

# Series SS NFPA Interchangeable Actuators

## Series D Low Friction Option

1-1/2" to 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.

### Technical data

Operating Temperatures:

Series SS -40°F to 200°F  
(-40°C to 93°C)

Series D -20°F to 250°F  
(-29°C to 121°C)

w/Viton Seals -20°F to 400°F  
(-29°C to 204°C)

Operating Pressure:

250 PSIG Air (17.2 Bar)

400 PSIG Hydraulic (27.6 Bar)

non-shock

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: Aluminum alloy 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



### Options selector

S C 0 4 J - A 0 1 - A A 6 0 0

Series	S	Series SS
	D	Series D*

Bore	Single Rod End	Double Rod End
1-1/2"	C	Q
2"	D	R
2-1/2"	E	S
3-1/4"	F	T
4"	G	U
5"	L	Y
6"	J	W
8"	M	Z

Full Strokes Inches in	
0" Stroke	00
1" Stroke	01
2" Stroke	02
3" Stroke	03
4" Stroke	04
5" Stroke	05
6" Stroke	06
...	...
99" Stroke	99
Special	XX

Fractional Increments of Stroke	
0"	A 1/2" J
1/16"	B 9/16" K
1/8"	C 5/8" M
3/16"	D 11/16" N
1/4"	E 3/4" P
5/16"	F 13/16" R
3/8"	G 7/8" S
7/16"	H 15/16" T
Special	X

Standard	Oversized
Male KK A	Male KK H
Male CC** B	Male CC J
Full Dia. Thd. C	Full Dia. Thd. K
Female XX D	Female XX M
Studded E	Studded N
Special	X

\* D series built with Teflon seals.

\*\*On 1-1/2", 2" & 2-1/2" Bore Sizes with 5/8" Rod, CC = 7/16 - 20 (NFPA)

No Options	00
Magnetic piston	90

Optional Seals	
No Option	A
Viton Seals	1
Air/Oil Seal	3
Metallic Rod Scraper	5
Ecology piston seal	6
Special	X

Cushions	
Needle Position	1 † 2 † 3 4
No Cushions	A
Head Only	B C D E
Cap Only	G H J K
Head and Cap	N M P R
Fixed	U
Special	X

†Standard position

Ports	
Position	1 † 2 3 4
Standard	A B C D
Oversized*	E G H J
Special	X

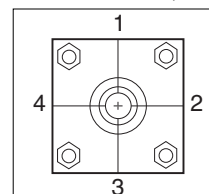
†Standard position

\*NFPA

Mounting Options	
Basic (MX0)	01 Head Square (ME3)* 10
Bottom Tap (MS4)	02 Cap Square (ME4)* 11
Front Flange (MF1)	04 Head Trunnion (MT1) 15
Rear Flange (MF2)	05 Cap Trunnion (MT2) 16
Cap Fixed Clevis (MP1)	06 Special XX

\*8" Bores only

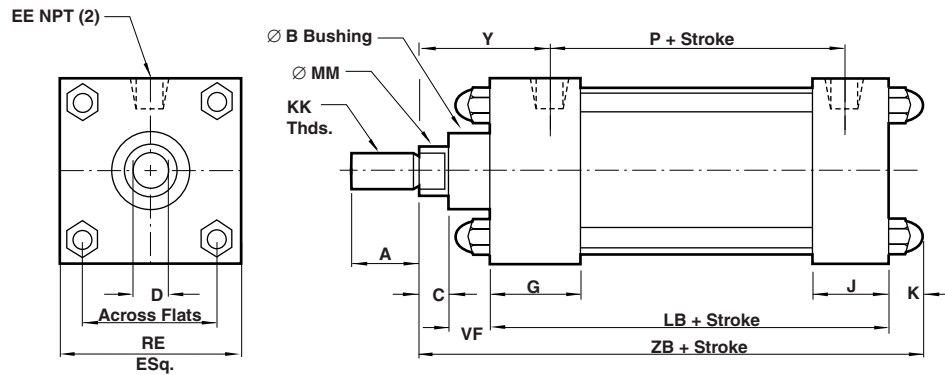
Port and Cushion Needle Positions (As viewed from rod end)



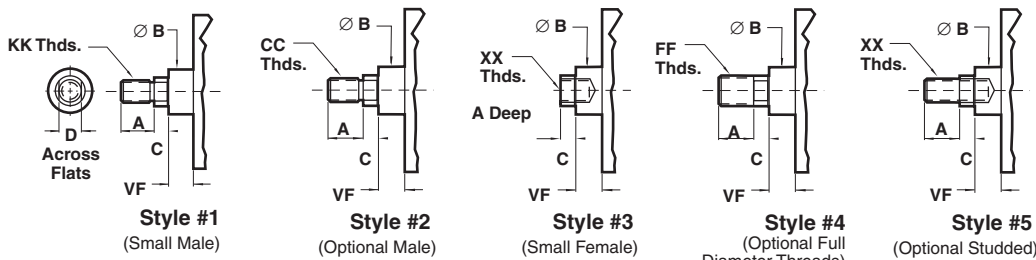
# Series SS NFPA Interchangeable Actuators

