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Pancake and conventional lengths for hostile environments
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Series SS Solid Stainless
The benchmark since ‘83
3/4 thru 2” bore
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Series HB Brass
For general industrial use in most environments
3/4 thru 2” bore
Pages 62 thru 83
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
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.

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.

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.
**1 1/8” BORE SMA ALUMINUM**

**200 PSI MAX. AIR**

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

### 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

HB-200

Clevis Pin Assembly

Used on HB 375

Stainless Pin/Steel Clips

### 1-14 Nut

Nose Mounting Nut

Not included with cylinder

Order Separately

### HB-375

Rod Clevis & Nut

Zinc Plated Steel

---

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

SMA Options

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

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

SMA7

SMA8

SMA9

SMA10

SMA11

All Aurora products available for 24 hour delivery
Spring Return Cylinders
Pneumatic only
- Springs add to cyl. length
- 0-2" stroke add 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

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 (SMA 12, 14, 15, 17, 20)
- 90° Rear Clevis

STC-40
Low Profile Clevis Brk’t
Used on SMA 16
Zinc plated steel

HB-90
St’d Clevis Brk’t
Used on SMA 16
Zinc plated steel

HB-90
St’d Clevis Brk’t
Used on SMA 16
Zinc plated steel

SMA12

SMA20

SMA21

SMA22

SMA23

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

Series SMA Aluminum

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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.

---

**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—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
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

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

STC-40
Low Profile Clevis Brk’t
Used on SMA 26, 29
Zinc plated steel

HB-90
St’d Clevis Brk’t
Used on SMA 26, 29
Zinc plated steel

Series SMA Aluminum

Tandem 200 PSI MAX. AIR models 400 PSI MAX. HYD. Non shock
**1 1/8” Bore SMA Volumetric Pump**

**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.
1 1/2” BORE SMA ALUMINUM

**Spring Return Cylinders**
- Pneumatic only
- Springs add to cyl. length
- 0” 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

**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

**HB-501**
- Clevis Pin Assembly
  - Used on HB-500

**STC-90**
- Low Profile Clevis Brkt
  - Used on SMA2

**HB-100 St’d Clevis Brkt**
- Used on SMA2

**SMA1**
- 2 31/32” STROKE DOUBLE ACTING

**SMA2**
- 3 7/8” STROKE DOUBLE ACTING

**SMA3**
- 3 3/16” STROKE DOUBLE ACTING

**SMA5**
- 2 1/4” UNC THRD. 4 HOLES EQUAL SPACED ON 2.187 B.C. (CLEARANCE FOR #10 S.H.C.S.)

**SMA6**
- 2 SQUARE

---

**Series SMA Aluminum**

Series SMA Aluminum

**200 PSI MAX. AIR**

**400 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
1 1/2" BORE SMA ALUMINUM

**SMA7**

- 2 HOLES CLEAR 1/4-20 S.H.C.S., DRILL & C-BORE TO 1/8-27 N.P.T.
- 3/8-24 x 5/8, .625 DIA.
- 2 SQUARE FLATS
- 1/8-27 N.P.T.
- 2-3/16 + STR DOUBLE ACTING
- DRILL & C-BORE TO CLEAR 1/4-20 S.H.C.S., 4 HOLES
- 5/16-18 x 5/8, 4 HOLES

**SMA8**

- 2 HOLES CLEAR 1/4-20 S.H.C.S., DRILL & C-BORE TO 1/8-27 N.P.T.
- 3/8-24 x 5/8, .625 DIA.
- 2 SQUARE FLATS
- 1/8-27 N.P.T.
- 3-3/16 + STR DOUBLE ACTING
- DRILL & C-BORE TO CLEAR 1/4-20 S.H.C.S., 2 HOLES
- 5/16-18 x 5/8, 2 HOLES

**SMA9**

- 2 HOLES CLEAR 1/4-20 S.H.C.S., DRILL & C-BORE TO 1/8-27 N.P.T.
- 3/8-24 x 5/8, .625 DIA.
- 2 SQUARE FLATS
- 1/8-27 N.P.T.
- 3-3/16 + STR DOUBLE ACTING
- DRILL & C-BORE TO CLEAR 1/4-20 S.H.C.S., 2 HOLES
- 5/16-18 x 5/8, 2 HOLES

**SMA10**

- 2 HOLES CLEAR 1/4-20 S.H.C.S., DRILL & C-BORE TO 1/8-27 N.P.T.
- 3/8-24 x 5/8, .625 DIA.
- 2 SQUARE FLATS
- 1/8-27 N.P.T.
- 3/8-24 x 5/8, .625 DIA.
- 2 SQUARE FLATS
- 1/2-20 THREAD

**SMA11**

**Optional Male Rod Thread**

- 1 3/8 DIA. 625 DIA.
- 1/2-20 UNF—2A

**1 1/4 Nut**

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

**HB-500**

- Rod Clevis & Nut
- Zinc Plated Steel
- Used on HB-500
- Stainless Pin/Steel Clips

**SMA7**

- Single Acting 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

---

**HB-501**

- Clevis Pin Assembly
- Used on HB-500
- Stainless Pin/Steel Clips
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 7,8,9,14,15,17)
- 90° Rear Clevis

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

Choose the pancake that’s better by design... Choose the pancake that’s better by design...

SMA14
2 3/16 + STROKE
DOUBLE ACTING
1/4-20 UNC THRD.
4 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.

SMA15
1 31/32 + STROKE
DOUBLE ACTING
1/4-20 UNC THRD.
4 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.

SMA16
2.78 + STROKE
DOUBLE ACTING
1/4-20 UNC THRD.
4 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.

SMA17
1.313/2 + STROKE
DOUBLE ACTING
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.

FOR MAXIMUM SUPPORT
SELECT MODELS WITH LONG HEADS IF SPACE PERMITS

Don’t Paint Yourself into a Corner
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

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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.
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 1/2" BORE SMA ALUMINUM Back to Back and Pump

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.

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

Spring Return Cylinders
Pneumatic only
Springs add to cyl. 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 1/4-12 Nut
Nose Mounting Nut
Not included with cylinder
Order Separately

HB-625
Rod Clevis
& Nut
Zinc plated steel
Used on HB 625 assembly
Stainless pin/steel clips

HB-601 Clevis Pin Assembly

SEE PAGES 84–86
FOR REED AND HALL EFFECT SWITCHES AND MAGNETIC PISTONS
**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 Brk’t  
Used on SMA 2  Stainless steel

---

**SS-100**

St’d Clevis Brk’t  
Used on SMA 2  Stainless steel

---

**SS-100T**

Trunnion Brk’t  
Used on SMA 10, 11  Stainless steel

---

**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 Brk’t  
Used on SMA 2  Stainless steel

---

**SS-100**

St’d Clevis Brk’t  
Used on SMA 2  Stainless steel

---

**SS-100T**

Trunnion Brk’t  
Used on SMA 10, 11  Stainless steel

---

**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 Brk’t  
Used on SMA 2  Stainless steel

---

**SS-100**

St’d Clevis Brk’t  
Used on SMA 2  Stainless steel

---

**SS-100T**

Trunnion Brk’t  
Used on SMA 10, 11  Stainless steel

---

**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

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**HB-100**

St’d Clevis Brk’t  
Used on SMA 2  Stainless steel

---

**SS-100**

St’d Clevis Brk’t  
Used on SMA 2  Stainless steel

---

**SS-100T**

Trunnion Brk’t  
Used on SMA 10, 11  Stainless steel

---

**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 Brk’t  
Used on SMA 2  Stainless steel

---

**SS-100**

St’d Clevis Brk’t  
Used on SMA 2  Stainless steel

---

**SS-100T**

Trunnion Brk’t  
Used on SMA 10, 11  Stainless steel

---

**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 Brk’t  
Used on SMA 2  Stainless steel

---

**SS-100**

St’d Clevis Brk’t  
Used on SMA 2  Stainless steel

---

**SS-100T**

Trunnion Brk’t  
Used on SMA 10, 11  Stainless steel

---

**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 Brk’t  
Used on SMA 2  Stainless steel

---

**SS-100**

St’d Clevis Brk’t  
Used on SMA 2  Stainless steel

---

**SS-100T**

Trunnion Brk’t  
Used on SMA 10, 11  Stainless 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

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
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 PORT 2 PORT 3 PORT 4

---

**SMA25**

PORT 1 PORT 2 PORT 3 PORT 4

---

**SMA26**

PORT 1 PORT 2 PORT 3 PORT 4

---

**SMA13**

PORT 1 PORT 2 PORT 3 PORT 4

---

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 1/4-12

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
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

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 Brk't |
| Used on SMA 2 | Zinc plated steel |
| 1/2 R | 1/32 DIA. | PER PART |
| 3/16 | 1/4 |

| SS-100 | Std Clevis Brk't |
| Used on SMA 2 | Zinc plated steel |
| 3/8 | 1/16 |

| SMA27 | 1 5/16 + STR CYL 1 | 1 21/32 + STR CYL 2 |
| 17/32 | 9/32 | 1 11/16 | 1 8-27 NPT 4 PLACES |
| 3/4 | 1/2 | 1 1/2 |
| 2 1/2 x 3/4 DP |

| SMA28 | 1 5/16 + STR CYL 1 | 2 21/32 + STR CYL 2 |
| 1 1/16 | 1 8-27 NPT 4 PLACES |
| 5/8 | 1 |
| 1 1/4-12 UNF PILOT DIA. |
| 1/8-27 NPT 4 PLACES |

| SMA29 | 2 9/32 + STR CYL 1 | 2 21/32 + STR CYL 2 |
| 41/64 | 1 1/16 | 1 8-27 NPT 4 PLACES |
| 5/8 | 1 |
| 1 1/4-12 UNF PILOT DIA. |
| 1/8-27 NPT 4 PLACES |

| SMA31 | 2 1/2 | 1 1/4-12 UNF PILOT DIA. |
| 3/8 | 1/16 |
| 2 1/4 |
| 5/8 FLATS |

| 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 |
**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

Spring Return Cylinders
Pneumatic only
- Springs add to cyl. length
  - 0.2” stroke add 1 1/2” extra
  - 1/2-2” 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 Brkt
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

Series SMA Aluminum

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.

**Breather Vents and Mufflers**

Protect Vent Ports from Dirt in Single Acting Cylinders.

**SMA18**

**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 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.

**Viton seals**

**Non-lube service**

**Magnetic piston**

**U Cup piston**

**90° Rear clevis**

**Shock pads not available**

---

**Optional Male Rod Thread**

**1 3/4 -12 Nut**

**Nose Mounting Nut**

Not included with cylinder

Order Separately

---

**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

---

**SMA24**

1 11/16 + 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.)

**SMA25**

1 11/16 + stroke cylinder 1

2 1/8 + stroke cylinder 2

**SMA26**

1 11/16 + stroke cylinder 1

2 1/8 + stroke cylinder 2
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 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.

