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.

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

Courtesy of Steven Engineering, Inc. • 230 Ryan Way, South San Francisco, CA, 94080-6370 • Main Office: (650) 588-9200 • Outside Local Area: (800) 258-9200 • www.stevenengineering.com
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.

SMA DESIGN FEATURES

Piston rod is hard chrome plated type 303 stainless.

Rod extension/wrench flats are long enough to fit standard wrenches.

Heavy duty polyurethane or viton rod wipers prevent damaging contaminants from entering the critical rod seal/rod bushing area.

Heavey 1/8" wall aluminum tube is hard anodized on the interior to provide a scratch and wear resistant surface.

Pneumatic rod seal is a "longlife" nitrile cup. Hydraulic rod seal is pressure energized and extra long wearing for improved sealability.

Brass or aluminum piston is attached with a high strength threaded joint.

Composite rod bushing has high temperature capability and excellent chemical resistance. Solid lubricant fillers provide excellent wear characteristics for non-lube service. The bearing is inboard of the wiper and seal, away from the environment.

Reduce noise and fatigue problems such as rod breakage with urethane/nitrile shock pads. Add 1/4" to the cylinder length for each pad. Pneumatic use only to 180° F.

Optional wick provides teflon lube for non-lube service on O ring piston.

Standard piston seal is large cross section O ring. Compounds are carefully selected for maximum cycle life.

Optional U cup piston seals with teflon wear strip stretch the limits of service even further. Reduce friction and operate without lube in the severest applications while extending or eliminating the service interval.

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.
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—8#
Fully compressed—20#

Spring material—Plated steel

Optional Male Rod Thread

1-14 Nut
Nose Mounting Nut
Not included with cylinder
Order Separately

HB-375
Rod Clevis & Nut
Zinc Plated Steel

HB-200
Clevis Pin Assembly
Used on HB 375
Stainless Pin/Steel Clips

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SMA Options

- Shock Pads
- Viton Seals
- Non-lube Service
- Magnetic Piston
- U Cup Piston
- Non-rotate (SMA 7,8,9)
- 90° Rear Clevis

All Aurora products available for 24 hour delivery

SMA7

STC-40
Low Profile Clevis Brk’t
Used on SMA 2
Zinc plated steel

HB-90
St’d Clevis Brk’t
Used on SMA 2
Zinc plated steel

HB-90T
Trunnion Bracket
Used on SMA 10, 11
Zinc plated steel

SMA8

SMA9

SMA10

SMA11
1 1/8” BORE SMA ALUMINUM

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Pneumatic only
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over 4” stroke not available

Spring force
Fully extended—8#
Fully compressed—20#
Spring material—Plated steel

Optional Male Rod Thread

1”-14 Nut
Nose Mounting Nut
Not included with cylinder
Order Separately

HB-375
Rod Clevis & Nut
Zinc Plated Steel

For the ultimate in cycle life or where side load exists
select the U cup piston with teflon wear strip

Adds 1/2” to length
Adjustable stroke models – Adjustment screw prevents the piston from fully retracting. Maximum adjustment is 1".

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

SMA Options
- Shock Pads
- Viton Seals
- Non-lube Service
- Magnetic Piston
- U Cup Piston
- Non-rotate (SMA 12, 14, 15, 17, 20)
- 90° Rear Clevis

STC-40
Low Profile Clevis Brk’t
Used on SMA 16
Zinc plated steel
- 1/2 DIA.
- 1/4 HEX
- SEAL/LOCK NUT
- 1/2-13 UNC
- 5/16-24 x 5/8 DP.

HB-90
St’d Clevis Brk’t
Used on SMA 16
Zinc plated steel
- 7/32 DIA.
- 1/2 DIA.
- 1/4 HEX
- SEAL/LOCK NUT
- 1/2-13 UNC
- 5/16-24 x 5/8 DP.

