Series SS Stainless Steel Cylinders



Series SS Stainless Steel NFPA interchangeable air cylinders — the only real solution to corrosive environments.



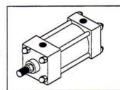
ADVANCED FLUID POWER, INC.

I-10 INDUSTRIAL PARK THEODORE (MOBILE), AL 36582 (334) 653-6888

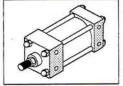




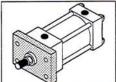
Series SS 1-1/2" thru 8" Cylinder Features	2
Series SS 1-1/2" thru 8" Cylinder Features	3
Series SS Technical Information	4
Series SS Technical Information	6
Series SS Cylinder with 01 (MX0) Basic	
Series SS Cylinder with 02 (MS4) Bottom Tap	
Series SS Cylinder with 04 (MF1) Front Flange	10
Series SS Cylinder with 05 (MF2) Rear Flange	12
Series SS Cylinder with 06 (MP1) Cap Fixed Clevis	14
Series SS 8" Cylinder with 10 (ME3) Head Square & 11 (ME4) Cap Square	16
Series SS Cylinder with 15 (MT1) Head Trunnion	18
Series SS Cylinder with 16 (MT2) Cap Trunnion	20
Series SS Double Rod End Cylinder with 01 (MX0) Basic	22
Series SS 1-1/2" thru 8" Cylinder Accessories	24
Series SS Optional Features & Custom Cylinders	25
Series SS 1-1/2" thru 8" Order Information	26
Series SS 1-1/8" Cylinder Features	27
Series SS 1-1/8" Cylinder with 01 (MX0) Basic, 03 (MS8) Bolt Thru, 04 (MF7) Front Flange, 05 (MF2) Rear Flange	28
Series SS 1-1/8" Cylinder with 17 (MP3) Fixed Eye, 22 (MS9) Side Tap, 30 (MR1) Head Face	30
Series SS 1-1/8" Double Rod End Cylinder with 01 (MX0) Basic	30
Series SS 1-1/8" Cylinder Accessories & Optional Features	32
Series SS 1-1/8" Order Information	33
Switch Information	34
Warning and Warranty	36
Truning und Trunding	



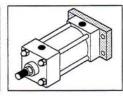
Page 6 Cylinder with 01 (MX0) Basic



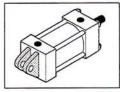
Page 8 Cylinder with 02 (MS4) Bottom Tap



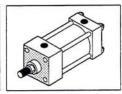
Page 10 Cylinder with 04 (MF1) Front Flange



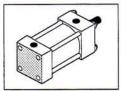
Page 12 Cylinder with 05 (MF2) Rear Flange



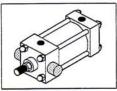
Page 14 Cylinder with 06 (MP1) Cap Fixed Clevis



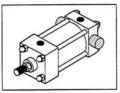
Page 16 8" Cylinder with 10 (ME3) Head Square



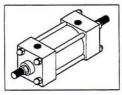
Page 16 8" Cylinder with 11 (ME4) Cap Square



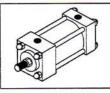
Page 18
Cylinder with
15 (MT1)
Head Trunnion



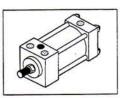
Page 20 Cylinder with 16 (MT2) Cap Trunnion



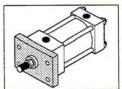
Page 22 Double Rod End Cylinder with 01 (MX0) Basic



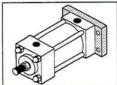
Page 28 1-1/8" Cylinder with 01 (MX0) Basic



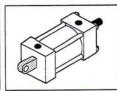
Page 28 1-1/8" Cylinder with 03 (MS8) Bolt Thru



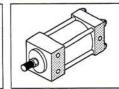
Page 28 1-1/8" Cylinder with 04 (MF7) Front Flange



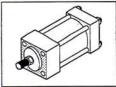
Page 28 1-1/8" Cylinder with 05 (MF2) Rear Flange



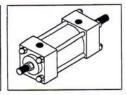
Page 30 1-1/8" Cylinder with 17 (MP3) Fixed Eye



Page 30 1-1/8" Cylinder with 22 (MS9) Side Tap



Page 30 1-1/8" Cylinder with 30 (MR1) Head Face

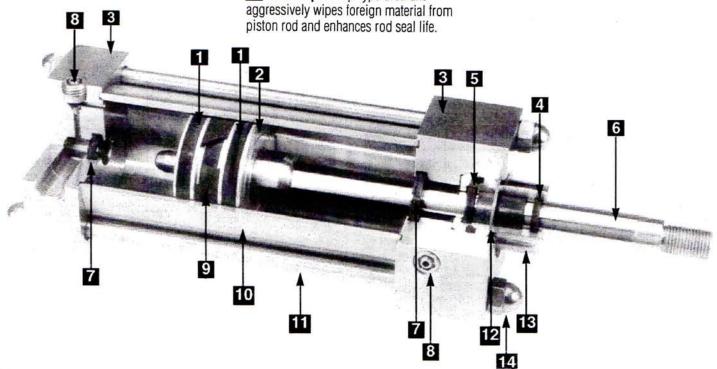


Page 30 1-1/8" Double Rod End Cylinder with 01 (MX0) Basic



The finest materials for each component!

- Piston Seals: Lip-type nitrile seals are pressure energized and wear compensating. Their excellent lubrication retention characteristics lower seal friction and ensure long life.
- 2 Piston: Solid aluminum alloy, light-weight for low inertia, yet strong.
- 3 Head/Cap: Precision machined from solid corrosion-resistant 304 stainless steel bar.
- 4 Rod Wiper: Lip-type urethane
- 5 Rod Seals: Rounded lip-type urethane is pressure energized and wear compensating.
- 6 Piston Rod: 303 stainless steel, 40,000 PSI minimum yield, hard chrome plated, ground and polished.



- 7 Ultra Cushion®: State-of-the-art design features a unique, one-piece, nitrile compound seal, captured within a precision machined groove. Linear and radial "float" of cushion seal eliminates misalignment. Ultra Cushions provide exceptionally fast "out of cushion" stroke reversal. (Head and Cap Cushions are optional.)
- 8 Adjustable Captive Cushion Needle Allows for safe and precise adjustment under pressure.
- 9 Wear Strip: Teflon® and graphite composition for minimum friction. maximum wear and side load resistance. (Magnetic band under wear strip optional.)
- 10 Tube: Corrosion-resistant 304 stainless steel.
- Tie Rods: High-strength 303 stainless steel maintains compression on tube end seals.
- 12 Retainer: Stainless steel snap ring securely retains bushing in head.
- 13 Rod Bearings: Machined from 304 stainless steel, with a Teflon® composite wear band insert that eliminates metal-tometal contact
- 14 Acorn Nut: Tie rod threads are covered by stainless steel acorn nuts which eliminate another bacteria hiding place.

Series D

Series D cylinders are designed for extremely smooth stroke performance on applications requiring very slow extension and/or retraction speeds. They are identical to the Series SS in design, function and dimensions, but have "ELF" carboxylated nitrile piston seals, rod seals, and rod wipers.

"ELF" carboxylated nitrile is a blend of Teflon® and other low friction additives that are molded into the substrate of the base seal material. Incorporating this compound in the dynamic seals of the cylinder results in diminished friction, lower breakaway and superior stroke performance.

Features:

- Extra smooth performance throughout the entire stroke of the cylinder.
- Available in standard SS series bore sizes.

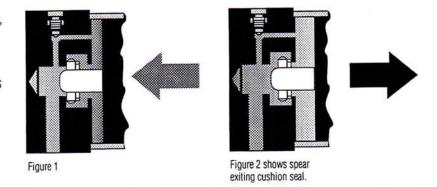
- NFPA interchangeable.
- Cylinders rated to 250 PSI air.



Ultra Cushion®

A Major Design and Performance Breakthrough in Air Cylinder Cushioning Systems!

Norgren's state-of-the-art cushion design features a unique, one-piece, nitrile compound seal that is captured within a precision machined groove. This allows both linear and radial "float" of the cushion seal which virtually eliminates problems associated with misalignment. Integral flow paths molded in the periphery of the seal provide exceptionally fast "out of cushion" stroke reversal without the use of ball checks.



Soft Touch Bumper Seal

The solution for noise pollution!

Norgren's Low Friction Soft Touch Bumper Seal, in conjunction with our state-of-the-art cushion design, decelerates and reduces end-of-stroke noise.

Figure 1: Cylinder deceleration starts when the cushion spear enters the cushion seal, creating a chamber of compressed air metered by an optional Adjustable Cushion Needle or Fixed Cushion (orifice).

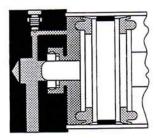
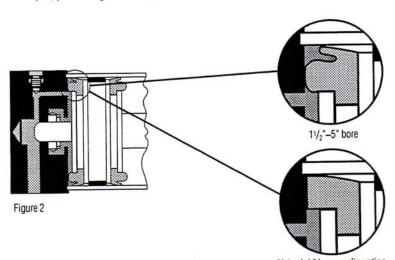


Figure 1

Figure 2: The final inertia load is absorbed by the Bumper, providing that final end-of-stroke "Soft Touch".



Note: 11/8" bore configuration.

Operating PSI will control the reduction of total cylinder stroke. The chart shows the approximate average (new cylinder) stroke reductions in inches based on PSI.

Stroke length will vary based on PSI.

Not recommended for applications that require 100% repeatable stroke increment.

Available on 1-1/8" thru 5" bores. (Not available in 1-1/2" bore with 1" diameter rod.)

Can be incorporated into cylinders with no cushions, fixed cushions or adjustable cushions.

Bore	0 PSI	20 PSI	40 PSI	60 PSI	80 PSI	100 PSI
11/8	.12	.08	.06	.03	02	0
11/2	.12	.04	.03	.02	.01	0
2"	.12	.10	.06	.03	.02	0
21/2*	.16	.10	.08	.04	.02	0
31/6	18	.10	.08	.04	.02	0
4.	.20	.14	.10	.06	.02	0
5*	22	.14	10	06	.02	- 0

Operating Temperature: -20°F to 200°F

(-29°C to 93°C)

Operating Pressure: 150 PSI Air Maximum

(10.4 Bar)

See page 26 for complete instructions on how to order cylinders.



Operating Temperatures:

Series SS

-40°F to 200°F

Series D

(-40°C to 93°C) -20°F to 250°F

with Viton Seals

(-29°C to 121°C) -20°F to 400°F

with viton Seals

(-29°C to 204°C)

Operating Pressure:

250 PSIG Air (17.2 Bar) 400 PSIG Hydraulic (27.6 Bar)

Bore Sizes: 1-1/8", 1-1/2", 2", 2-1/2", 3-1/4",

4", 5", 6", 8"

Supply:

Filtered compressed air to 250 PSI Petroleum based hydraulic fluid to 400 PSI

Lubrication:

None required

Norgren Air Cylinders are rated for "no lube added" service. All internal components are lubricated at time of assembly with a Teflon® based grease.

Materials:

Head and End Caps: 304 stainless steel

Tube: 304 stainless steel

Piston Rod: hard chrome plated 303 stainless steel

Piston: 2011-T451 aluminum with Teflon®

composite wearband

Rod Bearings: 304 stainless steel with Teflon®

composite wearband

Seals: urethane rod seal and wiper, nitrile piston seals

Tie Rods: 303 stainless steel

Side Loading:

Cylinders are specifically designed to push and pull. Side loading of the piston rod should be avoided to ensure maximum operating performance and life.

Care should be taken during installation to properly align the load to be moved with the center line of the cylinder. The use of a rod alignment coupler (see pages 24 and 32) is strongly recommended whenever possible.

Cylinder Weights

In pounds (kilograms)

								Moun	ting Code				
Bore		Rod		01, 02, 03, 1	0, 11, 22 & 30	04	& 05	•0	6 & 17	15	& 16	Add Pe	
11/8*	(28.58)	3/8*	(9.53)	1.1	(.49)	1.5	(.68)	1.3	(.58)	-		.13	(.05)
8	(20.00)	1/2*	(12.70)	1.2	(.54)	1.6	(.72)	1.4	(.63)	-	-	.15	(.06)
11/2	(38.10)	5/8*	(15.88)	3.3	(1.49)	4.0	(1.81)	3.8	(1.72)	3.8	(1.72)	.3	(.13)
1 12	(50.10)	1"	(25.40)	4.1	(1.85)	4.8	(2.17)	4.6	(2.08)	4.6	(2.08)	.4	(.18)
2*	(50.80)	5/8*	(15.88)	5.9	(2.67)	7.0	(3.17)	6.4	(2.90)	6.4	(2.90)	5	(.22)
-	(30.00)	1.	(25.40)	6.3	(2.85)	7.4	(3.35)	6.8	(2.94)	6.8	(3.08)	.6	(.27)
21/2	(63.50)	5/81	(15.88)	8.0	(3.62)	9.5	(4.30)	8.7	(3.94)	8.5	(3.85)	.6	(.27)
2 12	(00.50)	1°	(25.40)	8.5	(3.85)	10.0	(4.53)	9.2	(4.17)	9.0	(4.08)	.7	(.31)
31/4"	(82.55)	1	(25.40)	15.0	(6:80)	18.7	(8.48)	16.0	(7.25)	15.5	(7.03)	.8	(.36)
3.74	(02.33)	13/8	(34.93)	15.5	(7.03)	19.2	(8.70)	16.5	(7.48)	16.0	(7.25)	1.0	(.45)
4*	(101.60)	1	(25.40)	23.0	(10.43)	28.0	(12.70)	27.0	(12.24)	23.5	(10.65)	1.0	(.45)
-	(101.00)	13/8	(34.93)	23.5	(10.65)	28.5	(12.92)	27.5	(12.47)	24.0	(10.88)	1.2	(.54)
5*	(127.00)	1*	(25.40)	34.5	(15.64)	42.0	(19.05)	41.0	(18.59)	35.0	(15.87)	1.1	(.49)
J	(127.00)	13/8	(34.93)	35.0	(15.87)	42.5	(19.27)	41.5	(18.82)	35.5	(16.10)	1.3	(.58)
6*	(152.40)	13/8*	(34.93)	60.0	(27.21)	71.9	(32.61)	69.0	(31.29)	61.2	(27.76)	1.5	(88.)
	(102.40)	13/4	(44.45)	62.0	(28.12)	73.9	(33.52)	71.0	(32.20)	63.2	(28.66)	1.7	(.77)
8*	(203.20)	13/6	(34.93)	79,0	(35.83)	-	-	88.0	(39,91)	80.2	(36:37)	2.0	(.90)
0	(203.20)	13/4	(44.45)	82.0	(37.19)	-	-	91.0	(41.27)	83.2	(37.73)	2.3	(1.04)

^{*}Weight includes pivot pin

Listed are the average breakaway pressures in PSI for all Series SS and Series D cylinder bore sizes.

If your application requires a lower breakaway pressure than indicated for a particular bore size, consult the factory.

Breakaway Pressures in PSI

Bore	SS	Series	DS	Series
	Extend	Retract	Extend	Retract
11/8	6	7	3	4
11/2*, 2*, 21/2*	5	6	3	4
31/4", 4"	4	5	2	3
5", 6", 8"	3	4	1	2

Note: Breakaway pressures were established with the cylinders mounted horizontally and no load on the piston rod.





Piston Rod Diameter Selection:

Applications requiring long extend (push) strokes may require oversize piston rod diameters to prevent buckling. To determine the correct rod diameter for your application follow these simple steps:

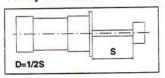
- Select the thrust from the Cylinder Force and Volume Chart that is required for your application.
 Thrust = Piston Surface Area x Operating Pressure
- 2. From the Cylinder Mounting Diagrams select the mounting style being used.
- 3. With the piston rod fully extended, calculate the value of D (in inches) using the formula shown or the cylinder mounting diagram selected in step #2.
- 4. Locate the value of D (in inches) at the bottom of the Selection Chart. Enter the chart at this point and move vertically upward until intersecting with the horizontal line representing the required thrust which was selected in step #1. The band within which these lines intersect represents the minimum recommended piston rod diameter.

Stop Tube Selection:

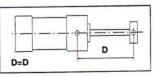
Stop tubes enhance the transverse load carrying capability of a long stroke cylinder by increasing the distance between the piston and rod bearing at full extension. When the value of **D** (calculated from the piston rod diameter selection instructions above) is less than 40," a stop tube is **not** required. However, if **D** is 40" or more, 1" of stop tube is recommended for every 10" (or fraction thereof) over 40."

