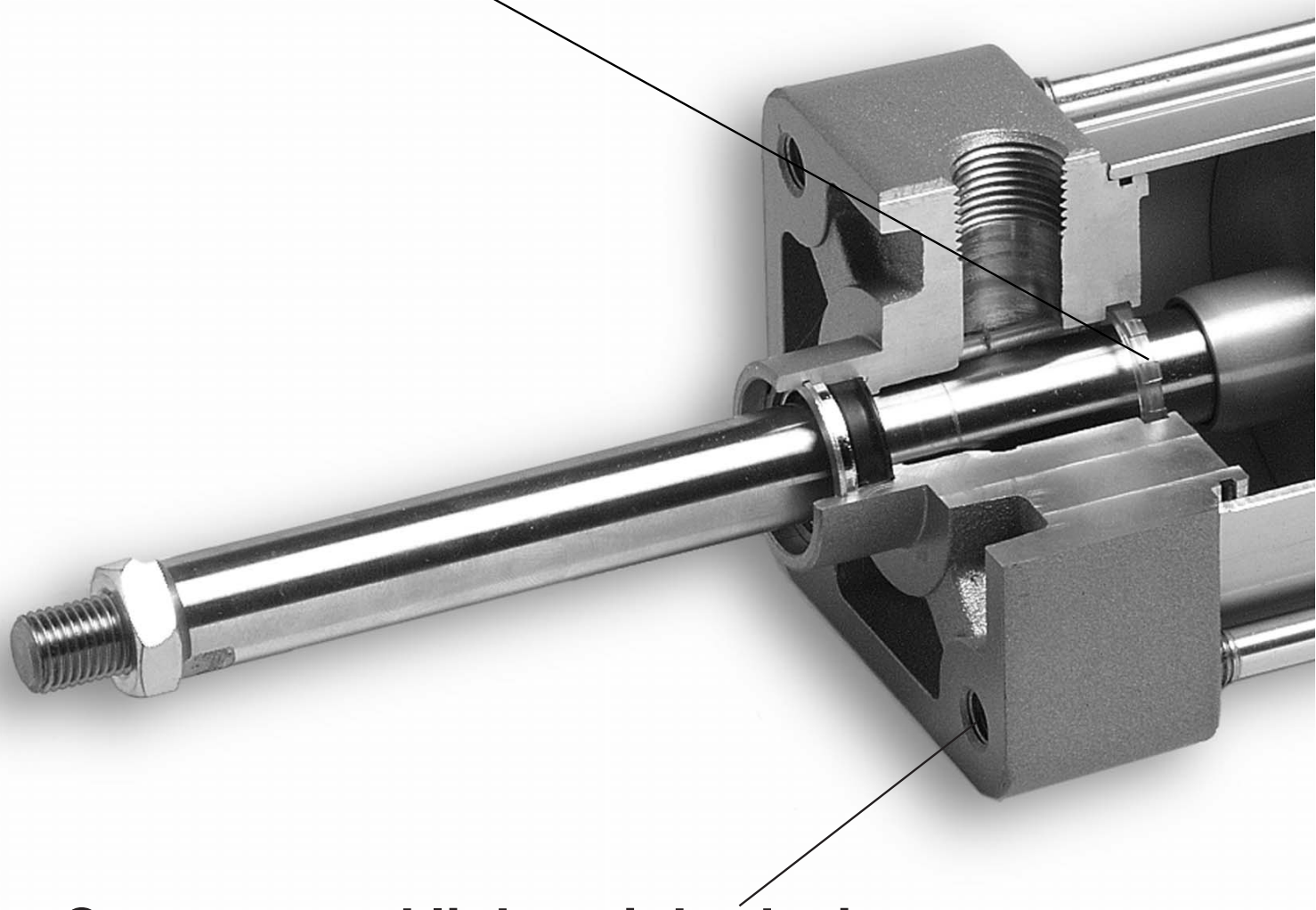
NFPA Interchangeable Air Cylinder
Medium Duty Series
Series NCA1
ø1.5", ø2", ø2.5", ø3.25", ø4"

Medium Duty 1.5 to 4" Bore
12 Different NFPA Mounting Options
Non-rotating Option
Tandem Cylinder Option
Auto Switch Capable

Series NCA1

Improved cushion capacity

"Floating" cushion seal design eliminates piston rod "bouncing" due to cracking pressure at beginning of stroke.



Compact and lightweight design

The square covers are made of an aluminum die-casting and provide a lower cost, lighterweight product.

Increased kinetic energy absorption

The absorption of kinetic energy has been increased by nearly 30% through increase cushion volume and the use of a new cushion seal.

Full port design

Allows for improved piston breakaway.

Full range of NFPA interchangeable mounting configurations

Mounting dimensions are in accordance with ANSI (NFPA) T3.6.7 R2-1996, Fluid Power Systems and products - Square Head Industrial Cylinders - Mounting Dimensions.

NFPA Interchangeable Cylinder: Standard Type Double Acting, Single Rod (Medium Duty)

Series NCA1

Inch size: ø1.5", ø2", ø2.5", ø3.25", ø4"

How to Order

NC **D** A1 **□** **B** **150** – **04** **00** **□** **□** – **A54** **□** – **XB5**

Built-in magnet

Nil	None
D	W/ auto switch (Magnetic piston)

Style

Nil	Standard cylinder
K	Non-rotating cylinder
W	Double rod
M	Male rod stud

Mounting style

B	MX0	Basic style
L	MS1	Foot style
F	MF1	Rod side flange style
G	MF2	Head side flange style
R	MS4	Side tapped style
D	MP2	Double detachable head side clevis style
T	MT4	Center trunnion style
C	MP4	Single detachable head side clevis style
X	MP1	Double head side clevis style
S	MS2	Side lug style
U	MT1	Rod side trunnion style
J	MT2	Head side trunnion style

Bore size

150	1.5"
200	2"
250	2.5"
325	3.25"
400	4"

For larger bore sizes up to 32" bore. Please consult CAT: N304-EX.

Standard stroke
Inches

Stroke
Hundredths of an inch

Air cushion

Nil	Both ends
N	None
H	Head end
R	Rod end

Rod boot

Nil	None
J	Nylon
K	Neoprene

Auto switch

Nil	Without auto switch

∗ For the applicable auto switch model, refer to the table on page 6-15-7.
∗ Auto switches are shipped together, (but not assembled.)

Number of auto switches

Nil	2 pcs.
S	1 pcs.
3	3 pcs.
n	"n" pcs.

Option

-XB5	Oversized rod
-XB6	High temperature
-XB7	Low temperature
-XB9	Low speed
-XC6	Stainless steel piston rod
-XC8	Adjustable stroke/Extend
-XC9	Adjustable stroke/Return
-XC10	Dual operation/Double rod
-XC11	Dual operation/Single rod
-XC22	Fluoro rubber seals
-XC35	With coil scraper

For special rod end modifications, please see page 6-15-33.

Mounting Bracket Part No.

Mounting bracket / Bore size	Part no.				
	150 (1.5")	**200 (2")**	**250 (2.5")**	**325 (3.25")**	**400 (4")**
Foot ∗	NCA1-L150	NCA1-L200	NCA1-L250	NCA1-L325	NCA1-L400
Flange	NCA1-F150	NCA1-F200	NCA1-F250	NCA1-F325	NCA1-F400
Double clevis (MP2)	NCA1-D150	NCA1-D200	NCA1-D250	NCA1-D325	NCA1-D400
Single clevis	NCA1-C150	NCA1-C200	NCA1-C250	NCA1-C325	NCA1-C400
Side lug ∗	NCA1-S150	NCA1-S200	NCA1-S250	NCA1-S325	NCA1-S400
Double clevis (MP1)	NCA1-X150	NCA1-X200	NCA1-X250	NCA1-X325	NCA1-X400

∗ These kits are for standard single rod/double acting cylinders without options. For option kits, please contact your local SMC sales office. One kit required per cylinder.

The SMC NCA1 expanded Series NFPA Industrial Interchangeable Pneumatic Cylinders are now available in bore sizes ranging from 5"-8" Medium Duty, and 1.5"-14" Heavy Duty.

The NCA1 Expanded Series Cylinders offer:
- Replaceable Rod Gland
- A full range of NFPA interchangeable mounting configurations.
- Available in three construction types: Aluminum, Steel, and Stainless steel
- Composite fiber tube optional.
- Fully adjustable cushion

For further information, please consult CAT: N304-EX or contact your local SMC sales office.

Specifications

Type	Standard	Double rod	Non-rotating rod
Fluid	Air	Air	Air
Lubrication	Non-lube	Non-lube	Non-lube
Max. operating pressure	250 psi (1.75 MPa)	250 psi (1.75 MPa)	250 psi (1.75 MPa) *
Min. operating pressure	8 psi (0.06 MPa)	8 psi (0.06 MPa)	15 psi (0.1 MPa)
Ambient & fluid temperature	40 to 140°F (5 to 60°C)	40 to 140°F (5 to 60°C)	0 to 140°F (5 to 60°C)
Piston speed	2 to 20 in/s (50 to 500 mm/s)	2 to 20 in/s (50 to 500 mm/s)	2 to 20 in/s (50 to 500 mm/s)
Cushion	Air cushion standard		
Mounting	Basic style, Foot style, Rod side flange style, Head side flange style, Clevis style, Side tapped style, Center trunnion style, Head side trunnion style, Side lug style, Rod side trunnion style	Basic style, Foot style, Flange style, Center trunnion style, Side tapped style Rod side trunnion style	Basic style, Foot style, Clevis style, Rod side flange style, Head side flange style, Center trunnion style, Side tapped style, Side lug style
Non-rotating accuracy	N/A	N/A	N/A

* Rod and head side trunnion maximum operating pressure for 325 and 400 bore is up to 150 psi.

Base Material/Surface Treatment

Description	Material	Note
Cover	Aluminum alloy	Silver paint
Tube	Aluminum alloy	Hard alumite
Seal	Nitrile rubber	PLD, PLP
Piston rod	Carbon steel	Hard chrom plating
Piston	Aluminum alloy	Chromate

To calculate thrust forces not shown in the table, multiply operating pressure by piston area.

How to use this table

1. Locate column with desired operating pressure.
2. Move down that column and locate the thrust value which is equal (or the next larger to the force to be delivered by the cylinder).
3. On that same line, locate in the first (left) column the bore size recommended for your application.

Note) These are guide lines only, which must be substantiated using additional data specific to your application.

To calculate pull forces not shown in the table, use the following formula: Pull Force = (Piston area – Rod area) x Working pressure

How to read this table

1. To find the force on the pull stroke, locate the required piston rod diameter in the left most column.
2. Moving to the right, locate the required working pressure.
3. Deduct the value shown at the intersection from the push stroke force value determined from the Push Stroke table. The resultant is the available pull stroke table.

Standard Stroke

(in)

Bore size (in)	Standard stroke	Maximum stroke
1.5"	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20,	
2", 2.5"	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24	Please consult with SMC.
3.25", 4"	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24, 28,	

Weight/Aluminum Tube

(lbs)

Bore size (in)		150 (1.5")	200 (2")	250 (2.5")	325 (3.25")	400 (4")
Basic weight	Basic style	1.58	2.35	3.19	6.03	7.79
	Foot mounting style	1.95	2.86	3.80	7.45	10.12
	Flange mounting style	2.30	3.22	4.45	8.85	11.66
	Clevis mounting style	2.27	3.23	4.28	8.95	11.41
	Trunnion mounting style	2.79	3.81	5.50	10.05	3.50
Add'l weight per each 2" of stroke	For all mountings style	0.38	0.48	0.51	0.97	1.06

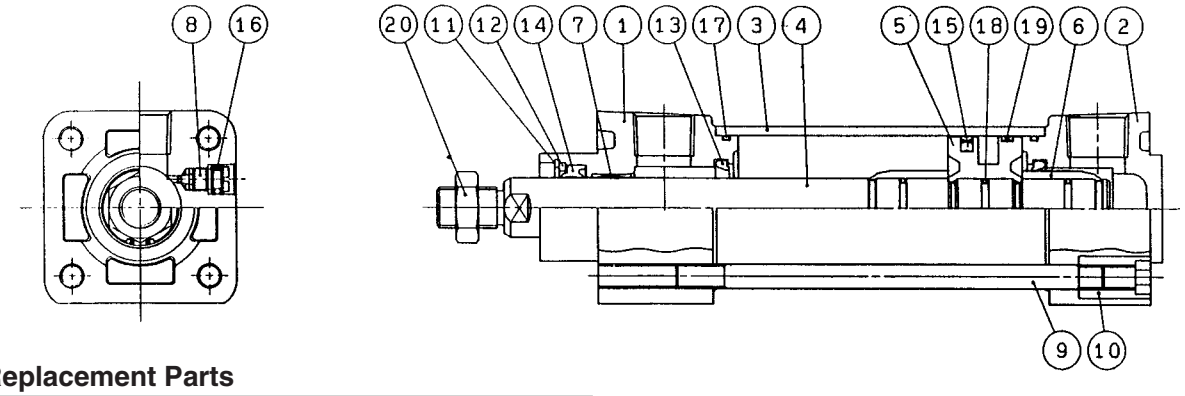
Cylinder Bore and Force: Push Stroke

Bore size (in)	Piston area (in)	Force (lbs); Push stroke Operating medium pressure (PSI)					
		50	**60**	**80**	**100**	**200**	**250**
1.5	1.767	88	106	141	177	353	442
2	3.142	157	188	251	314	628	785
2.5	4.909	245	295	393	491	982	1227
3.25	8.296	415	498	664	830	1659	2074
4	12.566	628	754	1005	1257	2513	3142

Cylinder Bore and Force: Pull Stroke

Piston rod diameter (in)	Piston rod area (in)	Force (lbs); Pull stroke (Deduct the listed thrusts corresponding to the rod size from push stroke pressure) Operating medium pressure (psi)					
		50	**60**	**80**	**100**	**200**	**250**
0.625	**0.307**	15	18	25	31	61	77
1	**0.785**	39	47	63	79	157	196
1.375	**1.485**	74	89	119	148	297	371

Construction



Replacement Parts

No.	Description	Material
①	Rod cover	Aluminum alloy
②	Head cover	Aluminum alloy
③	Cylinder tube	Aluminum alloy
④	Piston rod	Carbon steel
⑤	Piston	Aluminum alloy
⑥	Cushion ring	Brass
⑦	Rod bushing	Bronze casted
⑧	Cushion valve	Carbon steel
⑨	Tie-rod	Carbon steel
⑩	Tie-rod nut	Carbon steel
⑪	Retaining ring	Carbon steel
⑫	Rod seal retainer	Carbon steel
⑬*	Cushion seal	Urethan rubber
⑭*	Rod seal	NBR
⑮*	Piston seal	NBR
⑯*	Cushion valve seal	NBR
⑰*	Cylinder tube gasket	NBR
⑱	Piston gasket	NBR
⑲	Wear ring	Resin
⑳	Rod jam nut	Carbon steel

* Components included in a seal kit.

How to Order Seal Kit

NCA1 W 150 — — PS

Option

—	Single rod
W	Double rod
K*	Non-rotating

Bore

150
200
250
325
400

Option

-XB5***	Oversized rod
-XB6***	High temperature
-XB7***	Low temperature
-XC11	Dual operation/Single rod**

* Available for 150, 200 and 250 bores only.
** Use single rod designation when ordering XC11 kit.
Note: XC10 seal kit order 2 single rod kits.
*** Not available with W and K option

Auto Switch Specifications

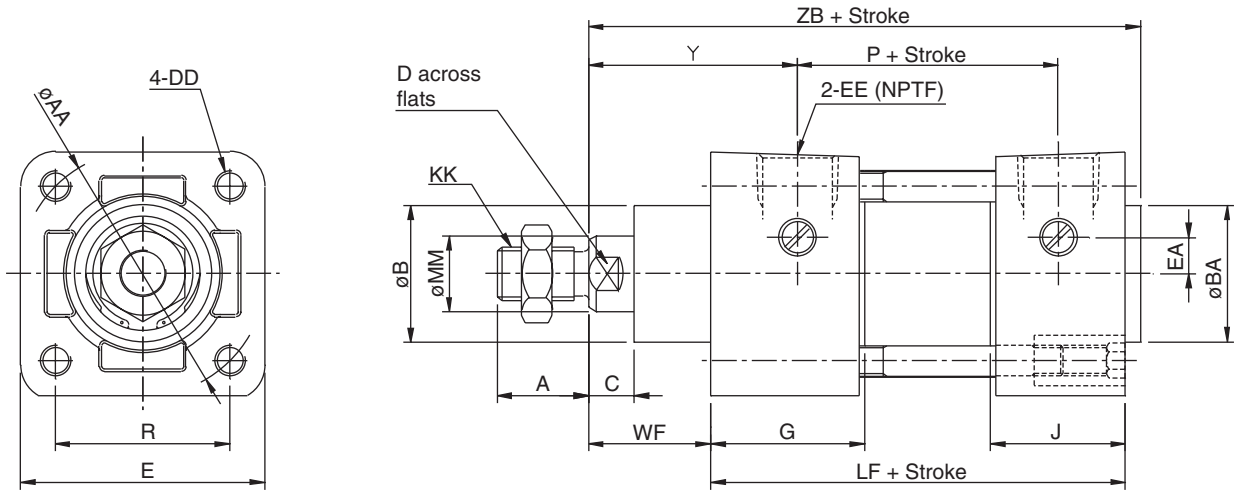
Applicable Auto Switch/Refer to page 6-16-1 for further information on auto switches.

Type	Special function	Electrical entry	Indicator light	Wiring (Output)	Load voltage DC		Load voltage AC	Auto switch model	Lead wire length (m) Note) 0.5 (Nil)	3 (L)	5 (Z)	Connector	Applicable load	
Reed switch	—	Grommet	Yes	2-wire	24 V	12 V	—	**A53**	●	●	●	—	—	PLC
							100 V, 200 V	**A54**	●	●	●	—		Relay, PLC
				3-wire (Equiv. NPN)	—	5 V	—	**A56**	●	●	—	—	IC circuit	—
	Diagnosis indication (2-color)			2-wire	24 V	—	—	**A59W**	●	●	—	—	—	Relay, PLC
	—		—			12 V	200 V or less	**A64**	●	●	—	—	—	
			—			5 V, 12 V	—	**A67**	●	●	—	—	IC circuit	PLC
Solid state switch	—	Grommet	Yes	3-wire (NPN)		5 V, 12 V	—	**F59**	●	●	○	○		Relay, PLC
				3-wire (PNP)			—	**F5P**	●	●	○	○		
				2-wire	—	—	100 V, 200 V	**J51**	●	●	○	—	—	
					24 V	12 V	—	**J59**	●	●	○	○	—	
	Diagnosis indication (2-color)			3-wire (NPN)		5 V, 12 V	—	**F59W**	●	●	○	○	IC circuit	
				3-wire (PNP)			—	**F5PW**	●	●	○	○		
				2-wire		12 V	—	**J59W**	●	●	○	○	—	
	Water resistant (2-color)						—	**F5BAL**	—	●	○	○	—	
	Diagnosis output (2-color)			4-wire (NPN)		5 V, 12 V	—	**F59F**	●	●	○	○	IC circuit	
	With timer			3-wire (NPN)			—	**F5NTL**	—	●	○	○		

Note) Lead wire length symbols: 0.5 m ····· Nil (Example) A53
3 m ····· L (Example) A53L
5 m ····· Z (Example) A53Z

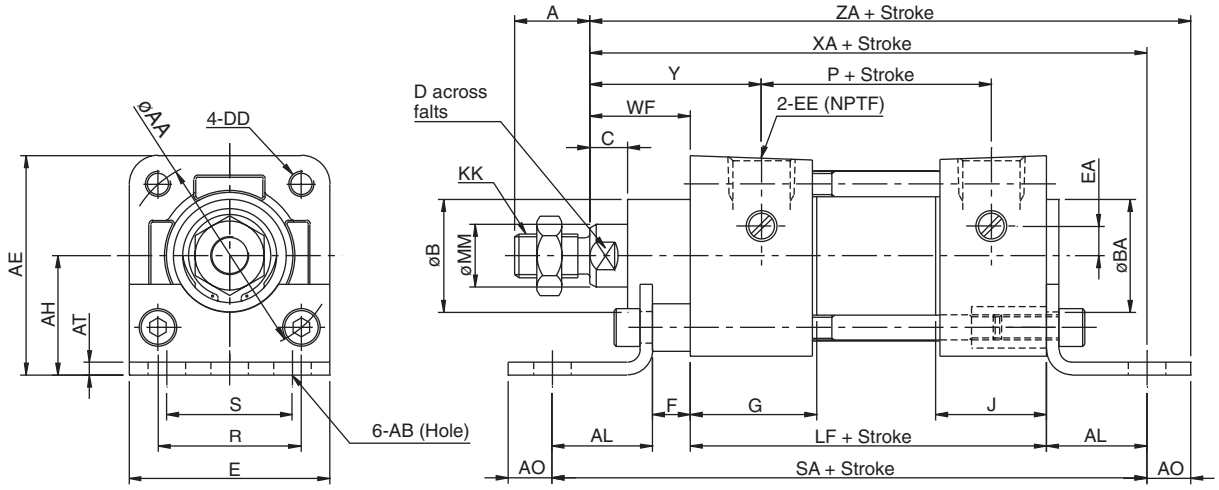
∗ Solid state auto switches marked with "○" are produced upon receipt of order.

Basic Style: NC□A1B (MX0 mounting style)



Bore size (in)	MM	KK	A	AA	B	BA	C	D	DD	E	EA	EE	G	J	R	WF	Y	LF	P	ZB
150 (1.5")	5/8	7/16-20	3/4	2.02	1 1/8	1 1/8	3/8	9/16	1/4-28	2	0.3	3/8	1.26	1.1	1.43	1	1.71	3 5/8	2.36	4 3/4
200 (2")	5/8	7/16-20	3/4	2.6	1 1/8	1 1/8	3/8	9/16	5/16-24	2 1/2	0.3	3/8	1.26	1.06	1.84	1	1.71	3 5/8	2.4	4 3/4
250 (2.5")	5/8	7/16-20	3/4	3.1	1 1/8	1 1/8	3/8	9/16	5/16-24	3	0	3/8	1.3	1.06	2.19	1	1.75	3 3/4	2.48	4 7/8
325 (3.25")	1	3/4-16	1 1/8	3.9	1 1/2	1 1/2	1/2	7/8	3/8-24	3 3/4	0	1/2	1.57	1.18	2.76	1 3/8	2.34	4 1/4	2.72	5 53/64
400 (4")	1	3/4-16	1 1/8	4.7	1 1/2	1 1/2	1/2	7/8	3/8-24	4 1/2	0	1/2	1.57	1.18	3.32	1 3/8	2.34	4 1/4	2.72	5 53/64

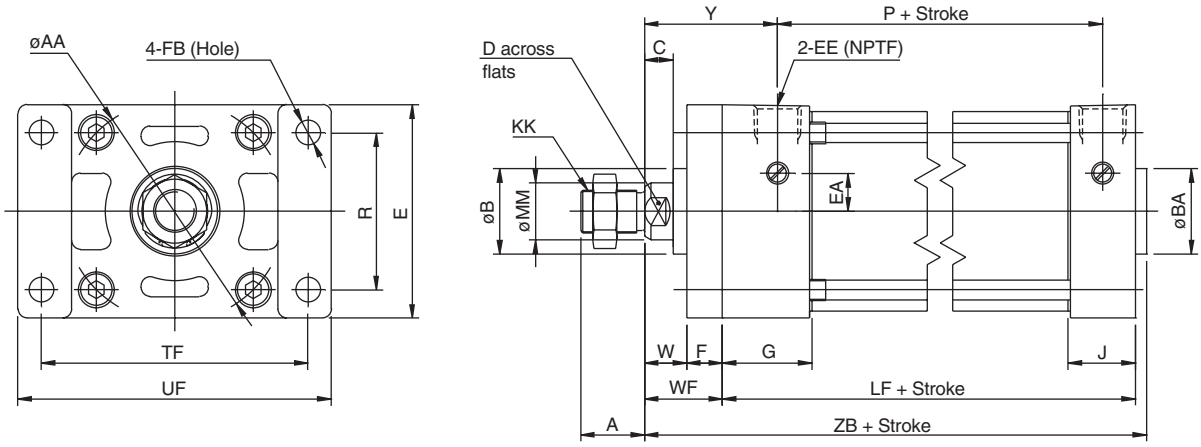
Foot Style: NC□A1L (MS1 mounting style)



Bore size (in)	MM	KK	A	AA	AB	AE	AH	AL	AO	AT	B	BA	C	D	DD	E	EA	EE	F	G	J	R	S	WF	Y	P	LF
150 (1.5")	5/8	7/16-20	3/4	2.02	3/8	2 3/16	1 3/16	1	7/16	1/8	1 1/8	1 1/8	3/8	9/16	1/4-28	2	0.3	3/8	3/8	1.26	1.1	1.43	1 1/4	1	1.71	2.36	3 5/8
200 (2")	5/8	7/16-20	3/4	2.6	3/8	2 11/16	1 7/16	1	9/16	1/8	1 1/8	1 1/8	3/8	9/16	5/16-24	2 1/2	0.3	3/8	3/8	1.26	1.06	1.84	1 3/4	1	1.71	2.4	3 5/8
250 (2.5")	5/8	7/16-20	3/4	3.1	3/8	3 1/8	1 5/8	1	9/16	1/8	1 1/8	1 1/8	3/8	9/16	5/16-24	3	0	3/8	3/8	1.3	1.06	2.19	2 1/4	1	1.75	2.48	3 3/4
325 (3.25")	1	3/4-16	1 1/8	3.9	1/2	3 13/16	1 15/16	1 1/4	3/4	11/64	1 1/2	1 1/2	1/2	7/8	3/8-24	3 3/4	0	1/2	5/8	1.57	1.18	2.76	2 3/4	1 3/8	2.34	2.72	4 1/4
400 (4")	1	3/4-16	1 1/8	4.7	1/2	4 1/2	2 1/4	1 1/4	3/4	15/64	1 1/2	1 1/2	1/2	7/8	3/8-24	4 1/2	0	1/2	5/8	1.57	1.18	3.32	3 1/2	1 3/8	2.34	2.72	4 1/4

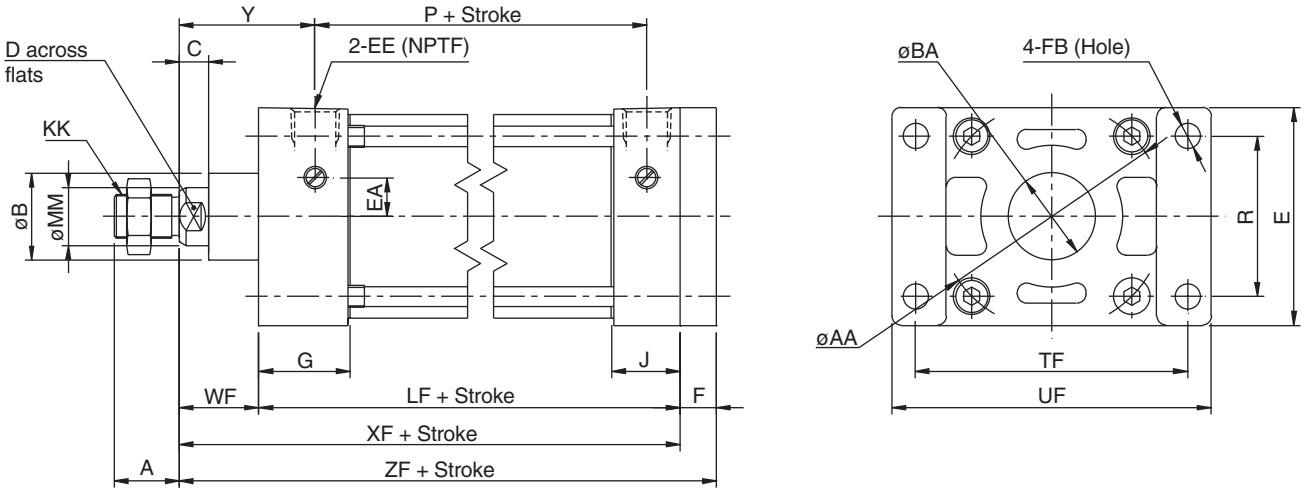
Bore size (in)	SA	XA	ZA
150 (1.5")	6	5 5/8	6 1/16
200 (2")	6	5 5/8	6 3/16
250 (2.5")	6 1/8	5 3/4	6 5/16
325 (3.25")	7 3/8	6 7/8	7 5/8
400 (4")	7 3/8	6 7/8	7 5/8

Rod Side Flange Style: NC□A1F (MF1 mounting style)



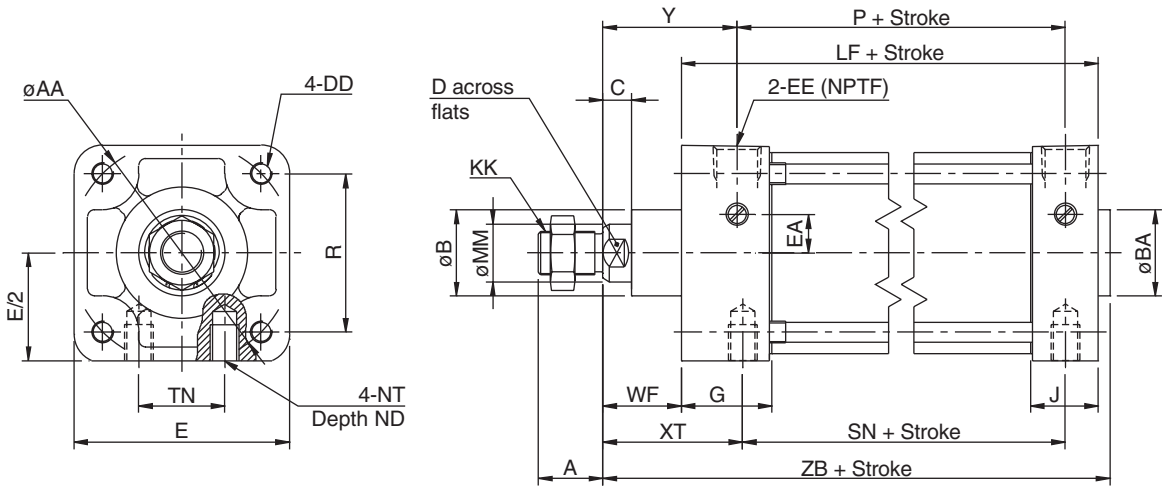
Bore size (in)	MM	KK	A	AA	B	BA	C	D	E	EA	EE	F	FB	G	J	R	TF	UF	W	WF	Y	LF	P	ZB
150 (1.5")	5/8	7/16-20	3/4	2.02	1 1/8	1 1/8	3/8	9/16	2	0.3	3/8	3/8	5/16	1.26	1.1	1.43	2 3/4	3 3/8	5/8	1	1.71	3 5/8	2.36	4 3/4
200 (2")	5/8	7/16-20	3/4	2.6	1 1/8	1 1/8	3/8	9/16	2 1/2	0.3	3/8	3/8	3/8	1.26	1.06	1.84	3 3/8	4 1/8	5/8	1	1.71	3 5/8	2.4	4 3/4
250 (2.5")	5/8	7/16-20	3/4	3.1	1 1/8	1 1/8	3/8	9/16	3	0	3/8	3/8	3/8	1.3	1.06	2.19	3 7/8	4 5/8	5/8	1	1.75	3 3/4	2.48	4 7/8
325 (3.25")	1	3/4-16	1 1/8	3.9	1 1/2	1 1/2	1/2	7/8	3 3/4	0	1/2	5/8	7/16	1.57	1.18	2.76	4 11/16	5 1/2	3/4	1 3/8	2.34	4 1/4	2.72	5 53/64
400 (4")	1	3/4-16	1 1/8	4.7	1 1/2	1 1/2	1/2	7/8	4 1/2	0	1/2	5/8	7/16	1.57	1.18	3.32	5 7/16	6 1/4	3/4	1 3/8	2.34	4 1/4	2.72	5 53/64

Head Side Flange Style: NC□A1G (MF2 mounting style)



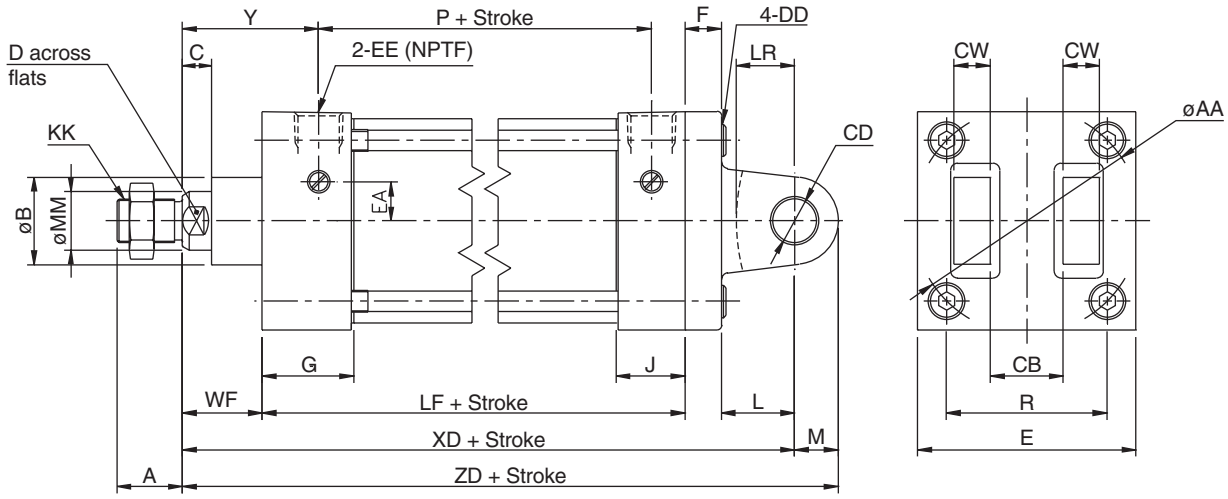
Bore size (in)	MM	KK	A	AA	B	BA	C	D	E	EA	EE	F	FB	G	J	R	TF	UF	WF	Y	P	XF	ZF
150 (1.5")	5/8	7/16-20	3/4	2.02	1 1/8	1 1/8	3/8	9/16	2	0.3	3/8	3/8	5/16	1.26	1.1	1.43	2 3/4	3 3/8	1	1.71	2.36	4 5/8	5
200 (2")	5/8	7/16-20	3/4	2.6	1 1/8	1 1/8	3/8	9/16	2 1/2	0.3	3/8	3/8	3/8	1.26	1.06	1.84	3 3/8	4 1/8	1	1.71	2.4	4 5/8	5
250 (2.5")	5/8	7/16-20	3/4	3.1	1 1/8	1 1/8	3/8	9/16	3	0	3/8	3/8	3/8	1.3	1.06	2.19	3 7/8	4 5/8	1	1.75	2.48	4 3/4	5 1/8
325 (3.25")	1	3/4-16	1 1/8	3.9	1 1/2	1 1/2	1/2	7/8	3 3/4	0	1/2	5/8	7/16	1.57	1.18	2.76	4 11/16	5 1/2	1 3/8	2.34	2.72	5 5/8	6 1/4
400 (4")	1	3/4-16	1 1/8	4.7	1 1/2	1 1/2	1/2	7/8	4 1/2	0	1/2	5/8	7/16	1.57	1.18	3.32	5 7/16	6 1/4	1 3/8	2.34	2.72	5 5/8	6 1/4

Side Tapped Style: NC□A1R (MS4 mounting style)



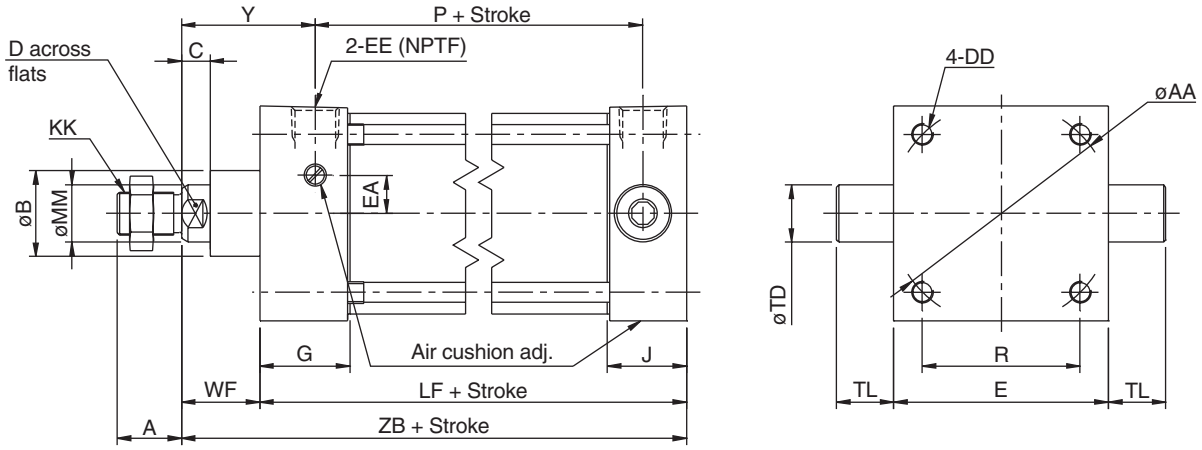
Bore size (in)	MM	KK	A	AA	B	BA	C	D	DD	E	E/2	EA	EE	G	J	R	ND	NT	TN	WF	XT	Y	LF	P	SN	ZB
150 (1.5")	5/8	7/16-20	3/4	2.02	1 1/8	1 1/8	3/8	9/16	1/4-28	2	1	0.3	3/8	1.26	1.1	1.43	9/32	1/4-20	5/8	1	1 15/16	1.71	3 5/8	2.36	2 1/4	4 3/4
200 (2")	5/8	7/16-20	3/4	2.6	1 1/8	1 1/8	3/8	9/16	5/16-24	2 1/2	1 1/4	0.3	3/8	1.26	1.06	1.84	7/16	5/16-18	7/8	1	1 15/16	1.71	3 5/8	2.4	2 1/4	4 3/4
250 (2.5")	5/8	7/16-20	3/4	3.1	1 1/8	1 1/8	3/8	9/16	5/16-24	3	1 1/2	0	3/8	1.3	1.06	2.19	19/32	3/8-16	1 1/4	1	1 15/16	1.75	3 3/4	2.48	2 3/8	4 7/8
325 (3.25")	1	3/4-16	1 1/8	3.9	1 1/2	1 1/2	1/2	7/8	3/8-24	3 3/4	1 7/8	0	1/2	1.57	1.18	2.76	5/8	1/2-13	1 1/2	1 3/8	2 7/16	2.34	4 1/4	2.72	2 5/8	5 53/64
400 (4")	1	3/4-16	1 1/8	4.7	1 1/2	1 1/2	1/2	7/8	3/8-24	4 1/2	2 1/4	0	1/2	1.57	1.18	3.32	5/8	1/2-13	2 1/16	1 3/8	2 7/16	2.34	4 1/4	2.72	2 5/8	5 53/64

