

# 12

## Helical bevel geared motors

# K

### 12.1 Overview

Highly rigid helical-gear right-angle geared motor

#### Features

- Power density ★★★★★
- Backlash ★★★★★
- Price category €€
- Shaft load ★★★★★
- Smooth operation ★★★★★
- Torsional stiffness ★★★★★
- Mass moment of inertia ★★★★★
- Helical gearing ✓
- Maintenance-free (K1 – K4) ✓
- FKM seal ring at the input ✓
- Reinforced output bearing (K5 – K8) ✓ (on request)
- Compact and dynamic due to direct motor attachment ✓

Key: ★☆☆☆☆ good | ★★★★★ excellent  
 € Economy | €€€€€ Premium

#### Technical data

$i$	4 – 294
$M_{2acc}$	17 – 6821 Nm
$\Delta\phi_2$	1.5 – 12 arcmin
$\eta_{get}$	≤ 97 %

## 12.2 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
- Weight specification for installation position EL1, housing design G

An explanation of the formula symbols can be found in the Chapter [▶ 15.1](#).

$n_{2N}$	$M_{2N}$	$M_{2,0}$	$a_{th}$	S	Type	$M_{2acc}$	$M_{2NOT}$	i	$i_{exakt}$	$n_{1maxDB}$ EL1,2	$n_{1maxDB}$ EL3,4,5,6	$n_{1maxZB}$	$J_1$	$\Delta\phi_2$	$C_2$	m
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]			[rpm]	[rpm]	[rpm]	[10 <sup>-4</sup> kgm <sup>2</sup> ]	[arcmin]	[Nm/ arcmin]	[kg]
<b>K1 (<math>n_{1N} = 3000</math> rpm, <math>M_{2acc,max} = 140</math> Nm)</b>																
64	105	113	13	0.97	K102_0470 LM401U	120	200	46.92	2299/49	4000	4000	6000	1.7	12/6	6.8	14
85	78	84	11	1.4	K102_0350 LM401U	140	190	35.11	3686/105	4000	4000	6000	1.7	12/6	6.8	14
89	75	81	17	0.97	K102_0340 LM401U	88	150	33.71	4719/140	4000	4000	6000	1.7	12/6	6.8	14
107	63	67	12	1.6	K102_0280 LM401U	120	170	28.05	589/21	4000	4000	6000	1.7	12/6	6.8	14
107	122	126	23	0.81	K102_0280 LM402U	140	240	28.05	589/21	4000	4000	6000	3.1	12/6	6.8	16
119	56	61	12	1.7	K102_0250 LM401U	110	140	25.22	1261/50	4000	4000	6000	1.7	12/6	6.8	14
119	110	114	23	0.87	K102_0250 LM402U	120	190	25.22	1261/50	4000	4000	6000	3.1	12/6	6.8	16
129	52	56	12	1.8	K102_0230 LM401U	100	160	23.27	1140/49	4000	4000	6000	1.8	12/6	6.8	14
129	102	105	23	0.92	K102_0230 LM402U	140	240	23.27	1140/49	4000	4000	6000	3.1	12/6	6.8	16
149	45	48	12	2.0	K102_0200 LM401U	88	120	20.15	403/20	4000	4000	6000	1.7	12/6	6.8	14
149	88	91	23	1.0	K102_0200 LM402U	130	220	20.15	403/20	4000	4000	6000	3.1	12/6	6.8	16
171	39	42	12	2.2	K102_0175 LM401U	77	130	17.56	2090/119	4000	3800	5500	1.8	12/6	6.8	14
171	77	79	24	1.1	K102_0175 LM402U	140	240	17.56	2090/119	4000	3800	5500	3.1	12/6	6.8	16
171	104	107	32	0.81	K102_0175 LM403U	140	240	17.56	2090/119	4000	3800	5500	4.4	12/6	6.8	17
179	37	40	12	2.2	K102_0165 LM401U	73	110	16.71	117/7	4000	4000	6000	1.8	12/6	6.8	14
179	73	75	24	1.1	K102_0165 LM402U	130	220	16.71	117/7	4000	4000	6000	3.1	12/6	6.8	16
179	99	102	32	0.84	K102_0165 LM403U	130	220	16.71	117/7	4000	4000	6000	4.4	12/6	6.8	17
213	31	34	12	2.5	K102_0140 LM401U	62	100	14.11	494/35	4000	3800	5500	1.9	12/6	6.8	14
213	62	64	24	1.3	K102_0140 LM402U	130	240	14.11	494/35	4000	3800	5500	3.2	12/6	6.8	16
213	84	86	33	0.94	K102_0140 LM403U	140	240	14.11	494/35	4000	3800	5500	4.5	12/6	6.8	17
238	28	30	12	2.6	K102_0125 LM401U	55	92	12.62	429/34	4000	3800	5500	1.8	12/6	6.8	14
238	55	57	24	1.4	K102_0125 LM402U	120	220	12.62	429/34	4000	3800	5500	3.2	12/6	6.8	16
238	75	77	33	1.0	K102_0125 LM403U	130	220	12.62	429/34	4000	3800	5500	4.5	12/6	6.8	17
259	26	28	13	2.6	K102_0115 LM401U	51	84	11.57	266/23	3600	3300	5000	1.9	12/6	6.8	14
259	50	52	25	1.5	K102_0115 LM402U	110	240	11.57	266/23	3600	3300	5000	3.3	12/6	6.8	16
259	69	71	33	1.1	K102_0115 LM403U	140	240	11.57	266/23	3600	3300	5000	4.5	12/6	6.8	17
296	23	24	13	2.6	K102_0100 LM401U	44	74	10.14	507/50	4000	3800	5500	1.9	12/6	6.8	14
296	44	46	25	1.6	K102_0100 LM402U	95	220	10.14	507/50	4000	3800	5500	3.2	12/6	6.8	16
296	60	62	34	1.2	K102_0100 LM403U	130	220	10.14	507/50	4000	3800	5500	4.5	12/6	6.8	17
324	21	22	13	2.6	K102_0092 LM401U	40	67	9.249	1748/189	3600	3300	5000	2.0	12/6	6.8	14
324	40	42	25	1.7	K102_0092 LM402U	87	240	9.249	1748/189	3600	3300	5000	3.3	12/6	6.8	16
324	55	56	34	1.2	K102_0092 LM403U	120	240	9.249	1748/189	3600	3300	5000	4.6	12/6	6.8	17
324	84	89	52	0.82	K102_0092 LM503U	130	240	9.249	1748/189	3600	3300	5000	11	12/6	6.8	20
361	19	20	13	2.6	K102_0083 LM401U	36	60	8.309	1911/230	3600	3300	5000	2.0	12/6	6.8	14
361	36	37	25	1.8	K102_0083 LM402U	78	220	8.309	1911/230	3600	3300	5000	3.3	12/6	6.8	16
361	49	51	34	1.3	K102_0083 LM403U	100	220	8.309	1911/230	3600	3300	5000	4.6	12/6	6.8	17
361	75	80	52	0.88	K102_0083 LM503U	120	220	8.309	1911/230	3600	3300	5000	11	12/6	6.8	20
452	15	16	13	2.6	K102_0066 LM401U	29	48	6.644	299/45	3600	3300	5000	2.1	12/6	6.8	14
452	29	30	26	2.1	K102_0066 LM402U	63	190	6.644	299/45	3600	3300	5000	3.4	12/6	6.8	16
452	39	41	35	1.6	K102_0066 LM403U	83	190	6.644	299/45	3600	3300	5000	4.7	12/6	6.8	17
452	60	64	53	1.0	K102_0066 LM503U	120	190	6.644	299/45	3600	3300	5000	11	12/6	6.8	20
500	26	27	26	2.3	K102_0060 LM402U	56	170	6.000	6/1	3300	2800	4500	3.5	12/6	6.8	16
500	36	37	35	1.7	K102_0060 LM403U	75	170	6.000	6/1	3300	2800	4500	4.8	12/6	6.8	17
500	54	58	54	1.1	K102_0060 LM503U	110	170	6.000	6/1	3300	2800	4500	11	12/6	6.8	20
539	12	13	13	2.6	K102_0056 LM401U	24	41	5.568	1520/273	3300	2800	4500	2.3	12/6	6.8	14
539	24	25	26	2.4	K102_0056 LM402U	52	160	5.568	1520/273	3300	2800	4500	3.7	12/6	6.8	16
539	33	34	36	1.7	K102_0056 LM403U	69	160	5.568	1520/273	3300	2800	4500	5.0	12/6	6.8	17
539	50	53	54	1.1	K102_0056 LM503U	110	160	5.568	1520/273	3300	2800	4500	11	12/6	6.8	20
750	8.9	9.6	14	2.6	K102_0040 LM401U	17	29	4.000	4/1	3300	2800	4500	2.5	12/6	6.8	14
750	17	18	27	3.0	K102_0040 LM402U	38	120	4.000	4/1	3300	2800	4500	3.9	12/6	6.8	16
750	24	24	37	2.2	K102_0040 LM403U	50	120	4.000	4/1	3300	2800	4500	5.2	12/6	6.8	17
750	36	38	56	1.4	K102_0040 LM503U	79	120	4.000	4/1	3300	2800	4500	11	12/6	6.8	20
750	52	59	81	0.99	K102_0040 LM505U	93	120	4.000	4/1	3300	2800	4500	18	12/6	6.8	25

12.2 Selection tables 12 K helical bevel geared motors

$n_{2N}$	$M_{2N}$	$M_{2,0}$	$a_{th}$	S	Type	$M_{2acc}$	$M_{2NOT}$	i	$i_{exakt}$	$n_{1maxDB}$	$n_{1maxDB}$	$n_{1maxZB}$	$J_1$	$\Delta\varphi_2$	$C_2$	m
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]			EL1,2 [rpm]	EL3,4,5,6 [rpm]	[rpm]	[10 <sup>-4</sup> kgm <sup>2</sup> ]	[arcmin]	[Nm/ arcmin]	[kg]
<b>K2 (<math>n_{1N} = 3000</math> rpm, <math>M_{2acc,max} = 220</math> Nm)</b>																
33	200	215	8.5	1.0	K203_0910 LM401U	220	390	90.79	46483/512	4000	3900	5500	1.7	10/6/2.5	11	25
38	175	189	8.2	1.1	K203_0800 LM401U	220	390	79.62	26273/330	4000	3900	5500	1.7	10/6/2.5	11	25
44	150	162	7.9	1.3	K203_0680 LM401U	220	390	68.42	26273/384	4000	3900	5500	1.7	10/6/2.5	11	25
45	145	157	7.8	1.4	K203_0660 LM401U	220	390	66.03	46483/704	4000	3900	5500	1.7	10/6/2.5	11	25
54	124	134	9.6	1.3	K202_0560 LM401U	190	280	55.54	1333/24	4000	3900	5500	1.7	10/5/1.5	11	22
55	119	129	7.5	1.7	K203_0540 LM401U	220	350	54.25	135407/2496	4000	3900	5500	1.8	10/6/2.5	11	25
60	109	118	7.3	1.8	K203_0500 LM401U	210	320	49.76	26273/528	4000	3900	5500	1.7	10/6/2.5	11	25
65	103	111	7.3	1.9	K202_0460 LM401U	200	260	46.23	1849/40	4000	3900	5500	1.7	10/5/1.5	11	22
65	202	208	14	0.99	K202_0460 LM402U	220	400	46.23	1849/40	4000	3900	5500	3.1	10/5/1.5	11	23
66	99	107	7.1	2.0	K203_0450 LM401U	190	290	45.22	58609/1296	4000	3900	5500	1.8	10/6/2.5	11	25
66	195	201	14	1.0	K203_0450 LM402U	220	290	45.22	58609/1296	4000	3900	5500	3.1	10/6/2.5	11	26
74	90	97	12	1.3	K202_0400 LM401U	140	200	40.39	1333/33	4000	3900	5500	1.7	10/5/1.5	11	22
76	87	94	7.0	2.3	K203_0390 LM401U	170	250	39.45	135407/3432	4000	3900	5500	1.8	10/6/2.5	11	25
76	170	175	14	1.2	K203_0390 LM402U	200	250	39.45	135407/3432	4000	3900	5500	3.1	10/6/2.5	11	26
87	77	83	7.1	2.2	K202_0350 LM401U	150	210	34.55	1935/56	4000	3900	5500	1.8	10/5/1.5	11	22
87	151	156	14	1.3	K202_0350 LM402U	220	400	34.55	1935/56	4000	3900	5500	3.1	10/5/1.5	11	23
87	205	211	19	0.92	K202_0350 LM403U	220	400	34.55	1935/56	4000	3900	5500	4.4	10/5/1.5	11	25
89	75	81	8.7	2.0	K202_0340 LM401U	150	190	33.62	1849/55	4000	3900	5500	1.8	10/5/1.5	11	22
89	147	151	17	1.1	K202_0340 LM402U	180	310	33.62	1849/55	4000	3900	5500	3.1	10/5/1.5	11	23
107	122	126	14	1.4	K202_0280 LM402U	220	400	27.95	559/20	4000	3900	5500	3.2	10/5/1.5	11	23
107	166	171	19	1.1	K202_0280 LM403U	220	400	27.95	559/20	4000	3900	5500	4.5	10/5/1.5	11	25
119	56	60	7.3	2.2	K202_0250 LM401U	110	160	25.13	1935/77	4000	3900	5500	1.8	10/5/1.5	11	22
119	110	113	14	1.6	K202_0250 LM402U	220	400	25.13	1935/77	4000	3900	5500	3.1	10/5/1.5	11	23
119	149	153	20	1.1	K202_0250 LM403U	220	400	25.13	1935/77	4000	3900	5500	4.4	10/5/1.5	11	25
129	52	56	7.4	2.6	K202_0230 LM401U	100	170	23.18	2967/128	4000	3900	5500	1.9	10/5/1.5	11	22
129	101	104	14	1.6	K202_0230 LM402U	220	400	23.18	2967/128	4000	3900	5500	3.2	10/5/1.5	11	23
129	138	141	20	1.2	K202_0230 LM403U	220	400	23.18	2967/128	4000	3900	5500	4.5	10/5/1.5	11	25
148	89	91	15	1.8	K202_0200 LM402U	190	400	20.33	1118/55	4000	3900	5500	3.2	10/5/1.5	11	23
148	121	124	20	1.3	K202_0200 LM403U	220	400	20.33	1118/55	4000	3900	5500	4.5	10/5/1.5	11	25
148	184	195	30	0.86	K202_0200 LM503U	220	400	20.33	1118/55	4000	3900	5500	11	10/5/1.5	11	28
172	39	42	7.6	2.6	K202_0175 LM401U	76	130	17.47	559/32	3900	3500	5000	2.0	10/5/1.5	11	22
172	76	79	15	2.0	K202_0175 LM402U	160	400	17.47	559/32	3900	3500	5000	3.4	10/5/1.5	11	23
172	104	107	20	1.5	K202_0175 LM403U	220	400	17.47	559/32	3900	3500	5000	4.7	10/5/1.5	11	25
172	158	168	31	0.96	K202_0175 LM503U	220	400	17.47	559/32	3900	3500	5000	11	10/5/1.5	11	28
178	38	41	7.6	2.6	K202_0170 LM401U	74	120	16.86	2967/176	4000	3900	5500	1.9	10/5/1.5	11	22
178	74	76	15	2.0	K202_0170 LM402U	160	400	16.86	2967/176	4000	3900	5500	3.3	10/5/1.5	11	23
178	100	103	20	1.5	K202_0170 LM403U	210	400	16.86	2967/176	4000	3900	5500	4.6	10/5/1.5	11	25
178	153	162	31	0.98	K202_0170 LM503U	220	400	16.86	2967/176	4000	3900	5500	11	10/5/1.5	11	28
217	60	62	15	2.3	K202_0140 LM402U	130	400	13.85	2881/208	3900	3500	5000	3.5	10/5/1.5	11	23
217	82	85	20	1.7	K202_0140 LM403U	170	400	13.85	2881/208	3900	3500	5000	4.8	10/5/1.5	11	25
217	125	133	31	1.1	K202_0140 LM503U	220	400	13.85	2881/208	3900	3500	5000	11	10/5/1.5	11	28
236	28	31	7.8	2.6	K202_0125 LM401U	56	92	12.71	559/44	3900	3500	5000	2.1	10/5/1.5	11	22
236	55	57	15	2.4	K202_0125 LM402U	120	370	12.71	559/44	3900	3500	5000	3.4	10/5/1.5	11	23
236	75	78	21	1.8	K202_0125 LM403U	160	370	12.71	559/44	3900	3500	5000	4.7	10/5/1.5	11	25
236	115	122	31	1.2	K202_0125 LM503U	220	370	12.71	559/44	3900	3500	5000	11	10/5/1.5	11	28
236	166	189	46	0.82	K202_0125 LM505U	220	370	12.71	559/44	3900	3500	5000	17	10/5/1.5	11	32
260	26	28	7.8	2.6	K202_0115 LM401U	51	84	11.55	1247/108	3500	3100	4500	2.3	10/5/1.5	11	22
260	50	52	15	2.6	K202_0115 LM402U	110	340	11.55	1247/108	3500	3100	4500	3.7	10/5/1.5	11	23
260	69	70	21	1.9	K202_0115 LM403U	140	340	11.55	1247/108	3500	3100	4500	5.0	10/5/1.5	11	25
260	104	111	32	1.3	K202_0115 LM503U	220	340	11.55	1247/108	3500	3100	4500	11	10/5/1.5	11	28
260	151	171	46	0.87	K202_0115 LM505U	220	340	11.55	1247/108	3500	3100	4500	17	10/5/1.5	11	32
298	44	45	15	2.9	K202_0100 LM402U	95	290	10.07	2881/286	3900	3500	5000	3.6	10/5/1.5	11	23
298	60	61	21	2.1	K202_0100 LM403U	130	290	10.07	2881/286	3900	3500	5000	4.9	10/5/1.5	11	25
298	91	97	32	1.4	K202_0100 LM503U	200	290	10.07	2881/286	3900	3500	5000	11	10/5/1.5	11	28
298	132	149	46	0.95	K202_0100 LM505U	220	290	10.07	2881/286	3900	3500	5000	17	10/5/1.5	11	32
326	40	41	16	3.0	K202_0092 LM402U	86	270	9.190	2279/248	3500	3100	4500	3.9	10/5/1.5	11	23
326	55	56	21	2.2	K202_0092 LM403U	110	270	9.190	2279/248	3500	3100	4500	5.2	10/5/1.5	11	25
326	83	88	32	1.5	K202_0092 LM503U	180	270	9.190	2279/248	3500	3100	4500	11	10/5/1.5	11	28
326	120	136	47	1.0	K202_0092 LM505U	210	270	9.190	2279/248	3500	3100	4500	18	10/5/1.5	11	32
357	19	20	8.0	2.6	K202_0084 LM401U	37	61	8.397	2494/297	3500	3100	4500	2.4	10/5/1.5	11	22
357	37	38	16	3.2	K202_0084 LM402U	79	240	8.397	2494/297	3500	3100	4500	3.8	10/5/1.5	11	23
357	50	51	21	2.4	K202_0084 LM403U	100	240	8.397	2494/297	3500	3100	4500	5.1	10/5/1.5	11	25
357	76	81	33	1.6	K202_0084 LM503U	170	240	8.397	2494/297	3500	3100	4500	11	10/5/1.5	11	28
357	110	125	47	1.1	K202_0084 LM505U	200	240	8.397	2494/297	3500	3100	4500	18	10/5/1.5	11	32

$n_{2N}$	$M_{2N}$	$M_{2,0}$	$a_{th}$	S	Type	$M_{2acc}$	$M_{2NOT}$	i	$i_{exakt}$	$n_{1maxDB}$ EL1,2	$n_{1maxDB}$ EL3,4,5,6	$n_{1maxZB}$	$J_1$	$\Delta\varphi_2$	$C_2$	m
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]			[rpm]	[rpm]	[rpm]	[10 <sup>-4</sup> kgm <sup>2</sup> ]	[arcmin]	[Nm/ arcmin]	[kg]
<b>K2 (<math>n_{1N} = 3000</math> rpm, <math>M_{2acc,max} = 220</math> Nm)</b>																
421	135	150	69	0.83	K202_0071 LM704U	210	400	7.118	2107/296	3000	2600	4000	38	10/5/1.5	11	38
449	29	30	16	3.8	K202_0067 LM402U	63	190	6.683	2279/341	3500	3100	4500	4.1	10/5/1.5	11	23
449	40	41	22	2.8	K202_0067 LM403U	83	190	6.683	2279/341	3500	3100	4500	5.4	10/5/1.5	11	25
449	60	64	33	1.8	K202_0067 LM503U	130	190	6.683	2279/341	3500	3100	4500	11	10/5/1.5	11	28
449	88	99	48	1.3	K202_0067 LM505U	160	190	6.683	2279/341	3500	3100	4500	18	10/5/1.5	11	32
449	127	141	70	0.86	K202_0067 LM704U	210	400	6.683	2279/341	3500	3100	4500	38	10/5/1.5	11	38
500	26	27	16	4.0	K202_0060 LM402U	56	170	6.000	6/1	3000	2600	4000	4.7	10/5/1.5	11	23
500	36	37	22	3.0	K202_0060 LM403U	75	170	6.000	6/1	3000	2600	4000	6.0	10/5/1.5	11	25
500	54	58	34	1.9	K202_0060 LM503U	120	170	6.000	6/1	3000	2600	4000	12	10/5/1.5	11	28
500	79	89	48	1.3	K202_0060 LM505U	140	170	6.000	6/1	3000	2600	4000	18	10/5/1.5	11	32
500	114	126	70	0.93	K202_0060 LM704U	200	400	6.000	6/1	3000	2600	4000	38	10/5/1.5	11	38
579	98	109	71	1.0	K202_0052 LM704U	190	380	5.177	2107/407	3000	2600	4000	38	10/5/1.5	11	38
687	19	20	17	5.0	K202_0044 LM402U	41	130	4.364	48/11	3000	2600	4000	5.1	10/5/1.5	11	23
687	26	27	23	3.7	K202_0044 LM403U	54	130	4.364	48/11	3000	2600	4000	6.4	10/5/1.5	11	25
687	39	42	34	2.4	K202_0044 LM503U	86	130	4.364	48/11	3000	2600	4000	12	10/5/1.5	11	28
687	57	65	50	1.7	K202_0044 LM505U	100	130	4.364	48/11	3000	2600	4000	19	10/5/1.5	11	32
687	83	92	72	1.1	K202_0044 LM704U	170	320	4.364	48/11	3000	2600	4000	39	10/5/1.5	11	38
687	109	127	95	0.87	K202_0044 LM706U	180	320	4.364	48/11	3000	2600	4000	56	10/5/1.5	11	45
750	76	84	73	1.2	K202_0040 LM704U	160	290	4.000	4/1	3000	2600	4000	39	10/5/1.5	11	38
750	100	116	96	0.92	K202_0040 LM706U	170	290	4.000	4/1	3000	2600	4000	56	10/5/1.5	11	45
<b>K3 (<math>n_{1N} = 3000</math> rpm, <math>M_{2acc,max} = 390</math> Nm)</b>																
22	299	323	5.9	1.2	K303_1360 LM401U	380	690	136.0	14147/104	3800	3500	5000	1.7	10/5/2.5	16	32
27	240	259	5.6	1.5	K303_1090 LM401U	380	690	109.2	167743/1536	3800	3500	5000	1.7	10/5/2.5	16	32
33	201	216	5.3	1.7	K303_0910 LM401U	380	590	91.23	26273/288	3800	3500	5000	1.7	10/5/2.5	16	32
38	175	188	6.3	1.6	K303_0790 LM401U	340	510	79.42	167743/2112	3800	3500	5000	1.7	10/5/2.5	16	32
38	342	352	12	0.84	K303_0790 LM402U	380	510	79.42	167743/2112	3800	3500	5000	3.1	10/5/2.5	16	33
43	155	167	8.4	1.4	K302_0690 LM401U	250	310	69.43	6665/96	3800	3500	5000	1.7	10/4/1.5	16	27
44	149	161	5.1	2.3	K303_0680 LM401U	290	430	67.73	74777/1104	3800	3500	5000	1.8	10/5/2.5	16	32
44	291	300	9.9	1.2	K303_0680 LM402U	350	430	67.73	74777/1104	3800	3500	5000	3.1	10/5/2.5	16	33
45	146	157	6.4	1.8	K303_0660 LM401U	290	430	66.35	26273/396	3800	3500	5000	1.8	10/5/2.5	16	32
45	285	294	13	0.94	K303_0660 LM402U	340	430	66.35	26273/396	3800	3500	5000	3.1	10/5/2.5	16	33
54	243	251	12	1.1	K302_0560 LM402U	320	530	55.71	2451/44	3800	3500	5000	3.1	10/4/1.5	16	28
55	120	129	5.2	2.3	K303_0550 LM401U	240	350	54.58	70735/1296	3800	3500	5000	1.8	10/5/2.5	16	32
55	235	242	10	1.2	K303_0550 LM402U	280	350	54.58	70735/1296	3800	3500	5000	3.1	10/5/2.5	16	33
59	113	121	11	1.4	K302_0500 LM401U	180	220	50.49	6665/132	3800	3500	5000	1.8	10/4/1.5	16	27
61	108	117	6.4	2.3	K303_0490 LM401U	210	320	49.26	74777/1518	3800	3500	5000	1.8	10/5/2.5	16	32
61	212	219	13	1.2	K303_0490 LM402U	250	320	49.26	74777/1518	3800	3500	5000	3.1	10/5/2.5	16	33
65	202	208	9.1	1.7	K302_0460 LM402U	390	690	46.23	1849/40	3800	3500	5000	3.2	10/4/1.5	16	28
65	274	282	12	1.3	K302_0460 LM403U	390	690	46.23	1849/40	3800	3500	5000	4.5	10/4/1.5	16	30
74	177	182	16	1.1	K302_0410 LM402U	230	390	40.51	4902/121	3800	3500	5000	3.1	10/4/1.5	16	28
77	350	371	18	0.99	K303_0390 LM503U	380	690	39.19	34916/891	3800	3500	5000	11	10/5/2.5	16	38
84	320	339	18	1.1	K303_0360 LM503U	380	630	35.83	215/6	3800	3500	5000	11	10/5/2.5	16	38
86	152	156	8.8	2.2	K302_0350 LM402U	330	700	34.73	903/26	3800	3500	5000	3.3	10/4/1.5	16	28
86	206	212	12	1.6	K302_0350 LM403U	390	700	34.73	903/26	3800	3500	5000	4.6	10/4/1.5	16	30
86	314	333	18	1.1	K302_0350 LM503U	390	700	34.73	903/26	3800	3500	5000	11	10/4/1.5	16	33
89	147	151	12	1.7	K302_0340 LM402U	300	500	33.62	1849/55	3800	3500	5000	3.2	10/4/1.5	16	28
89	200	205	16	1.3	K302_0340 LM403U	300	500	33.62	1849/55	3800	3500	5000	4.5	10/4/1.5	16	30
92	291	309	18	1.1	K303_0330 LM503U	380	580	32.65	44892/1375	3800	3500	5000	11	10/5/2.5	16	38
108	122	125	8.9	2.5	K302_0280 LM402U	260	700	27.88	3569/128	3800	3500	5000	3.4	10/4/1.5	16	28
108	166	170	12	1.9	K302_0280 LM403U	350	700	27.88	3569/128	3800	3500	5000	4.7	10/4/1.5	16	30
108	252	267	19	1.2	K302_0280 LM503U	390	700	27.88	3569/128	3800	3500	5000	11	10/4/1.5	16	33
119	110	114	9.0	2.0	K302_0250 LM402U	240	600	25.26	3612/143	3800	3500	5000	3.3	10/4/1.5	16	28
119	150	154	12	2.7	K302_0250 LM403U	310	600	25.26	3612/143	3800	3500	5000	4.6	10/4/1.5	16	30
119	229	242	19	1.3	K302_0250 LM503U	390	600	25.26	3612/143	3800	3500	5000	11	10/4/1.5	16	33
119	331	375	27	0.90	K302_0250 LM505U	390	600	25.26	3612/143	3800	3500	5000	17	10/4/1.5	16	37
129	102	105	9.1	2.9	K302_0230 LM402U	220	640	23.29	559/24	3800	3500	5000	3.5	10/4/1.5	16	28
129	138	142	12	2.1	K302_0230 LM403U	290	640	23.29	559/24	3800	3500	5000	4.8	10/4/1.5	16	30
129	211	223	19	1.4	K302_0230 LM503U	390	640	23.29	559/24	3800	3500	5000	11	10/4/1.5	16	33
129	305	346	27	0.95	K302_0230 LM505U	390	640	23.29	559/24	3800	3500	5000	17	10/4/1.5	16	37
148	89	91	9.2	3.1	K302_0200 LM402U	190	510	20.28	3569/176	3800	3500	5000	3.4	10/4/1.5	16	28
148	120	124	12	2.3	K302_0200 LM403U	250	510	20.28	3569/176	3800	3500	5000	4.7	10/4/1.5	16	30
148	184	195	19	1.5	K302_0200 LM503U	390	510	20.28	3569/176	3800	3500	5000	11	10/4/1.5	16	33
148	266	301	28	1.0	K302_0200 LM505U	390	510	20.28	3569/176	3800	3500	5000	17	10/4/1.5	16	37
173	75	78	9.3	3.5	K302_0175 LM402U	160	500	17.29	1591/92	3500	3100	5000	3.8	10/4/1.5	16	28







