



CORELESS DC MOTOR



Coreless motor is a permanent magnet DC servo motor, compared to common motor, the difference is the use of coreless rotor/stator. Coreless motor has following advantages:

- The maximum energy conversion efficiency (an index of energy saving characteristics) : its efficiency in general is more than 70%,some products can reach above 90%(the common core motor at 15-50%);
- Activation, brake fast, fast response: mechanical time constant less than 28ms, part of the product can reach 10ms, the recommended operating region of the state of high speed run, the flexible speed regulation;
- Reliable operation stability: adaptive ability is strong, speed fluctuation can be controlled within 2%
- Low electro-magnetic interference: using high-quality brush, commutator structure, small commutation spark, can be removed from the additional interference resistant device;
- High energy density: with the same power compared with iron core motor, weight, volume reduce by 13-1/2; speed-voltage, speed-torque, speed-current corresponding are presented the standard linear relationship.

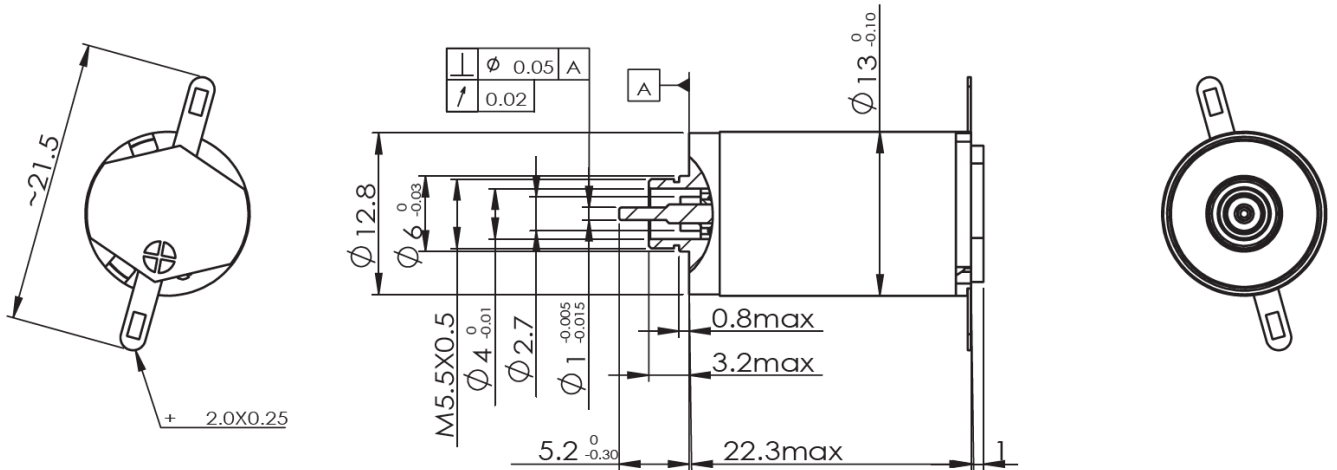
Features

- ❖ Non iron core, the unique design of high precision oil, thin air gap
- ❖ High performance rare earth magnet, high power density
- ❖ High torque, high efficiency
- ❖ No torque fluctuation
- ❖ Excellent volume power ratio, light weight
- ❖ Low vibration, high acceleration performance
- ❖ Smooth running, quick response
- ❖ Low noise
- ❖ No cogging
- ❖ Low starting torque, wide speed regulating range
- ❖ Good heat dissipation effect, low heat, small temperature rise

Contents

D13R22B.....	2
D13R35B.....	3
D16R24B.....	4
D16R41B.....	5
D22R24B.....	6
D22R32B.....	7
D23R32B.....	8
D23R47B.....	9
D30R68G	10
D35R71G	11
D40R71GK	12
Magnetic Encoder.....	13
Magnetic Encoder.....	14
Encoder HEDS-5540	15
Planetary Gearbox P12H.....	16
Planetary Gearbox P16H.....	17
Planetary Gearbox P22H.....	18
Planetary Gearbox P32H.....	19
Planetary Gearbox P35H.....	20
Planetary Gearbox P42H.....	21
Terminology	22

D13R22B



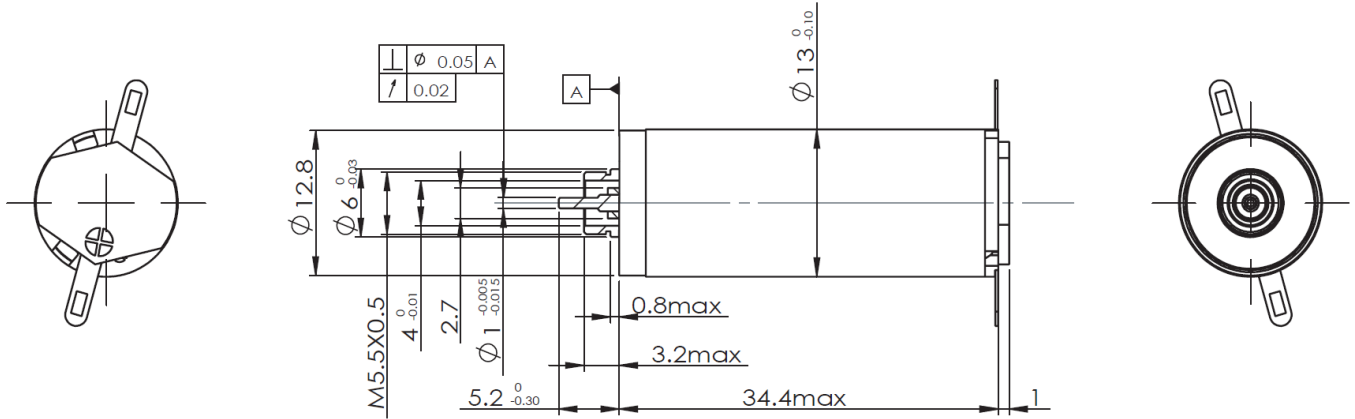
MOTOR TECHNICAL DATA

Motor model			D13R2203B	D13R2205B	D13R2206B	D13R2209B	D13R2212B	D13R2215B	
1	Nominal voltage	V	3	5	6	9	12	15	
2	No load speed	rpm	Wnl	12500	13000	12700	12500	13000	13200
3	No load current	mA	Inl	92	48	48	36	28	22
4	Nominal speed	rpm	Wc	8400	9970	7400	8300	8460	7960
5	Nominal torque	mNm	Tc	1.32	1	1.31	1.29	1.27	1.28
6	Nominal current	A	Ic	0.61	0.28	0.31	0.2	0.16	0.13
7	Output power	W	Pc	1.16	1.06	1.02	1.13	0.94	1.07
8	Stall torque	mNm	Tmax	3.61	3.9	3	3.44	3.21	3.4
9	Stall current	A	I _{max}	1.67	1.1	0.7	0.54	0.39	0.35
10	Max. efficiency	%	η _{max}	69	69	53	70	69	69
11	Terminal resistance	Ω	R _t	1.8	4.5	8.8	16.8	30.6	42.7
12	Torque constant	mNm/A	K _t	2.16	3.51	4.2	6.4	8.18	9.65
13	Speed constant	rpm/V	W _t	4410	2717	2295	1488	1167	990
14	Speed torque gradient	rpm/mNm	Δn/ΔT	3112	2893	4113	3200	3574	4645
15	Terminal inductance	mH	L	0.039	0.102	0.152	0.355	0.63	0.878
16	Rotor inertia	gcm ²	J	0.3	0.32	0.32	0.32	0.31	0.32

OTHER SPECIFICATIONS

1	Ambient temperature	T _a	-20°C to +65°C	
2	Max. winding temperature	T _{coilmax}	+85°C	
3	Max. speed	N _{max}	16000rpm	
4	Axial play	Δt	0.05 - 0.15 mm	
5	No. of pole pairs	2p	1	
6	No. of commutator segments		5	
7	Motor weight	W _t	16g	
8	Max. Axial load (dynamic)		0.8N	
9	Max. force for press fits (static)		15N	
10	Max. radial load, 4mm from flange		1.4N	
Modular System: Motor + Planetary Gearbox or Encoder				
Planetary Gearbox Type: P12H (Ø12mm) Torque: 0.004 – 0.2Nm Please refer to Gearbox Section		Magnetic Encoder 1000 CPT 3 Channels Please refer to Encoder Section		