Double Detachable Head Side Clevis Style: NC□A1D (MP2 mounting style)



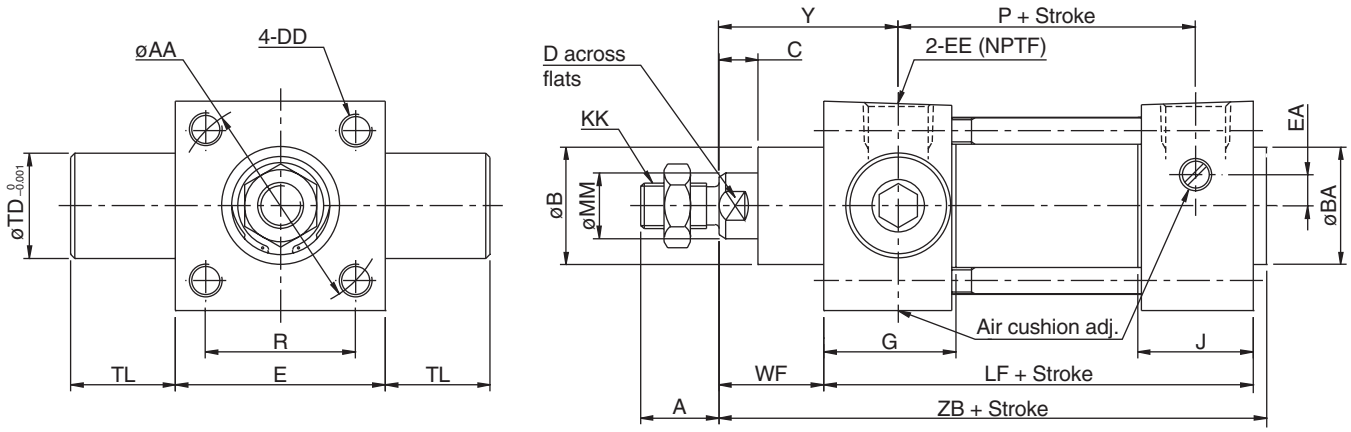
Bore size (in)	MM	KK	A	AA	B	C	CB	CD	CW	D	DD	E	EA	EE	F	G	J	R	L	LR	M	WF	XD	Y	LF	P	ZD
150 (1.5")	5/8	7/16-20	3/4	2.02	1 1/8	3/8	3/4	1/2	1/2	9/16	1/4-28	2	0.3	3/8	3/8	1.26	1.1	1.43	3/4	5/8	1/2	1	5 3/4	1.71	3 5/8	2.36	6 1/4
200 (2")	5/8	7/16-20	3/4	2.6	1 1/8	3/8	3/4	1/2	1/2	9/16	5/16-24	2 1/2	0.3	3/8	3/8	1.26	1.06	1.84	3/4	5/8	1/2	1	5 3/4	1.71	3 5/8	2.4	6 1/4
250 (2.5")	5/8	7/16-20	3/4	3.1	1 1/8	3/8	3/4	1/2	1/2	9/16	5/16-24	3	0	3/8	3/8	1.3	1.06	2.19	3/4	5/8	1/2	1	5 7/8	1.75	3 3/4	2.48	6 3/8
325 (3.25")	1	3/4-16	1 1/8	3.9	1 1/2	1/2	1 1/4	3/4	5/8	7/8	3/8-24	3 3/4	0	1/2	5/8	1.57	1.18	2.76	1 1/4	1	3/4	1 3/8	7 1/2	2.34	4 1/4	2.72	8 1/4
400 (4")	1	3/4-16	1 1/8	4.7	1 1/2	1/2	1 1/4	3/4	5/8	7/8	3/8-24	4 1/2	0	1/2	5/8	1.57	1.18	3.32	1 1/4	1	3/4	1 3/8	7 1/2	2.34	4 1/4	2.72	8 1/4

Head Side Trunnion Style: NC□A1J (MT2 mounting style)



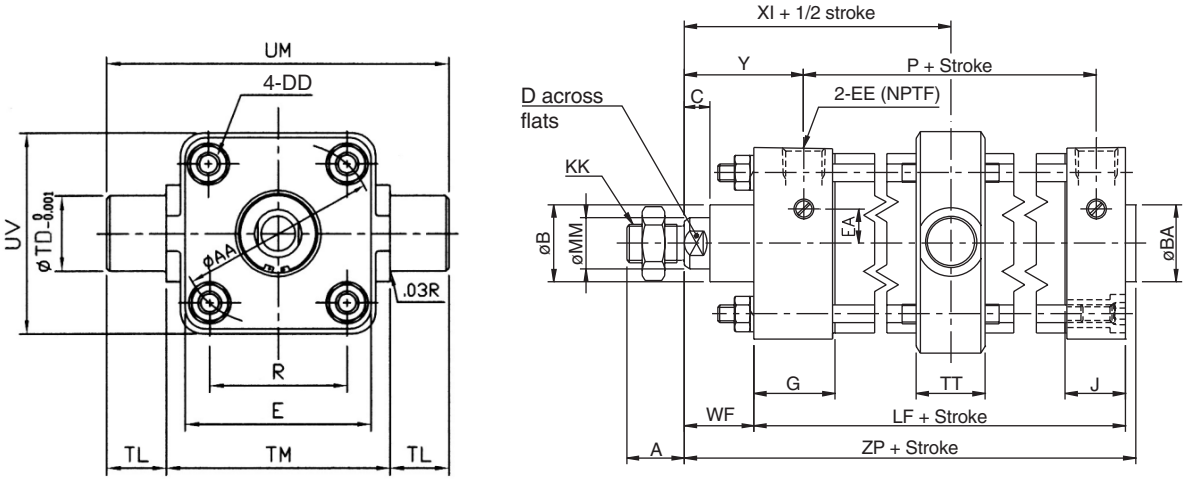
Bore size (in)	MM	KK	A	AA	B	C	D	DD	E	EA	EE	G	J	R	$TD^{0}_{0.001}$	TL	WF	Y	LF	P	ZB
150 (1.5")	5/8	7/16-20	3/4	2.02	1 1/8	3/8	9/16	1/4-28	2	0.3	3/8	1.26	1.1	1.43	1	1	1	1.71	3 5/8	2.36	4 3/4
200 (2")	5/8	7/16-20	3/4	2.6	1 1/8	3/8	9/16	5/16-24	2 1/2	0.3	3/8	1.26	1.06	1.84	1	1	1	1.71	3 5/8	2.4	4 3/4
250 (2.5")	5/8	7/16-20	3/4	3.1	1 1/8	3/8	9/16	5/16-24	3	0	3/8	1.3	1.06	2.19	1	1	1	1.75	3 3/4	2.48	4 7/8
325 (3.25")	1	3/4-16	1 1/8	3.9	1 1/2	1/2	7/8	3/8-24	3 3/4	0	1/2	1.57	1.18	2.76	1	1	1 3/8	2.34	4 1/4	2.72	5 53/64
400 (4")	1	3/4-16	1 1/8	4.7	1 1/2	1/2	7/8	3/8-24	4 1/2	0	1/2	1.57	1.18	3.32	1	1	1 3/8	2.34	4 1/4	2.72	5 53/64

Rod Side Trunnion Style: NC□A1U (MT1 mounting style)



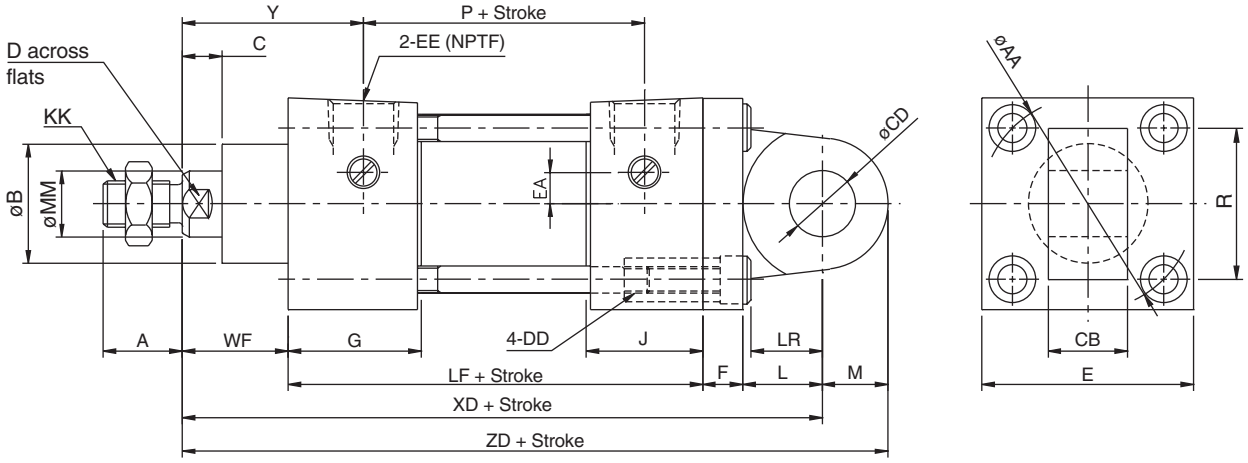
Bore size (in)	MM	KK	A	AA	B	BA	C	D	DD	E	EA	EE	G	J	R	$TD^{0}_{0.001}$	TL	WF	Y	LF	P	ZB
150 (1.5")	5/8	7/16-20	3/4	2.02	1 1/8	1 1/8	3/8	9/16	1/4-28	2	0.3	3/8	1.26	1.1	1.43	1	1	1	1.71	3 5/8	2.36	4 3/4
200 (2")	5/8	7/16-20	3/4	2.6	1 1/8	1 1/8	3/8	9/16	5/16-24	2 1/2	0.3	3/8	1.26	1.06	1.84	1	1	1	1.71	3 5/8	2.4	4 3/4
250 (2.5")	5/8	7/16-20	3/4	3.1	1 1/8	1 1/8	3/8	9/16	5/16-24	3	0	3/8	1.3	1.06	2.19	1	1	1	1.75	3 3/4	2.48	4 7/8
325 (3.25")	1	3/4-16	1 1/8	3.9	1 1/2	1 1/2	1/2	7/8	3/8-24	3 3/4	0	1/2	1.57	1.18	2.76	1	1	1 3/8	2.34	4 1/4	2.72	5 53/64
400 (4")	1	3/4-16	1 1/8	4.7	1 1/2	1 1/2	1/2	7/8	3/8-24	4 1/2	0	1/2	1.57	1.18	3.32	1	1	1 3/8	2.34	4 1/4	2.72	5 53/64

Center Trunnion Style: NC□A1T (MT4 mounting style)



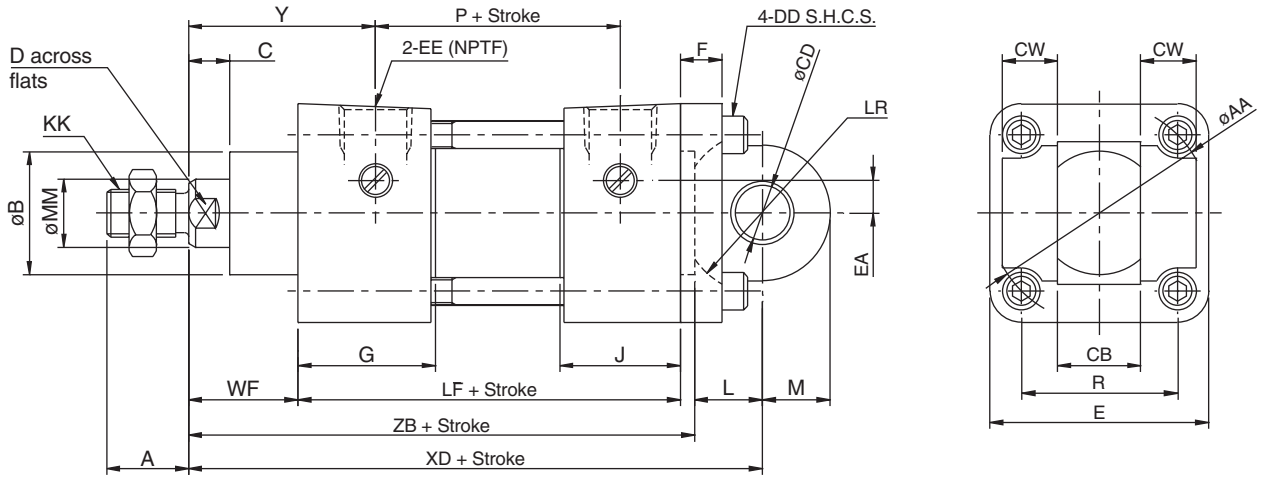
Bore size (in)	MM	KK	A	AA	B	BA	C	D	DD	E	EA	EE	G	J	R	$TD^{0}_{0.001}$	TL	TM	TT	UM	UV	WF	Y	P	LF	XI	ZP
150 (1.5")	5/8	7/16-20	3/4	2.02	1 1/8	1 1/8	3/8	9/16	1/4-28	2	0.3	3/8	1.26	1.1	1.43	1	1	2 1/2	1.18	4 1/2	2	1	1.71	2.36	3 5/8	2.89	4 3/4
200 (2")	5/8	7/16-20	3/4	2.6	1 1/8	1 1/8	3/8	9/16	5/16-24	2 1/2	0.3	3/8	1.26	1.06	1.84	1	1	3	1.18	5	2.56	1	1.71	2.4	3 5/8	2.91	4 3/4
250 (2.5")	5/8	7/16-20	3/4	3.1	1 1/8	1 1/8	3/8	9/16	5/16-24	3	0	3/8	1.3	1.06	2.19	1	1	3 1/2	1.18	5 1/2	3.39	1	1.75	2.48	3 3/4	2.99	4 7/8
325 (3.25")	1	3/4-16	1 1/8	3.9	1 1/2	1 1/2	1/2	7/8	3/8-24	3 3/4	0	1/2	1.57	1.18	2.76	1	1	4 1/2	1.34	6 1/2	4.33	1 3/8	2.34	2.72	4 1/4	3.7	5 53/64
400 (4")	1	3/4-16	1 1/8	4.7	1 1/2	1 1/2	1/2	7/8	3/8-24	4 1/2	0	1/2	1.57	1.18	3.32	1	1	5 1/4	1.57	7 1/4	5.12	1 3/8	2.34	2.72	4 1/4	3.74	5 53/64

Single Detachable Head Side Clevis Style: NC□A1C (MP4 mounting style)



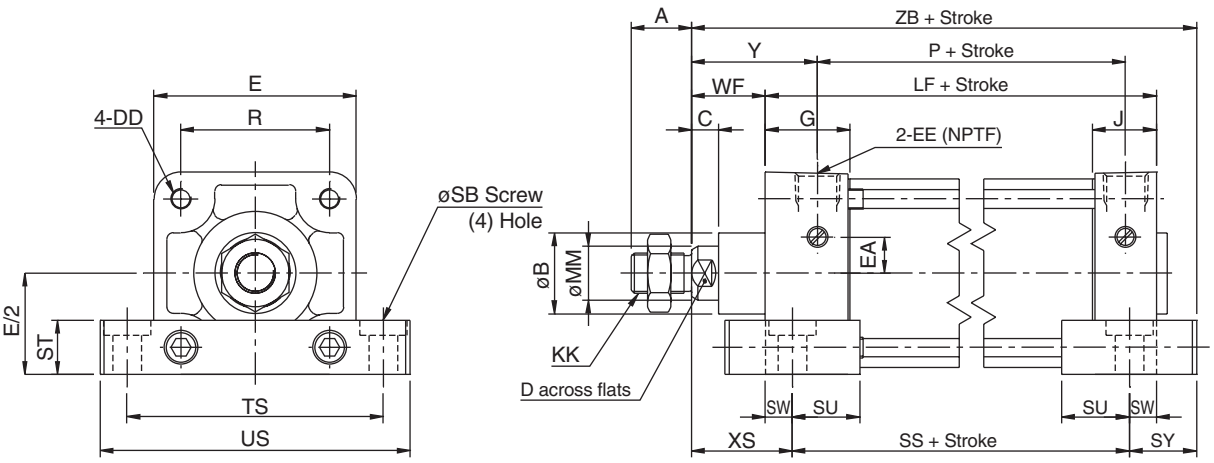
Bore size (in)	MM	KK	A	AA	B	C	CB	CD	D	DD	E	EA	EE	F	G	J	R	L	LR	M	WF	XD	Y	LF	P	ZD
150 (1.5")	5/8	7/16-20	3/4	2.02	1 1/8	3/8	3/4	1/2	9/16	1/4-28	2	0.3	3/8	3/8	1.26	1.1	1.43	3/4	5/8	1/2	1	5 3/4	1.71	3 5/8	2.36	6 1/4
200 (2")	5/8	7/16-20	3/4	2.6	1 1/8	3/8	3/4	1/2	9/16	5/16-24	2 1/2	0.3	3/8	3/8	1.26	1.06	1.84	3/4	5/8	1/2	1	5 3/4	1.71	3 5/8	2.4	6 1/4
250 (2.5")	5/8	7/16-20	3/4	3.1	1 1/8	3/8	3/4	1/2	9/16	5/16-24	3	0	3/8	3/8	1.3	1.06	2.19	3/4	5/8	1/2	1	5 7/8	1.75	3 3/4	2.48	6 3/8
325 (3.25")	1	3/4-16	1 1/8	3.9	1 1/2	1/2	1 1/4	3/4	7/8	3/8-24	3 3/4	0	1/2	5/8	1.57	1.18	2.76	1 1/4	1	3/4	1 3/8	7 1/2	2.34	4 1/4	2.72	8 1/4
400 (4")	1	3/4-16	1 1/8	4.7	1 1/2	1/2	1 1/4	3/4	7/8	3/8-24	4 1/2	0	1/2	5/8	1.57	1.18	3.32	1 1/4	1	3/4	1 3/8	7 1/2	2.34	4 1/4	2.72	8 1/4

Double Head Side Clevis Style: NC□A1X (MP1 mounting style)



Bore size (in)	MM	KK	A	AA	B	C	CB	CD	CW	D	DD	E	EA	EE	F	G	J	R	L	LR	M	WF	XD	Y	LF	P	ZB
150 (1.5")	5/8	7/16-20	3/4	2.02	1 1/8	3/8	3/4	1/2	1/2	9/16	1/4-28	2	0.3	3/8	3/8	1.26	1.1	1.43	0.62	.75	0.62	1	5 3/8	1.71	3 5/8	2.36	4 3/4
200 (2")	5/8	7/16-20	3/4	2.6	1 1/8	3/8	3/4	1/2	1/2	9/16	5/16-24	2 1/2	0.3	3/8	3/8	1.26	1.06	1.84	0.62	.75	0.62	1	5 3/8	1.71	3 5/8	2.4	4 3/4
250 (2.5")	5/8	7/16-20	3/4	3.1	1 1/8	3/8	3/4	1/2	1/2	9/16	5/16-24	3	0	3/8	3/8	1.30	1.06	2.19	0.62	.75	0.62	1	5 1/2	1.75	3 3/4	2.48	4 7/8
325 (3.25")	1	3/4-16	1 1/8	3.9	1 1/2	1/2	1 1/4	3/4	5/8	7/8	3/8-24	3 3/4	0	1/2	5/8	1.57	1.18	2.76	1.05	1.25	0.87	1 3/8	6 7/8	2.34	4 1/4	2.72	5 53/64
400 (4")	1	3/4-16	1 1/8	4.7	1 1/2	1/2	1 1/4	3/4	5/8	7/8	3/8-24	4 1/2	0	1/2	5/8	1.57	1.18	3.32	1.05	1.25	0.87	1 3/8	6 7/8	2.34	4 1/4	2.72	5 53/64

Side Lug Mounting Style: NC□A1S (MS2 mounting style)



Bore size (in)	MM	KK	A	B	C	D	DD	E	EA	EE	G	J	LF	P	R	SB	SS	ST	SU	SW	SY	TS	US	WF	XS	Y	ZB
150 (1.5")	5/8	7/16-20	3/4	1 1/8	3/8	9/16	1/4-28	2	0.3	3/8	1.26	1.1	3.63	2.36	1.43	3/8	2.88	5/8	0.94	3/8	0.94	2.75	3.50	1	1.38	1.71	5.19
200 (2")	5/8	7/16-20	3/4	1 1/8	3/8	9/16	5/16-24	2 1/2	0.3	3/8	1.26	1.06	3.63	2.4	1.84	3/8	2.88	5/8	0.94	3/8	0.94	3.25	4	1	1.38	1.71	5.19
250 (2.5")	5/8	7/16-20	3/4	1 1/8	3/8	9/16	5/16-24	3	0	3/8	1.3	1.06	3.75	2.48	2.19	3/8	3	3/4	0.94	3/8	0.94	3.75	4.50	1	1.38	1.75	5.31
325 (3.25")	1	3/4-16	1 1/8	1 1/2	1/2	7/8	3/8-24	3 3/4	0	1/2	1.57	1.18	4.25	2.72	2.76	1/2	3.25	1	1.25	1/2	1.25	4.75	5.75	1.38	1.88	2.34	6.38
400 (4")	1	3/4-16	1 1/8	1 1/2	1/2	7/8	3/8-24	4 1/2	0	1/2	1.57	1.18	4.25	2.72	3.32	1/2	3.25	1	1.25	1/2	1.25	5.50	6.50	1.38	1.88	2.34	6.38

NFPA Interchangeable Cylinder: Non-rotating Rod
Double Acting, Single Rod (Medium Duty)
Series NCA1K
Inch size: ø1.5", ø2", ø2.5"

How to Order

NCDA1 K **Mounting** **Bore** — **Stroke** **Suffix**

Ex: NCDA1KB150-0400

Auto switch capable

- **Rod non-rotating accuracy: ±0.5°**
- **Auto switch mounting available**

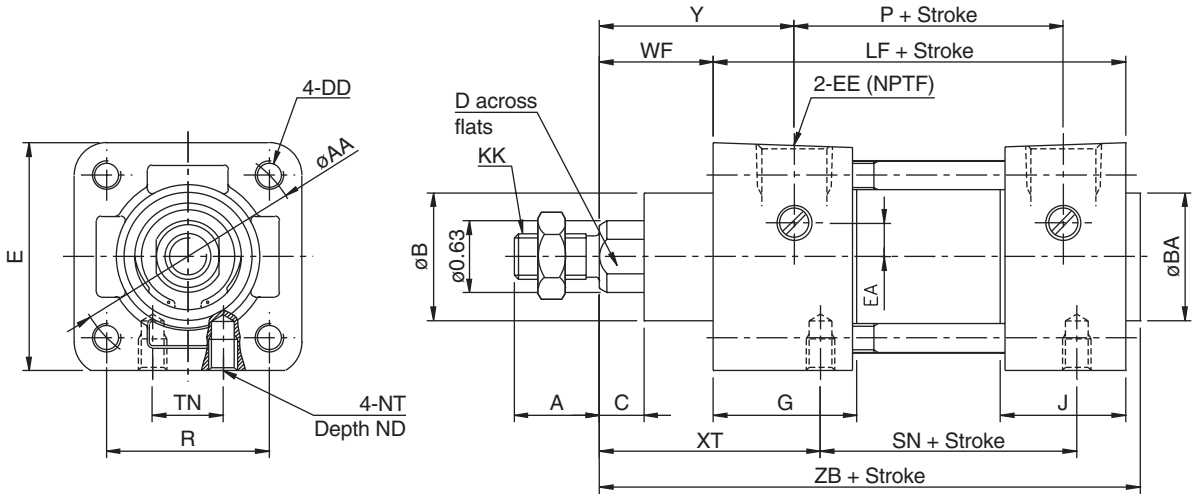
Specifications

Bore size (inch)	1.5	2	2.5
Fluid	Air		
Max. operating pressure	250 psi (1.75 MPa)		
Min. operating pressure	15 psi (0.06 MPa)		
Ambient and fluid temperature	40 to 140°F (5 to 60°C)		
Piston speed	2 to 20 inch/sec (50 to 500 mm/sec)		
Cushion	Air cushion standard		
Rotational torque range	3.9 lbs. in or less		
Non-rotating accuracy	±0.5°		
Mounting	Basic style, Foot style, Flange style Clevis style, Side tapped style Center trunnion style, Side lug style		

Standard Stroke

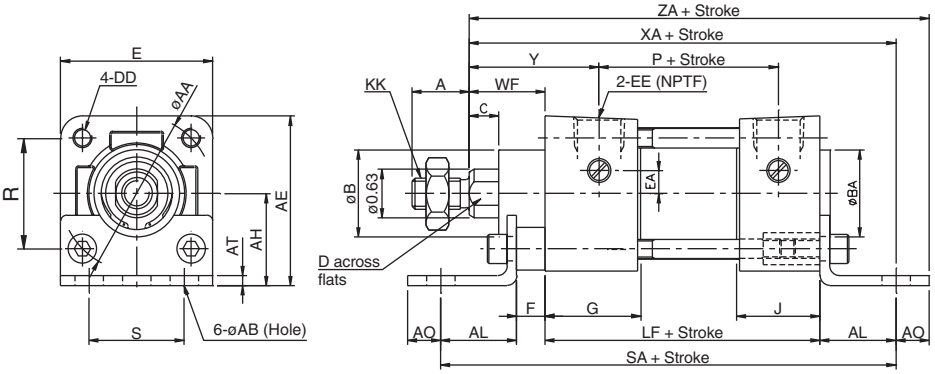
Bore size (in)	Standard stroke
1.50	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20
2, 2.50	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24

Non-rotating Rod - Basic Style/Side Tapped Style: NC□A1KB (MX0 mounting style)/NC□A1KR(MX4 mounting style)



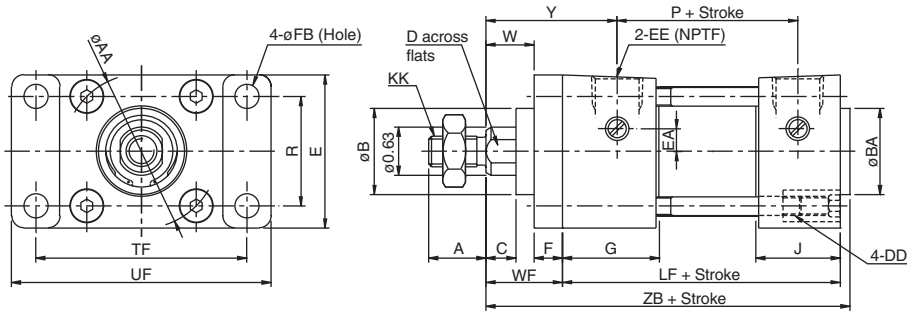
Bore size (in)	KK	A	AA	B	BA	C	D	DD	E	EA	EE	G	J	ND	NT	R	WF	Y	LF	P	ZB	TN	XT	SN
150 (1.5")	7/16-20	3/4	2.02	1 1/8	1 1/8	3/8	0.551	1/4-28	2	0.3	3/8	1.26	1.1	9/32	1/4-20	1.43	1	1.71	3 5/8	2.36	4 3/4	5/8	1 15/16	2 1/4
200 (2")	7/16-20	3/4	2.6	1 1/8	1 1/8	3/8	0.551	5/16-24	2 1/2	0.3	3/8	1.26	1.06	7/16	5/16-18	1.84	1	1.71	3 5/8	2.4	4 3/4	7/8	1 15/16	2 1/4
250 (2.5")	7/16-20	3/4	3.1	1 1/8	1 1/8	3/8	0.551	5/16-24	3	0	3/8	1.3	1.06	19/32	3/8-16	2.19	1	1.75	3 3/4	2.48	4 7/8	1 1/4	1 15/16	2 3/8

Non-rotating Rod-Foot Style: NC□A1KL (MS1 mounting style)



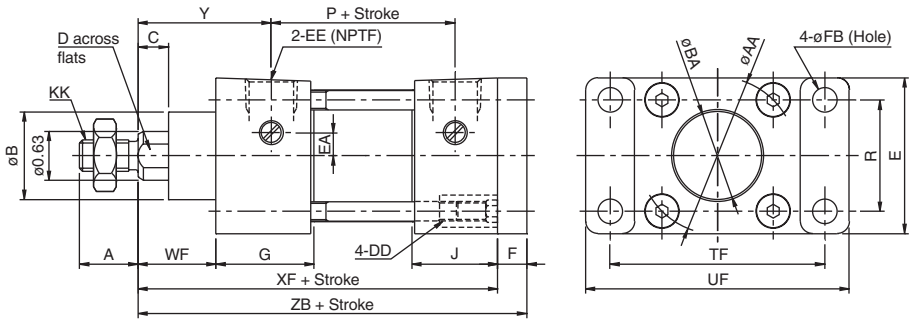
Bore size (in)	KK	A	AA	AB	AE	AH	AL	AO	AT	B	BA	C	D	DD	E	EA	EE	F	G	J	R	S	WF	Y	P	LF	SA	XA	ZA
150 (1.5")	7/16-20	3/4	2.02	3/8	2 3/16	1 3/16	1	7/16	1/8	1 1/8	1 1/8	3/8	0.551	1/4-28	2	0.3	3/8	3/8	1.26	1.1	1.43	1 1/4	1	1.71	2.36	3 5/8	6	5 5/8	6.062
200 (2")	7/16-20	3/4	2.6	3/8	2 11/16	1 7/16	1	9/16	1/8	1 1/8	1 1/8	3/8	0.551	5/16-24	2.5	0.3	3/8	3/8	1.26	1.06	1.84	1 3/4	1	1.71	2.4	3 5/8	6	5 5/8	6.197
250 (2.5")	7/16-20	3/4	3.1	3/8	3 1/8	1 5/8	1	9/16	1/8	1 1/8	1 1/8	3/8	0.551	5/16-24	3	0	3/8	3/8	1.3	1.06	2.19	2 1/4	1	1.75	2.48	3 3/4	6 1/4	5 3/4	6.321

Non-rotating Rod-Rod Side Flange Style: NC□A1KF (MF1 mounting style)



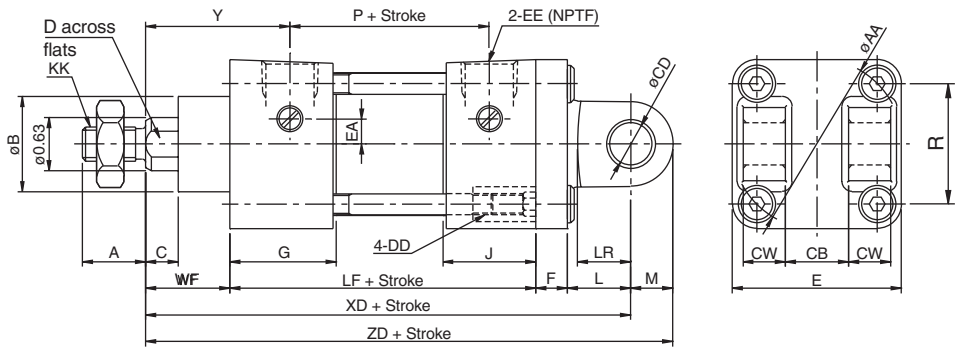
Bore size (in)	KK	A	AA	B	BA	C	D	DD	E	EA	EE	F	FB	G	J	R	TF	UF	W	WF	Y	LF	P	ZB
150 (1.5")	7/16-20	3/4	2.02	1 1/8	1 1/8	3/8	0.551	1/4-28	2	0.3	3/8	3/8	5/16	1.26	1.1	1.43	2 3/4	3 3/8	5/8	1	1.71	3 5/8	2.36	4 3/4
200 (2")	7/16-20	3/4	2.6	1 1/8	1 1/8	3/8	0.551	5/16-24	2.5	0.3	3/8	3/8	3/8	1.26	1.06	1.84	3 3/8	4 1/8	5/8	1	1.71	3 5/8	2.4	4 3/4
250 (2.5")	7/16-20	3/4	3.1	1 1/8	1 1/8	3/8	0.551	5/16-24	3	0	3/8	3/8	3/8	1.3	1.06	2.19	3 7/8	4 5/8	5/8	1	1.75	3 3/4	2.48	4 7/8

Non-rotating Rod-Head Side Flange Style: NC□A1KG (MF2 mounting style)



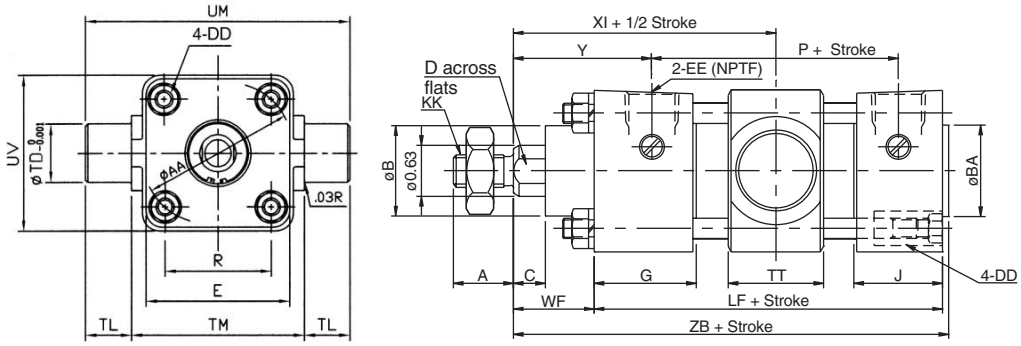
Bore size (in)	KK	A	AA	B	BA	C	D	DD	E	EA	EE	F	FB	G	J	R	TF	UF	WF	Y	P	XF	ZF
150 (1.5")	7/16-20	3/4	2.02	1 1/8	1 1/8	3/8	0.551	1/4-28	2	0.3	3/8	3/8	5/16	1.26	1.1	1.43	2 3/4	3 3/8	1	1.71	2.36	4 5/8	5
200 (2")	7/16-20	3/4	2.6	1 1/8	1 1/8	3/8	0.551	5/16-24	2.5	0.3	3/8	3/8	3/8	1.26	1.06	1.84	3 3/8	4 1/8	1	1.71	2.4	4 5/8	5
250 (2.5")	7/16-20	3/4	3.1	1 1/8	1 1/8	3/8	0.551	5/16-24	3	0	3/8	3/8	3/8	1.3	1.06	2.19	3 7/8	4 5/8	1	1.75	2.48	4 3/4	5 1/8

Non-rotating Rod-Double Detachable Head Side Clevis Style: NC□A1KD (MP2 mounting style)



Bore size (in)	KK	A	AA	B	C	CB	CD	CW	D	DD	E	EA	EE	F	G	J	R	L	LR	M	WF	XD	Y	LF	P	ZD
150 (1.5")	7/16-20	3/4	2.021	1 1/8	3/8	3/4	1/2	1/2	0.551	1/4-28	2	0.3	3/8	3/8	1.26	1.1	1.43	3/4	5/8	1/2	1	5 3/4	1.71	3 5/8	2.36	6 1/4
200 (2")	7/16-20	3/4	2.6	1 1/8	3/8	3/4	1/2	1/2	0.551	5/16-24	2.5	0.3	3/8	3/8	1.26	1.06	1.84	3/4	5/8	1/2	1	5 3/4	1.71	3 5/8	2.4	6 1/4
250 (2.5")	7/16-20	3/4	3.1	1 1/8	3/8	3/4	1/2	1/2	0.551	5/16-24	3	0	3/8	3/8	1.3	1.06	2.19	3/4	5/8	1/2	1	5 7/8	1.75	3 3/4	2.48	6 3/8

Non-rotating Rod-Center Trunnion Style: NC□A1KT (MT4 mounting style)



Bore size (in)	KK	A	AA	B	BA	C	D	DD	E	EA	EE	G	J	R	TD	TL	TM	TT	UM	UV	WF	Y	P	LF	XI	ZB
150 (1.5")	7/16-20	3/4	2.02	1 1/8	1 1/8	3/8	0.551	1/4-28	2	0.3	3/8	1.26	1.1	1.43	1	1	2.5	1.18	4.5	2	1	1.71	2.36	3 5/8	2.89	4 3/4
200 (2")	7/16-20	3/4	2.6	1 1/8	1 1/8	3/8	0.551	5/16-24	2.5	0.3	3/8	1.26	1.06	1.84	1	1	3	1.18	5	2.56	1	1.71	2.4	3 5/8	2.91	4 3/4
250 (2.5")	7/16-20	3/4	3.1	1 1/8	1 1/8	3/8	0.551	5/16-24	3	0	3/8	1.3	1.06	2.19	1	1	3.5	1.18	5.5	3.39	1	1.75	2.48	3 3/4	2.99	4 7/8

NFPA Interchangeable Cylinder: Standard Type
Double Acting, Double Rod (Medium Duty)
Series NCA1W
Inch size: ø1.5", ø2", ø2.5", ø3.25", ø4"

