# 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 |

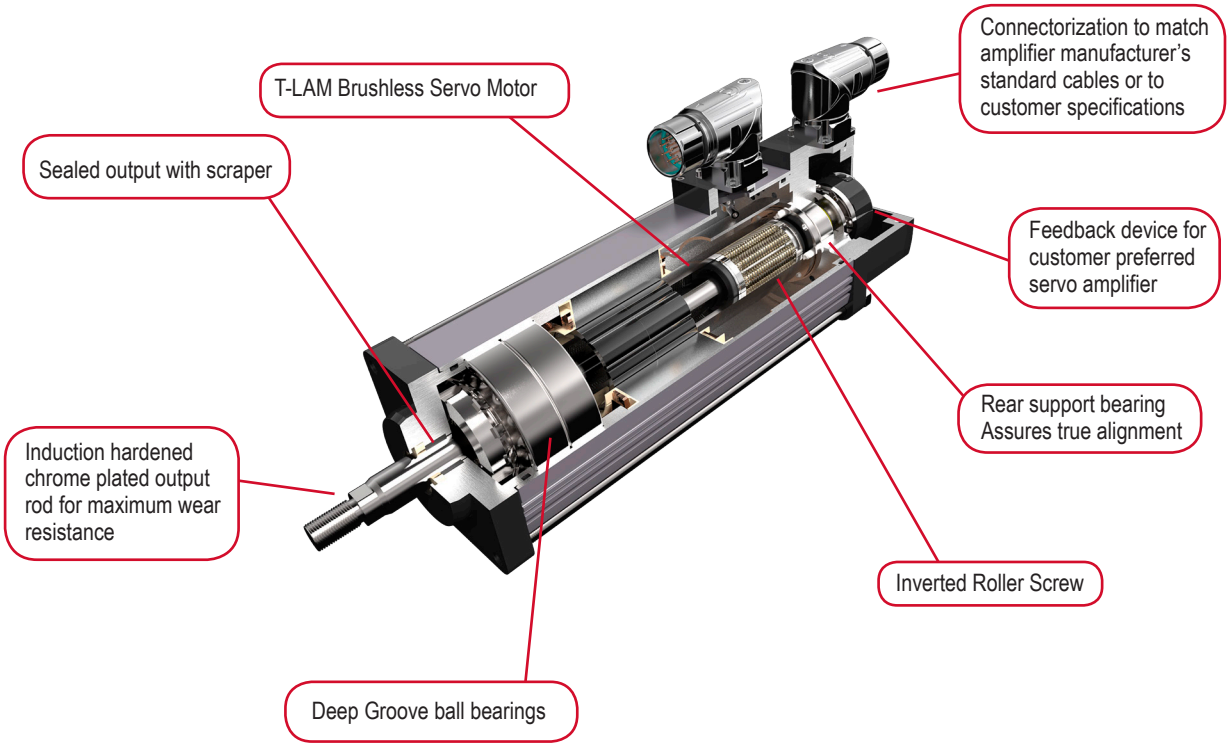
| Technical Characteristics | |
|---|---|
| Frame Sizes in (mm) | 2.25 (60), 3.3 (80), 3.9 (100) |
| Screw Leads in (mm) | 0.1 (2.54), 0.2 (5.08), 0.4 (10.16), 0.5 (12.7), 0.75 (19.05) |
| Standard Stroke Lengths in (mm) | 3 (76), 4 (102), 6 (152), 8 (203), 10 (254), 12 (305), 14 (356), 18 (457) |
| 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 (µm / 300 mm) | 0.001 (25) |
| Screw Travel Variation | in/ft (µm / 300 mm) | 0.0012 (30) |
| 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 |