<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</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>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mounting Style/Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMA 1</td>
</tr>
<tr>
<td>SMA 2</td>
</tr>
<tr>
<td>SMA 3</td>
</tr>
<tr>
<td>SMA 4</td>
</tr>
<tr>
<td>SMA 5</td>
</tr>
<tr>
<td>SMA 6</td>
</tr>
<tr>
<td>SMA 7</td>
</tr>
<tr>
<td>SMA 8</td>
</tr>
<tr>
<td>SMA 9</td>
</tr>
<tr>
<td>SMA 10</td>
</tr>
<tr>
<td>SMA 11</td>
</tr>
<tr>
<td>SMA 12</td>
</tr>
<tr>
<td>SMA 13</td>
</tr>
<tr>
<td>SMA 14</td>
</tr>
<tr>
<td>SMA 15</td>
</tr>
<tr>
<td>SMA 16</td>
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<td>SMA 17</td>
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<td>SMA 18</td>
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<td>SMA 19</td>
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<tr>
<td>SMA 20</td>
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<tr>
<td>SMA 21</td>
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<tr>
<td>SMA 22</td>
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<tr>
<td>SMA 23</td>
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<tr>
<td>SMA 24</td>
</tr>
<tr>
<td>SMA 25</td>
</tr>
<tr>
<td>SMA 26</td>
</tr>
<tr>
<td>SMA 27</td>
</tr>
<tr>
<td>SMA 28</td>
</tr>
<tr>
<td>SMA 29</td>
</tr>
<tr>
<td>SMA 30</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stroke</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code is stroke in total 1/8&quot; increments</td>
</tr>
<tr>
<td>Example: 1&quot; stroke = 8</td>
</tr>
<tr>
<td>2 1/4&quot; stroke = 18</td>
</tr>
</tbody>
</table>

| Stocked in the following strokes: |
| 1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/4, 1 1/2, 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 |

<table>
<thead>
<tr>
<th>Piston Rod Codes</th>
<th>Thread</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bore</td>
<td>Code</td>
</tr>
<tr>
<td>1.125</td>
<td>M6</td>
</tr>
<tr>
<td>1.500</td>
<td>F6</td>
</tr>
<tr>
<td>2.000</td>
<td>M12</td>
</tr>
<tr>
<td>3.000</td>
<td>M10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>With non-rotate option enter code</th>
</tr>
</thead>
<tbody>
<tr>
<td>For style SMA 30 enter code</td>
</tr>
<tr>
<td>11</td>
</tr>
</tbody>
</table>

<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</td>
<td>J</td>
</tr>
<tr>
<td>1/4 &quot; increments</td>
<td>Example: J.50 = 1/2&quot; extra</td>
<td>J.25</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>Double acting only</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 13, 12, 20, 21, 24, 25, 26, 27, 28, 29, 30, 31</td>
<td>M</td>
</tr>
<tr>
<td>1/4&quot; stroke</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 For service -10 to +400° F specify viton</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>SMA 2, 16, 26, 29, only</td>
<td>T</td>
</tr>
<tr>
<td>Magnetic piston</td>
<td>Adds 1/2&quot; to length — not available SMA 27, 28, 29, 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>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>Y</td>
</tr>
</tbody>
</table>

**Part No. Example:**

1.500 bore 15 SMA9 1 1/2-20 x 1 male thread

**Example:**

11SMA18C10E11 R — C16EF3 R

★ 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.
### 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.

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
<th>Part Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1/8 Bore</td>
<td>SMA 3411, SMA 3415, SMA 3420, SMA 3430</td>
</tr>
<tr>
<td>2</td>
<td>1/2 Bore</td>
<td>SMA 3411V, SMA 3415V, SMA 3420V, SMA 3430V</td>
</tr>
<tr>
<td>3</td>
<td>2 Bore</td>
<td>SMA 3511, SMA 3515, SMA 3520, SMA 3530</td>
</tr>
<tr>
<td>4</td>
<td>3 Bore</td>
<td>SMA 3511V, SMA 3515V, SMA 3520V, SMA 3530V</td>
</tr>
<tr>
<td>5</td>
<td>1 1/8 Bore</td>
<td>SMA 3411, SMA 3415, SMA 3420, SMA 3430</td>
</tr>
<tr>
<td>6</td>
<td>1 1/2 Bore</td>
<td>SMA 3411V, SMA 3415V, SMA 3420V, SMA 3430V</td>
</tr>
<tr>
<td>7</td>
<td>2 Bore</td>
<td>SMA 3511, SMA 3515, SMA 3520, SMA 3530</td>
</tr>
<tr>
<td>8</td>
<td>3 Bore</td>
<td>SMA 3511V, SMA 3515V, SMA 3520V, SMA 3530V</td>
</tr>
<tr>
<td>9</td>
<td>Rear pivot cap</td>
<td>Add suffix 250 for 2&quot; bore, 1/4 NPT</td>
</tr>
<tr>
<td>10</td>
<td>Side port cap</td>
<td>Add suffix 250 for 2&quot; bore, 1/4 NPT</td>
</tr>
<tr>
<td>11</td>
<td>Rear flange cap</td>
<td>SMA 1011, SMA 1015, SMA 1020, SMA 1030</td>
</tr>
<tr>
<td>12</td>
<td>Spherical bearing cap</td>
<td>SMA 2211, SMA 2215, SMA 2220, SMA 2230</td>
</tr>
<tr>
<td>13</td>
<td>Adjustable stroke cap</td>
<td>SMA 2011, SMA 2015, SMA 2020</td>
</tr>
<tr>
<td>14</td>
<td>Square cap</td>
<td>Add suffix 250 for 2&quot; bore, 1/4 NPT</td>
</tr>
<tr>
<td>15</td>
<td>Back to back body</td>
<td>SMA 1811, SMA 1815, SMA 1820, SMA 1830</td>
</tr>
<tr>
<td>16</td>
<td>Tube</td>
<td>Part No. is T followed by the complete cylinder part number</td>
</tr>
<tr>
<td>17</td>
<td>Piston rod assembly</td>
<td>Part No. is PR followed by the complete cylinder part number</td>
</tr>
<tr>
<td>18</td>
<td>Spring guide</td>
<td>Pair</td>
</tr>
<tr>
<td>19</td>
<td>Spring</td>
<td>SMA 1211, SMA 1215, SMA 1220, SMA 1230</td>
</tr>
<tr>
<td>20</td>
<td>1/8 Bore</td>
<td>SMA 3411, SMA 3415, SMA 3420, SMA 3430</td>
</tr>
<tr>
<td>21</td>
<td>1/2 Bore</td>
<td>SMA 3411V, SMA 3415V, SMA 3420V, SMA 3430V</td>
</tr>
<tr>
<td>22</td>
<td>2 Bore</td>
<td>SMA 3511, SMA 3515, SMA 3520, SMA 3530</td>
</tr>
<tr>
<td>23</td>
<td>3 Bore</td>
<td>SMA 3511V, SMA 3515V, SMA 3520V, SMA 3530V</td>
</tr>
</tbody>
</table>

### 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: SMA 3411
- Pneumatic, Viton: SMA 3411V
- Hydraulic, Nitrile: SMA 3511
- Hydraulic, Viton: SMA 3511V
- Add suffix NL for Non-Lube

### 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 3411
- Pneumatic, Viton: SMA 3411V
- Hydraulic, Nitrile: SMA 3511
- Hydraulic, Viton: SMA 3511V
- Add suffix NL for Non-Lube

### Seal kits for combination cylinders with O ring piston — SMA 13, 18, 19, 24, 25, 26, 27, 28, 29, 30, 31

- Pneumatic, Nitrile: SMA 3611
- Pneumatic, Viton: SMA 3611V
- Hydraulic, Nitrile: SMA 3711
- Hydraulic, Viton: SMA 3711V
- Add suffix NL for Non-Lube

### Seal kits for combination cylinders with U cup piston — SMA 13, 18, 19, 24, 25, 26

- Pneumatic, Nitrile: SMA 3611
- Pneumatic, Viton: SMA 3611V
- Hydraulic, Nitrile: SMA 3711
- Hydraulic, Viton: SMA 3711V
- Add suffix NL for Non-Lube

### Notes

- Short square Head: Add suffix 250 for 2" bore, 1/4 NPT
- Long square Head: Add suffix 250 for 2" bore, 1/4 NPT
- Non-rotate guide bushing: Pair
- Cap end shock pad: Consult factory
- Head end shock pad: 11CSP, 15CSP, 2CSP, 3MSP
- SMA 30 cap: SMA 6011, SMA 6015, SMA 6020

### Contact Information

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
SMS Solid Stainless Cylinders

Space Saving and Conventional Lengths
Pneumatic to 200 PSI
Hydraulic 400 to 500 PSI Non shock
1 1/8", 1 1/2", 2", 3" Bore

300 Series Stainless Exterior Assures Aesthetics and Function
in Washdown Applications or other Harsh Environments
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.

If space permits for applications involving side loads or long strokes, select SMS 1, 2, 3, 5, 7, 8, 9, which have extra long bearings with added space between support points.

If space permits for applications involving side loads or long strokes, select SMS 1, 2, 3, 5, 7, 8, 9, which have extra long bearings with added space between support points.
**SMS Options**
- Shock Pads
- Viton Seals
- Non-lube Service
- Magnetic Piston
- U Cup Piston
- 90° Rear Clevis

**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—22#
Spring material—Stainless steel

**Optional Male Rod Thread**

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

**SS-375**
Rod Clevis & Nut
303 Stainless

**SS-301**
Clevis Pin assembly
Used on SS-375
303 Stainless

**SMS Options**

**SMS1**

**SMS2**

**SMS3**

**SMS5**

**SS-90**
Std Clevis Brkt
Used on SMS 2
Series 300 Stainless

**SSC-40**
Low Profile Clevis Brkt
Used on SMS 2
303 Stainless
1 1/8" BORE SMS STAINLESS

**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—22#•
- Spring material—Stainless steel

**Optional Male Rod Thread**

**WHEN YOU’VE FINALLY HAD IT WITH PLATED CYLINDERS...**

**SS-375**
- Rod Clevis & Nut
- 303 Stainless

**SS-301**
- Clevis Pin assembly
- Used on SS-375
- 303 Stainless
SMS 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

SSC-40
Low Profile Clevis Brkt
Used on SMS16    303 Stainless

SS-90
St’d Clevis Brkt
Used on SMS 16
Series 300 Stainless steel

SS-90T
Trunnion Brkt
Used on SMS 10, 11   304 Stainless

RAISE THE BAR FOR YOUR COMPETITORS BY SELECTING AURORA SOLID STAINLESS PRODUCTS

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
SMS Options

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

SMS7

- 3/8-24 x 5/8
- .625 DIA.
- DRILL & C-BORE TO CLEAR 1/4-20 S.H.C.S., 4 HOLES

SMS8

- 3/8-24 x 5/8
- .625 DIA.
- DRILL & C-BORE TO CLEAR 1/4-20 S.H.C.S., 2 HOLES

SMS9

- 3/8-24 x 5/8
- .625 DIA.
- DRILL & C-BORE TO CLEAR 1/4-20 S.H.C.S., 2 HOLES

SMS10

- 3/8-24 x 5/8
- .625 DIA.
- DRILL & C-BORE TO CLEAR 1/4-20 S.H.C.S., 2 HOLES

SMS11

- 3/8-24 x 5/8
- .625 DIA.
- DRILL & C-BORE TO CLEAR 1/4-20 S.H.C.S., 2 HOLES
1 1/2” Bore SMS Stainless

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—Stainless steel

Optional Male Rod Thread

SS-500
Rod Clevis and Nut

SS-501
Clevis Pin Assembly
Used on SS-500 303 Stainless

All Aurora Cylinders are Fully Repairable

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
2" BORE SMS STAINLESS

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

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—Stainless steel

Optional Male Rod Thread

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

SS-625
Rod Clevis
and Nut

SS-601
Clevis Pin Assembly
Used on SS-625 303 Stainless

SS-100
St’d Clevis Brk’t
Used on SMS2 Series 300 Stainless

Make the Best Choice
1 630 851 4515
ask for Technical Support
2" BORE SMS STAINLESS

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—Stainless steel

Optional Male Rod Thread

SS-625
Rod Clevis and Nut

SS-601
Clevis Pin Assembly
Used on SS-625  303 Stainless

You CAN Buy Peace of Mind

Aurora Stainless
ALL AURORA PRODUCTS AVAILABLE FOR 24 HOUR DELIVERY

SMS 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

Unique Applications
Sometimes Require Unique Cylinders

See our custom design capabilities on page 87

Series SMS Solid Stainless

SS-100
Std Clevis Brk't
Used on SMS 16 Series 300 Stainless

SS-100T
Trunnion Brk't
Used on SMS 10, 11 Series 304 Stainless steel

SS-100
Std Clevis Brk't
Used on SMS 16 Series 300 Stainless

SS-100T
Trunnion Brk't
Used on SMS 10, 11 Series 304 Stainless steel

Unique Applications
Sometimes Require Unique Cylinders

See our custom design capabilities on page 87

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
**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**—Stainless steel

---

**Optional Male Rod Thread**

**1 3/4 -12SS Nut**

Nose Mounting Nut

Not included with cylinder Order Separately

---

**SMS-750**

Rod Clevis and Nut

---

**SS-701**

Clevis Pin Assembly

Used on SMS-750 303 Stainless

---

**STANDARD CYLINDERS + CORROSION = LIABILITY**

**AURORA STAINLESS + CORROSION = PEACE OF MIND**

---

**3” BORE SMS STAINLESS**

200 PSI MAX. AIR

400 PSI MAX. HYD.  Non shock

---

**SMS1**

**SMS2**

**SMS3**

**SMS5**

---

**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**
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.

**Bore**
- 1 1/8" **11**
- 1 1/2" **15**
- 2" **20**
- 3" **30**

**Type**
- Double acting **C**
- Single acting spring return **A**
- Spring extend not available

**Service**
- Pneumatic **E**
- Hydraulic **G**

**Mounting Style/Code**
- SMS 1
- SMS 2
- SMS 3
- SMS 5
- SMS 6
- SMS 7
- SMS 8
- SMS 9
- SMS 10
- SMS 11
- SMS 14
- SMS 15
- SMS 16
- SMS 17

