

GLENTEK DC BRUSH SERVO MOTORS GM4000 SERIES

Revision: 1/17/19



Glentek's GM4000 series of high performance, permanent magnet DC brush servo motors utilize traditional ferrite magnets, which are ideal for cost sensitive applications. In addition, the higher inertia armatures provide improved motor to load inertia matching for medium to high inertia loads. This helps to reduce the mechanical shaft resonance, which allows higher servo gains with increased stability. These motors incorporate skewed armatures, which provide ultra smooth operation (i.e. low cogging torque) at all speeds.

- Continuous Torque Range:
13.0 Lb-in (1.47 Nm) to 51.2 Lb-in (5.78 Nm)
- Peak Torque Range:
65.0 Lb-in (7.35 Nm) to 256.0 Lb-in (28.9 Nm)

GM4000 SERIES FEATURES

- Skewed armature design provides ultra smooth operation (i.e. low cogging torque) at all speeds.
- Various electrical windings are available as standard to suit both low and high voltage amplifiers in order to provide optimum speed and torque characteristics. Optional custom electrical windings are available to meet virtually any requirement.
- Worldwide standard mounting configurations are available (Square, Round, NEMA 42, and NEMA 56C).
Optional custom mounting configurations are available to meet virtually any requirement.
- Industry standard lead termination configurations. (i.e. MS connectors, fluid tight strain relief cable exit, NPT hole with flying leads and terminal boxes)
- Optional industry standard feedback devices. (i.e. high performance silver commutator tachometers, and encoders)
- Class H insulation standard.
- Standard operating temperature is dependent on the feedback device installed. Motors with resolver feedback can be specially configured to operate down to -40°C.
- Optional 24VDC holding brakes are available.
- Optional IP65 sealing is available
- RoHS compliant.
- CE marked.
- UL Recognized Component for US and Canada.

GM4000 SERIES ENVIRONMENTAL CONDITIONS

- Storage Temperature:** -20°C to 70°C
- Operating Temperature:** Standard: -20°C to 40°C, without derating, derate torque 10% per 10°C above 40°C
Special: -40°C to 40°C, without derating, derate torque 10% per 10°C above 40°C
- Humidity:** 5% to 95% relative humidity, non-condensing
- Altitude:** Up to 1000m without derating, derate torque 10% per 1000m above 1000m

GM4000 SERIES SELECTION TABLE

$$K_t = \text{Torque Constant} \cdot K_v = \text{BEMF} = \text{Volts/1000 RPM} \cdot L_A = \text{Inductance}$$

Model Number	Power @ Max Speed		Cont. Stall Rating			Peak Stall Rating			K _t		R _A	L _A	RPM	K _v	Armature Inertia	
	HP	KW	Lb-in	Nm	Amps	Lb-in	Nm	Amps	Lb-in/A	Nm/A	Ω	mH	Max	V/Krpm	Lb-in-sec ²	Kg-m ²
GM4010-20	0.83	0.619	13	1.47	7.7	65.0	7.35	38.5	1.70	0.19	0.8	3.00	4000	20	0.00700	0.000791
GM4010-30	0.76	0.567	13	1.47	5.1	65.0	7.35	25.5	2.55	0.29	1.8	7.50	3700	30	0.00700	0.000791
GM4020-25	1.46	1.089	23	2.60	11.0	115.0	13.00	55.0	2.10	0.24	0.8	3.60	4000	25	0.00920	0.001040
GM4020-39	1.28	0.955	23	2.60	6.6	115.0	13.00	33.0	3.50	0.40	1.3	7.40	3500	39	0.00920	0.001040
GM4020-60	0.80	0.597	23	2.60	4.6	115.0	1300	23.0	5.06	0.57	2.3	9.60	2200	60	0.00920	0.001040
GM4040-20	1.98	1.477	31.3	3.54	18.4	156.5	17.70	92.0	1.70	0.19	0.6	2.20	4000	20	0.01630	0.001842
GM4040-41	1.74	1.298	31.3	3.54	9.1	156.5	17.70	45.5	3.44	0.39	0.8	5.60	3500	41	0.01630	0.001842
GM4040-60	1.09	0.813	31.3	3.54	6.2	156.5	17.70	31.0	5.06	0.57	1.5	6.80	2200	60	0.01630	0.001842
GM4050-38	2.29	1.708	41.3	4.67	12.9	206.5	23.35	64.5	3.21	0.36	0.6	4.40	3500	38	0.01980	0.002237
GM4050-60	1.44	1.074	41.3	4.67	8.2	206.5	23.35	41.0	5.06	0.57	0.9	5.30	2200	60	0.01980	0.002237
GM4060-41	2.83	2.11	51.2	5.78	14.9	256.0	28.90	74.5	3.44	0.39	0.7	4.60	3500	41	0.02800	0.003164

NOTE: All ratings based on a 40°C ambient temperature with the motor face mounted to a 12" x 12" x 1/2" aluminum heatsink.

