

Class 6

Intermediate Pressure Square-Head Cylinders

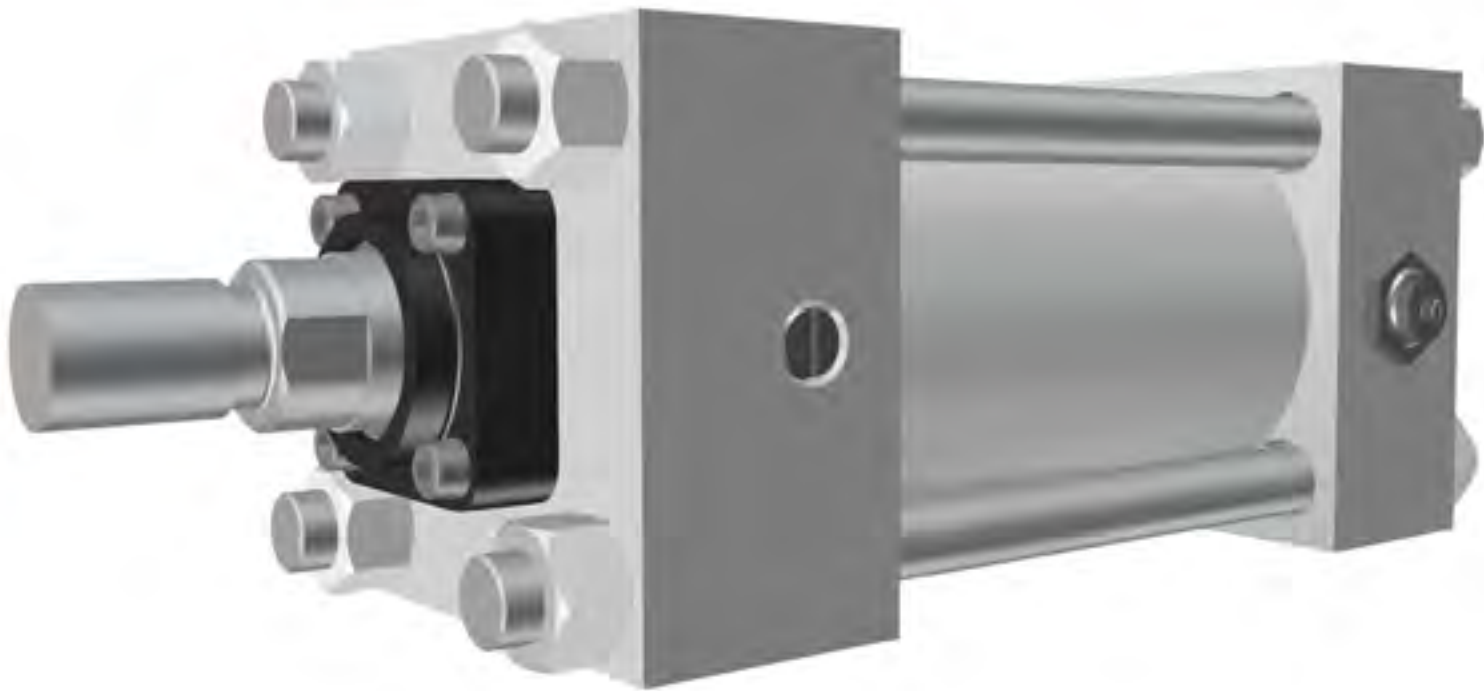


TABLE OF CONTENTS

Pressure Ratings (PSI)	96
Mounting Styles Index	97
Standard Features	98
Ordering Information	99
Flange Mount Cylinders	
1-1/2" Through 6" Bore	100
8" Through 20" Bore	102
Side and Lug Mount Cylinders	
1-1/2" Through 6" Bore	104
8" Through 20" Bore	106
End Lug and Clevis Mount Cylinders	
1-1/2" Through 8" Diameter	108
10" Through 20" Diameter	110
Fixed Eye Mount Cylinders	
1-1/2" Through 8" Diameter	112
Detachable Eye Mount Cylinders	
1-1/2" Through 10" Diameter	114
Spherical Eye Mount Cylinders	
1-1/2" Through 6" Diameter	116
Trunnion Mount Cylinders	
1-1/2" Through 6" Diameter	118
8" Through 20" Diameter	120
Tie-Rod Mount Cylinders	
1-1/2" Through 6" Diameter	122
8" Through 20" Diameter	124
Spherical Eye Pin Mount Cylinders	
1-1/2" Through 6" Diameter	126
Basic Model No Mount Cylinders	
1-1/2" Through 6" Diameter	128
8" Through 20" Diameter	130
Piston Rod Ends	132
Cylinder Accessories	133
Reed Proximity Switch	134
Proximity Position Indicator Switch	135
NOPAK Linear Displacement Transducer System	136
NLDT System Switch Number	137
How To Order	137
Engineering Information	138
Engineering Data	140
Replacement Parts	142
Exploded View	142
Repair Kits - Class P6 and H6	143
Packing Glands - Class P6 and H6	143

PRESSURE RATINGS (PSI)

NOPAK intermediate pressure square-head cylinders are designed as Class P6 for pneumatic (air) services to 250 PSI Class H6 for hydraulic service to 1500 PSI.

CYL. BORE	P6 (AIR)		H6 (HYD.)	
	RECOMMENDED CONTINUOUS DUTY OPERATING PRESSURE	MAXIMUM NON-CONTINUOUS PRESSURE RATING	RECOMMENDED CONTINUOUS DUTY OPERATING PRESSURE	MAXIMUM NON-CONTINUOUS PRESSURE RATING
1-1/2	250	750	1500	2500
2	250	750	1500	2500
2-1/2	250	500	1100	1600
3-1/4	250	650	1050	1550
4	250	400	750	1000
5	250	400	900	1200
6	200	250	500	700
8	200	250	500	800
10	200	250	400 Steel Tube	800 Steel Tube
			400 Brass Tube	450 Brass Tube
12	200	250	400	800
14	200	250	400	800
16	200	250	200	500
18	200	250	200	500
20	200	250	200	500

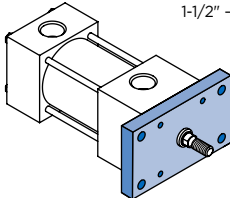
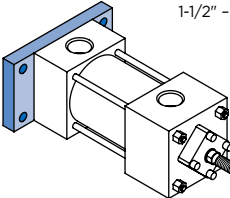
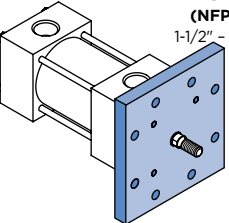
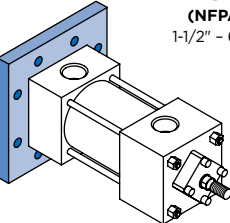
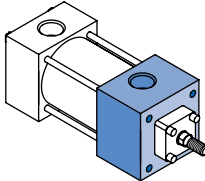
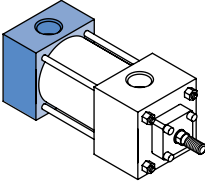
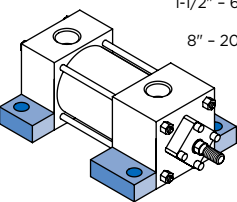
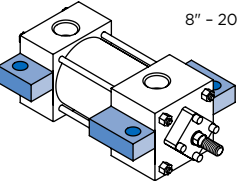
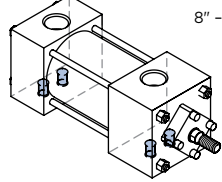
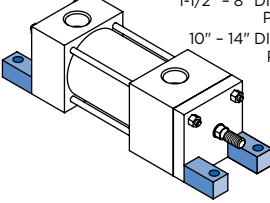
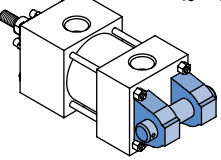
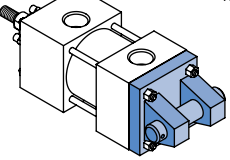
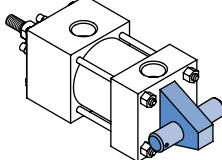
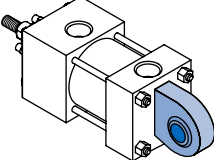
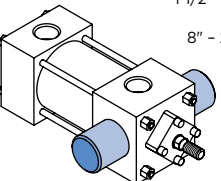
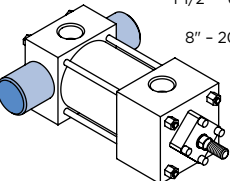
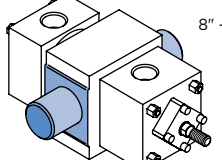
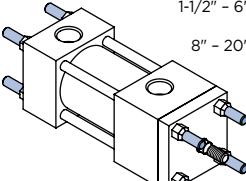
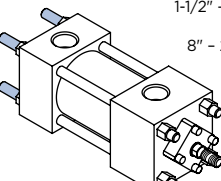
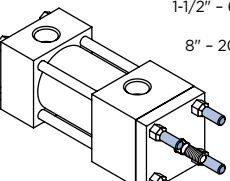
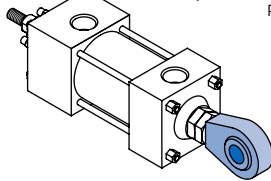
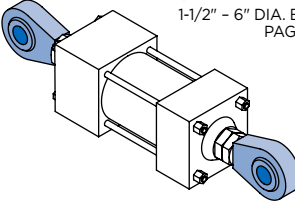
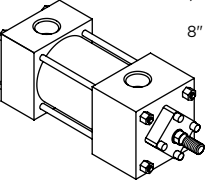
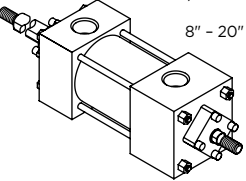
Note 1 — In addition to the pressure ratings, proper choice and application of a cylinder are dependent on mounting type, stroke, method of load application, fluid, temperature, environment, and other such conditions. For specific recommendations, consult your nearest NOPAK field representative or factory application engineer.

Note 2 — While P6 cylinders are designed primarily for air service as noted, they are also suitable for limited range low-pressure hydraulic service, consult factory. Unless otherwise specified any order received for a hydraulic cylinder will be entered as Class H6.

Note 3 — Maximum non-continuous ratings should be used only when all operating conditions are accurately known and *only* on applications intended for intermittent duty. For specific recommendations consult your nearest NOPAK field representative or factory application engineer.

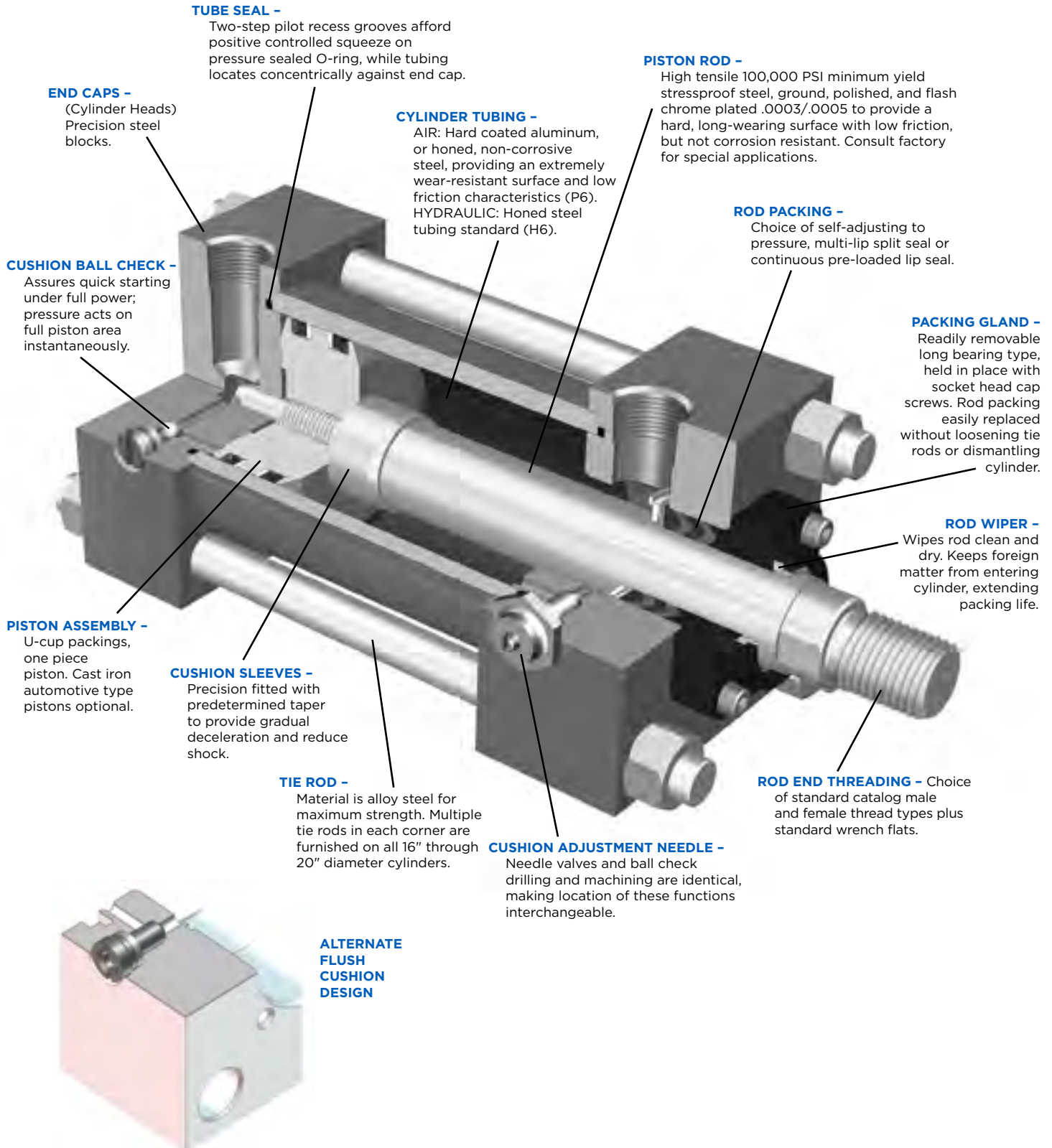
Note 4 — For pressures above these ratings, refer to NOPAK Class 3 High Pressure Hydraulic Cylinders in the Class 3 Section.

MOUNTING STYLES INDEX

 MODEL D (NFPA STD. MF1) 1-1/2" - 6" DIA. BORE PAGE 100	 MODEL C (NFPA STD. MF2) 1-1/2" - 6" DIA. BORE PAGE 100	 MODEL DD (NFPA STD. MF5) 1-1/2" - 6" DIA. BORE PAGE 100	 MODEL CC (NFPA STD. MF6) 1-1/2" - 6" DIA. BORE PAGE 100
 MODEL DG (NFPA STD. ME3) 8" - 20" DIA. BORE PAGE 102	 MODEL CJ (NFPA STD. ME4) 8" - 20" DIA. BORE PAGE 102	 MODEL A (NFPA STD. MS2) 1-1/2" - 6" DIA. BORE PAGE 104 8" - 20" DIA. BORE PAGE 106	 MODEL B (NFPA STD. MS3) 1-1/2" - 6" DIA. BORE PAGE 104 8" - 20" DIA. BORE PAGE 106
 MODEL S (NFPA STD. MS4) 1-1/2" - 6" DIA. BORE PAGE 104 8" - 20" DIA. BORE PAGE 106	 MODEL AL (NFPA STD. MS7) 1-1/2" - 8" DIA. BORE PAGE 108 10" - 14" DIA. BORE PAGE 110	 MODEL E (NFPA STD. MP1) 1-1/2" - 8" DIA. BORE PAGE 108 10" - 20" DIA. BORE PAGE 110	 MODEL HE (NFPA STD. MP2) 1-1/2" - 8" DIA. BORE PAGE 108 10" DIA. BORE PAGE 110
 MODEL E3 (NFPA STD. MP3) 1-1/2" - 8" DIA. BORE PAGE 112	 MODEL EU3 (NFPA STD. MPU3) 1-1/2" - 6" DIA. BORE PAGE 116	 MODEL FR (NFPA STD. MT1) 1-1/2" - 6" DIA. BORE PAGE 118 8" - 20" DIA. BORE PAGE 120	 MODEL FB (NFPA STD. MT2) 1-1/2" - 6" DIA. BORE PAGE 118 8" - 20" DIA. BORE PAGE 120
 MODEL F (NFPA STD. MT4) 1-1/2" - 6" DIA. BORE PAGE 118 8" - 14" DIA. BORE PAGE 120	 MODEL T (NFPA STD. MX1) 1-1/2" - 6" DIA. BORE PAGE 122 8" - 20" DIA. BORE PAGE 124	 MODEL TB (NFPA STD. MX2) 1-1/2" - 6" DIA. BORE PAGE 122 8" - 20" DIA. BORE PAGE 124	 MODEL TR (NFPA STD. MX3) 1-1/2" - 6" DIA. BORE PAGE 122 8" - 20" DIA. BORE PAGE 124
 MODEL UE (NFPA STD. NONE) 1-1/2" - 6" DIA. BORE PAGE 126	 MODEL UUE (NFPA STD. NONE) 1-1/2" - 6" DIA. BORE PAGE 126	 MODEL H (NFPA STD. NONE) 1-1/2" - 6" DIA. BORE PAGE 128 8" - 20" DIA. BORE PAGE 130	 MODEL XH (NFPA STD. NONE) 1-1/2" - 6" DIA. BORE PAGE 128 8" - 20" DIA. BORE PAGE 130

NOTE: NFPA-MS1 (NOPAK Model AP), ME5 (NOPAK MODEL G) and ME6 (NOPAK MODEL J) not shown, but available. Consult Factory.

INTERMEDIATE PRESSURE SQUARE-HEAD CLASS P6-AIR & H6 HYDRAULIC CYLINDERS CUTAWAY VIEW



HOW TO ORDER

YOU CAN HELP ENSURE PROMPT PROCESSING OF YOUR ORDER BY INCLUDING ALL OF THE FOLLOWING REQUESTED INFORMATION:

1. Quantity required.
2. Operating medium: Series P6 or H6.
P for pneumatic and H for hydraulic.
3. Bore size.
4. Stroke length in inches.
5. Type of mounting (NOPAK Model or NFPA STD. style).
6. Type of cushioning:
NN = non-cushioned
NA = cushioned blind end
AN = cushioned rod end
AA = cushioned both ends
7. Piston rod diameter and type of rod threading – specify Type 1, 3, 4, 5, 6 or 7. See page 132.

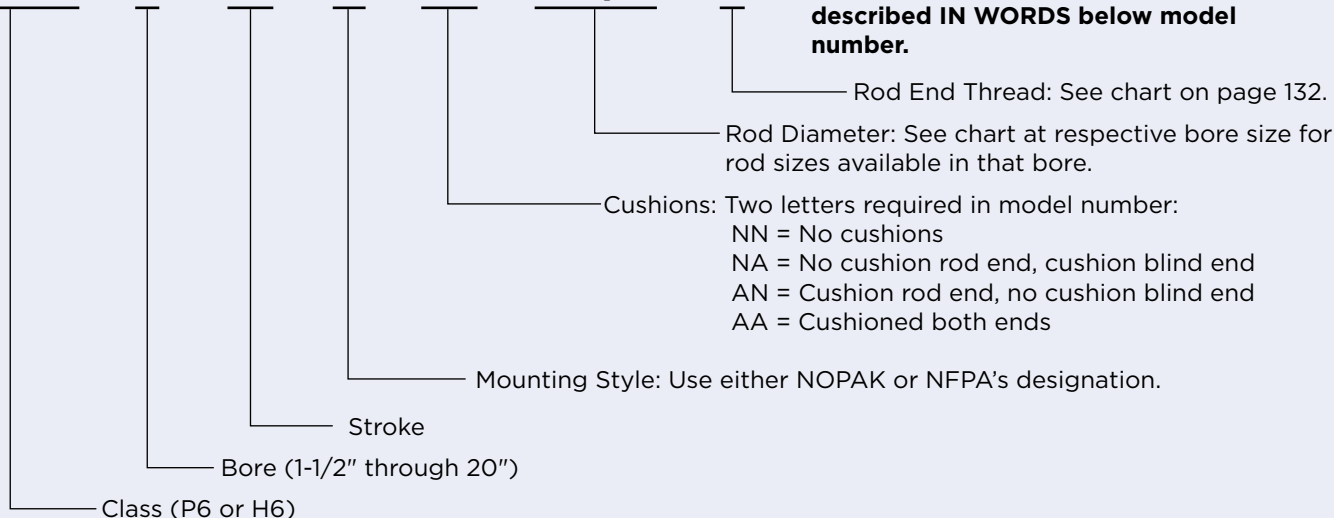
ALSO SPECIFY:

1. Position of cylinder ports and cushion adjustment screws, if other than standard. Standard positions are:
National pipe thread inlets – position 1
Ball check – position 2
Cushion adjustment – position 4
2. Extreme high or low operating or ambient temperatures.
3. Type of hydraulic fluid if other than standard petroleum base oil.
4. Any unusual operating conditions.