$n_{2N}$	$M_{2N}$	$M_{2,0}$	$a_{th}$	S	Type	$M_{2acc}$	$M_{2NOT}$	i	$i_{exakt}$	$n_{1maxDB}$ EL1,2	$n_{1maxDB}$ EL3,4,5,6	$n_{1maxZB}$	$J_1$	$\Delta\varphi_2$	$C_2$	m
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]			[rpm]	[rpm]	[rpm]	[10 <sup>-4</sup> kgm <sup>2</sup> ]	[arcmin]	[Nm/ arcmin]	[kg]
<b>K7 (<math>n_{1N} = 3000</math> rpm, <math>M_{2acc,max} = 2600</math> Nm)</b>																
60	1230	1426	17	1.6	K713_0500 LM706U	1940	2420	49.88	166005/3328	2900	2600	3800	58	10/5/2	126	119
67	844	935	13	2.1	K713_0450 LM704U	1750	2190	45.05	37485/832	2900	2600	3800	40	10/5/2	126	112
67	1111	1288	17	1.6	K713_0450 LM706U	1750	2190	45.05	37485/832	2900	2600	3800	58	10/5/2	126	119
76	735	814	13	2.4	K713_0390 LM704U	1540	2250	39.23	2511/64	2900	2600	3800	42	10/5/2	126	112
76	968	1121	17	1.9	K713_0390 LM706U	1800	2250	39.23	2511/64	2900	2600	3800	60	10/5/2	126	119
85	664	735	13	2.4	K713_0350 LM704U	1390	2030	35.44	567/16	2900	2600	3800	42	10/5/2	126	112
85	874	1013	17	1.9	K713_0350 LM706U	1630	2030	35.44	567/16	2900	2600	3800	60	10/5/2	126	119
<b>K8 (<math>n_{1N} = 3000</math> rpm, <math>M_{2acc,max} = 4650</math> Nm)</b>																
16	3539	3918	13	1.0	K814_1920 LM704U	4650	6040	191.9	85963/448	2800	2500	3600	38	10/6/3	196	179
17	3197	3539	14	1.0	K814_1730 LM704U	4370	5460	173.3	2773/16	2800	2500	3600	38	10/6/3	196	179
19	2890	3200	13	1.2	K814_1570 LM704U	4300	5380	156.7	601741/3840	2800	2500	3600	38	10/6/3	196	179
21	2610	2890	14	1.2	K814_1420 LM704U	3890	4860	141.5	135877/960	2800	2500	3600	38	10/6/3	196	179
24	2340	2590	13	1.4	K814_1270 LM704U	3930	4910	126.9	1461371/11520	2800	2500	3600	38	10/6/3	196	179
24	3080	3569	17	1.1	K814_1270 LM706U	3930	4910	126.9	1461371/11520	2800	2500	3600	55	10/6/3	196	186
26	2113	2340	14	1.4	K814_1150 LM704U	3550	4440	114.6	329987/2880	2800	2500	3600	38	10/6/3	196	179
26	2782	3224	18	1.1	K814_1150 LM706U	3550	4440	114.6	329987/2880	2800	2500	3600	55	10/6/3	196	186
31	1821	2016	12	1.6	K813_0970 LM704U	2920	3650	97.17	31093/320	2800	2500	3600	39	10/5/2	196	166
31	2397	2777	16	1.2	K813_0970 LM706U	2920	3650	97.17	31093/320	2800	2500	3600	56	10/5/2	196	173
34	1644	1821	13	1.6	K813_0880 LM704U	2640	3300	87.76	7021/80	2800	2500	3600	39	10/5/2	196	166
34	2165	2509	18	1.2	K813_0880 LM706U	2640	3300	87.76	7021/80	2800	2500	3600	57	10/5/2	196	173
38	1487	1647	9.1	1.8	K813_0790 LM704U	2630	3290	79.38	45725/576	2800	2500	3600	40	10/5/2	196	166
38	1958	2269	12	1.3	K813_0790 LM706U	2630	3290	79.38	45725/576	2800	2500	3600	58	10/5/2	196	173
42	1344	1487	9.7	1.8	K813_0720 LM704U	2380	2970	71.70	10325/144	2800	2500	3600	40	10/5/2	196	166
42	1768	2050	13	1.3	K813_0720 LM706U	2380	2970	71.70	10325/144	2800	2500	3600	58	10/5/2	196	173
61	918	1016	8.1	2.3	K813_0490 LM704U	1930	2690	48.99	5487/112	2800	2500	3600	45	10/5/2	196	166
61	1208	1400	11	1.8	K813_0490 LM706U	2160	2690	48.99	5487/112	2800	2500	3600	63	10/5/2	196	173
68	829	918	8.1	2.3	K813_0440 LM704U	1740	2430	44.25	177/4	2800	2500	3600	46	10/5/2	196	166
68	1091	1265	11	1.8	K813_0440 LM706U	1950	2430	44.25	177/4	2800	2500	3600	63	10/5/2	196	173
<b>K9 (<math>n_{1N} = 3000</math> rpm, <math>M_{2acc,max} = 6820</math> Nm)</b>																
10	5418	5999	13	0.84	K914_2940 LM704U	6820	8530	293.8	977647/3328	2600	2500	3400	38	10/5	379	293
12	4556	5044	12	0.95	K914_2470 LM704U	5730	7170	247.0	3288449/13312	2600	2500	3400	38	10/5	379	293
16	3535	3914	12	1.2	K914_1920 LM704U	5070	6340	191.7	4710481/24576	2600	2500	3400	38	10/5	379	293
20	2748	3042	12	1.4	K914_1490 LM704U	4600	5750	149.0	9154331/61440	2600	2500	3400	39	10/5	379	293
20	3617	4192	16	1.1	K914_1490 LM706U	4600	5750	149.0	9154331/61440	2600	2500	3400	56	10/5	379	300
24	2320	2569	12	1.6	K914_1260 LM704U	3900	4870	125.8	2221925/17664	2600	2500	3400	40	10/5	379	293
24	3054	3539	15	1.2	K914_1260 LM706U	3900	4870	125.8	2221925/17664	2600	2500	3400	57	10/5	379	300
32	1730	1915	14	1.7	K914_0940 LM704U	2910	3630	93.78	4177219/44544	2600	2500	3400	41	10/5	379	293
32	2277	2639	19	1.3	K914_0940 LM706U	2910	3630	93.78	4177219/44544	2600	2500	3400	58	10/5	379	300





## 12.3 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
Shaft $\varnothing$ fit $\leq$ 50 mm	DIN 748-1, ISO k6
Shaft $\varnothing$ fit $>$ 50 mm	DIN 748-1, ISO m6
Feather keys	DIN 6885-1, high form A

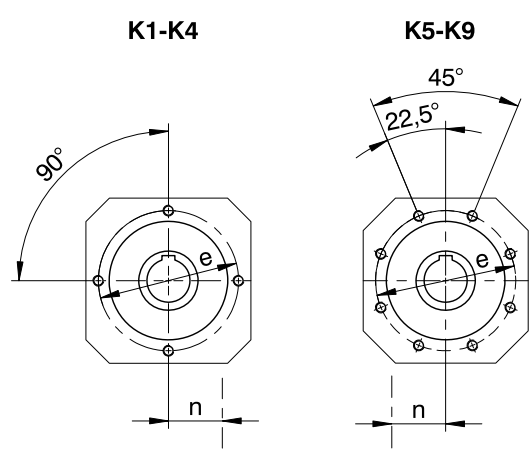
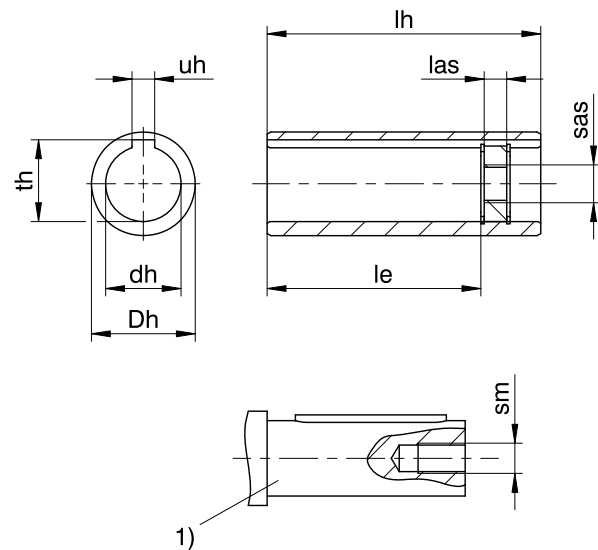
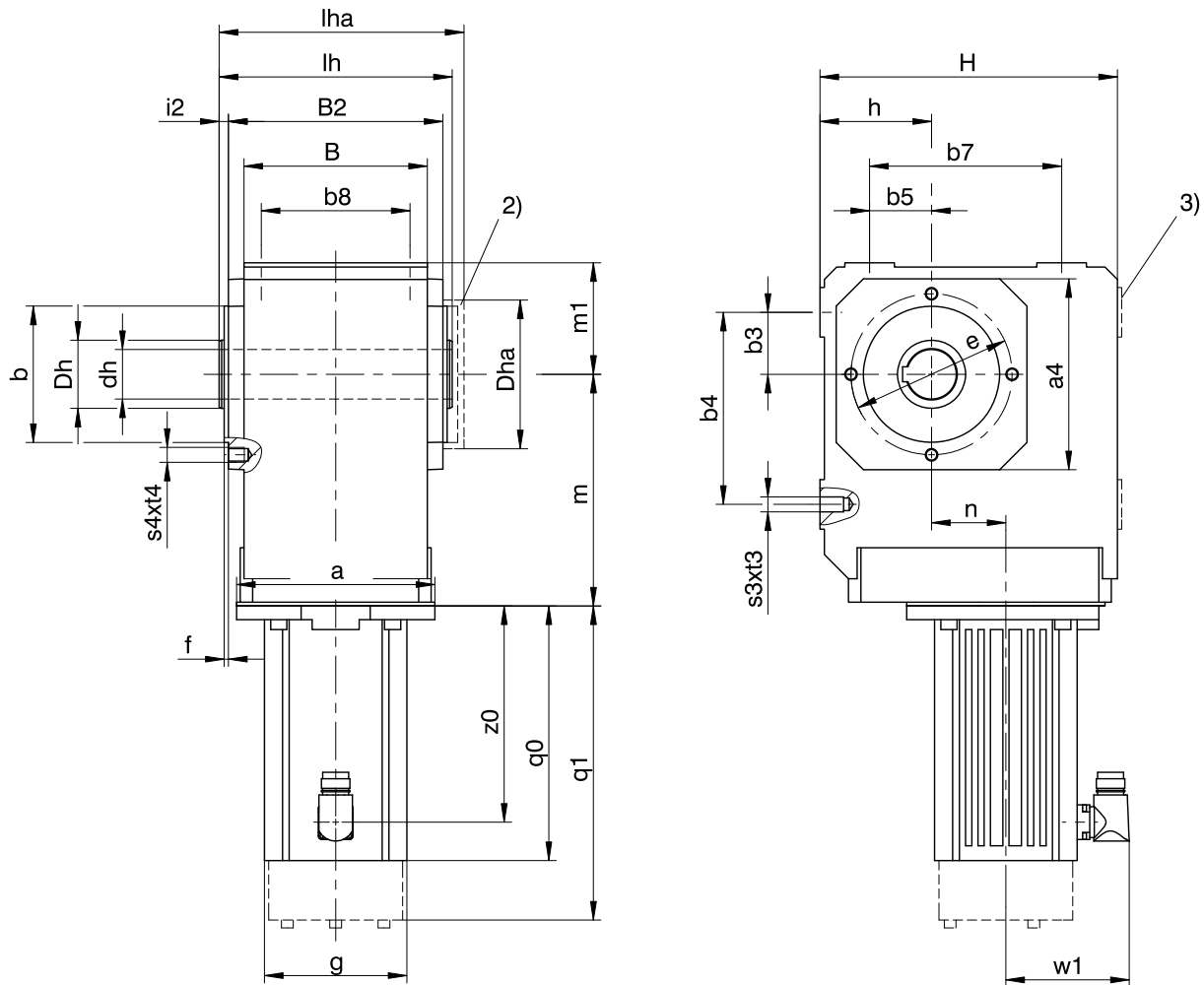
Hollow shaft	Tolerance
Hollow shaft hole fit	ISO H7
Feather keys	DIN 6885-1, high form S1/K1 $\varnothing$ 30: DIN 6885-3, low form

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 shape

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

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



- $q_0$  Applies to motors without brake.
- $x$  Applies to encoders using an optical measuring method.
- 2) Cover (optional)
- $q_1$  Applies to motors with brake.
- 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  $2 \times \varnothing dh$ .
- 3) Only for K1 (other sizes on request)

Dimensions of gear units

Type	□a4	∅b	b3	b4	b5	b7	b8	B	B2	∅dh	∅Dh	Dha	∅e	f	h	H	i2	le	lh	las	lha	m1	s3	s4	sm	sas	t3	t4	th	uh
K1	105	75 <sub>js</sub>	30	90	30	90	70	90	106	20 <sup>H7</sup>	40	□105	90	3.0	60	160	7.0	98.0	120	12	127.0	60	M8	M8	M6	M8	13	13	22.8	6 <sup>JS9</sup>
K1	105	75 <sub>js</sub>	30	90	30	90	70	90	106	25 <sup>H7</sup>	40	□105	90	3.0	60	160	7.0	98.0	120	12	127.0	60	M8	M8	M10	M12	13	13	28.3	8 <sup>JS9</sup>
K1	105	75 <sub>js</sub>	30	90	30	90	70	90	106	30 <sup>H7</sup>	40	□105	90	3.0	60	160	7.0	93.5	120	12	127.0	60	M8	M8	M10	M12	13	13	32.0	8 <sup>JS9</sup>
K2	116	82 <sub>js</sub>	35	115	35	115	90	115	134	30 <sup>H7</sup>	45	□116	100	3.0	65	190	7.0	121.5	148	12	156.0	65	M10	M8	M10	M12	16	13	33.3	8 <sup>JS9</sup>
K3	132	95 <sub>js</sub>	40	130	40	130	105	130	146	35 <sup>H7</sup>	50	□132	115	3.0	75	213	7.0	125.0	160	12	168.0	75	M10	M8	M12	M16	16	13	38.3	10 <sup>JS9</sup>
K4	152	110 <sub>js</sub>	50	155	50	155	120	148	173	40 <sup>H7</sup>	55	□152	130	3.5	90	240	7.5	157.0	188	12	197.5	90	M12	M10	M16	M20	19	16	43.3	12 <sup>JS9</sup>
K5	145	110 <sub>js</sub>	40	140	100	140	125	160	185	50 <sup>H7</sup>	65	□145	130	3.5	160	260	7.5	164.0	200	12	209.5	100	M16	M10	M16	M20	26	16	53.8	14 <sup>JS9</sup>
K6	180	140 <sub>js</sub>	50	160	110	160	130	168	200	50 <sup>H7</sup>	70	∅183	165	3.5	190	310	7.5	179.0	215	12	224.5	120	M16	M10	M16	M20	26	16	53.8	14 <sup>JS9</sup>
K7	195	155 <sub>js</sub>	55	180	125	180	145	190	226	60 <sup>H7</sup>	85	∅205	185	3.5	212	342	8.0	214.0	242	12	252.0	125	M20	M12	M20	M24	33	19	64.4	18 <sup>JS9</sup>
K8	226	185 <sub>js</sub>	75	240	165	240	185	235	282	70 <sup>H7</sup>	100	∅184	215	4.0	265	410	9.0	263.0	300	20	311.0	145	M24	M12	M20	M24	38	19	74.9	20 <sup>JS9</sup>
K9	280	230 <sub>js</sub>	95	280	185	280	225	285	330	90 <sup>H7</sup>	120	∅230	265	5.0	315	495	10.0	302.0	350	26	361.0	180	M30	M16	M24	M30	48	26	95.4	25 <sup>JS9</sup>

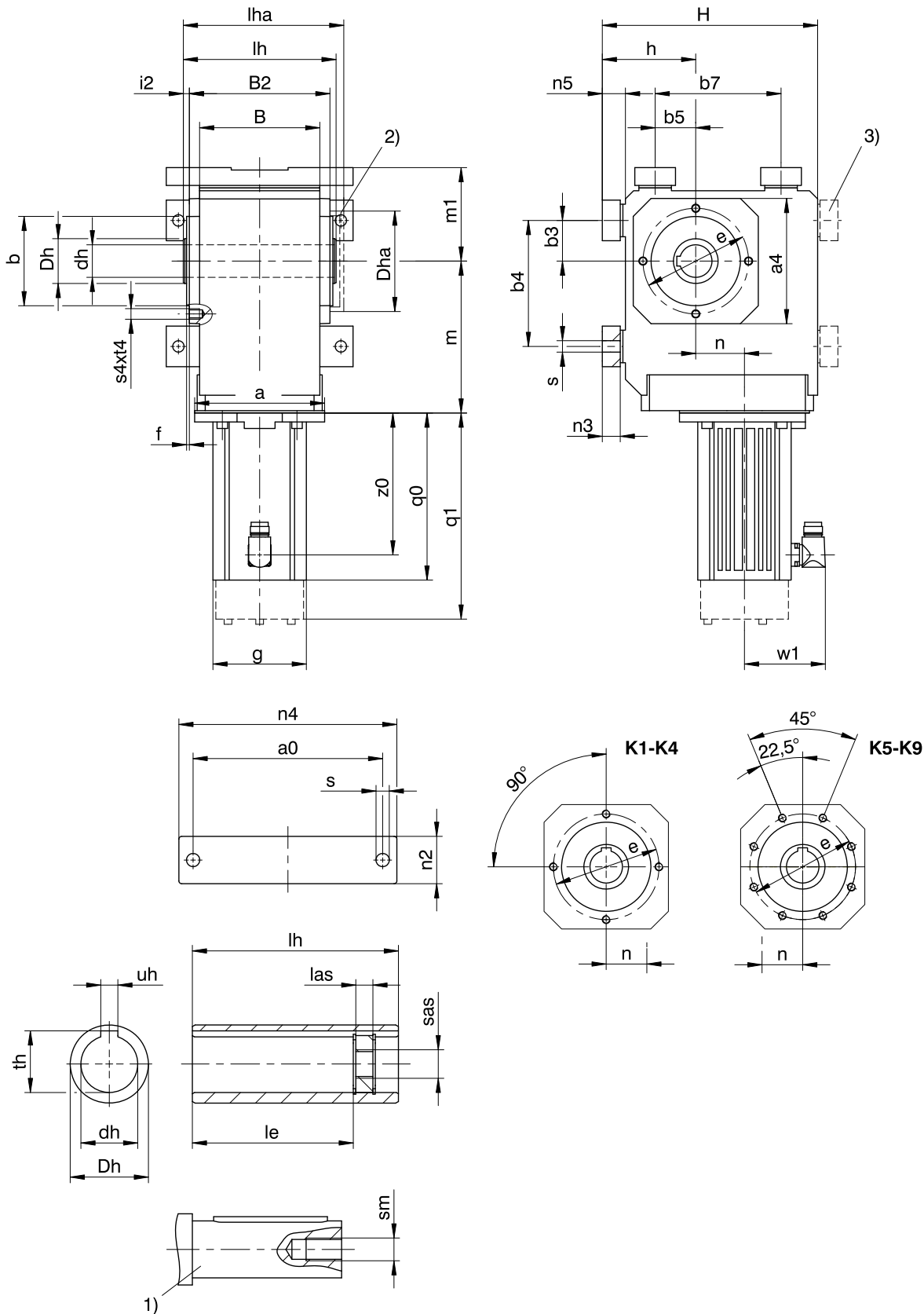
Dimensions of motors

Type	□g	q0	q1	w1	z0
LM401U	98	129.0	172.5	91	97
LM402U	98	168.0	211.5	91	136
LM403U	98	199.0	242.5	91	167
LM503U	115	205.5	253.5	100	175
LM505U	115	275.5	323.5	100	245
LM704U	145	259.5	318.5	115	227
LM706U	145	329.5	388.5	115	297

Dimensions of geared motors

Type	LM4			LM5			LM7		
	a	m	n	a	m	n	a	m	n
K102	□98	124	36.0	□115	128	36.0	-	-	-
K202	□98	143	46.0	□115	147	46.0	□145	149	46.0
K203	∅140	180	46.0	-	-	-	-	-	-
K302	∅140	163	52.5	□115	167	52.5	□145	169	52.5
K303	∅140	200	52.5	∅160	210	16.0	-	-	-
K402	-	-	-	∅160	187	60.0	□145	189	60.0
K403	∅140	220	60.0	∅160	230	23.0	-	-	-
K513	-	-	-	∅160	172	15.0	□145	174	15.0
K514	-	-	-	∅160	215	15.0	-	-	-
K613	-	-	-	∅160	191	18.0	∅200	193	18.0
K614	-	-	-	∅160	234	18.0	-	-	-
K713	-	-	-	-	-	-	∅200	221	20.0
K714	-	-	-	∅160	263	20.0	∅200	283	20.0
K813	-	-	-	-	-	-	∅200	247	24.0
K814	-	-	-	-	-	-	∅200	308	24.0
K914	-	-	-	-	-	-	∅200	353	25.0

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



$q_0$  Applies to motors without brake.