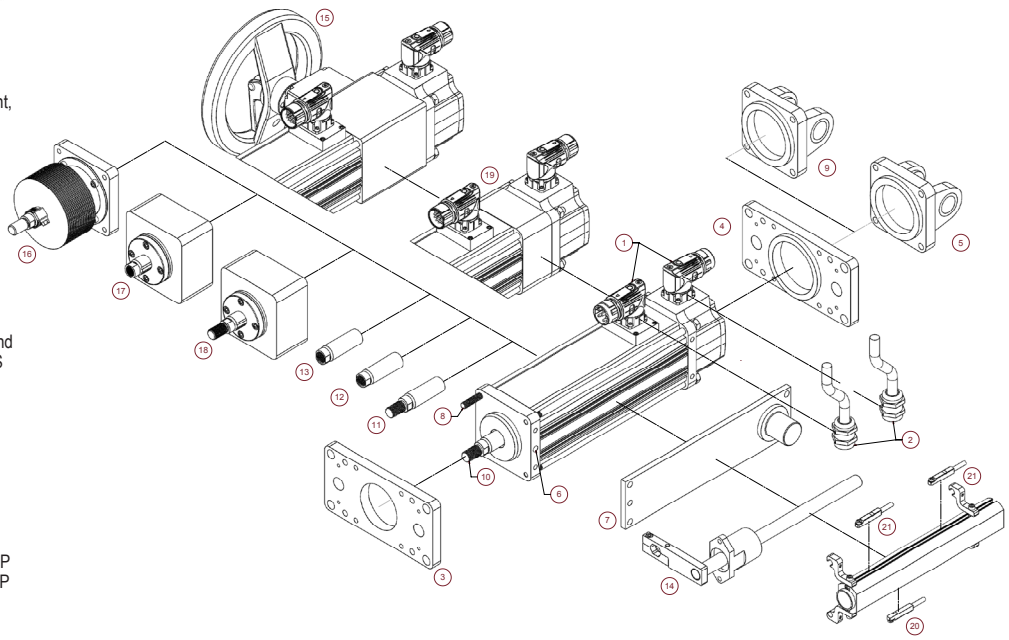
* Consult Exlar for extended temperature operations
** Resolver feedback

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

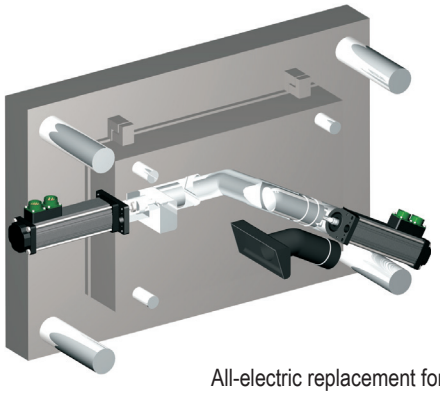
**Process Control**
- Control Valves
- Conveyor Diverters / Gates
- Dampers
- Pilot Valves

**Entertainment / Simulation**
- Robot Manipulator Arms
- Test Stands

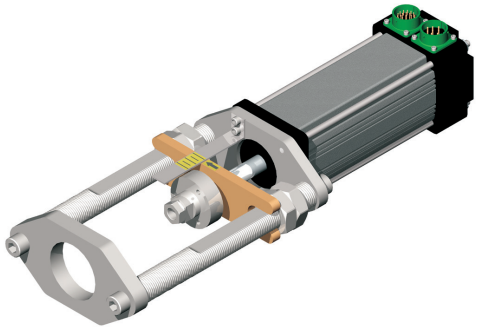
**Medical Equipment**
- Volumetric Pumps
- Patient Positioning

**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$^2$/in | 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$^2$/in | 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$^2$/in | 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 inch 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 inch 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 |
|---|---|---|---|---|---|---|---|---|---|
| Bus Voltage | Vrms | 115 | 230 | 400 | 460 | 115 | 230 | 400 | 460 |
| Speed @ Bus Voltage | rpm | 5000 | | | | | | | |
| 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 | 22 | | | | | | | |
| | Nm | 2.5 | | | | | | | |
| 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 |
| 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 |
|---|---|---|---|---|---|---|---|---|---|
| Bus Voltage | Vrms | 115 | 230 | 400 | 460 | 115 | 230 | 400 | 460 |
| Speed @ Bus Voltage | rpm | 3000 | | | | | | | |
| 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 | 40 | | | | | | | |
| | Nm | 4.5 | | | | | | | |
| 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 |
| 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 |
|---|---|---|---|---|---|---|---|---|---|
| Bus Voltage | Vrms | 115 | 230 | 400 | 460 | 115 | 230 | 400 | 460 |
| Speed @ Bus Voltage | rpm | 3000 | | | | | | | |
| 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 |
| Insulation Class | | 180 (H) | | | | | | | |

