GSM SERIES

INTEGRATED SERVO MOTOR AND ACTUATOR

Economical alternative to GSX

Standard capacity screw

GSM Series

Standard Capacity Roller Screw Technology

Description

This design incorporates superior roller screw technology with an integral brushless servo motor for medium to high performance motion control applications. The GSM Series offers 5 times the travel life and a smaller package with higher speed and higher load capacity than ball screws and other traditional rotary-to-linear conversion mechanisms. These features make the GSM Series an excellent replacement for ball screw actuators.

Selection of the proper feedback configuration allows GSM Series actuators to be powered by nearly any brand of brushless motor amplifier on the market. This flexibility allows these actuators to be incorporated into the highest performance single and multi-axis motion control systems in use today. In applications varying from food and beverage packaging, to multi-axis turning centers, to aircraft assembly, the GSM Series shows incredible performance and durability.

Feature	Standard	Optional
External anti-rotate mechanism	No	Yes
Internal Anti-rotate Mechanism	No	Yes
Pre-loaded follower	No	Yes
Electric brake	No	Yes
External End Switches	No	Yes
Connectors	Right Angle, Rotatable	Custom Connectors
Mounting Style	Extended Tie Rods, Side Tapped Mounting Holes, Trunnion, Rear Clevis, Front or Rear Flange	Custom Mountings
Rod End	Male or Female: U.S. Standard or Metric	Specials Available To Meet OEM Requirements
Lubrication	Greased, Oil Connection Ports are Built-in for Customer Supplied Recirculated Oil Lubrication	Specials Available To Meet OEM Requirements
Primary Feedback	Standard Encoders or Resolvers to Meet Most Amplifier Requirements	Custom Feedback

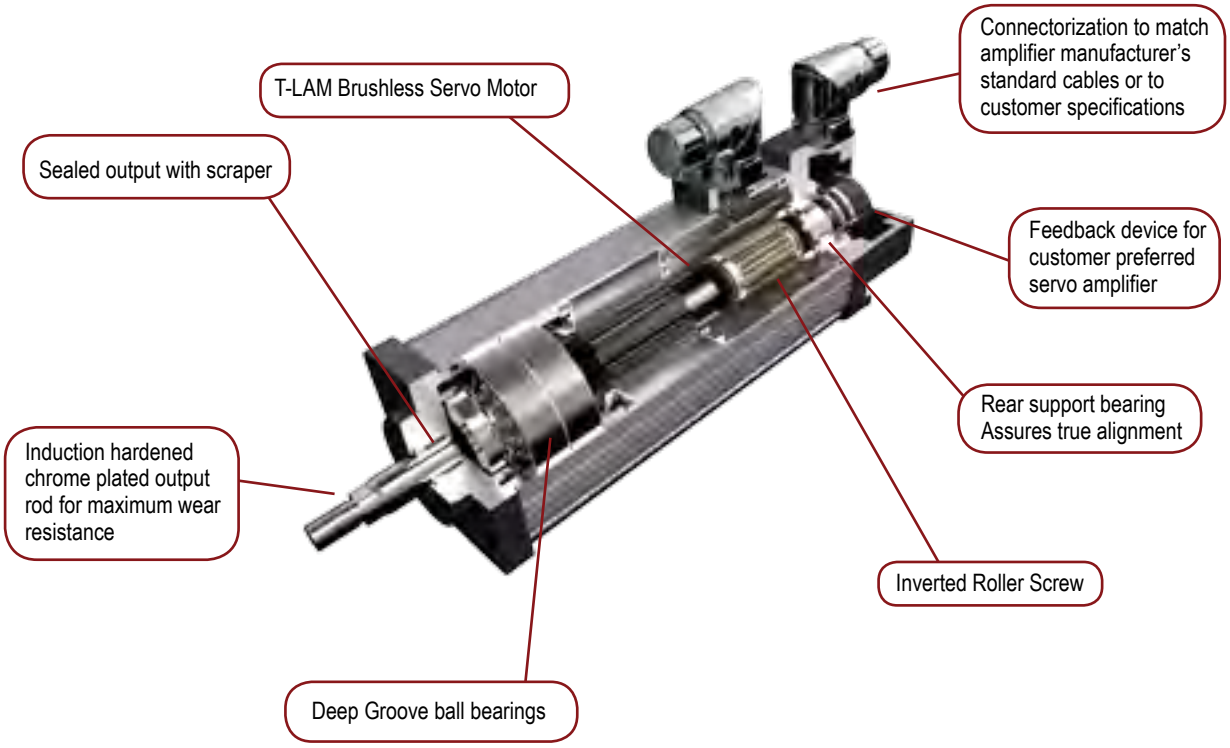
Technical Characteristics	
Frame Sizes in (mm)	2.25 (60), 3.3 (80), 3.9 (100)
Screw Leads in (mm)	0.1 (2.54), 0.2 (5.08), 0.4 (10.16), 0.5 (12.7), 0.75 (19.05)
Standard Stroke Lengths in (mm)	3 (76), 4 (102), 6 (152), 8 (203), 10 (254), 12 (305), 14 (356), 18 (457)
Force Range	103 to 3,457 lbf (458 to 15.3 kN)
Maximum Speed	Up to 37.5 in/sec (952 mm/sec) linear speeds

Operating Conditions and Usage		
Accuracy:		
Screw Lead Error	in/ft	0.001
Screw Lead Variation	in	0.0012
Screw Lead Backlash	in	0.008 maximum
Ambient Conditions:		
Standard Ambient Temperature	°C	0 to 65
Extended Ambient Temperature*	°C	-30 to 65
Storage Temperature	°C	-40 to 85
IP Rating		IP54S
Vibration**		3.5 grms; 5 to 500 hz

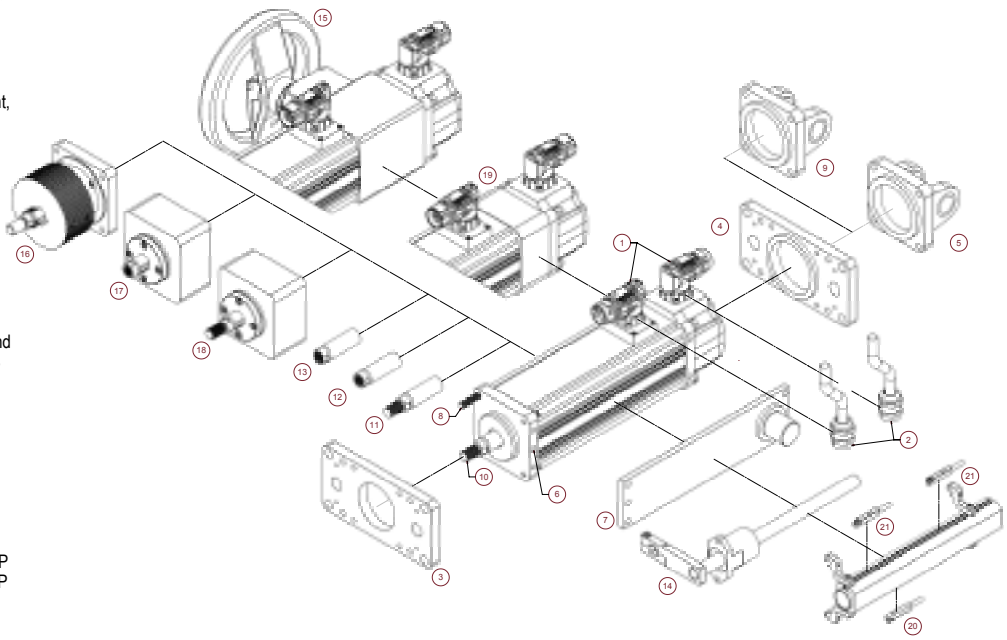
* Consult Exlar for extended temperature operations
** Resolver feedback

Ratings at 25°C, operation over 25°C requires de-rating.

