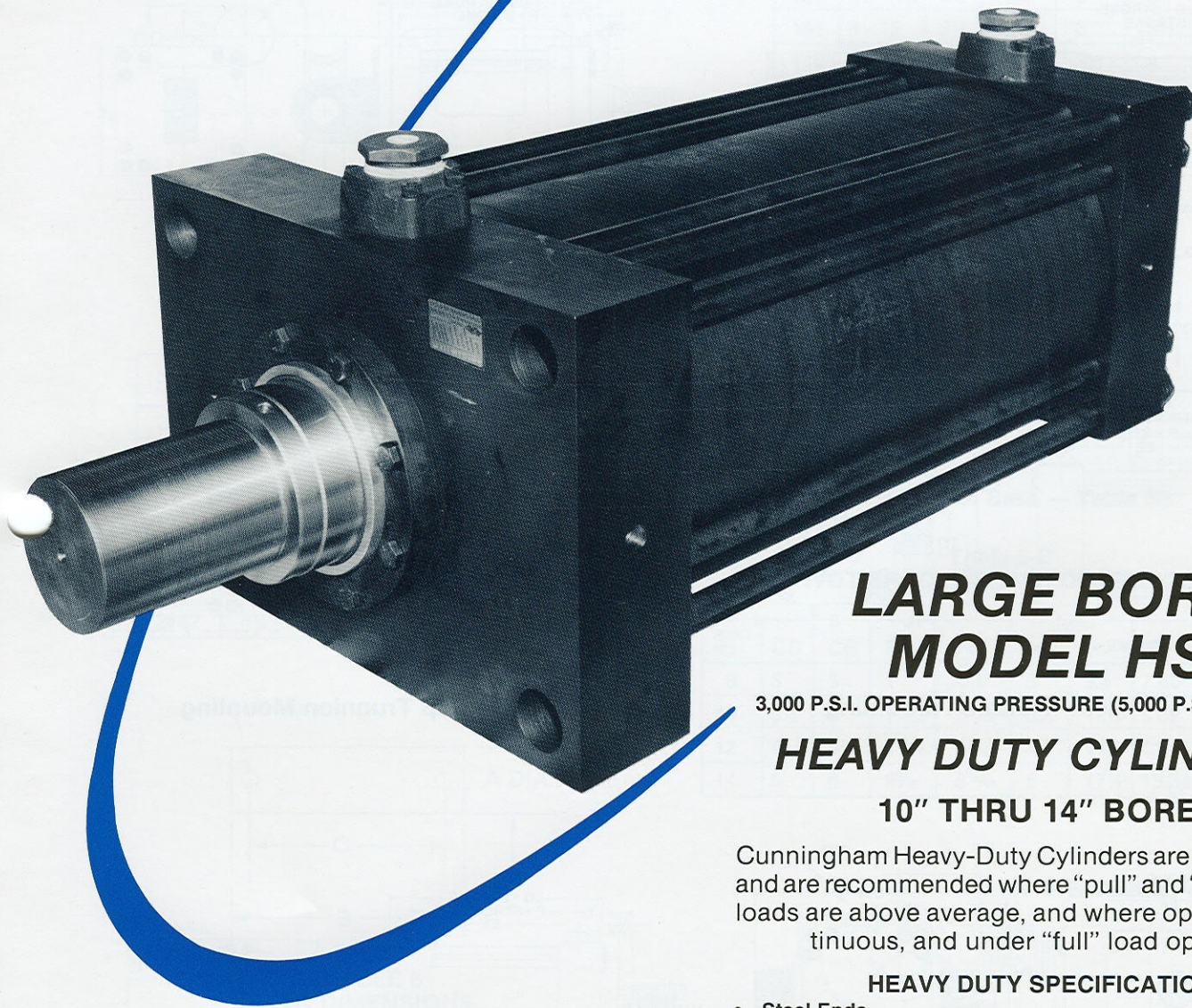


# Cunningham

SINCE 1949

## HYDRAULIC CYLINDERS



### LARGE BORE MODEL HS

3,000 P.S.I. OPERATING PRESSURE (5,000 P.S.I. Non-Shock)

