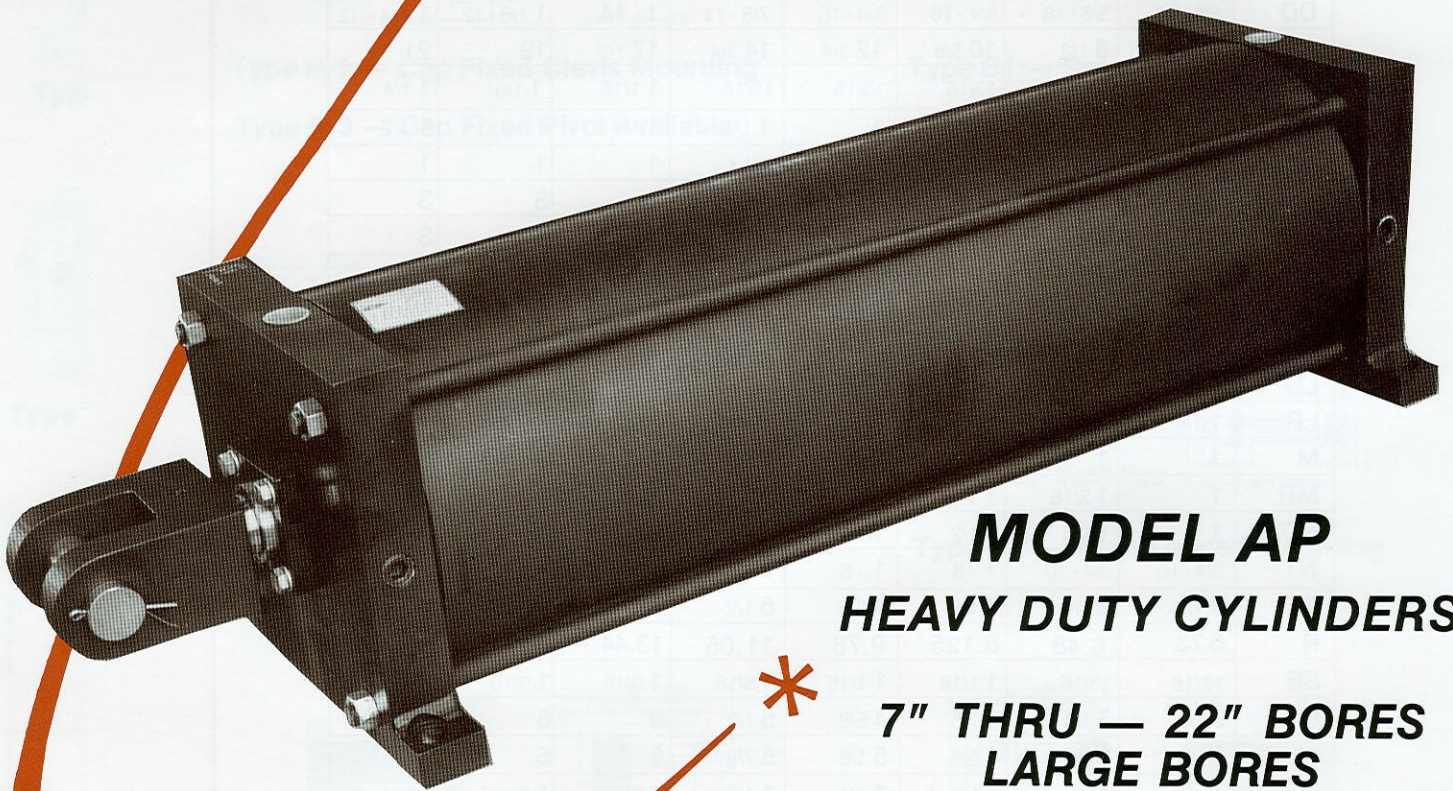


# Cunningham

SINCE 1949

## AIR CYLINDERS



### MODEL AP HEAVY DUTY CYLINDERS

\*  
**7" THRU — 22" BORES  
LARGE BORES**

Cunningham Heavy-Duty Cylinders are ruggedly built and are recommended where "pull" and "thrust" impact loads are above average and where operation is continuous and under "full" load operation.

#### HEAVY DUTY SPECIFICATIONS

- Steel Ends
- High Tensile Steel Piston Rods (Hard Chrome Plated)
- Air Cylinder Grade Steel Tubing Honed & Chromed I.D.
- High Tensile Tie Rods
- Oil Resistant Cylinder Cups and Packing
- Self-Regulating or Adjustable Cushioning
- 250 PSI Working Pressure
- Rod Wiper, Hytrel or Brass
- J I C Standard Construction and Dimensions
- N F P A Standards

CATALOG NO. 202 AP

For Bore 1 1/2-6", see CATALOG NO. 102 AA

## Cunningham Manufacturing Co.

318 SOUTH WEBSTER STREET • SEATTLE, WASHINGTON 98108 • (206) 767-3713 • FAX (206) 762-3457

[www.cunninghamcylinders.com](http://www.cunninghamcylinders.com)



