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,

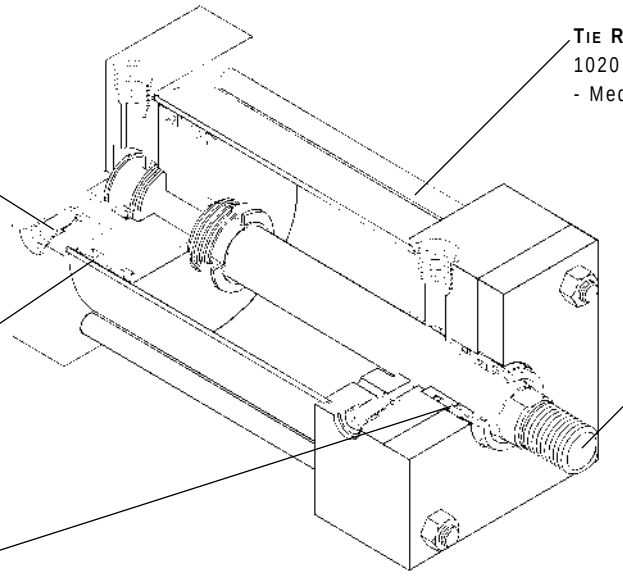
N/A - Not Available; please contact SMC Customer Service

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.

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.

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

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

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

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.

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

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

STANDARD STROKE
Inches
Example: 04 = 4” 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*

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

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”

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.

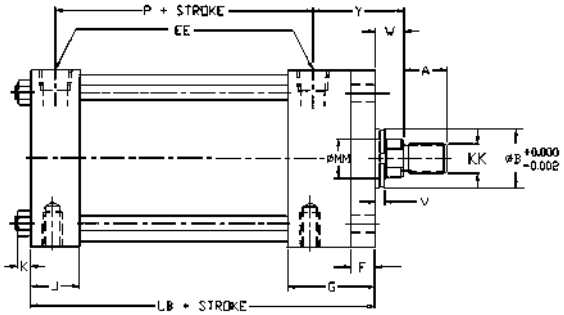
XB5 —

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

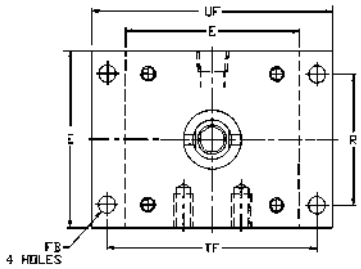
MF1 ø1.5" ~ 6"

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



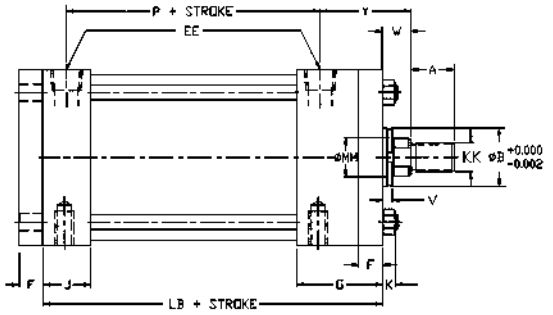
BORE	E	EE(NPT)	F	FB	G	J	K	R	TF	UF
1 1/2	2	3/8	3/8	5/16	2	1	1/4	1.43	2 3/4	3 3/8
2	2 1/2	3/8	3/8	3/8	2	1	5/16	1.84	3 3/8	4 1/8
2 1/2	3	3/8	3/8	3/8	2	1 1/8	5/16	2.19	3 7/8	4 5/8
3 1/4	3 3/4	1/2	5/8	7/16	2 1/4	1 1/4	3/8	2.76	4 11/16	5 1/2
4	4 1/2	1/2	5/8	7/16	2 1/4	1 1/4	3/8	3.32	5 7/16	6 1/4
5	5 1/2	1/2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



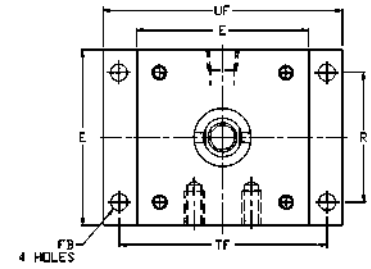
MF2 ø1.5" ~ 6"

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



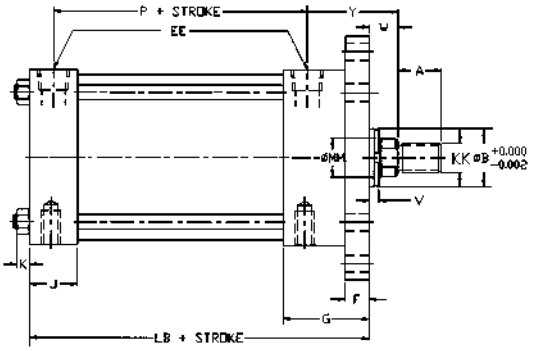
BORE	E	EE(NPT)	F	FB	G	J	K	R	TF	UF
1 1/2	2	3/8	3/8	5/16	2	1	1/4	1.43	2 3/4	3 3/8
2	2 1/2	3/8	3/8	3/8	2	1	5/16	1.84	3 3/8	4 1/8
2 1/2	3	3/8	3/8	3/8	2	1 1/8	5/16	2.19	3 7/8	4 5/8
3 1/4	3 3/4	1/2	5/8	7/16	2 1/4	1 1/4	3/8	2.76	4 11/16	5 1/2
4	4 1/2	1/2	5/8	7/16	2 1/4	1 1/4	3/8	3.32	5 7/16	6 1/4
5	5 1/2	1/2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



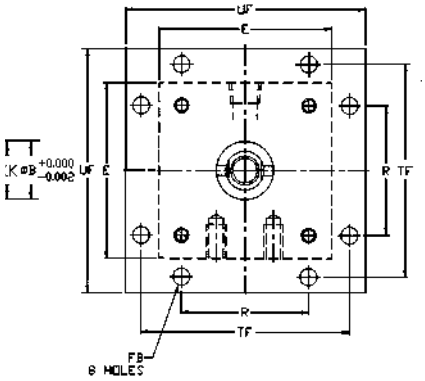
MF5 ø1.5" ~ 6"

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



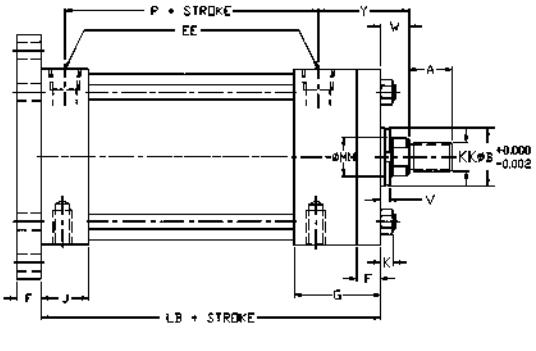
BORE	E	EE(NPT)	F	FB	G	J	K	R	TF	UF
1 1/2	2	3/8	3/8	5/16	2	1	1/4	1.43	2 3/4	3 3/8
2	2 1/2	3/8	3/8	3/8	2	1	5/16	1.84	3 3/8	4 1/8
2 1/2	3	3/8	3/8	3/8	2	1 1/8	5/16	2.19	3 7/8	4 5/8
3 1/4	3 3/4	1/2	5/8	7/16	2 1/4	1 1/4	3/8	2.76	4 11/16	5 1/2
4	4 1/2	1/2	5/8	7/16	2 1/4	1 1/4	3/8	3.32	5 7/16	6 1/4
5	5 1/2	1/2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