Cylinder Mounting Diagrams

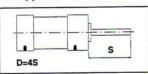
Firmly Guided Rod End



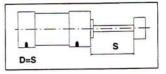
Head Trunnion



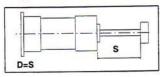
Unsupported Rod End



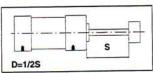
Supported Rod End



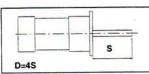
Supported Rod End



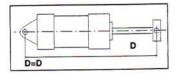
Firmly Guided Rod End



Unsupported Rod End



Cap Clevis or Cap Trunnion



Cylinder Force and Volume Charts

Extend Forces in pounds (newtons)

Bore	Piston	PSI (bar) 200 (74) 200 (14)					200 (14)	Volume Cu Ft (cm³) Displacement Per Inch	
	Area	40	(3)	60 (4)	80 (6)	100 (7)	150 (10)		***************************************
11/8	.99 (6.41)	40	(177)	60 (265)	80 (354)	99 (442)	149 (664)	200 (890)	.00057 (16)
11/2*	1.77 (11.40)		(315)	106 (472)	142 (629)	177 (786)	266 (1179)	353 (1570)	.00102 (29)
2"	3.14 (20.27)	********	(559)	189 (839)	251 (1119)	314 (1398)	471 (2097)	628 (2793)	.00182 (52)
21/2*	4.91 (31.67)		(874)	295 (1311)	393 (1748)	491 (2185)	737 (3277)	982 (4368)	.00284 (80)
31/4	8.30 (53.32)	0000000000	(1477)	498 (2215)	564 (2953)	830 (3692)	1245 (5538)	1659 (7379)	.00480 (136)
4'	12.57 (81.07)		(2237)	754 (3355)	1005 (4473)	1257 (5592)	1886 (8388)	2513 (11178)	.00727 (206)
5"	19.64 (126.71)	***********	(3491)	1178 (5240)	1571 (6988)	1964 (8736)	2946 (13104)	3928 (17472)	.01137 (322)
6*	28.27 (182.39)		(5026)		2262 (10061)	2827 (12574)	4240 (18860)	5654 (25149)	.01837 (520)
8*	50.26 (324.26)		(8940)	3015 (13411)	4020 (17881)	5026 (22356)	7539 (33533)	10052 (44711)	.02227 (631)

Deduct these Forces for Retract Strokes

Rod Rod		d Bod PSI (bar)								Volume Cu Ft (cm³) Displacement	
1100	Area	40	(3)	60 (4)	80 (6)	100 (7)	150 (10)	200 (14)	Per Inch		
3/8*	.112 (.72)		(20)	7 (30)	9 (40)	11 (50)	17 (75)	22 (100)	.00007	(2)	
1/2	.196 (1.26)	8	(35)	12 (52)	16 (70)	20 (87)	30 (131)	39 (174)	.00011	(3)	
5/8*	307 (1.98)	12	(53)	18 (80)	25 (111)	31 (138)	46 (205)	61 (271)	.00018	(5)	
1'	.785 (5.06)	31	(138)	47 (209)	63 (280)	70 (351)	118 (525)	157 (698)	.00045	(13)	
13/8*	1.485 (9.58)	59	(262)	89 (396)	119 (529)	149 (663)	222 (997)	297 (1321)	.00086	(24)	
13/4	2.404 (15.51)	******	(423)	144 (641)	192 (854)	240 (1068)	360 (1601)	480 (2135)	.00139	(39)	

Selection Chart 50000 30000 20000 10000 8000 6000 5000 4000 3000 2000 1000 800 600 500 400 300 200 5/8 100

100

150

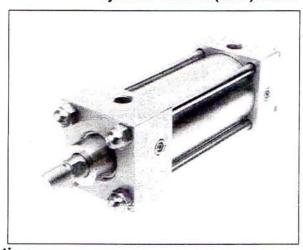
200

Axial thrust



Cylinder with 01 (MX0) Basic

- NFPA (MX0) 01 Basic Mount available in 1-1/2" thru 8" bore sizes.
- **Precision machined 300 Series** stainless steel components.
- Cylinders rated to 250 PSI air, 400 PSI hydraulic (non-shock).
- Designed for non-lube service.
- Switches available on all bore sizes. (See pages 34 & 35 for ordering information.)



Cylinder Order Information 8 (10)Series SS Series D Bore Single Rod End

11/2"	C
2.	D
21/2*	E
2 ¹ /2*	F
4.	G
5*	L
6*	J
8.	M

Full In	ches in Strokes
00	0° Stroke
01	1° Stroke
02	2° Stroke
03	3° Stroke
04	4° Stroke
05	5° Stroke
06	6° Stroke
	19949
99	99° Stroke
XX	Special

Α	0.	J	1/2*
В	1/16*	K	9/16*
С	1/8*	M	5/8*
D	3/16*	N	11/16
E	1/4"	P	3/4*
F	5/16*	R	13/16
G	3/8*	S	7/8*
Н	7/16*	T	15/16
X		Special	

St	andard	Ove	ersized
A	Male KK	H	Male KK
В	Male CC*	J	Male CC
C	Full Dia. Thd.	K	Full Dia. Thd
D	Female XX	M	Female XX
E	Studded	N	Studded
X	Special		

On 11/2; 2 & 21/2* Bore Sizes with 5/8" Rod, CC = 7/16 - 20 (NFPA)

No Options	00
Magnetic	
Piston Only**	90
Special ^a	98

^{**}See pages 34 & 35.

^{*}For any cylinder modifications not listed use "98" and please specify.

A
1
3
5
6
X

Cushions				
Needle Position	1	21	3	4
No Cushions			A	
Head Only	В	С	D	E
Cap Only	G	Н	J	K
Head and Cap	N	М	Р	R
Fixed			J	
Special		,	X	

Standard position

Ports				
Position	1"	2	3	4
Standard	Α	В	С	D
Oversized*	E	G	Н	J
Special			X	

*Standard position *NFPA

10 11 15	Head Square (ME3)* Cap Square (ME4)*
•	
15	Head Tamaine (MATA)
13	Head Trunnion (MT1)
16	Cap Trunnion (MT2)
XX	Special

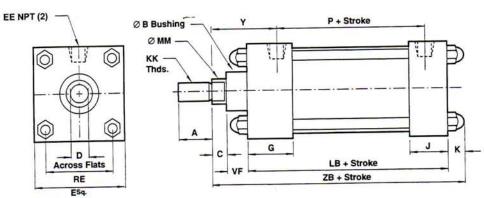
8 Bores Only

Port and Cushion Needle Positions (As viewed from rod end)

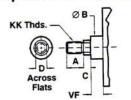


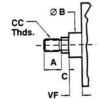
See page 26 for complete instructions on how to order cylinders.

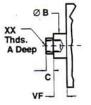


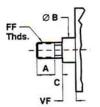


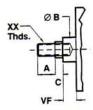
Standard & Optional Rod Ends











Style #1 (Standard Male)

Style #2 (Optional Male)

Style #3 (Optional Female)

Style #4 (Optional Full Diameter Threads)

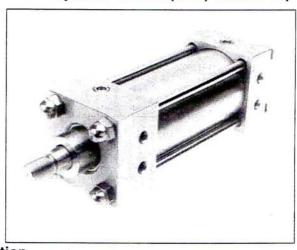
Style #5 (Optional Studded)

Dimens	ion	11/2" Bor	e (38.10)	2" Bore	(50.80)	21/2" Bor	e (63.50)	31/4" Boi	e (82.55)	4" Bore	(101.60)	5" Bore	(127.00)	6" Bore	(152.40)	8" Bore	(203.20)
	002000000		(15.88)	5/8*	(15.88)	5/8*	(15.88)	1°	(25.40)	1*	(25.40)	1'	(25.40)	1 3/8"	(34.93)	1 3/8*	(34.93)
Rod	Std.	5/8°	(25.40)	1*	(25.40)	1'	(25.40)	1 3/8*	(34.93)	1 3/8*	(34.93)	1 3/8*	(34.93)	1 3/4"	(44.45)	1 3/4"	(44.45)
	0.S.	*		750	(19.05)	750	(19.05)	1,125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28
4	Std.	.750	(19.05)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)	2.000	(50.80)	2.000	(50.80
_	0.8.	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	2.000	(50.80)	2.000	(50.80
3	Std.	1.125	(28.58)	1.500	(38.10)	1.500	(38.10)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)	2.375	(60.33)	2.375	(60.33
	0.S.	1.500	(38.10)	.375	(9.53)	.375	(9.53)	500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)	625	(15.88
3	Std.	.375	(9.53)	.500	(12.70)	.500	(12.70)	.625	(15.88)	.625	(15.88)	.625	(15.88)	.750	(19.05)	.750	(19.05
	0.S.	.500	(12.70)		5 – 20	_	5-20	_	1-14	************	3 –14		3-14	11/4	-12	13/4	- 12
CC	Std		- 20	1971/01/01/01/01	-14		1-14	A CONTRACTOR CONTRACTOR	- 12	**********	- 12	11/4	- 12	11/2	- 12	11/2	- 12
5056 J	0.S.		-14	*****************	(12.70)	.500	(12.70)	.812	(20.62)	.812	(20.62)	.812	(20.62)	1.125	(28.58)	1.125	(28,58
D	Std.	.500	(12.70)	500	(20.62)	.812	(20.62)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.500	(38.10)	1.500	(38.10
	0.S.	.812	(20.62)	.812		3.000	(76.20)	3.750	(95.25)	4.500	(114.30)	5.500	(139.70)	6.500	(165.10)	8.500	(215.90
E		2.000	(50.80)	2.500	(63,50)	.250	(6.35)	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)	.500	(12.7
EE	Std.	.250	(6.35)	.250	(6.35)	375	(9.53)	.500	(12.70)	.500	(12.70)	500	(12.70)	.750	(19.05)	.750	(19.0
-	0.5.	.375	(9.53)	375	(9.53)	A 0000000 0000000	3 –18	A STATE OF THE PARTY OF THE PAR	-14	************	-14	A. L. C.	-14		8 - 12	13/0	8 - 12
FF	Std.		3 –18		-18 -14		-14		3 – 12		e – 12		8-12		4-12	13/	4-12
125	0.5.	AAAAAA	-14		(38.10)	1.500	(38.10)	1.750	(44.45)	1.750	(44.45)	1.750	(44.45)	2.000	(50.80)	2.000	(50.8
G		1.500	(38.10)	1.500		1.000	(25.40)	1.250	(31.75)	1 250	(31.75)	1,500	(38.10)	1.500	(38.10)	1.750	(44.4
J		1.000	(25.40)	1,000	(25.40)		(13.49)	.625	(15.88)	.625	(15.88)	.830	(21.08)	.830	(21.08)	1.000	(25.4
K		.469	(11.91)	.531	(13.49)	.531			1-16		4 – 16	1000	4 – 16		- 14	1	- 14
KK	Std	6 3000000000000000000000000000000000000	2-20	S 1000000000000000000000000000000000000	- 20	Of Control Control	2 – 20	55 55 55 55 55 55 55 55 55 55 55 55 55	- 14	100000000000000000000000000000000000000	- 14		- 14	11/	4 – 12	11/	2-12
CANCELL .	0.8.		1 – 16		1 – 16		1 - 16	4.250	(107.95)	4.250	(107.95)	4,500	(114.30)	5.000	(127.00)	5.125	(130,1
LB		3.625	(92.08)	3.625	(92.08)	3,750	(95.25)	.980	(24.89)	.980	(24.89)	.980	(24.89)	1.355	(34.42)	1.355	(34.4
мм	Std.	.605	(15.37)	.605	(15.37)	.605	(15.37)		(34.42)	1.355	(34.42)	1.355	(34.42)	1.730	(43.94)	1.730	(43.9
IVIIVI	0,5,	.980	(24.89)	.980	(24.89)	.980	(24.89)	1,355	*****	2.625	(66.68)	2.875	(73.03)	3.000	(76.20)	3.125	(79.3
Р		2.125	(53.98)	2.125	(53.98)	2.250	(57.15)	2.625	(66.68) (70.10)		(84.33)	4.100	(104.14)	4.880	(123.95)	6.435	(163.4
RE		1.430	(36.32)	1.840	(46.74)	2.190	(55.63)	2.760	(22.23)	3.320	(22.23)	.875	(22.23)	1.000	(25.40)	1.000	(25.4
VF	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	.875		1.000	(25.40)	1.000	(25.40)	1,125	(28,58)	1.125	(28,5
٧,	0.5	.875	(22.23)	.875	(22.23)		(22.23)		(25,40)	Carrent and the last	4 – 16		4 – 16		- 14		- 14
XX	Std.		6 - 20		6 – 20		16 – 20		4 – 16	-		_	- 14	_	/4-12	13	/4-12
^^	0,5.	3/	4 – 16	3/-	4 – 16		4 – 16		- 14		- 14		(61.90)	2.875	(73.03)	2.875	(73.0
Υ	Std.	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)	100 000 000 000 000 000 000 000 000 000	(61.90)	2.437	(61.90)	2.437	(68.25)	3.125	(79.38)	3.125	(79.3
10	0.5	2.375	(60.33)	2.375	(60.33)	2.375	(60.33)		(68.25)	2.687	(68.25)	2.687	CANADA CONTRACTOR		(189.36)	7.750	(196.
70	Std.	5.094	(129.39)	5.156	(130.96)	5.281	(134.14)		(158.75)	6.250	(158.75)	6.705	(170.31)	7.455	(195.71)	8.000	*********
ZB	0.5.	5.469	(138.91)	5.531	(140.49)	5.656	(143.66)	6,500	(165.10)	6,500	(165.10)	6.955	(175.66)	7.705	(1924))	0.000	1200

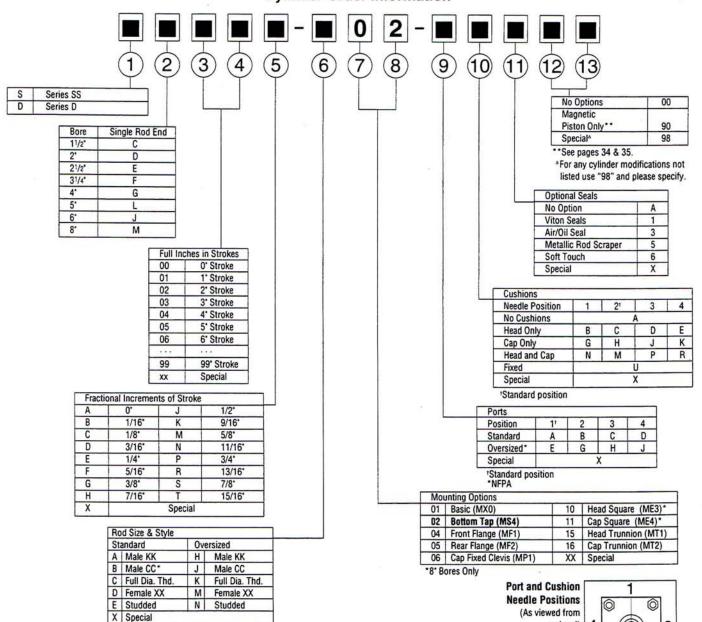


Cylinder with 02 (MS4) Bottom Tap

- NFPA (MS4) 02 Bottom Tap Mount available in 1-1/2" thru 8" bore sizes.
- **Precision machined 300 Series** stainless steel components.
- Cylinders rated to 250 PSI air. 400 PSI hydraulic (non-shock).
- Designed for non-lube service.
- Switches available on all bore sizes. (See pages 34 & 35 for ordering information.)



Cylinder Order Information



See page 26 for complete instructions on how to order cylinders.

On 11/2; 2" & 21/2" Bore Sizes with 5/8" Rod, CC = 7/16 - 20 (NFPA)

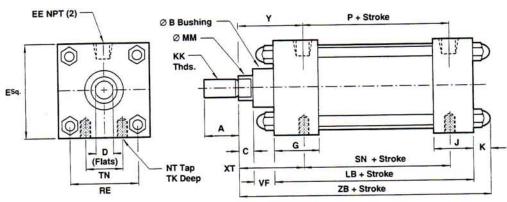


8

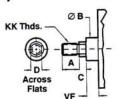
rod end)

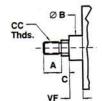
0

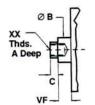


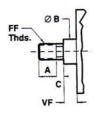


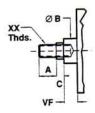
Standard & Optional Rod Ends











Style #1 (Standard Male)

Style #2 (Optional Male)

Style #3 (Optional Female)

Style #4 (Optional Full Diameter Threads)

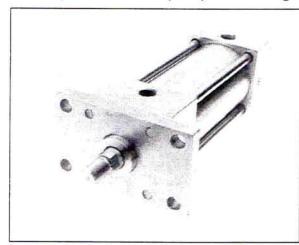
Style #5 (Optional Studded)

