

SMA Aluminum Cylinders



**PNEUMATIC TO
200 PSI
HYDRAULIC 250
TO 400 PSI Non shock**

**1 1/8", 1 1/2",
2", 3" BORE**

**SPACE SAVING
AND CONVENTIONAL
DESIGNS**

REPAIRABLE

Very high quality "Pancake" type cylinders with all of the engineering features you need to outpace the competition – generous bearing lengths, rod wipers, chromed shafts, superior seals and materials throughout.

— PLUS —

Cylinders of conventional length with longer bearings and increased distance between support points which provide exceptional service where space permits. U cup piston optional.

A GRAPH OF CYLINDER LENGTH vs QUALITY . . .

**Conventional
Pancake**

Too short to provide rod wipers, adequate bearing length, and quality seals. Length too short to provide end caps of sufficient strength for many applications. Piston rod wrench flats virtually unusable without special thin wrenches. Suitable for light duty pneumatic applications only.



SMA Short Mount

"Common sense engineered" to the shortest length possible without sacrificing areas critical to high performance. Excellent for both pneumatic and hydraulic service.



SMA Conventional Mount

Premium material in generous proportions yet small enough to fit.

Crimped Stainless Non Repairable

Although significantly longer, they fall short in design and materials.

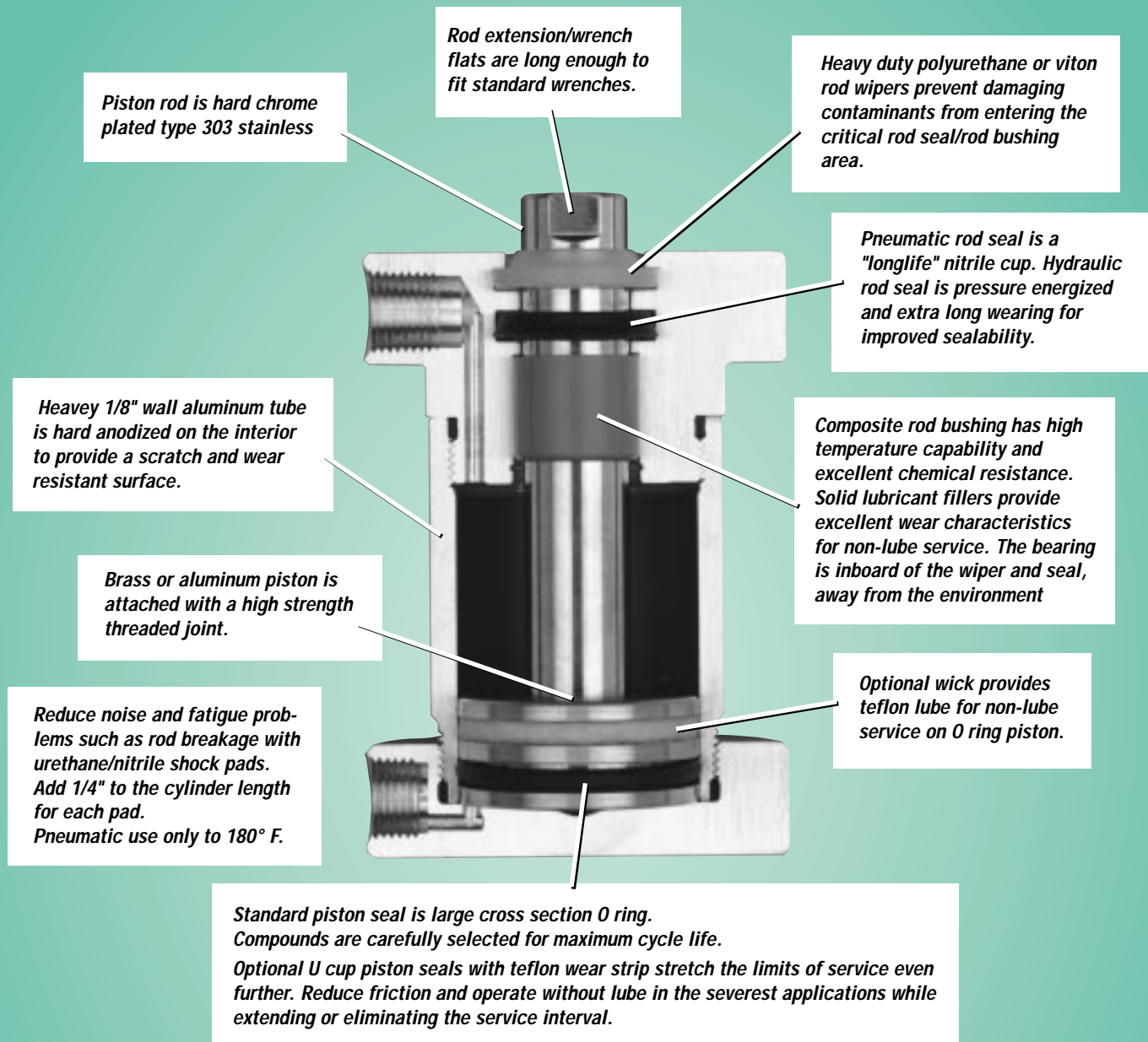
N.F.P.A. Tie Rod Cylinder

Conventional design is too long and too costly for many applications.

0" 1" 2" 3" 4" 5" 6"

Cylinder body length 1 1/2" Bore 0" Stroke

SMA DESIGN FEATURES



If space permits for applications involving side loads or long strokes, select SMA 1, 2, 3, 5, 7, 8, 9, 12, 13, 19, 21, 23, 25, 28 which have extra long bearings with added space between support points.

Strokes longer than the maximum listed in the ordering procedure can be produced but careful consideration must be given to how the cylinder is applied — how well is the load supported or guided, is the cylinder used in push or tension, is the cylinder vertical or horizontal, etc. Consult factory on all strokes longer than standard. Stroke increments other than standard can also be made. Special lengths are generally available in a few days and are priced as "non-standard" strokes.

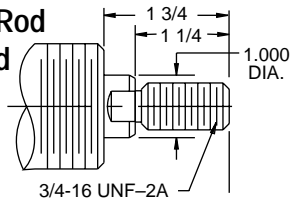
AIR PRODUCTS INC.

