ACME AND BALL SCREWS & NUTS

Design Guide

Duff-Norton®

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Screw System Selection Guide

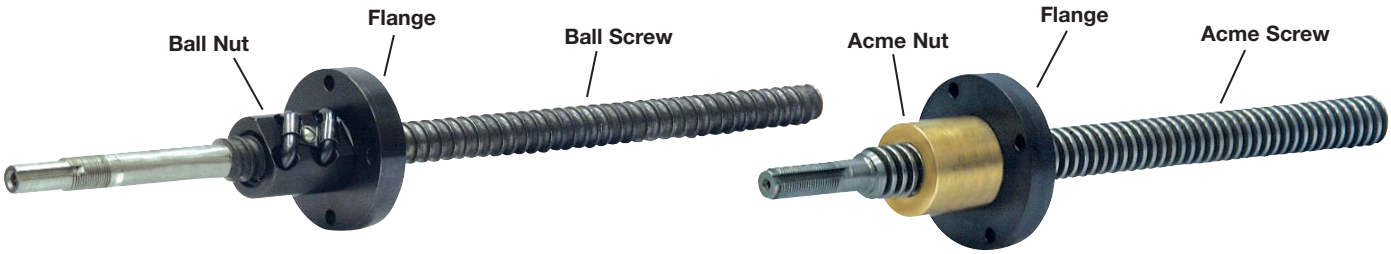
Users guide for selecting a Screw & Nut System

1. Define the application's operating parameters:

- Total load
- Load per screw & nut assembly (if more than one is required)
- Desired lifting speed
- Stroke (distance to move the load)
- Load type (tension, compression, guided, unguided)
- Ambient temperatures (-20° to 120° F, -29° to 50° C)

2. Consider which screw system best suits the application:

Ball Screw or Acme Screw? There are a wide variety of factors which influence the type of screw system selected. Ball Screw systems are more efficient than Acme Screw systems. When comparing the two screw types at the same capacity level; Ball Screw systems require less motor horsepower to move the same load than do the equivalent Acme Screw systems. However, many Acme Screw systems are inherently load holding eliminating the need for a braking system, and also provide a broader selection of leads for precise positioning benefits.



Ball Screw Systems

- Excellent load ratings
- 90% efficient for low power requirements
- Long and predictable life ratings
- Excellent lead accuracy

Acme Screw Systems

- Centralizing class screw & nut assemblies
- Excellent load ratings
- Excellent lead accuracy
- Large selections of diameters & leads

2a. If an Acme Screw system is the best solution, determine which Acme Nut material type best suits the application:

Bronze – provides strong load ratings and excellent wear properties.

Plastic – operates much more efficiently and quietly than their bronze acme nut counterparts, but do have lower load ratings.

Duff-Norton offers Ball Nuts, and also Bronze or Plastic Acme Nuts. Flanges must be requested.

2b. Verify the screw selection and nut configuration:

Double check your applications' travel requirements, and the screw lead. Verify the screw's capacity and speed. Determine which of the following screw journal ends best meet your application's requirements. Also, consider which nut configuration best suits your attachment needs – with or without a flange.

3. Once the initial selection has been made, the user should verify his performance requirements and the capabilities of selected screw & nut assembly.

Please note in catalog pages 56 - 75 we have already matched screw and nut performance to the most common motor horsepowers and gear ratios. The charts are easy to read and the user can quickly determine each screw's actual load ratings and speeds per horsepower and gear ratio.

Performance factors where speed and capacity have already been specified and for motor horsepowers, voltage and hertz ratings, or gear ratios not already shown can be determined by using the following:

- Screw RPM = Turns of the Screw for 1" travel x desired speed
- Starting Input HP = RPM X screw torque / 63025
- Critical Speed – shown on catalog pages 112 (Acme) and 114 (Ball) given the inverse relationship between RPM and stroke length, the application should be designed to fall below a given screw's curved line.
- PV Value – do not exceed an Acme nut's calculated PV Value (catalog page 111). If the desired speed requirements exceed the PV speed rating, the load should be decreased or a larger size screw & nut assembly should be considered.
- Column Strength (compression loads) – shown on catalog pages 113 (Acme) and 116 (Ball), given the inverse relationship between compressive strength and stroke length, the application should be designed to fall below a given screw's curved line. Tension load applications are typically preferred as they are generally not limited to a given stroke length.
- Life expectancy (ball applications) – shown on catalog pages 115. As load increases, the life expectancy will decrease. To ensure long life, the application should be designed to fall below a given screw's curved line.

NOTE

Input RPM's should not exceed 1800 RPM's.

NOTE

Never exceed the screw system's static and dynamic load, or the maximum RPM rating determined using the Critical Speed tables on pages 112 and 114.

NOTE

Please refer to our "Column Strength Charts" if the screw is loaded in compression. It may be necessary to select a larger diameter screw if the maximum recommended length, regardless of load, or maximum load has been exceeded. (Pages 113 and 116)

⚠ WARNING

Ball Screw Systems are inherently self-lowering. Should one of these models be the best fit for an application a brake motor with sufficient torque is required. Integral motors and brakes are already appropriately sized. For motors which will require external brake kits, the brake kit should have torque ratings equal to the motor torque. The following formula can be used to properly size your brake requirement:

Required brake torque (inch/pounds) = .215 x application load x screw lead

Duff-Norton®

Application Analysis Form for Screws and Nuts

Duff-Norton engineers will be pleased to make recommendations for your specific requirements. To obtain their recommendations, please complete this form and mail or fax it to
Duff-Norton, PO Box 7010, Charlotte, NC 28241. Fax number 704-588-1994.

1. **Quantity:** _____

2. **Required Capacity:**

   Dynamic (moving): Compression _____ lbs; Tension _____ lbs.

   Static (holding): Compression _____ lbs; Tension _____ lbs.

3. **Speed:** _____ in./min (with_____Hz power)

4. **Stroke:** _____ in. (actual use)

5. **Duty:** _____ in./hour of total travel

6. **Required life:** _____ in. of travel (Inches/hr. x hrs/day x days/yr x years of service)

7. **Screw Position:** Vertical _____ Horizontal _____

8. **End Fixity:** Fixed-Free _____, Simple-Simple _____, Fixed-Simple _____, Fixed-Fixed _____,

9. **Power:** _____VAC 1 / 3 Phase (circle one) 50 / 60 Hz (circle one)

10. **Environment:** Inside/ Outside covered/ Outside exposed/ Washdown (circle one)
    Service temperature: _____ °F (low) to _____°F (high)
    Exposure to: (Caustics, gases, dusts/abrasives, etc.) _____

11. **Motor Mounting Position Code** _____ (see codes & diagrams on catalog pg. 77. This is necessary to ensure for proper oil filling and plug locations on the gear box. Please choose the option which most closely matches the actual installed position. Unless we are informed otherwise we will assume our standard positions are desired.)

12. **Special requirements:** repeatability, quick stop, etc. _____

13. **Accessories:** limit switch (standard), digital encoder, mounting blocks, etc.
    _____

Name _____ Title _____

Company _____ Phone _____

Address _____ Fax _____

City, State, Zip _____ E-mail _____

Duff-Norton®

Screw and Nut Controls

Duff-Norton engineers will be pleased to make recommendations for your specific requirements.
Complete this form and mail or fax it to the Duff-Norton Company. There is no obligation for this service.
Use a separate sheet to sketch your application, or send us your design drawings in complete confidence.

P.O. Box 7010 • Charlotte, NC 28241-7010 • Ph: 800-477-5002 • Fax: 704-588-1994 • duffnorton@cmworks.com

Company: _____

Address: _____

_____

Phone Number: _____ **Fax Number:** _____

Contact: _____

Email Address: _____

---

1. **Comments:** _____

_____

2. **If the environment is explosive or hostile, where will the operator be located?** _____

_____

3. **Motor Enclosure:** ☐ Open Drip Proof ☐ Totally Enclosed ☐ Wash Down
4. **Controls Enclosure:** ☐ NEMA 1 ☐ NEMA 12/13 ☐ NEMA 4 ☐ NEMA 4X ☐ NEMA 3R
5. **Motor Mounting:** ☐ Separate ☐ Close Coupled ☐ Other _____
6. **Additional Gearing:** ☐ None ☐ In Line ☐ Parallel ☐ Ratio
7. **Orientation** *(description)*: _____
8. **Controls Mounting:** ☐ Wall ☐ Floor ☐ Free Standing ☐ Pedestal ☐ Console ☐ Other _____
9. **Control Requirements:** _____ Volts _____ Phase _____ Hz
10. **Operation:** ☐ Variable Speed ☐ Constant Speed ☐ Multiple Speed ☐ Inch/Jog
    ☐ Maintained ☐ Position ☐ Velocity ☐ Torque
11. **Features:** ☐ Soft Start; Acceleration Rate _____ in/min^2 ☐ Remote Control
    ☐ Soft Start/Stop; Acceleration Rate _____ in/min^2
    ☐ Soft Start/Stop; Acceleration Rate _____ in/min^2

    Indicators *(specify)*: _____

    Alarms *(specify)*: _____

    Communication *(specify)*: _____

    Limit Switches: _____

Accuracy for positioning *(in.)* _____

Number of positions: _____

Velocity Regulation: _____

Duty Cycle *(from above)* _____

Acceleration and Deceleration rates *(from above)* _____

Line Shaft Accuracy: _____

Load Conditions *(from above)*: _____

Screw and Nut most appropriate for this application: _____

_____

_____

Controls Needed: _____

_____

Acme Screws & Nuts

Features & Benefits

Duff-Norton has been manufacturing Acme screws and nuts for our actuator products for decades, and is now applying those years of experience to bring you an expanded assortment of Acme screws and nuts for your application requirements. Consider these advantages:

Performance – excellent performance ratings.

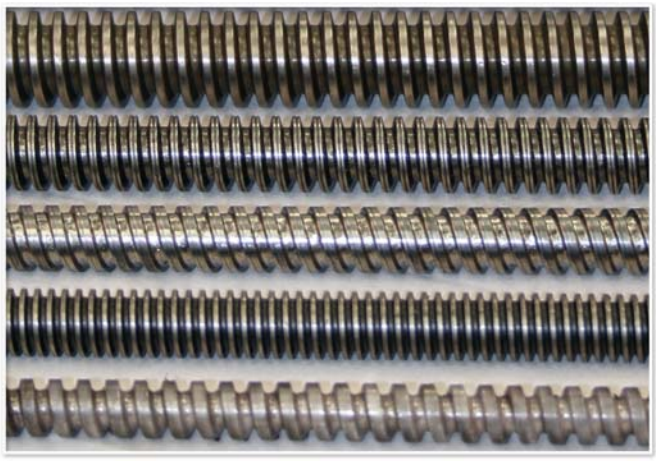
Quality – Centralizing class screw and nut assemblies. Good lead accuracy.

Delivery – In stock on the most popular sizes.

Broad Assortment – we offer a very broad assortment of acme diameters and leads.

System Integration – Duff-Norton can provide you with an entire screw and nut system: mounting components, drive components, controls, and protective coverings.

Customer Service – talk to one of our knowledgeable customer service agents or application engineers.



Multiple Leads

9 inch screws for a steel processing application

Multiple Diameters

Acme Screw and Nut Selection Overview

Screw Diameter	Acme Screw Part#	Screw Lead (in)	Turns Per Inch	Thread Starts	Standard Length	Root Diameter	Acme Nut Part#	Acme Nut Description	Flange Part#
1/2"	050ASA010R	0.100	10	Single	5 ft.	.359	050ANB010	Bronze	FL0937
	050ASA020R	0.200	5	Single	5 ft.	.362	050ANB020	Bronze	FL0937
	050ASA025R	0.250	4	Single	5 ft.	.381	050ANB025 (P)	Bronze or Plastic	FL0937
	050ASA050R	0.500	2	Double	5 ft.	.377	050ANB050 (P)	Bronze or Plastic	FL0937
5/8"	063ASA010R	0.100	10	Single	5 ft.	.484	063ANB010	Bronze	FL0937
	063ASA013R	0.125	8	Single	5 ft.	.470	063ANB013	Bronze	FL0937
	063ASA020R	0.200	5	Single	5 ft.	.487	063ANB020	Bronze	FL0937
	063ASA025R	0.250	4	Single	5 ft.	.506	063ANB025 (P)	Bronze or Plastic	FL0937
	063ASA050R	0.500	2	Double	5 ft.	.506	063ANB050 (P)	Bronze or Plastic	FL0937
3/4"	075ASA010	0.100	10	Single	5 ft.	.608	075ANB010	Bronze	FL1000
	075ASA020R	0.200	5	Single	12 ft.	.517	075ANB020	Bronze	FL1000
	075ASA025	0.250	4	Single	5 ft.	.450	075ANB025 (P)	Bronze or Plastic	FL1000
	075ASA050	0.500	2	Double	5 ft.	.450	075ANB050 (P)	Bronze or Plastic	FL1000
	075ASA100R	1.000	1	Quad	12 ft.	.450	075ANB100 (P)	Bronze or Plastic	FL1000
1"	100ASA010R	0.100	10	Single	12 ft.	.857	100ANB010	Bronze	FL1375
	100ASA020R	0.200	5	Single	12 ft.	.751	100ANB020	Bronze	FL1375
	100ASA025R	0.250	4	Single	12 ft.	.715	100ANB025 (P)	Bronze or Plastic	FL1375
	100ASA050R	0.500	2	Double	12 ft.	.715	100ANB050 (P)	Bronze or Plastic	FL1375
	100ASA100R	1.000	1	Quad	12 ft.	.715	100ANB100 (P)	Bronze or Plastic	FL1375
1 1/2"	150ASA010R	0.100	10	Single	12 ft.	1.355	150ANB010	Bronze	FL1967
	150ASA025R	0.250	4	Single	12 ft.	1.215	150ANB025	Bronze	FL1967
	150ASA038R	0.375	2.67	Single	12 ft.	1.053	150ANB038	Bronze	FL1967
	150ASA050R	0.500	2	Double	12 ft.	1.196	150ANB050	Bronze	FL1967
2"	200ASA025	0.250	4	Single	12 ft.	1.713	200ANB025	Bronze	FL2548
	200ASA050R	0.500	2	Single	12 ft.	1.435	200ANB050	Bronze	FL2548
2 1/4"	225ASA025	0.250	4	Single	12 ft.	1.944	225ANB025	Bronze	FL3137
	225ASA050R	0.500	2	Single	12 ft.	1.685	225ANB050	Bronze	FL3137
2 1/2"	250ASA025	0.250	4	Single	12 ft.	2.213	250ANB025	Bronze	FL3137
	250ASA050R	0.500	2	Single	12 ft.	1.934	250ANB050	Bronze	FL3137
3"	300ASA032	0.320	3.125	Single	12 ft.	2.761	300ANB032	Bronze Nuts	Bronze Nuts
	300ASA067R	0.666	1.52	Single	12 ft.	2.548	300ANB067	with Integral	with Integral
3 3/4"	375ASA032*	0.320	3.125	Single	12 ft.	3.390	375ANB032*	Flanges	Flanges
	375ASA067R	0.666	2	Single	12 ft.	3.297	375ANB067	Bronze Nuts	Bronze Nuts
	375ASA133	1.330	.75	Double	12 ft.	3.295	375ANB133	with Integral	with Integral
4 1/2"	450ASA032*	0.320	3.125	Single	12 ft.	4.139	450ANB032*	Flanges	Flanges
	450ASA067*	0.666	1.52	Single	12 ft.	3.978	450ANB067*	Bronze Nuts	Bronze Nuts
5"	500ASA067*	0.666	1.52	Single	12 ft.	4.343	500ANB067*	with Integral	with Integral
6"	600ASA075*	0.750	1.33	Single	12 ft.	5.196	600ANB075*	Flanges	Flanges
	600ASA100*	1.000	1	Single	12 ft.	5.074	600ANB100*	Bronze Nuts	Bronze Nuts
7"	700ASA100*	1.000	1	Single	12 ft.	6.058	700ANB100*	with Integral	with Integral
9"	900ASA100*	1.000	1	Single	12 ft.	7.850	900ANB100*	Flanges	Flanges

NOTE: Unless otherwise specified all dimensions are in Inches.
NOTE: Model numbers with an asterik have Modified Square Threads.

050 – ASA – 050 – X – XXX

Screw Diameter

Code	Diameter
050	1/2”
063	5/8”
075	3/4”
100	1”
150	1 1/2”
200	2”
225	2 1/4”
250	2 1/2”
300	3”
375	3 3/4”
450	4 1/2”
500	5”
600	6”
700	7”
900	9”

Screw Type

Acme

Component Options

Screw
Nut

Total Lead

Thread Pitch
X No. Starts

Code	Lead
010	.100”
013	.125”
020	.200”
025	.250”
032	.320”
038	.375”
050	.500”
067	.666”
075	.750”
100	1.00”
133	1.33”

Screw or Nut Options

Screw Options
A - Steel
S - Stainless

Nut Options
B - Bronze
P - Plastic

Suffix

Special Screws or Nuts will have a three digit serialized code

Optional Character

Standard Nut and/or Flange Assembly will contain an “ **A** ”

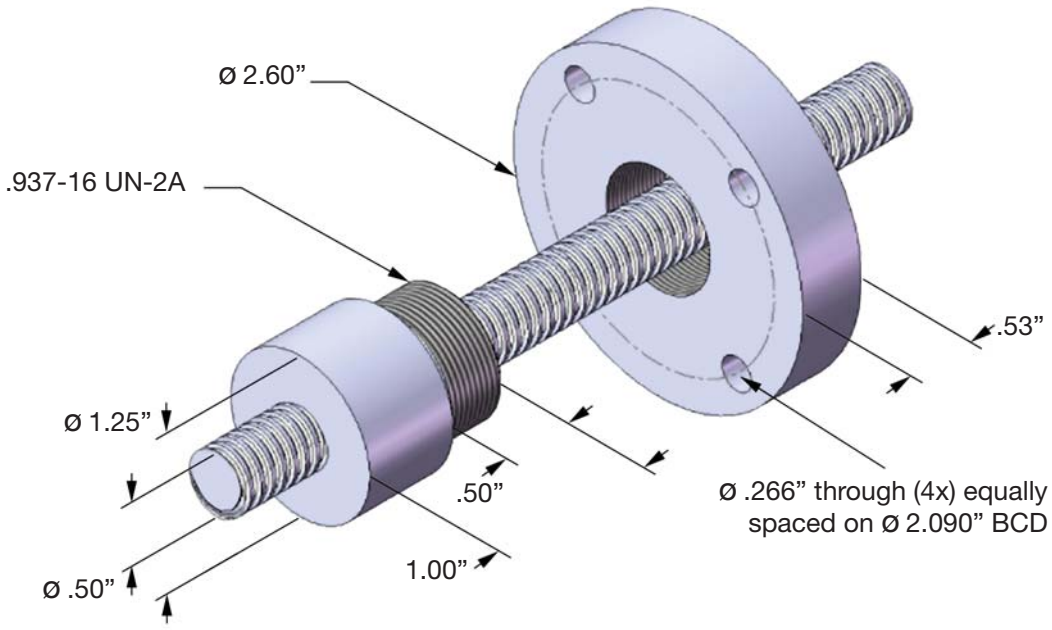
Rolled Screw model numbers and cut to length orders will contain a “ **R** ”, but no other suffix code

Special Screws or Nuts will contain a “ **-** ”

Standard Nuts only will have no suffix code

***** Bronze acme nuts for 3” and larger diameter screws are supplied with an integral flange as standard

1/2" (.500") Acme Screws & Nuts



Duff-Norton offers complete close mounted systems to complement these screw & nut assemblies as follows:

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End Blocks - *Page 50*
Motor Flanges - *Page 54*
Gearmotors - *Page 60*
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Acme Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
050ASA010R	.50	.100	.100	1	.359	Centralizing RH	Steel	0.009	Yes	Yes	-
050ASA020R	.50	.200	.200	1	.362	Centralizing RH	Steel	0.011	Yes	Yes	-
050ASA025R	.50	.250	.250	1	.381	Centralizing RH	Steel	0.004	Yes	Yes	-
050ASA050R	.50	.500	.250	2	.377	Centralizing RH	Steel	0.004	Yes	Yes	-

Acme Nut	*Static Load	*Dynamic Load	*Max. Speed	T.P.I.	Efficiency	Torque to Raise 1 Lb. (in/lb)	Material	Mounting Thread	Mounting Length	O.A. Nut Length	O.A. Nut Diameter
050ANB010	7,589	2,282	172.50	10	35%	0.046	Bronze	.937-16 UN-2A	.50	1.00	1.25
050ANB020	6,936	1,219	345.00	5	50%	0.063	Bronze	.937-16 UN-2A	.50	1.00	1.25
050ANB025	7,054	908	431.25	4	56%	0.071	Bronze	.937-16 UN-2A	.50	1.00	1.25
050ANB050	6,734	908	862.50	2	70%	0.114	Bronze	.937-16 UN-2A	.50	1.00	1.25
050ANP025	665	665	431.25	4	67%	0.059	Plastic	.937-16 UN-2A	.50	1.00	1.25
050ANP050	665	665	862.50	2	79%	0.101	Plastic	.937-16 UN-2A	.50	1.00	1.25

Flange	Overall Diameter	Bolt Cir. Diameter	Bolt Hole Diameter	Mounting Holes	Flange Width	Treated	Material	Mounting Thread
FL0937	2.60	2.090	.266	4	.53	Black Oxide	Steel	.937-16 UN-2B

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

*Load ratings are based on what the screw & nut assembly is capable of achieving. Actual load performance for a given screw and nut assembly will vary from application to application.

*Speed ratings are based on a directly coupled screw & motor turning at 1725 rpm. Actual speeds for a given screw and nut assembly will vary from application to application.

In many cases Duff-Norton can provide screw materials such as 316SS, longer screw lengths, or thread directions other than what has been cataloged. Please contact our customer service department for assistance.

Acme Screws & Nuts Specifications

5/8” (.625”) Acme Screws & Nuts

Duff-Norton offers complete close mounted systems to complement these screw & nut assemblies as follows:

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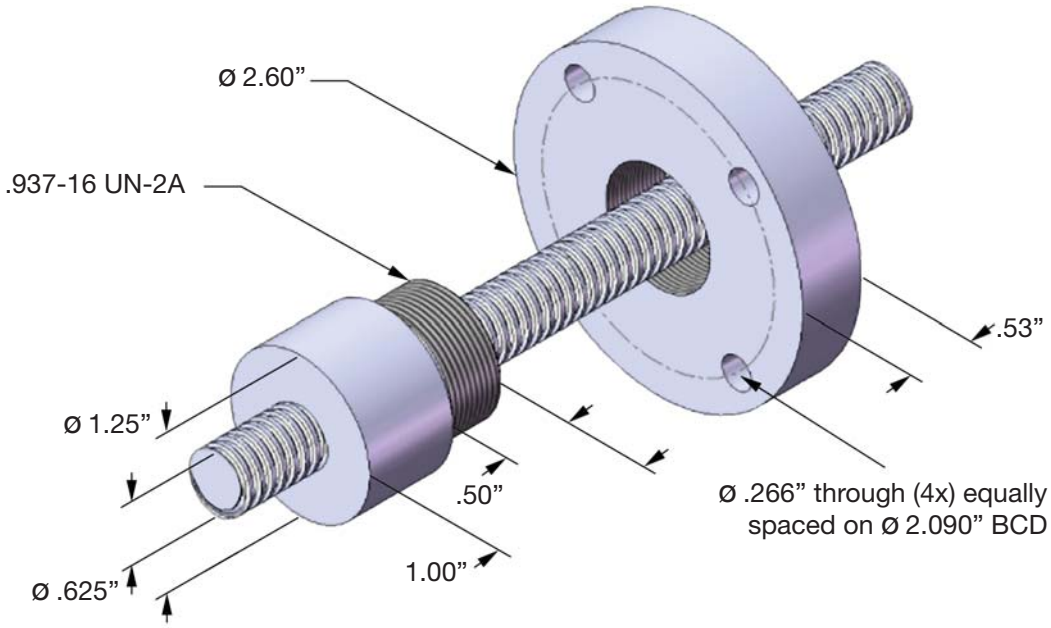


Acme Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
063ASA010R	.625	.100	.100	1	0.484	Centralizing RH	Steel	0.009	Yes	Yes	-
063ASA013R	.625	.125	.125	1	0.470	Centralizing RH	Steel	0.010	Yes	Yes	-
063ASA020R	.625	.200	.200	1	0.487	Centralizing RH	Steel	0.011	Yes	Yes	-
063ASA025R	.625	.250	.250	1	0.506	Centralizing RH	Steel	0.004	Yes	Yes	-
063ASA050R	.625	.500	.250	2	0.506	Centralizing RH	Steel	0.006	Yes	Yes	-

Acme Nut	*Static Load	*Dynamic Load	*Max Speed	T.P.I.	Efficiency	Torque to Raise 1 Lb. (in/lb)	Material	Mounting Thread	Mounting Length	Nut Length	Nut Diameter
063ANB010	9,487	2,897	172.50	10	29%	0.054	Bronze	.937-16 UN-2A	.50	1.00	1.25
063ANB013	9,553	2,836	215.63	8	34%	0.058	Bronze	.937-16 UN-2A	.50	1.00	1.25
063ANB020	8,671	1,544	345.00	5	45%	0.071	Bronze	.937-16 UN-2A	.50	1.00	1.25
063ANB025	8,786	1,137	431.25	4	51%	0.078	Bronze	.937-16 UN-2A	.50	1.00	1.25
063ANB050	8,296	1,163	862.50	2	65%	0.122	Bronze	.937-16 UN-2A	.50	1.00	1.25
063ANP025	828	828	431.25	4	62%	0.064	Plastic	.937-16 UN-2A	.50	1.00	1.25
063ANP050	808	808	862.50	2	75%	0.106	Plastic	.937-16 UN-2A	.50	1.00	1.25

Flange	Overall Diameter	Bolt Cir. Diameter	Bolt Hole Diameter	Mounting Holes	Flange Width	Treated	Material	Mounting Thread
FL0937	2.60	2.090	.266	4	.53	Black Oxide	Steel	.937-16 UN-2B

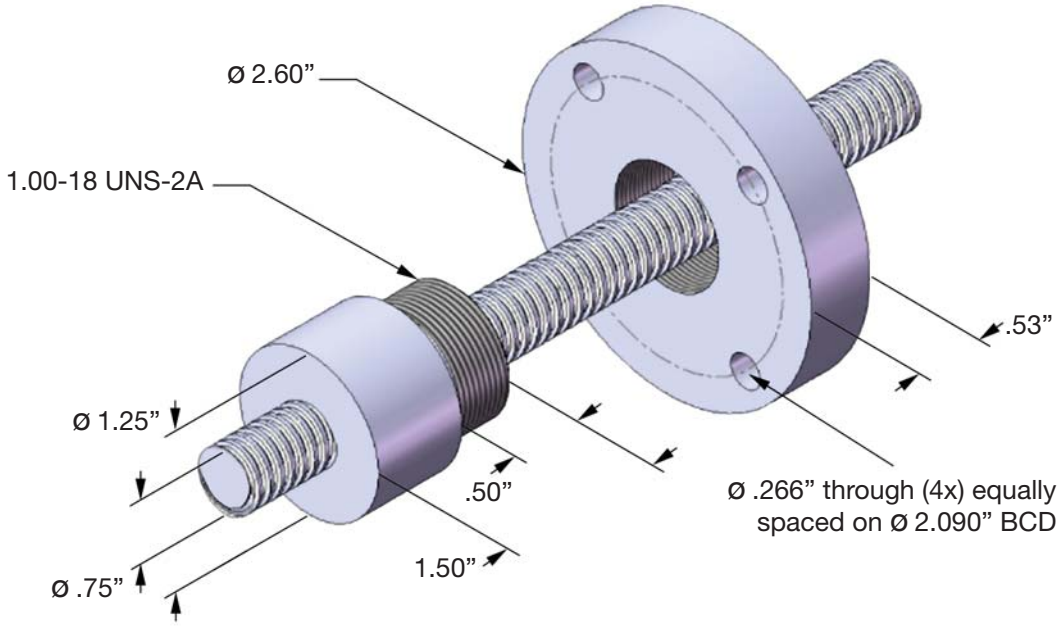
NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

*Load ratings are based on what the screw & nut assembly is capable of achieving. Actual load performance for a given screw and nut assembly will vary from application to application.

*Speed ratings are based on a directly coupled screw & motor turning at 1725 rpm. Actual speeds for a given screw and nut assembly will vary from application to application.

In many cases Duff-Norton can provide screw materials such as 316SS, longer screw lengths, or thread directions other than what has been cataloged. Please contact our customer service department for assistance.

3/4" (.750") Acme Screws & Nuts



Duff-Norton offers complete close mounted systems to complement these screw & nut assemblies as follows:

Screw Journal Ends - *Page 48*
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Acme Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	60"	72"
075ASA010	.75	.100	.100	1	0.608	Centralizing RH	Steel	0.010	Yes	Yes	-
075ASA020R	.75	.200	.200	1	0.517	Centralizing RH	Steel	0.009	Yes	Yes	Yes
075ASA025	.75	.250	.250	1	0.450	Centralizing RH	Steel	0.012	Yes	Yes	-
075ASA050	.75	.500	.250	2	0.450	Centralizing RH	Steel	0.012	Yes	Yes	-
075ASA100R	.75	1.00	.250	4	0.450	Centralizing RH	Steel	0.012	Yes	Yes	Yes

Acme Nut	*Static Load	*Dynamic Load	*Max Speed	T.P.I.	Efficiency	Torque to Raise 1 Lb. (in/lb)	Material	Mounting Thread	Mounting Length	Nut Length	Nut Diameter
075ANB010	17,005	5,275	172.50	10	25%	0.062	Bronze	1.00-18 UNS-2A	.50	1.50	1.25
075ANB020	17,410	4,935	345.00	5	42%	0.076	Bronze	1.00-18 UNS-2A	.50	1.50	1.25
075ANB025	17,521	4,747	431.25	4	48%	0.083	Bronze	1.00-18 UNS-2A	.50	1.50	1.25
075ANB050	15,919	4,776	862.50	2	63%	0.125	Bronze	1.00-18 UNS-2A	.50	1.50	1.25
075ANB100	15,155	4,798	1725.00	1	74%	0.215	Bronze	1.00-18 UNS-2A	.50	1.50	1.25
075ANP025	1,652	1,652	431.25	4	59%	0.067	Plastic	1.00-18 UNS-2A	.50	1.50	1.25
075ANP050	1,640	1,501	862.50	2	73%	0.109	Plastic	1.00-18 UNS-2A	.50	1.50	1.25
075ANP100	1,632	1,632	1725.00	1	82%	0.194	Plastic	1.00-18 UNS-2A	.50	1.50	1.25

Flange	Overall Diameter	Bolt Cir. Diameter	Bolt Hole Diameter	Mounting Holes	Flange Width	Treated	Material	Mounting Thread
FL1000	2.60	2.090	.266	4	.53	Black Oxide	Steel	1.00-18 UNS-2B

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

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*Speed ratings are based on a directly coupled screw & motor turning at 1725 rpm. Actual speeds for a given screw and nut assembly will vary from application to application.

In many cases Duff-Norton can provide screw materials such as 316SS, longer screw lengths, or thread directions other than what has been cataloged. Please contact our customer service department for assistance.

Acme Screws & Nuts Specifications

1” (1.00”) Acme Screws & Nuts

Duff-Norton offers complete close mounted systems to complement these screw & nut assemblies as follows:

Screw Journal Ends - *Page 48*
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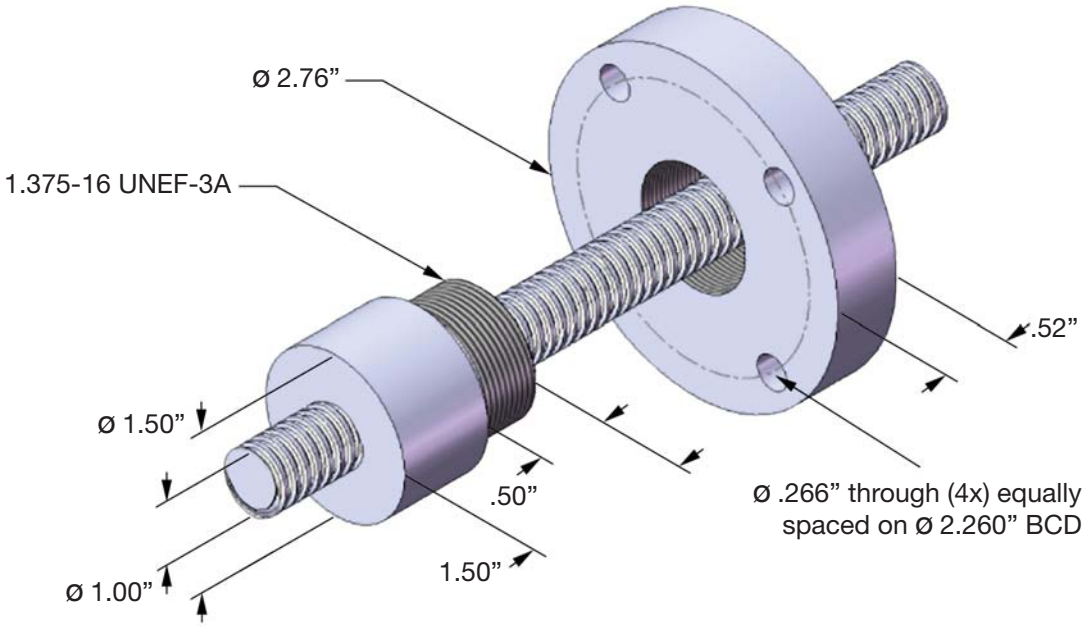


Acme Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
100ASA010R	1.00	.100	.100	1	0.857	Centralizing RH	Steel	0.010	Yes	Yes	Yes
100ASA020R	1.00	.200	.200	1	0.751	Centralizing RH	Steel	0.012	Yes	Yes	Yes
100ASA025R	1.00	.250	.250	1	0.715	Centralizing RH	Steel	0.007	Yes	Yes	Yes
100ASA050R	1.00	.500	.250	2	0.715	Centralizing RH	Steel	0.009	Yes	Yes	Yes
100ASA100R	1.00	1.00	.250	4	0.715	Centralizing RH	Steel	0.009	Yes	Yes	Yes

Acme Nut	*Static Load	*Dynamic Load	*Max Speed	T.P.I.	Efficiency	Torque to Raise 1 Lb. (in/lb)	Material	Mounting Thread	Mounting Length	Nut Length	Nut Diameter
100ANB010	22,676	7,119	172.50	10	20%	0.079	Bronze	1.375-16 UN-3A	.50	1.50	1.50
100ANB020	23,216	6,779	345.00	5	35%	0.092	Bronze	1.375-16 UN-3A	.50	1.50	1.50
100ANB025	23,755	7,374	431.25	4	41%	0.098	Bronze	1.375-16 UN-3A	.50	1.50	1.50
100ANB050	21,423	7,407	862.50	2	57%	0.140	Bronze	1.375-16 UN-3A	.50	1.50	1.50
100ANB100	20,297	7,440	1725.00	1	70%	0.227	Bronze	1.375-16 UN-3A	.50	1.50	1.50
100ANP025	2,239	2,239	431.25	4	52%	0.077	Plastic	1.375-16 UN-3A	.50	1.50	1.50
100ANP050	2,224	2,019	862.50	2	67%	0.118	Plastic	1.375-16 UN-3A	.50	1.50	1.50
100ANP100	2,209	2,209	1725.00	1	79%	0.202	Plastic	1.375-16 UN-3A	.50	1.50	1.50

Flange	Overall Diameter	Bolt Cir. Diameter	Bolt Hole Diameter	Mounting Holes	Flange Width	Treated	Material	Mounting Thread
FL1375	2.76	2.260	.266	4	.52	Black Oxide	Steel	1.375-16 UN-3B

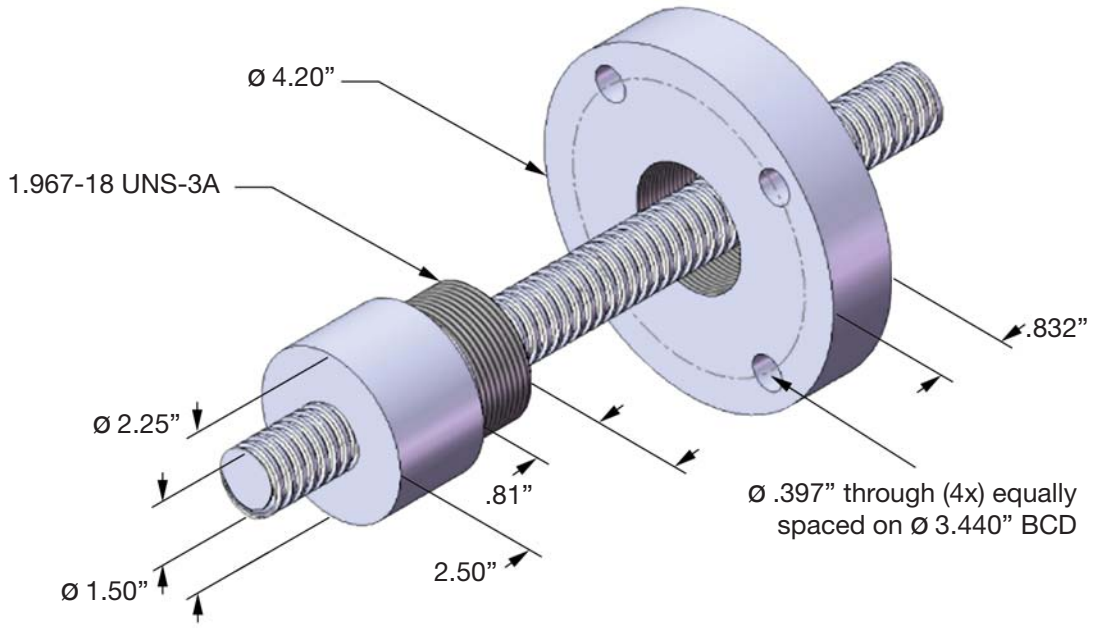
NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

*Load ratings are based on what the screw & nut assembly is capable of achieving. Actual load performance for a given screw and nut assembly will vary from application to application.

*Speed ratings are based on a directly coupled screw & motor turning at 1725 rpm. Actual speeds for a given screw and nut assembly will vary from application to application.

In many cases Duff-Norton can provide screw materials such as 316SS, longer screw lengths, or thread directions other than what has been cataloged. Please contact our customer service department for assistance.

1 1/2" (1.50") Acme Screws & Nuts



Duff-Norton offers complete close mounted systems to complement these screw & nut assemblies as follows:

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Acme Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
150ASA010R	1.50	.100	.100	1	1.355	Centralizing RH	Steel	0.011	Yes	Yes	Yes
150ASA025R	1.50	.250	.250	1	1.215	Centralizing RH	Steel	0.007	Yes	Yes	Yes
150ASA038R	1.50	.375	.375	1	1.053	Centralizing RH	Steel	0.016	Yes	Yes	Yes
150ASA050R	1.50	.500	.250	2	1.196	Centralizing RH	Steel	0.014	Yes	Yes	Yes

Acme Nut	*Static Load	*Dynamic Load	*Max Speed	T.P.I.	Efficiency	Torque to Raise 1 Lb. (in/lb)	Material	Mounting Thread	Mounting Length	Nut Length	Nut Diameter
150ANB010	56,206	18,037	172.50	10	14%	0.111	Bronze	1.967-18 UNF-3A	.81	2.50	2.25
150ANB025	59,393	18,992	431.25	5	31%	0.130	Bronze	1.967-18 UNF-3A	.81	2.50	2.25
150ANB038	53,749	20,180	646.88	2.66	39%	0.153	Bronze	1.967-18 UNF-3A	.81	2.50	2.25
150ANB050	52,926	17,197	862.50	2	46%	0.173	Bronze	1.967-18 UNF-3A	.81	2.50	2.25

Flange	Overall Diameter	Bolt Cir. Diameter	Bolt Hole Diameter	Mounting Holes	Flange Width	Treated	Material	Mounting Thread
FL1967	4.20	3.440	.397	4	.832	Black Oxide	Steel	1.967-18 UNF-3B

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*Speed ratings are based on a directly coupled screw & motor turning at 1725 rpm. Actual speeds for a given screw and nut assembly will vary from application to application.

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2” (2.00”) Acme Screws & Nuts

Duff-Norton offers complete close mounted systems to complement these screw & nut assemblies as follows:

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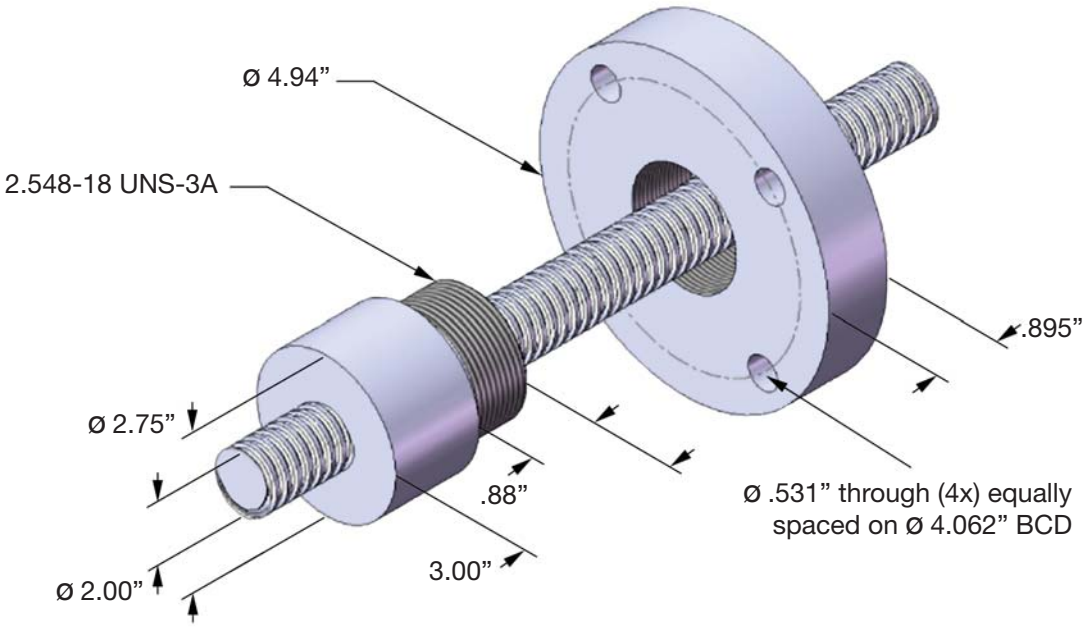

Acme Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
200ASA025	2.00	.250	.250	1	1.713	Centralizing RH	Steel	0.008	Yes	Yes	Yes
200ASA050R	2.00	.500	.500	1	1.435	Centralizing RH	Steel	0.019	Yes	Yes	Yes

Acme Nut	*Static Load	*Dynamic Load	*Max Speed	T.P.I.	Efficiency	Torque to Raise 1 Lb. (in/lb)	Material	Mounting Thread	Mounting Length	Nut Length	Nut Diameter
200ANB025	94,877	31,034	431.25	4	24%	0.162	Bronze	2.548-18 UNF-3A	.88	3.00	2.75
200ANB050	94,252	29,352	862.50	2	40%	0.197	Bronze	2.548-18 UNF-3A	.88	3.00	2.75

Flange	Overall Diameter	Bolt Cir. Diameter	Bolt Hole Diameter	Mounting Holes	Flange Width	Treated	Material	Mounting Thread
FL2548	4.94	4.062	.531	4	.895	Black Oxide	Steel	2.548-18 UNF-3B

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

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*Speed ratings are based on a directly coupled screw & motor turning at 1725 rpm. Actual speeds for a given screw and nut assembly will vary from application to application.

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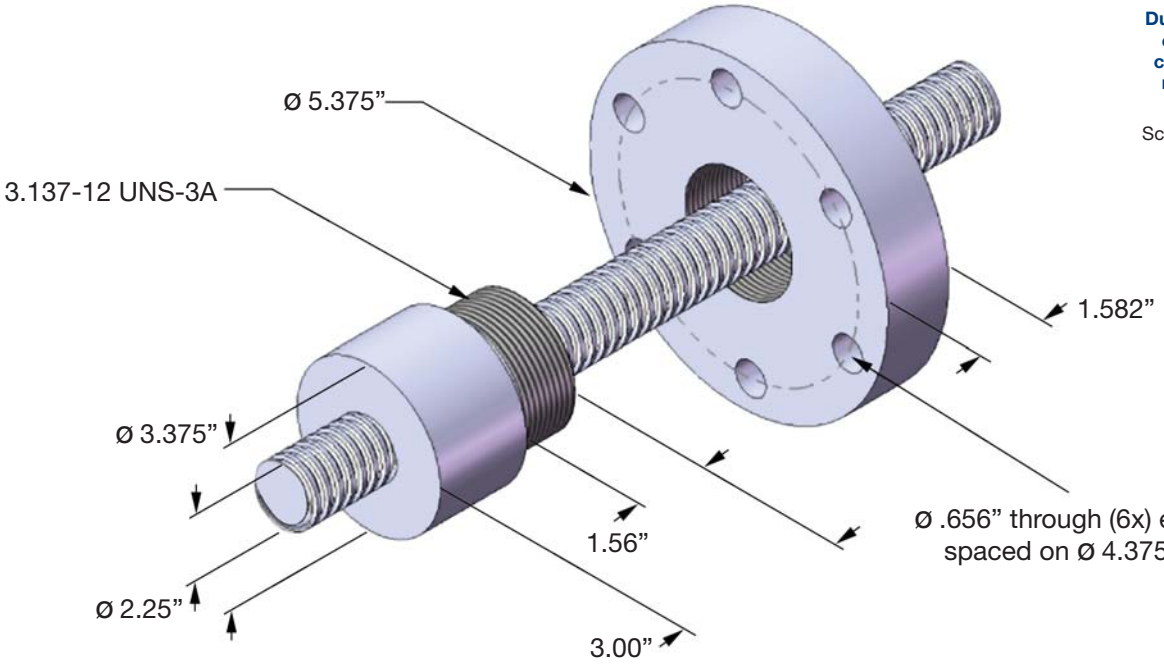
2 1/4" (2.25") Acme Screws & Nuts



Duff-Norton offers complete close mounted systems to complement these screw & nut assemblies as follows:

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Acme Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
225ASA025	2.25	.250	.250	1	1.944	Centralizing RH	Steel	0.012	Yes	Yes	Yes
225ASA050R	2.25	.500	.500	1	1.685	Centralizing RH	Steel	0.019	Yes	Yes	Yes

Acme Nut	*Static Load	*Dynamic Load	*Max Speed	T.P.I.	Efficiency	Torque to Raise 1 Lb. (in/lb)	Material	Mounting Thread	Mounting Length	Nut Length	Nut Diameter
225ANB025	104,447	31,632	431.25	4	22%	0.179	Bronze	3.137-12 UNF-3A	1.56	3.00	3.375
225ANB050	106,037	29,951	862.50	2	37%	0.213	Bronze	3.137-12 UNF-3A	1.56	3.00	3.375

Flange	Overall Diameter	Bolt Cir. Diameter	Bolt Hole Diameter	Mounting Holes	Flange Width	Treated	Material	Mounting Thread
FL3137	5.375	4.375	.656	6	1.582	Black Oxide	Steel	3.137-12 UNF-3B

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

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2 1/2” (2.50”) Acme Screws & Nuts

Duff-Norton offers complete close mounted systems to complement these screw & nut assemblies as follows:

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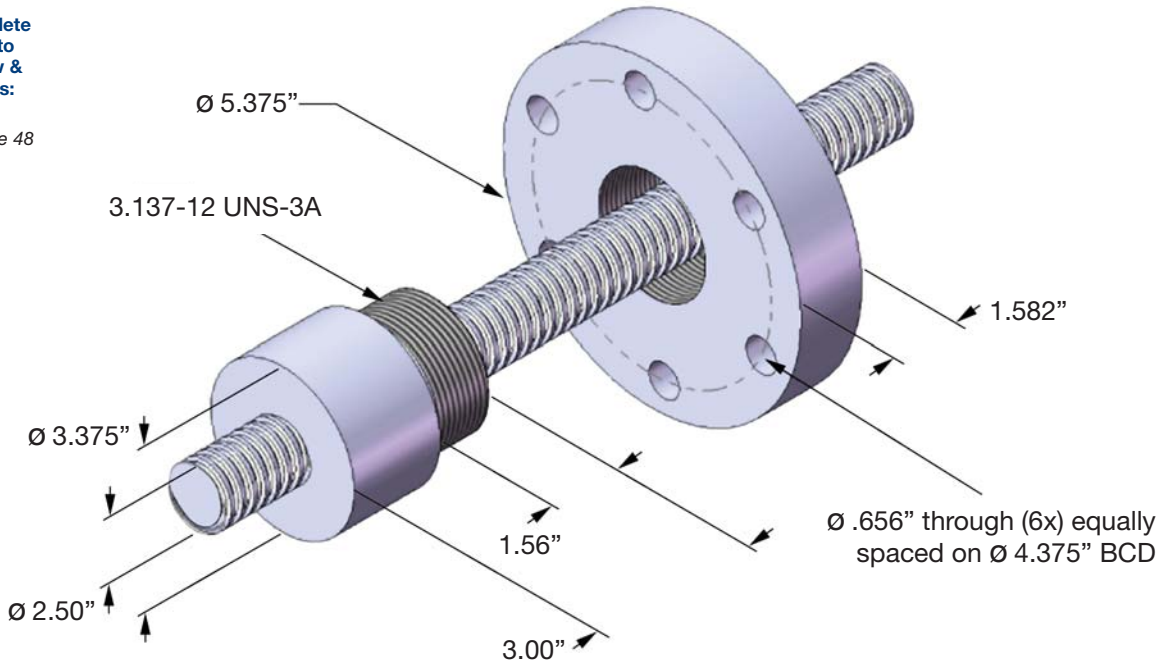

Acme Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
250ASA025	2.50	.250	.250	1	2.213	Centralizing RH	Steel	0.008	Yes	Yes	Yes
250ASA050R	2.50	.500	.500	1	1.934	Centralizing RH	Steel	0.019	Yes	Yes	Yes

Acme Nut	*Static Load	*Dynamic Load	*Max Speed	T.P.I.	Efficiency	Torque to Raise 1 Lb. (in/lb)	Material	Mounting Thread	Mounting Length	Nut Length	Nut Diameter
250ANB025	118,606	38,599	431.25	4	20%	0.195	Bronze	3.137-12 UNF-3A	1.56	3.00	3.375
250ANB050	117,726	33,654	862.50	2	35%	0.229	Bronze	3.137-12 UNF-3A	1.56	3.00	3.375

Flange	Overall Diameter	Bolt Cir. Diameter	Bolt Hole Diameter	Mounting Holes	Flange Width	Treated	Material	Mounting Thread
FL3137	5.375	4.375	.656	6	1.582	Black Oxide	Steel	3.137-12 UNF-3B

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

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*Speed ratings are based on a directly coupled screw & motor turning at 1725 rpm. Actual speeds for a given screw and nut assembly will vary from application to application.