Product Features



1 - Exlar standard M23 style and manufacturer's connector
2 - Embedded leads 3 ft. standard*
3 - Front flange and rear flange*
4 - Male metric thread SS and female, metric thread
5 - Rear clevis
6 - Side mount*, double side mount, metric side mount*, and metric double side mount
7 - Side trunnion and metric side trunnion
8 - Extended tie rods and metric extended tie rods
9 - Metric rear clevis
10 - Male, US standard thread and male, US standard thread SS
11 - Male, metric thread and male metric thread SS
12 - Female, US standard thread and female, US standard thread SS
13 - Female, metric thread and female, metric thread SS
14 - External anti-rotate
15 - Manual drive, handwheel with interlock switch
16 - Protective bellows
17 - Splined main rod- Female
18 - Splined main rod - Male
19 - Rear brake
20 - External limit switch - N.O., PNP
21 - External limit switch - N.C., PNP



* Consult Factory

Industries and Applications:

Hydraulic cylinder replacement
Ball screw replacement
Pneumatic cylinder replacement

Automotive
- Parts Clamping
- Automated Assembly

Food Processing
- Sealing
- Dispensing
- Forming
- Pick and Place Systems
- Fillers
- Cutting / Slicing / Cubing

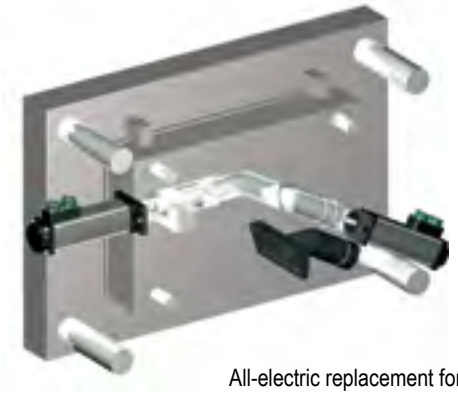
Process Control
- Control Valves
- Conveyor Diverters / Gates
- Dampers
- Pilot Valves

Entertainment / Simulation
- Robot Manipulator Arms
- Test Stands

Medical Equipment
- Volumetric Pumps
- Patient Positioning

Plastics
- Cutoffs
- Die Cutters
- Molding
- Formers

Material Handling
- Open / Close Doors
- Automated Flexible Fixturing
- Automatic Tool Changers
- Tension Control
- Web Guidance
- Wire Winding



All-electric replacement for hydraulic cylinders improves throughput with servo control and lower maintenance for core-pull cylinders.

A typical 3 inch stroke GSM Series actuator used in a valve-modulating application can control position to +/– 0.5% and fully open or close in less than 200 mSec.

Mechanical Specifications

GSM20

Model No. (Motor Stacks)		1 Stack			2 Stack		
Screw Lead Designator		**01**	**02**	**04**	**01**	**02**	**04**
Screw Lead	in	0.1	0.2	0.4	0.1	0.2	0.4
	mm	2.54	5.08	10.16	2.54	5.08	10.16
Continuous Force *(Motor Limited)*	lbf	367	195	103	578	307	163
	N	1632	867	459	2571	1366	723
Max Velocity	in/sec	8.3	16.8	33.3	8.3	16.8	33.3
	mm/sec	211.7	423.3	846.7	211.7	423.3	846.7
Friction Torque *(standard screw)*	in-lbf	1.0			1.1		
	N-m	0.12			0.12		
Friction Torque *(preloaded screw)*	in-lbf	1.25			1.25		
	N-m	0.14			0.14		
Back Drive Force [1]	lbf	110	60	30	110	60	30
	N	490	270	135	490	270	135
Min Stroke	in	3			3		
	mm	76			76		
Max Stroke	in	12			12		
	mm	305			305		
C_a (Dynamic Load Rating)	lbf	1568	1219	738	1568	1219	738
	N	6970	5422	3283	6970	5422	3283
Inertia *(zero stroke)*	lb-in-s^2	0.0007758			0.0008600		
	Kg-m^2	0.00008766			0.00009717		
Inertia Adder *(per inch of stroke)*	lb-in-s^2/in	0.00004667					
	Kg-m^2/mm	0.000005273					
Weight *(zero stroke)*	lb	4.5			5.0		
	Kg	2.04			2.27		
Weight Adder *(per inch of stroke)*	lb	0.5					
	Kg	0.23					

GSM30

Model No. (Motor Stacks)		1 Stack			2 Stack		
Screw Lead Designator		**01**	**02**	**05**	**01**	**02**	**05**
Screw Lead	in	0.1	0.2	0.5	0.1	0.2	0.5
	mm	2.54	5.08	12.7	2.54	5.08	12.7
Continuous Force *(Motor Limited)*	lbf	792	449	190	1277	724	306
	N	3521	1995	845	5680	3219	1363
Max Velocity	in/sec	5.0	10.0	25.0	5.0	10.0	25.0
	mm/sec	127.0	254.0	635.0	127.0	254.0	635.0
Friction Torque *(standard screw)*	in-lbf	1.5			1.7		
	N-m	0.17			0.19		
Friction Torque *(preloaded screw)*	in-lbf	1.75			1.75		
	N-m	0.20			0.20		
Back Drive Force [1]	lbf	180	80	40	180	80	40
	N	800	360	180	800	360	180
Min Stroke	in	3			3		
	mm	75			75		
Max Stroke	in	18			18		
	mm	457			457		
C_a (Dynamic Load Rating)	lbf	3310	3570	3016	3310	3570	3016
	N	14724	15880	13416	14724	15880	13416
Inertia *(zero stroke)*	lb-in-s^2	0.002655			0.002829		
	Kg-m^2	0.0003000			0.0003196		
Inertia Adder *(per inch of stroke)*	lb-in-s^2/in	0.0001424					
	Kg-m^2/mm	0.00001609					
Weight *(zero stroke)*	lb	6.5			7.65		
	Kg	2.95			3.47		
Weight Adder *(per inch of stroke)*	lb	1.1					
	Kg	0.50					

[1] Back drive force is nominal value only. Operating conditions can cause wide variations in back drive force. Exlar cannot assure that an actuator will or will not back drive.

GSM40

Model No. (Motor Stacks)		1 Stack				2 Stack			
Screw Lead Designator		**01**	**02**	**05**	**08**	**01**	**02**	**05**	**08**
Screw Lead	in	0.1	0.2	0.5	0.75	0.1	0.2	0.5	0.75
	mm	2.54	5.08	12.7	19.05	2.54	5.08	12.7	19.05
Continuous Force *(Motor Limited)*	lbf	2089	1194	537	358	3457	1975	889	593
	N	9293	5310	2390	1593	15377	8787	3954	2636
Max Velocity	in/sec	5.0	10.0	25.0	37.5	5.0	10.0	25.0	37.5
	mm/sec	127.0	254.0	635.0	953.0	127.0	254.0	635.0	953.0
Friction Torque *(standard screw)*	in-lbf	2.7				3.0			
	N-m	0.31				0.34			
Friction Torque *(preloaded screw)*	in-lbf	3.0				3.0			
	N-m	0.34				0.34			
Back Drive Force [1]	lbf	380	150	60	50	380	150	60	50
	N	1700	670	270	220	1700	670	270	220
Min Stroke	in	4				6			
	mm	102				102			
Max Stroke	in	18			12	18			12
	mm	457				457			
C_a (Dynamic Load Rating)	lbf	4736	4890	4218	3328	4736	4890	4218	3328
	N	21067	21751	18763	14804	21067	21751	18763	14804
Inertia *(zero stroke)*	lb-in-s^2	0.01132				0.01232			
	Kg-m^2	0.0012790				0.001392			
Inertia Adder *(per inch of stroke)*	lb-in-s^2/in	0.0005640							
	Kg-m^2/mm	0.00006372							
Weight *(zero stroke)*	lb	8.0				11.3			
	Kg	3.63				5.13			
Weight Adder *(per inch of stroke)*	lb	2.0							
	Kg	0.91							

[1] Back drive force is nominal value only. Operating conditions can cause wide variations in back drive force. Exlar cannot assure that an actuator will or will not back drive.

DEFINITIONS:

Continuous Force: The linear force produced by the actuator at continuous motor torque.

Max Velocity: The linear velocity that the actuator will achieve at rated motor rpm.

Friction Torque (standard screw): Amount of torque required to move the actuator when not coupled to a load.

Friction Torque (preloaded screw): Amount of torque required to move the actuator when not coupled to a load.

Back Drive Force: Amount of axial force applied to the rod end of the actuator that will produce motion with no power applied to the actuator.

Min Stroke: Shortest available stroke length.

Max Stroke: Longest available stroke length.

C_a (Dynamic Load Rating): A design constant used when calculating the estimated travel life of the roller screw.

Inertia (zero stroke): Base inertia of an actuator with zero available stroke length.

Inertia Adder (per unit of stroke): Inertia per inch of stroke that must be added to the base (zero stroke) inertia to determine the total actuator inertia.

Weight (zero stroke): Base weight of an actuator with zero available stroke length.

Weight Adder (per unit of stroke): Weight adder per inch of stroke that must be added to the base (zero stroke) weight to determine the total actuator weight.

