

HIGH PERFORMANCE **SERVO MOTORS**



- 5 Frame Sizes № 55, 70, 115, 142 and 190mm Square
- 0.21 54 Nm Continuous Torque Range

■ PMB Series

- 3 Frame Sizes
- Size 17, NEMA 23 and 34 Mounts
- $\bullet~0.22$ 4.8~Nm Continuous Torque Range

S Series

- 2 Frame Sizes
- Available in NEMA 23 and 34 Mounts
- 0.5 6.6 Nm Continuous Torque Range

R Series

- \bullet 5 Frame Sizes ${\tt N}$ 2, 3.25, 4.25, 5.75 and 7.5 Inches Square
- Explosion Proof Models Available
- 0.32 50 Nm Continuous Torque Range



PACIFIC SCIENTIFIC BRUSHLESS SERVO MOTORS





A Full Spectrum of Powerful Brushless Servomotors

Pacific Scientific servomotors are built for long, maintenance-free service life. Once installed, you probably won't have to look at them



again. The motors in the following pages feature Neodymium-iron-boron or Samarium cobalt magnets for the highest torque-to-inertia ratios possible. Anti-cog stator designs deliver smooth low-speed performance.

PMA Series

The PMA Series of brushless servomotors delivers a comprehensive line of rugged, costeffective servomotors. Covering frame sizes from 55mm square to 190mm square and a continuous rated torque range of 0.21 to 54 Nm, these motors offer an economic means to satisfy the requirements of your application. Standard IP65 sealing and the availability of IP67 washdown duty as an option on selected models allows the PMA Series to stand up to the rigors of the factory floor. Global certifications and input voltages on most models to 650 volts assure your machine's acceptance worldwide.

PMB Series

The PMB Series of brushless servomotors introduces an IP40 construction motor in three frames; size 17 and NEMA 23 & 34 to address your need for a high-performance motor in higher-volume applications. With a continuous rated torque range from 0.22 to 4.8 Nm, the cost-effective PMB motors complement our full line of servos.



S Series

The S Series brushless servomotors offer continuous torques from 0.5 to 6.6 Nm. Available in two frame sizes with both metric and NEMA 23 & 34 mounting faces, these compact motors squeeze a lot of torque into a small package.



R Series

R Series servomotors offer the highest torque-to-inertia ratios in the industry. Engineered for the highest dynamic response available, these motors come in five frame sizes – both NEMA and metric mountings. The R Series covers a continuous rated torque range from 0.32 to 50 Nm.

Pacific Scientific Digital Brushless Servo Drives – Harness the Power

When these motors are combined with Pacific Scientific's broad offering of digital brushless servo drives, they offer a cost-effective, high-performance solution that's tough to beat. The systems package motors shown on pages 5 to 9 are only the tip of the iceberg. All of the brushless servomotors are customizable — often with minimal impact on delivery times. From feedback options to application-specific windings, we can help with your servo needs.

Pacific Scientific's SC/SCE900 series brushless servo drives continue to be the flagship of our servo drives. No other brushless servo drive offers higher performance. No other drive offers broader functionality.

The PC800 family of brushless servo drives offers a cost-effective, small drive with the best lead time in the industry.

BRUSHLESS SERVO MOTORS FEATURES & BENEFITS

FEATURES



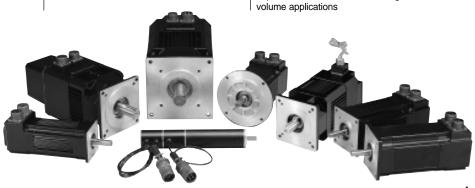
The PC3400 Series of brushless servo drives brings to you a family of cost-effective, easy-to-use, intelligent servos from the leaders in service and performance.

Smart technology. Motion simplified.

These systems are a prime example of Pacific Scientific's commitment to offer you smart technology — the highest-performance products available, customized to suit your applications, and backed by unmatched customer support and quality. We want to help make your job easier. For more information, contact our Customer Response Center at (815) 226-3100, or visit our website at www.pacsci.com.

BENEFITS

PMA/S/R Series Motors	
Rugged Brushless Construction	Eliminates brush replacement maintenance Stands up to the rigors of the factory floor
High torque over wide speed range	Improved machine throughput
Anti-cog motor design	Smooth low-speed operation
IP65 TENV construction standard	Withstands rigorous environments
Two year warranty	Quality and reliability for reduced machine downtime
Class H insulation	Longer life for reduced machine downtime
Overtemperature thermistor	Protection against motor damage
Global approvals and agency recognition	Eases recognition process for a machine
Multiple feedback options	Allows numerous control methods
Brake option	Improved machine safety
PMA/S Series Motors	
IP67 protection on selected PMA models	Withstands washdown
Neodymium-iron-boron magnets	Maximum performance, maximum value
High quality Interconnectron connectors	Faster installation and maintenance
High voltage models available	Improved application flexibility
S/R Series Motors	
NEMA mounting available	Improved application flexibility
Steel bearing inserts	Longer life for reduced machine downtime
R Series Motors	
High torque-to-inertia ratios	Fast acceleration, improved dynamic response
PMB Series Motors	
MS or AMP mini Mate-N-Lock® connector options	Improved application flexibility
IP40 Construction	Improved cost-effectiveness for higher



SELECTION OVERVIEW



			Ty Rated	pical Maximum Continuous Torque (Nm) and Speed (rpi	m)
			Torque Range	Speed Range	Page
48V dc bus Brushless	PMB	PMB1	0.22 - 0.50	700 - 6,450	17
Servomotors	, MD	PMB2	0.61 - 1.10	600 - 1,300	18

			Typ Rated	pical Maximum Continuous Torque (Nm) and Speed (rp	m)
			Torque Range	Speed Range	Page
		PMA1	0.21 - 0.60	7,000 - 9,000	11
		PMA2	0.50 - 2.2	3,000 - 6,450	12
	PMA	PMA4	3.4 - 9.9	600 - 4,700	13
240V ac, 320V dc bus		PMA5	8.8 - 20.5	900 - 3,450	14
		PMA6	24.5 - 48.5	950 - 1,750	15
		PMB1	0.14	11,000	17
Brushless	PMB	PMB2	0.45 - 1.40	4,400 - 10,000	18
Servomotors		PMB3	1.62 - 4.84	1,300 - 6,000	19
	S Series	S20	0.32 - 1.5	3,400 - 12,500	21
	S Series	S30	1.9 - 6.4	1,300 - 3,900	22
		R20	0.17 - 1.0	3,000 - 11,000	24
		R30	0.76 - 3.7	1,700 - 7,000	26
	R Series	R40	3.6 - 7.3	1,500 - 5,300	27
		R60	4.4 - 17.6	1,400 - 6,000	28
		R80	10.1 - 48.6	1,200 - 4,000	29
	R Series	R30P	0.62 - 3.0	1,900 - 7,000	30
	Explosion Proof	R60P	3.6 - 14.4	1,500 - 6,000	31

			Typ Rated	ical Maximum Continuous Torque (Nm) and Speed (rpr	n)
			Torque Range	Speed Range	Page
400V as ECOV de bus		PMA4	3.0 - 9.5	1,600 - 6,000	13
400V ac, 560V dc bus Brushless	PMA	PMA5	7.2 - 19.0	1,900 - 4,200	14
Servomotors		PMA6	19.0 - 43.8	1,350 - 3,300	15
	S Series	S30	4.0 - 4.3	3,000	22

			Tyj Rated	pical Maximum Continuous Torque (Nm) and Speed (rpi	m)					
Torque Range Speed Range										
490V as 640V de bue		PMA4	2.6 - 9.3	2,100 - 6,800	13					
480V ac, 640V dc bus Brushless	PMA	PMA5	6.8 - 18.6	2,200 - 4,750	14					
Servomotors		PMA6	17.5 - 42.2	1,600 - 3,800	15					
	S Series	S30	3.6 - 3.9	3,600 - 3,900	22					

INDEX



How to use this selection guide

Use the selection overview on page 2 to identify motors available to fit your system voltage, torque and speed requirements. Detailed system combinations with ratings are shown on pages 5 - 9. The table of contents to the right will help you find more information on each motor family.

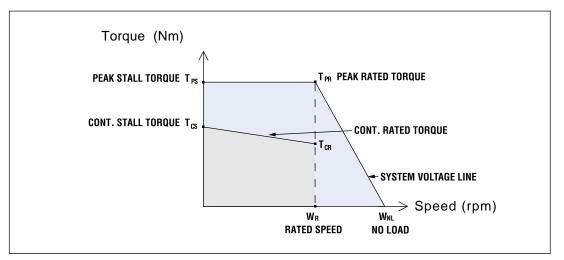
Information on the Pacific Scientific drives mentioned in the following pages can be found in the Pacific Scientific publication "High Performance Servo Drives." A Copy of this publication can be obtained by calling Pacific Scientific, or you can get one by visiting our website at www.pacsci.com

- If you are already familiar with these motors and their available options, refer to the Model Number Codes on pages 10, 16, 20, 23 and 25 to verify coded information prior to ordering.
- If you are not familiar with these motors and their available options, refer to the index at the right. Note that each frame size is covered individually and the technical data (last) applies to all motors. Construct a model number after all the technical parameters, including options, are determined.

Our sizing and selection program, OptimizerTM 3.0 can be helpful in determining the correct motor for your application. Input the parameters for your specific application and specify your drive voltage, current and output type and Optimizer will find the motors that fit the bill. Ask for your copy today.

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HOW TO BUILD A SERVO DRIVE & MOTOR SYSTEM



System torque/speed information on the following pages are designed to help you select the optimum brushless servo motor/controller combination.

The nominal values in this data illustrate performance for the recommended motor/controller systems.

DRIVE & MOTOR PERFORMANCE CURVES

The performance characteristics of a brushless servo system (motor/ controller combination) are described by a torque/speed operating envelope. As shown above, the shaded areas of the curve indicate the continuous duty and intermittent duty zones of the system.

Continuous Duty Zone

The continuous duty zone is bordered by the maximum continuous torque line up to the rated speed of the motor.

The continuous torque line is set by either the motor's maximum rated temperature, or the controller's rated continuous current output, whichever is less. The system voltage line is set by the voltage rating of the controller, the line voltage supplied, and the motor winding.

The system can operate on a continuous basis anywhere within this area, assuming the motor temperature is 40°C or less, ambient. Refer to the Test Conditions on the pages that follow.

Intermittent Duty Zone

The intermittent duty zone is bordered by the peak torque line and the system voltage line.

The peak torque line is set by either the controller's peak current rating, which the

controller can produce for a limited time, or the maximum rated current for the motor, whichever is less. Refer to the Rating Data on the pages that follow.

NOTE: higher torque levels may be achievable at higher power levels. Consult Pacific Scientific for more details.

The system voltage line is set by the voltage rating of the controller, the line voltage applied and the motor winding.

Operation in the intermittent zone must be limited to a duty cycle that will produce an RMS system torque falling within the continuous duty area. The RMS torque value is defined by the magnitude of the intermittent torque and the percentage of the time spent at that torque.

Zero - Peak, or RMS?

Current brushless drive technology uses a sinusoidal output. Pacific Scientific rates its systems using RMS values to accurately reflect system performance operating with a sinusoidal waveform.

Older published ratings were based on 0 - peak values, using a trapezoidal waveform.

Optimizer 3.0

For more information on any motor on the following pages, or to take a closer look at

detailed torque/speed information, take a look at our sizing and selection program, Optimizer™ 3.0. With Optimizer's sine/trapezoidal conversion algorithm, you can see how our motors pair up with a trapezoidal drive, too. Call Pacific Scientific at 815-226-3100 to get your free copy today, or visit our website at www.pacsci.com.

Additional References

On the pages that follow, each individual system has reference points in a table. In addition to rating points for peak (T_{PS}) and continuous torque (T_{CS}) ratings at stall, each system has:

- Rated speed (W_P)
- Continuous torque at rated speed (T_{CR})
- Peak torque at rated speed (T_{PR})
- Motor unloaded speed (W_{NL})

To construct a curve, follow the guidelines presented in the generic curve above. System rated speeds and torques are based on the intersection of the system voltage line and the peak current line. Differing peak currents will impact rated system speeds.

The points are provided for reference for use in comparing and sizing systems.

SERVO MOTORS

RECOMMENDED MOTOR/DRIVE SYSTEMS, 48V dc bus°2

Servo Motor Model®	Servo Drive Model	Peak Stall Torque T _{Ps} [©] Nm (lbin.)	Peak Rated Torque T _{PR} ²⁰ Nm (lbin.)	Cont. Stall Torque T _{cs} Nm (lbin.)	Cont. Rated Torque T _{CR} Nm (lbin.)	Rated Speed W _R [®] rpm	No-Load Speed W _{NL} rpm	Cont. Stall Current I _{CS} A _{RMS}	Current at Peak Torque I _{PS} A _{RMS}	J	Inductance Line-Line L mH
PMB Series m	notors with PC340XD I	Drives									
PMB11B	PC3402	0.45 (4.0)	0.45 (4.0)	0.22 (2.0)	0.22 (2.0)	1,000	5,000	2.4	5.0	0.005 (0.045)	2.5
PMB11D	PC3405	0.45 (4.0)	0.44 (3.9)	0.22 (2.0)	0.20 (1.8)	6,450	10,000	4.8	10.0	0.005 (0.045)	0.6
PMB12B	PC3402	0.80 (7.1)	0.79 (7.0)	0.40 (3.5)	0.40 (3.5)	700	2,900	2.5	5.0	0.009 (0.079)	3.3
PMB12D	PC3405	0.83 (7.3)	0.82 (7.3)	0.40 (3.5)	0.38 (3.3)	3,500	5,600	4.7	10.0	0.009 (0.079)	0.9
PMB13D	PC3405	1.11 (9.8)	1.10 (9.7)	0.55 (4.9)	0.50 (4.4)	2,350	4,150	4.8	10.0	0.013 (0.113)	1.1
PMB21D	PC3405	1.27 (11.2)	1.26 (11.2)	0.64 (5.7)	0.61 (5.4)	1,300	3,600	5.0	10.0	0.023 (0.201)	1.2
PMB22D	PC3405	2.2 (19.5)	2.2 (19.5)	1.11 (9.8)	1.10 (9.7)	600	2,150	5.0	10.0	0.044 (0.385)	1.5

① See page 4 for definitions of ratings.

RECOMMENDED MOTOR/DRIVE SYSTEMS, 240V ac, 320V dc busº

		Peak Stall	Peak Rated	Cont. Stall	Cont. Rated	Rated	No-Load	Cont. Stall	Current at	Inertia [®]	ductance
Servo	Servo	Torque	Torque	Torque	Torque	Speed	Speed	Current	Peak Torque	kgm² x 10 ⁻³ Li	ine-Line
Motor	Drive	T _{PS} ®	T _{PR}	T _{cs}	T _{CR}	W _R ®	W _{NI}	I _{cs}	I _{PS}	(lbinS ²	L
Model®	Model	Nm (lbin.)	Nm (lbin.)	Nm (lbin.)	Nm (lbin.)	rpm	rpm	A _{RMS}	A _{RMS}	x 10 ⁻³)	mH
	s motors with PC8xx and										
PMA11A	PC8x2, SC9x2/SCE9x2®	1.4 (12.4)	1.4 (12.4)	0.26 (2.3)	0.22 (1.9)	6,600	12,900	0.96	5.3	0.012 (0.102)	7.1
PMA12A	PC8x2, SC9x2/SCE9x2®	1.7 (14.8)	1.7 (14.7)	0.6 (5.3)	0.47 (4.2)	8,500	10,800	1.88	5.3	0.019 (0.164)	4.3
PMA13B	PC8x2, SC9x2/SCE9x2 ²	1.7 (15.3)	1.7 (15.2)	0.9 (8.0)	0.6 (5.3)	9,000	10,600	2.73	5.3	0.026 (0.226)	2.7
PMA21B	PC8x2, SC9x2/SCE9x2®	1.8 (16.3)	1.8 (16.2)	0.63 (5.6)	0.50 (4.4)	6,050	9,250	1.72	5.3	0.022 (0.19)	10.5
PMA22B	PC8x3, SC9x3 [©]	4.7 (42.0)	4.7 (41.9)	1.3 (11.5)	1.1 (9.4)	4,650	7,100	2.65	10.6	0.038 (0.34)	7.4
PMA22B	PC8x2, SC9x2/SCE9x2®	2.6 (22.7)	2.5 (22.5)	1.3 (11.5)	1.0 (8.9)	5,750	7,100	2.65	5.3	0.038 (0.34)	7.4
PMA23B	PC8x2, SC9x2/SCE9x2®	3.9 (34.2)	3.9 (34.1)	2.0 (17.7)	1.6 (14.6)	3,600	4,700	2.7	5.3	0.055 (0.49)	6.8
PMA23C	PC8x3 [©]	5.9 (52.4)	5.9 (52.2)	2.0 (17.7)	1.6 (14.2)	4,200	5,850	3.4	10.6	0.055 (0.49)	10.6
PMA23D	PC8x4 [©]	7.3 (64.6)	7.3 (64.3)	2.0 (17.7)	1.4 (12.3)	6,400	8,750	5.0	20.0	0.055 (0.49)	3.0
PMA23D	SC9x3 [©]	4.2 (36.8)	4.1 (36.6)	2.0 (17.7)	1.3 (11.5)	7,400	8,750	5.0	10.6	0.055 (0.49)	3.0
PMA24C	PC8x3 [©]	7.9 (70.2)	7.9 (70.9)	2.6 (23.0)	2.2 (19.5)	3,000	4,350	3.3	10.6	0.072 (0.64)	8.9
PMA24D	PC8x4 [©]	9.5 (84.1)	9.5 (83.8)	2.6 (23.0)	1.9 (17.2)	4,950	6,950	5.3	21.2	0.072 (0.64)	3.5
PMA24D	SC9x3®	5.1 (45.3)	5.1 (45.0)	2.6 (23.0)	1.8 (16.1)	5,850	6,950	5.3	10.6	0.072 (0.64)	3.5
PMA42M	PC8x2, SC9x2/SCE9x2®	7.7 (67.9)	7.6 (67.7)	4.1 (36.3)	3.9 (34.5)	1,600	2,350	2.8	5.3	0.36 (3.2)	26.0
PMA42N	PC8x3 [©]	11.3 (99.9)	11.2 (99.6)	4.0 (35.4)	3.8 (33.6)	1,950	3,100	3.6	10.6	0.36 (3.2)	14.3
PMA42P	SC903 [©]	9.1 (80.4)	9.0 (79.9)	4.1 (36.3)	3.6 (31.9)	2,950	4,000	4.7	10.6	0.36 (3.2)	8.9
PMA42Q	PC8x4 [©]	12.6 (111)	12.5 (111)	4.1 (36.3)	3.4 (30.1)	3,800	5,450	6.5	21.2	0.36 (3.2)	4.7
PMA43N	PC8x3 [©]	16.9 (149)	16.8 (149)	5.9 (52.2)	5.8 (51.3)	1,250	2,050	3.6	10.6	0.52 (4.6)	20.0
PMA43P	SC903 [©]	13.8 (122)	13.8 (122)	6.1 (54.0)	5.6 (49.6)	1,850	2,600	4.6	10.6	0.52 (4.6)	13.0
PMA43Q	PC8x4 [©]	17.3 (153)	17.2 (152)	6.0 (53.2)	5.2 (46.0)	3,000	4,050	7.1	21.2	0.52 (4.6)	5.3
PMA43R	SC904 ²	12.6 (112)	12.5 (111)	6.1 (54.0)	4.5 (39.8)	4,700	5,650	10.1	21.2	0.52 (4.6)	2.7
PMA44N	PC8x3 [©]	23.3 (206)	23.2 (206)	8.2 (72.6)	7.9 (70.0)	850	1,550	3.6	10.6	0.68 (6.0)	27.0
PMA44P	PC8x3 [©]	15.9 (141)	15.9 (140)	8.0 (71.3)	7.4 (65.5)	1,750	2,250	5.3	10.6	0.68 (6.0)	12.4
PMA44Q	PC8x4 [©]	23.2 (205)	23.1 (205)	8.1 (71.6)	7.3 (64.4)	2,100	3,000	7.1	21.2	0.68 (6.0)	7.1
PMA44R	SC904 [®]	17.0 (150)	16.9 (149)	8.2 (72.6)	6.7 (59.3)	3,450	4,200	10.1	21.2	0.68 (6.0)	3.6
PMA45N	PC8x3 [©]	29.0 (256)	28.9 (256)	10.2 (90.3)	9.9 (87.6)	600	1,200	3.6	10.6	0.84 (7.4)	33.0
PMA45Q	PC8x4 [©]	29.3 (259)	29.2 (258)	10.2 (90.3)	9.4 (83.2)	1,650	2,350	7.1	21.2	0.84 (7.4)	8.7
PMA45R	SC904 [®]	21.3 (189)	21.2 (188)	10.2 (90.3)	8.9 (78.8)	2,700	3,300	10.0	21.2	0.84 (7.3)	4.4
PMA53Q	PC8x4 ²	26.9 (238)	26.8 (237)	10.5 (92.9)	9.6 (85.0)	1,300	2,250	6.8	21.2	1.92 (17.0)	15.0
PMA53R	SC904 ²	20.6 (182)	20.5 (181)	10.5 (92.9)	8.8 (77.9)	2,350	3,200	9.7	21.2	1.92 (17.0)	7.2
PMA54Q	PC8x4®	34.1 (302)	34.1 (301)	13.5 (120)	12.4 (110)	1,200	1,800	7.1	21.2	2.49 (22.0)	16.0
PMA54R	SC904 [®]	24.7 (219)	24.6 (218)	13.5 (120)	11.6 (103)	2,100	2,700	10.6	21.2	2.49 (22.0)	7.1

 $[\]ensuremath{\textcircled{1}}$ See page 4 for definitions of ratings.

² Peak torque ratings are for 1 second.

^{3 48}V dc figures shown for reference. Operation available from 18-74V dc.

④ DC drives offer operation with encoder feedback only. Inertia figures include encoder feedback.

⁽⁵⁾ Each system requires one feedback and one motor power cable.

② Peak torque ratings are for 5 seconds.

Peak torque ratings are for 2 seconds.

 $[\]ensuremath{\textcircled{4}}$ Peak torque ratings are for 1 second.

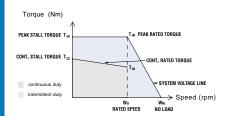
⑤ Peak torque ratings are for .5 second.

[®] Rated speed is provided for operation on 240V ac 3-phase line. Reduce to approximately 85% for 240V ac 1-phase line operation and to 40% for 120V ac 1-phase line operation.

⑦ Includes resolver feedback inertia.

[®] Each system requires one feedback and one motor power cable.

Characteristics shown with drive default parameters limited to 2.5x
the motor's continuous rating. Higher peak system performance
available. Contact the factory.