BRAKE OPTION

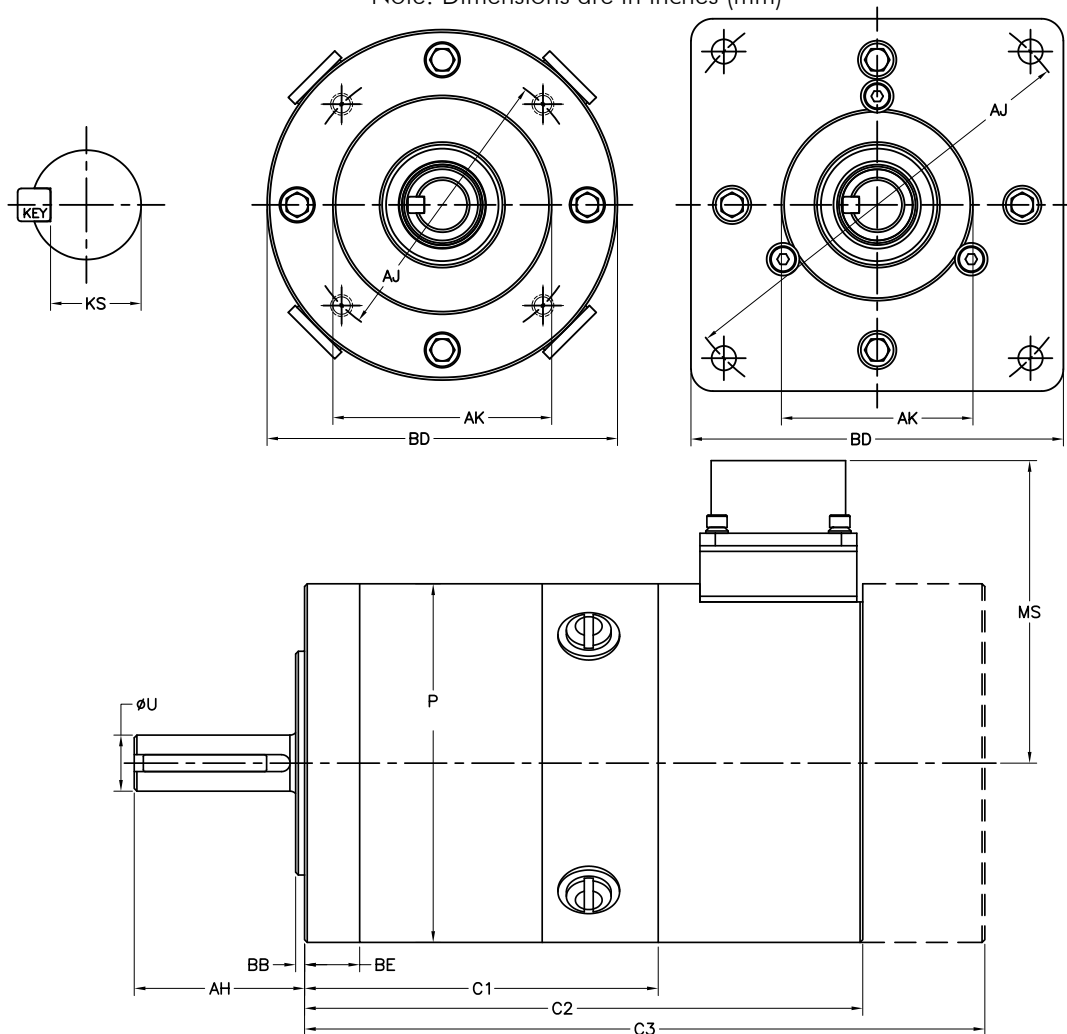
Brake requires 24V DC input voltage. The values for "Extension" represent the nominal maximum length that the brake will add to the motor. For some models, the extension will be less. Please contact one of our sales engineers for the exact values.

Extension	Torque		Power
in. (mm)	Lb-in	Nm	Watts
2.44 (62)	159	18	24

GM4000 SERIES DIMENSIONS

C1 = Bare Motor, C2 = Motor with Tachometer or Encoder, C3 = Motor with Tachometer and Encoder.

Note: Dimensions are in inches (mm)



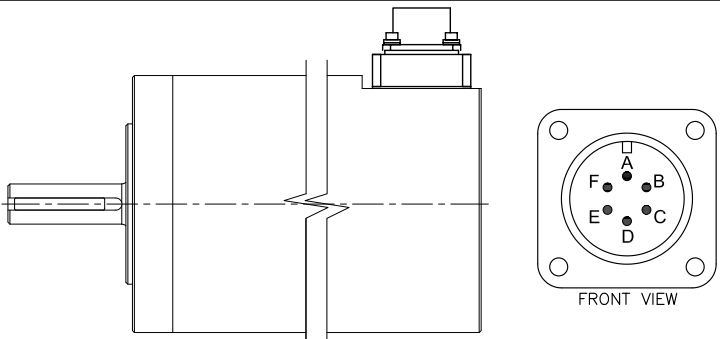
Model Number	Lbs (kg)	C1		C2		C3		P
		RND	SQR	RND	SQR	RND	SQR	
GM4010	8.0 (3.6)	5.25 (133.35)	7.26 (184.40)	8.39 (213.11)	4.00 (101.60)			
GM4020	12.0 (5.5)	6.56 (166.62)	8.57 (217.68)	9.70 (246.38)	4.00 (101.60)			
GM4040	17.0 (7.7)	8.63 (219.20)	10.64 (270.26)	11.77 (298.96)	4.00 (101.60)			
GM4050	20.0 (9.1)	9.63 (244.60)	11.64 (295.66)	12.77 (324.36)	4.00 (101.60)			
GM4060	23.0 (10.5)	10.40 (264.16)	12.41 (315.21)	13.54 (343.92)	4.00 (101.60)			

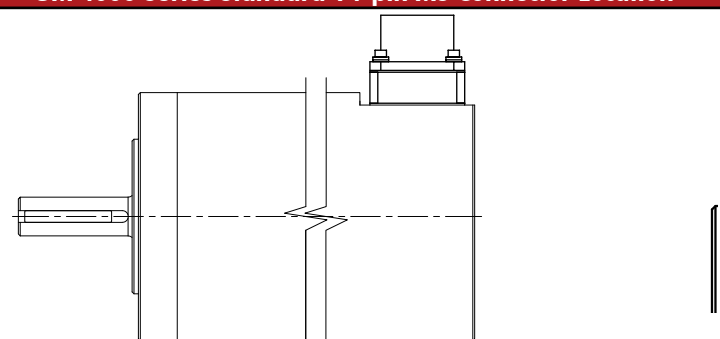
Connectors	6-Pin
6-Pin	2.52 (64.0)
14-Pin	3.80 (96.5)
16-Pin	4.08 (103.6)
Liquid Tight	3.07 (78.0)
Terminal box	5.09 (129.3)

