

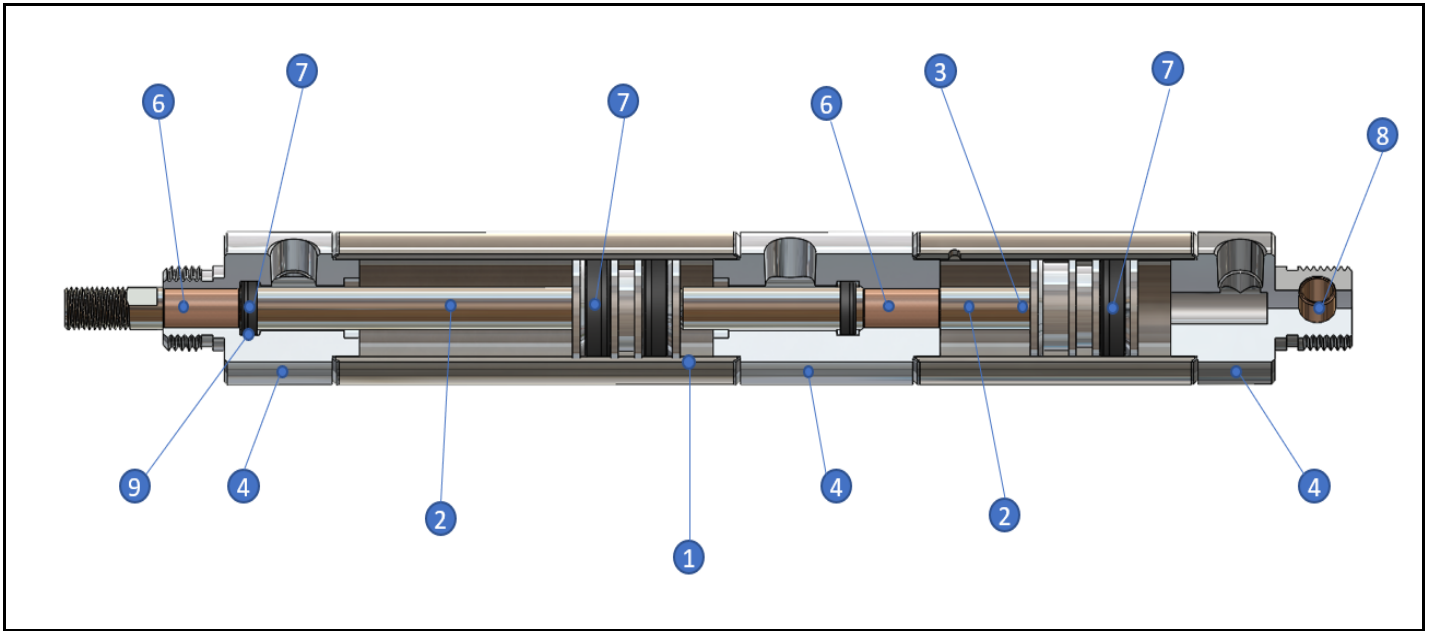
# Three Position Pneumatic Cylinders

Stainless Steel Body Air Cylinders



**Three Position Series**  
Standard Catalog  
9/16 inch through  
2 inch bore

## STANDARD FEATURES AND BENEFITS



① **Stainless Steel Cylinder Body:** Type 304 Stainless Steel manufactured to special mill specifications and tolerances to insure a long cylinder life.

② **Stainless Steel Rod:** Ground & Polished Type 303 Stainless Steel rods are standard on the Three Position Series. All rods 1/4" diameter and larger have wrench flats and stress relief grooves.

③ **Piston Rod Assembly:** Piston rods are threaded, anaerobically sealed, and machine staked into the piston for triple protection.

④ **End Caps, Piston, Center Section:** High strength aluminum alloy.

⑤ **Magnet for Sensing Switch Actuation:** Optional internal magnet specially designed for use with American Reed or Hall Effect switches. Used for position signaling.

⑥ **Rod Guide/Center Bushing:** Standard on all models. Oil impregnated sintered bronze bushing increases the life of the cylinder rod and provides a non-abrasive bearing surface.

⑦ **Buna-N U-Cup Rod & Piston Seals:** U-Cup seals provide low breakaway friction and maximize cylinder life expectancy. Standard Buna-N seals are recommended for operating temperatures of -20°F (-25°C) to 200°F (95°C). Fluoroelastomer seals are available for higher temperature applications. Additional special seal compounds and lubricants are available upon request.

⑧ **Pivot Pin/Pivot Bushing:** Stainless Steel Series cylinders are shipped with plated steel pivot pins as standard. Sintered bronze pivot bushings are available as an alternative standard option. (2" bore is supplied with pivot bushing only.)

⑨ **Rod Seal:** Precision machined rod seal groove provides a smooth sealing surface while positively retaining the seal without requiring additional components and relying on press fit containment.

**All cylinders are factory lubricated with a special high endurance oil mixture and tested before shipment.**

Product enhancements resulting from our quality improvement program may necessitate changes in specifications without notice.

