Phone: 877-478-3241
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www.iptech1.com

Stealth® GM Gearmotors Series

Bayside's Stealth® Gearmotors (GM) represents the first time a brushless servo motor and a helical planetary gearhead have been integrated into a single product.

4 Frame Sizes	
GM60	GM23
GM90	GM34
GM115	GM40
GM142	GM56

Ratios
5:1
7:1
10:1
15:1
20:1
25:1
30:1
50:1
70:1
100:1

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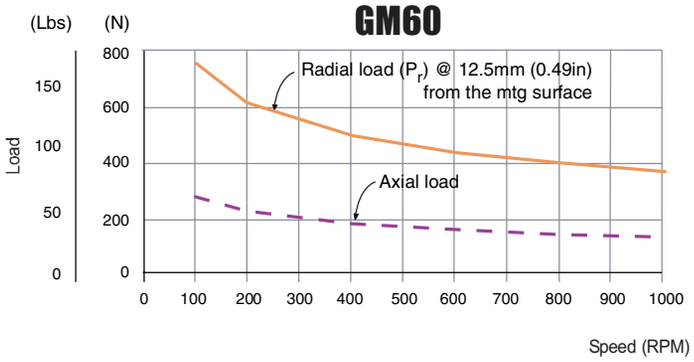
Stealth® GM Gearmotors Series:
Output Shaft Load Rating

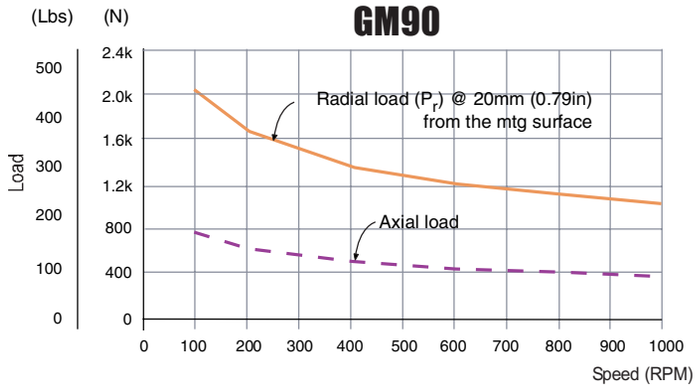
GM60



Formulas to calculate Radial Load (P_{rx}) at any distance "X" from the gearhead mounting surface.

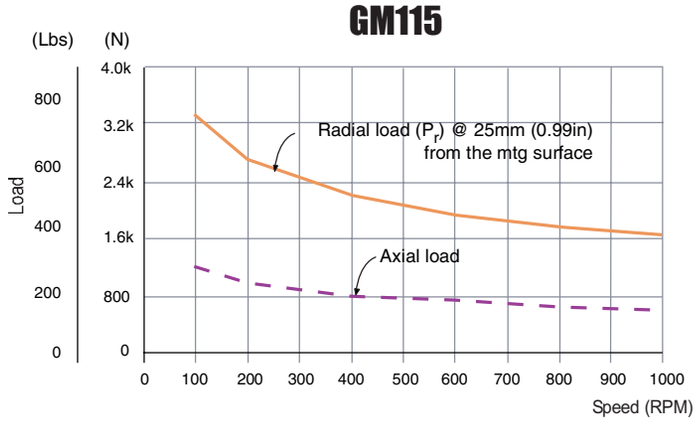
$P_{rx} = (P_r)(\mathbf{54mm}) / (\mathbf{41mm} + X)$
$P_{rx} = (P_r)(2.13in) / (1.61in + X)$

GM90



$P_{rx} = (P_r)(\mathbf{73mm}) / (\mathbf{52mm} + X)$
$P_{rx} = (P_r)(2.87in) / (2.05in + X)$

GM115



$P_{rx} = (P_r)(\mathbf{89mm}) / (\mathbf{63mm} + X)$
$P_{rx} = (P_r)(3.5in) / (2.48in + X)$

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Stealth® GM Gearmotors Series:
An Integrated Step Forward

When to Use:

- High torque in compact package
- Reduce mechanical complexity
- Cost reduction

Applications:

- Automotive
- Machine Tool
- Material Handling
- Medical
- Packaging
- Paper Converting
- Robotics
- Semiconductor

Bayside's Stealth® Gearmotors represents the first time a brushless servo motor and a helical planetary gearhead have been integrated into a single product. Previously, engineers needing a gear drive with servo motor were forced to purchase the gearhead and motor separately. Bayside manufactures precision gearheads and brushless motors under one roof. This provides us with the unique ability to design and supply a precision integrated gearmotors.

Stealth® Gearmotors combine both mechanical and electronic parts into a compact, powerful package. The motor magnets are attached directly to the input gearshaft, eliminating the extra couplings, shafts and bearings required when the two components are separate. Eliminating these extra parts means that Stealth Gearmotors are more reliable, have higher performance and cost less than traditional motor/gearhead assemblies.

1. **Large Output Bearings** for high radial loads
2. **IP65 Protection** with Viton seals, DIN-type connectors, O-rings and an anodized aluminum alloy housing for use in harsh environments
3. **High Density Copper Windings and Rare-Earth Magnets** provides maximum torque and efficiency
4. **Skewed Laminations with Odd Slot Counts** reduce cogging
5. **Duplex Angular Contact Bearing** for optimum motor assembly stiffness
6. **Modular Encoders, Resolvers and Brakes** offered standard without increasing package size
7. **Two Winding Options, Single or Double Stack Motors and Multiple Gear Ratios** for a wide range of torques and speeds
8. **Single Piece Construction** of rotor and sun gear guarantees alignment for smooth operation
9. **Motor, Gearhead and Encoder** in one compact package eliminates extra parts, improving reliability and performance
10. **Stealth® Helical Planetary Output** provides high torques, low backlash and quiet, reliable performance
11. **Innovative Thermal Design** runs 20% cooler than a separate motor/gearhead assembly
12. **Stainless Steel Output Shaft** won't rust in corrosive environments

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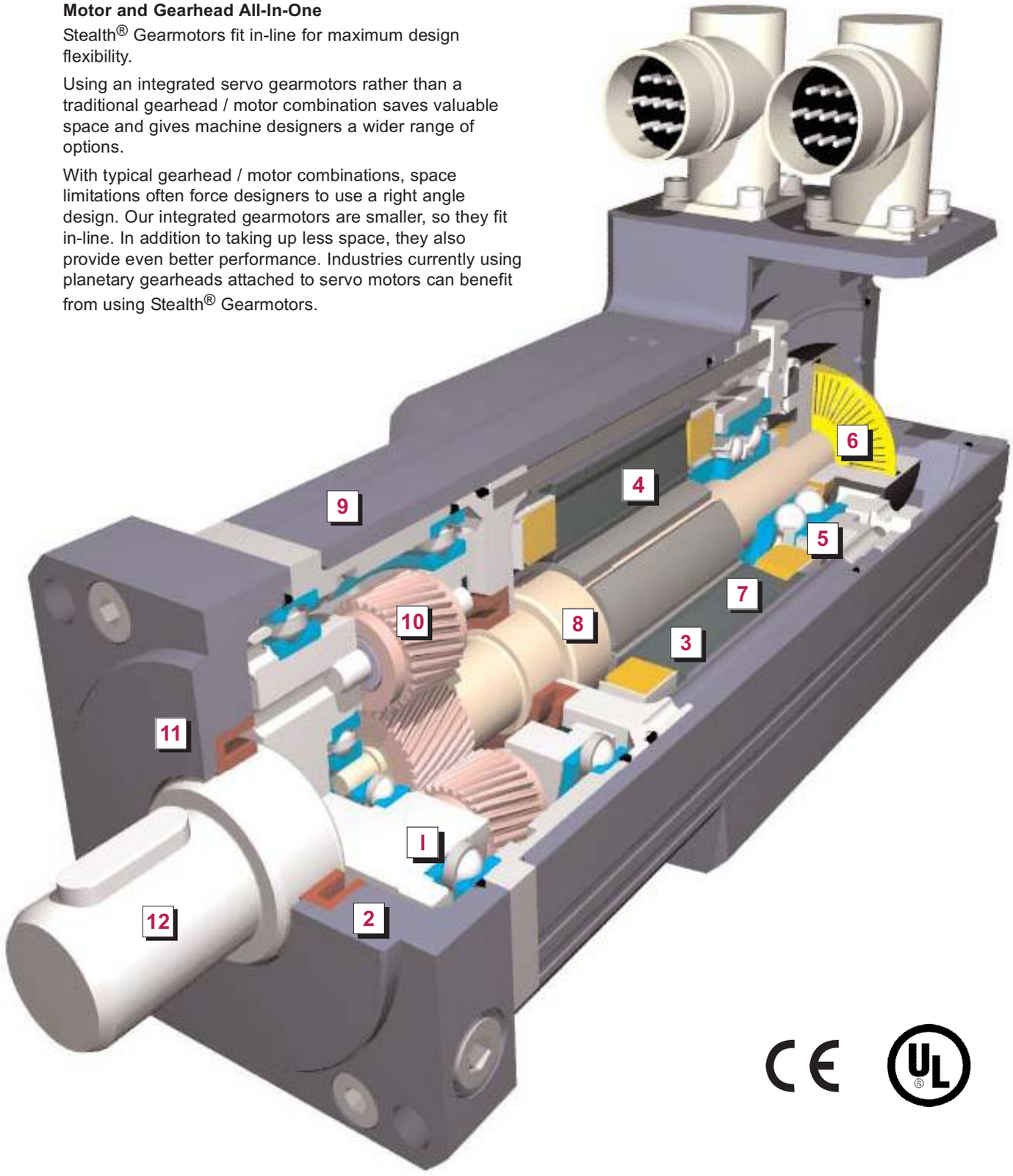
Motor and Gearhead All-In-One

Stealth® Gearmotors fit in-line for maximum design flexibility.

