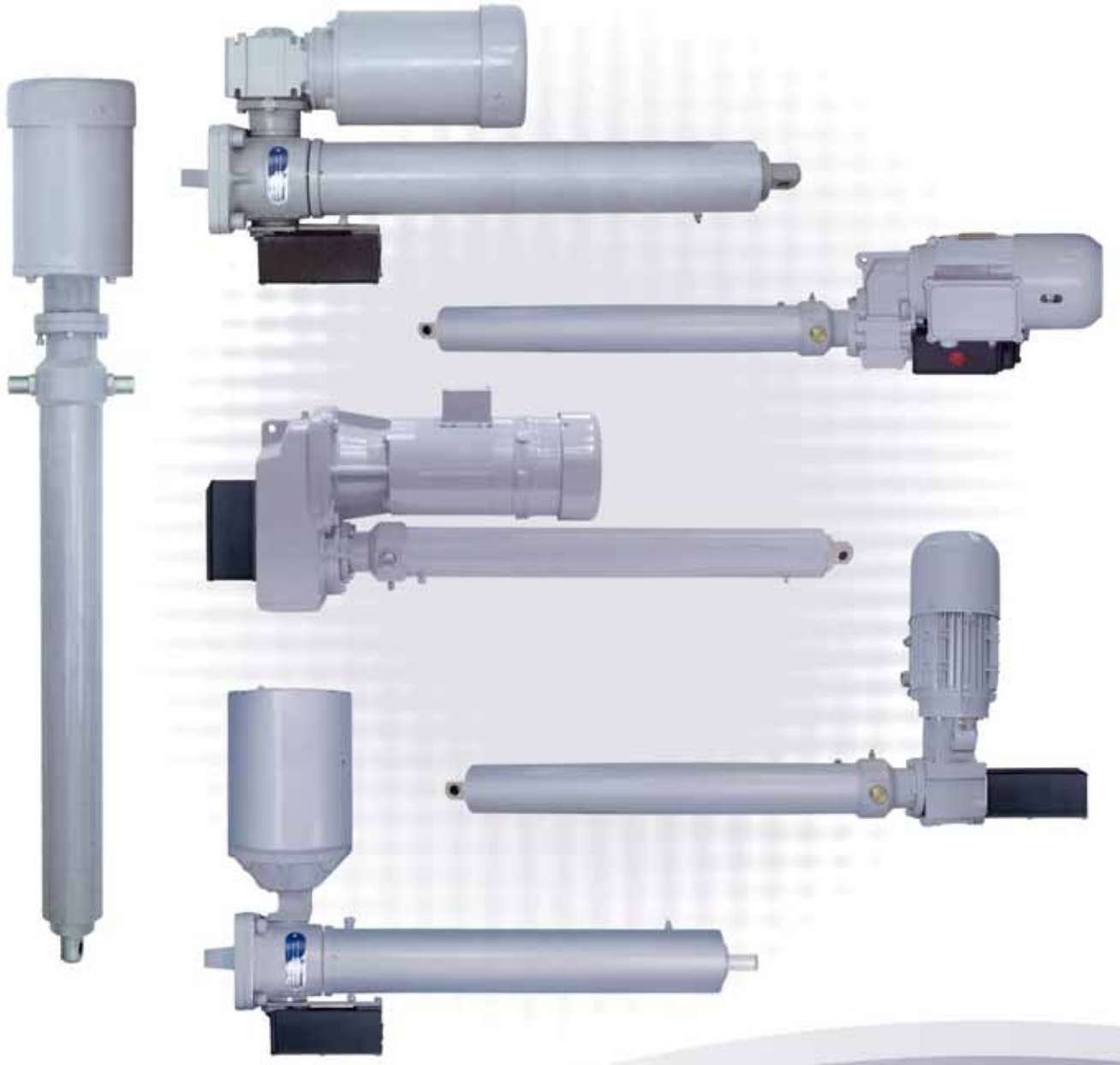
SuperCylinder™ Design Guide



Duff-Norton®

Contents

NOTE

Duff-Norton has made every effort to ensure that the information contained in this publication is accurate and reliable. Determining the suitability of our products for specific applications is the user's responsibility.

⚠ 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 Duff-Norton, which authorizes the specific actuator used in your applications as suitable for moving people.

Features & Benefits

Duff-Norton now offers the new SCD Series SuperCylinders TM in addition to the already popular SCW and SCN Series. The new SCD Series is a direct drive model with the cylinder's ball screw connected in-line to it's motor. The SCN Series combines the ball screw driven translating tube system with trunnion mounted high-efficiency helical or helical-bevel, oil filled gearboxes. The SCW Series combines a ball screw or ACME screw driven translating tube system with our existing clevis mounted worm gear actuators.

- Speeds Up To 817 in/min
- Capacities Up To 50,000 lbs.
- Strokes Up To 13 Feet
- Continuous Duty Ratings (SCN Series)
- Low Power Requirements (SCN Series)
- Aluminum Bronze Worm Gears (SCW Series)
- Helical & Helical Bevel Gears (SCN Series)
- Ball Screw or Acme Screw
- Clevis Mounting or Trunnion Mounting

Both Duff-Norton SuperCylinder series use a precision guided translating tube system to broaden application capabilities. A ground and chrome plated translating tube sliding in polymeric bearings produces excellent resistance to buckling. This lets SuperCylinders achieve stroke lengths much greater than are possible with conventional double clevis mounted mechanical actuators.

Enclosure of the screw by the tube system shields it from environmental contaminants and retains lubricants, requiring less maintenance and allowing longer service. SuperCylinders use hydraulic cylinder grade wiper seals to effectively exclude dirt from the screw area.

The modular concept employed by Duff-Norton for both SuperCylinder series allows an unlimited number of configuration possibilities for tailoring of the SuperCylinder to an application. The selection of available gear ratios is unmatched by any similar product. This exceptional choice of ratios allows precise tailoring of the actuator speed and load specifications. Many additional motor and ratio options are available to meet specific capacity, speed, or life requirements.

Common Applications

Steel Mill
- Dust collection damper operation actuating 4 tons with a 19" stroke.
- Lifting car trucks operation requiring 2 linked units lifting 44 tons.

Food Plant
- Processing machine requiring 1 ton capacity unit with a 12" stroke.

Waste Water Treatment
- Scum skimmer machine actuating 660 lbs. with a 12" stroke.
- Driving a dehydration cake hopper actuating 2 tons with a 27.5" stroke.

Incineration Plant
- Waste pusher actuating 10 tons with a 19" stroke.
- Driving stoker actuating 4 tons requiring 4 linked units.

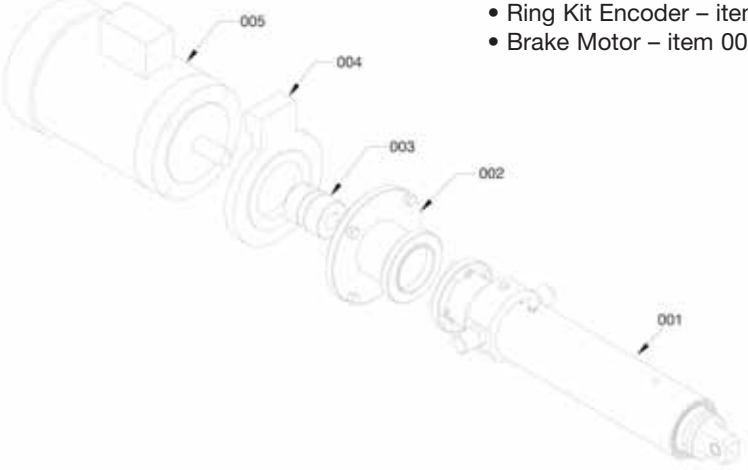
Security
- Raises security barriers.

Configurations & Components SCD/SCW Series

The SCD Series SuperCylinder is available in an in-line – direct drive configuration and is supplied with the components shown below. Stainless steel, and "wash-down" grade protection can be specified for certain models within the SCD, SCW, and SCN configurations.

Common SCD Series components are:

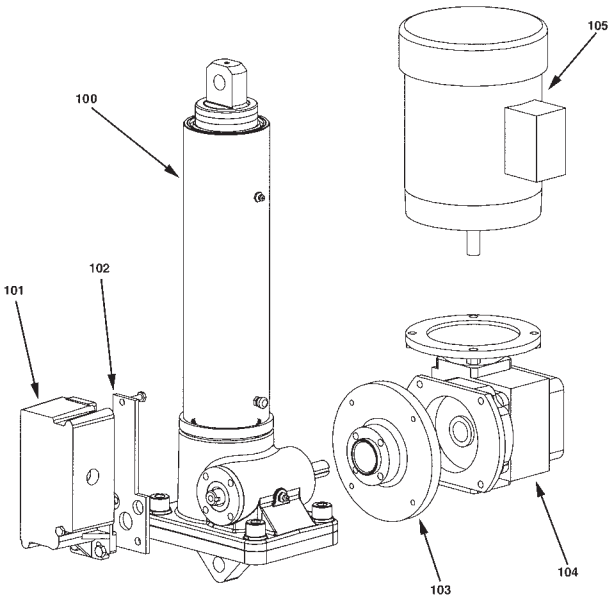
- Tube Assembly & Trunnion Housing – item 001
- Motor Adapter – item 002
- Coupling – item 003
- Ring Kit Encoder – item 004
- Brake Motor – item 005



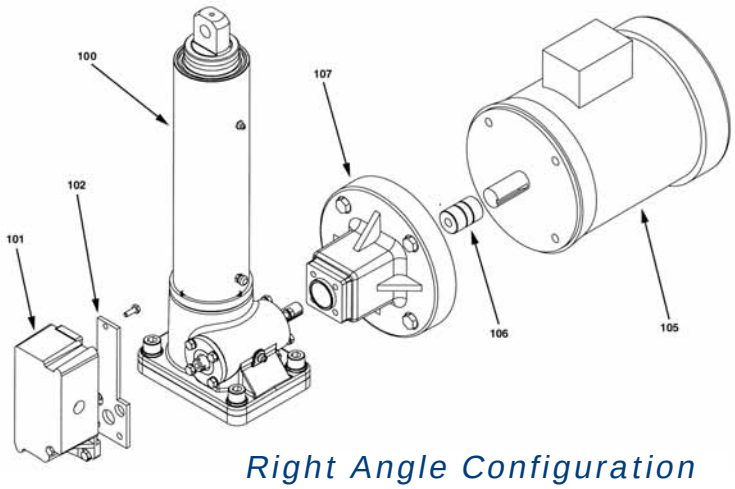
The SCW Series SuperCylinders come in two basic configurations depending on the performance desired and components used.

Common SCW Series components are:

- Actuator and Tube Assembly – item 100
- Limit Switch and Adapter Plates – item numbers 101 & 102
- Flange – item 103 (parallel configuration only)
- Reducer – item 104 (parallel configuration only)
- Brake Motor – item 105
- Coupling – item 106 (right angle configuration only)
- C-face adapter – item 107 (right angle configuration only)



Parallel Configuration



Right Angle Configuration

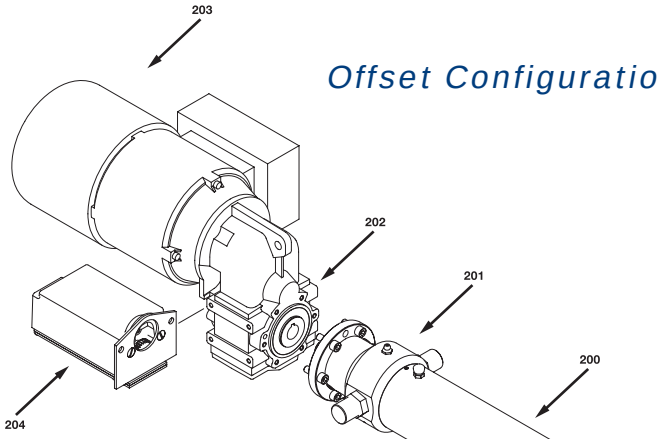
For additional assistance, contact our Application Engineers at (800) 477-5002.

The SCN Series SuperCylinders are available in three configurations – depending not only on desired performance, but also space considerations. Available configurations are Offset, Right Angle, and Parallel.

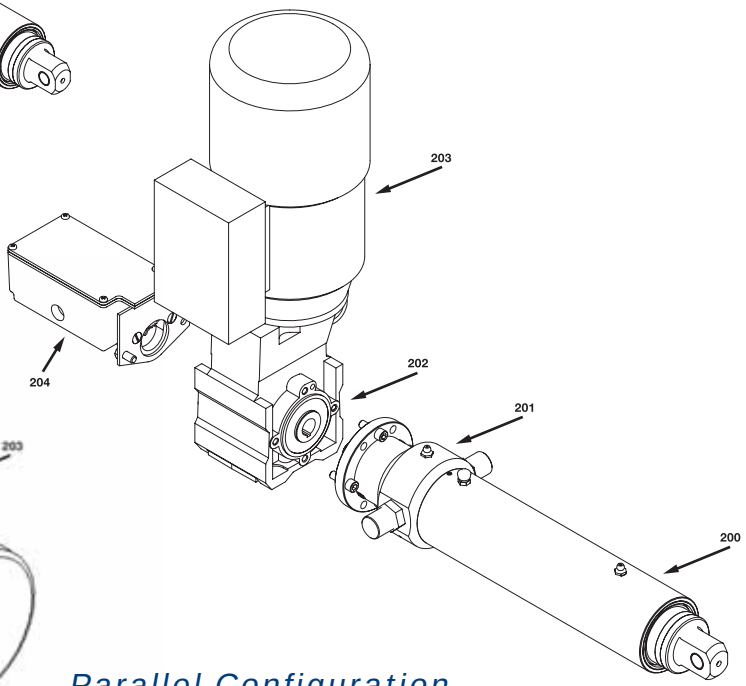
Common SCN Series components are:

- Tube Assembly – item 200
- Trunnion Housing – item 201
- Gear Box (oil filled) – item 202
- Brake Motor – item 203
- Limit Switch – item 204
- C-face Adapter – item 205 (parallel & select right angle configurations only)

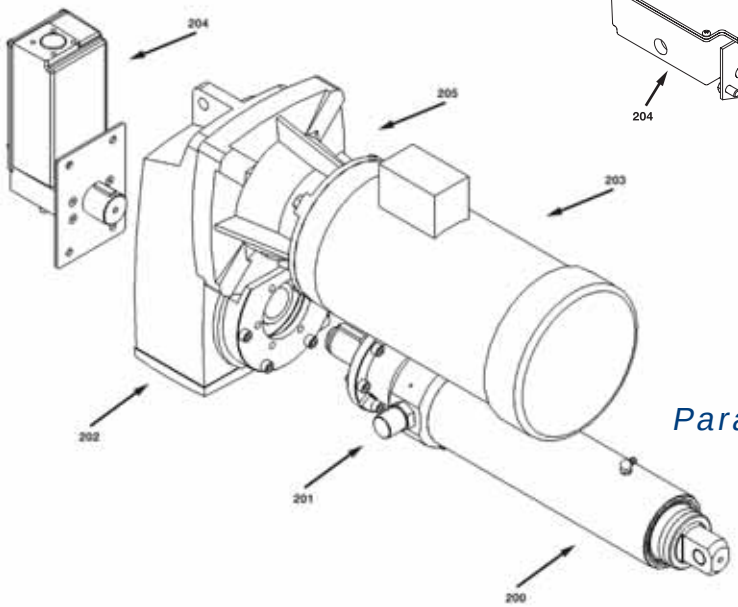
Offset Configuration

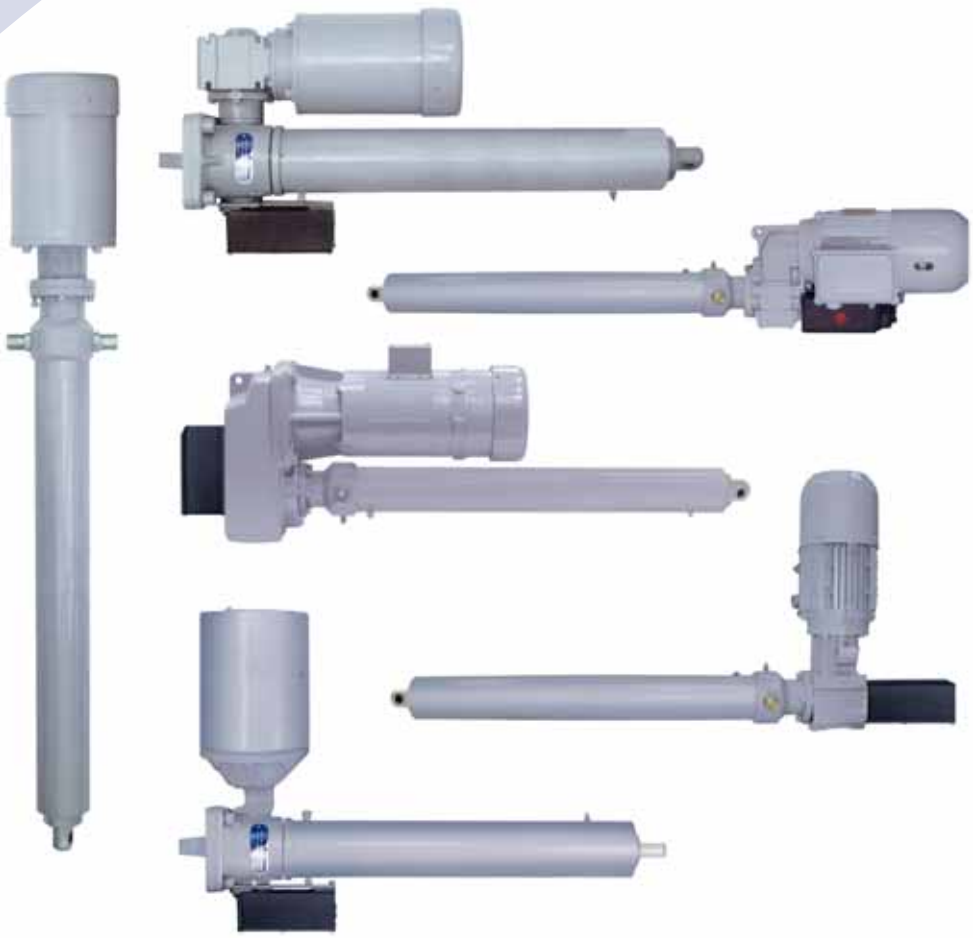


Right Angle Configuration



Parallel Configuration





1. Define the application's operating parameters:

   a. Total capacity – in most cases either the SCW or SCN Series will actuate the desired load.
   b. Load per cylinder (if more than one is required)
   c. Desired lifting speed – for applications requiring high speeds well in excess of 100 inches of travel per minute an SCN Series model should be chosen. Applications requiring speeds exceeding 379.5 inches per minute should consider using the SCD Series models.
   d. Travel (distance to move the load)
   e. Load type (tension, compression, guided, unguided)
   f. Ambient temperatures (-20˚ to 120˚ F, -29˚ to 50˚ C)
   g. Efficiency consideration – for applications requiring highly efficient – high duty cycles one should consider using a SCN Series model.
   h. Mounting considerations – There are two mounting configurations available – clevis and trunnion mounts. Should there be mounting restrictions; clevis mount applications should consider the SCW Series, and trunnion mount applications should consider the SCN or SCD Series. If one selects a SCN Series model, be sure to reference the closest matching mounting position as depicted on page 9.

i. Installation space restrictions – both the SCW and SCN series models are available with Right Angle and Parallel configurations. SCN Series models are available with an Offset configuration.
j. Screw life – Ball Screw and nut technology are used in all SCN, SCD, and many SCW Series models. Screw life ratings are listed in the table for each model. Given the inverse relationship between load rating and screw life; if the application requires a long screw life decreasing the load should be considered. Alternatively, increasing the cylinder's static capacity is another option to effectively move the load and achieve longer screw life.

2. Determine which SuperCylinder series best suits the application:
SCW Series – see pages 12 – 19 for details.
SCN Series – see pages 20 – 35 for details.
SCD Series – see pages 36 – 38 for details.

3. Verify the cylinder selection:
Verify the SuperCylinder's capacity, speed, travel requirements, mounting position, and environmental factors.

⚠ WARNING

- Input revolutions should not exceed 1800 RPM's.
- Never exceed the SuperCylinder's maximum static capacity.
- Never exceed the HP listed in our specification tables. If the application requires a higher HP than the model being considered, one should reduce the lifting speed, use a larger capacity cylinder, choose another ratio, consider a more efficient model containing ball screw, or perhaps choose the SCN Series.
- As duty cycles are intermittent, there is an inverse relationship regarding an actuator's duty cycle and the load being moved. Please consult our application engineers for assistance in determining the most appropriate service factor.
- Models featuring ball screws are inherently self-lowering. Should one of these models be the best fit for an application, a brake motor with sufficient torque is required. Please contact out application engineers for assistance.

Application Analysis Form for SuperCylinder™ Actuators

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. **Configuration** (check one): Right Angle _____ Offset _____ Parallel _____

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

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

10a. **Mounting** (SCW Series): Tube pointed at _____ o'clock.

10b. **Mounting Position Code** (SNC Series, see catalog pg. 9): _____
   (This is required to allow for proper oil filling of the gearbox. Choose the option that most closely matches actual installed position.)

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

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

Name _____ Title _____

Company _____ Phone _____

Address _____ Fax _____

City, State, Zip _____ E-mail _____

For additional assistance, contact our Application Engineers at (800) 477-5002.

ISO 9001:2000

SCN Series SuperCylinder Mounting Positions

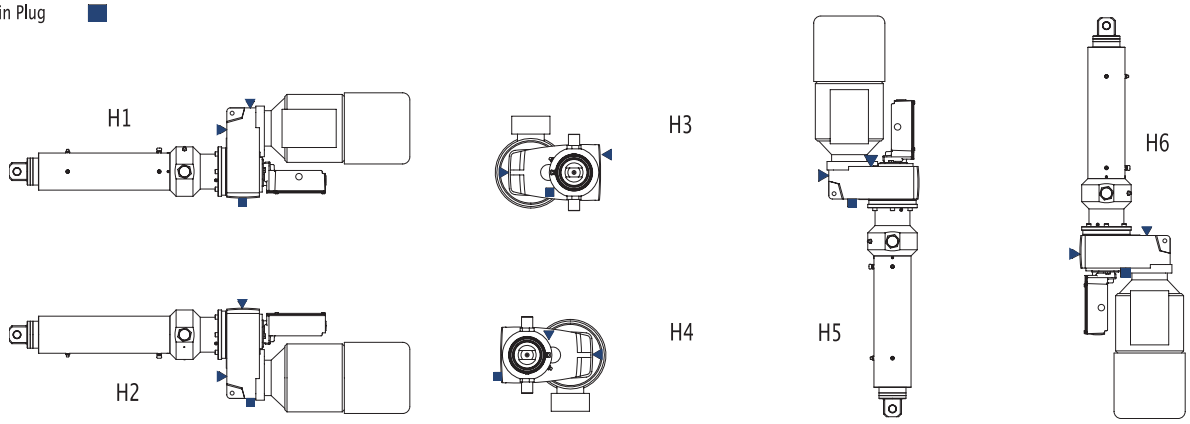
Because the SCN Series uses oil filled gear boxes, it is very important for Duff-Norton to know the cylinder's application mounting position. Providing this information to Duff-Norton will ensure that the level plug, vent plug, and drain plugs are located on the gearbox in the position best suited for the application. Please review the drawings below and provide the appropriate mounting code (see our Application Analysis Form pg. 8)

Example: the customer wants an offset configuration with the cylinder pointing straight up for a compression application. The proper mounting code would be H6.

