

Series N Actuators

1-1/8" to 4" bore sizes
 NFPA Interchangeable



Cylinders rated to 250 PSI air,
 400 PSI hydraulic (non-shock).

Designed for non-lube service.
 Switches available on all bore sizes.

Technical data

Medium:
 Filtered compressed air to
 250 psi
 (for hydraulic service
 consult factory.)

Operating Temperatures:
 -20°F to 200°F
 (-29°C to 93°C)

Operating Pressure:
 250 psig (17.2 bar)

1-1/8" Bore pressure rating: 150 psi

Bore Sizes:

1-1/8", 1-1/2", 2", 2-1/2", 3-1/4", 4"

Materials:

Head and end caps - anodized 6061-T6
 aluminum

Tube: 6063-T832 aluminum, clear
 anodized O.D., hard coat anodized I.D.

Piston Rod: C1141 hard chrome plated
 steel

Piston: 2011-T451 aluminum

Rod Bearings: G2 Durabar cast iron,
 teflon coated

Seals: carboxylated nitrile

Tie Rods: 12L14 steel

Options selector

N C 04 J - E 0 2 - A M B 0 0

Series	
Series N	N
Series Q Electroless Nickel	Q

Bore	Single rod end	Double rod end*
1-1/8"	B	P
1-1/2"	C	Q
2"	D	R
2-1/2"	E	S
3-1/4"	F	T
4"	G	U

* Double Rod End has two Piston Rods on one end and one Piston Rod on opposite end.

Strokes in inches	Substitute
0" Stroke	00
1" Stroke	01
2" Stroke	02
3" Stroke	03
4" Stroke	04
5" Stroke	05
6" Stroke	06
...	...
30" Stroke	30
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
X	Special		

Rod Axis	
Horizontal Rod Axis	E
Vertical Rod Axis	N
No Tooling Plate - Horizontal Rod	A
No Tooling Plate - Vertical Rod	B
Blank Rod End - Horizontal Rod*	C
Blank Rod End - Vertical Rod*	D
Special	X

* Does not include tooling plate
 Note: Double rod is not available with oversize rear rod on 1-1/2" bore.

Options	
No Options	O
Metal Rod Scraper	M
Air/Oil Piston	P
Double Rod W/OS Cap Rod	R
Stainless Piston Rods	S
Viton Seals	V
Special	X

Magnetic Option	
No Magnet	O
Magnetic Piston	M

Design Level	B
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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
Special	X			

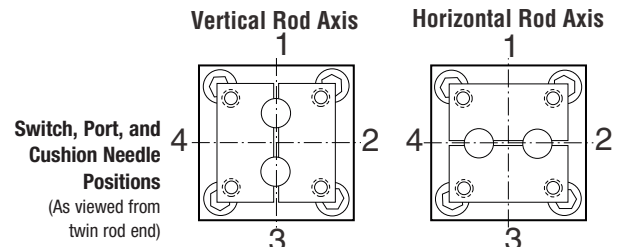
†Cushions not available on 1-1/8" Bore.

**Standard position

Ports				
Position	1**	2	3	4
Standard	A	B	C	D
Special	X			

**Standard position

Mounting Options			
01 No Mounts (MX0)	07 Det. Clevis (MP2)		
02 Bottom Tap (MS4)	18 Det. Eye (MP4)		
04 Front Flange (MF1)	20 Base Bar		
05 Rear Flange (MF2)	XX Special		



The finest materials for each component!

1 Piston Seals: Lip-type carboxylated nitrile incorporating Teflon® and other non-lube additives as integral parts of the compound. Extremely smooth stroke performance and “no lube added” operation results from reduced friction.

