



12 F offset helical geared motors

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12.1 Overview

Offset helical geared motors with large axial distances

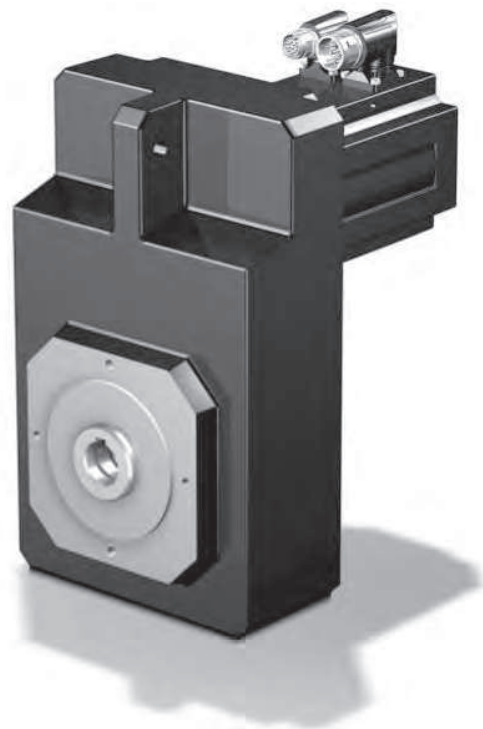
Technical data

i	4.3 – 274
M_{2acc}	19 – 1100 Nm
$\Delta\phi_2$	5 – 11 arcmin
η	≤ 96 – 97 %

Features

Power density	★☆☆☆☆
Backlash	★★★★☆
Price category	€
Shaft load	★★★★☆
Smooth operation	★★★★☆
Torsional stiffness	★★★★☆
Mass moment of inertia	★★★★★
Helical gearing	✓
Maintenance-free	✓
FKM seal ring at the input	✓
Large axial distances, suitable for confined situations	✓
Compact and highly dynamic due to direct motor attachment	✓

Key: ★☆☆☆☆ good | ★★★★★ excellent





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 (e.g. EZ401U)

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

Formula symbol	Unit	Explanation
a_{th}	–	Parameter for calculating $K_{mot,th}$
C_2	Nm/ arcmin	Torsional stiffness of gear unit (final stiffness) relative to the gear unit output
$\Delta\phi_2$	arcmin	Backlash at the output shaft with a blocked input (standard/class II)
η	%	Efficiency
i	–	Gear ratio
i_{exakt}	–	Mathematically exact gear ratio
J_1	10^{-4}kgm^2	Mass moment of inertia relative to the gear unit input
m	kg	Weight
$M_{2,0}$	Nm	Stall torque on the gear unit output
M_{2acc}	Nm	Maximum permitted acceleration torque on the gear unit output
$M_{2acc,max}$	Nm	Maximum permitted acceleration torque of a group of geared motors whose size and nominal torque n_{1N} are the same
M_{2N}	Nm	Nominal torque on the gear unit output (relative to n_{1N})
M_{2NOT}	Nm	Gear unit emergency-off torque on the gear unit output for max. 1000 load changes
$n_{1maxDBH}$	rpm	Maximum permitted input speed of the gear unit in continuous operation Installation positions EL1, EL2, EL3, EL4 (at surrounding temperature of 20 °C)
$n_{1maxDBV}$	rpm	Maximum permitted input speed of the gear unit in continuous operation Installation positions EL5, EL6 (at surrounding temperature of 20 °C)
n_{1maxZB}	min^{-1}	Maximum permitted input speed of the gear unit in cyclic operation (at surrounding temperature of 20 °C)
n_{1N}	min^{-1}	Nominal speed at the gear unit input
n_{2N}	min^{-1}	Nominal speed at the gear unit output
S	–	Load value: Quotient of gear unit and motor nominal torque without regard to the thermal performance limit. Represents a value for the reserve of the geared motor.



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12.2 Selection tables



n_{2N}	M_{2N}	$M_{2,0}$	a_{th}	S	Type	M_{zacc}	M_{2NOT}	i	i_{exakt}	n_{1max} DBH	n_{1max} DBV	n_{1max} ZB	J_1	$\Delta\phi_2$	C_2	m
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]			[rpm]	[rpm]	[rpm]	[10 ⁻⁴ kgm ²]	[arcmin]	[Nm/ arcmin]	[kg]
F1 ($n_{1N} = 3000$ rpm, $M_{zacc,max} = 120$ Nm)																
32	84	86	1.5	1.4	F102_0940 EZ301U	120	240	93.63	7865/84	4000	4000	6000	0.22	11/6	7.7	13
43	63	65	1.3	1.9	F102_0700 EZ301U	120	240	70.06	1261/18	4000	4000	6000	0.23	11/6	7.7	13
54	50	52	1.1	2.4	F102_0560 EZ301U	120	240	55.97	2015/36	4000	4000	6000	0.25	11/6	7.7	13
54	86	91	1.9	1.4	F102_0560 EZ302U	120	240	55.97	2015/36	4000	4000	6000	0.35	11/6	7.7	13
65	42	43	1.0	2.9	F102_0460 EZ301U	120	240	46.43	325/7	4000	4000	6000	0.28	11/6	7.7	13
65	72	76	1.8	1.7	F102_0460 EZ302U	120	240	46.43	325/7	4000	4000	6000	0.38	11/6	7.7	13
86	32	32	1.0	3.5	F102_0350 EZ301U	95	240	35.05	3575/102	4000	4000	6000	0.32	11/6	7.7	13
86	54	57	1.7	2.0	F102_0350 EZ302U	120	240	35.05	3575/102	4000	4000	6000	0.42	11/6	7.7	13
86	70	74	2.2	1.6	F102_0350 EZ303U	120	240	35.05	3575/102	4000	4000	6000	0.53	11/6	7.7	14
107	25	26	0.9	4.0	F102_0280 EZ301U	77	200	28.17	169/6	4000	4000	6000	0.37	11/6	7.7	13
107	43	46	1.6	2.3	F102_0280 EZ302U	120	200	28.17	169/6	4000	4000	6000	0.47	11/6	7.7	13
107	57	60	2.1	1.8	F102_0280 EZ303U	120	200	28.17	169/6	4000	4000	6000	0.58	11/6	7.7	14
107	77	82	2.8	1.3	F102_0280 EZ401U	120	240	28.17	169/6	4000	4000	6000	1.1	11/6	7.7	15
130	21	21	0.9	4.6	F102_0230 EZ301U	63	170	23.08	3185/138	3700	3600	6000	0.43	11/6	7.7	13
130	36	38	1.6	2.7	F102_0230 EZ302U	110	170	23.08	3185/138	3700	3600	6000	0.53	11/6	7.7	13
130	46	49	2.0	2.1	F102_0230 EZ303U	120	170	23.08	3185/138	3700	3600	6000	0.64	11/6	7.7	14
130	63	67	2.7	1.5	F102_0230 EZ401U	120	240	23.08	3185/138	3700	3600	6000	1.2	11/6	7.7	15
163	17	17	0.9	3.0	F102_0185 EZ301U	50	63	18.46	1495/81	3700	3600	6000	0.52	11/6	7.7	13
163	28	30	1.5	3.1	F102_0185 EZ302U	90	130	18.46	1495/81	3700	3600	6000	0.62	11/6	7.7	13
163	37	39	2.0	2.4	F102_0185 EZ303U	110	130	18.46	1495/81	3700	3600	6000	0.73	11/6	7.7	14
163	50	54	2.6	1.8	F102_0185 EZ401U	120	240	18.46	1495/81	3700	3600	6000	1.3	11/6	7.7	15
163	77	84	4.1	1.1	F102_0185 EZ501U	120	240	18.46	1495/81	3700	3600	6000	3.2	11/6	7.7	16
221	12	13	0.8	3.0	F102_0135 EZ301U	37	46	13.59	231/17	4000	4000	6000	0.41	11/8	6.5	13
221	21	22	1.4	3.8	F102_0135 EZ302U	66	99	13.59	231/17	4000	4000	6000	0.51	11/8	6.5	13
221	27	29	1.9	2.9	F102_0135 EZ303U	79	99	13.59	231/17	4000	4000	6000	0.62	11/8	6.5	14
221	37	40	2.5	2.2	F102_0135 EZ401U	110	200	13.59	231/17	4000	4000	6000	1.1	11/8	6.5	15
221	57	62	3.9	1.4	F102_0135 EZ501U	110	200	13.59	231/17	4000	4000	6000	3.1	11/8	6.5	16
221	62	69	4.2	1.3	F102_0135 EZ402U	110	200	13.59	231/17	4000	4000	6000	1.8	11/8	6.5	16
275	9.9	10	0.8	3.0	F102_0110 EZ301U	30	37	10.92	273/25	4000	4000	6000	0.50	11/8	6.5	13
275	17	18	1.4	3.8	F102_0110 EZ302U	53	79	10.92	273/25	4000	4000	6000	0.60	11/8	6.5	13
275	22	23	1.8	2.9	F102_0110 EZ303U	64	79	10.92	273/25	4000	4000	6000	0.71	11/8	6.5	14
275	30	32	2.4	2.5	F102_0110 EZ401U	90	160	10.92	273/25	4000	4000	6000	1.2	11/8	6.5	15
275	46	50	3.7	1.6	F102_0110 EZ501U	110	200	10.92	273/25	4000	4000	6000	3.2	11/8	6.5	16
275	50	55	4.1	1.5	F102_0110 EZ402U	110	160	10.92	273/25	4000	4000	6000	1.9	11/8	6.5	16
335	8.1	8.2	0.8	3.0	F102_0089 EZ301U	24	30	8.948	1029/115	3700	3600	6000	0.63	11/8	6.5	13
335	14	15	1.3	3.8	F102_0089 EZ302U	43	65	8.948	1029/115	3700	3600	6000	0.73	11/8	6.5	13
335	18	19	1.7	2.9	F102_0089 EZ303U	52	65	8.948	1029/115	3700	3600	6000	0.84	11/8	6.5	14
335	24	26	2.3	2.9	F102_0089 EZ401U	74	130	8.948	1029/115	3700	3600	6000	1.4	11/8	6.5	15
335	37	41	3.6	1.9	F102_0089 EZ501U	110	200	8.948	1029/115	3700	3600	6000	3.3	11/8	6.5	16
335	41	45	3.9	1.7	F102_0089 EZ402U	100	130	8.948	1029/115	3700	3600	6000	2.1	11/8	6.5	16
335	60	75	5.8	1.2	F102_0089 EZ404U	110	200	8.948	1029/115	3700	3600	6000	3.4	11/8	6.5	18
335	64	69	6.2	1.1	F102_0089 EZ502U	110	200	8.948	1029/115	3700	3600	6000	5.6	11/8	6.5	18
335	64	72	6.2	1.1	F102_0089 EZ701U	110	200	8.948	1029/115	3700	3600	6000	8.9	11/8	6.5	20
419	6.5	6.6	0.7	3.0	F102_0072 EZ301U	19	24	7.156	322/45	3700	3600	6000	0.82	11/8	6.5	13
419	11	12	1.3	3.8	F102_0072 EZ302U	35	52	7.156	322/45	3700	3600	6000	0.92	11/8	6.5	13
419	14	15	1.7	2.9	F102_0072 EZ303U	42	52	7.156	322/45	3700	3600	6000	1.0	11/8	6.5	14
419	19	21	2.3	3.3	F102_0072 EZ401U	59	100	7.156	322/45	3700	3600	6000	1.6	11/8	6.5	15
419	30	33	3.5	2.2	F102_0072 EZ501U	110	200	7.156	322/45	3700	3600	6000	3.5	11/8	6.5	16
419	33	36	3.8	2.0	F102_0072 EZ402U	83	100	7.156	322/45	3700	3600	6000	2.3	11/8	6.5	16
419	48	60	5.6	1.3	F102_0072 EZ404U	110	200	7.156	322/45	3700	3600	6000	3.6	11/8	6.5	18
419	51	56	6.0	1.3	F102_0072 EZ502U	110	200	7.156	322/45	3700	3600	6000	5.8	11/8	6.5	18
419	51	58	6.0	1.3	F102_0072 EZ701U	110	200	7.156	322/45	3700	3600	6000	9.1	11/8	6.5	20
464	10	11	1.3	3.8	F102_0065 EZ302U	31	47	6.462	84/13	3500	3000	6000	1.0	11/8	6.5	13
464	13	14	1.6	2.9	F102_0065 EZ303U	38	47	6.462	84/13	3500	3000	6000	1.2	11/8	6.5	14
464	18	19	2.2	3.6	F102_0065 EZ401U	53	94	6.462	84/13	3500	3000	6000	1.7	11/8	6.5	15
464	27	29	3.4	2.3	F102_0065 EZ501U	100	190	6.462	84/13	3500	3000	6000	3.7	11/8	6.5	16
464	29	33	3.7	2.1	F102_0065 EZ402U	75	94	6.462	84/13	3500	3000	6000	2.4	11/8	6.5	16
464	43	54	5.5	1.4	F102_0065 EZ404U	110	190	6.462	84/13	3500	3000	6000	3.7	11/8	6.5	18
464	46	50	5.9	1.3	F102_0065 EZ502U	110	190	6.462	84/13	3500	3000	6000	6.0	11/8	6.5	18

F



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12.2 Selection tables



n_{2N}	M_{2N}	$M_{2,0}$	a_{th}	S	Type	M_{zacc}	M_{zNOT}	i	i_{exakt}	n_{1max}	n_{1max}	n_{1max}	J_1	$\Delta\phi_2$	C_2	m
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]			DBH	DBV	ZB	[10 ⁻⁴ kgm ²]	[arcmin]	[Nm/arcmin]	[kg]
F1 ($n_{1N} = 3000$ rpm, $M_{zacc,max} = 120$ Nm)																
464	46	52	5.9	1.3	F102_0065 EZ701U	110	190	6.462	84/13	3500	3000	6000	9.3	11/8	6.5	20
464	61	70	7.7	1.0	F102_0065 EZ503U	110	190	6.462	84/13	3500	3000	6000	8.3	11/8	6.5	19
696	6.6	7.0	1.2	3.8	F102_0043 EZ302U	21	31	4.308	56/13	3500	3000	6000	1.8	11/8	6.5	13
696	8.7	9.2	1.5	2.9	F102_0043 EZ303U	25	31	4.308	56/13	3500	3000	6000	1.9	11/8	6.5	14
696	12	13	2.1	4.3	F102_0043 EZ401U	36	63	4.308	56/13	3500	3000	6000	2.4	11/8	6.5	15
696	18	20	3.2	3.0	F102_0043 EZ501U	67	130	4.308	56/13	3500	3000	6000	4.4	11/8	6.5	16
696	20	22	3.5	2.6	F102_0043 EZ402U	50	63	4.308	56/13	3500	3000	6000	3.1	11/8	6.5	16
696	29	36	5.1	1.9	F102_0043 EZ404U	100	130	4.308	56/13	3500	3000	6000	4.5	11/8	6.5	18
696	31	33	5.5	1.8	F102_0043 EZ502U	100	130	4.308	56/13	3500	3000	6000	6.7	11/8	6.5	18
696	31	35	5.5	1.8	F102_0043 EZ701U	84	130	4.308	56/13	3500	3000	6000	10	11/8	6.5	20
696	41	46	7.2	1.3	F102_0043 EZ503U	100	130	4.308	56/13	3500	3000	6000	9.1	11/8	6.5	19
F1 ($n_{1N} = 6000$ rpm, $M_{zacc,max} = 120$ Nm)																
64	81	86	1.4	1.5	F102_0940 EZ301U	120	240	93.63	7865/84	4000	4000	6000	0.22	11/6	7.7	13
86	60	65	1.3	1.8	F102_0700 EZ301U	120	240	70.06	1261/18	4000	4000	6000	0.23	11/6	7.7	13
107	48	52	1.3	2.1	F102_0560 EZ301U	120	240	55.97	2015/36	4000	4000	6000	0.25	11/6	7.7	13
107	81	91	2.1	1.2	F102_0560 EZ302U	120	240	55.97	2015/36	4000	4000	6000	0.35	11/6	7.7	13
129	40	43	1.2	2.4	F102_0460 EZ301U	120	240	46.43	325/7	4000	4000	6000	0.28	11/6	7.7	13
129	68	76	2.1	1.4	F102_0460 EZ302U	120	240	46.43	325/7	4000	4000	6000	0.38	11/6	7.7	13
171	30	32	1.2	2.9	F102_0350 EZ301U	95	240	35.05	3575/102	4000	4000	6000	0.32	11/6	7.7	13
171	51	57	2.0	1.7	F102_0350 EZ302U	120	240	35.05	3575/102	4000	4000	6000	0.42	11/6	7.7	13
171	67	76	2.6	1.3	F102_0350 EZ303U	120	240	35.05	3575/102	4000	4000	6000	0.53	11/6	7.7	14
213	24	26	1.1	3.3	F102_0280 EZ301U	77	200	28.17	169/6	4000	4000	6000	0.37	11/6	7.7	13
213	41	46	1.9	2.0	F102_0280 EZ302U	120	200	28.17	169/6	4000	4000	6000	0.47	11/6	7.7	13
213	54	61	2.5	1.5	F102_0280 EZ303U	120	200	28.17	169/6	4000	4000	6000	0.58	11/6	7.7	14
213	63	77	2.9	1.3	F102_0280 EZ401U	120	240	28.17	169/6	4000	4000	6000	1.1	11/6	7.7	15
260	20	21	1.1	3.8	F102_0230 EZ301U	63	170	23.08	3185/138	3700	3600	6000	0.43	11/6	7.7	13
260	34	38	1.8	2.3	F102_0230 EZ302U	110	170	23.08	3185/138	3700	3600	6000	0.53	11/6	7.7	13
260	44	50	2.4	1.7	F102_0230 EZ303U	120	170	23.08	3185/138	3700	3600	6000	0.64	11/6	7.7	14
260	51	63	2.8	1.5	F102_0230 EZ401U	120	240	23.08	3185/138	3700	3600	6000	1.2	11/6	7.7	15
325	16	17	1.1	4.4	F102_0185 EZ301U	50	130	18.46	1495/81	3700	3600	6000	0.52	11/6	7.7	13
325	27	30	1.8	2.6	F102_0185 EZ302U	90	130	18.46	1495/81	3700	3600	6000	0.62	11/6	7.7	13
325	35	40	2.3	2.0	F102_0185 EZ303U	110	130	18.46	1495/81	3700	3600	6000	0.73	11/6	7.7	14
325	41	50	2.7	1.7	F102_0185 EZ401U	120	240	18.46	1495/81	3700	3600	6000	1.3	11/6	7.7	15
325	61	79	4.0	1.2	F102_0185 EZ501U	120	240	18.46	1495/81	3700	3600	6000	3.2	11/6	7.7	16
325	63	88	4.2	1.1	F102_0185 EZ402U	120	240	18.46	1495/81	3700	3600	6000	2.0	11/6	7.7	16
442	12	13	1.0	3.1	F102_0135 EZ301U	37	46	13.59	231/17	4000	4000	6000	0.41	11/8	6.5	13
442	20	22	1.7	3.2	F102_0135 EZ302U	66	99	13.59	231/17	4000	4000	6000	0.51	11/8	6.5	13
442	26	30	2.2	2.5	F102_0135 EZ303U	79	99	13.59	231/17	4000	4000	6000	0.62	11/8	6.5	14
442	30	37	2.6	2.1	F102_0135 EZ401U	110	200	13.59	231/17	4000	4000	6000	1.1	11/8	6.5	15
442	45	58	3.8	1.4	F102_0135 EZ501U	110	200	13.59	231/17	4000	4000	6000	3.1	11/8	6.5	16
442	46	65	4.0	1.4	F102_0135 EZ402U	110	200	13.59	231/17	4000	4000	6000	1.8	11/8	6.5	16
549	9.4	10	1.0	3.1	F102_0110 EZ301U	30	37	10.92	273/25	4000	4000	6000	0.50	11/8	6.5	13
549	16	18	1.6	3.7	F102_0110 EZ302U	53	79	10.92	273/25	4000	4000	6000	0.60	11/8	6.5	13
549	21	24	2.1	2.8	F102_0110 EZ303U	64	79	10.92	273/25	4000	4000	6000	0.71	11/8	6.5	14
549	24	30	2.5	2.4	F102_0110 EZ401U	90	160	10.92	273/25	4000	4000	6000	1.2	11/8	6.5	15
549	36	47	3.7	1.6	F102_0110 EZ501U	110	200	10.92	273/25	4000	4000	6000	3.2	11/8	6.5	16
549	37	52	3.8	1.6	F102_0110 EZ402U	110	160	10.92	273/25	4000	4000	6000	1.9	11/8	6.5	16
671	7.7	8.2	0.9	3.1	F102_0089 EZ301U	24	30	8.948	1029/115	3700	3600	6000	0.63	11/8	6.5	13
671	13	15	1.6	4.0	F102_0089 EZ302U	43	65	8.948	1029/115	3700	3600	6000	0.73	11/8	6.5	13
671	17	20	2.1	3.1	F102_0089 EZ303U	52	65	8.948	1029/115	3700	3600	6000	0.84	11/8	6.5	14
671	20	24	2.4	2.8	F102_0089 EZ401U	74	130	8.948	1029/115	3700	3600	6000	1.4	11/8	6.5	15
671	30	38	3.6	1.9	F102_0089 EZ501U	110	200	8.948	1029/115	3700	3600	6000	3.3	11/8	6.5	16
671	30	43	3.7	1.8	F102_0089 EZ402U	100	130	8.948	1029/115	3700	3600	6000	2.1	11/8	6.5	16
671	45	68	5.5	1.2	F102_0089 EZ502U	110	200	8.948	1029/115	3700	3600	6000	5.6	11/8	6.5	18
671	45	69	5.5	1.2	F102_0089 EZ701U	110	200	8.948	1029/115	3700	3600	6000	8.9	11/8	6.5	20
671	50	73	6.1	1.1	F102_0089 EZ404U	110	200	8.948	1029/115	3700	3600	6000	3.4	11/8	6.5	18
838	6.2	6.6	0.9	3.1	F102_0072 EZ301U	19	24	7.156	322/45	3700	3600	6000	0.82	11/8	6.5	13
838	10	12	1.5	4.0	F102_0072 EZ302U	35	52	7.156	322/45	3700	3600	6000	0.92	11/8	6.5	13
838	14	16	2.0	3.1	F102_0072 EZ303U	42	52	7.156	322/45	3700	3600	6000	1.0	11/8	6.5	14



