

8.3 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 3D models of our standard drives at <https://configurator.stoeber.de/en-US/>.

Combination options and the dimensions of forced ventilated geared motors can also be found at <https://configurator.stoeber.de/en-US/>.

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 Ø fit ≤ 50 mm	DIN 748-1, ISO k6
Shaft Ø fit > 50 mm	DIN 748-1, ISO m6
Feather keys	DIN 6885-1, high form A

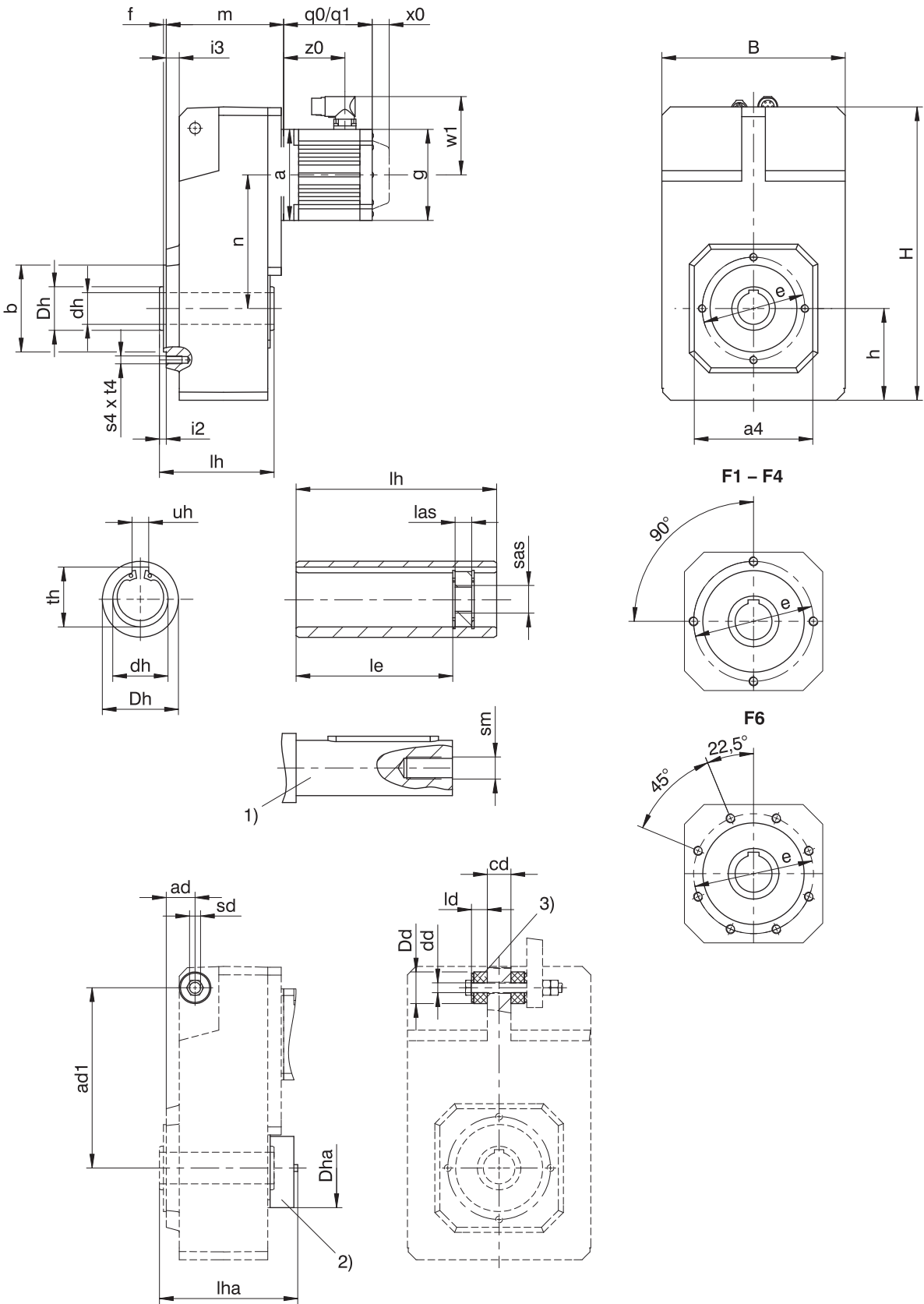
Hollow shaft	Tolerance
Hollow shaft hole fit	ISO H7
Feather keys	DIN 6885-1, high form

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

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



- q0 Applies to motors without brake.
- x0 E22: Applies only to motors with brake and encoders using an optical or inductive measuring method
E23 – E28: Applies to encoders using an optical measuring method
- 1) The length of the machine shaft must be at least 2.2 x $\varnothing d_h$ and the length of the feather key must be at least 2 x $\varnothing d_h$.

- q1 Applies to motors with brake.
- Different for the One Cable Solution (OCS), see the chapter [17.4](#)
- 2) Cover (optional)

- 3) Rubber buffer for torque arm bracket (optional). Dimension $\varnothing Dd$ = outer diameter of the rubber buffer when not tensioned.

Dimensions of gear units

Type	$\square a4$	ad	ad1	$\varnothing b$	B	cd	$\varnothing dd$	$\varnothing dh$	$\varnothing Dd$	$\varnothing Dh$	$\varnothing Dha$	$\varnothing e$	f	h	H	i2	i3	ld	le	lh	las	lha	s4	sd	sm	sas	t4	th	uh
F1	100	28.5	150	70 _{j6}	145	20	11.0 ^{+0.5}	20 ^{H7}	30	35	70	85	2.5	74	238.0	6.5	12.5	15	73	95	12	112	M8	M10	M6	M8	13	22.8	6 ^{JS9}
F2	130	32.0	181	95 _{j6}	180	22	11.0 ^{+0.5}	25 ^{H7}	30	45	82	115	3.0	93	299.0	8.0	15.0	15	92	115	12	132	M8	M10	M10	M12	13	28.3	8 ^{JS9}
F3	150	36.5	205	110 _{j6}	206	30	14.0 ^{+0.5}	30 ^{H7}	37	50	88	130	3.5	106	335.5	8.5	16.5	20	103	130	12	157	M10	M12	M10	M12	16	33.3	8 ^{JS9}
F4	150	36.5	228	110 _{j6}	230	30	14.0 ^{+0.5}	40 ^{H7}	37	55	100	130	3.5	116	370.0	8.5	16.5	20	114	145	12	175	M10	M12	M16	M20	16	43.3	12 ^{JS9}
F6	180	44.5	270	130 _{j6}	265	35	22.0 ^{+0.5}	50 ^{H7}	60	70	115	165	3.5	137	433.0	10.5	20.5	30	143	180	12	194	M10	M20	M16	M20	16	53.8	14 ^{JS9}

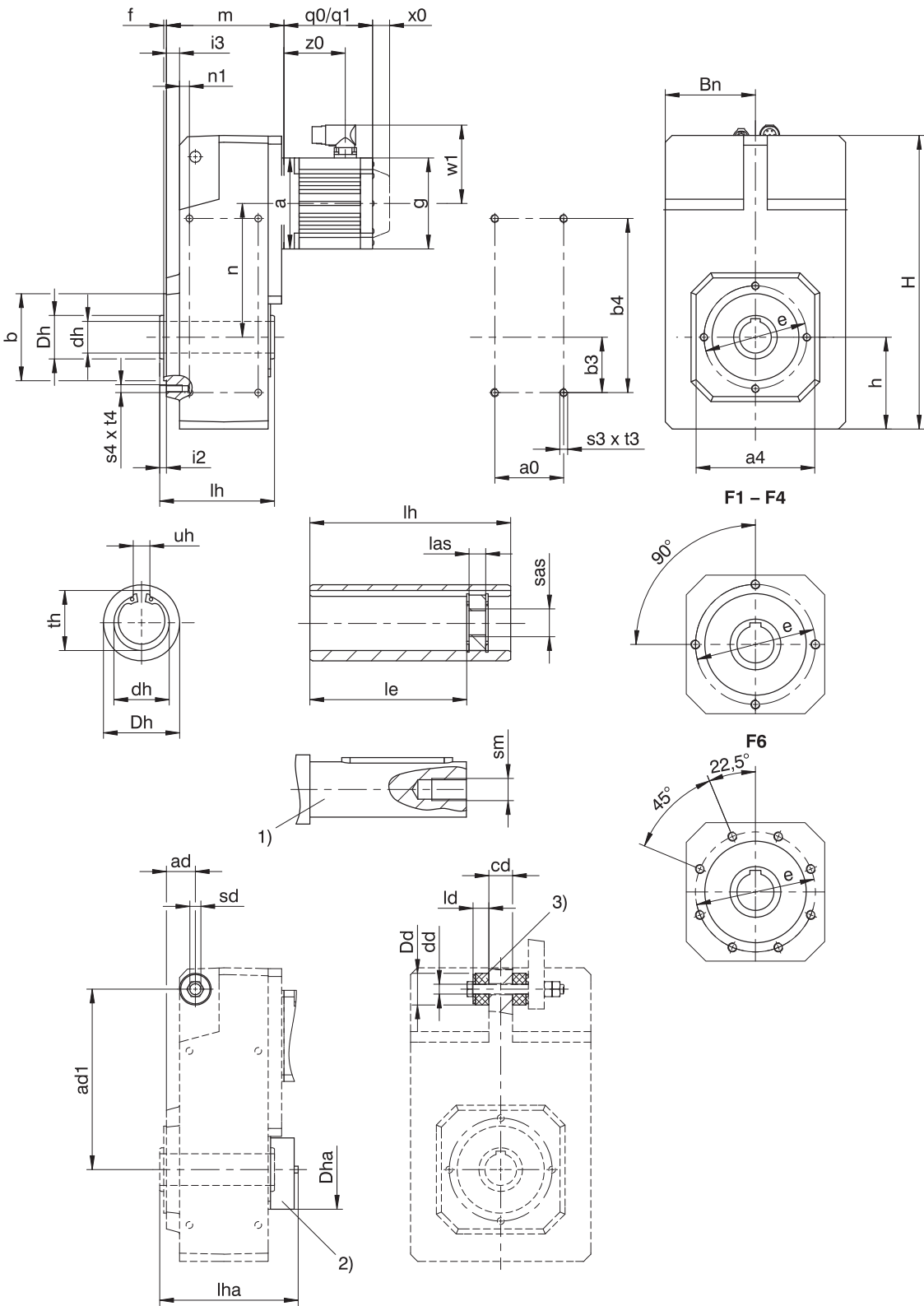
Dimensions of motors

Type	$\square g$	q0	q1	w1	x0	z0
EZ203U	55	166.0	175.0	47.0	25	111.0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
EZ503U	115	162.0	216.5	100.0	22	127.5
EZ505U	115	212.0	266.5	100.0	22	177.5
EZ701U	145	125.0	184.0	115.0	22	87.0
EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5
EZ803U	190	273.5	350.5	156.5	22	219.5
EZ805U	190	355.5	432.5	156.5	22	301.5

Dimensions of geared motors

Type	EZ2			EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
F102	$\square 55$	97.5	102.0	$\square 72$	97.5	102.0	$\square 98$	97.5	102.0	$\square 115$	101.5	102.0	$\square 145$	103.5	102.0	—	—	—
F202	—	—	—	$\square 72$	115.0	131.0	$\square 98$	115.0	131.0	$\square 115$	119.0	131.0	$\square 145$	121.0	131.0	—	—	—
F203	—	—	—	$\varnothing 140$	152.0	131.0	—	—	—	—	—	—	—	—	—	—	—	—
F302	—	—	—	$\varnothing 140$	129.5	149.5	$\varnothing 140$	129.5	149.5	$\square 115$	133.5	149.5	$\square 145$	135.5	149.5	—	—	—
F303	—	—	—	$\varnothing 140$	166.5	149.5	—	—	—	—	—	—	—	—	—	—	—	—
F402	—	—	—	—	—	—	—	—	—	$\varnothing 160$	148.5	169.0	$\square 145$	150.5	169.0	$\square 190$	153.5	169.0
F403	—	—	—	$\varnothing 140$	181.5	169.0	$\varnothing 140$	181.5	169.0	$\varnothing 160$	191.5	132.0	—	—	—	—	—	—
F602	—	—	—	—	—	—	—	—	—	$\varnothing 160$	179.5	196.0	$\square 145$	181.5	196.0	$\square 190$	184.5	196.0
F603	—	—	—	—	—	—	—	—	—	$\varnothing 160$	222.5	196.0	—	—	—	—	—	—

8.3.2 A shaft design (hollow shaft), GN housing design (pitch circle diameter + side fastening)



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x0	EZ2: Applies only to motors with brake and encoders using an optical or inductive measuring method EZ3 – EZ8: Applies to encoders using an optical measuring method		Different for the One Cable Solution (OCS), see the chapter 17.4
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) Rubber buffer for torque arm bracket (optional). Dimension $\varnothing Dd$ = outer diameter of the rubber buffer when not tensioned.