SMA12

SMA20

SMA21

SMA22

SMA23

Courtesy of Steven Engineering, Inc. • 230 Ryan Way, South San Francisco, CA, 94080-6370 • Main Office: (650) 588-9200 • Outside Local Area: (800) 258-9200 • www.stevenengineering.com
Three Position Cylinders are two in-line cylinders with a common cap but two separate and independent piston rods. By pressurizing 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 1 1/2", 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.

Optional Male Rod Thread

1/2"-14 Nut
Nose Mounting Nut
Not included with cylinder Order Separately

HB-375
Rod Clevis & Nut
Zinc Plated Steel
Used on HB-375 Stainless Pin/Steel Clips

HB-200
Clevis Pin Assembly
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.
**1 1/8” BORE SMA ALUMINUM**

Back to back cylinders are simply two standard double acting or single acting spring return cylinders with a common cap. By proper valve sequencing, four distinct stroke lengths may be achieved.

**SMA18**

<table>
<thead>
<tr>
<th>CYLINDER #1</th>
<th>CYLINDER #2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 1/2 DIA.</td>
<td>1 1/2 DIA.</td>
</tr>
<tr>
<td>1/16 STROKE</td>
<td>1/16 STROKE</td>
</tr>
<tr>
<td>7/16 DIA.</td>
<td>7/16 DIA.</td>
</tr>
<tr>
<td>1/8-27 NPT, 4 PLACES</td>
<td>1/8-27 NPT, 4 PLACES</td>
</tr>
<tr>
<td>1/2 SQUARE</td>
<td>1/2 SQUARE</td>
</tr>
</tbody>
</table>

**Shock pads**

- BACK TO BACK OPTIONS
  - Shock pads
  - Non-lube service
  - Viton seals
  - U cup piston
  - Magnetic piston

**SMA19**

<table>
<thead>
<tr>
<th>CYLINDER #1</th>
<th>CYLINDER #2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 1/2 DIA.</td>
<td>1 1/2 DIA.</td>
</tr>
<tr>
<td>1/16 STROKE</td>
<td>1/16 STROKE</td>
</tr>
<tr>
<td>7/16 DIA.</td>
<td>7/16 DIA.</td>
</tr>
<tr>
<td>1/8-27 NPT, 4 PLACES</td>
<td>1/8-27 NPT, 4 PLACES</td>
</tr>
<tr>
<td>1/2 SQUARE</td>
<td>1/2 SQUARE</td>
</tr>
</tbody>
</table>

**VOLUMETRIC PUMPS**

Volumetric Pumps measure and dispense specific volumes of fluid with compressed air. These tandem type cylinders have two pistons connected to a common rod. The air powered driver section is normally reciprocated with a four way valve. The inlet/discharge port is connected to a fluid supply line and a discharge line, both of which contain a check valve. On each stroke the pump section first draws in a specific volume of fluid from the supply line, and then forces it out the discharge line as both check valves shift. Maximum pressure of discharge fluid is approximately equal to the air pressure on the driver section. Standard construction materials are the same as all SMA cylinders – anodized aluminum tube and end caps, stainless rod, and brass pistons. Other materials, including all stainless construction, are available.

**Optional Male Rod Thread**

- 3/8-24 UNF
- 1/2 SQUARE
- 3/8-24 UNF
- 1/4 DIA.
- 1/4 DIA.
- 1/4 DIA.
- 1/4 DIA.

**SMA30**

<table>
<thead>
<tr>
<th>CYLINDER #1</th>
<th>CYLINDER #2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 1/2 MAX.</td>
<td>1 1/2 MAX.</td>
</tr>
<tr>
<td>2 3/32 + STR</td>
<td>2 3/32 + STR</td>
</tr>
<tr>
<td>3/16 DIA.</td>
<td>3/16 DIA.</td>
</tr>
<tr>
<td>1/8-27 NPT, 3 PLC.</td>
<td>1/8-27 NPT, 3 PLC.</td>
</tr>
<tr>
<td>9/32 DIA, DRILL THRU, 6 HOLES</td>
<td>9/32 DIA, DRILL THRU, 6 HOLES</td>
</tr>
<tr>
<td>3/8-18 NPT</td>
<td>3/8-18 NPT</td>
</tr>
</tbody>
</table>