SYSTEMS PERFORMANCE DATA

RECOMMENDED MOTOR/DRIVE SYSTEMS, 240V ac, 320V dc bus^o continued

		Peak	Peak	Cont.	Cont.					Inertia [®]	
		Stall	Rated	Stall	Rated	Rated	No-Load	Cont. Stall	Current at	ე In	ductance
Servo	Servo	Torque	Torque	Torque	Torque	Speed	Speed	Current	Peak Torque	kgm² x 10 ⁻³ L	ine-Line
Motor	Drive	T _{PS} ®	T _{PR}	T _{cs}	T _{CR}	W_R	W _{NL}	I _{cs}	I _{PS}	(lbinS ²	L
Model®	Model	Nm (lbin.)	Nm (lbin.)		Nm (lbin.)	rpm	rpm	A _{RMS}	A _{RMS}	x 10 ⁻³)	mH
PMA55Q	PC8x4 [©]	43.0 (380)	42.9 (379)	17.0 (151)	16.0 (141)	900	1,450	7.1	21.2	3.06 (27.1)	20.0
PMA55R	SC904 [©]	31.1 (276)	31.0 (274)	17.0 (151)	15.2 (135)	1,650	2,150	10.6	21.2	3.06 (27.1)	8.8
PMA55S	SC905 [©]	31.0 (274)	30.7 (272)	17.0 (151)	13.1 (116)	3,450	4,300	21.3	42.4	3.06 (27.1)	2.2
PMA57R	SC904 ²	43.6 (386)	43.5 (384)	22.0 (195)	20.5 (181)	1,150	1,550	9.8	21.2	4.21 (37.3)	12.5
PMA57S	SC905 [©]	43.8 (388)	43.6 (386)	22.0 (195)	18.4 (163)	2,450	3,050	19.5	42.4	4.21 (37.3)	3.1
PMA65S	SC905 [®]	56.8 (503)	56.6 (501)	30.0 (266)	24.5 (217)	1,750	2,400	20.9	42.4	7.9 (70.0)	5.9
PMA66S	SC905 [©]	68.9 (609)	68.6 (607)	36.0 (319)	31.0 (274)	1,450	2,000	20.7	42.4	9.4 (83.3)	7.0
PMA67S	SC905 [©]	80.3 (711)	80.1 (709)	42.0 (372)	37.0 (328)	1,250	1,700	20.7	42.4	10.9 (96.5)	8.2
PMA69S	SC905 [©]	104 (919)	104 (917)	54.0 (478)	48.5 (429)	950	1,300	20.6	42.4	13.9 (123)	10.4
PMA Series	s motors with PC34xxA D	rives									
PMA11A	PC3403 [©]	.64 (5.7)	.64 (5.7)	0.26 (2.3)	0.18 (1.6)	10,000	12,900	0.96	2.4 [®]	0.012 (0.102)	7.1
PMA12A	PC3403 [®]	1.5 (13.3)	1.5 (13.3)	0.6 (5.3)	0.47 (4.2)	8,750	10,800	1.88	4.7 [®]	0.019 (0.164)	4.3
PMA13B	PC3403 [®]	1.9 (17.3)	1.9 (17.2)	0.9 (8.0)	0.6 (5.4)	8,800	10,600	2.73	6.0	0.026 (0.226)	2.7
PMA21B	PC3403 [®]	1.5 (13.5)	1.5 (13.5)	0.63 (5.6)	0.47 (4.2)	6,800	9,250	1.72	4.3®	0.022 (0.19)	10.5
PMA22B	PC3403 [®]	2.9 (25.5)	2.9 (25.3)	1.3 (11.5)	1.0 (9.0)	5,600	7,100	2.65	6.0	0.038 (0.34)	7.4
PMA23B	PC3403 [®]	4.3 (38.5)	4.3 (38.3)	2.0 (17.7)	1.7 (14.7)	3,550	4,700	2.7	6.0	0.055 (0.49)	6.8
PMA23C	PC3403 [®]	3.5 (30.8)	3.5 (30.6)	1.8 (15.6)	1.5 (13.6)	4,900	5,850	3.0	6.0	0.055 (0.49)	10.6
PMA23D	PC3406 [®]	4.7 (41.2)	4.7 (41.1)	2.0 (17.7)	1.3 (11.7)	7,200	8,750	5.0	12.0	0.055 (0.49)	3.0
PMA24C	PC3403 [®]	4.7 (41.2)	4.6 (41.1)	2.4 (20.9)	2.1 (18.8)	3,600	4,350	3.0	6.0	0.072 (0.64)	8.9
PMA24D	PC3406 [®]	5.8 (51.6)	5.7 (51.0)	2.6 (23.0)	1.8 (16.1)	5,800	6,950	5.3	12.0	0.072 (0.64)	3.5
PMA42M	PC3403®	8.6 (76.5)	8.6 (76.3)	4.1 (36.3)	3.9 (34.6)	1,500	2,350	2.8	6.0	0.36 (3.2)	26.0
PMA42Q	PC3406 [®]	7.5 (66.3)	7.4 (65.7)	3.8 (33.5)	3.1 (27.4)	4,500	5,450	6.0	12.0	0.36 (3.2)	4.7
PMA42Q	PC3410 [®]	9.9 (88.1)	9.9 (87.5)	4.1 (36.3)	3.2 (28.3)	4,150	5,450	6.5	16.2 [®]	0.36 (3.2)	4.7
PMA43N	PC3403 [®]	9.8 (87.0)	9.8 (86.6)	4.9 (43.4)	4.8 (42.5)	1,600	2,050	3.0	6.0	0.52 (4.6)	20.0
PMA43P	PC3406 [®]	14.9 (132)	14.9 (131)	6.1 (54.0)	5.6 (49.6)	1,800	2,600	4.6	11.5 [®]	0.52 (4.6)	13.0
PMA43R	PC3410 [®]	11.9 (106)	11.8 (105)	6.0 (53.5)	4.5 (39.6)	4,750	5,650	10.0	20.0	0.52 (4.6)	2.7
PMA44N	PC3403®	13.6 (120)	13.5 (120)	6.8 (60.5)	6.7 (59.3)	1,100	1,550	3.0	6.0	0.68 (6.0)	27.0
PMA44P	PC3406 [®]	17.9 (159)	17.9 (158)	8.2 (72.6)	7.5 (65.9)	1,650	2,250	5.4	12.0	0.68 (6.0)	12.4
PMA44R	PC3410 [®]	16.1 (142)	15.9 (141)	8.1 (71.8)	6.7 (59.1)	3,500	4,200	10.0	20.0	0.68 (6.0)	3.6
PMA45N PMA45N	PC3403 [®] PC3406 [®]	16.9 (150)	16.9 (149)	8.5 (75.2)	8.4 (74.8)	850	1,200 1,200	3.0	6.0 9.0 [®]	0.84 (7.4)	33.0 33.0
PMA45R	PC3410 [®]	25.0 (221) 20.2 (179)	25.0 (221) 20.0 (178)	10.2 (90.3) 10.2 (90.3)	9.9 (87.5) 8.9 (78.6)	650 2,750	3,300	10.0	20.0	0.84 (7.4) 0.84 (7.3)	4.4
PMA53Q	PC3406 [®]	17.1 (151)	17.0 (150)	9.2 (81.4)	9.1 (80.5)	1,650	2,250	6.0	12.0	1.92 (17.0)	15.0
PMA53R	PC3410 [®]	19.6 (173)	19.5 (172)	10.5 (92.9)	8.6 (76.5)	2,400	3,200	9.7	20.0	1.92 (17.0)	7.2
PMA54R	PC3410 [®]	23.5 (208)	23.4 (207)	12.7 (113)	11.6 (103)	2,400	2,700	10.0	20.0	2.49 (22.0)	7.1
PMA55R	PC3410®	29.6 (262)	29.5 (261)	16.0 (142)	15.2 (135)	1,700	2,150	10.0	20.0	3.06 (27.1)	8.8
PMA55S	PC3420 [®]	29.4 (261)	29.2 (258)	16.0 (142)	13.1 (116)	3,500	4,300	20.0	40.0	3.06 (27.1)	2.2
PMA57R	PC3410 [®]	41.4 (367)	41.3 (366)	22.0 (195)	20.5 (181)	1,200	1,550	9.8	20.0	4.21 (37.3)	12.5
PMA57S	PC3420 [®]	41.6 (369)	41.4 (366)	22.0 (195)	18.3 (162)	2,500	3,050	19.5	40.0	4.21 (37.3)	3.1
MA65S	PC3420®	53.9 (477)	53.7 (475)	28.7 (254)	24.5 (217)	1,800	2,400	20.0	40.0	7.9 (70.0)	5.9
PMA66S	PC3420 [®]	65.3 (578)	65.1 (576)	34.8 (308)	31.0 (274)	1,450	2,000	20.0	40.0	9.4 (83.3)	7.0
PMA67S	PC3420 ^(S)	76.2 (675)	76.0 (673)	40.6 (359)	37.0 (328)	1,250	1,700	20.0	40.0	10.9 (96.5)	8.2
PMA69S	PC3420 [®]	98.5 (872)	98.3 (870)	52.4 (464)	48.5 (429)	950	1,300	20.0	40.0	13.9 (123)	10.4
PMB Series	s motors with PC8xx and	SC9xx Drives									
PMB13B	PC8x2, SC9x2/SCE9x2®	1.2 (10.9)	1.2 (10.5)	0.55 (4.9)	0.41 (3.6)	11,000	13,100	2.3	5.3	0.013 (0.118)	4.8
PMB21B	PC8x2, SC9x2/SCE9x2®	1.3 (11.5)	1.3 (11.2)	0.64 (5.7)	0.45 (4.0)	10,000	13,100	2.6	5.3	0.023 (0.206)	4.0
PMB22B	PC8x2, SC9x2/SCE9x2®	2.2 (19.2)	2.1 (18.9)	1.1 (9.8)	1.0 (8.9)	6,250	7,700	2.7	5.3	0.044 (0.390)	5.5
PMB23B	PC8x2, SC9x2/SCE9x2®	2.9 (26.1)	2.9 (25.8)	1.5 (13.6)	1.4 (12.4)	4,400	5,650	2.7	5.3	0.065 (0.576)	7.1
PMB23C	PC8x3, SC9x3 [©]	4.5 (39.8)	4.4 (39.4)	1.5 (13.6)	1.4 (12.0)	5,750	7,400	3.5	10.5	0.065 (0.576)	3.7
PMB31B	PC8x2, SC9x2/SCE9x2®	4.1 (36.6)	4.1 (36.5)	2.1 (18.7)	1.9 (16.8)	2,900	4,300	2.7	5.3	0.14 (1.21)	19.6
PMB31D	PC8x4 [®]	6.2 (55.0)	6.2 (54.7)	2.1 (18.7)	1.7 (15.0)	5,000	8,400	5.1	15.3	0.14 (1.21)	5.2
5015		1.2 (50.0)	(0)	()	(1010)	-,000	-,.00			()	

 $[\]ensuremath{\textcircled{1}}$ See page 4 for definitions of ratings.

② Peak torque ratings are for 5 seconds.

³ Peak torque ratings are for 2 seconds.

④ Peak torque ratings are for 1 second.

⑤ Peak torque ratings are for .5 second.

[®] Rated speed is provided for operation on 240V ac 3-phase line. Reduce to approximately 85% for 240V ac 1-phase line operation and to 40% for 120V ac 1-phase line operation.

⑦ Includes resolver feedback inertia.

[®] Each system requires one feedback and one motor power cable.

③ Characteristics shown with drive default parameters limited to 2.5x the motor's continuous rating. Higher peak system performance available. Contact the factory.

RECOMMENDED MOTOR/DRIVE SYSTEMS, 240V ac, 320V dc bus[®] continued

		Peak	Peak	Cont.	Cont.					Inertia®	
		Stall	Rated	Stall	Rated	Rated	No-Load	Cont. Stall	Current at	J	ductance
Servo	Servo	Torque	Torque	Torque	Torque	Speed	Speed	Current	Peak Torque	kgm² x 10 ⁻³ L	ine-Line
Motor	Drive	T _{PS}	T _{PR} ®	T _{cs}	T _{CR}	W_{R}	W _{NL}	l _{cs}	I _{PS}	(lbinS ²	L
Model®	Model	Nm (lbin.)	Nm (lbin.)	Nm (lbin.)	Nm (lbin.)	rpm	rpm	A _{RMS}	A _{RMS}	x 10 ⁻³)	mH
MB31D	SC903 [©]	4.3 (38.2)	4.3 (37.9)	2.1 (18.7)	1.6 (14.3)	6,000	8,400	5.1	10.6	0.14 (1.21)	5.2
PMB32C	PC8x2. SC9x2/SCE9x2®	6.8 (60.3)	6.8 (60.0)	3.5 (30.6)	3.0 (26.4)	1,900	2,550	2.7	5.3	0.14 (1.21)	22.5
MB32C	PC8x3, SC9x3 [©]	11.4 (101)	11.4 (101)	3.8 (34.0)	3.2 (28.4)	1,400	2,550	3.0	8.9	0.27 (2.39)	22.5
PMB32D	SC9x3 [®]	7.7 (68.4)	7.7 (68.0)	3.8 (34.0)	2.8 (25.2)	3,500	4,550	5.2	10.6	0.27 (2.39)	7.4
PMB32D	PC8x4, SC9x4 [©]	11.3 (100)	11.3 (100)	3.8 (34.0)	3.0 (26.5)	3,000	4,550	5.2	15.6	0.27 (2.39)	7.4
PMB32E	PC8x4, SC9x4 [®]	11.3 (100)	11.3 (100)	3.8 (34.0)	2.8 (25.1)	4,150	5,950	6.8	20.4	0.27 (2.39)	4.2
PMB33C	PC8x2, SC9x2/SCE9x2 ²	9.7 (86.3)	9.7 (86.0)	5.0 (44.5)	4.8 (42.8)	1,300	1,900	2.7	5.3	0.40 (3.57)	27.2
PMB33C	PC8x3, SC9x3 [©]	15.9 (141)	15.9 (141)	5.4 (48.0)	5.0 (44.3)	950	1,900	2.9	8.7	0.40 (3.57)	27.2
PMB33E	SC9x3 [©]	9.7 (86.0)	9.7 (85.5)	4.9 (43.6)	4.4 (39.0)	3,000	3,800	5.3	10.6	0.40 (3.57)	6.8
PMB33E	PC8x4, SC9x4®	16.0 (142)	15.9 (141)	5.4 (48.0)	4.6 (40.4)	2,550	3,800	5.8	17.5	0.40 (3.57)	6.8
PMB33F	SC9x4 [©]	12.5 (111)	12.5 (111)	5.4 (48.0)	4.1 (36.0)	4,500	5,700	9.0	21.2	0.40 (3.57)	2.8
	materia mitte DO24mi Deli		- ()	(/	()	,	.,			(,	
	motors with PC34xx Dri		1.0 (11.0)	0.55 (4.0)	0.41 (0.0)	11 000	10.100	0.0	0.0	0.010 (0.110)	4.0
MB13B	PC3403 [®]	1.4 (12.2)	1.3 (11.9)	0.55 (4.9)	0.41 (3.6)	11,000	13,100	2.3	6.0	0.013 (0.113)	4.8
MB21B	PC3403 [®]	1.5 (13.0)	1.4 (12.7)	0.64 (5.7)	0.45 (4.0)	10,000	13,100	2.6	4.7 [®]	0.023 (0.206)	4.0
MB22B	PC3403 [®]	2.5 (21.8)	2.4 (21.4)	1.1 (9.8)	1.0 (9.0)	6,050	7,700	2.7	6.0	0.044 (0.390)	5.5
MB23B	PC3403 [®]	3.3 (29.6)	3.3 (29.3)	1.5 (13.6)	1.4 (12.4)	4,200	5,650	2.7	6.0	0.065 (0.576)	7.1
PMB23C	PC3403 [®]	2.6 (22.7)	2.5 (22.2)	1.3 (11.7)	1.2 (10.6)	6,450	7,400	3.0	6.0	0.065 (0.576)	3.7
PMB23C	PC3406 [®]	3.7 (33.0)	3.7 (32.6)	1.5 (13.6)	1.3 (11.9)	6,000	7,400	3.5	8.7 [®]	0.065 (0.576)	3.7
PMB31B	PC3403 [®]	4.7 (41.4)	4.7 (41.3)	2.1 (18.7)	1.9 (16.9)	2,700	4,300	2.7	6.0	0.14 (1.21)	19.6
PMB31D	PC3406 [®]	4.9 (43.3)	4.8 (42.9)	2.1 (18.7)	1.6 (14.5)	5,750	8,400	5.1	12.0	0.14 (1.21)	5.2
PMB32C	PC3403 [®]	7.7 (68.2)	7.7 (68.0)	3.8 (34.0)	3.0 (26.8)	1,800	2,550	3.0	6.0	0.27 (2.39)	22.5
PMB32D	PC3406 [®]	8.7 (77.3)	8.7 (77.0)	3.8 (34.0)	2.9 (25.5)	3,400	4,550	5.2	12.0	0.27 (2.39)	7.4
PMB32E	PC3410 [®]	9.5 (83.8)	9.4 (83.3)	3.8 (34.0)	2.8 (24.5)	4,450	5,950	6.8	17.0 [®]	0.27 (2.39)	4.2
PMB33C	PC3403 [®]	11.0 (97.4)	11.0 (97.4)	5.4 (48.0)	4.9 (43.0)	1,250	1,900	2.9	6.0	0.40 (3.57)	27.2
PMB33E	PC3406 [®]	11.0 (97.4)	10.9 (96.5)	5.4 (48.0)	4.4 (39.3)	2,900	3,800	5.8	12.0	0.40 (3.57)	6.8
PMB33F	PC3410 [®]	11.8 (104)	11.7 (104)	5.4 (48.0)	4.0 (35.8)	4,600	5,700	9.0	20.0	0.40 (3.57)	2.8
S Sarias m	otors with PC8xx and SC9	Ovy Drivee									
S21H	PC8x3®	1.4 (12.5)	1.4 (12.3)	0.51 (4.5)	0.32 (2.8)	12,500	12,500	3.1	9.3	0.042 (0.38)	3.7
S21H	PC8x2, SC9x2/SCE9x2®	0.82 (7.3)	0.80 (7.1)	0.43 (3.8)	0.27 (2.4)	12,500	12,500	2.65	5.3	0.042 (0.38)	3.7
S22H	PC8x3®	2.6 (23.1)	2.6 (22.9)	1.0 (8.8)	0.68 (6.0)	7,600	10,400	2.9	8.6	0.064 (0.56)	5.7
S22H	PC8x2, SC9x2/SCE9x2®	1.6 (14.6)	1.6 (14.3)	0.90 (8.0)	0.59 (5.2)	9,100	10,400	2.65	5.3	0.064 (0.56)	5.7
S24G	PC8x3®	5.1 (44.7)	5.0 (44.5)	1.6 (14.4)	1.5 (12.9)	3,400	4,900	2.6	7.8	0.100 (0.89)	9.3
S24G	PC8x2, SC9x2/SCE9x2®	3.5 (30.9)	3.5 (30.7)	1.6 (14.4)	1.4 (12.5)	4,000	4,900	2.6	5.3	0.100 (0.89)	9.3
S24H	PC8x4 [®]	5.0 (44.1)	4.9 (43.6)	1.6 (14.4)	0.55 (4.9)	8,000	9,800	5.1	15.4	0.100 (0.89)	2.2
S24H	SC9x3 [©]	3.5 (30.9)	3.4 (30.4)	1.6 (14.4)	0.55 (4.9)	8,000	9,800	5.1	10.6	0.100 (0.89)	2.2
S31H	PC8x3®			2.3 (20.0)		3,500	5,200			0.18 (1.58)	
S31H S31H	PC8x2, SC9x2/SCE9x2 ²	6.6 (58.8) 3.4 (29.8)	6.6 (58.5) 3.3 (29.4)	1.8 (16.0)	1.9 (16.6) 1.4 (12.4)	4,600	5,200	3.3 2.65	10.6 5.3	0.18 (1.58)	10.3
332G	PC8x3 ²	13.0 (115)	13.0 (115)	4.0 (35.6)	3.6 (32.3)	1,500	2,600	3.1	10.6	0.18 (1.58)	18
532G 532G	PC8x2. SC9x2/SCE9x2®	6.6 (58.4)	6.6 (58.0)	3.4 (30.4)	3.0 (32.3)	2,200	2,600	2.65	5.3	0.34 (2.98)	18
532U 532H	PC8x4 ²	13.0 (115)	12.9 (114)	4.0 (35.6)	2.8 (24.9)	3,900	5,300	6.1	21.2	0.34 (2.98)	4.5
32H	SC9x3 ²	6.6 (58.4)	6.5 (57.6)	3.5 (30.9)	2.0 (24.9)	4,800	5,300	5.3	10.6	0.34 (2.98)	4.5
333A	PC8x3 ²	15.6 (138)	15.6 (138)	5.3 (47.0)	4.7 (41.3)	1,500	2,200	3.5	10.6	0.34 (2.96)	17
S33D	PC8x4 ²	15.6 (138)	15.5 (137)	5.3 (46.9)	3.7 (32.6)	3,600	4,400	7.0	21.2	0.48 (4.28)	4.4
S33D	SC9x4 [®]	15.6 (138)	15.5 (137)	5.3 (46.9)	3.7 (32.6)	3,600	4,400	7.0	21.2	0.48 (4.28)	4.4
33G	PC8x2, SC9x2/SCE9x2 ²	9.7 (86.2)	9.7 (85.9)	5.0 (44.6)	4.6 (40.5)	1,400	1,800	2.65	5.3	0.48 (4.28)	25.2
33H	SC9x3 [®]	9.7 (86.2)	9.7 (85.6)	5.0 (44.6)	3.7 (32.6)	3,200	3,600	5.3	10.6	0.48 (4.28)	6.3
334A	PC8x3 ²	17.5 (155)	17.4 (154)	6.0 (53.5)	5.1 (45.5)	1,500	2,000	3.6	10.6	0.46 (4.26)	14.7
34G	PC8x2, SC9x2/SCE9x2 ²	11.0 (97.3)	10.9 (96.8)	5.6 (50.0)	4.9 (43.7)	1,300	1,600	2.65	5.3	0.64 (5.68)	23.7
34H	PC8x4 [©]	22.0 (195)	21.9 (194)	6.6 (58.4)	4.3 (38.1)	2,400	3,100	6.1	21.2	0.64 (5.68)	5.9
S34H	SC9x3®	11.0 (97.3)	10.9 (96.5)	5.7 (50.4)	4.0 (35.4)	2,700	3,100	5.3	10.6	0.64 (5.68)	5.9
		, ,	10.0 (00.0)	0.7 (UU.T)	1.0 (00.7)	£,1 00	0,100	0.0	10.0	0.01 (0.00)	5.5
Series mo	otors with PC34xx Drives										
21H	PC3403 [®]	0.93 (8.2)	0.91 (8.1)	.49 (4.3)	0.32 (2.8)	12,500	12,500	3.0	6.0	0.042 (0.38)	3.7

 $[\]ensuremath{\textcircled{1}}$ See page 4 for definitions of ratings.

② Peak torque ratings are for 5 seconds.

③ Peak torque ratings are for 2 seconds.

 $[\]ensuremath{\textcircled{4}}$ Peak torque ratings are for 1 second.

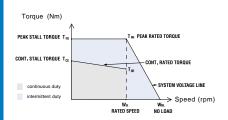
⑤ Peak torque ratings are for .5 second.

[®] Rated speed is provided for operation on 240V ac 3-phase line. Reduce to approximately 85% for 240V ac 1-phase line operation and to 40% for 120V ac 1-phase line operation.

⑦ Includes resolver feedback inertia.

 $[\]ensuremath{\mathfrak{B}}$ Each system requires one feedback and one motor power cable.

Characteristics shown with drive default parameters limited to 2.5x
the motor's continuous rating. Higher peak system performance
available. Contact the factory.







