Dynamax®

N Series

NFPA Interchangeable Cylinders

TECHNICAL PRODUCT CATALOG

144 Kay Drive, Easley, SC 29640

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N Series

The **N Series** is an aluminum NFPA Interchangeable cylinder line that is designed and built to excel in the most demanding applications. The N Series encompasses many value-added features such as an extra long graphite filled cast iron rod bushing, and a standard oversized wear band that is located on the rear of the piston. These are just a sample of the features that make the N Series the Superior NFPA Interchangeable air cylinder line.

Tube
The tube is hard coat anodized. The hard coating is an electro-chemical process, which produces a very dense surface of aluminum oxide. This surface has extreme hardness (60 RC), excellent wear and corrosion resistance, and a low coefficient of friction.

End Caps
The end caps are accurately machined from (6061-T6) solid aluminum bar stock. They are clear anodized for corrosion resistance. Additionally, a recess on the piston-mating surface (at both ends) enables the air to work on a larger piston area for effortless breakaway.

Rod Bushing
The N Series includes a graphite filled, cast iron rod bushing that is extra long in length. Graphite filled offers the best bearing surface when using a hard chrome plated steel piston rod. Cast iron provides maximum resistance against wear. The added length adds superior alignment and support of the piston rod as well as provides maximum load bearing support.

Rod Seal
The nitrile compound rod seal is extremely durable. The U-Cup design ensures proper sealing and long life.

Rod Wiper
The standard rod wiper construction is a highly durable polyurethane.

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

Bushing Retainer
The bushing retainer allows catridge removal (cylinder repair) without complete disassembly (in most cases).

Tie Rods
The tie rods are 100,000 psi minimum yield steel for maximum holding power. The threads are roll formed for superior strength and engagement.

Piston Seal
The piston seal is a nitrile compound. The O-ring design is very dependable.

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

Piston
The solid aluminum alloy piston is strong and durable.

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

Tube End Seal
The tube end seals are compression type and reusable.

Ports
Our enhanced port design enables the cylinder to work more efficiently. Through the use of precise machining depths and tool shape, we are able to smooth the flow path into and out of the cylinder.

Standard Specifications
- Meets NFPA specifications
- Bore sizes from 1-1/2” through 6”
- Piston rod diameters from 5/8” to 1-3/4”
- Nominal pressure rating is 250 psi air
- Standard temperature -10°F to 165°F (-23°C to 74°C)
- NPTF ports
- Multitude of mounting options
- Strokes up to 48”
- Single and double rods
- Ports (standard in position # 1)
  - -3/8 NPTF for 1-1/2”, 2”, and 2-1/2”
  - -1/2 NPTF for 3-1/4”, 4” and 5”
  - -3/4 NPTF for 6”
- Cushions: Adjustable (standard in position # 2) as well as fixed

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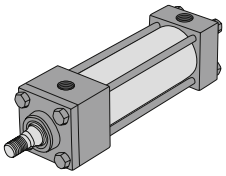
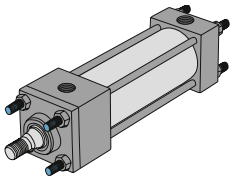
Standard N Series Mounts

Centerline Mounts

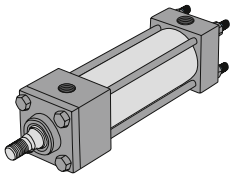
XO Mount
Basic No Mount



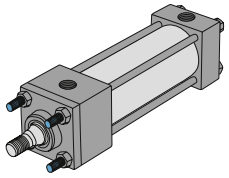
X1 Mount
Extended Tie Rods - Both Ends



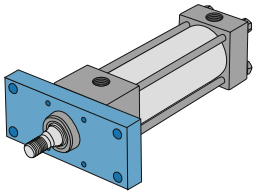
X2 Mount
Extended Tie Rods - Cap End



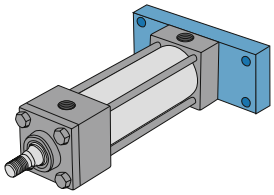
X3 Mount
Extended Tie Rods - Head End



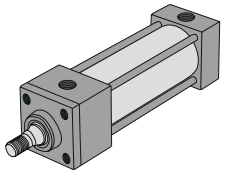
F1 Mount
Head Rectangular Flange



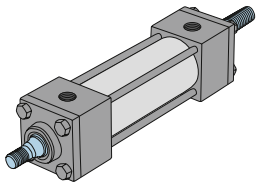
F2 Mount
Cap Rectangular Flange



SN Mount
Sleeve Nut

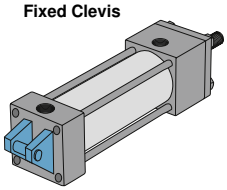


DA Option
Double Rod End

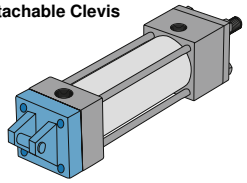


Pivot Mounts

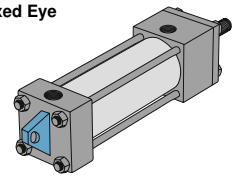
P1 Mount
Fixed Clevis



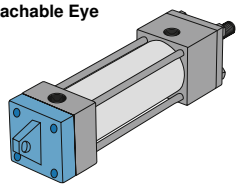
P2 Mount
Detachable Clevis



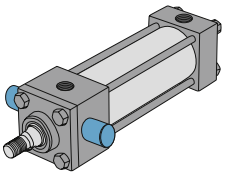
P3 Mount
Fixed Eye



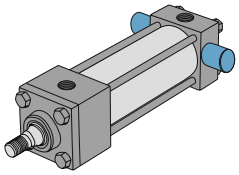
P4 Option
Detachable Eye



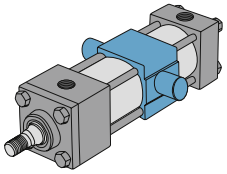
T6 Mount
Head Trunnion



T7 Mount
Cap Trunnion

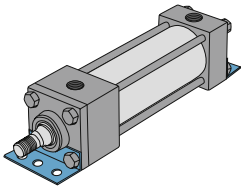


T8 Mount
Intermediate Trunnion

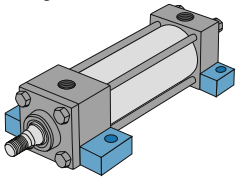


Foot Mounts

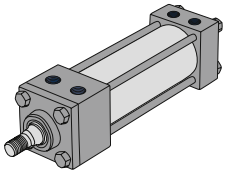
S1 Mount
Angle Mount



S2 Mount
Side Lugs



S4 Mount
Bottom Tapped



How To Order

N 1.5 – .625 F1 – 01 A – 01 1 1 – SM1 N A XXX

Series
N = Single Rod
ND = Through Rod

Bore
1.5 = 1-1/2"
2.0 = 2"
2.5 = 2-1/2"
3.25 = 3-1/4"
4.0 = 4"
5.0 = 5"
6.0 = 6"
8.0 = 8"

Rod Diameter
.625 = 5/8"
1.0 = 1"
1.375 = 1 3/8"
1.75 = 1 3/4"
2.0 = 2"
2.5 = 2 1/2"

Mounts
F1 = MF1 Front Flange Mount
F2 = MF2 Rear Flange Mount
P1 = MP1 Fixed Clevis Mount
P2 = MP2 Detachable Clevis
P3 = MP3 Fixed Eye
P4 = MP4 Detachable Eye
S1 = MS1 Angle Mount
S2 = MS2 Side Lug Mount
S4 = MS4 Bottom Tap
SN = MSN Sleeve Nut
T1 = MT1 Head Trunnion
T2 = MT2 Cap Trunnion (Fixed Steel Ears)
T4 = MT4 Mid Trunnion (Fixed Steel Ears)
XO = MXO Basic No Mount
X1 = MX1 Extended Tie Rods Both Ends
X2 = MX2 Extended Tie Rods Cap End
X3 = MX3 Extended Tie Rods Head End

Stroke
0 = 00
1" = 01
2" = 02
3" = 03
4" = 04
5" = 05
6" = 06
7" = 07
8" = 08
9" = 09
10" = 10
11" = 11
12" = 12
13" = 13
14" = 14
Etc.....

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

Port Size
01 = 1/8"
02 = 1/4"
03 = 3/8"
04 = 1/2"
05 = 3/4"
06 = 1"

Port Position Cap
1 = Position #1
2 = Position #2
3 = Position #3
4 = Position #4

Port Position Head
1 = Position #1
2 = Position #2
3 = Position #3
4 = Position #4

Rod End Code
SM1 = Style 1 Small Male
IM2 = Style 2 Intermediate Male
SF3 = Style 3 Small female
SM4 = Oversize Style 1 Small Male
IM5 = Oversize Style 2 Intermediate Male
SF6 = Oversize Syle 3 Small female
*See page for details on rod end threads.

Magnetic Piston Options
N = Non-magnetic
R = Reed Switch Magnet
H = Half Effect Magnet

Cushioned and Positions
A = Non-cushioned
B = Cushioned Position #1, Head & Cap
C = Cushioned Position #2, Head & Cap
D = Cushioned Position #3, Head & Cap
E = Cushioned Position #4, Head & Cap
F = Position #1, Head Only
G = Position #1, Cap Only
H = Position #2, Head Only
I = Position #2, Cap Only
J = Position #3, Head Only
K = Position #3, Cap Only
L = Position #4, Head Only
M = Position #4, Cap Only

Special Options
***Phone quote only
AA = No option
BA** = Bumpers Both Ends
BH** = Bumper, Head Only
BC** = Bumper, Cap Only
EB = Silencer Bumpers
MA = Metallic Rod Scraper
SS = Stainless Rod & Tie Rods
SA = Stainless Rod
ST = Stainless Tie Rods
VA = Viton* Seals (High Temperature Seals)
1A* = Rod Extension
2A* = Thread Extension
3A = Rod Stud

*Specify Lengt
**Bumpers add .062" to OAL (per bumper)

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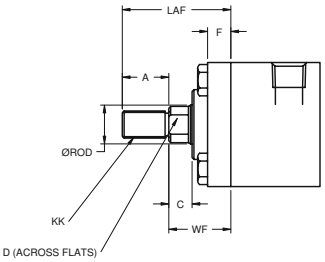
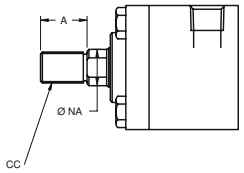
Standard and Optional Rod Ends