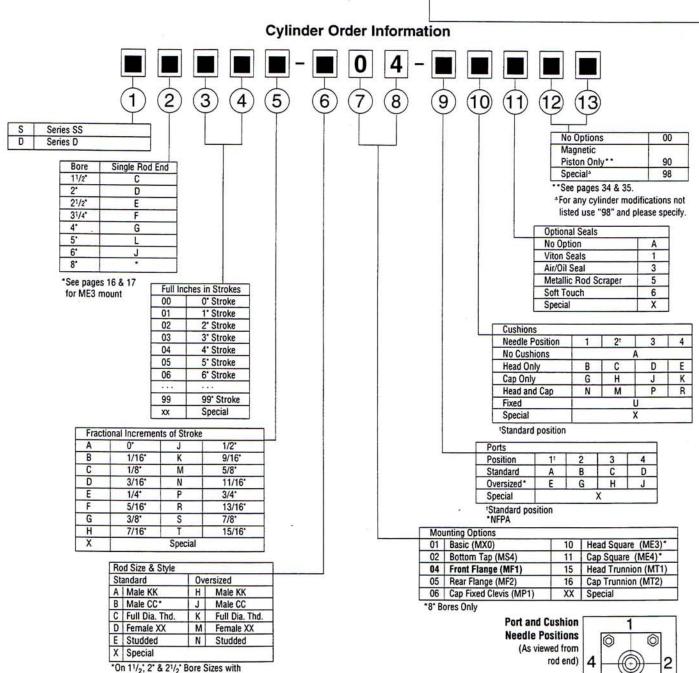
	(Standard I	Male)		(Opt	ional Male)	(C	ptional Fer	nale)	Орнопа	r Full Dian	ieter Tillea	us,		(Срисии	. 0.0000
imens	sion	11/2" Bor	e (38.10)	2" Bore	(50.80)	21/2" Bor	e (63.50)	31/4" Bor	e (82.55)	4" Bore	(101.60)	5" Bore	(127.00)	6" Bore	(152.40)	8" Bore	(203.20)
_	- C-4	5/8*	(15.88)	5/8*	(15.88)	5/8*	(15.88)	1.	(25.40)	1.	(25.40)	1'	(25.40)	1 3/8"	(34.93)	1 3/8*	(34.93
Rod	Std.	1"	(25.40)	1'	(25.40)	1"	(25.40)	1 3/8*	(34.93)	1 3/8*	(34.93)	1 3/8"	(34.93)	1 3/4"	(44.45)	1 3/4"	(44.45
	0.8.	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41,28
1	Std.	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)	2.000	(50.80)	2.000	(50.80
-		1.125	(28.58)	1.125	(28.58)	1.125	(28,58)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	2.000	(50.80)	2.000	(50.8
3	Std.	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)	2.375	(60.33)	2.375	(60.3
_		375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)	625	(15.8
	Std.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)	.625	(15.88)	.625	(15.88)	.750	(19.05)	.750	(19.0
_	Std.		-20		- 20		- 20		1-14	7/8	-14	7/8	-14	13/4	-12		- 12
CC	0.5.		-14		-14		-14		- 12	11/4	- 12	11/4	- 12	11/2	- 12	11/2	- 12
_	Std.	.500	(12.70)	500	(12.70)	500	(12.70)	.812	(20.62)	.812	(20.62)	812	(20.62)	1.125	(28.58)	1.125	(28.5
)	0.5.	.812	(20.62)	.812	(20.62)	.812	(20.62)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.500	(38.10)	1.500	(38.1
20000000	10.5.	2.000	(50.80)	2.500	(63.50)	3.000	(76.20)	3.750	(95:25)	4.500	(114.30)	5.500	(139.70)	6.500	(165.10)	8.500	(215.9
	Cra	.250	(6.35)	.250	(6.35)	.250	(6.35)	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)	.500	(12.7
EE	Std.	.250	(9.53)	375	(9.53)	,375	(9.53)	500	(12.70)	.500	(12.70)	.500	(12.70)	.750	(19.05)	750	(19.0
and to	200000000	0.0000000000000000000000000000000000000	(9.55) 3 –18	200000000000000000000000000000000000000	-18		3-18	0.0000000000000000000000000000000000000	-14		-14	1	-14	13/	B - 12	13/8	- 12
FF	Std.		-14		-14		-14		8-12	13/1	s – 12	13/4	- 12	19/	4-12	137	- 12
0	0.5	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	1.750	(44.45)	1.750	(44.45)	1.750	(44.45)	2.000	(50.80)	2.000	(50.8
G	*******	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.250	(31.75)	1.250	(31.75)	1,500	(38.10)	1.500	(38.10)	1.750	(44.4
J			Maria Company	.531	(13.49)	.531	(13.49)	.625	(15.88)	.625	(15.88)	.830	(21.08)	.830	(21.08)	1.000	(25.4
K	Email:	.469	(11.91) 2 – 20		-20	-	-20	VI CONTRACTOR OF THE PARTY OF T	1-16		1-16	3/4	-16	1	- 14	1	-14
KK	Std.	99 1000000000000000	- 20 I - 16		- 16	61 610000000000000000000000000000000000	- 16	25 20 20 20 20 20 20 20 20 20 20 20 20 20	- 14	5 1000000000000000000000000000000000000	- 14	1	- 14	11/	4-12	11/	2-12
	10.5.	3.625	(92.08)	3.625	(92.08)	3.750	(95.25)	4.250	(107.95)	4.250	(107.95)	4.500	(114.30)	5.000	(127.00)	5.125	(130.
LB	T 044		(15.37)	.605	(15.37)	.605	(15.37)	.980	(24.89)	.980	(24.89)	.980	(24.89)	1.355	(34.42)	1.355	(34.4
MM	Std.	.605	(24.89)	.980	(24.89)	.980	(24.89)	1.355	(34.42)	1,355	(34.42)	1.355	(34.42)	1.730	(43.94)	1.730	(43.9
	0.8.	.980	000000000000000000000000000000000000000	\$ 5000000000000000000000000000000000000	6 - 18	3/8	CONTRACTOR OF THE PARTY OF THE	SALL SALES ASSESSED	2 – 13		2 – 13	******	3 – 11	3/4	4 – 10	3/4	- 10
NT		C. Contractor	4 – 20 (53.98)	2.125	(53.98)	2,250	(57.15)	2.625	(66.68)	2.625	(66.68)	2.875	(73.03)	3.000	(76.20)	3.125	(79.
P		2.125	(36.32)	1.840	(46.74)	2.190	(55.63)	2.760	(70.10)	3.320	(84.33)	4.100	(104.14)	4.880	(123.95)	6.435	(163.4
RE		1.430	(57.15)	2:250	(57.15)	2.375	(60.33)	2.625	(66.68)	2.625	(66.68)	2.875	(73.03)	3.125	(79.38)	3.250	(82.
SN		2.250		.500	(12.70)	.625	(15.88)	.750	(19.05)	.750	(19.05)	1.000	(25.40)	1.125	(28.58)	1.125	(28.
TK		.375	(9.53) (15.88)	.875	(22.23)	1.250	(31.75)	** **********	(38.10)	2.062	(52.37)		(68.25)	3.250	(82.55)	4.500	(114
TN	T	.625		.625	(15.88)	.625	(15.88)	.875	(22.23)	.875	(22.23)	.875	(22.23)	1.000	(25.40)	1.000	(25.
VF	Std.	.625	(15.88)		(22.23)	.875	(22.23)	1.000	(25.40)	1.000	(25.40)	_	(25.40)	1,125	(28.58)	1.125	(28.
	0.5.	.875	(22,23)	.875	(49.20)	1.937	(49.20)	2.437	(61.90)	2.437	(61.90)		(61.90)	2.812	(71.42)	2.812	(71.
XT	Std.	1.937	(49.20)	1.937	(58.72)	2.312	(58.72)		(68.25)	2.687	(68.25)	_	(68.25)	3.062	(77.77)	3.062	(77
	0.5	2.312	(58.72)	2.312	6 - 20	***	6 - 20	************	4 - 16	- Contractor	4 – 16		4 – 16		- 14		-14
XX	Std.		16 – 20	1000	6 - 20 4 - 16		4-16	_	-14		-14		-14	1	/4 - 12	11	4-12
	0.5.		4 - 16		**********	**************************************	(50.80)		(61.90)	2.437	(61.90)	200 20000000000000000000000000000000000	(61.90)	2.875	(73.03)	2.875	(73.
Υ	Std.	2.000	(50.80)	2.000	(50.80)		(60.33)	AND REPRESENTATION	(68.25)	2.687	(68.25)		(68.25)	3,125	(79.38)	3.125	(79
10	0.5.	2.375	(60.33)	2.375	(60.33)			-	(158.75)	6.250	(158.75)		(170.31)	7.455	(189.36)	7.750	(196.
ZB	Std.	5.094	(129.39)	5.156	(130.96)	5.281	(134.14)		***************************************	***********	***************************************		(176.66)	7.705	(195.71)	000000000000000000000000000000000000000	(203
	0.5	5.469	(138.91)	5.531	(140.49)	5.656	(143.66	6.500	(100.10)	0.500	(105.10)	0.333	(110.00)	1.100	the second section of the		2000



Cylinder with 04 (MF1) Front Flange

- NFPA (MF1) 04 Front Flange Mount available in 1-1/2" thru 6" bore sizes.
- Precision machined 300 Series stainless steel components.
- Cylinders rated to 250 PSI air, 400 PSI hydraulic (non-shock).
- Designed for non-lube service.
- Switches available on all bore sizes.
 (See pages 34 & 35 for ordering information.)



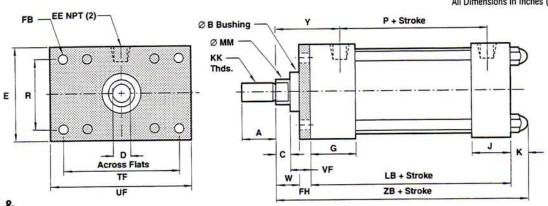


5/8" Rod, CC = 7/16 - 20 (NFPA)

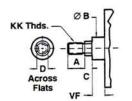
See page 26 for complete instructions on how to order cylinders.

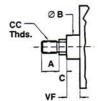
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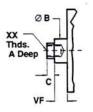
All Dimensions in Inches (mm)

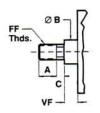


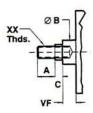
Standard & Optional Rod Ends











Style #1 (Standard Male)

Style #2 (Optional Male)

Style #3 (Optional Female)

Style #4 (Optional Full Diameter Threads)

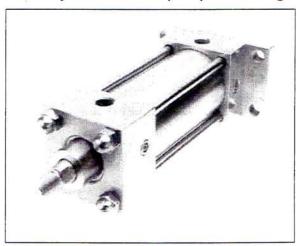
Style #5 (Optional Studded)

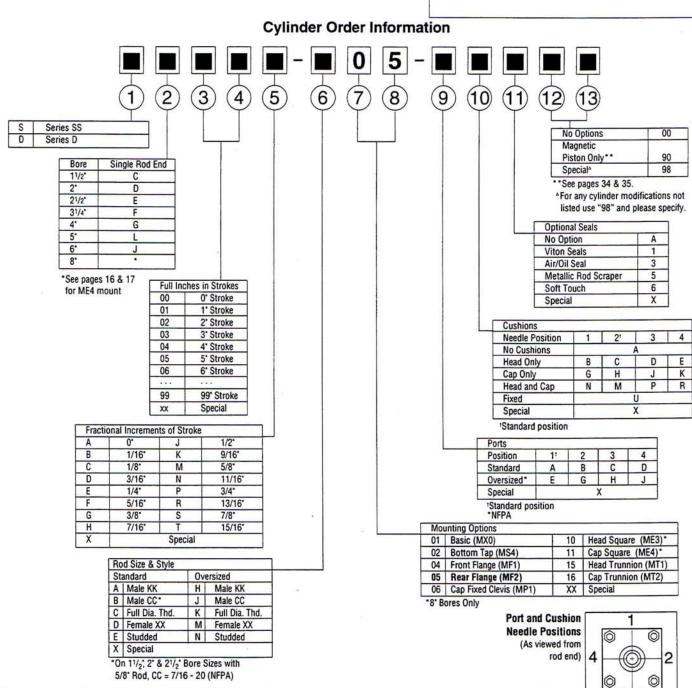
(Sta	ndard N	Male)		Орг	tional Male		(0	ptional Fe	male)	Орнопа	II FUII DIAITI	otor mile	au3)		Ориона
Dimen:	sion	11/2" Bor	re (38.10)	2" Bore	(50.80)	21/2" Bor	re (63.50)	31/4" Bor	re (82.55)	4" Bore	(101.60)	5" Bore	(127.00)	6" Bore	(152.40)
	Std	5/8*	(15.88)	5/8*	(15.88)	5/8*	(15.88)	1.	(25.40)	1*	(25.40)	1'	(25.40)	1 3/8*	(34.93)
ø Rod	0.5.	1*	(25.40)	1'	(25.40)	1'	(25.40)	1 3/8*	(34.93)	1 3/8*	(34.93)	1 3/8"	(34.93)	1 3/4"	(44.45)
	Std.	.750	(19.05)	.750	(19.05)	750	(19.05)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)
A	0.S.	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)	2.000	(50.80)
_	Std	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	2.000	(50.80)
В	0.S.	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)	2.375	(60.33)
_	Std.	375	(9.53)	375	(9,53)	.375	(9.53)	.500	(12.70)	.500	(12.70)	500	(12.70)	.625	(15.88)
С	0.S.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)	.625	(15.88)	.625	(15.88)	.750	(19.05)
	Std		5-20	7/16	6 – 20	7/16	5 – 20	7/8	-14		3-14		3 –14		- 12
CC	0.S.		-14	7/8	3 –14	7/8	3 –14	11/4	-12	11/4	- 12		4 – 12		- 12
1237	Std.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.812	(20.62)	.812	(20.62)	.812	(20.62)	1.125	(28.58)
D	0.S.	.812	(20.62)	.812	(20.62)	.812	(20.62)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.500	(38.10)
E		2.000	(50.80)	2.500	(63.50)	3.000	(76.20)	3.750	(95.25)	4.500	(114.30)	5.500	(139.70)	6.500	(165,10)
	Std.	.250	(6.35)	.250	(6.35)	.250	(6.35)	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
EE	0.5.	.375	(9.53)	,375	(9.53)	375	(9.53)	.500	(12.70)	.500	(12.70)	.500	(12.70)	750	(19.05)
FB	1-2-2-11	.312	(7.92)	.375	(9.53)	.375	(9.53)	.437	(11.10)	.437	(11.10)	.562	(14.27)	.562	(14.27)
	Std	5/8	3-18	5/8	3 -18	5/8	3-18	1	-14	a properties and the second	-14	1	-14		-12
FF	0.S.	1	-14	1	-14	1	-14	13/	- 12	1	8 - 12		8-12		- 12
FH		.375	(9.53)	.375	(9.53)	.375	(9.53)	.625	(15.88)	.625	(15.88)	.625	(15.88)	.750	(19,05)
G		1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	1.750	(44.45)	1.750	(44.45)	1.750	(44.45)	2.000	(50.80)
J		1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.250	(31.75)	1.250	(31.75)	1,500	(38.10)	1.500	(38.10)
K		.469	(11.91)	.531	(13.49)	.531	(13.49)	.625	(15.88)	.625	(15.88)	.830	(21.08)	.830	(21.08)
SILVAT	Std	1/2	- 20	1/2	2 - 20	1/2	2-20	3/4	- 16	3/4	1 – 16	3/4	4 - 16		- 14
KK	0.8.	3/4	- 16	3/4	1 - 16	3/4	1 – 16	1	- 14	1	- 14		- 14		4-12
LB		3.625	(92.08)	3.625	(92.08)	3.750	(95.25)	4.250	(107.95)	4.250	(107.95)	4.500	(114.30)	5.000	(127.00)
00710000000	Std.	.605	(15.37)	.605	(15.37)	.605	(15.37)	.980	(24.89)	.980	(24.89)	.980	(24.89)	1.355	(34.42)
MM	0.5.	.980	(24.89)	.980	(24.89)	.980	(24.89)	1.355	(34.42)	1,355	(34.42)	1.355	(34.42)	1.730	(43.94)
P	1,000000	2.125	(53.98)	2.125	(53.98)	2.250	(57.15)	2.625	(66.68)	2.625	(66.68)	2.875	(73.03)	3.000	(76.20)
R		1.430	(36.32)	1.840	(46.74)	2.190	(55.63)	2.760	(70.10)	3.320	(84.33)	4.100	(104.14)	4.880	(123.95)
TF	*******	2.750	(69.85)	3.375	(85.73)	3.875	(98.43)	4.687	(119.08)	5.437	(138.10)	6.625	(168.28)	7.625	(193.68)
UF		3.375	(85.73)	4.125	(104.78)	4.625	(117,48)	5.500	(139.70)	6.250	(158.75)	7.625	(193.68)	8.625	(219,08)
	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	.875	(22.23)	.875	(22.23)	.875	(22.23)	1.000	(25.40)
VF	0.5.	875	(22.23)	.875	(22.23)	.875	(22:23)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.125	(28.58)
	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	.750	(19.05)	.750	(19.05)	.750	(19.05)	.875	(22.23)
W	0.5	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.000	(25:40)	1.000	(25.40)	1.125	(28.58)
	Std.	7/1	6 - 20	7/1	16 - 20	7/1	6 - 20	and the second second	4 – 16	The state of the s	4 – 16	and the same of th	4 – 16		- 14
XX	0.5		4 – 16	3/	4 – 16	3/	4-16	1	-14	1	- 14		- 14		4-12
les.	Std.	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)	2.437	(61.90)	2.437	(61.90)	2.437	(61.90)	2.875	(73.03)
Y	0.5.	2.375	(60.33)	2.375	(60.33)	2.375	(60.33)	2.687	(68.25)	2.687	(68.25)	2.687	(68.25)	3.125	(79.38)
22	Std.	5.094	(129.39)	5.156	(130.96)	5.281	(134.14)	6.250	(158.75)	6.250	(158.75)	6.705	(170.31)	7.455	(189.36)
ZB	0.5	5.469	(138.91)	5.531	(140.49)	5.656	(143.66)	6.500	(165.10)	6.500	(165.10)	6.955	(176.66)	7.705	(195.71)



Cylinder with 05 (MF2) Rear Flange

- NFPA (MF2) 05 Rear Flange Mount available in 1-1/2" thru 6" bore sizes.
- Precision machined 300 Series stainless steel components.
- Cylinders rated to 250 PSI air, 400 PSI hydraulic (non-shock).
- Designed for non-lube service.
- Switches available on all bore sizes.
 (See pages 34 & 35 for ordering information.)