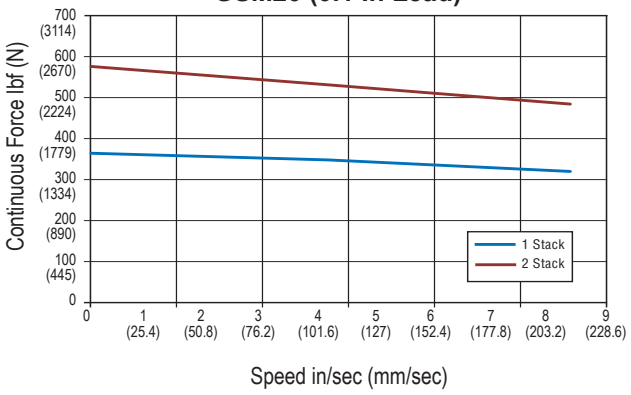
Test data derived using NEMA recommended aluminum heatsink 12" x 12" x 1/2" at 25°C

Specifications subject to change without notice.

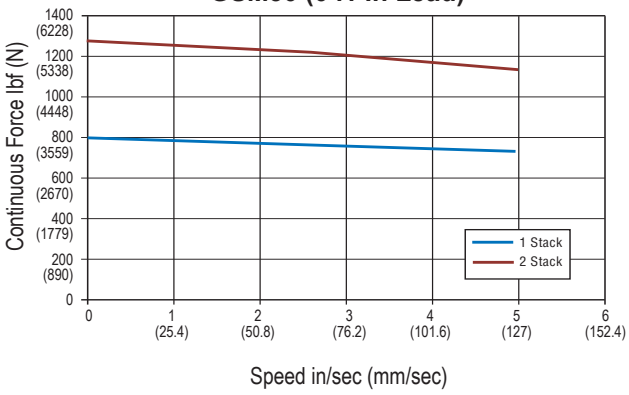
## Performance Curves

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.

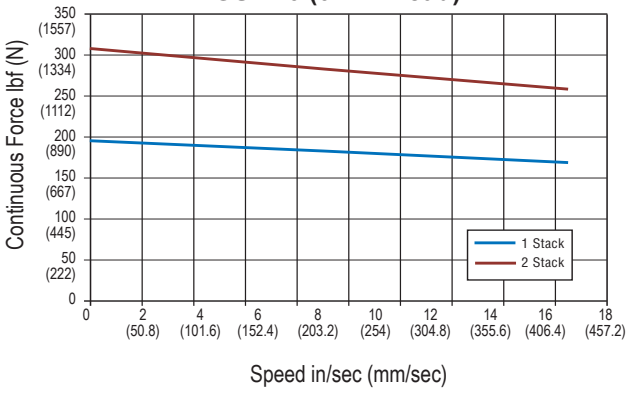
### GSM20 (0.1 In Lead)