Dimensions of gear units

Type	a0	□a4	ad	ad1	Øb	b3	b4	Bn	cd	Ødd	Ødh	ØDd	ØDh	ØDha	Øe	f	h	H
F1	50	100	28.5	150	70 _{j6}	40	140	71	20	11.0 ^{+0.5}	20 ^{H7}	30	35	70	85	2.5	74	238.0
F2	64	130	32.0	181	95 _{j6}	55	175	88	22	11.0 ^{+0.5}	25 ^{H7}	30	45	82	115	3.0	93	299.0
F3	72	150	36.5	205	110 _{j6}	60	200	102	30	14.0 ^{+0.5}	30 ^{H7}	37	50	88	130	3.5	106	335.5
F4	87	150	36.5	228	110 _{j6}	70	220	114	30	14.0 ^{+0.5}	40 ^{H7}	37	55	100	130	3.5	116	370.0
F6	108	180	44.5	270	130 _{j6}	85	270	131	35	22.0 ^{+0.5}	50 ^{H7}	60	70	115	165	3.5	137	433.0

Type	i2	i3	ld	le	lh	las	lha	n1	s3	s4	sd	sm	sas	t3	t4	th	uh
F1	6.5	12.5	15	73	95	12	112	10.0	M6	M8	M10	M6	M8	11	13	22.8	6 ^{JS9}
F2	8.0	15.0	15	92	115	12	132	10.5	M8	M8	M10	M10	M12	13	13	28.3	8 ^{JS9}
F3	8.5	16.5	20	103	130	12	157	12.5	M10	M10	M12	M10	M12	16	16	33.3	8 ^{JS9}
F4	8.5	16.5	20	114	145	12	175	12.5	M10	M10	M12	M16	M20	16	16	43.3	12 ^{JS9}
F6	10.5	20.5	30	143	180	12	194	15.5	M12	M10	M20	M16	M20	19	16	53.8	14 ^{JS9}

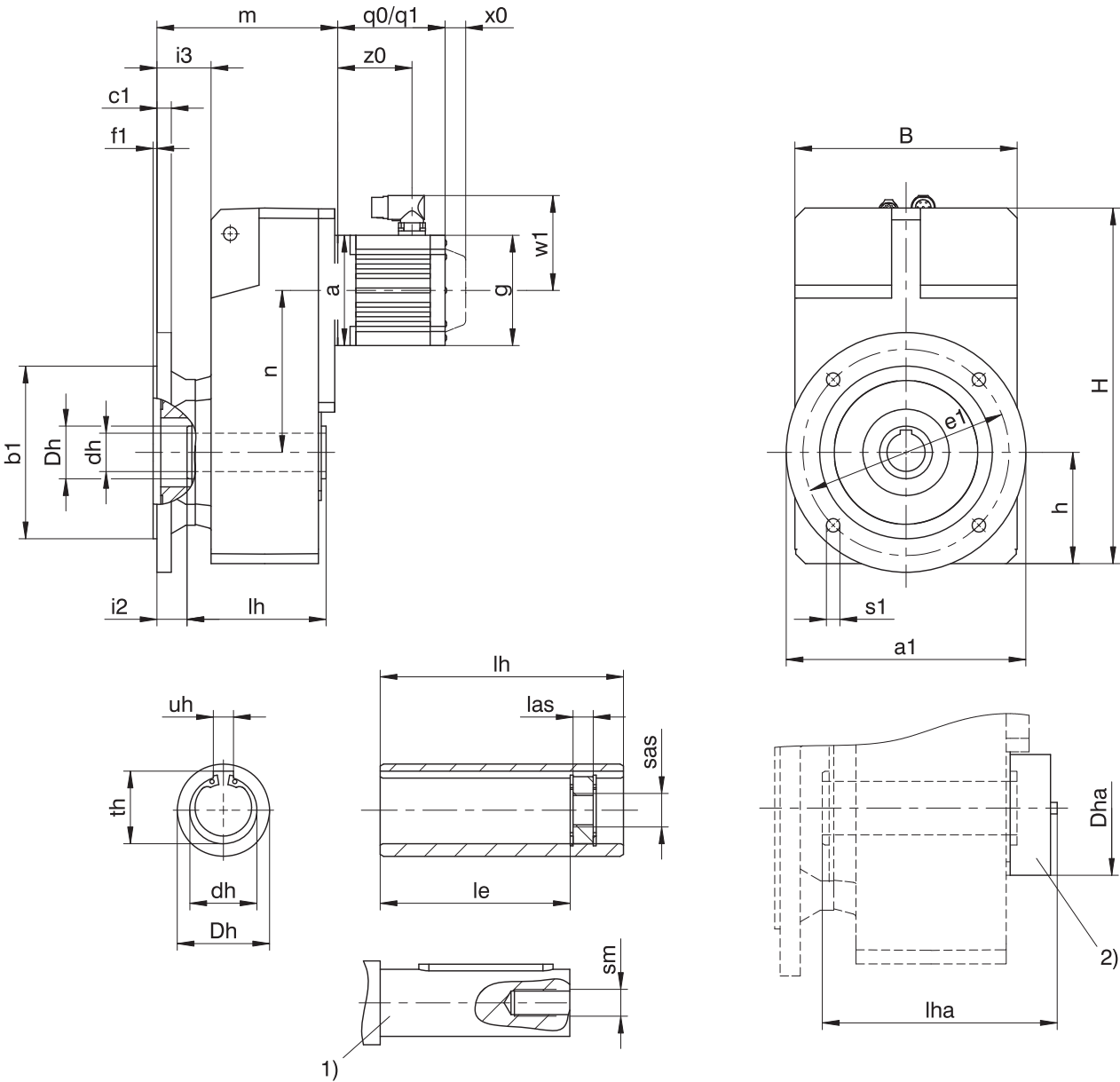
Dimensions of motors

Type	□g	q0	q1	w1	x0	z0
EZ203U	55	166.0	175.0	47.0	25	111.0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
EZ503U	115	162.0	216.5	100.0	22	127.5
EZ505U	115	212.0	266.5	100.0	22	177.5
EZ701U	145	125.0	184.0	115.0	22	87.0
EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5
EZ803U	190	273.5	350.5	156.5	22	219.5
EZ805U	190	355.5	432.5	156.5	22	301.5

Dimensions of geared motors

Type	EZ2			EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
F102	□55	97.5	102.0	□72	97.5	102.0	□98	97.5	102.0	□115	101.5	102.0	□145	103.5	102.0	–	–	–
F202	–	–	–	□72	115.0	131.0	□98	115.0	131.0	□115	119.0	131.0	□145	121.0	131.0	–	–	–
F203	–	–	–	Ø140	152.0	131.0	–	–	–	–	–	–	–	–	–	–	–	–
F302	–	–	–	Ø140	129.5	149.5	Ø140	129.5	149.5	□115	133.5	149.5	□145	135.5	149.5	–	–	–
F303	–	–	–	Ø140	166.5	149.5	–	–	–	–	–	–	–	–	–	–	–	–
F402	–	–	–	–	–	–	–	–	–	Ø160	148.5	169.0	□145	150.5	169.0	□190	153.5	169.0
F403	–	–	–	Ø140	181.5	169.0	Ø140	181.5	169.0	Ø160	191.5	132.0	–	–	–	–	–	–
F602	–	–	–	–	–	–	–	–	–	Ø160	179.5	196.0	□145	181.5	196.0	□190	184.5	196.0
F603	–	–	–	–	–	–	–	–	–	Ø160	222.5	196.0	–	–	–	–	–	–

8.3.3 A shaft design (hollow shaft), F housing design (round flange)



- q0

Applies to motors without brake.

q1

Applies to motors with brake.
- x0

EZ2: Applies only to motors with brake and encoders using w1 an optical or inductive measuring method
EZ3 – EZ8: Applies to encoders using an optical measuring method

Different for the One Cable Solution (OCS), see the chapter [17.4](#)
- 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)

Dimensions of gear units

Type	$\varnothing a1$	$\varnothing b1$	B	c1	$\varnothing dh$	$\varnothing Dh$	$\varnothing Dha$	$\varnothing e1$	f1	h	H	i2	i3	le	lh	las	lha	$\varnothing s1$	sm	sas	th	uh
F1	160	110 _{β}	145	10	20 ^{H7}	35	70	130	3.5	74	238.0	25.5	44.5	73	95	12	112	9	M6	M8	22.8	6 ^{JS9}
F2	200	130 _{β}	180	14	25 ^{H7}	45	82	165	3.5	93	299.0	30.0	53.0	92	115	12	132	11	M10	M12	28.3	8 ^{JS9}
F3	250	180 _{β}	206	15	30 ^{H7}	50	88	215	4.0	106	335.5	31.5	56.5	103	130	12	157	14	M10	M12	33.3	8 ^{JS9}
F4	250	180 _{β}	230	15	40 ^{H7}	55	100	215	4.0	116	370.0	31.5	56.5	114	145	12	175	14	M16	M20	43.3	12 ^{JS9}
F6	300	230 _{β}	265	17	50 ^{H7}	70	115	265	4.0	137	433.0	29.5	60.5	143	180	12	194	14	M16	M20	53.8	14 ^{JS9}

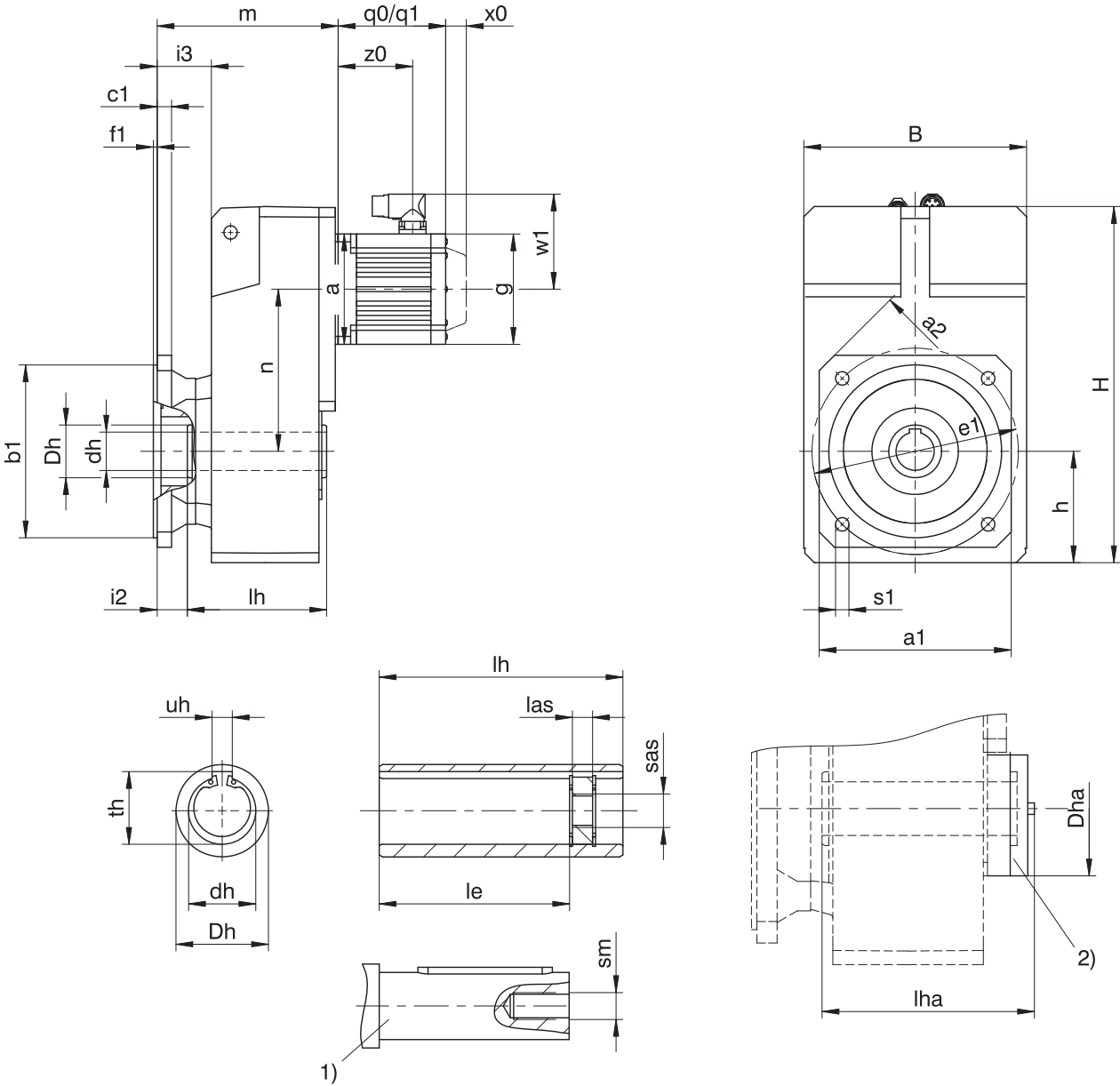
Dimensions of motors

Type	□g	q0	q1	w1	x0	z0
EZ203U	55	166.0	175.0	47.0	25	111.0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
EZ503U	115	162.0	216.5	100.0	22	127.5
EZ505U	115	212.0	266.5	100.0	22	177.5
EZ701U	145	125.0	184.0	115.0	22	87.0
EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5
EZ803U	190	273.5	350.5	156.5	22	219.5
EZ805U	190	355.5	432.5	156.5	22	301.5

