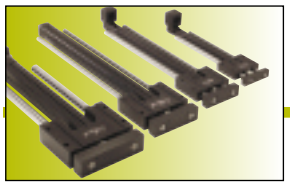
GSA/GSM GUIDED SCREW ACTUATORS

The following pages contain detailed information about Tol-O-Matic guided-screw rod type actuators. Visit www.tolomatic.com for the latest updates, Tol-O-Motion Sizing Software, CAD files and software support downloads.



Axidyne® Guided Screw Actuators

OVERVIEW

APPLICATION BENEFITS

- Cost-effective choice for short stroke, high thrust applications where external guidance is required
- Good resistance to side loading
- Flexible mounting for pivotal applications
- Wide tooling plate for end effector mounting

BEARING SYSTEM

The GSA/GSM Series design combines a rod screw actuator with a mounting block, guide rods and bearings. Bearings are available in linear ball or composite and guide rods are internally lubricated for increased bearing life.

GUIDED SCREW

GSA/GSM Series

MOTOR/ACTUATOR FACTORS

- Actuator's operating temperature range (40-130° F, 4-54° C) should take into consideration heat generated by the motor and drive, linear velocity and work cycle time.
- For large frame motors or small actuators, cantilevered motors need to be supported, if subjected to continuous rapid reversing duty and/or under dynamic conditions.
- Guided screw actuators are designed to push loads that are not separately guided and supported and may be used for applications that require substantial side loading. Reference the performance charts on D-13, 20, 26 and 32 for the appropriate actuator series side loading capacities.

STANDARD MOUNTING

Pre-tapped holes are provided on the actuator mounting block on both the top and side. Mounting surfaces are flat and parallel to plus or minus .002" (0.05 mm).

GEARHEAD REDUCTION

Gearheads are available for applications requiring reduction for inertia matching or higher torque at lower speeds. High efficiency, single stage, true planetary gearheads are available for the GSA/GSM24 and 32 series in 5.5:1 and 10:1 ratios for reduction solutions with most Tol-O-Matic NEMA 23- and 34-frame motors. For gearhead specifications and dimensions, see page F-10.

MOTOR MOUNTING

GSA/GSM guided screw actuators are configured as an in-line base model or a reverse-parallel base model.

In-line Motor Mounting— motor is internally coupled to the actuator shaft.

Reverse-parallel Motor Mounting— These factory assembled configurations allow offset mounting of the motor to either side of, or below the actuator. Available in a 1:1 drive ratio on GSA/GSM12 and 16 series or 1:1 and 2:1 drive ratios for the GSA/GSM24 and 32 series, they offer quiet, zero-backlash coupling of the motor to the actuator screw shaft.

OVERVIEW

AVAILABLE OPTIONS

Stop Collars: Available for both standard and oversize guide rods, stop collars add an extra safety factor for applications requiring heavy loading. Also available in stainless steel.

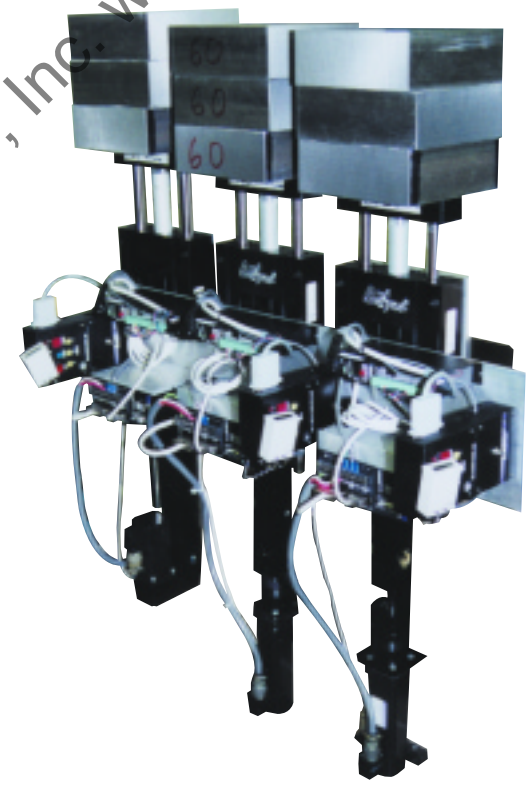
Stainless steel guide rods and fasteners: Available for both standard and oversize guide rods. Ideal for use in applications where protection form corrosives is required.

⚠ ***Option not available with linear ball bearings***

SWITCHES

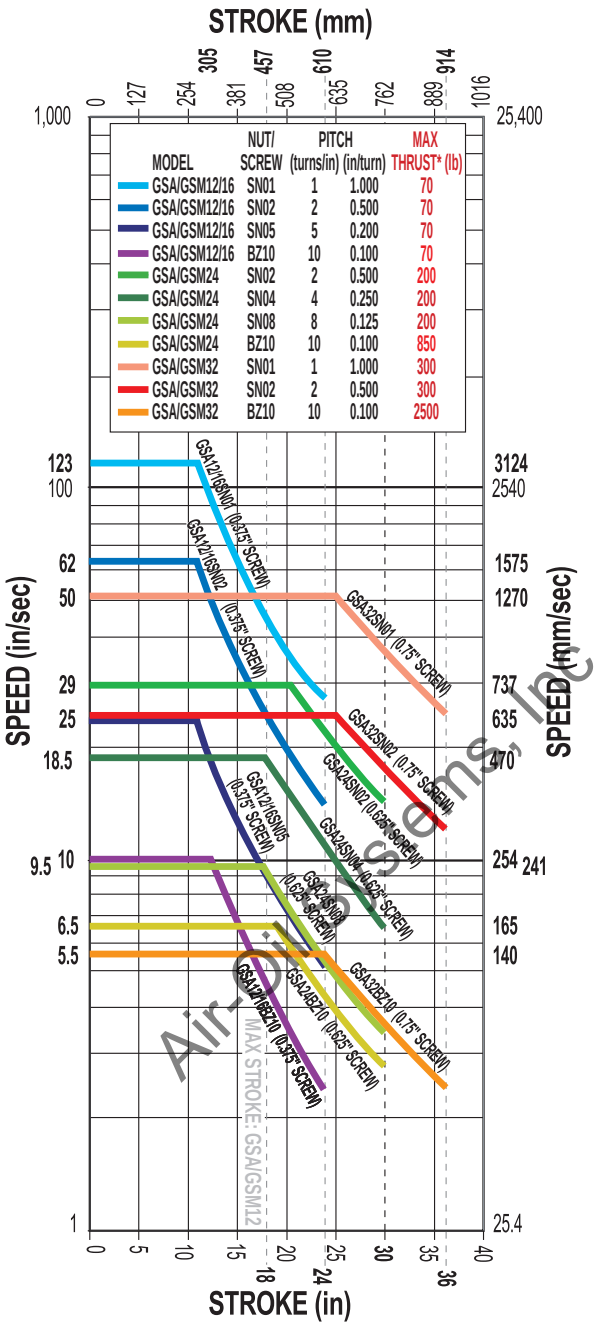
Switches: Reed, dc Hall-effect and ac TRIAC.
See page I-1.

All Tol-O-Matic products go through months of preliminary testing in our lab to ensure that they live up to our expectations. The simulation below has a series of GSA actuators moving substantial loads, testing for bearing wear and actuator life.

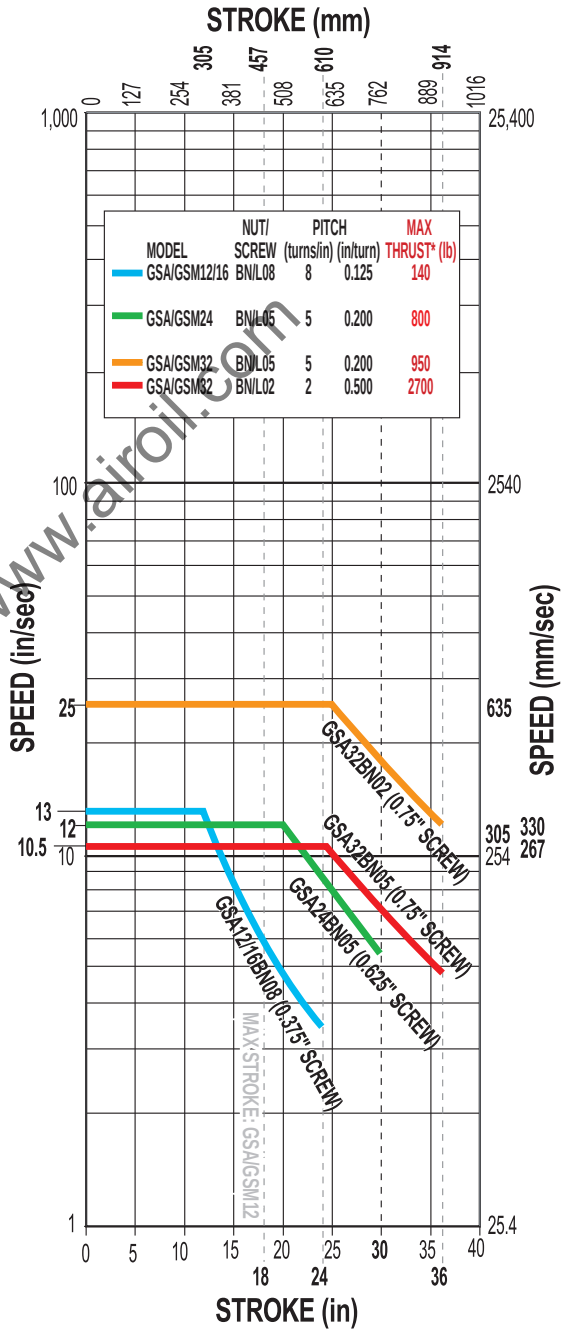


ACME AND BALL SCREW CRITICAL SPEED CAPACITIES

GSA: CRITICAL SPEED WITH ENGLISH ACME SCREW



GSA: CRITICAL SPEED WITH ENGLISH BALL SCREW



GUIDED SCREW

GSA/GSM Series

- Acme and ball screw critical speed

* *Acme Screws: Maximum thrust is the maximum continuous dynamic thrust subject to Thrust x Velocity limitation.*

Ball Screws: Maximum thrust reflects 90% reliability for 1 million linear inches of travel.

Dotted lines represent maximum stroke for actuator body size.

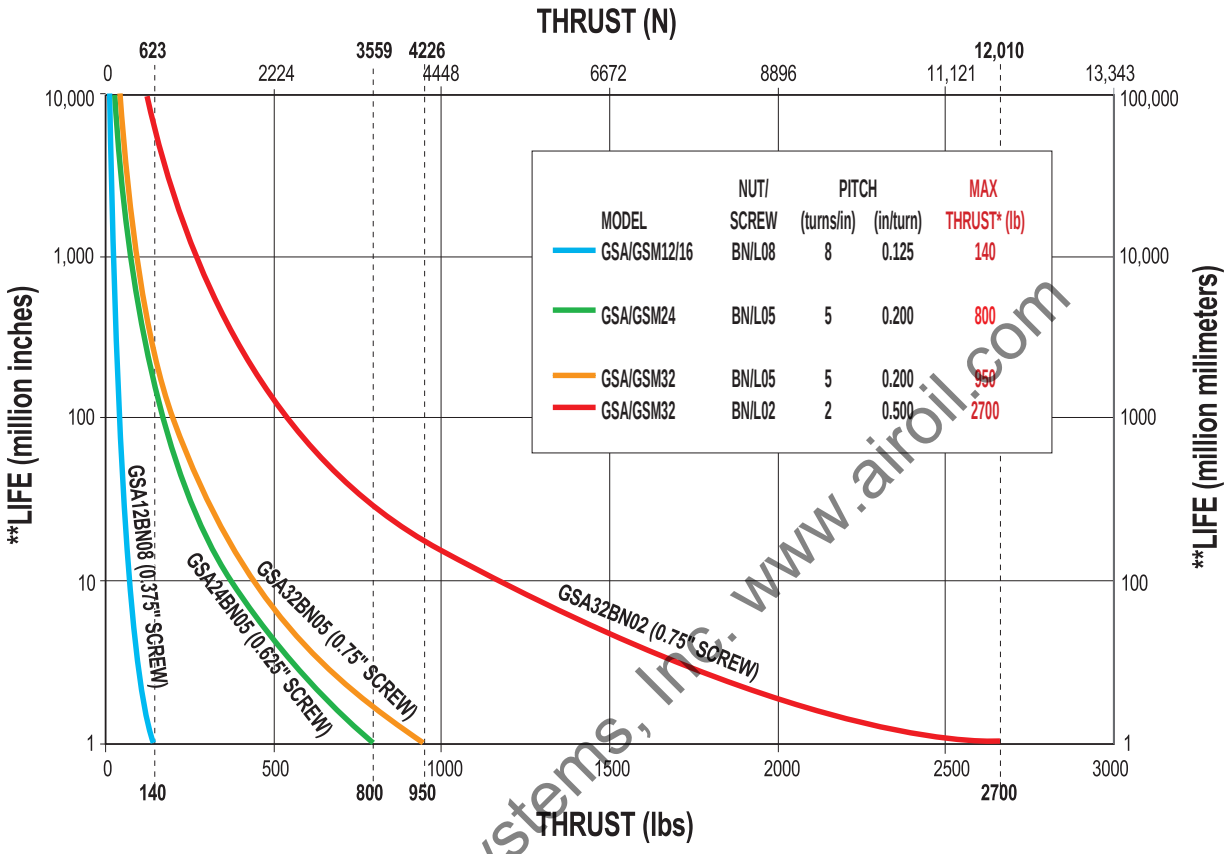
For Screw PV limits, refer to the individual charts located in the technical section for each actuator body size.

SCREW CODE	DESCRIPTION
SN	Solid Nut
BZ	Bronze Nut
BN	Ball Nut
BNL	Low-backlash Ball Nut

BALL SCREW SPECIFICATIONS

BALL SCREW LIFE CALCULATIONS

GSA: LIFE CAPACITIES WITH ENGLISH BALL SCREW



GUIDED SCREW

GSA/GSM Series

- Ball screw life calculations

**Maximum thrust reflects 90% reliability for 1 million linear inches of travel.*

Dotted lines represent maximum thrust for screw selections.

***Life indicates theoretical maximum life of screw only, under ideal conditions and does not indicate expected life of actuator.*

OVERALL SERIES SPECIFICATIONS

GSA12/16 SPECIFICATIONS RELATED TO ACTUATOR SIZE / SCREW SELECTION

GSA12 AND GSA16 ACTUATORS WITH ENGLISH LEAD SCREWS

ACTUATOR SERIES	BEARING TYPE	GUIDE ROD	SCREW DIA.	SCREW TYPE	TPI	LEAD ACCURACY	BACKLASH	MAXIMUM THRUST*	BASE ACTUATOR INERTIA		INERTIA PER/in OF STROKE	BREAKAWAY TORQUE	MOVING PARTS WEIGHT	
									In Line	Rev. Parallel			Base	Per Inch
		in	in		turns/in	in/ft	in	lb	lb-in²	lb-in²	lb-in²	lb-in	lb	lb
GSA12	LINEAR	STANDARD Ø0.50	0.38	SN01	1	0.010	0.007	70	0.0324	0.0326	0.0040	2.938	1.21	0.14
				SN02	2	0.006	0.007	70	0.0095	0.0097	0.0014	1.500	1.21	0.14
				SN05	5	0.006	0.007	70	0.0030	0.0032	0.0006	0.563	1.21	0.14
				BZ10	10	0.006	0.008	70	0.0021	0.0023	0.0005	0.438	1.21	0.14
				BN08	8	0.003	0.015	140	0.0023	0.0025	0.0006	0.500	1.29	0.14
				BNL08	8	0.003	0.002	140	0.0023	0.0025	0.0006	0.500	1.29	0.14
	COMPOSITE	STANDARD Ø0.50	0.38	SN01	1	0.010	0.007	70	0.0324	0.0326	0.0040	5.625	1.21	0.14
				SN02	2	0.006	0.007	70	0.0095	0.0097	0.0014	2.813	1.21	0.14
				SN05	5	0.006	0.007	70	0.0030	0.0032	0.0006	1.125	1.21	0.14
				BZ10	10	0.006	0.008	70	0.0021	0.0023	0.0005	0.813	1.21	0.14
				BN08	8	0.003	0.015	140	0.0023	0.0025	0.0006	0.688	1.29	0.14
				BNL08	8	0.003	0.002	140	0.0023	0.0025	0.0006	0.688	1.29	0.14
		OVERSIZED Ø0.63	0.38	SN01	1	0.010	0.007	70	0.0413	0.0415	0.0056	6.125	1.56	0.20
				SN02	2	0.006	0.007	70	0.0117	0.0119	0.0018	3.063	1.56	0.20
				SN05	5	0.006	0.007	70	0.0034	0.0036	0.0007	1.250	1.56	0.20
				BZ10	10	0.006	0.008	70	0.0022	0.0024	0.0006	0.938	1.56	0.20
				BN08	8	0.003	0.015	140	0.0024	0.0026	0.0006	0.750	1.64	0.20
				BNL08	8	0.003	0.002	140	0.0024	0.0026	0.0006	0.750	1.64	0.20
GSA16	LINEAR	STANDARD Ø0.63	0.38	SN01	1	0.010	0.007	70	0.0631	0.0633	0.0058	2.938	2.42	0.21
				SN02	2	0.006	0.007	70	0.0171	0.0173	0.0018	1.500	2.42	0.21
				SN05	5	0.006	0.007	70	0.0043	0.0045	0.0007	0.563	2.42	0.21
				BZ10	10	0.006	0.008	70	0.0024	0.0026	0.0006	0.438	2.42	0.21
				BN08	8	0.003	0.015	140	0.0028	0.0030	0.0006	0.500	2.50	0.21
				BNL08	8	0.003	0.002	140	0.0028	0.0030	0.0006	0.500	2.50	0.21
	COMPOSITE	STANDARD Ø0.63	0.38	SN01	1	0.010	0.007	70	0.0631	0.0633	0.0058	6.125	2.42	0.21
				SN02	2	0.006	0.007	70	0.0171	0.0173	0.0018	3.063	2.42	0.21
				SN05	5	0.006	0.007	70	0.0043	0.0045	0.0007	1.250	2.42	0.21
				BZ10	10	0.006	0.008	70	0.0024	0.0026	0.0006	0.938	2.42	0.21
				BN08	8	0.003	0.015	140	0.0028	0.0030	0.0006	0.688	2.50	0.21
				BNL08	8	0.003	0.002	140	0.0028	0.0030	0.0006	0.688	2.50	0.21
		OVERSIZED Ø0.75	0.38	SN01	1	0.010	0.007	70	0.0763	0.0765	0.0078	6.625	2.94	0.29
				SN02	2	0.006	0.007	70	0.0204	0.0206	0.0023	3.313	2.94	0.29
				SN05	5	0.006	0.007	70	0.0048	0.0050	0.0008	1.313	2.94	0.29
				BZ10	10	0.006	0.008	70	0.0025	0.0027	0.0006	1.000	2.94	0.29
				BN08	8	0.003	0.015	140	0.0030	0.0032	0.0006	0.750	3.02	0.29
				BNL08	8	0.003	0.002	140	0.0030	0.0032	0.0006	0.750	3.02	0.29

GUIDED SCREW

GSA/GSM Series

- Actuator and screw specifications

SCREW CODE	DESCRIPTION
SN	Solid Nut
BZ	Bronze Nut
BN	Ball Nut
BNL	Low-Backlash Ball Nut

Contact the factory for higher accuracy and lower backlash options.

* *For Acme screws, maximum thrust is the maximum continuous dynamic thrust subject to Thrust x Velocity limitation.*

For ball screws, maximum thrust reflects 90% reliability for 1 million linear inches of travel.