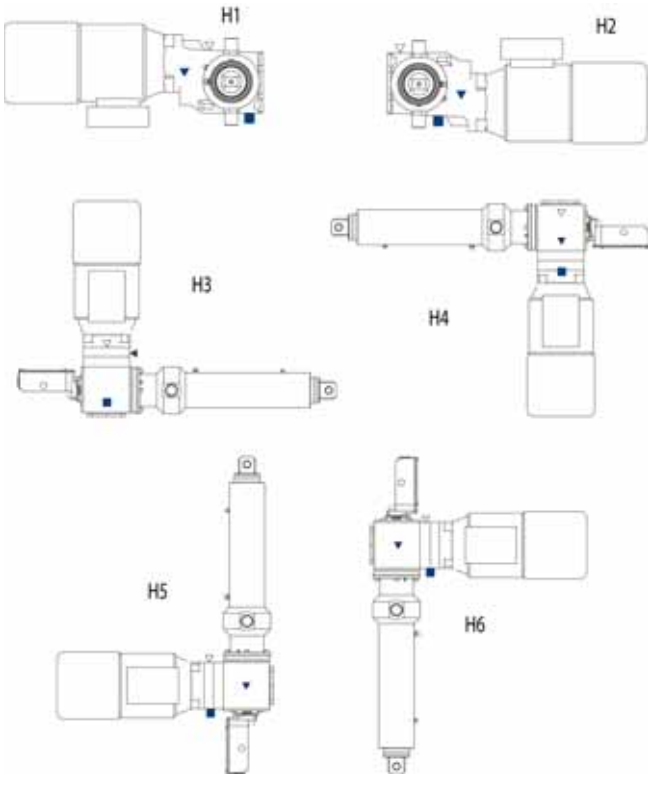
Common Symbols

Vent Plug ▼
Level Plug ▼
Drain Plug ■

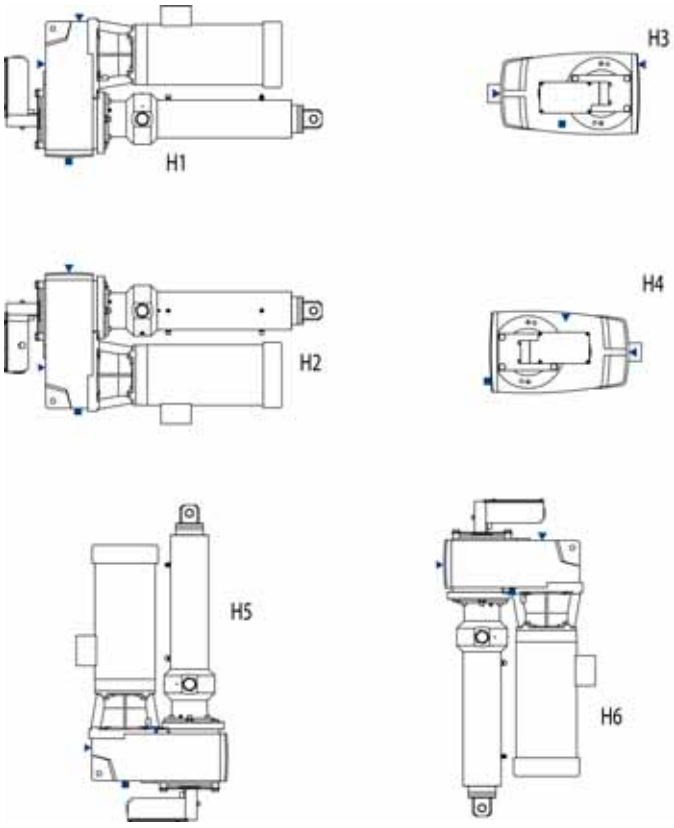
Offset Mounting Position Codes



Right Angle Mounting Position Codes



Parallel Mounting Position Codes



SuperCylinder Models- Quick Reference

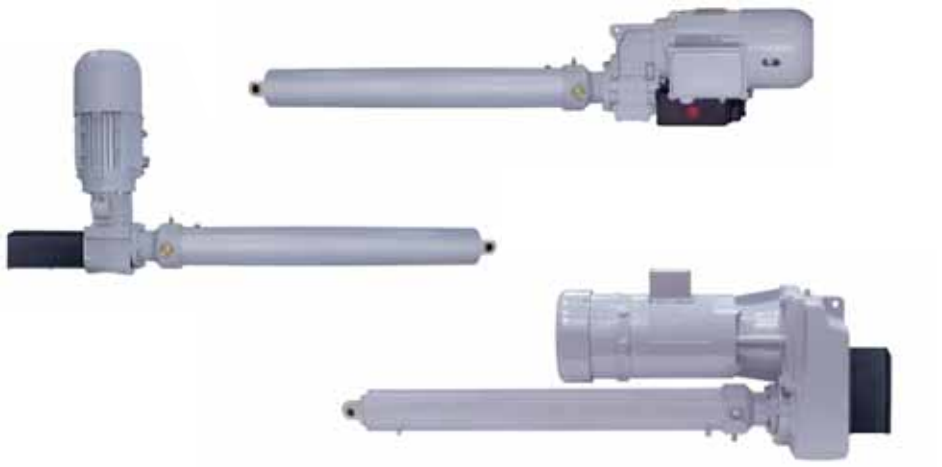
SCW Worm Gear Series

All SCW Models are clevis mounted

Series	Model	Capacity (lbs.)	Speed (in/min)	HP (1725)	Max Stroke (inches)	Screw Life (million in.)	Dia x Lead (inches)	Screw Type	Configuration
SCW02	W0206A25	2360	72	2	51.0	N/A	1.00 x .25	Acme	Right Angle
	W0206B25	3280	72	1	58.0	1.0	1.00 x .25	Ball	Right Angle
Catalog	W0212A25	1300	36	3/4*	51.0	N/A	1.00 x .25	Acme	Right Angle
Page	W0212B25	4000	36	3/4	52.0	0.52	1.00 x .25	Ball	Right Angle
12-13	W0224B25	3500	18	1/2	56.0	0.78	1.00 x .25	Ball	Right Angle
SCW03	W0306B41	4300	119	2	54.0	0.74	1.17 x .41	Ball	Right Angle
	R0330B01	3600	57.5	1	55.0	0.21	1.00 x 1.00	Ball	Parallel
Catalog	R0345B01	3040	38.3	1/2	59.0	0.35	1.00 x 1.00	Ball	Parallel
Page	R0360B01	3480	28.8	1/2	56.0	0.23	1.00 x 1.00	Ball	Parallel
12-13	R0330B41	6000	23.8	3/4	46.0	0.27	1.17 x .41	Ball	Parallel
	R0345B41	4700	15.8	1/3	52.0	0.57	1.17 x .41	Ball	Parallel
	R0330A25	5330	14.4	1	34.0	N/A	1.00 x .25	Acme	Parallel
	R0360B41	5600	11.9	1/3	47.0	0.34	1.17 x .41	Ball	Parallel
	R0360A25	5100	7.2	1/2*	35.0	N/A	1.00 x .25	Acme	Parallel
	R03120A25	5300	3.6	1/3*	34.0	N/A	1.00 x .25	Acme	Parallel
SCW05	W0506B47	5850	136	3	79.0	5.7	1.50 x .474	Ball	Right Angle
	R0530B18	6400	108	3	76.0	1.4	1.50 x 1.875	Ball	Parallel
Catalog	R0545B18	9280	72.0	3	62.0	0.44	1.50 x 1.875	Ball	Parallel
Page	R0530B01	8000	57.5	2	68.0	0.84	1.50 x 1.0	Ball	Parallel
14-15	R0545B01	8700	38.3	1-1/2	66.0	0.65	1.50 x 1.0	Ball	Parallel
	R0530B47	9200	27.2	1	64.0	1.5	1.50 x .473	Ball	Parallel
	R0530A37	10000	21.5	3	57.0	N/A	1.50 x .375	Acme	Parallel
	R0545B47	10000	18.1	3/4	61.0	1.1	1.50 x .473	Ball	Parallel
	R0560B47	8900	13.6	1/2	65.0	1.6	1.50 x .473	Ball	Parallel
	R0560A37	10000	10.8	1-1/2	57.0	N/A	1.50 x .375	Acme	Parallel
	R05120B47	10000	6.8	1/3	61.0	1.1	1.50 x .473	Ball	Parallel
	R05120A37	9800	5.4	3/4*	57.0	N/A	1.50 x .375	Acme	Parallel
	R05240B47	10000	3.4	1/4	61.0	1.1	1.50 x .473	Ball	Parallel
SCW10	W1008B50	11000	108	5	108.0	7.2	2.25 x .50	Ball	Right Angle
	W1012B50	9600	72	3	108.0	10.9	2.25 x .50	Ball	Right Angle
Catalog	R1040A50	20000	21.6	5	69.0	N/A	2.00 x .50	Acme	Parallel
Page	R1040B50	20000	21.6	2	108.0	1.2	2.25 x .50	Ball	Parallel
16-17	R1060B50	15500	14.4	1	108.0	2.6	2.25 x .50	Ball	Parallel
	R1080B50	20000	10.8	1	108.0	1.2	2.25 x .50	Ball	Parallel
	R1080A50	17500	10.8	2	73.0	N/A	2.00 x .50	Acme	Parallel
	R10160B50	18900	5.4	1/2	108.0	1.4	2.25 x .50	Ball	Parallel
	R10160A50	20000	5.4	1-1/2	69.0	N/A	2.00 x .50	Acme	Parallel
	R10320A50	20000	2.7	3/4*	69.0	N/A	2.00 x .50	Acme	Parallel
SCW20	R2040B50	30700	21.6	3	132.0	0.42	2.50 x .50	Ball	Parallel
	R2060B50	29700	14.4	2	132.0	0.46	2.50 x .50	Ball	Parallel
Catalog	R2080B50	29300	10.8	1.5	132.0	0.48	2.50 x .50	Ball	Parallel
Page	R2080A50	32000	10.8	5*	99.0	N/A	2.50 x .50	Acme	Parallel
18	R20160B50	26800	5.4	3/4	132.0	0.63	2.50 x .50	Ball	Parallel
	R20160A50	35000	5.4	3*	94.0	N/A	2.50 x .50	Acme	Parallel
	R20320B50	30900	2.7	1/2	132.0	0.41	2.50 x .50	Ball	Parallel
	R20320A50	32000	2.7	1.5*	99.0	N/A	2.50 x .50	Acme	Parallel
SCW25	R2556B66	50000	20.1	5	130.0	0.70	3.00 x .660	Ball	Parallel
	R2578B66	49300	14.6	3	130.0	0.73	3.00 x .660	Ball	Parallel
Catalog	R25104A66	49500	11.0	7-1/2*	138.0	N/A	3.00 x .666	Acme	Parallel
Page	R25115B66	49900	9.8	2	130.0	0.70	3.00 x .660	Ball	Parallel
19	R25150A66	47400	7.7	5	140.0	N/A	3.00 x .666	Acme	Parallel
	R25156B66	50000	7.3	1-1/2	130.0	0.70	3.00 x .660	Ball	Parallel
	R25248A66	47280	4.6	3	140.0	N/A	3.00 x .666	Acme	Parallel
	R25334B66	50000	3.4	3/4	130.0	0.70	3.00 x .660	Ball	Parallel
	R25398A66	50000	2.9	2	138.0	N/A	3.00 x .666	Acme	Parallel

For additional assistance, contact our Application Engineers at (800) 477-5002.

SCN Helical and Helical Bevel Gear Series



Series	Capacity (lbs.)	Speed (in/min)	Std. HP	Max Stroke (inches)	Screw Life (million in.)	Dia x Lead (inches)	Screw Type	Configuration	Mounting
SCN03	2134 - 6000	8.6 - 165.5	.16 - 1.0	61.0	.30 - 6.1	1.17x .413	Ball	Offset	Trunnion
Catalog	2879 - 6000	5.5 - 155.7	.16 - 1.5	61.0	.30 - 2.5	1.17x .413	Ball	Parallel	Trunnion
Page 20-23	2637 - 4991	12.8 - 182.4	.16 - 1.5	61.0	.70 - 3.2	1.17x .413	Ball	Right Angle	Trunnion
SCN06	4481 - 6633	185.2 - 354.9	3.0 - 5.0	80.0	2.4 - 4.8	1.50 x 1.00	Ball	Offset	Trunnion
Catalog	5645 - 12000	5.1 - 168.2	.25 - 3.0	77.0	.60 - 5.6	1.50 x .474	Ball	Offset	Trunnion
Pages 24-27	2773 - 4147	204.6 - 379.5	2.0 - 3.0	80.0	6.1 - 20.3	1.50 x 1.00	Ball	Parallel	Trunnion
	5900 - 12000	7.2 - 179.9	.33 - 3.0	77.0	.60 - 4.9	1.50 x .474	Ball	Parallel	Trunnion
	3281 - 5131	179.5 - 320.8	2.0 - 3.0	80.0	7.2 - 12.2	1.50 x 1.00	Ball	Right Angle	Trunnion
	6980 - 12000	12.8 - 152.0	.33 - 3.0	77.0	.70 - 3.0	1.50 x .474	Ball	Right Angle	Trunnion
SCN12	9305 - 24000	3.1 - 188.5	.25 - 5.0	110.0	.70 - 12.0	2.25 x .050	Ball	Offset	Trunnion
Catalog	9697 - 24000	5.5 - 180.9	.33 - 5.0	110.0	.80 - 10.6	2.25 x .050	Ball	Parallel	Trunnion
Pages 28-31	13469 - 23117	13.3 - 176.7	.75 - 7.5	110.0	.80 - 2.9	2.25 x .050	Ball	Right Angle	Trunnion
SCN25	14005 - 50000	2.3 - 250.4	.33 - 10.0	161.0	.70 - 31.7	3.00 x .660	Ball	Offset	Trunnion
Catalog	13505 - 50000	8.4 - 259.7	1.0 - 10.0	161.0	.70 - 35.3	3.00 x .660	Ball	Parallel	Trunnion
Pages 32-35	26510 - 50000	3.8 - 132.3	.50 - 10.0	161.0	.70 - 4.7	3.00 x .660	Ball	Right Angle	Trunnion

SCD Direct Drive Series

Model	HP >	1	1.5	2	3	5	Motor RPM	Max Stroke (inches)	Screw Life (million in.)	Dia x Lead (inches)
	Speed (in/sec)	Capacity (lbs.)								
SCD02	4.75	1249	1873	2498	3747	N.R.	1140	30	0.1 - 2.1	1.00 x .25
	7.19	825	1238	1651	2476	N.R.	1725	24	0.3 - 7.5	1.00 x .25
SCD03	7.85	756	1134	1512	2268	3780	1140	31	1.1 - 136.7	1.17 x .41
	11.87	500	749	999	1499	2498	1725	25	3.8 - 472.4	1.17 x .41
SCD06	9.00	659	988	1317	1976	3293	1140	36	28.4 - 3546.8	1.50 x .47
	13.63	435	653	871	1306	2177	1725	29	29.2 - 12331.9	1.50 x .47

These tables illustrate the wide capacity and speed ranges of the Duff-Norton SCN and SCD Series. Contact our Application Engineers at (800) 477-5002 for assistance in selecting the specific model that best suits your application.

SCW02 & SCW03 Series

Specifications

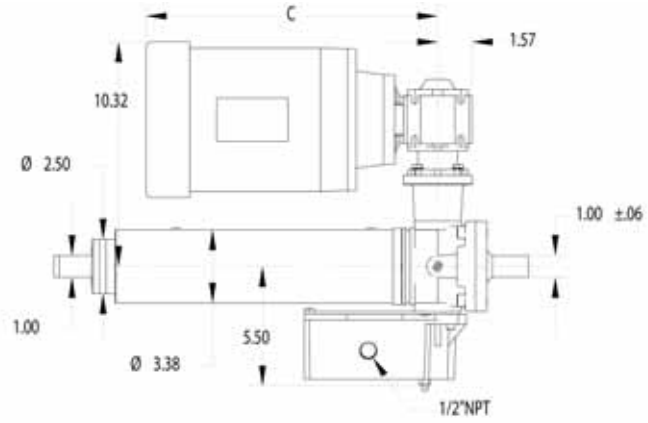
Maximum Capacity	2-3 Tons
Maximum Speed	119 in/min
Temperature Range*	0° to 120° F (-18° to 50° C)
Construction	Ductile iron actuator housing, and thin dense nodular chrome plated translating tubes. The translating tubes feature hydraulic cylinder grade wiper seals and are guided at both ends by polymeric bearings.
Power	Brake motor (230/460VAC, 3Ø, 60HZ standard)
Mounting	Double clevis
Load Screw	ACME or ball screw
Limit Switches	Independently adjustable, traveling nut style for best repeatability and setting ease

** For other temperatures contact customer service*

Series	Model	Capacity (lbs.)	Speed (in/min)	HP (1725)	Max Stroke (inches)	Screw Life (million in.)	Dia x Lead (inches)	Screw Type	Configuration	Mounting
SCW02	W0206A25	2360	72	2	51.0	N/A	1.00 x .25	Acme	Right Angle	Clevis
	W0206B25	3280	72	1	58.0	1.0	1.00 x .25	Ball	Right Angle	Clevis
	W0212A25	1300	36	3/4*	51.0	N/A	1.00 x .25	Acme	Right Angle	Clevis
	W0212B25	4000	36	3/4	52.0	0.52	1.00 x .25	Ball	Right Angle	Clevis
	W0224B25	3500	18	1/2	56.0	0.78	1.00 x .25	Ball	Right Angle	Clevis
SCW03	W0306B41	4300	119	2	54.0	0.74	1.17 x .41	Ball	Right Angle	Clevis
	R0330B01	3600	57.5	1	55.0	0.21	1.00 x 1.00	Ball	Parallel	Clevis
	R0345B01	3040	38.3	1/2	59.0	0.35	1.00 x 1.00	Ball	Parallel	Clevis
	R0360B01	3480	28.8	1/2	56.0	0.23	1.00 x 1.00	Ball	Parallel	Clevis
	R0330B41	6000	23.8	3/4	46.0	0.27	1.17 x .41	Ball	Parallel	Clevis
	R0345B41	4700	15.8	1/3	52.0	0.57	1.17 x .41	Ball	Parallel	Clevis
	R0330A25	5330	14.4	1	34.0	N/A	1.00 x .25	Acme	Parallel	Clevis
	R0360B41	5600	11.9	1/3	47.0	0.34	1.17 x .41	Ball	Parallel	Clevis
	R0360A25	5100	7.2	1/2*	35.0	N/A	1.00 x .25	Acme	Parallel	Clevis
	R03120A25	5300	3.6	1/3*	34.0	N/A	1.00 x .25	Acme	Parallel	Clevis

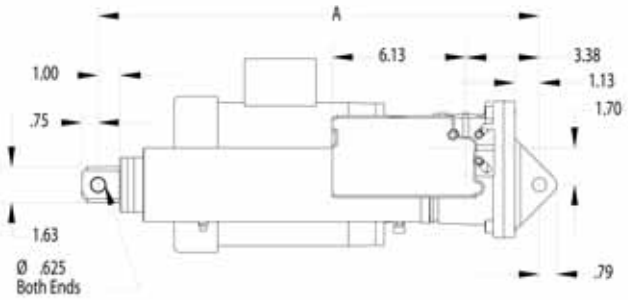
Models with asterisk by motor HP are inherently load holding. Motor brake may be omitted if slight drift is acceptable.

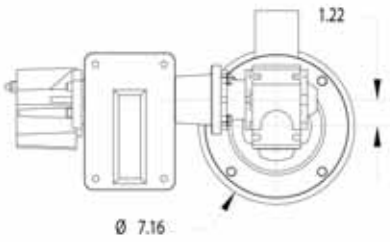
Product Dimensions

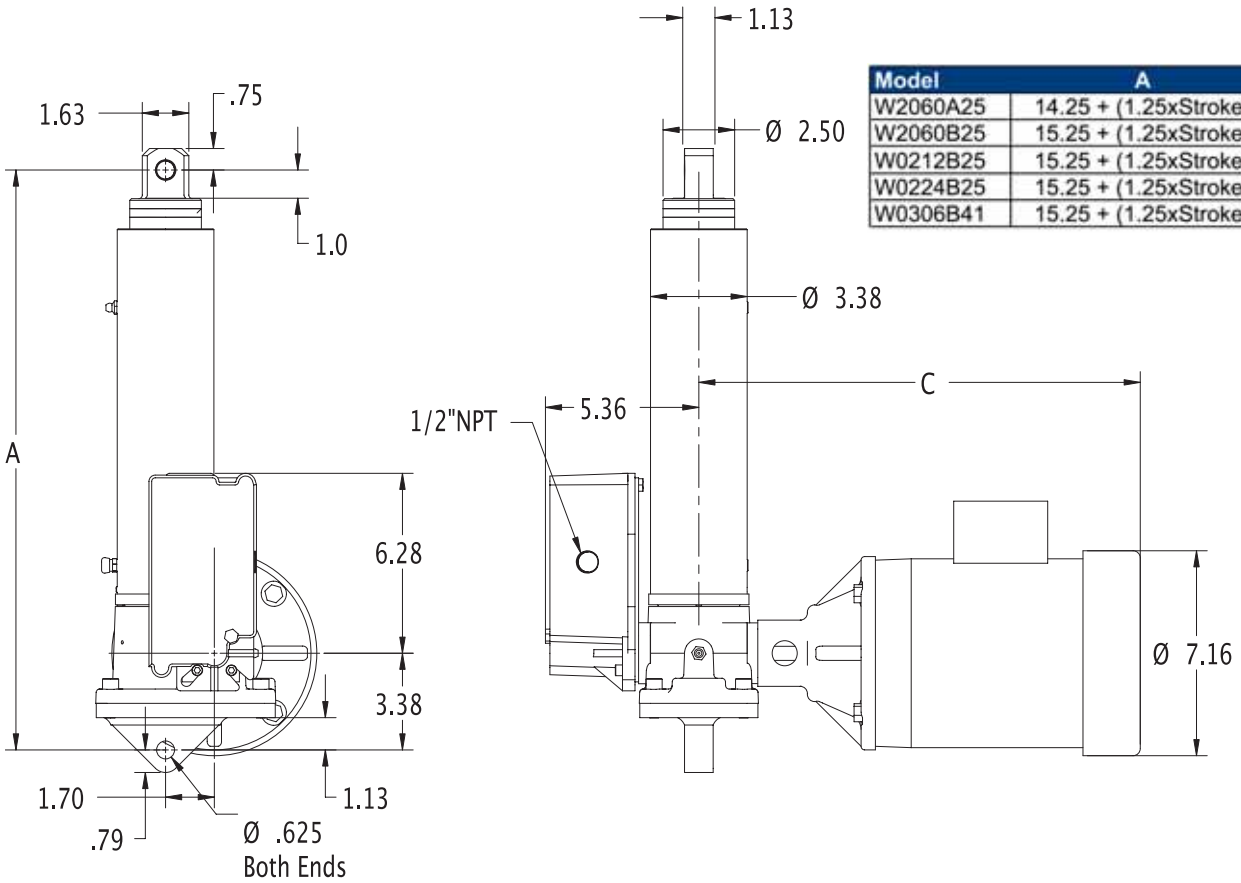


Standard orientations shown.
Reducer, motor, and limit switch
can be rotated 90° increments.