# Cylinder Model Numbering System

FEATURE	DESCRIPTION	SYMBOL	EXAMPLE
BORE	IN INCHES . . . . .		10 AP C P1 C 56-1 3 S 250
SERIES	AIR CYLINDERS STANDARD AIR CYLINDERS, OPTIONAL ADJUSTABLE CUSHIONS AIR CYLINDERS, 7-20" BORES	AA AB AP APB	
CUSHIONS HEAD END	IF NO CUSHION IS REQUIRED IF CUSHION IS REQUIRED	N C	
MOUNTING STYLE	<b>PARTIAL LISTING, SEE CATALOG.</b>  CAP FIXED CLEVIS CAP FIXED PIVOT HEAD TRUNNION CAP END TRUNNION ETC.	P1 P3 T1 T2	
CUSHIONS CAP END	IF NO CUSHION IS REQUIRED IF CUSHION IS REQUIRED	N C	
STROKE	IN INCHES	—	
ROD SIZE	STANDARD ROD DIAMETER FIRST OVERSIZE ROD OPTION SECOND OVERSIZE ROD OPTION THIRD OVERSIZE ROD OPTION ETC.	1 2 3 4	
ROD THREAD	"KK" STANDARD ROD THREAD "CC" FIRST OVERSIZE THD. "KK" FEMALE THREAD ANY NON-STANDARD THD.	1 2 3 4	
SPECIAL	USE FOR DOUBLE ROD END, ROD BOOT, STAINLESS ROD, STOP TUBE, ETC.	S	
MAXIMUM WORKING PRESSURE	AIR CYLINDERS MODEL AA, AB & AP	250	

## Force Developed By Air Cylinders

The table below may be used for any cylinder, but covers the pressure range normally used for air cylinders and air-over-oil cylinders operating from shop air lines.

Figures in the chart are forces in pounds, produced by cylinder bores on the left side of the chart operating at PSI gauge pressures shown along the top of the chart. Values were calculated by multiplying PSI gauge pressure times piston square inch area. To find cylinder

force at a pressure not shown, values in two or more columns may be combined, or, the piston area may be used as a "power factor" and multiplied times the operating PSI.

Remember to deduct rod area from piston area before multiplying by PSI when figuring cylinder force on the return stroke.

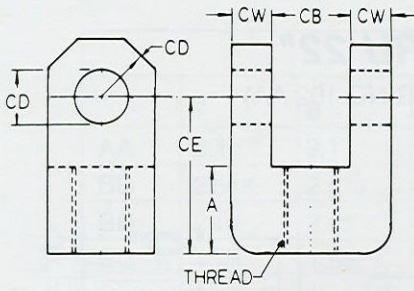
Note: Force values are theoretical. For practical use, deduct 5 to 10% for packing friction.

**TABLE 2 - A: Theoretical Force From Low Pressure Cylinders (Especially Air Cylinders).**

Bore Dia.	Area Sq. In.	Gauge Pressure									
		40 PSI	50 PSI	60 PSI	70 PSI	80 PSI	90 PSI	100 PSI	110 PSI	120 PSI	150 PSI
1.50	1.77	71	88	106	124	141	160	177	194	212	265
2.00	3.14	125	157	188	220	250	283	314	346	377	470
2.50	4.91	193	242	290	338	387	432	483	530	580	724
3.25	8.30	330	415	498	580	664	746	830	912	995	1245
4.00	12.57	503	628	753	880	1000	1130	1256	1380	1500	1885
5.00	19.64	785	908	1175	1375	1570	1765	1964	2160	2350	2940
6.00	28.27	1130	1410	1700	1980	2260	2550	2827	3100	3400	4220
8.00	50.27	2000	2500	3000	3500	4000	4500	5000	5500	6000	7530
10.00	78.54	3150	3900	4700	5500	6250	7000	7850	8600	9400	11,750
12.00	113.10	4530	5670	6800	7930	9060	10,200	11,310	12,450	13,600	16,900
14.00	153.94	6150	7700	9230	10,770	12,300	13,850	15,395	16,920	18,450	23,000
16.00	201.06	8040	10,050	12,060	14,070	16,085	18,095	20,105	22,115	24,125	30,160
18.00	254.47	10,170	12,720	15,265	17,810	20,350	22,900	25,445	27,990	30,535	38,170