Electrical Specifications

GSM20

Motor Stator		118	138	158	168	218	238	258	268
RMS SINUSOIDAL COMMUTATION									
Continuous Motor Torque	lbf-in	7.6	7.3	7.0	7.0	11.9	11.5	11.0	11.3
	Nm	0.86	0.83	0.79	0.79	1.34	1.30	1.25	1.28
Torque Constant (Kt) (+/– 10% @ 25˚C)	lbf-in/A	2.5	5.2	7.5	9.5	2.5	5.2	8.6	10.1
	Nm/A	0.28	0.59	0.85	1.07	0.28	0.59	0.97	1.15
Continuous Current Rating	A	3.4	1.6	1.0	0.8	5.4	2.5	1.4	1.2
Peak Current Rating	A	6.9	3.1	2.1	1.6	10.8	4.9	2.9	2.5
O-PK SINUSOIDAL COMMUTATION									
Continuous Motor Torque	lbf-in	7.6	7.3	7.0	7.0	11.9	11.5	11.0	11.3
	Nm	0.86	0.83	0.79	0.79	1.34	1.30	1.25	1.28
Torque Constant (Kt) (+/– 10% @ 25˚C)	lbf-in/A	1.7	3.7	5.3	6.7	1.7	3.7	6.1	7.2
	Nm/A	0.20	0.42	0.60	0.76	0.20	0.42	0.69	0.81
Continuous Current Rating	A	4.9	2.2	1.5	1.2	7.6	3.5	2.0	1.8
Peak Current Rating	A	9.7	4.5	2.9	2.3	15.2	7.0	4.1	3.5
MOTOR STATOR DATA									
Voltage Constant (Ke) (+/– 10% @ 25˚C)	Vrms/Krpm	16.9	35.5	51.5	64.8	16.9	35.5	58.6	69.3
	Vpk/Krpm	23.9	50.2	72.8	91.7	23.9	50.2	82.9	98.0
Pole Configuration		8	8	8	8	8	8	8	8
Resistance (L-L)(+/– 5% @ 25˚C)	Ohms	2.6	12.5	28.8	45.8	1.1	5.3	15.5	20.7
Inductance (L-L)(+/– 15%)	mH	4.6	21.4	47.9	68.3	2.5	10.2	28.3	39.5
Brake Inertia	lbf-in-sec^2	0.00012							
	Kg-cm^2	0.135							
Brake Current @ 24 VDC	A	0.33							
Brake Holding Torque	lbf-in	19							
	Nm	2.2							
Brake Engage/Disengage Time	ms	14/28							
Mechanical Time Constant (tm), ms	min	4.7	5.1	5.5	5.6	2.0	2.1	2.3	2.2
	max	6.6	7.2	7.9	7.9	2.8	3.0	3.3	3.1
Electrical Time Constant (te)	ms	1.8	1.7	1.7	1.5	2.2	1.9	1.8	1.9
Bus Voltage	Vrms	115	230	400	460	115	230	400	460
Speed @ Bus Voltage	rpm	5000							
Insulation Class		180 (H)							

Test data derived using NEMA recommended aluminum heatsink 10" x 10" x 1/4" at 25°C

Specifications subject to change without notice.

GSM30

Motor Stator		118	138	158	168	218	238	258	268
RMS SINUSOIDAL COMMUTATION									
Continuous Motor Torque	lbf-in	16.9	16.8	16.3	16.0	26.9	27.1	26.7	27.0
	Nm	1.91	1.90	1.84	1.81	3.04	3.06	3.01	3.05
Torque Constant (Kt) (+/– 10% @ 25˚C)	lbf-in/A	4.4	8.7	15.5	17.5	4.4	8.7	15.5	17.5
	Nm/A	0.49	0.99	1.75	1.97	0.49	0.99	1.75	1.97
Continuous Current Rating	A	4.3	2.2	1.2	1.0	6.9	3.5	1.9	1.7
Peak Current Rating	A	8.6	4.3	2.4	2.0	13.8	6.9	3.8	3.4
O-PK SINUSOIDAL COMMUTATION									
Continuous Motor Torque	lbf-in	16.9	16.8	16.3	16.0	26.9	27.1	26.7	27.0
	Nm	1.91	1.90	1.84	1.81	3.04	3.06	3.01	3.05
Torque Constant (Kt) (+/– 10% @ 25˚C)	lbf-in/A	3.1	6.2	11.0	12.4	3.1	6.2	11.0	12.4
	Nm/A	0.35	0.70	1.24	1.40	0.35	0.70	1.24	1.40
Continuous Current Rating	A	6.1	3.0	1.7	1.4	9.7	4.9	2.7	2.4
Peak Current Rating	A	12.2	6.1	3.3	2.9	19.5	9.8	5.4	4.9
MOTOR STATOR DATA									
Voltage Constant (Ke) (+/– 10% @ 25˚C)	Vrms/Krpm	29.8	59.7	105.8	119.3	29.8	59.7	105.8	119.3
	Vpk/Krpm	42.2	84.4	149.7	168.7	42.2	84.4	149.7	168.7
Pole Configuration		8	8	8	8	8	8	8	8
Resistance (L-L)(+/– 5% @ 25˚C)	Ohms	2.7	10.8	36.3	47.9	1.1	4.4	14.1	17.6
Inductance (L-L)(+/– 15%)	mH	7.7	30.7	96.8	123.0	3.7	14.7	46.2	58.7
Brake Inertia	lbf-in-sec^2	0.00033							
	Kg-cm^2	0.38							
Brake Current @ 24 VDC	A	0.5							
Brake Holding Torque	lbf-in	70							
	Nm	8							
Brake Engage/Disengage Time	ms	19/29							
Mechanical Time Constant (tm), ms	min	4.9	4.9	5.2	5.4	2.0	2.0	2.0	2.0
	max	9.4	9.5	10.1	10.5	3.9	3.8	3.9	3.8
Electrical Time Constant (te)	ms	2.9	2.8	2.7	2.6	3.3	3.4	3.3	3.3
Bus Voltage	Vrms	115	230	400	460	115	230	400	460
Speed @ Bus Voltage	rpm	3000							
Insulation Class		180 (H)							

Test data derived using NEMA recommended aluminum heatsink 10" x 10" x 3/8" at 25°C

Specifications subject to change without notice.

GSM40

Motor Stator		118	138	158	168	218	238	258	268
RMS SINUSOIDAL COMMUTATION									
Continuous Motor Torque	lbf-in	47.5	47.5	45.9	45.4	75.1	78.6	78.7	79.5
	Nm	5.37	5.36	5.19	5.13	8.49	8.89	8.89	8.99
Torque Constant (Kt) (+/– 10% @ 25˚C)	lbf-in/A	4.1	8.2	14.5	16.8	4.1	8.2	14.5	16.8
	Nm/A	0.46	0.93	1.64	1.90	0.46	0.93	1.64	1.90
Continuous Current Rating	A	12.9	6.5	3.5	3.0	20.5	10.7	6.0	5.3
Peak Current Rating	A	25.9	12.9	7.1	6.0	40.9	21.4	12.1	10.6
O-PK SINUSOIDAL COMMUTATION									
Continuous Motor Torque	lbf-in	47.5	47.5	45.9	45.4	75.1	78.6	78.7	79.5
	Nm	5.37	5.36	5.19	5.13	8.49	8.89	8.89	8.99
Torque Constant (Kt) (+/– 10% @ 25˚C)	lbf-in/A	2.9	5.8	10.3	11.9	2.9	5.8	10.3	11.9
	Nm/A	0.33	0.66	1.16	1.34	0.33	0.66	1.16	1.34
Continuous Current Rating	A	18.3	9.1	5.0	4.3	28.9	15.1	8.5	7.5
Peak Current Rating	A	36.6	18.3	10.0	8.6	57.9	30.3	17.1	15.0
MOTOR STATOR DATA									
Voltage Constant (Ke) (+/– 10% @ 25˚C)	Vrms/Krpm	28.0	56.0	99.3	114.6	28.0	56.0	99.3	114.6
	Vpk/Krpm	39.6	79.2	140.5	162.1	39.6	79.2	140.5	162.1
Pole Configuration		8	8	8	8	8	8	8	8
Resistance (L-L)(+/– 5% @ 25˚C)	Ohms	0.42	1.7	5.7	7.8	0.2	0.72	2.26	3.0
Inductance (L-L)(+/– 15%)	mH	3.0	11.9	37.5	49.9	1.2	5.4	18.2	23.1
Brake Inertia	lb-in-sec^2	0.00096							
	Kg-cm^2	1.08							
Brake Current @ 24 VDC	A	0.67							
Brake Holding Torque	bf-in	97							
	Nm	11							
Brake Engage/Disengage Time	ms	20/29							
Mechanical Time Constant (tm), ms	min	4.5	4.5	4.8	4.9	2.1	1.9	1.9	1.9
	max	6.0	6.0	6.4	6.6	2.8	2.6	2.6	2.5
Electrical Time Constant (te)	ms	7.0	7.0	6.6	6.4	5.9	7.5	8.0	7.8
Bus Voltage	Vrms	115	230	400	460	115	230	400	460
Speed @ Bus Voltage	rpm	3000							
Insulation Class		180 (H)							

