5	Ø140	150	25.5	Ø160	160	62.0	-	-	-	-	-	-
S402	-	-	-	-	-	-	Ø160	129	30.0	□145	131	30.0	□190	134	30.0
S403	Ø140	162	30.0	Ø140	162	30.0	Ø160	172	67.0	-	-	-	-	-	-



### 21.3.10 S shaft design (hollow shaft with shrink disk), NGD housing design (base + pitch circle diameter + torque arm)



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter <a href="#">[ 22.4 ]</a>
1)	Machine shaft: The dimension ls must meet or exceed the specified value.	2)	Cover (optional)



**Dimensions of gear units**

Type	a4	ad2	ad3	Øb	B	B2	Ødd	Øds	Øds1	Øds2	Ødss	ØDd	ØDs	ØDsa	ØDss	Øe	f	h	H	i2	ld	ld1	ls	lsa	m1	m2	m3	m4	m5	s4	t4
S0	Ø85	127	110	75 <sub>h6</sub>	92	94	10.5	20 <sub>h9</sub>	20 <sub>h9</sub> <sup>H7</sup>	20.5	24	25	40	80	50	90	3	80	143	7	5	13	136	151	63	20	33	25	28	M6	13
S0	Ø85	127	110	75 <sub>h6</sub>	92	94	10.5	25 <sub>h9</sub>	25 <sub>h9</sub> <sup>H7</sup>	25.5	30	25	40	80	60	90	3	80	143	7	5	13	136	151	63	20	34	25	29	M6	13

**Dimensions of motors**

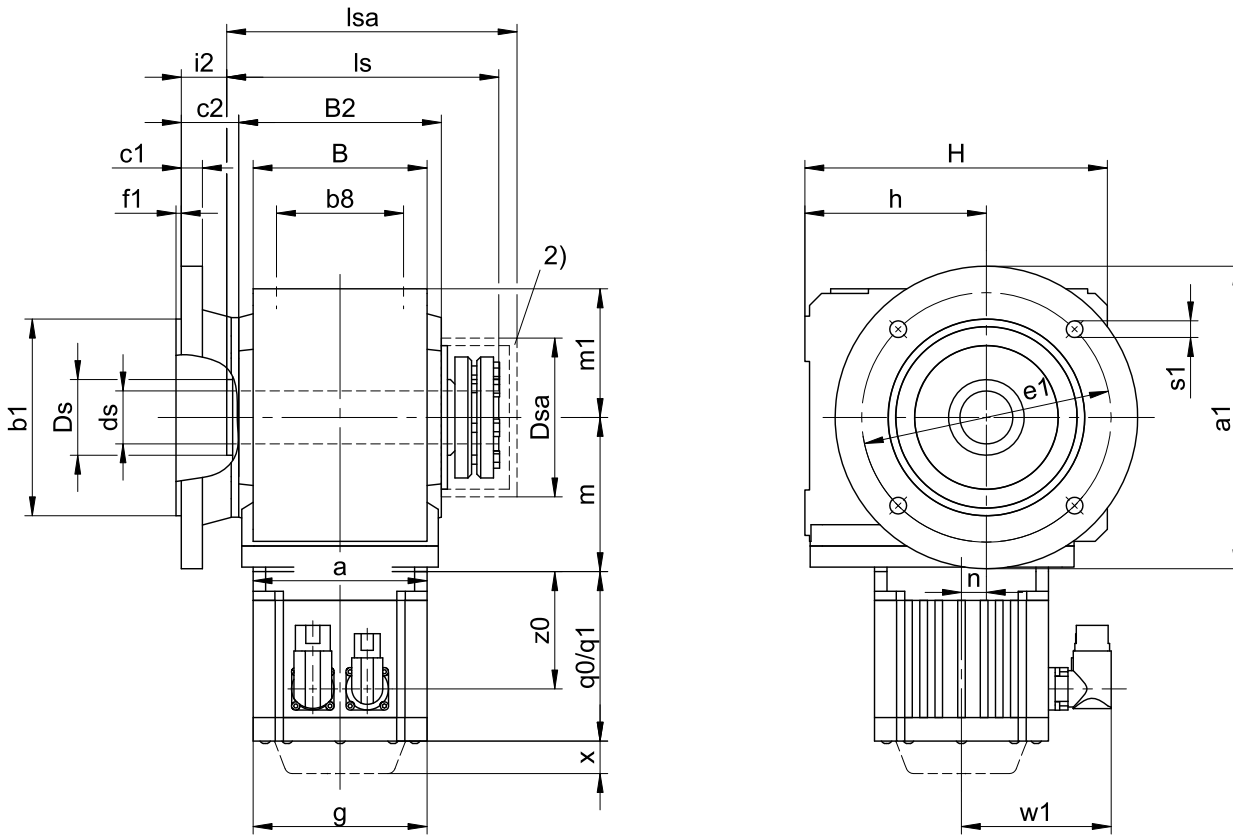
Type	□g	q0	q1	w1	x	z0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5

**Dimensions of geared motors**

Type	EZ3			EZ4		
	a	m	n	a	m	n
S002	Ø140	70	8.5	Ø140	70	8.5



### 21.3.11 S shaft design (hollow shaft with shrink disk), F housing design (round flange)



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter <a href="#">[ 22.4 ]</a>
1)	Machine shaft: The dimension ls must meet or exceed the specified value.	2)	Cover (optional)





Dimensions of gear units

Type	Øa1	Øb1	b8	B	B2	c1	c2	Øds	Øds1	Øds2	Ødss	ØDs	ØDsa	ØDss	Øe1	f1	h	H	i2	ls	lsa	m1	m2	m3	m4	m5	Øs1
S1	160	110 <sub>⊖</sub>	70	90	106	10	32.0	25 <sub>h9</sub>	25 <sub>h7</sub>	25.5	30	40	80	60	130	3.5	100	167	25.0	149	163	70	20	34	25	29	9.0
S2	200	130 <sub>⊖</sub>	90	115	134	14	38.0	35 <sub>h9</sub>	35 <sub>h7</sub>	35.5	44	50	101	80	165	3.5	120	200	30.0	180	195	85	30	37	35	32	11.0
S3	250	180 <sub>⊖</sub>	105	130	153	15	40.0	40 <sub>h9</sub>	40 <sub>h7</sub>	40.5	50	55	114	90	215	4.0	140	233	32.5	200	222	100	40	39	45	34	14.0
S4	250	180 <sub>⊖</sub>	120	148	173	15	39.5	50 <sub>h9</sub>	50 <sub>h7</sub>	50.5	62	65	116	106	215	4.0	160	263	31.0	227	243	110	40	44	45	39	14.0

Dimensions of additional round flanges

Type	Øa1	Øb1	c1	Øe1	f1	Øs1
S1	140	95 <sub>⊖</sub>	10	115	3.0	9.0
S2	160	110 <sub>⊖</sub>	14	130	3.5	9.0

Dimensions of motors

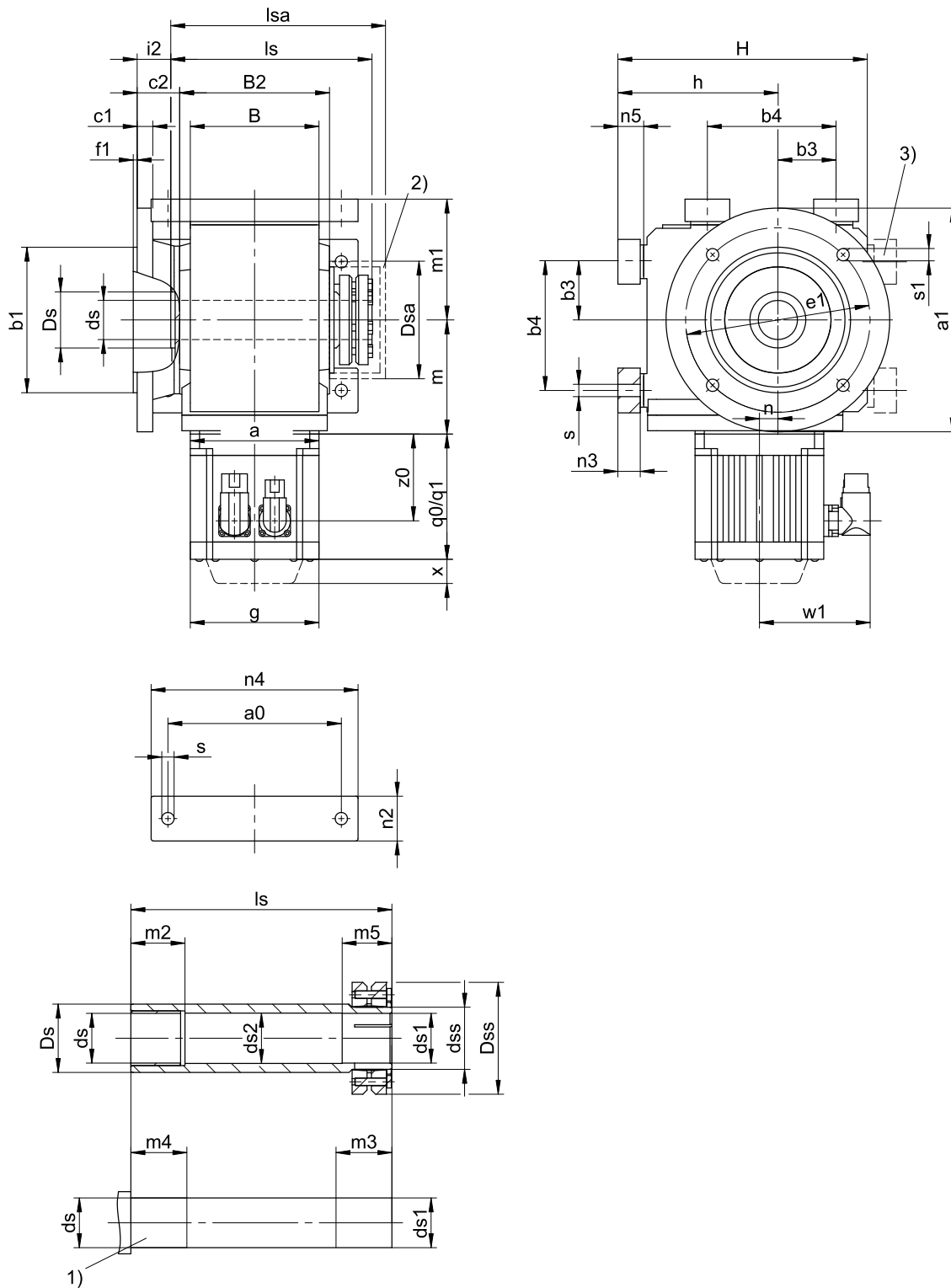
Type	□g	q0	q1	w1	x	z0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
EZ503U	115	162.0	216.5	100.0	22	127.5
EZ505U	115	212.0	266.5	100.0	22	177.5
EZ701U	145	125.0	184.0	115.0	22	87.0
EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5