Dimensions of geared motors

Type	EZ2			EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
F102	□55	129.5	102.0	□72	129.5	102.0	□98	129.5	102.0	□115	133.5	102.0	□145	135.5	102.0	–	–	–
F202	–	–	–	□72	153.0	131.0	□98	153.0	131.0	□115	157.0	131.0	□145	159.0	131.0	–	–	–
F203	–	–	–	Ø140	190.0	131.0	–	–	–	–	–	–	–	–	–	–	–	–
F302	–	–	–	Ø140	169.5	149.5	Ø140	169.5	149.5	□115	173.5	149.5	□145	175.5	149.5	–	–	–
F303	–	–	–	Ø140	206.5	149.5	–	–	–	–	–	–	–	–	–	–	–	–
F402	–	–	–	–	–	–	–	–	–	Ø160	188.5	169.0	□145	190.5	169.0	□190	193.5	169.0
F403	–	–	–	Ø140	221.5	169.0	Ø140	221.5	169.0	Ø160	231.5	132.0	–	–	–	–	–	–
F602	–	–	–	–	–	–	–	–	–	Ø160	219.5	196.0	□145	221.5	196.0	□190	224.5	196.0
F603	–	–	–	–	–	–	–	–	–	Ø160	262.5	196.0	–	–	–	–	–	–

8.3.4 A shaft design (hollow shaft), Q housing design (square flange)



- q0

Applies to motors without brake.
- q1

Applies to motors with brake.
- x0

EZ2: Applies only to motors with brake and encoders using an optical or inductive measuring method
EZ3 – EZ8: Applies to encoders using an optical measuring method
- 1)

The length of the machine shaft must be at least 2.2 x Ødh and the length of the feather key must be at least 2 x Ødh.
- 2)

Cover (optional)
- Different for the One Cable Solution (OCS), see the chapter [17.4](#)

Dimensions of gear units

Type	□a1	□a2	Øb1	B	c1	Ødh	ØDh	ØDha	Øe1	f1	h	H	i2	i3	le	lh	las	lha	Øs1	sm	sas	th	uh
F1	125	160	110 _{js}	145	10	20 ^{H7}	35	70	130	3.5	74	238.0	25.5	44.5	73	95	12	112	9	M6	M8	22.8	6 ^{JS9}
F2	150	195	130 _{js}	180	14	25 ^{H7}	45	82	165	3.5	93	299.0	30.0	53.0	92	115	12	132	11	M10	M12	28.3	8 ^{JS9}
F3	200	260	180 _{js}	206	15	30 ^{H7}	50	88	215	4.0	106	335.5	31.5	56.5	103	130	12	157	14	M10	M12	33.3	8 ^{JS9}
F4	200	260	180 _{js}	230	15	40 ^{H7}	55	100	215	4.0	116	370.0	31.5	56.5	114	145	12	175	14	M16	M20	43.3	12 ^{JS9}
F6	250	325	230 _{js}	265	17	50 ^{H7}	70	115	265	4.0	137	433.0	29.5	60.5	143	180	12	194	14	M16	M20	53.8	14 ^{JS9}

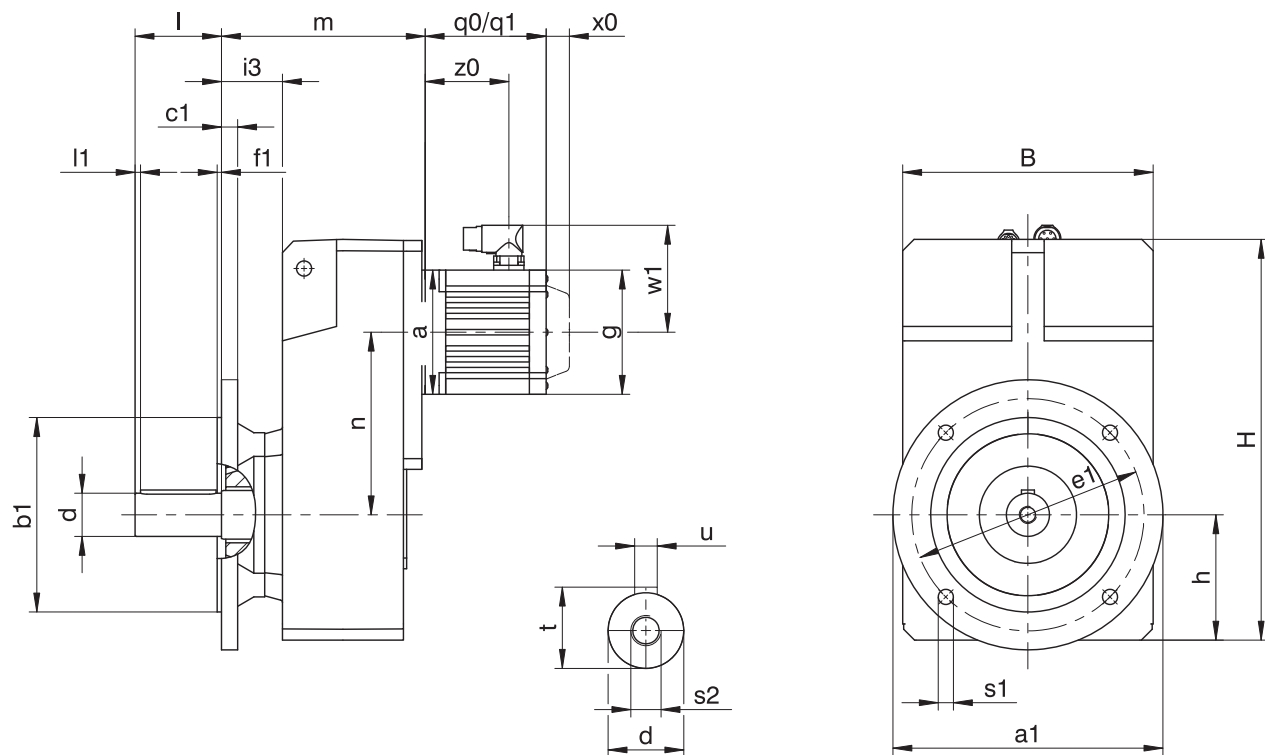
Dimensions of motors

Type	□g	q0	q1	w1	x0	z0
EZ203U	55	166.0	175.0	47.0	25	111.0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
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EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5
EZ803U	190	273.5	350.5	156.5	22	219.5
EZ805U	190	355.5	432.5	156.5	22	301.5

Dimensions of geared motors

Type	EZ2			EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
F102	□55	129.5	102.0	□72	129.5	102.0	□98	129.5	102.0	□115	133.5	102.0	□145	135.5	102.0	–	–	–
F202	–	–	–	□72	153.0	131.0	□98	153.0	131.0	□115	157.0	131.0	□145	159.0	131.0	–	–	–
F203	–	–	–	Ø140	190.0	131.0	–	–	–	–	–	–	–	–	–	–	–	–
F302	–	–	–	Ø140	169.5	149.5	Ø140	169.5	149.5	□115	173.5	149.5	□145	175.5	149.5	–	–	–
F303	–	–	–	Ø140	206.5	149.5	–	–	–	–	–	–	–	–	–	–	–	–
F402	–	–	–	–	–	–	–	–	–	Ø160	188.5	169.0	□145	190.5	169.0	□190	193.5	169.0
F403	–	–	–	Ø140	221.5	169.0	Ø140	221.5	169.0	Ø160	231.5	132.0	–	–	–	–	–	–
F602	–	–	–	–	–	–	–	–	–	Ø160	219.5	196.0	□145	221.5	196.0	□190	224.5	196.0
F603	–	–	–	–	–	–	–	–	–	Ø160	262.5	196.0	–	–	–	–	–	–

8.3.5 V shaft design (solid shaft), F housing design (round flange)



q0 Applies to motors without brake.

q1

Applies to motors with brake.

x0 EZ2: Applies only to motors with brake and encoders using an optical or inductive measuring method
EZ3 – EZ8: Applies to encoders using an optical measuring method

Different for the One Cable Solution (OCS), see the chapter [17.4](#)

Dimensions of gear units

Type	Øa1	Øb1	B	c1	Ød	Øe1	f1	h	H	i3	l	l1	Øs1	s2	t	u
F1	160	110 _{j6}	145	10	25 _{k6}	130	3.5	74	238.0	44.5	50	5	9	M10	28.0	A8×7×40
F2	200	130 _{j6}	180	14	30 _{k6}	165	3.5	93	299.0	53.0	60	5	11	M10	33.0	A8×7×50
F3	250	180 _{j6}	206	15	35 _{k6}	215	4.0	106	335.5	56.5	70	5	14	M12	38.0	A10×8×60
F4	250	180 _{j6}	230	15	40 _{k6}	215	4.0	116	370.0	56.5	80	5	14	M16	43.0	A12×8×70
F6	300	230 _{j6}	265	17	50 _{k6}	265	4.0	137	433.0	60.5	100	5	14	M16	53.5	A14×9×90

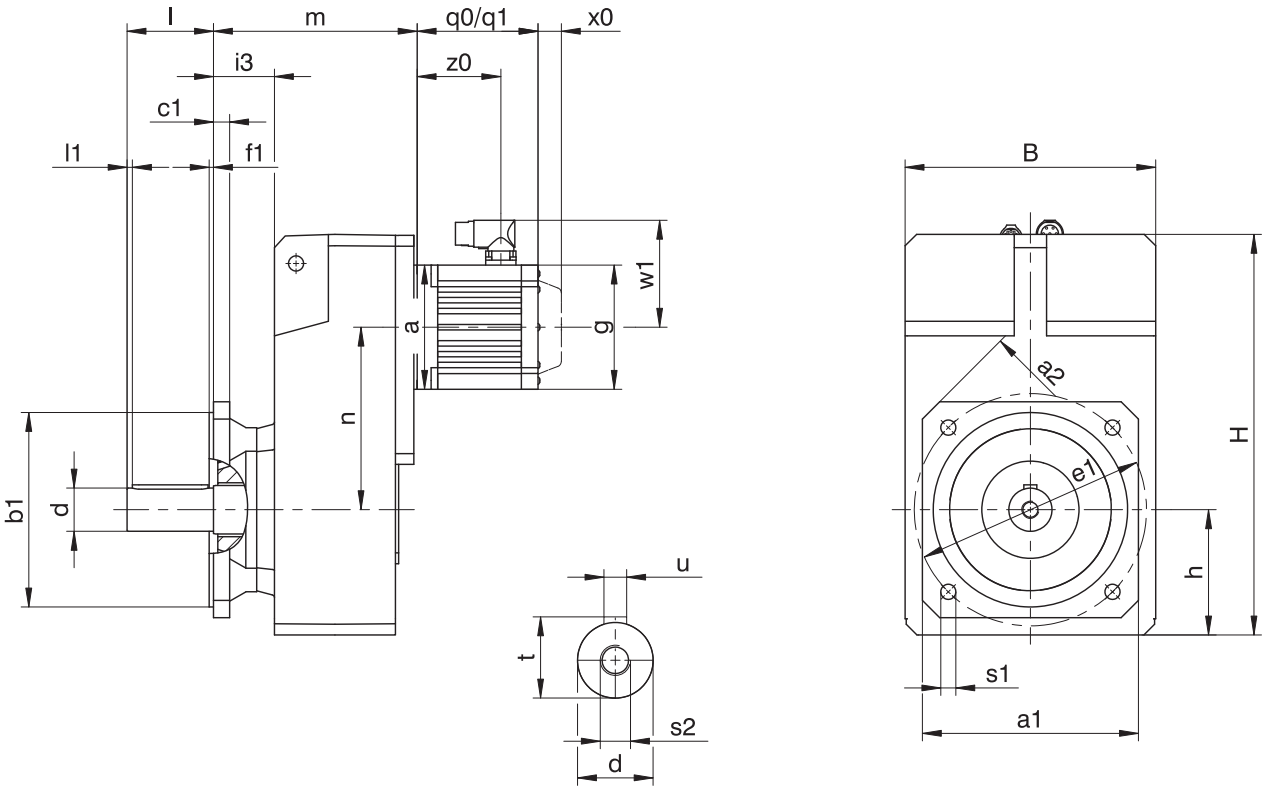
Dimensions of motors

Type	□g	q0	q1	w1	x0	z0
EZ203U	55	166.0	175.0	47.0	25	111.0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
EZ503U	115	162.0	216.5	100.0	22	127.5
EZ505U	115	212.0	266.5	100.0	22	177.5
EZ701U	145	125.0	184.0	115.0	22	87.0
EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5
EZ803U	190	273.5	350.5	156.5	22	219.5
EZ805U	190	355.5	432.5	156.5	22	301.5