1-1/2" to 8" bore sizes

## Standard Cylinder Dimensions



## Standard & Optional Rod Ends

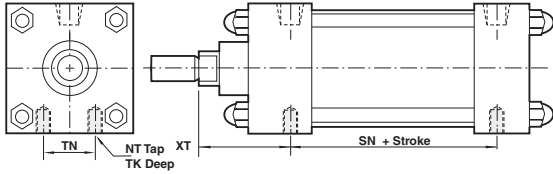


Bore		1-1/2"	2"	2-1/2"	3-1/4"	4"	5"	6"	8"
Ø Rod (MM)	Std.	5/8"	5/8"	5/8"	1"	1"	1"	1-3/8"	1-3/8"
	O.S.	1"	1"	1"	1-3/8"	1-3/8"	1-3/8"	1-3/4"	1-3/4"
A	Std.	0.75	0.75	0.75	1.125	1.125	1.125	1.625	1.625
	O.S.	1.125	1.125	1.125	1.625	1.625	1.625	2.000	2.000
B +.000 -.002	Std.	1.125	1.125	1.125	1.500	1.500	1.500	2.000	2.000
	O.S.	1.500	1.500	1.500	2.000	2.000	2.000	2.375	2.375
C	Std.	0.375	0.375	0.375	0.5	0.5	0.5	0.625	0.625
	O.S.	0.5	0.5	0.5	0.625	0.625	0.625	0.75	0.75
CC	Std.	7/16 - 20	7/16 - 20	7/16 - 20	7/8 - 14	7/8 - 14	7/8 - 14	1-1/4 - 12	1-1/4 - 12
	O.S.	7/8 - 14	7/8 - 14	7/8 - 14	1-1/4 - 12	1-1/4 - 12	1-1/4 - 12	1-1/2 - 12	1-1/2 - 12
D	Std.	0.5	0.5	0.5	0.812	0.812	0.812	1.125	1.125
	O.S.	0.812	0.812	0.812	1.125	1.125	1.125	1.5	1.5
E		2	2.5	3	3.75	4.5	5.5	6.5	8.5
EE	Std.	0.25	0.25	0.25	0.375	0.375	0.375	0.5	0.5
	O.S.	0.375	0.375	0.375	0.5	0.5	0.5	0.75	0.75
FF	Std.	5/8 - 18	5/8 - 18	5/8 - 18	1 - 14	1 - 14	1 - 14	1-3/8 - 12	1-3/8 - 12
	O.S.	1-14	1-14	1-14	1-3/8 - 12	1-3/8 - 12	1-3/8 - 12	1-3/4 - 12	1-3/4 - 12
G		1.5	1.5	1.5	1.75	1.75	1.75	2	2
J		1	1	1	1.25	1.25	1.5	1.5	1.5
K	Std.	0.469	0.531	0.531	0.625	0.625	0.83	0.83	1
	O.S.	1/2 - 20	1/2 - 20	1/2 - 20	3/4 - 16	3/4 - 16	3/4 - 16	1 - 14	1 - 14
LB	Std.	3/4 - 16	3/4 - 16	3/4 - 16	1 - 14	1 - 14	1 - 14	1-1/4 - 12	1-1/4 - 12
	O.S.	3/4 - 16	3/4 - 16	3/4 - 16	1 - 14	1 - 14	1 - 14	1-1/4 - 12	1-1/4 - 12
LB		3.625	3.625	3.75	4.25	4.25	4.5	5	5.125
P		2.125	2.125	2.25	2.625	2.625	2.875	3	3.125
RE		1.43	1.84	2.19	2.76	3.32	4.1	4.88	6.435
VF	Std.	0.625	0.625	0.625	0.875	0.875	0.875	1	1
	O.S.	0.875	0.875	0.875	1	1	1	1.125	1.125
XX	Std.	7/16 - 20	7/16 - 20	7/16 - 20	3/4 - 16	3/4 - 16	3/4 - 16	1 - 14	1 - 14
	O.S.	3/4 - 16	3/4 - 16	3/4 - 16	1 - 14	1 - 14	1 - 14	1-1/4 - 12	1-1/4 - 12
Y	Std.	2	2	2	2.437	2.437	2.437	2.875	2.875
	O.S.	2.375	2.375	2.375	2.687	2.687	2.687	3.125	3.125
ZB	Std.	5.094	5.156	5.281	6.25	6.25	6.705	7.455	7.75
	O.S.	5.469	5.531	5.656	6.5	6.5	6.955	7.705	8

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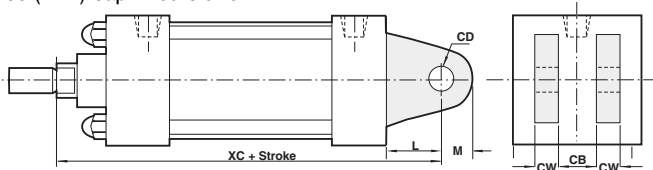
1-1/2" to 8" bore sizes