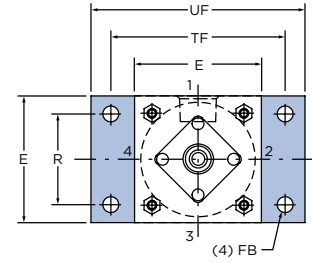
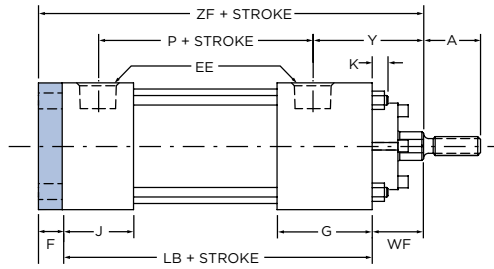
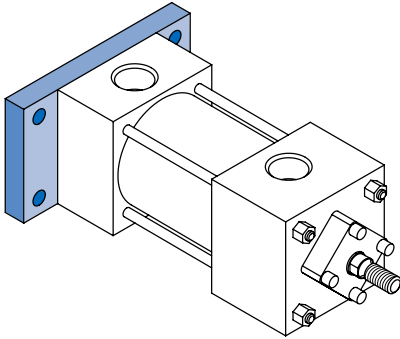
ORDERING CODE EXAMPLE

CLP6 - 8 x 18 - A - ΔΔ - 1-3/8 - 4

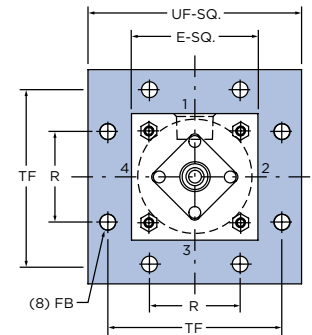
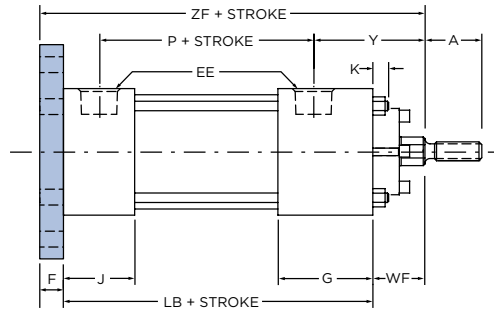
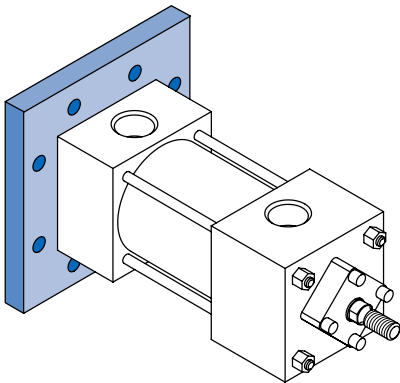
Any special requirements should be described IN WORDS below model number.



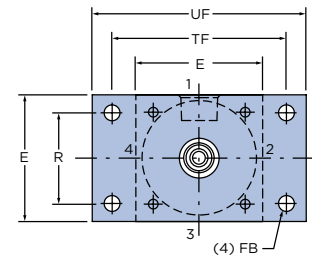
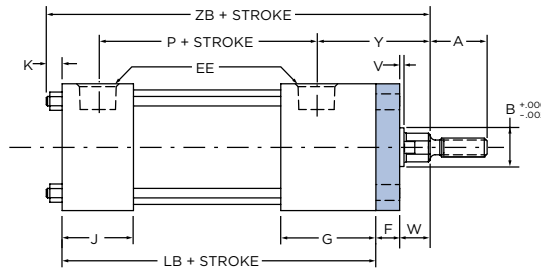
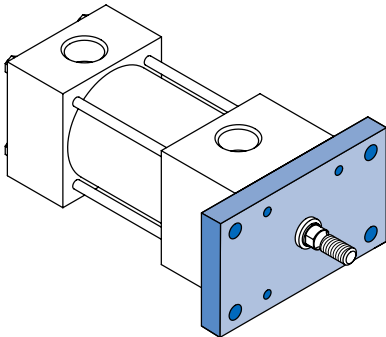
MODEL C (NFPA STD. MF2)▲



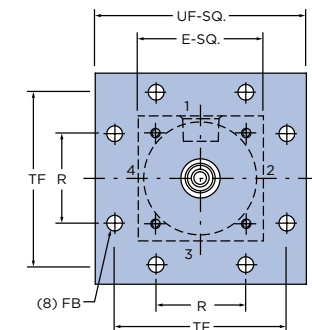
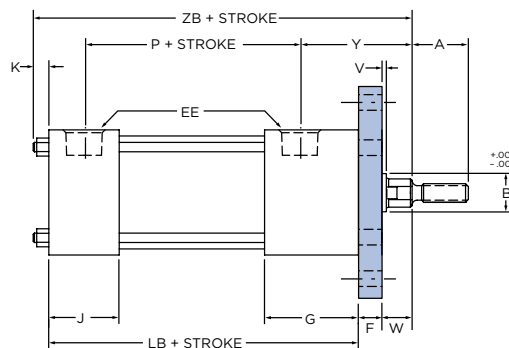
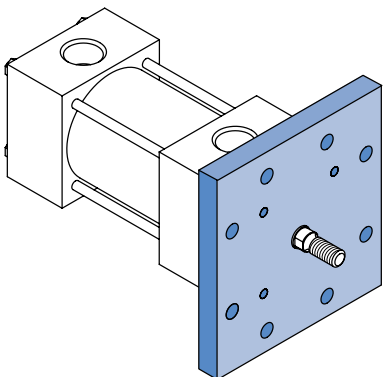
MODEL CC (NFPA STD. MF6)▲



MODEL D (NFPA STD. MF1)



MODEL DD (NFPA STD. MF5)



▲ = See Table A on page 127 for bore and rod combinations using head plates with threaded bronze glands.

Table 1 These dimensions are constant regardless of rod diameter or stroke.

Double rod end models are designated by letter "X" preceding the model identification. See page 128.

• = Dimensions refer to bolt diameter.

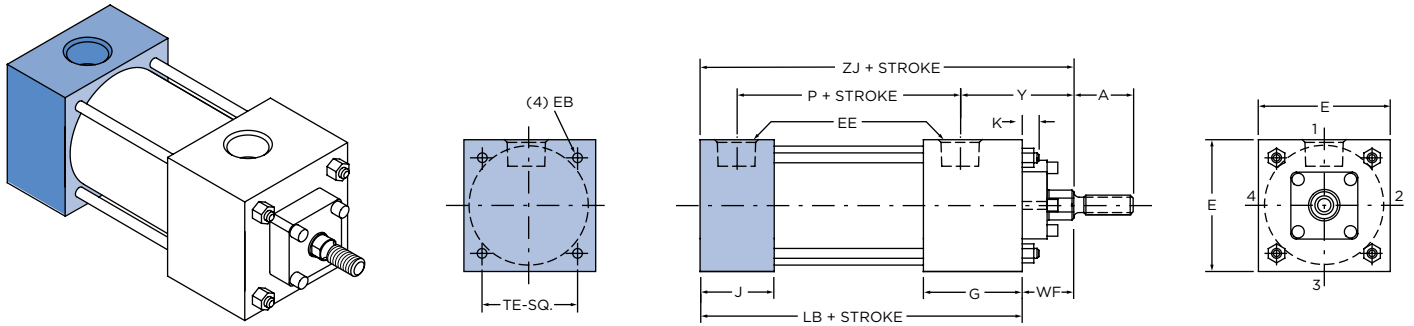
BORE DIA.	E	F	G	J	K	R	EE	FB•	TF	UF
1-1/2	2	3/8	1-1/2	1-1/8	1/4	1.43	3/8	1/4	2-3/4	3-3/8
2	2-1/2	3/8	1-1/2	1-1/8	7/16	1.84	3/8	5/16	3-3/8	4-1/8
2-1/2	3	3/8	1-1/2	1-1/8	5/16	2.19	3/8	5/16	3-7/8	4-5/8
3-1/4	3-3/4	5/8	1-3/4	1-1/4	7/16	2.76	1/2	3/8	4-11/16	5-1/2
4	4-1/2	5/8	1-3/4	1-1/4	7/16	3.32	1/2	3/8	5-7/16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

Table 2 The dimensions given on this table are affected by the piston rod diameter and the stroke.

• = For piston rod dimensions see page 132.

BORE DIA.	ROD MM•	A	B	P	V	W	Y	LB	WF	ZB	ZF
1-1/2	5/8	3/4	1-1/8	2-1/8	1/4	5/8	1-15/16	3-5/8	1	4-7/8	5
	1	1-1/8	1-1/2	2-1/8	1/2	1	2-5/16	3-5/8	1-3/8	5-1/4	5-3/8
2	5/8	3/4	1-1/8	2-1/8	1/4	5/8	1-15/16	3-5/8	1	5-1/16	5
	1	1-1/8	1-1/2	2-1/8	1/2	1	2-5/16	3-5/8	1-3/8	5-7/16	5-3/8
	1-3/8	1-5/8	2	2-1/8	5/8	1-1/4	2-9/16	3-5/8	1-5/8	5-11/16	5-5/8
2-1/2	5/8	3/4	1-1/8	2-1/4	1/4	5/8	1-15/16	3-3/4	1	5-1/16	5-1/8
	1	1-1/8	1-1/2	2-1/4	1/2	1	2-5/16	3-3/4	1-3/8	5-7/16	5-1/2
	1-3/8	1-5/8	2	2-1/4	5/8	1-1/4	2-9/16	3-3/4	1-5/8	5-11/16	5-3/4
	1-3/4	2	2-3/8	2-1/4	3/4	1-1/2	2-13/16	3-3/4	1-7/8	5-15/16	6
3-1/4	1	1-1/8	1-1/2	2-1/2	1/4	3/4	2-1/2	4-1/4	1-3/8	6-1/16	6-1/4
	1-3/8	1-5/8	2	2-1/2	3/8	1	2-3/4	4-1/4	1-5/8	6-5/16	6-1/2
	1-3/4	2	2-3/8	2-1/2	1/2	1-1/4	3	4-1/4	1-7/8	6-9/16	6-3/4
	2	2-1/4	2-5/8	2-1/2	1/2	1-3/8	3-1/8	4-1/4	2	6-11/16	6-7/8
4	1	1-1/8	1-1/2	2-1/2	1/4	3/4	2-1/2	4-1/4	1-3/8	6-1/16	6-1/4
	1-3/8	1-5/8	2	2-1/2	3/8	1	2-3/4	4-1/4	1-5/8	6-5/16	6-1/2
	1-3/4	2	2-3/8	2-1/2	1/2	1-1/4	3	4-1/4	1-7/8	6-9/16	6-3/4
	2	2-1/4	2-5/8	2-1/2	1/2	1-3/8	3-1/8	4-1/4	2	6-11/16	6-7/8
	2-1/2	3	3-1/8	2-1/2	5/8	1-5/8	3-3/8	4-1/4	2-1/4	6-15/16	7-1/8
5	1	1-1/8	1-1/2	2-3/4	1/4	3/4	2-1/2	4-1/2	1-3/8	6-3/8	6-1/2
	1-3/8	1-5/8	2	2-3/4	3/8	1	2-3/4	4-1/2	1-5/8	6-5/8	6-3/4
	1-3/4	2	2-3/8	2-3/4	1/2	1-1/4	3	4-1/2	1-7/8	6-7/8	7
	2	2-1/4	2-5/8	2-3/4	1/2	1-3/8	3-1/8	4-1/2	2	7	7-1/8
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	3	3-1/2	3-3/4	2-3/4	5/8	1-5/8	3-3/8	4-1/2	2-1/4	7-1/4	7-3/8
	3-1/2	3-1/2	4-1/4	2-3/4	5/8	1-5/8	3-3/8	4-1/2	2-1/4	7-1/4	7-3/8
6	1-3/8	1-5/8	2	3-1/8	1/4	7/8	2-13/16	5	1-5/8	7-3/16	7-3/8
	1-3/4	2	2-3/8	3-1/8	3/8	1-1/8	3-1/16	5	1-7/8	7-7/16	7-5/8
	2	2-1/4	2-5/8	3-1/8	3/8	1-1/4	3-3/16	5	2	7-9/16	7-3/4
	2-1/2	3	3-1/8	3-1/8	1/2	1-1/2	3-7/16	5	2-1/4	7-13/16	8
	3	3-1/2	3-3/4	3-1/8	1/2	1-1/2	3-3/16	5	2-1/4	7-13/16	8
	3-1/2	3-1/2	4-1/4	3-1/8	1/2	1-1/2	3-7/16	5	2-1/4	7-13/16	8
	4	4	4-3/4	3-1/8	1/2	1-1/2	3-7/16	5	2-1/4	7-13/16	8

MODEL CJ (NFPA STD. ME4)



MODEL DG (NFPA STD. ME3)

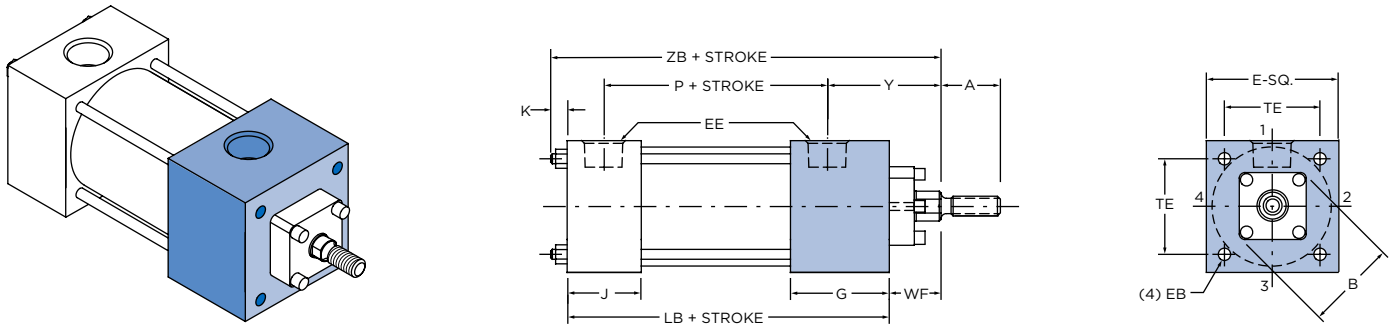


Table 1 These dimensions are constant regardless of rod diameter or stroke.

Double rod end models are designated by letter "X" preceding the model identification. See page 128.

• = Dimensions refer to bolt diameter.

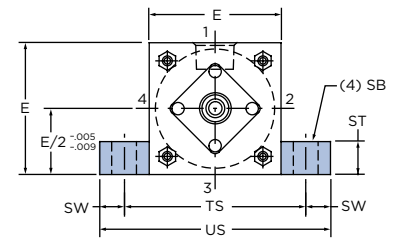
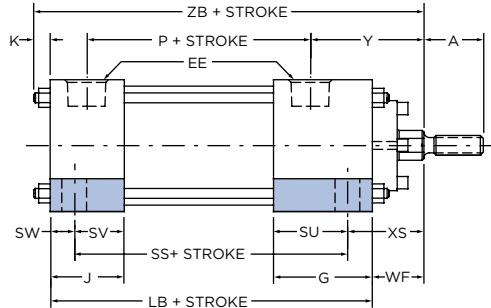
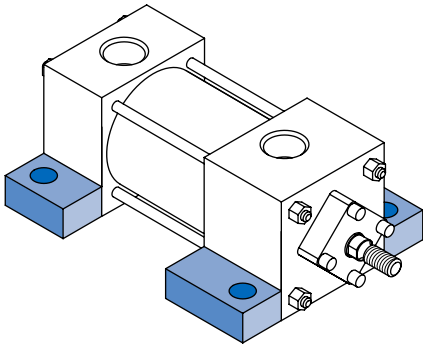
BORE DIA.	E	G	J	K	EB•	EE	TE
8	8-1/2	2	1-1/2	5/8	5/8	3/4	7.57
10	10-5/8	2-1/4	2	3/4	3/4	1	9.4
12	12-3/4	2-1/4	2	3/4	3/4	1	11.1
14	14-3/4	2-3/4	2-1/4	7/8	7/8	1-1/4	12.87
16	17-1/2	3	3	1	1-1/4	1-1/2	14-3/4
18	19-1/2	3-7/16	3-7/16	1-1/8	1-1/2	1-1/2	16-1/2
20	21-3/4	3-15/16	3-15/16	1-1/4	1-3/4	2	18-1/4

Table 2 The dimensions given on this table are affected by the piston rod diameter and the stroke.

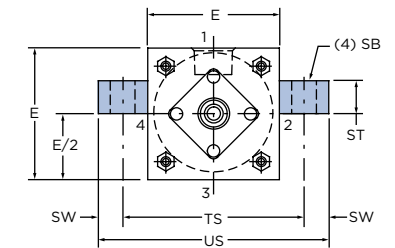
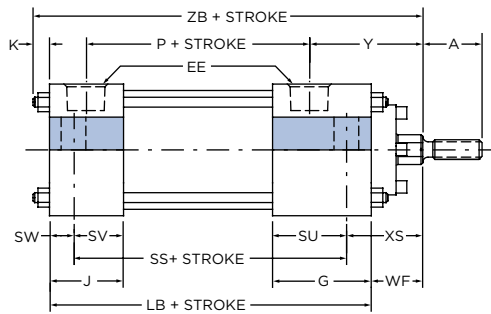
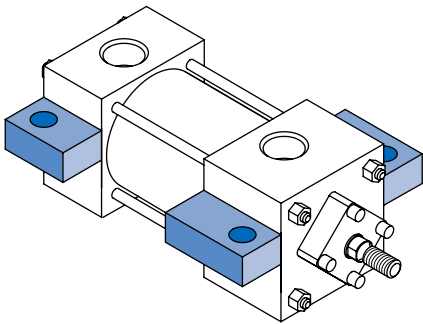
• = For piston rod dimensions see page 132.