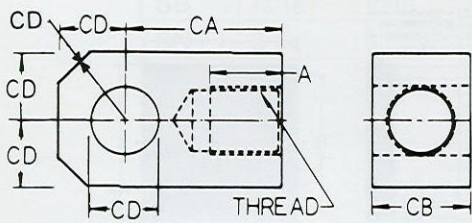


# MOUNTING ACCESSORIES



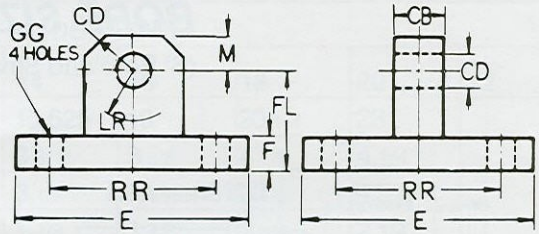
**Table 5—C  
ROD CLEVIS DIMENSIONS**

CL. NO.	THREAD	A	CE	CD	CB	CW
231	1 - 14	1 5/8	2 15/16	1	1 9/16	3/4
232	1 1/4 - 12	1 5/8	2 15/16	1	1 9/16	3/4
233	1 1/2 - 12	1 5/8	2 15/16	1	1 9/16	3/4
241	1 1/4 - 12	2	3 3/4	1 3/8	2 1/16	1
242	1 1/2 - 12	2	3 3/4	1 3/8	2 1/16	1
243	1 3/4 - 12	2	3 3/4	1 3/8	2 1/16	1
251	1 1/2 - 12	2 1/4	4 1/2	1 3/4	2 9/16	1 1/4
252	1 3/4 - 12	2 1/4	4 1/2	1 3/4	2 9/16	1 1/4
253	1 7/8 - 12	2 1/4	4 1/2	1 3/4	2 9/16	1 1/4
254	2 - 12	2 1/4	4 1/2	1 3/4	2 9/16	1 1/4
261	1 7/8 - 12	3	5 1/2	2	2 9/16	1 1/4
262	2 1/4 - 12	3	5 1/2	2	2 9/16	1 1/4
271	2 1/4 - 12	3 1/2	6 1/2	2 1/2	3 1/16	1 1/2
272	2 1/2 - 12	3 1/2	6 1/2	2 1/2	3 1/16	1 1/2
273	2 3/4 - 12	3 1/2	6 1/2	2 1/2	3 1/16	1 1/2
281	2 1/2 - 12	3 1/2	6 3/4	3	3 1/16	1 1/2
282	3 - 12	3 1/2	6 3/4	3	3 1/16	1 1/2
2101	3 1/4 - 12	3 1/2	7 3/4	3 1/2	4 1/16	2
2121	3 1/2 - 12	4	8 13/16	4	4 9/16	2 1/4
2122	4 - 12	4	8 13/16	4	4 9/16	2 1/4



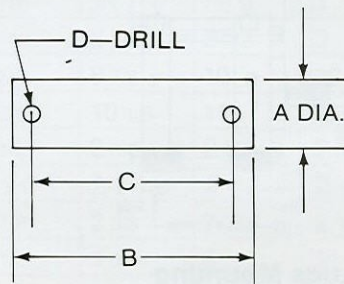
**Table 5 - A  
PIVOT ROD EYE DIMENSIONS**

EYE NO.	THREAD	A	CA	CD	CB
132	7/8 - 14	1 1/8	2 3/8	1	1 1/2
133	1 - 14	1 5/8	2 13/16	1	1 1/2
141	1 1/4 - 12	2	3 7/16	1 3/8	2
142	1 1/2 - 12	2	3 7/16	1 3/8	2
151	1 1/2 - 12	2 1/4	4	1 3/4	2 1/2
152	1 3/4 - 12	2 1/4	4	1 3/4	2 1/2
161	1 7/8 - 12	3	5	2	2 1/2
171	2 1/4 - 12	3 1/2	5 13/16	2 1/2	3
172	2 1/2 - 12	3 1/2	5 13/16	2 1/2	3
181	2 1/2 - 12	3 1/2	6 1/8	3	3
192	3 - 12	3 1/2	6 1/2	3	3 1/2
1101	3 1/4 - 12	3 1/2	7 5/8	3 1/2	4
1121	3 1/2 - 12	4	9 1/8	4	4 1/2



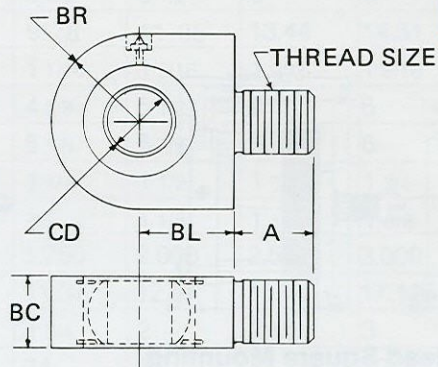
**Table 5—B  
PIVOT BRACKET BASE DIMENSIONS**

BRKT. NO.	CD	CB	F	FL	M	E	RR	LR	GG
3	1	1 1/2	3/4	2 1/4	1	4 1/2	3.25	1 1/2	21/32
4	1 3/8	2	7/8	3	1 3/8	5	3.82	2 1/8	21/32
5	1 3/4	2 1/2	7/8	3 1/8	1 3/4	6 1/2	4.95	2 1/4	29/32
6	2	2 1/2	1	3 1/2	2	7 1/2	5.73	2 1/4	1 1/16
7	2 1/2	3	1	4	2 1/2	8 1/2	6.58	2 1/2	1 3/16
8	3	3	1	4 1/4	3	9 1/2	7.50	2 3/4	1 5/16
10	3 1/2	4	1 11/16	5 11/16	3 1/2	12 5/8	9.62	4	1 13/16
12	4	4 1/2	1 15/16	6 7/16	4	14 7/8	11.45	4 1/2	2 1/16



**Table 5—D  
CLEVIS PIN**

A DIA.	PIN NO.	B	C	D
1	3	3 3/4	3 3/4	1 3/64
1 3/8	4	4 3/4	4 1/4	1 3/64
1 3/4	5	6	5 1/2	1 3/64
2	6	6	5 1/2	1 3/64
2 1/2	7	7	6 3/8	9/32
3	8	7 1/4	6 1/2	9/32
3 1/2	10	9 1/8	8 1/2	9/32
4	12	11	9 1/2	1 1/32



