

**Full range of bore sizes****All essential models****Optional Ecology seal****Technical features****Medium:**

Filtered, lubricated or non-lubricated, compressed air  
 Maximum Operating Pressure:  
 250 psig (17.2 bar)

**Temperature Range\*:**

Standard Nitrile Seals:  
 -20° to 200°F (-29° to 93°C)

**FPM/High temp Seals:**

-20° to 400°F (-29° to 205°C)  
 \*With dew point of supply air  
 less than air temperature below  
 35°F (2°C)

**Lubrication:**

All Roundline Plus cylinders are  
 pre-lubricated during assembly  
 with a PTFE based grease for non-  
 lube service and long life.

**Materials**

Cylinder Body:  
 304 Stainless Steel  
 Head and Cap:  
 Aluminum Alloy  
 Piston Rod:  
 Stainless steel in double rod  
 cylinders, and 5/16", 7/16", and  
 9/16" bores. Chrome plated  
 steel in all other bore sizes

\*NRN & NRP models are  
 non-chrome plated.  
 Rod Bearing: Oil Impregnated  
 Sintered Bronze  
 Piston: Aluminum Alloy or  
 stainless steel  
 Rod & Piston Seals: Nitrile  
 Pivot Bracket, Rod Clevis, Foot  
 Bracket, Mounting Nut:  
 Bright Zinc  
 Plated Carbon Steel

**Options selector****RP 075 x 2.500 - DAN - PS**

Series	
Roundline Plus	RP
Roundline Plus with Ecology seals*	*ERP
Bore Size	
5/16"	031
7/16"	043
9/16"	056
3/4" (E)	075
7/8"	087
1-1/16" (E)	106
1-1/4" (E)	125
1-1/2" (E)	150
1-3/4"	175
2" (E)	200
2-1/2" (E)	250
3" (E)	300

E - Available with Ecology Seals

Stroke	
Increments of 1/16" up to a maximum. See table	
Mounting Options	
Single Acting Nose	SAN
Single Acting Pivot	SAP
Single Acting Front Block	SBF
Single Acting Rear Block	SBR
Single Acting Front Trunnion	STF
Single Acting Rear Trunnion	STR
Single Acting Non-Rotating Nose*	NRN
Single Acting Non-Rotating Pivot*	NRP
Reverse Acting Nose	RAN
Reverse Acting Pivot	RAP
Reverse Acting Front Block (available in 3/4", 1-1/16" & 1-1/2" only)	RAF
Reverse Acting Rear Block	RAR
Double Acting Nose	DAN
Double Acting Pivot	DAP
Double Acting Double End Mount	DAD
Double Acting Front Block	DAF
Double Acting Rear Block	DAR
Double Acting Front Trunnion	DFT
Double Acting Rear Trunnion	DRT
Double Acting Double Rod End	DRD

\*Non rotating rod material is non-chrome  
 plated steel

Options	
Bumpers	UB
Alternate Port Location	PL( )
Side Ported End Cap (DAN, SAN, and DAF models only, note length adder)	PC
Magnetic Piston	PS
Non-Adjustable cushions both ends	NB*
No Rod Thread	PR
No Pin	NP
Pivot Bushing (no pin)	PO
Non-Standard Male Thread	TM( )
Thread extension over standard (specify additional length)	TX†( )
Rod extension over standard (specify additional length)	RX†( )
Stainless Steel piston rod (standard on certain models)	SS
FPM/High Temperature Seals	HT
Rod Wiper (not available with HT)	RW

\*ERP, Ecology cylinders available on DAP,  
 DAF, DAD, and DAN models only (add PC  
 option length adder to DAN models)  
 Cylinders with Ecology seals come standard  
 with non-adjustable cushions and does not  
 require NB call out in model number.  
 † Male thread extension only. Consult factory  
 for negative thread or rod extensions.

Bore	Maximum Stroke Lengths††	
	Single & Reverse Acting	Double Acting
5/16"	4	12
7/16"-9/16"	12	36
3/4"-1-3/4"	12	36
2"	4	36
2-1/2"-3"	-	36

†† Consult factory for longer stroke lengths.

- 1** Oil impregnated sintered bronze Rod Bearing provides exceptional rod support, and optimal cycle life
- 2** Chrome plated carbon steel Piston Rod for strength, smooth operation, and long life (stainless steel Piston Rod on 5/16, 7/16, 9/16 and all Double Rod cylinders)
- 3** Lip-Type nitrile Rod Seal, pressure energized and wear compensating
- 4** Head and Cap are solid aluminum alloy for strength and durability
- 5** Solid aluminum Piston is strong yet lightweight for low inertia
- 6** Lip-type nitrile Piston Seals are wear compensating for long life
- 7** 304 stainless steel Cylinder Body with polished I.D. ensures smooth performance and outstanding life cycle



\*Note: Single acting cylinders (not shown) use springs manufactured from music wire to provide millions of trouble free cycles.

**Ecology Roundline Plus - ERP Model**

The ERP model is the cost effective answer to load deceleration and faster through cushion performance.

- 1** IMPACT DAMPENING ECOLOGY PISTON SEALS
  - > Increased load capabilities and cycle rates
  - > Vibration and noise reduction
- 2** PRE-ENGINEERED NON-ADJUSTABLE CUSHION
  - > Tamper resistant
  - > Increased performance



**Roundline Ecology Piston Seal Option (ERP)**

The Ecology (Impact Dampening) Piston Seal option is available on select inch bore size Roundline cylinders in DAP, DAD, and DAN configurations. This option includes non-adjustable air cushions on both the extend and retract stroke of the cylinder. By including the Ecology Piston Seal option, cylinders can be specified based on weights of load being carried and speed of load. This is shown in the table below.

**Energy Absorption Capacity of the Impact Dampening Piston Seal**

This chart represents the energy absorption capacity of the Impact Dampening piston seals with standard Non-Adjustable air cushions. The values given are usable pounds stoppable at stated piston speeds.

In/Sec	Cylinder Bore					
	3/4	1-1/16	1-1/4	1-1/2	2	2-1/2
6	36.6	62.3	74.5	115.5	258.9	421.1
12	5.6	15.6	18.6	28.9	64.7	105.3
18	2.5	6.9	8.3	12.8	28.8	46.8
24	1.4	3.9	4.7	7.2	16.2	26.3
30	0.9	2.5	3.0	4.6	10.4	16.8
36	0.6	1.7	2.1	3.2	7.2	11.7
42	0.5	1.3	1.5	2.4	5.3	8.6
48	0.3	1.0	1.2	1.8	4.0	6.6
54	0.3	0.8	0.9	1.4	3.2	5.2
60	0.2	0.6	0.7	1.2	2.6	4.2

**Effect of Impact Dampening Seals on Total Stroke of Cylinders**

PSI	Cylinder Bore					
	3/4	1-1/16	1-1/4	1-1/2	2	2-1/2
0	.11	.12	.12	.14	.15	.17
20	.08	.09	.09	.10	.10	.12
40	.05	.06	.06	.07	.07	.08
60	.03	.04	.04	.04	.04	.05
80	.01	.02	.02	.02	.02	.02
100	0	0	0	0	0	0

The figure above represents total stroke loss (both ends) for the pressure indicated for new cylinders. The impact dampening seals will take some compression set during operation of the cylinder and the stroke loss will decrease. To determine stroke loss for either head or cap divide the value shown by 2.

### Force Factor Data

Bore	Code	Force Factor (Area)	
		Extend	Retract
5/16"	(031)	0.077	0.064
7/16"	(043)	0.15	0.12
9/16"	(056)	0.25	0.22
3/4"	(075)	0.44	0.39
7/8"	(087)	0.6	0.55
1-1/16"	(106)	0.89	0.81
1-1/4"	(125)	1.23	1.08
1-1/2"	(150)	1.77	1.62
1-3/4"	(175)	2.41	2.21
2"	(200)	3.14	2.84
2-1/2"	(250)	4.91	4.61
3"	(300)	7.07	6.63

#### Force Output Formula

Cylinder Output Force = Force Factor (area) x Air Line Pressure (psi)

Ex: 1-1/16 bore cylinder operating at 80 psi:

Force exerted on the extend:  $0.89 \times 80 = 71.2$  lbs.

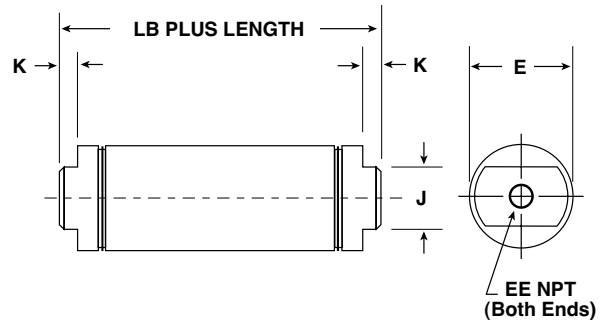
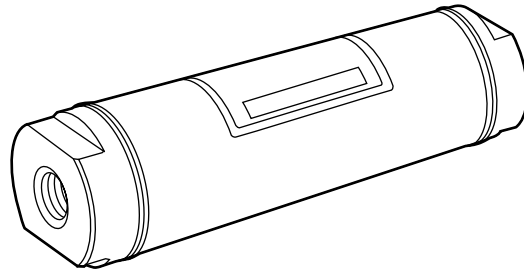
Force exerted on the retract:  $0.81 \times 80 = 65.2$  lbs.

### Approximate Spring Forces (lbs.)

Bore	Code	Relaxed (lbs)	Compressed (lbs)
5/16"	(031)	0.5	1
7/16"	(043)	1	2
9/16"	(056)	2	4
3/4"	(075)	3	6
7/8"	(087)	3	6
1-1/16"	(106)	3	6
1-1/4"	(125)	7.5	15
1-1/2"	(150)	7	14
1-3/4"	(175)	11	24
2"	(200)	15	30

### Air Reservoir

Air Reservoirs are made of the same high-quality stainless steel as the Series RP Cylinders.



Bore	E	EE	J	K	LB	Standard Internal Lengths
3/4"	0.813	1/8"	0.625	0.187	1.938	1" increments thru 4"
1-1/16"	1.125	1/8"	0.875	0.187	2.375	1" increments thru 8"
1-1/2"	1.562	1/8"	0.875	0.250	2.250	1" increments thru 16"
2"	2.080	1/4"	1.250	0.312	2.875	1" increments thru 16"
2-1/2"	2.610	1/4"	1.750	0.312	2.875	1" increments thru 24"
3"	3.12	3/8"	2.00	0.312	3.188	1" increments thru 24"

### How to Order

#### Example:

1-1/16" bore air reservoir with a 3" internal length would be ordered as follows: AR-1-1/16 x 3

### Single Acting Cylinders

To find total length of cylinder, calculate the length of next whole increment of stroke, then subtract the difference between the desired stroke and the next whole increment of stroke.

Example: RP106X1.750-SAN		
RP106 Base Length=		1.94"
Add, 1.56 per inch of stroke=		3.12"
(1.56 x next higher stroke, 2")		
Total for RP106x2.000-SAN		5.06"
Whole stroke Increment	2.00"	
Less required stroke	1.75"	
Stroke Difference	0.25"	
Subtract Stroke Diff.		-0.25
<b>RP105X1.750-SAN</b>		<b>4.81"</b>

### Reverse Acting Cylinders

To find total length of cylinder, calculate the length of next whole increment of stroke, then subtract 2 x the difference between the desired stroke and the next whole increment of stroke.

Example: RP075X1.375-RAN		
RP075 Base Length =		2.38"
Add, 2.62" per inch of stroke =		5.34"
(2.62 x next higher stroke, 2")		
Total for RP075x2.000-RAN		7.72"
Next whole stroke increment	2.000"	
Less required stroke	-1.375	
Stroke Difference	0.625"	
2 x stroke difference	1.250"	-1.25
<b>RP075X1.375-RAN</b>		<b>6.47"</b>

Dimensions in inches

**UB - Bumpers**

- Standard on 5/16", 7/8", 1-1/4", and 1-3/4" bore sizes.
- The UB option will increase the overall length on all other bore sizes (see chart for length changes).
- Single acting models will have one bumper on the piston side opposite the spring.
- Bumpers are not included or available on ERP Ecology Seal models.
- When the HT high temperature option is ordered on these bore sizes, the bumpers are omitted and may change the overall length of the cylinder (except 5/16" bore, bumpers are not omitted).
- See "HT" Option below for further explanation of HT and UB in combination.

Bore	Increase in cylinder length due to the UB option			
	Single Acting	Reverse Acting	Double Acting	Double Rod End
5/16"	Std	Std	Std	Std
7/16"	0.062	0.125	0.188	0.25
9/16"	0.062	0.062	0.125	0.125
3/4"	0.125	0.125	0	0
7/8"	Std	Std	Std	Std
1-1/16"	0.125	0.125	0.125	0.5*
1-1/4"	Std	Std	Std	Std
1-1/2"	0.125	0.125	0.125	0.125
1-3/4"	Std	Std	Std	Std
2"	0.125	0.125	0.250	0.250
2-1/2"	0.125	0.125	0.250	0.250
3"	0.125	0.125	0.250	0.250

\* When the UB and PS options are in combination on an 1-1/16" bore, double rod end, only the bumper length should be added. All other models and bore sizes should add the UB length and the PS length together.

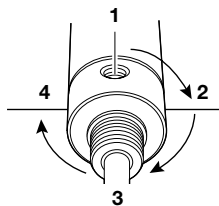
**HT - High Temperature Seals (FPM)**

- For service up to 400°F
- Not available with RW rod wiper option.
- When ordered with the UB bumper option, bumpers will also be rated to 400°F.
- For cylinders where bumpers are standard, opting for HT will omit the bumpers and may decrease the overall length of the cylinder (except 5/16" bore). See chart below for length changes.
- For cylinders where bumpers are standard, if high temp bumpers are required, reference both HT and UB in the model number. This will provide high temp seals and bumpers and not change the overall length of the cylinder (except 5/16" bore).
- On the 5/16" bore, bumpers are always standard, and never omitted. Additionally, high temperature bumpers are not available on this bore size. As a result, with the HT option, the 5/16" bore cylinder is rated to 200°F.