Using an integrated servo gearmotors rather than a traditional gearhead / motor combination saves valuable space and gives machine designers a wider range of options.

With typical gearhead / motor combinations, space limitations often force designers to use a right angle design. Our integrated gearmotors are smaller, so they fit in-line. In addition to taking up less space, they also provide even better performance. Industries currently using planetary gearheads attached to servo motors can benefit from using Stealth® Gearmotors.



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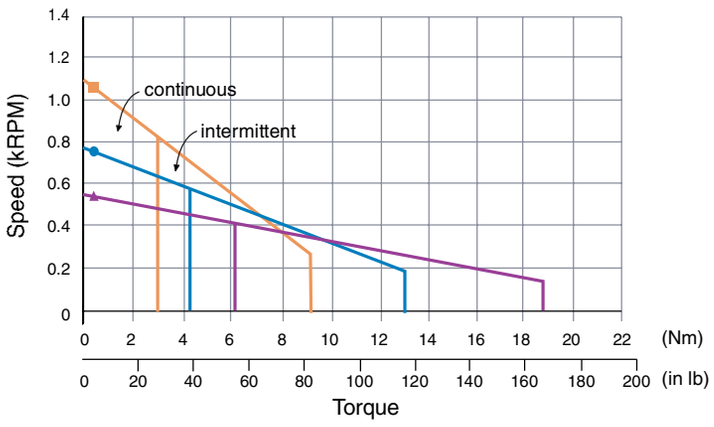
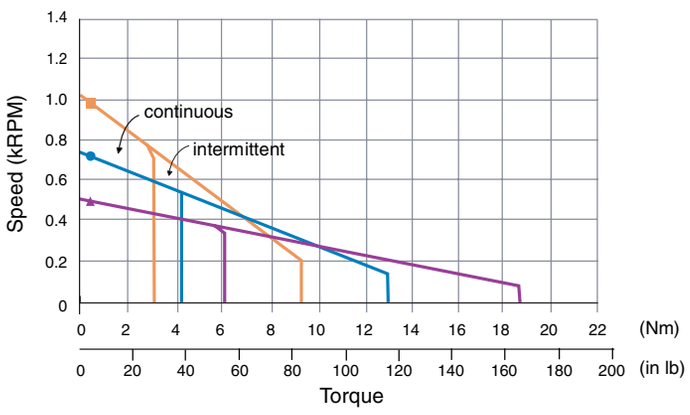
Stealth® GM Gearmotors Series:
GM60 Speed / Torque Curves

Single Stack - 160 volt

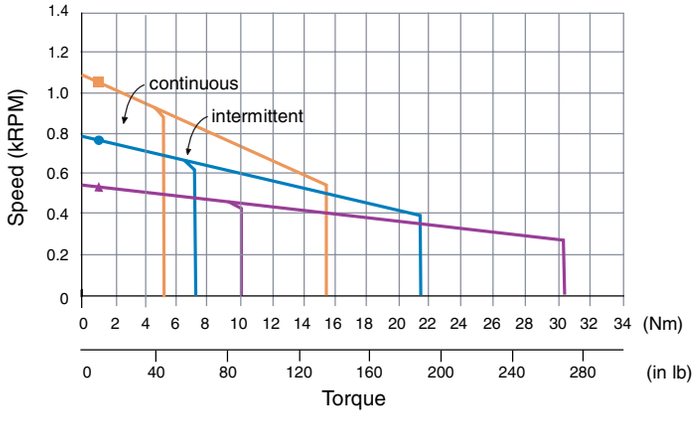


Single Stack - 300 volt

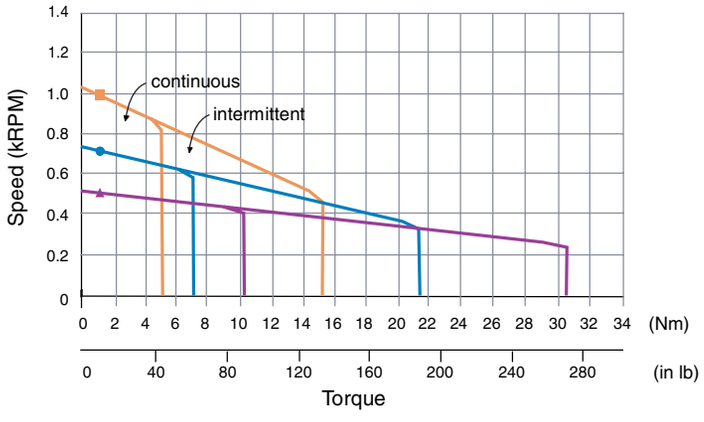


5:1 7:1 10:1

Double Stack - 160 volt



Double Stack - 300 volt



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Stealth® GM Gearmotors Series:
GM60

Performance Specifications (six step/trapezoidal commutation)

Mechanical Specifications

Frame Size	Stack Length	Weight without Brake		Maximum Radial Load		Torsional Stiffness		Standard Backlash *	Low Backlash *
		(kg)	(lb)	(N)	(lb)	(Nm/arc min)	(in lb/arc min)	(arc min)	(arc min)
GM060	Single	**2.1**	4.7	**1,300**	292	**6**	53	15	10
GM060	Double	**2.8**	6.2	**1,300**	292	**6**	53	15	10

* Measured at 2% of rated torque

Single Stack Specifications (4)

Frame Size	Ratio	Max. Speed(1)	Cont. Stall Torque (1) T_C		Peak Torque(1) T_P		Winding C:160 Vdc D:300 Vdc	Voltage Constant(1)(3) K_{EL-L}	Torque Constant(1)(3) K_{TL-L}		Induct L_{L-L}	Cold Resistance R_{L-L}	Cont. Current I_C	Peak Current I_P	Inertia (2)	
		(RPM)	(Nm)	(in lb)	(Nm)	(in lb)		(V/kRPM)	(Nm/amp)	(in lb/amp)	(mH)	(ohms)	(amps)	(amps)	(gm cm sec^2)	(lb in sec^2)
GM060	5:1	1,100	**3.1**	27.5	**9.3**	82.5	C	146.5	**1.40**	12.5	12.5	11.8	2	7	**0.23**	0.00019
GM060	5:1	1,000	**3.1**	27.5	**9.3**	82.5	D	296.5	**2.85**	25.0	51.2	48.3	1	3	**0.23**	0.00019
GM060	7:1	780	**4.3**	38.5	**13.0**	115.5	C	205.1	**1.96**	17.5	12.5	11.8	2	7	**0.19**	0.00016
GM060	7:1	720	**4.3**	38.5	**13.0**	115.5	D	415.1	**3.99**	35.0	51.2	48.3	1	3	**0.19**	0.00016
GM060	10:1	540	**6.2**	55.0	**18.6**	165.0	C	293.0	**2.80**	25.0	12.5	11.8	2	7	**0.19**	0.00016
GM060	10:1	500	**6.2**	55.0	**18.6**	165.0	D	593.0	**5.70**	50.0	51.2	48.3	1	3	**0.19**	0.00016

Double Stack Specifications (4)

Frame Size	Ratio	Max. Speed(1)	Cont. Stall Torque (1) T_C		Peak Torque(1) T_P		Winding C:160 Vdc D:300 Vdc	Voltage Constant(1)(3) K_{EL-L}	Torque Constant(1)(3) K_{TL-L}		Induct L_{L-L}	Cold Resistance R_{L-L}	Cont. Current I_C	Peak Current I_P	Inertia (2)	
		(RPM)	(Nm)	(in lb)	(Nm)	(in lb)		(V/kRPM)	(Nm/amp)	(in lb/amp)	(mH)	(ohms)	(amps)	(amps)	(gm cm sec^2)	(lb in sec^2)
GM060	5:1	1,100	**5.1**	45.0	**15.2**	135.0	C	146.5	1.40	12.5	6.2	4.8	4	11	**0.29**	0.00025
GM060	5:1	1,000	**5.1**	45.0	**15.2**	135.0	D	293.0	2.80	25.0	25	19	2	5	**0.29**	0.00025
GM060	7:1	780	**7.1**	63.0	**21.3**	189.0	C	205.6	1.96	17.5	6.2	4.8	4	11	**0.25**	0.00022
GM060	7:1	720	**7.1**	63.0	**21.3**	189.0	D	410.2	3.92	35.0	25	19	2	5	**0.25**	0.00022
GM060	10:1	540	**10.1**	90.0	**30.4**	270.0	C	293.0	2.80	25.0	6.2	4.8	4	11	**0.25**	0.00022
GM060	10:1	500	**10.1**	90.0	**30.4**	270.0	D	586.0	5.60	50.0	25	19	2	5	**0.25**	0.00022

Note: Pole Count for GM060 is 6

Thermal Resistance for GM060 is 1.5 °C/W

Stator winding thermal resistance (winding to ambient) is for the unit, mounted to a 254mm x 254mm x 12.7mm (10in x 10in x 0.5in) aluminum plate.