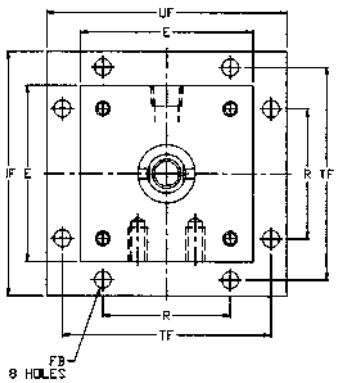
MF6 ø1.5" ~ 6"

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



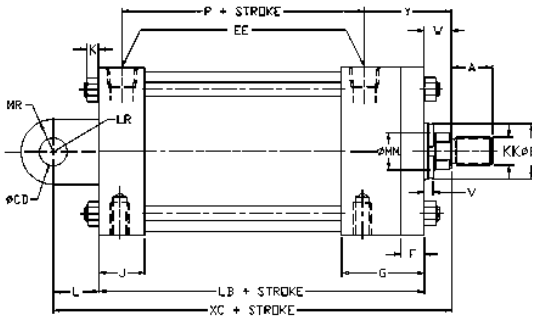
BORE	E	EE(NPT)	F	FB	G	J	K	R	TF	UF
1 1/2	2	3/8	3/8	5/16	2	1	1/4	1.43	2 3/4	3 3/8
2	2 1/2	3/8	3/8	3/8	2	1	5/16	1.84	3 3/8	4 1/8
2 1/2	3	3/8	3/8	3/8	2	1 1/8	5/16	2.19	3 7/8	4 5/8
3 1/4	3 3/4	1/2	5/8	7/16	2 1/4	1 1/4	3/8	2.76	4 11/16	5 1/2
4	4 1/2	1/2	5/8	7/16	2 1/4	1 1/4	3/8	3.32	5 7/16	6 1/4
5	5 1/2	1/2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

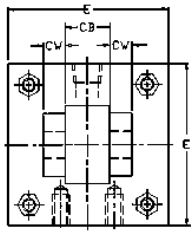
With Double Rear Clevis

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

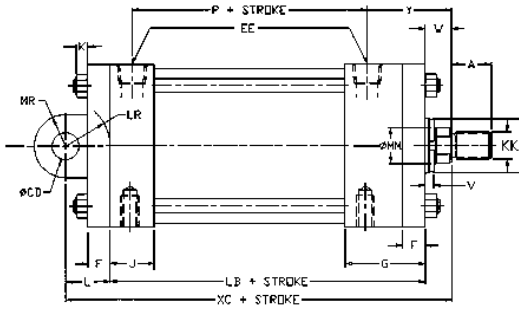


Heavy Duty

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

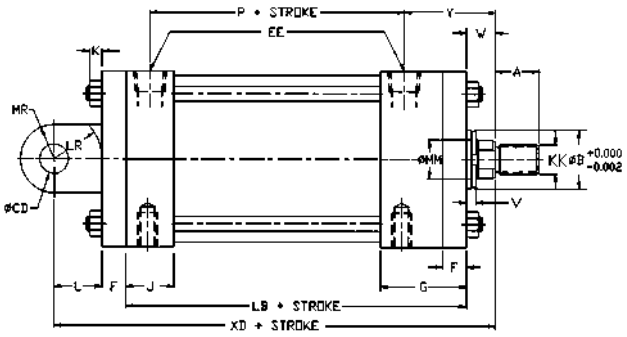


Medium Duty

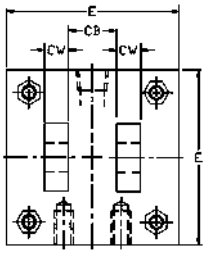
MP2 ø1.5" ~ 6"

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

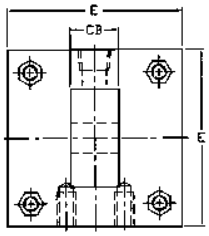


Bore	G	J	K	L	LR	MR
1 1/2	3/8	2	11/4	3/4	3/4	5/8
2	2	1	5/16	3/4	3/4	5/8
2 1/2	2	1 1/8	5/16	3/4	3/4	5/8
3 1/4	2 1/4	1 1/4	3/8	1 1/4	1 1/4	7/8
4	2 1/4	1 1/4	3/8	1 1/4	1 1/4	7/8
5	2 1/4	1 1/2	7/16	1 1/4	1 1/4	7/8
6	2 3/4	1 5/8	7/16	1 1/2	1 1/2	1 1/4

MP3 ø1.5" ~ 6"

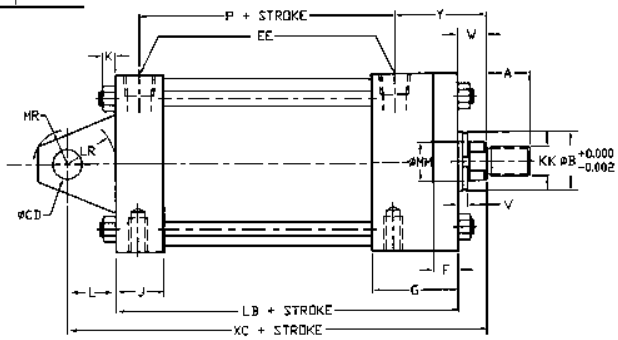
With Cap Fixed Eye

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

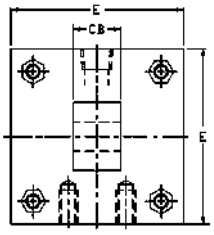
Bore	G	J	K	L	LR	MR
1 1/2	2	1	1/4	3/4	3/4	5/8
2	2	1	5/16	3/4	3/4	5/8
2 1/2	2	1 1/8	5/16	3/4	3/4	5/8
3 1/4	2 1/4	1 1/4	3/8	1 1/4	1 1/4	7/8
4	2 1/4	1 1/4	3/8	1 1/4	1 1/4	7/8
5	2 1/4	1 1/2	7/16	1 1/4	1 1/4	7/8
6	2 3/4	1 5/8	7/16	1 1/2	1 1/2	1 1/4



MP4 ø1.5" ~ 6"

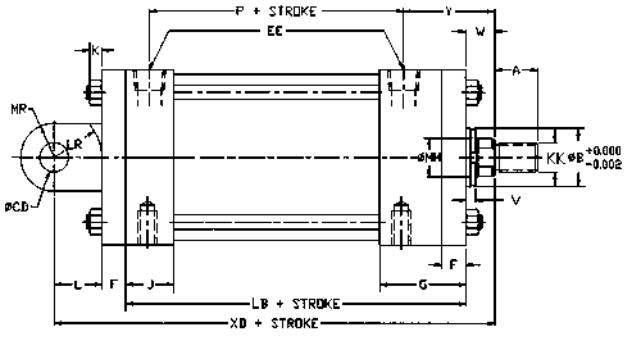
With Single Detachable Rear Clevis / Male

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



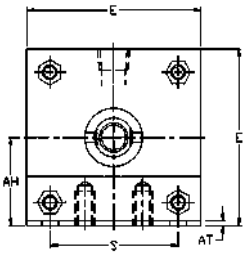
Bore	CB	CD	E	EE(NPT)	F
1 1/2	3/4	1/2	2	3/8	3/8
2	3/4	1/2	2 1/2	3/8	3/8
2 1/2	3/4	1/2	3	3/8	3/8
3 1/4	1 1/4	3/4	3 3/4	1/2	5/8
4	1 1/4	3/4	4 1/2	1/2	5/8
5	1 1/4	3/4	5 1/2	1/2	5/8
6	1 1/2	1	6 1/2	3/4	3/4