**SMA 30 Volumetric Pumps**

SMA 30 Volumetric Pumps are available only as double acting, pneumatic, and in 1” increments of stroke. U cup piston and shock pads not available.
1 1/2" BORE SMA ALUMINUM

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—15#
Fully compressed—50#
Spring material—Plated steel

Optional Male Rod Thread

1 1/4-12 Nut
Nose Mounting Nut
Not included with cylinder Order Separately

HB-500
Rod Clevis & Nut
Zinc Plated Steel
1/2-20 UNF—2A

HB-501
Clevis Pin Assembly
Used on HB-500

STC-90
Low Profile Clevis Brk’t
Used on SMA2

HB-100 Std Clevis Brk’t
Used on SMA2
Zinc plated steel

200 PSI MAX. AIR
400 PSI MAX. HYD. Non shock

SMA1

SMA2

SMA3

SMA5

SMA6
**1 1/2" BORE SMA ALUMINUM**

**Single Acting Cylinders**

- Pneumatic only
- Springs add to cyl. length
- 2 1/2-4" stroke add 3" extra over 4" stroke not available
- Spring force:
  - Fully extended—15#
  - Fully compressed—50#
- Spring material—Plated steel

**Optional Male Rod Thread**

**1 1/4 Nut**

- Nose Mounting Nut
- Not included with cylinder
- Order Separately

**HB-500**

- Rod Clevis & Nut
- Zinc Plated Steel

**HB-501**

- Clevis Pin Assembly
- Used on HB-500
- Stainless Pin/Steel Clips
SMA Options

- Shock Pads
- Viton Seals
- Non-lube Service
- Magnetic Piston
- U Cup Piston
- Non-rotate (SMA 7, 8, 9, 14, 15, 17)
- 90° Rear Clevis

For Maximum Support Choose the pancake that's better by design... Choose the pancake that's better by design...

SMA and SMS by Aurora

STC-90
Low Profile Clevis Brkt
Used on SMA 16
Zinc plated steel

HB-100
St'd Clevis Brkt
Used on SMA 16
Zinc plated steel

SS-100T
Trunnion Bracket
Used on SMA 10, 11

Don't Paint Yourself into a Corner

SMA14

SMA15

SMA16

SMA17

Don't Paint Yourself into a Corner

Choose the pancake that's better by design...
Adjustable stroke models – Adjustment screw prevents the piston from fully retracting. Maximum adjustment is 1”.

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

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—15#
Fully compressed—50#

Spring material—Plated steel
Also applies to Cyl. #1
and or Cyl. #2 of 3 position models

Optional Male Rod Thread

1 1/4 Nut
Nose Mounting Nut
Not included with cylinder
Order separately

SMA12

SMA20

SMA21

SMA22

SMA23

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EXAMPLE: If Cylinder 1 extends 2” when port 1 is pressurized, it will also push Cylinder 2 by 2”.

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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.

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**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 not available

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**Optional Male Rod Thread**

- 1 1/4-12 Nut
- Nose Mounting Nut
- Not included with cylinder
- Order Separately

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**STC-90 Low Profile Clevis Brkt**

- Used on SMA 29
- Zinc plated steel

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**HB-100 St'd Clevis Brkt**

- Used on SMA 29
- Stainless steel

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**SMA27**

- 1 7/32 + STROKE
- CYL 1
- 1 11/32 + STROKE
- CYL 2
- 1/4-20 UNC THRD. 8 HOLES
- EQUAL SPACED ON 2.187 B.C.
- (CLEARANCE FOR #10 S.H.C.S.)
- 1/2 FLATS
- 3/8-24 x 5/8 DP
- 2 5/8 DIA.