D13R35B



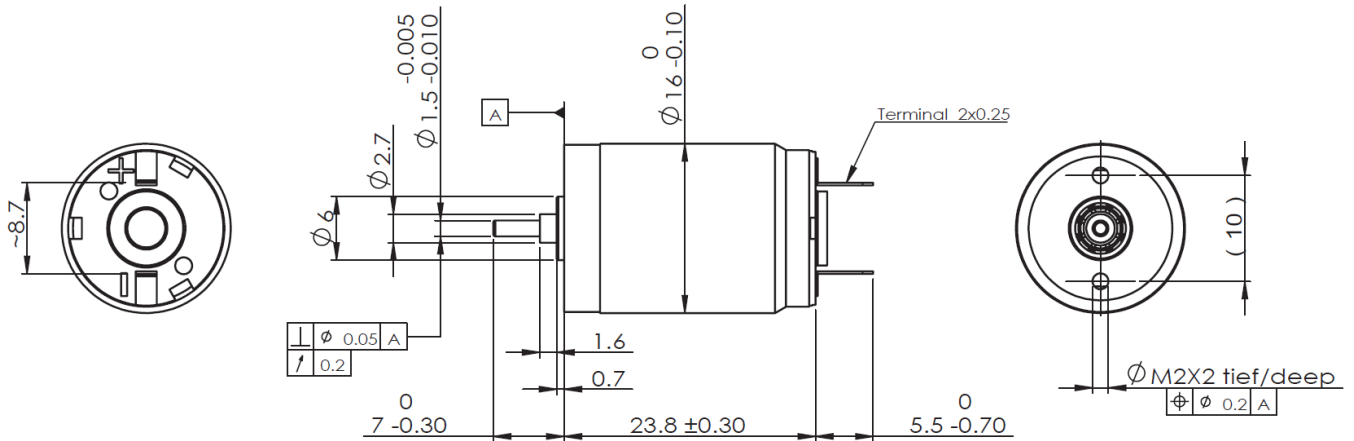
MOTOR TECHNICAL DATA

Motor model			D13R3503B	D13R3506B	D13R3507B	D13R3509B	D13R3512B	D13R3518B	D13R3524B	
1	Nominal voltage	V	3	6	7.2	9	12	18	24	
2	No load speed	rpm	Wnl	11600	13300	12500	12500	12500	12800	13800
3	No load current	mA	Inl	100	42	32	22	18	15	12
4	Nominal speed	rpm	Wc	10400	10400	9900	10100	10300	10000	11700
5	Nominal torque	mNm	Tc	2	2.3	2.4	2.5	2.4	2.5	2.4
6	Nominal current	A	Ic	0.84	0.53	0.44	0.37	0.27	0.19	0.15
7	Output power	W	Pc	2.2	2.5	2.5	2.6	2.6	2.6	2.9
8	Stall torque	mNm	Tmax	15.6	11.7	11.14	12.7	13.3	12.8	15.1
9	Stall current	A	I _{max}	6.52	2.73	2.06	1.88	1.46	0.95	0.92
10	Max. efficiency	%	η _{max}	87	78.2	76.3	78.1	78.3	78.1	84
11	Terminal resistance	Ω	R _t	0.46	2.2	3.5	4.8	8.2	18.9	26.1
12	Torque constant	mNm/A	K _t	2.4	4.31	5.41	6.79	9.05	13.43	16.39
13	Speed constant	rpm/V	W _t	3995	2298	1763	1405	1054	734	583
14	Speed torque gradient	rpm/mNm	Δn/ΔT	677	1261	1057	933	890	1120	852
15	Terminal inductance	mH	L	0.012	0.062	0.101	0.15	0.271	0.641	0.982
16	Rotor inertia	gcm ²	J	0.7	0.6	0.54	0.56	0.57	0.58	0.58

OTHER SPECIFICATIONS

1	Ambient temperature	T _a	-20°C to +65°C	
2	Max. winding temperature	T _{coilmax}	+85°C	
3	Max. speed	N _{max}	16000rpm	
4	Axial play	Δt	0.05 - 0.15 mm	
5	No. of pole pairs	2p	1	
6	No. of commutator segments		5	
7	Motor weight	W _t	23g	
8	Max. Axial load (dynamic)		0.8N	
9	Max. force for press fits (static)		15N	
10	Max. radial load, 4mm from flange		1.4N	
				<p>Modular System: Motor + Planetary Gearbox or Encoder</p>
				<p>Planetary Gearbox Type: P12H (Ø12mm) Torque: 0.008 – 0.2Nm Please refer to Gearbox Section</p>
				<p>Magnetic Encoder 1000 CPT 3 Channels Please refer to Encoder Section</p>

D16R24B



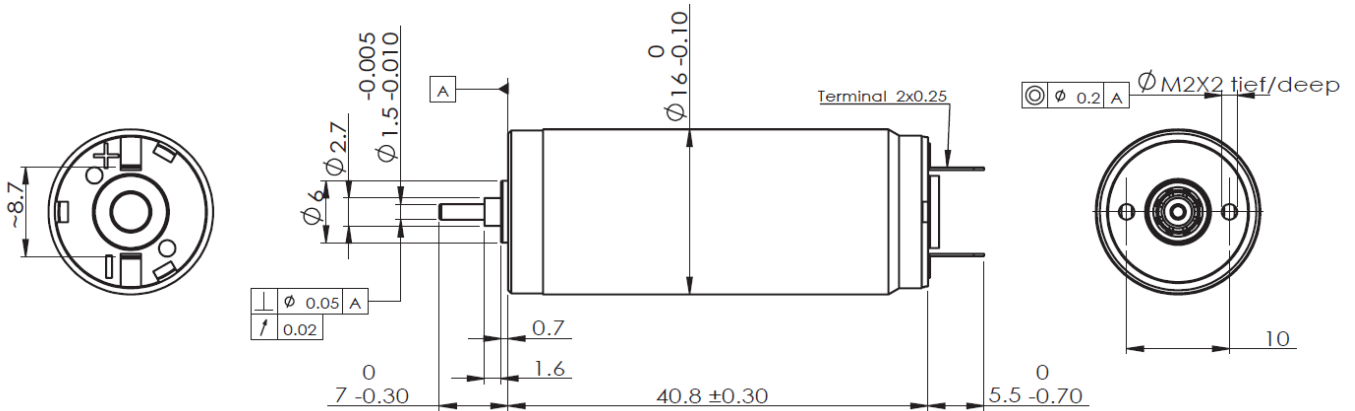
MOTOR TECHNICAL DATA

Motor model				D16R2406B	D16R2409B	D16R2412B	D16R2415B	D16R2418B	D16R2424B
1	Nominal voltage	V		6	9	12	15	18	24
2	No load speed	rpm	Wnl	11000	12300	14500	14200	14100	15200
3	No load current	mA	Inl	41	34	40	16	22	20
4	Nominal speed	rpm	Wc	6700	7580	10900	9600	9740	13000
5	Nominal torque	mNm	Tc	1.5	1.5	1.5	2.15	1.5	1.5
6	Nominal current	A	Ic	0.31	0.23	0.2	0.219	0.13	0.1
7	Output power	W	Pc	1.06	1.19	1.73	2.16	1.53	2.05
8	Stall torque	mNm	Tmax	3.55	4.5	5.26	6.3	5.1	8.9
9	Stall current	A	I _{max}	0.72	0.7	0.71	0.64	0.45	0.61
10	Max. efficiency	%	η_{max}	71	75	71	70	77	83
11	Terminal resistance	Ω	R _t	8.3	12.8	17	23.4	39.6	39.3
12	Torque constant	mNm/A	K _t	4.91	6.43	7.46	9.84	11.23	14.58
13	Speed constant	rpm/V	W _t	1943	1485	1281	971	851	655
14	Speed torque gradient	rpm/mNm	$\Delta n/\Delta T$	2842	2720	2340	2140	2763	1421
15	Terminal inductance	mH	L	0.202	0.313	0.533	0.75	0.898	1.6
16	Rotor inertia	gcm ²	J	0.65	0.64	0.62	0.62	0.61	0.6

OTHER SPECIFICATIONS

1	Ambient temperature	T _a	-20°C to +65°C	
2	Max. winding temperature	T _{coilmax}	+85°C	
3	Max. speed	N _{max}	16000rpm	
4	Axial play	Δt	0.05 - 0.15 mm	
5	No. of pole pairs	2p	1	
6	No. of commutator segments		5	
7	Motor weight	W _t	21g	
8	Max. Axial load (dynamic)		0.8N	
9	Max. force for press fits (static)		15N	
10	Max. radial load, 4mm from flange		1.5N	
Modular System: Motor + Planetary Gearbox or Encoder				
		Planetary Gearbox Type: P16H (Ø16mm) Torque: 0.006 – 0.4Nm Please refer to Gearbox Section	Magnetic Encoder 1000 CPT 3 Channels Please refer to Encoder Section	

D16R41B



MOTOR TECHNICAL DATA

Motor model		D16R4103B	D16R4106B	D16R4112B	D16R4118B	D16R4124B	D16R4136B	D16R4148B		
1	Nominal voltage	V	3	6	12	18	24	36	48	
2	No load speed	rpm	Wnl	8400	13300	13900	13200	14500	14100	14000
3	No load current	mA	Inl	90	42	26	18	20	14	12
4	Nominal speed	rpm	Wc	7400	11600	11700	11100	12620	12200	12100
5	Nominal torque	mNm	Tc	3.5	2.6	3.9	4.3	4.4	4.3	4.4
6	Nominal current	A	Ic	1.04	0.6	0.47	0.33	0.28	0.18	0.13
7	Output power	W	Pc	2.7	3.2	4.8	5	5.8	5.5	5.6
8	Stall torque	mNm	Tmax	29.8	23.5	28.3	31.7	31.83	36.3	37.3
9	Stall current	A	Imax	8.82	5.45	3.43	2.43	2.03	1.49	1.14
10	Max. efficiency	%	ηmax	87	87.2	84.2	84.1	86	86.5	86.4
11	Terminal resistance	Ω	Rt	0.34	1.1	3.5	7.4	11.8	24.2	42.1
12	Torque constant	mNm/A	Kt	3.38	4.31	8.24	13.02	15.65	24.38	32.74
13	Speed constant	rpm/V	Wt	2825	2252	1174	742	610	397	296
14	Speed torque gradient	rpm/mNm	Δn/ΔT	285	566	492	417	427	389	375
15	Terminal inductance	mH	L	0.014	0.034	0.544	0.304	0.482	0.986	1.69
16	Rotor inertia	gcm ²	J	1.35	1.37	1.33	1.28	1.26	1.24	1.2

OTHER SPECIFICATIONS

1	Ambient temperature	Ta	-20°C to +65°C	
2	Max. winding temperature	T _{coilmax}	+85°C	
3	Max. speed	N _{max}	16000rpm	
4	Axial play	Δt	0.05 - 0.15 mm	
5	No. of pole pairs	2p	1	
6	No. of commutator segments		5	
7	Motor weight	Wt	40g	
8	Max. Axial load (dynamic)		0.8N	
9	Max. force for press fits (static)		15N	
10	Max. radial load, 4mm from flange		1.5N	

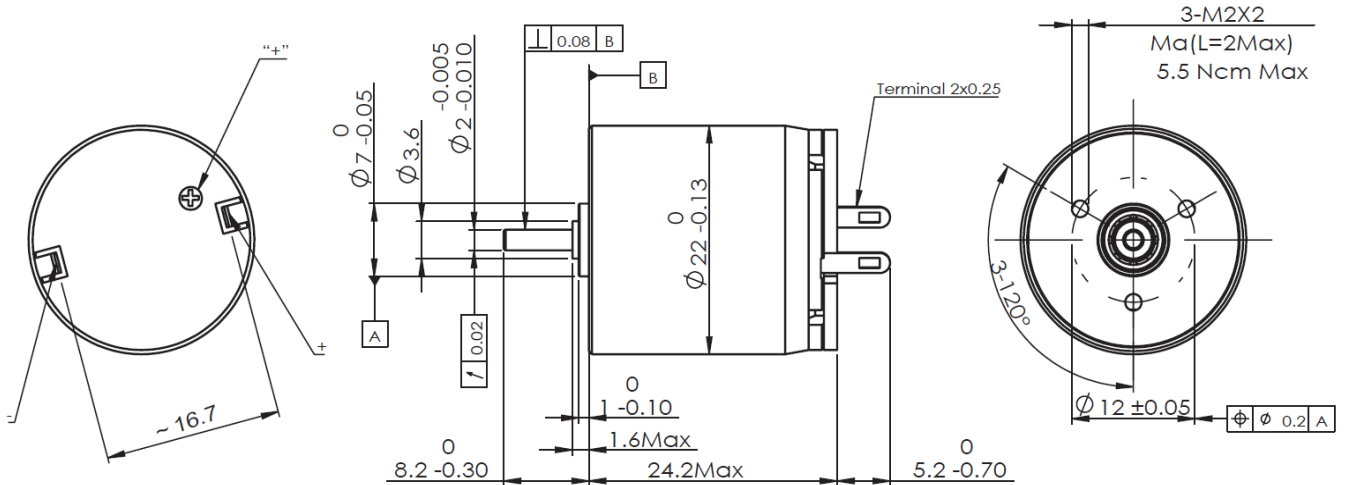
Modular System: Motor + Planetary Gearbox or Encoder