1-1/2” – 2-1/2” Bore

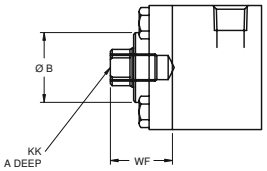
Style#1



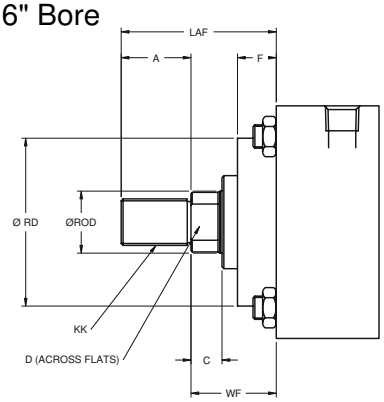
Style #2

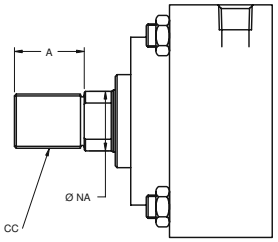


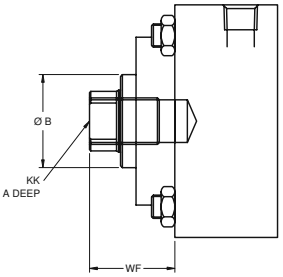
Style #3



3-1/4" – 6" Bore



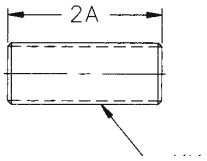




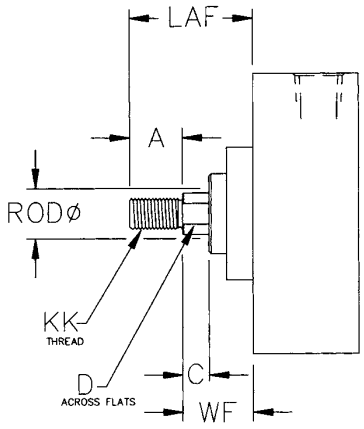
Bore	Rod	KK(1)	CC(2)	KK(3)	A	B	C	D	NA	LAF	WF	F
1-1/2	5/8	7/16-20	1/2-20	7/16-20	0 .750	1 .125	0 .375	0 .500	0 .585	1 .750	1 .000	0 .375
	1	3/4-16	7/8-14	3/4-16	1 .125	1 .400	0 .500	0 .813	0 .960	2 .500	1 .375	0 .375
2	5/8	7/16-20	1/2-20	7/16-20	0 .750	1 .125	0 .375	0 .500	0 .585	1 .750	1 .000	0 .375
	1	3/4-16	7/8-14	3/4-16	1 .125	1 .500	0 .500	0 .813	0 .960	2 .500	1 .375	0 .375
2-1/2	5/8	7/16-20	1/2-20	7/16-20	0 .750	1 .125	0 .375	0 .500	0 .585	1 .750	1 .000	0 .375
	1	3/4-16	7/8-14	3/4-16	1 .125	1 .500	0 .500	0 .813	0 .960	2 .500	1 .375	0 .375
3-1/4	1	3/4-16	7/8-14	3/4-16	1 .125	1 .500	0 .500	0 .813	0 .960	2 .500	1 .375	0 .625
	1-3/8	1-14	1 1/4-12	1-14	1 .625	2 .000	0 .625	1 .125	1 .313	3 .250	1 .625	0 .625
4	1	3/4-16	7/8-14	3/4-16	1 .125	1 .500	0 .500	0 .813	0 .960	2 .500	1 .375	0 .625
	1-3/8	1-14	1 1/4-12	1-14	1 .625	2 .000	0 .625	1 .125	0 .131	3 .250	1 .625	0 .625
5	1	3/4-16	7/8-14	3/4-16	1 .125	1 .500	0 .500	0 .813	0 .960	2 .500	1 .375	0 .625
	1-3/8	1-14	1 1/4-12	1-14	1 .625	2 .000	0 .625	1 .125	1 .313	3 .250	1 .625	0 .625
6	1-3/8	1-14	1 1/4-12	1-14	1 .625	2 .000	0 .625	1 .125	1 .313	3 .250	1 .625	0 .750
	1-3/4	1 1/4-12	1 1/2-12	1 1/4-12	2 .000	2 .375	0 .750	1 .500	1 .688	3 .875	1 .875	0 .750

Rod Stud

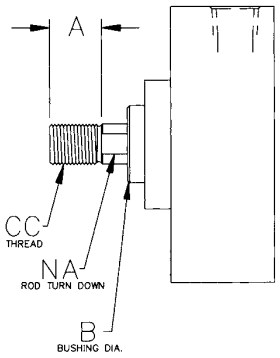
Part number	Thread	Length
B500-K01	7/16-20	1.500
B500-P01	3/4-16	2.250
B500-T01	1-14	3.250
B500-W01	1 1/4-12	4.000



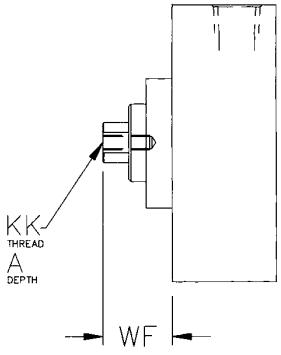
Standard and Optional Rod Ends



Style #1 (Standard Male)



Style #2 (Optional Male)

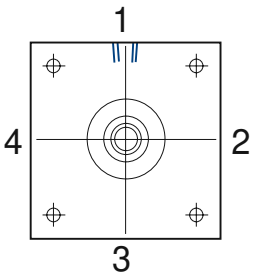


Style #3 (Optional Female)

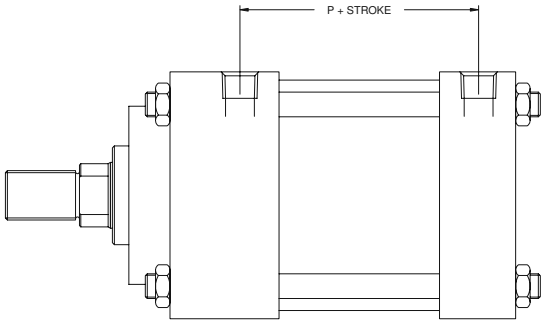
Dimensions

BORE	ROD*	KK(1)	CC(2)	KK(3)	A	B	C	D	NA	LAF	WF
8"	1 .375	1-14	1 1/4-12	1-14	1 .625	2 .000	0 .630	1 .130	1 .310	3 .250	1 .630
	1 .750	1 1/4-12	1 1/2-12	1 1/4-12	2 .000	2 .380	0 .750	1 .500	1 .690	3 .880	1 .880

Port Size Availablility



Cylinder Port Orientation

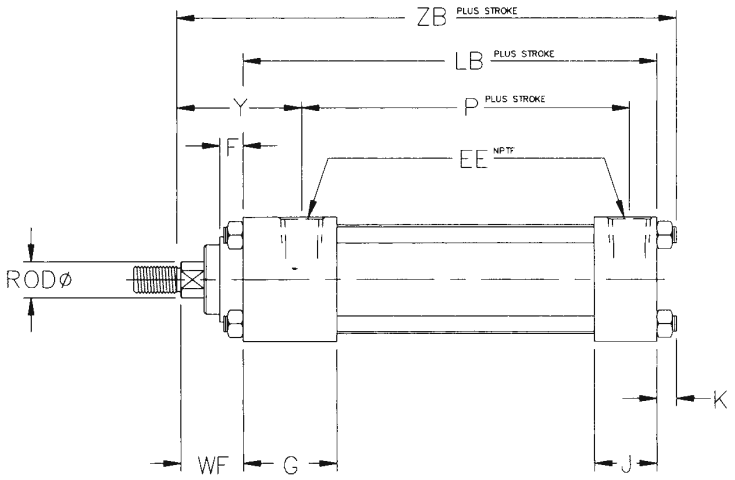


The above drawing represents port location # 1 (standard).
Note: Non-standard port size and port locations require a price adder.

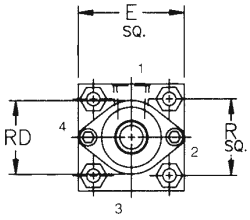
Note: Larger port sizes per given bore may require slight changes in the “P” dimension.

BORE	ROD	1/8 NPTF	1/4 NPTF	3/8 NPTF	1/2 NPTF	3/4 NPTF	1 NPTF
1-1/2	5/8	X	X	X	N/A	N/A	N/A
	1	X	X	N/A	N/A	N/A	N/A
2	5/8	X	X	X	X	N/A	N/A
	1	X	X	X	N/A	N/A	N/A
2-1/2	5/8	X	X	X	X	N/A	N/A
	1	X	X	X	X	N/A	N/A
3-1/4	1	X	X	X	X	X	N/A
	1-3/8	X	X	X	X	X	N/A
4	1	X	X	X	X	X	N/A
	1-3/8	X	X	X	X	X	N/A
5	1	X	X	X	X	X	N/A
	1-3/8	X	X	X	X	X	N/A
6	1-3/8	X	X	X	X	X	X
	1-3/4	X	X	X	X	X	X

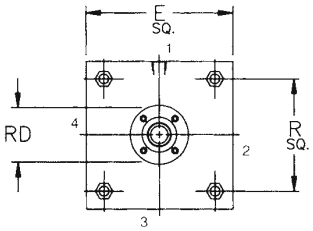
Basic No Mount Cylinder



Mount Code X0 NFPA MX0



1-1/2" Through 2-1/2"

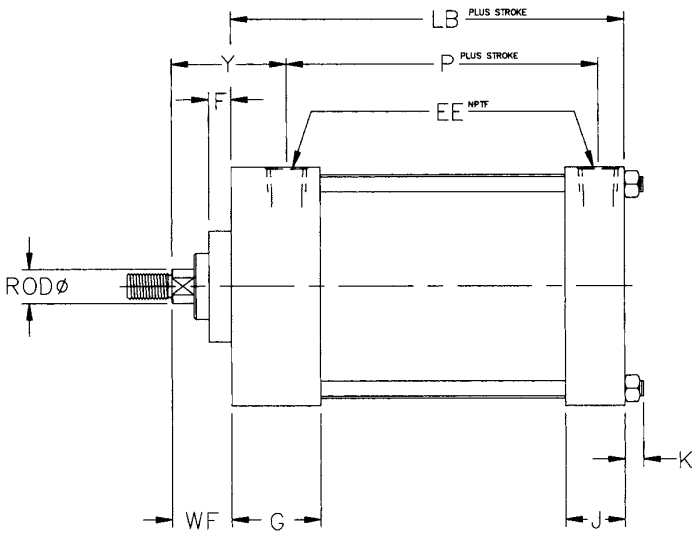


3-1/4" Through 6"

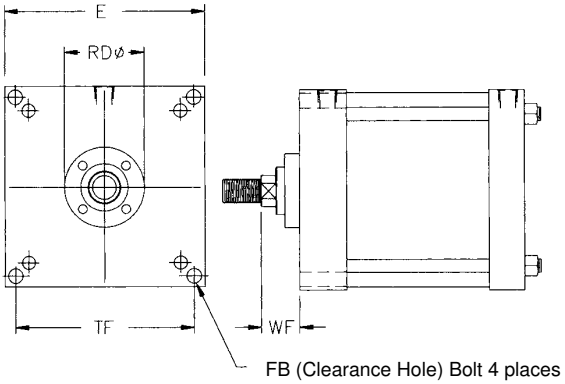
Dimensions

BORE	ROD	E	EE	F	G	J	K	LB	P	R	RD	WF	Y	ZB
1-1/2"	0.625	2.000	0.375	0.375	1.500	1.000	0.250	3.625	2.250	1.430	1.375	1.000	1.938	4.875
	1.000	2.000	0.250	0.375	1.500	1.000	0.250	3.625	2.103	1.430	2.000*	1.375	2.460	5.250
2"	0.625	2.500	0.375	0.375	1.500	1.000	0.313	3.625	2.250	1.840	1.375	1.000	1.938	4.938
	1.000	2.500	0.375	0.375	1.500	1.000	0.313	3.625	2.250	1.840	2.500*	1.375	2.313	5.313
2-1/2"	0.625	3.000	0.375	0.375	1.500	1.000	0.313	3.750	2.375	2.190	1.375	1.000	1.938	5.062
	1.000	3.000	0.375	0.375	1.500	1.000	0.313	3.750	2.375	2.190	3.000*	1.375	2.313	5.438
3-1/4"	1.000	3.750	0.500	0.625	1.750	1.250	0.375	4.250	2.625	2.760	2.706	1.375	2.438	6.000
	1.375	3.750	0.500	0.625	1.750	1.250	0.375	4.250	2.625	2.760	3.125	1.625	2.688	6.250
4"	1.000	4.500	0.500	0.625	1.750	1.250	0.375	4.250	2.625	3.320	2.706	1.375	2.438	6.000
	1.375	4.500	0.500	0.625	1.750	1.250	0.375	4.250	2.625	3.320	3.125	1.625	2.688	6.250

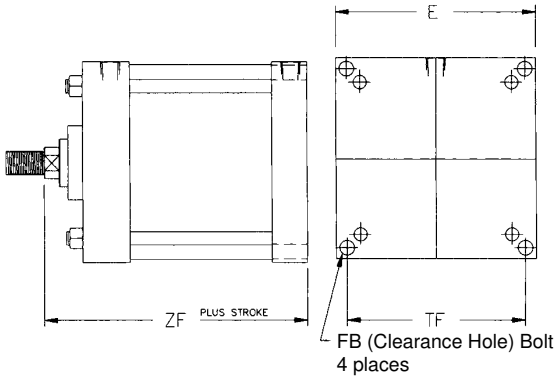
Basic No Mount Cylinder



Mount Code X0 NFPA MX0



Mount Code E3 NFPA ME3

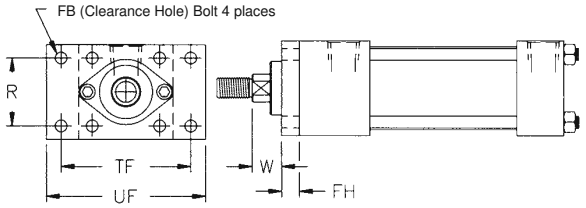


Mount Code E4 NFPA ME4

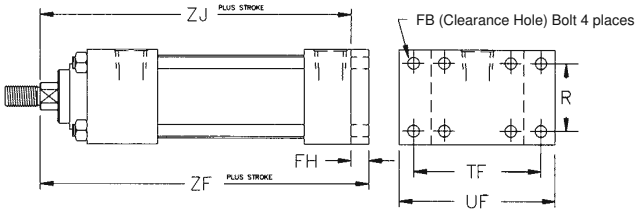
Dimensions

BORE	ROD	E	EE	F	FB	G	J	K	LB	P	RD	TF	WF	Y	ZF
8"	1 .375	8 .500	0 .750	0 .630	0 .630	2 .000	1 .500	0 .630	5 .125	3 .250	3 .130	7 .580	1 .630	2 .810	6 .750
	1 .750	8 .500	0 .750	0 .750	0 .630	2 .000	1 .500	0 .630	5 .125	3 .250	3 .790	7 .580	1 .880	3 .060	7 .000