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**SMA28**

- 1 7/32 + STROKE
- CYL 1
- 1 11/32 + STROKE
- CYL 2
- 1 1/4-12 UNF
- 1.249 PILOT DIA.
- 1/2 FLATS
- 3/8-24 x 5/8 DP.

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**SMA29**

- 2 1/8 + STROKE
- CYLINDER 1
- 1 11/16 + STROKE
- CYLINDER 2
- 1 3/4 DIA.

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**SMA31**

- 1 13/32 + STROKE
- CYL 1
- 1 11/16 + STROKE
- CYL 2
- 3/8
- 2 SQUARE

---
VOLUMETRIC PUMPS measure and dispense specific volumes of fluid with compressed air. These tandem type cylinders have two pistons connected to a common rod. The air powered driver section is normally reciprocated with a four way valve. The inlet/discharge port is connected to a fluid supply line and a discharge line, both of which contain a check valve. On each stroke the pump section first draws in a specific volume of fluid from the supply line, and then forces it out the discharge line as both check valves shift. Maximum pressure of discharge fluid is approximately equal to the air pressure on the driver section. Standard construction materials are the same as all SMA cylinders – anodized aluminum tube and end caps, stainless rod, and brass pistons. Other materials, including all stainless construction, are available. Special seal configurations are also available.

SMA 30 Volumetric Pumps are available only as double acting, pneumatic, and in 1” increments of stroke. U cup piston and shock pads not available.

Spring Return Cylinders
Pneumatic only
Springs add to cyl. length
0-2” stroke add 1 1/2” extra
2-1/2” stroke add 3” extra
over 4” stroke not available
Spring force
Fully extended—15#
Fully compressed—50#
Spring material—Plated steel

BACK TO BACK OPTIONS
Shock pads
Non-lube service
Viton seals
U cup piston
Magnetic piston

HB-500
Rod Clevis & Nut

1/2-20 THREAD
3/8 DIA.
1/4
2 1/4
3/8
1 3/16 + STR
1 1/4-12 UNC THR’D, 8 HOLES
EQUAL SPACED ON 2.187 B.C.
(CLEARANCE FOR #10 S.H.C.S.)

SMA18

SMA19

HB 501 Clevis Pin Assembly
Used on HB 500
Stainless pin/steel clips

VOLUMETRIC PUMPS measure and dispense specific volumes of fluid with compressed air. These tandem type cylinders have two pistons connected to a common rod. The air powered driver section is normally reciprocated with a four way valve. The inlet/discharge port is connected to a fluid supply line and a discharge line, both of which contain a check valve. On each stroke the pump section first draws in a specific volume of fluid from the supply line, and then forces it out the discharge line as both check valves shift. Maximum pressure of discharge fluid is approximately equal to the air pressure on the driver section. Standard construction materials are the same as all SMA cylinders – anodized aluminum tube and end caps, stainless rod, and brass pistons. Other materials, including all stainless construction, are available. Special seal configurations are also available.

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All Aurora products available for 24 hour delivery

SMA Options

- Shock Pads
- Viton Seals
- Non-lube Service
- Magnetic Piston
- U Cup Piston
- Non-rotate (SMA 7, 8, 9)
- 90° Rear Clevis
- Oversize ports

UNIQUE APPLICATIONS SOMETIMES REQUIRE UNIQUE CYLINDERS

See our custom design capabilities on page 87

HB-100
St'd Clevis Brkt
Used on SMA 2 Stainless steel

SS-100
St'd Clevis Brkt
Used on SMA 2 Stainless steel

SS-100T
Trunnion Brkt
Used on SMA 10, 11 Stainless steel

Series SMA Aluminum

SMA7

SMA8

SMA9

SMA10

SMA11
2" BORE SMA ALUMINUM

**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 1/4-12 Nut**
Nose Mounting Nut
Not included with cylinder
Order Separately