TM

Spring Return Cylinders

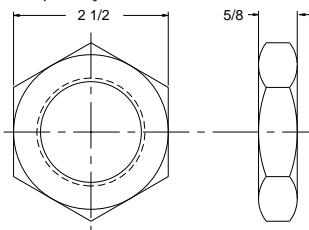
Pneumatic only
Springs add to cyl. length
0-2" stroke add 1 1/2" extra
2 1/2-4" stroke add 3" extra
over 4" stroke not available
Spring force
Fully extended—20#
Fully compressed—75#
Spring material—Plated steel

Optional Male Rod Thread



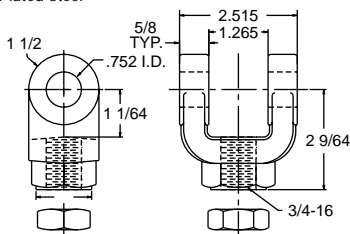
1 3/4 - 12 Nut Nose Mounting Nut

Not included with cylinder
Order Separately



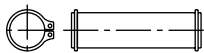
SMA-750 Rod Clevis & Nut

Plated steel



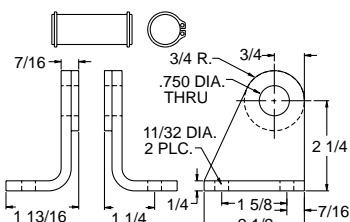
SMA-701 Clevis Pin Assembly

Used on SMA 750 Stainless pin/Steel clips



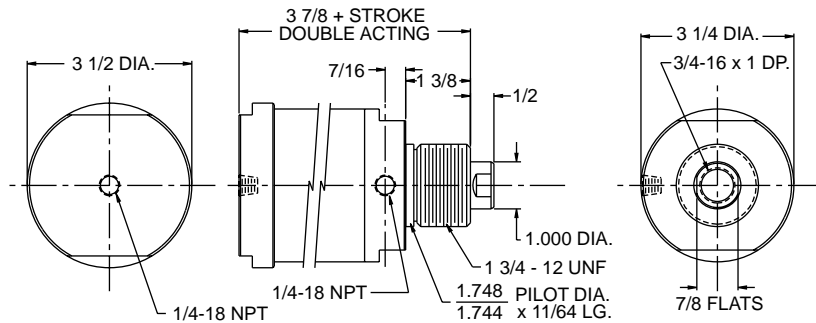
SSC-300 Clevis Brk't

Used on SMA 2 Stainless steel

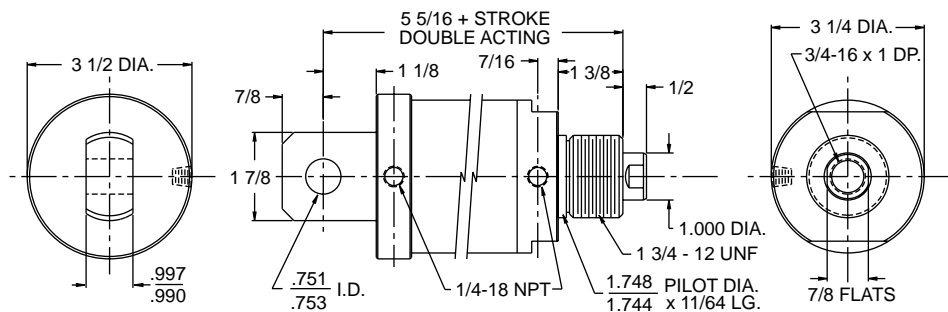


SMA Options

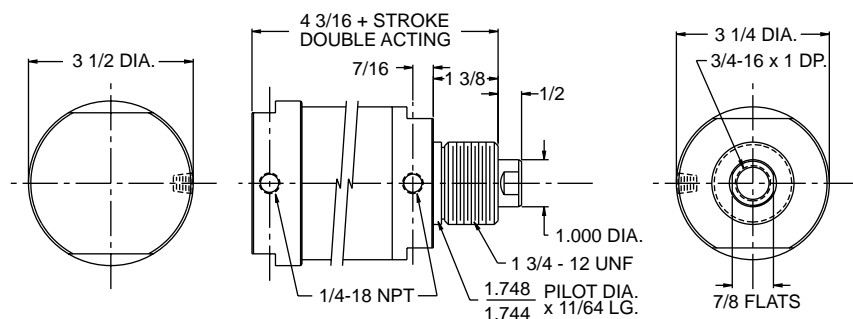
- Shock Pads
- Viton Seals
- Non-lube Service
- Magnetic Piston
- U Cup Piston
- 90° Rear Clevis