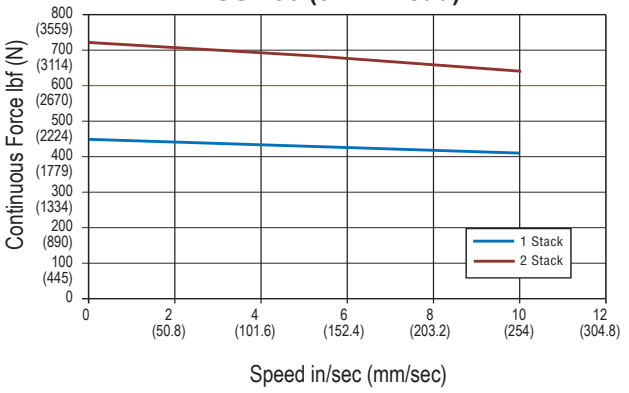

### GSM30 (0 .1 In Lead)



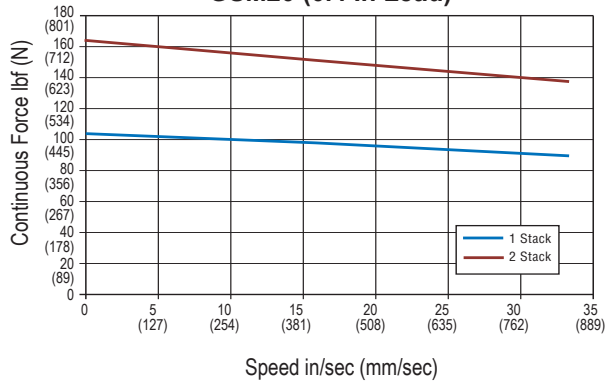

### GSM20 (0.2 In Lead)



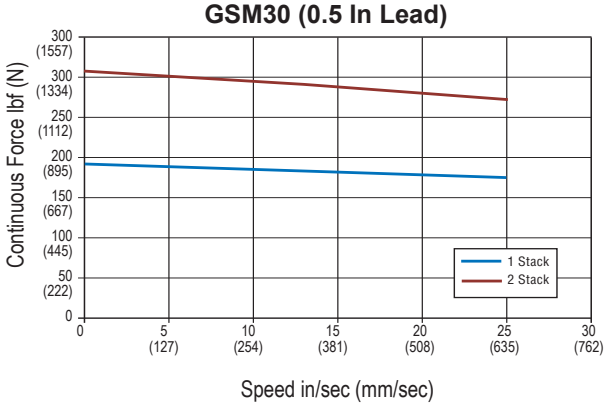

### GSM30 (0.2 In Lead)



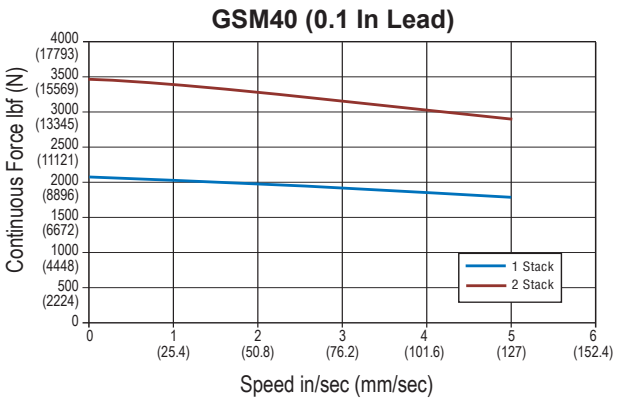

### GSM20 (0.4 In Lead)

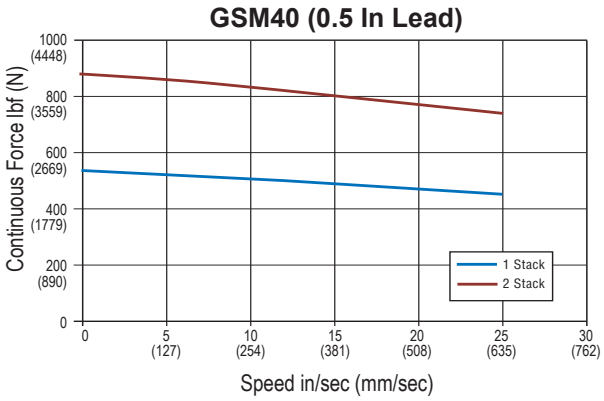


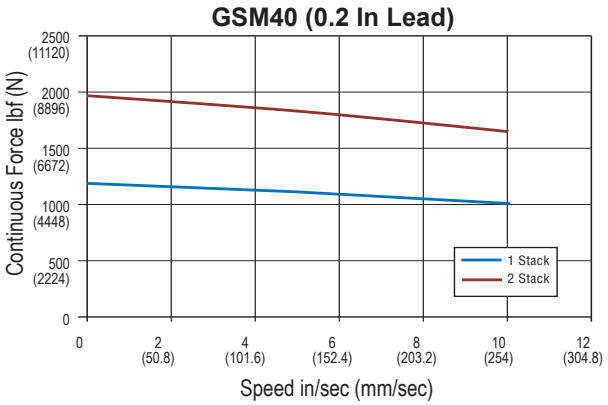

### GSM30 (0.5 In Lead)

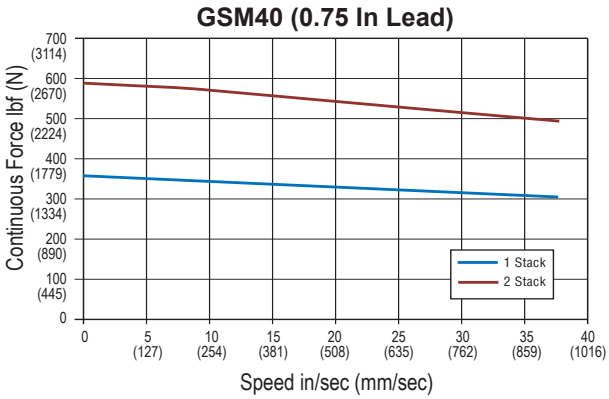



Test data derived using NEMA recommended aluminum heatsink 10" x 10" x 1/4"on GSM20 and 10" x 10" x 3/8" on GSM30