Dimensions of geared motors

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
S102	□72	83	14.0	□98	83	14.0	□115	87	14.0	□145	89	14.0	-	-	-
S202	□72	98	17.0	□98	98	17.0	□115	102	17.0	□145	104	17.0	-	-	-
S203	Ø140	135	17.0	-	-	-	-	-	-	-	-	-	-	-	-
S302	Ø140	113	25.5	Ø140	113	25.5	□115	117	25.5	□145	119	25.5	-	-	-
S303	Ø140	150	25.5	Ø140	150	25.5	Ø160	160	62.0	-	-	-	-	-	-
S402	-	-	-	-	-	-	Ø160	129	30.0	□145	131	30.0	□190	134	30.0
S403	Ø140	162	30.0	Ø140	162	30.0	Ø160	172	67.0	-	-	-	-	-	-



### 21.3.12 S shaft design (hollow shaft with shrink disk), NF housing design (base + round flange)



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter <a href="#">[ 22.4 ]</a>
1)	Machine shaft: The dimension $l_s$ must meet or exceed the specified value.	2)	Cover (optional)
3)	Only for S0		



Dimensions of gear units

Type	a0	Øa1	Øb1	b3	b4	B	B2	c1	c2	Øds	Øds1	Øds2	Ødss	ØDs	ØDsa	ØDss	Øe1	f1	h	H	i2	ls	lsa	m1	m2	m3	m4	m5	n2	n3	n4	n5	Øs	Øs1
S0	75	120	80 <sub>h6</sub>	40	80	92	94	9	28.0	20 <sub>h9</sub>	20 <sub>h9</sub> <sup>H7</sup>	20.5	24	40	80	50	100	3.0	80	143	21.0	136	151	72	20	33	25	28	22	9	92	9	6.6	6.6
S0	75	120	80 <sub>h6</sub>	40	80	92	94	9	28.0	25 <sub>h9</sub>	25 <sub>h9</sub> <sup>H7</sup>	25.5	30	40	80	60	100	3.0	80	143	21.0	136	151	72	20	34	25	29	22	9	92	9	6.6	6.6
S1	115	160	110 <sub>h6</sub>	40	90	90	106	10	32.0	25 <sub>h9</sub>	25 <sub>h9</sub> <sup>H7</sup>	25.5	30	40	80	60	130	3.5	115	182	25.0	149	163	85	20	34	25	29	30	13	140	15	9.0	9.0
S2	155	200	130 <sub>h6</sub>	52	115	115	134	14	38.0	35 <sub>h9</sub>	35 <sub>h9</sub> <sup>H7</sup>	35.5	44	50	101	80	165	3.5	143	223	30.0	180	195	108	30	37	35	32	40	20	185	23	11.0	11.0
S3	170	250	180 <sub>h6</sub>	52	130	130	153	15	40.0	40 <sub>h9</sub>	40 <sub>h9</sub> <sup>H7</sup>	40.5	50	55	114	90	215	4.0	163	256	32.5	200	222	123	40	39	45	34	45	20	200	23	11.0	14.0
S4	200	250	180 <sub>h6</sub>	67	155	148	173	15	39.5	50 <sub>h9</sub>	50 <sub>h9</sub> <sup>H7</sup>	50.5	62	65	116	106	215	4.0	185	288	31.0	227	243	135	40	44	45	39	50	22	230	25	14.0	14.0

Dimensions of additional round flanges

Type	Øa1	Øb1	c1	Øe1	f1	Øs1
S0	160	110 <sub>h6</sub>	10	130	3.5	9.0
S1	140	95 <sub>h6</sub>	10	115	3.0	9.0
S2	160	110 <sub>h6</sub>	14	130	3.5	9.0

Dimensions of motors

Type	□g	q0	q1	w1	x	z0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
EZ503U	115	162.0	216.5	100.0	22	127.5
EZ505U	115	212.0	266.5	100.0	22	177.5
EZ701U	145	125.0	184.0	115.0	22	87.0
EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5

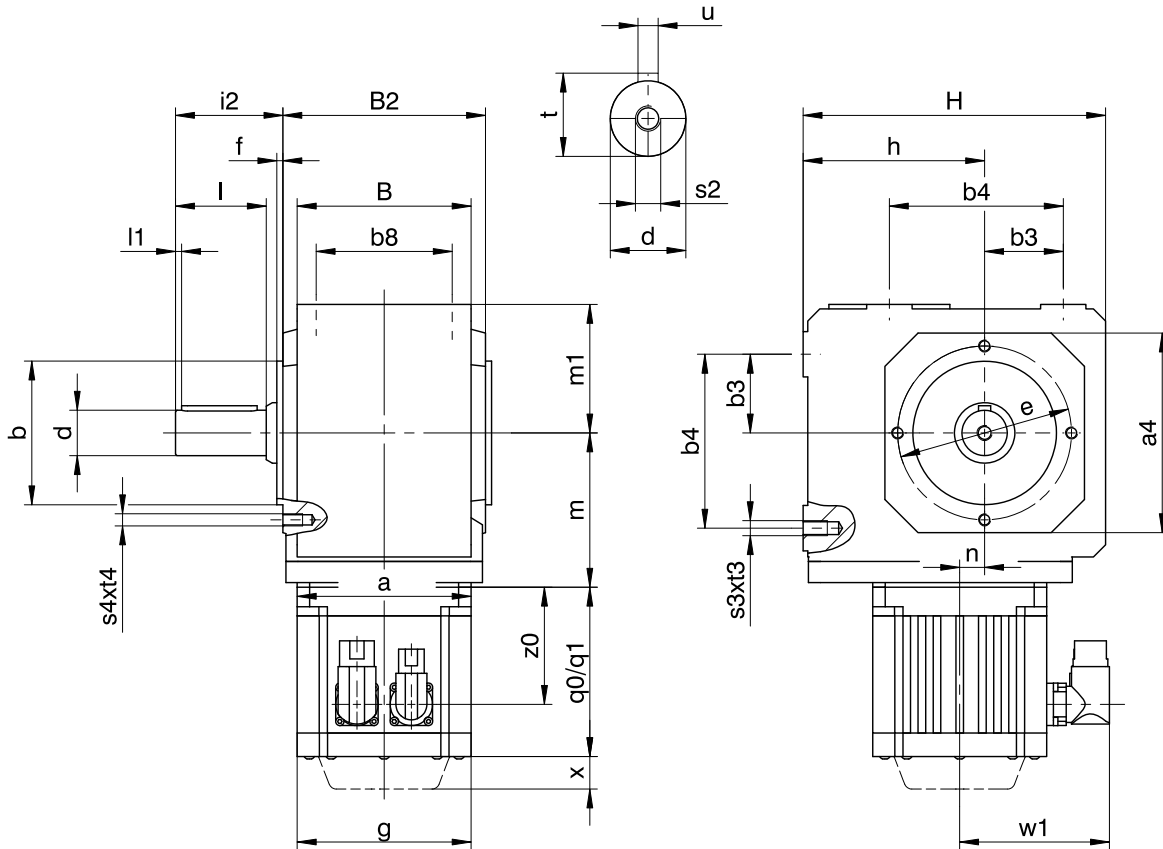
Dimensions of geared motors

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
S002	Ø140	70	8.5	Ø140	70	8.5	-	-	-	-	-	-	-	-	-
S102	□72	83	14.0	□98	83	14.0	□115	87	14.0	□145	89	14.0	-	-	-
S202	□72	98	17.0	□98	98	17.0	□115	102	17.0	□145	104	17.0	-	-	-
S203	Ø140	135	17.0	-	-	-	-	-	-	-	-	-	-	-	-
S302	Ø140	113	25.5	Ø140	113	25.5	□115	117	25.5	□145	119	25.5	-	-	-
S303	Ø140	150	25.5	Ø140	150	25.5	Ø160	160	62.0	-	-	-	-	-	-
S402	-	-	-	-	-	-	Ø160	129	30.0	□145	131	30.0	□190	134	30.0
S403	Ø140	162	30.0	Ø140	162	30.0	Ø160	172	67.0	-	-	-	-	-	-

S

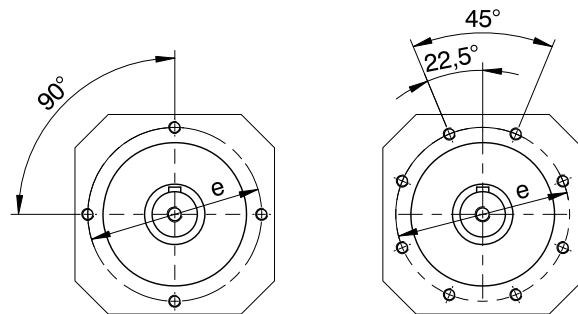


### 21.3.13 A shaft design (solid shaft), G housing design (pitch circle diameter)



S1-S3

S4



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter <a href="#">22.4</a>
-	Solid shaft on both sides available.		