### HEAVY DUTY CYLINDERS

10" THRU 14" 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)
- Precision Honed Steel Tubing
- High Tensile Tie Rods, and Grade 8 Nuts
- Urethane Piston and Rod Seals
- Cushions Optional
- JIC Standard Construction and Dimensions
- For 1½" thru 8" Bores, See Catalog 499 HS

CATALOG NO. 699 HS

## Cunningham Manufacturing Co.

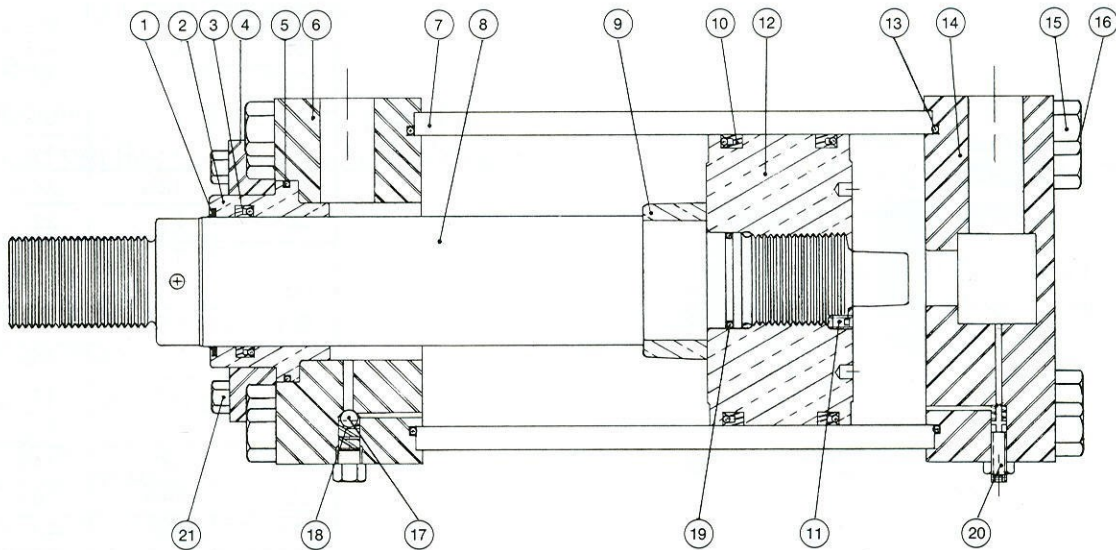
318 SOUTH WEBSTER STREET • SEATTLE, WASHINGTON 98108 • (206) 767-3713 • FAX # 206-762-3457



# Ordering Data Required for Model HS

1. QUANTITY
2. MOUNTING TYPE
3. BORE DIAMETER
4. STROKE LENGTH
5. ROD DIAMETER
6. ROD THREAD ("KK") STANDARD
7. CUSHIONS
8. PORT LOCATION
9. ROD END ATTACHMENT
10. SPECIAL FEATURES AS:
  - ROD BOOTS
  - STAINLESS ROD
  - SPECIAL SEALS
  - STOP TUBE
  - DUAL PISTON