OVERALL SERIES SPECIFICATIONS

GSA24/32 SPECIFICATIONS RELATED TO ACTUATOR SIZE / SCREW SELECTION

GSA24 AND GSA32 ACTUATORS WITH ENGLISH LEAD SCREWS

ACTUATOR SERIES	BEARING TYPE	GUIDE ROD	SCREW DIA.	SCREW TYPE	TPI	LEAD ACCURACY	BACKLASH	MAXIMUM THRUST*	BASE ACTUATOR INERTIA		INERTIA PER/in OF STROKE	BREAKAWAY TORQUE	MOVING PARTS WEIGHT	
									In Line	Rev. Parallel			Base	Per Inch
		in	in		turns/in	in/ft	in	lb	lb-in²	lb-in²	lb-in²	lb-in	lb	lb
GSA24	LINEAR	STANDARD Ø0.75	0.625	SN02	2	0.127	0.18	200	0.0399	0.0404	0.0060	1.875	4.49	0.33
				SN04	4	0.254	0.18	200	0.0260	0.0265	0.0047	1.125	4.49	0.33
				SN08	8	0.254	0.18	200	0.0225	0.0230	0.0043	1.563	4.49	0.33
				BZ10	10	0.152	0.20	850	0.0220	0.0225	0.0043	2.000	4.49	0.33
				BN05	5	0.076	0.38	800	0.0244	0.0249	0.0045	1.563	4.75	0.33
				BNL05	5	0.076	0.02	800	0.0244	0.0249	0.0045	1.563	4.75	0.33
	COMPOSITE	STANDARD Ø0.75	0.625	SN02	2	0.127	0.18	200	0.0497	0.0502	0.0063	3.438	4.49	0.33
				SN04	4	0.254	0.18	200	0.0284	0.0289	0.0047	2.188	4.49	0.33
				SN08	8	0.254	0.18	200	0.0231	0.0236	0.0043	1.563	4.49	0.33
				BZ10	10	0.152	0.20	850	0.0224	0.0229	0.0043	2.000	4.49	0.33
				BN05	5	0.076	0.38	800	0.0261	0.0266	0.0045	1.563	4.75	0.33
				BNL05	5	0.076	0.02	800	0.0261	0.0266	0.0045	1.563	4.75	0.33
		OVERSIZED Ø1.00	0.625	SN02	2	0.127	0.18	200	0.0597	0.0602	0.0076	3.875	6.06	0.53
				SN04	4	0.254	0.18	200	0.0309	0.0314	0.0050	2.813	6.06	0.53
				SN08	8	0.254	0.18	200	0.0237	0.0242	0.0044	1.875	6.06	0.53
				BZ10	10	0.152	0.20	850	0.0228	0.0233	0.0043	2.188	6.06	0.53
				BN05	5	0.076	0.38	800	0.0277	0.0282	0.0047	1.875	6.32	0.53
				BNL05	5	0.076	0.02	800	0.0277	0.0282	0.0047	1.875	6.32	0.53
GSA32	LINEAR	STANDARD Ø1.00	0.75	SN01	1	0.127	0.18	300	0.2903	0.2946	0.0239	4.375	9.03	0.60
				SN02	2	0.127	0.18	300	0.1188	0.1231	0.0125	3.750	9.03	0.60
				BZ10	10	0.152	0.20	2500	0.0639	0.0682	0.0088	2.000	9.03	0.60
				BN02	2	0.102	0.38	2700	0.1218	0.1261	0.0125	3.125	9.51	0.60
				BNL02	2	0.102	0.02	2700	0.1218	0.1261	0.0125	3.125	9.51	0.60
				BN05	5	0.076	0.38	950	0.0712	0.0755	0.0093	1.875	9.51	0.60
				BNL05	5	0.076	0.02	950	0.0712	0.0755	0.0093	1.875	9.51	0.60
	COMPOSITE	STANDARD Ø1.00	0.75	SN01	1	0.127	0.18	300	0.2903	0.2946	0.0239	8.688	9.03	0.60
				SN02	2	0.127	0.18	300	0.1188	0.1231	0.0125	4.375	9.03	0.60
				BZ10	10	0.152	0.20	2500	0.0639	0.0682	0.0088	2.813	9.03	0.60
				BN02	2	0.102	0.38	2700	0.1218	0.1261	0.0125	3.438	9.51	0.60
				BNL02	2	0.102	0.02	2700	0.1218	0.1261	0.0125	3.438	9.51	0.60
				BN05	5	0.076	0.38	950	0.0712	0.0755	0.0093	2.188	9.51	0.60
				BNL05	5	0.076	0.02	950	0.0712	0.0755	0.0093	2.188	9.51	0.60
		OVERSIZED Ø1.25	0.75	SN01	1	0.127	0.18	300	0.3504	0.3547	0.0305	10.000	11.40	0.86
				SN02	2	0.127	0.18	300	0.1338	0.1381	0.0141	5.625	11.40	0.86
				BZ10	10	0.152	0.20	2500	0.0645	0.0688	0.0089	3.438	11.40	0.86
				BN02	2	0.102	0.38	2700	0.1368	0.1411	0.0141	4.063	11.88	0.86
				BNL02	2	0.102	0.02	2700	0.1368	0.1411	0.0141	4.063	11.88	0.86
				BN05	5	0.076	0.38	950	0.0736	0.0779	0.0096	2.500	11.88	0.86
				BNL05	5	0.076	0.02	950	0.0736	0.0779	0.0096	2.500	11.88	0.86

SCREW CODE	DESCRIPTION
SN	Solid Nut
BZ	Bronze Nut
BN	Ball Nut
BNL	Low-Backlash Ball Nut

Contact the factory for higher accuracy and lower backlash options.

* *For Acme screws, maximum thrust is the maximum continuous dynamic thrust subject to Thrust x Velocity limitation.*

For ball screws, maximum thrust reflects 90% reliability for 1 million linear inches of travel.

GSM12/16 SPECIFICATIONS RELATED TO ACTUATOR SIZE / SCREW SELECTION

GSM12 AND GSM16 METRIC ACTUATORS* WITH ENGLISH LEAD SCREWS

ACTUATOR SERIES	BEARING TYPE	GUIDE ROD	SCREW DIA.	SCREW TYPE	TPI	LEAD ACCURACY	BACKLASH	MAXIMUM THRUST**	BASE ACTUATOR INERTIA		INERTIA PER/in OF STROKE	BREAKAWAY TORQUE	MOVING PARTS WEIGHT	
									In Line	Rev. Parallel			Base	Per Inch
		in	in		turns/in	mm/300	mm	N	kg-m² x 10⁻⁶	kg-m² x 10⁻⁶	kg-m² x 10⁻⁶	N-m	N	N
GSM12	LINEAR	STANDARD Ø0.50	0.38	SN01	1	0.254	0.18	311	9.492	9.550	1.184	0.332	5.38	0.62
				SN02	2	0.152	0.18	311	2.768	2.826	0.406	0.169	5.38	0.62
				SN05	5	0.152	0.18	311	0.885	0.944	0.188	0.064	5.38	0.62
				BZ10	10	0.152	0.20	311	0.616	0.675	0.157	0.049	5.38	0.62
				BN08	8	0.076	0.38	623	0.676	0.734	0.163	0.056	5.74	0.62
				BNL08	8	0.076	0.05	623	0.676	0.734	0.163	0.056	5.74	0.62
	COMPOSITE	STANDARD Ø0.50	0.38	SN01	1	0.254	0.18	311	9.492	9.550	1.184	0.636	5.38	0.62
				SN02	2	0.152	0.18	311	2.798	2.826	0.406	0.318	5.38	0.62
				SN05	5	0.152	0.18	311	0.885	0.944	0.188	0.127	5.38	0.62
				BZ10	10	0.152	0.20	311	0.616	0.675	0.157	0.092	5.38	0.62
				BN08	8	0.076	0.38	623	0.676	0.734	0.163	0.078	5.74	0.62
				BNL08	8	0.076	0.05	623	0.676	0.734	0.163	0.078	5.74	0.62
		OVERSIZED Ø0.63	0.38	SN01	1	0.254	0.18	311	12.085	12.143	1.628	0.692	6.94	0.89
				SN02	2	0.152	0.18	311	3.416	3.475	0.517	0.346	6.94	0.89
				SN05	5	0.152	0.18	311	0.989	1.047	0.206	0.141	6.94	0.89
				BZ10	10	0.152	0.20	311	0.642	0.701	0.161	0.106	6.94	0.89
				BN08	8	0.076	0.38	623	0.716	0.775	0.169	0.085	7.30	0.89
				BNL08	8	0.076	0.05	623	0.716	0.775	0.169	0.085	7.30	0.89
GSM16	LINEAR	STANDARD Ø0.63	0.38	SN01	1	0.254	0.18	311	18.457	18.515	1.702	0.332	10.77	0.93
				SN02	2	0.152	0.18	311	5.009	5.068	0.535	0.169	10.77	0.93
				SN05	5	0.152	0.18	311	1.245	1.302	0.209	0.064	10.77	0.93
				BZ10	10	0.152	0.20	311	0.706	0.764	0.162	0.049	10.77	0.93
				BN08	8	0.076	0.38	623	0.816	0.874	0.171	0.056	11.12	0.93
				BNL08	8	0.076	0.05	623	0.816	0.874	0.171	0.056	11.12	0.93
	COMPOSITE	STANDARD Ø0.63	0.38	SN01	1	0.254	0.18	311	18.457	18.515	1.702	0.692	10.77	0.93
				SN02	2	0.152	0.18	311	5.009	5.068	0.535	0.346	10.77	0.93
				SN05	5	0.152	0.18	311	1.244	1.302	0.209	0.141	10.77	0.93
				BZ10	10	0.152	0.20	311	0.706	0.764	0.162	0.106	10.77	0.93
				BN08	8	0.076	0.38	623	0.816	0.874	0.171	0.078	11.12	0.93
				BNL08	8	0.076	0.05	623	0.816	0.874	0.171	0.078	11.12	0.93
		OVERSIZED Ø0.75	0.38	SN01	1	0.254	0.18	311	22.309	22.368	2.295	0.749	13.08	1.29
				SN02	2	0.152	0.18	311	5.972	6.031	0.683	0.374	13.08	1.29
				SN05	5	0.152	0.18	311	1.398	1.456	0.232	0.148	13.08	1.29
				BZ10	10	0.152	0.20	311	0.744	0.803	0.168	0.113	13.08	1.29
				BN08	8	0.076	0.38	623	0.876	0.935	0.180	0.085	13.43	1.29
				BNL08	8	0.076	0.05	623	0.876	0.935	0.180	0.085	13.43	1.29

GUIDED SCREW

GSA/GSM Series

- Actuator and screw specifications

SCREW CODE	*DESCRIPTION*
SN	*Solid Nut*
BZ	*Bronze Nut*
BN	*Ball Nut*
BNL	*Low-Backlash Ball Nut*

Contact the factory for higher accuracy and lower backlash options.

** GSM metric actuators use the same leadscrew as the GSA English series. Mounting threaded and dowel pin holes on GSM series are metric.*

*** For Acme screws, maximum thrust is the maximum continuous dynamic thrust subject to Thrust x Velocity limitation.*

For ball screws, maximum thrust reflects 90% reliability for 1 million linear inches of travel.

OVERALL SERIES SPECIFICATIONS

GSM24/32 SPECIFICATIONS RELATED TO ACTUATOR SIZE / SCREW SELECTION

GSM24 AND GSM32 METRIC ACTUATORS* WITH ENGLISH LEAD SCREWS

ACTUATOR SERIES	BEARING TYPE	GUIDE ROD	SCREW DIA.	SCREW TYPE	TPI	LEAD ACCURACY	BACKLASH	MAXIMUM THRUST**	BASE ACTUATOR INERTIA		INERTIA PER/in OF STROKE	BREAKAWAY TORQUE	MOVING PARTS WEIGHT	
									In Line	Rev. Parallel			Base	Per Inch
		in	in		turns/in	mm/300	mm	N	kg-m² x 10⁻⁶	kg-m² x 10⁻⁶	kg-m² x 10⁻⁶	N-m	N	N
GSM24	LINEAR	STANDARD Ø0.75	0.625	SN02	2	0.127	0.18	890	11.676	11.822	1.764	0.212	19.97	1.47
				SN04	4	0.254	0.18	890	7.592	7.738	1.361	0.127	19.97	1.47
				SN08	8	0.254	0.18	890	6.571	6.717	1.260	0.177	19.97	1.47
				BZ10	10	0.152	0.20	3781	6.448	6.594	1.248	0.226	19.97	1.47
				BN05	5	0.076	0.38	3558	7.125	7.272	1.313	0.177	21.13	1.47
				BNL05	5	0.076	0.02	3558	7.125	7.272	1.313	0.177	21.13	1.47
	COMPOSITE	STANDARD Ø0.75	0.625	SN02	2	0.127	0.18	890	14.547	14.693	1.838	0.388	19.97	1.47
				SN04	4	0.254	0.18	890	8.309	8.456	1.380	0.247	19.97	1.47
				SN08	8	0.254	0.18	890	6.750	6.896	1.265	0.177	19.97	1.47
				BZ10	10	0.152	0.20	3781	6.563	6.709	1.251	0.226	19.97	1.47
				BN05	5	0.076	0.38	3558	7.638	7.784	1.325	0.177	21.13	1.47
				BNL05	5	0.076	0.02	3558	7.638	7.784	1.325	0.177	21.13	1.47
		OVERSIZED Ø1.00	0.625	SN02	2	0.127	0.18	890	17.455	17.601	1.209	0.438	26.96	2.36
				SN04	4	0.254	0.18	890	9.037	9.183	1.472	0.318	26.96	2.36
				SN08	8	0.254	0.18	890	6.932	7.078	1.288	0.212	26.96	2.36
				BZ10	10	0.152	0.20	3781	6.679	6.826	1.266	0.247	26.96	2.36
				BN05	5	0.076	0.38	3558	8.103	8.230	1.384	0.212	28.11	2.36
				BNL05	5	0.076	0.02	3558	8.103	8.230	1.384	0.212	28.11	2.36
GSM32	LINEAR	STANDARD Ø1.00	0.75	SN01	1	0.127	0.18	1334	84.922	86.180	6.987	0.494	40.17	2.67
				SN02	2	0.127	0.18	1334	34.744	36.002	3.653	0.424	40.17	2.67
				BZ10	10	0.152	0.20	11,120	18.687	19.945	2.586	0.226	40.17	2.67
				BN02	2	0.120	0.38	12,010	35.633	36.891	3.653	0.353	42.30	2.67
				BNL02	2	0.120	0.02	12,010	35.633	36.891	3.653	0.353	42.30	2.67
				BN05	5	0.076	0.38	4226	20.836	22.094	2.720	0.212	42.30	2.67
				BNL05	5	0.076	0.02	4226	20.836	22.094	2.720	0.212	42.30	2.67
	COMPOSITE	STANDARD Ø1.00	0.75	SN01	1	0.127	0.18	1334	84.922	86.180	6.987	0.982	40.17	2.67
				SN02	2	0.127	0.18	1334	34.744	36.002	3.653	0.494	40.17	2.67
				BZ10	10	0.152	0.20	11,120	18.687	19.945	2.586	0.318	40.17	2.67
				BN02	2	0.120	0.38	12,010	35.633	36.891	3.653	0.388	42.30	2.67
				BNL02	2	0.120	0.02	12,010	35.633	36.891	3.653	0.388	42.30	2.67
				BN05	5	0.076	0.38	4226	20.836	22.094	2.720	0.247	42.30	2.67
				BNL05	5	0.076	0.02	4226	20.836	22.094	2.720	0.247	42.30	2.67
		OVERSIZED Ø1.25	0.75	SN01	1	0.127	0.18	1334	102.482	103.740	8.914	1.130	50.71	3.83
				SN02	2	0.127	0.18	1334	39.134	40.392	4.135	0.636	50.71	3.83
				BZ10	10	0.152	0.20	11,120	18.863	20.120	2.606	0.388	50.71	3.83
				BN02	2	0.120	0.38	12,010	40.023	41.281	4.135	0.459	52.85	3.83
				BNL02	2	0.120	0.02	12,010	40.023	41.281	4.135	0.459	52.85	3.83
				BN05	5	0.076	0.38	4226	21.539	22.797	2.797	0.282	52.85	3.83
				BNL05	5	0.076	0.02	4226	21.539	22.797	2.797	0.282	52.85	3.83

SCREW CODE	DESCRIPTION
SN	Solid Nut
BZ	Bronze Nut
BN	Ball Nut
BNL	Low-Backlash Ball Nut

Contact the factory for higher accuracy and lower backlash options.

* *GSM metric actuators use the same leadscrew as the GSA English series. Mounting threaded and dowel pin holes on GSM series are metric.*

** *For Acme screws, maximum thrust is the maximum continuous dynamic thrust subject to Thrust x Velocity limitation.*

For ball screws, maximum thrust reflects 90% reliability for 1 million linear inches of travel.