RECOMMENDED MOTOR/DRIVE SYSTEMS, 240V ac, 320V dc bus continued

		Peak Stall	Peak Rated	Cont. Stall	Cont. Rated	Rated	No-Load	Cont. Stall	Current at	J	ductance
Servo	Servo	Torque	Torque	Torque	Torque	Speed	Speed	Current	Peak Torque		
Motor Model®	Drive Model	T _{PS} Nm (lbin.)	T _{PR} [®] Nm (lbin.)	T _{cs} Nm (lbin.)	T _{cr} Nm (lbin.)	W _R ® rpm	W _{NL}	I _{cs}	I _{PS}	(lbinS ²	ь mH
WIOGE	Wodel	MIII (IDIII.)	Will (15111.)	MIII (IDIII.)	MIII (15111.)	ipili	rpm	A _{RMS}	A _{RMS}	x 10 ⁻³)	11111
S22H	PC3403 [®]	1.8 (16.4)	1.8 (16.2)	1.0 (8.8)	0.62 (5.5)	8,500	10,400	2.9	6.0	0.064 (0.56)	5.7
S24G	PC3403 [®]	3.9 (34.9)	3.9 (34.8)	1.6 (14.4)	1.4 (12.7)	3,750	4,900	2.6	6.0	0.100 (0.89)	9.3
S24H	PC3406 [®]	3.9 (34.9)	3.9 (34.4)	1.6 (14.4)	0.55 (4.9)	8,000	9,800	5.1	12.0	0.100 (0.89)	2.2
S31H	PC3403 [®]	3.8 (33.6)	3.7 (32.8)	2.0 (17.7)	1.5 (13.3)	4,300	5,200	3.0	6.0	0.18 (1.58)	10.3
S32G	PC3403 [®]	7.5 (66.0)	7.4 (65.7)	3.9 (34.3)	3.1 (27.4)	2,050	2,600	3.0	6.0	0.34 (2.98)	18
S32H	PC3406 [®]	7.5 (66.0)	7.4 (65.2)	3.9 (34.8)	2.3 (20.3)	4,600	5,300	6.0	12.0	0.34 (2.98)	4.5
S33A	PC3403 [®]	8.9 (78.9)	8.9 (78.5)	4.5 (40.2)	4.6 (40.5)	1,800	2,200	3.0	6.0	0.48 (4.28)	17
S33D	PC3410 [®]	12.9 (114)	12.8 (113)	5.3 (46.9)	3.6 (31.7)	3,700	4,400	7.0	17.5	0.48 (4.28)	4.4
S33G	PC3403 [®]	11.0 (97.4)	11.0 (97.1)	5.3 (47.1)	4.6 (41.1)	1,300	1,800	2.77	6.0	0.48 (4.28)	25.2
S33H	PC3406 [®]	11.0 (97.4)	10.9 (96.8)	5.3 (47.0)	3.7 (33.2)	3,100	3,600	5.6	12.0	0.48 (4.28)	6.3
S34A	PC3403 [®]	9.9 (87.4)	9.8 (86.9)	5.1 (45.1)	4.9 (43.4)	1,700	2,000	3.0	6.0	0.64 (5.68)	14.7
S34G	PC3403 [®]	12.4 (110)	12.4 (109)	6.4 (56.5)	5.0 (44.5)	1,200	1,600	3.0	6.0	0.64 (5.68)	23.7
S34H	PC3406 [®]	12.6 (112)	12.5 (111)	6.4 (56.5)	4.1 (36.3)	2,600	3,100	6.0	12.0	0.64 (5.68)	5.9

- $\ensuremath{\textcircled{1}}$ See page 4 for definitions of ratings.
- $\ensuremath{@}$ Peak torque ratings are for 5 seconds.
- $\ensuremath{\mathfrak{3}}$ Peak torque ratings are for 2 seconds.
- $\ensuremath{\textcircled{4}}$ Peak torque ratings are for 1 second.
- $\ensuremath{\texttt{\textcircled{5}}}$ Peak torque ratings are for .5 second.
- ® Rated speed is provided for operation on 240V ac 3-phase line. Reduce to approximately 85% for 240V ac 1-phase line operation and to 40% for 120V ac 1-phase line operation.
- ⑦ Includes resolver feedback inertia.
- 8 Each system requires one feedback and one motor power cable.
- 9 Characteristics shown with drive default parameters limited to 2.5x the motor's continuous rating. Higher peak system performance available. Contact the factory

RECOMMENDED MOTOR/DRIVE SYSTEMS, 400V ac, 560V dc busº

		Peak	Peak	Cont.	Cont.					Inertia [®]	
		Stall	Rated	Stall	Rated	Rated	No-Load	Cont. Stall	Current at	J	Inductance
Servo	Servo	Torque	Torque	Torque	Torque	Speed	Speed	Current	Peak Torque	kgm² x 10	3 Line-Line
Motor	Drive	T _{PS} ®	T _{PR} ^②	T _{cs}	T _{cr}	W_R^3	$W_{_{\rm NL}}$	I _{cs}	I _{PS}	(lbinS ²	
Model [®]	Model	Nm (lbin.)	Nm (lbin.)	Nm (lbin.)	Nm (lbin.)	rpm	rpm	A _{RMS}	A _{RMS}	x 10 ⁻³)	mH
PMA Series	motors with SCE9xx	Drives									
PMA42N	SCE9x3	8.2 (72.6)	8.1 (71.7)	4.1 (36.3)	3.2 (28.3)	4,300	5,450	3.7	7.5	0.36 (3.2)	14.3
PMA42P	SCE9x4	12.4 (110)	12.3 (109)	4.1 (36.3)	3.0 (26.6)	5,100	6,950	4.7	15.0	0.36 (3.2)	8.9
PMA43N	SCE9x3	12.2 (108)	12.1 (107)	6.1 (54.0)	5.3 (46.9)	2,800	3,600	3.7	7.5	0.52 (4.6)	20.0
PMA43P	SCE9x4	18.8 (166)	18.7 (165)	6.1 (54.0)	5.1 (45.1)	3,300	4,500	4.6	15.0	0.52 (4.6)	13.0
PMA43Q	SCE9x4	12.5 (111)	12.4 (110)	6.1 (54.0)	4.0 (35.4)	6,000	7,100	7.2	15.0	0.52 (4.6)	5.3
PMA44N	SCE9x3	16.9 (150)	16.8 (149)	8.2 (72.6)	7.3 (64.6)	2,100	2,650	3.6	7.5	0.68 (6.0)	27.0
PMA44Q	SCE9x4	16.9 (150)	16.7 (148)	8.2 (72.6)	4.9 (43.4)	4,400	5,250	7.2	15.0	0.68 (6.0)	7.1
PMA45N	SCE9x3	21.0 (186)	20.9 (185)	10.2 (90.3)	9.5 (84.0)	1,600	2,100	3.6	7.5	0.84 (7.4)	33.0
PMA45Q	SCE9x4	21.3 (189)	21.1 (187)	10.2 (90.3)	7.9 (69.9)	3,400	4,150	7.1	15.0	0.84 (7.4)	8.7
PMA53Q	SCE9x4	20.7 (183)	20.6 (182)	10.5 (92.9)	8.2 (72.6)	2,900	3,900	6.8	15.0	1.92 (17.0)	15.0
PMA53R	SCE9x5	21.6 (191)	21.5 (190)	10.5 (92.9)	7.2 (63.7)	4,200	5,600	9.7	22.5	1.92 (17.0)	7.2
PMA54Q	SCE9x4	25.9 (229)	25.8 (228)	13.5 (120)	11.4 (101)	2,400	3,150	7.1	15.0	2.49 (22.0)	16.0
PMA54R	SCE9x5	26.0 (230)	25.8 (228)	13.5 (150)	10.0 (88.5)	3,750	4,800	10.6	22.5	2.49 (22.0)	7.1
PMA55Q	SCE9x4	32.6 (289)	32.5 (288)	17.0 (151)	14.8 (131)	1,900	2,500	7.1	15.0	3.06 (27.1)	20.0
PMA55R	SCE9x5	32.8 (290)	32.6 (289)	17.0 (151)	13.7 (121)	3,000	3,800	10.6	22.5	3.06 (27.1)	8.8
PMA57R	SCE9x5	45.9 (406)	45.7 (404)	22.0 (195)	19.0 (168)	2,100	2,700	9.8	22.5	4.21 (37.3)	12.5
PMA65R	SCE9x5	55.9 (495)	55.7 (493)	30.0 (266)	25.0 (221)	1,600	2,250	11.3	22.5	7.9 (70.0)	20.0
PMA65S	SCE9x6	46.1 (408)	45.6 (404)	30.0 (266)	19.0 (169)	3,300	4,200	20.9	33.7	7.9 (70.0)	5.9
PMA66R	SCE9x5	67.1 (594)	66.9 (592)	36.0 (319)	31.4 (278)	1,350	1,850	11.3	22.5	9.4 (83.3)	24.0
PMA66S	SCE9x6	55.8 (494)	55.4 (490)	36.0 (319)	22.3 (197)	2,750	3,500	20.7	33.7	9.4 (83.0)	7.0
PMA67S	SCE9x6	65.1 (576)	64.7 (573)	42.0 (372)	32.8 (283)	2,350	2,950	20.7	33.7	10.9 (96.5)	8.2
PMA69S	SCE9x6	84.1 (744)	83.7 (741)	54.0 (478)	43.8 (388)	1,800	2,300	20.6	33.7	13.9 (123)	10.4
S Series mo	otors with SCE9xx Driv	ies									
S33A	SCE9x3	11.1 (98.4)	11.0 (97.4)	5.3 (47.0)	3.9 (34.5)	3,300	3,900	3.5	7.5	0.48 (4.28)	17.0
S34A	SCE9x3	12.4 (110)	12.3 (109)	6.4 (56.5)	4.3 (37.9)	3,000	3,500	3.8	7.5	0.64 (5.68)	14.7

See page 4 for definitions of ratings.
 Peak torque ratings are for 5 seconds.
 Rated speed is provided for operation on 480V ac 3-phase line.

Includes resolver feedback inertia.
 Each system requires one feedback and one motor power cable.

SERVO MOTORS

RECOMMENDED MOTOR/DRIVE SYSTEMS, 480V ac, 640V dc bus

Servo Motor	Servo Drive	Peak Stall Torque T _{Ps} ^①	Peak Rated Torque T _{PR} [©]	Cont. Stall Torque T _{cs}	Cont. Rated Torque T _{cr}	Rated Speed W _R [®]	No-Load Speed W _{NL}	Cont. Stall Current I _{cs}	Current at Peak Torque	J	L
Model [®]	Model	Nm (lbin.)	Nm (lbin.)	Nm (lbin.)	Nm (lbin.)	rpm	rpm	A _{RMS}	A_{RMS}	x 10 ⁻³)	mH
PMA Series	motors with SCE9xx D	rives									
PMA42N	SCE9x3	8.2 (72.6)	8.1 (71.7)	4.1 (36.3)	3.2 (28.3)	4,300	5,450	3.7	7.5	0.36 (3.2)	14.3
PMA42P	SCE9x4	12.4 (110)	12.3 (109)	4.1 (36.3)	3.0 (26.6)	5,100	6,950	4.7	15.0	0.36 (3.2)	8.9
PMA43N	SCE9x3	12.2 (108)	12.1 (107)	6.1 (54.0)	5.3 (46.9)	2,800	3,600	3.7	7.5	0.52 (4.6)	20.0
PMA43P	SCE9x4	18.8 (166)	18.7 (165)	6.1 (54.0)	5.1 (45.1)	3,300	4,500	4.6	15.0	0.52 (4.6)	13.0
PMA43Q	SCE9x4	12.5 (111)	12.4 (110)	6.1 (54.0)	4.0 (35.4)	6,000	7,100	7.2	15.0	0.52 (4.6)	5.3
PMA44N	SCE9x3	16.9 (150)	16.8 (149)	8.2 (72.6)	7.3 (64.6)	2,100	2,650	3.6	7.5	0.68 (6.0)	27.0
PMA44Q	SCE9x4	16.9 (150)	16.7 (148)	8.2 (72.6)	4.9 (43.4)	4,400	5,250	7.2	15.0	0.68 (6.0)	7.1
PMA45N	SCE9x3	21.0 (186)	20.9 (185)	10.2 (90.3)	9.5 (84.0)	1,600	2,100	3.6	7.5	0.84 (7.4)	33.0
PMA45Q	SCE9x4	21.3 (189)	21.1 (187)	10.2 (90.3)	7.9 (69.9)	3,400	4,150	7.1	15.0	0.84 (7.4)	8.7
PMA53Q	SCE9x4	20.7 (183)	20.6 (182)	10.5 (92.9)	8.2 (72.6)	2,900	3,900	6.8	15.0	1.92 (17.0)	15.0
PMA53R	SCE9x5	21.6 (191)	21.5 (190)	10.5 (92.9)	7.2 (63.7)	4,200	5,600	9.7	22.5	1.92 (17.0)	7.2
PMA54Q	SCE9x4	25.9 (229)	25.8 (228)	13.5 (120)	11.4 (101)	2,400	3,150	7.1	15.0	2.49 (22.0)	16.0
PMA54R	SCE9x5	26.0 (230)	25.8 (228)	13.5 (150)	10.0 (88.5)	3,750	4,800	10.6	22.5	2.49 (22.0)	7.1
PMA55Q	SCE9x4	32.6 (289)	32.5 (288)	17.0 (151)	14.8 (131)	1,900	2,500	7.1	15.0	3.06 (27.1)	20.0
PMA55R	SCE9x5	32.8 (290)	32.6 (289)	17.0 (151)	13.7 (121)	3,000	3,800	10.6	22.5	3.06 (27.1)	8.8
PMA57R	SCE9x5	45.9 (406)	45.7 (404)	22.0 (195)	19.0 (168)	2,100	2,700	9.8	22.5	4.21 (37.3)	12.5
PMA65R	SCE9x5	55.9 (495)	55.7 (493)	30.0 (266)	25.0 (221)	1,600	2,250	11.3	22.5	7.9 (70.0)	20.0
PMA65S	SCE9x6	46.1 (408)	45.6 (404)	30.0 (266)	19.0 (169)	3,300	4,200	20.9	33.7	7.9 (70.0)	5.9
PMA66R	SCE9x5	67.1 (594)	66.9 (592)	36.0 (319)	31.4 (278)	1,350	1,850	11.3	22.5	9.4 (83.3)	24.0
PMA66S	SCE9x6	55.8 (494)	55.4 (490)	36.0 (319)	22.3 (197)	2,750	3,500	20.7	33.7	9.4 (83.0)	7.0
PMA67S	SCE9x6	65.1 (576)	64.7 (573)	42.0 (372)	32.8 (283)	2,350	2,950	20.7	33.7	10.9 (96.5)	8.2
PMA69S	SCE9x6	84.1 (744)	83.7 (741)	54.0 (478)	43.8 (388)	1,800	2,300	20.6	33.7	13.9 (123)	10.4
S Series m	otors with SCE9xx Drive	es									
S33A	SCE9x3	11.1 (98.4)	11.0 (97.4)	5.3 (47.0)	3.9)34.5)	3,300	3,900	3.5	7.5	0.48 (4.28)	17.0
S34A	SCE9x3	12.4 (110)	12.3 (109)	6.4 (56.5)	4.3 (37.9)	3,000	3,500	3.8	7.5	0.64 (5.68)	14.7

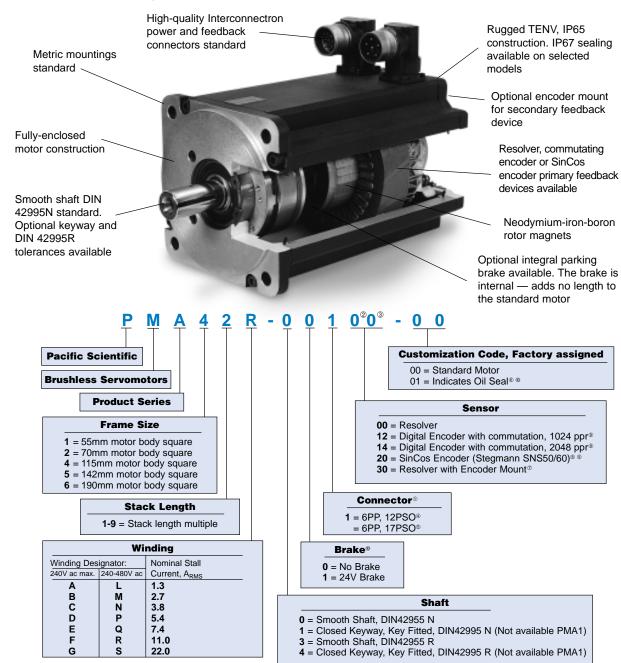
See page 4 for definitions of ratings.
 Peak torque ratings are for 5 seconds.
 Rated speed is provided for operation on 480V ac 3-phase line.

Includes resolver feedback inertia.
 Each system requires one feedback and one motor power cable.

PMA SERIES BRUSHLESS SERVO MOTORS



THE MOST RUGGED, COMPREHENSIVE LINE OF COST-EFFECTIVE SERVOMOTORS



- ① Right-Angle type standard; 6-Pin Power = 6PP etc.; 12-Pin Sensor, 0deg. Code.
- ② Encoder Mount: Motor prepared to mount external encoder (ROD426).
- 3 Standard thermal sensor: Thermistor.
- 4 Mating Connectors available separately. Contact Pacific Scientific.
- © With commutating encoder option, standard feedback connector is 17-pin. See page 32.
- ® Oil seal available on PMA1, PMA2 and PMA4 models only (PMA4 requires special endbell with seal option).
- To For more details on encoder mounting provisions, contact Pacific Scientific.
- ® Commutating encoder option available on PMA2, PMA4, PMA5 and PMA6 models only.
- 9 Sin Cos encoder option available on PMA4, PMA5 and PMA6 models only.
- PMA2 models accept either oil seal option or brake option not both.

PMA SERIES



• 6-pole synchronous servomotors

- · Neodymium-iron-boron magnets for maximum torque
- 240V ac, 320V dc bus maximum operation
- · Available with integral brake
- IP65 or optional IP67 protection
- Anti-cog stator design
- High-quality Interconnectron connectors
- · Rated speeds to 9,000 RPM

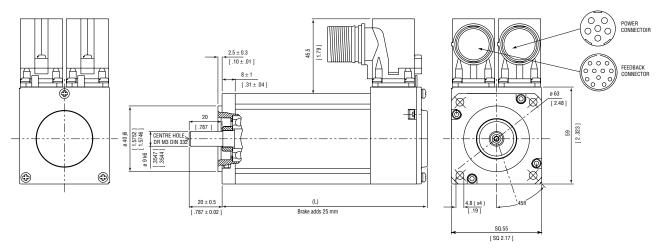
The PMA1 Series Motors Covere: 877-378-0240 continuous torque range range for 22176-378-0249 0.6 Nm. These compact the compact the compact that the compact the compact that the compact well-suited for speed, aกษาอุธรณ์เชล2go.com control applications that require maximum performance in minimum space.

RATINGS AND CHARACTERISTICS

Motor parameters and winding data. See system data beginning on page 4 for typical torque/speed performance.

PARAMETER	SYMBOL	UNITS	PMA11	PMA12	PMA13
Continuous stall torque ^{① ②}	T _{CS}	Nm (lbin.)	0.26 (2.3)	0.6 (5.3)	0.9 (8.0)
Peak torque ^{®®}	T _{PK}	Nm (lbin.)	1.4 (12.4)	2.9 (25.6)	4.3 (38.0)
Inertia ^{(5) (6)}	J _M	kgm ² x10 ⁻³ (lbinsec ² x10 ⁻³)	0.012 (0.102)	0.019 (0.164)	0.026 (0.226)
Static friction (max.)	T _f	Nm (lbin.)	0.008 (0.071)	0.012 (0.106)	0.018 (0.160)
Viscous damping coefficient	K _{DV}	Nm/kRPM (lbin./kRPM)	0.001 (0.009)	0.002 (0.018)	0.003 (0.027)
Thermal resistance	R _{TH}	deg. C/Watt	3.1	2.0	1.6
Thermal time constant	τ_{TH}	min.	10.0	13.0	16.0
Weight (motor only)	W	kg (lbs.)	1.2 (2.6)	1.5 (3.3)	1.9 (4.2)
WINDING DATA			A	A	В
Torque constant (RMS)	K _r	Nm/A _{RMS} (lbin./A _{RMS})	0.27 (2.38)	0.32 (2.85)	0.33 (2.90)
Voltage constant (RMS) (I-n)	K _E	V _{RMS} /rad/sec (V _{RMS} /kRPM)	0.16 (17.2)	0.20 (20.6)	0.20 (21.0)
Continuous stall current ^{① ②}	I _{CS}	A _{RMS}	0.96	1.88	2.73
Current at peak torque [®]	I _{PK}	A _{RMS}	5.3	9.4	13.8
Resistance (line-to-line)	R _C	Ohms	16.3	6.8	3.9
Inductance (line-to-line)	L	mH	7.1	4.3	2.7
Typical Rated Speed @ 240V ac, 320V dc bus	W _R	RPM	6,600	8,500	9,000
Typical Rated Torque @ 240V ac, 320V dc bus	T _{CR}	Nm (lbin.)	0.22 (1.9)	0.48 (4.2)	0.60 (5.3)

Metric Mount Shown



Note: All values at 25°C unless otherwise noted.

- ① Motor operated at rated winding temperature rise of ∆t = 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.
- Caution: For peak torques or peak currents greater than 4x the continuous rating, consult the factory for thermal considerations.
- (5) Add parking brake, if applicable, for total inertia.
- Motor with resolver feedback.

Model	PMA13	PMA12	PMA11
L	175 (6.890)	150 (5.906)	125 (4.921)

mm (in.) Note: Brake option adds 25 mm (.98")

PMA2 SERIES MOTOR



- 6-pole synchronous servomotors
- Neodymium-iron-boron magnets for maximum torque
- 240V ac, 320V dc bus maximum operation
- · Available with integral brake
- IP65 or optional IP67 protection
- · Anti-cog stator design
- High-quality Interconnectron connectors
- · Rated speeds to 7,400 RPM

SERVO GO.com

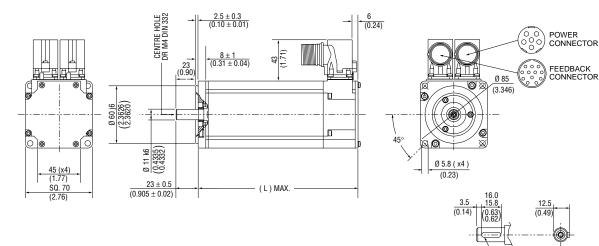
The PMA2 Series motors cover a continuous torque range from 0.3 78-0240 2.6 Nm. These compact motors are 0249 well-suited for specifications requiring maximum performance in minimum space. The PMA2 Series is available with a commutating encoder, in addition to the standard resolver primary feedback, allowing for integration with other control schemes.

RATINGS AND CHARACTERISTICS

Motor parameters and winding data. See system data beginning on page 4 for typical torque/speed performance.

