

### 1, 2, 6, 43

#### Heads, Caps, Retainers, Mountings

The heads, retainers, and mountings, are machined from steel. The trunnion head, flanges and foot bracket mounts are bolted. Pivot and clevis mounts on 1 1/8" bore only, also are bolted. Side lugs, centerline lugs, and clevis (except 1 1/8" bore), are welded. Trunnions between heads, front head, and rear head mounts are machined from solid stock. All mounting holes are accurately machined for socket head cap screws.

### 3

#### Piston Rods

Piston Rods are high tensile steel, and hard chrome plated. Rods with piston rod diameters through 4" have a minimum expected yield of 100,000 psi and are case hardened to 50 Rockwell C. Rod diameters of 4 1/2" and larger have an expected yield of 50,000 to 60,000 psi depending on diameter. All rods are hard chrome plated for wear and corrosion resistance. Style 2 rod ends through 2 1/2" rod diameter are high tensile studs.

### 3

#### Cylinder Tubes

Tubes are high tensile aluminum alloy tubing, hard anodized finish. The tube used on 10" and larger bore sizes is honed steel with hard chrome plated I.D. The tubes are mirror finished and sealed with static O-rings placed to completely eliminate extrusion. Fiberglass, brass and stainless steel optional.

### 5

#### Tie Rod Construction

For maximum strength tie rods are made of high tensile steel rods and prestressed to eliminate tube seal extrusion.

### 7

#### Rod Cartridges

Rod cartridges are long wearing and easily maintained. They are made of bearing bronze for long life and low friction. The cartridge is easily removed for replacement or maintenance of rod packing or rod wiper. In most cases the cylinder does not need to be disassembled. Groove provided for ease of removal. Dual purpose O-Ring seals and maintains tension to prevent longitudinal cartridge motion.

### 8

#### Pistons

Pistons are made from fine grain alloy cast iron in a one piece piston design secured with self-locking nut. Piston faces are drilled and grooved and relieved for fast air flow to packings to eliminate blow-by and minimize break away.

### 14

#### Piston Packings

Piston packings are made of standard commercial Buna-N compound, in modified U-Cup shape for low friction. They are self adjusting and long wearing.

### 15, 16, 24, 25

#### Cushions

Cushions are positive sealing. The cushion pistons are hard chrome plated steel. Cushion packings are Buna-N modified U-Cup which gives positive sealing during cushioning and free flow of air for rapid acceleration. No check valve is needed. Adjusting screw is O-Ring sealed with prevailing torque type of locking action.

### 17

#### Rod Packings

Low friction, long life. Rod packings are also made of standard commercial Buna-N compound, with modified U-Cup design that offers minimum friction and long life. It is self-adjusting to wear and pressure.

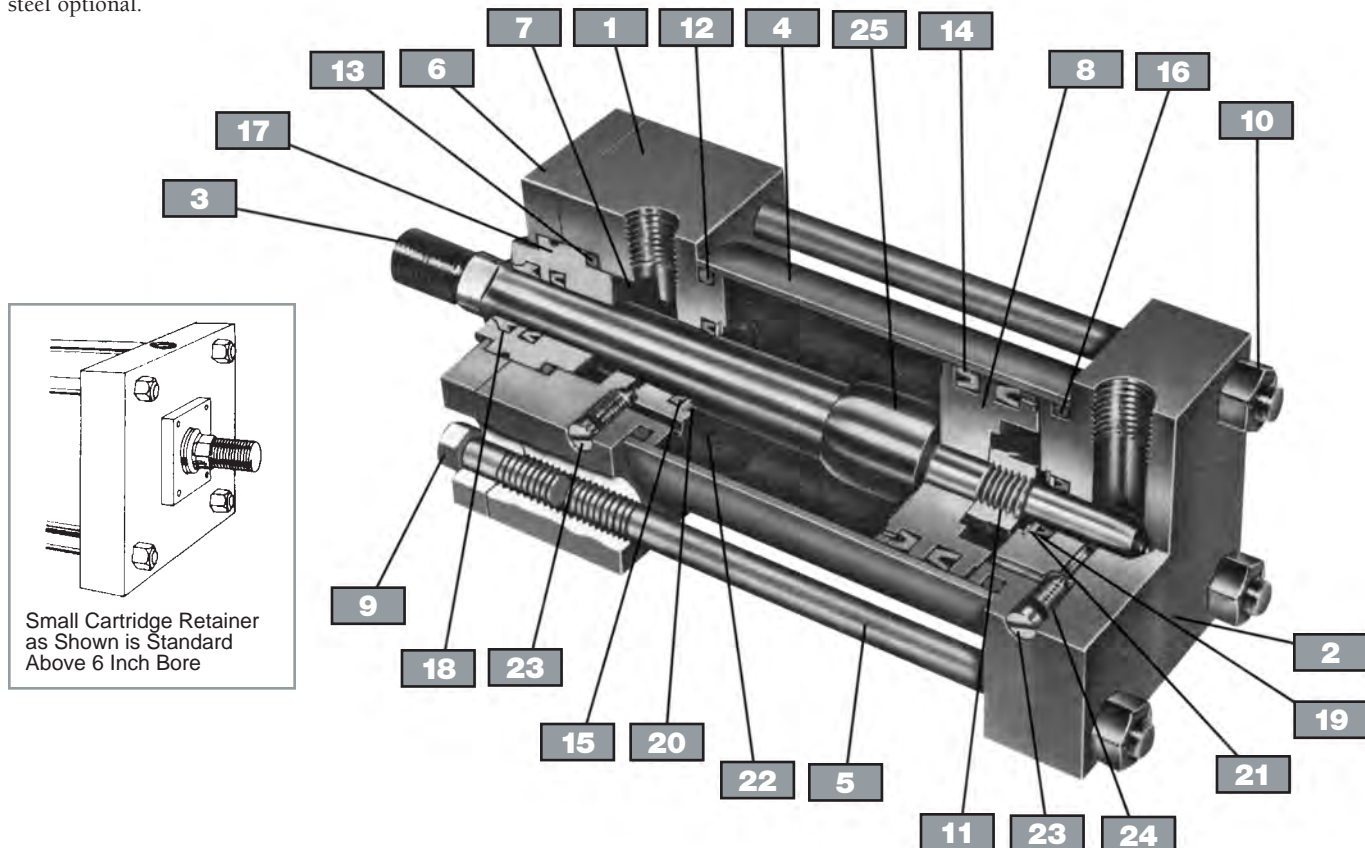
### 18

#### Rod Wipers

Rod wipers are efficient, and long wearing. They are furnished in commercial polyurethane compound as they are designed to wipe piston rod clean and dry in both directions, prevent foreign matter from entering cylinder and insure long life for piston rod, rod bearing and packing under all normal conditions.

### Ports

The ports are amply sized for most applications.



# Parts List

## Parts List

ITEM NUMBER	DESCRIPTION	QUANTITY REQUIRED
1	HEAD	1
2	CAP	1
3	PISTON ROD	1
4	TUBE	1
5	TIE ROD	4
6	CARTRIDGE RETAINER	1
7†	CARTRIDGE BUSHING	1
8	PISTON	1
9	CARTRIDGE RETAINER SCREW	4*
10	TIE ROD NUT	4
11	PISTON ROD NUT	1
12†	TUBE SEAL	2
13†	CARTRIDGE BUSHING O-RING	1
14†	PISTON PACKING	2
15†	CUSHION PACKING - FRONT	1
16†	CUSHION PACKING - REAR	1
17†	ROD PACKING	1
18†	ROD WIPER	1
19	CUSHION PACKING WASHER - REAR	1
20	CUSHION PACKING WASHER - FRONT	1
21	CUSHION PACKING RET. RING - REAR	1
22	CUSHION PACKING RET. RING - FRONT	1
23	CUSHION ADJUSTING SCREW	2
24†	CUSHION ADJUSTING SCREW SEAL	2
25	CUSHION PISTON	1
30	FRONT FLANGE	1
31	FRONT FLANGE SCREW	4
32	FRONT FLANGE EXTRA	1
33	REAR FLANGE	1
34	REAR FLANGE EXTRA	1
35	FOOT BRACKET - FRONT	1
36	FOOT BRACKET - SCREW	2
37	FOOT BRACKET - REAR	1
38	CLEVIS PIN	1
38A	CLEVIS MOUNT BRACKET (1/8" BORE ONLY)	1
43	INTERMEDIATE TRUNNION	1
45	SLEEVE NUT	4
46	SLEEVE NUT LOCK WASHER	4

†Recommended Spare Parts

\*On 7" bore and up with 3" rod diameter and up, 8 cartridge retainer cap screws are used.

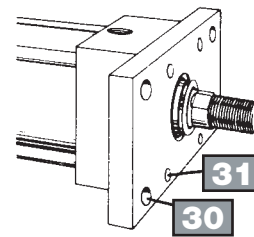
## Tie Rod Torque Chart

BORE	TORQUE IN FOOT POUNDS
1 1/8	8
1 1/2	8
2	15
2 1/2	15
3 1/4	25
4	25
5	50
6	50
7	110
8	110
10	200
12	200
14	300

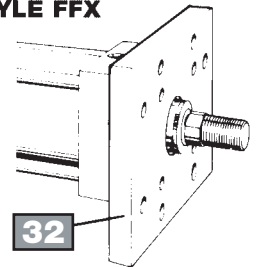
## SPECIFIC MOUNTING PARTS

### FRONT FLANGE MOUNTS

#### STYLE FF

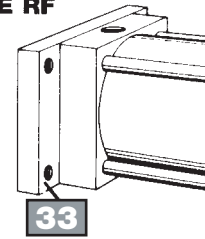


#### STYLE FFX

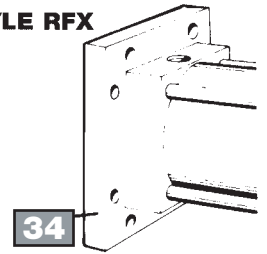


### REAR FLANGE MOUNTS

#### STYLE RF

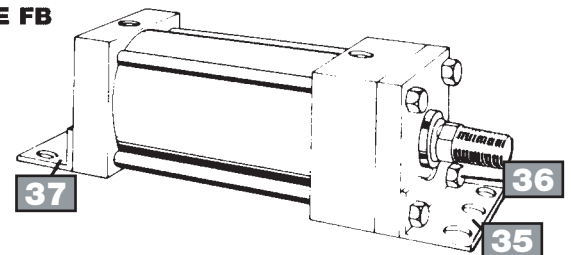


#### STYLE RFX



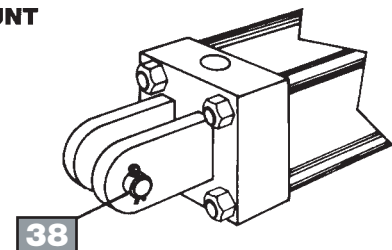
### FOOT BRACKET MOUNT

#### STYLE FB



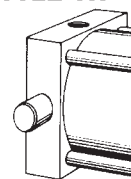
### CLEVIS MOUNT

#### STYLE C

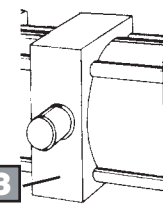


### TRUNNION MOUNTS

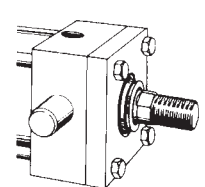
#### STYLE TR



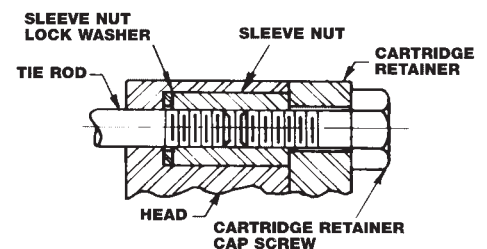
#### STYLE T



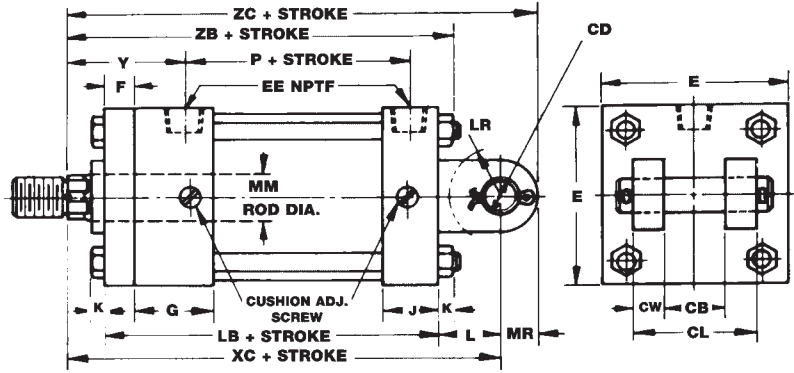
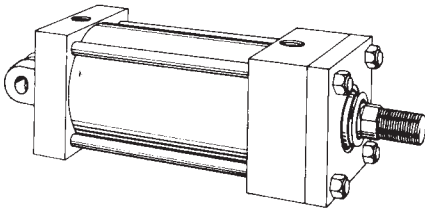
#### STYLE TF