**HB-625**
Rod Clevis & Nut
Zinc Plated Steel

**HB-601**
Clevis Pin Assembly
Used on HB 625
Stainless Pin/Steel Clips

For the ultimate in cycle life or where side load exists
select the U cup piston with teflon wear strip

*Adds 1/2" to length*
Adjustable stroke models – Adjustment screw prevents the piston from fully retracting. Maximum adjustment is 1”

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
- Non-Rotate (SMA12, 14, 15, 17, 20)
- 90° Rear Clevis

hb-100
St’d Clevis Brk’t
Used on SMA 16 Stainless steel

SS-100
St’d Clevis Brk’t
Used on SMA 16 Stainless steel

SMA12

SMA20

SMA21

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.

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*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 1 1/2" extra over 4" not available

Spring force
- Fully extended—20#
- Fully compressed—75#

Spring material—Plated steel
**Tandem models**

**200 PSI MAX. AIR**

**400 PSI MAX. HYD. Non shock**

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.

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**3 Position options**

- Viton seals
- Non-lube service
- Magnetic piston
- U Cup piston
- Non-rotate (SMA 13, 24)
- 90° Rear clevis

**Shock pads not available**

**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 not available

---

**HB -100**

Clevis Brkt

Used on SMA 2

Zinc plated steel

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**SS-100**

St'd Clevis Brkt

Used on SMA 2

Zinc plated steel

---

**SMA27**

1 5/16 + STR CYL 1

1 21/32 + STR CYL 2

5/16-18 UNC THRD. H OLES EQUAL SPACED ON 2.687 B.C. (CLEARANCE FOR 1/4 SHCS)

---

**SMA28**

1 5/16 + STR CYL 1

2 21/32 + STR CYL 2

1/4-12 UNF PILOT DIA. 1.249 x 11/64 LG.

1/2-20 x 3/4 DP.

---

**SMA29**

2 9/32 + STR CYL 1

2 21/32 + STR CYL 2

1/4-12 UNF PILOT DIA. 1.249 x 11/64 LG.

1/2-20 x 3/4 DP.

---

**SMA31**

1 21/32 + STR CYL 1

2 21/32 + STR CYL 2

DRILL & C-BORE TO CLEAR 1/4 S.H.C.S. 4 HOLES

5/16-18 x 5/8
VOLUMETRIC PUMPS measure and dispense specific volumes of fluid with compressed air. These tandem type cylinders have two pistons connected to a common rod. The air powered driver section is normally reciprocated with a four way valve. The inlet/discharge port is connected to a fluid supply line and a discharge line, both of which contain a check valve. On each stroke the pump section first draws in a specific volume of fluid from the supply line, and then forces it out the discharge line as both check valves shift. Maximum pressure of discharge fluid is approximately equal to the air pressure on the driver section. Standard construction materials are the same as all SMA cylinders—anodized aluminum tube and end caps, stainless rod, and brass pistons. Other materials, including all stainless construction, are available. Special seal configurations are also available.

SMA 30 Volumetric Pumps are available only as double acting, pneumatic, and in 1” increments of stroke. U cup piston and shock pads not available.
### 3" BORE SMA ALUMINUM

#### SMA14
3/16 + STROKE DOUBLE ACTING

#### SMA15
2 7/8 + STROKE DOUBLE ACTING

#### SMA16
4 5/16 + STROKE DOUBLE ACTING

#### SMA17
2 7/8 + STROKE DOUBLE ACTING

---

### Spring Return Cylinders

- **Pneumatic only**
- Springs add to cyll. length
- 0-2" stroke add 1 1/2" extra
- 2 1/4 - 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

---

**200 PSI MAX. AIR**

**250 PSI MAX. HYD.**

Non shock

---

**Courtesy of Steven Engineering, Inc.**

- 230 Ryan Way, South San Francisco, CA, 94080-6370
- Main Office: (650) 588-9200
- Outside Local Area: (800) 258-9200
- www.stevenengineering.com
SMA Options

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

**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.

![Diagram of SMA Options](image-url)

**Breather Vents and Mufflers**

Protect Vent Ports from Dirt in Single Acting Cylinders.