### SPECIAL DESIGN CYLINDERS

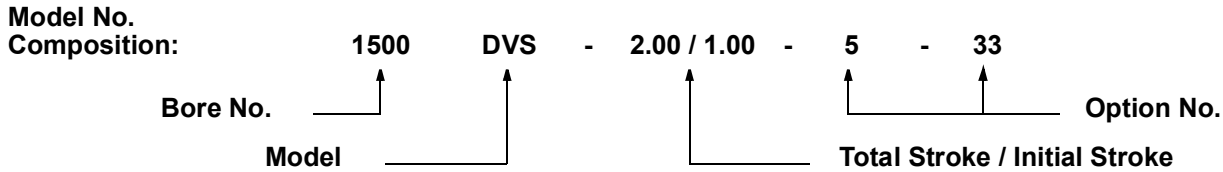
American Cylinder engineers and our Specials Department can design and manufacture special cylinders to meet the needs of your unusual or difficult applications. Contact your American Cylinder Distributor or the factory direct with your special requirements.



# HOW TO ORDER:

Example: 1-1/2" Bore Double Acting Universal Mount 3 Position Cylinder  
2" Stroke - Quad-X Wiper/Seal - Ports Rotated 90°

Model No.: 1500DVS-2.00/1.00-5-33



Bore	No.	Model Description	Model	Standard Options	No.
9/16"	562	Double Acting Nose Mount	DNS	1/8" Additional Rod Extension	1 <sup>a</sup>
3/4"	750	Double Acting Universal Mount	DVS	Rear Pivot Bushing (Omit Pin)	2
1 1/16"	1062	Double Acting Block Front Mount	DBFS	Unmilled Threaded Rear Mtg. Stud	3 <sup>b</sup>
1 1/2"	1500	Double Acting Block Front Trunnion Mount	DBFTS	Magnetic Field Piston	4 <sup>c</sup>
2"	2000	Double Acting Block Rear Mount	DBRS	Quad-X Wiper/Seal	5 <sup>d</sup>
		Double Acting Block Rear Trunnion Mount	DBRTS	Magnalube <sup>®</sup> Lubrication	6
				No Rod Threads & Flats - Std. Rod Extension	9
				Fluoroelastomer Seals	31
				Bumpers	32 <sup>e</sup>
				Ports Rotated 90°	33
				Side Port Rear Cap	38 <sup>f</sup>
				"UNC" Coarse Rod Threads	91 <sup>g</sup>

- a 1-1/16" bore only.
- N b Reduces tang length by 1/4" on the 1-1/2" models. Same thread as nose thread.
- O c Consult American's MFC<sup>®</sup> catalog for product information.
- T d In addition to Standard U-Cup Rod Seal. Not available in Block models or 9/16" bore size.
- E e See below for Bumper Length Adder.
- S f Available on DNS, DBFS, and DBFTS models.
- g Same thread length, extension and rod flats as standard models. Not available in 9/16" bore size.

(-91) "UNC" Coarse Rod Threads "P" Dimension.

Bore	3/4"	1-1/16"	1-1/2"	2"
"P" Dim.	1/4-20	5/16-18	7/16-14	1/2-13

## STROKE LENGTHS - 3 POSITION

### Models DNS & DVS

Bore	Maximum Total Stroke Lengths (in.)	Bumper (-32) Length Adder	Side Port (-38) Length Adder	Power Factor	
				Push	Pull
9/16"	4" - 1/8" min. stroke each stage in 1/8" increments	.25	.09	.25	.22
3/4"	6" - 1/8" min. stroke each stage in 1/8" increments	.00	.43	.44	.39
1 1/16"	6", 8" - 1/8" min. stroke each stage in 1/8" increments	.25	.25	.89	.81
1 1/2"	6", 10" - 1/8" min. stroke each stage in 1/8" increments	.25	.18	1.77	1.62
2"	8", 12" - 1/8" min. stroke each stage in 1/8" increments	.50	.37	3.14	2.83

NOTE: Stroke lengths in blue apply to DVS models.

### Models DBFS & DBFTS

### Models DBRS & DBRTS

Bore	Maximum Total Stroke Lengths (in.)	Bumper (-32) Length Adder	Side Port (-38) Length Adder	Power Factor	
				Push	Pull
9/16"	4" - 1/8" min. stroke each stage in 1/8" increments	.25	.09	.25	.22
3/4"	4", 6" - 1/8" min. stroke each stage in 1/8" increments	.00	.43	.44	.39
1 1/16"	4", 6" - 1/8" min. stroke each stage in 1/8" increments	.25	.25	.89	.81
1 1/2"	4", 6" - 1/8" min. stroke each stage in 1/8" increments	.25	.37	1.77	1.62

NOTE: Stroke lengths in blue apply to trunnion mounts.

## COMMON CONFIGURATIONS

American's Three Position cylinders can be used in two different manners, either as a multiple position cylinder or as in multiple power cylinder.