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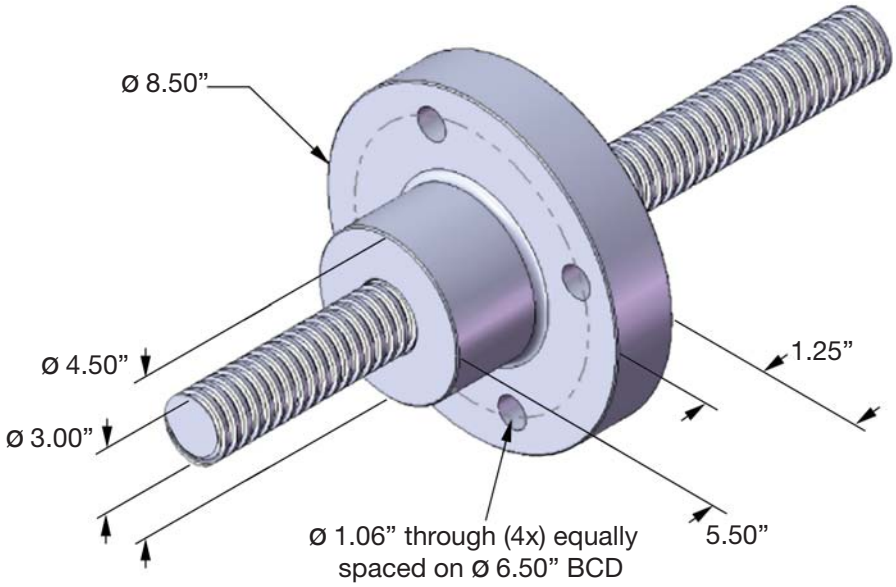
3” (3.00”) Acme Screws & Nuts



Duff-Norton offers complete close mounted systems to complement these screw & nut assemblies as follows:

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Acme Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
300ASA032	3.00	.320	.320	1	2.761	G Class RH	Steel	0.018	Yes	Yes	Yes
300ASA067R	3.00	.666	.666	1	2.548	G Class RH	Steel	0.022	Yes	Yes	Yes

Acme Nut	*Static Load	*Dynamic Load	*Max Speed	T.P.I.	Efficiency	Torque to Raise 1 Lb. (in/lb)	Material	Mounting Thread	Flange Width	Nut Length	Nut Diameter
300ANB032	115,046	51,299	552.00	3.125	21%	0.241	Bronze	Integral Flange	1.25	5.5	4.5
300ANB067	117,204	49,154	1148.85	1.515	36%	0.292	Bronze	Integral Flange	1.25	5.5	4.5

Flange	Overall Diameter	Bolt Cir. Diameter	Bolt Hole Diameter	Mounting Holes	Flange Width	Treated	Material	Mounting Thread
Integral	8.50	6.50	1.06	4	1.25	NA	Bronze	Integral Flange

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

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*Speed ratings are based on a directly coupled screw & motor turning at 1725 rpm. Actual speeds for a given screw and nut assembly will vary from application to application.

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3 3/4” (3.75”) Acme Screws & Nuts

Duff-Norton offers complete close mounted systems to complement these screw & nut assemblies as follows:

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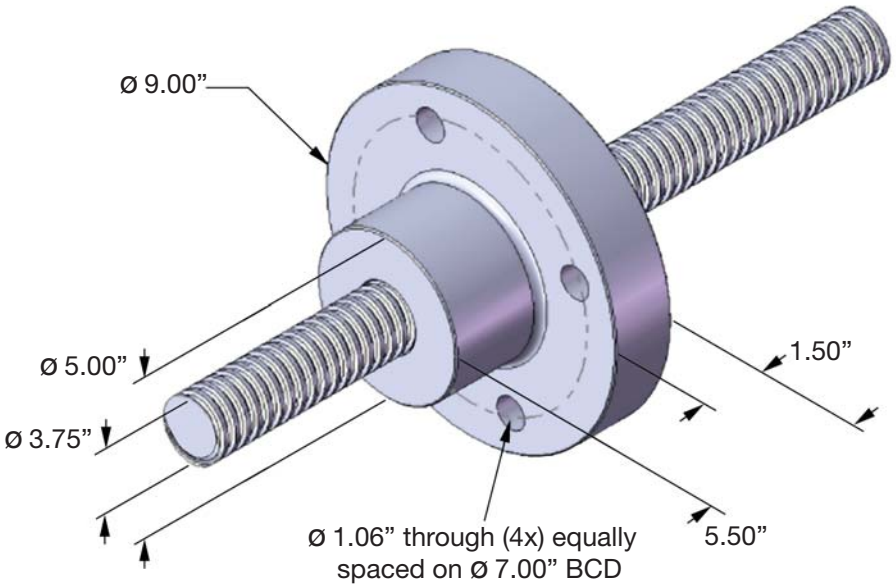

Acme Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
375ASA032	3.75	.320	.320	1	3.390	Mod Sq. RH	Steel	0.010	Yes	Yes	Yes
375ASA067R	3.75	.666	.666	1	3.220	G Class RH	Steel	0.022	Yes	Yes	Yes
375ASA133	3.75	.666	1.33	2	3.295	G Class RH	Steel	0.022	Yes	Yes	Yes

Acme Nut	*Static Load	*Dynamic Load	*Max Speed	T.P.I.	Efficiency	Torque to Raise 1 Lb. (in/lb)	Material	Mounting Thread	Flange Width	Nut Length	Nut Diameter
375ANB032	164,632	107,391	552.00	3.125	31%	0.340	Bronze	Integral Flange	1.5	5.5	5.0
375ANB067	146,406	62,203	1148.85	1.515	47%	0.450	Bronze	Integral Flange	1.5	5.5	5.0
375ANB133	137,796	62,272	2294.25	.75	18%	0.280	Bronze	Integral Flange	1.5	5.5	5.0

Flange	Overall Diameter	Bolt Cir. Diameter	Bolt Hole Diameter	Mounting Holes	Flange Width	Treated	Material	Mounting Thread
Integral	9.00	7.00	1.06	4	1.50	NA	Bronze	Integral Flange

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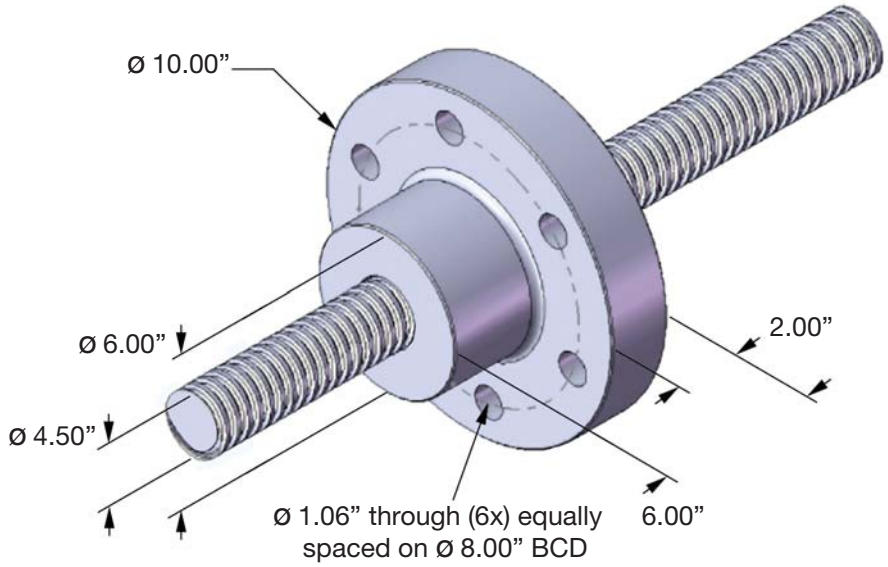
4 1/2” (4.50”) Acme Screws & Nuts



Duff-Norton offers complete close mounted systems to complement these screw & nut assemblies as follows:

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Acme Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
450ASA032	4.50	.320	.320	1	4.139	Mod Sq LH	Steel	0.008	Yes	Yes	Yes
450ASA067	4.50	.666	.666	1	3.978	Mod Sq LH	Steel	0.011	Yes	Yes	Yes

Acme Nut	*Static Load	*Dynamic Load	*Max Speed	T.P.I.	Efficiency	Torque to Raise 1 Lb. (in/lb)	Material	Mounting Thread	Flange Width	Nut Length	Nut Diameter
450ANB032	221,051	141,215	552.00	3.125	16%	0.327	Bronze	Integral Flange	2.0	6.00	6.00
450ANB067	215,679	75,463	1148.85	1.515	28%	0.383	Bronze	Integral Flange	2.0	6.00	6.00

Flange	Overall Diameter	Bolt Cir. Diameter	Bolt Hole Diameter	Mounting Holes	Flange Width	Treated	Material	Mounting Thread
Integral	10.00	8.00	1.06	6	2.00	NA	Bronze	Integral Flange

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

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*Speed ratings are based on a directly coupled screw & motor turning at 1725 rpm. Actual speeds for a given screw and nut assembly will vary from application to application.

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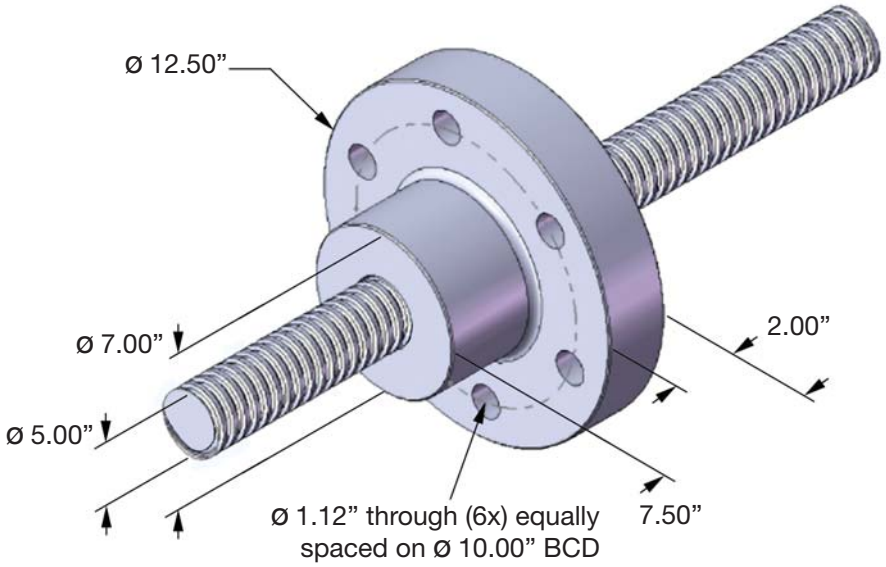
5” (5.00”) Acme Screws & Nuts



Acme Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
500ASA067	5.00	.666	.666	1	4.343	Mod Sq LH	Steel	.010	Yes	Yes	Yes

Acme Nut	*Static Load	*Dynamic Load	*Max Speed	T.P.I.	Efficiency	Torque to Raise 1 Lb. (in/lb)	Material	Mounting Thread	Flange Width	Nut Length	Nut Diameter
500ANB067	339,596	152,848	1148.85	1.515	26%	0.413	Bronze	Integral Flange	2.0	7.50	7.00

Flange	Overall Diameter	Bolt Cir. Diameter	Bolt Hole Diameter	Mounting Holes	Flange Width	Treated	Material	Mounting Thread
Integral	12.50	10.00	1.12	6	2.00	NA	Bronze	Integral Flange

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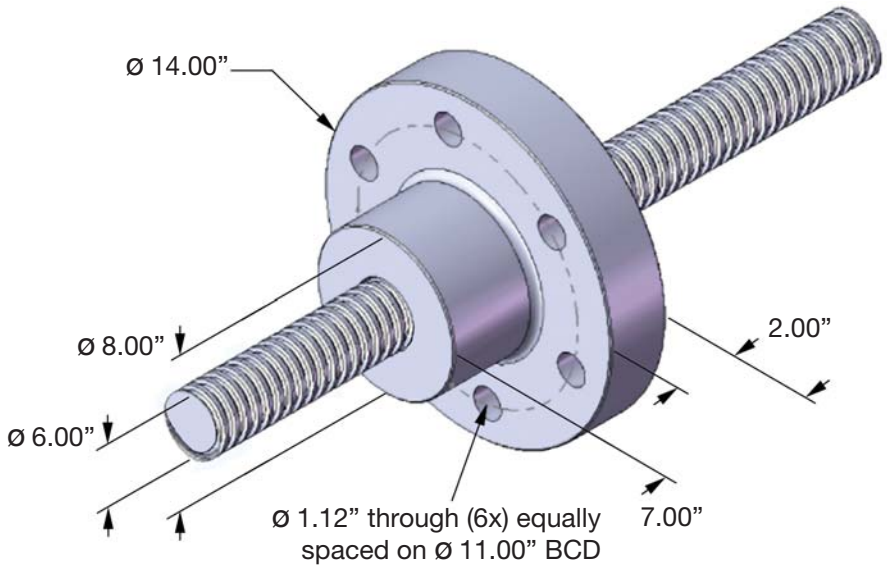
6” (6.00”) Acme Screws & Nuts



Acme Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
600ASA075	6.00	.075	.075	1	5.196	Mod Sq RH	Steel	0.011	Yes	Yes	Yes
600ASA100	6.00	1.00	1.00	1	5.074	Mod Sq RH	Steel	0.011	Yes	Yes	Yes

Acme Nut	*Static Load	*Dynamic Load	*Max Speed	T.P.I.	Efficiency	Torque to Raise 1 Lb. (in/lb)	Material	Mounting Thread	Flange Width	Nut Length	Nut Diameter
600ANB075	339,596	184,586	1293.75	1.33	25%	0.486	Bronze	Integral Flange	2.0	7.00	8.00
600ANB100	340,126	179,129	1725.00	1.33	31%	0.522	Bronze	Integral Flange	2.0	7.00	8.00

Flange	Overall Diameter	Bolt Cir. Diameter	Bolt Hole Diameter	Mounting Holes	Flange Width	Treated	Material	Mounting Thread
Integral	14.00	11.00	1.12	6	2.00	NA	Bronze	Integral Flange

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

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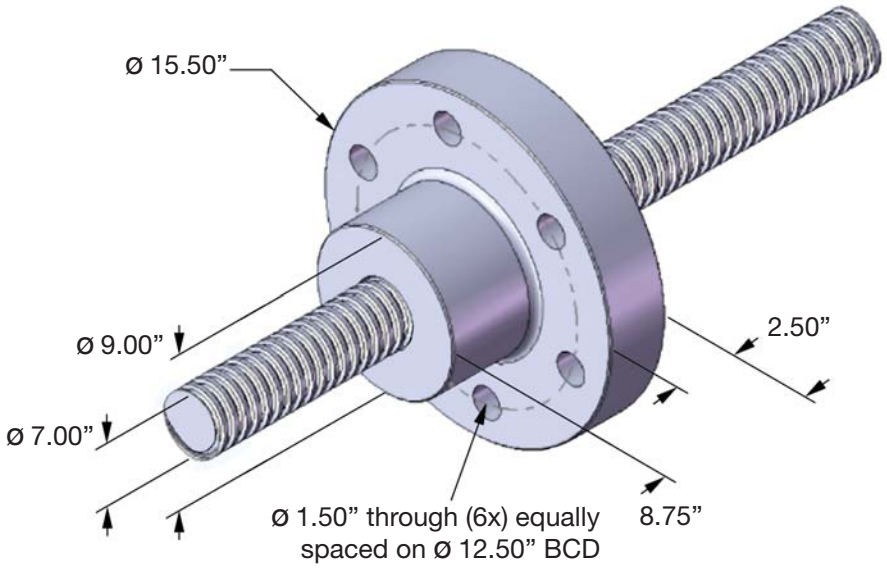
7” (7.00”) Acme Screws & Nuts



Acme Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
700ASA100	7.00	1.00	1.00	1	6.058	Mod Sq RH	Steel	.013	Yes	Yes	Yes
Acme Nut	***Static Load**	***Dynamic Load**	***Max Speed**	**T.P.I.**	**Efficiency**	**Torque to Raise 1 Lb. (in/lb)**	**Material**	**Mounting Thread**	**Flange Width**	**Nut Length**	**Nut Diameter**
700ANB100	487,409	256,345	1725.00	1.00	27%	0.591	Bronze	Integral Flange	2.5	8.75	9.00
Flange	**Overall Diameter**	**Bolt Cir. Diameter**	**Bolt Hole Diameter**	**Mounting Holes**	**Flange Width**	**Treated**	**Material**	**Mounting Thread**			
Integral	15.5	12.50	1.50	6	2.50	NA	Bronze	Integral Flange			

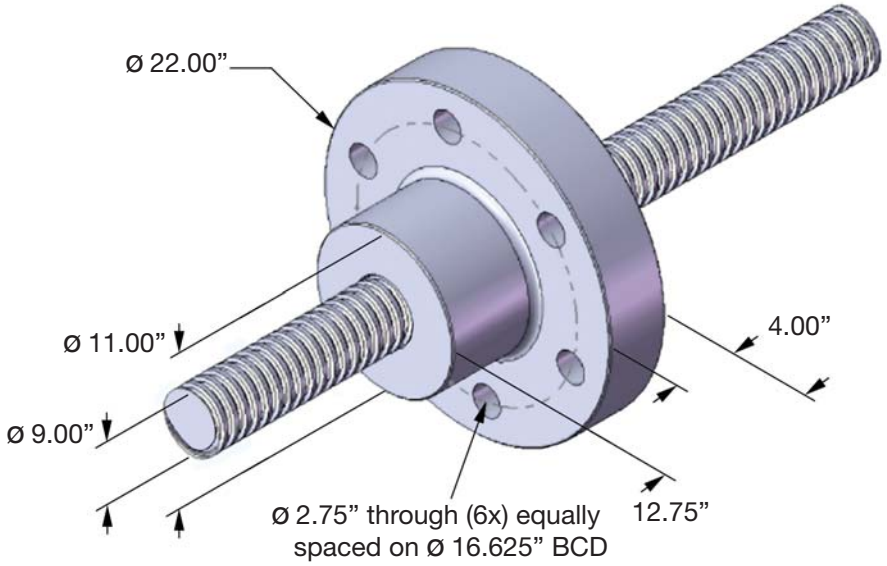
NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

*Load ratings are based on what the screw & nut assembly is capable of achieving. Actual load performance for a given screw and nut assembly will vary from application to application.

*Speed ratings are based on a directly coupled screw & motor turning at 1725 rpm. Actual speeds for a given screw and nut assembly will vary from application to application.

In many cases Duff-Norton can provide screw materials such as 316SS, longer screw lengths, or thread directions other than what has been cataloged. Please contact our customer service department for assistance.

9” (9.00”) Acme Screws & Nuts



Acme Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
900ASA100	9.00	1.00	1.00	1	7.850	Mod Sq RH	Steel	.008	Yes	Yes	Yes
Acme Nut	***Static Load**	***Dynamic Load**	***Max Speed**	**T.P.I.**	**Efficiency**	**Torque to Raise 1 Lb. (in/lb)**	**Material**	**Mounting Thread**	**Flange Width**	**Nut Length**	**Nut Diameter**
900ANB100	952,842	622,745	1725.00	1.00	23%	0.700	Bronze	Integral Flange	4.0	12.75	11.00
Flange	**Overall Diameter**	**Bolt Cir. Diameter**	**Bolt Hole Diameter**	**Mounting Holes**	**Flange Width**	**Treated**	**Material**	**Mounting Thread**			
Integral	22.00	16.625	2.75	6	4	NA	Bronze	Integral Flange			

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

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*Speed ratings are based on a directly coupled screw & motor turning at 1725 rpm. Actual speeds for a given screw and nut assembly will vary from application to application.

In many cases Duff-Norton can provide screw materials such as 316SS, longer screw lengths, or thread directions other than what has been cataloged. Please contact our customer service department for assistance.

Features & Benefits

Duff-Norton has been manufacturing ball screws and nuts for our actuator products for decades, and is now applying those years of experience to bring you an expanded assortment of ball screws and nuts for your application requirements. Consider these advantages:

Performance – Excellent load ratings; Over 90% efficient with low torque and power requirements. Long and predictable life ratings.

Quality – Excellent quality, all screws are precision rolled, heat-treated, inspected, and then manganese phosphate or black oxide coated. Good lead accuracy.

Delivery – In stock on the most popular sizes

Broad Assortment – We offer a very broad assortment of ball diameters and leads

System Integration – Duff-Norton can provide you with an entire screw and nut system: mounting components, drive components, controls, and protective coverings.

Customer Service – Talk to one of our knowledgeable customer service agents or application engineers

Multiple Leads

Multiple Diameters

Ball Screw and Nut Selection Overview

Screw Diameter	Ball Screw Part#	Screw Lead (in)	Turns Per Inch	Thread Starts	Standard Length	Root Diameter	Ball Nut Part#	Ball Nut Description	Flange Part#
1/2"	050BSA020	.200	5	Single	6 ft.	.360	050BNH020	Round, 2 Circuit	FL0937
	050BSA050	.500	2	Double	6 ft.	.360	050BNH050	Round, 2 Circuit	FL0937
.631"	063BSA020	.200	5	Single	6 ft.	.480	063BNE020	Square, 1 Circuit	FL0937
	063BSA020L	.200	5	Single LH	6 ft.	.480	063BNE020L	Square, 1 Circuit	FL0937
	063BSA100	1.00	1	Double	6 ft.	.480	063BNH100	Round, 2 Circuit	FL0937
3/4"	075BSA020	.200	5	Single	6 ft.	.660	075BNG020	Round, 1 Circuit	FL1173
	075BSA020	.200	5	Single	6 ft.	.660	075BNH020	Round, 2 Circuit	FL1173
	075BSA050	.500	2	Double	6 ft.	.630	075BNH050	Round, 2 Circuit	FL1173
1"	100BSA025	.250	4	Single	16 ft.	.840	100BNE025	Square, 1 Circuit	FL1563
	100BSA025	.250	4	Single	16 ft.	.840	100BNF025	Square, 2 Circuit	FL1563
	100BSA100	1.00	1	Double	16 ft.	.840	100BNF100	Square, 2 Circuit	FL1563
1.17"	117BSA041	.413	2.421	Single	16 ft.	.870	117BNH041	Round, 2 Circuit	FL1967
1 1/2"	150BSA047	.473	2.114	Single	20 ft.	1.14	150BNH047	Round, 2 Circuit	FL2548
	150BSA100	1.00	1	Double	20 ft.	1.14	150BNF100	Square, 2 Circuit	FL2250
	150BSA100	1.00	1	Double	20 ft.	1.14	150BNH100	Round, 2 Circuit	FL2250
	150BSA187	1.875	.53	Double	20 ft.	1.19	150BNF187	Square, 2 Circuit	FL2250
2"	200BSA050	.500	2	Single	12 ft.	1.72	200BNH050	Round, 2 Circuit	FL3000
	200BSA100	1.00	1	Double	12 ft.	1.72	200BNH100	Round, 2 Circuit	FL3000
2 1/4"	225BSA050	.500	2	Single	20 ft.	1.85	225BNH050	Round, 2 Circuit	FL3137
	225BSA050L	.500	2	Single LH	20 ft.	1.85	225BNH050L	Round, 2 Circuit	FL3137
	225BSA100	1.00	1	Double	20 ft.	1.85	225BNH100	Round, 2 Circuit	FL3137
3.00"	300BSA066	.660	1.515	Single	20 ft.	2.48	300BNJ066	Round, 3 Circuit	FL4325
4.00"	400BSA100	1.00	1	Single	20 ft.	3.34	400BNJ100	Round, 3 Circuit	FL5497

NOTE: Unless otherwise specified all dimensions are in Inches.

050 – BSE – 050 – X – XXX

Screw Diameter

Code	Diameter
050	1/2”
063	.631”
075	3/4”
100	1”
117	1.17”
150	1 1/2”
200	2”
225	2 1/4”
250	2 1/2”
300	3”
400	4”

Screw Type

Ball

Component Options

Screw
Nut

Total Lead

Thread Pitch
X No. Starts

Code	Lead
020	.200”
025	.250”
041	.413”
047	.473”
050	.500”
066	.660”
100	1.00”
187	1.875”

Screw or Nut Options

Screw Options
A - Alloy or Steel

Nut Options
E - Single, Square
F - Double, Square
G - Single, Round
H - Double, Round
J - Triple, Round

Suffix

Special Screws or Nuts will have a three digit serialized code

Optional Character

Standard Nut and Flange Assembly will contain an “ **A** ”

LH Thread Nut and Flange Assemblies will contain a “ **LA** ”

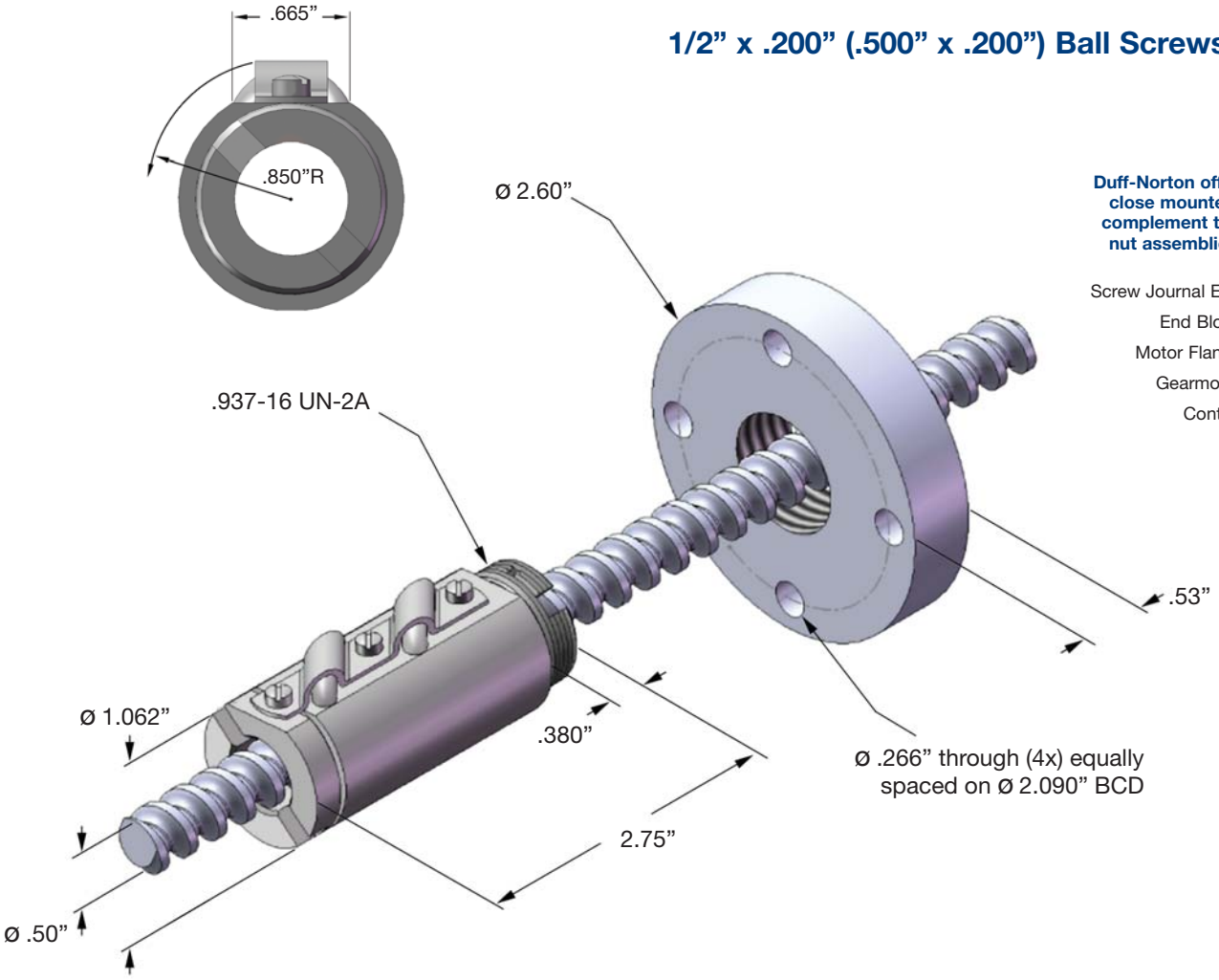
Standard RH Screws cut to length will have no suffix code

Special Screws or Nuts will contain a “ **-** ”

LH Thread Screws or Nuts will contain a “ **L** ”

Standard Nuts only will have no character

1/2” x .200” (.500” x .200”) Ball Screws & Nuts



Duff-Norton offers complete close mounted systems to complement these screw & nut assemblies as follows:

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End Blocks - *Page 50*
Motor Flanges - *Page 54*
Gearmotors - *Page 60*
Controls - *Page 79*

Ball Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
050BSA020	.500	.200	.200	1	.410	Ball RH	Alloy	.002 to .015	Yes	Yes	-

Ball Nut	*Static Load	*Dynamic Load	*Max Speed	T.P.I.	Efficiency	Torque to Raise 1 Lb. (in/lb)	Material	Mounting Thread	Mounting Length	Nut Length	Nut Diameter
050BNH020	9,430	1,200	1200.00	5	+90%	0.035	Steel	.937-16 UN-2A	.380	2.750	1.062

Flange	Overall Diameter	Bolt Cir. Diameter	Bolt Hole Diameter	No. Holes	Flange Width	Treated	Material	Mounting Thread	Nut Return Tubes	Return Tube Width	Nut Radius w/ Tubes
FL0937	2.60	2.090	.266	4	.53	Black Oxide	Steel	.937-16 UN-2B	2	.665	.850

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

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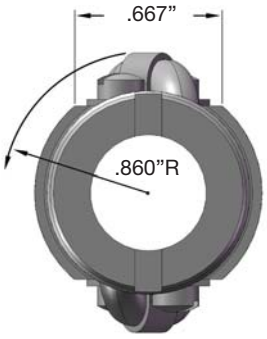
*Speed ratings are based on a DN spec of 3000, actual speeds will vary from application to application.

Ball Screws & Nuts Specifications

1/2” x .500” (.500” x .500”) Ball Screws & Nuts



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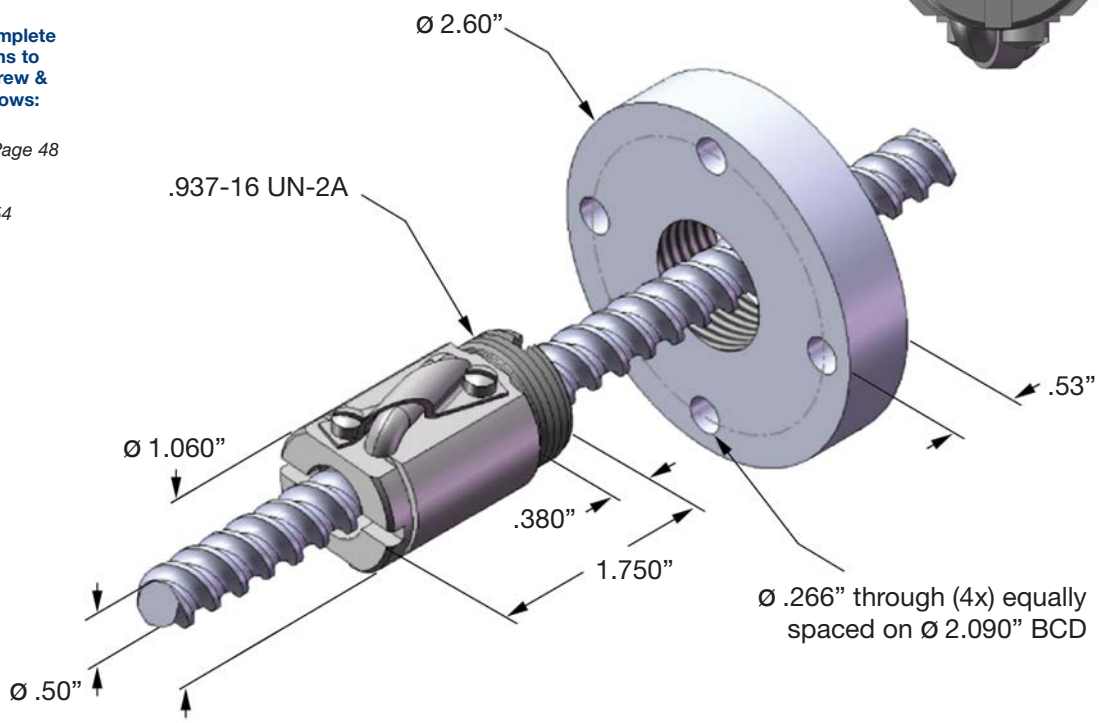

Ball Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
050BSA050	.500	.500	.250	2	.410	Ball RH	Alloy	.002 to .015	Yes	Yes	-

Ball Nut	*Static Load	*Dynamic Load	*Max Speed	T.P.I.	Efficiency	Torque to Raise 1 Lb. (in/lb)	Material	Mounting Thread	Mounting Length	Nut Length	Nut Diameter
050BNH050	4,150	929	3000.00	2	+90%	0.088	Steel	.937-16 UN-2A	.380	1.750	1.060

Flange	Overall Diameter	Bolt Cir. Diameter	Bolt Hole Diameter	No. Holes	Flange Width	Treated	Material	Mounting Thread	Nut Return Tubes	Return Tube Width	Nut Radius w/ Tubes
FL0937	2.60	2.090	.266	4	.53	Black Oxide	Steel	.937-16 UN-2B	1	.667	.860

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

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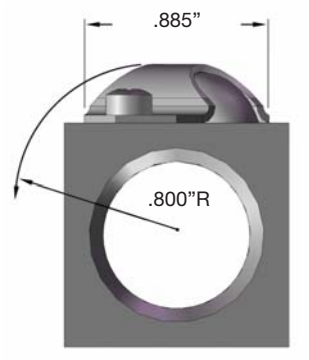

.631” x .200” Ball Screws & Nuts

Duff-Norton offers complete close mounted systems to complement these screw & nut assemblies as follows:

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Right Hand Ball Screw & Nut

Ball Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
063BSA020	.631	.200	.200	1	.500	Ball RH	Alloy	.002 to .015	Yes	Yes	-
Ball Nut	***Static Load**	***Dynamic Load**	***Max Speed**	**T.P.I.**	**Efficiency**	**Torque to Raise 1 Lb. (in/lb)**	**Material**	**Mounting Thread**	**Mounting Length**	**Nut Length**	**Nut Diameter**
063BNE020	6,384	800	951.00	5	+90%	0.035	Steel	.937-16 UN-2A	.500	1.710	1.00 Sq.
Flange	**Overall Diameter**	**Bolt Cir. Diameter**	**Bolt Hole Diameter**	**No. Holes**	**Flange Width**	**Treated**	**Material**	**Mounting Thread**	**Nut Return Tubes**	**Return Tube Width**	**Nut Radius w/ Tubes**
FL0937	2.60	2.090	.266	4	.53	Black Oxide	Steel	.937-16 UN-2B	1	.797	.800

Left Hand Ball Screw & Nut

Ball Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
063BSA020L	.631	.200	.200	1	.500	Ball LH	Alloy	.002 to .015	Yes	Yes	
Ball Nut	***Static Load**	***Dynamic Load**	***Max Speed**	**T.P.I.**	**Efficiency**	**Torque to Raise 1 Lb. (in/lb)**	**Material**	**Mounting Thread**	**Mounting Length**	**Nut Length**	**Nut Diameter**
063BNE020L	6,384	800	951.00	5	+90%	0.035	Steel	.937-16 UN-2A	.500	1.710	1.00 Sq.
Flange	**Overall Diameter**	**Bolt Cir. Diameter**	**Bolt Hole Diameter**	**No. Holes**	**Flange Width**	**Treated**	**Material**	**Mounting Thread**	**Nut Return Tubes**	**Return Tube Width**	**Nut Radius w/ Tubes**
FL0937	2.60"	2.090"	.266"	4	.53	Black Oxide	Steel	.937-16 UN-2B	1	.797	.800

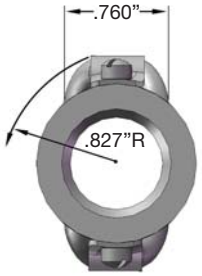
NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

*Load ratings are based on what the screw & nut assembly is capable of achieving. Actual load performance for a given screw and nut assembly will vary from application to application.

*Speed ratings are based on a DN spec of 3000, actual speeds will vary from application to application.

Ball Screws & Nuts Specifications

.631” x 1.00” Ball Screws & Nuts



Duff-Norton offers complete close mounted systems to complement these screw & nut assemblies as follows:

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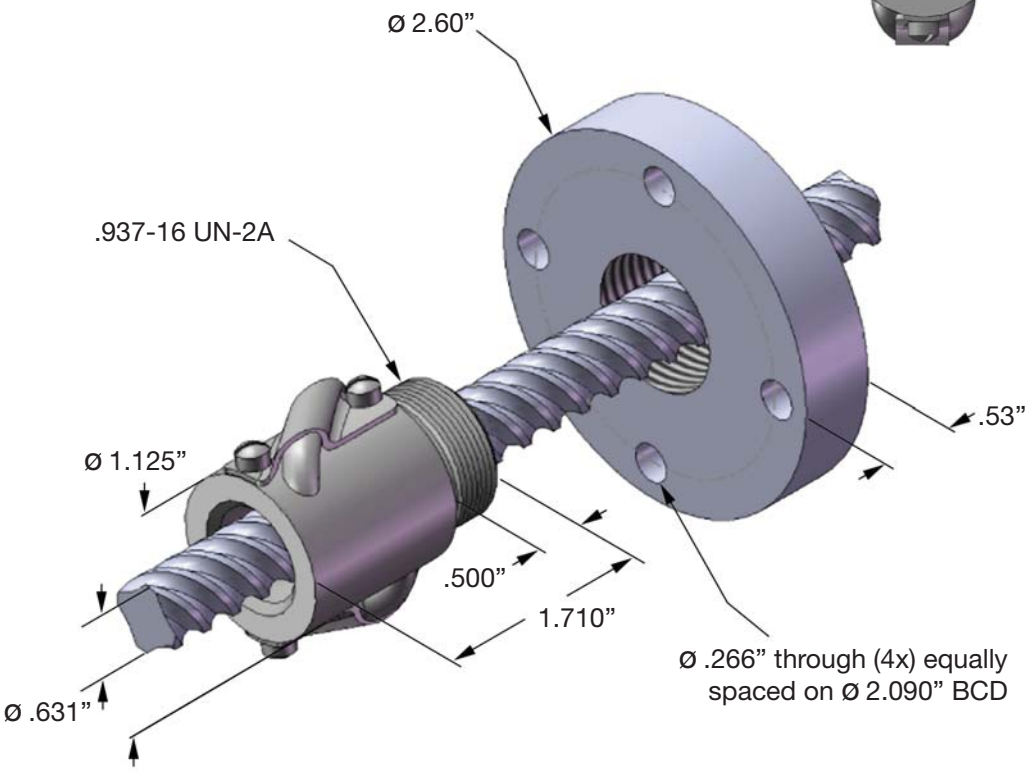

Ball Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
063BSA100	.631	1.00	.500	2	.480	Ball	Alloy	.002 to .015	Yes	Yes	-
Ball Nut	***Static Load**	***Dynamic Load**	***Max Speed**	**T.P.I.**	**Efficiency**	**Torque to Raise 1 Lb. (in/lb)**	**Material**	**Mounting Thread**	**Mounting Length**	**Nut Length**	**Nut Diameter**
063BNH100	2,425	578	2377.00	1	+90%	0.177	Steel	.937-16 UN-2A	.500	1.710	1.125
Flange	**Overall Diameter**	**Bolt Cir. Diameter**	**Bolt Hole Diameter**	**No. Holes**	**Flange Width**	**Treated**	**Material**	**Mounting Thread**	**Nut Return Tubes**	**Return Tube Width**	**Nut Radius w/ Tubes**
FL0937	2.60	2.090	.266	4	.53	Black Oxide	Steel	.937-16 UN-2B	2	.760	.827

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

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Duff-Norton offers complete close mounted systems to complement these screw & nut assemblies as follows:

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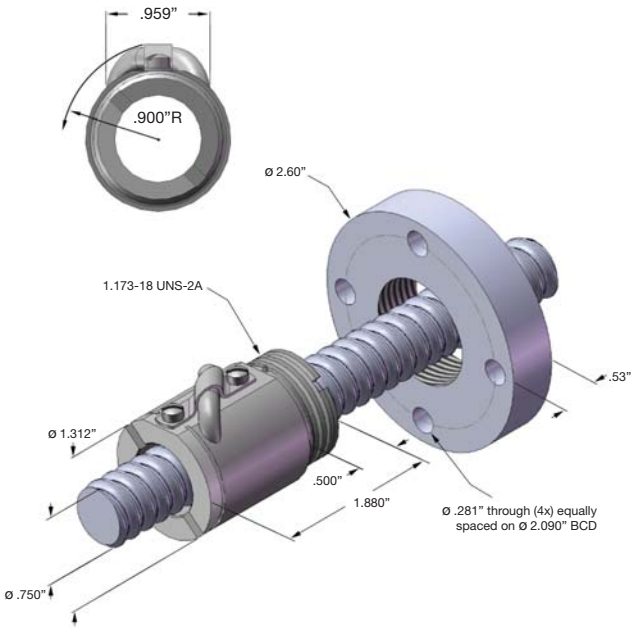
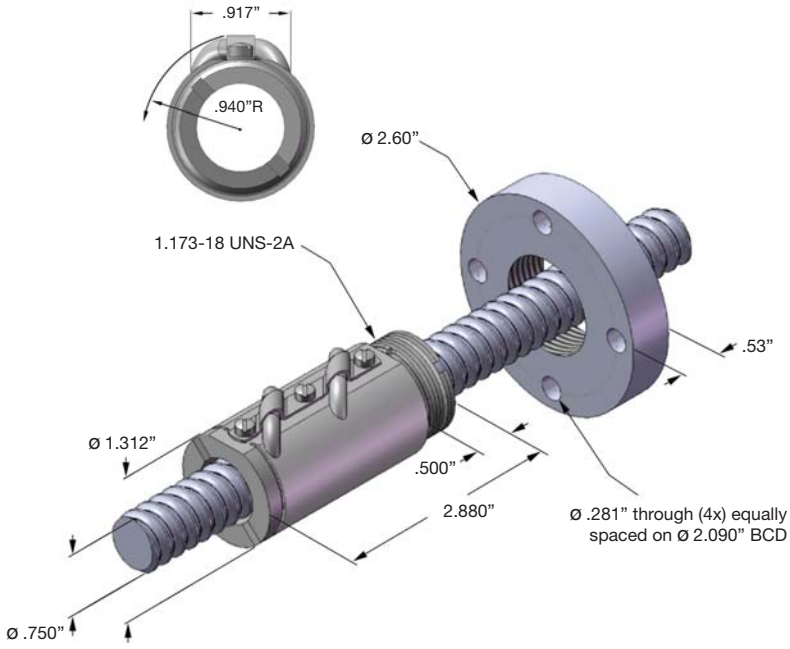
3/4" x .200" (.750" x .200") Ball Screws & Nuts





Ball Screw and Single Return Tube Ball Nut

Ball Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
075BSA020	.750	.200	.200	1	.660	Ball RH	Alloy	.002 to .015	Yes	Yes	-
Ball Nut	***Static Load**	***Dynamic Load**	***Max Speed**	**T.P.I.**	**Efficiency**	**Torque to Raise 1 Lb. (in/lb)**	**Material**	**Mounting Thread**	**Mounting Length**	**Nut Length**	**Nut Diameter**
075BNG020	7,750	950	800.00	5	+90%	0.035	Steel	1.173-18 UNS-2A	.500	1.880	1.312
Flange	**Overall Diameter**	**Bolt Cir. Diameter**	**Bolt Hole Diameter**	**No. Holes**	**Flange Width**	**Treated**	**Material**	**Mounting Thread**	**Nut Return Tubes**	**Return Tube Width**	**Nut Radius w/ Tubes**
FL1173	2.60	2.090	.281	4	.53	Black Oxide	Steel	1.173-18 UNS-2B	1	.959	.900

Double Return Tube Ball Nut

Ball Nut	*Static Load	*Dynamic Load	*Max Speed	T.P.I.	Efficiency	Torque to Raise 1 Lb. (in/lb)	Material	Mounting Thread	Mounting Length	Nut Length	Nut Diameter
075BNH020	18,800	1,900	800.00	5	+90%	0.035	Steel	1.173-18 UNS-2A	.500	2.880	1.312
Flange	**Overall Diameter**	**Bolt Cir. Diameter**	**Bolt Hole Diameter**	**No. Holes**	**Flange Width**	**Treated**	**Material**	**Mounting Thread**	**Nut Return Tubes**	**Return Tube Width**	**Nut Radius w/ Tubes**
FL1173	2.60	2.090	.281	4	.53	Black Oxide	Steel	1.173-18 UNS-2B	2	.917	.940

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

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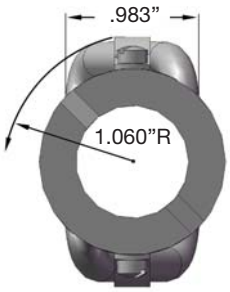
*Speed ratings are based on a DN spec of 3000, actual speeds will vary from application to application.

Ball Screws & Nuts Specifications

3/4” x .500” (.750” x .500”) Ball Screws & Nuts



Duff-Norton offers complete close mounted systems to complement these screw & nut assemblies as follows:

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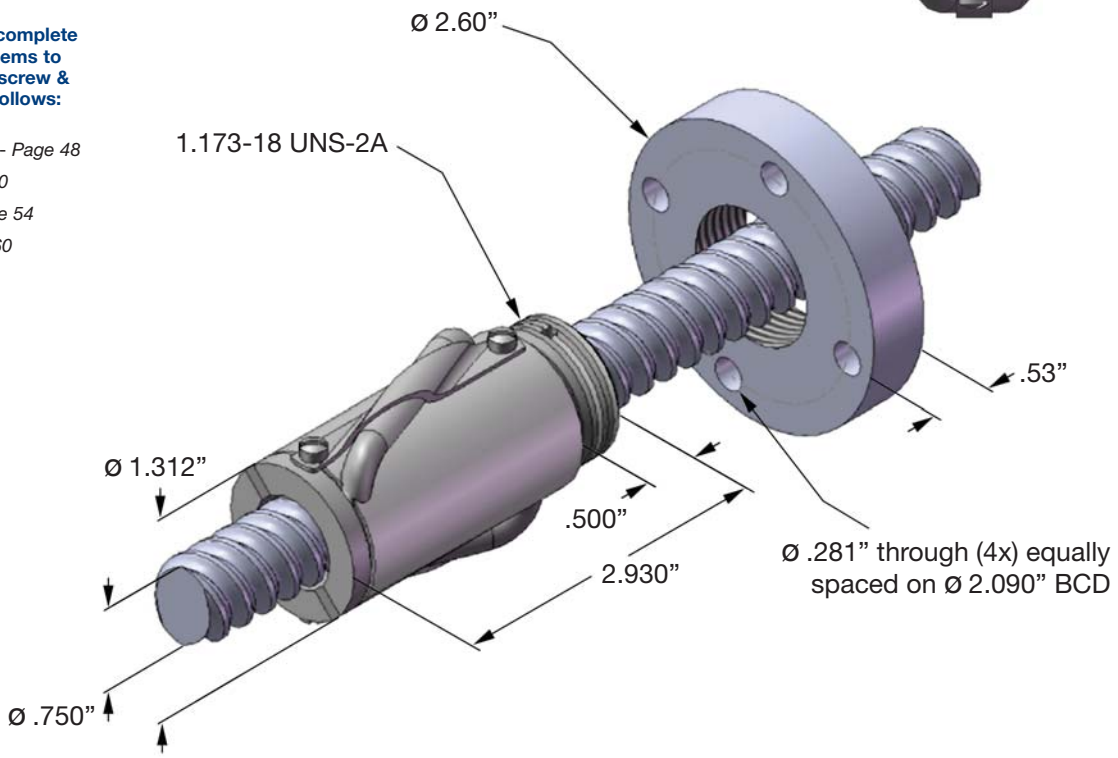

Ball Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
075BSA050	.750	.500	.250	2	.630	Ball RH	Alloy	.002 to .015	Yes	Yes	-

Ball Nut	*Static Load	*Dynamic Load	*Max Speed	T.P.I.	Efficiency	Torque to Raise 1 Lb. (in/lb)	Material	Mounting Thread	Mounting Length	Nut Length	Nut Diameter
075BNH050	24,200	3,450	800.00	2	+90%	0.088	Steel	1.173-18 UNS-2A	.500	2.930	1.312

Flange	Overall Diameter	Bolt Cir. Diameter	Bolt Hole Diameter	No. Holes	Flange Width	Treated	Material	Mounting Thread	Nut Return Tubes	Return Tube Width	Nut Radius w/ Tubes
FL1173	2.60	2.090	.281	4	.53	Black Oxide	Steel	1.173-18 UNS-2B	2	.983	1.060

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

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*Speed ratings are based on a DN spec of 3000, actual speeds will vary from application to application.

