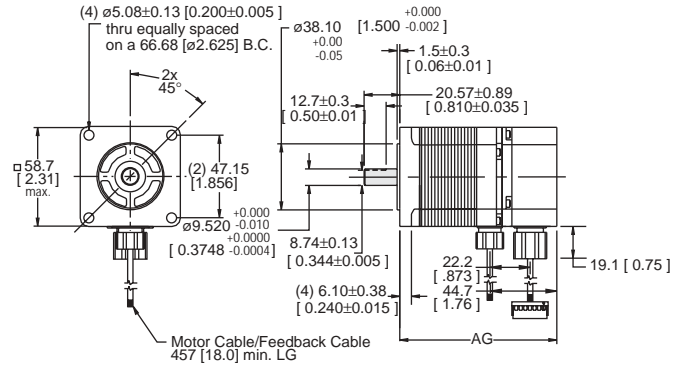


# PMB MOTORS

## Pacific Scientific PMB Brushless Servo Motors



### PMB2 SERIES MOTOR mm [in]



#### Features

##### PMB Series Motors

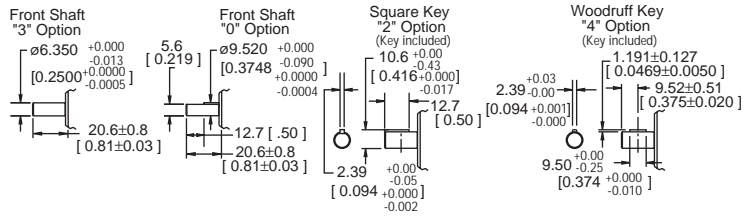
MS or AMP mini Mate-N-Lock® connector options

IP40 Construction

#### Benefits

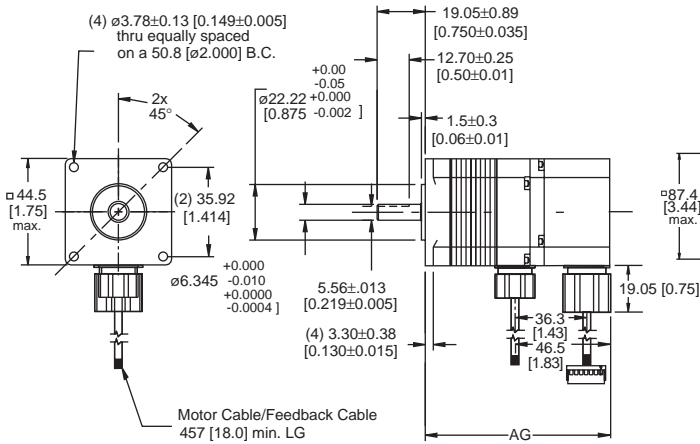
Improved application flexibility

Improved cost-effectiveness for higher volume applications



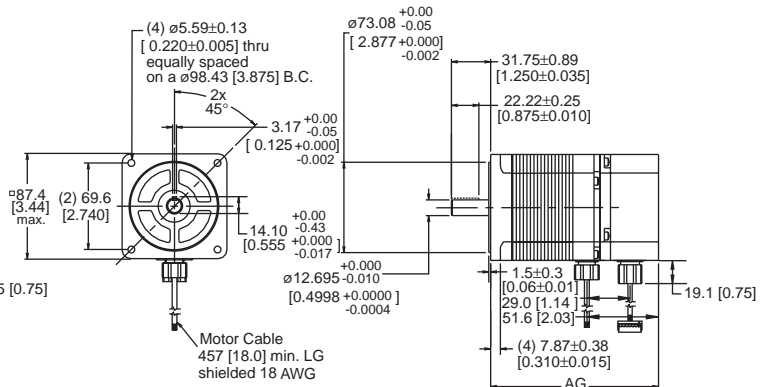
Motor	Length (AG)	Inertia - with resolver		Inertia - with encoder	
	mm (in)	kgm <sup>2</sup> x10 <sup>-3</sup>	lb-in-sec <sup>2</sup> x10 <sup>-3</sup>	kgm <sup>2</sup> x10 <sup>-3</sup>	lb-in-sec <sup>2</sup> x10 <sup>-3</sup>
PMB21	112.8 (4.44)	.023	.206	.023	.201
PMB22	142.0 (5.59)	.044	.390	.044	.385
PMB23	176.3 (6.94)	.065	.576	.065	.571

### PMB1 SERIES MOTOR mm [in]

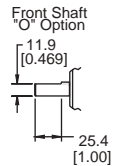


Motor	Length (AG)	Inertia - with resolver		Inertia - with encoder	
	mm (in)	kgm <sup>2</sup> x10 <sup>-3</sup>	lb-in-sec <sup>2</sup> x10 <sup>-3</sup>	kgm <sup>2</sup> x10 <sup>-3</sup>	lb-in-sec <sup>2</sup> x10 <sup>-3</sup>
PMB11	108.0 (4.25)	0.006	0.050	0.005	0.045
PMB12	133.4 (5.25)	0.009	0.084	0.009	0.079
PMB13	158.8 (6.25)	0.013	0.118	0.013	0.113