GENERAL ACTUATOR SPECIFICATIONS

SPECIFICATIONS		GSA ENGLISH ACTUATORS									
		GSA12				GSA16		GSA24		GSA32	
		17 frame		23 frame							
		GUIDE RODS		GUIDE RODS		GUIDE RODS		GUIDE RODS		GUIDE RODS	
		STANDARD	OVERSIZED	STANDARD	OVERSIZED	STANDARD	OVERSIZED	STANDARD	OVERSIZED	STANDARD	OVERSIZED
Weights											
In-Line base weight	(lb)	3.65	4.44	3.68	4.47	7.25	7.54	16.48	17.35	27.34	28.65
Reverse parallel base weight	(lb)	3.92	4.72	4.05	4.85	7.59	7.88	17.09	17.96	28.81	30.12
Weight per in of stroke	(lb)	0.21	0.27	0.21	0.27	0.30	0.38	0.54	0.74	0.93	1.19
Maximum Stroke	(in)	18	18	18	18	24	24	30	30	36	36
Temperature Operating Range*	(F)	40 - 130	40 - 130	40 - 130	40 - 130	40 - 130	40 - 130	40 - 130	40 - 130	40 - 130	40 - 130
IP Rating**		54	54	54	54	54	54	54	54	54	54

SPECIFICATIONS		GSM METRIC ACTUATORS									
		GSM12				GSM16		GSM24		GSM32	
		17 frame		23 frame							
		GUIDE RODS		GUIDE RODS		GUIDE RODS		GUIDE RODS		GUIDE RODS	
		STANDARD	OVERSIZED	STANDARD	OVERSIZED	STANDARD	OVERSIZED	STANDARD	OVERSIZED	STANDARD	OVERSIZED
Weights											
In-Line base weight	(kg)	1.65	2.01	1.67	2.03	3.29	3.42	7.48	7.87	12.40	13.00
Reverse parallel base weight	(kg)	1.78	2.14	1.84	2.20	3.44	3.57	7.75	8.15	13.07	13.66
Weight per mm of stroke	(kg)	0.004	0.005	0.004	0.005	0.005	0.007	0.010	0.013	0.017	0.021
Maximum Stroke	(mm)	457	457	457	457	610	610	762	762	914	914
Temperature Operating Range*	(°C)	4 - 54	4 - 54	4 - 54	4 - 54	4 - 54	4 - 54	4 - 54	4 - 54	4 - 54	4 - 54
IP Rating**		54	54	54	54	54	54	54	54	54	54

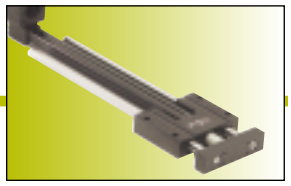
* *Heat generated by the motor and drive should be taken into consideration as well as linear velocity and work cycle time. For applications that require operation outside of the recommended temperature range, contact the factory.*

** *Protected against dust and splashing water.*

LARGE FRAME MOTORS AND SMALLER SIZE ACTUATORS: *Cantilevered motors need to be supported, if subjected to continuous rapid reversing duty and/or under dynamic conditions.*

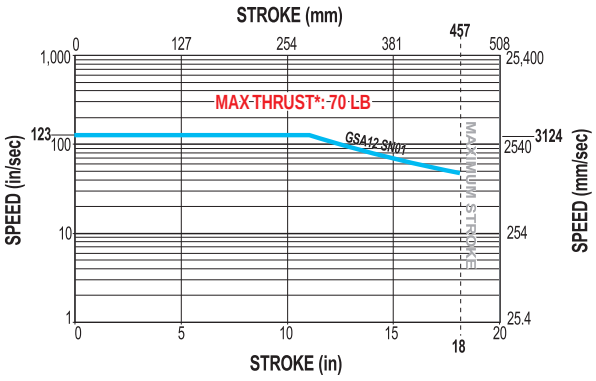
SIDE LOADING CONSIDERATIONS: *Guided screw actuators are designed to push loads that are not separately guided and supported and may be used for applications that require substantial side loading. Use the performance charts shown for each actuator size to determine its side loading capacities. The charts assume that the GSA is mounted horizontally. Tol-O-Matic recommends that you use the Tol-O-Motion Sizing Software to choose the correct actuator for your application. Contact the factory for questions regarding side loading capabilities or selection.*

Axidyne® GSA/GSM12 Series
ACME SCREW SPECIFICATIONS

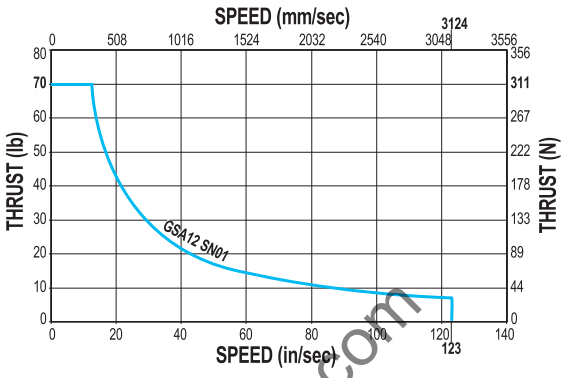


GSA/GSM12 ACME SCREW CRITICAL SPEED AND PV LIMITS

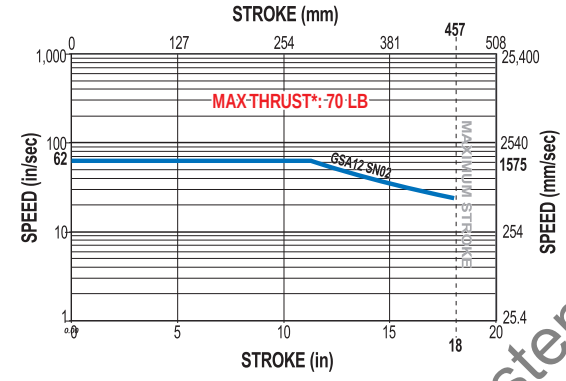
CRITICAL SPEED WITH 0.375" 1TPI ENGLISH ACME SCREW



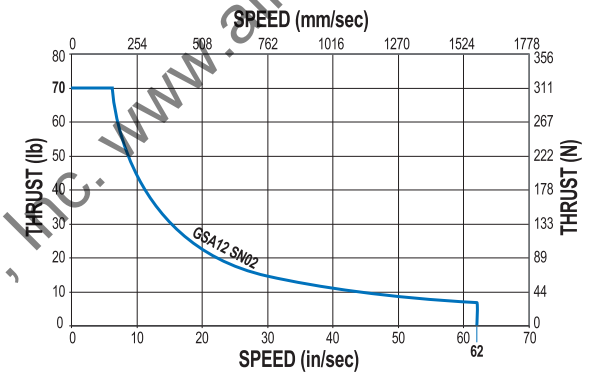
PV LIMITS: 0.375" 1TPI ENGLISH ACME SCREW



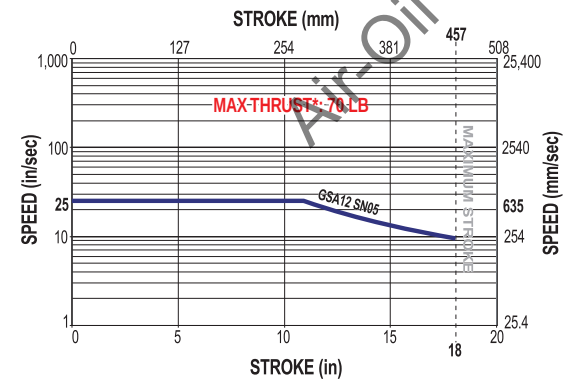
CRITICAL SPEED WITH 0.375" 2TPI ENGLISH ACME SCREW



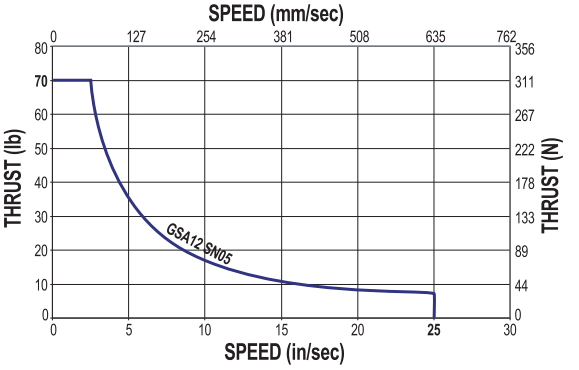
PV LIMITS: 0.375" 2TPI ENGLISH ACME SCREW



CRITICAL SPEED WITH 0.375" 5TPI ENGLISH ACME SCREW



PV LIMITS: 0.375" 5TPI ENGLISH ACME SCREW



SN = Solid Nut

** Maximum thrust is the maximum continuous dynamic thrust subject to Thrust x Velocity limitation.*

***PV LIMITS:** Any material which carries a sliding load is limited by heat buildup. The factors that affect heat generation rate in an application are the pressure on the nut in pounds per square inch and the surface velocity in feet per minute. The product of these factors provides a measure of the severity of an application.*

$$P = \frac{\text{Thrust}}{\text{Max. Thrust Rating}} \times V = \frac{\text{Speed}}{\text{Max. Speed Rating}} \leq 0.1$$

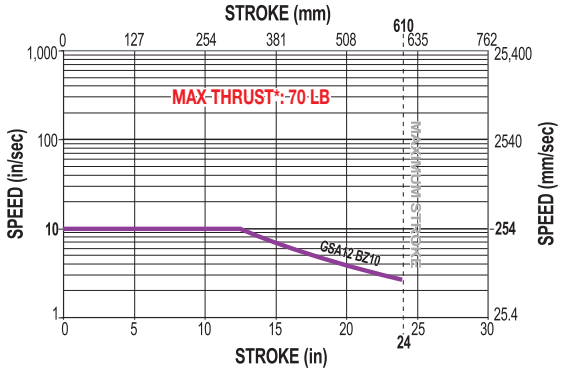
GUIDED SCREW

GSA/GSM12 Series

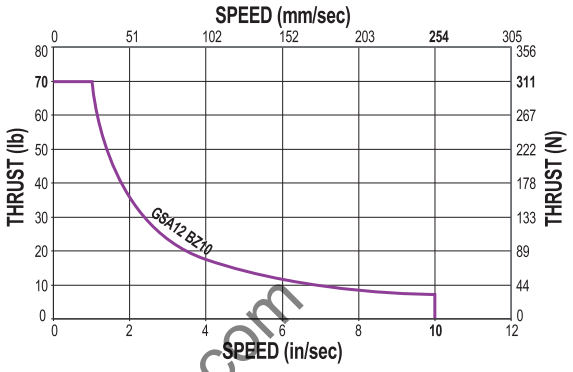
- Acme screw critical speed and PV limits

GSA/GSM12 ACME SCREW CRITICAL SPEED AND PV LIMITS (continued)

CRITICAL SPEED WITH 0.375" 10TPI ENGLISH ACME SCREW



PV LIMITS: 0.375" 10TPI ENGLISH ACME SCREW



BZ = Bronze Nut

** Maximum thrust is the maximum continuous dynamic thrust subject to Thrust x Velocity limitation.*

***PV LIMITS:** Any material which carries a sliding load is limited by heat buildup. The factors that affect heat generation rate in an application are the pressure on the nut in pounds per square inch and the surface velocity in feet per minute. The product of these factors provides a measure of the severity of an application.*

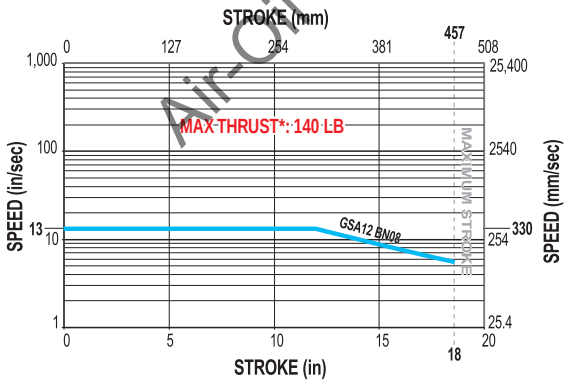
$$P = \frac{\text{Thrust}}{\text{Max. Thrust Rating}} \times V = \frac{\text{Speed}}{\text{Max. Speed Rating}} \leq 0.1$$

GUIDED SCREW

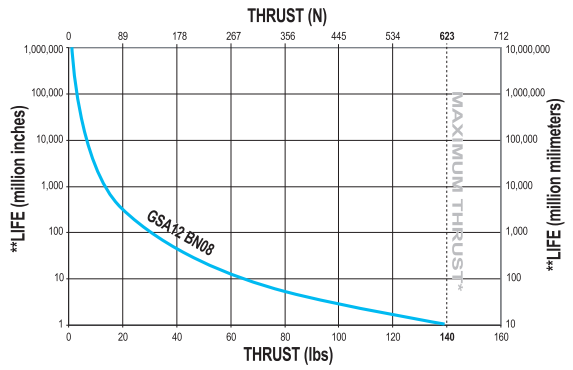
GSA/GSM12 Series
- Acme screw critical speed and PV limits
- Ball screw critical speed and life calculations

GSA/GSM12 BALL SCREW CRITICAL SPEED AND LIFE CALCULATIONS

CRITICAL SPEED WITH 0.375" 8TPI ENGLISH BALL SCREW



LIFE CALCULATION: 0.375" 8TPI ENGLISH BALL SCREW



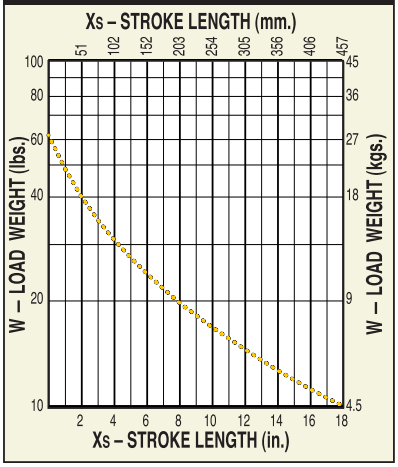
BN = Ball Nut

** Maximum thrust reflects 90% reliability for 1 million linear inches of travel.*

****Life indicates theoretical maximum life of screw only, under ideal conditions and does not indicate expected life of actuator.***

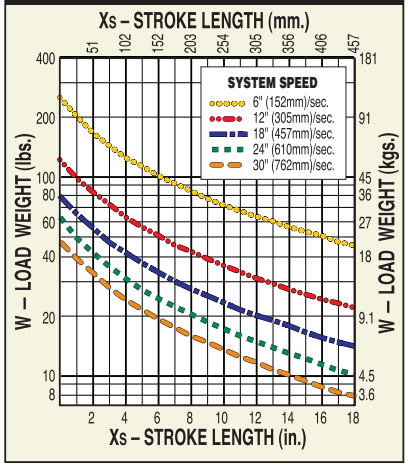
GSA/GSM12 MAXIMUM LOAD WEIGHT AND GUIDE ROD DEFLECTION

MAXIMUM LOAD WEIGHT vs STROKE LENGTH
Linear Ball Bearing, Standard Guide Rods

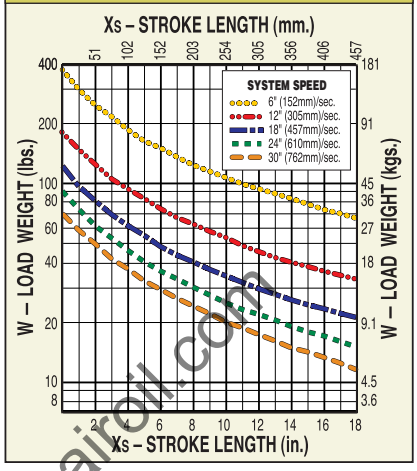


Linear ball bearings are not available with stainless steel guide rod option.

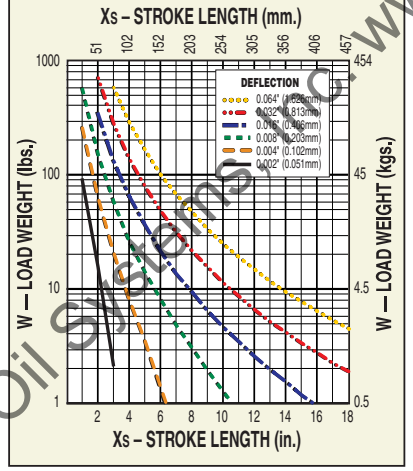
MAXIMUM LOAD WEIGHT vs STROKE LENGTH
Composite Bearing, Standard Guide Rods



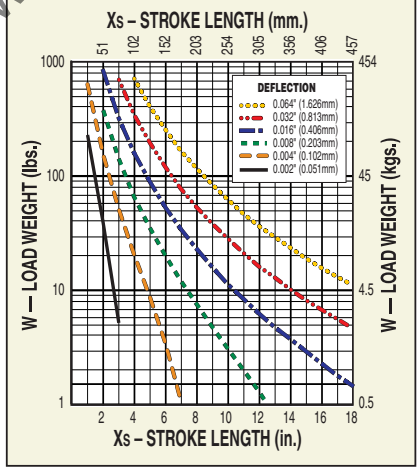
MAXIMUM LOAD WEIGHT vs STROKE LENGTH
Composite Bearing, Oversize Guide Rods



GUIDE ROD DEFLECTION
Standard Guide Rods



GUIDE ROD DEFLECTION
Oversize Guide Rods



DO NOT EXCEED MAXIMUM LOAD CURVE

Maximum load values are based on 200 million linear inches of travel.

1. To obtain most accurate results, stroke length should be adjusted by the distance between the center of mass of the load and tooling plate.

   $X_{adj} = X_s + X_{cm}$

   Then, use X_{adj} instead of X_s on the Maximum Load Weight vs. Stroke Length graph.

2. For the off-center loads, calculate adjusted load weight using the following formula:

   $W_{adj} = W (1 + 0.67\ Y_{cm})$

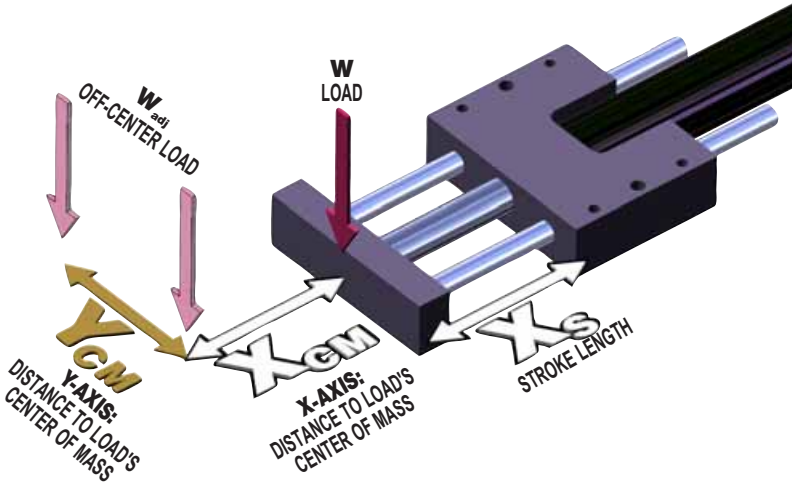
   where Y_{cm} is distance between center of mass of off-center load and center of tooling plate.

   Then, use W_{adj} instead of **W** on Maximum Load Weight vs. Stroke Length graph.

3. Using your stroke length and load weight, evaluate guide rod deflection. If the intersection point is above the highest curve (.064"), contact Tolomatic for assistance.

- ***Impact loading is not recommended for GSA/GSM actuators.***
- ***Motor brakes may be required on vertically positioned actuators with plastic (solid) or ball nuts in applications with risk of load backdriving. (Actuators with bronze nuts will not backdrive for loads, thrusts within catalog specifications.)***

Contact Tolomatic for assistance.