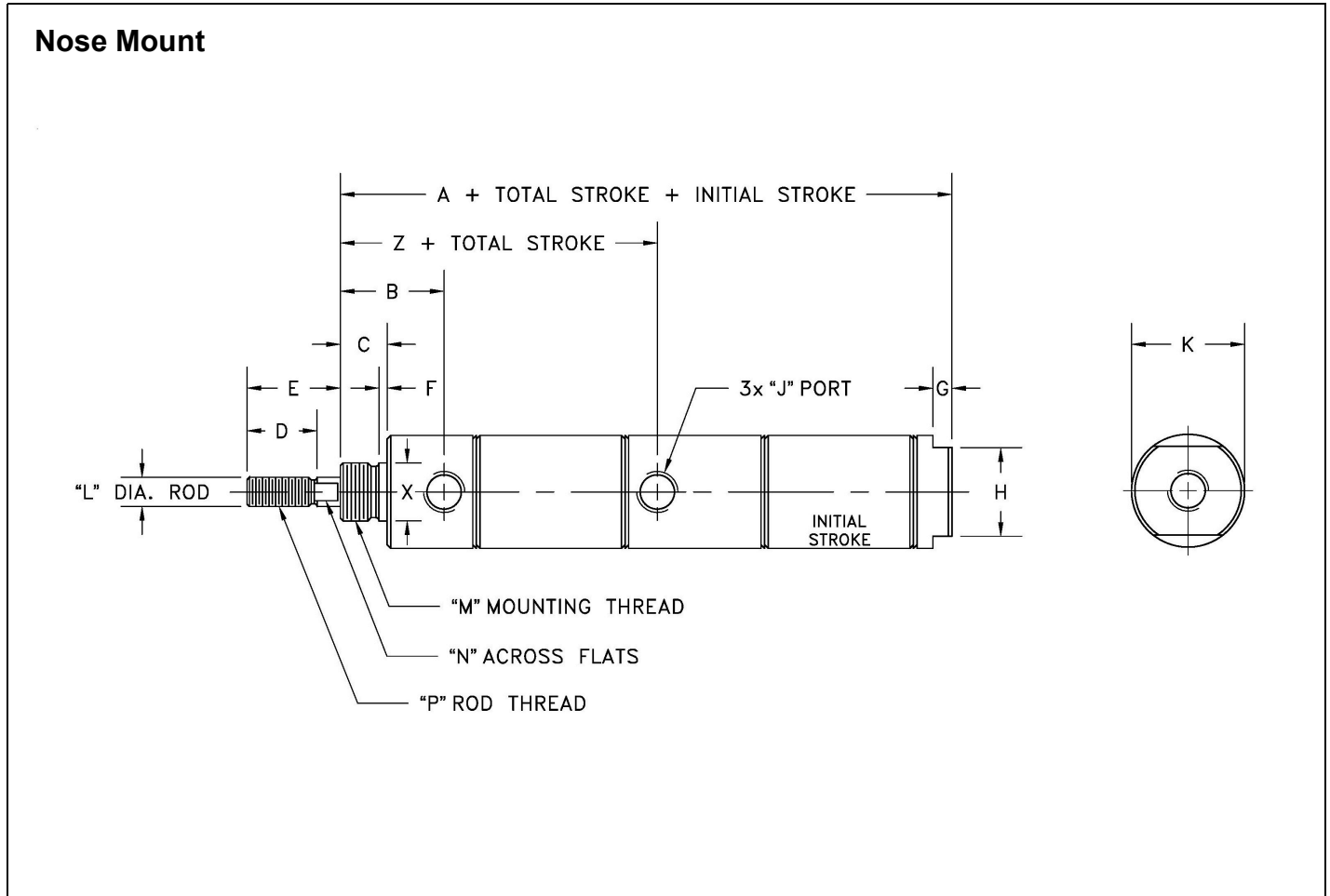
**Multiple Position:** In this configuration the front section of the cylinder has more stroke than the rear section. Air is applied to the rear most port to extend to a mid-position (initial stroke). Air is then applied to the center section port to finish extending the cylinder. To retract the cylinder fully, air is applied to the rod side port while venting both center and rear ports. If intention is to return to the mid-position from full retraction, air should be applied to both the rear most port and rod side port. If a more positive hold is needed for the mid-position, air should be applied to the rod side port after the rear section has been extended. This will keep the front section rod from being able to extend beyond the desired mid-position.

**Multiple Power:** In this configuration both the front and rear sections have identical strokes. This is called out by making the initial stroke and total stroke the same (ex. 1062DNS-2.00/2.00). This will provide roughly 2x the force output in the extend direction only. The retract function acts on only the front stage. To extend the cylinder with power multiplication, apply air pressure to both the rear and center section ports at the same time. To retract, apply air pressure to the rod side port and vent both the center and rear ports. Note that in this configuration the piston/rod assemblies are not mechanically connected. To insure forces stay within intended design limits, maximum air pressure input must be reduced to not exceed the equivalent of a single cylinder at 250psi. Use the table below to determine output force for your bore size. Multiply your input pressure by the related power factors:

Multiple Power Table

Bore	Max Input pressure (psi)	Power Factor Extend	Power Factor Retract
9/16"	130	0.46	0.22
3/4"		0.83	0.39
1 1/16"		1.69	0.81
1 1/2"		3.38	1.61
2"		5.97	2.83