**SEE KEY SHEET HS 3 FOR MODEL NUMBERING SYSTEM.**



## MODEL HS — PARTS LIST

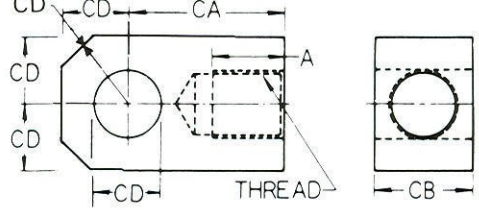
- |         |                     |         |   |
|---------|---------------------|---------|---|
| HS - 1  | Rod Wiper           | HS - 11 | Piston Lock Screw                                 |
| HS - 2  | Rod Guide Bushing   | HS - 12 | Piston  |
| HS - 3  | Rod Packing         | HS - 13 | Tube Seals  |
| HS - 4  | Retainer Plate      | HS - 14 | Blind End Cap                                     |
| HS - 5  | Bushing Seal        | HS - 15 | Tie Rod Nut                                       |
| HS - 6  | Rod End Cap         | HS - 16 | Tie Rod   |
| HS - 7  | Cylinder Tube       | HS - 17 | Stainless Ball (Each end)                         |
| HS - 8  | Piston rod          | HS - 18 | Ball Check Spring (Each end)                      |
| HS - 9  | Rod Cushion Bushing | HS - 19 | Piston ID Seal                                    |
| HS - 10 | Piston Seals        | HS - 20 | Cushion Adjusting Assembly<br>(Each end optional) |
|         |                     | HS - 21 | Retainer Cap Screws                               |

**IMPORTANT:** When ordering parts, please give complete nameplate data as to bore, stroke, rod diameter, and if cushioned. Every cylinder has a Serial Number metal stamped on the Rod End Cap.

STANDARD PRESSURE, 3,000 P.S.I.  
(5000 P.S.I. NON-SHOCK)

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

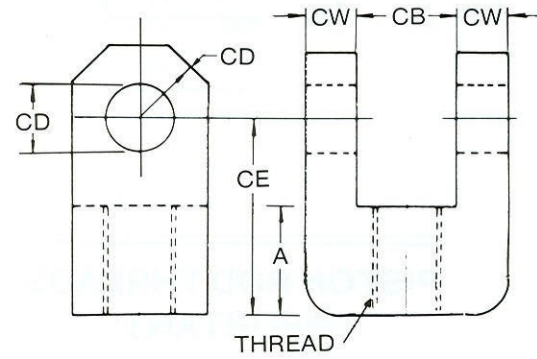
# MOUNTING ACCESSORIES



**Rod End Eye — Table 5A**

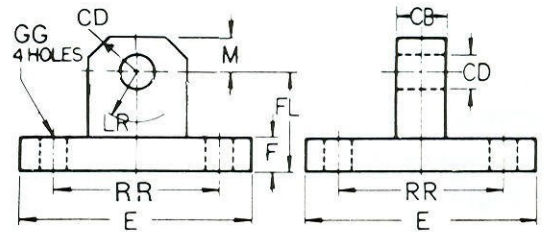
**Table 5-A  
PIVOT ROD EYE DIMENSIONS**

EYE NO.	THREAD	A	CA	CD	CB
181	2½ - 12	3½	6⅞	3	3
192	3 - 12	3½	6½	3	3½
1101	3¼ - 12	3½	7⅞	3½	4
1121	3½ - 12	4	9⅞	4	4½
1122	4 - 12	4	9⅞	4	4½
1141	5 - 12	6	11⅞	5	6
1142	5¾ - 12	6	11⅞	5	6



**Table 5-C  
ROD CLEVIS DIMENSIONS**

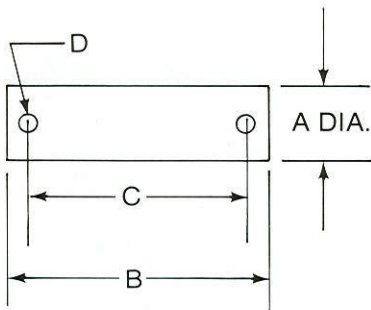
CL NO.	THREAD	A	CE	CD	CB	CW
282	3 - 12	3½	6¾	3	3⅛	1½
2101	3¼ - 12	3½	7¾	3½	4⅛	2
2111	3½ - 12	3½	7¾	3½	4⅛	2
2121	3½ - 12	4	8⅓⅛	4	4⅞	2¼
2122	4 - 12	4	8⅓⅛	4	4⅞	2¼
2141	5 - 12	5	10¾	5	6⅞	3
2142	5¾ - 12	5	10¾	5	6⅞	3



