

NUMATICS®

ASP Series

Steel Body NFPA Cylinder Line



www.numatics.com

ASP Series

Features and Benefits	3
Standard Mounts	4
How to Order	5
Port Size Availability	6
Dimensions	7-34
Rod Ends	7
Large Bore	8
Basic No Mount	9
Large Bore E3 and E4 Mount	10
F1 & F2 Mounts	11
F5 Mount	12
F6 Mount	13
P1 Mounts	14-15
P2 Mounts	16
P3 Mounts	17-18
P4 Mounts	19
S1 Mounts	20-21
S2 Mounts	22-23
S3 Mounts	24
S4 Mounts	25-26
S7 Mounts	27
T Mounts	28-29
X Mounts	30-31
U3 Mount	32
Double Rod Mounts	33-34
Cylinder Position Sensors	35
How to Order - ASP Series Repair Kit	36
How to Order - ASP Series Seal Kit	36
Piston Rod Assembly Kit Removal/Installation Instructions	37
Repair Kit and Seal Kit Removal/Installation Instructions	37
Diagrams	38
Seal Installation Guide	39

The **ASP Cylinder Line** is a heavy-duty, steel body cylinder line that is designed and built to exceed all of your strenuous application requirements. The **ASP Series** is an NFPA Steel Body pneumatic cylinder line. The **ASP Series** encompasses many of the same proven design features as our original NFPA Interchangeable cylinder, the A Series. This includes the extra long graphite filled cast iron rod bushing and a standard oversize wear band (located on the rear of the piston). Additionally, we have also included the proven "T" piston seal configuration with carboxilated nitrile with self-lubricating PTFE compound. These are just a sample of things that make the **ASP Series** the Superior Steel Body air cylinder line.

Tube

Our honed tubing is produced using our Suitable To Hone Drawn Over Mandrel (DOM) and Cold Drawn Seamless CDS. This tubing is ready to use for pneumatic or hydraulic cylinders without further ID processing. The honing process involves using abrasive polishing stones and abrasive paper to remove small amounts of material, to produce extremely precise ID dimensions and improved finishes.

End Caps

The **end caps** are accurately machined from precision square steel blocks. They also have a black oxide finish to protect from corrosion. Additionally, a recess on the piston-mating surface (at both ends) enables the air to work on a larger piston area for effortless breakaway (even at low pressures).

Rod Bushing

The ASP Series (1-1/2" through 8") includes a graphite filled, cast iron **rod bushing** that is extra long in length. Graphite filling offers the best bearing surface when using a hard chrome plated piston rod. Cast iron provides maximum resistance against wear. The added length adds superior alignment and support of the piston rod as well as provides maximum load bearing support. Sizes 10" through 14" bores include an extra long bronze rod bushing.

Rod Seal

The carboxilated nitrile with PTFE compound **rod seal** is self-lubricating and durable. The rounded lip design ensures proper sealing and long life.

Rod Wiper

The standard **rod wiper** construction is highly durable polyurethane.

Piston Rod

The high strength steel (100,000 psi minimum yield) **piston rod** has a ground, polished, and chrome plated surface. This surface provides maximum life for both the rod bushing and the seals.

Bushing Retainer

The **bushing retainer** allows cartridge removal (cylinder repair) without complete disassembly (except X1 and X3 mounts). Full-face retainer on 1-1/2" through 2-1/2" bore. Round retainer on 3-1/4" through 14" bore. Both the full-face and round retainer are steel construction.

Tie-Rods

The **tie-rods** are 100,000 psi minimum yield steel for maximum holding power. They are roll formed for superior strength and engagement (up to 5/8").

Piston Seal

The **piston seal** is carboxilated nitrile with PTFE compound for self-lubricating. The "T" seal with back-up rings prevents rolling and seals at all pressures.

Wear Band

The **wear band** is a stable, lubricating strip located on the piston. We separated the load bearing points by locating the wear band at the rear of the piston. This maximizes column strength at full-extension.



Piston

The solid aluminum alloy **piston** is strong and durable.

Cushion Seal

The floating **cushion seal** design enables rapid stroke reversal by providing instantaneous full-flow to the piston. Each cushion has a flush, retained adjustment needle.

Tube End Seal

The **tube end seals** are compression type and reusable.

Ports

Our enhanced **port** design enables the cylinder to work more efficiently. The use of precise machining depths and tool shape allows a smooth flow path into and out of the cylinder.

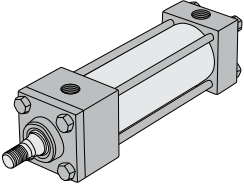
Standard Specifications:

- Meets NFPA specifications
- Bore sizes from 1-1/2" through 14"
- Piston rod diameters from 5/8" to 3-1/2"
- Maximum pressure rating is 250 psi air
- Standard temperature -10° F to 165° F (-23° C to 74° C)
- All steel construction, except piston (aluminum)
- NPTF ports
- Flexible port locating

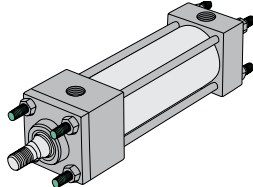
Standard ASP Series Mounts

Centerline Mounts

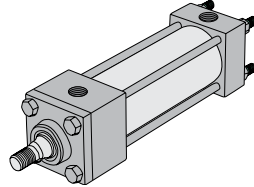
X0 Mount
Basic No Mount



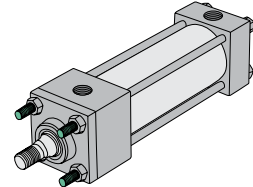
X1 Mount
Extended Tie Rods – Both Ends



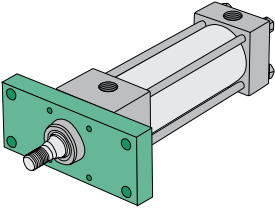
X2 Mount
Extended Tie Rods – Cap End



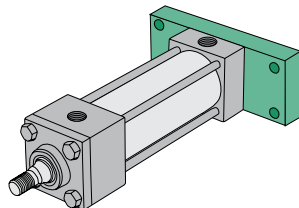
X3 Mount
Extended Tie Rods – Head End



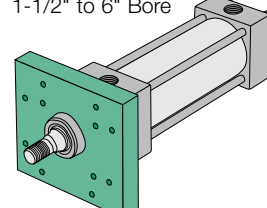
F1 Mount
Head Rectangular Flange



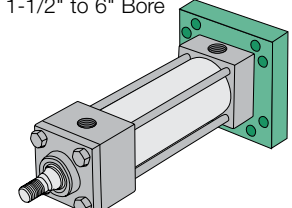
F2 Mount
Cap Rectangular Flange



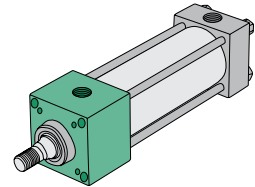
F5 Mount
Head Square Flange
1-1/2" to 6" Bore



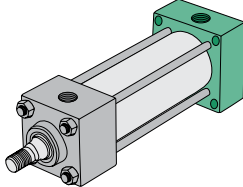
F6 Mount
Cap Square Flange
1-1/2" to 6" Bore



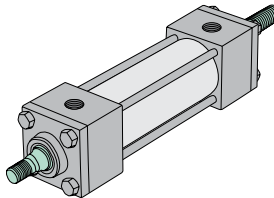
E3 Mount
Head Square Mount



E4 Mount
Cap Square Mount

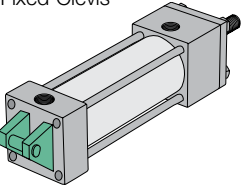


DA Mount
Double Rod End

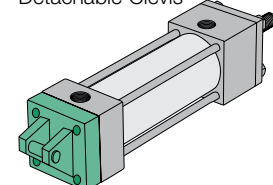


Pivot Mounts

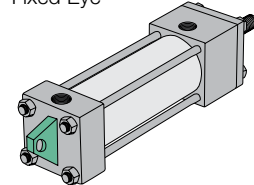
P1 Mount
Fixed Clevis



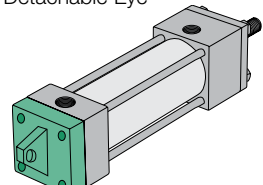
P2 Mount
Detachable Clevis



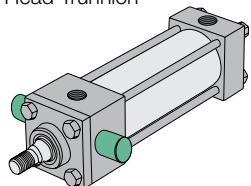
P3 Mount
Fixed Eye



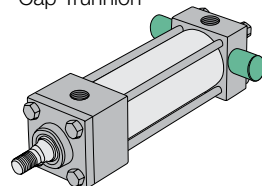
P4 Mount
Detachable Eye



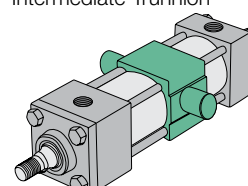
T1 Mount
Head Trunnion



T2 Mount
Cap Trunnion

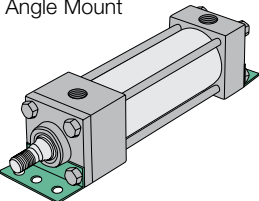


T4 Mount
Intermediate Trunnion

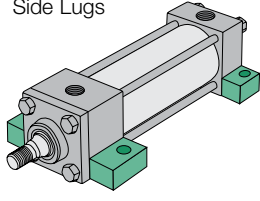


Foot Mounts

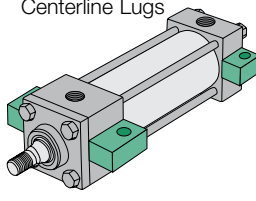
S1 Mount
Angle Mount



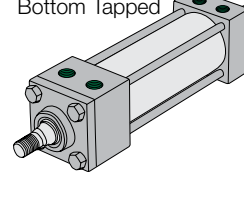
S2 Mount
Side Lugs



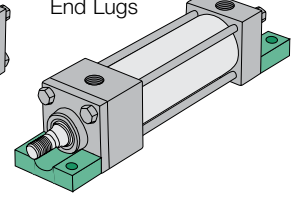
S3 Mount
Centerline Lugs



S4 Mount
Bottom Tapped



S7 Mount
End Lugs



How to Order

P1 ASP L - 04 A 1 1 D - C AA 1 1

Cylinder Mounting

- E3* = Head Square
- E4* = Cap Square
- F1** = Front Flange
- F2** = Rear Flange
- P1 = Fixed Clevis
- P2 = Detachable Clevis
- P3 = Fixed Eye
- P4 = Detachable Eye
- S1 = Angle Mount
- S2** = Side Lugs
- S3 = Center line Lugs
- S4** = Bottom Tapped
- S7 = End Lugs
- T1 = Head Trunnion
- T2 = Cap Trunnion
- T4** = Mid Trunnion
- X0 = Basic No Mount
- X1 = Extended Tie Rods (Both Ends)
- X2 = Cap Extended Tie Rods
- X3 = Head Extended Tie Rods
- F5** = Head Square Flange
- F6** = Cap Square Flange

*8"-14" Bore Only
 **1-1/2"-6" Bore Only

Cylinder Type

ASP = Steel Body NFPA Pneumatic Cylinder Line

Cylinder Bore

- K = 1.50 R = 4.00 X = 10.00
- L = 2.00 T = 5.00 Y = 12.00
- M = 2.50 U = 6.00 B = 14.00
- P = 3.25 W = 8.00

Full Inches of Stroke

- 00 = 0" Stroke
 - 01 = 1" Stroke
 - 02 = 2" Stroke
 - 03 = 3" Stroke
 - 04 = 4" Stroke
 - 05 = 5" Stroke
 - 99 = 99" Stroke
- Note: Consult factory for strokes greater than 99".

Fractional Inches of Stroke

- A = 0" E = 1/4" I = 1/2" M = 3/4"
- B = 1/16" F = 5/16" J = 9/16" N = 13/16"
- C = 1/8" G = 3/8" K = 5/8" O = 7/8"
- D = 3/16" H = 7/16" L = 11/16" P = 15/16"

Rod Diameter

- 1 = 0.625" 5 = 2.000"
- 2 = 1.000" 6 = 2.500"
- 3 = 1.375" 7 = 3.000"
- 4 = 1.750" 8 = 3.500"

Cap Cylindicator Position

(Leave blank if NS or CR is not used.)

Head Cylindicator Position

(Leave blank if NS or CR is not used.)

Options

- AA = No Options
- EB = Silencer Bumpers
- KA = Stroke Adjuster
- DA = Double Rod End
- RB = Rod Boot
- GA = High Temp Rod Boot
- MA = Metallic Rod Scraper
- LB = Low Breakaway
- RA* = Save Air Stroke Adjust
- SA = Stainless Rod
- ST = Stainless Tie Rods
- SS = Stainless Rod and Tie Rods
- VA** = FKM Seals
- 1A* = Rod Extension
- 2A* = Thread Extension
- 3A = Rod Stud
- 4A* = Stop Tube
- 4D* = Double Piston Stop Tube
- FB = Four Wrench Flats
- JN = Jam Nut
- PA = Polypak Rod Seal
- PP = Polypak Piston
- NA = Nickel Plated
- NS = Cylindicator Ready "No Stroke to Go"
- CR = Cylindicator Ready "Stroke to Go"

* Specify length

** FKM is not recommended for non-lube service

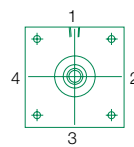
Note: For additional and combination options, consult factory for details.

Cushions

Position **1** **2** **3** **4** **Fixed**

- No Cushions A A A A A
 - Head & Cap B C D E Y
 - Head Only F G H J W
 - Cap Only K L M N V
- NOTE: Standard port location is position 1 and Standard cushion location is position 2.

Cylinder Orientation



Port Size

Position	1/8"	1/4"	3/8"	1/2"	3/4"	1"	1-1/4"
1	B	C	D	E	F	G	1
2	H	I	J	K	L	M	2
3	N	O	P	Q	R	S	3
4	T	U	V	W	X	Y	4

Rod End Style

- 1 = Style #1 Male Thread
- 2 = Style #2 Male Thread
- 3 = Style #3 Female Thread
- 4 = Special Rod End (Specify Threads)

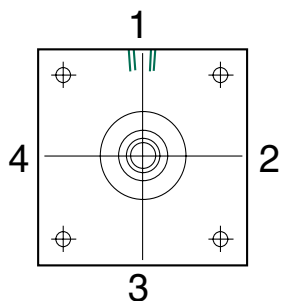
Rod End Styles, Diameters and Threads

Diameter	Style #1 Standard Male	Style #2 Optional Male	Style #3 Optional Female
0.625	7/16-20	1/2-20	7/16-20
1.000	3/4-16	7/8-14	3/4-16
1.375	1-14	1 1/4-12	1-14
1.750	1 1/4-12	1 1/2-12	1 1/4-12
2.000	1 1/2-12	1 3/4-12	1 1/2-12
2.500	1 7/8-12	2 1/4-12	1 7/8-12
3.000	2 1/4-12	2 3/4-12	2 1/4-12
3.500	2 1/2-12	3 1/4-12	2 1/2-12

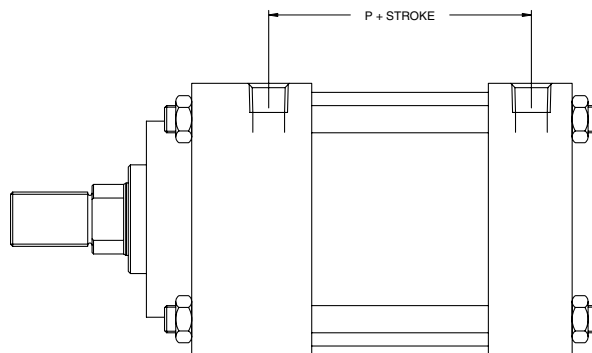
Rod Diameter by Bore Size

Bore	Standard Diameter	1st Oversized	2nd Oversized	3rd Oversized
1-1/2"	0.625	1.000	N/A	N/A
2"	0.625	1.000	1.375	N/A
2-1/2"	0.625	1.000	1.375	1.750
3-1/4"	1.000	1.375	1.750	2.000
4"	1.000	1.375	1.750	2.000
5"	1.000	1.375	1.750	2.000
6"	1.375	1.750	2.000	2.500
8"	1.375	1.750	2.000	2.500
10"	1.750	2.000	2.500	3.000
12"	2.000	2.500	3.000	3.500
14"	2.500	3.000	3.500	N/A

Port Size Availability



Cylinder
Port Orientation



The above drawing represents port location # 1.

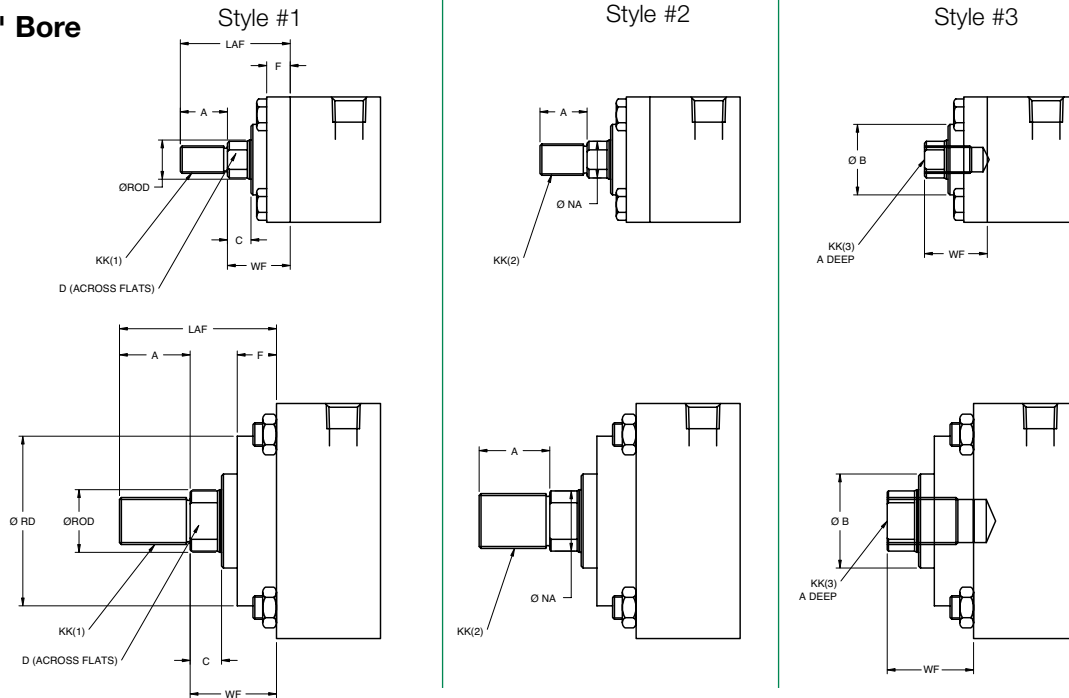
Note: Larger port sizes per given bore may require slight changes in the "P" dimension