### SLEEVE NUT CONSTRUCTION



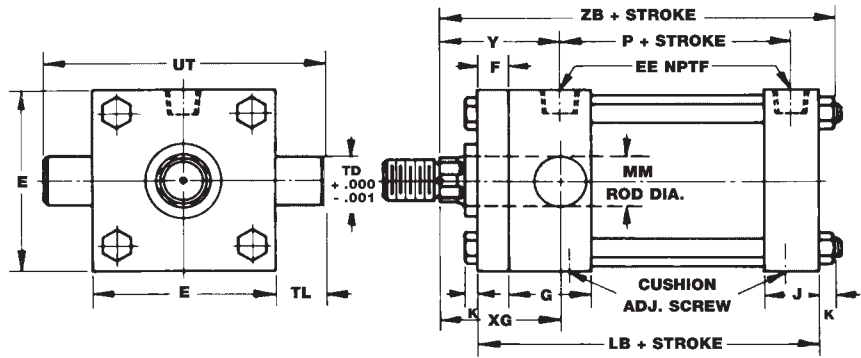
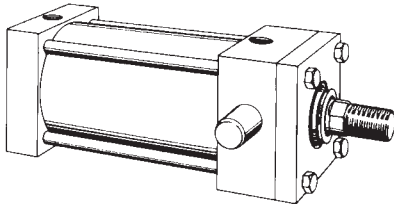
## CLEVIS MOUNT STYLE C (MP1)\*



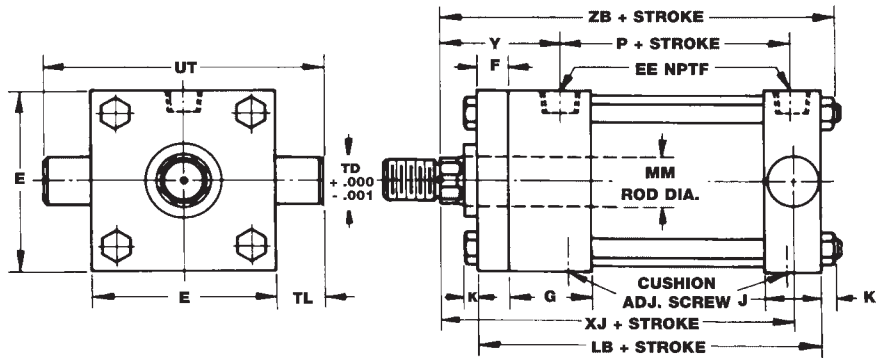
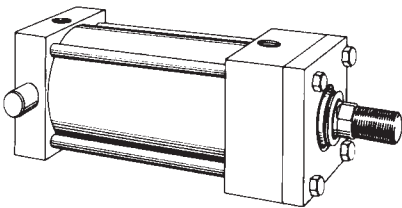
TIE ROD NUTS ON ROD END -  $1/8"$  AND  $1/2"$  BORE  
 $1/8"$  IS DETACHABLE CLEVIS

PIVOT MOUNT IS AVAILABLE  
PIVOT WIDTH IS SAME AS  $CB$ .

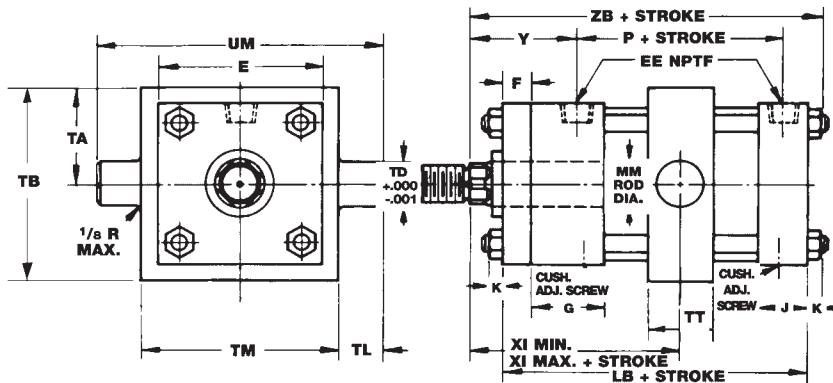
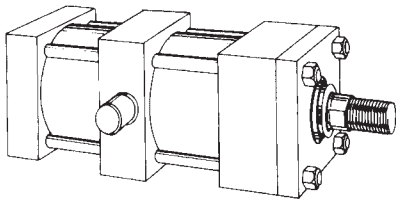
## TRUNNION FRONT MOUNT STYLE TF (MT1)\*



## TRUNNION REAR MOUNT STYLE TR (MT2)\*



## TRUNNION MOUNT STYLE T (MT4)\*



(Intermediate-Between Heads)  
Position not adjustable.

\*Number in parenthesis ( ) is ANSI Standard No. B93.1-64 Mounting Style Designation.

## Clevis and Trunnion Mounting Cylinder Dimensions

BORE	1 1/8	1 1/2	2	2 1/2	3 1/4	4	5	6
CB	5/8	3/4	3/4	3/4	1 1/4	1 1/4	1 1/4	1 1/2
CD	3/8	1/2	1/2	1/2	3/4	3/4	3/4	1
CL	1 1/4	1 3/4	1 3/4	1 3/4	2 1/2	2 1/2	2 1/2	3
CW	5/16	1/2	1/2	1/2	5/8	5/8	5/8	3/4
E	1 3/4	2	2 1/2	3	3 3/4	4 1/2	5 1/2	6 1/2
EE NPTF	1/4	3/8	3/8	3/8	1/2	1/2	1/2	3/4
F	3/8	3/8	3/8	3/8	5/8	5/8	5/8	3/4
G	1 3/32	1 15/32	1 3/8	1 3/8	1 5/8	1 5/8	1 5/8	1 7/8
J	27/32	31/32	7/8	7/8	1 1/8	1 1/8	1 1/8	1 3/8
K	7/32	7/32	1/4	1/4	5/16	5/16	7/16	7/16
L	15/16	3/4	3/4	3/4	1 1/4	1 1/4	1 1/4	1 1/2
LR	7/16	1/2	1/2	1/2	3/4	3/4	3/4	1
MM	1/2	5/8	5/8	5/8	1	1	1	1 3/8
MR	3/8	1/2	1/2	1/2	3/4	3/4	3/4	1
TA	7/8	1 1/4	1 1/2	1 3/4	2 1/4	2 1/2	3	3 5/8
TB	1 3/4	2 1/2	3	3 1/2	4 1/2	5	6	7 1/4
TD	3/4	1	1	1	1	1	1	1 3/8
TL	3/4	1	1	1	1	1	1	1 3/8
TM	1 3/4	2 1/2	3	3 1/2	4 1/2	5 1/4	6 1/4	7 5/8
TT	1	1 1/2	1 1/2	1 1/2	1 3/4	2	2	2 1/2
UM	3 1/4	4 1/2	5	5 1/2	6 1/2	7 1/4	8 1/4	10 3/8
UT	3 1/4	4	4 1/2	5	5 3/4	6 1/2	7 1/2	9 1/4

## Mounting Information

Clevis Mount Cylinders are furnished with a hard chrome plated clevis pin and retainers. For a complete line of accessories (rod eyes, rod clevises, clevis and pivot mounting brackets, jam nuts, and pins) designed for use with CylindersNow cylinders, see separate Accessories Brochure. All clevis and trunnion cylinders need provision on both ends for pivoting in one direction. Alignment in the other direction is essential in order to avoid excessive side loading. Where two-direction pivoting is necessary, contact our Distributor for specific recommendations.

Trunnion Pins on trunnion mount cylinders are designed for shear loads only, not bending loads. Customer trunnion pin pillow blocks should be rigid and mounted as close to the head as possible. Bearing should be provided for the full length of the trunnion pin. Lubrication should be provided to the pins. Trunnion pins are an integral part of the ring on the intermediate trunnion mount. Mounting position (Dimension XI) of the intermediate trunnion must be given on order.

## These Dimensions\*\* Affected By Rod Size

BORE	1 1/8	1 1/2	2	2 1/2	3 1/4	4	5	6
XG	1 23/32	1 15/16	1 15/16	1 15/16	2 7/16	2 7/16	2 7/16	2 13/16
Y	1 23/32	1 15/16	1 15/16	1 15/16	2 7/16	2 7/16	2 7/16	2 13/16

## These Dimensions\*\* Affected By Rod Size and Stroke

BORE	1 1/8	1 1/2	2	2 1/2	3 1/4	4	5	6
XC	5 5/16	5 3/8	5 3/8	5 1/2	6 7/8	6 7/8	7 1/8	8 1/8
XI (MIN)	2 19/32	3 7/32	3 1/8	3 1/8	3 7/8	4	4	4 3/4
XI (MAX)	3 1/32	2 29/32	3	3 1/8	3 5/8	3 1/2	3 3/4	4
XJ	3 29/32	4 3/16	4 3/16	4 5/16	5 1/16	5 1/16	5 5/16	5 15/16
ZB	4 19/32	4 27/32	4 7/8	5	5 15/16	5 15/16	6 5/16	7 1/16
ZC	5 11/16	5 7/8	5 7/8	6	7 5/8	7 5/8	7 7/8	9 1/8

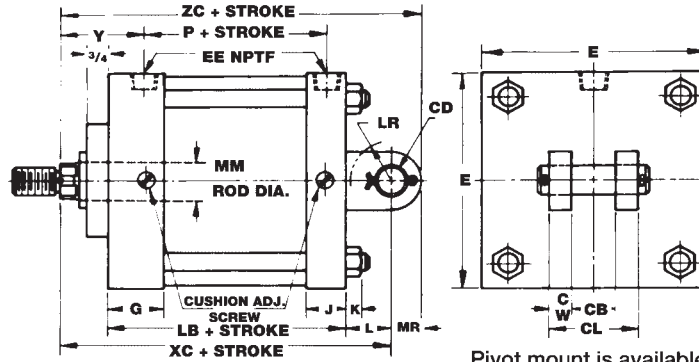
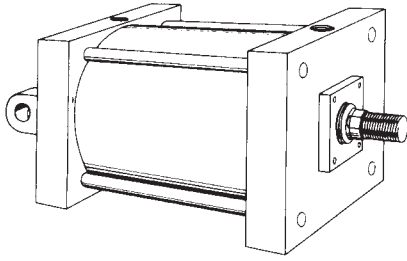
## These Dimensions Affected By Stroke

BORE	1 1/8	1 1/2	2	2 1/2	3 1/4	4	5	6
LB	3 3/4	4	4	4 1/8	4 7/8	4 7/8	5 1/8	5 3/4
P	2 3/16	2 1/4	2 1/4	2 3/8	2 5/8	2 5/8	2 7/8	3 1/8

For rod end information see Pages A-17 and A-18

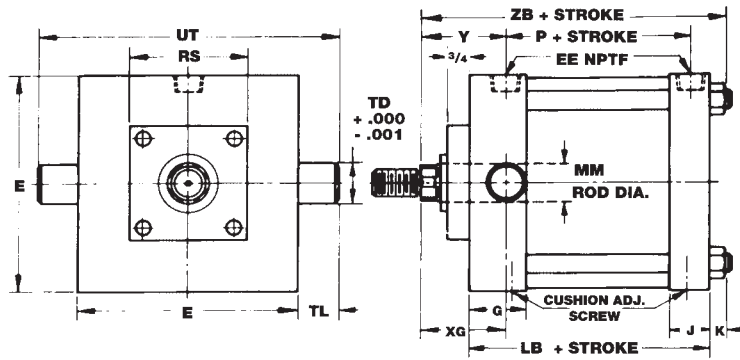
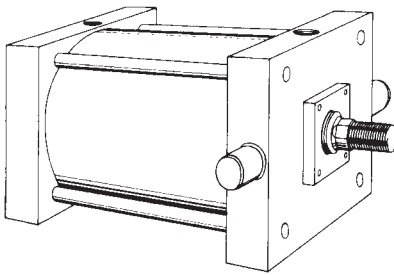
\*\*Dimensions shown are for standard rod size only. For oversize and 2:1 rods, add N dimension shown on rod end chart, Page A-17.

### CLEVIS MOUNT STYLE C (MP1)\*

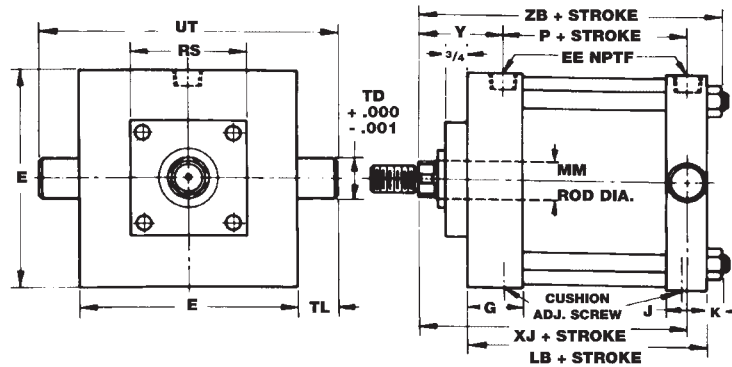
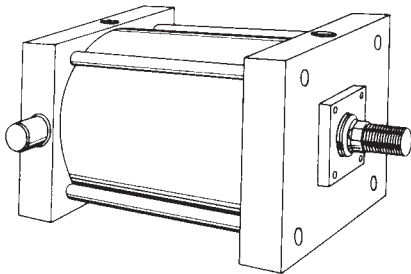


Pivot mount is available.  
Pivot width is same as CB.