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



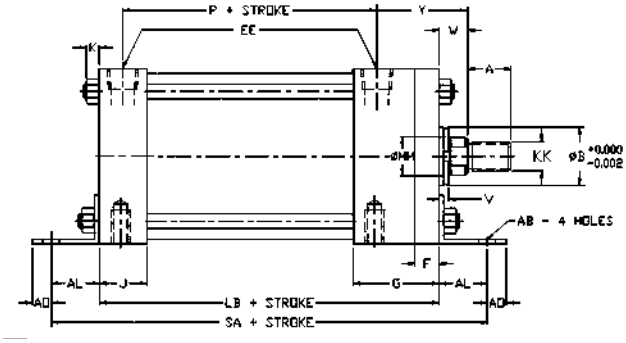
MS1 ø1.5" ~ 6"
With Foot Mount

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



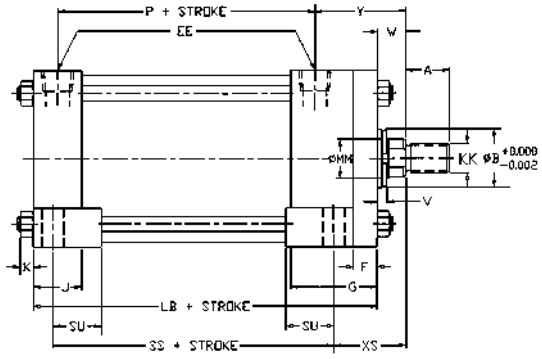
Bore	AB	AH	AL	AO	AT
1 1/2	7/16	1 3/16	1	3/8	1/8
2	7/16	1 7/16	1	3/8	1/8
2 1/2	7/16	1 5/8	1	3/8	1/8
3 1/4	9/16	1 15/16	1 1/4	1/2	1/8
4	9/16	2 1/4	1 1/4	1/2	1/8
5	11/16	2 3/4	1 3/8	5/8	3/16
6	13/16	3 1/4	1 3/8	5/8	3/16

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

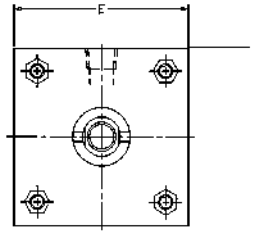


MS2 ø1.5" ~ 6"
With Side Lug

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

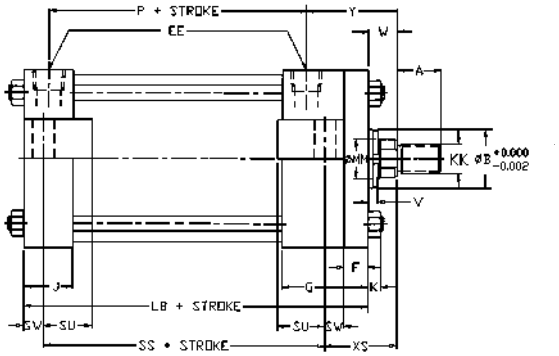


Bore	SB	ST	SU	SW	TS
1 1/2	7/16	1/2	15/16	3/8	2 3/4
2	7/16	1/2	15/16	3/8	3 1/4
2 1/2	7/16	1/2	15/16	3/8	3 3/4
3 1/4	9/16	3/4	1 1/4	1/2	4 3/4
4	9/16	3/4	1 1/4	1/2	5 1/2
5	13/16	1	1 9/16	11/16	6 7/8
6	13/16	1	1 9/16	11/16	7 7/8

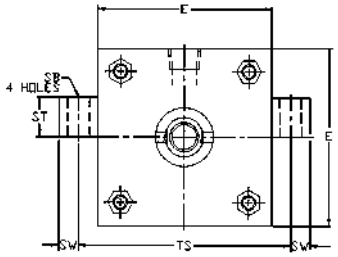
MS3 ø1.5" ~ 6"

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

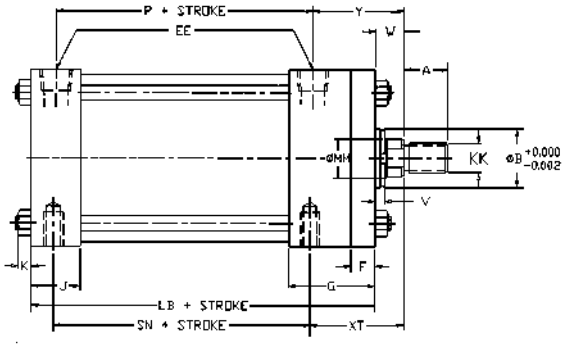


Bore	SB	ST	SU	SW	TS
1 1/2	7/16	1/2	15/16	3/8	2 3/4
2	7/16	1/2	15/16	3/8	3 1/4
2 1/2	7/16	1/2	15/16	3/8	3 3/4
3 1/4	9/16	3/4	1 1/4	1/2	4 3/4
4	9/16	3/4	1 1/4	1/2	5 1/2
5	13/16	1	1 9/16	11/16	6 7/8
6	13/16	1	1 9/16	11/16	7 7/8

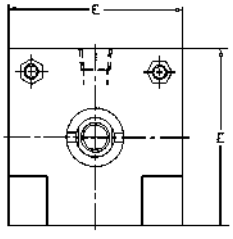
MS4 ø1.5" ~ 6"

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



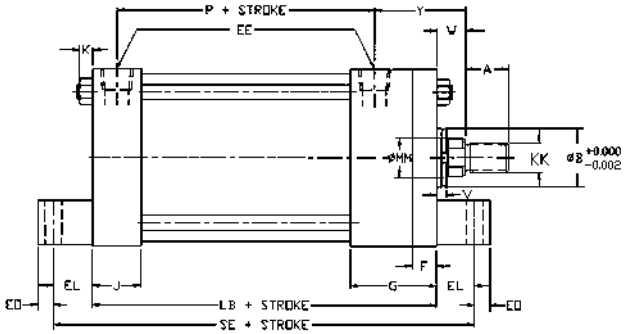
Bore	E	EE(NPT)	F	G	J	K	NT	TN
1 1/2	2	3/8	3/8	2	1	1/4	1/4-20	5/8
2	2 1/2	3/8	3/8	2	1	5/16	5/16-18	7/8
2 1/2	3	3/8	3/8	2	1 1/8	5/16	3/8-16	1 1/4
3 1/4	3 3/4	1/2	5/8	2 1/4	1 1/4	3/8	1/2-13	1 1/2
4	4 1/2	1/2	5/8	2 1/4	1 1/4	3/8	1/2-13	2 1/16
5	5 1/2	1/2	5/8	2 1/4	1 1/2	7/16	5/8-11	2 11/16
6	6 1/2	3/4	3/4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



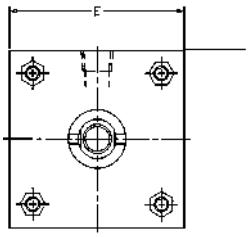
MS7 ø1.5" ~ 6"