Planetary Gearbox
 Type: P16H (Ø16mm)
 Torque: 0.01 – 0.4Nm
 Please refer to Gearbox Section

Magnetic Encoder
 1000 CPT
 3 Channels
 Please refer to Encoder Section

D22R24B



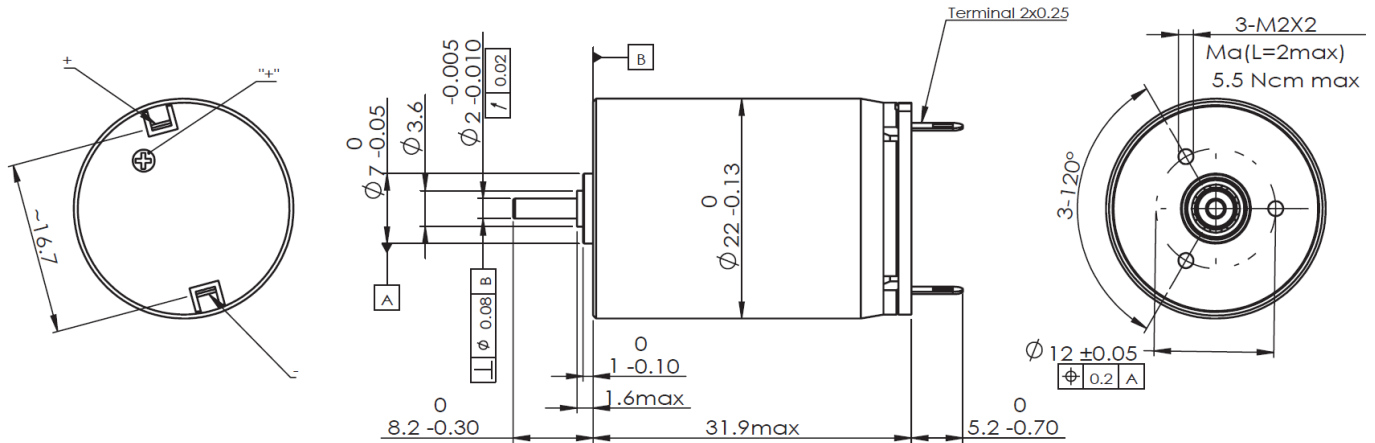
MOTOR TECHNICAL DATA

Motor model		D22R2406B	D22R2409B	D22R2412B	D22R2418B	D22R2424B	D22R2436B		
1	Nominal voltage	V	6	9	12	18	24	36	
2	No load speed	rpm	Wnl	10900	11800	12000	10800	12000	10800
3	No load current	mA	Inl	38	27	24	18	14	12
4	Nominal speed	rpm	Wc	6900	6200	7200	6320	5136	6460
5	Nominal torque	mNm	Tc	5	5	5	5	5	5
6	Nominal current	A	Ic	0.98	0.7	0.53	0.33	0.27	0.17
7	Output power	W	Pc	3.61	3.26	3.8	3.31	2.7	3.38
8	Stall torque	mNm	Tmax	14	10.38	12.36	12.1	8.55	12.4
9	Stall current	A	I _{max}	2.37	1.45	1.32	0.79	0.46	0.41
10	Max. efficiency	%	η _{max}	79	78	79	79	42	77
11	Terminal resistance	Ω	R _t	2.2	6.2	9.1	22.8	52	87.6
12	Torque constant	mNm/A	K _t	5.12	7.15	9.38	15.27	18.52	30.28
13	Speed constant	rpm/V	W _t	1866	1336	1018	625	516	315
14	Speed torque gradient	rpm/mNm	Δn/ΔT	781	1114	944	896	1372	868
15	Terminal inductance	mH	L	0.051	0.1	0.209	0.586	1.14	1.725
16	Rotor inertia	gcm ²	J	2.74	2.74	2.74	2.84	2.62	2.33

OTHER SPECIFICATIONS

1	Ambient temperature	T _a	-20°C to +65°C	
2	Max. winding temperature	T _{coilmax}	+85°C	
3	Max. speed	N _{max}	12000rpm	
4	Axial play	Δt	0.05 - 0.15 mm	
5	No. of pole pairs	2p	1	
6	No. of commutator segments		5	
7	Motor weight	W _t	44g	
8	Max. Axial load (dynamic)		3N	
9	Max. force for press fits (static)		45N	
10	Max. radial load, 4mm from flange		12N	
				<p>Modular System: Motor + Planetary Gearbox or Encoder</p>
				<p>Planetary Gearbox Type: P22H (Ø22mm) Torque: 0.018 – 1.2Nm Please refer to Gearbox Section</p>
				<p>Encoder HKT22 256 CPT 2 Channels Please refer to Encoder Section</p>

D22R32B



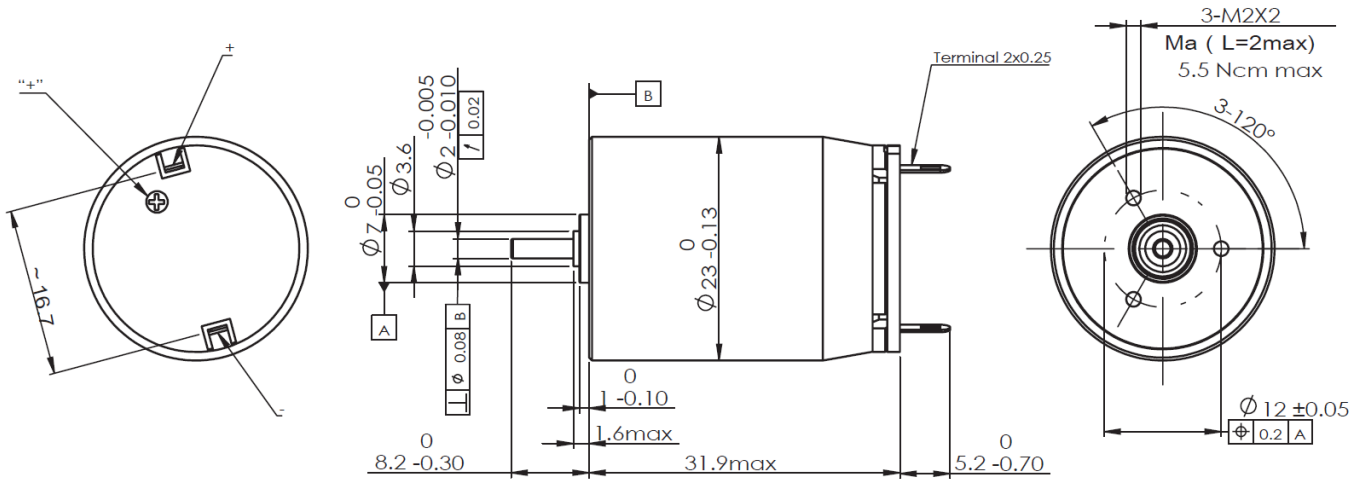
MOTOR TECHNICAL DATA

Motor model			D22R3206B	D22R3212B	D22R3218B	D22R3224B	D22R3236B	D22R3248B	
1	Nominal voltage	V	6	12	18	24	36	48	
2	No load speed	rpm	Wnl	7000	11000	11000	11500	9650	9130
3	No load current	mA	Inl	36	26	16	20	12	10
4	Nominal speed	rpm	Wc	4650	7680	7300	8840	6500	5920
5	Nominal torque	mNm	Tc	4.05	6.7	7	6.9	7	6.9
6	Nominal current	A	Ic	0.5	0.65	0.45	0.35	0.2	0.14
7	Output power	W	Pc	2	5.39	5.36	6.39	4.76	4.28
8	Stall torque	mNm	Tmax	11.9	21.7	20.4	28.6	21.9	20
9	Stall current	A	I _{max}	1.46	2.11	1.32	1.45	0.63	0.41
10	Max. efficiency	%	η _{max}	65	72	72	73	72	71
11	Terminal resistance	Ω	R _t	4.1	5.7	13.6	16.5	57.1	117
12	Torque constant	mNm/A	K _t	8.1	10.3	15.4	19.7	34.72	48.74
13	Speed constant	rpm/V	W _t	1179	925	618	486	275	196
14	Speed torque gradient	rpm/mNm	Δn/ΔT	590	494	525	385	441	457
15	Terminal inductance	mH	L	0.239	0.376	0.866	1.05	3.55	7
16	Rotor inertia	gcm ²	J	4.1	4.3	4.16	4.17	4.06	4

OTHER SPECIFICATIONS

1	Ambient temperature	T _a	-20°C to +65°C	<p>Speed (rpm)</p> <p>12000</p> <p>8000</p> <p>4000</p> <p>0</p> <p>0 2.0 4.0 6.0 8.0 10.0 Torque (mNm)</p> <p>0 0.2 0.4 0.6 0.8 1.0 Current (A)</p> <p>12V 6.0W</p>
2	Max. winding temperature	T _{coilmax}	+85°C	
3	Max. speed	N _{max}	12000rpm	
4	Axial play	Δt	0.05 - 0.15 mm	
5	No. of pole pairs	2p	1	
6	No. of commutator segments		5	
7	Motor weight	W _t	54g	
8	Max. Axial load (dynamic)		3N	
9	Max. force for press fits (static)		45N	
10	Max. radial load, 4mm from flange		12N	
				<p>Modular System: Motor + Planetary Gearbox or Encoder</p>
				<p>Planetary Gearbox Type: P22H (Ø22mm) Torque: 0.021 – 1.2Nm Please refer to Gearbox Section</p>
				<p>Encoder HKT22 256 CPT 2 Channels Please refer to Encoder Section</p>