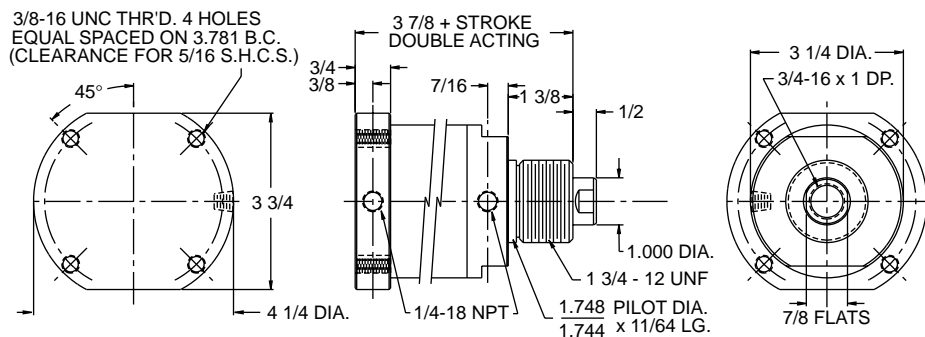
SMA1



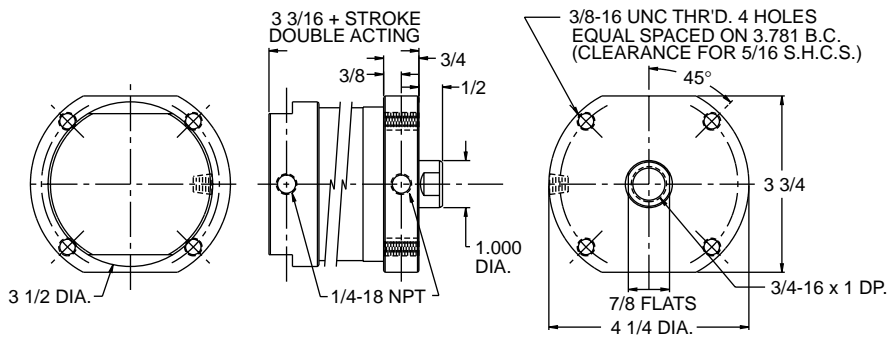
SMA2



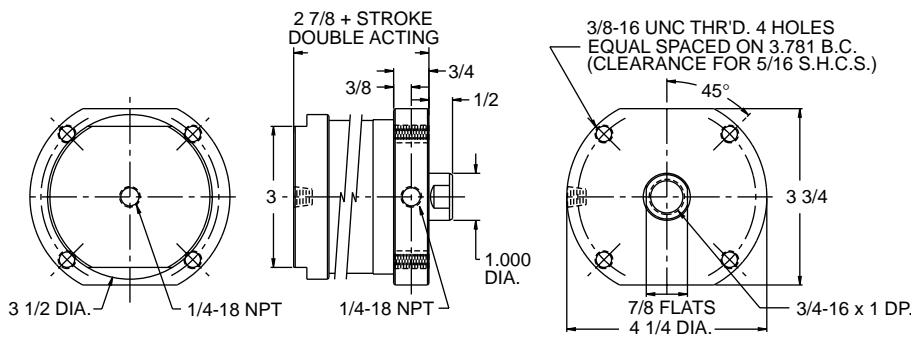
SMA3



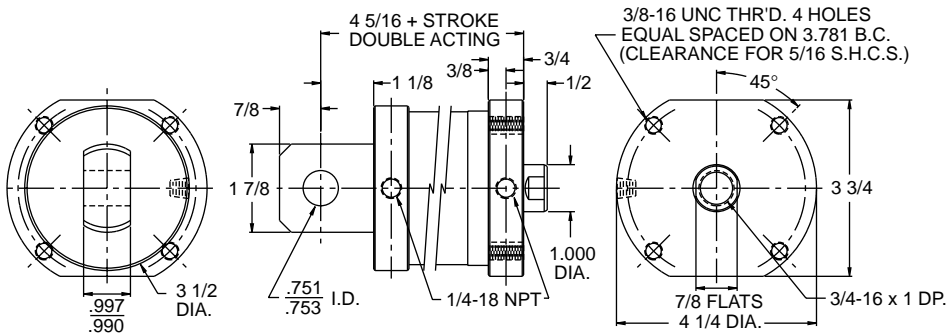
SMA5



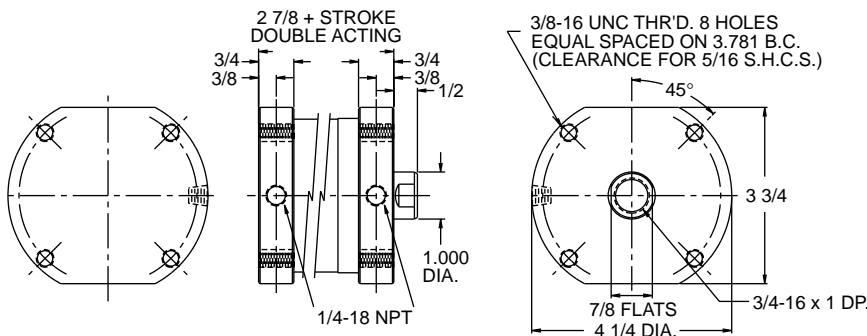
SMA14



SMA15



SMA16

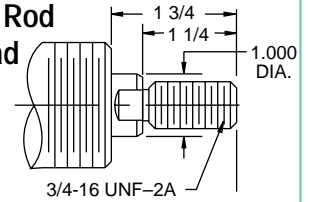


SMA17

Spring Return Cylinders

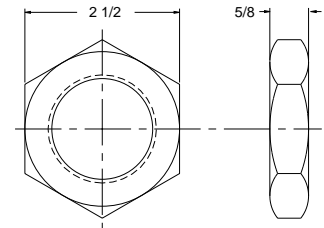
Pneumatic only
Springs add to cyl. length
0-2" stroke add 1 1/2" extra
2 1/2-4" stroke add 3" extra
over 4" stroke not available
Spring force
Fully extended—20#
Fully compressed—75#
Spring material—Plated steel

Optional Male Rod Thread



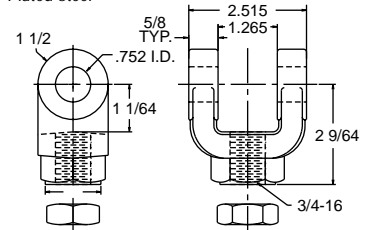
1 3/4 -12 Nut Nose Mounting Nut

Not included with cylinder
Order Separately



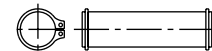
SMA-750 Rod Clevis & Nut

Plated steel



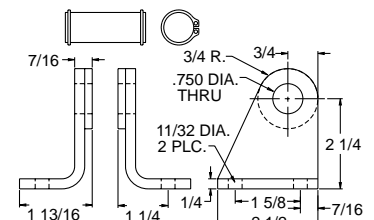
SMA-701 Clevis Pin Assembly

Used on SMA 750 Stainless pin/Steel clips



SSC-300 Clevis Brk't

Used on SMA16 Stainless steel



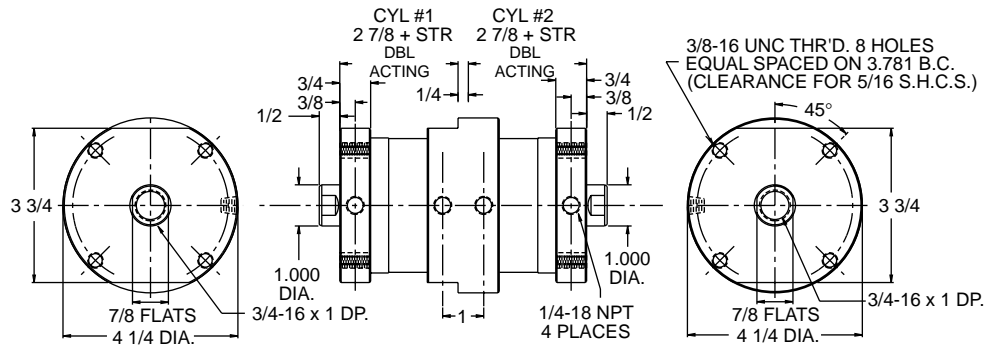
Back to Back models – Back to Back cylinders are two standard cylinders with a common cap.