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



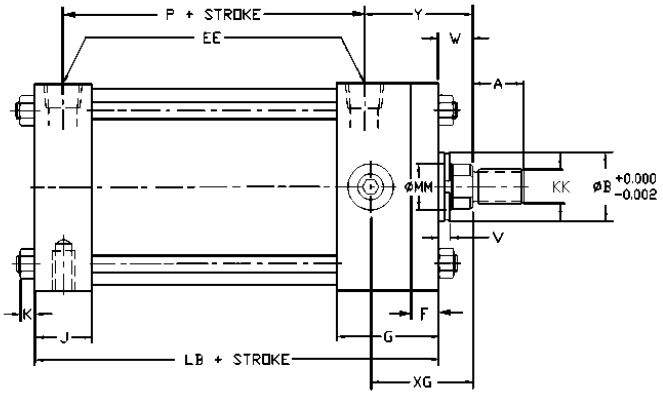
BORE	E	EB	EE(NPT)	EL	EO	ES	ET	F	G	J	K	R
1 1/2	2	5/16	3/8	3/4	1/4	9/16	17/32	3/8	2	1	1/4	1.43
2	2 1/2	3/8	3/8	15/16	5/16	5/8	5/8	3/8	2	1	5/16	1.84
2 1/2	3	3/8	3/8	1 1/16	5/16	13/16	25/32	3/8	2	1 1/8	5/16	2.19
3 1/4	3 3/4	7/16	1/2	7/8	3/8	1	15/16	5/8	2 1/4	1 1/4	3/8	2.76
4	4 1/2	7/16	1/2	1	3/8	1 1/4	1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



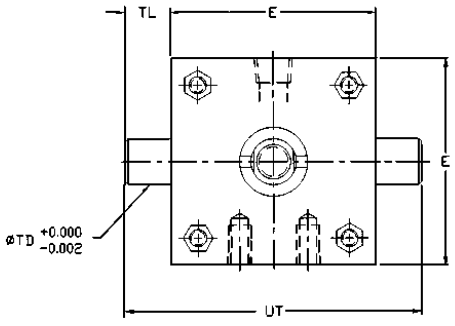
MT1 ø1.5" ~ 6"

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

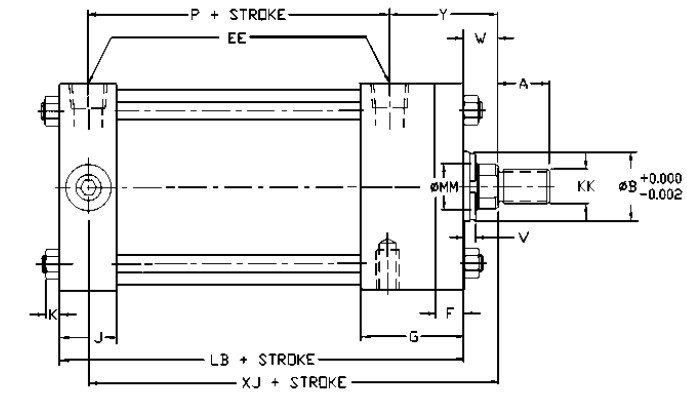


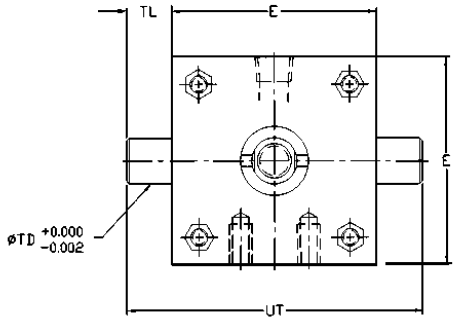
MT2 ø1.5" ~ 6"
WITH REAR TRUNNION

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



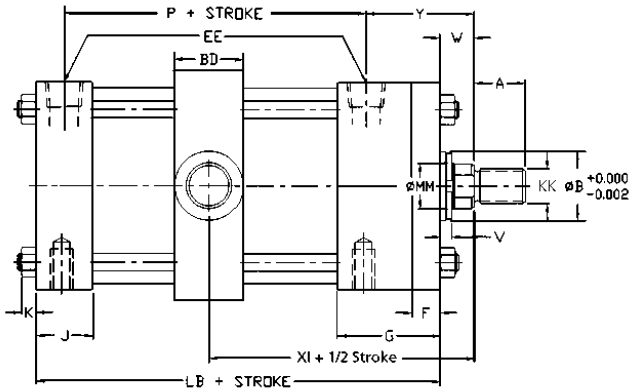


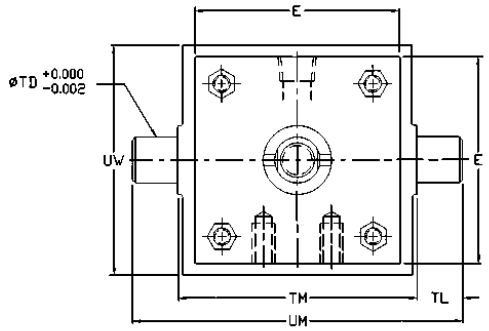
MT4 ø1.5" ~ 6"
WITH CENTER TRUNNION

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

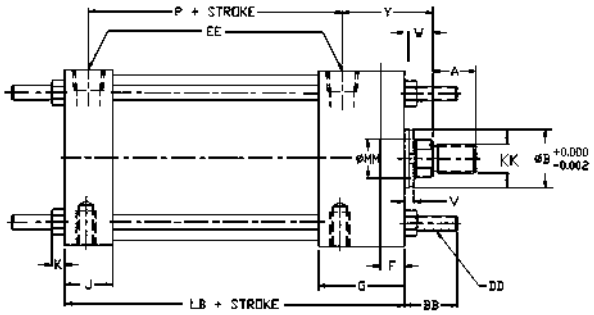




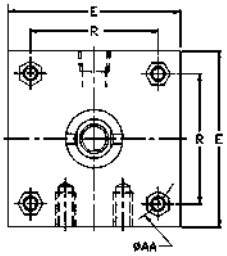
MX1 ø1.5" ~ 6"

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



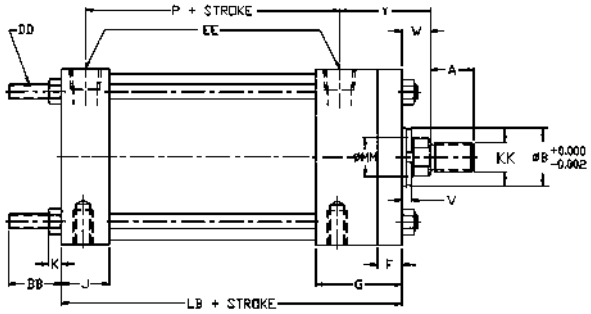
Bore	AA	BB	DD	E	EE(NPT)	F	G	J	K	R
1 1/2	2.02	1	1/4-20	2	3/8	3/8	2	1	1/4	1.43
2	2.60	1 1/8	5/16-24	2 1/2	3/8	3/8	2	1	5/16	1.84
2 1/2	3.10	1 1/8	5/16-24	3	3/8	3/8	2	1 1/8	5/16	2.19
3 1/4	3.90	1 3/8	3/8-24	3 3/4	1/2	5/8	2 1/4	1 1/4	3/8	2.78
4	4.70	1 3/8	3/8-24	4 1/2	1/2	5/8	2 1/4	1 1/4	3/8	3.32
5	5.80	1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



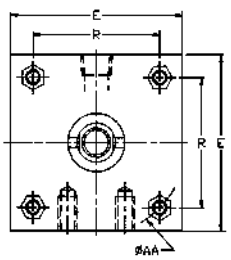
MX2 ø1.5" ~ 6"