Bore	Decrease in Overall length due to HT option (in.)			
	Single Acting	Reverse Acting	Double Acting	Double Rod End
5/16"	0.000	0.000	0.000	0.000
7/8"	0.090	0.125	0.220	0.250
1-1/4"	0.125	0.125	0.190	0.250
1-3/4"	0.125	0.125	0.250	0.250

**PL( ) - Alternate Port Location**

Designate location on head and cap respectively. For example: L(12) = Head port location 1, and Cap port location 2.



**PC - Side ported end cap (DAN and SAN models only)**

Port will be on the side of the end cap and in line with the head end port. Overall length of the cylinder will increase. Change in overall length due to the PC option.

Bore	Length Increase
5/16"	0.2
7/16"	0.19
9/16"	0.03
3/4"	0.44
7/8"	0.28
1-1/16"	0.25
1-1/4"	0.31
1-1/2"	0.19
1-3/4"	0.56
2"	0.38
2-1/2"	0.38
3"	0.44

**PS - Magnetic Piston**

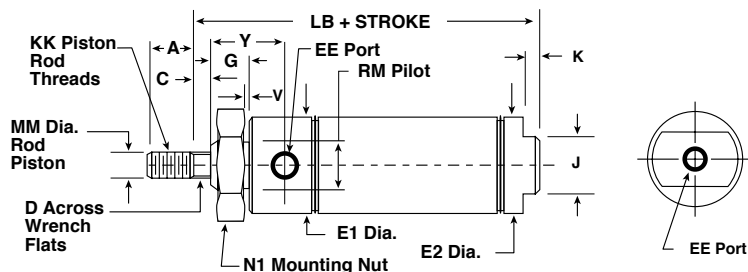
A magnet on the piston may increase the length of the cylinder. See chart below for length adders.

Bore	Increase in cylinder length with the PS option		
	Single & Reverse Acting	Double Acting	Double Rod End
5/16"	0.150	0.150	N/A
7/16"	0.200	0.250	0.250
9/16"	0.125	0	0
3/4"	0.125	0	0
7/8"	0.125	0.125	0.125
1-1/16"	0.125	0	0.125**
1-1/4"	0.125	0	0
1-1/2"	0.125	0	0
1-3/4"	0.125	0	0
2"	0.125	0	0
2-1/2"	-	0	0
3"	-	0	0

\* When the UB and PS options are in combination on an 1-1/16" bore, double rod end, only the bumper length should be added. All other models and bore sizes should add the UB length and the PS length together.

\*\* Ecology piston seal adds .375" to the overall length when combined with PS option on the 1-1/16" bore DRD model only.

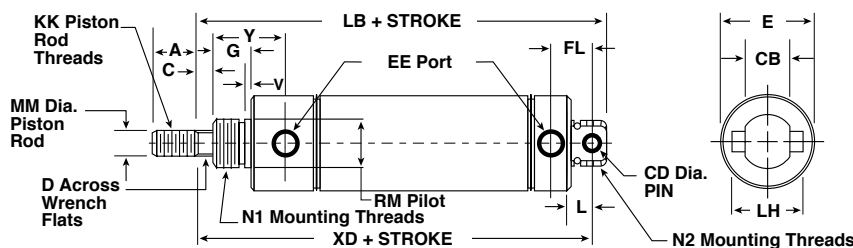
**Double Acting (DAN) – Nose Mount**



Bore	A	C	D	EE	E1	E2	G	J	K	KK	LB	MM	N1	RM	Y	V
5/16"	0.38	N/A	N/A	10-32	0.61	0.36	0.31	0.36	N/A	5-40	1.64	0.125	3/8-24	.371/.373	0.47	0.03
7/16"	0.50	N/A	N/A	10-32	0.74	0.50	0.38	0.38	0.19	10-32	2.12	0.187	7/16-20	.434/.437	0.72	0.05
9/16"	0.50	N/A	N/A	10-32	0.62	0.62	0.38	0.50	0.19	10-32	2.28	0.187	7/16-20	.434/.437	0.75	0.06
3/4"	0.50	N/A	N/A	1/8 NPT	0.86	0.81	0.50	0.62	0.19	1/4-28	2.97	0.250	5/8-18	.621/.624	0.97	0.09
7/8"	0.50	N/A	N/A	1/8 NPT	0.94	0.94	0.50	0.62	0.19	1/4-28	2.94	0.250	5/8-18	.621/.624	0.97	0.09
1-1/16"	0.50	N/A †	N/A	1/8 NPT	1.12	1.12	0.50	0.88	0.19	5/16-24	3.12	0.312	5/8-18	.621/.624	1.06	0.09
1-1/4"	0.75	0.25	0.38	1/8 NPT	1.34	1.34	0.63	0.88	0.25	7/16-20	4.00	0.437	3/4-16	.746/.749	1.37	0.09
1-1/2"	0.75	0.25	0.38	1/8 NPT	1.56	1.56	0.63	0.88	0.25	7/16-20	3.69	0.437	3/4-16	.746/.749	1.25	0.09
1-3/4"	0.88	0.31	0.44	1/4 NPT	1.84	1.84	0.75	1.25	0.25	1/2-20	4.69	0.500	1-14	1.029/1.032	1.63	0.09
2"	0.88	0.38	0.50	1/4 NPT	2.08	2.08	0.81	1.25	0.31	1/2-20	4.69	0.625	1-1/4-12	1.372/1.375	1.46	0.12
2-1/2"	0.88	0.38	0.50	1/4 NPT	2.59	2.59	0.81	1.75	0.31	1/2-20	4.69	0.625	1-3/8-12	1.497/1.500	1.46	0.12
3"	1.25	0.38	0.63	3/8 NPT	3.12	3.12	1.00	2.00	0.31	5/8-18	5.25	0.750	1-1/2-12	1.622/1.625	1.71	0.19

† 1-1/16 bore with SS or PS option, C = 0.12 and D = 0.25.

**Double Acting (DAP) – Pivot Mount**

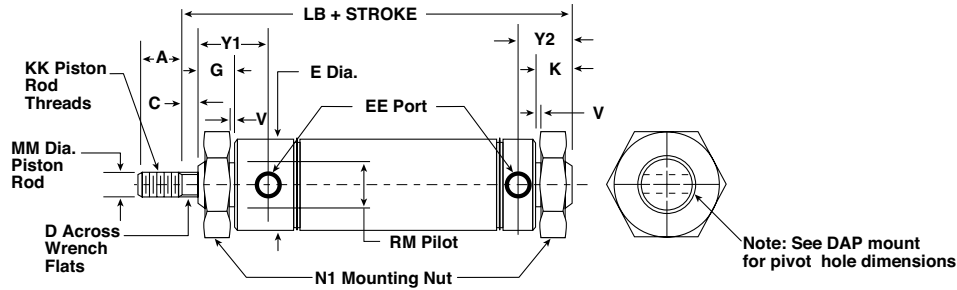


Bore	A	C	CB	CD	D	E	EE	FL	G	KK	L	LB	LH	MM	N1	N2	RM	V	XD	Y
5/16"	0.38	N/A	0.25	0.125	N/A	0.61	10-32	0.34	0.31	5-40	0.19	2.19	0.39	0.125	3/8-24	3/8-24	.371/.373	0.03	2.03	0.47
7/16"	0.50	N/A	0.31	0.156	N/A	0.74	10-32	0.44	0.38	10-32	0.25	2.81	0.50	0.187	7/16-20	7/16-20	.434/.437	0.05	2.56	0.72
9/16"	0.50	N/A	0.31	0.156	N/A	0.62	10-32	0.38	0.38	10-32	0.25	2.75	0.50	0.187	7/16-20	7/16-20	.434/.437	0.06	2.56	0.75
3/4"	0.50	N/A	0.38	0.250	N/A	0.86	1/8 NPT	0.62	0.50	1/4-28	0.34	4.03	0.75	0.250	5/8-18	5/8-18	.621/.624	0.09	3.75	0.97
7/8"	0.50	N/A	0.38	0.250	N/A	0.94	1/8 NPT	0.62	0.50	1/4-28	0.34	3.84	0.75	0.250	5/8-18	5/8-18	.621/.624	0.09	3.56	0.97
1-1/16"	0.50	0.12	0.38	0.250	0.25	1.12	1/8 NPT	0.62	0.50	5/16-24	0.34	4.12	0.75	0.312	5/8-18	5/8-18	.621/.624	0.09	3.84	1.07
1-1/4"	0.75	0.25	0.50	0.250	0.38	1.34	1/8 NPT	0.78	0.63	7/16-20	0.41	5.12	0.88	0.437	3/4-16	3/4-16	.746/.749	0.09	4.72	1.37
1-1/2"	0.75	0.25	0.62	0.375	0.38	1.56	1/8 NPT	0.81	0.63	7/16-20	0.50	4.75	1.00	0.437	3/4-16	3/4-16	.746/.749	0.09	4.38	1.25
1-3/4"	0.88	0.31	0.62	0.376	0.44	1.84	1/4 NPT	1.12	0.75	1/2-20	0.50	6.25	1.00	0.500	1-14	1-14	1.029/1.032	0.09	5.75	1.63
2"	0.88	0.38	0.75	0.375	0.50	2.08	1/4 NPT	1.03	0.81	1/2-20	0.56	6.06	1.63	0.625	1-1/4-12	1-1/4-12	1.372/1.375	0.12	5.62	1.54
2-1/2"	0.88	0.38	0.75	0.375	0.50	2.59	1/4 NPT	1.03	0.81	1/2-20	0.56	6.06	1.63	0.625	1-3/8-12	1-3/8-12	1.497/1.500	0.12	5.62	1.47
3"	1.25	0.38	0.88	0.500	0.63	3.12	3/8 NPT	1.34	1.00	5/8-18	0.81	7.12	1.90	0.750	1-1/2-12	1-1/2-12	1.622/1.625	0.19	6.50	1.71

\* Pivot bushing included

Dimensions in inches

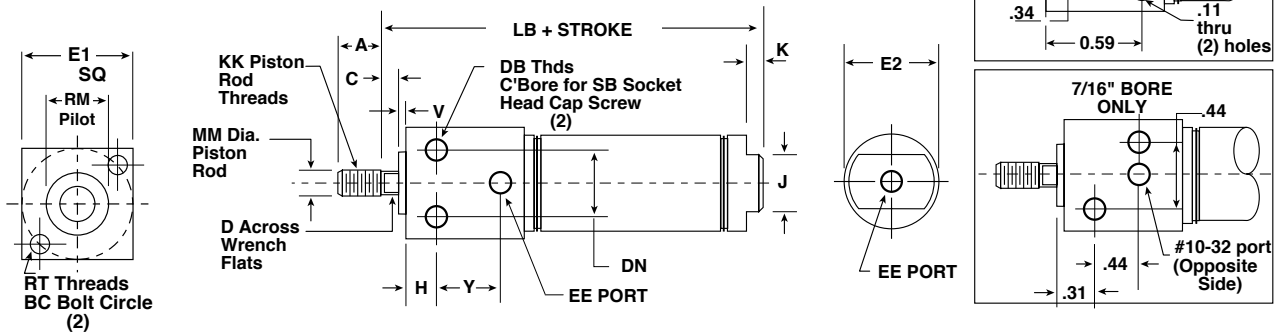
**Double Acting (DAD) – Double End Mount**



Bore	A	C	D	E	EE	G	K	KK	LB	MM	N1	RM	V	Y1	Y2
5/16"	0.38	N/A	N/A	0.61	10-32	0.31	0.35	5-40	2.19	0.125	3/8-24	.371/.373	0.03	0.47	0.50
7/16"	0.50	N/A	N/A	0.74	10-32	0.38	0.50	10-32	2.81	0.187	7/16-20	.434/.437	0.05	0.73	0.69
9/16"	0.50	N/A	N/A	0.62	10-32	0.38	0.44	10-32	2.75	0.187	7/16-20	.434/.437	0.06	0.75	0.57
3/4"	0.50	N/A	N/A	0.86	1/8 NPT	0.50	0.62	1/4-28	4.03	0.250	5/8-18	.621/.624	0.09	0.97	0.90
7/8"	0.50	N/A	N/A	0.94	1/8 NPT	0.50	0.62	1/4-28	3.84	0.250	5/8-18	.621/.624	0.09	0.97	0.90
1-1/16"	0.50	0.12	0.25	1.12	1/8 NPT	0.50	0.62	5/16-24	4.12	0.312	5/8-18	.621/.624	0.09	1.07	0.90
1-1/4"	0.75	0.25	0.38	1.34	1/8 NPT	0.63	0.81	7/16-20	5.12	0.437	3/4-16	.746/.749	0.09	1.37	1.18
1-1/2"	0.75	0.25	0.38	1.56	1/8 NPT	0.63	0.88	7/16-20	4.75	0.437	3/4-16	.746/.749	0.09	1.25	1.18
1-3/4"	0.88	0.31	0.44	1.84	1/4 NPT	0.75	1.00	1/2-20	6.25	0.500	1-14	1.029/1.032	0.09	1.63	1.62
2"	0.88	0.38	0.50	2.08	1/4 NPT	0.81	1.00	1/2-20	6.06	0.625	1-1/4-12	1.372/1.375	0.12	1.46	1.47
2-1/2"	0.88	0.38	0.50	2.59	1/4 NPT	0.81	1.00	1/2-20	6.06	0.625	1-3/8-12	1.497/1.500	0.12	1.46	1.47
3"	1.25	0.38	0.63	3.12	3/8 NPT	1.00	1.43	5/8-18	7.12	0.750	1-1/2-12	1.622/1.625	0.19	1.71	1.96

\* Pivot bushing included

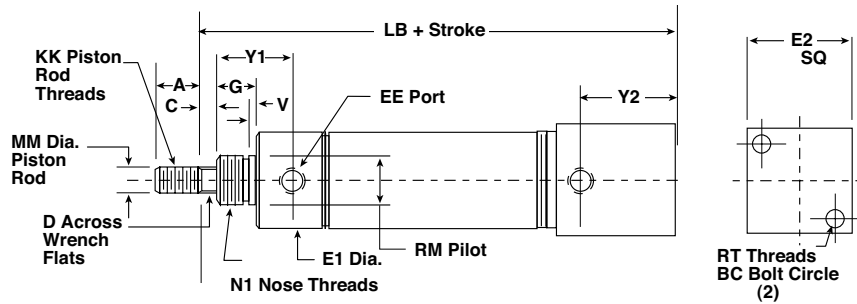
**Double Acting (DAF) – Front Block Mount**