Flange Mounts



Mount Code F1 NFPA MF1



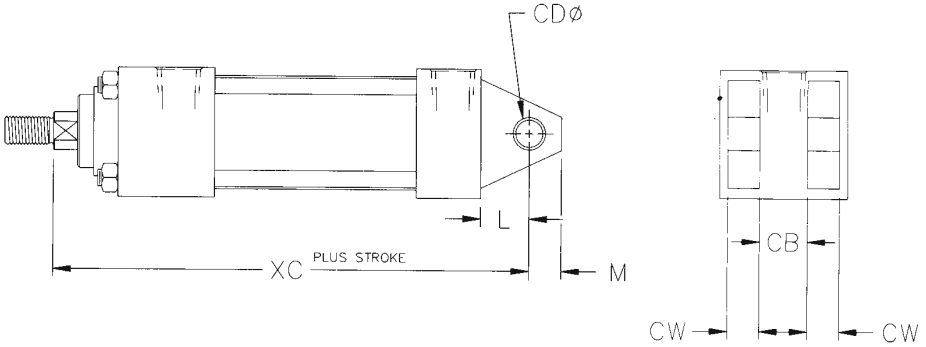
Mount Code F2 NFPA MF2

NOTE: This drawing represents 1-1/2” through 2-1/2” bore rod bushing retainer configuration.

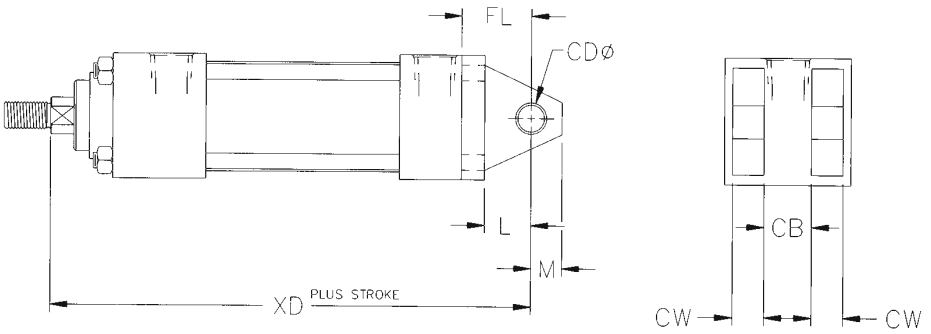
Dimensions

BORE	ROD	FB	FH	R	TF	UF	W	ZJ	ZF
1-1/2"	0 .625	0 .250	0 .375	1 .430	2 .750	3 .375	0 .625	4 .625	5 .000
	1 .000	0 .250	0 .375	1 .430	2 .750	3 .375	1 .000	5 .000	5 .375
2"	0 .625	0 .313	0 .375	1 .840	3 .375	4 .125	0 .625	4 .625	5 .000
	1 .000	0 .313	0 .375	1 .840	3 .375	4 .125	1 .000	5 .000	5 .375
2-1/2"	0 .625	0 .313	0 .375	2 .190	3 .875	4 .625	0 .625	4 .750	5 .125
	1 .000	0 .313	0 .375	2 .190	3 .875	4 .625	1 .000	5 .125	5 .500
3-1/4"	1 .000	0 .375	0 .625	2 .760	4 .688	5 .500	0 .750	5 .625	6 .250
	1 .375	0 .375	0 .625	2 .760	4 .688	5 .500	1 .000	5 .875	6 .500
4"	1 .000	0 .375	0 .625	3 .320	5 .438	6 .250	0 .750	5 .625	6 .250
	1 .375	0 .375	0 .625	3 .320	5 .438	6 .250	1 .000	5 .875	6 .500
5"	1 .000	0 .500	0 .625	4 .100	6 .625	7 .625	0 .750	5 .875	6 .500
	1 .375	0 .500	0 .625	4 .100	6 .625	7 .625	1 .000	6 .125	6 .750
	1 .375	0 .500	0 .750	4 .880	7 .625	8 .625	0 .875	6 .625	7 .375

Clevis Mounts



Mount Code P1 NFPA MP1

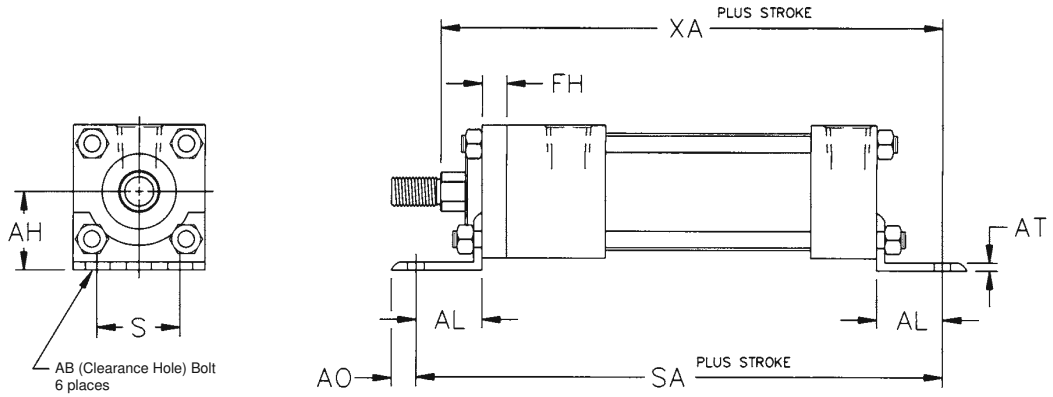


Mount Code P2 NFPA MP2

Dimensions

BORE	ROD	CB	CD	CW	FL	L	M	XC	XD
1-1/2"	0.625	0.750	0.500	0.500	1.125	0.750	0.500	5.375	5.750
	1.000	0.750	0.500	0.500	1.125	0.750	0.500	5.750	6.125
2"	0.625	0.750	0.500	0.500	1.125	0.750	0.500	5.375	5.750
	1.000	0.750	0.500	0.500	1.125	0.750	0.500	5.750	6.125
2-1/2"	0.625	0.750	0.500	0.500	1.125	0.750	0.500	5.500	5.875
	1.000	0.750	0.500	0.500	1.125	0.750	0.500	5.875	6.250
3-1/4"	1.000	1.250	0.750	0.625	1.875	1.250	0.750	6.875	7.500
	1.375	1.250	0.750	0.625	1.875	1.250	0.750	7.125	7.750
4"	1.000	1.250	0.750	0.625	1.875	1.250	0.750	6.875	7.500
	1.375	1.250	0.750	0.625	1.875	1.250	0.750	7.125	7.750
	1.000	1.250	0.750	0.625	1.875	1.250	0.750	7.125	7.750

Angle Mount

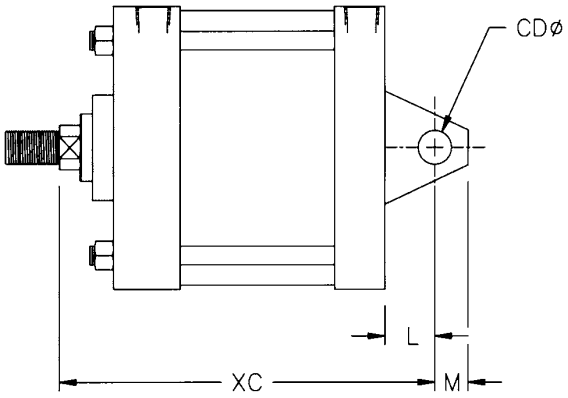


Mount Code S1 NFPA MS1

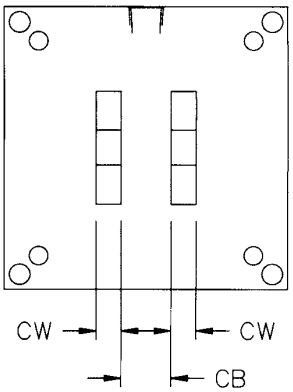
Dimensions

BORE	ROD	AB	AH	AL	AO	AT	FH	S	SA	XA
1-1/2"	0 .625	0 .375	1 .188	1 .000	0 .375	0 .125	0 .375	1 .250	6 .000	5 .625
	1 .000	0 .375	1 .188	1 .000	0 .375	0 .125	0 .375	1 .250	6 .000	6 .000
2"	0 .625	0 .375	1 .438	1 .000	0 .375	0 .125	0 .375	1 .750	6 .000	5 .625
	1 .000	0 .375	1 .438	1 .000	0 .375	0 .125	0 .375	1 .750	6 .000	6 .000
2-1/2"	0 .625	0 .375	1 .625	1 .000	0 .375	0 .125	0 .375	2 .250	6 .125	5 .750
	1 .000	0 .375	1 .625	1 .000	0 .375	0 .125	0 .375	2 .250	6 .125	6 .125
3-1/4"	1 .000	0 .500	1 .938	1 .250	0 .500	0 .125	0 .625	2 .750	7 .375	6 .875
	1 .375	0 .500	1 .938	1 .250	0 .500	0 .125	0 .625	2 .750	7 .375	7 .125
4"	1 .000	0 .500	2 .250	1 .250	0 .500	0 .125	0 .625	3 .500	7 .375	6 .875
	1 .375	0 .500	2 .250	1 .250	0 .500	0 .125	0 .625	3 .500	7 .375	7 .125
5"	1 .000	0 .625	2 .750	1 .375	0 .625	0 .188	0 .625	4 .250	7 .875	7 .250
	1 .375	0 .625	2 .750	1 .375	0 .625	0 .188	0 .625	4 .250	7 .875	7 .500
6"	1 .375	0 .750	3 .250	1 .375	0 .625	0 .188	0 .750	5 .250	8 .500	8 .000
	1 .750	0 .750	3 .250	1 .375	0 .625	0 .188	0 .750	5 .250	8 .500	8 .250