BORE DIA.	ROD MM•	A	P	Y	LB	RM	WF	ZB	ZJ
8	1-3/8	1-5/8	3-1/4	2-13/16	5-1/8	3	1-5/8	7-3/8	6-3/4
	1-3/4	2	3-1/4	3-1/16	5-1/8	3-1/2	1-7/8	7-5/8	7
	2	2-1/4	3-1/4	3-3/16	5-1/8	4-1/8	2	7-3/4	7-1/8
	2-1/2	3	3-1/4	3-7/16	5-1/8	4-5/8	2-1/4	8	7-3/8
	3	3-1/2	3-1/4	3-7/16	5-1/8	5-1/2	2-1/4	8	7-3/8
	3-1/2	3-1/2	3-1/4	3-7/16	5-1/8	6-1/8	2-1/4	8	7-3/8
	4	4	3-1/4	3-7/16	5-1/8	6-7/8	2-1/4	8	7-3/8
	4-1/2	4-1/2	3-1/4	3-7/16	5-1/8	7-3/4	2-1/4	8	7-3/8
	5	5	3-1/4	3-7/16	5-1/8	8-3/8	2-1/4	8	7-3/8
10	5-1/2	5-1/2	3-1/4	3-7/16	5-1/8	9	2-1/4	8	7-3/8
	1-3/4	2	4	3-3/16	6-3/8	3-1/2	1-7/8	9	8-1/4
	2	2-1/4	4	3-5/16	6-3/8	4-1/8	2	9-1/8	8-3/8
	2-1/2	3	4	3-9/16	6-3/8	4-5/8	2-1/4	9-3/8	8-5/8
	3	3-1/2	4	3-9/16	6-3/8	5-1/2	2-1/4	9-3/8	8-5/8
	3-1/2	3-1/2	4	3-9/16	6-3/8	6-1/8	2-1/4	9-3/8	8-5/8
	4	4	4	3-9/16	6-3/8	6-7/8	2-1/4	9-3/8	8-5/8
	4-1/2	4-1/2	4	3-9/16	6-3/8	7-3/4	2-1/4	9-3/8	8-5/8
	5	5	4	3-9/16	6-3/8	8-3/8	2-1/4	9-3/8	8-5/8
12	5-1/2	5-1/2	4	3-9/16	6-3/8	9	2-1/4	9-3/8	8-5/8
	2	2-1/4	4-1/2	3-5/16	6-7/8	4-1/8	2	9-5/8	8-7/8
	2-1/2	3	4-1/2	3-9/16	6-7/8	4-5/8	2-1/4	9-7/8	9-1/8
	3	3-1/2	4-1/2	3-9/16	6-7/8	5-1/2	2-1/4	9-7/8	9-1/8
	3-1/2	3-1/2	4-1/2	3-9/16	6-7/8	6-1/8	2-1/4	9-7/8	9-1/8
	4	4	4-1/2	3-9/16	6-7/8	6-7/8	2-1/4	9-7/8	9-1/8
	4-1/2	4-1/2	4-1/2	3-9/16	6-7/8	7-3/4	2-1/4	9-7/8	9-1/8
	5	5	4-1/2	3-9/16	6-7/8	8-3/8	2-1/4	9-7/8	9-1/8
	5-1/2	5-1/2	4-1/2	3-9/16	6-7/8	9	2-1/4	9-7/8	9-1/8
14	2-1/2	3	5-1/2	3-13/16	8-1/8	4-5/8	2-1/4	11-1/4	10-3/8
	3	3-1/2	5-1/2	3-13/16	8-1/8	5-1/2	2-1/4	11-1/4	10-3/8
	3-1/2	3-1/2	5-1/2	3-13/16	8-1/8	6-1/8	2-1/4	11-1/4	10-3/8
	4	4	5-1/2	3-13/16	8-1/8	6-7/8	2-1/4	11-1/4	10-3/8
	4-1/2	4-1/2	5-1/2	3-13/16	8-1/8	7-3/4	2-1/4	11-1/4	10-3/8
	5	5	5-1/2	3-13/16	8-1/8	8-3/8	2-1/4	11-1/4	10-3/8
	5-1/2	5-1/2	5-1/2	3-13/16	8-1/8	9	2-1/4	11-1/4	10-3/8
16	2-1/2	3	5-7/8	3-15/16	9-1/4	4-5/8	2-1/4	12-1/2	11-1/2
	3	3-1/2	5-7/8	3-15/16	9-1/4	5-1/2	2-1/4	12-1/2	11-1/2
	3-1/2	3-1/2	5-7/8	3-15/16	9-1/4	6-1/8	2-1/4	12-1/2	11-1/2
	4	4	5-7/8	3-15/16	9-1/4	6-7/8	2-1/4	12-1/2	11-1/2
	4-1/2	4-1/2	5-7/8	3-15/16	9-1/4	7-3/4	2-1/4	12-1/2	11-1/2
	5	5	5-7/8	3-15/16	9-1/4	8-3/8	2-1/4	12-1/2	11-1/2
	5-1/2	5-1/2	5-7/8	3-15/16	9-1/4	9	2-1/4	12-1/2	11-1/2
18	3-1/2	3-1/2	6	4-3/8	10-1/4	6-1/8	2-1/4	13-5/8	12-1/2
	4	4	6	4-3/8	10-1/4	6-7/8	2-1/4	13-5/8	12-1/2
	4-1/2	4-1/2	6	4-3/8	10-1/4	7-3/4	2-1/4	13-5/8	12-1/2
	5	5	6	4-3/8	10-1/4	8-3/8	2-1/4	13-5/8	12-1/2
	5-1/2	5-1/2	6	4-3/8	10-1/4	9	2-1/4	13-5/8	12-1/2
20	4	4	7-1/8	4-9/16	11-3/4	6-7/8	2-1/4	15-1/4	14
	4-1/2	4-1/2	7-1/8	4-9/16	11-3/4	7-3/4	2-1/4	15-1/4	14
	5	5	7-1/8	4-9/16	11-3/4	8-3/8	2-1/4	15-1/4	14
	5-1/2	5-1/2	7-1/8	4-9/16	11-3/4	9	2-1/4	15-1/4	14

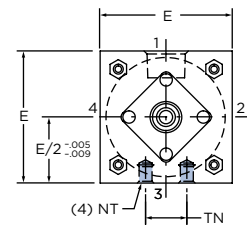
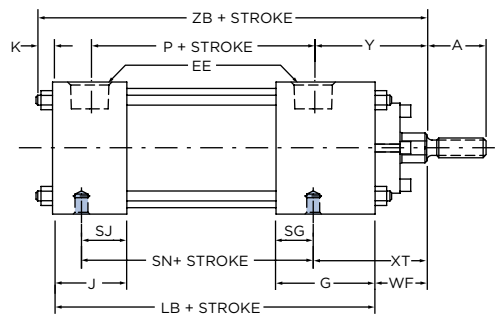
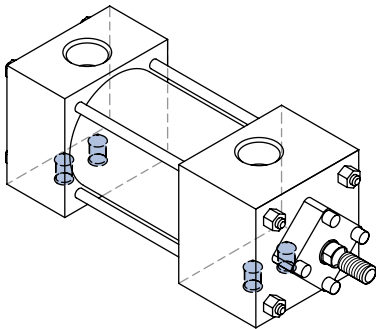
MODEL A (NFPA STD. MS2) ▲



MODEL B (NFPA STD. MS3) ▲



MODEL S (NFPA STD. MS4) ▲



▲ = See Table A on page 127 for bore and rod combinations using head plates with threaded bronze glands.

SIDE AND LUG MOUNT CYLINDERS

1-1/2" THROUGH 6" BORE

Table 1 These dimensions are constant regardless of rod diameter or stroke.

For double rod end cylinders Model A and B 1-1/2" through 6" bore: add 1/2" to dimension SS. See pages 128-131.

Double rod end models are designated by letter "X" preceding the model identification. See page 128.

• = Dimensions refer to bolt diameter.

BORE DIA.	E	G	J	K	EE	NT	SB•	SG	SJ	ST	SU	SV	SW	TN	TS	US
1-1/2	2	1-1/2	1-1/8	1/4	3/8	1/4-20	3/8	9/16	11/16	1/2	1-1/8	3/4	3/8	5/8	2-3/4	3-1/2
2	2-1/2	1-1/2	1-1/8	3/8	3/8	5/16-18	3/8	9/16	11/16	1/2	1-1/8	3/4	3/8	7/8	3-1/4	4
2-1/2	3	1-1/2	1-1/8	3/8	3/8	3/8-16	3/8	9/16	11/16	1/2	1-1/8	3/4	3/8	1-1/4	3-3/4	4-1/2
3-1/4	3-3/4	1-3/4	1-1/4	7/16	1/2	1/2-13	1/2	11/16	11/16	3/4	1-1/4	3/4	1/2	1-1/2	4-3/4	5-3/4
4	4-1/2	1-3/4	1-1/4	7/16	1/2	1/2-13	1/2	11/16	11/16	3/4	1-1/4	3/4	1/2	2-1/16	5-1/2	6-1/2
5	5-1/2	1-3/4	1-1/4	1/2	1/2	5/8-11	3/4	11/16	11/16	1	1-1/16	9/16	1-1/16	2-11/16	6-7/8	8-1/4
6	6-1/2	2	1-1/2	9/16	3/4	3/4-10	3/4	13/16	13/16	1	1-5/16	13/16	1-1/16	3-1/4	7-7/8	9-1/4

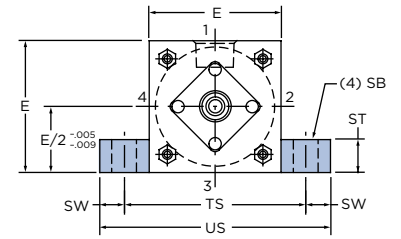
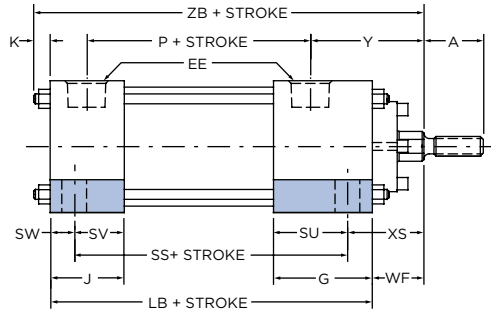
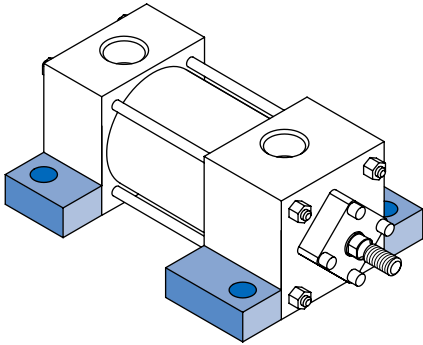
Table 2 The dimensions given on this table are affected by the piston rod diameter and the stroke.

For double rod end cylinders Model S 1-1/2" through 2-1/2" bore: add 0.13" to dimension SN. See pages 128-131.

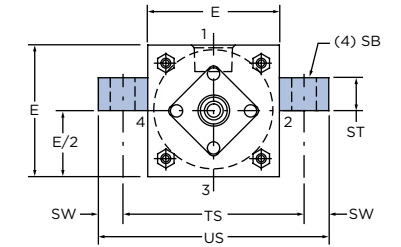
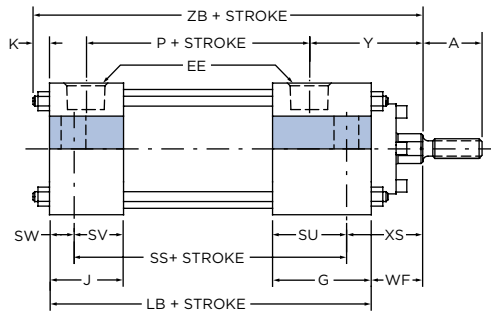
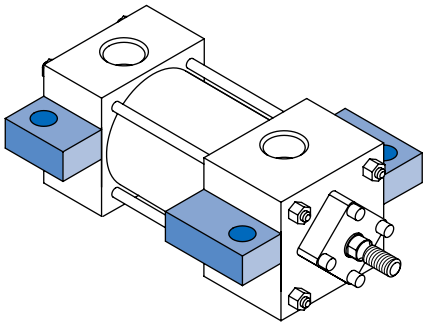
• = For piston rod dimensions see page 132.

BORE DIA.	ROD MM•	A	P	Y	LB	SN	SS	WF	XS	XT	ZB
1-1/2	5/8	3/4	2-1/8	1-15/16	3-5/8	2-1/4	2-7/8	1	1-3/8	1-15/16	4-7/8
	1	1-1/8	2-1/8	2-5/16	3-5/8	2-1/4	2-7/8	1-3/8	1-3/4	2-5/16	5-1/4
2	5/8	3/4	2-1/8	1-15/16	3-5/8	2-1/4	2-7/8	1	1-3/8	1-15/16	5
	1	1-1/8	2-1/8	2-5/16	3-5/8	2-1/4	2-7/8	1-3/8	1-3/4	2-5/16	5-3/8
	1-3/8	1-5/8	2-1/8	2-9/16	3-5/8	2-1/4	2-7/8	1-5/8	2	2-9/16	5-11/16
2-1/2	5/8	3/4	2-1/4	1-15/16	3-3/4	2-3/8	3	1	1-3/8	1-15/16	5-1/16
	1	1-1/8	2-1/4	2-5/16	3-3/4	2-3/8	3	1-3/8	1-3/4	2-5/16	5-7/16
	1-3/8	1-5/8	2-1/4	2-9/16	3-3/4	2-3/8	3	1-5/8	2	2-9/16	5-11/16
	1-3/4	2	2-1/4	2-13/16	3-3/4	2-3/8	3	1-7/8	2-1/4	2-13/16	5-15/16
3-1/4	1	1-1/8	2-1/2	2-1/2	4-1/4	2-5/8	3-1/4	1-3/8	1-7/8	2-7/16	6-1/16
	1-3/8	1-5/8	2-1/2	2-3/4	4-1/4	2-5/8	3-1/4	1-5/8	2-1/8	2-11/16	6-5/16
	1-3/4	2	2-1/2	3	4-1/4	2-5/8	3-1/4	1-7/8	2-3/8	2-15/16	6-9/16
	2	2-1/4	2-1/2	3-1/8	4-1/4	2-5/8	3-1/4	2	2-1/2	3-1/16	6-11/16
4	1	1-1/8	2-1/2	2-1/2	4-1/4	2-5/8	3-1/4	1-3/8	1-7/8	2-7/16	6-1/16
	1-3/8	1-5/8	2-1/2	2-3/4	4-1/4	2-5/8	3-1/4	1-5/8	2-1/8	2-11/16	6-5/16
	1-3/4	2	2-1/2	3	4-1/4	2-5/8	3-1/4	1-7/8	2-3/8	2-15/16	6-9/16
	2	2-1/4	2-1/2	3-1/8	4-1/4	2-5/8	3-1/4	2	2-1/2	3-1/16	6-11/16
	2-1/2	3	2-1/2	3-3/8	4-1/4	2-5/8	3-1/4	2-1/4	2-3/4	3-5/16	6-15/16
5	1	1-1/8	2-3/4	2-1/2	4-1/2	2-7/8	3-1/8	1-3/8	2-1/16	2-7/16	6-3/8
	1-3/8	1-5/8	2-3/4	2-3/4	4-1/2	2-7/8	3-1/8	1-5/8	2-5/16	2-11/16	6-5/8
	1-3/4	2	2-3/4	3	4-1/2	2-7/8	3-1/8	1-7/8	2-9/16	2-15/16	6-7/8
	2	2-1/4	2-3/4	3-1/8	4-1/2	2-7/8	3-1/8	2	2-11/16	3-1/16	7
	2-1/2	3	2-3/4	3-3/8	4-1/2	2-7/8	3-1/8	2-1/4	2-15/16	3-5/16	7-1/4
	3	3-1/2	2-3/4	3-3/8	4-1/2	2-7/8	3-1/8	2-1/4	2-15/16	3-5/16	7-1/4
	3-1/2	3-1/2	2-3/4	3-3/8	4-1/2	2-7/8	3-1/8	2-1/4	2-15/16	3-5/16	7-1/4
6	1-3/8	1-5/8	3-1/8	2-13/16	5	3-1/8	3-5/8	1-5/8	2-5/16	2-13/16	7-3/16
	1-3/4	2	3-1/8	3-1/16	5	3-1/8	3-5/8	1-7/8	2-9/16	3-1/16	7-7/16
	2	2-1/4	3-1/8	3-3/16	5	3-1/8	3-5/8	2	2-11/16	3-3/16	7-9/16
	2-1/2	3	3-1/8	3-7/16	5	3-1/8	3-5/8	2-1/4	2-15/16	3-7/16	7-13/16
	3	3-1/2	3-1/8	3-7/16	5	3-1/8	3-5/8	2-1/4	2-15/16	3-7/16	7-13/16
	3-1/2	3-1/2	3-1/8	3-7/16	5	3-1/8	3-5/8	2-1/4	2-15/16	3-7/16	7-13/16
	4	4	3-1/8	3-7/16	5	3-1/8	3-5/8	2-1/4	2-15/16	3-7/16	7-13/16

MODEL A (NFPA STD. MS2)



MODEL B (NFPA STD. MS3)



MODEL S (NFPA STD. MS4)

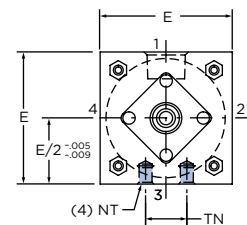
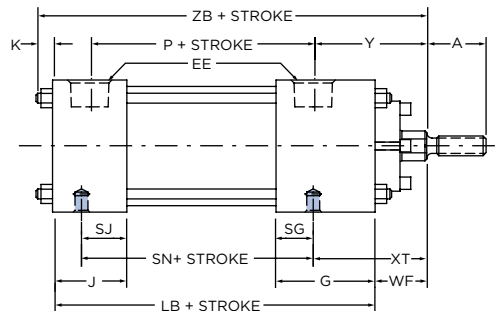
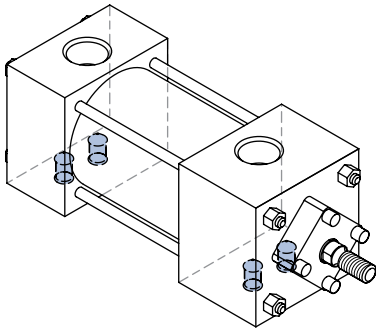


Table 1 These dimensions are constant regardless of rod diameter or stroke.

For double rod end cylinders Model A and B 8" through 14" bore: subtract dimension SV from dimension SS and add dimension SU. See pages 128-131. Double rod end models are designated by letter "X" preceding the model identification. See page 128.

• = Dimensions refer to bolt diameter.

BORE DIA.	E	G	J	K	EE	NT	SB•	SG	SJ	ST	SU	SV	SW	TN	TS	US
8	8-1/2	2	1-1/2	5/8	3/4	3/4-10	3/4	13/16	13/16	1	1-5/16	13/16	11/16	4-1/2	9-7/8	11-1/4
10	10-5/8	2-1/4	2	3/4	1	1-8	1	1	1	1-1/4	1-3/8	1-1/8	7/8	5-1/2	12-3/8	14-1/8
12	12-3/4	2-1/4	2	3/4	1	1-8	1	1	1	1-1/4	1-3/8	1-1/8	7/8	7-1/4	14-1/2	16-1/4
14	14-3/4	2-3/4	2-1/4	7/8	1-1/4	1-1/4-7	1-1/4	1-3/16	1-3/16	1-1/2	1-5/8	1-1/8	1-1/8	8-3/8	17	19-1/4
16	17-1/2	3	3	1	1-1/2	1-3/4-12	1-3/4	1-9/16	1-11/16	2	1-1/4	1-1/4	1-5/8	7	21	24-1/4
18	19-1/2	3-7/16	3-7/16	1-1/8	1-1/2	2-12	2	1-3/4	1-7/8	2-1/2	1-7/16	1-7/16	2	8	23-1/2	27-1/2
20	21-3/4	3-15/16	3-15/16	1-1/4	2	2-1/4-12	2-1/4	2	1-7/8	3	1-9/16	1-9/16	2-3/8	8-1/2	26-1/2	31-1/4

SIDE AND LUG MOUNT CYLINDERS

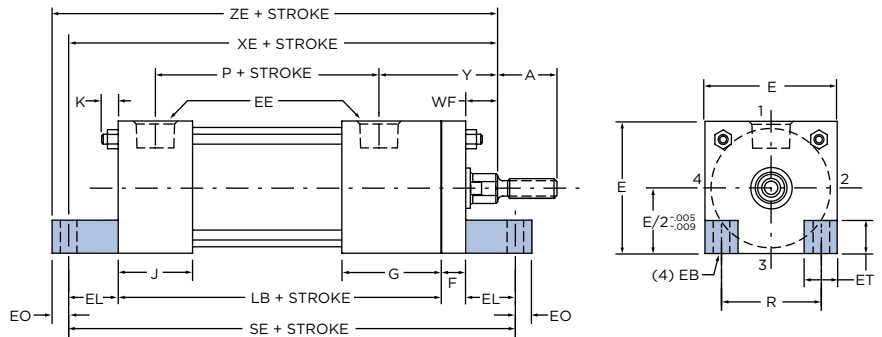
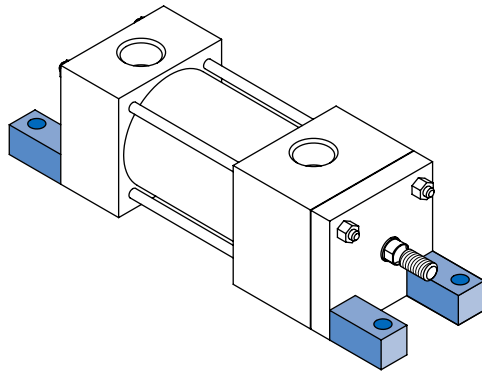
8" THROUGH 20" BORE

Table 2 The dimensions given on this table are affected by the piston rod diameter and the stroke.