#### Dimensions of gear units

Type	a4	Øb	b3	b4	b8	B	B2	Ød	Øe	f	h	H	i2	l	l1	m1	s2	s3	s4	t	t3	t4	u
S1	□105	75 <sub>f6</sub>	40	90	70	90	106	25 <sub>k6</sub>	90	3.0	100	167	62.0	50	4	70	M10	M8	M8	28.0	13	13	A8x7x40
S2	□132	95 <sub>f6</sub>	52	115	90	115	134	30 <sub>k6</sub>	115	4.0	120	200	71.0	60	4	85	M10	M10	M8	33.0	16	13	A8x7x50
S3	□152	110 <sub>f6</sub>	52	130	105	130	153	40 <sub>k6</sub>	130	3.5	140	233	93.5	80	4	100	M16	M10	M10	43.0	16	16	A12x8x70
S4	□145	110 <sub>f6</sub>	67	155	120	148	173	45 <sub>k6</sub>	130	3.5	160	263	103.5	90	4	110	M16	M12	M10	48.5	19	16	A14x9x80



**Dimensions of motors**

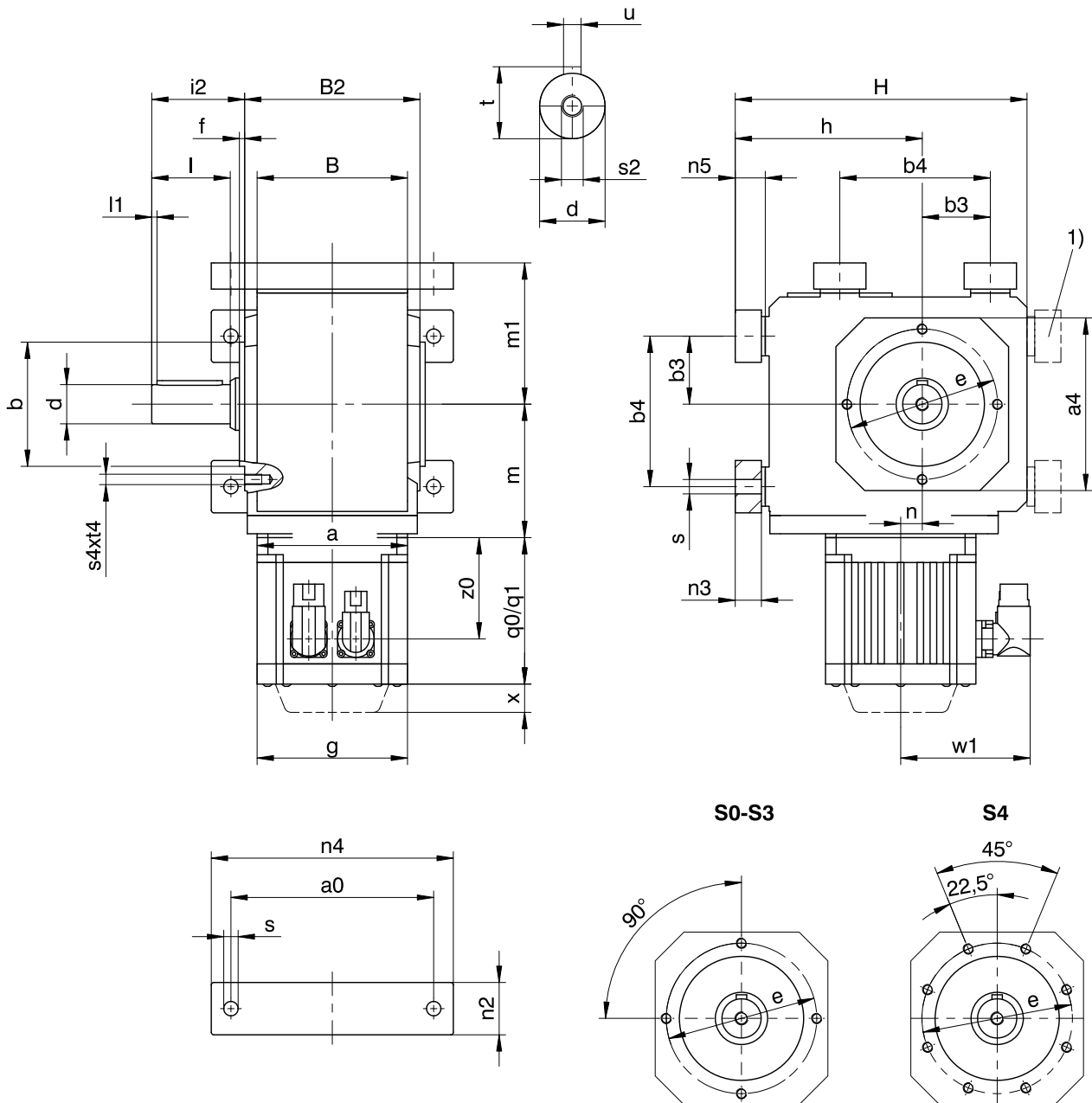
Type	□g	q0	q1	w1	x	z0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
EZ503U	115	162.0	216.5	100.0	22	127.5
EZ505U	115	212.0	266.5	100.0	22	177.5
EZ701U	145	125.0	184.0	115.0	22	87.0
EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5

**Dimensions of geared motors**

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
S102	□72	83	14.0	□98	83	14.0	□115	87	14.0	□145	89	14.0	-	-	-
S202	□72	98	17.0	□98	98	17.0	□115	102	17.0	□145	104	17.0	-	-	-
S203	∅140	135	17.0	-	-	-	-	-	-	-	-	-	-	-	-
S302	∅140	113	25.5	∅140	113	25.5	□115	117	25.5	□145	119	25.5	-	-	-
S303	∅140	150	25.5	∅140	150	25.5	∅160	160	62.0	-	-	-	-	-	-
S402	-	-	-	-	-	-	∅160	129	30.0	□145	131	30.0	□190	134	30.0
S403	∅140	162	30.0	∅140	162	30.0	∅160	172	67.0	-	-	-	-	-	-



### 21.3.14 V shaft design (solid shaft), NG housing design (base + pitch circle diameter)



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter <a href="#">[ 22.4 ]</a>
1)	Only for S0	-	Solid shaft on both sides available.

#### Dimensions of gear units

Type	a0	a4	Øb	b3	b4	B	B2	Ød	Øe	f	h	H	i2	l	l1	m1	n2	n3	n4	n5	Øs	s2	s4	t	t4	u
S0	75	Ø85	75 <sub>js</sub>	40	80	92	94	20 <sub>js6</sub>	90	3.0	80	143	53.0	40	3	72	22	9	92	9	6.6	M6	M6	22.5	13	A6x6x32
S0	75	Ø85	75 <sub>js</sub>	40	80	92	94	25 <sub>js6</sub>	90	3.0	80	143	53.0	40	3	72	22	9	92	9	6.6	M6	M6	28.0	13	A8x7x40
S1	115	□105	75 <sub>js</sub>	40	90	90	106	25 <sub>js6</sub>	90	3.0	115	182	62.0	50	4	85	30	13	140	15	9.0	M10	M8	28.0	13	A8x7x40
S2	155	□132	95 <sub>js6</sub>	52	115	115	134	30 <sub>js6</sub>	115	4.0	143	223	71.0	60	4	108	40	20	185	23	11.0	M10	M8	33.0	13	A8x7x50
S3	170	□152	110 <sub>js6</sub>	52	130	130	153	40 <sub>js6</sub>	130	3.5	163	256	93.5	80	4	123	45	20	200	23	11.0	M16	M10	43.0	16	A12x8x70
S4	200	□145	110 <sub>js6</sub>	67	155	148	173	45 <sub>js6</sub>	130	3.5	185	288	103.5	90	4	135	50	22	230	25	14.0	M16	M10	48.5	16	A14x9x80