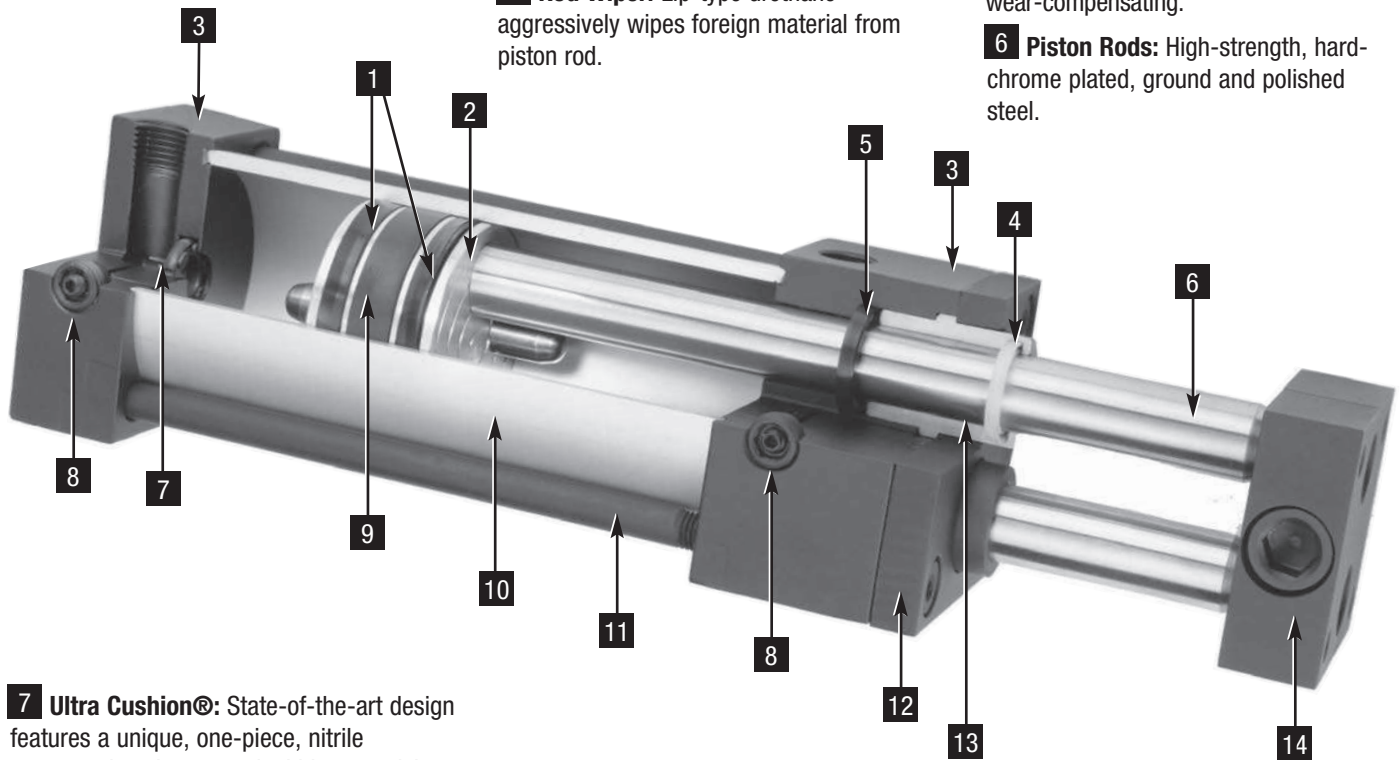
2 Piston: Solid aluminum alloy, light-weight for low inertia, yet strong.

3 Head/Cap: Precision machined from (6061-T6) solid aluminum bar, anodized for corrosion resistance.

4 Rod Wiper: Lip-type urethane aggressively wipes foreign material from piston rod.

5 Rod Seals: Rounded lip-type carboxylated nitrile incorporating Teflon® and other non-lube additives as integral parts of the compound. Extremely smooth stroke performance and “no lube added” operation results from reduced friction. Rod Seal is pressure-energized and wear-compensating.

6 Piston Rods: High-strength, hard-chrome plated, ground and polished steel.



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

9 Wear Strip: Teflon® and graphite composition for minimum friction, maximum wear and side load resistance. (Magnetic band under wear strip optional.)

10 Tube: 6063-T832 aluminum alloy ideally suited for air service. Tube is clear anodized on the O.D. and “hard anodic coated” on the I.D. resulting in a smooth, file-hard (60RC), corrosion-resistant and score-resistant surface finish.

11 Tie Rods: High-strength steel maintains compression on tube end seals.

12 Retainer: High-strength steel is used to retain rod bearings.

13 Rod Bearings: Machined from durable, close-grained cast iron, then completely coated with Teflon® to insure permanent lubrication and corrosion resistance.

14 Tooling Plate: Machined from solid steel and notched for secure attachment. Modular and pilot adaptor plates are available to add to the tooling plate mounting. (Use of modular and pilot adapter plates adds to overall length.)

Series Q

Series Q cylinders are designed for corrosive environments. They are identical to the Series N in design, function, and dimensions, but have electroless nickel plating and stainless steel components to create significant resistance to corrosion.