For double rod end cylinders Model S 16" through 20" bore: subtract dimension SJ from dimension SN and add dimension SG. See pages 128-131.
• = For piston rod dimensions see page 132.

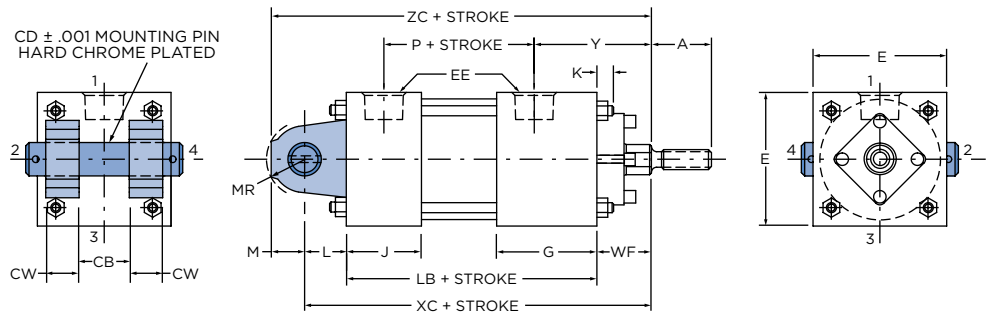
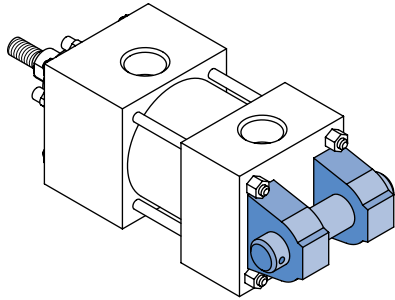
BORE DIA.	ROD MM•	A	P	Y	LB	SN	SS	WF	XS	XT	ZB
8	1-3/8	1-5/8	3-1/4	2-13/16	5-1/8	3-1/4	3-3/4	1-5/8	2-5/16	2-13/16	7-3/8
	1-3/4	2	3-1/4	3-1/16	5-1/8	3-1/4	3-3/4	1-7/8	2-9/16	3-1/16	7-5/8
	2	2-1/4	3-1/4	3-3/16	5-1/8	3-1/4	3-3/4	2	2-11/16	3-3/16	7-3/4
	2-1/2	3	3-1/4	3-7/16	5-1/8	3-1/4	3-3/4	2-1/4	2-15/16	3-7/16	8
	3	3-1/2	3-1/4	3-7/16	5-1/8	3-1/4	3-3/4	2-1/4	2-15/16	3-7/16	8
	3-1/2	3-1/2	3-1/4	3-7/16	5-1/8	3-1/4	3-3/4	2-1/4	2-15/16	3-7/16	8
	4	4	3-1/4	3-7/16	5-1/8	3-1/4	3-3/4	2-1/4	2-15/16	3-7/16	8
	4-1/2	4-1/2	3-1/4	3-7/16	5-1/8	3-1/4	3-3/4	2-1/4	2-15/16	3-7/16	8
	5	5	3-1/4	3-7/16	5-1/8	3-1/4	3-3/4	2-1/4	2-15/16	3-7/16	8
10	5-1/2	5-1/2	3-1/4	3-7/16	5-1/8	3-1/4	3-3/4	2-1/4	2-15/16	3-7/16	8
	1-3/4	2	4	3-3/16	6-3/8	4-1/8	4-5/8	1-7/8	2-3/4	3-1/8	9
	2	2-1/4	4	3-5/16	6-3/8	4-1/8	4-5/8	2	2-7/8	3-1/4	9-1/8
	2-1/2	3	4	3-9/16	6-3/8	4-1/8	4-5/8	2-1/4	3-1/8	3-1/2	9-3/8
	3	3-1/2	4	3-9/16	6-3/8	4-1/8	4-5/8	2-1/4	3-1/8	3-1/2	9-3/8
	3-1/2	3-1/2	4	3-9/16	6-3/8	4-1/8	4-5/8	2-1/4	3-1/8	3-1/2	9-3/8
	4	4	4	3-9/16	6-3/8	4-1/8	4-5/8	2-1/4	3-1/8	3-1/2	9-3/8
	4-1/2	4-1/2	4	3-9/16	6-3/8	4-1/8	4-5/8	2-1/4	3-1/8	3-1/2	9-3/8
	5	5	4	3-9/16	6-3/8	4-1/8	4-5/8	2-1/4	3-1/8	3-1/2	9-3/8
12	5-1/2	5-1/2	4	3-9/16	6-3/8	4-1/8	4-5/8	2-1/4	3-1/8	3-1/2	9-3/8
	2	2-1/4	4-1/2	3-5/16	6-7/8	4-5/8	5-1/8	2	2-7/8	3-1/4	9-5/8
	2-1/2	3	4-1/2	3-9/16	6-7/8	4-5/8	5-1/8	2-1/4	3-1/8	3-1/2	9-7/8
	3	3-1/2	4-1/2	3-9/16	6-7/8	4-5/8	5-1/8	2-1/4	3-1/8	3-1/2	9-7/8
	3-1/2	3-1/2	4-1/2	3-9/16	6-7/8	4-5/8	5-1/8	2-1/4	3-1/8	3-1/2	9-7/8
	4	4	4-1/2	3-9/16	6-7/8	4-5/8	5-1/8	2-1/4	3-1/8	3-1/2	9-7/8
	4-1/2	4-1/2	4-1/2	3-9/16	6-7/8	4-5/8	5-1/8	2-1/4	3-1/8	3-1/2	9-7/8
	5	5	4-1/2	3-9/16	6-7/8	4-5/8	5-1/8	2-1/4	3-1/8	3-1/2	9-7/8
	5-1/2	5-1/2	4-1/2	3-9/16	6-7/8	4-5/8	5-1/8	2-1/4	3-1/8	3-1/2	9-7/8
14	2-1/2	3	5-1/2	3-13/16	8-1/8	5-1/2	5-7/8	2-1/4	3-3/8	3-13/16	11-1/4
	3	3-1/2	5-1/2	3-13/16	8-1/8	5-1/2	5-7/8	2-1/4	3-3/8	3-13/16	11-1/4
	3-1/2	3-1/2	5-1/2	3-13/16	8-1/8	5-1/2	5-7/8	2-1/4	3-3/8	3-13/16	11-1/4
	4	4	5-1/2	3-13/16	8-1/8	5-1/2	5-7/8	2-1/4	3-3/8	3-13/16	11-1/4
	4-1/2	4-1/2	5-1/2	3-13/16	8-1/8	5-1/2	5-7/8	2-1/4	3-3/8	3-13/16	11-1/4
	5	5	5-1/2	3-13/16	8-1/8	5-1/2	5-7/8	2-1/4	3-3/8	3-13/16	11-1/4
	5-1/2	5-1/2	5-1/2	3-13/16	8-1/8	5-1/2	5-7/8	2-1/4	3-3/8	3-13/16	11-1/4
16	2-1/2	3	5-7/8	3-15/16	9-1/4	6-1/2	5-3/4	2-1/4	4	3-11/16	12-1/2
	3	3-1/2	5-7/8	3-15/16	9-1/4	6-1/2	5-3/4	2-1/4	4	3-11/16	12-1/2
	3-1/2	3-1/2	5-7/8	3-15/16	9-1/4	6-1/2	5-3/4	2-1/4	4	3-11/16	12-1/2
	4	4	5-7/8	3-15/16	9-1/4	6-1/2	5-3/4	2-1/4	4	3-11/16	12-1/2
	4-1/2	4-1/2	5-7/8	3-15/16	9-1/4	6-1/2	5-3/4	2-1/4	4	3-11/16	12-1/2
	5	5	5-7/8	3-15/16	9-1/4	6-1/2	5-3/4	2-1/4	4	3-11/16	12-1/2
	5-1/2	5-1/2	5-7/8	3-15/16	9-1/4	6-1/2	5-3/4	2-1/4	4	3-11/16	12-1/2
18	3-1/2	3-1/2	6	4-3/8	10-1/4	7	6-1/4	2-1/4	4-1/4	3-15/16	13-5/8
	4	4	6	4-3/8	10-1/4	7	6-1/4	2-1/4	4-1/4	3-15/16	13-5/8
	4-1/2	4-1/2	6	4-3/8	10-1/4	7	6-1/4	2-1/4	4-1/4	3-15/16	13-5/8
	5	5	6	4-3/8	10-1/4	7	6-1/4	2-1/4	4-1/4	3-15/16	13-5/8
	5-1/2	5-1/2	6	4-3/8	10-1/4	7	6-1/4	2-1/4	4-1/4	3-15/16	13-5/8
20	4	4	7-1/8	4-9/16	11-3/4	7-3/4	7	2-1/4	4-5/8	4-3/16	15-1/4
	4-1/2	4-1/2	7-1/8	4-9/16	11-3/4	7-3/4	7	2-1/4	4-5/8	4-3/16	15-1/4
	5	5	7-1/8	4-9/16	11-3/4	7-3/4	7	2-1/4	4-5/8	4-3/16	15-1/4
	5-1/2	5-1/2	7-1/8	4-9/16	11-3/4	7-3/4	7	2-1/4	4-5/8	4-3/16	15-1/4

MODEL AL (NFPA STD. MS7)

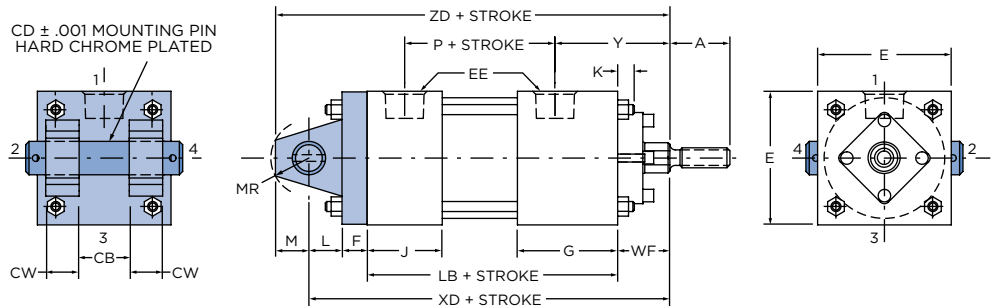
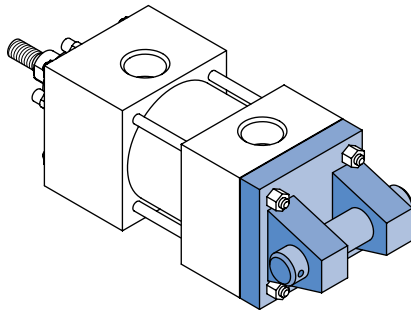


Model AL 1-1/2" diameter through 6" diameter cylinders furnished with head plates. 8" diameter through 14" diameter cylinders use (4) bolt glands as shown on page 110.

MODEL E (NFPA STD. MP1)▲



MODEL HE (NFPA STD. MP2)▲



▲ = See Table A on page 127 for bore and rod combinations using head plates with threaded bronze glands.

Table 1 These dimensions are constant regardless of rod diameter or stroke.

For double rod end cylinders Model AL: subtract dimension J from dimension G and add to dimension SE + stroke.

For 1-1/2" through 6" bore: also add dimension F. See pages 128-131.

Double rod end models are designated by letter "X" preceding the model identification. See page 128.

• = Dimensions refer to bolt diameter.

BORE DIA.	E	F		G	J	K	L	M	R	CB	CD	CW	EB•	EE	EL	EO	ET	MR
		AL	HE															
1-1/2	2	3/8	3/8	1-1/2	1-1/8	1/4	3/4	1/2	1.43	3/4	1/2	1/2	1/4	3/8	3/4	1/4	1/2	5/8
2	2-1/2	3/8	3/8	1-1/2	1-1/8	3/8	3/4	1/2	1.84	3/4	1/2	1/2	5/16	3/8	15/16	5/16	19/32	5/8
2-1/2	3	3/8	3/8	1-1/2	1-1/8	5/16	3/4	1/2	2.19	3/4	1/2	1/2	5/16	3/8	1-1/16	5/16	3/4	5/8
3-1/4	3-3/4	5/8	5/8	1-3/4	1-1/4	7/16	1-1/4	3/4	2.76	1-1/4	3/4	5/8	3/8	1/2	7/8	3/8	29/32	7/8
4	4-1/2	5/8	5/8	1-3/4	1-1/4	7/16	1-1/4	3/4	3.32	1-1/4	3/4	5/8	3/8	1/2	1	3/8	1-1/8	7/8
5	5-1/2	5/8	5/8	1-3/4	1-1/4	1/2	1-1/4	3/4	4.1	1-1/4	3/4	5/8	1/2	1/2	1-1/16	1/2	1-11/32	7/8
6	6-1/2	3/4	7/8	2	1-1/2	9/16	1-1/2	1	4.88	1-1/2	1	3/4	1/2	3/4	1	1/2	1-9/16	1-1/4
8	8-1/2	3/4	7/8	2	1-1/2	5/8	1-1/2	1	6.44	1-1/2	1	3/4	5/8	3/4	1-1/8	5/8	2	1-1/4

END LUG AND CLEVIS MOUNT CYLINDERS

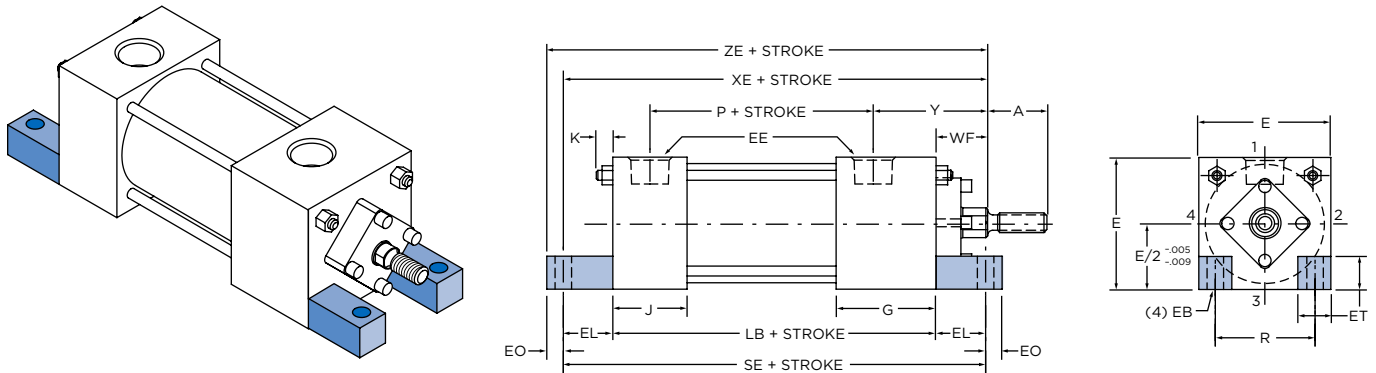
1-1/2" THROUGH 8" DIAMETER

Table 2 The dimensions given on this table are affected by the piston rod diameter and the stroke.

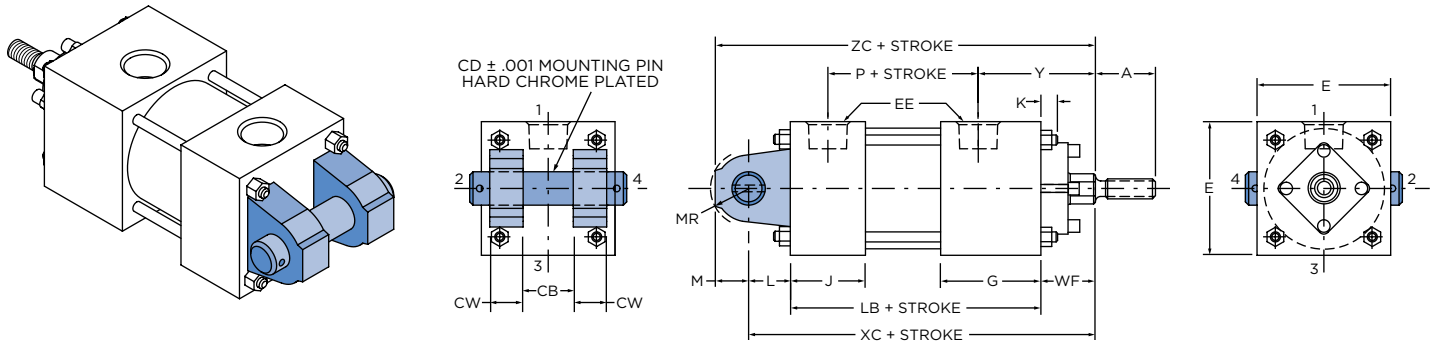
• = For piston rod dimensions see page 132.