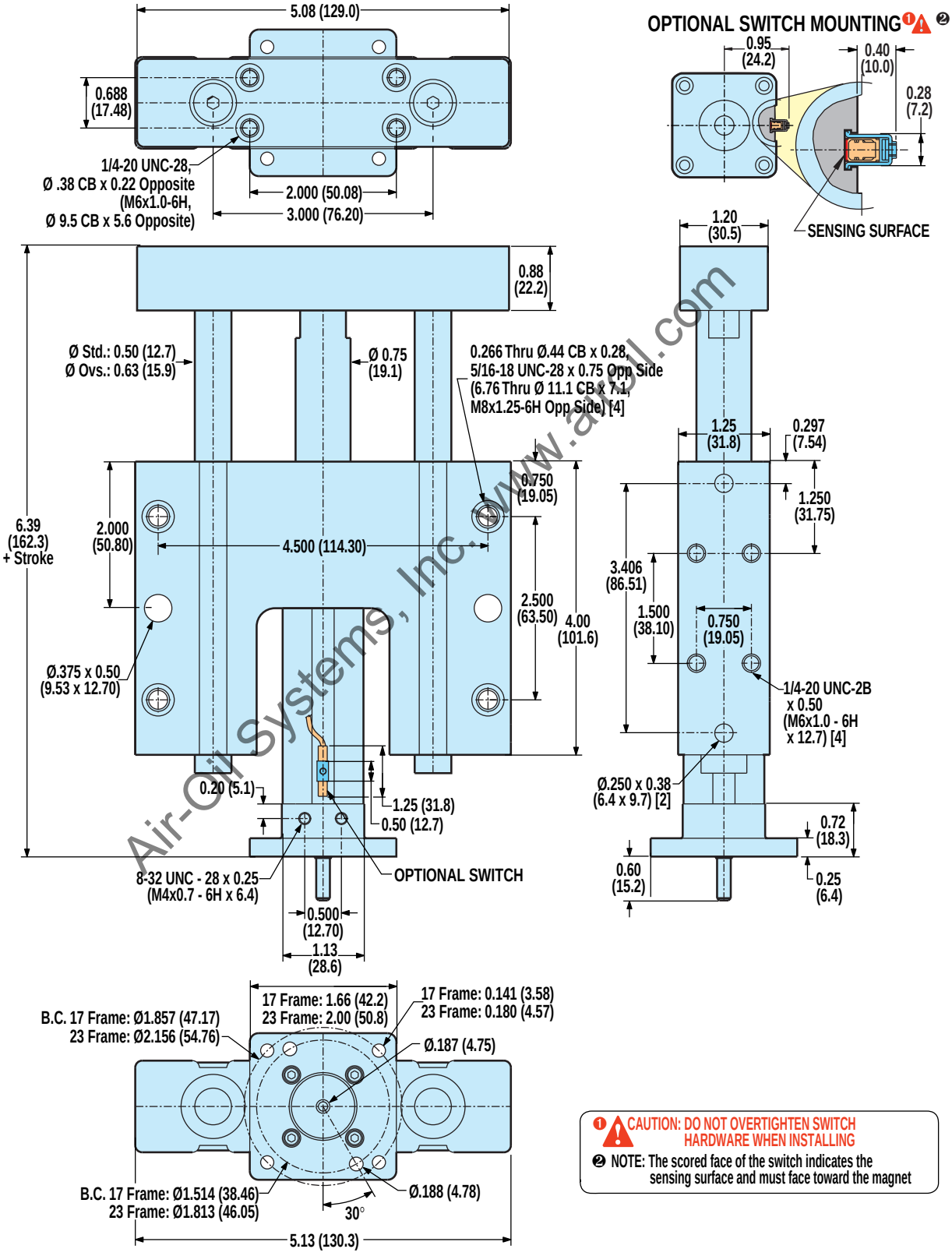


GUIDED SCREW

GSA/GSM12 Series

- Maximum load weight and guide rod deflection

GSA/GSM12 IN-LINE (LMI) BASE MODEL AND SWITCH MOUNTING



❶ CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING

❷ NOTE: The scored face of the switch indicates the sensing surface and must face toward the magnet

Unless otherwise noted, all dimensions shown are in inches (Dimensions in parenthesis are in millimeters)

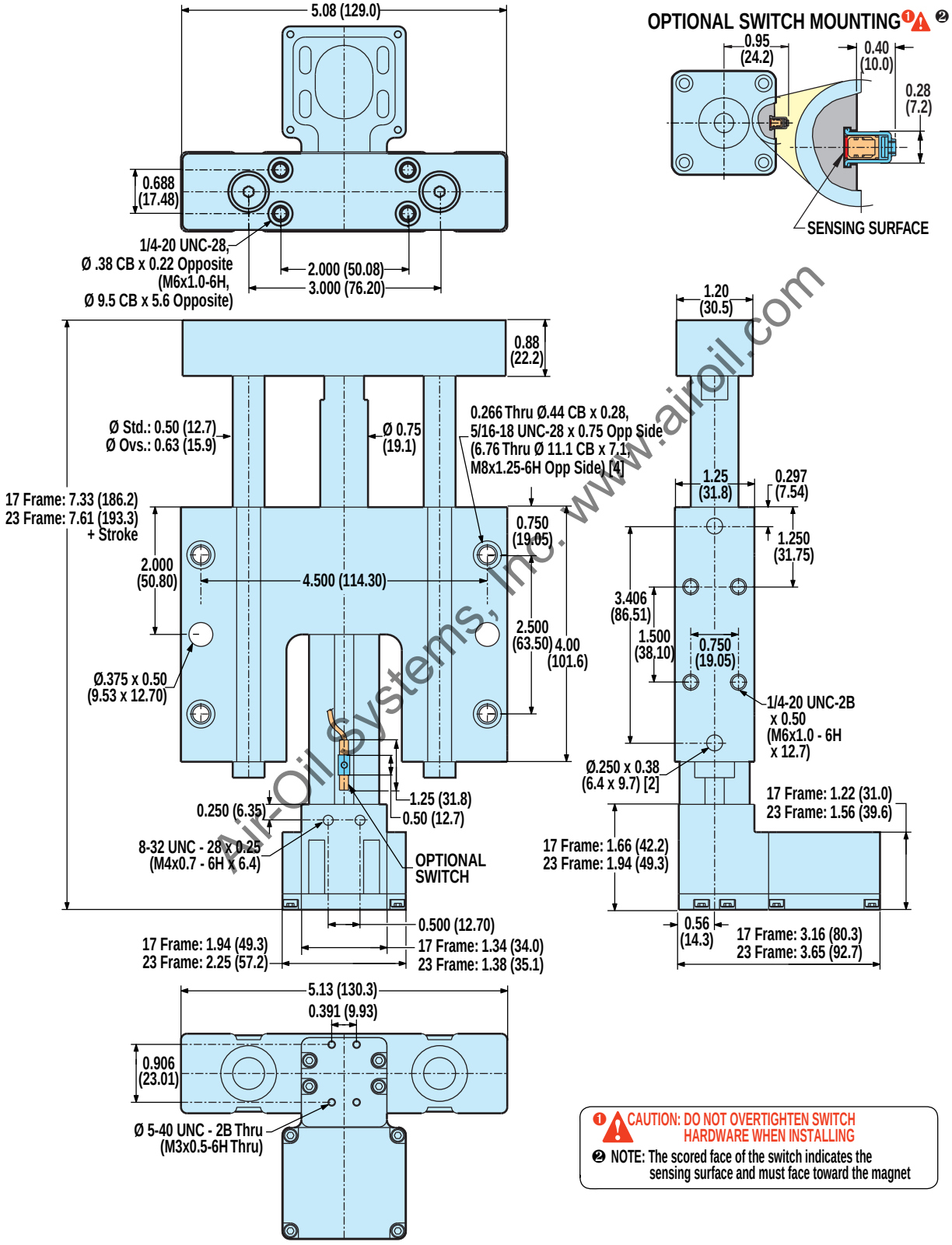
GUIDED SCREW

GSA/GSM12 Series

- In-line base model dimensions

DIMENSIONS

GSA/GSM12 REVERSE PARALLEL (RP) BASE MODEL OPTIONS AND SWITCH MOUNTING



❶⚠ CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING

❷ NOTE: The scored face of the switch indicates the sensing surface and must face toward the magnet

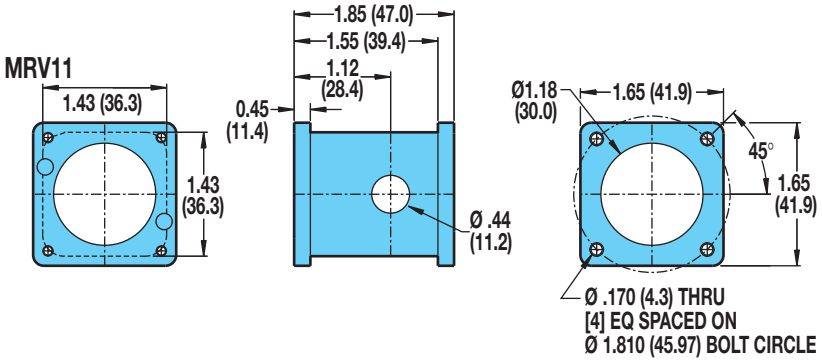
GUIDED SCREW

GSA/GSM12 Series

- Reverse parallel base model dimensions

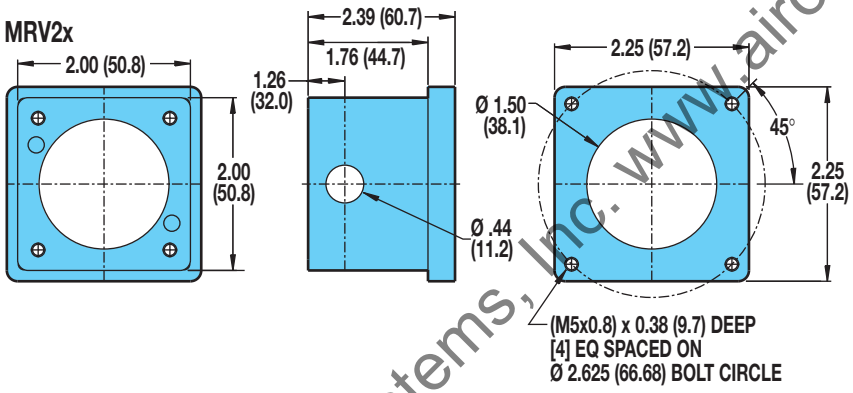
DIMENSIONS

GSA/GSM12: IN-LINE MOUNTING FOR 17-FRAME MOTORS



Gearheads are not available for the GSA/GSM12.

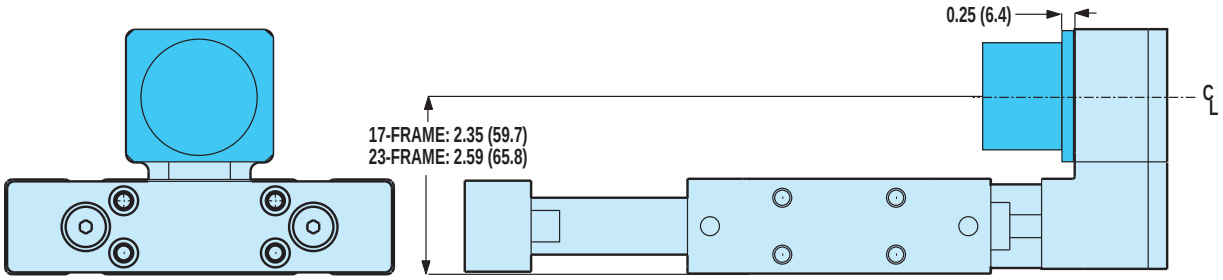
GSA/GSM12: IN-LINE MOUNTING FOR 23-FRAME MOTORS



Gearheads are not available for the GSA/GSM12.

DIMENSIONS

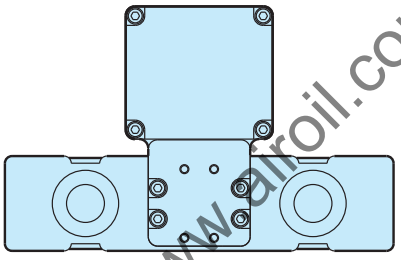
GSA/GSM12: REVERSE PARALLEL MOTOR MOUNTING

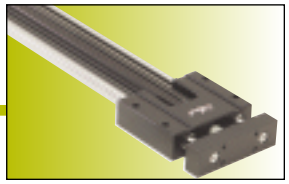


SPECIFICATIONS

	MOTOR	REDUCTION INERTIA AT MOTOR SHAFT 1:1	
		lb-in²	kg-cm²
BRUSHLESS	MRV11, 21, 22, 23, 24	.037	.1083

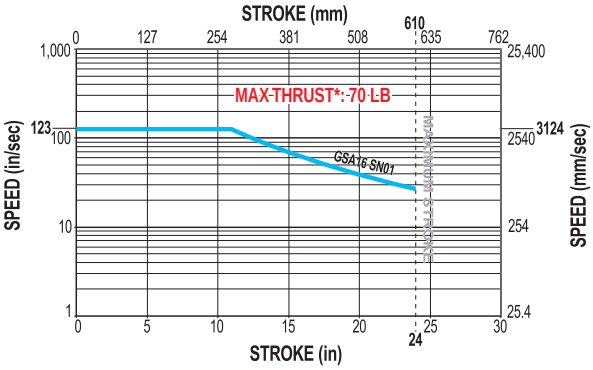
REDUCTION EFFICIENCY: 0.95



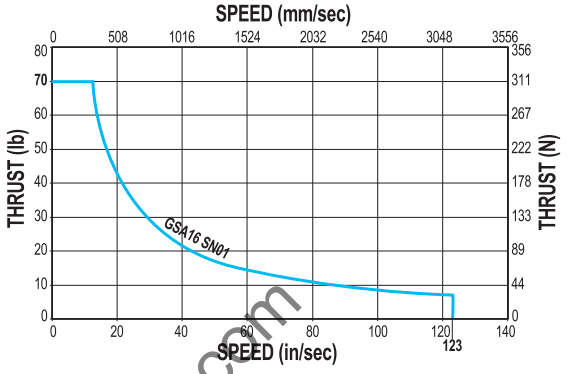


GSA16 ACME SCREW CRITICAL SPEED AND PV LIMITS

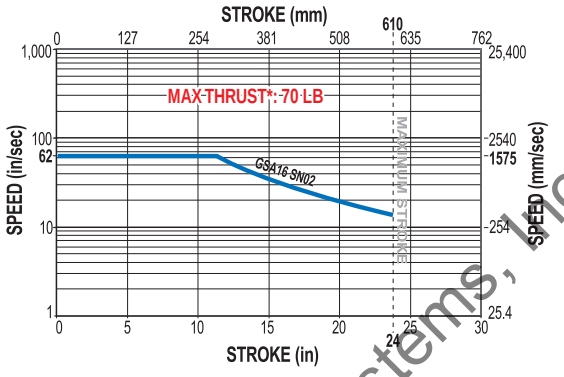
CRITICAL SPEED WITH 0.375" 1TPI ENGLISH ACME SCREW



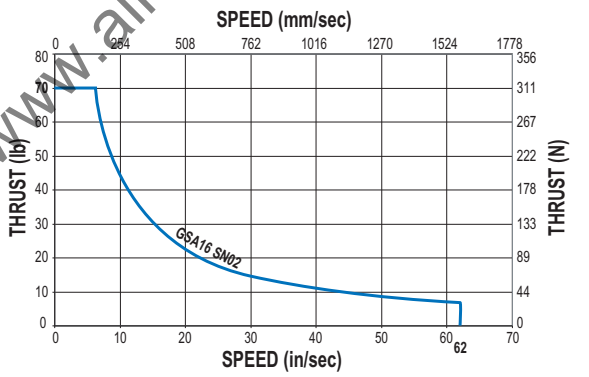
PV LIMITS: 0.375" 1TPI ENGLISH ACME SCREW



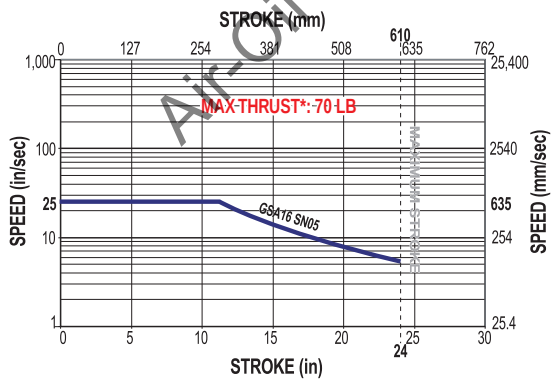
CRITICAL SPEED WITH 0.375" 2TPI ENGLISH ACME SCREW



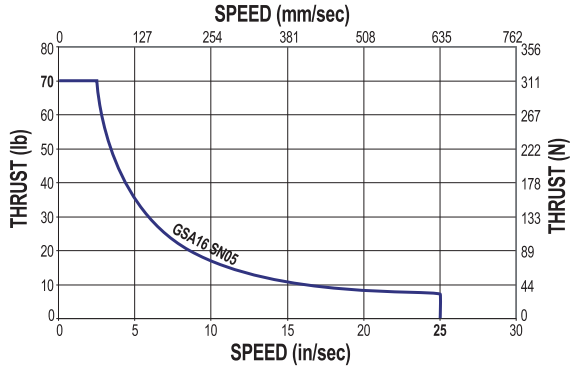
PV LIMITS: 0.375" 2TPI ENGLISH ACME SCREW



CRITICAL SPEED WITH 0.375" 5TPI ENGLISH ACME SCREW



PV LIMITS: 0.375" 5TPI ENGLISH ACME SCREW



SN = Solid Nut

**** Maximum thrust is the maximum continuous dynamic thrust subject to Thrust x Velocity limitation.***

PV LIMITS: Any material which carries a sliding load is limited by heat buildup. The factors that affect heat generation rate in an application are the pressure on the nut in pounds per square inch and the surface velocity in feet per minute. The product of these factors provides a measure of the severity of an application.

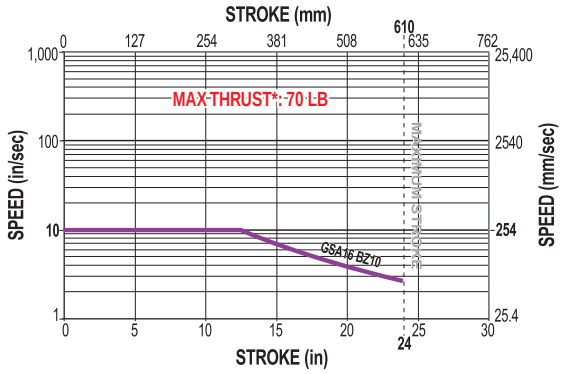
$$P = \frac{\text{Thrust}}{\text{Max. Thrust Rating}} \times V = \frac{\text{Speed}}{\text{Max. Speed Rating}} \leq 0.1$$

GUIDED SCREW

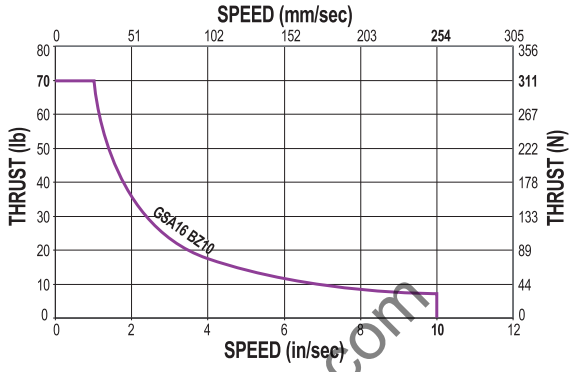
GSA/GSM16 Series
- Acme screw critical speed and PV limits

GSA16 ACME SCREW CRITICAL SPEED AND PV LIMITS (continued)

CRITICAL SPEED WITH 0.375" 10TPI ENGLISH ACME SCREW



PV LIMITS: 0.375" 10TPI ENGLISH ACME SCREW



BZ = Bronze Nut

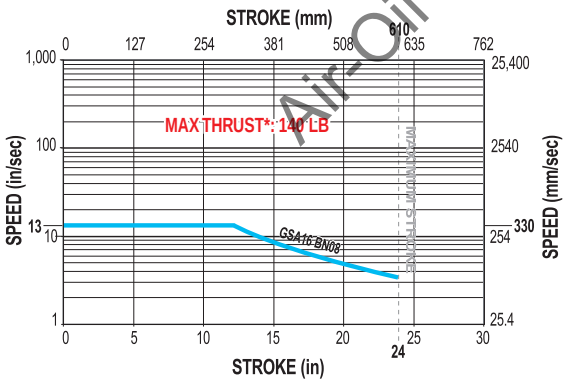
* *Maximum thrust is the maximum continuous dynamic thrust subject to Thrust x Velocity limitation.*

***PV LIMITS:** Any material which carries a sliding load is limited by heat buildup. The factors that affect heat generation rate in an application are the pressure on the nut in pounds per square inch and the surface velocity in feet per minute. The product of these factors provides a measure of the severity of an application.*

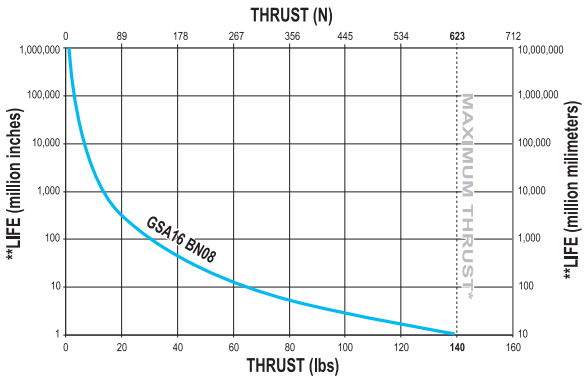
$$P = \frac{\text{Thrust}}{\text{Max. Thrust Rating}} \times V = \frac{\text{Speed}}{\text{Max. Speed Rating}} \leq 0.1$$

GSA16 BALL SCREW CRITICAL SPEED AND LIFE CALCULATIONS

CRITICAL SPEED WITH 0.375" 8TPI ENGLISH BALL SCREW



LIFE CALCULATION: 0.375" 8TPI ENGLISH BALL SCREW



BN = Ball Nut

* *Maximum thrust reflects 90% reliability for 1 million linear inches of travel.*

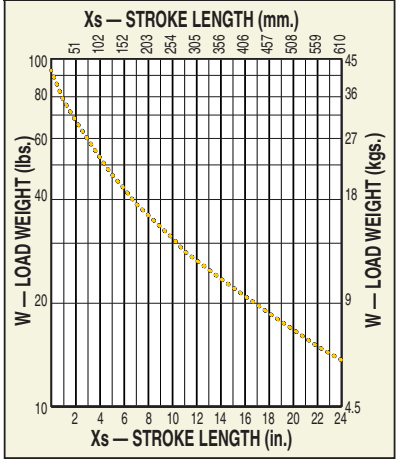
***Life indicates theoretical maximum life of screw only, under ideal conditions and does not indicate expected life of actuator.*

GUIDED SCREW

GSA/GSM16 Series
- Acme screw critical speed and PV limits
- Ball screw critical speed and life calculations

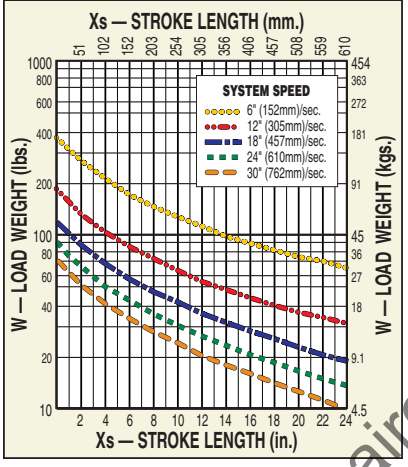
GSA/GSM16 MAXIMUM LOAD WEIGHT AND GUIDE ROD DEFLECTION

MAXIMUM LOAD WEIGHT vs STROKE LENGTH
LINEAR BALL BEARING, STANDARD GUIDE RODS

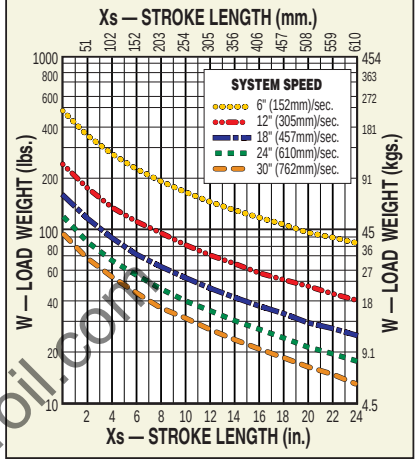


Linear ball bearings are not available with stainless steel guide rod option.