$x$  Applies to encoders using an optical measuring method.

$2)$  Cover (optional)

$q_1$  Applies to motors with brake.

$1)$  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  $2 \times \varnothing dh$ .

$3)$  Only for K1 (other sizes on request)

Dimensions of gear units

Type	a0	a4	Øb	b3	b4	b5	b7	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
K1	115	105	75 <sub>f6</sub>	30	90	30	90	90	106	20 <sup>H7</sup>	40	□105	90	3.0	75	175	7.0	98.0	120	12	127.0	75	30	13	140	15	9.0	M8	M6	M8	13	22.8	6 <sup>JS9</sup>
K1	115	105	75 <sub>f6</sub>	30	90	30	90	90	106	25 <sup>H7</sup>	40	□105	90	3.0	75	175	7.0	98.0	120	12	127.0	75	30	13	140	15	9.0	M8	M10	M12	13	28.3	8 <sup>JS9</sup>
K1	115	105	75 <sub>f6</sub>	30	90	30	90	90	106	30 <sup>H7</sup>	40	□105	90	3.0	75	175	7.0	93.5	120	12	127.0	75	30	13	140	15	9.0	M8	M10	M12	13	32.0	8 <sup>JS9</sup>
K2	155	116	82 <sub>f6</sub>	35	115	35	115	115	134	30 <sup>H7</sup>	45	□116	100	3.0	88	213	7.0	121.5	148	12	156.0	88	40	20	185	23	11.0	M8	M10	M12	13	33.3	8 <sup>JS9</sup>
K3	170	132	95 <sub>f6</sub>	40	130	40	130	130	146	35 <sup>H7</sup>	50	□132	115	3.0	98	236	7.0	125.0	160	12	168.0	98	45	20	200	23	11.0	M8	M12	M16	13	38.3	10 <sup>JS9</sup>
K4	200	152	110 <sub>f6</sub>	50	155	50	155	148	173	40 <sup>H7</sup>	55	□152	130	3.5	115	265	7.5	157.0	188	12	197.5	115	50	22	230	25	14.0	M10	M16	M20	16	43.3	12 <sup>JS9</sup>
K5	200	145	110 <sub>f6</sub>	40	140	100	140	160	185	50 <sup>H7</sup>	65	□145	130	3.5	190	290	7.5	164.0	200	12	209.5	130	60	27	240	30	18.0	M10	M16	M20	16	53.8	14 <sup>JS9</sup>
K6	210	180	140 <sub>f6</sub>	50	160	110	160	168	200	50 <sup>H7</sup>	70	Ø183	165	3.5	220	340	7.5	179.0	215	12	224.5	150	65	27	250	30	18.5	M10	M16	M20	16	53.8	14 <sup>JS9</sup>
K7	241	195	155 <sub>f6</sub>	55	180	125	180	190	226	60 <sup>H7</sup>	85	Ø205	185	3.5	250	380	8.0	214.0	242	12	252.0	163	70	35	290	38	23.0	M12	M20	M24	19	64.4	18 <sup>JS9</sup>
K8	300	226	185 <sub>f6</sub>	75	240	165	240	235	282	70 <sup>H7</sup>	100	Ø184	215	4.0	310	455	9.0	263.0	300	20	311.0	190	85	41	360	45	27.0	M12	M20	M24	19	74.9	20 <sup>JS9</sup>
K9	360	280	230 <sub>f6</sub>	95	280	185	280	285	330	90 <sup>H7</sup>	120	Ø230	265	5.0	365	545	10.0	302.0	350	26	361.0	230	95	46	430	50	31.0	M16	M24	M30	26	95.4	25 <sup>JS9</sup>

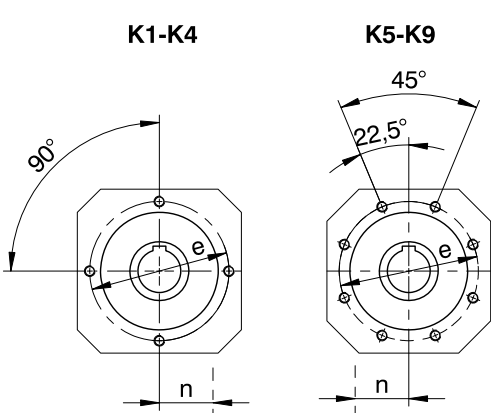
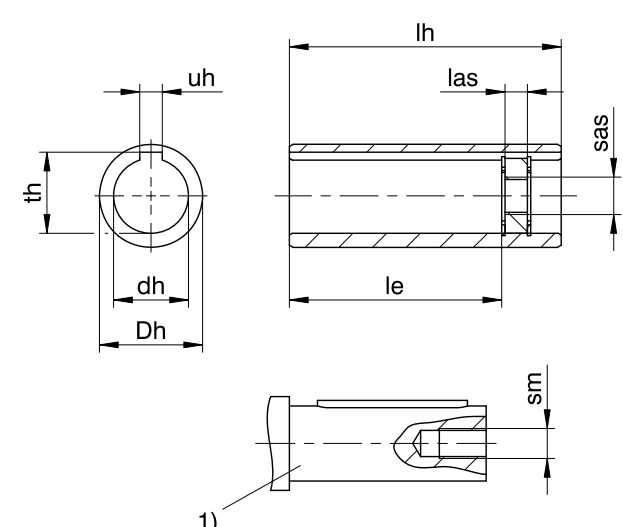
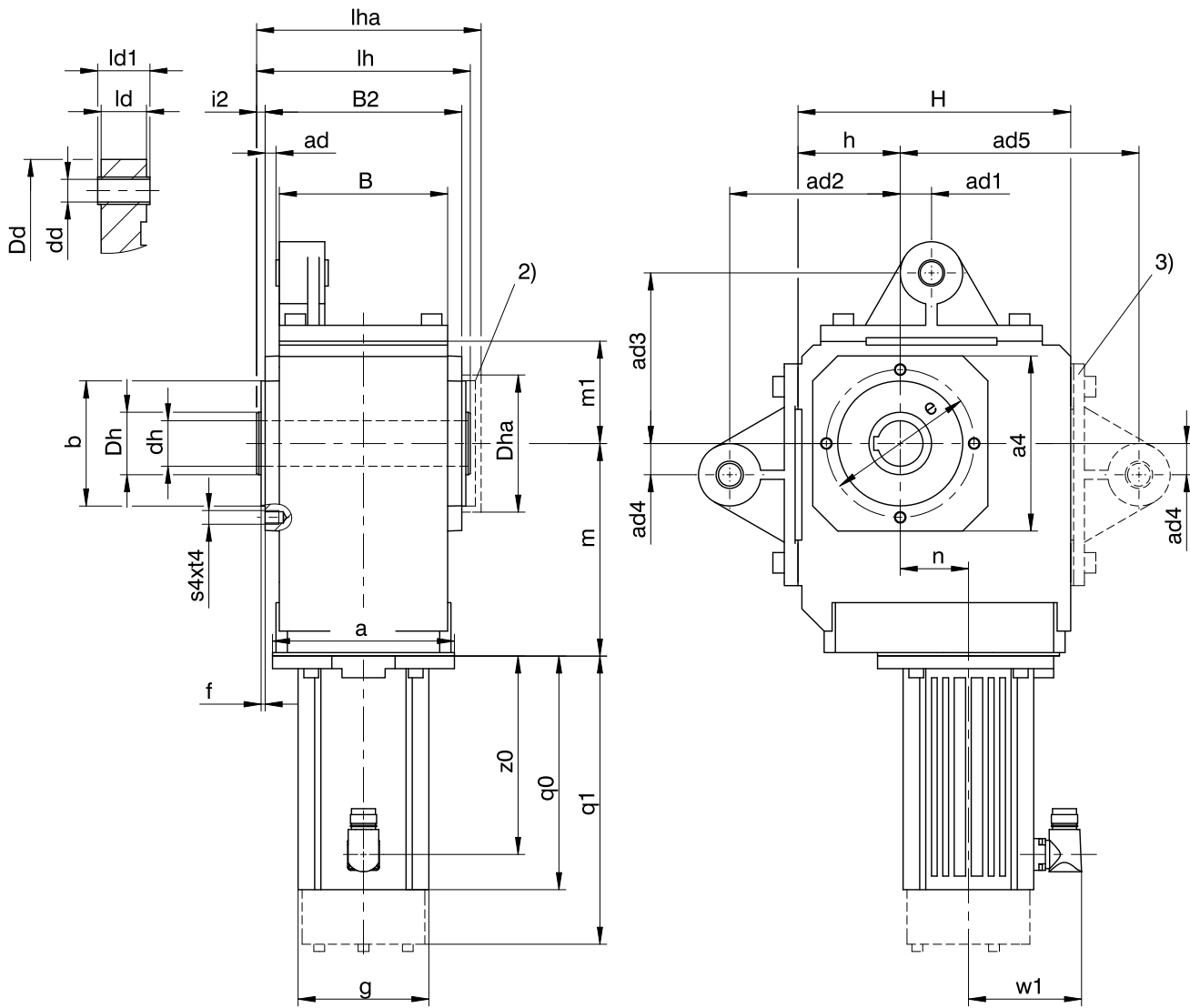
Dimensions of motors

Type	□g	q0	q1	w1	z0
LM401U	98	129.0	172.5	91	97
LM402U	98	168.0	211.5	91	136
LM403U	98	199.0	242.5	91	167
LM503U	115	205.5	253.5	100	175
LM505U	115	275.5	323.5	100	245
LM704U	145	259.5	318.5	115	227
LM706U	145	329.5	388.5	115	297

Dimensions of geared motors

Type	LM4			LM5			LM7		
	a	m	n	a	m	n	a	m	n
K102	□98	124	36.0	□115	128	36.0	-	-	-
K202	□98	143	46.0	□115	147	46.0	□145	149	46.0
K203	Ø140	180	46.0	-	-	-	-	-	-
K302	Ø140	163	52.5	□115	167	52.5	□145	169	52.5
K303	Ø140	200	52.5	Ø160	210	16.0	-	-	-
K402	-	-	-	Ø160	187	60.0	□145	189	60.0
K403	Ø140	220	60.0	Ø160	230	23.0	-	-	-
K513	-	-	-	Ø160	172	15.0	□145	174	15.0
K514	-	-	-	Ø160	215	15.0	-	-	-
K613	-	-	-	Ø160	191	18.0	Ø200	193	18.0
K614	-	-	-	Ø160	234	18.0	-	-	-
K713	-	-	-	-	-	-	Ø200	221	20.0
K714	-	-	-	Ø160	263	20.0	Ø200	283	20.0
K813	-	-	-	-	-	-	Ø200	247	24.0
K814	-	-	-	-	-	-	Ø200	308	24.0
K914	-	-	-	-	-	-	Ø200	353	25.0

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



- q0 Applies to motors without brake.
- x Applies to encoders using an optical measuring method.
- 2) Cover (optional)
- q1 Applies to motors with brake.
- 1) The length of the machine shaft must be at least 2.2 x  $\varnothing dh$  and the length of the feather key must be at least 2 x  $\varnothing dh$ .
- 3) Only for K1 (other sizes on request)

- If you brace the gear units without the factory-adjusted torque arms provided for this purpose, the dimensions for ad2 and ad3 must meet the specified value.

## Dimensions of gear units

Type	□a4	ad	ad1	ad2	ad3	ad4	ad5	Øb	B	B2	Ødd	Ødh	ØDd	ØDh	Dha	Øe	f
K1	105	6.0	15.0	90	90	15.0	130	75 <sub>6</sub>	90	106	12 <sup>H9</sup>	20 <sup>H7</sup>	43	40	□105	90	3.0
K1	105	6.0	15.0	90	90	15.0	130	75 <sub>6</sub>	90	106	12 <sup>H9</sup>	25 <sup>H7</sup>	43	40	□105	90	3.0
K1	105	6.0	15.0	90	90	15.0	130	75 <sub>6</sub>	90	106	12 <sup>H9</sup>	30 <sup>H7</sup>	43	40	□105	90	3.0
K2	116	6.5	22.5	100	100	22.5	-	82 <sub>6</sub>	115	134	16 <sup>H9</sup>	30 <sup>H7</sup>	45	45	□116	100	3.0
K3	132	5.0	25.0	120	120	25.0	-	95 <sub>6</sub>	130	146	16 <sup>H9</sup>	35 <sup>H7</sup>	45	50	□132	115	3.0
K4	152	9.5	27.5	150	150	27.5	-	110 <sub>6</sub>	148	173	20 <sup>H9</sup>	40 <sup>H7</sup>	55	55	□152	130	3.5
K5	145	9.5	30.0	250	190	30.0	-	110 <sub>6</sub>	160	185	20 <sup>H9</sup>	50 <sup>H7</sup>	58	65	□145	130	3.5
K6	180	13.0	30.0	250	180	30.0	-	140 <sub>6</sub>	168	200	20 <sup>H9</sup>	50 <sup>H7</sup>	58	70	Ø183	165	3.5
K7	195	15.0	35.0	300	213	35.0	-	155 <sub>6</sub>	190	226	20 <sup>H9</sup>	60 <sup>H7</sup>	68	85	Ø205	185	3.5
K8	226	17.0	45.0	350	230	45.0	-	185 <sub>6</sub>	235	282	24 <sup>H9</sup>	70 <sup>H7</sup>	72	100	Ø184	215	4.0
K9	280	16.0	45.0	450	315	45.0	-	230 <sub>6</sub>	285	330	24 <sup>H9</sup>	90 <sup>H7</sup>	75	120	Ø230	265	5.0

## Dimensions of gear units

Type	h	H	i2	ld	ld1	le	lh	las	lha	m1	s4	sm	sas	t4	th	uh
K1	60	160	7.0	24	28	98.0	120	12	127.0	60	M8	M6	M8	13	22.8	6 <sup>JS9</sup>
K1	60	160	7.0	24	28	98.0	120	12	127.0	60	M8	M10	M12	13	28.3	8 <sup>JS9</sup>
K1	60	160	7.0	24	28	93.5	120	12	127.0	60	M8	M10	M12	13	32.0	8 <sup>JS9</sup>
K2	65	190	7.0	32	38	121.5	148	12	156.0	65	M8	M10	M12	13	33.3	8 <sup>JS9</sup>
K3	75	213	7.0	32	38	125.0	160	12	168.0	75	M8	M12	M16	13	38.3	10 <sup>JS9</sup>
K4	90	240	7.5	40	46	157.0	188	12	197.5	90	M10	M16	M20	16	43.3	12 <sup>JS9</sup>
K5	160	260	7.5	40	46	164.0	200	12	209.5	100	M10	M16	M20	16	53.8	14 <sup>JS9</sup>
K6	190	310	7.5	40	46	179.0	215	12	224.5	120	M10	M16	M20	16	53.8	14 <sup>JS9</sup>
K7	212	342	8.0	64	70	214.0	242	12	252.0	125	M12	M20	M24	19	64.4	18 <sup>JS9</sup>
K8	265	410	9.0	102	115	263.0	300	20	311.0	145	M12	M20	M24	19	74.9	20 <sup>JS9</sup>
K9	315	495	10.0	102	115	302.0	350	26	361.0	180	M16	M24	M30	26	95.4	25 <sup>JS9</sup>

## Dimensions of motors

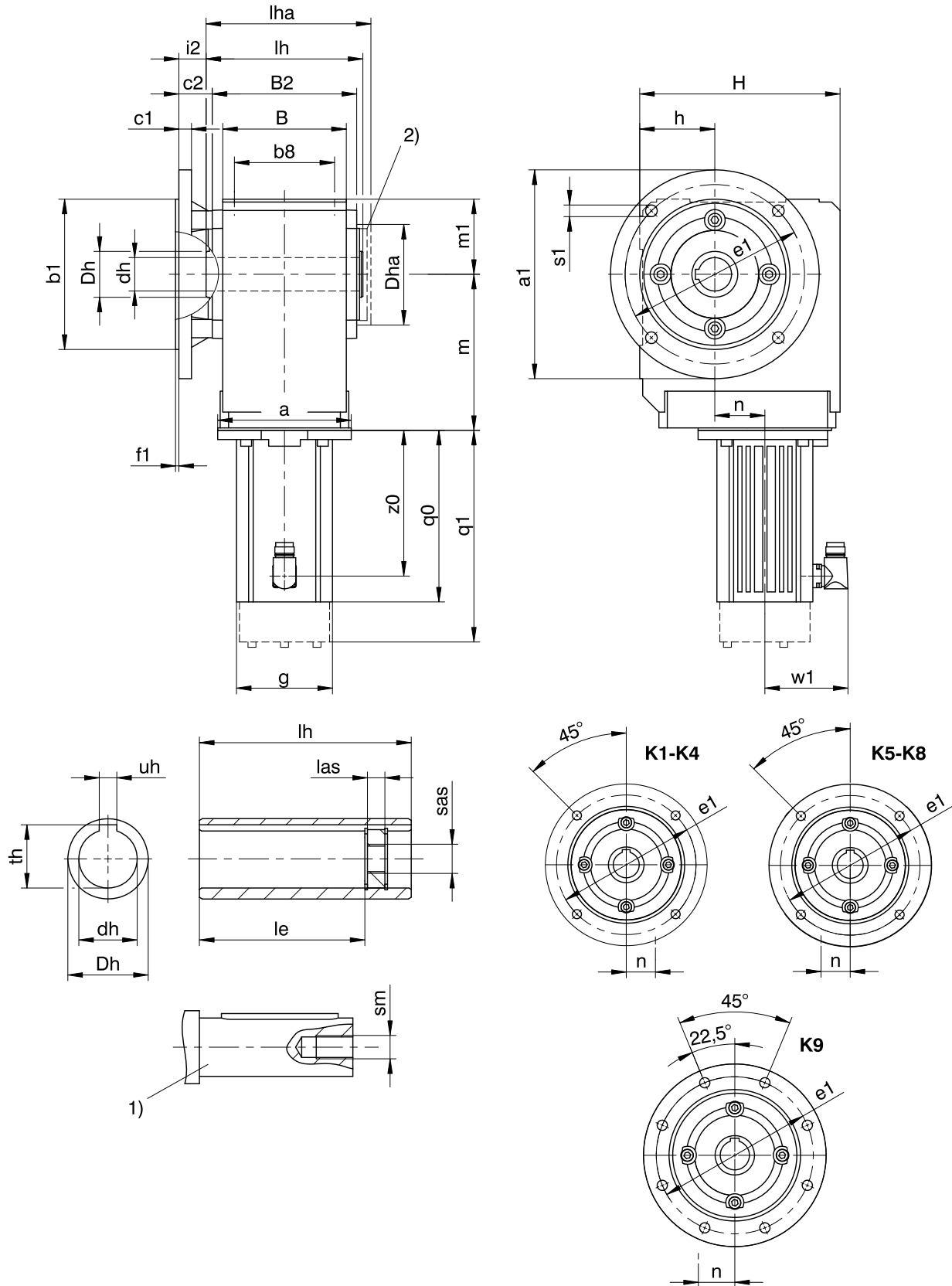
Type	□g	q0	q1	w1	z0
LM401U	98	129.0	172.5	91	97
LM402U	98	168.0	211.5	91	136
LM403U	98	199.0	242.5	91	167
LM503U	115	205.5	253.5	100	175
LM505U	115	275.5	323.5	100	245
LM704U	145	259.5	318.5	115	227
LM706U	145	329.5	388.5	115	297

## Dimensions of geared motors

Type	LM4			LM5			LM7		
	a	m	n	a	m	n	a	m	n
K102	□98	124	36.0	□115	128	36.0	-	-	-
K202	□98	143	46.0	□115	147	46.0	□145	149	46.0
K203	Ø140	180	46.0	-	-	-	-	-	-
K302	Ø140	163	52.5	□115	167	52.5	□145	169	52.5
K303	Ø140	200	52.5	Ø160	210	16.0	-	-	-
K402	-	-	-	Ø160	187	60.0	□145	189	60.0
K403	Ø140	220	60.0	Ø160	230	23.0	-	-	-
K513	-	-	-	Ø160	172	15.0	□145	174	15.0
K514	-	-	-	Ø160	215	15.0	-	-	-
K613	-	-	-	Ø160	191	18.0	Ø200	193	18.0
K614	-	-	-	Ø160	234	18.0	-	-	-
K713	-	-	-	-	-	-	Ø200	221	20.0
K714	-	-	-	Ø160	263	20.0	Ø200	283	20.0
K813	-	-	-	-	-	-	Ø200	247	24.0
K814	-	-	-	-	-	-	Ø200	308	24.0
K914	-	-	-	-	-	-	Ø200	353	25.0



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



q0 Applies to motors without brake.

x Applies to encoders using an optical measuring method.

2) Cover (optional)

q1 Applies to motors with brake.

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  $2 \times \varnothing d_h$ .