Dimensions of geared motors

Type	EZ2			EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
F102	□55	129.5	102.0	□72	129.5	102.0	□98	129.5	102.0	□115	133.5	102.0	□145	135.5	102.0	–	–	–
F202	–	–	–	□72	153.0	131.0	□98	153.0	131.0	□115	157.0	131.0	□145	159.0	131.0	–	–	–
F203	–	–	–	Ø140	190.0	131.0	–	–	–	–	–	–	–	–	–	–	–	–
F302	–	–	–	Ø140	169.5	149.5	Ø140	169.5	149.5	□115	173.5	149.5	□145	175.5	149.5	–	–	–
F303	–	–	–	Ø140	206.5	149.5	–	–	–	–	–	–	–	–	–	–	–	–
F402	–	–	–	–	–	–	–	–	–	Ø160	188.5	169.0	□145	190.5	169.0	□190	193.5	169.0
F403	–	–	–	Ø140	221.5	169.0	Ø140	221.5	169.0	Ø160	231.5	132.0	–	–	–	–	–	–
F602	–	–	–	–	–	–	–	–	–	Ø160	219.5	196.0	□145	221.5	196.0	□190	224.5	196.0
F603	–	–	–	–	–	–	–	–	–	Ø160	262.5	196.0	–	–	–	–	–	–

8.3.6
V shaft design (solid shaft), Q housing design (square flange)



- q0

Applies to motors without brake.
- q1

Applies to motors with brake.
- x0

EZ2: Applies only to motors with brake and encoders using an optical or inductive measuring method
- EZ3 – EZ8: Applies to encoders using an optical measuring method
- w1

Different for the One Cable Solution (OCS), see the chapter [17.4](#)

Dimensions of gear units

Type	□a1	□a2	Øb1	c1	B	Ød	Øe1	f1	h	H	i3	l	l1	Øs1	s2	t	u
F1	125	160	110 _⌀	10	145	25 _⌀	130	3.5	74	238.0	44.5	50	5	9	M10	28.0	A8×7×40
F2	150	195	130 _⌀	14	180	30 _⌀	165	3.5	93	299.0	53.0	60	5	11	M10	33.0	A8×7×50
F3	200	260	180 _⌀	15	206	35 _⌀	215	4.0	106	335.5	56.5	70	5	14	M12	38.0	A10×8×60
F4	200	260	180 _⌀	15	230	40 _⌀	215	4.0	116	370.0	56.5	80	5	14	M16	43.0	A12×8×70
F6	250	325	230 _⌀	17	265	50 _⌀	265	4.0	137	433.0	60.5	100	5	14	M16	53.5	A14×9×90

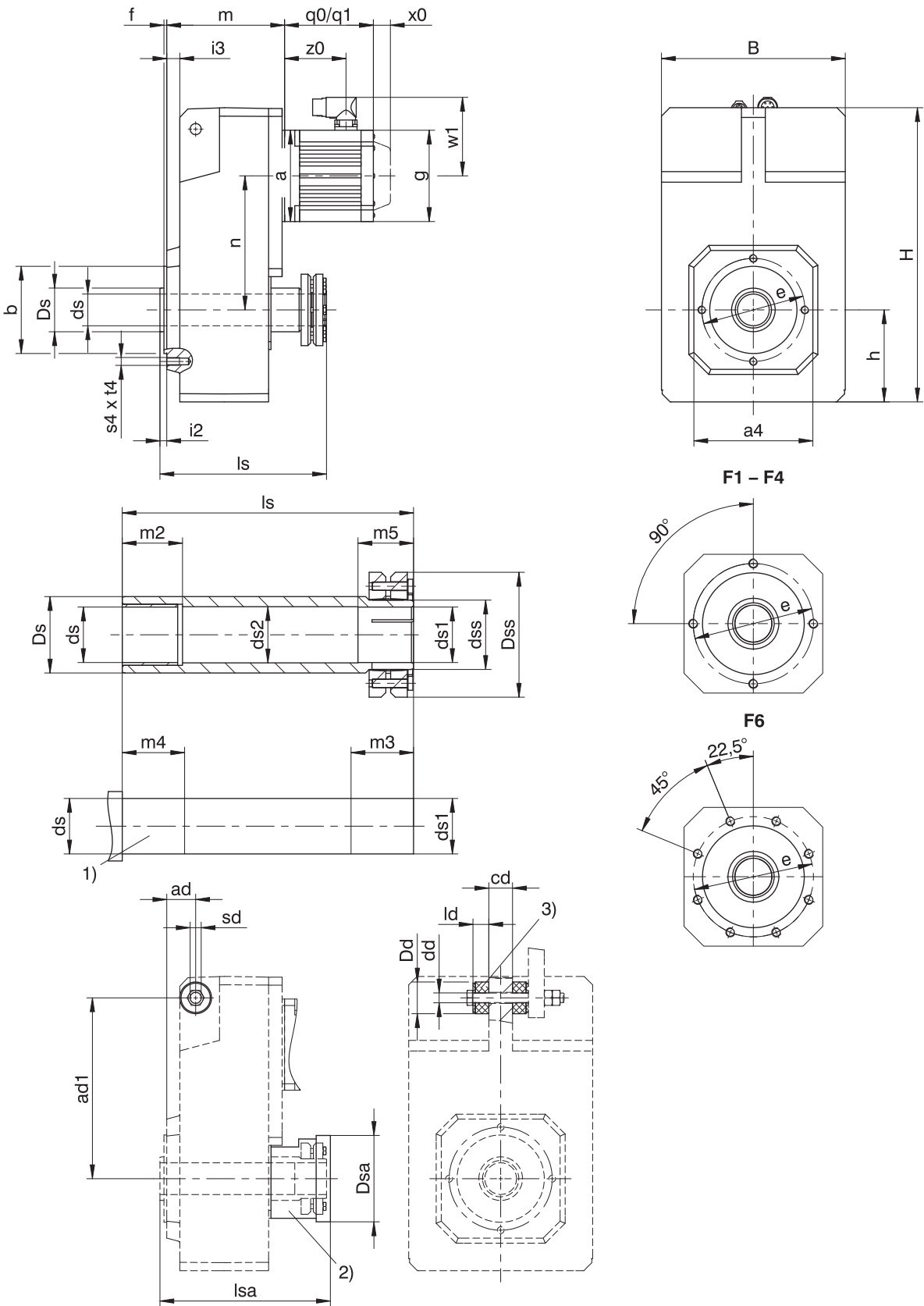
Dimensions of motors

Type	□g	q0	q1	w1	x0	z0
EZ203U	55	166.0	175.0	47.0	25	111.0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
EZ503U	115	162.0	216.5	100.0	22	127.5
EZ505U	115	212.0	266.5	100.0	22	177.5
EZ701U	145	125.0	184.0	115.0	22	87.0
EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5
EZ803U	190	273.5	350.5	156.5	22	219.5
EZ805U	190	355.5	432.5	156.5	22	301.5

Dimensions of geared motors

Type	EZ2			EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
F102	□55	129.5	102.0	□72	129.5	102.0	□98	129.5	102.0	□115	133.5	102.0	□145	135.5	102.0	–	–	–
F202	–	–	–	□72	153.0	131.0	□98	153.0	131.0	□115	157.0	131.0	□145	159.0	131.0	–	–	–
F203	–	–	–	Ø140	190.0	131.0	–	–	–	–	–	–	–	–	–	–	–	–
F302	–	–	–	Ø140	169.5	149.5	Ø140	169.5	149.5	□115	173.5	149.5	□145	175.5	149.5	–	–	–
F303	–	–	–	Ø140	206.5	149.5	–	–	–	–	–	–	–	–	–	–	–	–
F402	–	–	–	–	–	–	–	–	–	Ø160	188.5	169.0	□145	190.5	169.0	□190	193.5	169.0
F403	–	–	–	Ø140	221.5	169.0	Ø140	221.5	169.0	Ø160	231.5	132.0	–	–	–	–	–	–
F602	–	–	–	–	–	–	–	–	–	Ø160	219.5	196.0	□145	221.5	196.0	□190	224.5	196.0
F603	–	–	–	–	–	–	–	–	–	Ø160	262.5	196.0	–	–	–	–	–	–

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



- $q0$ Applies to motors without brake.
- $x0$ EZ2: Applies only to motors with brake and encoders using $w1$ an optical or inductive measuring method
EZ3 – EZ8: Applies to encoders using an optical measuring method
- 1) Machine shaft: The dimension ls must meet or exceed the specified value.

- $q1$ Applies to motors with brake.
- Different for the One Cable Solution (OCS), see the chapter [17.4](#)
- 2) Cover (optional)

- 3) Rubber buffer for torque arm bracket (optional). Dimension $\varnothing Dd$ = outer diameter of the rubber buffer when not tensioned.

Dimensions of gear units

Type	a4	ad	ad1	$\varnothing b$	B	cd	$\varnothing dd$	$\varnothing ds$	$\varnothing ds1$	$\varnothing ds2$	$\varnothing dss$	$\varnothing Dd$	$\varnothing Ds$	$\varnothing Dsa$	$\varnothing Dss$	$\varnothing e$	f	h	H	i2	i3	ld	ls	lsa	m2	m3	m4	m5	s4	sd	t4
F1	100	28.5	150	70 _{j6}	145	20	11.0 ^{+0.5}	20 _{h9}	20 _{h9} ^{H7}	20.5	24	30	35	63	50	85	2.5	74	238.0	6.5	12.5	15	146	150	20	31	25	26	M8	M10	13
F2	130	32.0	181	95 _{j6}	180	22	11.0 ^{+0.5}	25 _{h9}	25 _{h9} ^{H7}	25.5	30	30	45	73	60	115	3.0	93	299.0	8.0	15.0	15	175	180	20	37	25	32	M8	M10	13
F3	150	36.5	205	110 _{j6}	206	30	14.0 ^{+0.5}	30 _{h9}	30 _{h9} ^{H7}	30.5	36	37	50	83	72	130	3.5	106	335.5	8.5	16.5	20	192	196	25	37	30	32	M10	M12	16
F4	150	36.5	228	110 _{j6}	230	30	14.0 ^{+0.5}	40 _{h9}	40 _{h9} ^{H7}	40.5	50	37	55	108	90	130	3.5	116	370.0	8.5	16.5	20	210	215	40	45	45	40	M10	M12	16
F6	180	44.5	270	130 _{j6}	265	35	22.0 ^{+0.5}	50 _{h9}	50 _{h9} ^{H7}	50.5	62	60	70	128	106	165	3.5	137	433.0	10.5	20.5	30	248	251	40	47	45	42	M10	M20	16

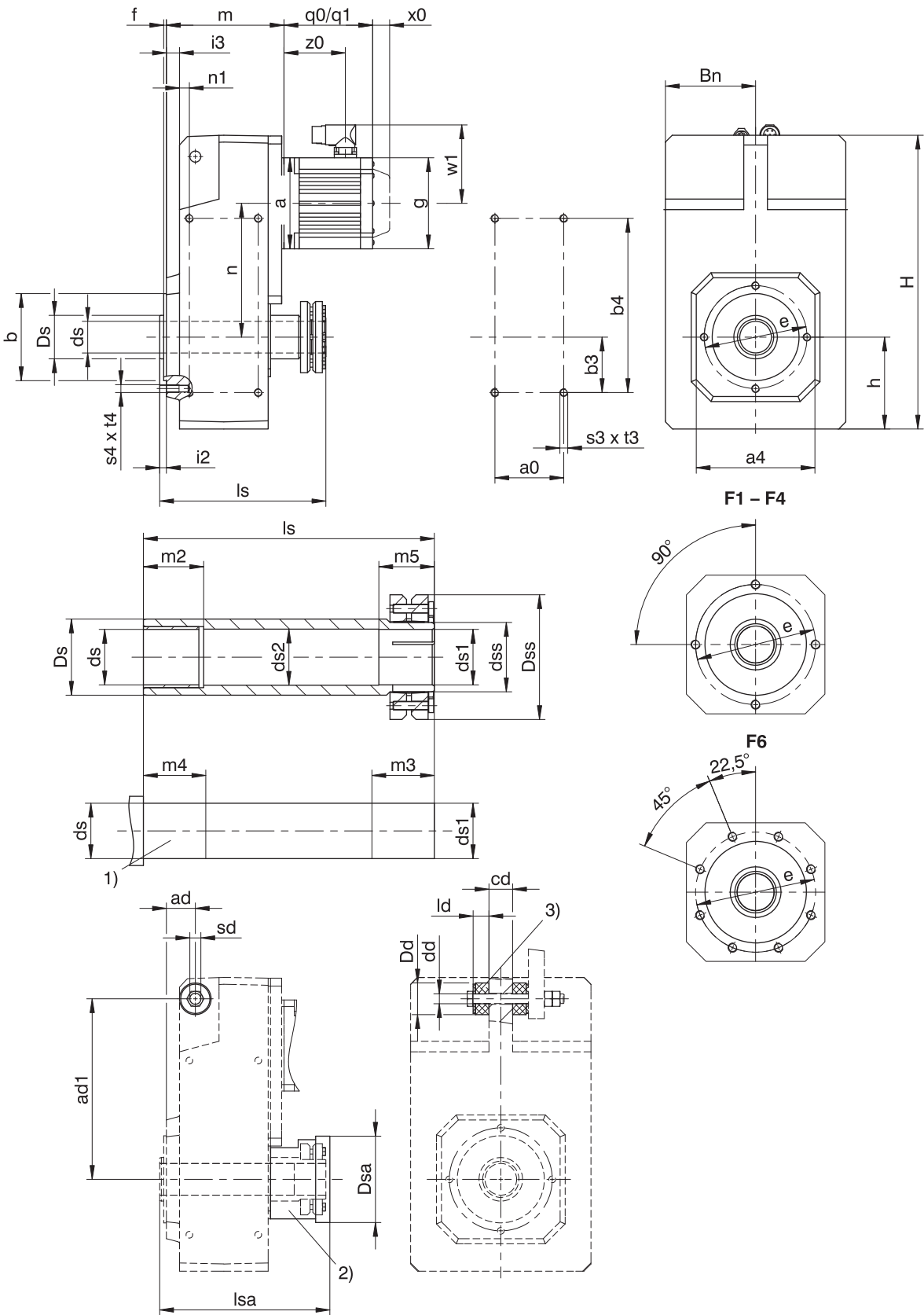
Dimensions of motors

Type	g	q0	q1	w1	x0	z0
EZ203U	55	166.0	175.0	47.0	25	111.0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
EZ503U	115	162.0	216.5	100.0	22	127.5
EZ505U	115	212.0	266.5	100.0	22	177.5
EZ701U	145	125.0	184.0	115.0	22	87.0
EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5
EZ803U	190	273.5	350.5	156.5	22	219.5
EZ805U	190	355.5	432.5	156.5	22	301.5

