

Small Brushless DC Motors

BL Series Brushless DC Motors with Integral Drive

24, 54, 68, and 70 mm diameters, 2W up to 110W output power

Allied Motion's BL series of small brushless DC motors are extremely compact, yet incorporate integrated drive electronics (EB models). BL series motors are also available without drive electronics on-board (EE models).

All models except the BL70 employ an external rotor and iron core stator to minimize cogging and maximize output torque.

High quality components ensure BL motor life is in excess of 20,000 hours. Long-life coupled with a torque range from 2.5 to 355 mNm (0.35 to 50 oz-in) and speed range from 1,000 to 10,000 RPM make the BL series ideal for a wide range of small motor applications, including gearpumps, membrane pumps, peristaltic pumps, laser scanners, high performance fans and blowers, and document and package handling.

Features & Benefits

- As simple to control as a DC motor: 2-wire brushless design requires only a DC voltage to operate
- Thermal overload protection with automatic recovery (BL58, BL70)
- Reverse supply voltage protection
- Low EMI: Comply with EN55011, EN55022, EN50082-1* (*requires supply filter capacitor)
- Adjustable speed and direction selection (BL58, BL70)
- Low audible noise — ideal for use in "quiet" applications

Options

- Special shaft diameter and machining
- Square or customized mounting flange
- Higher protection level to IP67DS
- 4-wire versions of BL21 and BL48 for speed sensing output and speed adjustment



- Small, high performance brushless DC motor series with integrated drive electronics (EB models)
- Power range from 2W up to 110W and continuous torque range of 4 up to 355 mNm
- Models without integral drive electronics available (EE models)

BL EB SERIES OVERVIEW



| Model | BL 21 EB | BL 48 EB | BL 58 EB | BL 70 EB |
|----------------------------|------------------------|--|--|---|
| Type | Outer rotor | | | NOT AVAILABLE NICHT LIEFERBAR |
| Output Power [W] | 2, 1.5 | 8, 12 | 35, 50 | |
| Voltage [VDC] | 12, 24 | 12, 24 | 12, 24 | 24, 42 |
| Cont. Torque [mNm (oz-in)] | 6 (0.85) | 30, 43 (4.25, 6.09) | 80, 114, 170 (11.3, 16.1, 24) | 300 - 480 (42.5 - 68) |
| Nom. Speed [RPM] | 2500 | 3200 | 2800 - 4000 | 3000 - 3800 |
| Size (D x L) [mm (in)] | 24 x 26 (0.945 x 1.02) | 54 x 30 (1.18 x 1.46) 54 x 37 (2.13 x 1.46) | 68 x 49 (2.68 x 1.93) 68 x 62 (2.68 x 2.44) | 69 x 95 (2.72 x 3.74) 69 x 109 (2.72 x 4.29) 69 x 123 (2.72 x 4.84) |
| Weight [g (oz)] | 30 (1.06) | 195, 250 (6.88, 8.82) | 450, 550 (15.9, 19.4) | 1000, 1300, 1600 (35.3, 45.9, 46.4) |

Small Brushless DC Motors

BL21 EB Series 2W BLDC Motors

SPECIFICATIONS

| Model | CW | 4322 016 + | 21511 | 21531 |
|--|-----|--|-------------------|-------------|
| | CCW | 4322 016 + | 21521 | 21541 |
| Nominal Voltage | | V | 12 | 24 |
| Voltage Range | | V | 5 - 17 | 9 - 28 |
| Max. Output Power ¹ | | W | 2 | 1.5 |
| Nominal Torque | | mNm (oz-in) | 4 (0.57) | |
| Max. Continuous Torque | | mNm (oz-in) | 6 (0.85) | |
| Nominal Speed | | RPM | 2500 | |
| No-Load Speed | | RPM | 4500 | |
| Nominal Current | | mA | 205 | 108 |
| Max. Continuous Current ^{1,2} | | mA | 280 | 150 |
| No-Load Current | | mA | 40 | 30 |
| Torque Constant | | mNm/A (oz-in/A) | 27.6 (3.91) | 56.2 (7.96) |
| Rotor Inertia | | kgm ² (oz-in-s ²) | 0.77E-6 (1.09E-4) | |
| Mechanical Time Constant | | ms | 36 | |
| Thermal Resistance Winding-Housing | | °C/W | 5.3 | |
| Thermal Resistance Housing-Ambient | | °C/W | 25.5 | |
| Weight | | g (oz) | 30 (1.06) | |
| Protection | | - | IP30 | |
| Gearbox (option) ³ | | - | P22A, S22A | |