## 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
K1	160	110 <sub>js</sub>	70	90	106	10	32.0	20 <sup>H7</sup>	40	□105	130	3.5	60	160	25.0	98.0	120	12	127.0	60	9	M6	M8	22.8	6 <sup>JS9</sup>
K1	160	110 <sub>js</sub>	70	90	106	10	32.0	25 <sup>H7</sup>	40	□105	130	3.5	60	160	25.0	98.0	120	12	127.0	60	9	M10	M12	28.3	8 <sup>JS9</sup>
K1	160	110 <sub>js</sub>	70	90	106	10	32.0	30 <sup>H7</sup>	40	□105	130	3.5	60	160	25.0	93.5	120	12	127.0	60	9	M10	M12	32.0	8 <sup>JS9</sup>
K2	200	130 <sub>js</sub>	90	115	134	12	32.0	30 <sup>H7</sup>	45	□116	165	3.5	65	190	25.0	121.5	148	12	156.0	65	11	M10	M12	33.3	8 <sup>JS9</sup>
K3	200	130 <sub>js</sub>	105	130	146	14	38.0	35 <sup>H7</sup>	50	□132	165	3.5	75	213	31.0	125.0	160	12	168.0	75	11	M12	M16	38.3	10 <sup>JS9</sup>
K4	250	180 <sub>js</sub>	120	148	173	15	40.0	40 <sup>H7</sup>	55	□152	215	4.0	90	240	32.5	157.0	188	12	197.5	90	14	M16	M20	43.3	12 <sup>JS9</sup>
K5	250	180 <sub>js</sub>	125	160	185	15	39.5	50 <sup>H7</sup>	65	□145	215	4.0	160	260	32.0	164.0	200	12	209.5	100	14	M16	M20	53.8	14 <sup>JS9</sup>
K6	300	230 <sub>js</sub>	130	168	200	17	36.0	50 <sup>H7</sup>	70	Ø183	265	4.0	190	310	28.5	179.0	215	12	224.5	120	14	M16	M20	53.8	14 <sup>JS9</sup>
K7	350	250 <sub>h6</sub>	145	190	226	18	44.0	60 <sup>H7</sup>	85	Ø205	300	5.0	212	342	36.0	214.0	242	12	252.0	125	18	M20	M24	64.4	18 <sup>JS9</sup>
K8	400	300 <sub>h6</sub>	185	235	282	20	45.0	70 <sup>H7</sup>	100	Ø184	350	5.0	265	410	36.0	263.0	300	20	311.0	145	18	M20	M24	74.9	20 <sup>JS9</sup>
K9	450	350 <sub>h6</sub>	225	285	330	23	50.0	90 <sup>H7</sup>	120	Ø230	400	5.0	315	495	40.0	302.0	350	26	361.0	180	18	M24	M30	95.4	25 <sup>JS9</sup>

## Dimensions of additional round flanges

Type	Øa1	Øb1	c1	Øe1	f1	Øs1
K1	140	95 <sub>js</sub>	10	115	3.0	9
K2	160	110 <sub>js</sub>	12	130	3.5	9
K3	160	110 <sub>js</sub>	14	130	3.5	9
K3	250	180 <sub>js</sub>	14	215	4.0	14
K8	350	250 <sub>h6</sub>	18	300	5.0	18
K8	450	350 <sub>h6</sub>	20	400	5.0	18

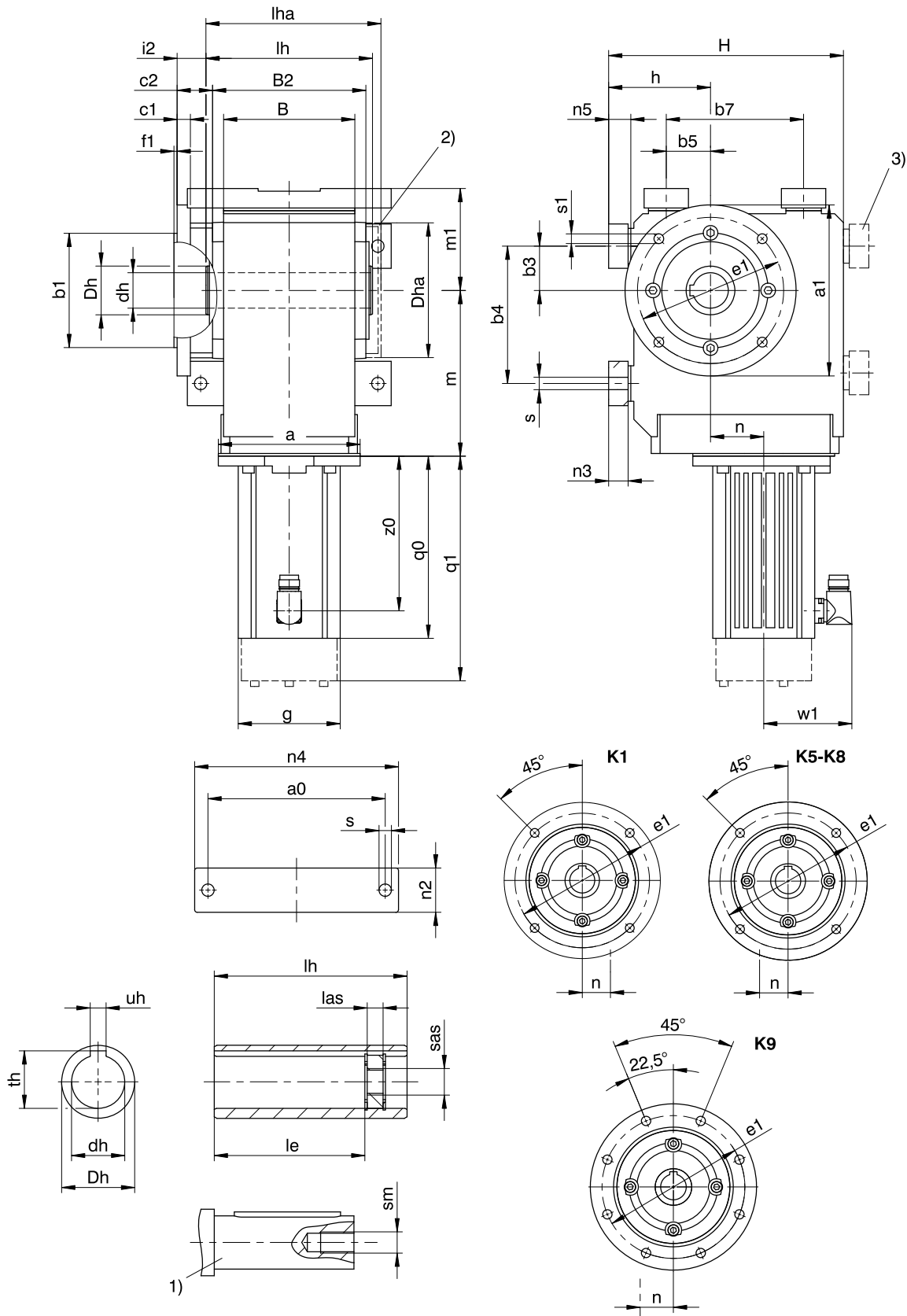
## Dimensions of motors

Type	□g	q0	q1	w1	z0
LM401U	98	129.0	172.5	91	97
LM402U	98	168.0	211.5	91	136
LM403U	98	199.0	242.5	91	167
LM503U	115	205.5	253.5	100	175
LM505U	115	275.5	323.5	100	245
LM704U	145	259.5	318.5	115	227
LM706U	145	329.5	388.5	115	297

## Dimensions of geared motors

Type	LM4			LM5			LM7		
	a	m	n	a	m	n	a	m	n
K102	□98	124	36.0	□115	128	36.0	-	-	-
K202	□98	143	46.0	□115	147	46.0	□145	149	46.0
K203	Ø140	180	46.0	-	-	-	-	-	-
K302	Ø140	163	52.5	□115	167	52.5	□145	169	52.5
K303	Ø140	200	52.5	Ø160	210	16.0	-	-	-
K402	-	-	-	Ø160	187	60.0	□145	189	60.0
K403	Ø140	220	60.0	Ø160	230	23.0	-	-	-
K513	-	-	-	Ø160	172	15.0	□145	174	15.0
K514	-	-	-	Ø160	215	15.0	-	-	-
K613	-	-	-	Ø160	191	18.0	Ø200	193	18.0
K614	-	-	-	Ø160	234	18.0	-	-	-
K713	-	-	-	-	-	-	Ø200	221	20.0
K714	-	-	-	Ø160	263	20.0	Ø200	283	20.0
K813	-	-	-	-	-	-	Ø200	247	24.0
K814	-	-	-	-	-	-	Ø200	308	24.0
K914	-	-	-	-	-	-	Ø200	353	25.0

### 12.3.5 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 method.
- 1) The length of the machine shaft must be at least 2.2 x  $\varnothing dh$  and the length of the feather key must be at least 2 x  $\varnothing dh$ .
- 2) Cover (optional)
- 3) Only for K1 (other sizes on request)

## Dimensions of gear units

Type	a0	Øa1	Øb1	b3	b4	b5	b7	B	B2	c1	c2	Ødh	ØDh	Dha	Øe1	f1	h
K1	115	160	110 <sub>je</sub>	30	90	30	90	90	106	10	32.0	20 <sup>H7</sup>	40	□105	130	3.5	75
K1	115	160	110 <sub>je</sub>	30	90	30	90	90	106	10	32.0	25 <sup>H7</sup>	40	□105	130	3.5	75
K1	115	160	110 <sub>je</sub>	30	90	30	90	90	106	10	32.0	30 <sup>H7</sup>	40	□105	130	3.5	75
K3	170	160	110 <sub>je</sub>	40	130	40	130	130	146	14	38.0	35 <sup>H7</sup>	50	□132	130	3.5	98
K5	200	250	180 <sub>je</sub>	40	140	100	140	160	185	15	39.5	50 <sup>H7</sup>	65	□145	215	4.0	190
K6	210	300	230 <sub>je</sub>	50	160	110	160	168	200	17	36.0	50 <sup>H7</sup>	70	Ø183	265	4.0	220
K7	241	350	250 <sub>h6</sub>	55	180	125	180	190	226	18	44.0	60 <sup>H7</sup>	85	Ø205	300	5.0	250
K8	300	400	300 <sub>h6</sub>	75	240	165	240	235	282	20	45.0	70 <sup>H7</sup>	100	Ø184	350	5.0	310
K9	360	450	350 <sub>h6</sub>	95	280	185	280	285	330	23	50.0	90 <sup>H7</sup>	120	Ø230	400	5.0	365

## Dimensions of gear units

Type	H	i2	le	lh	las	lha	m1	n2	n3	n4	n5	Øs	Øs1	sm	sas	th	uh
K1	175	25.0	98.0	120	12	127.0	75	30	13	140	15	9.0	9	M6	M8	22.8	6 <sup>JS9</sup>
K1	175	25.0	98.0	120	12	127.0	75	30	13	140	15	9.0	9	M10	M12	28.3	8 <sup>JS9</sup>
K1	175	25.0	93.5	120	12	127.0	75	30	13	140	15	9.0	9	M10	M12	32.0	8 <sup>JS9</sup>
K3	236	31.0	125.0	160	12	168.0	98	45	20	200	23	11.0	9	M12	M16	38.3	10 <sup>JS9</sup>
K5	290	32.0	164.0	200	12	209.5	130	60	27	240	30	18.0	14	M16	M20	53.8	14 <sup>JS9</sup>
K6	340	28.5	179.0	215	12	224.5	150	65	27	250	30	18.5	14	M16	M20	53.8	14 <sup>JS9</sup>
K7	380	36.0	214.0	242	12	252.0	163	70	35	290	38	23.0	18	M20	M24	64.4	18 <sup>JS9</sup>
K8	455	36.0	263.0	300	20	311.0	190	85	41	360	45	27.0	18	M20	M24	74.9	20 <sup>JS9</sup>
K9	545	40.0	302.0	350	26	361.0	230	95	46	430	50	31.0	18	M24	M30	95.4	25 <sup>JS9</sup>

## Dimensions of additional round flanges

Type	Øa1	Øb1	c1	Øe1	f1	Øs1
K1	140	95 <sub>je</sub>	10	115	3	9
K8	350	250 <sub>h6</sub>	18	300	5	18
K8	450	350 <sub>h6</sub>	20	400	5	18

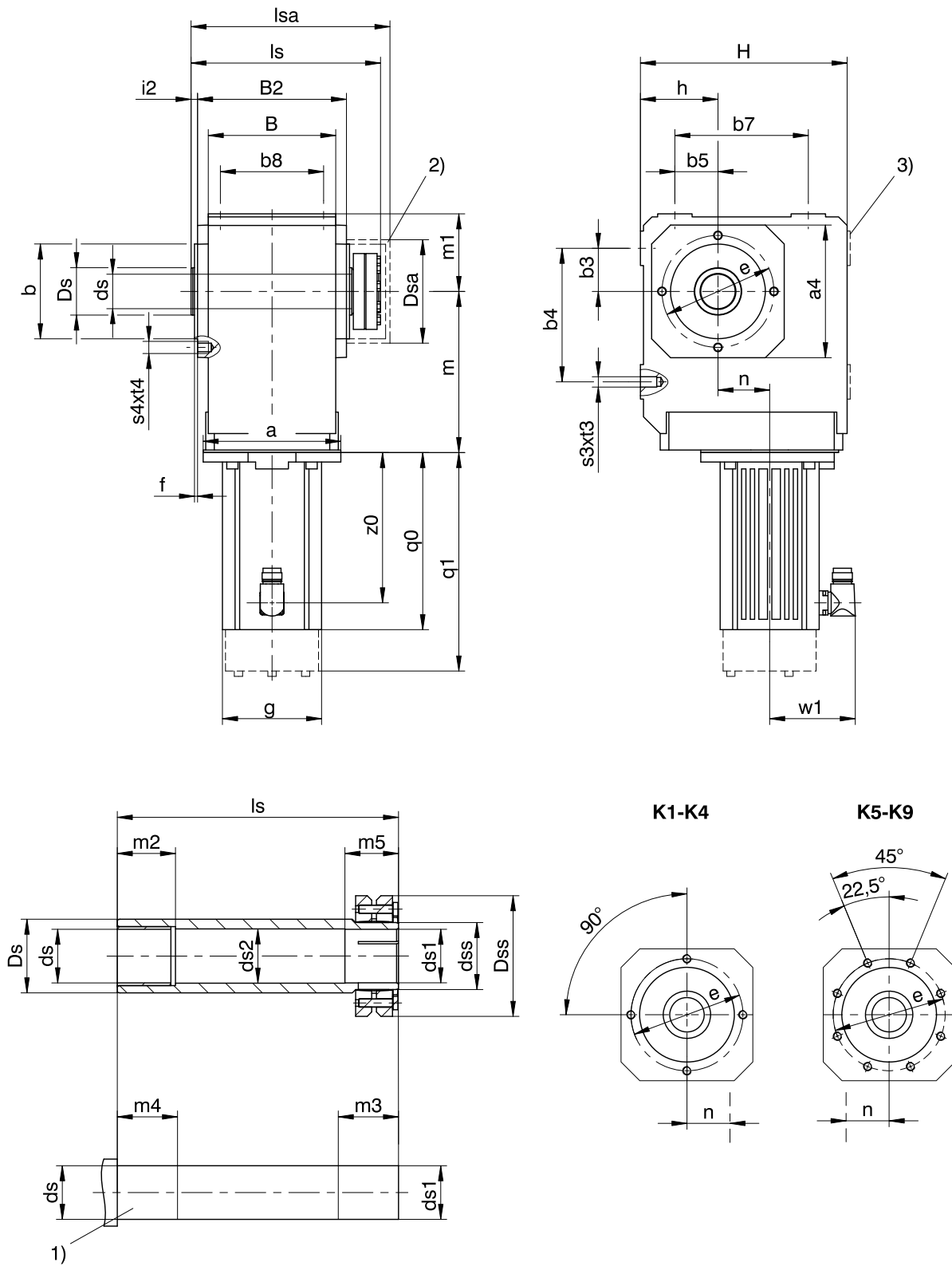
## Dimensions of motors

Type	□g	q0	q1	w1	z0
LM401U	98	129.0	172.5	91	97
LM402U	98	168.0	211.5	91	136
LM403U	98	199.0	242.5	91	167
LM503U	115	205.5	253.5	100	175
LM505U	115	275.5	323.5	100	245
LM704U	145	259.5	318.5	115	227
LM706U	145	329.5	388.5	115	297

## Dimensions of geared motors

Type	LM4			LM5			LM7		
	a	m	n	a	m	n	a	m	n
K102	□98	124	36.0	□115	128	36.0	–	–	–
K302	Ø140	163	52.5	□115	167	52.5	□145	169	52.5
K303	Ø140	200	52.5	Ø160	210	16.0	–	–	–
K513	–	–	–	Ø160	172	15.0	□145	174	15.0
K514	–	–	–	Ø160	215	15.0	–	–	–
K613	–	–	–	Ø160	191	18.0	Ø200	193	18.0
K614	–	–	–	Ø160	234	18.0	–	–	–
K713	–	–	–	–	–	–	Ø200	221	20.0
K714	–	–	–	Ø160	263	20.0	Ø200	283	20.0
K813	–	–	–	–	–	–	Ø200	247	24.0
K814	–	–	–	–	–	–	Ø200	308	24.0
K914	–	–	–	–	–	–	Ø200	353	25.0

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



- q0 Applies to motors without brake.
- x Applies to encoders using an optical measuring method.
- 2) Cover (optional)

- q1 Applies to motors with brake.
- 1) Machine shaft: The dimension  $l_s$  must meet or exceed the specified value.
- 3) Only for K1 (other sizes on request)

Dimensions of gear units

Type	□a4	∅b	b3	b4	b5	b7	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
K1	105	75 <sub>f6</sub>	30	90	30	90	70	90	106	25 <sub>h9</sub>	25 <sub>h7</sub>	25.5	30	40	80.0	60	90	3.0	60	160	7.0	149	163	60	20	34	25	29	M8	M8	13	13
K2	116	82 <sub>f6</sub>	35	115	35	115	90	115	134	30 <sub>h9</sub>	30 <sub>h7</sub>	30.5	36	45	88.0	72	100	3.0	65	190	7.0	178	193	65	25	39	30	34	M10	M8	16	13
K3	132	95 <sub>f6</sub>	40	130	40	130	105	130	146	35 <sub>h9</sub>	35 <sub>h7</sub>	35.5	44	50	101.0	80	115	3.0	75	213	7.0	190	206	75	30	39	35	34	M10	M8	16	13
K4	152	110 <sub>f6</sub>	50	155	50	155	120	148	173	40 <sub>h9</sub>	40 <sub>h7</sub>	40.5	50	55	114.0	88	130	3.5	90	240	7.5	220	243	90	40	39	45	34	M12	M10	19	16
K5	145	110 <sub>f6</sub>	40	140	100	140	125	160	185	50 <sub>h9</sub>	50 <sub>h7</sub>	50.5	62	65	116.0	106	130	3.5	160	260	7.5	237	254	100	40	44	45	39	M16	M10	26	16
K6	180	140 <sub>f6</sub>	50	160	110	160	130	168	200	50 <sub>h9</sub>	50 <sub>h7</sub>	50.5	62	70	128.0	106	165	3.5	190	310	7.5	254	276	120	40	45	45	40	M16	M10	26	16
K7	195	155 <sub>h6</sub>	55	180	125	180	145	190	226	60 <sub>h6</sub>	60 <sub>h7</sub>	62.0	75	85	161.5	138	185	3.5	212	342	8.0	278	314	125	40	45	45	40	M20	M12	33	19
K8	226	185 <sub>h6</sub>	75	240	165	240	185	235	282	70 <sub>h6</sub>	70 <sub>h7</sub>	72.0	90	100	193.0	155	215	4.0	265	410	9.0	352	378	145	50	60	60	50	M24	M12	38	19
K9	280	230 <sub>h6</sub>	95	280	185	280	225	285	330	90 <sub>h6</sub>	90 <sub>h7</sub>	92.0	120	120	244.0	200	265	5.0	315	495	10.0	418	428	180	60	70	70	60	M30	M16	48	26

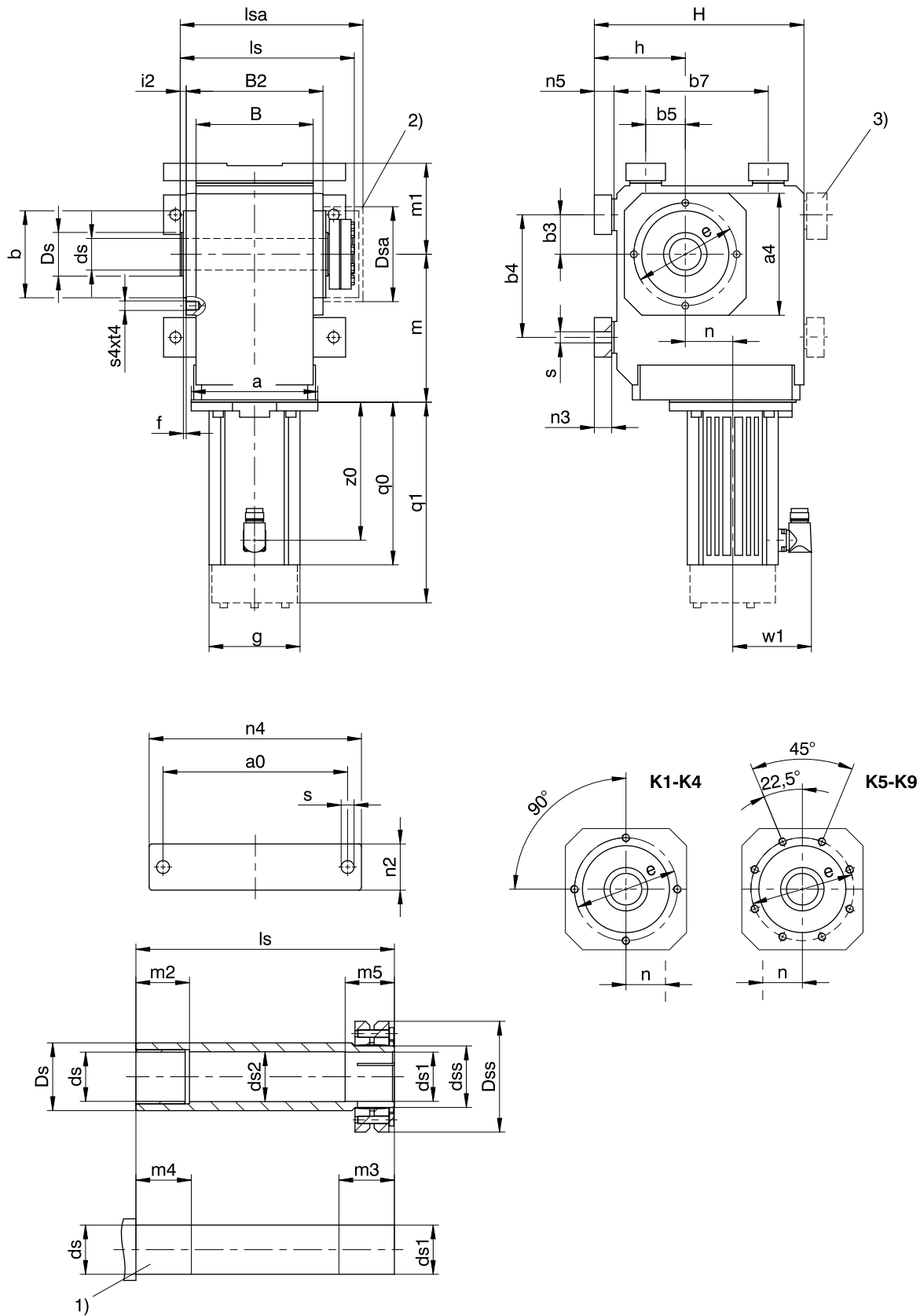
Dimensions of motors

Type	□g	q0	q1	w1	z0
LM401U	98	129.0	172.5	91	97
LM402U	98	168.0	211.5	91	136
LM403U	98	199.0	242.5	91	167
LM503U	115	205.5	253.5	100	175
LM505U	115	275.5	323.5	100	245
LM704U	145	259.5	318.5	115	227
LM706U	145	329.5	388.5	115	297

Dimensions of geared motors

Type	LM4			LM5			LM7		
	a	m	n	a	m	n	a	m	n
K102	□98	124	36.0	□115	128	36.0	-	-	-
K202	□98	143	46.0	□115	147	46.0	□145	149	46.0
K203	∅140	180	46.0	-	-	-	-	-	-
K302	∅140	163	52.5	□115	167	52.5	□145	169	52.5
K303	∅140	200	52.5	∅160	210	16.0	-	-	-
K402	-	-	-	∅160	187	60.0	□145	189	60.0
K403	∅140	220	60.0	∅160	230	23.0	-	-	-
K513	-	-	-	∅160	172	15.0	□145	174	15.0
K514	-	-	-	∅160	215	15.0	-	-	-
K613	-	-	-	∅160	191	18.0	∅200	193	18.0
K614	-	-	-	∅160	234	18.0	-	-	-
K713	-	-	-	-	-	-	∅200	221	20.0
K714	-	-	-	∅160	263	20.0	∅200	283	20.0
K813	-	-	-	-	-	-	∅200	247	24.0
K814	-	-	-	-	-	-	∅200	308	24.0
K914	-	-	-	-	-	-	∅200	353	25.0

### 12.3.7 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 method. | 1) | Machine shaft: The dimension ls must meet or exceed the specified value. |
| 2) | Cover (optional)                                       | 3) | Only for K1 (other sizes on request)                                     |

## Dimensions of gear units

Type	a0	a4	Øb	b3	b4	b5	b7	B	B2	Øds	Øds1	Øds2	Ødss	ØDs	ØDsa
K1	115	105	75 <sub>j6</sub>	30	90	30	90	90	106	25 <sub>h9</sub>	25 <sub>h9</sub> <sup>H7</sup>	25.5	30	40	80
K2	155	116	82 <sub>j6</sub>	35	115	35	115	115	134	30 <sub>h9</sub>	30 <sub>h9</sub> <sup>H7</sup>	30.5	36	45	88
K3	170	132	95 <sub>j6</sub>	40	130	40	130	130	146	35 <sub>h9</sub>	35 <sub>h9</sub> <sup>H7</sup>	35.5	44	50	101
K4	200	152	110 <sub>j6</sub>	50	155	50	155	148	173	40 <sub>h9</sub>	40 <sub>h9</sub> <sup>H7</sup>	40.5	50	55	114
K5	200	145	110 <sub>j6</sub>	40	140	100	140	160	185	50 <sub>h9</sub>	50 <sub>h9</sub> <sup>H7</sup>	50.5	62	65	116
K6	210	180	140 <sub>j6</sub>	50	160	110	160	168	200	50 <sub>h9</sub>	50 <sub>h9</sub> <sup>H7</sup>	50.5	62	70	128
K7	241	195	155 <sub>j6</sub>	55	180	125	180	190	226	60 <sub>h6</sub>	60 <sub>h6</sub> <sup>H7</sup>	62.0	75	85	161.5
K8	300	226	185 <sub>j6</sub>	75	240	165	240	235	282	70 <sub>h6</sub>	70 <sub>h6</sub> <sup>H7</sup>	72.0	90	100	193
K9	360	280	230 <sub>j6</sub>	95	280	185	280	285	330	90 <sub>h6</sub>	90 <sub>h6</sub> <sup>H7</sup>	92.0	120	120	244