Model	A	C
R0330B01	15.25 + (1.25xStroke)	17.64
R0345B01	15.25 + (1.25xStroke)	17.14
R0360B01	15.25 + (1.25xStroke)	17.14
R0330B41	15.25 + (1.25xStroke)	17.14
R0345B41	15.25 + (1.25xStroke)	15.64
R0330A25	14.25 + (1.25xStroke)	17.64
R0360B41	15.25 + (1.25xStroke)	15.64
R0360A25	14.25 + (1.25xStroke)	17.14
R03120A25	14.25 + (1.25xStroke)	15.64







Model	A	C
W2060A25	14.25 + (1.25xStroke)	22.1
W2060B25	15.25 + (1.25xStroke)	19.7
W0212B25	15.25 + (1.25xStroke)	19.2
W0224B25	15.25 + (1.25xStroke)	19.2
W0306B41	15.25 + (1.25xStroke)	22.1

Specifications

Maximum Capacity	5 Tons
Maximum Speed	136 in/min
Temperature Range*	0° to 120° F (-18° to 50° C)
Construction	Ductile iron actuator housing, and thin dense nodular chrome plated translating tubes. The translating tubes feature hydraulic cylinder grade wiper seals, and are guided at both ends by polymeric bearings.
Power	Brake motor (230/460VAC, 3Ø, 60HZ standard)
Mounting	Double clevis
Load Screw	ACME or ball screw
Limit Switches	Independently adjustable, traveling nut style for best repeatability and setting ease

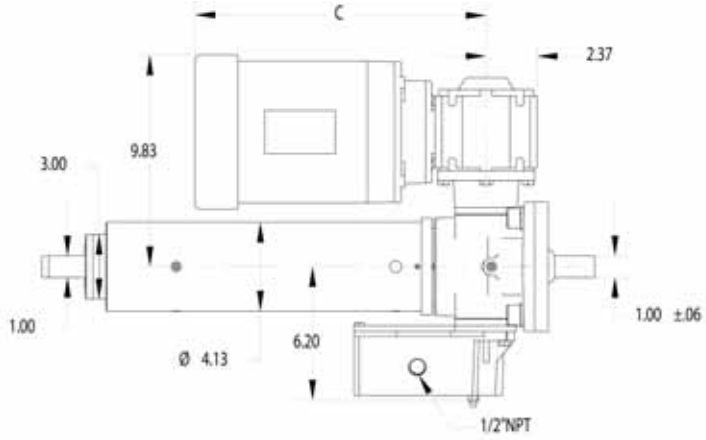
** For other temperatures contact customer service*

Series	Model	Capacity (lbs.)	Speed (in/min)	HP (1725)	Max Stroke (inches)	Screw Life (million in.)	Dia x Lead (inches)	Screw Type	Configuration	Mounting
SCW05	W0506B47	5850	136	3	79.0	5.7	1.50 x .474	Ball	Right Angle	Clevis
	R0530B18	6400	108	3	76.0	1.4	1.50 x 1.875	Ball	Parallel	Clevis
	R0545B18	9280	72.0	3	62.0	0.44	1.50 x 1.875	Ball	Parallel	Clevis
	R0530B01	8000	57.5	2	68.0	0.84	1.50 x 1.0	Ball	Parallel	Clevis
	R0545B01	8700	38.3	1-1/2	66.0	0.65	1.50 x 1.0	Ball	Parallel	Clevis
	R0530B47	9200	27.2	1	64.0	1.5	1.50 x .473	Ball	Parallel	Clevis
	R0530A37	10000	21.5	3	57.0	N/A	1.50 x .375	Acme	Parallel	Clevis
	R0545B47	10000	18.1	3/4	61.0	1.1	1.50 x .473	Ball	Parallel	Clevis
	R0560B47	8900	13.6	1/2	65.0	1.6	1.50 x .473	Ball	Parallel	Clevis
	R0560A37	10000	10.8	1-1/2	57.0	N/A	1.50 x .375	Acme	Parallel	Clevis
	R05120B47	10000	6.8	1/3	61.0	1.1	1.50 x .473	Ball	Parallel	Clevis
	R05120A37	9800	5.4	3/4*	57.0	N/A	1.50 x .375	Acme	Parallel	Clevis
	R05240B47	10000	3.4	1/4	61.0	1.1	1.50 x .473	Ball	Parallel	Clevis

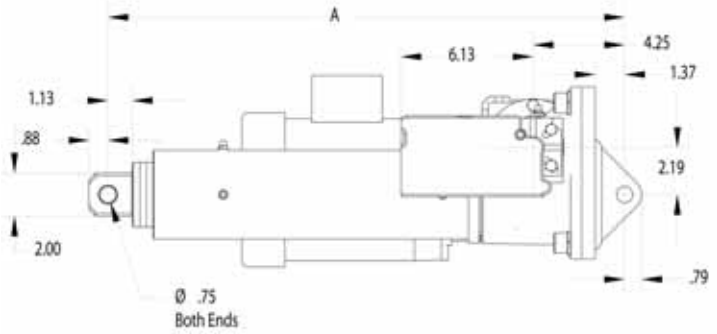
Models with asterisk by motor HP are inherently load holding. Motor brake may be omitted if slight drift is acceptable.

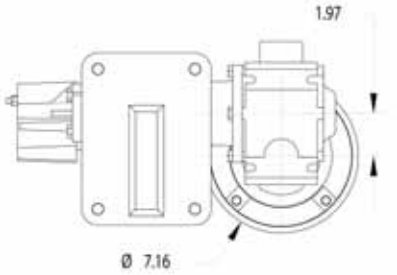
Product Dimensions

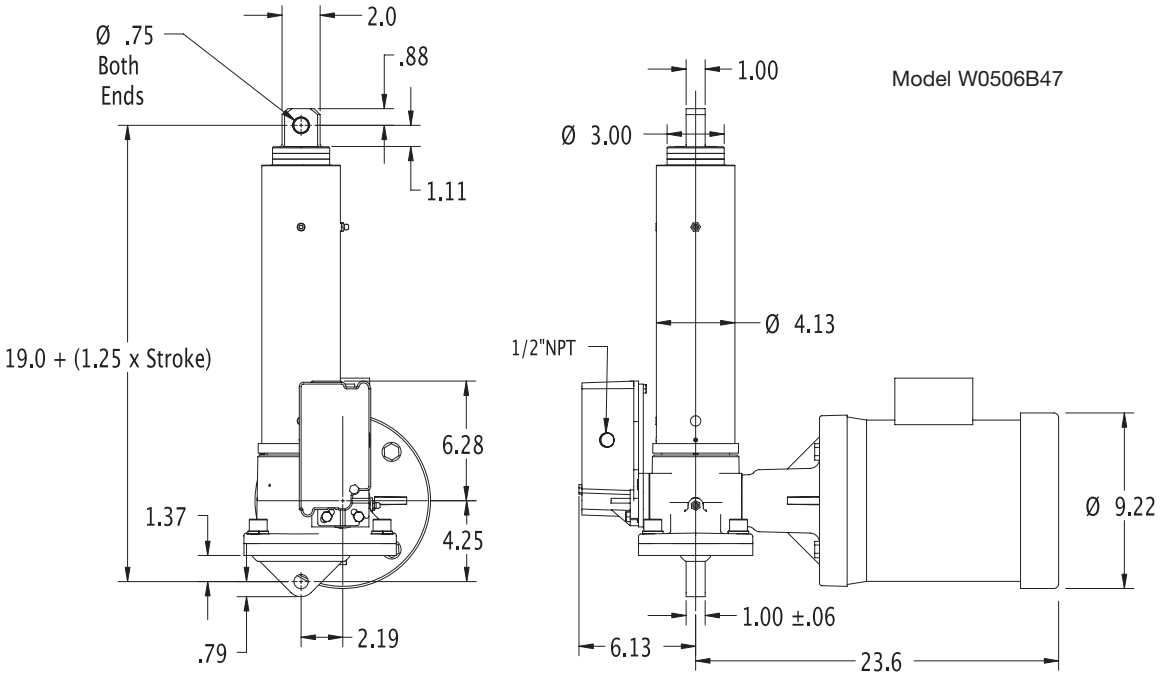
Standard orientations shown.
Reducer, motor, and limit switch
can be rotated 90° increments.



Model	A	C
R0530B18	19.5 + (1.25xStroke)	21.77
R0545B18	19.5 + (1.25xStroke)	21.77
R0530B01	19.5 + (1.25xStroke)	20.61
R0545B01	19.0 + (1.25xStroke)	19.61
R0530B47	19.0 + (1.25xStroke)	17.76
R0530A37	18.0 + (1.25xStroke)	21.77
R0545B47	19.0 + (1.25xStroke)	17.26
R0560B47	19.0 + (1.25xStroke)	17.26
R0560A37	18.0 + (1.25xStroke)	19.61
R05120B47	19.0 + (1.25xStroke)	15.76
R05120A37	18.0 + (1.25xStroke)	17.26
R05240B47	19.0 + (1.25xStroke)	15.76







Model W0506B47

Specifications

Maximum Capacity	10 Tons
Maximum Speed	108 in/min
Temperature Range*	0° to 120° F (-18° to 50° C)
Construction	Ductile iron actuator housing, and thin dense nodular chrome plated translating tubes. The translating tubes feature hydraulic cylinder grade wiper seals, and are guided at both ends by polymeric bearings.
Power	Brake motor (230/460VAC, 3Ø, 60HZ standard)
Mounting	Double clevis
Load Screw	ACME or ball screw
Limit Switches	Independently adjustable, traveling nut style for best repeatability and setting ease

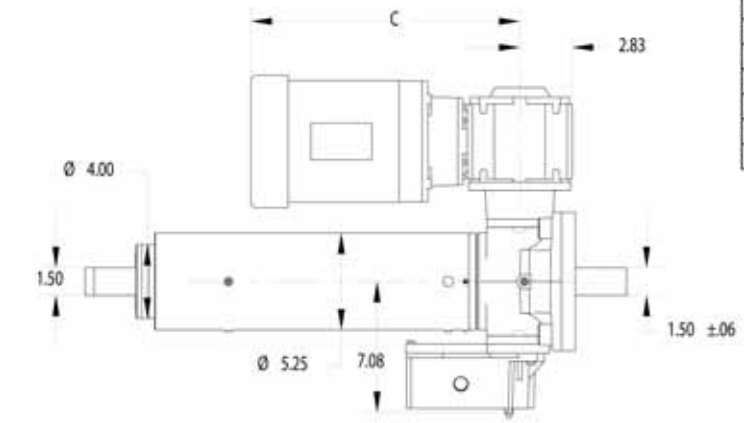
** For other temperatures contact customer service*

Series	Model	Capacity (lbs.)	Speed (in/min)	HP (1725)	Max Stroke (inches)	Screw Life (million in.)	Dia x Lead (inches)	Screw Type	Configuration	Mounting
SCW10	W1008B50	11000	108	5	108.0	7.2	2.25 x .50	Ball	Right Angle	Clevis
	W1012B50	9600	72	3	108.0	10.9	2.25 x .50	Ball	Right Angle	Clevis
	R1040A50	20000	21.6	5	69.0	N/A	2.00 x .50	Acme	Parallel	Clevis
	R1040B50	20000	21.6	2	108.0	1.2	2.25 x .50	Ball	Parallel	Clevis
	R1060B50	15500	14.4	1	108.0	2.6	2.25 x .50	Ball	Parallel	Clevis
	R1080B50	20000	10.8	1	108.0	1.2	2.25 x .50	Ball	Parallel	Clevis
	R1080A50	17500	10.8	2	73.0	N/A	2.00 x .50	Acme	Parallel	Clevis
	R10160B50	18900	5.4	1/2	108.0	1.4	2.25 x .50	Ball	Parallel	Clevis
	R10160A50	20000	5.4	1-1/2	69.0	N/A	2.00 x .50	Acme	Parallel	Clevis
	R10320A50	20000	2.7	3/4*	69.0	N/A	2.00 x .50	Acme	Parallel	Clevis

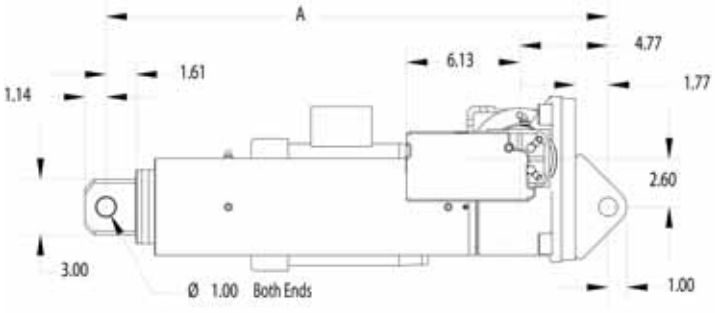
Models with asterisk by motor HP are inherently load holding. Motor brake may be omitted if slight drift is acceptable.

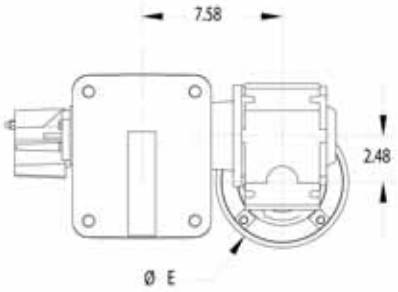
Product Dimensions

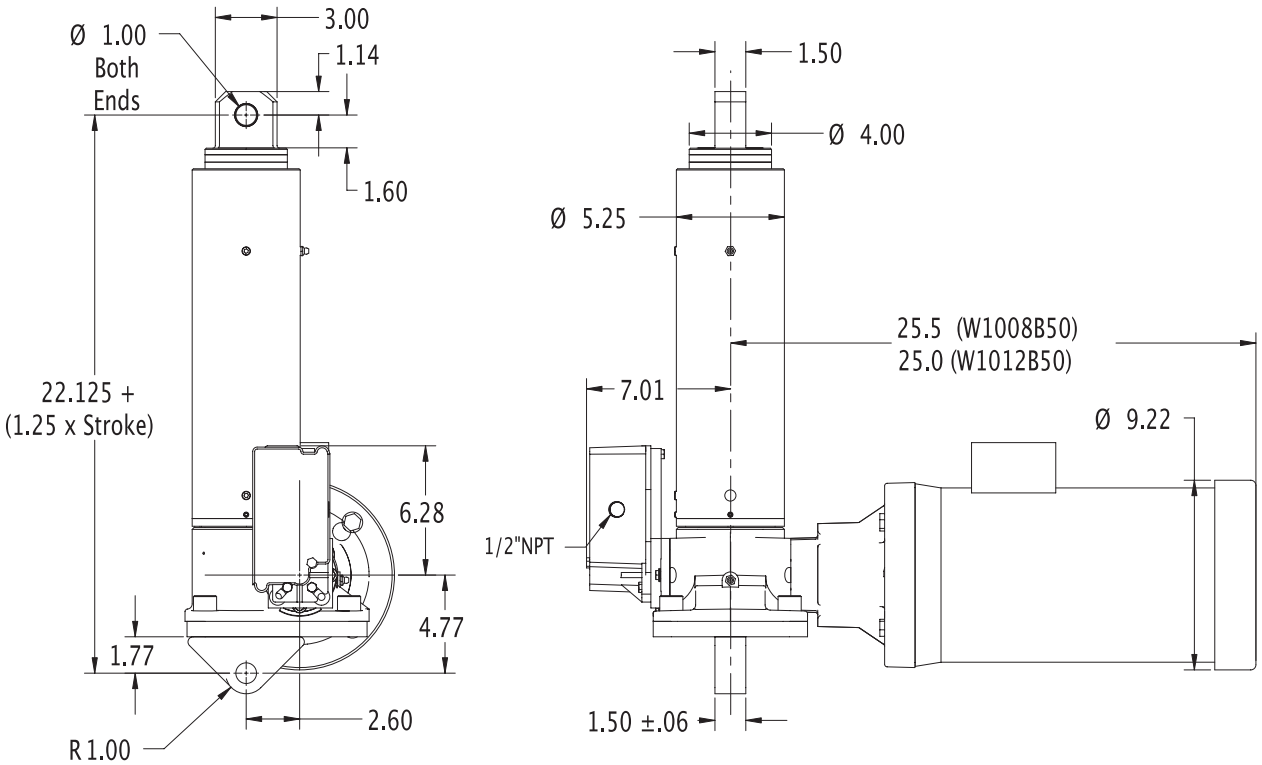
Model	A	C	E
R1040A50	19.625 + (1.25xStroke)	23.01	9.22
R1040B50	22.125 + (1.25xStroke)	21.20	7.16
R1060B50	22.125 + (1.25xStroke)	18.35	7.16
R1080B50	22.125 + (1.25xStroke)	18.35	7.16
R1080A50	19.625 + (1.25xStroke)	21.20	7.16
R10160B50	22.125 + (1.25xStroke)	17.85	7.16
R10160A50	19.625 + (1.25xStroke)	20.20	7.16
R10320A50	19.625 + (1.25xStroke)	17.85	7.16



Standard orientations shown.
Reducer, motor, and limit switch
can be rotated 90° increments.







Product Specifications

SCW20 Series

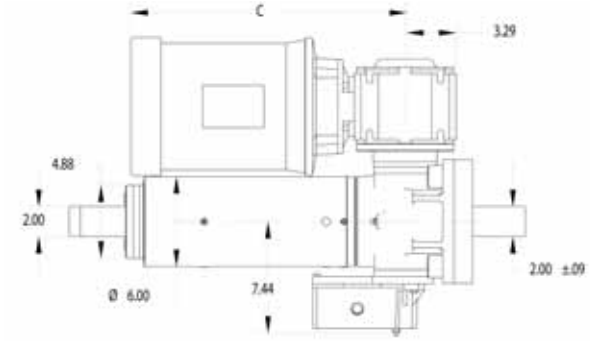
Specifications

Maximum Capacity	20 Tons
Maximum Speed	21.6 in/min
Temperature Range*	-0° to 120° F (-18° to 50° C)
Construction	Ductile iron actuator housing, and thin dense nodular chrome plated translating tubes. The translating tubes feature hydraulic cylinder grade wiper seals, and are guided at both ends by polymeric bearings.
Power	Brake motor (230/460VAC, 3Ø, 60HZ standard)
Mounting	Double clevis
Load Screw	ACME or ball screw
Limit Switches	Independently adjustable, traveling nut style for best repeatability and setting ease

** For other temperatures contact customer service*

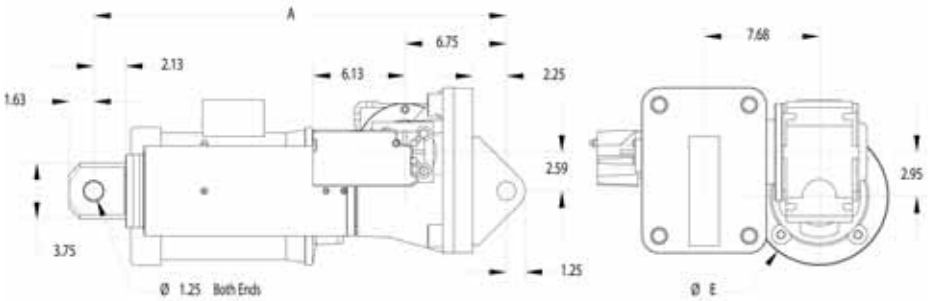
Series	Model	Capacity (lbs.)	Speed (in/min)	HP (1725)	Max Stroke (inches)	Screw Life (million in.)	Dia x Lead (inches)	Screw Type	Configuration	Mounting
SCW20	R2040B50	30700	21.6	3	132.0	0.42	2.50 x .50	Ball	Parallel	Clevis
	R2060B50	29700	14.4	2	132.0	0.46	2.50 x .50	Ball	Parallel	Clevis
	R2080B50	29300	10.8	1.5	132.0	0.48	2.50 x .50	Ball	Parallel	Clevis
	R2080A50	32000	10.8	5*	99.0	N/A	2.50 x .50	Acme	Parallel	Clevis
	R20160B50	26800	5.4	3/4	132.0	0.63	2.50 x .50	Ball	Parallel	Clevis
	R20160A50	35000	5.4	3*	94.0	N/A	2.50 x .50	Acme	Parallel	Clevis
	R20320B50	30900	2.7	1/2	132.0	0.41	2.50 x .50	Ball	Parallel	Clevis
	R20320A50	32000	2.7	1.5*	99.0	N/A	2.50 x .50	Acme	Parallel	Clevis

Models with asterisk by motor HP are inherently load holding. Motor brake may be omitted if slight drift is acceptable.



Standard orientations shown. Reducer, motor, and limit switch can be rotated 90° increments.

Model	A	C	E
R2040B50	26.25 + (1.25xStroke)	23.07	9.22
R2060B50	26.25 + (1.25xStroke)	21.97	7.16
R2080B50	26.25 + (1.25xStroke)	20.97	7.16
R2080A50	24.25 + (1.25xStroke)	23.52	9.22
R20160B50	26.25 + (1.25xStroke)	19.09	7.16
R20160A50	24.25 + (1.25xStroke)	23.07	9.22
R20320B50	26.25 + (1.25xStroke)	19.09	7.16
R20320A50	24.25 + (1.25xStroke)	20.97	7.16



For additional assistance, contact our Application Engineers at (800) 477-5002.