Bore	Rod	1/8 NPTF	1/4 NPTF	3/8 NPTF	1/2 NPTF	3/4 NPTF	1 NPTF	1-1/4 NPTF
1-1/2"	5/8	•	•	•	N/A	N/A	N/A	N/A
	1	•	•	N/A	N/A	N/A	N/A	N/A
2"	5/8	•	•	•	•	N/A	N/A	N/A
	1	•	•	•	N/A	N/A	N/A	N/A
	1-3/8	•	•	•	N/A	N/A	N/A	N/A
2-1/2"	5/8	•	•	•	•	N/A	N/A	N/A
	1	•	•	•	•	N/A	N/A	N/A
	1-3/8	•	•	•	N/A	N/A	N/A	N/A
	1-3/4	•	•	•	•	N/A	N/A	N/A
3-1/4"	1	•	•	•	•	•	N/A	N/A
	1-3/8	•	•	•	•	•	N/A	N/A
	1-3/4	•	•	•	•	N/A	N/A	N/A
	2	•	•	•	•	N/A	N/A	N/A
4"	1	•	•	•	•	•	N/A	N/A
	1-3/8	•	•	•	•	•	N/A	N/A
	1-3/4	•	•	•	•	•	N/A	N/A
	2	•	•	•	•	•	N/A	N/A
5"	1	•	•	•	•	•	N/A	N/A
	1-3/8	•	•	•	•	•	N/A	N/A
	1-3/4	•	•	•	•	•	N/A	N/A
	2	•	•	•	•	•	N/A	N/A
6"	1-3/8	•	•	•	•	•	•	N/A
	1-3/4	•	•	•	•	•	•	N/A
	2	•	•	•	•	•	N/A	N/A
	2-1/2	•	•	•	•	•	N/A	N/A
8"	1-3/8	•	•	•	•	•	•	N/A
	1-3/4	•	•	•	•	•	•	N/A
	2	•	•	•	•	•	•	N/A
	2-1/2	•	•	•	•	•	•	N/A
10"	1-3/4	•	•	•	•	•	•	N/A
	2	•	•	•	•	•	•	N/A
	2-1/2	•	•	•	•	•	•	N/A
12"	3	•	•	•	•	•	N/A	N/A
	2	•	•	•	•	•	•	•
	2-1/2	•	•	•	•	•	•	•
	3	•	•	•	•	•	•	N/A
14"	3-1/2	•	•	•	•	•	•	N/A
	2-1/2	•	•	•	•	•	•	•
	3	•	•	•	•	•	•	•
14"	3-1/2	•	•	•	•	•	•	•
	3-1/2	•	•	•	•	•	•	•

Dimensions: Inches

Standard and Optional Rod Ends

1-1/2" – 6" Bore

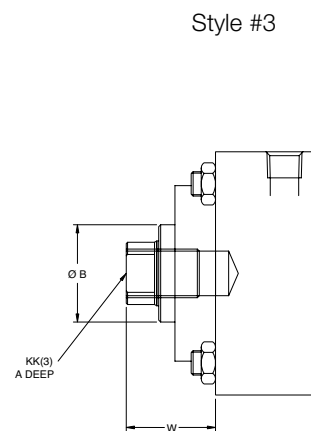
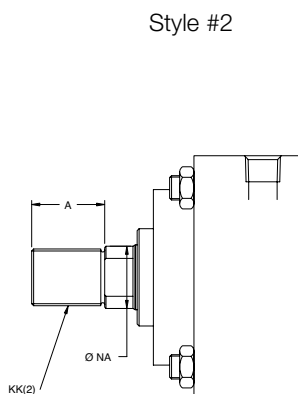
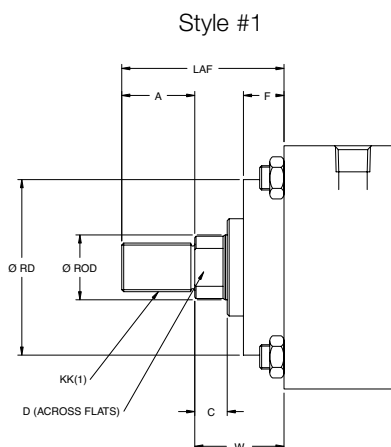


Bore	Rod	KK(1)	KK(2)	KK(3)	A	B	C	D	NA	LAF	WF	F
1-1/2"	5/8	7/16-20	1/2-20	7/16-20	0.750	1.125	0.375	0.500	0.585	1.750	1.000	0.375
	1	3/4-16	7/8-14	3/4-16	1.125	1.400	0.500	0.813	0.960	2.500	1.375	0.375
2"	5/8	7/16-20	1/2-20	7/16-20	0.750	1.125	0.375	0.500	0.585	1.750	1.000	0.375
	1	3/4-16	7/8-14	3/4-16	1.125	1.500	0.500	0.813	0.960	2.500	1.375	0.375
2-1/2"	1-3/8	1-14	1 1/4-12	1-14	1.625	2.000	0.625	1.125	1.313	3.250	1.625	0.375
	5/8	7/16-20	1/2-20	7/16-20	0.750	1.125	0.375	0.500	0.585	1.750	1.000	0.375
	1	3/4-16	7/8-14	3/4-16	1.125	1.500	0.500	0.813	0.960	2.500	1.375	0.375
	1-3/8	1-14	1 1/4-12	1-14	1.625	2.000	0.625	1.125	1.313	3.250	1.625	0.375
3-1/4"	1-3/4	1 1/4-12	1 1/2-12	1 1/4-12	2.000	2.375	0.750	1.500	1.688	3.875	1.875	0.625
	1	3/4-16	7/8-14	3/4-16	1.125	1.500	0.500	0.813	0.960	2.500	1.375	0.625
	1-3/8	1-14	1 1/4-12	1-14	1.625	2.000	0.625	1.125	1.313	3.250	1.625	0.625
	2	1 1/2-12	1 3/4-12	1 1/2-12	2.250	2.625	0.875	1.750	1.940	4.250	2.000	0.625
4"	1	3/4-16	7/8-14	3/4-16	1.125	1.500	0.500	0.813	0.960	2.500	1.375	0.625
	1-3/8	1-14	1 1/4-12	1-14	1.625	2.000	0.625	1.125	1.313	3.250	1.625	0.625
	1-3/4	1 1/4-12	1 1/2-12	1 1/4-12	2.000	2.375	0.750	1.500	1.688	3.875	1.875	0.625
	2	1 1/2-12	1 3/4-12	1 1/2-12	2.250	2.625	0.875	1.750	1.940	4.250	2.000	0.625
5"	1	3/4-16	7/8-14	3/4-16	1.125	1.500	0.500	0.813	0.960	2.500	1.375	0.625
	1-3/8	1-14	1 1/4-12	1-14	1.625	2.000	0.625	1.125	1.313	3.250	1.625	0.625
	1-3/4	1 1/4-12	1 1/2-12	1 1/4-12	2.000	2.375	0.750	1.500	1.688	3.875	1.875	0.625
	2	1 1/2-12	1 3/4-12	1 1/2-12	2.250	2.625	0.875	1.750	1.940	4.250	2.000	0.625
6"	1-3/8	1-14	1 1/4-12	1-14	1.625	2.000	0.625	1.125	1.313	3.250	1.625	0.750
	1-3/4	1 1/4-12	1 1/2-12	1 1/4-12	2.000	2.375	0.750	1.500	1.688	3.875	1.875	0.750
	2	1 1/2-12	1 3/4-12	1 1/2-12	2.250	2.625	0.875	1.750	1.940	4.250	2.000	0.750
	2-1/2	1 7/8-12	2 1/4-12	1 7/8-12	3.000	3.125	1.000	2.060	2.440	5.250	2.250	0.750

Dimensions: Inches

Large Bore

8" – 14" Bore: Standard and Optional Rod Ends

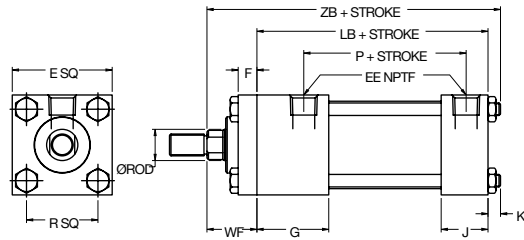


Bore	Rod	KK(1)	KK(2)	KK(3)	A	B	C	D	NA	LAF	W	F
8"	1-3/8	1-14	1 1/4-12	1-14	1.625	2.000	0.625	1.125	1.313	3.250	1.625	0.750
	1-3/4	1 1/4-12	1 1/2-12	1 1/4-12	2.000	2.375	0.750	1.500	1.688	3.875	1.875	0.750
	2	1 1/2-12	1 3/4-12	1 1/2-12	2.250	2.625	0.875	1.750	1.940	4.250	2.000	0.750
	2-1/2	1 7/8-12	2 1/4-12	1 7/8-12	3.000	3.125	1.000	2.060	2.440	5.250	2.250	0.750
10"	1-3/4	1 1/4-12	1 1/2-12	1 1/4-12	2.000	3.125	0.750	1.500	1.690	3.875	1.875	0.750
	2	1 1/2-12	1 3/4-12	1 1/2-12	2.250	3.125	0.875	1.750	1.940	4.250	2.000	0.750
	2-1/2	1 7/8-12	2 1/4-12	1 7/8-12	3.000	3.125	1.000	2.060	2.440	5.250	2.250	0.750
	3	2 1/4-12	2 3/4-12	2 1/4-12	3.500	3.750	1.000	2.625	2.875	5.750	2.250	0.750
12"	2	1 1/2-12	1 3/4-12	1 1/2-12	2.250	3.125	0.875	1.750	1.940	4.250	2.000	0.750
	2-1/2	1 7/8-12	2 1/4-12	1 7/8-12	3.000	3.125	1.000	2.060	2.440	5.250	2.250	0.750
	3	2 1/4-12	2 3/4-12	2 1/4-12	3.500	3.750	1.000	2.625	2.875	5.750	2.250	0.750
	3-1/2	2 1/2-12	3 1/4-12	2 1/2-12	3.500	4.250	1.000	3.000	3.438	5.750	2.250	0.750
14"	2-1/2	1 7/8-12	2 1/4-12	1 7/8-12	3.000	3.125	1.000	2.060	2.440	5.250	2.250	0.750
	3	2 1/4-12	2 3/4-12	2 1/4-12	3.500	3.750	1.000	2.625	2.875	5.750	2.250	0.750
	3-1/2	2 1/2-12	3 1/4-12	2 1/2-12	3.500	4.250	1.000	3.000	3.438	5.750	2.250	0.750

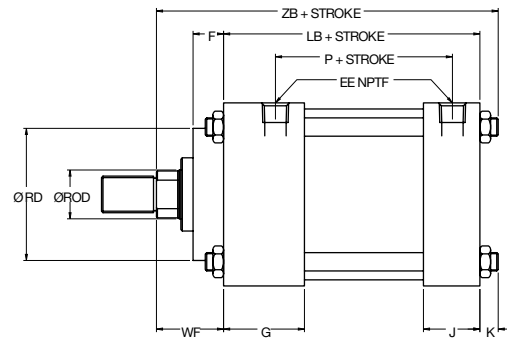
Dimensions: Inches

Basic No Mount Cylinder

1-1/2" through 2-1/2" Bore



3-1/4" through 6" Bore



Bore	Rod	E	EE	F	G	J	K	LB	P	R	RD	WF	ZB
1-1/2"	5/8	2.000	0.375	0.375	1.500	1.000	0.250	3.625	2.250	1.430	N/A	1.000	4.875
	1	2.000	0.250	0.375	1.500	1.000	0.250	3.625	2.103	1.430	N/A	1.375	5.250
2"	5/8	2.500	0.375	0.375	1.500	1.000	0.313	3.625	2.250	1.840	N/A	1.000	4.938
	1	2.500	0.375	0.375	1.500	1.000	0.313	3.625	2.250	1.840	N/A	1.375	5.313
	1-3/8	2.500	0.375	0.375	1.500	1.000	0.313	3.625	2.250	1.840	N/A	1.625	5.563
2-1/2"	5/8	3.000	0.375	0.375	1.500	1.000	0.313	3.750	2.375	2.190	N/A	1.000	5.062
	1	3.000	0.375	0.375	1.500	1.000	0.313	3.750	2.375	2.190	N/A	1.375	5.438
	1-3/8	3.000	0.375	0.375	1.500	1.000	0.313	3.750	2.375	2.190	N/A	1.625	5.688
	1-3/4	3.000	0.375	0.375	1.500	1.000	0.313	3.750	2.375	2.190	N/A	1.875	5.938
3-1/4"	1	3.750	0.500	0.625	1.750	1.250	0.375	4.250	2.625	2.760	2.706	1.375	6.000
	1-3/8	3.750	0.500	0.625	1.750	1.250	0.375	4.250	2.625	2.760	3.110	1.625	6.250
	1-3/4	3.750	0.500	0.625	1.750	1.250	0.375	4.250	2.625	2.760	N/A	1.875	6.500
	2	3.750	0.500	0.625	1.750	1.250	0.375	4.250	2.625	2.760	N/A	2.000	6.625
4"	1	4.500	0.500	0.625	1.750	1.250	0.375	4.250	2.625	3.320	2.706	1.375	6.000
	1-3/8	4.500	0.500	0.625	1.750	1.250	0.375	4.250	2.625	3.320	3.110	1.625	6.250
	1-3/4	4.500	0.500	0.625	1.750	1.250	0.375	4.250	2.625	3.320	3.788	1.875	6.500
	2	4.500	0.500	0.625	1.750	1.250	0.375	4.250	2.625	3.320	N/A	2.000	6.625
5"	1	5.500	0.500	0.625	1.750	1.250	0.500	4.500	2.875	4.100	2.706	1.375	6.375
	1-3/8	5.500	0.500	0.625	1.750	1.250	0.500	4.500	2.875	4.100	3.110	1.625	6.625
	1-3/4	5.500	0.500	0.625	1.750	1.250	0.500	4.500	2.875	4.100	3.788	1.875	6.875
	2	5.500	0.500	0.625	1.750	1.250	0.500	4.500	2.875	4.100	4.250	2.000	7.000
6"	1-3/8	6.500	0.750	0.750	2.000	1.500	0.500	5.000	3.125	4.880	3.110	1.625	7.125
	1-3/4	6.500	0.750	0.750	2.000	1.500	0.500	5.000	3.125	4.880	3.788	1.875	7.375
	2	6.500	0.750	0.750	2.000	1.500	0.500	5.000	3.125	4.880	4.250	2.000	7.500
	2-1/2	6.500	0.750	0.750	2.000	1.500	0.500	5.000	3.125	4.880	5.500	2.500	8.000

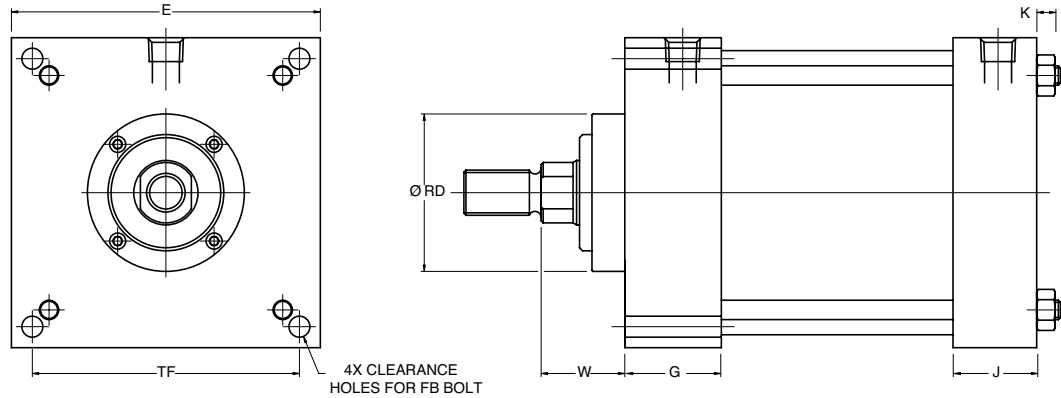
Dimensions: Inches

Large Bore

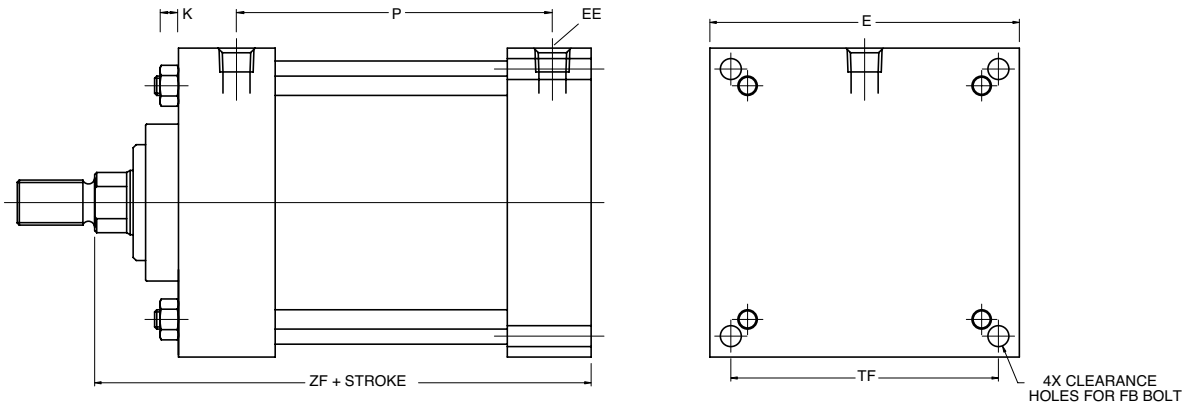
E3 and E4 Mount

8" through 14" Bore

E3 Mount



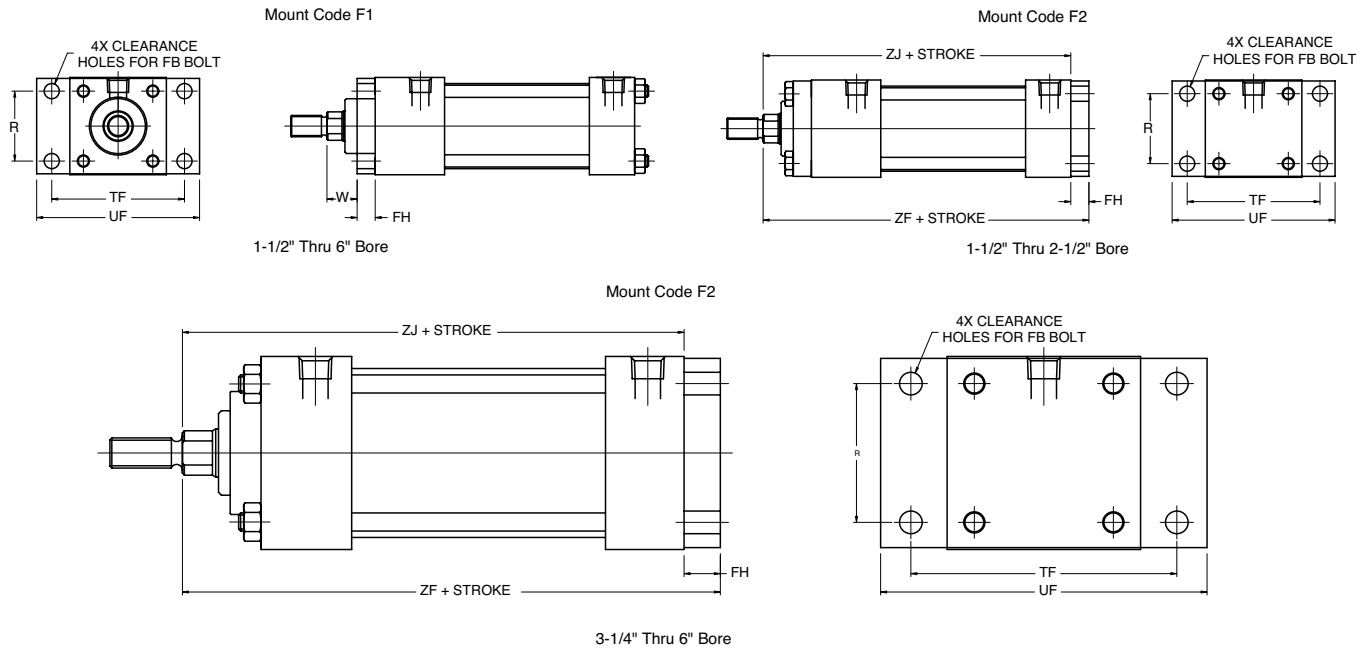
E4 Mount



Bore	Rod	E	EE	F	FB	G	J	K	LB	P	RD	TF	W	ZF
8"	1-3/8	8.500	0.750	0.625	0.625	2.000	1.500	0.625	5.125	3.250	3.110	7.580	1.625	6.750
	1-3/4	8.500	0.750	0.750	0.625	2.000	1.500	0.625	5.125	3.250	3.788	7.580	1.875	7.000
	2	8.500	0.750	0.750	0.625	2.000	1.500	0.625	5.125	3.250	4.250	7.580	2.000	7.125
	2-1/2	8.500	0.750	0.750	0.625	2.000	1.500	0.625	5.125	3.250	5.500	7.580	2.250	7.375
10"	1-3/4	10.625	1.000	0.750	0.750	2.250	2.000	0.750	6.375	4.125	3.788	9.400	1.875	8.250
	2	10.625	1.000	0.750	0.750	2.250	2.000	0.750	6.375	4.125	4.250	9.400	2.000	8.375
	2-1/2	10.625	1.000	0.750	0.750	2.250	2.000	0.750	6.375	4.125	5.500	9.400	2.250	8.625
	3	10.625	1.000	0.750	0.750	2.250	2.000	0.750	6.375	4.125	7.500	9.400	2.250	8.625
12"	2	12.750	1.000	0.750	0.750	2.250	2.000	0.750	6.875	4.625	4.250	11.100	2.000	8.875
	2-1/2	12.750	1.000	0.750	0.750	2.250	2.000	0.750	6.875	4.625	5.500	11.100	2.250	9.125
	3	12.750	1.000	0.750	0.750	2.250	2.000	0.750	6.875	4.625	7.500	11.100	2.250	9.125
	3-1/2	12.750	1.000	0.750	0.750	2.250	2.000	0.750	6.875	4.625	7.500	11.100	2.250	9.125
14"	2-1/2	14.750	1.250	0.750	0.875	2.750	2.250	0.875	8.125	5.500	5.500	12.870	2.250	10.375
	3	14.750	1.250	0.750	0.875	2.750	2.250	0.875	8.125	5.500	7.500	12.870	2.250	10.375
	3-1/2	14.750	1.250	0.750	0.875	2.750	2.250	0.875	8.125	5.500	7.500	12.870	2.250	10.375