**Dimensions of motors**

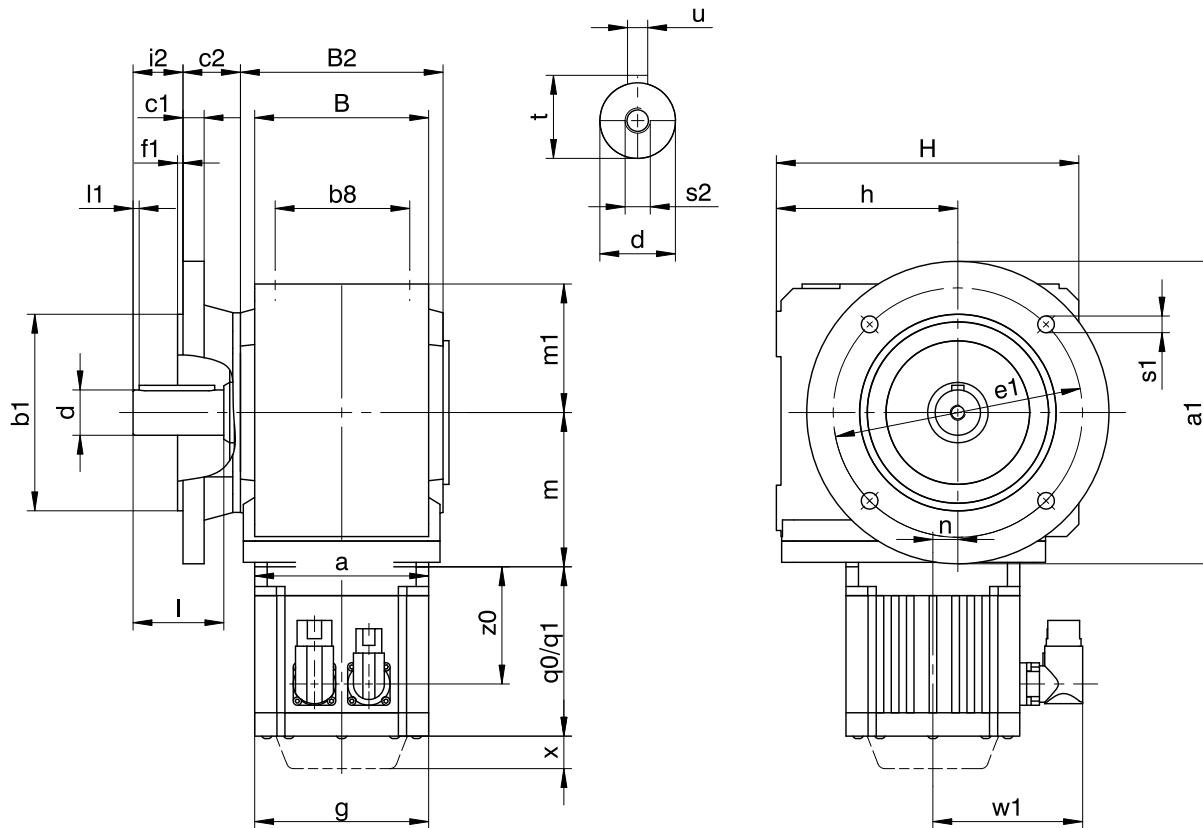
Type	□g	q0	q1	w1	x	z0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
EZ503U	115	162.0	216.5	100.0	22	127.5
EZ505U	115	212.0	266.5	100.0	22	177.5
EZ701U	145	125.0	184.0	115.0	22	87.0
EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5

**Dimensions of geared motors**

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
S002	∅140	70	8.5	∅140	70	8.5	-	-	-	-	-	-	-	-	-
S102	□72	83	14.0	□98	83	14.0	□115	87	14.0	□145	89	14.0	-	-	-
S202	□72	98	17.0	□98	98	17.0	□115	102	17.0	□145	104	17.0	-	-	-
S203	∅140	135	17.0	-	-	-	-	-	-	-	-	-	-	-	-
S302	∅140	113	25.5	∅140	113	25.5	□115	117	25.5	□145	119	25.5	-	-	-
S303	∅140	150	25.5	∅140	150	25.5	∅160	160	62.0	-	-	-	-	-	-
S402	-	-	-	-	-	-	∅160	129	30.0	□145	131	30.0	□190	134	30.0
S403	∅140	162	30.0	∅140	162	30.0	∅160	172	67.0	-	-	-	-	-	-



### 21.3.15 V shaft design (solid shaft), F housing design (round flange)



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter <a href="#">[ 22.4 ]</a>
-	Solid shaft on both sides available.		

#### Dimensions of gear units

Type	Øa1	Øb1	b8	B	B2	c1	c2	Ød	Øe1	f1	h	H	i2	l	l1	m1	Øs1	s2	t	u
S1	160	110 <sub>6</sub>	70	90	106	10	32.0	25 <sub>6</sub>	130	3.5	100	167	30.0	50	4	70	9.0	M10	28.0	A8x7x40
S2	200	130 <sub>6</sub>	90	115	134	14	38.0	30 <sub>6</sub>	165	3.5	120	200	33.0	60	4	85	11.0	M10	33.0	A8x7x50
S3	250	180 <sub>6</sub>	105	130	153	15	40.0	40 <sub>6</sub>	215	4.0	140	233	53.5	80	4	100	14.0	M16	43.0	A12x8x70
S4	250	180 <sub>6</sub>	120	148	173	15	39.5	45 <sub>6</sub>	215	4.0	160	263	64.0	90	4	110	14.0	M16	48.5	A14x9x80

#### Dimensions of additional round flanges

Type	Øa1	Øb1	c1	Øe1	f1	Øs1
S1	140	95 <sub>6</sub>	10	115	3.0	9.0
S2	160	110 <sub>6</sub>	14	130	3.5	9.0





**Dimensions of motors**

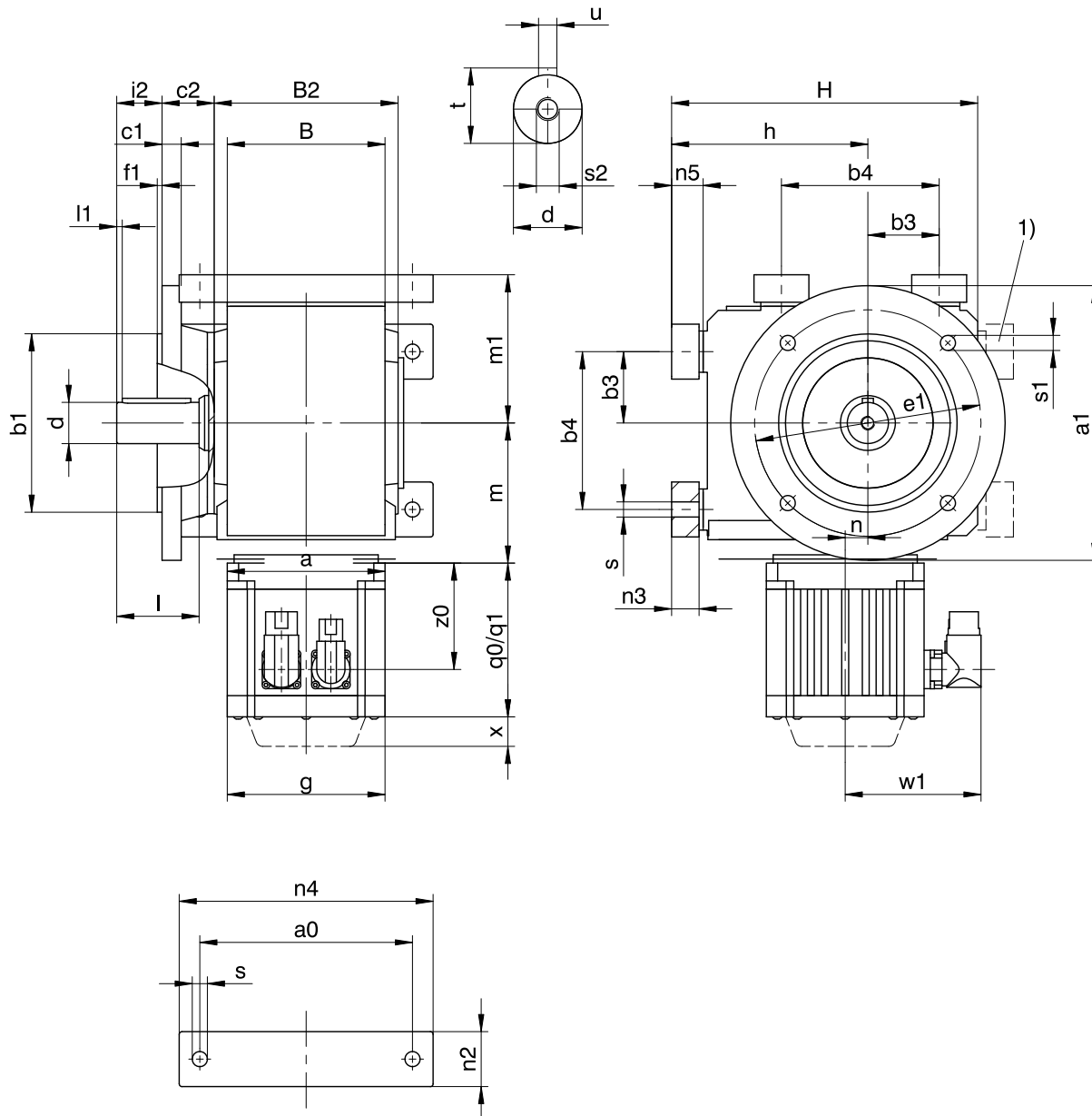
Type	□g	q0	q1	w1	x	z0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
EZ503U	115	162.0	216.5	100.0	22	127.5
EZ505U	115	212.0	266.5	100.0	22	177.5
EZ701U	145	125.0	184.0	115.0	22	87.0
EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5

**Dimensions of geared motors**

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
S102	□72	83	14.0	□98	83	14.0	□115	87	14.0	□145	89	14.0	-	-	-
S202	□72	98	17.0	□98	98	17.0	□115	102	17.0	□145	104	17.0	-	-	-
S203	∅140	135	17.0	-	-	-	-	-	-	-	-	-	-	-	-
S302	∅140	113	25.5	∅140	113	25.5	□115	117	25.5	□145	119	25.5	-	-	-
S303	∅140	150	25.5	∅140	150	25.5	∅160	160	62.0	-	-	-	-	-	-
S402	-	-	-	-	-	-	∅160	129	30.0	□145	131	30.0	□190	134	30.0
S403	∅140	162	30.0	∅140	162	30.0	∅160	172	67.0	-	-	-	-	-	-



### 21.3.16 V shaft design (solid shaft), NF housing design (base + round flange)



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter <a href="#">[ 22.4 ]</a>
1)	Only for S0	-	Solid shaft on both sides available.