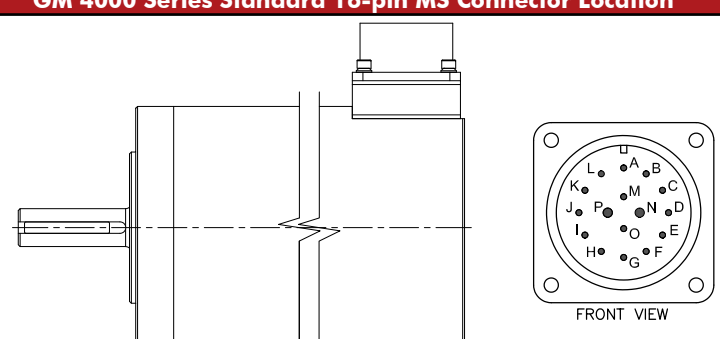
Flange Type	Shaft				Flange/Face				Mounting Hole		
	AH	U (MAX)	KEY	KS	AJ	AK	BB	BD	BE (MAX)	BF Dia.	Tap
Round	1.90 (48.26)	0.6250 (15.88)	0.188 SQ. X 1.50	0.507- 0.517	3.250 (82.55)	2.498 (63.45)	0.10 (2.54)	4.00 (101.6)	0.62 (15.7)	-	1/4-20 ▽.50
Square M1	1.90 (48.26)	0.6250 (15.88)	0.188 SQ. X 1.50	0.507- 0.517	4.950 (125.73)	2.187 (55.55)	0.06 (1.52)	4.25 (108.0)	0.44 (11.18)	0.281 (7.14)	THRU
Square M2	1.90 (48.26)	0.6250 (15.88)	0.188 SQ. X 1.50	0.507- 0.517	5.741 (145.82)	3.000 (76.20)	0.10 (2.54)	5.00 (127.0)	0.44 (11.18)	0.281 (7.14)	THRU
Square M3	1.90 (48.26)	0.6250 (15.88)	0.188 SQ. X 1.50	0.507- 0.517	5.875 (149.23)	4.500 (114.30)	0.10 (2.54)	5.00 (127.0)	0.44 (11.18)	-	3/8-16 THRU
NEMA 42	1.32 (33.5)	0.6250 (15.88)	0.188 SQ. X 1.50	0.507- 0.517	4.950 (125.73)	2.187 (55.55)	0.06 (1.52)	4.25 (108.0)	0.44 (11.18)	0.281 (7.14)	THRU
NEMA 56C	2.06 (52.32)	0.6250 (15.88)	0.188 SQ. X 1.50	0.507- 0.517	5.875 (149.23)	4.500 (114.30)	0.09 (2.29)	6.50 (165.1)	0.44 (11.18)	-	3/8-16 THRU

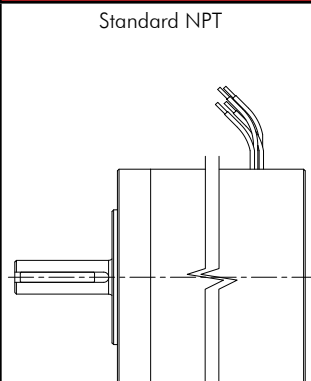
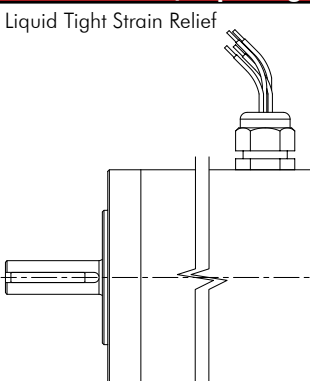
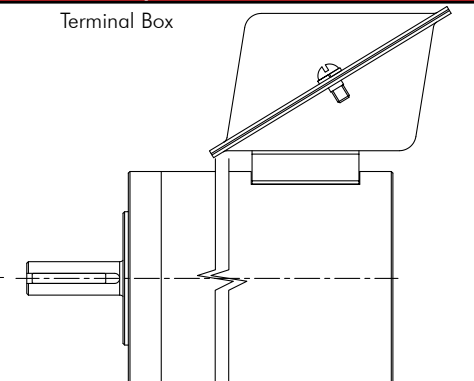
CONNECTORS & PIN-OUT INFORMATION

With a positive voltage applied to the red motor lead (Motor +) with respect to the black motor lead (Motor -), the motor drive shaft will turn in the **counter-clockwise** direction as viewed from the shaft end.

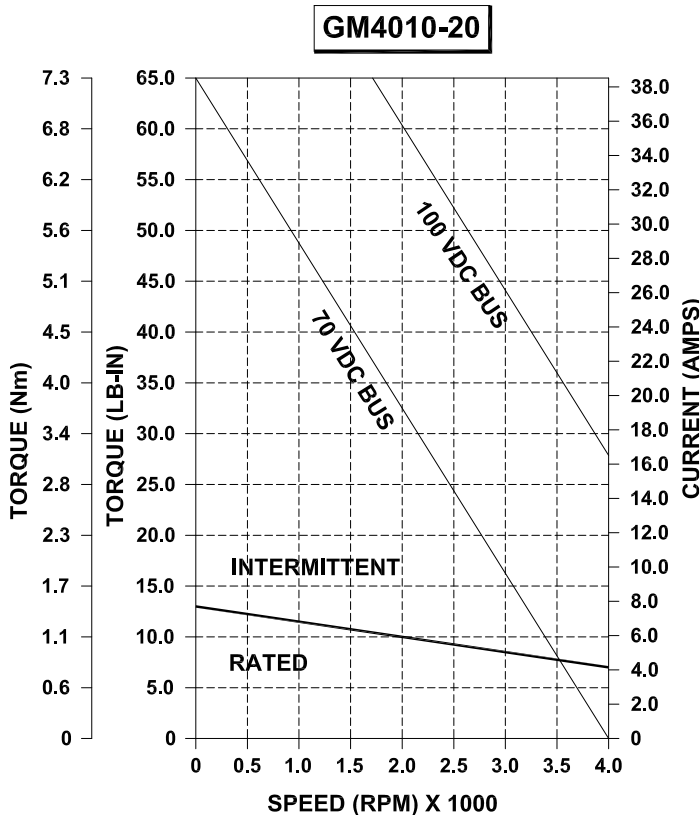
GM 4000 Series Standard 6-pin MS Connector Location	MS3102R-14-6P	Function
 <p style="font-size: small;">FRONT VIEW</p> <ul style="list-style-type: none"> •Straight Mating Connector: MS3106F-20-27S •90° Mating Connector: MS3108E-20-27S 	6-Pin	
	A	Motor +
	B	Motor -
	C	Tachometer +
	D	Tachometer -
	E (W/O Brake) E (W/ Brake)	Tachometer Cable Shield
	F	Brake + Brake -