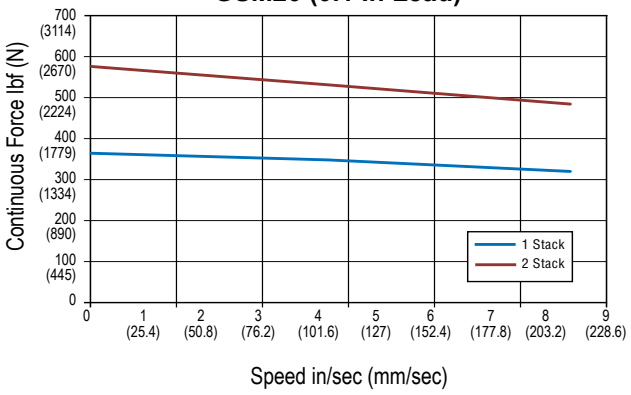
Test data derived using NEMA recommended aluminum heatsink 12" x 12" x 1/2" at 25°C

Specifications subject to change without notice.

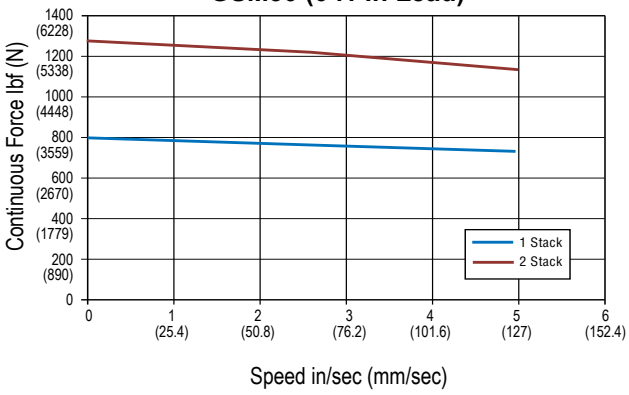
Performance Curves

The below speed vs. force curves represent approximate continuous thrust ratings at indicated linear speed. Different types of servo amplifiers will offer varying motor torque and actuator thrust. These values are at constant velocity and do not account for motor torque required for acceleration.

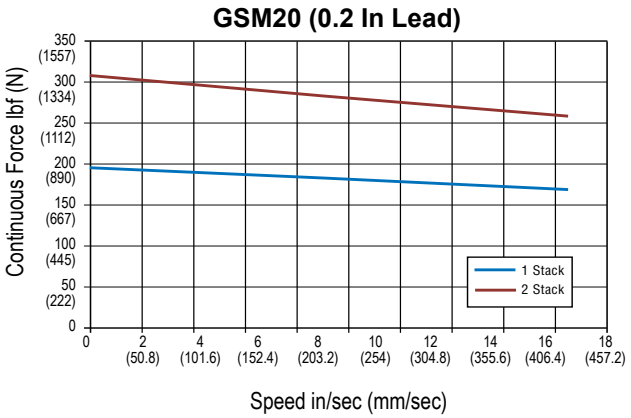
GSM20 (0.1 In Lead)



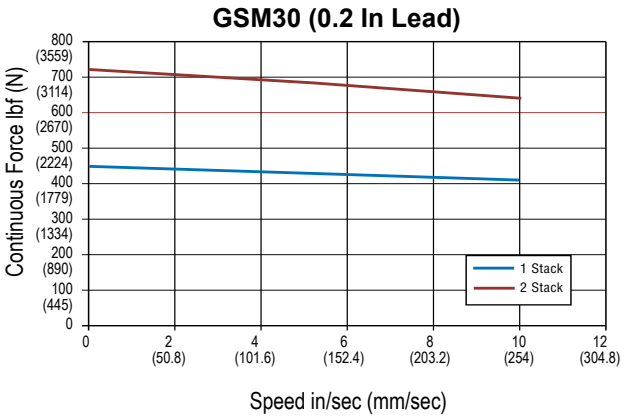
GSM30 (0 .1 In Lead)



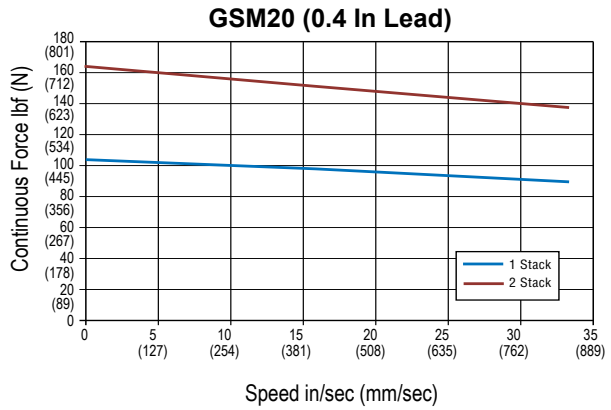
GSM20 (0.2 In Lead)



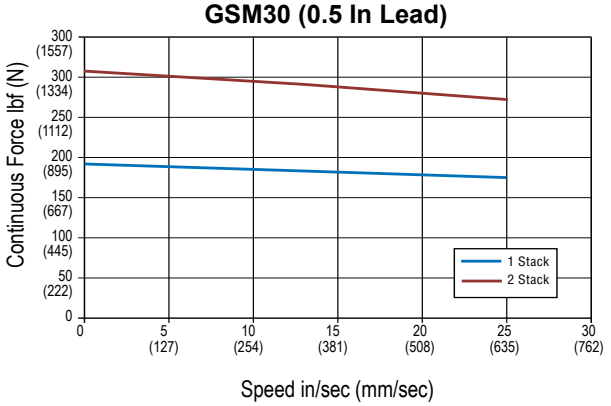
GSM30 (0.2 In Lead)



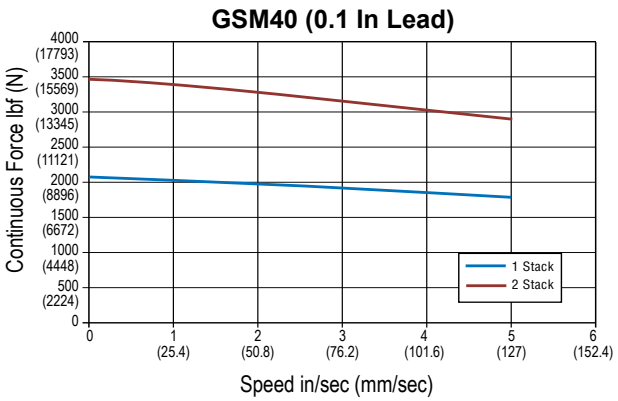
GSM20 (0.4 In Lead)

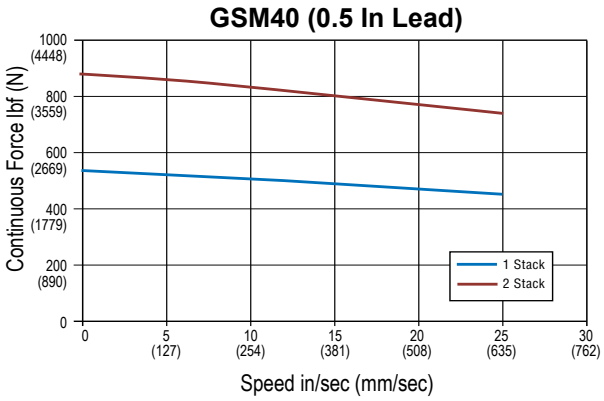


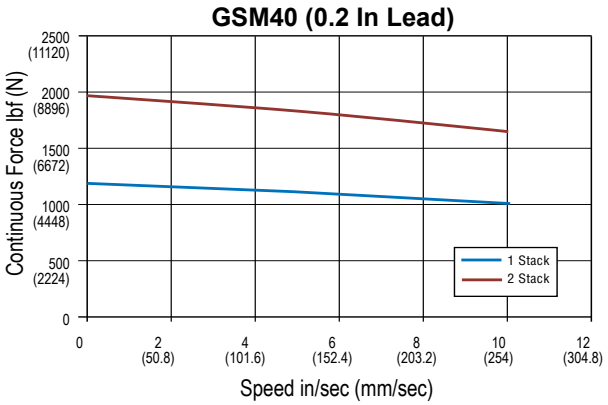
GSM30 (0.5 In Lead)