BORE DIA.	ROD MM•	A	P	W	Y	LB	SE	WF	XC	XD	XE	ZC	ZD	ZE
1-1/2	5/8	3/4	2-1/8	5/8	1-15/16	3-5/8	5-1/2	1	5-3/8	5-3/4	5-3/8	5-7/8	6-1/4	5-5/8
	1	1-1/8	2-1/8	1	2-5/16	3-5/8	5-1/2	1-3/8	5-3/4	6-1/8	5-3/4	6-1/4	6-5/8	6
2	5/8	3/4	2-1/8	5/8	1-15/16	3-5/8	5-7/8	1	5-3/8	5-3/4	5-9/16	5-7/8	6-1/4	5-7/8
	1	1-1/8	2-1/8	1	2-5/16	3-5/8	5-7/8	1-3/8	5-3/4	6-1/8	5-15/16	6-1/4	6-5/8	6-1/4
	1-3/8	1-5/8	2-1/8	1-1/4	2-9/16	3-5/8	5-7/8	1-5/8	6	6-3/8	6-3/16	6-1/2	6-7/8	6-1/2
2-1/2	5/8	3/4	2-1/4	5/8	1-15/16	3-3/4	6-1/4	1	5-1/2	5-7/8	5-13/16	6	6-3/8	6-1/8
	1	1-1/8	2-1/4	1	2-5/16	3-3/4	6-1/4	1-3/8	5-7/8	6-1/4	6-3/16	6-3/8	6-3/4	6-1/2
	1-3/8	1-5/8	2-1/4	1-1/4	2-9/16	3-3/4	6-1/4	1-5/8	6-1/8	6-1/2	6-7/16	6-5/8	7	6-3/4
	1-3/4	2	2-1/4	1-1/2	2-13/16	3-3/4	6-1/4	1-7/8	6-3/8	6-3/4	6-11/16	6-7/8	7-1/4	7
3-1/4	1	1-1/8	2-1/2	3/4	2-1/2	4-1/4	6-5/8	1-3/8	6-7/8	7-1/2	6-1/2	7-5/8	8-1/4	6-7/8
	1-3/8	1-5/8	2-1/2	1	2-3/4	4-1/4	6-5/8	1-5/8	7-1/8	7-3/4	6-3/4	7-7/8	8-1/2	7-1/8
	1-3/4	2	2-1/2	1-1/4	3	4-1/4	6-5/8	1-7/8	7-3/8	8	7	8-1/8	8-3/4	7-3/8
	2	2-1/4	2-1/2	1-3/8	3-1/8	4-1/4	6-5/8	2	7-1/2	8-1/8	7-1/8	8-1/4	8-7/8	7-1/2
4	1	1-1/8	2-1/2	3/4	2-1/2	4-1/4	6-7/8	1-3/8	6-7/8	7-1/2	6-5/8	7-5/8	8-1/4	7
	1-3/8	1-5/8	2-1/2	1	2-3/4	4-1/4	6-7/8	1-5/8	7-1/8	7-3/4	6-7/8	7-7/8	8-1/2	7-1/4
	1-3/4	2	2-1/2	1-1/4	3	4-1/4	6-7/8	1-7/8	7-3/8	8	7-1/8	8-1/8	8-3/4	7-1/2
	2	2-1/4	2-1/2	1-3/8	3-1/8	4-1/4	6-7/8	2	7-1/2	8-1/8	7-1/4	8-1/4	8-7/8	7-5/8
	2-1/2	3	2-1/2	1-5/8	3-3/8	4-1/4	6-7/8	2-1/4	7-3/4	8-3/8	7-1/2	8-1/2	9-1/8	7-7/8
5	1	1-1/8	2-3/4	3/4	2-1/2	4-1/2	7-1/4	1-3/8	7-1/8	7-3/4	6-15/16	7-7/8	8-1/2	7-7/16
	1-3/8	1-5/8	2-3/4	1	2-3/4	4-1/2	7-1/4	1-5/8	7-3/8	8	7-3/16	8-1/8	8-3/4	7-11/16
	1-3/4	2	2-3/4	1-1/4	3	4-1/2	7-1/4	1-7/8	7-5/8	8-1/4	7-7/16	8-3/8	9	7-15/16
	2	2-1/4	2-3/4	1-3/8	3-1/8	4-1/2	7-1/4	2	7-3/4	8-3/8	7-9/16	8-1/2	9-1/8	8-1/16
	2-1/2	3	2-3/4	1-5/8	3-3/8	4-1/2	7-1/4	2-1/4	8	8-5/8	7-13/16	8-3/4	9-3/8	8-5/16
	3	3-1/2	2-3/4	1-5/8	3-3/8	4-1/2	7-1/4	2-1/4	8	8-5/8	7-13/16	8-3/4	9-3/8	8-5/16
	3-1/2	3-1/2	2-3/4	1-5/8	3-3/8	4-1/2	7-1/4	2-1/4	8	8-5/8	7-13/16	8-3/4	9-3/8	8-5/16
6	1-3/8	1-5/8	3-1/8	7/8	2-13/16	5	7-3/4	1-5/8	8-1/8	9	7-5/8	9-1/8	10	8-1/8
	1-3/4	2	3-1/8	1-1/8	3-1/16	5	7-3/4	1-7/8	8-3/8	9-1/4	7-7/8	9-3/8	10-1/4	8-3/8
	2	2-1/4	3-1/8	1-1/4	3-3/16	5	7-3/4	2	8-1/2	9-3/8	8	9-1/2	10-3/8	8-1/2
	2-1/2	3	3-1/8	1-1/2	3-7/16	5	7-3/4	2-1/4	8-3/4	9-5/8	8-1/4	9-3/4	10-5/8	8-3/4
	3	3-1/2	3-1/8	1-1/2	3-7/16	5	7-3/4	2-1/4	8-3/4	9-5/8	8-1/4	9-3/4	10-5/8	8-3/4
	3-1/2	3-1/2	3-1/8	1-1/2	3-7/16	5	7-3/4	2-1/4	8-3/4	9-5/8	8-1/4	9-3/4	10-5/8	8-3/4
	4	4	3-1/8	1-1/2	3-7/16	5	7-3/4	2-1/4	8-3/4	9-5/8	8-1/4	9-3/4	10-5/8	8-3/4
8	1-3/8	1-5/8	3-1/4	-	2-13/16	5-1/8	7-3/8	1-5/8	8-1/4	9-1/8	7-7/8	9-1/4	10-1/8	8-1/2
	1-3/4	2	3-1/4	-	3-1/16	5-1/8	7-3/8	1-7/8	8-1/2	9-3/8	8-1/8	9-1/2	10-3/8	8-3/4
	2	2-1/4	3-1/4	-	3-3/16	5-1/8	7-3/8	2	8-5/8	9-1/2	8-1/4	9-5/8	10-1/2	8-7/8
	2-1/2	3	3-1/4	-	3-7/16	5-1/8	7-3/8	2-1/4	8-7/8	9-3/4	8-1/2	9-7/8	10-3/4	9-1/8
	3	3-1/2	3-1/4	-	3-7/16	5-1/8	7-3/8	2-1/4	8-7/8	9-3/4	8-1/2	9-7/8	10-3/4	9-1/8
	3-1/2	3-1/2	3-1/4	-	3-7/16	5-1/8	7-3/8	2-1/4	8-7/8	9-3/4	8-1/2	9-7/8	10-3/4	9-1/8
	4	4	3-1/4	-	3-7/16	5-1/8	7-3/8	2-1/4	8-7/8	9-3/4	8-1/2	9-7/8	10-3/4	9-1/8
	4-1/2	4-1/2	3-1/4	-	3-7/16	5-1/8	7-3/8	2-1/4	8-7/8	9-3/4	8-1/2	9-7/8	10-3/4	9-1/8
	5	5	3-1/4	-	3-7/16	5-1/8	7-3/8	2-1/4	8-7/8	9-3/4	8-1/2	9-7/8	10-3/4	9-1/8
	5-1/2	5-1/2	3-1/4	-	3-7/16	5-1/8	7-3/8	2-1/4	8-7/8	9-3/4	8-1/2	9-7/8	10-3/4	9-1/8

MODEL AL (NFPA STD. MS7) 10" THROUGH 14" DIAMETER



MODEL E (NFPA STD. MP1) 10" THROUGH 20" DIAMETER



MODEL HE (NFPA STD. MP2) 10" DIAMETER

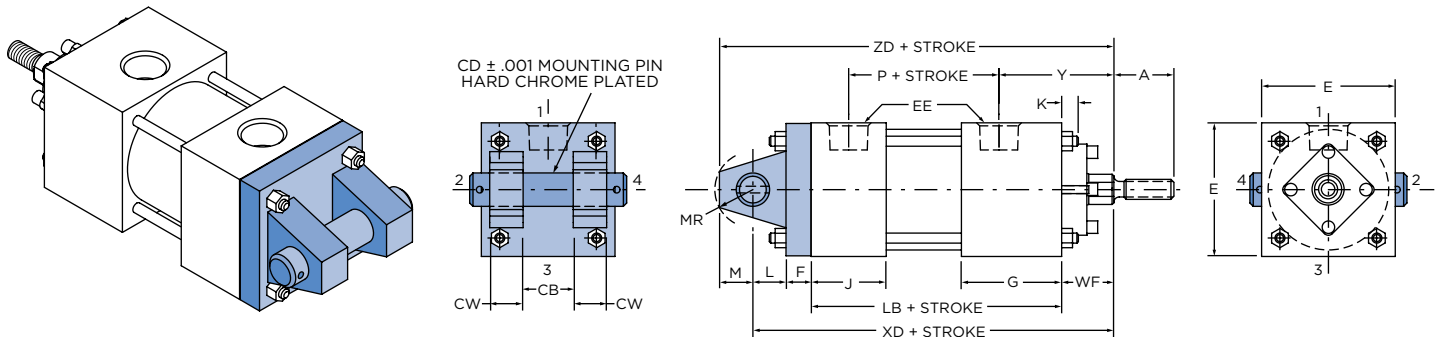


Table 1 These dimensions are constant regardless of rod diameter or stroke.

For double rod end cylinders Model AL: subtract dimension J from dimension G and add to dimension SE + stroke. See pages 128-131.
Double rod end models are designated by letter "X" preceding the model identification. See page 128.

• = Dimensions refer to bolt diameter.

BORE DIA.	E	F	G	J	K	L	M	R	CB	CD	CW	EB•	EE	EL	EO	ET	MR
10	10-5/8	7/8	2-1/4	2	3/4	2-1/8	1-3/8	7.92	2	1-3/8	1	3/4	1	1-5/16	1-5/16	2-5/8	1-5/8
12	12-3/4	-	2-1/4	2	3/4	2-1/4	1-3/4	9.4	2-1/2	1-3/4	1-1/4	3/4	1	1-5/16	1-11/16	3-3/8	2
14	14-3/4	-	2-3/4	2-1/4	7/8	2-1/2	2	10.9	2-1/2	2	1-1/4	7/8	1-1/4	1-1/2	2	3-7/8	2-3/8
16	17-1/2	-	3	3	1	2-1/2	2	-	2-1/2	2	1-1/4	-	1-1/2	-	-	-	2-3/8
18	19-1/2	-	3-7/16	3-7/16	1-1/8	3	2-3/4	-	3	2-1/2	1-1/2	-	1-1/2	-	-	-	3
20	21-3/4	-	3-15/16	3-15/16	1-1/4	3-1/4	2-3/4	-	3	3	1-1/2	-	2	-	-	-	3-1/4

END LUG AND CLEVIS MOUNT CYLINDERS

10" THROUGH 20" DIAMETER

Table 2 The dimensions given on this table are affected by the piston rod diameter and the stroke.

• = For piston rod dimensions see page 132.

BORE DIA.	ROD MM•	A	P	Y	LB	SE	WF	XC	XD	XE	ZC	ZD	ZE
10	1-3/4	2	4	3-3/16	6-3/8	9	1-7/8	10-3/8	11-1/4	9-9/16	11-3/4	12-5/8	10-7/8
	2	2-1/4	4	3-5/16	6-3/8	9	2	10-1/2	11-3/8	9-11/16	11-7/8	12-3/4	11
	2-1/2	3	4	3-9/16	6-3/8	9	2-1/4	10-3/4	11-5/8	9-15/16	12-1/8	13	11-1/4
	3	3-1/2	4	3-9/16	6-3/8	9	2-1/4	10-3/4	11-5/8	9-15/16	12-1/8	13	11-1/4
	3-1/2	3-1/2	4	3-9/16	6-3/8	9	2-1/4	10-3/4	11-5/8	9-15/16	12-1/8	13	11-1/4
	4	4	4	3-9/16	6-3/8	9	2-1/4	10-3/4	11-5/8	9-15/16	12-1/8	13	11-1/4
	4-1/2	4-1/2	4	3-9/16	6-3/8	9	2-1/4	10-3/4	11-5/8	9-15/16	12-1/8	13	11-1/4
	5	5	4	3-9/16	6-3/8	9	2-1/4	10-3/4	11-5/8	9-15/16	12-1/8	13	11-1/4
12	5-1/2	5-1/2	4	3-9/16	6-3/8	9	2-1/4	10-3/4	11-5/8	9-15/16	12-1/8	13	11-1/4
	2	2-1/4	4-1/2	3-5/16	6-7/8	9-1/2	2	11-1/8	-	10-3/16	12-7/8	-	11-7/8
	2-1/2	3	4-1/2	3-9/16	6-7/8	9-1/2	2-1/4	11-3/8	-	10-7/16	13-1/8	-	12-1/8
	3	3-1/2	4-1/2	3-9/16	6-7/8	9-1/2	2-1/4	11-3/8	-	10-7/16	13-1/8	-	12-1/8
	3-1/2	3-1/2	4-1/2	3-9/16	6-7/8	9-1/2	2-1/4	11-3/8	-	10-7/16	13-1/8	-	12-1/8
	4	4	4-1/2	3-9/16	6-7/8	9-1/2	2-1/4	11-3/8	-	10-7/16	13-1/8	-	12-1/8
	4-1/2	4-1/2	4-1/2	3-9/16	6-7/8	9-1/2	2-1/4	11-3/8	-	10-7/16	13-1/8	-	12-1/8
	5	5	4-1/2	3-9/16	6-7/8	9-1/2	2-1/4	11-3/8	-	10-7/16	13-1/8	-	12-1/8
14	5-1/2	5-1/2	4-1/2	3-9/16	6-7/8	9-1/2	2-1/4	11-3/8	-	10-7/16	13-1/8	-	12-1/8
	2-1/2	3	5-1/2	3-13/16	8-1/8	11-1/8	2-1/4	12-7/8	-	11-7/8	14-7/8	-	13-7/8
	3	3-1/2	5-1/2	3-13/16	8-1/8	11-1/8	2-1/4	12-7/8	-	11-7/8	14-7/8	-	13-7/8
	3-1/2	3-1/2	5-1/2	3-13/16	8-1/8	11-1/8	2-1/4	12-7/8	-	11-7/8	14-7/8	-	13-7/8
	4	4	5-1/2	3-13/16	8-1/8	11-1/8	2-1/4	12-7/8	-	11-7/8	14-7/8	-	13-7/8
	4-1/2	4-1/2	5-1/2	3-13/16	8-1/8	11-1/8	2-1/4	12-7/8	-	11-7/8	14-7/8	-	13-7/8
	5	5	5-1/2	3-13/16	8-1/8	11-1/8	2-1/4	12-7/8	-	11-7/8	14-7/8	-	13-7/8
	5-1/2	5-1/2	5-1/2	3-13/16	8-1/8	11-1/8	2-1/4	12-7/8	-	11-7/8	14-7/8	-	13-7/8
16	2-1/2	3	5-7/8	3-15/16	9-1/4	-	2-1/4	14	-	-	16	-	-
	3	3-1/2	5-7/8	3-15/16	9-1/4	-	2-1/4	14	-	-	16	-	-
	3-1/2	3-1/2	5-7/8	3-15/16	9-1/4	-	2-1/4	14	-	-	16	-	-
	4	4	5-7/8	3-15/16	9-1/4	-	2-1/4	14	-	-	16	-	-
	4-1/2	4-1/2	5-7/8	3-15/16	9-1/4	-	2-1/4	14	-	-	16	-	-
	5	5	5-7/8	3-15/16	9-1/4	-	2-1/4	14	-	-	16	-	-
	5-1/2	5-1/2	5-7/8	3-15/16	9-1/4	-	2-1/4	14	-	-	16	-	-
	3-1/2	3-1/2	6	4-3/8	10-1/4	-	2-1/4	15-1/2	-	-	18	-	-
18	4	4	6	4-3/8	10-1/4	-	2-1/4	15-1/2	-	-	18	-	-
	4-1/2	4-1/2	6	4-3/8	10-1/4	-	2-1/4	15-1/2	-	-	18	-	-
	5	5	6	4-3/8	10-1/4	-	2-1/4	15-1/2	-	-	18	-	-
	5-1/2	5-1/2	6	4-3/8	10-1/4	-	2-1/4	15-1/2	-	-	18	-	-
	3-1/2	3-1/2	6	4-3/8	10-1/4	-	2-1/4	15-1/2	-	-	18	-	-
20	4	4	7-1/8	4-9/16	11-3/4	-	2-1/4	17-1/4	-	-	20	-	-
	4-1/2	4-1/2	7-1/8	4-9/16	11-3/4	-	2-1/4	17-1/4	-	-	20	-	-
	5	5	7-1/8	4-9/16	11-3/4	-	2-1/4	17-1/4	-	-	20	-	-
	5-1/2	5-1/2	7-1/8	4-9/16	11-3/4	-	2-1/4	17-1/4	-	-	20	-	-

MODEL E3 (NFPA STD. MP3)

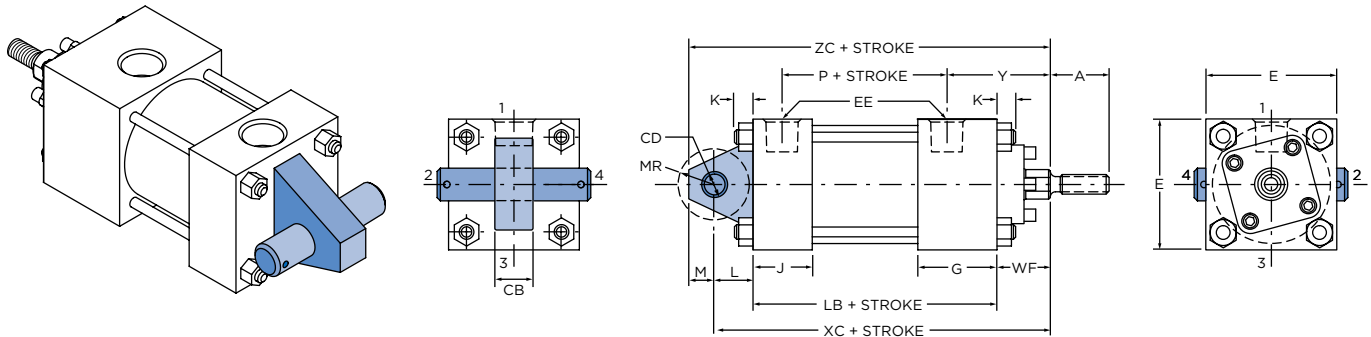


Table 1 These dimensions are constant regardless of rod diameter or stroke.

BORE DIA.	E	F	G	J	K	L	M	CB	CD	EE	MR
1-1/2	2	3/8	1-1/2	1-1/8	1/4	3/4	1/2	3/4	1/2	3/8	5/8
2	2-1/2	3/8	1-1/2	1-1/8	3/8	3/4	1/2	3/4	1/2	3/8	5/8
2-1/2	3	3/8	1-1/2	1-1/8	5/16	3/4	1/2	3/4	1/2	3/8	5/8
3-1/4	3-3/4	5/8	1-3/4	1-1/4	7/16	1-1/4	3/4	1-1/4	3/4	1/2	7/8
4	4-1/2	5/8	1-3/4	1-1/4	7/16	1-1/4	3/4	1-1/4	3/4	1/2	7/8
5	5-1/2	5/8	1-3/4	1-1/4	1/2	1-1/4	3/4	1-1/4	3/4	1/2	7/8
6	6-1/2	3/4	2	1-1/2	9/16	1-1/2	1	1-1/2	1	3/4	1-1/4
8	8-1/2	3/4	2	1-1/2	5/8	1-1/2	1	1-1/2	1	3/4	1-1/4

FIXED EYE MOUNT CYLINDERS

1-1/2" THROUGH 8" DIAMETER

Table 2 The dimensions given on this table are affected by the piston rod diameter and the stroke.

• = For piston rod dimensions see page 132.