GM 4000 Series Standard 14-pin MS Connector Location	MS3102R-20-27P	Encoder Feedback	Resolver Feedback
 <p style="font-size: small;">FRONT VIEW</p> <ul style="list-style-type: none"> •Straight Mating Connector: MS3106F-20-27S •90° Mating Connector: MS3108E-20-27S 	14-Pin	Function	Function
	A	Channel A+	Sine Sig (S1)
	B	Channel A-	Sine Com (S2)
	C	Channel B+	Cosine Sig (S3)
	D	Channel B-	Cosine Com (S4)
	E	Channel Z+	Reference Sig (R1)
	F	Channel Z-	Reference Com (R2)
	G	+5 VDC	N/C
	H	Common	N/C
	I	Cable Shield	N/C
	J	Tachometer +	
	K	Tachometer -	
	L	Tachometer Cable Shield	
	-	Brake +	
N	Motor +		
-	Brake -		
P	Motor -		

GM 4000 Series Standard 16-pin MS Connector Location	MS3102R-24-07P	Encoder Feedback	Resolver Feedback
 <p style="font-size: small;">FRONT VIEW</p> <ul style="list-style-type: none"> •Straight Mating Connector: MS3106F-20-27S •90° Mating Connector: MS3108E-20-27S 	16-Pin	Function	Function
	A	Channel A+	Sine Sig (S1)
	B	Channel A-	Sine Com (S2)
	C	Channel B+	Cosine Sig (S3)
	D	Channel B-	Cosine Com (S4)
	E	Channel Z+	Reference Sig (R1)
	F	Channel Z-	Reference Com (R2)
	G	+5 VDC	N/C
	H	Common	N/C
	I	Cable Shield	N/C
	J	Tachometer +	
	K	Tachometer -	
	L	Tachometer Cable Shield	
	M	Brake +	
	N	Motor +	
	O	Brake -	
P	Motor -		

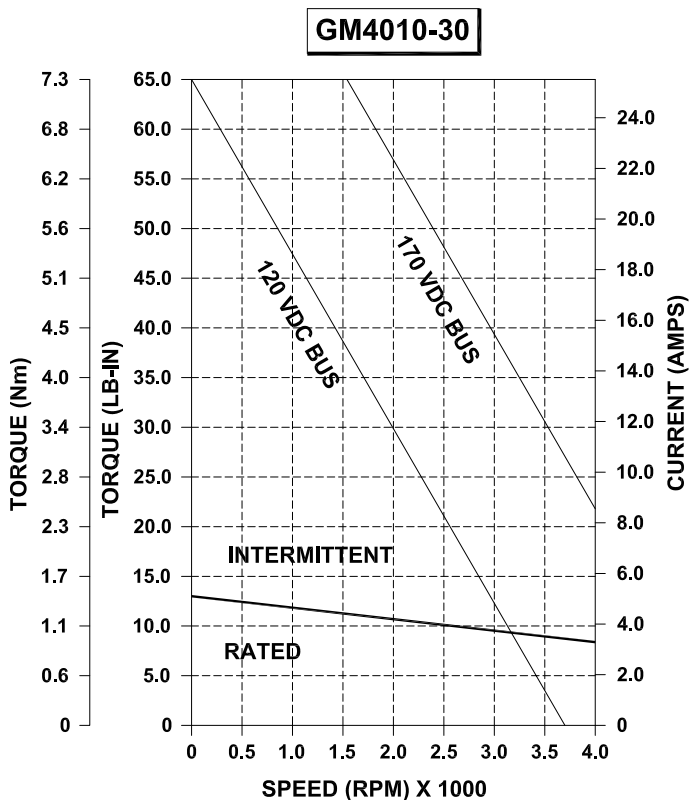
GM 4000 Series standard NPT, Liquid Tight Strain Relief, & Terminal Box		
<p style="font-size: small;">Standard NPT</p> 	<p style="font-size: small;">Liquid Tight Strain Relief</p> 	<p style="font-size: small;">Terminal Box</p> 
<p>Glentek's GM4000 Series offer Special mounting options please contact a Glentek Sales Engineer for detailed information.</p>		

GM4010-20 PERFORMANCE DATA



Power @ Max Speed	HP	0.83
	KW	0.619
Cont. Stall Rating	Lb-in	13
	Nm	1.47
	Amps	7.7
Peak Stall Rating	Lb-in	65.0
	Nm	7.35
	Amps	38.5
Torque Constant	Lb-in/A	1.70
	Nm/A	0.19
Resistance	Ohms	0.8
Inductance	mH	3.00
Maximum Speed	RPM	4000
Back EMF	V/Krpm	20
Armature Inertia	Lb-in-sec²	0.00700
	Kg-m²	0.000791