Dimensions: Inches

F1 and F2 Mounts

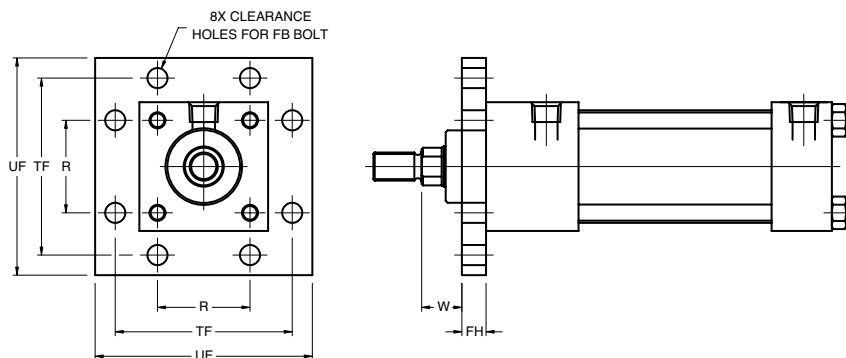


Bore	Rod	FB	FH	R	TF	UF	W	ZJ	ZF
1-1/2"	5/8	0.250	0.380	1.430	2.750	3.380	0.630	4.630	5.000
	1	0.250	0.380	1.430	2.750	3.380	1.000	5.000	5.380
2"	5/8	0.310	0.380	1.840	3.380	4.130	0.630	4.630	5.000
	1	0.310	0.380	1.840	3.380	4.130	1.000	5.000	5.380
	1-3/8	0.310	0.380	1.840	3.380	4.130	1.250	5.250	5.630
2-1/2"	5/8	0.310	0.380	2.190	3.880	4.630	0.630	4.750	5.130
	1	0.310	0.380	2.190	3.880	4.630	1.000	5.130	5.500
	1-3/8	0.310	0.380	2.190	3.880	4.630	1.250	5.380	5.750
	1-3/4	0.310	0.380	2.190	3.880	4.630	1.500	5.630	6.000
3-1/4"	1	0.380	0.630	2.760	4.690	5.500	0.750	5.630	6.250
	1-3/8	0.380	0.630	2.760	4.690	5.500	1.000	5.880	6.500
	1-3/4	0.380	0.630	2.760	4.690	5.500	1.250	6.130	6.750
	2	0.380	0.630	2.760	4.690	5.500	1.380	6.250	6.880
4"	1	0.380	0.630	3.320	5.440	6.250	0.750	5.630	6.250
	1-3/8	0.380	0.630	3.320	5.440	6.250	1.000	5.880	6.500
	1-3/4	0.380	0.630	3.320	5.440	6.250	1.250	6.130	6.750
	2	0.380	0.630	3.320	5.440	6.250	1.380	6.250	6.880
5"	1	0.500	0.630	4.100	6.630	7.630	0.750	5.880	6.500
	1-3/8	0.500	0.630	4.100	6.630	7.630	1.000	6.130	6.750
	1-3/4	0.500	0.630	4.100	6.630	7.630	1.250	6.380	7.000
	2	0.500	0.630	4.100	6.630	7.630	1.380	6.500	7.130
6"	1-3/8	0.500	0.750	4.880	7.630	8.630	0.880	6.630	7.380
	1-3/4	0.500	0.750	4.880	7.630	8.630	1.130	6.880	7.630
	2	0.500	0.750	4.880	7.630	8.630	1.250	7.000	7.750
	2-1/2	0.500	0.750	4.880	7.630	8.630	1.500	7.250	8.000

Dimensions: Inches

F5 Mount

Mount Code F5

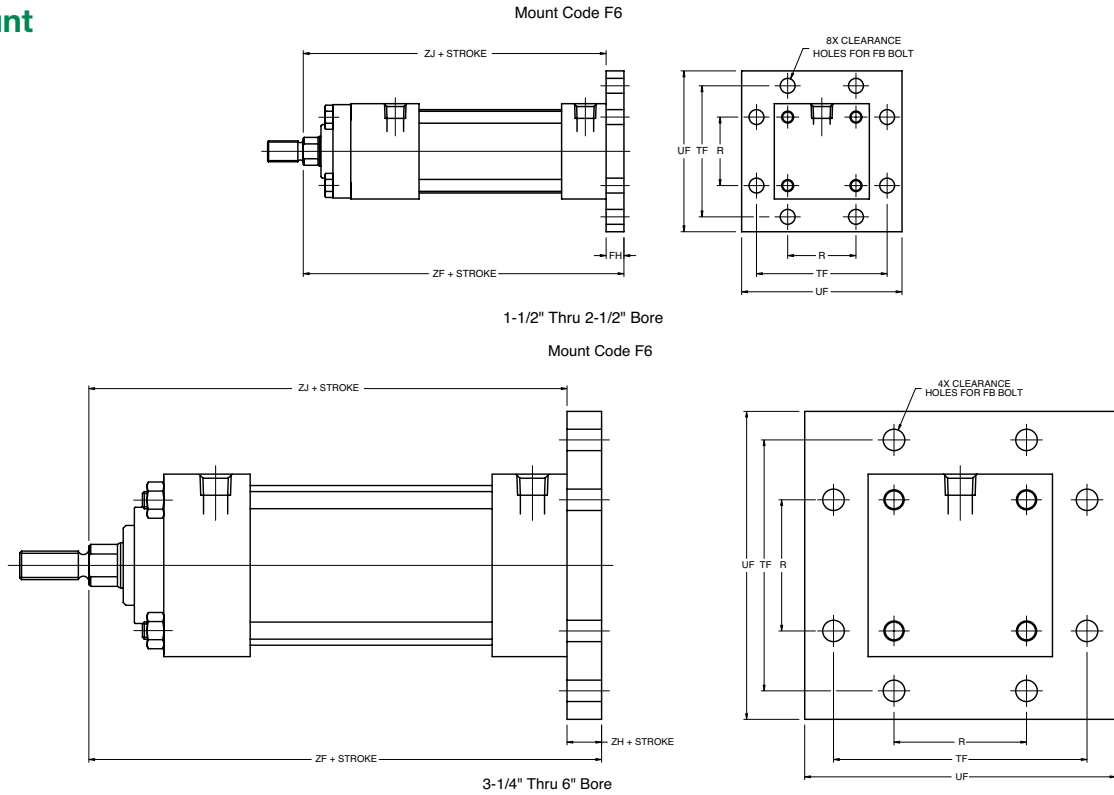


1-1/2" Thru 6" Bore

Bore	Rod	FB	FH	R	TF	UF	W
1-1/2"	5/8	0.250	0.380	1.430	2.750	3.380	0.630
	1	0.250	0.380	1.430	2.750	3.380	1.000
2"	5/8	0.310	0.380	1.840	3.380	4.130	0.630
	1	0.310	0.380	1.840	3.380	4.130	1.000
	1-3/8	0.310	0.380	1.840	3.380	4.130	1.250
2-1/2"	5/8	0.310	0.380	2.190	3.880	4.630	0.630
	1	0.310	0.380	2.190	3.880	4.630	1.000
	1-3/8	0.310	0.380	2.190	3.880	4.630	1.250
	1-3/4	0.310	0.380	2.190	3.880	4.630	1.500
3-1/4"	1	0.380	0.630	2.760	4.690	5.500	0.750
	1-3/8	0.380	0.630	2.760	4.690	5.500	1.000
	1-3/4	0.380	0.630	2.760	4.690	5.500	1.250
	2	0.380	0.630	2.760	4.690	5.500	1.380
4"	1	0.380	0.630	3.320	5.440	6.250	0.750
	1-3/8	0.380	0.630	3.320	5.440	6.250	1.000
	1-3/4	0.380	0.630	3.320	5.440	6.250	1.250
	2	0.380	0.630	3.320	5.440	6.250	1.380
5"	1	0.500	0.630	4.100	6.630	7.630	0.750
	1-3/8	0.500	0.630	4.100	6.630	7.630	1.000
	1-3/4	0.500	0.630	4.100	6.630	7.630	1.250
	2	0.500	0.630	4.100	6.630	7.630	1.380
6"	1-3/8	0.500	0.750	4.880	7.630	8.630	0.880
	1-3/4	0.500	0.750	4.880	7.630	8.630	1.130
	2	0.500	0.750	4.880	7.630	8.630	1.250
	2-1/2	0.500	0.750	4.880	7.630	8.630	1.500

Dimensions: Inches

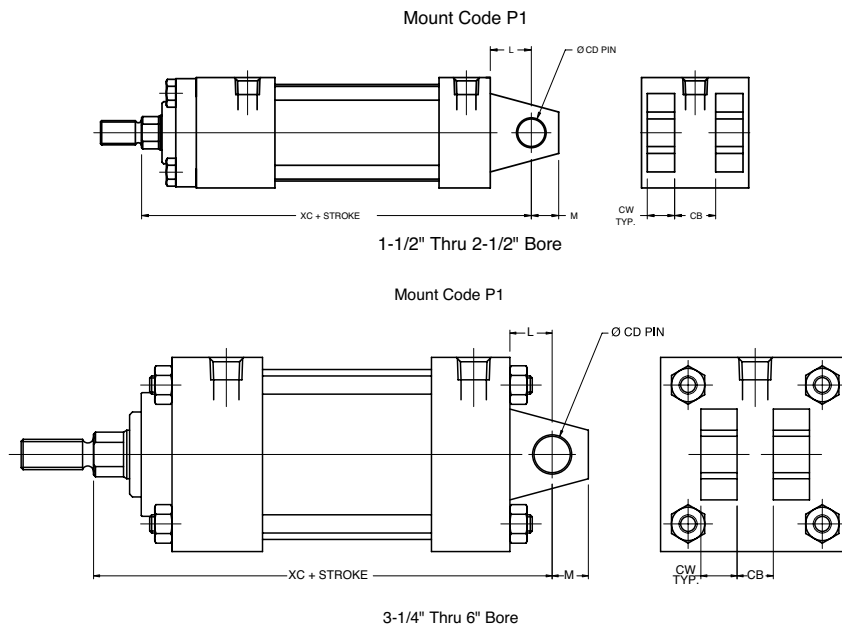
F6 Mount



Bore	Rod	FB	FH	R	TF	UF	ZJ	ZF
1-1/2"	5/8	0.250	0.380	1.430	2.750	3.380	4.630	5.000
	1	0.250	0.380	1.430	2.750	3.380	5.000	5.380
2"	5/8	0.310	0.380	1.840	3.380	4.130	4.630	5.000
	1	0.310	0.380	1.840	3.380	4.130	5.000	5.380
	1-3/8	0.310	0.380	1.840	3.380	4.130	5.250	5.630
2-1/2"	5/8	0.310	0.380	2.190	3.880	4.630	4.750	5.130
	1	0.310	0.380	2.190	3.880	4.630	5.130	5.500
	1-3/8	0.310	0.380	2.190	3.880	4.630	5.380	5.750
	1-3/4	0.310	0.380	2.190	3.880	4.630	5.630	6.000
3-1/4"	1	0.380	0.630	2.760	4.690	5.500	5.630	6.250
	1-3/8	0.380	0.630	2.760	4.690	5.500	5.880	6.500
	1-3/4	0.380	0.630	2.760	4.690	5.500	6.130	6.750
	2	0.380	0.630	2.760	4.690	5.500	6.250	6.880
4"	1	0.380	0.630	3.320	5.440	6.250	5.630	6.250
	1-3/8	0.380	0.630	3.320	5.440	6.250	5.880	6.500
	1-3/4	0.380	0.630	3.320	5.440	6.250	6.130	6.750
	2	0.380	0.630	3.320	5.440	6.250	6.250	6.880
5"	1	0.500	0.630	4.100	6.630	7.630	5.880	6.500
	1-3/8	0.500	0.630	4.100	6.630	7.630	6.130	6.750
	1-3/4	0.500	0.630	4.100	6.630	7.630	6.380	7.000
	2	0.500	0.630	4.100	6.630	7.630	6.500	7.130
6"	1-3/8	0.500	0.750	4.880	7.630	8.630	6.630	7.380
	1-3/4	0.500	0.750	4.880	7.630	8.630	6.880	7.630
	2	0.500	0.750	4.880	7.630	8.630	7.000	7.750
	2-1/2	0.500	0.750	4.880	7.630	8.630	7.250	8.000

Dimensions: Inches

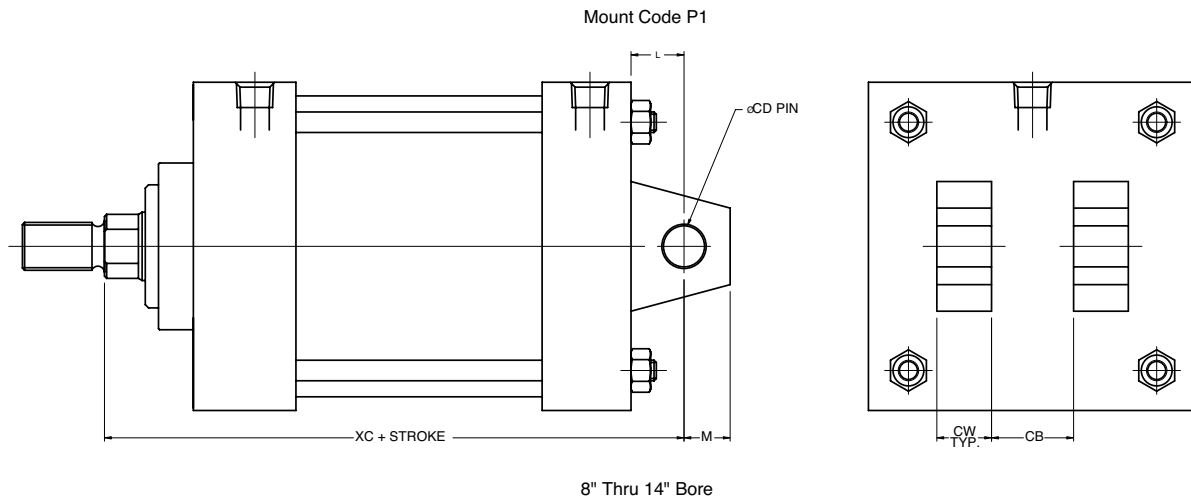
P1 Mounts



Bore	Rod	CB	CD	CW	L	M	XC
1-1/2"	5/8	0.75	0.500	0.50	0.75	0.500	5.38
	1	0.75	0.500	0.50	0.75	0.500	5.75
2"	5/8	0.75	0.500	0.50	0.75	0.500	5.38
	1	0.75	0.500	0.50	0.75	0.500	5.75
	1-3/8	0.75	0.500	0.50	0.75	0.500	6.00
2-1/2"	5/8	0.75	0.500	0.50	0.75	0.500	5.50
	1	0.75	0.500	0.50	0.75	0.500	5.88
	1-3/8	0.75	0.500	0.50	0.75	0.500	6.13
	1-3/4	0.75	0.500	0.50	0.75	0.500	6.38
3-1/4"	1	1.25	0.750	0.63	1.25	0.750	6.88
	1-3/8	1.25	0.750	0.63	1.25	0.750	7.13
	1-3/4	1.25	0.750	0.63	1.25	0.750	7.38
	2	1.25	0.750	0.63	1.25	0.750	7.50
4"	1	1.25	0.750	0.63	1.25	0.750	6.88
	1-3/8	1.25	0.750	0.63	1.25	0.750	7.13
	1-3/4	1.25	0.750	0.63	1.25	0.750	7.38
	2	1.25	0.750	0.63	1.25	0.750	7.50
5"	1	1.25	0.750	0.63	1.25	0.750	7.13
	1-3/8	1.25	0.750	0.63	1.25	0.750	7.38
	1-3/4	1.25	0.750	0.63	1.25	0.750	7.63
	2	1.25	0.750	0.63	1.25	0.750	7.75
6"	1-3/8	1.50	1.000	0.75	1.50	1.000	8.13
	1-3/4	1.50	1.000	0.75	1.50	1.000	8.38
	2	1.50	1.000	0.75	1.50	1.000	8.50
	2-1/2	1.50	1.000	0.75	1.50	1.000	8.75

Dimensions: Inches

P1 Mounts Continued

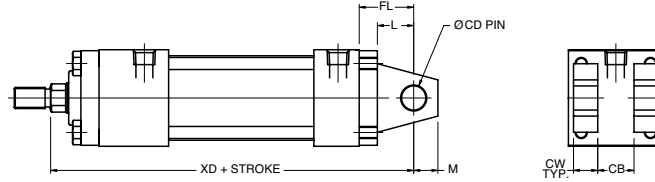


Bore	Rod	CB	CD	CW	L	M	XC
8"	1-3/8	1.50	1.000	0.75	1.50	1.00	8.25
	1-3/4	1.50	1.000	0.75	1.50	1.00	8.50
	2	1.50	1.000	0.75	1.50	1.00	8.63
	2-1/2	1.50	1.000	0.75	1.50	1.00	8.88
10"	1-3/4	2.00	1.375	1.00	2.13	1.38	10.38
	2	2.00	1.375	1.00	2.13	1.38	10.50
	2-1/2	2.00	1.375	1.00	2.13	1.38	10.75
	3	2.00	1.375	1.00	2.13	1.38	10.75
12"	2	2.50	1.750	1.25	2.25	1.75	11.13
	2-1/2	2.50	1.750	1.25	2.25	1.75	11.38
	3	2.50	1.750	1.25	2.25	1.75	11.38
	3-1/2	2.50	1.750	1.25	2.25	1.75	11.38
14"	2-1/2	2.50	2.000	1.25	2.50	2.00	12.88
	3	2.50	2.000	1.25	2.50	2.00	12.88
	3-1/2	2.50	2.000	1.25	2.50	2.00	12.88