12 F offset helical geared motors

12.2 Selection tables



n_{2N}	M_{2N}	$M_{2,0}$	a_{th}	S	Type	M_{zacc}	M_{2NOT}	i	i_{exakt}	n_{1max} DBH	n_{1max} DBV	n_{1max} ZB	J_1	$\Delta\phi_2$	C_2	m
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]			[rpm]	[rpm]	[rpm]	[10 ⁻⁴ kgm ²]	[arcmin]	[Nm/ arcmin]	[kg]
F1 ($n_{1N} = 6000$ rpm, $M_{zacc,max} = 120$ Nm)																
838	16	19	2.3	3.2	F102_0072 EZ401U	59	100	7.156	322/45	3700	3600	6000	1.6	11/8	6.5	15
838	24	31	3.4	2.2	F102_0072 EZ501U	110	200	7.156	322/45	3700	3600	6000	3.5	11/8	6.5	16
838	24	34	3.6	2.1	F102_0072 EZ402U	83	100	7.156	322/45	3700	3600	6000	2.3	11/8	6.5	16
838	36	54	5.3	1.4	F102_0072 EZ502U	110	200	7.156	322/45	3700	3600	6000	5.8	11/8	6.5	18
838	36	55	5.3	1.4	F102_0072 EZ701U	110	200	7.156	322/45	3700	3600	6000	9.1	11/8	6.5	20
838	40	58	5.9	1.3	F102_0072 EZ404U	110	200	7.156	322/45	3700	3600	6000	3.6	11/8	6.5	18
838	43	74	6.3	1.2	F102_0072 EZ503U	110	200	7.156	322/45	3700	3600	6000	8.2	11/8	6.5	19
929	9.4	11	1.5	4.0	F102_0065 EZ302U	31	47	6.462	84/13	3500	3000	6000	1.0	11/8	6.5	13
929	12	14	2.0	3.1	F102_0065 EZ303U	38	47	6.462	84/13	3500	3000	6000	1.2	11/8	6.5	14
929	14	18	2.3	3.4	F102_0065 EZ401U	53	94	6.462	84/13	3500	3000	6000	1.7	11/8	6.5	15
929	21	28	3.4	2.3	F102_0065 EZ501U	100	190	6.462	84/13	3500	3000	6000	3.7	11/8	6.5	16
929	22	31	3.5	2.3	F102_0065 EZ402U	75	94	6.462	84/13	3500	3000	6000	2.4	11/8	6.5	16
929	33	49	5.2	1.5	F102_0065 EZ502U	110	190	6.462	84/13	3500	3000	6000	6.0	11/8	6.5	18
929	33	50	5.2	1.5	F102_0065 EZ701U	110	190	6.462	84/13	3500	3000	6000	9.3	11/8	6.5	20
929	36	53	5.8	1.4	F102_0065 EZ404U	110	190	6.462	84/13	3500	3000	6000	3.7	11/8	6.5	18
929	39	66	6.2	1.3	F102_0065 EZ503U	110	190	6.462	84/13	3500	3000	6000	8.3	11/8	6.5	19
1393	6.3	7.0	1.4	4.0	F102_0043 EZ302U	21	31	4.308	56/13	3500	3000	6000	1.8	11/8	6.5	13
1393	8.2	9.4	1.8	3.1	F102_0043 EZ303U	25	31	4.308	56/13	3500	3000	6000	1.9	11/8	6.5	14
1393	9.6	12	2.1	4.5	F102_0043 EZ401U	36	63	4.308	56/13	3500	3000	6000	2.4	11/8	6.5	15
1393	14	18	3.2	3.0	F102_0043 EZ501U	67	130	4.308	56/13	3500	3000	6000	4.4	11/8	6.5	16
1393	15	20	3.3	3.0	F102_0043 EZ402U	50	63	4.308	56/13	3500	3000	6000	3.1	11/8	6.5	16
1393	22	33	4.8	2.0	F102_0043 EZ502U	100	130	4.308	56/13	3500	3000	6000	6.7	11/8	6.5	18
1393	22	33	4.8	2.0	F102_0043 EZ701U	84	130	4.308	56/13	3500	3000	6000	10	11/8	6.5	20
1393	24	35	5.4	1.8	F102_0043 EZ404U	100	130	4.308	56/13	3500	3000	6000	4.5	11/8	6.5	18
1393	26	44	5.8	1.7	F102_0043 EZ503U	100	130	4.308	56/13	3500	3000	6000	9.1	11/8	6.5	19
F2 ($n_{1N} = 3000$ rpm, $M_{zacc,max} = 270$ Nm)																
14	198	202	1.2	1.2	F203_2220 EZ301U	270	480	222.2	2444/11	4000	3900	6000	0.25	11/7	18	24
16	164	167	1.1	1.5	F203_1840 EZ301U	270	480	184.3	16215/88	4000	3900	6000	0.25	11/7	18	24
21	127	130	1.0	1.9	F202_1410 EZ301U	270	480	140.9	1550/11	4000	3900	6000	0.23	11/6	18	21
27	102	104	0.9	2.4	F202_1130 EZ301U	270	480	112.7	1240/11	4000	3900	6000	0.24	11/6	18	21
27	174	184	1.5	1.4	F202_1130 EZ302U	270	480	112.7	1240/11	4000	3900	6000	0.34	11/6	18	22
32	85	86	0.8	2.8	F202_0940 EZ301U	250	480	93.82	1032/11	4000	3900	6000	0.26	11/6	18	21
32	145	153	1.4	1.7	F202_0940 EZ302U	270	480	93.82	1032/11	4000	3900	6000	0.36	11/6	18	22
32	188	199	1.8	1.3	F202_0940 EZ303U	270	480	93.82	1032/11	4000	3900	6000	0.47	11/6	18	22
43	108	114	1.2	2.2	F202_0700 EZ302U	270	430	70.13	5400/77	4000	3900	6000	0.41	11/6	18	22
43	141	149	1.5	1.7	F202_0700 EZ303U	270	430	70.13	5400/77	4000	3900	6000	0.52	11/6	18	22
43	190	204	2.1	1.3	F202_0700 EZ401U	270	480	70.13	5400/77	4000	3900	6000	1.1	11/6	18	23
53	87	92	1.1	2.7	F202_0570 EZ302U	270	410	56.73	624/11	4000	3900	6000	0.46	11/6	18	22
53	114	121	1.4	2.1	F202_0570 EZ303U	270	410	56.73	624/11	4000	3900	6000	0.57	11/6	18	22
53	154	165	1.9	1.6	F202_0570 EZ401U	270	480	56.73	624/11	4000	3900	6000	1.1	11/6	18	23
64	73	77	1.0	3.3	F202_0470 EZ302U	230	340	47.05	1035/22	4000	3900	6000	0.52	11/6	18	22
64	94	100	1.3	2.5	F202_0470 EZ303U	270	340	47.05	1035/22	4000	3900	6000	0.63	11/6	18	22
64	128	137	1.7	1.9	F202_0470 EZ401U	270	480	47.05	1035/22	4000	3900	6000	1.2	11/6	18	23
85	55	58	0.9	3.8	F202_0350 EZ302U	170	260	35.46	390/11	3800	3500	6000	0.65	11/6	18	22
85	71	75	1.2	2.9	F202_0350 EZ303U	210	260	35.46	390/11	3800	3500	6000	0.76	11/6	18	22
85	96	103	1.6	2.3	F202_0350 EZ401U	270	480	35.46	390/11	3800	3500	6000	1.3	11/6	18	23
85	148	162	2.5	1.5	F202_0350 EZ501U	270	480	35.46	390/11	3800	3500	6000	3.3	11/6	18	24
85	162	179	2.7	1.4	F202_0350 EZ402U	270	480	35.46	390/11	3800	3500	6000	2.0	11/6	18	25
107	43	46	0.9	3.8	F202_0280 EZ302U	140	200	28.11	4020/143	3800	3500	6000	0.79	11/6	18	22
107	56	60	1.2	2.9	F202_0280 EZ303U	160	200	28.11	4020/143	3800	3500	6000	0.90	11/6	18	22
107	76	82	1.6	2.7	F202_0280 EZ401U	230	410	28.11	4020/143	3800	3500	6000	1.4	11/6	18	23
107	117	128	2.4	1.7	F202_0280 EZ501U	270	480	28.11	4020/143	3800	3500	6000	3.4	11/6	18	24
107	128	142	2.6	1.6	F202_0280 EZ402U	270	410	28.11	4020/143	3800	3500	6000	2.1	11/6	18	25
128	36	38	0.9	3.8	F202_0230 EZ302U	110	170	23.43	2320/99	3600	3100	6000	0.95	11/6	18	22
128	47	50	1.1	2.9	F202_0230 EZ303U	140	170	23.43	2320/99	3600	3100	6000	1.1	11/6	18	22
128	64	68	1.5	3.0	F202_0230 EZ401U	190	340	23.43	2320/99	3600	3100	6000	1.6	11/6	18	23
128	98	107	2.3	1.9	F202_0230 EZ501U	270	480	23.43	2320/99	3600	3100	6000	3.6	11/6	18	24
128	107	118	2.5	1.8	F202_0230 EZ402U	270	340	23.43	2320/99	3600	3100	6000	2.3	11/6	18	25
128	157	195	3.7	1.2	F202_0230 EZ404U	270	480	23.43	2320/99	3600	3100	6000	3.6	11/6	18	27

F



12 F offset helical geared motors

12.2 Selection tables



n_{2N}	M_{2N}	$M_{2,0}$	a_{th}	S	Type	M_{zacc}	M_{zNOT}	i	i_{exakt}	$n_{1\text{max}}$	$n_{1\text{max}}$	$n_{1\text{max}}$	J_1	$\Delta\varphi_2$	C_2	m
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]			DBH	DBV	ZB	[10 ⁻⁴ kgm ²]	[arcmin]	[Nm/arcmin]	[kg]
F2 ($n_{1N} = 3000 \text{ rpm}$, $M_{zacc,max} = 270 \text{ Nm}$)																
128	168	182	4.0	1.1	F202_0230 EZ502U	270	480	23.43	2320/99	3600	3100	6000	5.9	11/6	18	26
128	168	189	4.0	1.1	F202_0230 EZ701U	270	480	23.43	2320/99	3600	3100	6000	9.2	11/6	18	28
161	29	30	0.8	3.8	F202_0185 EZ302U	90	140	18.65	6360/341	3600	3100	6000	1.2	11/6	18	22
161	37	40	1.1	2.9	F202_0185 EZ303U	110	140	18.65	6360/341	3600	3100	6000	1.3	11/6	18	22
161	51	54	1.5	3.5	F202_0185 EZ401U	150	270	18.65	6360/341	3600	3100	6000	1.9	11/6	18	23
161	78	85	2.2	2.3	F202_0185 EZ501U	270	480	18.65	6360/341	3600	3100	6000	3.8	11/6	18	24
161	85	94	2.5	2.1	F202_0185 EZ402U	220	270	18.65	6360/341	3600	3100	6000	2.6	11/6	18	25
161	125	156	3.6	1.4	F202_0185 EZ404U	270	480	18.65	6360/341	3600	3100	6000	3.9	11/6	18	27
161	134	145	3.9	1.3	F202_0185 EZ502U	270	480	18.65	6360/341	3600	3100	6000	6.1	11/6	18	26
161	134	150	3.9	1.3	F202_0185 EZ701U	270	480	18.65	6360/341	3600	3100	6000	9.4	11/6	18	28
161	175	201	5.1	1.0	F202_0185 EZ503U	270	480	18.65	6360/341	3600	3100	6000	8.5	11/6	18	27
220	21	22	0.8	3.8	F202_0135 EZ302U	66	99	13.63	109/8	3800	3500	6000	0.93	11/8	16	22
220	27	29	1.0	2.9	F202_0135 EZ303U	79	99	13.63	109/8	3800	3500	6000	1.0	11/8	16	22
220	37	40	1.4	4.3	F202_0135 EZ401U	110	200	13.63	109/8	3800	3500	6000	1.6	11/8	16	23
220	57	62	2.1	2.8	F202_0135 EZ501U	210	400	13.63	109/8	3800	3500	6000	3.5	11/8	16	24
220	62	69	2.3	2.6	F202_0135 EZ402U	160	200	13.63	109/8	3800	3500	6000	2.3	11/8	16	25
220	91	114	3.4	1.7	F202_0135 EZ404U	210	400	13.63	109/8	3800	3500	6000	3.6	11/8	16	27
220	98	106	3.7	1.6	F202_0135 EZ502U	210	400	13.63	109/8	3800	3500	6000	5.8	11/8	16	26
220	98	110	3.7	1.6	F202_0135 EZ701U	210	400	13.63	109/8	3800	3500	6000	9.1	11/8	16	28
220	128	147	4.8	1.2	F202_0135 EZ503U	210	400	13.63	109/8	3800	3500	6000	8.2	11/8	16	27
278	17	18	0.8	3.8	F202_0110 EZ302U	52	79	10.80	7303/676	3800	3500	6000	1.2	11/8	16	22
278	22	23	1.0	2.9	F202_0110 EZ303U	63	79	10.80	7303/676	3800	3500	6000	1.3	11/8	16	22
278	29	31	1.3	4.3	F202_0110 EZ401U	89	160	10.80	7303/676	3800	3500	6000	1.9	11/8	16	23
278	45	49	2.0	3.3	F202_0110 EZ501U	170	310	10.80	7303/676	3800	3500	6000	3.8	11/8	16	24
278	49	54	2.2	2.6	F202_0110 EZ402U	130	160	10.80	7303/676	3800	3500	6000	2.6	11/8	16	25
278	72	90	3.3	2.0	F202_0110 EZ404U	210	310	10.80	7303/676	3800	3500	6000	3.9	11/8	16	27
278	78	84	3.5	1.9	F202_0110 EZ502U	210	310	10.80	7303/676	3800	3500	6000	6.1	11/8	16	26
278	78	87	3.5	1.9	F202_0110 EZ701U	210	400	10.80	7303/676	3800	3500	6000	9.4	11/8	16	28
278	102	116	4.6	1.4	F202_0110 EZ503U	210	310	10.80	7303/676	3800	3500	6000	8.5	11/8	16	27
278	126	151	5.7	1.2	F202_0110 EZ702U	210	400	10.80	7303/676	3800	3500	6000	15	11/8	16	30
333	14	15	0.7	3.8	F202_0090 EZ302U	44	66	9.006	3161/351	3600	3100	6000	1.6	11/8	16	22
333	18	19	1.0	2.9	F202_0090 EZ303U	52	66	9.006	3161/351	3600	3100	6000	1.7	11/8	16	22
333	24	26	1.3	4.3	F202_0090 EZ401U	74	130	9.006	3161/351	3600	3100	6000	2.2	11/8	16	23
333	38	41	2.0	3.7	F202_0090 EZ501U	140	260	9.006	3161/351	3600	3100	6000	4.2	11/8	16	24
333	41	45	2.2	2.6	F202_0090 EZ402U	100	130	9.006	3161/351	3600	3100	6000	2.9	11/8	16	25
333	60	75	3.2	2.3	F202_0090 EZ404U	210	260	9.006	3161/351	3600	3100	6000	4.3	11/8	16	27
333	65	70	3.4	2.1	F202_0090 EZ502U	210	260	9.006	3161/351	3600	3100	6000	6.5	11/8	16	26
333	65	73	3.4	2.1	F202_0090 EZ701U	170	400	9.006	3161/351	3600	3100	6000	9.8	11/8	16	28
333	85	97	4.5	1.6	F202_0090 EZ503U	210	260	9.006	3161/351	3600	3100	6000	8.9	11/8	16	27
333	105	126	5.6	1.3	F202_0090 EZ702U	210	400	9.006	3161/351	3600	3100	6000	15	11/8	16	30
333	118	140	6.2	1.2	F202_0090 EZ505U	210	400	9.006	3161/351	3600	3100	6000	13	11/8	16	30
419	11	12	0.7	3.8	F202_0072 EZ302U	35	52	7.167	5777/806	3600	3100	6000	2.2	11/8	16	22
419	14	15	0.9	2.9	F202_0072 EZ303U	42	52	7.167	5777/806	3600	3100	6000	2.3	11/8	16	22
419	19	21	1.2	4.3	F202_0072 EZ401U	59	100	7.167	5777/806	3600	3100	6000	2.9	11/8	16	23
419	30	33	1.9	4.3	F202_0072 EZ501U	110	210	7.167	5777/806	3600	3100	6000	4.8	11/8	16	24
419	33	36	2.1	2.6	F202_0072 EZ402U	83	100	7.167	5777/806	3600	3100	6000	3.6	11/8	16	25
419	48	60	3.1	2.7	F202_0072 EZ404U	170	210	7.167	5777/806	3600	3100	6000	4.9	11/8	16	27
419	51	56	3.3	2.5	F202_0072 EZ502U	170	210	7.167	5777/806	3600	3100	6000	7.1	11/8	16	26
419	51	58	3.3	2.5	F202_0072 EZ701U	140	400	7.167	5777/806	3600	3100	6000	10	11/8	16	28
419	67	77	4.3	1.9	F202_0072 EZ503U	170	210	7.167	5777/806	3600	3100	6000	9.5	11/8	16	27
419	83	100	5.3	1.5	F202_0072 EZ702U	210	400	7.167	5777/806	3600	3100	6000	16	11/8	16	30
419	94	111	6.0	1.4	F202_0072 EZ505U	210	400	7.167	5777/806	3600	3100	6000	14	11/8	16	30
419	115	145	7.3	1.1	F202_0072 EZ703U	210	400	7.167	5777/806	3600	3100	6000	24	11/8	16	32
540	37	46	2.9	3.2	F202_0056 EZ404U	130	160	5.552	5341/962	3100	2600	5000	6.0	11/8	16	27
540	40	43	3.2	3.0	F202_0056 EZ502U	130	160	5.552	5341/962	3100	2600	5000	8.2	11/8	16	26
540	40	45	3.2	3.0	F202_0056 EZ701U	110	400	5.552	5341/962	3100	2600	5000	12	11/8	16	28
540	52	60	4.1	2.3	F202_0056 EZ503U	130	160	5.552	5341/962	3100	2600	5000	11	11/8	16	27
540	65	78	5.1	1.8	F202_0056 EZ702U	210	400	5.552	5341/962	3100	2600	5000	17	11/8	16	30
540	73	86	5.8	1.6	F202_0056 EZ505U	210	400	5.552	5341/962	3100	2600	5000	15	11/8	16	30



12 F offset helical geared motors

12.2 Selection tables



n_{2N}	M_{2N}	$M_{2,0}$	a_{th}	S	Type	M_{zacc}	M_{2NOT}	i	i_{exakt}	n_{1max} DBH	n_{1max} DBV	n_{1max} ZB	J_1	$\Delta\phi_2$	C_2	m
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]			[rpm]	[rpm]	[rpm]	[10 ⁻⁴ kgm ²]	[arcmin]	[Nm/ arcmin]	[kg]
F2 ($n_{1N} = 3000$ rpm, $M_{zacc,max} = 270$ Nm)																
540	89	112	7.0	1.3	F202_0056 EZ703U	210	400	5.552	5341/962	3100	2600	5000	25	11/8	16	32
641	13	14	1.2	4.3	F202_0047 EZ401U	39	68	4.680	2616/559	3100	2600	5000	5.0	11/8	16	23
641	20	21	1.8	2.8	F202_0047 EZ501U	54	68	4.680	2616/559	3100	2600	5000	7.0	11/8	16	24
641	21	24	1.9	2.6	F202_0047 EZ402U	54	68	4.680	2616/559	3100	2600	5000	5.7	11/8	16	25
641	31	39	2.9	3.5	F202_0047 EZ404U	110	140	4.680	2616/559	3100	2600	5000	7.0	11/8	16	27
641	34	36	3.1	3.2	F202_0047 EZ502U	110	140	4.680	2616/559	3100	2600	5000	9.3	11/8	16	26
641	34	38	3.1	3.3	F202_0047 EZ701U	91	340	4.680	2616/559	3100	2600	5000	13	11/8	16	28
641	44	50	4.0	2.5	F202_0047 EZ503U	110	140	4.680	2616/559	3100	2600	5000	12	11/8	16	27
641	54	65	5.0	2.0	F202_0047 EZ702U	190	340	4.680	2616/559	3100	2600	5000	18	11/8	16	30
641	61	73	5.6	1.8	F202_0047 EZ505U	210	340	4.680	2616/559	3100	2600	5000	16	11/8	16	30
641	75	94	6.8	1.5	F202_0047 EZ703U	210	340	4.680	2616/559	3100	2600	5000	26	11/8	16	32
F2 ($n_{1N} = 4500$ rpm, $M_{zacc,max} = 210$ Nm)																
417	100	160	5.2	1.3	F202_0110 EZ505U	210	400	10.80	7303/676	3800	3500	6000	13	11/8	16	30
500	83	134	5.0	1.5	F202_0090 EZ505U	210	400	9.006	3161/351	3600	3100	6000	13	11/8	16	30
628	66	106	4.8	1.7	F202_0072 EZ505U	210	400	7.167	5777/806	3600	3100	6000	14	11/8	16	30
628	84	139	6.2	1.3	F202_0072 EZ703U	210	400	7.167	5777/806	3600	3100	6000	24	11/8	16	32
811	51	82	4.6	2.0	F202_0056 EZ505U	210	400	5.552	5341/962	3100	2600	5000	15	11/8	16	30
811	65	108	5.9	1.6	F202_0056 EZ703U	210	400	5.552	5341/962	3100	2600	5000	25	11/8	16	32
962	43	69	4.5	2.3	F202_0047 EZ505U	210	340	4.680	2616/559	3100	2600	5000	16	11/8	16	30
962	55	91	5.7	1.8	F202_0047 EZ703U	210	340	4.680	2616/559	3100	2600	5000	26	11/8	16	32
F2 ($n_{1N} = 6000$ rpm, $M_{zacc,max} = 270$ Nm)																
53	164	184	1.4	1.5	F202_1130 EZ302U	270	480	112.7	1240/11	4000	3900	6000	0.34	11/6	18	22
64	137	153	1.3	1.8	F202_0940 EZ302U	270	480	93.82	1032/11	4000	3900	6000	0.36	11/6	18	22
64	178	205	1.7	1.3	F202_0940 EZ303U	270	480	93.82	1032/11	4000	3900	6000	0.47	11/6	18	22
86	102	114	1.2	2.1	F202_0700 EZ302U	270	430	70.13	5400/77	4000	3900	6000	0.41	11/6	18	22
86	133	153	1.6	1.6	F202_0700 EZ303U	270	430	70.13	5400/77	4000	3900	6000	0.52	11/6	18	22
86	156	190	1.9	1.4	F202_0700 EZ401U	270	480	70.13	5400/77	4000	3900	6000	1.1	11/6	18	23
106	83	92	1.2	2.5	F202_0570 EZ302U	270	410	56.73	624/11	4000	3900	6000	0.46	11/6	18	22
106	108	124	1.6	1.9	F202_0570 EZ303U	270	410	56.73	624/11	4000	3900	6000	0.57	11/6	18	22
106	127	154	1.8	1.6	F202_0570 EZ401U	270	480	56.73	624/11	4000	3900	6000	1.1	11/6	18	23
128	68	77	1.2	2.8	F202_0470 EZ302U	230	340	47.05	1035/22	4000	3900	6000	0.52	11/6	18	22
128	89	103	1.5	2.1	F202_0470 EZ303U	270	340	47.05	1035/22	4000	3900	6000	0.63	11/6	18	22
128	105	128	1.8	1.8	F202_0470 EZ401U	270	480	47.05	1035/22	4000	3900	6000	1.2	11/6	18	23
128	155	201	2.6	1.2	F202_0470 EZ501U	270	480	47.05	1035/22	4000	3900	6000	3.1	11/6	18	24
169	52	58	1.1	3.4	F202_0350 EZ302U	170	260	35.46	390/11	3800	3500	6000	0.65	11/6	18	22
169	67	77	1.4	2.6	F202_0350 EZ303U	210	260	35.46	390/11	3800	3500	6000	0.76	11/6	18	22
169	79	96	1.7	2.2	F202_0350 EZ401U	270	480	35.46	390/11	3800	3500	6000	1.3	11/6	18	23
169	117	151	2.5	1.5	F202_0350 EZ501U	270	480	35.46	390/11	3800	3500	6000	3.3	11/6	18	24
169	120	169	2.6	1.4	F202_0350 EZ402U	270	480	35.46	390/11	3800	3500	6000	2.0	11/6	18	25
213	41	46	1.1	3.9	F202_0280 EZ302U	140	200	28.11	4020/143	3800	3500	6000	0.79	11/6	18	22
213	53	61	1.4	3.0	F202_0280 EZ303U	160	200	28.11	4020/143	3800	3500	6000	0.90	11/6	18	22
213	63	76	1.6	2.6	F202_0280 EZ401U	230	410	28.11	4020/143	3800	3500	6000	1.4	11/6	18	23
213	93	120	2.4	1.7	F202_0280 EZ501U	270	480	28.11	4020/143	3800	3500	6000	3.4	11/6	18	24
213	95	134	2.5	1.7	F202_0280 EZ402U	270	410	28.11	4020/143	3800	3500	6000	2.1	11/6	18	25
256	34	38	1.0	4.0	F202_0230 EZ302U	110	170	23.43	2320/99	3600	3100	6000	0.95	11/6	18	22
256	45	51	1.3	3.1	F202_0230 EZ303U	140	170	23.43	2320/99	3600	3100	6000	1.1	11/6	18	22
256	52	64	1.6	2.9	F202_0230 EZ401U	190	340	23.43	2320/99	3600	3100	6000	1.6	11/6	18	23
256	77	100	2.3	2.0	F202_0230 EZ501U	270	480	23.43	2320/99	3600	3100	6000	3.6	11/6	18	24
256	80	111	2.4	1.9	F202_0230 EZ402U	270	340	23.43	2320/99	3600	3100	6000	2.3	11/6	18	25
256	118	177	3.6	1.3	F202_0230 EZ502U	270	480	23.43	2320/99	3600	3100	6000	5.9	11/6	18	26
256	118	180	3.6	1.3	F202_0230 EZ701U	270	480	23.43	2320/99	3600	3100	6000	9.2	11/6	18	28
256	132	191	4.0	1.1	F202_0230 EZ404U	270	480	23.43	2320/99	3600	3100	6000	3.6	11/6	18	27
322	27	30	1.0	4.0	F202_0185 EZ302U	90	140	18.65	6360/341	3600	3100	6000	1.2	11/6	18	22
322	35	41	1.3	3.1	F202_0185 EZ303U	110	140	18.65	6360/341	3600	3100	6000	1.3	11/6	18	22
322	42	51	1.5	3.4	F202_0185 EZ401U	150	270	18.65	6360/341	3600	3100	6000	1.9	11/6	18	23
322	62	80	2.2	2.3	F202_0185 EZ501U	270	480	18.65	6360/341	3600	3100	6000	3.8	11/6	18	24
322	63	89	2.3	2.2	F202_0185 EZ402U	220	270	18.65	6360/341	3600	3100	6000	2.6	11/6	18	25
322	94	141	3.4	1.5	F202_0185 EZ502U	270	480	18.65	6360/341	3600	3100	6000	6.1	11/6	18	26
322	94	143	3.4	1.5	F202_0185 EZ701U	270	480	18.65	6360/341	3600	3100	6000	9.4	11/6	18	28