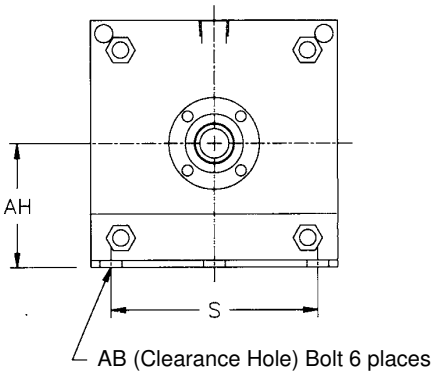
Clevis and Angle Mount



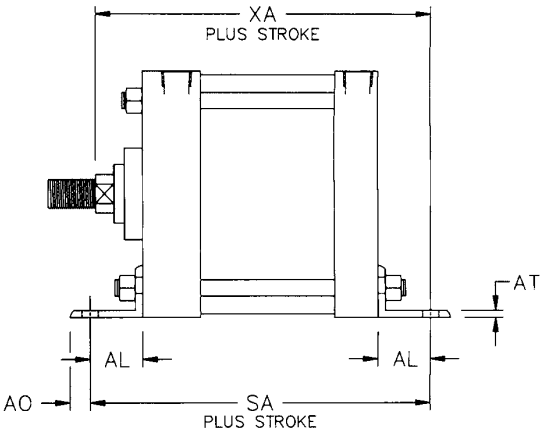
Mount Code P1



NFPA MP1



Mount Code S1

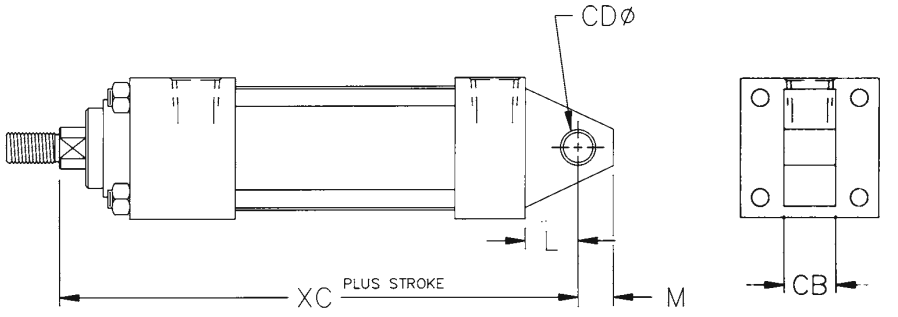


NFPA MS1

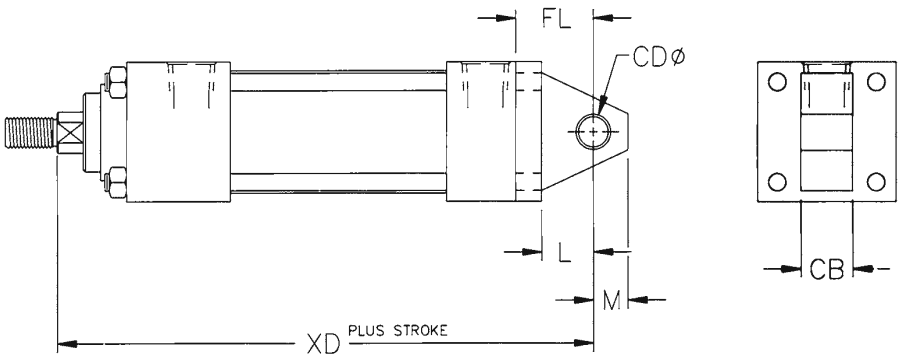
Dimensions

BORE	ROD	AB	AH	AL	AO	AT	CB	CD	CW	L	M	S	SA	XA	XC
8"	1.375	0.750	4.250	1.810	0.690	0.250	1.500	1.000	0.750	1.500	1.000	7.130	8.750	8.560	8.250
	1.750	0.750	4.250	1.810	0.690	0.250	1.500	1.000	0.750	1.500	1.000	7.130	8.750	8.810	8.500

Eye Mounts



Mount Code P3 NFPA MP3

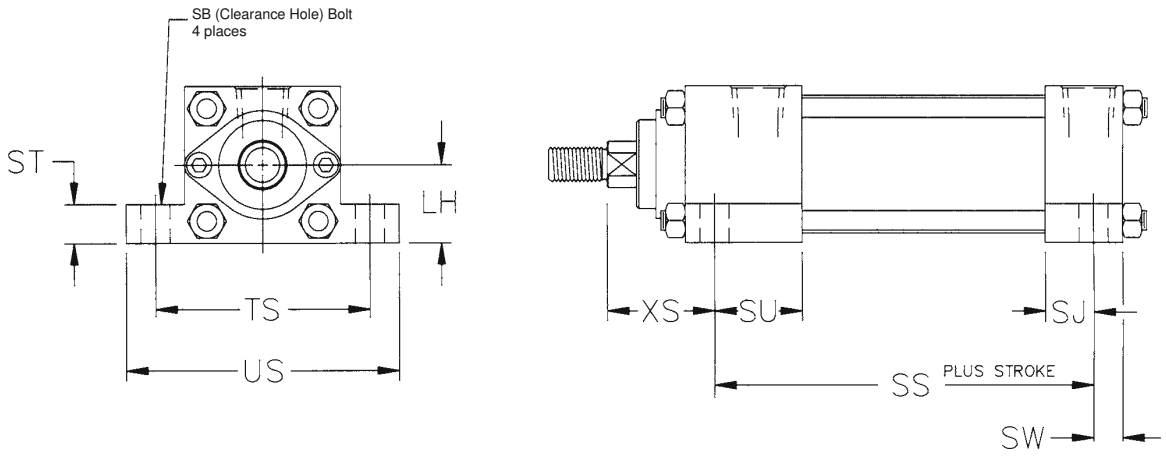


Mount Code P4 NFPA MP4

Dimensions

BORE	ROD	CB	CD	FL	L	M	XC	XD
1-1/2"	0 .625	0 .750	0 .500	1 .125	0 .750	0 .500	5 .375	5 .750
	1 .000	0 .750	0 .500	1 .125	0 .750	0 .500	5 .750	6 .125
2"	0 .625	0 .750	0 .500	1 .125	0 .750	0 .500	5 .375	5 .750
	1 .000	0 .750	0 .500	1 .125	0 .750	0 .500	5 .750	6 .125
2-1/2"	0 .625	0 .750	0 .500	1 .125	0 .750	0 .500	5 .500	5 .875
	1 .000	0 .750	0 .500	1 .125	0 .750	0 .500	5 .875	6 .250
3-1/4"	1 .000	1 .250	0 .750	1 .875	1 .250	0 .750	6 .875	7 .500
	1 .375	1 .250	0 .750	1 .875	1 .250	0 .750	7 .125	7 .750
4"	1 .000	1 .250	0 .750	1 .875	1 .250	0 .750	6 .875	7 .500
	1 .375	1 .250	0 .750	1 .875	1 .250	0 .750	7 .125	7 .750
5	1 .000	1 .250	0 .750	1 .875	1 .250	0 .750	7 .125	7 .750

Side Lug Mount

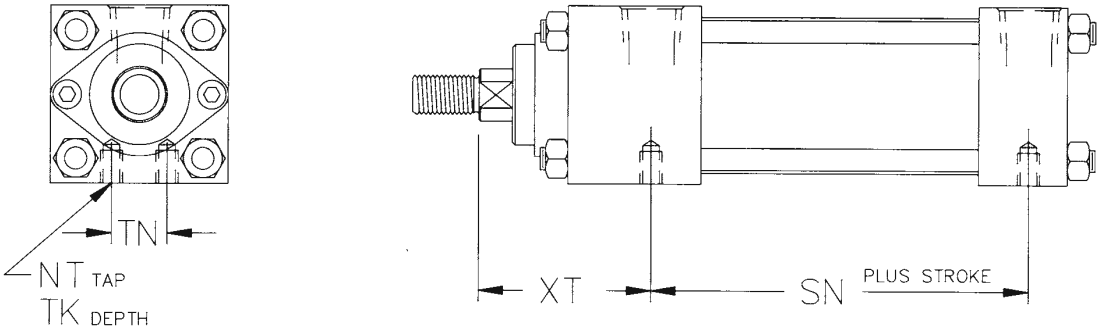


Mount Code S2 NFPA MS2

Dimensions

BORE	ROD	LH	SB	SJ	SS	ST	SU	SW	TS	US	XS
1-1/2"	0 .625	1 .000	0 .375	0 .625	2 .875	0 .500	1 .125	0 .375	2 .750	3 .500	1 .375
	1 .000	1 .000	0 .375	0 .625	2 .875	0 .500	1 .125	0 .375	2 .750	3 .500	1 .750
2"	0 .625	1 .250	0 .375	0 .625	2 .875	0 .500	1 .125	0 .375	3 .250	4 .000	1 .375
	1 .000	1 .250	0 .375	0 .625	2 .875	0 .500	1 .125	0 .375	3 .250	4 .000	1 .750
2-1/2"	0 .625	1 .500	0 .375	0 .625	3 .000	0 .500	1 .125	0 .375	3 .750	4 .500	1 .375
	1 .000	1 .500	0 .375	0 .625	3 .000	0 .500	1 .125	0 .375	3 .750	4 .500	1 .750
3-1/4"	1 .000	1 .875	0 .500	0 .750	3 .250	0 .750	1 .250	0 .500	4 .750	5 .750	1 .875
	1 .375	1 .875	0 .500	0 .750	3 .250	0 .750	1 .250	0 .500	4 .750	5 .750	2 .125
4"	1 .000	2 .250	0 .500	0 .750	3 .250	0 .750	1 .250	0 .500	5 .500	6 .500	1 .875
	1 .375	2 .250	0 .500	0 .750	3 .250	0 .750	1 .250	0 .500	5 .500	6 .500	2 .125
5"	1 .000	2 .750	0 .750	0 .563	3 .125	1 .000	1 .063	0 .688	6 .875	8 .250	2 .063
	1 .375	2 .750	0 .750	0 .563	3 .125	1 .000	1 .063	0 .688	6 .875	8 .250	2 .313
6"	1 .375	3 .250	0 .750	0 .813	3 .625	1 .000	1 .313	0 .688	7 .875	9 .250	2 .313
	1 .750	3 .250	0 .750	0 .813	3 .625	1 .000	1 .313	0 .688	7 .875	9 .250	2 .563

Bottom Tap Mount

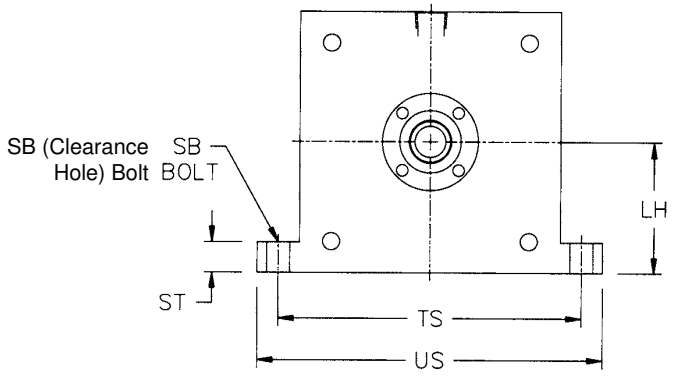


Mount Code S4 NFPA MS4

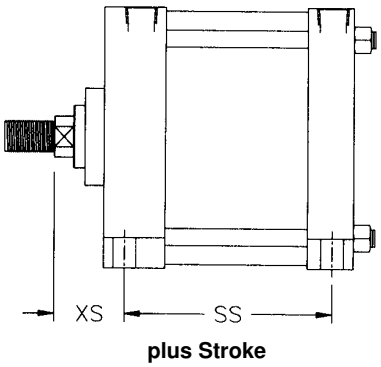
Dimensions

BORE	ROD	NT	TK	TN	SN	XT
1-1/2"	0 .625	1/4-20	0 .375	0 .625	2 .250	1 .938
	1 .000	1/4-20	0 .313	0 .625	2 .250	2 .313
2"	0 .625	5/16-18	0 .500	0 .875	2 .250	1 .938
	1 .000	5/16-18	0 .500	0 .875	2 .250	2 .313
2-1/2"	0 .625	3/8-16	0 .625	1 .250	2 .375	1 .938
	1 .000	3/8-16	0 .625	1 .250	2 .375	2 .313
3-1/4"	1 .000	1/2-13	0 .750	1 .500	2 .625	2 .438
	1 .375	1/2-13	0 .750	1 .500	2 .625	2 .688
4"	1 .000	1/2-13	0 .750	2 .063	2 .625	2 .438
	1 .375	1/2-13	0 .750	2 .063	2 .625	2 .688
5"	1 .000	5/8-11	1 .000	2 .688	2 .875	2 .438
	1 .375	5/8-11	1 .000	2 .688	2 .875	2 .688
6"	1 .375	3/4-10	1 .125	3 .250	3 .125	2 .813
	1 .750	3/4-10	1 .125	3 .250	3 .125	3 .063