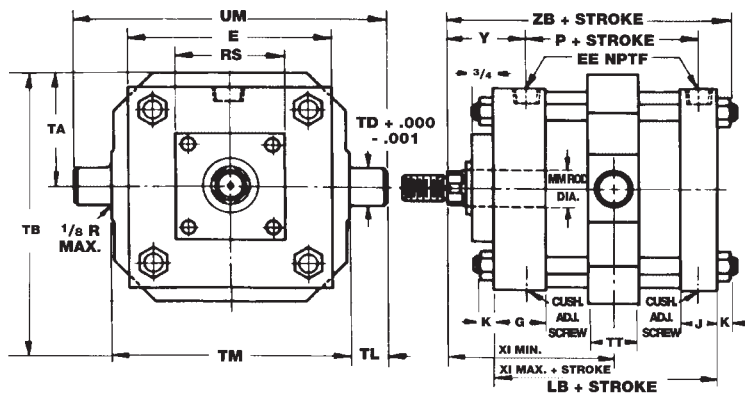
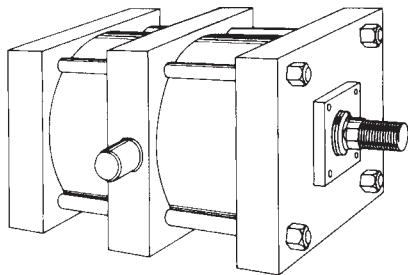
### TRUNNION FRONT MOUNT STYLE TF (MT1)\*



### TRUNNION REAR MOUNT STYLE TR (MT2)\*



### TRUNNION MOUNT STYLE T (MT4)\*



(Intermediate-Between Heads)  
Position not adjustable.

\*Number in parenthesis ( ) is ANSI Standard No. B93.1-64 Mounting Style Designation.

## Clevis and Trunnion Mounting Cylinder Dimensions

BORE	7	8	10	12	14
CB	1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	2	2 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>
CD	1	1	1 <sup>3</sup> / <sub>8</sub>	1 <sup>3</sup> / <sub>4</sub>	2
CL	3	3	4	5	5
CW	3/4	3/4	1	1 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>4</sub>
E	7 <sup>1</sup> / <sub>2</sub>	8 <sup>1</sup> / <sub>2</sub>	10 <sup>5</sup> / <sub>8</sub>	12 <sup>3</sup> / <sub>4</sub>	14 <sup>3</sup> / <sub>4</sub>
EE NPTF	3/4	3/4	1	1	1 <sup>1</sup> / <sub>4</sub>
G	1 <sup>7</sup> / <sub>8</sub>	1 <sup>7</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>8</sub>	2 <sup>3</sup> / <sub>16</sub>	2 <sup>7</sup> / <sub>8</sub>
J	1 <sup>3</sup> / <sub>8</sub>	1 <sup>3</sup> / <sub>8</sub>	1 <sup>7</sup> / <sub>8</sub>	1 <sup>15</sup> / <sub>16</sub>	2 <sup>3</sup> / <sub>8</sub>
K	9/16	9/16	5/8	5/8	3/4
L	1 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>4</sub>	2 <sup>1</sup> / <sub>2</sub>
LR	1	1	1 <sup>3</sup> / <sub>8</sub>	1 <sup>3</sup> / <sub>4</sub>	2
MM	1 <sup>3</sup> / <sub>8</sub>	1 <sup>3</sup> / <sub>8</sub>	1 <sup>3</sup> / <sub>4</sub>	2	2 <sup>1</sup> / <sub>2</sub>
MR	1	1	1 <sup>3</sup> / <sub>8</sub>	1 <sup>3</sup> / <sub>4</sub>	2
RS†	4	4	4	4	4
TA	4 <sup>1</sup> / <sub>4</sub>	4 <sup>3</sup> / <sub>4</sub>	5 <sup>7</sup> / <sub>8</sub>	6 <sup>7</sup> / <sub>8</sub>	8
TB	8 <sup>1</sup> / <sub>2</sub>	9 <sup>1</sup> / <sub>2</sub>	11 <sup>3</sup> / <sub>4</sub>	13 <sup>3</sup> / <sub>4</sub>	16
TD	1 <sup>3</sup> / <sub>8</sub>	1 <sup>3</sup> / <sub>8</sub>	1 <sup>3</sup> / <sub>4</sub>	1 <sup>3</sup> / <sub>4</sub>	2
TL	1 <sup>3</sup> / <sub>8</sub>	1 <sup>3</sup> / <sub>8</sub>	1 <sup>3</sup> / <sub>4</sub>	1 <sup>3</sup> / <sub>4</sub>	2
TM	8 <sup>3</sup> / <sub>4</sub>	9 <sup>3</sup> / <sub>4</sub>	12	14	16 <sup>1</sup> / <sub>4</sub>
TT	2 <sup>1</sup> / <sub>2</sub>	2 <sup>1</sup> / <sub>2</sub>	3	3	3 <sup>1</sup> / <sub>2</sub>
UM	11 <sup>1</sup> / <sub>2</sub>	12 <sup>1</sup> / <sub>2</sub>	15 <sup>1</sup> / <sub>2</sub>	17 <sup>1</sup> / <sub>2</sub>	20 <sup>1</sup> / <sub>4</sub>
UT	10 <sup>1</sup> / <sub>4</sub>	11 <sup>1</sup> / <sub>4</sub>	14 <sup>1</sup> / <sub>8</sub>	16 <sup>1</sup> / <sub>4</sub>	18 <sup>3</sup> / <sub>4</sub>

### These Dimensions\*\* Affected By Rod Size

BORE	7	8	10	12	14
XG	2 <sup>13</sup> / <sub>16</sub>	2 <sup>13</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>4</sub>	3 <sup>13</sup> / <sub>16</sub>
Y	2 <sup>13</sup> / <sub>16</sub>	2 <sup>13</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>4</sub>	3 <sup>13</sup> / <sub>16</sub>

### These Dimensions\*\* Affected By Rod Size and Stroke

BORE	7	8	10	12	14
XC	8 <sup>1</sup> / <sub>4</sub>	8 <sup>1</sup> / <sub>4</sub>	10 <sup>3</sup> / <sub>8</sub>	11 <sup>1</sup> / <sub>8</sub>	12 <sup>7</sup> / <sub>8</sub>
XI(MIN)	4 <sup>3</sup> / <sub>4</sub>	4 <sup>3</sup> / <sub>4</sub>	5 <sup>1</sup> / <sub>2</sub>	5 <sup>11</sup> / <sub>16</sub>	6 <sup>5</sup> / <sub>8</sub>
XI(MAX)*	4 <sup>1</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>8</sub>	4 <sup>7</sup> / <sub>8</sub>	5 <sup>7</sup> / <sub>16</sub>	6 <sup>1</sup> / <sub>2</sub>
XJ	6 <sup>1</sup> / <sub>16</sub>	6 <sup>1</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>4</sub>	7 <sup>7</sup> / <sub>8</sub>	9 <sup>5</sup> / <sub>16</sub>
ZB	7 <sup>5</sup> / <sub>16</sub>	7 <sup>5</sup> / <sub>16</sub>	8 <sup>7</sup> / <sub>8</sub>	9 <sup>1</sup> / <sub>2</sub>	11 <sup>1</sup> / <sub>8</sub>
ZC	9 <sup>1</sup> / <sub>4</sub>	9 <sup>1</sup> / <sub>4</sub>	11 <sup>3</sup> / <sub>4</sub>	12 <sup>7</sup> / <sub>8</sub>	14 <sup>7</sup> / <sub>8</sub>

### These Dimensions Affected By Stroke

BORE	7	8	10	12	14
LB	5 <sup>1</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>8</sub>	6 <sup>3</sup> / <sub>8</sub>	6 <sup>7</sup> / <sub>8</sub>	8 <sup>1</sup> / <sub>8</sub>
P	3 <sup>1</sup> / <sub>4</sub>	3 <sup>1</sup> / <sub>4</sub>	4 <sup>1</sup> / <sub>8</sub>	4 <sup>5</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>2</sub>

For oversize rods, see Page A-17.

†These dimensions are for standard rod only.

\*+Stroke

\*\*Dimensions shown are for standard rod size only. For oversize and 2:1 rods, add N dimension shown on rod end chart, Page A-17.

## Mounting Information

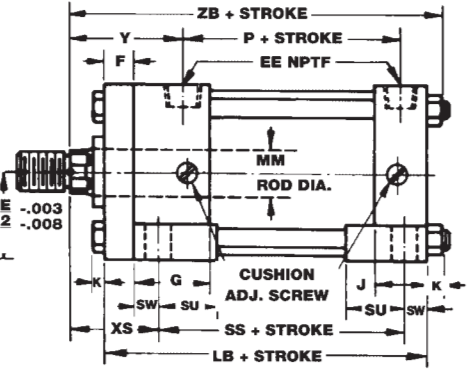
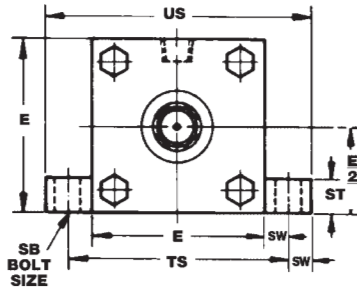
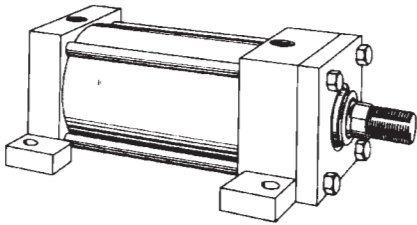
Clevis Mount Cylinders are furnished with a hard chrome plate clevis pin and retainers. For a complete line of accessories (rod eyes, rod clevises, clevis and pivot mounting brackets, jam nuts, and pin) designed for use with CylindersNow cylinders, see separate Accessories Brochure.

All Clevis and Trunnion cylinders need provision on both ends for pivoting in one direction. Alignment in the other direction is essential in order to avoid excessive side loading. Where two-direction pivoting is necessary, contact our Distributor for specific recommendations.

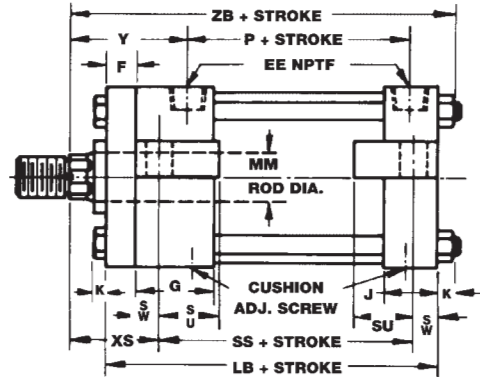
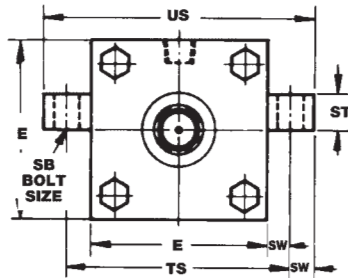
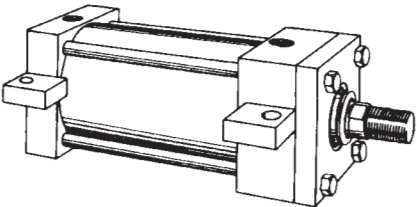
Trunnion Pins on trunnion mount cylinders are designed for shear loads only, not bending loads. Customer trunnion pin pillow blocks should be rigid and mounted as close to the head as possible. Bearing should be provided for the full length of the trunnion pin. Lubrication should be provided to the pins. Trunnion pins are an integral part of the ring on the intermediate trunnion mount. Mounting position (Dimension XI) of the intermediate trunnion must be given on order.