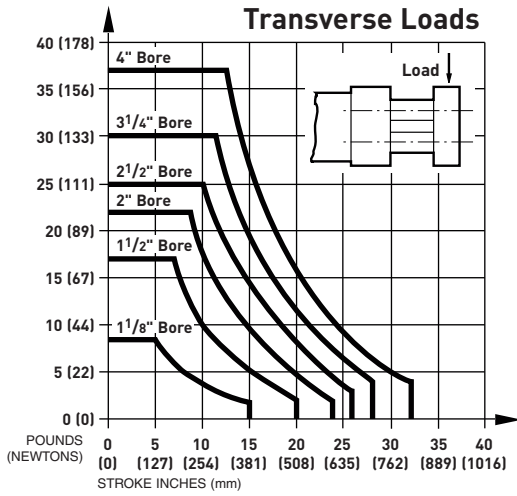
Features:

Head, cap, tube, bushings, front plate, mounts, tooling plate, tie rod nuts, and screws are plated with electroless nickel to a minimum thickness of .0005".

Piston rod, tie rods, and cushion needles are made from 300 series stainless steel.

Series N Actuators

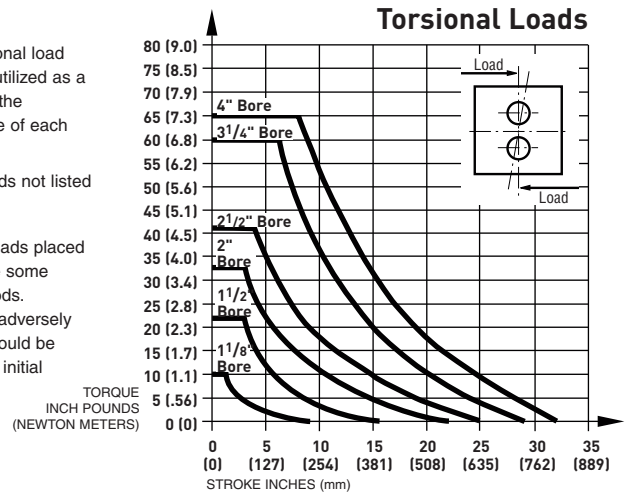
1-1/8" to 4" bore sizes



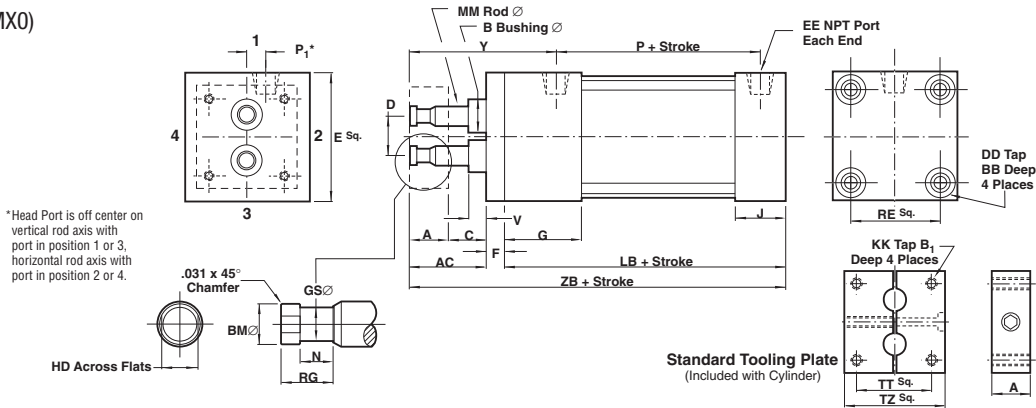
The transverse and torsional load graphs shown are to be utilized as a guideline with respect to the maximum load and stroke of each bore size.

NOTE: For strokes or loads not listed consult factory.

Transverse or torsional loads placed on the cylinder will cause some deflection of the piston rods. Excessive deflection will adversely affect cylinder life and should be considered at the time of initial application design.