(1) These specifications refer to the output of the GM assembly.
When programming a digital amplifier for use with a GM assembly, these specifications must be adjusted by the ratio to create actual motor performance

(2) Inertia = Motor Rotor + Gear Selection. External Inertia must be divided by the square of the ratio.

(3) Peak of sine wave

(4)* For Motor Selection calculations see page 194

Specification are subject to change without notice

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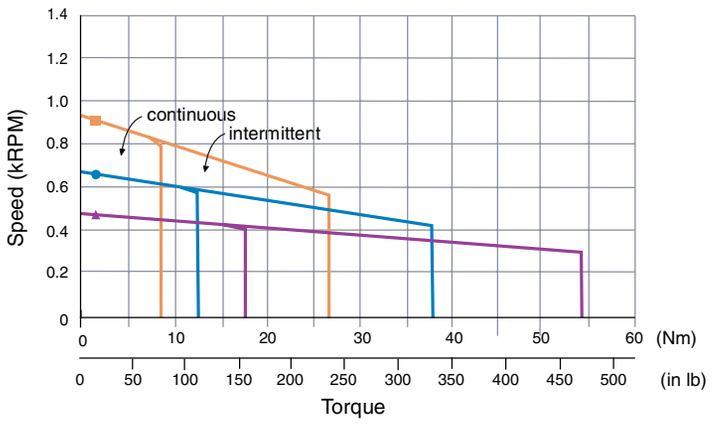
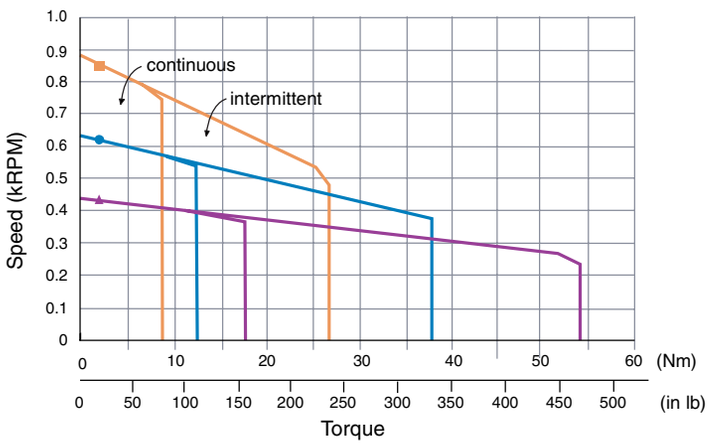
Stealth® GM Gearmotors Series:
GM90 Speed / Torque Curves

Single Stack - 160 volt

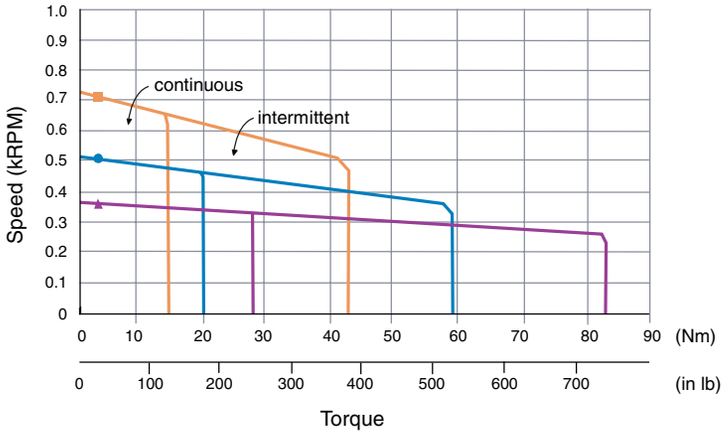


Single Stack - 300 volt

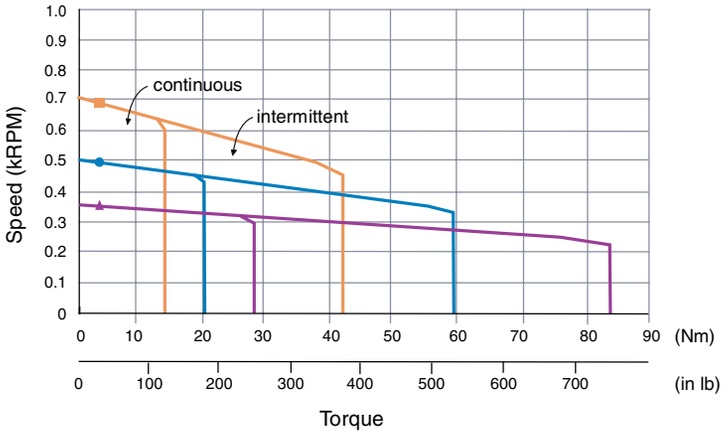


5:1 7:1 10:1

Double Stack - 160 volt



Double Stack - 300 volt



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Stealth® GM Gearmotors Series:
GM90

Performance Specifications (six step/trapezoidal commutation)

Mechanical Specifications

Frame Size	Stack Length	Weight without Brake		Maximum Radial Load		Torsional Stiffness		Standard Backlash*	Low Backlash*
		(kg)	(lb)	(N)	(lb)	(Nm/arc min)	(in lb/arc min)	(arc min)	(arc min)
GM090	Single	**6.0**	13.2	**2,600**	584	**11**	87	15	10
GM090	Double	**7.4**	16.3	**2,600**	584	**11**	87	15	10

* Measured at 2% of rated torque

Single Stack Specifications (4)

Frame Size	Ratio	Max. Speed(1)	Cont. Stall Torque (1) T_C		Peak Torque(1) T_P		Winding C:160 Vdc D:300 Vdc	Voltage Constant(1)(3) K_{EL-L}	Torque Constant(1)(3) K_{TL-L}		Induct L_{L-L}	Cold Resistance R_{L-L}	Cont. Current I_C	Peak Current I_P	Inertia (2)	
		(RPM)	(Nm)	(in lb)	(Nm)	(in lb)		(V/kRPM)	(Nm/amp)	(in lb/amp)	(mH)	(ohms)	(amps)	(amps)	(gm cm sec^2)	(lb in sec^2)
GM090	5:1	900	**8.7**	77.0	**26.0**	231.0	C	170.5	**1.65**	14.5	4.5	2.5	5	16	**1.16**	0.00100
GM090	5:1	870	**8.7**	77.0	**26.0**	231.0	D	341.0	**3.25**	29.0	18.1	10.1	3	8	**1.16**	0.00100
GM090	7:1	670	**12.0**	107.0	**36.1**	321.0	C	238.7	**2.31**	20.3	4.5	2.5	5	16	**0.94**	0.00081
GM090	7:1	620	**12.0**	107.0	**36.1**	321.0	D	477.9	**4.55**	40.6	18.1	10.1	3	8	**0.94**	0.00081
GM090	10:1	450	**17.2**	153.0	**51.7**	459.0	C	341.0	**3.30**	29.0	4.5	2.5	5	16	**0.94**	0.00081
GM090	10:1	430	**17.2**	153.0	**51.7**	459.0	D	682.0	**6.50**	58.0	18.1	10.1	3	8	**0.94**	0.00081

Double Stack Specifications (4)

Frame Size	Ratio	Max. Speed(1)	Cont. Stall Torque (1) T_C		Peak Torque(1) T_P		Winding C:160 Vdc D:300 Vdc	Voltage Constant(1)(3) K_{EL-L}	Torque Constant(1)(3) K_{TL-L}		Induct L_{L-L}	Cold Resistance R_{L-L}	Cont. Current I_C	Peak Current I_P	Inertia (2)	
		(RPM)	(Nm)	(in lb)	(Nm)	(in lb)		(V/kRPM)	(Nm/amp)	(in lb/amp)	(mH)	(ohms)	(amps)	(amps)	(gm cm sec^2)	(lb in sec^2)
GM090	5:1	720	**14.0**	124.0	**41.9**	372.0	C	221.5	**2.10**	18.5	3.8	1.6	7	20	**1.31**	0.00113
GM090	5:1	700	**14.0**	124.0	**41.9**	372.0	D	426.0	**4.05**	36.0	14.1	6.3	3	10	**1.31**	0.00113
GM090	7:1	500	**19.5**	173.0	**58.4**	519.0	C	310.1	**2.94**	25.9	3.8	1.6	7	20	**1.10**	0.00094
GM090	7:1	500	**19.5**	173.0	**58.4**	519.0	D	596.4	**5.67**	50.4	14.1	6.3	3	10	**1.10**	0.00094
GM090	10:1	360	**27.8**	247.0	**83.4**	741.0	C	443.0	**4.20**	37.0	3.8	1.6	7	20	**1.10**	0.00094
GM090	10:1	350	**27.8**	247.0	**83.4**	741.0	D	852.0	**8.10**	72.0	14.1	6.3	3	10	**1.10**	0.00094

Note: Pole Count for GM090 is 8

Thermal Resistance for GM090 is 1.2 °C/W

Stator winding thermal resistance (winding to ambient) is for the unit, mounted to a 254mm x 254mm x 12.7mm (10in x 10in x 0.5in) aluminum plate.