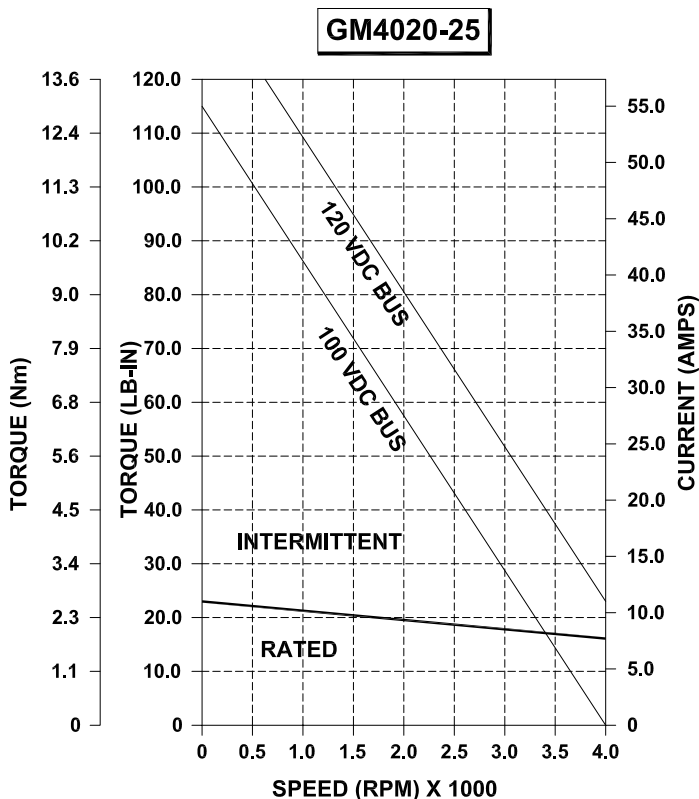
GM4010-30 PERFORMANCE DATA



Power @ Max Speed	HP	0.76
	KW	0.567
Cont. Stall Rating	Lb-in	13
	Nm	1.47
	Amps	5.1
Peak Stall Rating	Lb-in	65.0
	Nm	7.35
	Amps	25.5
Torque Constant	Lb-in/A	2.55
	Nm/A	0.29
Resistance	Ohms	1.8
Inductance	mH	7.50
Maximum Speed	RPM	3700
Back EMF	V/Krpm	30
Armature Inertia	Lb-in-sec²	0.00700
	Kg-m²	0.000791

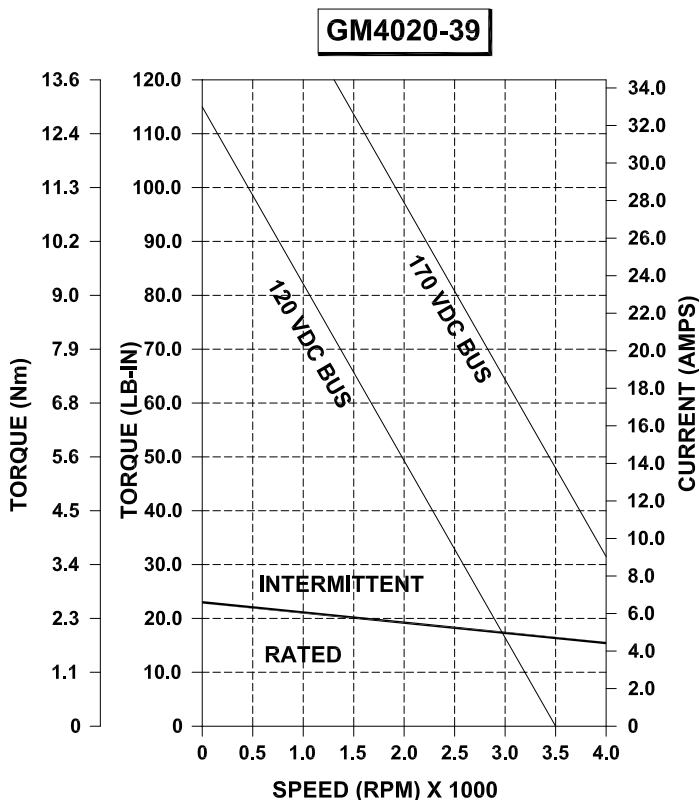
NOTE: All ratings based on a 40°C ambient temperature with the motor face mounted to a 12" x 12" x 1/2" aluminum heatsink.

GM4020-25 PERFORMANCE DATA



Power @ Max Speed	HP	1.46
	KW	1.089
Cont. Stall Rating	Lb-in	23
	Nm	2.60
	Amps	11.0
Peak Stall Rating	Lb-in	115.0
	Nm	13.00
	Amps	55.0
Torque Constant	Lb-in/A	2.10
	Nm/A	0.24
Resistance	Ohms	0.8
Inductance	mH	3.60
Maximum Speed	RPM	4000
Back EMF	V/Krpm	25
Armature Inertia	Lb-in-sec²	0.00920
	Kg-m²	0.001040

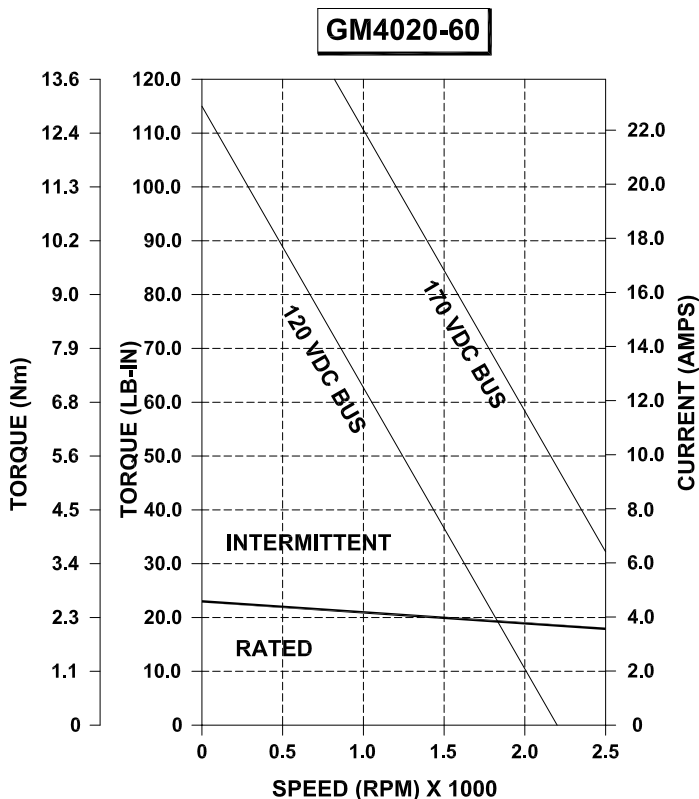
GM4020-39 PERFORMANCE DATA



Power @ Max Speed	HP	1.28
	KW	0.955
Cont. Stall Rating	Lb-in	23
	Nm	2.60
	Amps	6.6
Peak Stall Rating	Lb-in	115.0
	Nm	13.0
	Amps	33.0
Torque Constant	Lb-in/A	3.50
	Nm/A	0.40
Resistance	Ohms	1.3
Inductance	mH	7.40
Maximum Speed	RPM	3500
Back EMF	V/Krpm	39
Armature Inertia	Lb-in-sec²	0.00920
	Kg-m²	0.001040