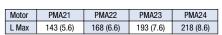
PARAMETER	SYMBOL	UNITS	PMA21	PMA22		PMA23		PM.	A24
Continuous stall torque ^{① ② ⑦}									
	T _{CS}	Nm (lbin.)	0.63 (5.6)	1.3 (11.5)		2 (17.7)			(23.0)
Peak torque ^{® ®}	T _{PK}	Nm (lbin.)	2.3 (20.4)	4.7 (41.6)		7.2 (63.7)		9.6 (85.0)	
Inertia [©] ®	J _M	kgm ² x10 ⁻³ (lbinsec ² x10 ⁻³)	0.022 (0.19)	0.038 (0.34)		0.055 (0.49)		0.072	(0.64)
Static friction (max.)	T _f	Nm (lbin.)	0.016 (0.14)	0.033 (0.29)		0.050 (0.44)		0.065	6 (0.58)
Viscous damping coefficient	K _{DV}	Nm/kRPM (lbin./kRPM)	0.003 (0.03)	0.006 (0.05)		0.009 (0.08)		0.012 (0.11)	
Thermal resistance	R _{TH}	deg. C/Watt	1.83	1.41		1.13		0.89	
Thermal time constant	τ_{TH}	min.	13.0	15.0	18.0			2	0.0
Weight (motor only)	W	kg (lbs.)	1.7 (3.7)	2.3 (5.0)	2.9 (6.4)			3.5 (7.7)	
WINDING DATA			В	В	В	C	D	C	D
Torque constant (RMS)	K _r	Nm/A _{RMS} (lbin./A _{RMS})	0.37 (3.3)	0.49 (4.3)	0.74 (6.5)	0.59 (5.2)	0.4 (3.5)	0.79 (7.0)	0.5 (4.41)
Voltage constant (RMS) (I-n)	Κ _E	V _{RMS} /rad/sec (V _{RMS} /kRPM)	0.23 (24.0)	0.30 (31.2)	0.45 (47.4)	0.36 (37.9)	0.24 (25.4)	0.49 (50.9)	0.31 (31.9)
Continuous stall current ^{① ②}	I _{CS}	A _{RMS}	1.72	2.65	2.7	3.4	5.0	3.3	5.3
Current at peak torque [®]	I _{PK}	A _{RMS}	6.88	10.6	10.8	13.6	20.0	13.2	21.2
Resistance (line-to-line)	R _C	Ohms	8.8	4.81	6.1	3.8	1.7	4.6	1.9
Inductance (line-to-line)	L	mH	10.5	7.4	10.6 6.8 3.0		3.0	8.9	3.5
Typical Rated Speed @ 240V ac, 320V dc bus	W _R	RPM	6,050	4,650	3,600	4,200	6,400	3,000	4,950
Typical Rated Torque @ 240V ac, 320V dc bus	T _{CR}	Nm (lbin.)	0.5 (4.4)	1.06 (9.4)	1.7 (14.6)	1.6 (14.2)	1.4 (12.4)	2.2 (19.5)	2.2 (19.5)

Metric Mount Shown



Note: All values at 25°C unless otherwise noted.

- ① Motor operated at rated winding temperature rise of $\Delta t = 100^{\circ}\text{C}$ 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 Add parking brake, if applicable, for total inertia.
- Motor with resolver feedback.
- ② Commutating encoder option may reduce continuous torque ratings by up to 10%. Contact factory for details.



CUSTOMER KEY OPTION

KEY A 4x4x16 DIN 6885

mm (in.)

Note: Commutating encoder option adds 15 mm (0.59") to total length.

PMA4 SERIES MOTOR



- 6-pole synchronous servomotors
- · Neodymium-iron-boron magnets for maximum torque
- 240V or 480V ac operation
- Available with integral brake
- IP65 or optional IP67 protection
- · Anti-cog stator design
- · High-quality Interconnectron connectors
- Rated speeds to 6,800 RPM

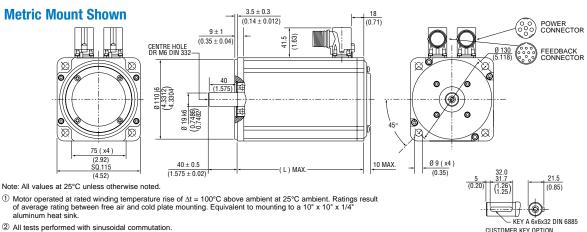
The PMA4 Series motors cover pone: 877-378-0240 continuous torque range from 2.5 %: 877-378-0249 10.2 Nm. These rugged motors@re-well-2go.com suited for speed and position of the composition of applications requiring maximum performance at maximum value. The

PMA4 Series is available with commutating encoder or SinCos encoder feedback devices, in addition to the standard resolver primary feedback, allowing for integration with other control schemes.

RATINGS AND CHARACTERISTICS

Motor parameters and winding data. See system data beginning on page 4 for typical torque/speed performance.

PARAMETER	SYMBOL	UNITS		PM	A42			PM.	A43			PM	A44			PMA45	
Continuous stall torque ${}^{0}{}^{\emptyset}$	T _{CS}	Nm (lbin.)		4.1	(36.3)			6.1 (54.0)			8.2	(72.6)			10.2 (90.3)	
Peak torque ³⁴	T _{PK}	Nm (lbin.)		14.6	(129)			21.7	(192)			29.4	(260)			36.8 (326)	
Inertia [©] ©	J _M	kgm ² x10 ⁻³ (lbinsec ² x10 ⁻³)		0.36	(3.2)			0.52	(4.6)			0.68	(6.0)			0.84 (7.4)	
Static friction (max.)	T _f	Nm (lbin.)		0.11	(1.0)			0.15	(1.3)			0.21	(1.9)			0.26 (2.3)	
Viscous damping coefficient	K _{DV}	Nm/kRPM (lbin./kRPM)		0.03	(0.27)			0.05	(0.44)			0.06	(0.53)			0.08 (0.71)	
Thermal resistance	R _{TH}	deg. C/Watt		0.	.68			0.	59			0.	.51			0.45	
Thermal time constant	τη	min.		2	5.0			30	1.0			3	5.0			40.0	
Weight (motor only)	W	kg (lbs.)		6.2	(13.6)			7.6 (16.7)			9.0	(20.0)			10.4 (22.9)	
WINDING DATA			М	N	P	Q	N	P	Q	R	N	P	Q	R	N	Q	R
Torque constant (RMS)	K,	Nm/Arms (lbin./A _{ms})	1.48 (13.1)	1.11 (9.8)	0.87 (7.7)	0.63 (5.6)	1.67 (14.8)	1.34 (11.9)	0.85 (7.5)	.61 (5.4)	2.26 (20.0)	1.54 (13.6)	1.15 (10.2)	0.82 (7.3)	2.85 (25.2)	1.46 (12.9)	1.04 (9.2)
Voltage constant (RMS) (I-n)	K _E	Vrms/rad/sec (V _{rms} /kRPM)	0.91 (94.8)	0.68 (7.1)	0.53 (55.8)	0.39 (40.6)	1.02 (107)	0.82 (86.1)	0.52 (54.9)	0.37 (39.2)	1.38 (145)	0.94 (98.8)	0.71 (74)	0.5 (52.8)	1.74 (183)	0.89 (93.4)	0.64 (66.7)
Continuous stall current ⁽¹⁾⁽²⁾	I _{CS}	A _{RMS}	2.8	3.7	4.7	6.5	3.7	4.6	7.2	10.1	3.6	5.4	7.2	10.1	3.6	7.1	10.0
Current at peak torque [®]	I _{PK}	A _{RMS}	11.2	14.8	18.8	26.0	14.8	18.4	28.8	40.4	14.4	21.6	28.8	40.4	14.4	28.4	40.0
Resistance (line to line)	R _C	Ohms	9.0	5.1	3.2	1.65	6.0	3.9	1.54	0.79	7.1	3.3	1.8	0.92	8.2	2.1	1.1
Inductance (line to line)	L	mH	26.0	14.3	8.9	4.7	20.0	13.0	5.3	2.7	27.0	12.4	7.1	3.6	33.0	8.7	4.4
Typical Rated Speed @ 240V ac, 320V dc bus	W _R	RPM	1,600	1,950	2,950	3,800	1,250	1,850	3,000	4,700	850	1,750	2,100	3,450	600	1,650	2,700
Typical Rated Torque @ 240V ac,320V dc bus	T _{CR}	Nm (lbin.)	3.9 (34.5)	3.8 (33.6)	3.6 (31.9)	34.0 (30.1)	5.8 (51.3)	5.6 (49.6)	5.2 (46.0)	4.5 (39.8)	7.9 (70.0)	7.5 (66.4)	7.3 (64.4)	6.7 (59.3)	9.9 (87.6)	9.4 (83.2)	8.9 (78.8)
Typical Rated Speed @ 400V ac,580V dc bus	W _R	RPM	N/A	4,300	5,100	N/A	2,800	3,300	6,000	N/A	2,100	N/A	4,400	N/A	1,600	3,400	N/A
Typical Rated Torque @ 400V ac,580V dc bus	T _{CR}	Nm (lbin.)	N/A	3.2 (28.3)	3.0 (26.6)	N/A	5.3 (46.9)	5.1 (45.1)	4.0 (35.4)	N/A	7.3 (64.6)	N/A	4.9 (43.4)	N/A	9.5 (84)	7.9 (69.9)	N/A
Typical Rated Speed @ 480V ac,640V dc bus	W _R	RPM	N/A	5,550	5,950	N/A	3,350	3,850	6,800	N/A	2,400	N/A	5,100	N/A	1,900	4,000	N/A
Typical Rated Torque @ 480V ac,640V dc bus	T _{CR}	Nm (lbin.)	N/A	2.8 (24.8)	2.6 (23)	N/A	5.1 (45.1)	4.9 (43.4)	3.6 (31.9)	N/A	7.2 (63.7)	N/A	4.4 (48.9)	N/A	9.3 (82.3)	7.3 (64.6)	N/A



- 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) Add parking brake, if applicable, for total inertia.
- Motor with resolver feedback.
- © Commutating encoder option may reduce continuous torque ratings by up to 10%. Contact factory for details.

Motor	PMA42	PMA43	PMA44	PMA45
L Max	185 (7.3)	210 (8.3)	235 (9.2)	260 (10.2)

mm (in.) Note: SinCos encoder option adds 31 mm (1.22")

PMA5 SERIES MOTOR



- · 6-pole synchronous servomotors
- Neodymium-iron-boron magnets for maximum torque
- 240V or 480V ac operation
- · Available with integral brake
- IP65 protection
- Anti-cog stator design
- High-quality Interconnectron connectors
- Rated speeds to 4,750 RPM

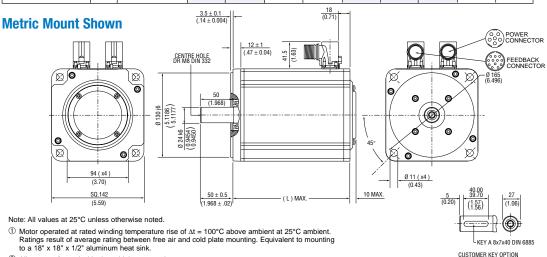
Sold & Serviced By:

The PMA5 Series molber cove 73-378-0240 continuous torque range from 76.8 to 8-0249 22 Nm. These regiged motors are well m suited for speed and/position2controlm applications requiring maximum performance at maximum value. The PMA5 Series is available with commutating encoder or SinCos encoder feedback devices, in addition to the standard resolver primary feedback, allowing for integration with other control schemes.

RATINGS AND CHARACTERISTICS

Motor parameters and winding data. See system data beginning on page 4 for typical torque/speed performance.

PARAMETER	SYMBOL	UNITS	PM	A53	PM.	154		PMA55		PM/	157
Continuous stall torque © © 🗇	T _{CS}	Nm (lbin.)	10.5	(92.9)	13.5	(120)		17.0 (151)		22.0	(195)
Peak torque ^{® ®}	T _{PK}	Nm (lbin.)	31.0	(274)	41.0	(363)		51.5 (456)		69.0	(611)
Inertia [©] ®	J _M	kgm ² x10 ⁻³ (lbinsec ² x10 ⁻³)	1.92	(17)	2.49	(22)		3.06 (27.1)		4.21 (37.3)
Static friction (max.)	T _f	Nm (lbin.)	0.26	(2.3)	0.34	(3.0)		0.43 (3.8)		0.57	(5.0)
Viscous damping coefficient	K _{DV}	Nm/kRPM (lbin./kRPM)	0.08	(0.71)	0.11	(0.97)		0.14 (1.24)		0.18 (1.59)	
Thermal resistance	R _{TH}	deg. C/Watt	0.	55	0.	53		0.47		0.4	¥5
Thermal time constant	τη	min.	3	5	40	1.0	45.0			55	.0
Weight (motor only)	W	kg (lbs.)	11 (24.2)	13.0	(28.6)	15.0 (33.0)			19.0 (41.9)
WINDING DATA			Q	R	Q	R	Q	R	S	R	S
Torque constant (RMS)	K,	Nm/A _{RMS} (lbin./A _{RMS})	1.55 (13.7)	1.08 (9.6)	1.9 (16.8)	1.27 (11.3)	2.4 (21.3)	1.6 (14.2)	0.8 (7.1)	2.26 (20)	1.13 (10)
Voltage constant (RMS) (I-n)	K _E	V _{RMS} /rad/sec (V _{RMS} /kRPM)	0.95 (99.3)	0.66 (69.2)	1.16 (122)	0.78 (81.5)	1.47 (154)	0.98 (103)	0.49 (51.3)	1.38 (145)	0.69 (72.5)
Continuous stall current ^{① ②}	I _{cs}	A _{RMS}	6.8	9.7	7.1	10.6	7.1	10.6	21.3	9.8	19.5
Current at peak torque [®]	I _{PK}	A _{RMS}	27.2	38.8	28.4	42.4	28.4	42.4	85.2	39.2	78.0
Resistance (line-to-line)	R _C	Ohms	1.9	0.92	1.8	0.8	2.1	0.9	0.2	1.1	0.3
Inductance (line-to-line)	L	mH	15.0	7.2	16.0	7.1	20.0	8.8	2.2	12.5	3.1
Typical Rated Speed @ 240V ac, 320V dc bus	W _R	RPM	1,300	2,350	1,200	2,100	900	1,650	3,450	1,150	2,450
Typical Rated Torque @ 240V ac, 320V dc bus	T _{CR}	Nm (lbin.)	9.6 (85.0)	8.8 (77.9)	12.4 (110)	11.6 (102.7)	16.0 (142)	15.2 (134.5)	13.1 (115.9)	20.5 (181.4)	18.4 (162.9)
Typical Rated Speed @ 400V ac, 560V dc bus	W _R	RPM	2,900	4,200	2,400	3,750	1,900	3,000	N/A	2,100	N/A
Typical Rated Torque @ 400V ac, 560V dc bus	T _{CR}	Nm (lbin.)	8.2 (72.6)	7.2 (63.7)	11.4 (101)	10.0 (88.5)	14.8 (131)	13.7 (121)	N/A	19.0 (168)	N/A
Typical Rated Speed @ 480V ac, 640V dc bus	W _R	RPM	3,350	4750	2,800	4,300	2,200	3,400	N/A	2,400	N/A
Typical Rated Torque @ 480V ac, 640V dc bus	T _{CR}	Nm (lbin.)	7.8 (69)	6.8 (60)	11.0 (97.4)	9.7 (85.8)	14.5 (128.3)	13.3 (109)	N/A	18.6 (164.6)	N/A



- 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 Add parking brake, if applicable, for total inertia.
- 6 Motor with resolver feedback.
- ① Commutating encoder option may reduce continuous torque ratings by up to 10%. Contact factory for details.

Motor	PMA53	PMA54	PMA55	PMA57
L Max	205 (8.1)	230 (9.0)	255 (10.0)	305 (12.0)

mm (in.) Note: SinCos encoder option adds 14 mm (.55") to total length

PMA6 SERIES MOTOR



- 6-pole synchronous servomotors
- Neodymium-iron-boron magnets for maximum torque
- 240V or 480V ac operation
- · Available with integral brake
- IP65 protection
- · Anti-cog stator design
- High-quality Interconnectron connectors
- Rated speeds to 3,800 RPM

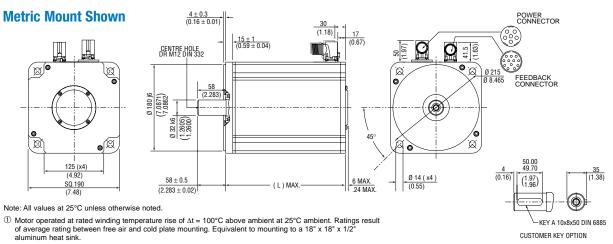
The PMA6 Series motors of page: 877-378-0240 continuous torque range ที่ใช้คำ ที่ 5 677-378-0249 54 Nm. These rugged ก็จะใช้ ผลิยาผลใช้ com suited for speed and position of page and position applications requiring maximum performance at maximum value.

The PMA6 Series is available with commutating encoder or SinCos encoder feedback devices, in addition to the standard resolver primary feedback, allowing for integration with other control schemes.

RATINGS AND CHARACTERISTICS

Motor parameters and winding data. See system data beginning on page 4 for typical torque/speed performance.

PARAMETER	SYMBOL	UNITS	PM	A65	PM.	A66	PMA67	PMA69
Continuous stall torque ^{① ② ⑦}	T _{CS}	Nm (lbin.)	30.0	(266)	36.0	(319)	42.0 (372)	54.0 (478)
Peak torque ^{® ®}	T _{PK}	Nm (lbin.)	95.0	(841)	114 (1009)	133 (1177)	170 (1505)
Inertia [®] ®	J_{M}	kgm ² x10 ⁻³ (lbinsec ² x10 ⁻³)	7.90	(70.0)	9.40	(83.3)	10.9 (96.5)	13.9 (123)
Static friction (max.)	T _f	Nm (lbin.)	0.75	(6.60)	0.90	(8.0)	1.05 (9.30)	1.35 (11.9)
Viscous damping coefficient	K _{DV}	Nm/kRPM (lbin./kRPM)	0.25	(2.20)	0.30	(2.70)	0.35 (3.10)	0.45 (4.0)
Thermal resistance	R _{TH}	deg. C/Watt	0.	38	0.3	35	0.32	0.28
Thermal time constant	τ_{TH}	min.	4	10	4	5	50	60
Weight (motor only)	W	kg (lbs.)	31.0	(68.3)	36.0	79.3)	42.0 (92.5)	54.0 (119)
WINDING DATA			R	S	R	s	s	S
Torque constant (RMS)	K _r	Nm/A _{RMS} (lbin./A _{RMS})	2.66 (23.5)	1.44 (12.7)	3.21 (28.5)	1.74 (15.4)	2.04 (18.0)	2.63 (23.3)
Voltage constant (RMS) (I-n)	K _E	V _{RMS} /rad/sec (V _{RMS} /kRPM)	1.63 (171)	0.88 (92.3)	1.96 (206)	1.06 (112)	1.25 (131)	1.61 (169)
Continuous stall current ^{① ②}	I _{CS}	A _{RMS}	11.3	20.9	11.3	20.7	20.7	20.6
Current at peak torque ⁴	I _{PK}	A _{RMS}	45.2	83.6	45.2	82.8	82.8	82.4
Resistance (line-to-line)	$R_{\mathbb{C}}$	Ohms	0.97	0.29	1.06	0.32	0.35	0.41
Inductance (line-to-line)	L	mH	20.0	5.90	24.0	7.0	8.2	10.4
Typical Rated Speed @ 240V ac, 320V dc bus	W _R	RPM	N/A	1,750	N/A	1,450	1,250	950
Typical Rated Torque @ 240V ac, 320V dc bus	T _{CR}	Nm (lbin.)	N/A	24.5 (216.8)	N/A	31.0 (274)	37.0 (327)	48.5 (429)
Typical Rated Speed @ 400V ac, 560V dc bus	W _R	RPM	1,600	3,300	1,350	2,750	2,350	1,800
Typical Rated Torque @ 400V ac, 560V dc bus	T _{CR}	Nm (lbin.)	25.0 (221)	19.0 (169)	31.4 (278)	22.3 (197)	32.8 (283)	43.8 (388)
Typical Rated Speed @ 480V ac, 640V dc bus	W _R	RPM	1,900	3,800	1,600	3,150	2,700	2,100
Typical Rated Torque @ 480V ac, 640V dc bus	T _{CR}	Nm (lbin.)	24.0 (212.4)	17.5 (155)	30.5 (270)	20.2 (179)	31.4 (278)	42.2 (373)



- 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) Add parking brake, if applicable, for total inertia.
- Motor with resolver feedback.
- Tommutating encoder option may reduce continuous torque ratings by up to 10%. Contact factory for details

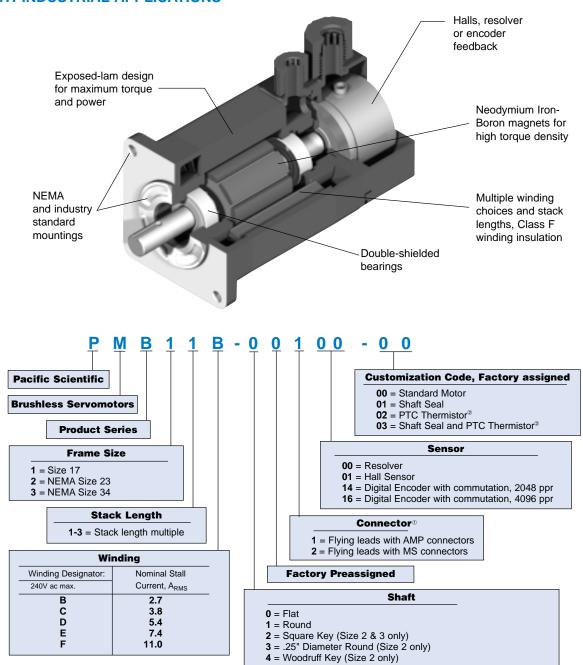
Motor	PMA65	PMA66	PMA67	PMA69
L Max	295 (11.6)	320 (12.6)	345 (13.6)	395 (15.6)

mm (in.) Note: SinCos encoder option adds 14 mm (.55") to total length.





COST-EFFECTIVE, HIGH PERFORMANCE FOR HIGHER VOLUME LIGHT-INDUSTRIAL APPLICATIONS



- ① Mating connectors not provided.
- ② Thermistor not available on PMB1 motors with resolver feedback.





- 4-pole synchronous servomotors
- · Neodymium-iron-boron magnets for maximum torque
- · 240V ac, 320V dc bus maximum operation
- IP40 construction
- MS-type or AMP mini Mate-N-Lock[®] connectors on 18" leads
- Rated speeds to 11,000 RPM

The PMB1 series of cost-effective: 877-378-0240 brushless servomotors covers ax: 877-378-0249 continuous torque range from 0.22 620.com 0.50 Nm. These compact who to say a go.com well-suited for speed and position control applications requiring high acceleration and torque in a compact package especially for light-industrial, highvolume applications.

Inertia - with encoder

lb-in.-sec2x10-3

.045

.079

.113

kgm²x10-

.005

.009

.013

lb-in-sec2x10-3

.050

.084

.118

RATINGS AND CHARACTERISTICS

Motor parameters and winding data. See system data beginning on page 4 for typical torque/speed performance.