Bore	A	BC	C	D	DB	DN	EE	E1	E2	H	J	K	KK	LB	MM	RM	RT	SB	V	Y
5/16"	0.38	N/A	N/A	N/A	N/A	N/A	10-32	0.50	0.36	N/A	N/A	N/A	5-40	1.72	0.125	N/A	N/A	N/A	N/A	N/A
7/16"	0.50	0.75	N/A	N/A	8-32	N/A	10-32	0.75	0.50	N/A	0.38	0.19	10-32	2.12	0.187	0.437	8-32	N/A	0.06	N/A
3/4"	0.75	1.00	0.25	0.22	1/4-20	0.62	1/8 NPT	1.00	0.81	0.38	0.62	0.19	1/4-28	3.22	0.250	0.625	10-32	#10	0.09	0.50
1-1/16"	0.75	1.25	0.38	0.25	1/4-20	0.81	1/8 NPT	1.25	1.12	0.62	0.88	0.19	5/16-24	3.75	0.312	0.75	10-32	#10	0.09	0.54
1-1/2"	1.25	1.75	0.25	0.38	5-16-18	1.12	1/4 NPT	1.75	1.56	0.88	0.88	0.25	7/16-20	4.19	0.437	1.00	1/4-20	1/4	0.13	0.65

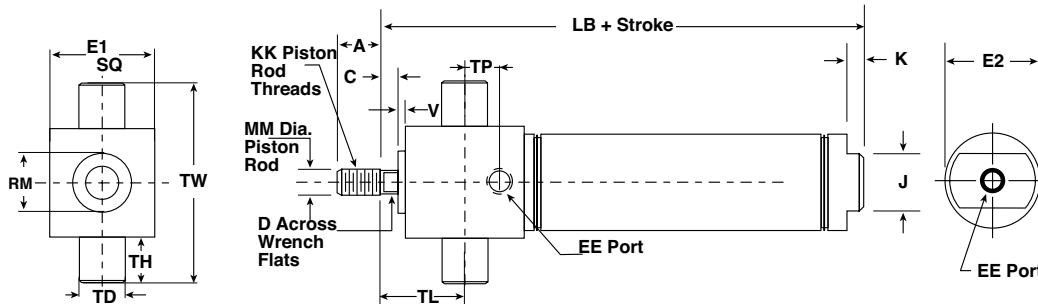
Dimensions in inches

**Double Acting (DAR) – Rear Block Mount**



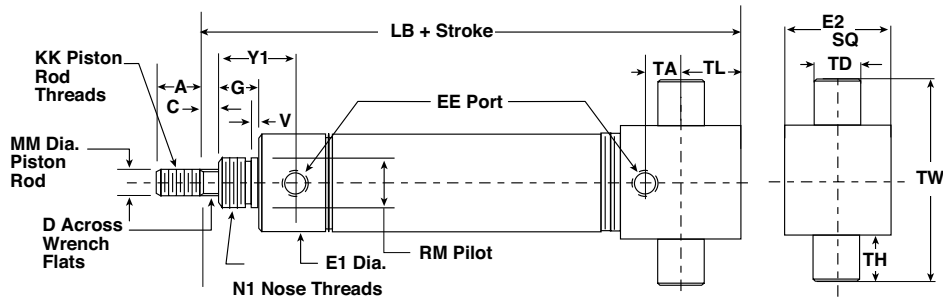
Bore	A	C	D	E1	E2	EE	G	KK	LB	MM	N1	RM	RT	BC	V	Y1	Y2
7/16"	0.50	N/A	N/A	0.75	0.75	10-32	0.38	10-32	2.44	0.187	7/16-20	.433/.437	8-32	0.75	0.05	0.72	0.34
3/4"	0.75	0.25	0.22	0.86	1.00	1/8 NPT	0.50	1/4-28	3.78	0.250	5/8-18	.621/.624	10-32	1.00	0.09	0.97	0.44
1-1/16"	0.75	0.38	0.25	1.12	1.25	1/8 NPT	0.50	5/16-24	4.00	0.312	5/8-18	.621/.624	10-32	1.25	0.09	1.06	1.25
1-1/2"	1.25	0.25	0.38	1.56	1.75	1/4 NPT	0.63	7/16-20	4.38	0.437	3/4-16	.746/.749	1/4-20	1.75	0.09	1.25	0.62

**Double Acting (DFT) – Front Trunnion Mount**



Bore	A	C	D	E1	E2	EE	J	K	KK	LB	MM	RM	TD	TH	TL	TP	TW	V
7/16"	0.50	N/A	N/A	0.75	0.50	10-32	0.38	0.19	10-32	2.12	0.187	0.44	0.374	0.25	0.31	0.41	1.25	0.06
3/4"	0.75	0.25	0.22	1.00	0.81	1/8 NPT	0.62	0.19	1/4-28	3.22	0.250	0.62	0.500	0.38	0.69	0.53	1.75	0.09
1-1/16"	0.75	0.38	0.25	1.25	1.12	1/8 NPT	0.88	0.19	5/16-24	3.75	0.312	0.75	0.500	0.38	1.09	0.53	2.00	0.09
1-1/2"	1.25	0.25	0.38	1.75	1.56	1/4 NPT	0.88	0.25	7/16-20	4.19	0.437	1.00	0.500	0.38	1.19	0.59	2.50	0.12

**Double Acting (DRT) – Rear Trunnion Mount**

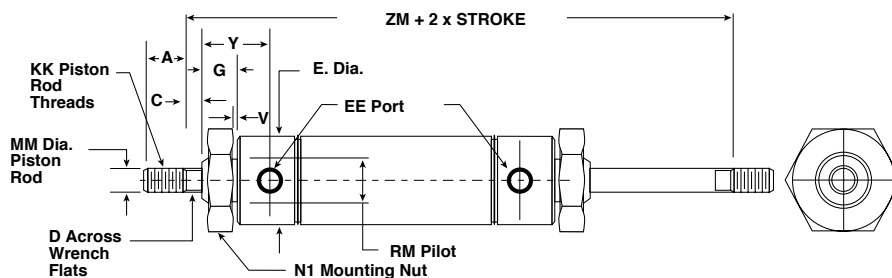


Bore	A	C	D	E1	E2	EE	G	KK	LB	MM	N1	RM	TA	TD	TH	TL	TW	V	Y1
7/16"	0.50	N/A	N/A	0.75	0.75	10-32	0.38	10-32	2.44	0.187	7/16-20	.433/.437	0.09	0.374	0.25	0.25	1.25	0.05	0.72
3/4"	0.75	0.25	0.22	0.86	1.00	1/8 NPT	0.50	1/4-28	3.78	0.250	5/8-18	.621/.624	0.06	0.500	0.38	0.38	1.75	0.09	0.97
1-1/16"	0.75	0.38	0.25	1.12	1.25	1/8 NPT	0.50	5/16-24	4.00	0.312	5/8-18	.621/.624	0.06	0.500	0.38	0.38	2.00	0.07	1.06
1-1/2"	1.25	0.25	0.38	1.56	1.75	1/4 NPT	0.63	7/16-20	4.38	0.437	3/4-16	.746/.749	0.12	0.500	0.38	0.50	2.50	0.09	1.25

Dimensions in inches

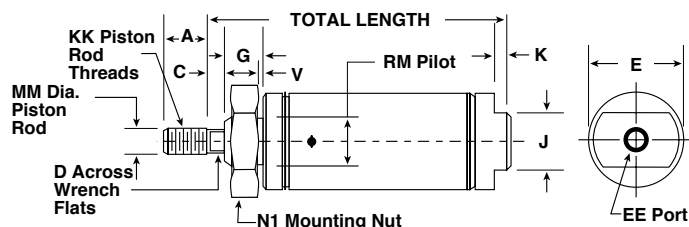


**Double Acting Double Rod End (DRD) – Double End Mount**



Bore	A	C	D	E	EE	G	KK	MM	N1	RM	V	Y	ZM
7/16"	0.50	N/A	N/A	0.74	10-32	0.38	10-32	0.187	7/16-20	.434/.437	0.05	0.72	2.81
9/16"	0.50	N/A	N/A	0.62	10-32	0.38	10-32	0.187	7/16-20	.434/.437	0.06	0.75	2.94
3/4"	0.50	N/A	N/A	0.86	1/8 NPT	0.50	1/4-28	0.250	5/8-18	.621/.624	0.09	0.97	4.00
7/8"	0.50	N/A	N/A	0.94	1/8 NPT	0.50	1/4-28	0.250	5/8-18	.621/.624	0.09	0.97	3.91
1-1/16"	0.50	0.12	0.25	1.12	1/8 NPT	0.50	5/16-24	0.312	5/8-18	.621/.624	0.09	1.06	4.00
1-1/4"	0.75	0.25	0.38	1.34	1/8 NPT	0.63	7/16-20	0.437	3/4-16	.746/.749	0.09	1.37	5.56
1-1/2"	0.75	0.25	0.38	1.56	1/8 NPT	0.63	7/16-20	0.437	3/4-16	.746/.749	0.09	1.25	5.12
1-3/4"	0.88	0.31	0.44	1.84	1/4 NPT	0.75	1/2-20	0.500	1-14	1.029/1.032	0.09	1.94	6.56
2"	0.88	0.38	0.50	2.08	1/4 NPT	0.81	1/2-20	0.625	1-1/4-12	1.372/1.375	0.12	1.46	6.56
2-1/2"	0.88	0.38	0.50	2.59	1/4 NPT	0.81	1/2-20	0.625	1-3/8-12	1.497/1.500	0.12	1.46	6.56
3"	1.25	0.38	0.63	3.12	3/8 NPT	1.00	5/8-18	0.750	1-1/2-12	1.622/1.625	0.19	1.71	7.31

**Single Acting Spring Return (SAN) – Nose Mount**



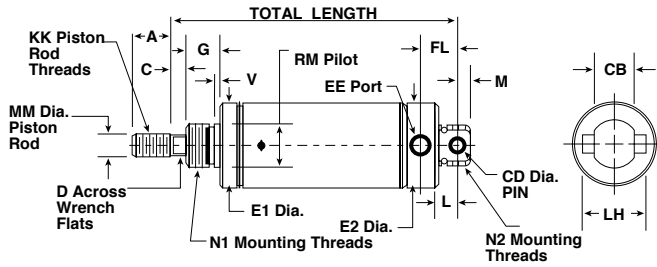
Bore	A	C	D	E	EE	G	J	K	KK	MM	N1	RM	V	Total Length
5/16"	0.38	N/A	N/A	0.36	10-32	0.25	N/A	N/A	5-40	0.125	1/4-28	.309/.312	0.03	1.12 + (0.75 per 1/2" of stroke)
7/16"	0.50	N/A	N/A	0.50	10-32	0.31	0.38	0.19	10-32	0.187	3/8-24	.369/.373	0.05	1.31 + (0.94 per 1/2" of stroke)
9/16"	0.50	N/A	N/A	0.62	10-32	0.38	0.50	0.19	10-32	0.187	7/16-20	.434/.437	0.06	1.53 + (1.62 per 1" of stroke)
3/4"	0.50	N/A	N/A	0.81	1/8 NPT	0.44	0.62	0.19	1/4-28	0.250	1/2-20	.494/.498	0.08	1.50 + (1.69 per 1" of stroke)
7/8"	0.50	N/A	N/A	0.94	1/8 NPT	0.50	0.62	0.19	1/4-28	0.250	5/8-18	.621/.624	0.09	1.84 + (1.56 per 1" of stroke)
1-1/16"	0.50	N/A†	N/A	1.12	1/8 NPT	0.50	0.88	0.19	5/16-24	0.312	5/8-18	.621/.624	0.07	1.94 + (1.56 per 1" of stroke)
1-1/4"	0.75	0.25	0.38	1.34	1/8 NPT	0.63	0.88	0.25	7/16-20	0.437	3/4-16	.746/.749	0.09	2.66 + (1.81 per 1" of stroke)
1-1/2"	0.75	0.25	0.38	1.56	1/8 NPT	0.63	0.88	0.25	7/16-20	0.437	3/4-16	.746/.749	0.09	2.44 + (1.69 per 1" of stroke)
1-3/4"	0.88	0.31	0.44	1.84	1/4 NPT	0.75	1.25	0.25	1/2-20	0.500	1-14	1.029/1.032	0.09	2.97 + (2.00 per 1" of stroke)
2"	0.88	0.38	0.50	2.08	1/4 NPT	0.81	1.25	0.31	1/2-20	0.625	1-1/4-12	1.372/1.375	0.12	Consult Factory

† 1-1/16 bore with SS or PS option, C = 0.12 and D = 0.25.