How to Order

NCDA1W | **Mounting** | **Bore** — **Stroke** | **Suffix**

Ex: NCDA1WB 150-400

- Auto switch capable
- Double rod

- **Standard with air cushion**
- **Auto switch mounting available**

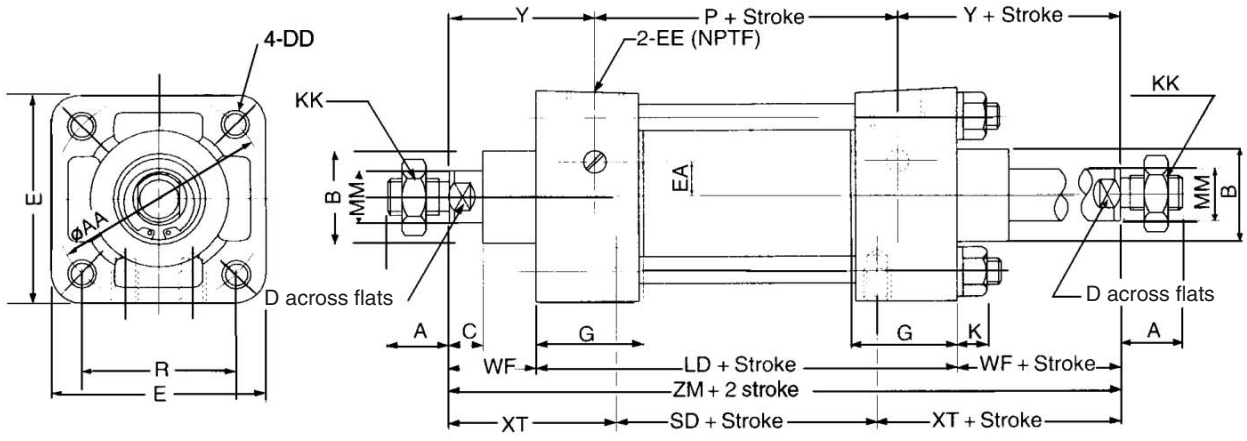
Specifications

Bore size (inch)	1.5	2	2.5	3.25	4
Fluid	Air				
Max. operating pressure	250 psi (1.75 MPa)				
Min. operating pressure	8 psi (0.06 MPa)				
Ambient & fluid temperature	40 to 140°F (5 to 60°C)				
Piston speed	2 to 20 inch/sec (50 to 500 mm/sec)				
Cushion	Air cushion standard				
Mounting	Basic style, Foot style, Flange style Center trunnion style, Rod side trunnion style, Side tapped style				

Standard Stroke

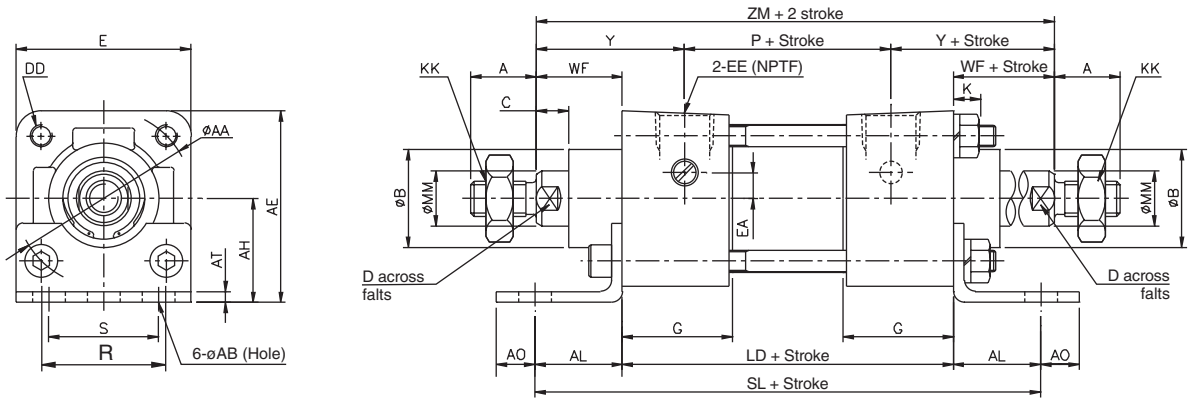
Bore size (in)	Standard stroke
1.50	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20
2, 2.50	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24
3.25, 4	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24, 28

Double Rod-Basic Style/Side Tapped Style: NC□A1WB (MX0 mounting style)/NC□A1WR (MX4 mounting style)



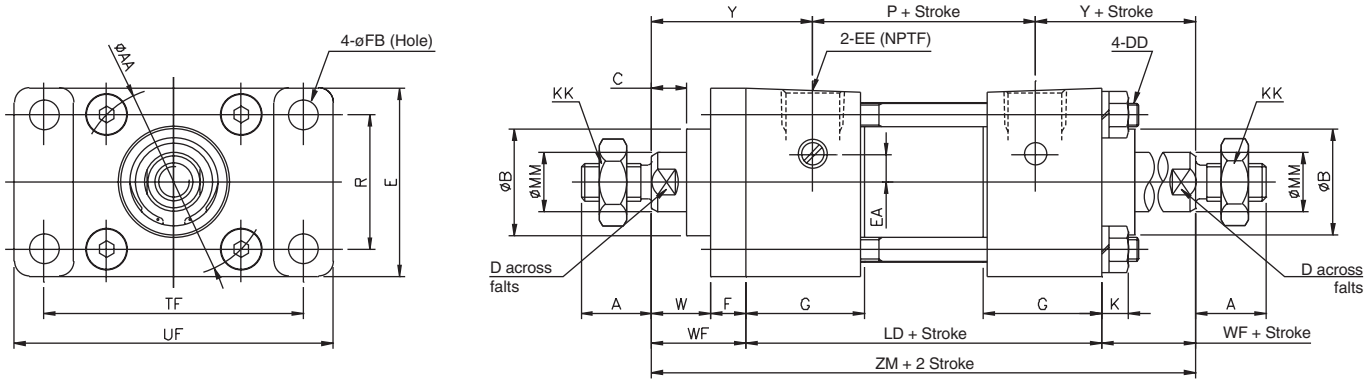
Bore size (in)	MM	KK	A	AA	B	C	D	DD	E	EA	EE	G	K	LD	P	R	WF	Y	ZM	XT	SD
150 (1.5")	5/8	7/16-20	3/4	2.02	1 1/8	3/8	9/16	1/4-28	2	0.3	3/8	1.26	0.28	3.78	2.36	1.43	1	1.71	5.78	1 15/16	1.9
200 (2")	5/8	7/16-20	3/4	2.6	1 1/8	3/8	9/16	5/16-24	2 1/2	0.3	3/8	1.26	0.34	3.82	2.4	1.84	1	1.71	5.82	1 15/16	1.94
250 (2.5")	5/8	7/16-20	3/4	3.1	1 1/8	3/8	9/16	5/16-24	3	0	3/8	1.3	0.34	3.98	2.48	2.19	1	1.75	5.98	1 15/16	2.1
325 (3.25")	1	3/4-16	1 1/8	3.9	1 1/2	1/2	7/8	3/8-24	3 3/4	0	1/2	1.57	0.42	4.64	2.72	2.76	1 3/8	2.34	7.4	2 7/16	2.52
400 (4")	1	3/4-16	1 1/8	4.7	1 1/2	1/2	7/8	3/8-24	4 1/2	0	1/2	1.57	0.42	4.64	2.72	3.32	1 3/8	2.34	7.4	2 7/16	2.52

Double Rod-Foot Style: NC□A1WL (MS1 mounting style)



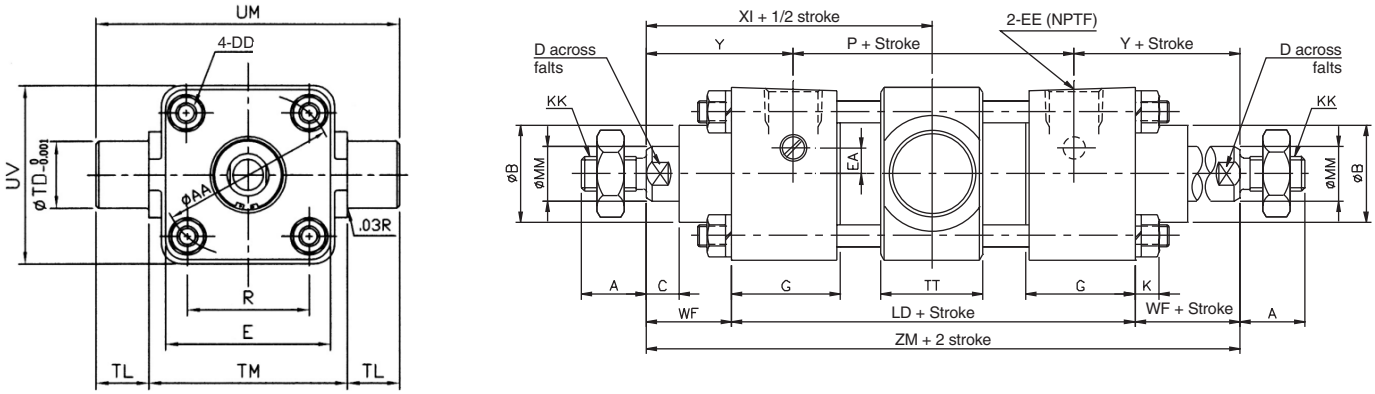
Bore size (in)	MM	KK	A	AA	AB	AE	AH	AL	AO	TA	B	C	D	DD	E	EA	EE	G	R	K	S	WF	Y	P	LD	SL	ZM
150 (1.5")	5/8	7/16-20	3/4	2.02	3/8	2 3/16	1 3/16	1	7/16	1/8	1 1/8	3/8	9/16	1/4-28	2	0.3	3/8	1.26	1.43	0.28	1 1/4	1	1.71	2.36	3.78	5.78	5.78
200 (2")	5/8	7/16-20	3/4	2.6	3/8	2 11/16	1 7/16	1	9/16	1/8	1 1/8	3/8	9/16	5/16-24	2.5	0.3	3/8	1.26	1.84	0.34	1 3/4	1	1.71	2.4	3.82	5.82	5.82
250 (2.5")	5/8	7/16-20	3/4	3.1	3/8	3 1/8	1 5/8	1	9/16	1/8	1 1/8	3/8	9/16	5/16-24	3	0	3/8	1.3	2.19	0.34	2 1/4	1	1.75	2.48	3.98	5.98	5.98
325 (3.25")	1	3/4-16	1 1/8	3.9	1/2	3 13/16	1 15/16	1 1/4	3/4	11/64	1 1/2	1/2	7/8	3/8-24	3.75	0	1/2	1.57	2.76	0.42	2 3/4	1 3/8	2.34	2.72	4.64	7.14	7.40
400 (4")	1	3/4-16	1 1/8	4.7	1/2	4 1/2	2 1/4	1 1/4	3/4	15/64	1 1/2	1/2	7/8	3/8-24	4.5	0	1/2	1.57	3.32	0.42	3 1/2	1 3/8	2.34	2.72	4.64	7.14	7.40

Double Rod-Rod Side Flange Style: NC□A1WF (MF1 mounting style)



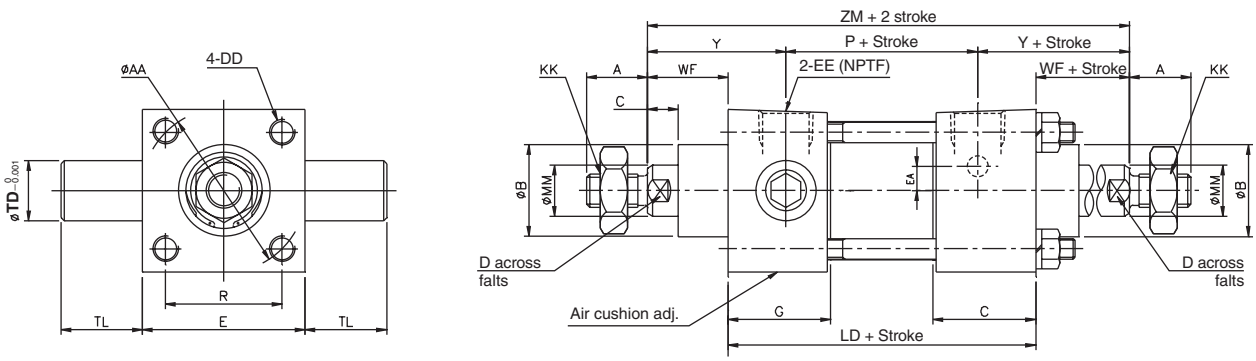
Bore size (in)	MM	KK	A	AA	B	C	D	DD	E	EA	EE	F	FB	G	K	R	TF	UF	W	WF	Y	LD	P	ZM
150 (1.5")	5/8	7/16-20	3/4	2.02	1 1/8	3/8	9/16	1/4-28	2	0.3	3/8	3/8	5/16	1.26	0.28	1.43	2 3/4	3 3/8	5/8	1	1.71	3.78	2.36	5.78
200 (2")	5/8	7/16-20	3/4	2.6	1 1/8	3/8	9/16	5/16-24	2.5	0.3	3/8	3/8	3/8	1.26	0.34	1.84	3 3/8	4 1/8	5/8	1	1.71	3.82	2.40	5.82
250 (2.5")	5/8	7/16-20	3/4	3.1	1 1/8	3/8	9/16	5/16-24	3	0	3/8	3/8	3/8	1.3	0.34	2.19	3 7/8	4 5/8	5/8	1	1.75	3.98	2.48	5.98
325 (3.25")	1	3/4-16	1 1/8	3.9	1 1/2	1/2	7/8	3/8-24	3.75	0	1/2	5/8	7/16	1.57	0.42	2.76	4 11/16	5 1/2	3/4	1 3/8	2.34	4.64	2.72	7.40
400 (4")	1	3/4-16	1 1/8	4.7	1 1/2	1/2	7/8	3/8-24	4.5	0	1/2	5/8	7/16	1.57	0.42	3.32	5 7/16	6 1/4	3.4	1 3/8	2.34	4.64	2.72	7.40

Double Rod-Center Trunnion Style: NC□A1WT (MT4 mounting style)



Bore size (in)	MM	KK	A	AA	B	C	D	DD	E	EA	EE	G	K	R	TD-0.001	TL	TM	TT	UM	UV	WF	Y	P	LD	XI	ZM
150 (1.5")	5/8	7/16-20	3/4	2.02	1 1/8	3/8	9/16	1/4-28	2	0.3	3/8	1.26	0.28	1.43	1	1	2.5	1.18	4.5	2	1	1.71	2.36	3.78	2.89	5.78
200 (2")	5/8	7/16-20	3/4	2.6	1 1/8	3/8	9/16	5/16-24	2.5	0.3	3/8	1.26	0.34	1.84	1	1	3	1.18	5	2.56	1	1.71	2.40	3.82	2.91	5.82
250 (2.5")	5/8	7/16-20	3/4	3.1	1 1/8	3/8	9/16	5/16-24	3	0	3/8	1.3	0.34	2.19	1	1	3.5	1.18	5.5	3.39	1	1.75	2.48	3.98	2.99	5.98
325 (3.25")	1	3/4-16	1 1/8	3.9	1 1/2	1/2	7/8	3/8-24	3.75	0	1/2	1.57	0.42	2.76	1	1	4.5	1.34	6.5	4.33	1 3/8	2.34	2.72	4.64	3.70	7.40
400 (4")	1	3/4-16	1 1/8	4.7	1 1/2	1/2	7/8	3/8-24	4.5	0	1/2	1.57	0.42	3.32	1	1	5.25	1.57	7.25	5.12	1 3/8	2.34	2.72	4.64	3.74	7.40

Double Rod - Rod Side Trunnion Style: NC□A1WU (MT1 mounting style)



Bore size (in)	MM	KK	A	AA	B	C	D	DD	E	EA	EE	G	K	R	TD-0.001	TL	WF	Y	LD	P	ZM
150 (1.5")	5/8	7/16-20	3/4	2.02	1 1/8	3/8	9/16	1/4-28	2	0.3	3/8	1.26	0.28	1.43	1	1	1	1.71	3.78	2.36	5.78
200 (2")	5/8	7/16-20	3/4	2.6	1 1/8	3/8	9/16	5/16-24	2.5	0.3	3/8	1.26	0.34	1.84	1	1	1	1.71	3.82	2.4	5.82
250 (2.5")	5/8	7/16-20	3/4	3.1	1 1/8	3/8	9/16	5/16-24	3	0	3/8	1.3	0.34	2.19	1	1	1	1.75	3.98	2.48	5.98
325 (3.25")	1	3/4-16	1 1/8	3.9	1 1/2	1/2	7/8	3/8-24	3.75	0	1/2	1.57	0.42	2.76	1	1	1 3/8	2.34	4.64	2.72	7.40
400 (4")	1	3/4-16	1 1/8	4.7	1 1/2	1/2	7/8	3/8-24	4.5	0	1/2	1.57	0.42	3.32	1	1	1 3/8	2.34	4.64	2.72	7.40

Rod Boot

Rod boots are used to protect the surface of a piston rod in harsh environments.

Rod Boot Material

Suffix for option	Material	Max. temperature
J	Nylon	140°F (60°C)
K	Neoprene	230°F (110°C)*

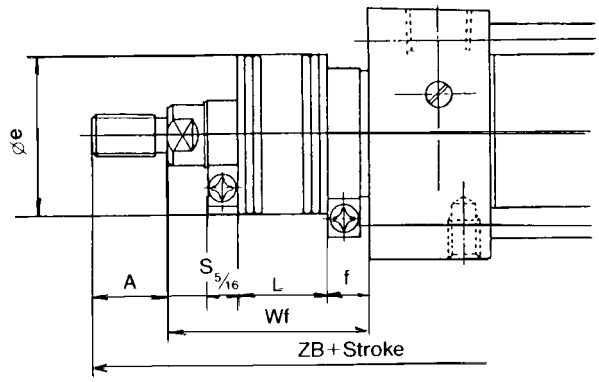
* Max. temperature is for boot only.

How to Order

NC D A1 Mounting Bore — Stroke Suffix Boot

Ex: NCDA1B150-0200J

- Auto switch capable
- Rod boot
  - J–Nylon rod boot
  - K–Neoprene rod boot



Rod Boot Dimensions

Bore size (in)	A	ØE	F	L										
				0 to 2	2.1 to 4	4.1 to 6	6.1 to 8	8.1 to 10	10.1 to 12	12.1 to 14	14.1 to 16	16.1 to 20	20.1 to 24	24.1 to 28
150 (1.5")	0.75	1.375	0.734	0.5	1	1.5	2	2.5	3	3.5	4	5	—	—
200 (2")	0.75	1.375	0.734										6	—
250 (2.5")	0.75	1.375	0.734										6	—
325 (2.25")	1.125	1.968	0.984										6	7
400 (4")	1.125	1.968	0.984										6	7

Bore size (in)	Wf										
	0 to 2	2.1 to 4	4.1 to 6	6.1 to 8	8.1 to 10	10.1 to 12	12.1 to 14	14.1 to 16	16.1 to 20	20.1 to 24	24.1 to 28
150 (1.5")	1.937	2.437	2.937	3.437	3.937	4.437	4.937	5.437	6.437	—	—
200 (2")	1.937	2.437	2.937	3.437	3.937	4.437	4.937	5.437	6.437	7.437	—
250 (2.5")	1.937	2.437	2.937	3.437	3.937	4.437	4.937	5.437	6.437	7.437	—
325 (2.25")	2.312	2.812	3.312	3.812	4.312	4.812	5.312	5.812	6.812	7.812	8.812
400 (4")	2.312	2.812	3.312	3.812	4.312	4.812	5.312	5.812	6.812	7.812	8.812

Bore size (in)	ZB										
	0 to 2	2.1 to 4	4.1 to 6	6.1 to 8	8.1 to 10	10.1 to 12	12.1 to 14	14.1 to 16	16.1 to 20	20.1 to 24	24.1 to 28
150 (1.5")	5.689	6.187	6.687	7.187	7.687	8.187	8.687	9.187	10.187	—	—
200 (2")	5.689	6.187	6.687	7.187	7.687	8.187	8.687	9.187	10.187	11.187	—
250 (2.5")	5.812	6.312	6.812	7.312	7.812	8.312	8.812	9.937	10.312	11.312	—
325 (2.25")	6.765	7.265	7.765	8.265	8.765	9.265	9.765	10.265	11.265	12.265	13.265
400 (4")	6.765	7.265	7.765	8.265	8.765	9.265	9.765	10.265	11.265	12.265	13.265

Stainless Steel Rod

- **Stainless steel piston rod is used to protect in harsh or wet environments.**
- **Auto switch mounting available.**

Specifications

Bore size (inch)	1.5	2	2.5	3.25	4
Fluid	Air				
Max. operating pressure	250 psi (1.75 MPa)				
Min. operating pressure	8 psi (0.06 MPa)				
Rod material	Stainless steel 304				
Ambient & fluid temperature	40 to 140°F (5 to 60°C)				
Piston speed	2 to 20 inch/sec (50 to 500 mm/sec)				
Cushion	Air cushion standard				
Mounting	Basic style, Foot style, Flange style Center trunnion style, Side tapped style, Clevis style Rod side trunnion style, Head side trunnion style Side lug style				

Standard Stroke

Bore size (in)	Standard stroke
1.50	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20
2, 2.50	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24
3.25, 4	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24, 28

How to Order

NC D A1 Mounting Bore — Stroke Suffix — XC6

Ex: NCDA1B 150-0400-XC6

- Auto switch capable
- Stainless steel rod

Low Speed

- **Smooth movements even at 0.4 to 2 inch/sec**
- **Auto switch mounting available.**

Specifications

Bore size (inch)	1.5	2	2.5	3.25	4
Fluid	Air				
Max. operating pressure	250 psi (1.75 MPa)				
Min. operating pressure	8 psi (0.06 MPa)				
Ambient & fluid temperature	40 to 140°F (5 to 60°C)				
Piston speed	0.4 to 2 inch/sec (10 to 50 mm/sec)				
Cushion	None				
Mounting	Basic style, Foot style, Flange style Center trunnion style, Side tapped style, Clevis style Rod side trunnion style, Head side trunnion style Side lug style				

Standard Stroke

Bore size (in)	Standard stroke
1.50	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20
2, 2.50	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24
3.25, 4	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24, 28

How to Order

NC D A1 Mounting Bore — Stroke N — XB9

Ex: NCDA1B 150-0400N-XB9

- Auto switch capable
- Low friction/Low speed
- **Standard**

High Temperature

• **Use at high temperature up to 300°F.**

Specifications

Bore size (inch)	1.5	2	2.5	3.25	4
Fluid	Air				
Max. operating pressure	250 psi (1.75 MPa)				
Min. operating pressure	8 psi (0.06 MPa)				
Ambient & fluid temperature	14 to 300°F (–10 to 150°C)				
Seal material	Fluoro rubber				
Piston speed	2 to 20 inch/sec (50 to 500 mm/sec)				
Cushion	Air cushion standard				
Mounting	Basic style, Foot style, Flange style Center trunnion style, Side tapped style, Clevis style Rod side trunnion style, Head side trunnion style Side lug style				

Standard Stroke

Bore size (in)	Standard stroke
1.50	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20
2, 2.50	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24
3.25, 4	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24, 28

How to Order

NCA1 [Mounting] [Bore]—[Stroke] [Suffix]—**XB6**

Ex: NCA1B 150-0400-XB6

└ High temperature

Auto switch capable not available

Low Temperature

• **Use at low temperature down to –22°F.**

Specifications

Bore size (inch)	1.5	2	2.5	3.25	4
Fluid	Air				
Max. operating pressure	250 psi (1.75 MPa)				
Min. operating pressure	8 psi (0.06 MPa)				
Ambient & fluid temperature	–22 to 140°F (–30 to 60°C)				
Seal material	Low durometer nitril rubber				
Piston speed	2 to 20 inch/sec (50 to 500 mm/sec)				
Cushion	None				
Mounting	Basic style, Foot style, Flange style Center trunnion style, Side tapped style, Clevis style Rod side trunnion style, Head side trunnion style Side lug style				

Standard Stroke

Bore size (in)	Standard stroke
1.50	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20
2, 2.50	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24
3.25, 4	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24, 28

How to Order

NCA1 [Mounting] [Bore]—[Stroke] **N**—**XB7**

Ex: NCA1B 150-0400N-XB7

└ Low temperature

● **Standard**

Auto switch capable not available

Oversized Rod

Specifications

Bore size (inch)	2	2.5	3.25	4
Fluid	Air			
Max.operating pressure	250 psi (1.75 MPa)			
Min.operating pressure	8 psi (0.06 MPa)			
Ambient & fluid temperature	40 to 140°F (5 to 60°C)			
Piston speed	2 to 20 inch/sec (50 to 500 mm/sec)			
Cushion	Air cushion standard			
Mounting	Basic style, Foot style, Flange style, Center trunnion style, Side tapped style			

Standard Stroke

Bore size (in)	Standard stroke
2, 2.50	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24
3.25, 4	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24, 28

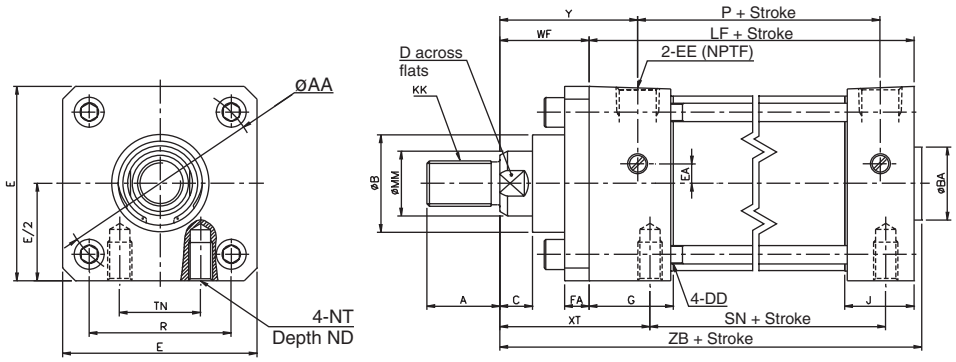
How to Order Oversized Rod/Standard

NC D A1 Mounting Bore — Stroke Suffix — XB5

Ex: NCDA1B 250-0200-XB5

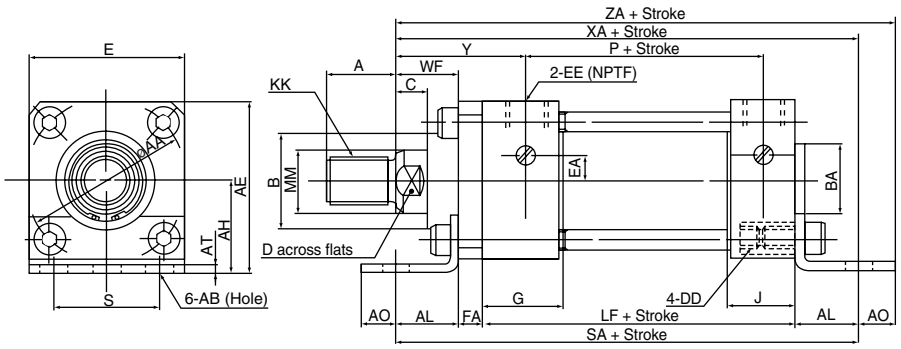
Auto switch capable — Oversized/rod

Oversized Rod-Basic Style: NC□A1B (XB5)



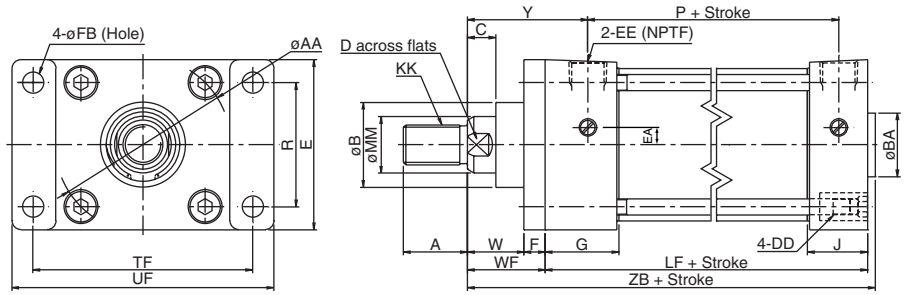
Bore size (in)	MM	KK	A	AA	B	BA	C	D	DD	E	EA	EE	FA	G	J	R	ND	NT	TN	WF	XT	Y	LF	P	SN	ZB
200 (2")	1	3/4-16	1 1/8	2.6	1 1/2	1 1/8	1/2	7/8	5/16-24	2 1/2	0.3	3/8	3/8	1.26	1.06	1.84	7/16	5/16-18	7/8	1 3/8	2 5/16	2.09	3 5/8	2.40	2 1/4	5 1/8
250 (2.5")	1	3/4-16	1 1/8	3.1	1 1/2	1 1/8	1/2	7/8	5/16-24	3	0	3/8	3/8	1.30	1.06	2.19	19/32	3/8-18	1 1/4	1 3/8	2 5/16	2.13	3 3/4	2.48	2 3/8	5 1/4
325 (3.25")	1 3/8	1-14	1 5/8	3.9	2	1 1/2	5/8	1 1/4	3/8-24	3 3/4	0	1/2	5/8	1.57	1.18	2.76	5/8	1/2-13	1 1/2	1 5/8	2 11/16	2.59	4 1/4	2.72	2 5/8	6 5/64
400 (4")	1 3/8	1-14	1 5/8	4.7	2	1 1/2	5/8	1 1/4	3/8-24	3 3/4	0	1/2	5/8	1.57	1.18	3.32	5/8	1/2-13	2 1/16	1 5/8	2 11/16	2.59	4 1/4	2.72	2 5/8	6 5/64

Oversized Rod-Foot Style: NC□A1L (XB5)



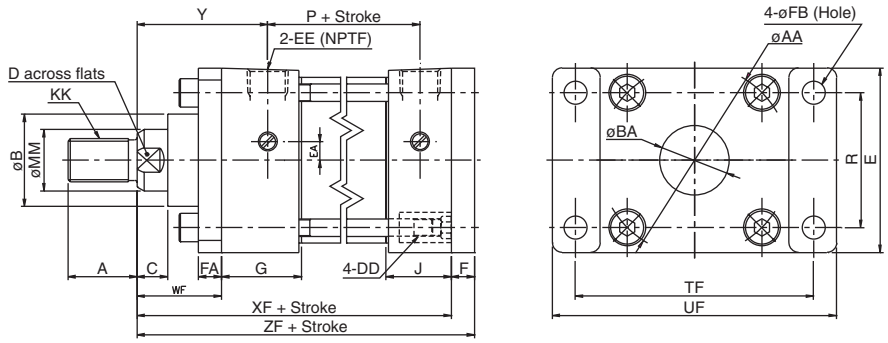
Bore size (in)	MM	KK	A	AA	AB	AE	AH	AL	AO	AT	B	BA	C	D	DD	E	EA	EE	FA	G	J	S	WF	Y	P	LF	SA	XA	ZA
200 (2")	1	3/4-16	1 1/8	2.6	3/8	2 11/16	1 7/16	1	9/16	1/8	1 1/2	1 1/8	1/2	7/8	5/16-24	2 1/2	0.3	3/8	3/8	1.26	1.06	1 3/4	1 3/8	2.09	2.40	3 5/8	6	6	6 9/16
250 (2.5")	1	3/4-16	1 1/8	3.1	3/8	3 1/8	1 5/8	1	9/16	1/8	1 1/2	1 1/8	1/2	7/8	5/16-24	3	0	3/8	3/8	1.30	1.06	2 1/4	1 3/8	2.13	2.48	3 3/4	6 1/8	6 1/8	6 11/16
325 (3.25")	1 3/8	1-14	1 5/8	3.9	1/2	3 13/16	1 15/16	1 1/4	3/4	11/64	2	1 1/2	5/8	1 1/4	3/8-24	3 3/4	0	1/2	5/8	1.57	1.18	2 3/4	1 5/8	2.59	2.72	4 1/4	7 3/8	7 1/8	7 7/8
400 (4")	1 3/8	1-14	1 5/8	4.7	1/2	4 1/2	2 1/4	1 1/4	3/4	15/64	2	1 1/2	5/8	1 1/4	3/8-24	4 1/2	0	1/2	5/8	1.57	1.18	3 1/2	1 5/8	2.59	2.72	4 1/4	7 3/8	7 1/8	7 7/8

Oversized Rod-Rod Side Flange Style: NC□A1F (XB5)



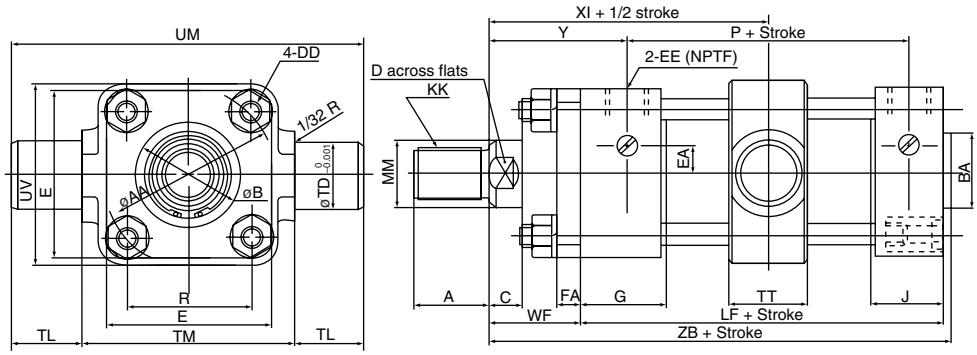
Bore size (in)	MM	KK	A	AA	B	BA	C	D	DD	E	EA	EE	F	FB	G	J	R	TF	UF	W	WF	LF	Y	P	ZB
200 (2")	1	3/4-16	1 1/8	2.6	1 1/2	1 1/8	1/2	7/8	5/16-24	2.5	0.3	3/8	3/8	3/8	1.26	1.06	1.84	3 3/8	4 1/8	1	1 3/8	3 5/8	2.09	2.40	5 1/8
250 (2.5")	1	3/4-16	1 1/8	3.1	1 1/2	1 1/8	1/2	7/8	5/16-24	3	0	3/8	3/8	3/8	1.30	1.06	2.19	3 7/8	4 5/8	1	1 3/8	3 3/4	2.13	2.48	5 1/4
325 (3.25")	1 3/8	1-14	1 5/8	3.9	2	1 1/2	5/8	1 1/4	3/8-24	3.25	0	1/2	5/8	7/16	1.57	1.18	2.76	4 11/16	5 1/2	1	1 5/8	4 1/4	2.59	2.72	6 5/64
400 (4")	1 3/8	1-14	1 5/8	4.7	2	1 1/2	5/8	1 1/4	3/8-24	4.5	0	1/2	5/8	7/16	1.57	1.18	3.32	5 7/16	6 1/4	1	1 5/8	4 1/4	2.59	2.72	6 5/64

Oversized Rod-Head Side Flange Style NC□A1G (XB5)



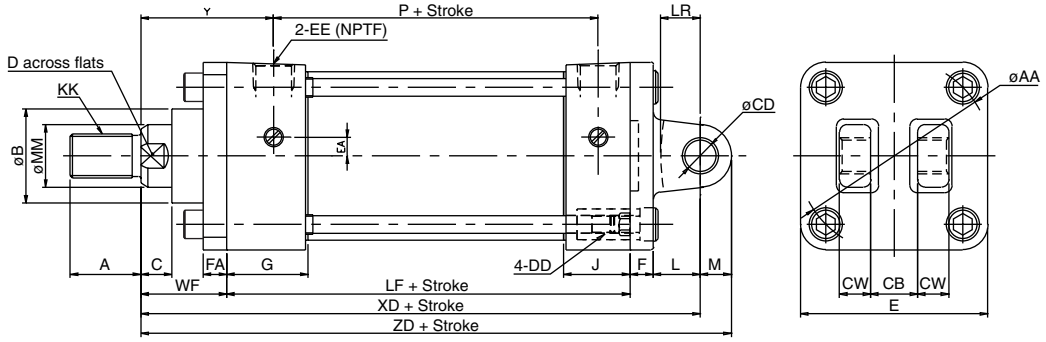
Bore size (in)	MM	KK	A	AA	B	BA	C	D	DD	E	EA	EE	F	FA	G	J	R	TF	UF	WF	Y	P	XF	ZF
200 (2")	1	3/4-16	1 1/8	2.6	1 1/2	1 1/8	1/2	7/8	5/16-24	2.5	0.3	3/8	3/8	3/8	1.26	1.06	1.84	3 3/8	4 1/8	1 3/8	2.09	2.40	5	5 3/8
250 (2.5")	1	3/4-16	1 1/8	3.1	1 1/2	1 1/8	1/2	7/8	5/16-24	3	0	3/8	3/8	3/8	1.30	1.06	2.19	3 7/8	4 5/8	1 3/8	2.13	2.48	5 1/8	5 1/2
325 (3.25")	1 3/8	1-14	1 5/8	3.9	2	1 1/2	5/8	1 1/4	3/8-24	3.75	0	1/2	5/8	5/8	1.57	1.18	2.76	4 11/16	5 1/2	1 5/8	2.59	2.72	5 7/8	6 1/2
400 (4")	1 3/8	1-14	1 5/8	4.7	2	1 1/2	5/8	1 1/4	3/8-24	4.5	0	1/2	5/8	5/8	1.57	1.18	3.32	5 7/16	6 1/4	1 5/8	2.59	2.72	5 7/8	6 1/2

Oversized Rod-Center Trunnion Style: NC□A1T (XB5)