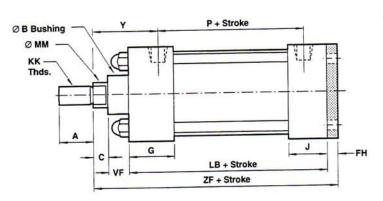


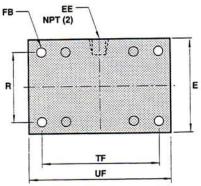
12

Cylinder with 05 (MF2) Rear Flange

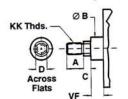
All Dimensions in Inches (mm)

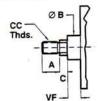


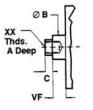


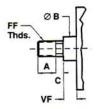


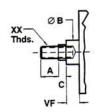
Standard & Optional Rod Ends











Style #1 (Standard Male)

Style #2 (Optional Male)

Style #3 (Optional Female)

Style #4 (Optional Full Diameter Threads)

Style #5 (Optional Studded)

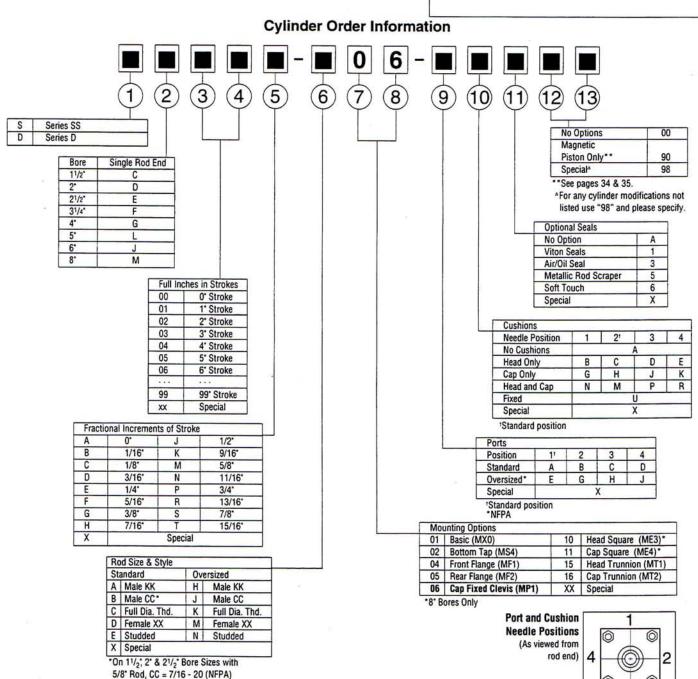
Dimens	sion	11/2" Bor	e (38.10)	2" Bore	(50.80)	21/2" Bor	e (63.50)	31/4" Bor	e (82.55)	4" Bore	(101.60)	5" Bore	(127.00)	6" Bore	(152.40)
	7	5/8*	(15.88)	5/8*	(15.88)	5/8*	(15.88)	1*	(25.40)	1"	(25.40)	1.	(25.40)	1 3/8*	(34.93)
Rod	Std.	1'	(25.40)	1'	(25.40)	1'	(25.40)	1 3/8*	(34.93)	1 3/8*	(34.93)	1 3/8*	(34.93)	1 3/4"	(44.45)
22,1160,000,000	Std.	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)
Α		1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)	2.000	(50.80)
-	0.8.		(28.58)	1.125	(28.58)	1,125	(28.58)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	2.000	(50.80)
В	Std.	1,125	(38.10)	1.500	(38.10)	1.500	(38.10)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)	2.375	(60.33)
	0.S.	1.500	(9.53)	.375	(9.53)	375	(9.53)	.500	(12.70)	.500	(12.70)	.500	(12.70)	625	(15.88)
C	Std.	.375	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)	.625	(15.88)	.625	(15.88)	.750	(19.05)
	O.S.	.500	(12.70) 3 – 20		i – 20		5-20	-	-14	7/8	-14	7/8	-14	17/4	- 12
CC	4-7-5-1-1-C-1-1-		-14		-14		-14	************	- 12		- 12	11/4	- 12	11/2	- 12
_	0.5.	500	(12.70)	.500	(12.70)	.500	(12.70)	.812	(20.62)	.812	(20.62)	812	(20.62)	1.125	(28.58)
D	Std.	.812	(20.62)	.812	(20.62)	.812	(20.62)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.500	(38.10)
	0.S.	-		2.500	(63.50)	3.000	(76.20)	3.750	(95.25)	4,500	(114.30)	5,500	(139.70)	6.500	(165.10)
E	T	2.000	(50.80)		(6.35)	.250	(6.35)	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)
EE	Std.	.250	(6.35)	.250 .375	(9.53)	.230	(9.53)	.500	(12.70)	500	(12.70)	.500	(12.70)	.750	(19.05)
	0.5	.375	(9.53)		(9.53)	.375	(9.53)	.437	(11.10)	.437	(11.10)	.562	(14.27)	.562	(14.27)
FB	10200000	.312	(7.92)	.375			3-18		-14		-14		-14	13/8	- 12
FF	Std.	4 1000000000000000000000000000000000000	1-18		1-18		-14		- 12		s – 12		8 – 12	13/4	- 12
	0.5.		-14		-14	375	(9.53)	625	(15.88)	.625	(15.88)	.625	(15.88)	.750	(19.05)
FH		.375	(9.53)	.375	(9.53)	1.500	(38.10)	1.750	(44.45)	1.750	(44.45)	1.750	(44.45)	2.000	(50.80)
G		1.500	(38.10)	1.500		1.000	(25.40)	1.250	(31.75)	1.250	(31.75)	1.500	(38.10)	1,500	(38.10)
J		1.000	(25.40)	1.000	(25.40)	COCCOSTRUCTOR	2 – 20		- 16	A SECTION ASSESSMENT OF THE PARTY OF THE PAR	1 – 16	000000000000000000000000000000000000000	1 – 16	1	- 14
KK	Std.		2 – 20		2 – 20 1 – 16		1-16	15.77	-14		-14		-14	11/	4-12
1894121	0.5	22 22 22 22 22 22 22 22 22 22 22 22 22	- 16		(92.08)	3.750	(95.25)	4.250	(107.95)	4.250	(107.95)	4.500	(114.30)	5.000	(127.00)
LB	F-0000	3.625	(92.08)	3.625	(15.37)	.605	(15.37)	980	(24.89)	.980	(24.89)	.980	(24.89)	1.355	(34.42)
MM	Std.	.605	(15.37)	.605		.980	(24.89)	1.355	(34.42)	1.355	(34.42)	1.355	(34.42)	1.730	(43.94)
¹ / ₂ (COSC)	0.8.	.980	(24.89)	.980	(24.89)	2,250	(57.15)	2.625	(66.68)	2.625	(66.68)	2.875	(73.03)	3.000	(76.20)
Р		2.125	(53.98)	2.125	(53.98)	2.230	(55.63)	2.760	(70.10)	3.320	(84.33)	4.100	(104.14)	4.880	(123.95
R		1.430	(36.32)	1.840	(46.74)		(98.43)	4.687	(119.08)	5.437	(138.10)	6.625	(168,28)	7.625	(193.68
TF		2.750	(69.85)	3.375	(85.73)	3.875 4.625	(117.48)	5.500	(139.70)	6.250	(158.75)	7.625	(193.68)	8.625	(219.08
UF		3.375	(85.73)	4.125	(104.78)			875	(22.23)	.875	(22.23)	875	(22.23)	1.000	(25.40
VF	Std.	.625	(15.88)	.625	(15.88)	625	(15.88)	1.000	(25.40)	1,000	(25.40)	1.000	(25.40)	1.125	(28.58
	0.5.	.875	(22.23)	.875	(22.23)	.875			4 – 16		4-16		4 - 16		- 14
XX	Std.		6-20		6 - 20		6-20		-14	20 000000000000000000000000000000000000	- 14		- 14	***********	/ ₄ – 12
AA :	0.8.		4 – 16		4 - 16		4 - 16		(61.90)	2.437	(61.90)	2.437	(61.90)	2.875	(73.03
Y	Std	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)	2.437	(68.25)	2.687	(68.25)	2.687	(68.25)	3.125	(79.38
	0.5.	2.375	(60.33)	2.375	(60.33)	2.375	(60.33)	2.687	**************	6,250		6.500	(165.10)	7.375	(187.33
ZF	Std.	5,000	(127.00)	5,000	(127.00)	5.125	(130.18)	6.250			(165.10)	6.750	(171.45)	7.625	(193.68
25	0.5.	5.375	(136.53)	5.375	(136.53)	5.500	(139.70)	6.500	(165.10)	6.500	(105.10)	0.750	(171.43)	1.025	(133.00



Cylinder with 06 (MP1) Cap Fixed Clevis

- NFPA (MP1) 06 Cap Fixed Clevis Mount available in 1-1/2" thru 8" bore sizes.
- Precision machined 300 Series stainless steel components.
- Cylinders rated to 250 PSI air, 400 PSI hydraulic (non-shock).
- Designed for non-lube service.
- Switches available on all bore sizes.
 (See pages 34 & 35 for ordering information.)



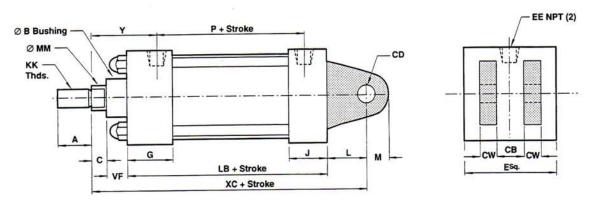


See page 26 for complete instructions on how to order cylinders.

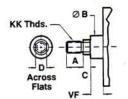
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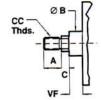


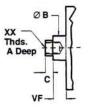
All Dimensions in Inches (mm)

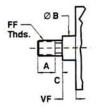


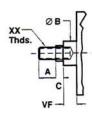
Standard & Optional Rod Ends











Style #1 (Standard Male)

Style #2 (Optional Male)

Style #3 (Optional Female)

Style #4 (Optional Full Diameter Threads)

Style #5 (Optional Studded)

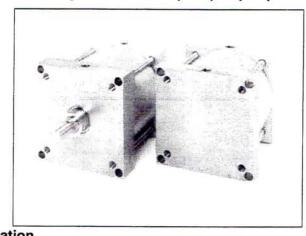
Dimen	sion	11/2" Bor	e (38.10)	2" Bore	(50.80)	21/2" Bor	e (63.50)	31/4" Bor	re (82.55)	4" Bore	(101.60)	5" Bore	(127.00)	6" Bore	(152.40)	8" Bore	(203.20)
	Std.	5/8*	(15.88)	5/8*	(15.88)	5/81	(15.88)	1*	(25.40)	1*	(25.40)	11'	(25.40)	1 3/8*	(34.93)	1 3/8*	(34.93)
ø Rod	0.S.	1'	(25.40)	1*	(25.40)	1°	(25.40)	1 3/8*	(34.93)	1 3/8*	(34.93)	1 3/8*	(34.93)	1 3/4"	(44.45)	1 3/4"	(44.45)
	Std.	.750	(19.05)	750	(19.05)	.750	(19.05)	1.125	(28.58)	1,125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)
A	0.S.	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)	2.000	(50.80)	2.000	(50.80)
	Std.	1.125	(28.58)	1.125	(28.58)	1,125	(28.58)	1,500	(38.10)	1.500	(38.10)	1,500	(38.10)	2.000	(50.80)	2.000	(50.80)
В	0.S.	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)	2.375	(60.33)	2.375	(60.33)
	Std.	375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)	.625	(15.88)
С	0.5.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)	.625	(15.88)	.625	(15.88)	.750	(19.05)	.750	(19.05)
СВ	0.3.	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.250	(31.75)	1.250	(31.75)	1.250	(31.75)	1.500	(38.10)	1.500	(38.10)
	Std.		- 20	CONTRACTOR AND ADDRESS OF THE RESE	- 20	Contract Con	- 20	7/8	-14	7/8	3-14	7/8	-14	11/4	- 12		- 12
CC	0.5		-14		-14		-14	11/4	- 12	17/	- 12	11/4	ı — 12	192	- 12	11/2	- 12
CD		.500	(12.70)	.500	(12.70)	.500	(12.70)	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.000	(25.40)	1.000	(25.40)
CW		.500	(12.70)	.500	(12.70)	500	(12.70)	625	(15.88)	625	(15.88)	.625	(15.88)	.750	(19.05)	750	(19.05)
U14	Std.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.812	(20.62)	.812	(20.62)	.812	(20.62)	1.125	(28.58)	1.125	(28.58)
D	0.5	.812	(20.62)	812	(20.62)	.812	(20:62)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.500	(38.10)	1.500	(38.10)
E		2.000	(50.80)	2.500	(63.50)	3.000	(76.20)	3.750	(95.25)	4.500	(114.30)	5.500	(139.70)	6.500	(165.10)	8.500	(215.90)
	Std.	.250	(6.35)	.250	(6.35)	.250	(6.35)	.375	(9.53)	.375	(9.53)	375	(9.53)	.500	(112.70)	.500	(12,70)
EE	0.5.	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)	.500	(12.70)	.500	(12.70)	.750	(19.05)	.750	(19.05)
	Std.		-18		-18	5/8	-18	1	-14	1	-14	1	-14	13/	8 – 12		8-12
FF	0.5.		-14		-14	1	-14	13/8	s - 12	13/	8-12	13/	8 – 12	13/	4-12		4 - 12
G		1,500	(38.10)	1.500	(38.10)	1.500	(38.10)	1.750	(44.45)	1.750	(44.45)	1.750	(44.45)	2.000	(50.80)	2.000	(50.80)
J	***********	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.250	(31.75)	1.250	(31.75)	1.500	(38.10)	1.500	(38.10)	1.750	(44.45)
	Std.	1/2	-20	1/2	- 20	1/2	- 20	3/4	- 16	3/4	1-16	3/4	1-16	6 100000000000000	- 14	700000000000000000000000000000000000000	- 14
KK	0.5.	3/4	- 16	3/4	- 16	3/4	- 16	1	- 14	1	- 14	1	- 14		4 - 12		2 – 12
L		.750	(19.05)	.750	(19.05)	.750	(19.05)	1.250	(31.75)	1.250	(31.75)	1.250	(31.75)	1.500	(38.10)	1.500	(38:10)
LB	**********	3.625	(92.08)	3.625	(92.08)	3.750	(95.25)	4.250	(107.95)	4.250	(107.95)	4.500	(114.30)	5.000	(127.00)	5.125	(130.18)
M		.625	(15.88)	.625	(15.88)	625	(15.88)	.875	(22.23)	.875	(22.23)	875	(22.23)	1.000	(25.40)	1.000	(25.40)
000000000000000000000000000000000000000	Std.	.605	(15.37)	.605	(15.37)	.605	(15.37)	.980	(24.89)	.980	(24.89)	.980	(24.89)	1.355	(34.42)	1.355	(34.42)
MM	0.5.	.980	(24.89)	.980	(24.89)	.980	(24.89)	1.355	(34.42)	1,355	(34.42)	1.355	(34.42)	1.730	(43.94)	1.730	(43.94)
P	B00000000	2.125	(53.98)	2.125	(53.98)	2.250	(57.15)	2.625	(66.68)	2.625	(66.68)	2.875	(73.03)	3.000	(76.20)	3.125	(79.38)
	Std.	625	(15.88)	.625	(15.88)	.625	(15.88)	875	(22.23)	.875	(22.23)	.875	(22.23)	1.000	(25.40)	1.000	(25.40)
VF	0.8.	.875	(22.23)	.875	(22.23)	.875	(22.23)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.125	(28.58)	1.125	(28.58
Sweet	Std.	5.375	(136.53)	5.375	(136.53)	5.500	(139.70)	6.875	(174.63)	6.875	(174.63)	7.125	(180.98)	8.125	(206.38)	8.250	(209.55
XC	0.5.	5.750	(146.05)	5.750	(146.05)	5.875	(149.23)	7.125	(180.98)	7.125	(180.98)	7.375	(187.33)	8.375	(212.73)	8.500	(215.90
Service Control	Std		6-20	7/1	6-20	7/1	6 – 20	3/4	4 – 16		4 – 16	3/	4 – 16		- 14		-14
	0.5.	-	4 – 16	3/4	1 – 16	3/4	1 – 16	1	- 14	1	- 14		- 14		/4 - 12		/4 – 12
XX			***************************************			***	000000000000000000000000000000000000000	St 1000000000000000000000000000000000000			704 000	0 (07	(61.90)	2.875	(73.03)	2.875	(73.03
Y	Std.	2.000	(50.80)	2.000	(50.80)	2,000	(50.80)	2.437	(61.90)	2.437	(61.90)	2.437	(01.90)	2,010	(79.38)	3.125	(79.38)

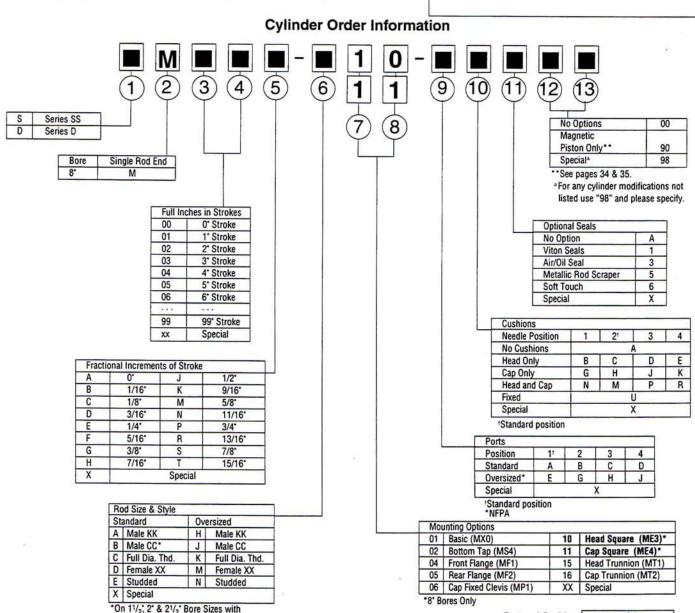


Cylinder with 10 (ME3) Head Square

and Cylinder with 11 (ME4) Cap Square

- NFPA (ME3) 10 Head Square Mount and NFPA (ME4) 11 Cap Square Mount available in 8" bore size only.
- Precision machined 300 Series stainless steel components.
- Cylinders rated to 250 PSI air. 400 PSI hydraulic (non-shock).
- Designed for non-lube service.
- Switches available on all bore sizes. (See pages 34 & 35 for ordering information.)