### 3 Position - Nose Mount



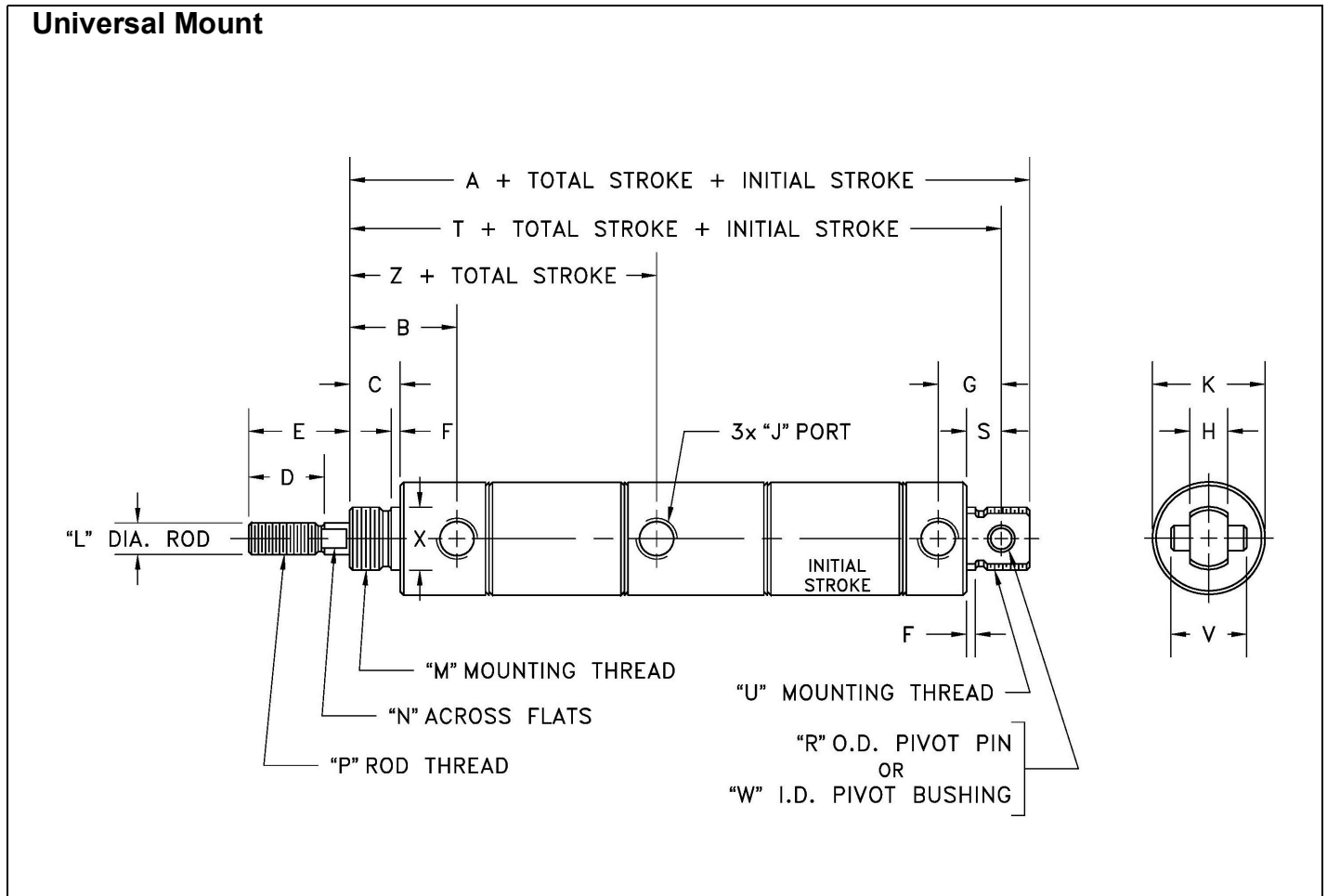
### 3 POSITION - Model DNS - Double Acting Nose Mount

Dimension																	Mounting Accessories		
Bore	A	B	C	D	E	F	G	H	J	K	L	M	N	P	X	Z	Foot Bkt.	Rod Clevis	Mtg. Nut
9/16"	4.06	0.75	.37	.50	0.50	.05	.18	.50	#10-32	0.62	.18	7/16-20	--	#10-32	.43	2.18	M11SD	M14S	M15SD
3/4"	5.46	0.96	.50	.50	0.50	.06	.18	.62	1/8 NPT	0.86	.25	5/8-18	.21	1/4-28	.62	3.12	M21	M24S	M25
1 1/16"	5.84	1.06	.50	.50	0.50*	.09	.18	.87	1/8 NPT	1.12	.31	5/8-18	.25	5/16-24	.62	3.12	M21	M24	M25
1 1/2"	6.25	1.25	.62	.75	1.00	.09	.25	.87	1/8 NPT	1.56	.43	3/4-16	.37	7/16-20	.75	3.43	M61S	M64S	M45
2"	7.87	1.50	.81	.87	1.25	.10	.25	1.25	1/4 NPT	2.09	.62	1 1/4-12	.56	1/2-20	1.37	4.31	M81S	M94	M85

NOTES

\* Specify Option No. 1 to increase rod extension an additional 1/8"; thread length remains 0.50.