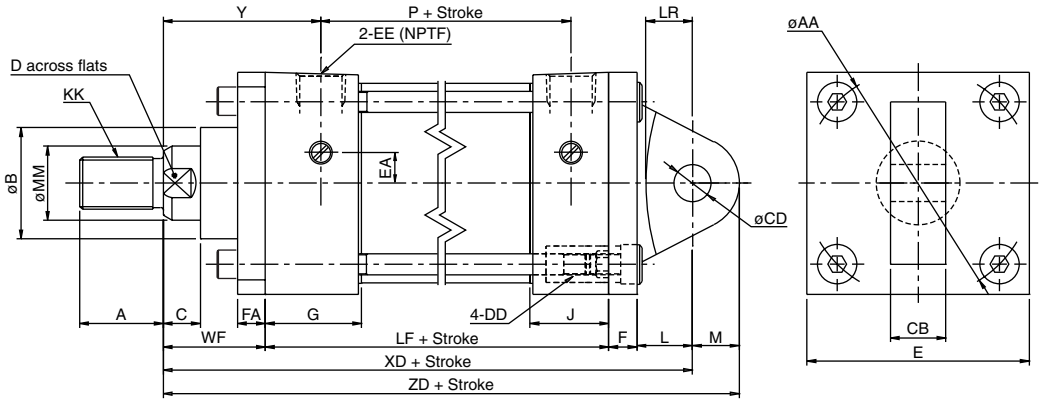
Bore size (in)	MM	KK	A	AA	B	BA	C	D	DD	E	EA	EE	FA	G	J	R	TD -0 -0.001	TL	TM	TT	UM	UV	WF	Y	LF	P	XI	ZB
200 (2")	1	3/4-16	1 1/8	2.6	1 1/2	1 1/8	1/2	7/8	5/16-24	2 1/2	0.3	3/8	3/8	1.26	1.06	1.84	1	1	3	1.18	5	2.56	1 3/8	2.09	3 5/8	2.40	3.29	5 1/8
250 (2.5")	1	3/4-16	1 1/8	3.1	1 1/2	1 1/8	1/2	7/8	5/16-24	3	0	3/8	3/8	1.30	1.06	2.19	1	1	3 1/2	1.18	5 1/2	3.39	1 3/8	2.13	3 3/4	2.48	3.37	5 1/4
325 (3.25")	1 3/8	1-14	1 5/8	3.9	2	1 1/2	5/8	1 1/4	3/8-24	3 3/4	0	1/2	5/8	1.57	1.18	2.76	1	1	4 1/2	1.34	6 1/2	4.33	1 5/8	2.59	4 1/4	2.72	3.95	6 5/64
400 (4")	1 3/8	1-14	1 5/8	4.7	2	1 1/2	5/8	1 1/4	3/8-24	4 1/2	0	1/2	5/8	1.57	1.18	3.32	1	1	5 1/4	1.57	7 1/4	5.12	1 5/8	2.59	4 1/4	2.72	3.99	6 5/64

Oversized Rod-Double Detachable Head Side Clevis Style: NC□A1D (XB5)



Bore size (in)	MM	KK	A	AA	B	C	CB	CD	CW	D	DD	E	EA	EE	F	FA	G	J	L	LR	M	WF	XD	Y	LF	P	ZD
200 (2")	1	3/4-16	1 1/8	2.6	1 1/2	1/2	3/4	1/2	1/2	7/8	5/16-24	2.5	0.3	3/8	3/8	3/8	1.26	1.06	3/4	5/8	1/2	1 3/8	6 1/8	2.09	3 5/8	2.40	6 5/8
250 (2.5")	1	3/4-16	1 1/8	3.1	1 1/2	1/2	3/4	1/2	1/2	7/8	5/16-24	3	0	3/8	3/8	3/8	1.30	1.06	3/4	5/8	1/2	1 3/8	6 1/4	2.13	3 3/4	2.48	6 3/4
325 (3.25")	1 3/8	1-14	1 5/8	3.9	2	5/8	1 1/4	3/4	5/8	1 1/4	3/8-24	3.75	0	1/2	5/8	5/8	1.57	1.18	1 1/4	1	3/4	1 5/8	7 3/4	2.59	4 1/4	2.72	8 1/2
400 (4")	1 3/8	1-14	1 5/8	4.7	2	5/8	1 1/4	3/4	5/8	1 1/4	3/8-24	4.5	0	1/2	5/8	5/8	1.57	1.18	1 1/4	1	3/4	1 5/8	7 3/4	2.59	4 1/4	2.72	8 1/2

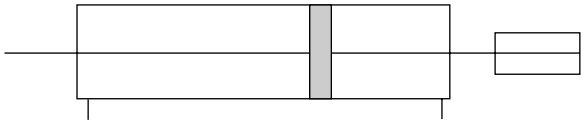
Oversized Rod-Double Single Detachable Head Side Clevis Style: NC□A1C (XB5)



Bore size (in)	MM	KK	A	AA	B	C	CB	CD	D	DD	E	EA	EE	F	FA	G	J	L	LR	M	WF	XD	Y	LF	P	ZD
200 (2")	1	3/4-16	1 1/8	2.6	1 1/2	1/2	3/4	1/2	7/8	5/16-24	2.5	0.3	3/8	3/8	3/8	1.26	1.06	3/4	5/8	1/2	1 3/8	6 1/8	2.09	3 5/8	2.40	6 5/8
250 (2.5")	1	3/4-16	1 1/8	3.1	1 1/2	1/2	3/4	1/2	7/8	5/16-24	3	0	3/8	3/8	3/8	1.30	1.06	3/4	5/8	1/2	1 3/8	6 1/4	2.13	3 3/4	2.48	6 3/4
325 (3.25")	1 3/8	1-14	1 5/8	3.9	2	5/8	1 1/4	3/4	1 1/4	3/8-24	3.75	0	1/2	5/8	5/8	1.57	1.18	1 1/4	1	3/4	1 5/8	7 3/4	2.59	4 1/4	2.72	8 1/2
400 (4")	1 3/8	1-14	1 5/8	4.7	2	5/8	1 1/4	3/4	1 1/4	3/8-24	4.5	0	1/2	5/8	5/8	1.57	1.18	1 1/4	1	3/4	1 5/8	7 3/4	2.59	4 1/4	2.72	8 1/2

Adjustable Stroke—Extended

- **The extended stroke stop position is infinately adjustable within the adjustment range.**
- **Auto switch capable.**



Specifications

Bore size (inch)	1.5	2	2.5	3.25	4
Fluid	Air				
Max. operating pressure	250 psi (1.75 MPa)				
Min. operating pressure	8 psi (0.06 MPa)				
Ambient & fluid temperature	40 to 140°F (5 to 60°C)				
Piston speed	2 to 20 inch/sec (50 to 500 mm/sec)				
Cushion	Air cushion standard				
Mounting	Basic style, Foot style, Flange style, Center trunnion style, Side tapped style				

Standard Stroke

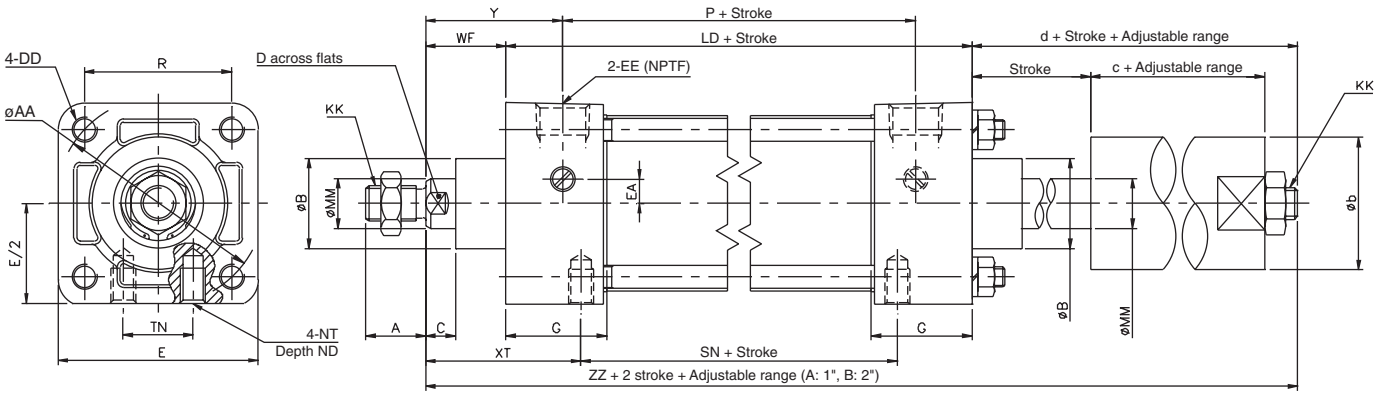
Bore size (in)	Standard stroke
1.50	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20
2, 2.50	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24
3.25, 4	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24, 28

How to Order

NC **D** A1 **B** **150** – **0400** **A** – XC8

- **D**: Auto switch
- **B**: Mounting
- **150**: Bore size
- **0400**: Stroke
- **A**: Adjustment range (A: 0 to 1", B: 0 to 2")
- **XC8**: Adjustable stroke—Extend

Dimensions



Bore size (in)	MM	KK	A	AA	B	C	D	DD	E	EA	EE	G	K	R	WF	Y	LD	P	ZZ
150 (1.5")	5/8	7/16-20	3/4	2.02	1 1/8	3/8	9/16	1/4-28	2	0.3	3/8	1.26	9/32	1.43	1	1.71	3.78	2.36	6.97
200 (2")	5/8	7/16-20	3/4	2.60	1 1/8	3/8	9/16	5/16-24	2 1/2	0.3	3/8	1.26	11/32	1.84	1	1.71	3.82	2.40	7.01
250 (2.5")	5/8	7/16-20	3/4	3.1	1 1/8	3/8	9/16	5/16-24	3	0	3/8	1.30	11/32	2.19	1	1.75	3.98	2.48	7.17
325 (3.25")	1	3/4-16	1 1/8	3.90	1 1/2	1/2	7/8	3/8-24	3 3/4	0	1/2	1.57	27/64	2.76	1 3/8	2.34	4.64	2.72	9.38
400 (4")	1	3/4-16	1 1/8	4.7	1 1/2	1/2	7/8	3/8-24	4 1/2	0	1/2	1.57	27/64	3.32	1 3/8	2.34	4.64	2.72	9.38

Bore size (in)	b	c	d	SN	NT	ND	TN	XT
150 (1.5")	1 1/2	1.25	1.80	2 1/4	1/4-20	9/32	5/8	1 15/16
200 (2")	1 21/32	1.64	2.19	2 1/4	5/16-18	7/16	7/8	1 15/16
250 (2.5")	1 21/32	1.64	2.19	2 3/8	3/8-16	19/32	1 1/4	1 15/16
325 (3.25")	2 9/32	2.48	3.37	2 5/8	1/2-13	5/8	1 1/2	2 7/16
400 (4")	2 9/32	2.48	3.37	2 5/8	1/2-13	5/8	2 1/16	2 7/16

Adjustable Stroke—Return

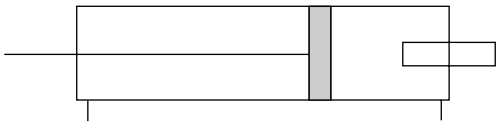
Specifications

Bore size (inch)	1.5	2	2.5	3.25	4
Fluid	Air				
Max. operating pressure	250 psi (1.75 MPa)				
Min. operating pressure	8 psi (0.06 MPa)				
Ambient & fluid temperature	40 to 140°F (5 to 60°C)				
Piston speed	2 to 20 inch/sec (50 to 500 mm/sec)				
Cushion	Air cushion standard				
Mounting	Basic style, Foot style, Flange style, Center trunnion style, Side tapped style				

- **The return stroke stop position is infinitely adjustable within the adjustment range.**
- **Auto switch capable.**

Standard Stroke

Bore size (in)	Standard stroke
1.50	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20
2, 2.50	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24
3.25, 4	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24, 28

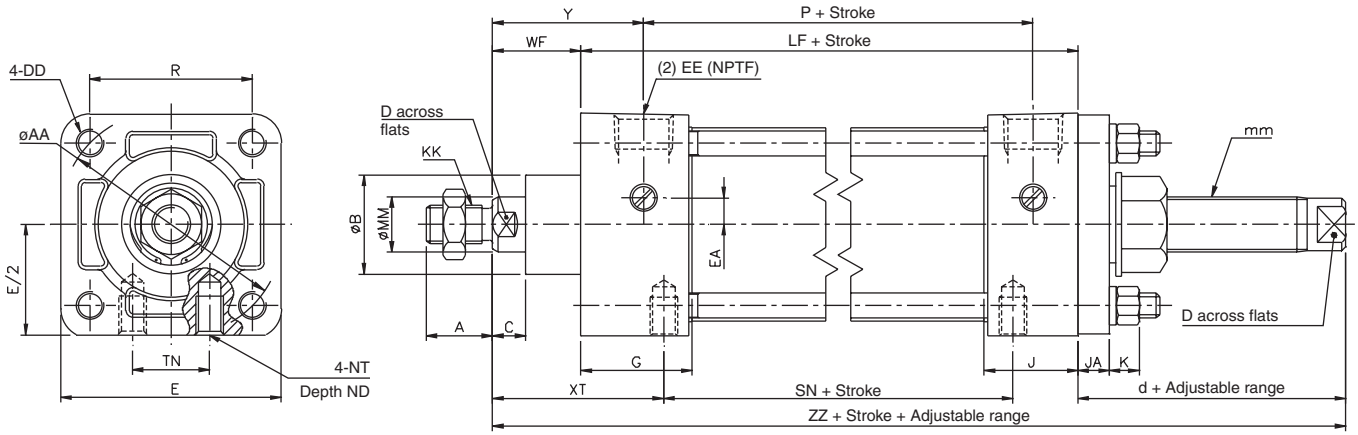


How to Order

NC D A1 B 150—0400 A— XC9

- **Auto switch**
- **Bore size**
- **Mounting**
- **Stroke**
- **Adjustment range** A: 0 to 1" B: 0 to 2"
- **Adjustable Stroke—Return**

Dimensions

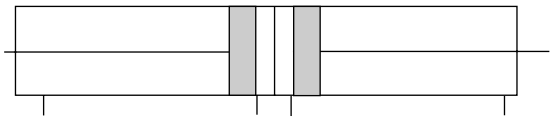


Bore size (in)	MM	KK	A	AA	B	C	D	DD	E	EA	EE	G	J	JA	K	R	WF	Y	LF	P	ZZ	TN	XT	SN	d	mm
150 (1.5")	5/8	7/16-20	3/4	2.02	1 1/8	3/8	9/16	1/4-28	2	0.3	3/8	1.26	1.10	11/32	9/32	1.43	1	1.71	3 5/8	2.36	6.44	5/8	1 15/16	2 1/4	1.81	M16x1.5
200 (2")	5/8	7/16-20	3/4	2.6	1 1/8	3/8	9/16	5/16-24	2 1/2	0.3	3/8	1.26	1.06	11/32	11/32	1.84	1	1.71	3 5/8	2.40	6.44	7/8	1 15/16	2 1/4	1.81	M16x1.5
250 (2.5")	5/8	7/16-20	3/4	3.1	1 1/8	3/8	9/16	5/16-24	3	0	3/8	1.30	1.06	11/32	11/32	2.19	1	1.75	3 3/4	2.48	6.44	1 1/4	1 15/16	2 3/8	1.69	M16x1.5
325 (3.25")	1	3/4-16	1 1/8	3.9	1 1/2	1/2	7/8	3/8-24	3 3/4	0	1/2	1.57	1.10	5/8	27/64	2.76	1 3/8	2.34	4 1/4	2.72	8.02	1 1/2	2 7/16	2 5/8	2.40	M24x1.5
400 (4")	1	3/4-16	1 1/8	4.7	1 1/2	1/2	7/8	3/8-24	4 1/2	0	1/2	1.57	1.10	5/8	27/64	3.32	1 3/8	2.34	4 1/4	2.72	8.02	2 1/16	2 7/16	2 5/8	2.40	M24x1.5

Bore size (in)	NT	ND
150 (1.5")	1/4-20	9/32
200 (2")	5/16-18	7/16
250 (2.5")	3/8-16	19/32
325 (3.25")	1/2-13	5/8
400 (4")	1/2-13	5/8

Dual Operation—Double Rod

- **4 positions available from a single cylinder**
- **Auto switch capable**



Specifications

Bore size (inch)	1.5	2	2.5	3.25	4
Fluid	Air				
Max. operating pressure	250 psi (1.75 MPa)				
Min. operating pressure	8 psi (0.06 MPa)				
Ambient & fluid temperature	40 to 140°F (5 to 60°C)				
Piston speed	2 to 20 inch/sec (50 to 500 mm/sec)				
Cushion	Air cushion standard				
Mounting	Basic style, Foot style, Flange style, Side tapped style				

Standard Stroke

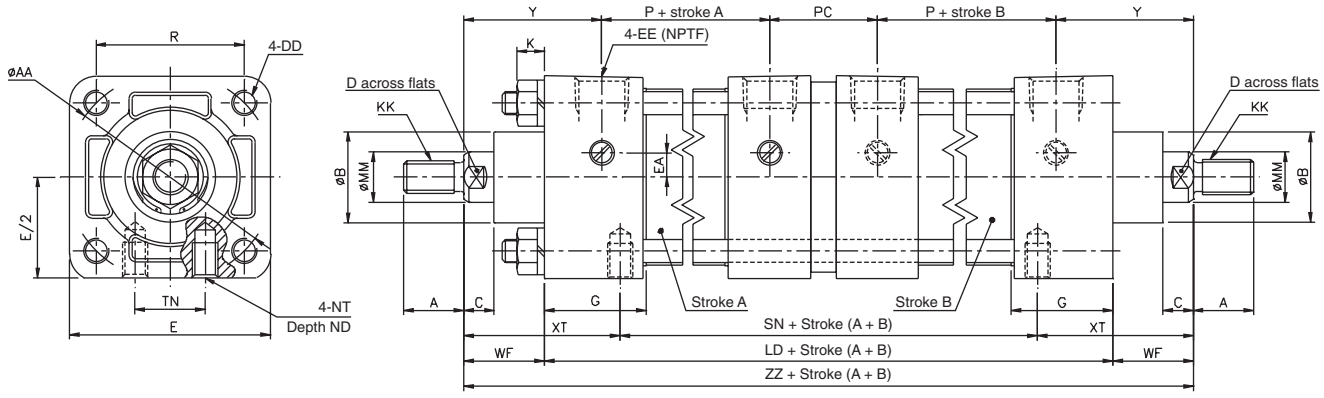
Bore size (in)	Standard stroke
1.50	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20
2, 2.50	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24
3.25, 4	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24, 28

How to Order

NC D A1 B 150 — 0400 N — 0200 R — XC10

- **Auto switch**
- **Bore size**
- **Mounting**
- **Stroke A**
- **Stroke B**
- **Dual operation - Double rod**
- **Cushion**
  - – Both ends
  - N W/o cushions
  - H Head end
  - R Rod end

Dimensions

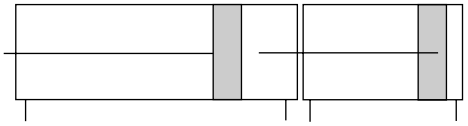


Bore size (in)	MM	KK	A	AA	B	C	D	DD	E	EA	EE	G	K	R	WF	Y	LD	P	PC	ZZ	SN
150 (1.5")	5/8	7/16-20	3/4	2.02	1 1/8	3/8	9/16	1/4-28	2	0.3	3/8	1.26	9/32	1.43	1	1.71	7.44	2.36	1.30	9.44	5.56
200 (2")	5/8	7/16-20	3/4	2.60	1 1/8	3/8	9/16	5/16-24	2 1/2	0.3	3/8	1.26	11/32	1.84	1	1.71	7.52	2.40	1.30	9.52	5.64
250 (2.5")	5/8	7/16-20	3/4	3.1	1 1/8	3/8	9/16	5/16-24	3	0	3/8	1.30	11/32	2.19	1	1.75	7.76	2.48	1.30	9.76	5.88
325 (3.25")	1	3/4-16	1 1/8	3.90	1 1/2	1/2	7/8	3/8-24	3 3/4	0	1/2	1.57	27/64	2.76	1 3/8	2.34	8.94	2.72	1.57	11.69	6.82
400 (4")	1	3/4-16	1 1/8	4.7	1 1/2	1/2	7/8	3/8-24	4 1/2	0	1/2	1.57	27/64	3.32	1 3/8	2.34	8.94	2.72	1.57	11.69	6.82

Bore size (in)	TN	XT	NT	ND
150 (1.5")	5/8	1 15/16	1/4-20	9/32
200 (2")	7/8	1 15/16	5/16-18	7/16
250 (2.5")	1 1/4	1 15/16	3/8-16	19/32
325 (3.25")	1 1/2	2 7/16	1/2-13	5/8
400 (4")	2 1/16	2 7/16	1/2-13	5/8

Dual Operation—Single Rod

- **3 positions can be obtained from a single cylinder.**
- **Twice the force is available for the extended stroke.**
- **Auto switch capable**



Specifications

Bore size (inch)	1.5	2	2.5	3.25	4
Fluid	Air				
Max. operating pressure	250 psi (1.75 MPa)				
Min. operating pressure	8 psi (0.06 MPa)				
Ambient & fluid temperature	40 to 140°F (5 to 60°C)				
Piston speed	2 to 20 inch/sec (50 to 500 mm/sec)				
Cushion	Air cushion standard				
Mounting	Basic style, Foot style, Flange style, Clevis style, Side tapped style				

Standard Stroke

Bore size (in)	Standard stroke
1.50	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20
2, 2.50	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24
3.25, 4	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24, 28

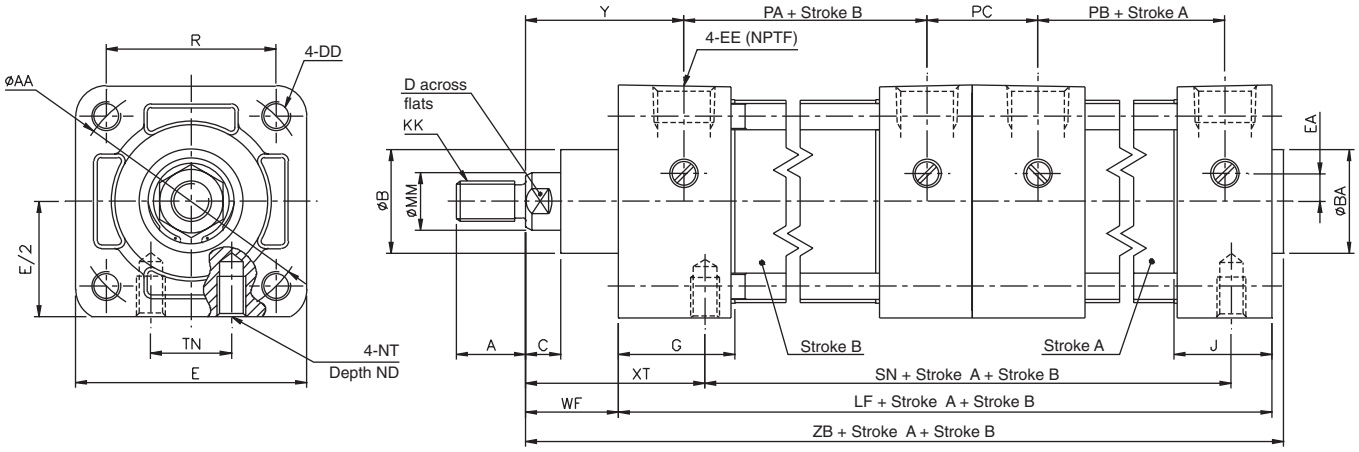
Example: NCDA1B150-0200R+0300-XC11 will stroke 2" then an additional 3" for a total stroke of 5". The front cylinder B (rod end) must be equal to 5" to allow the full stroke.

How to Order

NC D A1 B 150 – 0400 R + 0200 H – XC11

- **Auto switch**
- **Bore size**
- **Mounting**
- **Stroke A**
- **Stroke B-A**
- **Dual operation-Single rod**
- **Cushion**
  - – Both ends
  - N W/o cushions
  - H Head end
  - R Rod end

Dimensions



Bore size (in)	MM	KK	A	AA	B	BA	C	D	DD	E	EA	EE	G	J	R	TN	WF	XT	Y	LF	PA	PB	PC
150 (1.5")	5/8	7/16-20	3/4	2.02	1 1/8	1 1/8	3/8	9/16	1/4-28	2	0.3	3/8	1.26	1.1	1.43	5/8	1	1 15/16	1.71	7.26	2.36	2.40	1.24
200 (2")	5/8	7/16-20	3/4	2.6	1 1/8	1 1/8	3/8	9/16	5/16-24	2.5	0.3	3/8	1.26	1.06	1.84	7/8	1	1 15/16	1.71	7.26	2.40	2.44	1.20
250 (2.5")	5/8	7/16-20	3/4	3.1	1 1/8	1 1/8	3/8	9/16	5/16-24	3	0	3/8	1.3	1.06	2.19	1 1/4	1	1 15/16	1/75	7.38	2.48	2.52	1.12
325 (3.25")	1	3/4-16	1 1/8	3.9	1 1/2	1 1/2	1/2	7/8	3/8-24	3.75	0	1/2	1.57	1.18	2.76	1 1/2	1 3/8	2 7/16	2.34	8.52	2.72	2.76	1.51
400 (4")	1	3/4-16	1 1/8	4.7	1 1/2	1 1/2	1/2	7/8	3/8-24	4.5	0	1/2	1.57	1.18	3.32	2 1/16	1 3/8	2 7/16	2.34	8.52	2.72	2.76	1.51

Bore size (in)	SN	ZB	NT	ND
150 (1.5")	5.89	8.39	1/4-20	9/32
200 (2")	5.89	8.39	5/16-18	7/16
250 (2.5")	6.01	8.50	3/8-16	19/32
325 (3.25")	6.89	10.1	1/2-13	5/8
400 (4")	6.89	10.1	1/2-13	5/8

Fluoro Rubber Seals

- **Material for seals is changed to fluoro rubber excellent in chemical resistance.**

Specifications

Bore size (inch)	1.5	2	2.5	3.25	4
Fluid	Air				
Max. operating pressure	250 psi (1.75 MPa)				
Min. operating pressure	8 psi (0.06 MPa)				
Rod material	Stainless steel 304				
Ambient & fluid temperature	40 to 140°F (5 to 60°C)				
Piston speed	2 to 20 inch/sec (50 to 500 mm/sec)				
Cushion	Air cushion standard				
Mounting	Basic style, Foot style, Flange style Center trunnion style, Side tapped style, Clevis style Rod side trunnion style, Head side trunnion style Side lug style				

Standard Stroke

Bore size (in)	Standard stroke
1.50	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20
2, 2.50	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24
3.25, 4	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24, 28

How to Order

NC D A1 Mounting Bore — Stroke Suffix — XC22

Ex: NCDA1B 150-0400-XC22

- Auto switch capable
- Fluoro rubber seals

With Coil Scraper

- **Scraper removes frost, weld spatter, cutting dust, and etc., and it protects the seals.**

Specifications

Bore size (inch)	1.5	2	2.5	3.25	4
Fluid	Air				
Max. operating pressure	250 psi (1.75 MPa)				
Min. operating pressure	8 psi (0.06 MPa)				
Ambient & fluid temperature	40 to 140°F (5 to 60°C)				
Scraper	Coil scraper (Metal)				
Piston speed	0.4 to 2 inch/sec (10 to 50 mm/sec)				
Cushion	Air cushion standard				
Mounting	Basic style, Foot style, Flange style Center trunnion style, Side tapped style, Clevis style Rod side trunnion style, Head side trunnion style Side lug style				

Standard Stroke

Bore size (in)	Standard stroke
1.50	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20
2, 2.50	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24
3.25, 4	1, 2, 3, 4, 5, 6, 8, 10, 12, 14, 16, 18, 20, 24, 28

How to Order

NC D A1 Mounting Bore — Stroke — XC35

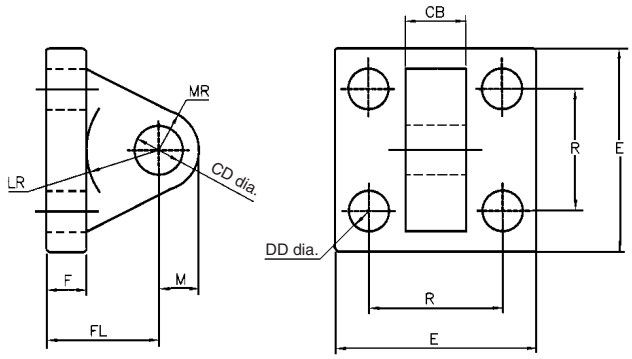
Ex: NCDA1B 150-0400-XC35

- Auto switch capable
- With coil scraper

Accessory Bracket Dimensions

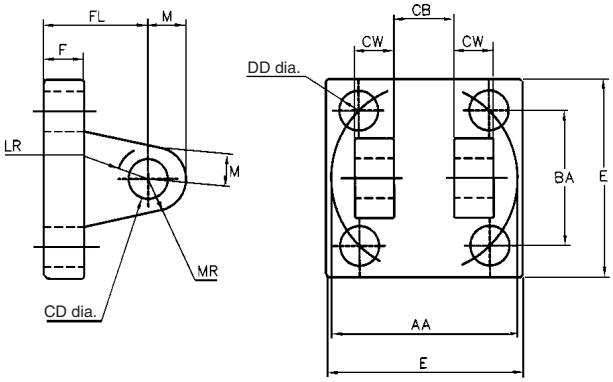
Eye Bracket

Part no.	CB	CD	DD	E	F	FL	LR	M	MR	R
NCA1-P150	3/4	1/2	13/32	2 1/2	3/8	1 1/8	3/4	1/2	9/16	1.63
NCA1-P325	1 1/4	3/4	17/32	3 1/2	5/8	1 7/8	1 1/4	3/4	7/8	2.56



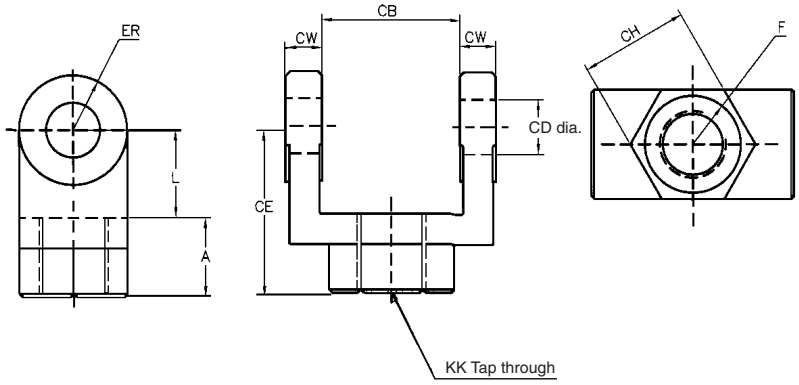
Clevis Bracket

Part no.	AA	BA	CB	CD	CW	DD	E	F	FL	LR	M	MR
NCA1-CB150	2.3	1 5/8	0.785	1/2	1/2	3/8 -24	2 1/2	3/8	1 1/8	1/2	1/2	9/16
NCA1-CB325	3.6	2 9/16	1.265	3/4	5/8	1/2 -20	3 1/2	5/8	1 7/8	1 1/16	3/4	1 1/16



Rod Clevis

Part no.	CB	CD	CE	CH	CW	F	L	A	KK	ER
NY-150	0.765	0.5	1 1/2	1	1/2	1	3/4	3/4	7/16-20	1/2
NY-325	1.265	0.75	2 3/8	1 3/8	5/8	1 1/4	1 1/4	1 1/8	3/4-16	3/4



Order to Match Rod Thread

Rod Eye

Part no.	A	CA	CB	CD	ER	KK
NI-150	3/4	1 1/2	3/4	1/2	5/8	7/16 20
NI-325	1 1/8	2 1/16	1 1/4	3/4	7/8	3/4 -16

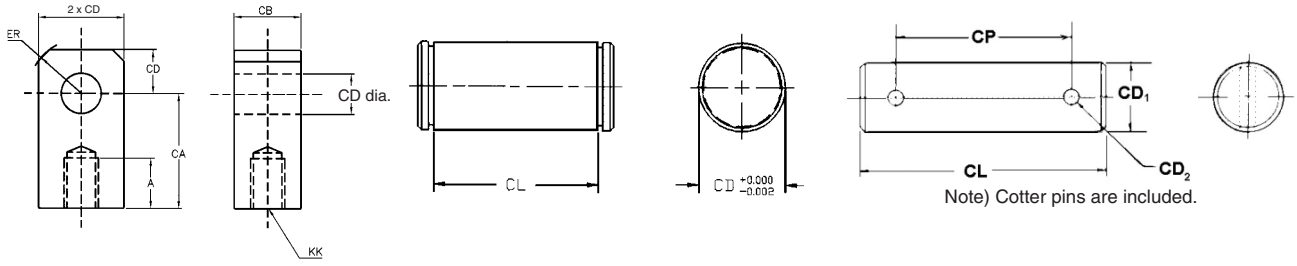
Pivot Pin

Part no.	CD	CL
NCA1-150	1/2	1 7/8
NCA1-325	3/4	2 5/8

Pivot Pin

Part no.	CD_1	CD_2	CL	CP
NCDP-150	$.500^{0}_{-.002}$	.106	2.28	1.94
NCDP-325	$.750^{0}_{-.002}$	.140	3.10	2.72

Note) Cotter pins are included.



Note) Cotter pins are included.

Auto Switch Specifications

How to Order Auto Switches

Grommet type

D - □ □ □ □ □

For standard part number please refer to applicable auto switches on page 6-15-7.

Lead wire length	
–	0.5 (m) (1.64 ft)
L	3 (m) (9.84 ft)
Z	5 (m) (16.4 ft)

Connector type

D - □ □ □ □ □ □ PC

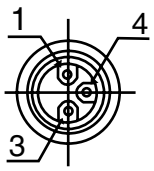
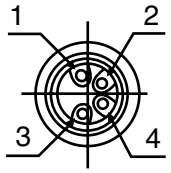
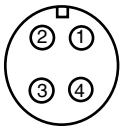
For standard part number please refer to applicable auto switches on page 6-15-7.

Lead wire length	
S	0.5 (m)(1.64 ft)
M	1.0 (m)(3.28 ft)

Connector type	
A	M8-3 pins
B	M8-4 pins
D	M12-4 pins

Auto Switch Mounting Bracket Part No.

Model no. \ Bore size (in)	150 (1.5")	200 (2")	250 (2.5")	325 (3/25")	400 (4")
D-A5, D-F5 D-A6, D-J5	NBT-150	NBT-200	NBT-200	NBT-325	NBT-325

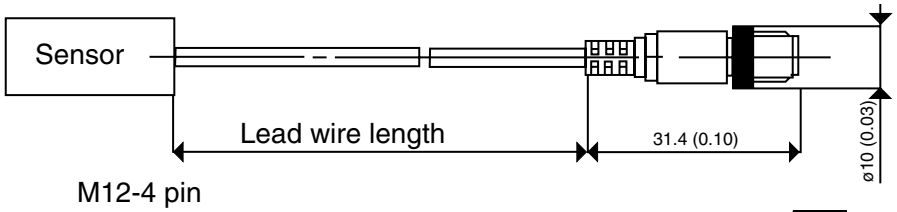
Connector type	M8-3 pin	M8-4 pin	M12-4 pin
Pin arrangement			
Applicable standards	JIS C 4524, JIS C 4525, IEC 947-5-2, NECA 0402		
Impact resistant	300 m/s²		
IP degress of protection	IP-67 (IEC529 standard)		
Insulation resistance	100 MΩ or more at 500 VDC meg.		
Withstand voltage	1500 VAC 1 minute (between contacts), Leakage current 1 mA or less		

Sensor type	Lead wire color				Meaning of contact no.			
	1 pin	2 pin	3 pin	4 pin	1 pin	2 pin	3 pin	4 pin
DC 2-wire	Brown	—	—	Blue	OUT (+)	—	—	OUT (–)
DC 2-wire non-polar	—	—	Brown	Blue	—	—	OUT (±)	OUT (∓)
DC 3-wire	Brown	—	Blue	Black	DC (+)	—	DC (–)	OUT
DC 4-wire	Brown	Orange	Blue	Black	DC (+)	Diagnostic output	DC (–)	OUT

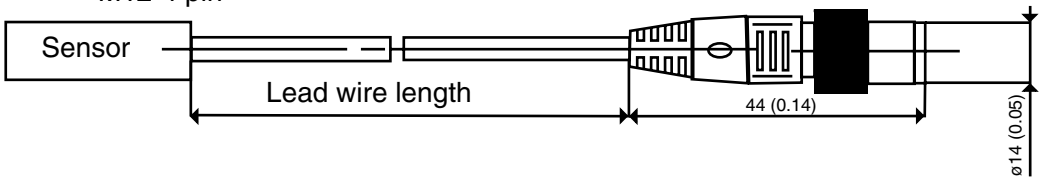
• Connector

Unit : mm
( ) : ft

M8-3 pin/4 pin



M12-4 pin



N304-EX

SMC

Air Cylinder

NCA1 Series

NFPA Industrial Interchangeable Pneumatic Cylinders
Medium Duty 5” to 8”
Heavy Duty 1.5” to 14”

PNEUMATIC CYLINDERS
SERIES NCA1 - TABLE OF CONTENTS

	Description	Page No
Specifications	Material / Technical	1
How To Order	NCA1 - ø1.5 to ø14" Heavy Duty	2
	NCA1 - ø5 to ø8" Medium Duty	3
Dimensions	ø1.5 - ø6 **MF1** w/Front Rectangular Flange	4
	ø1.5 - ø6 **MF2** w/Rear Rectangular Flange	4
	ø1.5 - ø6 **MF5** w/Front Square Flange	5
	ø1.5 - ø6 **MF6** w/Rear Square Flange	5
	ø1.5 - ø6 **MP1** w/Double Rear Clevis	6
	ø1.5 - ø6 **MP2** w/Double Detachable Rear Clevis	6
	ø1.5 - ø6 **MP3** w/Cap Fixed Eye	7
	ø1.5 - ø6 **MP4** w/Single Detachable Rear Clevis	7
	ø1.5 - ø6 **MS1** w/Foot Mount	8
	ø1.5 - ø6 **MS2** w/Side Lug	8
	ø1.5 - ø6 **MS3** w/Centerlug	9
	ø1.5 - ø6 **MS4** w/Side Tapped	9
	ø1.5 - ø6 **MS7** w/Front Lug Mount	10
	ø1.5 - ø6 **MT1** w/Head Trunnion	10
	ø1.5 - ø6 **MT2** w/Rear Trunnion	11
	ø1.5 - ø6 **MT4** w/Center Trunnion	11
	ø1.5 - ø6 **MX1** w/Extended Tie-Rods/Both Ends	12
	ø1.5 - ø6 **MX2** w/Extended Tie-Rods/Cap	12
	ø1.5 - ø6 **MX3** w/Extended Tie-Rods/Head	13
	ø8 - ø14 **ME3** w/Head Square Mount	13
	ø8 - ø14 **ME4** w/Cap Square Mount	14
	ø8 - ø14 **MP1** w/Double Rear Clevis	14
	ø8 - ø14 **MP2** w/Double Detachable Rear Clevis	15
	ø8 - ø14 **MP3** w/Cap Fixed Eye	15
	ø8 - ø14 **MP4** w/Single Detachable Rear Clevis	15
	ø8 - ø14 **MS1** w/Foot Mount	16
	ø8 - ø14 **MS2** w/Side Lug	16
	ø8 - ø14 **MS3** w/Center line Lug	16
	ø8 - ø14 **MS4** w/Side Tapped	17
	ø8 - ø14 **MS7** w/Front Lug Mount	17
	ø8 - ø14 **MT1** w/Head Trunnion	17
	ø8 - ø14 **MT2** w/Rear Trunnion	18
	ø8 - ø14 **MT4** w/Center Trunnion	18
	ø8 - ø14 **MX1/MX2/MX3** w/Extended Tie-Rods	19
	ø1.5 - ø6 **NCA1-W** Double Rod	19
	ø8 - ø14 **NCA1-W** Double Rod	19
Engineering Specifications	Push Stroke	20
	Pull Stroke	20
	Oversize Piston Rods	20
	Stroke Factors	21
	Stop Tube	21
Options	Auto Switch Options	22
	Table of Thread Form Codes / XA Options	22
	Option XC3 - Port and Cushion Location	23
Construction / Parts List / Seal Kit		23
Accessories	Eye Brackets, Clevis Brackets, Rod Clevises, Rod Eyes, Pin,	24
	Alignment Couplers, Rod Jam Nut	

Air Cylinder Series NCA1-EX

Material Specifications

Medium Duty XTAT			
Bore Size	5	6	8
Barrel -			
Aluminum	Std	Std	Std
Composite Fiber	Opt	Opt	Opt
Head/Cap - Aluminum	Std	Std	N/A
Head/Cap - Steel	N/A	N/A	Std
Piston - Aluminum	Std	Std	Std
Gland Bushing	Bronze Material		

Note Material Specifications for above: Aluminum; 6061-T6, Steel; ASTM A36, Stainless Steel; 316.