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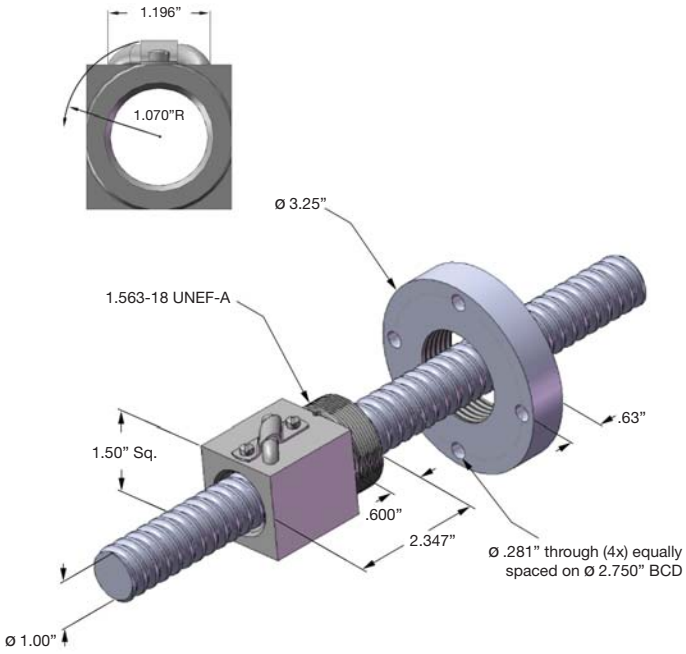
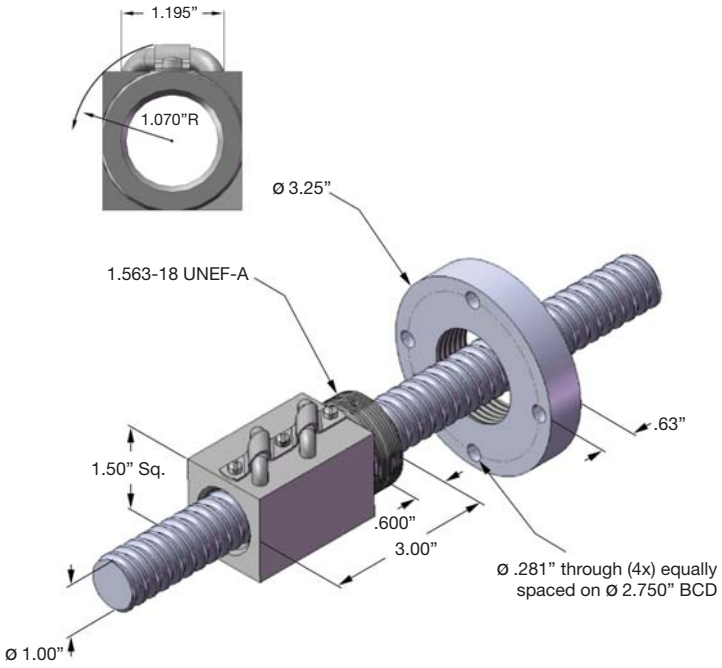
1" x .250" (1.00" x .250") Ball Screws & Nuts





Ball Screw and Single Return Tube Ball Nut

Ball Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
100BSA025	1.00	.250	.250	1	.840	Ball RH	Alloy	.002 to .015	Yes	Yes	Yes
Ball Nut	***Static Load**	***Dynamic Load**	***Max Speed**	**T.P.I.**	**Efficiency**	**To que to Raise 1 Lb. (in/lb)**	**Material**	**Mounting Thread**	**Mounting Length**	**Nut Length**	**Nut Diameter**
100BNE025	15,300	1,612	1200.00	4	+90%	0.044	Steel	1.563-18 UNEF-A	.600	2.347	1.500 Sq.
Flange	**Overall Diameter**	**Bolt Cir. Diameter**	**Bolt Hole Diameter**	**No. Holes**	**Flange Width**	**Treated**	**Material**	**Mounting Thread**	**Nut Return Tubes**	**Return Tube Width**	**Nut Radius w/ Tubes**
FL1563	3.25	2.750	.281	4	.63	Black Oxide	Steel	1.563-18 UNEF-B	1	1.195	1.070

Double Return Tube Ball Nut

Ball Nut	*Static Load	*Dynamic Load	*Max Speed	T.P.I.	Efficiency	Torque to Raise 1 Lb. (in/lb)	Material	Mounting Thread	Mounting Length	Nut Length	Nut Diameter
100BNF025	30,750	3,350	1200.00	4	+90%	0.044	Steel	1.563-18 UNEF-A	.600	3.00	1.500 Sq.
Flange	**Overall Diameter**	**Bolt Cir. Diameter**	**Bolt Hole Diameter**	**No. Holes**	**Flange Width**	**Treated**	**Material**	**Mounting Thread**	**Nut Retur Tubes**	**Return Tube Width**	**Nut Radius w/ Tubes**
FL1563	3.25	2.750	.281	4	.63	Black Oxide	Steel	1.563-18 UNEF-B	2	1.196	1.070

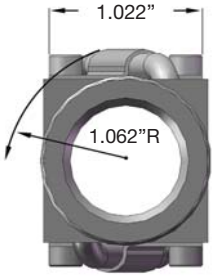
NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

*Load ratings are based on what the screw & nut assembly is capable of achieving. Actual load performance for a given screw and nut assembly will vary from application to application.

*Speed ratings are based on a DN spec of 3000, actual speeds will vary from application to application.

Ball Screws & Nuts Specifications

1” x 1.00” (1.00” x 1.00”) Ball Screws & Nuts



Duff-Norton offers complete close mounted systems to complement these screw & nut assemblies as follows:

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Motor Flanges - *Page 54*
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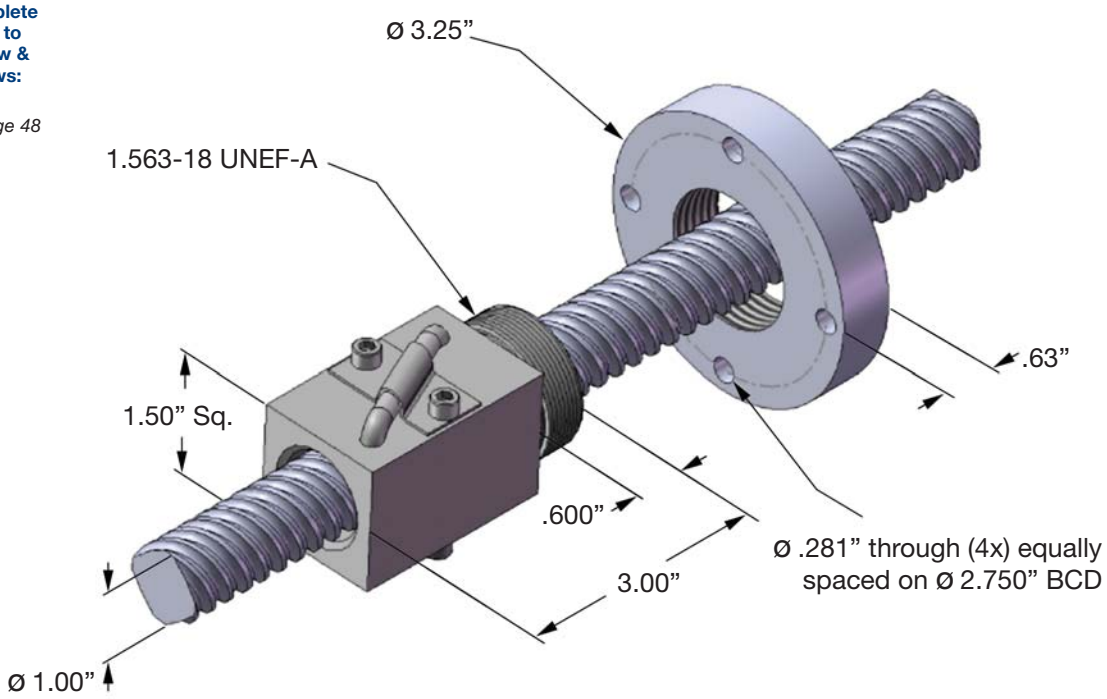


Ball Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
100BSA100	1.00	1.00	.250	4	.840	Ball RH	Alloy	.002 to .015	Yes	Yes	Yes

Ball Nut	*Static Load	*Dynamic Load	*Max Speed	T.P.I.	Efficiency	Torque to Raise 1 Lb. (in/lb)	Material	Mounting Thread	Mounting Length	Nut Length	Nut Diameter
100BNF100	13,600	2,400	750.00	1	+90%	0.177	Steel	1.563-18 UNEF-A	.600	3.000	1.500

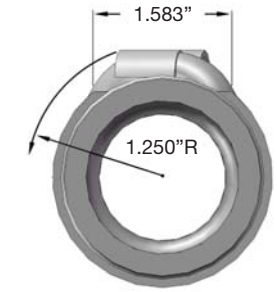
Flange	Overall Diameter	Bolt Cir. Diameter	Bolt Hole Diameter	No. Holes	Flange Width	Treated	Material	Mounting Thread	Nut Return Tubes	Return Tube Width	Nut Radius w/ Tubes
FL1563	3.25	2.750	.281	4	.63	Black Oxide	Steel	1.563-18 UNEF-B	2	1.022	1.062

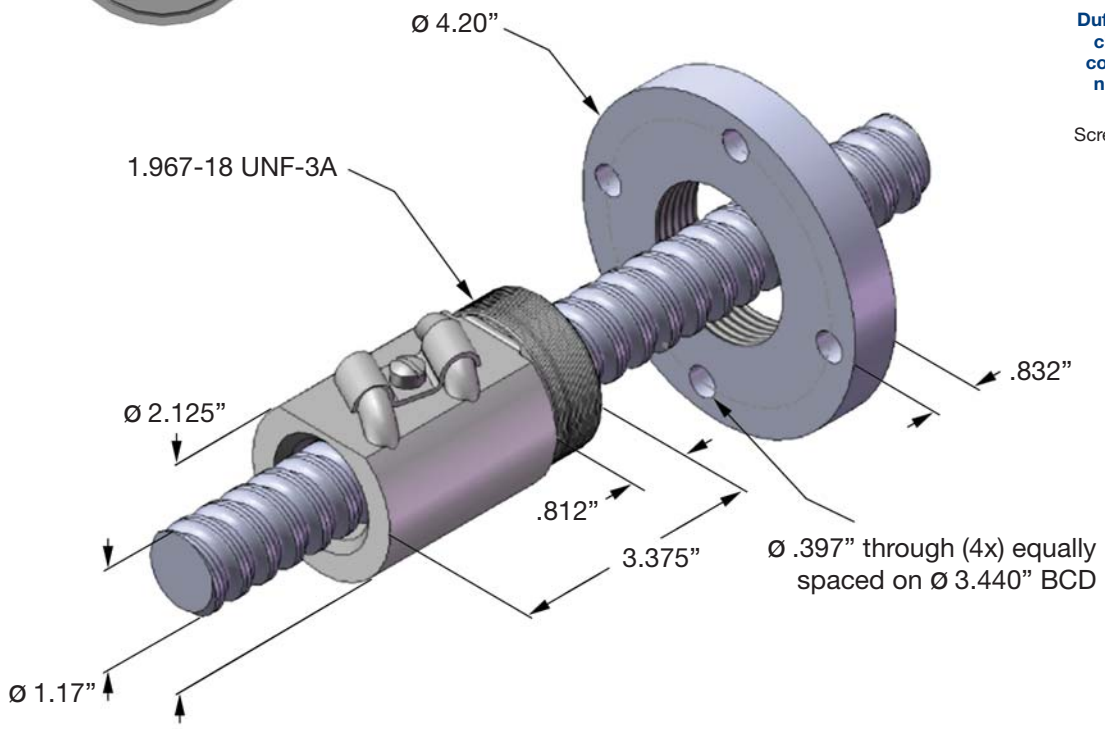
NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

*Load ratings are based on what the screw & nut assembly is capable of achieving. Actual load performance for a given screw and nut assembly will vary from application to application.

*Speed ratings are based on a DN spec of 3000, actual speeds will vary from application to application.

1.17” x .413” Ball Screws & Nuts





Duff-Norton offers complete close mounted systems to complement these screw & nut assemblies as follows:

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Ball Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
117BSA041	1.171	.413	.413	1	.870	Ball RH	Alloy	.002 to .015	Yes	Yes	Yes

Ball Nut	*Static Load	*Dynamic Load	*Max Speed	T.P.I.	Efficiency	Torque to Raise 1 Lb. (in/lb)	Material	Mounting Thread	Mounting Length	Nut Length	Nut Diameter
117BNH041	22,917	3,894	1058.00	2.421	+90%	0.073	Steel	1.967-18 UNF-3A	.812	3.375	2.125

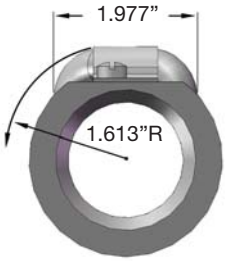
Flange	Overall Diameter	Bolt Cir. Diameter	Bolt Hole Diameter	No. Holes	Flange Width	Treated	Material	Mounting Thread	Nut Return Tubes	Return Tube Width	Nut Radius w/ Tubes
FL1967	4.20	3.44	.397	4	.832	Black Oxide	Steel	1.967-18 UNF-3B	2	1.583	1.250

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

*Load ratings are based on what the screw & nut assembly is capable of achieving. Actual load performance for a given screw and nut assembly will vary from application to application.

*Speed ratings are based on a DN spec of 3000, actual speeds will vary from application to application.

Ball Screws & Nuts Specifications



1 1/2” x .473” (1.50” x .473”) Ball Screws & Nuts

Duff-Norton offers complete close mounted systems to complement these screw & nut assemblies as follows:

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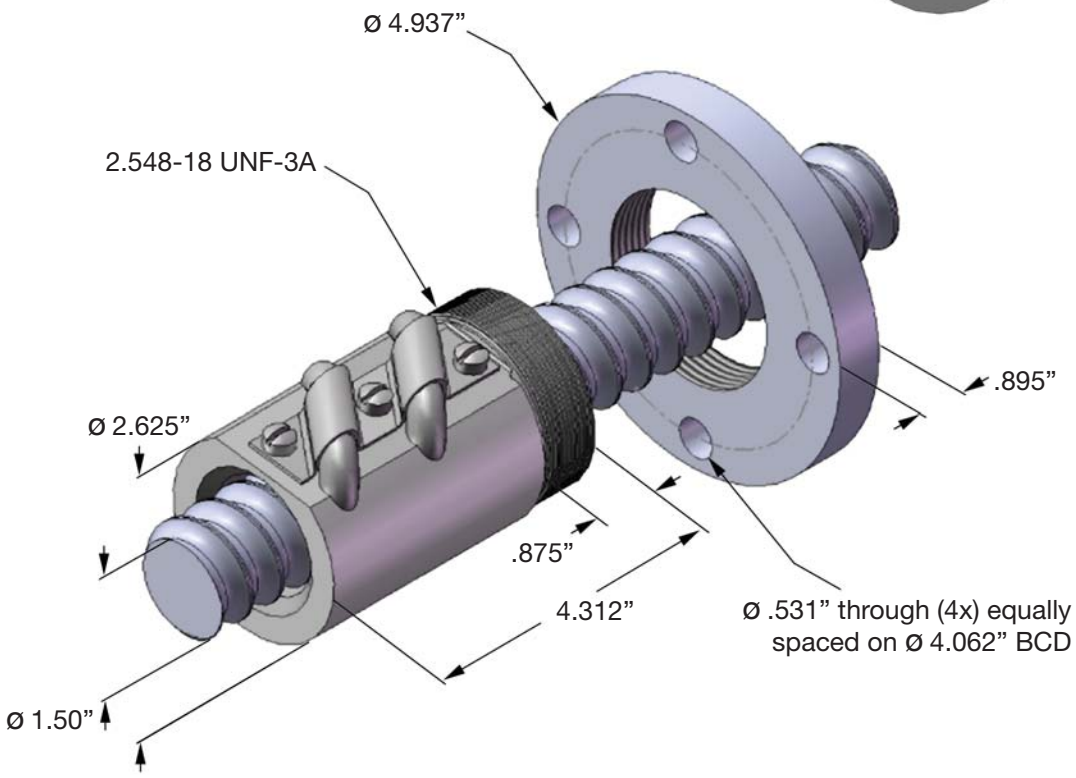

Ball Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
150BSA047	1.500	.473	.473	1	1.140	Ball RH	Alloy	.002 to .015	Yes	Yes	Yes

Ball Nut	*Static Load	*Dynamic Load	*Max Speed	T.P.I.	Efficiency	Torque to Raise 1 Lb. (in/lb)	Material	Mounting Thread	Mounting Length	Nut Length	Nut Diameter
150BNH047	57,770	10,050	946.00	2.114	+90%	0.084	Steel	2.548-18 UNF-3A	.875	4.312	2.625

Flange	Overall Diameter	Bolt Cir. Diameter	Bolt Hole Diameter	No. Holes	Flange Width	Treated	Material	Mounting Thread	Nut Return Tubes	Return Tube Width	Nut Radius w/ Tubes
FL2548	4.94	4.062	.531	4	.895	Black Oxide	Steel	2.548-18 UNF-3B	2	1.977	1.613

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

*Load ratings are based on what the screw & nut assembly is capable of achieving. Actual load performance for a given screw and nut assembly will vary from application to application.

*Speed ratings are based on a DN spec of 3000, actual speeds will vary from application to application.

Duff-Norton offers complete close mounted systems to complement these screw & nut assemblies as follows:

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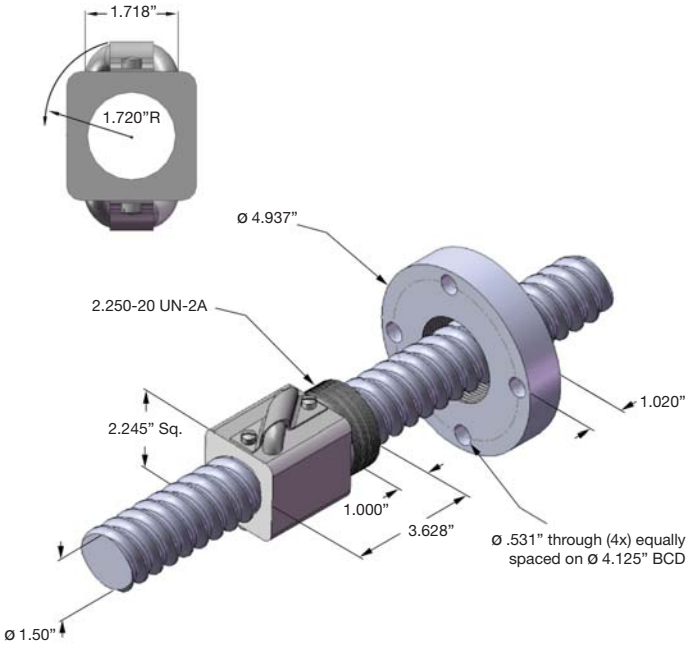
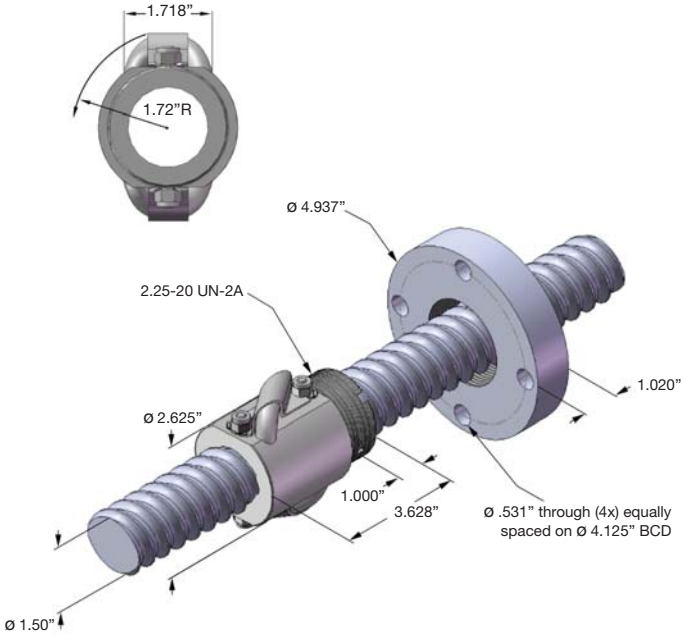
1 1/2” x 1.00” (1.50” x 1.00”) Ball Screws & Nuts





Ball Screw and Square Ball Nut

Ball Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
150BSA100	1.500	1.000	.500	2	1.140	Ball RH	Alloy	.002 to .015	Yes	Yes	Yes

Ball Nut	*Static Load	*Dynamic Load	*Max Speed	T.P.I.	Efficiency	Torque to Raise 1 Lb. (in/lb)	Material	Mounting Thread	Mounting Length	Nut Length	Nut Diameter
150BNF100	34,662	8,250	2000.00	1	+90%	0.176	Steel	2.250-20 UN-2A	1.00	3.628	2.245 Sq.

Flange	Overall Diameter	Bolt Cir. Diameter	Bolt Hole Diameter	No. Holes	Flange Width	Treated	Material	Mounting Thread	Nut Return Tubes	Return Tube Width	Nut Radius w/ Tubes
FL2250	4.94	4.125	.531	4	1.020	Black Oxide	Steel	2.250-20 UN-2B	2	1.718	1.720

Round Ball Nut

Ball Nut	*Static Load	*Dynamic Load	*Max Speed	T.P.I.	Efficiency	Torque to Raise 1 Lb. (in/lb)	Material	Mounting Thread	Mounting Length	Nut Length	Nut Diameter
150BNH100	34,662	8,250	2000.00	1	+90%	0.176	Steel	2.250-20 UN-2A	1.00	3.633	2.627

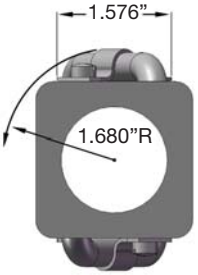
Flange	Overall Diameter	Bolt Cir. Diameter	Bolt Hole Diameter	No. Holes	Flange Width	Treated	Material	Mounting Thread	Nut Retur Tubes	Return Tube Width	Nut Radius w/ Tubes
FL2250	4.94	4.125	.531	4	1.020	Black Oxide	Steel	2.250-20 UN-2B	2	1.718	1.720

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

*Load ratings are based on what the screw & nut assembly is capable of achieving. Actual load performance for a given screw and nut assembly will vary from application to application.

*Speed ratings are based on a DN spec of 3000, actual speeds will vary from application to application.

Ball Screws & Nuts Specifications



1 1/2” x 1.875” (1.50” x 1.875”) Ball Screws & Nuts

Duff-Norton offers complete close mounted systems to complement these screw & nut assemblies as follows:

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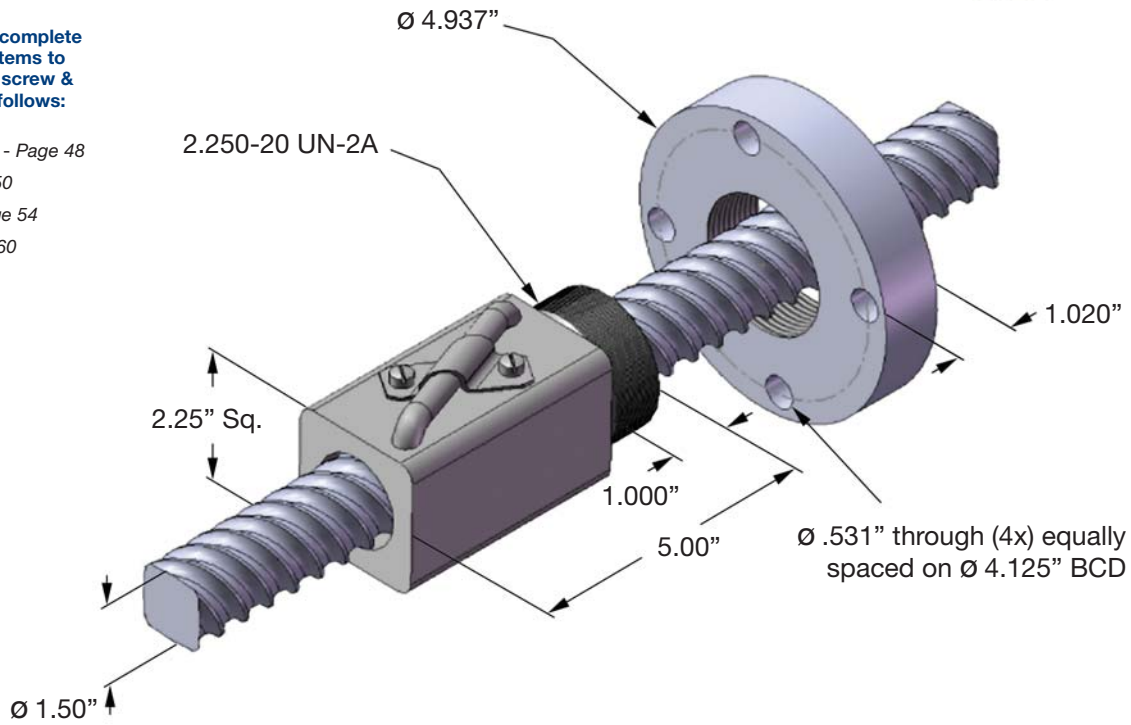

Ball Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
150BSA187	1.500	1.875	.468	4	1.190	Ball	Alloy	.002 to .015	Yes	Yes	Yes
Ball Nut	***Static Load**	***Dynamic Load**	***Max Speed**	**T.P.I.**	**Efficiency**	**Torque to Raise 1 Lb. (in/lb)**	**Material**	**Mounting Thread**	**Mounting Length**	**Nut Length**	**Nut Diameter**
150BNF187	29,895	7,242	3750.00	0.53	+90%	0.332	Steel	2.250-20 UN-2A	1.000	5.000	2.245 Sq.
Flange	**Overall Diameter**	**Bolt Cir. Diameter**	**Bolt Hole Diameter**	**No. Holes**	**Flange Width**	**Treated**	**Material**	**Mounting Thread**	**Nut Return Tubes**	**Return Tube Width**	**Nut Radius w/ Tubes**
FL2250	4.94	4.125	.531	4	1.020	Black Oxide	Steel	2.250-20 UN-2B	2	1.576	1.680

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

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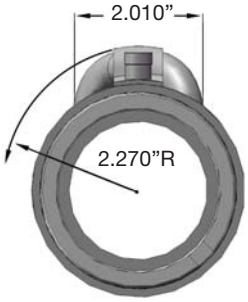
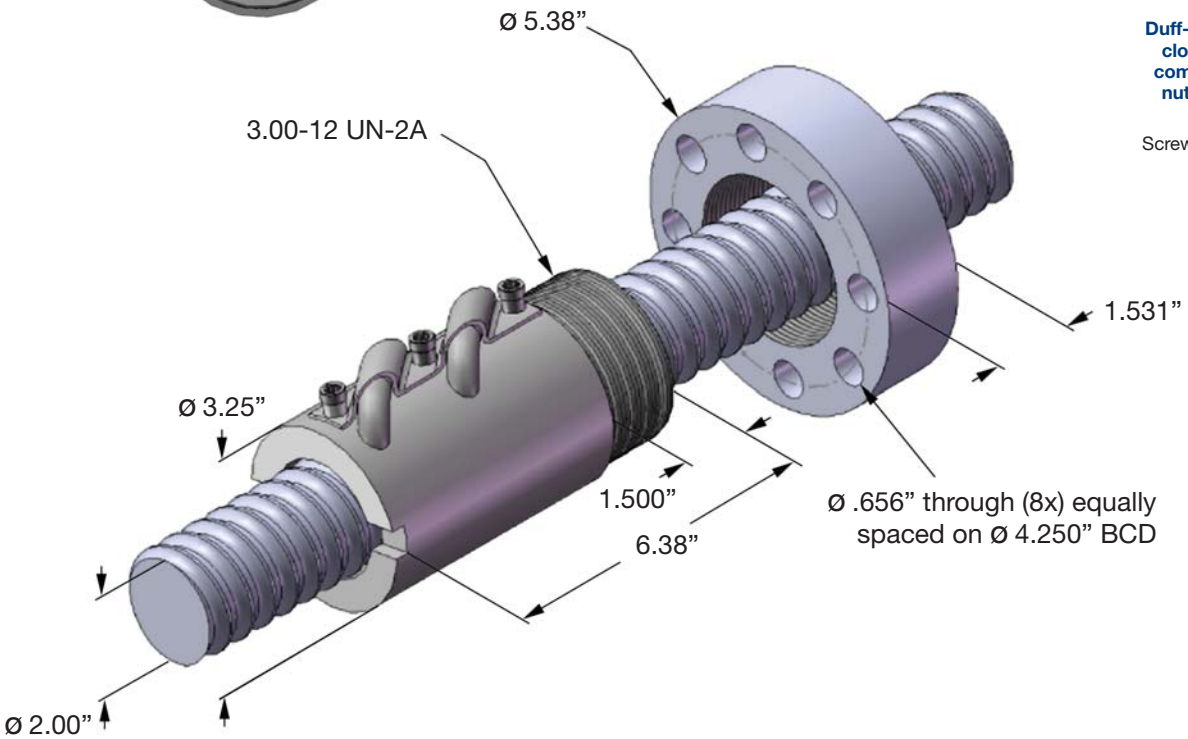
*Speed ratings are based on a DN spec of 3000, actual speeds will vary from application to application.



2” x .500” (2.00” x .500”) Ball Screws & Nuts



Duff-Norton offers complete close mounted systems to complement these screw & nut assemblies as follows:

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Ball Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
200BSA050	2.000	.500	.500	1	1.720	Ball RH	Alloy	.002 to .015	Yes	Yes	Yes

Ball Nut	*Static Load	*Dynamic Load	*Max Speed	T.P.I.	Efficiency	Torque to Raise 1 Lb. (in/lb)	Material	Mounting Thread	Mounting Length	Nut Length	Nut Diameter
200BNH050	143,400	18,500	750.00	2	+90%	0.088	Steel	3.00-12 UN-2A	1.500	6.380	3.250

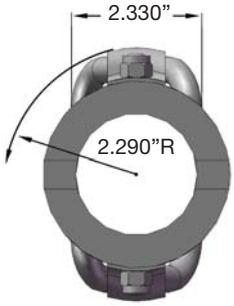
Flange	Overall Diameter	Bolt Cir. Diameter	Bolt Hole Diameter	No. Holes	Flange Width	Treated	Material	Mounting Thread	Nut Return Tubes	Return Tube Width	Nut Radius w/ Tubes
FL3000	5.38	4.250	.656	8	1.531	Black Oxide	Steel	3.00-12 UN-2B	2	2.010	2.270

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

*Load ratings are based on what the screw & nut assembly is capable of achieving. Actual load performance for a given screw and nut assembly will vary from application to application.

*Speed ratings are based on a DN spec of 3000, actual speeds will vary from application to application.

Ball Screws & Nuts Specifications



2” x 1.00” (2.00” x 1.00”) Ball Screws & Nuts

Duff-Norton offers complete close mounted systems to complement these screw & nut assemblies as follows:

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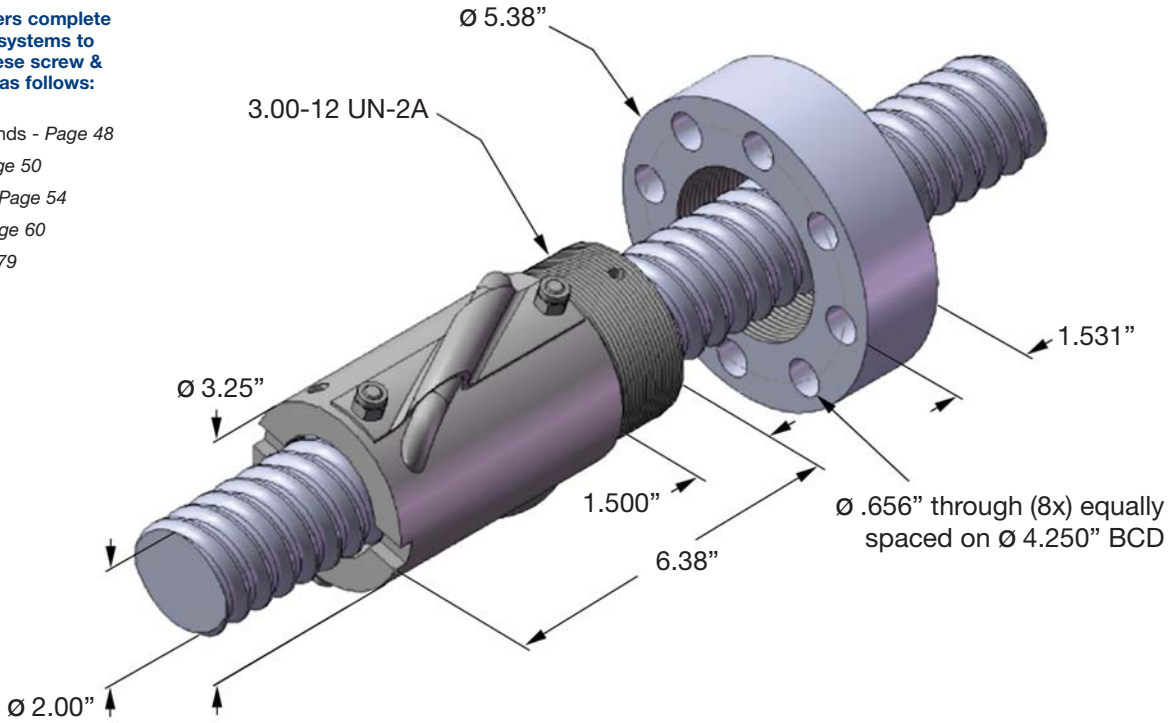

Ball Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
200BSA100	2.000	1.000	.500	2	1.720	Ball RH	Alloy	.002 to .015	Yes	Yes	Yes
Ball Nut	***Static Load**	***Dynamic Load**	***Max Speed**	**T.P.I.**	**Efficiency**	**Torque to Raise 1 Lb. (in/lb)**	**Material**	**Mounting Thread**	**Mounting Length**	**Nut Length**	**Nut Diameter**
200BNH100	134,500	21,200	1500.00	2	+90%	0.176	Steel	3.00-12 UN-2A	1.500	6.380	3.250
Flange	**Overall Diameter**	**Bolt Cir. Diameter**	**Bolt Hole Diameter**	**No. Holes**	**Flange Width**	**Treated**	**Material**	**Mounting Thread**	**Nut Return Tubes**	**Return Tube Width**	**Nut Radius w/ Tubes**
FL3000	5.38	4.250	.656	8	1.531	Black Oxide	Steel	3.00-12 UN-2B	2	2.330	2.290

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

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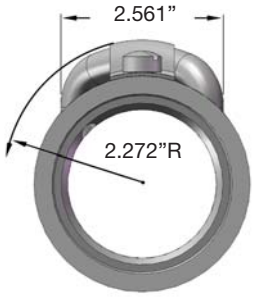
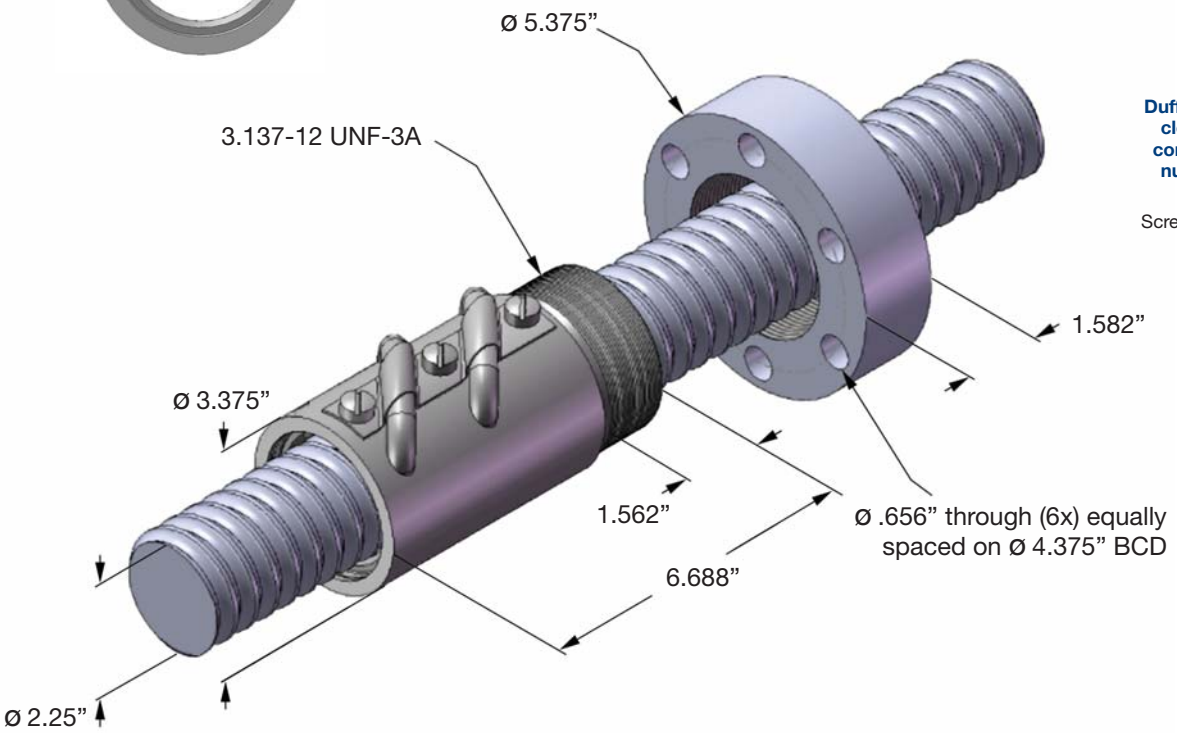
*Speed ratings are based on a DN spec of 3000, actual speeds will vary from application to application.



2 1/4” x .500” (2.25” x .500”) Ball Screws & Nuts



Duff-Norton offers complete close mounted systems to complement these screw & nut assemblies as follows:

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Right Hand Ball Screw & Nut

Ball Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
225BSA050	2.250	.500	.500	1	1.850	Ball RH	Alloy	.002 to .015	Yes	Yes	Yes
Ball Nut	***Static Load**	***Dynamic Load**	***Max Speed**	**T.P.I.**	**Efficiency**	**Torque to Raise 1 Lb. (in/lb)**	**Material**	**Mounting Thread**	**Mounting Length**	**Nut Length**	**Nut Diameter**
225BNH050	161,150	21,306	667.00	2	+90%	0.088	Alloy	3.137-12 UNF-3A	1.562	6.688	3.375
Flange	**Overall Diameter**	**Bolt Cir. Diameter**	**Bolt Hole Diameter**	**No. Holes**	**Flange Width**	**Treated**	**Material**	**Mounting Thread**	**Nut Return Tubes**	**Return Tube Width**	**Nut Radius w/ Tubes**
FL3137	5.375	4.375	.656	6	1.582	Black Oxide	Steel	3.137-12 UNF-3B	2	2.561	2.272

Left Hand Ball Screw & Nut

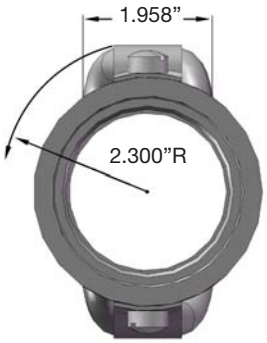
Ball Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
225BSA050L	2.250	.500	.500	1	1.850	Ball LH	Alloy	.002 to .015	Yes	Yes	Yes
Ball Nut	***Static Load**	***Dynamic Load**	***Max Speed**	**T.P.I.**	**Efficiency**	**Torque to Raise 1 Lb. (in/lb)**	**Material**	**Mounting Thread**	**Mounting Length**	**Nut Length**	**Nut Diameter**
225BNH050L	161,150	21,306	667.00	2	+90%	0.088	Alloy	3.137-12 UNF-3A	1.562	6.688	3.375
Flange	**Overall Diameter**	**Bolt Cir. Diameter**	**Bolt Hole Diameter**	**No. Holes**	**Flange Width**	**Treated**	**Material**	**Mounting Thr ead**	**Nut Return Tubes**	**Return Tube Width**	**Nut Radius w/ Tubes**
FL3137	5.375	4.375	.656	6	1.582	Black Oxide	Steel	3.137-12 UNF-3B	2	2.561	2.272

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

*Load ratings are based on what the screw & nut assembly is capable of achieving. Actual load performance for a given screw and nut assembly will vary from application to application.

*Speed ratings are based on a DN spec of 3000, actual speeds will vary from application to application.

Ball Screws & Nuts Specifications



2 1/4” x 1.00” (2.25” x 1.00”) Ball Screws & Nuts

Duff-Norton offers complete close mounted systems to complement these screw & nut assemblies as follows:

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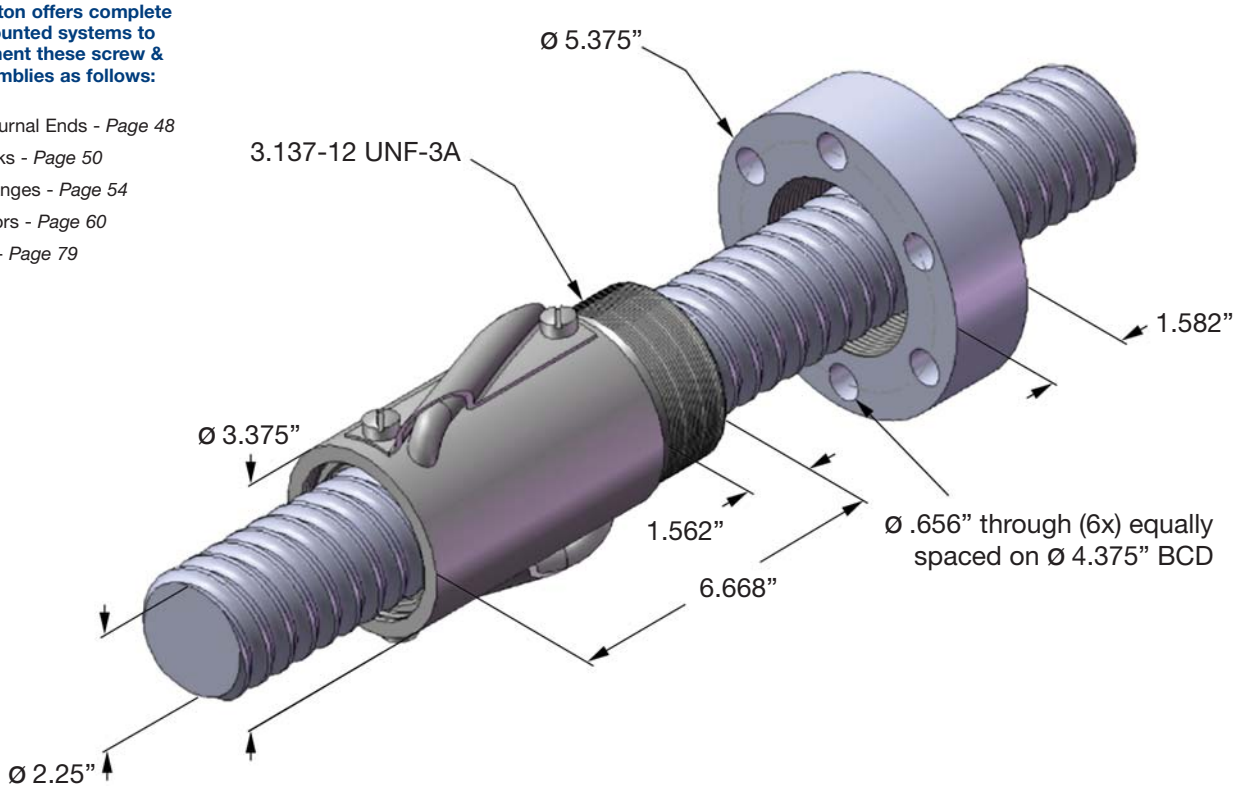
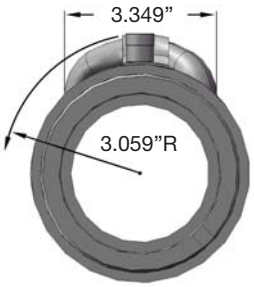


Ball Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
225BSA100	2.250	1.000	.500	2	1.850	Ball RH	Alloy	.002 to .015	Yes	Yes	Yes
Ball Nut	***Static Load**	***Dynamic Load**	***Max Speed**	**T.P.I.**	**Efficiency**	**Torque to Raise 1 Lb. (in/lb)**	**Material**	**Mounting Thread**	**Mounting Length**	**Nut Length**	**Nut Diameter**
225BNH100	161,150	26,538	1333.00	2	+90%	0.176	Steel	3.137-12 UNF-3A	1.562	6.688	3.375
Flange	**Overall Diameter**	**Bolt Cir. Diameter**	**Bolt Hole Diameter**	**No. Holes**	**Flange Width**	**Treated**	**Material**	**Mounting Thread**	**Nut Return Tubes**	**Return Tube Width**	**Nut Radius w/ Tubes**
FL3137	5.375	4.375	.656	6	1.582	Black Oxide	Steel	3.137-12 UNF-3B	2	1.958	2.300

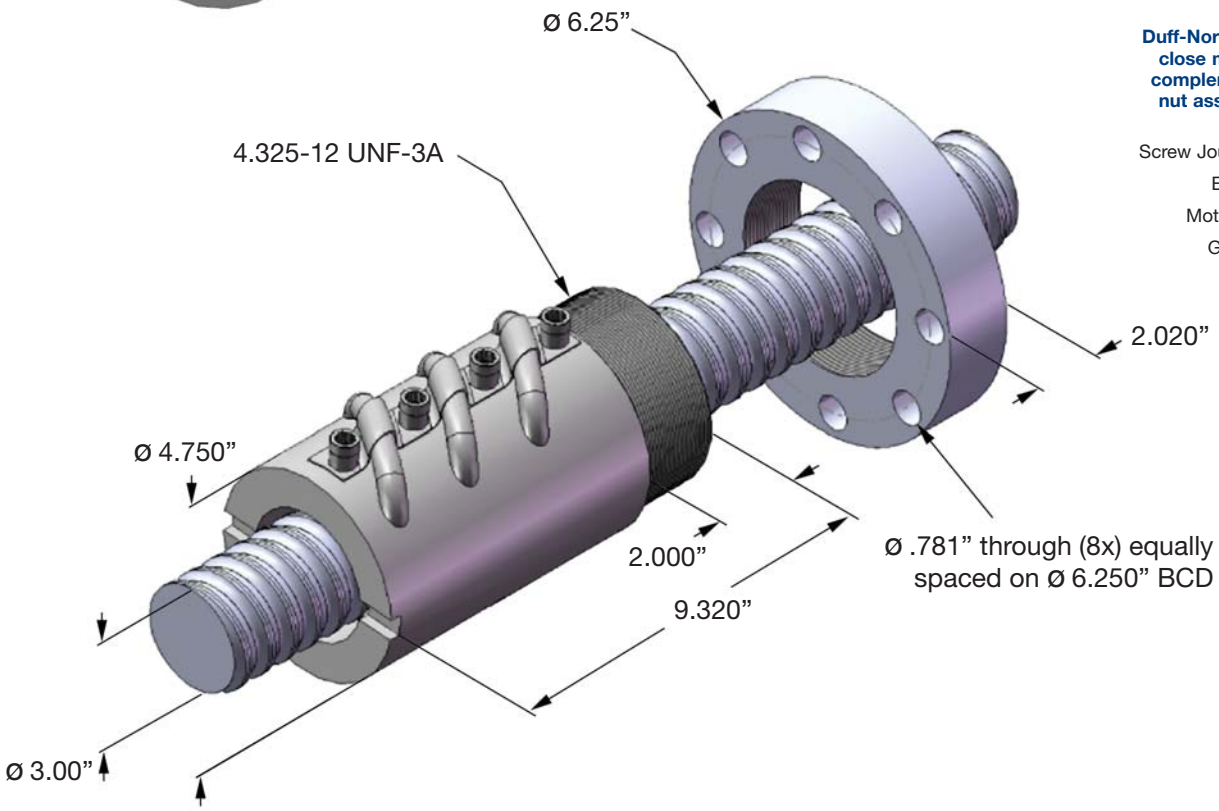
NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

*Load ratings are based on what the screw & nut assembly is capable of achieving. Actual load performance for a given screw and nut assembly will vary from application to application.

*Speed ratings are based on a DN spec of 3000, actual speeds will vary from application to application.



3” x .660” (3.00” x .660”) Ball Screws & Nuts



Duff-Norton offers complete close mounted systems to complement these screw & nut assemblies as follows:

Screw Journal Ends - *Page 48*
End Blocks - *Page 50*
Motor Flanges - *Page 54*
Gearmotors - *Page 60*
Controls - *Page 79*

Ball Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
300BSA066	3.000	.660	.660	1	2.480	Ball RH	Alloy	.002 to .015	Yes	Yes	Yes
Ball Nut	***Static Load**	***Dynamic Load**	***Max Speed**	**T.P.I.**	**Efficiency**	**Torque to Raise 1 Lb. (in/lb)**	**Material**	**Mounting Thread**	**Mounting Length**	**Nut Length**	**Nut Diameter**
300BNJ066	323,950	44,316	660.00	1.515	+90%	0.116	Alloy	4.325-12 UNF-3A	2.000	9.320	4.750
Flange	**Overall Diameter**	**Bolt Cir. Diameter**	**Bolt Hole Diameter**	**No. Holes**	**Flange Width**	**Treated**	**Material**	**Mounting Thread**	**Nut Return Tubes**	**Return Tube Width**	**Nut Radius w/ Tubes**
FL4325	7.375	6.250	.781	8	2.020	Black Oxide	Steel	4.325-12 UNF-3B	3	3.356	3.340

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

*Load ratings are based on what the screw & nut assembly is capable of achieving. Actual load performance for a given screw and nut assembly will vary from application to application.

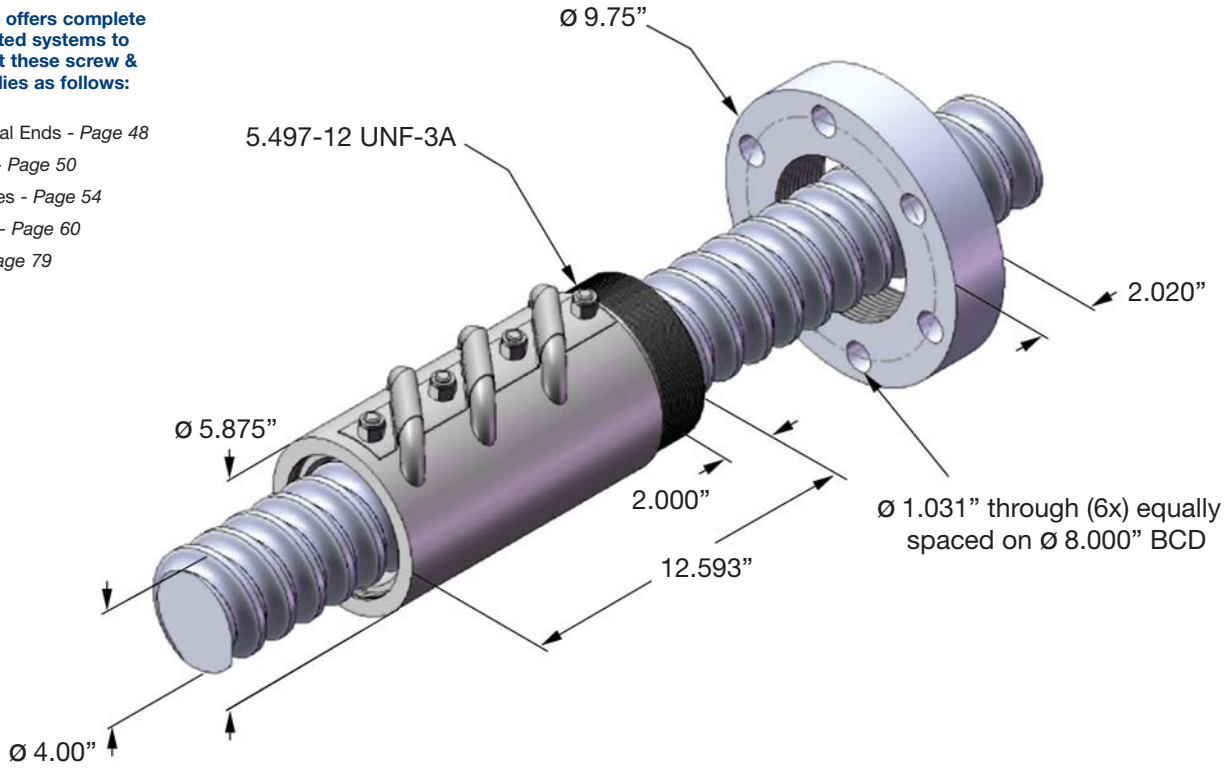
*Speed ratings are based on a DN spec of 3000, actual speeds will vary from application to application.