![Diagram of Breather Vents and Mufflers](image-url)
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 1 1/2", 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**

Port 1

1 1/16 + STROKE CYLINDER 1

2 1/8 + STROKE CYLINDER 2

3/8-16 UNC THRD. 8 HOLES EQUAL SPACED ON 3.781 B.C. (CLEARANCE FOR 5/16 S.H.C.S.)

3/4-16 x 1 DP = 4 1/4 DIA.

3 3/4

4 1/4 DIA.

1/4-18 NPT 4 PLACES

---

**SMA25**

Port 1

1 1/16 + STROKE CYLINDER 1

3 1/8 + STROKE CYLINDER 2

3/8-16 UNC THRD. 8 HOLES EQUAL SPACED ON 3.781 B.C. (CLEARANCE FOR 5/16 S.H.C.S.)

7/8 FLATS

3 1/4 DIA.

3/4-16 x 1 DP = 4 1/4 DIA.

3 3/4

4 1/4 DIA.

1/4-18 NPT 4 PLACES

---

**SMA26**

Port 1

3 1/8 + STROKE CYLINDER 1

3 1/8 + STROKE CYLINDER 2

3/8-16 UNC THRD. 8 HOLES EQUAL SPACED ON 3.781 B.C. (CLEARANCE FOR 5/16 S.H.C.S.)

7/8 FLATS

3 1/4 DIA.

3/4-16 x 1 DP = 4 1/4 DIA.

3 3/4

4 1/4 DIA.

1/4-18 NPT 4 PLACES

---

**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

---

**Viton options**

Viton seals

Non-lube service

Magnetic piston

U Cup piston

90° Rear clevis

---

Shock pads not available
Tandem models double acting only  
Spring return not available

SMA-750  
Rod Clevis & Nut  
Plated steel

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

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

Tandem options  
Viton seals  
Non-lube service  
90° Rear clevis  
Shock pads not available  
Magnetic piston not available  
U cup piston 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.
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.

<table>
<thead>
<tr>
<th>BORE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>J</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 1/8</td>
<td>11/16</td>
<td>3/4</td>
<td>1/2</td>
<td>5/16-24 x 3/4</td>
<td>2 3/4</td>
<td>2 1/2</td>
<td>1.062</td>
<td>1/4-20</td>
<td>#10</td>
</tr>
<tr>
<td>1 1/2</td>
<td>11/16</td>
<td>5/8</td>
<td>5/8</td>
<td>3/8-24 x 1</td>
<td>3 1/4</td>
<td>3</td>
<td>1.250</td>
<td>5/16-18</td>
<td>1/4</td>
</tr>
<tr>
<td>2</td>
<td>9/16</td>
<td>5/8</td>
<td>3/4</td>
<td>1/2-20 x 1 1/4</td>
<td>3 3/4</td>
<td>3 1/2</td>
<td>1.750</td>
<td>5/16-18</td>
<td>1/4</td>
</tr>
<tr>
<td>3</td>
<td>NOT AVAILABLE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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>
<thead>
<tr>
<th>Bore</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 1/8&quot;</td>
<td>11</td>
</tr>
<tr>
<td>1 1/2&quot;</td>
<td>15</td>
</tr>
<tr>
<td>2&quot;</td>
<td>20</td>
</tr>
<tr>
<td>3&quot;</td>
<td>30</td>
</tr>
</tbody>
</table>

<table>
<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)</td>
<td>A</td>
</tr>
</tbody>
</table>

<table>
<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>

**Mounting Style/Code**

| Mounting Style/Code | SMA 1 | SMA 2 | SMA 3 | SMA 5 | SMA 6 | SMA 7 | SMA 8 | SMA 9 | SMA 10 | SMA 11 | SMA 12 | SMA 13 | SMA 14 | SMA 15 | SMA 16 | SMA 17 | SMA 18 | SMA 19 | SMA 20 | SMA 21 | SMA 22 | SMA 23 | SMA 24 | SMA 25 | SMA 26 | SMA 27 | SMA 28 | SMA 29 | SMA 30 | SMA 31 |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|--------|--------|--------|--------|-------|--------|-------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|

**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" for SMA 27, 28, 29, 31.

3" bore - Limited to 8" max. stroke. Note: SMA 27, 28, 29, 31 available only 1/2" increments.