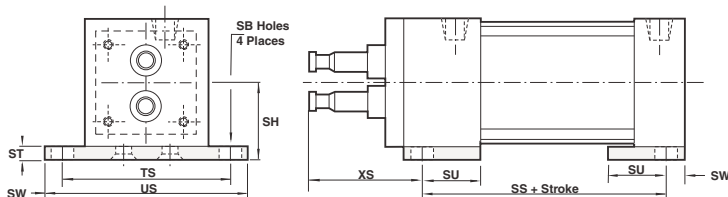
Basic Actuator O1 (MX0)



Bore	A	AC	B	B1	BB	BM	C	D	DD	E	EE	F	G	GS
1-1/8"	0.625	1.25	N/A	0.5	0.188	0.27	0.625	0.627	10 - 32	1.5	1/8	0.25	.875	0.19
1-1/2"	0.625	1.5	0.59	Thru	0.312	0.33	0.875	0.75	1/4 - 28	2	1/4	0.375	1.5	0.25
2"	0.75	1.5	0.9	Thru	0.312	0.55	0.75	1.052	5/16 - 24	2.5	1/4	0.375	1.5	0.5
2-1/2"	0.75	1.75	0.9	Thru	0.312	0.55	1	1.398	5/16 - 24	3	1/4	0.375	1.5	0.5
3-1/4"	1.25	1.75	1.498	Thru	0.437	0.9	0.5	2	3/8 - 24	3.75	3/8	0.625	1.75	0.75
4"	1.25	1.75	1.498	Thru	0.437	0.9	0.5	2.36	3/8 - 24	4.5	3/8	0.625	1.75	0.75

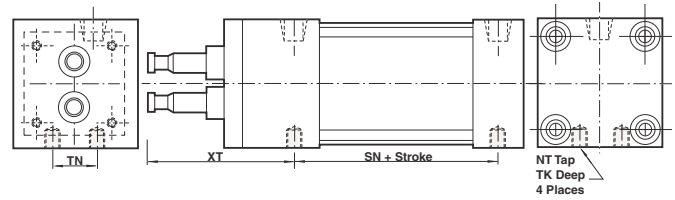
Bore	HD	J	KK	LB	MM	N	P	P1	RE	RG	TT	TZ	V	Y	ZB
1-1/8"	0.25	0.625	6 - 32	2.25	0.312	0.4	1.469	0.241	1.125	0.58	0.75	1.25	N/A	2.031	3.75
1-1/2"	0.312	1	10 - 32	3.625	0.375	0.4	2.125	0.303	1.428	0.58	1.125	1.5	0.25	2.875	5.5
2"	0.5	1	1/4 - 28	3.625	0.625	0.526	2.125	0.48	1.84	0.705	1.43	2	0.25	2.875	5.5
2-1/2"	0.5	1	5/16 - 24	3.75	0.625	0.526	2.25	0.635	2.192	0.705	1.84	2.5	0.25	3.125	5.875
3-1/4"	0.812	1.25	3/8 - 24	4.25	1	0.784	2.625	0.845	2.758	1.205	1.79	3.25	0.25	3.437	6.625
4"	0.812	1.25	3/8 - 24	4.25	1	0.784	2.625	0.875	3.323	1.205	3.44	4	0.25	3.437	6.625

Cylinder with 20 (not NFPA) Base Bar



Bore	F	G	LB	SB	SS	ST	SU	SW	TS	US	XS
1-1/8"	0.25	1	2.25	0.203	1.75	0.25	0.75	0.25	1.875	2.375	1.75
1-1/2"	0.375	1.5	3.625	0.437	2.875	0.25	1.125	0.375	2.75	3.5	2.25
2"	0.375	1.5	3.625	0.437	2.875	0.25	1.125	0.375	3.25	4.0	2.25
2-1/2"	0.375	1.5	3.75	0.437	3	0.375	1.125	0.375	3.75	4.5	2.5
3-1/4"	0.625	1.75	4.25	0.563	3.25	0.5	1.25	0.5	4.75	5.75	2.875
4"	0.625	1.75	4.25	0.563	3.25	0.5	1.25	0.5	5.5	6.5	2.875

Cylinder with O2 Bottom Tap

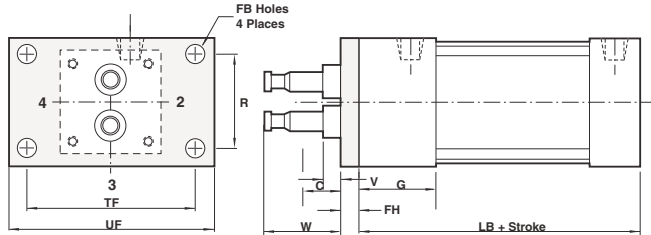


Bore	NT	SN	TK	TN	XT
1-1/8"	10 - 32	1.5	0.25	0.5	2
1-1/2"	1/4 - 20	2.25	0.375	0.625	2.812
2"	5/16 - 18	2.25	0.375	0.875	2.812
2-1/2"	3/8 - 16	2.375	0.625	1.25	3.063
3-1/4"	1/2 - 13	2.625	0.625	1.5	3.437
4"	1/2 - 13	2.625	0.75	2.063	3.437