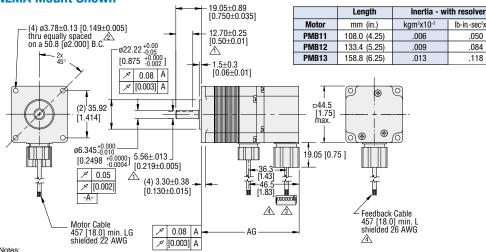
PARAMETER	SYMBOL	UNITS	PMB	11	PM	312	PN	IB13	
Continuous stall torque ^{① ②}	T _{cs}	Nm (lbin.)	0.22 (2.0)	0.40	(3.5)	.55	(4.9)	
Peak torque ^{③ ④}	T _{PK}	Nm (lbin.)	0.64 (5.7)	1.17	10.3)	1.6	(14.2)	
Inertia ⁽⁵⁾	J _M	kgm ² x10 ⁻³ (lbinsec ² x10 ⁻³)	0.0056 (0.050)	0.0095	(0.084)	0.0133	(0.118)	
Static friction (max.)	T _f	Nm (lbin.)	0.008 (0.07)	0.011	(0.1)	0.015	5 (0.13)	
Viscous damping coefficient	K _{DV}	Nm/kRPM (lbin./kRPM)	0.0023	(0.02)	0.0045	(0.04)	0.006	8 (0.06)	
Thermal resistance	R _{TH}	deg. C/Watt	2.4	7	2.	45	2	2.0	
Thermal time constant	τ_{TH}	min.	12.	0	14	.0	1	6.0	
Weight (motor only)	W	kg (lbs.)	0.6 (1	1.4)	0.7 (1.6)		1.3	(2.9)	
					,		_		
WINDING DATA			В	D	В	D	В	D	
Torque constant (RMS)	K,	Nm/A _{RMS} (lbin./A _{RMS})	0.09 (0.82)	0.05 (0.41)	0.16 (0.44)	0.08 (0.75)	0.24 (2.1)	0.11 (1.0)	
Voltage constant (RMS) (I-n)	K _E	V _{RMS} /rad/sec (V _{RMS} /kRPM)	0.06 (0.66)	0.03 (3.4)	0.11 (11.4)	0.06 (6.0)	0.16 (16.9)	0.88 (8.0)	
Continuous stall current ^{① ②}	I _{CS}	A _{RMS}	2.4	4.8	2.5	4.7	2.3	4.8	
Current at peak torque®	I _{PK}	A _{RMS}	7.2	14.4	7.4	14.1	6.9	14.5	
Resistance (line-to-line)	R _C	Ohms	4.1	1.0	3.9	1.0	5.4	1.2	
Inductance (line-to-line)	L	mH	2.5	0.6	3.3	0.9	4.8	1.1	
Typical Rated Speed @ 36V ac, 48V dc bus	W _R	RPM	1,000	6,450	700	3,500	n/a	2,350	
Typical Rated Torque @ 36V ac, 48V dc bus	T _{CR}	Nm (lbin.)	0.22 (2.0)	0.20 (1.8)	0.40 (3.5)	0.38 (3.3)	n/a (n/a)	0.50 (4.4)	
Typical Rated Speed @ 240V ac, 320V dc bus	W _R	RPM	n/a	n/a	n/a	n/a	11,000	n/a	
Typical Rated Torque @ 240V ac, 320V dc bus	T _{CR}	Nm (lbin.)	n/a (n/a)	n/a (n/a)	n/a (n/a)	n/a (n/a)	0.41 (3.6)	n/a (n/a)	

Note: All values at 25°C unless otherwise noted

- 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.
- 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.

2 All tests performed with sinusoidal commutation.

NEMA Mount Shown



- Notes
- 10" option (flat) shaft shown.
- Recommended mounting hardware: (4) fillister-lead or socket-lead cap screws #6 for PMB1 & 2, #10 for PMB3.
- Option "1" includes an AMP mini universal Mate-N-Lock® connector for power and feedback.
- Cable minimum bend radius 57.2 mm (2.25 in.).

PMB2 SERIES MOTOR



- 8-pole synchronous servomotors
- Neodymium-iron-boron magnets for maximum torque
- 240V ac, 320V dc bus maximum operation
- IP40 construction
- MS-type or AMP mini Mate-N-Lock® connectors on 18" leads
- Rated speeds to 10,000 RPM

The PMB2 Series of Cost office 177-378-0240 brushless servorhotors covers a-378-0249 continuous torque range rom 0 45 tom 1.40 Nm. These compact motors arem well-suited for speed and position control applications requiring high acceleration and torque in a compact package —

Sold & Serviced By:

especially for light-industrial, high-

volume applications.

RATINGS AND CHARACTERISTICS

Motor parameters and winding data. See system data beginning on page 4 for typical torque/speed performance.

PARAMETER	SYMBOL	UNITS	PME	321	PM	B22	PI	ЛВ23	
Continuous stall torque ^{(1) (2)}	T _{cs}	Nm (lbin.)	0.64	(5.7)	1.11	(9.8)	1.54	1.54 (13.6)	
Peak torque ^{③ ④}	T _{PK}	Nm (lbin.)	1.92 (17.0)	3.29	(29.1)	4.56	6 (40.4)	
Inertia [®]	J _M	kgm ² x10 ⁻³ (lbinsec ² x10 ⁻³)	0.023 (0.206)	0.044	(0.390)	0.065	(0.576)	
Static friction (max.)	Tf	Nm (lbin.)	0.034	(0.30)	0.068	(0.60)	0.10	2 (0.90)	
Viscous damping coefficient	Kov	Nm/kRPM (lbin./kRPM)	0.0079 (0.07)		0.012	4 (0.11)	0.018	1 (0.60)	
Thermal resistance	R _{TH}	deg. C/Watt	1.3	19	1.	.28	1	.10	
Thermal time constant	τ_{TH}	min.	22	2	2	24		26	
Weight (motor only)	W	kg (lbs.)	1.2 (2.7)	2.1	(4.6)	2.9	(6.4)	
						2.1 (1.0)			
WINDING DATA			В	D	В	D	В	C	
Torque constant (RMS)	K,	Nm/A _{RMS} (lbin./A _{RMS})	0.34 (2.99)	0.13 (1.14)	0.42 (3.7)	0.22 (1.98)	0.57 (5.0)	0.44 (3.9)	
Voltage constant (RMS) (I-n)	K _E	V _{RMS} /rad/sec (V _{RMS} /kRPM)	0.22 (22.7)	0.09 (9.1)	0.27 (28.8)	0.14 (15.0)	0.37 (39.0)	0.29 (29.9)	
Continuous stall current ^① ②	I _{CS}	A _{RMS}	2.6	5.0	2.65	4.95	2.7	3.5	
Current at peak torque [®]	I _{PK}	A _{RMS}	7.8	15.0	8.0	14.9	8.1	10.5	
Resistance (line-to-line)	R _C	Ohms	6.0	1.7	6.2	1.9	7.7	4.0	
Inductance (line-to-line)	L	mH	4.0	1.2	5.5	1.5	7.1	3.7	
Typical Rated Speed @ 36V ac, 48V dc bus	W _R	RPM	n/a	1,300	n/a	600	n/a	n/a	
Typical Rated Torque @ 36V ac, 48V dc bus	T _{CR}	Nm (lbin.)	n/a (n/a)	0.61 (5.4)	n/a (n/a)	1.10 (9.7)	n/a (n/a)	n/a (n/a)	
Typical Rated Speed @ 240V ac, 320V dc bus	W _R	RPM	10,000	n/a	6,250	n/a	4,400	6,000	
Typical Rated Torque @ 240V ac, 320V dc bus	T _{CR}	Nm (lbin.)	.45 (4.0)	n/a (n/a)	1.01 (8.9)	n/a (n/a)	1.40 (12.4)	1.33 (11.8)	

Note: All values at 25°C unless otherwise noted.

- 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.

Length

mm (in.)

Inertia - with resolver

lb-in.-sec2x10

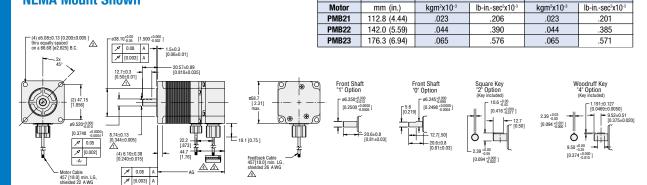
Inertia - with encoder

lb-in.-sec2x10-3

⑤ Motor with resolver feedback.

Motor

NEMA Mount Shown



Notes:

- Recommended mounting hardware: (4) fillister-lead or socket-lead cap screws #6 for PMB1 & 2, #10 for PMB3.
- ① Option "1" includes an AMP® mini universal Mate-N-Lock connector for power and feedback
- A Cable minimum bend radius 57.2 mm (2.25 in.).
- \$\frac{1}{2}\$ "2" option (square key shown) for shaft.

PMB3 SERIES MOTOR



- 8-pole synchronous servomotors
- Neodymium-iron-boron magnets for maximum torque
- 240V ac, 320V dc bus maximum operation
- IP40 construction
- MS-type or AMP mini Mate-N-Lock® connectors on 18" lead
- Rated speeds to 6,000 RPM

The PMB3 series of Cost-effectione: 877-378-0240 brushless servomotors over a ax: 877-378-0249 continuous torque range and the compact whole series of cost with the cost of c

Sold & Serviced By:

RATINGS AND CHARACTERISTICS

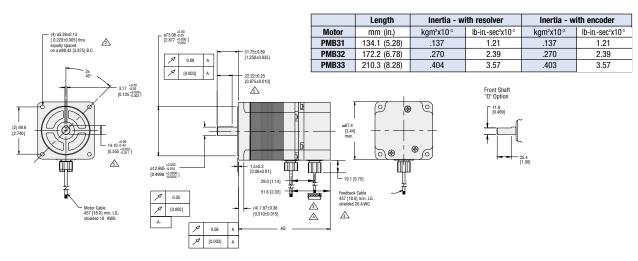
Motor parameters and winding data. See system data beginning on page 4 for typical torque/speed performance.

PARAMETER	SYMBOL	UNITS	PMB	31		PMB32			PMB33		
Continuous stall torque ^{⊕ ②}	T _{cs}	Nm (lbin.)	2.11 (1	18.7)		3.84 (34.0)			5.42 (48.0)		
Peak torque ^{③ ④}	T _{PK}	Nm (lbin.)	6.26 (5	55.4)		11.40 (101)			16.1 (142)		
Inertia [®]	J _M	kgm ² x10 ⁻³ (lbinsec ² x10 ⁻³)	0.137 (1.21)	0.27 (2.39)			0.404 (3.57)			
Static friction (max.)	T _f	Nm (lbin.)	0.09 (0	0.09 (0.80)		0.12 (1.10)			0.169 (1.50)		
Viscous damping coefficient	K _{DV}	Nm/kRPM (lbin./kRPM)	0.0124 (0.0124 (0.110)		0.026 (0.23)			0.038 (0.34)		
Thermal resistance	R _{TH}	deg. C/Watt	1.08			0.92			0.78		
Thermal time constant	τ_{TH}	min.	28			30			32		
Weight (motor only)	W	kg (lbs.)	2.5 (5	2.5 (5.5) 4.4 (9.7)		6.3 (13.8)					
WINDING DATA			В	D	С	D	E	С	E	F	
Torque constant (RMS)	K,	Nm/A _{RMS} (lbin./A _{RMS})	0.79 (7.03)	0.41 (3.67)	1.30 (11.5)	0.74 (6.5)	0.57 (5.0)	1.86 (16.5)	0.93(8.2)	060 (5.3)	
Voltage constant (RMS) (I-n)	K _E	V _{RMS} /rad/sec (V _{RMS} /kRPM)	0.49 (51.3)	0.25 (26.4)	0.82 (85.4)	0.46 (48.4)	0.35 (37.1)	1.11 (117)	0.56 (58.4)	0.37 (38.7)	
Continuous stall current ^① ②	I _{CS}	A _{RMS}	2.66	5.1	2.95	5.2	6.8	2.9	5.8	9.0	
Current at peak torque [®]	I _{PK}	A _{RMS}	8.0	15.3	8.9	15.6	20.4	8.7	17.5	27.1	
Resistance (line-to-line)	R _C	Ohms	7.6	2.0	7.2	2.3	1.4	8.6	2.2	0.96	
Inductance (line-to-line)	L	mH	19.6	5.2	22.5	7.4	20.4	27.2	6.8	2.8	
Typical Rated Speed @ 240V ac, 320V dc bus	W _R	RPM	2,900	6,000	1,900	3,500	4,450	1,300	3,000	4,600	
Typical Rated Torque @ 240V ac, 320V dc bus	T _{CR}	Nm (lbin.)	1.90 (16.8)	1.62 (14.3)	2.98 (26.4)	2.85 (25.2)	2.77 (24.5)	4.84 (42.8)	4.41 (39.0)	4.04 (35.8)	

Note: All values at 25°C unless otherwise noted

- ① Motor operated at rated winding temperature rise of $\Delta t = 100$ °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 14° aluminum heat sink.
- ② All tests performed with sinusoidal commutation.
- 3 Theoretical motor maximum.
- Caution: For peak torques or peak currents greater than 4x the continuous rating, consult the factory for thermal considerations.
- Motor with resolver feedback.

NEMA Mount Shown



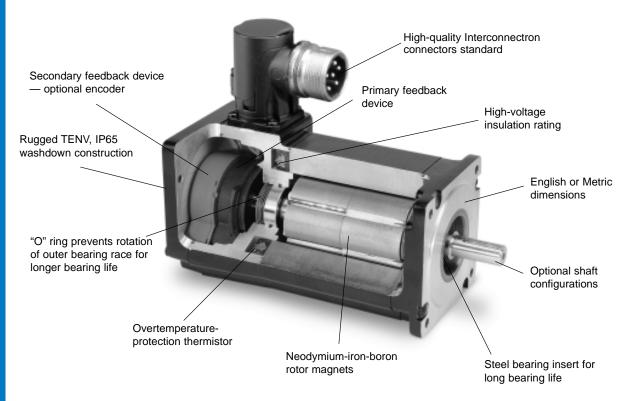
Notes:

- 1 "0" option (flat) shaft shown.
- Recommended mounting hardware: (4) fillister-lead or socket-lead cap screws #6 for PMB1 & 2, #10 for PMB3.
- Option "1" includes an AMP® mini universal Mate-N-Lock connector for power and feedback
- A Cable minimum bend radius 57.2 mm (2.25 in.).
- 2" option (square key shown) for shaft.



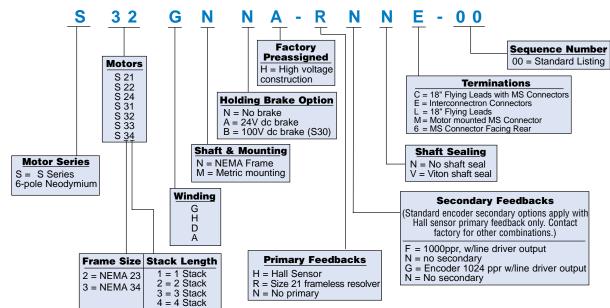


HIGH TORQUE PER FRAME SIZE — MEDIUM INERTIA FOR IMPROVED LOAD MATCHING



MODEL NUMBER CODE

To construct a motor listing, select the combination of features required and put all the coded information in the proper sequence. Please account for all entries. The model number shown is an example of a properly specified motor.





- 6-pole synchronous servomotors
- Neodymium-iron-boron magnets for maximum torque
- Long-life bearing system
- IP65 protection
- Anti-cog stator design
- High-quality Interconnectron connectors
- Rated speeds to 12,500 RPM

The S20 Series moore from hone: 877-378-0240 continuous torque range from 532 877-378-0249

1.6 Nm. These compact from 10290.com well-suited for speed and position 10290.com control applications requiring maximum performance in minimum space. The S20 Series is available with other primary and secondary feedback devices, in addition to the standard resolver primary feedback, allowing for integration with other control schemes.

Sold & Serviced By:

GO.com

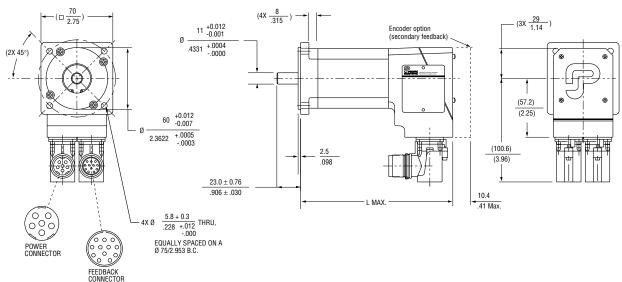
RATINGS AND CHARACTERISTICS

Motor parameters and winding data. See system data beginning on page 4 for typical torque/speed performance.

PARAMETER	SYMBOL	UNITS	s	21	S	22	S	24
Continuous stall torque ^①	T _{CS}	Nm (lbin.)	0.5	(4.5)	1.0	(8.8)	1.6 (14.4)
Peak torque [®]	T _{PK}	Nm (lbin.)	1.36	(12.0)	2.64	(23.4)	4.94	(43.7)
Inertia [®]	J _M	kgm ² x10 ⁻³ (lbinsec ² x10 ⁻³)	0.042 (0.38)		0.064 (0.56)		0.100 (0.89)	
Static friction (max.)	T _f	Nm (lbin.)	0.008 (0.07)		0.010 (0.09)		0.025 (0.22)	
Viscous damping coefficient	K _{DV}	Nm/kRPM (lbin./kRPM)	0.003 (0.03)		0.006 (0.05)		0.012 (0.11)	
Thermal resistance [®]	R _{TH}	deg. C/Watt	2.2		1.7		1.29	
Thermal time constant	τ_{TH}	min.	5	.0	11.0		15	5.0
Weight (motor only)	W	kg (lbs.)	1.4	(3.1) 1.9 (4.2)		(4.2)	2.7	(6.0)
WINDING DATA			G	Н	G	н	G	н
Torque constant (RMS) ²	K,	Nm/A _{RMS} (lbin./A _{RMS})	0.3 (2.7)	0.2 (1.8)	0.7 (6.2)	0.3 (2.7)	0.6 (5.3)	0.3 (2.7)
Voltage constant (RMS) ^②	K _E	V _{RMS} /rad/sec (V _{RMS} /kRPM)	0.19 (19.9)	0.13 (13.6)	0.44 (46.1)	0.19 (19.9)	0.38 (39.8)	0.19 (19.9)
Continuous stall current ^①	I _{cs}	A _{RMS}	1.5	3.1	1.5	2.9	2.6	5.1

WINDING DATA			և	n n	u	n	L G	п
Torque constant (RMS) ²	K,	Nm/A _{RMS} (lbin./A _{RMS})	0.3 (2.7)	0.2 (1.8)	0.7 (6.2)	0.3 (2.7)	0.6 (5.3)	0.3 (2.7)
Voltage constant (RMS) ^②	K _E	V _{RMS} /rad/sec (V _{RMS} /kRPM)	0.19 (19.9)	0.13 (13.6)	0.44 (46.1)	0.19 (19.9)	0.38 (39.8)	0.19 (19.9)
Continuous stall current ^①	I _{CS}	A _{RMS}	1.5	3.1	1.5	2.9	2.6	5.1
Current at peak torque [®]	I _{PK}	A _{RMS}	4.5	9.3	4.5	8.7	7.8	15.3
Resistance (line-to-line)	R _C	Ohms	12.0	3.0	16.2	4.2	6.8	1.8
Inductance (line-to-line)	L	mH	14.4	3.7	22.1	5.7	9.3	2.2
Typical Rated Speed @ 240V ac, 320V dc bus	W _R	RPM	7,900	12,500	3,800	7,600	3,400	7,000
Typical Rated Torque @ 240V ac, 320V dc bus	T _{CR}	Nm (lbin.)	0.44 (3.9)	0.32 (2.8)	0.92 (8.1)	0.70 (6.2)	1.5 (12.9)	0.7 (6.6)

Metric Mount Shown — also available in NEMA mount. Consult factory or website for details.



- 1 Windings at 155°C. Motor in 25°C ambient and mounted to a 10" x 10" x 1/4" aluminum heat sink.
- ② RMS value of a sinusoidal waveform, measured line to neutral.
- 3 Motor with resolver feedback.
- ④ Caution: For peak torques or peak currents greater than 3x the continuous rating, consult the factory for thermal considerations.
- (5) Motor in 25°C ambient, mounted to a 10" x 10" x 1/4" aluminum heat sink.

Motor	S21	S22	S24
L Max	124.0 (4.88)	149.4 (5.88)	200.2 (7.88)
mm (in.)			

S30 SERIES MOTOR



- 6-pole synchronous servomotors
- Neodymium-iron-boron magnets for maximum torque
- 240V to 480V ac operation
- · Long-life bearing system
- IP65 protection
- · Anti-cog stator design
- High-quality Interconnectron connectors
- · Rated speeds to 3,900 RPM



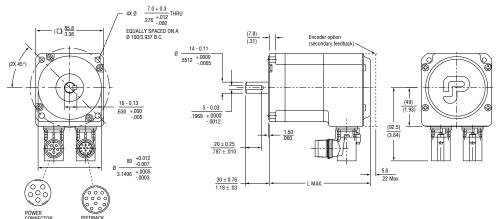
The S30 Series rectors coverra378-0249 continuous torque sange from 49 dem 6.6 Nm. These compact motors are well-suited for speed and position control applications requiring maximum performance in minimum space. The S30 Series is available with other primary and secondary feedback devices, in addition to the standard resolver primary feedback, allowing for integration with other control schemes.

RATINGS AND CHARACTERISTICS

Motor parameters and winding data. See system data beginning on page 4 for typical torque/speed performance.

PARAMETER	SYMBOL	UNITS	s	31	S	32		S	33			S34	
Continuous stall torque ^①	T _{CS}	Nm (lbin.)	2.2 (19.5)	4.0 (35.4)		5.3 (46.9)			6.6 (58.4)	
Peak torque [®]	T _{PK}	Nm (lbin.)	6.2 (55.0)	11.3	(100)		15.3	(135)			25.3 (224)	
Inertia [®]	J _M	kgm ² x10 ⁻³ (lbinsec ² x10 ⁻³)	0.18	(1.58)	0.34	2.98)		0.48	(4.28)			0.64 (5.68)	
Static friction (max.)	Tf	Nm (lbin.)	0.06	(0.56)	0.15	1.31)		0.17	(1.50)			0.19 (1.70)	
Viscous damping coefficient	K _{DV}	Nm/kRPM (lbin./kRPM)	0.016	(0.15)	0.039	(0.35)		0.047	(0.42)			0.073 (0.65)	
Thermal resistance [®]	R _{TH}	deg. C/Watt	1.	23	0.9	97		0.0	87			0.85	
Thermal time constant	τ_{TH}	min.	14	4.0	24	.0		27	'.0			30.0	
Weight (motor only)	W	kg (lbs.)	3.2	(7.1)	4.9 (10.7)		6.5 (14.2)			8.1 (17.8)	
				_									
WINDING DATA			G	н	G	н	Α	D	G	н	Α	G	н
Torque constant (RMS) ^②	K,	Nm/Arms (lbin./A _{RMS})	1.3 (11.5)	0.7 (6.2)	1.3 (11.5)	0.7 (6.2)	1.5 (13.3)	0.8 (6.7)	1.9 (16.8)	0.9 (8.0)	1.7 (15.0)	2.1 (18.6)	1.1 (9.6)
Voltage constant (RMS) ²	Κ _E	V _{RMS} /rad/sec (V _{RMS} /kRPM)	0.82 (85.9)	0.44 (46.1)	0.82 (85.9)	0.44 (46.1)	0.94 (98.4)	.47 (49.6)	1.19 (125)	0.56 (58.6)	1.07 (112)	1.32 (138)	.68 (71.1)
Continuous stall current ^①	I _{CS}	A _{RMS}	1.7	3.3	3.1	6.1	3.5	7.0	2.8	5.6	3.9	3.1	6.1
Current at peak torque [®]	I _{PK}	A _{RMS}	6.0	11.7	10.9	21.4	12.3	24.6	9.7	19.7	13.7	10.9	21.4
Resistance (line-to-line)	R _C	Ohms	16.4	4.1	6.2	1.6	5.2	1.3	8.4	2.1	4.4	7.2	1.8
Inductance (line-to-line)	L	mH	41.2	10.3	18.0	4.5	17.0	4.4	25.2	6.3	14.7	23.7	5.9
Typical Rated Speed @ 240V ac, 320V dc bus	W _R	RPM	1,800	3,500	1,500	3,900	1,500	3,600	1,400	3,200	1,500	1,300	2,000
Typical Rated Torque @ 240V ac, 320V dc bus	T _{CR}	Nm (lbin.)	2.2 (19.1)	1.9 (16.6)	3.6 (32.3)	2.8 (24.9)	4.7 (41.3)	3.7 (32.6)	4.8 (42.8)	3.9 (34.4)	5.6 (49.3)	5.8 (51.1)	6.4 (56.8)
Typical Rated Speed @ 400V ac, 560V dc bus	W _R	RPM	N/A	N/A	N/A	N/A	3,000	N/A	N/A	N/A	3,000	N/A	N/A
Typical Rated Torque @ 400V ac, 560V dc bus	T _{CR}	Nm (lbin.)	N/A	N/A	N/A	N/A	4.0 (35.6)	N/A	N/A	N/A	4.3 (37.9)	N/A	N/A
Typical Rated Speed @ 480V ac, 640V dc bus	W _R	RPM	N/A	N/A	N/A	N/A	3,900	N/A	N/A	N/A	3,600	N/A	N/A
Typical Rated Torque @ 480V ac, 640V dc bus	T _{CR}	Nm (lbin.)	N/A	N/A	N/A	N/A	3.6 (32.1)	N/A	N/A	N/A	3.9 (34.2)	N/A	N/A

Metric Mount Shown — also available in NEMA mount. Consult factory or website for details.

