

Small Coreless DC Motors

CL Series 3 to 25 W Coreless DC Motors

Smooth-running, optimized-performance coreless DC motors

Allied Motion's CL series of small coreless DC motors provides maximized performance through the use of high performance permanent magnets, a uniquely wound and formed coreless rotor, and in the CL29 and CL40 a precious-metal commutation system. CL motors are efficient, having zero iron loss, and being coreless, they have no preferred rotor position (cog-free), minimal torque ripple, and low rotor inertia.

Available in three diameters (29, 40, and 66 mm), CL series motors are ideal for medical devices, small pumps, mirror/prism drives, and ticket and money dispensers.

Features & Benefits

- Coreless rotor design for smooth, cog-free operation
- High-strength magnets for maximized performance

- Coreless design means no iron loss and higher efficiency compared to iron-core motors
- Precious metal commutation system in CL29 and CL40 models for low starting voltage
- Low inertia rotor for rapid response

Options

- Spur or planetary gearhead with ratios up to 900:1
- Incremental or absolute encoder
- Integrated tachometer
- Ball bearings for CL29 and CL40 models
- Custom winding for alternate voltages
- Custom lead and connector configurations
- Alternate shaft configurations



- High performance DC coreless motors in 29, 40, and 66 mm diameters
- Power ratings from 3 to 25 W and voltage ratings from 6 to 36 VDC
- Optimized performance from coreless winding and high strength magnets

SPECIFICATIONS

Series	CL29	CL40		CL66
Rated Shaft Power	3 W	7 W	12 W	25W
Bearing System	Sleeve	Sleeve	Sleeve + Ball	Ball
Commutation System	Precious metal	Precious metal	Graphite-Copper	Graphite-Copper
Radial Load (max., 10 mm (0.39") from front mount)	5 N (18 oz)			100 N (22.5 lb)
Axial Load (max.)	0.5 N (1.8 oz)			15 N (3.37 lb)
Ambient Temp. Range (Operating)	-10 to +60 °C			
Ambient Temp. Range (Storage)	-40 to +70 °C			
Mass (Weight)	125 g (4.41 oz)	200 g (7.05 oz)		900 g (31.7 oz)
OPTIONS				
Ball Bearings	Yes	Yes	Yes	N/A
Special Shaft Configuration	Yes	Yes	Yes	Yes
Connection Cable	Yes	Yes	Yes	Yes
Integrated EMI Suppression	Yes	Yes	Yes	Yes
Special Windings for Alternate Voltages	Yes	Yes	Yes	Yes
Tachometer	Yes	Yes	N/A	N/A
Encoder	Yes	Yes	Yes	Yes
Gearheads	P32A, S30A*, S37A, S38A	P32A, P32B, S37A, S38A, S52B, S70C		P52A, S64A, S66A

* Use motor with 2 mm shaft

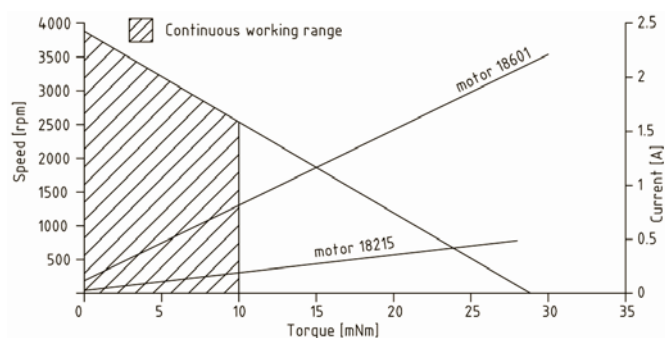
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CL 29 Series 3 W Coreless DC Motors