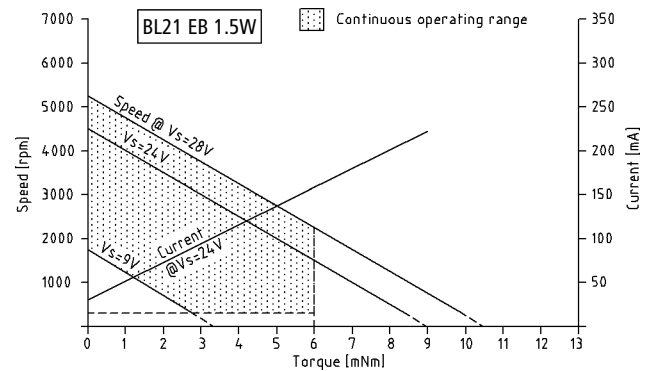
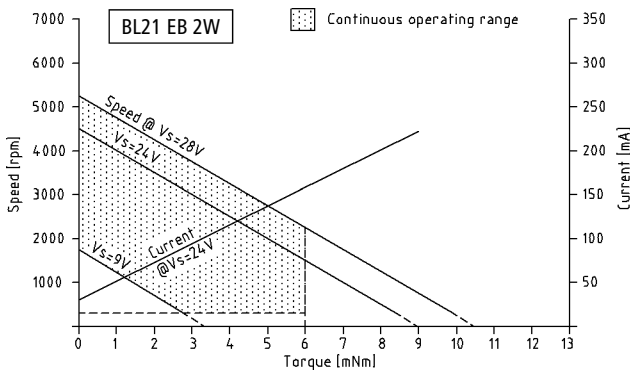
Notes: Values valid for nominal voltage and $T_{amb} = 22\text{ }^{\circ}\text{C}$

1) Motor mounted to heatsink

2) At $T_{amb} = 50\text{ }^{\circ}\text{C}$, 230 mA, 125 mA, respectively

3) Requires 2 mm dia. motor shaft

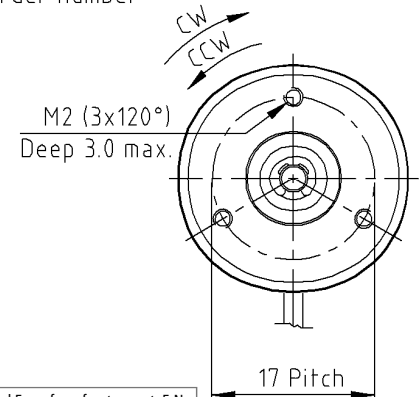
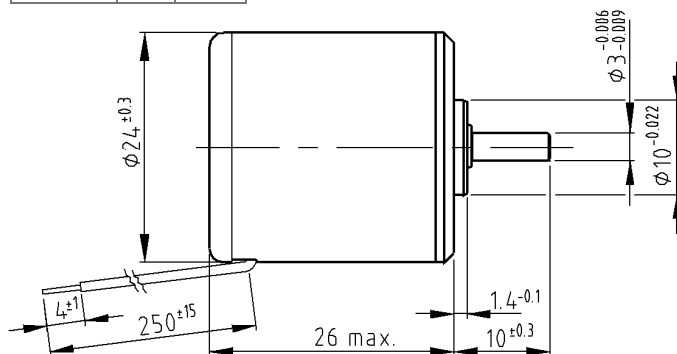
PERFORMANCE