(1) These specifications refer to the output of the GM assembly.
When programming a digital amplifier for use with a GM assembly, these specifications must be adjusted by the ratio to create actual motor performance

(2) Inertia = Motor Rotor + Gear Selection. External Inertia must be divided by the square of the ratio.

(3) Peak of sine wave

(4)* For Motor Selection calculations see page 194

Specification are subject to change without notice

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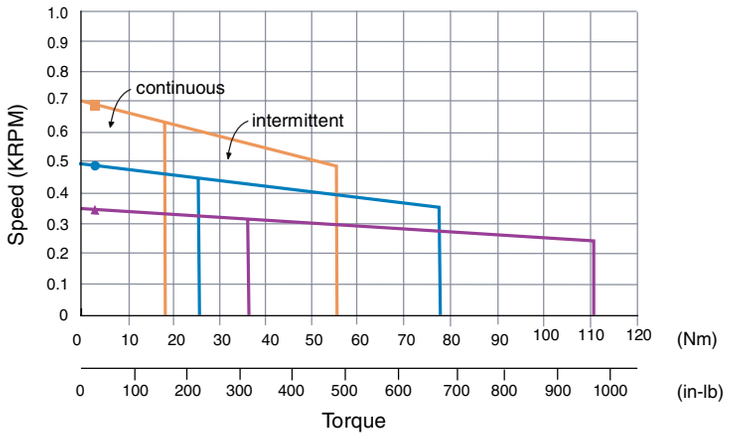
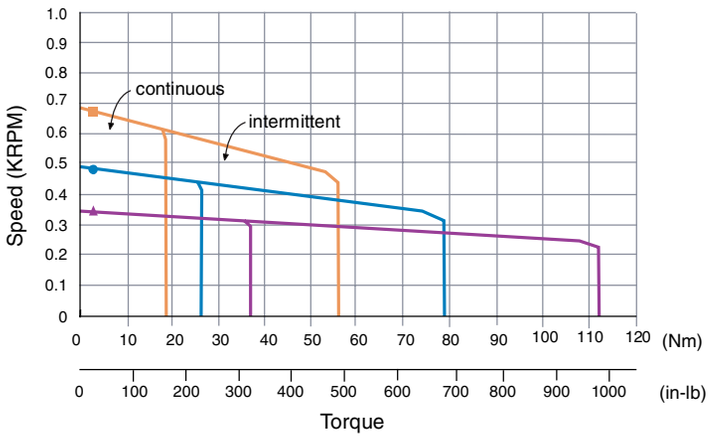
Stealth® GM Gearmotors Series:
GM115 Speed / Torque Curves

Single Stack - 160 volt

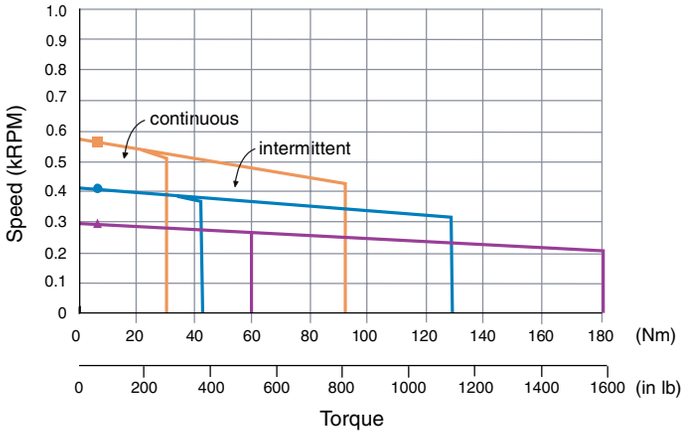


Single Stack - 300 volt

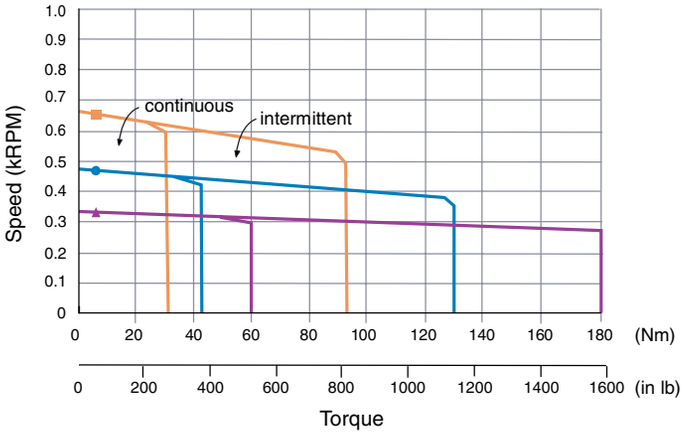


5:1 7:1 10:1

Double Stack - 160 volt



Double Stack - 300 volt



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Stealth® GM Gearmotors Series: GM115

Performance Specifications (six step / trapezoidal commutation)

Mechanical Specifications

Frame Size	Stack Length	Weight without Brake		Maximum Radial Load		Torsional Stiffness		Standard Backlash	Low Backlash
		(kg)	(lb)	(N)	(lb)	(Nm/arc min)	(in lb/arc min)	(arc min)	(arc min)
GM115	Single	**8.4**	18.5	**3,900**	876	**20**	177	15	10
GM115	Double	**10.6**	23.4	**3,900**	876	**20**	177	15	10

* Measured at 2% of rated torque

Single Stack Specifications

Frame Size	Ratio	Max. Speed[1]	Cont. Stall Torque[1] T_C		Peak Torque[1] T_P		Winding C:160 Vdc D:300 Vdc	Voltage Constant[1][3] K_{EL-L}	Torque Constant[1][3] K_{TL-L}		Induct L_{L-L}	Cold Resistance R_{L-L}	Cont. Current I_C	Peak Current I_P	Inertia[2]	
		(RPM)	(Nm)	(in lb)	(Nm)	(in lb)		(V/kRPM)	(Nm/amp)	(in lb/amp)	(mH)	(ohms)	(amps)	(amps)	(gm cm sec^2)	(lb in sec^2)
GM115	5:1	700	**18.2**	162	**54.7**	486	C	228.0	**2.15**	19.5	2.9	1.2	8	25	**4.33**	0.00375
GM115	5:1	680	**18.2**	162	**54.7**	486	D	438.0	**4.15**	37.0	10.7	4.7	4	13	**4.33**	0.00375
GM115	7:1	500	**25.4**	227	**76.6**	681	C	319.2	**3.01**	27.3	2.9	1.2	8	25	**3.54**	0.00306
GM115	7:1	480	**25.4**	227	**76.6**	681	D	613.2	**5.81**	51.8	10.7	4.7	4	13	**3.54**	0.00306
GM115	10:1	350	**36.5**	324	**109.4**	972	C	456.0	**4.30**	39.0	2.9	1.2	8	25	**3.54**	0.00306
GM115	10:1	340	**36.5**	324	**109.4**	972	D	876.0	**8.30**	74.0	10.7	4.7	4	13	**3.54**	0.00306

Double Stack Specifications

Frame Size	Ratio	Max. Speed[1]	Cont. Stall Torque[1] T_C		Peak Torque[1] T_P		Winding C:160 Vdc D:300 Vdc	Voltage Constant[1][3] K_{EL-L}	Torque Constant[1][3] K_{TL-L}		Induct L_{L-L}	Cold Resistance R_{L-L}	Cont. Current I_C	Peak Current I_P	Inertia[2]	
		(RPM)	(Nm)	(in lb)	(Nm)	(in lb)		(V/kRPM)	(Nm/amp)	(in lb/amp)	(mH)	(ohms)	(amps)	(amps)	(gm cm sec^2)	(lb in sec^2)
GM115	5:1	570	**30.1**	267	**90.2**	801	C	280.5	**2.70**	23.5	2.2	0.73	11	34	**6.28**	0.00544
GM115	5:1	650	**30.1**	267	**90.2**	801	D	455.5	**4.35**	38.5	5.8	1.9	7	21	**6.28**	0.0054
GM115	7:1	400	**42.0**	373	**125.9**	1,119	C	392.7	**3.78**	32.9	2.2	0.73	11	34	**5.50**	0.00475
GM115	7:1	470	**42.0**	373	**125.9**	1,119	D	637.7	**6.09**	53.9	5.8	1.9	7	21	**5.50**	0.00475
GM115	10:1	280	**60.0**	533	**179.9**	1,599	C	561.0	**5.40**	47.0	2.2	0.73	11	34	**5.50**	0.00475
GM115	10:1	320	**60.0**	533	**179.9**	1,599	D	911.0	**8.70**	77.0	5.8	1.9	7	21	**5.50**	0.00475

Note: Pole Count for GM115 is 12

Thermal Resistance for GM115 is 0.95 °C/W

Stator winding thermal resistance (winding to ambient) is for the unit, mounted to a 254mm x 254mm x 12.7mm (10in x 10in x 0.5in) aluminum plate.