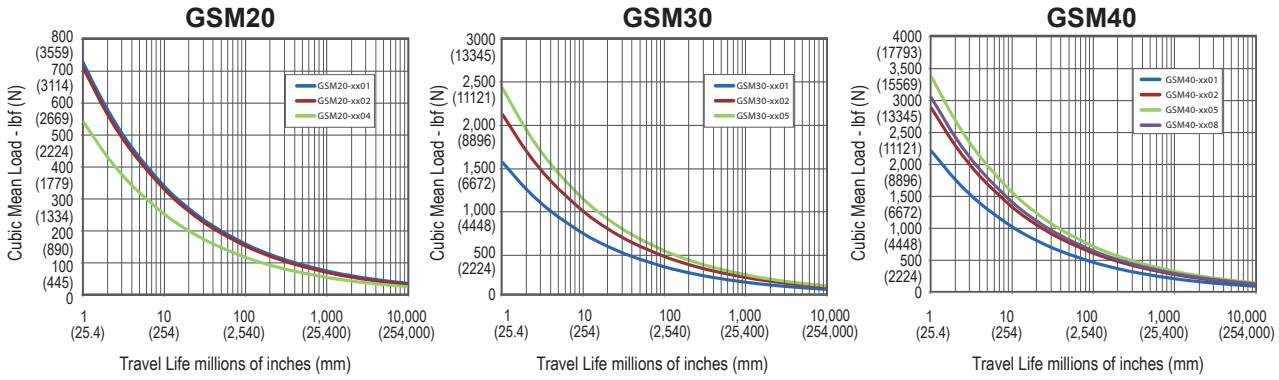




Test data derived using NEMA recommended aluminum heatsink 12" x 12" x 1/2" on GSM40

## 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

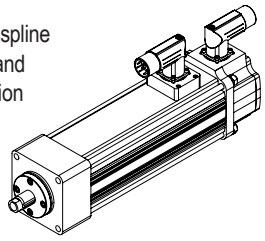
## AR = External Anti-rotate Assembly

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.

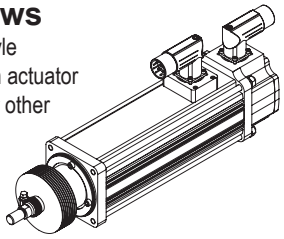
## SR = Splined Main Rod



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.

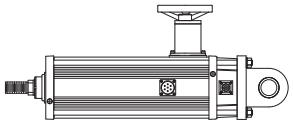
## PB = Protective Bellows



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 | | |
| 218 | 2 stack | 115 Vrms | 8 Pole | Class 180 H |
| 238 | | 230 Vrms | | |
| 258 | | 400 Vrms | | |
| 268 | | 460 Vrms | | |

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.