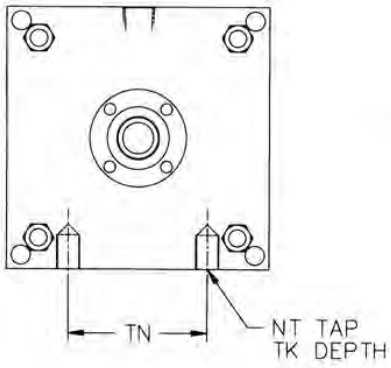
Side Lug and Bottom Tap Mount



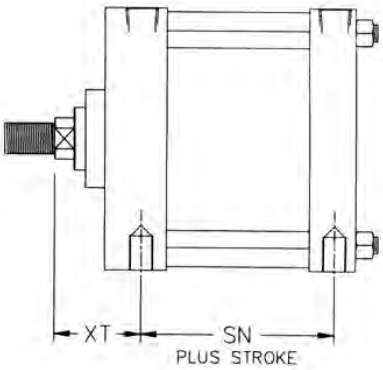
Mount Code S2



NFPA MS2



Mount Code S4

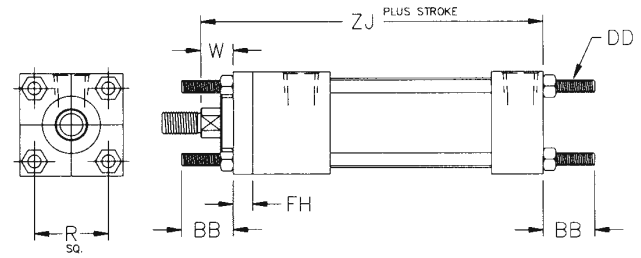


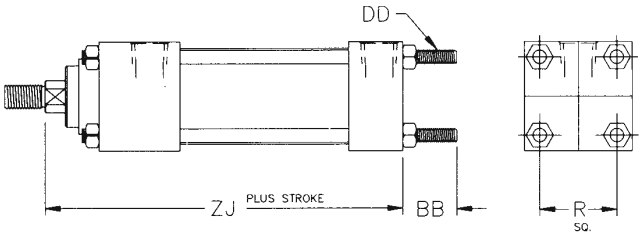
NFPA MS4

Dimensions

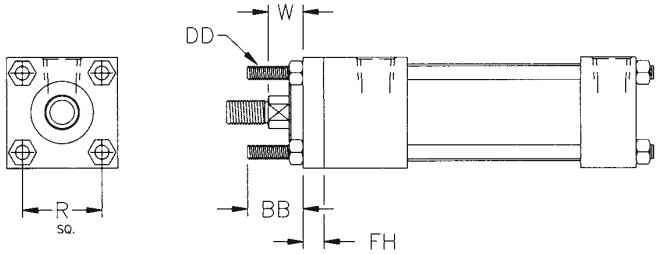
BORE	ROD	LH	NT	SB	SN	SS	ST	TK	TN	TS	US	XS	XT
8"	1.375	4.250	3/4-10	0.750	3.250	3.750	1.000	1.130	4.500	9.880	11.250	2.310	2.810
	1.750	4.250	3/4-10	0.750	3.250	3.750	1.000	1.130	4.500	9.880	11.250	2.560	3.060

Extended Tie Rod Mounts





Mount Code X2 NFPA MX2

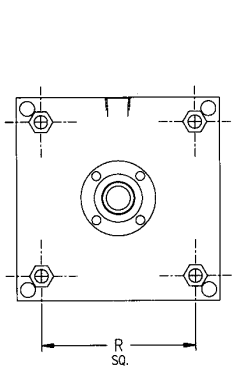


Mount Code X3 NFPA MX3

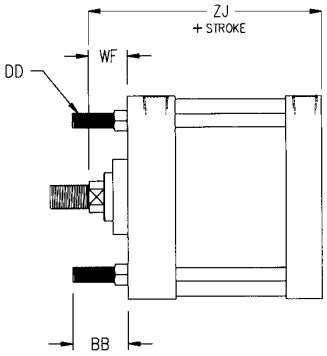
Dimensions

BORE	ROD	BB	DD	FH	R	W	ZJ
1-1/2"	0 .625	1 .000	1/4-28	0 .375	1 .430	0 .625	4 .625
	1 .000	1 .000	1/4-28	0 .375	1 .430	1 .000	5 .000
2"	0 .625	1 .125	5/16-24	0 .375	1 .840	0 .625	4 .625
	1 .000	1 .125	5/16-24	0 .375	1 .840	1 .000	5 .000
2-1/2"	0 .625	1 .125	5/16-24	0 .375	2 .190	0 .625	4 .750
	1 .000	1 .125	5/16-24	0 .375	2 .190	1 .000	5 .125
3-1/4"	1 .000	1 .375	3/8-24	0 .625	2 .760	0 .750	5 .625
	1 .375	1 .375	3/8-24	0 .625	2 .760	1 .000	5 .875
4"	1 .000	1 .375	3/8-24	0 .625	3 .320	0 .750	5 .625
	1 .375	1 .375	3/8-24	0 .625	3 .320	1 .000	5 .875

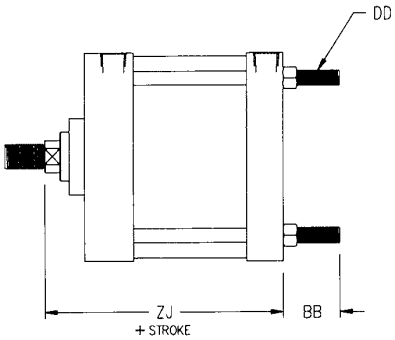
Extended Tie Rod Mounts



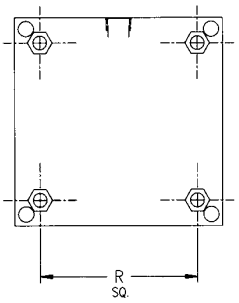
Mount Code X3



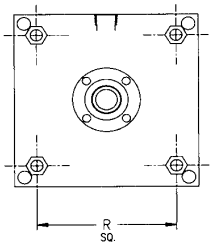
NFPA MX3



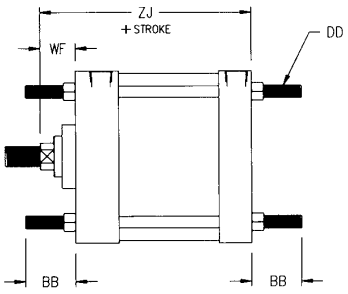
Mount Code X2



NFPA MX2



Mount Code X1



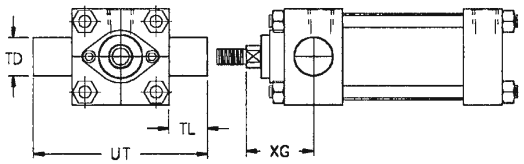
NFPA MX1

Dimensions

BORE	ROD	BB	DD	R	WF	ZJ

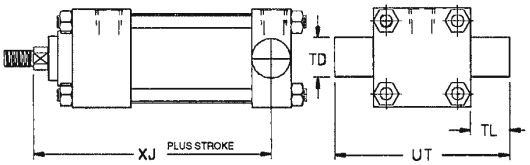
Trunnion Mounts

NFPA MT1



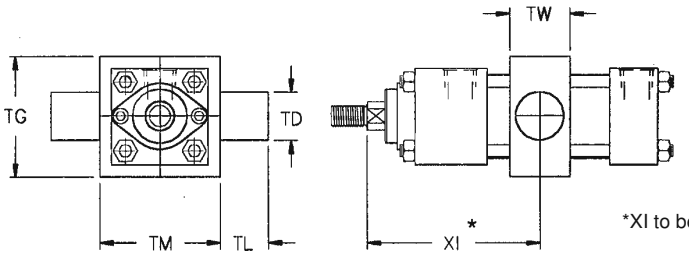
Mount Code T6 (Removable Aluminum Trunnion Ears)

NFPA MT2



Mount Code T7 (Removable Aluminum Trunnion Ears)

NFPA MT4



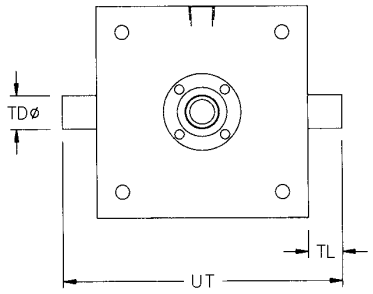
*XI to be specified by customer

Mount Code T8 (Removable Trunnion Ears)

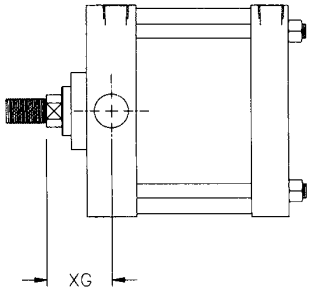
Dimensions

BORE	ROD	TD	TG	TL	TM	TW	UT	XG	XI (Min .)	XJ
1-1/2"	0 .625	1 .000	2 .500	1 .000	2 .500	1 .250	4 .000	1 .750	3 .125	4 .125
	1 .000	1 .000	2 .500	1 .000	2 .500	1 .250	4 .000	2 .125	3 .500	4 .500
2"	0 .625	1 .000	3 .000	1 .000	3 .000	1 .500	4 .500	1 .750	3 .250	4 .125
	1 .000	1 .000	3 .000	1 .000	3 .000	1 .500	4 .500	2 .125	3 .625	4 .500
2-1/2"	0 .625	1 .000	3 .500	1 .000	3 .500	1 .500	5 .000	1 .750	3 .250	4 .250
	1 .000	1 .000	3 .500	1 .000	3 .500	1 .500	5 .000	2 .125	3 .625	4 .625
3-1/4"	1 .000	1 .000	4 .250	1 .000	4 .500	2 .000	5 .750	2 .250	4 .125	5 .000
	1 .375	1 .000	4 .250	1 .000	4 .500	2 .000	5 .750	2 .500	4 .375	5 .250
4"	1 .000	1 .000	5 .000	1 .000	5 .250	2 .000	6 .500	2 .250	4 .125	5 .000
	1 .375	1 .000	5 .000	1 .000	5 .250	2 .000	6 .500	2 .500	4 .375	5 .250
	1 .000	1 .000	6 .000	1 .000	6 .250	2 .000	7 .500	2 .250	4 .125	5 .250

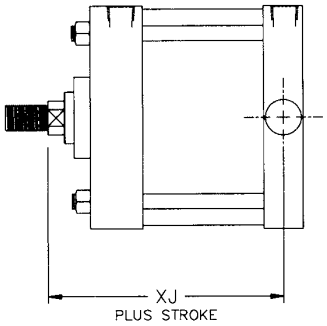
Trunnion Mounts



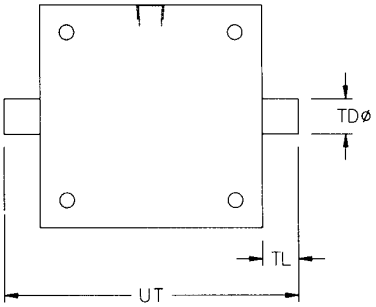
Mount Code T1



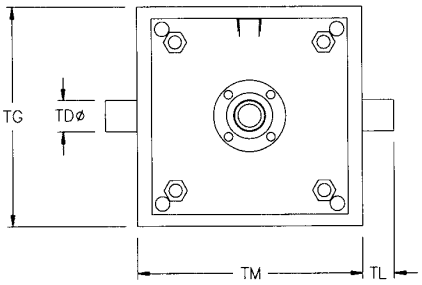
NFPA MT1



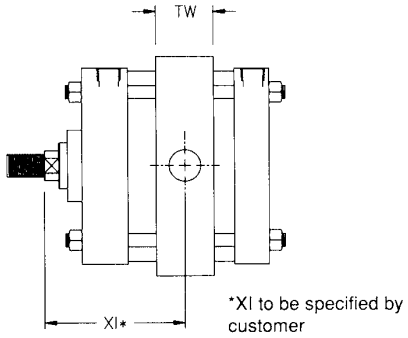
Mount Code T2



NFPA MT2



Mount Code T4



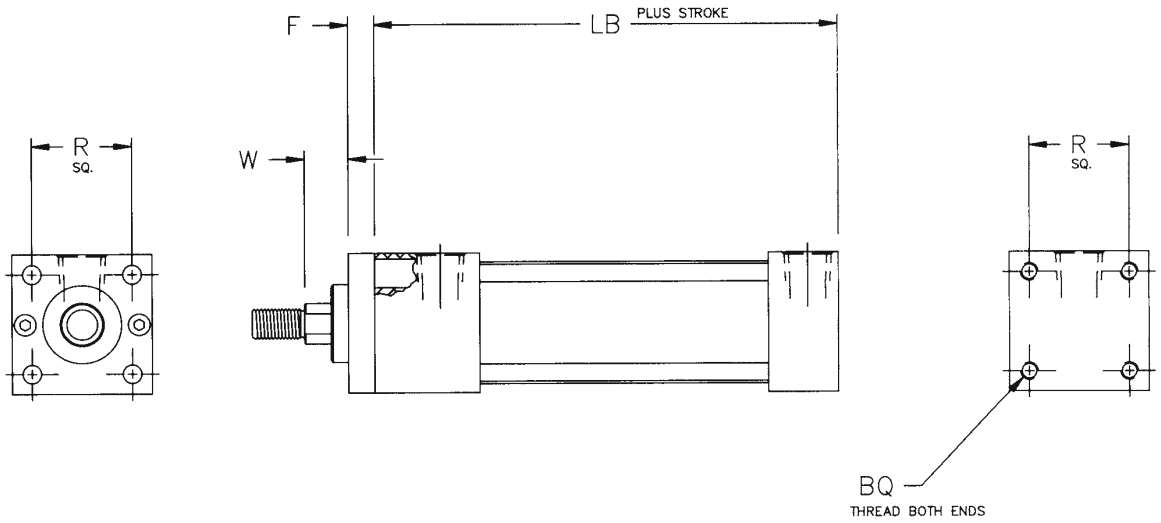
NFPA MT4

NOTE: All Large Bore N Series trunnion mounts are one piece machined steel.