Spherical mount models – Eliminate side load where misalignment exists. Br'g is plated steel with teflon liner for non-lube service



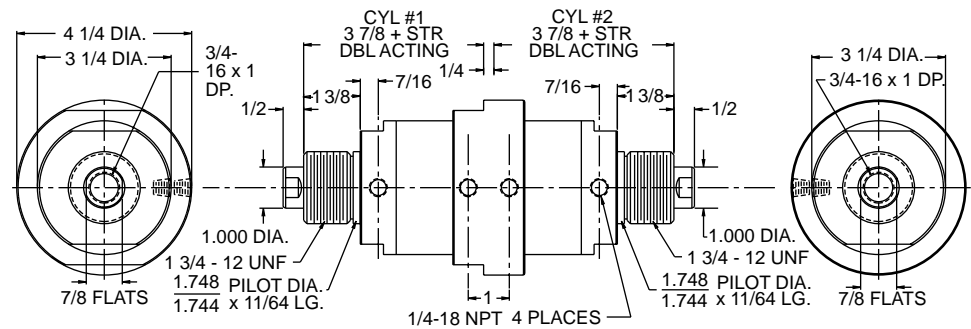
SMA Options

- Shock Pads
- Viton Seals
- Non-lube Service
- Magnetic Piston
- U Cup Piston
- 90° Rear Clevis

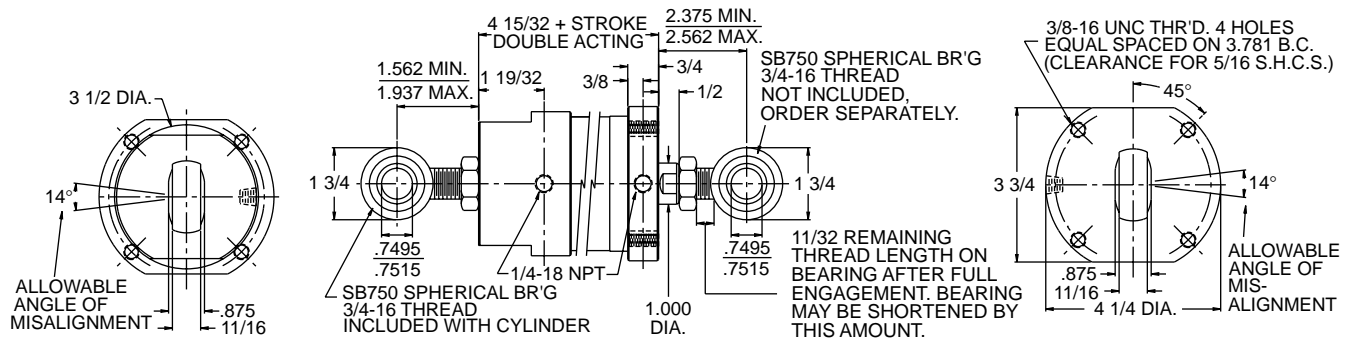


SMA18

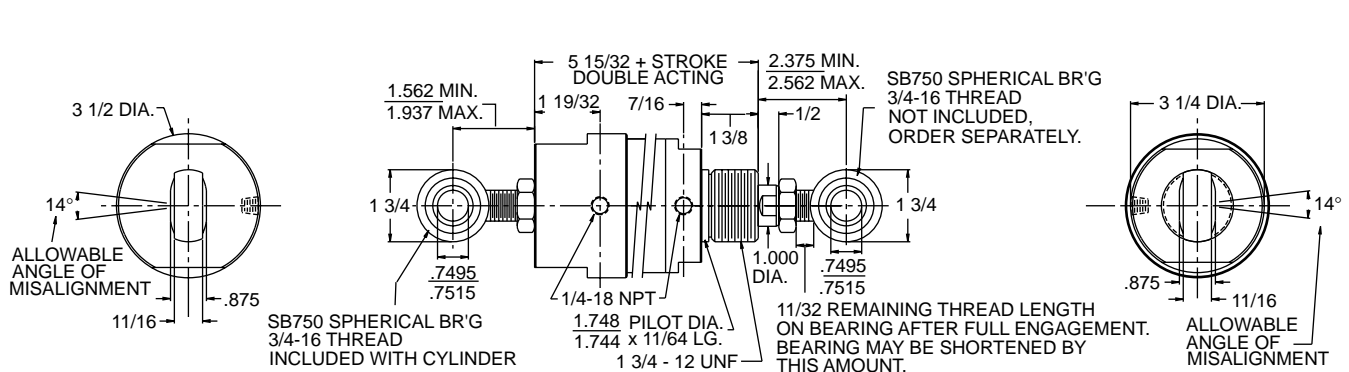
Breather Vents and Mufflers
Protect Vent Ports from Dirt in Single Acting Cylinders.



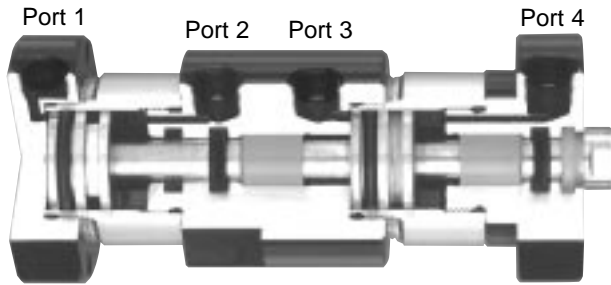
SMA19



SMA22



SMA23



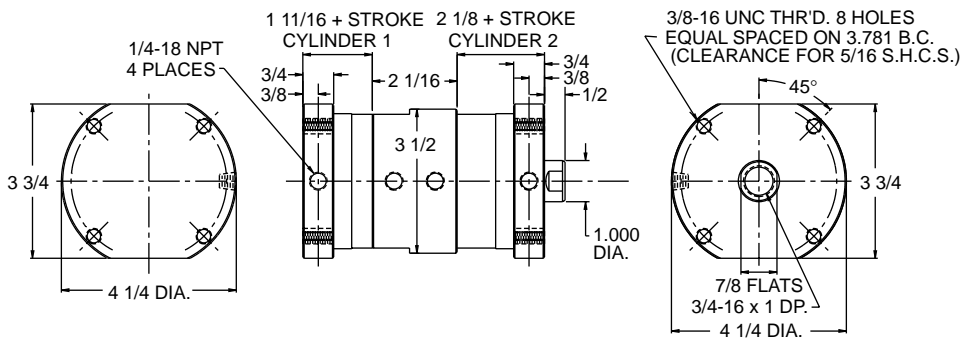
Three Position Cylinders are two in-line cylinders with a common cap but two separate and independent piston rods. By pressuring Port 1, 3, or 4, any combination of stroke 1 and total stroke may be achieved. Port 2 is a vent port only for Cylinder 1. In hydraulic applications it should be connected to a tank by a drain line.