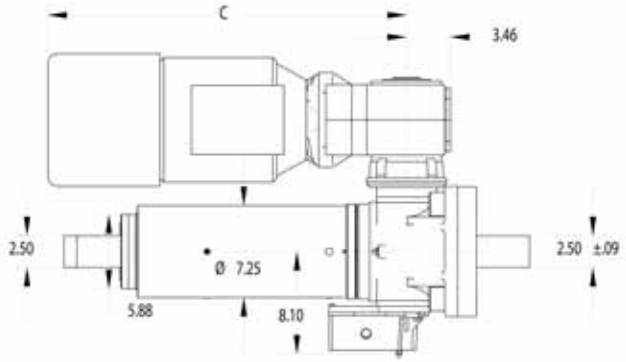
Specifications

Maximum Capacity	25 Tons
Maximum Speed	20.1 in/min
Temperature Range*	-0° to 120° F (-18° to 50° C)
Construction	Ductile iron actuator housing, and thin dense nodular chrome plated translating tubes. The translating tubes feature hydraulic cylinder grade wiper seals, and are guided at both ends by poly-meric bearings.
Power	Brake motor (230/460VAC, 3Ø, 60HZ standard)
Mounting	Double clevis
Load Screw	ACME or ball screw
Limit Switches	Independently adjustable, traveling nut style for best repeatability and setting ease

** For other temperatures contact customer service*

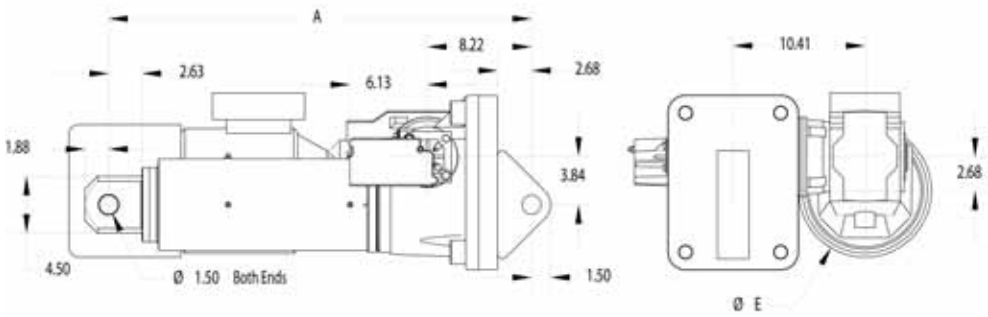
Series	Model	Capacity (lbs.)	Speed (in/min)	HP (1725)	Max Stroke (inches)	Screw Life (million in.)	Dia x Lead (inches)	Screw Type	Configuration	Mounting
SCW25	R2556B66	50000	20.1	5	130.0	0.70	3.00 x .660	Ball	Parallel	Clevis
	R2578B66	49300	14.6	3	130.0	0.73	3.00 x .660	Ball	Parallel	Clevis
	R25104A66	49500	11.0	7-1/2*	138.0	N/A	3.00 x .666	Acme	Parallel	Clevis
	R25115B66	49900	9.8	2	130.0	0.70	3.00 x .660	Ball	Parallel	Clevis
	R25150A66	47400	7.7	5	140.0	N/A	3.00 x .666	Acme	Parallel	Clevis
	R25156B66	50000	7.3	1-1/2	130.0	0.70	3.00 x .660	Ball	Parallel	Clevis
	R25248A66	47280	4.6	3	140.0	N/A	3.00 x .666	Acme	Parallel	Clevis
	R25334B66	50000	3.4	3/4	130.0	0.70	3.00 x .660	Ball	Parallel	Clevis
	R25398A66	50000	2.9	2	138.0	N/A	3.00 x .666	Acme	Parallel	Clevis

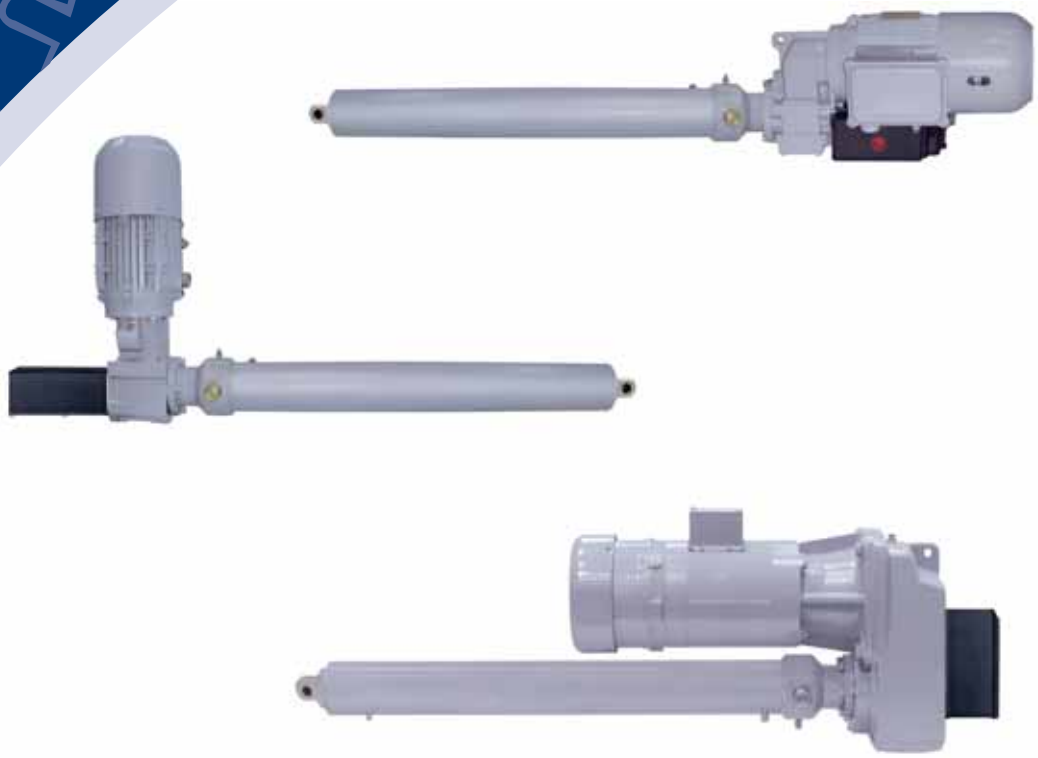
Models with asterisk by motor HP are inherently load holding. Motor brake may be omitted if slight drift is acceptable.



Standard orientations shown. Reducer, motor, and limit switch can be rotated 90° increments.

Model	A	C	E
R2556B66	32.12 + (1.25xStroke)	22.24	7.91
R2578B66	32.12 + (1.25xStroke)	22.24	7.91
R25104A66	29.12 + (1.25xStroke)	28.51	10.47
R25115B66	32.12 + (1.25xStroke)	20.43	7.20
R25150A66	29.12 + (1.25xStroke)	23.23	7.91
R25156B66	32.12 + (1.25xStroke)	20.43	7.20
R25248A66	29.12 + (1.25xStroke)	23.23	7.91
R25334B66	32.12 + (1.25xStroke)	17.83	6.50
R25398A66	29.12 + (1.25xStroke)	21.42	7.20





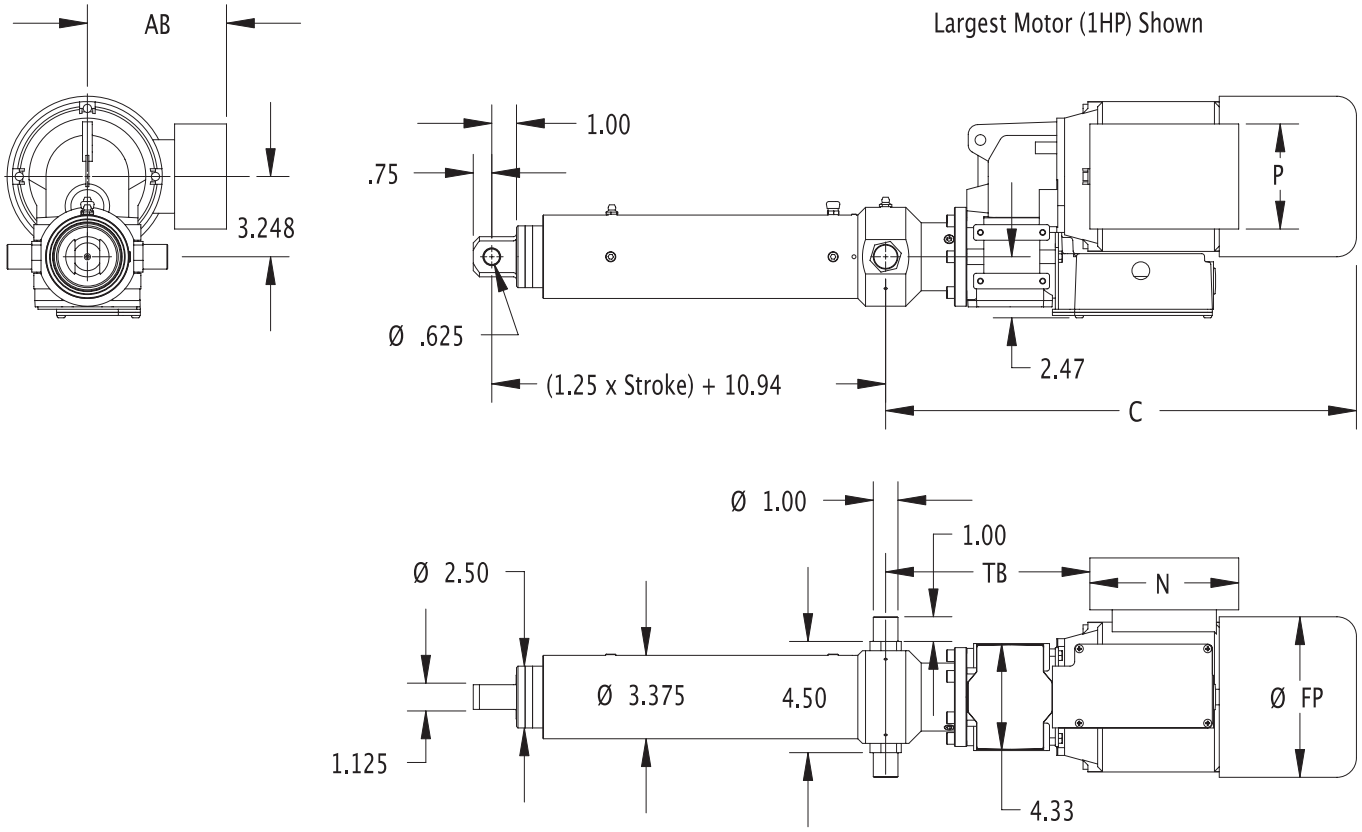
Specifications

Maximum Capacity	3 Tons
Maximum Speed	182.4 in/min
Temperature Range	-15° to 140° F (-29° to 60° C)
Construction	Steel trunnion housing, and thin dense nodular chrome plated translating tubes. The translating tubes feature hydraulic cylinder grade wiper seals, and are guided at both ends by polymeric bearings.
Power	Standard brake motors use Class F insulation with Class B rise (1.15 S.F.) All brake motors are totally enclosed, fan cooled. IP66 or wash-down motors are available. Standard brake motors are UL, CSA, or CE marked, depending on voltage. Various encoder options are available. (230/460VAC, 3Ø, 60HZ standard)
Mounting	Trunnion
Load Screw	1.17 x .41 Ball Screw
Limit Switches	Independently adjustable, traveling nut style for best repeatability and setting ease

For additional assistance, contact our Application Engineers at (800) 477-5002.

Product Specifications and Dimensions

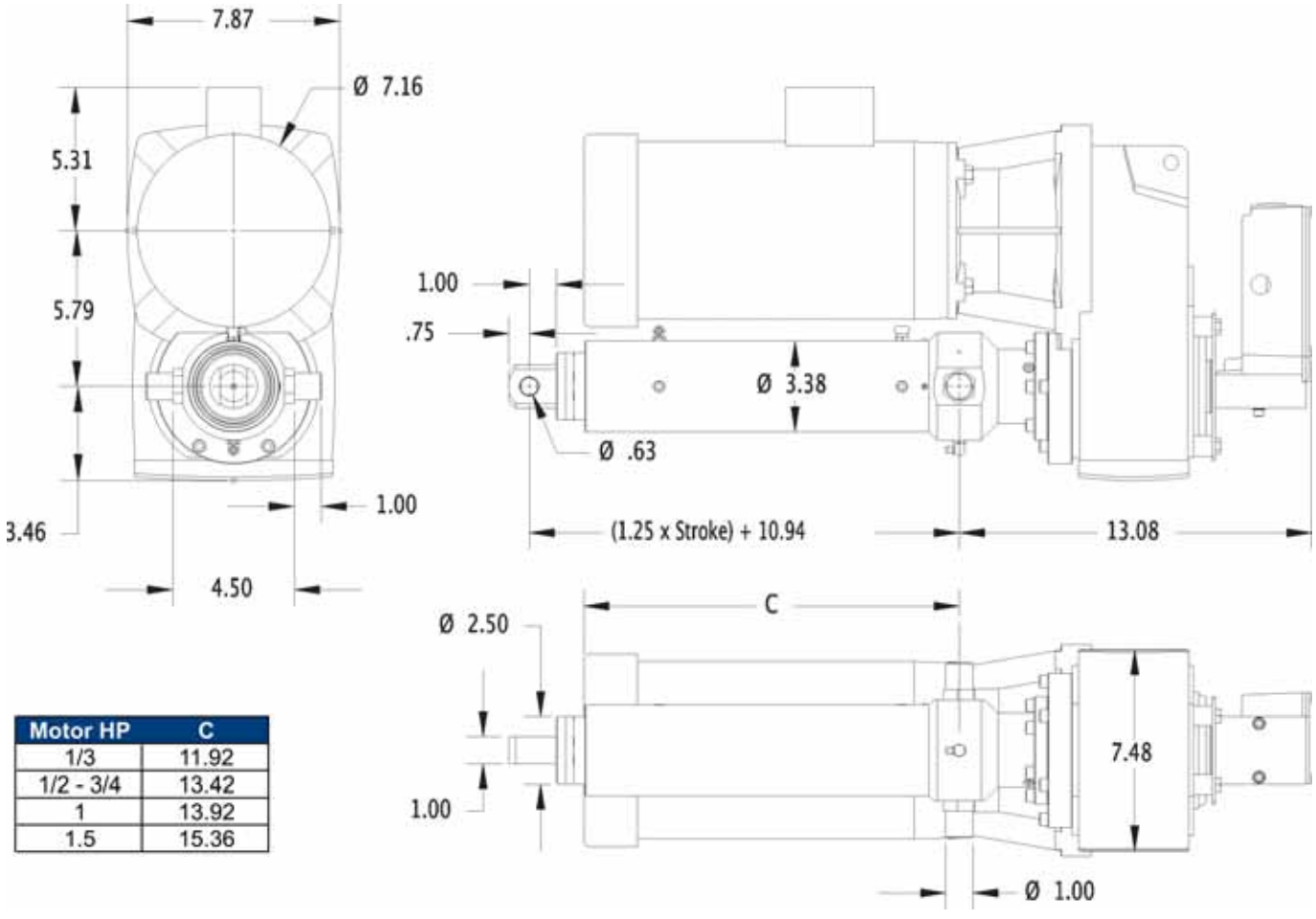
Series	Model	Capacity (lbs.)	Speed (in/min)	Std. HP	Max Stroke (inches)	Screw Life (million in.)
SCN03	NZ03-0424	2134	165.6	1	61.0	6.1
	NZ03-0534	2687	131.5	1	61.0	3.0
	NZ03-0635	3196	110.6	1	61.0	1.8
	NZ03-0726	3654	96.7	1	59.0	1.2
	NZ03-0864	3261	81.3	0.75	61.0	1.7
	NZ03-0949	3582	74.0	0.75	59.0	1.3
	NZ03-1166	2934	60.2	0.5	61.0	2.3
	NZ03-1384	3482	50.7	0.5	60.0	1.4
	NZ03-1492	3754	47.1	0.5	58.0	1.1
	NZ03-1653	4159	42.5	0.5	55.0	0.8
	NZ03-1879	4728	37.4	0.5	52.0	0.6
	NZ03-2235	3712	31.4	0.33	58.0	1.2
	NZ03-2455	4077	28.6	0.33	56.0	0.9
	NZ03-2913	4838	24.1	0.33	51.0	0.5
	NZ03-3181	5283	22.1	0.33	49.0	0.4
	NZ03-3480	5779	20.2	0.33	47.0	0.3
	NZ03-3773	6000	18.6	0.33	45.0	0.3
	NZ03-4185	5265	16.8	0.25	49.0	0.4
	NZ03-4965	6000	14.1	0.25	45.0	0.3
	NZ03-5933	6000	11.8	0.25	41.0	0.3
	NZ03-8171	6000	8.6	0.16	44.0	0.3



Motor HP	C	FP	AB	TB	N	P
.16 - .25	17.00	5.17	4.84	7.94	5.20	3.43
.33 - .50	17.95	5.71	5.24	8.25	5.20	3.43
.75 - 1.0	19.05	6.50	5.63	8.21	6.02	4.25

Important: See page 9 for mounting position code.

Series	Model	Capacity (lbs.)	Speed (in/min)	Std. HP	Max Stroke (inches)	Screw Life (million in.)
SCN03	NU03-0451	3404	155.7	1.5	61.0	1.5
	NU03-0572	2879	122.7	1	61.0	2.5
	NU03-0643	3236	109.2	1	61.0	1.7
	NU03-0748	3764	93.9	1	58.0	1.1
	NU03-0837	3159	83.9	0.75	61.0	1.9
	NU03-0903	3408	77.8	0.75	61.0	1.5
	NU03-1015	3831	69.2	0.75	57.0	1.1
	NU03-1181	2972	59.4	0.5	61.0	2.3
	NU03-1323	3329	53.1	0.5	61.0	1.6
	NU03-1653	4159	42.5	0.5	55.0	0.8
	NU03-1851	3074	37.9	0.33	61.0	2.0
	NU03-2190	3637	32.1	0.33	59.0	1.2
	NU03-2396	3979	29.3	0.33	56.0	0.9
	NU03-2497	4147	28.1	0.33	55.0	0.8
	NU03-2683	3375	26.2	0.25	61.0	1.5
	NU03-2965	3730	23.7	0.25	58.0	1.1
	NU03-3123	3929	22.5	0.25	57.0	1.0
	NU03-3654	4597	19.2	0.25	52.0	0.6
	NU03-3718	4678	18.9	0.25	52.0	0.6
	NU03-4511	3632	15.6	0.16	59.0	1.2
	NU03-5396	4345	13.0	0.16	54.0	0.7
	NU03-6383	5139	11.0	0.16	50.0	0.4
	NU03-6967	5610	10.1	0.16	47.0	0.3
	NU03-8242	6000	8.5	0.16	44.0	0.3
	NU03-10098	6000	7.0	0.16	39.0	0.3
	NU03-10407	6000	6.7	0.16	39.0	0.3
	NU03-12751	6000	5.5	0.16	35.0	0.3

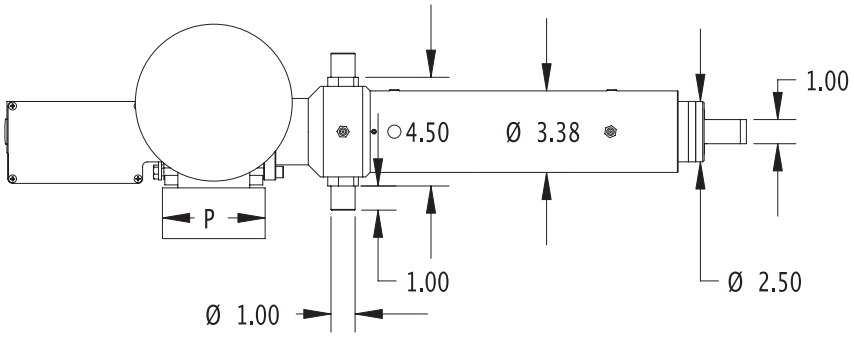


Motor HP	C
1/3	11.92
1/2 - 3/4	13.42
1	13.92
1.5	15.36

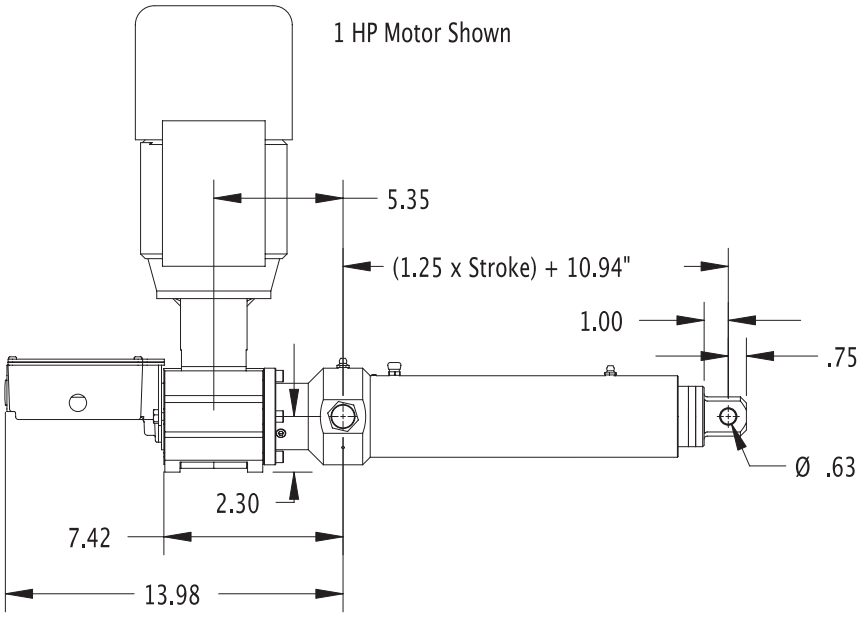
Important: See page 9 for mounting position code.

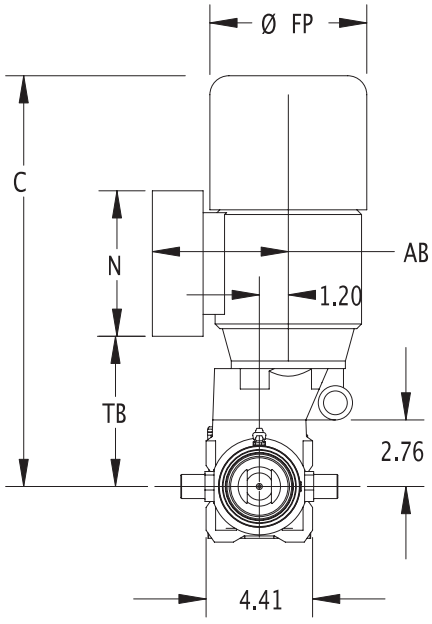
Product Specifications and Dimensions

Series	Model	Capacity (lbs.)	Speed (in/min)	Std. HP	Max Stroke (inches)	Screw Life (million in.)
SCN03	NL03-0385	2906	182.4	1.5	61.0	2.4
	NL03-0524	2637	134.0	1	61.0	3.2
	NL03-0579	2914	121.3	1	61.0	2.4
	NL03-0644	3241	109.0	1	61.0	1.7
	NL03-0787	2970	89.2	0.75	61.0	2.3
	NL03-0899	3393	78.1	0.75	61.0	1.5
	NL03-0968	3654	72.5	0.75	59.0	1.2
	NL03-1106	2783	63.5	0.5	61.0	2.7
	NL03-1355	3409	51.8	0.5	61.0	1.5
	NL03-1756	2916	40.0	0.33	61.0	2.4
	NL03-2037	3383	34.5	0.33	61.0	1.5
	NL03-2328	3866	30.2	0.33	57.0	1.0
	NL03-2639	3320	26.6	0.25	61.0	1.6
	NL03-3015	3793	23.3	0.25	58.0	1.1
	NL03-3473	4369	20.2	0.25	54.0	0.7
	NL03-3967	4991	17.7	0.25	50.0	0.5
	NL03-4783	3851	14.7	0.16	57.0	1.0
	NL03-5465	4400	12.8	0.16	54.0	0.7

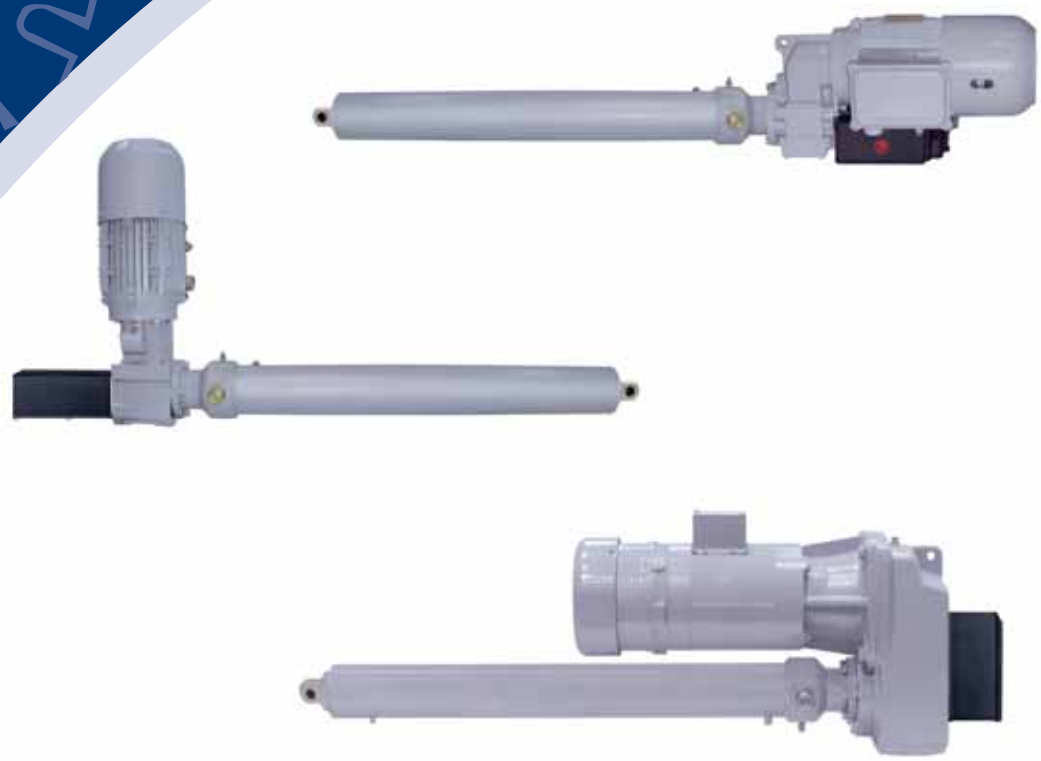


Motor HP	C	FP	AB	TB	N	P
.16 - .25	14.96	5.17	4.84	5.94	5.2	3.43
.33 - .50	15.91	5.71	5.24	6.26	5.2	3.43
.75 - 1.0	17.01	6.5	5.63	6.22	6.02	4.25
1.5 - 2.0	19.02	7.2	5.83	6.42	6.02	4.25





Important: See page 9 for mounting position code.