## Dimensions of gear units

Type	ØDss	Øe	f	h	H	i2	ls	lsa	m1	m2	m3	m4	m5	n2	n3	n4	n5	Øs	s4	t4
K1	60	90	3.0	75	175	7.0	149	163	75	20	34	25	29	30	13	140	15	9.0	M8	13
K2	72	100	3.0	88	213	7.0	178	193	88	25	39	30	34	40	20	185	23	11.0	M8	13
K3	80	115	3.0	98	236	7.0	190	206	98	30	39	35	34	45	20	200	23	11.0	M8	13
K4	88	130	3.5	115	265	7.5	220	243	115	40	39	45	34	50	22	230	25	14.0	M10	16
K5	106	130	3.5	190	290	7.5	237	254	130	40	44	45	39	60	27	240	30	18.0	M10	16
K6	106	165	3.5	220	340	7.5	254	276	150	40	45	45	40	65	27	250	30	18.5	M10	16
K7	138	185	3.5	250	380	8.0	278	314	163	40	45	45	40	70	35	290	38	23.0	M12	19
K8	155	215	4.0	310	455	9.0	352	378	190	50	60	60	50	85	41	360	45	27.0	M12	19
K9	200	265	5.0	365	545	10.0	418	428	230	60	70	70	60	95	46	430	50	31.0	M16	26

## Dimensions of motors

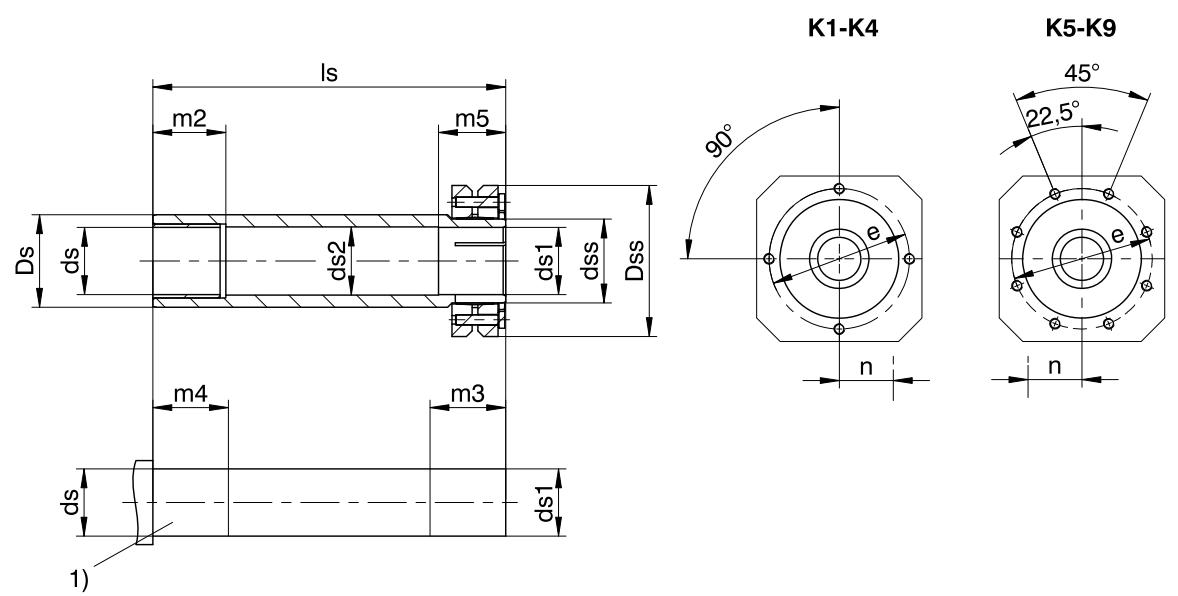
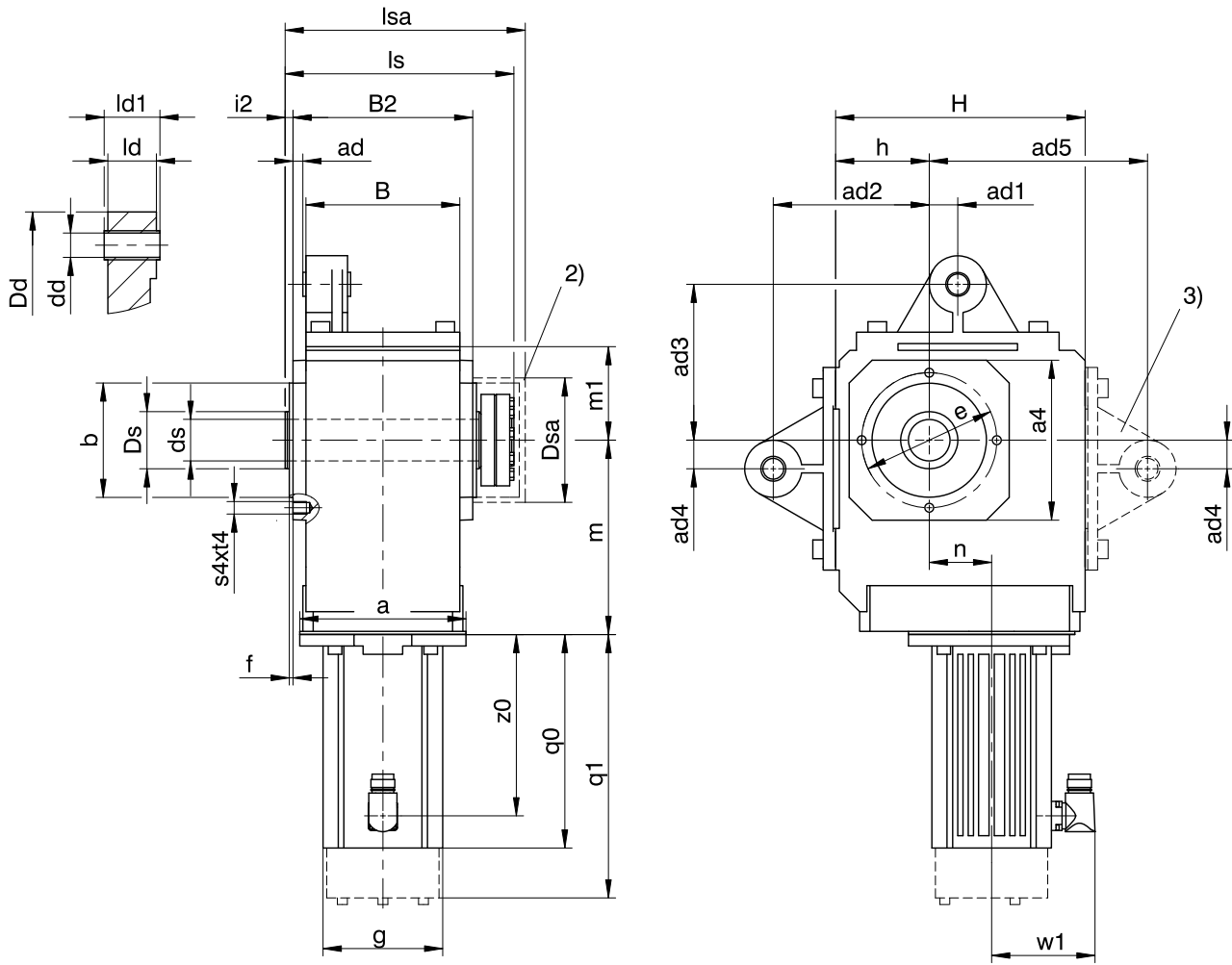
Type	□g	q0	q1	w1	z0
LM401U	98	129.0	172.5	91	97
LM402U	98	168.0	211.5	91	136
LM403U	98	199.0	242.5	91	167
LM503U	115	205.5	253.5	100	175
LM505U	115	275.5	323.5	100	245
LM704U	145	259.5	318.5	115	227
LM706U	145	329.5	388.5	115	297

## Dimensions of geared motors

Type	LM4			LM5			LM7		
	a	m	n	a	m	n	a	m	n
K102	□98	124	36.0	□115	128	36.0	-	-	-
K202	□98	143	46.0	□115	147	46.0	□145	149	46.0
K203	Ø140	180	46.0	-	-	-	-	-	-
K302	Ø140	163	52.5	□115	167	52.5	□145	169	52.5
K303	Ø140	200	52.5	Ø160	210	16.0	-	-	-
K402	-	-	-	Ø160	187	60.0	□145	189	60.0
K403	Ø140	220	60.0	Ø160	230	23.0	-	-	-
K513	-	-	-	Ø160	172	15.0	□145	174	15.0
K514	-	-	-	Ø160	215	15.0	-	-	-
K613	-	-	-	Ø160	191	18.0	Ø200	193	18.0
K614	-	-	-	Ø160	234	18.0	-	-	-
K713	-	-	-	-	-	-	Ø200	221	20.0
K714	-	-	-	Ø160	263	20.0	Ø200	283	20.0
K813	-	-	-	-	-	-	Ø200	247	24.0
K814	-	-	-	-	-	-	Ø200	308	24.0
K914	-	-	-	-	-	-	Ø200	353	25.0



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



- q0 Applies to motors without brake.
- x Applies to encoders using an optical measuring method.
- 2) Cover (optional)
- If you brace the gear units without the factory-adjusted torque arms provided for this purpose, the dimensions for ad2 and ad3 must meet the specified value.
- q1 Applies to motors with brake.
- 1) Machine shaft: The dimension ls must meet or exceed the specified value.
- 3) Only for K1 (other sizes on request)

Dimensions of gear units

Type	□a4	ad	ad1	ad2	ad3	ad4	ad5	Øb	B	B2	Ødd	Øds	Øds1	Øds2	Ødss	ØDd	ØDs	ØDsa
K1	105	6.0	15.0	90	90	15.0	130	75 <sub>f6</sub>	90	106	12 <sup>H9</sup>	25 <sub>h9</sub>	25 <sub>h9</sub> <sup>H7</sup>	25.5	30	43	40	80
K2	116	6.5	22.5	100	100	22.5	–	82 <sub>f6</sub>	115	134	16 <sup>H9</sup>	30 <sub>h9</sub>	30 <sub>h9</sub> <sup>H7</sup>	30.5	36	45	45	88
K3	132	5.0	25.0	120	120	25.0	–	95 <sub>f6</sub>	130	146	16 <sup>H9</sup>	35 <sub>h9</sub>	35 <sub>h9</sub> <sup>H7</sup>	35.5	44	45	50	101
K4	152	9.5	27.5	150	150	27.5	–	110 <sub>f6</sub>	148	173	20 <sup>H9</sup>	40 <sub>h9</sub>	40 <sub>h9</sub> <sup>H7</sup>	40.5	50	55	55	114
K5	145	9.5	30.0	250	190	30.0	–	110 <sub>f6</sub>	160	185	20 <sup>H9</sup>	50 <sub>h9</sub>	50 <sub>h9</sub> <sup>H7</sup>	50.5	62	58	65	116
K6	180	13.0	30.0	250	180	30.0	–	140 <sub>f6</sub>	168	200	20 <sup>H9</sup>	50 <sub>h9</sub>	50 <sub>h9</sub> <sup>H7</sup>	50.5	62	58	70	128
K7	195	15.0	35.0	300	213	35.0	–	155 <sub>h6</sub>	190	226	20 <sup>H9</sup>	60 <sub>h6</sub>	60 <sub>h6</sub> <sup>H7</sup>	62.0	75	68	85	161.5
K8	226	17.0	45.0	350	230	45.0	–	185 <sub>h6</sub>	235	282	24 <sup>H9</sup>	70 <sub>h6</sub>	70 <sub>h6</sub> <sup>H7</sup>	72.0	90	72	100	193
K9	280	16.0	45.0	450	315	45.0	–	230 <sub>h6</sub>	285	330	24 <sup>H9</sup>	90 <sub>h6</sub>	90 <sub>h6</sub> <sup>H7</sup>	92.0	120	75	120	244

Dimensions of gear units

Type	ØDss	Øe	f	h	H	i2	ld	ld1	ls	lsa	m1	m2	m3	m4	m5	s4	t4
K1	60	90	3.0	60	160	7.0	24	28	149	163	60	20	34	25	29	M8	13
K2	72	100	3.0	65	190	7.0	32	38	178	193	65	25	39	30	34	M8	13
K3	80	115	3.0	75	213	7.0	32	38	190	206	75	30	39	35	34	M8	13
K4	88	130	3.5	90	240	7.5	40	46	220	243	90	40	39	45	34	M10	16
K5	106	130	3.5	160	260	7.5	40	46	237	254	100	40	44	45	39	M10	16
K6	106	165	3.5	190	310	7.5	40	46	254	276	120	40	45	45	40	M10	16
K7	138	185	3.5	212	342	8.0	64	70	278	314	125	40	45	45	40	M12	19
K8	155	215	4.0	265	410	9.0	102	115	352	378	145	50	60	60	50	M12	19
K9	200	265	5.0	315	495	10.0	102	115	418	428	180	60	70	70	60	M16	26

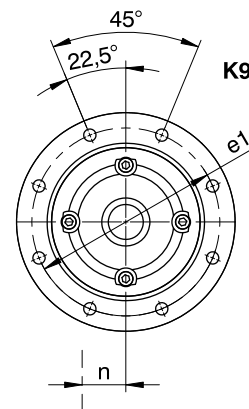
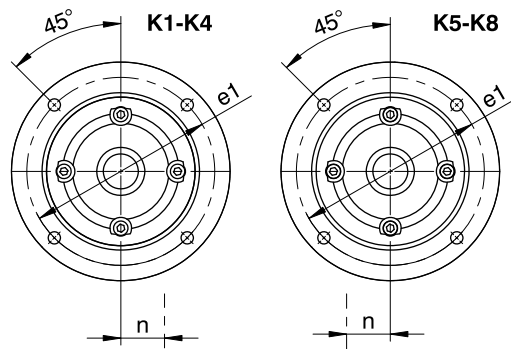
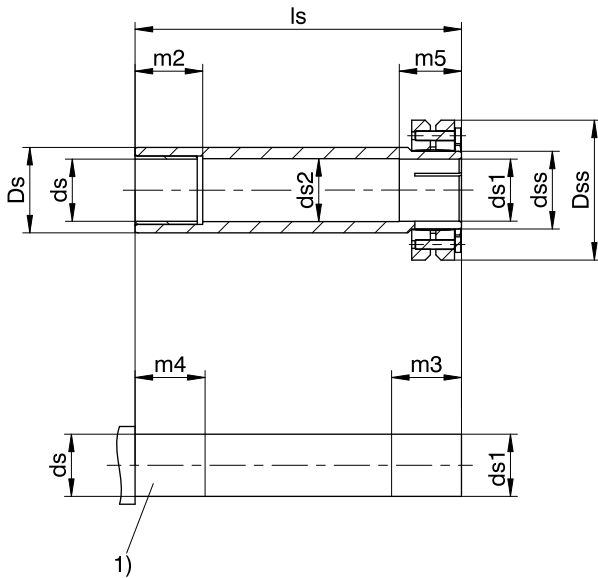
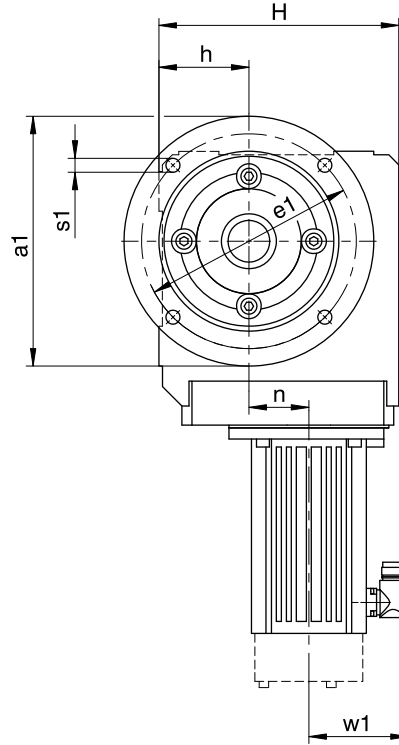
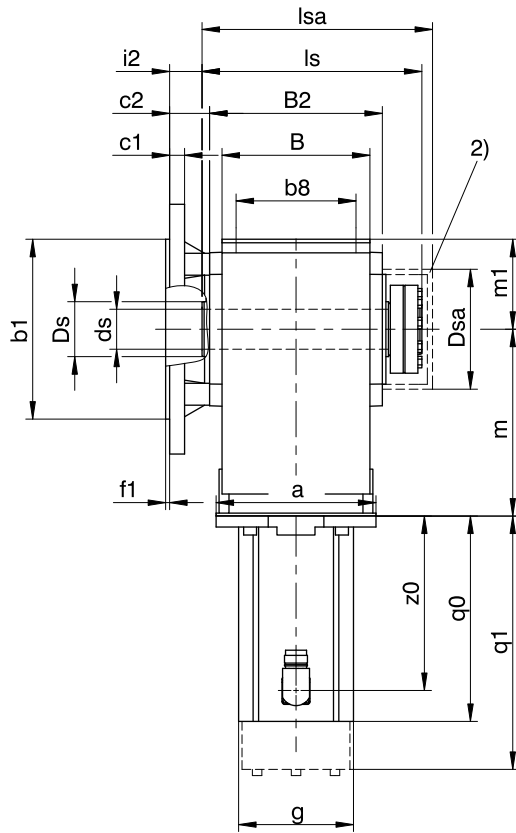
Dimensions of motors

Type	□g	q0	q1	w1	z0
LM401U	98	129.0	172.5	91	97
LM402U	98	168.0	211.5	91	136
LM403U	98	199.0	242.5	91	167
LM503U	115	205.5	253.5	100	175
LM505U	115	275.5	323.5	100	245
LM704U	145	259.5	318.5	115	227
LM706U	145	329.5	388.5	115	297

Dimensions of geared motors

Type	LM4			LM5			LM7		
	a	m	n	a	m	n	a	m	n
K102	□98	124	36.0	□115	128	36.0	–	–	–
K202	□98	143	46.0	□115	147	46.0	□145	149	46.0
K203	Ø140	180	46.0	–	–	–	–	–	–
K302	Ø140	163	52.5	□115	167	52.5	□145	169	52.5
K303	Ø140	200	52.5	Ø160	210	16.0	–	–	–
K402	–	–	–	Ø160	187	60.0	□145	189	60.0
K403	Ø140	220	60.0	Ø160	230	23.0	–	–	–
K513	–	–	–	Ø160	172	15.0	□145	174	15.0
K514	–	–	–	Ø160	215	15.0	–	–	–
K613	–	–	–	Ø160	191	18.0	Ø200	193	18.0
K614	–	–	–	Ø160	234	18.0	–	–	–
K713	–	–	–	–	–	–	Ø200	221	20.0
K714	–	–	–	Ø160	263	20.0	Ø200	283	20.0
K813	–	–	–	–	–	–	Ø200	247	24.0
K814	–	–	–	–	–	–	Ø200	308	24.0
K914	–	–	–	–	–	–	Ø200	353	25.0

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



q0 Applies to motors without brake.

x Applies to encoders using an optical measuring method.

2) Cover (optional)

q1 Applies to motors with brake.

1) Machine shaft: The dimension  $l_s$  must meet or exceed the specified value.

## 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
K1	160	110 <sub>js</sub>	70	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	60	160	25.0	149	163	60	20	34	25	29	9
K2	200	130 <sub>js</sub>	90	115	134	12	32.0	30 <sub>h9</sub>	30 <sub>h9</sub> <sup>H7</sup>	30.5	36	45	88	72	165	3.5	65	190	25.0	178	193	65	25	39	30	34	11
K3	200	130 <sub>js</sub>	105	130	146	14	38.0	35 <sub>h9</sub>	35 <sub>h9</sub> <sup>H7</sup>	35.5	44	50	101	80	165	3.5	75	213	31.0	190	206	75	30	39	35	34	11
K4	250	180 <sub>js</sub>	120	148	173	15	40.0	40 <sub>h9</sub>	40 <sub>h9</sub> <sup>H7</sup>	40.5	50	55	114	88	215	4.0	90	240	32.5	220	243	90	40	39	45	34	14
K5	250	180 <sub>js</sub>	125	160	185	15	39.5	50 <sub>h9</sub>	50 <sub>h9</sub> <sup>H7</sup>	50.5	62	65	116	106	215	4.0	160	260	32.0	237	254	100	40	44	45	39	14
K6	300	230 <sub>js</sub>	130	168	200	17	36.0	50 <sub>h9</sub>	50 <sub>h9</sub> <sup>H7</sup>	50.5	62	70	128	106	265	4.0	190	310	28.5	254	276	120	40	45	45	40	14
K7	350	250 <sub>h6</sub>	145	190	226	18	44.0	60 <sub>h6</sub>	60 <sub>h6</sub> <sup>H7</sup>	62.0	75	85	161.5	138	300	5.0	212	342	36.0	278	314	125	40	45	45	40	18
K8	400	300 <sub>h6</sub>	185	235	282	20	45.0	70 <sub>h6</sub>	70 <sub>h6</sub> <sup>H7</sup>	72.0	90	100	193	155	350	5.0	265	410	36.0	352	378	145	50	60	60	50	18
K9	450	350 <sub>h6</sub>	225	285	330	23	50.0	90 <sub>h6</sub>	90 <sub>h6</sub> <sup>H7</sup>	92.0	120	120	244	200	400	5.0	315	495	40.0	418	428	180	60	70	70	60	18

## Dimensions of additional round flanges

Type	Øa1	Øb1	c1	Øe1	f1	Øs1
K1	140	95 <sub>js</sub>	10	115	3.0	9
K2	160	110 <sub>js</sub>	12	130	3.5	9
K3	160	110 <sub>js</sub>	14	130	3.5	9
K3	250	180 <sub>js</sub>	14	215	4.0	14
K8	350	250 <sub>h6</sub>	18	300	5.0	18
K8	450	350 <sub>h6</sub>	20	400	5.0	18

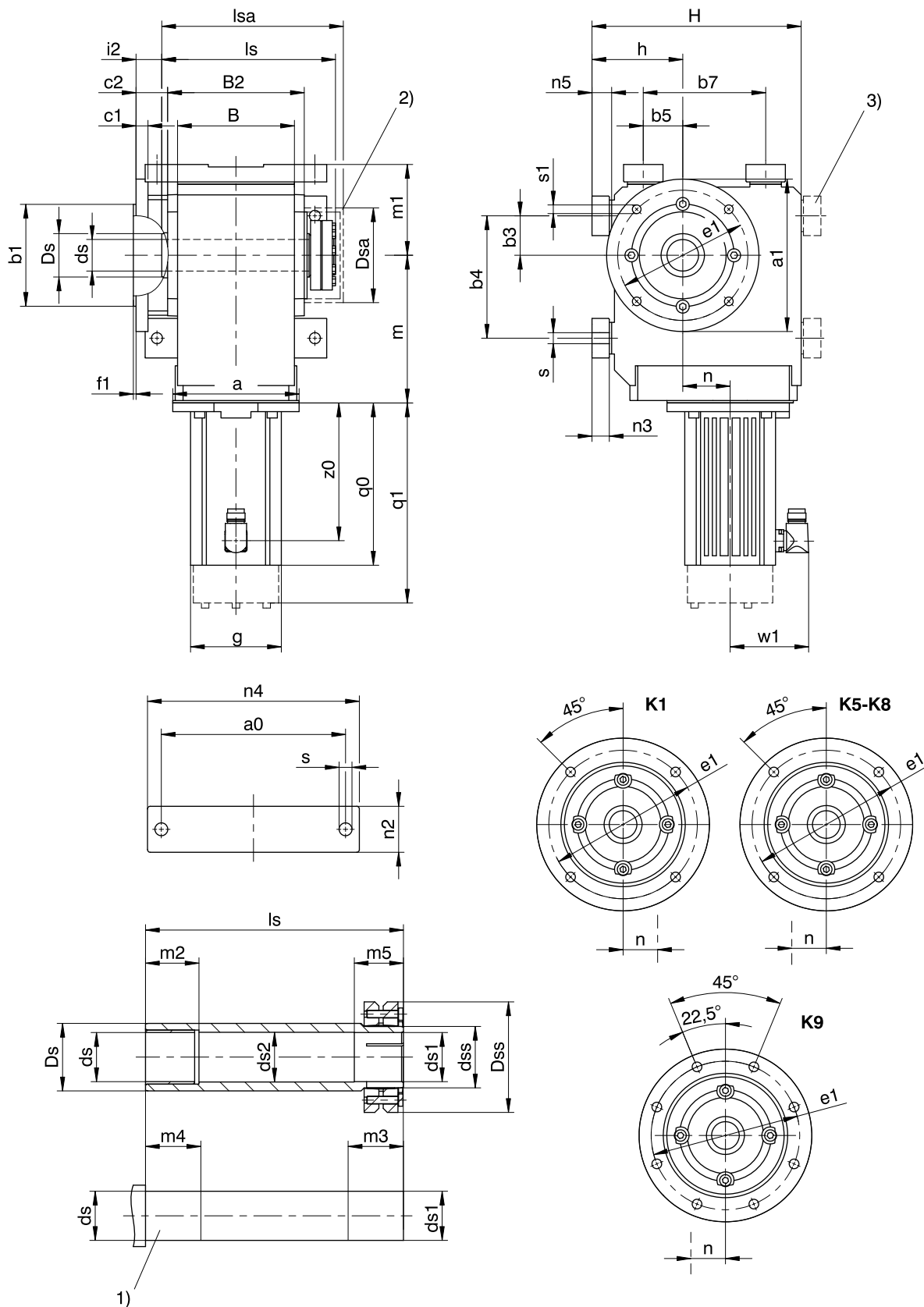
## Dimensions of motors

Type	□g	q0	q1	w1	z0
LM401U	98	129.0	172.5	91	97
LM402U	98	168.0	211.5	91	136
LM403U	98	199.0	242.5	91	167
LM503U	115	205.5	253.5	100	175
LM505U	115	275.5	323.5	100	245
LM704U	145	259.5	318.5	115	227
LM706U	145	329.5	388.5	115	297