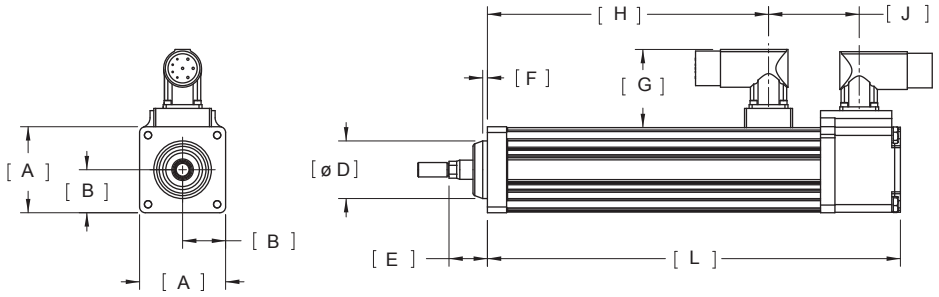
## Housing Options

### P5 = IP65S Sealing Option

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

# Dimensions

## Base Actuator



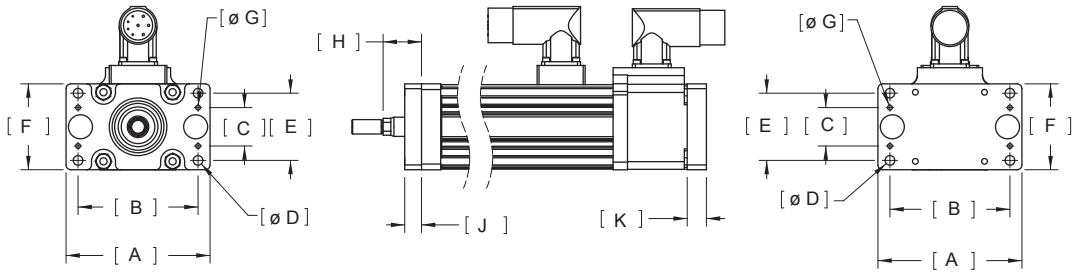

| | | GSM20 | GSM30 | GSM40 |
|---|---|---|---|---|
| **A** | in | 2.24 | 3.05 | 3.90 |
| | mm | 56.9 | 77.4 | 99.1 |
| **B** | in | 1.12 | 1.52 | 1.95 |
| | mm | 28.4 | 38.7 | 49.5 |
| **Ø D** | in | 1.500 +0.000/-0.003 | 2.000 +0.000/-0.003 | 2.500 +0.000/-0.003 |
| | mm | 38.10 0.00/0.08 | 50.80 0.00/0.08 | 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.

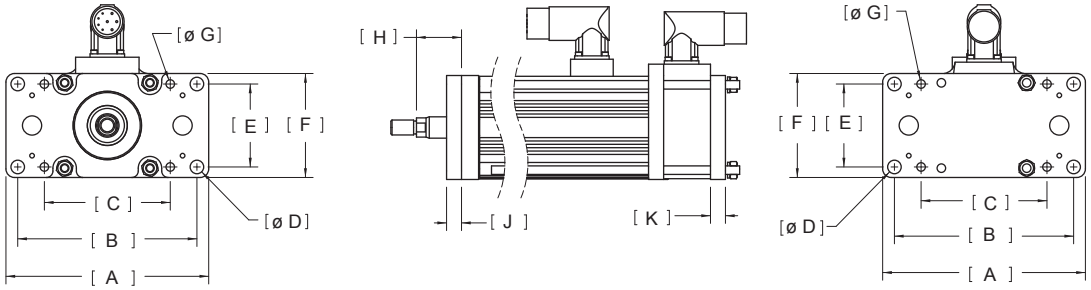
*Pre-sale drawings and models are representative and are subject to change. Certified drawings and models are available for a fee. Consult your local Exlar representative for details.*

## Front or Rear Flange Mount

GSM20




GSM30, GSM40

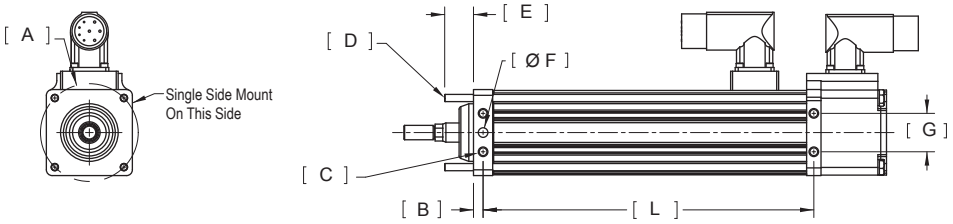



| | | GSM20 | GSM30 | GSM40 |
|---|---|---|---|---|
| **A** | in | 3.75 | 5.94 | 7.68 |
| | mm | 95.3 | 150.9 | 195.1 |
| **B** | in | 3.13 | 5.25 | 6.80 |
| | mm | 79.4 | 133.4 | 172.7 |
| **C** | in | 1.00 | 3.69 | 5.25 |
| | mm | 25.4 | 93.7 | 133.4 |
| **Ø D** | in | 0.250 | 0.397 | 0.516 |
| | mm | 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