See page 26 for complete instructions on how to order cylinders.



16

5/8° Rod, CC = 7/16 - 20 (NFPA)

Port and Cushion

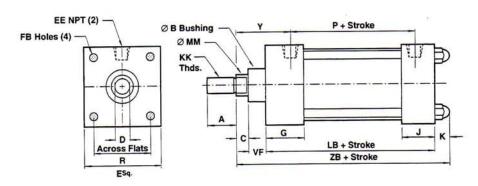
Needle Positions

(As viewed from rod end) 0

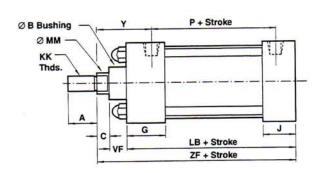
0

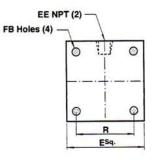




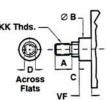


11 (ME4)

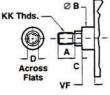


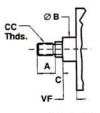


Standard & **Optional Rod Ends**

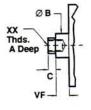


Style #1 (Standard Male)

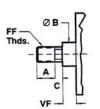




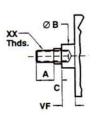
Style #2 (Optional Male)



Style #3 (Optional Female)



(Optional Full Diameter Threads)



Style #5 (Optional Studded)

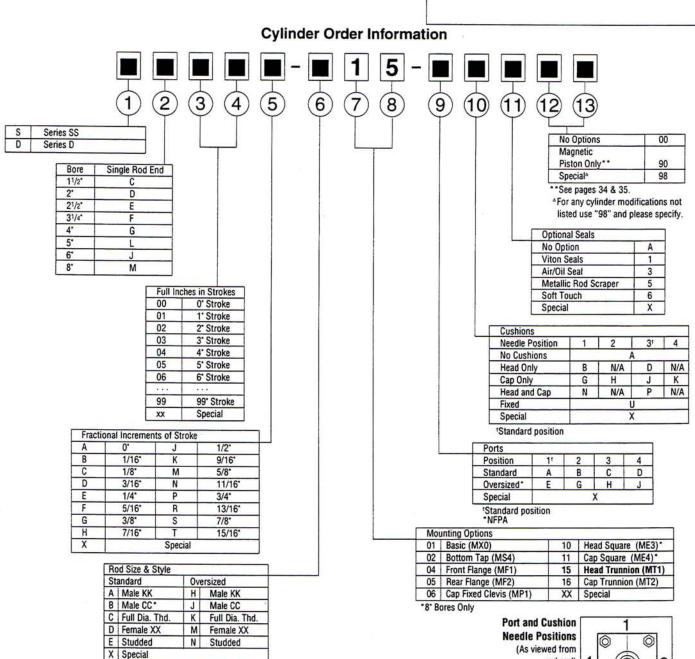
		10 (ME3) H	ead Square	11 (ME4) C	ap Square
Dimen	sion	Market Contract Contract	8" Bore (2	203.20)	
	Std.	1 3/8*	(34.93)	1 3/8*	(34.93)
Rod	0.S.	1 3/4*	(44.45)	1 3/4*	(44.45)
	Std.	1.625	(41.28)	1.625	(41.28)
4	0.S.	2.000	(50.80)	2.000	(50.80)
	Std.	2.000	(50.80)	2.000	(50.80)
3	0.S.	2.375	(60.33)	2.375	(60.33)
	Std.	.625	(15.88)	.625	(15.88)
)	0.S.	.750	(19.05)	.750	(19.05)
	Std.	11/4	- 12	17/4	- 12
CC	0.S.	11/2	- 12	11/2	- 12
407	Std.	1.125	(28.58)	1,125	(28.58)
D	0.S.	1.500	(38.10)	1.500	(38.10)
E		8.500	(215.90)	8.500	(215.90)
	Std.	.500	(12.70)	.500	(12.70)
EE	0.S.	.750	(19.05)	.750	(19.05)
FB		.687	(17.45)	.687	(17.45)
	Std.	13/8	- 12	13/8	- 12
FF	0.S.		- 12	13/4	- 12
G		2.000	(50.80)	2:000	(50.80)
J		1.750	(44.45)	1.750	(44.45)
K		1.000	(25.40)	1.000	(25.40)
	Std.	1-	- 14	1-	- 14
KK	0.S.	11/2	-12	11/2	-12
LB		5.125	(130.18)	5.125	(130.18)
ierore o	Std.	1.355	(34.42)	1.355	(34.42)
MM	0.S.	1.730	(43.94)	1.730	(43.94)
P		3.125	(79.38)	3,125	(79.38)
R		7.570	(192.28)	7.570	(192.28)
	Std.	1.000	(25.40)	1,000	(25.40)
VF	0.S.	1.125	(28.58)	1.125	(28.58)
	Std.		- 14	1	- 14
XX	0.S.	11/4	- 12	11/4	- 12
v	Std.	2.875	(73.03)	2.875	(73.03)
Υ	0.S.	3.125	(79.38)	3.125	(79.38)
70	Std.	7.750	(196.85)		-
ZB	0.S.	8.000	(203.30)		-
75	Std.		-	6.750	(171.45)
ZF	0.S.		-	7.000	(177.80)



Cylinder with 15 (MT1) Head Trunnion

- NFPA (MT1) 15 Head Trunnion Mount available in 1-1/2" thru 8" bore sizes.
- Precision machined 300 Series stainless steel components.
- Cylinders rated to 250 PSI air, 400 PSI hydraulic (non-shock).
- Designed for non-lube service.
- Switches available on all bore sizes.
 (See pages 34 & 35 for ordering information.)





See page 26 for complete instructions on how to order cylinders.

On 11/2; 2 & 21/2* Bore Sizes with 5/8* Rod, CC = 7/16 - 20 (NFPA)



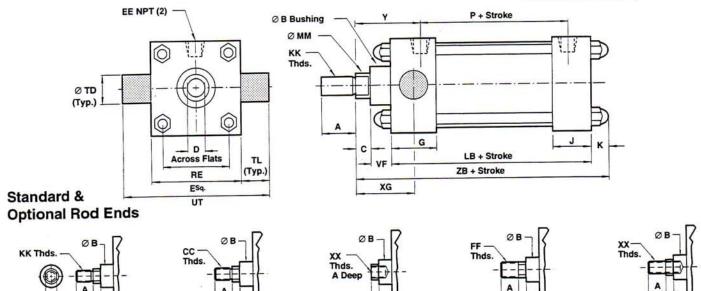
rod end)

4

0

All Dimensions in Inches (mm)





Style #1 (Standard Male)

Across Flats

Style #2

(Optional Male)

Style #3 (Optional Female)



Style #4 (Optional Full Diameter Threads)



Style #5 (Optional Studded)

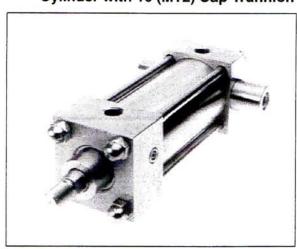
Dimens	ion	11/2" Bor	e (38.10)	2" Bore	(50.80)	21/2" Bor	e (63.50)	31/4" Box	re (82.55)	4" Bore	(101.60)	5" Bore	(127.00)	6" Bore	(152.40)	8" Bore	(203.20)
acamaten.	014	5/8*	(15.88)	5/8*	(15.88)	5/8*	(15.88)	1*	(25.40)	1"	(25.40)	1'	(25.40)	1 3/8*	(34.93)	1 3/8*	(34.93)
Rod	Std.	1"	(25.40)	1*	(25.40)	1.	(25.40)	1 3/8*	(34.93)	1 3/8*	(34.93)	1 3/8*	(34.93)	1 3/4*	(44.45)	1 3/4*	(44.45)
	Std.	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)
4	0.S.	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)	2.000	(50.80)	2.000	(50.80)
	Std.	1.125	(28.58)	1.125	(28.58)	1,125	(28.58)	1,500	(38,10)	1.500	(38.10)	1.500	(38.10)	2,000	(50.80)	2.000	(50.80)
3	0.S.	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)	2.375	(60.33)	2.375	(60.33)
_	Std.	.375	(9.53)	375	(9.53)	.375	(9.53)	500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)	.625	(15.88
;	0.S.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)	.625	(15.88)	.625	(15.88)	.750	(19.05)	.750	(19.05
	Std.		- 20		- 20	7/16	- 20	7/8	3 –14	7/8	-14	7/8	-14	************	-12		- 12
CC	0.5.		-14		-14	7/8	-14	11/4	- 12	11/4	- 12	11/4	- 12		- 12		- 12
100	Std.	.500	(12.70)	500	(12.70)	.500	(12.70)	.812	(20.62)	.812	(20.62)	.812	(20.62)	1.125	(28.58)	1.125	(28.58
D	0.5.	.812	(20.62)	.812	(20.62)	.812	(20.62)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.500	(38.10)	1.500	(38.10
E	0.0.	2.000	(50.80)	2.500	(63.50)	3.000	(76.20)	3.750	(95.25)	4.500	(114.30)	5.500	(139.70)	6.500	(165.10)	8.500	(215.90
	Std.	.250	(6.35)	.250	(6.35)	.250	(6.35)	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)	.500	(12.70
EE	0.5	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)	.500	(12.70)	.500	(12.70)	.750	(19.05)	.750	(19.05
	Std.		-18	5/8	-18	5/8	3-18	1	-14		-14		-14		s – 12		- 12
FF	0.5.		-14	1	-14	1	-14	13/	s – 12	13/	ı - 12		- 12		ı - 12		- 12
G	100.00	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	1.750	(44.45)	1.750	(44.45)	1.750	(44.45)	2.000	(50.80)	2.000	(50.80
J		1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.250	(31.75)	1.250	(31.75)	1,500	(38.10)	1.500	(38.10)	1.750	(44.45
K		.469	(11.91)	.531	(13.49)	.531	(13.49)	.625	(15.88)	.625	(15.88)	.830	(21.08)	.830	(21.08)	1.000	(25.40
	Std.	AND THE RESERVE OF THE PARTY OF	-20	1/2	- 20	1/2	2 - 20	3/4	4 – 16	3/4	-16	3/4	- 16	0.0000000000000000000000000000000000000	14		- 14
KK	0.5.	20000000000000000	- 16		- 16	3/4	- 16	1	- 14	1	- 14	1	- 14	11/	4-12	Market Transfer of the Control of th	2 - 12
LB	10.0.	3.625	(92.08)	3.625	(92.08)	3.750	(95.25)	4.250	(107.95)	4.250	(107.95)	4.500	(114.30)	5.000	(127.00)	5.125	(130.18
	Std.	.605	(15.37)	.605	(15.37)	.605	(15.37)	.980	(24.89)	.980	(24.89)	.980	(24.89)	1.355	(34.42)	1.355	(34.42
MM	0.5	980	(24.89)	.980	(24.89)	.980	(24.89)	1.355	(34.42)	1.355	(34.42)	1.355	(34.42)	1.730	(43.94)	1.730	(43.94
P		2.125	(53.98)	2.125	(53.98)	2.250	(57.15)	2.625	(66.68)	2.625	(66.68)	2.875	(73.03)	3.000	(76.20)	3.125	(79.38
RE		1,430	(36.32)	1.840	(46.74)	2.190	(55.63)	2.760	(70.10)	3,320	(84.33)	4.100	(104.14)	4.880	(123.95)	6.435	(163.45
TD	0000000000	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)	1.375	(34.93
TL		1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1,375	(34.93)	1,375	(34.93
UT	***********	4.000	(101.60)	4.500	(114.30)	5.000	(127.00)	5.750	(146.05)	6.500	(165.10)	7.500	(190.50)	9.250	(234.95)	11.250	(285.75
	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	.875	(22.23)	.875	(22.23)	.875	(22.23)	1,000	(22.23)	1.000	(22.2
VF	0.5.	.875	(22.23)	.875	(22.23)	.875	(22.23)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.125	(28.58)	1.125	(28.5
SOSTA	Std	1.750	(44.45)	1.750	(44.45)	1.750	(44.45)	2.250	(57.15)	2.250	(57.15)	2.250	(57.15)	2.625	(66.68)	2.625	(66.6
XG	0.5.	2.125	(53.98)	2.125	(53.98)	2.125	(53.98)	2.500		2.500	(63.50)	2.500	(63.50)	2.875	(73.03)	2.875	(73.0
Unite	Std.	7/1	6-20	7/1	6 - 20	7/	6-20		4 – 16		4 – 16		4 – 16		- 14		-14
XX	0.5.		4 – 16		4 – 16	3/	4 – 16		1 – 14		- 14		- 14		/4 - 12		/4 - 12
441	Std	2.000	(50.80)	2,000	(50.80)	2.000	(50.80)			2.437	(61.90)	2.437	(61.90)	2.875	(73.03)	2.875	(73.0
Y	0.5.	2.375	(60.33)	2.375	(60.33)	2.375	(60.33)	2.687		2.687	(68.25)	2.687	(68.25)	3.125	(79.38)	3.125	(79.3
	Std	5.094	(129.39)	5.156	(130.96)	5.281	(134.14)	6.250	COLUMN TO THE PARTY OF THE PART	6.250		6.705		7,455	(189.36)	7.750	
ZB	0.5.	5.469	(138.91)	5.531	(140.49)	5.656	(143.66)	6.500	(165.10)	6.500	(165.10)	6.955	(176.66)	7.705	(195.71)	8.000	(203.2

Phone 815-633-8897

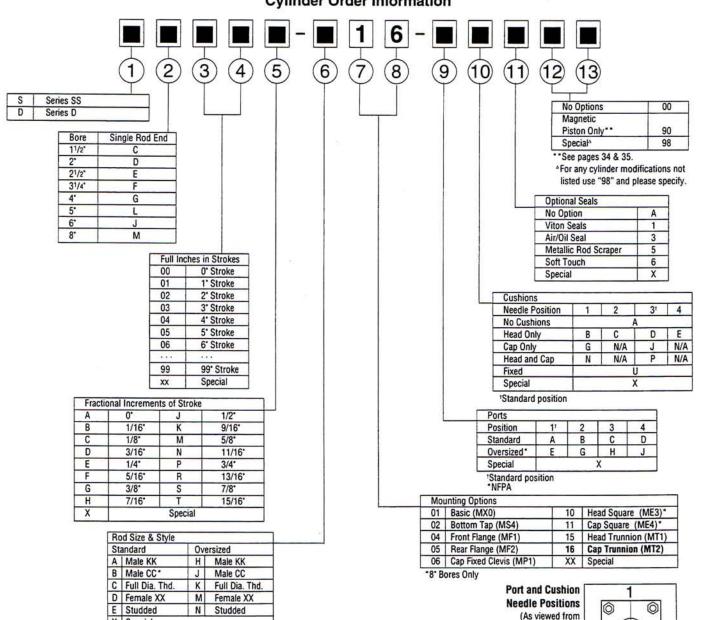


Cylinder with 16 (MT2) Cap Trunnion

- NFPA (MT2) 16 Cap Trunnion Mount available in 1-1/2" thru 8" bore sizes.
- Precision machined 300 Series stainless steel components.
- Cylinders rated to 250 PSI air, 400 PSI hydraulic (non-shock).
- Designed for non-lube service.
- Switches available on all bore sizes. (See pages 34 & 35 for ordering information.)



Cylinder Order Information



See page 26 for complete instructions on how to order cylinders.

