

# 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

# ALCYON

ÉLECTRONIQUE

Tel : +33 (0) 1 34 94 77 00

<https://alcyonelectronique.fr/>

[commercial@alcyonelectronique.fr](mailto:commercial@alcyonelectronique.fr)

## 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 mNm (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

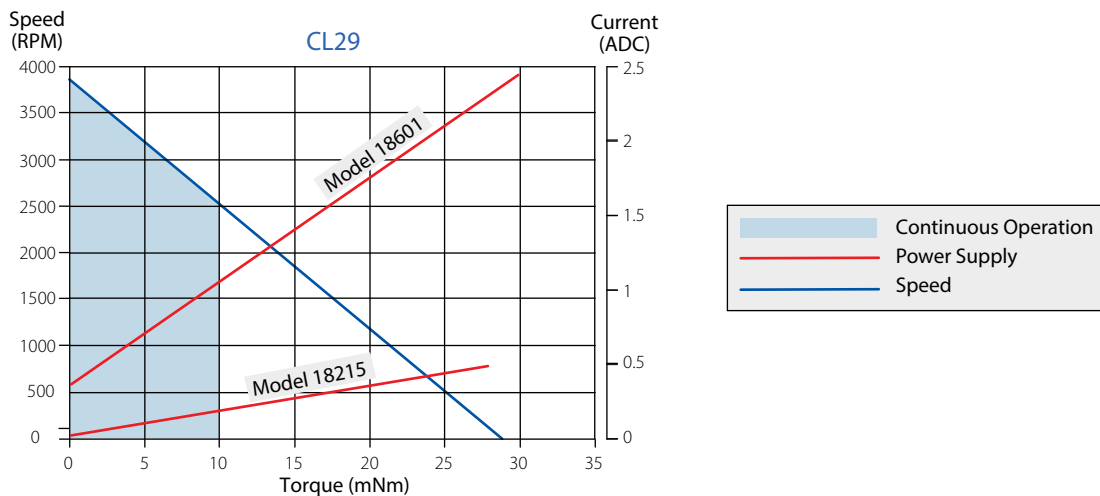
| Series                      | CL29 | CL40 (7 W) | CL40 (12W) | CL66 |
|-----------------------------|------|------------|------------|------|
| Ball Bearings               | ✓    | ✓          | ✓          | —    |
| Special Shaft Configuration | ✓    | ✓          | ✓          | ✓    |
| Connection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

Specifications subject to change without notice

## 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       | 18105       | 18605     | 18606       | 18215       |  |
| 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                                      | Rated            | 2680        | 2550        | 2680        | 2440        | 2380      | 2680        | 2470        |  |
|                                  | No-load                                  | 4010             | 3850        | 3990        | 3840        | 3750        | 4010      | 3840        |             |  |
| Current                          | mA                                       | 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                                     | Winding-Housing  | 5.2         |             |             |             |           |             |             |  |
|                                  | Housing-Ambient                          | 16.3             |             |             |             |             |           |             |             |  |