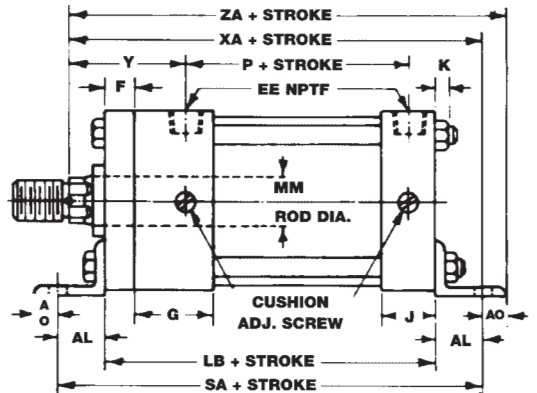
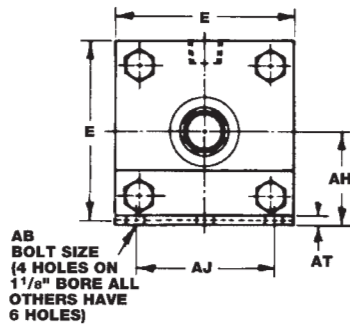
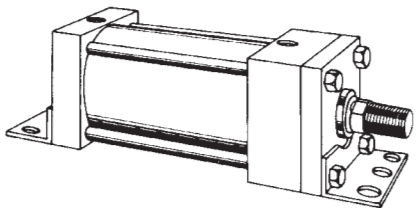
**SIDE LUG MOUNT  
STYLE SL (MS2)\***



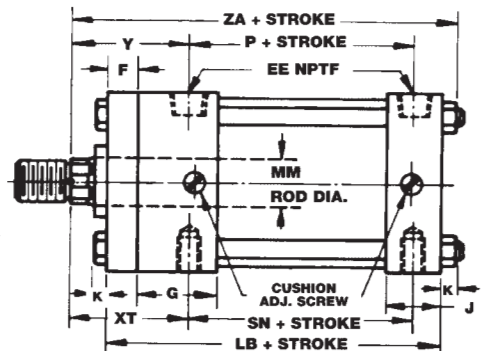
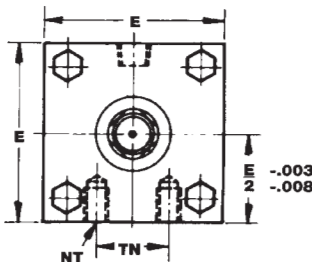
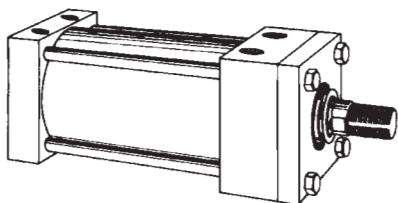
**CENTER LINE LUG MOUNT  
STYLE CL (MS3)\***



**FOOT BRACKET MOUNT  
STYLE FB (MS1)\***



**SIDE FLUSH MOUNT  
STYLE SF (MS4)\***



\*Number in parenthesis ( ) is ANSI Standard No. B93.1-64 Mounting Style Designation.

## Side Flush and Lug Mounting Cylinder Dimensions

BORE	1 1/8	1 1/2	2	2 1/2	3 1/4	4	5	6
AB*	5/16	3/8	3/8	3/8	1/2	1/2	5/8	3/4
AH	1 1/16	1 3/16	1 7/16	1 5/8	1 15/16	2 1/4	2 3/4	3 1/4
AJ	1 1/8	1 1/4	1 3/4	2 1/4	2 3/4	3 1/2	4 1/4	5 1/4
AL	1	1	1	1	1 1/4	1 1/4	1 3/8	1 3/8
AO	3/8	3/8	3/8	3/8	1/2	1/2	5/8	5/8
AT	1/8	1/8	1/8	1/8	1/8	1/8	3/16	3/16
E	1 3/4	2	2 1/2	3	3 3/4	4 1/2	5 1/2	6 1/2
EE NPTF	1/4	3/8	3/8	3/8	1/2	1/2	1/2	3/4
F	3/8	3/8	3/8	3/8	5/8	5/8	5/8	3/4
G	1 3/32	1 15/32	1 3/8	1 3/8	1 5/8	1 5/8	1 5/8	1 7/8
J	2 7/32	3 1/32	7/8	7/8	1 1/8	1 1/8	1 1/8	1 3/8
K	7/32	7/32	1/4	1/4	5/16	5/16	7/16	7/16
MM	1/2	5/8	5/8	5/8	1	1	1	1 3/8
NT	5/16-18	1/4-20	5/16-18	3/8-16	1/2-13	1/2-13	5/8-11	3/4-10
SB*	5/16	3/8	3/8	3/8	1/2	1/2	3/4	3/4
ST	1/2	1/2	1/2	1/2	3/4	3/4	1	1
SU	1 5/16	1 5/16	1 5/16	1 5/16	1 1/4	1 1/4	1 9/16	1 9/16
SW	3/8	3/8	3/8	3/8	1/2	1/2	1 1/16	1 1/16
TN	†	5/8	7/8	1 1/4	1 1/2	2 1/16	2 11/16	3 1/4
TS	2 1/2	2 3/4	3 1/4	3 3/4	4 3/4	5 1/2	6 7/8	7 7/8
US	3 1/4	3 1/2	4	4 1/2	5 3/4	6 1/2	8 1/4	9 1/4

## Mounting Information

Side Mounted Cylinders (styles SL, CL, FB, SF) used under shock conditions or at high pressure ranges, should be doweled or keyed to the machine. Cylinders should be pinned or keyed on one end only (especially important on long strokes) due to deflection that takes place under load.

Lugs on styles SL and CL are sized to allow pinning thru the lug. On style FB two pins and one bold can be used on one end to take the thrust. On style SF keys should be welded (or bolted and pinned) to the machine member to take the thrust.

Intermediate Supports are very important for the long stroke cylinders (order 72") and are available at a nominal charge. Consult our Distributor for recommendations.

## These Dimensions\*\* Affected By Rod Size

BORE	1 1/8	1 1/2	2	2 1/2	3 1/4	4	5	6
XS	1 3/8	1 3/8	1 3/8	1 3/8	1 7/8	1 7/8	2 1/16	2 5/16
XT	1 25/32	1 15/16	1 15/16	1 15/16	2 7/16	2 7/16	2 7/16	2 13/16
Y	1 25/32	1 15/16	1 15/16	1 15/16	2 7/16	2 7/16	2 7/16	2 13/16

## These Dimensions\*\* Affected By Rod Size and Stroke

BORE	1 1/8	1 1/2	2	2 1/2	3 1/4	4	5	6
XA	5 3/8	5 5/8	5 5/8	5 3/4	6 7/8	6 7/8	7 1/4	8
ZA	5 3/4	6	6	6 1/8	7 3/8	7 3/8	7 7/8	8 5/8
ZB	4 19/32	4 27/32	4 7/8	5	5 15/16	5 15/16	6 5/16	7 1/16

## These Dimensions Affected By Stroke

BORE	1 1/8	1 1/2	2	2 1/2	3 1/4	4	5	6
LB	3 3/4	4	4	4 1/8	4 7/8	4 7/8	5 1/8	5 3/4
P	2 3/16	2 1/4	2 1/4	2 3/8	2 5/8	2 5/8	2 7/8	3 1/8
SA	5 3/4	6	6	6 1/8	7 3/8	7 3/8	7 7/8	8 1/2
SN	2 1/16	2 1/4	2 1/4	2 3/8	2 5/8	2 5/8	2 7/8	3 1/8
SS	2 5/8	2 7/8	2 7/8	3	3 1/4	3 1/4	3 1/8	3 5/8

For rod end information see Pages A-17 and A-18.

\*Clearance hole for indicated bolt size.

\*\*Dimensions shown are for standard rod size only. For oversize and 2:1 rods, add N dimension shown on rod end chart, Page A-17.

†One mounting hold on center line.

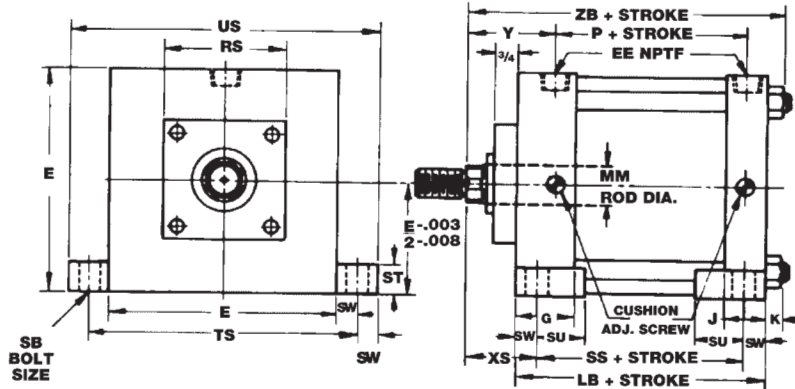
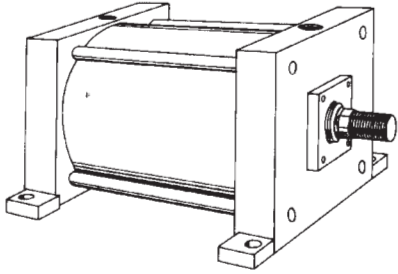
## Thread Depth and Side Flush Mounting Availability

BORE	ROD DIAMETER	THREAD DEPTH
1 1/8	1/2	3/8
	5/8	3/8
1 1/2	1	5/16
	5/8, 1, 1 3/8	7/16
2	5/8, 1, 1 3/8	5/8
	1 3/4	7/16
2 1/2	1, 1 3/8, 1 3/4	3/4
	2	1/2
3 1/4	1, 1 3/8, 1 3/4, 2	3/4
	2 1/2	1 1/16
4	1, 1 3/8, 1 3/4, 2, 2 1/2	1 1/4
	3	15/16
5	3 1/2	3/4
	1 3/8, 1 3/4, 2, 2 1/2, 3, 3 1/2	1 1/8
6	4	1

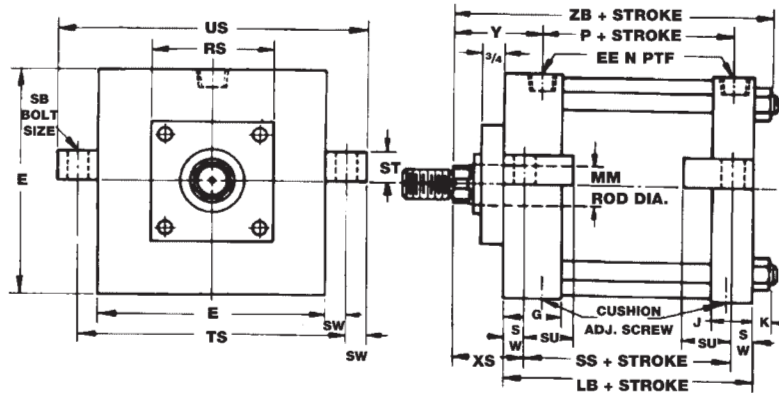
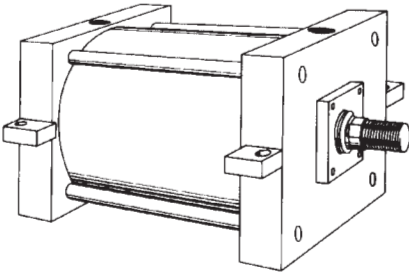
Note: Side flush mounting is available with usable thread depths shown above.



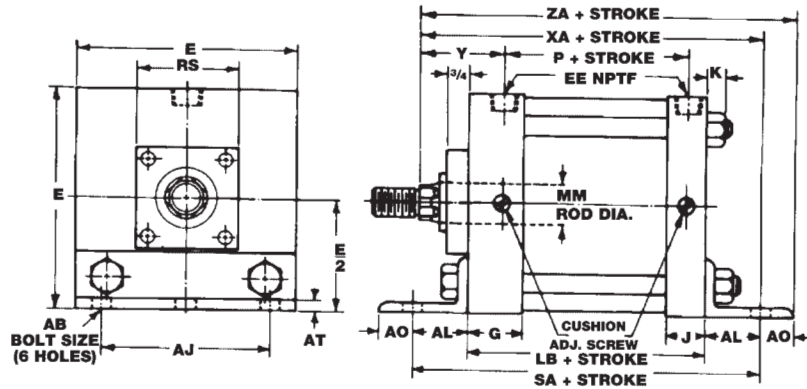
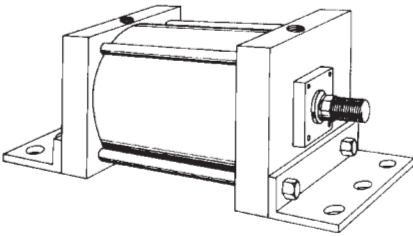
**SIDE LUG MOUNT  
STYLE SL (MS2)\***



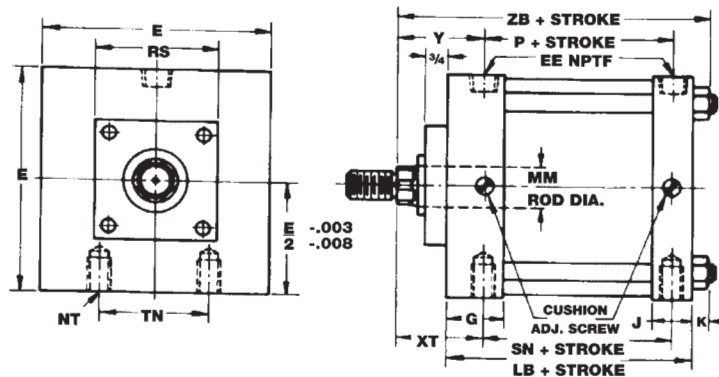
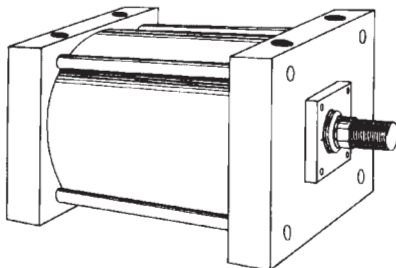
**CENTER LINE LUG MOUNT  
STYLE CL (MS3)\***



**FOOT BRACKET MOUNT  
STYLE FB (MS1)\***



**SIDE FLUSH MOUNT  
STYLE SF (MS4)\***



\*Number in parenthesis ( ) is ANSI Standard No. B93.1-64 Mounting Style Designation.