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



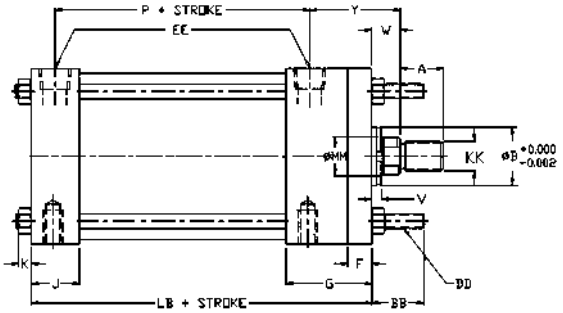
Bore	AA	BB	DD	E	EE(NPT)	F	G	J	K	R
1 1/2	2.02	1	1/4-20	2	3/8	3/8	2	1	1/4	1.43
2	2.60	1 1/8	5/16-24	2 1/2	3/8	3/8	2	1	5/16	1.84
2 1/2	3.10	1 1/8	5/16-24	3	3/8	3/8	2	1 1/8	5/16	2.19
3 1/4	3.90	1 3/8	3/8-24	3 3/4	1/2	5/8	2 1/4	1 1/4	3/8	2.78
4	4.70	1 3/8	3/8-24	4 1/2	1/2	5/8	2 1/4	1 1/4	3/8	3.32
5	5.80	1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



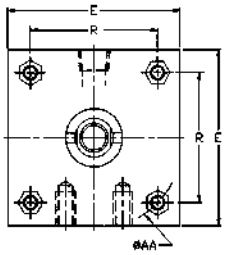
MX3 ø1.5" ~ 6"

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



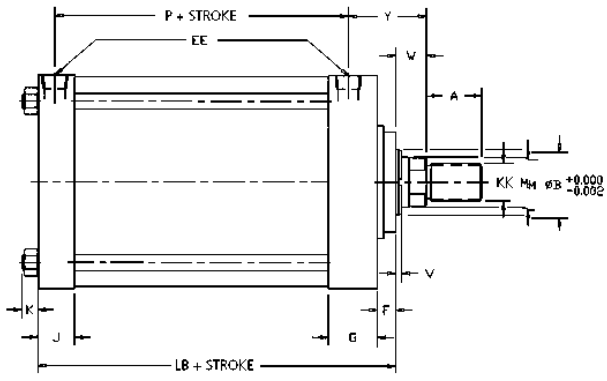
BORE	AA	BB	DD	E	EE(NPT)	F	G	J	K	R
1 1/2	2.02	1	1/4-20	2	3/8	3/8	2	1	1/4	1.43
2	2.60	1 1/8	5/16-24	2 1/2	3/8	3/8	2	1	5/16	1.84
2 1/2	3.10	1 1/8	5/16-24	3	3/8	3/8	2	1 1/8	5/16	2.19
3 1/4	3.90	1 3/8	3/8-24	3 3/4	1/2	5/8	2 1/4	1 1/4	3/8	2.78
4	4.70	1 3/8	3/8-24	4 1/2	1/2	5/8	2 1/4	1 1/4	3/8	3.32
5	5.80	1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



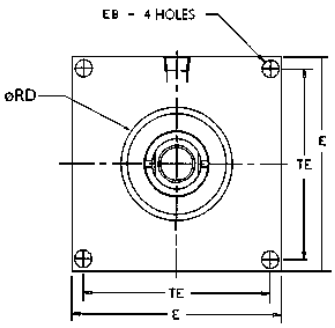
ME3 ø8" ~ 14"

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

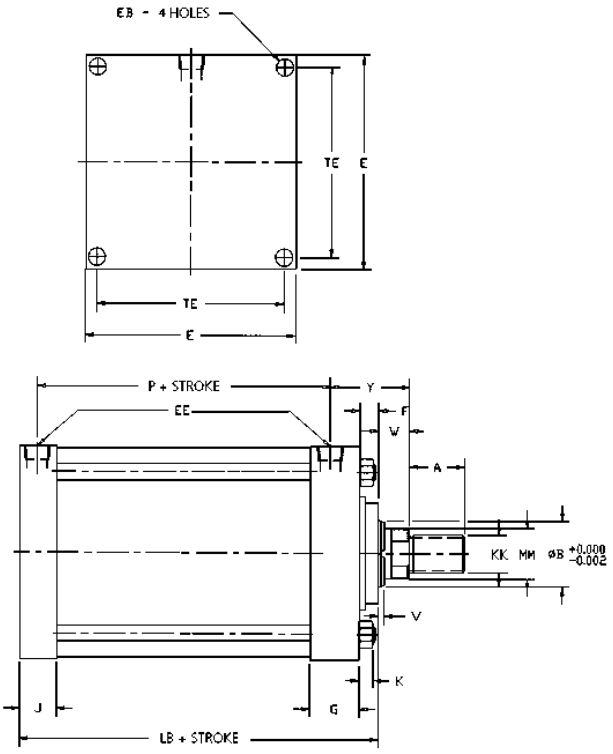


ME4 ø8" ~ 14"
With Cap Square Mount

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

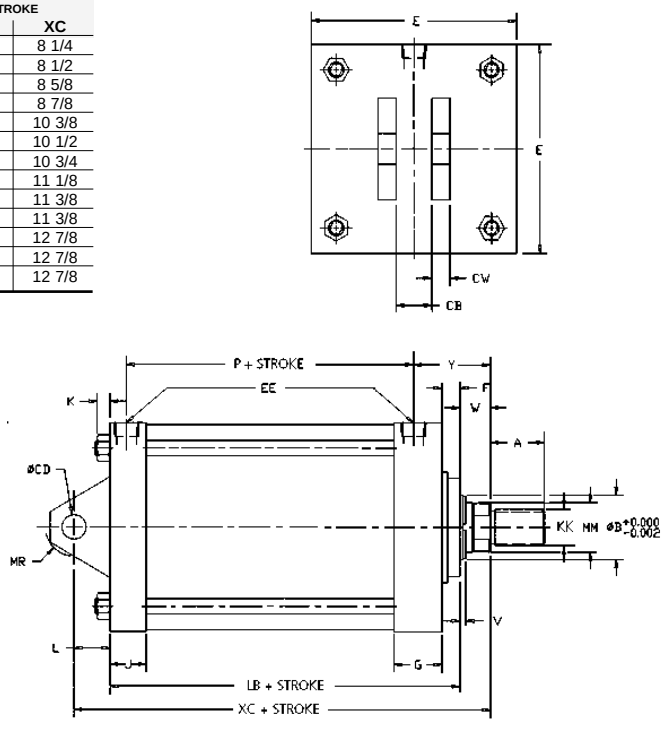


MP1 ø8" ~ 14"
With Double Rear Clevis

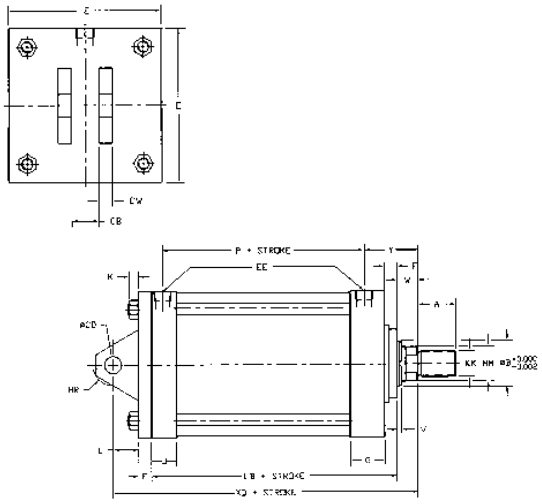
Bore	Rod øMM	KK SM	A	B	V	W	Y	Add Stroke LB	P	XC
8	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	5 7/8	3 1/4	8 1/4
8	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	5 7/8	3 1/4	8 1/2
8	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	5 7/8	3 1/4	8 5/8
8	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 7/16	5 7/8	3 1/4	8 7/8
10	1 3/4	1 1/4-12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