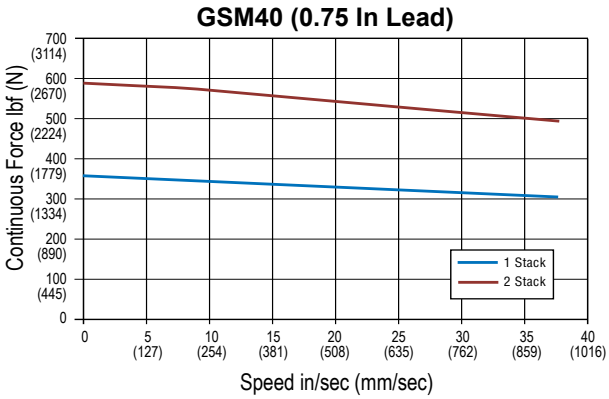


Test data derived using NEMA recommended aluminum heatsink 10" x 10" x 1/4"on GSM20 and 10" x 10" x 3/8" on GSM30



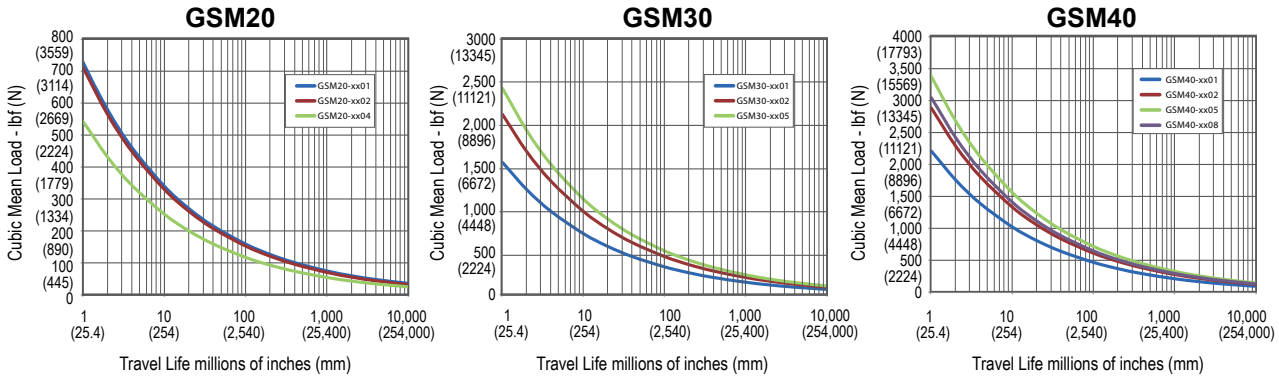






Test data derived using NEMA recommended aluminum heatsink 12" x 12" x 1/2" on GSM40

Life Curves Estimated L_{10} Travel Life



See page 17 for Life Curve Information.
If your application requires high force over a stroke length shorter than the length of the nut, please contact Exlar for derated life calculations.
You may also download the article “Calculating Life Expectancy” at www.exlar.com.

Options

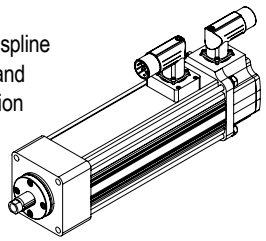
AR = External Anti-rotate Assembly

This option provides a rod and bushing to restrict the actuator rod from rotating when the load is not held by another method. Shorter actuators have single sided anti-rotation attachments. Longer lengths require attachments on both sides for proper operation. For AR dimensions, see page 30.

RB = Rear Electric Brake

This option provides an internal holding brake for the GSM Series actuators. The brake is spring activated and electrically released.

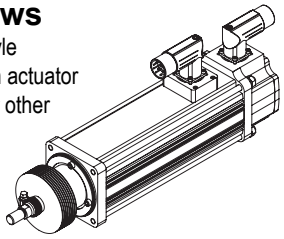
SR = Splined Main Rod



A ball spline shafting main rod with a ball spline nut that replaces the standard front seal and bushing assembly. This rod restricts rotation without the need for an external mechanism. The rod diameter will be the closest metric equivalent to our standard rod sizes. Since this option is NOT sealed, it is not suitable for environments in which contaminants may enter the actuator.

Note: Adding this option affects the overall length and mounting dimensions. Due to the reduced diameter of the splined main rod on GSX50 actuators, the standard A, F and B rod ends are not available. In this case, an "X" should be used in the rod end location. If not otherwise specified, an M24x2 male rod end will be used.

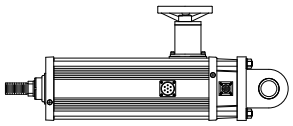
PB = Protective Bellows



This option provides an accordion style protective bellows to protect the main actuator rod from damage due to abrasives or other contaminants in the environment in which the actuator must survive. The standard material of this bellows is S2 Neoprene Coated Nylon, Sewn Construction. This standard bellows is rated for environmental temperatures of -40 to 250 degrees F. Longer strokes may require the main rod of the actuator to be extended beyond standard length. Not available with extended tie rod mounting option. Please contact your local sales representative.

HW = Manual Drive, Handwheel

This option provides a manual drive handwheel on the side of the actuator. The handwheel has an engage/disengage lever that is tied to an interrupt switch. Not available on GSM20. Also not available with holding brake unless application details have been discussed with your local sales representative.



L1, L2, L3 = Adjustable External Travel Switches

This option allows up to 3 external switches to be included with the GSM Series Actuator. These switches provide travel indication to the controller and are adjustable. See drawing on page 54. Must purchase external anti-rotate with this option.

Motor Speed

All Exlar T-LAM motors and actuators carry a standard motor speed designator (see chart). This is representative of the standard base speed of the motor for the selected bus voltage.

Designator	Base Speed	Actuator/ Motor Series
-50	5000 rpm	GSM20
-30	3000 rpm	GSM30, GSM40
01-99	Special Speed, consult your local sales representative	

If the model number is created and the location for the motor speed designator is left blank, this is the base speed to which the motor will be manufactured. The model number can also be created including this standard speed designator.

Exlar also provides the flexibility to manufacture all of its T-LAM products with special base speeds to match your exact application requirements. This may be a higher than standard speed motor, or lower base speed than standard which will allow you to get the required torque at a speed optimized to your application and use the minimum amount of current from your amplifier.

The call out for a special speed is configured in the model number by using a two digit code from 01-99. This code represents the number, in hundreds, of RPM that is the base speed for the particular motor.

For example, a GSM30-0301-MFM-EM2-138-30 motor that normally has a 3000 RPM standard winding can be changed to a 3300 RPM winding by changing the -30 to a -33. Similarly, it can be changed to a 5000 RPM winding by changing the -30 to a -50.

Changing this speed designator changes the ratings of the motor; these must be obtained from your local sales representative. Also, it is not possible to produce every possible speed from -01 to -99 for each motor at each voltage so please contact your local sales representative for confirmation of the speed that is desired for the application.

Feedback

Due to the variability in size of some feedback devices, especially absolute feedback devices which are often very large relative to the size of the actuator motor, the actual size of the actuator may differ in length and width from these drawings for feedback types other than standard resolvers and standard encoders. Please consult your local sales representative. In the event that you order an actuator that differs from these standard dimensions, you will be sent a drawing of the final configuration of your actuator for approval.

Motor Stators

GSM motor options are described with a 3 digit code. The first digit calls out the stack length, the second digit signifies the rated bus voltage, and the third digit identifies the number of poles of the motor. Refer to the mechanical/electrical specifications for motor torque and actuator rated force.

118	1 stack	115 Vrms	8 Pole	Class 180 H
138		230 Vrms		
158		400 Vrms		
168		460 Vrms		
1A8*		24 VDC		
1B8*		48 VDC		
1C8*		120 VDC		
218	2 stack	115 Vrms	8 Pole	Class 180 H
238		230 Vrms		
258		400 Vrms		
268		460 Vrms		
2A8*		24 VDC		
2B8*		48 VDC		
2C8*		120 VDC		

Note: 3 stack not available in GSM Series

* Low voltage stators may be limited to less than catalog rated torque and/or speed. Please contact your local sales representative when ordering this option.

Rod End Attachments

Rear Clevis Pin **Spherical Rod Eye**
Rod Eye **Rod Clevis**

See drawings on pages 53-54.
Attachments ordered separate from actuator.