**SPHERICAL BUSHING — B1**

EYE NO.	BEARING (SKF)	BC	BL	BR	CD PIN	THREAD SIZE	A THD. LENGTH
2B1T	012	1	1 1/4	1	3/4	3/4 - 16	1
2B1T	012	1	1 1/4	1	3/4	3/4 - 16	1
3B1T	100	1 1/8	1 1/2	1 3/8	1	1 - 14	1 1/4
4B1T	106	1 3/8	2 1/4	1 13/16	1 3/8	1 1/4 - 12	1 5/8
5B1T	112	1 3/4	2 1/2	2 5/16	1 3/4	1 1/2 - 12	2
6B1T	200	1 7/8	3	2 3/4	2	1 7/8 - 12	2 1/4
7B1T	208	2 1/4	3 1/2	3 1/4	2 1/2	2 1/4 - 12	2 1/2
8B1T	300	2 3/4	4 1/4	3 7/8	3	2 1/2 - 12	3
10B1T	308	3 1/8	5	4 5/8	3 1/2	3 1/2 - 12	4
12B1T	400	3 1/2	6	5 1/2	4	4 - 12	4 1/2



## ORDERING DATA REQUIRED FOR MODEL AP

**QUANTITY**

**MOUNTING:** Type

**BORE:** Diameter

**STROKE:** Length

**ROD DIAMETER:** \* is Standard, unless otherwise specified. See Table 3.

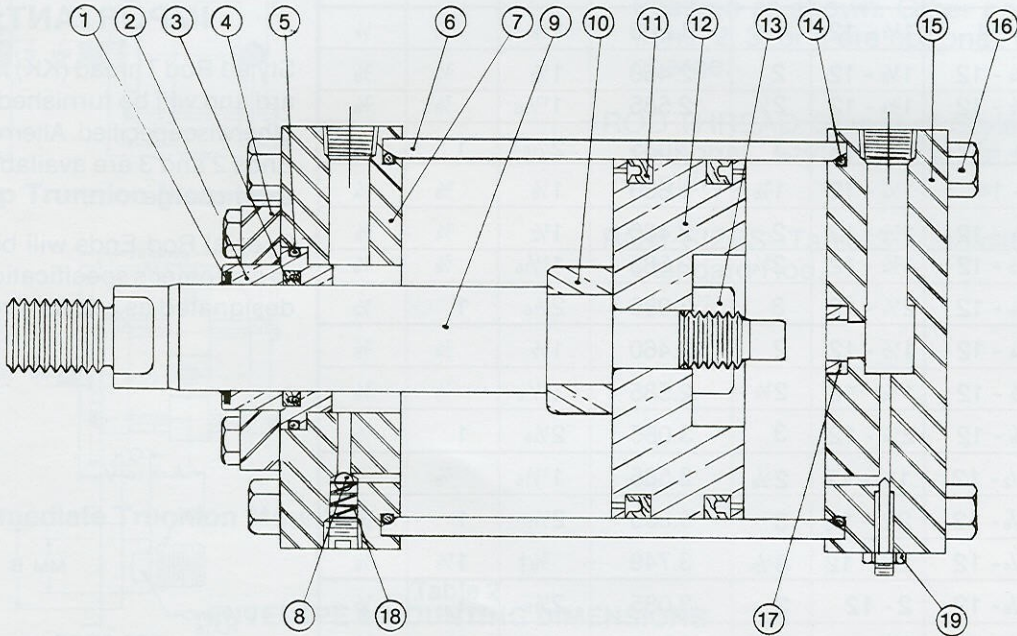
**ROD THREAD:** "KK" will be furnished unless otherwise specified.

**CUSHIONING:** Non-cushioned is standard. Self-regulating cushions model AP or adjustable cushions model APB is optional.

**PORT LOCATION:** Standard No. 1 (top) position as indicated. 2, 3, and 4 Optional.

**ROD END ATTACHMENTS:** If desired.

**SPECIAL FEATURES:** Rod Boots, Stainless Rod, Water Service. Non-Lube, etc.



### MODEL AP — PARTS LIST

AP - 1	Rod Wiper	AP - 10	Rod cushion bushing
AP - 2	Rod guide bushing	AP - 11	Piston seals
AP - 3	Rod packing	AP - 12	Piston
AP - 4	Clamp plate	AP - 13	Piston nut
AP - 5	Bushing seal	AP - 14	Tube seals
AP - 6	Cylinder tube	AP - 15	Blind end cap
AP - 7	Rod end cap	AP - 16	Tie rod nut and tie rods
AP - 8	Stainless ball (Each End)	AP - 17	Blind end cushion bushing
AP - 9	Piston rod	AP - 18	Check valve spring (Each End)
		AP - 19	Cushion Adjusting Screw (Each End Optional)

**IMPORTANT:** When ordering parts, please give complete nameplate data as to bore, stroke, rod diameter, if cushioned.

Items 8, 10, 17, 18 and 19 are for cushioned cylinders only.  
Large Bore uses 'O' Ring tube end seals.