BORE DIA.	ROD MM•	A	P	W	Y	LB	WF	XC	ZC
1-1/2	5/8	3/4	2-1/8	5/8	1-15/16	3-5/8	1	5-3/8	5-7/8
	1	1-1/8	2-1/8	1	2-5/16	3-5/8	1-3/8	5-3/4	6-1/4
2	5/8	3/4	2-1/8	5/8	1-15/16	3-5/8	1	5-3/8	5-7/8
	1	1-1/8	2-1/8	1	2-5/16	3-5/8	1-3/8	5-3/4	6-1/4
	1-3/8	1-5/8	2-1/8	1-1/4	2-9/16	3-5/8	1-5/8	6	6-1/2
2-1/2	5/8	3/4	2-1/4	5/8	1-15/16	3-3/4	1	5-1/2	6
	1	1-1/8	2-1/4	1	2-5/16	3-3/4	1-3/8	5-7/8	6-3/8
	1-3/8	1-5/8	2-1/4	1-1/4	2-9/16	3-3/4	1-5/8	6-1/8	6-5/8
	1-3/4	2	2-1/4	1-1/2	2-13/16	3-3/4	1-7/8	6-3/8	6-7/8
3-1/4	1	1-1/8	2-1/2	3/4	2-1/2	4-1/4	1-3/8	6-7/8	7-5/8
	1-3/8	1-5/8	2-1/2	1	2-3/4	4-1/4	1-5/8	7-1/8	7-7/8
	1-3/4	2	2-1/2	1-1/4	3	4-1/4	1-7/8	7-3/8	8-1/8
	2	2-1/4	2-1/2	1-3/8	3-1/8	4-1/4	2	7-1/2	8-1/4
4	1	1-1/8	2-1/2	3/4	2-1/2	4-1/4	1-3/8	6-7/8	7-5/8
	1-3/8	1-5/8	2-1/2	1	2-3/4	4-1/4	1-5/8	7-1/8	7-7/8
	1-3/4	2	2-1/2	1-1/4	3	4-1/4	1-7/8	7-3/8	8-1/8
	2	2-1/4	2-1/2	1-3/8	3-1/8	4-1/4	2	7-1/2	8-1/4
	2-1/2	3	2-1/2	1-5/8	3-3/8	4-1/4	2-1/4	7-3/4	8-1/2
5	1	1-1/8	2-3/4	3/4	2-1/2	4-1/2	1-3/8	7-1/8	7-7/8
	1-3/8	1-5/8	2-3/4	1	2-3/4	4-1/2	1-5/8	7-3/8	8-1/8
	1-3/4	2	2-3/4	1-1/4	3	4-1/2	1-7/8	7-5/8	8-3/8
	2	2-1/4	2-3/4	1-3/8	3-1/8	4-1/2	2	7-3/4	8-1/2
	2-1/2	3	2-3/4	1-5/8	3-3/8	4-1/2	2-1/4	8	8-3/4
	3	3-1/2	2-3/4	1-5/8	3-3/8	4-1/2	2-1/4	8	8-3/4
	3-1/2	3-1/2	2-3/4	1-5/8	3-3/8	4-1/2	2-1/4	8	8-3/4
6	1-3/8	1-5/8	3-1/8	7/8	2-13/16	5	1-5/8	8-1/8	9-1/8
	1-3/4	2	3-1/8	1-1/8	3-1/16	5	1-7/8	8-3/8	9-3/8
	2	2-1/4	3-1/8	1-1/4	3-3/16	5	2	8-1/2	9-1/2
	2-1/2	3	3-1/8	1-1/2	3-7/16	5	2-1/4	8-3/4	9-3/4
	3	3-1/2	3-1/8	1-1/2	3-7/16	5	2-1/4	8-3/4	9-3/4
	3-1/2	3-1/2	3-1/8	1-1/2	3-7/16	5	2-1/4	8-3/4	9-3/4
	4	4	3-1/8	1-1/2	3-7/16	5	2-1/4	8-3/4	9-3/4
8	1-3/8	1-5/8	3-1/4	-	2-13/16	5-1/8	1-5/8	8-1/4	9-1/4
	1-3/4	2	3-1/4	-	3-1/16	5-1/8	1-7/8	8-1/2	9-1/2
	2	2-1/4	3-1/4	-	3-3/16	5-1/8	2	8-5/8	9-5/8
	2-1/2	3	3-1/4	-	3-7/16	5-1/8	2-1/4	8-7/8	9-7/8
	3	3-1/2	3-1/4	-	3-7/16	5-1/8	2-1/4	8-7/8	9-7/8
	3-1/2	3-1/2	3-1/4	-	3-7/16	5-1/8	2-1/4	8-7/8	9-7/8
	4	4	3-1/4	-	3-7/16	5-1/8	2-1/4	8-7/8	9-7/8
	4-1/2	4-1/2	3-1/4	-	3-7/16	5-1/8	2-1/4	8-7/8	9-7/8
	5	5	3-1/4	-	3-7/16	5-1/8	2-1/4	8-7/8	9-7/8
	5-1/2	5-1/2	3-1/4	-	3-7/16	5-1/8	2-1/4	8-7/8	9-7/8

MODEL E4 (NFPA STD. MP4)

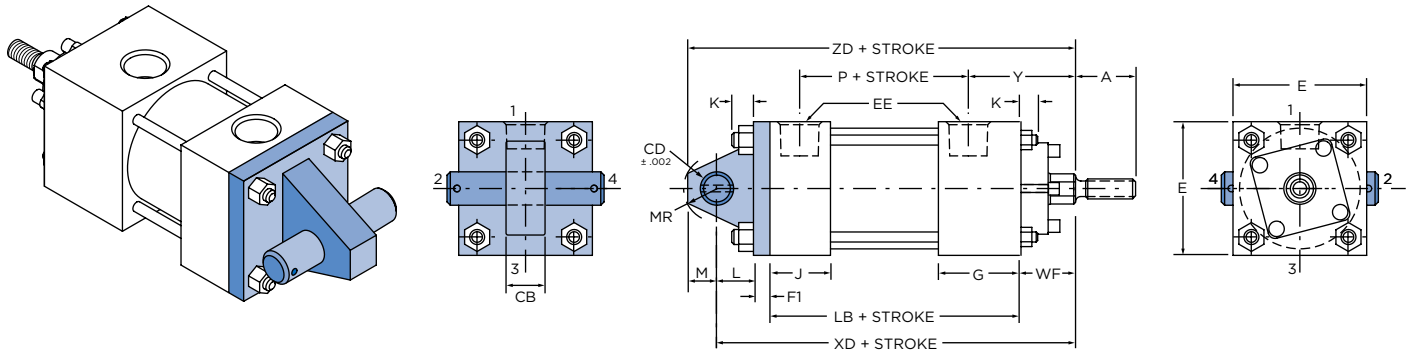


Table 1 These dimensions are constant regardless of rod diameter or stroke.

BORE DIA.	E	F	G	J	K	L	M	CB	CD	EE	MR
1-1/2	2	3/8	1-1/2	1-1/8	1/4	3/4	1/2	3/4	1/2	3/8	5/8
2	2-1/2	3/8	1-1/2	1-1/8	3/8	3/4	1/2	3/4	1/2	3/8	5/8
2-1/2	3	3/8	1-1/2	1-1/8	3/8	3/4	1/2	3/4	1/2	3/8	5/8
3-1/4	3-3/4	5/8	1-3/4	1-1/4	7/16	1-1/4	3/4	1-1/4	3/4	1/2	7/8
4	4-1/2	5/8	1-3/4	1-1/4	7/16	1-1/4	3/4	1-1/4	3/4	1/2	7/8
5	5-1/2	5/8	1-3/4	1-1/4	1/2	1-1/4	3/4	1-1/4	3/4	1/2	7/8
6	6-1/2	7/8	2	1-1/2	9/16	1-1/2	1	1-1/2	1	3/4	1-1/4
8	8-1/2	7/8	2	1-1/2	5/8	1-1/2	1	1-1/2	1	3/4	1-1/4
10	10-5/8	7/8	2-1/4	2	3/4	2-1/8	1-3/8	2	1-3/8	1	1-5/8

DETACHABLE EYE MOUNT CYLINDERS

1-1/2" THROUGH 10" DIAMETER

Table 2 The dimensions given on this table are affected by the piston rod diameter and the stroke.

• = For piston rod dimensions see page 132.

BORE DIA.	ROD MM•	A	P	Y	LB	WF	XD	ZD
1-1/2	5/8	3/4	2-1/8	1-15/16	3-5/8	1	5-3/4	6-1/4
	1	1-1/8	2-1/8	2-5/16	3-5/8	1-3/8	6-1/8	6-5/8
2	5/8	3/4	2-1/8	1-15/16	3-5/8	1	5-3/4	6-1/4
	1	1-1/8	2-1/8	2-5/16	3-5/8	1-3/8	6-1/8	6-5/8
	1-3/8	1-5/8	2-1/8	2-9/16	3-5/8	1-5/8	6-3/8	6-7/8
2-1/2	5/8	3/4	2-1/4	1-15/16	3-3/4	1	5-7/8	6-3/8
	1	1-1/8	2-1/4	2-5/16	3-3/4	1-3/8	6-1/4	6-3/4
	1-3/8	1-5/8	2-1/4	2-9/16	3-3/4	1-5/8	6-1/2	7
	1-3/4	2	2-1/4	2-13/16	3-3/4	1-7/8	6-3/4	7-1/4
3-1/4	1	1-1/8	2-1/2	2-1/2	4-1/4	1-3/8	7-1/2	8-1/4
	1-3/8	1-5/8	2-1/2	2-3/4	4-1/4	1-5/8	7-3/4	8-1/2
	1-3/4	2	2-1/2	3	4-1/4	1-7/8	8	8-3/4
	2	2-1/4	2-1/2	3-1/8	4-1/4	2	8-1/8	8-7/8
4	1	1-1/8	2-1/2	2-1/2	4-1/4	1-3/8	7-1/2	8-1/4
	1-3/8	1-5/8	2-1/2	2-3/4	4-1/4	1-5/8	7-3/4	8-1/2
	1-3/4	2	2-1/2	3	4-1/4	1-7/8	8	8-3/4
	2	2-1/4	2-1/2	3-1/8	4-1/4	2	8-1/8	8-7/8
	2-1/2	3	2-1/2	3-3/8	4-1/4	2-1/4	8-3/8	9-1/8
5	1	1-1/8	2-3/4	2-1/2	4-1/2	1-3/8	7-3/4	8-1/2
	1-3/8	1-5/8	2-3/4	2-3/4	4-1/2	1-5/8	8	8-3/4
	1-3/4	2	2-3/4	3	4-1/2	1-7/8	8-1/4	9
	2	2-1/4	2-3/4	3-1/8	4-1/2	2	8-3/8	9-1/8
	2-1/2	3	2-3/4	3-3/8	4-1/2	2-1/4	8-5/8	9-3/8
	3	3-1/2	2-3/4	3-3/8	4-1/2	2-1/4	8-5/8	9-3/8
	3-1/2	3-1/2	2-3/4	3-3/8	4-1/2	2-1/4	8-5/8	9-3/8
6	1-3/8	1-5/8	3-1/8	2-13/16	5	1-5/8	9	10
	1-3/4	2	3-1/8	3-1/16	5	1-7/8	9-1/4	10-1/4
	2	2-1/4	3-1/8	3-3/16	5	2	9-3/8	10-3/8
	2-1/2	3	3-1/8	3-7/16	5	2-1/4	9-5/8	10-5/8
	3	3-1/2	3-1/8	3-7/16	5	2-1/4	9-5/8	10-5/8
	3-1/2	3-1/2	3-1/8	3-7/16	5	2-1/4	9-5/8	10-5/8
8	4	4	3-1/8	3-7/16	5	2-1/4	9-5/8	10-5/8
	1-3/8	1-5/8	3-1/4	2-13/16	5-1/8	1-5/8	9-1/8	10-1/8
	1-3/4	2	3-1/4	3-1/16	5-1/8	1-7/8	9-3/8	10-3/8
	2	2-1/4	3-1/4	3-3/16	5-1/8	2	9-1/2	10-1/2
	2-1/2	3	3-1/4	3-7/16	5-1/8	2-1/4	9-3/4	10-3/4
	3	3-1/2	3-1/4	3-7/16	5-1/8	2-1/4	9-3/4	10-3/4
	3-1/2	3-1/2	3-1/4	3-7/16	5-1/8	2-1/4	9-3/4	10-3/4
	4	4	3-1/4	3-7/16	5-1/8	2-1/4	9-3/4	10-3/4
	4-1/2	4-1/2	3-1/4	3-7/16	5-1/8	2-1/4	9-3/4	10-3/4
	5	5	3-1/4	3-7/16	5-1/8	2-1/4	9-3/4	10-3/4
10	5-1/2	5-1/2	3-1/4	3-7/16	5-1/8	2-1/4	9-3/4	10-3/4
	1-3/4	2	4	3-3/16	6-3/8	1-7/8	11-1/4	12-5/8
	2	2-1/4	4	3-5/16	6-3/8	2	11-3/8	12-3/4
	2-1/2	3	4	3-9/16	6-3/8	2-1/4	11-5/8	13
	3	3-1/2	4	3-9/16	6-3/8	2-1/4	11-5/8	13
	3-1/2	3-1/2	4	3-9/16	6-3/8	2-1/4	11-5/8	13
	4	4	4	3-9/16	6-3/8	2-1/4	11-5/8	13
	4-1/2	4-1/2	4	3-9/16	6-3/8	2-1/4	11-5/8	13
	5	5	4	3-9/16	6-3/8	2-1/4	11-5/8	13
	5-1/2	5-1/2	4	3-9/16	6-3/8	2-1/4	11-5/8	13

MODEL EU3 (NFPA STD. MPU3)

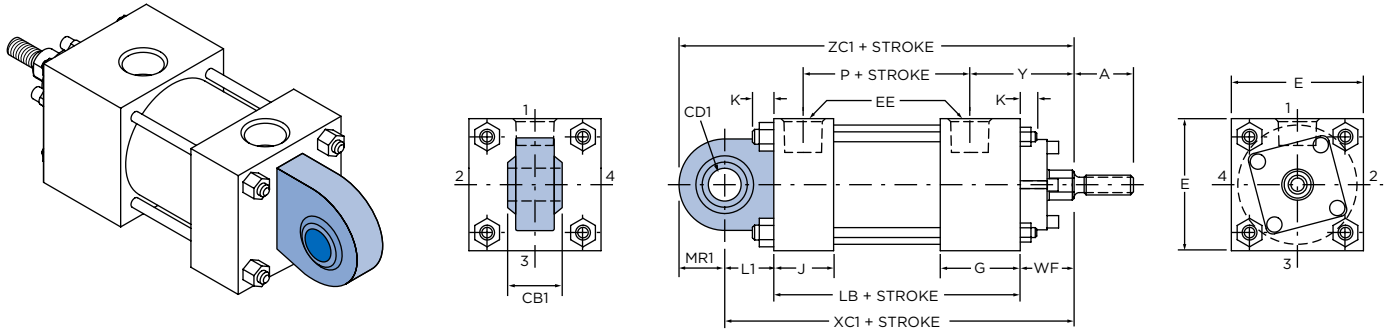


Table 1 These dimensions are constant regardless of rod diameter or stroke.

BORE DIA.	E	G	J	K	EE	L1	CB1	CD1	MR1	PRESSURE RATING
1-1/2	2	1-1/2	1-1/8	1/4	3/8	3/4	7/16	1/2	7/8	1750 PSI
2	2-1/2	1-1/2	1-1/8	3/8	3/8	3/4	7/16	1/2	7/8	980 PSI
2-1/2	3	1-1/2	1-1/8	3/8	3/8	3/4	7/16	1/2	7/8	630 PSI
3-1/4	3-3/4	1-3/4	1-1/4	7/16	1/2	1-1/4	21/32	3/4	1-1/4	830 PSI
4	4-1/2	1-3/4	1-1/4	7/16	1/2	1-1/4	21/32	3/4	1-1/4	550 PSI
5	5-1/2	1-3/4	1-1/4	1/2	1/2	1-1/4	21/32	3/4	1-1/4	350 PSI
6	6-1/2	2	1-1/2	9/16	3/4	1-1/2	7/8	1	1-1/2	440 PSI

SPHERICAL EYE MOUNT CYLINDERS

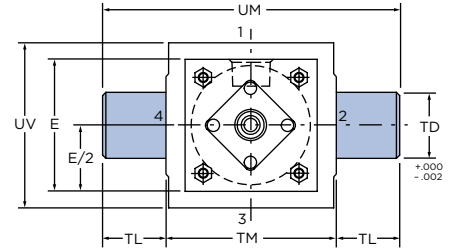
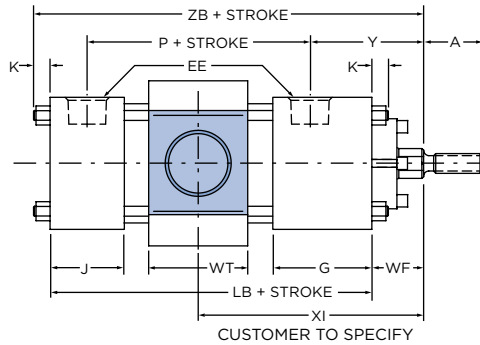
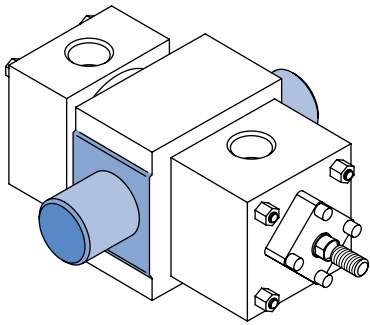
1-1/2" THROUGH 6" DIAMETER

Table 2 The dimensions given on this table are affected by the piston rod diameter and the stroke.

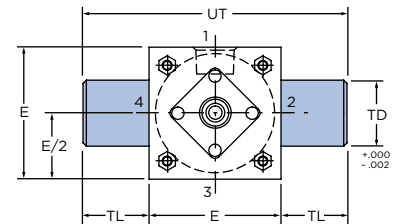
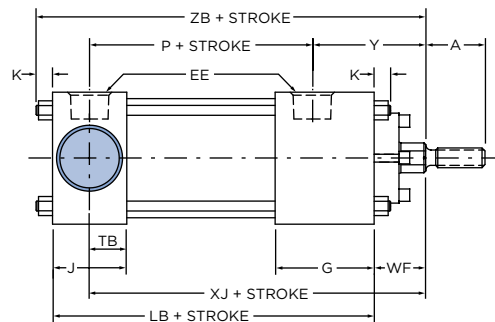
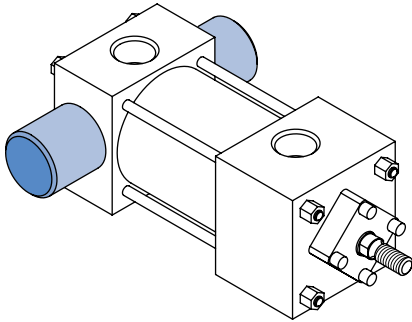
• = For piston rod dimensions see page 132.