D23R32B

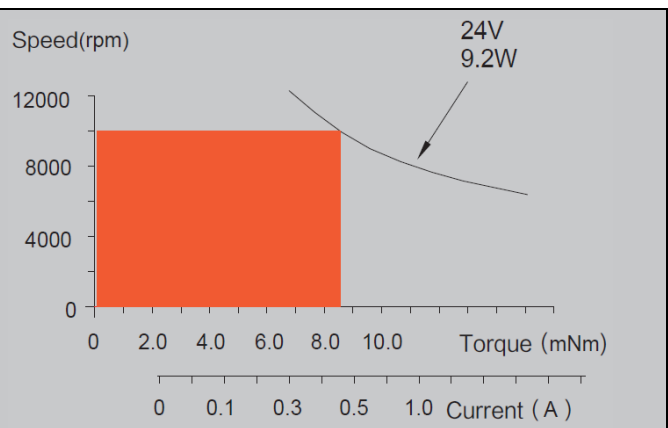


MOTOR TECHNICAL DATA

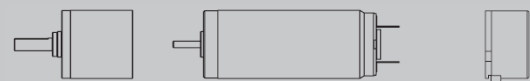
Motor model		D23R3209B	D23R3212B	D23R3224B		
1	Nominal voltage	V	9	12	24	
2	No load speed	rpm	Wnl	12500	11000	12150
3	No load current	mA	Inl	35	25	15
4	Nominal speed	rpm	Wc	9200	9450	10000
5	Nominal torque	mNm	Tc	11.7	9	8.7
6	Nominal current	A	Ic	1.72	0.89	0.48
7	Output power	W	Pc	11.3	8.9	9.2
8	Stall torque	mNm	Tmax	42.8	36.4	33
9	Stall current	A	I _{max}	6.3	3.6	2
10	Max. efficiency	%	η _{max}	85	80	80
11	Terminal resistance	Ω	R _t	1.42	3.3	12
12	Torque constant	mNm/A	K _t	6.8	10.3	18.7
13	Speed constant	rpm/V	W _t	1388	920	506
14	Speed torque gradient	rpm/mNm	Δn/ΔT	282	172	247
15	Terminal inductance	mH	L	0.07	0.113	0.448
16	Rotor inertia	gcm ²	J	4.7	4.7	4.8

OTHER SPECIFICATIONS

1	Ambient temperature	T _a	-20°C to +65°C
2	Max. winding temperature	T _{coilmax}	+85°C
3	Max. speed	N _{max}	16000rpm
4	Axial play	Δt	0.05 - 0.15 mm
5	No. of pole pairs	2p	1
6	No. of commutator segments		5
7	Motor weight	W _t	56g
8	Max. Axial load (dynamic)		3N
9	Max. force for press fits (static)		45N
10	Max. radial load, 4mm from flange		12N



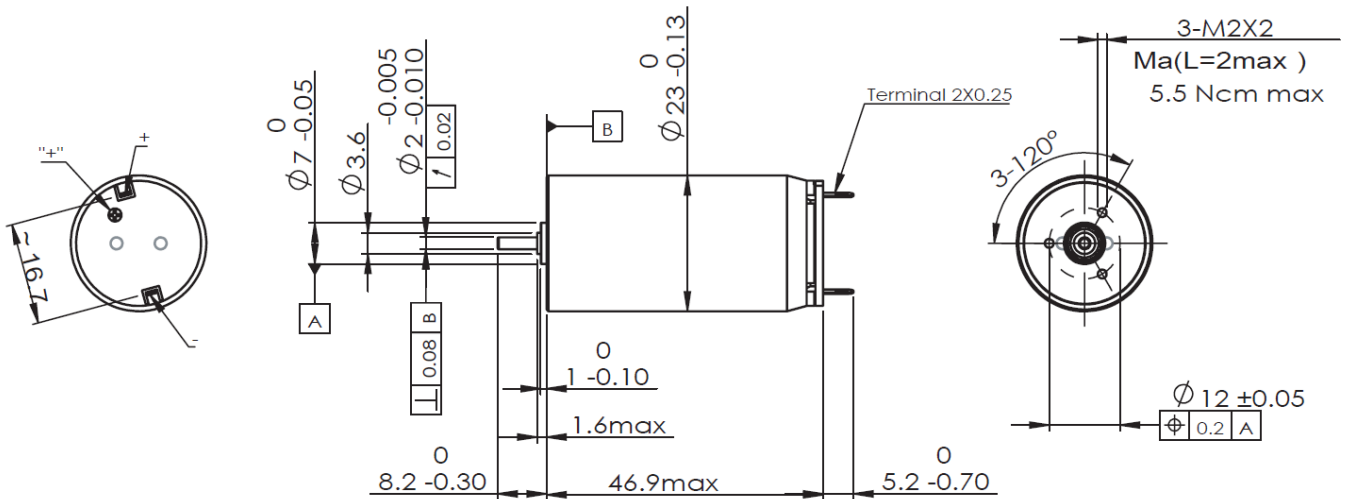
Modular System: Motor + Planetary Gearbox or Encoder



Planetary Gearbox
 Type: P22H (Ø22mm)
 Torque: 0.031 – 1.2Nm
 Please refer to Gearbox Section

Encoder HKT22
 256 CPT
 2 Channels
 Please refer to Encoder Section

D23R47B

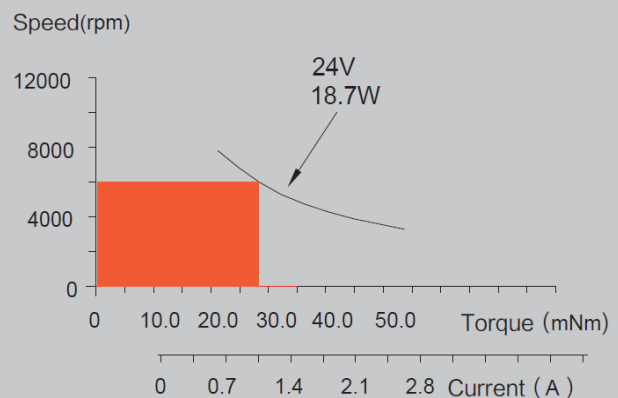


MOTOR TECHNICAL DATA

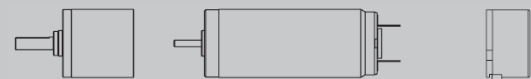
Motor model		D23R4709B		D23R4724B-01		D23R4724B-02	
1	Nominal voltage	V		9	24	24	
2	No load speed	rpm	Wnl	7370	7570	11000	
3	No load current	mA	Inl	<40	<18	<40	
4	Nominal speed	rpm	Wc	6160	6350	9860	
5	Nominal torque	mNm	Tc	17	28.1	26.7	
6	Nominal current	A	Ic	1.46	0.93	1.29	
7	Output power	W	Pc	11	18.7	27.5	
8	Stall torque	mNm	Tmax	101	126.8	243.1	
9	Stall current	A	Imax	8.74	4.2	11.7	
10	Max. efficiency	%	ηmax	83	80	80	
11	Terminal resistance	Ω	Rt	1.03	5.7	2.05	
12	Torque constant	mNm/A	Kt	11.6	30.2	20.7	
13	Speed constant	rpm/V	Wt	823	315	460	
14	Speed torque gradient	rpm/mNm	Δn/ΔT	71.2	43.4	44	
15	Terminal inductance	mH	L	0.11	0.598	0.209	
16	Rotor inertia	gcm ²	J	9.7	9.4	9.4	

OTHER SPECIFICATIONS

1	Ambient temperature	Ta	-20°C to +65°C
2	Max. winding temperature	T _{coilmax}	+85°C
3	Max. speed	N _{max}	16000rpm
4	Axial play	Δt	0.05 - 0.15 mm
5	No. of pole pairs	2p	1
6	No. of commutator segments		5
7	Motor weight	Wt	95g
8	Max. Axial load (dynamic)		3N
9	Max. force for press fits (static)		45N
10	Max. radial load, 4mm from flange		12N



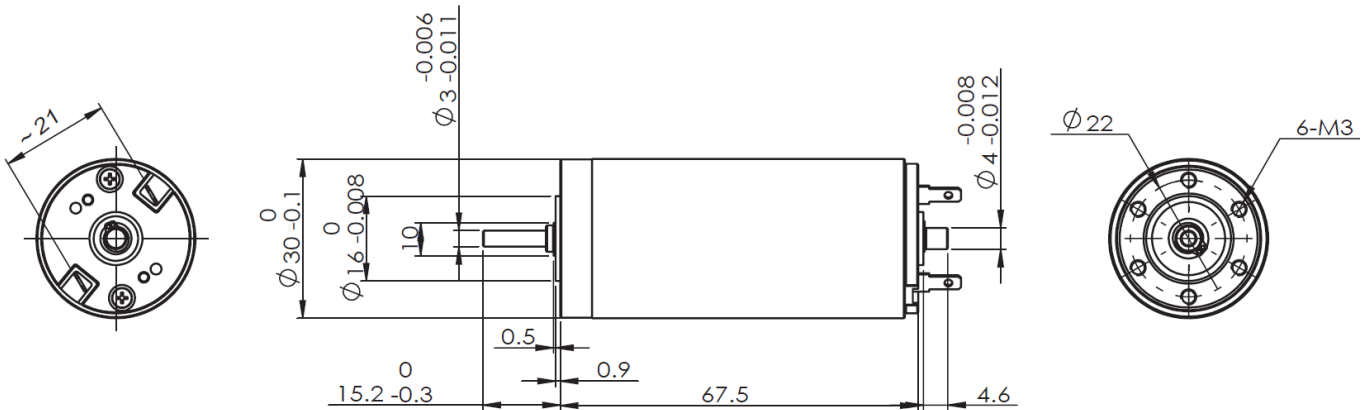
Modular System: Motor + Planetary Gearbox or Encoder



Planetary Gearbox
 Type: P22H (Ø22mm)
 Torque: 0.031 – 1.2Nm
 Please refer to Gearbox Section