Series N Actuators

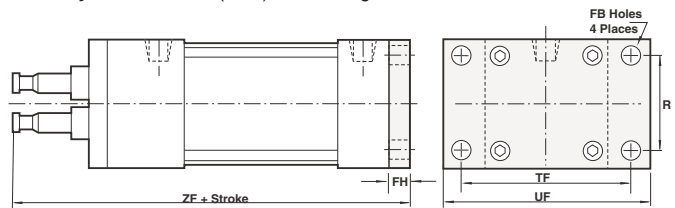
1-1/8" to 4" bore sizes

Cylinder with 04 (MF1) Front Flange



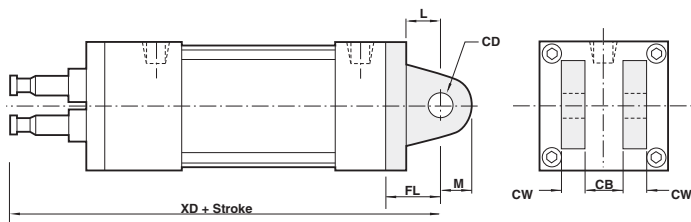
Bore	C	FB	FH	R	TF	UF	W
1-1/8"	0.625	0.219	0.25	1	2	2.5	1.25
1-1/2"	0.875	0.312	0.375	1.43	2.75	3.75	1.5
2"	0.75	0.375	0.375	1.84	3.375	4.125	1.5
2-1/2"	1	0.375	0.375	2.19	3.875	4.625	1.75
3-1/4"	0.5	0.437	0.625	2.76	4.688	5.5	1.75
4"	0.5	0.437	0.625	3.32	5.437	6.25	1.75

Cylinder with 05 (MF2) Rear Flange



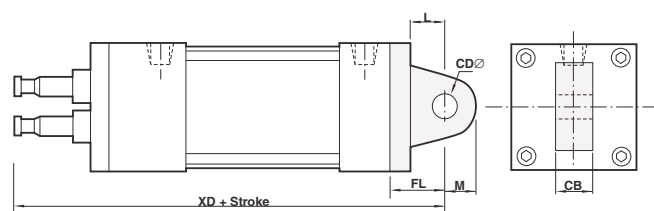
Bore	FB	FH	TF	UF	ZF
1-1/8"	0.219	0.25	2	2.5	4
1-1/2"	0.312	0.375	2.75	3.75	5.875
2"	0.375	0.375	3.375	4.125	5.875
2-1/2"	0.375	0.375	3.875	4.625	6.25
3-1/4"	0.437	0.625	4.688	5.5	7.25
4"	0.437	0.625	5.437	6.25	7.25

Cylinder with 07 (MP2) Detachable Clevis



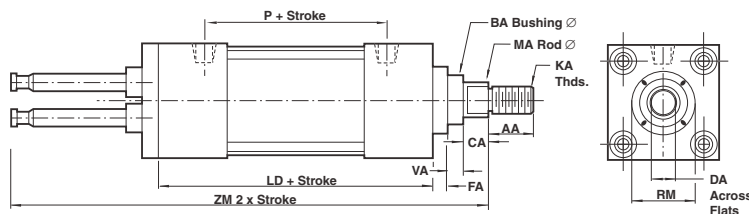
Bore	CB	CD	CW	FL	L	M	XD
1-1/8"	0.375	0.375	0.25	1.125	0.625	0.375	4.875
1-1/2"	0.75	0.5	0.5	1.125	0.75	0.625	6.625
2"	0.75	0.5	0.5	1.125	0.75	0.625	6.625
2-1/2"	0.75	0.5	0.5	1.125	0.75	0.625	7
3-1/4"	1.25	0.75	0.625	1.875	1.25	0.875	8.5
4"	1.25	0.75	0.625	1.875	1.25	0.875	8.5

Cylinder with 18 (MP4) Detachable Clevis



Bore	CB	CD	FL	L	M	XD
1-1/8"	0.375	0.375	1.125	0.625	0.375	4.875
1-1/2"	0.75	0.5	1.125	0.75	0.625	6.625
2"	0.75	0.5	1.125	0.75	0.625	6.625
2-1/2"	0.75	0.5	1.125	0.75	0.625	7
3-1/4"	1.25	0.75	1.875	1.25	0.875	8.375
4"	1.25	0.75	1.875	1.25	0.875	8.375