#### RECOMMENDED TIE ROD TORQUE FOR MODEL "AP" CYLINDERS

Bore	7	8	10	12	14	16	18	20
Torque (in Foot lbs.)	110	110	190	190	250	300	500	700
Tie Rod Dia.	5/8	5/8	3/4	3/4	7/8	1"	1 1/8	1 1/4

CMC does not authorize the approval of CMC cylinders in any of the following applications: aircraft, personnel lifts, aerial ladders, or amusement park devices.

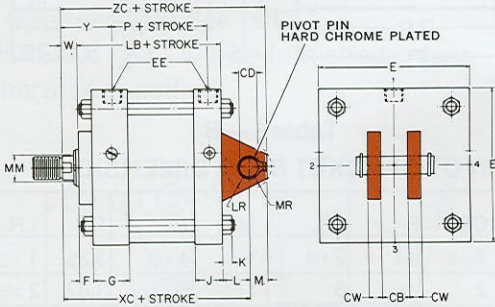




# MODEL AP AIR CYLINDERS

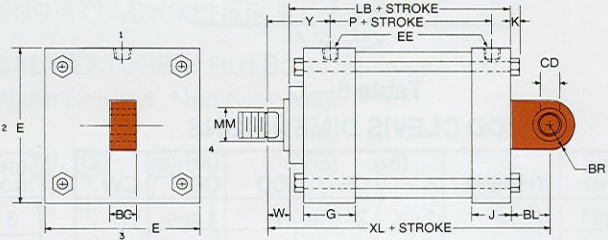
## BORE SIZES: 7" THRU 22"

(6" Bore and Smaller, see CATALOG NO.102 AA)

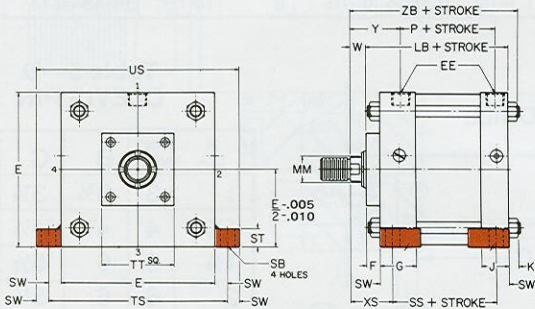


**Type P-1 — Cap Fixed Clevis Mounting**

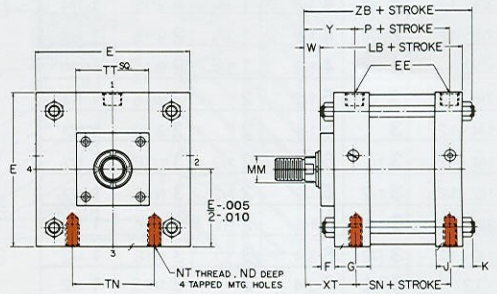
**Type P-3 — Cap Fixed Pivot Available**