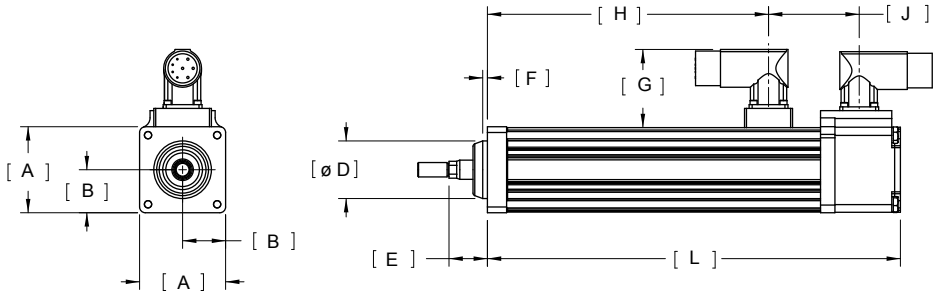
Housing Options

P5 = IP65S Sealing Option

Please read full description of IP Ratings in the engineering reference in the back of the book.

Dimensions

Base Actuator



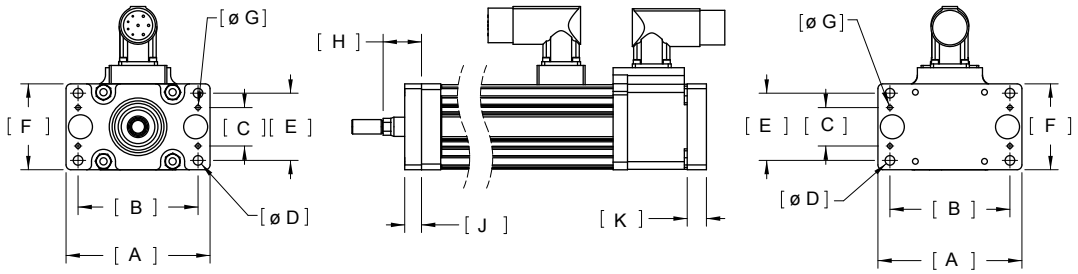
		GSM20	GSM30	GSM40
A	in	2.24	3.05	3.90
	mm	56.9	77.4	99.1
B	in	1.12	1.52	1.95
	mm	28.4	38.7	49.5
Ø D	in	1.500 +0.000/-0.003	2.000 +0.000/-0.003	2.500 +0.000/-0.003
	mm	38.10 0.00/0.08	50.80 0.00/0.08	63.50 0.00/0.08
E [5]	in	1.00	1.32	1.65
	mm	25.4	33.5	41.9
F	in	0.12	0.31	0.10
	mm	3.1	8.0	2.5
G	in	2.04	2.04	2.04
	mm	51.7	51.7	51.7
H (zero stroke)	in	1.3	1.5	2.9
	mm	34	38	73
J [4]	in	2.36	2.63	2.63
	mm	60.0	66.7	66.7
L [4] **(zero stroke)**	in	4.8	5.2	6.6
	mm	122	133	167

1. Dimensions shown are for referencing only and are subject to change
2. Dimensions reflect Exlar standard M23 style connectors (option I)
3. Dimensions may vary based on options selected. Consult Exlar for details or refer to drawings provided after receipt of order
4. If ordering a brake, add the following to dimensions J and L:
   GSM20 add 1.78 in (45.2 mm)
   GSM30 add 1.60 in (40.6 mm)
   GSM40 add 2.33 in (59.2 mm)
5. If ordering bellows add 2 in (50.8 mm) to dimension E.

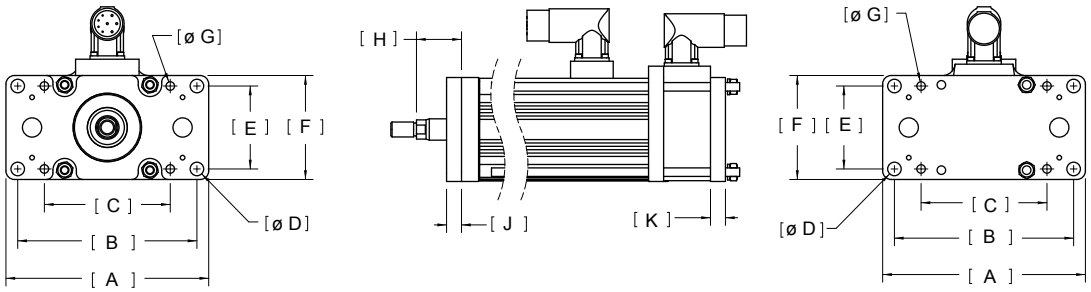
Pre-sale drawings and models are representative and are subject to change. Certified drawings and models are available for a fee. Consult your local Exlar representative for details.

Front or Rear Flange Mount

GSM20



GSM30, GSM40

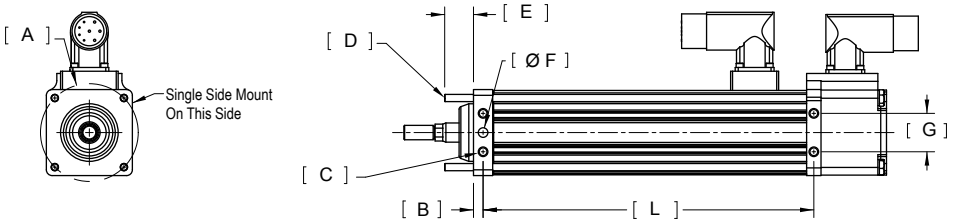


		GSM20	GSM30	GSM40
A	in	3.75	5.94	7.68
	mm	95.3	150.9	195.1
B	in	3.13	5.25	6.80
	mm	79.4	133.4	172.7
C	in	1.00	3.69	5.25
	mm	25.4	93.7	133.4
Ø D	in	0.250	0.397	0.516
	mm	6.35	10.08	13.10
E	in	1.75	2.43	2.92
	mm	44.5	61.7	74.2
F	in	2.24	3.05	3.80
	mm	56.8	77.4	96.5
Ø G	in	0.125 +0.001/-0.000	0.250 ±0.0005	0.250 ±0.001
	mm	3.18 +0.03/0.00	6.35 ±0.13	6.35 ±0.025
H [1]	in	1.00	1.32	1.65
	mm	25.4	33.5	41.9
J [1]	in	0.44	0.44	0.63
	mm	11.1	11.1	15.9
K	in	0.50	0.44	0.63
	mm	12.7	11.1	15.9

1. If ordering a splined main rod, add the following to dimensions H and J:
   GSM20 add .50 in (12.7 mm)
   GSM30 add 1.20 in (30.5 mm)
   GSM40 add 1.77 in (45.0 mm)

Pre-sale drawings and models are representative and are subject to change. Certified drawings and models are available for a fee. Consult your local Exlar representative for details.

Side Mount or Extended Tie Rod Mount

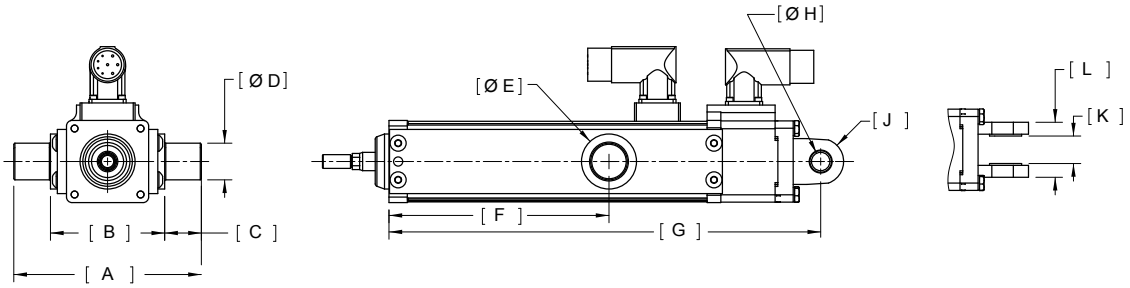


		GSM20	GSM30	GSM40
Ø A	in	2.546	3.536	4.243
	mm	64.66	89.80	107.76
B [2]	in	0.25	0.25	0.31
	mm	6.4	6.4	7.9
C [1]	in	1/4-20 UNC	1/4-20 UNC	3/8-16 UNC
	mm	M6 x 1.0	M6 x 1.0	M10 x 1.5
D	in	10-24 UNC	1/4-20 UNC	3/8-16 UNC
	mm	M5 x 0.8	M6 x 1.0	M8 x 1.25
E	in	0.75	0.96	1.38
	mm	19.1	24.4	35.1
Ø F	in	0.2500 +0/-0.0005↧0.25	0.2500 +0/-0.0005↧0.25	0.3750 +0/-0.0005↧0.44
	mm	6 M7↧9.0	6 M7↧9.5	8 M7↧12.0
G	in	1.00	1.75	1.75
	mm	25.4	44.5	44.5
L (zero stroke)	in	2.6	3.1	4.3
	mm	67	80	109

1. Side mount options S and J = 4X, D and K = 8X for dimension C
2. If ordering a splined main rod, add the following to dimension B:
   GSM20 add .50 in (12.7 mm)
   GSM30 add 1.20 in (30.5 mm)
   GSM40 add 1.77 in (45.0 mm)

Pre-sale drawings and models are representative and are subject to change. Certified drawings and models are available for a fee. Consult your local Exlar representative for details.