## CL29 – Performance

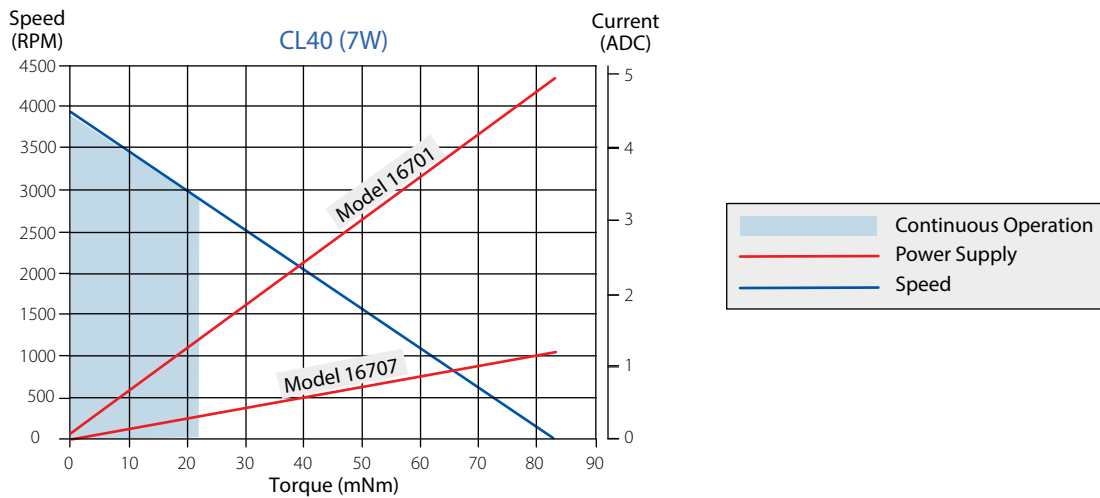


Specifications subject to change without notice

## CL40 (7W) – Specifications

| Model  | 9904 120+       | 16701          | 16702     | 16703     | 16704    | 16705     | 16706     | 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

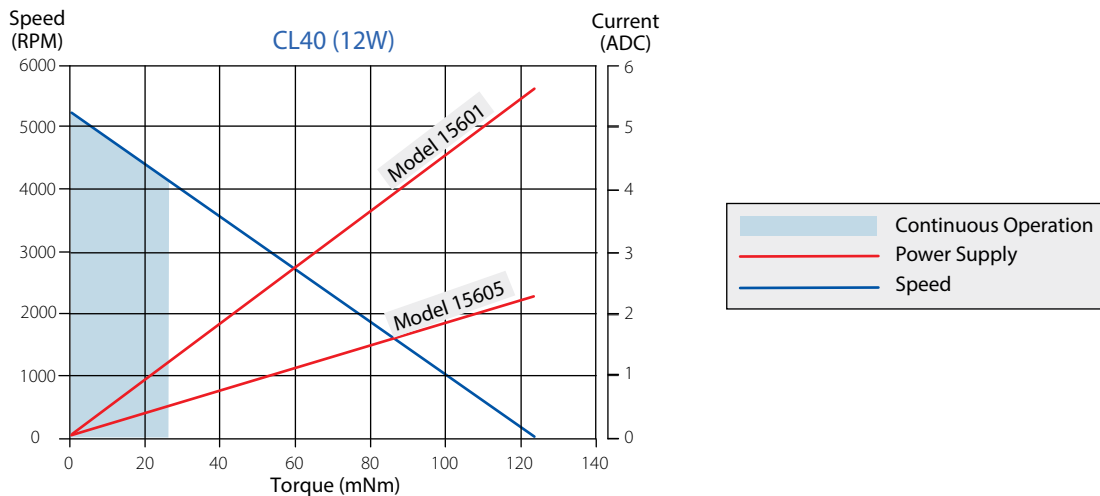


Specifications subject to change without notice

## CL40 (12W) – Specifications

| Model  | 9904 120+       | 15601          | 15602       | 15603       | 15604      | 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           |             |             |            |             |

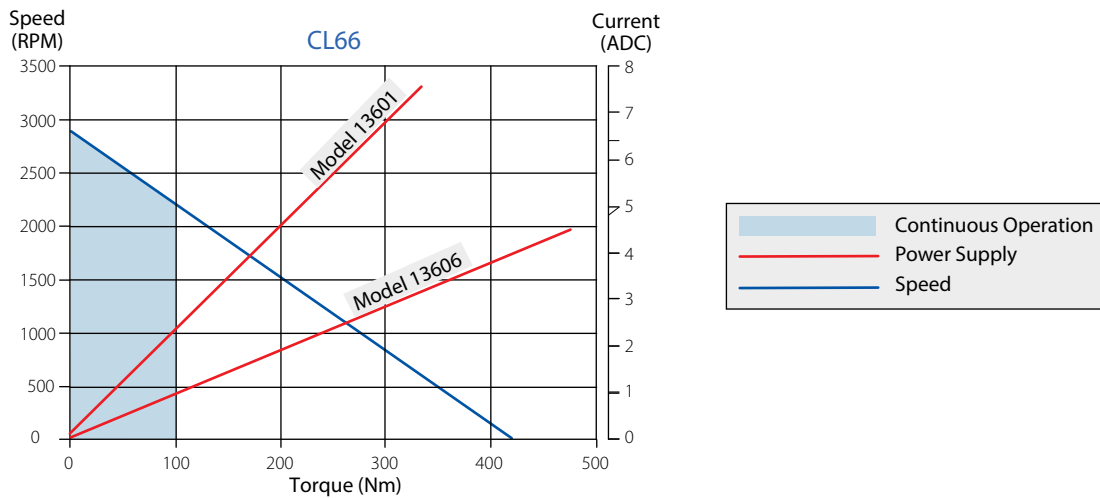
## CL40 (12W) – Performance



## CL66 – Specifications

| Model  | 9904 120+       | 13601           | 13602      | 13603      | 13604       | 13605       | 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               |            |            |             |             |            |