Double Rod End Cylinder



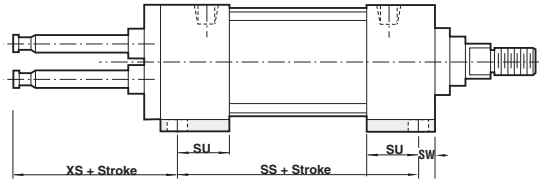
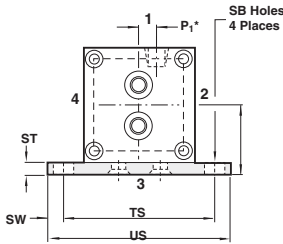
Bore	AA	BA	CA	DA	FA	KA	LD	MA	P	RM	VA	ZM	
1-1/8"	Standard	0.625	N/A	0.25	0.312	0.125	3/8 - 24	±2.875	0.375	±1.844	0.75	N/A	±4.625
	Oversize	0.75	N/A	0.25	0.437		1/2 - 20	0.5		1.00	N/A		
1-1/2"	Standard	0.75	1.125	0.375	0.5	0.375	1/2 - 20	4.125	0.625	2.125	2.00	0.25	7.00
	Oversize	1.125	1.4	0.5	0.812		3/4 - 16	1.00		2.00	0.5		
2"	Standard	0.75	1.125	0.375	0.5	0.375	1/2 - 20	4.125	0.625	2.125	2.00	0.25	7.00
	Oversize	1.125	1.5	0.5	0.812		3/4 - 16	1.00		2.50	0.5		
2-1/2"	Standard	.75	1.125	0.375	0.5	0.375	1/2 - 20	4.25	0.625	2.25	2.00	0.25	7.35
	Oversize	1.125	1.5	0.5	0.812		3/4 - 16	1.00		3.00	0.5		
3-1/4"	Standard	1.125	1.5	0.5	0.812	0.625	3/4 - 16	4.75	1.00	2.65	2.625	0.25	8.50
	Oversize	1.625	2	0.625	1.125		1 - 14	1.375		3.375	0.375		
4"	Standard	1.125	1.5	0.5	0.812	0.625	3/4 - 16	4.75	1.00	2.625	2.625	0.25	8.5
	Oversize	1.625	2	0.625	1.125		1 - 14	1.375		3.375	0.375		

*Note: 1-1/8" bore overall body is 3/8" longer than our standard Series "C" Double Rod End Cylinder.

Series N Actuators

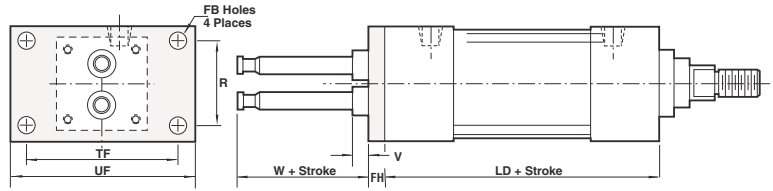
1-1/8" to 4" bore sizes

Double Rod End w/20 (not NFPA) base bar

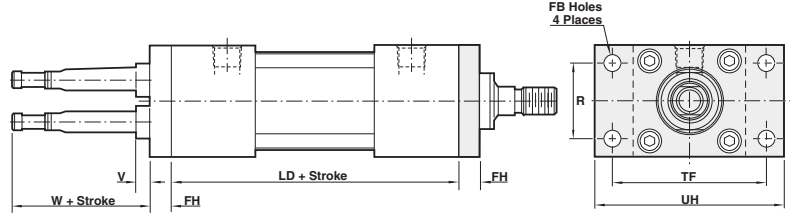


Bore	F	SB	SS	ST	SU	SW	TS	US	XS
1-1/8"	0.25	0.203	2.25	0.25	0.75	0.25	1.875	2.375	1.75
1-1/2"	0.375	0.437	3.375	0.25	1.125	0.375	2.75	3.5	2.25
2"	0.375	0.437	3.375	0.25	1.125	0.375	3.25	4	2.25
2-1/2"	0.375	0.437	3.5	0.375	1.125	0.375	3.75	4.5	2.25
3-1/4"	0.625	0.563	3.75	0.5	1.25	0.5	4.75	5.75	2.875
4"	0.625	0.563	3.75	0.5	1.25	0.5	5.5	6.5	2.875