F



12 F offset helical geared motors

12.2 Selection tables



n_{2N}	M_{2N}	$M_{2,0}$	a_{th}	S	Type	M_{zacc}	M_{zNOT}	i	i_{exakt}	n_{1max}	n_{1max}	n_{1max}	J_1	$\Delta\phi_2$	C_2	m
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]			DBH	DBV	ZB	[10 ⁻⁴ kgm ²]	[arcmin]	[Nm/arcmin]	[kg]
F2 ($n_{1N} = 6000$ rpm, $M_{zacc,max} = 270$ Nm)																
322	105	152	3.8	1.3	F202_0185 EZ404U	270	480	18.65	6360/341	3600	3100	6000	3.9	11/6	18	27
322	112	192	4.1	1.2	F202_0185 EZ503U	270	480	18.65	6360/341	3600	3100	6000	8.5	11/6	18	27
440	20	22	0.9	4.0	F202_0135 EZ302U	66	99	13.63	109/8	3800	3500	6000	0.93	11/8	16	22
440	26	30	1.2	3.1	F202_0135 EZ303U	79	99	13.63	109/8	3800	3500	6000	1.0	11/8	16	22
440	30	37	1.4	4.2	F202_0135 EZ401U	110	200	13.63	109/8	3800	3500	6000	1.6	11/8	16	23
440	45	58	2.1	2.8	F202_0135 EZ501U	210	400	13.63	109/8	3800	3500	6000	3.5	11/8	16	24
440	46	65	2.2	2.7	F202_0135 EZ402U	160	200	13.63	109/8	3800	3500	6000	2.3	11/8	16	25
440	69	103	3.2	1.8	F202_0135 EZ502U	210	400	13.63	109/8	3800	3500	6000	5.8	11/8	16	26
440	69	104	3.2	1.8	F202_0135 EZ701U	210	400	13.63	109/8	3800	3500	6000	9.1	11/8	16	28
440	77	111	3.6	1.6	F202_0135 EZ404U	210	400	13.63	109/8	3800	3500	6000	3.6	11/8	16	27
440	82	140	3.9	1.5	F202_0135 EZ503U	210	400	13.63	109/8	3800	3500	6000	8.2	11/8	16	27
555	16	18	0.9	4.0	F202_0110 EZ302U	52	79	10.80	7303/676	3800	3500	6000	1.2	11/8	16	22
555	21	24	1.2	3.1	F202_0110 EZ303U	63	79	10.80	7303/676	3800	3500	6000	1.3	11/8	16	22
555	24	29	1.4	4.8	F202_0110 EZ401U	89	160	10.80	7303/676	3800	3500	6000	1.9	11/8	16	23
555	36	46	2.0	3.3	F202_0110 EZ501U	170	310	10.80	7303/676	3800	3500	6000	3.8	11/8	16	24
555	37	51	2.1	3.2	F202_0110 EZ402U	130	160	10.80	7303/676	3800	3500	6000	2.6	11/8	16	25
555	54	82	3.1	2.1	F202_0110 EZ502U	210	310	10.80	7303/676	3800	3500	6000	6.1	11/8	16	26
555	54	83	3.1	2.1	F202_0110 EZ701U	210	400	10.80	7303/676	3800	3500	6000	9.4	11/8	16	28
555	61	88	3.5	1.9	F202_0110 EZ404U	210	310	10.80	7303/676	3800	3500	6000	3.9	11/8	16	27
555	65	111	3.7	1.8	F202_0110 EZ503U	210	310	10.80	7303/676	3800	3500	6000	8.5	11/8	16	27
555	75	150	4.3	1.5	F202_0110 EZ702U	210	400	10.80	7303/676	3800	3500	6000	15	11/8	16	30
666	13	15	0.9	4.0	F202_0090 EZ302U	44	66	9.006	3161/351	3600	3100	6000	1.6	11/8	16	22
666	17	20	1.1	3.1	F202_0090 EZ303U	52	66	9.006	3161/351	3600	3100	6000	1.7	11/8	16	22
666	20	24	1.3	2.6	F202_0090 EZ401U	52	66	9.006	3161/351	3600	3100	6000	2.2	11/8	16	23
666	30	38	2.0	3.7	F202_0090 EZ501U	140	260	9.006	3161/351	3600	3100	6000	4.2	11/8	16	24
666	31	43	2.0	3.4	F202_0090 EZ402U	100	130	9.006	3161/351	3600	3100	6000	2.9	11/8	16	25
666	45	68	3.0	2.4	F202_0090 EZ502U	210	260	9.006	3161/351	3600	3100	6000	6.5	11/8	16	26
666	45	69	3.0	2.4	F202_0090 EZ701U	170	400	9.006	3161/351	3600	3100	6000	9.8	11/8	16	28
666	51	73	3.4	2.2	F202_0090 EZ404U	210	260	9.006	3161/351	3600	3100	6000	4.3	11/8	16	27
666	54	93	3.6	2.0	F202_0090 EZ503U	210	260	9.006	3161/351	3600	3100	6000	8.9	11/8	16	27
666	63	125	4.2	1.7	F202_0090 EZ702U	210	400	9.006	3161/351	3600	3100	6000	15	11/8	16	30
837	10	12	0.8	4.0	F202_0072 EZ302U	35	52	7.167	5777/806	3600	3100	6000	2.2	11/8	16	22
837	14	16	1.1	3.1	F202_0072 EZ303U	42	52	7.167	5777/806	3600	3100	6000	2.3	11/8	16	22
837	16	19	1.3	2.6	F202_0072 EZ401U	42	52	7.167	5777/806	3600	3100	6000	2.9	11/8	16	23
837	24	31	1.9	4.3	F202_0072 EZ501U	110	210	7.167	5777/806	3600	3100	6000	4.8	11/8	16	24
837	24	34	2.0	3.4	F202_0072 EZ402U	83	100	7.167	5777/806	3600	3100	6000	3.6	11/8	16	25
837	36	54	2.9	2.8	F202_0072 EZ502U	170	210	7.167	5777/806	3600	3100	6000	7.1	11/8	16	26
837	36	55	2.9	2.8	F202_0072 EZ701U	140	400	7.167	5777/806	3600	3100	6000	10	11/8	16	28
837	40	58	3.3	2.5	F202_0072 EZ404U	170	210	7.167	5777/806	3600	3100	6000	4.9	11/8	16	27
837	43	74	3.5	2.4	F202_0072 EZ503U	170	210	7.167	5777/806	3600	3100	6000	9.5	11/8	16	27
837	50	99	4.0	2.0	F202_0072 EZ702U	210	400	7.167	5777/806	3600	3100	6000	16	11/8	16	30
F3 ($n_{1N} = 3000$ rpm, $M_{zacc,max} = 450$ Nm)																
16	281	297	1.2	1.4	F303_1850 EZ302U	450	800	184.8	29939/162	4000	3900	6000	0.37	11/7	22	34
21	217	229	1.1	1.8	F302_1410 EZ302U	450	620	140.6	7595/54	4000	3900	6000	0.37	11/6	22	29
21	282	299	1.4	1.4	F302_1410 EZ303U	450	620	140.6	7595/54	4000	3900	6000	0.48	11/6	22	30
27	174	184	1.0	2.3	F302_1130 EZ302U	450	590	112.8	3724/33	4000	3900	6000	0.40	11/6	22	29
27	227	240	1.3	1.8	F302_1130 EZ303U	450	590	112.8	3724/33	4000	3900	6000	0.51	11/6	22	30
27	306	328	1.7	1.3	F302_1130 EZ401U	450	800	112.8	3724/33	4000	3900	6000	1.0	11/6	22	31
32	144	153	0.9	2.7	F302_0940 EZ302U	390	490	93.64	4214/45	4000	3900	6000	0.45	11/6	22	29
32	188	199	1.2	2.1	F302_0940 EZ303U	390	490	93.64	4214/45	4000	3900	6000	0.56	11/6	22	30
32	254	273	1.6	1.6	F302_0940 EZ401U	450	800	93.64	4214/45	4000	3900	6000	1.1	11/6	22	31
43	109	115	0.8	3.4	F302_0700 EZ302U	340	460	70.36	2744/39	4000	3900	6000	0.54	11/6	22	29
43	141	149	1.0	2.6	F302_0700 EZ303U	370	460	70.36	2744/39	4000	3900	6000	0.65	11/6	22	30
43	191	205	1.4	2.1	F302_0700 EZ401U	450	800	70.36	2744/39	4000	3900	6000	1.2	11/6	22	31
43	293	321	2.1	1.4	F302_0700 EZ501U	450	800	70.36	2744/39	4000	3900	6000	3.2	11/6	22	32
53	87	92	0.7	3.8	F302_0560 EZ302U	270	410	56.49	4067/72	4000	3900	6000	0.65	11/6	22	29
53	113	120	0.9	2.9	F302_0560 EZ303U	330	410	56.49	4067/72	4000	3900	6000	0.76	11/6	22	30
53	153	164	1.2	2.6	F302_0560 EZ401U	450	800	56.49	4067/72	4000	3900	6000	1.3	11/6	22	31
53	236	258	1.9	1.7	F302_0560 EZ501U	450	800	56.49	4067/72	4000	3900	6000	3.3	11/6	22	32



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12.2 Selection tables



n_{2N}	M_{2N}	$M_{2,0}$	a_{th}	S	Type	M_{zacc}	M_{2NOT}	i	i_{exakt}	n_{1max} DBH	n_{1max} DBV	n_{1max} ZB	J_1	$\Delta\phi_2$	C_2	m
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]			[rpm]	[rpm]	[rpm]	[10 ⁻⁴ kgm ²]	[arcmin]	[Nm/ arcmin]	[kg]
F3 ($n_{1N} = 3000$ rpm, $M_{zacc,max} = 450$ Nm)																
53	258	285	2.1	1.6	F302_0560 EZ402U	450	800	56.49	4067/72	4000	3900	6000	2.0	11/6	22	32
64	73	77	0.6	3.8	F302_0470 EZ302U	230	340	47.19	1274/27	4000	3900	6000	0.77	11/6	22	29
64	95	100	0.8	2.9	F302_0470 EZ303U	270	340	47.19	1274/27	4000	3900	6000	0.88	11/6	22	30
64	128	137	1.1	3.1	F302_0470 EZ401U	390	690	47.19	1274/27	4000	3900	6000	1.4	11/6	22	31
64	197	215	1.7	2.0	F302_0470 EZ501U	450	800	47.19	1274/27	4000	3900	6000	3.4	11/6	22	32
64	215	238	1.9	1.9	F302_0470 EZ402U	450	690	47.19	1274/27	4000	3900	6000	2.1	11/6	22	32
86	95	102	1.1	3.8	F302_0350 EZ401U	290	510	35.03	7252/207	3700	3500	5500	1.7	11/6	22	31
86	146	160	1.6	2.5	F302_0350 EZ501U	450	800	35.03	7252/207	3700	3500	5500	3.6	11/6	22	32
86	160	177	1.8	2.3	F302_0350 EZ402U	410	510	35.03	7252/207	3700	3500	5500	2.4	11/6	22	32
86	234	292	2.6	1.5	F302_0350 EZ404U	450	800	35.03	7252/207	3700	3500	5500	3.7	11/6	22	34
86	251	272	2.8	1.4	F302_0350 EZ502U	450	800	35.03	7252/207	3700	3500	5500	5.9	11/6	22	34
86	251	282	2.8	1.4	F302_0350 EZ701U	450	800	35.03	7252/207	3700	3500	5500	9.2	11/6	22	35
106	118	129	1.6	2.9	F302_0280 EZ501U	440	800	28.23	6860/243	3700	3500	5500	3.9	11/6	22	32
106	189	235	2.5	1.8	F302_0280 EZ404U	450	800	28.23	6860/243	3700	3500	5500	4.0	11/6	22	34
106	203	219	2.7	1.7	F302_0280 EZ502U	450	800	28.23	6860/243	3700	3500	5500	6.2	11/6	22	34
106	203	227	2.7	1.7	F302_0280 EZ701U	450	800	28.23	6860/243	3700	3500	5500	9.5	11/6	22	35
106	266	304	3.6	1.3	F302_0280 EZ503U	450	800	28.23	6860/243	3700	3500	5500	8.6	11/6	22	35
128	98	107	1.5	3.2	F302_0240 EZ501U	370	680	23.52	588/25	3500	3100	5000	4.3	11/6	22	32
128	157	196	2.5	2.0	F302_0240 EZ404U	450	680	23.52	588/25	3500	3100	5000	4.4	11/6	22	34
128	169	183	2.6	1.9	F302_0240 EZ502U	450	680	23.52	588/25	3500	3100	5000	6.6	11/6	22	34
128	169	189	2.6	1.9	F302_0240 EZ701U	450	680	23.52	588/25	3500	3100	5000	9.9	11/6	22	35
128	221	253	3.5	1.4	F302_0240 EZ503U	450	680	23.52	588/25	3500	3100	5000	9.0	11/6	22	35
128	274	329	4.3	1.2	F302_0240 EZ702U	450	680	23.52	588/25	3500	3100	5000	15	11/6	22	38
160	78	86	1.5	3.8	F302_0190 EZ501U	290	550	18.77	4900/261	3500	3100	5000	4.8	11/6	22	32
160	126	157	2.4	2.3	F302_0190 EZ404U	440	550	18.77	4900/261	3500	3100	5000	4.9	11/6	22	34
160	135	146	2.5	2.2	F302_0190 EZ502U	440	550	18.77	4900/261	3500	3100	5000	7.1	11/6	22	34
160	135	151	2.5	2.2	F302_0190 EZ701U	360	800	18.77	4900/261	3500	3100	5000	10	11/6	22	35
160	177	202	3.3	1.7	F302_0190 EZ503U	440	550	18.77	4900/261	3500	3100	5000	9.5	11/6	22	35
160	219	262	4.1	1.3	F302_0190 EZ702U	450	800	18.77	4900/261	3500	3100	5000	16	11/6	22	38
160	246	291	4.6	1.2	F302_0190 EZ505U	450	800	18.77	4900/261	3500	3100	5000	14	11/6	22	38
224	36	39	0.9	4.3	F302_0135 EZ401U	110	190	13.38	7696/575	3700	3500	5500	2.2	11/8	20	31
224	56	61	1.4	4.7	F302_0135 EZ501U	210	390	13.38	7696/575	3700	3500	5500	4.2	11/8	20	32
224	61	68	1.5	2.6	F302_0135 EZ402U	160	190	13.38	7696/575	3700	3500	5500	2.9	11/8	20	32
224	90	112	2.2	2.9	F302_0135 EZ404U	310	390	13.38	7696/575	3700	3500	5500	4.3	11/8	20	34
224	96	104	2.4	2.7	F302_0135 EZ502U	310	390	13.38	7696/575	3700	3500	5500	6.5	11/8	20	34
224	96	108	2.4	2.7	F302_0135 EZ701U	260	650	13.38	7696/575	3700	3500	5500	9.8	11/8	20	35
224	126	144	3.1	2.1	F302_0135 EZ503U	310	390	13.38	7696/575	3700	3500	5500	8.9	11/8	20	35
224	156	187	3.9	1.7	F302_0135 EZ702U	350	650	13.38	7696/575	3700	3500	5500	15	11/8	20	38
224	175	208	4.4	1.5	F302_0135 EZ505U	350	650	13.38	7696/575	3700	3500	5500	13	11/8	20	38
224	214	270	5.3	1.2	F302_0135 EZ703U	350	650	13.38	7696/575	3700	3500	5500	23	11/8	20	40
278	72	90	2.2	3.4	F302_0110 EZ404U	250	310	10.79	1456/135	3700	3500	5500	4.9	11/8	20	34
278	77	84	2.3	3.2	F302_0110 EZ502U	250	310	10.79	1456/135	3700	3500	5500	7.1	11/8	20	34
278	77	87	2.3	3.2	F302_0110 EZ701U	210	650	10.79	1456/135	3700	3500	5500	10	11/8	20	35
278	101	116	3.0	2.4	F302_0110 EZ503U	250	310	10.79	1456/135	3700	3500	5500	9.5	11/8	20	35
278	126	151	3.7	2.0	F302_0110 EZ702U	350	650	10.79	1456/135	3700	3500	5500	16	11/8	20	38
278	141	167	4.2	1.7	F302_0110 EZ505U	350	650	10.79	1456/135	3700	3500	5500	14	11/8	20	38
278	173	218	5.2	1.4	F302_0110 EZ703U	350	650	10.79	1456/135	3700	3500	5500	24	11/8	20	40
334	60	75	2.1	3.5	F302_0090 EZ404U	210	260	8.986	5616/625	3500	3100	5000	5.6	11/8	20	34
334	65	70	2.2	3.2	F302_0090 EZ502U	210	260	8.986	5616/625	3500	3100	5000	7.8	11/8	20	34
334	65	72	2.2	3.6	F302_0090 EZ701U	170	650	8.986	5616/625	3500	3100	5000	11	11/8	20	35
334	85	97	2.9	2.5	F302_0090 EZ503U	210	260	8.986	5616/625	3500	3100	5000	10	11/8	20	35
334	105	126	3.6	2.2	F302_0090 EZ702U	350	650	8.986	5616/625	3500	3100	5000	16	11/8	20	38
334	118	139	4.1	2.0	F302_0090 EZ505U	350	650	8.986	5616/625	3500	3100	5000	15	11/8	20	38
334	144	181	5.0	1.6	F302_0090 EZ703U	350	650	8.986	5616/625	3500	3100	5000	24	11/8	20	40
418	48	60	2.0	3.5	F302_0072 EZ404U	170	210	7.172	208/29	3500	3100	5000	6.8	11/8	20	34
418	51	56	2.2	3.2	F302_0072 EZ502U	170	210	7.172	208/29	3500	3100	5000	9.1	11/8	20	34
418	51	58	2.2	4.2	F302_0072 EZ701U	140	520	7.172	208/29	3500	3100	5000	12	11/8	20	35
418	67	77	2.8	2.5	F302_0072 EZ503U	170	210	7.172	208/29	3500	3100	5000	11	11/8	20	35
418	83	100	3.5	2.6	F302_0072 EZ702U	290	520	7.172	208/29	3500	3100	5000	18	11/8	20	38

F



12 F offset helical geared motors

12.2 Selection tables



n_{2N}	M_{2N}	$M_{2,0}$	a_{th}	S	Type	M_{zacc}	M_{zNOT}	i	i_{exakt}	$n_{1\text{max}}$	$n_{1\text{max}}$	$n_{1\text{max}}$	J_1	$\Delta\phi_2$	C_2	m
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]			DBH	DBV	ZB	[10 ⁻⁴ kgm ²]	[arcmin]	[Nm/arcmin]	[kg]
F3 ($n_{1N} = 3000$ rpm, $M_{zacc,max} = 450$ Nm)																
418	94	111	3.9	2.3	F302_0072 EZ505U	350	520	7.172	208/29	3500	3100	5000	16	11/8	20	38
418	115	145	4.8	1.9	F302_0072 EZ703U	350	520	7.172	208/29	3500	3100	5000	25	11/8	20	40
524	41	46	2.1	4.8	F302_0057 EZ701U	110	420	5.720	143/25	3000	2600	4500	14	11/8	20	35
524	67	80	3.4	3.0	F302_0057 EZ702U	230	420	5.720	143/25	3000	2600	4500	19	11/8	20	38
524	75	89	3.8	2.6	F302_0057 EZ505U	330	420	5.720	143/25	3000	2600	4500	18	11/8	20	38
524	92	115	4.6	2.2	F302_0057 EZ703U	330	420	5.720	143/25	3000	2600	4500	27	11/8	20	40
646	31	39	1.9	3.5	F302_0046 EZ404U	110	140	4.644	4992/1075	3000	2600	4500	11	11/8	20	34
646	33	36	2.0	3.2	F302_0046 EZ502U	110	140	4.644	4992/1075	3000	2600	4500	13	11/8	20	34
646	33	37	2.0	3.2	F302_0046 EZ701U	90	140	4.644	4992/1075	3000	2600	4500	17	11/8	20	35
646	44	50	2.6	2.5	F302_0046 EZ503U	110	140	4.644	4992/1075	3000	2600	4500	16	11/8	20	35
646	54	65	3.3	3.4	F302_0046 EZ702U	180	340	4.644	4992/1075	3000	2600	4500	22	11/8	20	38
646	61	72	3.7	3.0	F302_0046 EZ505U	270	340	4.644	4992/1075	3000	2600	4500	20	11/8	20	38
646	74	94	4.5	2.5	F302_0046 EZ703U	270	340	4.644	4992/1075	3000	2600	4500	30	11/8	20	40
646	96	136	5.8	1.9	F302_0046 EZ705U	350	650	4.644	4992/1075	3000	2600	4500	42	11/8	20	45
F3 ($n_{1N} = 4500$ rpm, $M_{zacc,max} = 450$ Nm)																
240	173	279	3.7	1.5	F302_0190 EZ505U	450	800	18.77	4900/261	3500	3100	5000	14	11/6	22	38
336	123	199	3.5	1.9	F302_0135 EZ505U	350	650	13.38	7696/575	3700	3500	5500	13	11/8	20	38
336	157	260	4.5	1.5	F302_0135 EZ703U	350	650	13.38	7696/575	3700	3500	5500	23	11/8	20	40
417	99	160	3.4	2.2	F302_0110 EZ505U	350	650	10.79	1456/135	3700	3500	5500	14	11/8	20	38
417	127	209	4.3	1.7	F302_0110 EZ703U	350	650	10.79	1456/135	3700	3500	5500	24	11/8	20	40
501	83	133	3.3	2.4	F302_0090 EZ505U	350	650	8.986	5616/625	3500	3100	5000	15	11/8	20	38
501	105	174	4.2	1.9	F302_0090 EZ703U	350	650	8.986	5616/625	3500	3100	5000	24	11/8	20	40
627	66	106	3.2	2.8	F302_0072 EZ505U	350	520	7.172	208/29	3500	3100	5000	16	11/8	20	38
627	84	139	4.0	2.2	F302_0072 EZ703U	350	520	7.172	208/29	3500	3100	5000	25	11/8	20	40
787	53	85	3.1	3.3	F302_0057 EZ505U	330	420	5.720	143/25	3000	2600	4500	18	11/8	20	38
787	67	111	3.9	2.6	F302_0057 EZ703U	330	420	5.720	143/25	3000	2600	4500	27	11/8	20	40
969	43	69	3.0	3.8	F302_0046 EZ505U	270	340	4.644	4992/1075	3000	2600	4500	20	11/8	20	38
969	55	90	3.8	3.0	F302_0046 EZ703U	270	340	4.644	4992/1075	3000	2600	4500	30	11/8	20	40
969	74	135	5.1	2.2	F302_0046 EZ705U	350	650	4.644	4992/1075	3000	2600	4500	42	11/8	20	45
F3 ($n_{1N} = 6000$ rpm, $M_{zacc,max} = 450$ Nm)																
32	265	297	1.2	1.5	F303_1850 EZ302U	450	800	184.8	29939/162	4000	3900	6000	0.37	11/7	22	34
43	205	229	1.0	2.0	F302_1410 EZ302U	450	620	140.6	7595/54	4000	3900	6000	0.37	11/6	22	29
43	267	307	1.4	1.5	F302_1410 EZ303U	450	620	140.6	7595/54	4000	3900	6000	0.48	11/6	22	30
53	164	184	0.9	2.4	F302_1130 EZ302U	450	590	112.8	3724/33	4000	3900	6000	0.40	11/6	22	29
53	215	246	1.2	1.9	F302_1130 EZ303U	450	590	112.8	3724/33	4000	3900	6000	0.51	11/6	22	30
53	252	306	1.4	1.6	F302_1130 EZ401U	450	800	112.8	3724/33	4000	3900	6000	1.0	11/6	22	31
64	136	153	0.8	2.9	F302_0940 EZ302U	390	490	93.64	4214/45	4000	3900	6000	0.45	11/6	22	29
64	178	204	1.1	2.2	F302_0940 EZ303U	390	490	93.64	4214/45	4000	3900	6000	0.56	11/6	22	30
64	209	254	1.3	1.9	F302_0940 EZ401U	450	800	93.64	4214/45	4000	3900	6000	1.1	11/6	22	31
85	102	115	0.8	3.5	F302_0700 EZ302U	340	460	70.36	2744/39	4000	3900	6000	0.54	11/6	22	29
85	134	154	1.1	2.7	F302_0700 EZ303U	370	460	70.36	2744/39	4000	3900	6000	0.65	11/6	22	30
85	157	191	1.2	2.3	F302_0700 EZ401U	450	800	70.36	2744/39	4000	3900	6000	1.2	11/6	22	31
85	232	300	1.8	1.6	F302_0700 EZ501U	450	800	70.36	2744/39	4000	3900	6000	3.2	11/6	22	32
85	239	334	1.9	1.5	F302_0700 EZ402U	450	800	70.36	2744/39	4000	3900	6000	1.9	11/6	22	32
106	82	92	0.8	4.0	F302_0560 EZ302U	270	410	56.49	4067/72	4000	3900	6000	0.65	11/6	22	29
106	107	123	1.0	3.1	F302_0560 EZ303U	330	410	56.49	4067/72	4000	3900	6000	0.76	11/6	22	30
106	126	153	1.2	2.7	F302_0560 EZ401U	450	800	56.49	4067/72	4000	3900	6000	1.3	11/6	22	31
106	186	241	1.8	1.8	F302_0560 EZ501U	450	800	56.49	4067/72	4000	3900	6000	3.3	11/6	22	32
106	192	268	1.8	1.8	F302_0560 EZ402U	450	800	56.49	4067/72	4000	3900	6000	2.0	11/6	22	32
127	69	77	0.8	4.0	F302_0470 EZ302U	230	340	47.19	1274/27	4000	3900	6000	0.77	11/6	22	29
127	90	103	1.0	3.1	F302_0470 EZ303U	270	340	47.19	1274/27	4000	3900	6000	0.88	11/6	22	30
127	105	128	1.2	3.0	F302_0470 EZ401U	390	690	47.19	1274/27	4000	3900	6000	1.4	11/6	22	31
127	156	201	1.7	2.0	F302_0470 EZ501U	450	800	47.19	1274/27	4000	3900	6000	3.4	11/6	22	32
127	160	224	1.8	2.0	F302_0470 EZ402U	450	690	47.19	1274/27	4000	3900	6000	2.1	11/6	22	32
F4 ($n_{1N} = 2000$ rpm, $M_{zacc,max} = 550$ Nm)																
344	246	373	7.1	1.5	F402_0058 EZ805U	550	1100	5.813	3784/651	2700	2300	4000	143	10/7	39	81
428	198	300	6.8	1.8	F402_0047 EZ805U	550	910	4.678	1408/301	2700	2300	4000	148	10/7	39	81



