

# Coreless DC Motors CL Series

*Smooth-running, optimized-performance, 3 to 25 W coreless DC motors*

Allied Motion's CL series of coreless DC motors maximizes 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, and being coreless, have virtually zero iron loss and no preferred rotor position (cogfree). They offer minimized 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, ticket and cash dispensers, and similar applications.

## Options & Accessories

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



## Features & Benefits

- 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
- Coreless technology means no cogging and no iron loss for smooth speed and high efficiency operation 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

### QuickShip Products

Some of the part number configurations for this product are in stock and available for ***immediate delivery!***

Look for the QuickShip symbol next to available part numbers. Then, click on the part number to go directly to our online store.



### CL Series – General Specifications



Series	CL29	CL40		CL66
Rated Power W (HP)	3 (0.004)	7 (0.009)	12 (0.016)	25 (0.034)
Rated Torque Nm (oz.in.)	10 (1.42)	22 (3.12)	26 (3.68)	100 (14.2)
Load N (oz) max	Radial	5 (18)	5 (18)	100 (22.5)
	Axial	0.5 (0.18)	0.5 (0.18)	15 (3.37)
Bearing System	Sleeve	Sleeve	Sleeve & Ball	Ball
Commutation System	Precious Metal	Precious Metal	Graphite-Copper	Graphite-Copper
Protection				
Weight kg (lb)	0.125 (0.28)	0.2 (0.44)	0.2 (0.44)	0.9 (1.98)
Ambient Temperature	Operating	-10 to 60 °C (14 to +140 °F)		
	Storage	-40 to 70 °C (-40 to 158 °F)		

\* 10 mm (0.39") from front mount

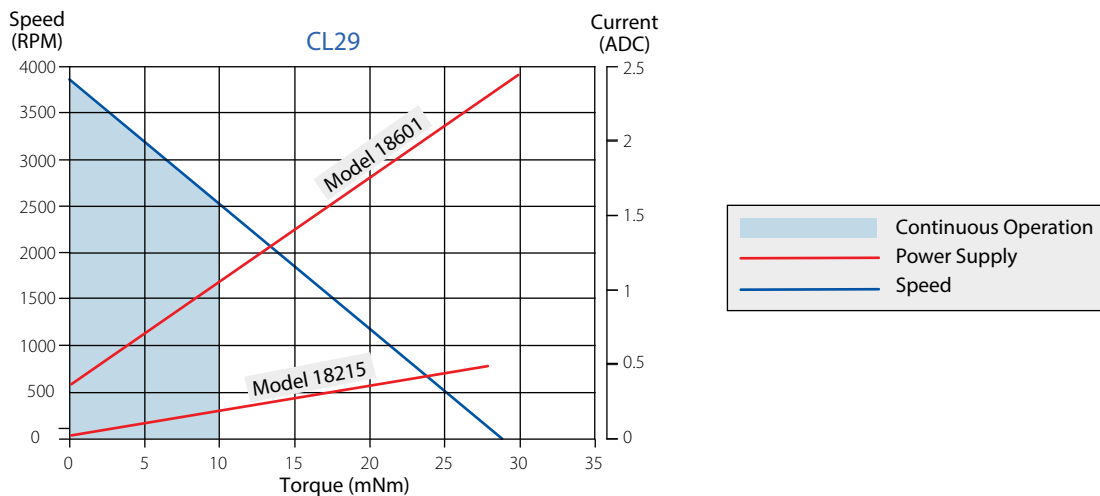
### CL Series Options

Series	CL29	CL40 (7 W)	CL40 (12W)	CL66
Ball Bearings	✓	✓	✓	—
Special Shaft Configuration	✓	✓	✓	✓
Connection Cable	✓	✓	✓	✓
Integrated EMI Suppression	✓	✓	✓	✓
Alternate Voltage Winding	✓	✓	✓	✓
Tachometer	✓	✓	—	—
Encoder	✓	✓	✓	✓