Dimensions in inches



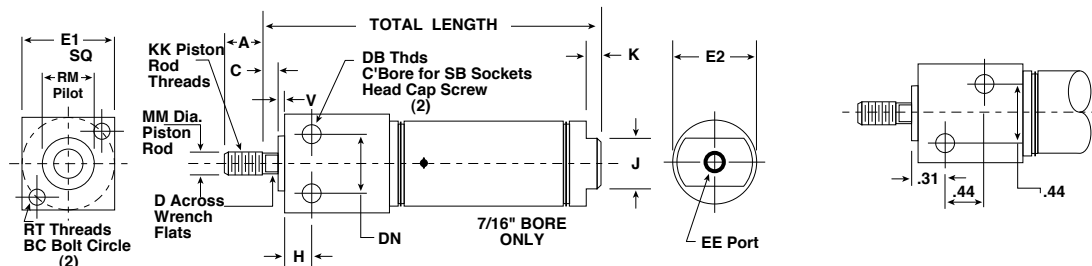
**Single Acting Spring Return (SAP) – Pivot Mount**



Bore	A	CB	C	CD	D	E1	E2	EE	FL	G	KK	L	LH	M	MM	N1	N2	V	RM	Total Length
5/16**	0.38	0.25	N/A	0.125	N/A	0.36	0.36	10-32	0.34	0.25	5-40	0.19	N/A	0.16	0.125	1/4-28	3/8-24	0.03	.245/.249	1.52 + (.75 per 1/2" of stroke)
7/16"	0.50	0.31	N/A	0.156	N/A	0.50	0.74	10-32	0.44	0.31	10-32	0.25	0.50	0.25	0.187	3/8-24	7/16-20	0.05	.369/.373	1.75 + (.94 per 1/2" of stroke)
9/16**	0.50	0.31	N/A	0.156	N/A	0.62	0.62	10-32	0.38	0.38	10-32	0.25	N/A	0.19	0.187	7/16-20	7/16-20	0.06	.434/.437	1.81 + (1.62 per 1" of stroke)
3/4"	0.50	0.38	N/A	0.250	N/A	0.81	0.86	1/8 NPT	0.62	0.44	1/4-28	0.34	0.75	0.28	0.250	1/2-20	5/8-18	0.08	.494/.498	2.28 + (1.69 per 1" of stroke)
7/8"	0.50	0.38	N/A	0.250	N/A	0.94	0.94	1/8 NPT	0.62	0.50	1/4-28	0.34	0.75	0.28	0.250	5/8-18	5/8-18	0.09	.621/.624	2.47 + (1.56 per 1" of stroke)
1-1/16"	0.50	0.38	0.12	0.250	0.25	1.12	1.12	1/8 NPT	0.62	0.50	5/16-24	0.34	0.75	0.28	0.312	5/8-18	5/8-18	0.07	.621/.624	2.66 + (1.56 per 1" of stroke)
1-1/4"	0.75	0.50	0.25	0.250	0.38	1.34	1.34	1/8 NPT	0.78	0.63	7/16-20	0.41	N/A	0.40	0.437	3/4-16	3/4-16	0.09	.746/.749	3.38 + (1.81 per 1" of stroke)
1-1/2"	0.75	0.62	0.25	0.375	0.38	1.56	1.56	1/8 NPT	0.81	0.63	7/16-20	0.50	N/A	0.38	0.437	3/4-16	3/4-16	0.09	.746/.749	3.12 + (1.69 per 1" of stroke)
1-3/4"	0.88	0.62	0.31	0.375	0.44	1.84	1.84	1/4 NPT	1.12	1.06	1/2-20	0.50	N/A	0.50	0.500	1-14	1-14	0.09	1.029/1.032	4.03 + (2.00 per 1" of stroke)
2**	0.88	0.75	0.38	0.375	0.50	2.08	2.08	1/4 NPT	1.03	0.81	1/2-20	0.56	N/A	0.44	0.625	1-1/4-12	1-1/4-12	0.12	1.372/1.375	Consult Factory

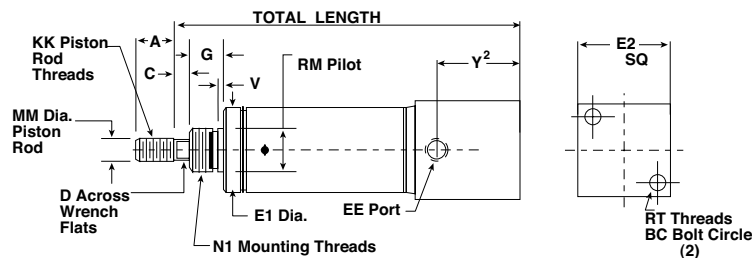
\* Pivot bushing included

**Single Acting Spring Return (SBF) – Front Block Mount**



Bore	A	BC	C	D	DB	DN	E1	E2	EE	H	J	K	KK	MM	RM	RT	SB	V	Total Length
7/16"	0.50	0.75	N/A	N/A	8-32	N/A	0.75	0.50	10-32	N/A	0.38	0.19	10-32	0.187	0.44	8-32	N/A	0.06	1.94 + (.94 per 1/2" of stroke)
3/4"	0.75	1.00	0.25	0.22	1/4-20	0.62	1.00	0.81	1/8 NPT	0.38	0.62	0.19	1/4-28	0.250	0.63	10-32	#10	0.09	2.66 + (1.69 per 1" of stroke)
1-1/16"	0.75	1.25	0.38	0.25	1/4-20	0.81	1.25	1.12	1/8 NPT	0.62	0.88	0.19	5/16-24	0.312	0.75	10-32	#10	0.09	3.38 + (1.81 per 1" of stroke)
1-1/2"	1.25	1.75	0.25	0.38	5/16-18	1.12	1.75	1.56	1/4 NPT	0.88	0.88	0.25	7/16-20	0.437	1.00	1/4-20	1/4	0.13	3.69 + (2.00 per 1" of stroke)

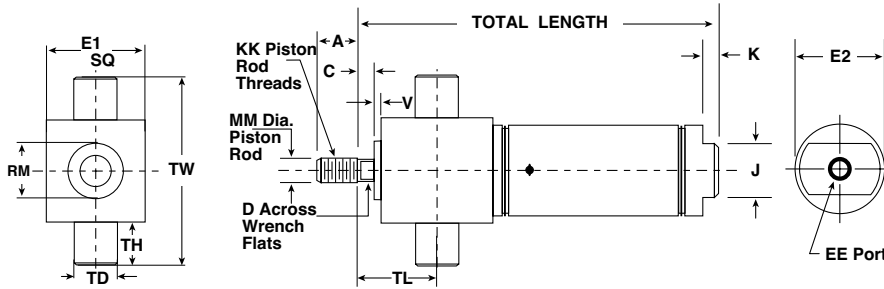
**Single Acting Spring Return (SBR) – Rear Block Mount**



Bore	A	BC	C	D	E1	E2	EE	G	KK	MM	N1	RM	RT	V	Y2	Total Length
7/16"	0.50	0.75	N/A	N/A	0.50	0.75	10-32	0.31	10-32	0.187	3/8-24	.369/.373	8-32	0.05	0.34	1.62 + (0.94 per 1/2" of stroke)
3/4"	0.75	1.00	0.25	0.22	0.81	1.00	1/8 NPT	0.44	1/4-28	0.250	1/2-20	.494/.498	10-32	0.08	0.44	2.31 + (1.69 per 1" of stroke)
1-1/16"	0.75	1.25	0.25	0.25	1.12	1.25	1/8 NPT	0.50	5/16-24	0.312	5/8-18	.621/.624	10-32	0.07	0.44	2.81 + (1.81 per 1" of stroke)
1-1/2"	1.25	1.75	0.25	0.38	1.56	1.75	1/8 NPT	0.63	7/16-20	0.437	3/4-16	.746/.749	1/4-20	0.09	0.62	3.06 + (2.00 per 1" of stroke)

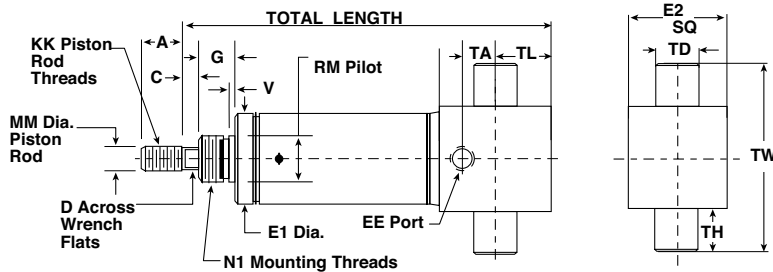
Dimensions in inches

**Single Acting Spring Return (STF) – Front Trunnion Mount**



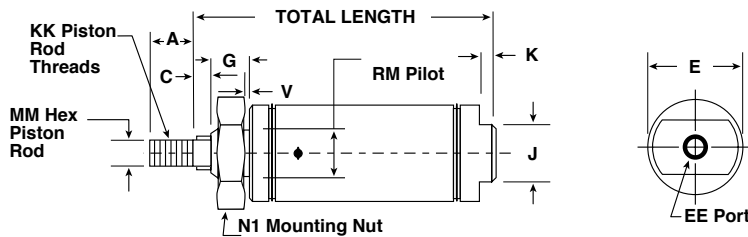
Bore	A	C	D	E1	E2	EE	J	K	KK	MM	RM	TD	TH	TL	TW	V	Total Length
7/16"	0.50	N/A	N/A	0.75	0.50	10-32	0.38	0.19	10-32	0.187	0.44	0.37	0.25	0.31	1.25	0.05	1.94 + (0.94 per 1/2" of stroke)
3/4"	0.75	0.25	0.22	1.00	0.81	1/8 NPT	0.62	0.19	1/4-28	0.250	0.62	0.50	0.38	0.69	1.75	0.09	2.66 + (1.69 per 1" of stroke)
1-1/16"	0.75	0.25	0.25	1.25	1.12	1/8 NPT	0.88	0.19	5/16-24	0.312	0.75	0.50	0.38	0.97	2.00	0.09	3.38 + (1.81 per 1" of stroke)
1-1/2"	1.25	0.25	0.38	1.75	1.56	1/4 NPT	0.88	0.25	7/16-20	0.437	1.00	0.50	0.38	1.19	2.50	0.12	3.69 + (2.00 per 1" of stroke)

**Single Acting Spring Return (STR) – Rear Trunnion Mount**



Bore	A	C	D	E1	E2	EE	G	KK	MM	N1	RM	TA	TD	TH	TL	TW	V	Total Length
7/16"	0.50	N/A	N/A	0.50	0.75	10-32	0.31	10-32	0.187	3/8-24	.370/.375	0.09	0.37	0.25	0.25	1.25	0.05	1.62 + (0.94 per 1/2" of stroke)
3/4"	0.75	0.25	0.22	0.81	1.00	1/8 NPT	0.69	1/4-28	0.250	1/2-20	.494/.498	0.06	0.50	0.38	0.38	1.75	0.08	2.31 + (1.69 per 1" of stroke)
1-1/16"	0.75	0.25	0.38	1.12	1.25	1/8 NPT	0.75	5/16-24	0.312	5/8-18	.621/.624	0.06	0.50	0.38	0.38	2.00	0.07	2.81 + (1.81 per 1" of stroke)
1-1/2"	1.25	0.25	0.38	1.56	1.75	1/4 NPT	0.88	7/16-20	0.437	3/4-16	.746/.749	0.12	0.50	0.38	0.50	2.50	0.06	3.06 + (2.00 per 1" of stroke)

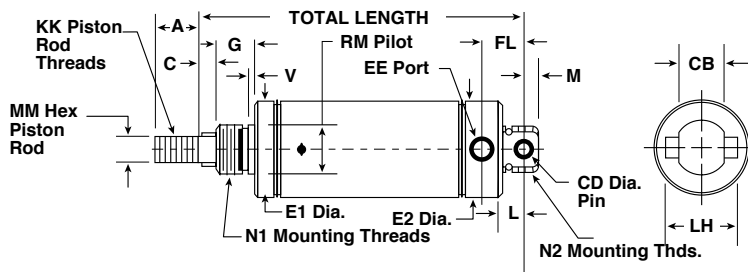
**Single Acting Non-Rotating (NRN) – Nose Mount**



Bore	A	C	E	EE	G	J	K	KK	MM (hex)	N1	RM	V	Total Length
7/16"	0.50	0.25	0.50	10-32	0.31	0.38	0.19	10-32	0.187	3/8-24	.369/.373	0.05	1.56 + (.94 per 1/2" of stroke)
9/16"	0.50	0.25	0.62	10-32	0.38	0.50	0.19	10-32	0.187	7/16-20	.434/.437	0.06	1.78 + (1.62 per 1" of stroke)
3/4"	0.50	0.25	0.81	1/8 NPT	0.44	0.62	0.19	1/4-28	0.250	1/2-20	.494/.498	0.08	1.75 + (1.69 per 1" of stroke)
7/8"	0.50	0.25	0.94	1/8 NPT	0.50	0.62	0.19	1/4-28	0.250	5/8-18	.621/.624	0.09	2.09 + (1.56 per 1" of stroke)
1-1/16"	0.50	0.25	1.12	1/8 NPT	0.50	0.88	0.19	5/16-24	0.375	5/8-18	.621/.624	0.07	2.19 + (1.56 per 1" of stroke)
1-1/4"	0.88	0.25	1.34	1/8 NPT	0.63	0.88	0.25	7/16-20	0.437	3/4-16	.746/.749	0.09	2.66 + (1.81 per 1" of stroke)
1-1/2"	0.88	0.25	1.56	1/8 NPT	0.63	0.88	0.25	7/16-20	0.437	3/4-16	.746/.749	0.09	2.44 + (1.69 per 1" of stroke)
1-3/4"	0.88	0.38	1.84	1/4 NPT	0.74	1.25	0.25	1/2-20	0.500	1-14	1.029/1.032	0.09	3.03 + (2.00 per 1" of stroke)

Dimensions in inches

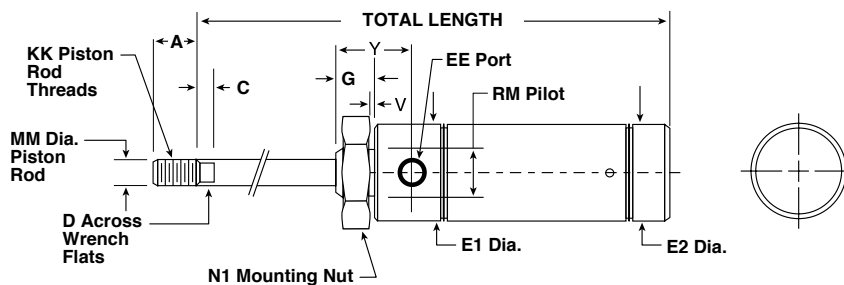
Single Acting Non-Rotating (NRP) – Pivot Mount