**Pivot Bracket Base — Table 5B**

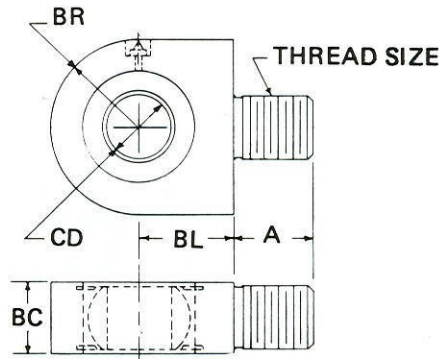
**Table 5-B  
PIVOT BRACKET BASE DIMENSIONS**

BRKT. NO.	CD	CB	F	FL	M	E	RR	LR	GG
8	3	3	1	4¼	3	9½	7.50	2¾	1⅝
10	3½	4	1⅛⅛	5⅓⅛	3½	12⅝	9.62	4	1⅓⅛
12	4	4½	1⅓⅛	6⅓⅛	4	14⅞	11.45	4½	2⅓⅛
14	5	6	2⅓⅛	8⅓⅛	5	17¼	13.34	5¼	2⅝



**TABLE 6  
PIN DIMENSIONS**

PIN NO.	A	C	B	D
8	3	6½	7¼	⅝
10	3½	8½	9⅞	⅝
12	4	9½	11	1⅓
14	5	12½	14	1⅓



**SPHERICAL BUSHING — B1T**

EYE NO.	CYL. BORE	BEARING (SKF)	BC	BL	BR	CD PIN	THREAD SIZE	'A' THD. LENGTH
8 BIT	8	300	2¾	4¼	3⅞	3	2½-12	3
10 BIT	10	308	3⅞	5	4⅝	3½	3½-12	4
12 BIT	12	400	3½	6	5½	4	4 - 12	4½
14 BIT	14	500	4⅝	7	6½	5	5 - 12	6



## ENVELOPE & MOUNTING DIMENSIONS

BORE	ROD	W	Y	XC	XF	XG	XI MIN.	XL	XJ	XS	WF	ZB	ZM
10	4½	2	5⅛	19¼	15¼	5	9⅛	20¼	13¼	4¾	3	16⅞	18¼
	5*	2	5⅛	19¼	15¼	5	9⅛	20¼	13¼	4¾	3	16⅞	18¼
	5½	2	5⅛	19¼	15¼	5	9⅛	20¼	13¼	4¾	3	16⅞	18¼
	7	2	5⅛	19¼	15¼	5	9⅛	20¼	13¼	4¾	3	16⅞	18¼
12	5½*	2	5⅛	22⅞	17⅞	5½	10⅛	22⅞	15⅞	5¼	3¼	18⅞	20⅞
	7	2	5⅛	22⅞	17⅞	5½	10⅛	23⅞	15⅞	5¼	3¼	18⅞	20⅞
14	7*	3⅞	7½	27⅞	21⅞	7⅛	13¼	28⅞	18⅞	6⅞	4⅞	22⅞	25½
	8	3⅞	7½	27⅞	21⅞	7⅛	13¼	28⅞	18⅞	6⅞	4⅞	22⅞	25½

\*STANDARD ROD DIAMETER

### QUALITY FEATURES

1. 660 Bronze Rod Bearing.
2. 75,000 min. yield, hard chrome plated rod.
3. 100,000 PSI min. yield Tie Rods with Grade 8 hardware.
4. Non-ferrous pistons for excellent wear and strength.
5. 65,000 min. yield steel tube, honed on I.D. to 16 RMS finish.
6. Hytrel or brass rod wiper.
7. Urethane rod seal and piston seals with expander "O" Ring.
8. Precision finished steel end caps, machined on CNC turret lathes.
9. Case hardened (IHCP) rod material optional. Many special features and options available. Contact factory for particulars.