## CL29 – Specifications

Model	Ø2 mm Shaft Ø	9904 120+	18611	18612	18613	18614	18615	18616	18617	
		Ø3 mm Shaft Ø	9904 120+	18601	18602	18603	 <a href="#">18105</a>	18605	18606	 <a href="#">18215</a>
Rated Voltage	VDC		6	7.2	9	12	15	18	24	
Rated Torque	mNm (oz.in.)	10 (1.42)								
Starting Torque @ Rated Voltage	mNm (oz.in.)		30 (4.25)	30 (4.25)	30 (4.25)	27 (3.82)	27 (3.82)	30 (4.25)	28 (3.97)	
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)	
Speed	RPM		2680	2550	2680	2440	2380	2680	2470	
		Rated	2680	2550	2680	2440	2380	2680	2470	
	No-load	4010	3850	3990	3840	3750	4010	3840		
Current	mA		775	620	515	370	290	260	185	
		Rated	775	620	515	370	290	260	185	
	No-load	67	52	45	31	24	22	16		
Starting Current @ Rated Voltage	A		2.21	1.73	1.47	0.96	0.75	0.73	0.49	
Terminal Resistance	Ohm		2.7	4.2	6.1	12.5	20.1	24.5	49	
Rotor Inductance	mH		0.2	0.32	0.46	0.89	1.46	1.84	3.55	
Rotor Inertia	kgm <sup>2</sup> (oz.in.s <sup>2</sup> )	0.9E-6 (1.27E-4)								
Mechanical Time Constant	ms								13	
Thermal Resistance	°C/W						5.2			
		Winding-Housing					5.2			
		Housing-Ambient					16.3			

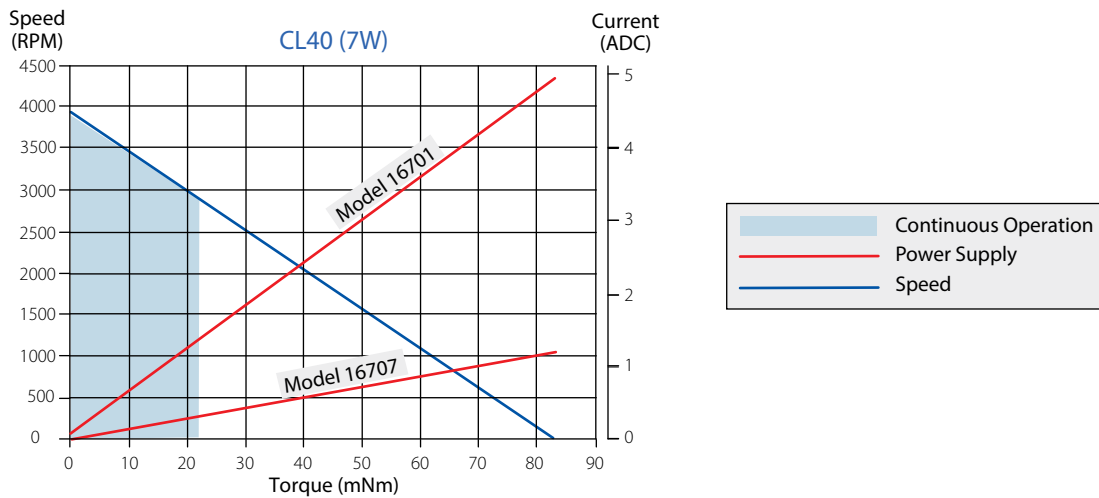
## CL29 – Performance





### CL40 (7W) – Specifications

Model	9904 120+	16701	16702	 <a href="#">16703</a>	16704	16705	 <a href="#">16706</a>	16707
Rated Voltage VDC		6	9	12	15	18	24	30
Rated Torque mNm (oz.in.)		22 (3.12)						
Starting Torque @ Rated Voltage mNm (oz.in.)		74 (10.5)	86 (12.2)	77(10.9)	85 (12)	89 (12.6)	87 (12.3)	85 (12)
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)
Speed RPM	Rated	2650	3010	2700	2920	3050	2980	2930
	No-load	3780	4050	3780	3940	4050	3980	3940
Current mA	Rated	1520	1090	760	635	540	400	320
	No-load	60	44	30	25	22	16	13
Starting Current @ Rated Voltage A		5	4.1	2.6	2.4	2.1	1.5	1.2
Terminal Resistance Ohm		1.2	2.2	4.6	6.3	8.4	15.6	25.1
Rotor Inductance mH		0.15	0.29	0.59	0.85	1.16	2.14	3.41
Rotor Inertia kgm <sup>2</sup> (oz.in.s <sup>2</sup> )		4E-6 (5.67E-4)						
Mechanical Time Constant ms		20	20	20	19	19	19	19
Thermal Resistance °C/W	Winding-Housing	5.5						
	Housing-Ambient	13						