Ball Screws & Nuts Specifications

4” x 1.00” (4.00” x 1.00”) Ball Screws & Nuts

Duff-Norton offers complete close mounted systems to complement these screw & nut assemblies as follows:

Screw Journal Ends - *Page 48*
End Blocks - *Page 50*
Motor Flanges - *Page 54*
Gearmotors - *Page 60*
Controls - *Page 79*



Ball Screw	Screw Diameter	Lead	Pitch	No. Starts	Root Diameter	Thread Form	Material	Max. Backlash	Standard Lengths 36"	72"	144"
400BSA100	4.000	1.000	1.000	1	3.340	Ball RH	Alloy	.002 to .015	Yes	Yes	Yes

Ball Nut	*Static Load	*Dynamic Load	*Max Speed	T.P.I.	Efficiency	Torque to Raise 1 Lb. (in/lb)	Material	Mounting Thread	Mounting Length	Nut Length	Nut Diameter
400BNJ100	476,970	85,758	750.00	1	+90%	0.176	Steel	5.497-12 UNF-3A	1.995	12.593	5.875

Flange	Overall Diameter	Bolt Cir. Diameter	Bolt Hole Diameter	No. Holes	Flange Width	Treated	Material	Mounting Thread	Nut Return Tubes	Return Tube Width	Nut Radius w/ Tubes
FL5497	9.75	8.000	1.031	6	2.020	Black Oxide	Steel	5.497-12 UNF-3B	3	4.029	3.756

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.

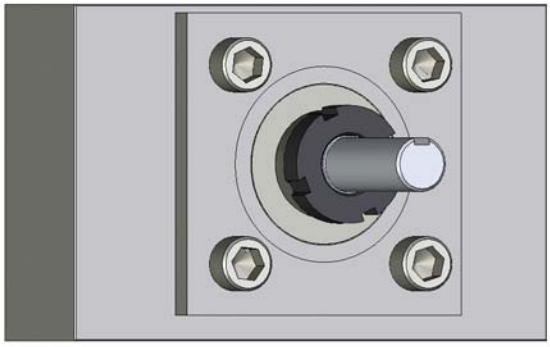
*Load ratings are based on what the screw & nut assembly is capable of achieving. Actual load performance for a given screw and nut assembly will vary from application to application.

*Speed ratings are based on a DN spec of 3000, actual speeds will vary from application to application.

Notes

Screw Journals

Duff-Norton offers the traditional style Type 1 & 3 journal end screws with and without keyed drive ends. These traditional styled journals coordinate well with the Duff-Norton End Blocks and can be delivered quickly. Additionally, Duff-Norton does have the machining capability to provide custom journal ends.

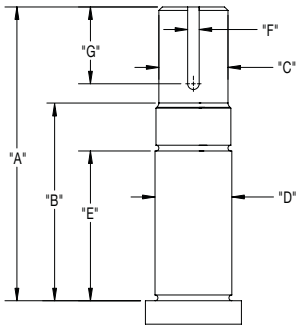


Journal End Features

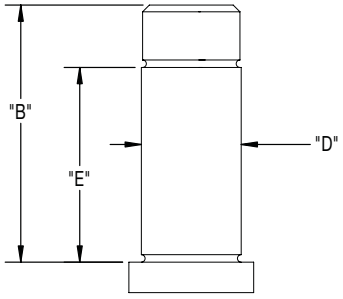
- Common Type 1 and 3 journal ends for Acme or Ball Screws
- Close bearing journal tolerances, for simple bearing installation
- Specialty journals integrate with Duff-Norton Drive and Control components
- Integrate with standard self-locking lock nuts
- Custom journals available for many applications

Typical Journal End Dimensions - Simple and Fixed

Fixed Journal Ends



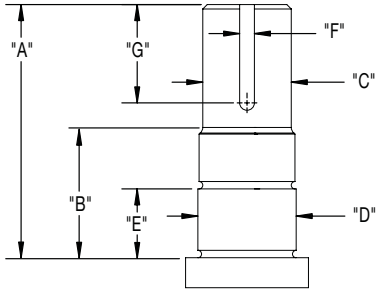
Type 3A - with Drive End



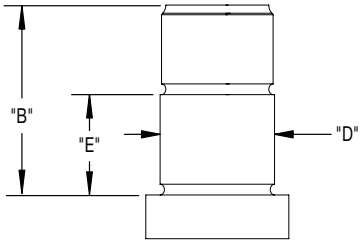
Type 3B - without Drive End

Acme Screw & Lead	Ball Screw & Lead	Type 3A, Type 3B - Fixed Ends A	B	E	End Block#	Bearing Number	Motor Flange Fixed "A"	Common Dimensions C	D**	F	G	Lock Nut#
0.5 - all*	0.5 - all*	3.03	1.75	1.36	EB000F	7200	Special	0.313	0.3936	1/8	1.12	SN-00
0.63 - all*, 0.75 - all*	0.63 - all*	3.28	2.10	1.62	EB001F	7301	Special	0.406	0.4723	1/8	1.12	SN-01
1 - all*	0.75 - all*	3.65	2.38	1.82	EB003F	7303	Special	0.562	0.6692	1/8	1.12	SN-03
1 x .100	1, 1.17 - all*	4.03	2.73	2.09	EB004F	7304	Special	0.625	0.7873	3/16	1.25	SN-04
1.5 x .375	1.5 - all*	4.44	2.93	2.25	EB005F	7305	Special	0.875	0.9842	3/16	1.25	SN-05
1.5 - all*, 2 x .500	1.5 x 1.875	4.69	2.92	2.22	EB006F	7306	Special	1.00	1.1810	1/4	1.38	SN-06
2 x .250, 2.25 x .500	2 - all*	6.19	4.00	3.25	EB008F	7308	Special	1.375	1.5747	5/16	1.88	SN-08
2.25 x .250	2.25 - all*	6.81	4.62	3.70	EB009F	7309	Special	1.375	1.7716	5/16	1.88	SN-09
2.5 - all*	-	7.56	4.62	3.70	EB010F	7310	Special	1.75	1.9684	3/8	2.50	SN-10
3 - all*	3 - all*	8.56	5.04	4.24	EB012F	7312	Special	2.25	2.3621	1/2	3.25	SN-12

Simple Journal Ends



Type 1A - with Drive End



Type 1B - without Drive End

Acme Screw & Lead	Ball Screw & Lead	Type 1A, Type 1B - Simple Ends A	B	E	End Block#	Bearing Number	Common Dimensions C	D**	F	G	Lock Nut#
0.5 - all*	0.5 - all*	1.90	0.65	0.35	EB000S	6200	0.313	0.3936	1/8	1.00	SN-00
0.63 - all*, 0.75 - all*	0.63 - all*	2.10	0.85	0.47	EB001S	6301	0.406	0.4723	1/8	1.13	SN-01
1 - all*	0.75 - all*	2.25	1.00	0.55	EB003S	6303	0.562	0.6692	1/8	1.13	SN-03
1 x .100	1, 1.17 - all*	2.38	1.13	0.59	EB004S	6304	0.625	0.7873	3/16	1.25	SN-04
1.5 x .375	1.5 - all*	2.75	1.25	0.67	EB005S	6305	0.875	0.9842	3/16	1.25	SN-05
1.5 - all*, 2 x .500	1.5 x 1.875	3.05	1.30	0.75	EB006S	6306	1.00	0.1810	1/4	1.38	SN-06
2 x .250, 2.25 x .500	2 - all*	3.72	1.48	0.91	EB008S	6308	1.375	1.5747	5/16	1.88	SN-08
2.25 x .250	2.25 - all*	3.75	1.69	0.98	EB009S	6309	1.375	1.7716	5/16	1.88	SN-09
2.5 - all*	-	4.75	1.75	1.06	EB010S	6310	1.75	1.9684	3/8	2.50	SN-10
3 - all*	3 - all*	5.50	1.94	1.22	EB012S	6312	2.25	2.3621	1/2	3.25	SN-12

NOTE: Unless otherwise specified all dimensions are in Inches.

Duff-Norton does not warrant that each journal's drive end is capable of lifting the full rated load capacity - actual results may vary from application to application.

Bearing journals for some screws may show a slight thread trace along the journal diameter; this is not detrimental, and has been design this way to fit each screw into the largest bearing support possible.

All leads for that diameter screw except where noted

Standard journal tolerances are as follows - Journals 00 - 04 are +.0000 / - .0004, Journals 05 - 10 are +.0000 / -.0005, Journal 12 is +.0000 / -.0006

End Blocks

Duff-Norton's End Blocks and Screw End Journals are the key to assembling a complete screw and nut system from the Drive End all the way through to Control End. Our End Blocks follow the conventional style, and together with a special journal design allow the user to integrate the following Duff-Norton components:

- Motor Flanges: Servo, IEC, NEMA frame motors
- Gearmotors: brake, non-brake, IEC, NEMA gearmotors closely coupled with Duff-Norton Motor Flanges
- Ring Kit Encoders: coupled between Duff-Norton motor flanges and motors or gear motors
- Limit Switches and Potentiometers
- Control panels – custom designed for each application

How does this work? Simply remove the bolts from the End Block's face plate, and use the longer bolts provided in the Duff-Norton kit for that drive or control component for mounting that component to the block face. All mounting holes and surfaces have been designed for proper fit. Duff-Norton specialty screw end journals have also been specifically designed to properly mate with each of these control and drive components.

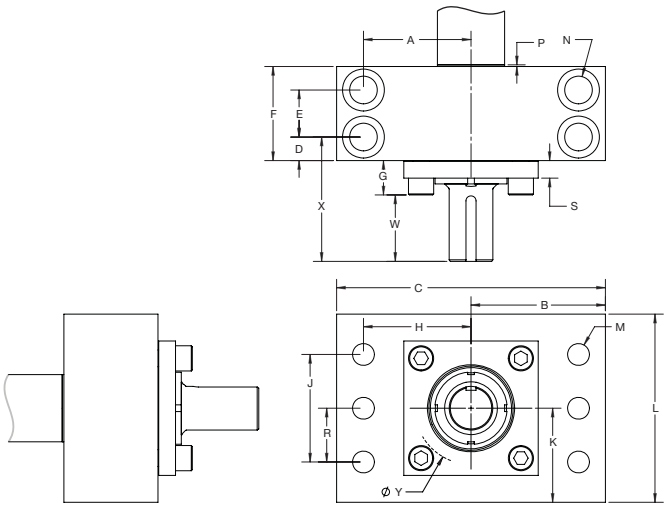
End Block Features

- Angular Contact Bearings for excellent radial and thrust load ratings
- Dust seals on either side of the bearings
- Drilled and/or Tapped to common ANSI dimensions
- Integrate with Duff-Norton Drive and Control components
- Black Oxide treated
- Solid steel housings with compact design
- End Blocks are available for both "Fixed" and "Simple" journal end fixity configurations

End Block Performance Specifications - Fixed

End Block Part #	Acme Screw & Lead	Ball Screw & Lead	Bearing Bore (mm)	Basic Dyn. Cap.	Basic Stat. Cap.	Locknut
EB000F	0.5 - all*	0.5 - all*	10	1826	1124	SN-00
EB001F	0.63 - all*, 0.75 - all*	0.63 - all*	12	3871	2248	SN-01
EB003F	1 - all*	0.75 - all*	17	5843	3732	SN-03
EB004F	1 x .100	1, 1.17 - all*	20	6939	4676	SN-04
EB005F	1.5 x .375	1.5 - all*	25	9495	6744	SN-05
EB006F	1.5 - all*, 2 x .500	1.5 x 1.875	30	11869	8992	SN-06
EB008F	2 x .250, 2.25 x .500	2 - all*	40	18260	14613	SN-08
EB009F	2.25 x .250	2.25 - all*	45	21912	17985	SN-09
EB010F	2.5 - all*	-	50	25382	21357	SN-10
EB012F	3 - all*	3 - all*	60	32868	29450	SN-12

All leads for that diameter screw except where noted



End Block Dimensions - Fixed

End Block Part #	Bearing ID (mm)	A & H	B	C	D	E	F	G	J	K	L	M	N	P	R	S	W	X	Y
EB000F	10	1.125	1.50	3.00	0.63	-	1.25	0.47	1.375	1.375	2.38	4 holes 0.281 dia.	2 Holes 0.281 Dia. Thru 0.50 C-bore x 0.56 DP	0.03	0.688	0.22	1.28	2.375	1.40
EB001F	12	1.50	2.00	4.00	0.75	-	1.50	0.48	1.500	1.313	2.50	4 Holes 0.281 dia.	2 Holes 0.406 Dia. Thru 0.625 C-Bore x .875 DP	0.03	0.750	0.23	1.27	2.500	1.40
EB003F	17	1.75	2.38	4.50	0.875	-	1.75	0.65	1.500	1.750	3.13	4 holes 0.406 dia.	2 Holes 0.531 Dia. Thru 0.81 C-bore x 1.125 DP	0.03	0.750	0.40	1.22	2.750	2.00
EB004F	20	1.75	2.38	5.00	1.00	-	2.00	0.65	1.750	1.750	3.13	4 Holes 0.469 dia.	2 Holes 0.656 Dia. Thru 1.00 C-Bore x 1.312 DP	0.03	0.875	0.40	1.35	3.000	2.00
EB005F	25	2.38	3.25	6.50	1.00	-	2.00	0.71	2.000	2.500	4.38	4 holes 0.656 dia.	2 Holes 0.906 Dia. Thru 1.375 C-bore x 2.0 DP	0.06	1.000	0.40	1.66	3.375	2.53
EB006F	30	2.50	3.50	6.50	1.00	-	2.00	0.90	2.500	2.500	4.75	4 Holes 0.656 dia.	2 Holes 0.906 Dia. Thru 1.375 C-Bore x 2.0 DP	0.06	1.250	0.53	1.72	3.625	2.94
EB008F	40	4.00	5.00	10.00	0.75	1.50	3.00	1.28	4.000	3.500	7.00	6 holes 0.656 dia.	4 Holes 0.781 Dia. Thru 1.188 C-bore x 2.0 DP	0.06	2.000	0.65	1.85	3.875	4.31
EB009F	45	4.00	5.00	10.00	0.90	1.75	3.50	1.28	4.000	3.500	7.00	6 Holes 0.812 dia.	4 Holes 1.031 Dia. Thru 1.562 C-Bore x 2.0 DP	0.06	2.000	0.65	1.97	4.125	4.31
EB010F	50	4.00	5.00	10.00	1.10	1.75	3.50	1.28	4.000	3.500	7.00	6 Holes 0.812 dia.	4 Holes 1.031 Dia. Thru 1.562 C-Bore x 2.0 DP	0.06	2.000	0.65	2.72	4.875	4.31
EB012F	60	4.00	5.00	10.00	1.00	2.35	4.00	1.28	4.000	3.500	7.00	6 Holes 0.812 dia.	4 Holes 1.031 Dia. Thru 1.562 C-Bore x 2.0 DP	0.06	2.000	0.65	3.22	5.500	5.41

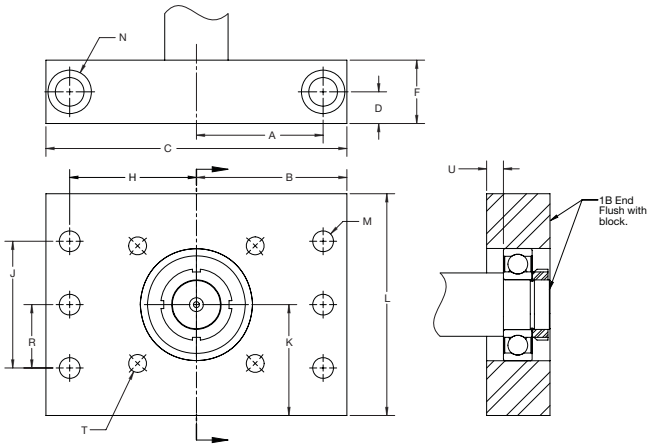
NOTE: Unless otherwise specified all dimensions are in Inches.
NOTE: Duff-Norton does not warrant that these typical Journal End and End Block combinations are capable of accepting the amount of torque and axial load required to drive their respective screw and nut assembly to its' full rated capacity. Careful analysis buy the customer should be done to ensure the Duff-Norton journal end meets the application requirements.

NOTE - Duff-Norton always recommend driving the screw and nut system from the fixed end. The "Fixed" - "Simple" screw end configuration and End Block combination is the recommended configuration for most applications.

End Block Performance Specifications - Simple

End Block Part #	Acme Screw & Lead	Ball Screw & Lead	Bearing Bore (mm)	Dynamic Capacity	Static Capacity	Locknut
EB000S	0.5 - all*	0.5 - all*	10	1150	540	SN-00
EB001S	0.63 - all*, 0.75 - all*	0.63 - all*	12	2180	940	SN-01
EB003S	1 - all*	0.75 - all*	17	3050	1470	SN-03
EB004S	1 x .100	1, 1.17 - all*	20	3600	1770	SN-04
EB005S	1.5 x .375	1.5 - all*	25	4750	2460	SN-05
EB006S	1.5 - all*, 2 x .500	1.5 x 1.875	30	6000	3400	SN-06
EB008S	2 x .250, 2.25 x .500	2 - all*	40	9150	5400	SN-08
EB009S	2.25 x .250	2.25 - all*	45	11900	7200	SN-09
EB010S	2.5 - all*	-	50	13900	8600	SN-10
EB012S	3 - all*	3 - all*	60	18400	11700	SN-12

All leads for that diameter screw except where noted Note: Capacity ratings are in Lbs.



End Block Dimensions - Simple

End Block Part #	Bearing ID (mm)	A & H	B	C	D	F	J	K	L	M	N	R	T	U
EB000S	10	1.125	1.50	3.00	0.38	0.75	1.375	1.375	2.38	4 holes 0.281 dia.	2 Holes 0.281 Dia. Thru 0.50 C-bore x 0.56 DP	0.688	4 Holes 1/4-20 tap 1.78" B.C.	0.10
EB001S	12	1.50	2.00	4.00	0.50	1.00	1.500	1.313	2.50	4 Holes 0.281 dia.	2 Holes 0.406 Dia. Thru 0.625 C-Bore x .875 DP	0.750	4 Holes 1/4-20 tap 1.78" B.C.	0.15
EB003S	17	1.75	2.38	4.75	0.50	1.00	1.500	1.750	3.13	4 holes 0.406 dia.	2 Holes 0.531 Dia. Thru 0.81 C-bore x 1.125 DP	0.750	4 Holes 5/16-18 tap 2.375" B.C.	0.00
EB004S	20	1.75	2.38	4.75	0.63	1.25	1.750	1.750	3.13	4 Holes 0.469 dia.	2 Holes 0.656 Dia. Thru 1.00 C-Bore x 1.312 DP	0.875	4 Holes 5/16-18 tap 2.375" B.C.	0.13
EB005S	25	2.38	3.25	6.50	0.88	1.75	2.000	2.500	4.38	4 holes 0.656 dia.	2 Holes 0.906 Dia. Thru 1.375 C-bore x 2.0 DP	1.000	4 Holes 5/16-18 tap 3.00" B.C.	0.50
EB006S	30	2.50	3.50	7.00	0.88	1.75	2.500	2.500	4.75	4 Holes 0.656 dia.	2 Holes 0.906 Dia. Thru 1.375 C-Bore x 2.0 DP	1.250	4 Holes 3/8-16 tap 3.50" B.C.	0.45
EB008S	40	4.00	5.00	10.00	1.25	2.00	4.000	3.500	7.00	6 holes 0.656 dia.	2 Holes 0.781 Dia. Thru 1.188 C-bore x 2.0 DP	2.000	4 Holes 5/8-11 tap 5.25" B.C.	0.53
EB009S	45	4.00	5.00	10.00	1.25	2.50	4.000	3.500	7.00	6 Holes 0.812 dia.	2 Holes 1.031 Dia. Thru 1.562 C-Bore x 2.0 DP	2.000	4 Holes 5/8-11 tap 5.25" B.C.	0.38
EB010S	50	4.00	5.00	10.00	1.25	2.50	4.000	3.500	7.00	6 Holes 0.812 dia.	2 Holes 1.031 Dia. Thru 1.562 C-Bore x 2.0 DP	2.000	4 Holes 5/8-11 tap 5.25" B.C.	0.75
EB012S	60	4.00	5.00	10.00	1.25	2.50	4.000	3.500	7.00	6 Holes 0.812 dia.	2 Holes 1.031 Dia. Thru 1.562 C-Bore x 2.0 DP	2.000	4 Holes 5/8-11 tap 6.36" B.C.	0.62

NOTE: Unless otherwise specified all dimensions are in Inches.
NOTE: Duff-Norton does not warrant that these typical Journal End and End Block combinations are capable of accepting the amount of torque and axial load required to drive their respective screw and nut assembly to its' full rated capacity. Careful analysis buy the customer should be done to ensure the Duff-Norton journal end meets the application requirements.

NOTE: Duff-Norton always recommend driving the screw and nut system from the fixed end. The "Fixed" - "Simple" screw end configuration and End Block combination is the recommended configuration for most applications.

Motors

Duff-Norton can competitively supply motors for any application from suppliers such as Baldor, Nord, US Electric, Leeson, and more.

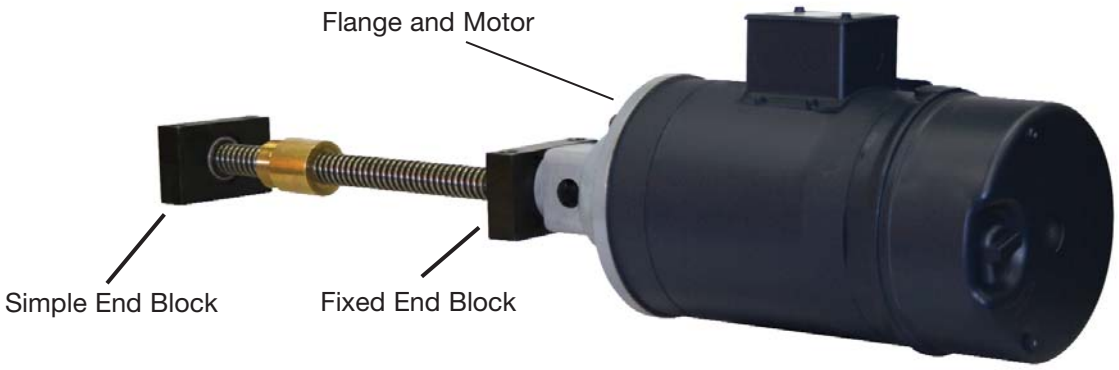
Features

Standard motors options:

- Brake and non-brake models
- Single and three phase models
- Explosion proof, washdown duty
- Wide variety of voltages and RPM's
- 50/60Hz models
- 1/4 to 10 Horsepower ratings
- Common NEMA frame sizes

Motors can be directly mounted to most Duff-Norton actuators using C-face adapters, directly mounted via speed reducers, or remotely mounted with shafting and couplings. IEC, servo, hydraulic, and air motors can also be supplied upon request.

Motor Flanges - Screw & Nut Systems



Duff-Norton provides complete close coupled Motor to Screw & Nut systems to Limit Switch systems for all application needs. These systems use our End Blocks and Motor Flanges to mount the respective drive and control components into one package. Common system components are:

- Motor Flanges: Servo, IEC, NEMA frame motors
- Servo, IEC, or NEMA motors: brake, non-brake, closely mounted to Duff-Norton Motor Flanges
- Ring Kit Encoders: (optional) mounted between Duff-Norton NEMA Motor Flanges and NEMA motors
- Couplings – needed to connect the screw's journal to the motor shaft - will be included in the motor flange kits.
- Acme or Ball Screw and Nut, with special length screw journal ends
- Limit Switches and Potentiometers (optional)
- Control panels – custom designed for each application

Our standard motor flanges use the most common and appropriately sized motor frames. Common flange and frame sizes available are:

- Servo Flanges: our IEC flanges are compatible with most common European made servo motors
- IEC Flanges: B14 and B5 – frame size varies by screw diameter
- NEMA Flanges: C56, C143, and C182 – for most screw diameters

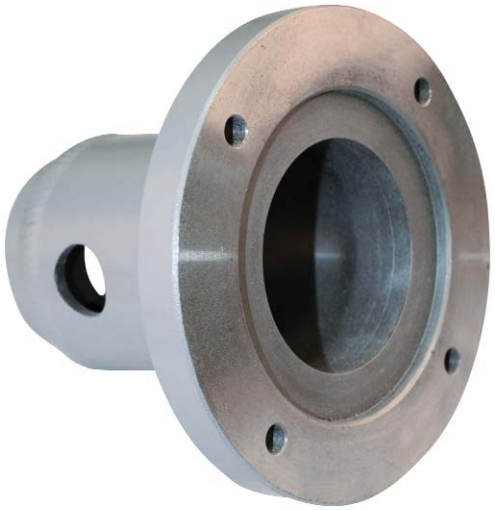
Motor Flange Assortment

Acme Screw & Lead	Ball Screw & Lead	Fixed End Block#	NEMA Flanges	IEC / Servo Flanges
0.5 - all*	0.5 - all*	EB000F	MFN000-C56, MFN000-C143	MFE000-63B14, MFE000-71B14, MFE000-80B14, MFE000-90B14
0.63 - all*, 0.75 - all*	0.63 - all*	EB001F	MFN001-C56, MFN001-C143	MFE001-63B14, MFE001-71B14, MFE001-80B14, MFE001-90B14
1 - all*	0.75 - all*	EB003F	MFN003-C56, MFN003-C143, MFN003-C182	MFE003-71B5, MFE003-80B5, MFE003-90B5, MFE003-100B14, MFE003-112B14
1 x .100	1, 1.17 - all*	EB004F	MFN004-C56, MFN004-C143, MFN004-C182	MFE004-71B5, MFE004-80B5, MFE004-90B5, MFE004-100B14, MFE004-112B14
1.5 x .375	1.5 - all*	EB005F	MFN005-C56, MFN005-C143, MFN005-C182	MFE005-80B5, MFE005-80B5, MFE005-100B14, MFE005-112B14
1.5 - all*, 2 x .500	1.5 x 1.875	EB006F	MFN006-C56, MFN006-C143, MFN006-C182	MFE006-80B5, MFE006-80B5, MFE006-100B14, MFE006-112B14
2 x .250, 2.25 x .500	2 - all*	EB008F	MFN008-C182, MFN008-C213	N.A.
2.25 x .250	2.25 - all*	EB009F	MFN009-C182, MFN009-C213	N.A.
2.5 - all*	-	EB010F	MFN010-C182, MFN010-C213	N.A.
All leads for that diameter screw except where noted				

NOTE: Unless otherwise specified all dimensions are in Inches.

Our motor flanges can be purchased as a kit along with our End Blocks and Limit Switches to form a complete drive system. Motor flange kits include:

- Motor flange
- All required mounting hardware
- Couplings will be specified and should be provided with the Motor Flange kit



NEMA C-Face Performance Specifications

Our performance tables below show directly coupled motorized performance for each screw type's diameters and leads which coordinate with our motor flanges. Screw diameter and lead along with Speed and Maximum Stroke are listed in columns along the table's left side. RPM's and Horsepowers are listed in rows along the table's top. Actual lifting capacities are shown throughout the table's body under their respective horsepower size.

To calculate your own Speed and Lifting Capacity for other motor types, horsepowers, or voltages and hertz ratings not shown; Duff-Norton advises using the following formulas:

Speed (in/min): **Motor RPM X Screw Lead**

Capacity (lbs): **Motor Torque (in-lb) = HP X 63025/RPM**
Capacity = Motor Torque X Screw Torque to Raise 1 lb.

NOTE: Critical speeds vs. stroke lengths, column strength, compressed loads vs. tension loads (catalog pages 112 and 113) must be considered when a screw is directly coupled to a motor and turning at high RPM's. For these applications Duff-Norton always recommends using the "Fixed-Simple" mounting option. Tension loads are often preferred for vertical applications to enable longer stroke lengths. Duff-Norton advises using the following formula to help determine your systems maximum stroke length:

Max Stroke Length = SQRT(4056 x root diameter)

PV Values (catalog page 111) should be consulted as well.

Acme Screw / NEMA Performance Specifications

Acme Screw Performance - 1/2" - 1" Diameters

Acme Diameter & Lead	Speed (in/min)	*Max Screw Length	Motor Flange + (frame size)	End Block Model #	Motor HP (1725rpm) / Frame Size Capacity (pounds) - See Notes**								
					1/4 - 56C	1/3 - 56C	1/2 - 56C	3/4 - 56C	1 - 56C	1.5 - 140C	2 - 140C	3 - 180C	5 - 180C
050 x 010 Bronze Nut	172.50	39	MFN000+(frame)	EB000F	199	264	397	596	794	1191	1589	1941	N.A.
050 x 020 Bronze Nut	345.00	39	MFN000+(frame)	EB000F	145	193	290	435	580	870	1160	1219	N.A.
050 x 025 Bronze Nut	431.25	39	MFN000+(frame)	EB000F	129	171	257	386	515	772	908	908	N.A.
050 x 050 Bronze Nut	862.50	39	MFN000+(frame)	EB000F	80	107	160	240	320	481	641	783	N.A.
050 x 025 Plastic Nut	431.25	39	MFN000+(frame)	EB000F	155	206	310	464	619	665	N.A.	N.A.	N.A.
050 x 050 Plastic Nut	862.50	39	MFN000+(frame)	EB000F	90	120	181	271	362	543	665	N.A.	N.A.
063 x 010 Bronze Nut	172.50	45	MFN001+(frame)	EB001F	169	225	338	507	677	1015	1353	2030	2897
063 x 013 Bronze Nut	215.63	45	MFN001+(frame)	EB001F	157	210	315	472	630	945	1260	1890	2836
063 x 020 Bronze Nut	345.00	45	MFN001+(frame)	EB001F	129	171	257	386	515	772	1029	1544	1544
063 x 025 Bronze Nut	431.25	45	MFN001+(frame)	EB001F	117	156	234	351	468	703	937	1137	N.A.
063 x 050 Bronze Nut	862.50	45	MFN001+(frame)	EB001F	75	100	150	225	299	449	599	898	1163
063 x 025 Plastic Nut	431.25	45	MFN001+(frame)	EB001F	143	190	285	428	571	828	828	N.A.	N.A.
063 x 050 Plastic Nut	862.50	45	MFN001+(frame)	EB001F	86	115	172	259	345	517	689	808	N.A.
075 x 010 Bronze Nut	172.50	45	MFN001+(frame)	EB001F	147	196	295	442	589	884	1179	1768	2946
075 x 020 Bronze Nut	345.00	45	MFN001+(frame)	EB001F	120	160	240	361	481	721	961	1442	2404
075 x 025 Bronze Nut	431.25	45	MFN001+(frame)	EB001F	110	147	220	330	440	660	880	1321	2201
075 x 050 Bronze Nut	862.50	45	MFN001+(frame)	EB001F	73	97	146	219	292	438	585	877	1461
075 x 100 Bronze Nut	1725.00	45	MFN001+(frame)	EB001F	42	57	85	127	170	255	340	510	850
075 x 025 Plastic Nut	431.25	45	MFN001+(frame)	EB001F	136	182	273	409	545	818	1091	1636	1652
075 x 050 Plastic Nut	862.50	45	MFN001+(frame)	EB001F	84	112	168	251	335	503	670	1006	1501
075 x 100 Plastic Nut	1725.00	45	MFN001+(frame)	EB001F	47	63	94	141	188	282	377	565	942
100 x 010 Bronze Nut	172.50	55	MFN004+(frame)	EB004F	116	154	231	347	462	694	925	1387	2312
100 x 020 Bronze Nut	345.00	55	MFN003+(frame)	EB003F	99	132	199	298	397	596	794	1191	1986
100 x 025 Bronze Nut	431.25	55	MFN003+(frame)	EB003F	93	124	186	280	373	559	746	1118	1864
100 x 050 Bronze Nut	862.50	55	MFN003+(frame)	EB003F	65	87	130	196	261	391	522	783	1305
100 x 100 Bronze Nut	1725.00	55	MFN003+(frame)	EB003F	40	54	80	121	161	241	322	483	805
100 x 025 Plastic Nut	431.25	55	MFN003+(frame)	EB003F	119	158	237	356	474	712	949	1423	2239
100 x 050 Plastic Nut	862.50	55	MFN003+(frame)	EB003F	77	103	155	232	310	464	619	929	1548
100 x 100 Plastic Nut	1725.00	55	MFN003+(frame)	EB003F	45	60	90	136	181	271	362	543	904
Note: Cells with blue shading mean the combination of screw and motor horsepower exceeds the screw & nut's dynamic load rating													

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute. Catalog performance assumes 230/460VAC, 3Ø, 60HZ are being used.

Acme Screw Performance - 1 1/2" - 2 1/2" Diameters

Acme Diameter & Lead	Speed (in/min)	*Max Screw Length	Motor Flange + (frame size)	End Block Model #	Motor HP (1725rpm) / Frame Size Capacity (pounds) - See Notes**										
					1/4 - 56C	1/3 - 56C	1/2 - 56C	3/4 - 56C	1 - 56C	1.5 - 140C	2 - 140C	3 - 180C	5 - 180C	7.5 - 210C	10 - 210C
150 x 010 Bronze Nut	172.50	70	MFN006+(frame)	EB006F	82	110	165	247	329	494	658	987	1646	N.A.	N.A.
150 x 025 Bronze Nut	431.25	70	MFN006+(frame)	EB006F	70	94	141	211	281	422	562	843	1405	N.A.	N.A.
150 x 038 Bronze Nut	646.88	70	MFN006+(frame)	EB005F	60	80	119	179	239	358	478	716	1194	N.A.	N.A.
150 x 050 Bronze Nut	862.50	70	MFN006+(frame)	EB006F	53	70	106	158	211	317	422	634	1056	N.A.	N.A.
200 x 025 Bronze Nut	431.25	80	MFN008+(frame)	EB008F	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	677	1128	1691	2255
200 x 050 Bronze Nut	862.50	80	MFN006+(frame)	EB006F	46	62	93	139	185	278	371	556	927	N.A.	N.A.
225 x 025 Bronze Nut	431.25	86	MFN009+(frame)	EB009F	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	612	1021	1531	2041
225 x 050 Bronze Nut	862.50	86	MFN008+(frame)	EB008F	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	515	858	1286	1715
250 x 025 Bronze Nut	431.25	92	MFN010+(frame)	EB010F	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	562	937	1405	1874
250 x 050 Bronze Nut	862.50	92	MFN010+(frame)	EB010F	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	479	798	1197	1595
Note: N.A. means Motor Flanges for these motor frame sizes, and screw diameters are not available.															

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute. Catalog performance assumes 230/460VAC, 3Ø, 60HZ are being used.

Ball Screw / NEMA Performance Specifications

Ball Screw Performance - 1/2” - 1.17” Diameters

Ball Diameter & Lead	Speed (in/min)	*Max Screw Length	Motor Flange + (frame size)	End Block Model #	Motor HP (1725rpm) / Frame Size Capacity (pounds) - See Notes**								
					1/4 - 56C	1/3 - 56C	1/2 - 56C	3/4 - 56C	1 - 56C	1.5 - 140C	2 - 140C	3 - 180C	5 - 180C
050 x 020 Double Return	345.00	41	MFN000+(frame)	EB000F	261	348	522	783	1044	1200	N.A.	N.A.	N.A.
050 x 050 Double Return	862.50	41	MFN000+(frame)	EB000F	104	138	208	311	415	623	830	859	N.A.
063 x 020 Single Return	345.00	45	MFN001+(frame)	EB001F	261	348	522	783	800	N.A.	N.A.	N.A.	N.A.
063 x 100 Double Return	1725.00	45	MFN001+(frame)	EB001F	52	69	103	155	206	310	413	578	N.A.
075 x 020 Single Return	345.00	52	MFN003+(frame)	EB003F	261	348	522	783	950	N.A.	N.A.	N.A.	N.A.
075 x 020 Double Return	345.00	52	MFN003+(frame)	EB003F	261	348	522	783	1044	1566	1900	N.A.	N.A.
075 x 050 Double Return	862.50	52	MFN003+(frame)	EB003F	104	138	208	311	415	623	830	1246	2076
100 x 025 Single Return	345.00	58	MFN004+(frame)	EB004F	208	277	415	623	830	1246	1612	N.A.	N.A.
100 x 025 Double Return	345.00	58	MFN004+(frame)	EB004F	208	277	415	623	830	1246	1661	2491	3350
100 x 100 Double Return	1725.00	58	MFN004+(frame)	EB004F	52	69	103	155	206	310	413	619	1032
117 x 041 Double Return	712.43	59	MFN004+(frame)	EB004F	125	167	250	375	500	751	1001	1501	2502

Note: Cells with blue shading mean the combination of screw and motor horsepower exceeds the screw & nut's dynamic load rating

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute. Catalog performance assumes 230/460VAC, 3Ø, 60HZ are being used.

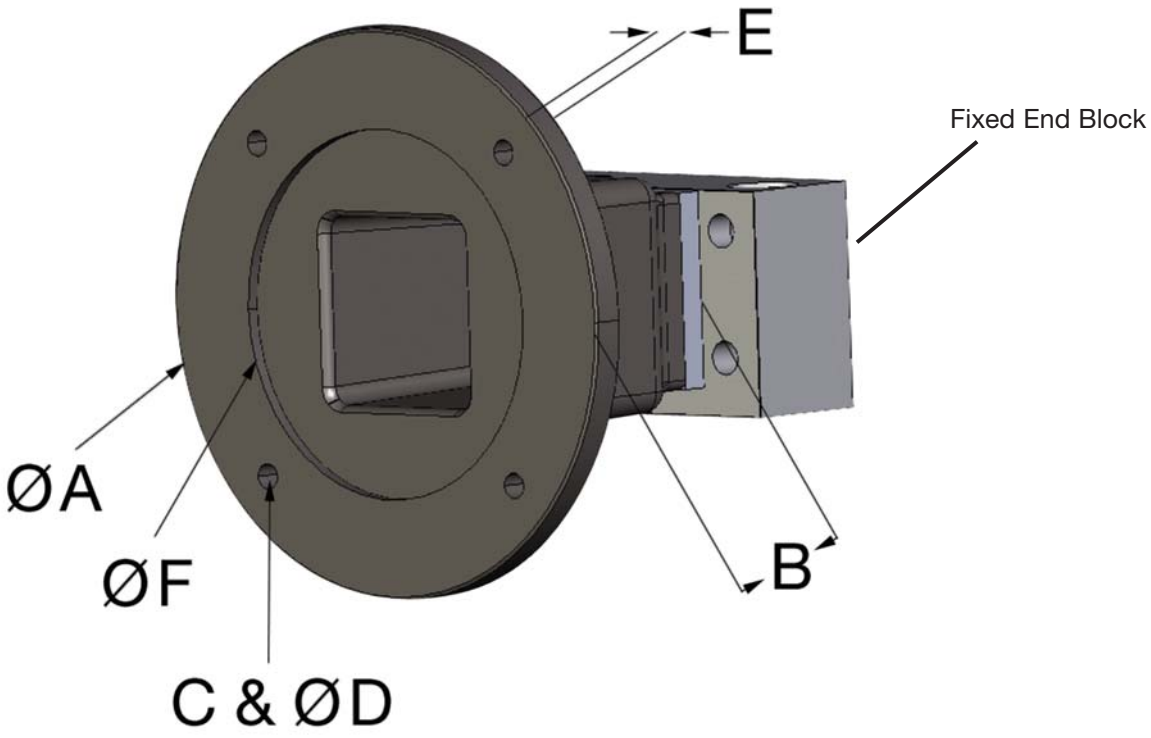
Ball Screw Performance - 1 1/2” - 2 1/4” Diameters

Ball Diameter & Lead	Speed (in/min)	*Max Screw Length	Motor Flange + (frame size)	End Block Model #	Motor HP (1725rpm) / Frame Size Capacity (pounds) - See Notes**										
					1/4 - 56C	1/3 - 56C	1/2 - 56C	3/4 - 56C	1 - 56C	1.5 - 140C	2 - 140C	3 - 180C	5 - 180C	7.5 - 210C	10 - 210C
150 x 047 Double Return	815.93	68	MFN005+(frame)	EB005F	109	145	217	326	435	652	870	1305	2175	N.A.	N.A.
150 x 100 Double Return	1725.00	68	MFN005+(frame)	EB005F	52	69	104	156	208	311	415	623	1038	N.A.	N.A.
150 x 187 Double Return	3234.38	69	MFN006+(frame)	EB006F	28	37	55	83	110	165	220	330	550	N.A.	N.A.
200 x 050 Double Return	862.50	84	MFN008+(frame)	EB008F	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	1246	2076	3135	4152
200 x 100 Double Return	1725.00	84	MFN008+(frame)	EB008F	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	623	1038	1567	2076
225 x 050 Double Return	862.50	87	MFN009+(frame)	EB009F	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	1246	2076	3135	4152
225 x 100 Double Return	1725.00	68	MFN009+(frame)	EB009F	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	623	1038	1567	2076

Note: N.A. means Motor Flanges for these motor frame sizes, and screw diameters are not available.

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute. Catalog performance assumes 230/460VAC, 3Ø, 60HZ are being used.

Motor Flange Dimensions



NEMA - Motor Flanges

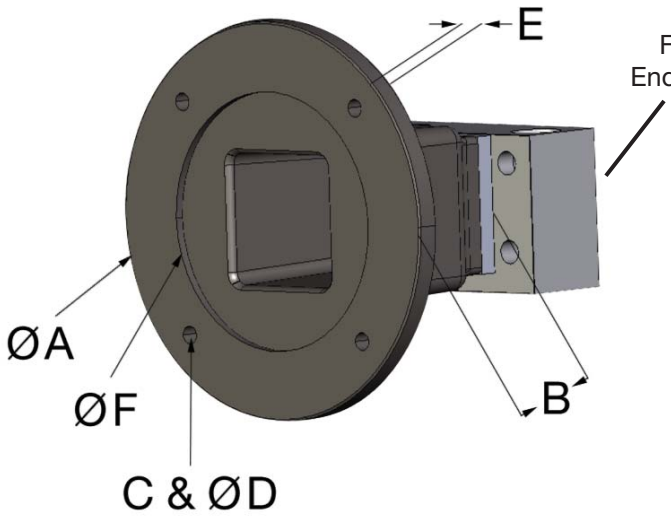
NEMA Flanges	A Flange O.D.	B Flange Length**	C Mounting Holes B.C.	D Mounting Holes Dia.	E Mounting Hole Depth	F Counter Bore Dia.	G Through Hole
MFM000-C56, MFN000-C143*, MFN001-C56, MFN001-C143*	6.75	4.48	5.87	.406	.47	4.502	1.87 Sq.
MFN003-C56, MFN003-C143*, MFN004-C56, MFN004-C143*	6.75	4.68	5.87	.406	.56	4.502	2.63 Sq.
MFN003-C182, MFN004-C182	9.00	5.52	7.25	.531	1.38	8.502	2.63 Sq.
MFN005-C56, MFN005-C143*	6.75	5.19	5.87	.406	.60	4.502	4.25 Dia.
MFN005-C182	9.00	6.03	7.25	.531	1.38	8.502	4.25 Dia.
MFN006-C56, MFN006-C143*	6.75	5.32	5.87	.406	.97	4.502	3.50 Sq.
MFN006-C182***	9.00	6.05	7.25	.531	1.38	8.502	3.50 Sq.
MFN008-C182, MFN009-C182, MFN010-C182	9.00	9.125	7.25	.531	.31	8.502	4.00 Dia.
MFN008-C213, MFN009-C213, MFN010-C213	11.13	9.625	9.00	.531	.81	10.502	4.00 Dia.

NOTE: All dimensions are shown in inches. All couplings are purchased seperately from the motor flange kit.

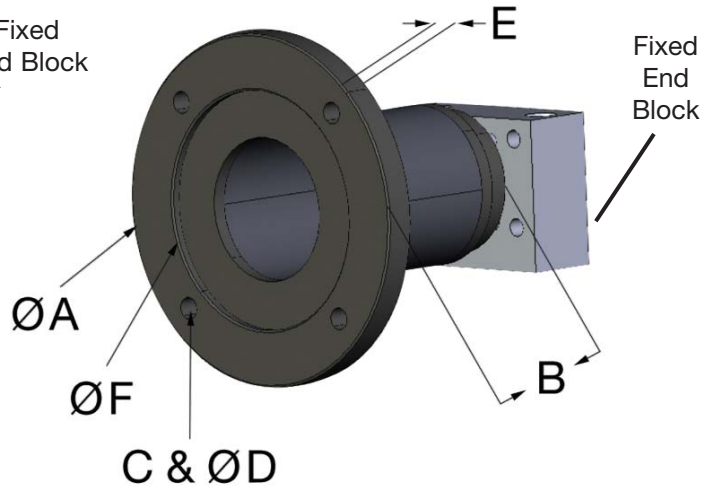
143C frame models use the 56C frame with an appropriately sized coupling to fit the 143 motor shaft dimensions

Excludes the pilot dimensions which recess into a counter bore in the Fixed End Blocks' face plate

Uses an adapter plate mounted to the MFN006-C56 Flange



B5 Flange Configuration



B14 Flange Configuration

Servo / IEC - Motor Flanges

IEC / Servo Flanges	A Flange O.D.	B Flange Length**	C Mounting Holes B.C.	D Mounting Holes Dia.	E Mounting Hole Depth	F Counter Bore Dia.	G Through Hole
MFE000-63B14, MFE001-63B14	90	83	75	6	12.7	60	57.2 Dia.
MFE001-71B14, MFE001-71B14	105	90	85	7	12.7	70	57.2 Dia.
MFE001-80B14, MFE001-80B14	120	100	100	7	12.7	80	57.2 Dia.
MFE001-90B14, MFE001-90B14	140	110	115	9	12.7	95	57.2 Dia.
MFE003-71B5, MFE004-71B5	160	116	130	M8 Tap	12.4	110	66.7 Sq.
MFE003-80B5, MFE004-80B5	200	116	165	M10 Tap	12.4	130	66.7 Sq.
MFE003-90B5, MFE004-90B5	200	116	165	M10 Tap	12.4	130	66.7 Sq.
MFE003-100B14, MFE004-100B14	160	119	130	9	15.7	110	66.7 Sq.
MFE003-112B14, MFE004-112B14	160	119	130	9	15.7	110	66.7 Sq.
MFE005-80B5	200	128	165	M10 Tap	12.2	130	107.95 Dia.
MFE005-90B5	200	128	165	M10 Tap	12.2	130	107.95 Dia.
MFE005-100B14*	190	138	130	9	10.0	110	107.95 Dia.
MFE005-112B14*	190	138	130	9	10.0	110	107.95 Dia.
MFE006-80B5	200	131	165	M10 Tap	20.1	130	88.9 Sq.
MFE006-90B5	200	131	165	M10 Tap	20.1	130	88.9 Sq.
MFE006-100B14*	190	141	130	9	10.0	110	88.9 Sq.
MFE006-112B14*	190	141	130	9	10.0	110	88.9 Sq.
NOTE: All dimensions are shown in millimeters. All couplings are purchased seperately from the motor flange kit.							
Uses an adapter plate mounted to the MFE005-90B5, or MFE006-90B5 Flanges respectively.							
Adapter plates should be mounted to the motor, and then to the motor flange							
Excludes the pilot dimensions which recess into a counter bore in the Fixed End Blocks' face plate							

Gearmotor / Screw & Nut Systems

Duff-Norton provides complete close coupled Gearmotor / Screw & Nut systems / Limit Switch systems for all application needs. These systems use our End Blocks and Motor Adapters to mount the respective drive and control components into one package. Common system components are:

- Gearmotors: Servo type functionality (available upon request) and compact frame sizes, brake, non-brake, NEMA gearmotors closely mounted to Duff-Norton motor flanges.
  Integral gearmotors are 230/460VAC, 3Ø, 60HZ standard.
  Brakemotors are Inverter Duty / Vector Duty rated to NEMA MG-1 standards.
  Close-mounted inverters are available upon request.
  1000 : 1 constant torque turndown ratio available, 5 : 1 constant torque turndown ratio standard.
- Motor Flanges (depending on overall system size)
- Couplings (depending on overall system size)
- Acme or Ball Screw and Nut, with special length screw journal ends
- Limit Switches and Potentiometers (optional)
- Control panels – custom designed for each application

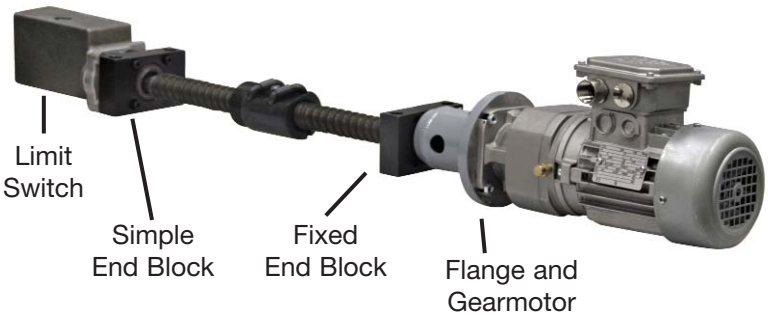
Gearmotors and Motor Flanges are sold separately as kits. Gearmotors are supplied as assemblies. Mounting Kits can be purchased which include:

- Motor flange
- All required mounting hardware
- Coupling

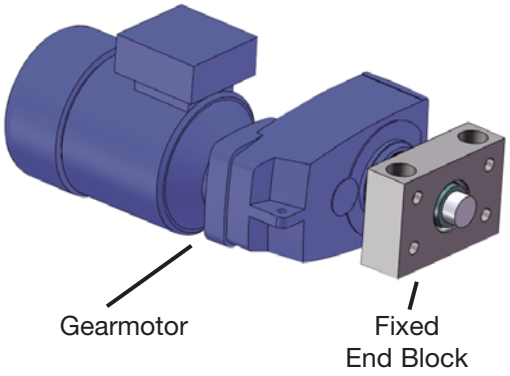
NOTE: Mounting Kit components will vary as from size to size, especially for the larger size screw diameters where the screw shaft is inserted into the gearmotors hollow bore. All mounting kits have been properly specified for their matched gearmotors.

Gearmotor Configurations

Gearmotor configuration used on .500" - 1.17" screw systems.



Gearmotor configuration used on 1.50" - 2.50" screw systems.