Technical Specifications

Fluid	Air / Hydraulic* (250psi non-shock)
Lubrication	Non Lube
Max operating Pressure	250 PSI
Min Operating Pressure	5 PSI
Ambient & Fluid Temp	40~140ºF / 5~60ºC

Please note for Hydraulic Service please order the H option as denoted in the How to Order breakdown on pgs 2 & 3

Heavy Duty XTST

Bore Size	1.5~4	5	6	8	10	12	14
Barrel -							
Steel	Std	Std	Std	Std	Std	Std	Std
Composite Fiber	Opt	Opt	Opt	Opt	Opt	Opt	Opt
Head/Cap - Steel	Std	Std	Std	Std	Std	Std	Std
Piston - Aluminum	Std	Std	Std	Std	N/A	N/A	N/A
Piston - Steel	N/A	N/A	N/A	N/A	Std	Std	Std
Gland Bushing	Bronze Material						

Note Material Specifications for above: Aluminum; 6061-T6, Steel; ASTM A36, Stainless Steel; 316,

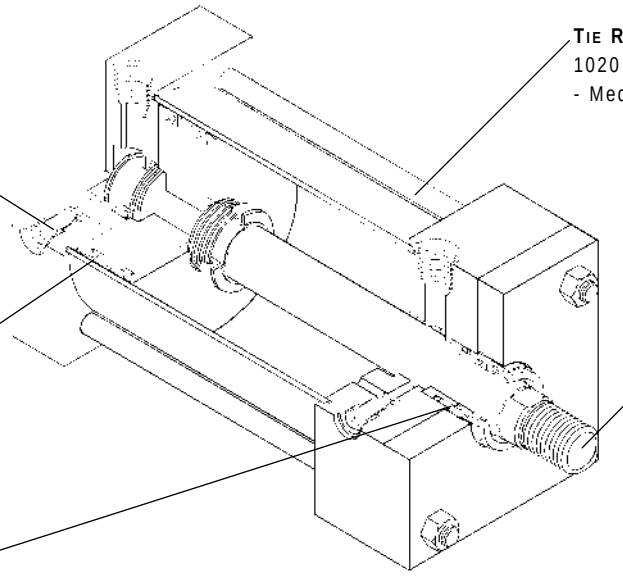
N/A - Not Available; please contact SMC Customer Service

OPT - Optional; see How to Order

Corrosion Resistant XTSS

Barrel	Stainless Steel
	Composite Tube Optional
Head/Cap	Stainless Steel
Piston	Aluminum
Tie Rods	Stainless Steel
Gland Bushing	Delrin

Note Material Specifications for above: Aluminum; 6061-T6, Stainless Steel; 316,



Tie Rod Material
1020 Carbon Steel
- Medium Duty: Zinc Coated

Cushions
An industry proven fully adjustable cushion is a standard option.

Piston Packings
Nitrile type U-cups are standard. Bronze filled Teflon wear bands are also standard.

Gland Bushing
Cartridge Type SAE 660 bronze bushing.
Removable without dismantling of cylinder for easy replacement of seals.

Piston Rod
High Strength 1045 Carbon Steel, Hard Chrome-Plated and Ground is Standard for the XTST Heavy Duty Series. The Corrosion-Resistant Series (XTSS) comes complete with a 316 Chrome-Plated Stainless Steel Piston Rod.

Cylinder not as shown

Rod Seals & Wipers
Rod seals are Nitrile U-cups with Teflon backup rings. Polyurethane wipers are standard.
Other wiper materials are available as standard options depending on service application.

Mountings
Full range of NFPA accessories. (Please see Page 24)
Special mountings available on request.

SERIES NCA1 HEAVY DUTY PNEUMATIC CYLINDERS BORE SIZES 1.5 ~ 14”

- **Steel and Stainless Steel Construction**
- **Replaceable Rod Gland Design**
- **Auto Switch Sensing Option (Stainless and Composite Tube Only)**
- **Hydraulic Service / 250PSI Non Shock (H Option)**
- **Non Rotating Piston Rod & Through Hole Rod Types Available**
- **Full Range of NFPA Interchangeable Mounting Configurations**
  - **Mounting Dimensions are in accordance with ANSI/(NFPA) T3.6.7 R2-1996, Fluid Power Systems and products - Square Head Industrial Cylinders - Mounting Dimensions.**

How To Order

NC ○ A1 ○ ○ ○ ○ — ○ ○ ○ ○ — ○ ○ — X ○ T ○

AUTO SWITCH
- ……Standard
D ……Auto Switch capable (Stainless and Composite tube only)

STYLE
- ……Standard Cylinder
W ……Double Rod (Please see Page 19 for Mounting Information)
K …… Non-rotating Piston Rod (5 to 14”ø)

MOUNTING / SINGLE ROD ONLY
EA … **ME3** - Head Square Mount (8 to 14”ø)
EB … **ME4** - Cap Square Mount (8 to 14”ø)
F … **MF1** - Front Flange (1.5 to 6”ø)
G … **MF2** - Rear Flange (1.5 to 6”ø)
M … **MF5** - Front Flange (1.5 to 6”ø)
N … **MF6** - Rear Flange (1.5 to 6”ø)
X … **MP1** - Double Rear Clevis (1.5 to 14”ø)
D … **MP2** - Double Detachable Rear Clevis/Female (1.5 to 14”ø)
E … **MP3** - Cap Fixed Eye (1.5 to 14”ø)
C … **MP4** - Single Detachable Rear Clevis/Male (1.5 to 14”ø)
L … **MS1** - Foot Mount (1.5 to 14”ø)
S … **MS2** - Side Lug (1.5 to 14”ø)
O … **MS3** - Centerline Lug (1.5 to 14”ø)
R … **MS4** - Side-Tapped (1.5 to 14”ø)
P … **MS7** - Front Lug Mount (1.5 to 14”ø)
U … **MT1** - Rod End Trunnion (1.5 to 14”ø)
J … **MT2** - Cap Trunnion (1.5 - 14”ø)
T … **MT4** - Center Trunnion (1.5 to 14”ø) *See below
B … **MX0** - Basic/No Mount (1.5 to 14”ø)
BA … **MX1** - Extended Tie-Rods; Head/Cap (1.5 to 14”ø)
BB … **MX2** - Extended Tie-Rods; Cap (1.5 to 14”ø)
BC … **MX3** - Extended Tie-Rods; Head (1.5 to 14”ø)

How To Order MT4 With Non Standard XI Dimension
NCA1 T ○ - ○ - X46US (XI = Total Inches) T ○
Specify XI Dimension in inches — Construction Type

STYLE
- ……Pneumatic
H …Hydraulic

BORE SIZE	STD. ROD Ø	STD. ROD THREAD
150 ……1.5”	5/8”	7/16-20
200 ……2”	5/8”	7/16-20
250 ……2.5”	5/8”	7/16-20
325 ……3.25”	1”	3/4-16
400 ……4”	1”	3/4-16
500 ……5”	1”	3/4-16
600 ……6”	1-3/8”	1-14
800 ……8”	1-3/8”	1-14
1000 ……10”	1-3/4”	1 1/4-12
1200 ……12”	2”	1 1/2-12
1400 ……14”	2-1/2”	1 7/8-12

Up to 32” Bore available
Please contact SMC Customer Service
REFER TO PAGE 22 FOR OPTIONAL ROD THREADS

STANDARD STROKE
Inches
Example: 04 = 4” Stroke

STROKE
Hundredths Of An Inch
Example: 25 = 0.25 (1/4) Inch Stroke

OPTION
OVERSIZED ROD - XB5 OPTION
When ordering an oversized rod, please order the following way to represent the rod size required.
XB5___
- E 1”
- G 1 3/8”
- H 1 3/4”
- J 2”
- K 2 1/2”
- L 3”
- M 3 1/2”
- Z Please consult SMC Customer Service for larger sizes.

CONSTRUCTION TYPE
(PLEASE SEE PAGE 1 FOR CONSTRUCTION DETAILS)
ST …Steel Construction (1.5~14”ø)
SS …All Stainless Steel (1.5~14”ø)
SCT …Steel w/ Composite Tube (1.5 - 14”ø)
SSCT …Stainless Steel w/ Composite Tube (1.5- 14”ø)

OPTIONS
A……Special Rod Thread (See Page 22)
B5 ……Oversized Rod (See Chart below)
B6 ……High Temperature *
C3 ……Port and Cushion Location (see Page 23)
C6 ……Stainless Steel Piston Rod (Std. on XTSS series)
C8 ……Adjustable Stroke Extended Piston Rod *
C9 ……Adjustable Stroke Return Piston Rod *
C10 …Dual Operation/Double Piston Rod *
C11 …Dual Operation/Single Piston Rod *
C12 …Tandem Cylinder*
* *(Contact SMC Customer Service)*

NO OF SWITCHES
- ……2 Pieces
S ……1 Piece
n ……Number Of Switches

AUTO SWITCH
For Switch information for steel tube please contact SMC customer service.
See Pg 22 for auto switch options when using composite or stainless steel tube.

ROD BOOT
- ……Without Boot
K ……Neoprene Boot

AIR CUSHION
- ……..Both Ends
N ……..None
H ……..Cap End
R ……..Rod End
*Note: Non Adjustable Cushions are available on units above 4”Bore Please Consult SMC Customer Service
**Note: Cushions not recommended for Strokes below 3”

SERIES NCA1 MEDIUM DUTY LARGE BORE PNEUMATIC CYLINDERS BORE SIZES 5 ~ 8”

- **Aluminum Construction**
- **Replaceable Rod Gland Design**
- **Auto Switch Capable**
- **Hydraulic Service / 250PSI Non-Shock (H Option)**
- **Full Range of NFPA Interchangeable Mounting Configurations**
  - **Mounting Dimensions are in accordance with ANSI/(NFPA) T3.6.7 R2-1996, Fluid Power Systems and products - Square Head Industrial Cylinders - Mounting Dimension**

How To ORDER

NC ○ A1 ○ ○ ○ ○ — ○ ○ ○ ○ — ○ ○ — X ○ T ○

AUTO SWITCH
- ……Standard
D ……Auto Switch capable

STYLE
- ……Standard
W ……Double Rod (Please see Page 19 for Mounting Information)
K ……Non-Rotating Piston Rod

MOUNTING / SINGLE ROD ONLY
EA … **ME3** - Head Square Mount (8”only)
EB … **ME4** - Cap Square Mount (8” only)
F … **MF1** - Front Flange (5 to 6”ø)
G … **MF2** - Rear Flange (5 to 6”ø)
M … **MF5** - Front Flange (5 to 6”ø)
N … **MF6** - Rear Flange (5 to 6”ø)
X … **MP1** - Double Rear Clevis (5 to 8”ø)
D … **MP2** - Double Detachable Rear Clevis/Female (5 to 8”ø)
E … **MP3** - Cap Fixed Eye (8”ø only)
C … **MP4** - Single Detachable Rear Clevis/Male (5 to 8”ø)
L … **MS1** - Foot Mount (5 to 8”ø)
S … **MS2** - Side Lug (8”only)
O … **MS3** - Centerline Lug (8” only)
R … **MS4** - Side-Tapped (5 to 8”ø)
P … **MS7** - Front Lug Mount (5 to 8”ø)
U … **MT1** - Head Trunnion (5 to 8”ø)
J … **MT2** - Cap Trunnion (5 to 8”ø)
T … **MT4** - Center Trunnion (5 to 8”ø) *See below
B … **MX0** - Basic / No Mount (5 to 8”ø)
BA … **MX1** - Extended Tie-Rods; Head/Cap (5 to 8”ø)
BB … **MX2** - Extended Tie-Rods; Cap (5 to 8”ø)
BC … **MX3** - Extended Tie-Rods; Head (5 to 8”ø)

How To Order MT4 With Non Standard XI Dimension
NCA1 T ❍ - ❍ - X46US (XI = Total Inches) T ❍
Specify XI Dimension in inches
Construction Type

STYLE
- ……Pneumatic
H …Hydraulic

BORE SIZE	STD.ROD ø	STD.ROD THREAD
500 ……5”	1”	3/4-16
600 ……6”	1-3/8”	1-14
800 ……8”	1-3/8”	1-14

REFER TO PAGE 22 FOR OPTIONAL ROD THREADS

STANDARD STROKE
Inches
Example: 04 = 4” Stroke

STROKE
Hundredths Of An Inch
Example: 25 = 0.25
(1/4) Inch Stroke

CONSTRUCTION TYPE
(PLEASE SEE PAGE 1 FOR CONSTRUCTION DETAILS)
AT …Aluminum Tube (5~8”ø)
ACT …Composite tube (5~8”ø)

OPTIONS
A……Special Rod Thread (Please see Page 22)
B5 ……Oversized Rod (See Chart below for Bore Sizes above 4”)
B6 ……High Temperature *
C3 ……Port and Cushion Location (see Page 23)
C6 ……Stainless Steel Piston Rod
C8 ……Adjustable Stroke Extended Piston Rod *
C9 ……Adjustable Stroke Return Piston Rod *
C10 …Dual Operation/Double Piston Rod *
C11 …Dual Operation/Single Piston Rod *
C12 …Tandem Cylinder*
** Contact SMC Customer Service*

ROD BOOT
- ……Without Boot
K ……Neoprene Boot

AIR CUSHION
- ……..Both Ends
N ……..None
H ……..Cap End
R ……..Rod End
*Note: Non Adjustable Cushions are available Please Consult SMC Customer Service
**Note: Cushions not recommended for Strokes below 3”

NO OF SWITCHES
- ……2 Pieces
S ……1 Piece
n ……Number of Switches

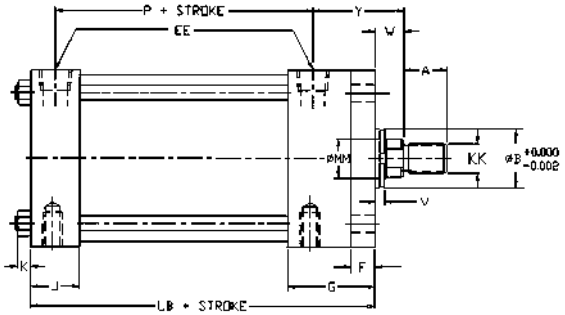
AUTO SWITCH
See Page 22 for Auto Switch Options

OPTION
OVERSIZED ROD - XB5 OPTION
When ordering an oversized rod, please order the following way to represent the rod size required.
XB5 —
G 1 3/8”
H 1 3/4”
J 2”
K 2 1/2”
L 3”
M 3 1/2”
Z Please contact SMC Customer Service for larger sizes

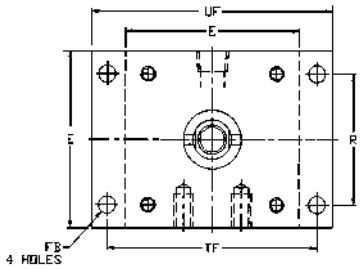
MF1 ø1.5" ~ 6"

WITH FRONT RECTANGULAR FLANGE

BORE	ROD øMM	KK SM	A	B	V	W	Y	ADD LB	STROKE P
1 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4
1 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4
2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4
2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4
2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4	2 1/4
2 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4 1/8	2 3/8
2 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4 1/8	2 3/8
2 1/2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4 1/8	2 3/8
3 1/4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8
3 1/4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8
4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8
4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8
5	1	3/4-16	1 1/8	1.5	1/4	3/4	2 5/16	5 1/8	2 7/8
5	1 3/8	1-14	1 5/8	2	3/8	1	2 9/16	5 1/8	2 7/8
5	1 3/4	1 1/4-12	2	2.375	1/2	1 1/4	2 13/16	5 1/8	2 7/8
6	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	5 3/4	3 1/8
6	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	5 3/4	3 1/8
6	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	5 3/4	3 1/8



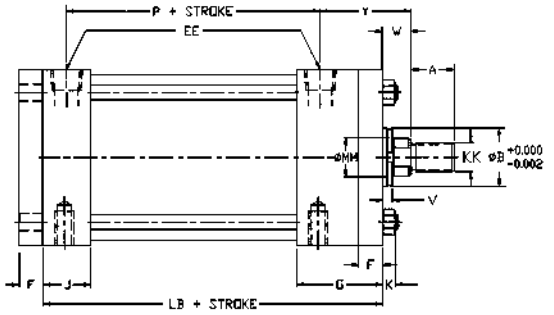
BORE	E	EE(NPT)	F	FB	G	J	K	R	TF	UF
1 1/2	2	3/8	3/8	5/16	2	1	1/4	1.43	2 3/4	3 3/8
2	2 1/2	3/8	3/8	3/8	2	1	5/16	1.84	3 3/8	4 1/8
2 1/2	3	3/8	3/8	3/8	2	1 1/8	5/16	2.19	3 7/8	4 5/8
3 1/4	3 3/4	1/2	5/8	7/16	2 1/4	1 1/4	3/8	2.76	4 11/16	5 1/2
4	4 1/2	1/2	5/8	7/16	2 1/4	1 1/4	3/8	3.32	5 7/16	6 1/4
5	5 1/2	1/2	5/8	9/16	2 1/4	1 1/2	7/16	4.10	6 5/8	7 5/8
6	6 1/2	3/4	3/4	9/16	2 3/4	1 5/8	7/16	4.88	7 5/8	8 5/8



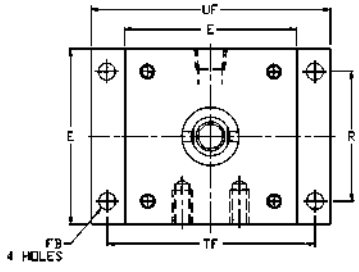
MF2 ø1.5" ~ 6"

WITH REAR RECTANGULAR FLANGE

BORE	ROD øMM	KK SM	A	B	V	W	Y	ADD LB	STROKE P
1 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4
1 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4
2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4
2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4
2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4	2 1/4
2 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4 1/8	2 3/8
2 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4 1/8	2 3/8
2 1/2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4 1/8	2 3/8
3 1/4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8
3 1/4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8
4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8
4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8
5	1	3/4-16	1 1/8	1.5	1/4	3/4	2 5/16	5 1/8	2 7/8
5	1 3/8	1-14	1 5/8	2	3/8	1	2 9/16	5 1/8	2 7/8
5	1 3/4	1 1/4-12	2	2.375	1/2	1 1/4	2 13/16	5 1/8	2 7/8
6	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	5 3/4	3 1/8
6	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	5 3/4	3 1/8
6	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	5 3/4	3 1/8



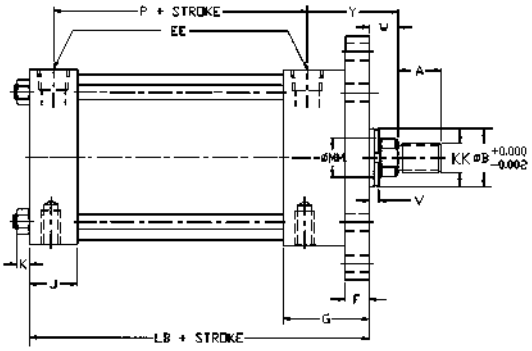
BORE	E	EE(NPT)	F	FB	G	J	K	R	TF	UF
1 1/2	2	3/8	3/8	5/16	2	1	1/4	1.43	2 3/4	3 3/8
2	2 1/2	3/8	3/8	3/8	2	1	5/16	1.84	3 3/8	4 1/8
2 1/2	3	3/8	3/8	3/8	2	1 1/8	5/16	2.19	3 7/8	4 5/8
3 1/4	3 3/4	1/2	5/8	7/16	2 1/4	1 1/4	3/8	2.76	4 11/16	5 1/2
4	4 1/2	1/2	5/8	7/16	2 1/4	1 1/4	3/8	3.32	5 7/16	6 1/4
5	5 1/2	1/2	5/8	9/16	2 1/4	1 1/2	7/16	4.10	6 5/8	7 5/8
6	6 1/2	3/4	3/4	9/16	2 3/4	1 5/8	7/16	4.88	7 5/8	8 5/8



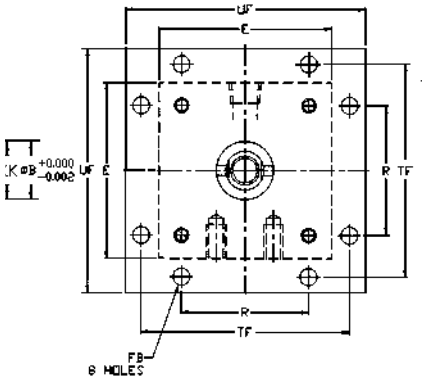
MF5 ø1.5" ~ 6"

WITH FRONT SQUARE FLANGE

BORE	ROD øMM	KK SM	A	B	V	W	Y	ADD LB	STROKE P
1 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4
1 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4
2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4
2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4
2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4	2 1/4
2 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4 1/8	2 3/8
2 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4 1/8	2 3/8
2 1/2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4 1/8	2 3/8
3 1/4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8
3 1/4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8
4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8
4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8
5	1	3/4-16	1 1/8	1.5	1/4	3/4	2 5/16	5 1/8	2 7/8
5	1 3/8	1-14	1 5/8	2	3/8	1	2 9/16	5 1/8	2 7/8
5	1 3/4	1 1/4-12	2	2.375	1/2	1 1/4	2 13/16	5 1/8	2 7/8
6	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	5 3/4	3 1/8
6	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	5 3/4	3 1/8
6	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	5 3/4	3 1/8



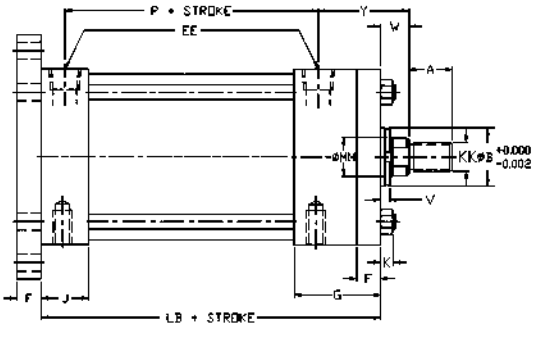
BORE	E	EE(NPT)	F	FB	G	J	K	R	TF	UF
1 1/2	2	3/8	3/8	5/16	2	1	1/4	1.43	2 3/4	3 3/8
2	2 1/2	3/8	3/8	3/8	2	1	5/16	1.84	3 3/8	4 1/8
2 1/2	3	3/8	3/8	3/8	2	1 1/8	5/16	2.19	3 7/8	4 5/8
3 1/4	3 3/4	1/2	5/8	7/16	2 1/4	1 1/4	3/8	2.76	4 11/16	5 1/2
4	4 1/2	1/2	5/8	7/16	2 1/4	1 1/4	3/8	3.32	5 7/16	6 1/4
5	5 1/2	1/2	5/8	9/16	2 1/4	1 1/2	7/16	4.10	6 5/8	7 5/8
6	6 1/2	3/4	3/4	9/16	2 3/4	1 5/8	7/16	4.88	7 5/8	8 5/8



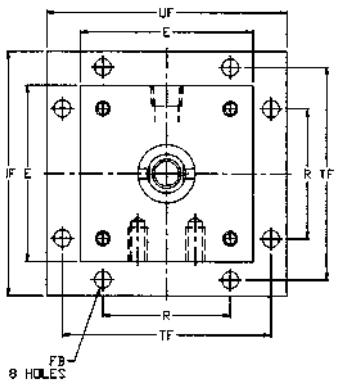
MF6 ø1.5" ~ 6"

WITH REAR SQUARE FLANGE

BORE	ROD øMM	KK SM	A	B	V	W	Y	ADD LB	STROKE P
1 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4
1 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4
2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4
2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4
2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4	2 1/4
2 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4 1/8	2 3/8
2 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4 1/8	2 3/8
2 1/2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4 1/8	2 3/8
3 1/4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8
3 1/4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8
4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8
4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8
5	1	3/4-16	1 1/8	1.5	1/4	3/4	2 5/16	5 1/8	2 7/8
5	1 3/8	1-14	1 5/8	2	3/8	1	2 9/16	5 1/8	2 7/8
5	1 3/4	1 1/4-12	2	2.375	1/2	1 1/4	2 13/16	5 1/8	2 7/8
6	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	5 3/4	3 1/8
6	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	5 3/4	3 1/8
6	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	5 3/4	3 1/8



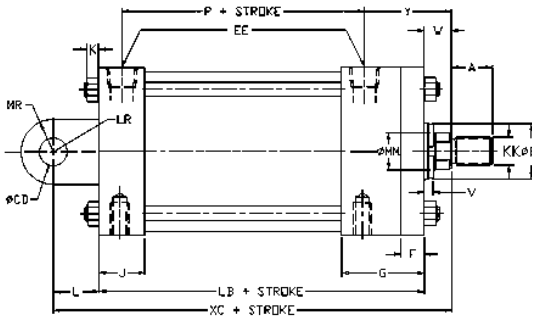
BORE	E	EE(NPT)	F	FB	G	J	K	R	TF	UF
1 1/2	2	3/8	3/8	5/16	2	1	1/4	1.43	2 3/4	3 3/8
2	2 1/2	3/8	3/8	3/8	2	1	5/16	1.84	3 3/8	4 1/8
2 1/2	3	3/8	3/8	3/8	2	1 1/8	5/16	2.19	3 7/8	4 5/8
3 1/4	3 3/4	1/2	5/8	7/16	2 1/4	1 1/4	3/8	2.76	4 11/16	5 1/2
4	4 1/2	1/2	5/8	7/16	2 1/4	1 1/4	3/8	3.32	5 7/16	6 1/4
5	5 1/2	1/2	5/8	9/16	2 1/4	1 1/2	7/16	4.10	6 5/8	7 5/8
6	6 1/2	3/4	3/4	9/16	2 3/4	1 5/8	7/16	4.88	7 5/8	8 5/8



MP1 ø1.5" ~ 6"

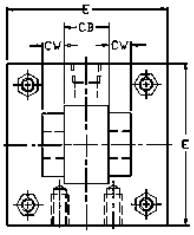
With Double Rear Clevis

Bore	Rod øMM	KK SM	A	B	V	W	Y	Add Stroke LB	P	XC
1 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4	5 3/8
1 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4	5 3/4
2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4	5 3/8
2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4	5 3/4
2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4	2 1/4	6
2 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4 1/8	2 3/8	5 1/2
2 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4 1/8	2 3/8	5 7/8
2 1/2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4 1/8	2 3/8	6 1/8
3 1/4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8	6 7/8
3 1/4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8	7 1/8
4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8	6 7/8
4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8	7 1/8
5	1	3/4-16	1 1/8	1.5	1/4	3/4	2 5/16	5 1/8	2 7/8	7 1/8
5	1 3/8	1-14	1 5/8	2	3/8	1	2 9/16	5 1/8	2 7/8	7 3/8
5	1 3/4	1 1/4-12	2	2.375	1/2	1 1/4	2 13/16	5 1/8	2 7/8	7 5/8
6	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	5 3/4	3 1/8	8 1/8
6	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	5 3/4	3 1/8	8 3/8
6	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	5 3/4	3 1/8	8 1/2

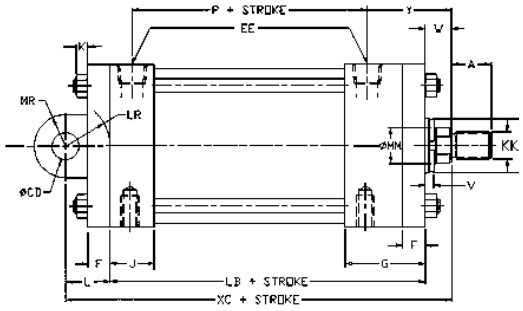


Heavy Duty

Bore	CB	CD	CW	E	EE(NPT)	F
1 1/2	3/4	1/2	1/2	2	3/8	3/8
2	3/4	1/2	1/2	2 1/2	3/8	3/8
2 1/2	3/4	1/2	1/2	3	3/8	3/8
3 1/4	1 1/4	3/4	5/8	3 3/4	1/2	5/8
4	1 1/4	3/4	5/8	4 1/2	1/2	5/8
5	1 1/4	3/4	5/8	5 1/2	1/2	5/8
6	1 1/2	1	3/4	6 1/2	3/4	3/4



Bore	G	J	K	L	LR	MR
1 1/2	2	1	1/4	3/4	3/4	5/8
2	2	1	5/16	3/4	3/4	5/8
2 1/2	2	1 1/8	5/16	3/4	3/4	5/8
3 1/4	2 1/4	1 1/4	3/8	1 1/4	1 1/4	7/8
4	2 1/4	1 1/4	3/8	1 1/4	1 1/4	7/8
5	2 1/4	1 1/2	7/16	1 1/4	1 1/4	7/8
6	2 3/4	1 5/8	7/16	1 1/2	1 1/2	1 1/4

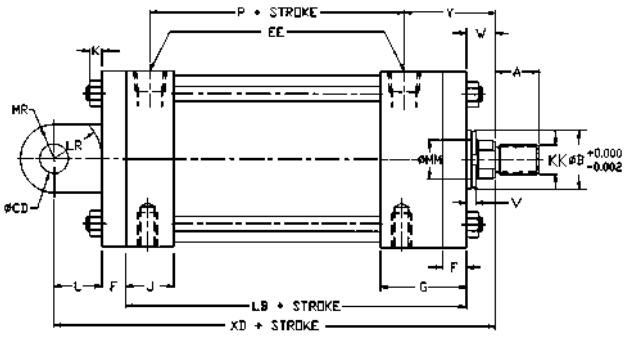


Medium Duty

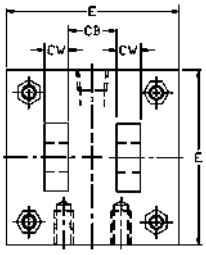
MP2 ø1.5" ~ 6"

With Double Detachable Rear Clevis / Female

Bore	Rod øMM	KK SM	A	B	V	W	Y	Add Stroke LB	P	XD
1 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4	5 3/4
1 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4	6 1/8
2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4	5 3/4
2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4	6 1/8
2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4	2 1/4	6 3/8
2 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4 1/8	2 3/8	5 7/8
2 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4 1/8	2 3/8	6 1/4
2 1/2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4 1/8	2 3/8	6 1/2
3 1/4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8	7 1/2
3 1/4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8	7 3/4
4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8	7 1/2
4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8	7 3/4
5	1	3/4-16	1 1/8	1.5	1/4	3/4	2 5/16	5 1/8	2 7/8	7 3/4
5	1 3/8	1-14	1 5/8	2	3/8	1	2 9/16	5 1/8	2 7/8	8
5	1 3/4	1 1/4-12	2	2.375	1/2	1 1/4	2 13/16	5 1/8	2 7/8	8 1/4
6	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	5 3/4	3 1/8	8 7/8
6	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	5 3/4	3 1/8	9 1/8
6	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	5 3/4	3 1/8	9 1/4



Bore	CB	CD	CW	E	EE(NPT)	F
1 1/2	3/4	1/2	1/2	2	3/8	3/8
2	3/4	1/2	1/2	2 1/2	3/8	3/8
2 1/2	3/4	1/2	1/2	3	3/8	3/8
3 1/4	1 1/4	3/4	5/8	3 3/4	1/2	5/8
4	1 1/4	3/4	5/8	4 1/2	1/2	5/8
5	1 1/4	3/4	5/8	5 1/2	1/2	5/8
6	1 1/2	1	3/4	6 1/2	3/4	3/4

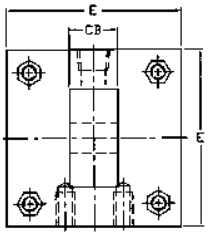


Bore	G	J	K	L	LR	MR
1 1/2	3/8	2	11/4	3/4	3/4	5/8
2	2	1	5/16	3/4	3/4	5/8
2 1/2	2	1 1/8	5/16	3/4	3/4	5/8
3 1/4	2 1/4	1 1/4	3/8	1 1/4	1 1/4	7/8
4	2 1/4	1 1/4	3/8	1 1/4	1 1/4	7/8
5	2 1/4	1 1/2	7/16	1 1/4	1 1/4	7/8
6	2 3/4	1 5/8	7/16	1 1/2	1 1/2	1 1/4

MP3 ø1.5" ~ 6"

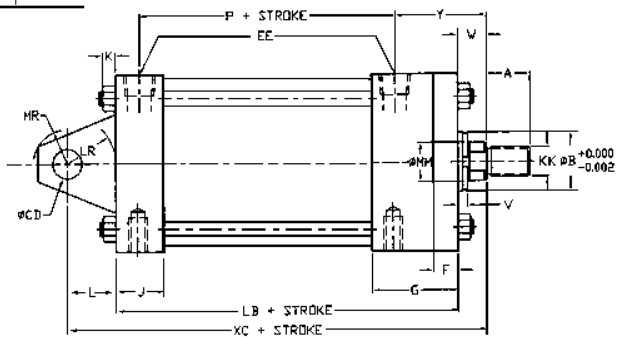
With Cap Fixed Eye

Bore	Rod øMM	KK SM	A	B	V	W	Y	Add Stroke LB	P	XC
1 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4	5 3/8
1 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4	5 3/4
2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4	5 3/8
2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4	5 3/4
2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4	2 1/4	6
2 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4 1/8	2 3/8	5 1/2
2 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4 1/8	2 3/8	5 7/8
2 1/2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4 1/8	2 3/8	6 1/8
3 1/4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8	6 7/8
3 1/4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8	7 1/8
4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8	6 7/8
4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8	7 1/8
5	1	3/4-16	1 1/8	1.5	1/4	3/4	2 5/16	5 1/8	2 7/8	7 1/8
5	1 3/8	1-14	1 5/8	2	3/8	1	2 9/16	5 1/8	2 7/8	7 3/8
5	1 3/4	1 1/4-12	2	2.375	1/2	1 1/4	2 13/16	5 1/8	2 7/8	7 5/8
6	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	5 3/4	3 1/8	8 1/8
6	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	5 3/4	3 1/8	8 3/8
6	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	5 3/4	3 1/8	8 1/2



Bore	CB	CD	E	EE(NPT)	F
1 1/2	3/4	1/2	2	3/8	3/8
2	3/4	1/2	2 1/2	3/8	3/8
2 1/2	3/4	1/2	3	3/8	3/8
3 1/4	1 1/4	3/4	3 3/4	1/2	5/8
4	1 1/4	3/4	4 1/2	1/2	5/8
5	1 1/4	3/4	5 1/2	1/2	5/8
6	1 1/2	1	6 1/2	3/4	3/4

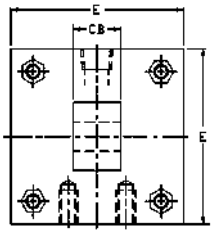
Bore	G	J	K	L	LR	MR
1 1/2	2	1	1/4	3/4	3/4	5/8
2	2	1	5/16	3/4	3/4	5/8
2 1/2	2	1 1/8	5/16	3/4	3/4	5/8
3 1/4	2 1/4	1 1/4	3/8	1 1/4	1 1/4	7/8
4	2 1/4	1 1/4	3/8	1 1/4	1 1/4	7/8
5	2 1/4	1 1/2	7/16	1 1/4	1 1/4	7/8
6	2 3/4	1 5/8	7/16	1 1/2	1 1/2	1 1/4



MP4 ø1.5" ~ 6"

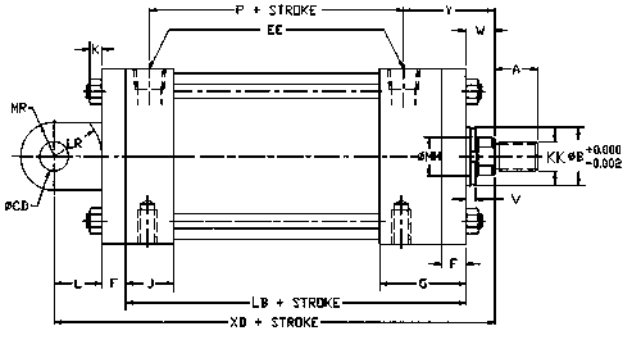
With Single Detachable Rear Clevis / Male