**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

**Piston Rod Codes**
- Bore
  - 1.125: 3/8-24 x 3/4 Male
  - 1.125: 5/16-18 x 5/8 Female
  - 1.125: 5/16-24 x 3/8 Female
  - 1.500: 1/2-20 x 1 Male
  - 1.500: 3/8-16 x 5/8 Female
  - 1.500: 3/8-24 x 5/8 Female
  - 2.000: 5/8-18 x 1 1/8 Male
  - 2.000: 5/8-18 x 1 1/8 Male
  - 3.000: 3/4-16 x 1 1/4 Male
  - 3.000: 3/4-16 x 1 Female

**Thread Code**
- 5/16-24 x 3/4 Female
- 5/16-18 x 5/8 Female
- 5/8-18 x 1 1/8 Male
- 3/4-16 x 1 Female
- 3/4-16 x 1 Male
- 3/8-16 x 5/8 Female
- 3/8-24 x 5/8 Female
- 3/8-16 x 5/8 Female
- 1/2-20 x 1 Male
- M6
- F3
- F4
- M8
- F5
- F6
- M12
- F8
- M10
- F10
- M11

**Option**
- Extra rod extension
  - 1/4" increments
  - Code: **J**
  - Example: 
    - J.50 = 1/2" extra
    - J1.25 = 1 1/4" extra

- Shock pads
  - Pneu. only to 180° F
  - Double acting only
  - Rod end only
  - Cap end only
  - Both ends
  - Code: **L, M, N**

- Non-lube service
  - Available on standard O ring Piston. Not available or necessary on U cup piston
  - Code: **P**

- Viton seals
  - Standard seals are nitrile and urethane +10 to +200° F
  - For service -10 to +400° F specify viton
  - Code: **R**

- U cup piston
  - Extends cycle life and reduces friction
  - Piston is aluminum and includes teflon wear strip — adds 1/2" to length
  - Code: **S**

- Clevis 90° to std
  - SMS 2, 16, only
  - Code: **T**

- Magnetic piston
  - Adds 1/2" to length
  - Code: **W**

- Non rotate
  - Available only on double acting SMS 7, 8, 9, 14, 15, 17
  - Code: **X, Y**

- 1/4" oversize ports
  - 2" bore only — SMS 1, 2, 3, 6, 7, 8, 9, only
  - Code: **Z**

**Part No. Example:**

```
15 SMS9 C 12 E M8 R W
```

1.500 bore
- Mounting style SMS9
- 1.500 stroke
- 1/2-20 x 1 male thread
- Double acting
- Magnetic piston
- Viton seals
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.

### Seal kits for cylinders with O ring piston

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
<th>1 1/8 Bore</th>
<th>1 1/2 Bore</th>
<th>2 Bore</th>
<th>3 Bore</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rear port cap Add suffix 250 for 2&quot; bore 1/4 NPT</td>
<td>SMS 1011</td>
<td>SMS 1015</td>
<td>SMS 1020</td>
<td>SMS 1030</td>
</tr>
<tr>
<td>2</td>
<td>Rear pivot cap Add suffix 250 for 2&quot; bore 1/4 NPT</td>
<td>SMS 1111</td>
<td>SMS 1115</td>
<td>SMS 1120</td>
<td>SMS 1130</td>
</tr>
<tr>
<td>3</td>
<td>90° Rear pivot cap Add suffix 250 for 2&quot; bore 1/4 NPT</td>
<td>SMS 111190</td>
<td>SMS 111590</td>
<td>SMS 112090</td>
<td>SMS 113090</td>
</tr>
<tr>
<td>4</td>
<td>Rear flange cap Add suffix 250 for 2&quot; bore 1/4 NPT</td>
<td>SMS 4811</td>
<td>SMS 4815</td>
<td>SMS 4820</td>
<td>SMS 4830</td>
</tr>
<tr>
<td>5</td>
<td>Square cap Add suffix 250 for 2&quot; bore 1/4 NPT</td>
<td>SMS 4611</td>
<td>SMS 4615</td>
<td>SMS 4620</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Tube part No. is T followed by the complete cylinder part number</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Seal kits for cylinders with U cup piston - includes Teflon wear strip

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
<th>1 1/8 Bore</th>
<th>1 1/2 Bore</th>
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</tr>
</thead>
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<tr>
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<td>Rear port cap Add suffix 250 for 2&quot; bore 1/4 NPT</td>
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<td>Rear flange cap Add suffix 250 for 2&quot; bore 1/4 NPT</td>
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<td>SMS 4815</td>
<td>SMS 4820</td>
<td>SMS 4830</td>
</tr>
<tr>
<td>5</td>
<td>Square cap Add suffix 250 for 2&quot; bore 1/4 NPT</td>
<td>SMS 4611</td>
<td>SMS 4615</td>
<td>SMS 4620</td>
<td></td>
</tr>
</tbody>
</table>

### Part numbers

- **Part No. is T** followed by the complete cylinder part number
- **Part No. is PR** followed by the complete cylinder part number

### Additional Information

- **Rear port cap** Add suffix 250 for 2" bore 1/4 NPT
- **Rear pivot cap** Add suffix 250 for 2" bore 1/4 NPT
- **Side port cap** Add suffix 250 for 2" bore 1/4 NPT
- **Square cap** Add suffix 250 for 2" bore 1/4 NPT
- **Cap end shock pad** Consult factory
- **Head end shock pad** 11CSP, 15CSP, 2CSP, 3MSP

---

**Series SMS Solid Stainless**

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**

- **Pneumatic, Nitrile** Add suffix NL for Non-Lube
- **Pneumatic, Viton** Add suffix NL for Non-Lube
- **Hydraulic, Nitrile**
- **Hydraulic, Viton**
- **SMS 3411** SMS 3415 SMS 3420 SMS 3430
- **SMS 3411V** SMS 3415V SMS 3420V SMS 3430V
- **SMS 3511** SMS 3515 SMS 3520 SMS 3530
- **SMS 3511V** SMS 3515V SMS 3520V SMS 3530V
- **Add suffix NL for Non-Lube**
- **Add suffix 250 for 2" bore 1/4 NPT**

---

**Part Numbers**

- **SMS 3411** SMS 3415 SMS 3420 SMS 3430
- **SMS 3411V** SMS 3415V SMS 3420V SMS 3430V
- **SMS 3511** SMS 3515 SMS 3520 SMS 3530
- **SMS 3511V** SMS 3515V SMS 3520V SMS 3530V
- **SMS 5411** SMS 5415 SMS 5420 SMS 5430
- **SMS 5411V** SMS 5415V SMS 5420V SMS 5430V
- **SMS 5511** SMS 5515 SMS 5520 SMS 5530
- **SMS 5511V** SMS 5515V SMS 5520V SMS 5530V

---

**Contact Information**

- **Consult factory**
- **3MSP**

---

**Series SMS Solid Stainless**

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**

- **Pneumatic, Nitrile** Add suffix NL for Non-Lube
- **Pneumatic, Viton** Add suffix NL for Non-Lube
- **Hydraulic, Nitrile**
- **Hydraulic, Viton**
- **SMS 3411** SMS 3415 SMS 3420 SMS 3430
- **SMS 3411V** SMS 3415V SMS 3420V SMS 3430V
- **SMS 3511** SMS 3515 SMS 3520 SMS 3530
- **SMS 3511V** SMS 3515V SMS 3520V SMS 3530V
- **Add suffix NL for Non-Lube**
- **Add suffix 250 for 2" bore 1/4 NPT**

---

**Part Numbers**

- **SMS 3411** SMS 3415 SMS 3420 SMS 3430
- **SMS 3411V** SMS 3415V SMS 3420V SMS 3430V
- **SMS 3511** SMS 3515 SMS 3520 SMS 3530
- **SMS 3511V** SMS 3515V SMS 3520V SMS 3530V
- **SMS 5411** SMS 5415 SMS 5420 SMS 5430
- **SMS 5411V** SMS 5415V SMS 5420V SMS 5430V
- **SMS 5511** SMS 5515 SMS 5520 SMS 5530
- **SMS 5511V** SMS 5515V SMS 5520V SMS 5530V

---

**Contact Information**

- **Consult factory**
- **3MSP**
Series SS Solid Stainless Cylinders

Pneumatic to 200 PSI
Hydraulic to 1000 PSI  Non shock
3/4", 1 1/8", 1 1/2", 2" Bore

To Help Brighten Your Corner of the World.
All exterior components 300 series stainless
SS STAINLESS DESIGN FEATURES

- **Piston rod is hard chrome plated type 303 stainless. Optional hollow piston rods available (hollow rod is not chrome plated).**
- **End caps are machined from type 303 stainless steel.**
- **Removable stainless retaining rings hold the seal and rod wiper in place.**
- **Extra long rod bearings of sintered bronze provide ample support and serve as an oil reservoir for pneumatic use. The bearing is inboard of the seal, away from the environment to ensure proper lubrication. Optional non metallic rod bearings available for chemically inert or severe applications.**
- **Brass piston silver brazed to the piston rod provides an almost indestructable joint. Optional solid stainless steel piston with teflon wearstrip available for chemically inert or clean applications.**
- **Piston seals are extra long wearing pressure energized lip seals of the highest quality.**
- **Optional wick provides teflon lube for non-lube service.**
- **Magnetic piston available to operate Aurora stainless proximity switches.**

---

- **Reduce noise and fatigue problems such as rod breakage with urethane shock pads.**
  - **Pneumatic use only to 180° F.**
- **Heavy duty urethane rod wipers seal out the environment. Other materials available.**
- **Pneumatic Rod Seal is a “longlife” nitrile cup. Hydraulic Rod Seal is pressure energized and extra long wearing for improved stability.**
- **Tube is heavy 1/8 inch wall type 304 stainless steel and is precision honed to insure proper size, roundness, and finish for maximum cylinder life.**
- **Adjustable cushions to provide deceleration at the end of the stroke are available on most models above 3/4” bore.**
- **O ring static tube seal**
- **Optional solid stainless steel piston with teflon wearstrip available for chemically inert or clean applications.**

---

**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
3/4” BORE SERIES SS STAINLESS

**Single Acting Cylinders**

<table>
<thead>
<tr>
<th>TYPE</th>
<th>STROKE</th>
<th>Add to</th>
<th>STROKE</th>
<th>Add to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring</td>
<td>0-1&quot;</td>
<td>Spring</td>
<td>1&quot;</td>
<td>Not available over 2” stroke</td>
</tr>
<tr>
<td>Spring extend</td>
<td>1&quot;</td>
<td>Spring</td>
<td>1 1/8” -2”</td>
<td>2”</td>
</tr>
<tr>
<td>Force:</td>
<td>Spring fully extended approx. 4#</td>
<td>Spring</td>
<td>1 1/8” -2”</td>
<td>2”</td>
</tr>
</tbody>
</table>

**7/8 -14SS Nut**

Nose Mounting Nut

Not included with cylinder

Order Separately

**SS-312**

Rod Clevis and Nut

303 Stainless

- 3/4” BORE SERIES SS STAINLESS 200 PSI MAX. AIR
- 1000 PSI MAX. HYD. Non shock

**Suitable for Submerged Service with Reverse Polypak Wiper**

**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
SS Options

- Shock Pads
- Wrench Flats
- Viton Seals
- Non-lube Service
- Non-Metallic Rod Br’g
- Reverse Polypak Wiper
- Stainless Piston
- Magnetic Piston
- Hollow Piston Rod
- 90° Rear Clevis

Wrench Flats Optional

STAIN · LESS
(STÁN’LÍS) Adjective
1. Without blemish or stain: a stainless reputation

SS-40
St’d Clevis Brk’t
Used on SS 2 Series 300 Stainless

SSC-30
Low Profile Clevis Brk’t
Used on SS 2 Series 300 Stainless

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**1 1/8” BORE SERIES SS STAINLESS**