Dimensions: Inches

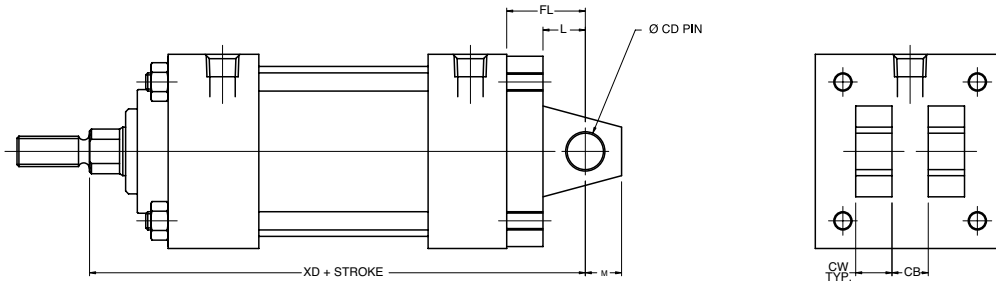
P2 Mounts

Mount Code P2



1-1/2" Thru 2-1/2" Bore

Mount Code P2

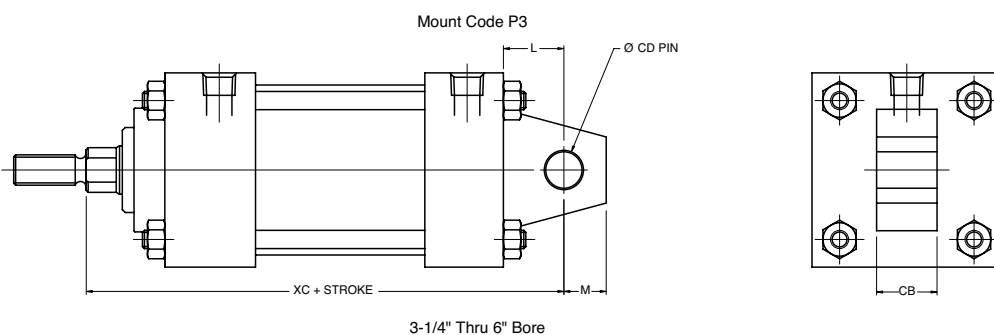
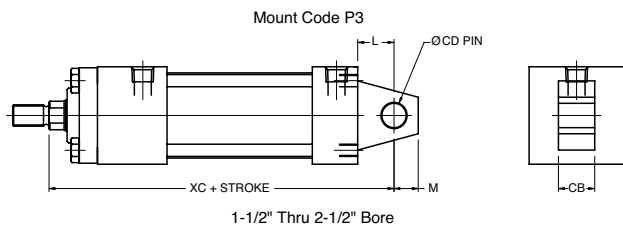


3-1/4" Thru 8" Bore

Bore	Rod	CB	CD	CW	FL	L	M	ZD
1-1/2"	5/8	0.75	0.500	0.50	1.13	0.75	0.50	5.75
	1	0.75	0.500	0.50	1.13	0.75	0.50	6.13
2"	5/8	0.75	0.500	0.50	1.13	0.75	0.50	5.75
	1	0.75	0.500	0.50	1.13	0.75	0.50	6.13
	1-3/8	0.75	0.500	0.50	1.13	0.75	0.50	6.38
2-1/2"	5/8	0.75	0.500	0.50	1.13	0.75	0.50	5.88
	1	0.75	0.500	0.50	1.13	0.75	0.50	6.25
	1-3/8	0.75	0.500	0.50	1.13	0.75	0.50	6.50
	1-3/4	0.75	0.500	0.50	1.13	0.75	0.50	6.75
3-1/4"	1	1.25	0.750	0.63	1.88	1.25	0.75	7.50
	1-3/8	1.25	0.750	0.63	1.88	1.25	0.75	7.75
	1-3/4	1.25	0.750	0.63	1.88	1.25	0.75	8.00
	2	1.25	0.750	0.63	1.88	1.25	0.75	8.13
4"	1	1.25	0.750	0.63	1.88	1.25	0.75	7.50
	1-3/8	1.25	0.750	0.63	1.88	1.25	0.75	7.75
	1-3/4	1.25	0.750	0.63	1.88	1.25	0.75	8.00
	2	1.25	0.750	0.63	1.88	1.25	0.75	8.13
5"	1	1.25	0.750	0.63	1.88	1.25	0.75	7.75
	1-3/8	1.25	0.750	0.63	1.88	1.25	0.75	8.00
	1-3/4	1.25	0.750	0.63	1.88	1.25	0.75	8.50
	2	1.25	0.750	0.63	1.88	1.25	0.75	8.38
6"	1-3/8	1.50	1.000	0.75	2.25	1.50	1.00	8.88
	1-3/4	1.50	1.000	0.75	2.25	1.50	1.00	9.13
	2	1.50	1.000	0.75	2.25	1.50	1.00	9.25
	2-1/2	1.50	1.000	0.75	2.25	1.50	1.00	9.50
8"	1-3/8	1.50	1.000	0.75	2.25	1.50	1.00	9.00
	1-3/4	1.50	1.000	0.75	2.25	1.50	1.00	9.25
	2	1.50	1.000	0.75	2.25	1.50	1.00	9.38
	2-1/2	1.50	1.000	0.75	2.25	1.50	1.00	9.63

Dimensions: Inches

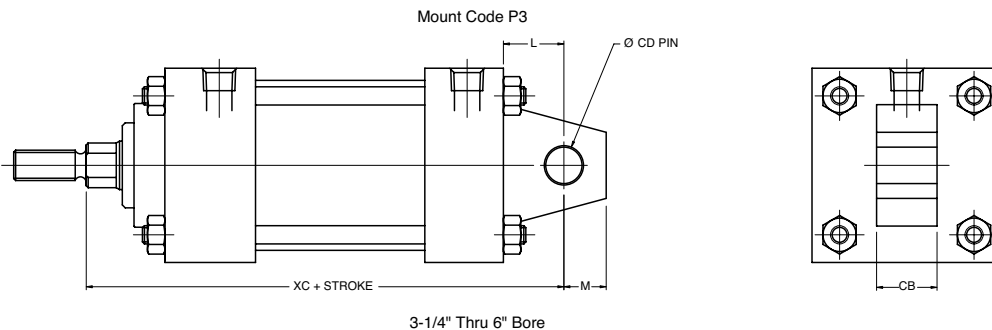
P3 Mounts



Bore	Rod	CB	CD	L	M	XC
1-1/2"	5/8	0.75	0.500	0.75	0.50	5.38
	1	0.75	0.500	0.75	0.50	5.75
2"	5/8	0.75	0.500	0.75	0.50	5.38
	1	0.75	0.500	0.75	0.50	5.75
	1-3/8	0.75	0.500	0.75	0.50	6.00
2-1/2"	5/8	0.75	0.500	0.75	0.50	5.50
	1	0.75	0.500	0.75	0.50	5.88
	1-3/8	0.75	0.500	0.75	0.50	6.13
	1-3/4	0.75	0.500	0.75	0.50	6.38
3-1/4"	1	1.25	0.750	1.25	0.75	6.88
	1-3/8	1.25	0.750	1.25	0.75	7.13
	1-3/4	1.25	0.750	1.25	0.75	7.38
	2	1.25	0.750	1.25	0.75	7.50
4"	1	1.25	0.750	1.25	0.75	6.88
	1-3/8	1.25	0.750	1.25	0.75	7.13
	1-3/4	1.25	0.750	1.25	0.75	7.38
	2	1.25	0.750	1.25	0.75	7.50
5"	1	1.25	0.750	1.25	0.75	7.13
	1-3/8	1.25	0.750	1.25	0.75	7.38
	1-3/4	1.25	0.750	1.25	0.75	7.63
	2	1.25	0.750	1.25	0.75	7.75
6"	1-3/8	1.50	1.000	1.50	1.00	8.13
	1-3/4	1.50	1.000	1.50	1.00	8.38
	2	1.50	1.000	1.50	1.00	8.50
	2-1/2	1.50	1.000	1.50	1.00	8.75

Dimensions: Inches

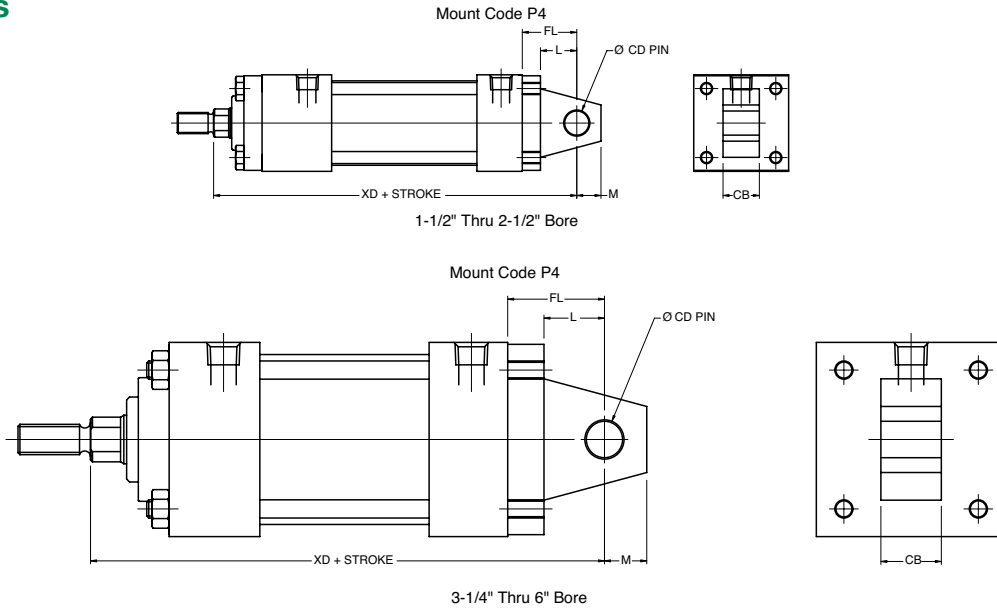
P3 Mounts Continued



Bore	Rod	CB	CD	L	M	XC
8"	1-3/8	1.50	1.000	1.50	1.00	8.25
	1-3/4	1.50	1.000	1.50	1.00	8.50
	2	1.50	1.000	1.50	1.00	8.63
	2-1/2	1.50	1.000	1.50	1.00	8.88
10"	1-3/4	2.00	1.375	2.13	1.38	10.38
	2	2.00	1.375	2.13	1.38	10.50
	2-1/2	2.00	1.375	2.13	1.38	10.75
	3	2.00	1.375	2.13	1.38	10.75
12"	2	2.50	1.750	2.25	1.75	11.13
	2-1/2	2.50	1.750	2.25	1.75	11.38
	3	2.50	1.750	2.25	1.75	11.38
	3-1/2	2.50	1.750	2.25	1.75	11.38
14"	2-1/2	2.50	2.000	2.50	2.00	12.88
	3	2.50	2.000	2.50	2.00	12.88
	3-1/2	2.50	2.000	2.50	2.00	12.88

Dimensions: Inches

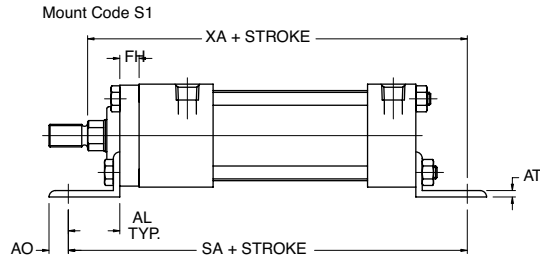
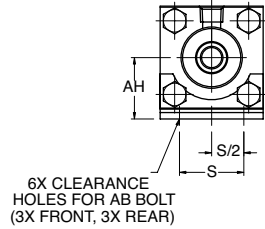
P4 Mounts



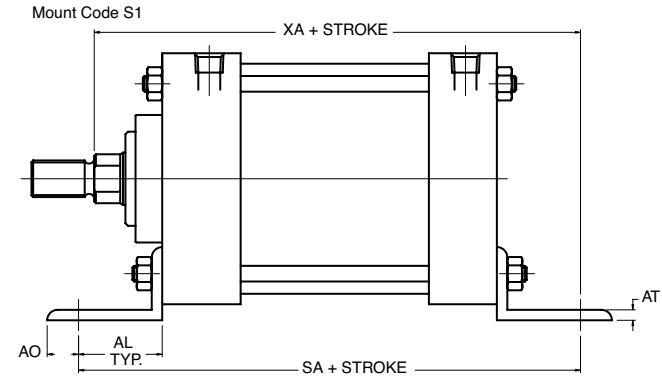
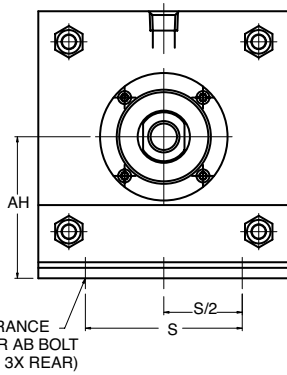
Bore	Rod	CB	CD	FL	L	M	XD
1-1/2"	5/8	0.75	0.500	1.13	0.75	0.50	5.75
	1	0.75	0.500	1.13	0.75	0.50	6.13
2"	5/8	0.75	0.500	1.13	0.75	0.50	5.75
	1	0.75	0.500	1.13	0.75	0.50	6.13
	1-3/8	0.75	0.500	1.13	0.75	0.50	6.38
2-1/2"	5/8	0.75	0.500	1.13	0.75	0.50	5.88
	1	0.75	0.500	1.13	0.75	0.50	6.25
	1-3/8	0.75	0.500	1.13	0.75	0.50	6.50
3-1/4"	1-3/4	0.75	0.500	1.13	0.75	0.50	6.75
	1	1.25	0.750	1.88	1.25	0.75	7.50
	1-3/8	1.25	0.750	1.88	1.25	0.75	7.75
	1-3/4	1.25	0.750	1.88	1.25	0.75	8.00
4"	2	1.25	0.750	1.88	1.25	0.75	8.13
	1	1.25	0.750	1.88	1.25	0.75	7.50
	1-3/8	1.25	0.750	1.88	1.25	0.75	7.75
	1-3/4	1.25	0.750	1.88	1.25	0.75	8.00
5"	2	1.25	0.750	1.88	1.25	0.75	8.13
	1	1.25	0.750	1.88	1.25	0.75	7.75
	1-3/8	1.25	0.750	1.88	1.25	0.75	8.00
	1-3/4	1.25	0.750	1.88	1.25	0.75	8.50
6"	2	1.25	0.750	1.88	1.25	0.75	8.38
	1-3/8	1.50	1.000	2.25	1.50	1.00	8.88
	1-3/4	1.50	1.000	2.25	1.50	1.00	9.13
	2	1.50	1.000	2.25	1.50	1.00	9.25
8"	2-1/2	1.50	1.000	2.25	1.50	1.00	9.50
	1-3/8	1.50	1.000	2.25	1.50	1.00	9.00
	1-3/4	1.50	1.000	2.25	1.50	1.00	9.25
	2	1.50	1.000	2.25	1.50	1.00	9.38
	2-1/2	1.50	1.000	2.25	1.50	1.00	9.63

Dimensions: Inches

S1 Mounts



1-1/2" Thru 2-1/2" Bore

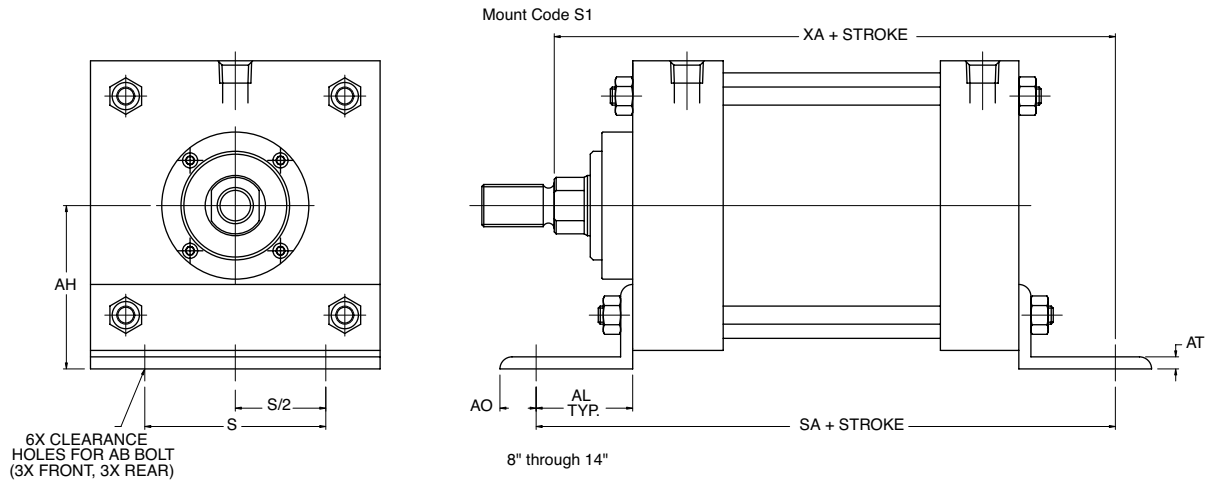


3-1/4" Thru 6" Bore

Bore	Rod	AB	AH	AL	AO	AT	FH	S	SA	XA
1-1/2"	5/8	0.38	1.19	1.00	0.38	0.13	0.38	1.25	6.00	5.63
	1	0.38	1.19	1.00	0.38	0.13	0.38	1.25	6.00	6.00
2"	5/8	0.38	1.44	1.00	0.38	0.13	0.38	1.75	6.00	5.63
	1	0.38	1.44	1.00	0.38	0.13	0.38	1.75	6.00	6.00
	1-3/8	0.38	1.44	1.00	0.38	0.13	0.38	1.75	6.00	6.25
2-1/2"	5/8	0.38	1.63	1.00	0.38	0.13	0.38	2.25	6.13	5.75
	1	0.38	1.63	1.00	0.38	0.13	0.38	2.25	6.13	6.13
	1-3/8	0.38	1.63	1.00	0.38	0.13	0.38	2.25	6.13	6.38
	1-3/4	0.38	1.63	1.00	0.38	0.13	0.38	2.25	6.13	6.63
3-1/4"	1	0.50	1.94	1.25	0.50	0.13	0.63	2.75	7.38	6.88
	1-3/8	0.50	1.94	1.25	0.50	0.13	0.63	2.75	7.38	7.13
	1-3/4	0.50	1.94	1.25	0.50	0.13	0.63	2.75	7.38	7.38
	2	0.50	1.94	1.25	0.50	0.13	0.63	2.75	7.38	7.50
4"	1	0.50	2.25	1.25	0.50	0.13	0.63	3.50	7.38	6.88
	1-3/8	0.50	2.25	1.25	0.50	0.13	0.63	3.50	7.38	7.13
	1-3/4	0.50	2.25	1.25	0.50	0.13	0.63	3.50	7.38	7.38
	2	0.50	2.25	1.25	0.50	0.13	0.63	3.50	7.38	7.50
5"	1	0.63	2.25	1.38	0.63	0.19	0.63	4.25	7.88	7.25
	1-3/8	0.63	2.25	1.38	0.63	0.19	0.63	4.25	7.88	7.50
	1-3/4	0.63	2.25	1.38	0.63	0.19	0.63	4.25	7.88	7.75
	2	0.63	2.25	1.38	0.63	0.19	0.63	4.25	7.88	7.88
6"	1-3/8	0.75	3.25	1.38	0.63	0.19	0.75	5.25	8.50	8.00
	1-3/4	0.75	3.25	1.38	0.63	0.19	0.75	5.25	8.50	8.25
	2	0.75	3.25	1.38	0.63	0.19	0.75	5.25	8.50	8.38
	2-1/2	0.75	3.25	1.38	0.63	0.19	0.75	5.25	8.50	8.63