On 11/2; 2 & 21/2* Bore Sizes with 5/8" Rod, CC = 7/16 - 20 (NFPA)



20

X Special

rod end)

0



Style #4

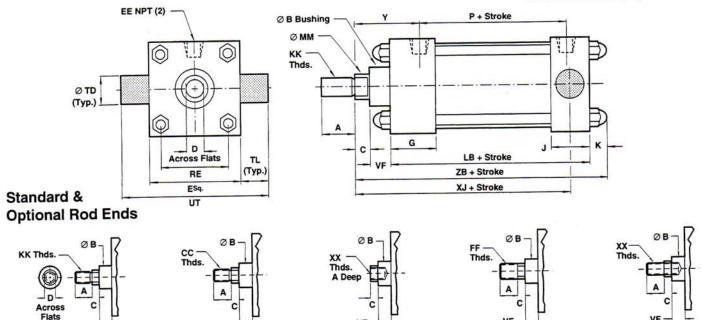
(Optional Full Diameter Threads)

All Dimensions in Inches (mm)



Style #5

(Optional Studded)



Style #3

(Optional Female)

Style #2

(Optional Male)

Style #1

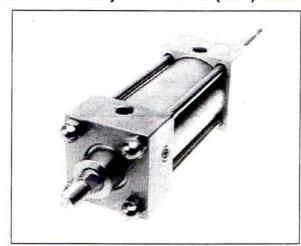
(Standard Male)

Dimen	sion	11/2" Bor	e (38.10)	2" Bore	(50.80)	21/2" Bor	e (63.50)	31/4" Bor	e (82.55)	4" Bore	(101.60)	5" Bore	(127.80)	6" Bore	(152.40)	8" Bore	
	C. C.	5/8*	(15.88)	5/8*	(15.88)	5/8*	(15.88)	1"	(25.40)	1'	(25.40)	1*	(25.40)	1 3/8*	(34.93)	1 3/8'	(34.93)
Rod	Std.	1*	(25.40)	1.	(25.40)	1'	(25.40)	1 3/8*	(34.93)	1 3/8*	(34.93)	1 3/8*	(34.93)	1 3/4"	(44.45)	1 3/4"	(44.45)
_	0.S.	.750	(19.05)	.750	(19.05)	.750	(19.05)	1,125	(28.58)	1.125	(28.58)	1,125	(28.58)	1.625	(41.28)	1.625	(41.28)
A	Std.	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)	2.000	(50.80)	2.000	(50.80)
_	0.8.	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	2,000	(50.80)	2.000	(50,80)
В	Std.	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)	2.375	(60.33)	2.375	(60.33)
	O.S.	.375	(9.53)	.375	(9.53)	375	(9.53)	.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)	625	(15.88)
С	0.S.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)	.625	(15.88)	.625	(15.88)	.750	(19.05)	.750	(19.05)
_	Std.		- 20		5 – 20		5-20		-14	7/8	-14	7/8	-14	17/4	- 12		- 12
CC	0.5.		-14		-14		-14	STATE OF THE PARTY	- 12	11/4	- 12	11/4	- 12	11/2	- 12	11/2	- 12
_	Std.	500	(12.70)	.500	(12.70)	.500	(12.70)	.812	(20.62)	.812	(20.62)	.812	(20.62)	1,125	(28.58)	1,125	(28.58)
D	0.5.	.812	(20.62)	.812	(20.62)	.812	(20.62)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.500	(38.10)	1.500	(38.10)
E	10.5.	2.000	(50.80)	2.500	(63.50)	3.000	(76.20)	3.750	(95.25)	4.500	(114.30)	5.500	(139.70)	6.500	(165.10)	8.500	(215.90)
C	Std.	.250	(6.35)	.250	(6.35)	.250	(6.35)	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)	.500	(12.70)
EE	0.5	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)	.500	(12.70)	.500	(12.70)	.750	(19.05)	.750	(19.05)
	Std.	P. P. L. P.	1-18		3-18	N CONTRACTOR OF STREET	3 –18	1	-14	1	-14	1	-14	13/6	8 – 12		- 12
FF	0.5		-14		-14		-14	13/5	- 12	13/1	-12	13/6	- 12	13/	4-12	13/4	- 12
G	0.0.	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	1.750	(44.45)	1.750	(44.45)	1.750	(44.45)	2.000	(50.80)	2.000	(50.80)
J	*********	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.250	(31.75)	1.250	(31.75)	1.500	(38.10)	1.500	(38.10)	1.750	(44.45)
K	*********	.469	(11.91)	.531	(13.49)	.531	(13.49)	.625	(15.88)	.625	(15.88)	.830	(21.08)	.830	(21.08)	1.000	(25.40)
Λ	l coa	A CONTRACTOR OF THE PARTY OF TH	-20	and the second second	- 20	CEDITION I	2-20		- 16	3/4	-16	3/4	- 16	1	- 14	1	- 14
KK	Std.	200000000000000000000000000000000000000	- 20 - 16	100000000000000000000000000000000000000	I – 16	0.0000000000000000000000000000000000000	1 – 16		- 14	1	- 14	1	- 14	11/	4-12	11/2	- 12
100	10.5.	3.625	(92.08)	3.625	(92.08)	3.750	(95.25)	4.250	(107.95)	4.250	(107.95)	4.500	(114.30)	5.000	(127.00)	5.125	(130.18
LB	T 014	.605	(15.37)	.605	(15.37)	.605	(15.37)	.980	(24.89)	.980	(24.89)	.980	(24.89)	1.355	(34.42)	1.355	(34.42)
MM	Std.	.980	(24.89)	.980	(24.89)	.980	(24.89)	1.355	(34 42)	1.355	(34.42)	1.355	(34.42)	1.730	(43.94)	1.730	(43.94
P	U.S.	2.125	(53.98)	2.125	(53.98)	2.250	(57.15)	2.625	(66.68)	2.625	(66.68)	2.875	(73.03)	3.000	(76.20)	3.125	(79.38
RE	0.00000000	1.430	(36.32)	1.840	(46.74)	2.190	(55.63)	2,760	(70.10)	3.320	(84.33)	4.100	(104.14)	4.880	(123.95)	6.435	(163.45
TD		1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)	1.375	(34.93
TL		1.000	(25.40)	1.000	(25.40)	1,000	(25.40)	1,000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.375	(34.93)	1.375	(34.93
UT		4.000	(101.60)	4.500	(114.30)	5.000	(127.00)	5.750	(146.05)	6.500	(165.10)	7.500	(190.50)	9.250	(234.95)	11.250	(285.75
01	Std.	.625	(15.88)	.625	(15.88)	625	(15.88)	875	(22.23)	.875	(22.23)	.875	(22.23)	1.000	(22.23)	1.000	(22.23
VF	0.5.	.875	(22.23)	.875	(22.23)	.875	(22.23)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.125	(28.58)	1.125	(28.58
_	Std.	4.125	(104.78)	.4.125	(104.78)	4.250		5.000	(127.00)	5.000	(127.00)	5.250	(133.35)	5.875	(149.23)	6.000	(152.40
XJ	0.5.	4.500	(114.30)	4.500	(114.30)	4.625	(117.48)	5.250	(133.35)	5.250	(133.35)	5.500	(139.70)	6.125	(155.58)	6.250	(158.75
_	Std.		6-20		6 - 20		6-20	3/	4 – 16	3/	4 - 16	3/-	4-16	1	- 14	1	-14
XX	0.5.		4 – 16		4 – 16	OU CONTRACTOR	4 – 16		- 14		- 14	_	- 14	11	/4 - 12	117	4-12
_	-	2.000	(50.80)	2.000	(50.80)				(61.90)	2.437	(61.90)	2.437	(61.90)	2.875	(73.03)	2.875	(73.03
Y	Std.	2.375	(60.33)	2.375	(60.33)	2.375	(60.33)	2.687	(68.25)	2.687	(68.25)	2.687	(68.25)	3.125	(79.38)	3.125	(79.38
777	0.8.	5.094	(129.39)	5,156	(130.96)	5.281	THE CONTRACTOR OF THE PARTY OF	6.250	THE PERSON NAMED IN COLUMN TWO	6.250		6.705	(170.31)	7,455	(189.36)	7.750	(196.85
ZB	Std.	5.094	(123.39)	5.531	(140.49)	5.656	****	6.500	(165.10)	6.500		6.955	(176.66)	7.705		8.000	(203.20



Double Rod End Cylinder with 01 (MX0) Basic

- NFPA (MX0) 01 Basic Double Rod End Cylinder available in 1-1/2" thru 8" bore size.
- Precision machined 300 Series stainless steel components.
- Cylinders rated to 250 PSI air. 400 PSI hydraulic (non-shock).
- Designed for non-lube service.
- Switches available on all bore sizes. (See pages 34 & 35 for ordering information.)



Cylinder Order Information 3 7 5 6 (10)8 9 Series SS 00 No Options D Series D Magnetic Piston Only** 90 Bore Double Rod End Special* 11/2 See pages 34 & 35. 2. R *For any cylinder modifications not 21/2" S listed use "98" and please specify. 31/4 4 U Optional Seals 5. No Option 6 W Viton Seals 1 3 Air/Oil Seal 5 Metallic Rod Scraper Full Inches in Strokes Soft Touch 00 0° Stroke X Special 01 1° Stroke 02 2° Stroke Cushions 03 3° Stroke 3 21 **Needle Position** 04 4° Stroke No Cushions 05 5° Stroke Head Only В C D 06 6° Stroke Cap Only G Н K N M Р R Head and Cap 99 99° Stroke Fixed U Special X Special Standard position Fractional Increments of Stroke 1/2 Ports В 1/16 9/16 Position C 1/8 M D 5/8 Standard В D 3/16 N 11/16 G Oversized* E 1/4" 3/4" Special 'Standard position *NFPA F 5/16 R 13/16 G 3/8 S 7/8 7/16 15/16 Н **Mounting Options** X Special 01 Basic (MX0) 10 Head Square (ME3)* 11 | Cap Square (ME4)* 02 | Bottom Tap (MS4) Rod Size & Style 04 Front Flange (MF1) 15 Head Trunnion (MT1) 05 | Rear Flange (MF2) Cap Trunnion (MT2) Standard Oversized 16

See page 26 for complete instructions on how to order cylinders.

On 11/2, 2" & 21/2" Bore Sizes with 5/8" Rod, CC = 7/16 - 20 (NFPA)

H | Male KK

J | Male CC

M Female XX

N Studded

K Full Dia. Thd.



22

A | Male KK

B Male CC

C Full Dia.Thd.

D Female XX

E Studded

X Special

06 Cap Fixed Clevis (MP1)

*8" Bores Only

Port and Cushion

Needle Positions

(As viewed from

rod end)

XX Special

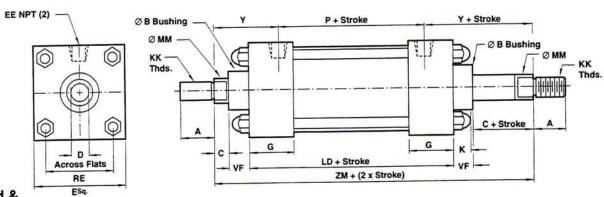
4

0

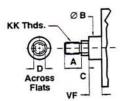
Double Rod End Cylinder with 01 (MX0) Basic

All Dimensions in Inches (mm)

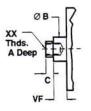


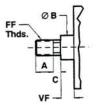


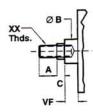
Standard & E Optional Rod Ends











Style #1 (Standard Male)

Style #2 (Optional Male)

Style #3 (Optional Female)

Style #4 (Optional Full Diameter Threads)

Style #5 (Optional Studded)

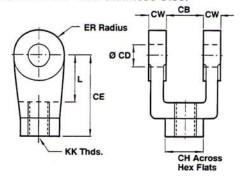
Dimens	sion	11/2" Bor	e (38.10)	2" Bore	(50.80)	21/2" Bor	e (63.50)	31/4" Bor	re (82.55)	4" Bore	(101.60)	5" Bore	(127.00)	6" Bore	(152.40)	8" Bore	(203.20)
	lies.	5/8*	(15.88)	5/8"	(15.88)	5/8*	(15.88)	1"	(25.40)	1*	(25.40)	11	(25.40)	1 3/8*	(34.93)	1 3/8*	(34.93)
ø Rod	Std.	1'	(25.40)	1*	(25.40)	1'	(25.40)	1 3/8*	(34.93)	1 3/8*	(34.93)	1 3/8*	(34.93)	1 3/4"	(44.45)	1 3/4"	(44.45)
	Std.	.750	(19.05)	.750	(19.05)	.750	(19.05)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)
Α	0.8.	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.625	(41.28)	1.625	(41.28)	1.625	(41.28)	2.000	(50.80)	2.000	(50.80)
-	Std.	1.125	(28.58)	1.125	(28.58)	1,125	(28.58)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	2.000	(50.80)	2.000	(50.80)
В	0.8.	1,500	(38.10)	1.500	(38.10)	1.500	(38.10)	2.000	(50.80)	2.000	(50.80)	2.000	(50.80)	2.375	(60.33)	2.375	(60.33)
	Std.	.375	(9.53)	375	(9.53)	375	(9.53)	.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)	625	(15.88)
С	O.S.	.500	(12.70)	.500	(12.70)	.500	(12.70)	.625	(15.88)	.625	(15.88)	.625	(15.88)	.750	(19.05)	.750	(19.05)
	Std.		- 20		- 20		5-20	-	3-14	7/8	-14	7/8	-14	11/4	-12	11/4	1-12
CC	0.5.	CONTRACTOR OF THE PARTY OF	-14	***********	-14		-14	11/4	- 12	11/4	- 12	11/4	- 12	11/2	- 12		- 12
_	Std.	.500	(12.70)	500	(12.70)	.500	(12.70)	.812	(20.62)	.812	(20.62)	.812	(20.62)	1,125	(28.58)	1,125	(28,58)
D	0.5.	.812	(20.62)	.812	(20.62)	.812	(20.62)	1.125	(28.58)	1.125	(28.58)	1.125	(28.58)	1.500	(38.10)	1.500	(38.10)
E	10.3.	2.000	(50.80)	2.500	(63.50)	3.000	(76.20)	3.750	(95.25)	4.500	(114.30)	5.500	(139.70)	6.500	(165.10)	8.500	(215.90)
E	Std.	.250	(6.35)	.250	(6.35)	.250	(6.35)	.375	(9.53)	.375	(9.53)	.375	(9.53)	.500	(12.70)	.500	(12.70)
EE	0.5	.375	(9.53)	375	(9.53)	.375	(9.53)	.500	(12.70)	.500	(12.70)	.500	(12.70)	.750	(19.05)	.750	(19.05)
	Std.		3-18	100000000000000000000000000000000000000	-18	Control of the second	3 –18	1	-14	1	-14	1	-14	13/8	- 12		8 – 12
FF	0.5		-14		-14		-14	13/	8 – 12	13/1	- 12	19/	8 – 12	13/	1-12		4 – 12
G	1.0.0	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)	1.750	(44.45)	1.750	(44.45)	1.750	(44.45)	2.000	(50.80)	2.000	(50.80)
K		469	(11.91)	.531	(13.49)	531	(13.49)	.625	(15.88)	.625	(15.88)	.830	(21.08)	.830	(21.08)	1.000	(25.40)
Λ	Std.		- 20	STREET PRESENTA	- 20		- 20	3/4	1 – 16	3/4	- 16	3/4	- 16	1	- 14		- 14
KK	0.5	A CONTRACTOR OF THE PARTY OF TH	- 16		- 16	17.0	- 16	1	- 14	1	- 14	1	- 14	11/	4-12		2-12
LD	0.3	4.125	(104.78)	4.125	(104.78)	4.250	(107.95)	4.750	(120.65)	4.750	(120.65)	5.000	(127.00)	5.500	(139.70)	5.500	(139.70)
LD	Std.	.605	(15.37)	605	(15.37)	.605	(15.37)	.980	(24.89)	.980	(24.89)	980	(24.89)	1.355	(34.42)	1.355	(34.42)
MM	0.S.	.980	(24.89)	.980	(24.89)	.980	(24.89)	1.355	(34.42)	1.355	(34.42)	1.355	(34.42)	1.730	(43.94)	1.730	(43.94)
P	0.3.	2.125	(53.98)	2.125	(53.98)	2.250	(57.15)	2.625	(66.68)	2.625	(66.68)	2.875	(73.03)	3.000	(76.20)	3.125	(79.38)
RE	<u> </u>	1.430	(36.32)	1.840	(46.74)	2.190	(55.63)	2.760	(70.10)	3.320	(84.33)	4.100	(104.14)	4.880	(123.95)	6.435	(163.45)
NE	Std	.625	(15.88)	625	(15.88)	,625	(15.88)	.875	(22.23)	.875	(22.23)	.875	(22.23)	1.000	(22.23)	1.000	(22.23)
VF	0.5.	.875	(22.23)	.875	(22.23)	.875	(22.23)	1.000	(25.40)	1.000	(25.40)	1.000	(25.40)	1.125	(28.58)	1.125	(28.58)
See and	Std		6-20		6-20	7/1	6-20	3/	4-16	3/-	4 – 16	3/-	4 – 16		- 14	o	-14
XX	0.5.	61 60000000000000000	4 – 16		4 – 16	200 20000000000000000000000000000000000	4 – 16	1	- 14	1	- 14	1	- 14	11/	4-12		/4 - 12
	Std.	2.000	(50.80)	2.000	(50.80)		(50.80)	2.437	(61.90)	2.437	(61.90)	2.437	(61.90)	2.875	(73.03)	2.875	(73.03)
Y	0.5.	2.375	(60.33)	2.375	(60.33)	2.375	(60.33)	2.687	(68.25)	2.687	(68.25)	2.687	(68.25)	3.125	(79.38)	3.125	(79.38)
	Std.	6.125	(155.58)	6.125	(155.58)	6,250	(158.75)	7.500	(190.50)	7.500	(190.50)	7.750	(196.85)	8.750	(222.25)	8.750	(222.25)
ZM	310.	6.875	(174.63)	6.875	(174.63)	7.000	(177.80)	8.000		8,000	(203.20)	8.250	(209.55)	9.250	(234.95)	9.250	(234.95)

Rockford, IL USA



All Dimensions in Inches (mm)

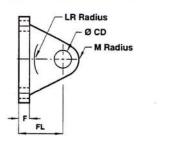
Rod Clevis 303 Stainless Steel

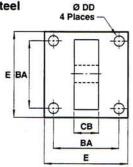


Rod Clevis Dimensions

	S-92-03	S-92-065	S-92-12	S-92-16
CB	.750 (19.05)	1.250 (31.75)	1.500 (38.10)	2.000 (50.80)
CD	.500 (12.70)	.750 (19.05)	1.000 (25.40)	1.375 (34.93)
CE	1.500 (38.10)	2.375 (60.33)	3.125 (79.38)	4.125 (104.78)
CH	1.000 (25.40)	1.250 (31.75)	1.500 (38.10)	2.000 (50.80)
CW	.500 (12.70)	.625 (15.88)	.750 (19:05)	1.000 (25.40)
ER	.500 (12.70)	.750 (19.05)	1.000 (25.40)	1.375 (34.93)
KK	1/2-20	3/4-16	1-14	11/4 - 12
L	.750 (19.05)	1.250 (31.75)	1.500 (38.10)	2.125 (53.98)