**200 PSI MAX. AIR**

**1000 PSI MAX. HYD. Non shock**

### Single Acting Cylinders

Pneumatic only  Adds to cylinder length

<table>
<thead>
<tr>
<th>TYPE</th>
<th>STROKE</th>
<th>Add to cyl. O.A.L.</th>
<th>STROKE</th>
<th>Add to cyl. O.A.L.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring extend</td>
<td>0-2”</td>
<td>1 1/2”</td>
<td>Not available over 2”</td>
<td></td>
</tr>
<tr>
<td>Spring return</td>
<td>0-2”</td>
<td>1 1/2”</td>
<td>2 1/8”-4”</td>
<td>3”</td>
</tr>
</tbody>
</table>

Spring Force: Spring fully extended approx. 7#  
Spring fully compressed approx. 22#

**1 -14SS Nut**

Nose Mounting Nut  
Not included with cylinder  
Order Separately

**SS1**

**SS2**

**SS3**

**SS5**

**SS6**

* INDICATES STANDARD CUSHION SCREW LOCATION

90° rear pivot hole optional

---

**Conventional Cylinder Cost**

+ Warranty Repairs  
+ Downtime  
+ Liability  
> Aurora Stainless
SS Options

- Shock Pads
- Wrench Flats
- Viton Seals
- Non-lube Service
- Non-Metallic Rod Br’g
- Reverse Polypak Wiper
- Stainless Piston
- Magnetic Piston
- Hollow Piston Rod
- 90° Rear Clevis
- Adjustable Cushions

Wrench Flats Optional

Series SS
Stainless have been field proven since 1983

SS-90
St’d Clevis Brk’t
Used on SS 2
Series 300 Stainless

SSC-40
St’d Clevis Brk’t
Used on SS 2
Series 300 Stainless

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
1 1/2” BORE SERIES SS STAINLESS

200 PSI MAX. AIR
1000 PSI MAX. HYD. Non shock

Single Acting Cylinders
Pneumatic only Adds to cylinder length

<table>
<thead>
<tr>
<th>TYPE</th>
<th>STROKE Add to</th>
<th>STROKE Add to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring</td>
<td>0.2” 1 1/2”</td>
<td>2 1/8” - 4”</td>
</tr>
<tr>
<td>Spring</td>
<td>0.2” 1 1/2”</td>
<td>2 1/8” - 4”</td>
</tr>
</tbody>
</table>

Spring Force: Spring fully extended approx. 15#
Spring fully compressed approx. 50#

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

18-8 Stainless

SS-500
Rod Clevis and Nut

1/2-20 THREAD
3/8 SQUARE

303 Stainless

SS-501
Clevis Pin Assembly
Used on SS-500

303 Stainless

We’ll Bill You for the
Cylinders. . .

but Our Experience is
Free

630 851 4515
**SS Options**

- Shock Pads
- Wrench Flats
- Viton Seals
- Non-lube Service
- Non-Metallic Rod Br’g
- Reverse Polypak Wiper
- Stainless Piston
- Magnetic Piston
- 90° Rear Clevis
- Adjustable Cushions

**Wrench Flats** Optional

---

**UNIQUE APPLICATIONS**

SOMETIMES REQUIRE UNIQUE CYLINDERS

See our custom design capabilities on page 87

---

**SS-100**

St’d Clevis Brk’t

Used on SS 2 Series 300 Stainless

---

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
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>3/4&quot;</td>
<td>07</td>
</tr>
<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>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Acting</td>
<td>A</td>
</tr>
<tr>
<td>Single Acting</td>
<td>B</td>
</tr>
<tr>
<td>Double acting</td>
<td>C</td>
</tr>
</tbody>
</table>

*Adds to cyl. length. If double rod end model is to be single acting, select A.

<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>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mounting Style/Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>SS 1</td>
</tr>
<tr>
<td>SS 10</td>
</tr>
<tr>
<td>SS 2</td>
</tr>
<tr>
<td>SS 11</td>
</tr>
<tr>
<td>SS 3</td>
</tr>
<tr>
<td>SS 12</td>
</tr>
<tr>
<td>SS 5</td>
</tr>
<tr>
<td>SS 13</td>
</tr>
<tr>
<td>SS 6</td>
</tr>
<tr>
<td>SS 14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stroke</th>
</tr>
</thead>
</table>
| Code is stroke in total 1/8" increments. Stocked in 1/2" increments as follows:
| 3/4" bore to 6"  |
| 1 1/8" bore to 8" |
| 1 1/2" bore to 10"|
| 2" bore to 12"    |

<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 the extra length as a two place decimal. Example: J .50 = 1/2&quot; extra J 1.25 = 1 1/4&quot; extra SS6, 14 double rod cylinders with extra extension cannot be ordered by a standard part number - consult factory for a special part number.</td>
<td>J</td>
</tr>
<tr>
<td>Wrench flats</td>
<td>Specify if required. If specified will be added to both ends of SS6, 14 double rod cylinders</td>
<td>K</td>
</tr>
<tr>
<td>Shock pads</td>
<td>Double acting cylinders only — must be added to both ends. Adds 1/2&quot; to length — pneumatic use only to 180°F</td>
<td>N</td>
</tr>
<tr>
<td>Non-lube service</td>
<td>Pneumatic only — Not available with magnetic piston or solid stainless piston</td>
<td>P</td>
</tr>
<tr>
<td>Viton seals</td>
<td>Standard seals are nitrile and urethane +10 to +180°F. For service −10 to +400°F specify viton.</td>
<td>R</td>
</tr>
<tr>
<td>Reverse polypak rod wiper</td>
<td>More effective at keeping liquids and gases out of the cylinder.</td>
<td>S</td>
</tr>
<tr>
<td>Clevis 90° to st'd</td>
<td>SS 2 only.</td>
<td>T</td>
</tr>
<tr>
<td>Stainless piston</td>
<td>303 Stainless with teflon wear strip. Not available with magnet, non-lube, or cushion options.</td>
<td>V</td>
</tr>
<tr>
<td>Magnetic piston</td>
<td>Adds 1/2&quot; to length on 3/4&quot; bore only. Not available with Non-lube or stainless piston options.</td>
<td>W</td>
</tr>
<tr>
<td>Hollow piston rod</td>
<td>Available in 5/16 dia.rod - thru hole .135&quot;. Available in 3/8 dia.rod - thru hole .248&quot;. Available in 1/2 dia.rod - thru hole .313&quot;. Rod is plain 304 stainless - no chrome plating.</td>
<td>X</td>
</tr>
<tr>
<td>Non - metallic rod bushings</td>
<td>Fiberglass backed teflon.</td>
<td>Y</td>
</tr>
</tbody>
</table>

| Cushion head end only       | AA    |
| Cushion cap end only        | BB    |
| Cushion both ends           | CC    |

**Part No. Example:**

```
15 SS10 C16 G8 K W
```

<table>
<thead>
<tr>
<th>Mounting style SS10</th>
<th>2&quot; stroke</th>
<th>1/2-20 x 1 th’d rod</th>
</tr>
</thead>
</table>

Double acting | Hydraulic | Magnetic piston | Wrench flats
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.

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
<th>3/4 Bore</th>
<th>1 1/8 Bore</th>
<th>1 1/2 Bore</th>
<th>2 Bore</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seal kit - Pneumatic, Nitrile</td>
<td>Add suffix NL for Non-lube</td>
<td>SS 2207 PB</td>
<td>SS 2211 PB</td>
<td>SS 2215 PB</td>
<td>SS 2220 PB</td>
</tr>
<tr>
<td>Seal kit - Pneumatic, Viton</td>
<td>Add suffix NL for Non-lube</td>
<td>SS 2207 PV</td>
<td>SS 2211 PV</td>
<td>SS 2215 PV</td>
<td>SS 2220 PV</td>
</tr>
<tr>
<td>Seal kit - Hydraulic, Urethane</td>
<td>Add suffix REV for Reverse Polypak Wiper</td>
<td>SS 2207 HU</td>
<td>SS 2211 HU</td>
<td>SS 2215 HU</td>
<td>SS 2220 HU</td>
</tr>
<tr>
<td>Seal kit - Hydraulic, Viton</td>
<td>Add suffix REV for Reverse Polypak Wiper</td>
<td>SS 2207 HV</td>
<td>SS 2211 HV</td>
<td>SS 2215 HV</td>
<td>SS 2220 HV</td>
</tr>
<tr>
<td>1</td>
<td>Rear port cap</td>
<td>SS 1007</td>
<td>SS 1011</td>
<td>SS 1015</td>
<td>SS 1020</td>
</tr>
<tr>
<td>2</td>
<td>Rear pivot cap</td>
<td>SS 1107</td>
<td>SS 1111</td>
<td>SS 1115</td>
<td>SS 1120</td>
</tr>
<tr>
<td>3</td>
<td>Rear pivot cap</td>
<td>SS 110790</td>
<td>SS 111190</td>
<td>SS 111590</td>
<td>SS 112090</td>
</tr>
<tr>
<td>4</td>
<td>Rear stud cap</td>
<td>SS 1207</td>
<td>SS 1211</td>
<td>SS 1215</td>
<td>SS 1220</td>
</tr>
<tr>
<td>5</td>
<td>Side port cap</td>
<td>SS 1307</td>
<td>SS 1311</td>
<td>SS 1315</td>
<td>SS 1320</td>
</tr>
<tr>
<td>6</td>
<td>Side port cap</td>
<td>SS 1507</td>
<td>SS 1511</td>
<td>SS 1515</td>
<td>SS 1520</td>
</tr>
<tr>
<td>7</td>
<td>Tube</td>
<td>SS 2007</td>
<td>SS 2011</td>
<td>SS 2015</td>
<td>SS 2020</td>
</tr>
<tr>
<td>8</td>
<td>Piston rod assembly</td>
<td>SS 2107</td>
<td>SS 2111</td>
<td>SS 2115</td>
<td>SS 2120</td>
</tr>
<tr>
<td>9</td>
<td>Spring</td>
<td>SS 2107</td>
<td>SS 2111</td>
<td>SS 2115</td>
<td>SS 2120</td>
</tr>
<tr>
<td>10</td>
<td>Magnet</td>
<td>SS 3207</td>
<td>SS 3211</td>
<td>SS 3215</td>
<td>SS 3220</td>
</tr>
<tr>
<td>11</td>
<td>Shock pad</td>
<td>75MSP</td>
<td>11MSP</td>
<td>15MSP</td>
<td>2MSP</td>
</tr>
<tr>
<td>12</td>
<td>Rod bearing</td>
<td>SS 0107</td>
<td>SS 0111</td>
<td>SS 0115</td>
<td>SS 0120</td>
</tr>
<tr>
<td>13</td>
<td>Head w/ Bronze br’g</td>
<td>SS 0107 DU</td>
<td>SS 0111 DU</td>
<td>SS 0115 DU</td>
<td>SS 0120 DU</td>
</tr>
<tr>
<td>14</td>
<td>Head w/ Bronze br’g</td>
<td>SS 1407</td>
<td>SS 1411</td>
<td>SS 1415</td>
<td>SS 1420</td>
</tr>
<tr>
<td>15</td>
<td>Head w/ Non-metalic br’g</td>
<td>SS 1407 DU</td>
<td>SS 1411 DU</td>
<td>SS 1415 DU</td>
<td>SS 1420 DU</td>
</tr>
<tr>
<td>16</td>
<td>Head w/ Non-metalic br’g</td>
<td>SS 1407</td>
<td>SS 1411</td>
<td>SS 1415</td>
<td>SS 1420</td>
</tr>
<tr>
<td>17</td>
<td>Rod seal retaining washer</td>
<td>SS 0507</td>
<td>SS 0511</td>
<td>SS 0515</td>
<td>SS 0520</td>
</tr>
<tr>
<td>18</td>
<td>Rod seal retaining washer</td>
<td>SS 0607</td>
<td>SS 0611</td>
<td>SS 0615</td>
<td>SS 0620</td>
</tr>
<tr>
<td>19</td>
<td>Rod washer</td>
<td>SS 0307</td>
<td>SS 0311</td>
<td>SS 0315</td>
<td>SS 0320</td>
</tr>
<tr>
<td>20</td>
<td>Rod washer</td>
<td>SS 0407</td>
<td>SS 0411</td>
<td>SS 0415</td>
<td>SS 0420</td>
</tr>
<tr>
<td>21</td>
<td>Cushion screw</td>
<td>SS 0407</td>
<td>SS 0411</td>
<td>SS 0415</td>
<td>SS 0420</td>
</tr>
<tr>
<td>22</td>
<td>Cushion screw</td>
<td>SS 2611</td>
<td>SS 2615</td>
<td>SS 2620L</td>
<td>SS 2620L</td>
</tr>
<tr>
<td>23</td>
<td>Cushion screw locknut</td>
<td>SS 2611</td>
<td>SS 2615</td>
<td>SS 2620L</td>
<td>SS 2620L</td>
</tr>
</tbody>
</table>
**Series HB Solid Brass Cylinders**

**For General Industrial Use in most Environments**

- **200 PSI Pneumatic**
- **500 PSI Hydraulic  Non shock**
- **3/4”, 1”, 1 1/8”, 1 1/2”, 2” Bores**

- Magnetic piston available to operate Aurora stainless proximity switches.
- Solid brass heads and caps are precision machined.
- Brass piston is silver brazed to the rod for an almost indestructible joint.
- Tube is heavy wall brass honed to insure proper size, roundness, and finish for maximum cylinder life.