Bore	Rod øMM	KK SM	A	B	V	W	Y	Add Stroke LB	P	XD
1 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4	5 3/4
1 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4	6 1/8
2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4	5 3/4
2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4	6 1/8
2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4	2 1/4	6 3/8
2 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4 1/8	2 3/8	5 7/8
2 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4 1/8	2 3/8	6 1/4
2 1/2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4 1/8	2 3/8	6 1/2
3 1/4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8	7 1/2
3 1/4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8	7 3/4
4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8	7 1/2
4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8	7 3/4
5	1	3/4-16	1 1/8	1.5	1/4	3/4	2 5/16	5 1/8	2 7/8	7 3/4
5	1 3/8	1-14	1 5/8	2	3/8	1	2 9/16	5 1/8	2 7/8	8
5	1 3/4	1 1/4-12	2	2.375	1/2	1 1/4	2 13/16	5 1/8	2 7/8	8 1/4
6	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	5 3/4	3 1/8	8 7/8
6	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	5 3/4	3 1/8	9 1/8
6	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	5 3/4	3 1/8	9 1/4



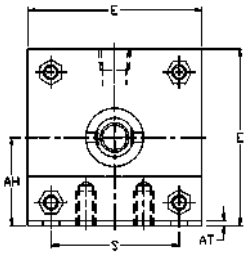
Bore	CB	CD	E	EE(NPT)	F
1 1/2	3/4	1/2	2	3/8	3/8
2	3/4	1/2	2 1/2	3/8	3/8
2 1/2	3/4	1/2	3	3/8	3/8
3 1/4	1 1/4	3/4	3 3/4	1/2	5/8
4	1 1/4	3/4	4 1/2	1/2	5/8
5	1 1/4	3/4	5 1/2	1/2	5/8
6	1 1/2	1	6 1/2	3/4	3/4

Bore	G	J	K	L	LR	MR
1 1/2	2	1	1/4	3/4	3/4	5/8
2	2	1	5/16	3/4	3/4	5/8
2 1/2	2	1 1/8	5/16	3/4	3/4	5/8
3 1/4	2 1/4	1 1/4	3/8	1 1/4	1 1/4	7/8
4	2 1/4	1 1/4	3/8	1 1/4	1 1/4	7/8
5	2 1/4	1 1/2	7/16	1 1/4	1 1/4	7/8
6	2 3/4	1 5/8	7/16	1 1/2	1 1/2	1 1/4



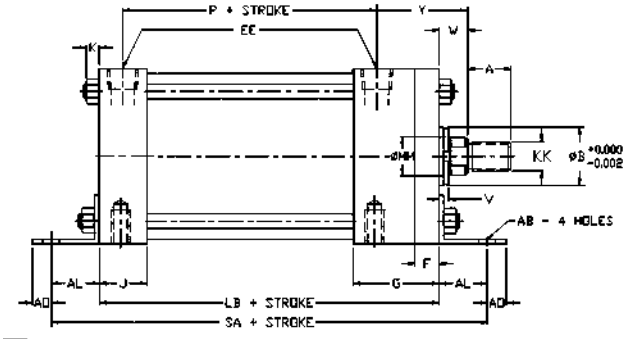
MS1 ø1.5" ~ 6"
With Foot Mount

Bore	Rod øMM	KK SM	A	B	V	W	Y	Add Stroke LB	P	SA
1 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4	6
1 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4	6
2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4	6
2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4	6
2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4	2 1/4	6
2 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4 1/8	2 3/8	6 1/8
2 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4 1/8	2 3/8	6 1/8
2 1/2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4 1/8	2 3/8	6 1/8
3 1/4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8	7 3/8
3 1/4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8	7 3/8
4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8	7 3/8
4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8	7 3/8
5	1	3/4-16	1 1/8	1.5	1/4	3/4	2 5/16	5 1/8	2 7/8	7 7/8
5	1 3/8	1-14	1 5/8	2	3/8	1	2 9/16	5 1/8	2 7/8	7 7/8
5	1 3/4	1 1/4-12	2	2.375	1/2	1 1/4	2 13/16	5 1/8	2 7/8	7 7/8
6	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	5 3/4	3 1/8	8 1/2
6	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	5 3/4	3 1/8	8 1/2
6	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	5 3/4	3 1/8	8 1/2



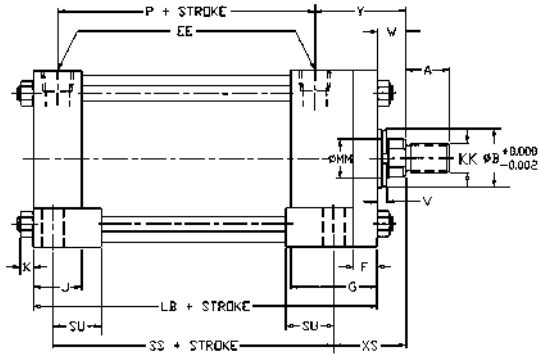
Bore	AB	AH	AL	AO	AT
1 1/2	7/16	1 3/16	1	3/8	1/8
2	7/16	1 7/16	1	3/8	1/8
2 1/2	7/16	1 5/8	1	3/8	1/8
3 1/4	9/16	1 15/16	1 1/4	1/2	1/8
4	9/16	2 1/4	1 1/4	1/2	1/8
5	11/16	2 3/4	1 3/8	5/8	3/16
6	13/16	3 1/4	1 3/8	5/8	3/16

Bore	E	EE(NPT)	F	G	J	K	S
1 1/2	2	3/8	3/8	2	1	1/4	1 1/4
2	2 1/2	3/8	3/8	2	1	5/16	1 3/4
2 1/2	3	3/8	3/8	2	1 1/8	5/16	2 1/4
3 1/4	3 3/4	1/2	5/8	2 1/4	1 1/4	5/16	2 3/4
4	4 1/2	1/2	5/8	2 1/4	1 1/4	3/8	3 1/2
5	5 1/2	1/2	5/8	2 1/4	1 1/2	7/16	4 1/4
6	6 1/2	3/4	3/4	2 3/4	1 5/8	7/16	5 1/4

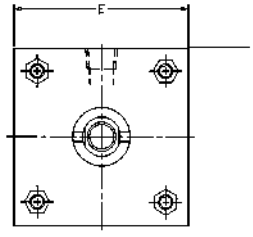


MS2 ø1.5" ~ 6"
With Side Lug

Bore	Rod øMM	KK SM	A	B	V	W	XS	Y	Add Stroke LB	P	SS
1 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 3/8	1 15/16	4	2 1/4	2 7/8
1 1/2	1	3/4-16	1 1/8	1.5	1/2	1	1 3/4	2 5/16	4	2 1/4	2 7/8
2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	1 15/16	4	2 1/4	2 7/8
2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	2 5/16	4	2 1/4	2 7/8
2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2	2 9/16	4	2 1/4	2 7/8
2 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 3/8	1 15/16	4 1/8	2 3/8	3
2 1/2	1	3/4-16	1 1/8	1.5	1/2	1	1 3/4	2 5/16	4 1/8	2 3/8	3
2 1/2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2	2 9/16	4 1/8	2 3/8	3
3 1/4	1	3/4-16	1 1/8	1.5	1/4	3/4	1 7/8	2 3/8	4 7/8	2 5/8	3 1/4
3 1/4	1 3/8	1-14	1 5/8	2	3/8	1	2 1/8	2 5/8	4 7/8	2 5/8	3 1/4
4	1	3/4-16	1 1/8	1.5	1/4	3/4	1 7/8	2 3/8	4 7/8	2 5/8	3 1/4
4	1 3/8	1-14	1 5/8	2	3/8	1	2 1/8	2 5/8	4 7/8	2 5/8	3 1/4
5	1	3/4-16	1 1/8	1.5	1/4	3/4	2 1/16	2 5/16	5 1/8	2 7/8	3 1/8
5	1 3/8	1-14	1 5/8	2	3/8	1	2 5/16	2 9/16	5 1/8	2 7/8	3 1/8
5	1 3/4	1 1/4-12	2	2.375	1/2	1 1/4	2 9/16	2 13/16	5 1/8	2 7/8	3 1/8
6	1 3/8	1-14	1 5/8	2	1/4	7/8	2 5/16	2 13/16	5 3/4	3 1/8	3 5/8
6	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	2 9/16	3 1/16	5 3/4	3 1/8	3 5/8
6	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	2 11/16	3 3/16	5 3/4	3 1/8	3 5/8



Bore	E	EE(NPT)	F	G	J	K
1 1/2	2	3/8	3/8	2	1	1/4
2	2 1/2	3/8	3/8	2	1	5/16
2 1/2	3	3/8	3/8	2	1 1/8	5/16
3 1/4	3 3/4	1/2	5/8	2 1/4	1 1/4	3/8
4	4 1/2	1/2	5/8	2 1/4	1 1/4	3/8
5	5 1/2	1/2	5/8	2 1/4	1 1/2	7/16
6	6 1/2	3/4	3/4	2 3/4	1 5/8	7/16

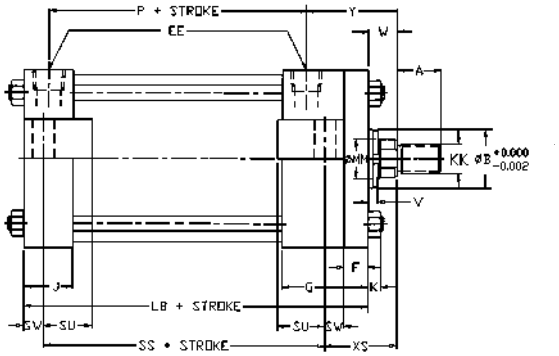


Bore	SB	ST	SU	SW	TS
1 1/2	7/16	1/2	15/16	3/8	2 3/4
2	7/16	1/2	15/16	3/8	3 1/4
2 1/2	7/16	1/2	15/16	3/8	3 3/4
3 1/4	9/16	3/4	1 1/4	1/2	4 3/4
4	9/16	3/4	1 1/4	1/2	5 1/2
5	13/16	1	1 9/16	11/16	6 7/8
6	13/16	1	1 9/16	11/16	7 7/8

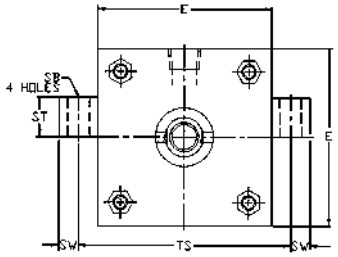
MS3 ø1.5" ~ 6"

With Centerline Lug

Bore	Rod øMM	KK SM	A	B	V	W	XS	Y	Add Stroke LB	P	SS
1 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 3/8	1 15/16	4	2 1/4	2 7/8
1 1/2	1	3/4-16	1 1/8	1.5	1/2	1	1 3/4	2 5/16	4	2 1/4	2 7/8
2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	1 15/16	4	2 1/4	2 7/8
2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	2 5/16	4	2 1/4	2 7/8
2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2	2 9/16	4	2 1/4	2 7/8
2 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 3/8	1 15/16	4 1/8	2 3/8	3
2 1/2	1	3/4-16	1 1/8	1.5	1/2	1	1 3/4	2 5/16	4 1/8	2 3/8	3
2 1/2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2	2 9/16	4 1/8	2 3/8	3
3 1/4	1	3/4-16	1 1/8	1.5	1/4	3/4	1 7/8	2 3/8	4 7/8	2 5/8	3 1/4
3 1/4	1 3/8	1-14	1 5/8	2	3/8	1	2 1/8	2 5/8	4 7/8	2 5/8	3 1/4
4	1	3/4-16	1 1/8	1.5	1/4	3/4	1 7/8	2 3/8	4 7/8	2 5/8	3 1/4
4	1 3/8	1-14	1 5/8	2	3/8	1	2 1/8	2 5/8	4 7/8	2 5/8	3 1/4
5	1	3/4-16	1 1/8	1.5	1/4	3/4	2 1/16	2 5/16	5 1/8	2 7/8	3 1/8
5	1 3/8	1-14	1 5/8	2	3/8	1	2 5/16	2 9/16	5 1/8	2 7/8	3 1/8
5	1 3/4	1 1/4-12	2	2.375	1/2	1 1/4	2 9/16	2 13/16	5 1/8	2 7/8	3 1/8
6	1 3/8	1-14	1 5/8	2	1/4	7/8	2 5/16	2 13/16	5 3/4	3 1/8	3 5/8
6	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	2 9/16	3 1/16	5 3/4	3 1/8	3 5/8
6	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	2 11/16	3 3/16	5 3/4	3 1/8	3 5/8



Bore	E	EE(NPT)	F	G	J	K
1 1/2	2	3/8	3/8	2	1	1/4
2	2 1/2	3/8	3/8	2	1	5/16
2 1/2	3	3/8	3/8	2	1 1/8	5/16
3 1/4	3 3/4	1/2	5/8	2 1/4	1 1/4	3/8
4	4 1/2	1/2	5/8	2 1/4	1 1/4	3/8
5	5 1/2	1/2	5/8	2 1/4	1 1/2	7/16
6	6 1/2	3/4	3/4	2 3/4	1 5/8	7/16

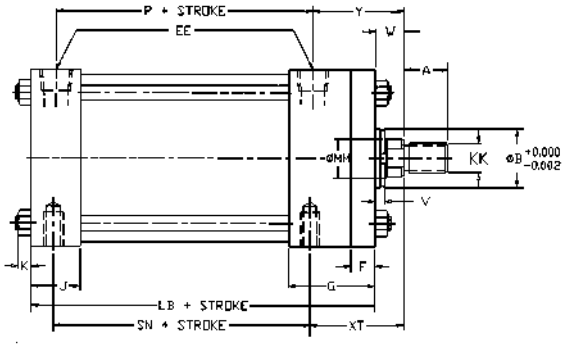


Bore	SB	ST	SU	SW	TS
1 1/2	7/16	1/2	15/16	3/8	2 3/4
2	7/16	1/2	15/16	3/8	3 1/4
2 1/2	7/16	1/2	15/16	3/8	3 3/4
3 1/4	9/16	3/4	1 1/4	1/2	4 3/4
4	9/16	3/4	1 1/4	1/2	5 1/2
5	13/16	1	1 9/16	11/16	6 7/8
6	13/16	1	1 9/16	11/16	7 7/8

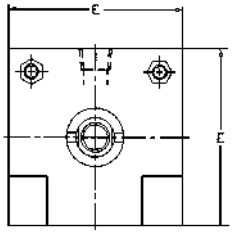
MS4 ø1.5" ~ 6"

Side Tapped

Bore	Rod øMM	KK SM	A	B	V	W	Y	Add StrokeIM LB	P	SN	XT
1 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4	2 1/4	1 15/16
1 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4	2 1/4	2 5/16
2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4	2 1/4	1 15/16
2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4	2 1/4	2 5/16
2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4	2 1/4	2 1/4	2 9/16
2 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4 1/8	2 3/8	2 3/8	1 15/16
2 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4 1/8	2 3/8	2 3/8	2 5/16
2 1/2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4 1/8	2 3/8	2 3/8	2 9/16
3 1/4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8	2 5/8	2 7/16
3 1/4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8	2 5/8	2 11/16
4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8	2 5/8	2 7/16
4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8	2 5/8	2 11/16
5	1	3/4-16	1 1/8	1.5	1/4	3/4	2 5/16	5 1/8	2 7/8	2 7/8	2 7/16
5	1 3/8	1-14	1 5/8	2	3/8	1	2 9/16	5 1/8	2 7/8	2 7/8	2 11/16
5	1 3/4	1 1/4-12	2	2.375	1/2	1 1/4	2 13/16	5 1/8	2 7/8	2 7/8	2 15/16
6	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	5 3/4	3 1/8	3 1/8	2 13/16
6	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	5 3/4	3 1/8	3 1/8	3 1/16
6	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	5 3/4	3 1/8	3 1/8	3 3/16



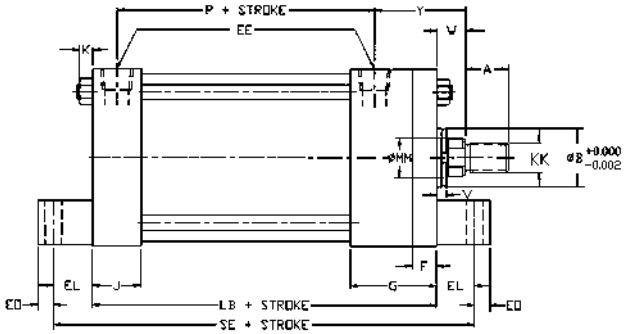
Bore	E	EE(NPT)	F	G	J	K	NT	TN
1 1/2	2	3/8	3/8	2	1	1/4	1/4-20	5/8
2	2 1/2	3/8	3/8	2	1	5/16	5/16-18	7/8
2 1/2	3	3/8	3/8	2	1 1/8	5/16	3/8-16	1 1/4
3 1/4	3 3/4	1/2	5/8	2 1/4	1 1/4	3/8	1/2-13	1 1/2
4	4 1/2	1/2	5/8	2 1/4	1 1/4	3/8	1/2-13	2 1/16
5	5 1/2	1/2	5/8	2 1/4	1 1/2	7/16	5/8-11	2 11/16
6	6 1/2	3/4	3/4	2 3/4	1 5/8	7/16	3/4-10	3 1/4



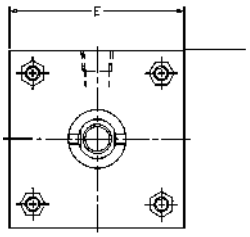
MS7 ø1.5” ~ 6”

WITH FRONT LUG MOUNT

BORE	ROD øMM	KK SM	A	B	V	W	Y	ADD STROKE LB	P	SE
1 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4	5 1/2
1 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4	5 1/2
2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4	5 7/8
2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4	5 7/8
2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4	2 1/4	5 7/8
2 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4 1/8	2 3/8	6 1/4
2 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4 1/8	2 3/8	6 1/4
2 1/2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4 1/8	2 3/8	6 1/4
3 1/4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8	6 5/8
3 1/4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8	6 5/8
4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8	6 7/8
4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8	6 7/8
5	1	3/4-16	1 1/8	1.5	1/4	3/4	2 5/16	5 1/8	2 7/8	7 1/4
5	1 3/8	1-14	1 5/8	2	3/8	1	2 9/16	5 1/8	2 7/8	7 1/4
5	1 3/4	1 1/4-12	2	2.375	1/2	1 1/4	2 13/16	5 1/8	2 7/8	7 1/4
6	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	5 3/4	3 1/8	7 3/4
6	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	5 3/4	3 1/8	7 3/4
6	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	5 3/4	3 1/8	7 3/4



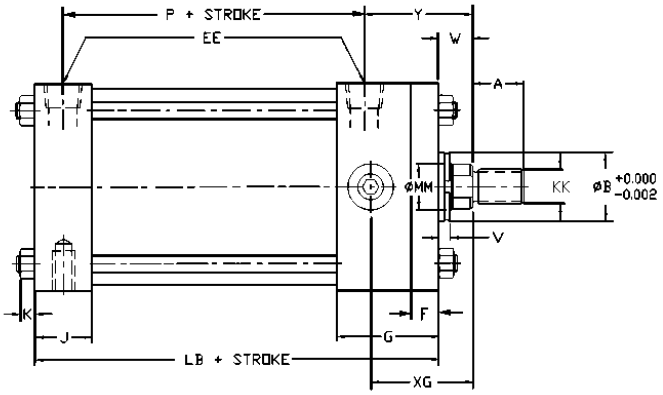
BORE	E	EB	EE(NPT)	EL	EO	ES	ET	F	G	J	K	R
1 1/2	2	5/16	3/8	3/4	1/4	9/16	17/32	3/8	2	1	1/4	1.43
2	2 1/2	3/8	3/8	15/16	5/16	5/8	5/8	3/8	2	1	5/16	1.84
2 1/2	3	3/8	3/8	1 1/16	5/16	13/16	25/32	3/8	2	1 1/8	5/16	2.19
3 1/4	3 3/4	7/16	1/2	7/8	3/8	1	15/16	5/8	2 1/4	1 1/4	3/8	2.76
4	4 1/2	7/16	1/2	1	3/8	1 1/4	1 5/32	5/8	2 1/4	1 1/4	3/8	3.32
5	5 1/2	9/16	1/2	1 1/16	1/2	1 3/8	1 3/8	5/8	2 1/4	1 1/2	7/16	4.1
6	6 1/2	9/16	3/4	1	1/2	1 3/4	1 19/32	3/4	2 3/4	1 5/8	7/16	4.88



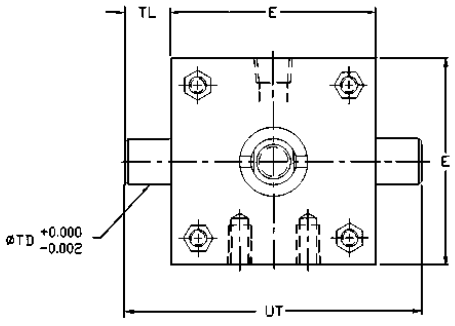
MT1 ø1.5” ~ 6”

WITH HEAD TRUNNION

BORE	ROD øMM	KK SM	A	B	V	W	XG	Y	ADD STROKE LB	P
1 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 3/4	1 15/16	4	2 1/4
1 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 1/8	2 5/16	4	2 1/4
2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 3/4	1 15/16	4	2 1/4
2	1	3/4-16	1 1/8	1.5	1/2	1	2 1/8	2 5/16	4	2 1/4
2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 3/8	2 9/16	4	2 1/4
2 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 3/4	1 15/16	4 1/8	2 3/8
2 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 1/8	2 5/16	4 1/8	2 3/8
2 1/2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 3/8	2 9/16	4 1/8	2 3/8
3 1/4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 1/4	2 3/8	4 7/8	2 5/8
3 1/4	1 3/8	1-14	1 5/8	2	3/8	1	2 1/2	2 5/8	4 7/8	2 5/8
4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 1/4	2 3/8	4 7/8	2 5/8
4	1 3/8	1-14	1 5/8	2	3/8	1	2 1/2	2 5/8	4 7/8	2 5/8
5	1	3/4-16	1 1/8	1.5	1/4	3/4	2 1/4	2 5/16	5 1/8	2 7/8
5	1 3/8	1-14	1 5/8	2	3/8	1	2 1/2	2 9/16	5 1/8	2 7/8
5	1 3/4	1 1/4-12	2	2.375	1/2	1 1/4	2 3/4	2 13/16	5 1/8	2 7/8
6	1 3/8	1-14	1 5/8	2	1/4	7/8	2 5/8	2 13/16	5 3/4	3 1/8
6	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	2 7/8	3 1/16	5 3/4	3 1/8
6	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3	3 3/16	5 3/4	3 1/8



BORE	E	EE(NPT)	F	G	J	K	TD	TL	UT
1 1/2	2	3/8	3/8	2	1	1/4	1	1	4
2	2 1/2	3/8	3/8	2	1	5/16	1	1	4 1/2
2 1/2	3	3/8	3/8	2	1 1/8	5/16	1	1	5
3 1/4	3 3/4	1/2	5/8	2 1/4	1 1/4	3/8	1	1	5 3/4
4	4 1/2	1/2	5/8	2 1/4	1 1/4	3/8	1	1	6 1/2
5	5 1/2	1/2	5/8	2 1/4	1 1/2	7/16	1	1	7 1/2
6	6 1/2	3/4	3/4	2 3/4	1 5/8	7/16	1 3/8	1 3/8	9 1/4

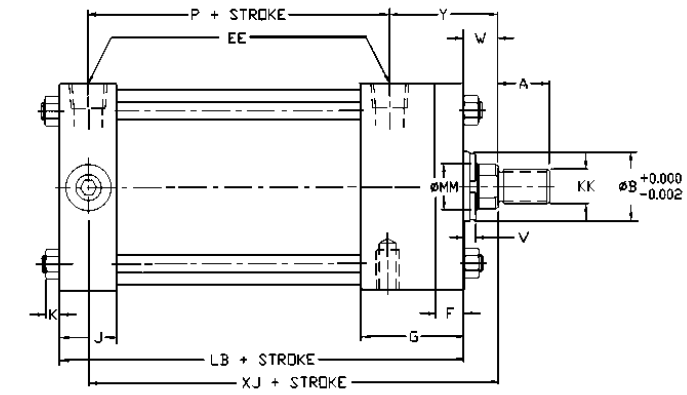


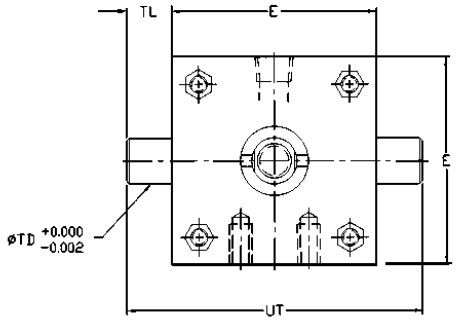
MT2 ø1.5" ~ 6"
WITH REAR TRUNNION

BORE	ROD øMM	KK SM	A	B	V	W	Y	ADD STROKE LB	P	XJ
1 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4	4 1/8
1 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4	4 1/2
2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4	4 1/8
2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4	4 1/2
2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4	2 1/4	4 3/4
2 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4 1/8	2 3/8	4 1/4
2 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4 1/8	2 3/8	4 5/8
2 1/2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4 1/8	2 3/8	4 7/8
3 1/4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8	5
3 1/4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8	5 1/4
4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8	5
4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8	5 1/4
5	1	3/4-16	1 1/8	1.5	1/4	3/4	2 5/16	5 1/8	2 7/8	5 1/4
5	1 3/8	1-14	1 5/8	2	3/8	1	2 9/16	5 1/8	2 7/8	5 1/2
5	1 3/4	1 1/4-12	2	2.375	1/2	1 1/4	2 13/16	5 1/8	2 7/8	5 3/4
6	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	5 3/4	3 1/8	5 7/8
6	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	5 3/4	3 1/8	6 1/8
6	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	5 3/4	3 1/8	6 1/4

BORE	E	EE(NPT)	F	G	J	K
1 1/2	2	3/8	3/8	2	1	1/4
2	2 1/2	3/8	3/8	2	1	5/16
2 1/2	3	3/8	3/8	2	1 1/8	5/16
3 1/4	3 3/4	1/2	5/8	2 1/4	1 1/4	3/8
4	4 1/2	1/2	5/8	2 1/4	1 1/4	3/8
5	5 1/2	1/2	5/8	2 1/4	1 1/2	7/16
6	6 1/2	3/4	3/4	2 3/4	1 5/8	7/16

BORE	TD	TL	UT
1 1/2	1	1	4
2	1	1	4 1/2
2 1/2	1	1	5
3 1/4	1	1	5 3/4
4	1	1	6 1/2
5	1	1	7 1/2
6	1 3/8	1 3/8	9 1/4



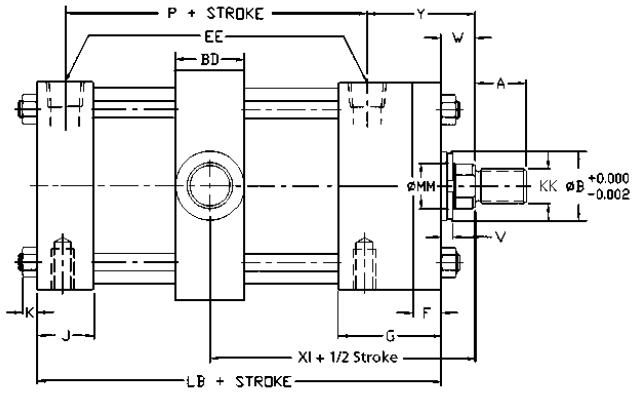


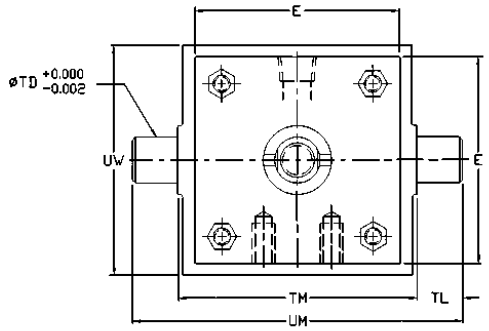
MT4 ø1.5" ~ 6"
WITH CENTER TRUNNION

BORE	ROD øMM	KK SM	A	B	V	W	Y	ADD STROKE LB	P	ADD STROKE/2 XI
1 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4	3.125
1 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4	3.500
2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4	3.125
2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4	3.500
2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4	2 1/4	3.750
2 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4 1/8	2 3/8	3.125
2 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4 1/8	2 3/8	3.500
2 1/2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4 1/8	2 3/8	3.750
3 1/4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8	3.688
3 1/4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8	3.938
4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8	3.688
4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8	3.838
5	1	3/4-16	1 1/8	1.5	1/4	3/4	2 5/16	5 1/8	2 7/8	3.688
5	1 3/8	1-14	1 5/8	2	3/8	1	2 9/16	5 1/8	2 7/8	3.838
5	1 3/4	1 1/4-12	2	2.375	1/2	1 1/4	2 13/16	5 1/8	2 7/8	4.188
6	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	5 3/4	3 1/8	4.313
6	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	5 3/4	3 1/8	4.563
6	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	5 3/4	3 1/8	4.688

BORE	BD	E	EE(NPT)	F	G	J	K
1 1/2	1 1/4	2	3/8	3/8	2	1	1/4
2	1 1/4	2 1/2	3/8	3/8	2	1	5/16
2 1/2	1 1/4	3	3/8	3/8	2	1 1/8	5/16
3 1/4	1 1/2	3 3/4	1/2	5/8	2 1/4	1 1/4	3/8
4	1 1/2	4 1/2	1/2	5/8	2 1/4	1 1/4	3/8
5	1 1/2	5 1/2	1/2	5/8	2 1/4	1 1/2	7/16
6	1 3/4	6 1/2	3/4	3/4	2 3/4	1 5/8	7/16

BORE	TD	TL	TM	UM	UW
1 1/2	1	1	2 1/2	4 1/2	2 1/2
2	1	1	3	5	3
2 1/2	1	1	3 1/2	5 1/2	3 1/2
3 1/4	1	1	4 1/2	6 1/2	4 1/2
4	1	1	5 1/4	7 1/4	5 1/4
5	1	1	6 1/4	8 1/4	6 1/4
6	1 3/8	1 3/8	7 5/8	10 3/8	7 5/8

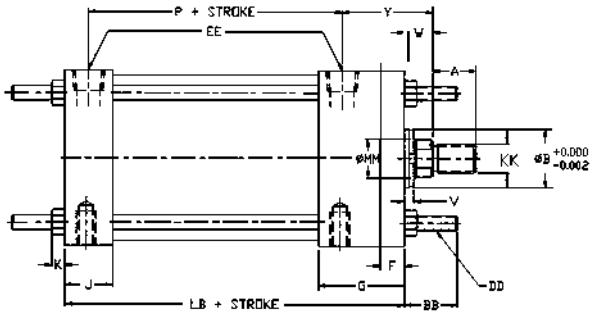




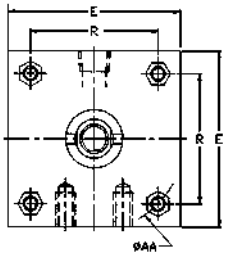
MX1 ø1.5" ~ 6"

With Extended Tie-Rods / Both Ends

Bore	Rod øMM	KK SM	A	B	V	W	Y	Add Stroke LB	Add Stroke P
1 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4
1 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4
2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4
2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4
2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4	2 1/4
2 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4 1/8	2 3/8
2 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4 1/8	2 3/8
2 1/2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4 1/8	2 3/8
3 1/4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8
3 1/4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8
4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8
4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8
5	1	3/4-16	1 1/8	1.5	1/4	3/4	2 5/16	5 1/8	2 7/8
5	1 3/8	1-14	1 5/8	2	3/8	1	2 9/16	5 1/8	2 7/8
5	1 3/4	1 1/4-12	2	2.375	1/2	1 1/4	2 13/16	5 1/8	2 7/8
6	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	5 3/4	3 1/8
6	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	5 3/4	3 1/8
6	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	5 3/4	3 1/8



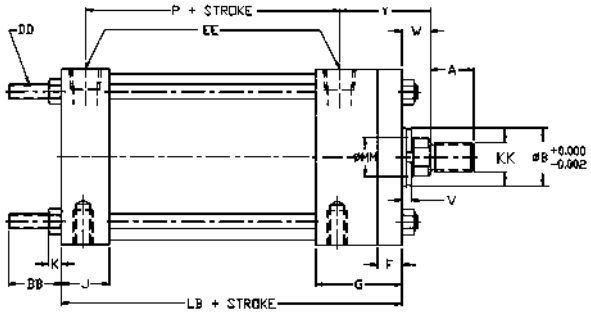
Bore	AA	BB	DD	E	EE(NPT)	F	G	J	K	R
1 1/2	2.02	1	1/4-20	2	3/8	3/8	2	1	1/4	1.43
2	2.60	1 1/8	5/16-24	2 1/2	3/8	3/8	2	1	5/16	1.84
2 1/2	3.10	1 1/8	5/16-24	3	3/8	3/8	2	1 1/8	5/16	2.19
3 1/4	3.90	1 3/8	3/8-24	3 3/4	1/2	5/8	2 1/4	1 1/4	3/8	2.78
4	4.70	1 3/8	3/8-24	4 1/2	1/2	5/8	2 1/4	1 1/4	3/8	3.32
5	5.80	1 13/16	1/2-20	5 1/2	1/2	5/8	2 1/4	1 1/2	7/16	4.10
6	6.90	1 13/16	1/2-20	6 1/2	3/4	3/4	2 3/4	1 5/8	7/16	4.88



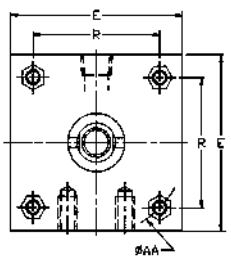
MX2 ø1.5" ~ 6"

With Extended Tie-Rods / Cap

Bore	Rod øMM	KK SM	A	B	V	W	Y	Add Stroke LB	Add Stroke P
1 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4
1 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4
2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4
2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4
2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4	2 1/4
2 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4 1/8	2 3/8
2 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4 1/8	2 3/8
2 1/2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4 1/8	2 3/8
3 1/4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8
3 1/4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8
4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8
4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8
5	1	3/4-16	1 1/8	1.5	1/4	3/4	2 5/16	5 1/8	2 7/8
5	1 3/8	1-14	1 5/8	2	3/8	1	2 9/16	5 1/8	2 7/8
5	1 3/4	1 1/4-12	2	2.375	1/2	1 1/4	2 13/16	5 1/8	2 7/8
6	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	5 3/4	3 1/8
6	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	5 3/4	3 1/8
6	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	5 3/4	3 1/8



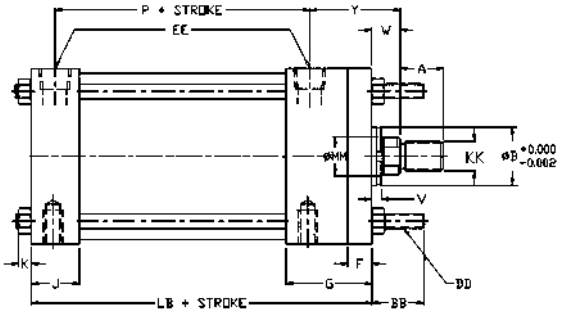
Bore	AA	BB	DD	E	EE(NPT)	F	G	J	K	R
1 1/2	2.02	1	1/4-20	2	3/8	3/8	2	1	1/4	1.43
2	2.60	1 1/8	5/16-24	2 1/2	3/8	3/8	2	1	5/16	1.84
2 1/2	3.10	1 1/8	5/16-24	3	3/8	3/8	2	1 1/8	5/16	2.19
3 1/4	3.90	1 3/8	3/8-24	3 3/4	1/2	5/8	2 1/4	1 1/4	3/8	2.78
4	4.70	1 3/8	3/8-24	4 1/2	1/2	5/8	2 1/4	1 1/4	3/8	3.32
5	5.80	1 13/16	1/2-20	5 1/2	1/2	5/8	2 1/4	1 1/2	7/16	4.10
6	6.90	1 13/16	1/2-20	6 1/2	3/4	3/4	2 3/4	1 5/8	7/16	4.88



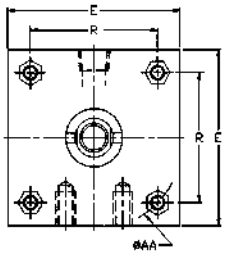
MX3 ø1.5" ~ 6"

WITH EXTENDED TIE-RODS / HEAD

BORE	ROD øMM	KK SM	A	B	V	W	Y	ADD LB	STROKE P
1 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4
1 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4
2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4	2 1/4
2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4	2 1/4
2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4	2 1/4
2 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	4 1/8	2 3/8
2 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	4 1/8	2 3/8
2 1/2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	4 1/8	2 3/8
3 1/4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8
3 1/4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8
4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	4 7/8	2 5/8
4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	4 7/8	2 5/8
5	1	3/4-16	1 1/8	1.5	1/4	3/4	2 5/16	5 1/8	2 7/8
5	1 3/8	1-14	1 5/8	2	3/8	1	2 9/16	5 1/8	2 7/8
5	1 3/4	1 1/4-12	2	2.375	1/2	1 1/4	2 13/16	5 1/8	2 7/8
6	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	5 3/4	3 1/8
6	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	5 3/4	3 1/8
6	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	5 3/4	3 1/8