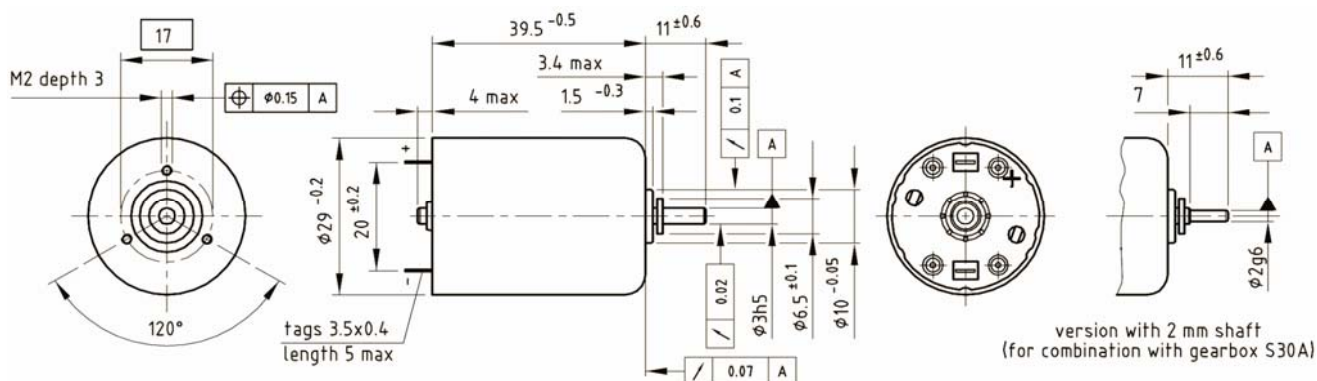
SPECIFICATIONS

Model	(Ø2 mm Shaft)	9904 120 +	18611	18612	18613	18614	18615	18616	18617
	(Ø3 mm Shaft)	9904 120 +	18601	18602	18603	18105	18605	18606	18215
Nominal Voltage	V	6	7.2	9	12	15	18	24	
Nominal Torque	mNm (oz-in)	10 (1.42 oz-in)							
Nominal Speed	RPM	2680	2550	2680	2440	2380	2680	2470	
Nominal Current	mA	775	620	515	370	290	260	185	
No-Load Speed	RPM	4010	3850	3990	3840	3750	4010	3840	
No-Load Current	mA	67	52	45	31	24	22	16	
BEMF at 3000 RPM	V	4.35	5.44	6.53	9.07	11.6	13.1	18.1	
Torque Constant	mNm/A (oz-in/A)	13.9 (1.97)	17.3 (2.45)	20.8 (2.95)	28.9 (4.09)	37 (5.24)	41.6 (5.89)	57.7 (8.17)	
Terminal Resistance	Ohm	2.7	4.2	6.1	12.5	20.1	24.5	49	
Starting Torque at Nom. Voltage	mNm (oz-in)	30 (4.25)			27 (3.82)		30 (4.25)		28 (3.97)
Starting Current at Nom. Voltage	A	2.21	1.73	1.47	0.96	0.5	0.73	0.49	
Rotor Inductance	mH	0.2	0.32	0.46	0.89	1.46	1.84	3.55	
Rotor Inertia	kgm ² (oz-in-s ²)	0.9E-6 (1.27E-4)							
Mech. Time Constant	ms	13							
Thermal Resistance Winding-Housing	°C/W	5.2							
Thermal Resistance Housing-Ambient	°C/W	16.3							

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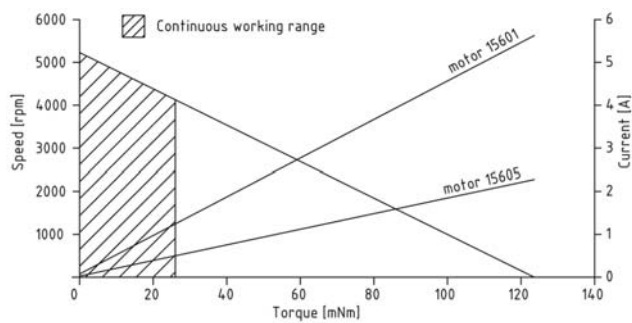
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CL40 Series 7 W Coreless DC Motors