DIMENSIONS

| Connection | Color | Size |
|------------|-------|-------|
| Supply | Red | AWG26 |
| Common | Blu | AWG26 |

Direction of rotation depending on motor order number



Shaft max. radial load 5mm from front mount: 5 N

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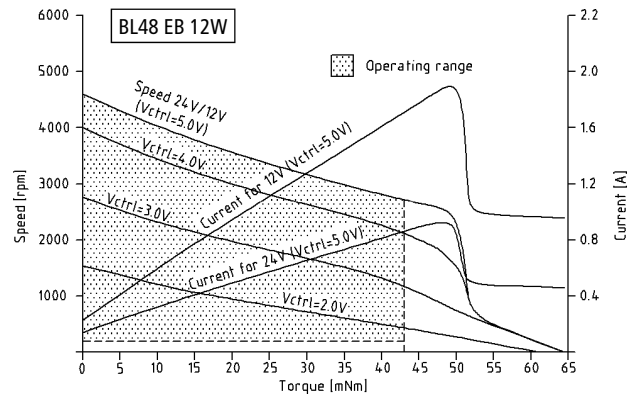
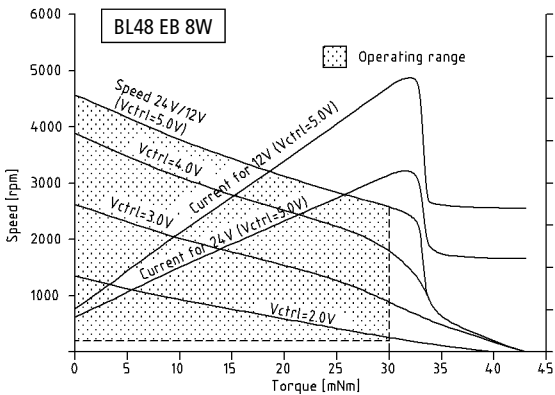
BL48 EB Series 8W and 12W BLDC Motors

SPECIFICATIONS

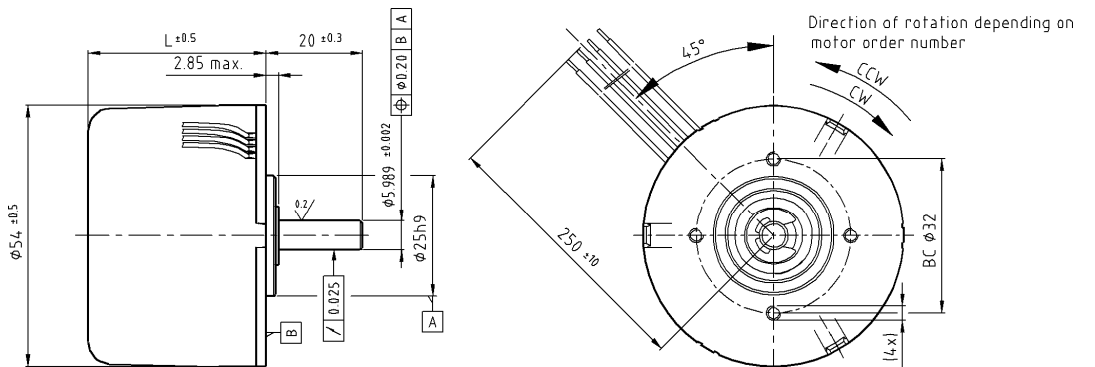
| Model | CW | 4322 016 + | 48007 | 48017 | 48027 | 48037 |
|--------------------------------------|--|------------------|---------|---------|----------------|-------|
| | CCW | 4322 016 + | 48003 | 48013 | 48023 | 48033 |
| Housing Length, L | mm | 30 | | | 36.75 | |
| Nominal Voltage | V | 12 | 24 | 12 | 24 | |
| Voltage Range | V | 10 - 15 | 14 - 28 | 10 - 15 | 14 - 28 | |
| Max. Output Power ¹ | W | 8 | | | 12 | |
| Nominal Torque | mNm (oz-in) | 22 (3.12) | | | 30 (4.25) | |
| Max. Continuous Torque ¹ | mNm (oz-in) | 30 (4.25) | | | 43 (6.09) | |
| Nominal Speed | RPM | 3000 | | | 3200 | |
| No-Load Speed | RPM | 4550 | | | 4600 | |
| Min. Adjustable Speed | RPM | 200 | | | | |
| Nominal Current | A | 0.98 | 0.5 | 1.28 | 0.66 | |
| Max. Continuous Current ¹ | A | 1.47 | 0.74 | 2.13 | 1.04 | |
| No-Load Current | mA | 205 | 125 | 230 | 140 | |
| Rotor Inertia | kgm ² (oz-in-s ²) | 22E-6 (3.1E-3) | | | 31E-6 (4.4E-3) | |
| Mechanical Time Constant | ms | 65 | 45 | 51 | 41 | |
| Thermal Resistance Winding-Housing | °C/W | 2 | | | | |
| Thermal Resistance Housing-Ambient | °C/W | 8 | | | | |
| Weight | g (oz) | 195 (6.88) | | | 250 (8.82) | |
| Protection | - | IP30 | | | | |
| Gearbox (option) | - | P42A, S64A, S69A | | | | |