**Piston Rod Codes**

<table>
<thead>
<tr>
<th>Bore</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.125</td>
<td>1/8-24 x 3/4 Male</td>
</tr>
<tr>
<td>1.125</td>
<td>3/16-24 x 5/8 Female</td>
</tr>
<tr>
<td>1.125</td>
<td>5/16-18 x 5/8 Female</td>
</tr>
<tr>
<td>1.500</td>
<td>1/2-20 x 1 Male</td>
</tr>
<tr>
<td>1.500</td>
<td>3/8-16 x 5/8 Female</td>
</tr>
<tr>
<td>1.500</td>
<td>3/8-24 x 5/8 Female</td>
</tr>
<tr>
<td>2.000</td>
<td>5/8-18 x 1 1/8 Male</td>
</tr>
<tr>
<td>2.000</td>
<td>1-20 x 3/4 Female</td>
</tr>
<tr>
<td>3.000</td>
<td>3/4-16 x 1 1/4 Male</td>
</tr>
<tr>
<td>3.000</td>
<td>3/4-16 x 1 Male</td>
</tr>
</tbody>
</table>

**Thread**

<table>
<thead>
<tr>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/16-24 x 5/8 Female</td>
</tr>
<tr>
<td>5/8-18 x 1 1/8 Male</td>
</tr>
<tr>
<td>1/2-20x 3/4 Male</td>
</tr>
<tr>
<td>3/4-16 x 1 1/4 Female</td>
</tr>
<tr>
<td>3/4-16 x 1 Female</td>
</tr>
<tr>
<td>1/2-20 x 1 Female</td>
</tr>
<tr>
<td>M6</td>
</tr>
<tr>
<td>F3</td>
</tr>
<tr>
<td>E</td>
</tr>
<tr>
<td>G</td>
</tr>
<tr>
<td>R</td>
</tr>
</tbody>
</table>

With non-rotate option enter code

For style SMA 30 enter code

<table>
<thead>
<tr>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
</tr>
</tbody>
</table>

**Option**

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extra rod extension</td>
<td>Specify code letter J followed by extra length required as a two place decimal Example: J.50 = 1/2&quot; extra</td>
<td>J</td>
</tr>
<tr>
<td>1/4 &quot; increments</td>
<td>Add to either or both ends in 1 1/8&quot;, 1 1/2&quot;, 2&quot; bore up to 2&quot; stroke.</td>
<td>L</td>
</tr>
<tr>
<td>Shock pads</td>
<td>Add to either or both ends in 1 1/8&quot;, 1 1/2&quot;, 2&quot; bore up to 2&quot; stroke.</td>
<td>L</td>
</tr>
<tr>
<td>Pneu. only to 180° F</td>
<td>Over 2&quot; stroke and on all 3&quot; bore must be added to both ends. Each pad adds 1/4&quot; length — not available SMA 12, 13, 20, 21, 24, 25, 26, 27, 28, 29, 30, 31</td>
<td>M</td>
</tr>
<tr>
<td>Double acting only</td>
<td>Rod end only Cap end only Both ends</td>
<td>N</td>
</tr>
<tr>
<td>Non-lube service</td>
<td>Available on standard O ring Piston. Not available or necessary on U cup piston</td>
<td>P</td>
</tr>
<tr>
<td>Viton seals</td>
<td>Standard seals are nitrile and urethane +10 to +200° F</td>
<td>R</td>
</tr>
<tr>
<td>U cup piston</td>
<td>Extends cycle life and reduces friction Piston is aluminum and includes teflon wear strip — adds 1/2&quot; to length Not available SMA 27, 28, 29, 30, 31</td>
<td>S</td>
</tr>
<tr>
<td>Clevis 90° to std</td>
<td>Available on standard O ring Piston. Not available or necessary on U cup piston</td>
<td>T</td>
</tr>
<tr>
<td>Magnetic piston</td>
<td>Adds 1/2&quot; to length — not available SMA 27, 28, 39, 31</td>
<td>W</td>
</tr>
<tr>
<td>Non rotate</td>
<td>Available only on double acting SMA 7, 8, 9, 12, 13, 14, 15, 17, 20, 24 with male stud without male stud</td>
<td>X</td>
</tr>
<tr>
<td>Non rotate</td>
<td>Available only on double acting SMA 7, 8, 9, 12, 13, 14, 15, 17, 20, 24 with male stud without male stud</td>
<td>Y</td>
</tr>
<tr>
<td>1/4&quot; oversize ports</td>
<td>2&quot; bore only — SMA 1, 2, 3, 6, 7, 8, 9, only Not available with option x,y</td>
<td>Z</td>
</tr>
</tbody>
</table>