#### Dimensions of gear units

Type	a0	Øa1	Øb1	b3	b4	B	B2	c1	c2	Ød	Øe1	f1	h	H	i2	l	l1	m1	n2	n3	n4	n5	Øs	Øs1	s2	t	u
S0	75	120	80 <sub>6</sub>	40	80	92	94	9	28.0	20 <sub>6</sub>	100	3.0	80	143	40.0	40	3	72	22	9	92	9	6.6	6.6	M6	22.5	A6x6x32
S0	75	120	80 <sub>6</sub>	40	80	92	94	9	28.0	25 <sub>6</sub>	100	3.0	80	143	40.0	40	3	72	22	9	92	9	6.6	6.6	M6	28.0	A8x7x40
S1	115	160	110 <sub>6</sub>	40	90	90	106	10	32.0	25 <sub>6</sub>	130	3.5	115	182	30.0	50	4	85	30	13	140	15	9.0	9.0	M10	28.0	A8x7x40
S2	155	200	130 <sub>6</sub>	52	115	115	134	14	38.0	30 <sub>6</sub>	165	3.5	143	223	33.0	60	4	108	40	20	185	23	11.0	11.0	M10	33.0	A8x7x50
S3	170	250	180 <sub>6</sub>	52	130	130	153	15	40.0	40 <sub>6</sub>	215	4.0	163	256	53.5	80	4	123	45	20	200	23	11.0	14.0	M16	43.0	A12x8x70
S4	200	250	180 <sub>6</sub>	67	155	148	173	15	39.5	45 <sub>6</sub>	215	4.0	185	288	64.0	90	4	135	50	22	230	25	14.0	14.0	M16	48.5	A14x9x80



**Dimensions of additional round flanges**

Type	Øa1	Øb1	c1	Øe1	f1	Øs1
S0	160	110 <sub>h6</sub>	10	130	3.5	9.0
S1	140	95 <sub>h6</sub>	10	115	3.0	9.0
S2	160	110 <sub>h6</sub>	14	130	3.5	9.0

**Dimensions of motors**

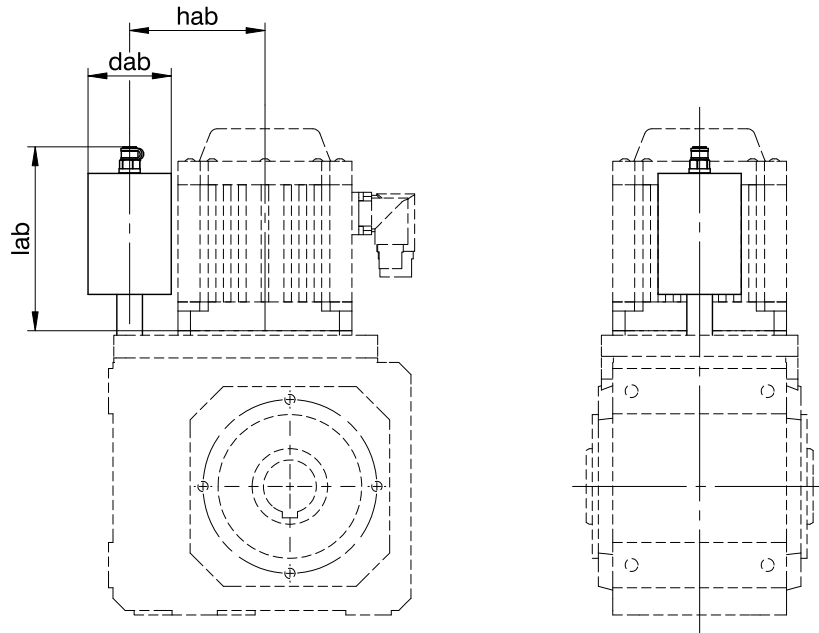
Type	□g	q0	q1	w1	x	z0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
EZ503U	115	162.0	216.5	100.0	22	127.5
EZ505U	115	212.0	266.5	100.0	22	177.5
EZ701U	145	125.0	184.0	115.0	22	87.0
EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5

**Dimensions of geared motors**

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
S002	Ø140	70	8.5	Ø140	70	8.5	-	-	-	-	-	-	-	-	-
S102	□72	83	14.0	□98	83	14.0	□115	87	14.0	□145	89	14.0	-	-	-
S202	□72	98	17.0	□98	98	17.0	□115	102	17.0	□145	104	17.0	-	-	-
S203	Ø140	135	17.0	-	-	-	-	-	-	-	-	-	-	-	-
S302	Ø140	113	25.5	Ø140	113	25.5	□115	117	25.5	□145	119	25.5	-	-	-
S303	Ø140	150	25.5	Ø140	150	25.5	Ø160	160	62.0	-	-	-	-	-	-
S402	-	-	-	-	-	-	Ø160	129	30.0	□145	131	30.0	□190	134	30.0
S403	Ø140	162	30.0	Ø140	162	30.0	Ø160	172	67.0	-	-	-	-	-	-



### 21.3.17 Oil expansion tank



#### Dimensions

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	dab	hab	lab	dab	hab	lab	dab	hab	lab	dab	hab	lab	dab	hab	lab
S102	65	66.0	162.0	65	113.0	161.0	65	130.0	156.5	-	-	-	-	-	-
S202	65	86.0	114.0	65	86.0	114.0	65	134.0	160.5	65	134.0	161.0	-	-	-
S302	65	97.5	162.0	65	97.5	162.0	65	97.5	113.5	65	97.5	161.0	-	-	-
S402	-	-	-	-	-	-	65	110.0	161.5	65	111.0	113.5	65	110.0	157.5

More information can be found in Chapter [▶ 21.6.4](#)



## 21.4 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

<b>S</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>A</b>	<b>G</b>	<b>1700</b>	<b>EZ401U</b>
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### Explanation

Code	Designation	Design
<b>S</b>	Type	Helical worm gear unit
<b>3</b>	Size	3 (example)
<b>0</b>	Generation	Generation 0
<b>2</b>	Stages	Two-stage
<b>3</b>		Three-stage
<b>A</b>	Shaft	Hollow shaft with keyway
<b>S</b>		Hollow shaft with shrink disk
<b>V</b>		Solid shaft
<b>G</b>	Housing	Pitch circle diameter
<b>F</b>		Round flange
<b>NG</b>		Base + pitch circle diameter
<b>NF</b>		Base + round flange
<b>GD</b>		Pitch circle diameter + torque arm
<b>NGD</b>		Base + pitch circle diameter + torque arm
<b>1700</b>	Transmission ratio (i x 10)	i = 170 (example)
<b>EZ401U</b>	Motor	EZ synchronous servo motor