Specifications

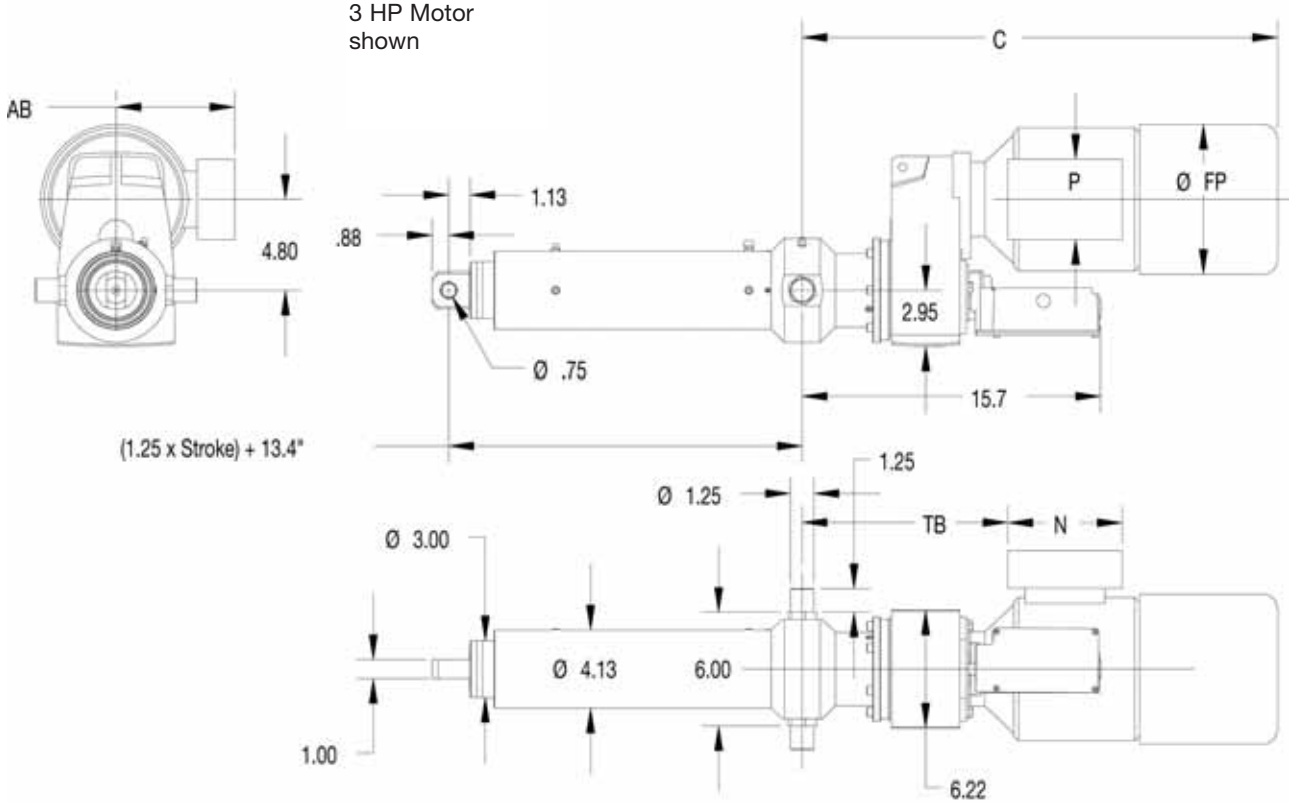
Maximum Capacity	6 Tons
Maximum Speed	379.5 in/min
Temperature Range	-15° to 140° F (-29° to 60° C)
Construction	Steel trunnion housing, and thin dense nodular chrome plated translating tubes. The translating tubes feature hydraulic cylinder grade wiper seals, and are guided at both ends by polymeric bearings.
Power	Standard brake motors use Class F insulation with Class B rise (1.15 S.F.) All brake motors are totally enclosed, fan cooled. IP66 or wash-down motors are available. Standard brake motors are UL, CSA, or CE marked, depending on voltage. Various encoder options are available. (230/460VAC, 3Ø, 60HZ standard)
Mounting	Trunnion
Load Screw	1.50 x .474 and 1.50 x 1.00 Ball Screw (models with asterisk contain 1.50 x 1.00 Ball Screws.)
Limit Switches	Independently adjustable, traveling nut style for best repeatability and setting ease

For additional assistance, contact our Application Engineers at (800) 477-5002.

Product Specifications and Dimensions

Series	Model	Capacity (lbs.)	Speed (in/min)	Std. HP	Max Stroke (inches)	Screw Life (million in.)
SCN06	NZH6-0479*	4942	354.9	5	80.0	3.6
	NZH6-0547*	5643	310.8	5	80.0	2.4
	NZH6-0643*	6633	264.4	5	75.0	1.5
	NZH6-0724*	4481	234.8	3	80.0	4.8
	NZH6-0824*	5100	206.3	3	80.0	3.3
	NZH6-0918*	5682	185.2	3	80.0	2.4
	NZ06-0479	6308	168.2	3	77.0	4.0
	NZ06-0547	7204	147.3	3	72.0	2.7
	NZ06-0643	5645	125.3	2	80.0	5.6
	NZ06-0724	6357	111.3	2	77.0	4.0
	NZ06-0824	7235	97.8	2	72.0	2.7
	NZ06-0918	8060	87.8	2	68.0	1.9
	NZ06-1034	6809	77.9	1.5	74.0	3.2
	NZ06-1176	7744	68.5	1.5	69.0	2.2
	NZ06-1411	6194	57.1	1	78.0	4.3
	NZ06-1721	7555	46.8	1	70.0	2.4
	NZ06-2057	9030	39.2	1	64.0	1.4
	NZ06-2522	8304	32.0	0.75	67.0	1.8
	NZ06-2833	9328	28.4	0.75	63.0	1.3
	NZ06-3208	10562	25.1	0.75	59.0	0.9
	NZ06-4107	9015	19.6	0.5	64.0	1.4
	NZ06-4925	10810	16.4	0.5	59.0	0.8
	NZ06-5889	12926	13.7	0.5	54.0	0.5
	NZ06-7217	10455	11.2	0.33	60.0	0.9
	NZ06-7899	11443	10.2	0.33	57.0	0.7
	NZ06-8117	11759	9.9	0.33	56.0	0.6
	NZ06-8894	12000	9.1	0.33	54.0	0.6
	NZ06-9248	12000	8.7	0.33	53.0	0.6
	NZ06-10114	12000	8.0	0.33	50.0	0.6
	NZ06-10608	12000	7.6	0.33	49.0	0.6
	NZ06-10950	12000	7.4	0.33	48.0	0.6
	NZ06-11816	12000	6.8	0.25	54.0	0.6
	NZ06-13660	12000	5.9	0.25	50.0	0.6
	NZ06-15812	12000	5.1	0.25	46.0	0.6

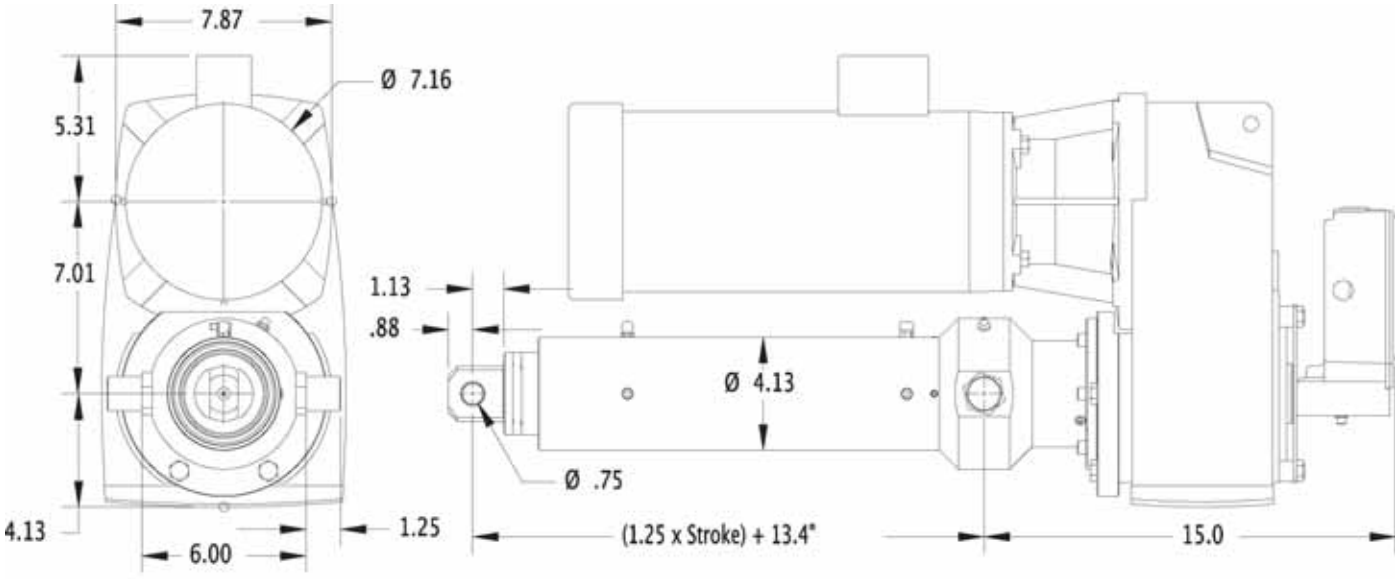
3 HP Motor shown



Motor HP	C	FP	AB	TB	N	P
.16 - .25	18.33	5.17	4.84	9.31	5.20	3.43
.33 - .50	20.00	5.71	5.24	10.14	5.20	3.43
.75 - 1.0	21.21	6.50	5.63	10.42	6.02	4.25
1.5 - 2.0	23.25	7.20	5.83	10.61	6.02	4.25
3	25.06	7.91	6.26	10.85	6.02	4.25

Important: See page 9 for mounting position code.

Series	Model	Capacity (lbs.)	Speed (in/min)	Std. HP	Max Stroke (inches)	Screw Life (million in.)
SCN06	NUH6-0448*	2773	379.5	3	80.0	20.3
	NUH6-0568*	3516	299.3	3	80.0	9.9
	NUH6-0670*	4147	253.7	3	80.0	6.1
	NUH6-0831*	3429	204.6	2	80.0	10.7
	NU06-0448	5900	179.9	3	80.0	4.9
	NU06-0568	7480	141.9	3	71.0	2.4
	NU06-0670	8824	120.3	3	65.0	1.5
	NU06-0831	7296	97.0	2	72.0	2.6
	NU06-0980	8604	82.2	2	66.0	1.6
	NU06-1138	9992	70.8	2	61.0	1.0
	NU06-1411	9291	57.1	1.5	63.0	1.3
	NU06-1667	7318	48.3	1	71.0	2.6
	NU06-2018	8859	39.9	1	65.0	1.5
	NU06-2138	9386	37.7	1	63.0	1.2
	NU06-2245	9855	35.9	1	62.0	1.1
	NU06-2371	7806	34.0	0.75	69.0	2.1
	NU06-2588	8521	31.1	0.75	66.0	1.6
	NU06-2870	9449	28.1	0.75	63.0	1.2
	NU06-3193	10513	25.2	0.75	60.0	0.9
	NU06-3777	8290	21.3	0.5	67.0	1.8
	NU06-4202	9223	19.2	0.5	64.0	1.3
	NU06-4485	9844	18.0	0.5	62.0	1.1
	NU06-5297	11627	15.2	0.5	57.0	0.6
	NU06-6412	9289	12.6	0.33	63.0	1.3
	NU06-6589	9545	12.2	0.33	63.0	1.2
	NU06-7976	11555	10.1	0.33	57.0	0.7
	NU06-8874	12000	9.1	0.33	54.0	0.6
	NU06-10088	12000	8.0	0.33	50.0	0.6
	NU06-11223	12000	7.2	0.33	48.0	0.6



Motor HP	C
1/3	11.16
1/2 - 3/4	12.66
1	13.16
1 - 1/2	14.16
2	15.16
3	16.04

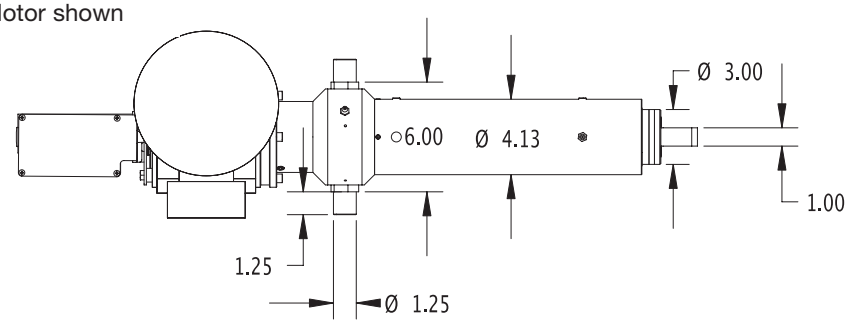
Important: See page 9 for mounting position code.

Product Specifications and Dimensions

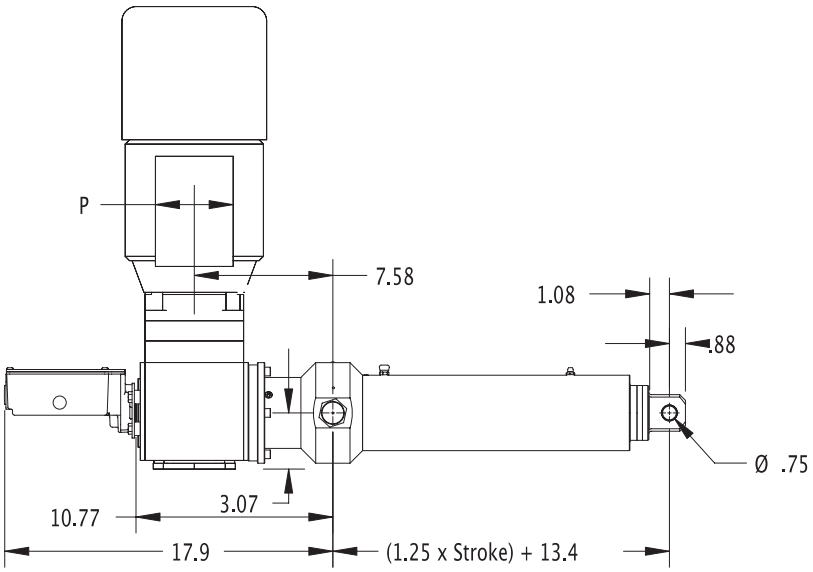
Series	Model	Capacity (lbs.)	Speed (in/min)	Std. HP	Max Stroke (inches)	Screw Life (million in.)
SCN06	NLH6-0530*	3281	320.8	3	80.0	12.2
	NLH6-0597*	3695	284.8	3	80.0	8.6
	NLH6-0649*	4017	261.9	3	80.0	6.7
	NLH6-0732*	4531	232.2	3	80.0	4.6
	NLH6-0829*	5131	205.1	3	80.0	3.2
	NLH6-0947*	3908	179.5	2	80.0	7.2
	NL06-0530	6980	152.0	3	73.0	3.0
	NL06-0597	7862	135.0	3	69.0	2.1
	NL06-0649	8547	124.2	3	66.0	1.6
	NL06-0732	9640	110.1	3	62.0	1.1
	NL06-0829	7279	97.2	2	72.0	2.6
	NL06-0947	8315	85.1	2	67.0	1.8
	NL06-1084	9517	74.3	2	63.0	1.2
	NL06-1139	7500	70.7	1.5	71.0	2.4
	NL06-1301	8567	61.9	1.5	66.0	1.6
	NL06-1465	9647	55.0	1.5	62.0	1.1
	NL06-1706	7489	47.2	1*	71.0	2.4
	NL06-1921	8433	41.9	1*	67.0	1.7
	NL06-2195	9636	36.7	1*	62.0	1.1
	NL06-2433	8011	33.1	0.75	68.0	2.0
	NL06-2741	9025	29.4	0.75	64.0	1.4
	NL06-3132	10312	25.7	0.75	60.0	0.9
	NL06-3380	11129	23.8	0.75	58.0	0.7
	NL06-3862	8477	20.9	0.5	66.0	1.7
	NL06-4352	9553	18.5	0.5	62.0	1.2
	NL06-4973	10916	16.2	0.5	58.0	0.8
	NL06-5500	12000	14.7	0.5	56.0	0.6
	NL06-6285	9105	12.8	0.33	64.0	1.3

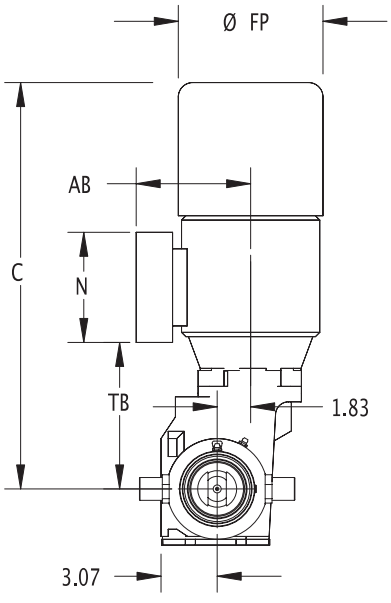
Horsepowers with asterisks are NEMA C-face motors.

3 HP Motor shown

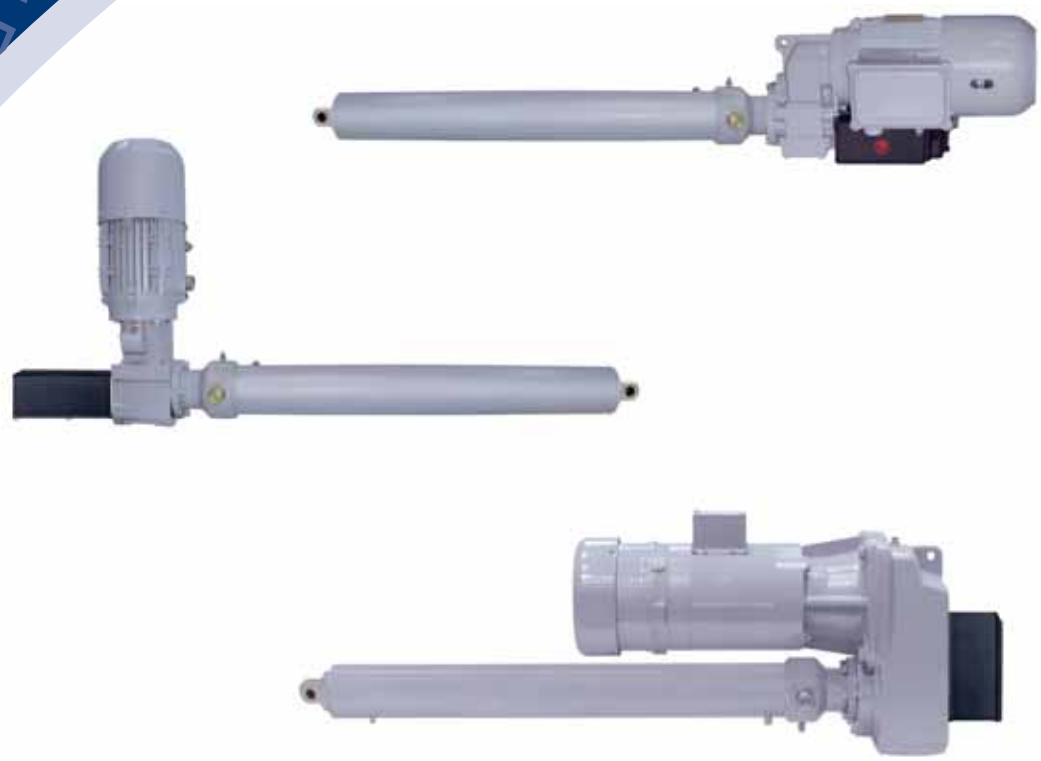


Motor HP	C	FP	AB	TB	N	P
.16 - .25	15.79	5.17	4.84	6.47	5.2	3.43
.33 - .50	16.73	5.71	5.24	7.3	5.2	3.43
.75 - 1.0	17.83	6.5	5.63	7.58	6.02	4.25
1.5 - 2.0	20.43	7.2	5.83	7.77	6.02	4.25
3.0 - 5.0	22.24	7.91	6.26	8.01	6.02	4.25





Important: See page 9 for mounting position code.



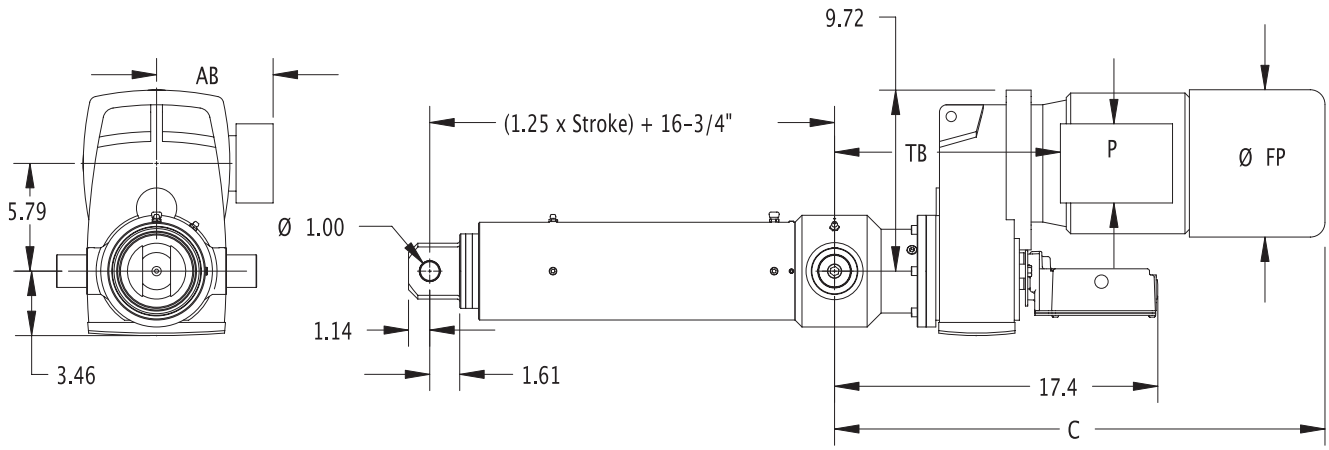
Specifications

Maximum Capacity	12 Tons
Maximum Speed	188.5 in/min
Temperature Range	-15° to 140° F (-29° to 60° C)
Construction	Steel trunnion housing, and thin dense nodular chrome plated translating tubes. The translating tubes feature hydraulic cylinder grade wiper seals, and are guided at both ends by polymeric bearings.
Power	Standard brake motors use Class F insulation with Class B rise (1.15 S.F.) All brake motors are totally enclosed, fan cooled. IP66 or wash-down motors are available. Standard brake motors are UL, CSA, or CE marked, depending on voltage. Various encoder options are available. (230/460VAC, 3Ø, 60HZ standard)
Mounting	Trunnion
Load Screw	2.25 x .50 Ball Screw
Limit Switches	Independently adjustable, traveling nut style for best repeatability and setting ease

For additional assistance, contact our Application Engineers at (800) 477-5002.