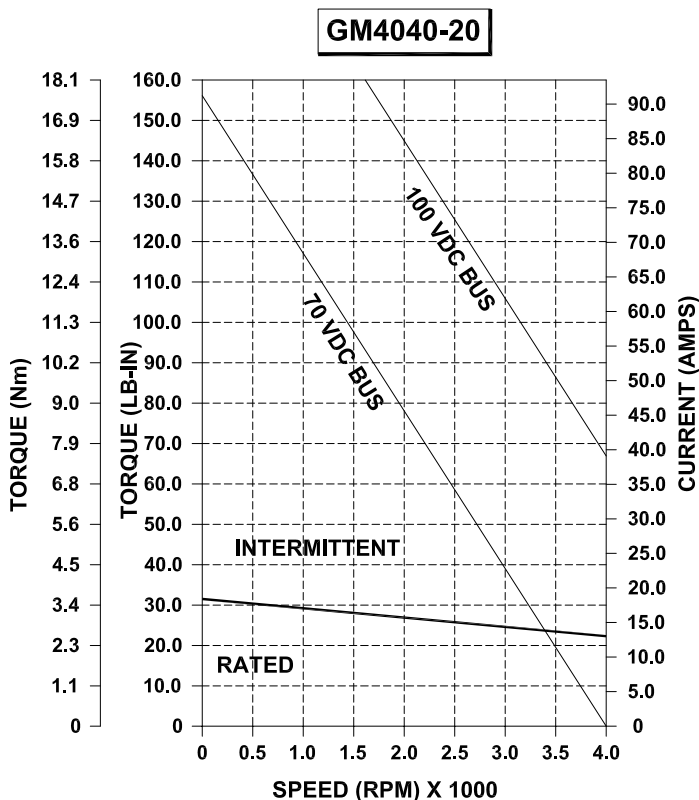
NOTE: All ratings based on a 40°C ambient temperature with the motor face mounted to a 12" x 12" x 1/2" aluminum heatsink.

GM4020-60 PERFORMANCE DATA



Power @ Max Speed	HP	0.80
	KW	0.597
Cont. Stall Rating	Lb-in	23
	Nm	2.60
	Amps	4.6
Peak Stall Rating	Lb-in	115.0
	Nm	13.00
	Amps	23.0
Torque Constant	Lb-in/A	5.06
	Nm/A	0.57
Resistance	Ohms	2.3
Inductance	mH	9.60
Maximum Speed	RPM	2200
Back EMF	V/Krpm	60
Armature Inertia	Lb-in-sec²	0.00920
	Kg-m²	0.001040

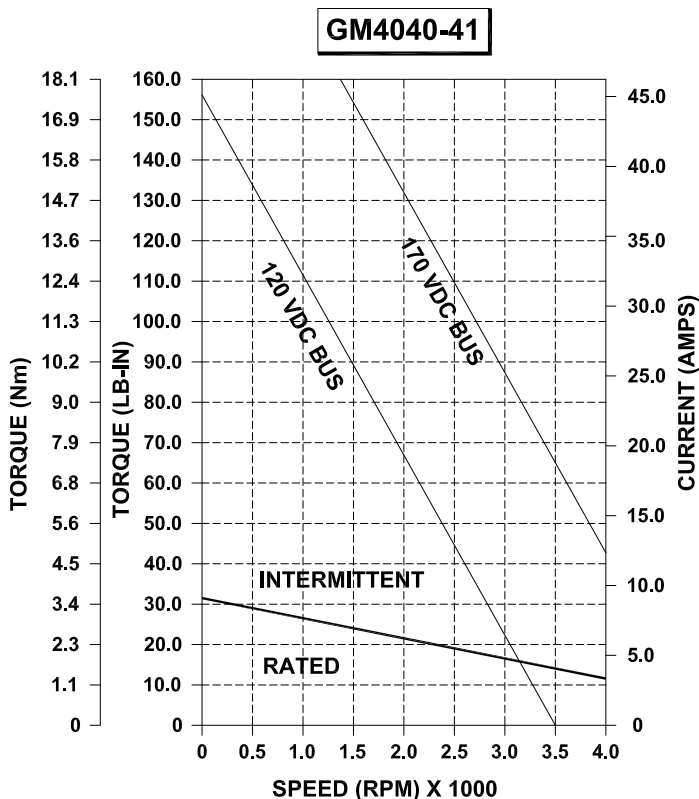
GM4040-20 PERFORMANCE DATA



Power @ Max Speed	HP	1.98
	KW	1.477
Cont. Stall Rating	Lb-in	31.3
	Nm	3.54
	Amps	18.4
Peak Stall Rating	Lb-in	156.5
	Nm	17.70
	Amps	92.0
Torque Constant	Lb-in/A	1.70
	Nm/A	0.19
Resistance	Ohms	0.6
Inductance	mH	2.20
Maximum Speed	RPM	4000
Back EMF	V/Krpm	20
Armature Inertia	Lb-in-sec²	0.01630
	Kg-m²	0.001842

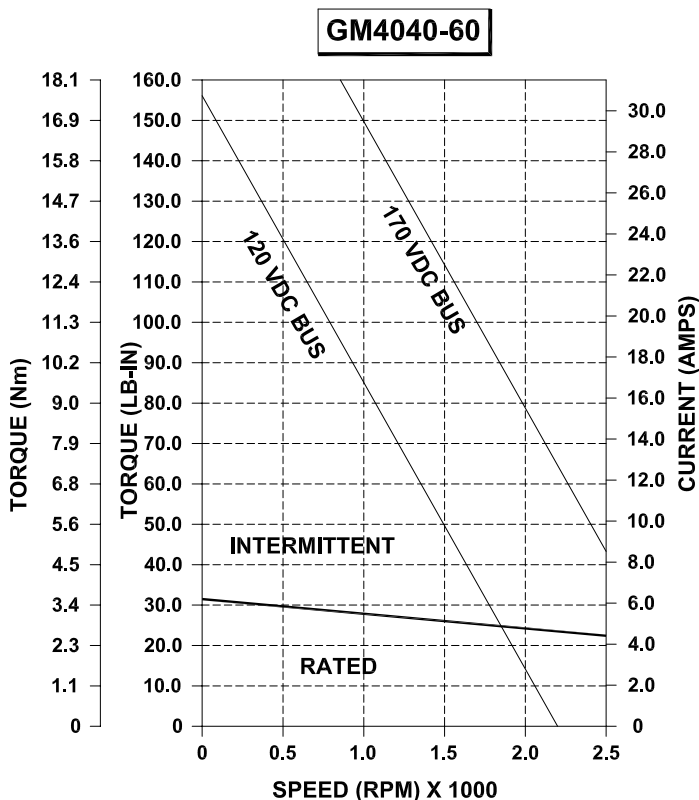
NOTE: All ratings based on a 40°C ambient temperature with the motor face mounted to a 12" x 12" x 1/2" aluminum heatsink.