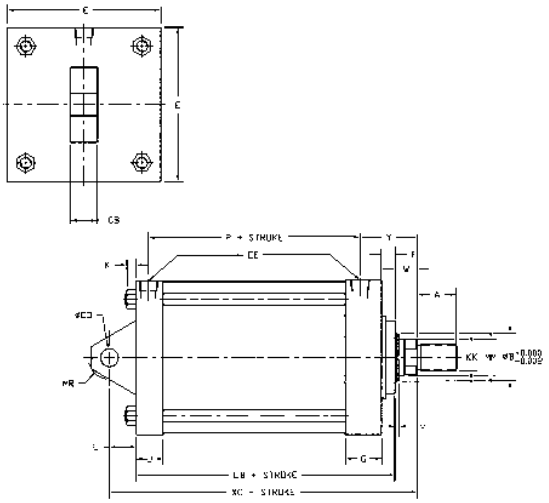
MP2 ø8" ~ 14"
With Double Detachable Rear Clevis



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

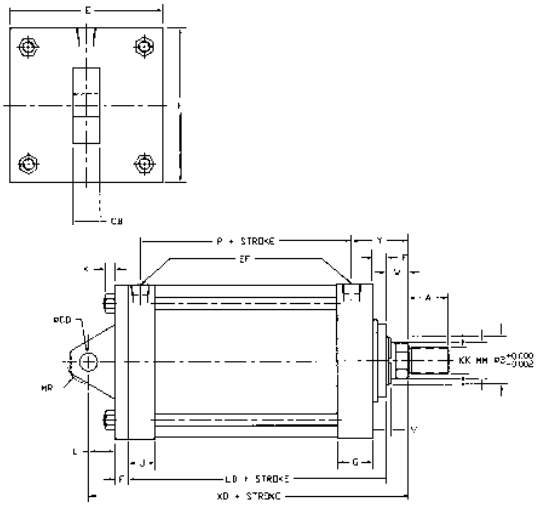
MP3 ø8" ~ 14"
With Cap Fixed Eye



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

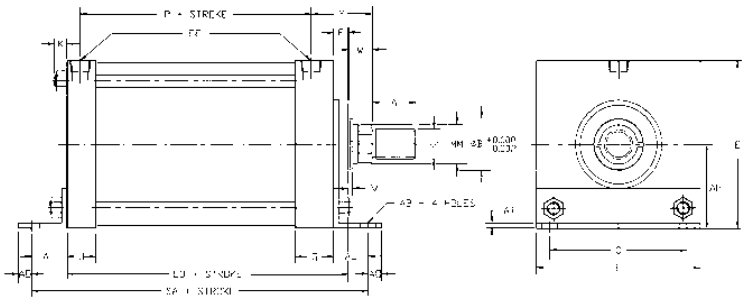


Bore	Rod øMM SM	KK	A	B	V	W	Y	Add Stroke LB	P	XD
8	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	5 7/8	3 1/4	9
8	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	5 7/8	3 1/4	9 1/4
8	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	5 7/8	3 1/4	9 3/8
8	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 7/16	5 7/8	3 1/4	9 5/8
10	1 3/4	1 1/4-12	2	2.375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

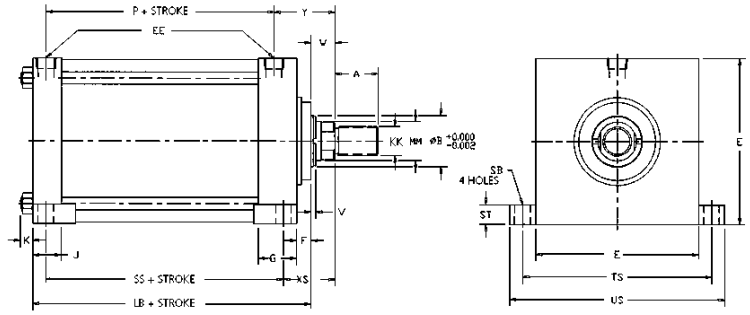
Bore	Rod øMM	KK SM	A	B	V	W	Y
8	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16
8	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16
8	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16
8	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 7/16
10	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/8
10	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4
10	2 1/2	1 7/8-12	3	3.125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

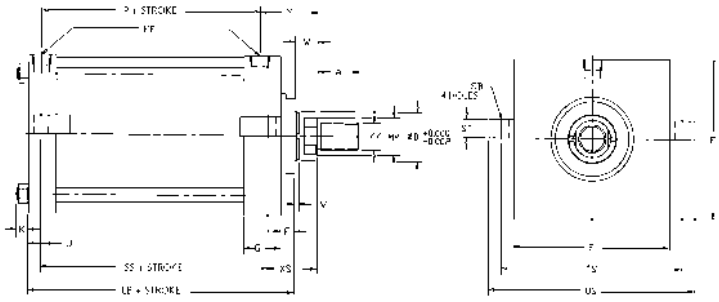
Bore	Rod (mm)	KK SM	A	B	V	W	XS	Y
8	1 3/8	1-14	1 5/8	2	1/4	7/8	2 5/16	2 13/16
8	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	2 9/16	3 1/16
8	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	2 11/16	3 3/16
8	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	2 15/18	3 7/16
10	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	2 3/4	3 1/8
10	2	1 1/2-12	2 1/4	2.625	3/8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

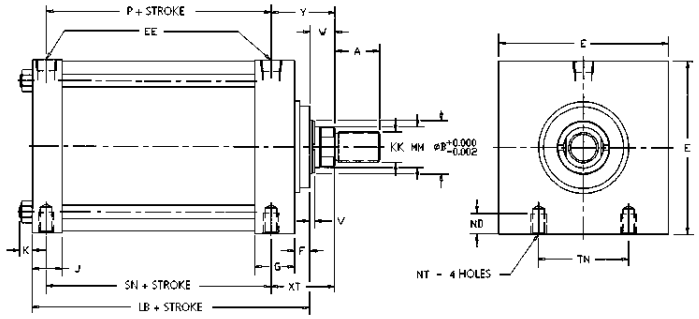


Bore	E	EE(NPT)	F	G	J	K	SB	ST	TS	US	Add Stroke LB	P	SS
8	8 1/2	3/4	3/4	2	1 1/2	9/16	13/16	1	9 7/8	11 1/4	5 7/8	3 1/4	3 3/4
10	10 5/8	1	3/4	2 1/4	2	11/16	1 1/16	1 1/4	12 3/8	14 1/8	7 1/8	4 1/8	4 5/8
12	12 3/4	1	3/4	2 1/4	2	11/16	11/16	1 1/4	14 1/2	16 1/4	7 5/8	4 5/8	5 1/8
14	14 3/4	1 1/4	3/4	2 3/4	2 1/4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

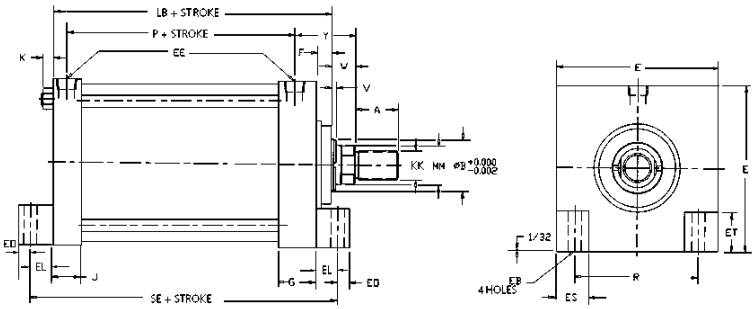


Bore	E	EE(NPT)	F	G	J	K	ND	NT	TN	Add LB	Add P	Stroke SN
8	8 1/2	3/4	3/4	2	1 1/2	9/16	1 1/8	3/4-10	4 1/2	5 7/8	3 1/4	3 1/4
10	10 5/8	1	3/4	2 1/4	2	11/16	1 1/2	1-8	5 1/2	7 1/8	4 1/8	4 1/8
12	12 3/4	1	3/4	2 1/4	2	11/16	1 1/2	1-8	7 1/4	7 5/8	4 5/8	4 5/8
14	14 3/4	1 1/4	3/4	2 3/4	2 1/4	3/4	1 7/8	1 1/4-7	8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