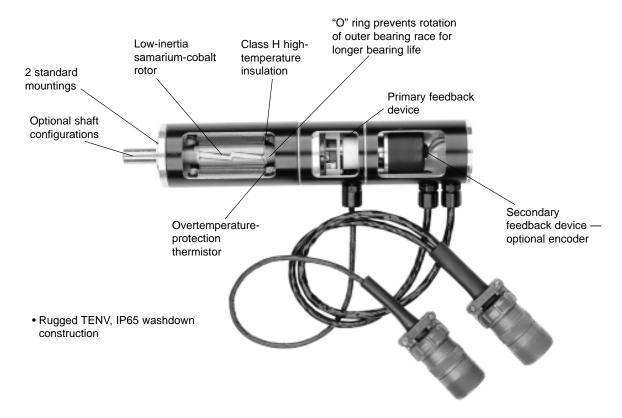


- ① Windings at 155°C. Motor in 25°C ambient and mounted to a 10" x 10" x 1/4" aluminum heat sink.
- $\ensuremath{\mathfrak{D}}$ RMS value of a sinusoidal waveform, measured line to neutral.
- 3 Motor with resolver feedback.
- ④ Caution: For peak torques or peak currents greater than 3.5x the continuous rating, consult the factory for thermal considerations.
- ⑤ Motor in 25°C ambient, mounted to a 10" x 10" x 1/4" aluminum heat sink.

Motor	S31	S32	S33	S34
L Max	130.3 (5.13)	168.4 (6.63)	206.5 (8.13)	244.6 (9.63)

mm (in.)

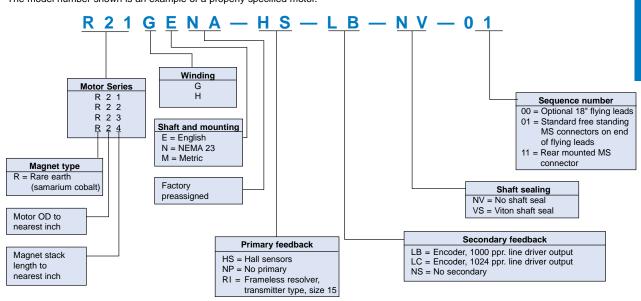
HIGH DYNAMIC RESPONSE OVER A WIDE SPEED RANGE — IN A COMPACT PACKAGE



MODEL NUMBER CODE. . . R20 Series

To construct a motor listing, select the combination of features required and put all the coded information in the proper sequence. Please account for all entries. Include the factory-preassigned "N" and "A" as noted.

The model number shown is an example of a properly specified motor.



R-SERIES

R20 SERIES MOTOR — 2" OD (round frame)



- 4-pole synchronous servomotors
- Samarium-cobalt permanent magnets for maximum torque-to-inertia without demagnetization
- 240V ac, 320V dc bus maximum operation
- · Anti-cog stator design
- MS-type connectors on 18" leads
- Rated speeds to 11,000 RPM



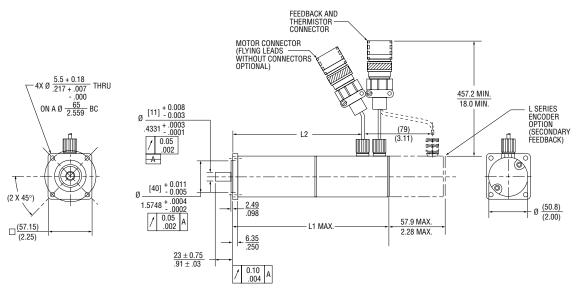
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RATINGS AND CHARACTERISTICS

Motor parameters and winding data. See system data beginning on page 4 for typical torque/speed performance.

PARAMETER	SYMBOL	UNITS	R	21	R	22	R	23		R24
Continuous stall torque ^①	T _{CS}	Nm (lbin.)	0.3	(2.7)	0.6	(5.3)	0.9	(8.0)	1.1	9.7)
Peak torque [®]	T _{PK}	Nm (lbin.)	0.88	(7.8)	1.62	(14.3)	2.54	(22.5)	3.07	27.2)
Inertia [®]	J _M	kgm ² x10 ⁻³ (lbinsec ² x10 ⁻³)	0.01	0.01 (0.09)		.014 (.12)		(0.16)	0.021 (.19)	
Static friction (max.)	T _f	Nm (lbin.)	0.01 (0.10)		0.02 (0.17)		0.03	(0.24)	0.04	0.31)
Viscous damping coefficient	K _{DV}	Nm/kRPM (lbin./kRPM)	0.003 (0.03)		0.005 (0.04)		0.006	(0.05)	0.008	(0.07)
Thermal resistance®	R _{TH}	deg. C/Watt	1.65		1.43		1.3	27	1.3	27
Thermal time constant	τ_{TH}	min.	8.0		1:	2.0	15	i.0	17	.0
Weight (motor only)	W	kg (lbs.)	0.68 (1.5)		0.95 (2.1)		1.3 (2.8)		1.5	(3.4)
WINDING DATA			G	н	G	Н	G	н	G	н
Torque constant (RMS) ^②	K,	Nm/A _{RMS} (lbin./A _{RMS})	0.4 (3.5)	0.2 (1.8)	0.4 (3.5)	0.2 (1.8)	0.6 (5.3)	0.3 (2.7)	0.7 (6.2)	0.4 (0.24)
Voltage constant (RMS) ²	K _E	V _{RMS} /rad/sec (V _{RMS} /kRPM)	0.24 (25.1)	0.12 (12.6)	0.24 (25.1)	0.12 (12.6)	0.36 (37.7)	0.18 (18.8)	0.43 (45.0)	3.5 (25.1)
Continuous stall current ^①	I _{CS}	A _{RMS}	0.7	1.5	1.4	2.7	1.5	3.0	1.1	1.1
Current at peak torque [®]	I _{PK}	A _{RMS}	2.1	4.5	4.2	8.1	4.5	9.0	4.5	9.0
Resistance (line-to-line)	R _C	Ohms	62.0	16.0	22.0	5.4	20.0	4.9	22.0	5.5
Inductance (line-to-line)	L	mH	47.0	12.0	21.0	5.3	26.0	6.5	26.0	6.5
Typical Rated Speed @ 240V ac, 320V dc bus	W _R	RPM	4,000	11,000	5,300	8,000	3,800	8,000	3,000	7,700
Typical Rated Torque @ 240V ac, 320V dc bus	T _{CR}	Nm (lbin.)	0.31 (2.7)	0.17 (1.5)	0.47 (4.2)	0.29 (2.6)	0.80 (7.1)	0.61 (5.4)	1.03 (9.1)	0.79 (7.0)

Metric Mount Shown — also available in English mount. Consult factory or website for details.



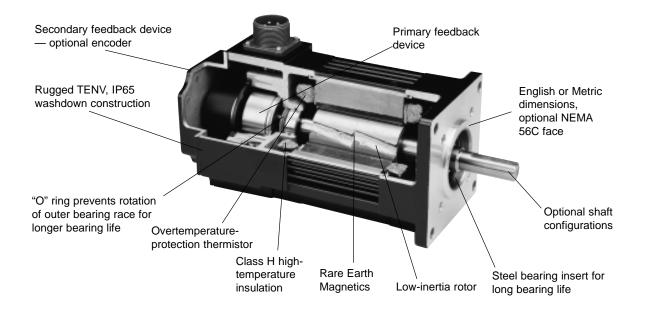
- 1 Windings at 155°C. Motor in 25°C ambient and mounted to a 10" x 10" x 1/4" aluminum heat sink.
- ② RMS value of a sinusoidal waveform, measured line to neutral.
- 3 Motor with resolver feedback.
- ④ Caution: For peak torques or peak currents greater than 3x the continuous rating, consult the factory for thermal considerations.
- (5) Motor in 25°C ambient, mounted to a 10" x 10" x 1/4" aluminum heat sink.

Motor	R21	R22	R23	R24
L1 Max	162.1 (6.38)	187.5 (7.38)	212.9 (8.38)	238.3 (9.38)
L2	125.2 (4.93)	150.6 (5.93)	176.0 (6.93)	201.4 (7.93)



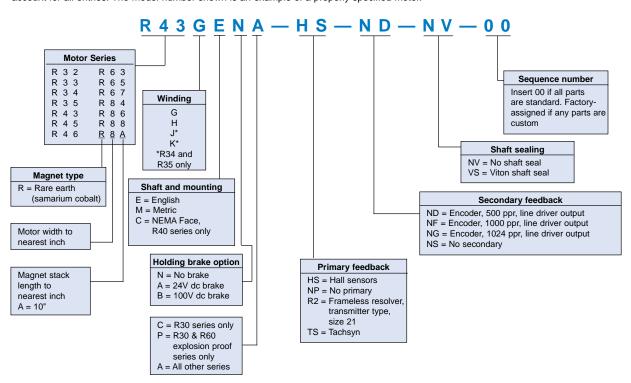


HIGH TORQUE-TO-INERTIA FOR UNMATCHED PERFORMANCE



MODEL NUMBER CODE. . . R30/R40/R60/R80 Series

To construct a motor listing, select the combination of features required and put all the coded information in the proper sequence. Please account for all entries. The model number shown is an example of a properly specified motor.



R30 SERIES MOTOR — 3.25" width/height (square frame)



- 4-pole synchronous servomotors
- Samarium-cobalt permanent magnets for maximum torque-to-inertia without demagnetization
- Low rotor inertia for rapid accel/decel
- 240V ac, 320V dc bus operation
- · Anti-cog stator design
- Rated speeds to 7,000 RPM



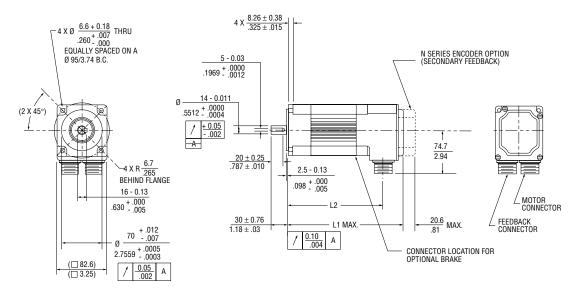
The R30 Series ก็จะประชาชา 27-378-0240 continuous เป็นปริจัติเอียร์ กับที่ 7.778-0249 3.8 Nm. These จังคำอังกับกระดา well-suited for speed พหา position control projections that require maximum performance in minimum space.

RATINGS AND CHARACTERISTICS

Motor parameters and winding data. See system data beginning on page 4 for typical torque/speed performance.

PARAMETER	SYMBOL	UNITS	R	32	R	33	R	34		R35
Continuous stall torque ^①	T _{CS}	Nm (lbin.)	1.7 (15.0)	2.5	(22.1)	3.2 (28.3)	3.8 (33.6)
Peak torque [®]	T _{PK}	Nm (lbin.)	4.40	(39.0)	6.54	(57.9)	8.30	(73.5)	10.1	(89.4)
Inertia [®]	J _M	$kgm^{2}x10^{-3}(lbinsec^{2}x10^{-3})$.071	(.63)	0.093 (.82)		0.11 (1.00)		.13 (1.19)
Static friction (max.)	T _f	Nm (lbin.)	0.03	(0.23)	0.04 (0.31)		0.04 (0.39)		0.05	(0.47)
Viscous damping coefficient	K _{DV}	Nm/kRPM (lbin./kRPM)	0.005	(0.04)	0.007 (0.06)		0.01 (0.09)		0.012	(0.11)
Thermal resistance ⁽⁵⁾	R _{TH}	deg. C/Watt	0.93		0.84		0.	76	0.	70
Thermal time constant	τπ	min.	20.0		2	3.0	26	i.0	29	0.0
Weight (motor only)	W	kg (lbs.)	2.5 (5.5)		3.2 (7.1)		3.9 (8.7)		4.6 (10.2)
WINDING DATA			G	н	G	н	J	K	J	K
Torque constant (RMS) ^②	K _r	Nm/A _{RMS} (lbin./A _{RMS})	0.6 (5.3)	0.3 (2.7)	0.8 (7.1)	0.4 (3.5)	1.1 (9.7)	0.5 (4.4)	1.3 (11.5)	0.6 (5.3)
Voltage constant (RMS) ^②	K _E	V _{RMS} /rad/sec (V _{RMS} /kRPM)	0.36 (37.7)	0.18 (18.8)	0.49 (51.3)	0.24 (25.1)	0.67 (70.2)	0.3 (31.4)	0.79 (82.7)	0.36 (37.7)
Continuous stall current [⊕]	Ics	A _{RMS}	2.9	5.8	3.2	6.4	3.0	6.1	2.9	6.0
Current at peak torque [®]	I _{PK}	A _{RMS}	8.7	17.4	9.6	19.2	9.0	18.3	8.7	18.0
Resistance (line-to-line)	R _C	Ohms	7.3	1.8	6.9	1.7	8.1	2.0	9.2	2.3
Inductance (line-to-line)	L	mH	23.0	5.8	22.0	5.6	30.0	7.5	42.0	10.5
Typical Rated Speed @ 240V ac, 320V dc bus	W _R	RPM	4,000	7,000	3,000	6,000	2,300	4,000	1,700	4,200
Typical Rated Torque @ 240V ac, 320V dc bus	T _{CR}	Nm (lbin.)	1.2 (10.5)	0.76 (6.7)	1.9 (16.6)	1.2 (10.7)	2.9 (25.3)	1.9 (17.2)	3.7 (32.5)	2.4 (21.6)

Metric Mount Shown — also available in English mount. Consult factory or website for details.



- ① Windings at 155°C. Motor in 25°C ambient and mounted to a 10" x 10" x 1/4" aluminum heat sink.
- $\ensuremath{{\mathbb Q}}$ RMS value of a sinusoidal waveform, measured line to neutral.
- 3 Motor with resolver feedback.
- ④ Caution: For peak torques or peak currents greater than 3x the continuous rating, consult the factory for thermal considerations.
- (5) Motor in 25°C ambient, mounted to a 10" x 10" x 1/4" aluminum heat sink.

Motor	R32	R33	R34	R35
L1 Max	180.1 (7.09)	205.5 (8.09)	230.9 (9.09)	256.3 (10.09)
L2	142.7 (5.62)	168.1 (6.62)	193.5 (7.62)	218.9 (8.62)
mm (in.)				





- · 4-pole synchronous servomotors
- Samarium-cobalt permanent magnets for maximum torque-to-inertia without demagnetization
- Low rotor inertia for rapid accel/decel
- 240V ac, 320V dc bus operation
- · Anti-cog stator design
- Rated speeds to 5,300 RPM

The R40 Series models cover hone: 877-378-0240 continuous torque range from 5.9 to 877-378-0249 7.6 Nm. These motors are characterized com by smooth operation at low species, range com acceleration and deceleration, and high torque production throughout a wide speed range.

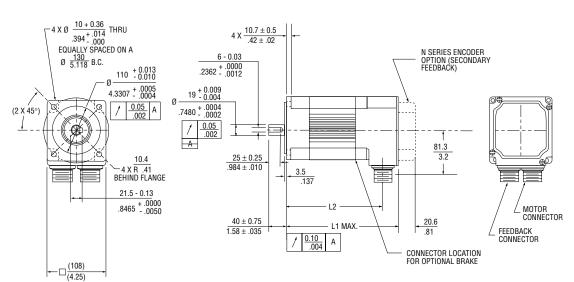
RATINGS AND CHARACTERISTICS

Motor parameters and winding data. See system data beginning on page 4 for typical torque/speed performance.

PARAMETER	SYMBOL	UNITS	R	43	R	45	R	46
Continuous stall torque ^①	T _{CS}	Nm (lbin.)	3.9 (3	4.5)	5.7	(50.4)	7.6 (67.3)
Peak torque ⁽⁴⁾	T _{PK}	Nm (lbin.)	10.4 (92.1)		15.1 (134)		20.2 (179)	
Inertia [®]	J _M	kgm ² x10 ⁻³ (lbinsec ² x10 ⁻³)	.22 (1.98)		.31 (2.78)		.40 (3.5	
Static friction (max.)	T _f	Nm (lbin.)	0.03 (0.26)		0.04 (0.33)		0.04 (0.39)	
Viscous damping coefficient	K _{DV}	Nm/kRPM (lbin./kRPM)	0.011 (0.10)		0.016 (0.14)		0.019 (0.17)	
Thermal resistance ^⑤	R _{TH}	deg. C/Watt	0.7	0.72		0.61		52
Thermal time constant	τ _{τΗ}	min.	19.	19.0 29.0		9.0	35	5.0
Weight (motor only)	W	kg (lbs.)	6.8 (1	5.0)	9.1 (20.0)		11.3	(25.0)
WINDING DATA			G	н	G	н	G	Н
Torque constant (RMS) ²	K,	Nm/A _{RMS} (lbin./A _{RMS})	1.3 (11.5)	0.7 (6.2)	1.0 (8.9)	0.5 (4.4)	1.4 (12.4)	0.7 (6.2)
Voltage constant (RMS) ²	K _E	V _{RMS} /rad/sec (V _{RMS} /kRPM)	0.79 (82.7)	0.43 (45.0)	0.61 (63.9)	0.30 (31.4)	0.85 (89.0)	0.43 (45.0)
Continuous stall current ^①	I	A	29	5.6	5.5	10.9	5.5	11.0

WINDING DATA			G	Н	G	н	G	Н
Torque constant (RMS) ²	K,	Nm/A _{RMS} (lbin./A _{RMS})	1.3 (11.5)	0.7 (6.2)	1.0 (8.9)	0.5 (4.4)	1.4 (12.4)	0.7 (6.2)
Voltage constant (RMS) ²	K _E	V _{RMS} /rad/sec (V _{RMS} /kRPM)	0.79 (82.7)	0.43 (45.0)	0.61 (63.9)	0.30 (31.4)	0.85 (89.0)	0.43 (45.0)
Continuous stall current [⊕]	I _{CS}	A _{RMS}	2.9	5.6	5.5	10.9	5.5	11.0
Current at peak torque [®]	I _{PK}	A _{RMS}	8.7	16.8	16.5	32.7	16.5	33.0
Resistance (line-to-line)	$R_{\mathbb{C}}$	Ohms	10.0	2.5	3.2	0.81	3.7	0.93
Inductance (line-to-line)	L	mH	53.0	13.3	20.0	4.9	25.0	6.2
Typical Rated Speed @ 240V ac, 320V dc bus	W _R	RPM	1,500	3,700	2,400	5,300	1,700	4,000
Typical Rated Torque @240V ac, 320V dc bus	T _{CR}	Nm (lbin.)	3.9 (34.6)	3.6 (31.7)	5.5 (48.5)	4.7 (41.9)	7.3 (64.6)	5.7 (50.3)

Metric Mount Shown — also available in NEMA and English mount. Consult factory or website for details.



- ① Windings at 155°C. Motor in 25°C ambient and mounted to a 10" x 10" x 1/4" aluminum heat sink.
- ② RMS value of a sinusoidal waveform, measured line to neutral.
- 3 Motor with resolver feedback.
- ④ Caution: For peak torques or peak currents greater than 3x the continuous rating, consult the factory for thermal considerations.
- ⑤ Motor in 25°C ambient, mounted to a 10" x 10" x 1/4" aluminum heat sink.

I	Motor	R43	R45	R46				
I	L1 Max	213.4 (8.4)	251.5 (9.9)	289.6 (11.4)				
I	L2	178.1 (7.01)	216.2 (8.51)	254.3 (10.01)				
	mm (in)							

R60 SERIES MOTOR — 5.75" width/height (square frame)



- 4-pole synchronous servomotors
- Samarium-cobalt permanent magnets for maximum torque-to-inertia without demagnetization
- · Low rotor inertia for rapid accel/decel
- 240V ac, 320V dc bus operation
- Anti-cog stator design
- · Rated speeds to 6,000 RPM



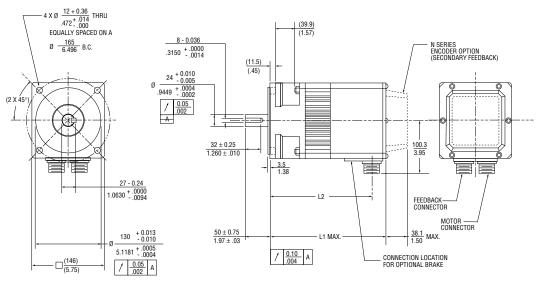
The R60 Series incorps obver 877-378-0240 continuous torque rearger on 873 to 8-0249 19.9 Nm. Built for hea@ daty appreations, these motors deliver excellent orque m speed and/or velocity control.

RATINGS AND CHARACTERISTICS

Motor parameters and winding data. See system data beginning on page 4 for typical torque/speed performance.