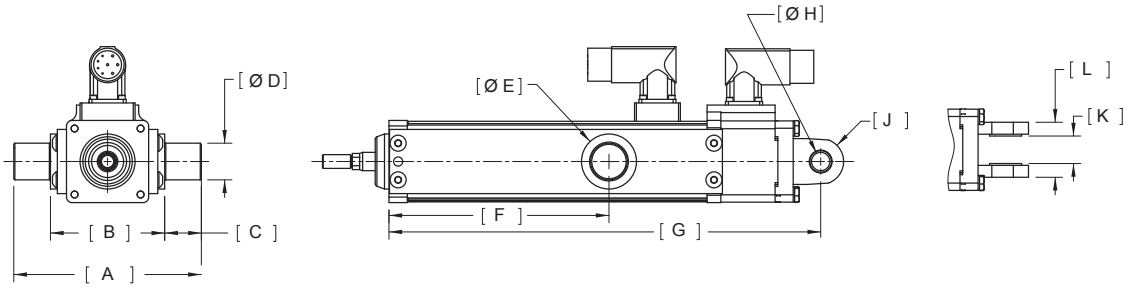



| | | GSM20 | GSM30 | GSM40 |
|---|---|---|---|---|
| Ø A | in | 2.546 | 3.536 | 4.243 |
| | mm | 64.66 | 89.80 | 107.76 |
| B [2] | in | 0.25 | 0.25 | 0.31 |
| | mm | 6.4 | 6.4 | 7.9 |
| C [1] | in | 1/4-20 UNC | 1/4-20 UNC | 3/8-16 UNC |
| | mm | M6 x 1.0 | M6 x 1.0 | M10 x 1.5 |
| D | in | 10-24 UNC | 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

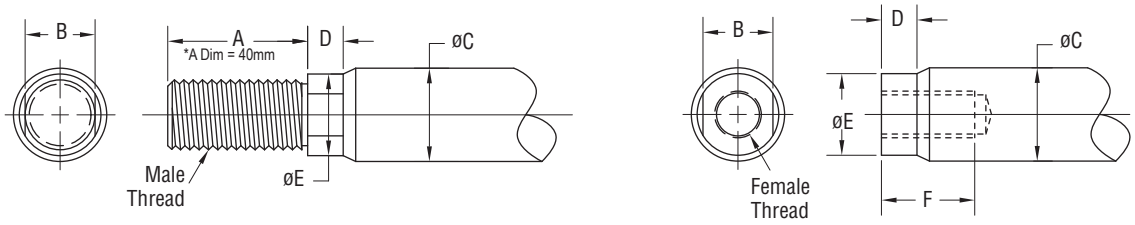



| | | GSM20 | GSM30 | GSM40 |
|---|---|---|---|---|
| **A** | in | 5.12 | 5.92 | 6.90 |
| | mm | 129.9 | 150.4 | 175.2 |
| **B** | in | 3.12 | 3.92 | 4.90 |
| | mm | 79.1 | 99.6 | 124.4 |
| **C** | in | 1.00 | 1.00 | 1.00 |
| | mm | 25.4 | 25.4 | 25.4 |
| **Ø D** | in | 1.000 +/-0.001 | 1.000 +/-0.001 | 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



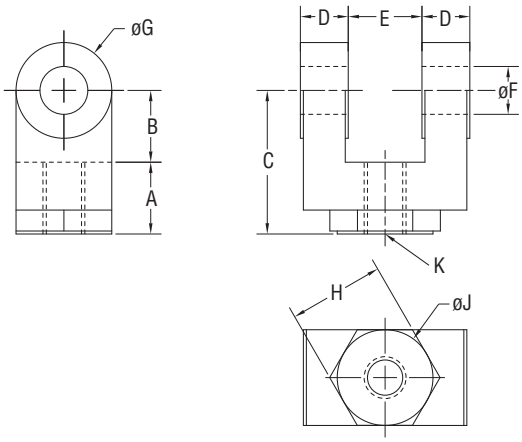

## Standard Rod Ends

| | 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.

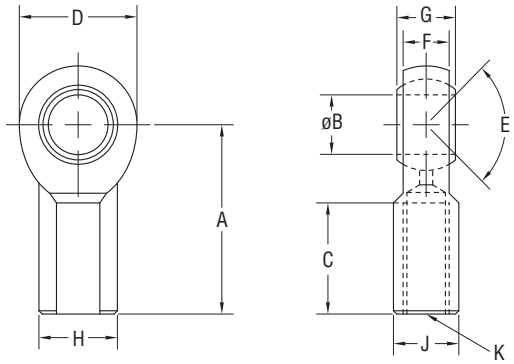
For Rod End with Splined Main Rod, see pg 32