Bore	A	C	CB	CD	E1	E2	EE	FL	G	KK	L	LH	M	MM (hex)	N1	N2	RM	V	Total Length
7/16"	0.50	0.25	0.31	0.156	0.50	0.74	10-32	0.44	0.31	10-32	0.25	0.50	0.25	0.187	3/8-24	7/16-20	.369/.373	0.05	2.00 + (.94 per 1/2" of stroke)
9/16"	0.50	0.25	0.31	0.156	0.62	0.62	10-32	0.38	0.38	10-32	0.25	N/A	0.19	0.187	7/16-20	7/16-20	.434/.437	0.06	2.06 + (1.62 per 1" of stroke)
3/4"	0.50	0.25	0.38	0.250	0.81	0.86	1/8 NPT	0.62	0.44	1/4-28	0.34	0.75	0.28	0.250	1/2-20	5/8-18	.494/.498	0.08	2.53 + (1.69 per 1" of stroke)
7/8"	0.50	0.25	0.38	0.250	0.94	0.94	1/8 NPT	0.62	0.50	1/4-28	0.34	0.75	0.28	0.250	5/8-18	5/8-18	.621/.624	0.09	2.72 + (1.56 per 1" of stroke)
1-1/16"	0.50	0.25	0.38	0.250	1.12	1.12	1/8 NPT	0.62	0.50	5/16-24	0.34	0.75	0.28	0.375	5/8-18	5/8-18	.621/.624	0.07	2.78 + (1.56 per 1" of stroke)
1-1/4"	0.88	0.25	0.50	0.250	1.34	1.34	1/8 NPT	0.78	0.63	7/16-20	0.41	0.88	0.40	0.437	3/4-16	3/4-16	.746/.749	0.09	3.38 + (1.81 per 1" of stroke)
1-1/2"	0.88	0.38	0.62	0.375	1.56	1.56	1/8 NPT	0.81	0.63	7/16-20	0.50	1.00	0.37	0.437	3/4-16	3/4-16	.746/.749	0.09	3.25 + (1.69 per 1" of stroke)
1-3/4"	0.88	0.38	0.62	0.375	1.84	1.84	1/4 NPT	1.12	0.74	1/2-20	0.50	N/A	0.50	0.500	1-14	1-14	1.029/1.032	0.09	4.09 + (2.00 per 1" of stroke)

\* Pivot bushing included

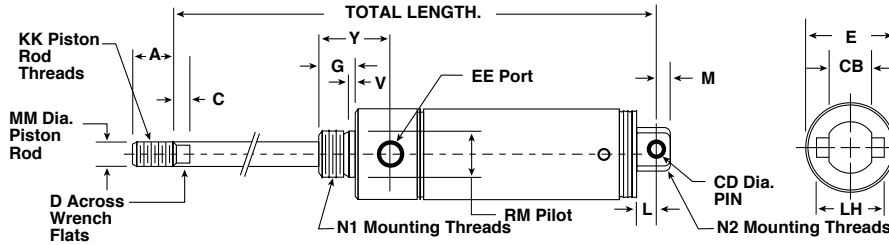
Reverse Acting Spring Extend (RAN) – Nose Mount



Bore	A	C	D	E1	E2	EE	G	KK	MM	N1	RM	V	Y	Total Length
5/16"	0.38	N/A	N/A	0.61	0.36	10-32	0.31	5-40	0.125	3/8-24	.371/.373	0.03	0.47	1.49 + (1.25 per 1/2" of stroke)
7/16"	0.50	N/A	N/A	0.74	0.50	10-32	0.38	10-32	0.187	7/16-20	.434/.437	0.05	0.72	1.94 + (1.44 per 1/2" of stroke)
9/16"	0.50	N/A	N/A	0.62	0.62	10-32	0.38	10-32	0.187	7/16-20	.434/.437	0.06	0.75	2.00 + (2.62 per 1" of stroke)
3/4"	0.50	N/A	N/A	0.86	0.81	1/8 NPT	0.50	1/4-28	0.250	5/8-18	.621/.624	0.09	0.97	2.31 + (2.69 per 1" of stroke)
7/8"	0.50	N/A	N/A	0.94	0.94	1/8 NPT	0.50	1/4-28	0.250	5/8-18	.621/.624	0.09	0.97	2.31 + (2.56 per 1" of stroke)
1-1/16"	0.50	0.12	0.25	1.12	1.12	1/8 NPT	0.50	5/16-24	0.312	5/8-18	.621/.624	0.09	1.06	2.62 + (2.81 per 1" of stroke)
1-1/4"	0.75	0.25	0.38	1.34	1.34	1/8 NPT	0.63	7/16-20	0.437	3/4-16	.746/.749	0.09	1.37	3.47 + (2.81 per 1" of stroke)
1-1/2"	1.25	0.25	0.38	1.56	1.56	1/8 NPT	0.63	7/16-20	0.437	3/4-16	.746/.749	0.09	1.25	3.19 + (3.00 per 1" of stroke)
1-3/4"	0.88	0.31	0.44	1.84	1.84	1/4 NPT	0.75	1/2-20	0.500	1-14	1.029/1.032	0.09	1.62	4.03 + (3.00 per 1" of stroke)
2"	0.88	0.38	0.50	2.08	2.08	1/4 NPT	0.81	1/2-20	0.625	1-1/4-12	1.372/1.375	0.12	1.46	Consult Factory

Dimensions in inches

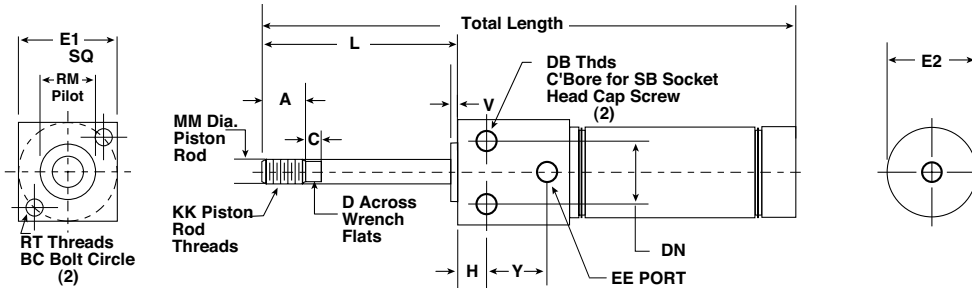
**Reverse Acting Spring Extend (RAP) – Pivot Mount**



Bore	A	C	CB	CD	D	EE	E	G	KK	L	LH	MM	M	N1	N2	RM	V	Y	Total Length
5/16"	0.38	N/A	0.25	0.125	N/A	10-32	0.61	0.31	5-40	0.19	N/A	0.125	0.16	3/8-24	3/8-24	.371/.373	0.03	0.47	1.88 + (1.25 per 1/2" of stroke)
7/16"	0.50	N/A	0.31	0.156	N/A	10-32	0.74	0.38	10-32	0.25	0.50	0.187	0.25	7/16-20	7/16-20	.434/.437	0.05	0.72	2.38 + (1.44 per 1/2" of stroke)
9/16"	0.50	N/A	0.31	0.156	N/A	10-32	0.62	0.38	10-32	0.25	0.50	0.187	0.19	7/16-20	7/16-20	.434/.437	0.06	0.75	2.28 + (2.62 per 1" of stroke)
3/4"	0.50	N/A	0.38	0.250	N/A	1/8 NPT	0.86	0.50	1/4-28	0.34	0.75	0.250	0.28	5/8-18	—	.621/.624	0.09	0.97	2.44 + (2.69 per 1" of stroke)
7/8"	0.50	N/A	0.38	0.250	N/A	1/8 NPT	0.94	0.50	1/4-28	0.34	0.75	0.250	0.28	5/8-18	—	.621/.624	0.09	0.97	2.62 + (2.56 per 1" of stroke)
1-1/16"	0.50	0.12	0.38	0.250	0.25	1/8 NPT	1.12	0.50	5/16-24	0.34	0.75	0.312	0.28	5/8-18	—	.621/.624	0.09	1.06	2.78 + (2.81 per 1" of stroke)
1-1/4"	0.75	0.25	0.50	0.250	0.38	1/8 NPT	1.34	0.63	7/16-20	0.44	0.88	0.437	0.38	3/4-16	3/4-16	.746/.749	0.09	1.37	3.78 + (2.81 per 1" of stroke)
1-1/2"	1.25	0.25	0.62	0.375	0.38	1/8 NPT	1.56	0.63	7/16-20	0.50	1.00	0.437	0.38	3/4-16	3/4-16	.746/.749	0.09	1.25	3.88 + (3.00 per 1" of stroke)
2"	0.88	0.38	0.75	0.375	0.50	1/4 NPT	2.08	0.81	1/2-20	0.56	1.63	0.625	0.44	1-1/4-12	1-1/4-12	1.372/1.375	0.12	1.46	Consult Factory

\* Pivot bushing included

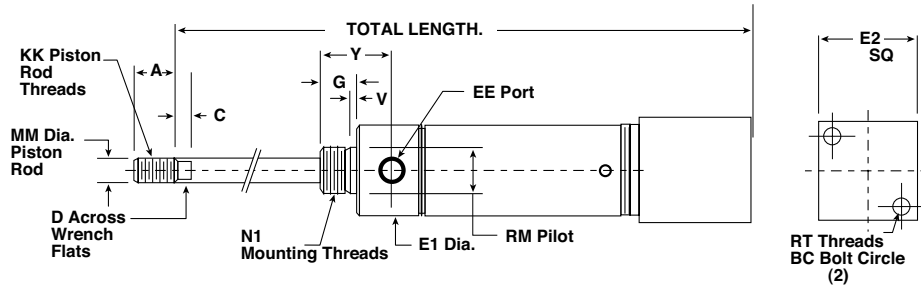
**Reverse Acting Spring (RAF) – Front Block Mount**



Bore	A	C	D	DB	DN	SB	E1	E2	EE	H	KK	L	MM	RM	RT	BC	V	Y	Total Length
3/4"	0.75	0.25	0.22	1/4-20	0.63	10-32	1.00	0.81	1/8 NPT	0.38	1/4-28	1.09	0.250	0.62	10-32	1.00	0.09	0.5	2.56 + (2.69 per 1" of stroke)
1-1/16"	0.75	0.25	0.38	1/4-20	0.81	10-32	1.25	1.12	1/8 NPT	0.62	5/16-24	1.22	0.312	0.75	10-32	1.25	0.07	0.54	3.12 + (2.81 per 1" of stroke)
1-1/2"	1.25	0.25	0.38	5/16-18	1.12	0.25	1.75	1.56	1/4 NPT	0.88	7/16-20	1.63	0.437	1.00	1/4-20	1.75	0.12	0.65	3.69 + (3.00 per 1" of stroke)

Dimensions in inches

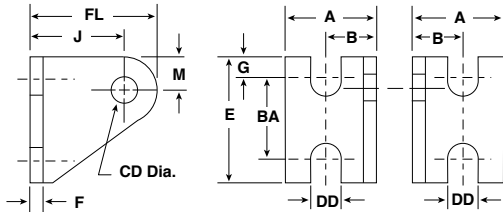
**Reverse Acting Spring (RAR) – Rear Block Mount**



Bore	A	C	D	E1	E2	EE	G	KK	MM	N1	RM	RT	BC	V	Y	Total Length
3/4"	0.75	0.25	0.22	0.86	1.00	1/8 NPT	0.50	1/4-28	0.250	5/8-18	.621/.624	10-32	1.00	0.09	0.97	3.22 + (2.69 per 1" of stroke)
1-1/16"	0.75	0.25	0.25	1.12	1.25	1/8 NPT	0.50	5/16-24	0.312	5/8-18	.621/.624	10-32	1.25	0.09	1.06	3.53 + (2.81 per 1" of stroke)
1-1/2"	1.25	0.25	0.38	1.56	1.75	1/4 NPT	0.62	7/16-20	0.437	3/4-16	.746/.749	1/4-20	1.75	0.09	1.25	3.88 + (3.00 per 1" of stroke)

• All accessories are clear zinc plated carbon steel

**Pivot Bracket (without pin)**

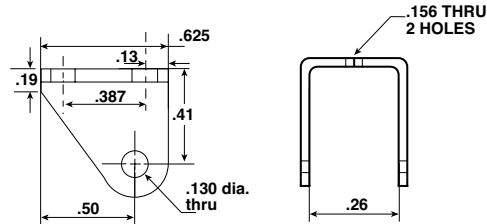


Bore	Part Number	A	B	BA	CD	DD	E	F	FL	G	J	M
7/16", 9/16"	PB-1	0.50	0.28	0.50	0.16	0.19	0.75	0.06	0.77	0.12	0.56	0.20
3/4", 7/8", 1-1/16", 1-1/4"	PB-2	0.81	0.44	0.75	0.25	0.27	1.12	0.12	1.19	0.19	0.88	0.31
1-1/2"	PB-3	1.00	0.62	1.00	0.38	0.27	1.50	0.12	1.75	0.25	1.38	0.38
1-3/4", 2", 2-1/2"	PB-4	1.13	0.68	1.00	0.38	0.26	1.50	0.25	1.75	0.25	1.38	0.38
3"	PB-5	1.44	0.88	1.25	0.50	0.27	1.75	0.25	2.25	0.25	1.75	0.50

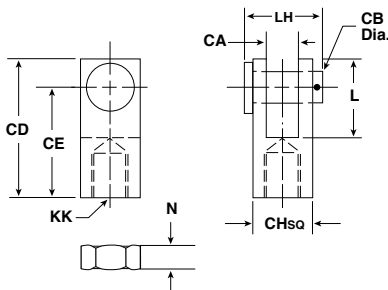
**Pivot Bracket (with pin)**

Bore	Part Number
5/16"	PB-0
7/16", 9/16"	PB-1K
3/4", 7/8", 1-1/16", 1-1/4"	PB-2K
1-1/2"	PB-3K
1-3/4", 2", 2-1/2"	PB-4K
3"	PB-5K

**PB-0 (5/16" bore only) (includes pin)**



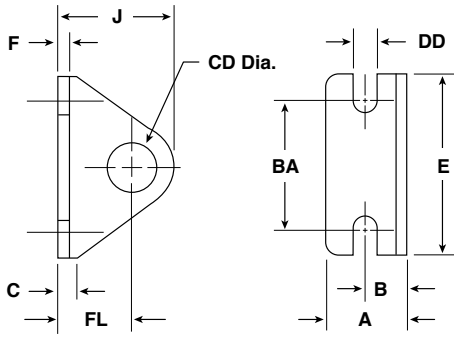
**Rod Clevis  
(Includes Pin & Jam Nut)**