## Side Flush and Lug Mounting Cylinders

BORE	7	8	10	12	14
AB*	3/4	3/4	1	1	1 1/4
AJ	6 1/8	7 1/8	8 7/8	11	12 5/8
AL	1 13/16	1 13/16	2 1/8	2 1/8	2 7/16
AO	1 1/16	1 1/16	7/8	7/8	1 1/16
AT	1/4	1/4	1/4	3/8	3/8
E	7 1/2	8 1/2	10 5/8	12 3/4	14 3/4
EE NPTF	3/4	3/4	1	1	1 1/4
G	1 7/8	1 7/8	2 1/8	2 3/16	2 7/8
J	1 3/8	1 3/8	1 7/8	1 15/16	2 3/8
K	9/16	9/16	5/8	5/8	3/4
MM	1 3/8	1 3/8	1 3/4	2	2 1/2
NT	3/4-10	3/4-10	1-8	1-8	1 1/4-7
RS†	4	4	4	4	4
SB*	3/4	3/4	1	1	1 1/4
ST	1	1	1 1/4	1 1/4	1 1/2
SU	1 9/16	1 9/16	2	2	2 1/2
SW	1 1/16	1 1/16	7/8	7/8	1 1/8
TN	3 1/2	4 1/2	5 1/2	7 1/4	8 3/8
TS	8 7/8	9 7/8	12 3/8	14 1/2	17
US	10 1/4	11 1/4	14 1/8	16 1/4	19 1/4

### Mounting Information

Side Mounted Cylinders (styles SL, CL, FB, SF) used under shock conditions or at high pressure ranges, should be doweled or keyed to the machine. Cylinders should be pinned or keyed on one end only (especially important on long strokes) due to deflection that takes place under load.

Lugs on styles SL and CL are sized to allow pinning thru the lug. On style FB two pins and one bolt can be used on one end to take the thrust. On style SF keys should be welded (or bolted and pinned) to the machine member to take the thrust.

Intermediate Supports are very important for long stroke cylinders (over 72") and are available at a nominal charge. Consult our Distributor for recommendations.

### These Dimensions\*\* Affected By Rod Size

BORE	7	8	10	12	14
XS	2 5/16	2 5/16	2 3/4	2 7/8	3 3/8
XT	2 13/16	2 13/16	3 1/8	3 1/4	3 13/16
Y	2 13/16	2 13/16	3 1/8	3 1/4	3 13/16

### These Dimensions\*\* Affected By Rod Size and Stroke

BORE	7	8	10	12	14
XA	8 9/16	8 9/16	10 3/8	11	12 13/16
ZA	9 1/4	9 1/4	11 1/4	11 7/8	13 7/8
ZB	7 5/16	7 5/16	8 7/8	9 1/2	11 1/8

### These Dimensions Affected By Stroke

BORE	7	8	10	12	14
LB	5 1/8	5 1/8	6 3/8	6 7/8	8 1/8
P	3 1/4	3 1/4	4 1/8	4 5/8	5 1/2
SA	8 3/4	8 3/4	10 5/8	11 1/8	13
SN	3 1/4	3 1/4	4 1/8	4 5/8	5 1/2
SS	3 3/4	3 3/4	4 5/8	5 1/8	5 7/8

For rod end information see Pages A-17 and A-18.

\*Clearance hole for indicated bolt size.

\*\*Dimensions shown are for standard rod size only. For oversize and 2:1 rods, add N dimension shown on rod end chart, Page A-17.

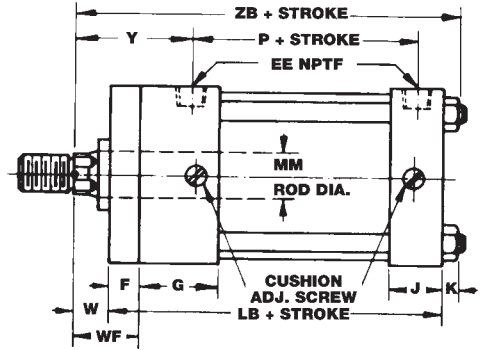
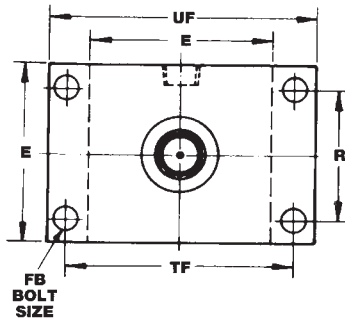
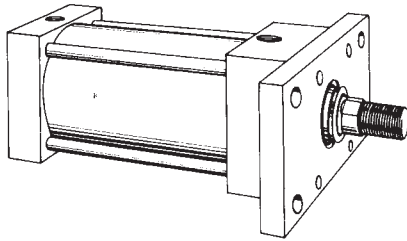
†These dimensions are for standard rod only.

### Thread Depth and Side Flush Mounting Availability

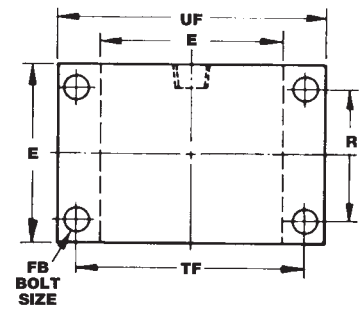
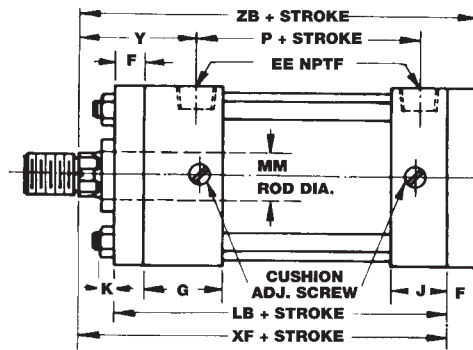
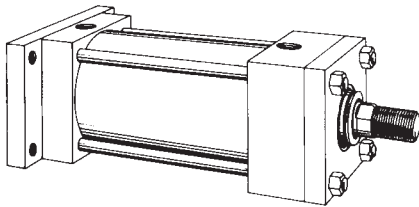
BORE	ROD DIAMETER	THREAD DEPTH
7	1 3/8, 1 3/4, 2, 2 1/2, 3, 3 1/2, 4, 4 1/2	1 1/8
	5	1
8	ALL ROD SIZES	1 1/8
10	ALL ROD SIZES	1 1/2
12	ALL ROD SIZES	1 1/2
14	ALL ROD SIZES	1 7/8

Note: Side flush mounting is available with usable thread depths shown above.

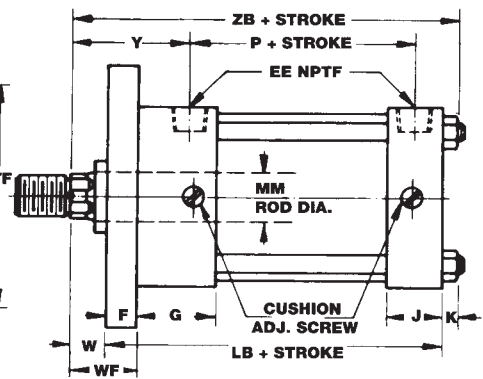
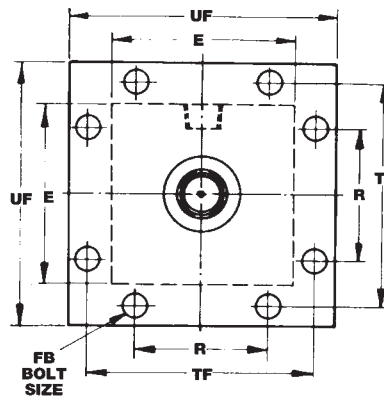
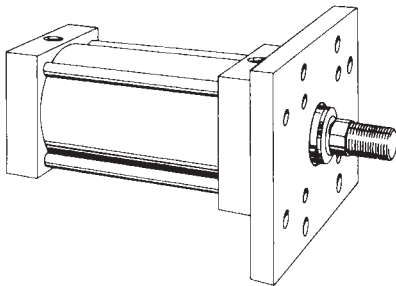
### FRONT FLANGE MOUNT STYLE FF (MF1)\*



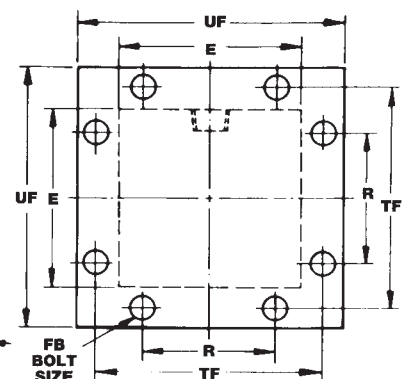
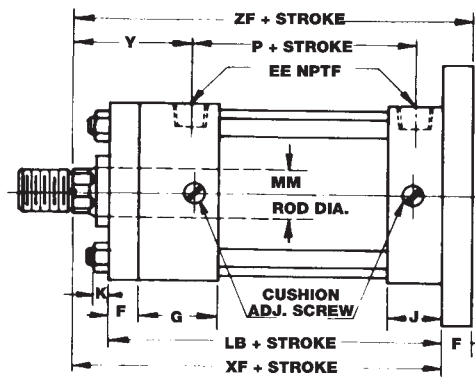
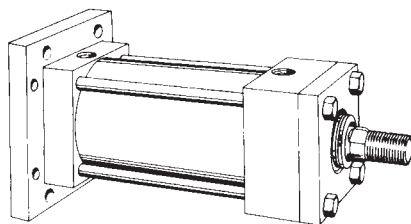
### REAR FLANGE MOUNT STYLE RF (MF2)\*



### FRONT FLANGE MOUNT EXTRA SIZE STYLE FFX (MF5)\*



### REAR FLANGE MOUNT EXTRA SIZE STYLE RFX (MF6)\*



\*Number in parenthesis ( ) is ANSI Standard No. B93.1-64 Mounting Style Designation.

## Clevis and Trunnion Mounting Cylinder Dimensions

BORE	1 1/8	1 1/2	2	2 1/2	3 1/4	4	5	6
E	1 3/4	2	2 1/2	3	3 3/4	4 1/2	5 1/2	6 1/2
EE NPTF	1/4	3/8	3/8	3/8	1/2	1/2	1/2	3/4
F	3/8	3/8	3/8	3/8	5/8	5/8	5/8	3/4
FB*	1/4	1/4	5/16	5/16	3/8	3/8	1/2	1/2
G	1 3/32	1 15/32	1 3/8	1 3/8	1 5/8	1 5/8	1 5/8	1 7/8
J	27/32	31/32	7/8	7/8	1 1/8	1 1/8	1 1/8	1 3/8
K	7/32	7/32	1/4	1/4	5/16	5/16	7/16	7/16
MM	1/2	5/8	5/8	5/8	1	1	1	1 3/8
R	1.19	1.43	1.84	2.19	2.76	3.32	4.10	4.88
TF	2 3/8	2 3/4	3 3/8	3 7/8	4 11/16	5 7/16	6 5/8	7 5/8
UF	3	3 3/8	4 1/8	4 5/8	5 1/2	6 1/4	7 5/8	8 5/8

## Mounting Information

Rectangular Type Flanges are sufficient for normal cylinder applications. For long stroke cylinders (over 36"), large rod diameters, or where extra rigidity is required, square type flanges are recommended. See the Engineering Brochure for Long Stroke information and detailed Mounting Data.

Pilot Diameters (B in table Page A-17) are accurately machined for aligning cylinders to the work. On installations where the pilot diameter cannot be used for aligning cylinder to work, we recommend drilling and dowel pinning flanges after cylinder is tightened in place to prevent shifting.

FLANGES SHOULD BE SOLIDLY MOUNTED to a rigid section of the machine with high tensile bolts (socket head type recommended).