### PMB3 SERIES MOTOR mm [in]



Motor	Length (AG)	Inertia - with resolver		Inertia - with encoder	
	mm (in)	kgm <sup>2</sup> x10 <sup>-3</sup>	lb-in-sec <sup>2</sup> x10 <sup>-3</sup>	kgm <sup>2</sup> x10 <sup>-3</sup>	lb-in-sec <sup>2</sup> x10 <sup>-3</sup>
PMB31	134.1 (5.28)	0.137	1.21	0.137	1.21
PMB32	172.2 (6.78)	0.270	2.39	0.270	2.39
PMB33	210.3 (8.28)	0.404	3.57	0.403	3.57



# PMB MOTORS

## Pacific Scientific PMB Brushless Servo Motors

### RATINGS AND CHARACTERISTICS

Motor parameters and winding data. System pairings are available, see the Servo Selection Guide located on the MOTIONEERING® CD-ROM bound into the back inside cover of this catalog.

PMB1-2 SERIES MOTORS	PARAMETER	SYMBOL	UNITS	PMB11	PMB12	PMB13	PMB21	PMB22	PMB23
	Continuous stall torque ① ②	T <sub>CS</sub>	N-m (lb-in)	0.22 (1.95)	0.40 (3.5)	0.55 (4.9)	0.59 (5.2)	1.11 (9.8)	1.53 (13.5)
	Peak torque ③ ④	T <sub>PK</sub>	N-m (lb-in)	0.66 (5.8)	1.2 (10.6)	1.65 (14.6)	1.85 (16.4)	3.29 (29.1)	4.59 (40.6)
	Inertia ⑤ ⑥	J <sub>M</sub>	kgm <sup>2</sup> x10 <sup>-3</sup> (lb-in-sec <sup>2</sup> x10 <sup>-3</sup> )	0.0054 (0.048)	0.0093 (0.082)	0.0127 (0.112)	0.023 (0.204)	0.0438 (0.388)	0.065 (0.574)
	Static friction (max.)	T <sub>f</sub>	N-m (lb-in)	0.008 (0.07)	0.011 (0.1)	0.015 (0.13)	0.034 (0.30)	0.068 (0.60)	0.102 (0.90)
	Viscous damping coefficient	K <sub>DV</sub>	N-m/krpm (lb-in/krpm)	0.0023 (0.02)	0.0045 (0.04)	0.0068 (0.06)	0.0079 (0.07)	0.124 (0.11)	0.0181 (0.160)
	Thermal resistance	R <sub>TH</sub>	deg. C/watt	2.4	2.4	2.0	1.45	1.3	1.2
	Thermal time constant	t <sub>TH</sub>	min	12.0	14.0	16.0	22	24	26
	Weight (motor only)	W	kg (lbs)	0.6 (1.4)	0.7 (1.6)	1.3 (2.9)	1.2 (2.7)	2.1 (4.6)	2.9 (6.4)
	WINDING DATA				B-D	B-D	B-D	B-D	B-D
Torque constant (RMS)	K <sub>T</sub>	N-m/A <sub>RMS</sub> (lb-in/A <sub>RMS</sub> )	0.096 (0.85)-0.048 (0.42)	0.17 (1.48)-0.087 (0.77)	0.25 (2.2)-0.12 (1.05)	0.25 (2.24)-0.14 (1.21)	0.43 (3.8)-0.23 (2.01)	0.61 (5.39)-0.45 (4.0)	
Voltage constant (RMS) (I-I)	K <sub>E</sub>	V <sub>RMS</sub> /rad/sec (V <sub>RMS</sub> /krpm)	0.061 (6.4)-0.031 (3.2)	0.106 (11.1)-0.055 (5.8)	0.159 (16.6)-0.075 (7.9)	0.16 (16.8)-0.09 (9.1)	0.27 (28.8)-0.14 (15.1)	0.39 (40.5)-0.29 (30.0)	
Continuous stall current ① ②	I <sub>CS</sub>	A <sub>RMS</sub>	2.3-4.6	2.4-4.6	2.2-4.6	2.4-4.3	2.6-4.9	2.5-3.4	
Current at peak torque ④	I <sub>PK</sub>	A <sub>RMS</sub>	6.9-13.8	7.2-13.8	6.6-13.8	7.5-13.5	7.8-14.7	7.5-10.2	
Resistance (line-to-line)	R <sub>C</sub>	ohms	4.45-1.15	4.15-1.15	5.2-1.25	6.6-1.84	6.4-1.8	7.8-3.8	
Inductance (line-to-line)	L	mH	3.2-0.8	3.5-1.0	4.8-1.1	5.5-1.6	6.7-1.9	8.4-4.3	
Typical Rated Speed @ 36 VAC, 48 VDC bus	W <sub>R</sub>	rpm	700-5,800	600-3,300	n/a-2,450	n/a-1,100	n/a-700	n/a-n/a	