Notes: Values valid for nominal voltage and $T_{amb} = 22\text{ }^{\circ}\text{C}$
 1) Motor mounted to heatsink; max. flange temp = $85\text{ }^{\circ}\text{C}$

PERFORMANCE



DIMENSIONS



| Connection | Color | Size | Connection | Color | Size |
|------------|-------|-------|---------------|-------|-------|
| Supply | Red | AWG24 | Control IN | Wht | AWG24 |
| Common | Blu | AWG24 | Frequency OUT | Grn | AWG24 |

Screw insertion depth max 3mm

Shaft max. radial load 15mm from front mount: 40 N

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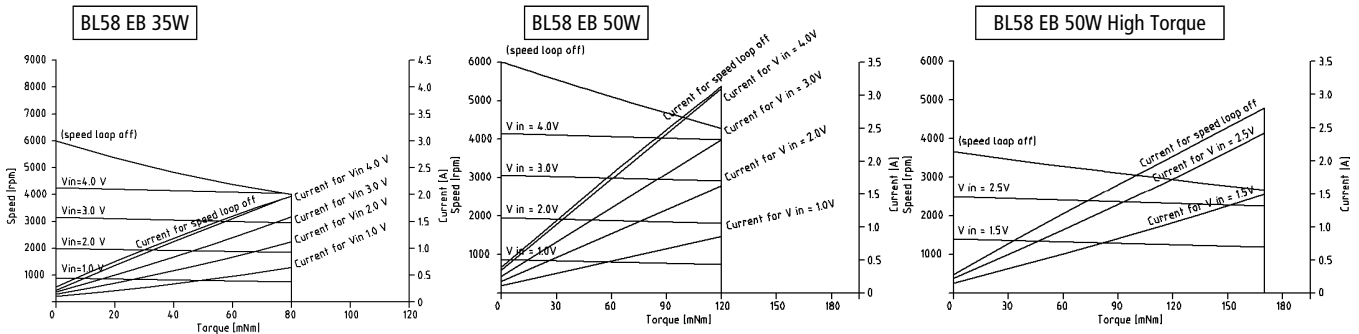
BL58 EB Series 35W and 50W BLDC Motors