## Dimensions of geared motors

Type	LM4			LM5			LM7		
	a	m	n	a	m	n	a	m	n
K102	□98	124	36.0	□115	128	36.0	–	–	–
K202	□98	143	46.0	□115	147	46.0	□145	149	46.0
K203	Ø140	180	46.0	–	–	–	–	–	–
K302	Ø140	163	52.5	□115	167	52.5	□145	169	52.5
K303	Ø140	200	52.5	Ø160	210	16.0	–	–	–
K402	–	–	–	Ø160	187	60.0	□145	189	60.0
K403	Ø140	220	60.0	Ø160	230	23.0	–	–	–
K513	–	–	–	Ø160	172	15.0	□145	174	15.0
K514	–	–	–	Ø160	215	15.0	–	–	–
K613	–	–	–	Ø160	191	18.0	Ø200	193	18.0
K614	–	–	–	Ø160	234	18.0	–	–	–
K713	–	–	–	–	–	–	Ø200	221	20.0
K714	–	–	–	Ø160	263	20.0	Ø200	283	20.0
K813	–	–	–	–	–	–	Ø200	247	24.0
K814	–	–	–	–	–	–	Ø200	308	24.0
K914	–	–	–	–	–	–	Ø200	353	25.0

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



- |       |  |       |   |
|-------|--|-------|---|
| $q_0$ | Applies to motors without brake.                       | $q_1$ | Applies to motors with brake.   |
| x     | Applies to encoders using an optical measuring method. | 1)    | Machine shaft: The dimension $l_s$ must meet or exceed the specified value. |
| 2)    | Cover (optional)                                       | 3)    | Only for K1 (other sizes on request)  |

## Dimensions of gear units

Type	a0	Øa1	Øb1	b3	b4	b5	b7	B	B2	c1	c2	Øds	Øds1	Øds2	Ødss	ØDs	ØDsa	ØDss
K1	115	160	110 <sub>f6</sub>	30	90	30	90	90	106	10	32.0	25 <sub>h9</sub>	25 <sub>h9</sub> <sup>H7</sup>	25.5	30	40	80.0	60
K3	170	160	110 <sub>f6</sub>	40	130	40	130	130	146	14	38.0	35 <sub>h9</sub>	35 <sub>h9</sub> <sup>H7</sup>	35.5	44	50	101.0	80
K5	200	250	180 <sub>f6</sub>	40	140	100	140	160	185	15	39.5	50 <sub>h9</sub>	50 <sub>h9</sub> <sup>H7</sup>	50.5	62	65	116.0	106
K6	210	300	230 <sub>f6</sub>	50	160	110	160	168	200	17	36.0	50 <sub>h9</sub>	50 <sub>h9</sub> <sup>H7</sup>	50.5	62	70	128.0	106
K7	241	350	250 <sub>h6</sub>	55	180	125	180	190	226	18	44.0	60 <sub>h6</sub>	60 <sub>h6</sub> <sup>H7</sup>	62.0	75	85	161.5	138
K8	300	400	300 <sub>h6</sub>	75	240	165	240	235	282	20	45.0	70 <sub>h6</sub>	70 <sub>h6</sub> <sup>H7</sup>	72.0	90	100	193.0	155
K9	360	450	350 <sub>h6</sub>	95	280	185	280	285	330	23	50.0	90 <sub>h6</sub>	90 <sub>h6</sub> <sup>H7</sup>	92.0	120	120	244.0	200

## Dimensions of gear units

Type	Øe1	f1	h	H	i2	ls	lsa	m1	m2	m3	m4	m5	n2	n3	n4	n5	Øs	Øs1
K1	130	3.5	75	175	25.0	149	163	75	20	34	25	29	30	13	140	15	9.0	9
K3	130	3.5	98	236	31.0	190	206	98	30	39	35	34	45	20	200	23	11.0	9
K5	215	4.0	190	290	32.0	237	254	130	40	44	45	39	60	27	240	30	18.0	14
K6	265	4.0	220	340	28.5	254	276	150	40	45	45	40	65	27	250	30	18.5	14
K7	300	5.0	250	380	36.0	278	314	163	40	45	45	40	70	35	290	38	23.0	18
K8	350	5.0	310	455	36.0	352	378	190	50	60	60	50	85	41	360	45	27.0	18
K9	400	5.0	365	545	40.0	418	428	230	60	70	70	60	95	46	430	50	31.0	18

## Dimensions of additional round flanges

Type	Øa1	Øb1	c1	Øe1	f1	Øs1
K1	140	95 <sub>f6</sub>	10	115	3	9
K8	350	250 <sub>h6</sub>	18	300	5	18
K8	450	350 <sub>h6</sub>	20	400	5	18

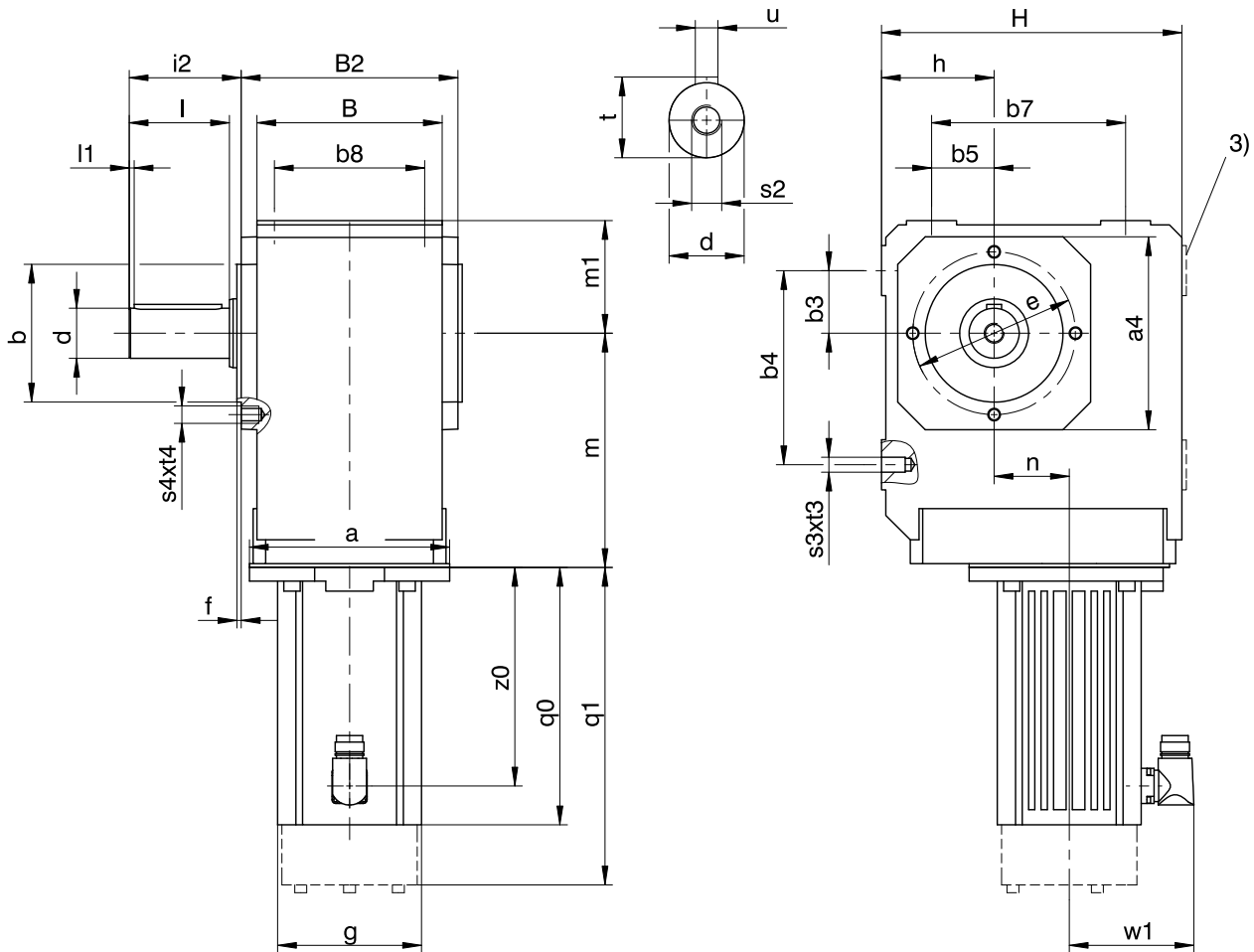
## Dimensions of motors

Type	□g	q0	q1	w1	z0
LM401U	98	129.0	172.5	91	97
LM402U	98	168.0	211.5	91	136
LM403U	98	199.0	242.5	91	167
LM503U	115	205.5	253.5	100	175
LM505U	115	275.5	323.5	100	245
LM704U	145	259.5	318.5	115	227
LM706U	145	329.5	388.5	115	297

## Dimensions of geared motors

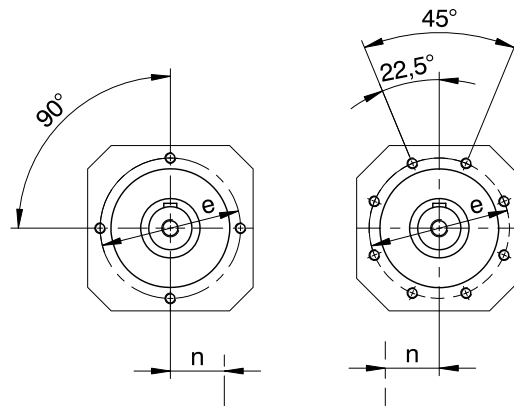
Type	LM4			LM5			LM7		
	a	m	n	a	m	n	a	m	n
K102	□98	124	36.0	□115	128	36.0	–	–	–
K302	Ø140	163	52.5	□115	167	52.5	□145	169	52.5
K303	Ø140	200	52.5	Ø160	210	16.0	–	–	–
K513	–	–	–	Ø160	172	15.0	□145	174	15.0
K514	–	–	–	Ø160	215	15.0	–	–	–
K613	–	–	–	Ø160	191	18.0	Ø200	193	18.0
K614	–	–	–	Ø160	234	18.0	–	–	–
K713	–	–	–	–	–	–	Ø200	221	20.0
K714	–	–	–	Ø160	263	20.0	Ø200	283	20.0
K813	–	–	–	–	–	–	Ø200	247	24.0
K814	–	–	–	–	–	–	Ø200	308	24.0
K914	–	–	–	–	–	–	Ø200	353	25.0

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



K1-K4

K5-K9



- q0 Applies to motors without brake.
- x Applies to encoders using an optical measuring method.
- K1 – K4: solid shaft without feather key available, on request starting at K5.

- q1 Applies to motors with brake.
- 3) Only for K1 (other sizes on request)
- K1 – K9: Solid shaft on both sides available.

## Dimensions of gear units

Type	□a4	∅b	b3	b4	b5	b7	b8	B	B2	∅d	∅e	f	h	H	i2	l	l1	m1	s2	s3	s4	t	t3	t4	u
K1	105	75 <sub>g6</sub>	30	90	30	90	70	90	106	25 <sub>h6</sub>	90	3.0	60	160	62.0	50	4	60	M10	M8	M8	28.0	13	13	A8×7×40
K2	116	82 <sub>g6</sub>	35	115	35	115	90	115	134	30 <sub>h6</sub>	100	3.0	65	190	68.0	60	4	65	M10	M10	M8	33.0	16	13	A8×7×50
K3	132	95 <sub>g6</sub>	40	130	40	130	105	130	146	30 <sub>h6</sub>	115	3.0	75	213	69.0	60	4	75	M10	M10	M8	33.0	16	13	A8×7×50
K4	152	110 <sub>g6</sub>	50	155	50	155	120	148	173	40 <sub>h6</sub>	130	3.5	90	240	89.5	80	4	90	M16	M12	M10	43.0	19	16	A12×8×70
K5	145	110 <sub>g6</sub>	40	140	100	140	125	160	185	45 <sub>h6</sub>	130	3.5	160	260	129.5	90	4	100	M16	M16	M10	48.5	26	16	A14×9×80
K6	180	140 <sub>g6</sub>	50	160	110	160	130	168	200	50 <sub>h6</sub>	165	3.5	190	310	136.0	100	4	120	M16	M16	M10	53.5	26	16	A14×9×90
K7	195	155 <sub>g6</sub>	55	180	125	180	145	190	226	60 <sub>h6</sub>	185	3.5	212	342	164.0	120	4	125	M20	M20	M12	64.0	33	19	A18×11×110
K8	226	185 <sub>g6</sub>	75	240	165	240	185	235	282	70 <sub>h6</sub>	215	4.0	265	410	185.0	140	5	145	M20	M24	M12	74.5	38	19	A20×12×125
K9	280	230 <sub>g6</sub>	95	280	185	280	225	285	330	90 <sub>h6</sub>	265	5.0	315	495	220.0	170	8	180	M24	M30	M16	95.0	48	26	A25×14×140

## Dimensions of motors

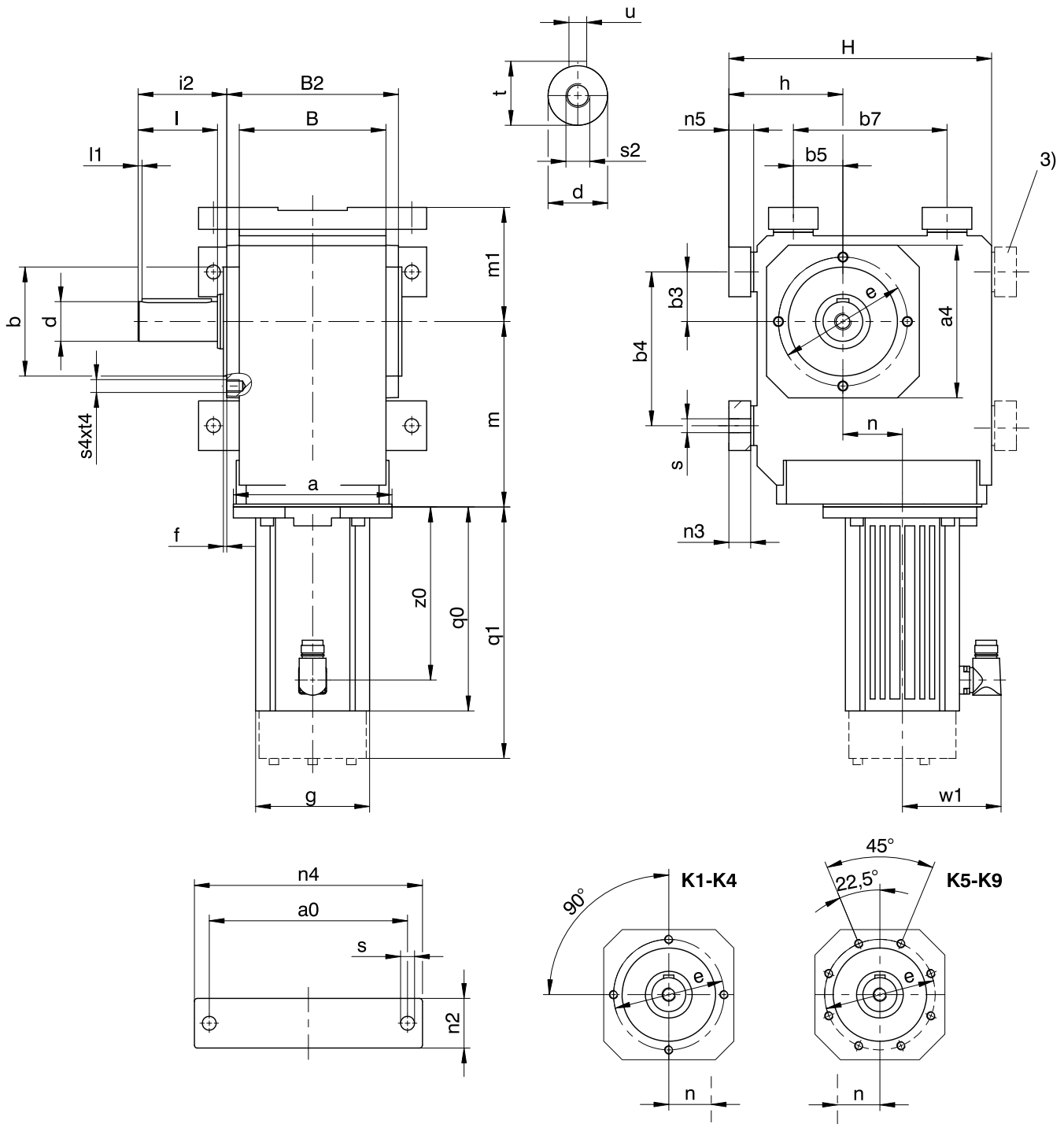
Type	□g	q0	q1	w1	z0
LM401U	98	129.0	172.5	91	97
LM402U	98	168.0	211.5	91	136
LM403U	98	199.0	242.5	91	167
LM503U	115	205.5	253.5	100	175
LM505U	115	275.5	323.5	100	245
LM704U	145	259.5	318.5	115	227
LM706U	145	329.5	388.5	115	297

## Dimensions of geared motors

Type	LM4			LM5			LM7		
	a	m	n	a	m	n	a	m	n
K102	□98	124	36.0	□115	128	36.0	–	–	–
K202	□98	143	46.0	□115	147	46.0	□145	149	46.0
K203	∅140	180	46.0	–	–	–	–	–	–
K302	∅140	163	52.5	□115	167	52.5	□145	169	52.5
K303	∅140	200	52.5	∅160	210	16.0	–	–	–
K402	–	–	–	∅160	187	60.0	□145	189	60.0
K403	∅140	220	60.0	∅160	230	23.0	–	–	–
K513	–	–	–	∅160	172	15.0	□145	174	15.0
K514	–	–	–	∅160	215	15.0	–	–	–
K613	–	–	–	∅160	191	18.0	∅200	193	18.0
K614	–	–	–	∅160	234	18.0	–	–	–
K713	–	–	–	–	–	–	∅200	221	20.0
K714	–	–	–	∅160	263	20.0	∅200	283	20.0
K813	–	–	–	–	–	–	∅200	247	24.0
K814	–	–	–	–	–	–	∅200	308	24.0
K914	–	–	–	–	–	–	∅200	353	25.0



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



- q0 Applies to motors without brake.
- x Applies to encoders using an optical measuring method.
- K1 – K4: solid shaft without feather key available, on request starting at K5.

- q1 Applies to motors with brake.
- 3) Only for K1 (other sizes on request)
- K1 – K10: Solid shaft on both sides available.

## Dimensions of gear units

Type	a0	□a4	∅b	b3	b4	b5	b7	B	B2	∅d	∅e	f	h	H	i2	l	l1	m1	n2	n3	n4	n5	∅s	s2	s4	t	t4	u
K1	115	105	75 <sub>β</sub>	30	90	30	90	90	106	25 <sub>κβ</sub>	90	3.0	75	175	62.0	50	4	75	30	13	140	15	9.0	M10	M8	28.0	13	A8×7×40
K2	155	116	82 <sub>β</sub>	35	115	35	115	115	134	30 <sub>κβ</sub>	100	3.0	88	213	68.0	60	4	88	40	20	185	23	11.0	M10	M8	33.0	13	A8×7×50
K3	170	132	95 <sub>β</sub>	40	130	40	130	130	146	30 <sub>κβ</sub>	115	3.0	98	236	69.0	60	4	98	45	20	200	23	11.0	M10	M8	33.0	13	A8×7×50
K4	200	152	110 <sub>β</sub>	50	155	50	155	148	173	40 <sub>κβ</sub>	130	3.5	115	265	89.5	80	4	115	50	22	230	25	14.0	M16	M10	43.0	16	A12×8×70
K5	200	145	110 <sub>β</sub>	40	140	100	140	160	185	45 <sub>κβ</sub>	130	3.5	190	290	129.5	90	4	130	60	27	240	30	18.0	M16	M10	48.5	16	A14×9×80
K6	210	180	140 <sub>β</sub>	50	160	110	160	168	200	50 <sub>κβ</sub>	165	3.5	220	340	136.0	100	4	150	65	27	250	30	18.5	M16	M10	53.5	16	A14×9×90
K7	241	195	155 <sub>β</sub>	55	180	125	180	190	226	60 <sub>κβ</sub>	185	3.5	250	380	164.0	120	4	163	70	35	290	38	23.0	M20	M12	64.0	19	A18×11×110
K8	300	226	185 <sub>β</sub>	75	240	165	240	235	282	70 <sub>κβ</sub>	215	4.0	310	455	185.0	140	5	190	85	41	360	45	27.0	M20	M12	74.5	19	A20×12×125

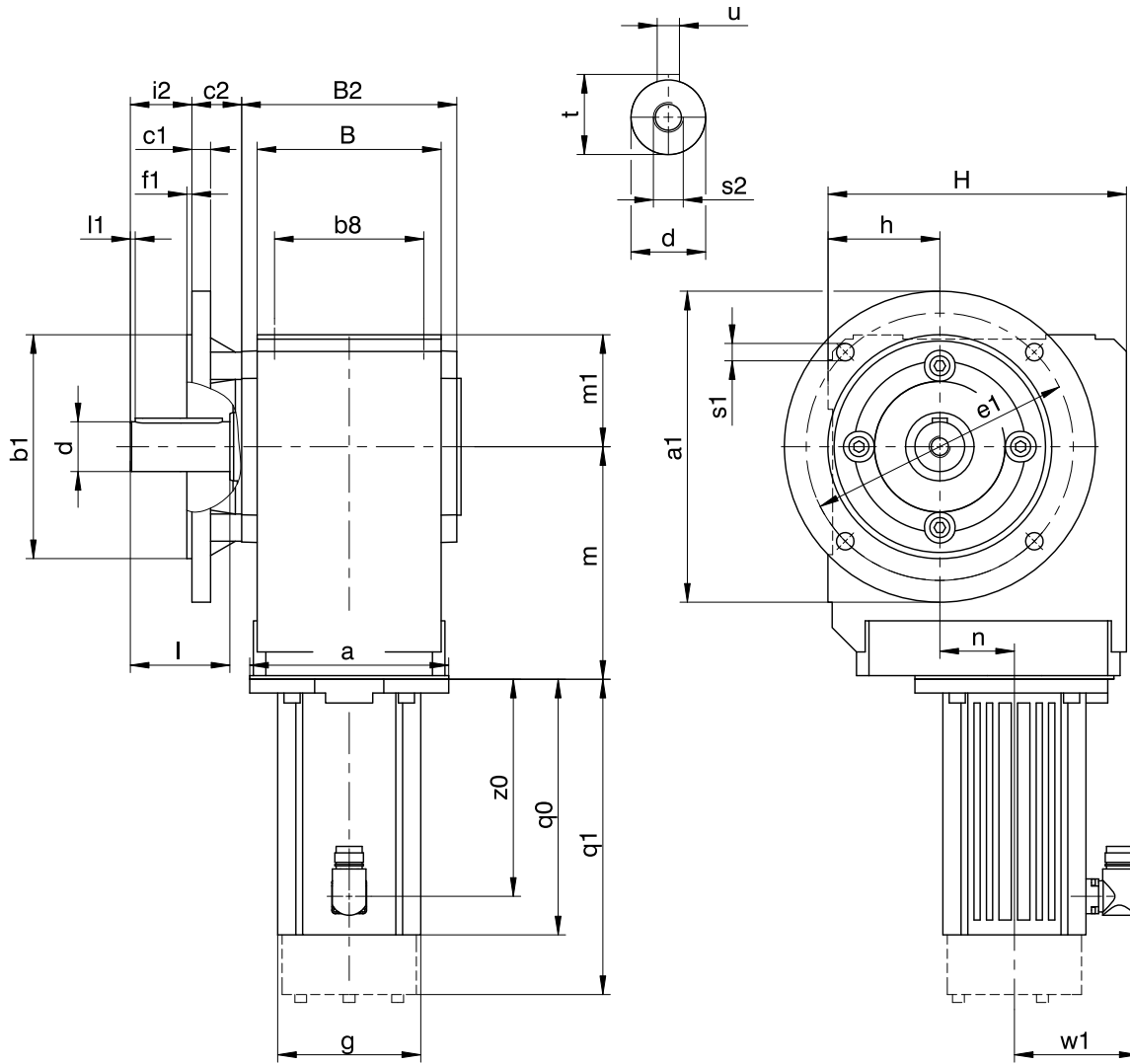
## Dimensions of motors

Type	□g	q0	q1	w1	z0
LM401U	98	129.0	172.5	91	97
LM402U	98	168.0	211.5	91	136
LM403U	98	199.0	242.5	91	167
LM503U	115	205.5	253.5	100	175
LM505U	115	275.5	323.5	100	245
LM704U	145	259.5	318.5	115	227
LM706U	145	329.5	388.5	115	297

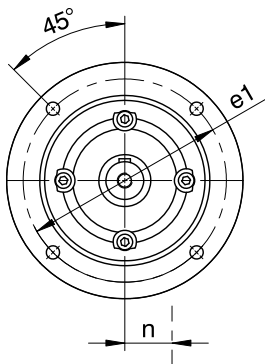
## Dimensions of geared motors

Type	LM4			LM5			LM7		
	a	m	n	a	m	n	a	m	n
K102	□98	124	36.0	□115	128	36.0	–	–	–
K202	□98	143	46.0	□115	147	46.0	□145	149	46.0
K203	∅140	180	46.0	–	–	–	–	–	–
K302	∅140	163	52.5	□115	167	52.5	□145	169	52.5
K303	∅140	200	52.5	∅160	210	16.0	–	–	–
K402	–	–	–	∅160	187	60.0	□145	189	60.0
K403	∅140	220	60.0	∅160	230	23.0	–	–	–
K513	–	–	–	∅160	172	15.0	□145	174	15.0
K514	–	–	–	∅160	215	15.0	–	–	–
K613	–	–	–	∅160	191	18.0	∅200	193	18.0
K614	–	–	–	∅160	234	18.0	–	–	–
K713	–	–	–	–	–	–	∅200	221	20.0
K714	–	–	–	∅160	263	20.0	∅200	283	20.0
K813	–	–	–	–	–	–	∅200	247	24.0
K814	–	–	–	–	–	–	∅200	308	24.0
K914	–	–	–	–	–	–	∅200	353	25.0

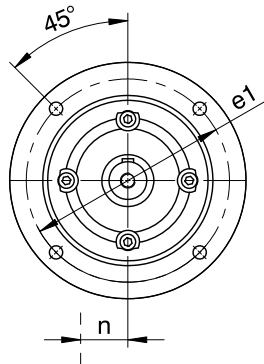
### 12.3.13 V shaft design (solid shaft), F housing design (round flange)



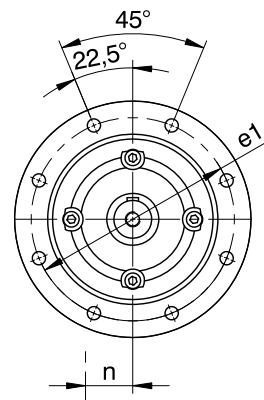
**K1-K4**



**K5-K8**



**K9**



q0 Applies to motors without brake.

x Applies to encoders using an optical measuring method.