- Pressure energized wear compensating cup type piston seals on all models and bore sizes with one exception: 3/4” bore oversize piston rod model has an O ring piston seal.

3/4, 1, 1 1/8 Bore Cylinders have four lobed rod seal.
1 1/2, 2 Bore Cylinders have cup type rod seal.

**A natural choice where moisture is a problem .**
ADDITIONAL DESIGN FEATURES

SHOCK PADS
Reduce noise and fatigue problems such as rod breakage with energy absorbing shock pads. Add 1/4" to the cylinder length for each pad. For pneumatic use only to 180°F.

ROD WIPERS
Prolong the life of cylinders operating in dirty environments by adding rod wipers. Polyurethane or Viton wipers are wear compensating and effectively prevent damaging contaminants from entering the critical rod seal/rod bushing area. Limited availability.

SEAL COMPOUNDS
Standard cylinders contain buna n (nitrile) seals and polyurethane wipers which are compatible with most lubricants and fluids, and can withstand temperatures from –40° to +200°F.
Viton seals and wipers may be ordered for temperatures ranging from –10° to +400°F and for added chemical resistance.
“Long Life” seals will provide significantly increased service life due to their excellent abrasion resistance. Fluid compatibility is identical to buna n seals and their effective temperature range is +20° - +200°F. Long life rod seals are standard on all 3/4, 1, 1 1/8" bore cylinders.

HYDRAULIC SEALS
Rod seal weepage can be substantially reduced by specifying Polypak* rod seals. They are available on all 1 1/2 and 2" bore cylinders. For availability on other bore sizes consult factory.

HARD CHROMED PISTON ROD
The standard rod in all HB cylinders is ground and polished type 303 stainless steel. Hard chrome plated steel rods are available. The plating gives the rod a very hard scratch resistant surface which increases the wear life of the rod, rod bushing, and rod seal. The result is increased cycle life on all cylinders and improved sealability on hydraulic cylinders.

PISTON ROD THREADS
Rods are stocked with both fine and coarse male threads as listed in the ordering procedure. Almost any special thread — female, metric, etc. — can be produced to customer requirements in just a day or so for a modest extra charge.
• Female thread depth: #10, 1/4, 5/16, 3/8 threads are 5/8 deep.
• 1/2, 5/8, 3/4 threads are 1 1/4 deep.
• Threads smaller than the nominal rod diameter will be per the photo unless otherwise noted.

PIVOT BUSHING
All HB2 caps have a stainless steel pivot bushing.

STOP TUBE
Stop tubes are spacers between the piston and the cylinder head which prevent the piston from fully extending. This will reduce the bearing loads by increasing the distance between bearing points. Stop tubes should be used on long stroke cylinders and on cylinders where side load is a concern. See ordering procedure for available lengths. Also consider SMA aluminum cylinders for long strokes and side load conditions.

ADJUSTABLE CUSHIONS
Reduce noise and decelerate the piston at the end of stroke. Aurora’s cup type cushion seal provides positive cushioning yet allows a high flow rate when reversing for minimum cycle time. A stainless steel metering screw offers simple adjustment of the cushion rate. The adjusting screw is fully recessed and self locking on 1 1/2 and 2" bore cylinders. The adjusting screw on 1 1/8" bore cylinders is locked in place by a low profile nut.

* Polypak is a registered trademark of Parker Hannifin
3/4” BORE HB BRASS

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

Single Acting Cylinders
Pneumatic only Adds to cylinder length

<table>
<thead>
<tr>
<th>TYPE</th>
<th>STROKE</th>
<th>cyl. O.A.L.</th>
<th>STROKE</th>
<th>cyl. O.A.L.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring return</td>
<td>0-1 3/4”</td>
<td>1”</td>
<td>1 7/8”</td>
<td>3 1/2”</td>
</tr>
<tr>
<td>Spring extend</td>
<td>0-1 3/4”</td>
<td>1”</td>
<td>Not available over 1 3/4” stroke</td>
<td></td>
</tr>
</tbody>
</table>

Spring Force: Spring fully extended approx. 4# Spring fully compressed approx. 9#

Wrench Flats Optional

Nose Mounting Nut
Included with Cylinder  Zinc plated steel

Rod Clevis and Nut

HB-250 1/4-28 Thread
HB-312 5/16-18 Thread

HB-200 Clevis Pin Assembly
Used on HB-250, 312

HB1

HB2

HB29

HB3

HB4

HB1

HB2

HB29

HB3

HB4

HB1

HB2

HB29

HB3

HB4

HB1

HB2

HB29

HB3

HB4
ALL AURORA PRODUCTS AVAILABLE FOR 24 HOUR DELIVERY

HB Options
- Shock Pads
- Wrench Flats
- Viton or Long Life Seals
- Chrome Rod
- Magnetic Piston
- Hollow Rod 5/16 ONLY

HB-10
Flange Bracket
Used on HB1, 3, 4, 5, 6
Zinc plated steel

HB-20
Foot Bracket
Used on HB1, 3, 4, 5, 6
Zinc plated steel

HB-30
Clevis Bracket
Used on HB2, 29
Zinc plated steel

HB-30T
Trunnion Bracket
Used on HB7, 8, 9
Zinc plated steel

Series HB BRASS

<table>
<thead>
<tr>
<th>A ROD DIA.</th>
<th>B NOSE THREAD</th>
<th>C PILOT DIA.</th>
<th>COMBINATIONS</th>
<th>Part No. Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4</td>
<td>5/8 – 18</td>
<td>.684/.682</td>
<td>D</td>
<td></td>
</tr>
<tr>
<td>5/16</td>
<td>5/8 – 18</td>
<td>.684/.682</td>
<td>E</td>
<td></td>
</tr>
</tbody>
</table>

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"1" BORE HB BRASS

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

Single Acting Cylinders
Pneumatic only Adds to cylinder length

<table>
<thead>
<tr>
<th>TYPE</th>
<th>STROKE</th>
<th>cyl. O.A.L.</th>
<th>ADDime</th>
<th>STROKE</th>
<th>cyl. O.A.L.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring return</td>
<td>0-2&quot;</td>
<td>1&quot;</td>
<td>2 1/8&quot;-4&quot;</td>
<td>2&quot;</td>
<td></td>
</tr>
<tr>
<td>Spring extend</td>
<td>0-2&quot;</td>
<td>1&quot;</td>
<td>Not available over 2&quot; stroke</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Wrench Flat Chart - Pg 68

Nose Mounting Nut

HB-312 5/16 – 18 Thread
HB-375 3/8 – 24 Thread
Rod Clevis & Nut

HB-200 Clevis Pin
Used on HB 312, 375

HB-10 Flange Brkt
Used on HB 1, 3, 4

HB-20 Foot Brkt
Used on HB 1, 3, 4

HB-40 Clevis Brkt
Used on HB 2, 29

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HB Options

- Shock Pads
- Wrench flats
- Viton or Long Life Seals
- Chrome Rod
- Hollow Rod

HB-10
Flange Bracket
Used on HB1, 3, 4, 5, 6
Zinc plated steel

HB-20
Foot Bracket
Used on HB1, 3, 4, 5, 6
Zinc plated steel

HB-40T
Trunnion Bracket
Used on HB7, 8, 9
Zinc plated steel

Don’t Guess-
Call Us to
Review Your
Application

630 851 4515
1 1/8" BORE HB BRASS

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

Single Acting Cylinders
Pneumatic only

<table>
<thead>
<tr>
<th>TYPE</th>
<th>STROKE</th>
<th>Add to cylinder length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring return</td>
<td>0-2&quot;</td>
<td>1&quot;</td>
</tr>
<tr>
<td>Spring extend</td>
<td>0-2 1/2&quot;</td>
<td>1&quot;</td>
</tr>
</tbody>
</table>

Spring Force: Spring fully extended approx. 49#
Spring fully compressed approx. 20#
† Spring fully compressed approx. 13#

Wrench Flats
Optional

<table>
<thead>
<tr>
<th>ROD DIA.</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/16</td>
<td>250</td>
<td>1/4</td>
</tr>
<tr>
<td>3/8</td>
<td>312</td>
<td>1/4</td>
</tr>
<tr>
<td>1/2</td>
<td>437</td>
<td>1/4</td>
</tr>
</tbody>
</table>

Nose Mounting Nut
Included with Cylinder
Zinc plated steel

<table>
<thead>
<tr>
<th>TH’D</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/8 – 18</td>
<td>15/16</td>
<td>3/8</td>
</tr>
<tr>
<td>3/4 – 16</td>
<td>1 1/8</td>
<td>27/64</td>
</tr>
<tr>
<td>7/8 – 14</td>
<td>1 5/16</td>
<td>31/64</td>
</tr>
</tbody>
</table>

Rod Clevis & Nut

Zinc plated steel

| HB-312 | 5/16 – 18 Thread | Rod Clevis & Nut |
| HB-375 | 3/8 – 24 Thread |

HB-300 Clevis Pin

Used on HB-312, 375

HB-501 Clevis Pin

Used on HB-500

303 Stainless

Cushions not available on cylinders with 1/2" diameter rod.
HB Options

- Shock Pads
- Wrench flats
- Viton or Long Life Seals
- Chrome Rod
- Magnetic Piston
- Hollow Rod
- Adjustable Cushions

HB-10
Flange Bracket
Used on HB1, 3, 4, 5, 6
Zinc plated steel

HB-20
Foot Bracket
Used on HB1, 3, 4, 5, 6
Zinc plated steel

HB-40
Clevis Bracket
Used on HB2, 29
Zinc plated steel

HB-40T
Trunnion Bracket
Used on HB7, 8, 9
Zinc plated steel

24 HOUR DELIVERY

HB-5

HB-6

HB-7

HB-8

HB-9

Series HB BRASS

<table>
<thead>
<tr>
<th>A ROD DIA</th>
<th>B NOSE THREAD</th>
<th>C PILOT DIA. COMBINATIONS</th>
<th>Part No. Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/16 Standard</td>
<td>5/8 – 18</td>
<td>.684/.682</td>
<td>D</td>
</tr>
<tr>
<td>3/8 Oversize</td>
<td>5/8 – 18</td>
<td>.684/.682</td>
<td>E</td>
</tr>
<tr>
<td>3/8 Oversize</td>
<td>3/4 – 14</td>
<td>.934/.932 HB5, 6 Only</td>
<td>G</td>
</tr>
<tr>
<td>1/2 Oversize</td>
<td>7/8 – 14</td>
<td>.934/.932</td>
<td>H</td>
</tr>
</tbody>
</table>

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
1 1/2” BORE HB BRASS

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

Single Acting Cylinders
Pneumatic only  Adds to cylinder length

<table>
<thead>
<tr>
<th>TYPE</th>
<th>STROKE</th>
<th>SPRING RETURN</th>
<th>SPRING EXTEND</th>
<th>SPRING FORCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring</td>
<td>0.2”</td>
<td>1 1/2”</td>
<td>2 1/4”–4”</td>
<td>3”</td>
</tr>
<tr>
<td>Extend</td>
<td>0.2”</td>
<td>1 1/2”</td>
<td>2 1/4”–4”</td>
<td>3”</td>
</tr>
</tbody>
</table>