SPECIFICATIONS

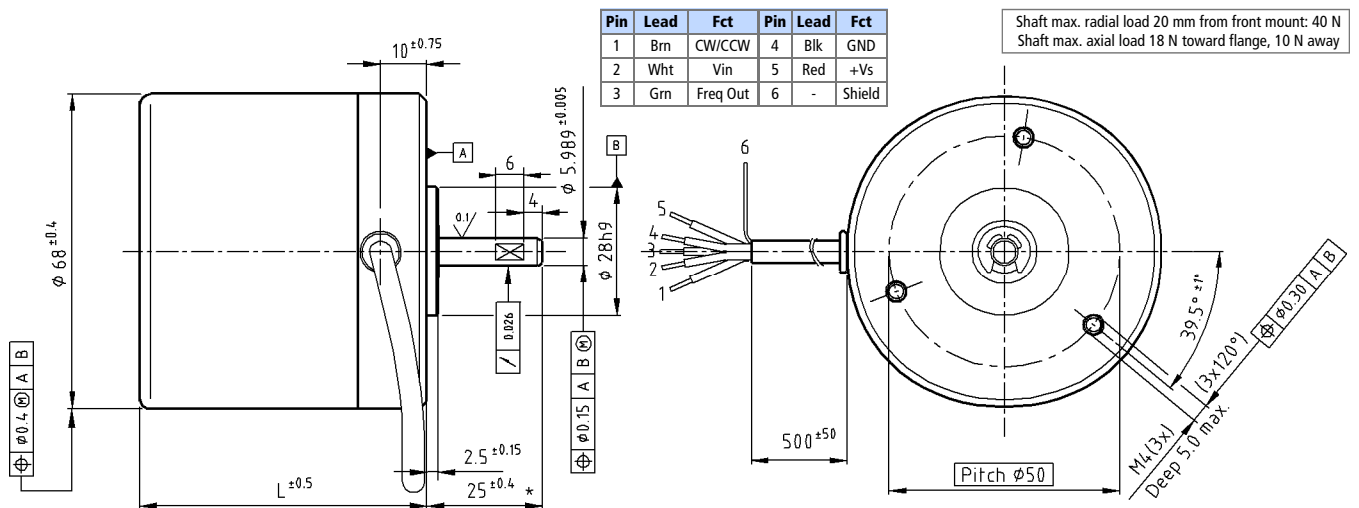
| Model | Shaft L = 25 mm | 4322 016 + | 58041 | 58013 | 58023 |
|--------------------------------------|--|------------------|----------------|------------------|----------------|
| | Shaft L = 20 mm | 4322 016 + | 58042 | 58014 | 58024 |
| Housing Length, L | mm | 49 | | 62.1 | |
| Nominal Voltage | V | | | 24 | |
| Max. Output Power ¹ | W | 35 | | 50 | |
| Nominal Torque | mNm (oz-in) | 80 (11.3) | 114 (16.1) | | 170 (24) |
| Max. Continuous Torque ¹ | mNm (oz-in) | 80 (11.3) | 114 (16.1) | | 170 (24) |
| Nominal Speed | RPM | | 4000 | | 2700 |
| No-Load Speed | RPM | | 6000 | | 3650 |
| Nominal Current | A | 2 | | 3 | |
| Max. Continuous Current ¹ | A | 2 | 3.4 | | 3 |
| No-Load Current | mA | 215 | 260 | | 265 |
| Rotor Inertia | kgm ² (oz-in-s ²) | 0.75E-4 (0.0106) | 1.2E-4 (0.017) | | 1.2E-4 (0.017) |
| Mechanical Time Constant | ms | 30 | 40 | | 25 |
| Thermal Resistance Housing-Ambient | °C/W | 4 | 3.7 | | 3.7 |
| Weight | g (oz) | 450 (15.9) | 550 (19.4) | | 550 (19.4) |
| Protection | - | | | IP54 | |
| Gearbox (option) ² | - | | | P50A, P59A, S69A | |

Notes: Values valid for nominal voltage and $T_{amb} = 22\text{ }^{\circ}\text{C}$
 1) Motor mounted to heatsink; max. flange temp = $90\text{ }^{\circ}\text{C}$
 2) Requires 20 mm shaft length model

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