BORE DIA.	ROD MM•	A	P	W	Y	LB	WF	XC1	ZC1
1-1/2	5/8	3/4	2-1/8	5/8	1-15/16	3-5/8	1	5-3/8	6-1/8
	1	1-1/8	2-1/8	1	2-5/16	3-5/8	1-3/8	5-3/4	6-1/2
2	5/8	3/4	2-1/8	5/8	1-15/16	3-5/8	1	5-3/8	6-1/8
	1	1-1/8	2-1/8	1	2-5/16	3-5/8	1-3/8	5-3/4	6-1/2
	1-3/8	1-5/8	2-1/8	1-1/4	2-9/16	3-5/8	1-5/8	6	6-3/4
2-1/2	5/8	3/4	2-1/4	5/8	1-15/16	3-3/4	1	5-1/2	6-1/4
	1	1-1/8	2-1/4	1	2-5/16	3-3/4	1-3/8	5-7/8	5-5/8
	1-3/8	1-5/8	2-1/4	1-1/4	2-9/16	3-3/4	1-5/8	6-1/8	6-7/8
	1-3/4	2	2-1/4	1-1/2	2-13/16	3-3/4	1-7/8	6-3/8	7-1/8
3-1/4	1	1-1/8	2-1/2	3/4	2-1/2	4-1/4	1-3/8	6-7/8	8-1/16
	1-3/8	1-5/8	2-1/2	1	2-3/4	4-1/4	1-5/8	7-1/8	8-5/16
	1-3/4	2	2-1/2	1-1/4	3	4-1/4	1-7/8	7-3/8	8-9/16
	2	2-1/4	2-1/2	1-3/8	3-1/8	4-1/4	2	7-1/2	8-11/16
4	1	1-1/8	2-1/2	3/4	2-1/2	4-1/4	1-3/8	6-7/8	8-1/16
	1-3/8	1-5/8	2-1/2	1	2-3/4	4-1/4	1-5/8	7-1/8	8-5/16
	1-3/4	2	2-1/2	1-1/4	3	4-1/4	1-7/8	7-3/8	8-9/16
	2	2-1/4	2-1/2	1-3/8	3-1/8	4-1/4	2	7-1/2	8-11/16
	2-1/2	3	2-1/2	1-5/8	3-3/8	4-1/4	2-1/4	7-3/4	8-15/16
5	1	1-1/8	2-3/4	3/4	2-1/2	4-1/2	1-3/8	7-1/8	8-5/16
	1-3/8	1-5/8	2-3/4	1	2-3/4	4-1/2	1-5/8	7-3/8	8-9/16
	1-3/4	2	2-3/4	1-1/4	3	4-1/2	1-7/8	7-5/8	8-13/16
	2	2-1/4	2-3/4	1-3/8	3-1/8	4-1/2	2	7-3/4	8-15/16
	2-1/2	3	2-3/4	1-5/8	3-3/8	4-1/2	2-1/4	8	9-3/16
	3	3-1/2	2-3/4	1-5/8	3-3/8	4-1/2	2-1/4	8	9-3/16
	3-1/2	3-1/2	2-3/4	1-5/8	3-3/8	4-1/2	2-1/4	8	9-3/16
6	1-3/8	1-5/8	3-1/8	7/8	2-13/16	5	1-5/8	8-1/8	9-5/8
	1-3/4	2	3-1/8	1-1/8	3-1/16	5	1-7/8	8-3/8	9-7/8
	2	2-1/4	3-1/8	1-1/4	3-3/16	5	2	8-1/2	10
	2-1/2	3	3-1/8	1-1/2	3-7/16	5	2-1/4	8-3/4	10-1/4
	3	3-1/2	3-1/8	-	3-3/16	5	-	8-3/4	10-1/4
	3-1/2	3-1/2	3-1/8	-	3-7/16	5	-	8-3/4	10-1/4
	4	4	3-1/8	-	-	5	-	8-3/4	10-1/4

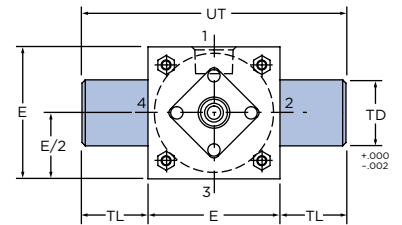
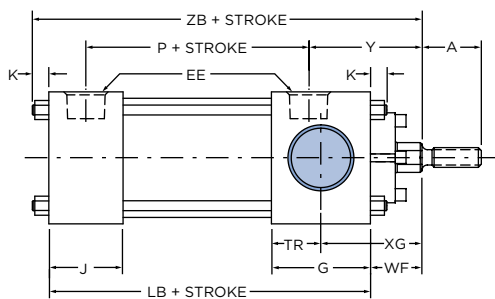
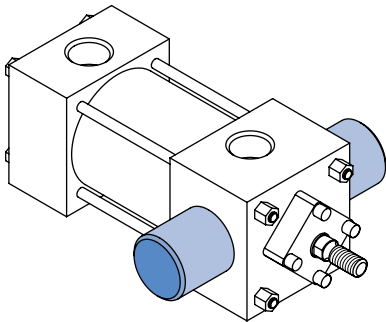
MODEL F (NFPA STD. MT4)▲



MODEL FB (NFPA STD. MT2)▲



MODEL FR (NFPA STD. MT1)▲



▲ = See Table A on page 127 for bore and rod combinations using head plates with threaded bronze glands.

TRUNNION MOUNT CYLINDERS

1-1/2" THROUGH 6" DIAMETER

Table 1 These dimensions are constant regardless of rod diameter or stroke.

Double rod end models are designated by letter "X" preceding the model identification. See page 128.

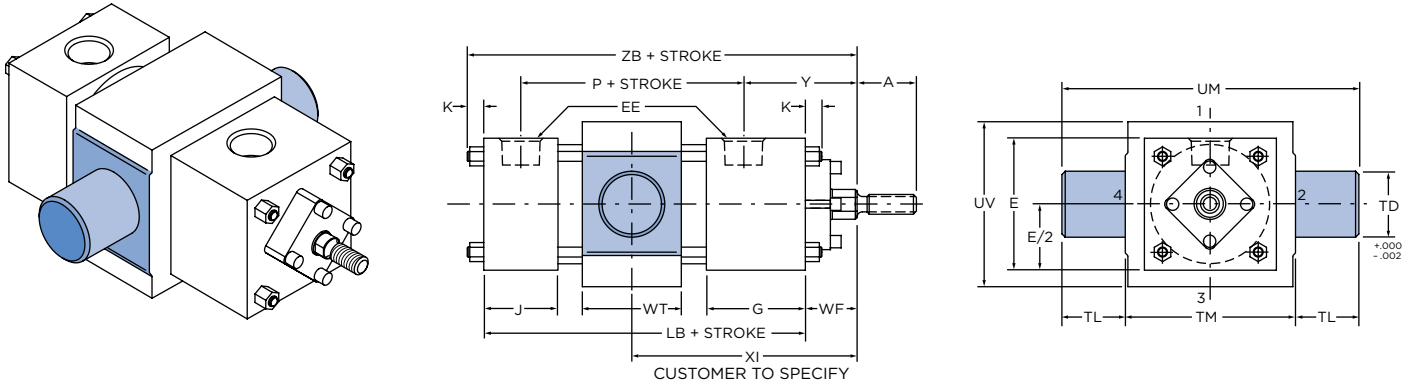
BORE DIA.	E	G	J	K	EE	TB	TD	TL	TM	TR	UM	UT	UV	WT
1-1/2	2	1-1/2	1-1/8	1/4	3/8	9/16	1	1	2-1/2	3/4	4-1/2	4	2-1/2	1-1/2
2	2-1/2	1-1/2	1-1/8	3/8	3/8	9/16	1	1	3	3/4	5	4-1/2	3	1-1/2
2-1/2	3	1-1/2	1-1/8	3/8	3/8	9/16	1	1	3-1/2	3/4	5-1/2	5	3-1/2	1-1/2
3-1/4	3-3/4	1-3/4	1-1/4	7/16	1/2	5/8	1	1	4-1/2	7/8	6-1/2	5-3/4	4-1/2	2
4	4-1/2	1-3/4	1-1/4	7/16	1/2	5/8	1	1	5-1/4	7/8	7-1/4	6-1/2	5	2
5	5-1/2	1-3/4	1-1/4	1/2	1/2	5/8	1	1	6-1/4	7/8	8-1/4	7-1/2	6	2
6	6-1/2	2	1-1/2	9/16	3/4	3/4	1-3/8	1-3/8	7-5/8	1	10-3/8	9-1/4	7	2-1/2

Table 2 The dimensions given on this table are affected by the piston rod diameter and the stroke.

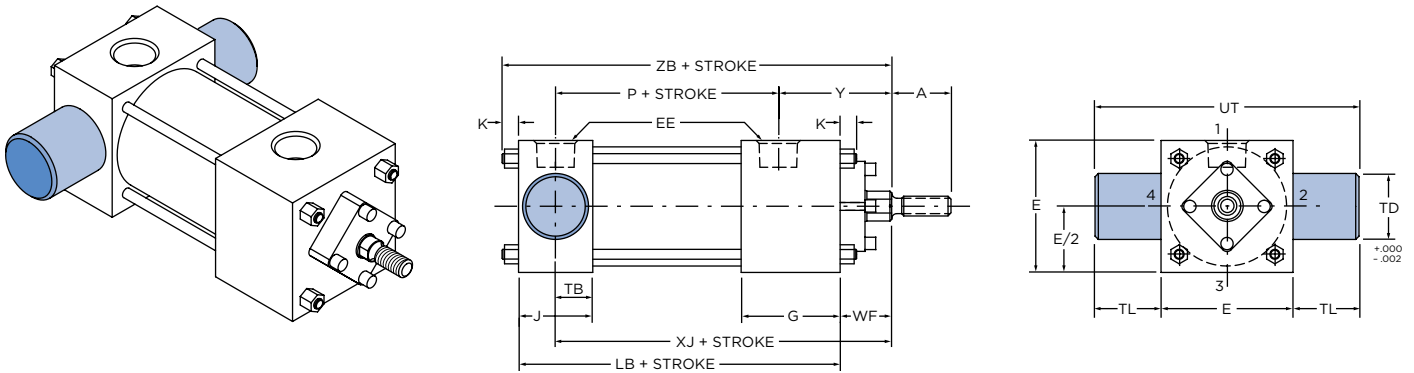
• = For piston rod dimensions see page 132.

BORE DIA.	ROD MM•	A	P	Y	LB	WF	XG	XI (MIN)	XJ	ZB
1-1/2	5/8	3/4	2-1/8	1-15/16	3-5/8	1	1-3/4	3-1/4	4-1/16	4-7/8
	1	1-1/8	2-1/8	2-5/16	3-5/8	1-3/8	2-1/8	3-5/8	4-7/16	5-1/4
2	5/8	3/4	2-1/8	1-15/16	3-5/8	1	1-3/4	3-1/4	4-1/16	5
	1	1-1/8	2-1/8	2-5/16	3-5/8	1-3/8	2-1/8	3-5/8	4-7/16	5-3/8
	1-3/8	1-5/8	2-1/8	2-9/16	3-5/8	1-5/8	2-3/8	3-7/8	4-11/16	5-11/16
2-1/2	5/8	3/4	2-1/4	1-15/16	3-3/4	1	1-3/4	3-1/4	4-3/16	5-1/16
	1	1-1/8	2-1/4	2-5/16	3-3/4	1-3/8	2-1/8	3-5/8	4-9/16	5-7/16
	1-3/8	1-5/8	2-1/4	2-9/16	3-3/4	1-5/8	2-3/8	3-7/8	4-13/16	5-11/16
	1-3/4	2	2-1/4	2-13/16	3-3/4	1-7/8	2-5/8	4-1/8	5-1/16	5-15/16
3-1/4	1	1-1/8	2-1/2	2-1/2	4-1/4	1-3/8	2-1/4	4-1/8	5	6-1/16
	1-3/8	1-5/8	2-1/2	2-3/4	4-1/4	1-5/8	2-1/2	4-3/8	5-1/4	6-5/16
	1-3/4	2	2-1/2	3	4-1/4	1-7/8	2-3/4	4-5/8	5-1/2	6-9/16
	2	2-1/4	2-1/2	3-1/8	4-1/4	2	2-7/8	4-3/4	5-5/8	6-11/16
4	1	1-1/8	2-1/2	2-1/2	4-1/4	1-3/8	2-1/4	4-1/8	5	6-1/16
	1-3/8	1-5/8	2-1/2	2-3/4	4-1/4	1-5/8	2-1/2	4-3/8	5-1/4	6-5/16
	1-3/4	2	2-1/2	3	4-1/4	1-7/8	2-3/4	4-5/8	5-1/2	6-9/16
	2	2-1/4	2-1/2	3-1/8	4-1/4	2	2-7/8	4-3/4	5-5/8	6-11/16
	2-1/2	3	2-1/2	3-3/8	4-1/4	2-1/4	3-1/8	5	5-7/8	6-15/16
5	1	1-1/8	2-3/4	2-1/2	4-1/2	1-3/8	2-1/4	4-1/8	5-1/4	6-3/8
	1-3/8	1-5/8	2-3/4	2-3/4	4-1/2	1-5/8	2-1/2	4-3/8	5-1/2	6-5/8
	1-3/4	2	2-3/4	3	4-1/2	1-7/8	2-3/4	4-5/8	5-3/4	6-7/8
	2	2-1/4	2-3/4	3-1/8	4-1/2	2	2-7/8	4-3/4	5-7/8	7
	2-1/2	3	2-3/4	3-3/8	4-1/2	2-1/4	3-1/8	5	6-1/8	7-1/4
	3	3-1/2	2-3/4	3-3/8	4-1/2	2-1/4	3-1/8	5	6-1/8	7-1/4
	3-1/2	3-1/2	2-3/4	3-3/8	4-1/2	2-1/4	3-1/8	5	6-1/8	7-1/4
6	1-3/8	1-5/8	3-1/8	2-13/16	5	1-5/8	2-5/8	4-7/8	5-7/8	7-3/16
	1-3/4	2	3-1/8	3-1/16	5	1-7/8	2-7/8	5-1/8	6-1/8	7-7/16
	2	2-1/4	3-1/8	3-3/16	5	2	3	5-1/4	6-1/4	7-9/16
	2-1/2	3	3-1/8	3-7/16	5	2-1/4	3-1/4	5-1/2	6-1/2	7-13/16
	3	3-1/2	3-1/8	3-7/16	5	2-1/4	3-1/4	5-1/2	6-1/2	7-13/16
	3-1/2	3-1/2	3-1/8	3-7/16	5	2-1/4	3-1/4	5-1/2	6-1/2	7-13/16
	4	4	3-1/8	3-7/16	5	2-1/4	3-1/4	5-1/2	6-1/2	7-13/16

MODEL F (NFPA STD. MT4) 8" THROUGH 14" DIAMETER



MODEL FB (NFPA STD. MT2) 8" THROUGH 20" DIAMETER



MODEL FR (NFPA STD. MT1) 8" THROUGH 20" DIAMETER

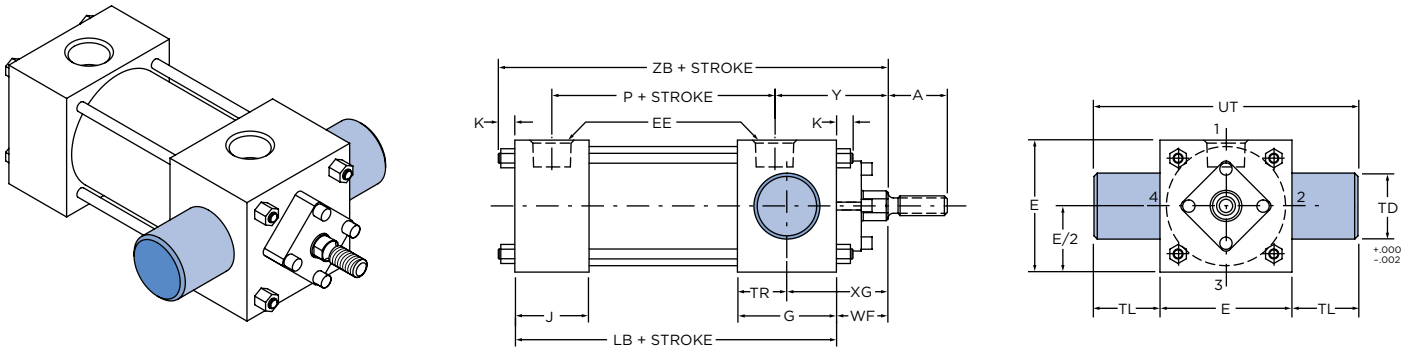


Table 1 These dimensions are constant regardless of rod diameter or stroke.

Double rod end models are designated by letter "X" preceding the model identification. See page 128.

BORE DIA.	E	G	J	K	EE	TB	TD	TL	TM	TR	UM	UT	UV	WT
8	8-1/2	2	1-1/2	5/8	3/4	3/4	1-3/8	1-3/8	9-3/4	1	12-1/2	11-1/4	9-1/2	2-1/2
10	10-5/8	2-1/4	2	3/4	1	1	1-3/4	1-3/4	12	1-1/8	15-1/2	14-1/8	11-3/4	3
12	12-3/4	2-1/4	2	3/4	1	1	1-3/4	1-3/4	14	1-1/8	17-1/2	16-1/4	13-3/4	3
14	14-3/4	2-3/4	2-1/4	7/8	1-1/4	1-1/8	2	2	16-1/4	1-3/8	20-1/4	18-3/4	16	3-1/2
16	17-1/2	3	3	1	1-1/2	1-1/2	2-3/4	2-3/4	-	1-1/2	-	23	-	-
18	19-1/2	3-7/16	3-7/16	1-1/8	1-1/2	1-11/16	3	3	-	1-11/16	-	25-1/2	-	-
20	21-3/4	3-15/16	3-15/16	1-1/4	2	1-15/16	3-1/2	3-1/2	-	1-15/16	-	28-3/4	-	-

TRUNNION MOUNT CYLINDERS

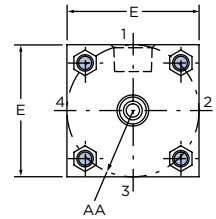
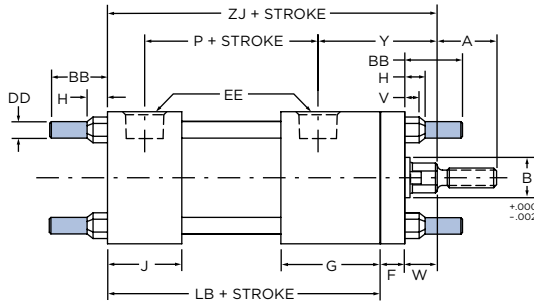
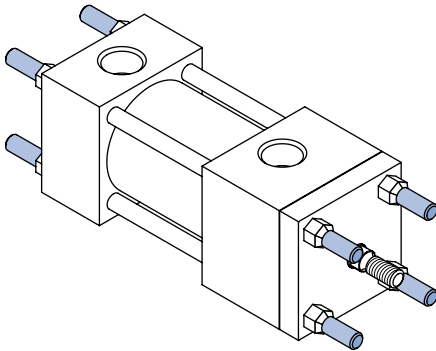
8" THROUGH 20" DIAMETER

Table 2 The dimensions given on this table are affected by the piston rod diameter and the stroke.

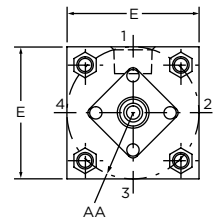
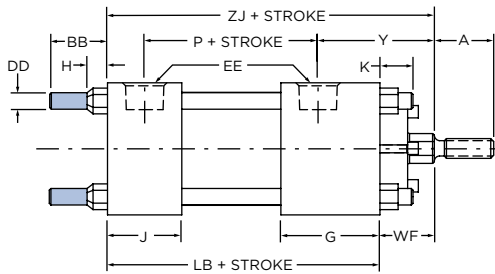
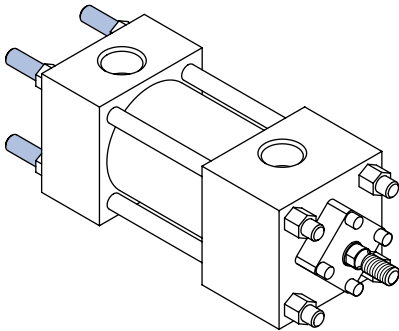
• = For piston rod dimensions see page 132.