Dimensions: Inches

S1 Mounts continued

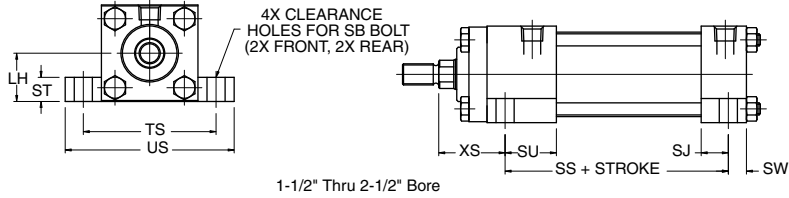


Bore	Rod	AB	AH	AL	AO	AT	S	SA	XA
8"	1-3/8	0.75	4.25	1.81	0.69	0.25	7.13	8.75	8.56
	1-3/4	0.75	4.25	1.81	0.69	0.25	7.13	8.75	8.81
	2	0.75	4.25	1.81	0.69	0.25	7.13	8.75	8.94
	2-1/2	0.75	4.25	1.81	0.69	0.25	7.13	8.75	9.91
10"	1-3/4	1.00	5.31	2.13	0.88	0.25	8.88	10.63	10.38
	2	1.00	5.31	2.13	0.88	0.25	8.88	10.63	10.50
	2-1/2	1.00	5.31	2.13	0.88	0.25	8.88	10.63	10.75
	3	1.00	5.31	2.13	0.88	0.25	8.88	10.63	10.75
12"	2	1.00	6.38	2.13	0.88	0.38	11.00	11.13	11.00
	2-1/2	1.00	6.38	2.13	0.88	0.38	11.00	11.13	11.25
	3	1.00	6.38	2.13	0.88	0.38	11.00	11.13	11.25
	3-1/2	1.00	6.38	2.13	0.88	0.38	11.00	11.13	11.25
14"	2-1/2	1.25	7.38	2.44	1.06	0.38	12.63	13.00	12.81
	3	1.25	7.38	2.44	1.06	0.38	12.63	13.00	12.81
	3-1/2	1.25	7.38	2.44	1.06	0.38	12.63	13.00	12.81

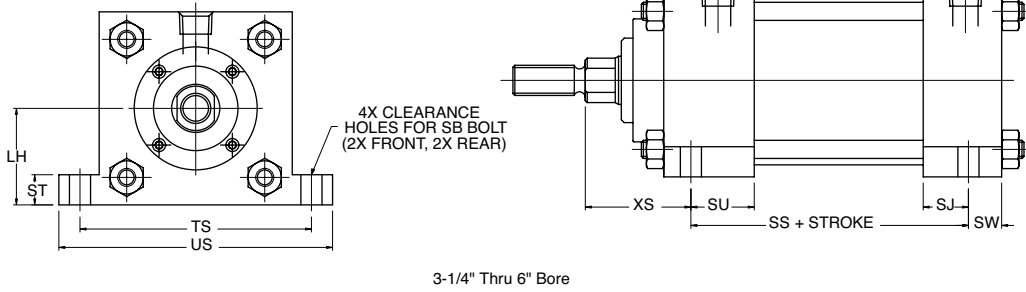
Dimensions: Inches

S2 Mounts

Mount Code S2



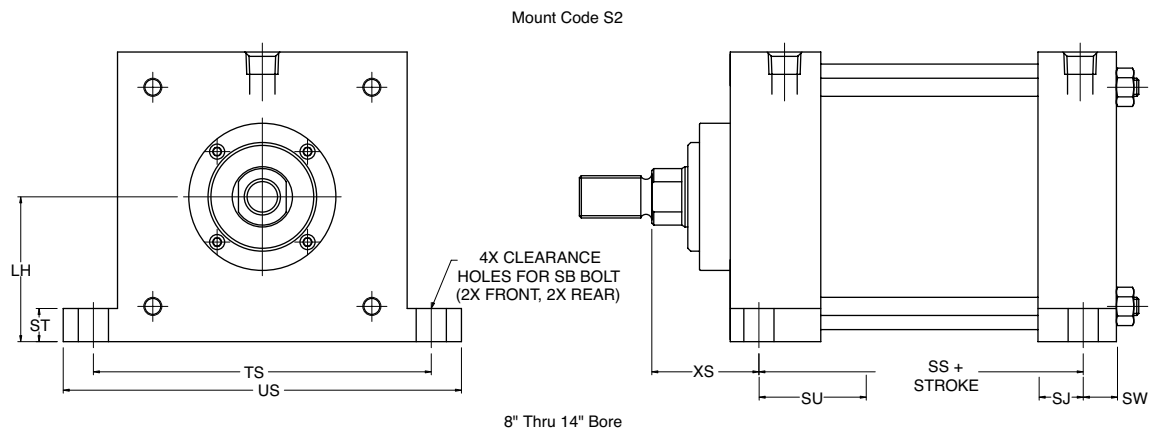
Mount Code S2



Bore	Rod	LH	SB	SJ	SS	ST	SU	SW	TS	US	XS
1-1/2"	5/8	1.00	0.38	0.63	2.88	0.50	1.13	0.38	2.75	3.50	1.38
	1	1.00	0.38	0.63	2.88	0.50	1.13	0.38	2.75	3.50	1.75
2"	5/8	1.25	0.38	0.63	2.88	0.50	1.13	0.38	3.25	4.00	1.38
	1	1.25	0.38	0.63	2.88	0.50	1.13	0.38	3.25	4.00	1.75
	1-3/8	1.25	0.38	0.63	2.88	0.50	1.13	0.38	3.25	4.00	2.00
2-1/2"	5/8	1.50	0.38	0.63	3.00	0.50	1.13	0.38	3.25	4.50	1.38
	1	1.50	0.38	0.63	3.00	0.50	1.13	0.38	3.75	4.50	1.75
	1-3/8	1.50	0.38	0.63	3.00	0.50	1.13	0.38	3.75	4.50	2.00
	1-3/4	1.50	0.38	0.63	3.00	0.50	1.13	0.38	3.75	4.50	2.25
3-1/4"	1	1.88	0.50	0.75	3.25	0.75	1.25	0.50	4.75	5.75	1.88
	1-3/8	1.88	0.50	0.75	3.25	0.75	1.25	0.50	4.75	5.75	2.13
	1-3/4	1.88	0.50	0.75	3.25	0.75	1.25	0.50	4.75	5.75	2.38
	2	1.88	0.50	0.75	3.25	0.75	1.25	0.50	4.75	5.75	2.50
4"	1	2.25	0.50	0.75	3.25	0.75	1.25	0.50	5.50	6.50	1.88
	1-3/8	2.25	0.50	0.75	3.25	0.75	1.25	0.50	5.50	6.50	2.13
	1-3/4	2.25	0.50	0.75	3.25	0.75	1.25	0.50	5.50	6.50	2.38
	2	2.25	0.50	0.75	3.25	0.75	1.25	0.50	5.50	6.50	2.50
5"	1	2.75	0.75	0.56	3.13	1.00	1.06	0.69	6.88	8.25	2.06
	1-3/8	2.75	0.75	0.56	3.13	1.00	1.06	0.69	6.88	8.25	2.31
	1-3/4	2.75	0.75	0.56	3.13	1.00	1.06	0.69	6.88	8.25	2.56
	2	2.75	0.75	0.56	3.13	1.00	1.06	0.69	6.88	8.25	2.69
6"	1-3/8	3.25	0.75	0.81	3.63	1.00	1.31	0.69	7.88	9.25	2.31
	1-3/4	3.25	0.75	0.81	3.63	1.00	1.31	0.69	7.88	9.25	2.56
	2	3.25	0.75	0.81	3.63	1.00	1.31	0.69	7.88	9.25	2.69
	2-1/2	3.25	0.75	0.81	3.63	1.00	1.31	0.69	7.88	9.25	2.94

Dimensions: Inches

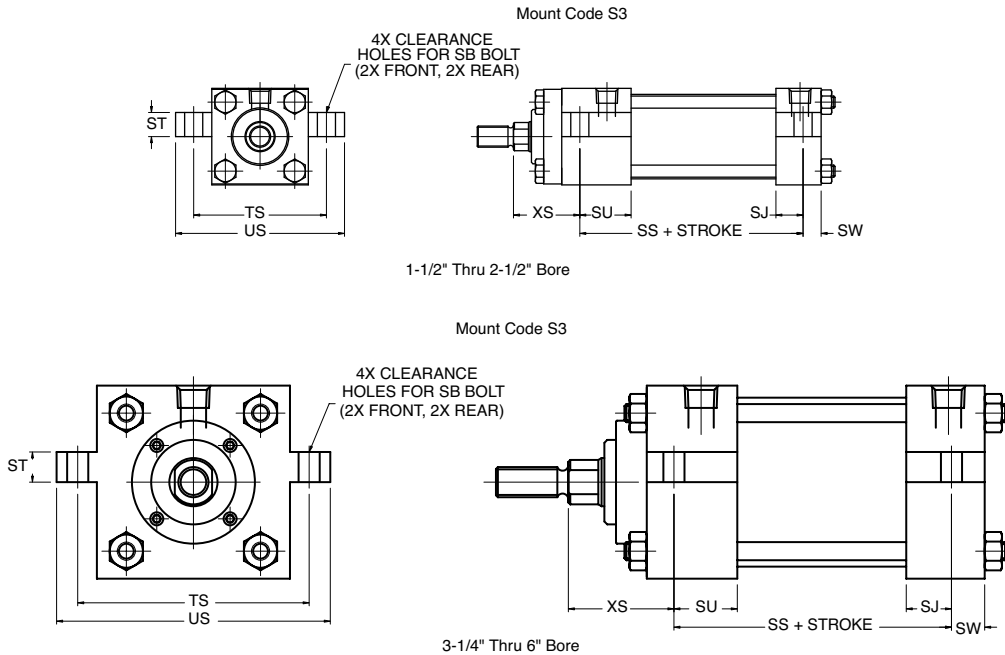
S2 Mounts continued



Bore	Rod	LH	SB	SJ	SS	ST	SU	SW	TS	US	XS
8"	1-3/8	4.25	0.75	0.81	3.75	1.00	1.31	0.69	9.88	11.25	2.31
	1-3/4	4.25	0.75	0.81	3.75	1.00	1.31	0.69	9.88	11.25	2.56
	2	4.25	0.75	0.81	3.75	1.00	1.31	0.69	9.88	11.25	2.69
	2-1/2	4.25	0.75	0.81	3.75	1.00	1.31	0.69	9.88	11.25	2.94
10"	1-3/4	5.31	1.00	1.13	4.63	1.25	1.38	0.88	12.38	14.13	2.75
	2	5.31	1.00	1.13	4.63	1.25	1.38	0.88	12.38	14.13	2.88
	2-1/2	5.31	1.00	1.13	4.63	1.25	1.38	0.88	12.38	14.13	3.13
	3	5.31	1.00	1.13	4.63	1.25	1.38	0.88	12.38	14.13	3.13
12"	2	6.38	1.00	1.13	5.13	1.25	1.38	0.88	14.50	16.25	2.88
	2-1/2	6.38	1.00	1.13	5.13	1.25	1.38	0.88	14.50	16.25	3.13
	3	6.38	1.00	1.13	5.13	1.25	1.38	0.88	14.50	16.25	3.13
	3-1/2	6.38	1.00	1.13	5.13	1.25	1.38	0.88	14.50	16.25	3.13
14"	2-1/2	7.38	1.25	1.13	5.88	1.50	1.63	1.13	17.00	19.25	3.38
	3	7.38	1.25	1.13	5.88	1.50	1.63	1.13	17.00	19.25	3.38
	3-1/2	7.38	1.25	1.13	5.88	1.50	1.63	1.13	17.00	19.25	3.38

Dimensions: Inches

S3 Mounts

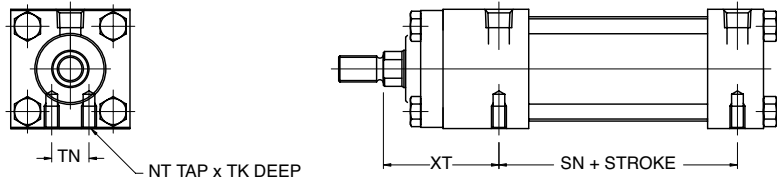


Bore	Rod	SB	SJ	SS	ST	SU	SW	TS	US	XS
1-1/2"	5/8	0.38	0.63	2.88	0.50	1.13	0.38	2.75	3.50	1.38
	1	0.38	0.63	2.88	0.50	1.13	0.38	2.75	3.50	1.75
2"	5/8	0.38	0.63	2.88	0.50	1.13	0.38	3.25	4.00	1.38
	1	0.38	0.63	2.88	0.50	1.13	0.38	3.25	4.00	1.75
	1-3/8	0.38	0.63	2.88	0.50	1.13	0.38	3.25	4.00	2.00
2-1/2"	5/8	0.38	0.63	3.00	0.50	1.13	0.38	3.25	4.50	1.38
	1	0.38	0.63	3.00	0.50	1.13	0.38	3.75	4.50	1.75
	1-3/8	0.38	0.63	3.00	0.50	1.13	0.38	3.75	4.50	2.00
	1-3/4	0.38	0.63	3.00	0.50	1.13	0.38	3.75	4.50	2.25
3-1/4"	1	0.50	0.75	3.25	0.75	1.25	0.50	4.75	5.75	1.88
	1-3/8	0.50	0.75	3.25	0.75	1.25	0.50	4.75	5.75	2.13
	1-3/4	0.50	0.75	3.25	0.75	1.25	0.50	4.75	5.75	2.38
	2	0.50	0.75	3.25	0.75	1.25	0.50	4.75	5.75	2.50
4"	1	0.50	0.75	3.25	0.75	1.25	0.50	5.50	6.50	1.88
	1-3/8	0.50	0.75	3.25	0.75	1.25	0.50	5.50	6.50	2.13
	1-3/4	0.50	0.75	3.25	0.75	1.25	0.50	5.50	6.50	2.38
	2	0.50	0.75	3.25	0.75	1.25	0.50	5.50	6.50	2.50
5"	1	0.75	0.56	3.13	1.00	1.06	0.69	6.88	8.25	2.06
	1-3/8	0.75	0.56	3.13	1.00	1.06	0.69	6.88	8.25	2.31
	1-3/4	0.75	0.56	3.13	1.00	1.06	0.69	6.88	8.25	2.56
	2	0.75	0.56	3.13	1.00	1.06	0.69	6.88	8.25	2.69
6"	1-3/8	0.75	0.81	3.63	1.00	1.31	0.69	7.88	9.25	2.31
	1-3/4	0.75	0.81	3.63	1.00	1.31	0.69	7.88	9.25	2.56
	2	0.75	0.81	3.63	1.00	1.31	0.69	7.88	9.25	2.69
	2-1/2	0.75	0.81	3.63	1.00	1.31	0.69	7.88	9.25	2.94

Dimensions: Inches

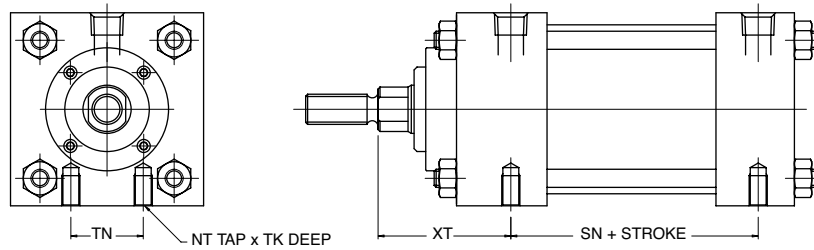
S4 Mounts

Mount Code S4



1-1/2" Thru 2-1/2" Bore

MOUNT CODE S4

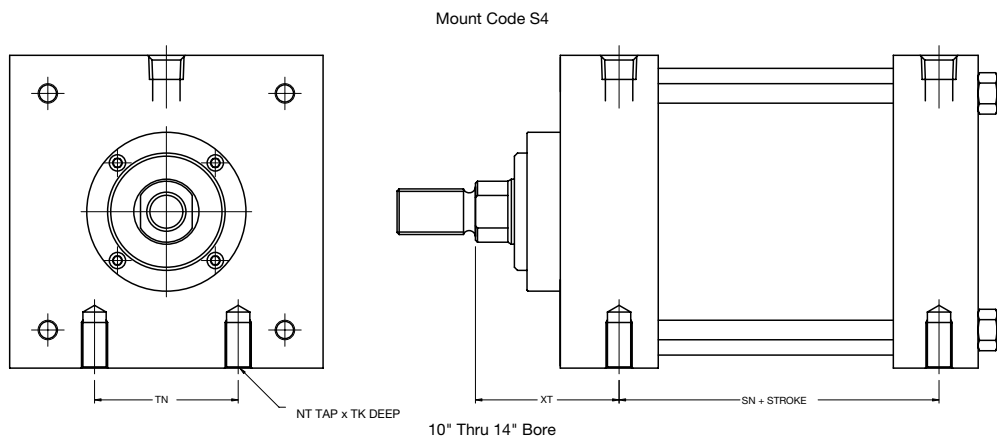


3-1/4" THRU 8" BORE

Bore	Rod	NT	TK	TN	SN	XT
1-1/2"	5/8	1/4-20	0.375	0.625	2.250	1.938
	1	1/4-20	0.313	0.625	2.250	2.313
2"	5/8	5/16-18	0.500	0.875	2.250	1.938
	1	5/16-18	0.500	0.875	2.250	2.313
	1-3/8	5/16-18	0.375	0.875	2.250	2.563
2-1/2"	5/8	3/8-16	0.625	1.250	2.375	1.938
	1	3/8-16	0.625	1.250	2.375	2.313
	1-3/8	3/8-16	0.375	1.250	2.375	2.563
	1-3/4	3/8-16	0.375	1.250	2.375	2.563
3-1/4"	1	1/2-13	0.750	1.500	2.625	2.438
	1-3/8	1/2-13	0.750	1.500	2.625	2.688
	1-3/4	1/2-13	0.750	1.500	2.625	2.938
	2	1/2-13	0.500	1.500	2.625	3.063
4"	1	1/2-13	0.750	2.063	2.625	2.438
	1-3/8	1/2-13	0.750	2.063	2.625	2.688
	1-3/4	1/2-13	0.750	2.063	2.625	2.938
	2	1/2-13	0.750	2.063	2.625	3.063
5"	1	5/8-11	1.000	2.688	2.875	2.438
	1-3/8	5/8-11	1.000	2.688	2.875	2.688
	1-3/4	5/8-11	1.000	2.688	2.875	2.938
	2	5/8-11	1.000	2.688	2.875	3.063
6"	1-3/8	3/4-10	1.125	3.250	3.125	2.813
	1-3/4	3/4-10	1.125	3.250	3.125	3.063
	2	3/4-10	1.125	3.250	3.125	3.188
	2-1/2	3/4-10	1.125	3.250	3.125	3.438