n_{2N}	M_{2N}	$M_{2,0}$	a_{th}	S	Type	M_{zacc}	M_{2NOT}	i	i_{exakt}	n_{1max} DBH	n_{1max} DBV	n_{1max} ZB	J_1	$\Delta\phi_2$	C_2	m
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]			[rpm]	[rpm]	[rpm]	[10 ⁻⁴ kgm ²]	[arcmin]	[Nm/ arcmin]	[kg]
F4 ($n_{1N} = 3000$ rpm, $M_{zacc,max} = 700$ Nm)																
11	417	441	0.9	1.7	F403_2740 EZ302U	700	1400	274.4	59267/216	3800	3500	5500	0.36	10/6	39	42
14	333	352	0.8	2.1	F403_2190 EZ302U	700	1400	219.2	94705/432	3800	3500	5500	0.38	10/6	39	42
14	434	459	1.1	1.6	F403_2190 EZ303U	700	1400	219.2	94705/432	3800	3500	5500	0.49	10/6	39	42
16	279	295	0.8	2.5	F403_1840 EZ302U	700	1180	183.9	39715/216	3800	3500	5500	0.39	10/6	39	42
16	364	385	1.0	1.9	F403_1840 EZ303U	700	1180	183.9	39715/216	3800	3500	5500	0.50	10/6	39	42
16	492	527	1.3	1.4	F403_1840 EZ401U	700	1180	183.9	39715/216	3800	3500	5500	1.0	10/6	39	44
27	468	512	1.6	1.5	F402_1120 EZ501U	700	1400	112.3	1235/11	3800	3500	5500	3.1	10/5	39	40
32	389	426	1.5	1.8	F402_0930 EZ501U	700	1400	93.33	280/3	3800	3500	5500	3.2	10/5	39	40
43	292	319	1.3	2.4	F402_0700 EZ501U	700	1400	70.06	1261/18	3800	3500	5500	3.3	10/5	39	40
54	233	255	1.2	3.0	F402_0560 EZ501U	700	1400	55.97	2015/36	3800	3500	5500	3.5	10/5	39	40
54	402	434	2.0	1.7	F402_0560 EZ502U	700	1400	55.97	2015/36	3800	3500	5500	5.8	10/5	39	42
54	402	451	2.0	1.7	F402_0560 EZ701U	700	1400	55.97	2015/36	3800	3500	5500	9.1	10/5	39	44
64	196	214	1.1	3.4	F402_0470 EZ501U	700	1370	46.94	845/18	3800	3500	5500	3.7	10/5	39	40
64	337	364	1.9	2.0	F402_0470 EZ502U	700	1370	46.94	845/18	3800	3500	5500	6.0	10/5	39	42
64	337	378	1.9	2.0	F402_0470 EZ701U	700	1400	46.94	845/18	3800	3500	5500	9.3	10/5	39	44
64	442	505	2.5	1.5	F402_0470 EZ503U	700	1370	46.94	845/18	3800	3500	5500	8.4	10/5	39	43
86	146	160	1.1	4.1	F402_0350 EZ501U	540	1020	35.08	2210/63	3500	3100	5000	4.2	10/5	39	40
86	252	272	1.8	2.4	F402_0350 EZ502U	700	1020	35.08	2210/63	3500	3100	5000	6.5	10/5	39	42
86	252	282	1.8	2.4	F402_0350 EZ701U	680	1400	35.08	2210/63	3500	3100	5000	9.8	10/5	39	44
86	330	378	2.4	1.8	F402_0350 EZ503U	700	1020	35.08	2210/63	3500	3100	5000	8.9	10/5	39	43
86	408	490	3.0	1.5	F402_0350 EZ702U	700	1400	35.08	2210/63	3500	3100	5000	15	10/5	39	46
107	201	225	1.8	2.8	F402_0280 EZ701U	540	1400	27.99	2015/72	3500	3100	5000	10	10/5	39	44
107	326	391	2.9	1.7	F402_0280 EZ702U	700	1400	27.99	2015/72	3500	3100	5000	16	10/5	39	46
107	366	434	3.2	1.5	F402_0280 EZ505U	700	1400	27.99	2015/72	3500	3100	5000	14	10/5	39	46
129	167	187	1.7	3.1	F402_0230 EZ701U	450	1400	23.21	325/14	3200	2800	4500	11	10/5	39	44
129	270	324	2.8	1.9	F402_0230 EZ702U	700	1400	23.21	325/14	3200	2800	4500	16	10/5	39	46
129	304	360	3.1	1.7	F402_0230 EZ505U	700	1400	23.21	325/14	3200	2800	4500	15	10/5	39	46
129	372	468	3.8	1.4	F402_0230 EZ703U	700	1400	23.21	325/14	3200	2800	4500	24	10/5	39	48
161	134	150	1.7	3.6	F402_0185 EZ701U	360	1350	18.62	3575/192	3200	2800	4500	12	10/5	39	44
161	217	260	2.7	2.2	F402_0185 EZ702U	700	1350	18.62	3575/192	3200	2800	4500	17	10/5	39	46
161	244	289	3.0	2.0	F402_0185 EZ505U	700	1350	18.62	3575/192	3200	2800	4500	15	10/5	39	46
161	298	376	3.7	1.6	F402_0185 EZ703U	700	1350	18.62	3575/192	3200	2800	4500	25	10/5	39	48
221	97	105	1.6	3.2	F402_0135 EZ502U	320	390	13.57	5984/441	3500	3100	5000	7.5	10/7	39	42
221	97	109	1.6	4.5	F402_0135 EZ701U	260	930	13.57	5984/441	3500	3100	5000	11	10/7	39	44
221	128	146	2.1	2.5	F402_0135 EZ503U	320	390	13.57	5984/441	3500	3100	5000	9.9	10/7	39	43
221	158	190	2.6	2.8	F402_0135 EZ702U	540	930	13.57	5984/441	3500	3100	5000	16	10/7	39	46
221	178	211	2.9	2.5	F402_0135 EZ505U	550	930	13.57	5984/441	3500	3100	5000	14	10/7	39	46
221	217	274	3.5	2.0	F402_0135 EZ703U	550	930	13.57	5984/441	3500	3100	5000	24	10/7	39	48
221	280	397	4.5	1.6	F402_0135 EZ705U	550	1100	13.57	5984/441	3500	3100	5000	36	10/7	39	54
277	126	151	2.5	3.2	F402_0110 EZ702U	430	790	10.83	682/63	3500	3100	5000	17	10/7	39	46
277	142	168	2.8	2.9	F402_0110 EZ505U	550	790	10.83	682/63	3500	3100	5000	16	10/7	39	46
277	173	218	3.4	2.3	F402_0110 EZ703U	550	790	10.83	682/63	3500	3100	5000	25	10/7	39	48
277	224	317	4.4	1.8	F402_0110 EZ705U	550	1100	10.83	682/63	3500	3100	5000	37	10/7	39	54
277	234	390	4.6	1.7	F402_0110 EZ802U	550	1100	10.83	682/63	3500	3100	5000	61	10/7	39	62
334	105	125	2.4	3.6	F402_0090 EZ702U	360	650	8.980	440/49	3200	2800	4500	18	10/7	39	46
334	118	139	2.7	3.2	F402_0090 EZ505U	520	650	8.980	440/49	3200	2800	4500	17	10/7	39	46
334	144	181	3.3	2.6	F402_0090 EZ703U	520	650	8.980	440/49	3200	2800	4500	26	10/7	39	48
334	186	263	4.2	2.1	F402_0090 EZ705U	550	1100	8.980	440/49	3200	2800	4500	39	10/7	39	54
334	194	323	4.4	2.0	F402_0090 EZ802U	550	1100	8.980	440/49	3200	2800	4500	63	10/7	39	62
334	232	420	5.3	1.6	F402_0090 EZ803U	550	1100	8.980	440/49	3200	2800	4500	88	10/7	39	68
417	84	101	2.3	4.2	F402_0072 EZ702U	290	520	7.202	605/84	3200	2800	4500	21	10/7	39	46
417	94	112	2.6	3.7	F402_0072 EZ505U	420	520	7.202	605/84	3200	2800	4500	19	10/7	39	46
417	115	145	3.2	3.1	F402_0072 EZ703U	420	520	7.202	605/84	3200	2800	4500	29	10/7	39	48
417	149	211	4.1	2.4	F402_0072 EZ705U	550	1100	7.202	605/84	3200	2800	4500	41	10/7	39	54
417	156	259	4.3	2.3	F402_0072 EZ802U	550	1100	7.202	605/84	3200	2800	4500	65	10/7	39	62
417	186	337	5.1	1.9	F402_0072 EZ803U	550	1100	7.202	605/84	3200	2800	4500	90	10/7	39	68
516	68	81	2.2	4.9	F402_0058 EZ702U	230	420	5.813	3784/651	2700	2300	4000	24	10/7	39	46
516	76	90	2.5	4.3	F402_0058 EZ505U	340	420	5.813	3784/651	2700	2300	4000	22	10/7	39	46
516	93	117	3.1	3.5	F402_0058 EZ703U	340	420	5.813	3784/651	2700	2300	4000	32	10/7	39	48

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12 F offset helical geared motors

12.2 Selection tables



n_{2N}	M_{2N}	$M_{2,0}$	a_{th}	S	Type	M_{zacc}	M_{zNOT}	i	i_{exakt}	n_{1max}	n_{1max}	n_{1max}	J_1	$\Delta\phi_2$	C_2	m
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]			DBH	DBV	ZB	[10 ⁻⁴ kgm ²]	[arcmin]	[Nm/arcmin]	[kg]
F4 ($n_{1N} = 3000$ rpm, $M_{zacc,max} = 700$ Nm)																
516	120	170	3.9	2.7	F402_0058 EZ705U	550	1100	5.813	3784/651	2700	2300	4000	44	10/7	39	54
516	126	209	4.1	2.6	F402_0058 EZ802U	550	1100	5.813	3784/651	2700	2300	4000	68	10/7	39	62
516	150	272	4.9	2.2	F402_0058 EZ803U	550	1100	5.813	3784/651	2700	2300	4000	94	10/7	39	68
641	34	36	1.3	3.2	F402_0047 EZ502U	110	140	4.678	1408/301	2700	2300	4000	20	10/7	39	42
641	34	38	1.3	3.2	F402_0047 EZ701U	91	140	4.678	1408/301	2700	2300	4000	23	10/7	39	44
641	44	50	1.7	2.5	F402_0047 EZ503U	110	140	4.678	1408/301	2700	2300	4000	22	10/7	39	43
641	54	65	2.1	5.0	F402_0047 EZ702U	190	340	4.678	1408/301	2700	2300	4000	29	10/7	39	46
641	61	73	2.4	4.4	F402_0047 EZ505U	270	340	4.678	1408/301	2700	2300	4000	27	10/7	39	46
641	75	94	2.9	3.6	F402_0047 EZ703U	270	340	4.678	1408/301	2700	2300	4000	36	10/7	39	48
641	97	137	3.8	3.0	F402_0047 EZ705U	470	910	4.678	1408/301	2700	2300	4000	49	10/7	39	54
641	101	168	4.0	3.0	F402_0047 EZ802U	450	910	4.678	1408/301	2700	2300	4000	73	10/7	39	62
641	121	219	4.7	2.5	F402_0047 EZ803U	550	910	4.678	1408/301	2700	2300	4000	98	10/7	39	68
F4 ($n_{1N} = 4500$ rpm, $M_{zacc,max} = 700$ Nm)																
128	323	521	2.7	1.6	F402_0350 EZ505U	700	1400	35.08	2210/63	3500	3100	5000	13	10/5	39	46
161	258	415	2.6	1.9	F402_0280 EZ505U	700	1400	27.99	2015/72	3500	3100	5000	14	10/5	39	46
194	214	345	2.5	2.1	F402_0230 EZ505U	700	1400	23.21	325/14	3200	2800	4500	15	10/5	39	46
194	272	450	3.2	1.7	F402_0230 EZ703U	700	1400	23.21	325/14	3200	2800	4500	24	10/5	39	48
242	172	276	2.4	2.5	F402_0185 EZ505U	700	1350	18.62	3575/192	3200	2800	4500	15	10/5	39	46
242	219	361	3.1	1.9	F402_0185 EZ703U	700	1350	18.62	3575/192	3200	2800	4500	25	10/5	39	48
332	125	201	2.3	3.0	F402_0135 EZ505U	550	930	13.57	5984/441	3500	3100	5000	14	10/7	39	46
332	159	263	2.9	2.4	F402_0135 EZ703U	550	930	13.57	5984/441	3500	3100	5000	24	10/7	39	48
332	216	395	4.0	1.8	F402_0135 EZ705U	550	1100	13.57	5984/441	3500	3100	5000	36	10/7	39	54
416	100	161	2.2	3.5	F402_0110 EZ505U	550	790	10.83	682/63	3500	3100	5000	16	10/7	39	46
416	110	362	2.5	3.2	F402_0110 EZ802U	550	1100	10.83	682/63	3500	3100	5000	61	10/7	39	62
416	127	210	2.8	2.8	F402_0110 EZ703U	550	790	10.83	682/63	3500	3100	5000	25	10/7	39	48
416	172	315	3.8	2.1	F402_0110 EZ705U	550	1100	10.83	682/63	3500	3100	5000	37	10/7	39	54
501	83	133	2.2	4.0	F402_0090 EZ505U	520	650	8.980	440/49	3200	2800	4500	17	10/7	39	46
501	91	301	2.4	3.6	F402_0090 EZ802U	550	1100	8.980	440/49	3200	2800	4500	63	10/7	39	62
501	105	174	2.8	3.2	F402_0090 EZ703U	520	650	8.980	440/49	3200	2800	4500	26	10/7	39	48
501	143	261	3.7	2.3	F402_0090 EZ705U	550	1100	8.980	440/49	3200	2800	4500	39	10/7	39	54
625	66	107	2.1	4.7	F402_0072 EZ505U	420	520	7.202	605/84	3200	2800	4500	19	10/7	39	46
625	73	241	2.3	4.2	F402_0072 EZ802U	550	1100	7.202	605/84	3200	2800	4500	65	10/7	39	62
625	85	140	2.7	3.7	F402_0072 EZ703U	420	520	7.202	605/84	3200	2800	4500	29	10/7	39	48
625	115	210	3.6	2.7	F402_0072 EZ705U	550	1100	7.202	605/84	3200	2800	4500	41	10/7	39	54
F6 ($n_{1N} = 2000$ rpm, $M_{zacc,max} = 1000$ Nm)																
185	459	694	5.4	1.7	F602_0110 EZ805U	1000	1600	10.82	2077/192	3300	2800	4500	141	10/7	73	108
222	381	577	5.2	1.9	F602_0090 EZ805U	1000	1600	8.995	1943/216	2900	2500	4000	144	10/7	73	108
279	303	459	5.0	2.2	F602_0072 EZ805U	1000	1380	7.159	3551/496	2900	2500	4000	149	10/7	73	108
353	240	364	4.9	2.6	F602_0057 EZ805U	880	1100	5.673	1407/248	2500	2100	3500	157	10/7	73	108
440	193	291	4.7	3.0	F602_0045 EZ805U	710	880	4.546	1273/280	2500	2100	3500	169	10/7	73	108
F6 ($n_{1N} = 3000$ rpm, $M_{zacc,max} = 1100$ Nm)																
17	743	812	1.5	1.5	F603_1810 EZ501U	1100	2000	180.6	8671/48	3500	3200	5000	3.2	10/6	77	72
21	583	637	1.3	1.9	F602_1400 EZ501U	1100	2000	139.8	559/4	3500	3200	5000	3.2	10/5	77	67
27	468	512	1.2	2.4	F602_1120 EZ501U	1100	2000	112.2	9425/84	3500	3200	5000	3.3	10/5	77	67
32	389	426	1.1	2.8	F602_0930 EZ501U	1100	1870	93.33	280/3	3500	3200	5000	3.5	10/5	77	67
32	670	724	1.9	1.6	F602_0930 EZ502U	1100	1870	93.33	280/3	3500	3200	5000	5.8	10/5	77	69
32	670	751	1.9	1.6	F602_0930 EZ701U	1100	2000	93.33	280/3	3500	3200	5000	9.1	10/5	77	71
43	290	318	0.9	3.8	F602_0700 EZ501U	1080	1590	69.64	975/14	3500	3200	5000	3.9	10/5	77	67
43	500	540	1.6	2.2	F602_0700 EZ502U	1100	1590	69.64	975/14	3500	3200	5000	6.2	10/5	77	69
43	500	561	1.6	2.2	F602_0700 EZ701U	1100	2000	69.64	975/14	3500	3200	5000	9.5	10/5	77	71
43	655	750	2.1	1.7	F602_0700 EZ503U	1100	1590	69.64	975/14	3500	3200	5000	8.6	10/5	77	70
54	232	254	0.8	4.7	F602_0560 EZ501U	860	1470	55.71	390/7	3500	3200	5000	4.4	10/5	77	67
54	400	432	1.5	2.8	F602_0560 EZ502U	1100	1470	55.71	390/7	3500	3200	5000	6.7	10/5	77	69
54	400	449	1.5	2.8	F602_0560 EZ701U	1080	2000	55.71	390/7	3500	3200	5000	10	10/5	77	71
54	524	600	1.9	2.1	F602_0560 EZ503U	1100	1470	55.71	390/7	3500	3200	5000	9.1	10/5	77	70
54	649	778	2.4	1.7	F602_0560 EZ702U	1100	2000	55.71	390/7	3500	3200	5000	15	10/5	77	73
64	335	376	1.3	3.3	F602_0470 EZ701U	910	2000	46.72	1495/32	3500	3200	5000	10	10/5	77	71
64	544	653	2.2	2.0	F602_0470 EZ702U	1100	2000	46.72	1495/32	3500	3200	5000	16	10/5	77	73
64	612	725	2.4	1.8	F602_0470 EZ505U	1100	2000	46.72	1495/32	3500	3200	5000	14	10/5	77	73



12 F offset helical geared motors

12.2 Selection tables



n_{2N}	M_{2N}	$M_{2,0}$	a_{th}	S	Type	M_{zacc}	M_{2NOT}	i	i_{exakt}	n_{1max} DBH	n_{1max} DBV	n_{1max} ZB	J_1	$\Delta\phi_2$	C_2	m
[rpm]	[Nm]	[Nm]				[Nm]	[Nm]			[rpm]	[rpm]	[rpm]	[10 ⁻⁴ kgm ²]	[arcmin]	[Nm/ arcmin]	[kg]
F6 ($n_{1N} = 3000$ rpm, $M_{zacc,max} = 1100$ Nm)																
85	253	283	1.3	4.0	F602_0350 EZ701U	680	2000	35.21	845/24	3300	2800	4500	11	10/5	77	71
85	410	492	2.1	2.4	F602_0350 EZ702U	1100	2000	35.21	845/24	3300	2800	4500	17	10/5	77	73
85	461	546	2.3	2.2	F602_0350 EZ505U	1100	2000	35.21	845/24	3300	2800	4500	15	10/5	77	73
85	564	710	2.8	1.8	F602_0350 EZ703U	1100	2000	35.21	845/24	3300	2800	4500	25	10/5	77	75
107	201	225	1.2	4.6	F602_0280 EZ701U	540	2000	27.99	2015/72	3300	2800	4500	13	10/5	77	71
107	326	391	2.0	2.9	F602_0280 EZ702U	1100	2000	27.99	2015/72	3300	2800	4500	18	10/5	77	73
107	366	434	2.2	2.5	F602_0280 EZ505U	1100	2000	27.99	2015/72	3300	2800	4500	16	10/5	77	73
107	448	565	2.7	2.1	F602_0280 EZ703U	1100	2000	27.99	2015/72	3300	2800	4500	26	10/5	77	75
107	578	820	3.5	1.6	F602_0280 EZ705U	1100	2000	27.99	2015/72	3300	2800	4500	38	10/5	77	81
129	271	325	1.9	3.2	F602_0230 EZ702U	930	1690	23.27	1885/81	2900	2500	4000	19	10/5	77	73
129	305	361	2.2	2.9	F602_0230 EZ505U	1100	1690	23.27	1885/81	2900	2500	4000	18	10/5	77	73
129	372	470	2.7	2.3	F602_0230 EZ703U	1100	1690	23.27	1885/81	2900	2500	4000	27	10/5	77	75
129	481	682	3.4	1.8	F602_0230 EZ705U	1100	2000	23.27	1885/81	2900	2500	4000	39	10/5	77	81
129	503	837	3.6	1.7	F602_0230 EZ802U	1100	2000	23.27	1885/81	2900	2500	4000	63	10/5	77	89
162	383	543	3.3	2.1	F602_0185 EZ705U	1100	2000	18.52	3445/186	2900	2500	4000	42	10/5	77	81
162	401	667	3.5	2.0	F602_0185 EZ802U	1100	2000	18.52	3445/186	2900	2500	4000	66	10/5	77	89
220	158	190	1.8	4.6	F602_0135 EZ702U	540	920	13.61	871/64	3300	2800	4500	19	10/7	73	73
220	178	211	2.0	4.1	F602_0135 EZ505U	740	920	13.61	871/64	3300	2800	4500	18	10/7	73	73
220	218	275	2.4	3.4	F602_0135 EZ703U	740	920	13.61	871/64	3300	2800	4500	27	10/7	73	75
220	281	399	3.1	2.6	F602_0135 EZ705U	1000	1600	13.61	871/64	3300	2800	4500	39	10/7	73	81
220	294	490	3.3	2.5	F602_0135 EZ802U	1000	1600	13.61	871/64	3300	2800	4500	63	10/7	73	89
220	351	636	3.9	2.1	F602_0135 EZ803U	1000	1600	13.61	871/64	3300	2800	4500	89	10/7	73	95
277	126	151	1.7	5.0	F602_0110 EZ702U	430	790	10.82	2077/192	3300	2800	4500	22	10/7	73	73
277	142	168	1.9	4.4	F602_0110 EZ505U	630	790	10.82	2077/192	3300	2800	4500	20	10/7	73	73
277	173	218	2.3	3.6	F602_0110 EZ703U	630	790	10.82	2077/192	3300	2800	4500	30	10/7	73	75
277	224	317	3.0	3.0	F602_0110 EZ705U	1000	1600	10.82	2077/192	3300	2800	4500	42	10/7	73	81
277	234	389	3.2	2.9	F602_0110 EZ802U	1000	1600	10.82	2077/192	3300	2800	4500	66	10/7	73	89
277	279	506	3.8	2.4	F602_0110 EZ803U	1000	1600	10.82	2077/192	3300	2800	4500	91	10/7	73	95
334	105	126	1.6	5.0	F602_0090 EZ702U	360	650	8.995	1943/216	2900	2500	4000	25	10/7	73	73
334	118	140	1.9	4.4	F602_0090 EZ505U	520	650	8.995	1943/216	2900	2500	4000	23	10/7	73	73
334	144	181	2.3	3.6	F602_0090 EZ703U	520	650	8.995	1943/216	2900	2500	4000	33	10/7	73	75
334	186	264	2.9	3.4	F602_0090 EZ705U	910	1600	8.995	1943/216	2900	2500	4000	45	10/7	73	81
334	195	324	3.1	3.3	F602_0090 EZ802U	870	1600	8.995	1943/216	2900	2500	4000	69	10/7	73	89
334	232	421	3.7	2.7	F602_0090 EZ803U	1000	1600	8.995	1943/216	2900	2500	4000	94	10/7	73	95
419	148	210	2.8	4.0	F602_0072 EZ705U	720	1380	7.159	3551/496	2900	2500	4000	50	10/7	73	81
419	155	258	2.9	3.8	F602_0072 EZ802U	690	1380	7.159	3551/496	2900	2500	4000	74	10/7	73	89
419	185	335	3.5	3.2	F602_0072 EZ803U	1000	1380	7.159	3551/496	2900	2500	4000	100	10/7	73	95
529	117	166	2.7	4.7	F602_0057 EZ705U	570	1100	5.673	1407/248	2500	2100	3500	58	10/7	73	81
529	123	204	2.8	4.4	F602_0057 EZ802U	550	1100	5.673	1407/248	2500	2100	3500	82	10/7	73	89
529	146	265	3.4	3.7	F602_0057 EZ803U	800	1100	5.673	1407/248	2500	2100	3500	108	10/7	73	95
660	117	213	3.3	4.3	F602_0045 EZ803U	640	880	4.546	1273/280	2500	2100	3500	120	10/7	73	95
F6 ($n_{1N} = 4500$ rpm, $M_{zacc,max} = 1100$ Nm)																
81	513	827	2.0	2.0	F602_0560 EZ505U	1100	2000	55.71	390/7	3500	3200	5000	14	10/5	77	73
96	431	693	2.0	2.2	F602_0470 EZ505U	1100	2000	46.72	1495/32	3500	3200	5000	14	10/5	77	73
128	324	523	1.9	2.7	F602_0350 EZ505U	1100	2000	35.21	845/24	3300	2800	4500	15	10/5	77	73
128	413	683	2.4	2.1	F602_0350 EZ703U	1100	2000	35.21	845/24	3300	2800	4500	25	10/5	77	75
161	258	415	1.8	3.1	F602_0280 EZ505U	1100	2000	27.99	2015/72	3300	2800	4500	16	10/5	77	73
161	328	543	2.3	2.5	F602_0280 EZ703U	1100	2000	27.99	2015/72	3300	2800	4500	26	10/5	77	75
161	445	814	3.1	1.8	F602_0280 EZ705U	1100	2000	27.99	2015/72	3300	2800	4500	38	10/5	77	81
331	139	455	1.8	4.6	F602_0135 EZ802U	1000	1600	13.61	871/64	3300	2800	4500	63	10/7	73	89
331	160	264	2.0	4.0	F602_0135 EZ703U	740	920	13.61	871/64	3300	2800	4500	27	10/7	73	75
331	216	396	2.8	2.9	F602_0135 EZ705U	1000	1600	13.61	871/64	3300	2800	4500	39	10/7	73	81
416	127	210	2.0	4.7	F602_0110 EZ703U	630	790	10.82	2077/192	3300	2800	4500	30	10/7	73	75
416	172	315	2.7	3.4	F602_0110 EZ705U	1000	1600	10.82	2077/192	3300	2800	4500	42	10/7	73	81

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

Hollow shaft	Tolerance
Hollow shaft hole fit	ISO H7

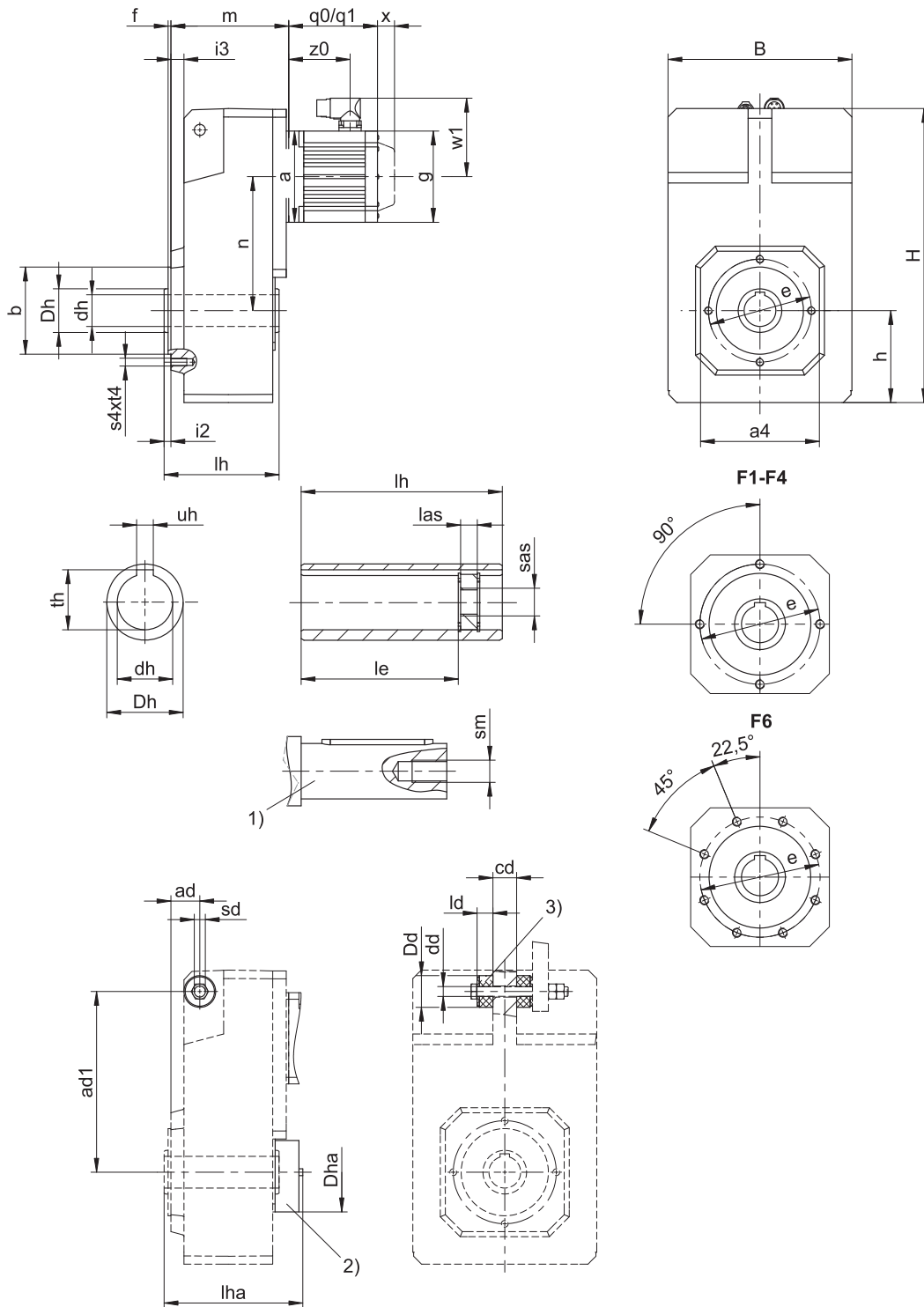
Flange	Pilot tolerance
Up to 300 mm	ISO j6
Starting at 350 mm	ISO h6