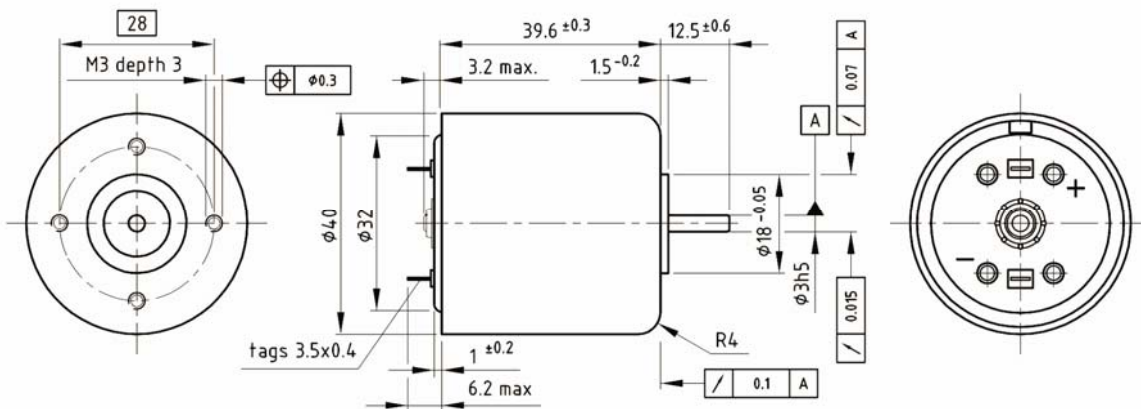
SPECIFICATIONS

Model	9904 120 +	16701	16702	16703	16704	16705	16706	16707
Nominal Voltage	V	6	9	12	15	18	24	30
Nominal Torque	mNm (oz-in)	22 (3.12 oz-in)						
Nominal Speed	RPM	2650	3010	2700	2920	3050	2980	2930
Nominal Current	mA	1520	1090	760	635	540	400	320
No-Load Speed	RPM	3780	4050	3780	3940	4050	3980	3940
No-Load Current	mA	60	44	30	25	22	16	13
BEMF at 3000 RPM	V	4.71	6.59	9.42	11.3	13.2	17.9	22.6
Torque Constant	mNm/A (oz-in/A)	15 (2.12)	21 (2.97)	30 (4.25)	36 (5.1)	42 (5.95)	57 (8.07)	72 (10.2)
Terminal Resistance	Ohm	1.2	2.2	4.6	6.3	8.4	15.6	25.1
Starting Torque at Nom. Voltage	mNm (oz-in)	74 (10.5)	86 (12.2)	77(10.9)	85 (12)	89 (12.6)	87 (12.3)	85 (12)
Starting Current at Nom. Voltage	A	5	4.1	2.6	2.4	2.1	1.5	1.2
Rotor Inductance	mH	0.15	0.29	0.59	0.85	1.16	2.14	3.41
Rotor Inertia	kgm ² (oz-in-s ²)	4E-6 (5.67E-4)						
Mech. Time Constant	ms	20				19		
Thermal Resistance Winding-Housing	°C/W					5.5		
Thermal Resistance Housing-Ambient	°C/W					13		

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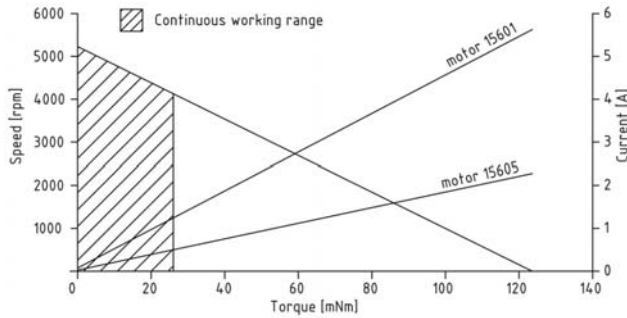
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CL40 Series 12 W Coreless DC Motors