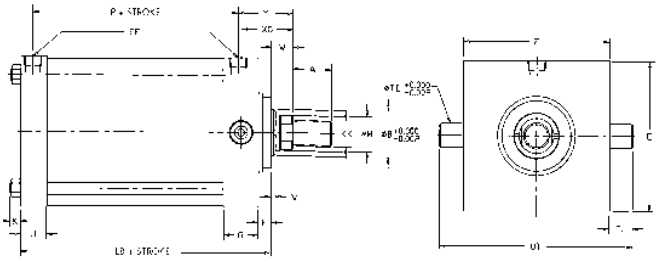


Bore	E	EB	EE(NPT)	EL	EO	ES	ET	F	G	J	K	R	Add LB	Stroke P	Stroke SE
8	8 1/2	11/16	3/4	1 1/8	5/8	2 1/4	2 1/32	3/4	2	1 1/2	9/16	6.44	5 7/8	3 1/4	7 3/8
10	10 5/8	13/16	1	1 5/16	5/8	2 3/4	2 11/16	3/4	2 1/4	2	11/16	7.92	7 1/8	4 1/8	9
12	12 3/4	13/16	1	1 5/16	5/8	3 1/2	3 5/16	3/4	2 1/4	2	11/16	9.40	7 5/8	4 5/8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

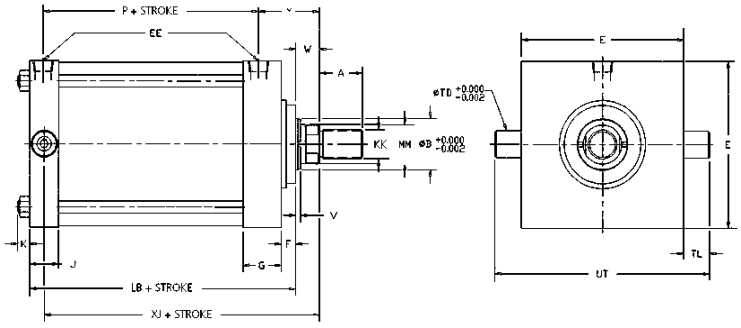
With Head Trunnion

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

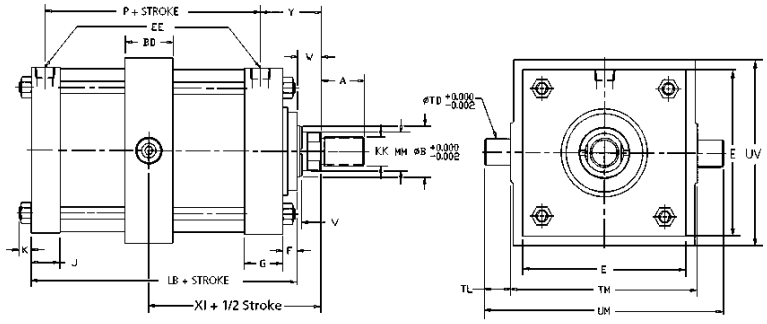


BORE	ROD (MM)	KK SM	A	B	V	W	Y	ADD LB	STROKE P	STROKE XJ
8	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	5 7/8	3 1/4	6
8	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	5 7/8	3 1/4	6 1/4
8	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	5 7/8	3 1/4	6 3/8
8	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 7/16	5 7/8	3 1/4	6 5/8
10	1 3/4	1 1/4-12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

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

MT4 ø8" ~ 14"
WITH CENTER TRUNNION



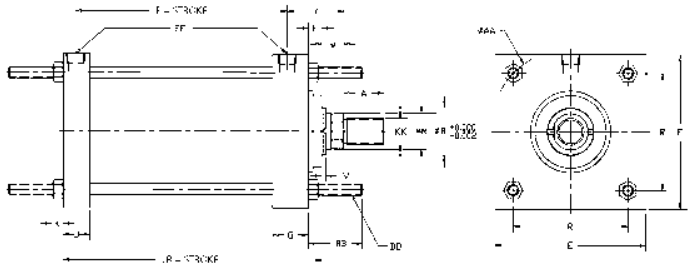
BORE	ROD (MM)	KK SM	A	B	V	W	Y	ADD STROKE/2 XI
8	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16	4.438
8	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16	4.688
8	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16	4.813
8	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 7/16	5.063
10	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/8	5.188
10	2	1 1/2-12	2 1/4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



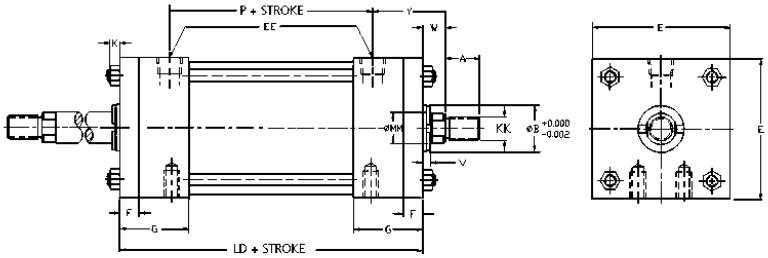
BORE	ROD (MM)	KK SM	A	B	V	W	Y
8	1 3/8	1-14	1 5/8	2	1/4	7/8	2 13/16
8	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/16
8	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 3/16
8	2 1/2	1 7/8-12	3	3.125	1/2	1 1/2	3 7/16
10	1 3/4	1 1/4-12	2	2.375	3/8	1 1/8	3 1/8
10	2	1 1/2-12	2 1/4	2.625	3/8	1 1/4	3 1/4
10	2 1/2	1 7/8-12	3	3.125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

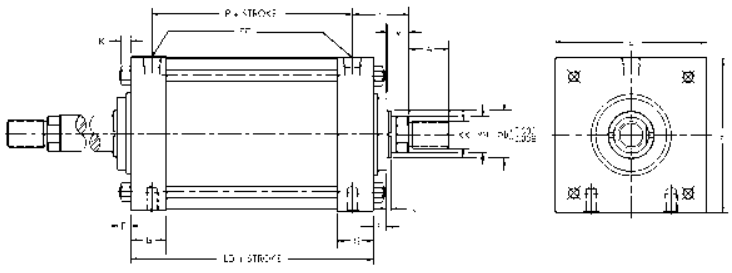
NCA1W ø1.5" ~ 6"
DOUBLE ROD

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.