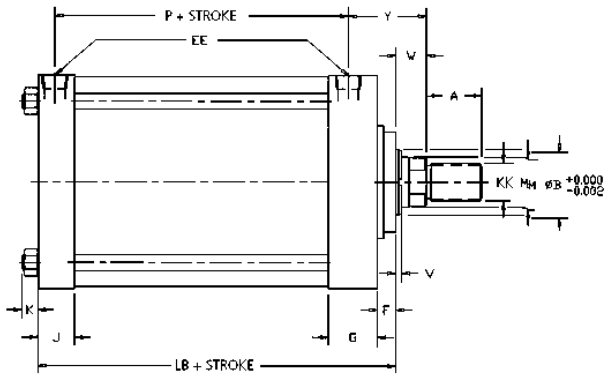
BORE	AA	BB	DD	E	EE(NPT)	F	G	J	K	R
1 1/2	2.02	1	1/4-20	2	3/8	3/8	2	1	1/4	1.43
2	2.60	1 1/8	5/16-24	2 1/2	3/8	3/8	2	1	5/16	1.84
2 1/2	3.10	1 1/8	5/16-24	3	3/8	3/8	2	1 1/8	5/16	2.19
3 1/4	3.90	1 3/8	3/8-24	3 3/4	1/2	5/8	2 1/4	1 1/4	3/8	2.78
4	4.70	1 3/8	3/8-24	4 1/2	1/2	5/8	2 1/4	1 1/4	3/8	3.32
5	5.80	1 13/16	1/2-20	5 1/2	1/2	5/8	2 1/4	1 1/2	7/16	4.10
6	6.90	1 13/16	1/2-20	6 1/2	3/4	3/4	2 3/4	1 5/8	7/16	4.88



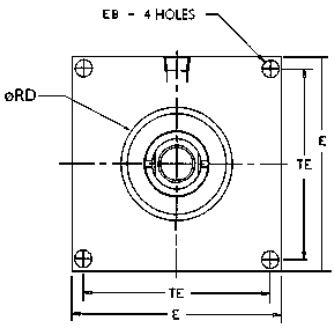
ME3 ø8" ~ 14"

WITH HEAD SQUARE MOUNT

BORE	ROD øMM	KK SM	A	B	V	W	Y
8	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16
8	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16
8	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16
8	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 7/16
10	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/8
10	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4
10	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/2
12	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4
12	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/2
12	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 1/2
14	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 13/16
14	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 13/16
14	3 1/2	2 1/2-12	3 1/2	4.25	1/2	1 1/2	3 13/16



BORE	E	EE(NPT)	EB	F	G	J	K	RD	TE	ADD LB	STROKE P
8	8 1/2	3/4	11/16	3/4	2	1 1/2	9/16	4 1/2	7.57	5 7/8	3 1/4
10	10 5/8	1	13/16	3/4	2 1/4	2	11/16	4 1/2	9.40	7 1/8	4 1/8
12	12 3/4	1	13/16	3/4	2 1/4	2	11/16	5 1/2	11.10	7 5/8	4 5/8
14	14 3/4	1 1/4	15/16	3/4	2 3/4	2 1/4	3/4	6	12.87	8 7/8	5 1/2

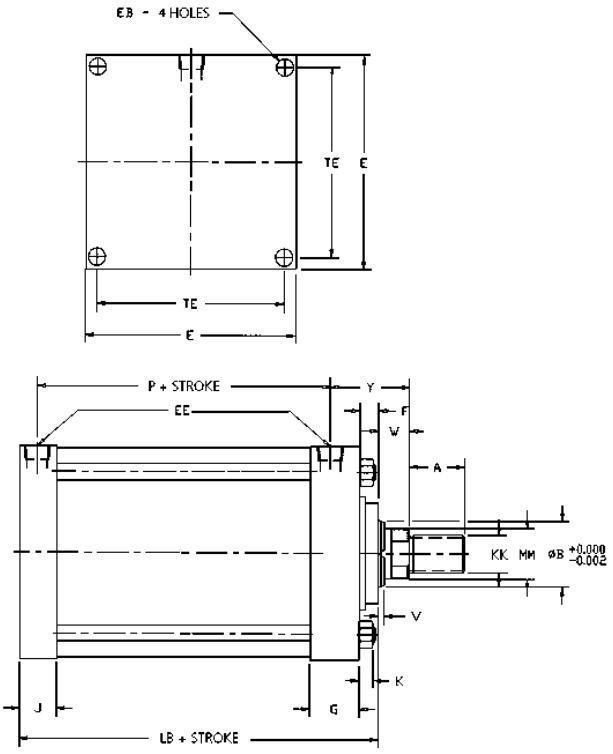


ME4 ø8" ~ 14"
With Cap Square Mount

Bore	Rod øMM	KK SM	A	B	V	W	Y
8	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16
8	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16
8	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16
8	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 7/16
10	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/8
10	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4
10	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/2
12	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4
12	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/2
12	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 1/2
14	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 13/16
14	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 13/16
14	3 1/2	2 1/2-12	3 1/2	4.25	1/2	1 1/2	3 13/16

Bore	E	EE(NPT)	EB	F	G
8	8 1/2	3/4	11/16	3/4	2
10	10 5/8	1	13/16	3/4	2 1/4
12	12 3/4	1	13/16	3/4	2 1/4
14	14 3/4	1 1/4	15/16	3/4	2 3/4

Bore	J	K	TE	Add LB	Stroke P
8	1 1/2	9/16	7.57	5 7/8	3 1/4
10	2	11/16	9.40	7 1/8	4 1/8
12	2	11/16	11.10	7 5/8	4 5/8
14	2 1/4	3/4	12.87	8 7/8	5 1/2

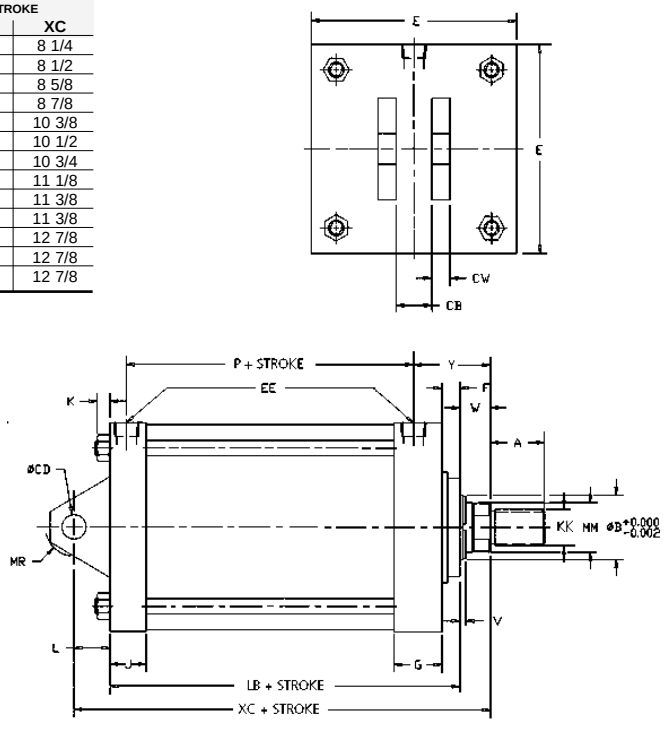


MP1 ø8" ~ 14"
With Double Rear Clevis

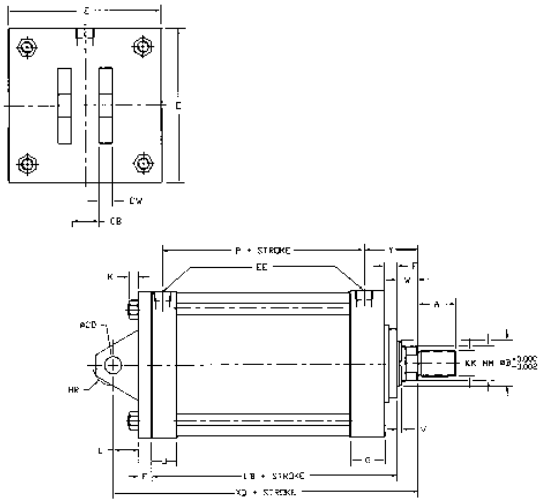
Bore	Rod øMM	KK SM	A	B	V	W	Y	Add Stroke LB	P	XC
8	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	5 7/8	3 1/4	8 1/4
8	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	5 7/8	3 1/4	8 1/2
8	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	5 7/8	3 1/4	8 5/8
8	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 7/16	5 7/8	3 1/4	8 7/8
10	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/8	7 1/8	4 1/8	10 3/8
10	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4	7 1/8	4 1/8	10 1/2
10	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/2	7 1/8	4 1/8	10 3/4
12	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4	7 5/8	4 5/8	11 1/8
12	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/2	7 5/8	4 5/8	11 3/8
12	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 1/2	7 5/8	4 5/8	11 3/8
14	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 13/16	8 7/8	5 1/2	12 7/8
14	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 13/16	8 7/8	5 1/2	12 7/8
14	3 1/2	2 1/2-12	3 1/2	4.25	1/2	1 1/2	3 13/16	8 7/8	5 1/2	12 7/8

Bore	CB	CD	CW	E	EE(NPT)
8	1 1/2	1.001	3/4	8 1/2	3/4
10	2	1.376	1	10 5/8	1
12	2 1/2	1.751	1 1/4	12 3/4	1
14	2 1/2	2.001	1 1/4	14 3/4	1 1/4

Bore	F	G	J	K	L	MR
8	3/4	2	1 1/2	9/16	1 1/2	1 3/16
10	3/4	2 1/4	2	11/16	2 1/8	1 5/8
12	3/4	2 1/4	2	11/16	2 1/4	2 1/8
14	3/4	2 3/4	2 1/4	3/4	2 1/2	2 3/8



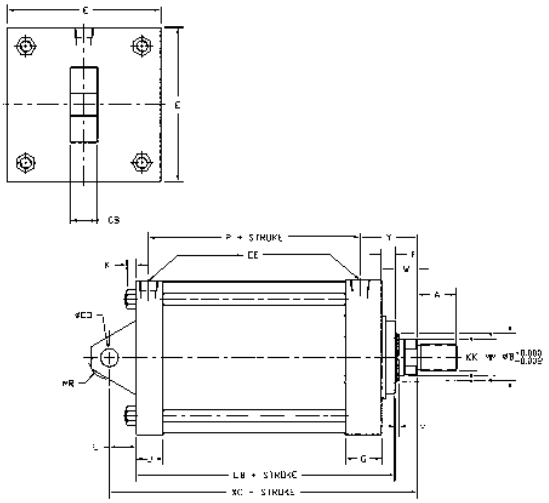
MP2 ø8" ~ 14"
With Double Detachable Rear Clevis



Bore	Rod øMM SM	KK	A	B	V	W	Y	Add Stroke LB	P	XD
8	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	5 7/8	3 1/4	9
8	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	5 7/8	3 1/4	9 1/4
8	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	5 7/8	3 1/4	9 3/8
8	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 7/16	5 7/8	3 1/4	9 5/8
10	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/8	7 1/8	4 1/8	11 1/8
10	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4	7 1/8	4 1/8	11 1/4
10	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/2	7 1/8	4 1/8	11 1/2
12	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4	7 5/8	4 5/8	11 7/8
12	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/2	7 5/8	4 5/8	12 1/8
12	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 1/2	7 5/8	4 5/8	12 1/8
14	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 13/16	8 7/8	5 1/2	13 5/8
14	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 13/16	8 7/8	5 1/2	13 5/8
14	3 1/2	2 1/2-12	3 1/2	4.25	1/2	1 1/2	3 13/16	8 7/8	5 1/2	13 5/8

Bore	CB	CD	CW	E	EE(NPT)	F	G	J	K	MR
8	1 1/2	1.001	3/4	8 1/2	3/4	3/4	2	1 1/2	9/16	1 3/16
10	2	1.376	1	10 5/8	1	3/4	2 1/4	2	11/16	1 5/8
12	2 1/2	1.751	1 1/4	12 3/4	1	3/4	2 1/4	2	11/16	2 1/8
14	2 1/2	2.001	1 1/4	14 3/4	1 1/4	3/4	2 3/4	2 1/4	3/4	2 3/8

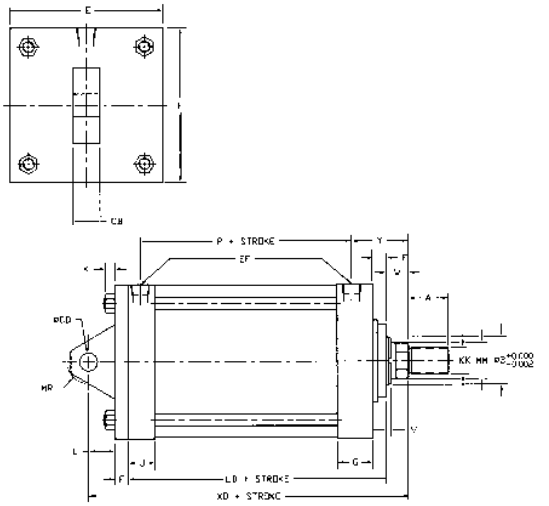
MP3 ø8" ~ 14"
With Cap Fixed Eye



Bore	Rod øMM SM	KK	A	B	V	W	Y	Add Stroke LB	P	XC
8	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	5 7/8	3 1/4	8 1/4
8	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	5 7/8	3 1/4	8 1/2
8	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	5 7/8	3 1/4	8 5/8
8	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 7/16	5 7/8	3 1/4	8 7/8
10	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/8	7 1/8	4 1/8	10 3/8
10	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4	7 1/8	4 1/8	10 1/2
10	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/2	7 1/8	4 1/8	10 3/4
12	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4	7 5/8	4 5/8	11 1/8
12	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/2	7 5/8	4 5/8	11 3/8
12	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 1/2	7 5/8	4 5/8	11 3/8
14	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 13/16	8 7/8	5 1/2	12 7/8
14	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 13/16	8 7/8	5 1/2	12 7/8
14	3 1/2	2 1/2-12	3 1/2	4.25	1/2	1 1/2	3 13/16	8 7/8	5 1/2	12 7/8

Bore	CB	CD	E	EE(NPT)	F	G	J	K	L	MR
8	1 1/2	1.001	8 1/2	3/4	3/4	2	1 1/2	9/16	1 1/2	1 3/16
10	2	1.376	10 5/8	1	3/4	2 1/4	2	11/16	2 1/8	1 5/8
12	2 1/2	1.751	12 3/4	1	3/4	2 1/4	2	11/16	2 1/4	2 1/8
14	2 1/2	2.001	14 3/4	1 1/4	3/4	2 3/4	2 1/4	3/4	2 1/2	2 3/8

MP4 ø8" ~ 14"
With Single Detachable Rear Clevis

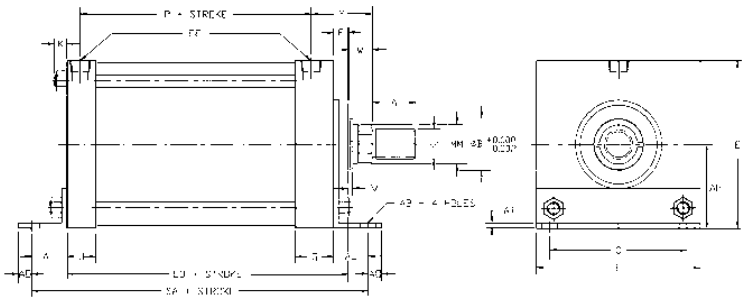


Bore	Rod øMM SM	KK	A	B	V	W	Y	Add Stroke LB	P	XD
8	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	5 7/8	3 1/4	9
8	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	5 7/8	3 1/4	9 1/4
8	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	5 7/8	3 1/4	9 3/8
8	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 7/16	5 7/8	3 1/4	9 5/8
10	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/8	7 1/8	4 1/8	11 1/8
10	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4	7 1/8	4 1/8	11 1/4
10	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/2	7 1/8	4 1/8	11 1/2
12	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4	7 5/8	4 5/8	11 7/8
12	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/2	7 5/8	4 5/8	12 1/8
12	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 1/2	7 5/8	4 5/8	12 1/8
14	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 13/16	8 7/8	5 1/2	13 5/8
14	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 13/16	8 7/8	5 1/2	13 5/8
14	3 1/2	2 1/2-12	3 1/2	4.25	1/2	1 1/2	3 13/16	8 7/8	5 1/2	13 5/8

Bore	CB	CD	E	EE(NPT)	F	G	J	K	MR
8	1 1/2	1.001	8 1/2	3/4	3/4	2	1 1/2	9/16	1 3/16
10	2	1.376	10 5/8	1	3/4	2 1/4	2	11/16	1 5/8
12	2 1/2	1.751	12 3/4	1	3/4	2 1/4	2	11/16	2 1/8
14	2 1/2	2.001	14 3/4	1 1/4	3/4	2 3/4	2 1/4	3/4	2 3/8

MS1 ø8" ~ 14"
With Foot Mount

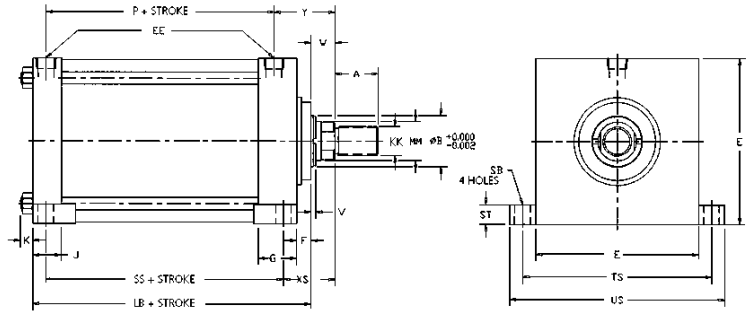
Bore	Rod øMM	KK SM	A	B	V	W	Y
8	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16
8	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16
8	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16
8	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 7/16
10	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/8
10	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4
10	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/2
12	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4
12	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/2
12	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 1/2
14	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 13/16
14	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 13/16
14	3 1/2	2 1/2-12	3 1/2	4.25	1/2	1 1/2	3 13/16



Bore	AB	AH	AL	AO	AT	E	EE(NPT)	F	G	J	K	S	Add Stroke LB	P	SA
8	13/16	4 1/4	1 13/16	11/16	1/4	8 1/2	3/4	3/4	2	1 1/2	9/16	7 1/8	5 7/8	3 1/4	8 3/4
10	1 1/16	5 5/16	2 1/8	7/8	1/4	10 5/8	1	3/4	2 1/4	2	11/16	8 7/8	7 1/8	4 1/8	10 5/8
12	1 1/16	6 3/8	2 1/8	7/8	3/8	12 3/4	1	3/4	2 1/4	2	11/16	11	7 5/8	4 5/8	11 1/8
14	1 5/16	7 3/8	2 7/16	2 7/16	3/8	14 3/4	1 1/4	3/4	2 3/4	2 1/4	3/4	12 5/8	8 7/8	5 1/2	13

MS2 ø8" ~ 14"
With Side Lug

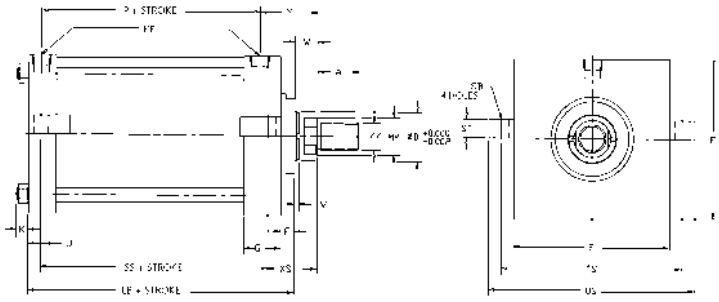
Bore	Rod (MM)	KK SM	A	B	V	W	XS	Y
8	1 3/8	1-14	1 5/8	2	1/4	7/8	2 5/16	2 13/16
8	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	2 9/16	3 1/16
8	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	2 11/16	3 3/16
8	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	2 15/18	3 7/16
10	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	2 3/4	3 1/8
10	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	2 7/8	3 1/4
10	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/8	3 1/2
12	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	2 7/8	3 1/4
12	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/8	3 1/2
12	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 1/8	3 1/2
14	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 3/8	3 13/16
14	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 3/8	3 13/16
14	3 1/2	2 1/2-12	3 1/2	4.25	1/2	1 1/2	3 3/8	3 13/16



Bore	E	EE(NPT)	F	G	J	K	SB	ST	TS	US	Add Stroke LB	P	SS
8	8 1/2	3/4	3/4	2	1 1/2	9/16	13/16	1	9 7/8	11 1/4	5 7/8	3 1/4	3 3/4
10	10 5/8	1	3/4	2 1/4	2	11/16	1 1/16	1 1/4	12 3/8	14 1/8	7 1/8	4 1/8	4 5/8
12	12 3/4	1	3/4	2 1/4	2	11/16	11/16	1 1/4	14 1/2	16 1/4	7 5/8	4 5/8	5 1/8
14	14 3/4	1 1/4	3/4	2 3/4	2 1/4	3/4	1 5/16	1 1/2	17	19 1/4	8 7/8	5 1/2	5 7/8

MS3 ø8" ~ 14"
With Centerline Lug

Bore	Rod (MM)	KK SM	A	B	V	W	XS	Y
8	1 3/8	1-14	1 5/8	2	1/4	7/8	2 5/16	2 13/16
8	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	2 9/16	3 1/16
8	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	2 11/16	3 3/16
8	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	2 15/18	3 7/16
10	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	2 3/4	3 1/8
10	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	2 7/8	3 1/4
10	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/8	3 1/2
12	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	2 7/8	3 1/4
12	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/8	3 1/2
12	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 1/8	3 1/2
14	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 3/8	3 13/16
14	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 3/8	3 13/16
14	3 1/2	2 1/2-12	3 1/2	4.25	1/2	1 1/2	3 3/8	3 13/16

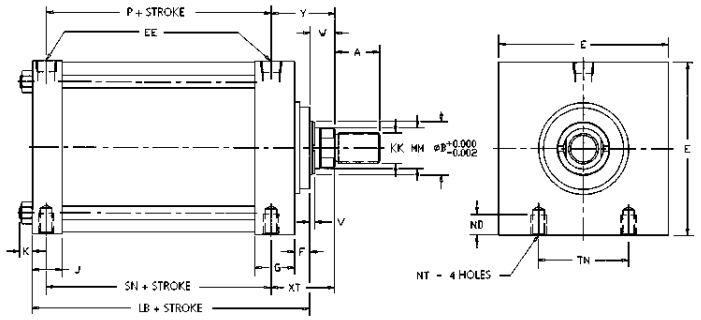


Bore	E	EE(NPT)	F	G	J	K	SB	ST	TS	US	Add Stroke LB	P	SS
8	8 1/2	3/4	3/4	2	1 1/2	9/16	13/16	1	9 7/8	11 1/4	5 7/8	3 1/4	3 3/4
10	10 5/8	1	3/4	2 1/4	2	11/16	1 1/16	1 1/4	12 3/8	14 1/8	7 1/8	4 1/8	4 5/8
12	12 3/4	1	3/4	2 1/4	2	11/16	11/16	1 1/4	14 1/2	16 1/4	7 5/8	4 5/8	5 1/8
14	14 3/4	1 1/4	3/4	2 3/4	2 1/4	3/4	1 5/16	1 1/2	17	19 1/4	8 7/8	5 1/2	5 7/8

MS4 ø8" ~ 14"

Side-Tapped

Bore	Rod (mm)	KK SM	A	B	V	W	XT	Y
8	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	2 13/16
8	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	3 1/16
8	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	3 3/16
8	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 7/16	3 7/16
10	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/8	3 1/8
10	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4	3 1/4
10	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/2	3 1/2
12	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4	3 1/4
12	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/2	3 1/2
12	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 1/2	3 1/2
14	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 13/16	3 13/16
14	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 13/16	3 13/16
14	3 1/2	2 1/2-12	3 1/2	4.25	1/2	1 1/2	3 13/16	3 13/16

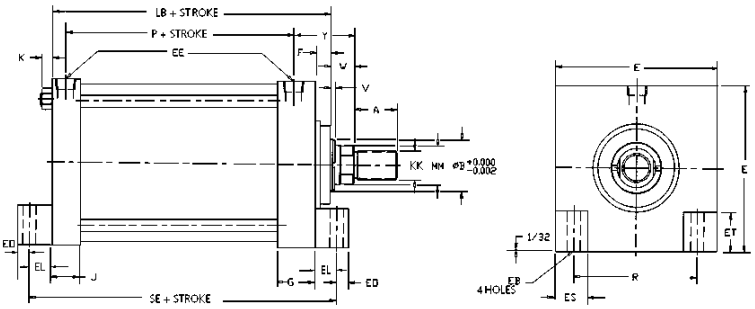


Bore	E	EE(NPT)	F	G	J	K	ND	NT	TN	Add LB	Add P	Stroke SN
8	8 1/2	3/4	3/4	2	1 1/2	9/16	1 1/8	3/4-10	4 1/2	5 7/8	3 1/4	3 1/4
10	10 5/8	1	3/4	2 1/4	2	11/16	1 1/2	1-8	5 1/2	7 1/8	4 1/8	4 1/8
12	12 3/4	1	3/4	2 1/4	2	11/16	1 1/2	1-8	7 1/4	7 5/8	4 5/8	4 5/8
14	14 3/4	1 1/4	3/4	2 3/4	2 1/4	3/4	1 7/8	1 1/4-7	8 3/8	8 7/8	5 1/2	5 1/2

MS7 ø8" ~ 14"

With Front Lug Mount

Bore	Rod (mm)	KK SM	A	B	V	W	Y
8	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16
8	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16
8	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16
8	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 7/16
10	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/8
10	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4
10	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/2
12	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4
12	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/2
12	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 1/2
14	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 13/16
14	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 13/16
14	3 1/2	2 1/2-12	3 1/2	4.25	1/2	1 1/2	3 13/16

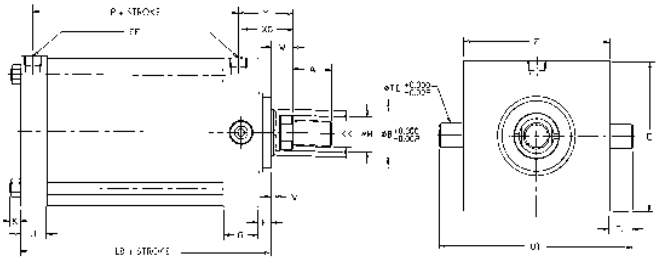


Bore	E	EB	EE(NPT)	EL	EO	ES	ET	F	G	J	K	R	Add LB	Stroke P	Stroke SE
8	8 1/2	11/16	3/4	1 1/8	5/8	2 1/4	2 1/32	3/4	2	1 1/2	9/16	6.44	5 7/8	3 1/4	7 3/8
10	10 5/8	13/16	1	1 5/16	5/8	2 3/4	2 11/16	3/4	2 1/4	2	11/16	7.92	7 1/8	4 1/8	9
12	12 3/4	13/16	1	1 5/16	5/8	3 1/2	3 5/16	3/4	2 1/4	2	11/16	9.40	7 5/8	4 5/8	9 1/2
14	14 3/4	15/16	1 1/4	1 1/2	3/4	4	3 13/16	3/4	2 3/4	2 1/4	3/4	10.90	8 7/8	5 1/2	11 1/8

MT1 ø8" ~ 14"

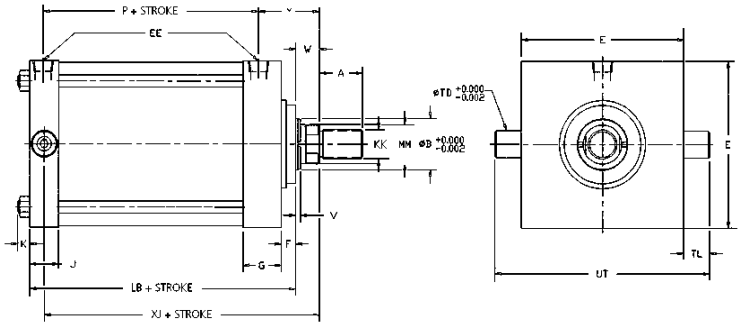
With Head Trunnion

Bore	Rod (mm)	KK SM	A	B	V	W	XG	Y
8	1 3/8	1-14	1 5/8	2	1/4	7/8	2 5/8	2 13/16
8	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	2 7/8	3 1/16
8	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3	3 3/16
8	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/4	3 7/16
10	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3	3 1/8
10	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/8	3 1/4
10	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 3/8	3 1/2
12	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/8	3 1/4
12	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 3/8	3 1/2
12	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 3/8	3 1/2
14	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 5/8	3 13/16
14	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 5/8	3 13/16
14	3 1/2	2 1/2-12	3 1/2	4.25	1/2	1 1/2	3 5/8	3 13/16



Bore	E	EE(NPT)	F	G	J	K	TD	TL	UT	Add LB	Stroke P
8	8 1/2	3/4	3/4	2	1 1/2	9/16	1.375	1 3/8	11 1/4	5 7/8	3 1/4
10	10 5/8	1	3/4	2 1/4	2	11/16	1.750	1 3/4	14 1/8	7 1/8	4 1/8
12	12 3/4	1	3/4	2 1/4	2	11/16	1.750	1 3/4	16 1/4	7 5/8	4 5/8
14	14 3/4	1 1/4	3/4	2 3/4	2 1/4	3/4	2.000	2	18 3/4	8 7/8	5 1/2

MT2 ø8" ~ 14"
WITH REAR TRUNNION

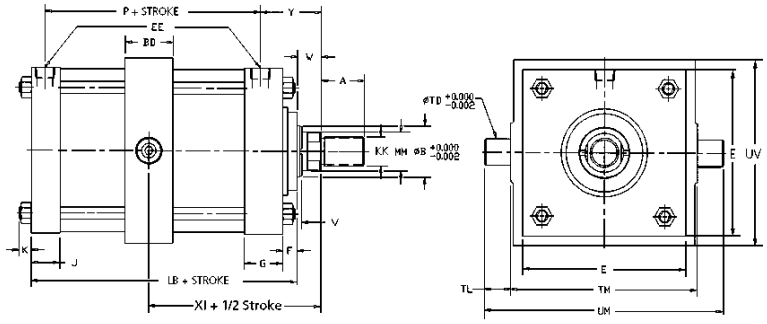


BORE	E	EE(NPT)	F	G	J
8	8 1/2	3/4	3/4	2	1 1/2
10	10 5/8	1	3/4	2 1/4	2
12	12 3/4	1	3/4	2 1/4	2
14	14 3/4	1 1/4	3/4	2 3/4	2 1/4

BORE	K	TD	TL	UT
8	9/16	1.375	1 3/8	11 1/4
10	11/16	1.750	1 3/4	14 1/8
12	11/16	1.750	1 3/4	16 1/4
14	3/4	2.000	2	18 3/4

BORE	ROD (MM)	KK SM	A	B	V	W	Y	ADD STROKE LB	STROKE P	STROKE XJ
8	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	5 7/8	3 1/4	6
8	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	5 7/8	3 1/4	6 1/4
8	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	5 7/8	3 1/4	6 3/8
8	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 7/16	5 7/8	3 1/4	6 5/8
10	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/8	7 1/8	4 1/8	7 1/4
10	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4	7 1/8	4 1/8	7 3/8
10	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/2	7 1/8	41/8	7 5/8
12	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4	7 5/8	4 5/8	7 7/8
12	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/2	7 5/8	4 5/8	8 1/8
12	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 1/2	7 5/8	4 5/8	8 1/8
14	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 13/16	8 7/8	5 1/2	9 1/4
14	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 13/16	8 7/8	5 1/2	9 1/4
14	3 1/2	2 1/2-12	3 1/2	4.25	1/2	1 1/2	3 13/16	8 7/8	5 1/2	9 1/4

MT4 ø8" ~ 14"
WITH CENTER TRUNNION



BORE	BD	E	EE(NPT)	F	G
8	2 1/2	8 1/2	3/4	3/4	2
10	3	10 5/8	1	3/4	2 1/4
12	3	12 3/4	1	3/4	2 1/4
14	3 1/2	14 3/4	1 1/4	3/4	2 3/4

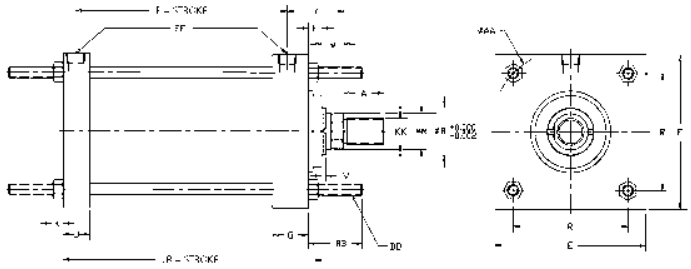
BORE	J	K	TD	TL	TM
8	1 1/2	9/16	1.375	1 3/8	9 3/4
10	2	11/16	1.750	1 3/4	12
12	2	11/16	1.750	1 3/4	14
14	2 1/4	3/4	2.000	2	16 1/4

BORE	ROD (MM)	KK SM	A	B	V	W	Y	ADD STROKE/2 XI
8	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	4.438
8	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	4.688
8	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	4.813
8	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 7/16	5.063
10	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/8	5.188
10	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4	5.313
10	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/2	5.563
12	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4	5.563
12	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/2	5.813
12	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 1/2	5.813
14	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 13/16	6.563
14	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 13/16	6.563
14	3 1/2	2 1/2-12	3 1/2	4.125	1/2	1 1/2	3 13/16	6.563

BORE	UM	UV	ADD STROKE LB	STROKE P
8	12 1/2	9 1/2	5 7/8	3 1/4
10	15 1/2	11 3/4	7 1/8	4 1/8
12	17 1/2	13 3/4	7 5/8	4 5/8
14	20 1/4	16	8 7/8	5 1/2

MX1/MX2/MX3 ø8" ~ 14"

WITH EXTENDED TIE-RODS



BORE	ROD (MM)	KK SM	A	B	V	W	Y
8	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16
8	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16
8	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16
8	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 7/16
10	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/8
10	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4
10	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/2
12	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4
12	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/2
12	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 1/2
14	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 13/16
14	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 13/16
14	3 1/2	2 1/2-12	3 1/2	4.25	1/2	1 1/2	3 13/16

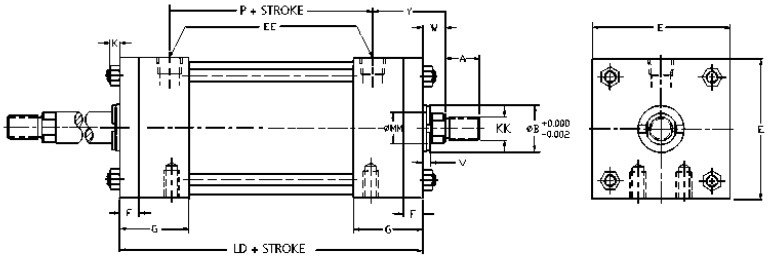
BORE	AA	BB	DD	E	EE(NPT)	F	G	J	K	R	ADD LB	STROKE P
8	9.1	2 5/16	5/8-18	8 1/2	3/4	3/4	2	1 1/2	9/16	6.44	5 7/8	3 1/4
10	11.2	2 11/16	3/4-16	10 5/8	1	3/4	2 1/4	11/16	7.92	7.92	7 1/8	4 1/8
12	13.3	2 11/16	3/4-16	12 3/4	1	3/4	2 1/4	2	11/16	9.40	7 5/8	4 5/8
14	15.4	3 3/16	7/8-14	14 3/4	1 1/4	3/4	2 3/4	2 1/4	3/4	10.90	8 7/8	5 1/2

NCA1W ø1.5" ~ 6"

DOUBLE ROD

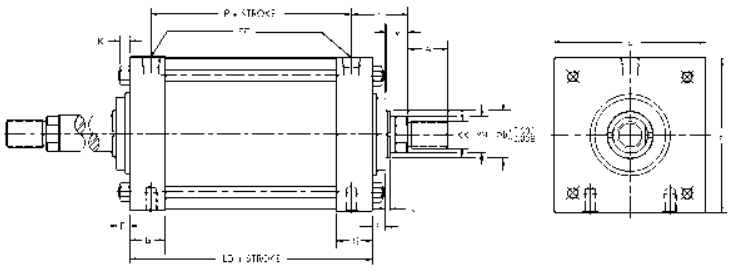
BORE	ROD øMM	KK SM	A	B	V	W	Y	ADD LD	STROKE P
1 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	5	2 3/8
1 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	5	2 3/8
2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	5	2 3/8
2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	5	2 3/8
2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	5	2 3/8
2 1/2	5/8	7/16-20	3/4	1.125	1/4	5/8	1 15/16	5	2 3/8
2 1/2	1	3/4-16	1 1/8	1.5	1/2	1	2 5/16	5	2 3/8
2 1/2	1 3/8	1-14	1 5/8	2	5/8	1 1/4	2 9/16	5	2 3/8
3 1/4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	5 7/8	2 5/8
3 1/4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	5 7/8	2 5/8
4	1	3/4-16	1 1/8	1.5	1/4	3/4	2 3/8	5 7/8	2 5/8
4	1 3/8	1-14	1 5/8	2	3/8	1	2 5/8	5 7/8	2 5/8
5	1	3/4-16	1 1/8	1.5	1/4	3/4	2 5/16	5 7/8	2 3/4
5	1 3/8	1-14	1 5/8	2	3/8	1	2 9/16	5 7/8	2 3/4
5	1 3/4	1 1/4-12	2	2.375	1/2	1 1/4	2 13/16	5 7/8	2 3/4
6	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	6 7/8	3
6	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	6 7/8	3
6	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	6 7/8	3

BORE	E	EE(NPT)	F	G	J	K
1 1/2	2	3/8	3/8	2	1	1/4
2	2 1/2	3/8	3/8	2	1	5/16
2 1/2	3	3/8	3/8	2	1 1/8	5/16
3 1/4	3 3/4	1/2	5/8	2 1/4	1 1/4	3/8
4	4 1/2	1/2	5/8	2 1/4	1 1/4	3/8
5	5 1/2	1/2	5/8	2 1/4	1 1/2	7/16
6	6 1/2	3/4	3/4	2 3/4	1 5/8	7/16



NCA1W ø8" ~ 14"

DOUBLE ROD



BORE	ROD (MM)	KK SM	A	B	V	W	Y
8	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16
8	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16
8	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16
8	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 7/16
10	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/8
10	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4
10	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/2
12	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4
12	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 1/2
12	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 1/2
14	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 13/16
14	3	2 1/4-12	3 1/2	3.75	1/2	1 1/2	3 13/16
14	3 1/2	2 1/2-12	3 1/2	4.75	1/2	1 1/2	3 13/16

BORE	E	EE(NPT)	F	G	J	K	ADD LD	STROKE P
8	8 1/2	3/4	3/4	2	1 1/2	9/16	7 1/8	3 1/4
10	10 5/8	1	3/4	2 1/4	2	11/16	8 1/8	4 1/8
12	12 3/4	1	3/4	2 1/4	2	11/16	8 5/8	4 5/8
14	14 3/4	1 1/4	3/4	2 3/4	2 1/4	3/4	10 1/8	5 1/2

TECHNICAL SPECIFICATIONS

CYLINDER BORES AND FORCES: PUSH STROKE

Bore (in)	Piston Area (in)	Forces (lbs); Push Stroke Operating medium Pressure (PSI)					
		50	**60**	**80**	**100**	**200**	**250**
1.5	1.767	88	106	141	177	353	442
2	3.142	157	188	251	314	628	785
2.5	4.909	245	295	393	491	982	1227
3.25	8.296	415	498	664	830	1659	2074
4	12.566	628	754	1005	1257	2513	3142
5	19.635	982	1178	1571	1964	3927	4909
6	28.274	1414	1696	2262	2827	5655	7069
7	38.485	1924	2309	3079	3848	7697	9621
8	50.266	2513	3016	4021	5027	10053	12566
10	78.540	3927	4712	6283	7854	15708	19635
12	113.098	5655	6786	9048	11310	22620	28274
14	153.938	7697	9236	12315	15394	30788	38485

To calculate thrust forces not shown in the table, multiply operating pressure by piston area.