Dimensions of geared motors

Type	EZ2			EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
F102	□55	97.5	102.0	□72	97.5	102.0	□98	97.5	102.0	□115	101.5	102.0	□145	103.5	102.0	—	—	—
F202	—	—	—	□72	115.0	131.0	□98	115.0	131.0	□115	119.0	131.0	□145	121.0	131.0	—	—	—
F203	—	—	—	∅140	152.0	131.0	—	—	—	—	—	—	—	—	—	—	—	—
F302	—	—	—	∅140	129.5	149.5	∅140	129.5	149.5	□115	133.5	149.5	□145	135.5	149.5	—	—	—
F303	—	—	—	∅140	166.5	149.5	—	—	—	—	—	—	—	—	—	—	—	—
F402	—	—	—	—	—	—	—	—	—	∅160	148.5	169.0	□145	150.5	169.0	□190	153.5	169.0
F403	—	—	—	∅140	181.5	169.0	∅140	181.5	169.0	∅160	191.5	132.0	—	—	—	—	—	—
F602	—	—	—	—	—	—	—	—	—	∅160	179.5	196.0	□145	181.5	196.0	□190	184.5	196.0
F603	—	—	—	—	—	—	—	—	—	∅160	222.5	196.0	—	—	—	—	—	—

8.3.8 S shaft design (hollow shaft with shrink disk), GN housing design (pitch circle diameter + side fastening)



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x0	EZ2: Applies only to motors with brake and encoders using w1 an optical or inductive measuring method EZ3 – EZ8: Applies to encoders using an optical measuring method		Different for the One Cable Solution (OCS), see the chapter 17.4
1)	Machine shaft: The dimension l _s must meet or exceed the specified value.	2)	Cover (optional)

- 3) Rubber buffer for torque arm bracket (optional). Dimension $\varnothing Dd$ = outer diameter of the rubber buffer when not tensioned.

Dimensions of gear units

Type	a0	□a4	ad	ad1	Øb	b3	b4	Bn	cd	Ødd	Øds	Øds1	Øds2	Ødss	ØDd	ØDs	ØDsa	ØDss
F1	50	100	29.5	150	70 _{j6}	40	140	71	20	11.0 ^{+0.5}	20 _{h9}	20 _{h9} ^{H7}	20.5	24	30	63	63	50
F2	64	130	33.0	181	95 _{j6}	55	175	88	22	11.0 ^{+0.5}	25 _{h9}	25 _{h9} ^{H7}	25.5	30	30	73	73	60
F3	72	150	38.5	205	110 _{j6}	60	200	102	30	14.0 ^{+0.5}	30 _{h9}	30 _{h9} ^{H7}	30.5	36	37	83	83	72
F4	87	150	38.5	228	110 _{j6}	70	220	114	30	14.0 ^{+0.5}	40 _{h9}	40 _{h9} ^{H7}	40.5	50	37	108	108	90
F6	108	180	44.5	270	130 _{j6}	85	270	131	35	22.0 ^{+0.5}	50 _{h9}	50 _{h9} ^{H7}	50.5	62	60	128	128	106

Type	Øe	f	h	H	i2	i3	ld	ls	lsa	n1	m2	m3	m4	m5	s3	s4	sd	t3	t4
F1	85	2.5	74	238.0	6.5	12.5	15	146	150	10	20	31	25	26	M6	M8	M10	11	13
F2	115	3.0	93	299.0	8.0	15.0	15	175	180	10.5	20	37	25	32	M8	M8	M10	13	13
F3	130	3.5	106	335.5	8.5	16.5	20	192	196	12.5	25	37	30	32	M10	M10	M12	16	16
F4	130	3.5	116	370.0	8.5	16.5	20	210	215	12.5	40	45	45	40	M10	M10	M12	16	16
F6	165	3.5	137	433.0	10.5	20.5	30	248	251	15.5	40	47	45	42	M12	M10	M20	19	16

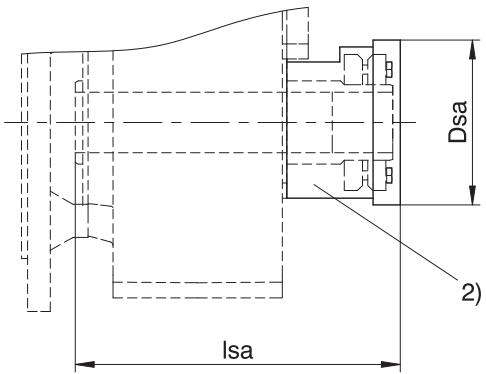
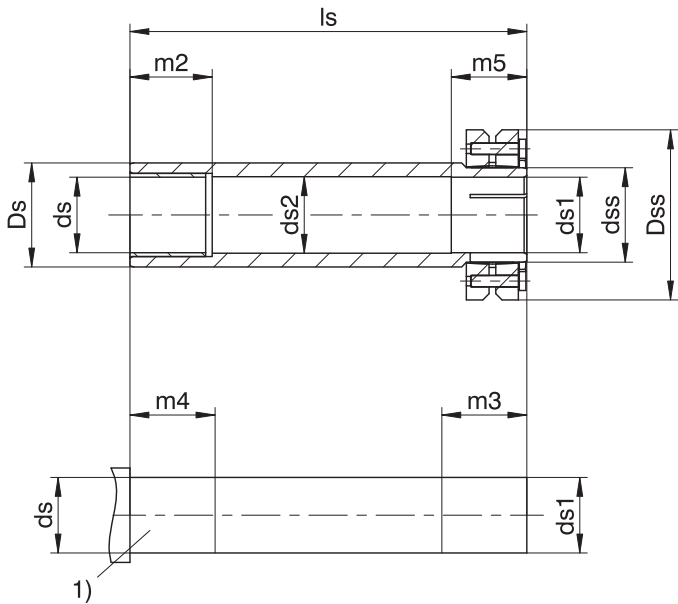
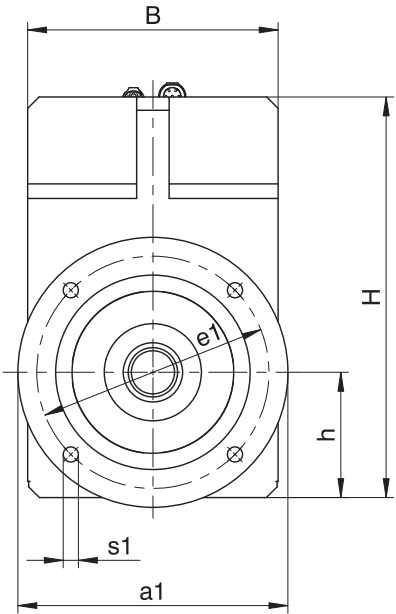
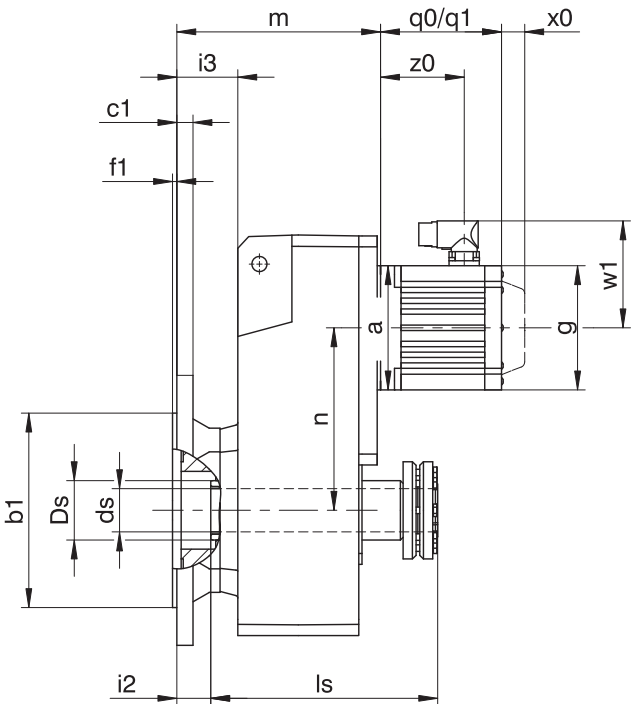
Dimensions of motors

Type	□g	q0	q1	w1	x0	z0
EZ203U	55	166.0	175.0	47.0	25	111.0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
EZ503U	115	162.0	216.5	100.0	22	127.5
EZ505U	115	212.0	266.5	100.0	22	177.5
EZ701U	145	125.0	184.0	115.0	22	87.0
EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5
EZ803U	190	273.5	350.5	156.5	22	219.5
EZ805U	190	355.5	432.5	156.5	22	301.5

Dimensions of geared motors

Type	EZ2			EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
F102	□55	97.5	102.0	□72	97.5	102.0	□98	97.5	102.0	□115	101.5	102.0	□145	103.5	102.0	–	–	–
F202	–	–	–	□72	115.0	131.0	□98	115.0	131.0	□115	119.0	131.0	□145	121.0	131.0	–	–	–
F203	–	–	–	Ø140	152.0	131.0	–	–	–	–	–	–	–	–	–	–	–	–
F302	–	–	–	Ø140	129.5	149.5	Ø140	129.5	149.5	□115	133.5	149.5	□145	135.5	149.5	–	–	–
F303	–	–	–	Ø140	166.5	149.5	–	–	–	–	–	–	–	–	–	–	–	–
F402	–	–	–	–	–	–	–	–	–	Ø160	148.5	169.0	□145	150.5	169.0	□190	153.5	169.0
F403	–	–	–	Ø140	181.5	169.0	Ø140	181.5	169.0	Ø160	191.5	132.0	–	–	–	–	–	–
F602	–	–	–	–	–	–	–	–	–	Ø160	179.5	196.0	□145	181.5	196.0	□190	184.5	196.0
F603	–	–	–	–	–	–	–	–	–	Ø160	222.5	196.0	–	–	–	–	–	–

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



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x0	EZ2: Applies only to motors with brake and encoders using an optical or inductive measuring method EZ3 – EZ8: Applies to encoders using an optical measuring method		Different for the One Cable Solution (OCS), see the chapter 17.4
1)	Machine shaft: The dimension ls must meet or exceed the specified value.	2)	Cover (optional)

Dimensions of gear units

Type	Øa1	Øb1	B	c1	Øds	Øds1	Øds2	Ødss	ØDs	ØDsa	ØDss	Øe1	f1	h	H	i2	i3	ls	lsa	m2	m3	m4	m5	Øs1
F1	160	110 _{j6}	145	10	20 _{h9}	20 _{h9} ^{H7}	20.5	24	35	63	50	130	3.5	74	238.0	25.5	44.5	146	150	20	31	25	26	9
F2	200	130 _{j6}	180	14	25 _{h9}	25 _{h9} ^{H7}	25.5	30	45	73	60	165	3.5	93	299.0	30.0	53.0	175	180	20	37	25	32	11
F3	250	180 _{j6}	206	15	30 _{h9}	30 _{h9} ^{H7}	30.5	36	50	83	72	215	4.0	106	335.5	31.5	56.5	192	196	25	37	30	32	14
F4	250	180 _{j6}	230	15	40 _{h9}	40 _{h9} ^{H7}	40.5	50	55	108	90	215	4.0	116	370.0	31.5	56.5	210	215	40	45	45	40	14
F6	300	230 _{j6}	265	17	50 _{h9}	50 _{h9} ^{H7}	50.5	62	70	128	106	265	4.0	137	433.0	29.5	60.5	248	251	40	47	45	42	14