02 (MS4) Bottom Tap



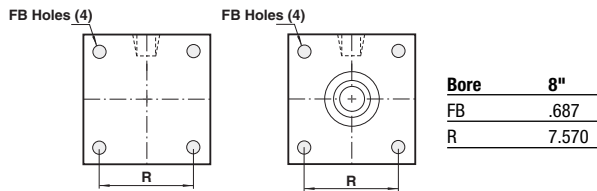
Bore	1-1/2"	2"	2-1/2"	3-1/4"	4"	5"	6"	8"
NT	1/4-20	5/16-18	3/8-16	1/2-13	1/2-13	5/8-11	3/4-10	3/4-10
SN	2.250	2.250	2.375	2.625	2.625	2.875	3.125	3.250
TK	.375	.500	.625	.750	.750	1.000	1.125	1.125
TN	.625	.875	1.250	1.500	2.062	2.687	3.250	4.500
XT	Std. 1.937	1.937	1.937	2.437	2.437	2.437	2.812	2.812
	O.S. 2.312	2.312	2.312	2.687	2.687	2.687	3.062	3.062

06 (MP1) Cap Fixed Clevis

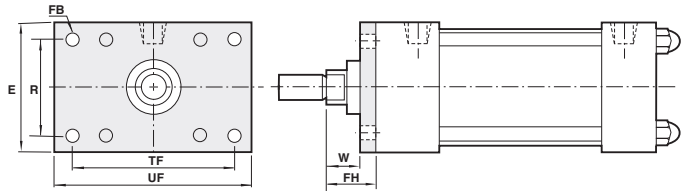


Bore	1-1/2"	2"	2-1/2"	3-1/4"	4"	5"	6"	8"
CB	.750	.750	.750	1.250	1.250	1.250	1.500	1.500
CD	.500	.500	.500	.750	.750	.750	1.000	1.000
CW	.500	.500	.500	.625	.625	.625	.750	.750
L	.750	.750	.750	1.250	1.250	1.250	1.500	1.500
M	.50	.50	.50	.75	.75	.75	1.000	1.000
XC	Std. 5.375	5.375	5.500	6.875	6.875	7.125	8.125	8.250
	O.S. 5.750	5.750	5.875	7.125	7.125	7.375	8.375	8.500

10 (ME3) Head Square  
11 (ME4) Cap Square

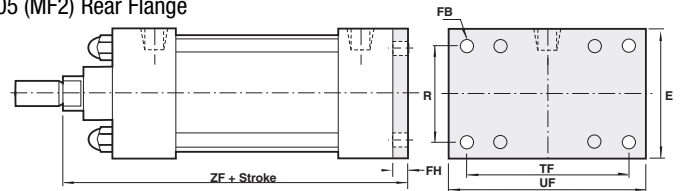


04 (MF1) Front Flange



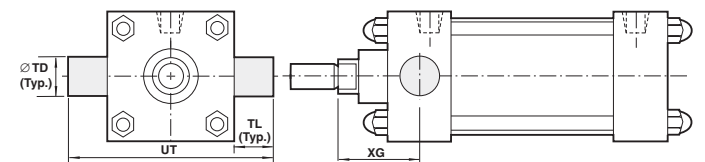
Bore	1-1/2"	2"	2-1/2"	3-1/4"	4"	5"	6"
E	2.000	2.500	3.000	3.750	4.500	5.500	6.500
FB	.312	.375	.375	.437	.437	.562	.562
G	1.500	1.500	1.500	1.750	1.750	1.750	2.000
FH	.375	.375	.375	.625	.625	.625	.750
R	1.430	1.840	2.190	2.760	3.320	4.100	4.880
TF	2.750	3.375	3.875	4.687	5.437	6.625	7.625
UF	3.375	4.125	4.625	5.500	6.250	7.625	8.625
W	Std. .625	.625	.625	.750	.750	.750	.875
	O.S. 1.000	1.000	1.000	1.000	1.000	1.000	1.125

05 (MF2) Rear Flange



Bore	1-1/2"	2"	2-1/2"	3-1/4"	4"	5"	6"
E	2.000	2.500	3.000	3.750	4.500	5.500	6.500
FB	.312	.375	.375	.437	.437	.562	.562
G	1.500	1.500	1.500	1.750	1.750	1.750	2.000
FH	.375	.375	.375	.625	.625	.625	.750
R	1.430	1.840	2.190	2.760	3.320	4.100	4.880
TF	2.750	3.375	3.875	4.687	5.437	6.625	7.625
UF	3.375	4.125	4.625	5.500	6.250	7.625	8.625
W	Std. .625	.625	.625	.750	.750	.750	.875
	O.S. 1.000	1.000	1.000	1.000	1.000	1.000	1.125
ZF	Std. 5.000	5.000	5.125	6.250	6.250	6.500	7.375
	O.S. 5.375	5.375	5.500	6.500	6.500	6.750	7.625

15 (MT1) Head Trunnion

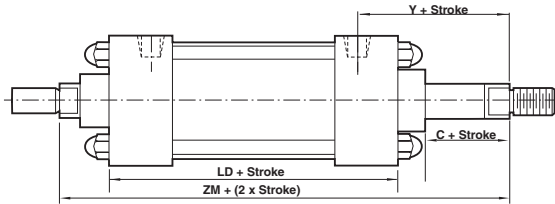


Bore	1-1/2"	2"	2-1/2"	3-1/4"	4"	5"	6"	8"
TD	1.000	1.000	1.000	1.000	1.000	1.000	1.375	1.375
TL	1.000	1.000	1.000	1.000	1.000	1.000	1.375	1.375
UT	4.000	4.500	5.000	5.750	6.500	7.500	9.250	11.250
XG	Std. 1.750	1.750	1.750	2.250	2.250	2.250	2.625	2.625
	O.S. 2.125	2.125	2.125	2.500	2.500	2.500	2.875	2.875