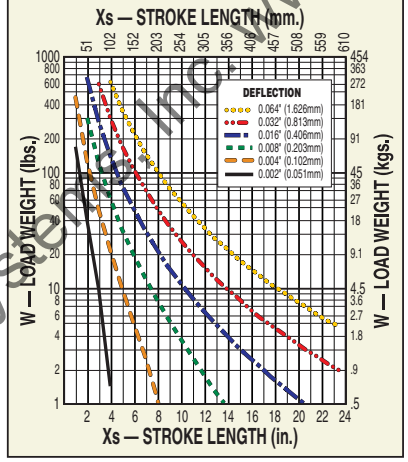
MAXIMUM LOAD WEIGHT vs STROKE LENGTH
COMPOSITE BEARING, STANDARD GUIDE RODS



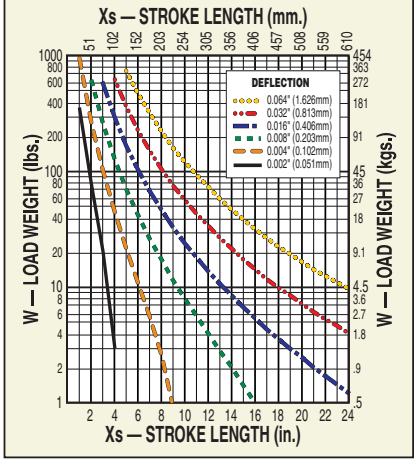
MAXIMUM LOAD WEIGHT vs STROKE LENGTH
COMPOSITE BEARING, OVERSIZE GUIDE RODS



GUIDE ROD DEFLECTION
STANDARD GUIDE RODS



GUIDE ROD DEFLECTION
OVERSIZE GUIDE RODS



DO NOT EXCEED MAXIMUM LOAD CURVE

Maximum load values are based on 200 million linear inches of travel.

1. To obtain most accurate results, stroke length should be adjusted by the distance between the center of mass of the load and tooling plate.

   $X_{adj} = X_s + X_{cm}$

   Then, use X_{adj} instead of X_s on the Maximum Load Weight vs. Stroke Length graph.

2. For the off-center loads, calculate adjusted load weight using the following formula:

   $W_{adj} = W (1 + 0.53\ Y_{cm})$

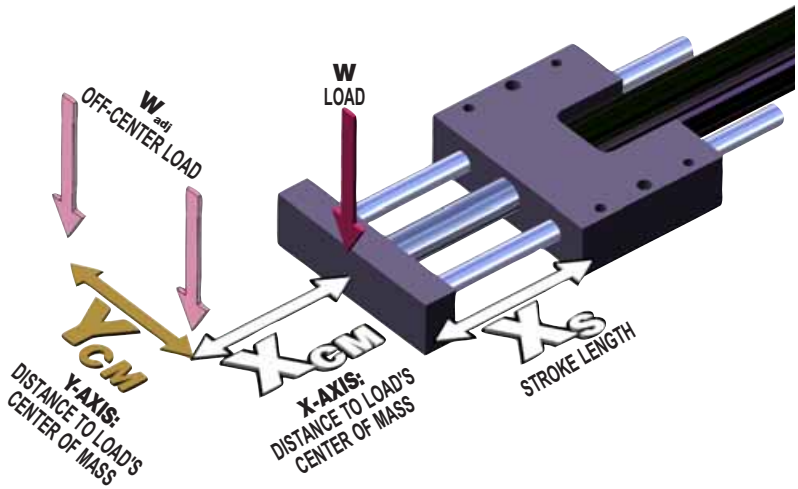
   where Y_{cm} is distance between center of mass of off-center load and center of tooling plate.

   Then, use W_{adj} instead of **W** on Maximum Load Weight vs. Stroke Length graph.

3. Using your stroke length and load weight, evaluate guide rod deflection. If the intersection point is above the highest curve (.064"), contact Tolomatic for assistance.

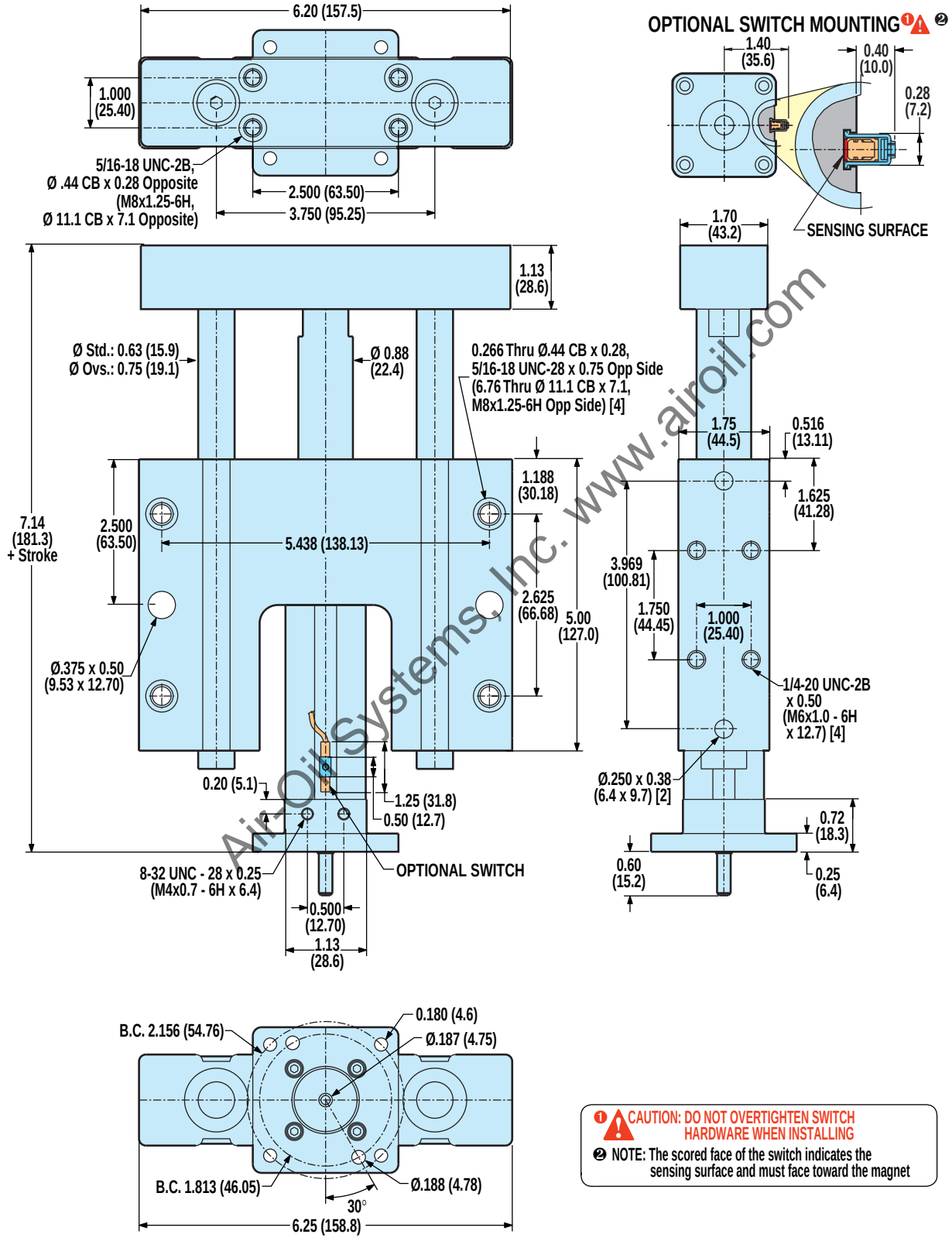
- ***Impact loading is not recommended for GSA/GSM actuators.***
- ***Motor brakes may be required on vertically positioned actuators with plastic (solid) or ball nuts in applications with risk of load backdriving. (Actuators with bronze nuts will not backdrive for loads, thrusts within catalog specifications.)***

Contact Tolomatic for assistance.



DIMENSIONS

GSA/GSM16 IN-LINE (LMI) BASE MODEL AND SWITCH MOUNTING



❶⚠ CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING

❷ NOTE: The scored face of the switch indicates the sensing surface and must face toward the magnet

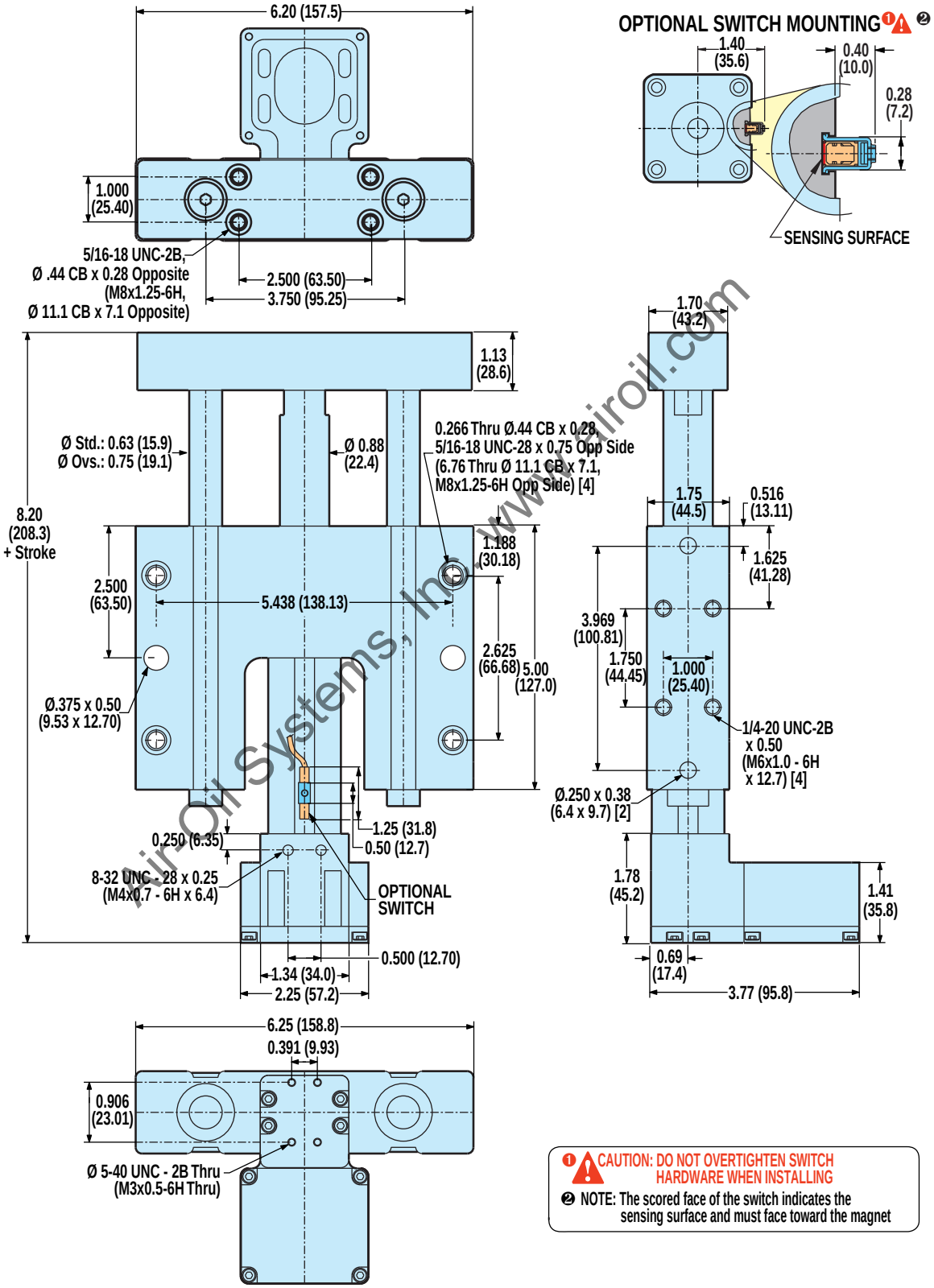
Unless otherwise noted, all dimensions shown are in inches (Dimensions in parenthesis are in millimeters)

GSA/GSM16 REVERSE PARALLEL (RP) BASE MODEL OPTIONS AND SWITCH MOUNTING

GUIDED SCREW

GSA/GSM16 Series

- Reverse parallel base model dimensions



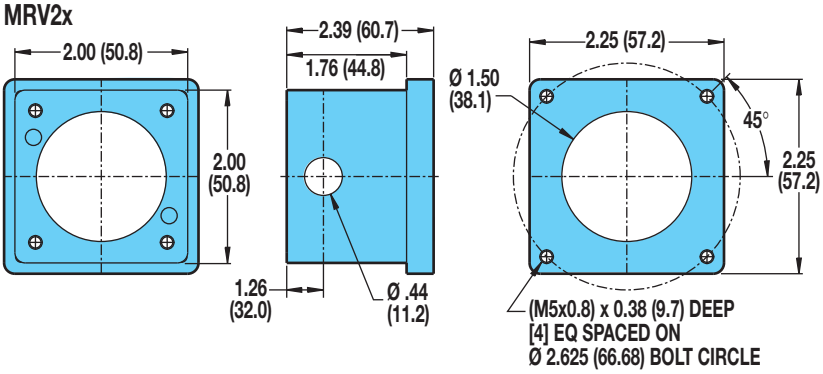
❶⚠ CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING

❷ NOTE: The scored face of the switch indicates the sensing surface and must face toward the magnet

DIMENSIONS

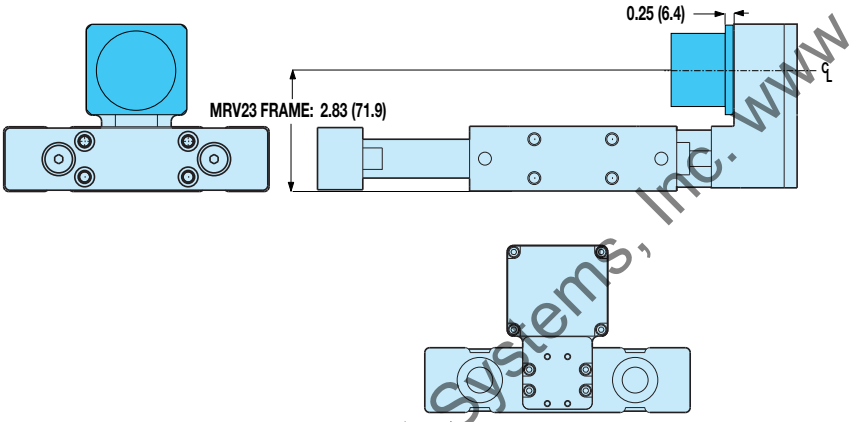
GSA/GSM16: IN-LINE MOTOR MOUNTING

MRV2x



Gearheads are not available for the GSA/GSM16

GSA/GSM16: REVERSE PARALLEL MOTOR MOUNTING



SPECIFICATIONS

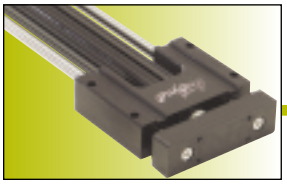
	MOTOR	REDUCTION INERTIA AT MOTOR SHAFT 1:1	
		lb-in²	kg-m² x 10⁻⁶
BRUSHLESS	MRV21, 22, 23, 24	0.037	10.676

REDUCTION EFFICIENCY: 0.95

GUIDED SCREW

GSA/GSM16 Series

- In-line motor mounting
- Reverse parallel motor mounting

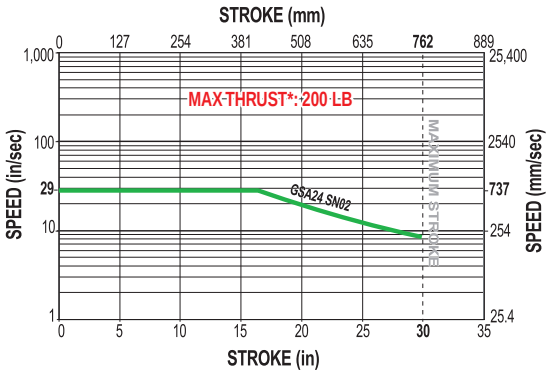


Axidyne® GSA/GSM24 Series

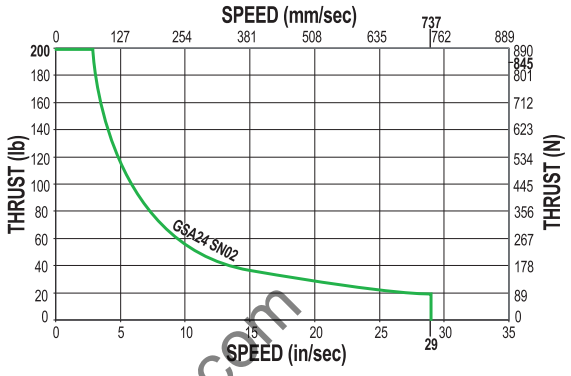
ACME SCREW SPECIFICATIONS

GSA24 ACME SCREW CRITICAL SPEED AND PV LIMITS

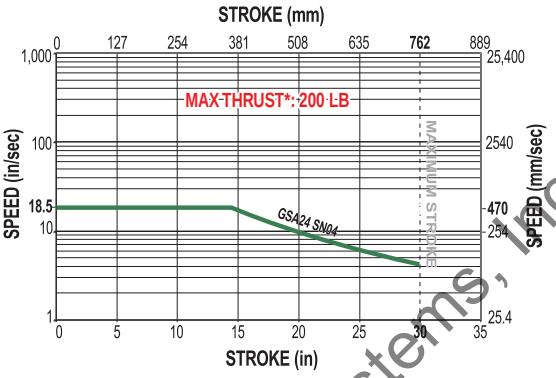
CRITICAL SPEED WITH 0.625" 2TPI ENGLISH ACME SCREW