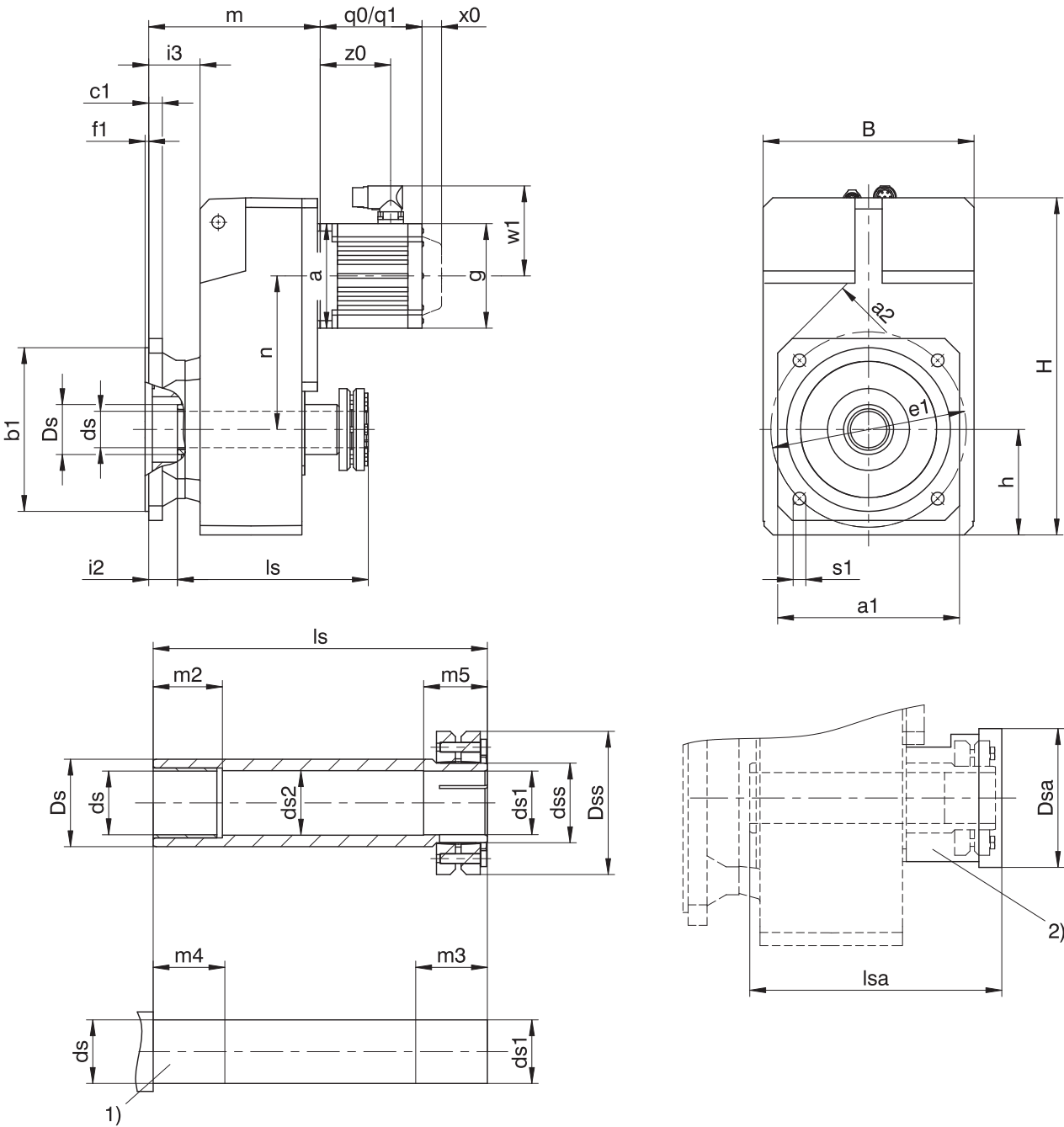
Dimensions of motors

Type	□g	q0	q1	w1	x0	z0
EZ203U	55	166.0	175.0	47.0	25	111.0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
EZ503U	115	162.0	216.5	100.0	22	127.5
EZ505U	115	212.0	266.5	100.0	22	177.5
EZ701U	145	125.0	184.0	115.0	22	87.0
EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5
EZ803U	190	273.5	350.5	156.5	22	219.5
EZ805U	190	355.5	432.5	156.5	22	301.5

Dimensions of geared motors

Type	EZ2			EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
F102	□55	129.5	102.0	□72	129.5	102.0	□98	129.5	102.0	□115	133.5	102.0	□145	135.5	102.0	–	–	–
F202	–	–	–	□72	153.0	131.0	□98	153.0	131.0	□115	157.0	131.0	□145	159.0	131.0	–	–	–
F203	–	–	–	Ø140	190.0	131.0	–	–	–	–	–	–	–	–	–	–	–	–
F302	–	–	–	Ø140	169.5	149.5	Ø140	169.5	149.5	□115	173.5	149.5	□145	175.5	149.5	–	–	–
F303	–	–	–	Ø140	206.5	149.5	–	–	–	–	–	–	–	–	–	–	–	–
F402	–	–	–	–	–	–	–	–	–	Ø160	188.5	169.0	□145	190.5	169.0	□190	193.5	169.0
F403	–	–	–	Ø140	221.5	169.0	Ø140	221.5	169.0	Ø160	231.5	132.0	–	–	–	–	–	–
F602	–	–	–	–	–	–	–	–	–	Ø160	219.5	196.0	□145	221.5	196.0	□190	224.5	196.0
F603	–	–	–	–	–	–	–	–	–	Ø160	262.5	196.0	–	–	–	–	–	–

8.3.10
S shaft design (hollow shaft with shrink disk), Q housing design (square flange)



- q0

Applies to motors without brake.
- q1

Applies to motors with brake.
- x0

EZ2: Applies only to motors with brake and encoders using w1 an optical or inductive measuring method
EZ3 – EZ8: Applies to encoders using an optical measuring method
- 1)

Machine shaft: The dimension ls must meet or exceed the specified value.
- 2)

Cover (optional)
- Different for the One Cable Solution (OCS), see the chapter [17.4](#)

Dimensions of gear units

Type	□a1	□a2	Øb1	B	c1	Øds	Øds1 ^{H7}	Øds2	Ødss	ØDs	ØDsa	ØDss	Øe1	f1	h	H	i2	i3	ls	lsa	m2	m3	m4	m5	Øs1
F1	125	160	110 _β	145	10	20 _{h9}	20 _{h9} ^{H7}	20.5	24	35	63	50	130	3.5	74	238.0	25.5	44.5	146	150	20	31	25	26	9
F2	150	195	130 _β	180	14	25 _{h9}	25 _{h9} ^{H7}	25.5	30	45	73	60	165	3.5	93	299.0	30.0	53.0	175	180	20	37	25	32	11
F3	200	260	180 _β	206	15	30 _{h9}	30 _{h9} ^{H7}	30.5	36	50	83	72	215	4.0	106	335.5	31.5	56.5	192	196	25	37	30	32	14
F4	200	260	180 _β	230	15	40 _{h9}	40 _{h9} ^{H7}	40.5	50	55	108	90	215	4.0	116	370.0	31.5	56.5	210	215	40	45	45	40	14
F6	250	325	230 _β	265	17	50 _{h9}	50 _{h9} ^{H7}	50.5	62	70	128	106	265	4.0	137	433.0	29.5	60.5	248	251	40	47	45	42	14

Dimensions of motors

Type	□g	q0	q1	w1	x0	z0
EZ203U	55	166.0	175.0	47.0	25	111.0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
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EZ802U	190	232.5	309.5	156.5	22	178.5
EZ803U	190	273.5	350.5	156.5	22	219.5
EZ805U	190	355.5	432.5	156.5	22	301.5

Dimensions of geared motors

Type	EZ2			EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
F102	□55	129.5	102.0	□72	129.5	102.0	□98	129.5	102.0	□115	133.5	102.0	□145	135.5	102.0	–	–	–
F202	–	–	–	□72	153.0	131.0	□98	153.0	131.0	□115	157.0	131.0	□145	159.0	131.0	–	–	–
F203	–	–	–	Ø140	190.0	131.0	–	–	–	–	–	–	–	–	–	–	–	–
F302	–	–	–	Ø140	169.5	149.5	Ø140	169.5	149.5	□115	173.5	149.5	□145	175.5	149.5	–	–	–
F303	–	–	–	Ø140	206.5	149.5	–	–	–	–	–	–	–	–	–	–	–	–
F402	–	–	–	–	–	–	–	–	–	Ø160	188.5	169.0	□145	190.5	169.0	□190	193.5	169.0
F403	–	–	–	Ø140	221.5	169.0	Ø140	221.5	169.0	Ø160	231.5	132.0	–	–	–	–	–	–
F602	–	–	–	–	–	–	–	–	–	Ø160	219.5	196.0	□145	221.5	196.0	□190	224.5	196.0
F603	–	–	–	–	–	–	–	–	–	Ø160	262.5	196.0	–	–	–	–	–	–

8.4 Type designation

This chapter shows you 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.

Example code

F	2	0	2	A	G	0700	EZ401U
---	---	---	---	---	---	------	--------

Explanation

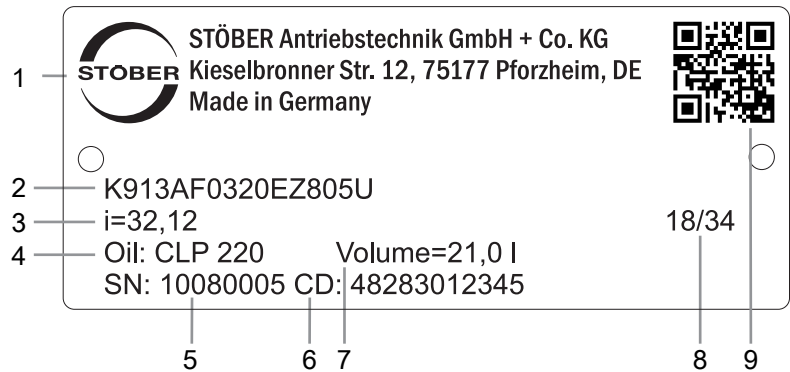
Code	Designation	Design
F	Type	Offset helical gear unit
2	Size	2 (example)
0	Generation	Generation 0
2	Stages	Two-stage
3		Three-stage
A	Shaft	Hollow shaft with keyway
S		Hollow shaft with shrink ring
V		Solid shaft
G	Housing	Pitch circle diameter
F		Round flange
Q		Square flange
GN		Pitch circle diameter + side fastening
/0700	Transmission ratio (i x 10 rounded)	i = 70.13 (example)
EZ401U	Motor	EZ synchronous servo motor

To complete the type designation, also specify the following in your order:

- A detailed type designation of the motor, see the chapter [▶ 17](#)
- The mounting position, see the chapter [▶ 8.5.5](#)
- The position of the plug connectors, see the chapter [▶ 8.5.7](#)

8.4.1 Nameplate

An example gear unit nameplate is explained in the figure below.



Code	Designation
1	Name of manufacturer
2	Type designation
3	Gear ratio of the gear unit
4	Lubricant specification
5	Serial number of the gear unit
6	Customer-specific data
7	Lubricant fill volume
8	Date of manufacture (year/calendar week)
9	QR code (link to product information)

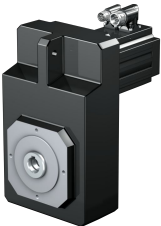
8.4.1.1 Supporting documents

You can view or download supporting documents for the product by reading off the serial number on the nameplate of the product and entering it at the following address online:
<https://id.stober.com>
Alternatively, you can use a suitable mobile device to scan in the QR code on the nameplate of the product in order to be linked to the supporting documents.

8.5 Product description

8.5.1 Input options

EZ synchronous servo motor



Catalog ID 442437_en

MB motor adapter +
EZ synchronous servo motor



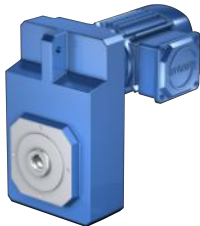
Catalog ID 443311_en

LM Lean motor



Catalog ID 443016_en

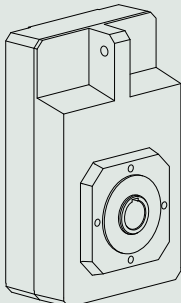
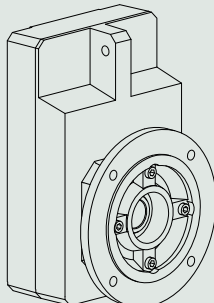
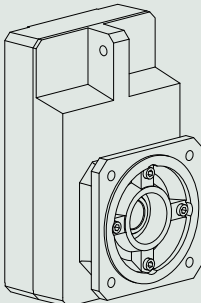
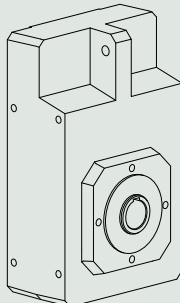
Asynchronous motor



Catalog ID 443136_en

The corresponding catalogs can be found at <http://www.stober.de/en/downloads/>
Enter the ID of the catalog in the Search term field.

8.5.2 Housing design

Pitch circle diameter G		Round flange F		
				
Square flange Q		Pitch circle diameter + side fastening GN		
				
	G	F	Q	GN
F1	✓	✓	✓	✓
F2	✓	✓	✓	✓
F3	✓	✓	✓	✓
F4	✓	✓	✓	✓
F6	✓	✓	✓	✓

8.5.3 Combinatorial shaft/housing design

	Housing design				
Shaft design	Code	G	F	Q	GN
Hollow shaft with keyway	A	AG	AF	AQ	AGN
Hollow shaft with shrink ring	S	SG	SF	SQ	SGN
Solid shaft	V	–	VF	VQ	–

8.5.4 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 ≤ 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 keeper plate is included in the scope of delivery. You also have the option to order the hollow shaft without a keeper plate.