# Series SS NFPA Interchangeable Actuators

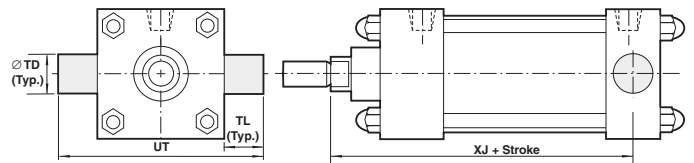
1-1/2" to 8" bore sizes

## Double Rod End 01 (MX0) Basic



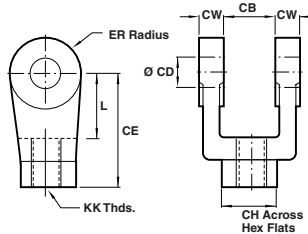
Bore		1-1/2"	2"	2-1/2"	3-1/4"	4"	5"	6"	8"
C	Std.	.375	.375	.375	.500	.500	.500	.625	.625
	O.S.	.500	.500	.500	.625	.625	.625	.750	.750
LD	Std.	4.125	4.125	4.250	4.750	4.750	5.000	5.500	5.500
	O.S.	2.375	2.375	2.375	2.687	2.687	2.687	3.125	3.125
Y	Std.	2.000	2.000	2.000	2.437	2.437	2.437	2.875	2.875
	O.S.	2.375	2.375	2.375	2.687	2.687	2.687	3.125	3.125
ZM	Std.	6.125	6.125	6.250	7.500	7.500	7.750	8.750	8.750
	O.S.	6.875	6.875	7.000	8.000	8.000	8.250	9.250	9.250

## 16 (MT2) Cap Trunnion



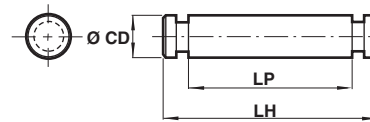
Bore		1-1/2"	2"	2-1/2"	3-1/4"	4"	5"	6"	8"
TD	Std.	1.000	1.000	1.000	1.000	1.000	1.000	1.375	1.375
	O.S.	1.000	1.000	1.000	1.000	1.000	1.000	1.375	1.375
TL	Std.	4.000	4.500	5.000	5.750	6.500	7.500	9.250	11.250
	O.S.	4.000	4.500	5.000	5.750	6.500	7.500	9.250	11.250
XJ	Std.	4.125	4.125	4.250	5.000	5.000	5.250	5.875	6.000
	O.S.	4.500	4.500	4.625	5.250	5.250	5.500	6.125	6.250

## Rod Clevis 303 Stainless Steel



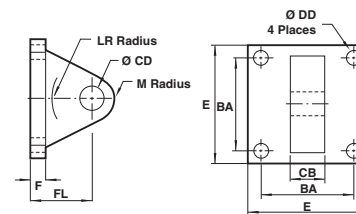
	S-92-03	S-92-065	S-92-12	S-92-16
CB	.750	1.250	1.500	2.000
CD	.500	.750	1.000	1.375
CE	1.500	2.375	3.125	4.125
CH	1.000	1.250	1.500	2.000
CW	.500	.625	.750	1.000
ER	.500	.750	1.000	1.375
KK	1/2-20	3/4-16	1-14	1-1/4 - 12
L	.750	1.250	1.500	2.125

## NFPA Pin 303 Stainless Steel



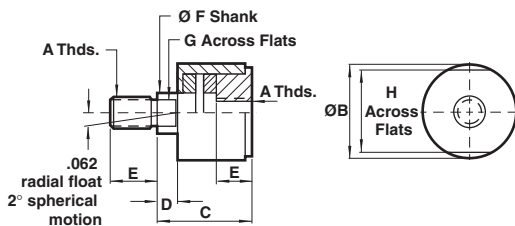
	S-96-03A	S-96-065A	S-96-12A	S-96-16A
CD	.500	.750	1.000	1.375
LH	2.219	3.125	3.750	5.625
LP	1.875	2.750	3.250	4.375

## Eye Bracket 303 Stainless Steel



	S-89-03A	S-89-065A	S-89-12A
BA	1.625	2.562	3.250
CB	.750	1.250	1.500
CD	.500	.750	1.000
DD	.406	.531	.656
E	2.500	3.500	4.500
F	.375	.625	.750
FL	1.125	1.875	2.250
LR	.750	1.250	1.500
M	.500	.750	1.000

## Rod Alignment Coupler



	SC-107	SC-1-08	SC-1-12	SC-1-16
A	7/16-20	1/2 - 20	3/4 - 16	1-14
B	1.250	1.250	1.750	2.500
C	2.000	2.000	2.312	2.937
D	.500	.500	.500	.500
E	.750	.750	1.125	1.625
F	.625	.625	.969	1.375
G	.563	.563	.812	1.156
H	1.125	1.125	1.500	2.250
Max Pull (lbs)	2,250	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.