Pressurize Port 1 and Cylinder 1 will extend pushing Cylinder 2 by the same amount. Then pressurize port 3 and Cylinder 2 will extend further to its maximum length. Pressurize Port 4 and both cylinders will retract.

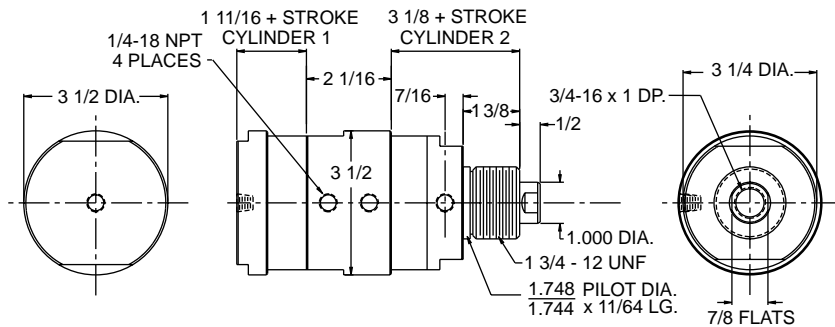
*Stroke of Cylinder 2 = TOTAL Stroke

EXAMPLE: If Cylinder 1 extends 2" when port 1 is pressurized, it will also push Cylinder 2 by 2". If, when Port 3 is pressurized, Cylinder 2 moves an ADDITIONAL 11/2". Then the total stroke of Cylinder 2 is 2" + 1 1/2" = 3 1/2". Always specify the stroke of Cylinder 2 as the total stroke.

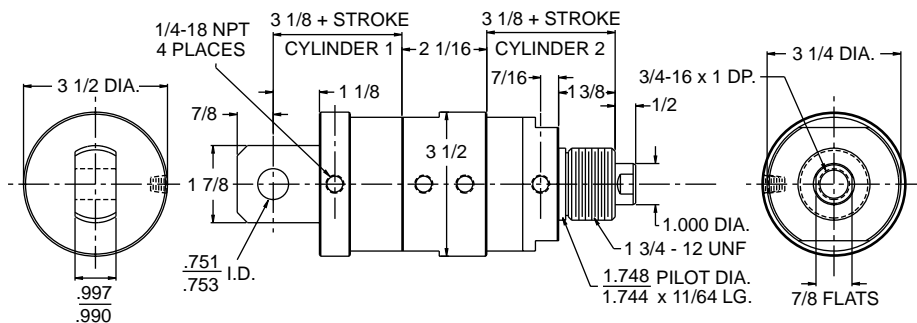
SMA24



SMA25



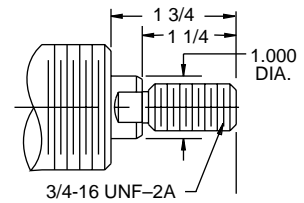
SMA26



Spring Return 3 Position

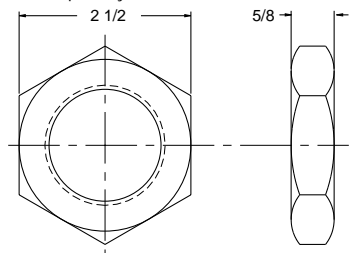
Pneumatic only
Springs add to cyl. length
Cyl. #1 and/or Cyl. #2
0-2" stroke add 1 1/2" extra
2 1/2-4" stroke add 3" extra
over 4" not available
Spring force
Fully extended—20#
Fully compressed—75#
Spring material—Plated steel

Optional Male Rod Thread



1 3/4 - 12 Nut Nose Mounting Nut

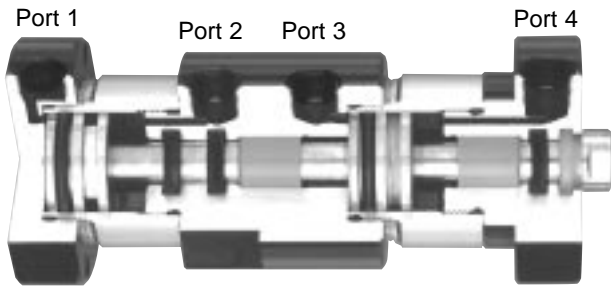
Not included with cylinder
Order Separately



3 Position options

Viton seals
Non-lube service
Magnetic piston
U Cup piston
90° Rear clevis

Shock pads not available



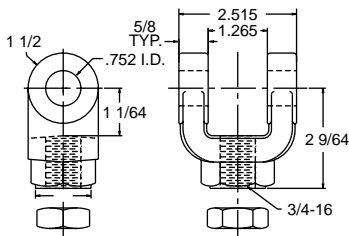
Tandem Cylinders are two in-line cylinders of the same stroke length with a common cap. Both pistons are attached to a common rod. By simultaneously pressurizing Ports 1 and 3 or 2 and 4, the force on the piston rod is nearly doubled. This can be useful when more force is required, but the diameter of the cylinder cannot be increased due to size restrictions.

Tandem cylinders can also be used as part of an air/oil system. Fill the front cylinder (Cyl.2) with oil and pipe its ports (3 & 4) in series using one or two flow controls. Using the rear cylinder (Cyl. 1) as an air powered driver, meter the oil from end to end on Cylinder 2. This will provide smooth, precise control of piston rod motion at all speeds.

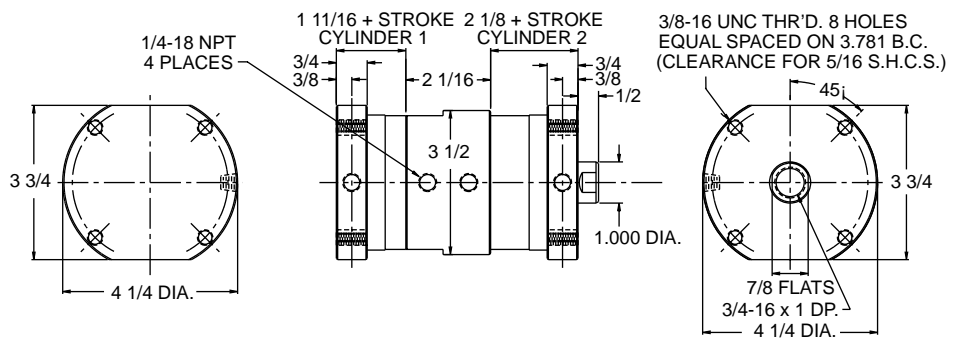
A small reservoir of oil at 10-20 psi should be connected to Cylinder 2 if oil loss or expansion/contraction due to heat are a concern.