Non shock

Wrench Flat chart pg 74

1-14 Nut & 1 1/4-12 Nut
Not included with Cylinder  Order separately

TH'D 1”-14
1 1/4-12
1 1/2
1 1/4

HB-500
Rod Clevis and Nut
Zinc plated steel

HB-750
Rod Clevis and Nut
Zinc plated steel

HB-50
Flange Brk’t
Order 1”-14 nut separately
Zinc plated steel

HB-70
Foot Brk’t
Order 1”-14 nut separately
Zinc plated steel

HB-90 St’d Clevis Brk’t
Used on HB2, 29  Zinc plated steel

Cushions not available on cylinders with 3/4” diameter rod or oversize 1/4” ports

Part No. Code

A ROD DIA.  B NOSE THREAD  C PILOT DIA. COMBINATIONS  D
1/2 Standard  1”-14  1.123/1.121  D
3/4 Oversize  1 1/4”-12  1.373/1.371  E

Series HB BRASS

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
1 1/2” BORE HB BRASS

Single Acting Cylinders
Pneumatic only   Adds to cylinder length

<table>
<thead>
<tr>
<th>TYPE</th>
<th>STROKE</th>
<th>cyl. O.A.L.</th>
<th>Add to</th>
<th>STROKE</th>
<th>cyl. O.A.L.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring return</td>
<td>0-2&quot;</td>
<td>1 1/2&quot;</td>
<td>2 1/8&quot;-4&quot;</td>
<td>3&quot;</td>
<td></td>
</tr>
<tr>
<td>Spring extend</td>
<td>0-2&quot;</td>
<td>1 1/2&quot;</td>
<td>2 1/8&quot;-4&quot;</td>
<td>3&quot;</td>
<td></td>
</tr>
</tbody>
</table>

Spring Force: Spring fully extended approx. 15#  Spring fully compressed approx. 50#

Wrench Flats
Optional

ROD DIA. | A | B
---------|---|---
1/2      | .437 | .375
3/4      | .625 | .500
1/2      | .375 | .312

1-14 Nut & 1 1/4-12 Nut
Nose Mounting Nut
Included with Cylinder   Zinc plated steel

TH'D        | A | B
----------|---|---
1 1/4-12   | 1 1/2 | 1 7/8
1 1/4-12   | 1 7/8 | 2 7/8

Zinc plated steel

HB-500
Rod Clevis and Nut

HB-750
Rod Clevis and Nut

Zinc plated steel

HB-501 Clevis Pin Assembly
Used on HB-500
HB-601 Clevis Pin Assembly
Used on HB-750

1/4” Oversize
Ports Available
on 1 1/2 Bore
Series HB

<table>
<thead>
<tr>
<th>A ROD DIA.</th>
<th>B NOSE THREAD</th>
<th>C PILOT DIA. COMBINATIONS</th>
<th>Part No. Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2 Standard</td>
<td>1-14</td>
<td>1.123/1.121</td>
<td>D</td>
</tr>
<tr>
<td>3/4 Oversize</td>
<td>1 1/4-12</td>
<td>1.378/1.371</td>
<td>E</td>
</tr>
</tbody>
</table>
**HB Options**

- Shock Pads
- Wrench Rats
- Rod Wiper
- Viton or Long Life Seals
- Polypak Rod Seal
- Chrome Rod
- Magnetic Piston
- Hollow Rod (1/2” only)
- Stop Tube
- Oversized Ports
- Adjustable Cushions

**HB-50**

Flange Bracket
Order 1”–14 Nut separately
Zinc plated steel

**HB-70**

Foot Bracket
Order 1”–14 Nut separately
Zinc plated steel

**HB-90T**

Trunnion Bracket
Used on HB7, 8, 9
Zinc plated steel

Cushions not available on cylinders with 3/4” diameter rod or oversize 1/4” ports.

**Series HB BRASS**

**A ROD DIA.** | **B NOSE THREAD** | **C PILOT DIA. COMBINATIONS** | **Part No. Code**
---|---|---|---
1/2 Standard | 1 –14 | 1.123/1.121 | D
3/4 Oversize | 1 1/4 –12 | 1.373/1.371 HB13 Only | E

---

24 HOUR DELIVERY

**HB10**

3 1/2 + STROKE DOUBLE ACTING
1/8-27 NPT

**HB11**

3 7/8 + STROKE DOUBLE ACTING
1/8-27 NPT

**HB12**

3 1/4 + STR OBL ACTING
1/8-27 NPT

**HB13**

3 1/3 + STR OBL ACTING
1/8-27 NPT

**HB14**

**Part No. Code**
**2" BORE HB BRASS**

**200 PSI MAX. AIR**

**500 PSI MAX. HYD.** Non shock

---

**Single Acting Cylinders**

Pneumatic only  
Adds to cylinder length

<table>
<thead>
<tr>
<th>TYPE</th>
<th>STROKE</th>
<th>Add to</th>
<th>CYL. O.A.L.</th>
<th>Add to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring return</td>
<td>0-2&quot;</td>
<td>1 1/2&quot;</td>
<td>2 1/8-4&quot;</td>
<td>3&quot;</td>
</tr>
<tr>
<td>Spring extend</td>
<td>0-2&quot;</td>
<td>1 1/2&quot;</td>
<td>2 1/8-4&quot;</td>
<td>3&quot;</td>
</tr>
</tbody>
</table>

Spring Force:  
Spring fully extended approx. 20#  
Spring fully compressed approx. 75#

---

**Wrench Flats Optional**

---

**1 1/4-12 Nut**

Nose Mounting Nut  
Not included with Cylinder  
Order separately

---

**HB-625**  
5/8-18 Thread  
**HB-750**  
3/4-16 Thread

---

**Rod Clevis and Nut**

Zinc plated steel

---

**HB-601**

Clevis Pin Assembly  
Used on HB-625, 750

---

Cushions not available on cylinders with 3/4" diameter rod.

---

**HB1**

* INDICATES CUSHION SCREW LOCATION AND AVAILABILITY.

---

**HB2**

* INDICATES CUSHION SCREW LOCATION AND AVAILABILITY.

---

**HB29**

* INDICATES CUSHION SCREW LOCATION AND AVAILABILITY.

---

**HB3**

* INDICATES CUSHION SCREW LOCATION AND AVAILABILITY.

---

**HB4**

* INDICATES CUSHION SCREW LOCATION AND AVAILABILITY.

---

**Part No. Code**

<table>
<thead>
<tr>
<th>A ROD DIA.</th>
<th>B NOSE THREAD</th>
<th>C PILOT DIA. COMBINATIONS</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/8 Standard</td>
<td>1 1/4 - 12</td>
<td>1.373/1.371</td>
<td>D</td>
<td>E</td>
</tr>
<tr>
<td>3/4 Oversize</td>
<td>1 1/4 - 12</td>
<td>1.373/1.371</td>
<td>E</td>
<td></td>
</tr>
</tbody>
</table>
All Aurora products available for 24 hour delivery

## HB Options

- Shock Pads
- Wrench Flats
- Rod Wiper
- Viton or Long Life Seals
- Polypak Rod Seal
- Chrome Rod
- Magnetic Piston
- Stop Tube
- Adjustable Cushions

### HB-60
**Flange Bracket**
Order 1 1/4-12 nut separately
Zinc plated steel

### HB-80
**Foot Bracket**
Order 1 1/4-12 nut separately
Zinc plated steel

### HB-100
**Clevis Bracket**
Used on HB2, 29
Zinc plated steel

### HB-100T
**Trunnion Bracket**
Used on HB7, 8, 9
Zinc plated steel

### HB-6

### HB-7

### HB-8

### HB-9

---

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>Part No. Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/8 Standard</td>
<td>1 1/4-12</td>
<td>1.375/1.371</td>
<td>D</td>
</tr>
<tr>
<td>3/4 Oversize</td>
<td>1 1/4-12</td>
<td>1.375/1.371</td>
<td>E</td>
</tr>
</tbody>
</table>
**Single Acting Cylinders**

Pneumatic only  Add to cylinder length

<table>
<thead>
<tr>
<th>TYPE</th>
<th>STROKE</th>
<th>Add to cyl. O.A.L.</th>
<th>STROKE</th>
<th>Add to cyl. O.A.L.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring return</td>
<td>0-2&quot;</td>
<td>1 1/2&quot;</td>
<td>2 1/8-4&quot;</td>
<td>3&quot;</td>
</tr>
<tr>
<td>Spring extend</td>
<td>0-2&quot;</td>
<td>1 1/2&quot;</td>
<td>2 1/8-4&quot;</td>
<td>3&quot;</td>
</tr>
</tbody>
</table>

- Spring Force: Spring fully extended approx. 20#
- Spring fully compressed approx. 75#

**Wrench Flats**
Optional

<table>
<thead>
<tr>
<th>ROG DIA</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/8</td>
<td>.502</td>
<td>.500</td>
</tr>
<tr>
<td>3/4</td>
<td>.625</td>
<td>.625</td>
</tr>
</tbody>
</table>

- Zinc plated steel

**Problem:**
Side Load

**Solution:**
Series SMA with Wear Strip Piston and Teflon Rod Bushing

---

**HB10**

- 2" BORE HB BRASS 200 PSI MAX. AIR
- 400 PSI MAX. HYD. Non shock

- 3 1/16 + STR DBL ACTING
- 1 11/16
- 1 3/16

* INDICATES CUSHION SCREW LOCATION AND AVAILABILITY.

**HB11**

- 4 1/16 + STR DBL ACTING
- 1 9/16
- 1 11/16
- 1 3/16

* INDICATES CUSHION SCREW LOCATION AND AVAILABILITY.

**HB12**

- 3 1/4 + STROKE DOUBLE ACTING
- 3/4
- 2 1/2 SQ

* INDICATES CUSHION SCREW LOCATION AND AVAILABILITY.

**HB13**

- 4 7/8 + STROKE DOUBLE ACTING
- 1 11/16
- 1 9/16
- 1 3/16

* INDICATES CUSHION SCREW LOCATION AND AVAILABILITY.

**HB14**

- 5/8 Standard
- 1 1/4 – 12
- 1.373/1.371
- D

- 3/4 Oversize
- 1 1/4 – 12
- 1.373/1.371
- E
Select code numbers/letters **(bold type)** from each of the six boxes below - then select any options desired from the opposite page. List codes in the same sequence as shown.

The cylinder part number is an alpha numeric code.

<table>
<thead>
<tr>
<th>Bore</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4&quot;</td>
<td>07</td>
</tr>
<tr>
<td>1&quot;</td>
<td>10</td>
</tr>
<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>
</tbody>
</table>

**Type** & **Code**
- Single Acting Spring return* (A)
- Single Acting Spring extend* (B)
- Double acting (C)
* Adds to cyl. length

If double rod end model (HB6, 9, 14) is to be single acting, select A.