# Series SS Actuators

## Series D Low Friction Option

1-1/8" 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.**

### Technical data

Operating Temperatures:

Series SS -40°F to 200°F  
 (-40°C to 93°C)

Series D -20°F to 250°F  
 (-29°C to 121°C)

w/Viton Seals -20°F to 400°F  
 (-29°C to 204°C)

Operating Pressure:

250 PSIG Air (17.2 Bar)  
 400 PSIG Hydraulic (27.6 Bar)  
 non-shock

Bore Sizes:

1-1/8"

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: Aluminum alloy 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

### Options selector

★ ★ ★ ★ ★ - ★ ★ / ★ ★ ★ ★ ★

<b>Series</b>	S	Series SS	
	D	Series D*	

<b>Single Rod End</b>	B	<b>Bore</b>	1-1/8"	<b>Double Rod End</b>	P
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<b>Full Strokes Inches in</b>	
0" Stroke	00
1" Stroke	01
2" Stroke	02
3" Stroke	03
4" Stroke	04
5" Stroke	05
6" Stroke	06
...	...
99" Stroke	99
Special	XX

<b>Fractional Increments of Stroke</b>	
0" A	1/2" J
1/16" B	9/16" K
1/8" C	5/8" M
3/16" D	11/16" N
1/4" E	3/4" P
5/16" F	13/16" R
3/8" G	7/8" S
7/16" H	15/16" T
Special	X

<b>Rod Size &amp; Style</b>	
<b>Standard</b>	<b>Oversized</b>
Male KK A	Male KK H
Male CC** B	Male CC J
Female XX D	Female XX M
Special	X

<b>No Options</b>	00
Magnetic	
Piston Only	90
Special	98

For any cylinder modifications not listed use "98" and please specify.

<b>Optional Seals</b>	
No Option	A
Viton Seals	1
Air/Oil Seal	3
Metallic Rod Scraper	5
Ecology piston seal	6
Special	X

<b>Cushions</b>	
Needle Position	1 2† 3 4
No Cushions	A
Head Only	B C D E
Cap Only	G H J K
Head and Cap	N M P R
Fixed	U
Special	X

†Standard position

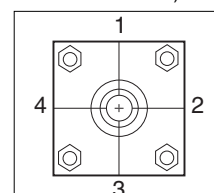
<b>Ports</b>	
Position	1† 2 3 4
Standard	A B C D
Special	X

†Standard position

<b>Mounting Options</b>			
Basic (MX0)	01	Fixed Eye (MP3)	17
Bolt Thru (MS8)	03	Side Tap (MS9)	22
Front Flange (MF7)	04	Head Face (MR1)	30
Rear Flange (MF2)	05	Special	XX

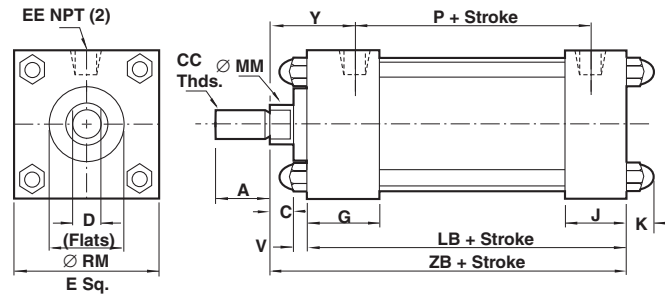
Port and Cushion Needle Positions (As viewed from rod end)