**Part No. Example:**

Mounting style SMA 9

| 1.500 stroke |
| 1 1/2-20 x 1 male thread |

**Double acting**

Magnetic piston

Viton seals

Pneumatic

**Part No. Example:**

1.500 bore

15 SMA 9 C 12 E M8 R W

1/1/2-20 x 1 male thread

Magnetic piston

Viton seals

Pneumatic

★ 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 II. 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:**

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
- **3 Bore**
- **2 Bore**
- **1 1/2 Bore**
- **1 1/8 Bore**

### Pneumatic, Nitrile
- SMA 3411
- SMA 3415
- SMA 3420
- SMA 3430

### Pneumatic, Viton
- 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

### Add suffix NL for Non-Lube
- SMA 3411NL
- SMA 3415NL
- SMA 3420NL
- SMA 3430NL

### 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**
- **Pneumatic, Viton**
- **Hydraulic, Nitrile**
- **Hydraulic, Viton**

### Rear port cap
- Add suffix 250 for 2" bore 1/4 NPT

### Rear pivot cap

### Side port cap
- Add suffix 250 for 2" bore 1/4 NPT

### Rear flange cap

### Spherical bearing cap

### Adjustable stroke cap

### Square cap
- Add suffix 250 for 2" bore 1/4 NPT

### Back to back body
- SMA 1811
- SMA 1815
- SMA 1820
- SMA 1830

### Tube
- part No. is T followed by the complete cylinder part number

### Piston rod assembly
- part No. is PR followed by the complete cylinder part number

### Spring guide
- Pair

### Spring
- SMA 1211
- SMA 1215
- SMA 1220
- SMA 1230

### Magnet
- SM55911 and SS3215 supplied in pairs

### 3 position/Tandem/Pump body
- SMA 5111
- SMA 5115
- SMA 5120
- SMA 5130

### Flange head
- Add suffix NR for non-rotate

### Nose Mount Head
- Add suffix 250 for 2" bore, 1/4 NPT

### Short square Head
- Add suffix 250 for 2" bore, 1/4 NPT

### Long square Head
- Add suffix 250 for 2" bore, 1/4 NPT

### Square non rotate head
- SMA 4511NR
- SMA 4515NR
- SMA 4520NR

### Trunnion head
- SMA 4511T
- SMA 4515T
- SMA 4520T

### Non-rotate guide bushing
- Pair

### Cap end shock pad
- Consult factory

### Head end shock pad
- 11CSP
- 15CSP
- 2CSP

### SMA 30 cap
- SMA 6011
- SMA 6015
- SMA 6020

---

**Consult factory**

**www.stevenengineering.com**