Tandem models double acting only
Spring return not available

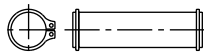
SMA-750
Rod Clevis & Nut
Plated steel



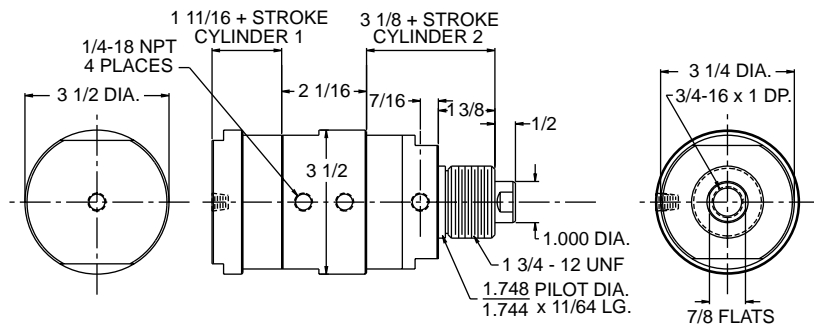
SMA27



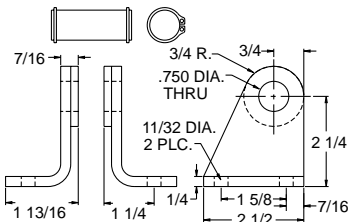
SMA-701
Clevis Pin Assembly
Used on SMA 750
Stainless pin/Steel clips



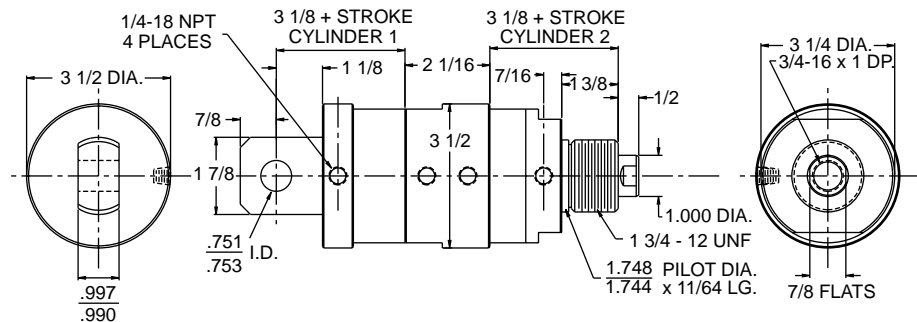
SMA28



SSC-300
Clevis Bracket
Used on SMA 26, 29 Stainless steel



SMA29



Tandem options

- Viton seals
- Non-lube service
- 90° Rear clevis

Shock pads not available
Magnetic piston not available
U cup piston not available

Non-Rotate Option SMA Aluminum and SMS Stainless

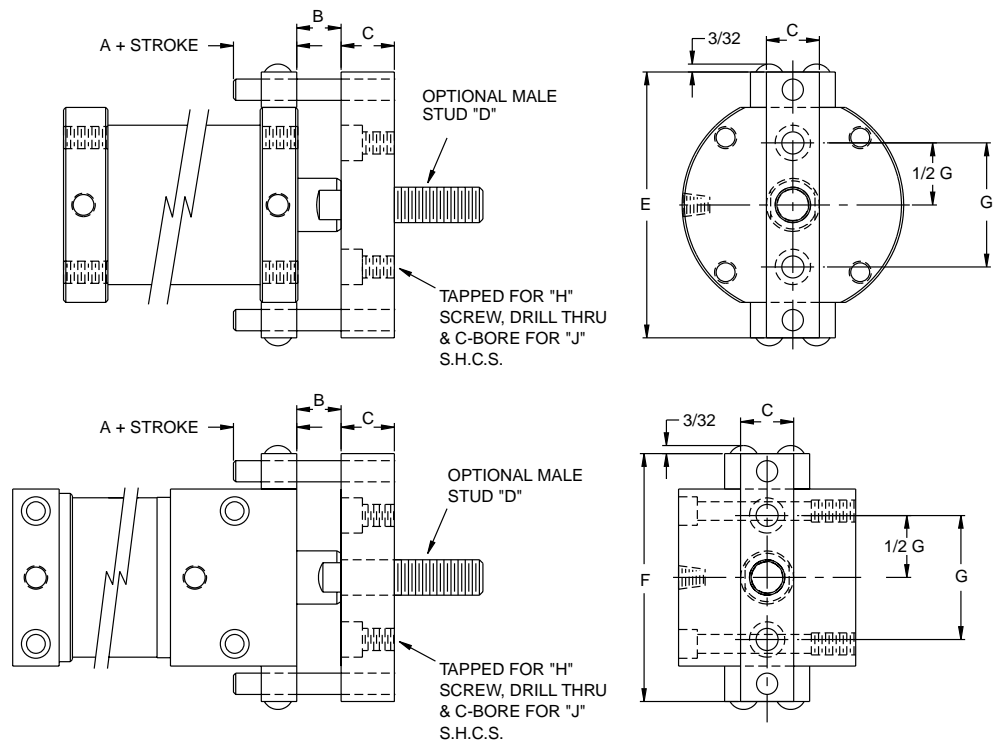
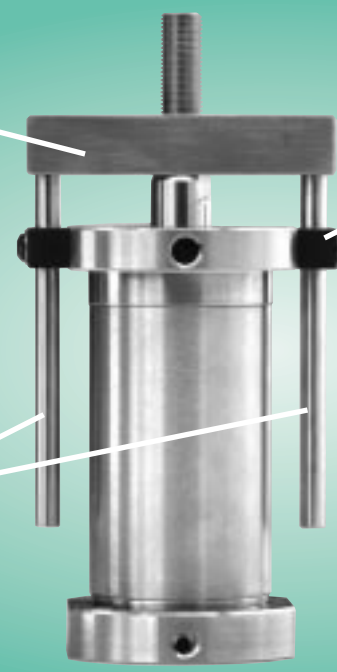
Add a stainless tooling bar to prevent rotation on standard square or flange mount cylinders.