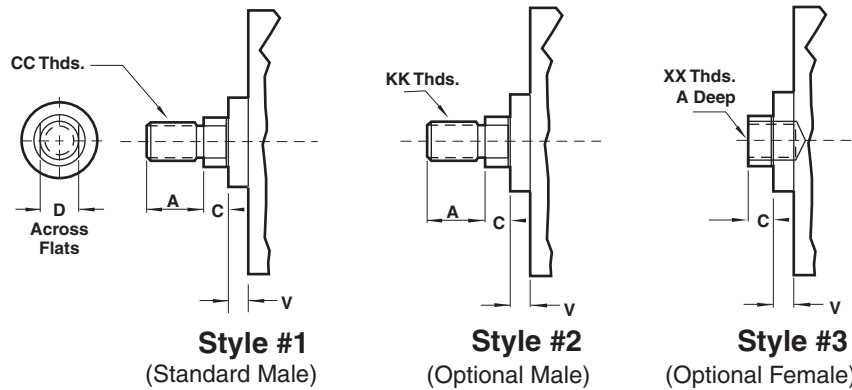
# Series SS Actuators

1-1/8" bore size

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



Standard and optional rod ends

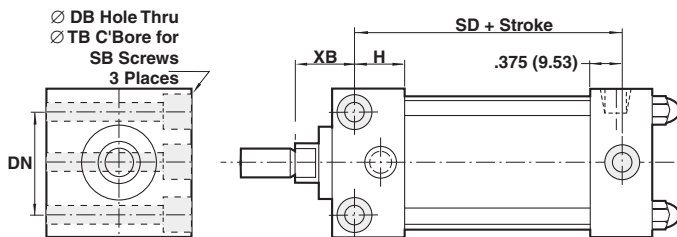


Dimension		01 (MX0) Basic	03 (MS8) Bolt Thru	04 (MF7) Front Flange	05 (MF2) Rear Flange
ø Rod	Std.	3/8"	.375"	.375"	.375"
	O.S.	1/2"	.500"	.500"	.500"
A	Std.	.625	.625	.625	.625
	O.S.	.750	.750	.750	.750
C		.250	.250	.250	.250
CC	Std.	3/8 - 24	3/8 - 24	3/8 - 24	3/8 - 24
	O.S.	1/2 - 20	1/2 - 20	1/2 - 20	1/2 - 20
D	Std.	.312	.312	.312	.312
	O.S.	.437	.437	.437	.437
E		1.500	1.500	1.500	1.500
EE		.125	.125	.125	.125
G		.875	.875	.875	.875
J		.625	.625	.625	.625
K		.400	.400	.400	-
KK	Std.	5/16 - 24	5/16 - 24	5/16 - 24	5/16 - 24
	O.S.	7/16 - 20	7/16 - 20	7/16 - 20	7/16 - 20
LB		2.250	2.250	2.250	2.250
MM	Std.	.370	.370	.370	.370
	O.S.	.495	.495	.495	.495
P		1.375	-	1.375	1.375
RM	Std.	.750	.750	-	-
	O.S.	1.000	1.000	-	-
V		.125	.125	.125	.125
XX	Std.	1/4 - 28	1/4 - 28	1/4 - 28	1/4 - 28
	O.S.	3/8 - 24	3/8 - 24	3/8 - 24	3/8 - 24
Y		.938	-	.938	.938
ZB		2.625	2.625	2.625	-

# Series SS Actuators

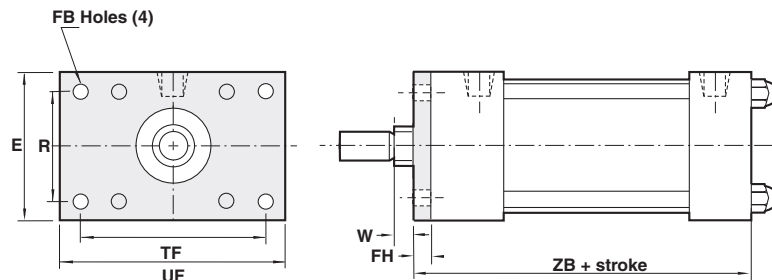
1-1/8" bore size

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



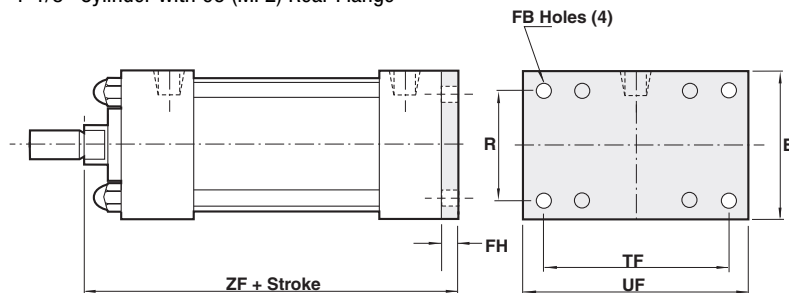
03 (MS8) Bolt Thru	
DB	.203
DN	1.000
SB	#10
SD	1.750
XB	.625

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



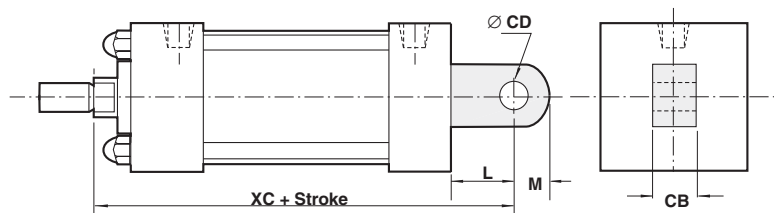
04 (MF7) Front Flange	
FB	.219
FH	.250
E	1.500
R	1.000
W	.125
TF	2.000
UF	2.500
ZB	2.625

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



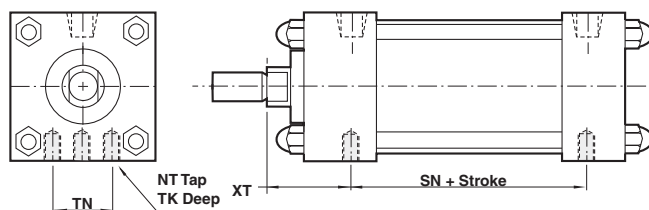
05 (MF2) Rear Flange	
E	1.500
FB	.219
FH	.250
R	1.000
TF	2.000
UF	2.500
ZF	2.875