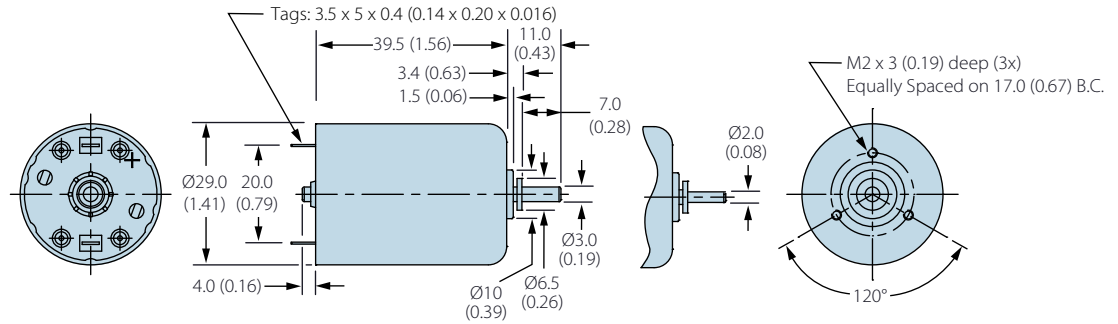
## CL66 – Performance



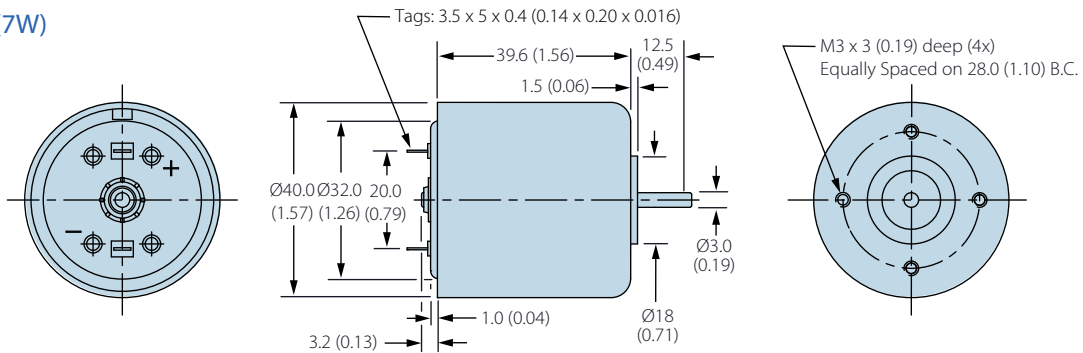
Specifications subject to change without notice

## CL Series Dimensions — mm (in)

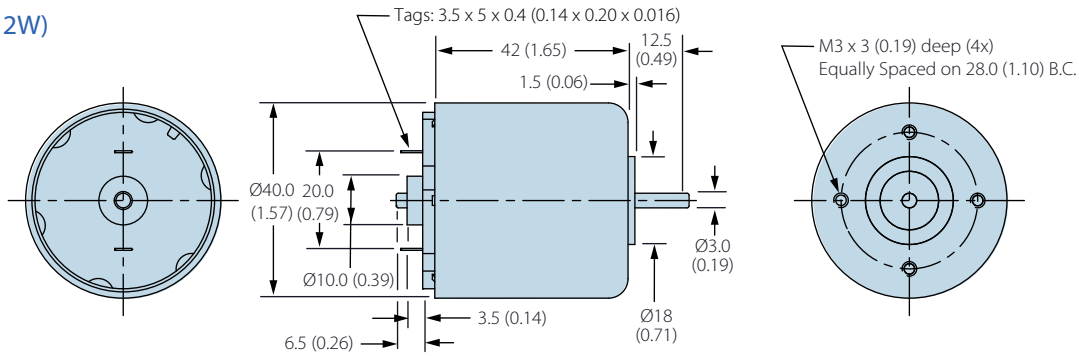
CL29



CL40 (7W)



CL40 (12W)



CL66