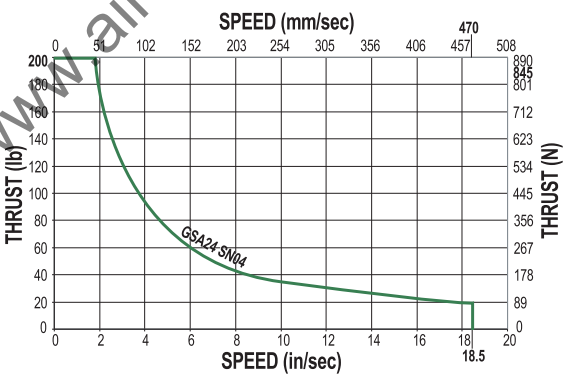
PV LIMITS: 0.625" 2TPI ENGLISH ACME SCREW



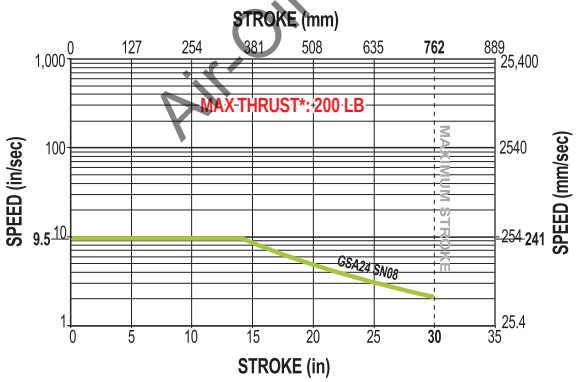
CRITICAL SPEED WITH 0.625" 4TPI ENGLISH ACME SCREW



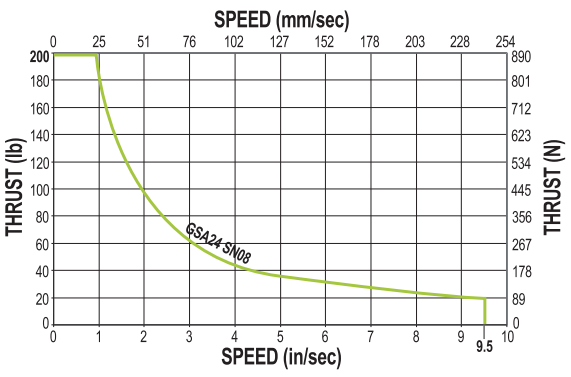
PV LIMITS: 0.625" 4TPI ENGLISH ACME SCREW



CRITICAL SPEED WITH 0.625" 8TPI ENGLISH ACME SCREW



PV LIMITS: 0.625" 8TPI ENGLISH ACME SCREW



SN = Solid Nut

**** Maximum thrust is the maximum continuous dynamic thrust subject to Thrust x Velocity limitation.***

PV LIMITS: Any material which carries a sliding load is limited by heat buildup. The factors that affect heat generation rate in an application are the pressure on the nut in pounds per square inch and the surface velocity in feet per minute. The product of these factors provides a measure of the severity of an application.

$$P = \frac{\text{Thrust}}{\text{Max. Thrust Rating}} \times V = \frac{\text{Speed}}{\text{Max. Speed Rating}} \leq 0.1$$

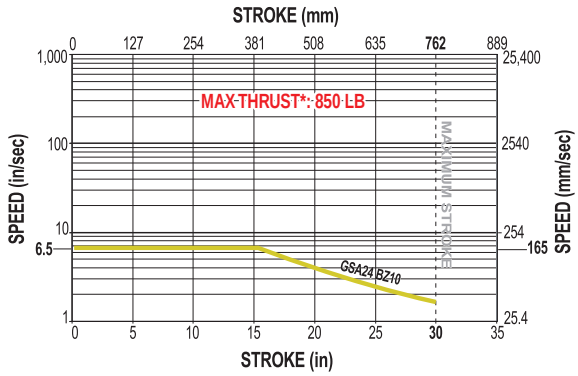
GUIDED SCREW

GSA/GSM24 Series

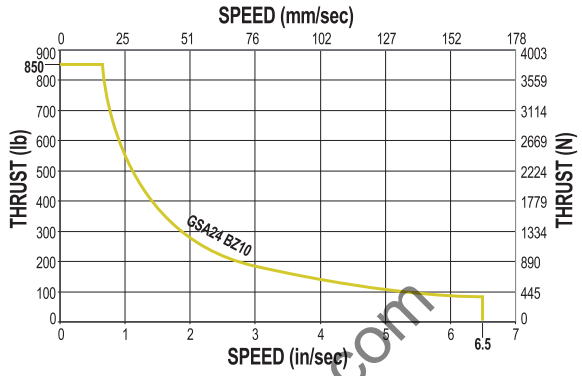
- Acme screw critical speed and PV limits

GSA24 ACME SCREW CRITICAL SPEED AND PV LIMITS (continued)

CRITICAL SPEED WITH 0.625" 10TPI ENGLISH ACME SCREW



PV LIMITS: 0.625" 10TPI ENGLISH ACME SCREW



BZ = Bronze Nut

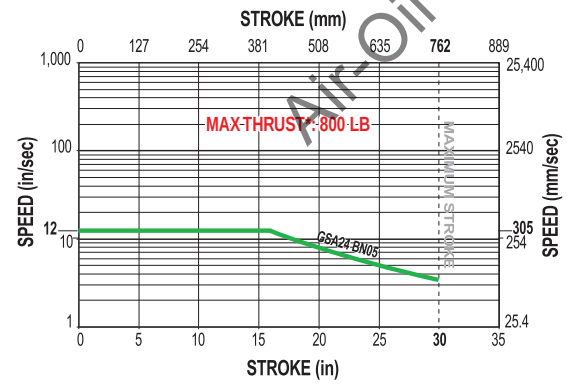
** Maximum thrust is the maximum continuous dynamic thrust subject to Thrust x Velocity limitation.*

***PV LIMITS:** Any material which carries a sliding load is limited by heat buildup. The factors that affect heat generation rate in an application are the pressure on the nut in pounds per square inch and the surface velocity in feet per minute. The product of these factors provides a measure of the severity of an application.*

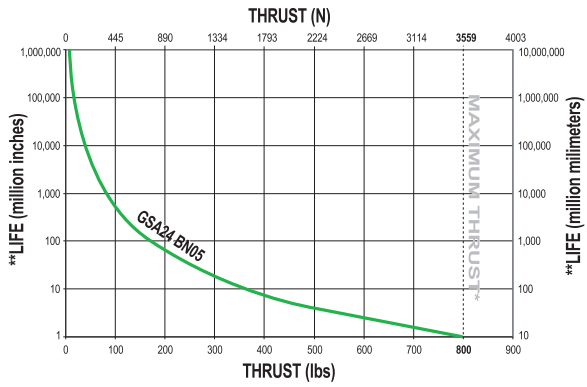
$$P = \frac{\text{Thrust}}{\text{Max. Thrust Rating}} \times V = \frac{\text{Speed}}{\text{Max. Speed Rating}} \leq 0.1$$

GSA24 BALL SCREW CRITICAL SPEED AND LIFE CALCULATIONS

CRITICAL SPEED WITH 0.625" 5TPI ENGLISH BALL SCREW



LIFE CALCULATION: 0.625" 5TPI ENGLISH BALL SCREW



BN = Ball Nut

**Maximum thrust reflects 90% reliability for 1 million linear inches of travel.*

***Life indicates theoretical maximum life of screw only, under ideal conditions and does not indicate expected life of actuator.*

GUIDED SCREW

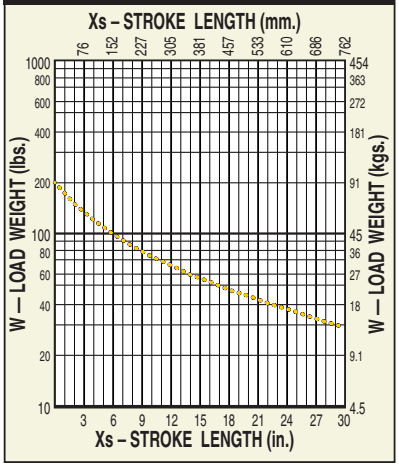
GSA/GSM24 Series
- Acme screw critical speed and PV limits
- Ball screw critical speed and life calculations

GSA/GSM24 Series

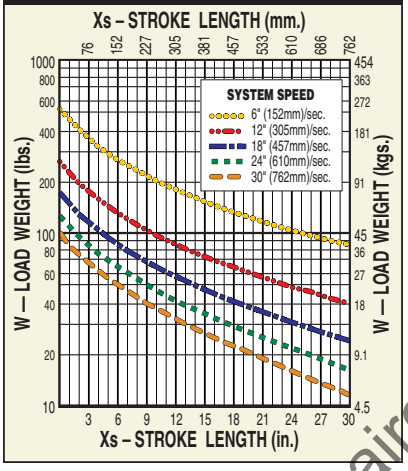
PERFORMANCE DATA

GSA/GSM24 MAXIMUM LOAD WEIGHT AND GUIDE ROD DEFLECTION

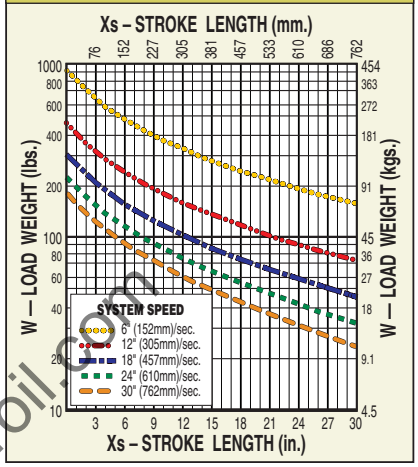
MAXIMUM LOAD WEIGHT vs STROKE LENGTH
Linear Ball Bearing, Standard Guide Rods



MAXIMUM LOAD WEIGHT vs STROKE LENGTH
Composite Bearing, Standard Guide Rods

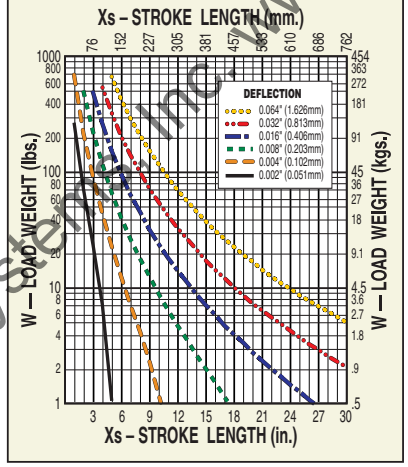


MAXIMUM LOAD WEIGHT vs STROKE LENGTH
Composite Bearing, Oversize Guide Rods

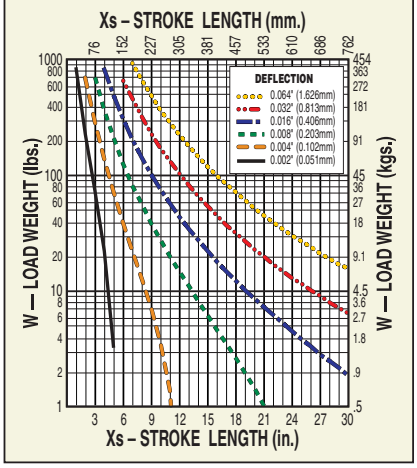


Linear ball bearings are not available with stainless steel guide rod option.

GUIDE ROD DEFLECTION
Standard Guide Rods



GUIDE ROD DEFLECTION
Oversize Guide Rods



GUIDED SCREW

GSA/GSM24 Series

- Maximum load weight and rod deflection

DO NOT EXCEED MAXIMUM LOAD CURVE

Maximum load values are based on 200 million linear inches of travel.

1. To obtain most accurate results, stroke length should be adjusted by the distance between the center of mass of the load and tooling plate.

   $X_{adj} = X_s + X_{cm}$

   Then, use X_{adj} instead of X_s on the Maximum Load Weight vs. Stroke Length graph.

2. For the off-center loads, calculate adjusted load weight using the following formula:

   $W_{adj} = W (1 + 0.40\ Y_{cm})$

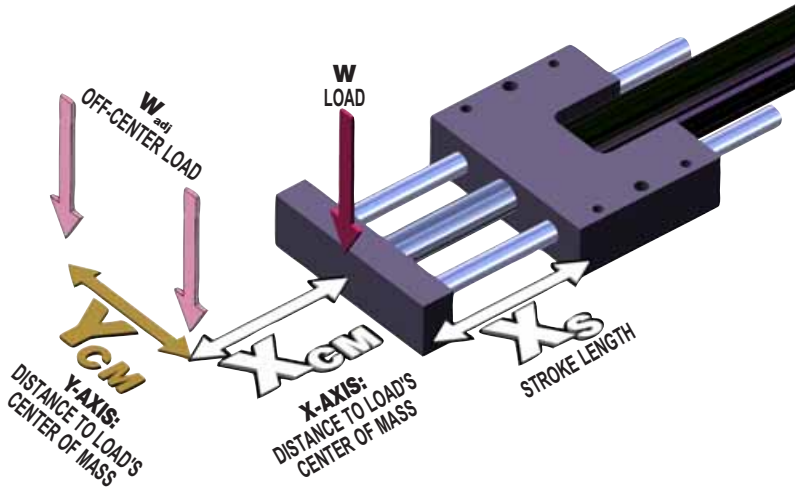
   where Y_{cm} is distance between center of mass of off-center load and center of tooling plate.

   Then, use W_{adj} instead of **W** on Maximum Load Weight vs. Stroke Length graph.

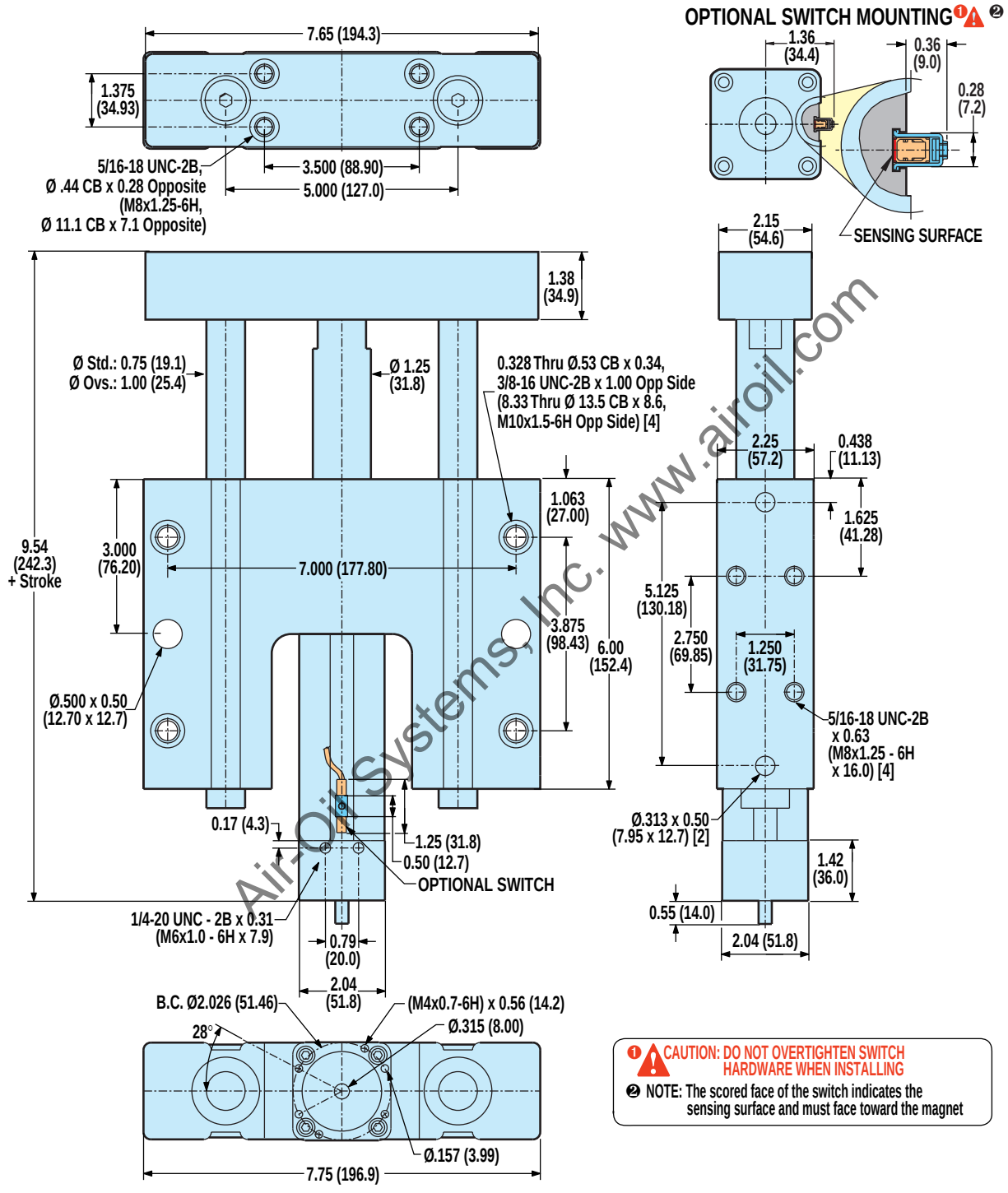
3. Using your stroke length and load weight, evaluate guide rod deflection. If the intersection point is above the highest curve (.064"), contact Tolomatic for assistance.

- ***Impact loading is not recommended for GSA/GSM actuators.***
- ***Motor brakes may be required on vertically positioned actuators with plastic (solid) or ball nuts in applications with risk of load backdriving. (Actuators with bronze nuts will not backdrive for loads, thrusts within catalog specifications.)***

Contact Tolomatic for assistance.