### In order to complete the type designation, also specify:

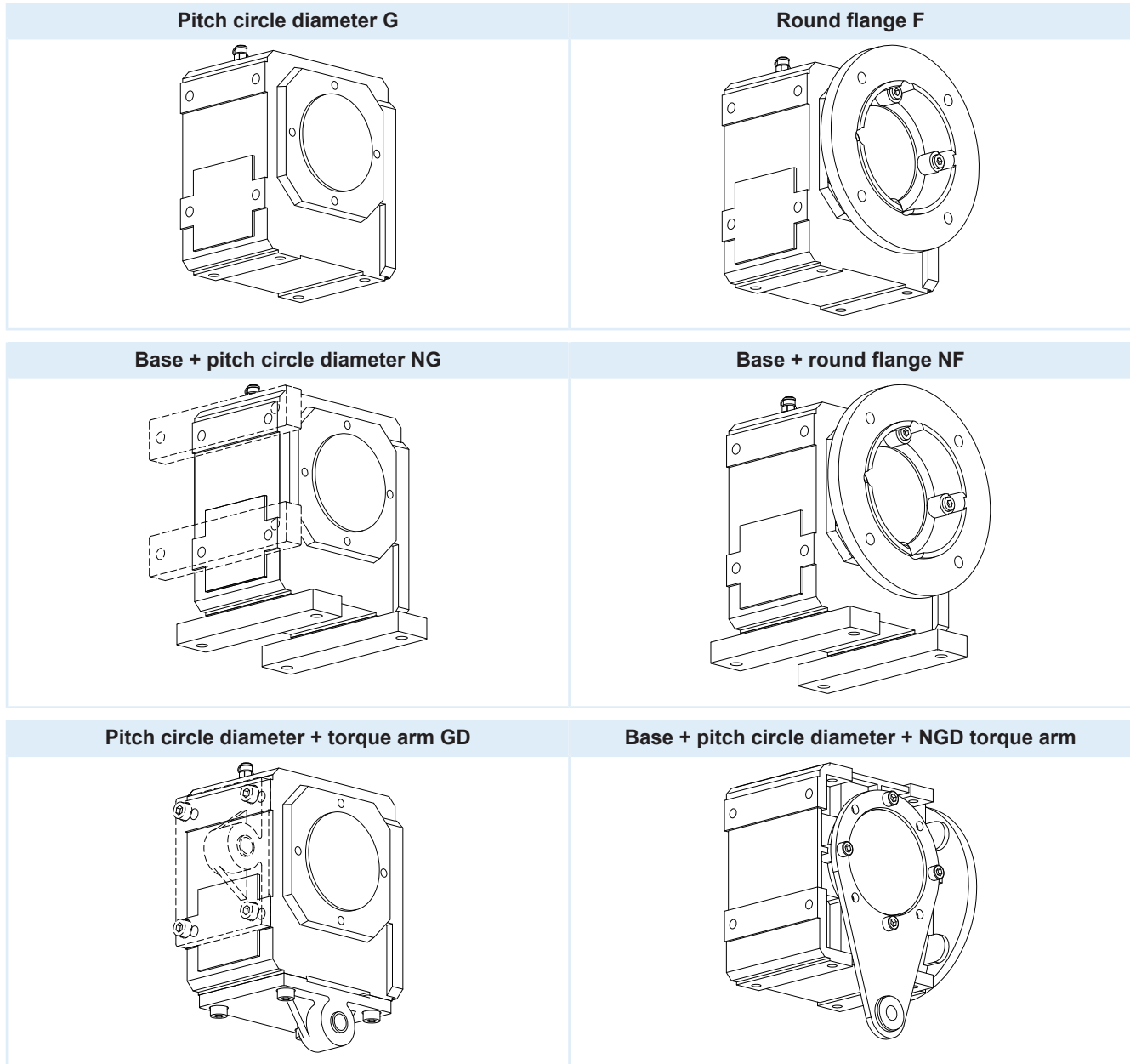
- A detailed type designation of the motor, see Chapter [ 22]
- The installation position, see Chapter [ 21.5.4]
- Attachment of solid shaft: gear unit side 3 or 4; solid shaft on both sides
- Attachment of hollow shaft with keyway: insertion side 3 or 4
- Attachment of hollow shaft with shrink disk: shrink disk on gear unit side 3 or 4
- Attachment of baseboards: gear unit side 1 or 5
- Attachment of flange: gear unit side 3 or 4
- Pitch circle diameter: gear unit side 3 or 4
- Attachment of torque arm: torque arm:
  - S0: torque arm on gear unit side 3 or 4, eye on gear unit side 1, 2, 5, 25, 51
  - S1 – S4: torque arm on gear unit side 1 or 5, eye on gear unit side 3 or 4
- S1 – S4: extended worm shaft on gear unit side 5 (option), dimensions under <http://cad.stoeber.de>
- The position of the plug connectors, see Chapter [ 21.5.6]
- Oil expansion tank (recommended for gear units in installation position EL5), see Chapter [ 21.6.4]
- Standard or reinforced output bearing

An explanation of the gear unit sides can be found in Chapter [ 21.5.4].



## 21.5 Product description

### 21.5.1 Housing design



	<b>G</b>	<b>F</b>	<b>NG</b>	<b>NF</b>	<b>GD</b>	<b>NGD</b>
S0	-	-	✓	✓	-	✓
S1	✓	✓	✓	✓	✓	-
S2	✓	✓	✓	✓	✓	-
S3	✓	✓	✓	✓	✓	-
S4	✓	✓	✓	✓	✓	-



## 21.5.2 Combinatorial shaft/housing design

Shaft design	Code	Housing design					
		G	F	NG	NF	GD	NGD
Hollow shaft with keyway	<b>A</b>	AG	AF	ANG	ANF	AGD	ANGD
Hollow shaft with shrink disk	<b>S</b>	SG	SF	SNG	SNF	SGD	SNGD
Solid shaft	<b>V</b>	VG	VF	VNG	VNF	-	-

## 21.5.3 Installation conditions

### Hollow shaft

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

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

Maximum deviation  $\leq 0.03$  mm.

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

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

### Hollow shaft with shrink disk

The tolerance of the hollow shaft hole is ISO H7.

The machine shaft must be ISO h9.

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

Possible materials:

- C45E +QT
- 42CrMo4

### Attaching the gear unit on the machine side using the pitch circle diameter

The specified torques and forces only apply when attaching gear units at the machine side using screws of quality 10.9. For gear units in size S0, use screws of quality 8.8.

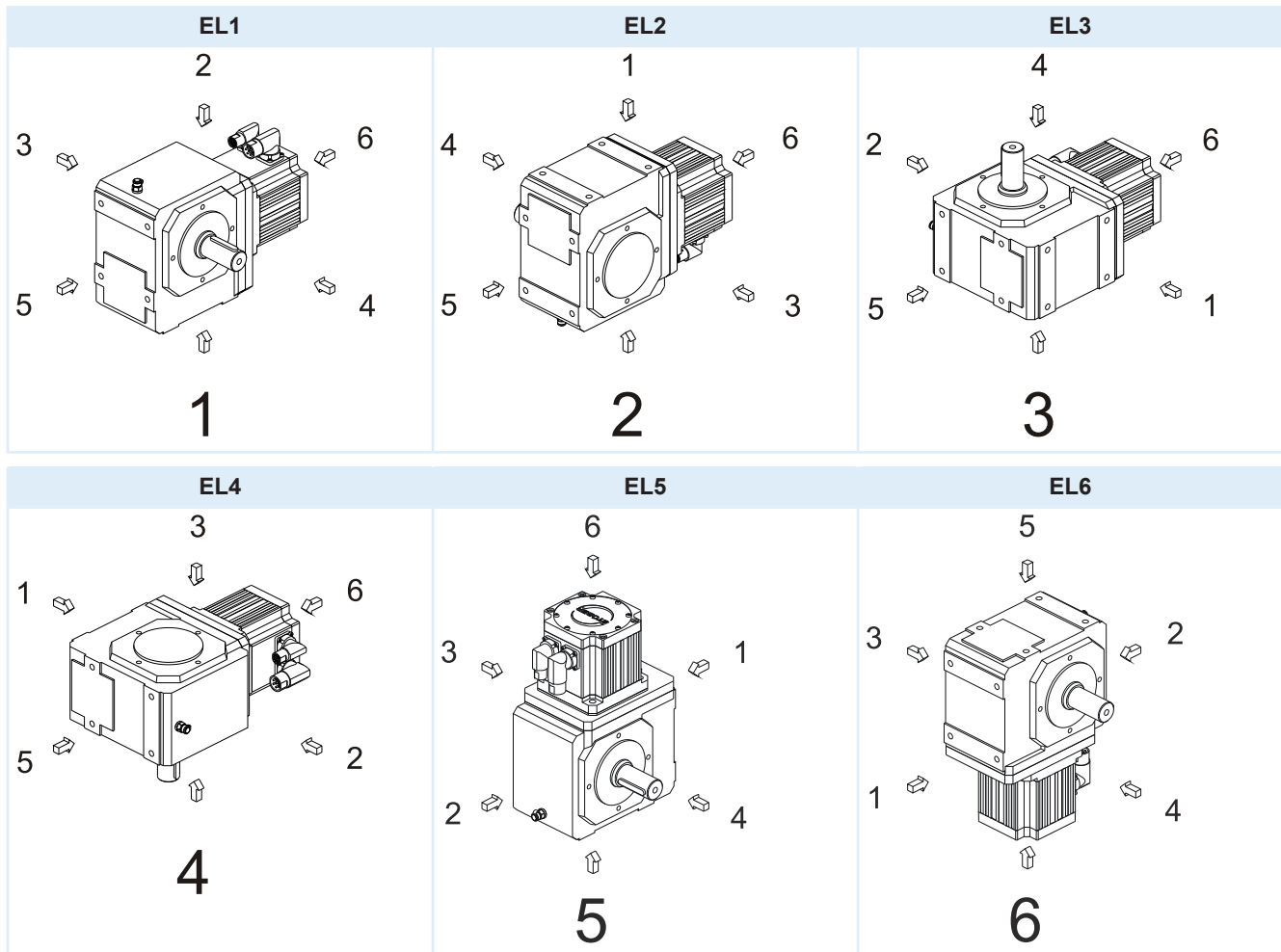
In addition, the gear housing must be adjusted at the pilot (H7).



### 21.5.4 Installation positions

The following table shows the standard installation positions.