Hollow shaft with shrink ring

The tolerance of the hollow shaft hole is ISO H7.

The machine shaft must be ISO h9.

Select a material for the machine shaft with a permitted surface pressure of $p \geq 325$ N/mm².

Possible materials:

- C45E +QT
- 42CrMo4

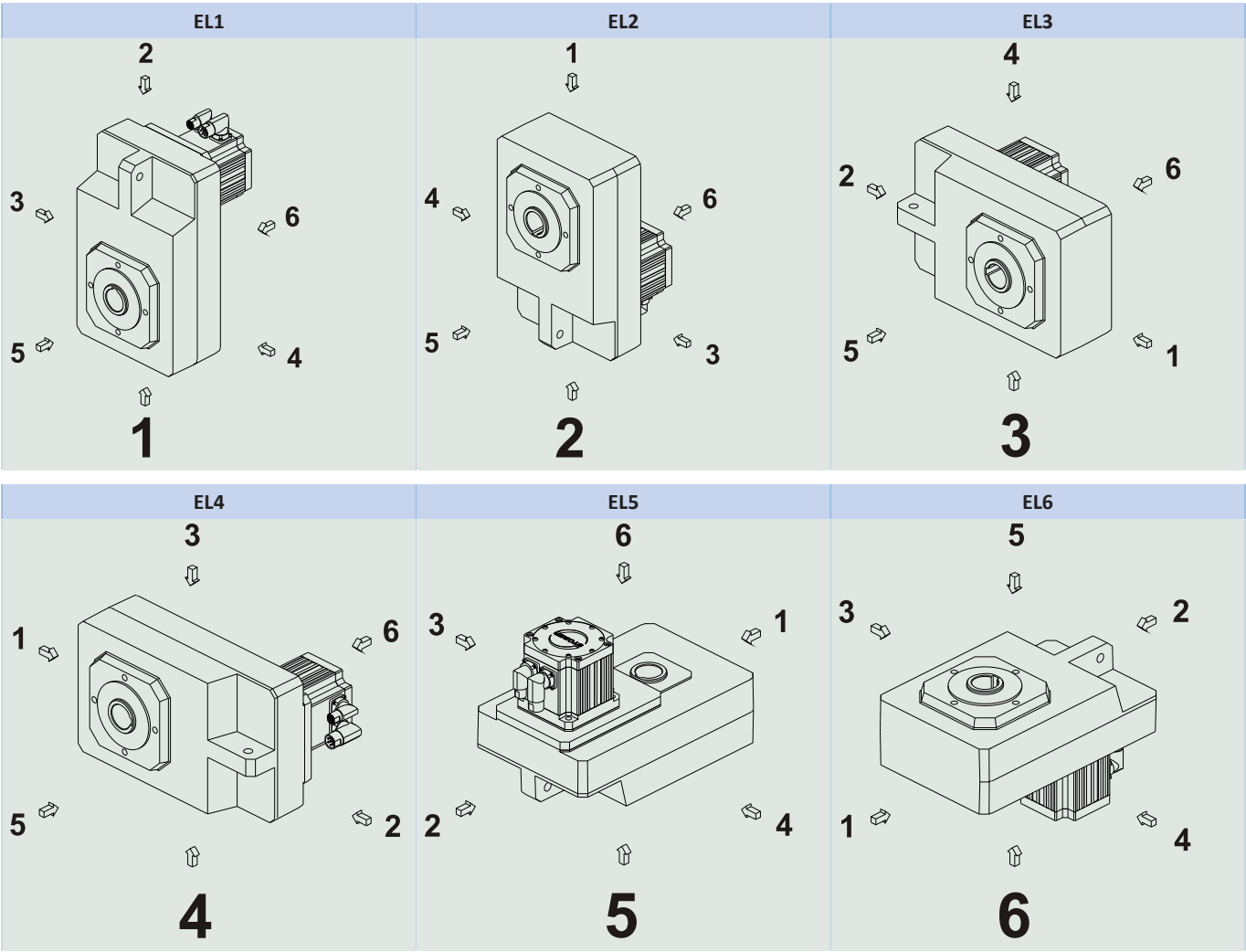
Fastening the gear units on the machine side using the pitch circle diameter

The specified torques and forces only apply when gear units are fastened on the machine side using screws of strength class 10.9. In addition, the gear housings must be adjusted at the pilot. The machine-side fit must be H7.

8.5.5 Mounting positions

The following table shows the standard mounting positions.

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



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

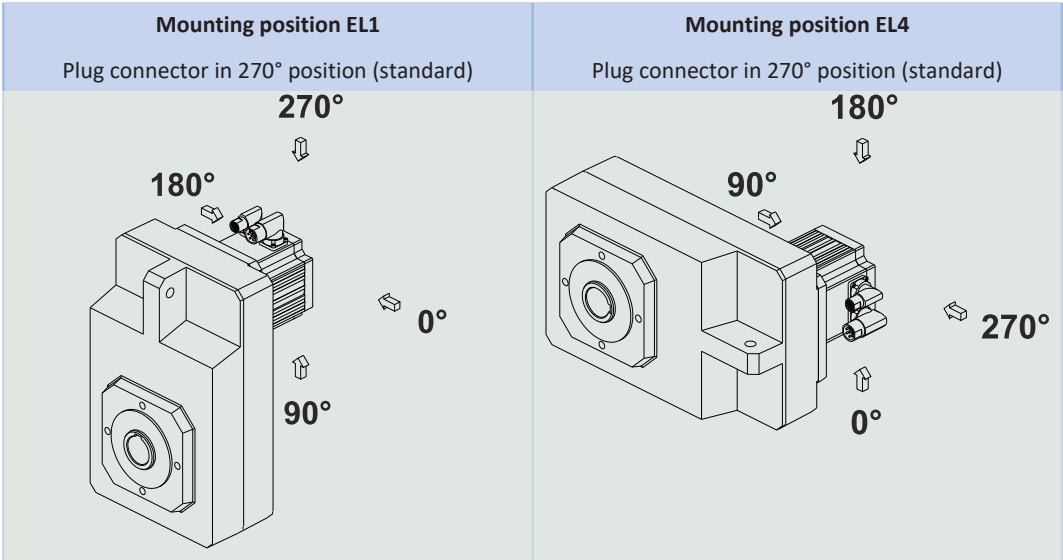
8.5.6 Lubricants

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 mounting position.

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

You will receive lubricants for use in the food industry upon request.

8.5.7
Position of the plug connectors



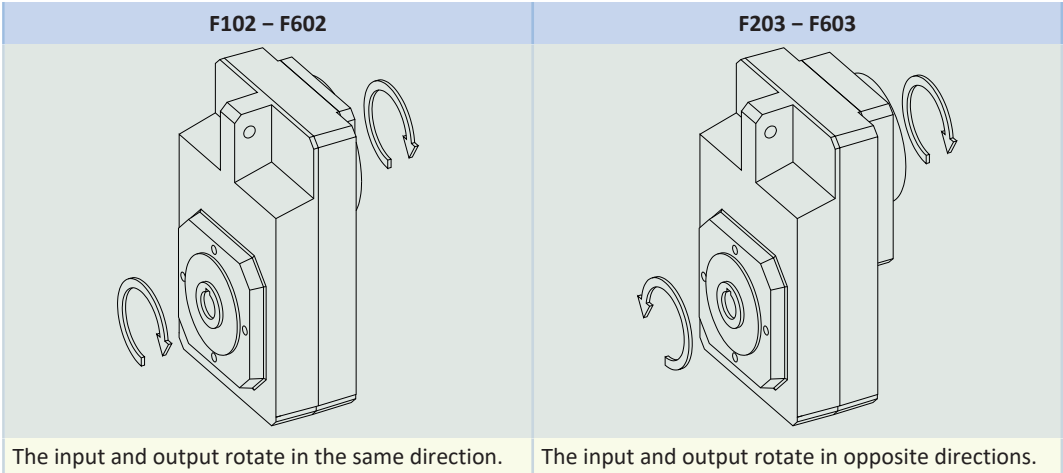
Indicate variations for your geared motor in the order.
Note that the plug connector position rotates along with the geared motor if the geared motor is in another mounting position.

8.5.8
Other product features

Feature	Value
Max. permitted gear unit temperature (on the surface of the gear unit)	≤ 80 °C
Paint	Black RAL 9005
Explosion-proof design in accordance with (ATEX) Directive 2014/34/EU (optional)	Not available
Efficiency:	
η _{get} two-stage	97%
η _{get} three-stage	96%
Protection class: ¹	
Gear unit	IP65
Motor	IP56, optionally IP66

8.5.9
Direction of rotation

Solid shaft (V), hollow shaft with keyway (A), hollow shaft with shrink ring (S)



The pictures show mounting position EL1.

8.6 Project configuration

Project your drives using our SERVOnsoft designing software. Download SERVOnsoft for free at <https://www.stoeber.de/en/ServoSoft>.

It is the most convenient and reliable method of drive selection, as the entire torque/speed curve of the application is displayed and evaluated here in the curve of the geared motor.

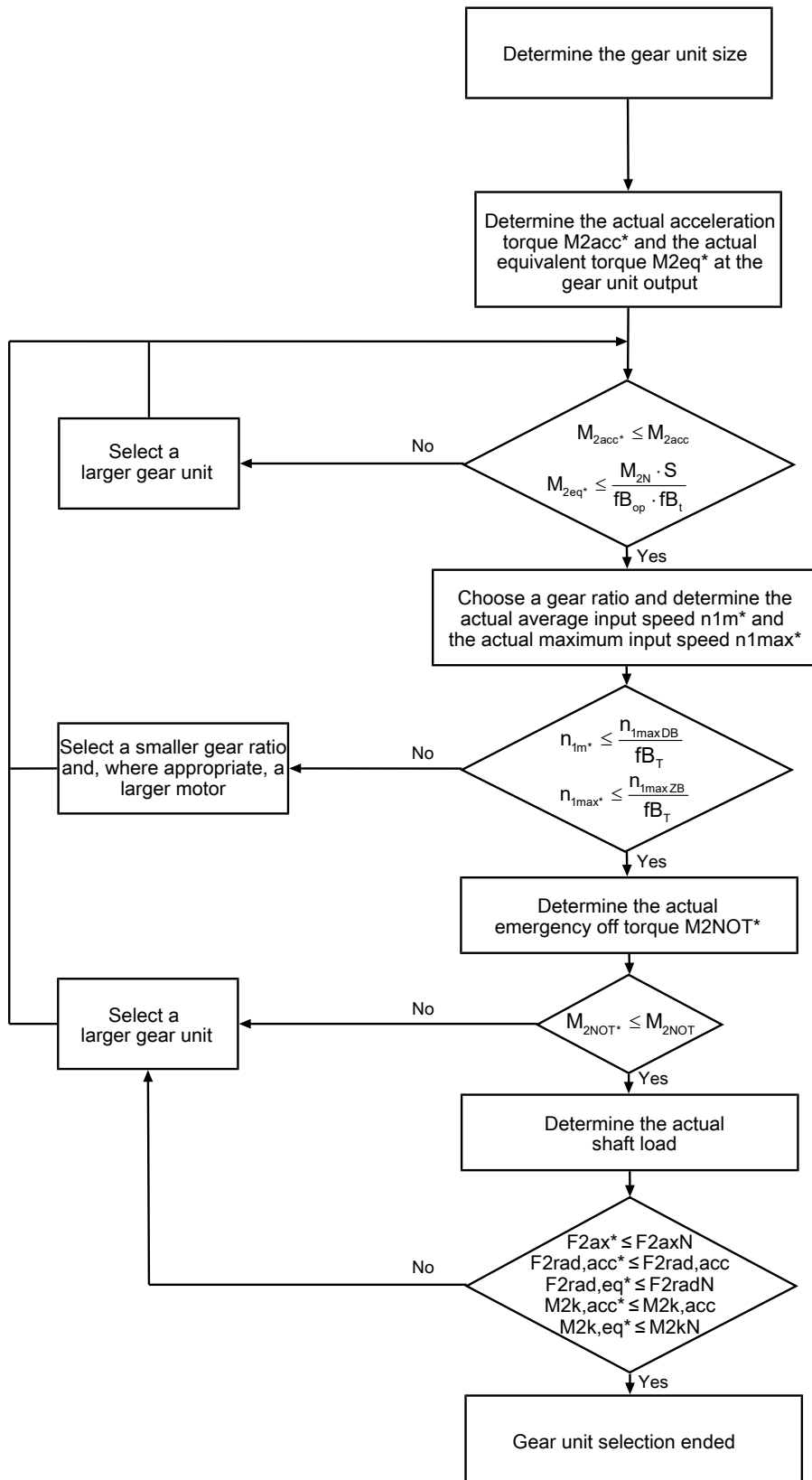
In this chapter, only limit values for specific operating points can be taken into consideration for manual drive selection.