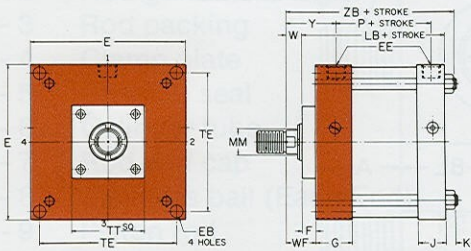
**Type B1 — Spherical Ball Bushing**



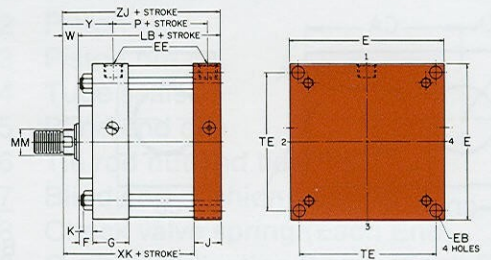
**Type S-2 — Side Lugs Mounting**



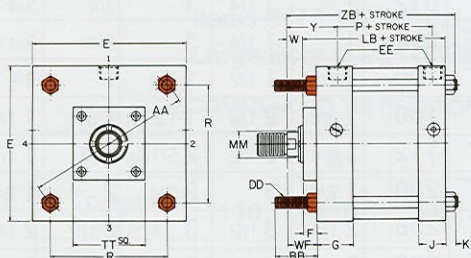
**Type S-4 — Side Tapped Mounting**



**Type E-3 — Head Square Mounting**



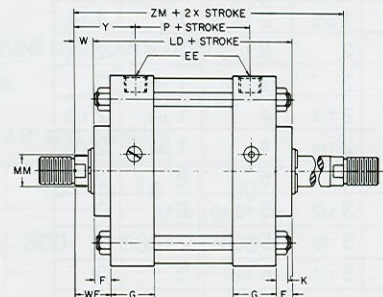
**Type E-4 — Cap Square Mounting**



**Type X3 — Head Tie Rods Extended Mounting**

Type X1 - BOTH ENDS

Type X2 - CAP END



**Type DRE — Basic Double Rod Extension**



# MODEL AP BORE SIZES: 7" THRU 22"

**TABLE 3  
ROD END DIMENSIONS**

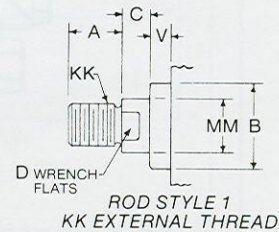
\*\*

BORE	ROD MM	STAND. KK	CC	A	+0.000 B -0.002	D	C	V
7	1 3/8*	1 - 14	1 1/4 - 12	1 5/8	1.860	1 1/8	5/8	1/4
	1 3/4	1 1/4 - 12	1 1/2 - 12	2	2.460	1 1/2	3/4	3/8
	2	1 1/2 - 12	1 3/4 - 12	2 1/4	2.585	1 11/16	7/8	3/8
8	2 1/2	1 7/8 - 12	2 1/4 - 12	3	3.085	2 1/16	1	1/2
	1 3/8*	1 - 14	1 1/4 - 12	1 5/8	1.860	1 1/8	5/8	1/4
	1 3/4	1 1/4 - 12	1 1/2 - 12	2	2.460	1 1/2	3/4	3/8
10	2	1 1/2 - 12	1 3/4 - 12	2 1/4	2.585	1 11/16	7/8	3/8
	2 1/2	1 7/8 - 12	2 1/4 - 12	3	3.085	2 1/16	1	1/2
	2*	1 1/2 - 12	1 3/4 - 12	2 1/4	2.585	1 11/16	7/8	3/8
12	2 1/2	1 7/8 - 12	2 1/4 - 12	3	3.085	2 1/16	1	1/2
	3	2 1/4 - 12	2 1/2 - 12	3 1/2	3.749	3/8†	1 1/8	3/8
14	2 1/2*	1 7/8 - 12	2 - 12	3	3.085	2 1/16	1	1/2
	3	2 1/4 - 12	2 1/2 - 12	3 1/2	3.749	3/8†	1 1/8	3/8
16	3 1/2	2 1/2 - 12	3 1/4 - 12	3 1/2	4.249	3/8†	1 1/4	1/4
	3*	2 1/4 - 12	2 1/2 - 12	3 1/2	3.749	3/8†	1 5/8	3/8
18	4	3 - 12	3 3/4 - 12	4	4.749	1/2‡	1 3/4	1/4
	3 1/2*	2 1/2 - 12	3 1/4 - 12	3 1/2	4.249	3/8†	1 3/4	1/4
	4	3 - 12	3 3/4 - 12	4	4.749	1/2‡	1 3/4	1/4
20	5	3 1/2 - 12	4 3/4 - 12	5	5.749	1/2‡	1 5/8	3/8
	4*	3 - 12	3 3/4 - 12	4	4.749	1/2‡	2 1/4	1/4
22	5	3 1/2 - 12	4 3/4 - 12	5	5.749	1/2‡	2 1/8	3/8
	4*	3 - 12	3 3/4 - 12	4	4.749	1/2‡	2 1/4	1/4

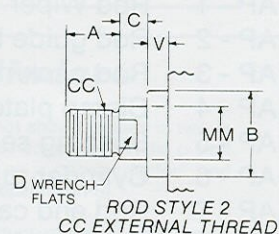
## PISTON ROD THREADS IMPORTANT:

Style 1 Rod Thread (KK) is standard and will be furnished unless otherwise specified. Alternate Rod Ends 2 and 3 are available at no extra charge.

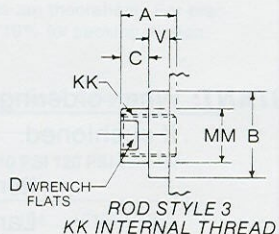
Special Rod Ends will be made to customer's specifications and designated as a style 4 rod end.