Gearmotor Performance Specifications

Our performance tables show typical motorized performance for each screw type's diameters and leads which integrate with our motor flanges, and gearmotor selections. Screw Diameter and Lead along with Speed are listed in columns along the table's left side. RPM's and Horsepowers are listed in rows along the table's top. Actual lifting capacities are shown throughout out the table's body under their respective horse-power sizes.

To calculate your own Speed and Lifting Capacity for other motor types, horsepowers, voltages and hertz ratings, or gear ratios not shown Duff-Norton advises using the following formulas:

Speed (Acme or Ball): **Speed = Screw RPM x Screw Lead**
Screw RPM = Motor RPM/Reducer Ratio

Capacity (Acme): **Capacity = Screw Torque / Torque to Raise 1 lb.**
Screw Torque = (Motor Torque x Reduction) x Reducer Efficiency
Motor Torque = 63025 x HP / RPM

Capacity (Ball): **Capacity = Screw Torque / .177 x Screw Lead**
Screw Torque = (Motor Torque x Reduction) x Reducer Efficiency
Motor Torque = 63025 x HP / RPM

NOTE: Critical speeds vs. stroke lengths, column strength, compressed loads vs. tension loads (catalog pages 112 and 113) must be considered when a screw is directly coupled to a motor and turning at high RPM's. For these applications Duff-Norton always recommends using the "Fixed-Simple" mounting option. Tension loads are often preferred for vertical applications to enable longer stroke lengths. Duff-Norton advises using the following formula to help determine your systems maximum stroke length.

Max Stroke Length = SQRT(4056 x root diameter)

PV Values (catalog page 111) should be consulted as well.

Acme Screw / Gearmotor Performance Specifications

Gearmotor configuration used on .500" - 1.17" screw systems.

1/2" Acme Screw & Nut - Gearmotor Performance Specifications

Acme Diameter & Lead	Gearmotor Model	Gear Ratio	Speed (in/min)	Mounting Kit #	End Block Model #	Motor HP (1725 RPM) Capacity (pounds) - See Notes Below			
						1/6 HP	1/4 HP	1/3 HP	1/2 HP
050 x 010 Bronze Nut	NB07F	4.77	36.2	EB00-NB07F	EB000F	606	909	1211	1819
		5.96	28.9	EB00-NB07F	EB000F	757	1136	1513	1826
		7.23	23.9	EB00-NB07F	EB000F	918	1378	1826	-
		8.00	21.6	EB00-NB07F	EB000F	1016	1525	1826	-
		10.00	17.3	EB00-NB07F	EB000F	1269	1826	-	-
		11.56	14.9	EB00-NB07F	EB000F	1468	1826	-	-
050 x 020 Bronze Nut	NB07F	4.77	72.3	EB00-NB07F	EB000F	442	664	884	1219
		5.96	57.9	EB00-NB07F	EB000F	552	830	1105	1219
		7.23	47.7	EB00-NB07F	EB000F	670	1006	1219	-
		8.00	43.1	EB00-NB07F	EB000F	742	1113	1219	-
		10.00	34.5	EB00-NB07F	EB000F	927	1219	-	-
		11.56	29.8	EB00-NB07F	EB000F	1072	1219	-	-
050 x 025 Bronze Nut	NB07F	4.77	90.4	EB00-NB07F	EB000F	392	589	785	908
		5.96	72.4	EB00-NB07F	EB000F	490	736	908	-
		7.23	59.6	EB00-NB07F	EB000F	595	893	908	-
		8.00	53.9	EB00-NB07F	EB000F	658	908	-	-
		10.00	43.1	EB00-NB07F	EB000F	822	908	-	-
		11.56	37.3	EB00-NB07F	EB000F	908	-	-	-
050 x 050 Bronze Nut	NB07F	4.77	180.8	EB00-NB07F	EB000F	244	367	489	734
		5.96	144.7	EB00-NB07F	EB000F	305	458	611	783
		7.23	119.3	EB00-NB07F	EB000F	370	556	741	783
		8.00	107.8	EB00-NB07F	EB000F	410	615	783	-
		10.00	86.3	EB00-NB07F	EB000F	512	769	783	-
		11.56	74.6	EB00-NB07F	EB000F	592	783	-	-
050 x 025 Plastic Nut	NB07F	2.10	205.4	EB00-NB07F	EB000F	208	312	416	624
		2.57	167.8	EB00-NB07F	EB000F	254	382	509	665
		2.95	146.2	EB00-NB07F	EB000F	292	438	584	665
		3.58	120.5	EB00-NB07F	EB000F	354	532	665	-
		3.92	110.0	EB00-NB07F	EB000F	388	583	665	-
		4.77	90.4	EB00-NB07F	EB000F	472	665	-	-
050 x 050 Plastic Nut	NB07F	2.10	410.7	EB00-NB07F	EB000F	121	182	243	365
		2.57	335.6	EB00-NB07F	EB000F	149	223	297	446
		2.95	292.4	EB00-NB07F	EB000F	171	256	341	512
		3.58	240.9	EB00-NB07F	EB000F	207	311	414	622
		3.92	220.0	EB00-NB07F	EB000F	227	340	453	665
		4.77	180.8	EB00-NB07F	EB000F	276	414	552	665

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.
NOTE: Cells with blue shaded numbers indicate the combination of screw, motor horsepower, and gear ratio exceeds the screw and nut's dynamic load rating, or the End Block's basic dynamic capacity.

Cells with blue shaded dashes indicate the dynamic load rating has already been exceeded once per horsepower.

Cells with blue shaded N.A. indicate a combination of horsepower and gear ratio that is not advisable or not available.

5/8" Acme Screw & Nut - Gearmotor Performance Specifications

Acme Diameter & Lead	Gearmotor Model	Gear Ratio	Speed (in/min)	Mounting Kit #	End Block Model #	Motor HP (1725 RPM) Capacity (pounds) - See Notes Below			
						1/6 HP	1/4 HP	1/3 HP	1/2 HP
063 x 010 Bronze Nut	NB07F	4.77	36.2	EB01-NB07F	EB001F	516	775	1032	1549
		5.96	28.9	EB01-NB07F	EB001F	645	968	1289	1936
		7.23	23.9	EB01-NB07F	EB001F	782	1174	1564	2348
		8.00	21.6	EB01-NB07F	EB001F	865	1299	1730	2598
		10.00	17.3	EB01-NB07F	EB001F	1081	1624	2163	2897
		11.56	14.9	EB01-NB07F	EB001F	1250	1877	2500	2897
063 x 013 Bronze Nut	NB07F	4.77	45.2	EB01-NB07F	EB001F	480	721	961	1442
		5.96	36.2	EB01-NB07F	EB001F	600	901	1200	1802
		7.23	29.8	EB01-NB07F	EB001F	728	1093	1456	2186
		8.00	27.0	EB01-NB07F	EB001F	805	1209	1611	2419
		10.00	21.6	EB01-NB07F	EB001F	1007	1512	2014	2836
		11.56	18.7	EB01-NB07F	EB001F	1164	1748	2328	2836
063 x 020 Bronze Nut	NB07F	4.77	72.3	EB01-NB07F	EB001F	392	589	785	1178
		5.96	57.9	EB01-NB07F	EB001F	490	736	980	1472
		7.23	47.7	EB01-NB07F	EB001F	595	893	1189	1544
		8.00	43.1	EB01-NB07F	EB001F	658	988	1316	1544
		10.00	34.5	EB01-NB07F	EB001F	822	1235	1544	-
		11.56	29.8	EB01-NB07F	EB001F	951	1428	1544	-
063 x 025 Bronze Nut	NB07F	4.77	90.4	EB01-NB07F	EB001F	357	536	714	1072
		5.96	72.4	EB01-NB07F	EB001F	446	670	892	1137
		7.23	59.6	EB01-NB07F	EB001F	541	813	1083	1137
		8.00	53.9	EB01-NB07F	EB001F	599	899	1137	-
		10.00	43.1	EB01-NB07F	EB001F	749	1124	1137	-
		11.56	37.3	EB01-NB07F	EB001F	865	1137	-	-
063 x 050 Bronze Nut	NB07F	4.77	180.8	EB01-NB07F	EB001F	228	343	457	686
		5.96	144.7	EB01-NB07F	EB001F	285	428	571	857
		7.23	119.3	EB01-NB07F	EB001F	346	520	692	1039
		8.00	107.8	EB01-NB07F	EB001F	383	575	766	1150
		10.00	86.3	EB01-NB07F	EB001F	479	719	957	1163
		11.56	74.6	EB01-NB07F	EB001F	553	831	1107	1163
063 x 025 Plastic Nut	NB07F	2.10	205.4	EB01-NB07F	EB001F	192	288	383	575
		2.57	167.8	EB01-NB07F	EB001F	234	352	469	704
		2.95	146.2	EB01-NB07F	EB001F	269	404	538	808
		3.58	120.5	EB01-NB07F	EB001F	327	490	653	828
		3.92	110.0	EB01-NB07F	EB001F	358	537	715	828
		4.77	90.4	EB01-NB07F	EB001F	435	654	828	-
063 x 050 Plastic Nut	NB07F	2.10	410.7	EB01-NB07F	EB001F	116	174	231	347
		2.57	335.6	EB01-NB07F	EB001F	142	213	283	425
		2.95	292.4	EB01-NB07F	EB001F	163	244	325	488
		3.58	240.9	EB01-NB07F	EB001F	197	296	394	592
		3.92	220.0	EB01-NB07F	EB001F	216	324	432	649
		4.77	180.8	EB01-NB07F	EB001F	263	395	526	789

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.
NOTE: Cells with blue shaded numbers indicate the combination of screw, motor horsepower, and gear ratio exceeds the screw and nut's dynamic load rating, or the End Block's basic dynamic capacity.

Cells with blue shaded dashes indicate the dynamic load rating has already been exceeded once per horsepower.

Cells with blue shaded N.A. indicate a combination of horsepower and gear ratio that is not advisable or not available.

3/4" Acme Screw & Nut - Gearmotor Performance Specifications

Acme Diameter & Lead	Gearmotor Model	Gear Ratio	Speed (in/min)	Mounting Kit #	End Block Model #	Motor HP (1725 RPM) Capacity (pounds) - See Notes Below				
						1/4 HP	1/3 HP	1/2 HP	3/4 HP	1 HP
075 x 010 Bronze Nut	NB07F	4.77	36.2	EB01-NB07F	EB001F	675	899	1349	Reducer and Horsepower combinations are not available.	
		6.57	26.3	EB01-NB07F	EB001F	929	1238	1858		
		8.91	19.4	EB01-NB07F	EB001F	1260	1679	2520		
		11.56	14.9	EB01-NB07F	EB001F	1635	2178	3173		
		15.77	10.9	EB01-NB07F	EB001F	2230	2971	3173		
		19.20	9.0	EB01-NB07F	EB001F	2715	3617	-		
075 x 020 Bronze Nut	NB07F	4.77	72.3	EB01-NB07F	EB001F	550	733	1101		
		6.57	52.5	EB01-NB07F	EB001F	758	1010	1516		
		8.91	38.7	EB01-NB07F	EB001F	1028	1369	2056		
		11.56	29.8	EB01-NB07F	EB001F	1334	1777	2588		
		15.77	21.9	EB01-NB07F	EB001F	1820	2424	2588		
		19.20	18.0	EB01-NB07F	EB001F	2215	2951	-		
075 x 025 Bronze Nut	NB07F	4.77	90.4	EB01-NB07F	EB001F	504	671	1008		
		6.57	65.6	EB01-NB07F	EB001F	694	925	1388		
		8.91	48.4	EB01-NB07F	EB001F	941	1254	1883		
		11.56	37.3	EB01-NB07F	EB001F	1221	1627	2370		
		15.77	27.3	EB01-NB07F	EB001F	1666	2219	2370		
		19.20	22.5	EB01-NB07F	EB001F	2028	2702	-		
075 x 050 Bronze Nut	NB17F	4.62	186.7	EB01-NB07F	EB001F	324	432	648	972	1296
		5.77	149.5	EB01-NB07F	EB001F	405	539	810	1214	1574
		7.08	121.8	EB01-NB07F	EB001F	497	662	993	1490	1574
		7.83	110.2	EB01-NB07F	EB001F	549	732	1099	1574	-
		9.79	88.1	EB01-NB07F	EB001F	687	915	1374	1574	-
		11.39	75.7	EB01-NB07F	EB001F	799	1064	1574	-	-
		13.54	63.7	EB01-NB07F	EB001F	950	1265	1574	-	-
		15.76	54.7	EB01-NB07F	EB001F	1106	1473	1574	-	-
075 x 100 Bronze Nut	NB17F	4.62	373.4	EB01-NB07F	EB001F	188	251	377	565	754
		5.77	299.0	EB01-NB07F	EB001F	235	313	471	706	915
		7.08	243.6	EB01-NB07F	EB001F	289	385	578	866	915
		7.83	220.3	EB01-NB07F	EB001F	319	425	639	915	-
		9.79	176.2	EB01-NB07F	EB001F	399	532	799	915	-
		11.39	151.4	EB01-NB07F	EB001F	465	619	915	-	-
		13.54	127.4	EB01-NB07F	EB001F	552	736	915	-	-
		15.76	109.5	EB01-NB07F	EB001F	643	856	915	-	-
075 x 025 Plastic Nut	NB07F	2.95	146.2	EB01-NB07F	EB001F	386	514	772	Reducer and Horsepower combinations are not available.	
		3.58	120.5	EB01-NB07F	EB001F	469	624	937		
		3.92	110.0	EB01-NB07F	EB001F	513	683	1026		
		4.77	90.4	EB01-NB07F	EB001F	624	832	1249		
		5.96	72.4	EB01-NB07F	EB001F	780	1039	1560		
		7.23	59.6	EB01-NB07F	EB001F	946	1260	1652		
075 x 050 Plastic Nut	NB07F	2.95	292.4	EB01-NB07F	EB001F	237	316	475		
		3.58	240.9	EB01-NB07F	EB001F	288	384	576		
		3.92	220.0	EB01-NB07F	EB001F	315	420	631		
		4.77	180.8	EB01-NB07F	EB001F	384	511	767		
		5.96	144.7	EB01-NB07F	EB001F	479	639	959		
		7.23	119.3	EB01-NB07F	EB001F	582	775	1163		
075 x 100 Plastic Nut	NB07F	4.77	361.6	EB01-NB07F	EB001F	216	287	431		
		5.96	289.4	EB01-NB07F	EB001F	269	359	539		
		7.23	238.6	EB01-NB07F	EB001F	327	435	654		
		8.00	215.6	EB01-NB07F	EB001F	362	482	723		
		10.00	172.5	EB01-NB07F	EB001F	452	602	904		
		11.56	149.2	EB01-NB07F	EB001F	523	696	1015		

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.
NOTE: Cells with blue shaded numbers indicate the combination of screw, motor horsepower, and gear ratio exceeds the screw and nut's dynamic load rating, or the End Block's basic dynamic capacity.

Cells with blue shaded dashes indicate the dynamic load rating has already been exceeded once per horsepower.

Cells with blue shaded N.A. indicate a combination of horsepower and gear ratio that is not advisable or not available.

1" Acme Screw & Nut - Gearmotor Performance Specifications

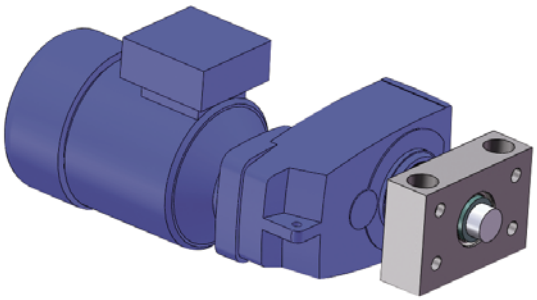
Acme Diameter & Lead	Gearmotor Model	Gear Ratio	Speed (in/min)	Mounting Kit #	End Block Model #	Motor HP (1725 RPM) Capacity (pounds) - See Notes Below						
						1/4 HP	1/3 HP	1/2 HP	3/4 HP	1 HP	1.5 HP	2 HP
100 x 010 Bronze Nut	NB17H	4.62	37.3	EB04-NB07H	EB004F	513	683	1026	1538	2051	3077	4102
		5.77	29.9	EB04-NB07H	EB004F	640	853	1281	1921	2562	3843	5124
		7.08	24.4	EB04-NB07H	EB004F	786	1047	1572	2358	3143	4715	6287
		7.83	22.0	EB04-NB07H	EB004F	869	1158	1738	2607	3476	5215	6939
		9.79	17.6	EB04-NB07H	EB004F	1087	1447	2173	3260	4347	6520	6939
		11.39	15.1	EB04-NB07H	EB004F	1264	1684	2528	3793	5057	N.A.	N.A.
		13.54	12.7	EB04-NB07H	EB004F	1503	2002	3006	4509	6012	N.A.	N.A.
		15.76	10.9	EB04-NB07H	EB004F	1749	2330	3499	5248	6939	N.A.	N.A.
100 x 020 Bronze Nut	NB17H	4.62	74.7	EB03-NB07H	EB003F	440	587	881	1321	1761	2642	3523
		5.77	59.8	EB03-NB07H	EB003F	550	733	1100	1650	2200	3300	4400
		7.08	48.7	EB03-NB07H	EB003F	675	899	1350	2024	2699	4049	5398
		7.83	44.1	EB03-NB07H	EB003F	746	994	1493	2239	2985	4478	5672
		9.79	35.2	EB03-NB07H	EB003F	933	1243	1866	2799	3732	5599	5672
		11.39	30.3	EB03-NB07H	EB003F	1086	1446	2171	3257	4342	N.A.	N.A.
		13.54	25.5	EB03-NB07H	EB003F	1291	1719	2581	3872	5162	N.A.	N.A.
		15.76	21.9	EB03-NB07H	EB003F	1502	2001	3004	4506	5672	N.A.	N.A.
100 x 025 Bronze Nut	NB17H	4.62	93.3	EB03-NB07H	EB003F	413	551	827	1240	1654	2480	3307
		5.77	74.7	EB03-NB07H	EB003F	516	688	1033	1549	2065	3098	4130
		7.08	60.9	EB03-NB07H	EB003F	633	844	1267	1900	2534	3801	5068
		7.83	55.1	EB03-NB07H	EB003F	701	933	1401	2102	2802	4204	5325
		9.79	44.1	EB03-NB07H	EB003F	876	1167	1752	2628	3504	5256	5325
		11.39	37.9	EB03-NB07H	EB003F	1019	1357	2038	3057	4077	N.A.	N.A.
		13.54	31.9	EB03-NB07H	EB003F	1212	1614	2423	3635	4846	N.A.	N.A.
		15.76	27.4	EB03-NB07H	EB003F	1410	1878	2820	4230	5325	N.A.	N.A.
100 x 050 Bronze Nut	NB17H	4.62	186.7	EB03-NB07H	EB003F	289	385	579	868	1157	1736	2315
		5.77	149.5	EB03-NB07H	EB003F	361	481	723	1084	1446	2168	2891
		7.08	121.8	EB03-NB07H	EB003F	443	591	887	1330	1774	2661	3548
		7.83	110.2	EB03-NB07H	EB003F	490	653	981	1471	1962	2943	3727
		9.79	88.1	EB03-NB07H	EB003F	613	817	1226	1840	2453	3679	3727
		11.39	75.7	EB03-NB07H	EB003F	713	950	1427	2140	2854	N.A.	N.A.
		13.54	63.7	EB03-NB07H	EB003F	848	1130	1696	2544	3392	N.A.	N.A.
		15.76	54.7	EB03-NB07H	EB003F	987	1315	1974	2961	3727	N.A.	N.A.
100 x 100 Bronze Nut	NB17H	4.62	373.4	EB03-NB07H	EB003F	178	238	357	535	714	1071	1428
		5.77	299.0	EB03-NB07H	EB003F	223	297	446	669	892	1337	1783
		7.08	243.6	EB03-NB07H	EB003F	273	364	547	820	1094	1641	2188
		7.83	220.3	EB03-NB07H	EB003F	302	403	605	907	1210	1815	2299
		9.79	176.2	EB03-NB07H	EB003F	378	504	756	1135	1513	2269	2299
		11.39	151.4	EB03-NB07H	EB003F	440	586	880	1320	1760	N.A.	N.A.
		13.54	127.4	EB03-NB07H	EB003F	523	697	1046	1569	2092	N.A.	N.A.
		15.76	109.5	EB03-NB07H	EB003F	609	811	1218	1826	2299	N.A.	N.A.
100 x 025 Plastic Nut	NB17H	4.62	93.3	EB03-NB07H	EB003F	526	701	1052	1578	2104		
		5.77	74.7	EB03-NB07H	EB003F	657	875	1314	1971	2239		
		7.08	60.9	EB03-NB07H	EB003F	806	1074	1613	2239	-		
		7.83	55.1	EB03-NB07H	EB003F	892	1188	1783	2239	-		
		9.79	44.1	EB03-NB07H	EB003F	1115	1485	2230	2239	-		
		11.39	37.9	EB03-NB07H	EB003F	1297	1728	2239	N.A.	N.A.		
		13.54	31.9	EB03-NB07H	EB003F	1542	2054	2239	N.A.	N.A.		
		15.76	27.4	EB03-NB07H	EB003F	1795	2239	N.A.	N.A.	N.A.		
100 x 050 Plastic Nut	NB17H	4.62	186.7	EB03-NB07H	EB003F	343	457	687	1030	1373		
		5.77	149.5	EB03-NB07H	EB003F	429	571	858	1286	1715		
		7.08	121.8	EB03-NB07H	EB003F	526	701	1052	1578	2019		
		7.83	110.2	EB03-NB07H	EB003F	582	775	1164	1746	2019		
		9.79	88.1	EB03-NB07H	EB003F	728	969	1455	2019	N.A.		
		11.39	75.7	EB03-NB07H	EB003F	846	1127	1693	N.A.	N.A.		
		13.54	63.7	EB03-NB07H	EB003F	1006	1340	2012	N.A.	N.A.		
		15.76	54.7	EB03-NB07H	EB003F	1171	1560	2019	N.A.	N.A.		
100 x 100 Plastic Nut	NB17H	4.62	373.4	EB03-NB07H	EB003F	201	267	401	602	802	1203	1604
		5.77	299.0	EB03-NB07H	EB003F	250	334	501	751	1002	1503	2004
		7.08	243.6	EB03-NB07H	EB003F	307	409	615	922	1229	1844	2209
		7.83	220.3	EB03-NB07H	EB003F	340	453	680	1020	1360	2039	2209
		9.79	176.2	EB03-NB07H	EB003F	425	566	850	1275	1700	2209	N.A.
		11.39	151.4	EB03-NB07H	EB003F	494	659	989	1483	1978	2209	N.A.
		13.54	127.4	EB03-NB07H	EB003F	588	783	1176	1763	2209	N.A.	N.A.
		15.76	109.5	EB03-NB07H	EB003F	684	911	1368	2052	2209	N.A.	N.A.

These Screw & Nut dynamic load ratings have already been exceeded, or the combination of horsepower and gear ration is not advisable.

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.
NOTE: Cells with blue shaded numbers indicate the combination of screw, motor horsepower, and gear ratio exceeds the screw and nut's dynamic load rating, or the End Block's basic dynamic capacity.

Cells with blue shaded dashes indicate the dynamic load rating has already been exceeded once per horsepower.

Cells with blue shaded N.A. indicate a combination of horsepower and gear ratio that is not advisable or not available.



Gearmotor configuration used on 1.50” - 2.50” screw systems.

1 1/2" Acme Screw & Nut - Gearmotor Performance Specifications

Acme Diameter & Lead	Gearmotor Model	Gear Ratio	Speed (in/min)	Mounting Kit #	End Block Model #	Motor HP (1725 RPM) Capacity (pounds) - See Notes Below			
						1.5 HP	2 HP	3 HP	5 HP
150 x 010 Bronze Nut	NC12C	4.79	36.0	EB06-NC12C	EB006F	2270	3027	4541	7568
		6.43	26.8	EB06-NC12C	EB006F	3048	4064	6095	10159
		8.24	20.9	EB06-NC12C	EB006F	3906	5207	7811	11869
		10.34	16.7	EB06-NC12C	EB006F	4901	6535	9802	11869
		14.11	12.2	EB06-NC12C	EB006F	6688	8917	11869	N.A.
		17.21	10.0	EB06-NC12C	EB006F	8157	10876	11869	N.A.
		20.57	8.4	EB06-NC12C	EB006F	9750	13000	11869	N.A.
		28.33	6.1	EB06-NC12C	EB006F	13428	11869	N.A.	N.A.
150 x 025 Bronze Nut	NC12C	4.79	90.0	EB06-NC12C	EB006F	1939	2585	3877	6462
		6.43	67.1	EB06-NC12C	EB006F	2602	3470	5205	8674
		8.24	52.3	EB06-NC12C	EB006F	3335	4446	6670	11116
		10.34	41.7	EB06-NC12C	EB006F	4185	5580	8369	11869
		14.11	30.6	EB06-NC12C	EB006F	5710	7614	11421	N.A.
		17.21	25.1	EB06-NC12C	EB006F	6965	9287	11869	N.A.
		20.57	21.0	EB06-NC12C	EB006F	8325	11100	11869	N.A.
		28.33	15.2	EB06-NC12C	EB006F	11465	11869	N.A.	N.A.
150 x 038 Bronze Nut	NC12E	4.79	135.0	EB05-NC12E	EB005F	1647	2196	3294	5490
		6.43	100.6	EB05-NC12E	EB005F	2211	2948	4422	7370
		8.24	78.5	EB05-NC12E	EB005F	2833	3778	5667	9445
		10.34	62.6	EB05-NC12E	EB005F	3556	4741	7111	9495
		14.11	45.8	EB05-NC12E	EB005F	4852	6469	9495	N.A.
		17.21	37.6	EB05-NC12E	EB005F	5918	7891	9495	N.A.
		20.57	31.4	EB05-NC12E	EB005F	7073	9495	-	N.A.
		28.33	22.8	EB05-NC12E	EB005F	9495	-	N.A.	N.A.
150 x 050 Bronze Nut	NC12C	4.79	180.1	EB06-NC12C	EB006F	1457	1942	2913	4856
		6.43	134.1	EB06-NC12C	EB006F	1955	2607	3911	6518
		8.24	104.7	EB06-NC12C	EB006F	2506	3341	5012	8353
		10.34	83.4	EB06-NC12C	EB006F	3145	4193	6289	10482
		14.11	61.1	EB06-NC12C	EB006F	4291	5721	8582	N.A.
		17.21	50.1	EB06-NC12C	EB006F	5234	6978	10468	N.A.
		20.57	41.9	EB06-NC12C	EB006F	6256	8341	11869	N.A.
		28.33	30.4	EB06-NC12C	EB006F	8616	11487	N.A.	N.A.

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.
NOTE: Cells with blue shaded numbers indicate the combination of screw, motor horsepower, and gear ratio exceeds the screw and nut's dynamic load rating, or the End Block's basic dynamic capacity.

Cells with blue shaded dashes indicate the dynamic load rating has already been exceeded once per horsepower.

Cells with blue shaded N.A. indicate a combination of horsepower and gear ratio that is not advisable or not available.

2" Acme Screw & Nut - Gearmotor Performance Specifications

Acme Diameter & Lead	Gearmotor Model	Gear Ratio	Speed (in/min)	Mounting Kit #	End Block Model #	Motor HP (1725RPM) Capacity (pounds) - See Below		
						2 HP	3 HP	5 HP
200 x 025 Bronze Nut	NC22G	5.72	75.4	EB08-NC22G	EB008F	N.A.	N.A.	6192
		7.48	57.7	EB08-NC22G	EB008F	N.A.	4859	8098
		9.03	47.8	EB08-NC22G	EB008F	N.A.	5865	9775
		13.23	32.6	EB08-NC22G	EB008F	5729	8593	14322
		18.51	23.3	EB08-NC22G	EB008F	7848	11772	19621
		24.97	17.3	EB08-NC22G	EB008F	10587	15881	21912
		31.23	13.8	EB08-NC22G	EB008F	13242	19862	N.A.
		43.71	9.9	EB08-NC22G	EB008F	18533	21912	N.A.
200 x 050 Bronze Nut	NC22H	5.72	150.8	EB06-NC22H	EB006F	N.A.	N.A.	4986
		7.48	115.3	EB06-NC22H	EB006F	N.A.	3912	6520
		9.03	95.5	EB06-NC22H	EB006F	N.A.	4723	7871
		13.23	65.2	EB06-NC22H	EB006F	4613	6919	11532
		18.51	46.6	EB06-NC22H	EB006F	6454	9681	11869
		24.97	34.5	EB06-NC22H	EB006F	8706	11869	-
		31.23	27.6	EB06-NC22H	EB006F	10889	11869	N.A.
		43.71	19.7	EB06-NC22H	EB006F	11869	-	N.A.

2 1/4" Acme Screw & Nut - Gearmotor Performance Specifications

Acme Diameter & Lead	Gearmotor Model	Gear Ratio	Speed (in/min)	Mounting Kit #	End Block Model #	Motor HP (1725 RPM) Capacity (pounds) - See Notes Below			
						2 HP	3 HP	5 HP	7.5 HP
225 x 025 Bronze Nut	NC32J	14.11	30.6	EB09-NC32J	EB009F	N.A.	N.A.	13824	20736
		16.67	25.9	EB09-NC32J	EB009F	N.A.	N.A.	16332	24498
		21.38	20.2	EB09-NC32J	EB009F	N.A.	12568	20947	25382
		25.88	16.7	EB09-NC32J	EB009F	10142	15213	25356	25382
		31.93	13.5	EB09-NC32J	EB009F	12253	18379	25382	-
		42.02	10.3	EB09-NC32J	EB009F	16124	24187	25382	N.A.
		52.97	8.1	EB09-NC32J	EB009F	20326	25382	N.A.	N.A.
		64.12	6.7	EB09-NC32J	EB009F	24605	25382	N.A.	N.A.
225 x 050 Bronze Nut	NC32G	14.11	61.1	EB08-NC32G	EB008F	N.A.	N.A.	11617	17426
		16.67	51.7	EB08-NC32G	EB008F	N.A.	N.A.	13725	18260
		21.38	40.3	EB08-NC32G	EB008F	N.A.	10562	17603	18260
		25.88	33.3	EB08-NC32G	EB008F	8523	12785	18260	18260
		31.93	27.0	EB08-NC32G	EB008F	10297	15445	18260	18260
		42.02	20.5	EB08-NC32G	EB008F	13551	18260	18260	N.A.
		52.97	16.3	EB08-NC32G	EB008F	17082	18260	N.A.	N.A.
		64.12	13.5	EB08-NC32G	EB008F	18260	18260	N.A.	N.A.

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.
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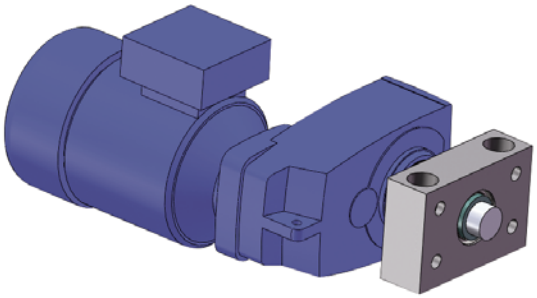

Gearmotor configuration used on 1.50” - 2.50” screw systems.

2 1/2" Acme Screw & Nut - Gearmotor Performance Specifications

Acme Diameter & Lead	Gearmotor Model	Gear Ratio	Speed (in/min)	Mounting Kit #	End Block Model #	Motor HP (1725 RPM) Capacity (pounds) - See Notes Below			
						3 HP	5 HP	7.5 HP	10 HP
250 x 025 Bronze Nut	NC32J	8.31	51.90	EB10-NC32J	EB010F	N.A.	7318	10977	14636
		11.38	37.90	EB10-NC32J	EB010F	N.A.	10021	15032	20043
		14.11	30.56	EB10-NC32J	EB010F	N.A.	12426	18638	24851
		20.18	21.37	EB10-NC32J	EB010F	10663	17771	25382	25382
		25.88	16.66	EB10-NC32J	EB010F	13674	22790	25382	25382
		31.93	13.51	EB10-NC32J	EB010F	16871	25382	25382	-
		42.02	10.26	EB10-NC32J	EB010F	22202	25382	N.A.	N.A.
		52.97	8.14	EB10-NC32J	EB010F	27988	N.A.	N.A.	N.A.
250 x 050 Bronze Nut	NC32J	8.31	103.79	EB10-NC32J	EB010F	N.A.	6231	9347	12463
		11.38	75.79	EB10-NC32J	EB010F	N.A.	8534	12800	17067
		14.11	61.13	EB10-NC32J	EB010F	N.A.	10581	15871	21161
		20.18	42.74	EB10-NC32J	EB010F	9079	15132	22699	25382
		25.88	33.33	EB10-NC32J	EB010F	11644	19407	25382	33654
		31.93	27.01	EB10-NC32J	EB010F	14366	23943	25382	-
		42.02	20.53	EB10-NC32J	EB010F	18906	25382	N.A.	N.A.
		52.97	16.28	EB10-NC32J	EB010F	23832	N.A.	N.A.	N.A.

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Ball Screw / Gearmotor Performance Specifications

Gearmotor configuration used on .500” - 1.17” screw systems.

1/2" Ball Screw & Nut - Gearmotor Performance Specifications

Ball Diameter & Lead	Gearmotor Model	Gear Ratio	Speed (in/min)	Mounting Kit #	End Block Model #	Motor HP (1725 RPM) Capacity (pounds) - See Notes Below			
						1/6 HP	1/4 HP	1/3 HP	1/2 HP
050 x 020 Ball Nut - Double Return Tubes	NB07F	2.10	164.3	EB00-NB07F	EB000F	350	526	701	1052
		2.57	134.2	EB00-NB07F	EB000F	429	644	858	1200
		2.95	116.9	EB00-NB07F	EB000F	492	739	984	1200
		3.58	96.4	EB00-NB07F	EB000F	597	897	1195	1200
		3.92	88.0	EB00-NB07F	EB000F	654	982	1200	-
		4.77	72.3	EB00-NB07F	EB000F	796	1195	1200	-
050 x 050 Ball Nut - Double Return Tubes	NB07F	2.10	410.7	EB00-NB07F	EB000F	139	209	279	419
		2.57	335.6	EB00-NB07F	EB000F	171	256	341	512
		2.95	292.4	EB00-NB07F	EB000F	196	294	392	588
		3.58	240.9	EB00-NB07F	EB000F	238	357	475	713
		3.92	220.0	EB00-NB07F	EB000F	260	391	520	781
		4.77	180.8	EB00-NB07F	EB000F	317	475	633	850

.631" Ball Screw & Nut - Gearmotor Performance Specifications

Ball Diameter & Lead	Gearmotor Model	Gear Ratio	Speed (in/min)	Mounting Kit #	End Block Model #	Motor HP (1725 RPM) Capacity (pounds) - See Notes Below			
						1/6 HP	1/4 HP	1/3 HP	1/2 HP
063 x 020 Ball Nut	NB07F	2.10	164.3	EB01-NB07F	EB001F	350	526	701	800
		2.57	134.2	EB01-NB07F	EB001F	429	644	800	-
		2.95	116.9	EB01-NB07F	EB001F	492	739	800	-
		3.58	96.4	EB01-NB07F	EB001F	597	800	-	-
		3.92	88.0	EB01-NB07F	EB001F	654	800	-	-
		4.77	72.3	EB01-NB07F	EB001F	796	800	-	-
063 x 100 Ball Nut	NB07F	2.10	821.4	EB01-NB07F	EB001F	69	104	139	208
		2.85	605.3	EB01-NB07F	EB001F	94	141	188	282
		3.58	481.8	EB01-NB07F	EB001F	118	177	236	355
		4.77	361.6	EB01-NB07F	EB001F	157	236	315	473
		5.96	289.4	EB01-NB07F	EB001F	197	295	393	578
		8.00	215.6	EB01-NB07F	EB001F	264	396	528	578

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.
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Gearmotor configuration used on .500” - 1.17” screw systems.

3/4" Ball Screw & Nut - Gearmotor Performance Specifications

Ball Diameter & Lead	Gearmotor Model	Gear Ratio	Speed (in/min)	Mounting Kit #	End Block Model #	Motor HP (1725 RPM) Capacity (pounds) - See Notes Below							
						1/6 HP	1/4 HP	1/3 HP	1/2 HP	3/4 HP	1 HP	1.5 HP	2 HP
075 x 020 Ball Nut - Single Return Tube	NB07H	2.10	164.3	EB03-NB07H	EB003F	350	526	701	950	Reducer and Horsepower combinations are not available.			
		2.57	134.2	EB03-NB07H	EB003F	429	644	858	950				
		2.95	116.9	EB03-NB07H	EB003F	492	739	950	-				
		3.58	96.4	EB03-NB07H	EB003F	597	897	950	-				
		4.31	80.0	EB03-NB07H	EB003F	719	950	-	-				
		5.31	65.0	EB03-NB07H	EB003F	886	950	-	-				
075 x 020 Ball Nut - Double Return Tubes	NB07H	2.85	121.1	EB03-NB07H	EB003F	476	714	951	1428				
		3.58	96.4	EB03-NB07H	EB003F	597	897	1195	1794				
		4.31	80.0	EB03-NB07H	EB003F	719	1080	1438	1900				
		5.31	65.0	EB03-NB07H	EB003F	886	1330	1772	1900				
		5.96	57.9	EB03-NB07H	EB003F	994	1493	1900	-				
		7.23	47.7	EB03-NB07H	EB003F	1206	1811	1900	-				
075 x 050 Ball Nut - Double Return Tubes	NB17H	2.32	371.8	EB03-NB07H	EB003F	154	231	308	462	693	925	1387	1849
		2.72	317.1	EB03-NB07H	EB003F	180	271	361	542	813	1084	1626	2168
		3.22	267.9	EB03-NB07H	EB003F	214	321	427	642	962	1284	1925	2567
		3.79	227.6	EB03-NB07H	EB003F	252	378	503	755	1133	1511	2266	3021
		4.62	186.7	EB03-NB07H	EB003F	307	460	613	921	1381	1842	2762	3450
		5.77	149.5	EB03-NB07H	EB003F	383	575	766	1150	1725	2300	3449	N.A.

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Gearmotor configuration used on .500” - 1.17” screw systems.

1" Ball Screw & Nut - Gearmotor Performance Specifications

Ball Diameter & Lead	Gearmotor Model	Gear Ratio	Speed (in/min)	Mounting Kit #	End Block Model #	Motor HP (1725 RPM) Capacity (pounds) - See Notes Below						
						1/4 HP	1/3 HP	1/2 HP	3/4 HP	1 HP	1.5 HP	2 HP
100 x 025 Ball Nut - Single Return Tube	NB07H	2.10	205.4	EB04-NB07H	EB004F	419	557	837				
		2.57	167.8	EB04-NB07H	EB004F	512	682	1024				
		2.95	146.2	EB04-NB07H	EB004F	588	783	1176				
		3.58	120.5	EB04-NB07H	EB004F	713	950	1427				
		3.92	110.0	EB04-NB07H	EB004F	781	1041	1562				
		4.77	90.4	EB04-NB07H	EB004F	951	1266	1612				
100 x 025 Ball Nut - Double Return Tubes	NB07H	2.95	146.2	EB04-NB07H	EB004F	588	783	1176				
		3.58	120.5	EB04-NB07H	EB004F	713	950	1427				
		4.77	90.4	EB04-NB07H	EB004F	951	1266	1901				
		5.96	72.4	EB04-NB07H	EB004F	1188	1582	2376				
		7.23	59.6	EB04-NB07H	EB004F	1441	1919	2882				
		8.91	48.4	EB04-NB07H	EB004F	1776	2365	3350				
100 x 100 Ball Nut - Double Return Tubes	NB17H	4.62	373.4	EB04-NB07H	EB004F	229	305	458	687	916	1373	1831
		5.77	299.0	EB04-NB07H	EB004F	286	381	572	858	1143	1715	2287
		7.08	243.6	EB04-NB07H	EB004F	351	467	701	1052	1403	2104	2400
		8.72	197.8	EB04-NB07H	EB004F	432	575	864	1296	1728	2400	N.A.
		11.39	151.4	EB04-NB07H	EB004F	564	752	1129	1693	2257	N.A.	N.A.
		13.54	127.4	EB04-NB07H	EB004F	671	893	1342	2012	2400	N.A.	N.A.

Reducer and Horsepower combinations are not available.

1.17" Ball Screw & Nut - Gearmotor Performance Specifications

Ball Diameter & Lead	Gearmotor Model	Gear Ratio	Speed (in/min)	Mounting Kit #	End Block Model #	Motor HP (1725 RPM) Capacity (pounds) - See Notes Below						
						1/4 HP	1/3 HP	1/2 HP	3/4 HP	1 HP	1.5 HP	2 HP
117 x 041 Ball Nut - Double Return Tubes	NB17H	2.32	307.1	EB04-NB07H	EB004F	279	371	557	836	1115	1672	2229
		2.92	244.0	EB04-NB07H	EB004F	351	467	701	1052	1403	2104	2806
		3.79	188.0	EB04-NB07H	EB004F	455	606	911	1366	1821	2731	3642
		4.62	154.2	EB04-NB07H	EB004F	555	739	1110	1665	2220	3330	3894
		5.77	123.5	EB04-NB07H	EB004F	693	923	1386	2079	2772	3894	N.A.
		7.08	100.6	EB04-NB07H	EB004F	850	1133	1701	2551	3402	3894	N.A.

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.
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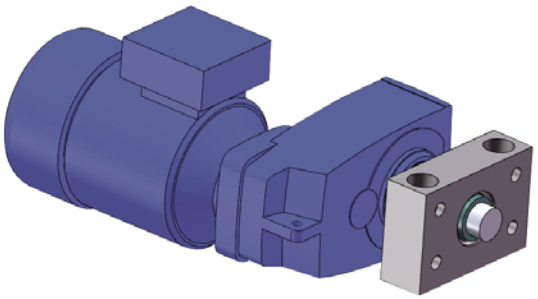

Gearmotor configuration used on 1.50” - 2.50” screw systems.

1 1/2" Ball Screw & Nut - Gearmotor Performance Specifications

Ball Diameter & Lead	Gearmotor Model	Gear Ratio	Speed (in/min)	Mounting Kit #	End Block Model #	Motor HP (1725 RPM) Capacity (pounds) - See Notes Below						
						1/2 HP	3/4 HP	1 HP	1.5HP	2 HP	3 HP	5 HP
150 x 047 Ball Nut - Double Return Tubes	NC12E	5.47	149.2	EB05-NC12E	EB005F	1142	1713	2284	3426	4568	6852	9495
		6.43	126.9	EB05-NC12E	EB005F	1342	2014	2685	4027	5370	8055	9495
		8.24	99.0	EB05-NC12E	EB005F	1720	2581	3441	5161	6881	9495	-
		10.34	78.9	EB05-NC12E	EB005F	2159	3238	4318	6476	8635	9495	-
		11.76	69.4	EB05-NC12E	EB005F	2455	3683	4910	7366	9495	-	-
		14.11	57.8	EB05-NC12E	EB005F	2946	4419	5892	8838	9495	-	-
150 x 100 Ball Nut - Double Return Tubes	NC12E	5.47	315.4	EB05-NC12E	EB005F	545	818	1090	1635	2180	3270	5451
		6.43	268.3	EB05-NC12E	EB005F	641	961	1281	1922	2563	3844	6407
		8.24	209.3	EB05-NC12E	EB005F	821	1232	1642	2463	3284	4926	8211
		10.34	166.8	EB05-NC12E	EB005F	1030	1545	2061	3091	4121	6182	8250
		11.76	146.7	EB05-NC12E	EB005F	1172	1758	2344	3515	4687	7031	8250
		14.11	122.3	EB05-NC12E	EB005F	1406	2109	2812	4218	5624	8250	8250
150 x 187 Ball Nut - Double Return Tubes	NC12C	6.43	503.0	EB06-NC12C	EB006F	340	509	679	1019	1359	2038	3397
		8.24	392.5	EB06-NC12C	EB006F	435	653	871	1306	1741	2612	4353
		10.34	312.8	EB06-NC12C	EB006F	546	819	1092	1639	2185	3277	5462
		11.76	275.0	EB06-NC12C	EB006F	621	932	1242	1864	2485	3727	6212
		14.11	229.2	EB06-NC12C	EB006F	745	1118	1491	2236	2981	4472	7242
		17.21	187.9	EB06-NC12C	EB006F	909	1364	1818	2727	3636	5455	7242

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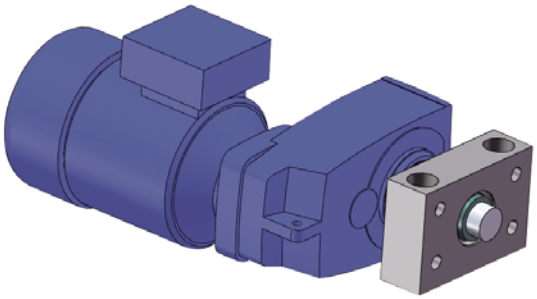
Cells with blue shaded dashes indicate the dynamic load rating has already been exceeded once per horsepower.

Cells with blue shaded N.A. indicate a combination of horsepower and gear ratio that is not advisable or not available.



Gearmotor configuration used on 1.50” - 2.50” screw systems.

2" Ball Screw & Nut - Gearmotor Performance Specifications

Ball Diameter & Lead	Gearmotor Model	Gear Ratio	Speed (in/min)	Mounting Kit #	End Block Model #	Motor HP (1725 RPM) Capacity (pounds) - See Below		
						2 HP	3 HP	5 HP
200 x 050 Ball Nut - Double Return Tubes	NC22G	8.37	103.0	EB08-NC22G	EB008F	N.A.	10008	16680
		9.03	95.5	EB08-NC22G	EB008F	N.A.	10797	17996
		10.15	85.0	EB08-NC22G	EB008F	N.A.	12137	18260
		11.81	73.0	EB08-NC22G	EB008F	9414	14122	18260
		13.23	65.2	EB08-NC22G	EB008F	10546	15820	18260
		16.53	52.2	EB08-NC22G	EB008F	13177	18260	N.A.
200 x 100 Ball Nut - Double Return Tubes	NC22G	7.48	230.6	EB08-NC22G	EB008F	N.A.	4472	7453
		8.37	206.1	EB08-NC22G	EB008F	N.A.	5004	8340
		9.03	191.0	EB08-NC22G	EB008F	N.A.	5399	8998
		10.15	170.0	EB08-NC22G	EB008F	N.A.	6068	10114
		11.81	146.1	EB08-NC22G	EB008F	4707	7061	11768
		13.23	130.4	EB08-NC22G	EB008F	5273	7910	13183

2 1/4" Ball Screw & Nut - Gearmotor Performance Specifications

Ball Diameter & Lead	Gearmotor Model	Gear Ratio	Speed (in/min)	Mounting Kit #	End Block Model #	Motor HP (1725 RPM) Capacity (pounds) - See Notes Below				
						2 HP	3 HP	5 HP	7.5 HP	10 HP
225 x 050 Ball Nut - Double Return Tubes	NC32J	8.31	103.8	EB09-NC32J	EB009F	N.A.	9937	16561	21306	-
		9.80	88.0	EB09-NC32J	EB009F	7812	11718	19530	21306	-
		11.38	75.8	EB09-NC32J	EB009F	9072	13607	21306	-	-
		14.11	61.1	EB09-NC32J	EB009F	11248	16872	21306	-	-
		16.67	51.7	EB09-NC32J	EB009F	13289	19933	21306	-	-
		20.18	42.7	EB09-NC32J	EB009F	16087	21306	-	-	-
225 x 100 Ball Nut - Double Return Tubes	NC32J	6.70	257.5	EB09-NC32J	EB009F	N.A.	N.A.	6676	10014	13352
		8.31	207.6	EB09-NC32J	EB009F	N.A.	N.A.	8280	12421	16561
		9.80	176.0	EB09-NC32J	EB009F	N.A.	N.A.	9765	14648	19530
		11.38	151.6	EB09-NC32J	EB009F	N.A.	N.A.	11340	17009	21912
		14.11	122.3	EB09-NC32J	EB009F	N.A.	N.A.	14060	21090	21912
		16.67	103.5	EB09-NC32J	EB009F	6644	9966	16611	21912	21912

NOTE: Unless otherwise specified, all capacities are in Pounds, all dimensions are in Inches, and all speeds are in Inches per Minute.
NOTE: Cells with blue shaded numbers indicate the combination of screw, motor horsepower, and gear ratio exceeds the screw and nut's dynamic load rating, or the End Block's basic dynamic capacity.

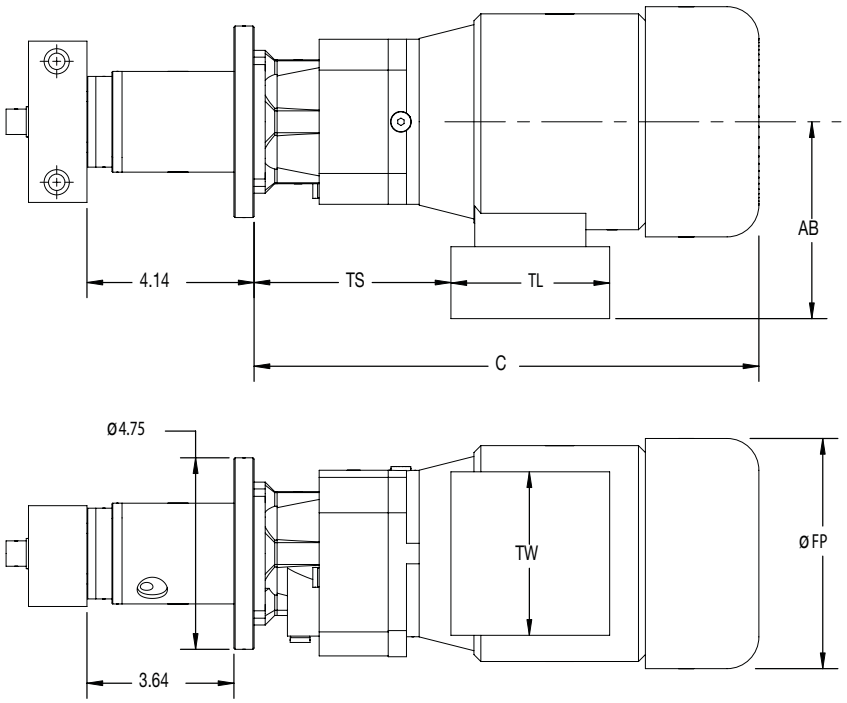
Cells with blue shaded dashes indicate the dynamic load rating has already been exceeded once per horsepower.

Cells with blue shaded N.A. indicate a combination of horsepower and gear ratio that is not advisable or not available.