### 3 Position - Universal Mount



### 3 POSITION - Model DVS - Double Acting Universal Mount

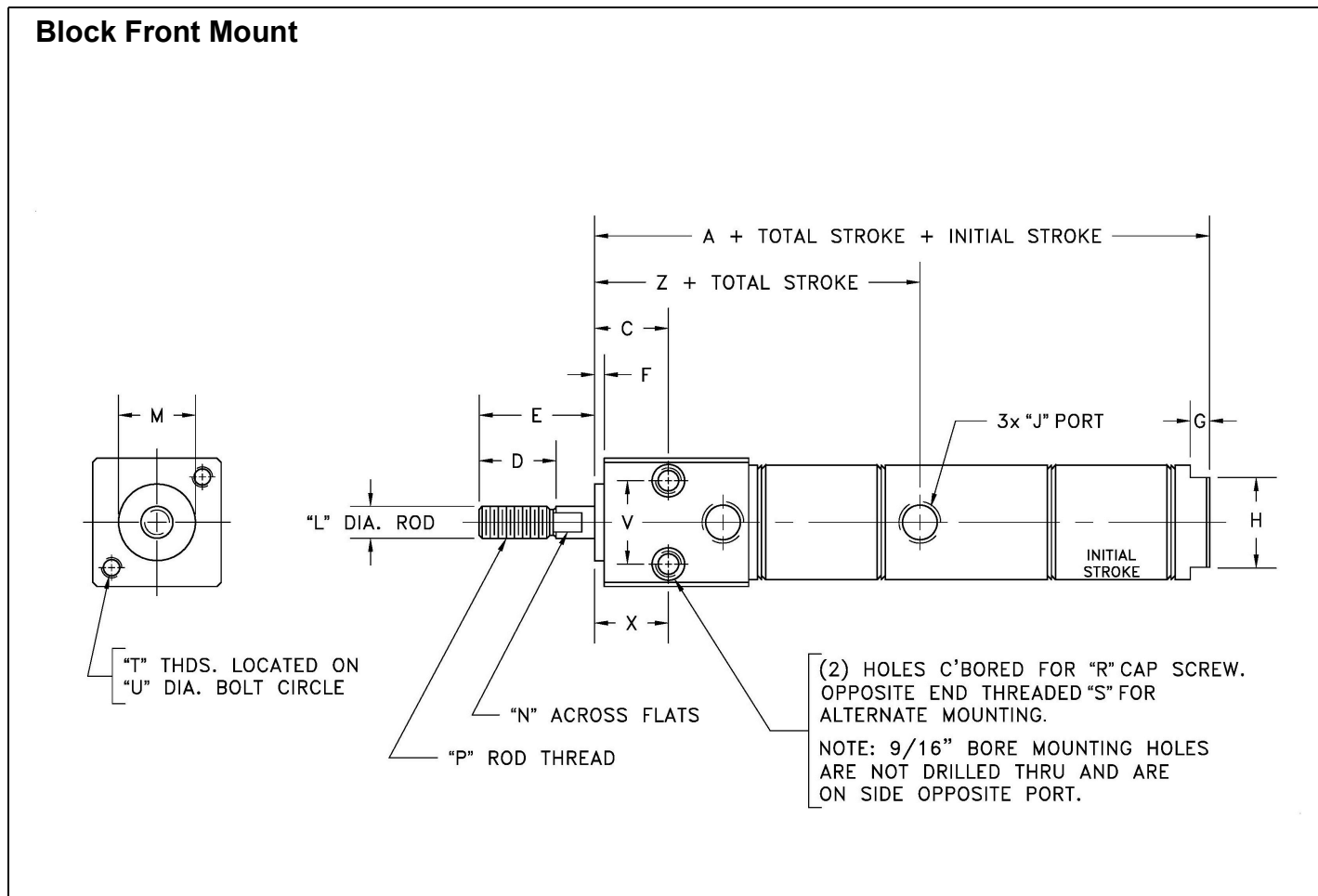
Dimension																					Mounting Accessories				
Bore	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	W	X	Z	Foot Bkt.	Pivot Bkt.	Rod Clevis
9/16"	4.59	0.75	.37	.50	0.50	.05	.43	.31	#10-32	0.62	.18	7/16-20	--	#10-32	.15	.25	4.40	7/16-20	.50	--	.43	2.18	M11SD	M13S	M14S
3/4"	6.53	0.96	.50	.50	0.50	.06	.62	.37	1/8 NPT	0.86	.25	5/8-18	.21	1/4-28	.25	.34	6.25	5/8-18	.75	--	.62	3.12	M21	M23S	M24S
1 1/16"	6.71	1.06	.50	.50	0.50*	.09	.62	.37	1/8 NPT	1.12	.31	5/8-18	.25	5/16-24	.25	.34	6.43	5/8-18	.75	--	.62	3.12	M21	M23S	M24
1 1/2"	7.31	1.25	.62	.75	1.00	.09	.81	.62	1/8 NPT	1.56	.43	3/4-16	.37	7/16-20	.37	.50	6.93	◆	1.00	--	.75	3.43	M61S	M63S	M64S
2"	9.25	1.50	.81	.87	1.25	.10	.93	.75	1/4 NPT	2.09	.62	1 1/4-12	.56	1/2-20	--	.56	8.81	1 1/4-20	--	.37	1.37	4.31	M81S	M93	M94

NOTES

\* Specify Option No. 1 to increase rod extension an additional 1/8"; thread length remains 0.50.