Product Specifications and Dimensions

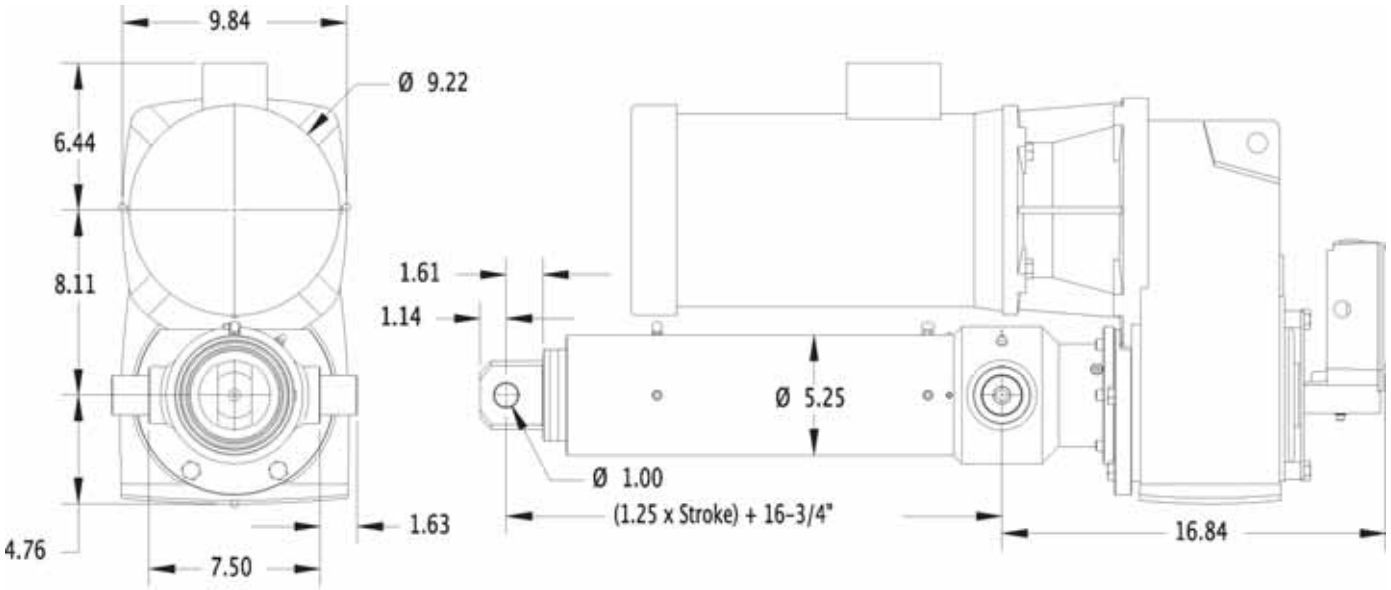
Series	Model	Capacity (lbs.)	Speed (in/min)	Std. HP	Max Stroke (inches)	Screw Life (million in.)
SCN12	NZ12-0451	9305	188.5	5	110.0	12.0
	NZ12-0572	11802	148.6	5	110.0	5.9
	NZ12-0643	13267	132.2	5	110.0	4.1
	NZ12-0748	15433	113.6	5	110.0	2.6
	NZ12-0837	17270	101.6	5	110.0	1.9
	NZ12-0903	18631	94.1	5	107.0	1.5
	NZ12-1015	20942	83.7	5	101.0	1.1
	NZ12-1181	14620	72.0	3	110.0	3.1
	NZ12-1323	16378	64.2	3	110.0	2.2
	NZ12-1653	20464	51.4	3	102.0	1.1
	NZ12-1851	15277	45.9	2	110.0	2.7
	NZ12-2190	18074	38.8	2	109.0	1.6
	NZ12-2396	19774	35.5	2	104.0	1.3
	NZ12-2497	20608	34.0	2	102.0	1.1
	NZ12-2683	16607	31.7	1.5	110.0	2.1
	NZ12-2965	18353	28.7	1.5	108.0	1.6
	NZ12-3123	19331	27.2	1.5	105.0	1.3
	NZ12-3654	22618	23.3	1.5	97.0	0.8
	NZ12-3718	15343	22.9	1	110.0	2.7
	NZ12-4511	18615	18.8	1	108.0	1.5
	NZ12-5396	22267	15.8	1	98.0	0.9
	NZ12-6383	24000	13.3	1	89.0	0.7
	NZ12-6967	24000	12.2	1	85.0	0.7
	NZ12-8242	24000	10.3	0.75	91.0	0.7
	NZ12-10098	24000	8.4	0.75	81.0	0.7
	NZ12-10407	24000	8.2	0.75	80.0	0.7
	NZ12-12751	24000	6.7	0.5	89.0	0.7
	NZ12-13186	24000	6.4	0.5	88.0	0.7
	NZ12-14996	24000	5.7	0.5	82.0	0.7
	NZ12-18511	24000	4.6	0.33	91.0	0.7
	NZ12-23611	24000	3.6	0.33	80.0	0.7
	NZ12-27627	24000	3.1	0.25	85.0	0.7



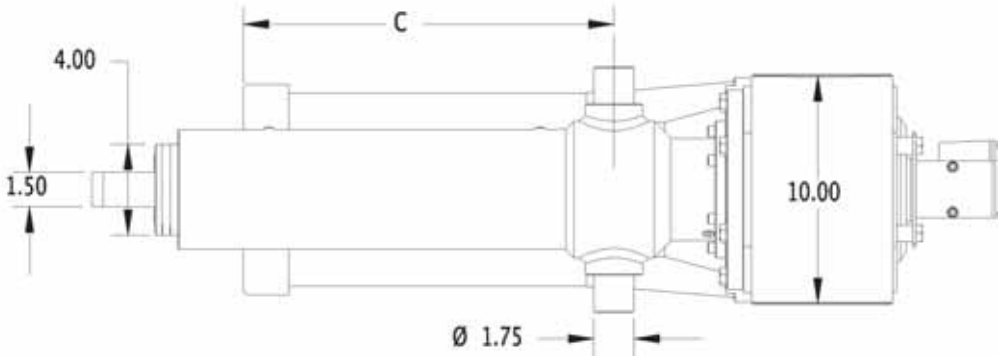
Motor HP	C	FP	AB	TB	N	P
.33 - .50	25.84	5.71	5.24	11.62	5.2	3.43
.75 - 1.0	25.92	6.5	5.63	11.7	6.02	4.25
1.5 - 2.0	26.11	7.2	5.83	11.9	6.02	4.25
3.0 - 5.0	26.35	7.91	6.26	12.13	6.02	4.25

Important: See page 9 for mounting position code.

Series	Model	Capacity (lbs.)	Speed (in/min)	Std. HP	Max Stroke (inches)	Screw Life (million in.)
SCN12	NU12-0470	9697	180.9	5	110.0	10.6
	NU12-0500	10316	170.0	5	110.0	8.8
	NU12-0543	11204	156.5	5	110.0	6.9
	NU12-0606	12503	140.3	5	110.0	4.9
	NU12-0713	14711	119.2	5	110.0	3.0
	NU12-0823	17187	102.0	5	110.0	1.9
	NU12-0923	19044	92.1	5	106.0	1.4
	NU12-1085	13432	78.3	3	110.0	4.0
	NU12-1268	15697	67.0	3	110.0	2.5
	NU12-1520	18817	55.9	3	107.0	1.5
	NU12-1818	15004	46.8	2	110.0	2.9
	NU12-2145	17703	39.6	2	110.0	1.7
	NU12-2239	18479	38.0	2	108.0	1.5
	NU12-2625	21664	32.4	2	99.0	1.0
	NU12-2643	16360	32.2	1.5	110.0	2.2
	NU12-3234	20018	26.3	1.5	103.0	1.2
	NU12-3681	22785	23.1	1.5	96.0	0.8
	NU12-4074	16812	20.9	1	110.0	2.0
	NU12-4505	18590	18.9	1	108.0	1.5
	NU12-9052	24000	9.4	0.75	86.0	0.7
	NU12-11078	22857	7.7	0.5	96.0	0.8
	NU12-15540	21162	5.5	0.33	100.0	1.0



Motor HP	C
1/3	11.84
1/2 - 3/4	13.34
1	13.84
1 - 1/2	14.84
2	15.84
3	16.07
5	16.52

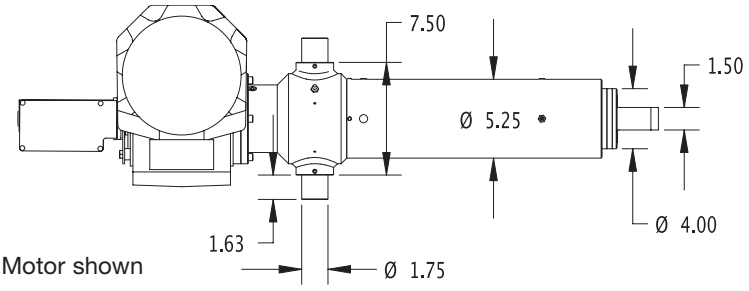


Important: See page 9 for mounting position code.

Product Specifications and Dimensions

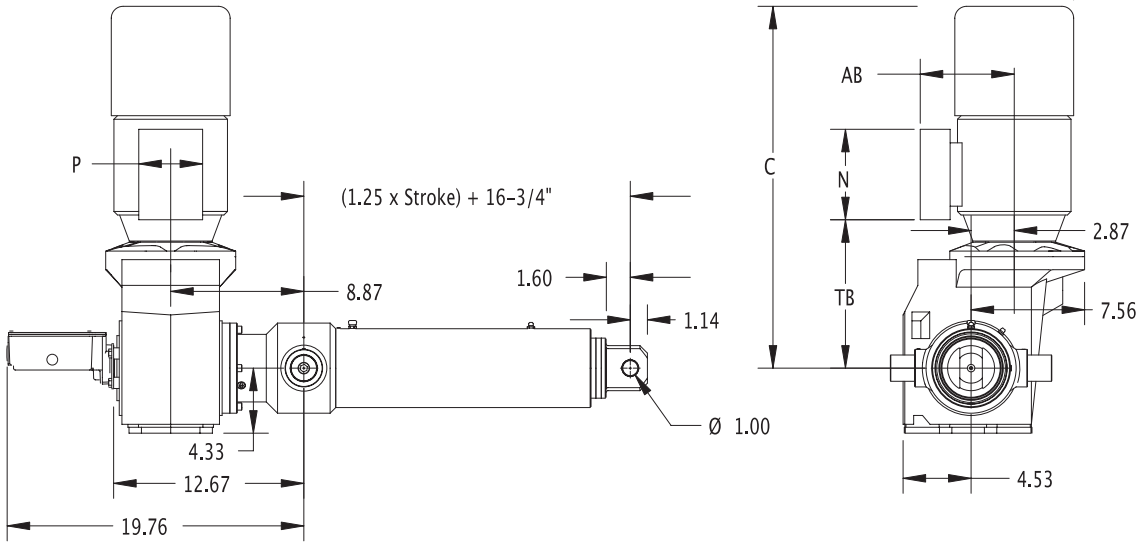
Series	Model	Capacity (lbs.)	Speed (in/min)	Std. HP	Max Stroke (inches)	Screw Life (million in.)
SCN12	NL12-0481	14887	176.7	7.5	110.0	2.9
	NL12-0543	16805	156.5	7.5	110.0	2.0
	NL12-0611	18910	139.1	7.5	107.0	1.4
	NL12-0641	19838	132.6	7.5	104.0	1.2
	NL12-0760	15681	111.8	5	110.0	2.5
	NL12-0855	17641	99.4	5	110.0	1.8
	NL12-0963	19869	88.3	5	104.0	1.2
	NL12-1088	13469	78.1	3	110.0	4.0
	NL12-1243	15388	68.4	3	110.0	2.7
	NL12-1391	17220	61.1	3	110.0	1.9
	NL12-1560	19312	54.5	3	105.0	1.3
	NL12-1783	14715	47.7	2	110.0	3.0
	NL12-1973	16283	43.1	2*	110.0	2.2
	NL12-2222	18338	38.3	2*	108.0	1.6
	NL12-2539	20955	33.5	2*	101.0	1.1
	NL12-2844	17604	29.9	1.5*	110.0	1.8
	NL12-3204	19832	26.5	1.5	104.0	1.2
	NL12-3661	22661	23.2	1.5	97.0	0.8
	NL12-4077	16824	20.8	1	110.0	2.0
	NL12-4593	18953	18.5	1	106.0	1.4
	NL12-5248	21656	16.2	1	99.0	1.0
	NL12-5602	23117	15.2	1	96.0	0.8
	NL12-6401	19811	13.3	0.75	104.0	1.2

Horsepowers with asterisks are NEMA C-face motors.

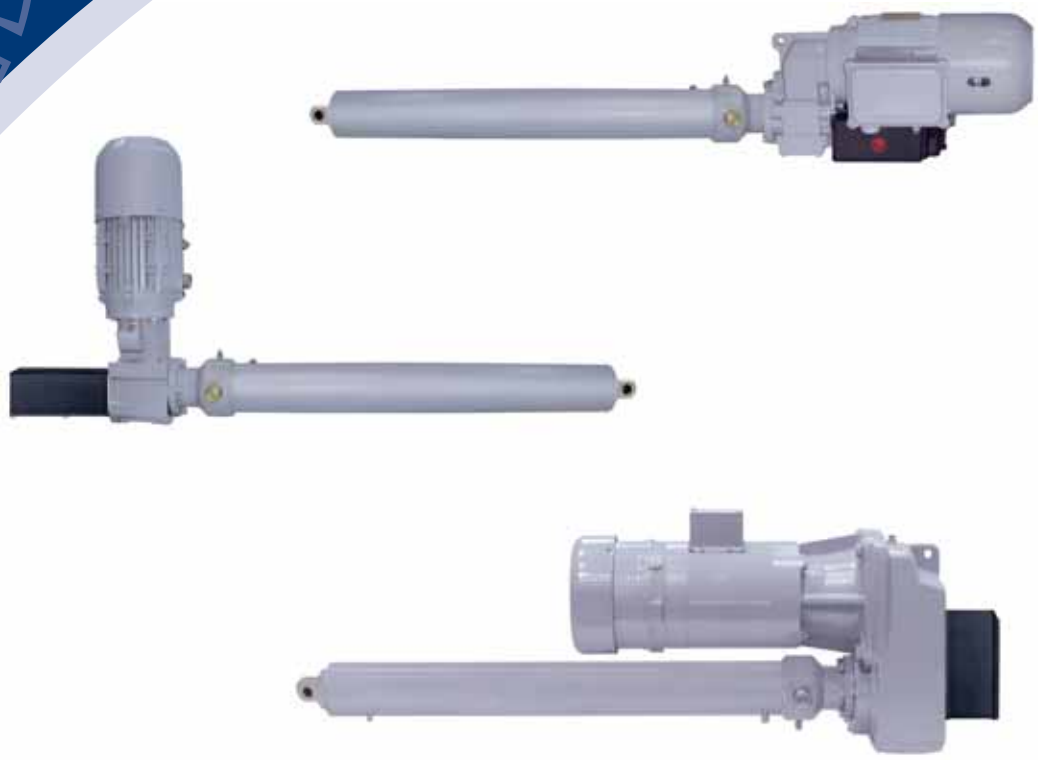


5HP Motor shown

Motor HP	C	FP	AB	TB	N	P
.75 - 1.0	19.76	6.5	5.63	9.45	6.02	4.25
1.5 - 2.0	22.32	7.2	5.83	9.64	6.02	4.25
3.0 - 5.0	24.13	7.91	6.26	9.88	6.02	4.25



Important: See page 9 for mounting position code.



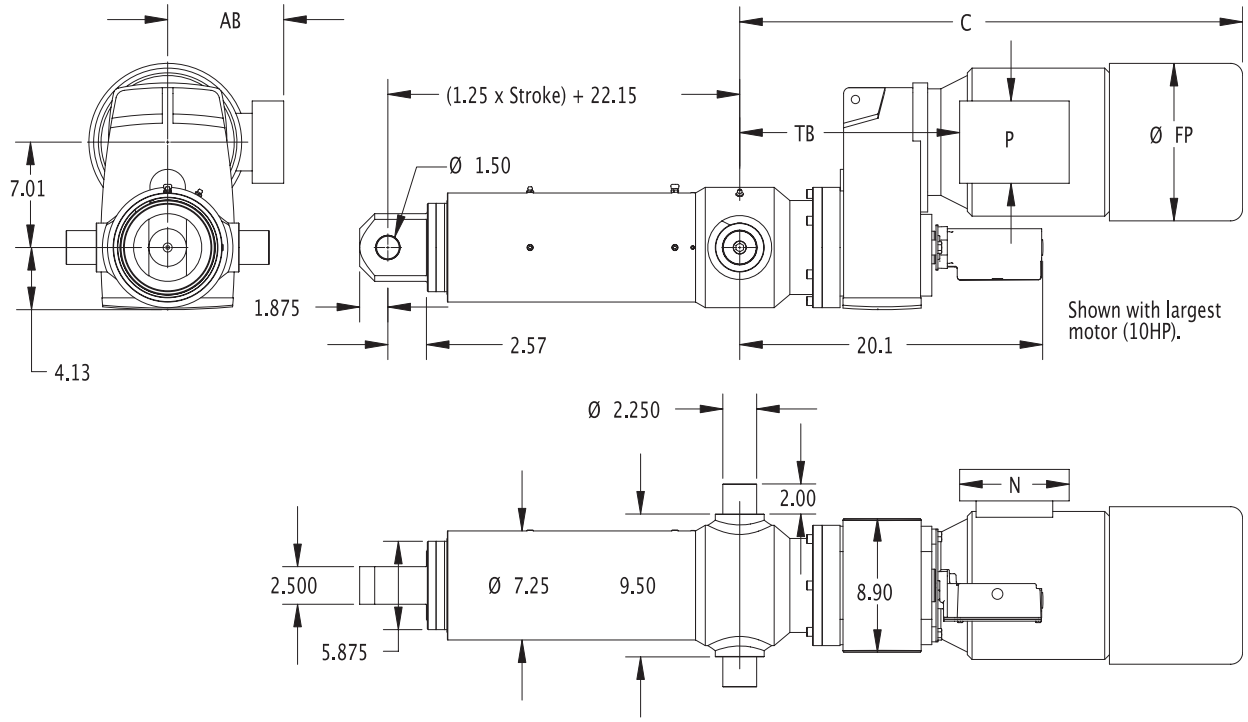
Specifications

Maximum Capacity	25 Tons
Maximum Speed	259.7 in/min
Temperature Range	-15° to 140° F (-29° to 60° C)
Construction	Steel trunnion housing, and thin dense nodular chrome plated translating tubes. The translating tubes feature hydraulic cylinder grade wiper seals, and are guided at both ends by polymeric bearings.
Power	Standard brake motors use Class F insulation with Class B rise (1.15 S.F.) All brake motors are totally enclosed, fan cooled. IP66 or wash-down motors are available. Standard brake motors are UL, CSA, or CE marked, depending on voltage. Various encoder options are available. (230/460VAC, 3Ø, 60HZ standard)
Mounting	Trunnion
Load Screw	3.0 x .666 Ball Screw
Limit Switches	Independently adjustable, traveling nut style for best repeatability and setting ease

For additional assistance, contact our Application Engineers at (800) 477-5002.