(1) These specifications refer to the output of the GM assembly.
When programming a digital amplifier for use with a GM assembly, these specifications must be adjusted by the ratio to create actual motor performance

(2) Inertia = Motor Rotor + Gear Selection. External Inertia must be divided by the square of the ratio.

(3) Peak of sine wave

* For Motor Selection calculations see page 194

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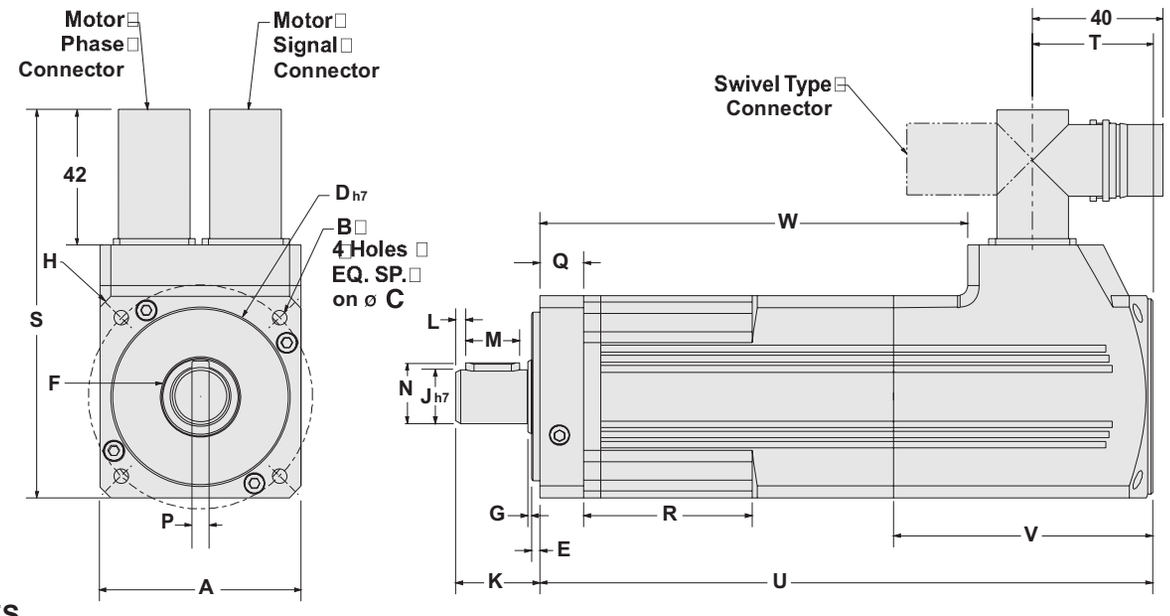
Stealth® GM Gearmotors Series

Dimensions



METRIC SIZES

Frame Size	A Square Flange		B Bolt Hole		C Bolt Circle Diameter		D Pilot Diameter		E Pilot Thick.		F Shoulder Diameter		G Shoulder Height		H Housing Diameter		J Shaft Diameter	
	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)
GM060	**60**	2.36	**5.5**	0.22	**70**	2.756	**50**	1.969	**2.5**	0.1	**23**	0.91	**1.0**	0.04	**80**	3.15	**16**	0.63
GM090	**90**	3.54	**6.5**	0.26	**100**	3.94	**80**	3.15	**3.0**	0.12	**36**	1.42	**1.0**	0.04	**116**	4.57	**20**	0.79
GM115	**115**	4.53	**8.5**	0.33	**130**	5.12	**110**	4.33	**3.5**	0.14	**36**	1.42	**1.5**	0.6	**152**	5.95	**24**	0.94

Frame Size	K Shaft Length		L Dist From Shaft End		M Keyway Length		N Keyway Height		P Keyway Width		Q Flange Thick.		R Recess Length		S Height		T Connector Location	
	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)
GM060	**25.0**	0.98	**3**	0.118	**16**	0.630	**18.0**	0.709	**5**	0.20	**13**	0.51	**50.0**	1.969	**117**	4.60	**37**	1.457
GM090	**40.0**	1.57	**5**	0.20	**28**	1.10	**22.5**	0.886	**6**	0.24	**17**	0.67	**54.5**	2.15	**147**	5.79	**39**	1.535
GM115	**50.0**	1.97	**7**	0.28	**32**	1.26	**27.0**	1.063	**8**	0.32	**20**	0.79	**55.5**	2.18	**175**	6.89	**46**	1.811

NEMA SIZES

Frame Size	B Bolt Hole		C Bolt Circle		D Pilot Diameter		J Output Shaft Diameter		K Output Shaft Length		M Keyway Length		N Keyway Height		P Keyway Width	
	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)
GM023	**0.195**	5.0	**2.625**	66.7	**1.500**	38.1	**0.375**	9.5	**1.000**	25.4	**0.750** flat	19.1 flat	**0.015** flat	0.4 flat	—	—
GM034	**0.218**	5.5	**3.875**	98.4	**2.875**	73.0	**0.500**	12.7	**1.250**	31.8	**1.063**	27.0	**0.072**	1.8	**0.125**	3.2
GM042	**0.281**	7.1	**4.950**	125.7	**2.187**	55.5	**0.625**	15.9	**1.500**	38.1	**1.130**	28.7	**0.108**	2.7	**0.188**	4.8

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Stealth® GM Gearmotors Series:
Options

Options	Single Stage U Length (mm)	Single Stage U Length (in)	Single Stage V Rear Cover Length (mm)	Single Stage V Rear Cover Length (in)	Single Stage W Flange Offset (mm)	Single Stage W Flange Offset (in)	Double Stage U Length (mm)	Double Stage U Length (in)	Double Stage V Rear Cover Length (mm)	Double Stage V Rear Cover Length (in)	Double Stage W Flange Offset (mm)	Double Stage W Flange Offset (in)
GM060 Single Stack – Encoder or Resolver	**178**	7.01	**70**	2.76	**121**	4.76	219.2	8.63	70	2.76	162.2	6.39
GM060 Single Stack – Encoder or Resolver and Brake	**203**	7.99	**95**	3.74	**143**	5.63	244.2	9.61	95	3.74	184.2	7.25
GM060 Double Stack – Encoder or Resolver	**216**	8.5	**70**	2.76	**159**	6.26	257.2	10.13	70	2.76	200.2	7.88
GM060 Double Stack – Encoder or Resolver and Brake	**241**	9.46	**95**	3.74	**181**	7.12	282.2	11.11	95	3.74	222.2	8.75
GM090 Single Stack – Encoder or Resolver	**202.3**	7.96	**83**	3.27	**143.3**	5.64	259.3	10.21	83	3.27	200.3	7.89
GM090 Single Stack – Encoder or Resolver and Brake	**230.3**	9.07	**111**	4.37	**171**	6.73	287.3	11.31	111	4.37	228	8.98
GM090 Double Stack – Encoder or Resolver	**240.4**	9.46	**83**	3.27	**181.4**	7.14	297.4	11.71	83	3.27	238.4	9.39
GM090 Double Stack – Encoder or Resolver and Brake	**268.4**	10.57	**111**	4.37	**209.1**	8.23	325.4	12.81	111	4.37	266.1	10.48
GM115 Single Stack – Encoder or Resolver	**207.2**	8.16	**70**	2.76	**147.3**	5.8	276.2	10.87	70	2.76	216.3	8.52
GM115 Single Stack – Encoder or Resolver and Brake	**240.2**	9.46	**103**	4.06	**170.3**	6.7	309.2	12.17	103	4.06	239.3	10.02
GM115 Double Stack – Encoder or Resolver	**245.3**	9.66	**70**	2.76	**185.4**	7.3	314.3	12.37	70	2.76	254.4	2.14
GM115 Double Stack – Encoder or Resolver and Brake	**278.3**	10.96	**103**	4.06	**208.4**	8.2	347.3	13.67	103	4.06	277.4	10.92