◆ 1.00" Diameter Unthreaded, specify Option No. 3 for 3/4-16 UNF x 5/8 long unmilled, threaded rear mounting stud; overall length reduces 0.25"

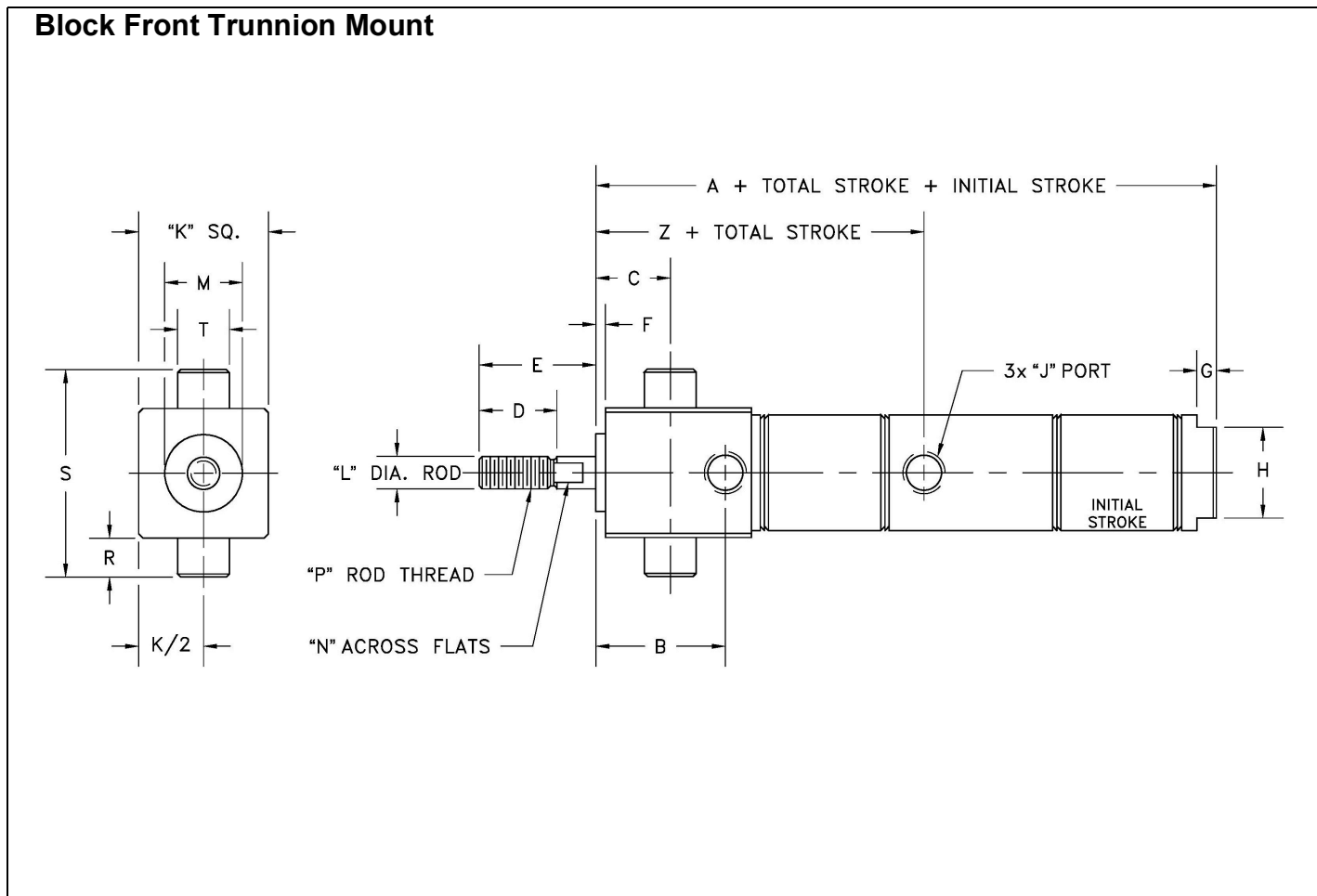
### 3 Position - Block Front Mount



### 3 POSITION - Model DBFS - Double Acting Block Front Mount

Dimension																					
Bore	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U	V	X	Z
9/16"	4.06	0.75	.31	.50	0.50	.06	.18	.50	#10-32	0.75	.18	.43	--	#10-32	--	#8-32	#8-32	0.75	.43	.75	2.18
3/4"	5.46	0.96	.46	.75	1.00	.09	.18	.62	1/8 NPT	1.00	.25	.62	.21	1/4-28	#10	1/4-20	#10-32	1.00	.62	.46	3.12
1 1/16"	6.09	1.25	.71	.75	1.12	.09	.18	.87	1/8 NPT	1.25	.31	.75	.25	5/16-24	#10	1/4-20	#10-32	1.25	.81	.71	3.37
1 1/2"	6.75	1.65	1.00	1.25	1.50	.12	.25	.87	1/4 NPT	1.75	.43	1.00	.37	7/16-20	1/4	5/16-18	1/4-20	1.75	1.12	1.00	3.93