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

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



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



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



3) Rubber buffer for torque arm (optional). Dimension $\varnothing Dd$ = outer \varnothing 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	29.5	150	70_{j6}	145	20	$10.5^{+0.5}$	20^{H7}	30	35	70	85	2.5	74	238.0	6.5	12.5	15	73	95	12	110.5	M8	M10	M6	M8	13	22.8	6^{JS9}
F2	130	33.0	181	95_{j6}	180	22	$10.5^{+0.5}$	25^{H7}	30	45	82	115	3.0	93	299.0	8.0	15.0	15	92	115	12	130.5	M8	M10	M10	M12	13	28.3	8^{JS9}
F3	150	38.5	205	110_{j6}	206	30	$13.0^{+0.5}$	30^{H7}	37	50	88	130	3.5	106	335.5	8.5	16.5	20	103	130	12	155.5	M10	M12	M10	M12	16	33.3	8^{JS9}
F4	150	38.5	228	110_{j6}	230	30	$13.0^{+0.5}$	40^{H7}	37	55	100	130	3.5	116	370.0	8.5	16.5	20	114	145	12	174.5	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	192.5	M10	M20	M16	M20	16	53.8	14^{JS9}

Dimensions of motors

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

F

Dimensions of geared motors

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
F102	$\square 72$	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	-	-	-	-	-	-	-	-	-
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	-	-	-	-	-	-



3) Rubber buffer for torque arm (optional). Dimension $\varnothing Dd$ = outer \varnothing 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	29.5	150	70 _f	40	140	71	20	10.5 ^{+0.5}	20 ^{H7}	30	35	70	85	2.5	74	238.0
F2	64	130	33.0	181	95 _f	55	175	88	22	10.5 ^{+0.5}	25 ^{H7}	30	45	82	115	3.0	93	299.0
F3	72	150	38.5	205	110 _f	60	200	102	30	13.0 ^{+0.5}	30 ^{H7}	37	50	88	130	3.5	106	335.5
F4	87	150	38.5	228	110 _f	70	220	114	30	13.0 ^{+0.5}	40 ^{H7}	37	55	100	130	3.5	116	370.0
F6	108	180	44.5	270	130 _f	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	110.5	10.0	M6	M8	M10	M6	M8	11	13	22.8	6 ^{JS9}
F2	8.0	15.0	15	92	115	12	130.5	10.5	M8	M8	M10	M10	M12	13	13	28.3	8 ^{JS9}
F3	8.5	16.5	20	103	130	12	155.5	12.5	M10	M10	M12	M10	M12	16	16	33.3	8 ^{JS9}
F4	8.5	16.5	20	114	145	12	174.5	12.5	M10	M10	M12	M16	M20	16	16	43.3	12 ^{JS9}
F6	10.5	20.5	30	143	180	12	192.5	15.5	M12	M10	M20	M16	M20	19	16	53.8	14 ^{JS9}

Dimensions of motors

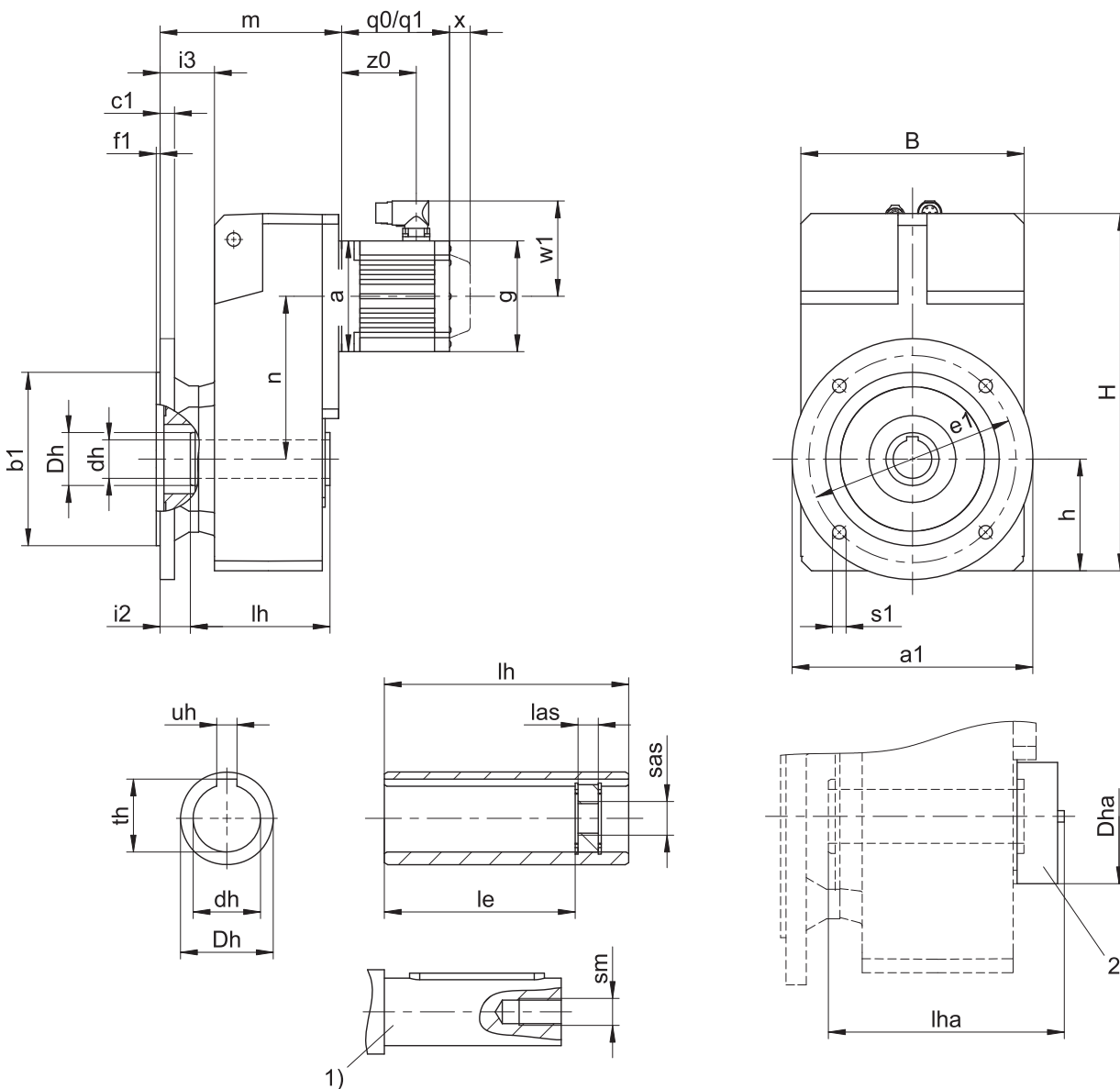
Type	□g	q0	q1	w1	x	z0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
EZ503U	115	162.0	216.5	100.0	22	127.5
EZ505U	115	212.0	266.5	100.0	22	177.5
EZ701U	145	125.0	184.0	115.0	22	87.0
EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5
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	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
F102	□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	-	-	-	-	-	-	-	-	-
F602	-	-	-	-	-	-	Ø160	179.5	196.0	□145	181.5	196.0	□190	184.5	196.0
F603	-	-	-	-	-	-	Ø160	222.5	196.0	-	-	-	-	-	-



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



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter 22.4
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)

Dimensions of gear units

Type	Øa1	Øb1	B	c1	Ødh	ØDh	ØDha	Øe1	f1	h	H	i2	i3	le	lh	las	lha	Øs1	sm	sas	th	uh
F1	160	110 _{f6}	145	10	20 ^{H7}	35	70	130	3.5	74	238.0	25.5	44.5	73	95	12	110.5	9	M6	M8	22.8	6 ^{JS9}
F2	200	130 _{f6}	180	14	25 ^{H7}	45	82	165	3.5	93	299.0	30.0	53.0	92	115	12	130.5	11	M10	M12	28.3	8 ^{JS9}
F3	250	180 _{f6}	206	15	30 ^{H7}	50	88	215	4.0	106	335.5	31.5	56.5	103	130	12	155.5	14	M10	M12	33.3	8 ^{JS9}
F4	250	180 _{f6}	230	15	40 ^{H7}	55	100	215	4.0	116	370.0	31.5	56.5	114	145	12	174.5	14	M16	M20	43.3	12 ^{JS9}
F6	300	230 _{f6}	265	17	50 ^{H7}	70	115	265	4.0	137	433.0	29.5	60.5	143	180	12	192.5	14	M16	M20	53.8	14 ^{JS9}



Dimensions of motors

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

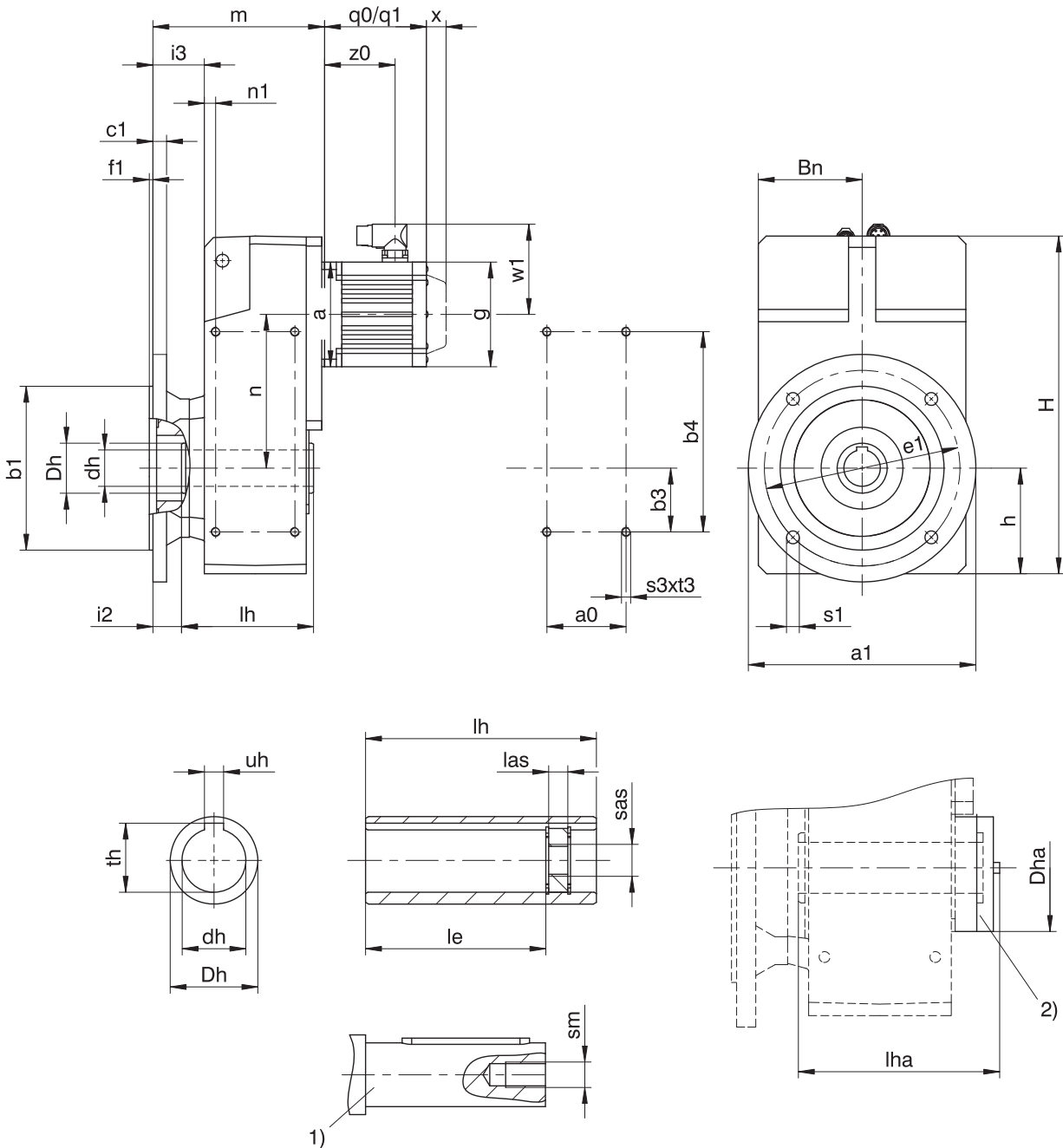
Dimensions of geared motors

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
F102	□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	∅140	190.0	131.0	-	-	-	-	-	-	-	-	-	-	-	-
F302	∅140	169.5	149.5	∅140	169.5	149.5	□115	173.5	149.5	□145	175.5	149.5	-	-	-
F303	∅140	206.5	149.5	-	-	-	-	-	-	-	-	-	-	-	-
F402	-	-	-	-	-	-	∅160	188.5	169.0	□145	190.5	169.0	□190	193.5	169.0
F403	∅140	221.5	169.0	∅140	221.5	169.0	-	-	-	-	-	-	-	-	-
F602	-	-	-	-	-	-	∅160	219.5	196.0	□145	221.5	196.0	□190	224.5	196.0
F603	-	-	-	-	-	-	∅160	262.5	196.0	-	-	-	-	-	-

F



12.3.4 A shaft design (hollow shaft), FN housing design (round flange + side fastening)



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



Dimensions of gear units

Type	a0	Øa1	Øb1	b3	b4	Bn	c1	Ødh	ØDh	ØDha	Øe1	f1	h	H	i2	i3	le	lh	las	lha	n1	Øs1	s3	sm	sas	t3	th	uh
F1	50	160	110 _β	40	140	71	10	20 ^{H7}	35	70	130	3.5	74	238.0	25.5	44.5	73	95	12	110.5	10.0	9	M6	M6	M8	11	22.8	6 ^{JS9}
F2	64	200	130 _β	55	175	88	14	25 ^{H7}	45	82	165	3.5	93	299.0	30.0	53.0	92	115	12	130.5	10.5	11	M8	M10	M12	13	28.3	8 ^{JS9}
F3	72	250	180 _β	60	200	102	15	30 ^{H7}	50	88	215	4.0	106	335.5	31.5	56.5	103	130	12	155.5	12.5	14	M10	M10	M12	16	33.3	8 ^{JS9}
F4	87	250	180 _β	70	220	114	15	40 ^{H7}	55	100	215	4.0	116	370.0	31.5	56.5	114	145	12	174.5	12.5	14	M10	M16	M20	16	43.3	12 ^{JS9}
F6	108	300	230 _β	85	270	131	17	50 ^{H7}	70	115	265	4.0	137	433.0	29.5	60.5	143	180	12	192.5	15.5	14	M12	M16	M20	19	53.8	14 ^{JS9}

Dimensions of motors

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

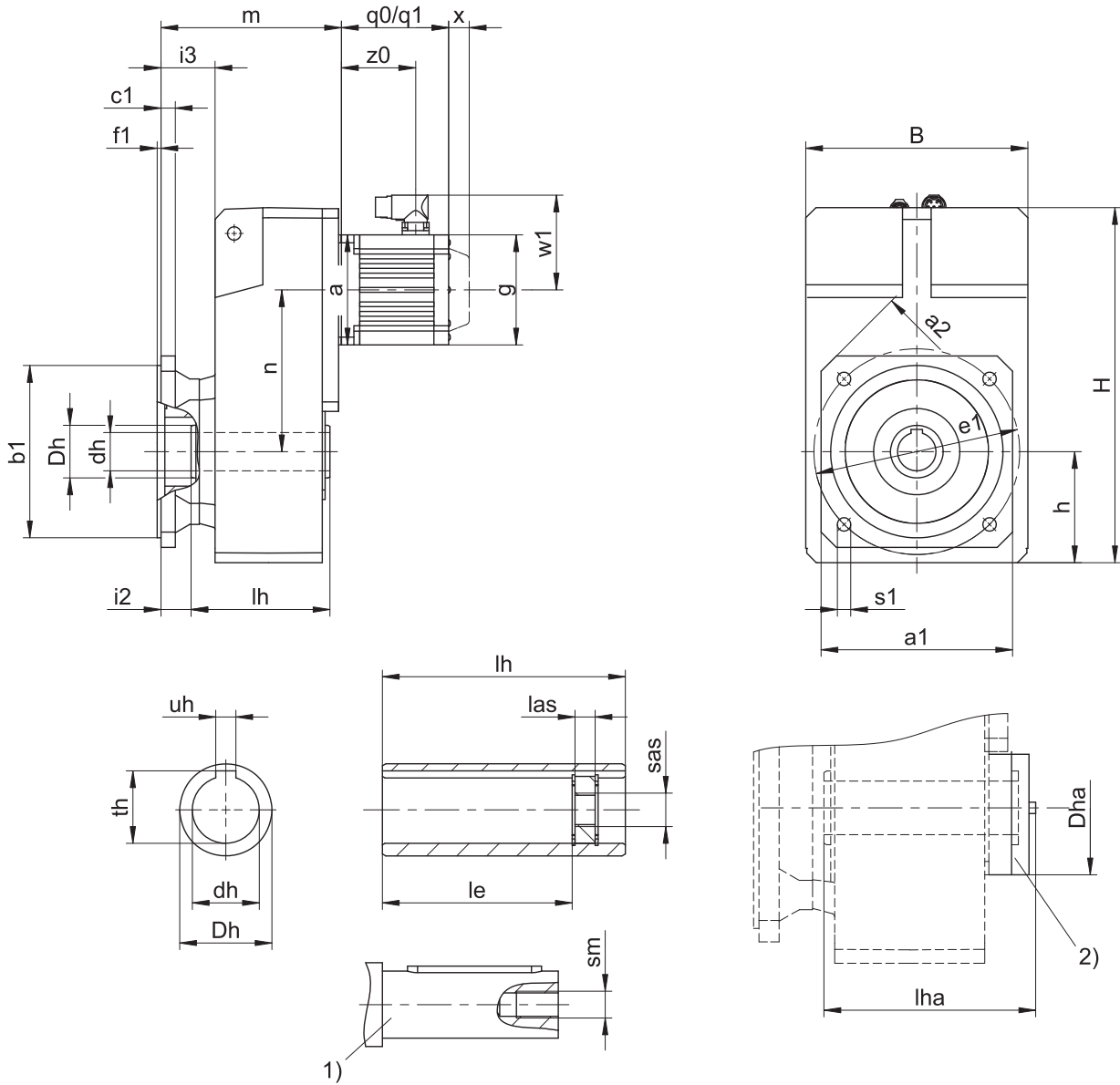
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Dimensions of geared motors

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
F102	□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	-	-	-	-	-	-	-	-	-
F602	-	-	-	-	-	-	Ø160	219.5	196.0	□145	221.5	196.0	□190	224.5	196.0
F603	-	-	-	-	-	-	Ø160	262.5	196.0	-	-	-	-	-	-



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



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter [22.4]
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)

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 _β	145	10	20 ^{H7}	35	70	130	3.5	74	238.0	25.5	44.5	73	95	12	110.5	9	M6	M8	22.8	6 ^{JS9}
F2	150	195	130 _β	180	14	25 ^{H7}	45	82	165	3.5	93	299.0	30.0	53.0	92	115	12	130.5	11	M10	M12	28.3	8 ^{JS9}
F3	200	260	180 _β	206	15	30 ^{H7}	50	88	215	4.0	106	335.5	31.5	56.5	103	130	12	155.5	14	M10	M12	33.3	8 ^{JS9}
F4	200	260	180 _β	230	15	40 ^{H7}	55	100	215	4.0	116	370.0	31.5	56.5	114	145	12	174.5	14	M16	M20	43.3	12 ^{JS9}
F6	250	325	230 _β	265	17	50 ^{H7}	70	115	265	4.0	137	433.0	29.5	60.5	143	180	12	192.5	14	M16	M20	53.8	14 ^{JS9}



Dimensions of motors

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

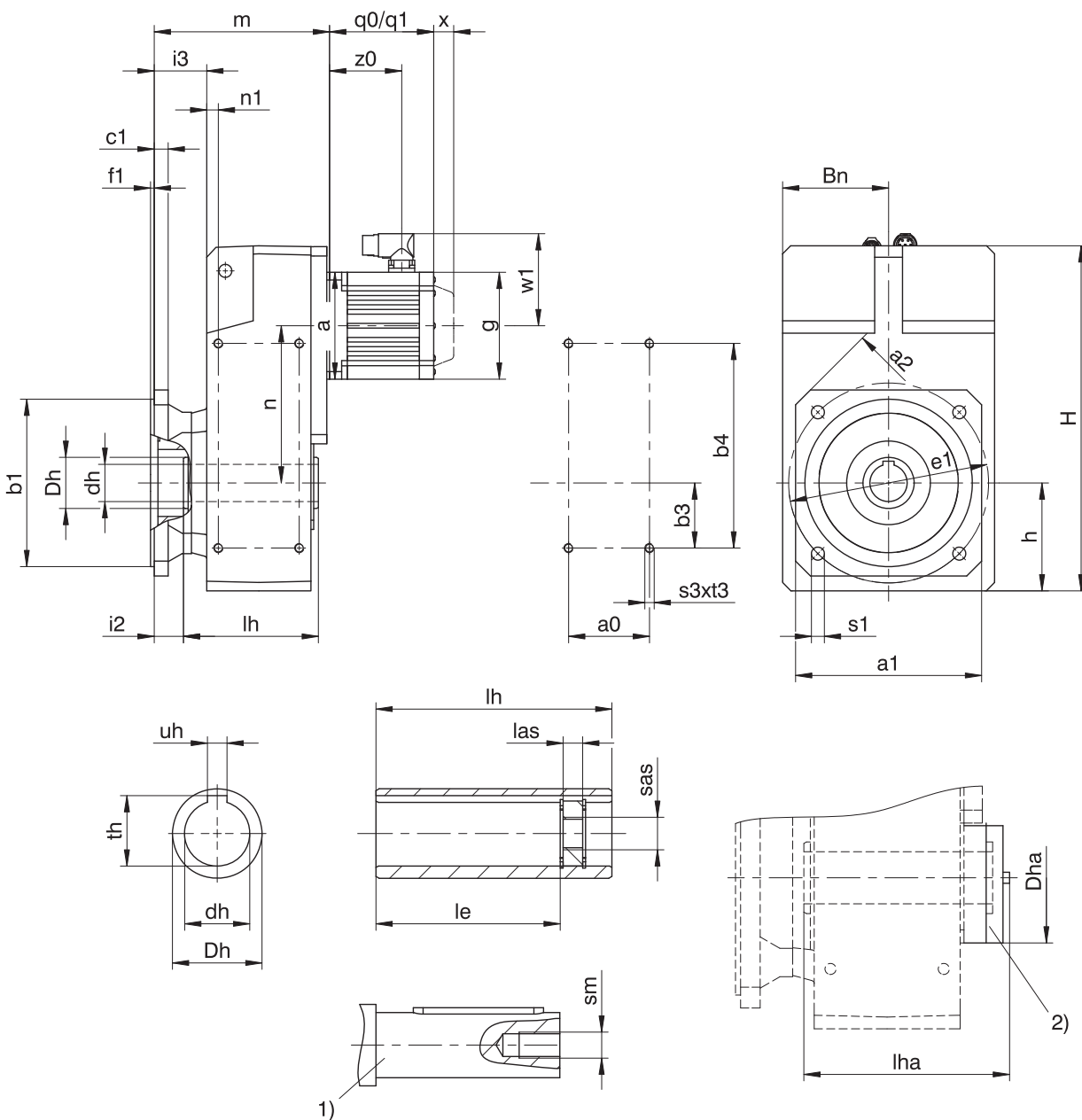
F

Dimensions of geared motors

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
F102	□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	∅140	190.0	131.0	-	-	-	-	-	-	-	-	-	-	-	-
F302	∅140	169.5	149.5	∅140	169.5	149.5	□115	173.5	149.5	□145	175.5	149.5	-	-	-
F303	∅140	206.5	149.5	-	-	-	-	-	-	-	-	-	-	-	-
F402	-	-	-	-	-	-	∅160	188.5	169.0	□145	190.5	169.0	□190	193.5	169.0
F403	∅140	221.5	169.0	∅140	221.5	169.0	-	-	-	-	-	-	-	-	-
F602	-	-	-	-	-	-	∅160	219.5	196.0	□145	221.5	196.0	□190	224.5	196.0
F603	-	-	-	-	-	-	∅160	262.5	196.0	-	-	-	-	-	-



12.3.6 A shaft design (hollow shaft), QN housing design (square flange + side fastening)



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter 22.4
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)