An explanation of the formula symbols can be found in Chapter [▶ 20.1](#).

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

8.6.1 Drive selection

Drive selection for gear units

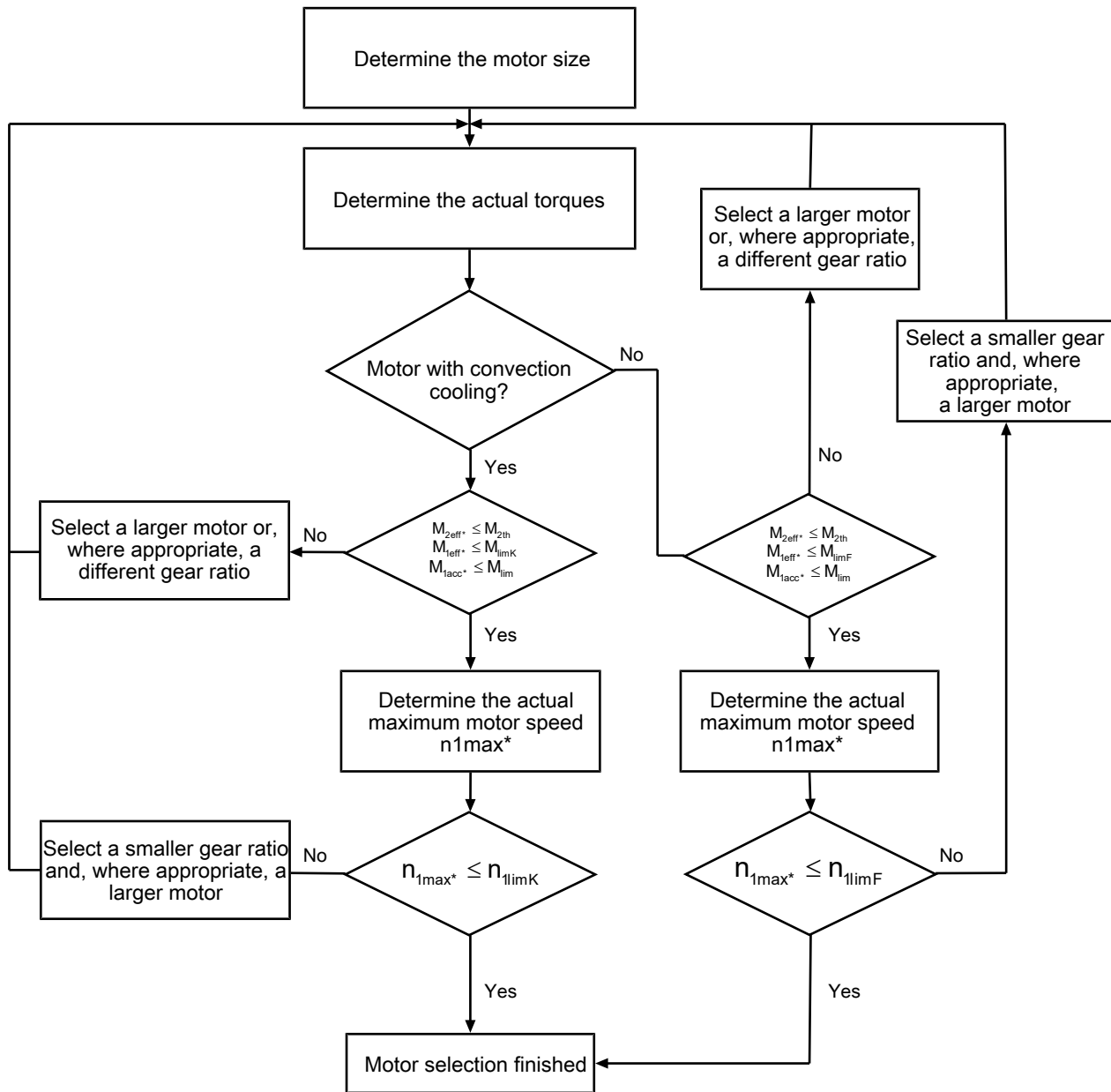


Calculate the forces and tilting torques in the chapter Permitted shaft loads.

Refer to the selection tables for the values for i , n_{1maxDB} , 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.

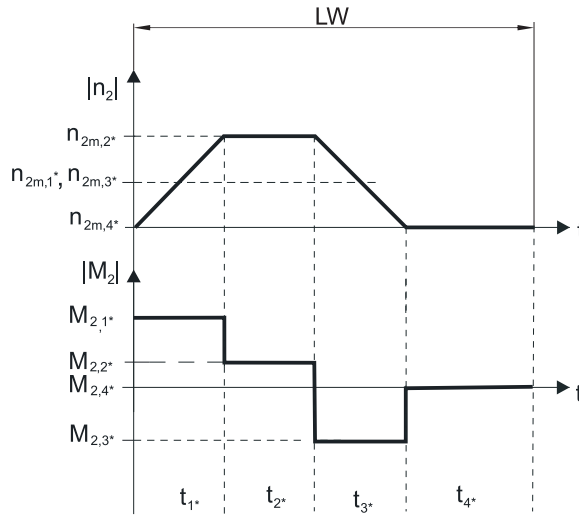
Drive selection for motors



The value for M_{lim} , M_{limK} , M_{limF} , n_{limK} and n_{limF} can be found in the motor characteristic curve in the chapter [► 17.3]. Note the size, nominal speed n_N and cooling type of the motor.

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 maximum acceleration torques**

$$M_{2acc*} = J_{tot} \cdot \frac{\Delta n_2}{9,55 \cdot \Delta t} + M_{L*}$$

$$M_{1acc*} = \frac{M_{2acc*}}{i \cdot \eta_{get}} + J_1 \cdot \frac{\Delta n_1}{9,55 \cdot \Delta t}$$

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_{3*} \ge 6\$ min, calculate \$n_{2m*}\$ without the rest phase \$t_{4*}\$.

The values for the ratio \$i\$ can be found in the selection tables.

Calculation of the actual effective torque

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

Calculation of the actual emergency-off torque

$$M_{2NOT*} = J_{tot} \cdot \frac{\Delta n_2}{9,55 \cdot \Delta t} + M_{L*}$$

Calculation of the actual equivalent torque

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

Calculation of the thermal limit torque

Calculate the thermal limit torque \$M_{2th}\$ for a duty cycle \$ED_{10} > 50\%\$ and the actual average input speed \$n_{1m*}\$. (At \$K_{mot,th} \le 0\$ you must reduce the average input speed \$n_{1m*}\$ accordingly or select another geared motor size.)

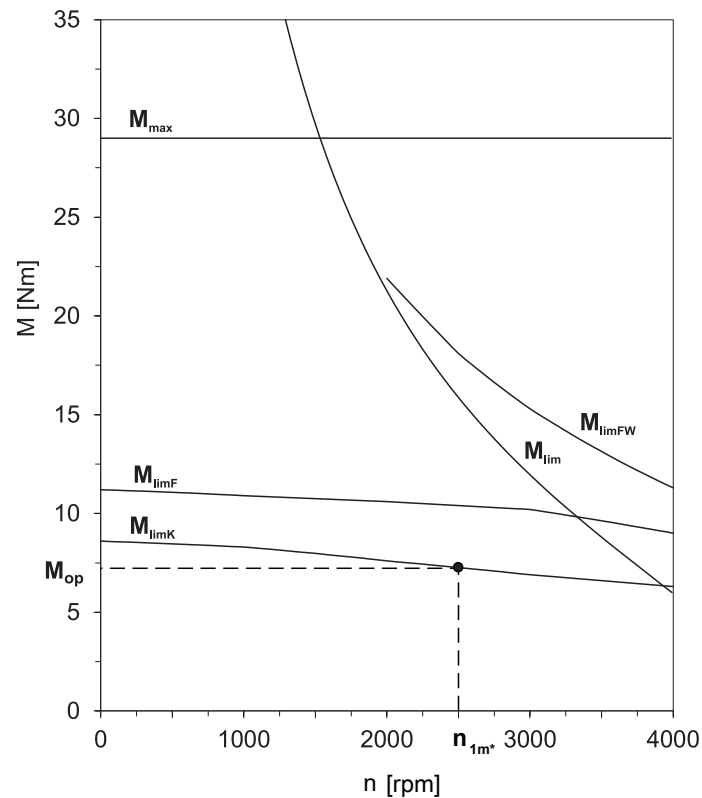
$$M_{2th} = M_{op} \cdot i \cdot K_{mot,th}$$

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

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

The values for a_{thEL} and fB_T can be found in the corresponding tables in this chapter.

The value for the torque of the motor at operating point M_{op} with the determined average input speed n_{1m*} can be found in the motor characteristic curve in the chapter [► 17.3]. Note the size, nominal speed n_N and cooling type of the motor. The figure below shows an example of reading the torque M_{op} of a motor with convection cooling at the operating point.



Operating factors

Parameter a_{thEL}

Mounting position	a_{thEL}
EL1, 2, 5, 6	1.0
EL3, 4	1.1

Operating mode	fB_{op}
Uniform continuous operation	1.00
Cyclic operation	1.25
Reversing load cyclic operation	1.40

Run time	fB_t
Daily runtime ≤ 8 h	1.00
Daily runtime ≤ 16 h	1.15
Daily runtime ≤ 24 h	1.20

Temperature		fB_T
Motor cooling	Surrounding temperature	
Motor with forced ventilation	≤ 20 °C	0.9
	≤ 30 °C	1.0
	≤ 40 °C	1.15
Motor with convection cooling	≤ 20 °C	1.0
	≤ 30 °C	1.1
	≤ 40 °C	1.25

Notes

- The maximum permitted gear unit temperature (see the "Other product features" chapter) must not be exceeded. Doing so may result in damage to the geared motor.

- For braking from full speed (for example when the power fails or when setting up the machine), note the permitted gear unit torques (M_{2acc} , M_{2NOT}) in the selection tables.

8.6.2 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 for the pitch circle diameter and flange housing design

8.6.2.1 V shaft design

Permitted shaft loads for V shaft design (solid shaft)

Type	z_2 [mm]	F_{2ax20} [N]	F_{2rad20} [N]	$F_{2rad,acc}$ [N]	M_{2k20} [Nm]	$M_{2k,acc}$ [Nm]
F1	35.0	1100	4200	4200	260	260
F2	41.0	1400	5400	5400	400	400
F3	43.0	1900	7500	7500	600	600
F4	44.0	2350	9250	9250	800	800
F6	44.0	3100	12500	12500	1200	1200

For other output speeds, download diagrams at <https://configurator.stoeber.de/en-US/>.

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.

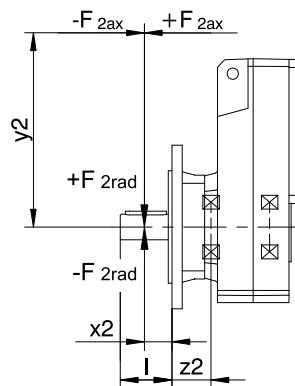


Fig. 1: Force application points for solid shaft

The specified values for F_{2rad20} and $F_{2rad,acc}$ refer to an application of force at the center of the output shaft: $x_2 = l/2$.

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

The following applies to other force application points:

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

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.

Also note the calculation for equivalent values:

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

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

8.6.2.2 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]	$F_{2rad,acc}$ [N]	M_{2k20} [Nm]	$M_{2k,acc}$ [Nm]
F1	30.0	900	4200	4200	175	175
F2	33.0	1200	5400	5400	250	250
F3	33.0	1350	7500	7500	375	375
F4	39.0	1900	9250	9250	550	550
F6	45.0	2200	12500	12500	800	800

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

Type	z_2 [mm]	F_{2ax20} [N]	F_{2rad20} [N]	$F_{2rad,acc}$ [N]	M_{2k20} [Nm]	$M_{2k,acc}$ [Nm]
F1	30.0	900	4200	4200	175	175
F2	33.0	1200	5400	5400	250	250
F3	33.0	1350	7500	7500	375	375
F4	39.0	1900	9250	9250	550	550
F6	45.0	2200	12500	12500	800	800

For other output speeds, download diagrams at <https://configurator.stoeber.de/en-US/>.

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

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

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

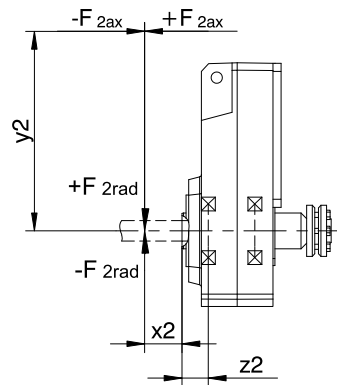


Fig. 2: Force application points for hollow shaft

You can determine the permitted radial forces from the permitted tilting torque M_{2kN} and $M_{2k,acc*}$. The actual radial forces may not exceed the permitted radial forces. The permitted radial forces pertain to the shaft end ($x_2 = 0$).

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

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.

Also note the calculation for equivalent values:

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

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

8.6.3 Radial shaft seal rings

Leak-proofness

Our gear units are equipped with high-quality radial shaft seal rings and checked for leaks. 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.

8.7 Additional documentation

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

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

Documentation	ID
Operating manual gear units, geared motors F	443366_en