- K1 - K9: Solid shaft on both sides available.

q1 Applies to motors with brake.

- K1 - K4: solid shaft without feather key available, on request starting at K5.

## 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
K1	160	110 <sub>f6</sub>	70	90	106	10	32.0	25 <sub>k6</sub>	130	3.5	60	160	30.0	50	4	60	9	M10	28.0	A8×7×40
K2	200	130 <sub>f6</sub>	90	115	134	12	32.0	30 <sub>k6</sub>	165	3.5	65	190	36.0	60	4	65	11	M10	33.0	A8×7×50
K3	200	130 <sub>f6</sub>	105	130	146	14	38.0	30 <sub>k6</sub>	165	3.5	75	213	31.0	60	4	75	11	M10	33.0	A8×7×50
K4	250	180 <sub>f6</sub>	120	148	173	15	40.0	40 <sub>k6</sub>	215	4.0	90	240	49.5	80	4	90	14	M16	43.0	A12×8×70
K5	250	180 <sub>f6</sub>	125	160	185	15	39.5	45 <sub>k6</sub>	215	4.0	160	260	90.0	90	4	100	14	M16	48.5	A14×9×80
K6	300	230 <sub>f6</sub>	130	168	200	17	36.0	50 <sub>k6</sub>	265	4.0	190	310	100.0	100	4	120	14	M16	53.5	A14×9×90
K7	350	250 <sub>h6</sub>	145	190	226	18	44.0	60 <sub>m6</sub>	300	5.0	212	342	120.0	120	4	125	18	M20	64.0	A18×11×110
K8	400	300 <sub>h6</sub>	185	235	282	20	45.0	70 <sub>m6</sub>	350	5.0	265	410	140.0	140	5	145	18	M20	74.5	A20×12×125

## Dimensions of additional round flanges

Type	Øa1	Øb1	c1	Øe1	f1	Øs1
K1	140	95 <sub>f6</sub>	10	115	3.0	9
K2	160	110 <sub>f6</sub>	12	130	3.5	9
K3	160	110 <sub>f6</sub>	14	130	3.5	9
K3	250	180 <sub>f6</sub>	14	215	4.0	14
K8	350	250 <sub>h6</sub>	18	300	5.0	18
K8	450	350 <sub>h6</sub>	20	400	5.0	18

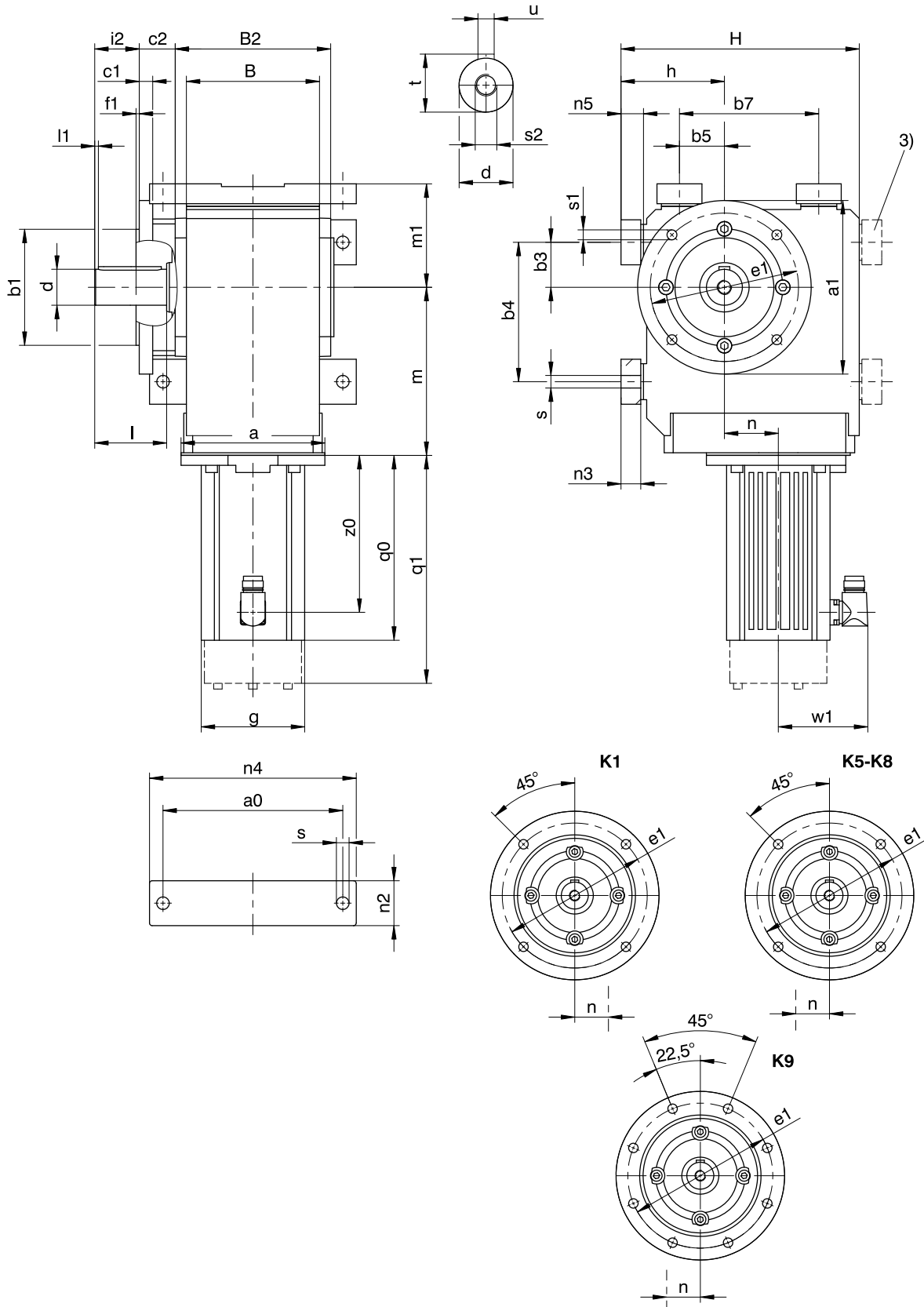
## Dimensions of motors

Type	□g	q0	q1	w1	z0
LM401U	98	129.0	172.5	91	97
LM402U	98	168.0	211.5	91	136
LM403U	98	199.0	242.5	91	167
LM503U	115	205.5	253.5	100	175
LM505U	115	275.5	323.5	100	245
LM704U	145	259.5	318.5	115	227
LM706U	145	329.5	388.5	115	297

## Dimensions of geared motors

Type	LM4			LM5			LM7		
	a	m	n	a	m	n	a	m	n
K102	□98	124	36.0	□115	128	36.0	–	–	–
K202	□98	143	46.0	□115	147	46.0	□145	149	46.0
K203	Ø140	180	46.0	–	–	–	–	–	–
K302	Ø140	163	52.5	□115	167	52.5	□145	169	52.5
K303	Ø140	200	52.5	Ø160	210	16.0	–	–	–
K402	–	–	–	Ø160	187	60.0	□145	189	60.0
K403	Ø140	220	60.0	Ø160	230	23.0	–	–	–
K513	–	–	–	Ø160	172	15.0	□145	174	15.0
K514	–	–	–	Ø160	215	15.0	–	–	–
K613	–	–	–	Ø160	191	18.0	Ø200	193	18.0
K614	–	–	–	Ø160	234	18.0	–	–	–
K713	–	–	–	–	–	–	Ø200	221	20.0
K714	–	–	–	Ø160	263	20.0	Ø200	283	20.0
K813	–	–	–	–	–	–	Ø200	247	24.0
K814	–	–	–	–	–	–	Ø200	308	24.0
K914	–	–	–	–	–	–	Ø200	353	25.0

### 12.3.14 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 method.
- 3) Only for K1 (other sizes on request)
- K1 – K4: solid shaft without feather key available, on request starting at K5.
- K1 – K10: Solid shaft on both sides available.

**Dimensions of gear units**

Type	a0	Øa1	Øb1	b3	b4	b5	b7	B	B2	c1	c2	Ød	Øe1	f1	h	H	i2	l	l1	m1	n2	n3	n4	n5	Øs	Øs1	s2	t	u
K1	115	160	110 <sub>6</sub>	30	90	30	90	90	106	10	32.0	25 <sub>6</sub>	130	3.5	75	175	30.0	50	4	75	30	13	140	15	9.0	9	M10	28.0	A8×7×40
K3	170	160	110 <sub>6</sub>	40	130	40	130	130	146	14	38.0	30 <sub>6</sub>	130	3.5	98	236	31.0	60	4	98	45	20	200	23	11.0	9	M10	33.0	A8×7×50

Type	a0	Øa1	Øb1	b3	b4	b5	b7	B	B2	c1	c2	Ød	Øe1	f1	h	H	i2	l	l1	m1	n2	n3	n4	n5	Øs	Øs1	s2	t	u
K5	200	250	180 <sub>g</sub>	40	140	100	140	160	185	15	39.5	45 <sub>g</sub>	215	4.0	190	290	90.0	90	4	130	60	27	240	30	18.0	14	M16	48.5	A14×9×80
K6	210	300	230 <sub>g</sub>	50	160	110	160	168	200	17	36.0	50 <sub>g</sub>	265	4.0	220	340	100.0	100	4	150	65	27	250	30	18.5	14	M16	53.5	A14×9×90
K7	241	350	250 <sub>h</sub>	55	180	125	180	190	226	18	44.0	60 <sub>m</sub>	300	5.0	250	380	120.0	120	4	163	70	35	290	38	23.0	18	M20	64.0	A18×11×110
K8	300	400	300 <sub>h</sub>	75	240	165	240	235	282	20	45.0	70 <sub>m</sub>	350	5.0	310	455	140.0	140	5	190	85	41	360	45	27.0	18	M20	74.5	A20×12×125

## Dimensions of additional round flanges

Type	Øa1	Øb1	c1	Øe1	f1	Øs1
K1	140	95 <sub>g</sub>	10	115	3	9
K8	350	250 <sub>h</sub>	18	300	5	18
K8	450	350 <sub>h</sub>	20	400	5	18

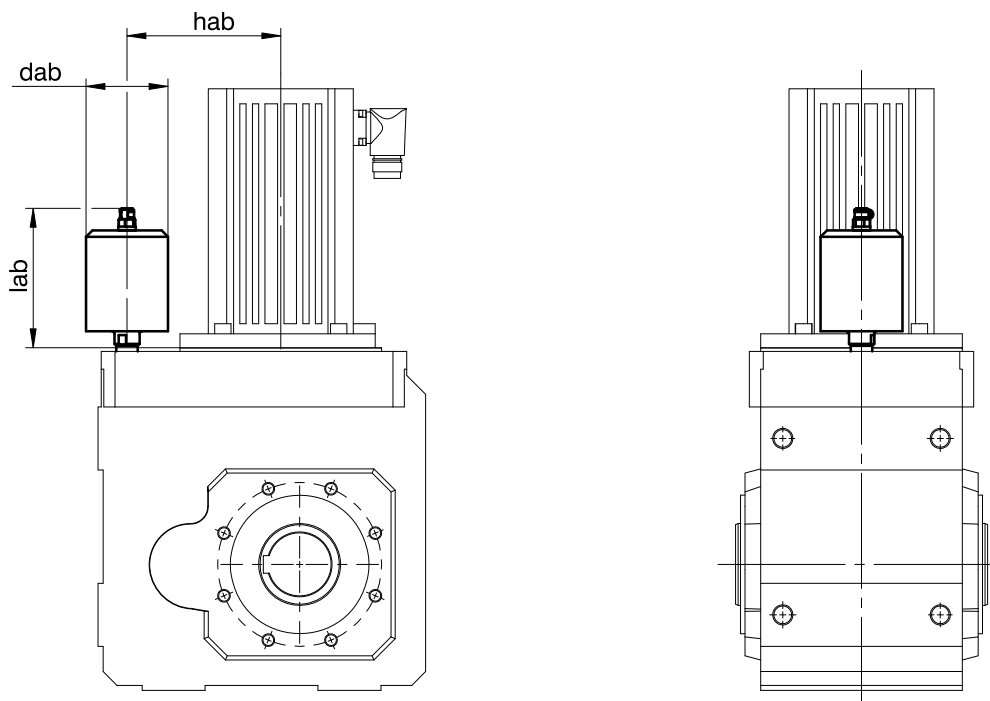
## Dimensions of motors

Type	□g	q0	q1	w1	z0
LM401U	98	129.0	172.5	91	97
LM402U	98	168.0	211.5	91	136
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LM503U	115	205.5	253.5	100	175
LM505U	115	275.5	323.5	100	245
LM704U	145	259.5	318.5	115	227
LM706U	145	329.5	388.5	115	297

## Dimensions of geared motors

Type	LM4			LM5			LM7		
	a	m	n	a	m	n	a	m	n
K102	□98	124	36.0	□115	128	36.0	–	–	–
K302	Ø140	163	52.5	□115	167	52.5	□145	169	52.5
K303	Ø140	200	52.5	Ø160	210	16.0	–	–	–
K513	–	–	–	Ø160	172	15.0	□145	174	15.0
K514	–	–	–	Ø160	215	15.0	–	–	–
K613	–	–	–	Ø160	191	18.0	Ø200	193	18.0
K614	–	–	–	Ø160	234	18.0	–	–	–
K713	–	–	–	–	–	–	Ø200	221	20.0
K714	–	–	–	Ø160	263	20.0	Ø200	283	20.0
K813	–	–	–	–	–	–	Ø200	247	24.0
K814	–	–	–	–	–	–	Ø200	308	24.0
K914	–	–	–	–	–	–	Ø200	353	25.0

### 12.3.15 Oil expansion tank



#### Dimensions

Type	LM5			LM7		
	dab	hab	lab	dab	hab	lab
K513	65	122.0	113.5	65	122.0	113.5
K613	65	148.5	116.5	65	148.5	116.5
K713	-	-	-	65	170.0	114.5
K813	-	-	-	73	205.0	129.5

More information can be found in Chapter [12.6.4](#)

## 12.4 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

K	4	0	2	A	G	0280	LM704U
---	---	---	---	---	---	------	--------

### Explanation

Code	Designation	Design
K	Type	Helical bevel gear unit
4	Size	4 (example)
0	Generation	Generation 0
1		Generation 1
2	Stages	Two-stage
3		Three-stage
4		Four-stage
A	Shaft	Hollow shaft with keyway
S		Hollow shaft with shrink disk
V		Solid shaft
G	Housing	Pitch circle diameter
F		Round flange
NG		Foot + pitch circle diameter
NF		Foot + round flange
GD		Pitch circle diameter + torque arm
NGD		Foot + pitch circle diameter + torque arm
0280	Transmission ratio (i x 10)	i = 28 (example)
LM704U	Motor	LM Lean motor

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

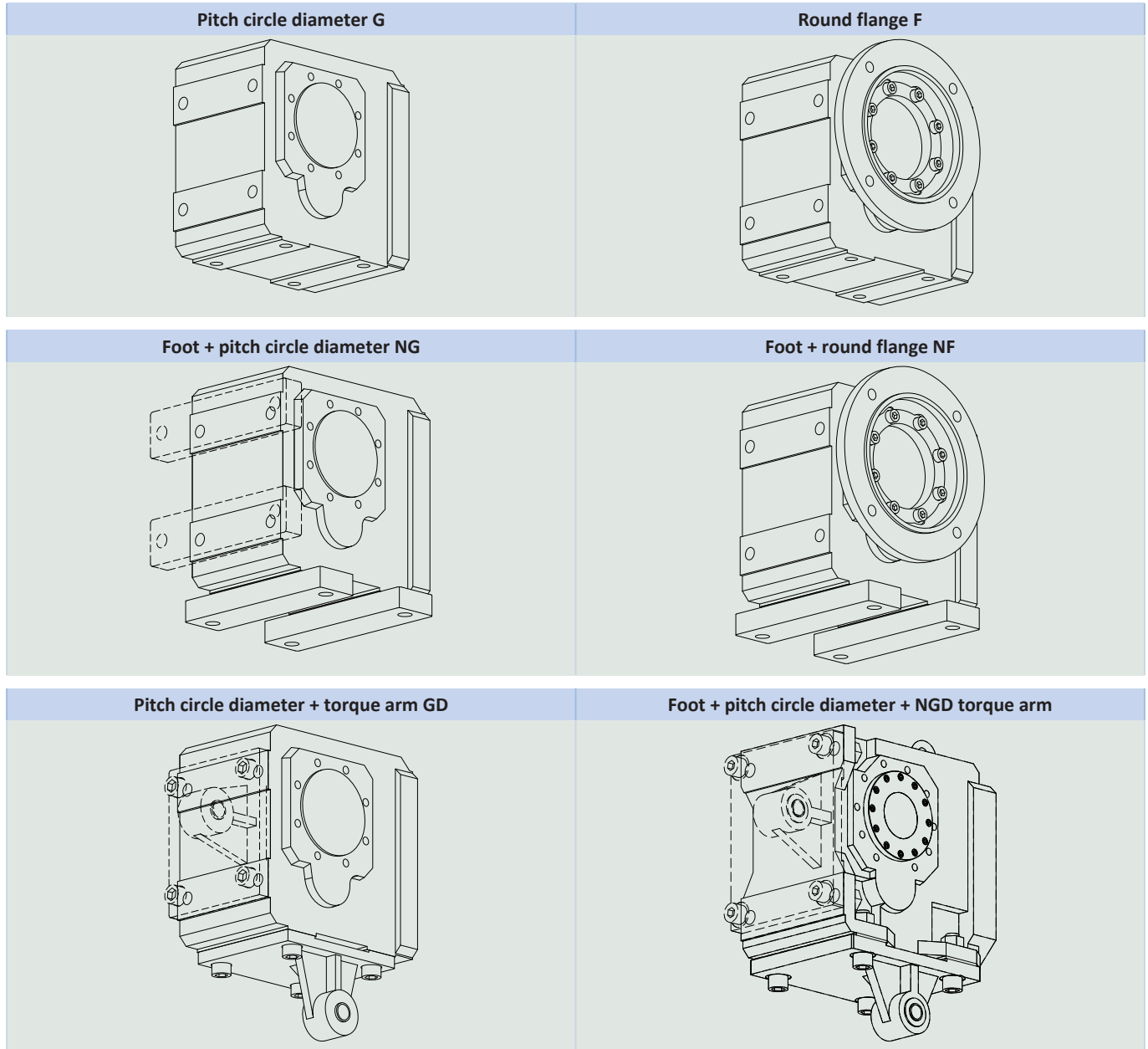
- A detailed type designation of the motor, see the chapter [\[ 2 \]](#)
- The installation position, see Chapter [\[ 12.5.4 \]](#)
- Attachment of solid shaft: gear unit side 3 or 4; solid shaft on both sides
- Attachment of hollow shaft with keyway: insertion side 3 or 4
- Attachment of hollow shaft 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 on gear unit side 1 or 5, eye on gear unit side 3 or 4
- The position of the plug connector, see the chapter [\[ 12.5.6 \]](#)
- Oil expansion tank (recommended for gear units in installation position EL5), see the chapter [\[ 12.6.4 \]](#)
- Backlash: standard/class II/class I. Backlash class II and class I for an additional charge.  
Backlash class I with reduced input speeds (see section [\[ 12.6.1 \]](#)) and only possible in conjunction with synthetic oil.
- Standard or reinforced output bearing

An explanation of the gear unit sides can be found in the chapter [\[ 12.5.4 \]](#).



## 12.5 Product description

### 12.5.1 Housing design



	G	F	NG	NF	GD	NGD
K1	✓	✓	✓	✓	✓	-
K2	✓	✓	✓	-	✓	-
K3	✓	✓	✓	-	✓	-
K4	✓	✓	✓	-	✓	-
K5	✓	✓	✓	✓	✓	-
K6	✓	✓	✓	✓	✓	-
K7	✓	✓	✓	✓	✓	-
K8	✓	✓	✓	✓	✓	-
K9	✓	✓	✓	✓	✓	-
K10	-	-	✓	✓	-	✓

## 12.5.2 Combinatorial shaft/housing design

Shaft design	Housing design						
	Code	G	F	NG	NF	GD	NGD
Hollow shaft with keyway	A	AG	AF	ANG	ANF	AGD	ANGD
Hollow shaft with shrink disk	S	SG	SF	SNG	SNF	SGD	SNGD
Solid shaft <sup>1)</sup>	V	VG	VF	VNG	VNF	–	–

<sup>1)</sup> Gear units in sizes K1 – K10 come with a solid shaft with feather key as standard. Gear units in sizes K1 – K4 can be ordered with the option of a solid shaft without feather key. Only upon request starting at size K5.