Dimensions of gear units

Type	a0	□a1	□a2	Øb1	Bn	b3	b4	c1	Ødh	ØDh	ØDha	Øe1	f1	h	H	i2	i3	le	lh	las	lha	n1	Øs1	s3	sm	sas	t3	th	uh
F1	50	125	160	110 ₆	71	40	140	10	20 ^{H7}	35	70	130	3.5	74	238.0	25.5	44.5	73	95	12	110.5	10.0	9	M6	M6	M8	11	22.8	6 ^{JS9}
F2	64	150	195	130 ₆	88	55	175	14	25 ^{H7}	45	82	165	3.5	93	299.0	30.0	53.0	92	115	12	130.5	10.5	11	M8	M10	M12	13	28.3	8 ^{JS9}
F3	72	200	260	180 ₆	102	60	200	15	30 ^{H7}	50	88	215	4.0	106	335.5	31.5	56.5	103	130	12	155.5	12.5	14	M10	M10	M12	16	33.3	8 ^{JS9}
F4	87	200	260	180 ₆	114	70	220	15	40 ^{H7}	55	100	215	4.0	116	370.0	31.5	56.5	114	145	12	174.5	12.5	14	M10	M16	M20	16	43.3	12 ^{JS9}
F6	108	250	325	230 ₆	131	85	270	17	50 ^{H7}	70	115	265	4.0	137	433.0	29.5	60.5	143	180	12	192.5	15.5	14	M12	M16	M20	19	53.8	14 ^{JS9}



Dimensions of motors

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

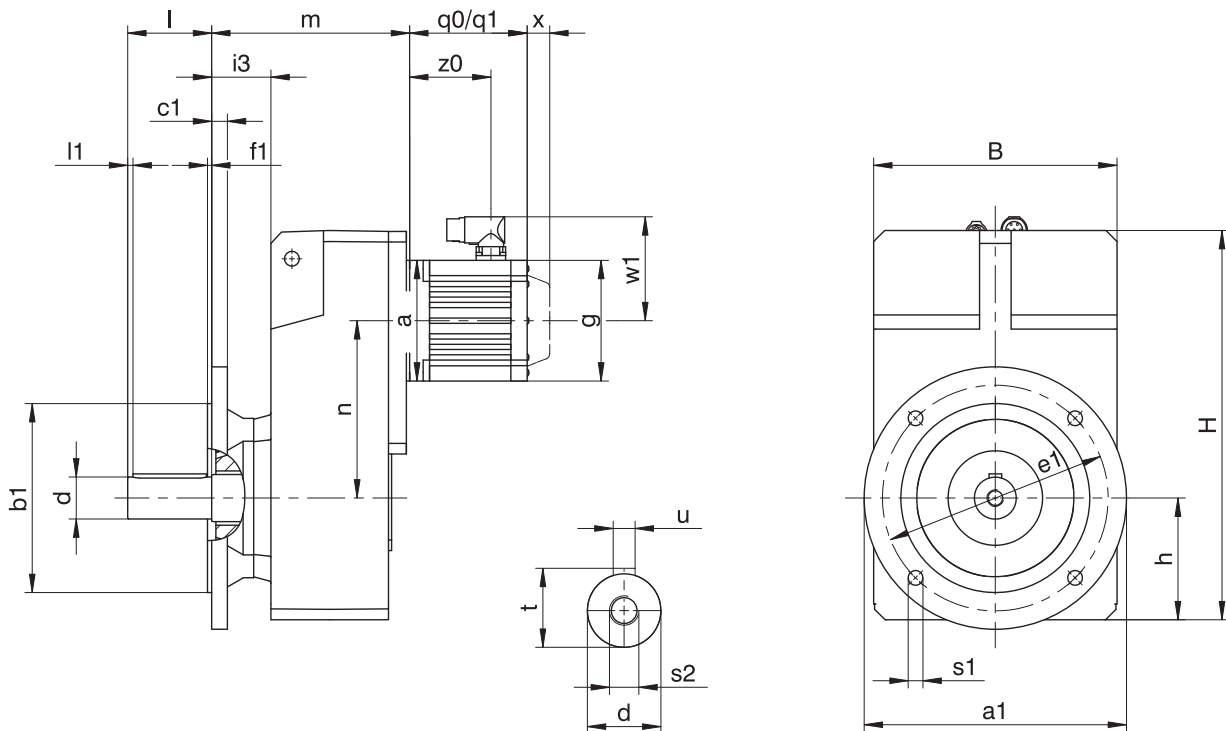
Dimensions of geared motors

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
F102	□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	∅140	190.0	131.0	-	-	-	-	-	-	-	-	-	-	-	-
F302	∅140	169.5	149.5	∅140	169.5	149.5	□115	173.5	149.5	□145	175.5	149.5	-	-	-
F303	∅140	206.5	149.5	-	-	-	-	-	-	-	-	-	-	-	-
F402	-	-	-	-	-	-	∅160	188.5	169.0	□145	190.5	169.0	□190	193.5	169.0
F403	∅140	221.5	169.0	∅140	221.5	169.0	-	-	-	-	-	-	-	-	-
F602	-	-	-	-	-	-	∅160	219.5	196.0	□145	221.5	196.0	□190	224.5	196.0
F603	-	-	-	-	-	-	∅160	262.5	196.0	-	-	-	-	-	-

F



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



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter 22.4

Dimensions of gear units

Type	Øa1	Øb1	B	c1	Ød	Øe1	f1	h	H	i3	l	l1	Øs1	s2	t	u
F1	160	110 _β	145	10	25 _{k6}	130	3.5	74	238.0	44.5	50	5	9	M10	28.0	A8x7x40
F2	200	130 _β	180	14	30 _{k6}	165	3.5	93	299.0	53.0	60	5	11	M10	33.0	A8x7x50
F3	250	180 _β	206	15	35 _{k6}	215	4.0	106	335.5	56.5	70	5	14	M12	38.0	A10x8x60
F4	250	180 _β	230	15	40 _{k6}	215	4.0	116	370.0	56.5	80	5	14	M16	43.0	A12x8x70
F6	300	230 _β	265	17	50 _{k6}	265	4.0	137	433.0	60.5	100	5	14	M16	53.5	A14x9x90

Dimensions of motors

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

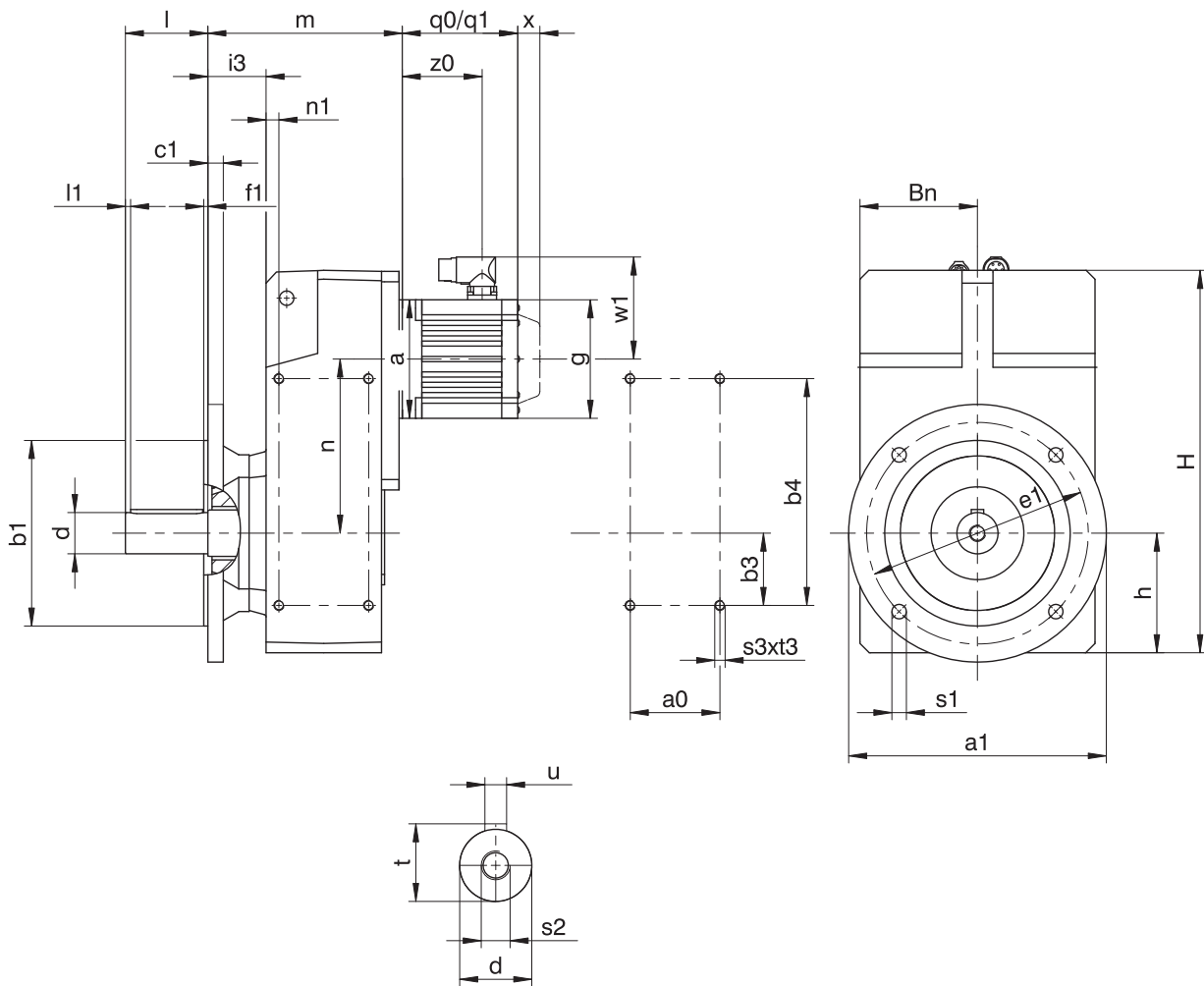


Dimensions of geared motors

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
F102	□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	∅140	190.0	131.0	-	-	-	-	-	-	-	-	-	-	-	-
F302	∅140	169.5	149.5	∅140	169.5	149.5	□115	173.5	149.5	□145	175.5	149.5	-	-	-
F303	∅140	206.5	149.5	-	-	-	-	-	-	-	-	-	-	-	-
F402	-	-	-	-	-	-	∅160	188.5	169.0	□145	190.5	169.0	□190	193.5	169.0
F403	∅140	221.5	169.0	∅140	221.5	169.0	-	-	-	-	-	-	-	-	-
F602	-	-	-	-	-	-	∅160	219.5	196.0	□145	221.5	196.0	□190	224.5	196.0
F603	-	-	-	-	-	-	∅160	262.5	196.0	-	-	-	-	-	-



12.3.8 V shaft design (solid shaft), FN housing design (round flange + side fastening)



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter 22.4

Dimensions of gear units

Type	a0	Øa1	Øb1	b3	b4	Bn	c1	Ød	Øe1	f1	h	H	i3	l	l1	n1	Øs1	s2	s3	t	t3	u
F1	50	160	110 ₆	40	140	71	10	25 _{6/5}	130	3.5	74	238.0	44.5	50	5	10.0	9	M10	M6	28.0	11	A8x7x40
F2	64	200	130 ₆	55	175	88	14	30 _{6/5}	165	3.5	93	299.0	53.0	60	5	10.5	11	M10	M8	33.0	13	A8x7x50
F3	72	250	180 ₆	60	200	102	15	35 _{6/5}	215	4.0	106	335.5	56.5	70	5	12.5	14	M12	M10	38.0	16	A10x8x60
F4	87	250	180 ₆	70	220	114	15	40 _{6/5}	215	4.0	116	370.0	56.5	80	5	12.5	14	M16	M10	43.0	16	A12x8x70
F6	108	300	230 ₆	85	270	131	17	50 _{6/5}	265	4.0	137	433.0	60.5	100	5	15.5	14	M16	M12	53.5	19	A14x9x90



Dimensions of motors

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

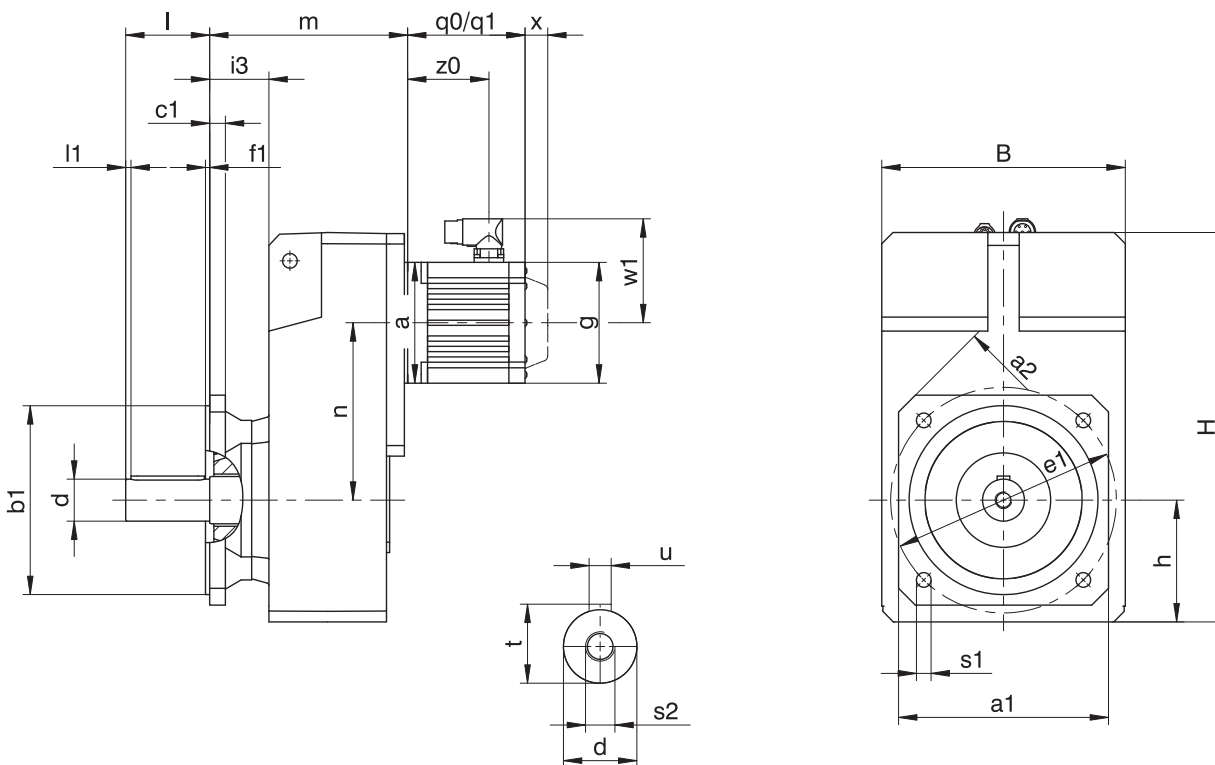
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Dimensions of geared motors

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
F102	□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	∅140	190.0	131.0	-	-	-	-	-	-	-	-	-	-	-	-
F302	∅140	169.5	149.5	∅140	169.5	149.5	□115	173.5	149.5	□145	175.5	149.5	-	-	-
F303	∅140	206.5	149.5	-	-	-	-	-	-	-	-	-	-	-	-
F402	-	-	-	-	-	-	∅160	188.5	169.0	□145	190.5	169.0	□190	193.5	169.0
F403	∅140	221.5	169.0	∅140	221.5	169.0	-	-	-	-	-	-	-	-	-
F602	-	-	-	-	-	-	∅160	219.5	196.0	□145	221.5	196.0	□190	224.5	196.0
F603	-	-	-	-	-	-	∅160	262.5	196.0	-	-	-	-	-	-



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



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter 22.4

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 _β	10	145	25 _{k6}	130	3.5	74	238.0	44.5	50	5	9	M10	28.0	A8x7x40
F2	150	195	130 _β	14	180	30 _{k6}	165	3.5	93	299.0	53.0	60	5	11	M10	33.0	A8x7x50
F3	200	260	180 _β	15	206	35 _{k6}	215	4.0	106	335.5	56.5	70	5	14	M12	38.0	A10x8x60
F4	200	260	180 _β	15	230	40 _{k6}	215	4.0	116	370.0	56.5	80	5	14	M16	43.0	A12x8x70
F6	250	325	230 _β	17	265	50 _{k6}	265	4.0	137	433.0	60.5	100	5	14	M16	53.5	A14x9x90

Dimensions of motors

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



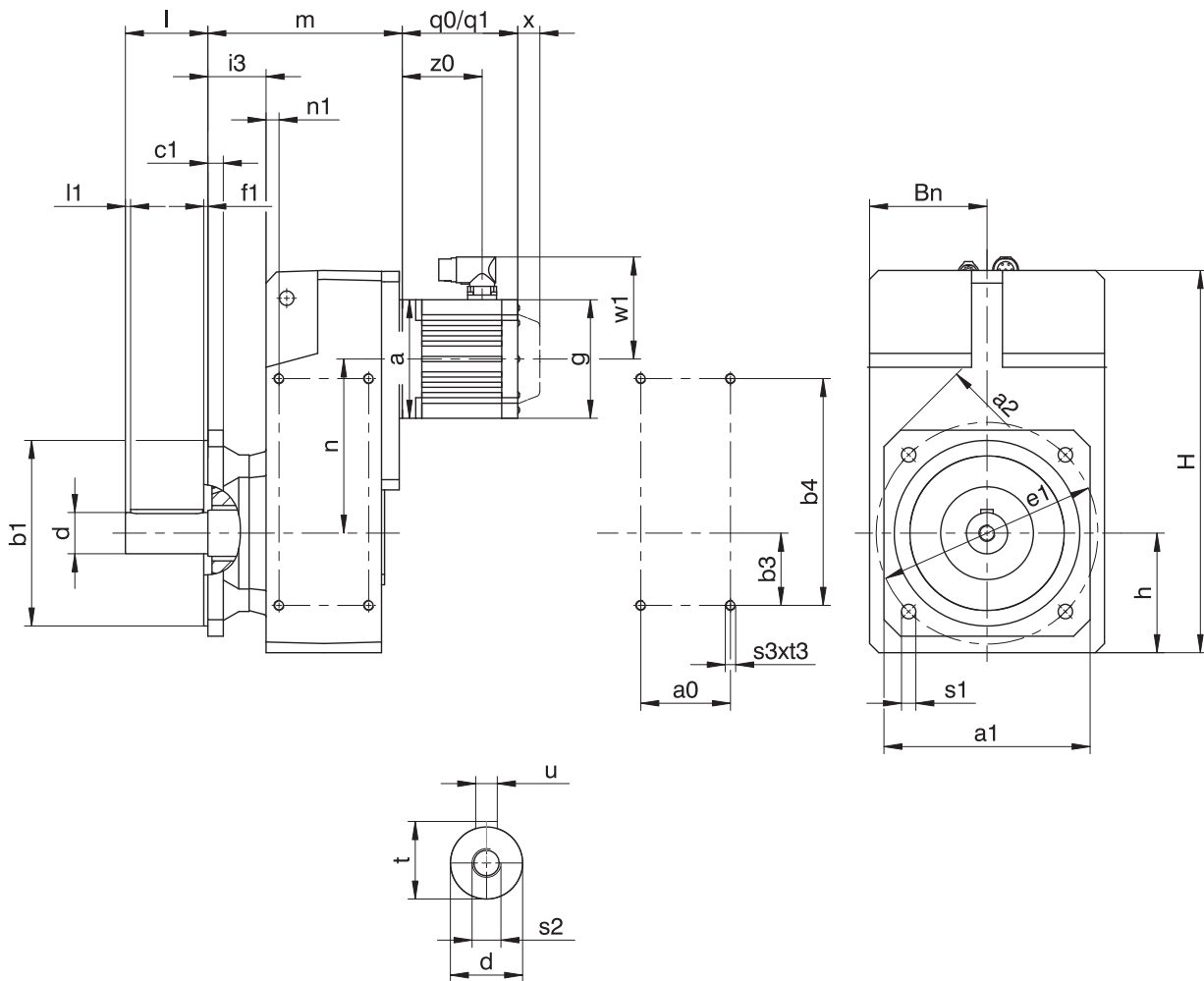
Dimensions of geared motors

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
F102	□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	∅140	190.0	131.0	-	-	-	-	-	-	-	-	-	-	-	-
F302	∅140	169.5	149.5	∅140	169.5	149.5	□115	173.5	149.5	□145	175.5	149.5	-	-	-
F303	∅140	206.5	149.5	-	-	-	-	-	-	-	-	-	-	-	-
F402	-	-	-	-	-	-	∅160	188.5	169.0	□145	190.5	169.0	□190	193.5	169.0
F403	∅140	221.5	169.0	∅140	221.5	169.0	-	-	-	-	-	-	-	-	-
F602	-	-	-	-	-	-	∅160	219.5	196.0	□145	221.5	196.0	□190	224.5	196.0
F603	-	-	-	-	-	-	∅160	262.5	196.0	-	-	-	-	-	-

F



12.3.10 V shaft design V (solid shaft), QN housing design (square flange + side fastening)



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter 22.4

Dimensions of gear units

Type	a0	□a1	□a2	Øb1	b3	b4	Bn	c1	Ød	Øe1	f1	h	H	i3	l	l1	n1	Øs1	s2	s3	t	t3	u
F1	50	125	160	110 ₆	40	140	71	10	25 _{k6}	130	3.5	74	238.0	44.5	50	5	10.0	9	M10	M6	28.0	11	A8x7x40
F2	64	150	195	130 ₆	55	175	88	14	30 _{k6}	165	3.5	93	299.0	53.0	60	5	10.5	11	M10	M8	33.0	13	A8x7x50
F3	72	200	260	180 ₆	60	200	102	15	35 _{k6}	215	4.0	106	335.5	56.5	70	5	12.5	14	M12	M10	38.0	16	A10x8x60
F4	87	200	260	180 ₆	70	220	114	15	40 _{k6}	215	4.0	116	370.0	56.5	80	5	12.5	14	M16	M10	43.0	16	A12x8x70
F6	108	250	325	230 ₆	85	270	131	17	50 _{k6}	265	4.0	137	433.0	60.5	100	5	15.5	14	M16	M12	53.5	19	A14x9x90



Dimensions of motors

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

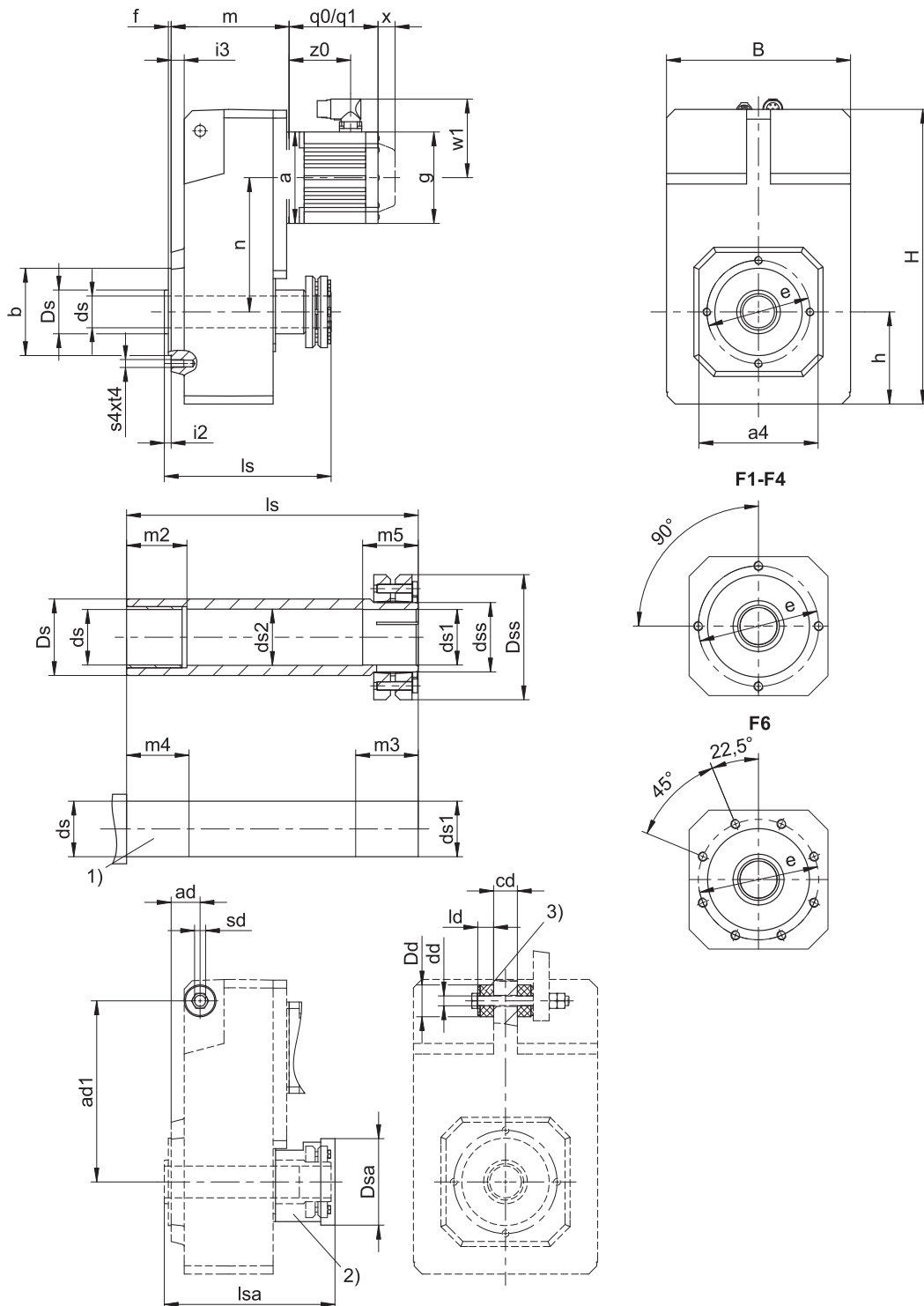
Dimensions of geared motors

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
F102	□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	∅140	190.0	131.0	-	-	-	-	-	-	-	-	-	-	-	-
F302	∅140	169.5	149.5	∅140	169.5	149.5	□115	173.5	149.5	□145	175.5	149.5	-	-	-
F303	∅140	206.5	149.5	-	-	-	-	-	-	-	-	-	-	-	-
F402	-	-	-	-	-	-	∅160	188.5	169.0	□145	190.5	169.0	□190	193.5	169.0
F403	∅140	221.5	169.0	∅140	221.5	169.0	-	-	-	-	-	-	-	-	-
F602	-	-	-	-	-	-	∅160	219.5	196.0	□145	221.5	196.0	□190	224.5	196.0
F603	-	-	-	-	-	-	∅160	262.5	196.0	-	-	-	-	-	-