Product Specifications and Dimensions

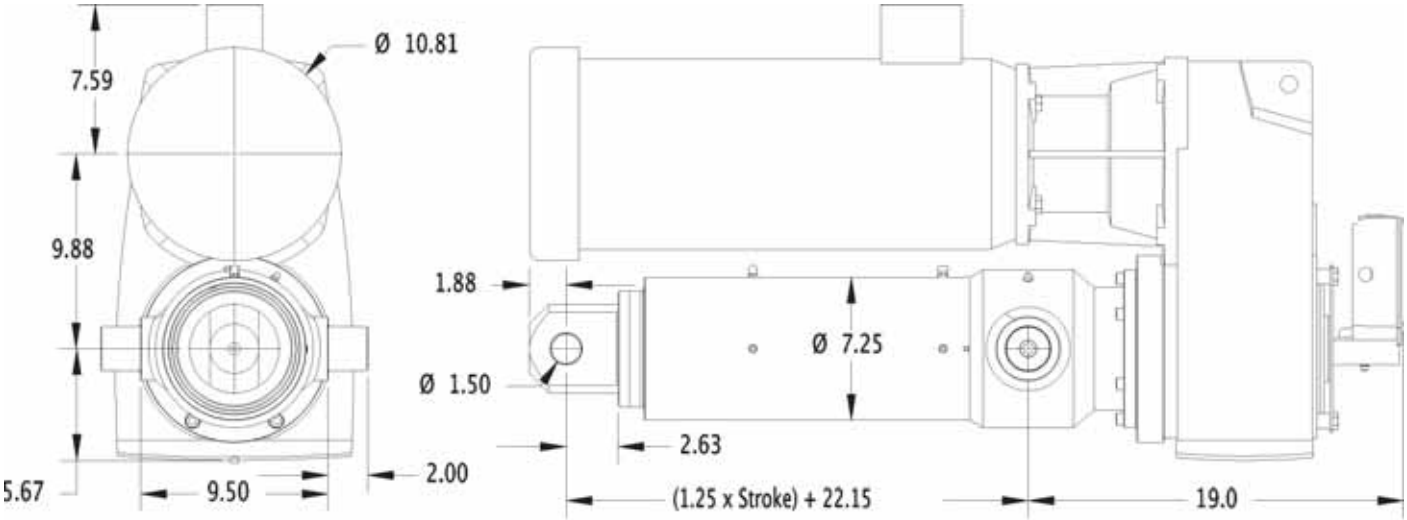
Series	Model	Capacity (lbs.)	Speed (in/min)	Std. HP	Max Stroke (inches)	Screw Life (million in.)
SCN25	NZ25-0448	14005	250.4	10	161.0	31.7
	NZ25-0568	17757	197.5	10	161.0	15.5
	NZ25-0670	20945	167.5	10	161.0	9.5
	NZ25-0831	25979	135.0	10	161.0	5.0
	NZ25-0980	30637	114.5	10	161.0	3.0
	NZ25-1138	26682	98.6	7.5	161.0	4.6
	NZ25-1411	33083	79.5	7.5	160.0	2.4
	NZ25-1667	26057	67.3	5	161.0	4.9
	NZ25-2018	31543	55.6	5	161.0	2.8
	NZ25-2138	33419	52.5	5	159.0	2.3
	NZ25-2245	35091	50.0	5	155.0	2.0
	NZ25-2371	22236	47.3	3	161.0	7.9
	NZ25-2588	24272	43.4	3	161.0	6.1
	NZ25-2870	26916	39.1	3	161.0	4.5
	NZ25-3193	29946	35.1	3	161.0	3.2
	NZ25-3777	35423	29.7	3	154.0	2.0
	NZ25-4202	39409	26.7	3	146.0	1.4
	NZ25-4485	42063	25.0	3	142.0	1.2
	NZ25-5297	49678	21.2	3	130.0	0.7
	NZ25-6412	40090	17.5	2	145.0	1.4
	NZ25-6589	41197	17.0	2	143.0	1.2
	NZ25-7976	49869	14.1	2	130.0	0.7
	NZ25-8874	50000	12.6	2	123.0	0.7
	NZ25-10088	47305	11.1	1.5	133.0	0.8
	NZ25-11223	50000	10.0	1.5	127.0	0.7
	NZ25-12693	39681	8.8	1	146.0	1.4
	NZ25-16146	50000	6.9	1	129.0	0.7
	NZ25-19069	44710	5.9	0.75	137.0	1.0
	NZ25-23083	50000	4.9	0.75	125.0	0.7
	NZ25-28714	44883	3.9	0.5	137.0	1.0
	NZ25-40858	42151	2.7	0.33	141.0	1.2
	NZ25-48256	49783	2.3	0.33	130.0	0.7



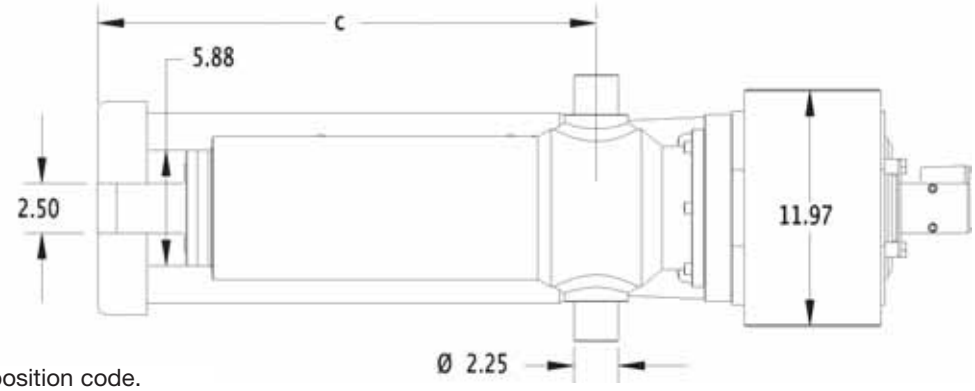
Motor HP	C	FP	AB	TB	N	P
.33 - .50	23.19	5.71	5.24	14.05	5.2	3.43
.75 - 1.0	24.41	6.5	5.63	14.13	6.02	4.25
1.5 - 2.0	26.45	7.2	5.83	14.33	6.02	4.25
3.0 - 5.0	28.27	7.91	6.26	14.57	6.02	4.25
7.5 - 10	33.19	10.47	7.72	14.37	7.28	5.47

Important: See page 9 for mounting position code.

Series	Model	Capacity (lbs.)	Speed (in/min)	Std. HP	Max Stroke (inches)	Screw Life (million in.)
SCN25	NU25-0432	13505	259.7	10	161.0	35.3
	NU25-0501	15662	224.0	10	161.0	22.7
	NU25-0529	16537	212.1	10	161.0	19.2
	NU25-0571	17850	196.5	10	161.0	15.3
	NU25-0633	19789	177.3	10	161.0	11.2
	NU25-0717	22415	156.5	10	161.0	7.7
	NU25-0870	27198	129.0	10	161.0	4.3
	NU25-0946	29574	118.6	10	161.0	3.4
	NU25-1071	33481	104.8	10	159.0	2.3
	NU25-1300	40640	86.3	10	144.0	1.3
	NU25-1538	36060	73.0	7.5	153.0	1.9
	NU25-1759	41242	63.8	7.5	143.0	1.2
	NU25-1888	44267	59.4	7.5	138.0	1.0
	NU25-2036	31824	55.1	5	161.0	2.7
	NU25-2500	39077	44.9	5	147.0	1.5
	NU25-3050	28605	36.8	3	161.0	3.7
	NU25-3343	31352	33.6	3	161.0	2.8
	NU25-3546	33256	31.6	3	159.0	2.4
	NU25-4080	38264	27.5	3	148.0	1.6
	NU25-5555	50000	20.2	3	127.0	0.7
	NU25-8161	50000	13.7	2	129.0	0.7
	NU25-10019	46982	11.2	1.5	134.0	0.8
	NU25-13403	41900	8.4	1	142.0	1.2



Motor HP	C
1/2 - 3/4	14.12
1	14.62
1 - 1/2	15.8
2	16.8
3	16.86
5	17.31
7.5	22.79
10	25.49



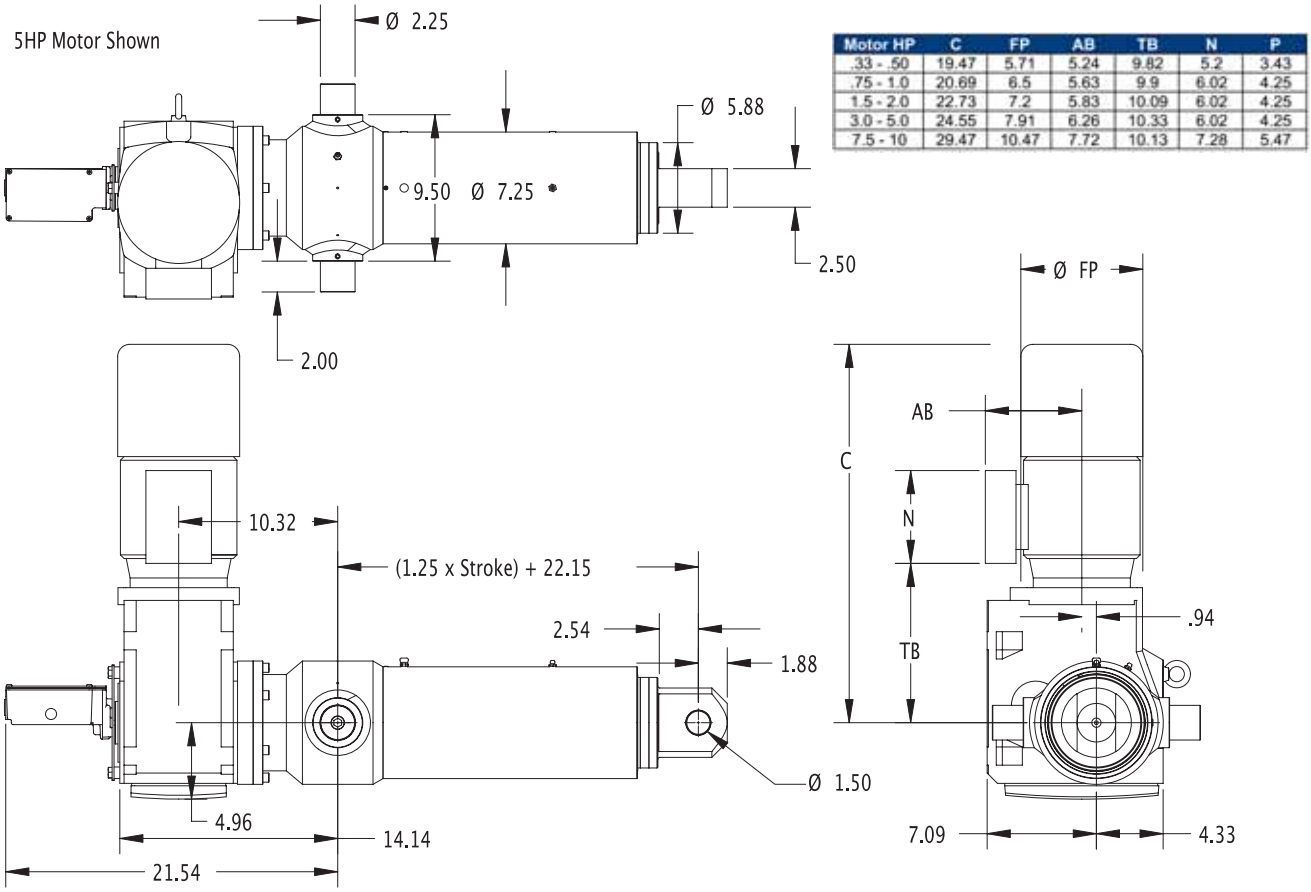
Important: See page 9 for mounting position code.

For additional assistance, contact our Application Engineers at (800) 477-5002.

Product Specifications and Dimensions

Series	Model	Capacity (lbs.)	Speed (in/min)	Std. HP	Max Stroke (inches)	Screw Life (million in.)
SCN25	NL25-0848	26510	132.3	10	161.0	4.7
	NL25-1073	33544	104.6	10	159.0	2.3
	NL25-1268	39640	88.5	10	146.0	1.4
	NL25-1349	42172	83.2	10	141.0	1.2
	NL25-1573	49175	71.3	10	131.0	0.7
	NL25-1708	40046	65.7	7.5	145.0	1.4
	NL25-2023	31621	55.5	5	161.0	2.8
	NL25-2391	37373	46.9	5	150.0	1.7
	NL25-2503	39124	44.8	5	147.0	1.5
	NL25-2966	46361	37.8	5	135.0	0.9
	NL25-3561	33397	31.5	3	159.0	2.3
	NL25-3805	35685	29.5	3	154.0	1.9
	NL25-4036	37852	27.8	3	149.0	1.6
	NL25-4770	44736	23.5	3	137.0	1.0
	NL25-4994	46836	22.5	3	134.0	0.8
	NL25-5917	50000	19.0	3	123.0	0.7
	NL25-6408	40065	17.5	2	145.0	1.4
	NL25-7591	47462	14.8	2	133.0	0.8
	NL25-8417	50000	13.3	2	127.0	0.7
	NL25-9350	50000	12.0	2	120.0	0.7
	NL25-11077	50000	10.1	1.5	127.0	0.7
	NL25-11770	50000	9.5	1.5*	124.0	0.7
	NL25-13944	43591	8.0	1*	139.0	1.1
	NL25-15874	49625	7.1	1*	130.0	0.7
	NL25-18806	50000	6.0	1*	120.0	0.7
	NL25-19745	46295	5.7	0.75	135.0	0.9
	NL25-23392	50000	4.8	0.75	124.0	0.7
	NL25-24972	50000	4.5	0.75	120.0	0.7
	NL25-29585	46244	3.8	0.5	135.0	0.9

Horsepowers with asterisks are NEMA C-face motors.



Motor HP	C	FP	AB	TB	N	P
.33 - .50	19.47	5.71	5.24	9.82	5.2	3.43
.75 - 1.0	20.69	6.5	5.63	9.9	6.02	4.25
1.5 - 2.0	22.73	7.2	5.83	10.09	6.02	4.25
3.0 - 5.0	24.55	7.91	6.26	10.33	6.02	4.25
7.5 - 10	29.47	10.47	7.72	10.13	7.28	5.47

Important: See page 9 for mounting position code.

Specifications

Maximum Capacity	3780 lbs.
Maximum Speed	13.63 in/sec
Temperature Range	-15° to 140° F (-29° to 60° C)
Construction	Steel trunnion housing, and thin dense nodular chrome plated translating tubes. The translating tubes feature hydraulic cylinder grade wiper seals, and are guided at both ends by polymeric bearings.
Power	Standard brake motors use Class F insulation with Class B rise (1.15 S.F.) All brake motors are totally enclosed, fan cooled. IP66 or wash-down motors are available. Standard brake motors are UL, CSA, or CE marked, depending on voltage. (230/460VAC, 3Ø, 60HZ standard)
Mounting	Trunnion
Control Feedback	Ring Kit Encoder

⚠ WARNING

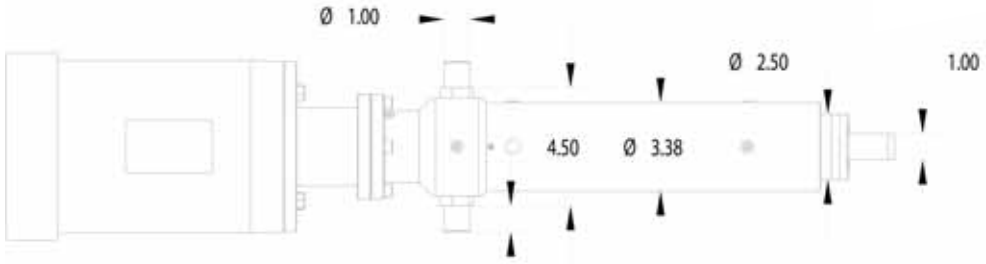
- The SCD Series SuperCylinders are capable of extremely high speeds. As such, the user should be careful to properly integrate the cylinder's Ring Kit Encoder or other controlling device with the control system to ensure the cylinder functions as desired.
- We recommend using soft start and stop for smooth operation and added life.
- Motor brakes should always be used with SCD models, and must be separately switched from the motor to assure fast brake response.

Product Specifications and Dimensions

Series	Model	Capacity (lbs.)	Speed (in/sec.)	Motor RPM	HP	Max Stroke (inches)	Screw Life (million in.)	Dia x Lead (inches)
SCD02	ND02-410	825	7.19	1725	1	24	7.5	1.00 x .25
	ND02-610	1249	4.75	1140	1	30	2.1	1.00 x .25
	ND02-415	1238	7.19	1725	1.5	24	2.2	1.00 x .25
	ND02-615	1873	4.75	1140	1.5	30	0.6	1.00 x .25
	ND02-420	1651	7.19	1725	2	24	0.9	1.00 x .25
	ND02-620	2498	4.75	1140	2	30	0.3	1.00 x .25
	ND02-430	2476	7.19	1725	3	24	0.3	1.00 x .25
	ND02-630	3747	4.75	1140	3	30	0.1	1.00 x .25
SCD03	ND03-410	500	11.87	1725	1	25	472.4	1.17 x .41
	ND03-610	756	7.85	1140	1	31	136.7	1.17 x .41
	ND03-415	749	11.87	1725	1.5	25	140.5	1.17 x .41
	ND03-615	1134	7.85	1140	1.5	31	40.5	1.17 x .41
	ND03-420	999	11.87	1725	2	25	59.2	1.17 x .41
	ND03-620	1512	7.85	1140	2	31	17.1	1.17 x .41
	ND03-430	1499	11.87	1725	3	25	17.5	1.17 x .41
	ND03-630	2268	7.85	1140	3	31	5.1	1.17 x .41
	ND03-450	2498	11.87	1725	5	25	3.8	1.17 x .41
	ND03-650	3780	7.85	1140	5	31	1.1	1.17 x .41

NOTE

Catalog pages provide performance specifications for standard NEMA brake motors. Models wth IEC or Servo adapter flanges and motors can be provided. Should your application require performance criteria outside of our standard model performances, please see page 39 for the revelant performance/design formulas.



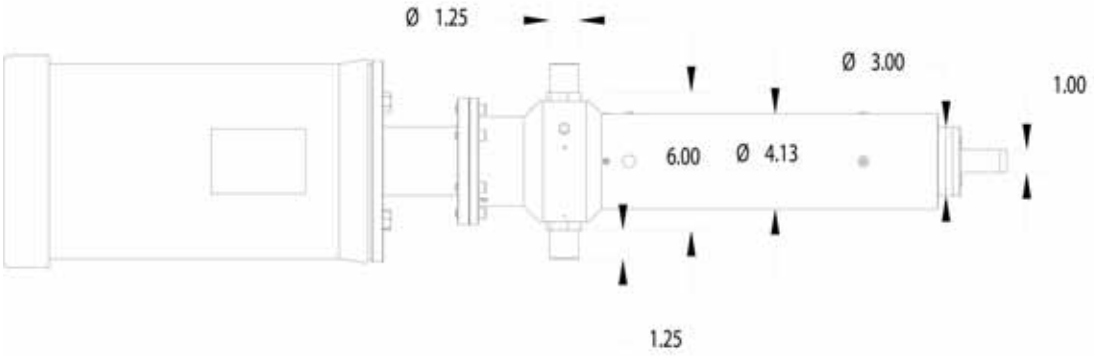
HP	RPM	C	FP
1	1140	22.38	7.16
	1725	20.06	7.16
1.5	1140	23.38	7.16
	1725	21.50	7.16
2	1140	24.35	9.22
	1725	22.50	7.16
3	1140	27.35	9.22
	1725	23.23	9.22
5	1140	28.62	10.81
	1725	23.68	9.22

SCD06 Series

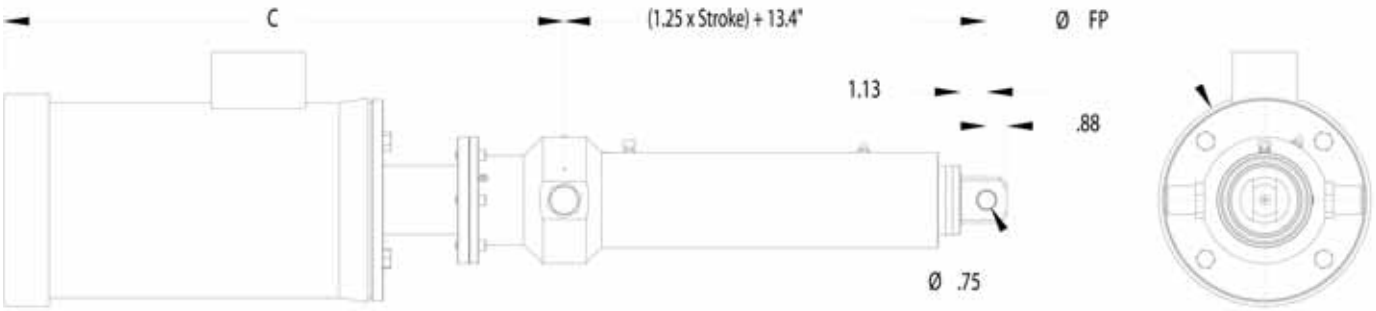
Series	Model	Capacity (lbs.)	Speed (in/sec.)	Motor RPM	HP	Max Stroke (inches)	Screw Life (million in.)	Dia x Lead (inches)
SCD06	ND06-410	435	13.63	1725	1	29	12331.9	1.50 x .47
	ND06-610	659	9.00	1140	1	36	3546.8	1.50 x .47
	ND06-415	653	13.63	1725	1.5	29	3645.5	1.50 x .47
	ND06-615	988	9.00	1140	1.5	36	1052.5	1.50 x .47
	ND06-420	871	13.63	1725	2	29	1536.2	1.50 x .47
	ND06-620	1317	9.00	1140	2	36	444.4	1.50 x .47
	ND06-430	1306	13.63	1725	3	29	455.7	1.50 x .47
	ND06-630	1976	9.00	1140	3	36	131.6	1.50 x .47
	ND06-450	2177	13.63	1725	5	29	98.4	1.50 x .47
	ND06-650	3293	9.00	1140	5	36	28.4	1.50 x .47
	ND06-475	3265	13.63	1725	7.5	29	29.2	1.50 x .47

NOTE

Catalog pages provide performance specifications for standard NEMA brake motors. Models wth IEC or Servo adapter flanges and motors can be provided. Should your application require performance criteria outside of our standard model performances, please see page 39 for the revelant performance/design formulas.



HP	RPM	C	FP
1	1140	23.56	7.16
	1725	21.25	7.16
1.5	1140	24.56	7.16
	1725	22.68	7.16
2	1140	25.53	9.22
	1725	23.68	7.16
3	1140	28.53	9.22
	1725	24.00	9.22
5	1140	24.41	10.81
	1725	24.86	9.22



Customized Performance Considerations

There are many factors to be considered when designing applications for a direct drive models. Please review the following formulas carefully, and feel free to contact our customer service department with questions.

Screw Specifications:

Dia x Lead (inches)	D_{min}	L_{10} rating	Max RPM
1.00 x .25	0.82	1612	3000
1.17 x .413	0.87	3894	2560
1.50 x .474	1.14	10050	2000

Max RPM = maximum screw speed due to ball velocity limit.

L_{10} rating = Load (lbs) to produce 10% failure rate after 1,000,000 inches of travel.

D_{min} = Screw minor dia.(in.)

Design Formulae:

$$\text{Speed (in/sec)} = \frac{\text{Screw Lead} \times \text{Motor rpm}}{60}$$

$$\text{Capacity (lbs)} = \frac{5.65 \times \text{Motor torque (in-lbs)}}{\text{Screw Lead}}$$

$$\text{Motor torque (in-lbs)} = \frac{\text{Horsepower} \times 63000}{\text{RPM}}$$

$$\text{Screw Life (million inches of travel)} = \left[\frac{L_{10}\ \text{Rating}}{\text{Load}}\right]^3 \times \text{Screw Lead}$$

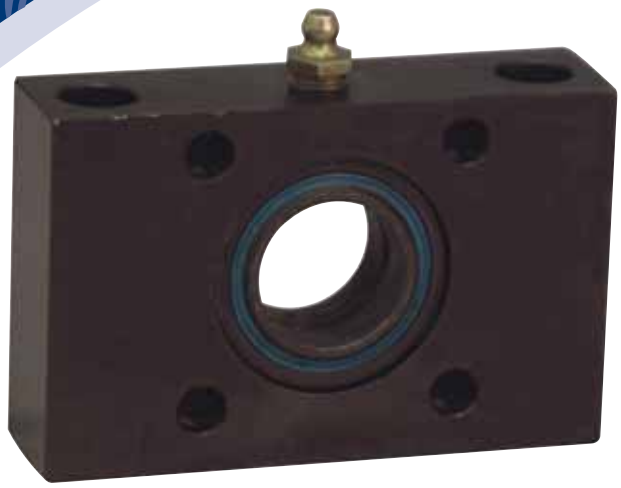
Critical Speed: High speed rotating shafts are subject to destructive vibrations. To prevent instability, the speed and length must be held within limits per the following equation:

$$RPM_{max} = \frac{1.37 \times 10^6 \times D_{min}}{L^2}$$

where L = Actuator stroke (inches)

(Note: This equation for critical rpm includes a 0.80 factor of safety.)

Trunnion Blocks



ANSI Standard through holes, and black oxide finish

ANSI Standard tapped holes, and dust seals

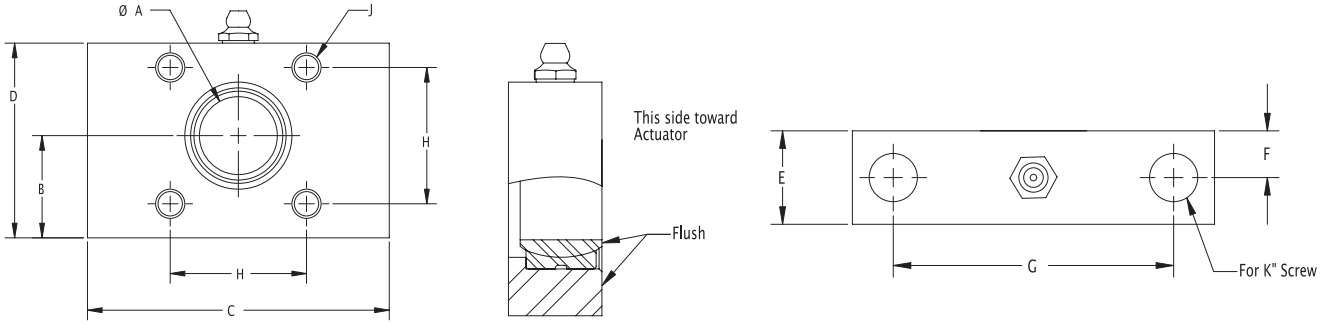
Duff-Norton SCN and SCD SuperCylinders are available with trunnion mounting only and are fitted with trunnion pins as standard. The trunnion pins are designed to fit standard dimension radial spherical plain bearings (Torrington type SF, or SKF type GEZ, for example). Duff-Norton offers Trunnion Blocks to facilitate the installation of SCN and SCD series SuperCylinders. These blocks are solid steel and house properly sized spherical plain bearings. The blocks are drilled for mounting either as a conventional pillow blocks or as flange units. Heat-treated fasteners should be used for all attachments.