## 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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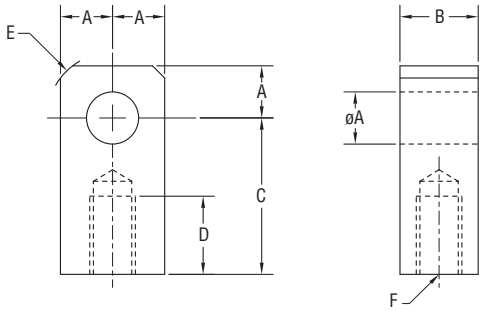
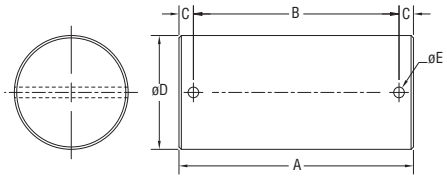
## Rod Eye Dimensions




| 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



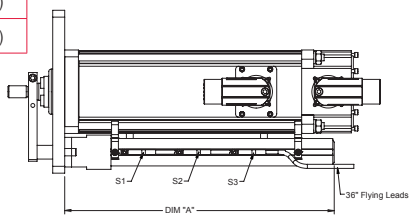

| in (mm) | A | B | C | ØD | ØE |
|---|---|---|---|---|---|
| CP050[1] | 2.28 (57.9) | 1.94 (49.28) | 0.17 (4.32) | 0.50 -0.001/-0.002 (12.7 +0.00/-0.05) | 0.106 (2.69) |
| CP075[2] | 3.09 (78.5) | 2.72 (69.1) | 0.19 (4.82) | 0.75 -0.001/-0.002 (19.1 +0.00/-0.05) | 0.14 (3.56) |

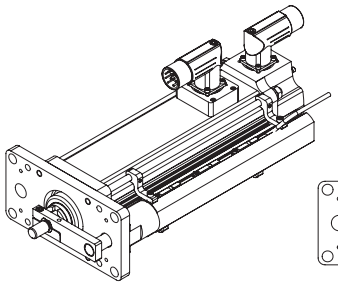
[1] Fits GSM30 rear clevis, RC050 and RE050
[2] Fits GSM30, 40 and RC075, RE075 and SRM075

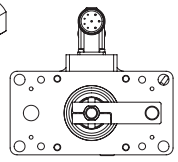
## GSM20, GSM30 and GSM40 External Limit Switch Extension Options

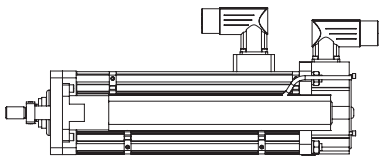
| Dim A | 3 inch (76 mm) stroke in (mm) | 6 inch (152 mm) stroke in (mm) | 8 inch (203 mm) stroke in (mm) | 10 inch (254 mm) stroke in (mm) | 12 inch (305 mm) stroke in (mm) | 18 inch (457 mm) stroke in (mm) |
|---|---|---|---|---|---|---|
| GSM20 | 5.515 (140.1) | 8.515 (216.3) | NA | 12.5 (317.5) | 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 |

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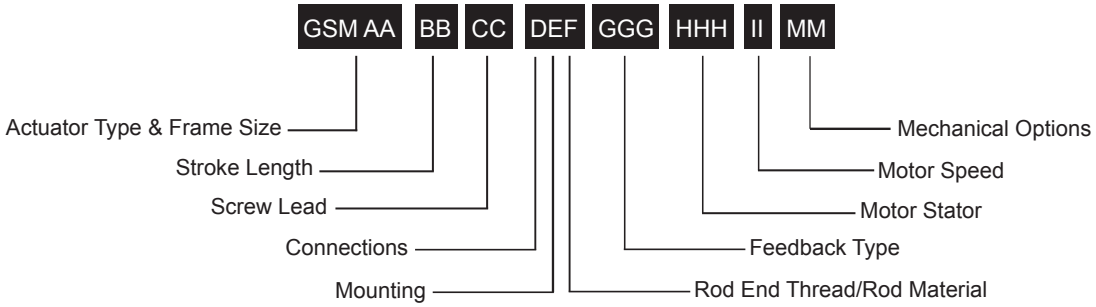




## Commonly Ordered Options Shown in BOLD

**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