Encoder HKT22
 256 CPT
 2 Channels
 Please refer to Encoder Section

D30R68G

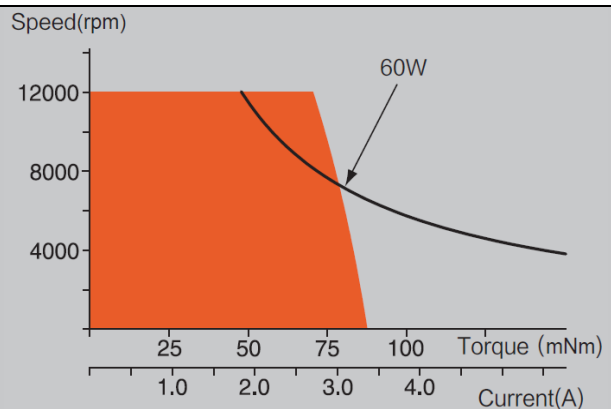


MOTOR TECHNICAL DATA

	Motor model			D30R6812G	D30R6818G	D30R6824G	D30R6848G
1	Nominal voltage	V		12	18	24	48
2	No load speed	rpm	Wnl	7900	8270	8380	8490
3	No load current	mA	Inl	350	260	150	100
4	Nominal speed	rpm	Wc	7470	7560	7600	7690
5	Nominal torque	mNm	Tc	51.6	75.5	85.6	89.7
6	Nominal current	A	Ic	3.58	3.67	3.15	1.66
7	Output power	W	Pc	40	60	68	72
8	Stall torque	mNm	Tmax	865.2	805	669	918.9
9	Stall current	A	I _{max}	60	39.1	24.6	17.08
10	Max. efficiency	%	η_{max}	90	86	90	88
11	Terminal resistance	Ω	R _t	0.2	0.46	0.71	2.81
12	Torque constant	mNm/A	K _t	14.4	20.6	27.2	53.8
13	Speed constant	rpm/V	W _t	663	463	349	177.5
14	Speed torque gradient	rpm/mNm	$\Delta n/\Delta T$	8.3	9.4	9.1	8.9
15	Terminal inductance	mH	L	0.036	0.039	0.138	0.588
16	Rotor inertia	gcm ²	J	34.4	36.1	34.2	35.2

OTHER SPECIFICATIONS

1	Ambient temperature	T _a	-30°C to +100°C
2	Max. winding temperature	T _{coilmax}	+125°C
3	Max. speed	N _{max}	12000rpm
4	Axial play	Δt	0.05 - 0.15 mm
5	No. of pole pairs	2p	1
6	No. of commutator segments		13
7	Motor weight	W _t	260g
8	Max. Axial load (dynamic)		5.6N
9	Max. force for press fits (static)		110N
10	Max. radial load, 4mm from flange		28N



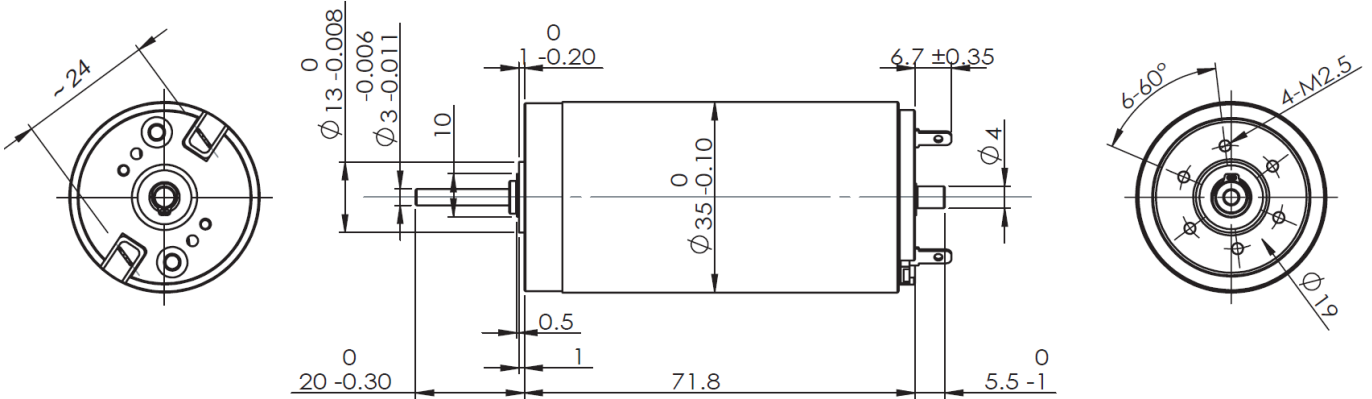
Modular System: Motor + Planetary Gearbox or Encoder



Planetary Gearbox
 Type: P32H (Ø32mm)
 Torque: 0.16 – 6Nm
 Please refer to Gearbox Section

Encoder HEDS-5540
 500 CPT
 3 Channels
 Please refer to Encoder Section

D35R71G



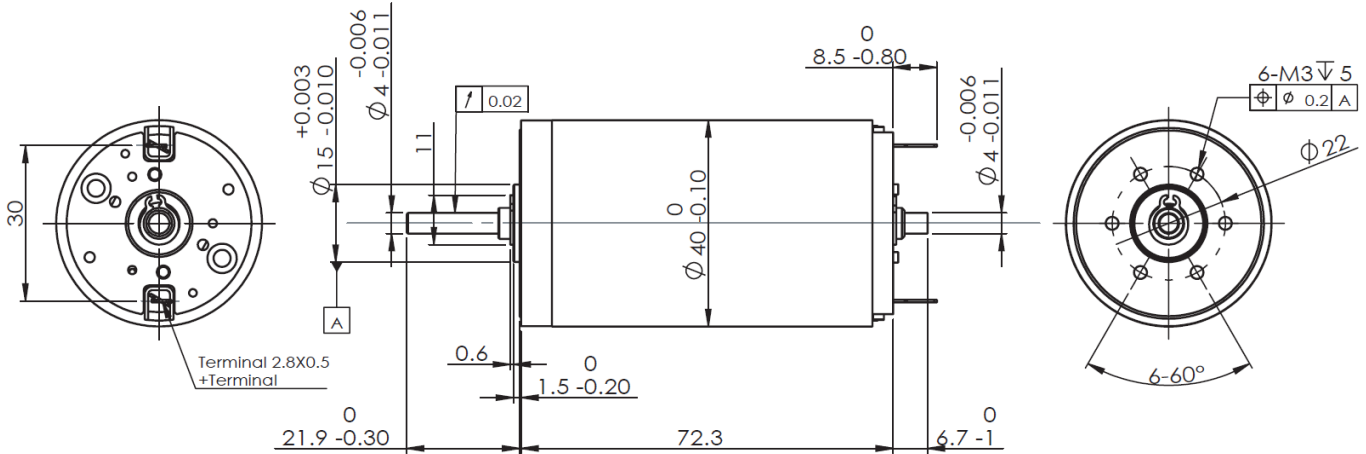
MOTOR TECHNICAL DATA

Motor model		D35R7112G	D35R7115G	D35R7124G	D35R7130G		
1	Nominal voltage	V	12	15	24	30	
2	No load speed	rpm	Wnl	7200	7270	8000	7270
3	No load current	mA	Inl	270	170	190	124
4	Nominal speed	rpm	Wc	6550	6550	7200	6490
5	Nominal torque	mNm	Tc	89.4	97	119	97.2
6	Nominal current	A	Ic	5.6	4.9	4.17	2.62
7	Output power	W	Pc	61	66	90	66
8	Stall torque	mNm	Tmax	950	981	1200	973
9	Stall current	A	I _{max}	60	50	42	25
10	Max. efficiency	%	η _{max}	87	90	90	85
11	Terminal resistance	Ω	R _t	0.2	0.3	0.57	1.2
12	Torque constant	mNm/A	K _t	15.8	14.45	28.5	38.9
13	Speed constant	rpm/V	W _t	602	486	335	246
14	Speed torque gradient	rpm/mNm	Δn/ΔT	7.24	7.17	6.36	7.57
15	Terminal inductance	mH	L	0.05	0.08	0.186	0.35
16	Rotor inertia	gcm ²	J	68.2	68.2	79.4	68.2

OTHER SPECIFICATIONS

1	Ambient temperature	T _a	-30°C to +100°C	<p>Speed (rpm)</p> <p>12000</p> <p>8000</p> <p>4000</p> <p>90W</p> <p>50 100 150 Torque (mNm)</p> <p>1.0 2.0 3.0 Current (A)</p>	
2	Max. winding temperature	T _{coilmax}	+125°C		
3	Max. speed	N _{max}	12000rpm		
4	Axial play	Δt	0.05 - 0.15 mm		
5	No. of pole pairs	2p	1		
6	No. of commutator segments		13		
7	Motor weight	W _t	340g		
8	Max. Axial load (dynamic)		5.6N		
9	Max. force for press fits (static)		110N		
10	Max. radial load, 4mm from flange		28N		
				Modular System: Motor + Planetary Gearbox or Encoder	
				Planetary Gearbox Type: P35H (Ø35mm) Torque: 0.256 – 20Nm Please refer to Gearbox Section	Encoder HEDS-5540 500 CPT 3 Channels Please refer to Encoder Section

D40R71GK

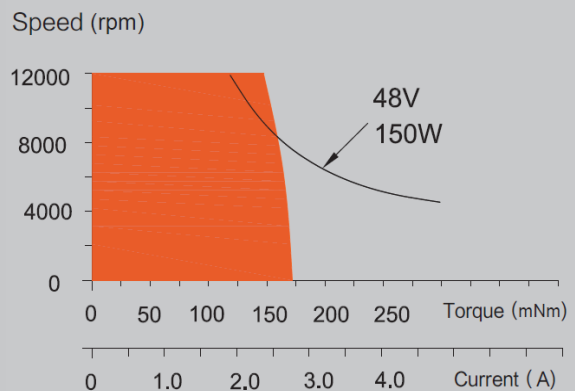


MOTOR TECHNICAL DATA

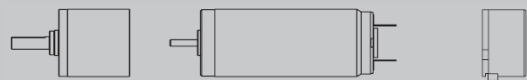
				D40R7124GK	D40R7148GK-01	D40R7148GK-02
1	Nominal voltage	V		24	48	48
2	No load speed	rpm	Wnl	7600	7960	6500
3	No load current	mA	Inl	230	110	70
4	Nominal speed	rpm	Wc	7000	7000	5400
5	Nominal torque	mNm	Tc	180	187	186
6	Nominal current	A	Ic	6.06	3.26	2.65
7	Output power	W	Pc	131	137	105
8	Stall torque	mNm	Tmax	2037	1246	1094
9	Stall current	A	I _{max}	68.6	21.7	12.3
10	Max. efficiency	%	η _{max}	91	88	84
11	Terminal resistance	Ω	R _t	0.35	1.7	3.08
12	Torque constant	mNm/A	K _t	29.7	57.4	70.2
13	Speed constant	rpm/V	W _t	321	166	136
14	Speed torque gradient	rpm/mNm	Δn/ΔT	3.3	5.1	5.8
15	Terminal inductance	mH	L	0.096	0.496	0.84
16	Rotor inertia	gcm ²	J	142.6	137.8	129