Bore	Part Number	CA	CB dia.	CD	CE	CH	KK	L	LH	N
5/16"	RC-0	0.13	0.13	0.56	0.44	0.31	5-40	0.38	0.5	0.16
7/16", 9/16"	RC-1	0.19	0.19	0.94	0.75	0.38	10-32	0.56	0.66	0.12
3/4", 7/8"	RC-2	0.25	0.25	1.19	0.94	0.50	1/4-28	0.68	0.85	0.16
1-1/16"	RC-3	0.25	0.25	1.19	0.94	0.50	5/16-24	0.69	0.85	0.19
1-1/4", 1-1/2"	RC-4	0.38	0.38	1.69	1.31	0.75	7/16-20	0.94	1.12	0.25
1-3/4", 2", 2-1/2"	RC-5	0.38	0.38	1.69	1.31	0.75	1/2-20	0.94	1.12	0.31
3"	RC-6	0.50	0.50	2.75	2.25	1	5/8-18	1.5	1.41	0.38

Dimensions in inches

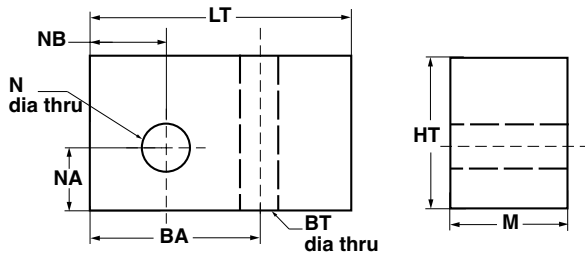
**Foot Bracket**



Bore	Part Number	A	B	BA	C	CD	DD	E	F	FL	J
5/16"(S)	FB-0S	0.38	0.25	0.75	0.13	0.25	0.13	1.00	0.06	0.44	0.75
5/16"(D)	FB-0D	0.38	0.25	0.75	0.13	0.38	0.13	1.00	0.06	0.44	0.75
7/16"(S)	FB-1	0.62	0.31	1.00	0.12	0.38	0.19	1.38	0.07	0.56	0.88
7/16"(D), 9/16"(S/D)	FB-2	0.69	0.38	1.00	0.12	0.44	0.19	1.38	0.09	0.56	0.83
3/4"(S)	FB-3	0.75	0.44	1.25	0.19	0.50	0.19	1.62	0.10	0.69	1.09
3/4"(D), 7/8"(S/D), 1-1/16"(S/D)	FB-4	1.00	0.56	1.50	0.25	0.62	0.27	1.88	0.12	0.81	1.38
1-1/4"(S/D), 1-1/2"(S/D)	FB-5	1.50	0.75	1.88	0.62	0.75	0.28	2.50	0.12	1.00	1.75
1-3/4"(S/D)	FB-5A	1.50	0.88	2.25	0.75	1.03	0.34	3.00	0.19	1.25	2.13
2"(S/D)	FB-6	1.62	1.00	2.25	0.62	1.38	0.34	3.12	0.25	1.50	2.50
2-1/2"(D)	FB-7	1.62	1.00	2.88	0.75	1.50	0.34	3.75	0.25	1.75	3.00
3"(D)	FB-8	1.62	1.00	3.50	0.89	1.63	0.34	4.38	0.26	1.89	3.14

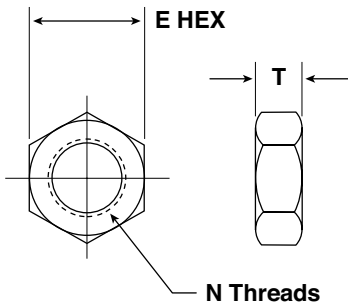
S = Single Acting Models    D = Double Acting Models    S/D = Single and Double Acting Models

**Trunnion Bracket**



Bore	Part number	A	B	BA	CD	DD	E	F	FL	G	J	M
7/16"	PB-4	1.13	0.69	1.00	0.38	0.27	1.50	0.25	1.75	0.25	1.38	0.38
3/4", 1-1/16", 1-1/2"	TB-1	1.13	0.69	1.00	0.50	0.27	1.50	0.25	1.75	0.25	1.38	0.38

**Mounting Nut**



Single Acting Spring Extend & Double Acting Models				
Bore	Part Number	N	E	T
5/16"	MN-1	3/8-24	0.56	0.22
7/16", 9/16"	MN-2	7/16-20	0.69	0.25
3/4", 7/8", 1-1/16"	MN-4	5/8-18	0.94	0.38
1-1/4", 1-1/2"	MN-5	3/4-16	1.12	0.42
1-3/4"	MN-5A	1-14	1.50	0.55
2"	MN-6	1-1/4-12	1.88	0.50
2-1/2"	MN-7	1-3/8-12	1.88	0.50
3"	MN-8	1-1/2-12	2.25	0.50

Dimensions in inches

**Acetal Resin end cap cylinders for washdown,  
and corrosive environment application**

**Technical features**
**Medium:**

Filtered, lubricated or non-lubricated, compressed air

**Maximum operating pressure:**

125 psig (8.6 bar)

**Temperature range:**

Standard Nitrile Seals:  
32° to 160°F (0°C to 72°C)

**Lubrication:**

All RPD cylinders are pre-lubricated during assembly with a PTFE based grease for non-lube service and long life.

**Materials**

Cylinder Body:  
304 Series stainless steel  
Head and Cap:  
Acetal Resin  
Piston Rod:  
300 Series chrome plated stainless steel

Piston: Anodised aluminum alloy or stainless steel  
Rod & Piston Seals: Nitrile  
Mounting Accessories:  
300 Series stainless steel

**Options selector**
**RPD 106 x 3.250 - DAN - PS**

<b>Series</b> RPD Series Acetal end cap RPD RPD Series Acetal with Ecology Seals* *ERPD * Ecology version not available on 9/16" bore RPD cylinder	<b>Additional Options</b> FPM seals HT** Side ported end cap (DAN mount only) PC Alternate port location PL(_) Plain rod end PR Magnetic piston PS Rod extension over std. (specify additional length) RX(_) Rod wiper RW† Alternate male thread (Specify thread type) TM (_) Thread extension over std. (specify additional length) TX(_) Bumper both ends UB
<b>Bore Size</b> 9/16" 056 3/4" 075 1-1/16" 106 1-1/2" 150 2" 200	<b>Mounting Options</b> (all models are double acting) Nose DAN Double End DAD (with pivot hole) Double Rod End DRD
<b>Stroke</b> Increments of 1/16" up to 36"	

\*\* FPM seals are for chemical compatibility applications, and are not available in Ecology 1-1/16" bore

† Rod wiper not available on 9/16" bores



**RPD Series Acetal End Cap  
Roundline Plus Stainless Steel Body Actuators**

The Norgren RPD Series Cylinder utilizes a stainless steel body, a stainless steel rod, and Acetal Resin end caps for corrosion resistance. This cylinder is designed to endure a variety of environmental conditions. The RPD Series construction provides resistance to moisture, various solvents, and many other neutral chemicals. The Norgren RPD Series is ideal in corrosive environment applications.

Additionally, the Norgren RPD Series Cylinder is the only Acetal end cap cylinder in the industry to offer the patented impact dampening Ecology Seal Technology. The Ecology Seal option, used in conjunction with a fixed cushion, eliminates the bacteria-collecting cushion screw orifice found in competing adjustable cushion model cylinders.

**1 Head and Cap:** Acetal Resin

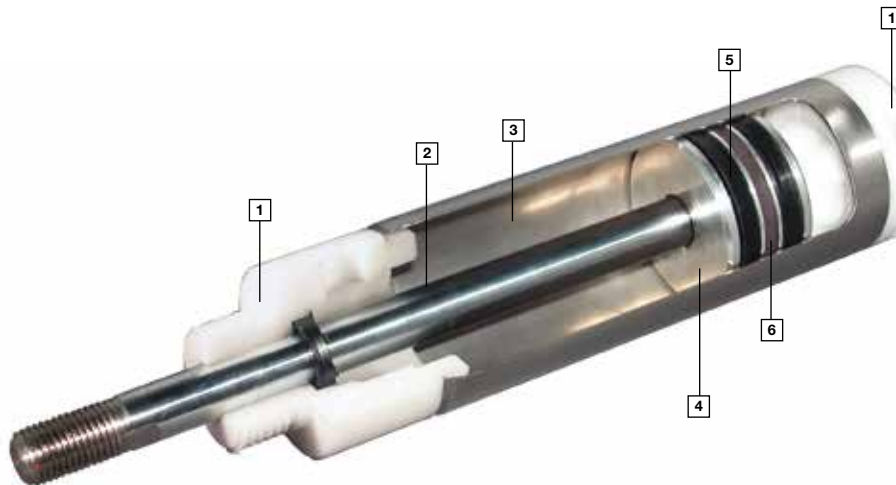
**2 Piston Rod:** Chrome plated stainless steel

**3 Tube:** Stainless steel

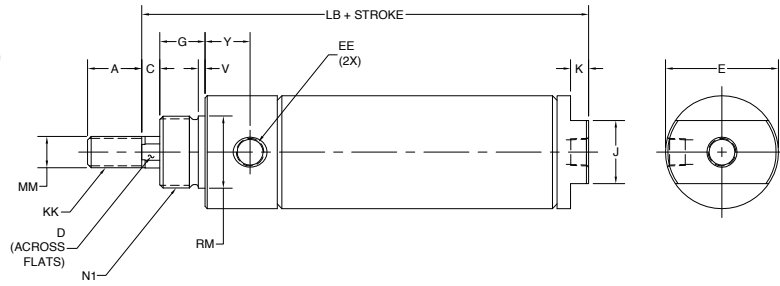
**4 Piston:** Anodised aluminum (stainless steel on 9/16" bore DRD model)

**5 Piston Seals:** Nitrile (FPM optional)

**6 Optional magnet** on piston for position sensing



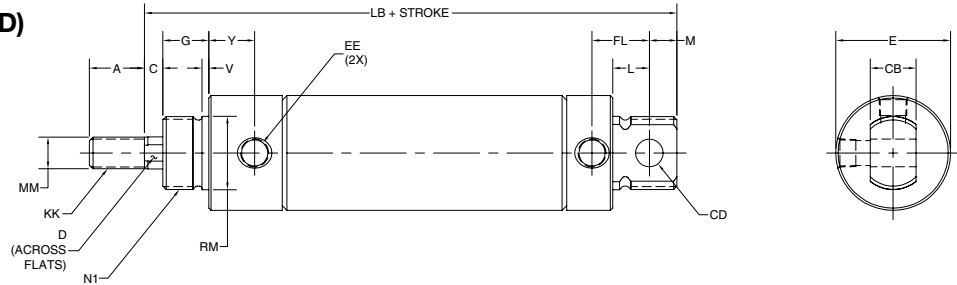
Double Acting Nose Mount (DAN)



Bore	A	C	D	E	EE	G	J	K	KK	LB	LB		MM	N1	RM	V	Y
											Ecology or PC	Bumpers					
9/16" (056)	0.50	--	--	0.61	#10-32	0.38	0.50	0.19	#10-32	2.28	--	2.41	0.19	7/16-20	.434/.437	0.06	0.38
3/4" (075)	0.50	--	--	0.81	1/8 NPT	0.50	0.63	0.19	1/4-28	2.97	3.41	2.97	0.25	5/8-18	.621/.624	0.09	0.47
1-1/16" (106)	0.50	0.13	0.25	1.13	1/8 NPT	0.50	0.88	0.19	5/16-24	3.12	3.38	3.25	0.31	5/8-18	.621/.624	0.09	0.56
1-1/2" (150)	0.75	0.25	0.38	1.56	1/8 NPT	0.63	0.88	0.25	7/16-20	3.69	3.88	3.82	0.44	1-14	.996/.999	0.09	0.63
2" (200)	0.88	0.38	0.50	2.08	1/4 NPT	0.81	1.25	0.31	1/2-20	4.69	5.06	4.94	0.63	1-1/4-12	1.371/1.374	0.13	0.73

PS (Magnetic Piston) length adder: 1-1/16" & 1-1/2" bores = 0.125". 9/16", 3/4", and 2" bores = 0.25".  
 When PS (magnetic piston) and Ecology options are ordered in combination, use "LB Ecology" length only - do not add extra length for the magnet.

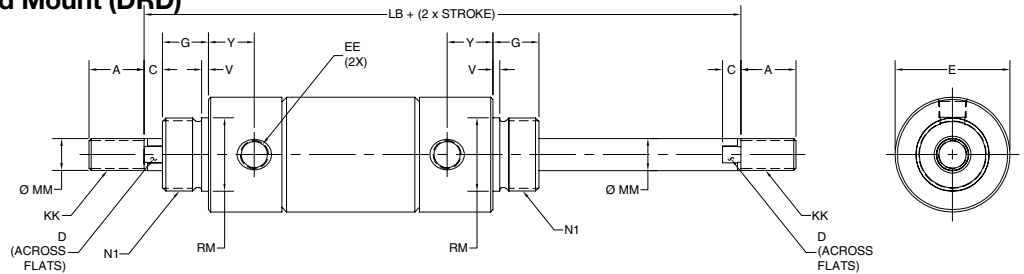
Double Acting Pivot Mount (DAD)



Bore	A	C	CB	CD	D	E	EE	FL	G	KK	L	LB	LB		MM	N1	RM	V	Y
													Ecology	Bumpers					
9/16" (056)	0.50	--	0.31	0.16	--	0.61	#10-32	0.38	0.38	#10-32	0.25	2.75	-	2.88	0.19	7/16-20	.434/.437	0.06	0.38
3/4" (075)	0.50	--	0.38	0.25	--	0.81	1/8 NPT	0.63	0.50	1/4-28	0.34	4.03	4.03	4.03	0.28	5/8-18	.621/.624	0.09	0.47
1-1/16" (106)	0.50	0.13	0.38	0.25	0.25	1.13	1/8 NPT	0.63	0.50	5/16-24	0.34	4.12	4.12	4.25	0.28	5/8-18	.621/.624	0.09	0.56
1-1/2" (150)	0.75	0.25	0.63	0.38	0.38	1.56	1/8 NPT	0.78	0.63	7/16-20	0.50	4.75	4.75	4.88	0.38	1-14	.996/.999	0.09	0.63
2" (200)	0.88	0.38	0.74	0.38	0.50	2.08	1/4 NPT	1.03	0.81	1/2-20	0.56	6.06	6.06	6.31	0.44	1-1/4-12	1.371/1.374	0.13	0.73

PS (Magnetic Piston) length adder: 1-1/16" & 1-1/2" bores = 0.125". 9/16", 3/4", and 2" bores = 0.25".  
 When PS (magnetic piston) and Ecology options are ordered in combination, use "LB Ecology" length only - do not add extra length for the magnet.