Double Rod End w/04 (MF1) Front Flange

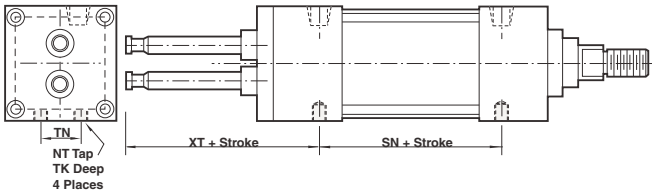


Double Rod End w/05 (MF2) Rear Flange



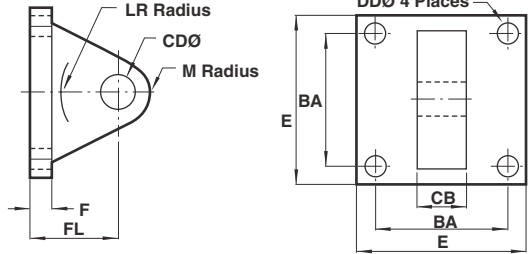
Bore	FB	FH	LD	R	TF	UF	V	W
1-1/8"	0.219	0.250	2.875	1	2	2.5	N/A	1.25
1-1/2"	0.312	0.375	4.125	1.43	2.75	3.75	0.25	1.5
2"	0.375	0.375	4.125	1.84	3.375	4.125	0.25	1.5
2-1/2"	0.375	0.375	4.25	2.19	3.875	4.625	0.25	1.75
3-1/4"	0.437	0.625	4.75	2.76	4.688	5.5	0.25	1.75
4"	0.437	0.625	4.75	3.32	5.437	6.25	0.25	1.75

Double Rod End w/02 (MS4) bottom tap



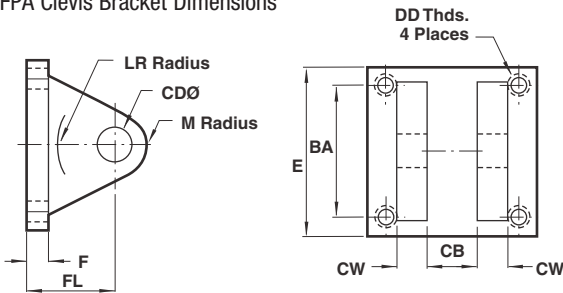
Bore	NT	SN	TK	TN	XT
1-1/8"	10 - 32	1.875	0.25	0.5	2
1-1/2"	1/4 - 20	2.25	0.375	0.625	2.812
2"	5/16 - 18	2.25	0.375	0.875	2.812
2-1/2"	3/8 - 16	2.375	0.625	1.25	3.063
3-1/4"	1/2 - 13	2.625	0.625	1.5	3.437
4"	1/2 - 13	2.625	0.75	2.063	3.437

NFPA Eye Bracket Dimensions



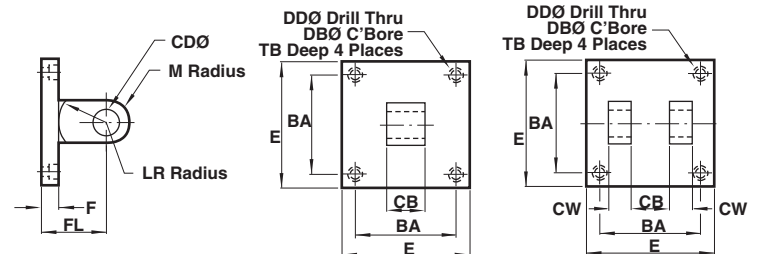
Bore	BA	CB	CD	DD	E	F	FL	LR	M
C-89-03A	1.625	.750	.500	.406	2.500	.375	1.125	.750	.50
C-89-065A	2.562	1.250	.750	.531	3.500	.625	1.875	1.250	.750
C-89-12A	3.250	1.500	1.000	.656	4.500	.750	2.250	1.500	1.000

NFPA Clevis Bracket Dimensions



	BA	CB	CD	CW	DD	E	F	FL	LR	M
C-91-03A	1.625	.750	.50	.50	3/8-24	2.50	.375	1.125	.750	.500
C-91-065A	2.562	1.250	.750	.625	1/2-20	3.500	.625	1.875	1.250	.812
C-91-12A	3.250	1.500	1.000	.750	5/8-18	4.500	.750	2.250	1.500	1.000