GM4040-41 PERFORMANCE DATA



Power @ Max Speed	HP	1.74
	KW	1.298
Cont. Stall Rating	Lb-in	31.3
	Nm	3.54
	Amps	9.1
Peak Stall Rating	Lb-in	156.5
	Nm	17.70
	Amps	45.5
Torque Constant	Lb-in/A	3.44
	Nm/A	0.39
Resistance	Ohms	0.8
Inductance	mH	5.60
Maximum Speed	RPM	3500
Back EMF	V/Krpm	41
Armature Inertia	Lb-in-sec²	0.01630
	Kg-m²	0.001842

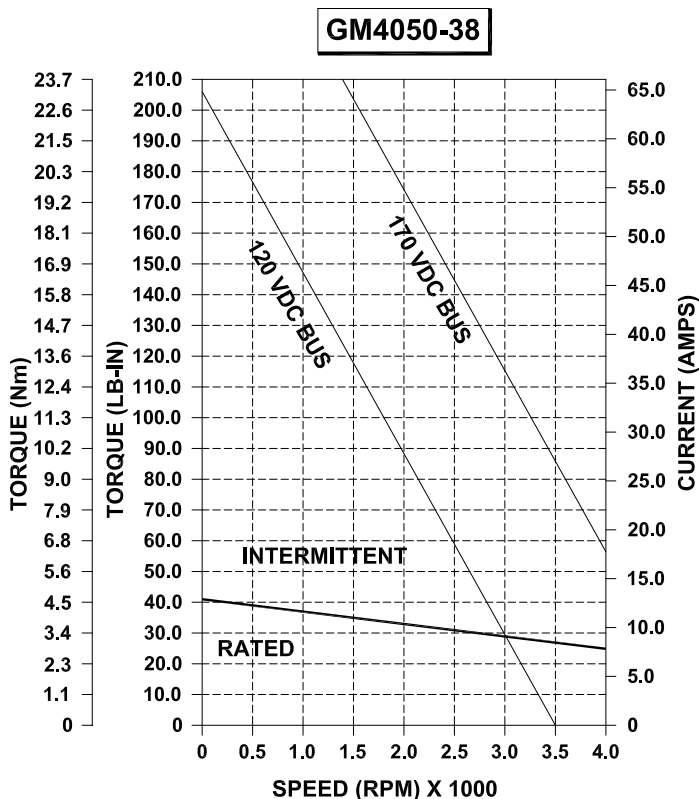
GM4040-60 PERFORMANCE DATA



Power @ Max Speed	HP	1.09
	KW	0.813
Cont. Stall Rating	Lb-in	31.3
	Nm	3.54
	Amps	6.2
Peak Stall Rating	Lb-in	156.5
	Nm	17.70
	Amps	31.0
Torque Constant	Lb-in/A	5.06
	Nm/A	0.57
Resistance	Ohms	1.5
Inductance	mH	6.80
Maximum Speed	RPM	2200
Back EMF	V/Krpm	60
Armature Inertia	Lb-in-sec²	0.01630
	Kg-m²	0.001842

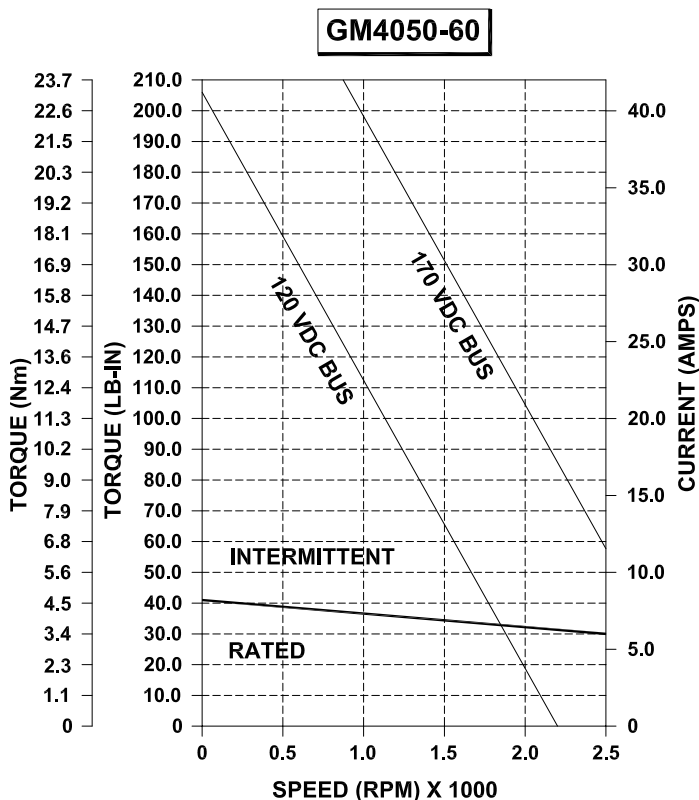
NOTE: All ratings based on a 40°C ambient temperature with the motor face mounted to a 12" x 12" x 1/2" aluminum heatsink.