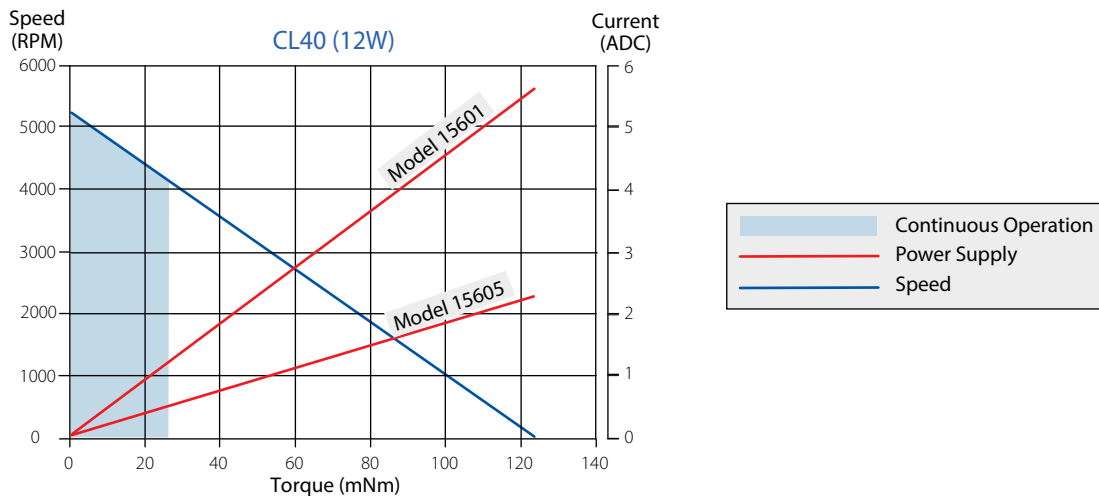
### CL40 (7W) – Performance





## CL40 (12W) – Specifications

Model	9904 120+	 <a href="#">15601</a>	15602	15603	 <a href="#">15604</a>	15605
Rated Voltage VDC		12	15	18	24	30
Rated Torque mNm (oz.in.)		26 (3.68)				
Starting Torque @ Rated Voltage mNm (oz.in.)		121 (17.1)	123 (17.4)	126 (17.8)	123 (17.4)	125 (17.7)
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)
Speed RPM	Rated	4140	4090	4150	4170	4100
	No-load	5280	5180	5220	5280	5180
Current mA	Rated	1250	980	830	630	490
	No-load	49	38	32	25	19
Starting Current @ Rated Voltage A		5.6	4.5	3.9	2.9	2.3
Terminal Resistance Ohm		2.1	3.3	4.6	8.3	13.1
Rotor Inductance mH		0.31	0.5	0.71	1.23	2.01
Rotor Inertia kgm <sup>2</sup> (oz.in.s <sup>2</sup> )		4E-6 (5.67E-4)				
Mechanical Time Constant ms		18				
Thermal Resistance °C/W	Winding-Housing	5.5				
	Housing-Ambient	10.5				