PARAMETER	SYMBOL	UNITS	R	63	R	65	R	67	
Continuous stall torque ^①	T _{CS}	Nm (lbin.)	8.3 (7:	3.5)	13.6	(120)	19.9	19.9 (176)	
Peak torque [®]	T _{PK}	Nm (lbin.)	20.5 (181)		33.3 (295)		48.9 (433)		
Inertia [®]	J _M	kgm ² x10 ⁻³ (lbinsec ² x10 ⁻³)	.81 (7.2)		1.26 (11.2)		1.72 (15.2)		
Static friction (max.)	T _f	Nm (lbin.)	0.16 (1.4)		0.26	6 (2.3)	0.36	(3.2)	
Viscous damping coefficient	K _{DV}	Nm/kRPM (lbin./kRPM)	0.046 (0.41)	0.075 (0.66)		0.104	(0.92)	
Thermal resistance [®]	R _{TH}	deg. C/Watt	0.51		0.42		0.	30	
Thermal time constant	τ_{TH}	min.	19.0		36.0		72.0		
Weight (motor only)	W	kg (lbs.)	13.0 (29.0)		18.0 (39.0)		22.0 (49.0)		
WINDING DATA			G	Н	G	Н	G	н	
Torque constant (RMS) ²	K,	Nm/A _{RMS} (lbin./A _{RMS})	0.8 (7.1)	0.4 (3.5)	1.3 (11.5)	0.6 (5.3)	1.8 (15.9)	0.9 (8.0)	
Voltage constant (RMS) ²	K _E	V _{RMS} /rad/sec (V _{RMS} /kRPM)	0.49 (51.3)	0.24 (25.1)	0.79 (82.7)	0.36 (37.7)	1.09 (114)	0.55 (57.6)	
Continuous stall current ^①	I _{CS}	A _{RMS}	11.0	22.0	10.7	21.4	11.3	22.5	
Current at peak torque [®]	I _{PK}	A _{RMS}	33.0	66.0	32.1	64.2	33.9	67.5	
Resistance (line-to-line)	R _C	Ohms	0.93	0.23	1.20	0.34	1.50	0.37	
Inductance (line-to-line)	L	mH	8.9	2.2	13.7	3.40	18.2	4.60	
Typical Rated Speed @240V ac, 320V dc bus	W _R	RPM	3,400	6,000	2,000	4,300	1,400	3,000	
Typical Rated Torque @ 240V ac, 320V dc bus	T _{CR}	Nm (lbin.)	6.8 (60.1)	4.4 (39.3)	12.2 (108)	9.9 (87.6)	17.6 (156)	15.7 (139)	

Metric Mount Shown — also available in English mount. Consult factory or website for details.



- ① Windings at 155°C. Motor in 25°C ambient and mounted to a 18" x 18" x 1/2" aluminum heat sink.
- ② RMS value of a sinusoidal waveform, measured line to neutral.
- 3 Motor with resolver feedback.
- ④ Caution: For peak torques or peak currents greater than 3x the continuous rating, consult the factory for thermal considerations.
- ⑤ Motor in 25°C ambient, mounted to a 18" x 18" x 1/2" aluminum heat sink.

Motor	R63	R65	R67
L1 Max	237.7 (9.36)	288.5 (11.36)	339.3 (13.36)
L2	206.2 (8.12)	257 (10.12)	307.8 (12.12)
mm (in)			

The R80 Series motors cover a continuous torque range from \$25.5 to 77-378-0249 53.4 Nm. Providing excellent @ accommod provided to the commod provided to the c

R80 SERIES MOTOR — 7.5" width/height (square frame)



- 4-pole synchronous servomotors
- Samarium-cobalt permanent magnets for maximum torque-to-inertia without demagnetization
- Low rotor inertia for rapid accel/decel
- 240V ac, 320V dc bus operation
- Anti-cog stator design
- · Rated speeds to 4,000 RPM

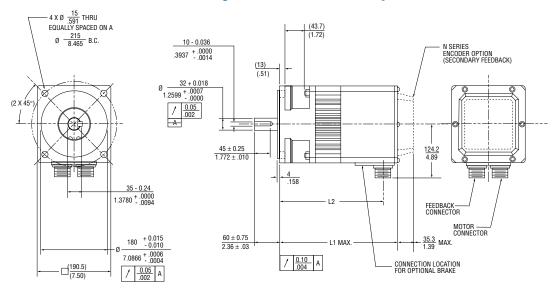
RATINGS AND CHARACTERISTICS

Motor parameters and winding data. See system data beginning on page 4 for typical torque/speed performance.

PARAMETER	SYMBOL	UNITS	R84		R	R86		88	R8A	
Continuous stall torque ^①	T _{CS}	Nm (lbin.)	22.5	(199)	32.7	(289)	42.2	(374)	53.4	(473)
Peak torque [®]	T _{PK}	Nm (lbin.)	44.5	(394)	66.6	66.6 (590)		(762)	109 (961)	
Inertia [®]	J _M	kgm ² x10 ⁻³ (lbinsec ² x10 ⁻³)	4.43 (39.2)		6.57 (58.2)		8.61	(76.2)	10.8	(95.2)
Static friction (max.)	T _f	Nm (lbin.)	0.28 (2.5)		0.42 (3.7)		0.56	(5.0)	0.70	(6.3)
Viscous damping coefficient	K _{DV}	Nm/kRPM (lbin./kRPM)	0.11 (0.96) 0.16 (1.4		i (1.4)	`0.20 (1.8)		0.25 (2.2)		
Thermal resistance [®]	R _{TH}	deg. C/Watt	0.30		0.25		0.23		0.21	
Thermal time constant	τ_{TH}	min.	40.0		54.0		59.0		63.0	
Weight (motor only)	W	kg (lbs.)	27.0	(60.0)	35.0 (77.0)		43.0 (94.0)		49.0 (111)	
WINDING DATA			G	Н	G	Н	G	н	G	н
Torque constant (RMS) ²	K _r	Nm/A _{RMS} (lbin./A _{RMS})	0.8 (7.1)	0.4 (3.5)	1.1 (9.7)	0.5 (4.4)	1.4 (12.4)	0.7 (6.2)	2.2 (19.5)	1.1 (9.7)
Voltage constant (RMS) ²	Κ _E	V _{RMS} /rad/sec (V _{RMS} /kRPM)	0.49 (51.3)	0.24 (25.1)	0.67 (70.2)	0.30 (31.4)	0.85 (89.0)	0.43 (45.0)	1.34 (140)	0.67 (70.2)
Continuous stall current ^①	I _{CS}	A _{RMS}	26.9	53.9	30.2	60.4	29.4	59.6	24.5	49.0
Current at peak torque [®]	I _{PK}	A _{RMS}	80.7	162	90.6	181	88.2	179	73.5	147

WINDING DATA			G	Н	G	Н	G	Н	G	Н
Torque constant (RMS) ^②	K _r	Nm/A _{RMS} (lbin./A _{RMS})	0.8 (7.1)	0.4 (3.5)	1.1 (9.7)	0.5 (4.4)	1.4 (12.4)	0.7 (6.2)	2.2 (19.5)	1.1 (9.7)
Voltage constant (RMS) [©]	K _E V _{RMS} /rad/sec (V _{RMS} /kRPM)		0.49 (51.3)	0.24 (25.1)	0.67 (70.2)	0.30 (31.4)	0.85 (89.0)	0.43 (45.0)	1.34 (140)	0.67 (70.2)
Continuous stall current ^①	I _{CS}	A _{RMS}	26.9	53.9	30.2	60.4	29.4	59.6	24.5	49.0
Current at peak torque [⊕]	I _{PK}	A _{RMS}	80.7	162	90.6	181	88.2	179	73.5	147
Resistance (line-to-line)	R _C	Ohms	0.26	0.07	0.25	0.06	0.28	0.07	0.46	0.12
Inductance (line-to-line)	L	mH	3.2	0.8	3.6	0.9	4.0	1.0	7.4	1.9
Typical Rated Speed @ 240V ac, 320V dc bus	W _R	RPM	3,300	4,000	2,500	3,500	1,900	3,500	1,200	2,600
Typical Rated Torque @ 240V ac, 320V dc bus	T _{CR}	Nm (lbin.)	17.4 (154)	10.1 (89.7)	23.5 (208)	16.6 (147)	36.8 (326)	20.5 (181)	48.6 (430)	26.8 (237)

Metric Mount Shown — also available in English mount. Consult factory or website for details.



Note: All values at 25°C unless otherwise noted

- ① Windings at 155°C. Motor in 25°C ambient and mounted to a 18" x 18" x 1/2" aluminum heat sink.
- ② RMS value of a sinusoidal waveform, measured line to neutral.
- 3 Motor with resolver feedback.
- ④ Caution: For peak torques or peak currents greater than 3x the continuous rating, consult the factory for thermal considerations.
- ⑤ Motor in 25°C ambient, mounted to a 18" x 18" x 1/2" aluminum heat sink.

Motor	R84	R86	R88	R8A
L1 Max	277.6 (10.93)	328.4 (12.93)	379.2 (14.93)	430.0 (16.93)
L2	242.8 (9.56)	293.6 (11.56)	344.4 (13.56)	395.2 (15.56)

mm (in.)

R-SERIES

R30P SERIES MOTOR — 3.25" width/height (square frame)





Toll Free Phone: 877-378-0240

- Built-in the hostat Fax: 877-378-0249
- Rated speedsate (000eRMgo.com)
- R30P Series Explosion Proof flotors cover a continuous torque range from 1.3 to 3.1 Nm. These compact motors are well-suited for speed and position control applications that require maximum performance in minimum space wherever hazardous conditions are present.



RATINGS AND CHARACTERISTICS

Motor parameters and winding data. See system data beginning on page 4 for typical torque/speed performance.

• 4-pole synchronous servomotors

demagnetization

EN 50014-1992.

Anti-cog stator design

 Samarium-cobalt permanent magnets for maximum torque-to-inertia without

Low rotor inertia for rapid accel/decel

240V ac, 320V dc bus operation

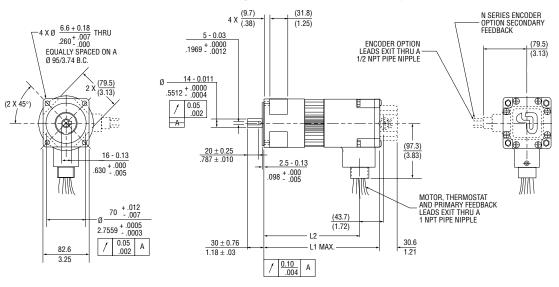
UL Listed, file 150845. Meets UL

Division 1, Class 1, Groups C & D

Meets Cenelec requirements of

PARAMETER	SYMBOL	UNITS	R3	2P	R3	3P	R	34P	F	135P	
Continuous stall torque ^①	T _{CS}	Nm (lbin.)	1.3 (11.5)	2.0 (17.7)		2.6 (23.0)	3.1 (27.4)		
Peak torque [®]	T _{PK}	Nm (lbin.)	3.70 (32.8)		5.31 (47.0)		6.90 (61.1)		8.31 (73.5)		
Inertia [®]	J _M	kgm ² x10 ⁻³ (lbinsec ² x10 ⁻³)	.071 (.63)		.093	3 (.82)	.11 (1.00)		.13 (1.19)		
Static friction (max.)	Tf	Nm (lbin.)	0.03 (0.23)		0.04 (0.31)		0.04	(0.39)	0.05	(0.47)	
Viscous damping coefficient	K _{DV}	Nm/kRPM (lbin./kRPM)	0.005 (0.04) 0.007 (0.06)		0.010 (0.09)		0.012	(0.11)			
Thermal resistance [®]	R _{TH}	deg. C/Watt	0.	93	0.84		0.76		0.	70	
Thermal time constant	τ_{TH}	min.	20	0.0	2	23.0		26.0		29.0	
Weight (motor only)	w	kg (lbs.)	2.5	.5 (5.5) 3.2 (7.1)		3.9 (8.7)		4.6 (10.2)			
WINDING DATA			G	Н	G	н	J	K	J	K	
Torque constant (RMS) ²	K,	Nm/A _{RMS} (lbin./A _{RMS})	0.6 (5.3)	0.3 (2.7)	0.8 (7.1)	0.4 (3.5)	1.0 (8.9)	0.5 (4.4)	1.2 (10.6)	0.6 (5.3)	
Voltage constant (RMS) ²	K _E	V _{RMS} /rad/sec (V _{RMS} /kRPM)	0.36 (37.7)	0.18 (18.8)	0.49 (51.3)	0.24 (25.1)	0.61 (63.9)	0.30 (31.4)	0.73 (76.4)	0.36 (37.7)	
Continuous stall current [⊕]	I _{cs}	A _{RMS}	2.5	4.8	2.6	5.2	2.5	5.1	2.5	4.9	
Current at peak torque®	I _{PK}	A _{RMS}	7.3	14.4	7.8	15.6	7.5	15.3	7.5	14.7	
Resistance (line-to-line)	R _C	Ohms	7.3	1.8	6.9	1.7	8.1	2.0	9.2	2.3	
Inductance (line-to-line)	L	mH	23.0	5.8	22.0	5.6	30.0	7.5	42.0	10.5	
Typical Rated Speed @ 240V ac, 320V dc bus	W _R	RPM	4,500	7,000	3,500	7,000	2,600	5,700	1,900	4,500	
Typical Rated Torque @ 240V ac, 320V dc bus	T _{CR}	Nm (lbin.)	0.9 (8.3)	0.62 (5.5)	1.5 (13.4)	0.9 (7.6)	2.3 (20.6)	1.4 (12.5)	3.0 (26.5)	2.0 (17.4)	

Metric Mount Shown — also available in English mount. Consult factory or website for details.



- 1 Windings at 155°C. Motor in 25°C ambient and mounted to a 10" x 10" x 1/4" aluminum heat sink.
- ② RMS value of a sinusoidal waveform, measured line to neutral.
- 3 Motor with resolver feedback.
- $\mbox{\textcircled{4}}$ Caution: For peak torques or peak currents greater than 3x the continuous rating, consult the factory for thermal considerations.
- ⑤ Motor in 25°C ambient, mounted to a 10" x 10" x 1/4" aluminum heat sink.

Motor	R32	R33	R34	R35
L1 Max	214.6 (8.45)	240.0 (9.45)	265.4 (10.45)	290.8 (11.45)
L2	173.0 (6.81)	198.4 (7.81)	223.8 (8.81)	249.2 (9.81)
mm (in.)				





Toll Free Phone: 877-378-0240

• Built-in thermostatoll Free Fax: 877-378-0249

Rated speeds to 6,000 RBM servo2go.com

The R60P Series motors www arvo2go.com continuous torque range from 8.3 to 19.9 Nm. Built for heavy duty applications, these motors deliver excellent torque, speed and/or velocity control, wherever

hazardous conditions are present.



Samarium-cobalt permanent magnets for maximum torque-to-inertia without demagnetization

- Low rotor inertia for rapid accel/decel
- 240V ac, 320V dc bus operation

• 4-pole synchronous servomotors

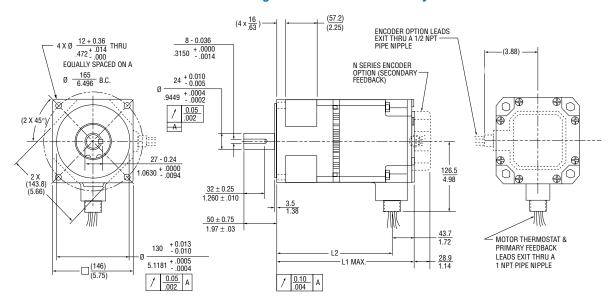
- Anti-cog stator design
- UL Listed, file 150845. Meets UL Division 1, Class 1, Groups C & D
- Meets Cenelec requirements of EN 50014-1992.

RATINGS AND CHARACTERISTICS

Motor parameters and winding data. See system data beginning on page 4 for typical torque/speed performance.

PARAMETER	SYMBOL	UNITS	R6	3P	R6	5P	Re	7P	
Continuous stall torque ^①	T _{CS}	Nm (lbin.)	6.8 (6	0.2)	11.2	(99.1)	15.9	(141)	
Peak torque®	T _{PK}	Nm (lbin.)	16.6 (147)		27.8 (246)		40.0 (354)		
Inertia [®]	J _M	kgm ² x10 ⁻³ (lbinsec ² x10 ⁻³)	.81 (7.2)		1.26 (11.2)		1.72 (15.2)		
Static friction (max.)	T _f	Nm (lbin.)	0.16 (1.4)		0.26	(2.3)	0.36	(3.2)	
Viscous damping coefficient	K _{DV}	Nm/kRPM (lbin./kRPM)	0.05 (0.41)		0.08 (0.66)		0.10	0.10 (0.92)	
Thermal resistance [®]	R _{TH}	deg. C/Watt	0.51		0.42		0.30		
Thermal time constant	τ_{TH}	min.	19.0		36.0		72.0		
Weight (motor only)	W	kg (lbs.)	13.0 (29.0)		18.0 (39.0)		22.0 (49.0)		
WINDING DATA			G	Н	G	н	G	н	
Torque constant (RMS) ²	K,	Nm/A _{RMS} (lbin./A _{RMS})	0.7 (6.2)	0.4 (3.5)	1.2 (10.6)	0.6 (5.3)	1.7 (15.0)	0.9 (8.0)	
Voltage constant (RMS) ²	K _E	V _{RMS} /rad/sec (V _{RMS} /kRPM)	0.43 (45.0)	0.24 (25.1)	0.73 (76.4)	0.36 (37.7)	1.03 (108)	0.55 (57.6)	
Continuous stall current ^①	I _{CS}	A _{RMS}	9.1	18.2	9.4	17.7	9.3	18.6	
Current at peak torque [®]	I _{PK}	A _{RMS}	27.3	54.6	28.3	53.0	27.9	54.8	
Resistance (line-to-line)	R _C	Ohms	0.93	0.23	1.20	0.34	1.5	0.37	
Inductance (line-to-line)	L	mH	8.9	2.2	13.7	3.4	18.2	4.6	
Typical Rated Speed @240V ac, 320V dc bus	W _R	RPM	3,600	6,000	2,100	4,500	1,500	3,200	
Typical Rated Torque @ 240V ac, 320V dc bus	T _{CR}	Nm (lbin.)	65.5 (48.9)	3.6 (32.2)	9.9 (87.9)	9.0 (80.0)	14.4 (127)	12.8 (113)	

Metric Mount Shown — also available in English mount. Consult factory or website for details.



Note: All values at 25°C unless otherwise noted.

- ① Windings at 155°C. Motor in 25°C ambient and mounted to a 18" x 18" x 1/2" aluminum heat sink.
- ② RMS value of a sinusoidal waveform, measured line to neutral.
- 3 Motor with resolver feedback.
- Caution: For peak torques or peak currents greater than 3x the continuous rating, consult the factory for thermal considerations.
- ⑤ Motor in 25°C ambient, mounted to a 18" x 18" x 1/2" aluminum heat sink.

Motor	R63	R65	R67
L1 Max	254.8 (10.03)	305.6 (12.03)	356.4 (14.03)
L2	211.6 (8.33)	262.4 (10.33)	313.2 (12.33)

R-SERIES

PRIMARY FEEDBACK DEVICES

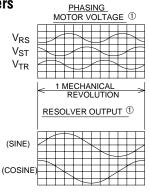


Primary Feedba	ack Devices	Secondary Feedback Devices	
PMA Series Resolver Commutating Encoder SinCos Encoder	PMB Series Resolver Hall Effect Sensors Commutating Encoder	S Series, R Series Resolver Hall Effect Sensors	S Series, R Series Encoder

A selection of feedback combinations are available for the PMA, S Series and R Series motors. Options for the PMA Series include resolver, commutating encoder and SinCos encoder. The R and S Series offers either resolver or Hall effect sensors as primary feedback, and an encoder as a secondary feedback device. The PMA, R Series and S Series motors all use a resolver as feedback for system use with the PC800 and SC/SCE900 Series Drives.

FRAMELESS RESOLVERS (R)

Frameless Resolvers for the PMA and S Series motors



RESOLVER WINDING CONFIGURATION R1 SS1 R2 SS3

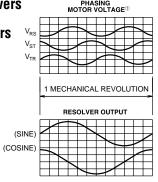
Typical output @ 25°C

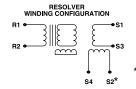
Parameter	Units	PMA:	S Series	
Frame size Type Primary Speed Input voltage Frequency Input current, max. Transformation ratio Max. electrical error Rotor inertia, max. Weight	V _{RMS} kHz mA Minutes kgm² kg	21 Transmitter Rotor 1 7.0 10 50 0.5 10 12.3 x 10 ⁻⁶ 0.22	15 Transmitter Rotor 1 7.0 10 65 0.5 10 3 x 10 ⁴ 0.06	21 Transmitter Rotor 1 4.0 5 25 0.5 21 20.3 x 10° 0.21

① For clockwise motor rotation.

FRAMELESS RESOLVERS (R1, R2, PMB SERIES)

Frameless Resolvers for the R Series, PMB Series motors





Typical output @ 25°C

Parameter	Units	R1	R2	PMB
Frame size Type Primary Speed Input voltage Frequency Input current, max. Transformation ratio Max. electrical error Rotor inertia Max. Weight	V _{RMS} kHz mA Minutes kgm² x 10 ⁻⁶ kg	15 Transmitter Rotor 1 4.0 5 25 0.5 ±15 2.8 0.13	21 Transmitter Rotor 1 4.0 5 25 0.5 ±21 1.7 0.25	15 Transmitter Rotor 1 7.0 4.3 100 0.5 ±10 2.6 0.074

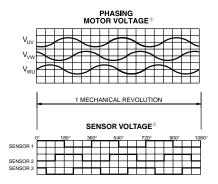
① For clockwise motor rotation.

Note: S2 & S4 reversed for PMB Series motors.

PRIMARY FEEDBACK DEVICES

PRIMARY FEEDBACK DEVICES...TECHNICAL DATA

Hall Sensors for S Series motors



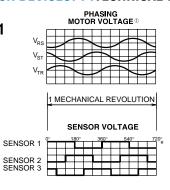
Typical output @ 25°C

Parameter	Units	Value
Commutation outputs:		See phasing diagram
No. of poles		6
No. of phases		3
Output volts, max.	volts	DC Supply
Power supply required	volts	+ 4.5 to 24 VDC
	mA	20 mA max
Rotor inertia	kgm² x 10 ⁻⁶	5.5
Weight	kg	.03

① For clockwise motor rotation.

PRIMARY FEEDBACK DEVICES. . . TECHNICAL DATA

Hall Sensors for R Series, PMB1



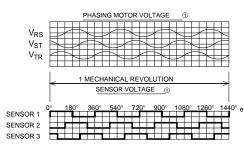
Typical performance @ 25°C

Parameter	Units	Value
Commutation outputs: No. of poles No. of phases		See phasing diagram 4 3
Output volts, max.	volts	DC Supply
Power supply required	volts mA	+ 4.5 to 24 VDC 20 mA max
Rotor inertia	kgm²	1.81 x 10° — R20 series, PMB1 5.53 x 10° — All other series
Weight	kg	0.014 — R20 series 0.036 — All other series

① For clockwise motor rotation.

PRIMARY FEEDBACK DEVICES. . . TECHNICAL DATA

Hall Sensors for PMB2, 3 Series



Typical performance @ 25°C

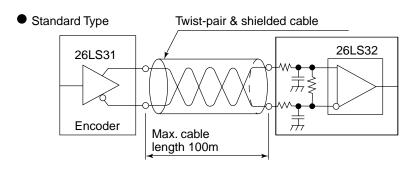
Hall Sensor Data	Units	PMB Series
Number of poles		8
Number of phases		3
Input voltage	VDC	+4 to 24
Input current	mA max.	30
Maximum output voltage Rotor inertia	DC Supply kgm²	DC Supply 1.8 x 10 ⁻⁶

① For clockwise motor rotation.

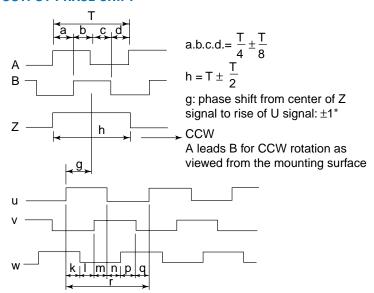


PMA SERIES WITH COMMUTATION ENCODER OPTION

RECOMMENDED OUTPUT CIRCUITRY



OUTPUT PHASE SHIFT



Specifications

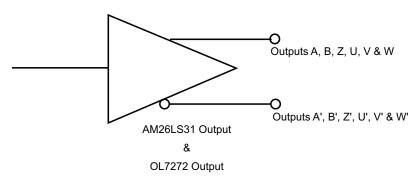
Resolution	1024 or 2048 line count			
Input voltage	5V dc ±5%			
Input current	200 mA max.			
Output Circuit	Line driver 26LS31 (26C31)			
	Source current: 20 mA max.			
	Sink current: 20 mA max.			
Frequency response	200 kHz max. (up to 85°C)			
	100 kHz max. (up to 100°C)			
Rise and fall time	100 nSec. max.			
Inertia	6.5 x 10 ⁻⁶ kgm² max.			
Max speed	6,000 rpm			
Weight	0.3 kg max.			