Eye Bracket 304 Stainless Steel

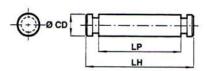




NFPA Eye Bracket Dimensions

	S-89-03A	S-89-065A	S-89-12A
BA	1.625 (41.28)	2.562 (65.07)	3.250 (82.55)
CB	.750 (19.05)	1.250 (31.75)	1.500 (38.10)
CD	500 (12.70)	.750 (19.05)	1.000 (25.40)
DD	.406 (10.31)	.531 (13.49)	.656 (16.66)
E	2.500 (63.50)	3.500 (88.90)	4.500 (114.30)
F	.375 (9.53)	.625 (15.88)	.750 (19.05)
FL	1.125 (28.58)	1.875 (47.63)	2.250 (57.15)
LR	.750 (19.05)	1.250 (31.75)	1.500 (38.10)
M	.500 (12.70)	.750 (19:05)	1,000 (25.40)

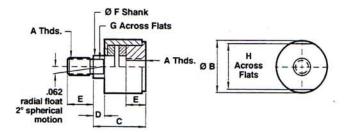
NFPA Pin 303 Stainless Steel



NFPA Pin Dimensions

	S-96-03A	S-96-065A	S-96-12A	S-96-16A
CD	.500 (12.70)	.750 (19.05)	1.000 (25.40)	1.375 (34.93)
LH	2.219 (56.36)	3.125 (79.38)	3.750 (95.25)	5.625 (144.88)
LP	1.875 (47.63)	2.750 (69.85)	3.250 (82.55)	4.375 (111.13)

Rod Alignment Coupler



NFPA Rod Alignment Coupler Dimensions

	SC-	1-08	SC-	1-12	SC-	1-16
A	1/2	- 20	3/4	- 16	1.	-14
В	1.250	(31.75)	1.750	(44.45)	2.500	(63.50)
C	2.000	(50.80)	2.312	(58.72)	2.937	(74.60)
D	.500	(12.70)	.500	(12.70)	.500	(12.70)
E	.750	(19.05)	1 125	(25.58)	1.625	(41.28)
F	.625	(15.88)	.969	(24.61)	1.375	(34.93)
G	.500	(12.70)	.812	(20.62)	1.156	(29.36)
Н	1.125	(28.58)	1.500	(38.10)	2.250	(57.15)
Maximum Pull (lbs.)	3,	150	7,	750	12	250

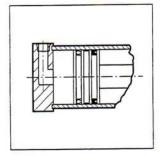
Made of 303 Stainless Steel, the Rod Alignment Coupler allows 1/16" of radial float and 2° of spherical movement. This prevents cylinder binding due to misalignment thus extending bearing and seal life, and permits greater tolerance between the center line of the cylinder and mating part for simplified installation.



Optional Features

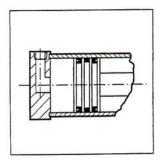
Air/Oil Piston Seal

Prevents leakage past the seal in air/oil applications. This added protection is accomplished by using one loaded lip-type piston seal. TO ORDER: enter 3 in position 11 of the model number.



303 Stainless Steel Piston

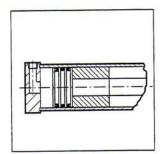
When internal corrosion is a concern, specify the 303 Stainless Steel Piston.



Stop Tube

Provides increased stability to long stroke cylinders.

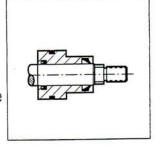
TO ORDER: Indicate full working stroke in positions 3, 4 & 5 of the model number. Enter 98 in positions 12 & 13 of the model number and specify: 98 = ____inches of stop tube.



Metallic Rod Scraper

Aggressively scrapes foreign materials from the exposed portion of the piston rod during retract, thereby protecting the rod seal.

TO ORDER: enter 5 in position 11 of the model number.



Optional features should be specified at the time of cylinder order. Enter 98 in positions 12 & 13 of the model number and specify: Example 98 = 303 stainless steel piston.

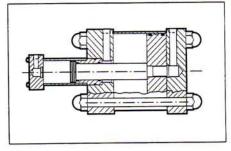
Custom Cylinders

- Extra long cushions.
- Extremely low breakaway.
- High temperature.
- Stop tube.

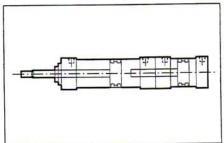
6/96

- Spring extend/retract.
- Non-rotating rod.
- Oversized piston rods.

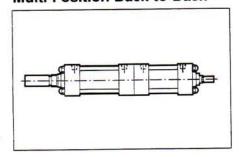
Air-to-Air Booster/Pump



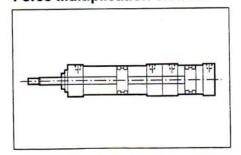
Multi-Position Duplex



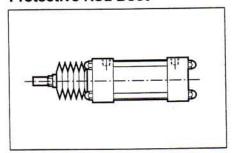
Multi-Position Back-to-Back



Force Multiplication Tandem



Protective Rod Boot

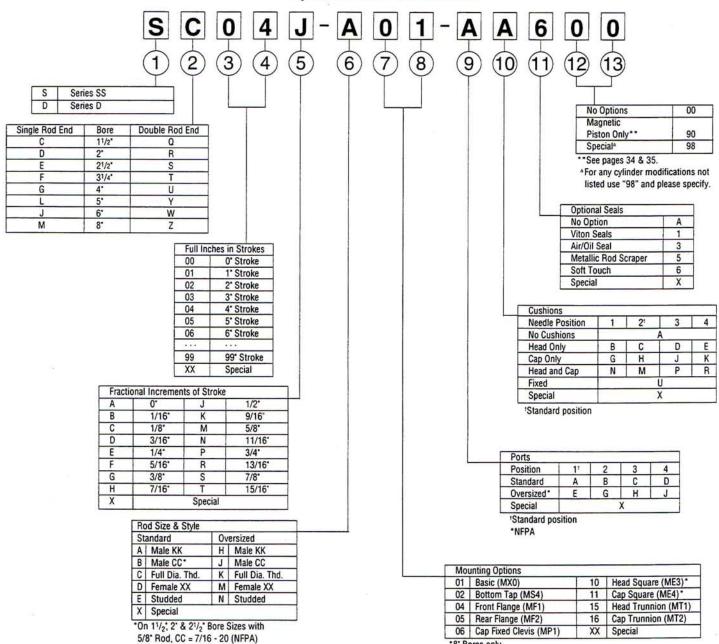


Norgren designs and manufactures literally hundreds of specialty cylinders. We welcome the opportunity to provide you with a customized cylinder that meets the specific requirements of your application. For more information on how to order custom cylinders consult factory.





Cylinder Order Information



EXAMPLE: Series SS - 11/2" bore -41/2" stroke – standard rod end – MX0 Basic mount – standard ports at position #1 – no cushions – Soft Touch Bumper Seal – no options.

IMPORTANT: When using X, XX, or 98 in a model number, please be specific! $X = (\underline{Description})$.

Reed & Hall Effect Switches

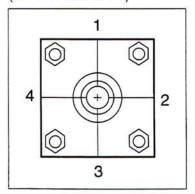
Available on all bore sizes – order separately. See pages 34 and 35 for specifications.

NOTE: Consult factory when using competitive position sensing devices.

Port and Cushion Needle Positions

(As viewed from rod end)

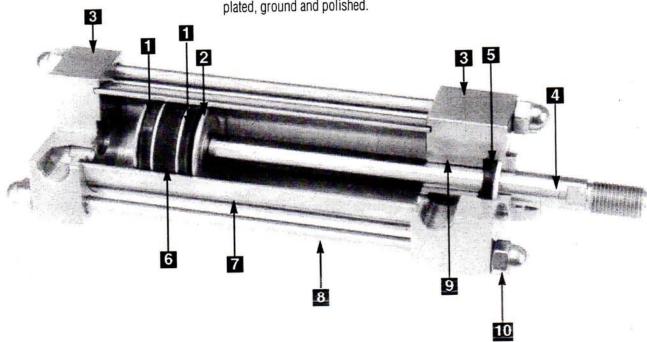
8" Bores only





Superior operating performance in a 1-1/8" bore size!

- Piston Seals: Lip-type nitrile seals are pressure energized and wear compensating. Their excellent lubrication retention characteristics lower seal friction and ensure long life.
- **2 Piston:** Solid aluminum alloy, light-weight for low inertia, yet strong.
- **3 Head/Cap:** Precision machined from solid corrosion-resistant 304 stainless steel bar.
- **4 Piston Rods:** 303 stainless steel, 40,000 PSI minimum yield, hard chrome plated, ground and polished.
- **Bearing Seal:** Teflon® rod wiper provides positive wiping action and low friction. Lip-type nitrile seal is pressure energized and wear compensating for long life.



- 6 Wear Strip: Teflon® and graphite composition for minimum friction, maximum wear and side load resistance. (Magnetic band under wear strip optional.)
- **7 Tube:** Corrosion-resistant 304 stainless steel.
- 8 Tie Rods: High-strength 303 stainless steel maintains compression on tube and seals.
- **9 Rod Bearing:** Incorporates a sintered bronze rod bearing which is pressed into the cylinder head.
- **10 Acorn Nut:** Tie rod threads are covered by stainless steel acorn nuts which eliminate another bacteria hiding place.

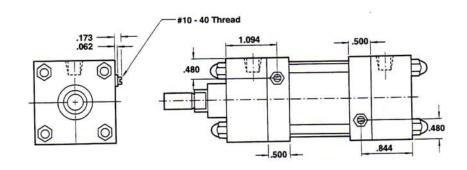
Optional Features

Norgren's state-of-the-art Ultra Cushion® design and Soft Touch Bumper Seal are also available on our 11/8" bore. (See page 3.)

Cushions permit the trapping of cylinder exhaust volume prior to the completion of full rod extension or retraction. This volume is then metered through a finely tapered needle to deliver smooth, adjustable deceleration of the cylinder load.

Note: Cushion block increases stroke related dimensions by .500 per end.

Cushions are not available on 11/8" bore with 1/2" diameter rod.

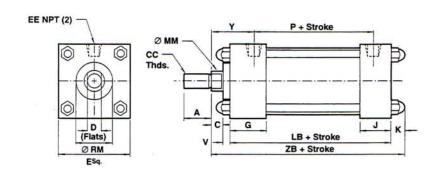




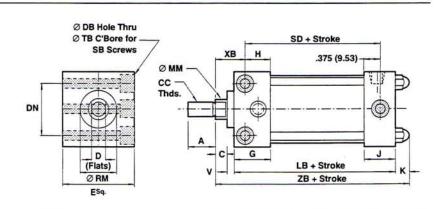
Series SS 1-1/8" Cylinders

Cylinder with 01 (MX0) Basic Cylinder with 03 (MS8) Bolt Thru Cylinder with 04 (MF7) Front Flange Cylinder with 05 (MF2) Rear Flange

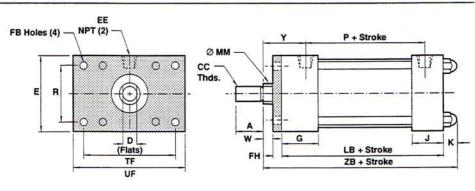


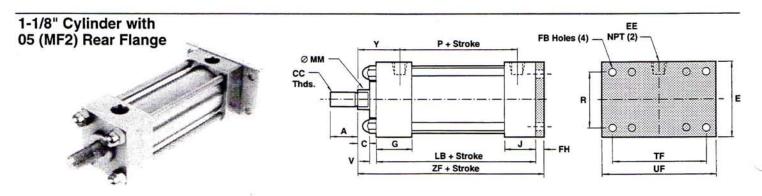


1-1/8" Cylinder with 03 (MS8) Bolt Thru







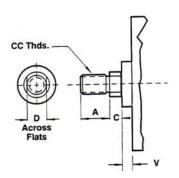


See page 33 for complete instructions on how to order cylinders.

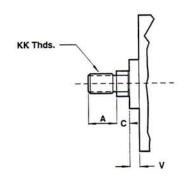




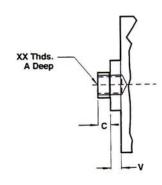
Standard & Optional Rod Ends







Style #2 (Optional Male)



Style #3 (Optional Female)

Dimens	sion	Cylinder with 01	(MXO) Basic	Cylinder with 03 (MS8) Bolt Thru		Cylinder with 04 (M	F7) Front Flange	Cylinder with 05 (M	
		3/8*	(9.53)	3/8°	(9.53)	3/8"	(9.53)	3/8°	(9.53)
Rod	Std.	1/2"	(12.70)	1/2"	(12.70)	1/2"	(12.70)	1/2"	(12.70)
		.625	(15.88)	.625	(15.88)	.625	(15.88)	625	(15.88)
A	Std	.750	(19.05)	.750	(19.05)	.750	(19.05)	.750	(19.05)
	0.S.	.750	(6.35)	.250	(6.35)	.250	(6.35)	250	(6.35)
•	0	,250	The state of the s	3/8 -		3/8 -	24	3/8 -	24
CC	Std.	1/2 -		1/2 -		1/2 -		1/2 -	20
	0.S.		(7.92)	.312	(7.92)	.312	(7.92)	.312	(7.92)
D	Std.	.312	(11.10)	.437	(11.10)	437	(11.10)	.437	(11.10)
1950	0.S.	.437	(11.10)	.203	(5.16)	-		-	
DB	VI	_		1.000	(25.40)			-	
DN		-	(38.10)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)
E		1.500		.125	(3.18)	.125	(3.18)	.125	(3.18)
EE		.125	(3.18)	.123		.219	(5.56)	.219	(5.56)
FB		_				.250	(6.35)	.250	(6.35)
FH		-			(22.23)	.875	(22.23)	.875	(22.23)
G		.875	(22.23)	.875 .625	(15.88)	.073	The same of the sa)
H		-			(15.88)	.625	(15.88)	.625	(15.88)
J		.625	(15.88)	.625 .400	(10.16)	.400	(10.16)		*******************
K		.400	(10.16)			5/16		5/16	- 24
KK	Std.	5/16		5/16		7/16		7/16	
	0.5	7/16		7/16	(57.15)	2.250	(57.15)	2.250	(57.15)
LB		2.250	(57.15)	2.250		.370	(9.40)	.370	(9.40)
мм	Std.	.370	(9.40)	.370	(9.40)	.495	(12.57)	.495	(12.57)
IVIIVI	0.S.	.495	(12.57)	.495	(12.57)	1.375	(34.93)	1.375	(34.93)
Ρ		1.375	(34.93)		•	1.000	(25.40)	1.000	(25.40)
R		5			-	1.000		1.000	
RM	Std.	.750	(19.05)	.750	(19.05)		200000000000000000000000000000000000000		
LIVI	0.S.	1.000	(25.40)	1.000	(25.40)				
SB	Std.	-			10		•		-
28	0.S.		-		10	-			
SD		-		1.750	(44,45)	3000 0000000000000000000000000000000000	-		-
TB				.328	(8.33)	-		2.000	(50.80)
TF			-		-	2.000	(50.80)		(63.50)
UF			217		-	2.500	(63.50)	2.500	(3.18)
٧		.125	(3.18)	.125	(3.18)	.125	(3.18)	.125	
W			-		-	.125	(3.18)		-
XB			-	.625	(15.88)	<u> </u>			- 00
	Std.	1/4	- 28		- 28		- 28		- 28
XX	0.5.	3/8	- 24	3/8	- 24		-24		-24
Υ	4.4.4.4.	.938	(23.82)		-	.938	(23.82)	.938	(23.82)
ZB		2.625	(66:68)	2.625	(66.68)	2.625	(66.68)		-
ZF			_		_	and the second s	- 4	2.875	(73.03)

29

Phone 815-633-8897

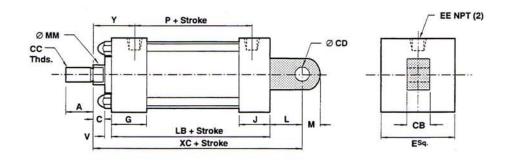


Series SS 1-1/8" Cylinders

Cylinder with 17 (MP3) Fixed Eye Cylinder with 22 (MS9) Side Tap Cylinder with 30 (MR1) Head Face Double Rod End Cylinder with 01 (MX0) Basic

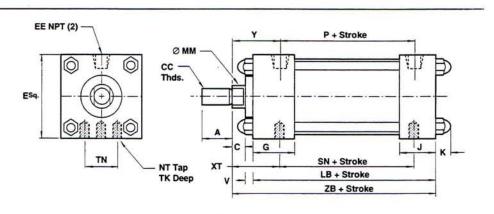
1-1/8" Cylinder with 17 (MP3) Fixed Eye





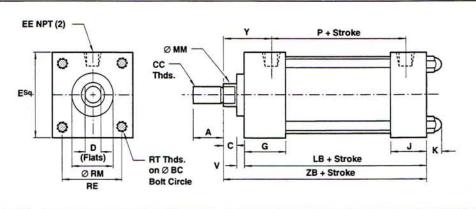
1-1/8" Cylinder with 22 (MS9) Side Tap





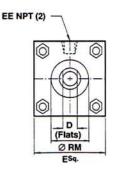
1-1/8" Cylinder with 30 (MR1) Head Face

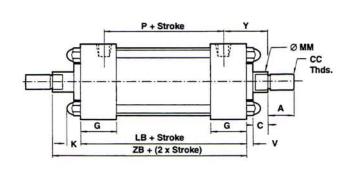




1-1/8" Double Rod End Cylinder with 01 (MX0) Basic



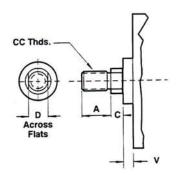




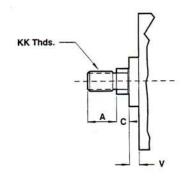
See page 33 for complete instructions on how to order cylinders.