ROD STYLE 1  
KK EXTERNAL THREAD



ROD STYLE 2  
CC EXTERNAL THREAD



ROD STYLE 3  
KK INTERNAL THREAD

STANDARD ROD DIAMETER      † 3/8 DIA. SPANNER HOLES      ‡ 1/2 DIA. SPANNER HOLES

\*\* WILL SUIT ROD END ACCESSORY ORDERED WITH CYLINDER



**Table 1  
ENVELOPE & MOUNTING DIMENSIONS**

CYLINDER BORE									
	7	8	10	12	14	16	18	20	22
AA	8.1	9.1	11.5	13.83	15.625	19	20 1/4	23	
BB	2 5/16	2 5/16	2 11/16	2 11/16	3 3/16	3 5/8	4 1/8	4 1/4	
BD	2 1/2	2 1/2	3	3	3 1/2	3 1/2	3 1/2	4	
BC	1 1/8	1 1/8	1 3/8	1 3/4	1 7/8	1 7/8	2 1/4	2 3/4	
BL	1 1/2	1 1/2	2 1/4	2 1/2	3	3	3 1/2	4 1/4	
BR	1 3/8	1 3/8	1 13/16	2 5/16	2 3/4	2 3/4	3 1/4	3 7/8	
CB	1 9/16	1 9/16	2 1/16	2 9/16	2 9/16	2 9/16	3 1/16	3 1/16	
CD	1.001	1.001	1.376	1.751	2.002	2.002	2.504	3.000	
CW	3/4	3/4	1	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	
DD	5/8 - 18	5/8 - 18	3/4 - 16	3/4 - 16	7/8 - 14	1 - 14	1 1/8 - 12	1 1/4 - 12	
E	7 1/2	8 1/2	10 5/8	12 3/4	14 3/4	17 1/2	19	21	
EB	9/16	11/16	13/16	13/16	15/16	1 1/16	1 1/8	1 1/4	
EE	3/4	3/4	1	1	1 1/4	1 1/4	1 1/4	1 1/2	
F	3/4	3/4	3/4	3/4 *	3/4 *	1	1	1	
G	2	2	2 1/4	2 1/4	2 3/4	3	3	3	
J	1 1/2	1 1/2	2	2	2 1/4	3	3	3	
K	9/16	9/16	11/16	11/16	3/4	7/8	1	1 1/16	
L	1 1/2	1 1/2	2 1/8	2 1/4	2 1/2	2 1/2	3	3 1/4	
LB	5 7/8	5 7/8	7 1/8	7 5/8	8 7/8	10	10	10 1/2	
LD	7 1/8	7 1/8	8 1/8	8 5/8	10 1/8	11	11	11 1/2	
LR	1 1/4	1 1/4	1 7/8	2 1/8	2 3/8	2 3/8	2 3/4	3	
M	1	1	1 3/8	1 3/4	2	2	2 1/2	3	
MR	1	1 3/16	1 5/8	2 1/8	2 3/8	2 3/8	2 3/4	3 1/2	
ND	1	1 1/8	1 1/2	1 1/2	1 3/4	2	2	2	
NT	3/4 - 10	3/4 - 10	1 - 8	1 - 8	1 1/4 - 7	1 1/2 - 6	1 1/2 - 6	1 1/2 - 6	
P	3 1/4	3 1/4	4 1/8	4 5/8	5 1/2	6	6	6 1/2	
R	5.73	6.48	8.125	9.78	11.05	13.44	14.31	16.266	
SB	13/16	13/16	1 1/16	1 1/16	1 5/16	1 9/16	1 9/16	1 9/16	
SN	3 1/4	3 1/4	4 1/8	4 5/8	5 1/2	6	6	6 1/2	
SS	3 3/4	3 3/4	4 5/8	5 1/8	5 7/8	6	6	6 1/2	
ST	1	1	1 1/4	1 1/4	1 1/2	1 3/4	1 3/4	1 3/4	
SW	11/16	11/16	7/8	7/8	1 1/8	1 3/4	1 3/8	1 3/8	
** TD	1.375	1.375	1.750	1.750	2.000	2.500	3.000	3.500	
TE	6.75	7.57	9.40	11.37	12.87	15.44	17.125	18.50	
TL	1 3/8	1 3/8	1 3/4	1 3/4	2	2 1/2	3	3 1/2	
TM	8 3/4	9 3/4	12	14	16 1/4	18 1/4	20 1/4	23 1/4	
TN	3 1/2	4 1/2	5 1/2	7 1/4	8 3/8	8 1/2	9	10	
TS	8 7/8	9 7/8	12 3/8	14 1/2	17	21	21 3/4	23 3/4	
UM	11 1/2	12 1/2	15 1/2	17 1/2	20 1/4	23 1/4	26 1/4	30 1/4	
US	10 1/4	11 1/4	14 1/8	16 1/4	19 1/4	24 1/2	24 1/4	26 1/2	
UT	10 1/4	11 1/4	14 1/8	16 1/4	18 3/4	22 1/2	24	28	
UV	8 1/2	9 1/2	11 3/4	13 3/4	16	18	20	23	

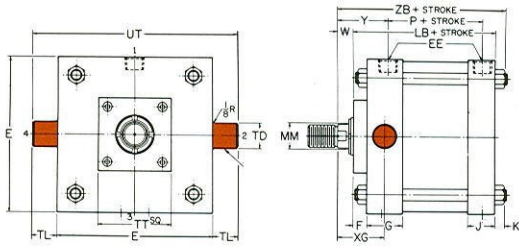
CHECK WITH FACTORY

\* 3" & 3 1/2" Rod F=7/8"

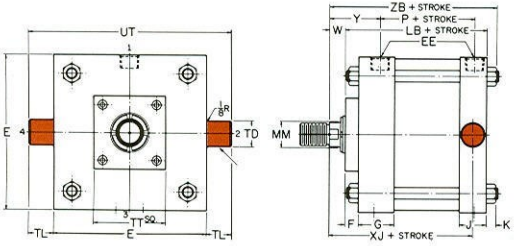
\*\* Oversize Trunnion Journals  
Available on Request

\*\* Journal Tolerance    + .000    Standard  
                                     - .002

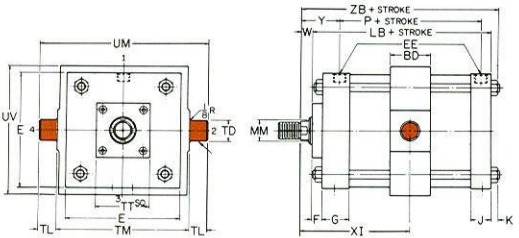




**Type T-1 — Head Trunnion Mounting**



**Type T-2 — Cap Trunnion Mounting**



**Type T-4 — Intermediate Trunnion Mounting**

MODEL AP: Model APB is identical to Model AP except for adjustable cushions.

PORT LOCATION: Standard No. 1 Position as shown. Other positions, 2, 3, or 4 are optional, no charge.

ROD THREAD: Standard, Style 1, Optional, Style 2. Special as required.

ROD SIZES: Table 3 \* indicates Standard Rod.