**Mounting Style/Code**
- HB 1
- HB 2
- HB 29
- HB 3
- HB 4
- HB 5
- HB 6
- HB 7
- HB 8
- HB 9
- HB 10
- HB 11
- HB 12
- HB 13
- HB 14

**Stroke**
**Code is stroke in total 1/8" increments**

Example:
- 1" stroke = 8
- 2 1/2" stroke = 20

**Piston Rod Diameter / Nose Mount Combinations**

<table>
<thead>
<tr>
<th>Bore size</th>
<th>Rod dia.</th>
<th>Mounting Style of Cylinder Head</th>
<th>Pilot dia.</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8</td>
<td>3/4-16</td>
<td>Nose Mount / Sq. Head Mount</td>
<td>.745/.747</td>
<td>F</td>
</tr>
<tr>
<td>1 1/8</td>
<td>3/4-16</td>
<td>Nose Mount / Sq. Head Mount</td>
<td>.745/.747</td>
<td>F</td>
</tr>
<tr>
<td>1 1/8</td>
<td>7/8-14</td>
<td>Nose Mount</td>
<td>.932/.934</td>
<td>G</td>
</tr>
<tr>
<td>1 1/2</td>
<td>1 1/4-12</td>
<td>Nose Mount / Sq. Head Mount / Sq. Cap Mount</td>
<td>1.371/1.373</td>
<td>D</td>
</tr>
<tr>
<td>3/4</td>
<td>1 1/4-12</td>
<td>Nose Mount / Sq. Head Mount / Sq. Cap Mount</td>
<td>1.371/1.373</td>
<td>E</td>
</tr>
<tr>
<td>3/4</td>
<td>Sq. Head</td>
<td>Mount</td>
<td>1.121/1.123</td>
<td>E</td>
</tr>
<tr>
<td>3/4</td>
<td>1 1/4-12</td>
<td>Nose Mount / Sq. Head Mount / Sq. Cap Mount</td>
<td>1.371/1.373</td>
<td>D</td>
</tr>
<tr>
<td>3/4</td>
<td>1 1/4-12</td>
<td>Nose Mount / Sq. Head Mount / Sq. Cap Mount</td>
<td>1.371/1.373</td>
<td>E</td>
</tr>
</tbody>
</table>

**Piston Rod Threads**

HB6, HB9, HB14 Double rod models have same rod thread both ends

<table>
<thead>
<tr>
<th>Cyl. bore</th>
<th>Rod dia.</th>
<th>Rod th’d</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>All</td>
<td>Plain Rod</td>
<td>0</td>
</tr>
<tr>
<td>3/4</td>
<td>.250</td>
<td>1/4-20 x 5/8</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>.250</td>
<td>1/4-28 x 5/8</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>.312</td>
<td>5/16-18 x 5/8</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>.312</td>
<td>5/16-24 x 5/8</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>.312</td>
<td>5/16-18 x 5/8</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>.312</td>
<td>5/16-24 x 5/8</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>.312</td>
<td>5/16-18 x 5/8</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>.312</td>
<td>5/16-24 x 5/8</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>.312</td>
<td>5/16-18 x 5/8</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>.312</td>
<td>5/16-24 x 5/8</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>.312</td>
<td>5/16-18 x 5/8</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>.312</td>
<td>5/16-24 x 5/8</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>.375</td>
<td>3/8-16 x 5/8</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>.375</td>
<td>3/8-24 x 5/8</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>.375</td>
<td>3/8-16 x 5/8</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>.500</td>
<td>1/2-13 x 3/4</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>.500</td>
<td>1/2-20 x 5/8</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>.750</td>
<td>3/4-10 x 7/8</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>.750</td>
<td>3/4-16 x 7/8</td>
<td>10</td>
</tr>
<tr>
<td>1 1/2</td>
<td>.625</td>
<td>5/8-11 x 1 1/4</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>.750</td>
<td>3/4-10 x 1 1/4</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>.750</td>
<td>3/4-16 x 1 1/4</td>
<td>10</td>
</tr>
</tbody>
</table>

**Examples**
- 1" stroke = 8
- 2 1/2" stroke = 20
# Series HB Cylinder Options

List codes in the same sequence as they appear below.

<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 <strong>J</strong> followed by the extra length as a two place decimal.</td>
<td><strong>J</strong></td>
</tr>
<tr>
<td></td>
<td>Example: <strong>J .50</strong> = 1/2&quot; extra  <strong>J 1.25</strong> = 1 1/4&quot; extra</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HB6, 9, 14 double rod cylinders with extra extension cannot be ordered by a standard part number - consult factory for a special part number.</td>
<td></td>
</tr>
<tr>
<td>Wrench flats</td>
<td>Specify if required</td>
<td><strong>K</strong></td>
</tr>
<tr>
<td></td>
<td>If specified will be added to both ends of HB6, HB9, HB14 double rod cylinders</td>
<td></td>
</tr>
<tr>
<td>Shock pads</td>
<td>Available on both ends of double acting cylinders and the end opposite the spring on single acting cylinders. Each pad adds 1/4&quot; to cylinder length.</td>
<td><strong>L</strong> <strong>M</strong> <strong>N</strong></td>
</tr>
<tr>
<td></td>
<td>Pneumatic use only to 180° F</td>
<td></td>
</tr>
<tr>
<td>Rod wiper</td>
<td>3/4&quot;, 1&quot; bore - Not available</td>
<td><strong>P</strong></td>
</tr>
<tr>
<td></td>
<td>1 1/8&quot; bore - Available only with 3/8&quot; rod, 7/8 - 14 nose mount</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 1/2, 2&quot; bore - Available all models - standard with trunnion &amp; adj. cushion heads</td>
<td></td>
</tr>
<tr>
<td>Optional seal compounds</td>
<td>SF'd seals are buna (nitrile) and require no code -40 to +200° F</td>
<td><strong>Q</strong> <strong>R</strong></td>
</tr>
<tr>
<td></td>
<td>Long life available for extended cycle life +10 to +200° F</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Viton available for temps -10 to +400° F</td>
<td></td>
</tr>
<tr>
<td>Polypak rod seal</td>
<td>For optimum sealing on hydraulic cylinders</td>
<td><strong>S</strong></td>
</tr>
<tr>
<td></td>
<td>Available only in 1 1/2 and 2&quot; bore sizes</td>
<td></td>
</tr>
<tr>
<td>Hard chromed rod</td>
<td>Hard chrome plated steel - 100,000 min. yield</td>
<td><strong>T</strong></td>
</tr>
<tr>
<td>Magnetic piston</td>
<td>Not available in 1&quot; bore Adds 1/2&quot; to cylinder length</td>
<td><strong>W</strong></td>
</tr>
<tr>
<td>Hollow piston rod</td>
<td>Available in 5/16 dia. rod - thru hole .135&quot;</td>
<td><strong>X</strong></td>
</tr>
<tr>
<td></td>
<td>Available in 3/8 dia. rod - thru hole .248&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Available in 1/2 dia. rod - thru hole .313&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not available on hard chrome rods</td>
<td></td>
</tr>
<tr>
<td>Stop tube</td>
<td>Available on 1 1/2 &amp; 2&quot; bore only in 2&quot; increments</td>
<td><strong>Y</strong></td>
</tr>
<tr>
<td></td>
<td>Specify code <strong>Y</strong> followed by length in inches</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Example: <strong>Y4</strong> = 4&quot; stop tube</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adds to cylinder length. An 8&quot; stroke cyl. with 2&quot; stop tube will be as long as a 10&quot; stroke cylinder. Order actual stroke req. (8&quot; above)</td>
<td></td>
</tr>
<tr>
<td>Oversize ports</td>
<td>1/4 NPT ports on 1 1/2 bore cylinder (both ends)</td>
<td><strong>Z</strong></td>
</tr>
<tr>
<td>Adjustable Cushions</td>
<td>Available on 1 1/8, 1 1/2, 2&quot; bore except as follows:</td>
<td><strong>AA</strong> <strong>BB</strong> <strong>CC</strong></td>
</tr>
<tr>
<td></td>
<td>Mounting styles HB7, 8, 9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Rear port cap on mt'g styles HB1, 4, 10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cyl. with 1/2&quot; or 3/4&quot; oversize rods or oversize ports</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cylinders with shock pads</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cushion head end only</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cushion cap end only</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cushion both ends</td>
<td></td>
</tr>
</tbody>
</table>

## Part No. Example:

```
11 HB2 C 16 E 6 K W
```

- Part No. Example:
- Mounting style HB2
- 1-125" bore
- 2" stroke
- 3/8-24 x 5/8 th'd rod
- 3/8 rod, 5/8-18 nose mount
- Magnetic piston
- Wrench flats
- Double acting
## 3 / 4” Bore Service Parts

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seal Kit, Buna</td>
<td>07522-B</td>
<td></td>
</tr>
<tr>
<td>Seal Kit, Long life</td>
<td>07522-LL</td>
<td></td>
</tr>
<tr>
<td>Seal Kit, Viton</td>
<td>07522-V</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Rear port cap</td>
<td>07503</td>
</tr>
<tr>
<td>2</td>
<td>Rear pivot cap</td>
<td>07506</td>
</tr>
<tr>
<td>2</td>
<td>90° Rear pivot cap</td>
<td>0750690</td>
</tr>
<tr>
<td>3</td>
<td>Rear stud cap</td>
<td>07507</td>
</tr>
<tr>
<td>4</td>
<td>Cap</td>
<td>07508</td>
</tr>
<tr>
<td>5</td>
<td>Cap</td>
<td>07509</td>
</tr>
<tr>
<td>6</td>
<td>Cap</td>
<td>07525</td>
</tr>
<tr>
<td>7</td>
<td>Tube - P.N. is T followed by the complete cyl. part no.</td>
<td>0750690</td>
</tr>
<tr>
<td>8</td>
<td>Rod - P.N. is PR followed by the complete cyl. part no.</td>
<td>0750690</td>
</tr>
</tbody>
</table>

### Notes
- Tube - P.N. is T followed by the complete cyl. part no.
- Rod - P.N. is PR followed by the complete cyl. part no.

## 1” Bore Service Parts

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seal Kit, Buna</td>
<td>10022-B</td>
<td></td>
</tr>
<tr>
<td>Seal Kit, Long life</td>
<td>10022-LL</td>
<td></td>
</tr>
<tr>
<td>Seal Kit, Viton</td>
<td>10022-V</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Cap</td>
<td>10003</td>
</tr>
<tr>
<td>2</td>
<td>Cap</td>
<td>10006</td>
</tr>
<tr>
<td>2</td>
<td>90° Cap</td>
<td>1000690</td>
</tr>
<tr>
<td>3</td>
<td>Cap</td>
<td>10007</td>
</tr>
<tr>
<td>4</td>
<td>Cap</td>
<td>10008</td>
</tr>
<tr>
<td>5</td>
<td>Cap</td>
<td>10009</td>
</tr>
<tr>
<td>6</td>
<td>Cap</td>
<td>10025</td>
</tr>
<tr>
<td>7</td>
<td>Tube - P.N. is T followed by the complete cyl. part no.</td>
<td>1000690</td>
</tr>
<tr>
<td>8</td>
<td>Rod - P.N. is PR followed by the complete cyl. part no.</td>
<td>1000690</td>
</tr>
</tbody>
</table>

### Notes
- Tube - P.N. is T followed by the complete cyl. part no.
- Rod - P.N. is PR followed by the complete cyl. part no.

## 1 1/8” Bore Service Parts

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seal Kit, Buna, 5/16 rod</td>
<td>11222-312B</td>
<td></td>
</tr>
<tr>
<td>Seal Kit, Buna, 3/8 rod</td>
<td>11222-375B</td>
<td></td>
</tr>
<tr>
<td>Seal Kit, Buna, 1/2 rod</td>
<td>11222-500B</td>
<td></td>
</tr>
<tr>
<td>Seal Kit, Long life, 5/16 rod</td>
<td>11222-312LL</td>
<td></td>
</tr>
<tr>
<td>Seal Kit, Long life, 3/8 rod</td>
<td>11222-375LL</td>
<td></td>
</tr>
<tr>
<td>Seal Kit, Long life, 1/2 rod</td>
<td>11222-312V</td>
<td></td>
</tr>
<tr>
<td>Seal Kit, Viton, 5/16 rod</td>
<td>11222-375V</td>
<td></td>
</tr>
<tr>
<td>Seal Kit, Viton, 3/8 rod</td>
<td>11222-500V</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Cap</td>
<td>11203</td>
</tr>
<tr>
<td>2</td>
<td>Cap Add suffix C for cushion</td>
<td>11206</td>
</tr>
<tr>
<td>2</td>
<td>90° Cap Add suffix C for cushion</td>
<td>1120690</td>
</tr>
</tbody>
</table>

### Notes
- Spring stop 1/4” rod pair
- Spring stop 5/16” rod pair
- Spring - Must supply cyl. stroke
- Head 1/4 rod
- Head 3/8 rod
- Head 5/16 rod
- Head 1/4 rod
- Head 3/8 rod
- Head 5/16 rod
- Head 3/8 rod (cushion)
- Head 3/8 rod (7/8 - 14 nose)
- Shock pad 75MSP