F



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



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



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

Dimensions of gear units

Type	$\square a4$	ad	ad1	$\varnothing b$	B	cd	$\varnothing dd$	$\varnothing ds$	$\varnothing ds1$	$\varnothing ds2$	$\varnothing ds3$	$\varnothing Dd$	$\varnothing Ds$	$\varnothing Dsa$	$\varnothing Dss$	$\varnothing e$	f	h	H	i2	i3	ld	ls	lsa	m2	m3	m4	m5	s4	sd	t4
F1	100	29.5	150	70 _{j6}	145	20	10.5 ^{+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	33.0	181	95 _{j6}	180	22	10.5 ^{+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	38.5	205	110 _{j6}	206	30	13.0 ^{+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	38.5	228	110 _{j6}	230	30	13.0 ^{+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	40	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	$\square g$	q0	q1	w1	x	z0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
EZ503U	115	162.0	216.5	100.0	22	127.5
EZ505U	115	212.0	266.5	100.0	22	177.5
EZ701U	145	125.0	184.0	115.0	22	87.0
EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5
EZ803U	190	273.5	350.5	156.5	22	219.5
EZ805U	190	355.5	432.5	156.5	22	301.5

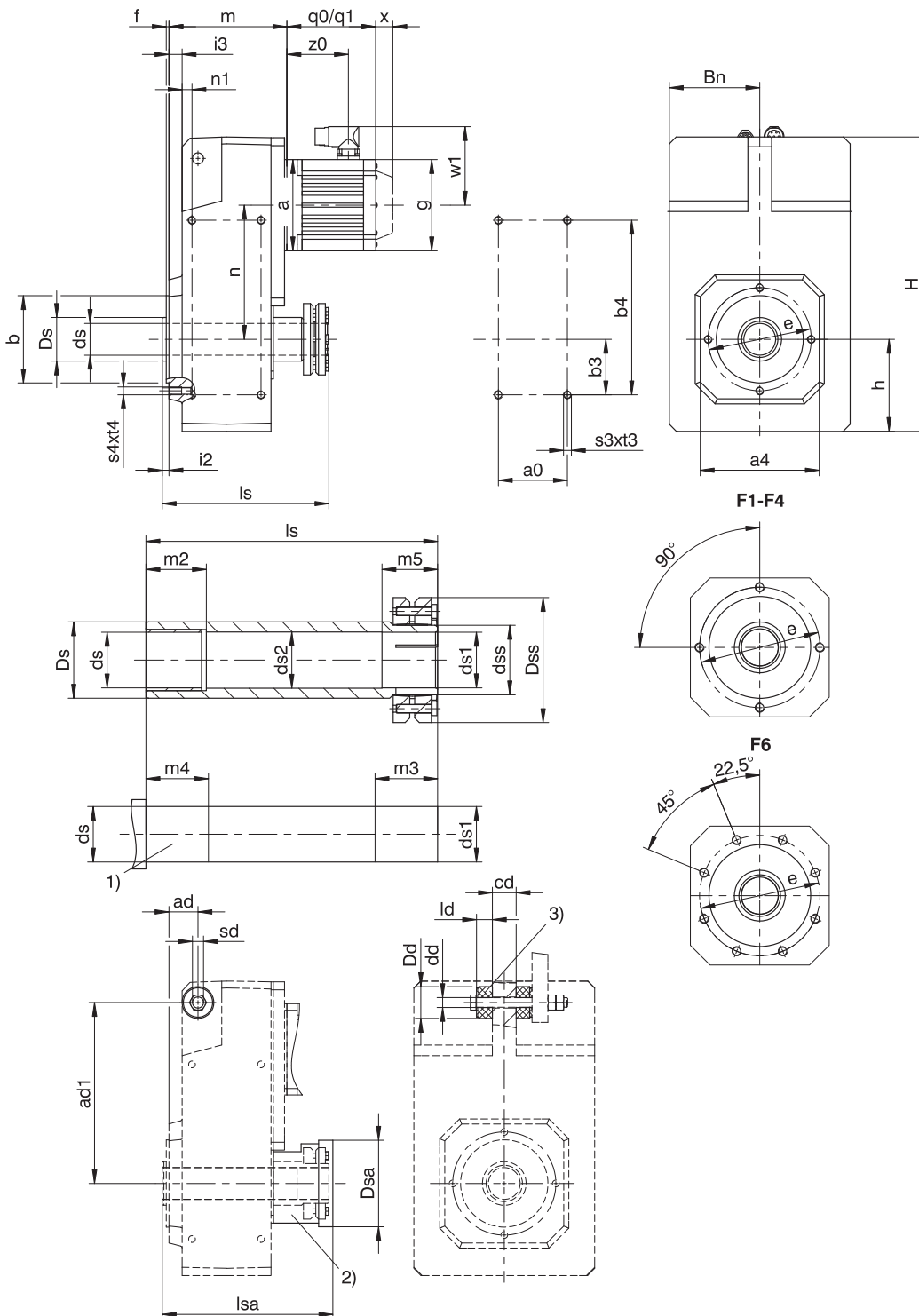
Dimensions of geared motors

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
F102	$\square 72$	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	-	-	-	-	-	-	-	-	-
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	-	-	-	-	-	-





12.3.12 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.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter 22.4
1)	Machine shaft: The dimension ls must meet or exceed the specified value.	2)	Cover (optional)



3) Rubber buffer for torque arm (optional). Dimension $\varnothing Dd$ = outer \varnothing 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 _{f6}	40	140	71	20	10.5 ^{+0.5}	20 _{h9}	20 _{h9} ^{H7}	20.5	24	30	63	63	50
F2	64	130	33.0	181	95 _{f6}	55	175	88	22	10.5 ^{+0.5}	25 _{h9}	25 _{h9} ^{H7}	25.5	30	30	73	73	60
F3	72	150	38.5	205	110 _{f6}	60	200	102	30	13.0 ^{+0.5}	30 _{h9}	30 _{h9} ^{H7}	30.5	36	37	83	83	72
F4	87	150	38.5	228	110 _{f6}	70	220	114	30	13.0 ^{+0.5}	40 _{h9}	40 _{h9} ^{H7}	40.5	50	37	108	108	90
F6	108	180	44.5	270	130 _{f6}	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	x	z0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
EZ503U	115	162.0	216.5	100.0	22	127.5
EZ505U	115	212.0	266.5	100.0	22	177.5
EZ701U	145	125.0	184.0	115.0	22	87.0
EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5
EZ803U	190	273.5	350.5	156.5	22	219.5
EZ805U	190	355.5	432.5	156.5	22	301.5

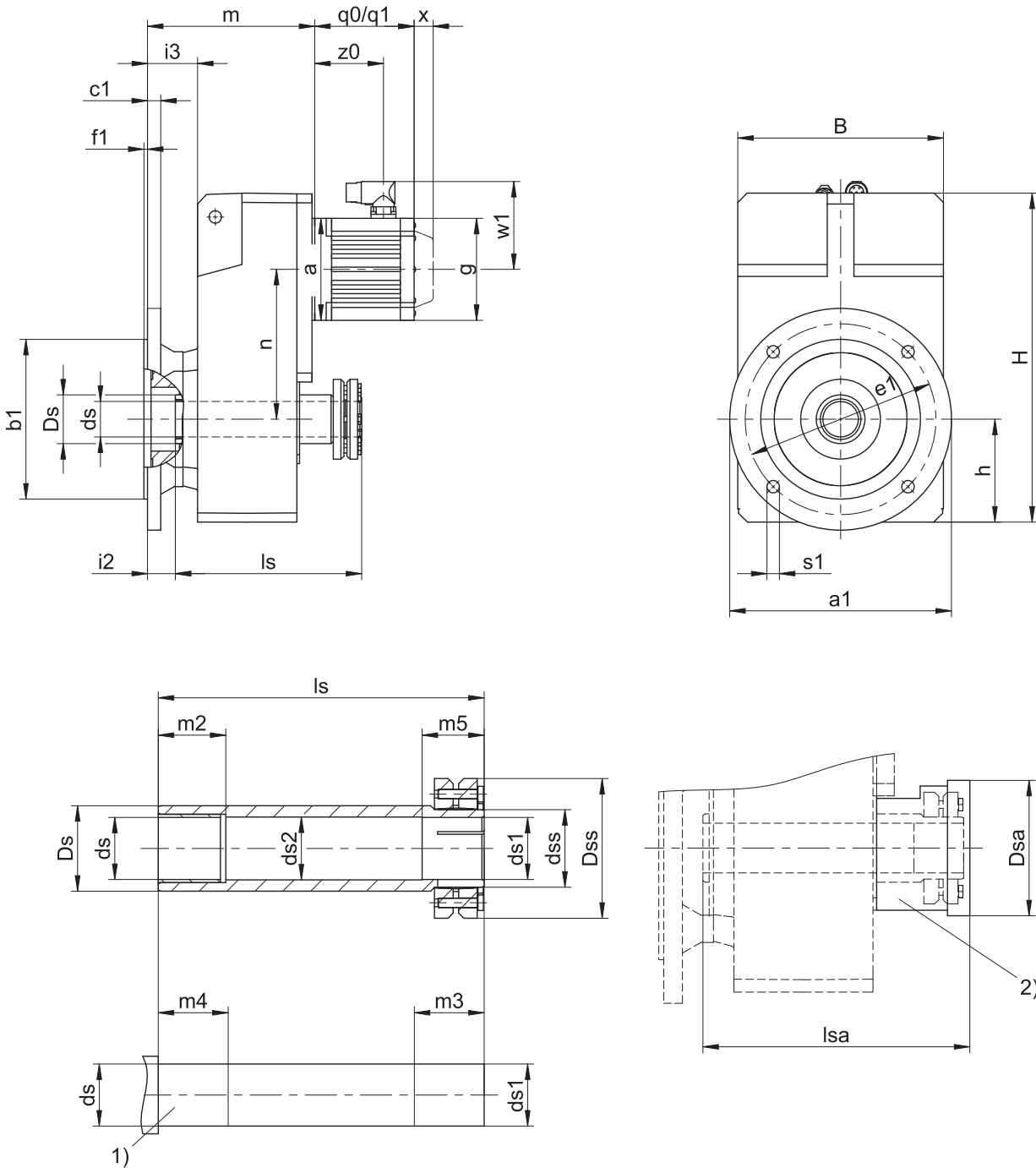
Dimensions of geared motors

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
F102	□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	-	-	-	-	-	-	-	-	-
F602	-	-	-	-	-	-	Ø160	179.5	196.0	□145	181.5	196.0	□190	184.5	196.0
F603	-	-	-	-	-	-	Ø160	222.5	196.0	-	-	-	-	-	-





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



q0	Applies to motors without brake.	q1	Applies to motors with brake.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter 22.4
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 _{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 _{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 _{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 _{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 _{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	x	z0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
EZ503U	115	162.0	216.5	100.0	22	127.5
EZ505U	115	212.0	266.5	100.0	22	177.5
EZ701U	145	125.0	184.0	115.0	22	87.0
EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5
EZ803U	190	273.5	350.5	156.5	22	219.5
EZ805U	190	355.5	432.5	156.5	22	301.5

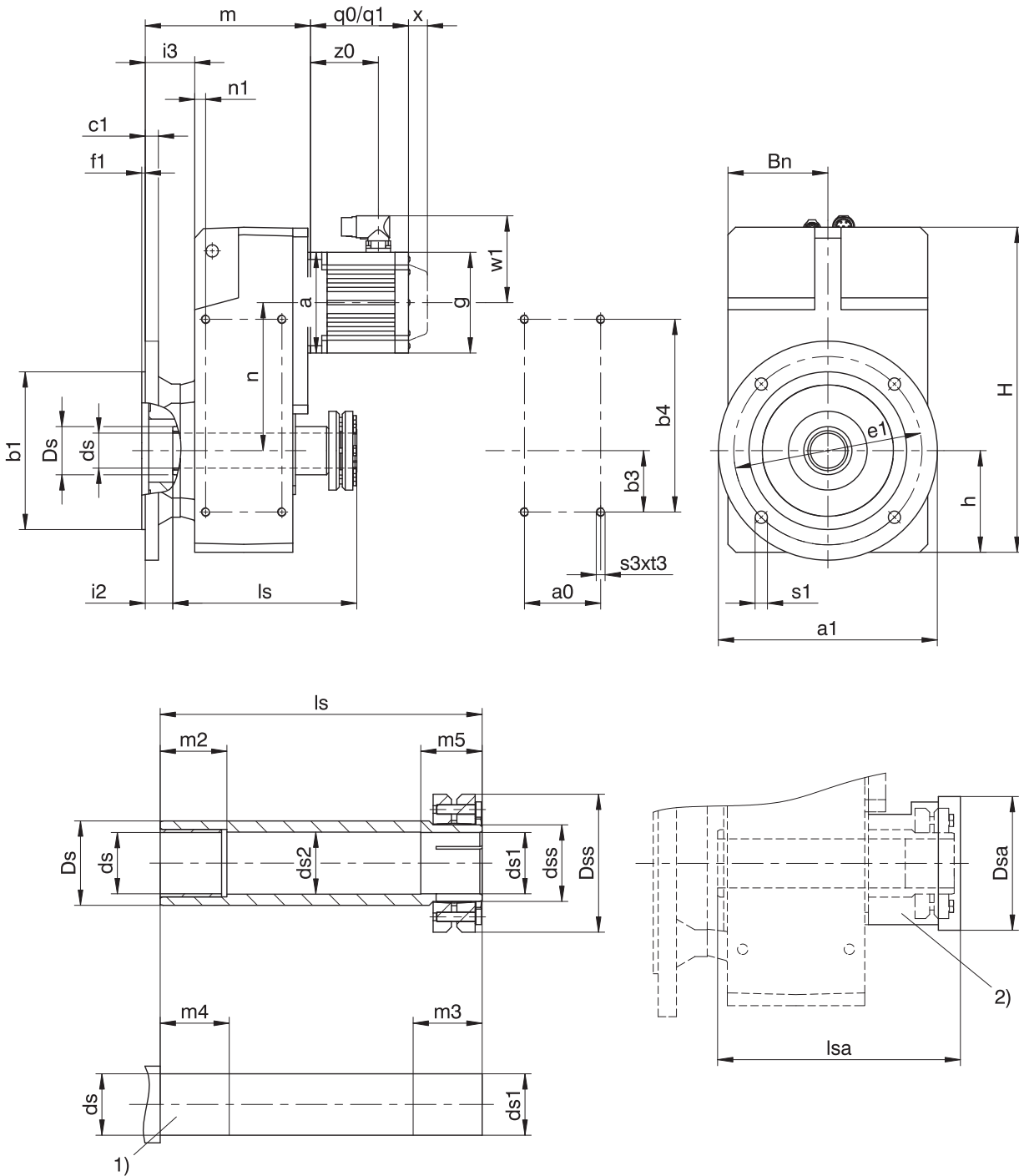
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Dimensions of geared motors

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
F102	□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	-	-	-	-	-	-	-	-	-
F602	-	-	-	-	-	-	Ø160	219.5	196.0	□145	221.5	196.0	□190	224.5	196.0
F603	-	-	-	-	-	-	Ø160	262.5	196.0	-	-	-	-	-	-



12.3.14 S shaft design (hollow shaft with shrink disk), FN housing design (round flange + side fastening)



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



Dimensions of gear units

Type	a0	Øa1	Øb1	b3	b4	Bn	c1	Øds	Øds1	Øds2	Ødss	ØDs	ØDsa	ØDss	Øe1	f1	h	H	i2	i3	ls	lsa	m2	m3	m4	m5	n1	Øs1	s3	t3
F1	50	160	110 ₆	40	140	71	10	20 _{h9}	20 _{h7}	20.5	24	35	63	50	130	3.5	74	238.0	25.5	44.5	146	150	20	31	25	26	10.0	9	M6	11
F2	64	200	130 ₆	55	175	88	14	25 _{h9}	25 _{h7}	25.5	30	45	73	60	165	3.5	93	299.0	30.0	53.0	175	180	20	37	25	32	10.5	11	M8	13
F3	72	250	180 ₆	60	200	102	15	30 _{h9}	30 _{h7}	30.5	36	50	83	72	215	4.0	106	335.5	31.5	56.5	192	196	25	37	30	32	12.5	14	M10	16
F4	87	250	180 ₆	70	220	114	15	40 _{h9}	40 _{h7}	40.5	50	55	108	90	215	4.0	116	370.0	31.5	56.5	210	215	40	45	45	40	12.5	14	M10	16
F6	108	300	230 ₆	85	270	131	17	50 _{h9}	50 _{h7}	50.5	62	70	128	106	265	4.0	137	433.0	29.5	60.5	248	251	40	47	45	42	15.5	14	M12	19

Dimensions of motors

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

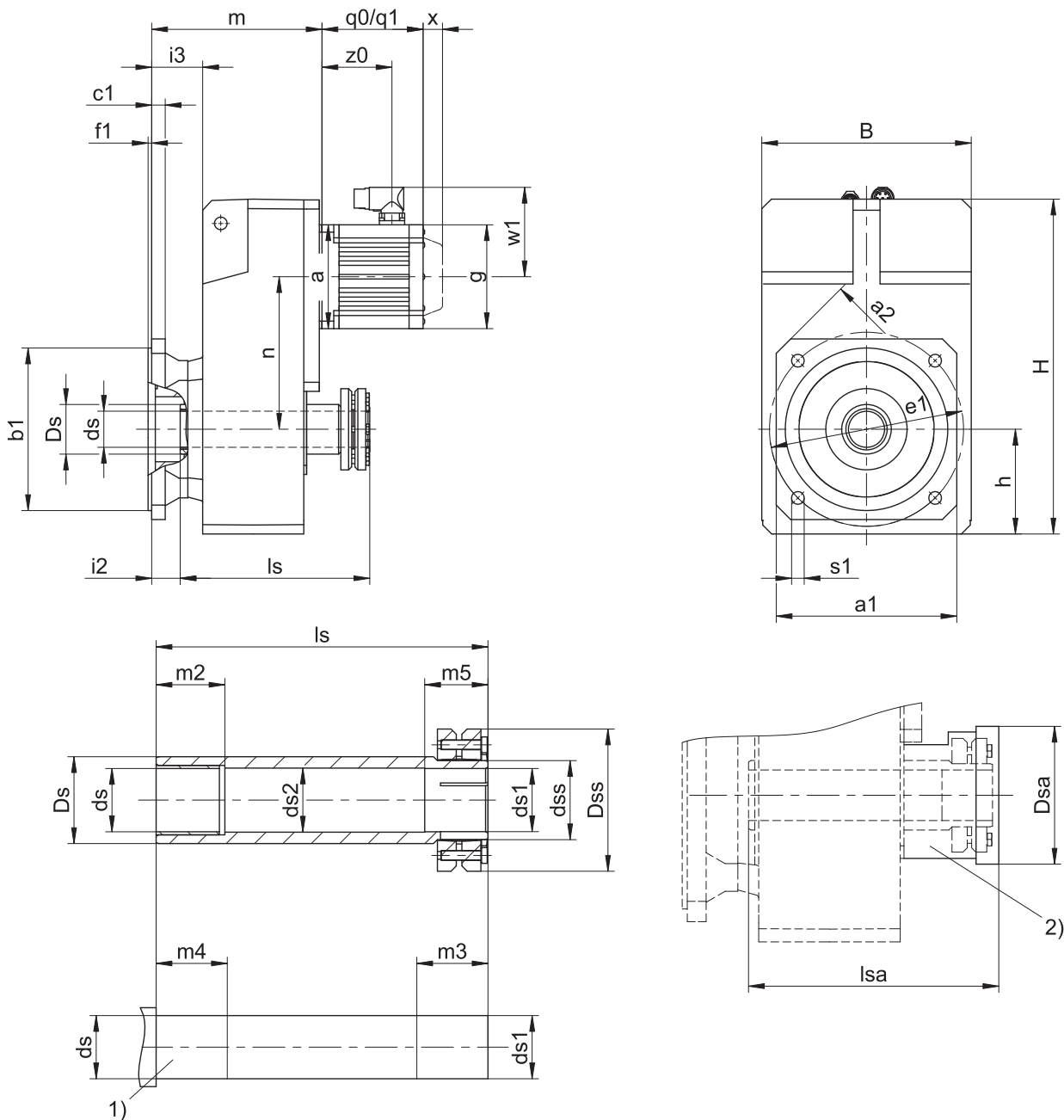
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Dimensions of geared motors

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
F102	□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	-	-	-	-	-	-	-	-	-
F602	-	-	-	-	-	-	Ø160	219.5	196.0	□145	221.5	196.0	□190	224.5	196.0
F603	-	-	-	-	-	-	Ø160	262.5	196.0	-	-	-	-	-	-



12.3.15 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.
x	Applies to encoders using an optical measuring concept.	w1	For variation for One Cable Solution (OCS), see Chapter 22.4
1)	Machine shaft: The dimension ls must meet or exceed the specified value.	2)	Cover (optional)

Dimensions of gear units

Type	□a1	□a2	Øb1	B	c1	Øds	Øds1	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



12 F offset helical geared motors

12.3 Dimensional drawings



Type	□a1	□a2	Øb1	B	c1	Øds	Øds1	Øds2	Ødss	ØDs	ØDsa	ØDss	Øe1	f1	h	H	i2	i3	ls	lsa	m2	m3	m4	m5	Øs1
F4	200	260	180 ₆	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 ₆	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	x	z0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
EZ401U	98	118.5	167.0	91.0	22	76.5
EZ402U	98	143.5	192.0	91.0	22	101.5
EZ404U	98	193.5	242.0	91.0	22	151.5
EZ501U	115	112.0	166.5	100.0	22	77.5
EZ502U	115	137.0	191.5	100.0	22	102.5
EZ503U	115	162.0	216.5	100.0	22	127.5
EZ505U	115	212.0	266.5	100.0	22	177.5
EZ701U	145	125.0	184.0	115.0	22	87.0
EZ702U	145	150.0	209.0	115.0	22	112.0
EZ703U	145	175.0	234.0	115.0	22	137.0
EZ705U	145	230.0	289.0	134.0	22	188.0
EZ802U	190	232.5	309.5	156.5	22	178.5
EZ803U	190	273.5	350.5	156.5	22	219.5
EZ805U	190	355.5	432.5	156.5	22	301.5

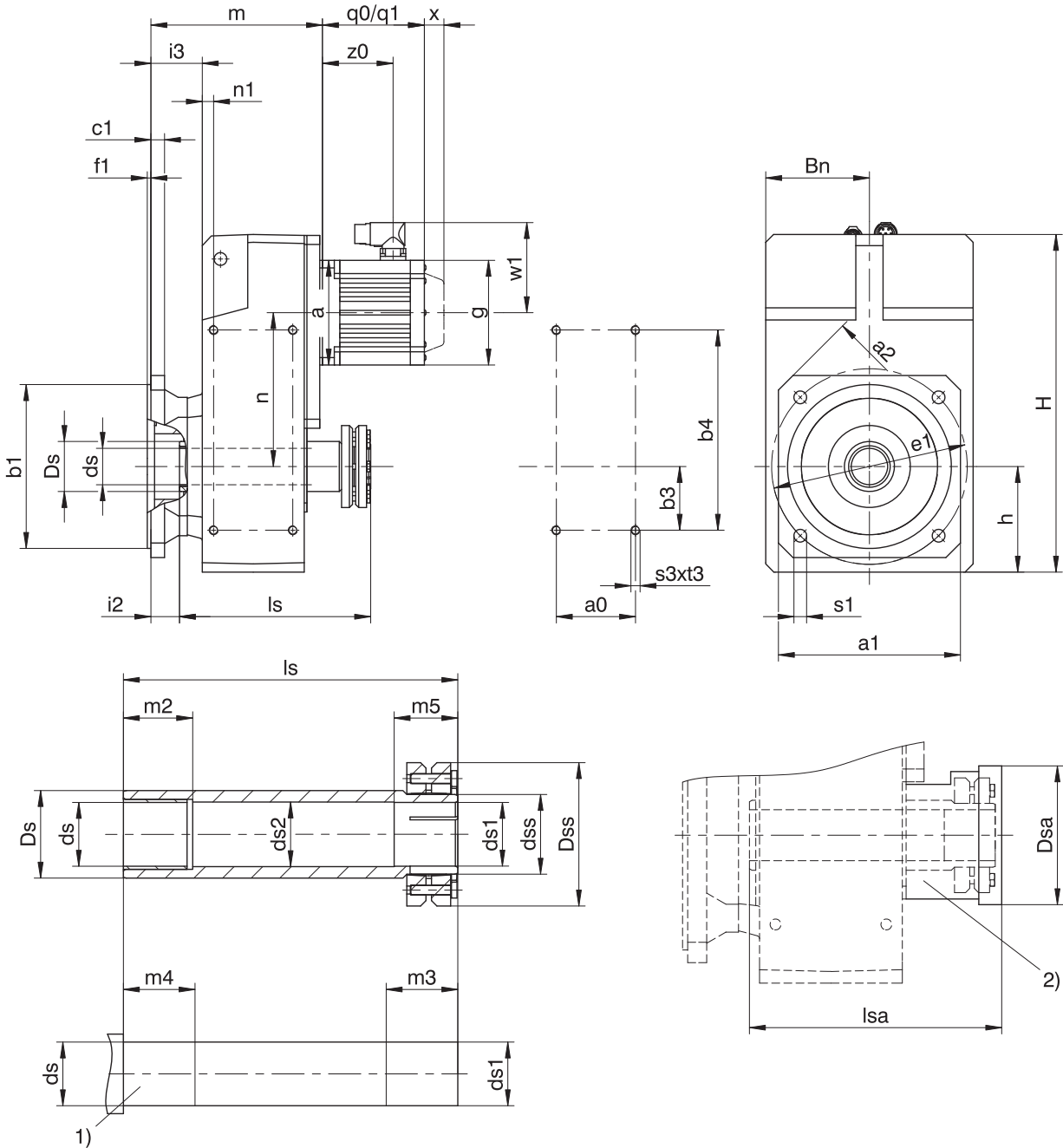
F

Dimensions of geared motors

Type	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
F102	□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	-	-	-	-	-	-	-	-	-
F602	-	-	-	-	-	-	Ø160	219.5	196.0	□145	221.5	196.0	□190	224.5	196.0
F603	-	-	-	-	-	-	Ø160	262.5	196.0	-	-	-	-	-	-