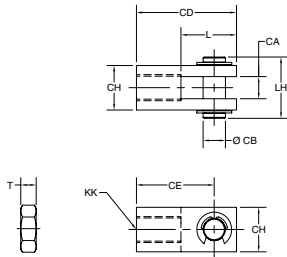
Double Acting Double Rod End Mount (DRD)



Bore	A	C	D	E	EE	G	KK	LB	LB		MM	N1	RM	V	Y
									Ecology	Bumpers					
9/16" (056)	0.50	--	--	0.61	#10-32	0.38	#10-32	2.94	--	3.06	0.19	7/16-20	.434/.437	0.06	0.38
3/4" (075)	0.50	--	--	0.86	1/8 NPT	0.50	1/4-28	4.00	4.00	4.00	0.25	5/8-18	.621/.624	0.09	0.47
1-1/16" (106)	0.50	0.13	0.25	1.13	1/8 NPT	0.50	5/16-24	4.00	4.00	4.50	0.31	5/8-18	.621/.624	0.09	0.56
1-1/2" (150)	0.75	0.25	0.38	1.56	1/8 NPT	0.63	7/16-20	5.13	5.13	5.25	0.44	1-14	.996/.999	0.09	0.63
2" (200)	0.88	0.38	0.50	2.08	1/4 NPT	0.81	1/2-20	6.56	6.56	6.81	0.63	1-1/4-12	1.371/1.374	0.13	0.73

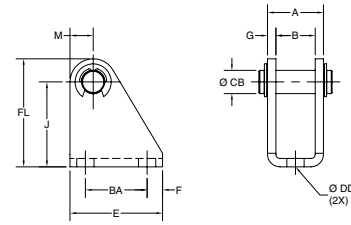
PS (Magnetic Piston) length adder = 0.25" for all bore sizes.  
 When PS (magnetic piston) and Ecology options are ordered in combination, use "LB Ecology" length only - do not add extra length for the magnet.

**Stainless steel Rod Clevis (includes nut and pin)**



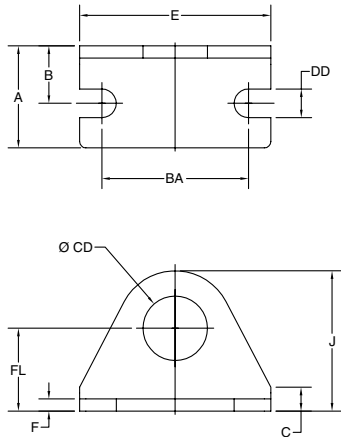
Bore	P/N	CA	CB	CD	CE	CH	L	LH	KK	T
9/16"	(056) DRC-056	0.19	0.19	0.94	0.75	0.38	0.56	0.56	#10-32	0.13
3/4"	(075) DRC-075	0.25	0.25	1.19	0.94	0.50	0.69	0.69	1/4-28	0.16
1-1/16"	(106) DRC-106	0.25	0.25	1.19	0.94	0.50	0.69	0.69	5/16-24	0.19
1-1/2"	(150) DRC-150	0.38	0.38	1.69	1.31	0.75	0.94	1.03	7/16-20	0.25
2"	(200) DRC-200	0.38	0.38	1.69	1.31	0.75	0.94	1.03	1/2-20	0.31

**Stainless steel Pivot Bracket (includes pin)**



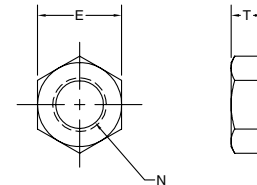
Bore	P/N	A	B	BA	CB	DD	E	F	FL	G	J	M
9/16"	(056) DPB-056	0.44	0.31	0.50	0.16	0.20	0.75	0.13	0.76	0.06	0.56	0.20
3/4"	(075) DPB-075	0.63	0.38	0.75	0.25	0.22	1.13	0.19	1.19	0.12	0.88	0.31
1-1/16"	(106) DPB-075	0.63	0.38	0.75	0.25	0.22	1.13	0.19	1.19	0.12	0.88	0.31
1-1/2"	(150) DPB-150	0.91	0.63	1.00	0.38	0.28	1.50	0.25	1.75	0.13	1.38	0.38
2"	(200) DPB-200	1.25	0.75	1.00	0.38	0.28	1.50	0.25	1.75	0.25	1.38	0.38

**Stainless steel Foot Bracket**



Bore	P/N	A	B	BA	C	CD	DD	E	F	FL	J
9/16"	056 RPDFB-056	0.69	0.38	0.97	0.13	0.44	0.19	1.38	0.09	0.56	0.84
3/4"	075 RPDFB-075	1.00	0.56	1.44	0.23	0.63	0.27	1.88	0.12	0.81	1.38
1-1/16"	106 RPDFB-075	1.00	0.56	1.44	0.23	0.63	0.27	1.88	0.12	0.81	1.38
1-1/2"	150 RPDFB-150	1.50	0.75	1.88	0.72	1.00	0.28	2.50	0.12	1.00	1.75
2"	200 RPDFB-200	1.63	1.00	2.25	0.61	1.38	0.34	3.13	0.25	1.50	2.50

**Stainless steel Mounting Nut**



Bore	P/N	E	N	T	Maximum torque (in-lbs.)
9/16"	(056) 52025-SS	0.69	7/16-20	0.25	4
3/4"	(075) 52027-SS	0.94	5/8-18	0.38	12
1-1/16"	(106) 52027-SS	0.94	5/8-18	0.38	12
1-1/2"	(150) 52030-SS	1.50	1-14	0.55	30
2"	(200) 52085-SS	1.88	1-1/4-12	0.50	45

Dimensions in inches


**PS magnetic piston option**
**Optional ecology seal**
**Optional shock absorbers**
**Choice of high load composite or precision low friction bearings**
**Comes with stroke adjusting collars**
**Technical features**
**Medium:**

Filtered, lubricated or non-lubricated, compressed air

**Operating pressure**

250 psig (17.2 Bar) Max.

**Temperature range:**

Standard Nitrile seals:

-20°F to 200°F (-29°C to 93°C)

\*With dew point of supply air less than air temperature below 35°F (2°C)

**Lubrication:**

All Roundline Thruster cylinders are prelubricated at the time of assembly with a PTFE-Based grease, for non-lube service and long life.

**Thruster materials:**

Guide shafts with **composite bearings:**

9/16" to 2.0" bore: Chrome plated 303 SS.

2-1/2" to 3.0": Chrome plated carbon steel.

Guide shafts with **roller bearings:** All bore sizes case hardened carbon steel shafts.

Body: Anodised aluminum housing and tooling plate. Choice of composite or roller bearing shaft guides.

**Cylinder materials:**

304 Stainless Steel body

Aluminum alloy head, cap and piston

Oil impregnated sintered bronze rod bearing

Chrome Plated stainless steel piston rod.

Nitrile piston and rod seals

**Options selector**
**RT 075 C x 4.500 - PS**

Series		
Roundline Thruster		RT
Roundline Cylinder with Ecology Seals		ERT†
Bore Size		
9/16"		056
3/4"	E	075
1-1/16"	E	106
1-1/2"	E	150
2"	E	200
2-1/2"	E	250
3"	E	300

E\* - Ecology seals available,  
Note: Ecology seals not available in 9/16" bore.

Bearing Type	
Composite	C
Roller	R

Maximum Stroke Lengths **	
056	6.0" Maximum Stroke
075	12.0" Maximum Stroke
106	12.0" Maximum Stroke
150	12.0" Maximum Stroke
200	12.0" Maximum Stroke
250	12.0" Maximum Stroke
300	12.0" Maximum Stroke

\*\*Consult factory for longer stroke lengths.

Options	
Stroke Adjustment (Collar & Bumper) Extend	AE
Stroke Adjustment (Collar & Bumper) Both Ends	AJ
Stroke Adjustment (Collar & Bumper) Retract	AR
Dowel Pin*	DP
Mounting Plate (Composite only)**	MP
No Mounting Plate (Roller only)**	NM
Non-Adjustable cushions both ends†	NB
Side Ported	PC
Magnetic Piston	PS
Shock Absorber Extend ††	SG (‡)
Shock Absorber Retract ††	SH (‡)
Shock Absorber Both ††	SJ (‡)
Tapped Mounting Holes (Composite only)**	TH
Stainless Steel Tooling Plate	TP
Internal Bumpers	UB

\*Contact factory for dowel pin option.

\*\* Mounting plate and tapped holes, standard with roller bearing thruster

† ERT Ecology Thrusters come complete with non-adjustable cushions both ends. (NB option not required in model number or ERT Thruster). Note cushions and ecology seals not available in 9/16" bore.

†† Contact application engineering for applications requiring shock absorbers. Shocks available in three different duty rating:

Note, shock absorbers not available in 2 1/2" or 3" bore

‡ L=Light, M=Medium, H=Heavy

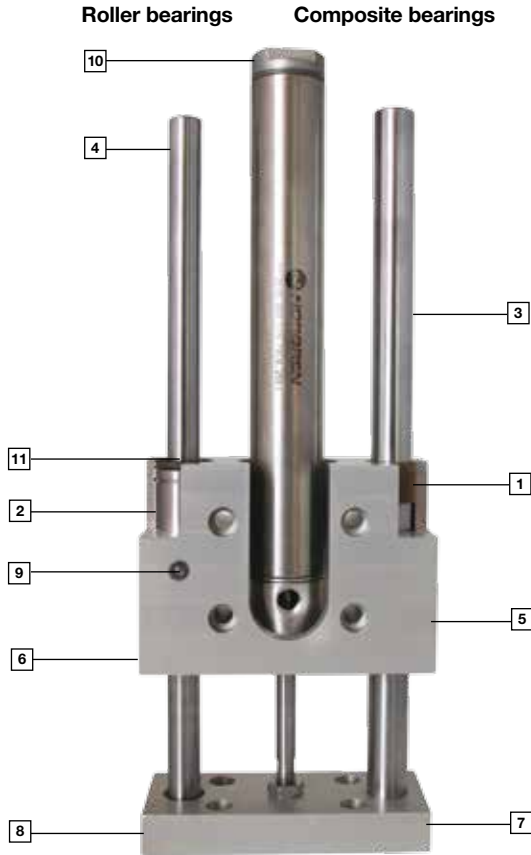
**PS Magnetic piston option for position sensing with either Reed or Hall Effect switches.**

**Optional ecology seal with non-adjustable cushion for the optimum in smooth, noise dampening deceleration of load at end of stroke.**

**Shock absorbers optional to decelerate heavier loads or high speed applications**

**Choice of high load composite or precision low friction bearings.**

**A set of stroke adjusting collars come standard on the extend stroke of the roller bearing thruster.**



This product is for demonstration purposes only.

- 1 Two bearings options:** High load carrying composite bearings...
- 2** ...or high precision low friction recirculating ball bearings (roller bearings)
- 3 Composite bearing:** 9/16" to 2.0" bore has stainless steel guide shafts 2-1/2" and 3.0" bore has chrome plated carbon steel guide shafts
- 4 Roller bearing:** Case hardened steel guide shafts
- 5 Composite bearings,** precision machined clear hard anodised aluminum body and tooling plate
- 6 Roller bearing,** precision machined black anodised aluminum body
- 7 Composite bearings,** clear hard anodised aluminum tooling plate
- 8 Roller bearings,** black oxide steel tooling plate
- 9** Easily accessible oiler port on roller bearing model
- 10 RP Series Actuator** with stainless steel tube aluminum end caps and chrome plated stainless steel piston rod.
- 11 Guide shaft wiper** included on roller bearing model

**Force Factor Data**

Bore	Code	Force Factor (Area)	
		Extend	Retract
9/16"	056	0.25	0.2
3/4"	075	0.44	0.36
1-1/16"	106	0.89	0.69
1-1/2"	150	1.77	1.46
2.0"	200	3.14	2.70
2-1/2"	250	4.91	4.47
3.0"	300	7.07	6.47

Replacement Cylinder for (RT) Roundline Thruster	
Bore	Model number
9/16"	RP056X***-DAN-TX(0.063) - options*
3/4"	RP075X***-DAN-SS-TX(0.125) - options*
1-1/16"	RP106X***-DAN-SS-TX(0.250) - options* -NF
1-1/2"	RP150X***-DAN-SS-TX(0.250) - options*
2"	RP200X***-DAN-SS-TX(0.250) - options*
2-1/2"	RP250X***-DAN-SS-TX(0.250) - options*
3"	RP300X***-DAN-SS-TX(0.250) - options*