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



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

### 21.5.5 Lubricants

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

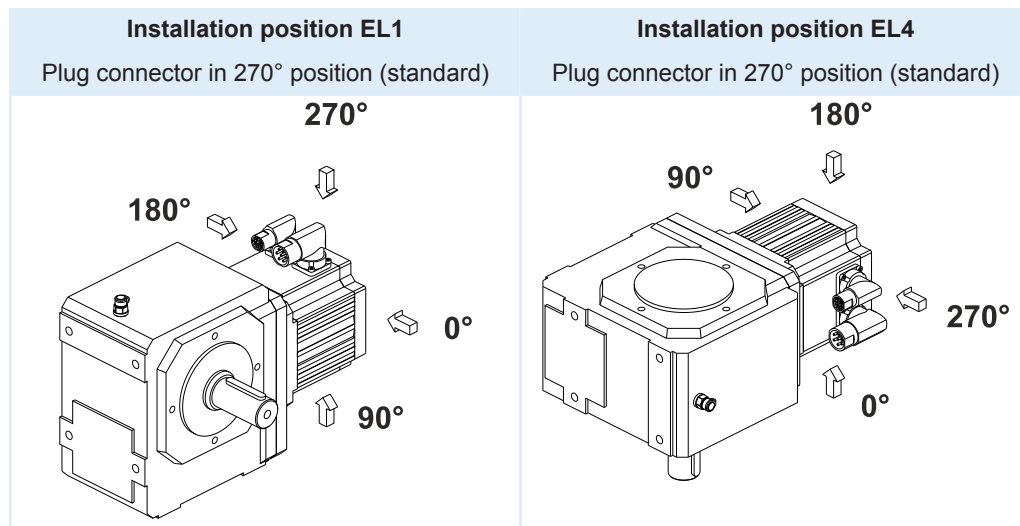
Only install the gear units in the intended installation position! Reposition the gear units only after consulting STÖBER. Otherwise, STÖBER assumes no liability for the gear units.

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





## 21.5.6 Position of the plug connectors



Indicate variations for your geared motor in the purchase order.

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

## 21.5.7 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
<b>Protection class:</b> <sup>1</sup>	
Gear unit	IP65
Motor	IP56, optionally IP66

## 21.5.8 Maintenance

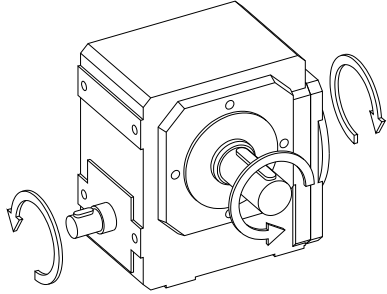
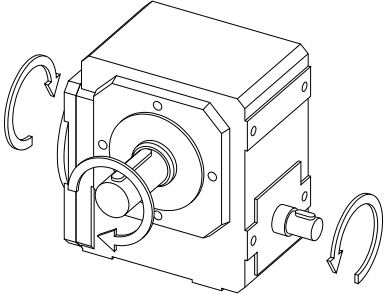
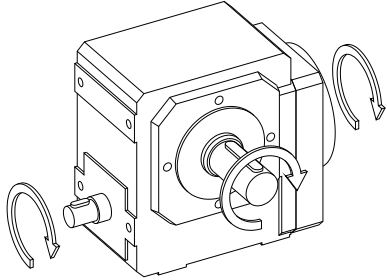
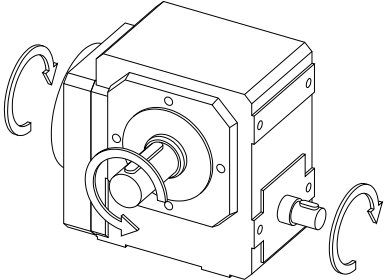
The instructions for maintenance can be found in the operating instructions, ID 441972, at <http://www.stoeber.de/en/download>.

<sup>1</sup> Observe the protection class of all the components.



## 21.5.9 Direction of rotation

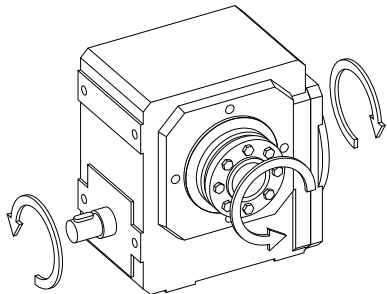
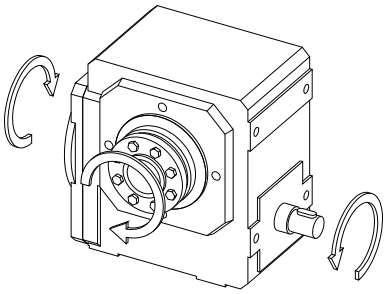
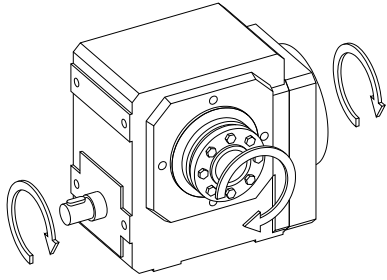
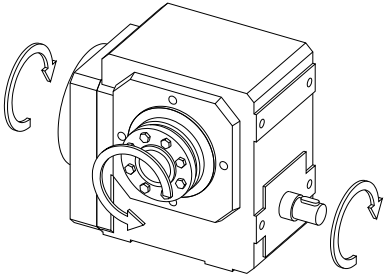
Solid shaft (V), solid shaft on both sides (V), hollow shaft with keyway (A)

Type	Output side 4	Output side 3
S002 – S402		
S203 – S403		

The specified directions of rotation also apply to gear units with hollow shaft (A) if the insertion side of the machine shaft corresponds to the side of the solid shaft that is shown.

The pictures show installation position EL1.

Hollow shaft with shrink disk (S)

Type	Output side 4	Output side 3
S002 – S402		
S203 – S403		

The pictures show installation position EL1.

## 21.6 Project configuration

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



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

Formula symbol	Unit	Explanation
$a_{th}$	–	Parameter for calculating $K_{mot,th}$
$a_{thEL}$	–	Parameters for calculating $K_{mot,th}$ (dependent on the installation position)
ED	%	Duty cycle relative to 20 minutes
$fB_{op}$	–	Operating mode operating factor
$fB_t$	–	Run-time operating factor
$fB_T$	–	Temperature operating factor
$F_{2ax}^*$	N	Actual axial force at the gear unit output
$F_{2ax20}$	N	Permitted axial force on the gear unit output for $n_{2m} \leq 20$ rpm
$F_{2axN}$	N	Permitted nominal axial force at the gear unit output
$F_{2rad}^*$	N	Actual radial force on the gear unit output
$F_{2rad20}$	N	Permitted radial force on the gear unit output for $n_{2m} \leq 20$ rpm
$F_{2radN}$	N	Permitted nominal radial force at the gear unit output
$i$	–	Gear ratio
$K_{mot,th}$	–	Factor for determining the thermal limit torque
$l$	mm	Length of the output shaft
$M_{op}$	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
$M_{2k20}$	Nm	Permitted breakdown torque on the gear unit output for $n_{2m} \leq 20$ rpm
$M_{2kN}$	Nm	Permitted nominal breakdown torque on the gear unit output
$M_{2k}^*$	Nm	Actual breakdown torque on the gear unit output
$M_{2N}$	Nm	Nominal torque on the gear unit output (relative to $n_{1N}$ )
$M_{2NOT}$	Nm	Gear unit emergency-off torque on the gear unit output for max. 1000 load changes
$M_{2NOT}^*$	Nm	Actual emergency off torque for the gear unit on the gear unit output
$M_{2th}$	Nm	Thermal limit torque on the gear unit output
$n_{1m}^*$	rpm	Actual average input speed
$n_{1max}^*$	rpm	Actual maximum input speed
$n_{1maxDBH}$	rpm	Maximum permitted input speed of the gear unit in continuous operation Installation positions EL1, EL2
$n_{1maxDBV}$	rpm	Maximum permitted input speed of the gear unit in continuous operation Installation positions EL3, EL4, EL5, EL6
$n_{1maxZB}$	$\text{min}^{-1}$	Maximum permitted input speed of the gear unit in cyclic operation



Formula symbol	Unit	Explanation
$ n_2 $	rpm	Value of output speed
$n_{2m^*}$	rpm	Actual average output speed
$n_{2m,1^*} - n_{2m,6^*}$	rpm	Actual average output speed in the respective time segment (1 to 6)
$n_{2m,n^*}$	rpm	Actual average output speed in the n-th time segment
$t$	s	Time
$t_1^* - t_6^*$	s	Duration of the respective time segment (1 to 6)
$t_n^*$	s	Duration of the n-th time segment
$S$	–	Load value: Quotient of gear unit and motor nominal torque without regard to the thermal performance limit. Represents a value for the reserve of the geared motor.
$x_2$	mm	Distance of the shaft shoulder to the force application point
$y_2$	mm	Distance of the shaft axis to the axial force application point
$z_2$	mm	Distance of the shaft shoulder to the middle of the output bearing

### 21.6.1 Calculation of the operating point

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

**For continuous operation in installation positions EL1, EL2:**

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

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

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

**For all installation positions:**

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

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

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

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

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

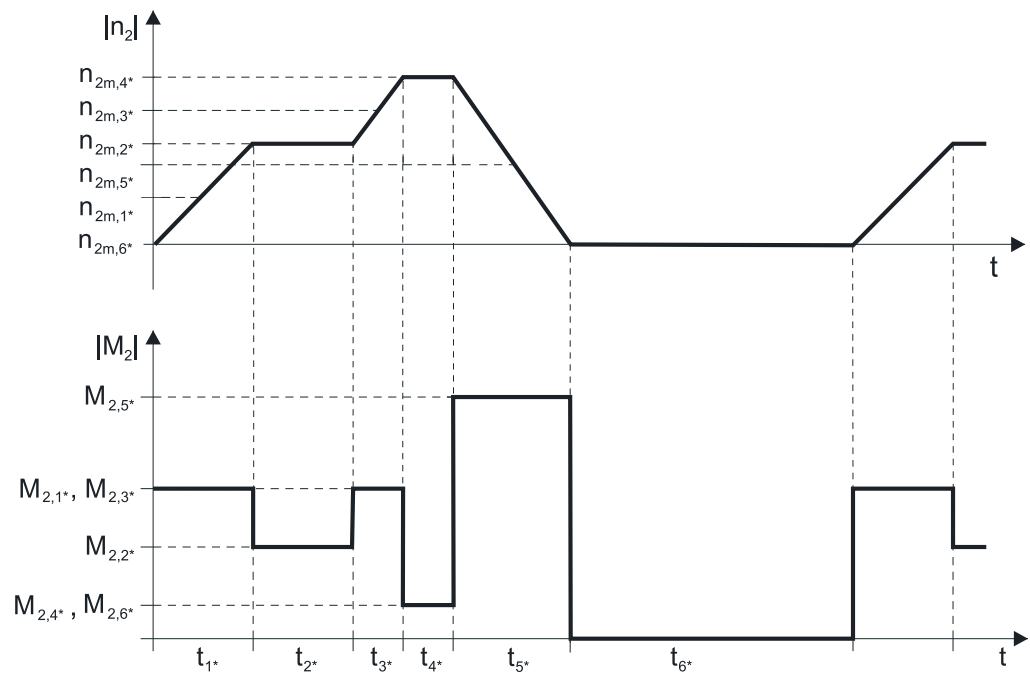
The values for  $n_{1maxDBH}$  and  $n_{1maxDBV}$ ,  $n_{1maxZB}$ ,  $M_{2acc}$ ,  $M_{2NOT}$ ,  $M_{2N}$  and  $S$  can be found in the selection tables.