Dimensions: Inches

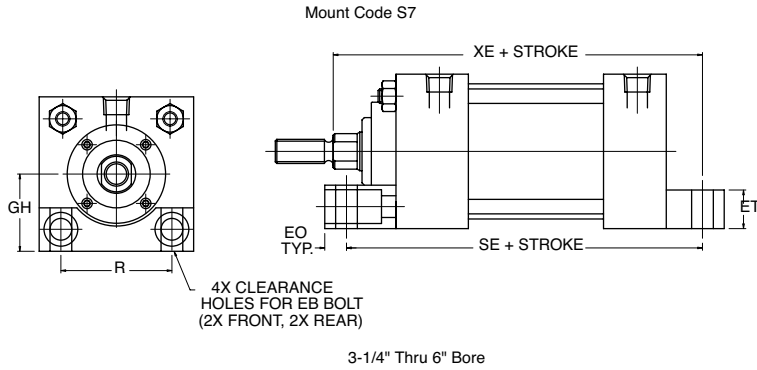
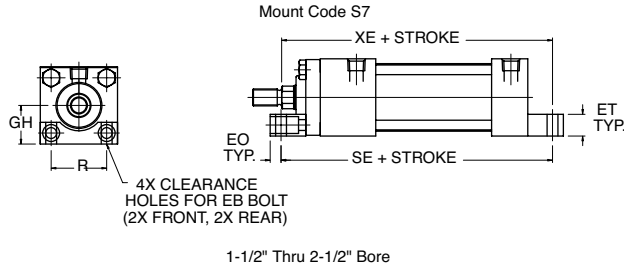
S4 Mounts Continued



Bore	Rod	NT	TK	TN	SN	XT
8"	1-3/8	3/4-10	1.125	4.500	3.250	2.813
	1-3/4	3/4-10	1.125	4.500	3.250	3.063
	2	3/4-10	1.125	4.500	3.250	3.188
	2-1/2	3/4-10	1.125	4.500	3.250	3.438
10"	1-3/4	1-8	2.000	5.500	4.125	3.125
	2	1-8	2.000	5.500	4.125	3.250
	2-1/2	1-8	2.000	5.500	4.125	3.500
	3	1-8	2.000	5.500	4.125	3.500
12"	2	1-8	2.000	7.250	4.625	3.250
	2-1/2	1-8	2.000	7.250	4.625	3.500
	3	1-8	2.000	7.250	4.625	3.500
	3-1/2	1-8	2.000	7.250	4.625	3.500
14"	2-1/2	1 1/4-7	2.500	8.375	5.500	3.813
	3	1 1/4-7	2.500	8.375	5.500	3.813
	3-1/2	1 1/4-7	2.500	8.375	5.500	3.813

Dimensions: Inches

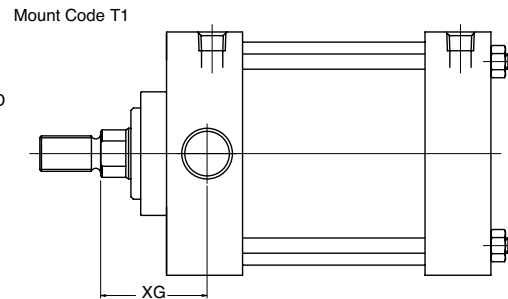
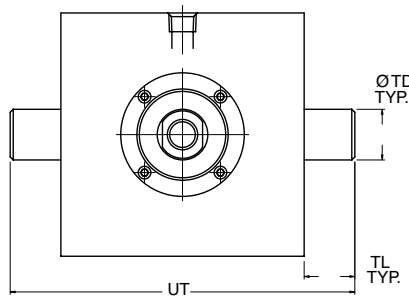
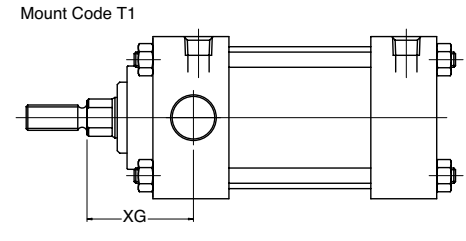
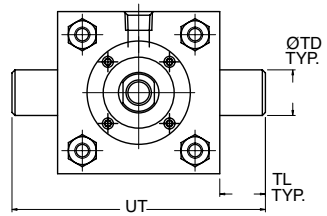
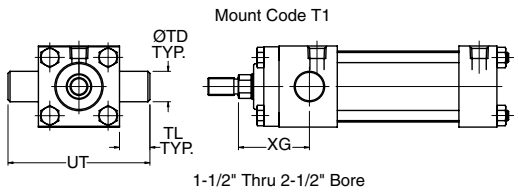
S7 Mounts



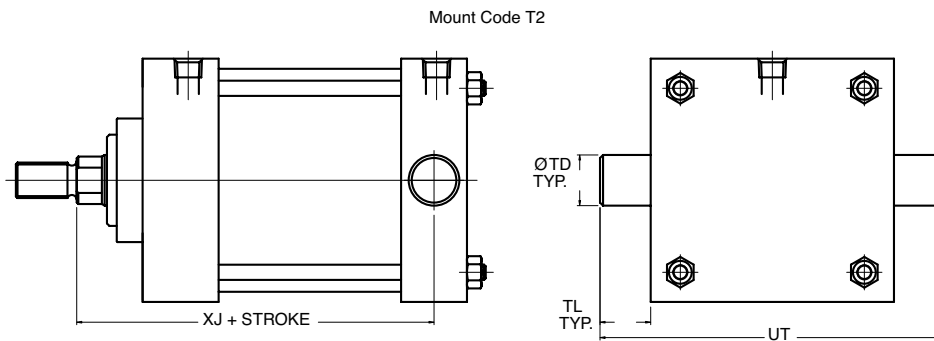
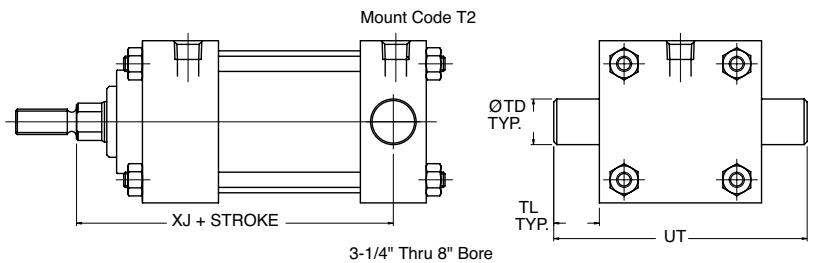
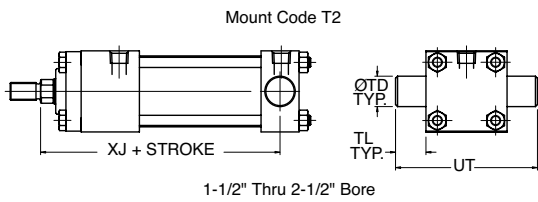
Bore	Rod	EB	GH	SE	ET	EO	R	XE
1-1/2"	5/8	0.25	1.00	5.500	0.55	0.25	1.43	5.38
	1	0.25	1.00	5.500	0.55	0.25	1.43	5.75
2"	5/8	0.31	1.25	5.875	0.64	0.31	1.84	5.56
	1	0.31	1.25	5.875	0.64	0.31	1.84	5.94
2-1/2"	5/8	0.31	1.50	6.625	0.80	0.31	2.19	5.81
	1	0.31	1.50	6.625	0.80	0.31	2.19	6.19
	1-3/8	0.31	1.50	6.625	0.80	0.31	2.19	6.44
3-1/4"	1	0.38	1.88	6.625	0.95	0.50	2.76	6.50
	1-3/8	0.38	1.88	6.625	0.95	0.50	2.76	6.75
	1-3/4	0.38	1.88	6.625	0.95	0.50	2.76	7.00
	2	0.38	1.88	6.625	0.95	0.50	2.76	7.13
4"	1	0.38	2.25	6.875	1.17	0.50	3.32	6.63
	1-3/8	0.38	2.25	6.875	1.17	0.50	3.32	6.88
	1-3/4	0.38	2.25	6.875	1.17	0.50	3.32	7.13
	2	0.38	2.25	6.875	1.17	0.50	3.32	7.25
5"	1	0.50	2.75	7.250	1.39	0.50	4.10	6.94
	1-3/8	0.50	2.75	7.250	1.39	0.50	4.10	7.19
	1-3/4	0.50	2.75	7.250	1.39	0.50	4.10	7.44
	2	0.50	2.75	7.250	1.39	0.50	4.10	7.56
6"	1-3/8	0.50	3.25	7.750	1.61	0.50	4.88	7.63
	1-3/4	0.50	3.25	7.750	1.61	0.50	4.88	7.88
	2	0.50	3.25	7.750	1.61	0.50	4.88	8.00
	2-1/2	0.50	3.25	7.750	1.61	0.50	4.88	8.25

Dimensions: Inches

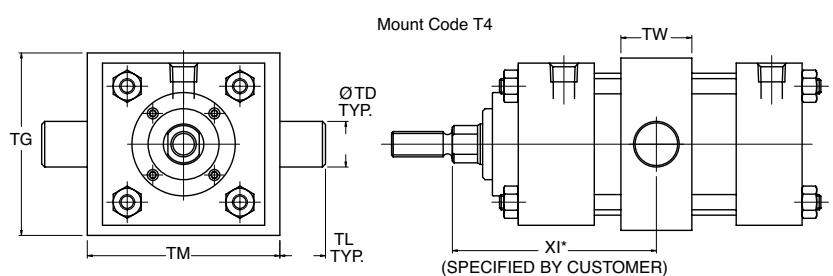
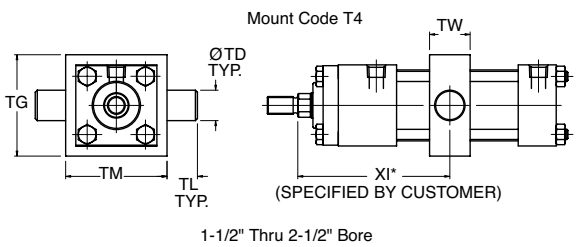
T1 Mounts



T2 Mounts



T4 Mounts



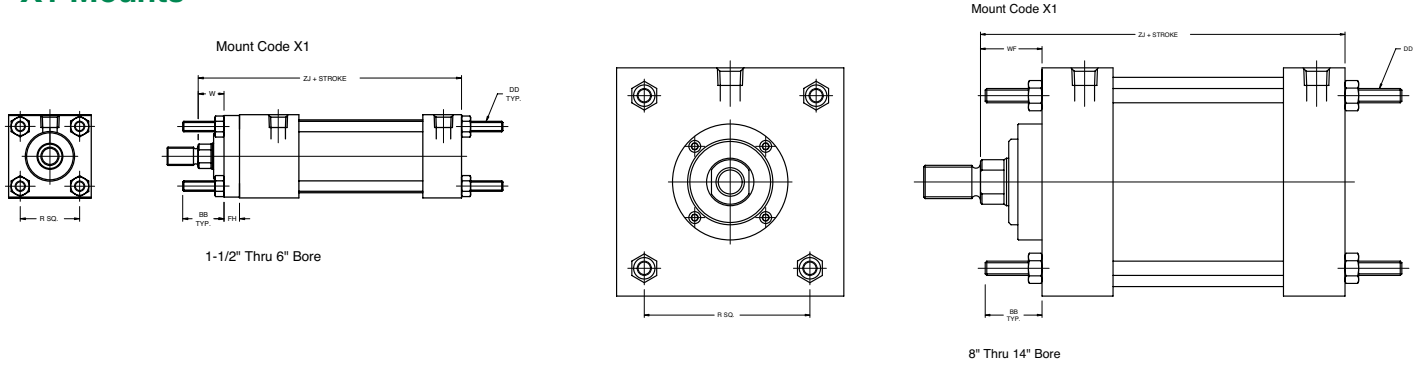
Dimensions: Inches

T Mounts continued

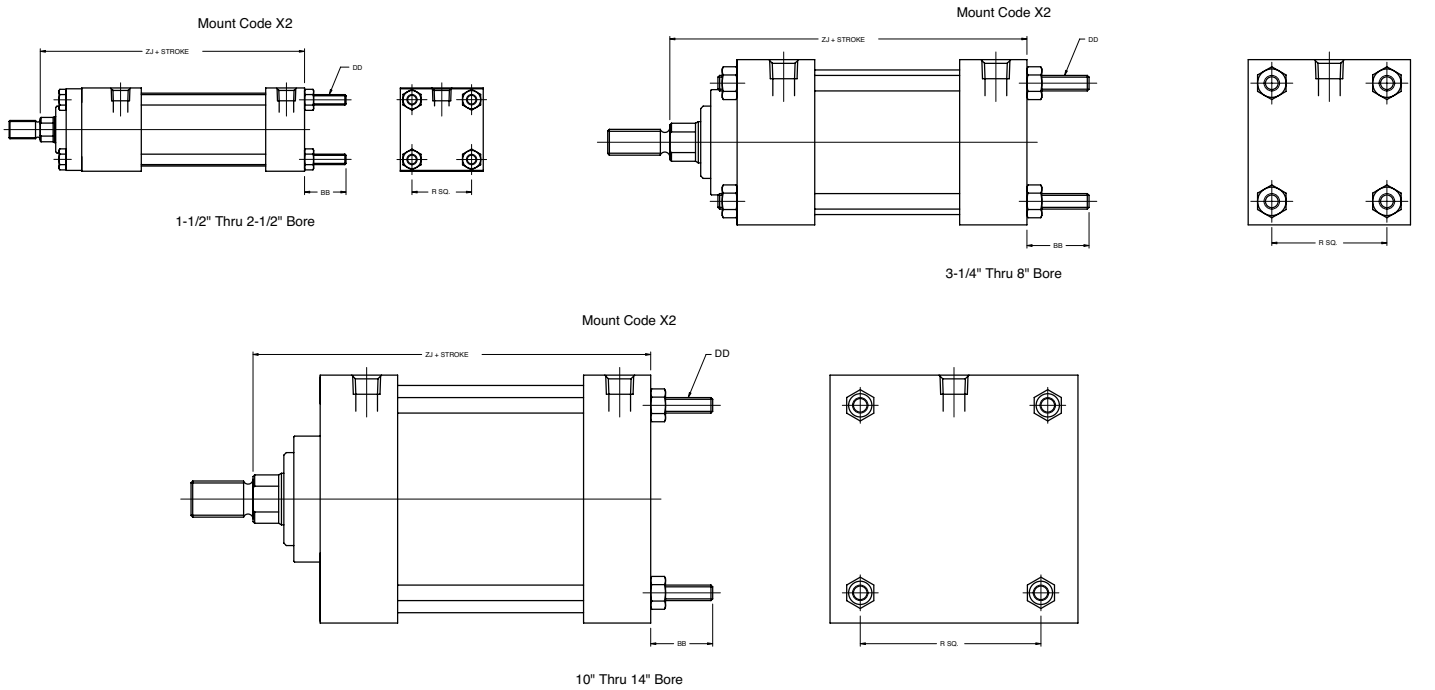
Bore	Rod	TD	TG	TL	TM	TW	UT	XG	XI (min)	XJ
1-1/2"	5/8	1.000	2.50	1.00	2.50	1.25	4.00	1.75	3.13	4.13
	1	1.000	2.50	1.00	2.50	1.25	4.00	2.13	3.50	4.50
2"	5/8	1.000	3.00	1.00	3.00	1.50	4.50	1.75	3.25	4.13
	1	1.000	3.00	1.00	3.00	1.50	4.50	2.13	3.63	4.50
	1-3/8	1.000	3.00	1.00	3.00	1.50	4.50	2.38	3.88	4.75
2-1/2"	5/8	1.000	3.50	1.00	3.50	1.50	5.00	1.75	3.25	4.25
	1	1.000	3.50	1.00	3.50	1.50	5.00	2.13	3.63	4.63
	1-3/8	1.000	3.50	1.00	3.50	1.50	5.00	2.38	3.88	4.88
	1-3/4	1.000	3.50	1.00	3.50	1.50	5.00	2.63	4.13	5.13
3-1/4"	1	1.000	4.25	1.00	4.50	2.00	5.75	2.25	4.13	5.00
	1-3/8	1.000	4.25	1.00	4.50	2.00	5.75	2.50	4.38	5.25
	1-3/4	1.000	4.25	1.00	4.50	2.00	5.75	2.75	4.63	5.50
	2	1.000	4.25	1.00	4.50	2.00	5.75	2.88	4.75	5.63
4"	1	1.000	5.00	1.00	5.25	2.00	6.50	2.25	4.13	5.00
	1-3/8	1.000	5.00	1.00	5.25	2.00	6.50	2.50	4.38	5.25
	1-3/4	1.000	5.00	1.00	5.25	2.00	6.50	2.75	4.63	5.50
	2	1.000	5.00	1.00	5.25	2.00	6.50	2.88	4.75	5.63
5"	1	1.000	6.00	1.00	6.25	2.00	7.50	2.25	4.13	5.25
	1-3/8	1.000	6.00	1.00	6.25	2.00	7.50	2.50	4.38	5.50
	1-3/4	1.000	6.00	1.00	6.25	2.00	7.50	2.75	4.63	5.75
	2	1.000	6.00	1.00	6.25	2.00	7.50	2.88	4.75	5.88
6"	1-3/8	1.375	7.00	1.38	7.63	2.50	9.25	2.63	4.88	5.88
	1-3/4	1.375	7.00	1.38	7.63	2.50	9.25	2.88	5.13	6.13
	2	1.375	7.00	1.38	7.63	2.50	9.25	3.00	5.25	6.25
	2-1/2	1.375	7.00	1.38	7.63	2.50	9.25	3.25	5.50	6.50
8"	1-3/8	1.375	9.50	1.38	9.75	2.50	11.25	2.63	4.88	6.00
	1-3/4	1.375	9.50	1.38	9.75	2.50	11.25	2.88	5.13	6.25
	2	1.375	9.50	1.38	9.75	2.50	11.25	3.00	5.25	6.38
	2-1/2	1.375	9.50	1.38	9.75	2.50	11.25	3.25	5.50	6.63
10"	1-3/4	1.750	11.75	1.75	12.00	3.00	14.13	3.00	5.63	7.25
	2	1.750	11.75	1.75	12.00	3.00	14.13	3.13	5.75	7.38
	2-1/2	1.750	11.75	1.75	12.00	3.00	14.13	3.38	6.00	7.63
	3	1.750	11.75	1.75	12.00	3.00	14.13	3.38	6.00	7.63
12"	2	1.750	13.75	1.75	14.00	3.00	16.25	3.13	5.75	7.88
	2-1/2	1.750	13.75	1.75	14.00	3.00	16.25	3.38	6.00	8.13
	3	1.750	13.75	1.75	14.00	3.00	16.25	3.38	6.00	8.13
	3-1/2	1.750	13.75	1.75	14.00	3.00	16.25	3.38	6.00	8.13
14"	2-1/2	2.000	16.00	2.00	16.25	3.50	18.75	3.63	6.75	9.25
	3	2.000	16.00	2.00	16.25	3.50	18.75	3.63	6.75	9.25
	3-1/2	2.000	16.00	2.00	16.25	3.50	18.75	3.63	6.75	9.25