Gearmotor - Screw System Dimensions

Depending on system performance requirements Duff-Norton will recommend either of two system configurations:

Screw diameters .500” to 1.17”
Systems using screw diameters within this range feature the Gearmotor close mounted to the motor flange, which is then close coupled to the screw mounted with End Blocks.
NOTE – See catalog page 77 for mounting positions

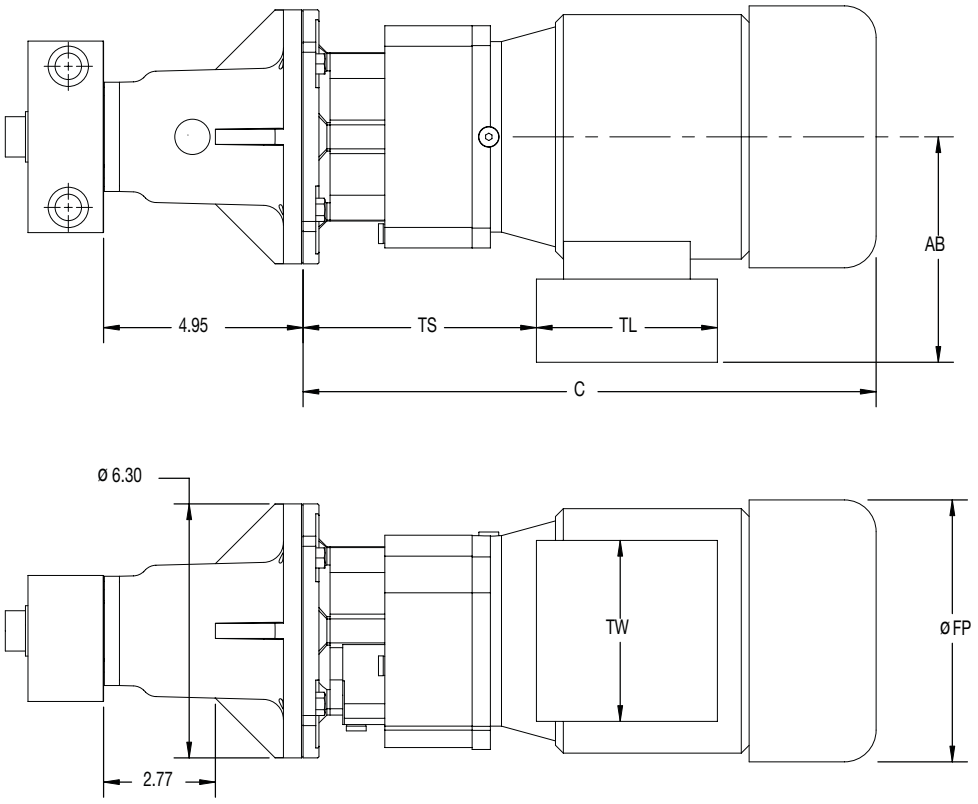


Gearmotor and Motor Flange dimensions
for .500” - .750” Acme Screws and
.500” - .631” Ball Screws.

Gearmotor and Motor Flange dimensions

NB072	FP	C	AB	TL	TW	TS	C(Brake)	AB(Brake)	TL(Brake)	TW(Brake)	TS(Brake)
1/6 HP	5.12	11.66	4.53	3.94	3.94	4.57	13.86	4.84	5.20	3.43	4.85
1/4 HP	5.12	11.66	4.53	3.94	3.94	4.57	13.86	4.84	5.20	3.43	4.85
1/3 HP	5.71	12.52	4.88	3.94	3.94	4.88	14.81	5.24	5.20	3.43	5.15
1/2 HP	5.71	12.52	4.88	3.94	3.94	4.88	14.81	5.24	5.20	3.43	5.15
NB172	**FP**	**C**	**AB**	**TL**	**TW**	**TS**	**C(Brake)**	**AB(Brake)**	**TL(Brake)**	**TW(Brake)**	**TS(Brake)**
1/6 HP	5.12	12.49	4.53	3.94	3.94	5.39	14.69	4.84	5.20	3.43	5.67
1/4 HP	5.12	12.49	4.53	3.94	3.94	5.39	14.69	4.84	5.20	3.43	5.67
1/3 HP	5.71	13.35	4.88	3.94	3.94	5.71	15.63	5.24	5.20	3.43	5.15
1/2 HP	5.71	13.35	4.88	3.94	3.94	5.71	15.63	5.24	5.20	3.43	5.15
3/4 HP	6.50	14.22	5.59	4.49	4.49	5.79	16.74	5.63	6.02	4.25	5.94
1 HP	6.50	14.22	5.59	4.49	4.49	5.79	16.74	5.63	6.02	4.25	5.94
1.5 HP	7.20	15.79	5.79	4.49	4.49	5.94	18.74	5.83	6.02	4.25	6.10
2 HP	7.20	15.79	5.79	4.49	4.49	5.94	18.74	5.83	6.02	4.25	6.10

NOTE: Unless otherwise specified all dimensions are in Inches.



Gearmotor and Motor Flange dimensions
for all 1.00” Acme Screws and
.750” - 1.17” Ball Screws.

Gearmotor and Motor Flange dimensions

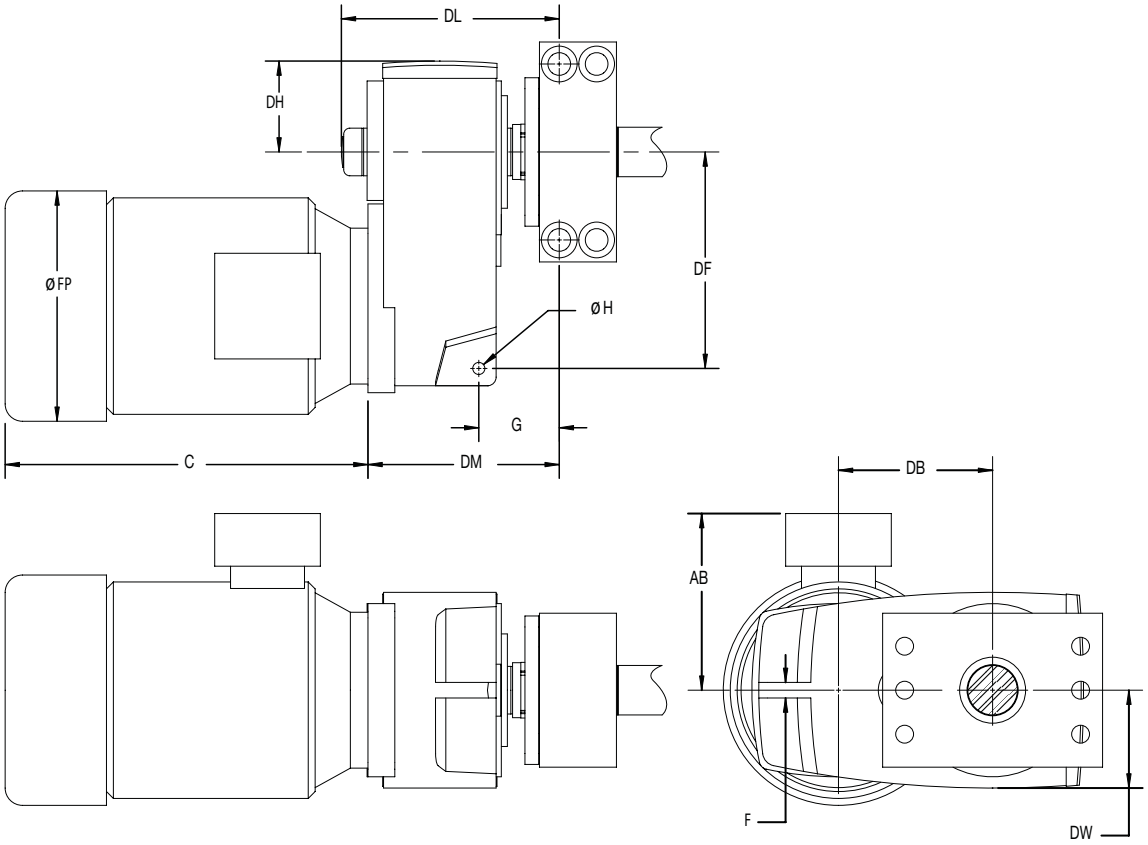
NB072	FP	C	AB	TL	TW	TS	C(Brake)	AB(Brake)	TL(Brake)	TW(Brake)	TS(Brake)
1/6 HP	5.12	11.66	4.53	3.94	3.94	4.57	13.86	4.84	5.20	3.43	4.85
1/4 HP	5.12	11.66	4.53	3.94	3.94	4.57	13.86	4.84	5.20	3.43	4.85
1/3 HP	5.71	12.52	4.88	3.94	3.94	4.88	14.81	5.24	5.20	3.43	5.15
1/2 HP	5.71	12.52	4.88	3.94	3.94	4.88	14.81	5.24	5.20	3.43	5.15
NB172	**FP**	**C**	**AB**	**TL**	**TW**	**TS**	**C(Brake)**	**AB(Brake)**	**TL(Brake)**	**TW(Brake)**	**TS(Brake)**
1/6 HP	5.12	12.49	4.53	3.94	3.94	5.39	14.69	4.84	5.20	3.43	5.67
1/4 HP	5.12	12.49	4.53	3.94	3.94	5.39	14.69	4.84	5.20	3.43	5.67
1/3 HP	5.71	13.35	4.88	3.94	3.94	5.71	15.63	5.24	5.20	3.43	5.15
1/2 HP	5.71	13.35	4.88	3.94	3.94	5.71	15.63	5.24	5.20	3.43	5.15
3/4 HP	6.50	14.22	5.59	4.49	4.49	5.79	16.74	5.63	6.02	4.25	5.94
1 HP	6.50	14.22	5.59	4.49	4.49	5.79	16.74	5.63	6.02	4.25	5.94
1.5 HP	7.20	15.79	5.79	4.49	4.49	5.94	18.74	5.83	6.02	4.25	6.10
2 HP	7.20	15.79	5.79	4.49	4.49	5.94	18.74	5.83	6.02	4.25	6.10

NOTE: Unless otherwise specified all dimensions are in Inches.

Screw diameters 1.50” to 2.50”

Systems using screw diameters within this range feature the Gearmotor with the screw mounted into the gearboxes’ hollow-bore input shaft and to the End Blocks. The installer must provide a torque reaction bracket at the hole indicated by ØH.

NOTE – See catalog page 77 for mounting positions



Gearmotor and Motor Flange dimensions

End Block	Gearbox	DB	DF	DH	DL	DM	DW	F	G	H
EB005F	NC12	4.80	6.50	2.95	7.42	6.69	3.11	0.55	3.36	0.43
EB006F	NC12	4.80	6.50	2.95	7.48	6.81	3.11	0.55	3.36	0.43
EB008F	NC22	5.79	8.31	3.47	8.01	7.07	3.94	0.63	3.41	0.55
EB009F	NC32	7.01	9.84	4.13	9.91	8.07	4.45	0.71	3.66	0.55
EB010F	NC32	7.01	9.84	4.13	10.16	8.33	4.45	0.71	3.91	0.55

Motor	FP	C	C(brake)	AB	AB(brake)
1/6-1/4 HP	4.84	7.49	9.69	4.53	4.84
1/3-1/2 HP	5.43	9.05	11.34	4.88	5.24
3/4- 1 HP	6.14	10.04	12.56	5.59	5.63
1.5- 2 HP	6.92	11.65	14.60	5.79	5.83
3 - 5 HP	7.63	12.83	16.42	6.65	6.26
7.5 -10 HP	10.16	17.12	21.34	8.03	7.72

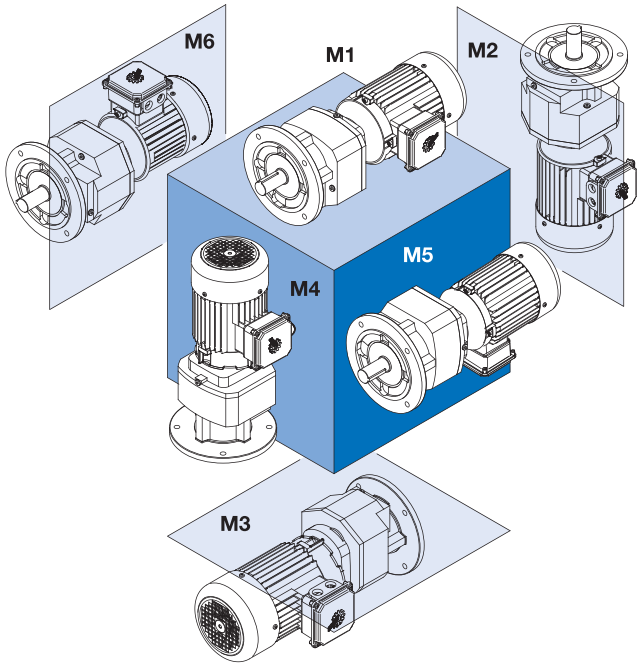
NOTE: Unless otherwise specified all dimensions are in Inches.

Mounting Positions

Because our gearmotors use oil lubrication, it is very important for us to know how the gearmotors will be mounted during use. Providing this information to us will ensure that the Level, Vent, and Drain Plugs are located on the gearbox in the position best suited for the application. Please review the provided drawings and give us the corresponding mounting code.

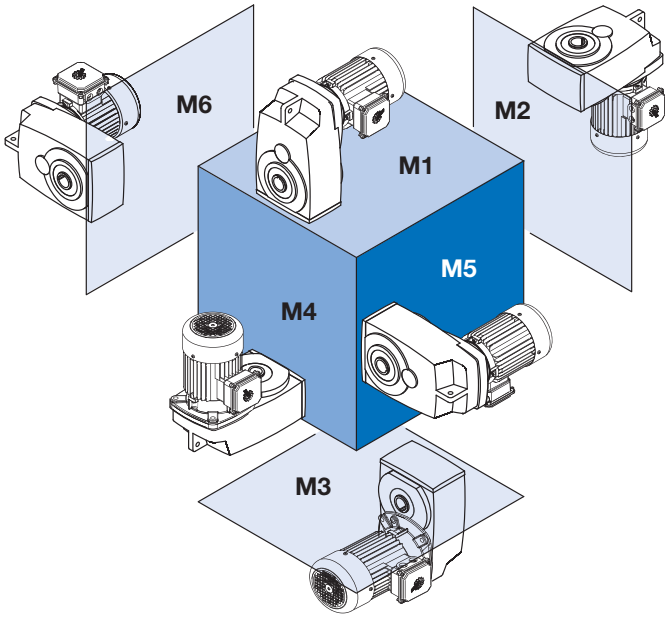
NOTE: Should the customer fail to provide this information, Duff-Norton will assume the gear box will require our standard mounting configurations shown below.

Gearmotor mounting positions for all screw diameters .500” to 1.17”



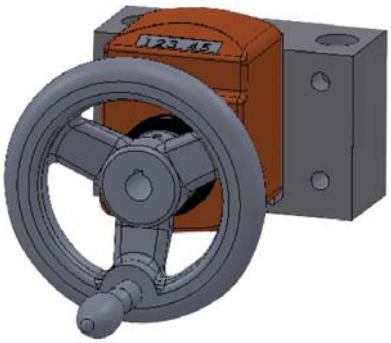
The Duff-Norton default position code for these sizes is M1.

Gearmotor mounting positions for all screw diameters 1.50” to 2.50”



The Duff-Norton default position code for these sizes is M6.

Hand Wheels



Hand Wheels and Rotary Counters can be mounted together on the same screw end to provide the user with instant positioning data. This combination can be used on one or both screw ends.

The Duff-Norton hand wheel is for customers who may require precise positioning, or may have loads which do not require motorized power to adjust.

Features

- Easy installation to the Fixed End Journal. All handwheels are bored, keyed, and set-screw drilled to the proper dimensions
- Revolving handle design for rotational ease
- Recessed hub and spoke design
- Cast iron material with chrome plating

Note: Handwheels do not contain braking systems; therefore an additional locking mechanism to prevent possible backdriving is recommended.

The table below presents dimensional information for all Duff-Norton Hand Wheels. To properly select the best hand wheel for your application, please review the provided information, or contact our customer service team.

Hand Wheel Dimensions and Selection Table

Model #	Acme Screw & Lead	Ball Screw & Lead	Hand Wheel only Journal End Size	HandWheel and Counter Journal End Size	Dia.	Width**	Bore Size	Keyway Size
HW04-.313	0.5 - all*	0.5 - all*	Type 3A - Drive End Size 00	Type 3RH - Drive End Size 00	4"	3 3/8"	0.313"	1/8 x 1/16
HW04-.406	0.63 - all*, 0.75 - all*	0.63 - all*	Type 3A - Drive End Size 01	Type 3RH - Drive End Size 01	4"	3 3/8"	0.406"	1/8 x 1/16
HW06-.562	1 - all*	0.75 - all*	Type 3A - Drive End Size 03	Type 3RH - Drive End Size 03	6"	4"	0.562"	1/8 x 1/16
HW06-.625	1 x .100	1, 1.17 - all*	Type 3A - Drive End Size 04	Type 3RH - Drive End Size 04	6"	4"	0.625"	3/16 x 3/32
HW06-.875	1.5 x .375	1.5 - all*	Type 3A - Drive End Size 05	Type 3RH - Drive End Size 05	6"	4"	0.875"	3/16 x 3/32
HW08-1.00	1.5 - all*	1.5 x 1.875	Type 3A - Drive End Size 06	Type 3RH - Drive End Size 06	8"	6 3/16"	1.00"	1/4 x 1/8

NOTE: Unless otherwise specified all dimensions are in Inches.

All leads for that diameter screw except where noted

From the end of the handle to the end of the hub

Duff-Norton offers constant speed AC Motor Controls for acme and ball screw systems. These new control systems provide the option of jogging-inching, or maintained operation, when specified as part of a Duff-Norton Linear Positioning System. Numerous options are available including short circuit protection, pilot lamps, illuminated push buttons, and loose limit switches, as well as single and three phase power up to 575 VAC. Contact Duff-Norton for all your special control applications needs. Duff-Norton can be your single source for complete linear positioning systems.
For application analysis form, see front of guide. Assembled with UL and CE listed components.

Jogging-Inching Operation with Constant Speed AC Motor

Duff-Norton Jogging-Inching AC Motor Controls provide simple operation and reliable service. The operator must hold the push button down to activate motion in a direction, and release the push button to stop motion. If the end of travel limit switch is activated while in operation, the system stops automatically.

Features

Jogging-Inching Controls Feature

- NEMA 12 Enclosure
- Full Voltage Reversing Motor Starter
- Horsepower Rated Overload Relay
- Fused Control Voltage Transformer
- Extend and Retract Push Buttons
- Customer Connection Terminal Strips
- With Fused Short Circuit Protection

AC Motor Control unit for Jogging-Inching Operation

Additional Feature Options

- End of travel limit switches are available through Duff-Norton.
- Motor short circuit protection is available through Duff-Norton.

Optional fused short circuit protection.

Maintained Operation with Constant Speed AC Motor

Duff-Norton Maintained Operation AC Motor Controls are designed for systems that do not require monitoring while in operation. To activate the system the operator must engage the pushbutton in a direction. The operation will continue until the end of travel limit switch is tripped, at which time the operation will stop. The operation can be stopped at any time by activating the stop push button.

Features

Maintained Operation Controls Feature

- NEMA 12 Enclosure
- Full Voltage Reversing Motor Starter
- Horsepower Rated Overload Relay
- Fused Control Voltage Transformer
- Extend and Retract Push Buttons
- Stop Push Button
- Customer Connection Terminal Strips

Optional circuit breaker and disconnect

Additional Feature Options

- End of travel limit switches are available through Duff-Norton.
- Motor short circuit protection is available through Duff-Norton.

Standard Features for all Control Boxes

- All starters meet or exceed IEC, UL, CSA, CE, V DE, BS and other international standards.
- All starters are built in the USA
- Full rated IEC Full Voltage Motor Starter
- 115 VAC Control Voltage Transformer with Fused Primary and Secondary on all 3-Phase Units
- Single Phase Protection of Three Phase Circuits
- Overload Trip Indication on Starter
- Interchangeable Overload Relays to Accommodate Motor Full Load Ratings
- Adjustable Overload Relays to Accommodate Full Load and Service Factor Variables
- Designed for 1.5 Million Cycles
- Compact Design -20" H x 10" W x 8" D
- Door Mounted Reset Push Button to Reset Overload Relay if Tripped without Opening the Enclosure

Optional Features for AC Motor Controls

- **Power On pilot Lamp**
The pilot lamp is mounted to the enclosure door and wired to indicate the presence of control power in the enclosure.

- **Overload Tripped Pilot Lamp**
The pilot lamp is mounted to the enclosure door and wired to indicate that the motor overload relay has tripped.

- **Loose Limit Switches**
Limit switches (2) supplied loose. NEMA 4 rated, with adjustable rollers (not rotary) for customer mounting. (Rotary switches directly mounted by the factory to the actuator are also available.)

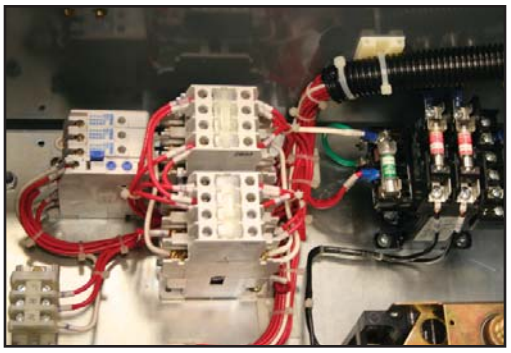
- **Fused Short Circuit Protection**
Provides fuses and fuse holders mounted and wired within the enclosure to provide motor and component protection.

- **Circuit Breaker Short Circuit Protection and Disconnect**
Provides motor and component protection and includes a door mounted and interlocked switch mechanism allowing access to panel with power off.

- **NEMA 4 Rated Enclosure and Operating Devices**
The NEMA 4 rated enclosure provides dust, dirt, and water protection in wash down duty situations such as food, drug, washing, and cleaning applications. Standard enclosure is NEMA 12 rated for dust, dirt and oil protection.

- **End of Travel Pilot Lamps**
Provides 2 pilot lamps mounted on the enclosure door and wired to indicate when the end of travel is reached. Limit switches are required for this and must be ordered separately.

- **Traveling Illuminated Push Buttons**
These provide illumination within the existing push buttons to indicate that a control in engaged.

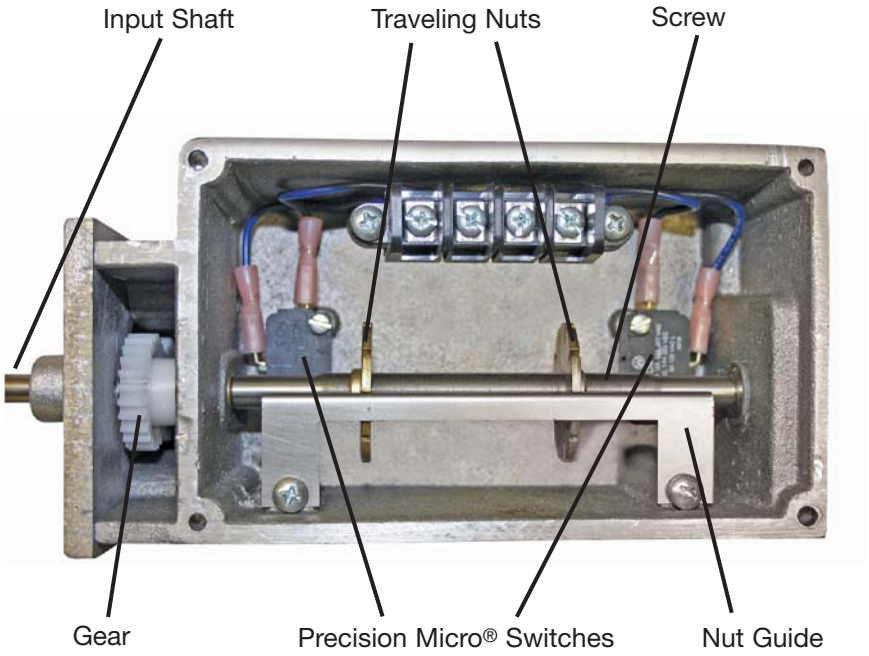


AC Motor Control unit for maintained operation equipped with optional "Power On" pilot lamp, overload tripped pilot lamp, jog/maintain selector switch, end of travel pilot lamps and travelling illuminated push buttons.

Loose adjustable roller type limit switches.

Rotary Limit Switches

Typical Rotary Limit Switch



Features

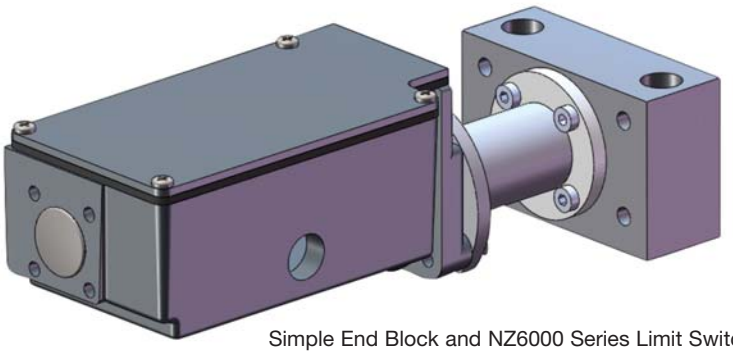
- The standard NZ6000 series switch is rated for 10A at 125-277VAC, and 1/2A at 125VDC.
- Four gear ratios to govern even the longest stroke requirements.
- Sturdy and compact. Constructed of corr-sion-resistant materials. Meets NEMA-4 water tightness requirements.
- Simple to adjust. Two switches, one for up/stop and one for down/stop, are activated by the adjustable limit-switch nuts which travel laterally when the internal screw is rotated through gear reduction.
- Operating temperature range -20° to + 150°F.
- Lifetime lubricated.
- Both Limit Switch models are available with adapters for mounting to our Simple End Blocks.

To ensure that limit switch has sufficient travel capability for the acme or ball screw system, use the following formula:

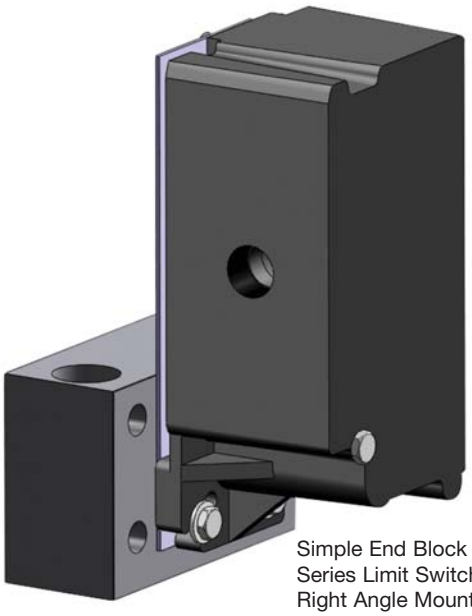
Limit Switch Turns =
Length of travel (inches) / Screw Lead

Note: For water-tight connection, use a weather-tight connector and sealant around threads. Limit switches will be damaged if overtraveled. For shipping purposes, the 1/2" NPT hole is closed with a plastic plug which is not water tight.

Mounting Configurations



Simple End Block and NZ6000 Series Limit Switch
In-Line Mounting



Simple End Block and SKA6000
Series Limit Switch
Right Angle Mounting

Limit Switch Performance Specifications

Limit Switch Model	NZ6000-1	NZ6000-2	SKA6000AT10	SKA6000AT20
Screw Lead	Max. Stroke per Limit Switch Model (inches)			
0.100	12	24	109	219
0.125	15	30	136	273
0.200	24	48	219	438
0.250	30	61	273	547
0.320	38	78	350	700
0.375	45	91	410	821
0.413	49	100	452	904
0.473	56	115	517	1035
0.500	60	122	547	1095
0.667	80	162	730	1460
0.750	90	183	821	1642
1.000	120	244	1095	2190
1.334	160	325	1460	2921

The NZ6000 series switch is appropriate for most applications and is mounted in-line to the screw. The SKA6000 series switch is required only for long screws with fine pitches (more than 244 turns) and has a right angle gear reduction. SKA6000 series switches are readily adaptable to End Block sizes EB0003S – EB0006S, and require custom adapters for other block sizes.

Limit Switch Mounting

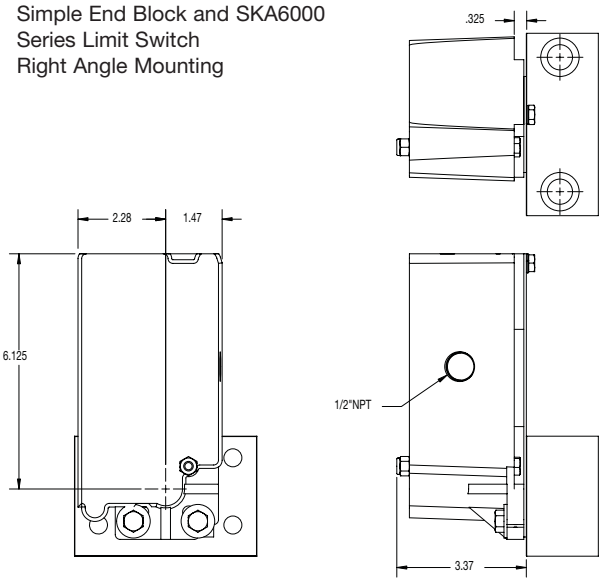
Mounting of a Limit Switch requires that the screw end be modified to provide a switch drive engagement. Specify screw journal end from the following table.

End Block	Mounting Kits	Screw Journal End
EB000S	EBLS01K	End 1A
EB001S	EBLS01K	End 1ALS
EB003S	EBLS04K	End 1B with L.S. Drill
EB004S	EBLS04K	End 1B with L.S. Drill
EB005S	EBLS06K	End 1B with L.S. Drill
EB006S	EBLS06K	End 1B with L.S. Drill
EB008S	EBLS10K	End 1B with L.S. Drill
EB009S	EBLS10K	End 1B with L.S. Drill
EB010S	EBLS10K	End 1B with L.S. Drill
EB012S	EBLS12K	End 1B with L.S. Drill

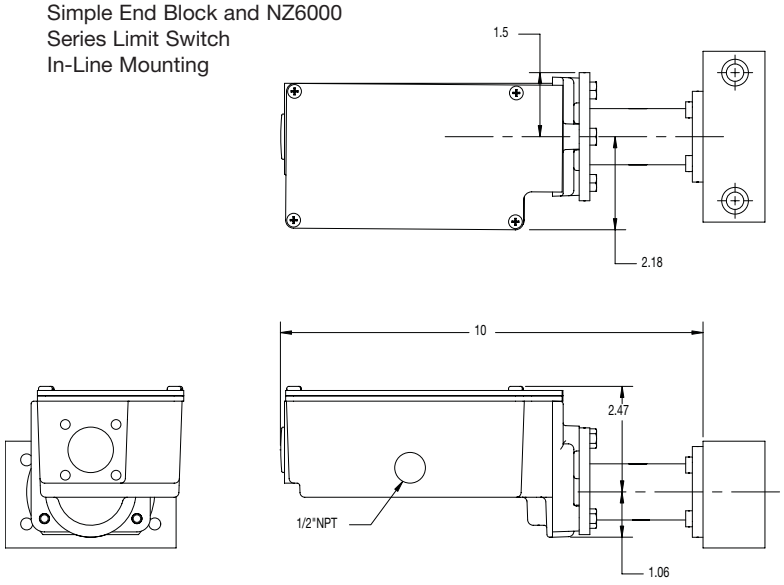
Limit Switch and End Block Dimensions

End block must be located so that the 1B screw end is flush with the face of the block. See block dimensions page 52 and page 117 for further installation instructions.

Simple End Block and SKA6000 Series Limit Switch Right Angle Mounting



Simple End Block and NZ6000 Series Limit Switch In-Line Mounting



Potentiometer/Transducer

The Duff-Norton SKA6205 Series Position Feedback Potentiometer/Transducer is designed to mount on the end of any NZ6000 or SKA6000T limit switch. Its active component is a precision potentiometer which may be used as voltage divider to provide a feedback voltage that is proportional to the acme or ball nuts position.

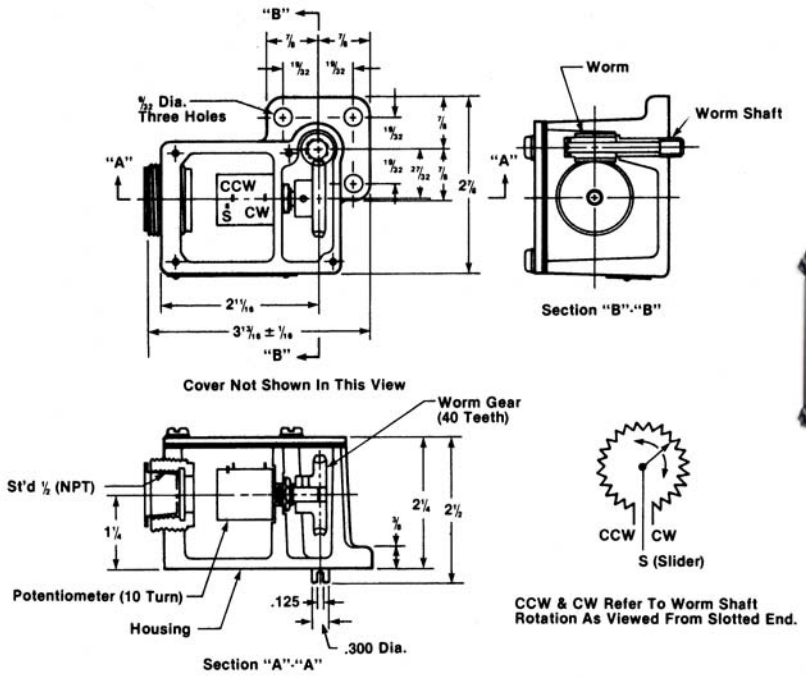
Features

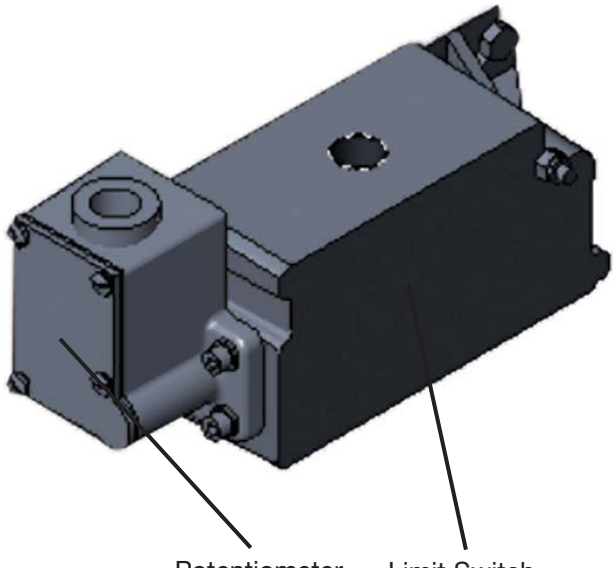
- Multiple gear ratios allow for a wide range of turns.
- Standard resistance is 5000 ohms. Other resistances are available on special order.
- Power rating: 2 watts at 40°C
- Max. service temp.: 85°C
- Interface directly with the Model SK6300-4K Digital Position Indicator to provide a scalable readout of position. The SKA6205 Series can also be used with most motor controls that have provision for potentiometer feedback signal.
- Transducer supplied with black anodized finish as standard.

Potentiometer Performance Specifications

Model	Max. Turns Potentiometer	Max. Limit Switch Turns with Pot NZ6000-1	NZ6000-2	SKA6000AT10	SKA6000AT20
SKA6205-30	30	31	64	300	600
SKA6205-50	50	52	106	500	1000
SKA6205-60	60	62	128	600	1200
SKA6205-100	100	104	213	1000	2000
SKA6205-120	120	120	240	1095	2190

The table show the turns capability of available pots, mated with limit switches. Choose a combination which most closely exceeds the application requirement.





Note: Transducer shipped unattached, to be installed at site.
Includes required mounting hardware; soldering to potentiometer required.

Digital Position Indicator for Duff-Norton Potentiometers

Features

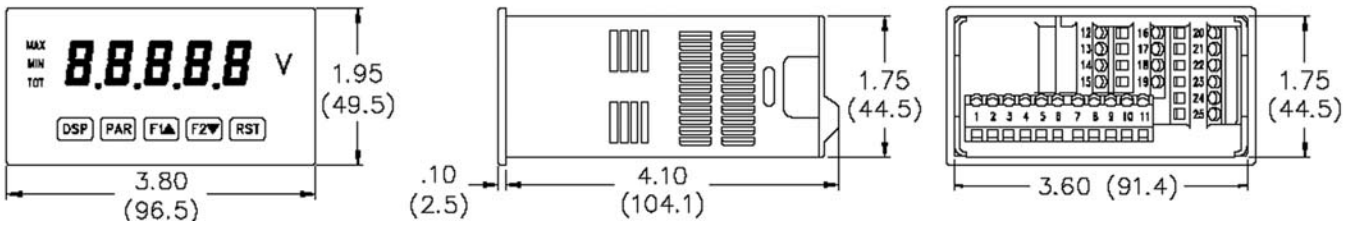
- Self scaling by inputting minimum and maximum readings – either by entering the stroke or input signal
- Accepts 1K to 10K potentiometer inputs
- Programmable decimal point location
- Input power requirement from 85 – 250 VAC
- Programmable front panel functions
- For use with Duff-Norton acme or ball screw and nut systems

c UL US LISTED IND. CONT. EQ. 51EB CE

The Duff-Norton model SK6300-4K Digital Position Indicator processes a feedback signal from a the SK6200T series potentiometer to provide position readout with user selectable scaling factor. By running the screw and nut system to two positions in its stroke and keying in the desired readout at each point, the indicator automatically scales the input signal to provide linear readout over the full travel. The SK6300-4K has a universal, 85-250 VAC power input and generates a regulated 24 VDC excitation signal to the potentiometer. The SK6300-4K operates seamlessly with any potentiometer equipped Duff-Norton screw and nut system.

DIMENSIONS In inches (mm)

Note: Recommended minimum clearance (behind the panel) for mounting clip installation is 2.1" (53.4) H x 5.0" (127) W.

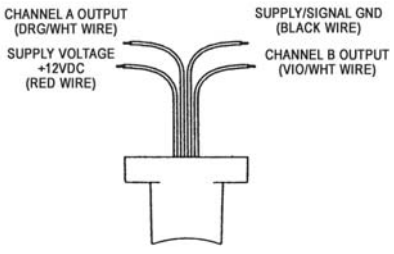


Ring Kit Encoder

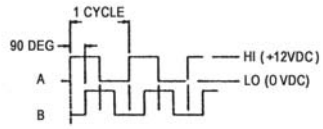
The Ring Kit Encoder counts motor revolutions and is mounted between the C-face motor and motor mounting flange. With 60 pulses per motor revolution, the ring kit offers a high pulse count relative to actuator travel. A small junction box with NPT opening is attached to the ring, allowing easy, protected electrical connections. Available for all sizes of NEMA C flanges used on Duff-Norton motorized screw and nut systems. Additional output types available. Contact Duff-Norton Application Engineering for specifics.

Specifications

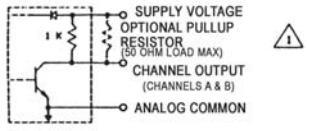
Sensor Type	Bidirectional shaft speed sensor
Pulse Per Revolution	60 cycles each channel
Supply Voltage	+12 Volts DC +/-5%
Supply Current	60 mA typical (115 mA maximum)
Output Drive Capability	250 mA per channel continuous
Maximum Load	50 ohms per channel
Frame Sizes	56C, 182C



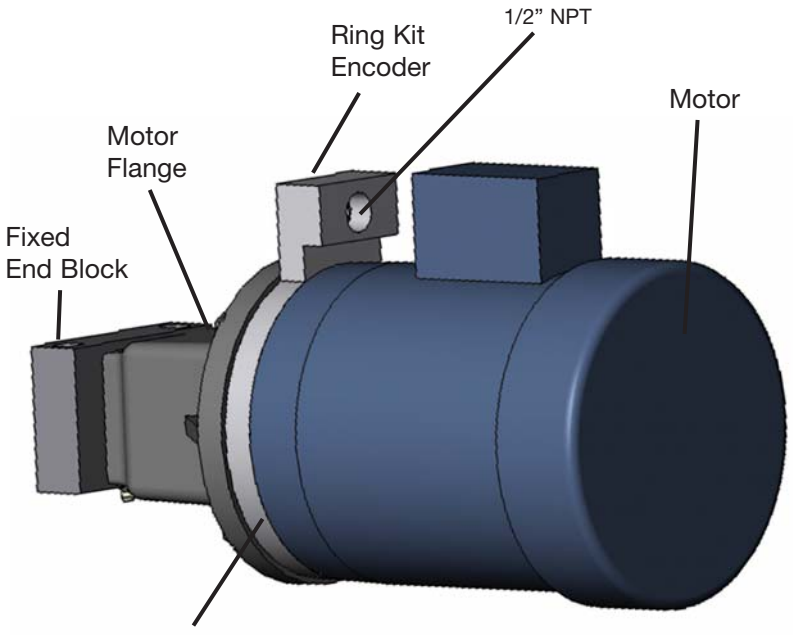
Electrical Connections



Output Channel Waveforms



Output Channel Schematic (Channels A & B)



Ring Kit Encoder width is .65".

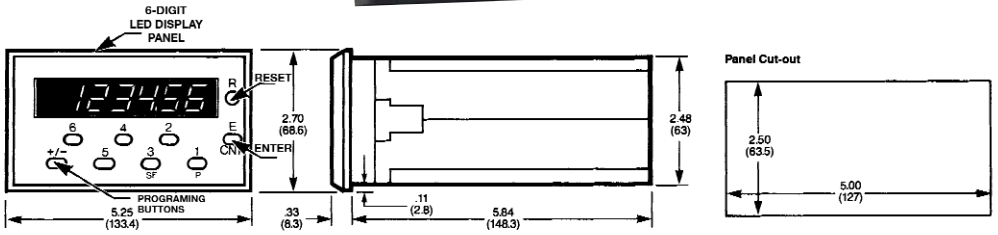
Programmable Digital Position Indicator for Duff-Norton Encoders

Displays position of acme or ball nuts in increments of up to .001", depending on PPR (Accuracy is relative to ratio and backlash. Please consult factory for details).

Features

- Five digit input scaling with 0.0000 to +/- 5.0000, programmable decimal point location and lead zero blanking.
- Two adjustable up/down output limits with 0 to +/- 999999.
- Non-volatile E2-PROM Memory retains all programmed information and count value in event of power interruption.
- Input power requirement is 115/230 VAC, 50/60 Hz.
- Can be provided with optional 20 ma. current loop to provide capability of 2-way digital communication.
- On-line self-test permits complete check of all functions and reset capability allows reset to zero from front panel.
- Compact, die cast NEMA 4 rated front panel has six digit LED display with 0.56" high characters and negative sign (-). Display convertible to English, metric or other units of measurement.
- Field Programmable front panel functions may be locked out to prevent unauthorized adjustment.
- For use in precision positioning applications with Duff-Norton acme or ball screw systems.

The Duff-Norton SK10006-35 Digital Position Indicator provides a high degree of accuracy and versatility when incorporated in acme or ball screw systems. Operating as a revolution counter, it is ideal for use in a wide range of precision positioning applications to indicate inches or millimeters of lifting screw travel. Two built-in relays act as limit switches for travel limit control. Start-up/shut-off, audio/visual warning, multiple screw system sequencing or the initiation of subsequent operations may also be controlled.
Electrical connections are made at the rear of the unit to UL recognized terminal strips. Clamp-type pressure plate terminals accept AWG-14 wire without lugs.



Stop Nuts

Modern day controls, limit switches, and encoders… are highly sophisticated. However, those controls are not always fool proof – particularly during prototype system development stages. In such cases, Duff-Norton highly recommends the use of stop nuts. **In either horizontal or vertical applications where a positive mechanical stop may be desired; the Duff-Norton stop nut is up to the task and will prevent the system from over running its limits. Stop nuts should only be used as a last resort as jamming the acme or ball nut can damage the entire system.**

Acme stop nuts are machined with female acme threads. Ball stop nuts are machined to a ball thread form designed to mate with the ball screws' threads. Both Acme and Ball stop nuts are also drilled and tapped for an appropriately sized half dog set-screw. Typical stop nut installation on an Acme or Ball Screw involves lightly drilling into the screws' surface to pilot the half dog set-screw during stop nut installation.

Stop nuts are available for most screw diameters and leads. Contact our customer service group for more information as to how to include stop nuts in your application.

Acme stop nuts are machined with female acme threads.

Ball stop nuts are machined to a ball thread form designed to mate with the ball screws' threads.

Safety Nuts

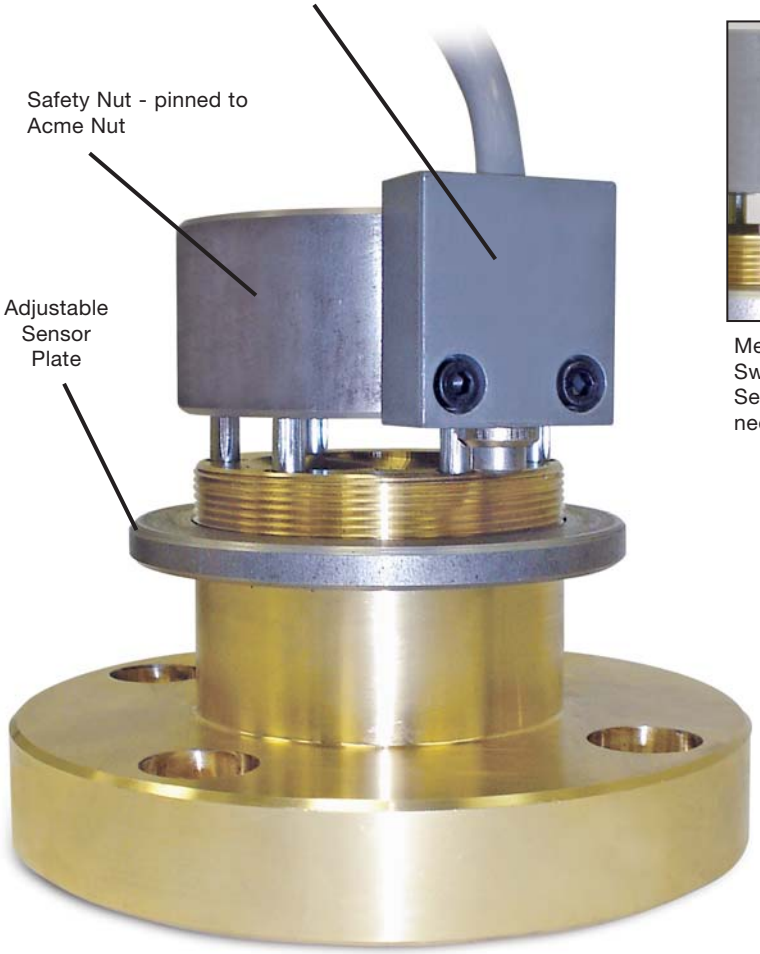
The Duff-Norton safety nut is highly recommended for vertical applications where the load must be maintained. The safety nut is pinned to the acme or ball nut and can be supplied with either a mounted proximity switch or mechanical switch.

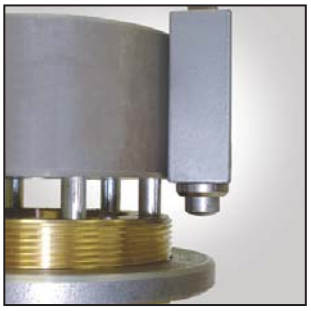
Proximity Safety Nuts - The desired distance between the safety nut and acme or ball nut is established during installation. When the acme nut threads or ball nut bearing balls begin to wear, the distance between the acme and/or ball nut and the safety nut changes and the proximity switch sends a warning signal to the system controls.

Mechanical Safety Nuts – This system uses a mechanical switch mounted to the safety nut. The system is installed with the mechanical switch in a compressed or un-compressed state. When the acme or ball nut begins to wear the distance between the safety and acme or ball nut increases and the mechanical switch compresses or decompresses which sends a warning signal to the system controls.

Safety nuts are available for most screw sizes. Safety Nut installation can be to either end of the acme nut, and to the flange end of a ball nut.

Safety Nut threads are machined to a slightly larger tolerance than are the acme or ball nut threads. This larger tolerance allows the acme or ball nut to rotate freely around its respective screw with the safety nut still performing its function.





Mechanical or Proximity Switches can be used. Sensor plate may not be needed in some designs.

Acme or Ball systems are available for many applications.

Safety nut can be machined to accomodate a customer supplied switch.

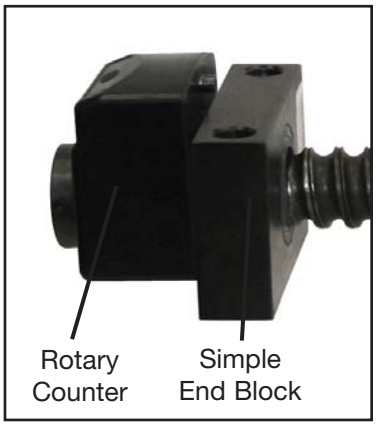
Rotary Counters

The Duff-Norton Rotary Counter is for customers who are looking for an easy way to determine an acme or ball nuts' position along the screw. Our counter ratios have been designed to match the most common screw leads. An operator viewing the reading in the display window will know the nuts' approximate position because the counter's display shows stroke to the nearest 1000ths of an inch up to 99 inches of travel. Custom numeric displays are also available.

Features

Some of the more important features are:

- Display readings have been pre-matched to the screw lead.
- Display reading has been extended to the nearest 1000ths of an inch.
- Clockwise and counter clockwise models available.
- Easy mounting kits available.

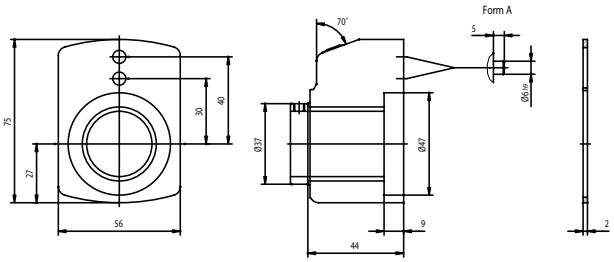


Note: Rotary Counters and Hand Wheels can be mounted on the same screw end. See page 78 for details.

Rotary Counter Performance Specifications

Model# Clockwise rotation	Turns Per Inch	Acme & Ball Screw Leads (In)
RC01R	1	1.00
RC02R	2	.500
RC04R	4	.250
RC05R	5	.200
RC10R	10	.100
Counter clockwise rotation		
RC01L	1	1.00
RC02L	2	.500
RC04L	4	.250
RC05L	5	.200
RC10L	10	.100
*Contact our Customer Service for screw leads which are not even T.P.I.		