GSA/GSM24 IN-LINE (LMI) BASE MODEL AND SWITCH MOUNTING



❶⚠ CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING

❷ NOTE: The scored face of the switch indicates the sensing surface and must face toward the magnet

GUIDED SCREW

GSA/GSM24 Series

- In-line base model dimensions

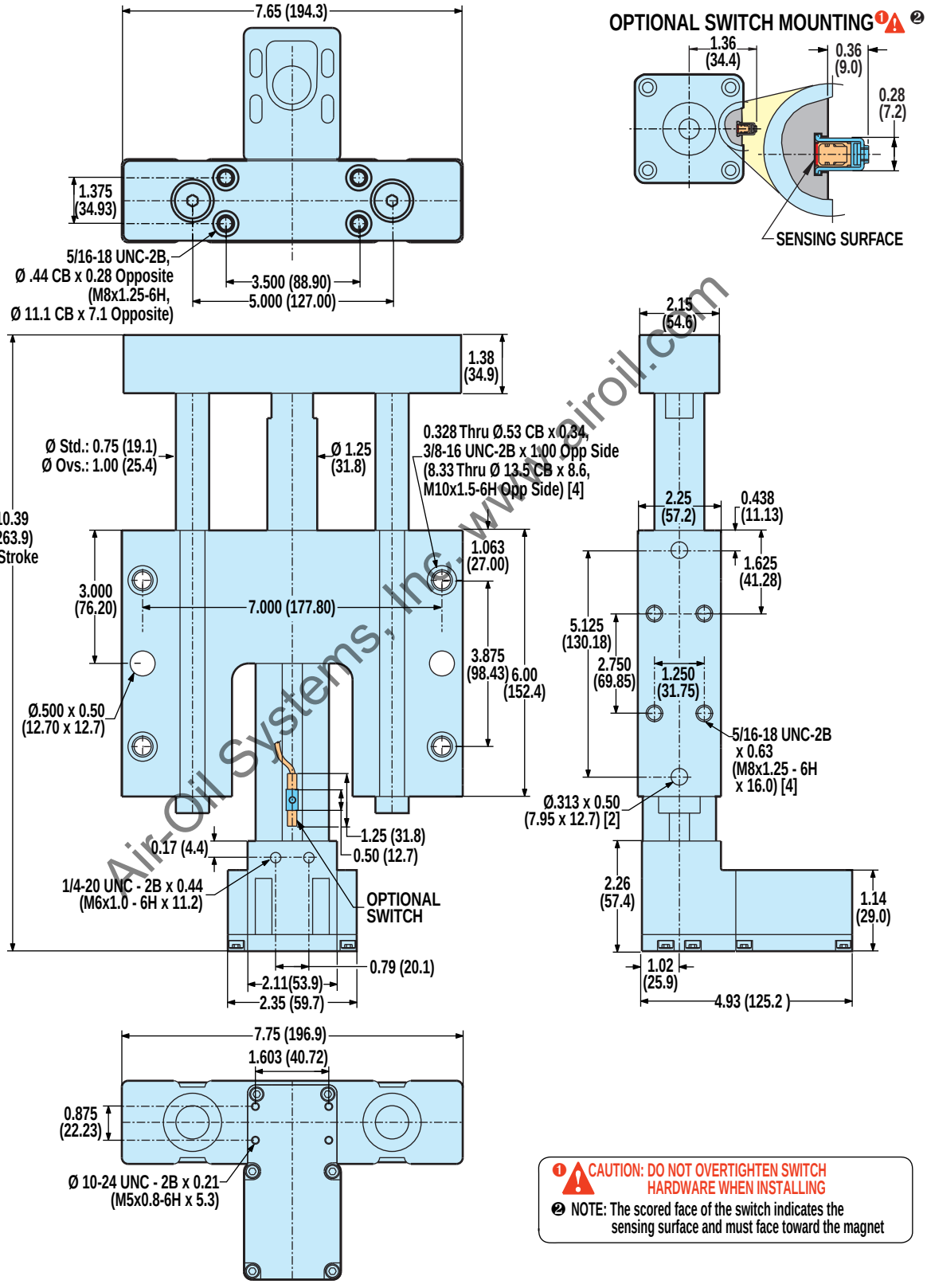
Unless otherwise noted, all dimensions shown are in inches (Dimensions in parenthesis are in millimeters)

GSA/GSM24 REVERSE PARALLEL (RP) BASE MODEL OPTIONS AND SWITCH MOUNTING

GUIDED SCREW

GSA/GSM24 Series

- Reverse parallel base model dimensions

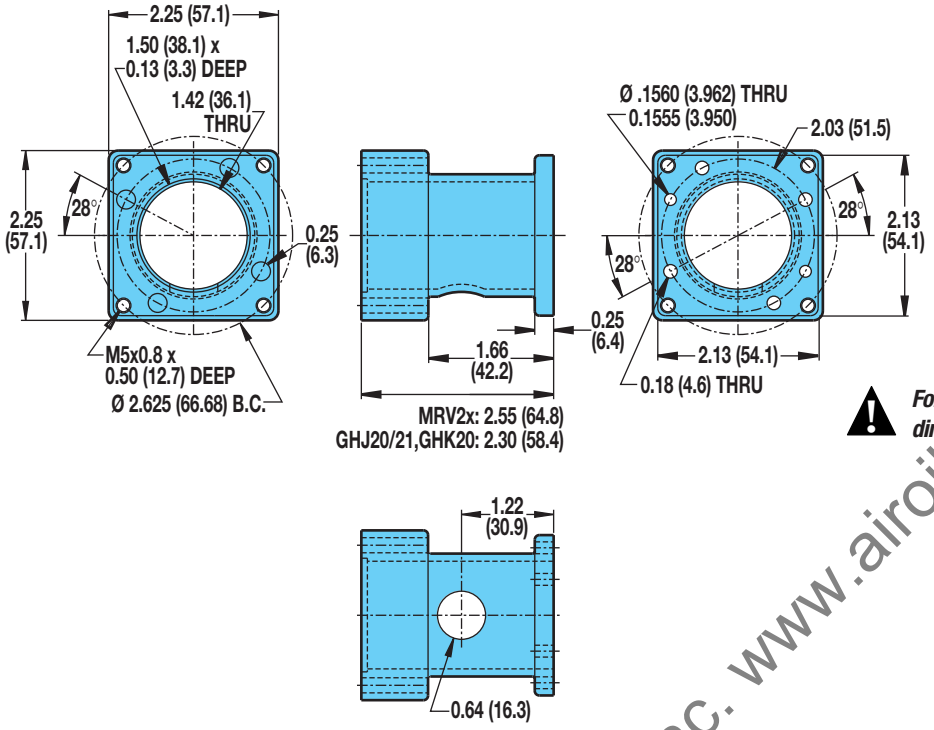


❶ CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING

❷ NOTE: The scored face of the switch indicates the sensing surface and must face toward the magnet

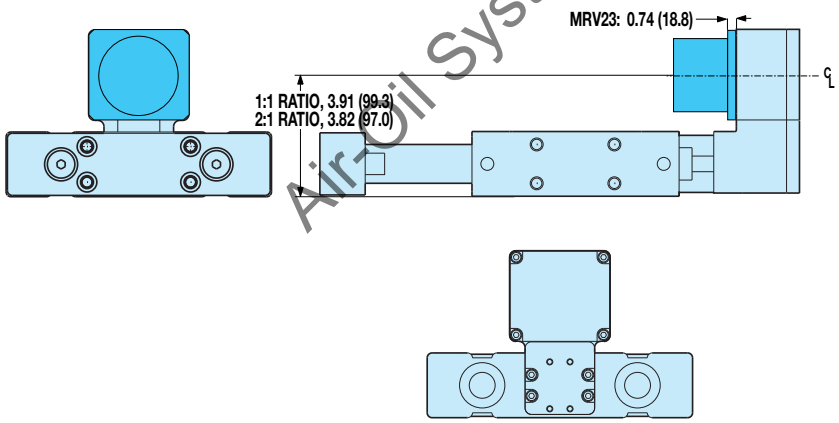
DIMENSIONS

GSA/GSM24: IN-LINE MOUNTING FOR 23-FRAME MOTORS AND GEARHEADS



For gearhead specifications and dimensions, see page F-10.

GSA/GSM24: REVERSE PARALLEL MOTOR MOUNTING



SPECIFICATIONS

MOTOR		REDUCTION INERTIA AT MOTOR SHAFT			
		1:1		2:1	
		lb-in²	kg-m² x 10⁻⁴	lb-in²	kg-m² x 10⁻⁴
BRUSHLESS	MRV21, 22, 23, 24	0.008	2.320	0.029	8.599

REDUCTION EFFICIENCY: 0.95

GUIDED SCREW

GSA/GSM24 Series

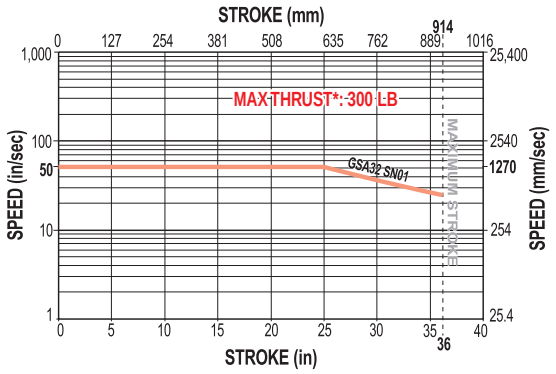
- In-line motor mounting
- Reverse parallel motor mounting

Axidyne® GSA/GSM32 Series

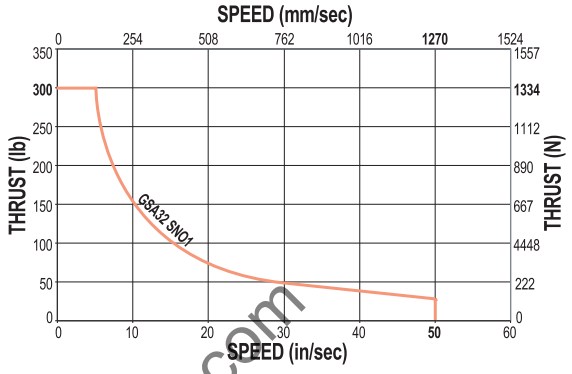
ACME SCREW SPECIFICATIONS

GSA32 ACME SCREW CRITICAL SPEED AND PV LIMITS

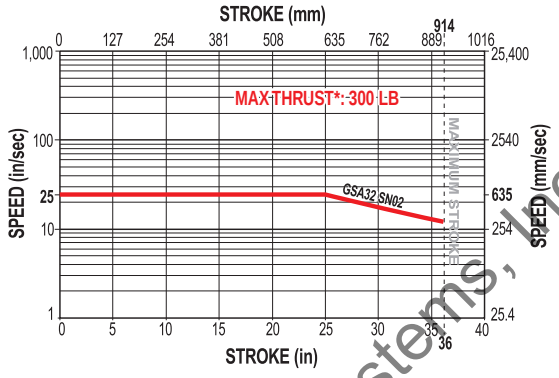
CRITICAL SPEED WITH 0.75" 1TPI ENGLISH ACME SCREW



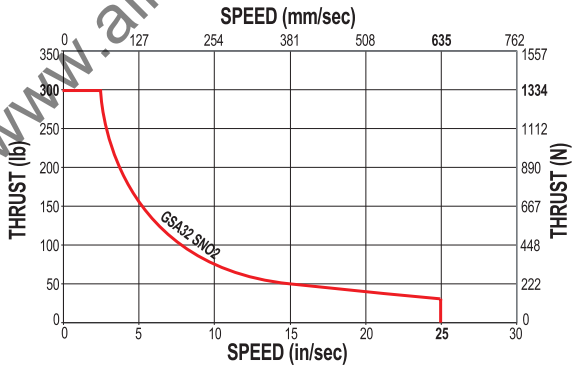
PV LIMITS: 0.75" 1TPI ENGLISH ACME SCREW



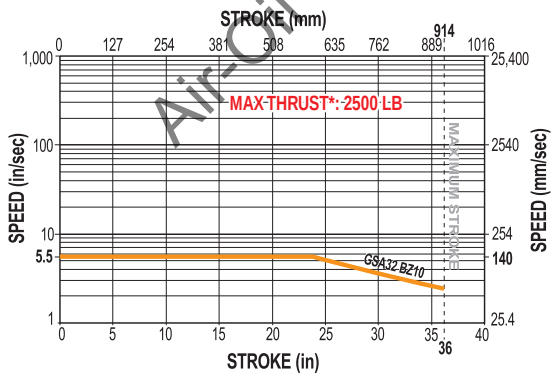
CRITICAL SPEED WITH 0.75" 2TPI ENGLISH ACME SCREW



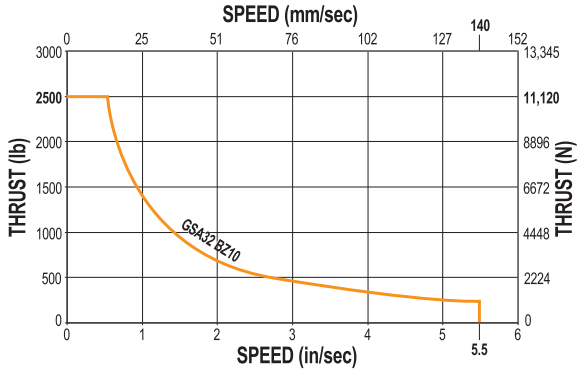
PV LIMITS: 0.75" 2TPI ENGLISH ACME SCREW



CRITICAL SPEED WITH 0.75" 10TPI ENGLISH ACME SCREW



PV LIMITS: 0.75" 10TPI ENGLISH ACME SCREW



SN = Solid Nut ***BZ= Bronze Nut***

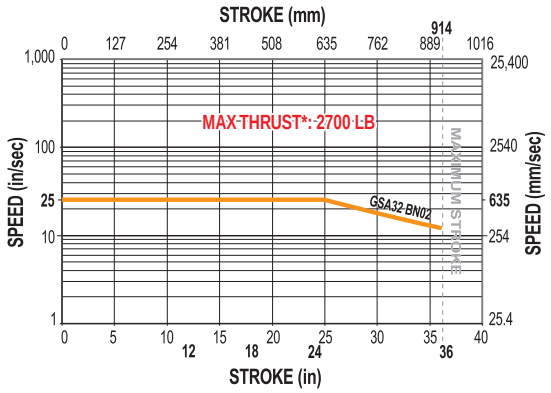
** Maximum thrust is the maximum continuous dynamic thrust subject to Thrust x Velocity limitation.*

PV LIMITS: *Any material which carries a sliding load is limited by heat buildup. The factors that affect heat generation rate in an application are the pressure on the nut in pounds per square inch and the surface velocity in feet per minute. The product of these factors provides a measure of the severity of an application.*

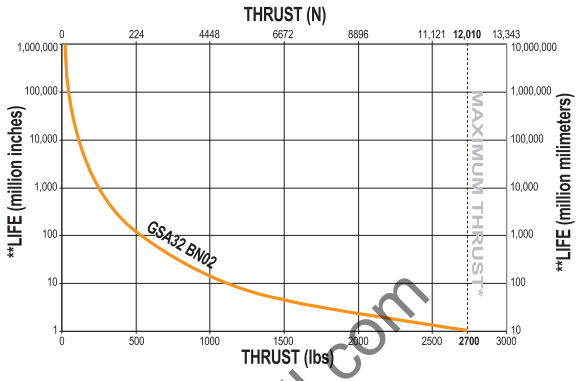
$$P = \frac{\text{Thrust}}{\text{Max. Thrust Rating}} \times V = \frac{\text{Speed}}{\text{Max. Speed Rating}} \leq 0.1$$

GSA32 BALL SCREW CRITICAL SPEED AND LIFE CALCULATIONS

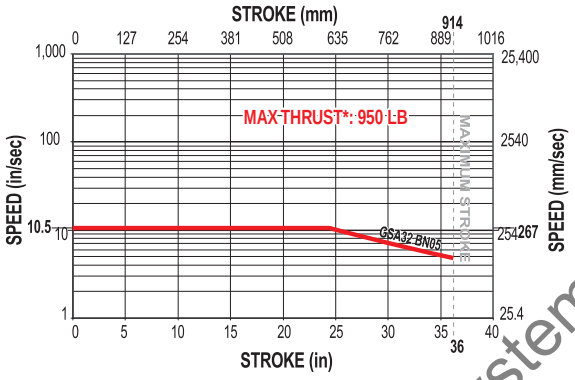
CRITICAL SPEED WITH 0.75" 2TPI ENGLISH BALL SCREW



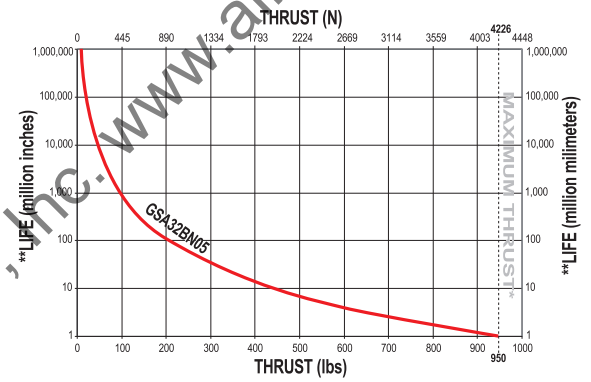
LIFE CALCULATION: 0.75" 2TPI ENGLISH BALL SCREW



CRITICAL SPEED WITH 0.75" 5TPI ENGLISH BALL SCREW



LIFE CALCULATION: 0.75" 5TPI ENGLISH BALL SCREW



GUIDED SCREW

GSA/GSM32 Series

- Ball screw critical speed and life calculations

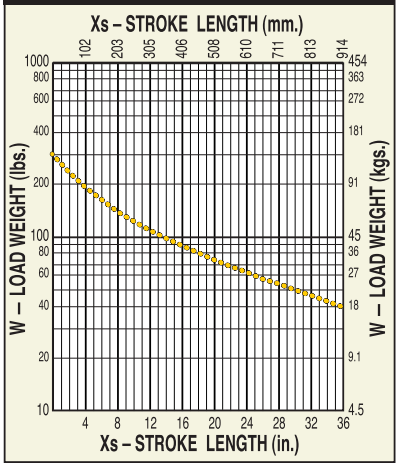
BN = Ball Nut

**Maximum thrust reflects 90% reliability for 1 million linear inches of travel.*

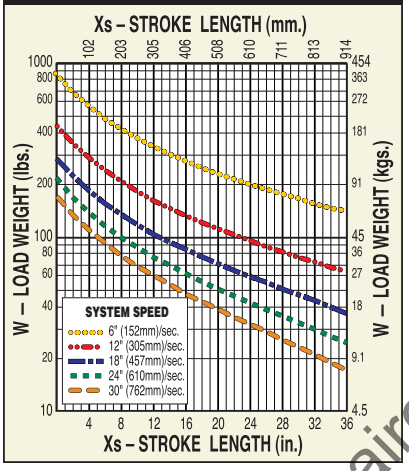
Life indicates theoretical maximum life of screw only, under ideal conditions and does not indicate expected life of actuator.

GSA/GSM32 MAXIMUM LOAD WEIGHT AND GUIDE ROD DEFLECTION

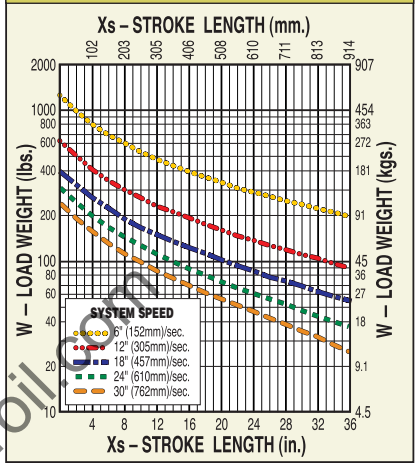
MAXIMUM LOAD WEIGHT vs STROKE LENGTH
Linear Ball Bearing, Standard Guide Rods



MAXIMUM LOAD WEIGHT vs STROKE LENGTH
Composite Bearing, Standard Guide Rods

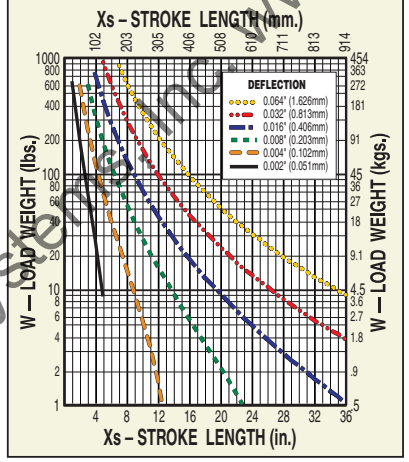


MAXIMUM LOAD WEIGHT vs STROKE LENGTH
Composite Bearing, Oversize Guide Rods

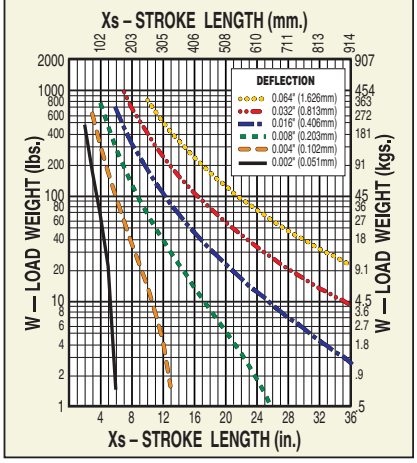


Linear ball bearings are not available with stainless steel guide rod option.