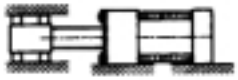
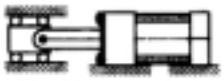
HOW TO USE THIS TABLE

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 100VAC 200VAC	5~20mA 5~25mA 5~12.5mA	Yes
D-A56	4~8VDC	20mA	Yes
D-A59W	24VDC	5~40mA	Yes
D-A64	24VAC/DC 100VAC 200VAC	50mA 25mA 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

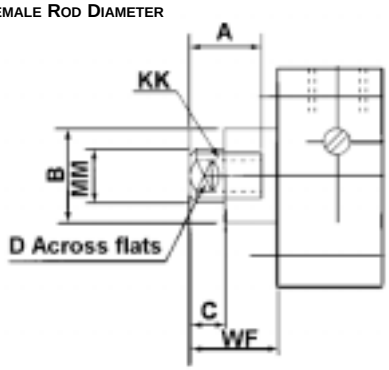
Metric

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 •

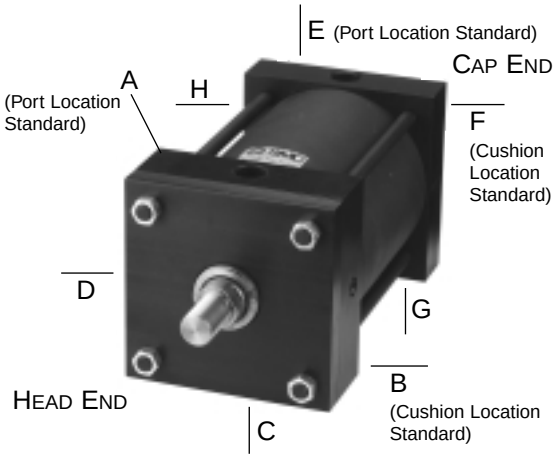
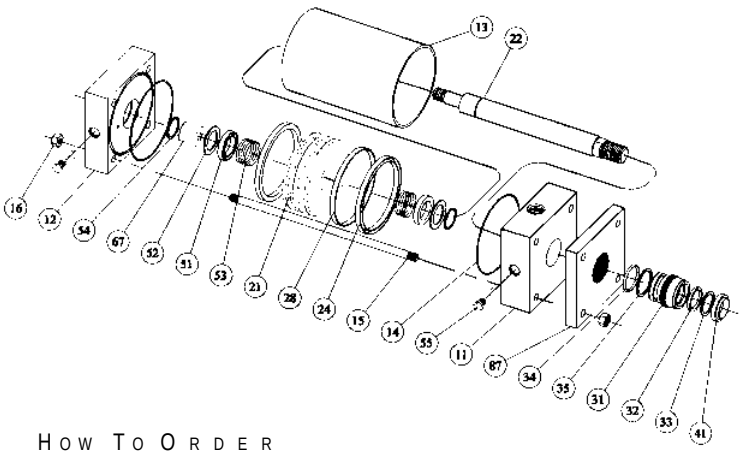


CHART 1

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"

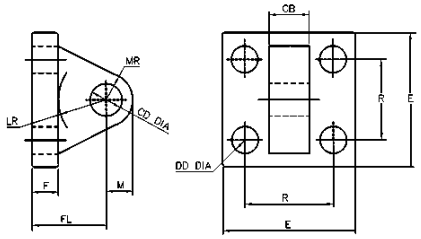
XB6 HIGH TEMPERATURE

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

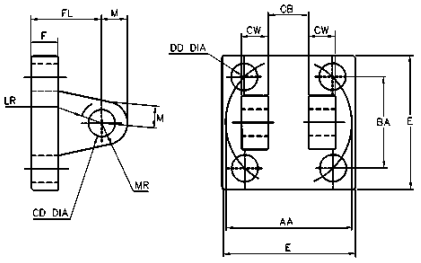
Note) Pivot Pin not included



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

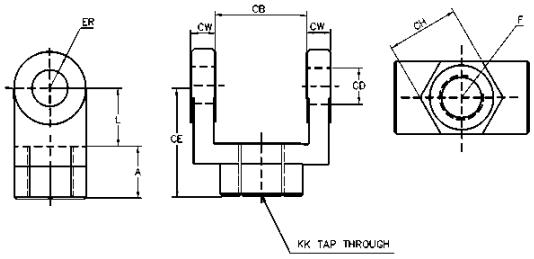
Note) Pivot Pin not included



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

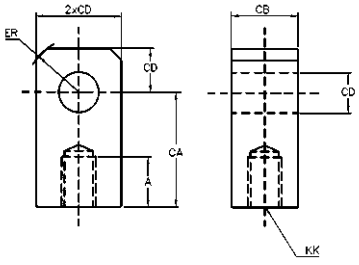
Note) Pivot Pin not included



Order to match Rod Thread

Rod Eyes

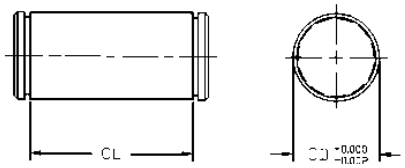
Part No	A	CA	CB	CD	ER	KK
NI-150	3/4	1 1/2	3/4	1/2	5/8	7/16 20
NI-325	1 1/8	2 1/16	1 1/4	3/4	7/8	3/4 -16
NI-800	1 5/8	2 13/16	1 1/2	1	1 3/16	1 -14
NI-1000	2	3 7/16	2	1 3/8	1 9/16	1 1/4 -12
NI-1200	2 1/4	4	2 1/2	1 3/4	2	1 1/2 -12
NI-1400	3	5	2 1/2	2	2 1/2	1 7/8 -12
NI-1401	3 1/2	5 13/16	3	2 1/2	2 13/16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



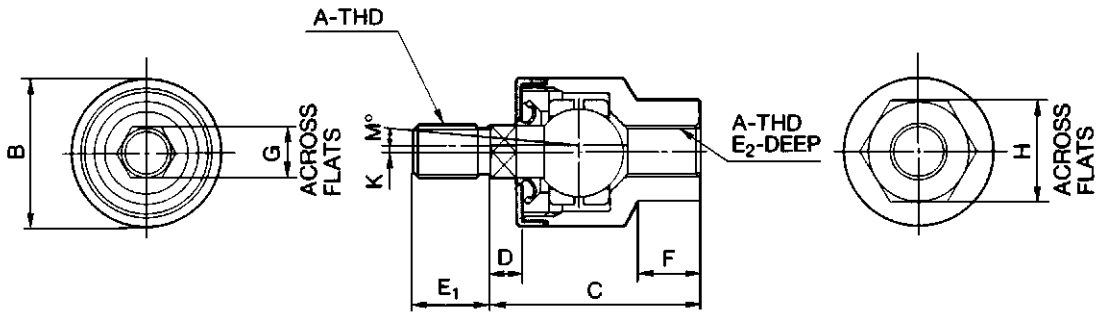
Pivot Pin

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

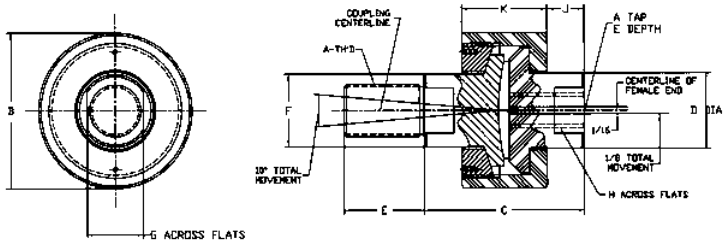
Note) Retainer Rings are included



ALIGNMENT COUPLERS

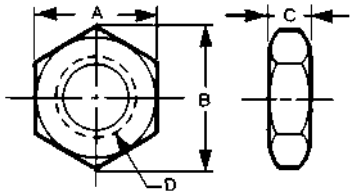


Part No	A	B	C	D	E1	E2	F	G	H	K	M°
NJ-07	7/16-20	1.22	1.83	0.31	0.75	0.75	0.63	0.44	0.75	0.03	5°
NJ-08	1/2-20	1.61	2.11	0.31	0.75	0.75	0.63	0.5	1	0.06	5°
NJ-12	3/4-16	1.97	2.91	0.5	1.13	1.13	0.94	0.81	1.13	0.06	5°



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]*

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