If Duff-Norton Trunnion Blocks are not chosen for the SuperCylinder's installation, we strongly recommended that the trunnion pins be supported by some type of self-aligning bearing, as perfect alignment of trunnion support bearings is difficult to achieve. Standard pillow blocks are not recommended, as their maximum static load rating is usually less than that of the SuperCylinder. In addition, most pillow blocks use gray cast iron frames, which are subject to fracture under heavy loads.

Order trunnion blocks per the following chart:

SuperCylinder series	Mounting Blocks (2 req'd)
NZ03, NL03, NU03	Part No. NZ03-510
NZ06, NL06, NU06	Part No. NZ06-510
NZ12, NL12, NU12	Part No. NZ12-510
NZ25, NL25, NU25	Part No. NZ25-510

Trunnion Block Specifications



Capacity	Part #	A	B	C	D	E	F	G	H	J	K
3 Ton	NZ03-510	1.00	1.31	3.87	2.50	1.00	0.50	3.00	1.75	3/8"-16	1/2"
6 Ton	NZ06-510	1.25	1.56	4.50	3.00	1.12	0.56	3.50	2.00	1/2"-13	5/8"
12 Ton	NZ12-510	1.75	2.06	5.50	4.00	1.50	0.75	4.25	2.75	5/8"-11	3/4"
25 Ton	NZ25-510	2.25	2.56	7.50	5.00	2.00	1.00	5.50	3.25	3/4"-10	1-1/4"

For additional assistance, contact our Application Engineers at (800) 477-5002.

Duff-Norton offers constant speed AC Motor Control Systems for SuperCylinders. 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 Disconnects

AC Motor Control unit for Jogging-Inching Operation

Optional fused short circuit protection.

Additional Feature Options

- End of travel limit switches come standard with the Duff-Norton SuperCylinder.
- Motor short circuit protection is available through Duff-Norton.

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 come standard with the Duff-Norton SuperCylinder.
- 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

For additional assistance, contact our Application Engineers at (800) 477-5002.

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.)

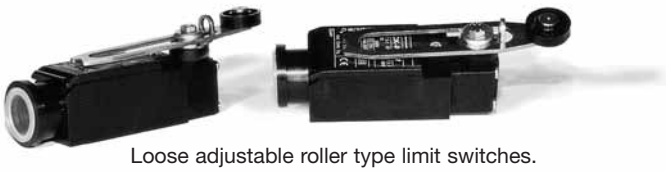
• **Fused Short Circuit Protection**
Provides fuses and fuse holders mounted and wired within the enclosure to provide motor and component protection.

• **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.

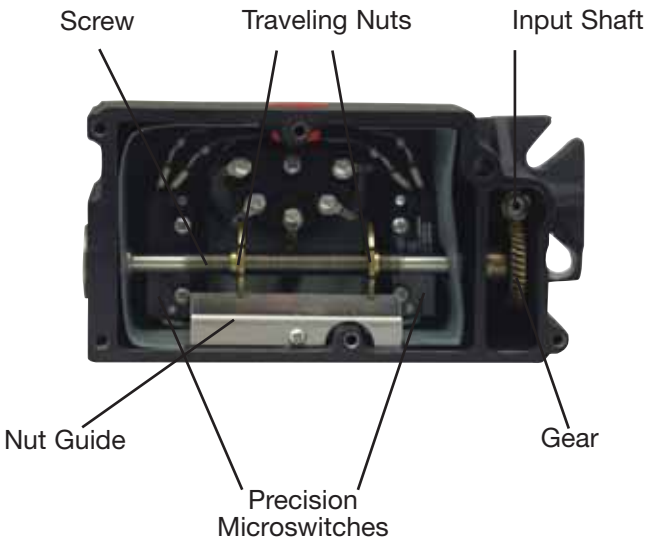


Loose adjustable roller type limit switches.

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.

SCW Series Limit Switches

SKA-6000-A Rotary Limit Switch



Features

Standard on all Duff-Norton SCW Series SuperCylinders.

- Sturdy and compact. Constructed of corrosion-resistant materials, with housing of anodized aluminum. Meets NEMA-4 water tightness requirements.
- Lifetime lubricated.
- Can be mounted on right or left extension of cylinder's worm shaft. Switch already mounted in its optional position.
- Optional 4-position limit switch available. Consult factory for dimensions.
- Simple to adjust. Two microswitches, 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.
- Can be used in applications where there is a need to limit the rotation of equipment that rotates and/or reverses.
- Operating temperature range -20° to + 150°F.

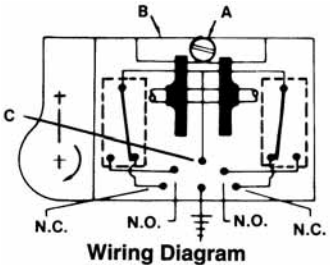
Electrical Specifications

Wiring Diagrams and Voltage

CAUTION: DISCONNECT POWER BEFORE MAKING ANY ADJUSTMENT

To Adjust Limit Switch Settings:

1. Check drift before adjusting limits.
2. Remove screw "A" and nut guide keeper "B" to adjust limits.
3. Run actuator unit to desired limit.
4. Rotate appropriate nut until switch clicks, then turn 1/2 turn more.
5. Replace "A" and "B. "
6. Run actuator unit to other limit.
7. Repeat steps 2, 4 and 5 to adjust this nut.



Wiring Diagram

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

For additional assistance, contact our Application Engineers at (800) 477-5002.

Features

Standard on all SCN Series SuperCylinders

- Multi-turn, traveling nut style limit switch offers superior repeatability, easy adjustment.
- Extend and retract positions independently adjustable, with actuator installed.
- Fully gasketed aluminum housing sealed against dirt and water entry.
- Precision, snap-action switches eliminate contact bounce.
- Terminal strip for easy connections.
- Rated 10 amps, 250 vac.
- Switch gear ratio matched to actuator model to assure best switch function.

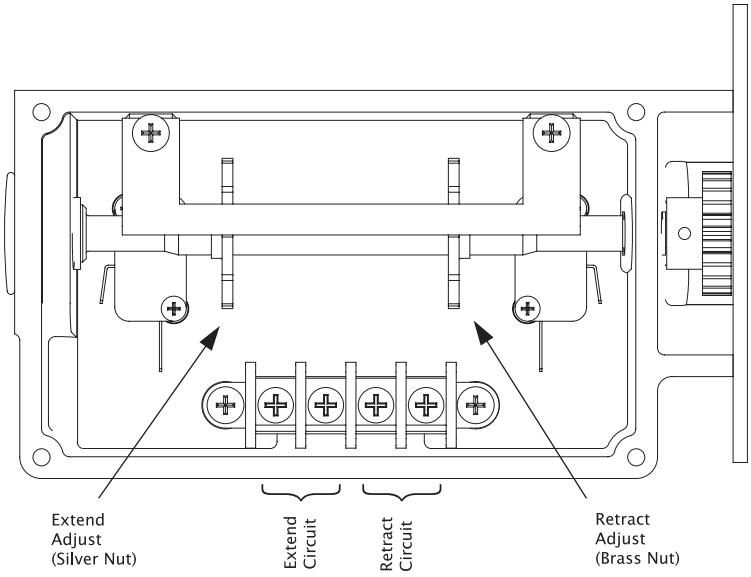
Electrical Specifications

Wiring Diagrams and Voltage

CAUTION: DISCONNECT POWER BEFORE MAKING ANY ADJUSTMENT

To Adjust Limit Switch Settings:

1. Run actuator or rotate tube to desired retracted position. Be careful not to jam actuator. Turn off power.
2. Pry up nut guide just enough to turn nuts and turn brass nut toward switch until the switch clicks. Turn 3 notches farther. Drop nut guide into notch.
3. Restore power. Run actuator out and run back in until switch stops it. Do not let tube rotate. Check stopping point.
4. If more adjustment is necessary, turn off power and adjust nut a few notches. Each notch is approx. 1/16". Turning nut toward switch makes actuator stop sooner; turning nut away from switch makes actuator travel farther.
5. Repeat steps 3 and 4 until desired setting is obtained.
6. Run actuator to the desired extended position, being careful not to jam. Turn off power.
7. Repeat steps 2 through 5 for the silver nut until desired extended setting is obtained.



Normally Closed switches rated 15 amps, 277 VAC Maximum.

The Duff-Norton SKA6205T Series Position Feedback Potentiometer/Transducer is designed to mount on the end of any 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 actuator position.

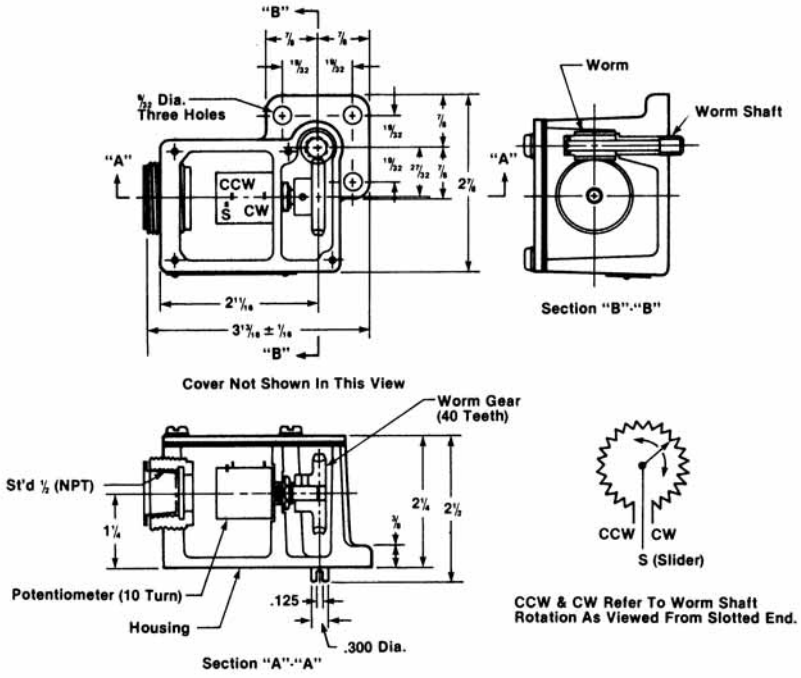
Features

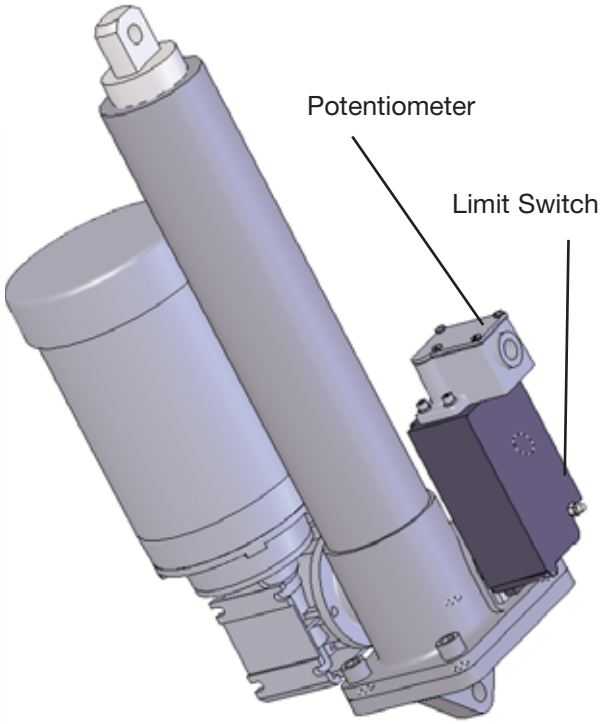
- Multiple gear ratios allow for a wide range of raises.
- Standard resistance is 5000 ohms. Other resistances are available on special order.
- Power rating: 2 watts at 40°C
- Max. service temp.: 85°C
- The SKA6205T can be used with most motor controls that have pro vision for potentiometer feedback signal.
- Transducer supplied with black anodized finish as standard.

IMPROVED

Potentiometer Performance Specifications

Model	Gear Ratio	Max. Turns Potentiometer Worm Shaft
SKA6205T-10	10:1	100
SKA6205T-20	20:1	200
SKA6205T-40	40:1	400





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

NEW

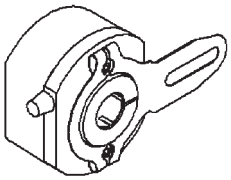
The Duff-Norton Digital Encoder and Digital Display is a more advanced way to determine a cylinder's position.

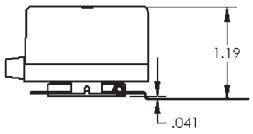
A digital encoder can be used to provide an extremely precise position signal to devices such as the Duff-Norton SK10006-35 digital display or 3rd party PLC's.

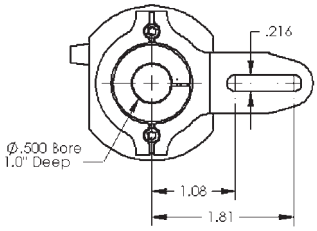
Duff-Norton uses two styles of incremental encoders, with the type used depending on the layout of the cylinder. When one end of the cylinders worm shaft is accessible, a Hollow Bore style of encoder is used, mounted on the worm. When the worm is not accessible, and the actuator is using a flange-mounted motor, a Ring Kit style encoder can be fitted on the drive motor.

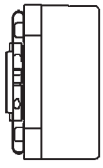
Digital Incremental Encoders

The EN260C60 is a compact yet rugged encoder designed for harsh factory environments and can easily accommodate clockwise or counter clockwise rotational requirements. Standard encoders are low-level, open collector output. Push-pull and line driven outputs are also available. Installation or removal is quick and simple. A M12, 5-pin body mount connector is provided as standard, and a shielded 4-meter cable with connector is available. Contact Duff-Norton Application Engineering for more specifics.









Features

- Up to 600 pulses per revolution (60 ppr standard)
- Pulse frequency - 200kHz, with a 90° phase shift
- Input voltage - +5 VDC to +28VDC
- Operating temperature (-0° to +70°C)
- Shock resistance to 200g, vibration resistance to 10g
- IP 64 rated seal
- Black non-corrosive housing

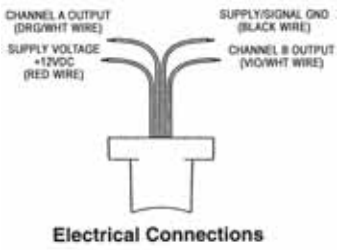
Function	Cable Wire Color
Com	Black
+VDC	White
A	Brown
B	Red

Ring Kit Encoder

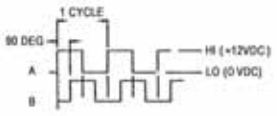
The Ring Kit Encoder is supplied as standard with all SCD Series models, and is available with SCW Series models. The kit is mounted between the motor and motor flange. For SCW Series models this mounting allows the cylinder worm opposite the motor to be available for mounting the limit switch or coupled and shafted to drive another cylinder. 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 actuators. Additional output types available. Contact Duff-Norton Application Engineering for specifics.

Specifications

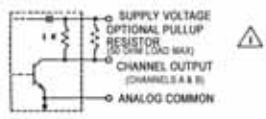
Sensor Type	Bidirectional shaft speed sensor
Pulse Per Revolution	60 cycles each channel
Supply Voltage	+12 Volts DC +/-5%
Supply Current	60 mA typical (115 mA maximum)
Output Drive Capability	250 mA per channel continuous
Maximum Load	50 ohms per channel



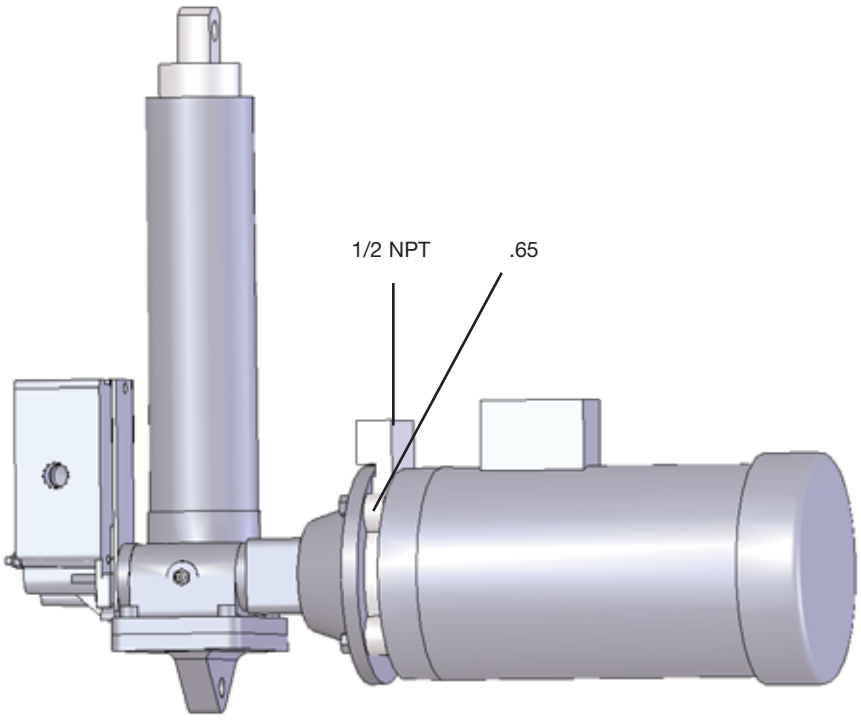
Electrical Connections



Output Channel Waveforms



Output Channel
Schematic (Channels A & B)



Programmable Digital Position Indicator for Duff-Norton Encoders

Displays position of cylinder's translating tube 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 all Duff-Norton SuperCylinders.

The Duff-Norton SK10006-35 Digital Position Indicator provides a high degree of accuracy and versatility when incorporated in machine or ball screw actuator 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 actuator 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.

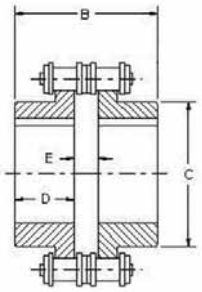
NEW

Features

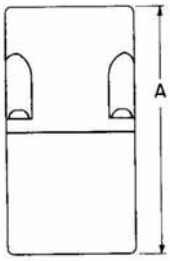
Chain Coupling:

- Integrate well with Duff-Norton “SCW Series SuperCylinders
- 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 cylinder’s worm shaft
- 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.

*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

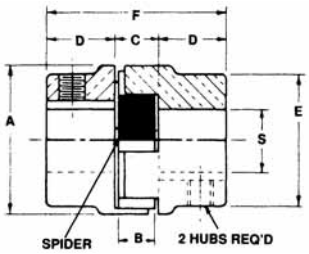
Coupling Selection Guide:

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 cylinder worm shafts.
2. Determine required coupling torque with this formula: **Torque Requirement per Cylinder X Number of Cylinders 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 actuators, shafts, gear boxes and motor should be carefully aligned.

Features

Jaw Coupling:

- Integrate well with Duff-Norton 2-3 Ton SCW Series SuperCylinders
- Do not require lubrication
- Our Hytrel® spiders provide 2 times the torque capability vs. a standard urethane or BUNA® spider
- Easy fit onto the cylinders worm shaft



Jaw Type 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
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.

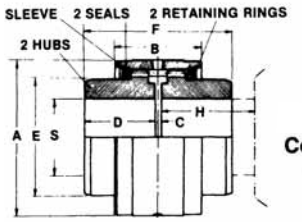
*Includes two hubs, and Hytrel spider
***Tolerance for all bores is +.001/-.000

Features

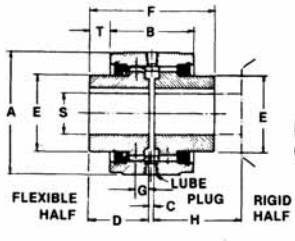
Full-Flex and Flex-Rigid Gear Couplings:

- 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

Part # Sleeve Kit	Part # Flex Hub	Part # 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.

*Includes two hubs, gaskets, and sleeve
***Tolerance for all bores is +.001/-.000

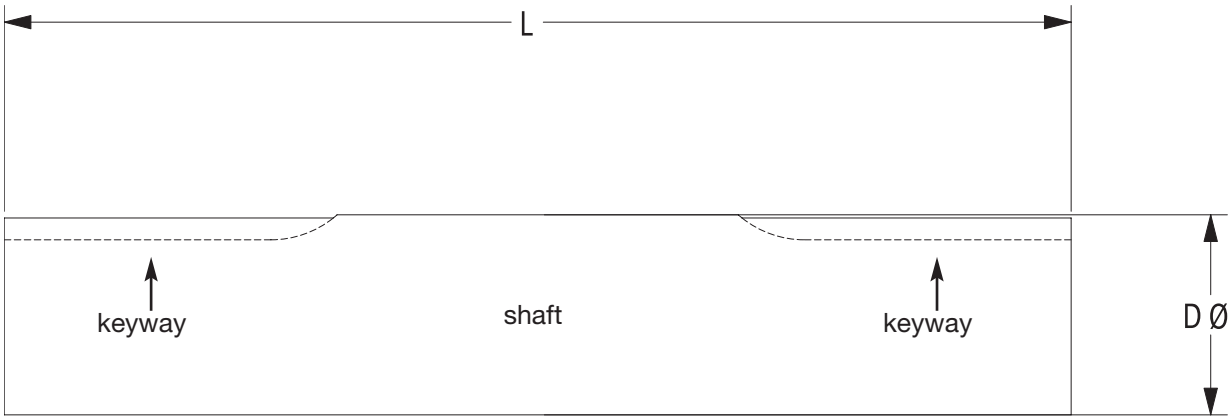
NEW

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
- Coordinates well with Duff-Norton Couplings (pages 50 – 51)



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 0.499	0.625 0.624	0.750 0.749	1.000 0.999	1.250 1.249	1.500 1.499	1.625 1.624	1.750 1.749	2.000 1.999	2.250 2.247	2.500 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. Actual keyway maybe woodruff style as shown or endmilled. Usable keyway width's and flat's remain the same.

For additional assistance, contact our Application Engineers at (800) 477-5002.

Shaft selection criteria

Chart Directions:

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.

Notes

Notes

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

Mechanical Actuators

Electromechanical Actuators

Rotary Unions

⚠ 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®

P.O. Box 7010 • Charlotte, NC 28241-7010
Phone: (800) 477-5002 • (704) 588-4610
Fax: (704) 588-1994
Email: duffnorton@cmworks.com
www.duffnorton.com

ISO 9001:2000

© Yale Industrial Products, Inc., Duff-Norton Division, 2007
All rights reserved by Yale Industrial Products, Inc., Duff-Norton Division.
May not be copied in whole or in part.
Printed in the USA

SCCAT-4
5M 02/08