## These Dimensions\*\* Affected By Rod Size

BORE	1 1/8	1 1/2	2	2 1/2	3 1/4	4	5	6
W	5/8	5/8	5/8	5/8	3/4	3/4	3/4	7/8
WF	1	1	1	1	1 3/8	1 3/8	1 3/8	1 5/8
Y	1 22/32	1 15/16	1 15/16	1 15/16	2 7/16	2 7/16	2 7/16	2 13/16

## These Dimensions\*\* Affected By Rod Size and Stroke

BORE	1 1/8	1 1/2	2	2 1/2	3 1/4	4	5	6
XF	4 3/8	4 5/8	4 5/8	4 3/4	5 5/8	5 5/8	5 7/8	6 5/8
ZB	4 19/32	4 27/32	4 7/8	5	5 15/16	5 15/16	6 5/16	7 1/16
ZF	4 3/4	5	5	5 1/8	6 1/4	6 1/4	6 1/2	7 3/8

## These Dimensions Affected By Stroke

BORE	1 1/8	1 1/2	2	2 1/2	3 1/4	4	5	6
LB	3 3/4	4	4	4 1/8	4 7/8	4 7/8	5 1/8	5 3/4
P	2 3/16	2 1/4	2 1/4	2 3/8	2 5/8	2 5/8	2 7/8	3 1/8

For rod end information see Pages A-17 and A-18

\*Clearance hole for indicated bolt size.

\*\*Dimensions shown are for standard rod size only. For oversize and 2:1 rods, add N dimension shown on rod end chart, Page A-17.

### Mounting Information

Tie Rod Mount Cylinders are compact space savers for the customer whose overall cylinder envelope dimensions must be held to a minimum. Longer or shorter tie rod extensions are available.

### Head Mount

Front Head Mount Cylinders have accurately machined pilot diameters (B in table, page A-17) for aligning cylinders to the work. On installations

where the pilot diameter cannot be used for aligning cylinder to work, or for rear head mount cylinders, we recommend drilling and dowel pinning heads ( $3/4$ " maximum drill depth in head) after cylinder is tightened in place to prevent shifting.

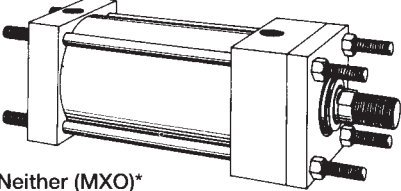
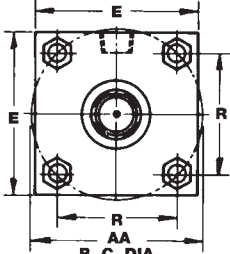
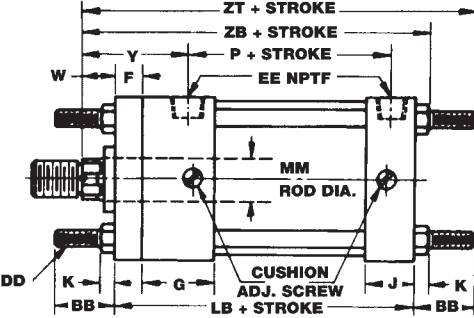
Head Mount Cylinders should be solidly mounted to a rigid section of the machine with high tensile bolts (socket head types recommended).

### Double Rod Extension

Double Piston Rod Extension is available in any mounting style except Clevis. Basic dimensions shown here apply to all mounting styles.

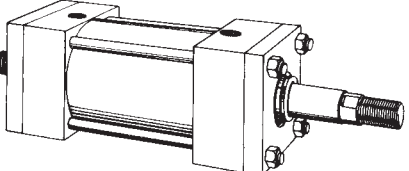
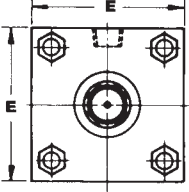
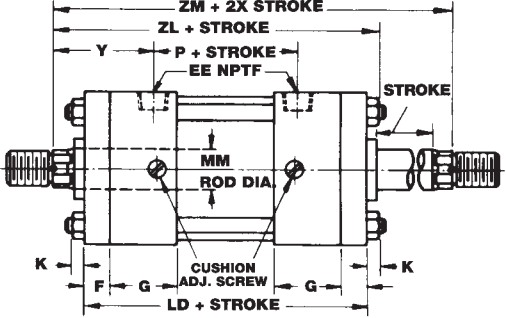
For Double Rod Cylinder Mounting dimensions not shown in chart, refer to pages 3, 4, 7, 8, 11, 12, 13, 14 showing specific mounting style to be used.

**TIE RODS EXTENDED**  
1 1/8" - 6"

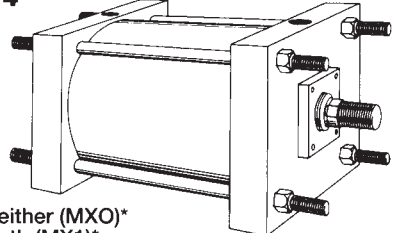
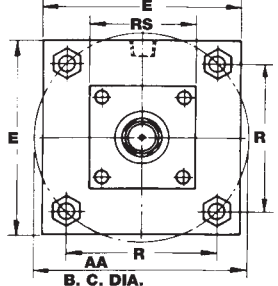
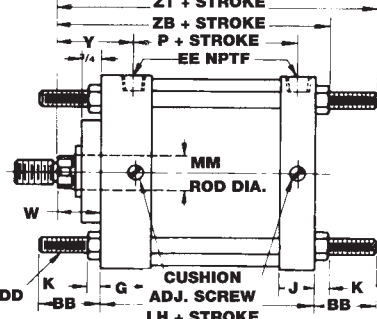
NX - Neither (MX0)\*  
BX - Both (MX1)\*  
RX - Rear (MX2)\*  
FX - Front (MX3)\*

**BASIC DOUBLE ROD EXTENSION**  
1 1/8" - 6"

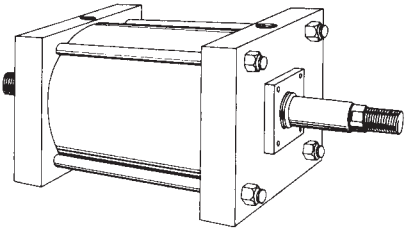
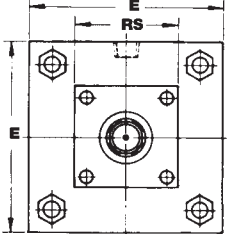
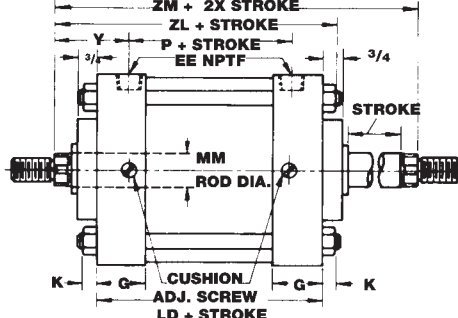
Available in all except C and P mounts.

**TIE RODS EXTENDED**  
7" - 14"

NX - Neither (MX0)\*  
BX - Both (MX1)\*  
RX - Rear (MX2)\*  
FX - Front (MX3)\*

**BASIC DOUBLE ROD EXTENSION**  
7" - 14"

\*Number in parenthesis ( ) is ANSI Standard No. B93.1-64 Mounting Style Designation.

## Head, Tie Rod and Basic Double Rod Cylinder Dimensions

BORE	1 1/8	1 1/2	2	2 1/2	3 1/4	4	5	6	7	8	10	12	14
AA	1.68	2.02	2.6	3.1	3.9	4.7	5.8	6.9	8.1	9.1	11.2	13.3	15.4
BB	1	1	1 1/8	1 1/8	1 3/8	1 3/8	1 13/16	1 13/16	2 5/16	2 5/16	2 11/16	2 11/16	3 3/16
DD	1/4-28	1/4-28	5/16-24	5/16-24	3/8-24	3/8-24	1/2-20	1/2-20	5/8-18	5/8-18	3/4-16	3/4-16	7/8-14
E	1 3/4	2	2 1/2	3	3 3/4	4 1/2	5 1/2	6 1/2	7 1/2	8 1/2	10 5/8	12 3/4	14 3/4
EE NPTF	1/4	3/8	3/8	3/8	1/2	1/2	1/2	3/4	3/4	3/4	1	1	1 1/4
F	3/8	3/8	3/8	3/8	5/8	5/8	5/8	3/4	—	—	—	—	—
FB*	—	—	—	—	—	—	—	—	1/2	5/8	3/4	3/4	7/8
G	1 3/32	1 15/32	1 3/8	1 3/8	1 5/8	1 5/8	1 5/8	1 7/8	1 7/8	1 7/8	2 1/8	2 3/16	2 7/8
J	2 7/32	3 1/32	7/8	7/8	1 1/8	1 1/8	1 1/8	1 3/8	1 3/8	1 3/8	1 7/8	1 15/16	2 3/8
K	7/32	7/32	1/4	1/4	5/16	5/16	7/16	7/16	9/16	9/16	5/8	5/8	3/4
MM	1/2	5/8	5/8	5/8	1	1	1	1 3/8	1 3/8	1 3/8	1 3/4	2	2 1/2
R	1.19	1.43	1.84	2.19	2.76	3.32	4.10	4.88	5.73	6.44	7.92	9.40	10.90
RS†	—	—	—	—	—	—	—	—	4	4	4	4	4
TE	—	—	—	—	—	—	—	—	6.75	7.57	9.40	11.10	12.87

### These Dimensions\*\* Affected By Rod Size

BORE	1 1/8	1 1/2	2	2 1/2	3 1/4	4	5	6	7	8	10	12	14
W	5/8	5/8	5/8	5/8	3/4	3/4	3/4	7/8	1 5/8	1 5/8	1 7/8	2	2 1/4
WG	—	—	—	—	—	—	—	—	3 1/2	3 1/2	4	4 3/16	5 1/8
Y	1 23/32	1 15/16	1 15/16	1 15/16	2 7/16	2 7/16	2 7/16	2 13/16	2 13/16	2 13/16	3 1/8	3 1/4	3 13/16

### These Dimensions\*\* Affected By Rod Size and Stroke

BORE	1 1/8	1 1/2	2	2 1/2	3 1/4	4	5	6	7	8	10	12	14
XK	—	—	—	—	—	—	—	—	5 3/8	5 3/8	6 3/8	6 15/16	8 1/4
ZB	4 19/32	4 27/32	4 7/8	5	5 15/16	5 15/16	6 5/16	7 1/16	7 5/16	7 5/16	8 7/8	9 1/2	11 1/8
ZJ	—	—	—	—	—	—	—	—	6 3/4	6 3/4	8 1/4	8 7/8	10 3/8
ZL	5 7/32	5 23/32	5 3/4	5 7/8	7 1/16	7 1/16	7 7/16	8 5/16	7 13/16	7 13/16	9 1/8	9 3/4	11 5/8
ZM	5 5/8	6 1/8	6 1/8	6 1/4	7 1/2	7 1/2	7 3/4	8 3/4	8 7/8	8 7/8	10 3/8	11 1/8	13 1/8
ZT	5 3/8	5 5/8	5 3/4	5 7/8	7	7	7 1/16	8 7/16	9 1/16	9 1/16	10 15/16	11 9/16	13 9/16

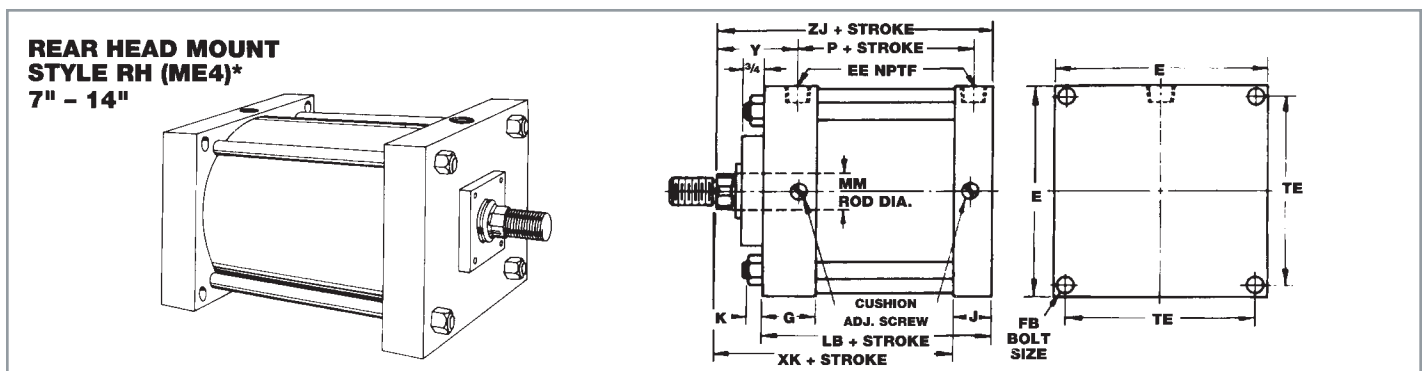
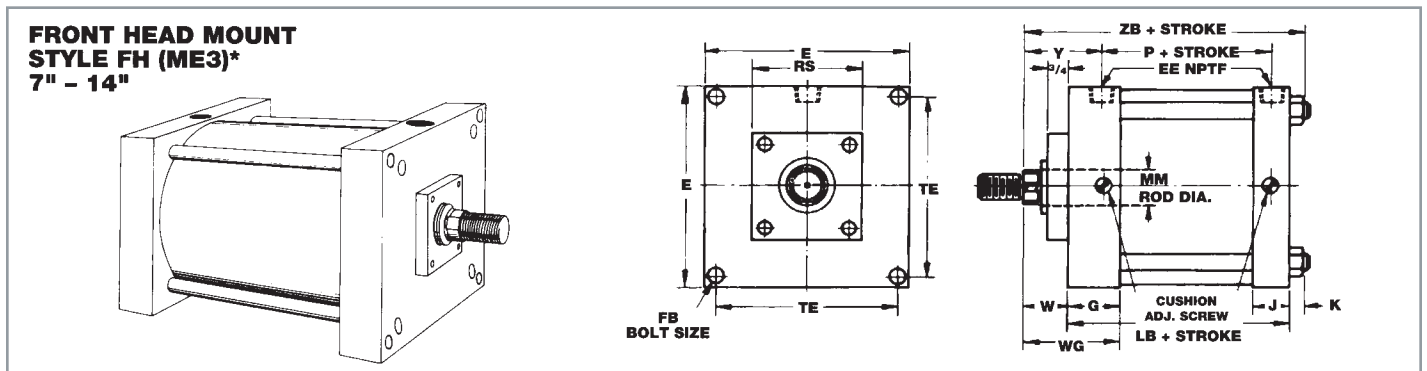
### These Dimensions Affected By Stroke