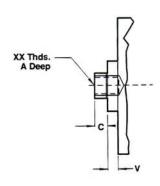
Standard & Optional Rod Ends







Style #2 (Optional Male)

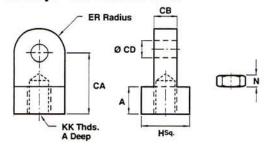


Style #3 (Optional Female)

Dimens	sion	Cylinder with 17 (MP3) Fixed Eye	Cylinder with 22	(MS9) Side Tap	Cylinder with 30 (MR1) Head Face		The second secon			nder with 01 (MXC
_	Std	3/8*	(9.53)	3/8*	(9.53)	3/8"	(9.53)	3/8*	(9.53)		
Rod	0.S.	1/2"	(12.70)	1/2*	(12.70)	1/2"	(12.70)	1/2"	(12.70)		
-	Std.	.625	(15.88)	.625	(15.88)	.625	(15.88)	.625	(15.88)		
A .	O.S.	.750	(19.05)	.750	(19.05)	.750	(19.05)	.750	(19.05)		
BC .	0.3.	.750 -		-	THE RESERVE OF THE PARTY OF THE	1.593	(40.46)	-			
) }		.250	(6.35)	.250	(6.35)	.250	(6.35)	.250	(6.35)		
		.375	(9.53)	.200		-		-			
В	Cad	3/8 -		3/8 -	24	3/8 -	24	3/8 -	24		
C	Std. O.S.	1/2 -		1/2 -		1/2 -	20	1/2 -	20		
20	U.S.			-		-		-			
D	locarosco d	.375	(9.53)	312	(7.92)	.312	(7.92)	.312	(7.92)		
)	Std.	.312	(7.92)	.437	(11.10)	.437	(11.10)	.437	(11.10)		
	0.8.	.437	(11.10)	1.500	(38.10)	1.500	(38.10)	1.500	(38.10)		
		1,500	(38.10)	.125	(3.18)	.125	(3.18)	.125	(3.18)		
E		.125		.875	(22.23)	.875	(22.23)	.875	(22.23)		
ì		.875	(22.23)	.625	(15.88)	.625	(15.88)	.625	(15.88)		
		.625.	(15.88)			.400	(10.16)		(10.16)		
(-		.400 5/16	(10.16)	5/16	CONTRACTOR OF STREET	5/16			
KK	Std.	5/16 -		7/16		7/16		7/16			
1001	0.5	7/16				7/10		_			
L		.437	(11.10)	-				2.250	(57.15)		
LB		2.250	(57.15)	2.250	(57.15)	2,230			(0)01		
М		.375	(9.53)	-		- International Control of the Contr		370	(9.40)		
мм	Std	.370	(9.40)	.370	(9.40)	370	(9.40)	.495	(12.57)		
WIIWI	0.8.	.495	(12.57)	.495	(12.57)	.495	(12.57)		(12.57)		
NT				10 -				1.375	(34.93)		
P	and the second	1.375	(34.93)	1.375	(34.93)	1.375	(34.93)	1.373	~ (34.55)		
RE		-				1,125	(28.58)	750	(19.05)		
RM	Std.			-		.750	(19.05)	.750	(25.40)		
HIVI	0.5.	-		-		1.000	(25.40)	1.000			
RT		-			-		- 32		-		
SN		-		1.750	(44,45)		•	0001 0000000000000000000000000000000000	-		
TK		-		.250	(6.35)		-		-		
TN		-	•	1,000	(25.40)	***	-		(0.40)		
٧		.125	(3.18)	.125	(3.18)	.125	(3.18)	.125	(3.18)		
XC		THE RESIDENCE OF THE PROPERTY	(77.77)		-		-		-		
XT				.625	(15.88)	The state of the s	71		-		
	Std	1/4	- 28		- 28		- 28		- 28		
XX	0.8.	3/8	- 24	3/8	- 24		- 24	THE RESERVE AND ADDRESS OF THE PARTY OF THE	- 24		
Y		.938	(23.83)	.938	(23.83)	.938	(23.83)	.938	(23.83)		
ZB			-	2.625	(66.68)	2.625	(66.68)	3.250	(82.55)		

All Dimensions in Inches (mm)

Rod Eye 303 Stainless Steel

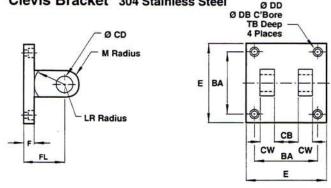


Rod Eye Dimensions

	S-97-225*	S-97-225A*
A	.437 (11.10)	.437 (11.10)
CA	.875 (22.23)	.875 (22.23)
CB	.375 (9.53)	.375 (9.53)
CD	.375 (9.53)	.375 (9.53)
ER	.375 (9.53)	.375 (9.53)
Н	.750 (19.05)	.750 (19.05)
KK	3/8-24	1/2-20
N	.219 (5.56)	.312 (7.92)

^{*}Includes Jam Nut

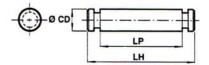
Clevis Bracket 304 Stainless Steel



Clevis Bracket Dimensions

	S-9 ⁻	1-225
8A	1,125	(28.58)
CB	.375	(9.53)
CD	.375	(9.53)
CW	.250	(6.35)
DB	.328	(8.33)
DD	.203	(5.16)
Ε	.500	(12.70)
F	.500	(12.70)
FL	1.125	(28.58)
LR	.625	(15.88)
M	.375	(9.53)
TB	.312	(7.92)

Pivot Pin 303 Stainless Steel

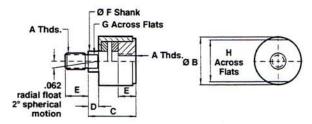


Pivot Pin Dimensions

	S-96-2	225A**
CD	.375	(9.53)
LH	1.250	(31.75)
LP	1.032	(26.21)

^{**}Use with S-91-225, S-97-225

Rod Alignment Coupler



NFPA Rod Alignment Coupler Dimensions

	SC-	1-06
A	3/8	- 24
В	.875	(22.23)
C	1.250	(31.75)
D	.250	(6.35)
E	.625	(15.88)
F	.375	(9.53)
G	.312	(7.92)
Н	.750	(19.05)
Maximum Pull (lbs.)	1,	375

Made of 303 Stainless Steel, the Rod Alignment Coupler allows 1/16" of radial float and 2° of spherical movement. This prevents cylinder binding due to misalignment thus extending bearing and seal life, and permits greater tolerance between the center line of the cylinder and mating part for simplified installation.

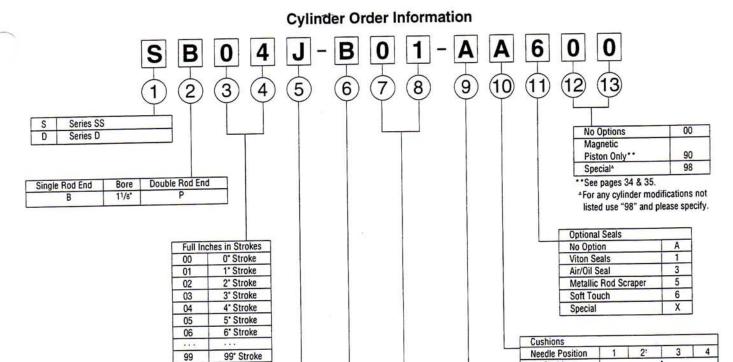


D

P

K

R



A	0-	J	1/2*
В	1/16*	K	9/16*
С	1/8*	M	5/8*
D	3/16*	N	11/16*
E	1/4"	Р	3/4*
F	5/16*	R	13/16*
G	3/8*	S	7/8*
Н	7/16*	T	15/16*
X		Special	

XX

Special

Sta	andard	Ovi	ersized
A	Male KK	Н	Male KK
В	Male CC*	J	Male CC
D	Female XX	M	Female XX
X	Special		

^{*}Standard Rod End 11/8* Bore (3/8 - 24)

Port and Cushion Needle Positions

No Cushions

Head and Cap
Fixed
Special
Standard position

with 1/2' diameter rod.

G

N

Note: Cushions are not available on 11/8° bore

H

M

C

17 | Fixed Eye (MP3)

30 Head Face (MR1)

XX | Special

Side Tap (MS9)

X

D

Head Only

Cap Only

Ports Position

Standard Special

'Standard position

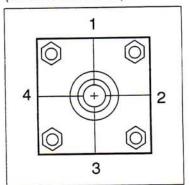
(As viewed from rod end)

Mounting Options

01 Basic (MX0)

03 Bolt Thru (MS8) 04 Front Flange (MF7)

05 Rear Flange (MF2)



EXAMPLE: Series $SS - 1^1/8^n$ bore $-4^1/2^n$ stroke – standard rod end – MX0 Basic mount – standard ports at position #1 – no cushions – Soft Touch Bumper Seal – no options.

IMPORTANT: When using X, XX, or 98 in a model number, please be specific! X = (Description).

Reed & Hall Effect Switches

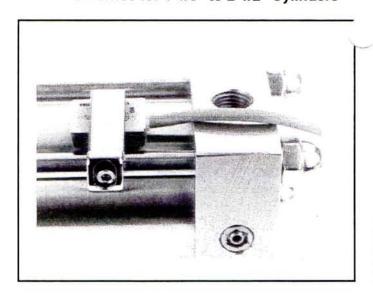
Available on all bore sizes – order separately. See pages 34 and 35 for specifications.

NOTE: Consult factory when using competitive position sensing devices.



Switches for 1-1/8" to 2-1/2" Cylinders

- Magnetically operated, non-contact sensing system.
- Consists of a magnet in the piston, and a sensing switch clamped on the cylinder tie rod.
- One or more switches may be mounted to provide an indication of piston position.
- Switches are provided with vinyl molded cable.
- Adjustable mounting brackets allow for switches to be securely positioned anywhere along the range of piston travel.
- Indicator light facilitates installation and troubleshooting.
- Several switches may be mounted to control or initiate any sequence function.
- Mounting brackets standard with switches.

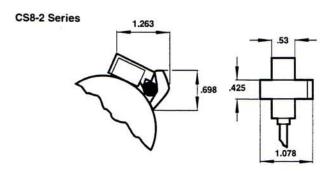


Specifications

*Metal Oxide Varsitor Surge Suppression. NOTE: All CS7 and CS8 Series Switches are supplied with 9 foot leads.

Switch Model	CS8-2-04 Reed	CS8-2-31 Hall	CS8-2-32 Hall
Bore Sizes	11/8" thru 21/3"	11/8" thru 21/2"	1½* thru 2½*
Switch Type	Reed Switch *MOV & Light	Hall Effect & Light, Sourcing PNP	Hall Effect & Light, Sinking NPN
Function	SPST Normally Open	Normally Open	Normally Open
Switching Voltage	5-120 VDC/VAC 50/60 Hz	6-24 VDC	6-24 VDC
Switching Current	.5 Amp Max .005 Amp Min	5 Amp Max	.5 Amp Max
Switching Power	10 VA	12 Watts Max	12 Watts Max
Max Voltage Drop	3.5 Volts	.5 Volts	.5 Volts
Magnetic Sensitivity	85 Gauss	85 Gauss	85 Gauss
Enclosure Classification	NEMA 6 & CSA Approved	NEMA 6 & CSA Approved	NEMA 6 & CSA Approved
Temperature Range	-22°F to +176°F	-22°F to +176°F	-22°F to +176°F
Wiring Diagrams	Supply BRN 0.45 Center of Sensing Area	BRN Supply 6-24 VDC Load Center of Sensing Area	Supply GRN 0.10 Center of Sensing Are

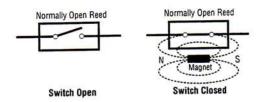
Switch & Mounting Bracket Dimensions





Reed Switch Working Principle

Reed switch sensors contain hermetically sealed reed elements (mechanical contacts) which are open in their normal state. When a magnetic field moves within proximity of the switch, magnetism is induced into the leads and forces the contacts to close.



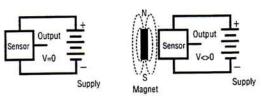
Application Recommendations and Precautions

To provide maximum reliability.

- Always stay within the specifications and power rating limitations of the unit installed.
- Primary and control circuit wiring should not be mixed in the same conduit. Motors will produce high pulses that will be introduced into the control wiring if the wiring is carried in the same conduit.
- 3. Never connect the switch without a load present. The switch will be destroyed.
- Some electrical loads may be capacitive. Capacitive loading may occur due to distributed capacity in cable runs over 25 feet. Use switch Model CS7-24 whenever capacitive loading may occur.

Hall Effect/Magnetoresistive Working Principle

The solid state (no moving parts) magnetoresistive sensor responds to a north or south magnetic pole by providing a digital signal to the output control circuit. This technique enables the sensing of weak magnetic fields, with no limit to the maximum strength of the magnetic field.



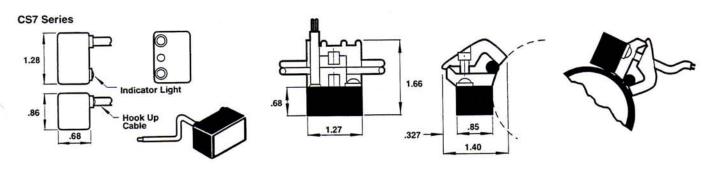
In order to obtain optimum performance and long life, magnetically operated limit switches should not be subjected to: (1) strong magnetic fields, (2) extreme temperature, and (3) excessive ferrous filing or chip buildup.

Improper wiring may damage or destroy the switch. The wiring diagram, along with the listed power ratings, must be carefully observed before connecting power to the switch.

Lower power switches are designed for signaling electronic circuits. Do not use on relay loads or with incandescent bulbs. Resistive loads only.

CS7-04 Reed	CS7-24 Reed	CS7-31 Hall	CS7-32 Hall
2' thru 8"	2" thru 8""	2° thru 8**	2" thru 8"
Reed Switch *MOV & Light	Reed Switch *MOV & Light, 3 Wire	Hall Effect & Light, Sourcing PNP	Hall Effect & Light, Sinking NPN
Normally Open	Normally Open	Normally Open	Normally Open
5-240 VDC/VAC 50/60 Hz	24-240 VAC 50/60 Hz	6-24 VDC	6-24 VDC
1 Amp Max	4 Amp Max 50 Amp Inrush	1 Amp Max	1 Amp Max
30 Watts Max	100 Watts Max	24 Watts Max	24 Watts Max
3 Volts	N/A	.5 Volts	.5 Volts
85 Gauss Parallel	85 Gauss Parallel	85 Gauss Parallel	85 Gauss Parallel
NEMA 6 & CSA Approved	NEMA 6 & CSA Approved	NEMA 6 & CSA Approved	NEMA 6 & CSA Approved
-22°F to +176°F	-22°F to +176°F	-22°F to +176°F	-22°F to +176°F
+ ~ Load RED TO Supply AC/DC BLK	Supply Load WHT RED	RED Supply 6-24 VDC Load	BLK Supply AC/DC Load

*Note: for 8" bore add 9 to part number. Example: CS7-9-04



Warning and Warranty



WARNING

These products are intended for use in industrial compressed air systems only. Do not use these products where pressures and temperatures can exceed those listed under **Technical Information**.

Before using these products with fluids other than those specified, for nonindustrial applications, life-support systems, or other applications not within published specifications, consult NORGREN.

Through misuse, age, or malfunction, components used in fluid power systems can fail in various modes. The system designer is warned to consider the failure modes of all component parts used in fluid power systems and to provide adequate safeguards to prevent personal injury or damage to equipment in the event of such failure modes. System designers must provide a warning to end users in the system instructional manual if protection against a failure mode cannot be adequately provided.

System designers and end users are cautioned to review specific warnings found in instruction sheets packed and shipped with these products. System designers should also provide for all OSHA requirements including Title 29 CFR 1910.147 Lockout/Tagout.

It should be recognized that warnings are valid for any product, regardless of manufacturer, and are not restricted to products manufactured by NORGREN. NORGREN's reputation for product quality and performance is well established. We feel we have the additional obligation to provide information or warnings to customers to assist them in applying our products in a reasonable and safe manner.

WARRANTY

Limited Warranty, Disclaimer & Limitation of Remedies

Items sold by NORGREN are warranted to be free from defects in materials and workmanship for a period of two years from the date of manufacture, provided said items are used according to NORGREN's recommended usages. NORGREN's liability is limited to the repair of, refund of purchase price paid for, or replacement in kind of, at NORGREN's sole option, any items proved defective, provided the allegedly defective items are returned to NORGREN prepaid. The warranties expressed above are in lieu of and exclusive of all other warranties.

There are no other warranties, expressed or implied, except as stated herein. There are no implied warranties of merchantability or fitness for a particular purpose, which are specifically disclaimed. NORGREN's liability for breach of warranty as herein stated is the exclusive remedy, and in no event shall NORGREN be liable or responsible for incidental or consequential damages, even if the possibility of such incidental or consequential damages has been made known to NORGREN.

NORGREN reserves the right to discontinue manufacture of any product or change product materials, design, or specifications without notice.



Quality System Certified Certificate No. OSC-4385







Valves



IMI Group.



Air Line