GM4050-38 PERFORMANCE DATA



Power @ Max Speed	HP	2.29
	KW	1.708
Cont. Stall Rating	Lb-in	41.3
	Nm	4.67
	Amps	12.9
Peak Stall Rating	Lb-in	206.5
	Nm	23.35
	Amps	64.5
Torque Constant	Lb-in/A	3.21
	Nm/A	0.36
Resistance	Ohms	0.6
Inductance	mH	4.40
Maximum Speed	RPM	3500
Back EMF	V/Krpm	38
Armature Inertia	Lb-in-sec²	0.01980
	Kg-m²	0.002237

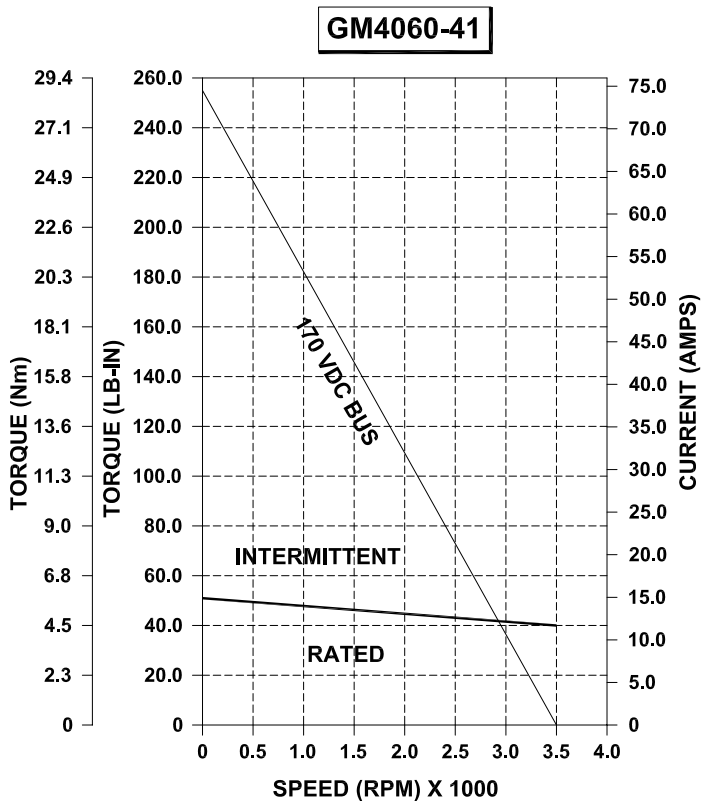
GM4050-60 PERFORMANCE DATA



Power @ Max Speed	HP	1.44
	KW	1.074
Cont. Stall Rating	Lb-in	41.3
	Nm	4.67
	Amps	8.2
Peak Stall Rating	Lb-in	206.5
	Nm	23.35
	Amps	41.0
Torque Constant	Lb-in/A	5.06
	Nm/A	0.57
Resistance	Ohms	0.9
Inductance	mH	5.30
Maximum Speed	RPM	2200
Back EMF	V/Krpm	60
Armature Inertia	Lb-in-sec²	0.01980
	Kg-m²	0.002237

NOTE: All ratings based on a 40°C ambient temperature with the motor face mounted to a 12" x 12" x 1/2" aluminum heatsink.

GM4060-41 PERFORMANCE DATA



Power @ Max Speed	HP	2.83
	KW	2.11
Cont. Stall Rating	Lb-in	51.2
	Nm	5.78
	Amps	14.9
Peak Stall Rating	Lb-in	256.0
	Nm	28.90
	Amps	74.5
Torque Constant	Lb-in/A	3.44
	Nm/A	0.39
Resistance	Ohms	0.7
Inductance	mH	4.60
Maximum Speed	RPM	3500
Back EMF	V/Krpm	41
Armature Inertia	Lb-in-sec²	0.02800
	Kg-m²	0.003164

NOTE: All ratings based on a 40°C ambient temperature with the motor face mounted to a 12" x 12" x 1/2" aluminum heatsink.

GM4000 SERIES MODEL NUMBERING

This section explains the model numbering system for Glentek's GM4000 Series DC Brush Servo Motors. The model numbering system is designed so that you, our customer, will be able to quickly and accurately create the model number for the drive that best suits your requirements. Please complete the drive configuration code you require using the information on this page. After completing your model number, please contact a Glentek Sales Engineer to confirm that the model number you have created is correct.



- Frame Size** 40 = 4.0" Motor
- Stack Length** 20 = 2.0 inch stack
- Back EMF Constant** 39 = 39 V/Krpm
- Brake Option** 0 = No brake installed
- Tachometer Option** 2 = 7 VDC tachometer
- Encoder Option** 8 = 2500 PPR
- Brushless Resolver Option** 0 = No resolver installed
- Flange Type** 0 = Standard Round
- Lead Termination** 5 = Male MS connector, MS3102R-24-07P (16-pin style)
- Wiring Diagram** 0 = Glentek Standard
- Sealing Option** 0 = No shaft seal
- Factory Assigned Option** Leave blank



Frame Size	
40	4.0" Motor

Stack Length					
10	1.0" Stack	20	2.0" Stack	40	4.0" Stack
50	5.0" Stack	60	6.0" Stack		

Back EMF Constant									
1.0" only		2.0" only		4.0" only		5.0" only		6.0" only	
20	20V/Krpm	25	25V/Krpm	20	20V/Krpm	38	38V/Krpm	41	41V/Krpm
30	30V/Krpm	39	39V/Krpm	41	41V/Krpm	60	60V/Krpm		
		60	60V/Krpm	60	60V/Krpm				

For custom Back EMF, Please Contact Glentek

Brake Option					
0	No brake installed		1	24 VDC Brake	
			2	Special	

Tachometer Option					
0	No tachometer installed		2	7 VDC tachometer	
1	3 VDC tachometer		3	9.5 VDC tachometer	
			4	Special	
			-	-	

Encoder Option					
0	No encoder installed		4	1000 PPR	
2	500 PPR		6	2000 PPR	
			8	2500 PPR	
			9	Special	

Brushless Resolver Option						
0	No resolver installed					
	1	Brushless resolver			2	Special

Flange Type					
0	Standard Round	3	M2	5	NEMA 56C
2	M1	4	M3	6	Special
				9	NEMA 42

Lead Termination					
0	Flying leads exiting through a rubber grommet		5	16-Pin, Male MS connecto	
1	.5" NPT with flying leads		6	Liquid tight strain relief with flying leads	
2	.75" NPT with flying leads		7	Terminal Box	
3	6-Pin, Male MS connector		8	Special	
4	14-Pin, Male MS connector				

Wiring Diagram (MS connector lead termination only)					
0	Glentek Standard			1	Special

Sealing Option						
0	No shaft seal				1	Shaft Seal
				2	Special	

Factory Assigned Option	
A numerical code will be assigned by Glentek to motors whose specifications vary from the standard configuration	