Encoder Specifications (All GM Frame Sizes)

Resolution	2,000 LPR (8,000 LPR)
Electrical Input:	5 Vdc, 125 ma maximum (plus interface loads)
Encoder Output:	A, B, I, $\overline{A}$, $\overline{B}$, $\overline{I}$
	Differential, TTL compatible
	Frequency Response 500 Khz

Resolver Specification (All Frame Sizes)

Frequency	Hz	5,000
Input Voltage	Vrms	4.0
Input Current	ma max.	23
Input Power	Watts nom.	0.045
Transformation Ratio	± 10%	0.50
Output voltage	Vrms	2.0
Sensitivity	mv / Deg	35

Brake Specification

Frame Size	Static Holding Torque (Nm)	Static Holding Torque (in lb)	Voltage (V)	Current (amps)	Resistance (ohms)	Inertia (gm cm sec^2)	Inertia (oz in sec^2)
GM060	**0.33**	3.0	24 Vdc	0.19	131	**4.32 x 10^{-8}**	6.0 x 10^{-10}
GM090	**5.64**	50	24 Vdc	0.30	65	**4.32 x 10^{-8}**	6.0 x 10^{-10}
GM115	**5.64**	50	24 Vdc	0.30	65	**2.5 x 10^{-7}**	3.5 x 10^{-9}

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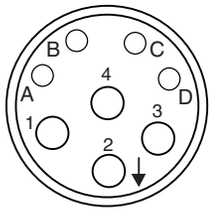
Stealth® GM Gearmotors Series:
Motor Connections & Cables

DIN Motor Power Connection

Pin Number	Function
1	U
4	V
3	W
2	Chassis Gnd.
A	Thermistor +
B	Thermistor -
C	Brake +
D	Brake -
–	Shield



Power

Motor Power Mating Connector

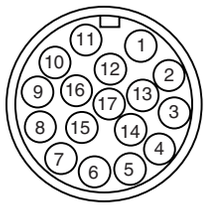
Manufacturer	Part Number	Description
Hypertac	LPNA08BFRKB170	Body
	020.232.2000	4 Pins Female 18-26 AWG
	020.090.1020	4 Pins Female 16-20 AWG

Motor Power Cable

Part Number	Length	Used With
10963093	3 meter	Flying Leads
10963117	8 meter	Flying Leads

DIN Sensor Connector Details

Pin Number	Function		Mating Cable
	Encoder	Resolver	i-Drive Conn. Pin Number
1	A +	S1 (SIN+)	1
2	B +	S4 (COS+)	2
7	+5V	R2 (Ref+)	7
8	Shield	Shield	8
9	A -	S3 (SIN-)	9
10	B -	S2 (COS-)	10
15	Gnd	R1 (REF-)	15
12	Spare	Spare	—
5	I +	—	5
13	I -	—	13
3	Hall 1 (S1)	—	—
11	Hall 2 (S2)	—	—
4	Hall 3 (S3)	—	—
16	Thermistor +	Thermistor +	—
17	Thermistor -	Thermistor -	—
6 & 14	No Connection		



Sensor

Motor Sensor Mating Connector

Manufacturer	Part Number	Description
Hypertac	SPNA17HFRON	Body
	020.256.1020	17 Pins Female

Mating Sensor Cable

Part Number	Length	Used With
10963094	3 meter	Flying Leads
10963096	3 meter	i-Drive
10963123	8 meter	Flying Leads
10963118	8 meter	i-Drive
10963136[1]	—	i-Drive / Controller

(1) NOTE: When an external controller is used in a closed loop mode an additional sensor cable, part number 10963136, is required.

Flying Leads from out of the Motor (All GM Frame Sizes)

Power

Function	Color Code
U	Red
V	Black
W	White
Ground	Green

Encoder

Function	Color Code
A-	White
A+	Brown
B-	Green
B+	Blue
I-	Yellow
I+	Orange
S2	Violet
S1	White / Brown
S3	White / Orange
+5V	Red
GND	Black
T1	White / Red
T2	White / Black

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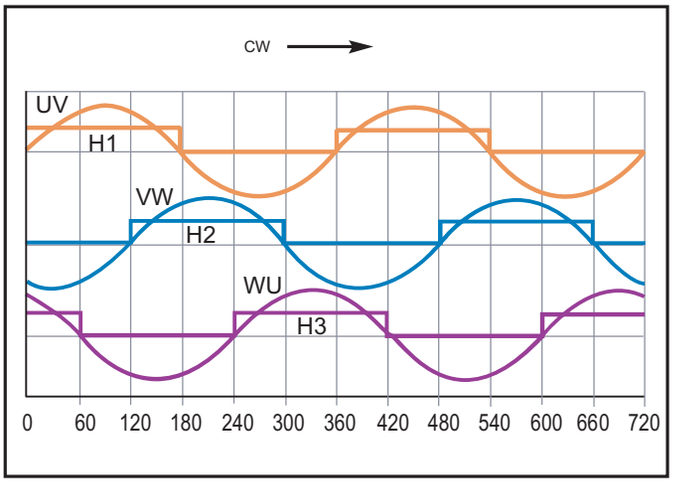
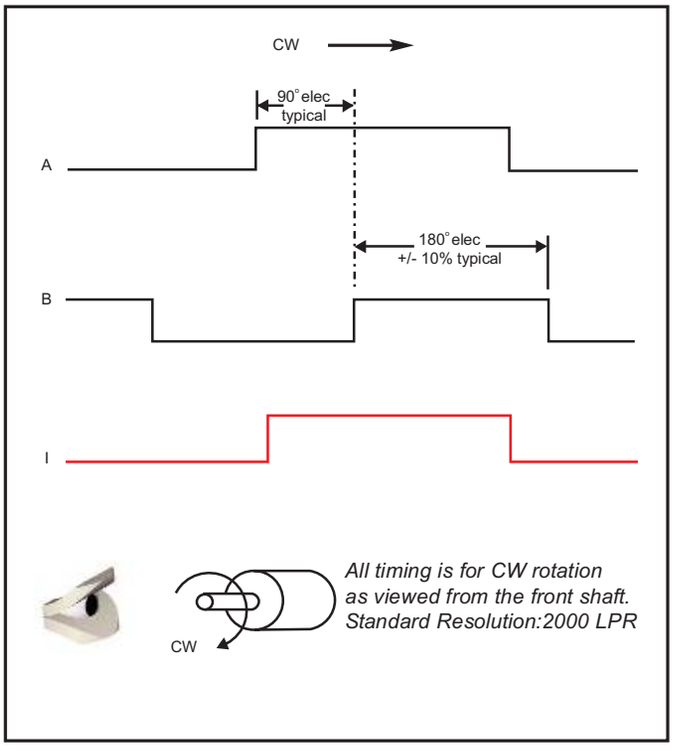
Motor Signal Timing (C/D winding)
at motor connector



Encoder Timing



All timing is for CW rotation as viewed from the front shaft. Standard Resolution:2000 LPR

Specifications are subject to change without notice.

How to Order

Order Numbering Example: G M 0 6 0 – B 1 C 1 D

FRAME SIZE		RATIO	STACK LENGTH	WINDING	OPTIONS	CONNECTOR
Metric	**NEMA**	B = 5:1	1 = Single	C = 160Vdc	1 = 2000 Line (1) Encoder	B = MIL Connector
060	023	C = 7:1	2 = Double	D = 300Vdc	2 = 2000 Line (1) Encoder, Brake	D = DIN Connector
090	034	D = 10:1			3 = Resolver	F = Flying Leads (450mm/18in)
115	042	E = 15:1			4 = Resolver, Brake	
142	056	F = 20:1				
		G = 25:1				
		H = 30:1				
		J = 50:1				
		K = 70:1				
		L = 100:1				

(1) Includes commutation signals

Gearmotors are supported by a worldwide network of offices and local distributors. Call **1-800-305-4555** for application engineering assistance or for the name of your local distributor. Information can also be obtained at **www.baysidemotion.com**.

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Servo Wheel Series:

Compact Wheel Drives for Electric Vehicles

The Servo Wheel™ combines a brushless dc motor with planetary gears in a lightweight, aluminum housing to provide a compact solution for vehicle control. The Power Wheel's unique design makes system integration easy. You no longer have to purchase the motor, gearhead, wheel, electronics and bracket from different sources. Bayside does all of the work for you. From component sourcing to actual assembly, Bayside engineers designed the Power Wheel with your application in mind.
All you have to do is bolt it up and go!

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Servo Wheel Series:
Design Features

Single Piece Construction Motor Shaft

The first stage's planetary section sun gear is integrated into the single piece construction motor shaft, to provide higher reliability in a compact package.

Planetary Gears

The planetary input stage provides a first pass reduction that is capable of carrying high torques with high input speeds in a small package.