Dimensions

BORE	ROD	TD	TG	TL	TM	TW	UT	XG	XI (MIN .)	XJ
	1 .375	1 .375	9 .500	1 .380	9 .750	2 .500	11 .250	2 .630	4 .880	6 .000

Sleeve Nut Mount

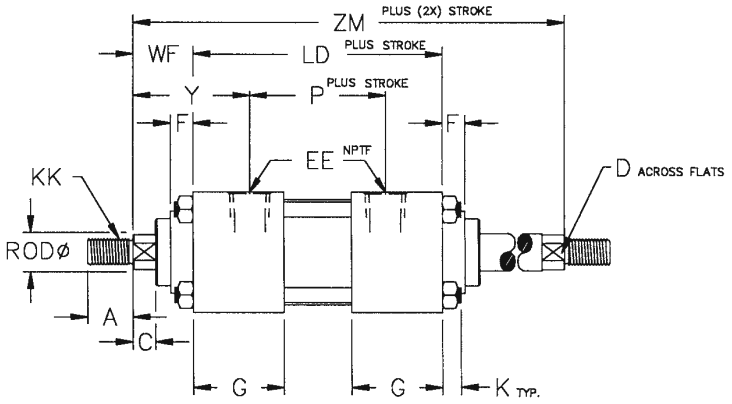


Mount Code SN

Dimensions

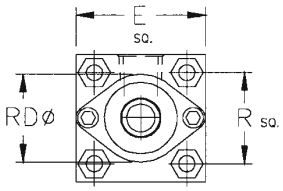
BORE	ROD	BQ	F	LB	R	W
1-1/2"	0 .625	1/4-28	0 .375	3 .625	1 .430	0 .625
	1 .000	1/4-28	0 .375	3 .625	1 .430	1 .000
2"	0 .625	5/16-24	0 .375	3 .625	1 .840	0 .625
	1 .000	5/16-24	0 .375	3 .625	1 .840	1 .000
2-1/2"	0 .625	5/16-24	0 .375	3 .750	2 .190	0 .750
	1 .000	5/16-24	0 .375	3 .750	2 .190	1 .000
3-1/4"	1 .000	3/8-24	0 .625	4 .250	2 .760	0 .750
	1 .375	3/8-24	0 .625	4 .250	2 .760	1 .000
4"	1 .000	3/8-24	0 .625	4 .250	3 .320	0 .750
	1 .375	3/8-24	0 .625	4 .250	3 .320	1 .000
5"	1 .000	1/2-20	0 .625	4 .500	4 .100	0 .750
	1 .375	1/2-20	0 .625	4 .500	4 .100	1 .000
6"	1 .375	1/2-20	0 .625	5 .000	4 .880	0 .875
	1 .750	1/2-20	0 .750	5 .000	4 .880	1 .125

Double Rod End

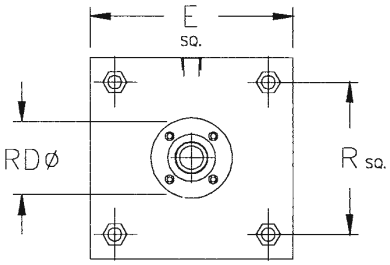


NFPA MDXO

Order as “ND” Series Cylinder



1 1/2” Through 2 1/2”

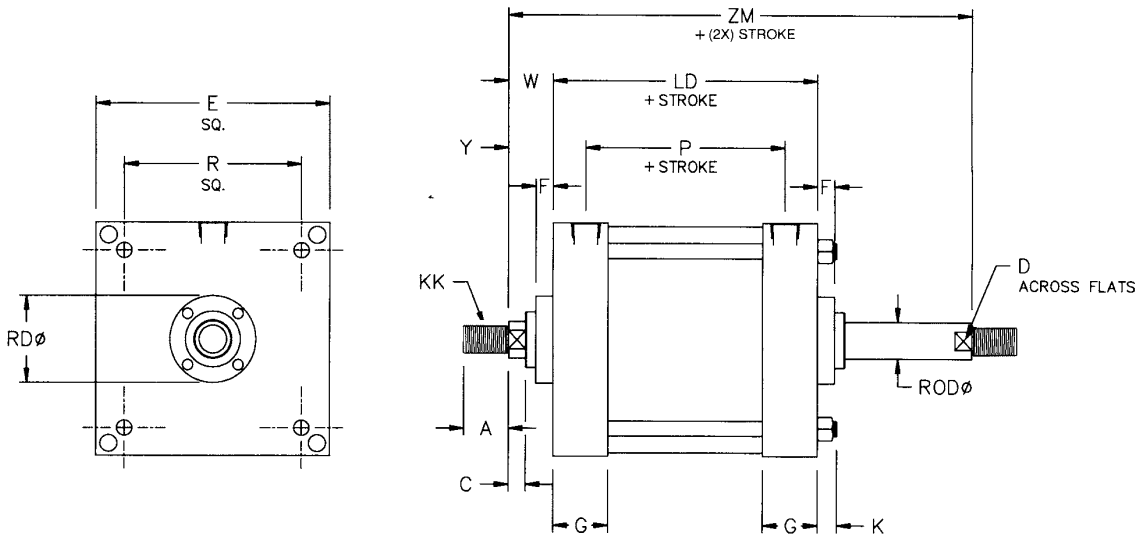


3 1/4” Through 6”

Dimensions

BORE	ROD	A	C	D	E	EE	F	G	K	KK	LD	P	R	SN	SS	RD	WF	Y	ZM
1-1/2"	0.625	0.750	0.375	0.500	2.000	0.375	0.375	1.500	0.250	7/16-20	4.125	2.250	1.430	2.250	3.375	1.375	1.000	1.938	6.125
	1.000	1.125	0.500	0.813	2.000	0.250	0.375	1.500	0.250	3/4-16	4.125	1.955	1.430	2.250	3.375	2.000	1.375	2.460	6.875
2"	0.625	0.750	0.375	0.500	2.500	0.375	0.375	1.500	0.313	7/16-20	4.125	2.250	1.840	2.250	3.375	1.375	1.000	1.938	6.125
	1.000	1.125	0.500	0.813	2.500	0.375	0.375	1.500	0.313	3/4-16	4.125	2.250	1.840	2.250	3.375	2.500	1.375	2.313	6.875
2-1/2"	0.625	0.750	0.375	0.500	3.000	0.375	0.375	1.500	0.313	7/16-20	4.250	2.375	2.190	2.375	3.500	1.375	1.000	1.938	6.250
	1.000	1.125	0.500	0.813	3.000	0.375	0.375	1.500	0.313	3/4-16	4.250	2.375	2.190	2.375	3.500	3.000	1.375	2.313	7.000
3-1/4"	1.000	1.125	0.500	0.813	3.750	0.500	0.625	1.750	0.375	3/4-16	4.750	2.625	2.760	2.625	3.750	2.706	1.375	2.438	7.500
	1.375	1.625	0.625	1.125	3.750	0.500	0.625	1.750	0.375	1-14	4.750	2.625	2.760	2.625	3.750	3.125	1.625	2.688	8.000
4"	1.000	1.125	0.500	0.813	4.500	0.500	0.625	1.750	0.375	3/4-16	4.750	2.625	3.320	2.625	3.750	2.706	1.375	2.438	7.500
	1.375	1.625	0.625	1.125	4.500	0.500	0.625	1.750	0.375	1-14	4.750	2.625	3.320	2.625	3.750	3.125	1.625	2.688	8.000
	1.000	1.125	0.500	0.813	5.500	0.500	0.625	1.750	0.500	3/4-16	5.000	2.875	4.100	2.875	3.625	2.706	1.375	2.438	7.750

Double Rod End



Order as “ND” Series Cylinder NFPA MDX0

Dimensions

BORE	ROD	A	C	D	E	F	G	K	KK	LD	P	R	RD	W	Y	ZM
8"	1.375	1.630	0.630	1.130	8.500	0.63	2.000	0.630	1-14	5.630	3.250	6.440	3.130	1.630	2.810	8.880
	1.750	2.000	0.750	1.500	8.500	0.750	2.000	0.630	1 1/4-12	5.630	3.250	6.440	3.790	1.880	3.060	9.380

Force Tables

The **extend force** is determined from Table 1 based on the operating pressure and cylinder bore size . Then determine the Retract Force by subtracting the "Retract Force Deduction" from the Extend Force . The "Retract Force Deduction" is found in Table 2 below corresponding to the piston rod diameter and operating pressure . These forces are theoretical based on areas with no friction allowance .

Table 1 Force Chart Extend

BORE	PISTON AREA	PRESSURE											CUBIC FEET DISPLACEMENT PER INCH OF EXTENDED STROKE
		40	50	60	80	90	100	125	150	175	200	400	
1 .50	1 .77	71	88	106	141	159	177	221	265	309	353	707	.00102
2 .00	3 .14	126	157	188	251	283	314	393	471	550	628	1257	.00182
2 .50	4 .91	196	245	295	393	442	491	614	736	859	982	1963	.00284
3 .25	8 .30	332	415	498	664	747	830	1037	1244	1452	1659	3318	.00480
4 .00	12 .57	503	628	754	1005	1131	1257	1571	1885	2199	2513	5027	.00727
5 .00	19 .63	785	982	1178	1571	1767	1963	2454	2945	3436	3927	7854	.01136
6 .00	28 .27	1131	1414	1696	2262	2545	2827	3534	4241	4948	5655	11310	.01636

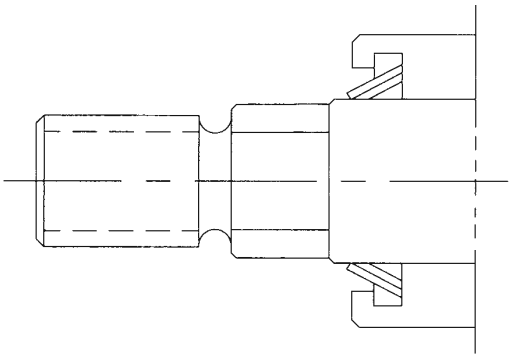
Table 2 Retract Force Deduction

ROD	ROD AREA	PRESSURE											CUBIC FEET DISPLACEMENT PER INCH OF STROKE
		40	50	60	80	90	100	125	150	175	200	400	
.625	.307	12	15	18	25	28	31	38	46	54	61	123	.00018
1 .000	.785	31	39	47	63	71	79	98	118	137	157	314	.00045
1 .375	1 .485	59	74	89	119	134	148	186	223	260	297	594	.00086
1 .750	2 .405	96	120	144	192	216	241	301	361	421	481	962	.00139

Approximate Cylinder Weights (lbs)

BORE	1 1/2"		2"		2 1/2"		3 1/4"		4"		5"		6"	
Piston Rod Diameter	5/8"	1"	5/8"	1"	5/8"	1"	1"	1 3/8"	1"	1 3/8"	1"	1 3/8"	1 3/8"	1 3/4"
X0, S4	2 .10	2 .80	2 .70	3 .40	3 .60	4 .30	7 .10	8 .40	9 .30	10 .80	13 .00	14 .00	22 .00	22 .50
F1, F2, S2	2 .70	3 .50	3 .70	4 .40	5 .00	5 .70	10 .30	12 .00	14 .00	15 .40	20 .00	21 .00	32 .00	34 .00
P2, P4	3 .20	4 .00	4 .10	5 .00	5 .50	6 .40	11 .50	13 .10	15 .50	16 .40	20 .10	21 .80	35 .00	36 .00
T1, T2	2 .60	3 .30	3 .10	3 .90	4 .00	4 .80	7 .50	8 .90	9 .90	11 .30	13 .70	15 .00	23 .00	25 .00
P1, P3, X1, X2, X3, S1	2 .30	3 .00	2 .80	3 .50	3 .70	4 .50	7 .50	9 .00	9 .90	11 .30	13 .30	15 .00	23 .00	25 .00
Per Inch of Stroke	0 .24	0 .40	0 .30	0 .40	0 .30	0 .44	0 .50	0 .70	0 .60	0 .80	0 .60	0 .80	0 .90	1 .14

Metallic Rod Scraper



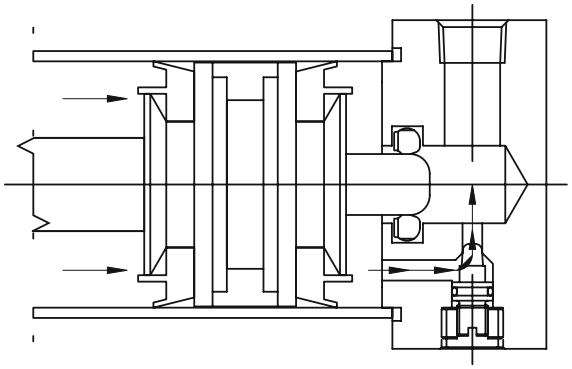
A rod scraper may be necessary when the cylinder must endure paint overspray, weld splatter or flyash.