OTHER SPECIFICATIONS

1	Ambient temperature	T _a	-30°C to +100°C
2	Max. winding temperature	T _{coilmax}	+155°C
3	Max. speed	N _{max}	12000rpm
4	Axial play	Δt	0.05 - 0.15 mm
5	No. of pole pairs	2p	1
6	No. of commutator segments		13
7	Motor weight	W _t	480g
8	Max. Axial load (dynamic)		5.6N
9	Max. force for press fits (static)		110N
10	Max. radial load, 4mm from flange		28N



Modular System: Motor + Planetary Gearbox or Encoder

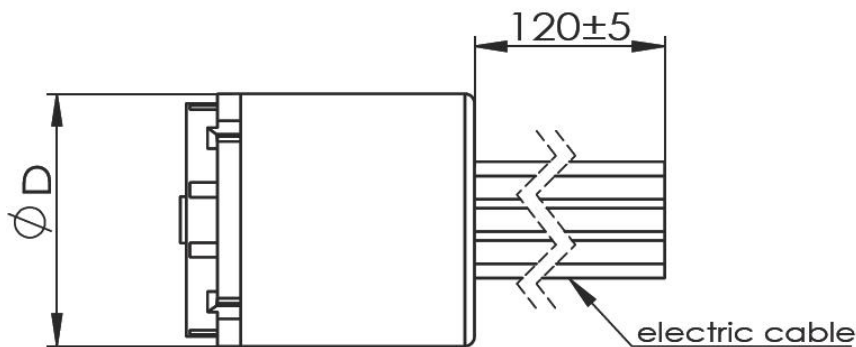


Planetary Gearbox
 Type: P42H (Ø42mm)
 Torque: 0.578 – 15Nm
 Please refer to Gearbox Section

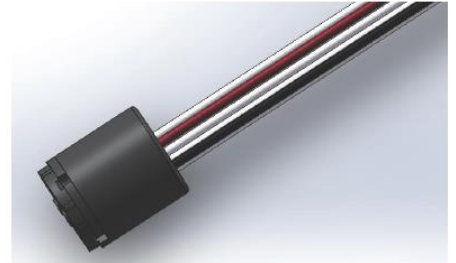
Encoder HEDS-5540
 500 CPT
 3 Channels
 Please refer to Encoder Section

Magnetic Encoder

13 – 16 1000CPT, 3 Channels



D=Motor diameter



TECHNICAL DATA		TERMINAL INFORMATION	
Counts per turn	1000		Red Motor +
Number of channels	3		1 +5V
Max. operating frequency (kHz)	20		2 GND
Max. speed (rpm)	28,000		3 Channel Z
Supply voltage V_{cc}	5 V		4 Channel B
Output signal $V_{cc} = 5VDC$	TTL compatible		5 Channel A
Phase shift Φ	$90^\circ \pm 45e$		Black Motor -
Power input at $V_{cc} 5VDC$	max. 15 mA		
Inertia of the magnetic disc	0.07 gcm^2		
Operating temperature range	$-20^\circ \text{ C to } +80^\circ \text{ C}$		

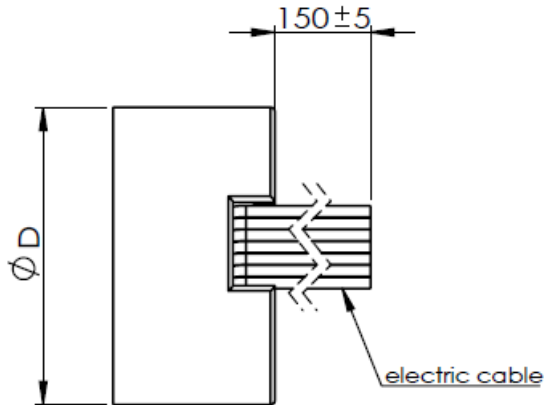
Modular System



Motor Part No.	Overall Length A	Part No.	+ Gearbox	Overall Length B
D13R22B	34.3	S13R34	P12H	.
D13R35B	46.4	S13R47	P12H	.
D16R24B	36.4	S16R36	P16H	.
D16R41B	53.4	S16R54	P16H	.

Magnetic Encoder

22 – 30 1000CPT, 3 Channels



D= 22mm (for Ø22mm & Ø23mm motors)

D= 30mm (for Ø30mm / Ø35mm & Ø40mm motors)

TECHNICAL DATA		TERMINAL INFORMATION	
Counts per turn	1000		Red Motor +
Number of channels	3		1 +5V
Max. operating frequency (kHz)	20		2 GND
Max. speed (rpm)	28,000		3 Channel Z
Supply voltage V _{cc}	5 V		4 Channel B
Output signal V _{cc} = 5VDC	TTL compatible		5 Channel A
Phase shift Φ	90° e ± 45e		Black Motor -
Power input at V _{cc} 5VDC	max. 15 mA		
Inertia of the magnetic disc	0.07 gcm ²		
Operating temperature range	-20° C to +85° C		

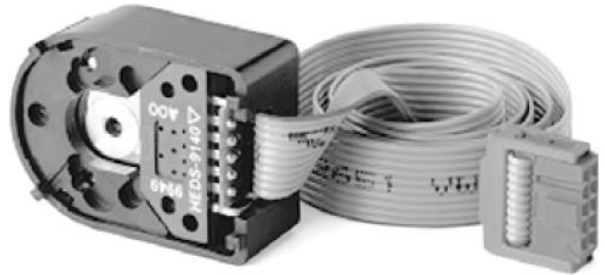
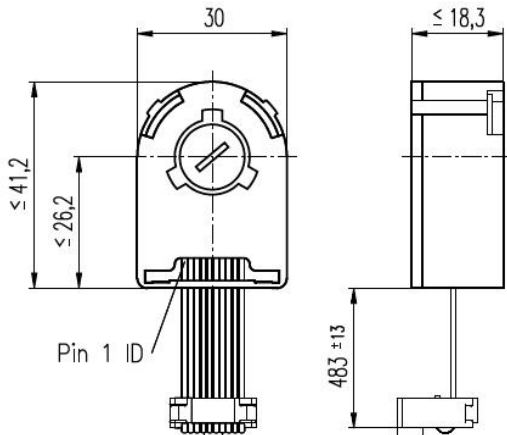
Modular System



Motor Part No.	Overall Length A	Part No.	+ Gearbox	Overall Length B
D22R24B	34.4	S22R34	P22H	.
D22R32B	42.1	S22R42	P22H	.
D23R32B	42.1	S23R42	P22H	.
D23R47B	57.1	S23R58	P22H	.
D30R68B	84.5	S30R85	P32H	.
D35R71B	88.8	S35R89	P35H	.
D40R71B	89.3	S40R90	P42H	.

Encoder HEDS-5540

500CPT, 3 Channels, with Line Drive RS422

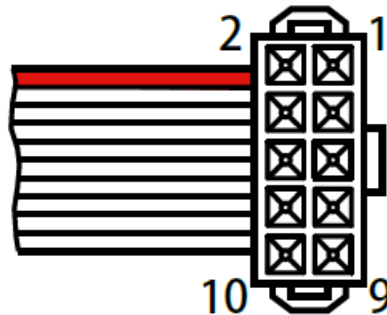


TECHNICAL DATA

Counts per turn	500
Number of channels	3
Max. operating frequency (kHz)	100
Max. speed (rpm)	12,000
Supply voltage VCC	5 V ± 10%
Output signal	EIA Standard RS 422
driver used:	DS26LS31
Phase shift	90°e ± 45°e
Signal rise time (typically, at C _L = 25 pF, R _L = 2.7kΩ, 25°C)	180 ns
Signal fall time (typically, at C _L = 25 pF, R _L = 2.7kΩ, 25°C)	40 ns
Index pulse width	90°e
Operating temperature range	-40°C to +100°C
Moment of inertia of code wheel -	0.6 gcm ²
Max. angular acceleration	250,000 rad s ⁻²
Output current per channel	min. -20 mA, max. 20 mA
Option	1000 Counts per turn, 2 Channels

The index signal I is synchronised with channel A or B.

TERMINAL INFORMATION



- 1 N.C.
- 2 V_{CC}
- 3 GND
- 4 N.C.
- 5 Channel A
- 6 Channel A
- 7 Channel B
- 8 Channel B
- 9 Channel I (Index)
- 10 Channel I (Index)

Pin type DIN 41651/
EN 60603-13
Flat band cable AWG 28

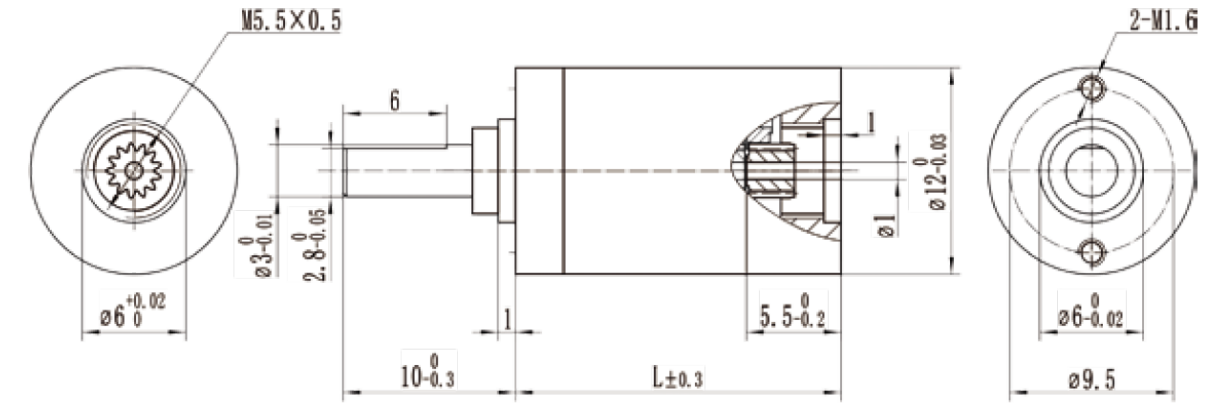
Modular System



Motor Part No.	Overall Length A	Part No.	+ Gearbox	Overall Length B
D30R68B	87.3	S30R87	P32H	·
D35R71B	90.6	S35R91	P35H	·
D40R71B	92.1	S40R92	P42H	·