Rotary Counter Dimensions



Note: All dimensions in millimeters

Rotary Counters – Mounting Information

The Duff-Norton Rotary Counter fits over one of the screws Journal Ends with drive extension. A special bushing fills dimensional difference between the counters' bore and the journal ends drive diameter (see table). The user should make provisions to provide some mechanism to prevent the counter from rotating along the screw's shaft

Installation Information

Bushing #	Acme Screw & Lead	Ball Screw & Lead	Journal End Size
BU10-.313	0.5 - all*	0.5 - all*	Type 1A - Drive End Size 00
BU10-.406	0.63 - all*, 0.75 - all*	0.63 - all*	Type 1A - Drive End Size 01
BU10-.562	1 - all*	0.75 - all*	Type 1A - Drive End Size 03
BU10-.625	1 x .100	1- all*	Type 1A - Drive End Size 04
BU10-.875	-	1.5 - all*	Type 1A - Drive End Size 05
BU10-1.00	1.5 - all*	-	Type 1A - Drive End Size 06
All leads for that diameter screw except where noted			

Linear Motion Components

Duff-Norton offers all of the components necessary to complete your linear motion system, whether it consists of a single actuator or multiple screw and nut arrangements. We offer a complete line of accessories to interconnect two or more screw and nut systems and provide permanent synchronization. Duff-Norton's Application Engineers can specify shafts, couplings, end blocks, pillow blocks, and right-angle miter gearboxes to accommodate any layout. Bellows boots to protect screws from dirt and other contaminates are available for all systems, to increase life and reduce maintenance requirements.

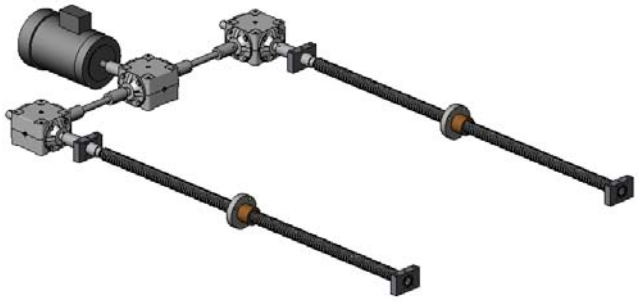
The following pages outline the basic selection of power transmission components that can be utilized to assemble a system. The tables match the parts to their respective actuator sizes to assist selection.

By letting Duff-Norton be your sole source for actuator system components, you can consolidate your needs on one purchase order, reducing time spent sourcing, pricing, and receiving parts. Should you have questions, contact our customer service representatives. Duff-Norton's extensive experience with linear motion can provide you with suggestions for the most economical and reliable application solutions.

Typical System Arrangements

1.

2.



3.

4.

Mitre Boxes

Screw and nut systems can use multiple arrangements. Such systems could use mitre boxes to effectively position and equally distribute loads. As the mitre boxes are supplied with 1:1 gear ratios as standard, all motion is synchronous upon system actuation through the main drive shaft.

Features

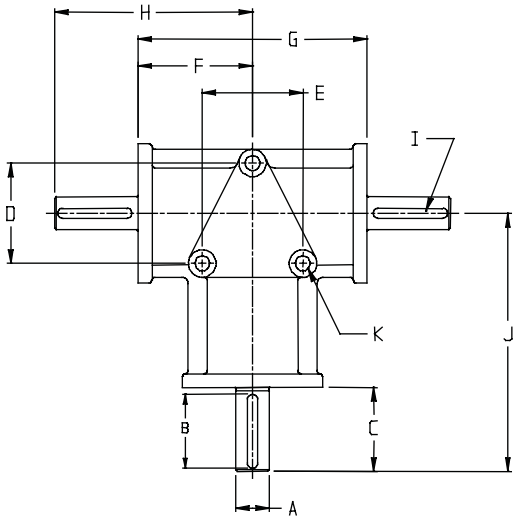
- 98% average efficiency ratings
- Carburized and case hardened bevel gears
- Alloy steel input/output shafts for greater strength
- Anti-friction bearings on all shafts
- MB-4 and MB-8 models come with lifetime lubrication, stainless steel shafts and aluminum housings

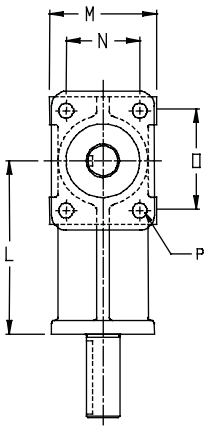
Mitre Box Performance Specifications

Part #	Type	Capacity (inch lbs)	Shaft Diameter
MB-4	3 Way	23	.375"
MB-8	3 Way	97	.75"
MB-16	3 Way	344	.625"
MB-19	3 Way	1400	1.0"
MB-19G	4 Way	1400	1.0"
MB-20	3 Way	3000	1.25"
MB-20G	4 Way	3000	1.25"
MB-22	3 Way	5000	1.375"
MB-22G	4 Way	5000	1.375"

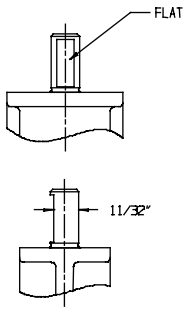
Our mitre boxes feature a compact design, which eliminates the need for an extended hub. With this design feature the bevel gear is supported by tapered roller bearings on both sides. The result is a higher horsepower rating, increased service-life, improved lubrication, and more flexible mounting compared to other brands.

Model	Torque	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
MB-4	23	0.375	0.625	0.781	1.938	1.938	1.375	2.75	2.156	FLAT	2.938	0.219	2.156	1.25	0.875	1.188	0.188
MB-8	97	0.75	1.375	1.563	3	3	3	6	4.563	3/16"	6.563	0.375	5	3	2.25	3	0.375





Mitre Box Dimensional Specifications

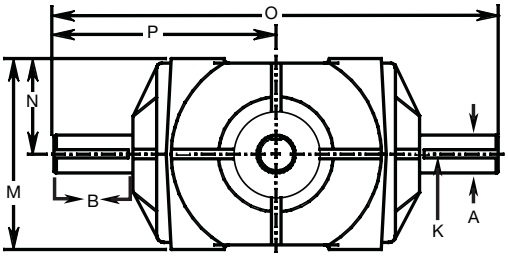


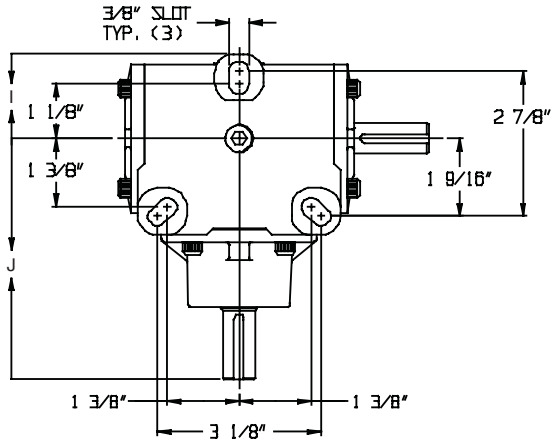
NOTE: Shaft extensions can be either keyed or flat

Mitre Box Dimensional Specifications

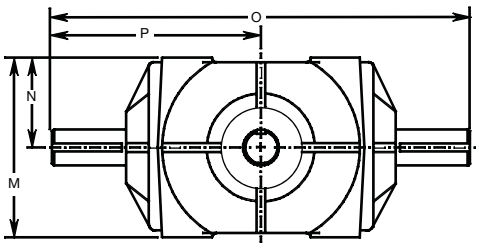
Model	Torque	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
MB-16	344	0.625	1.219	1.375						1.688	4.875	3/16"		3.188	1.594	7.25	3.625

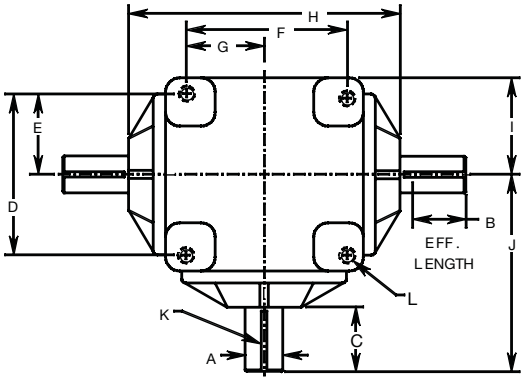
Note: Standard model is a 3-way configuration
B: Effective keyway length





Model	Torque	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
MB-19 (G)	1400	1	1.396	2	4.25	2.125	4.25	2.125	7	2.75	5.5	¼"	3/8"-16	4.125	2.062	11	5.5
MB-20 (G)	3000	1.25	1.84	2.5	4.5	2.25	4.5	2.25	8	2.875	6.5	¼"	½"-13	5.625	2.813	13	6.5
MB-22 (G)	5000	1.375	2.17	2.938	6	3	6	3	10.625	4.125	8.25	5/16"	½"-13	7.5	3.75	16.5	8.25

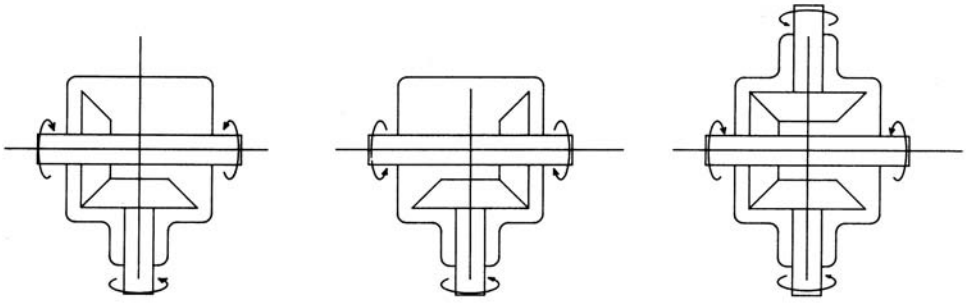




Mitre Box Shaft Rotation

The direction of rotation of a connecting shaft can be controlled either by selecting clockwise or counter-clockwise mitre box rotation. The sketches above show how either a C.W. or C.C.W. rotation is obtained. Both the depicted 3-way boxes are identical except for the position of the mitre gear on the drive shaft.

The C.W. rotation is most common on both the 3-way and 4-way configurations and is the standard rotation for all Duff-Norton mitre boxes. For more information regarding mitre box shaft rotation please contact our customer service team.



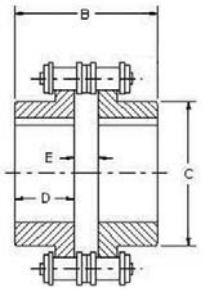
Duff-Norton provides three coupling types which have been tailored to specific screw and nut system requirements:

Features

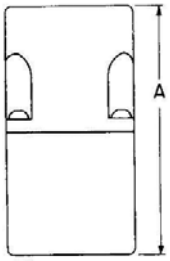
Chain Coupling:

- Integrate well with Duff-Norton mid and larger diameter screw and nut systems
- High torque capacities
- Standard ANSI dimensions, straight bore diameters
- Common bore diameters readily available
- Special bore diameters may be custom ordered
- Long service lives
- Easy fit onto the screw's end
- Allows for incremental system adjustments

Coupling with cover



Coupling



Cover

Chain Coupling Specifications

Part #	Standard Bore***	Maximum Bore	Key Broach Dimensions	A*	B	C	D	E	Coupling Torque	Misalignment (Max) Parallel	Angular
CP03-500500	.500"	.875"	.125" x .63"	4.00"	2.53"	1.41"	1.13"	.28"	1354	.015	1/2 deg.
CP03-625625	.625"	.875"	.125" x .63"	4.00"	2.53"	1.41"	1.13"	.28"	1354	.015	1/2 deg.
CP05-750750	.750"	.875"	.1875" x .093"	4.00"	2.53"	1.41"	1.13"	.28"	1354	.015	1/2 deg.
CP20-10001000	1.000"	1.687"	.25" x .125"	5.13"	3.25"	2.50"	1.44"	.38"	4614	.015	1/2 deg.
CP35-13751375	1.375"	2.000"	.313" x .156"	5.13"	3.75"	2.97"	1.69"	.38"	5969	.015	1/2 deg.
CP50-15001500	1.500"	2.437"	.375" x .1875"	6.38"	4.23"	3.50"	1.88"	.47"	10899	.015	1/2 deg.

*Includes two hubs, four rubber gaskets, chain, and cover
***Tolerance for all bores is +.001/-.000
NOTE: Duff-Norton recommends using the cover assembly with the chain coupling

Coupling Selection Guide:

1. Flexible couplings are made up of components. Two hubs each with a bore and keyway to match the shafts being coupled and a chain cover (for chain couplings) or a sleeve kit (for gear-type couplings) or a spider (for jaw-type couplings). The bores in the coupling hubs are sized to give an easy fit on screw's end.

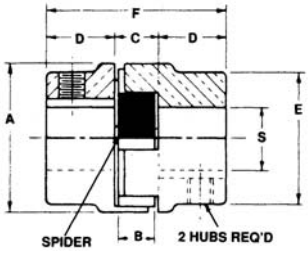
2. Determine required coupling torque with this formula: **Torque Requirement per Screw System X Number of Screws to Be Driven by the Coupling**

3. Verify the required coupling torque. Make sure it's not greater than the maximum rating in the accompanying coupling tables.
4. Chain or full-flex gear couplings are recommended for close coupled arrangements.
5. Chain or flex-rigid gear couplings are recommended for floating shaft arrangements with the rigid hub (if selected) mounted to the floating shaft.
6. For maximum performance, the screws, shafts, gear boxes and motor should be carefully aligned.

Features

Jaw Coupling:

- Integrate well with Duff-Norton smaller diameter screw and nut systems
- Do not require lubrication
- Our Hytrel® spiders provide 2 times the torque capability vs. a standard urethane or BUNA® spider
- Easy fit onto the screw's end
- Other sizes for our standard journal ends are available



Jaw Coupling Specifications

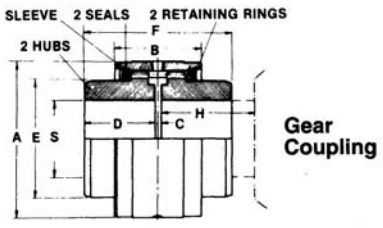
Part # Hub#	Part # Spider #	Standard Bore***	Maximum Bore	Key Broach Dimensions	A*	B	C	D	E	F	Coupling Torque	Misalignment (Max) Parallel	Misalignment (Max) Angular
SK2555H2	SK2555-29S	.375"	.875"	None	1 5/64	7/16	15/32	5/8	1 5/64	1 23/32	50	.015	1/2 deg.
SK2402J-H1	SK2402-JS	.501	1.687"	.125" x .63"	1 3/4	15/32	1/2	13/16	1 3/4	2 1/8	250	.015	1/2 deg.
SK2402J-H2	SK2402-JS	.626"	1.687"	.1875" x .0938"	1 3/4	15/32	1/2	13/16	1 3/4	2 1/8	250	.015	1/2 deg.

*Includes two hubs, and Hytrel spider
**Based on screw's dynamic torque requirements
***Tolerance for all bores is +.001/-.000

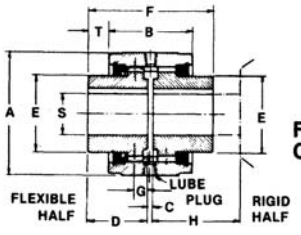
Features

Full-Flex and Flex-Rigid Gear Couplings:

- Give great strength under load due to compact design and construction.
- Allow for incremental system adjustment.



Gear Coupling



Flex—Rigid Coupling

Gear Coupling Performance Specifications

Sleeve Kit	Part # Flex Hub	Rigid Hub	Standard Bore***	Key Broach Dimensions	A*	B	C	D	E	F	H	Coupling Torque	Misalignment (Max) Parallel	Misalignment (Max) Angular
SK2405S	SK2405H	SK2404H	.0751	.1875" x .0938"	3 5/16	2	1/8	1 1/2	2	3 1/8	2 1/8	6300	+	1/2 deg.
SK2410S	SK2410H	SK2409H	1.001	.25" x .125"	3 5/16	2	1/8	1 1/2	2	3 1/8	2 1/8	6300	+	1/2 deg.
SK2425S	SK2425H	SK2424H	1.376	.313" x .156"	3 3/4	2 17/32	1/8	1 13/16	2 3/8	3 3/4	2 21/32	18900	+	1/2 deg.
SK2450S	SK2450H	SK2449H	1.501	.375" x .1875"	3 3/4	2 17/32	1/8	1 13/16	2 3/8	3 3/4	2 21/32	18900	+	1/2 deg.
SK2499S	SK2499H	SK2498H	1.751	.50" x .25"	4 3/4	2 9/16	1/8	2 1/16	3 1/4	4 1/4	2 11/16	50000	+	1/2 deg.

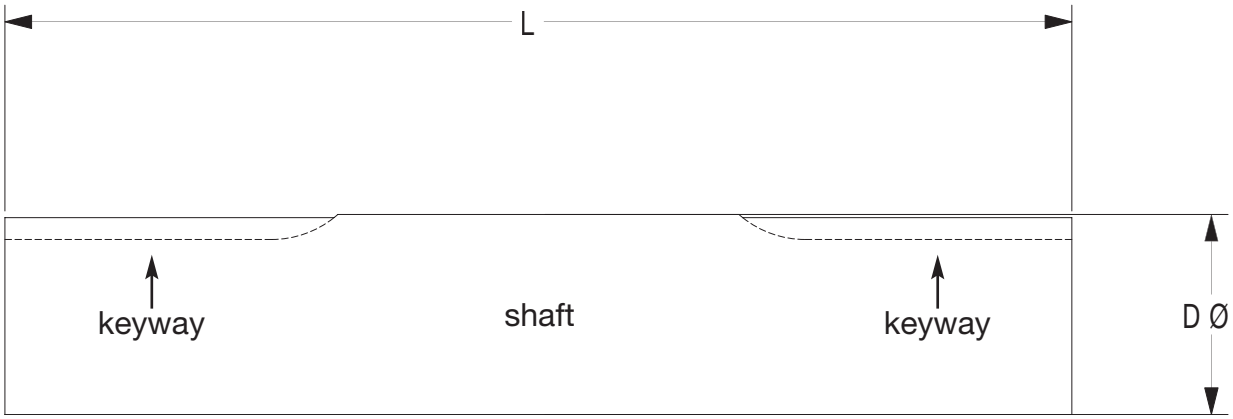
*Includes two hubs, gaskets, and sleeve
**Based on screw's dynamic torque requirements
***Tolerance for all bores is +.001/-.000

Problem Scenario – A common system operating problem stems from connecting shafts made from standard steel, which are often bowed or out-of-round. This results in a whipping effect while the system is being run with the connecting shaft working its way loose form the system at high speeds and doing a great deal of damage to the system's equipment.

Solution – Duff-Norton connecting shafts, which are furnished with close tolerance Turned, Ground, and Polished steel for smooth rotation.

Features

- Turned, Ground, and Polished steel
- Shaft material is machined from cold-drawn bar
- Furnished with ANSI-standard in-line keyways



Dimensions and Minimum Size

Model		SH50	SH63	SH75	SH100	SH125	SH150	SH163	SH175	SH200	SH225	SH250
Minimum Shaft Length* "L" (in.)		5	5	5	5	6	7	7	7	8	10	10
Shaft Diameter "D" (in.)	Nominal	1/2	5/8	3/4	1	1 1/4	1 1/2	1 5/8	1 3/4	2	2 1/4	2 1/2
	Actual	0.500	0.625	0.750	1.000	1.250	1.500	1.625	1.750	2.000	2.250	2.500
		0.499	0.624	0.749	0.999	1.249	1.499	1.624	1.749	1.999	2.247	2.497
Keyway Width (in.)		1/8	3/16	3/16	1/4	1/4	3/8	3/8	3/8	1/2	1/2	5/8
Keyway Flat (in.)		1.25	1.25	1.25	1.25	1.5	1.75	1.75	2	2	2.5	2.5

NOTE: Minimum shaft length may vary depending on the specified coupling.

Shaft selection criteria

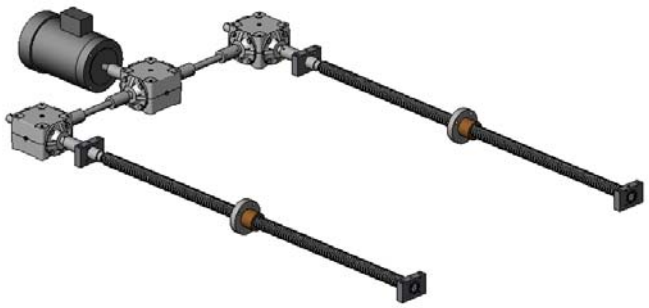
Instructions:

1. Find a torque value that is greater than or equal to your calculated torque requirements.
2. Use the second column to find the required shaft diameter (rounding up is recommended.)
3. Check the third column for the maximum allowable shaft span before supports are required.
4. Match your selected shaft's maximum allowable speed (rpm) to actual shaft speed (rpm). Increasing your selected shaft size is recommended until it falls into the allowable range.

Typical Shaft Torque (Inch/Lbs.)	Nominal Shaft Diameter* (Inches)	Maximum** Distance Between Supports (Inches)	RPM's Not to Exceed ***										
			Typical Shaft Lengths: (Inches)										
			36	48	60	72	84	96	108	120	132	144	156
20	0.51	54.60	1802	1014	649	450	331	253	200	162	134	113	96
40	0.73	61.30	2143	1205	771	536	394	301	238	193	159	134	114
50	0.81	65.50	2372	1334	854	593	436	333	264	213	176	148	126
80	0.87	68.80	2548	1433	917	637	468	358	283	229	190	159	136
100	0.92	71.40	2695	1516	970	674	495	379	299	243	200	168	143
150	1.01	76.30	2982	1677	1074	746	548	419	331	268	222	186	159
200	1.09	80.10	3204	1802	1154	801	589	451	356	288	238	200	171
250	1.15	83.10	3388	1906	1220	847	622	476	376	305	252	212	180
300	1.21	85.70	3546	1995	1277	887	651	499	394	319	264	222	189
350	1.25	87.90	3686	2073	1327	921	677	518	410	332	274	230	196
400	1.30	89.90	3811	2144	1372	953	700	536	423	343	283	238	203
450	1.34	91.70	3925	2208	1413	981	721	552	436	353	292	245	209
500	1.37	93.30	4029	2266	1451	1007	740	567	448	363	300	252	215
600	1.44	96.20	4217	2372	1518	1054	775	593	469	380	314	264	225
700	1.49	98.70	4383	2465	1578	1096	805	616	487	394	326	274	233
800	1.54	100.90	4532	2549	1631	1133	832	637	504	408	337	283	241
900	1.59	102.90	4667	2625	1680	1167	857	656	519	420	347	292	249
1000	1.63	104.70	4792	2695	1725	1198	880	674	532	431	356	299	255
1250	1.72	108.70	5067	2250	1824	1267	931	712	563	456	377	317	270
1500	1.80	112.00	5303	2983	1909	1326	974	746	589	477	394	331	282
1750	1.92	114.90	5511	3100	1984	1378	1012	775	612	496	410	344	293
2000	1.94	117.50	5698	3205	2051	1425	1047	801	633	513	424	356	303
2250	2.00	119.80	5869	3301	2113	1467	1078	825	652	528	437	367	313
2500	2.05	122.00	6025	3389	2169	1506	1107	847	669	542	448	377	321
3000	2.15	125.70	6306	3547	2270	1577	1158	887	701	568	469	394	336
3250	2.19	127.40	6434	3619	2316	1608	1182	905	715	579	479	402	343
3500	2.23	129.00	6554	3687	2359	1639	1204	922	728	590	487	410	349
4000	2.31	131.90	6776	3812	2440	1694	1245	953	753	610	504	424	361
4500	2.38	134.50	6979	3926	2512	1745	1282	981	775	628	519	436	372
5000	2.44	136.90	7165	4030	2579	1791	1315	1008	796	645	533	448	382
6000	2.55	141.10	7499	4218	2700	1875	1377	1055	833	675	558	469	399
7000	2.65	144.80	7794	4384	2806	1949	1432	1096	866	701	580	487	415

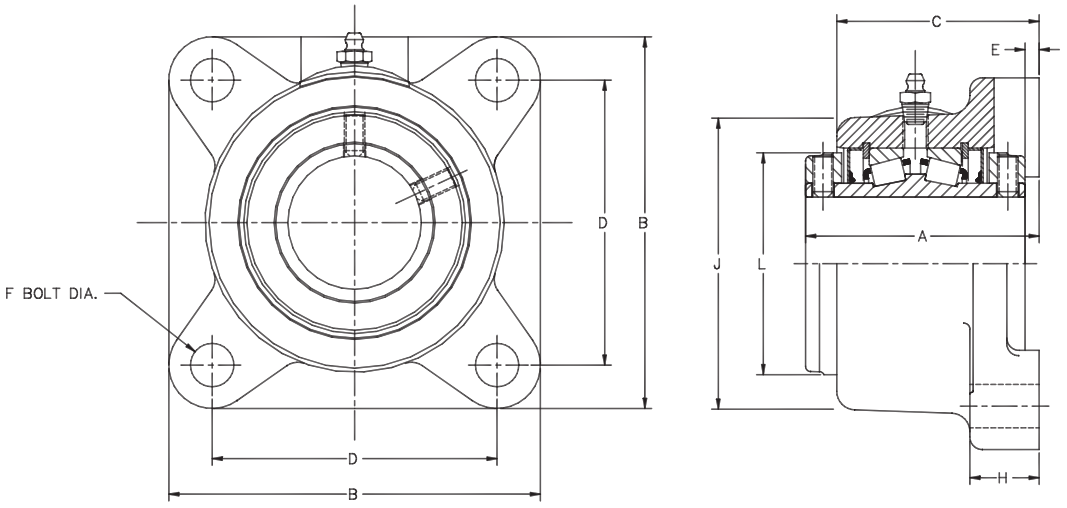
Note: Shaded area exceeds maximum distance between supports. Additional support is required.
* Shaft diameter is based on 0.08 degrees twist per foot of length.
** Maximum distance between supports is based on a maximum allowable deflection of 0.01 inches per foot of length.
*** Maximum allowable RPM's is based on 80% of critical shaft speed.

Duff-Norton provides a wide assortment of Flange Blocks designed to operate with our screw and nut systems. Flange Blocks lock on to the end of the screw, and can then be bolted on to the machine or fixture. This simple screw support ensures that the load being carried by the acme or ball nut is properly guided.



Features

- Double row tapered roller bearings.
- ASTM A48 Class 30 Iron with tensile strength of at least 30,000psi.
- Dust seals.
- Set-screw locks – to properly secure screws or shafts regardless of rotation direction.



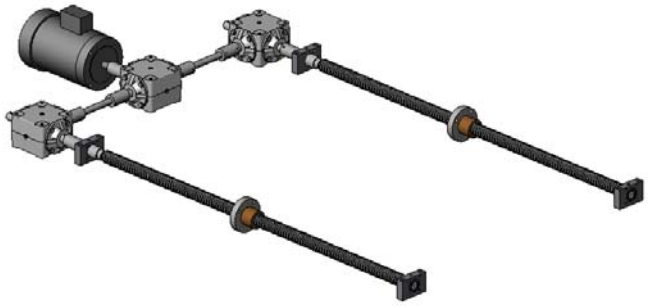
Flange Block Dimensional Specifications

Screw Diameter	Duff Part#	Shaft Size (In)	# Base Holes	A	B	C	D	E	F Bolt Dia	H	J	L	Weight
3.00	FB250	2.50	4	4	6-7/8	3-9/16	5-3/8	3/16	5/8	1-1/2	5-5/16	4-1/16	19
3.75	FB300	3.00	4	4-1/2	7-3/4	3-15/16	6	3/16	3/4	1-5/8	6	4-23/32	26
4.00	FB325	3.25	4	5	9-1/4	4-1/2	7	1/4	3/4	1-7/8	7-1/4	5-1/2	51
4.50	FB350	3.50	4	5	9-1/4	4-1/2	7	1/4	3/4	1-7/8	7-1/4	5-1/2	50
5.00	FB400	4.00	4	6-1/4	10-1/4	5-5/8	7-3/4	1/4	7/8	2-1/8	8-1/4	6	75

Note: Flange blocks are suited to function as Simple End supports only, not as thrust load bearings. All sizes use a 1/8-27 NPT hydraulic grease fitting.

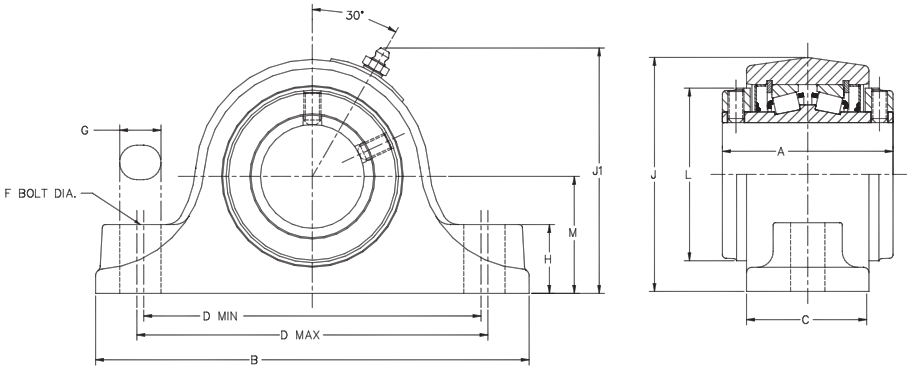
Pillow Blocks

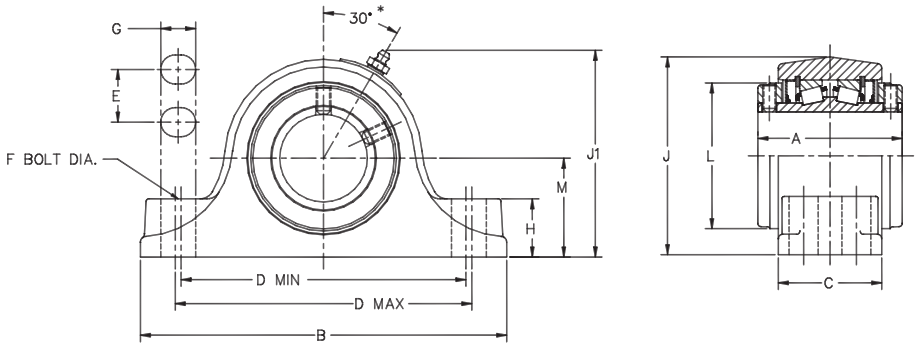
Duff-Norton provides a wide assortment of Pillow Blocks designed to operate with our screws and nuts, shafts, and couplings meeting a wide range of system requirements. Pillow Blocks may be used in any shafting configuration for additional shaft support, but are specifically required when the shaft length exceeds the dimensions listed in our shaft selection tables.



Features

- Double row tapered roller bearings.
- ASTM A48 Class 30 Iron with tensile strength of at least 30,000psi.
- Dust seals.
- Set-screw locks – to properly secure screws or shafts regardless of rotation direction.





Pillow Block Dimensional Specifications

Screw Diameter	Duff Part#	Shaft Size (In)	# Base Holes	A	B	C*	D (Min / Max)		E	F Bolt Dia	G	H	J	J1	L	M	Weight
3.00	PB250	2-1/2	2	4	10-1/2	2-7/8	8-3/8	8-5/8	NA	5/8	7/8	1-5/8	5-1/2	5-5/8	4-1/16	2-3/4	20 lbs.
3.75	PB300	3	2	4-1/2	12	3	9-5/16	9-11/16	NA	3/4	1	1-7/8	6-1/4	6-11/32	4-23/32	3-1/8	27 lbs.
4.00	PB325	3-1/4	2	5	14	3-1/2	10-13/16	11-3/16	NA	7/8	1-3/16	2-1/4	7-1/2	7-1/2	5-1/2	3-3/4	47 lbs.
4.50	PB350	3-1/2	2	5	14	3-1/2	10-13/16	11-3/16	NA	7/8	1-3/16	2-1/4	7-1/2	7-1/2	5-1/2	3-3/4	45 lbs.
5.00	PB400	4	4	6-1/4	15-1/4	4-1/2	12-1/4	12-3/4	2-1/4	3/4	1-1/8	2-7/16	8-7/16	8-1/2	6	4-1/4	69 lbs.
6.00	PB500	5	4	7-1/4	18-1/2	5-1/8	15-1/4	15-3/4	2-7/8	7/8	1-1/4	3	10-11/16	10-7/8	7-29/64	5-1/2	133 lbs.
7.00	PB600	6	4	9	22	6-1/4	17-3/8	19-1/8	3-3/4	1	2	3-1/4	----	13-3/16	9-3/8	6-11/16	245 lbs.
9.00	PB700	7	4	10-1/2	26	7-1/8	21-1/4	23-1/4	4-5/8	1	2	3-11/16	----	14-15/16	11-3/8	7-1/2	335 lbs.

Note: Pillow blocks are suited to function as Simple End supports only, not as thrust load bearings. All sizes use a 1/8-27 NPT hydraulic grease fitting.

Bellows Boots

2 boots, one on either side of the acme or ball nut are recommended for most applications. Either a collar or flange end can be supplied can be supplied as needed. Adjustable hose clamps are provided to secure the boots to the nut.

Duff-Norton highly recommends the use of a bellows boot for most screw & nut applications. Duff-Norton can provide bellows boots for the most stringent application requirement.

Features

Some of the more important features are:

- New compact O.D. to I.D. dimensions
- Protects the lifting screw from: dust, dirt, moisture.
- Standard bellows boots are made of 33NN neoprene coated nylon with sewn construction, and are thicker than most boots provided by other sources.
- Special bellows boots can be provided with a variety of materials for applications:
  - High temperatures,
  - Corrosive atmospheres
  - UV / Outdoor environments
  - Bacteria resistance
- Bellows boots can also be provided with internal or external guides to prevent sagging, and with zippers for easy installation or removal.
- Flange End boots are provided with an aluminum back-up plate of the same OD to ensure secure mounting.
- Helps maintain the proper lubrication.

Application Example

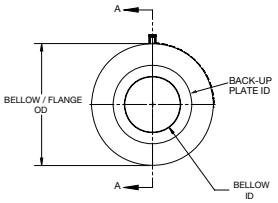
To accurately determine the ratio for expanded boot length versus compressed boot length follow this example.

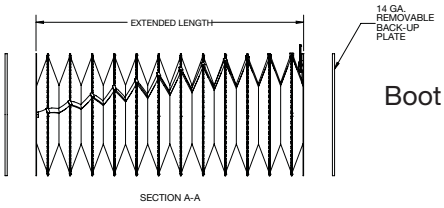
Expanded sleeve boot length – 2 ft.
Compressed sleeve boot length – 3/4" per foot
Total compressed sleeve boot length is 1 1/2 inches

Expanded zipper boot length – 2 ft.
Compressed zipper boot length – 2" per foot
Total compressed sleeve boot length is 4 inches

Duff-Norton sleeve and zipper boots are sold in standard 1 ft. increments

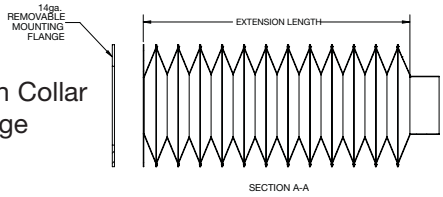
Boot End View

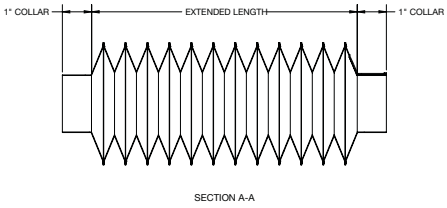




Boot with Flanges

Boot with Collar and Flange





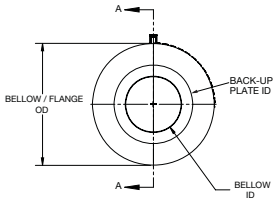
Boot with Collars

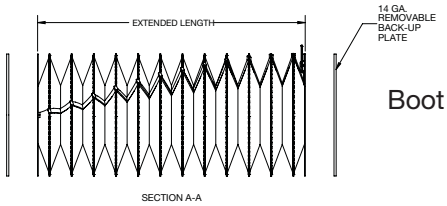
Acme Screw & Nut Boot Selection and Dimensions

Sleeve Boots Acme Nut #	Boot Part# Prefix	Acme Nut Diameter	Screw Diameter	Boot I.D.	Boot O.D	Collar End Length	Flange Diameter	Boot Compression
050AN----	BTS125----	1.25	0.50	1.25	3.75	1"	3.75	3/4" per Foot
063AN----	BTS125----	1.25	0.63	1.25	3.75	1"	3.75	3/4" per Foot
075AN----	BTS125----	1.25	0.75	1.25	3.75	1"	3.75	3/4" per Foot
100AN----	BTS150----	1.50	1.00	1.50	4.00	1"	4.00	3/4" per Foot
150AN----	BTS225----	2.25	1.50	2.25	4.75	1"	4.75	3/4" per Foot
200AN----	BTS275----	2.75	2.00	2.75	5.25	1"	5.25	3/4" per Foot
225AN----	BTS350----	3.38	2.25	3.50	6.00	1"	6.00	3/4" per Foot
250AN----	BTS350----	3.38	2.50	3.50	6.00	1"	6.00	3/4" per Foot
Boots for larger size Acme Nuts are available - contact Customer Service for assistance.								
Zipper Boots Acme Nut#	**Boot Part# Prefix**	**Acme Nut Diameter**	**Screw Diameter**	**Boot I.D.**	**Boot O.D**	**Collar End Length**	**Flange Diameter**	**Boot Compression**
050AN----	BTZ125----	1.25	0.50	1.25	3.75	1"	3.75	2" per Foot
063AN----	BTZ125----	1.25	0.63	1.25	3.75	1"	3.75	2" per Foot
075AN----	BTZ125----	1.25	0.75	1.25	3.75	1"	3.75	2" per Foot
100AN----	BTZ150----	1.50	1.00	1.50	4.00	1"	4.00	2" per Foot
150AN----	BTZ225----	2.25	1.50	2.25	4.75	1"	4.75	2" per Foot
200AN----	BTZ275----	2.75	2.00	2.75	5.25	1"	5.25	2" per Foot
225AN----	BTZ350----	3.38	2.25	3.50	6.00	1"	6.00	2" per Foot
250AN----	BTZ350----	3.38	2.50	3.50	6.00	1"	6.00	2" per Foot
Boots for larger size Acme Nuts are available - contact Customer Service for assistance.								

NOTE: Unless otherwise specified all dimensions are in Inches.
NOTE - Boots with internal guides can be supplied for horizontal applications to ensure smooth nut translating with out interference from fabric sagging - both the boots' ID and OD might need to be enlarged to accommodate the guides. Please contact out customer service for more information.
NOTE - Collar ID and Boot ID are the same dimension

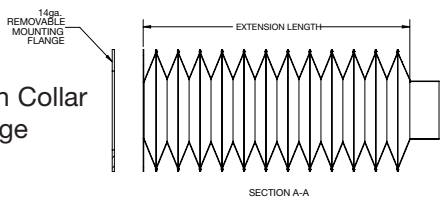
Boot End View

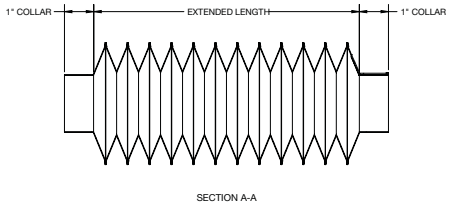




Boot with Flanges

Boot with Collar and Flange





Boot with Collars

Ball Screw & Nut Boot Selection and Dimensions

Sleeve Boots Ball Nut #	Boot Part# Prefix	Ball Nut Diameter	Screw Diameter	Boot I.D.	Boot O.D	Collar End Length	Flange Diameter	Boot Compression
050BNH020	BTS150----	1.38	0.50	1.50	4.00	1"	4.00	3/4" per Foot
050BNH050	BTS175----	1.72	0.50	1.75	4.25	1"	4.25	3/4" per Foot
063BNE020	BTS175----	1.60	0.63	1.75	4.25	1"	4.25	3/4" per Foot
063BNE020L	BTS175----	1.60	0.63	1.75	4.25	1"	4.25	3/4" per Foot
063BNH100	BTS175----	1.65	0.63	1.75	4.25	1"	4.25	3/4" per Foot
075BNG020	BTS175----	1.56	0.75	1.75	4.25	1"	4.25	3/4" per Foot
075BNH020	BTS175----	1.56	0.75	1.75	4.25	1"	4.25	3/4" per Foot
075BNH050	BTS225----	2.12	0.75	2.25	4.75	1"	4.75	3/4" per Foot
100BNE025	BTS225----	2.14	1.00	2.25	4.75	1"	4.75	3/4" per Foot
100BNF025	BTS225----	2.14	1.00	2.25	4.75	1"	4.75	3/4" per Foot
100BNF100	BTS225----	2.13	1.00	2.25	4.75	1"	4.75	3/4" per Foot
117BNH041	BTS250----	2.31	1.17	2.50	5.00	1"	5.00	3/4" per Foot
150BNH047	BTS300----	2.93	1.50	3.00	5.50	1"	5.50	3/4" per Foot
150BNF100	BTS350----	3.44	1.50	3.50	6.00	1"	6.00	3/4" per Foot
150BNR100	BTS400----	3.92	1.50	4.00	6.50	1"	6.50	3/4" per Foot
150BNF187	BTS350----	3.36	1.50	3.50	6.00	1"	6.00	3/4" per Foot
200BNH050	BTS400----	3.90	2.00	4.00	6.50	1"	6.50	3/4" per Foot
200BNH100	BTS475----	4.58	2.00	4.75	7.25	1"	7.25	3/4" per Foot
225BNH050	BTS400----	3.95	2.25	4.00	6.50	1"	6.50	3/4" per Foot
225BNH050L	BTS400----	3.95	2.25	4.00	6.50	1"	6.50	3/4" per Foot
225BNH100	BTS475----	4.60	2.25	4.75	7.25	1"	7.25	3/4" per Foot
Boots for larger size Ball Nuts are available - contact Customer Service for assistance.								
Zipper Boots Ball Nut#	**Boot Part# Prefix**	**Ball Nut Diameter**	**Screw Diameter**	**Boot I.D.**	**Boot O.D**	**Collar End Length**	**Flange Diameter**	**Boot Compression**
050BNH020	BTZ150----	1.38	0.50	1.50	4.00	1"	4.00	2" per Foot
050BNH050	BTZ175----	1.72	0.50	1.75	4.25	1"	4.25	2" per Foot
063BNE020	BTZ175----	1.60	0.63	1.75	4.25	1"	4.25	2" per Foot
063BNE020L	BTZ175----	1.60	0.63	1.75	4.25	1"	4.25	2" per Foot
063BNH100	BTZ175----	1.65	0.63	1.75	4.25	1"	4.25	2" per Foot
075BNG020	BTZ175----	1.56	0.75	1.75	4.25	1"	4.25	2" per Foot
075BNH020	BTZ175----	1.56	0.75	1.75	4.25	1"	4.25	2" per Foot
075BNH050	BTZ225----	2.12	0.75	2.25	4.75	1"	4.75	2" per Foot
100BNE025	BTZ225----	2.14	1.00	2.25	4.75	1"	4.75	2" per Foot
100BNF025	BTZ225----	2.14	1.00	2.25	4.75	1"	4.75	2" per Foot
100BNF100	BTZ225----	2.13	1.00	2.25	4.75	1"	4.75	2" per Foot
117BNH041	BTZ250----	2.31	1.17	2.50	5.00	1"	5.00	2" per Foot
150BNH047	BTZ300----	2.93	1.50	3.00	5.50	1"	5.50	2" per Foot
150BNF100	BTZ350----	3.44	1.50	3.50	6.00	1"	6.00	2" per Foot
150BNR100	BTZ400----	3.92	1.50	4.00	6.50	1"	6.50	2" per Foot
150BNF187	BTZ350----	3.36	1.50	3.50	6.00	1"	6.00	2" per Foot
200BNH050	BTZ400----	3.90	2.00	4.00	6.50	1"	6.50	2" per Foot
200BNH100	BTZ475----	4.58	2.00	4.75	7.25	1"	7.25	2" per Foot
225BNH050	BTZ400----	3.95	2.25	4.00	6.50	1"	6.50	2" per Foot
225BNH050L	BTZ400----	3.95	2.25	4.00	6.50	1"	6.50	2" per Foot
225BNH100	BTZ475----	4.60	2.25	4.75	7.25	1"	7.25	2" per Foot
Boots for larger size Ball Nuts are available - contact Customer Service for assistance.								

NOTE: Unless otherwise specified all dimensions are in Inches. Collar ID and Boot ID are the same dimension.
NOTE - Boots with internal guides can be supplied for horizontal applications to ensure smooth nut translating with out interference from fabric sagging - both the boots' ID and OD might need to be enlarged to accommodate the guides. Please contact out customer service for more information.

Bellows Boot Model Numbering System

BTZ150 – CC048X

Boot Type

BTS - Sleeve Boot

BTZ - Zipper Boot

Boot I.D.

(Inches)

Characters are shown without decimals for example:

1.25” I.D. shown as 125

2.00” I.D. shown as 200

End Types

C = Collar

F = Flange

Both spaces should be represented

Boot Length

(Inches)

Boot Lengths are available in 1 ft. extended length increments

Characters are shown without decimals for example:

36” extended length shown as 036

144” extended length shown as 144

Optional Character

G - will appear in this space if internal guides are required.

X - will appear in this space if internal guides are not required.

Bellows Boots made with specialty fabrics or other non standard design features will have serialized suffix numbers such as - 0123.

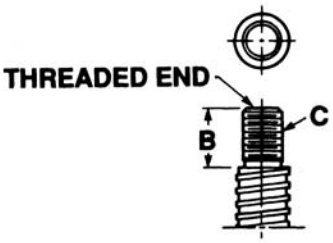
Clevis Ends

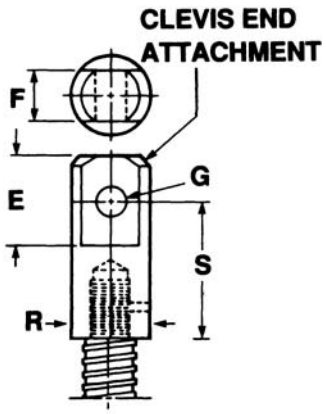
For certain applications it may be desirable to rotate the acme or ball nut around a non-rotating and firmly fixed screw. Duff-Norton provides standard End Plates and Clevis Ends attachments for such applications.

Features

Some of the more important features are:

- Fabricated to common ANSI standard dimensions.
- Drilled and Tapped for common UN Threaded Screws
- Set-screw drilled, with hardware provided
- Readily available for most Acme & Ball Screws





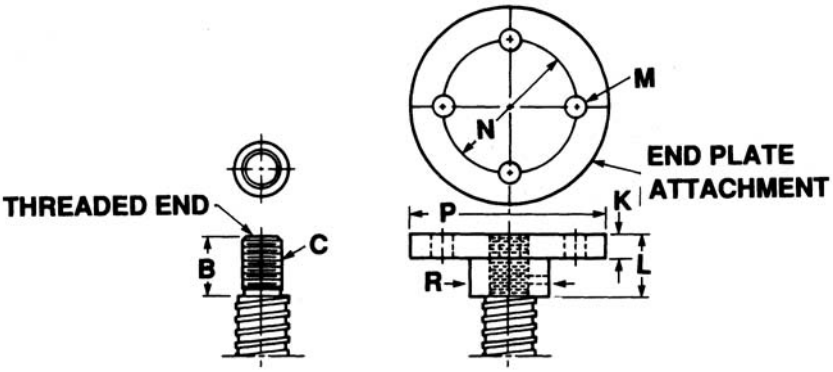
Clevis End Dimensions

Acme Screw & Lead	Ball Screw & Lead	Clevis End #	Dimensions (inches) B	C	E	F	G	R
.50 X .250 & .500	.500 - all	SK2800-4-29A	3/4	3/8"-24-UNF-2A	1	1/2	5/16"+.007/-.000	3/4
.63 & .75 - all	.631 - all	SK2800-4-29A	3/4	3/8"-24-UNF-2A	1	1/2	5/16"+.007/-.000	3/4
1 X .250, .500 & 1.00	.750 - all	SK28750-8A	3/4	1/2"-13UNC-2A	3/4	1/2	5/16"+.007/-.000	1 1/4
1 X .100 & .200	1.00 - all	SK2800-4-2A	1 1/8	3/4"-16-UNF-2A	1 1/2	1	1/2" +.008/-.000	1 1/2
-	1.17	SK2800-4-2A	1 1/8	3/4"-16-UNF-2A	1 1/2	1	1/2" +.008/-.000	1 1/2
1.50 - all	1.50 - all	SK2800-4-5A	1 1/8	1"-14-UNS-2A	2 1/2	1 1/4	3/4" +.010/-.000	1 3/4
2.00 - all, 2.25 X .500	2.00 - all	SK2800-4-10A	1 1/8	1"-14-UNS-2A	2 1/2	1 1/2	1" +.010/-.000	2
2.25 X .250	2.25 - all	SK2800-4-20A	2 1/4	1 3/4"-12-UN-2A	3	1 3/4	1 1/4" +.010/-.000	2 5/8
2.50 - all	-	SK2800-4-20A	2 1/4	1 3/4"-12-UN-2A	3	1 3/4	1 1/4" +.010/-.000	2 5/8
3.00 - all	3.00	SK2800-4-25A	2 1/4	2 1/4"-12-UN-2A	5	2 3/4	1 1/2"+.010/-.000	3 1/2
3.75 - all	4.00	SK2800-4-60A	2 3/4	3 1/4"-12-UN-2A	5 1/4	3 3/4	2"+.012/-.000	5

*Note - some of the smaller diameter acme screws have root diameters to small to engage with the End Plate

End Plates

NOTE: During installation it is necessary to thread the End Plate or Clevis End into it's position, then drill through the tapped hole and to penetrate the screw's surface. When the attachment is in place, this will ensure that the supplied set-screw properly engages both the attachment and Acme or Ball Screw.