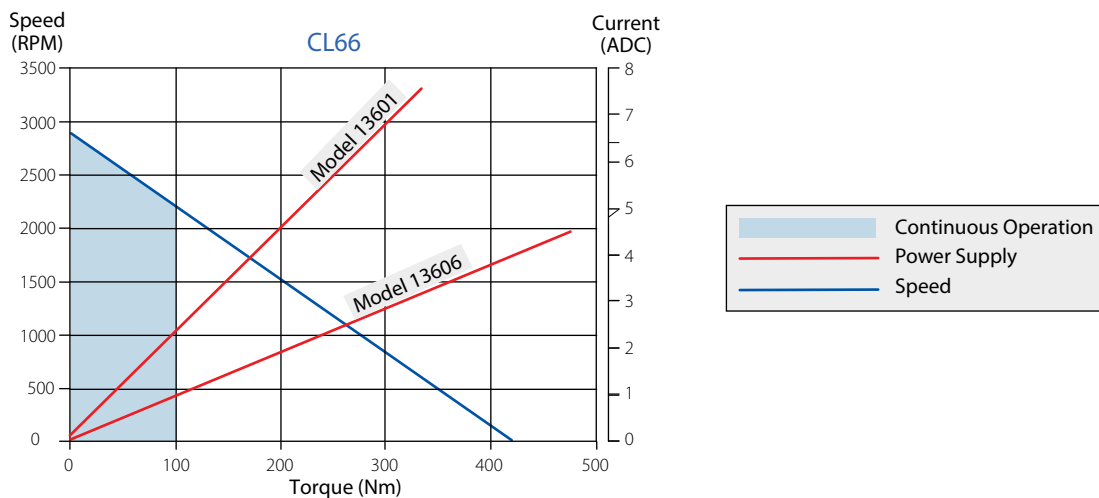
## CL40 (12W) – Performance



### CL66 – Specifications

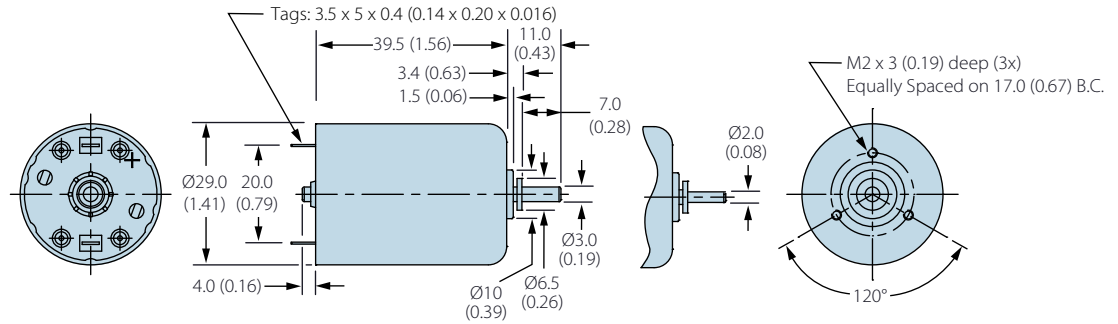
Model	9904 120+	13601	13602	 <a href="#">13603</a>	13604	 <a href="#">13605</a>	13606
Rated Voltage VDC		12	15	18	24	30	36
Rated Torque mNm (oz.in.)		100 (14.2)					
Starting Torque @ Rated Voltage mNm (oz.in.)		335 (47.5)	384 (54.4)	418 (59.2)	418 (59.2)	436 (61.8)	477 (67.6)
Torque Constant mNm/A (oz.in./A)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