17 (MP3) Fixed eye



17 (MP3) Fixed eye	
CB	.375
CD	.375
L	.437
M	.375
XC	3.062

22 (MS9) Side tap

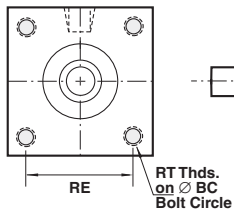


22 (MS9) Side tap	
NT	10-32
SN	1.750
TK deep	.250
TN	1.000
XT	.625

# Series SS Actuators

1-1/8" bore size

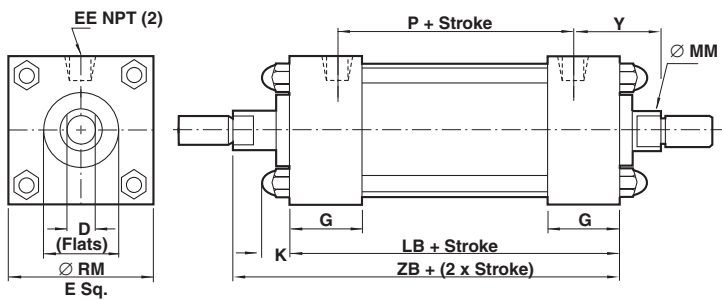
## 30 (MR1) Head face



### 30 (MR1) Head face

BC	1.593
RE	1.125
RT	10-32

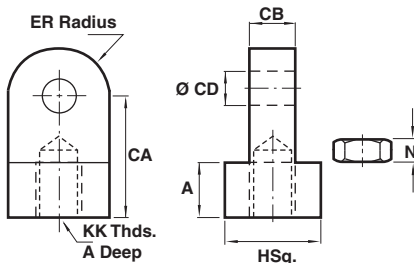
## Double rod with O1 (MX0) basic



### Double rod end cylinder with O1 (MX0) basic

D	Std.	.312
	O.S.	.437
E		1.500
EE		.125
G		.875
K		.400
LB		2.250
MM	Std.	.370
	O.S.	.495
P		1.375
RM	Std.	.750
	O.S.	1.000
Y		.938
ZB		3.250

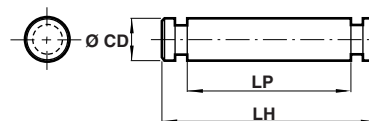
## Rod eye 303 stainless steel w/jam nut 3/8-24 pn S-97-225, 1/2-20 pn S-97-225A



### Rod Eye

	S-97-225*	S-97-225A
A	.437	.437
CA	.875	.875
CB	.375	.375
CD	.375	.375
ER	.375	.375
H	.750	.750
KK	3/8-24	1/2-20
N	.219	.312

## Pivot pin 303 stainless steel, pn S-96-225A

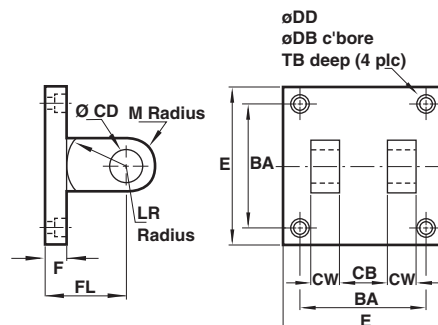


### Pivot pin

CD	.375
LH	1.250
LP	1.032

\*\*Use with S-91-225, S-97-225

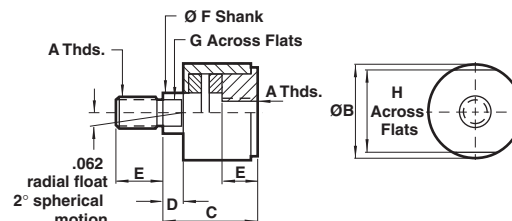
## Clevis bracket 304 stainless steel P/N S-91-225



### Clevis bracket

BA	1.125
CB	.375
CD	.375
CW	.250
DB	.328
DD	.203
E	1.50
F	.500
FL	1.125
LR	.625
M	.375
TB	.260

## NFPA Rod alignment coupler, pn SC-1-06



### Rod alignment coupler

A	3/8 - 24
B	.875
C	1.250
D	.250
E	.625
F	.375
G	.312
H	.750
Maximum pull	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.

# Series SS Actuators

1-1/2" to 8" bore size

## Cylinder Force and Volume Charts

### Extend Forces

Bore	Piston Area	PSI (bar)								Volume Cu Ft (cm3) Displacement per inch
		40 (3)	60 (4)	80 (6)	100 (7)	150 (10)	200 (14)			
1-1/8"	.99 (6.41)	40 (177)	60 (265)	80 (354)	99 (442)	149 (664)	200 (890)	.00057 (16)		
1-1/2"	1.77 (11.40)	71 (315)	106 (472)	142 (629)	177 (786)	266 (1179)	353 (1570)	.00102 (29)		
2"	3.14 (20.27)	126 (559)	189 (839)	251 (1119)	314 (1398)	471 (2097)	628 (2793)	.00182 (52)		
2-1/2"	4.91 (31.67)	196 (874)	295 (1311)	393 (1748)	491 (2185)	737 (3277)	982 (4368)	.00284 (80)		
3-1/4"	8.30 (53.32)	332 (1477)	498 (2215)	664 (2953)	830 (3692)	1245 (5538)	1659 (7379)	.00480 (136)		
4"	12.57 (81.07)	503 (2237)	754 (3355)	1005 (4473)	1257 (5592)	1886 (8388)	2513 (11178)	.00727 (206)		
5"	19.64 (126.71)	785 (3491)	1178 (5240)	1571 (6988)	1964 (8736)	2946 (13104)	3928 (17472)	.01137 (322)		
6"	28.27 (182.39)	1130 (5026)	1696 (7544)	2262 (10061)	2827 (12574)	4240 (18860)	5654 (25149)	.01837 (520)		
8"	50.26 (324.26)	2010 (8940)	3015 (13411)	4020 (17881)	5026 (22356)	7539 (33533)	10052 (44711)	.02227 (631)		