Dimensions: Inches

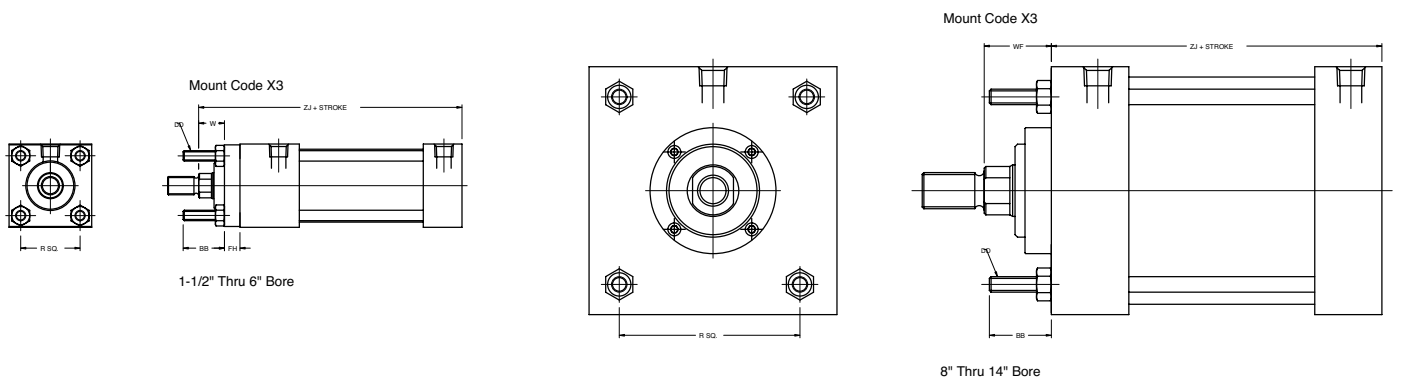
X1 Mounts



X2 Mounts



X3 Mounts



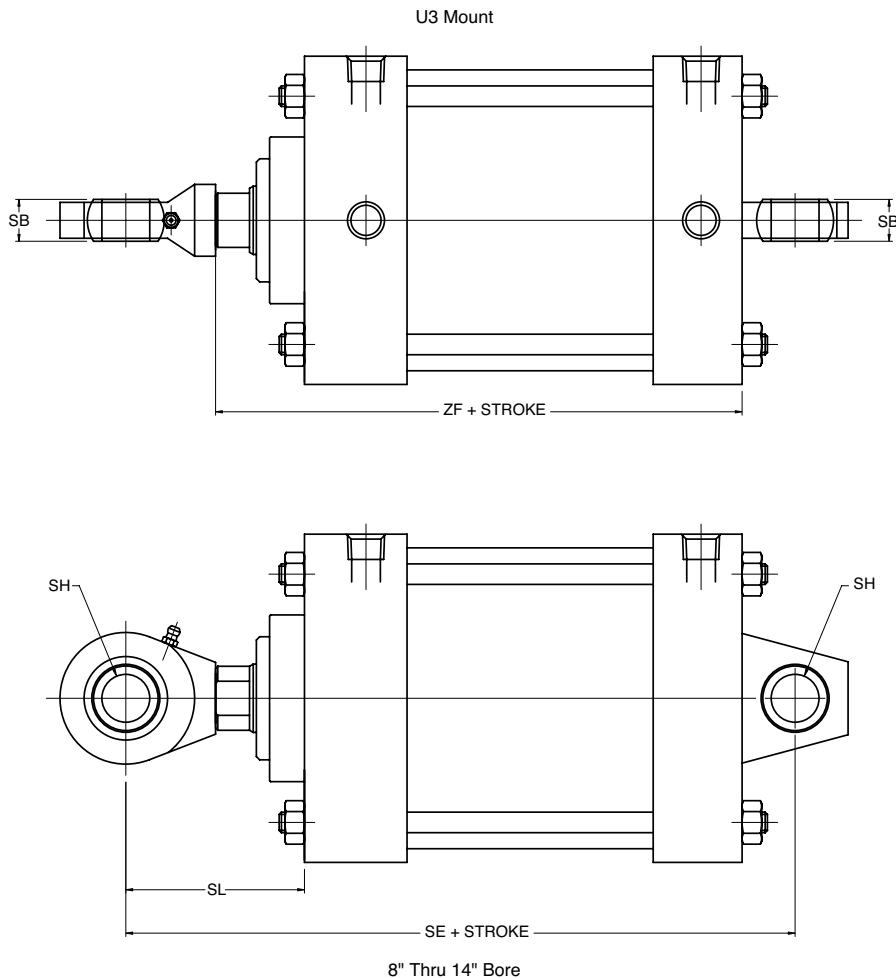
Dimensions: Inches

X Mounts (continued)

Bore	Rod	BB	DD	FH	R	W	ZJ
1-1/2"	5/8	1.000	1/4-28	0.38	1.430	0.630	4.630
	1	1.000	1/4-28	0.38	1.430	1.000	5.000
2"	5/8	1.125	5/16-24	0.38	1.840	0.630	4.630
	1	1.125	5/16-24	0.38	1.840	1.000	5.000
	1-3/8	1.125	5/16-24	0.38	1.840	1.250	5.250
2-1/2"	5/8	1.125	5/16-24	0.38	2.190	0.630	4.750
	1	1.125	5/16-24	0.38	2.190	1.000	5.130
	1-3/8	1.125	5/16-24	0.38	2.190	1.250	5.380
	1-3/4	1.125	5/16-24	0.38	2.190	1.500	5.630
3-1/4"	1	1.375	3/8-24	0.63	2.760	0.750	5.630
	1-3/8	1.375	3/8-24	0.63	2.760	1.000	5.880
	1-3/4	1.375	3/8-24	0.63	2.760	1.250	6.130
	2	1.375	3/8-24	0.63	2.760	1.380	6.250
4"	1	1.375	3/8-24	0.63	3.320	0.750	5.630
	1-3/8	1.375	3/8-24	0.63	3.320	1.000	5.880
	1-3/4	1.375	3/8-24	0.63	3.320	1.250	6.130
	2	1.375	3/8-24	0.63	3.320	1.380	6.250
5"	1	1.813	1/2-20	0.63	4.100	0.750	5.880
	1-3/8	1.813	1/2-20	0.63	4.100	1.000	6.130
	1-3/4	1.813	1/2-20	0.63	4.100	1.250	6.380
	2	1.813	1/2-20	0.63	4.100	1.380	6.500
6"	1-3/8	1.813	1/2-20	0.75	4.880	0.880	6.630
	1-3/4	1.813	1/2-20	0.75	4.880	1.130	6.880
	2	1.813	1/2-20	0.75	4.880	1.250	7.000
	2-1/2	1.813	1/2-20	0.75	4.880	1.500	7.250
8"	1-3/8	2.313	5/8-18	N/A	6.44	1.63	6.750
	1-3/4	2.313	5/8-18	N/A	6.44	1.88	7.000
	2	2.313	5/8-18	N/A	6.44	2.00	7.125
	2-1/2	2.313	5/8-18	N/A	6.44	2.25	7.375
10"	1-3/4	2.690	3/4-16	N/A	8.06	1.88	8.250
	2	2.690	3/4-16	N/A	8.06	2.00	8.375
	2-1/2	2.690	3/4-16	N/A	8.06	2.25	8.625
	3	2.690	3/4-16	N/A	8.06	2.25	8.625
12"	2	2.690	3/4-16	N/A	9.41	2.00	8.875
	2-1/2	2.690	3/4-16	N/A	9.41	2.25	9.125
	3	2.690	3/4-16	N/A	9.41	2.25	9.125
	3-1/2	2.690	3/4-16	N/A	9.41	2.25	9.125
14"	2-1/2	3.190	7/8-14	N/A	10.90	2.25	10.375
	3	3.190	7/8-14	N/A	10.90	2.25	10.375
	3-1/2	3.190	7/8-14	N/A	10.90	2.25	10.375

Dimensions: Inches

U3 Mount

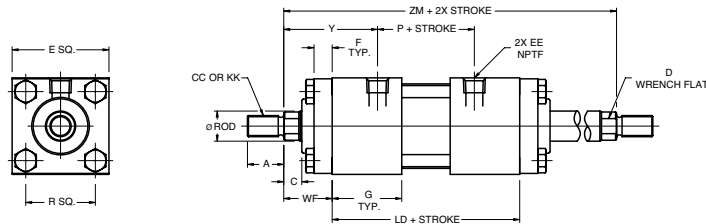


Bore	Rod	SB	SH	SL	SE
8"	1-3/8	0.88	1.00	3.50	10.13
	1-3/4	0.88	1.00	3.75	10.38
	2	0.88	1.00	3.88	10.50
	2-1/2	0.88	1.00	4.13	10.75
10"	1-3/4	1.19	1.38	4.00	12.50
	2	1.19	1.38	4.13	12.63
	2-1/2	1.19	1.38	4.38	12.88
	3	1.19	1.38	4.38	12.88
12"	2	1.53	1.75	4.50	13.63
	2-1/2	1.53	1.75	4.75	13.88
	3	1.53	1.75	4.38	13.88
	3-1/2	1.53	1.75	4.38	13.88
14"	2-1/2	1.75	2.00	5.00	15.63
	3	1.75	2.00	4.38	15.63
	3-1/2	1.75	2.00	4.38	15.63

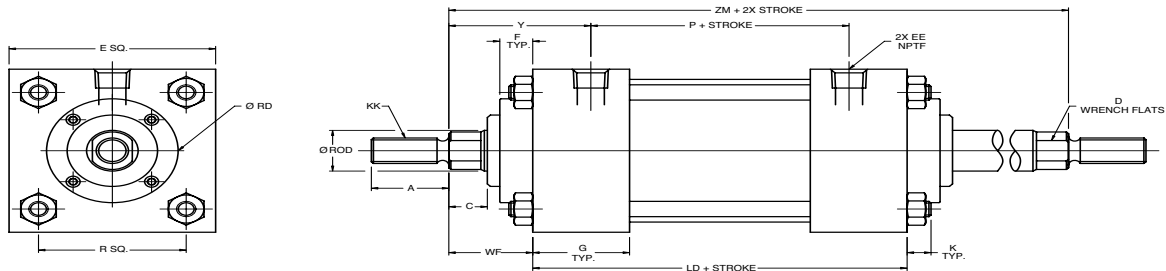
Dimensions: Inches

Double Rod Mounts

DA-DOUBLE ROD END



1-1/2" THRU 2-1/2" BORE

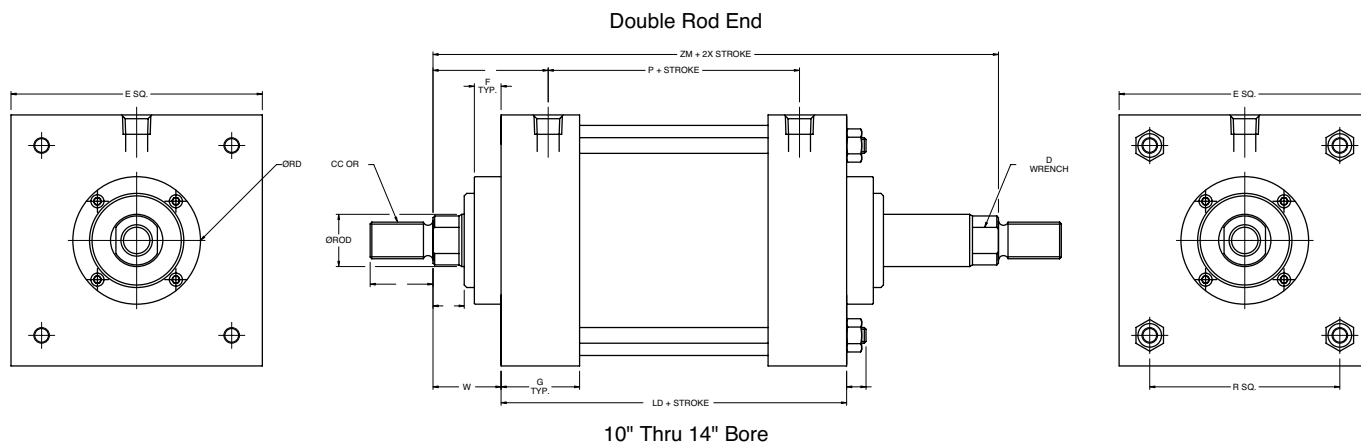


3-1/4" THRU 8" BORE

Bore	Rod	A	C	D	E	EE	F	G	K	KK	LD	P	R	SN*	SS*	RD	WF	Y	ZM
1-1/2"	5/8	0.750	0.375	0.500	2.000	0.375	0.375	1.500	0.250	7/16-20	4.125	2.250	1.430	2.250	3.375	N/A	1.000	1.938	6.125
	1	1.125	0.500	0.813	2.000	0.250	0.375	1.500	0.250	3/4-16	4.125	2.103	1.430	2.250	3.375	N/A	1.375	2.460	6.875
2"	5/8	0.750	0.375	0.500	2.500	0.375	0.375	1.500	0.313	7/16-20	4.125	2.250	1.840	2.250	3.375	N/A	1.000	1.938	6.152
	1	1.125	0.500	0.813	2.500	0.375	0.375	1.500	0.313	3/4-16	4.125	2.250	1.840	2.250	3.375	N/A	1.375	2.250	6.875
2-1/2"		1.625	0.625	1.125	2.500	0.375	0.375	1.500	0.313	1-14	4.125	2.250	1.840	2.250	3.375	N/A	1.625	2.500	7.375
	5/8	0.750	0.375	0.500	3.000	0.375	0.375	1.500	0.313	7/16-20	4.250	2.375	2.190	2.375	3.500	N/A	1.000	1.813	6.250
	1	1.125	0.500	0.813	3.000	0.375	0.375	1.500	0.313	3/4-16	4.250	2.375	2.190	2.375	3.500	N/A	1.375	2.188	7.000
	1-3/8	1.625	0.625	1.125	3.000	0.375	0.375	1.500	0.313	1-14	4.250	2.375	2.190	2.375	3.500	N/A	1.625	2.438	7.500
3-1/4"		2.000	0.750	1.500	3.000	0.375	0.375	1.500	0.313	1 1/4-12	4.250	2.375	2.190	2.375	3.500	N/A	1.875	2.668	8.000
	1	1.125	0.500	0.813	3.750	0.500	0.625	1.750	0.375	3/4-16	4.750	2.625	2.760	2.625	3.750	2.706	1.375	2.438	7.500
	1-3/8	1.625	0.625	1.125	3.750	0.500	0.625	1.750	0.375	1-14	4.750	2.625	2.760	2.625	3.750	3.110	1.625	2.688	8.000
	1-3/4	2.000	0.750	1.500	3.750	0.500	0.625	1.750	0.375	1 1/4-12	4.750	2.625	2.760	2.625	3.750	N/A	1.875	2.938	8.500
4"	2	2.250	0.875	1.750	3.750	0.500	0.625	1.750	0.375	1 1/2-12	4.750	2.625	2.760	2.625	3.750	N/A	2.000	3.063	8.750
	1	1.125	0.500	0.813	4.500	0.500	0.625	1.750	0.375	3/4-16	4.750	2.625	3.320	2.625	3.750	2.706	1.375	2.438	7.500
	1-3/8	1.625	0.625	1.125	4.500	0.500	0.625	1.750	0.375	1-14	4.750	2.625	3.320	2.625	3.750	3.110	1.625	2.688	8.000
	1-3/4	2.000	0.750	1.500	4.500	0.500	0.625	1.750	0.375	1 1/4-12	4.750	2.625	3.320	2.625	3.750	3.788	1.875	2.938	8.500
5"	2	2.250	0.875	1.750	4.500	0.500	0.625	1.750	0.375	1 1/2-12	4.750	2.625	3.320	2.625	3.750	N/A	2.000	3.063	8.750
	1	1.125	0.500	0.813	5.500	0.500	0.625	1.750	0.500	3/4-16	5.000	2.875	4.100	2.875	3.625	2.706	1.375	2.438	7.750
	1-3/8	1.625	0.625	1.125	5.500	0.500	0.625	1.750	0.500	1-14	5.000	2.875	4.100	2.875	3.625	3.110	1.625	2.688	8.250
	1-3/4	2.000	0.750	1.500	5.500	0.500	0.625	1.750	0.500	1 1/4-12	5.000	2.875	4.100	2.875	3.625	3.788	1.875	2.938	8.750
6"	2	2.250	0.875	1.750	5.500	0.500	0.625	1.750	0.500	1 1/2-12	5.000	2.875	4.100	2.875	3.625	4.250	2.000	3.063	9.000
	1-3/8	1.625	0.625	1.125	6.500	0.750	0.750	2.000	0.500	1-14	5.000	3.125	4.880	3.125	4.125	3.110	1.625	2.813	8.750
	1-3/4	2.000	0.750	1.500	6.500	0.750	0.750	2.000	0.500	1 1/4-12	5.000	3.125	4.880	3.125	4.125	3.788	1.875	3.063	9.250
	2	2.250	0.875	1.750	6.500	0.750	0.750	2.000	0.500	1 1/2-12	5.000	3.125	4.880	3.125	4.125	4.250	2.000	3.188	9.500
	2-1/2	3.000	1.000	2.060	6.500	0.750	0.750	2.000	0.500	1 7/8-12	5.000	3.125	4.880	3.125	4.125	5.500	2.250	3.438	10.000

Dimensions: Inches

Double Rod Mounts (continued)