Guide bushings of P.E.T. plastic can be adjusted to take up wear. Superior registration can be achieved and maintained.

Hard chromed stainless guide rods.

Available on double acting cylinders in mounting styles SMA7, 8, 9, 12, 13, 14, 15, 17, 20, 24, and SMS7, 8, 9, 14, 15, 17.

Where space permits U cup piston with wear strip is recommended.



BORE	A	B	C	D	E	F	G	H	J
1 1/8	11/16	3/4	1/2	5/16-24 x 3/4	2 3/4	2 1/2	1.062	1/4-20	#10
1 1/2	11/16	5/8	5/8	3/8-24 x 1	3 1/4	3	1.250	5/16-18	1/4
2	9/16	5/8	3/4	1/2-20 x 1 1/4	3 3/4	3 1/2	1.750	5/16-18	1/4
3	NOT AVAILABLE								

ORDERING PROCEDURE - SMA Aluminum



Select code numbers/letters (**bold type**) from each of the six boxes below - then select options desired from the table below. List codes in the same sequence as shown.

<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Bore</th> <th>Code</th> </tr> </thead> <tbody> <tr><td>1 1/8"</td><td>11</td></tr> <tr><td>1 1/2"</td><td>15</td></tr> <tr><td>2"</td><td>20</td></tr> <tr><td>3"</td><td>30</td></tr> </tbody> </table>	Bore	Code	1 1/8"	11	1 1/2"	15	2"	20	3"	30		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Type</th> <th>Code</th> </tr> </thead> <tbody> <tr><td>Double acting</td><td>C</td></tr> <tr><td>Single acting spring return (Adds to cyl. length) Spring extend not available</td><td>A</td></tr> </tbody> </table>	Type	Code	Double acting	C	Single acting spring return (Adds to cyl. length) Spring extend not available	A	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>Service</th> <th>Code</th> </tr> </thead> <tbody> <tr><td>Pneumatic</td><td>E</td></tr> <tr><td>Hydraulic</td><td>G</td></tr> <tr><td>SMA 30 always</td><td>E</td></tr> </tbody> </table>	Service	Code	Pneumatic	E	Hydraulic	G	SMA 30 always	E																																																																									
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Stroke																																																																																																				
Code is stroke in total 1/8" increments Example: 1" stroke = 8 2 1/4" stroke = 18																																																																																																				
Stocked in the following strokes: 1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2, 1 3/4, 2 and 1/2" increments to 10"																																																																																																				
3" bore - Limited to 8" max. stroke																																																																																																				
Note: SMA 27, 28, 29, 31 available only 1/2" increments																																																																																																				
Piston Rod Codes																																																																																																				
Bore	Thread		Code																																																																																																	
1.125	3/8-24 x 3/4	Male	M6																																																																																																	
1.125	5/16-18 x 5/8	Female	F3																																																																																																	
1.125	5/16-24 x 5/8	Female	F4																																																																																																	
1.500	1/2-20 x 1	Male	M8																																																																																																	
1.500	3/8-16 x 5/8	Female	F5																																																																																																	
1.500	3/8-24 x 5/8	Female	F6																																																																																																	
2.000	5/8-18 x 1 1/8	Male	M12																																																																																																	
2.000	1/2-20x 3/4	Female	F8																																																																																																	
3.000	3/4-16 x 1 1/4	Male	M10																																																																																																	
3.000	3/4-16 x 1	Female	F10																																																																																																	
With non-rotate option enter code			11																																																																																																	
For style SMA 30 enter code			11																																																																																																	

Option	Description	Code
Extra rod extension 1/4 " increments	Specify code letter J followed by extra length required as a two place decimal Example: J.50 = 1/2" extra J1.25 = 1 1/4"extra	J
Shock pads	Add to either or both ends in 1 1/8", 1 1/2", 2" bore up to 2" stroke.	Rod end only L
Pneu. only to 180° F	Over 2" stroke and on all 3" bore must be added to both ends Each pad adds	Cap end only M
Double acting only	1/4" length — not available SMA 12, 13, 20, 21, 24, 25, 26, 27, 28, 29, 30, 31	Both ends N
Non-lube service	Available on standard O ring Piston. Not available or necessary on U cup piston	P
Viton seals	Standard seals are nitrile and urethane +10 to +200° F For service -10 to +400° F specify viton	R
U cup piston	Extends cycle life and reduces friction Piston is aluminum and includes teflon wear strip — adds 1/2" to length Not available SMA 27, 28, 29, 30, 31	S
Clevis 90° to std	SMA 2, 16, 26, 29, only	T
Magnetic piston	Adds 1/2" to length — not available SMA 27, 28, 29, 31	W
Non rotate	Available only on double acting SMA 7, 8, 9, 12, 13, 14, 15, 17, 20, 24	with male stud X without male stud Y
1/4" oversize ports	2" bore only — SMA 1, 2, 3, 6, 7, 8, 9, only Not available with option x,y	Z

Part No. Example:

1.500 bore
Mounting style SMA9
1.500 stroke
1 1/2-20 x 1 male thread
Magnetic piston

15 SMA9 C 12 E M8 R W

Double acting
Pneumatic
Viton seals

* These models are combinations of two cylinders with a common cap. The dimensional drawings illustrate them as being composed of a cylinder #1 section and a cylinder #2 section. The part number also contains 2 sections. Compose the part number for cylinder #1 as shown above. Mounting styles SMA 13, 24, 25, 26, 27, 28, 29, 31 will always have piston rod code 11. Then add a dash (-) and the part number for cylinder #2 skipping the "bore" and "mounting style" codes and beginning with the "type" code.