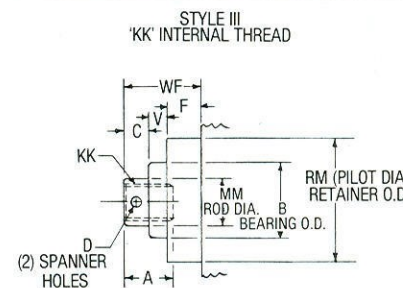
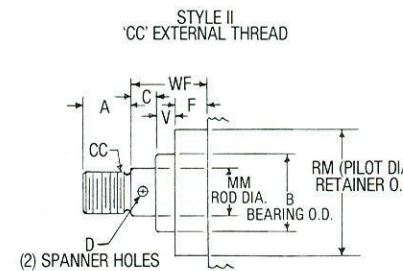
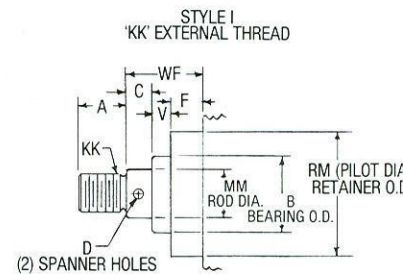
**Table 3  
ROD END DIMENSIONS**

BORE	ROD MM	STD. KK	CC	A	B +0.000 -0.002	SPANNER HOLES D	C	V	F +0.000 -0.010 RM	F
10	4½	3¼ - 12	4 - 12	5	5.875	½	1½	½	8.500	1
	5	3½ - 12	4¾ - 12	5	5.875	½	1½	½	8.500	1
	5½	4 - 12	5¼ - 12	5	6.500	½	1¼	½	9.500	1
	7	5 - 12	5¼ - 12	5	8.000	½	1¼	¾	10.000	1
12	5½	4 - 12	5¼ - 12	5½	6.500	⅝	1¾	¼	9.500	1¼
	7	5 - 12	5¼ - 12	5½	8.000	⅝	1½	½	11.000	1¼
14	7	5 - 12	6½ - 12	6	8.000	⅝	2⅝	½	11.000	1¼
	8	5¾ - 12	7½ - 12	6	9.000	⅝	2⅝	½	12.000	1¼

### PISTON ROD THREADS IMPORTANT:

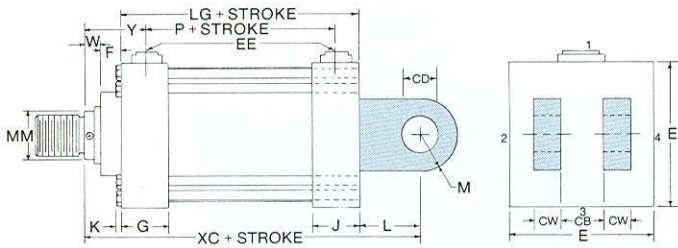
Style 1 Rod Thread (KK) is standard and will be furnished unless otherwise specified. Alternate Rod Ends 2 and 3 are available at no extra charge.