Typical Rated Torque @ 36 VAC, 48 VDC bus	T <sub>CR</sub>	N-m (lb-in)	0.22 (1.95)-0.20 (1.77)	0.40 (3.5)-0.38 (3.4)	n/a (n/a)-0.50 (4.4)	n/a (n/a)-0.59 (5.2)	n/a (n/a)-1.10 (9.7)	n/a (n/a)-n/a (n/a)	
Typical Rated Speed @ 240 VAC, 320 VDC bus	W <sub>R</sub>	rpm	n/a	n/a	11,500-n/a	9500-n/a	6,000-n/a	4,100-6,350	
Typical Rated Torque @ 240 VAC, 320 VDC bus	T <sub>CR</sub>	N-m (lb-in)	n/a (n/a)	n/a	0.37 (3.27)-n/a (n/a)	0.42 (3.7)-n/a (n/a)	0.9 (8.0)-n/a (n/a)	1.33 (11.8)-1.17 (10.4)	
PMB3 SERIES MOTORS	PARAMETER	SYMBOL	UNITS	PMB31	PMB32	PMB33			
	Continuous stall torque ① ②	T <sub>CS</sub>	N-m (lb-in)	2.03 (18)	3.8 (33.6)	5.3 (46.9)			
	Peak torque ③ ④	T <sub>PK</sub>	N-m (lb-in)	6.1 (53.9)	11.4 (101)	15.9 (141)			
	Inertia ⑤ ⑥	J <sub>M</sub>	kgm <sup>2</sup> x10 <sup>-3</sup> (lb-in-sec <sup>2</sup> x10 <sup>-3</sup> )	0.137 (1.21)	0.272 (2.41)	0.408 (3.61)			
	Static friction (max.)	T <sub>f</sub>	N-m (lb-in)	0.09 (0.80)	0.12 (1.10)	0.169 (1.50)			
	Viscous damping coefficient	K <sub>DV</sub>	N-m/krpm (lb-in/krpm)	0.0124 (0.110)	0.026 (0.23)	0.038 (0.34)			
	Thermal resistance	R <sub>TH</sub>	deg. C/watt	1.1	0.9	0.78			
	Thermal time constant	τ <sub>TH</sub>	min	28	30	32			
	Weight (motor only)	W	kg (lbs)	2.5 (5.5)	4.4 (9.7)	6.3 (13.8)			
	WINDING DATA				B-D	C-D-E	C-E-F		
	Torque constant (RMS)	K <sub>T</sub>	N-m/A <sub>RMS</sub> (lb-in/A <sub>RMS</sub> )	0.77 (6.83)-0.40 (3.51)	1.32 (11.7)-0.75 (6.62)-0.57 (5.06)	1.85 (16.4)-0.92 (8.2)-0.59 (5.3)			
	Voltage constant (RMS) (I-I)	K <sub>E</sub>	V <sub>RMS</sub> /rad/sec (V <sub>RMS</sub> /krpm)	0.49 (51.3)-0.25 (26.4)	0.838 (87.7)-0.475 (49.7)-0.363 (38.0)	1.17 (123)-0.586 (61.4)-0.377 (39.5)			
	Continuous stall current ① ②	I <sub>CS</sub>	A <sub>RMS</sub>	2.64-5.1	2.88-5.1-6.7	2.9-5.8-9.0			
	Current at peak torque ④	I <sub>PK</sub>	A <sub>RMS</sub>	7.9-15.3	8.64-15.3-20.1	8.6-17.3-27.0			
	Resistance (line-to-line)	R <sub>C</sub>	ohms	7.5-2.0	7.7-2.4-1.46	8.4-2.1-0.86			
Inductance (line-to-line)	L	mH	16-4.2	19.3-6.2-3.6	23.4-5.8-2.4				
Typical Rated Speed @ 240 VAC, 320 VDC bus	W <sub>R</sub>	rpm	3,100-6,550	1,900-3,600-4,650	1,350-3,050-4,850				
Typical Rated Torque @ 240 VAC, 320 VDC bus	T <sub>CR</sub>	N-m (lb-in)	1.94 (17.2)-1.53 (13.5)	3.6 (31.9)-3.4 (30.1)-3.1 (27.4)	4.9 (43.3)-4.6 (40.7)-3.75 (33.3)				

Note: All values at 25°C unless otherwise noted. All Inertias are shown with a Resolver.

① Motor operated at rated winding temperature rise of Δt = 100°C above ambient at 25°C ambient. Ratings result of average rating between free air and cold plate mounting. Equivalent to mounting to a 10" x 10" x 1/4" aluminum heat sink. | ② All tests performed with sinusoidal commutation. | ③ Theoretical motor maximum. | ④ Caution: For peak torques or peak currents greater than 4x the continuous rating, consult the factory for thermal considerations. | ⑤ Motor with resolver feedback.