BORE	1 1/8	1 1/2	2	2 1/2	3 1/4	4	5	6	7	8	10	12	14
LB	3 3/4	4	4	4 1/8	4 7/8	4 7/8	5 1/8	5 3/4	5 1/8	5 1/8	6 3/8	6 7/8	8 1/8
LD	4 3/8	4 7/8	4 7/8	5	6	6	6 1/4	7	5 5/8	5 5/8	6 5/8	7 1/8	8 5/8
P	2 3/16	2 1/4	2 1/4	2 3/8	2 5/8	2 5/8	2 7/8	3 1/8	3 1/4	3 1/4	4 1/8	4 5/8	5 1/2

\*Clearance hole for indicated bolt size.

\*\*Dimensions shown are for standard rod size only. For oversize and 2:1 rods, add N dimensions. For double rod cylinders add applicable N dimension for rod size on each end of cylinder. N dimension shown on rod end chart, Page A-17.

†These dimensions are for standard rod only. See Pages A-17 and A-18 for rod end information.



\*Number in parenthesis ( ) is ANSI Standard No. B93.1-64 Mounting Style Designation.



# ► Conversions

## Fraction Equivalents

Fraction (inches)	Decimal (inches)	Metric (mm) (x 25.4)
1/64	.016	.4
1/32	.031	.8
3/64	.047	1.2
1/16	.062	1.6
5/64	.078	2.0
3/32	.094	2.4
7/64	.109	2.8
1/8	.125	3.2
9/64	.141	3.6
5/32	.156	4.0
11/64	.172	4.4
3/16	.187	4.7
13/64	.203	5.2
7/32	.219	5.6
15/64	.234	5.9
1/4	.250	6.3
17/64	.266	6.8
9/32	.281	7.1
19/64	.297	7.5
5/16	.312	7.9
21/64	.328	8.3
11/32	.344	8.7
23/64	.359	9.1
3/8	.375	9.5
25/64	.391	9.9
13/32	.406	10.3
27/64	.422	10.7
7/16	.437	11.1
29/64	.453	11.5
15/32	.469	11.9
31/64	.484	12.3
1/2	.500	12.7

Fraction (inches)	Decimal (inches)	Metric (mm) (x 25.4)
33/64	.516	13.1
17/32	.531	13.5
35/64	.547	13.9
9/16	.562	14.3
37/64	.578	14.7
19/32	.594	15.1
39/64	.609	15.5
5/8	.625	15.9
41/64	.641	16.3
21/32	.656	16.7
43/64	.672	17.1
11/16	.687	17.4
45/64	.703	17.9
23/32	.719	18.3
47/64	.734	18.6
3/4	.750	19.0
49/64	.766	19.5
25/32	.781	19.8
51/64	.797	20.2
13/16	.812	20.6
53/64	.828	21.0
27/32	.844	21.4
55/64	.859	21.8
7/8	.875	22.2
57/64	.891	22.6
29/32	.906	23.0
59/64	.922	23.4
15/16	.937	23.8
61/64	.953	24.2
31/32	.969	24.6
63/64	.984	25.0
1	1.000	25.4

## Temperature Equivalents

F°	C°
-30	-34.4
-20	-28.9
-10	-23.3
0	-17.8
10	-12.2
20	-6.7
30	-1.1
40	4.4
50	10.0
60	15.6
70	21.1
80	26.7
90	32.2
100	37.8
110	43.3
120	48.9
130	54.4
140	60.0
150	65.6
160	71.1
170	76.7
180	82.2
190	87.8
200	93.3
210	98.9
220	104.4
230	110.0
240	115.6
250	121.1
260	126.7

C°	F°
-30	-22
-20	-4
-10	14
0	32
5	41
10	50
15	59
20	68
25	77
30	86
35	95
40	104
45	113
50	122
55	131
60	140
65	149
70	158
75	167
80	176
85	185
90	194
95	203
100	212
105	221
110	230
115	239
120	248
125	257
130	266

$$C^{\circ} = (F^{\circ} - 32) \div 1.8$$

$$F^{\circ} = C^{\circ} \times 1.8 + 32$$

# ► Conversions

## Pressure Conversions

PSI	Kg/cm <sup>2</sup>	Bars
60	4.2	4.1
70	4.9	4.8
80	5.6	5.5
90	6.3	6.2
100	7.0	6.9
150	10.5	10.3
200	14.0	13.8
250	17.6	17.2
300	21.1	20.7
350	24.6	24.1
400	28.1	27.6
450	31.6	31.0
500	35.1	34.4
550	38.7	37.9
600	42.2	41.3
650	45.7	44.8
700	49.2	48.2
750	52.7	51.7
800	56.2	55.1
850	59.8	58.6
900	63.3	62.0
950	66.8	65.5
1000	70.3	68.9
1500	105.5	103.4
2000	140.6	137.8
2500	175.8	172.3
3000	210.9	206.7
3500	246.1	241.2
4000	281.2	275.6
4500	316.4	310.1
5000	351.5	344.5

Kg/cm<sup>2</sup> = PSI x .0703  
 Bars = PSI x .0689

Kg/cm <sup>2</sup>	PSI	Bars
4	56.9	3.9
5	71.1	4.9
6	85.3	5.9
7	99.5	6.9
8	113.8	7.8
9	128.0	8.8
10	142.2	9.8
20	284.4	19.6
30	426.6	29.4
40	568.8	39.2
50	711.0	49.0
60	853.2	58.8
70	995.4	68.6
80	1137.6	78.4
90	1279.8	88.2
100	1422.0	98.0
150	2133.0	147.0
200	2844.0	196.0
250	3555.0	245.0
300	4266.0	294.0
350	4977.0	343.0
400	5688.0	392.0

PSI = Kg/cm<sup>2</sup> x 14.22  
 Bars = Kg/cm<sup>2</sup> x .98

## Distance Conversions

Inches	cm	mm
1	2.5	25.4
2	5.1	50.8
3	7.6	76.2
4	10.2	101.6
5	12.7	127.0
6	15.2	152.4
7	17.8	177.8
8	20.3	203.2
9	22.9	228.6
10	25.4	254.0
15	38.1	381.0
20	50.8	508.0
25	63.5	635.0
30	76.2	762.0
35	88.9	889.0
40	101.6	1016.0
45	114.3	1143.0
50	127.0	1270.0
55	139.7	1397.0
60	152.4	1524.0
65	165.1	1651.0
70	177.8	1778.0
75	190.5	1905.0
80	203.2	2032.0
85	215.9	2159.0
90	228.6	2286.0
95	241.3	2413.0
100	254.0	2540.0

cm = in. x 2.54  
 mm = in. x 25.4

cm	Inches
1	.4
2	.8
3	1.2
4	1.6
5	2.0
6	2.4
7	2.8
8	3.1
9	3.5
10	3.9
20	7.9
30	11.8
40	15.8
50	19.7
60	23.6
70	27.6
80	31.5
90	35.5
100	39.4
110	43.3
120	47.3
130	51.2
140	55.2
150	59.1
160	63.0
170	67.0
180	70.9
190	74.9
200	78.8
210	82.7
220	86.7
230	90.6
240	94.6
250	98.5
260	102.4

in. = cm x .394

# ▶ Rod End Dimensions

## Style 2 Rod End Offers the Following Advantages:

1. The shoulder eliminates the need for a jam nut, and since the shoulder is square with the threads, cocking of the rod is eliminated.
2. The shoulder provides a fixed point for cylinder positioning.
3. Available from most manufacturers of the interchangeables as standard.
  - Rod End Style 2 is standard and furnished unless otherwise specified.
  - Piston rods are available with End Styles 1, 3, 4 and 6 at no extra charge.
  - Special End Styles are available for a nominal extra charge.
  - 4 Wrench Flats are standard. 6 Wrench Flats are available for a small extra charge.

**Piston Rod Diameters** are available as shown on this page for each given bore size. First size shown for each bore is STANDARD SIZE. The largest rod size for each bore through 8" is referred to as 2:1 rod. These rods have areas about 1/2 the bore area. A cylinder with 2:1 rod has a return stroke approximately twice as fast, and with half the force, of the push stroke. Intermediate and 2:1 rod sizes are for use with long strokes, or to offer greater resistance to the effects of side thrust. They are also used for specific ratio of speed or force between push and pull stroke. Consult our Distributor for recommendations.

## Rod End Dimensions

MM DIA.	A	AC	AD	AE	AF DIA.	B -.001 -.003	CC	D	KK	NA ±.002
1/2	3/4	1	1/2	3/16	5/16	15/16	7/16-20	3/8	5/16-24	.468
5/8	3/4	11/8	5/8	1/4	3/8	11/8	1/2-20	1/2	7/16-20	.594
1	11/8	11/2	15/16	3/8	11/16	11/2	7/8-14	13/16	3/4-16	.968
1 3/8	15/8	1 3/4	11/16	3/8	7/8	2	11/4-12	11/8	1-14	1.343
1 3/4	2	2	15/16	1/2	11/8	2 3/8	11/2-12	11/2	11/4-12	1.703
2	2 1/4	2 5/8	1 11/16	5/8	1 3/8	2 5/8	1 3/4-12	1 5/8	1 1/2-12	1.953
2 1/2	3	3 1/4	1 15/16	3/4	1 3/4	3 1/8	2 1/4-12	2 1/16	1 7/8-12	2.453
3	3 1/2	3 3/4	2 7/16	7/8	2 1/4	3 3/4	2 3/4-12	2 9/16	2 1/4-12	2.937
3 1/2	3 1/2	4 3/8	2 11/16	1	2 1/2	4 1/4	3 1/4-12	3	2 1/2-12	3.437
4	4	4 1/2	2 11/16	1	3	4 3/4	3 3/4-12	3 7/16	3-12	3.937
4 1/2	4 1/2	5 1/4	3 3/16	1 1/2	3 1/2	5 1/4	4 1/4-12	3 13/16	3 1/4-12	4.421
5	5	5 3/8	3 3/16	1 1/2	3 7/8	5 3/4	4 3/4-12	4 1/4	3 1/2-12	4.921
5 1/2	5 1/2	6 1/4	3 15/16	1 7/8	4 3/8	6 1/4	5 1/4-12	4 5/8	4-12	5.421

Above rod dimensions do not vary with different bore sizes.