GUIDE ROD DEFLECTION
Standard Guide Rods



GUIDE ROD DEFLECTION
Oversize Guide Rods



GUIDED SCREW

GSA/GSM32 Series

- Maximum load weight and rod deflection

DO NOT EXCEED MAXIMUM LOAD CURVE

Maximum load values are based on 200 million linear inches of travel.

1. To obtain most accurate results, stroke length should be adjusted by the distance between the center of mass of the load and tooling plate.

   $X_{adj} = X_s + X_{cm}$

   Then, use X_{adj} instead of X_s on the Maximum Load Weight vs. Stroke Length graph.

2. For the off-center loads, calculate adjusted load weight using the following formula:

   $W_{adj} = W (1 + 0.30\ Y_{cm})$

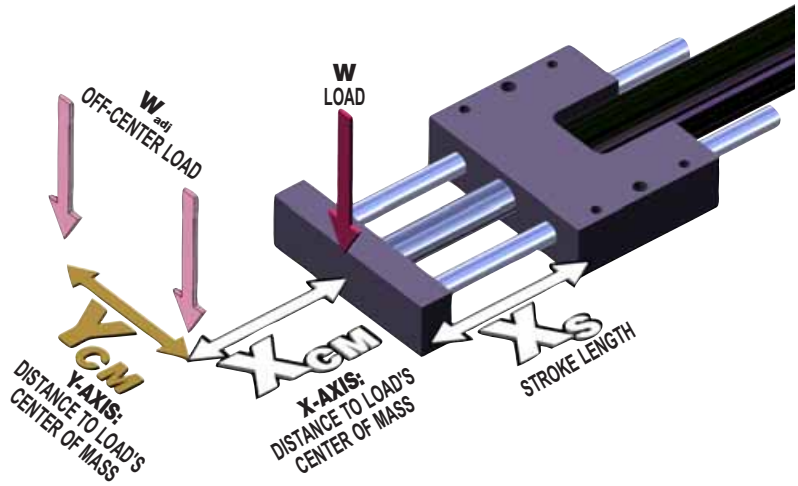
   where Y_{cm} is distance between center of mass of off-center load and center of tooling plate.

   Then, use W_{adj} instead of **W** on Maximum Load Weight vs. Stroke Length graph.

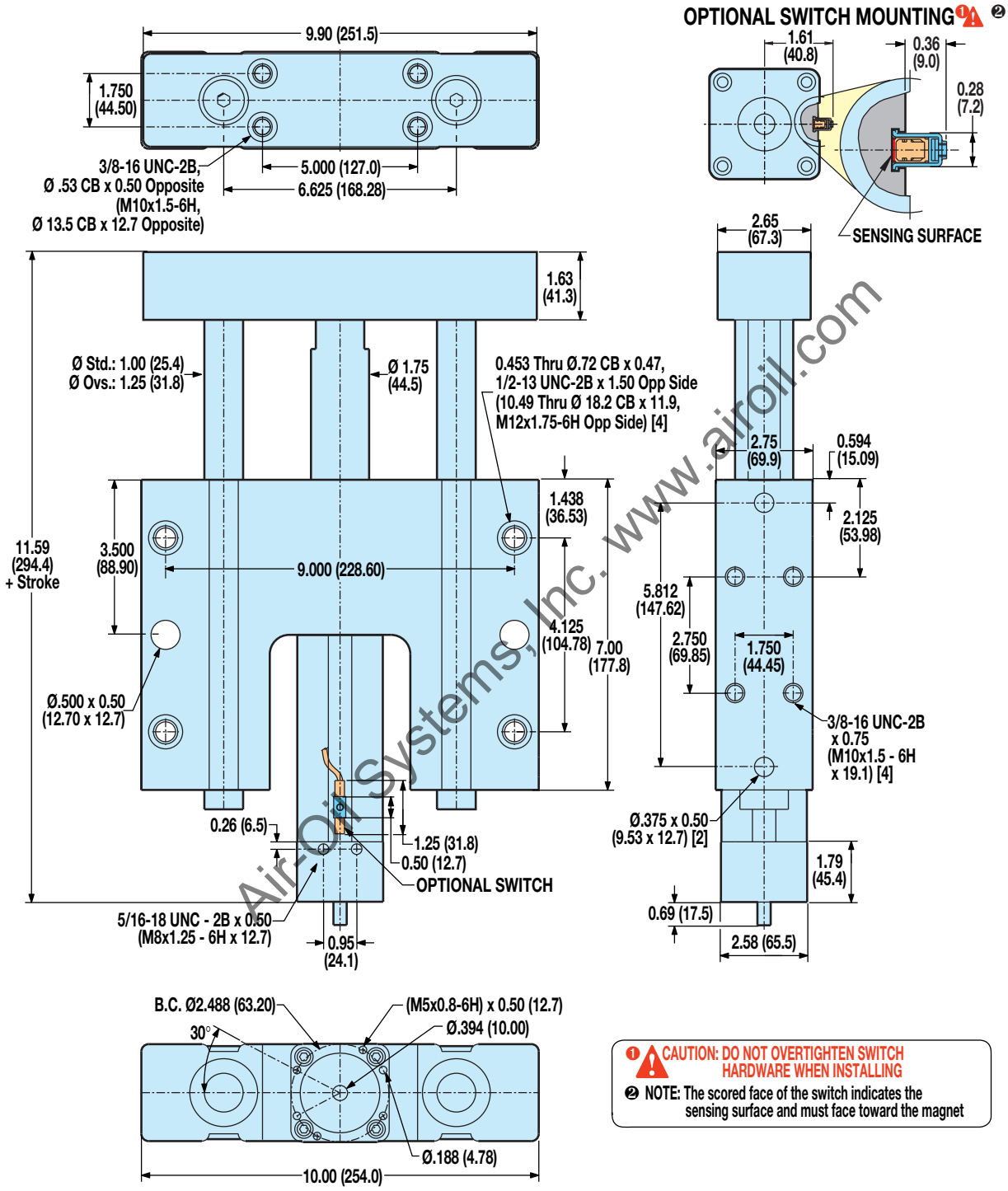
3. Using your stroke length and load weight, evaluate guide rod deflection. If the intersection point is above the highest curve (.064"), contact Tolomatic for assistance.

- ***Impact loading is not recommended for GSA/GSM actuators.***
- ***Motor brakes may be required on vertically positioned actuators with plastic (solid) or ball nuts in applications with risk of load backdriving. (Actuators with bronze nuts will not backdrive for loads, thrusts within catalog specifications.)***

Contact Tolomatic for assistance.



GSA/GSM32 IN-LINE (LMI) BASE MODEL AND SWITCH MOUNTING



❶⚠ CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING

❷ NOTE: The scored face of the switch indicates the sensing surface and must face toward the magnet

GUIDED SCREW

GSA/GSM32 Series

- In-line base model dimensions

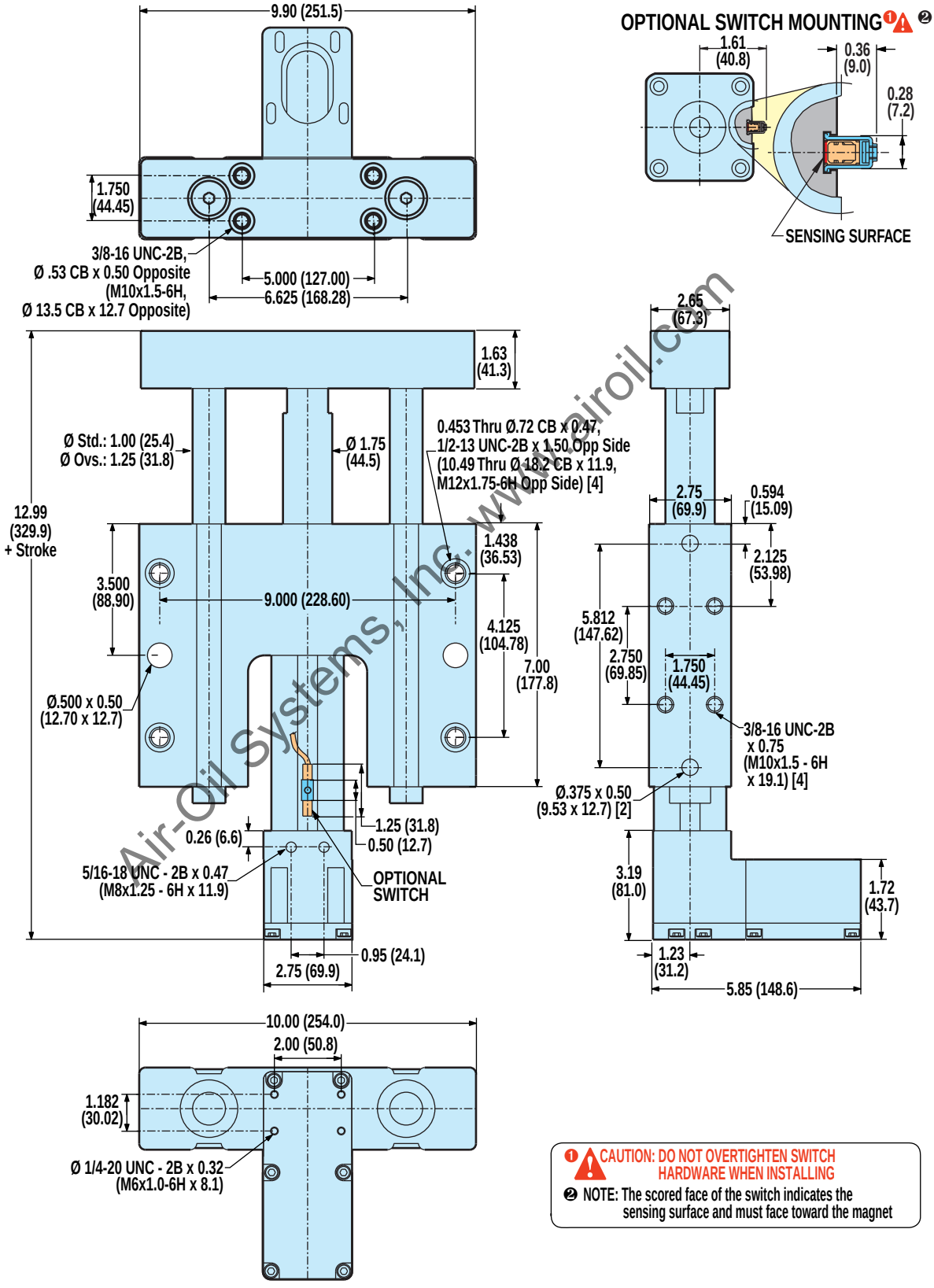
Unless otherwise noted, all dimensions shown are in inches (Dimensions in parenthesis are in millimeters)

GSA/GSM32 REVERSE PARALLEL (RP) BASE MODEL OPTIONS AND SWITCH MOUNTING

GUIDED SCREW

GSA/GSM32 Series

- Reverse parallel base model dimensions



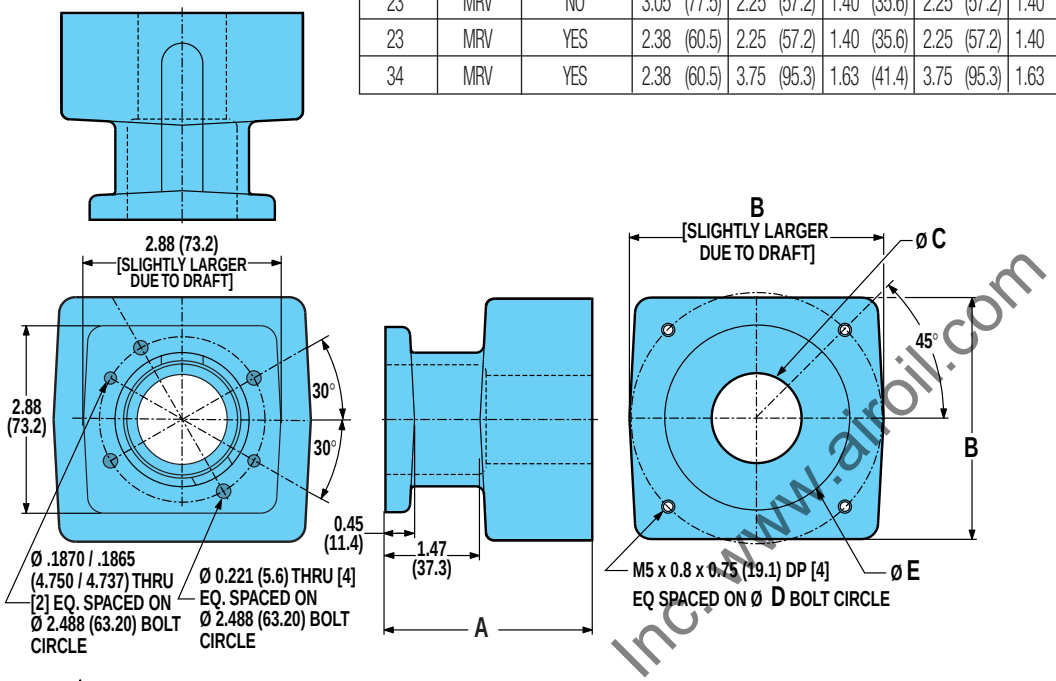
❶ CAUTION: DO NOT OVERTIGHTEN SWITCH HARDWARE WHEN INSTALLING

❷ NOTE: The scored face of the switch indicates the sensing surface and must face toward the magnet

DIMENSIONS

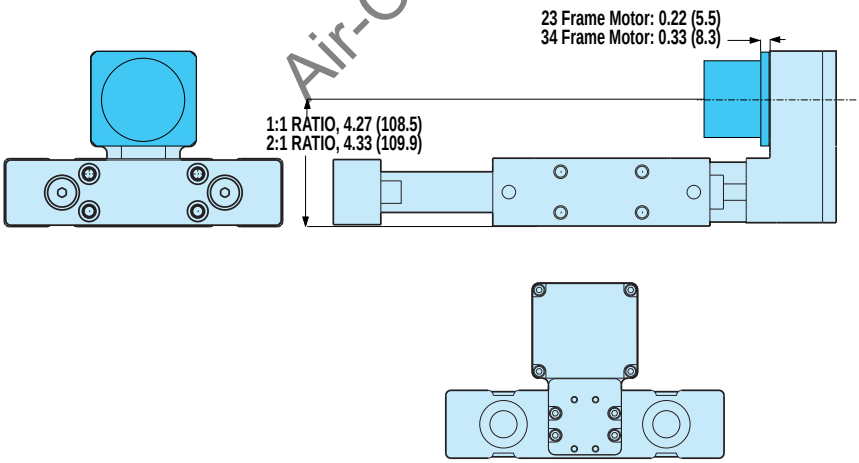
GSA/GSM32: IN-LINE MOUNTING MOTORS AND GEARHEADS

FRAME	MOTOR	GEARHEAD	A		B		C		D		E		F	
			in	(mm)	in	(mm)	in	(mm)	in	(mm)	in	(mm)	in	(mm)
23	MRV	NO	3.05	(77.5)	2.25	(57.2)	1.40	(35.6)	2.25	(57.2)	1.40	(35.6)	2.625	(66.7)
23	MRV	YES	2.38	(60.5)	2.25	(57.2)	1.40	(35.6)	2.25	(57.2)	1.40	(35.6)	3.875	(98.4)
34	MRV	YES	2.38	(60.5)	3.75	(95.3)	1.63	(41.4)	3.75	(95.3)	1.63	(41.4)	3.875	(98.4)



For gearhead specifications and dimensions, see page F-10.

GSA/GSM32: REVERSE PARALLEL MOTOR MOUNTING



SPECIFICATIONS

	MOTOR	REDUCTION INERTIA AT MOTOR SHAFT			
		1:1		2:1	
		lb-in²	kg-m² x 10⁻⁶	lb-in²	kg-m² x 10⁻⁶
BRUSHLESS	MRV21, 22, 23, 24	0.467	13.650	0.144	42.256

REDUCTION EFFICIENCY: 0.95

GUIDED SCREW

GSA/GSM32 Series

- In-line motor mounting
- Reverse parallel motor mounting

ORDERING

BASE MODEL SPECIFICATIONS G S A 2 4 B N 0 5 S K 1 9 L M I

OPTIONS SPECIFICATIONS C B S O C K S K T 2

MODEL TYPE

GSA	GSA Series English Guided Screw
GSM	GSM Series Metric Guided Screw

BODY SIZE

12	0.75" Bore	24	1.5" Bore
16	1" Bore	32	2" Bore

NUT/SCREW CONFIGURATION

SOLID NUT / PITCH (TPI)	GSA AND GSM SERIES
SN01	12, 16, 32
SN02	12, 16, 24, 32
SN04	24,
SN05	12, 16
SN08	24
BZ10	12, 16, 24, 32

BALL NUT / PITCH (TPI)	GSA AND GSM SERIES
BN02	32
BN05	24, 32
BN08	12, 16

STROKE LENGTH

SK_ _ Stroke, then enter desired stroke length in decimal inches

MODEL	MAX STROKE (in)
12 Series	18
16 Series	24
24 Series	30
32 Series	36

BASE MODEL MOUNTING OPTIONS

LMI	In-line motor mounting base model
RP1	1:1 Reverse parallel mount
RP2	2:1 Reverse parallel mount*

Not available on 12 or 16 Series.

BEARINGS AND GUIDE RODS

LB	Linear Ball Bearings*
CB	Composite Bearings, Standard rods
COB	Composite Bearings, Over-sized rods
CBS	Composite Bearings, Stainless-steel rods
CBSO	Composite Bearings, Over-sized stainless-steel rods

*Not available with stainless-steel guide rods

STOP COLLAR OPTION

The configurator will determine the appropriate clamps to use based on the bearing and guide rod previously selected.

CK	Steel Stop Collar
CKS	Stainless-steel Stop Collar

SWITCHES

RM_	Reed Switch (Form A) with 5-meter lead/QD, and quantity desired
RT_	Reed Switch (Form A) with 5-meter lead, and quantity desired
BM_	Reed Switch (Form C) with 5-meter lead/QD, and quantity desired
BT_	Reed Switch (Form C) with 5-meter lead, and quantity desired
KM_	Hall-effect Sinking Switch with 5-meter lead/QD, and quantity desired
KT_	Hall-effect Sinking Switch with 5-meter lead, and quantity desired
TM_	Hall-effect Sourcing Switch with 5-meter lead/QD, and quantity desired
TT_	Hall-effect Sourcing Switch with 5-meter lead, and quantity desired
CM_	TRIAC Switch with 5-meter lead/QD, and quantity desired
CT_	TRIAC Switch with 5-meter lead, and quantity desired

Not all codes listed are compatible with all options.

Use the Tol-O-Motion™ Sizing Software to determine available options and accessories based on your application requirements.

TO ORDER MOTORS/CONTROLS/INTERFACES

BRUSHLESS SERVO (SEE PAGE F-33)

FIELD RETROFIT KITS				
ITEM	GSA/GSM12 Series	GSA/GSM16 Series	GSA/GSM24 Series	GSA/GSM32 Series
Standard Stop Collar	2312-1005	2317-1005	2334-1005	2332-1005
Stainless-steel Stop Collar	2312-1056	2317-1056	2324-1056	2332-1056
Oversized Stop Collar	2317-1005	2324-1005	2332-1005	2348-1005
Oversized Stainless-steel Stop Collar	2317-1056	2324-1056	2332-1056	2348-1056

Kits contain one collar and appropriate fasteners.