Integrated Output Stage

The second stage planetary's unique design uses two planets for higher efficiency. Built entirely into the wheel, it utilizes an otherwise wasted area to provide a compact, space-saving package. Two large diameter bearings support the weight, protecting the gears from shock loading and dramatically increasing the radial load carrying capacity of the wheels.

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Servo Wheel Series:
Compact Wheel Drives for Electric Vehicles

Baysides NEW Servo Wheel™ Drive System features state-of-the-art technology to provide motion for small, battery-powered, electric vehicles including:

- **Automated Cleaning Equipment**
- **Healthcare Equipment**
- **Robotic/Material Handling Equipment**
- **AGV's**

Bayside's Servo Wheel™ features:

BRUSHLESS DC MOTOR AMPLIFIERS designed for common motion profiles in battery powered vehicles to provide:

- 12, 24, 36 and 48 volt operation
- Current and temperature feedback control for safe, reliable operation
- Multiple input architectures for easy communication with higher level controllers and navigation systems

PERMANENT MAGNET BRUSHLESS MOTORS to provide:

- High efficiency for longer run times between battery charges
- Greater power to size ratio for a compact package
- Integral hall sensors for motor TRAP commutation
- Long life and maintenance free operation
- High input speeds in excess of 10,000 RPM
- No internal sparking – safe in explosive environments
- Low EMI, eliminating the need for heavy shielding

PLANETARY GEARS to provide high torque-carrying capability in a small package. The gears are built into the hub of the wheel, making the package compact and lightweight. This design also increases the radial load-carrying and shock loading capacity of the entire system.

TIRES Polyurethane is ideal for applications in hospitals, schools, and airports – any place requiring non-marking materials. This material is also ideal for high load carrying applications like material handling.

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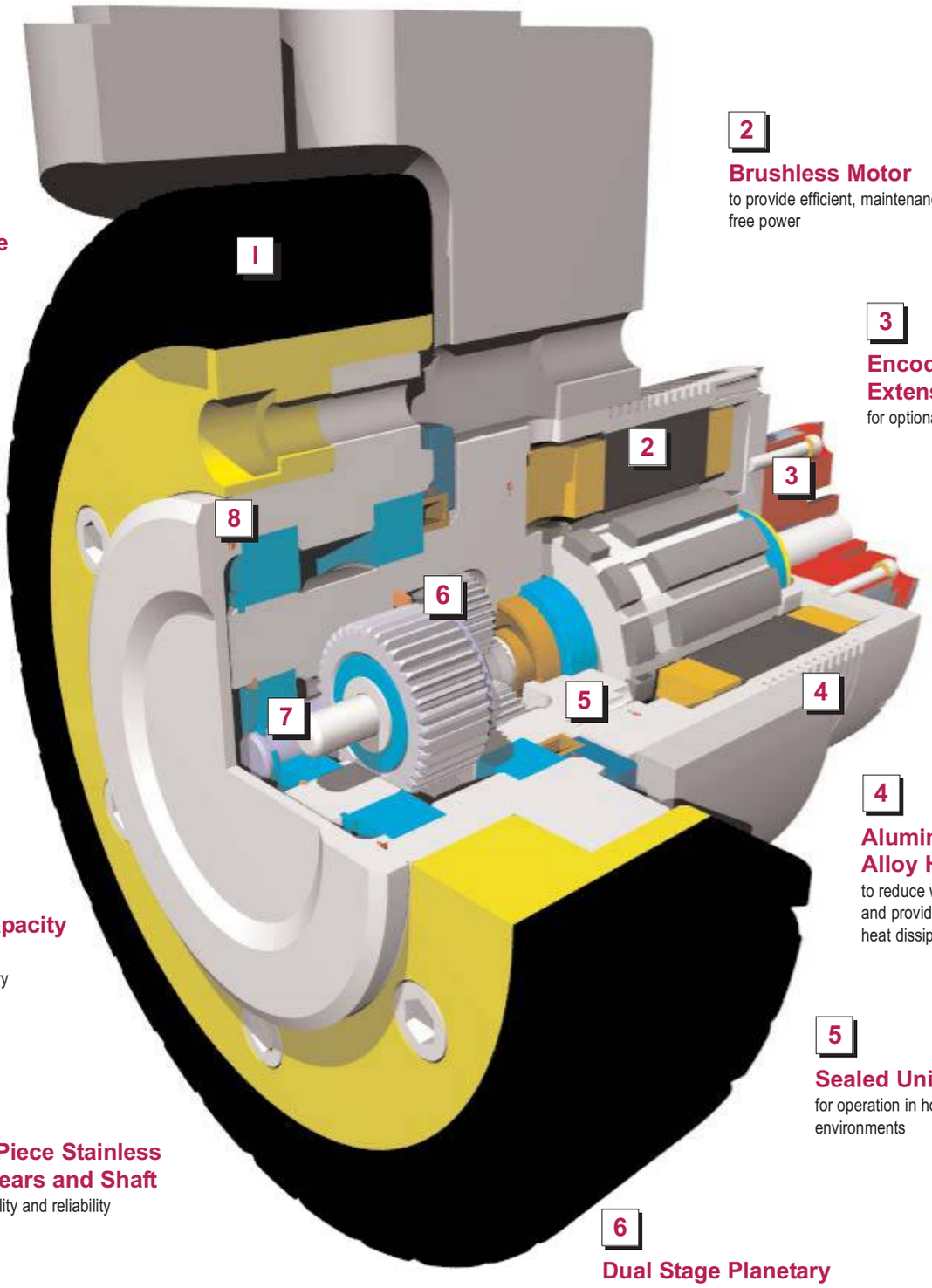

1 Polyurethane Tires
for all types of surfaces

2 Brushless Motor
to provide efficient, maintenance-free power

3 Encoder/Brake Extension
for optional ad-ons

4 Aluminum Alloy Housing
to reduce weight and provide optimum heat dissipation

5 Sealed Unit
for operation in hostile or wet environments

6 Dual Stage Planetary Gear Design
to deliver high torque and high efficiency in a compact package

7 Single Piece Stainless Steel Gears and Shaft
for high quality and reliability

8 High Load Capacity Ball Bearings
to accommodate heavy vehicle loads

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Servo Wheel Series:
Performance Specifications

Performance Specifications

Tire Diameter				152mm (6in)				203mm (8in)			
Speed Code / Gear Ratio				20	25	30	36	20	25	30	36
Motor Code	Power Cont. (W)										
1	150	Max Speed	Km/hr	6.3	5.0	4.2	3.5	8.4	6.8	5.6	4.7
			MPH	3.9	3.1	2.6	2.2	5.2	4.2	3.5	2.9
		Peak Torque	Nm	65	81	97	116	65	81	97	116
			in lb	578	722	866	1,040	578	722	866	1,040
		Continuous Torque	Nm	20	24	29	35	20	24	29	35
			in lb	174	217	260	312	174	217	260	312
2	300	Max Speed	Km/hr	5.8	4.7	3.9	3.2	7.7	6.3	5.2	4.3
			MPH	3.6	2.9	2.4	2.0	4.8	3.9	3.2	2.7
		Peak Torque	Nm	88	110	132	158	88	110	132	158
			in lb	784	980	1,176	1,411	784	980	1,176	1,411
		Continuous Torque	Nm	26	33	40	48	26	33	40	48
			in lb	235	294	353	423	235	294	353	423
3	746	Max Speed	Km/hr	5.5	4.4	3.6	3.0	7.3	5.9	4.9	4.1
			MPH	3.4	2.7	2.2	1.8	4.5	3.6	3.0	2.5
		Peak Torque	Nm	235	294	353	423	235	294	353	423
			in lb	2,100	2,625	3,150	3,780	2,100	2,625	3,150	3,780
		Continuous Torque	Nm	70	88	106	127	70	88	106	127
			in lb	630	788	945	1,134	630	788	945	1,134
ALL TIRES		Load Capacity	kg	454				454			
			lb	1,000				1,000			

Tire Composition

Code		
	P	Polyurethane Clear Smooth
	Q	Polyurethane Clear x Thread
	R	Polyurethane Black Smooth
	S	Polyurethane Black x Thread