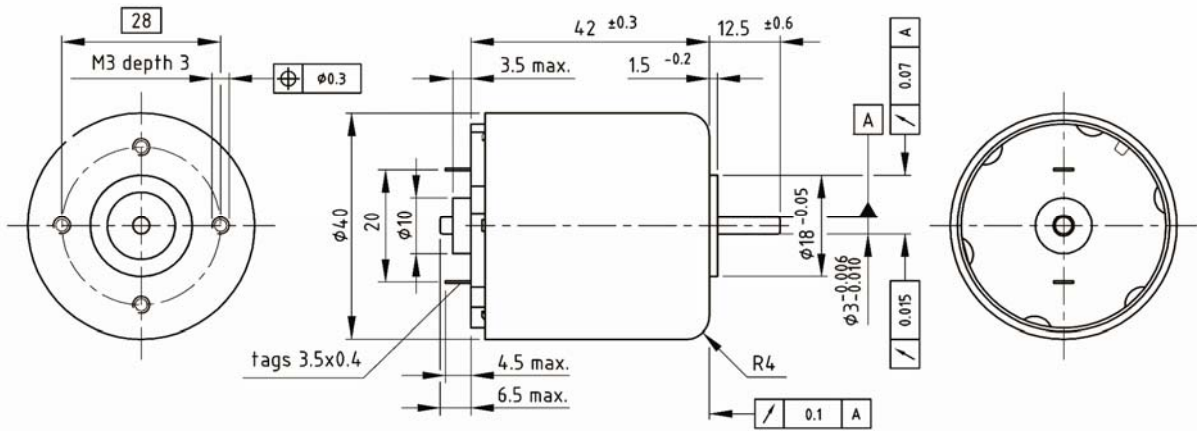
SPECIFICATIONS

Model	9904 120 +	15601	15602	15603	15604	15605
Nominal Voltage	V	12	15	18	24	30
Nominal Torque	mNm (oz-in)	26 (3.68 oz-in)				
Nominal Speed	RPM	4140	4090	4150	4170	4100
Nominal Current	mA	1250	980	830	630	490
No-Load Speed	RPM	5280	5180	5220	5280	5180
No-Load Current	mA	49	38	32	25	19
BEMF at 3000 RPM	V	6.76	8.62	10.3	13.5	17.2
Torque Constant	mNm/A (oz-in/A)	21.5 (3.05)	27.4 (3.88)	32.6 (4.62)	43 (6.09)	54.9 (7.78)
Terminal Resistance	Ohm	2.1	3.3	4.6	8.3	13.1
Starting Torque at Nom. Voltage	mNm (oz-in)	121 (17.1)	123 (17.4)	126 (17.8)	123 (17.4)	125 (17.7)
Starting Current at Nom. Voltage	A	5.6	4.5	3.9	2.9	2.3
Rotor Inductance	mH	0.31	0.5	0.71	1.23	2.01
Rotor Inertia	kgm ² (oz-in-s ²)	4E-6 (5.67E-4)				
Mech. Time Constant	ms	18				
Thermal Resistance Winding-Housing	°C/W	5.5				
Thermal Resistance Housing-Ambient	°C/W	10.5				

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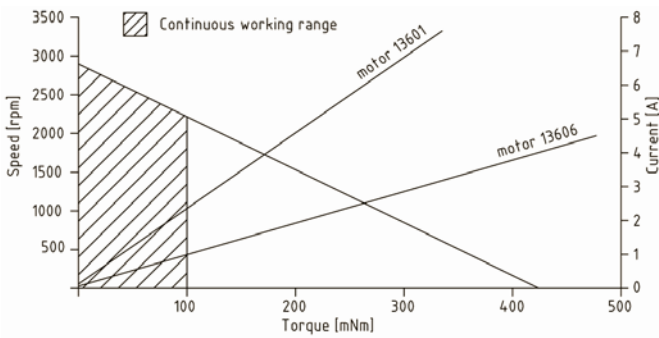
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CL66 Series 25 W Coreless DC Motors