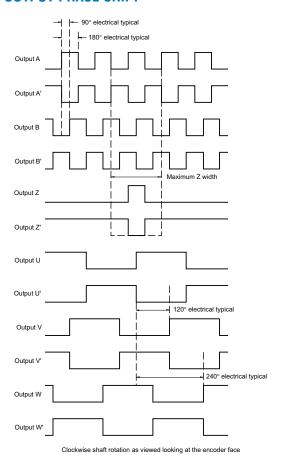


PMB SERIES WITH COMMUTATION ENCODER OPTION

RECOMMENDED OUTPUT CIRCUITRY



OUTPUT PHASE SHIFT



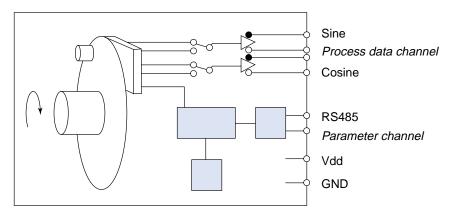
Specifications

Resolution	2048 or 4096 line count				
Input voltage	5V dc ±5%				
Input current	100 mA max.				
Output Circuit	Line driver AM26LS31 RS422A				
	OL7272 high voltage line drive				
	TTL output				
Frequency response	200 kHz				
Commutation accuracy	-1 _i mechanical				
Inertia	1.5 x 10 ⁻⁴ oz-in-S ²				
Max speed	8,000 rpm				



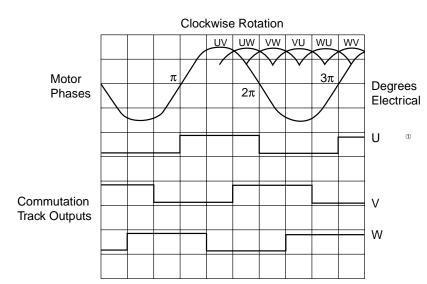


PMA SERIES WITH SINCOS ENCODER OPTION



In the SinCos encoder, the interface to the motor controller consists of a process data channel and a parameter channel. The SinCos encoder uses the following basic internal information:

- 1. A sine/cosine signal with 1024 cycles per revolution.
- 2. A sine/cosine signal with one cycle per revolution.
- 3. A reference signal (REF) which appears once per revolution with a length of <1/1024 revolution. The reference pulse is transmitted via the microcontroller RS485 interface. When operating the encoder at the maximum frequency, a misalignment of the reference pulse of up to 1 increment may occur.

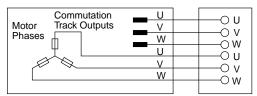


Specifications

Resolution	1024 line count
Input voltage	8V dc
Input current	100 mA max.
Frequency response	100 kHz max. (up to 100°C)
Rise and fall time	100 nSec. max.
Inertia	1.0 x 10 ⁻⁶ kgm² max.
Max speed	9,000 rpm
Weight	0.1 kg

 $\label{eq:max-max} Max. \\ \mbox{\mathbb{P}} \m$

Motor Connections



When using the SinCos encoder for primary feedback, Pacific Scientific recommends a 10% derating of motor performance specifications to avoid overheating the encoder.





S SERIES MOTORS

SECONDARY FEEDBACK DEVICES...TECHNICAL DATA

OPTICAL ENCODERS

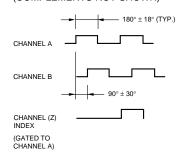
Typical performance @ 25°C

S20 SERIES, NEMA 23 Frame

Parameter	F	G				
Pulses per revolution	1000 1024					
Туре	Incren	nental				
Supply voltage	+5V dc ±10%	@160 mA typical				
Output format	Dual-channel quadrature and					
	index with complements					
Output type	26LS31 TTL Differential Line					
	Driver (RS422A)-short-circuit					
	protected					
Frequency response	125 kHz					
Rotor inertia	1.5 x 10 ⁻⁶ kgm²					
Weight	.08	kg				

ENCODER OUTPUT

FOR CW DIRECTION OF ROTATION WHEN VIEWED FROM DRIVE SHAFT END (COMPLEMENTS NOT SHOWN)

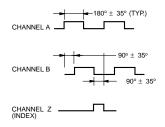


S30 SERIES, NEMA 34 Frame

Parameter	F	G				
Pulses per revolution	1000 1024					
Туре	Increm	nental				
Supply voltage	+5V dc ±10% @	2165 mA typical				
Output format	Dual-channel quadrature and					
	index with complements					
Output type	26LS31 TTL Differential Line					
	Driver (RS422A)-short-circuit					
	prote	cted				
Frequency response	100 kHz					
Rotor inertia	.75 x 10 ⁻⁶ kgm²					
Weight	[®] .08	kg				

^① Includes weight of additional end cover.

FOR CW DIRECTION OF ROTATION WHEN VIEWED FROM DRIVE SHAFT END (COMPLEMENTS NOT SHOWN)



OPTICAL ENCODERS (LA, LB, LC, ND, NF, NG)

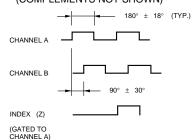
Typical performance @ 25°C

Parameter	LA	LB	LC				
Pulses per revolution	500	1000	1024				
Туре		Incremental					
Supply voltage	+5V do	c ±5% @160 m	A typical				
Output format	Dual-channel quadrature and						
	index with complements						
Output type	26LS31 TTL Differential Line						
	Driver	(RS422A)-sho	rt-circuit				
	protected						
Frequency response	125 kHz						
Rotor inertia	:	2.82 x 10 ⁻⁶ kgm	2				

Parameter	ND	NF	NG				
Pulses per revolution	500 1000 1024						
Туре		Incremental					
Supply voltage	+5V do	±5% @160 m/	A typical				
Output format	Dual-cl	Dual-channel quadrature and					
	inde	index with complements					
Output type	26LS31 TTL Differential Line						
	Driver	(RS422A)-shor	t-circuit				
	protected						
Frequency response	125 kHz						
Rotor inertia	•	1.58 x 10⁴ kgm²	2				

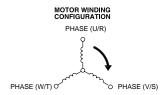
ENCODER OUTPUT L and N Types

FOR CW DIRECTION OF ROTATION WHEN VIEWED FROM DRIVE SHAFT END (COMPLEMENTS NOT SHOWN)



PHASING DIAGRAM—ALL MOTORS

Shown here is the phasing diagram for CW rotation as viewed from the drive-shaft end of the motor.







PMA SERIES MOTORS

The brake is intended for holding or 'parking' of a stationary motor. It may be used for a limited number of emergency stop conditions, however such use will eventually cause wear, leading to eventual malfunction of the brake.

A PMA motor with integral brake must never be subjected to uncontrolled axial forces or shocks to the motor shaft.

Contamination of the motor internal compartment by oil or other foreign materials will result in failure of the brake. Check the suitability of motor sealing for the working environment.

Motor Family	Brake Type	Static To @ 120		Nominal @ 3,000rpi		Wei	ght	Operating Voltage	Power Consumption @ 24V, 20℃	Current @ 24V, 20°C	Current @ 24V, 120		rtia x 10 ⁻³	Closing Time (engage)	Opening Time (release)
		lbin. +/-30%	Nm +/-30%	lbin. +/-30%	Nm +/-30%	lbs.	Kg	Volt +/-10%	Watt	Amp	Amp	lbinsec	² kgm²	mSec	mSec
PMA1 PMA2	04E04	10.6	1.2	5.3	0.6	0.4	0.2	24	8	0.33	0.24	0.11	0.012	25	25
PMA4	07H22	88.5	10	44.3	5	1.3	0.6	25	16	0.66	0.48	0.97	0.11	20	30
PMA5	09H22	159.3	16	88.5	10	3.3	1.5	24	13.5	0.56	0.41	3.19	0.36	25	50\
PMA6	11H00	354.0	40	194.7	22	4.8	2.2	24	24	1	0.73	8.41	0.95	25	75

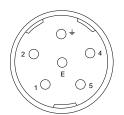
Brake data available for R Series and S Series motors. Consult factory or website for details.

CONNECTION INFORMATION BRUSHLESS SERVO MOTORS



POWER CONNECTOR

PMA Series, S Series



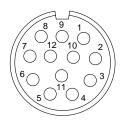
Connector Pin	PMA Series	S Series	
1	Phase U	Phase U	
2	Phase W	Phase W	
gnd	Earth Case	Earth Case	
4	Optional Brake -	Optional Brake -	
5	Phase V	Phase V	
E	Optional Brake +	Optional Brake +	

SUGGESTED MATING CONNECTOR

1	
	CONNECTOR
	LPLA 06D FRRN 213 00 A5
	PACIFIC SCIENTIFIC
	769-004916-00

FEEDBACK CONNECTOR 12-PIN

PMA Series, S Series with Resolver PMA Series with SinCos Encoder



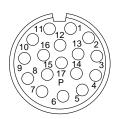
Connector Pin	PMA Series		S Series
	Standard Resolver	SinCos Encoder	Standard Resolver
1	S1	not used	S1
2	S3	not used	S3
3	S4	Sin +	S4
4	S2	Sin REF	S2
5	R1 Excit	Cos +	R1 Excit
6	R2 Excit Rtn	Cos REF	R2 Excit Rtn
7	PTC	RS 485 data -	PTC
8	PTC rtn	RS 485 data +	PTC rtn
9	not used	gnd	not used
10	not used	+ 8V	not used
11	not used	PTC rtn	not used
12	not used	PTC	not used

SUGGESTED MATING CONNECTOR

CONNECTOR
SPNA 12T FRON 169 00 D9
PACIFIC SCIENTIFIC
769-004915-00

FEEDBACK CONNECTOR 17-PIN

PMA Series with Commutating Encoder



Connector Pin	Commutating Encoder
1	5V +
2	PTC
3	0V supply
4	Hall Sensor W
5	Hall Sensor W
6	Hall Sensor U
7	Hall Sensor U
8	Hall Sensor V
9	Hall Sensor V
10	A
11	A
12	В
13	B
14	Z
15	Z
16	not used
17	PTC rtn

SUGGESTED MATING CONNECTOR

COCCECTED III) (TING (
CONNECTOR
SPNA 17H FRON 169 00 E3
PACIFIC SCIENTIFIC
769-004917-00

Contact Pacific Scientific for connection details on S Series motors with alternate feedback devices. MS-type connector options also available.

CONNECTOR DESCRIPTIONS. . . . PMB Series Motors

Described here are pinouts of standard Pacific Scientific PMB motors. The pinout of the motor-power connector does not vary among motors with varying feedback configurations.

Toll Free Phone: 877-378-0240

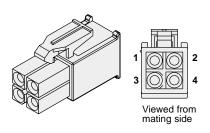
The pinout of feedback connectors varies with the devices employed and with primary-only or primary-and-secondary configurations.

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Sold & Serviced By:

POWER CONNECTOR

PMB Series



STANDARD PINOUTS- All Series

Connector Pin	PMB Series
1	Phase U
2	Phase V
3	Phase W
4	Ground (Frame)

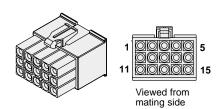
Shield connected to motor ground point (frame) internal to motor

SUGGESTED MATING CONNECTOR

CONNECTOR PART NUMBER	MATING CONNECTOR PART NUMBER (not supplied)
AMP 172167-1	AMP 172159

FEEDBACK CONNECTOR 15-PIN

PMB Series



STANDARD PINOUTS- All Series

Connector	PMB Series		
Pin	Function Hall Sensor	Resolver	Encoder
1	N/C	S2 (+Sine)	Channel A
2	N/C	S4 (-Sine)	Channel A
3	N/C	S1 (+Cosine)	Channel B
4	N/C	S3 (-Cosine)	Channel B
5	N/C	R1 (+ Ref)	Index
6	N/C	R2 (- Ref)	Index
7	Supply return	N/C	Supply Return®
8	+4 to 24V dc	N/C	+5V dc®
9	Shield [®]	Shield [®]	Shield [®]
10	N/C	N/C	N/C
11	Thermistor [®]	Thermistor [®]	Thermistor [®]
12	Thermistor [®]	Thermistor [®]	Thermistor [®]
13	Hall 1	N/C	U (Hall 1)
14	Hall 2	N/C	V (Hall 2)
15	Hall 3	N/C	W (Hall 3)

- ① Encoder supply power is used to power Hall Sensors.
- @Thermistor is optional. Pins are not connected without this option
- 3 Shields are hot connected at motor end.

SUGGESTED MATING CONNECTOR

CONNECTOR	MATING CONNECTOR
PART NUMBER	PART NUMBER (not supplied)
AMP 12171-1	AMP 172163

CONNECTOR DESCRIPTIONS...S20, S30, R20, R30, R40, R60, R80 Series Motor

Described here are pinouts of standard Pacific Scientific R20, R30, R40, R60 and R80 motors. The pinout of the motor-power connector-coles not vary among motors with varying feedback configurations. not vary among motors with varying feedback configurations.

The pinout of feedback connectors varies with the devices employed and with primary-only or primary-and-secondary configurations. 877-378-0249 sales@servo2go.com

www.servo2go.com

PRIMARY & SECONDARY FEEDBACK CONNECTOR

All Series Except R20, S20, S30



R20 Series, S20, S30 Only

MS3101A20-29P



STANDARD PINOUTS-All Series

Primary Feedback			Secondary Feedback	
Connector			Hall	
Pin	Tachsyn	Resolver	Sensors	Encoder
Α	Excitation	S4	+Vdc	
В	Excitation RTN	S3	Vdc RTN	
С	Phase 1	S2	Sensor 1	
D	Phase 2	S1	Sensor 2	
E	Phase 3	R1	Sensor 3	
F	Thermistor	Thermistor	Thermistor	
G				Encoder A
Н				Encoder A
J				Encoder B
К				Encoder B
L				Encoder Z
М				Encoder Z
N				
P		R2 (excitation RTN)		
R	Thermistor	Thermistor	Thermistor	
S				Encoder +Vdc
Т				Encoder Vdc RTN

SUGGESTED MATING CONNECTOR AND CLAMP

CONNECTOR	CLAMP
MS3106A20-29S	MS3057-12A-1
PACIFIC SCIENTIFIC	PACIFIC SCIENTIFIC
P/N CZ00009	P/N CE00003

MOTOR AND PRIMARY FEEDBACK CONNECTOR

(Available for R20 motors with primary feedback only)

> R20 Series with rear mounted connector option and S20 with single motormounted connector

MS3102E20-29P



STANDARD PINOUTS

Connector	Motor and	Motor and
Pin	Resolver Feedback	Hall Sensor Feedback
Α	Phase R	Phase R
В	Phase S	Phase S
С	Phase T	Phase T
D	N/C	N/C
E	S4	Sensor 1
F	S3	Sensor 2
G	S2	Sensor 3
Н	S1	N/C
J	N/C	N/C
K	Thermistor	Thermistor
L	Thermistor	Thermistor
M	N/C	N/C
N	Ground (Frame)	Ground (Frame)
P	N/C	N/C
R	R1 (Excitation)	+V dc
S	R2 (Excitation RTN)	V dc RTN
T	N/C	N/C

SUGGESTED MATING CONNECTOR AND CLAMP

CONNECTOR	CLAMP	
MS3106A20-29S	MS3057-12A-1	
PACIFIC SCIENTIFIC	PACIFIC SCIENTIFIC	
P/N CZ00009	P/N CE00003	

CONNECTOR DESCRIPTIONS. . . . R20, R30, R40, R60, R80 Series Meters

Described here are pinouts of standard Pacific Scientific R20, R30, R60 and R80 motors. The pinout of the motor-power connector does not vary among motors with varying feedback configurations.

The pinout of feedback connectors varies with the devices employed and with primary-only or primary-and-secondary configurations.

MOTOR CONNECTORS

S20, S30, R30, R40, R60 Series MS3102E20-4P



R80 Series Only MS3102E24-22P



R20 Series Only MS3101A20-4P



STANDARD PINOUTS- All Series

Connector Pin	Function	
Α	Phase R	
В	Phase S	
С	Phase T	
D	Ground (Frame)	

SUGGESTED MATING CONNECTOR AND CLAMP

SERIES	MATING CONNECTOR	CLAMP
R20, R30 R40, R60	MS3106A20-4S PACIFIC SCIENTIFIC P/N CZ00007	MS3057-12A-1 PACIFIC SCIENTIFIC P/N CE00003
R80	MS3106A24-22S PACIFIC SCIENTIFIC P/N CZ00010	MS3057-16A-1 PACIFIC SCIENTIFIC P/N CE00004

PRIMARY FEEDBACK ONLY — CONNECTORS

All Series Except R20



R20 Series Only



STANDARD PINOUTS-All Series

Connector Pin	Tachsyn	Resolver	Hall Sensors
Α	Excitation	S4	+V dc
В	Excitation RTN	S3	V dc RTN
С	Phase 1	S2	Sensor 1
D	Phase 2	S1	Sensor 2
E	Phase 3	R1 (Excitation)	Sensor 3
F	N/C	R2 (Excitation RTN)	N/C
G	Thermistor	Thermistor	Thermistor
Н	Thermistor	Thermistor	Thermistor

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SUGGESTED MATING CONNECTOR AND CLAMP

CONNECTOR	CLAMP	
MS3106A20-7S	MS3057-12A-1	
PACIFIC SCIENTIFIC	PACIFIC SCIENTIFIC	
P/N CZ00008	P/N CE00003	

BRAKE CONNECTOR

MS3102E14S-9P



STANDARD PINOUTS

Connector	
Pin	Function
Α	+V dc
В	V dc RTN

SUGGESTED MATING CONNECTOR AND CLAMP

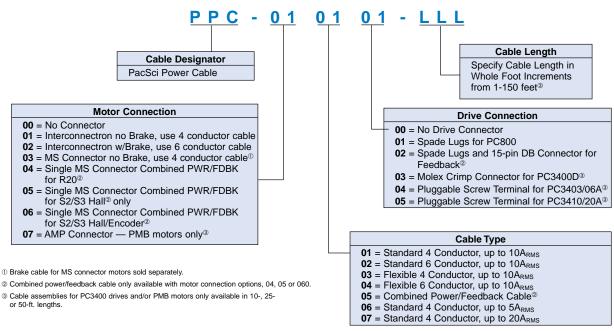
CONNECTOR	CLAMP	
MS3106A14S-9S	MS3057-6A-1	
PACIFIC SCIENTIFIC	PACIFIC SCIENTIFIC	
P/N CZ00011	P/N CE00005	

THE ADVANTAGES OF FACTORY CABLING

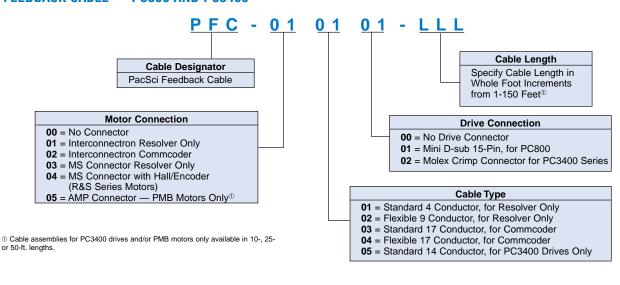
The most common — and easily preventable — cause of startup problems is cabling. That's why we offer factory tested, fully terminated connecting cables for PacSci brushless servo systems. Factory cabling saves you time as well as troubleshooting.

The PC800 drives are equipped with appropriate connectors for system interconnection. The PMA and S Series motors described in this system selection guide are equipped with Interconnectron connectors. PMB motors offer AMP or MS connectors. One power cable and one feedback cable are necessary for connection between motor and drive.

POWER CABLE — PC800 AND PC3400



FEEDBACK CABLE — PC800 AND PC3400





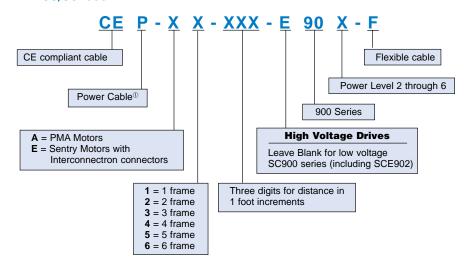


THE ADVANTAGES OF FACTORY CABLING

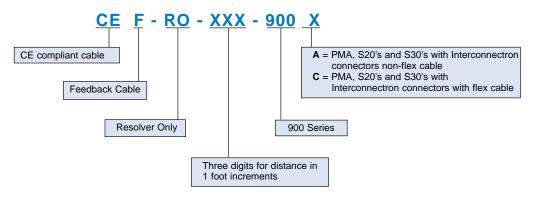
The most common — and easily preventable — cause of startup problems is cabling. That's why we offer factory tested, fully terminated connecting cables for PacSci brushless servo systems. Factory cabling saves you time as well as troubleshooting.

The SC/SCE900 drives are equipped with appropriate connectors for system interconnection. The PMA and S Series motors described in this system selection guide are equipped with Interconnectron connectors. One power cable and one feedback cable are necessary for connection between motor and drive.

POWER CABLE - SC/SCE900



FEEDBACK CABLE - SC/SCE900



① Flexible cable is available for High Voltage Drives.

CABLING AND ACCESSORIES



Order these accessories to simplify installation, startup and programming of your Pacific Scientific step motor and servo motor controls.



RS-232 CABLE CS-232-950

FOR MODEL SC/SCE950 and PC3400

Use to connect SC/SCE950 servo controllers to personal computers. The 6 foot RS-232 cable connects 9-pin SC/SCE950 connector (J58 port) to PC's 9-pin serial port. Includes 9 to 25-pin adaptor for PCs with 25-pin serial port.

HOW TO ORDER..... Model number RS-232 cable CS-232-950



PACLAN DATA CABLE

Twinaxial transmission cable. Use with SC/SCE950 to interconnect LAN nodes for digital communications up to 500 feet. Jacket is blue PVC.

Specifications

Use with SC/SCE950 25 AWG

.25 AWG (7/33 stranded) 124 Ohm characteristic impedance 60°C, UL Style 2092 Passes VW-1 vertical wire flame test

RECOMMENDED FILTERING FOR CE COMPLIANCE

There are many applications for machines today which require filtering to reduce electrical noise. Filters may be necessary to comply with the standards of the global regulatory groups, or just to have piece of mind for reliable machine operation. The SCE900 drives have been designed with this in mind. The table below summarizes the conditions under which filtering is required to meet the standards for CE compliance:

Drive	Cable Length	Filter	Supplier
SCE902	Up to 50 meters	25CE4	MTE Corporation ©Tel# 414-253-8200
SCE903	Up to 10 Meters	None	0
SCE904	Up to 10 Meters	None	2
SCE905	Up to 10 Meters	None	0
SCE906	Up to 10 Meters	None	2 3

- $\ensuremath{\textcircled{1}}$ Recommended filter not supplied by Pacific Scientific.
- ② No filter is required with a single axis at designated cable lengths. Filtering may be required for multi-axis configurations or longer cable lengths. Consult factory for more information.
- A 3-phase line inductor with a minimum of 1.17mH is required to comply with CE. Consult Factory for
 more information.