### 3 Position - Block Front Trunnion Mount

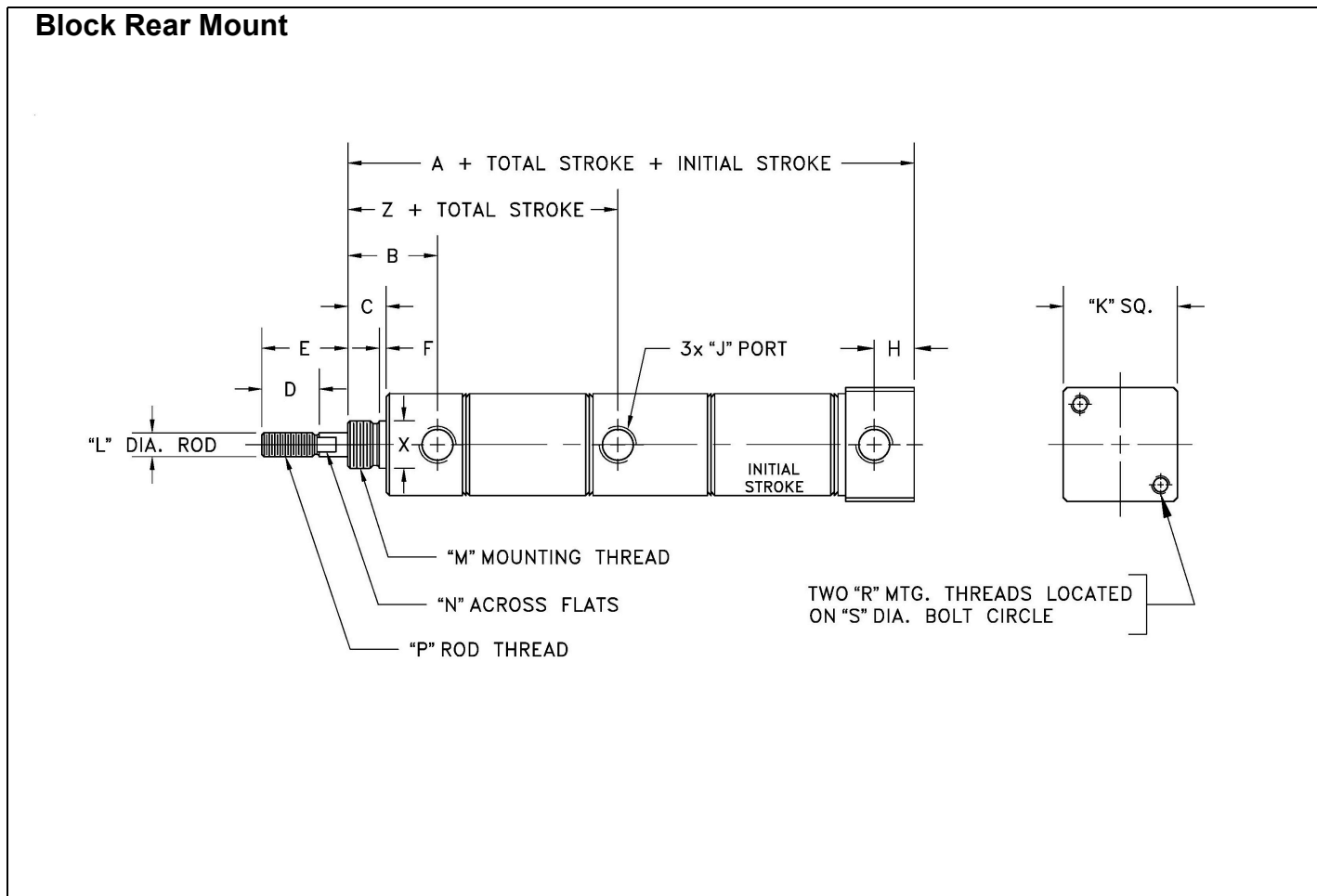


### 3 POSITION - Model DBFTS - Double Acting Block Front Trunnion Mount

Dimension																			Mounting Accessory
Bore	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	Z	Bkt. No.
3/4"	5.46	0.96	.43	.75	1.00	.09	.18	.62	1/8 NPT	1.00	.25	.62	.21	1/4-28	.37	1.75	.50	3.12	M37S
1 1/16"	6.09	1.25	.71	.75	1.12	.09	.18	.87	1/8 NPT	1.25	.31	.75	.25	5/16-24	.37	2.00	.50	3.37	M37S
1 1/2"	6.75	1.65	1.06	1.25	1.50	.12	.25	.87	1/4 NPT	1.75	.43	1.00	.37	7/16-20	.37	2.50	.50	3.93	M37S