Planetary Gearbox

P12H



TECHNICAL DATA

1	Radial play	mm						≤ 0.1
2	Axial play	mm						≤ 0.2
3	Max. force for press fits	N						100
4	Max. radial load	N						8
5	Max. axial load	N						8
6	Recommended temperature range	-20°C to +125°C						
7	Number of stages		1	2	3	4	5	
8	Max. continuous torque	Nm	0.2	0.2	0.3	0.3	0.35	
9	Max. intermittent torque at gear output	Nm	0.3	0.3	0.45	0.45	0.5	
10	Max. efficiency	%	90	81	73	65	59	
11	Weight	g	7	10	13	16.5	20	
12	Gearbox length L	mm	13.3	16.1	18.9	21.7	24.5	
			3.94	13.68	61.05	240.37	649.85	
	Gear Ratio		4.62	16.03	71.56	341.52	736.62	
13	(For other speed ratios, please ask for advice)			21.3	83.88	387.12	946.46	
					98.32	453.77	1147.22	
						560.4	3194.28	

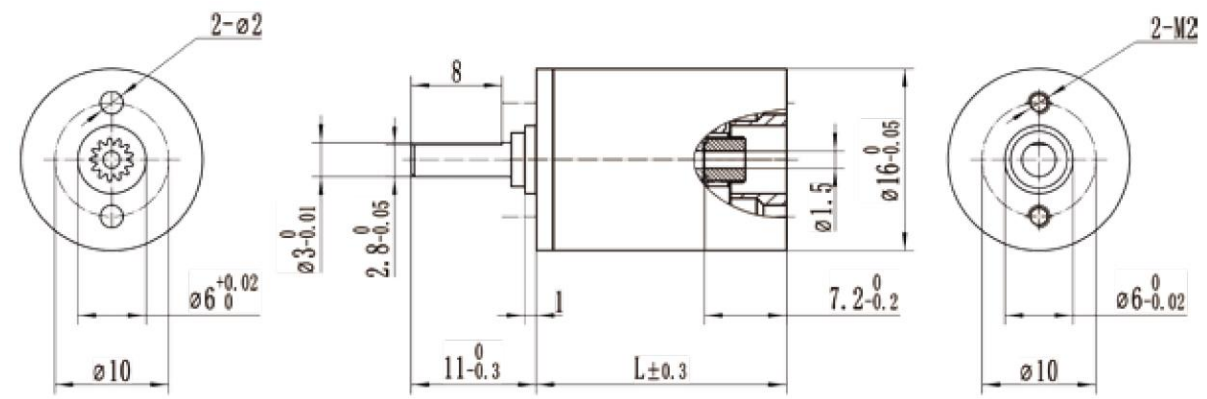
Modular System



+ Motor	Overall length A					Overall length B				
	1	2	3	4	5	1	2	3	4	5
D13R22B	35.6	38.4	41.2	44.0	46.8					
D13R35B	47.7	50.5	53.3	56.1	58.9					
S13R34						47.6	50.4	53.2	56	58.8
S13R47						59.7	62.5	65.3	68.1	70.9

Planetary Gearbox

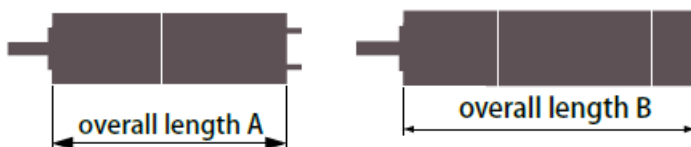
P16H



TECHNICAL DATA

1	Radial play	mm						≤ 0.1
2	Axial play	mm						≤ 0.2
3	Max. force for press fits	N						100
4	Max. radial load	N						8
5	Max. axial load	N						8
6	Recommended temperature range	-20°C to +125°C						
7	Number of stages		1	2	3	4	5	
8	Max. continuous torque	Nm	0.15	0.2	0.25	0.3	0.35	
9	Max. intermittent torque at gear output	Nm	0.2	0.23	0.35	0.4	0.45	
10	Max. efficiency	%	90	81	73	65	59	
11	Weight	g	15	20	25	30	35	
12	Gearbox length L	mm	14.8	18.4	22	25.6	29.2	
			3.79	16.34	54.42	267.06	1151.72	
	Gear Ratio		4.31	18.6	80.2	407.18	1491.58	
13	(For other speed ratios, please ask for advice)		5.08	21.89	94.42	664.36	1596.2	
					111.16		2067.23	
					130.86		2433.66	

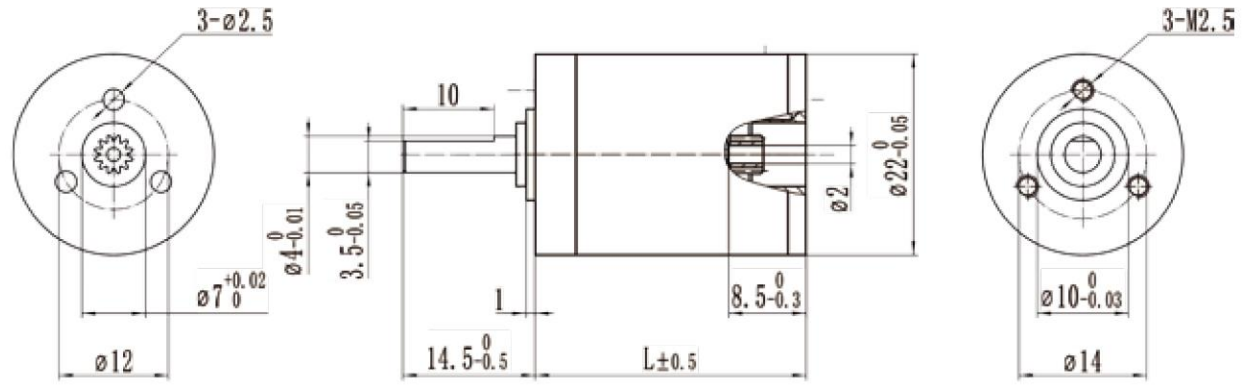
Modular System



+ Motor	Overall length A					Overall length B				
	1	2	3	4	5	1	2	3	4	5
D16R24B	38.6	42.2	45.8	49.4	53					
D16R41B	55.6	59.2	62.8	66.4	70					
S16R36						51.2	54.8	58.4	62	65.6
S16R54						68.2	71.8	75.4	79	82.6

Planetary Gearbox

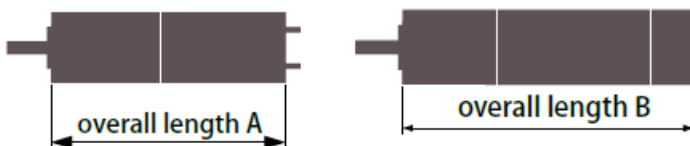
P22H



TECHNICAL DATA

1	Radial play	mm						≤ 0.1
2	Axial play	mm						≤ 0.2
3	Max. force for press fits	N						100
4	Max. radial load	N						8
5	Max. axial load	N						8
6	Recommended temperature range	-20°C to +125°C						
7	Number of stages		1	2	3	4	5	
8	Max. continuous torque	Nm	0.5	0.5	1.2	1.2	1.2	
9	Max. intermittent torque at gear output	Nm	0.3	0.4	0.5	0.7	0.8	
10	Max. efficiency	%	90	81	73	65	59	
11	Weight	g	30	35	46	55	65	
12	Gearbox length L	mm	22.1	25.9	29.7	33.5	37.3	
13	Gear Ratio (For other speed ratios, please ask for advice)		3.57	16	64	182.22	728.86	
			4	18.4	84.64	228.57	1024	
			5.5	22	101.2	262.86	1209.14	
					121	404.8	1354.24	
						465.52	1557.38	
						556.6	1936	
						2286.04		
							2662	

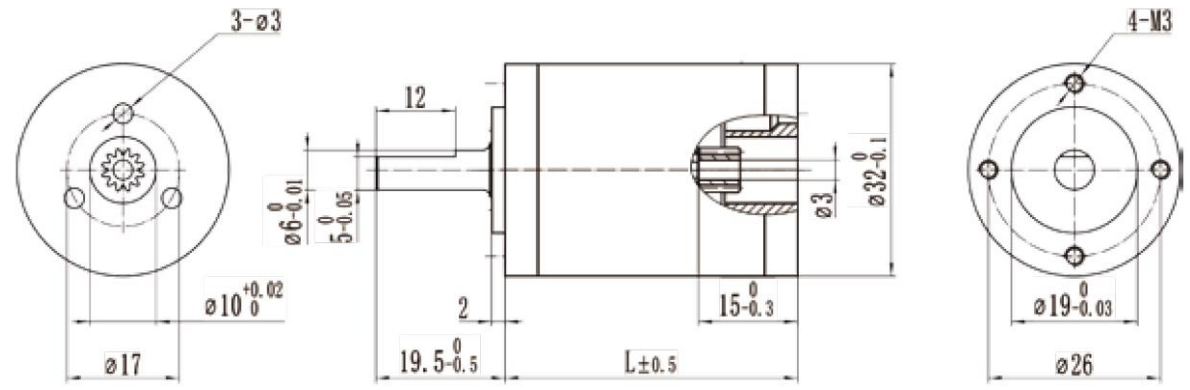
Modular System



+ Motor	Overall length A					Overall length B				
	1	2	3	4	5	1	2	3	4	5
D22R24B	46.3	50.1	53.9	57.7	61.5					
D22R32B	54	57.8	61.6	65.4	69.2					
D23R32B	54	57.8	61.6	65.4	69.2					
S22R37						59.2	63	66.8	70.6	74.4
S22R45						66.9	70.7	74.5	78.3	82.1
S23R45						66.9	70.7	74.5	78.3	82.1