## 3/4” Bore Service Parts

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>Spring stop 1/4” rod pair</td>
<td>07512-250</td>
</tr>
<tr>
<td>9</td>
<td>Spring stop 5/16” rod pair</td>
<td>07512-312</td>
</tr>
<tr>
<td>10</td>
<td>Spring - Must supply cyl. stroke</td>
<td>07515</td>
</tr>
<tr>
<td>11</td>
<td>Head 1/4 rod</td>
<td>07510-250</td>
</tr>
<tr>
<td>11</td>
<td>Head 3/8 rod</td>
<td>07510-312</td>
</tr>
<tr>
<td>11</td>
<td>Head 5/16 rod</td>
<td>07510-250</td>
</tr>
<tr>
<td>12</td>
<td>Head 1/4 rod</td>
<td>07510-250</td>
</tr>
<tr>
<td>12</td>
<td>Head 3/8 rod</td>
<td>07510-312</td>
</tr>
<tr>
<td>13</td>
<td>Head 1/4 rod</td>
<td>07524-250</td>
</tr>
<tr>
<td>13</td>
<td>Head 3/8 rod</td>
<td>07524-312</td>
</tr>
<tr>
<td>14</td>
<td>Magnet pair</td>
<td>SS3207</td>
</tr>
<tr>
<td>16</td>
<td>Shock pad pair</td>
<td>75MSP</td>
</tr>
</tbody>
</table>

### Notes
- Spring stop 1/4” rod pair
- Spring stop 5/16” rod pair
- Spring - Must supply cyl. stroke
- Head 1/4 rod
- Head 3/8 rod
- Head 5/16 rod
- Head 3/8 rod (cushion)
- Head 3/8 rod (7/8 - 14 nose)
### 1 1/8" Bore Service Parts

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Cap</td>
<td>11207</td>
</tr>
<tr>
<td>4</td>
<td>Cap</td>
<td>11208</td>
</tr>
<tr>
<td>5</td>
<td>Cap</td>
<td>11209</td>
</tr>
<tr>
<td>6</td>
<td>Cap</td>
<td>11225</td>
</tr>
<tr>
<td>7</td>
<td>Tube - P.N. is T followed by the complete cyl. part no.</td>
<td>11221</td>
</tr>
<tr>
<td>8</td>
<td>Rod - P.N. is PR followed by the complete cyl. P.N.</td>
<td>11222</td>
</tr>
<tr>
<td>9</td>
<td>Stop 5/16 rod, 0 - 2 1/2&quot; stroke</td>
<td>11212-312</td>
</tr>
<tr>
<td>9</td>
<td>Stop 5/16 rod, over 2 1/2&quot; stroke (pair)</td>
<td>10012-312</td>
</tr>
<tr>
<td>9</td>
<td>Stop 3/8 rod, 0 - 2 1/2&quot; stroke</td>
<td>11212-375</td>
</tr>
<tr>
<td>9</td>
<td>Stop 3/8 rod, over 2 1/2&quot; stroke (pair)</td>
<td>10012-375</td>
</tr>
<tr>
<td>9</td>
<td>Stop 1/2 rod, 0 - 2 1/2&quot; stroke</td>
<td>11212-500</td>
</tr>
<tr>
<td>9</td>
<td>Stop 1/2 rod, over 2 1/2&quot; stroke (pair)</td>
<td>10012-500</td>
</tr>
</tbody>
</table>

### 1 1/2" Bore Service Parts

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cap 1/4&quot; port</td>
<td>15003</td>
</tr>
<tr>
<td>2</td>
<td>Cap + add suffix C for cushion</td>
<td>15006</td>
</tr>
<tr>
<td>2</td>
<td>Cap 1/4&quot; port</td>
<td>15006250</td>
</tr>
<tr>
<td>2</td>
<td>90° Cap + add suffix C for cushion</td>
<td>1500690</td>
</tr>
<tr>
<td>2</td>
<td>90° Cap 1/4&quot; port</td>
<td>1500690250</td>
</tr>
<tr>
<td>3</td>
<td>Cap + add suffix C for cushion</td>
<td>15007</td>
</tr>
<tr>
<td>4</td>
<td>Cap 1/4&quot; port</td>
<td>15008</td>
</tr>
<tr>
<td>4</td>
<td>Cap + add suffix C for cushion</td>
<td>15009</td>
</tr>
<tr>
<td>5</td>
<td>Cap 1/4&quot; port</td>
<td>15009250</td>
</tr>
<tr>
<td>6</td>
<td>Cap + add suffix C for cushion</td>
<td>15025</td>
</tr>
<tr>
<td>6</td>
<td>Cap 1/4&quot; port</td>
<td>15025250</td>
</tr>
<tr>
<td>7</td>
<td>Tube - P.N. is T followed by the complete cyl. part no.</td>
<td>11223</td>
</tr>
<tr>
<td>8</td>
<td>Rod - P.N. is PR followed by the complete cyl. part no.</td>
<td>11224</td>
</tr>
<tr>
<td>9</td>
<td>Stop, 1/2 rod, st'd pair</td>
<td>15012-500</td>
</tr>
<tr>
<td>9</td>
<td>Stop, 1/2 rod, spring extend over 2&quot; str.</td>
<td>15012-500L</td>
</tr>
<tr>
<td>9</td>
<td>Stop, 3/4 rod, st'd</td>
<td>15012-750</td>
</tr>
<tr>
<td>9</td>
<td>Stop, 3/4 rod, spring extend over 2&quot; str.</td>
<td>15012-750L</td>
</tr>
</tbody>
</table>

Add suffix HYD to seal kit part no. if polyapak hyd. rod seal is required

#### Seal Kit, Buna, 1/2 rod
- 15022-500B
- 15022-750B
- 15022-500LL
- 15022-750LL
- 15022-500V
- 15022-750V

#### Seal Kit, Viton, 1/2 rod
- 15022-500V
- 15022-750V

### 2" Bore Service Parts

<table>
<thead>
<tr>
<th>Key</th>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cap</td>
<td>20003</td>
</tr>
<tr>
<td>2</td>
<td>Cap + add suffix C for cushion</td>
<td>20006</td>
</tr>
<tr>
<td>3</td>
<td>Cap + add suffix C for cushion</td>
<td>2000690</td>
</tr>
<tr>
<td>3</td>
<td>Cap + add suffix C for cushion</td>
<td>20007</td>
</tr>
<tr>
<td>4</td>
<td>Cap</td>
<td>20008</td>
</tr>
<tr>
<td>5</td>
<td>Cap + add suffix C for cushion</td>
<td>20009</td>
</tr>
<tr>
<td>6</td>
<td>Cap + add suffix C for cushion</td>
<td>20025</td>
</tr>
<tr>
<td>7</td>
<td>Tube - P.N. is T followed by the complete cyl. part no.</td>
<td>11226</td>
</tr>
<tr>
<td>8</td>
<td>Rod - P.N. is PR followed by the complete cyl. part no.</td>
<td>11227</td>
</tr>
<tr>
<td>9</td>
<td>Stop, 3/8 rod, st'd</td>
<td>20012-625</td>
</tr>
<tr>
<td>9</td>
<td>Stop, 3/8 rod, st'd pair</td>
<td>20012-625L</td>
</tr>
<tr>
<td>9</td>
<td>Stop, 5/8 rod, st'd</td>
<td>20012-625</td>
</tr>
</tbody>
</table>
ORDERING PROCEDURE AND TECHNICAL DATA

1. FILL IN 4 BLANK SPACES TO SELECT A SWITCH AND TO CREATE ITS PART NUMBER

   R  REED SWITCH
   H  HALL SWITCH
   O SWITCH with permanent 9 foot cable
   3 SWITCH ONLY with 8mm male quick connect

2. SELECT A SWITCH MOUNTING CLAMP
   To securely fasten any switch to the cylinder tube choose the proper size stainless steel band clamp from the table below

<table>
<thead>
<tr>
<th>CYLINDER BORE SIZE</th>
<th>CLAMP PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/4&quot;</td>
<td>750CLAMP</td>
</tr>
<tr>
<td>1 1/8&quot;</td>
<td>112CLAMP</td>
</tr>
<tr>
<td>1 1/2&quot;</td>
<td>150CLAMP</td>
</tr>
<tr>
<td>2&quot;</td>
<td>200CLAMP</td>
</tr>
<tr>
<td>3&quot;</td>
<td>300CLAMP</td>
</tr>
</tbody>
</table>

   ORDER SEPARATELY - NOT INCLUDED WITH SWITCH

3. SELECT A QUICK CONNECT CABLE IF REQUIRED
   Cable part No. ARC130 fits any Aurora switch with 8mm male quick connect and is 16 feet long

   120VAC/DC 4Amp max.
   Nominal Volt. Rating - 60 VAC / 75 VDC
   Environmental Resistance - IP67
   Current Rating - 4 Amps
   Insulation Resistance - $\geq 10^{10} \Omega$
   Contact Resistance - $\leq 5 \Omega$
   Temperature Rating - $-25^\circ$ to $85^\circ$C
   Wire Gauge - .25mm$^2$ wire / 24 AWG

4. SELECT MAGNETIC PISTON
   When ordering a cylinder along with a switch be sure to include a magnetic piston on the cylinder – see next page.
**MAGNETIC PISTON**

*Add this option to your cylinder to operate Aurora reed or hall switches*

Flexible Nitrile based permanent magnets are suitable for pneumatic and hydraulic service –20°F to +180°F.

Aurora piston magnets are made from high energy material and sufficient mass to create a strong stable magnetic field parallel to the cylinder axis.

All magnets are impact resistant and will retain maximum strength indefinitely.

Magnetic pistons are available in all series Aurora cylinders. They are compatible with most options and usually add 1/2” to cylinder length. Consult ordering procedure options for your choice.

---

**BREATHER VENTS, MUFFLERS, SPEED CONTROLS**

**Breather Vent**

<table>
<thead>
<tr>
<th>PART</th>
<th>NPT</th>
<th>HEX</th>
<th>LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABV-1</td>
<td>1/8</td>
<td>7/16</td>
<td>7/16</td>
</tr>
<tr>
<td>ABV-2</td>
<td>1/4</td>
<td>9/16</td>
<td>5/8</td>
</tr>
</tbody>
</table>

Aurora breather vents can be used to vent single acting cylinders gear boxes, etc. where contamination from foreign particles is a problem. The vent is made of sintered bronze fitted to a brass body, and is rated at 40 microns. Threaded construction allows easy removal for cleaning.

**Exhaust Muffler**

<table>
<thead>
<tr>
<th>PART</th>
<th>NPT</th>
<th>HEX</th>
<th>LENGTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>AM-1</td>
<td>1/8</td>
<td>7/16</td>
<td>1 1/8</td>
</tr>
<tr>
<td>AM-2</td>
<td>1/4</td>
<td>9/16</td>
<td>1 3/8</td>
</tr>
</tbody>
</table>

These muffler-filters utilize porous sintered bronze bonded to copper plated steel bodies, and are used to silence exhaust air from the port of cylinders, valves, air tools, etc. The standard filter is rated at 40 microns, and may be removed for cleaning.

**Speed Control Muffler**

<table>
<thead>
<tr>
<th>PART</th>
<th>NPT</th>
<th>HEX</th>
<th>LENGTH CLOSED</th>
<th>LENGTH OPEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASC-1</td>
<td>1/8</td>
<td>9/16</td>
<td>1 3/8</td>
<td>2</td>
</tr>
<tr>
<td>ASC-2</td>
<td>1/4</td>
<td>5/8</td>
<td>1 9/16</td>
<td>2 3/16</td>
</tr>
</tbody>
</table>

These units provide an infinite variation of metered air flow at an acceptable sound level on exhaust ports of air valves, cylinders, etc. The operating speed of cylinders or air tools may be varied with the adjusting screw, which is locked in place with a locknut. The standard unit contains a 40 micron bronze element on a brass body.
Hall Effect and Reed Switch Magnetic Sensors

Aurora quality American made switches with broad spectrum application and durability

One Series of switches fits all Aurora cylinders

- All switches have a corrosion and moisture resistant 300 series stainless housing with translucent inert plastic cover and epoxy filled circuit board. Nema 6 rated for wet environments
- Hall switches are completely solid state with no moving parts making them shock and vibration resistant
- LED indicator light shows same brightness throughout voltage range
- Reed switches operational to 30g (11msec) shock and 20g (10–55hz) vibration
- Operational from 0° to 170° F
- Both reed and hall switches work with the same magnet. 85 Gauss required at cylinder O.D. See page 86
- Stainless band clamp fastens the switch to any cylinder. Not included with switch - order separately
- All housings have the same slim profile 8mm male quick connect model shown

Cable

- Part number ARC130 quick connect cable connects to any switch that has the 8mm male quick connect thread
- Not included with switch - order separately
- Extra long 16 foot length
We turn ideas into reality.

In special design our only bounds are the limits of imagination...