Side Trunnion Mount of Rear Clevis Mount

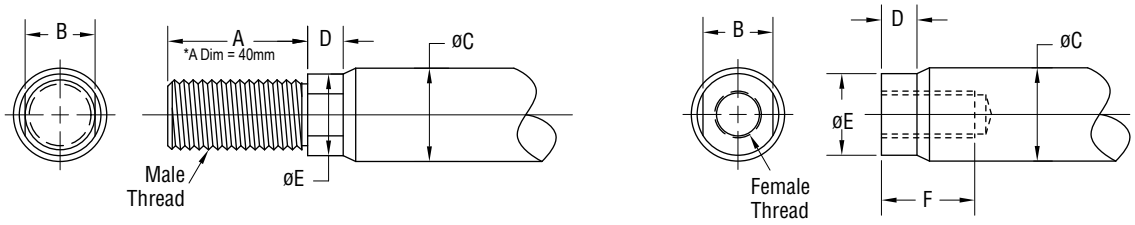


		GSM20	GSM30	GSM40
A	in	5.12	5.92	6.90
	mm	129.9	150.4	175.2
B	in	3.12	3.92	4.90
	mm	79.1	99.6	124.4
C	in	1.00	1.00	1.00
	mm	25.4	25.4	25.4
Ø D	in	1.000 +/-0.001	1.000 +/-0.001	1.500 +/-0.001
	mm	25 h7	25 h7	35 h7
Ø E	in	1.50	1.50	2.00
	mm	38.1	38.1	50.8
F (3" stroke)	in	3.0	5.4	NA
	mm	76	137	NA
F (4" stroke)	in	NA	NA	4.0
	mm	NA	NA	102
F (6" stroke)	in	6.0	8.0	6.0
	mm	152	203	152
F (8" stroke)	in	NA	NA	8.0
	mm	NA	NA	203
F (10" stroke)	in	10.0	10.0	10.0
	mm	254	254	254
F (12" stroke)	in	12.0	12.0	12.0
	mm	305	305	305
F (14" stroke)	in	NA	14.0	NA
	mm	NA	406	NA
F (18" stroke)	in	NA	18.0	18.0
	mm	NA	457	457
G [1] (zero stroke)	in	5.8	6.5	8.3
	mm	147	165	210
Ø H	in	0.500 +0.002/-0.001	0.750 +0.002/-0.001	0.750 +0.002/-0.001
	mm	12 +0.01/-0.06	20 +0/-0.07	20 +0/-0.07
J	in	0.63	0.75	0.75
	mm	15.9	19.1	19.1
K	in	0.75	1.25	1.25
	mm	19.1	31.8	31.8
L	in	1.50	2.50	2.50
	mm	38.1	63.5	63.5

1. If ordering a brake, add the following to dimension G: GSM20 add 1.78 in (45.2 mm), GSM30 add 1.60 in (40.6 mm), GSM40 add 2.33 in (59.2 mm)

Pre-sale drawings and models are representative and are subject to change. Certified drawings and models are available for a fee. Consult your local Exlar representative for details.

Actuator Rod End Options



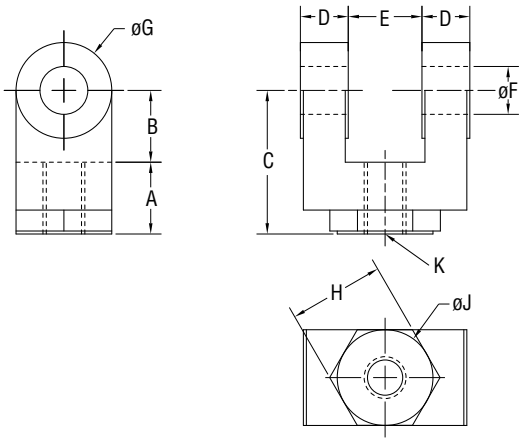
Standard Rod Ends

	A	B	ØC	D	ØE	F	Male U.S.	Male Metric	Female U.S.	Female Metric
GSM20 in (mm)	0.813 (20.7)	0.375 (9.5)	0.500 (12.7)	0.200 (5.1)	0.440 (11.2)	0.750 (19.1)	3/8 – 24 UNF – 2A	M8 x 1 6g	5/16 – 24 UNF – 2B	M8 x 1 6h
GSM30 in (mm)	0.750 (19.1)	0.500 (12.7)	0.625 (15.9)	0.281 (7.1)	0.562 (14.3)	0.750 (19.1)	7/16 – 20 UNF– 2A	M12 x 1.75* 6g	7/16 – 20 UNF – 2B	M10 x 1.5 6h
GSM40 in (mm)	1.500 (38.1)	0.750 (19.1)	1.000 (25.4)	0.381 (9.7)	0.875 (22.2)	1.000 (25.4)	3/4 – 16 UNF – 2A	M16 x 1.5 6g	5⁄8 – 18 UNF – 2B	M16 x 1.5 6h

Part numbers for rod attachment options indicate the through hole size or pin diameter. Before selecting a spherical rod eye please consult the information on the anti-rotation option for the GSM actuators. Spherical rod eyes will allow the rod to rotate if the load is not held.

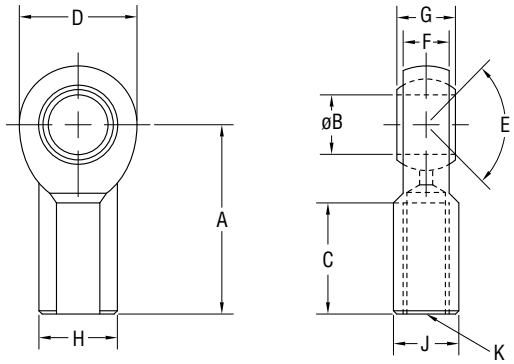
For Rod End with Splined Main Rod, see pg 32

Rod Clevis Dimensions



in (mm)	GSM20 - RC038	GSM30 - RC050	GSM40 - RC075
A	0.810 (20.6)	0.75 (19.1)	1.125 (28.58)
B	0.785 (19.9)	0.75 (19.1)	1.25 (31.75)
C	1.595 (40.5)	1.50 (38.1)	2.375 (60.3)
D	0.182 (4.6)	0.50 (12.7)	0.625 (15.88)
E	0.386 (9.8)	0.765 (19.43)	1.265 (32.13)
ØF	0.373 (9.5)	0.50 (12.7)	0.75 (19.1)
ØG	0.951 (24.2)	1.00 (25.4)	1.50 (38.1)
H	NA	1.00 (25.4)	1.25 (31.75)
ØJ	NA	1.00 (25.4)	1.25 (31.75)
K	3/8-24	7/16-20	3/4-16

Spherical Rod Eye Dimensions



in (mm)	GSM20 - SRM038	GSM30 - SRM044	GSM40 - SRM075
A	1.625 (41.3)	1.81 (46.0)	2.88 (73.2)
ØB	0.375 (9.525)	0.438 (11.13)	0.75 (19.1)
C	0.906 (23.0)	1.06 (26.9)	1.72 (43.7)
D	1.0 (25.4)	1.13 (28.7)	1.75 (44.5)
E	6 deg	14 deg	14 deg
F	0.406 (10.3)	0.44 (11.1)	0.69 (17.5)
G	0.500 (12.7)	0.56 (14.2)	0.88 (22.3)
H	0.688 (17.4)	0.75 (19.1)	1.13 (28.7)
J	0.562 (14.3)	0.63 (16.0)	1.00 (25.4)
K	3/8-24	7/16-20	3/4-16

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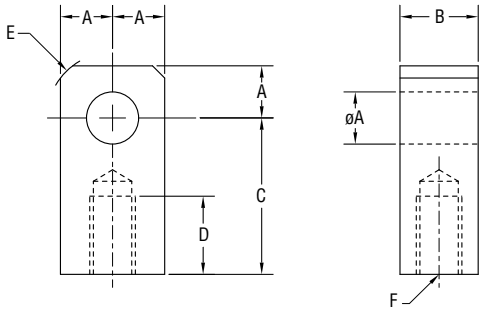
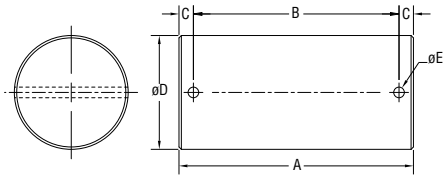
Rod Eye Dimensions



in (mm)	GSM20 - RE038	GSM30 - RE050	GSM40 - RE075
ØA	0.50 (12.7)	0.50 (12.7)	0.75 (19.1)
B	0.560 (14.2)	0.75 (19.1)	1.25 (31.8)
C	1.00 (25.4)	1.50 (38.1)	2.06 (52.3)
D	0.50 (12.7)	0.75 (19.1)	1.13 (28.7)
E	0.25 x 45°	0.63 (16.0)	0.88 (22.3)
F	3/8 - 24	7/16 - 20	3/4 - 16