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

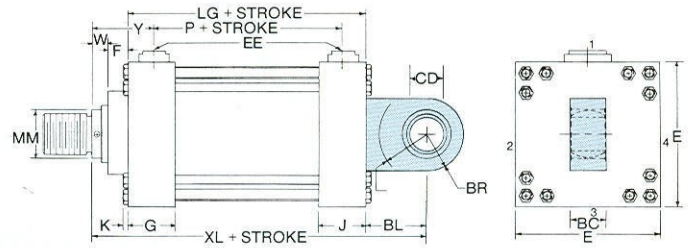


# Cunningham HYDRAULIC CYLINDERS

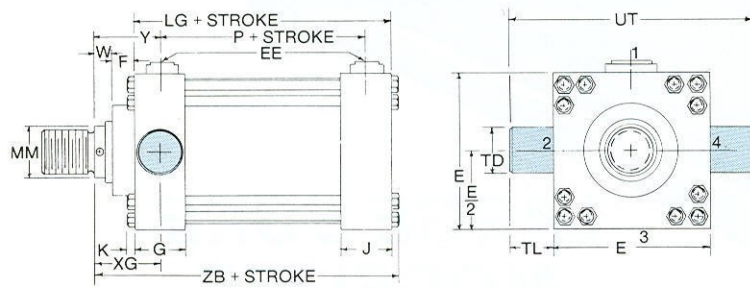
## MODEL HS LARGE BORES 10", 12" and 14"



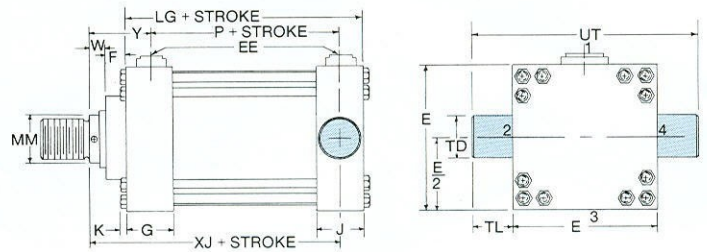
**Type P-1 — Cap Fixed Clevis Mount**



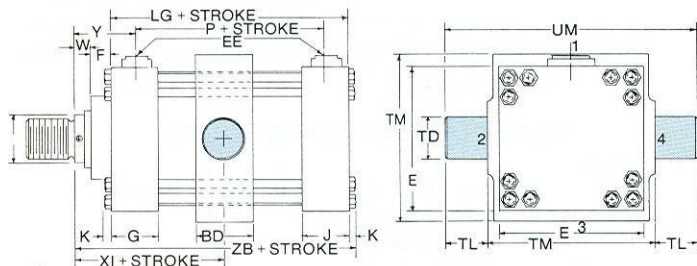
**Type B-1 — Spherical Bushing Mount**



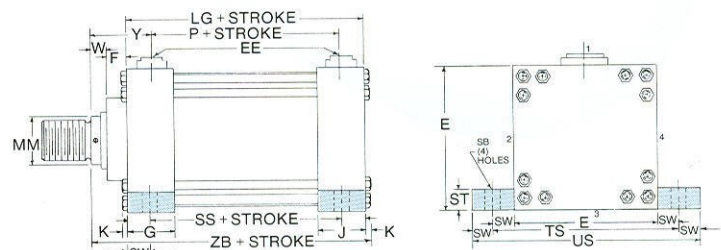
**Type T-1 — Head Trunnion Mounting**



**Type T-2 — Cap Trunnion Mounting**



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

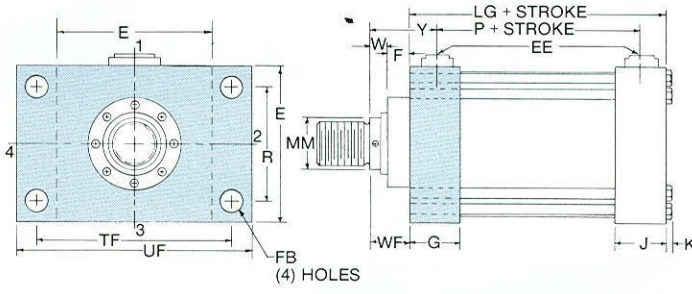


**Type S-2 — Side Lug Mounting**

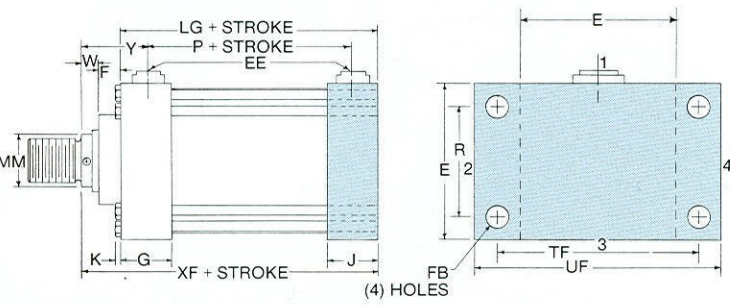
### CUSHIONS:

Tapered cushions are provided for gradual deceleration and to eliminate shock at the end of cylinder stroke. A cushion check provides rapid acceleration out of cushioning. Cushioning is designed to properly cushion the cylinder, and is not intended to cushion large inertial loads. Adjustable cushions are available as an option.

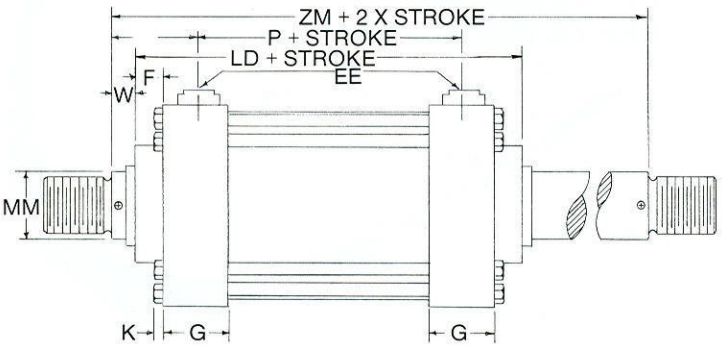




**Type FH-1 — Head Flange Mounting**  
 "G" IS FLANGE THICKNESS



**Type FH-2 — Cap Flange Mounting**  
 "J" IS FLANGE THICKNESS



**Type DRE — Basic Double Rod End**

**Table 1**  
**ENVELOPE & MOUNTING DIMENSIONS**

BORE	10	12	14
BC	3 1/8	3 1/2	4 3/8
BD	4 1/2	5 1/2	6
BL	5	6	7
BR	4 5/8	5 1/2	6 1/2
CB	4	4 1/2	6
CD*	3 1/2	4	5
CW	2	2 1/4	3
DD	1 - 14†	1 1/8 - 12†	1 1/4 - 12†
E	12 5/8	14 7/8	17 1/4
EE-NPTF	2‡	2‡	2 1/2‡
F	1"	1 1/4"	1 1/4"
FB	1 13/16	2 1/16	2 5/16
G	3 15/16	4 7/16	5 3/8
J	3 15/16	4 7/16	5 3/8
K	7/8†	1†	1 1/16
L	4	4 1/2	6 1/2
LG	12 1/4	14 3/8	16 3/4
LD	14 1/4	16 7/8	19 1/4
M	3 1/2	4	5
MB	4 3/4	5 5/8	6 5/8
P	8 1/8	9 1/2	10 1/2
R	9.605	11.45	13.34
SB	1 9/16	1 9/16	2 5/16
SS	8 7/8	10 1/2	12 1/2
ST	2 1/2	3	3 1/2
SW	1 3/4	2	2 1/4
TD**	3.500	4.000	5.000
TF	15 5/8	18 1/2	21 1/8
TL	3 1/2	4	5
TM	14	16 1/2	19 5/8
TS	16 1/8	18 3/8	21 1/4
UF	19	22	25 1/4
UM	21	24 1/2	29 5/8
US	19 5/8	22 7/8	26 1/4
UT	19 5/8	22 7/8	27 1/4

\*\*TD +.000  
 -.002

**TIE ROD TORQUE FOR MODEL HS**  
**LARGE BORE CYLINDERS**

BORE	10	12	14
TORQUE IN FOOT LBS.	650	900	1100
(12 TIE RODS)			
DIA.	1"	1 1/8"	1 1/4"

† MULTIPLE TIE RODS

‡ SAE 4 BOLTS