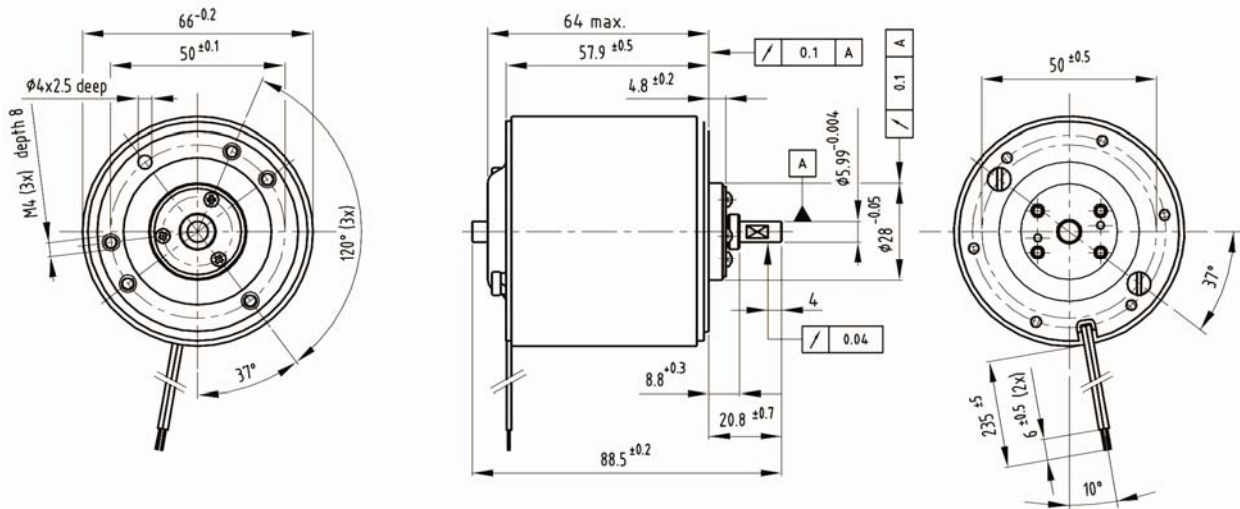
SPECIFICATIONS

Model	9904 120 +	13601	13602	13603	13604	13605	13606
Nominal Voltage	V	12	15	18	24	30	36
Nominal Torque	mNm (oz-in)	100 (14.2 oz-in)					
Nominal Speed	RPM	1800	2090	2200	2170	2280	2540
Nominal Current	mA	2330	2060	1750	1300	1080	980
No-Load Speed	RPM	2560	2830	2890	2850	2960	3210
No-Load Current	mA	81	77	66	49	41	40
BEMF at 3000 RPM	V	13.9	15.7	18.5	25	30.1	33.3
Torque Constant	mNm/A (oz-in/A)	44.2 (6.26)	50.1 (7.1)	59 (8.36)	79.6 (11.3)	95.8 (13.6)	106 (15)
Terminal Resistance	Ohm	1.6	2	2.5	4.6	6.6	8
Starting Torque at Nom. Voltage	mNm (oz-in)	335 (47.5)	384 (54.4)	418 (59.2)		436 (61.8)	477 (67.6)
Starting Current at Nom. Voltage	A	7.6	7.7	7.1	5.3	4.6	4.5
Rotor Inductance	mH	0.59	0.75	1.04	1.9	2.75	3.37
Rotor Inertia	kgm ² (oz-in-s ²)	21E-6 (2.97E-3)					
Mech. Time Constant	ms	17	16	15			
Thermal Resistance Winding-Housing	°C/W	2.9					
Thermal Resistance Housing-Ambient	°C/W	5					

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