Order as "MA" Option

Silencer Bumper Seal

Our "Silencer" design reduces the noise caused by the final impact of the piston against the cap. It also allows usage of standard pneumatic cushions in order to further reduce the amount of end of stroke noise and impact while still giving the deceleration benefits. When the cushion spear enters into the cushion seal, the cushioning effect takes place by trapping air and then metering it out at a rate set via the adjustable cushion needle.

NOTE: Silencer Bumper does not add length to the cylinder.



Techincal Data
"N" Series Bore Sizes: 1-1/2", 2", 2 1/2", 4" and 5"
Temperature: - 20°F to 200°F
Pressure Rating: 150 psi air

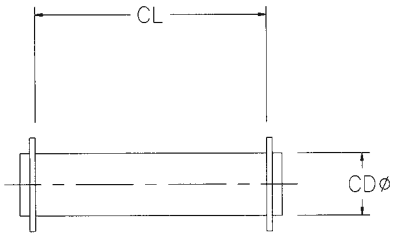
Static Stroke Length Reduction Based on PSI

BORE	0 PSI	20 PSI	40 PSI	60 PSI	80 PSI	100 PSI
1-1/2"	0 .106	0 .056	0 .028	0 .018	0 .000	0 .000
2"	0 .090	0 .070	0 .046	0 .037	0 .018	0 .000
2 1/2"	0 .201	0 .166	0 .122	0 .071	0 .008	0 .000
3 1/4"	0 .160	0 .102	0 .082	0 .048	0 .038	0 .000
4"	0 .150	0 .085	0 .065	0 .031	0 .005	0 .000
5"	0 .219	0 .158	00 .099	0 .530	0 .015	0 .000

Accessories

Accessories Guide

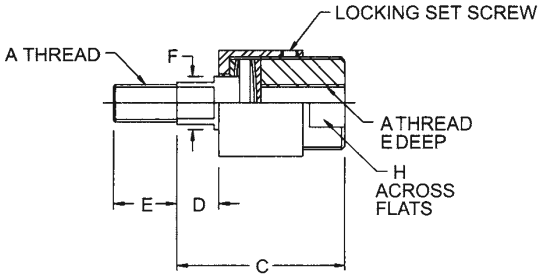
ROD THREAD	ROD CLEVIS	EYE BRACKET	PIVOT PIN	ROD EYE	CLEVIS BRACKET	BORE
7/16-20	BDC-05	BDEB-05	BDP-05G	BDE-05	BDCB-05	1 1/2, 2, 2 1/2
1/2-20	BDC-06	BDEB-05	BDP-05G	BDE-06	BDCB-05	1 1/2, 2, 2 1/2
3/4-16	BDC-07	BDEB-07	BDP-07G	BDE-07	BDCB-07	3 1/4, 4, 5
7/8-14	BDC-08	BDEB-07	BDP-10G	–	–	–
1-14	BDC-10	BDEB-10	BDP-10G	BDE-10	BDCB-10	6
1 1/4-12	BDC-13	BDEB-13	BDP-13G	BDE-13	–	–
1 1/2-12	BDC-17	BDEB-17	BDP-17G	BDE-17	–	–

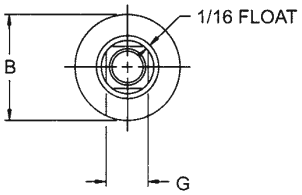


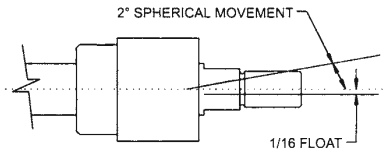
Pivot Pin

PART NO .	CD	CL
BDP-05G	0 .500	1 .875
BDP-07G	0 .750	2 .625
BDP-10G	1 .000	3 .125
BDP-13G	1 .375	4 .187
BDP-17G	1 .750	5 .188

Rod Couplers





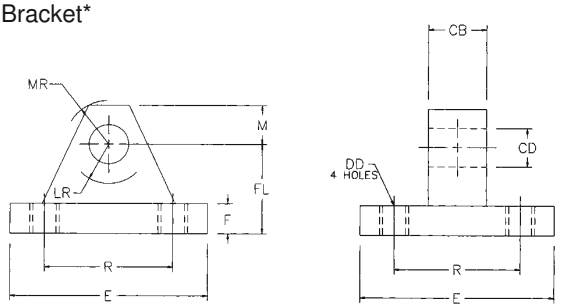


Standard Couplers

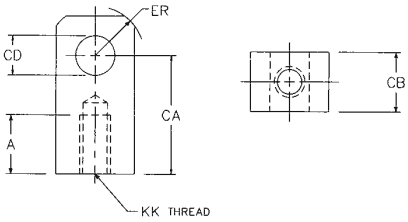
PART NUMBER STANDARD	A	B	C	D	E	F	G	H	MAXIMUM PULL LOAD
437F	7/16-20	1 1/4	2	1/2	3/4	5/8	1/2	1	2,535 lbs .
500F	1/2-20	1 1/4	2	1/2	3/4	5/8	1/2	1	3,500 lbs .
625F	5/8-18	1 1/4	2	1/2	3/4	5/8	1/2	1	4,750 lbs .
750F	3/4-16	1 3/4	2 5/16	1/2	1 1/8	31/32	13/16	1 1/2	8,750 lbs .
875F	7/8-14	1 3/4	2 5/16	1/2	1 1/8	31/32	13/16	1 1/2	9,750 lbs .
1000F	1-14	2 1/2	2 15/16	1/2	1 5/8	1 3/8	1 5/32	2 1/4	16,125 lbs .
1250F	1 1/4-12	2 1/ 2	2 15/16	1/2	1 5/8	1 3/8	1 5/32	2 1/4	19,600 lbs .

Accessories

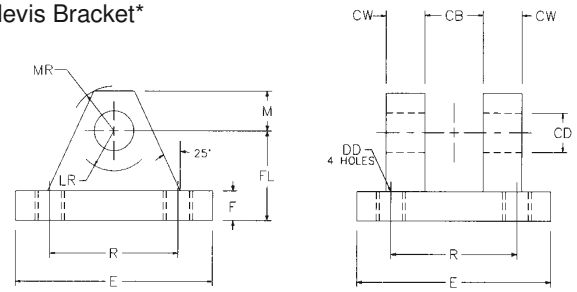
Eye Bracket*



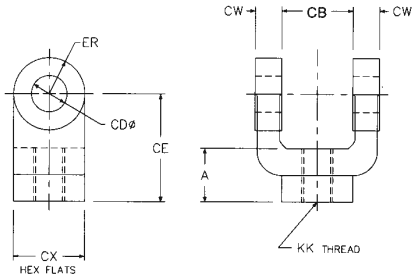
Rod Eye*



Clevis Bracket*



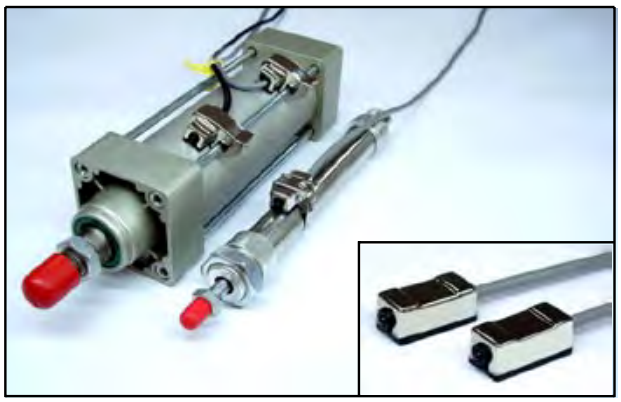
Rod Clevis*

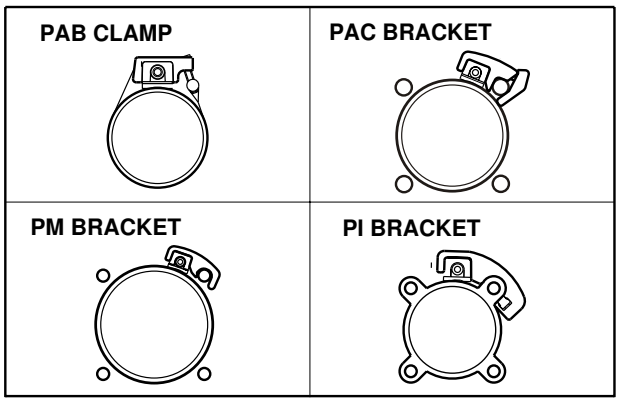


*Order pivot pin separately.

Dimensions

PART NO .	A	CA	CB	CD	CE	CW	CX	DD	E	ER	F	FL	KK	LR	M	MR	R
Clevis Bracket																	
BDCD-05	-	-	0 .750	0 .500	-	0 .500	-	3/8-24	2 .500	-	0 .375	1 .125	-	0 .500	0 .500	0 .563	1 .625
BDCB-07	-	-	1 .250	0 .750	-	0 .625	-	1/2-20	3 .500	-	0 .625	1 .875	-	1 .063	0 .750	1 .063	2 .563
BDCB-10	-	-	1 .500	1 .000	-	0 .750	-	5/8-18	4 .500	-	0 .750	2 .250	-	1 .250	1 .000	1 .125	3 .250
Eye Bracket																	
BDEB-05	-	-	0 .750	0 .500	-	-	-	0 .406	2 .500	-	0 .375	1 .125	-	0 .750	0 .500	0 .563	1 .630
BDEB-07	-	-	1 .250	0 .750	-	-	-	0 .531	3 .500	-	0 .625	1 .875	-	1 .250	0 .750	0 .875	2 .560
BDEB-10	-	-	1 .500	1 .000	-	-	-	0 .656	4 .500	-	0 .750	2 .250	-	1 .500	1 .000	1 .250	3 .250
BDEB-13	-	-	2 .000	1 .375	-	-	-	0 .656	5 .000	-	0 .875	3 .000	-	2 .125	1 .375	1 .625	3 .810
BDEB-17	-	-	2 .500	1 .750	-	-	-	0 .906	6 .500	-	0 .875	3 .125	-	2 .250	1 .750	2 .125	4 .950
Rod Clevis																	
BDC-05	0 .750	-	0 .750	0 .500	1 .500	0 .500	1 .000	-	-	0 .500	-	-	7/16-20	-	-	-	-
BDC-06	0 .750	-	0 .750	0 .500	1 .500	0 .500	1 .000	-	-	0 .500	-	-	1/2-20	-	-	-	-
BDC-07	1 .125	-	1 .250	0 .750	2 .375	0 .625	1 .250	-	-	0 .750	-	-	3/4-16	-	-	-	-
BDC-08	1 .625	-	1 .500	1 .000	3 .125	0 .750	1 .500	-	-	1 .000	-	-	7/8-14	-	-	-	-
BDC-10	1 .625	-	1 .500	1 .000	3 .125	0 .750	1 .500	-	-	1 .000	-	-	1-14	-	-	-	-
BDC-13	2 .000	-	2 .000	1 .375	4 .125	1 .000	2 .000	-	-	1 .375	-	-	1 1/4-12	-	-	-	-
BDC-17	2 .250	-	2 .500	1 .750	4 .500	1 .250	2 .375	-	-	1 .750	-	-	1 1/2-12	-	-	-	-
Rod Eye																	
BDE-05	0 .750	1 .500	0 .750	0 .500	-	-	-	-	-	0 .625	-	- -	7/16-20	-	-	-	-