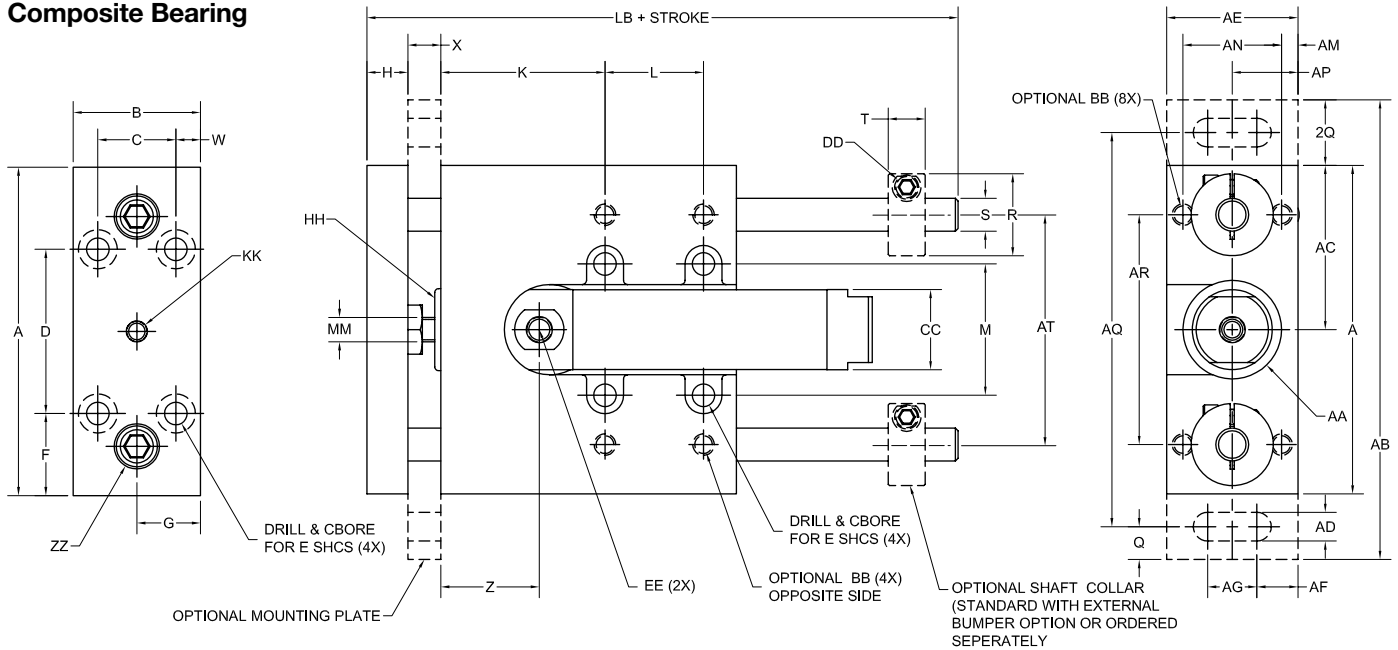
Replacement Cylinder for (ERT) Ecology Roundline Thruster	
Bore	Model number
9/16"	N/A
3/4"	ERP075X***-DAN-SS-TX(0.125) - options*
1-1/16"	ERP106X***-DAN-SS-TX(0.250) - options* -NF
1-1/2"	ERP150X***-DAN-SS-TX(0.250) - options*
2"	ERP200X***-DAN-SS-TX(0.250) - options*
2-1/2"	ERP250X***-DAN-SS-TX(0.250) - options*
3"	ERP300X***-DAN-SS-TX(0.250) - options*

**Force Output Formula**

Cylinder Output Force=  
Force Factor(area) x Air Line Pressure  
Example: 1 1/16" Bore operating at 80psi  
Extend Force = .89 x 80 = 71.2lbs  
Retract Force = .69 x 80= 55.2 lbs

\*\*\* = Stroke in inches  
\* The following options, if in the model number of the thruster, must be added to the model number of the replacement cylinder part number above.:  
PS, NB, PC, UB

**Composite Bearing**



Bore	A	B	BB	C	CC	D	DD	E	EE	F	G	H	HH	K	KK	L	LB	M	MM	Q
9/16"	2.50	0.90	#8-32	0.60	0.62	1.25	#6-32	#8	#10-32	0.63	0.45	0.38	7/16-20	1.25	10-32	0.75	3.50	1.00	0.19	0.25
3/4"	3.00	1.15	#10-32	0.75	0.81	1.50	#8-32	#10	1/8 NPT	0.75	0.58	0.50	5/8-18	0.78	1/4-28	0.94	4.25	1.25	0.25	0.38
1-1/16"	4.25	1.75	1/4-20	1.00	1.12	2.00	#10-32	1/4"	1/8 NPT	1.12	0.88	0.62	5/8-18	0.81	5/16-24	1.38	5.00	1.88	0.31	0.50
1-1/2"	5.50	2.25	5/16-18	1.50	1.56	3.00	1/4-28	5/16"	1/8 NPT	1.25	1.12	0.75	3/4-16	1.12	7/16-20	1.75	6.38	2.38	0.44	0.50
2"	6.00	2.75	5/16-18	2.00	2.08	3.00	1/4-28	5/16"	1/4 NPT	1.50	1.38	1.00	1-1/4-12	1.00	1/2-20	2.00	7.12	2.70	0.62	0.50
2-1/2"	7.50	3.25	3/8-16	2.25	2.62	3.75	1/4-28	3/8"	1/4 NPT	1.88	1.63	1.25	1-3/8-12	1.75	1/2-20	2.50	9.75	3.50	0.62	1.00
3"	9.00	4.00	1/2-13	2.75	3.12	4.50	1/4-28	1/2"	3/8 NPT	2.25	2.00	1.50	1-1/2-12	2.00	5/8-18	3.00	11.50	4.20	0.75	1.00
Bore	R	S	T	W	X	Z	AA	AB	AC	AD	AE	AF	AG	AM	AN	AP	AQ	AR	AT	ZZ
9/16"	0.88	0.38	0.34	0.15	0.25	0.86	0.75	3.50	1.25	0.22	1.00	0.31	0.38	0.12	0.75	0.50	3.00	1.75	1.75	#10-32
3/4"	1.12	0.50	0.41	0.20	0.38	0.85	1.00	4.50	1.50	0.25	1.25	0.38	0.50	0.16	0.94	0.62	3.75	2.12	2.12	1/4-20
1-1/16"	1.31	0.62	0.44	0.38	0.38	1.00	1.50	6.25	2.12	0.38	2.00	0.50	1.00	0.31	1.38	1.00	5.25	3.12	3.12	5/16-18
1-1/2"	1.50	0.75	0.50	0.38	0.50	1.38	2.00	7.50	2.75	0.44	2.50	0.59	1.31	0.38	1.75	1.25	6.50	4.00	4.00	3/8-16
2"	1.62	0.88	0.50	0.38	0.75	1.60	2.25	8.00	3.00	0.44	3.00	0.75	1.50	0.50	2.00	1.50	7.00	4.25	4.25	3/8-16
2-1/2"	1.87	1.13	0.50	0.50	0.75	1.45	3.00	11.50	3.75	0.69	3.50	0.84	1.81	0.50	2.50	1.75	9.50	5.37	5.37	1/2-13
3"	2.25	1.38	0.56	0.63	1.00	1.62	3.50	13.00	4.50	0.81	4.50	1.15	2.19	0.75	3.00	2.25	11.00	6.50	6.50	3/4-16

**Approximate Thruster Weights**

Bore	Composite Bearing	Roller Bearing	Composite Bearing Per Inch Adder	Roller Bearing Per Inch Adder	Mounting Plate Adder
9/16"	.70 lbs	.83 lbs	.08 lbs	.05 lbs	.06 lbs
3/4"	1.33 lbs	1.59 lbs	.15 lbs	.10 lbs	.14 lbs
1-1/16"	3.18 lbs	4.03 lbs	.30 lbs	.16 lbs	.32 lbs
1-1/2"	6.55 lbs	8.54 lbs	.35 lbs	.25 lbs	.60 lbs
2"	9.81 lbs	18.07 lbs	.50 lbs	.40 lbs	1.15 lbs
2-1/2"	19.34 lbs	35.82 lbs	.75 lbs	.62 lbs	2.0 lbs
3"	35.19 lbs	68.71 lbs	1.9 lbs	.96 lbs	3.9 lbs

**Guide Shaft Extension With Bumper**

Bore Size	Length Adder
9/16"	0.50"
3/4"	0.50"
1-1/16"	0.63"
1-1/2"	0.75"
2"	0.88"
2-1/2"	1.38"
3"	1.50"

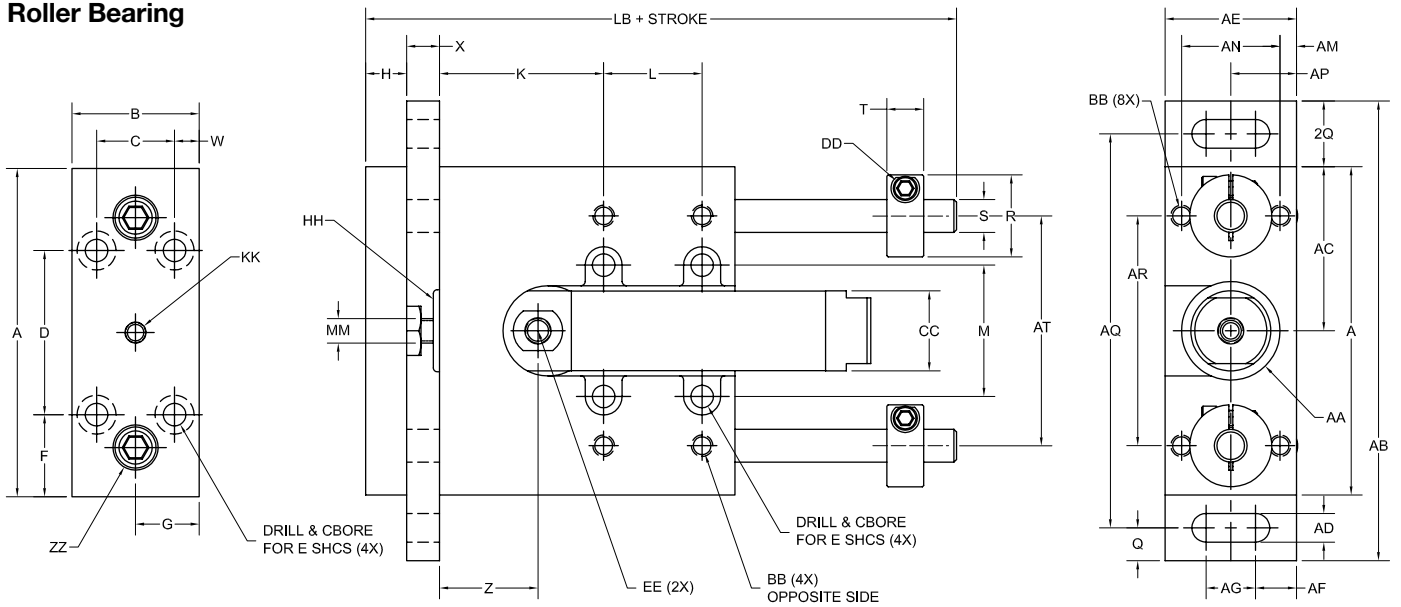
**Retraction Stroke Reduction with Bumper**

Bore Size	Standard	w/Mounting Plate Option
9/16"	0.34"	0.59"
3/4"	0.28"	0.66"
1-1/16"	0.31"	0.69"
1-1/2"	0.25"	0.75"
2"	0"	0.75"
2-1/2"	0.25"	1.00"
3"	0.31"	1.31"

Guide shafts are extended so the extend stroke is not affected with the addition of bumpers and collars, however the retract stroke is shortened. See above chart.

Dimensions in inches

**Roller Bearing**



Bore	A	B	BB	C	CC	D	DD	E	EE	F	G	H	HH	K	KK	L	LB	M	MM	Q
9/16"	2.50	1.00	#8-32	0.60	0.62	1.25	4-40	#8	#10-32	0.62	0.50	0.31	7/16-20	1.25	10-32	0.75	3.50	1.00	0.19	0.25
3/4"	3.00	1.25	#10-32	0.75	0.81	1.50	6-32	#10	1/8 NPT	0.75	0.62	0.38	5/8-18	0.78	1/4-28	0.94	4.12	1.25	0.25	0.38
1-1/16"	4.25	2.00	1/4-20	1.00	1.12	2.00	8-32	1/4	1/8 NPT	1.12	1.00	0.50	5/8-18	0.81	5/16-24	1.38	4.75	1.88	0.31	0.50
1-1/2"	5.50	2.50	5/16-18	1.50	1.56	3.00	10-32	5/16	1/8 NPT	1.25	1.25	0.75	3/4-16	1.12	7/16-20	1.75	6.38	2.38	0.44	0.50
2"	7.00	3.00	3/8-16	2.00	2.08	4.00	1/4-28	3/8	1/4 NPT	1.50	1.50	1.00	1 1/4-12	0.94	1/2-20	2.12	7.00	3.25	0.62	0.63
2-1/2"	8.50	4.00	3/8-16	3.00	2.62	4.75	1/4-28	3/8	1/4 NPT	1.76	2.00	1.25	1 3/8-12	1.69	1/2-20	2.63	9.50	4.10	0.62	1.00
3"	11.00	4.00	1/2-13	3.00	3.12	6.00	1/4-28	1/2	3/8 NPT	2.50	2.00	1.50	1 1/2-12	1.50	5/8-18	4.00	11.50	5.25	0.75	1.00
Bore	R	S	T	W	X	Z	AA	AB	AC	AD	AE	AF	AG	AM	AN	AP	AQ	AR	AT	ZZ
9/16"	0.62	0.25	0.28	0.20	0.25	0.86	0.75	3.50	1.25	0.22	1.00	0.31	0.38	0.12	0.75	0.50	3.00	1.75	1.75	N/A
3/4"	0.88	0.38	0.34	0.25	0.38	0.85	0.94	4.50	1.50	0.25	1.25	0.38	0.50	0.16	0.94	0.62	3.75	2.12	2.12	10-32
1-1/16"	1.12	0.50	0.41	0.50	0.38	1.00	1.62	6.25	2.12	0.38	2.00	0.50	1.00	0.31	1.38	1.00	5.25	3.12	3.12	1-4-20
1-1/2"	1.31	0.62	0.44	0.50	0.50	1.50	2.12	7.50	2.75	0.44	2.50	0.59	1.31	0.38	1.75	1.25	6.50	4.00	4.00	3/8-16
2"	1.50	0.75	0.50	0.50	0.75	1.60	3.00	9.50	3.50	0.56	4.00	1.22	1.56	0.94	2.12	2.00	8.25	5.00	5.00	3/8-16
2-1/2"	1.75	1.00	0.50	0.50	0.75	1.48	3.50	12.50	4.25	0.63	4.50	1.25	2.00	0.94	2.63	2.25	10.50	6.25	6.25	1/2-13
3"	2.06	1.25	0.50	0.50	1.00	1.88	4.63	15.00	5.50	0.81	6.00	1.41	3.19	1.00	4.00	3.00	13.00	8.00	8.00	3/4-16

Dimensions in inches