HOW TO USE THIS TABLE

1 Locate column with desired operating pressure.

2 Move down that column and locate the thrust value which is equal (or the next larger to the force to be delivered by the cylinder.)

3 On that same line, locate in the first (left) column the bore size recommended for your application.

Note: *These are guide lines only which must be substantiated using additional data specific to your application.*

CYLINDER BORES AND FORCES: PULL STROKE

Piston *Rod* Diameter (in)	Piston *Rod* Area (in)	Forces (lbs); Pull Stroke *(Deduct the listed thrusts corresponding to the rod size from push stroke pressure)* Operating medium Pressure (PSI)					
		50	60	80	100	200	250
0.625	0.307	15	18	25	31	61	77
1	0.785	39	47	63	79	157	196
1.375	1.485	74	89	119	148	297	371
1.75	2.405	120	144	192	241	481	601
2	3.142	157	188	251	314	628	785
2.5	4.909	245	295	393	491	982	1227
3	7.069	353	424	565	707	1414	1767
3.5	9.621	481	577	770	962	1924	2405
4	12.566	628	754	1005	1257	2513	3142

To calculate pull forces not shown in the table, use the following formula:

Pull Force = (Piston Area-Rod Area) x Working Pressure

HOW TO USE THIS TABLE

1 To find the force on the pull stroke, locate the required piston rod diameter in the left most column.

2 Moving to the right, locate the required working pressure

3 Deduct the value shown at the intersection from the push stroke force value determined from the Push Stroke table. The resultant is the available pull stroke table.

OVERSIZE PISTON RODS

- Selection Table -

Thrust In lbs	Piston Rod Diameter							
	5/8"	**1"**	**1 3/8"**	**1 3/4"**	**2"**	**2 1/2"**	**3"**	**3 1/2"**
400	37	83	134	186				
700	30	68	118	168	202	275		
1000	27	60	105	155	190	257	330	
1400	24	53	92	142	174	244	308	385
1800	23	48	82	127	160	230	296	366
2400	19	45	75	114	145	213	281	347
3200	16	41	67	103	130	194	261	329
4000	13	38	63	94	119	175	240	310
5000	9	34	60	87	110	163	225	289
6000	5	30	56	82	102	152	208	274
8000	4	26	50	76	93	137	188	245
10000	3	21	45	70	89	125	172	222
12000		17	41	65	84	118	155	210
16000		9	34	57	75	110	142	188
20000		8	28	52	68	103	136	172
30000		5	12	39	55	87	120	156
40000			11	22	43	74	108	142
50000			9	15	30	66	96	130
60000				14	18	57	88	119
80000				12	16	36	71	104
100000					14	22	57	90
120000					12	21	45	77
140000						19	27	64
160000						17	26	47
200000						14	23	31
250000							19	28
300000								25
350000								22
400000								19

Oversized Piston Rods

In applications where extra column strength is required, or for long push stroke cylinders, oversized piston rods may be required.

It must be noted, however, that oversized piston rods transmit more side load than is the case with more flexible smaller rods; therefore, the use of oversized rods should not be considered a remedy against excessive side loads.

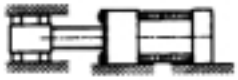
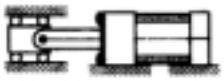
HOW TO USE THIS TABLE

1 From Stroke Factors Table (see Table 1 on page 21), determine the value of **L**.

2 In the left table, locate the previously determined thrust value.

3 Moving across the table, locate dimension **L** (If the exact length is not shown, select the next larger value)

STROKE FACTORS FOR VARIOUS MOUNTING STYLES TABLE 1

Cylinder Mounting	Rod End Connection		Stroke Factor
Side-Tapped, Head or Cap Flange, Tie-Rod, Center or Side Lug	Fixed and Rigidly Guided		.50
Side-Tapped, Head or Cap Flange, Tie-Rod, Center or Side Lug	Pivot and Rigidly Guided		.70
Side-Tapped, Head or Cap Flange, Tie-Rod, Center or Side Lug	Supported but not Rigidly Guided		2.00
Side-Tapped, Head or Cap Flange, Tie-Rod, Center or Side Lug	None		5.00
Head Trunnion	Pivoted and Rigidly Guided		1.00
Center Trunnion	Pivoted and Rigidly Guided		1.50
Cap Trunnion or Clevis	Pivoted and Rigidly Guided		2.00

STOP TUBE REQUIREMENTS / TABLE 2

L (in)	Tube Length (in)
0-40	0
41-50	1
51-60	2
61-70	3
71-80	4
81-90	5
91-100	6
101-110	7
111-120	8
121-130	9
131-140	10
141-150	11
151-160	12
161-170	13
171-180	14
181-190	15
181-190	16
191-200	17
201-220	18
221-230	19
231-240	20
241-250	21
251-260	22
261-270	23
271-280	24
281-290	25
291-300	26
301-310	27

Stop Tubes are used for reducing piston and bearing loads on to prevent buckling and jack-knifing of horizontally installed long push stroke cylinders when the piston rod is fully extended.

How to use this table

1 Multiply Cylinder Stroke by Stroke Factor for appropriate mounting style to obtain Effective Length L.

2 If Cylinder has extra rod extension, add length of extension to stroke length prior to obtaining Effective Length L.

Example:
NCDA1L800-6000-XTATCDN
8" Bore
60" Stroke
MS1 Mount
Supported but not rigidly guided

1) From Table 1, determine Stroke Factor (SF) ~
Stroke Factor 2.0

2) Determine Effective Length L
L = Stroke x Stroke Factor
= 60 x 2.0
= 120 inches

3) From Table 2, determine Stop Tube Requirements ~
Find L length and note Stop Tube length
Stop Tube Length = 8"

Options
Mounting Brackets for Switches

Model	Bore Size
BT-12	500 (5" Bore)
	600 (6" Bore)
BT-18A	800 (8" Bore)
BT-20	1000 (10" Bore)
	1200 (12" Bore)

Options
Auto Switches - Reed Type

Model Number	Operating Voltage	Max Current or Operating Current Range (mA)	Indicator Light / Wire Output
D-A53	24VDC	5~20mA	Yes
D-A54	24VDC	5~20mA	Yes
	100VAC	5~25mA	
	200VAC	5~12.5mA	
D-A56	4~8VDC	20mA	Yes
D-A59W	24VDC	5~40mA	Yes
D-A64	24VAC/DC	50mA	-
	100VAC	25mA	
	200VAC	12.5mA	
D-A67	24VDC	30mA	-

Options
Auto Switches - Solid State Type

Model Number	Operating Voltage	Max Current or Operating Current Range (mA)	Indicator Light / Wire Output
D-F59	28VDC or less	150mA	3 Wire (NPN)
D-F5P	-	100mA	3 Wire (PNP)
D-J59	24VDC (10~28VDC)	5~150mA	2 Wire
D-F59W	28VDC	80mA	3 Wire (NPN)
D-F59PW	-	80mA	3 Wire (PNP)
D-J59W	24VDC (10~28VDC)	5~40mA	2 Wire
D-F5BAL	24VDC (10~28VDC)	5~40mA	2 Wire (NPN)
D-F59F	28VDC	40mA	4 Wire (NPN)
D-F5NTL	28VDC	80mA	3 Wire (NPN)

NCA1 (Mounting) (Bore) - (Stroke) (Suffix) (Auto Switch) - XA 27 M

Thread Form Code

M ..... Male Rod End
F ..... Female Rod End
B ..... No Thread

Thread Form Code
Special Rod Thread - XA Option

Imperial

Code	: Thread Form
00	: None (No reduction in piston rod diameter)
01	: 2-56
02	: 2-64
03	: 4-40
04	: 4-48
05	: 5-40
06	: 5-44
07	: 6-32
08	: 6-40
09	: 8-32
10	: 8-36
11	: 10-24
12	: 10-32
13	: 1/4-20
14	: 1/4-28
15	: 5/16-18
16	: 5/16-24
17	: 3/8-16
18	: 3/8-24
19	: 7/16-14
20	: 7/16-20
21	: 1/2-13
22	: 1/2-20
23	: 9/16-12
24	: 9/16-18
25	: 5/8-11
26	: 5/8-18

Code	: Thread Form
27	: 3/4-10
28	: 3/4-16
29	: 7/8-9
30	: 7/8-14
31	: 1-8
32	: 1-12
33	: 1 1/8-7
34	: 1 1/8-12
35	: 1 1/4-7
36	: 1 1/4-12
37	: 1 3/8-6
38	: 1 3/8-12
39	: 1-14
40	: 1 1/2-16
41	: 1 1/2-12
42	: 12-24
43	: 3/8-20
44	: 2 1/2-12
45	: 2-12
46	: 2 1/4-12
47	: 1 7/8-12
48	: 2 3/4-12
49	: 3-12
50	: 3 1/4-12
51	: 3 1/2-12
52	: 1 3/4-12
53	: 1 3/4-5
54	:1 7/8-12

Metric

Code	: Thread Form
60	: M3 x 0.35
61	: M3 x 0.5
62	: M4 x 0.5
63	: M4 x 0.7
64	: M5 x 0.5
65	: M5 x 0.8
66	: M6 x 0.75
67	: M6 x 1.0
68	: M8 x 1.0
69	: M8 x 1.25
70	: M10 x 1.25
71	: M10 x 1.5
72	: M12 x 1.5
73	: M12 x 1.75
74	: M14 x 1.75
75	: M14 x 2.0
76	: M16 x 1.5
77	: M16 x 2.0
78	: M18 x 1.5
79	: M18 x 2.5
80	: M20 x 2.0
81	: M20 x 2.5
82	: M22 x 1.5
83	: M22 x 2.5
84	: M24 x 2.0
85	: M24 x 1.5
86	: M26 x 1.5
87	: M30 x 1.5

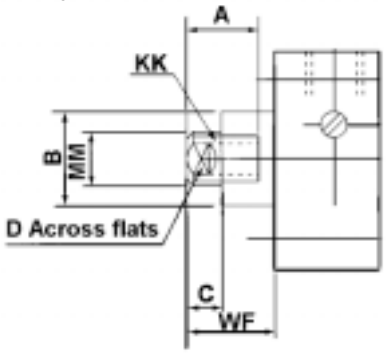
Metric

Code	: Thread Form
88	: M14 x 1.5
89	: M20 x 1.5
90	: M12 x 1.25
91	: M42 x 1.5
92	: M24 x 3.0
93	: M30 x 3.5
94	: M36 x 4.0
95	: M16 x 1.25
96	: M36 x 1.5
97	: M36 x 2.0

This chart represents all current thread codes and are not all applicable to NCA1 due to rod size limitations. Male threads cannot be specified equal to, but not, greater than the rod diameters as standard.

Female Rod Diameter

Bore (Inch)	MM	KK	A	B	C	WF
150 (1.5")	5/8	7/16-20	3/4	1 1/8	3/8	1
200 (2")	5/8	7/16-20	3/4	1 1/8	3/8	1
250 (2.5")	5/8	7/16-20	3/4	1 1/8	3/8	1
325 (3.25")	1	3/4-20	1 1/8	1 1/2	1/2	1 3/8
400 (4")	1	3/4-20	1 1/8	1 1/2	1/2	1 3/8



PARTS BREAKDOWN

OPTIONS
SERIES NCA1 - XC3 OPTION

NCDA1L500 - 2400 - XC3 (A)(B)(E)(F) TAT

- Head Cover Port Location A, B, C or D •
- Head Cover Cushion Location A, B, C or D •
- Cap Cover Port Location E, F, G or H •
- Cap Cover Cushion Location E, F, G or H •

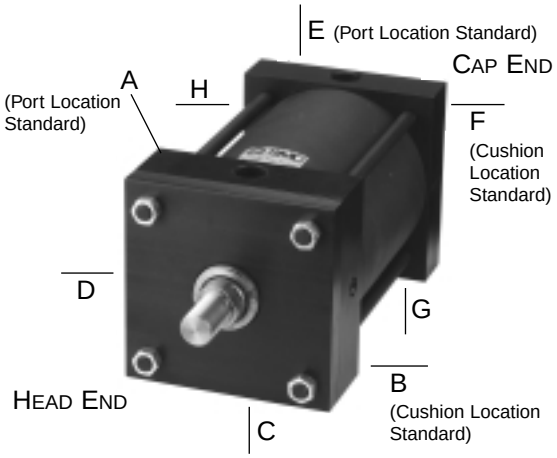
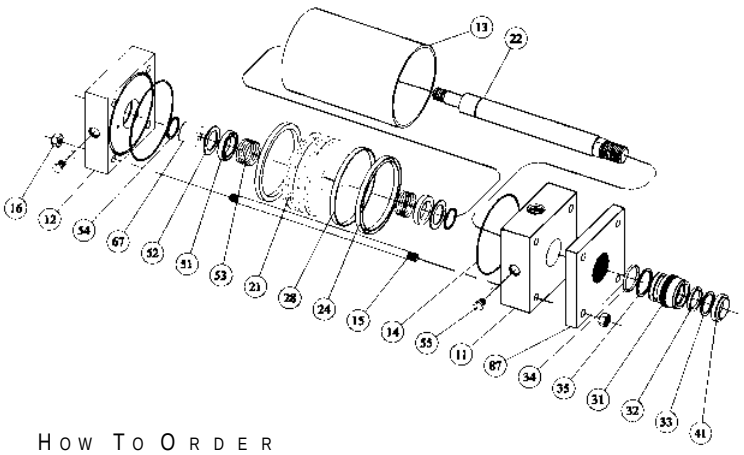


CHART 1

Spare Parts and Repair Kit

Item	Quantity	Description
11	1	Head
12	1	Cap
13	1	Barrel
14*	2	Barrel Seal
15	4	Tie Rods
16	4	Tie Rod Nuts
21	1	Piston *(See Note1)*
22	1	Piston Rod *(See Note1)*
24*	2	Piston Packings
26A	1	Piston Rod Assembly *(See Note1)*
28	1	Wear Band
31	1	Gland Bushing
32*	1	Gland Packing
33*	1	Gland Packing Backup
34*	1	Gland Seal
35*	1	Gland Seal Backup
41*	1	Rod Wiper
44	1	Magnet
51*	2	Cushion Packing
52	2	Cushion Backup
53	2	Cushion Spring
54	2	Cushion Retainer
55*	2	Adjustable Cushion Assembly
67	1	Cushion Seat
87	1	Head Flange

** Denotes 'Included in Service Kit'*
Note 1) Piston Rod and Piston are not sold separately. Please order Item No 26A Piston Rod Assembly.



HOW TO ORDER
SERIES NCA1 REPLACEMENT PARTS

NC D A1 - □ □ - □ - □ - □

MAGNET (if applicable)

MOUNTING STYLE

Item No from CHART 1 to reference Part required

CONSTRUCTION DETAILS
XTAT .....Aluminum Tube
XTST .....Steel Tube Construction
XTSS .....Stainless Steel Construction
XTSCT.....Steel w/ composite tube
XTACT ...Composite tube
XTSSCT...Stainless steel w/ composite tube

STROKE
Only necessary for Item No 13, 15 and 26A

BORE SIZE	ROD ø	ROD THREAD ø
150 .....1.5"	5/8"	7/16-20
200 .....2"	5/8"	7/16-20
250 .....2.5"	5/8"	7/16-20
325 .....3.25"	1"	3/4-16
400 .....4"	1"	3/4-16
500 .....5"	1"	3/4-16
600 .....6"	1-3/8"	1-14
800 .....8"	1-3/8"	1-14
1000.....10"	1-3/4"	1 1/4-12
1200.....12"	2"	1 1/2-12
1400.....14"	2-1/2"	1 7/8-12

REFER TO PAGE 22 FOR OPTIONAL ROD THREADS

HOW TO ORDER
SERIES NCA1 SEAL KIT

NCA1-□ □ - PS - □

STYLE
- ...Single Rod
W ...Double Rod

For information on Bore Size, Rod ø and Rod Thread ø, please see **How To Order Series NCA1 Replacement Parts**.

OPTIONS (IF APPLICABLE)
XB5
- G 1 3/8"
- H 1 3/4"
- J 2"
- K 2 1/2"
- L 3"
- M 3 1/2"

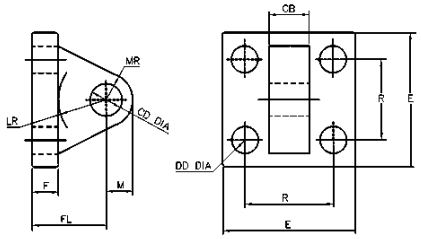
XB6 HIGH TEMPERATURE

ACCESSORIES

Eye Brackets

Part No	CB	CD	DD	E	F	FL	LR	M	MR	R
NCA1-P150	3/4	1/2	13/32	2 1/2	3/8	1 1/8	3/4	1/2	9/16	1.63
NCA1-P325	1 1/4	3/4	17/32	3 1/2	5/8	1 7/8	1 1/4	3/4	7/8	2.56
NCA1-P800	1 1/2	1	21/32	4 1/2	3/4	2 1/4	1 1/2	1	1 1/4	3.25
NCA1-P1000	2	1 3/8	21/32	5	7/8	3	2 1/8	1 3/8	1 5/8	3.81
NCA1-P1200	2 1/2	1 3/4	29/32	6 1/2	7/8	3 1/8	2 1/4	1 3/4	2 1/8	4.95
NCA1-P1400	2 1/2	2	1 1/16	7 1/2	1	3 1/2	2 1/2	2	2 7/16	5.75
NCA1-P1401	3	2 1/2	1 3/16	8 1/2	1 3/4	4 3/4		2 1/2	3	6.58
NCA1-P1402	3	3	1 5/16	9 1/2	2	5 1/4		2 3/4	3 1/4	7.50

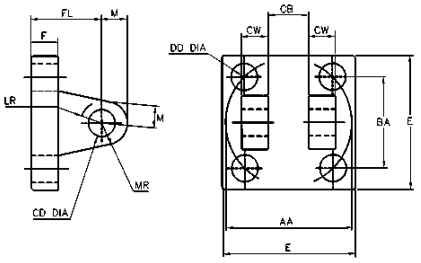
Note) Pivot Pin not included



Clevis Brackets

Part No	AA	BA	CB	CD	CW	DD	E	F	FL	LR	M	MR
NCA1-CB150	2.3	1 5/8	0.785	1/2	1/2	3/8 -24	2 1/2	3/8	1 1/8	1/2	1/2	9/16
NCA1-CB325	3.6	2 9/16	1.265	3/4	5/8	1/2 -20	3 1/2	5/8	1 7/8	1 1/16	3/4	1 1/16
NCA1-CB800	4.6	3 1/4	1.515	1	3/4	5/8 -18	4 1/2	3/4	2 1/4	1 1/4	1	1 1/8
NCA1-CB1000	5.4	3 13/16	2.032	1 3/8	1	5/8 -18	5	7/8	3	1 7/8	1 3/8	1 3/4
NCA1-CB1200	7	4 15/16	2.531	1 3/4	1 1/4	7/8 -14	6 1/2	7/8	3 1/8	2	1 3/4	1 7/8
NCA1-CB1400	8.1	5 3/4	2.531	2	1 1/4	1 -14	7 1/2	1	3 1/2	2 1/8	2	2 1/8
NCA1-CB1401	9.3	6 19/32	3.032	2 1/2	1 1/2	1 1/8-12	8 1/2	1	4	2 5/8	2 1/2	2 1/2
NCA1-CB1402	10.6	7 1/2	3.032	3	1 1/2	1 1/4-12	9 1/2	1	4 1/4	2 7/8	2 3/4	2 3/4

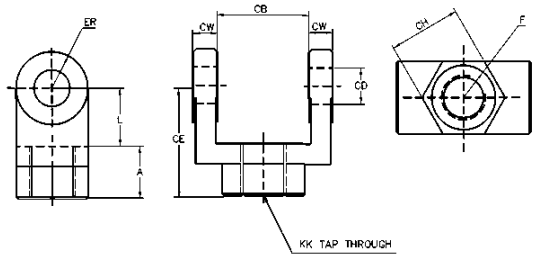
Note) Pivot Pin not included



Rod Clevises

Part No	CB	CD	CE	CH	CW	F	L	A	KK	ER
NY-150	0.765	0.5	1 1/2	1	1/2	1	3/4	3/4	7/16-20	1/2
NY-325	1.265	0.75	2 3/8	1 3/8	5/8	1 1/4	1 1/4	1 1/8	3/4-16	3/4
NY-800	1.515	1	3 1/8	1 1/2	3/4	1 1/2	1 1/2	1 5/8	1 -14	1
NY-1000	2.032	1 3/8	4 1/8	2	1	2	2 1/8	2	1 1/4 -12	1 3/8
NY-1200	2.531	1 3/4	4 1/2	2 3/8	1 1/4	2 3/8	2 1/4	2 1/4	1 1/2 -12	1 3/4
NY-1400	2.531	2	5 1/2	2 15/16	1 1/4	2 15/16	2 1/2	3	1 7/8 -12	2
NY-1401	3.032	2 1/2	6 1/2	3 1/2	1 1/2	3 1/2	3	3 1/2	2 1/4 -12	2 1/2
NY-1402	3.032	3	6 3/4	3 7/8	1 1/2	3 7/8	3 1/4	3 1/2	2 1/2 -12	2 3/4

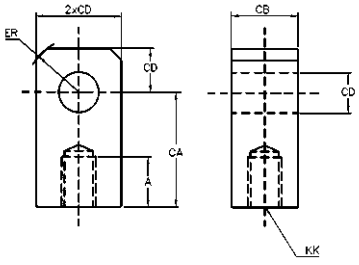
Note) Pivot Pin not included



Order to match Rod Thread

Rod Eyes

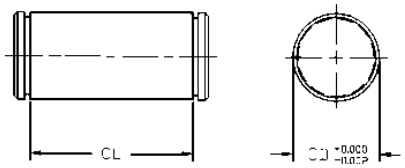
Part No	A	CA	CB	CD	ER	KK
NI-150	3/4	1 1/2	3/4	1/2	5/8	7/16 20
NI-325	1 1/8	2 1/16	1 1/4	3/4	7/8	3/4 -16
NI-800	1 5/8	2 13/16	1 1/2	1	1 3/16	1 -14
NI-1000	2	3 7/16	2	1 3/8	1 9/16	1 1/4 -12
NI-1200	2 1/4	4	2 1/2	1 3/4	2	1 1/2 -12
NI-1400	3	5	2 1/2	2	2 1/2	1 7/8 -12
NI-1401	3 1/2	5 13/16	3	2 1/2	2 13/16	2 1/4-12
NI-1402	3 1/2	6 1/8	3	3	3 1/4	2 1/2-12



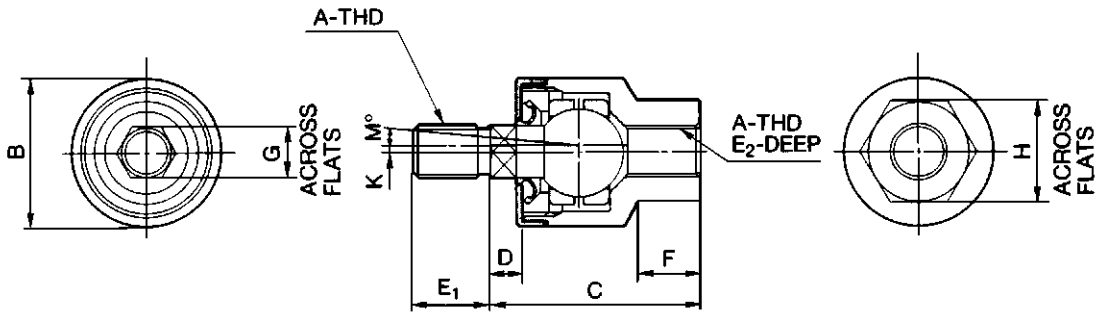
Pivot Pin

Part No	CD	CL
NCA1-150	1/2	1 7/8
NCA1-325	3/4	2 5/8
NCA1-800	1	3 1/8
NCA1-1000	1 3/8	4 1/8
NCA1-1200	1 3/4	5 1/8
NCA1-1400	2	5 1/8
NCA1-1401	2.5	6.19
NCA1-1402	3	6.25

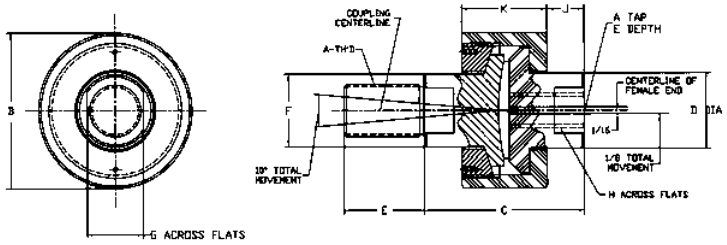
Note) Retainer Rings are included



ALIGNMENT COUPLERS

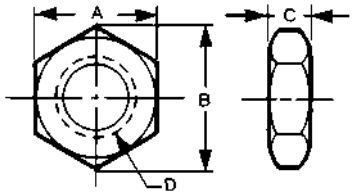


Part No	A	B	C	D	E1	E2	F	G	H	K	M°
NJ-07	7/16-20	1.22	1.83	0.31	0.75	0.75	0.63	0.44	0.75	0.03	5°
NJ-08	1/2-20	1.61	2.11	0.31	0.75	0.75	0.63	0.5	1	0.06	5°
NJ-12	3/4-16	1.97	2.91	0.5	1.13	1.13	0.94	0.81	1.13	0.06	5°



Part No	A	B	C	D	E	F	G	H	J	K
NCA1-AC800	1-14	2 3/4	3 1/16	1 1/2	1 5/8	1 1/4	1 1/8	1 1/4	9/16	2
NCA1-AC1000	1 1/4-12	3 1/2	4	2	2	1 1/2	1 1/4	1 11/16	3/4	2 1/2
NCA1-AC1200	1 1/2-12	4	4 3/8	2 1/4	2 1/4	1 3/4	1 1/2	1 15/16	7/8	2 3/4
NCA1-AC1400	1 7/8-12	5	5 5/8	3	3	2 1/4	1 15/16	2 5/8	1 3/8	3 3/8
NCA1-AC1401	2 1/4-12	6 3/4	6 3/8	3 1/4	3 1/2	2 3/4	2 3/8	2 7/8	1 5/8	3 3/4
NCA1-AC1402	2 1/2-12	7	6 1/2	4	3 1/2	3 1/4	2 7/8	3 3/8	1 5/8	3 7/8

Rod Jam Nut



Part No	A Across Flats	B Across Corners (max)	C (max)	D (max)
JM-045	0.69	0.79	0.26	7/16-20UNF
JM-10	1.12	1.30	0.42	3/4-16UNF
JM-800	1.62	1.73	0.57	1-14UNF
JM-1000	2.00	2.16	0.75	1 1/4-12UNF
JM-1200	2.37	2.50	0.88	1 1/2-12UNF
JM-1400	2.93	3.39	1.07	1 7/8-12UNF
JM-1401	3.50	4.04	1.25	2 1/4-12
JM-1402	3.87	4.47	1.50	2 1/2-12UNF

Limited Cylinder Warranty - Terms and Conditions of Sale....

SMC warrants that for **18 months or 1800 service miles***, whichever occurs first from date of purchase, it will replace or make adjustment at SMC's option, of any defective cylinder sold if the cylinder product is returned with SMC's prior written consent, transportation prepaid by the original buyer, and received by SMC at its place of business within the warranty period.

SMC shall have the right to inspect, prior to return, at the buyer's facility, any products claimed to be defective.

This warranty is limited exclusively to cylinder products which, in the opinion of SMC, have not been subjected to modification, misuse, negligence, misapplication, repairs or alterations. Damage caused by fire, theft, riot, explosion or acts of Gods are excluded from this warranty. The foregoing constitutes the sole exclusive remedy of the buyer and the only liability of SMC and is in lieu of any and all other warranties, expressed or implied, or statutory as to merchantability, fitness for purpose sold, description, quality, productiveness or any other matter. SMC shall not be liable for loss of use, or profit, or special or consequential damages.

SMC assumes no responsibility for engineering technical advice pertaining to any manufactured item to which SMC's products or goods have been attached. No agent, employee, distributor, or representative of SMC has the authority to extend the scope of this warranty or to make any other promises, warranties or guarantees concerning the manufacture, sale or application of SMC's products.

**Service Miles = (inches/stroke) x (2 strokes/cycle) x (no of cycles) x [1 mile / 63,360 inches]*

Published by THE MARKETING DEPARTMENT OF SMC PNEUMATICS (CANADA) LTD.
6768 FINANCIAL DRIVE, MISSISSAUGA, ONTARIO L5N 7J6 CANADA
TEL: (905) 812 0400
FAX: (905) 812 8686

PRINTED IN CANADA. MAY 2001

World Wide SMC Support...

United States Branch Offices For a branch office near you call: 1-800-SMC-SMC1 (762-7621)

SMC Corporation of America (Atlanta)
1440 Lakes Parkway, Suite 600
Lawrenceville, GA 30043
TEL: (770) 624-1940
FAX: (770) 624-1943

SMC Corporation of America (Austin)
9101 Wall Street, Suite 1030
Austin, TX 78754
TEL: (512) 926-2646
FAX: (512) 926-7055

SMC Corporation of America (Boston)
Zero Centennial Drive
Peabody, MA 01960
TEL: (978) 326-3600
Fax: (978) 326-3700

SMC Corporation of America (Charlotte)
5029-B West W.T. Harris Blvd.
Charlotte, NC 28269
TEL: (704) 597-9292
FAX: (704) 596-9561

SMC Corporation of America (Chicago)
27725 Diehl Road
Warrenville, IL 60555
Tel: (630) 393-0080
FAX: (630) 393-0084

SMC Corporation of America (Cincinnati)
4598 Olympic Blvd.
Erlanger, KY 41018
TEL: (859) 647-5600
FAX: (859) 647-5609

SMC Corporation of America (Cleveland)
2305 East Aurora Rd., Unit A-3
Twinsburg, OH 44087
TEL: (330) 963-2727
FAX: (330) 963-2730

SMC Corporation of America (Dallas)
1301 W. Beltline Suite 119
Carrollton, TX 75006
TEL: (972) 446-9554
FAX: (972) 446-5931

SMC Corporation of America (Detroit)
2990 Technology Drive
Rochester Hills, MI 48309
TEL: (248) 299-0202
FAX: (248) 293-3333

SMC Corporation of America (Houston)
9001 Jameel, Suite 180
Houston, TX 77040
TEL: (713) 460-0762
FAX: (713) 460-1510

SMC Corporation of America (L.A.)
14191 Myford Road
Tustin, CA 92780
TEL: (714) 669-1701
FAX: (714) 669-1715

SMC Corporation of America (Milwaukee)
16850 W. Victor Road
New Berlin, WI 53151
TEL: (262) 827-0080
FAX: (262) 827-0092

SMC Corporation of America (Mnpls.)
6541 City West Parkway
Eden Prairie, MN 55344
TEL: (952) 943-1299
FAX: (952) 943-1614

SMC Corporation of America (Nashville)
5000 Linbar Drive, Suite 297
Nashville, TN 37211
TEL: (615) 331-0020
FAX: (615) 331-9950

SMC Corporation of America (Newark)
3434 US Hwy. 22 West, Ste. 110
Somerville, NJ 08876
TEL: (908) 253-3241
FAX: (908) 253-3452

SMC Corporation of America (Phoenix)
2001 W. Melinda Lane
Phoenix, AZ 85027
TEL: (623) 492-0908
FAX: (623) 492-9493

SMC Corporation of America (Portland)
14107 N.E. Airport Way
Portland, OR 97230
TEL: (503) 252-9299
FAX: (503) 252-9253

SMC Corporation of America (Richmond)
4701 Cox Rd.
Richmond, VA 23060
TEL: (804) 527-0500
FAX: (804) 527-2100

SMC Corporation of America (Rochester)
245 Summit Point Drive
Henrietta, NY 14467
TEL: (716) 321-1300
FAX: (716) 321-1865

SMC Corporation of America (S.F.)
85 Nicholson Lane
San Jose, CA 95134
TEL: (408) 943-9600
FAX: (408) 943-9111

SMC Corporation of America (St. Louis)
4130 Rider Trail North
Earth City, MO 63045
TEL: (314) 209-0080
FAX: (314) 209-0085

SMC Corporation of America (Tampa)
18167 US19 North Suite 150
Clearwater, FL 33764
TEL: (813) 243-8350
FAX: (813) 243-8621

Canadian Branch Offices

SMC Pneumatics (Canada) Ltd. (Toronto)
6768 Financial Drive
Mississauga, ON L5N 7J6
TEL: (905) 812-0400
FAX: (905) 812-8686

SMC Pneumatiques (Canada) Ltd.(Montreal)
8495 Dalton Drive
Township of Mount-Royal, PQ H4T 1V5
TEL: (514) 733-9595
FAX: (514) 733-1771

SMC Pneumatiques (Canada) Ltd.(Quebec)
3260 Rue Watt - Local 112
Ste-Foy, PQ G1X 4T5
TEL: (418) 654-1997
FAX: (418) 654-1998

SMC Pneumatics (Canada) Ltd.(Vancouver)
Annacis Business Park
730 Eaton Way - Unit 2
Delta, BC V3M 6J9
TEL: (604) 517-1646
FAX: (604) 517-1647

SMC Pneumatics (Canada) Ltd.(Windsor)
2870 Jefferson BLVD - Unit 1
Windsor, ON N8T 3L2
TEL: (519) 944-0555
FAX: (519) 944-1870

Europe

ENGLAND
SMC Pneumatics (U.K.) Ltd.

GERMANY
SMC Pneumatik GmbH

ITALY
SMC Italia SpA

FRANCE
SMC Pneumatique SA

HOLLAND
SMC Controls BV

SWEDEN
SMC Pneumatics Sweden AB

SWITZERLAND
SMC Pneumatik AG

AUSTRIA
SMC Pneumatik GmbH

SPAIN
SMC Espana, S.A.

IRELAND
SMC Pneumatics (Ireland) Ltd.

ROMANIA
SMC Pneumatics (Romania) Ltd.

RUSSIA
SMC Pneumatik LLC

NORWAY
SMC Pneumatics Norway A/S

DENMARK/LATVIA/LITHUANIA
SMC Pneumatik A/S

Asia

JAPAN
SMC Corporation

KOREA
SMC Pneumatics Korea Co., Ltd.

CHINA
SMC (China) Co., Ltd.

HONG KONG
SMC Pneumatics (Hong Kong) Ltd.

SINGAPORE
SMC Pneumatics (S.E.A.) Pte. Ltd.

PHILIPPINES
SMC Pneumatics (Philippines), Inc.

MALAYSIA
SMC Pneumatics (S.E.A.) Sdn. Bhd.

TAIWAN
SMC Pneumatics (Taiwan) Co., Ltd.

THAILAND
SMC Thailand Ltd.

INDIA
SMC Pneumatics (India) Pvt., Ltd.

North America

MEXICO
SMC Pneumatics (Mexico) S.A. de C.V.

South America

ARGENTINA
SMC Argentina S.A.

CHILE
SMC Pneumatics (Chile) Ltda.

Oceania

AUSTRALIA
SMC Pneumatics (Australia) Pty. Ltd.

NEW ZEALAND
SMC Pneumatics (N.Z.) Ltd.

SMC offers the same quality and engineering expertise in many other pneumatic components

Valves
Directional Control Valves
Manual Valves
Mufflers
Exhaust Cleaners
Quick Exhaust Valves

Valves
Proportional Valves
Mechanical Valves
Miniature Valves
Fluid Valves

Cylinders/Actuators
Compact Cylinders
Miniature Cylinders
Rodless Cylinders
Rotary Actuators
Pneumatic Grippers

Vacuum
Vacuum Ejectors
Vacuum Accessories

Instrumentation
Pneumatic Positioners
Pneumatic Transducers

Air Preparation Equipment
Filters-Regulators-Lubricators
Coalescing Filters
Micro Mist Separators

Fittings
Air Fittings

SMC Corporation of America

3011 N. Franklin Rd Indianapolis, IN 46226
Tel: (317) 899-4440 • FAX: (317) 899-3102
http://www.smcusa.com

SMC Pneumatics (Canada) Ltd.

6768 Financial Drive, Mississauga, Ontario L5N 7J6
Tel: (905) 812-0400 • FAX: (905) 812-8686
http://www.smcpneumatics.ca