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

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

#### Example of cycle sequence

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



#### Calculation of the actual average input speed

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

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

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

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

#### Calculation of the actual equivalent torque

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

#### Calculation of the thermal limit torque

Calculate the thermal limit torque  $M_{2th}$  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.)

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

**Ratio  $i < 40$ :**

$$K_{mot,th} = 0,8 - \frac{a_{th}}{1000} \cdot athEL \cdot fB_T \cdot \left(\frac{n_{1m^*}}{1000}\right)^2$$



Ratio  $40 < i \leq 100$ :

$$K_{\text{mot,th}} = 0,7 - \frac{a_{\text{th}}}{1000} \cdot a_{\text{thEL}} \cdot f_{\text{B}_T} \cdot \left( \frac{n_{1m^*}}{1000} \right)^2$$

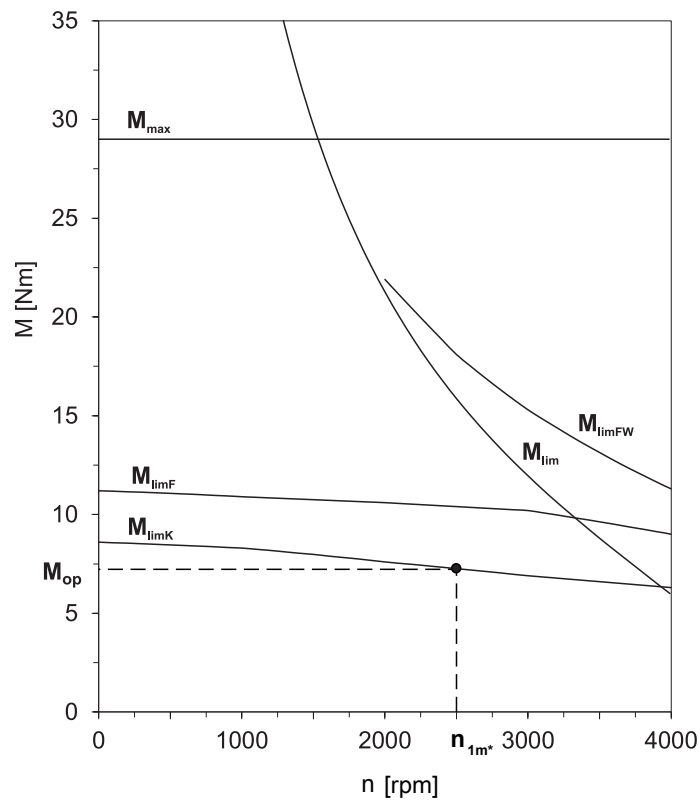
Ratio  $i > 100$ :

$$K_{\text{mot,th}} = 0,65 - \frac{a_{\text{th}}}{1000} \cdot a_{\text{thEL}} \cdot f_{\text{B}_T} \cdot \left( \frac{n_{1m^*}}{1000} \right)^2$$

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

The values for  $a_{\text{thEL}}$  and  $f_{\text{B}_T}$  can be found in the corresponding tables in this chapter.

The value for the torque of the motor at operating point  $M_{\text{op}}$  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  $M_{\text{op}}$  of a motor with convection cooling at the operating point.



### Operating factors

#### Parameter $a_{\text{thEL}}$

Installation position	$a_{\text{thEL}}$
EL1, 2	1.0
EL3, 4, 5, 6	1.1
Operating mode	$f_{\text{B}_{\text{op}}}$
Uniform continuous operation	1.00
Cyclic operation	1.25
Reversing load cyclic operation	1.40



Run time		fB <sub>t</sub>
Daily run time ≤ 8 h		1.00
Daily run time ≤ 16 h		1.15
Daily run time ≤ 24 h		1.20

Temperature		fB <sub>T</sub>
Motor cooling	Surrounding temperature	
Motor with forced ventilation	≤ 20 °C	0.9
	≤ 30 °C	1.0
	≤ 40 °C	1.15
Motor with convection cooling	≤ 20 °C	1.0
	≤ 30 °C	1.1
	≤ 40 °C	1.25

**Notes**

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

## 21.6.2 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<sub>2m\*</sub> ≤ 20 rpm (F<sub>2axN</sub> = F<sub>2ax20</sub>; F<sub>2radN</sub> = F<sub>2rad20</sub>; M<sub>2kN</sub> = M<sub>2k20</sub>)
- Only if transverse forces on the gear unit are supported via its pilots (housing, flange shaft)

### 21.6.2.1 V shaft design

**Permitted shaft loads for V shaft design (solid shaft)**

Type	z <sub>2</sub> [mm]	F <sub>2ax20</sub> [N]	F <sub>2rad20</sub> [N]	M <sub>2k20</sub> [Nm]
S0	31.0	1050	3500	180
S1	37.0	1650	5000	350
S2	38.0	2400	7000	550
S3	46.0	3000	10000	900
S4	47.0	3900	13000	1200

For the V solid shaft design on both sides, the values for F<sub>2rad20</sub> and M<sub>2k20</sub> must be multiplied by a factor of 0.7.

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

The following applies to output speeds n<sub>2m\*</sub> > 20 rpm:

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

The values for F<sub>2ax20</sub>, F<sub>2rad20</sub> and M<sub>2k20</sub> can be found in the table "Permitted shaft loads" in this chapter.

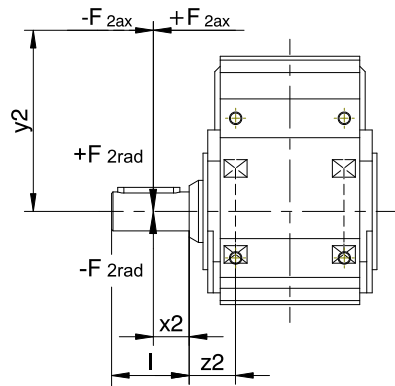


Fig. 1: Force application points for solid shaft

The specified values for  $F_{2rad20}$  are based on application of force at the middle 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:**

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

$$F_{2rad*} \leq F_{2radN}$$

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

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

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

### 21.6.2.2 A and S shaft design

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

Type	$z_2$ [mm]	$F_{2ax20}$ [N]	$F_{2rad20}$ [N]	$M_{2k20}$ [Nm]
S0	25.0	1050	3500	150
S1	32.0	1650	5000	200
S2	35.0	1700	7000	350
S3	39.0	2100	10000	600
S4	40.0	2800	13000	800

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

Type	$z_2$ [mm]	$F_{2ax20}$ [N]	$F_{2rad20}$ [N]	$M_{2k20}$ [Nm]
S0	25.0	1050	3500	150
S1	32.0	1650	5000	200
S2	35.0	1700	7000	350
S3	39.0	2100	10000	600
S4	40.0	2800	13000	800

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





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

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

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

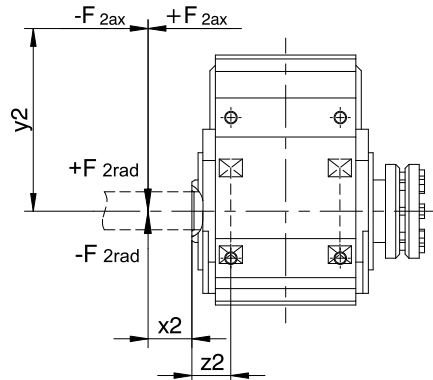


Fig. 2: Force application points for hollow shaft

The permitted transverse forces can be determined using the permitted breakdown torque  $M_{2kN}$ . The actual transverse forces must not exceed the permitted transverse forces. The permitted transverse forces are based on the end of the hollow shaft ( $x_2 = 0$ ).

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

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

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

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

### 21.6.3 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.

### 21.6.4 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.

#### Notes

- We recommend using an oil expansion tank in installation position EL5 (additional cost) for fast running gear units with an input speed  $n_1 > 1750$  rpm and gear ratios  $i < 20$ .
- It is not possible to use an oil expansion tank if the plug connector is at  $90^\circ$ !
- The oil expansion tank can only be used with certain sizes; see Chapter [21.3.17](#)



## 21.7 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
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