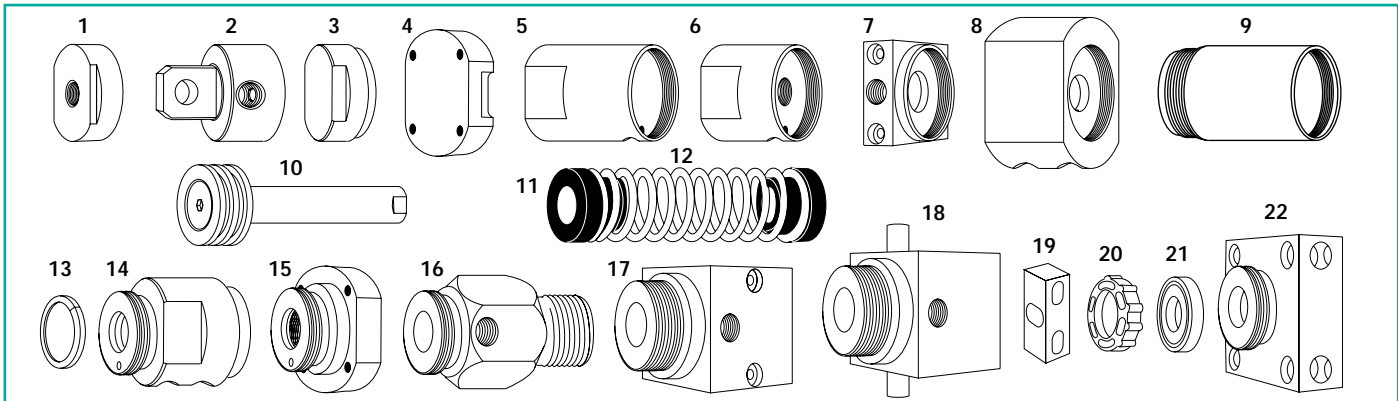
Example:

← Cylinder 1 →
← Cylinder 2 →

11 SMA 18 C 10 E 11 R
- C 16 E F 3 R

SMA Service Parts

When ordering any repair part please provide the part number and description shown below along with the serial number and part number of the cylinder being serviced.



Key	Description	1 1/8 Bore	1 1/2 Bore	2 Bore	3 Bore
Seal kits for standard cylinders with O ring piston — SMA 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 20, 21, 22, 23					
	Pneumatic, Nitrile Add suffix NL for Non-Lube	SMA 3411	SMA 3415	SMA 3420	SMA 3430
	Pneumatic, Viton Add suffix NL for Non-Lube	SMA 3411V	SMA 3415V	SMA 3420V	SMA 3430V
	Hydraulic, Nitrile	SMA 3511	SMA 3515	SMA 3520	SMA 3530
	Hydraulic, Viton	SMA 3511V	SMA 3515V	SMA 3520V	SMA 3530V
Seal kits for standard cylinders with U cup piston — SMA 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 20, 21, 22, 23					
	Pneumatic, Nitrile	SMA 5411	SMA 5415	SMA 5420	SMA 5430
	Pneumatic, Viton	SMA 5411V	SMA 5415V	SMA 5420V	SMA 5430V
	Hydraulic, Nitrile	SMA 5511	SMA 5515	SMA 5520	SMA 5530
	Hydraulic, Viton	SMA 5511V	SMA 5515V	SMA 5520V	SMA 5530V
Seal kits for combination cylinders with O Ring piston — SMA 13, 18, 19, 24, 25, 26, 27, 28, 29, 30, 31					
	Pneumatic, Nitrile Add suffix NL for Non-Lube	SMA 3611	SMA 3615	SMA 3620	SMA 3630
	Pneumatic, Viton Add suffix NL for Non-Lube	SMA 3611V	SMA 3615V	SMA 3620V	SMA 3630V
	Hydraulic, Nitrile	SMA 3711	SMA 3715	SMA 3720	SMA 3730
	Hydraulic, Viton	SMA 3711V	SMA 3715V	SMA 3720V	SMA 3730V
Seal kits for combination cylinders with U cup piston — SMA 13, 18, 19, 24, 25, 26					
	Pneumatic, Nitrile	SMA 5611	SMA 5615	SMA 5620	SMA 5630
	Pneumatic, Viton	SMA 5611V	SMA 5615V	SMA 5620V	SMA 5630V
	Hydraulic, Nitrile	SMA 5711	SMA 5715	SMA 5720	SMA 5730
	Hydraulic, Viton	SMA 5711V	SMA 5715V	SMA 5720V	SMA 5730V
1	Rear port cap Add suffix 250 for 2" bore 1/4 NPT	SMA 1011	SMA 1015	SMA 1020	SMA 1030
2	Rear pivot cap Add suffix 250 for 2" bore 1/4 NPT	SMA 1111	SMA 1115	SMA 1120	SMA 1130
2	90° Rear pivot cap Add suffix 250 for 2" bore 1/4 NPT	SMA 111190	SMA 111590	SMA 112090	SMA 113090
3	Side port cap Add suffix 250 for 2" bore 1/4 NPT	SMA 4811	SMA 4815	SMA 4820	SMA 4830
4	Rear flange cap	SMA 1311	SMA 1315	SMA 1320	SMA 1330
5	Spherical bearing cap	SMA 2211	SMA 2215	SMA 2220	SMA 2230
6	Adjustable stroke cap	SMA 2011	SMA 2015	SMA 2020	
7	Square cap Add suffix 250 for 2" bore 1/4 NPT	SMA 4611	SMA 4615	SMA 4620	
8	Back to back body	SMA 1811	SMA 1815	SMA 1820	SMA 1830
9	Tube	part No. is T followed by the complete cylinder part number			
10	Piston rod assembly	part No. is PR followed by the complete cylinder part number			
11	Spring guide Pair	SMA 1211	SMA 1215	SMA 1220	SMA 1230
12	Spring	11215	15015	20015	20015
13	Magnet SMS5911 and SS3215 supplied in pairs	SMS 5911	SS 3215	SS 3220	SS 3230
14	3 position/Tandem/Pump body	SMA 2411	SMA 2415	SMA 2420	SMA 2430
15	Flange head Add suffix NR for non-rotate	SMA 1411	SMA 1415	SMA 1420	SMA 1430
16	Nose Mount Head Add suffix 250 for 2" bore, 1/4 NPT	SMA 0111	SMA 0115	SMA 0120	SMA 0130
17	Short square Head Add suffix 250 for 2" bore, 1/4 NPT	SMA 4411	SMA 4415	SMA 4420	
17	Long square Head Add suffix 250 for 2" bore, 1/4 NPT	SMA 4511	SMA 4515	SMA 4520	
17	Square non rotate head	SMA 4511NR	SMA 4515NR	SMA 4520NR	
18	Trunnion head	SMA 4511T	SMA 4515T	SMA 4520T	
19	Non-rotate guide bushing Pair	SMS 5111	SMS 5111	SMS 5111	
20	Cap end shock pad	Consult factory			3MSP
21	Head end shock pad	11CSP	15CSP	2CSP	3MSP
22	SMA 30 cap	SMA 6011	SMA 6015	SMA 6020	