### Deduct these Forces for Retract Strokes

Rod	Rod area	PSI (bar)								Volume cu ft (cm3) displacement per inch
		40 (3)	60 (4)	80 (6)	100 (7)	150 (10)	200 (14)			
3/8"	.112 (.72)	5 (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)		
1-3/8"	1.485 (9.58)	59 (262)	89 (396)	119 (529)	149 (663)	222 (997)	297 (1321)	.00086 (24)		
1-3/4"	2.404 (15.51)	95 (423)	144 (641)	192 (854)	240 (1068)	360 (1601)	480 (2135)	.00139 (39)		

## Series SS Actuators

1-1/2" to 8" bore sizes

**1** Piston Seals: Lip-type nitrile seals are pressure energized and wear compensating. Their excellent lubrication retention characteristics lower seal friction and ensure long life.

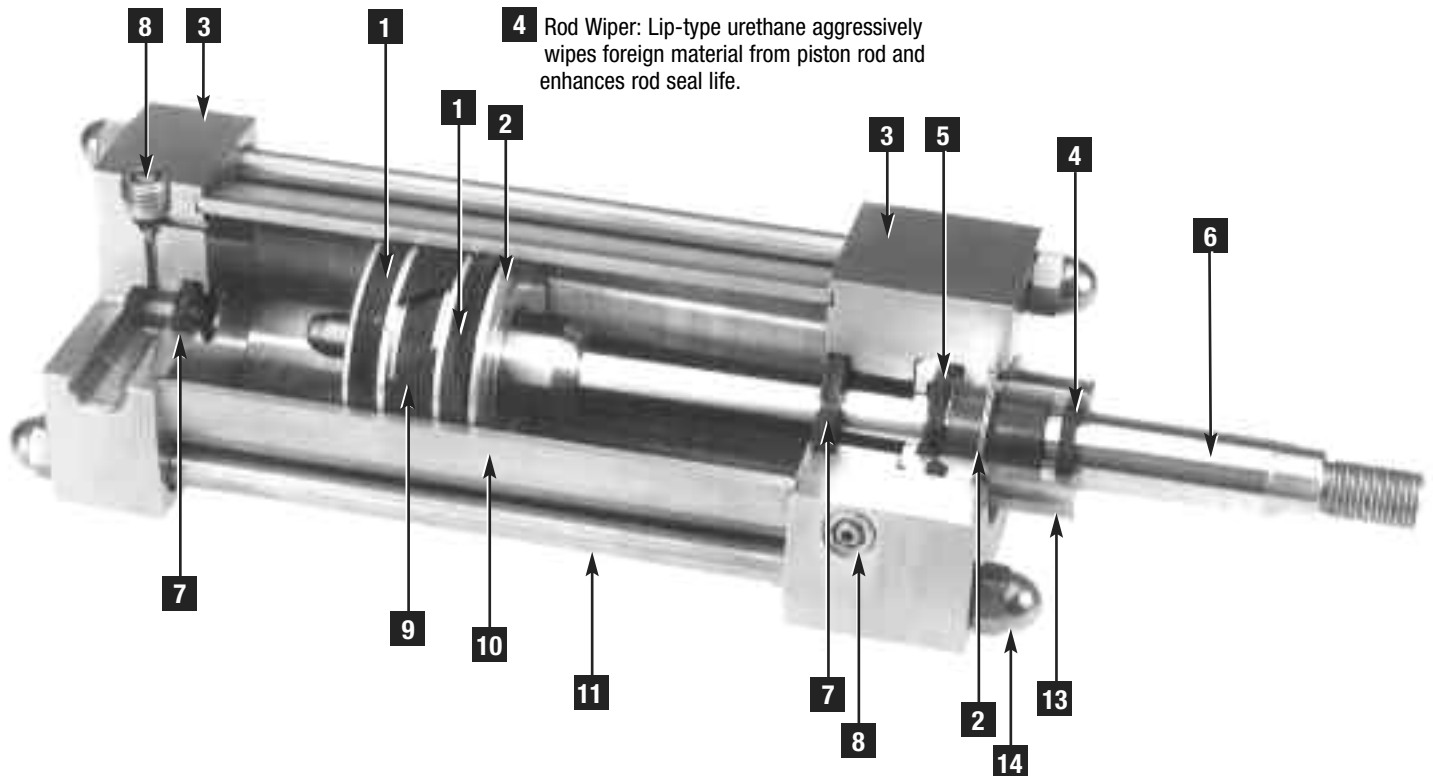
**2** Piston: Solid aluminum alloy, light-weight for low inertia, yet strong.

**5** Rod Seals: Rounded lip-type urethane is pressure energized and wear compensating.

**3** Head/Cap: Precision machined from solid corrosion-resistant 304 stainless steel bar.

**6** Piston Rod: 303 stainless steel, 40,000 PSI minimum yield, hard chrome plated, ground and polished.

**4** Rod Wiper: Lip-type urethane aggressively wipes foreign material from piston rod and enhances rod seal life.



**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® composite for minimum friction, maximum wear and side load resistance.

**10** Tube: Corrosion-resistant 304 stainless steel.

**11** 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-to-metal contact.

**14** Acorn Nut: Tie rod threads are covered by stainless steel acorn nuts.

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