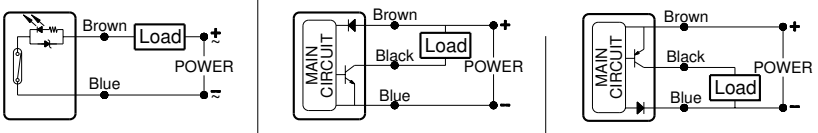




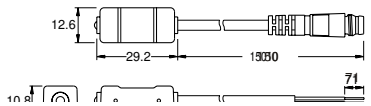
SPECIFICATION

CHARACTERISTIC \ TYPE	UL - 20R	UL - 20N	UL - 20P
SWITCHING LOGIC	SPST Normally Open	Solid State Output, Normally Open	
SENSOR TYPE	Reed Switch	NPN Current Sinking	PNP Current Sourcing
OPERATING VOLTAGE (NOTE 1.)	5~240V DC/AC	5~28V DC	
SWITCHING CURRENT	100 mA max.	200 mA max.	
SWITCHING RATING	10 W max.	6 W max.	
CURRENT CONSUMPTION	——	15 mA max. @ 24V (Switch Active)	16 mA max. @ 24V (Switch Active)
VOLTAGE DROP	2.5 V max. @ 100mA DC	1.5 V max. @ 200 mA (Resistive Load)	
LEAKAGE CURRENT	——	0.01 mA max.	
INDICATOR	Red LED	Red LED	Green LED
CABLE	4.0 ϕ, 2C, OIL RESISTANT PVC	4.0 ϕ, 3C, OIL RESISTANT PVC	
SENSITIVITY (NOTE 2.)	70 Gauss	60 Gauss	
MAX. SWITCHING FREQUENCY	200 Hz	1000 Hz	
TEMPERATURE RANGE	-10 ~ 70		
SHOCK (NOTE 3.)	30 G	50 G	
VIBRATION (NOTE 4.)	9 G		
ENCLOSURE CLASSIFICATION	IP 67 (NEMA 6)		
PROTECTION CIRCUIT	——	PowerSourceReversePolarity;SurgeSuppression; O/PShortCircuitProtect	

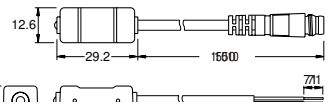
Wiring Diagram



UL-20R-03
UL-20R-QC8

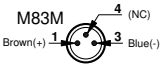


UL-20N(P)-03
UL-20N(P)-QC8

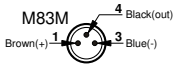


M8 QUICK CONNECTOR (IEC61076-2-101)

2 wire QC wiring

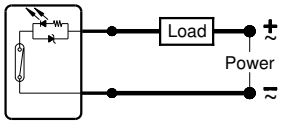
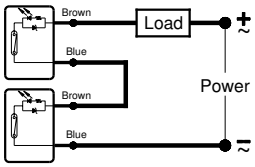
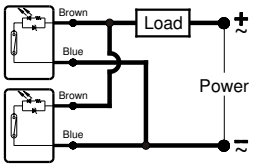


3 wire QC wiring

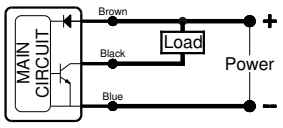
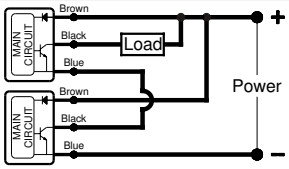
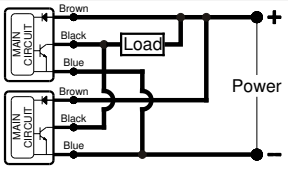


144 Kay Drive, Easley, SC 29640

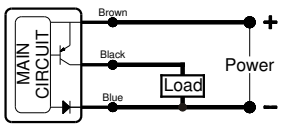
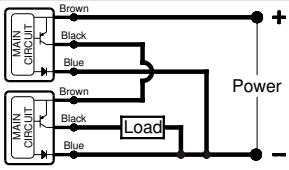
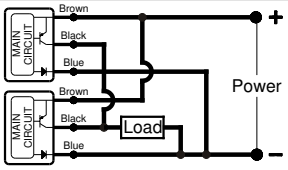
⟹ 2 wire reed switch type connection ⟸

General connection	Series connection (And)	Parallel connection (OR)
		
1. When connecting 2 wire switches, load must be connected in series with the sensor to prevent damage. 2. Connect the brown wire in series load with positive(+) and the blue wire to negative(-) of DC power source, otherwise the LED will not light.	1. When 2 wire switches in series(AND) use. The voltage drop will be added up. (Typical Vdrop about 2.5V per switch) 2. When series too many switches, excessive voltage drop will cause non-operation of the load. 3. The quantity of switches in series due to the voltage of power source.	1. When 2 wire switches in parallel(OR) use. The current flow to the switch will be shared when switches all in active. 2. When connect too many switches in parallel use, possible concurrent operation will cause dim or off LED due to lower current distribution. 3. The quantity of switches in parallel due to the current of load.

⟹ 3 wire solid state NPN type connection ⟸

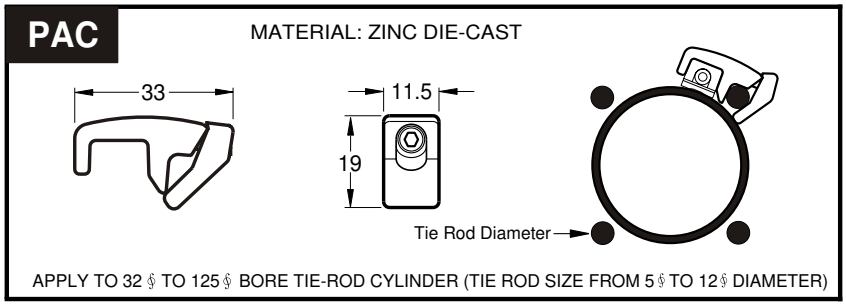
General connection	Series connection (And)	Parallel connection (OR)
		
1. 3 wire switches connection must be connected to a DC power source. Pay attention to the wiring of black wire. Wrong connection will damage the switch. 2. Connect brown wire to the positive(+) and the blue to the negative(-). The black wire must series load and beto positive(+) only.	1. When 3 wire solid state switches are in series (AND) use, Voltage drop will be cumulative(Typical Vdrop is 1.5V per switch) 2. When series uses too many switches, excessive voltage drop will cause non-operation of the load. 3. The quantity of switches in series due to the voltage of power source.	1. When 3-wire solid state switches in parallel(OR) use leakage current will be cumulative. 2. When too many switches are in parallel use, a lower load current may cause a wrong operation. 3. The quantity of switches in parallel due to the current of load.

⟹ 3 wire solid state PNP type connection ⟸

General connection	Series connection (And)	Parallel connection (OR)
		
1. 3 wire switches connection must be connected to a DC power source. Pay attention to the wiring of black wire. Wrong connectio will damage the switch. 2. Connect brown wire to the positive(+) and the blue to the negative(-). The black wire must series load and to negative(-) only.	1. When 3 wire solid state switches in series (AND) use. Voltage drop will be cumulative. (Typical Vdrop about 1.5V per switch) 2. When series uses too many switches, excessive voltage drop will cause non-operation of the load. 3. The quantity of switches in series due to the voltage of power source.	1. When 3-wire solid state switches in parallel(OR) use leakage current will be cumulative . 2. When too many switches are in parallel use, a lower load current may cause a wrong operation 3. The quantity of switches in parallel due to the current of load.

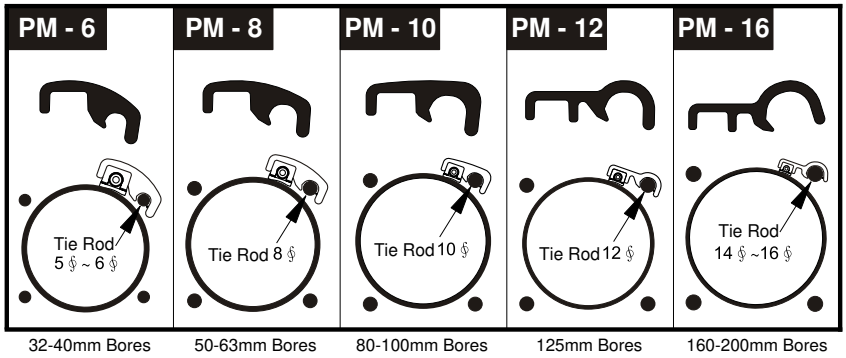
PAC BRACKET

Mounting UL-20 & UL-21 series on Tie-Rod Cylinder



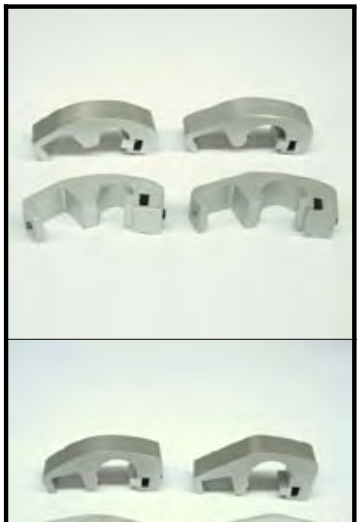
PM BRACKET

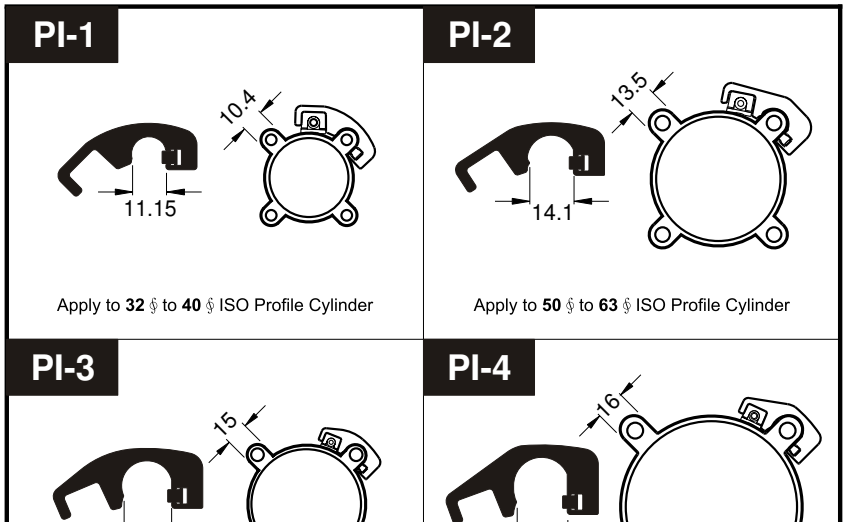
Mounting UL-20 & UL-21 series on Tie-Rod Cylinder

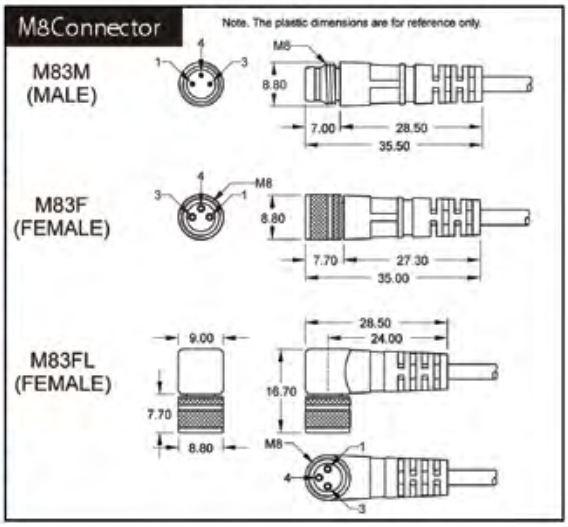


PI BRACKET

Mounting UL-20 & UL-21 series on ISO Profile Cylinder







SPECIFICATION

CHARACTERISTIC \ TYPE	M83M	M83F	M83FL
CONNECTOR TYPE	M8 3PIN Male (Straight)	M8 3PIN Female (Straight)	M8 3PIN Female (right-angle)
LEAD WIRE COLOR	PIN 1: Brown, PIN 3: Blue, PIN 4: Black		
MAX. OPERATING VOLTAGE	60V AC/DC		
MAX. RATING CURRENT	3 A		
INSULATION BETWEEN CONTACTS	1.0 KV		
INSULATION BETWEEN CONTACTS & METAL HOUSING	0.85 KV		
PIN COATING	5M Gold Coating		
NUMBERS OF MECHANICAL OPERATIONS	Over 100 times		
TEMPERATURE RANGE	-25 8		
CABLE TENSION FORCE IN CONNECTED	30 N		
IP DEGREE PROTECTION	IP 67 (IEC 60529)		
STANDARD	IEC 61076-2-101		

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