### CL66 – Performance

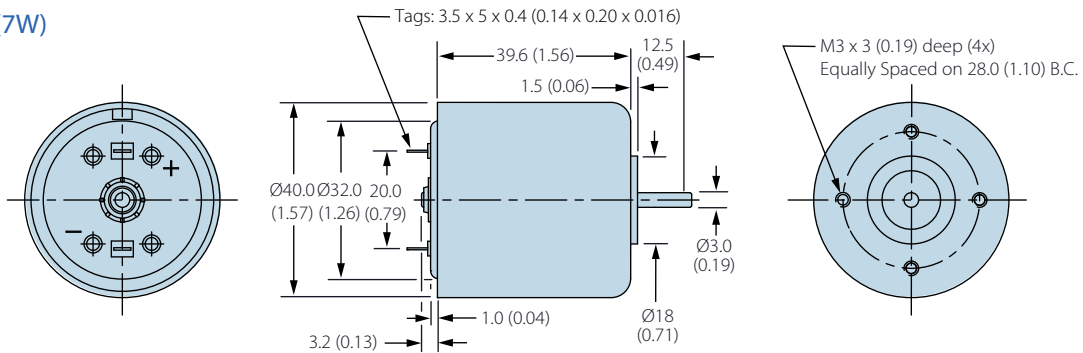


## CL Series Dimensions — mm (in)

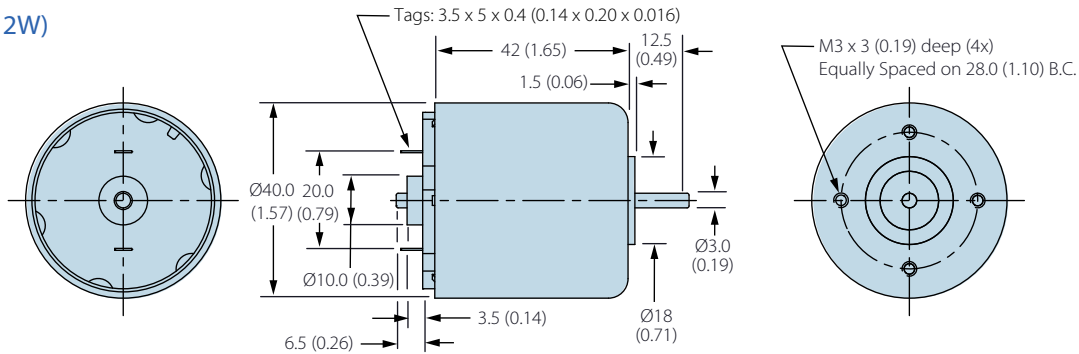
CL29



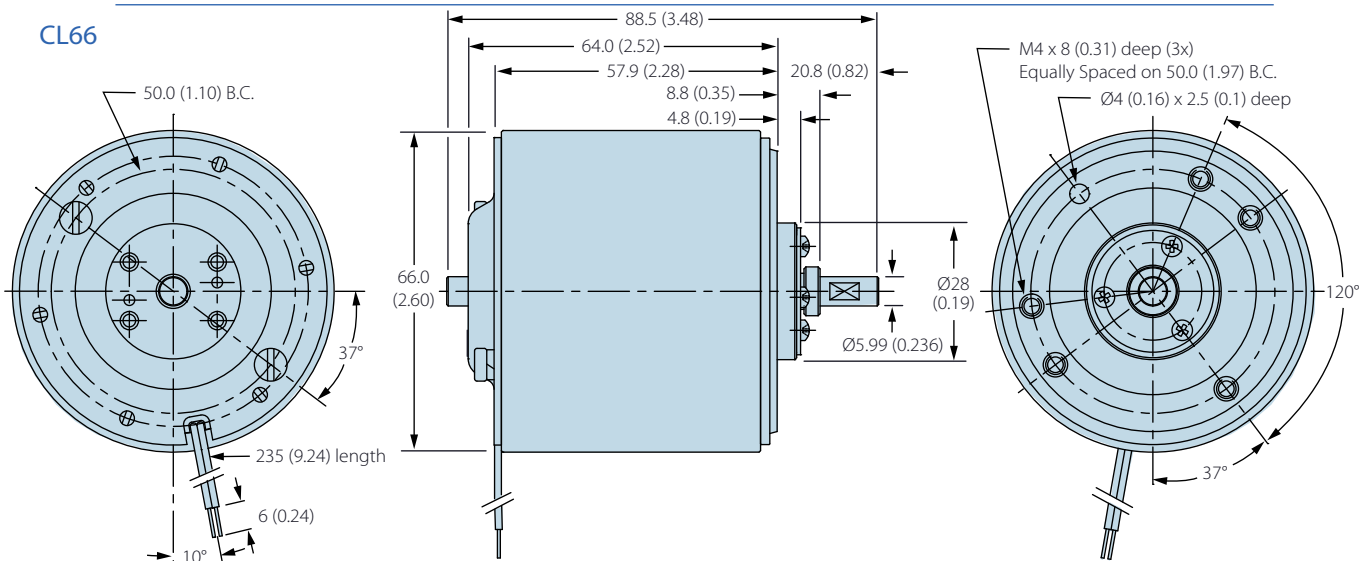
CL40 (7W)



CL40 (12W)



CL66



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Allied Motion offers a very wide selection of standard motion control solutions to satisfy the requirements found in the commercial, industrial and aerospace and defense markets. And, we are adding new products every year to meet new demands we find in those markets.

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