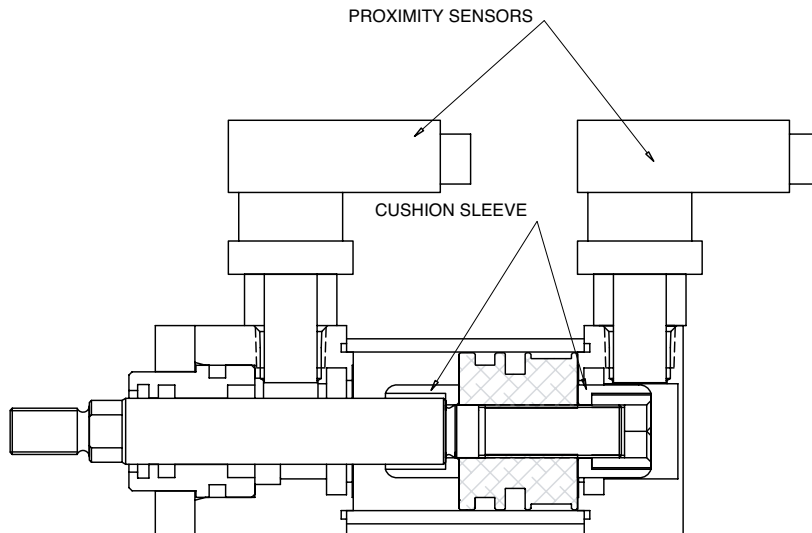
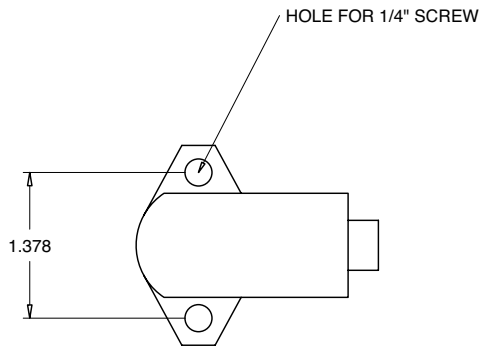
Bore	Rod	A	C	D	E	EE	F	G	K	KK	LD	P	R	SN*	SS*	RD	WF	Y	ZM
8"	1-3/8	1.625	0.625	1.125	8.500	0.750	0.625	2.000	0.625	1-14	5.625	3.250	6.440	3.250	4.250	3.110	1.625	2.810	8.875
	1-3/4	2.000	0.750	1.500	8.500	0.750	0.750	2.000	0.625	1 1/4-12	5.625	3.250	6.440	3.250	4.250	3.788	1.875	3.060	9.375
	2	2.250	0.875	1.750	8.500	0.750	0.750	2.000	0.625	1 1/2-12	5.625	3.250	6.440	3.250	4.250	4.250	2.000	3.185	9.625
	2-1/2	3.000	1.000	2.060	8.500	0.750	0.750	2.000	0.625	1 7/8-12	5.625	3.250	6.440	3.250	4.250	5.500	2.250	3.435	10.125
10"	1-3/4	2.000	0.750	1.500	10.625	1.000	0.750	2.250	0.750	1 1/4-12	6.625	4.125	8.063	4.125	4.875	3.788	1.875	3.125	10.375
	2	2.250	0.875	1.750	10.625	1.000	0.750	2.250	0.750	1 1/2-12	6.625	4.125	8.063	4.125	4.875	4.250	2.000	3.250	10.625
	2-1/2	3.000	1.000	2.060	10.625	1.000	0.750	2.250	0.750	1 7/8-12	6.625	4.125	8.063	4.125	4.875	5.500	2.250	3.500	11.125
	3	3.500	1.000	2.625	10.625	1.000	0.750	2.250	0.750	2 1/4-12	6.625	4.125	8.063	4.125	4.875	7.500	2.250	3.500	11.125
12"	2	2.250	0.875	1.750	12.750	1.000	0.750	2.250	0.750	1 1/2-12	7.125	4.625	9.410	4.625	5.375	4.250	2.000	3.250	11.125
	2-1/2	3.000	1.000	2.060	12.750	1.000	0.750	2.250	0.750	1 7/8-12	7.125	4.625	9.410	4.625	5.375	5.500	2.250	3.500	11.625
	3	3.500	1.000	2.625	12.750	1.000	0.750	2.250	0.750	2 1/4-12	7.125	4.625	9.410	4.625	5.375	7.500	2.250	3.500	11.625
	3-1/2	3.500	1.000	3.000	12.750	1.000	0.750	2.250	0.750	2 1/2-12	7.125	4.625	9.410	4.625	5.375	7.500	2.250	3.500	11.625
14"	2-1/2	3.000	1.000	2.060	14.750	1.250	0.750	2.750	0.875	1 7/8-12	8.625	5.500	10.900	5.500	6.375	5.500	2.250	3.810	13.125
	3	3.500	1.000	2.625	14.750	1.250	0.750	2.750	0.875	2 1/4-12	8.625	5.500	10.900	5.500	6.375	7.500	2.250	3.810	13.125
	3-1/2	3.500	1.000	3.000	14.750	1.250	0.750	2.750	0.875	2 1/2-12	8.625	5.500	10.900	5.500	6.375	7.500	2.250	3.810	13.125

* For bottom tap and side lug.

Cylinder Position Sensors

("Cylindicator Ready" Option)

The ASP Series Cylinder Line offers cylinder position sensing using inductive proximity switches. The steel tube construction does not enable the use of conventional pneumatic cylinder position sensing through magnetic field sensors. Inductive proximity sensors are commonly used on steel tube cylinders (both pneumatic and hydraulic). These sensors are typically mounted to the cylinder end caps via screws through spacers. The sensor determines end of stroke positioning by detecting the steel cushion sleeves (also known as cylinder spuds) as they pass beneath the sensor. There are two common types of sensors. The first is "No Stroke to Go." This is where the sensor is switched when the cylinder reaches end of stroke. The other type is "Stroke to Go." This is where the sensor is switched slightly before the cylinder reaches end of stroke. This is commonly utilized when a reduction of cycle time is desired. However, the timing is crucial and end of stroke may not be achieved soon enough after switching. ASP Series cylinders ordered with the "Cylindicator Ready" option includes the spacers, O-rings and 3/8 NPT necessary to mount to most common switches.



Bore	Rod Diameter	Probe Length
1-1/2"	5/8	1.025
	1	N/A
2"	5/8	1.250
	1	1.025
	1-3/8	1.025
2-1/2"	5/8	2.062
	1	1.250
	1-3/8	1.025
	1-3/4	1.025
3-1/4"	1	1.250
	1-3/8	1.250
	1-3/4	1.250
	2	1.025
4"	1	2.062
	1-3/8	2.062
	1-3/4	2.062
	2	2.062
5"	1	2.875
	1-3/8	2.062
	1-3/4	2.062
	2	2.062
6"	1-3/8	2.875
	1-3/4	2.875
	2	2.875
	2-1/2	2.875
8"	1-3/8	3.775
	1-3/4	3.775
	2	3.775
	2-1/2	3.775
10"	1-3/4	4.560
	2	4.560
	2-1/2	4.560
	3	3.775
12"	2	N/A
	2-1/2	N/A
	3	4.560
	3-1/2	N/A
14"	2-1/2	N/A
	3	N/A
	3-1/2	N/A

How to Order - ASP Series Repair Kit

ASP98 - K 1 N - AA

Type

ASP98 = ASP Series Repair Kit

Bore

K = 1-1/2"	R = 4"	X = 10"
L = 2"	T = 5"	Y = 12"
M = 2-1/2"	U = 6"	B = 14"
P = 3-1/4"	W = 8"	

Rod Size

1 = 0.625"
2 = 1.000"
3 = 1.375"
4 = 1.750"
5 = 2.000"
6 = 2.500"
7 = 3.000"
8 = 3.500"

Options

- AA = No Options
- DA = Double Rod
- EB = Silencer Bumpers
- LB = Low Breakaway
- LT = Low Temp Seals
- MA = Metallic Rod Scraper
- MB = Rear Metallic Rod Scraper
- NA = Nickel Plated
- PA = Polypak Rod Seal
- PB = Rear Polypak Rod Seal
- PP = Polypak Piston Seals
- RA = Save Air Stroke Adjust
- TI = T-Seal Piston (10"-14" bore only)
- VA = FKM Seals
- 4D = Double Piston Stop Tube

Cushions

- N = No Cushion
- B = Both Ends Cushioned
- H = Head End Cushioned
- C = Cap End Cushioned

Note: Options listed are ones that apply to a repair kit only. Model number is set up to use option code supplied with original cylinder or with any above.

How to Order - ASP Series Seal Kit

ASP97 - K 1 N - AA

Type

ASP97 = ASP Series Repair Kit

Bore

K = 1-1/2"	R = 4"	X = 10"
L = 2"	T = 5"	Y = 12"
M = 2-1/2"	U = 6"	B = 14"
P = 3-1/4"	W = 8"	

Rod Size

1 = 0.625"
2 = 1.000"
3 = 1.375"
4 = 1.750"
5 = 2.000"
6 = 2.500"
7 = 3.000"
8 = 3.500"

Options

- AA = No Options
- DA = Double Rod
- EB = Silencer Bumpers
- LB = Low Breakaway
- LT = Low Temp Seals
- MA = Metallic Rod Scraper
- MB = Rear Metallic Rod Scraper
- NA = Nickel Plated
- PA = Polypak Rod Seal
- PB = Rear Polypak Rod Seal
- PP = Polypak Piston Seals
- RA = Save Air Stroke Adjust
- TI = T-Seal Piston (10"-14" bore only)
- VA = FKM Seals
- 4D = Double Piston Stop Tube

Cushions

- N = No Cushion
- B = Both Ends Cushioned
- H = Head End Cushioned
- C = Cap End Cushioned

Note: Options listed are ones that apply to a repair kit only. Model number is set up to use option code supplied with original cylinder or with any above.

Piston Rod Assembly

Kit Removal/Installation Instructions

1. Loosen 4 Retainer Screws (Part #11) to remove Full Face Retainer (Part #10).
2. Loosen 4 Sleeve Nuts (Part #14) to remove Piston/Rod Assembly (Part #17, #18, #19, & #20).
3. Carefully remove old seals and wearband (Part #22, #23, & #24). Any damage to the seal may result in leakage.
4. Lubricate pistons seal(s) and Wearband (Part #22) with supplied Numatics' Lube. Examine seals before installing for any contamination. Contamination may cause leakage.
5. Install Piston Seal (Part #24). Make sure the piston seal is not twisted inside groove. Next install back-up rings (Part #23) if piston seal is a T-seal.
6. Install lubricated wearband onto piston. Sink piston/rod assembly into sinker tube. See Sinker Tube Part Numbers Chart.
7. Apply lube inside the cylinder tube.
8. Sink piston/rod assembly into cylinder tube.
9. Press piston/rod assembly flush with the cylinder tube. Wipe off any lube from the face of the piston.
10. Examine all seals after installing for any contamination. Contamination may cause leakage.
11. Lightly grease Rod Seal (Part #2) and Bushing O-ring (Part #3) of Loaded bushing (Part #5) before installation. This will ease the installation of the rod bushing over the rod.
12. Assemble cylinder. First, loosely torque sleeve nuts to allow head and cap to rotate slightly. Before final torque, place cylinder on level surface to square head and cap. Torque sleeve nuts in a crisscross pattern. Use the following charts for torque tolerances.
13. Place full face retainer over bushing. Tighten retainer screws. Use torque tolerance charts for specific torque information.
14. Stroke cylinder by hand. This will enable detection of any binding. If binding does occur, repeat steps 12-14.

See Seal Installation Guide on page 39 for additional (visual) instructions.

NOTE: Depending on bore and/or rod size, the cylinder may not have full face retainer.

Repair Kit and Seal Kit

Removal/Installation Instructions

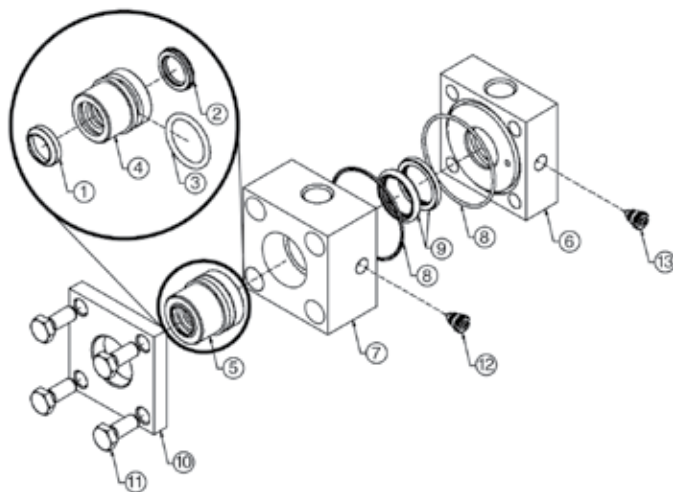
1. Loosen 4 Retainer Screws (Part #11) to remove Full Face Retainer (Part #10) and Loaded Bushing (Part # 5).
2. Loosen 4 Sleeve Nuts (Part #14) to remove Piston/Rod Assembly (Part #17, #18, #19, & #20).
3. Carefully remove old seals and wearband (Part [#1, #2, #3 Seal Kit only], #8, #9, #22, #23, & #24). Any damage to the seal grooves may result in leakage.
4. Lubricate new seals and Wearband (Part #22) with supplied Numatics' Lube. Examine seals before installing for any contamination. Contamination may cause leakage.
5. Install Piston Seal (Part #24). Make sure the piston seal is not twisted inside groove. Next install back-up rings (Part #23) if piston seal is a T-seal.
6. Install lubricated wearband onto piston. Sink piston/rod assembly into sinker tube. See Sinker Tube Part Numbers Chart.
7. Apply lube inside the cylinder tube.
8. Sink piston/rod assembly into cylinder tube.
9. Press piston/rod assembly flush with the cylinder tube. Wipe off any lube from the face of the piston.
10. Place Tube End Seals (Part #8) into head and cap seal grooves. Examine seals after installing for any contamination. Contamination may cause leakage.
11. Install Rod Wiper (Part #1), Rod Seal (Part #2), and Bushing O-ring (Part #3) into bushing (Seal Kit only). Lightly grease Rod Seal and Bushing O-ring after installation. This will ease the installation of the rod bushing over the rod and into the head.
12. Assemble cylinder except for loaded bushing. First, loosely torque sleeve nuts to allow head and cap to rotate slightly. Carefully place bushing over the rod until getting interference. With a twisting motion, slide the bushing down onto the rod and into the bushing pocket on the head.
13. Before final torque, place cylinder on level surface to square head and cap. Torque sleeve nuts in a crisscross pattern. Use the following charts for torque tolerances.
14. Place full face retainer over bushing. Tighten retainer screws. Use torque tolerance charts for specific torque information.
15. Stroke cylinder by hand. This will enable detection of any binding. If binding does occur, repeat steps 12-14.

See Seal Installation Guide on page 39 for additional (visual) instructions.

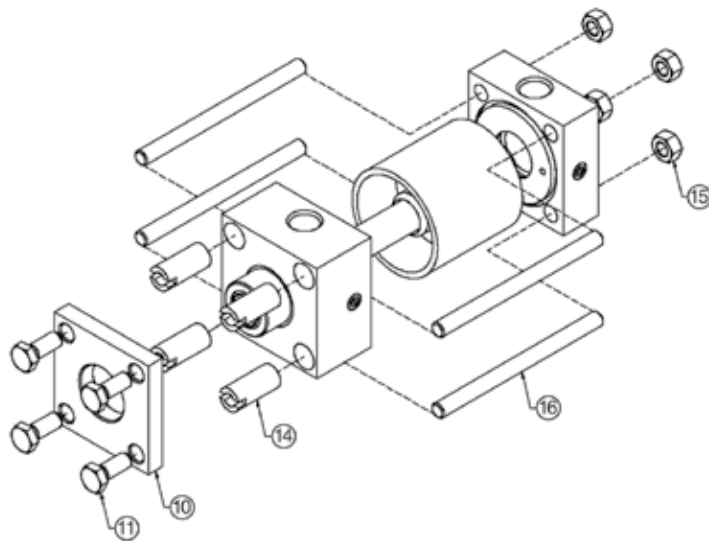
NOTE: Depending on bore and/or rod size, the cylinder may not have full face retainer.

Diagrams

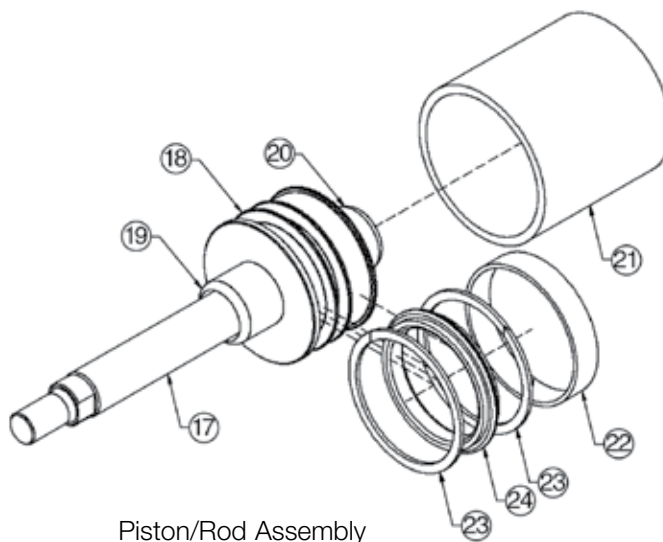
Pneumatic Service Temperatures:
 Nitrile Seals: -10°F (-23°C) to 165°F (74°C)
 FKM Seals: 0°F (-17°C) to 400°F (204°C)



Head, Cap, and Bushing Assembly



Cylinder Assembly and Tie Rod Torque

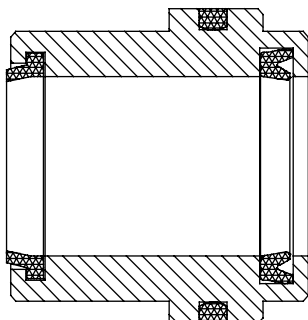


Piston/Rod Assembly

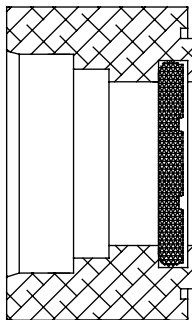
ASP Series

Part #	Description	Parts Included in:		
		Seal Kit	Repair Kit	Piston/Rod Assembly
1	Rod Wiper	X		
2	Rod Seal	X		
3	Bushing O-ring	X		
4	Bushing			
5	Loaded Bushing Assembly		X	
6	Cap			
7	Head			
8	Tube End Seals	X	X	
9	Head and Cap Cushion Seals	X	X	
10	Bushing Retainer			
11	Retainer Screws			
12	Head Cushion Needle			
13	Cap Cushion Needle			
14	Sleeve Nuts			
15	Hex Nuts			
16	Tie Rods			
17	Rod			X
18	Piston			X
19	Head Cushion Spear			X
20	Cap Cushion Spear			X
21	Tube			
22	Wearband	X	X	
23	Back-up Rings	X	X	
24	Piston Seal	X	X	

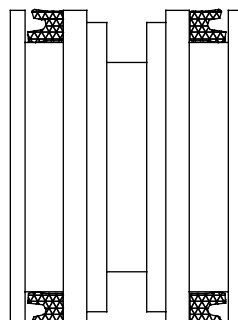
Seal Installation Guide



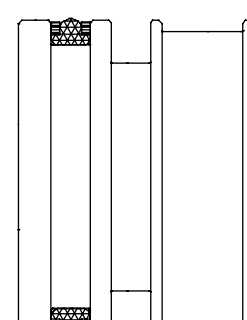
Loaded Bushing



Cushioned Head or Cap



Low Breakaway Piston



T-Seal Piston

Torque Tolerances (lbs-ft)

Tie Rod Nut and Sleeve Nut Part #14 & #15

Bore	Min.	Max.
1-1/2"	8	10
2"	15	20
2-1/2"	15	20
3-1/4"	23	30
4"	23	30
5"	50	60
6"	50	60
8"	80	90
10"	200	220
12"	200	220
14"	300	330

Retainer Screws Torque Tolerances (lbs-ft) Part #11

Size	Min.	Max.
#10-32	1	1.5
1/4-28	5	7
5/16-24	10	12
1/2-20	15	20

Note: Sinker Tubes are not included in kits. They can be ordered using the part numbers from the provided chart.

Sinker Tube Part Numbers

Bore	Min.
1-1/2"	A06-K91
2"	A06-L91
2-1/2"	A06-M91
3-1/4"	A06-P91
4"	A06-R91
5"	A06-T91
6"	A06-U91
8"	A06-W91
10"	A06-X91
12"	A06-Y91
14"	A06-B91

numatics®

World Class Supplier of Pneumatic Components



World Headquarters

USA Numatics, Incorporated

46280 Dylan Drive
Novi, Michigan 48377

P: 248-596-3200
F: 248-596-3201

Canada Numatics, Ltd

P: 519-758-2700
F: 519-758-5540

México - Ascomatica SA de CV

P: 52 55 58 09 56 40 (DF y Area metropolitana)
P: 01 800 000 ASCO (2726) (Interior de la República)
F: 52 55 58 09 56 60

Brazil Ascoval Ind.e Comercio Ltda

P: (55) 11-4208-1700
F: (55) 11-4195-3970