1-1/8" Bore Eye & Clevis Bracket Dimensions

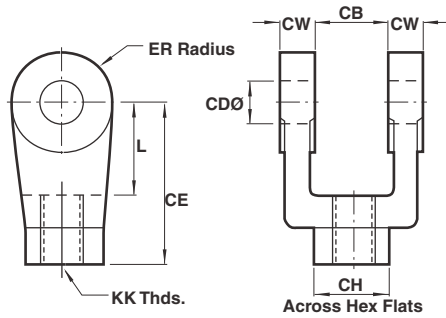


	BA	CB	CD	CW	DB	DD	E	F	FL	LA	M	TB
W-89-225K Eye	1.125	.375	.375	-	.328	.203	1.500	.500	1.125	.625	.375	.312
W-91-225K Clevis	1.150	.375	.375	.250	.328	.203	1.500	.500	1.125	.625	.375	.312

Series N Actuators

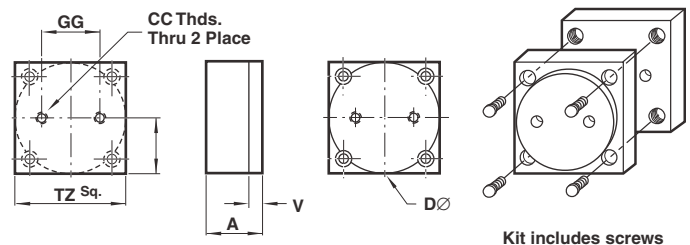
1-1/8" to 4" bore sizes

Rod Clevis Dimensions



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

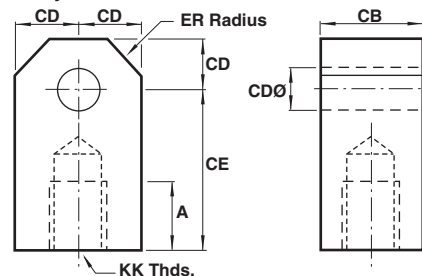
Pilot Adaptor Plate Dimensions



Kit includes screws

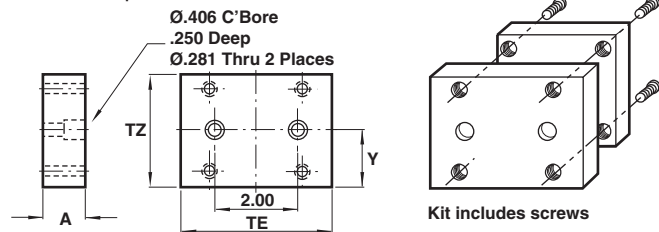
Bore	A	CC	D	GG	TZ	V	Y
NB-171-225K (1-1/8")	.625	1/4-20	1.260	.750	1.25	.160	.625
NB-171-03K (1-1/2")	.625	5/16-18	1.575	.860	1.500	.160	.750
NB-171-04K(2")	.625	5/16-18	1.969	1.180	2.000	.200	1.000
NB-171-05K (2-1/2")	.625	3/8-16	2.480	1.500	2.500	.200	1.250
NB-171-065K (3/4")	.875	1/2-13	3.150	1.970	3.250	.200	1.625
NB-171-08K (4")	.875	1/2-13	3.937	2.760	4.000	.200	2.000

Rod Eye Dimensions



	CB	CD	CE	ER	KK
C-97-03	.750	.500	1.500	.562	1/2-20
C-97-065	1.250	.750	2.062	.937	3/4-16
C-97-12	1.500	1.000	2.812	1.125	1-14

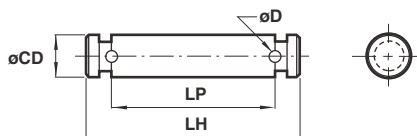
Modular Adaptor Plate Dimensions



Kit includes screws

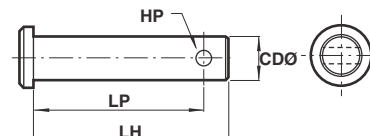
Bore	A	TE	TZ	Y
NB-172-225K (1-1/8")	0.625	3.00	1.25	0.625
NB-172-03K (1-1/2")	0.625	3.00	1.50	0.75
NB-172-04K (2")	0.625	3.00	2.00	1.00
NB-172-05K (2-1/2")	0.625	3.00	2.50	1.25

NFPA Pin Dimensions



	CD	LH	LP
C-96-03A	.500	2.219	1.875
C-96-065A	.750	3.125	2.750
C-96-12A	1.000	3.750	3.250

Standard Pin Dimensions



	CD	HP	LH	LP
C-96-225	.375	.156	1.250	1.032
C-96-03	.500	.156	2.250	2.093
C-96-065	.750	.156	3.000	2.843
C-96-12	1.000	.203	3.500	3.297