## 12.5.3 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 executed as follows:

Gear unit type	Tolerance
K1 to K6	ISO h9
K7 to K10	ISO h6

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

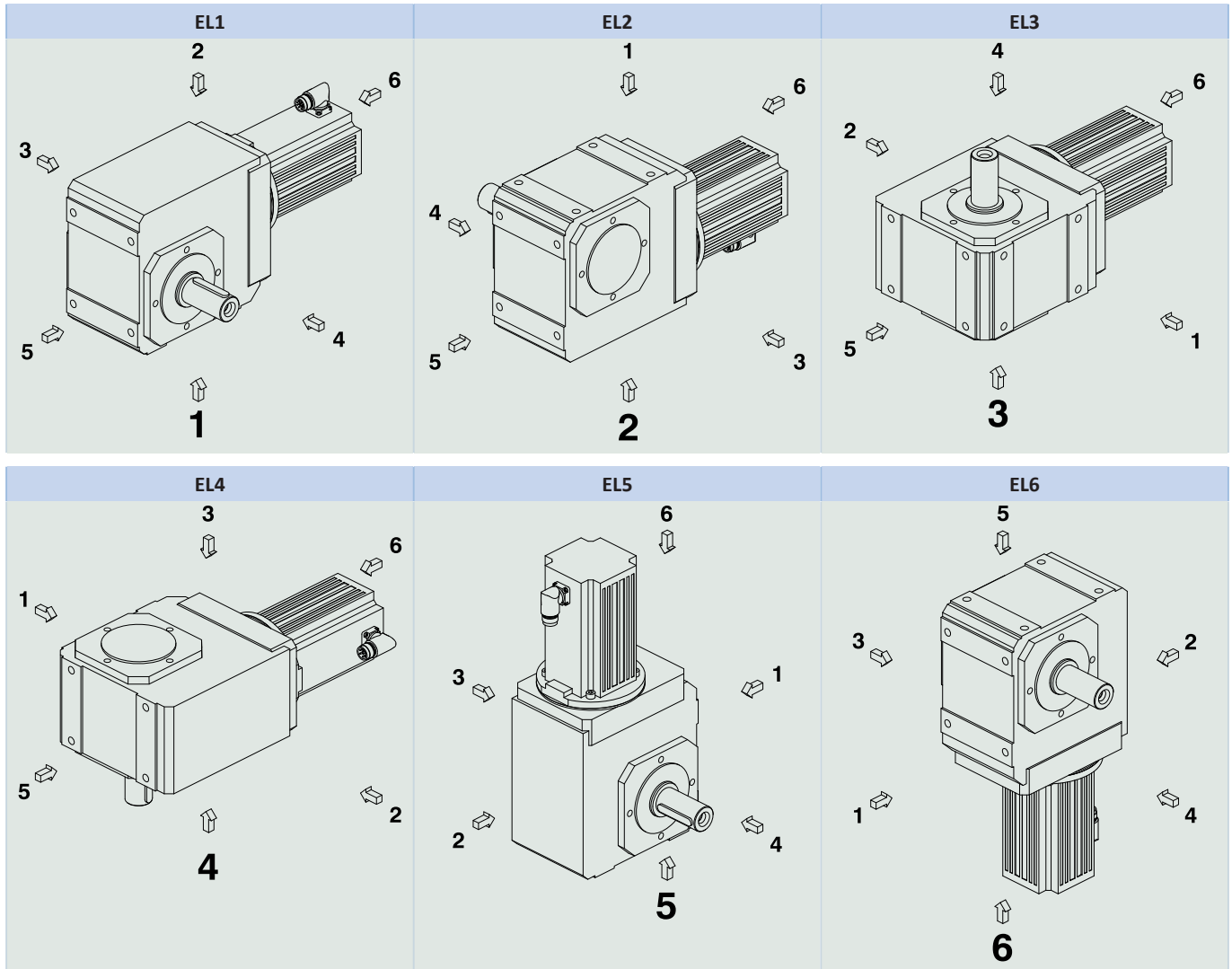
The specified torques and forces only apply when attaching gear units at the machine side using screws of quality 10.9. In addition, the gear housing must be adjusted at the pilot (H7).

## 12.5.4 Installation positions

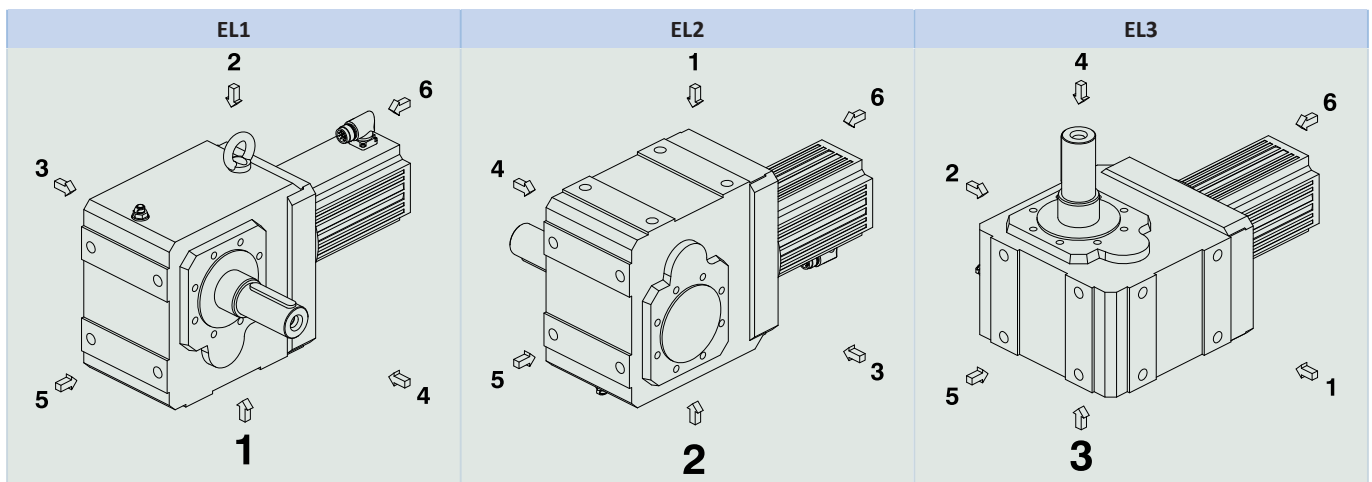
The following table shows the standard installation positions.

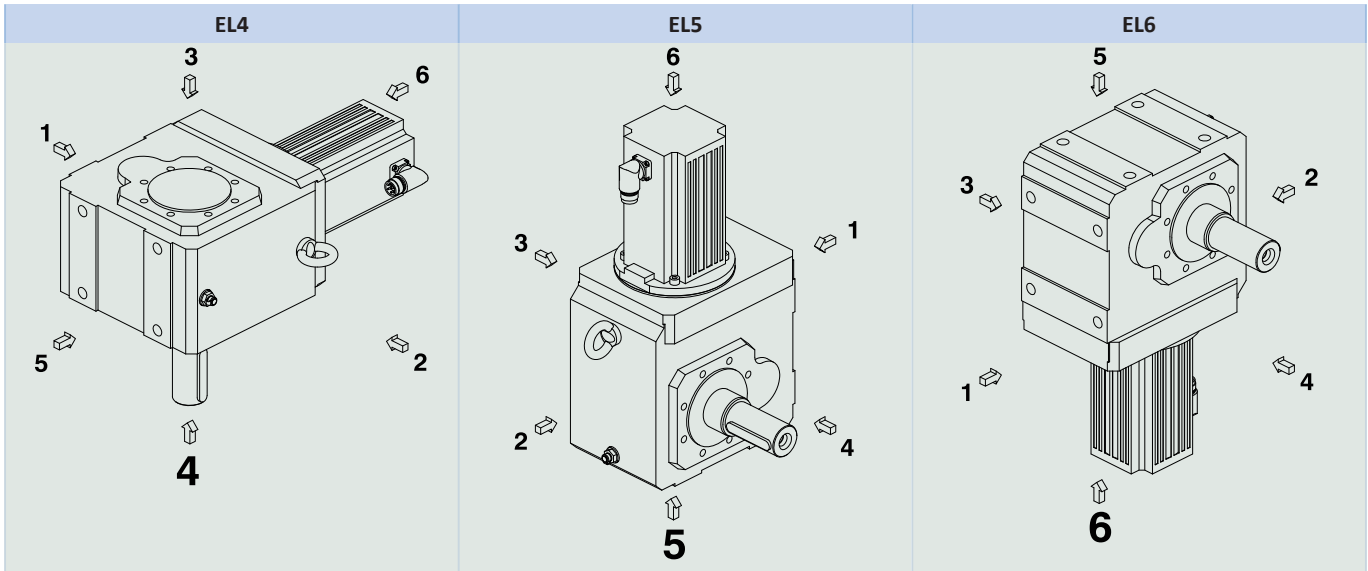
The numbers identify the gear unit sides. The installation position is defined by the gear side facing downwards.

Installation positions for gear unit sizes K1 – K4



Installation positions for gear unit sizes K5 – K10





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

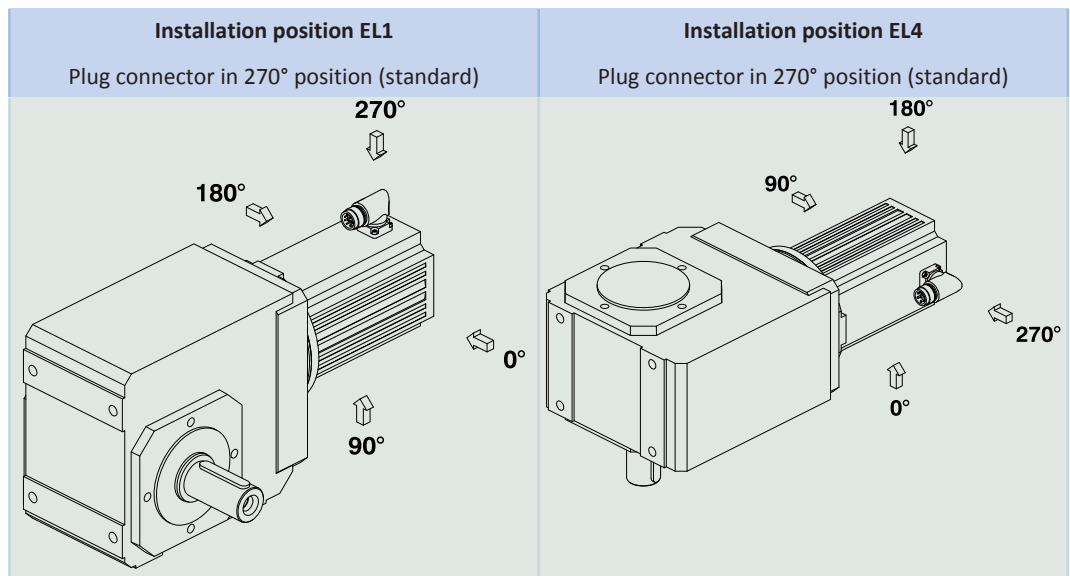
### 12.5.5 Lubricants

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

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

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

### 12.5.6 Position of the plug connector



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.

## 12.5.7 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

## 12.5.8 Maintenance

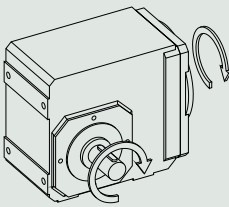
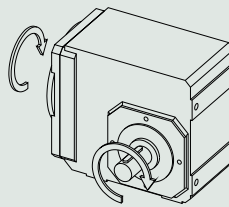
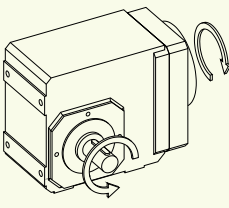
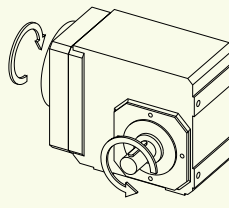
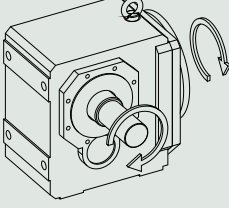
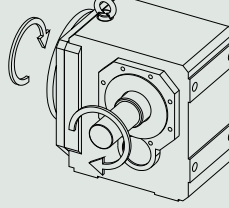
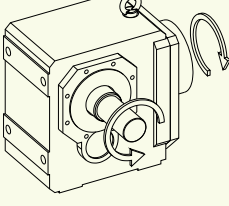
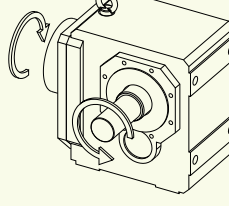
The instructions for maintenance can be found in the operating manual, ID 443027\_en, at <http://www.stoeber.de/en/download>.

### Ventilation

Air release valves are fitted as a standard feature for gear unit sizes K5 to K10.

## 12.5.9 Direction of rotation

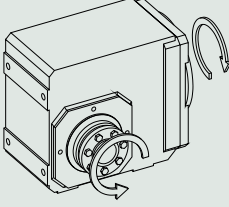
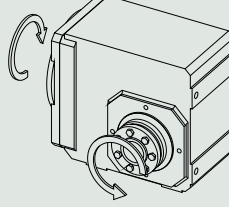
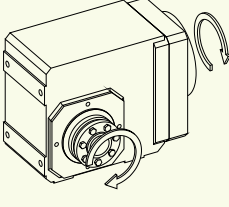
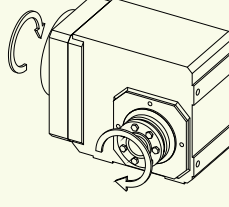
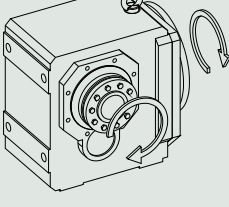
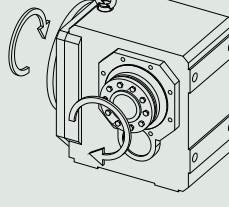
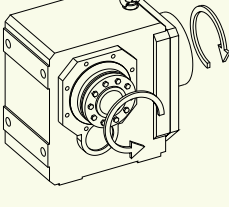
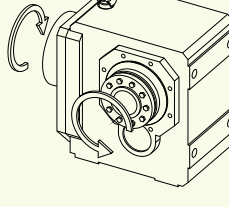
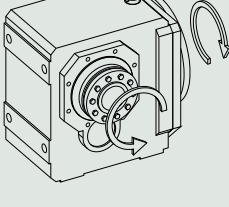
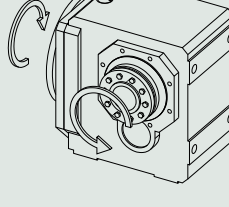
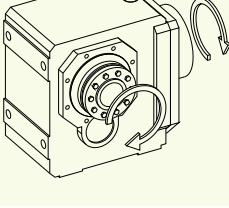
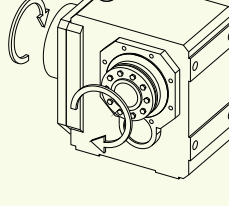
Solid shaft (V), solid shaft on both sides (V), hollow shaft with keyway (A)

Type	Output side 4	Output side 3
K102 – K402		
K203 – K403		
K513 – K1013		
K514 – K1014		

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	Shrink disk side 4	Shrink disk side 3
K102 – K402		
K203 – K403		
K513 – K813		
K514 – K814		
K913 – K1013		
K914 – K1014		

The pictures show installation position EL1.

## 12.6 Project configuration

Project your drives using our SERVOnsoft designing software. You can receive SERVOnsoft 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.

An explanation of the formula symbols can be found in Chapter Symbols in formulas.

### 12.6.1 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:

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

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

$$n_{1m^*} \leq \frac{n_{1maxDBEL3,4,5,6}}{fB_T}$$

For all installation positions:

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

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

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

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

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

**Notes**

Note that for gear units with backlash class I the maximum permitted input speed of the gear unit in continuous operation is reduced by 20%.

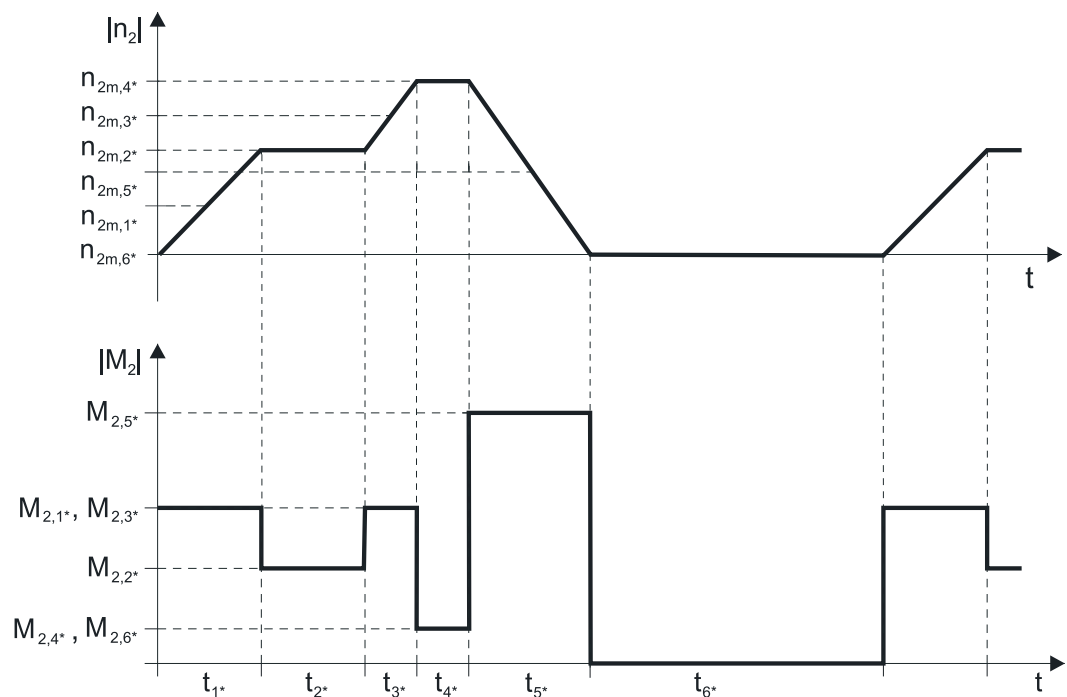
Refer to the selection tables for the values for  $n_{1maxDBEL1,2}$  and  $n_{1maxDBEL3,4,5,6}$ ,  $n_{1maxZB}$ ,  $M_{2acc}$ ,  $M_{2NOT}$ ,  $M_{2N}$  and  $S$ .

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 cyclic operation**

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

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

#### Calculation of the actual equivalent torque

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

#### Calculation of the thermal limit torque

Calculate the thermal limit torque  $M_{2\text{th}}$  for a duty cycle  $ED_{20} > 50\%$  and the actual average input speed  $n_{1m^*}$ . (At  $K_{\text{mot,th}} \leq 0$  you must reduce the average input speed  $n_{1m^*}$  accordingly or select another geared motor size.)

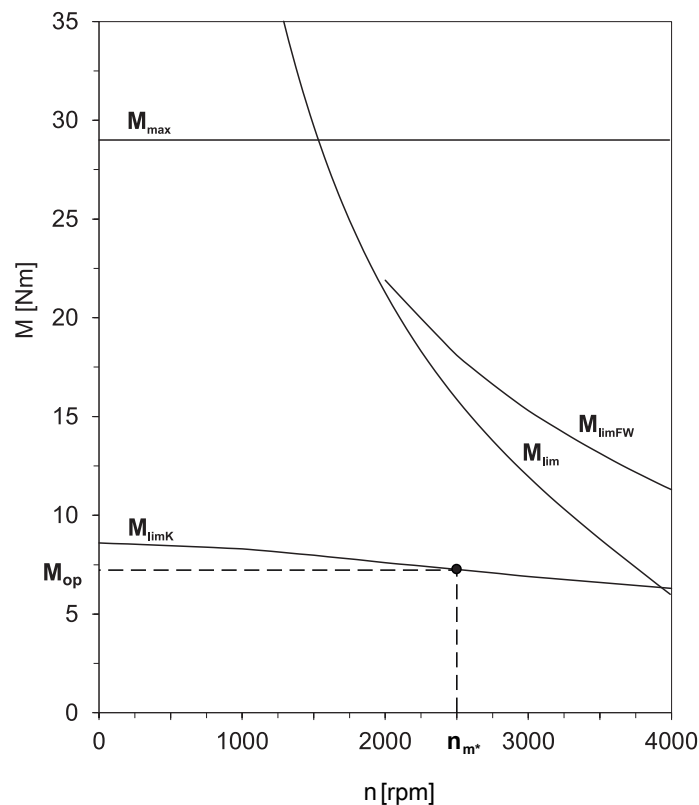
$$M_{2\text{th}} = M_{\text{op}} \cdot i \cdot K_{\text{mot,th}}$$

$$K_{\text{mot,th}} = 0,95 - \frac{a_{\text{th}}}{1000} \cdot \text{athEL} \cdot f_{\text{B}_T} \cdot \left(\frac{n_{1m^*}}{1000}\right)^2$$

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

The values for  $f_{\text{B}_T}$  can be found in the corresponding table 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 [▶ 2.3](#). Note the size and nominal speed  $n_N$  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  $a_{thEL}$** 

Installation position		$a_{thEL}$
EL1, 2		1.0
EL3, 4, 5, 6		1.1
Operating mode		$fB_{op}$
Uniform continuous operation		1.00
Cyclic operation		1.25
Reversing load cyclic operation		1.40
Run time		$fB_t$
Daily run time $\leq 8$ h		1.00
Daily run time $\leq 16$ h		1.15
Daily run time $\leq 24$ h		1.20
Temperature		$fB_T$
Motor cooling	Surrounding temperature	
Motor with convection cooling	$\leq 20$ °C	1.0
	$\leq 30$ °C	1.1
	$\leq 40$ °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 ( $M_{2acc}$ ,  $M_{2NOT}$ ) in the selection tables.

## 12.6.2 Permitted shaft loads for the output shaft

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

- For shaft dimensions in accordance with the catalog
- For output speeds  $n_{2m^*} \leq 20$  rpm ( $F_{2axN} = F_{2ax20}$ ;  $F_{2radN} = F_{2rad20}$ ;  $M_{2kN} = M_{2k20}$ )
- Only if radial forces on the gear unit are stabilized by its pilots (housing, flange shaft)

### 12.6.2.1 V shaft design

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

Type	$z_2$ [mm]	$F_{2ax20}$ [N]	$F_{2rad20}$ [N]	$M_{2k20}$ [Nm]
K1	40.0	1900	5000	360
K2	42.0	2100	6000	430
K3	45.0	2400	7000	525
K4	52.0	3500	11200	1050
K5	72.0	3500	13450	1580
K6	72.0	4000	16000	1960
K8	60.0	7250	29000	3800
K9	87.0	16500	65000	11200
K10	84.0	25000	80000	15200

Reduced values apply in the case of a V shaft design (solid shaft) in conjunction with an NF housing design (foot + round flange):

Type	$z_2$ [mm]	$F_{2ax20}$ [N]	$F_{2rad20}$ [N]	$M_{2k20}$ [Nm]
K10	132.0	25000	64000	15200

For the V solid shaft design on both sides, the values for  $F_{2rad20}$  and  $M_{2k20}$  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  $n_{2m^*} > 20$  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.

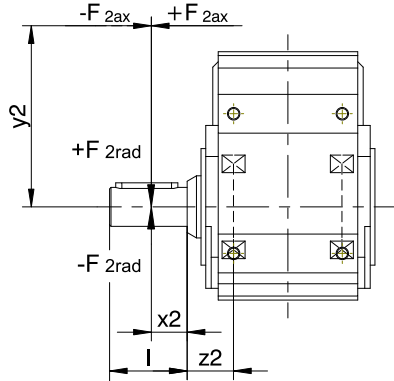


Fig. 1: Force application points for solid shaft

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.

### 12.6.2.2 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]
K1	40.0	1900	5000	240
K2	42.0	2100	6000	310
K3	45.0	2400	7000	380
K4	52.0	3500	11200	740
K5	39.0	2500	13450	1000
K6	42.0	3000	16000	1300
K7	45.0	4100	22000	2100
K8	50.0	5300	29000	2600
K9	56.0	7000	65000	3600
K10	56.0	9000	80000	5000

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]
K1	40.0	1900	5000	240
K2	42.0	2100	6000	310
K3	45.0	2400	7000	380
K4	52.0	3500	11200	740
K5	39.0	2500	13450	1000
K6	42.0	3000	16000	1300
K7	45.0	4100	22000	2100
K8	50.0	5300	29000	2600
K9	56.0	7000	65000	3600
K10	56.0	9000	80000	5000

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

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

$$F_{2axN} = \frac{F_{2ax20}}{\sqrt[3]{\frac{n_{2m^*}}{20 \text{ rpm}}}}$$

$$F_{2radN} = \frac{F_{2rad20}}{\sqrt[3]{\frac{n_{2m^*}}{20 \text{ rpm}}}}$$

$$M_{2kN} = \frac{M_{2k20}}{\sqrt[3]{\frac{n_{2m^*}}{20 \text{ rpm}}}}$$

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

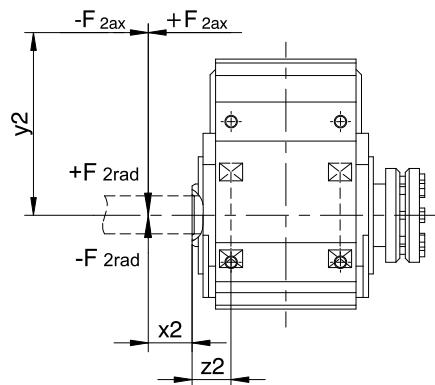


Fig. 2: Force application points for hollow shaft

You can determine the permitted radial forces from the permitted breakdown torque  $M_{2kN^*}$ . The actual radial forces may not exceed the permitted radial forces. The permitted radial forces are in relation to 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.

### 12.6.3 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 a gear unit. If you use a 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.

## 12.6.4 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°!
- The oil expansion tank can only be used with certain sizes; see the chapter [▶ 12.3.15]

## 12.7 Additional documentation

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

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

Documentation	ID
Operating manual for C/F/K/S gear units and gear motors	443027_en
Lubricant filling quantities for gear units	441871