## Rod End Dimensions

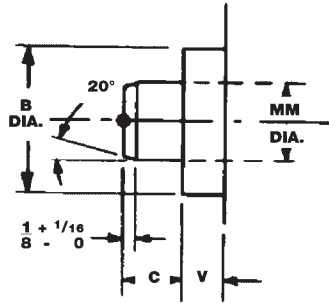
BORE	MM DIA.	RS	C	V	N†
1 1/8	1/2	—	3/8	1/4	—
	5/8	—	3/8	1/4	—
1 1/2	1	—	1/2	1/2	3/8
	5/8	—	3/8	1/4	—
2	1	—	1/2	1/2	3/8
	1 3/8	—	5/8	5/8	5/8
2 1/2	5/8	—	3/8	1/4	—
	1	—	1/2	1/2	3/8
	1 3/8	—	5/8	5/8	5/8
3 1/4	1 3/4	—	3/4	3/4	7/8
	1	—	1/2	1/4	—
	1 3/8	—	5/8	3/8	1/4
4	1 3/4	—	3/4	1/2	1/2
	2	—	7/8	1/2	5/8
	1	—	1/2	1/4	—
	1 3/8	—	5/8	3/8	1/4
5	1 3/4	—	3/4	1/2	1/2
	2	—	7/8	1/2	5/8
	2 1/2	—	1	5/8	7/8
	3	—	1	5/8	7/8
	3 1/2	—	1	5/8	7/8
	1 3/8	—	5/8	1/4	—
6	1 3/4	—	3/4	3/8	1/4
	2	—	7/8	3/8	3/8
	2 1/2	—	1	1/2	5/8
	3	—	1	1/2	5/8
	3 1/2	—	1	1/2	5/8
	4	—	1	1/2	5/8
7	1 3/8	4 SQ.	5/8	1/4	—
	1 3/4	4 SQ.	3/4	3/8	1/4
	2	4 SQ.	7/8	3/8	3/8
	2 1/2	4 SQ.	1	1/2	5/8

BORE	MM DIA.	RS	C	V	N†
7	3 1/2	5 1/2 DIA.	1	1/2	5/8
	4	6 DIA.	1	1/2	5/8
	4 1/2	6 1/2 DIA.	1	1/2	5/8
	5	7 DIA.	1	1/2	5/8
8	1 3/8	4 SQ.	5/8	1/4	—
	1 3/4	4 SQ.	3/4	3/8	1/4
	2	4 SQ.	7/8	3/8	3/8
	2 1/2	4 SQ.	1	1/2	5/8
	3	5 DIA.	1	1/2	5/8
	3 1/2	5 1/2 DIA.	1	1/2	3/8
	4	6 DIA.	1	1/2	5/8
10	4 1/2	6 1/2 DIA.	1	1/2	5/8
	5	7 DIA.	1	1/2	5/8
	5 1/2	8 DIA.	1	1/2	5/8
	1 3/4	4 SQ.	3/4	3/8	—
	2	4 SQ.	7/8	3/8	1/8
	2 1/2	4 SQ.	1	1/2	3/8
	3	5 DIA.	1	1/2	3/8
	3 1/2	5 1/2 DIA.	1	1/2	3/8
12	4	6 DIA.	1	1/2	3/8
	4 1/2	6 1/2 DIA.	1	1/2	3/8
	5	7 DIA.	1	1/2	3/8
	5 1/2	8 DIA.	1	1/2	3/8
	2	4 SQ.	7/8	3/8	—
	2 1/2	4 SQ.	1	1/2	1/4
	3	5 DIA.	1	1/2	1/4
14	3 1/2	5 1/2 DIA.	1	1/2	1/4
	4	6 DIA.	1	1/2	1/4
	4 1/2	6 1/2 DIA.	1	1/2	1/4
	5	7 DIA.	1	1/2	1/4
	5 1/2	8 DIA.	1	1/2	1/4
	2 1/2	4 SQ.	1	1/2	—

†Oversize rod adder. See note on cylinder dimension charts for application.

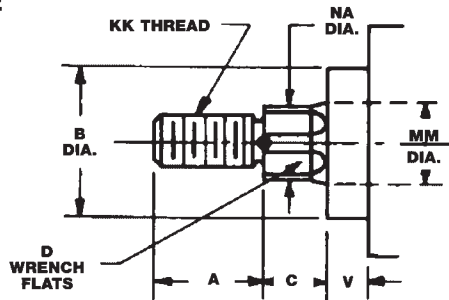
# ▶ Rod End Information

**Alternate-Style 1**

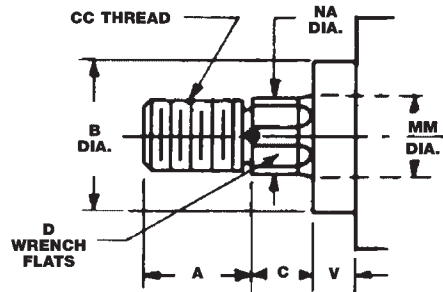


**ROD END-STYLE 2 STANDARD**

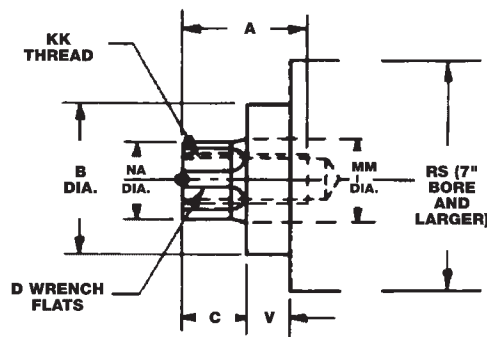
STUDDED THRU 2 1/2" ROD DIA.



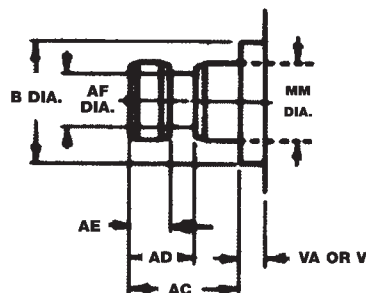
**Alternate-Style 3**



**Alternate-Style 4**



**Alternate-Style 6**



**2½ A FF 25 CC W**

Bore	Cylinder Series	Mounting	Stroke	Cushion	Modification
As Required <hr/> Use Fractions Where Required	<b>A</b> Heavy Duty Pneumatic <b>AA</b> 200 PSI Pneumatic <b>CLA</b> Heavy Duty Pneumatic <b>CLH</b> Heavy Duty, 250 Pneumatic/1500 Hydraulic <b>C20</b> Heavy Duty Pneumatic, Cast Iron <b>HH</b> Heavy Duty Hydraulic <b>MA</b> Medium Duty Pneumatic <b>MH</b> Medium Pressure Hydraulic	Listed Below	As Required <hr/> Use Fractions Where Required <hr/> Shown as Gross Stroke Including Dual Piston or Stop Tube Length	<b>CF</b> – Cushion Front <b>CR</b> – Cushion Rear <b>CC</b> – Cushion Both Ends	<b>A</b> – Variation in Ports <b>D</b> – Double Rod Extension <b>K</b> – Any Variation in Rod from Standard. Any Variation from Standard Style 2 Rod End. <b>M</b> – Variation in Mounting <b>P</b> – NPT Ports <b>S</b> – Spring Return <b>V</b> – Viton Seals <b>W</b> – Water Fitted <b>Y</b> – Variation in Construction

### Mounting Styles

<b>BX</b> – Basic Cylinder, Tie Rods Extended, Both Ends	<b>FHF</b> – Front Head Flange	<b>RHF</b> – Rear Head Flange
<b>C</b> – Clevis	<b>FX</b> – Basic Cylinder, Tie Rods Extended, Front End	<b>RX</b> – Basic Cylinder, Tie Rods Extended, Rear End
<b>CL</b> – Center Line Lug	<b>NX</b> – Basic Cylinder, No Tie Rod Extension	<b>SF</b> – Side Flush
<b>EL</b> – End Lug	<b>P</b> – Pivot	<b>SL</b> – Side Lug
<b>FB</b> – Foot Bracket	<b>RF</b> – Rear Flange	<b>T</b> – Trunnion, Between Heads
<b>FF</b> – Front Flange	<b>RFX</b> – Rear Flange, Extra Size	<b>TF</b> – Trunnion, Front
<b>FFX</b> – Front Flange, Extra Size	<b>RH</b> – Rear Head (7" thru 14" A and MH - 16" thru 24" HH)	<b>TR</b> – Trunnion, Rear
<b>FH</b> – Front Head (7" thru 14" A and MH - 16" thru 24" HH)		

### Order Information

To insure prompt delivery, please BE SURE TO INCLUDE THIS INFORMATION WHEN ORDERING:

- |  |   |   |
|--|---|---|
| 1. Quantity  | 8. Rod End Style (if other than Style 2 standard)   | 14. Medium (air, oil, water or other)                     |
| 2. Series  | 9. Rod Size (standard, oversize or 2:1)   | 15. Type of fluid   |
| 3. Bore  | 10. Extra Rod Extension (where required)  | 16. Operating Pressure and Maximum Shock Pressure         |
| 4. Stroke - Gross Stroke always shown in Model Number                          | 11. Port Size (if other than standard)  | 17. Temperature   |
| 5. Dual Piston or Stop Tube when necessary - always give Gross and Net Strokes | 12. Port Positions other than standard positions 1 and 5.   | 18. Double rod extension (when required)                  |
| 6. Mounting Style  | 13. Cushion check, adjusting screw, and bleed positions (when required) if other than standard positions. | 19. XI dimension on all Trunnion (between head) cylinders |
| 7. Cushion (front, rear, both or none)   |   | 20. Delivery required, or scheduling                      |

Complete and correct ordering information will eliminate untimely delays. When in doubt, always contact local distributor or factory. Contact distributor for helpful order or inquiry form.

#### Policy:

The policy of the CylindersNow Corporation is one of continual improvement in design and manufacture to assure still finer products, hence, specifications are subject to change without notice.

#### Limited Warranty:

CylindersNow warrants its products to be free from defects in material and workmanship for a period of one year from the date of shipment. This warranty does not cover field labor charges for parts removal and replacement, adjustments, repairs or other work, corrosion, electrolysis, mineral deposits or normal deterioration, misapplication, modification, or change in original operating conditions; components supplied by others; defects in parts resulting from abuse, negligence, neglect, accident, fire or explosion, or seals and other components subject to normal wear.

The sole and exclusive remedy against CylindersNow shall be for the repair or replacement of parts returned transportation prepaid to Sheffer's factory and found by CylindersNow to be defective. Replacement parts provided shall not extend the warranty period for said parts or for the total unit.

**IN CONSIDERATION OF THIS EXPRESS WARRANTY NO OTHER REMEDY (INCLUDING BUT NOT LIMITED TO INCIDENTAL OR CONSEQUENTIAL DAMAGES) SHALL BE AVAILABLE. THIS WARRANTY SHALL BE IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND OF ALL OTHER OBLIGATIONS ON THE PART OF CylindersNow.**

CylindersNow neither assumes, nor authorizes any person to assume for it, any other obligation or warranty.

## **CylindersNow Cylinders are Better Cylinders**

### **The performance you expect from a quality cylinder**

- Ⓞ Longer lifetime of service
- Ⓞ Minimal downtime
- Ⓞ Fast and easy installation
- Ⓞ Simple, affordable repairs
- Ⓞ No special tool required to make repairs
- Ⓞ Lower operating cost
- Ⓞ More options available

## **Our Cylinders are Designed with the End User in Mind**

### **Studded Rod End**

*(Standard, except on C20 Series)*

Sheffer's rod end design virtually eliminates rod end breakage! The rod ends of many competitive cylinders are cut from the piston rod, creating a weak point at the threads. Our studded connection routes stress factors away from this weak point, so rod-end failure is nearly impossible. Also, rod ends can be replaced without changing the entire piston rod, thereby reducing downtime and repair costs.

### **Four Full Wrench Flats**

For convenience, time and money savings during cylinder installation or replacement, CylindersNow cylinders are produced with four full wrench flats. With our design, a flat is always positioned for a good wrench hold with normal tools. Our cylinders come this way because unconventional tools and methods are often used when a wrench flat isn't convenient—possibly marring the rod surface which can damage seals and cause leaks.

### **Removable Rod Gland**

*(Not available on select small bore cylinders)*

The wiper and pressure seals on CylindersNow cylinders are encapsulated behind a removable rod gland that is bolted to the front of the cylinder.

“On line” changing of seals is fast and easy using normal tools, without disturbing torque settings, removing the rod bearing or tearing down the cylinder. This feature dramatically increases productivity by reducing downtime and repair costs.

### **Separate Rod Bearing**

On CylindersNow cylinders, the rod bearing is a hydrodynamic “flooded bearing”, which greatly reduces wear and extends part life. It's also inboard from the seals and a separate component, so if changeout is needed, the seals need not be replaced — and vice versa. No special tools are required. Moreover, the rod bearing can be removed and replaced without having to loosen tie rods or tear down the cylinder. That saves downtime, plus the cost of parts and labor.

### **Chamfered Tube Ends**

A small angle, or chamfer, is machined into the end of each CylindersNow piston tube for quick, easy and reliable repairs. If the piston and rod have been removed (to replace seals for example), when the piston is pushed back in, the chamfer physically compresses the seal into the piston like a built-in funnel. Special compression tools aren't needed during assembly and chances of seal damage are minimized. The chamfer design also prohibits extrusion of the O-ring once the tie rods are tightened. This forms a superior seal and diminishes the chance of leakage at the head and cap joint.

### **Slipper Piston Seal & Bearing**

*(Standard on all hydraulic cylinders)*

The slipper piston seal and bearing on CylindersNow cylinders are a standard option, not a cost-additive feature other manufacturers offer when their designs are inadequate. Our Teflon®-based surfaces are an excellent lubricant, demonstrating a very low coefficient of friction with low heat. As the cylinder moves back and forth, the Teflon also migrates into the pores of the cylinder tube, creating an even better lubricating surface. Slipper seals and bearings — another reason CylindersNow cylinders reduce costs and downtime while increasing productivity.