**Table 2  
ENVELOPE & MOUNTING DIMENSIONS**

Bore	Rod	TT	W	XC	XG	XI	XJ	XL	XK	XS	XT	Y	ZB	ZC	ZJ	ZM
7	1 3/8*	4	7/8	8 1/4	2 5/8	4 7/8	6	8 1/4	5 1/4	2 5/16	2 13/16	2 13/16	7 5/16	9 1/4	6 3/4	8 7/8
	1 3/4	4	1 1/8	8 1/2	2 7/8	5 1/8	6 1/4	8 1/2	5 1/2	2 9/16	3 1/16	3 1/16	7 9/16	9 1/2	7	9 3/8
	2	4	1 1/4	8 5/8	3	5 1/4	6 3/8	8 5/8	5 5/8	2 11/16	3 3/16	3 3/16	7 11/16	9 5/8	7 1/8	9 5/8
	2 1/2	4 1/2	1 1/2	8 7/8	3 1/4	5 1/2	6 5/8	8 7/8	5 7/8	2 15/16	3 7/16	3 7/16	7 15/16	9 7/8	7 3/8	10 1/8
8	1 3/8*	4	7/8	8 1/4	2 5/8	4 7/8	6	8 1/4	5 1/4	2 5/16	2 13/16	2 13/16	7 5/16	9 1/4	6 3/4	8 7/8
	1 3/4	4	1 1/8	8 1/2	2 7/8	5 1/8	6 1/4	8 1/2	5 1/2	2 9/16	3 1/16	3 1/16	7 9/16	9 1/2	7	9 3/8
	2	4	1 1/4	8 5/8	3	5 1/4	6 3/8	8 5/8	5 5/8	2 11/16	3 3/16	3 3/16	7 11/16	9 5/8	7 1/8	9 5/8
	2 1/2	4 1/2	1 1/2	8 7/8	3 1/4	5 1/2	6 5/8	8 7/8	5 7/8	2 15/16	3 7/16	3 7/16	7 15/16	9 7/8	7 3/8	10 1/8
10	1 3/4*	4	1 1/8	10 3/8	3	5 5/8	7 1/4	10 1/2	6 1/4	2 3/4	3 1/8	3 1/8	8 15/16	11 3/4	8 1/4	10 3/8
	2	4	1 1/4	10 1/2	3 1/8	5 3/4	7 3/8	10 5/8	6 3/8	2 7/8	3 1/4	3 1/4	9 1/16	11 7/8	8 3/8	10 5/8
	2 1/2	4 1/2	1 1/2	10 3/4	3 3/8	6	7 5/8	10 7/8	6 5/8	3 1/8	3 1/2	3 1/2	9 5/16	12 1/8	8 5/8	11 1/8
12	2*	4	1 1/4	11 1/8	3 1/8	5 3/4	7 7/8	11 3/8	6 7/8	2 7/8	3 1/4	3 1/4	9 9/16	12 7/8	8 7/8	11 1/8
	2 1/2	4 1/2	1 1/2	11 3/8	3 3/8	6	8 1/8	11 5/8	7 1/8	3 1/8	3 1/2	3 1/2	9 13/16	13 1/8	9 1/8	11 5/8
	3	6 1/2	1 1/2	11 3/8	3 3/8	6	8 1/8	11 5/8	7 1/8	3 1/8	3 1/2	3 1/2	9 13/16	13 1/8	9 1/8	11 7/8
14	2 1/2*	4 1/2	1 1/2	12 7/8	3 5/8	6 3/4	9 1/4	13 3/8	8 1/8	3 3/8	3 13/16	3 13/16	11 1/8	14 7/8	10 3/8	13 1/8
	3	6 1/2	1 1/2	12 7/8	3 5/8	6 3/4	9 1/4	13 3/8	8 1/8	3 3/8	3 13/16	3 13/16	11 1/8	14 7/8	10 3/8	13 3/8
	3 1/2	6 1/2	1 1/2	12 7/8	3 5/8	6 3/4	9 1/4	13 3/8	8 1/8	3 3/8	3 13/16	3 13/16	11 1/8	14 7/8	10 3/8	13 3/8
16	3*	6 1/2	2	14 1/2	4 1/2	8 1/4	10 1/2	15	9	4 1/2	-	4 1/2	12 7/8	16 1/2	12	15
	3 1/2	6 1/2	2	14 1/2	4 1/2	8 1/4	10 1/2	15	9	4 1/2	-	4 1/2	12 7/8	16 1/2	12	15
	4	7 1/2	2	14 1/2	4 1/2	8 1/4	10 1/2	15	9	4 1/2	-	4 1/2	12 7/8	16 1/2	12	15
18	3 1/2*	6 1/2	2	15	4 1/2	8 1/4	10 1/2	15 1/2	9	4 1/2	-	4 1/2	13	17 1/2	12	15
	4	7 1/2	2	15	4 1/2	8 1/4	10 1/2	15 1/2	9	4 1/2	-	4 1/2	13	17 1/2	12	15
20	4*	7 1/2	2 1/2	16 1/4	5	8 3/4	11 1/2	17 1/4	10	5	5	5	14 1/16	19 1/4	13	16 1/2
22	CHECK WITH FACTORY															

\* Standard Rod Diameter