Operating Voltages

Code	K	M
Volts	24	48

Brake

Code	0	None
	3	50 in-lb

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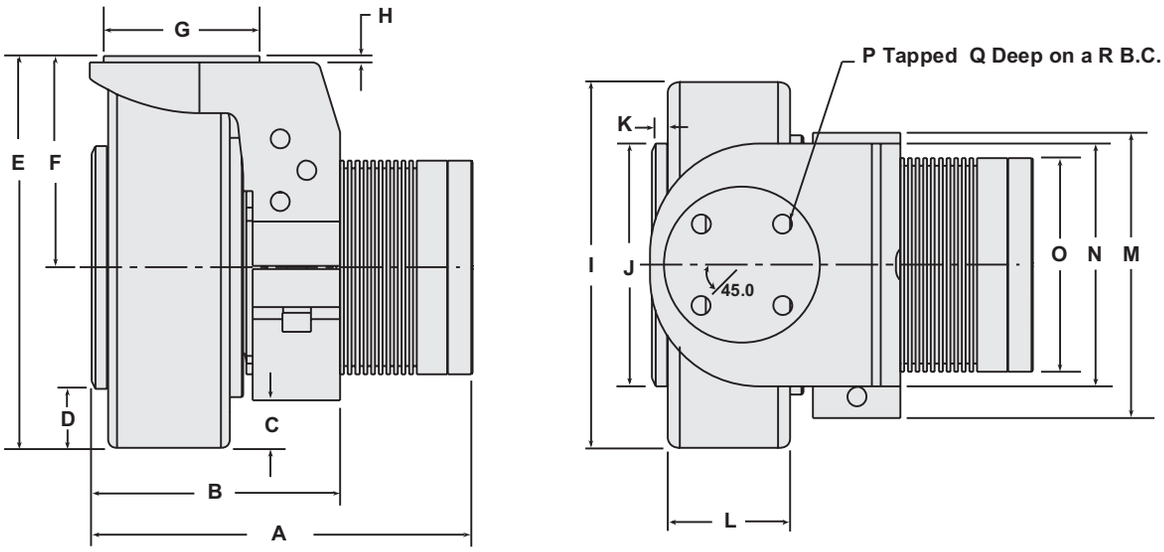
Servo Wheel: Dimensions

Dimensions



Model Number	Motor Power	A with out Brake		B		C		D		E		F	
		(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)
DX6	150	158.75	6.25	104.1	4.1	20.3	0.8	25.4	1.0	165.1	6.5	87.9	3.46
	300	175.26	6.90	104.1	4.1	20.3	0.8	25.4	1.0	165.1	6.5	87.9	3.46
	746	191.77	7.55	104.1	4.1	20.3	0.8	25.4	1.0	165.1	6.5	87.9	3.46
DX8	150	158.75	6.25	104.1	4.1	45.7	1.8	50.8	2.0	218.4	8.6	116.8	4.60
	300	175.26	6.90	104.1	4.1	45.7	1.8	50.8	2.0	218.4	8.6	116.8	4.60
	746	191.77	7.55	104.1	4.1	45.7	1.8	50.8	2.0	218.4	8.6	116.8	4.60

Model Number	Motor Power	G		H		I		J		K		L	
		(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)
DX6	150	65.0	2.559	2.54	0.1	152.4	6.0	101.1	3.98	6.86	0.27	50.8	2.0
	300	65.0	2.559	2.54	0.1	152.4	6.0	101.1	3.98	6.86	0.27	50.8	2.0
	746	65.0	2.559	2.54	0.1	152.4	6.0	101.1	3.98	6.86	0.27	50.8	2.0
DX8	150	65.0	2.559	2.54	0.1	203.2	8.0	101.1	3.98	6.86	0.27	50.8	2.0
	300	65.0	2.559	2.54	0.1	203.2	8.0	101.1	3.98	6.86	0.27	50.8	2.0
	746	65.0	2.559	2.54	0.1	203.2	8.0	101.1	3.98	6.86	0.27	50.8	2.0

Model Number	Motor Power	M		N		O		P		Q		R	
		(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)	(mm)	(in)
DX6	150	118.6	4.67	101.1	3.98	88.9	3.5	7.94	5.16	25.4	1.0	47.98	1.889
	300	118.6	4.67	101.1	3.98	88.9	3.5	7.94	5.16	25.4	1.0	47.98	1.889
	746	118.6	4.67	101.1	3.98	100	3.94	7.94	5.16	25.4	1.0	47.98	1.889
DX8	150	118.6	4.67	101.1	3.98	88.9	3.5	7.94	5.16	25.4	1.0	47.98	1.889
	300	118.6	4.67	101.1	3.98	88.9	3.5	7.94	5.16	25.4	1.0	47.98	1.889
	746	118.6	4.67	101.1	3.98	100	3.94	7.94	5.16	25.4	1.0	47.98	1.889

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Servo Wheel Series:
Selection Guide & How to Order

5 Step Procedure

1 **Motor Code Selection**

Based on the application requirement, select the appropriate motor power from the second column in the "Performance Specifications" table. The number to the left of it in the first column is the motor code.

2 **Speed Code Selection**

Find the intersection of the column with the selected tire diameter and the row with the motor code to give you the available speed ranges. From the four given speeds (in mph), select the one that meets your application needs. Proceed to the top of that column to find the speed code just under the tire diameter you have selected in step 1.

3 **Voltage Code Selection**

From the "Operating Voltages" table, select the correct voltage code based on the power supply available for the application.

4 **Tire Composition Code Selection**

Servo Wheels™ are available for a wide variety of applications. Some require a smooth ride or high load carrying capacity, or a combination of both. From the tire composition table, select the appropriate material for your application. The letter in the first column is the tire composition code.

5 **Compose part number based on the codes selected**

Specifications are subject to change without notice.

How to Order

Order Numbering Example: **D X C A – R M V T B**

CLEAN ROOM RATING (Optional)	TIRE DIAMETER	SPEED CODE	MOTOR SIZE	VOLTAGE	TIRE MATERIAL	BRAKE SIZE
0 = None	A = 6 in.	1 = 20	1 = 150W	K = 24V	P = Polyurethane clear	0 = No Brake
3 = Class 1,000	B = 8 in.	2 = 24	2 = 300W		Q = Polyurethane clear x thread	3 = 50 in-lb
4 = Class 10,000		3 = 30	4 = 746W		R = Polyurethane black	
		4 = 36			S = Polyurethane black x thread	

Call **1-800-305-4555** for application engineering assistance or for the name of your local distributor.

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Servo Weel Amplifier Board

How to Order

TB1

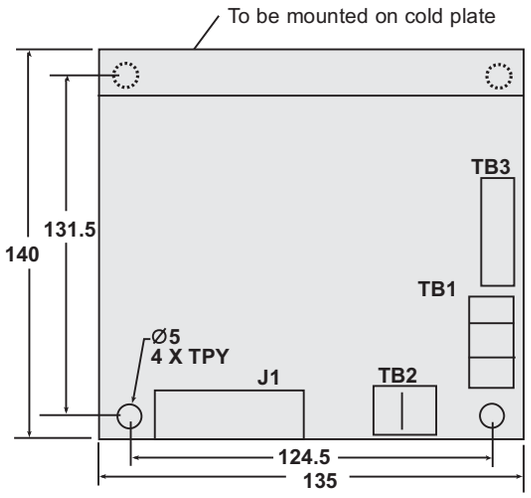
1	Motor Phase A
2	Motor Phase B
3	Motor Phase C

TB2

1	Battery Ground
2	Battery Voltage

TB3

1	Hall Sensor Ground
2	Hall Sensor +6.5V
3	Hall Sensor C
4	Hall Sensor B
5	Hall Sensor A



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J1

Digital Control I/ O Interface	1	Digital Host Ground
	2	Digital Host Voltage
	3	Hall Distance Pulse Feedback
	4	Hall Direction Feedback
	5	Lost Pulse count Warning
	6	Reset Computer / Motor Off
	7	Distance/ speed pulse Input
	8	Direction Input
	9	Motor On / Off
+ / - 10V or Joy Stick	10	Analog Host Power
	11	Analog Host Ground
	12	Analog Signal Input
	13	Analog Direction Output
	14	Frequency Output
Available Voltage	15	Motor Ref. A. +15V
	16	Motor Ref. B. +6.5V
	17	Motor Ground
	18	Not Used
	19	Not Used
	20	Not Used

Input Voltage	24V (Battery 17V to 37V)
Continuous Current	37 Amps (1)
Peak Current	100 Amps (2)
PWM Frequency	60KHz
Pulse Rate or # of Hall Sensor State Change Rate	20KHz
Operating Temperatures	0 to 50 deg C

(1) With Cold Plate @ 50 deg C

(2) For 2 sec

Specifications are subject to change without notice.

How to Order

Order Numbering Example: **MA1-24V-100B**

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MODEL
1 = Single Axis

VOLTAGE OPTIONS
24 = 24V

PEAK CURRENT
100 = 100 Amps

OPERATION
B = CLOSED LOOP

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Stealth® PS Advanced Series:
The Ultimate in Gearhead Performance

Stealth® Advanced PS is Bayside's highest performance servo gearhead. Available in 8 frame sizes and 12 gear ratios, you are guaranteed to find a Stealth® PS to fit your high performance servo applications.

8 Frame Sizes	
PS40	PS142
PS60	PS180
PS90	PS220
PS115	PS300

Ratios *	
3:1	25:1
4:1	30:1
5:1	40:1
7:1	50:1
10:1	70:1
15:1	100:1
20:1	* For PS40 & PS300 see Note (4)