Planetary Gearbox

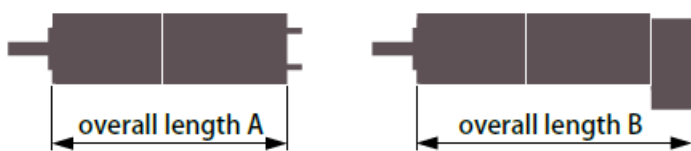
P32H



TECHNICAL DATA

1	Radial play	mm						≤ 0.1	
2	Axial play	mm						≤ 0.2	
3	Max. force for press fits	N						100	
4	Max. radial load	N						8	
5	Max. axial load	N						8	
6	Recommended temperature range	-20°C to +125°C							
7	Number of stages		1	2	3	4	5		
8	Max. continuous torque	Nm	1	3	6	6	6		
9	Max. intermittent torque at gear output	Nm	1.25	3.75	7.5	7.5	7.5		
10	Max. efficiency	%	90	81	73	65	59		
11	Weight	g	125	147	169	191	213		
12	Gearbox length L	mm	31.6	37.9	44.2	50.5	56.8		
13	Gear Ratio (For other speed ratios, please ask for advice)		4	14.93	30.11	159.42	592.13		
			4.8	19.2	51.24	178.23	693.79		
				23.04	62.01	223	765.21		
					80.14	266.24	988.89		
						110.59	297.66	1277.95	
							344.06	1428.77	
							412.16	1846.41	
						530.84	2548.04		
							3174		

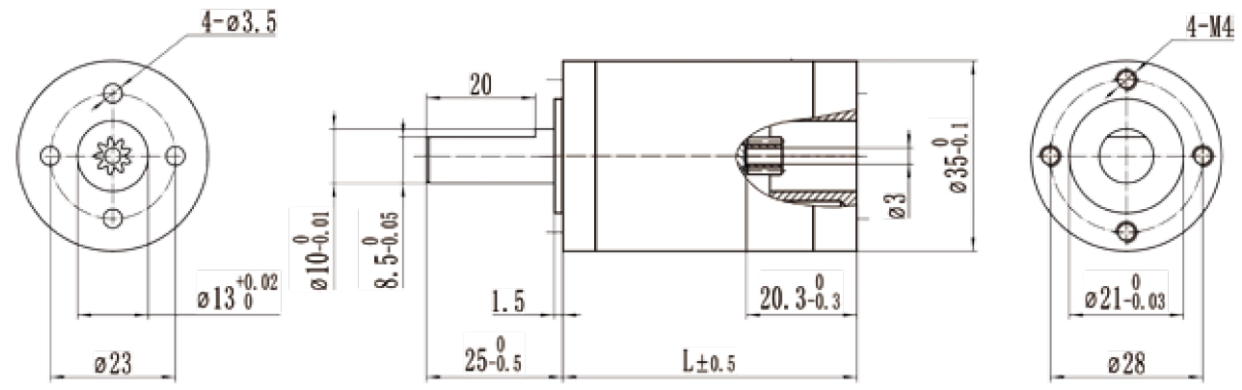
Modular System



+ Motor	Overall length A					Overall length B				
	1	2	3	4	5	1	2	3	4	5
D30R68B	99.1	105.4	111.7	118	124.3					
S30R87						118.9	125.2	131.5	137.8	144.1

Planetary Gearbox

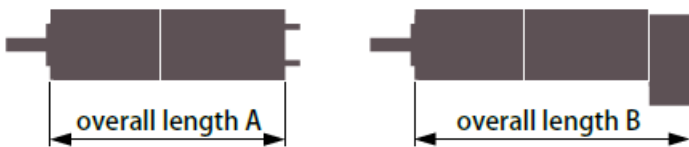
P35H



TECHNICAL DATA

1	Radial play	mm						≤ 0.1
2	Axial play	mm						≤ 0.2
3	Max. force for press fits	N						100
4	Max. radial load	N						8
5	Max. axial load	N						8
6	Recommended temperature range	-20°C to +125°C						
7	Number of stages		1	2	3	4	5	
8	Max. continuous torque	Nm	3	8	16	16	20	
9	Max. intermittent torque at gear output	Nm	5	12	25	25	30	
10	Max. efficiency	%	90	81	73	65	59	
11	Weight	g	210	245	280	318	350	
12	Gearbox length L	mm	40.8	47.4	54	60.6	67.2	
13	Gear Ratio (For other speed ratios, please ask for advice)		4	12.25	42.88	150.06	525.22	
			4.75	16	49	171.5	686	
			6	19	56	224	784	
				21	64	256	1216	
					76	361		
					84	384		
						90.25		
				144				

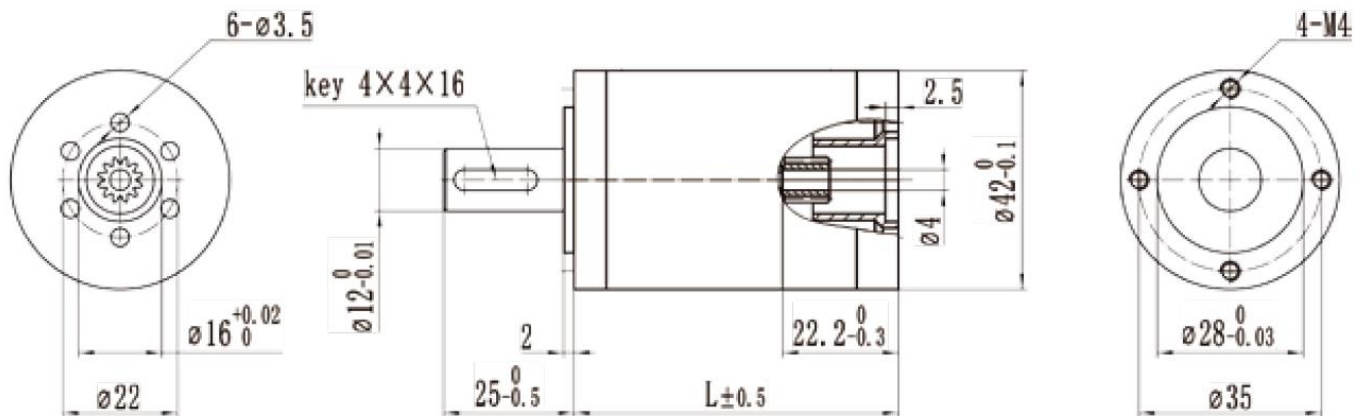
Modular System



+ Motor	Overall length A					Overall length B				
	1	2	3	4	5	1	2	3	4	5
D35R71B	112	118.2	124.8	131.4	138					
S35R91						131.4	138	144.6	151.2	157.8

Planetary Gearbox

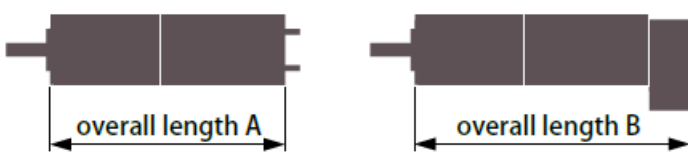
P42H



TECHNICAL DATA

1	Radial play	mm						≤ 0.1
2	Axial play	mm						≤ 0.2
3	Max. force for press fits	N						100
4	Max. radial load	N						8
5	Max. axial load	N						8
6	Recommended temperature range	-20°C to +125°C						
7	Number of stages		1	2	3	4	5	
8	Max. continuous torque	Nm	3	16	25	25	25	
9	Max. intermittent torque at gear output	Nm	5	25	36	36	36	
10	Max. efficiency	%	90	81	73	65	59	
11	Weight	g	250	345	405	490	580	
12	Gearbox length L	mm	41.2	53.2	62.2	77.2	86.2	
13	Gear Ratio (For other speed ratios, please ask for advice)		3.11	35.95	111.85	664.25	2649.6	
			4.17	42.92	159.42	765.21		
			5.75	54.01	193.58	916.66		
			11.56	72.34	225.05	1244.44		
			15.48	83.33	259.26			
			20	96	347.22			
				115	400			
				158.7	530.84			
					661.25			
						761.76		

Modular System



+ Motor	Overall length A					Overall length B				
	1	2	3	4	5	1	2	3	4	5
D40R71B	114	125.5	134.5	149.5	158.5					
S40R92						133.3	145.3	154.3	169.3	178.3

Terminology

1 Nominal voltage

is the applied voltage between two powered phases in block commutation.

2 No load speed

is the speed at which the unloaded motor runs with the nominal voltage applied. It is approximately proportional to the applied voltage.

3 No load current

This is the typical current that the unloaded motor draws when operating at nominal voltage. It increases with rising speed owing to bearing friction and iron losses. No load friction depends heavily on temperature. It decreases in extended operation and increases at lower temperatures.

4 Nominal speed

is the speed set for operation at nominal voltage and nominal torque at a motor temperature of 25°C.

5 Nominal torque

is the torque generated for operation at nominal voltage and nominal current at a motor temperature of 25°C. It is at the limit of the motor's continuous operation range. Higher torques heat up the winding too much.

6 Nominal current

is the current in the active phase in block commutation that generates the nominal torque at the given nominal speed (= max. permissible continuous load current).

7 Stall torque

is the torque produced by the motor when at standstill. Rising motor temperatures reduce stall torque.

8 Stall current

is the quotient from nominal voltage and the motor's terminal resistance. Stall current is equivalent to stall torque.

9 Max. efficiency

is the optimal relationship between input and output power at nominal voltage. It also doesn't always denote the optimal operating point.

10 Terminal resistance phase to phase

is determined through the resistance at 25°C between two connections.

11 Terminal inductance phase to phase

is the winding inductance between two connections. It is measured at 1 kHz, sinusoidal.

12 Torque constant

This may also be referred to as «specific torque» and represents the quotient from generated torque and applicable current.

13 Speed constant

indicates the theoretical no load speed per volt of applied voltage, disregarding friction losses.

14 Speed/torque gradient

The speed/torque gradient is an indicator of the motor's performance. The smaller the value, the more powerful the motor and consequently the less motor speed varies with load variations. It is based on the quotient of ideal no load speed and ideal stall torque (tolerance $\pm 20\%$).

15 Mechanical time constant

is the time required for the rotor to accelerate from standstill to 63% of its no load speed.

16 Rotor moment of inertia

is the mass moment of inertia of the rotor, based on the axis of rotation.



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