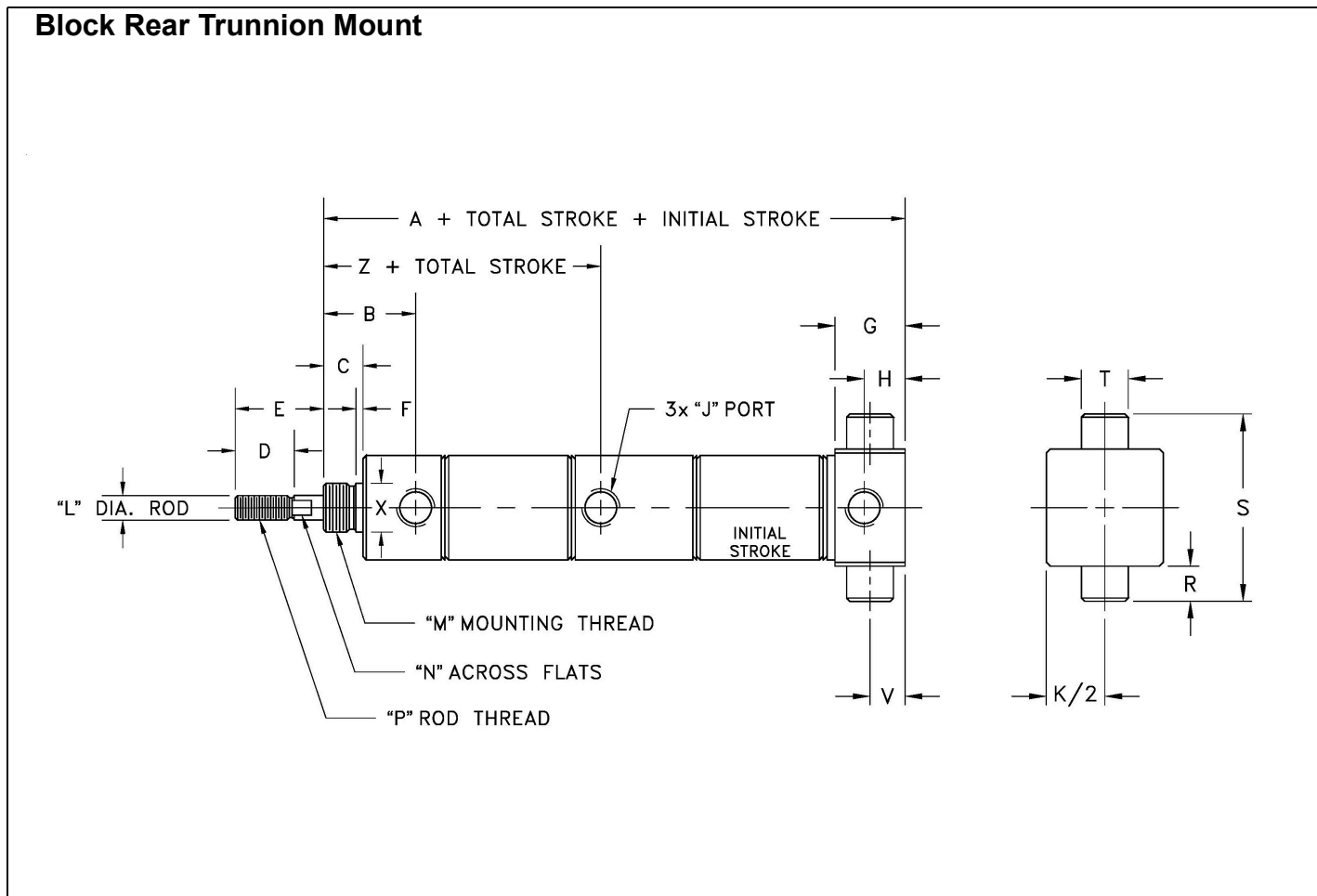
### 3 Position - Block Rear Mount



### 3 POSITION - Model DBRS- Double Acting Block Rear Mount

Dimension																	
Bore	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	Z
3/4"	6.03	0.96	.50	.75	1.00	.06	.75	.43	1/8 NPT	1.00	.25	5/8-18	.21	1/4-28	#10-32	1.00	3.12
1 1/16"	6.34	1.06	.50	.75	1.12	.09	.75	.43	1/8 NPT	1.25	.31	5/8-18	.25	5/16-24	#10-32	1.25	3.12
1 1/2"	6.93	1.21	.62	1.25	1.50	.09	1.00	.62	1/4 NPT	1.75	.43	3/4-16	.37	7/16-20	1/4-20	1.75	3.43

### 3 Position - Block Rear Trunnion Mount



### 3 POSITION - Model DBRTS - Double Acting Block Rear Trunnion Mount

Dimension																				Mounting Accessory
Bore	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	V	Z	Bkt. No.
3/4"	6.03	0.96	.50	.75	1.00	.06	.75	.43	1/8 NPT	1.00	.25	5/8-18	.21	1/4-28	.37	1.75	.50	.37	3.12	M37S
1 1/16"	6.34	1.06	.50	.75	1.12	.09	.75	.43	1/8 NPT	1.25	.31	5/8-18	.25	5/16-24	.37	2.00	.50	.37	3.12	M37S
1 1/2"	6.93	1.21	.62	1.25	1.50	.09	1.00	.62	1/4 NPT	1.75	.43	3/4-16	.37	7/16-20	.37	2.50	.50	.50	3.43	M37S



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## **Warranty**

American Cylinder Co., Inc. warrants its products to be free from defects in material and workmanship under normal wear and service for a period of 3 years from date of shipment of the order. American Cylinder Company shall have no liability under this warranty if: 1) The product is used other than in accordance with specifications. 2) The product is subjected to abuse, negligence, accident, misapplication, or unintended use. 3) The product is manufactured to buyer's specifications.

Manufacturer's liability shall be limited to allowance of credit or replacement of defective product. American Cylinder Company shall not be liable or responsible for injuries or damages to persons or property arising out of the use or operation of American Cylinder products.

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**American Cylinder Co., Inc.**  
Peotone, Illinois 60468-9116  
708/258-3935  
FAX 708/258-3980

**ON THE INTERNET**  
<http://www.americancylinder.com>  
E-MAIL: [amcyl@americancylinder.com](mailto:amcyl@americancylinder.com)