Rod Clevis Pin Dimensions



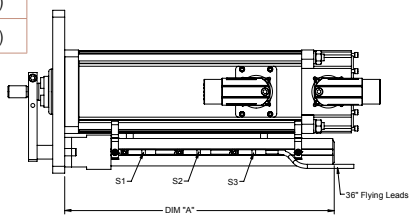
in (mm)	A	B	C	ØD	ØE
CP050[1]	2.28 (57.9)	1.94 (49.28)	0.17 (4.32)	0.50 -0.001/-0.002 (12.7 +0.00/-0.05)	0.106 (2.69)
CP075[2]	3.09 (78.5)	2.72 (69.1)	0.19 (4.82)	0.75 -0.001/-0.002 (19.1 +0.00/-0.05)	0.14 (3.56)

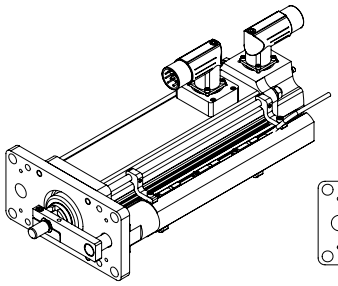
[1] Fits GSM30 rear clevis, RC050 and RE050
[2] Fits GSM30, 40 and RC075, RE075 and SRM075

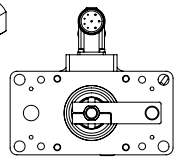
GSM20, GSM30 and GSM40 External Limit Switch Extension Options

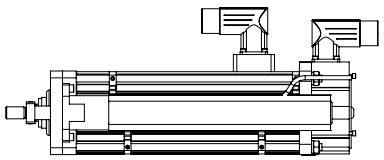
Dim A	3 inch (76 mm) stroke in (mm)	6 inch (152 mm) stroke in (mm)	8 inch (203 mm) stroke in (mm)	10 inch (254 mm) stroke in (mm)	12 inch (305 mm) stroke in (mm)	18 inch (457 mm) stroke in (mm)
GSM20	5.515 (140.1)	8.515 (216.3)	NA	12.5 (317.5)	14.515 (368.7)	NA
GSM30	6.932 (176.1)	9.832 (249.7)	NA	13.832 (351.3)	15.832 (402.1)	21.832 (554.5)
GSM40	NA	9.832 (249.7)	11.83 (300.5)	13.832 (351.3)	15.832 (402.1)	21.832 (554.5)

** Dimensions for Anti rotate option can be seen on page 30.*









The external limit switch option (requires anti-rotate option) provides the user with 1, 2, or 3 externally mounted adjustable switches for use as the end-of-travel limit switches or home position sensors.

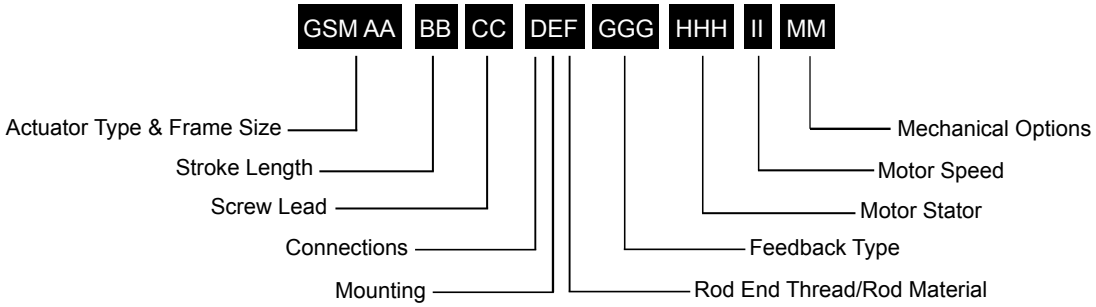
The number of switches desired is selected by ordering the L1, L2, or L3 option, in which 1, 2, or 3 switches will be provided, respectively.

The switches are 9-30 VDC powered, PNP output, with either normally open or normally closed logic operation depending on the switch configuration ordered. Switches are supplied with 1 meter of 3-wire embedded cable. Below is a chart that shows which logic operation will be provided for each switch, based on the option that is ordered.

Option	SW1	SW2	SW3
L1	Not Supplied	Normally Open	Not Supplied
L2	Normally Closed	Not Supplied	Normally Closed
L3	Normally Closed	Normally Open	Normally Closed

Switch Type	Exlar Part Number	Turck Part Number
Normally Closed Switch	43404	BIM-UNT-RP6X
Normally Open Switch	43403	BIM-UNT-AP6X

Pre-sale drawings and models are representative and are subject to change. Certified drawings and models are available for a fee. Consult your local Exlar representative for details.



Commonly Ordered Options Shown in BOLD

AA = GSM Actuator Size (nominal)
20 = 2 in (60 mm) frame
30 = 3 in (80 mm) frame
40 = 4 in (100 mm) frame

BB = Stroke Length
03 = 3 in (76 mm) GSM20 and GSM30
04 = 4 in (102 mm) GSM40
06 = 6 in (152 mm) all models; 5.9 in (150 mm) GSM30
08 = 8 in (203 mm) GSM40
10 = 10 in (254 mm) GSM20, GSM30 and GSM40
12 = 12 in (305 mm) GSM20, GSM30 and GSM40
18 = 18 in (457 mm) GSM30 and GSM40

CC = Lead
01 = 0.1 in (2.54 mm) (all models)
02 = 0.2 in (5.08 mm) (all models)
04 = 0.4 in (10.16 mm) (GSM20)
05 = 0.5 in (12.7 mm) (GSM30 and GSM40)
08 = 0.75 in (19.05 mm) (GSM40) [3]

D = Connections
I = Exlar standard M23 style
M = Manufacturer's connector [1]
J = Embedded leads with "I" plug, 3 ft. standard

E = Mounting
C = Rear clevis
F = Front flange
R = Rear flange
D = Double side mount [11]
T = Side trunnion
E = Extended tie rods
K = Metric double side mount [11]
Q = Metric side trunnion
M = Metric extended tie rods
G = Metric rear clevis

F = Rod End Thread / Rod Material
M = Male, US standard thread
A = Male, metric thread
F = Female, US standard thread
B = Female, metric thread
W = Male, US standard thread SS [10]
R = Male metric thread SS [10]
V = Female, US standard thread SS [10]
L = Female, metric thread SS [10]

GGG = Feedback Type
See page 207 for detailed information.

HHH = Motor Stator [2] – All 8 Pole [8]
118 = 1 stack, 115 Vrms
138 = 1 stack, 230 Vrms
158 = 1 stack, 400 Vrms
168 = 1 stack, 460 Vrms

218 = 2 stack, 115 Vrms
258 = 2 stack, 230 Vrms
238 = 2 stack, 400 Vrms
268 = 2 stack, 460 Vrms

II = Motor Speed
30 = 3000 rpm, GSM30, GSM40
50 = 5000 rpm, GSM20

MM = Mechanical Options [12]
AR = External anti-rotate [7]
HW = Manual drive, Handwheel with interlock switch [5, 9]
PB = Protective bellows [6]
SR = Splined main rod
RB = Rear brake
L1/L2/L3 = External limit switch [4]
P5 = IP65S sealing option[13]

NOTES:
1. Available as described in Feedback Types.
2. Stator voltage and pole options allow for catalog rated performance at varying amplifier bus voltages and pole configuration requirements.
3. 0.75 lead not available over 12 inch stroke
4. Requires AR option
5. Not available on GSM20.
6. Not available with extended tie rod mounting option.
7. A second anti-rotate arm is used on GSM 20, 30 & 40 for 10 inch and longer stroke.
8. See page 48 for optimized stators.
9. N/A with holding brake unless application details are discussed with your local ales representative.
10. Consult with your local sales representative when ordering splined stainless steel main rod.
11. Anti-rotate with D or K mounting N/A on 10 inch or longer stroke.
12. For extended temperature operation consult factory for model number.
13. Not available with splined main rod option

For cables and accessories, see page 202.

For options or specials not listed above or for extended temperature operation, please contact Exlar