End Plate Dimensions

Acme Screw & Lead	Ball Screw & Lead	End Plate #	Dimensions (inches) B	C	K	L	M	N	P	R
.50 X .250 & .500	.500 - all	SK2800-1-29A	3/4	3/8"-24-UNF-2A	5/16	13/16	9/32	1 1/2	2 1/4	3/4
.63 & .75 - all	.631 - all	SK2800-1-29A	3/4	3/8"-24-UNF-2A	5/16	13/16	9/32	1 1/2	2 1/4	3/4
1 X .250, .500 & 1.00	.750 - all	SK28750-1A	3/4	1/2"-13UNC-2A	3/8	4/5	7/16	2 1/2	3 1/2	1 1/4
1 X .100 & .200	1.00 - all	SK2800-1-2A	1 1/8	3/4"-16-UNF-2A	7/16	1 3/16	13/32	3	4 1/4	1 1/2
-	1.17	SK2800-1-2A	1 1/8	3/4"-16-UNF-2A	7/16	1 3/16	13/32	3	4 1/4	1 1/2
1.50 - all	1.50 - all	SK2800-1-5A	1 1/8	1"-14-UNS-2A	5/8	1 1/4	11/16	3 1/2	5	1 3/4
2.00 - all, 2.25 X .500	2.00 - all	SK2800-1-10A	1 1/8	1"-14-UNS-2A	3/4	1 3/8	13/16	4 1/8	5 3/4	2
2.25 X .250	2.25 - all	SK2800-1-20A	2 1/4	1 3/4"-12-UN-2A	1	2 5/16	13/16	5	7	2 5/8
2.50 - all	-	SK2800-1-20A	2 1/4	1 3/4"-12-UN-2A	1	2 5/16	13/16	5	7	2 5/8
3.00 - all	3.00	SK2800-1-25A	2 1/4	2 1/4"-12-UN-2A	1	2 5/16	1 1/6	6	8 1/2	3 1/2
3.75 - all	4.00	SK2800-1-60A	2 3/4	3 1/4"-12-UN-2A	1 3/8	2 13/16	1 1/2	10	13	5

*Note - some of the smaller diameter acme screws have root diameters to small to engage with the End Plate

Thread Characteristics

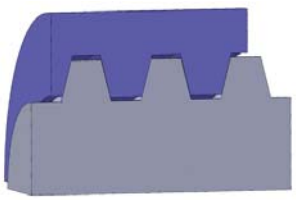
The three primary thread form types Duff-Norton offers: Acme and Modified Square Threads, and Ball Screw Threads

Modified square thread screws have straight-sided flanks. Larger size Duff-Norton acme screws have the modified square thread form. There is no measurable performance difference between the modified square and acme thread forms.

Acme thread screws have a nominal depth of thread of 0.50 x pitch and have a 29° included thread angle resulting in a angled tooth shape (some sizes have 40°).

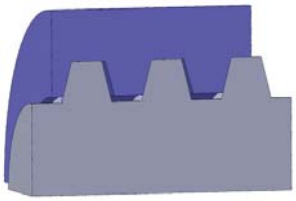
There are three main classes of Acme thread forms: General Purpose (G), Centralizing (C), and Stub Acme.

- **General thread** class acme screws and nuts are manufactured with broader tolerances and clearances. In some horizontal applications a G class screw and nut assembly might bottom out and lock up when the nuts' thread flanks come into contact with the screws thread flanks. Duff-Norton screw and nut assemblies 3" in diameter and larger use general class thread forms.

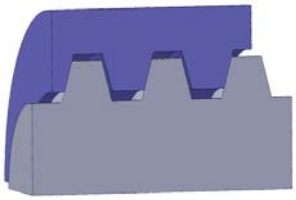


Side loaded G Class Nut

- **Centralizing thread** class acme screws are manufactured with tighter flank tolerances and limited major diameter clearances. The combination of these features helps prevent the previously described operating scenario which can occur with general class threads Duff-Norton screw and nut assemblies ranging from 1/2" to 2 1/2" use centralizing thread forms.



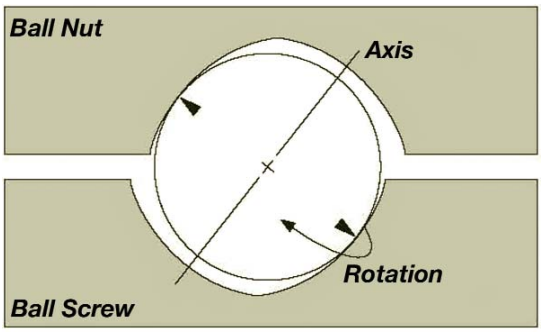
Side loaded C Class Nut



Normally loaded nut

- **Stub Acme** thread forms are used in some of the small diameter screws and are made with the same tolerance characteristics as our centralizing threads, but have a thread depth less than one half the normal acme pitch.

Ball thread screws have a rounded / gothic arch shape design to match the bearing balls within the ball nut. The ball nut will also have the same rounded / gothic arch shape. All ball screws are heat treated. Most ball screws are manganese phosphate coated, some ball screws are black oxide coated.

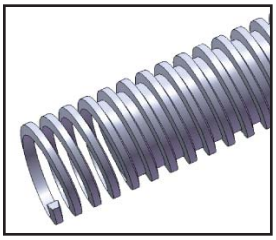


Ball nut interior - Contact points and clearance under normal conditions

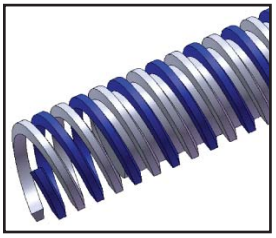
Screw Characteristics

Screw Starts

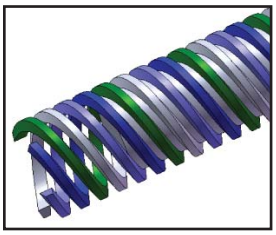
The number of independent threads on the screw shaft: one, two, or four.



Single Start Screw - Lead & Pitch are the same



Double Start Screw - Lead is 2 X Pitch



Four Start Screw - Lead is 4 X Pitch

Lead

The distance the nut advances along the screw in one revolution *(lead = pitch x number of starts).*

Pitch

The distance along the screw axis from a point on one thread to a corresponding point on the adjacent thread.

Lead Error

All forms of screw production yield minor inconsistencies in the distance between screw threads. This difference is commonly referred to as lead error and is the difference between what the travel should be and what the travel is. For example: if an assembly were programmed to travel 24" and the screws' lead error was .004 inch per foot, the actual distance traveled could be from 23.996" to 24.004". Most modern day controls and programs are sophisticated enough to account and correct for lead error.

Root Diameter

The diameter of the screw at the bottom of the thread groove.

Standard Screw Lengths and Materials

Most screws are available with right hand threads (our 4.5" and 5" acme screws are supplied with Left Hand threads as standard). Left hand thread screws may be available in other sizes depending on order requirements.

Standard screw lengths are 36", 72", and 144". Some custom ball screws are available in 240" lengths depending on screw diameter. Custom length acme screws over 144" can be manufactured based on material availability.

Stainless steel screws can be provided for many diameters and leads.

Production Processing

Duff-Norton employs three production techniques to manufacture screws.

- **Rolled Acme screws** – use a combination of feed rates and compression through a machine with cylindrical dies to roll a screw into its desired form.
- **Machine cut Acme screws** – use high-end flat bed machines and several different cutting techniques to produce the desired form.
- **Rolled ball screws** – are rolled, induction hardened, inspected for quench cracks, and then manganese phosphate or black oxide coated.

There are only minor screw surface finish differences resulting from rolling or machine cutting Acme screws, and there are production and functional advantages and disadvantages to screws made from either process.

Good and consistent lubrication is much more important to a successful application than whether or not a screw was cut or rolled. All screw and nut systems should be lubricated often enough or in such a fashion the lubricant film is always present.

Nut Characteristics

Bronze Acme Nuts

Through our years of experience Duff-Norton has chosen and uses two different bronze blends based on the desired performance characteristics. The bronze used for our smaller size nut performs extremely well in applications where the probability of friction and wear are high (Yield 49,000 psi, Ultimate Strength 68,000 psi, Hardness 74 Rockwell B min, Thermal Conductivity 58 BTU (Sqft-ft-hr-f)).

Larger size acme nuts use a different bronze selected for strength, abrasion, and impact properties (Yield 29,500 psi, Ultimate Strength 74,500 psi, Compressive Strength 100,000 psi, Hardness 170 BHN).

Plastic Acme Nuts

Duff-Norton plastic acme nuts are made from a high viscosity homopolymer with Teflon fibers and serve most industrial applications very well (Tensile Strength 7,700 psi @ 73° F, Ultimate Strength 7,700 psi @ 73° F, PV Limit @ ft-lbs 11,000). Specialty plastics may be provided upon request.

Ball Nuts

Duff-Norton ball nuts are provided with external bearing ball return tubes with a deflector which helps provide a smooth and quiet ball re-circulation. Our ball nuts can be supplied with flanges and wiper kits. All ball nuts are carburized, and black oxide coated. Some ball nuts are also provided with a load lock spring which helps prevent the ball nut from failing if the ball threads or return tubes are worn out.

⚠ CAUTION

Ball Nut Installation

Ball nuts are normally supplied on arbors. After clipping the retaining binder, care must be taken to slide or position the arbor onto or next to the ball screw. Rotate the screw or ball nut so that the ball nut clears the screws end before removing the arbor from its position. Ball nut removal should be done the same way. Failure to perform these actions may result in the bearing balls falling out of the ball nut and possible loss of bearing balls. While being installed or handled it is strongly advised that temporary stops such as tape or rubber bands be positioned on either end of the ball nut and only removed after installation is complete.

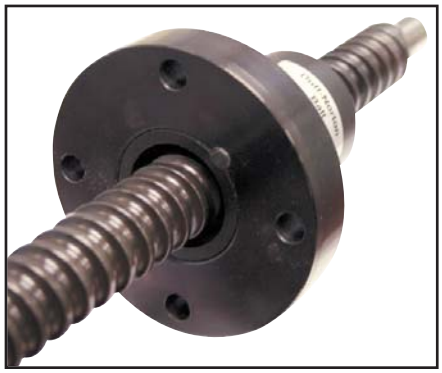
Flanges

All ball nut flanges are made from steel and black oxided. Smaller size acme nut flanges are also made from steel and black oxided. Larger size acme nuts have an integral bronze flange.

⚠ CAUTION

Flange Installation

During installation, after threading the flange and nut together; the nut may be drilled and tapped from the back end for a set screw. While spot drilling the nut and flange assembly avoid getting metal chips in the nuts' ball threads. Then install a dog point set screw or pin to secure the assembly.



Performance Characteristics

Static Capacity
The maximum dead weight load the screw and nut assembly can advisably hold.

Dynamic Capacity
The maximum load the screw and nut assembly can advisably move.

Efficiency
A ratio of work output and work input with the difference being lost energy. These ratios are calculated as lubricated efficiencies and will vary depending on the nut material.

Torque to Raise
The amount of rotational force required to move one pound of load.

Acme Life
As mentioned, Duff-Norton manufactures our acme product from high quality materials. Still, there are too many variables involved in a given application for us to accurately predict acme nut life. This is largely due to inconsistent lubrication, and also the friction of dissimilar metals rubbing against one another.

Ball Life
Because of the ball screw and nut design, these assemblies operate very efficiently and life ratings can be provided. Please see page 115.

Ball Nut orientation
Proper orientation is important in horizontal applications. Return tubes located on one side of the ball nut only should be mounted facing up. Return tubes located on opposing sides of the ball nut should be mounted horizontally. Ball nut return tubes should not be installed in a downward position.

Backdriving
Generally speaking, any acme screw with a lead greater than .250” may be subject to backdriving or creep. Backdriving is when the force of the static load causes the undriven screw to rotate. The use of a brake motor is recommended in these applications. Acme screws with diameters .750” or larger and leads .250” or less are inherently self-locking.

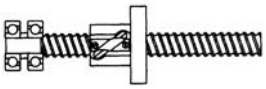
Backlash
Backlash results from the space tolerance between the threads of the screw & nut and always increases with use. This undesirable motion will occur when the load is changing direction, and the load shifts to the opposite thread flank.

Load Conditions

End Fixity

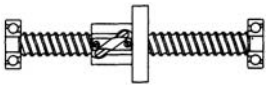
The method by which the screw's ends are supported. There are 3 common methods of end fixity which are frequently used in 4 combinations. "Free" support means the screw end is not supported. "Simple" support means the screw end is supported at one point only. "Fixed" support means the screw end is rigidly restrained.

Fixed - Free



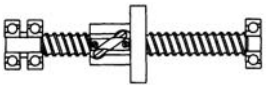
Double bearing support on one screw end, the other end is not supported.

Simple - Simple



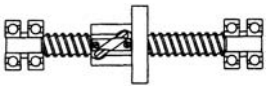
Single bearing support on both screw ends.

Fixed - Simple



Double bearing support on one screw end, single bearing support on the other screw end.

Fixed - Fixed



Double bearing support on both screw ends.

Column Strength

All screws loaded in compression are subject to buckling or bending although screw end-fixity can greatly impact column strength. It is important to understand the point at which these conditions are likely to occur. Please consult the tables on pages 113 & 116 for more information.

Critical Speed

Is the maximum recommended rate at which the screw should be turned. Critical speeds are highly subject to screw diameter, length, and end-fixity. Please consult pages 112 & 114.

Load Definitions

Static Load

The maximum dead-weight load that can be applied to a non-moving system.

Dynamic Load

The maximum recommended load that can be moved by a system.

PV Load

The severity of an application is something which should be considered when selecting a screw and nut system as all nuts are subject to heat buildup. The amount of pressure on the nut and surface velocity greatly impact system temperature. PV Values and formulas for Duff-Norton acme nuts provided on page 111.

Tension Load

Occurs when a load pulls on the screw and its support.

Compression Load

Occurs when a load pushes on the screw and its support.

Radial Load

Occuring either from the side or over-turning of the nut while travelling along the screw may be detrimental to system performance. Our customer service team will be glad to discuss your application with you to determine the best installation for your application.

PV Values

Bronze Nut P/N	P factor	Max Speed at Rated Load (in/min)	Plastic Nut P/N	P factor	Max Speed at Rated Load (in/min)
050ANB010	1.56	11			
050ANB020	2.93	22			
050ANB025	3.93	27	050ANP025	3.93	8
050ANB050	3.93	55	050ANP050	3.93	16
063ANB010	1.23	9			
063ANB013	1.26	11			
063ANB020	2.31	17			
063ANB025	3.14	22	063ANP025	3.14	6
063ANB050	3.07	44	063ANP050	3.07	14
075ANB010	0.68	7			
075ANB020	0.72	15			
075ANB025	0.75	18	075ANP025	0.75	11
075ANB050	0.75	36	075ANP050	0.75	25
075ANB100	0.74	73	075ANP100	0.74	46
100ANB010	0.5	5			
100ANB020	0.53	11			
100ANB025	0.48	14	100ANP025	0.48	10
100ANB050	0.48	27	100ANP050	0.48	22
100ANB100	0.48	55	100ANP100	0.48	40
150ANB010	0.2	4			
150ANB025	0.19	9			
150ANB038	0.18	14	150ANP038	0.18	12
150ANB050	0.21	18	150ANP050	0.21	12
200ANB025	0.12	7			
200ANB050	0.12	14			
225ANB025	0.11	6			
225ANB050	0.12	12			
250ANB025	0.09	5			
250ANB050	0.11	11			
300ANB032	0.07	6			
300ANB066	0.07	12			
375ANB067	0.06	10			
375ANB133	0.06	19			
375ANB032	0.32	5			
450ANB032	0.25	4			
450ANB066	0.11	8			
500ANB066	0.05	7			
600ANB075	0.03	7			
600ANB100	0.02	9			
700ANB100	0.02	8			
900ANB100	0.01	6			

The “Maximum PV value” for plastic nuts is 11,000

The “Maximum PV value” for bronze nuts is 50,000

The PV calculation method is:

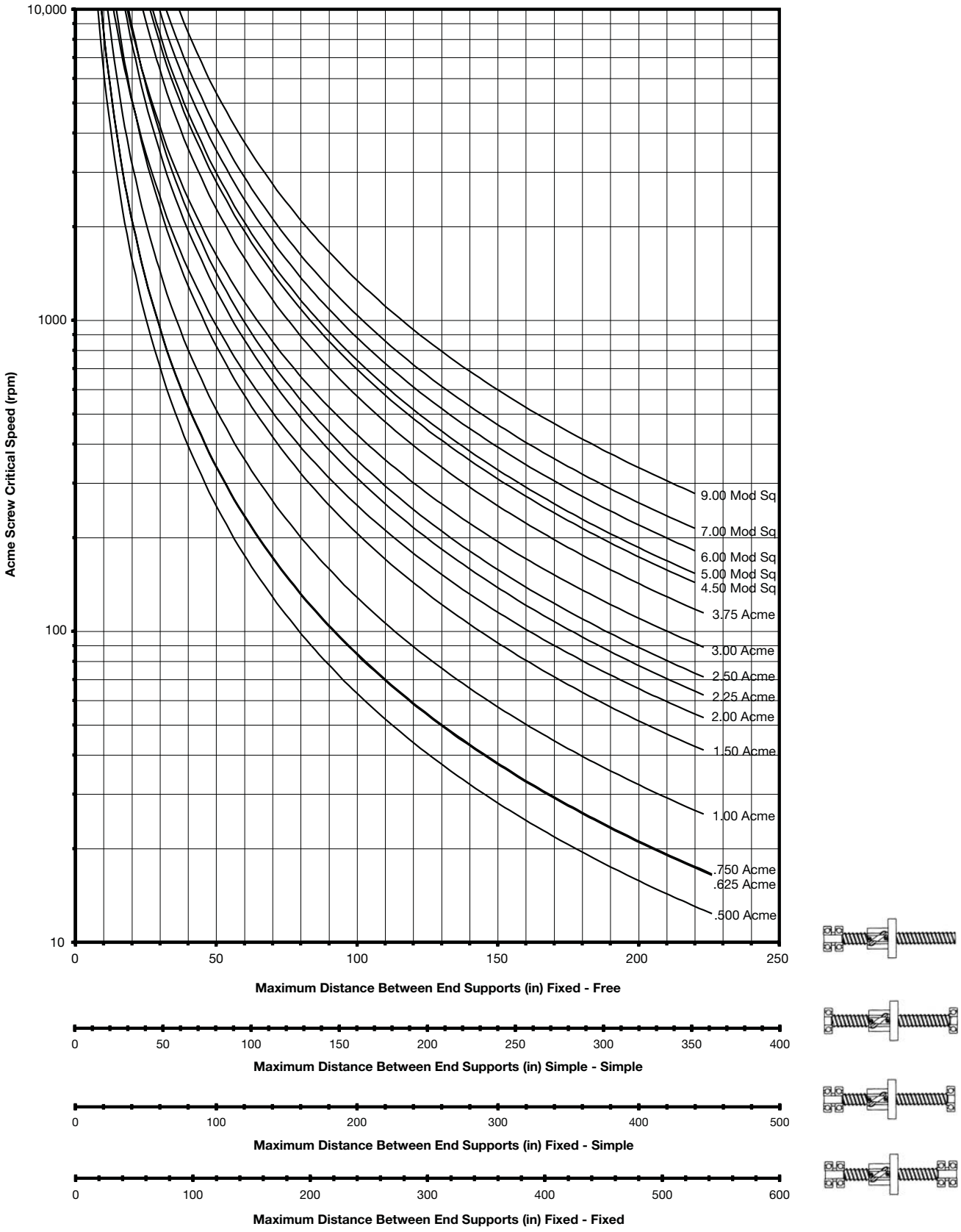
1) Find P; P = Actual Load (pounds) x P_f (P factor)

2) Find V; V = .2618 x Nominal diameter of the screw (inches) x Rotational speed of the screw (rev per minute)

3) Compare the results to the maximum limit: P x V must be less than “Maximum PV Value”

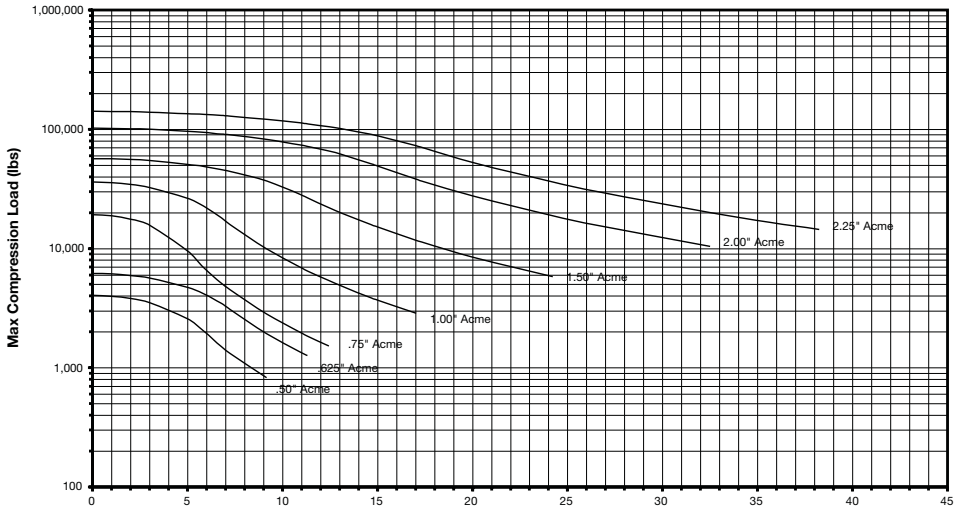
Note: Rotational speed of the screw (revolutions per minute) = Linear speed of the screw (inches per minute) / Lead of the screw (inches per revolution)

Critical Speeds - Acme Screw

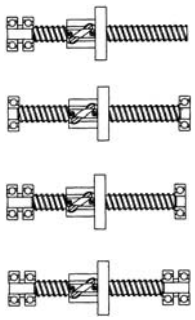


For best performance results always design your system to operate at parameters below and to the left of a given screw's curve. The "Fixed-Simple" bearing support structure is recommended for most applications.

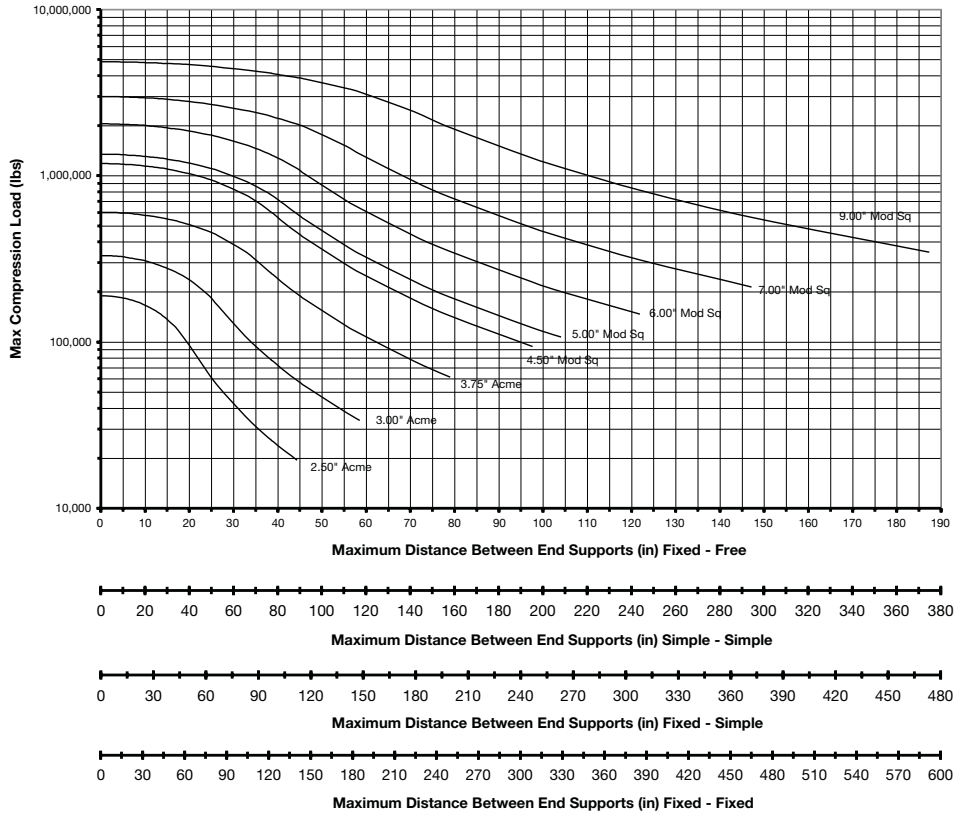
Small Acme Screw Column Strength



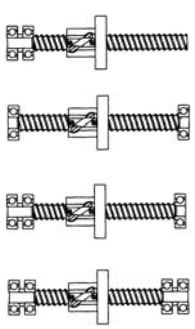
For best performance results; the "Fixed-Simple" bearing support structure is recommended for most applications. For vertical applications; tensions load structures are recommended.



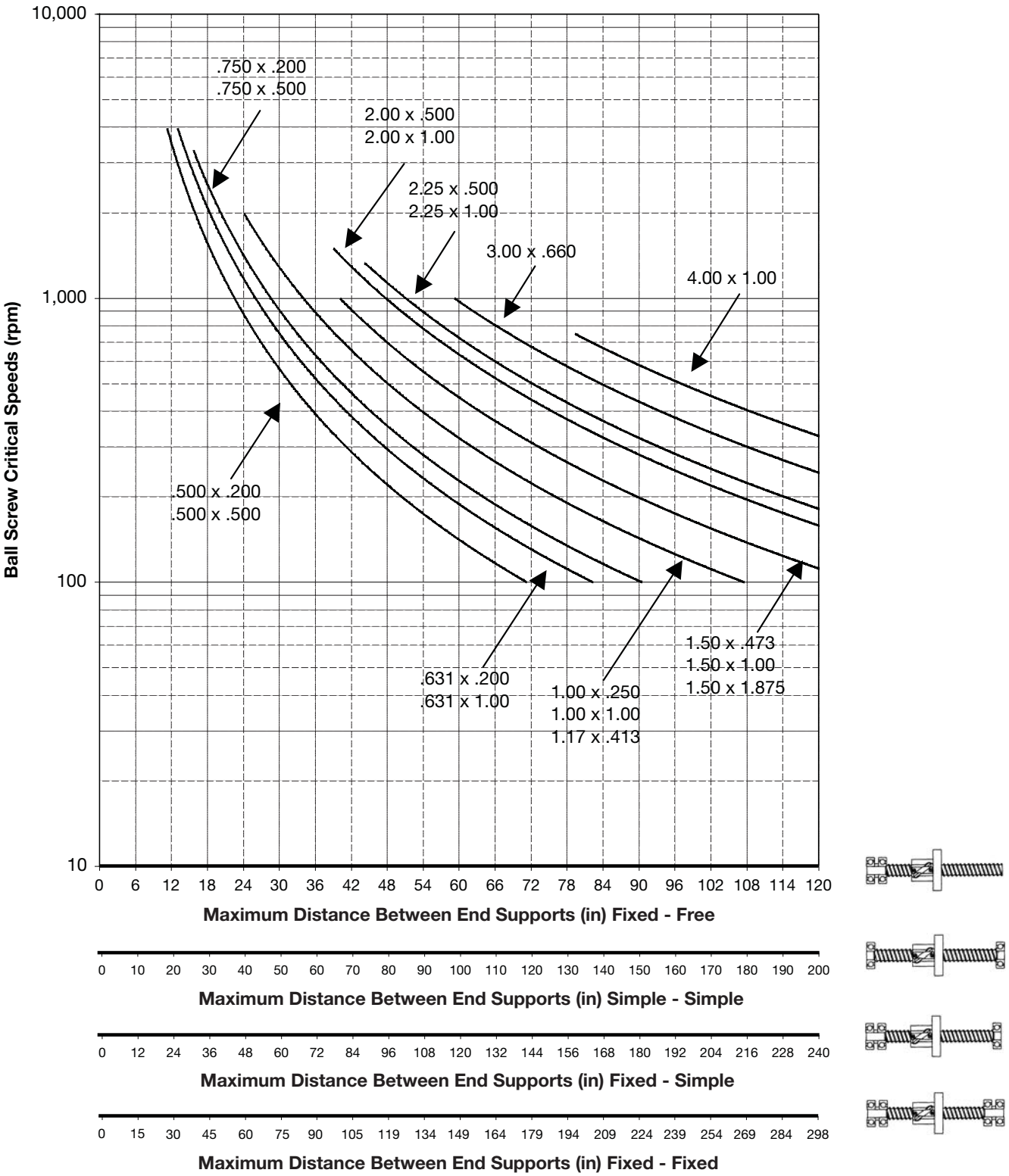
Large Acme Screw Column Strength



For best performance results; the "Fixed-Simple" bearing support structure is recommended for most applications. For vertical applications; tensions load structures are recommended.

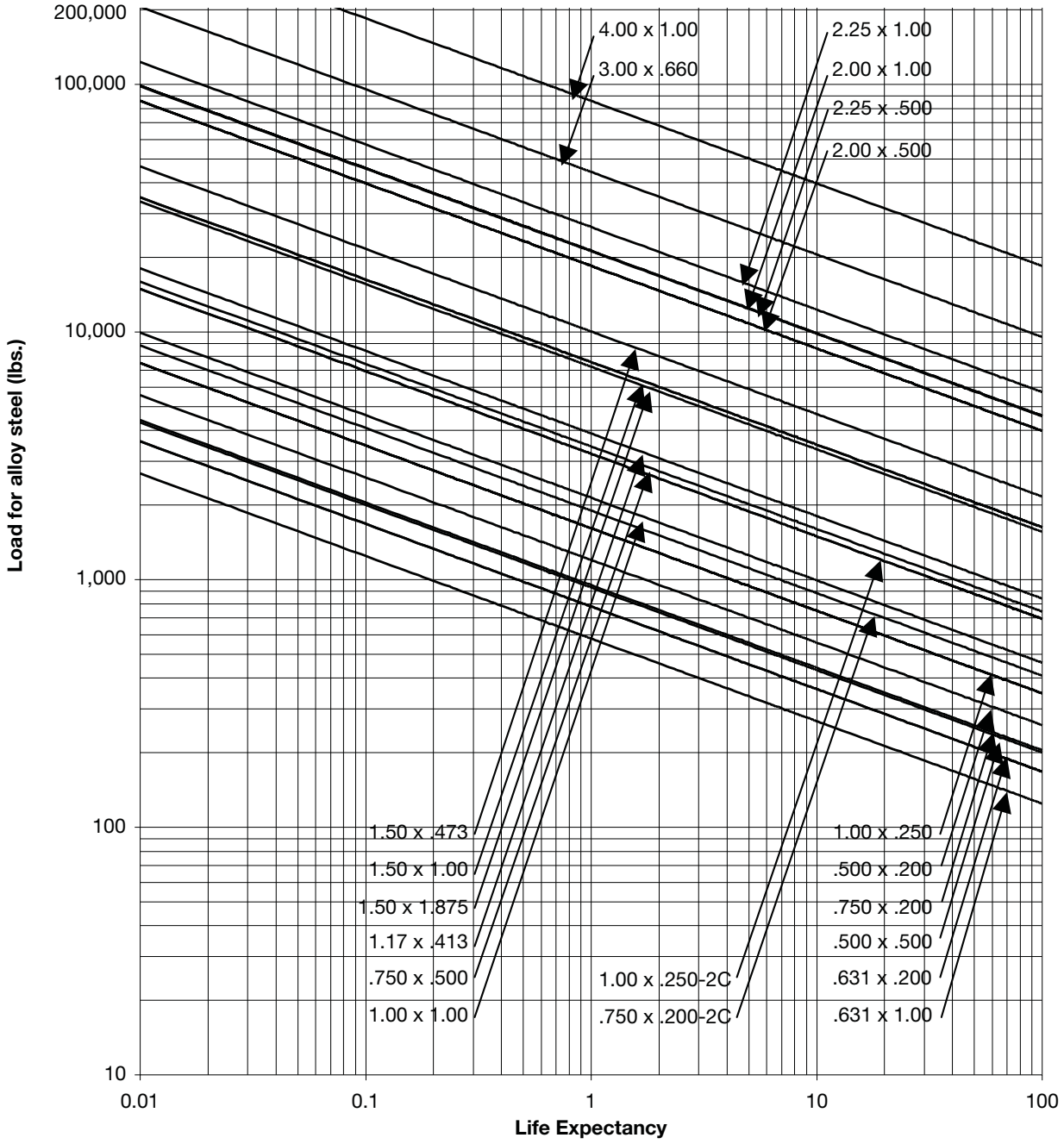


Critical Speeds - Ball Screw



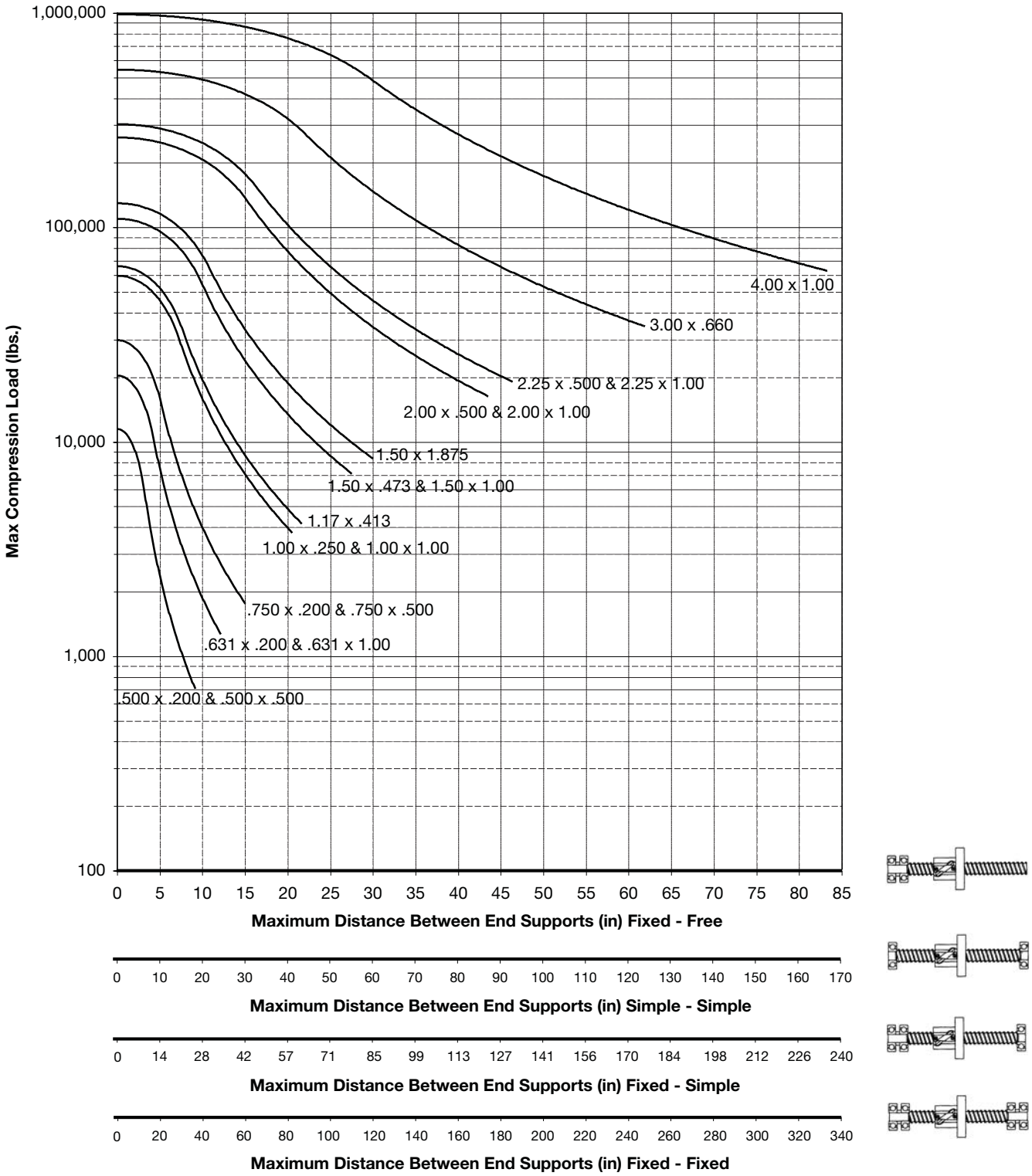
For best performance results always design your system to operate at parameters below and to the left of a given screw's curve. The "Fixed-Simple" bearing support structure is recommended for most applications.

Ball Screw Life Performance



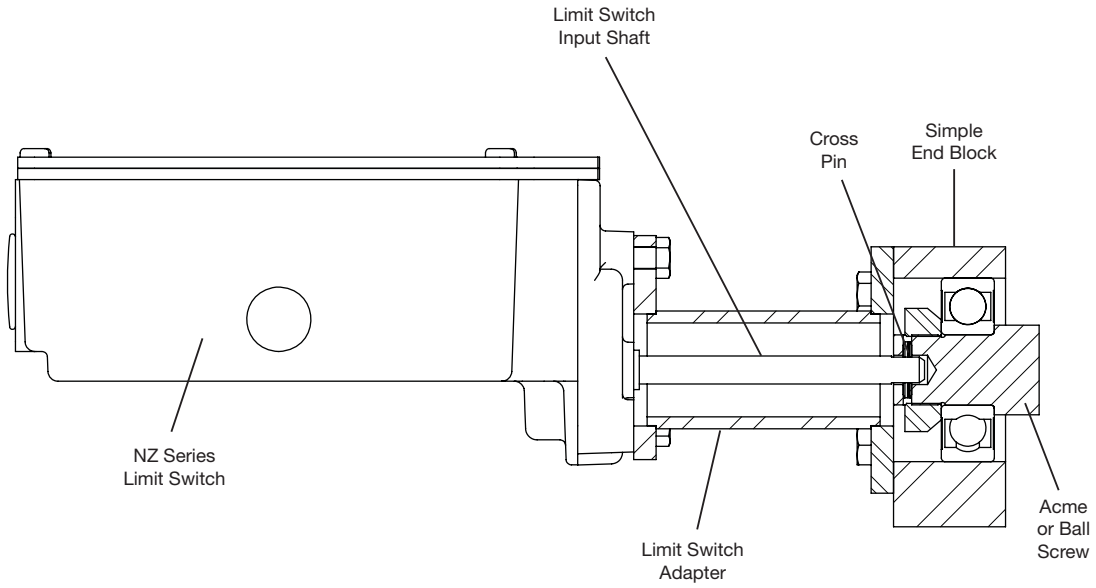
1 = 1,000,000 In. Travel, 2C = Double Circuit Ball Nut

Ball Screw Column Strength



For best performance results; the “Fixed-Simple” bearing support structure is recommended for most applications. For vertical applications; tensions load structures are recommended.

Limit Switch Installation



Instuctions for installing our NZ Series Limit Switches to our Simple End Blocks.

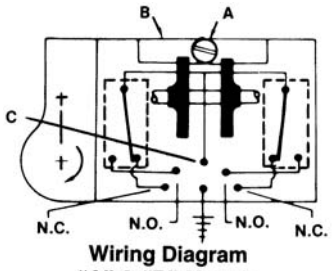
1. The Simple End Block is designed to be a “floating block” and should be moved backwards on to the acme or ball screw.
2. Mount the bearing in place on the screw’s journal.
3. Insert the cross pin into the hole drilled parallel to the screw’s end, then thread the lock nut in place.
4. Mount the Limit Switch adapter to the NZ Series Limit Switch with the input shaft extending beyond the adapter’s far edge.
5. Mount the Limit Switch and Adapter to the repositioned Simple End Block’s face, the end of the limit switches input shaft is slotted to fit into the screw’s end and over the cross pin. The acme or ball screw’s end will now be flush with the End Blocks face.

Note: Journal Ends and End Block sizes 000 and 001 use a small coupling to connect the Limit Switches input shaft to the screw’s journal. Contact Customer Service for SKA Series Limit Switch installation instructions.

Rotary Limit Switch Electrical Wiring Diagram and Setting Instructions

1. ⚠ CAUTION: Disconnect power before making any adjustment.
2. Check drift before adjusting limits.
3. Remove screw "A" and nut guide keeper "B" to adjust limits.
4. Run the screw system to desired limit.
5. Rotate appropriate nut until switch clicks, then turn 1/2 turn more.
6. Replace "A" and "B. "
7. Run the screw system to other limit.
8. Repeat steps 2, 4 and 5 to adjust this nut.

Slight adjustments may be necessary. See Performance Specification Chart on page 83 for notch adjustment value.



Wiring Diagram
“A” & “B” Models

N.O. = Normally Open
N.C. = Normally Closed

Terms and Conditions

All sales by Seller are made pursuant to the following terms. No other or additional terms or conditions are or will be accepted.

ACCEPTANCE OF ORDERS -

All orders, whether placed directly or through an agent, and all subsequent amendments thereto, are subject to a final approval and acceptance by Seller's main office.

LIMITATION OF WARRANTIES, REMEDIES AND DAMAGES –

THE WARRANTY STATED BELOW IS GIVEN IN PLACE OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE. NO PROMISE OR AFFIRMATION OF FACT MADE BY ANY AGENT OR REPRESENTATIVE OF SELLER SHALL CONSTITUTE A WARRANTY BY SELLER OR GIVE RISE TO ANY LIABILITY OR OBLIGATION.

Seller warrants that on the date of its delivery to carrier the goods are free from defects in workmanship and materials.

SELLER'S SOLE OBLIGATION IN THE EVENT OF BREACH OF WARRANTY OR CONTRACT OR FOR NEGLIGENCE OR OTHERWISE WITH RESPECT TO GOODS SOLD SHALL BE EXCLUSIVELY LIMITED TO REPAIR OR REPLACEMENT, F.O.B. SELLER'S POINT OF SHIPMENT, OF ANY PARTS WHICH SELLER DETERMINES TO HAVE BEEN DEFECTIVE or if Seller determines that such repair or replacement is not feasible, to a refund of the purchase price upon return of the goods to Seller.

Any action against Seller for breach of warranty, negligence or otherwise must be commenced within one year after such cause of action accrues.

NO CLAIM AGAINST SELLER FOR ANY DEFECT IN THE GOODS SHALL BE VALID OR ENFORCEABLE UNLESS BUYER'S WRITTEN NOTICE THEREOF IS RECEIVED BY SELLER WITHIN ONE YEAR FROM THE DATE OF SHIPMENT.

Seller shall not be liable for any damage, injury or loss arising out of the use of the goods if, prior to such damage, injury or loss, such goods are (1) damaged or misused following Seller's delivery to carrier; (2) not maintained, inspected, or used in compliance with applicable law and Seller's written instructions and recommendations; or (3) installed, repaired, altered or modified without compliance with such law, instructions or recommendations.

UNDER NO CIRCUMSTANCES SHALL SELLER BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES AS THOSE TERMS ARE DEFINED IN SECTION 2-715 OF THE UNIFORM COMMERCIAL CODE.

TERMS OF PAYMENT -

Unless otherwise stated herein, payment of each invoice is required within thirty (30) days after date of shipment. Any balance unpaid after the required payment date shall be subject to a service charge of 1% per month from such date.

PRICE ADJUSTMENTS -

Amendments made by the Buyer to orders already placed shall, without formal notice to the Buyer, be subject to extra charges. If the estimated shipping date for the goods is more than sixty (60) days after date of order, the price of the goods are subject to increase by Seller.

TAXES -

Any sales, use, excise, and other taxes applicable to this transaction and the goods and/or services furnished by Seller are not included in the price and shall be paid by Buyer when due. If Seller pays any such taxes, Buyer shall reimburse Seller upon demand.

INDEMNIFICATION AND SAFE OPERATION -

Buyer shall comply with and require its employees to comply with directions set forth in instructions and manuals furnished by Seller and shall use and require its employees to follow such instructions and manuals and to use reasonable care in the use and maintenance of the goods. Buyer shall not remove or permit anyone to remove any warning or instruction signs on the goods. In the event of personal injury or damage to property or business arising from the use of the goods, Buyer shall, within forty-eight (48) hours thereafter, give Seller written notice of such injury or damage. Buyer shall cooperate with Seller in investigating any such injury or damage and in the defense of any claims arising therefrom.

If Buyer fails to comply with this section or if any injury or damage is caused, in whole or in part, by Buyer's failure to comply with applicable federal or state safety requirements, Buyer shall indemnify and hold Seller harmless against any claims, loss or expense for injury or damage arising from the use of the goods.

GOVERNING LAW -

This agreement shall be governed by and construed under the laws of the State of New York.

DELIVERY AND DELAYS -

Unless otherwise specified herein, deliveries shall be F.O.B. Seller's point of shipment and risk of loss shall pass to Buyer upon Seller's delivery to carrier. All shipping dates are approximate and Seller shall not be liable for loss or damage because of delays occasioned by labor disputes, damage to facilities, or failure of suppliers or subcontractors to meet scheduled deliveries or any other cause beyond Seller's reasonable control or making its performance commercially impracticable.

Not withstanding other provisions hereof, if shipment is delayed at Buyer's request, the goods shall be deemed to be stored at Buyer's risk and expense and Seller may thereupon bill Buyer for the full price and storage costs. Buyer shall pay such bill within 30 days after mailing thereof.

BUYER'S INSPECTION UPON RECEIPT OF SHIPMENT -

Buyer shall inspect the goods as soon as received. If any loss or damage is discovered, Buyer must notify both the carrier and Seller at once. Seller will cooperate with Buyer in filing claims with the carrier.

CHANGES AND CANCELLATION -

Seller reserves the right to change or cancel any order whenever circumstances require allocation of production or delivery or Seller deems change or cancellation to be necessary to comply with applicable laws, ordinances, regulations, directives or administrative actions. Seller reserves the right to make changes in materials or design which it determines appropriate for the goods.

SECURITY INTEREST AND REPOSSESSION -

Until full payment has been made therefor, Seller shall have a security interest in goods shipped to Buyer and the goods shall remain personal property. Upon request Buyer shall execute and deliver to Seller security agreements and financing statements further evidencing Seller's security interest. Buyer authorizes Seller to file a financing statement or statements relating to the goods, without Buyer's signature thereon, as Seller may deem appropriate and appoints Seller as Buyer's attorney-in-fact for the limited purpose of executing (without requiring Seller to do so) financing statements in Buyer's name and performing other acts which Seller deems appropriate to perfect and continue its security interest and to protect and preserve the goods.

In the event Buyer defaults in making any payment due Seller, Seller in addition to any other rights or remedies provided by law, shall have the right, with or without legal process, to enter the place where said goods are located and to repossess the goods in accordance with the Uniform Commercial Code.

ASSURANCES -

Shipment by Seller shall at all times be subject to the prior approval of its credit personnel and Seller may, at any time, decline to make shipment except upon receipt of prior payment or upon other terms and conditions or security satisfactory to such personnel.

PATENTS -

Except as to goods manufactured according to design supplied by Buyer, Seller will defend and hold Buyer free and harmless in a suit or proceeding brought against Buyer insofar as it is based on a claim that use of the goods by Buyer constitutes an infringement of any existing U.S. Patents, provided, however, that Buyer gives Seller prompt written notice of such suit or proceeding; permits Seller, through its counsel, to defend and/or settle the same; and gives Seller all necessary information, assistance and authority to enable Seller so to do. If Buyer's use of the goods is held to constitute infringement and further use is enjoined, Seller shall, at its option, either (i) procure for Buyer the right to continue using the goods; or (ii) replace the goods with non-infringing goods; or (iii) modify the goods to non-infringing goods. The foregoing states Seller's entire liability for patent infringement and shall not be construed to render Seller liable for damages based on product output.

MISCELLANEOUS -

This instrument constitutes the entire agreement between Seller and Buyer, superseding all previous understandings and writings regarding this transaction. Any amendment or modification of this Agreement shall be void unless in writing and signed by Seller.

No delay or omission by Seller in exercising any right or remedy hereunder shall be a waiver thereof or of any other right or remedy, and no single or partial exercise thereof shall preclude any other or further exercise thereof or the exercise of any other right or remedy. All rights and remedies of Seller are cumulative.

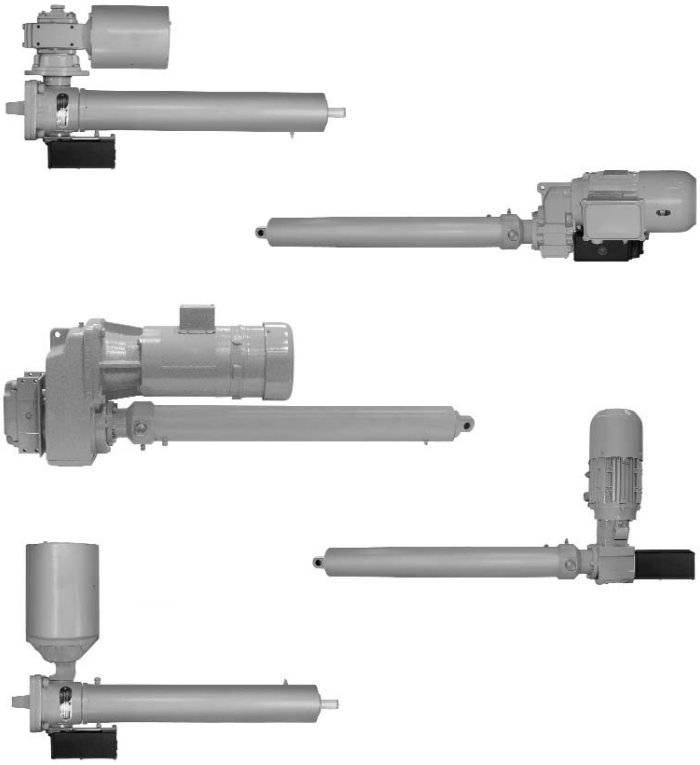
Sales made pursuant to this Agreement shall be governed by the Uniform Commercial Code as the same may from time to time be construed and in effect in the state wherein Seller has its main office.

ARBITRATION -

All disputes that may arise between the parties regarding the interpretation of the contract and the legal effect of the contract shall, to the exclusion of any court of law, be arbitrated and determined in accordance with the latest Commercial Arbitration Rules of the American Arbitration Association. The arbitration proceeding shall be held in the city in that state where the principal office of the Seller is located. The parties recognize and consent to the above mentioned arbitration association's jurisdiction over each and every one of them.

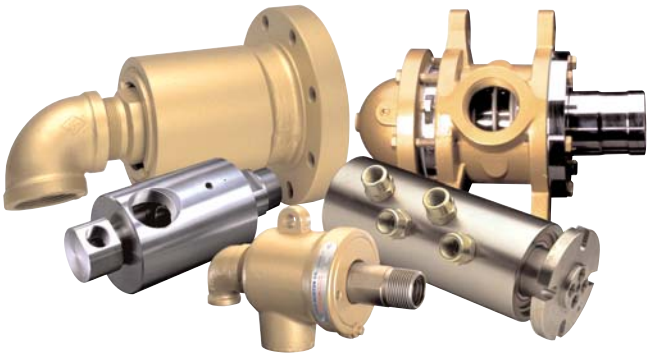
USTS rev. 2/98

Duff-Norton also manufactures



SuperCylinders

Electromechanical Actuators



Rotary Unions

Mechanical Actuators

⚠ WARNING

The equipment shown in this catalog is intended for industrial use only and should not be used to lift, support, or otherwise transport people unless you have a written statement from the Duff-Norton Company which authorizes the specific actuator unit as used in your applications suitable for moving people.

Duff-Norton Also Manufactures....

Screw Jacks

Linear Actuators

Electric Cylinders

Rotary Unions

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www.duffnorton.com

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2.5M 03/10