12.3.16 S shaft design (hollow shaft with shrink disk), QN housing design (square flange + side fastening)



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

Dimensions of gear units

Type	a0	a1	a2	b1	b3	b4	Bn	c1	ds	ds1	ds2	ds	Ds	Dsa	Dss	e1	f1	h	H	i2	i3	ls	lsa	m2	m3	m4	m5	n1	s1	s3	t3
F1	50	125	160	110 ₆	40	140	71	10	20 _{h9}	20 _{h7}	20.5	24	35	63	50	130	3.5	74	238.0	25.5	44.5	146	150	20	31	25	26	10.0	9	M6	11
F2	64	150	195	130 ₆	55	175	88	14	25 _{h9}	25 _{h7}	25.5	30	45	73	60	165	3.5	93	299.0	30.0	53.0	175	180	20	37	25	32	10.5	11	M8	13
F3	72	200	260	180 ₆	60	200	102	15	30 _{h9}	30 _{h7}	30.5	36	50	83	72	215	4.0	106	335.5	31.5	56.5	192	196	25	37	30	32	12.5	14	M10	16



Type	a0	□a1	□a2	∅b1	b3	b4	Bn	c1	∅ds	∅ds1	∅ds2	∅dss	∅Ds	∅Dsa	∅Dss	∅e1	f1	h	H	i2	i3	ls	lsa	m2	m3	m4	m5	n1	∅s1	s3	t3
F4	87	200	260	180 _{j6}	70	220	114	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	12.5	14	M10	16
F6	108	250	325	230 _{j6}	85	270	131	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	15.5	14	M12	19

Dimensions of motors

Type	□g	q0	q1	w1	x	z0
EZ301U	72	114.0	154.0	55.5	21	78.5
EZ302U	72	136.0	176.0	55.5	21	100.5
EZ303U	72	158.0	198.0	55.5	21	122.5
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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	EZ3			EZ4			EZ5			EZ7			EZ8		
	a	m	n	a	m	n	a	m	n	a	m	n	a	m	n
F102	□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	∅140	190.0	131.0	-	-	-	-	-	-	-	-	-	-	-	-
F302	∅140	169.5	149.5	∅140	169.5	149.5	□115	173.5	149.5	□145	175.5	149.5	-	-	-
F303	∅140	206.5	149.5	-	-	-	-	-	-	-	-	-	-	-	-
F402	-	-	-	-	-	-	∅160	188.5	169.0	□145	190.5	169.0	□190	193.5	169.0
F403	∅140	221.5	169.0	∅140	221.5	169.0	-	-	-	-	-	-	-	-	-
F602	-	-	-	-	-	-	∅160	219.5	196.0	□145	221.5	196.0	□190	224.5	196.0
F603	-	-	-	-	-	-	∅160	262.5	196.0	-	-	-	-	-	-



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

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

Explanation

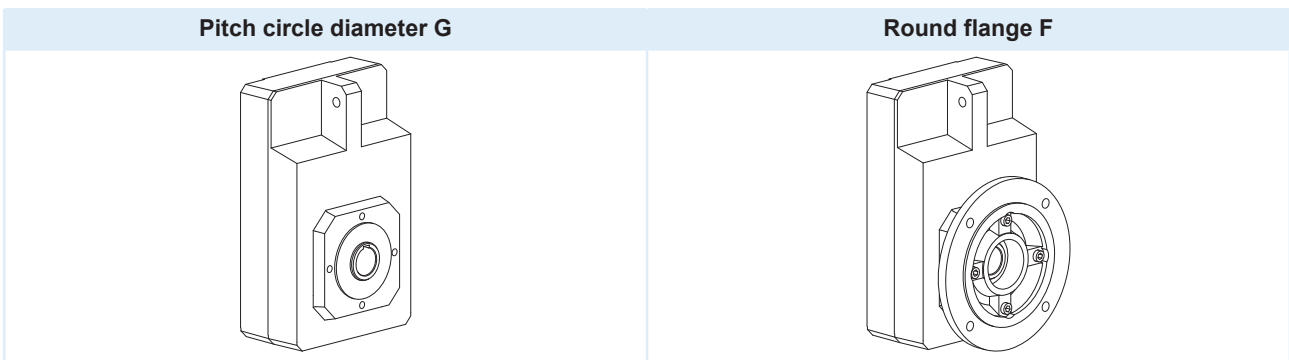
Code	Designation	Design
F	Type	Offset helical gear unit
2	Size	2 (example)
0	Generation	Generation 0
2 3	Stages	Two-stage Three-stage
A S V	Shaft	Hollow shaft with keyway Hollow shaft with shrink disk Solid shaft
G F Q GN FN QN	Housing	Pitch circle diameter Round flange Square flange Pitch circle diameter + side fastening Round flange + side fastening Square flange + side fastening
0700	Transmission ratio (i x 10)	i = 70 (example)
EZ401U	Motor	EZ synchronous servo motor

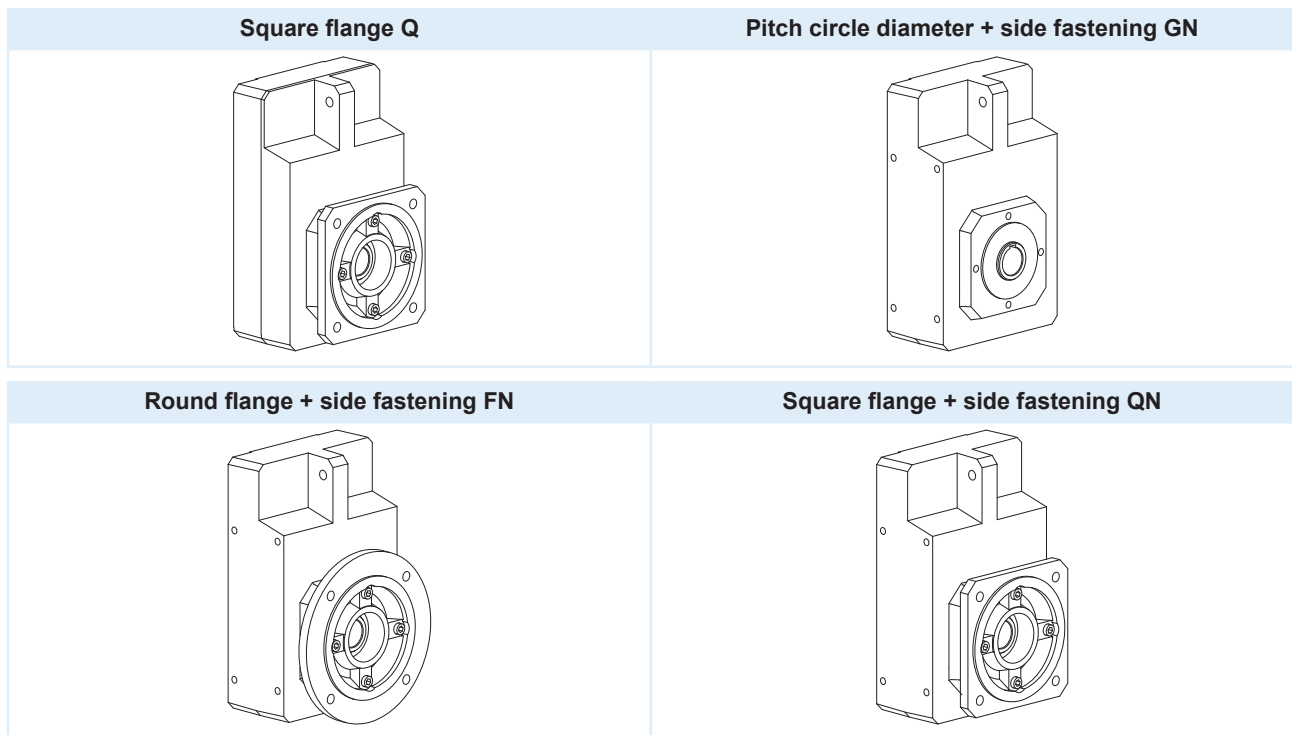
In order to complete the type designation, also specify:

- A detailed type designation of the motor, see Chapter [\[22 \]](#)
- The installation position, see Chapter [\[12.5.4 \]](#)
- The position of the plug connectors, see Chapter [\[12.5.6 \]](#)

12.5 Product description

12.5.1 Housing design





	G	F	Q	GN	FN	QN
F1	✓	✓	✓	✓	✓	✓
F2	✓	✓	✓	✓	✓	✓
F3	✓	✓	✓	✓	✓	✓
F4	✓	✓	✓	✓	✓	✓
F6	✓	✓	✓	✓	✓	✓

12.5.2 Combinatorial shaft/housing design

Shaft design	Code	Housing design					
		G	F	Q	GN	FN	QN
Hollow shaft with keyway	A	AG	AF	AQ	AGN	AFN	AQN
Hollow shaft with shrink disk	S	SG	SF	SQ	SGN	SFN	SQN
Solid shaft	V	-	VF	VQ	-	VFN	VQN

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 ≤ 0.03 mm.

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

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



Hollow shaft with shrink disk

The tolerance of the hollow shaft hole is ISO H7.

The machine shaft must be ISO h9.

Select a material for the machine shaft with a permitted surface pressure of $p \geq 325 \text{ N/mm}^2$.

Possible materials:

- C45E +QT
- 42CrMo4

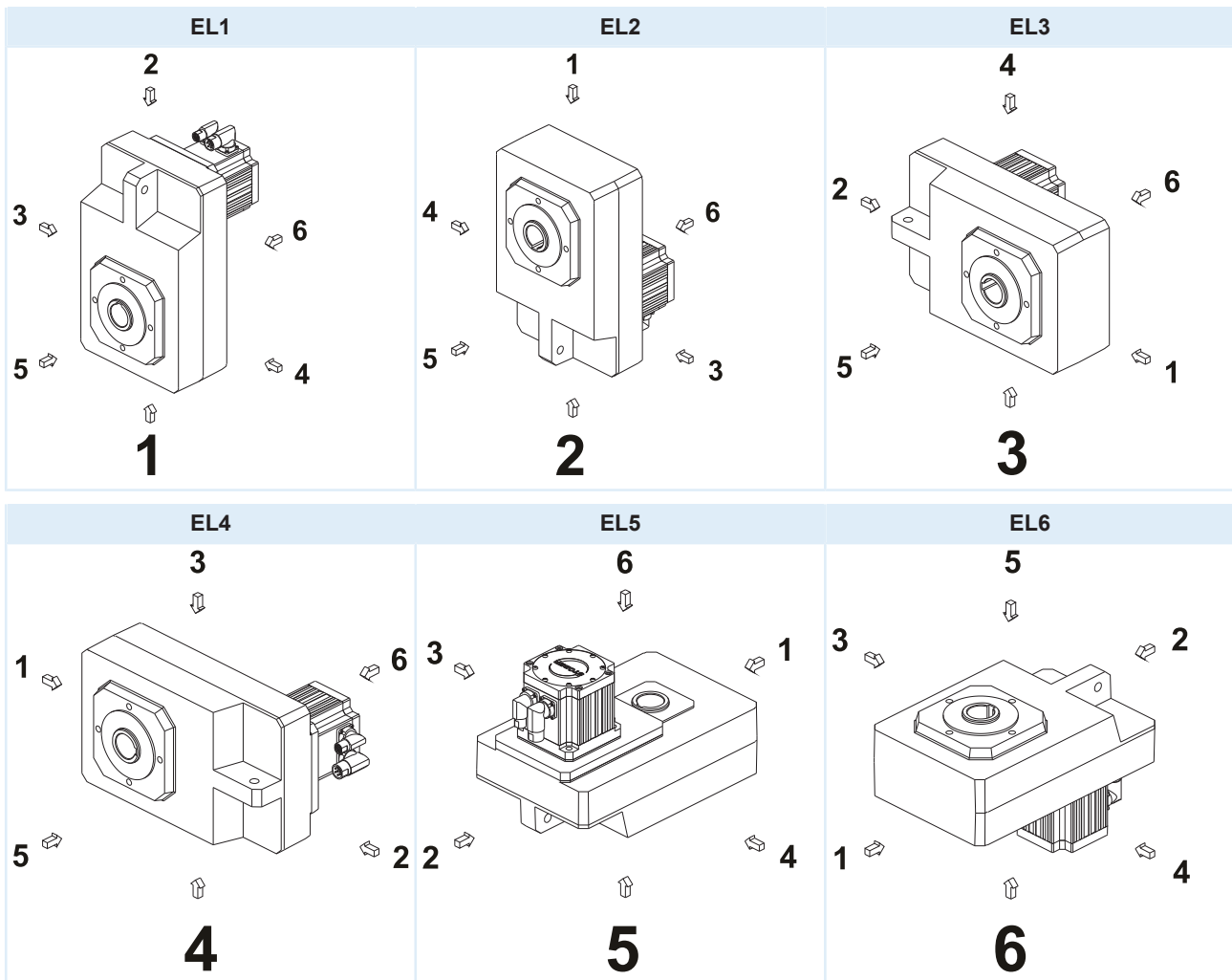
Attaching the gear unit on the machine side using the pitch circle diameter

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.



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



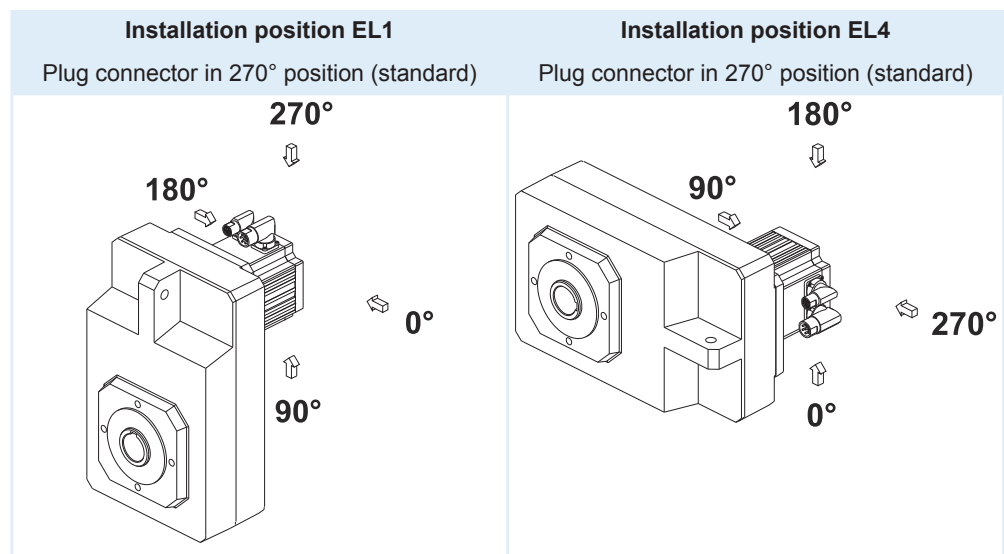
12.5.5 Lubricants

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.stoeber.de>

12.5.6 Position of the plug connectors



Indicate variations for your geared motor in the purchase order.

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

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
Protection class: ¹	
Gear unit	IP65
Motor	IP56, optionally IP66

¹ Observe the protection class of all the components.



12.5.8 Direction of rotation

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

F102 – F602	F203 – F603
The input and output rotate in the same direction.	The input and output rotate in opposite directions.

The pictures show installation position EL1.

12.6 Project configuration

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

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

Formula symbol	Unit	Explanation
a_{th}	–	Parameter for calculating $K_{mot,th}$
a_{thEL}	–	Parameters for calculating $K_{mot,th}$ (dependent on the installation position)
ED	%	Duty cycle relative to 20 minutes
fB_{op}	–	Operating mode operating factor
fB_t	–	Run-time operating factor
fB_T	–	Temperature operating factor
F_{2ax}^*	N	Actual axial force at the gear unit output
F_{2ax20}	N	Permitted axial force on the gear unit output for $n_{2m} \leq 20$ rpm
F_{2axN}	N	Permitted nominal axial force at the gear unit output
F_{2rad}^*	N	Actual radial force on the gear unit output
F_{2rad20}	N	Permitted radial force on the gear unit output for $n_{2m} \leq 20$ rpm
F_{2radN}	N	Permitted nominal radial force at the gear unit output
i	–	Gear ratio
$K_{mot,th}$	–	Factor for determining the thermal limit torque
l	mm	Length of the output shaft
M_{op}	Nm	Torque of motor at the operating point from the motor characteristic curve at n_{1m}^*
$ M_2 $	Nm	Amount of torque on the output
$M_{2,1}^* - M_{2,6}^*$	Nm	Actual torque in the respective time segment (1 to 6)



Formula symbol	Unit	Explanation
M_{2,n^*}	Nm	Actual torque in the n-th time segment
M_{2acc}	Nm	Maximum permitted acceleration torque on the gear unit output
M_{2acc^*}	Nm	Actual acceleration torque on the gear unit output
M_{2eff^*}	Nm	Actual effective torque on the gear unit output
M_{2eq^*}	Nm	Equivalent torque present on the gear unit output
M_{2k20}	Nm	Permitted breakdown torque on the gear unit output for $n_{2m^*} \leq 20$ rpm
M_{2kN}	Nm	Permitted nominal breakdown torque on the gear unit output
M_{2k^*}	Nm	Actual breakdown torque on the gear unit output
M_{2N}	Nm	Nominal torque on the gear unit output (relative to n_{1N})
M_{2NOT}	Nm	Gear unit emergency-off torque on the gear unit output for max. 1000 load changes
M_{2NOT^*}	Nm	Actual emergency off torque for the gear unit on the gear unit output
M_{2th}	Nm	Thermal limit torque on the gear unit output
n_{1m^*}	rpm	Actual average input speed
n_{1max^*}	rpm	Actual maximum input speed
$n_{1maxDBH}$	rpm	Maximum permitted input speed of the gear unit in continuous operation Installation positions EL1, EL2, EL3, EL4
$n_{1maxDBV}$	rpm	Maximum permitted input speed of the gear unit in continuous operation Installation positions EL5, EL6
n_{1maxZB}	min ⁻¹	Maximum permitted input speed of the gear unit in cyclic operation
$ n_2 $	rpm	Value of output speed
n_{2m^*}	rpm	Actual average output speed
$n_{2m,1^*} - n_{2m,6^*}$	rpm	Actual average output speed in the respective time segment (1 to 6)
n_{2m,n^*}	rpm	Actual average output speed in the n-th time segment
t	s	Time
$t_1^* - t_6^*$	s	Duration of the respective time segment (1 to 6)
t_n^*	s	Duration of the n-th time segment
S	–	Load value: Quotient of gear unit and motor nominal torque without regard to the thermal performance limit. Represents a value for the reserve of the geared motor.
x_2	mm	Distance of the shaft shoulder to the force application point
y_2	mm	Distance of the shaft axis to the axial force application point
z_2	mm	Distance of the shaft shoulder to the middle of the output bearing

F

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 installation positions EL1, EL2, EL3, EL4:

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



For installation positions EL5, EL6:

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

For all installation positions:

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

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

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

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

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

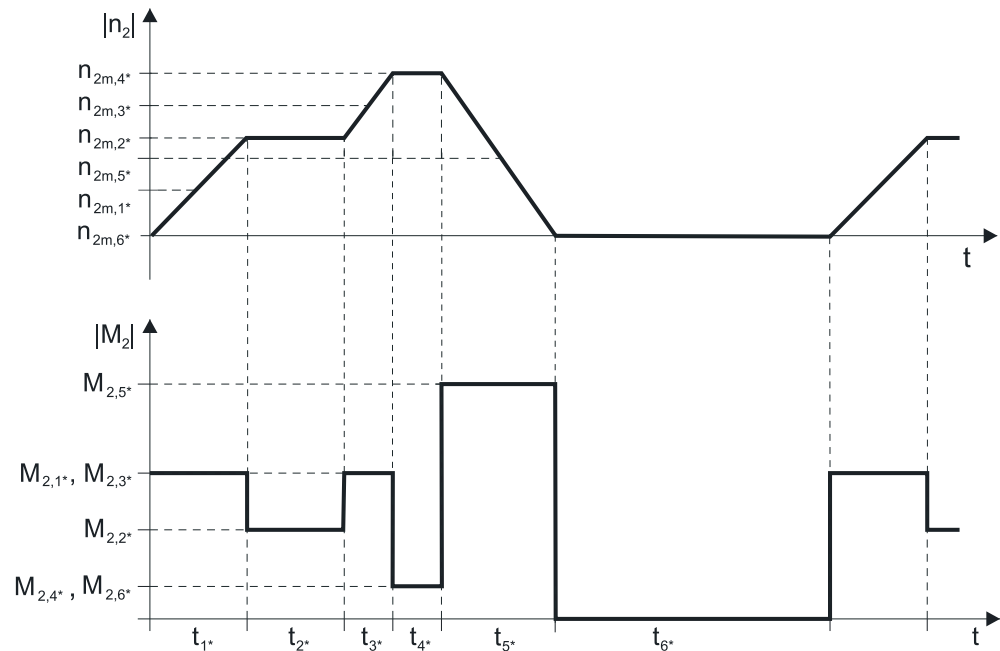
The values for $n_{1\max DBH}$ and $n_{1\max DBV}$, $n_{1\max ZB}$, $M_{2\text{acc}}$, $M_{2\text{NOT}}$, M_{2N} and S can be found in the selection tables.

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

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

Example of cycle sequence

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



Calculation of the actual average input speed

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

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

If $t_{1^*} + \dots + t_{5^*} \geq 20$ min, calculate n_{2m^*} without the rest phase t_{6^*} .



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

Calculation of the actual effective torque

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

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 $ED > 50\%$ 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.)

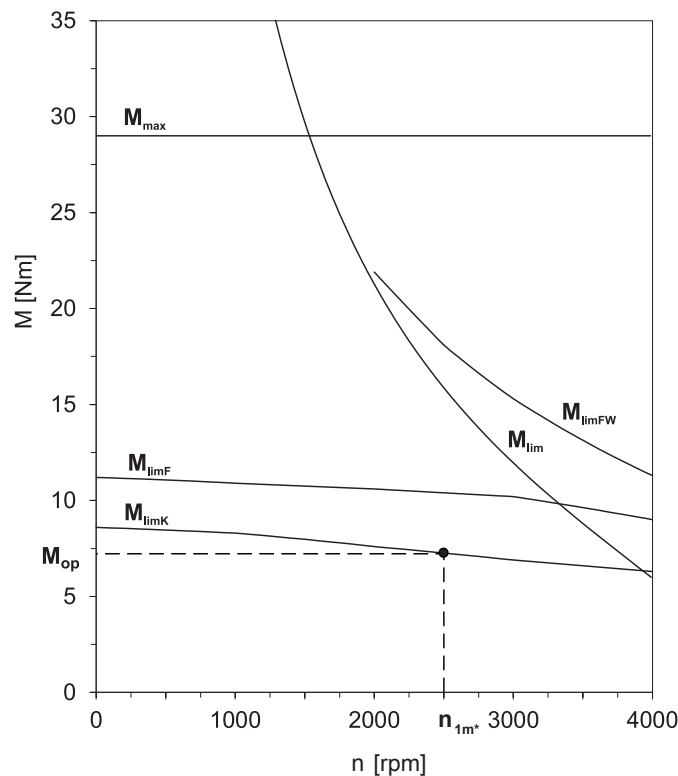
$$M_{2\text{th}} = M_{\text{op}} \cdot i \cdot K_{\text{mot,th}}$$

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

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

The values for a_{thEL} and f_{BT} 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 curve of Chapter [22.3]. Note the size, nominal speed n_N and cooling type of the motor. The figure below shows an example of reading the torque M_{op} of a motor with convection cooling at the operating point.





Operating factors

Parameter a_{thEL}

Installation 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 run time ≤ 8 h		1.00
Daily run time ≤ 16 h		1.15
Daily run time ≤ 24 h		1.20
Temperature		fB_T
Motor cooling	Surrounding temperature	
Motor with forced ventilation	≤ 20 °C	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.

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 transverse forces on the gear unit are supported via 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]
F1	35.0	1100	4200	260
F2	41.0	1400	5400	400
F3	43.0	1900	7500	600
F4	44.0	2350	9250	800
F6	44.0	3100	12500	1200

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.

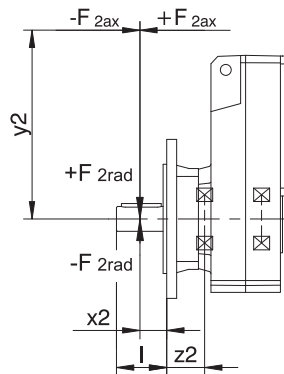


Fig. 1: Force application points for solid shaft

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]
F1	30.0	900	4200	175
F2	33.0	1200	5400	250
F3	33.0	1350	7500	375
F4	39.0	1900	9250	550
F6	45.0	2200	12500	800



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

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

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

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

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

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

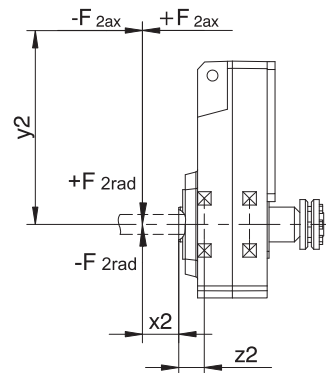


Fig. 2: Force application points for hollow shaft

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

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

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

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

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

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 the gear unit. If you use the gear unit with goods incompatible with the lubricant, you must take measures to prevent direct contact with the gear unit lubricant in case of a leak.



12.7 Additional documentation

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

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

Documentation	ID
Operating manual for gear units and motors	441972
Lubricant filling quantities for gear units	441871