BORE DIA.	ROD MM•	A	P	Y	LB	WF	XG	XI (MIN)	XJ	ZB
8	1-3/8	1-5/8	3-1/4	2-13/16	5-1/8	1-5/8	2-5/8	4-7/8	6	7-3/8
	1-3/4	2	3-1/4	3-1/16	5-1/8	1-7/8	2-7/8	5-1/8	6-1/4	7-5/8
	2	2-1/4	3-1/4	3-3/16	5-1/8	2	3	5-1/4	6-3/8	7-3/4
	2-1/2	3	3-1/4	3-7/16	5-1/8	2-1/4	3-1/4	5-1/2	6-5/8	8
	3	3-1/2	3-1/4	3-7/16	5-1/8	2-1/4	3-1/4	5-1/2	6-5/8	8
	3-1/2	3-1/2	3-1/4	3-7/16	5-1/8	2-1/4	3-1/4	5-1/2	6-5/8	8
	4	4	3-1/4	3-7/16	5-1/8	2-1/4	3-1/4	5-1/2	6-5/8	8
	4-1/2	4-1/2	3-1/4	3-7/16	5-1/8	2-1/4	3-1/4	5-1/2	6-5/8	8
	5	5	3-1/4	3-7/16	5-1/8	2-1/4	3-1/4	5-1/2	6-5/8	8
10	5-1/2	5-1/2	3-1/4	3-7/16	5-1/8	2-1/4	3-1/4	5-1/2	6-5/8	8
	1-3/4	2	4	3-3/16	6-3/8	1-7/8	3	5-5/8	7-1/4	9
	2	2-1/4	4	3-5/16	6-3/8	2	3-1/8	5-3/4	7-3/8	9-1/8
	2-1/2	3	4	3-9/16	6-3/8	2-1/4	3-3/8	6	7-5/8	9-3/8
	3	3-1/2	4	3-9/16	6-3/8	2-1/4	3-3/8	6	7-5/8	9-3/8
	3-1/2	3-1/2	4	3-9/16	6-3/8	2-1/4	3-3/8	6	7-5/8	9-3/8
	4	4	4	3-9/16	6-3/8	2-1/4	3-3/8	6	7-5/8	9-3/8
	4-1/2	4-1/2	4	3-9/16	6-3/8	2-1/4	3-3/8	6	7-5/8	9-3/8
	5	5	4	3-9/16	6-3/8	2-1/4	3-3/8	6	7-5/8	9-3/8
12	5-1/2	5-1/2	4	3-9/16	6-3/8	2-1/4	3-3/8	6	7-5/8	9-3/8
	2	2-1/4	4-1/2	3-5/16	6-7/8	2	3-1/8	5-3/4	7-7/8	9-5/8
	2-1/2	3	4-1/2	3-9/16	6-7/8	2-1/4	3-3/8	6	8-1/8	9-7/8
	3	3-1/2	4-1/2	3-9/16	6-7/8	2-1/4	3-3/8	6	8-1/8	9-7/8
	3-1/2	3-1/2	4-1/2	3-9/16	6-7/8	2-1/4	3-3/8	6	8-1/8	9-7/8
	4	4	4-1/2	3-9/16	6-7/8	2-1/4	3-3/8	6	8-1/8	9-7/8
	4-1/2	4-1/2	4-1/2	3-9/16	6-7/8	2-1/4	3-3/8	6	8-1/8	9-7/8
	5	5	4-1/2	3-9/16	6-7/8	2-1/4	3-3/8	6	8-1/8	9-7/8
	5-1/2	5-1/2	4-1/2	3-9/16	6-7/8	2-1/4	3-3/8	6	8-1/8	9-7/8
14	2-1/2	3	5-1/2	3-13/16	8-1/8	2-1/4	3-5/8	6	9-1/4	11-1/4
	3	3-1/2	5-1/2	3-13/16	8-1/8	2-1/4	3-5/8	6	9-1/4	11-1/4
	3-1/2	3-1/2	5-1/2	3-13/16	8-1/8	2-1/4	3-5/8	6	9-1/4	11-1/4
	4	4	5-1/2	3-13/16	8-1/8	2-1/4	3-5/8	6	9-1/4	11-1/4
	4-1/2	4-1/2	5-1/2	3-13/16	8-1/8	2-1/4	3-5/8	6	9-1/4	11-1/4
	5	5	5-1/2	3-13/16	8-1/8	2-1/4	3-5/8	6	9-1/4	11-1/4
	5-1/2	5-1/2	5-1/2	3-13/16	8-1/8	2-1/4	3-5/8	6	9-1/4	11-1/4
16	2-1/2	3	5-7/8	3-15/16	9-1/4	2-1/4	3-3/4	-	10	12-1/2
	3	3-1/2	5-7/8	3-15/16	9-1/4	2-1/4	3-3/4	-	10	12-1/2
	3-1/2	3-1/2	5-7/8	3-15/16	9-1/4	2-1/4	3-3/4	-	10	12-1/2
	4	4	5-7/8	3-15/16	9-1/4	2-1/4	3-3/4	-	10	12-1/2
	4-1/2	4-1/2	5-7/8	3-15/16	9-1/4	2-1/4	3-3/4	-	10	12-1/2
	5	5	5-7/8	3-15/16	9-1/4	2-1/4	3-3/4	-	10	12-1/2
	5-1/2	5-1/2	5-7/8	3-15/16	9-1/4	2-1/4	3-3/4	-	10	12-1/2
18	3-1/2	3-1/2	6	4-3/8	10-1/4	2-1/4	4	-	10-3/4	13-5/8
	4	4	6	4-3/8	10-1/4	2-1/4	4	-	10-3/4	13-5/8
	4-1/2	4-1/2	6	4-3/8	10-1/4	2-1/4	4	-	10-3/4	13-5/8
	5	5	6	4-3/8	10-1/4	2-1/4	4	-	10-3/4	13-5/8
	5-1/2	5-1/2	6	4-3/8	10-1/4	2-1/4	4	-	10-3/4	13-5/8
20	4	4	7-1/8	4-9/16	11-3/4	2-1/4	4-1/4	-	12	15-1/4
	4-1/2	4-1/2	7-1/8	4-9/16	11-3/4	2-1/4	4-1/4	-	12	15-1/4
	5	5	7-1/8	4-9/16	11-3/4	2-1/4	4-1/4	-	12	15-1/4
	5-1/2	5-1/2	7-1/8	4-9/16	11-3/4	2-1/4	4-1/4	-	12	15-1/4

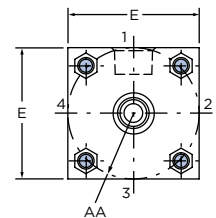
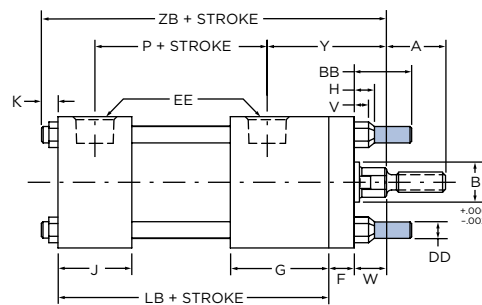
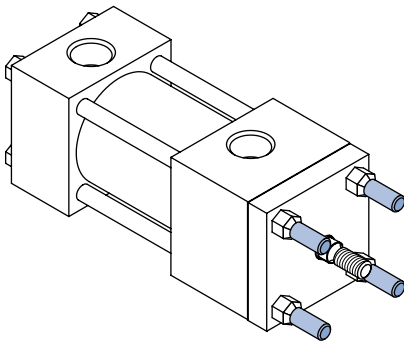
MODEL T (NFPA STD. MX1)



MODEL TB (NFPA STD. MX2)▲



MODEL TR (NFPA STD. MX3)



▲ = See Table A on page 127 for bore and rod combinations using head plates with threaded bronze glands.

TIE-ROD MOUNT CYLINDERS

1-1/2" THROUGH 6" DIAMETER

Table 1 These dimensions are constant regardless of rod diameter or stroke.

Double rod end models are designated by letter "X" preceding the model identification. See page 128.

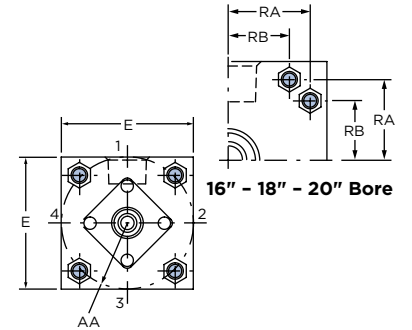
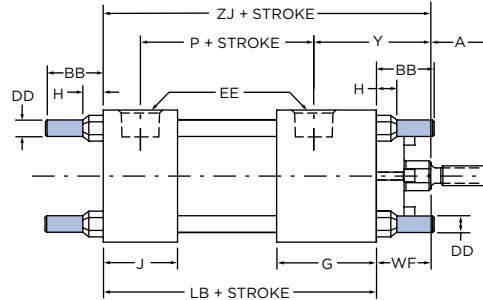
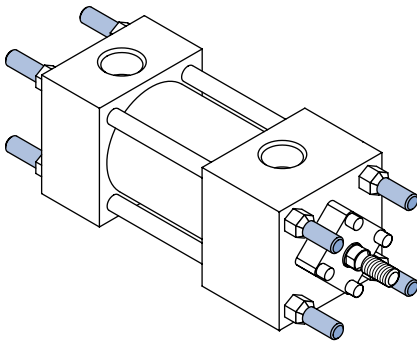
BORE DIA.	E	F	G	H	J	K	AA	BB	DD	EE
1-1/2	2	3/8	1-1/2	7/32	1-1/8	1/4	2.02	7/8	1/4-28	3/8
2	2-1/2	3/8	1-1/2	9/32	1-1/8	7/16	2.60	1-3/16	5/16-24	3/8
2-1/2	3	3/8	1-1/2	9/32	1-1/8	5/16	3.10	1-1/8	5/16-24	3/8
3-1/4	3-3/4	5/8	1-3/4	3/8	1-1/4	7/16	4.00	1-3/8	3/8-24	1/2
4	4-1/2	5/8	1-3/4	3/8	1-1/4	7/16	4.75	1-3/8	3/8-24	1/2
5	5-1/2	5/8	1-3/4	7/16	1-1/4	1/2	5.80	1-3/4	1/2-20	1/2
6	6-1/2	3/4	2	1/2	1-1/2	9/16	6.90	1-3/4	1/2-20	3/4

Table 2 The dimensions given on this table are affected by the piston rod diameter and the stroke.

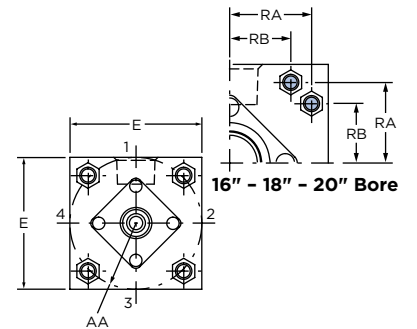
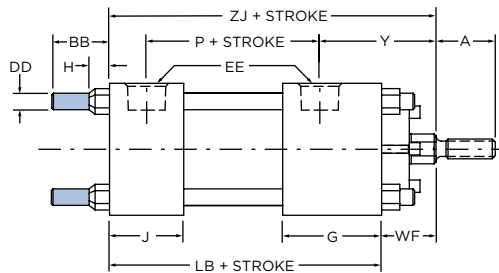
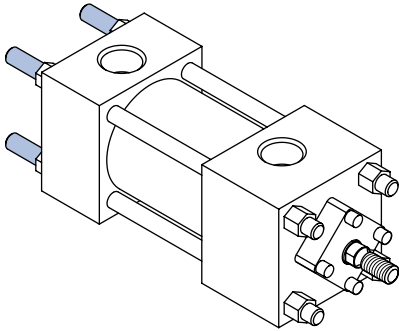
• = For piston rod dimensions see page 132.

BORE DIA.	ROD MM•	A	B	P	V	W	Y	LB	WF	ZB	ZJ
1-1/2	5/8	3/4	1-1/8	2-1/8	1/4	5/8	1-15/16	3-5/8	1	4-7/8	4-5/8
	1	1-1/8	1-1/2	2-1/8	1/2	1	2-5/16	3-5/8	1-3/8	5-1/4	5
2	5/8	3/4	1-1/8	2-1/8	1/4	5/8	1-15/16	3-5/8	1	5	4-5/8
	1	1-1/8	1-1/2	2-1/8	1/2	1	2-5/16	3-5/8	1-3/8	5-3/8	5
	1-3/8	1-5/8	2	2-1/8	5/8	1-1/4	2-9/16	3-5/8	1-5/8	5-11/16	5-1/4
2-1/2	5/8	3/4	1-1/8	2-1/4	1/4	5/8	1-15/16	3-3/4	1	5-1/16	4-3/4
	1	1-1/8	1-1/2	2-1/4	1/2	1	2-5/16	3-3/4	1-3/8	5-7/16	5-1/8
	1-3/8	1-5/8	2	2-1/4	5/8	1-1/4	2-9/16	3-3/4	1-5/8	5-11/16	5-3/8
	1-3/4	2	2-3/8	2-1/4	3/4	1-1/2	2-13/16	3-3/4	1-7/8	5-15/16	5-5/8
3-1/4	1	1-1/8	1-1/2	2-1/2	1/4	3/4	2-1/2	4-1/4	1-3/8	6-1/16	5-5/8
	1-3/8	1-5/8	2	2-1/2	3/8	1	2-3/4	4-1/4	1-5/8	6-5/16	5-7/8
	1-3/4	2	2-3/8	2-1/2	1/2	1-1/4	3	4-1/4	1-7/8	6-9/16	6-1/8
	2	2-1/4	2-5/8	2-1/2	1/2	1-3/8	3-1/8	4-1/4	2	6-11/16	6-1/4
4	1	1-1/8	1-1/2	2-1/2	1/4	3/4	2-1/2	4-1/4	1-3/8	6-1/16	5-5/8
	1-3/8	1-5/8	2	2-1/2	3/8	1	2-3/4	4-1/4	1-5/8	6-5/16	5-7/8
	1-3/4	2	2-3/8	2-1/2	1/2	1-1/4	3	4-1/4	1-7/8	6-9/16	6-1/8
	2	2-1/4	2-5/8	2-1/2	1/2	1-3/8	3-1/8	4-1/4	2	6-11/16	6-1/4
	2-1/2	3	3-1/8	2-1/2	5/8	1-5/8	3-3/8	4-1/4	2-1/4	6-15/16	6-1/2
5	1	1-1/8	1-1/2	2-3/4	1/4	3/4	2-1/2	4-1/2	1-3/8	6-3/8	5-7/8
	1-3/8	1-5/8	2	2-3/4	3/8	1	2-3/4	4-1/2	1-5/8	6-5/8	6-1/8
	1-3/4	2	2-3/8	2-3/4	1/2	1-1/4	3	4-1/2	1-7/8	6-7/8	6-3/8
	2	2-1/4	2-5/8	2-3/4	1/2	1-3/8	3-1/8	4-1/2	2	7	6-1/2
	2-1/2	3	3-1/8	2-3/4	5/8	1-5/8	3-3/8	4-1/2	2-1/4	7-1/4	6-3/4
	3	3-1/2	3-3/4	2-3/4	5/8	1-5/8	3-3/8	4-1/2	2-1/4	7-1/4	6-3/4
	3-1/2	3-1/2	4-1/4	2-3/4	5/8	1-5/8	3-3/8	4-1/2	2-1/4	7-1/4	6-3/4
6	1-3/8	1-5/8	2	3-1/8	1/4	7/8	2-13/16	5	1-5/8	7-3/16	6-5/8
	1-3/4	2	2-3/8	3-1/8	3/8	1-1/8	3-1/16	5	1-7/8	7-7/16	6-7/8
	2	2-1/4	2-5/8	3-1/8	3/8	1-1/4	3-3/16	5	2	7-9/16	7
	2-1/2	3	3-1/8	3-1/8	1/2	1-1/2	3-7/16	5	2-1/4	7-13/16	7-1/4
	3	3-1/2	3-3/4	3-1/8	1/2	1-1/2	3-7/16	5	2-1/4	7-13/16	7-1/4
	3-1/2	3-1/2	4-1/4	3-1/8	1/2	1-1/2	3-7/16	5	2-1/4	7-13/16	7-1/4
	4	4	4-3/4	3-1/8	1/2	1-1/2	3-7/16	5	2-1/4	7-13/16	7-1/4

MODEL T (NFPA STD. MX1)



MODEL TB (NFPA STD. MX2)



MODEL TR (NFPA STD. MX3)

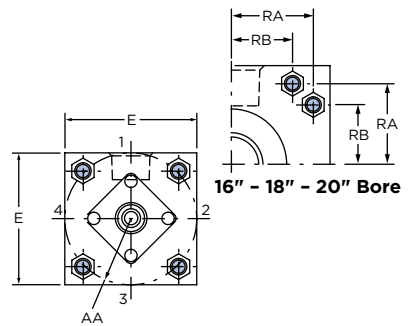
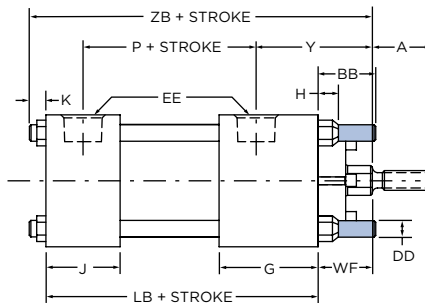
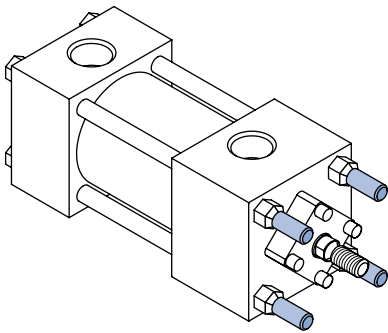


Table 1 These dimensions are constant regardless of rod diameter or stroke.

Double rod end models are designated by letter "X" preceding the model identification. See page 128.

BORE DIA.	E	G	H	J	K	AA	BB	DD	EE	RA	RB
8	8-1/2	2	9/16	1-1/2	5/8	9.10	2-1/4	5/8-18	3/4	-	-
10	10-5/8	2-1/4	5/8	2	3/4	11.31	2-5/8	3/4-16	1	-	-
12	12-3/4	2-1/4	5/8	2	3/4	13.30	2-11/16	3/4-16	1	-	-
14	14-3/4	2-3/4	3/4	2-1/4	7/8	15.40	3-3/16	7/8-14	1-1/4	-	-
16	17-1/2	3	7/8	3	1	18.25	3-5/8	1-14	1-1/2	7.48	5.23
18	19-1/2	3-7/16	1	3-7/16	1-1/8	20.50	4-1/8	1-1/8-12	1-1/2	8.40	5.88
20	21-3/4	3-15/16	1-1/8	3-15/16	1-1/4	22.62	4-1/2	1-1/4-12	2	9.27	6.49

TIE-ROD MOUNT CYLINDERS

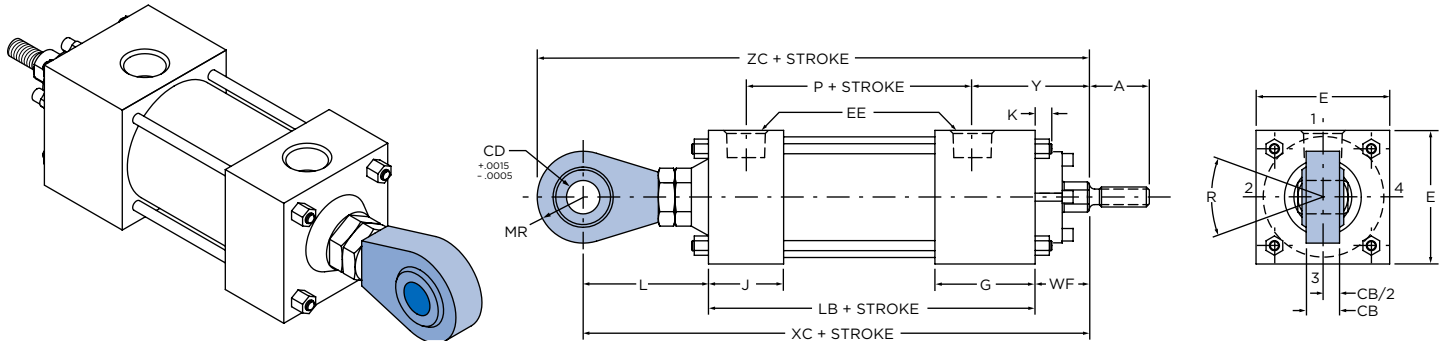
8" THROUGH 20" DIAMETER

Table 2 The dimensions given on this table are affected by the piston rod diameter and the stroke.

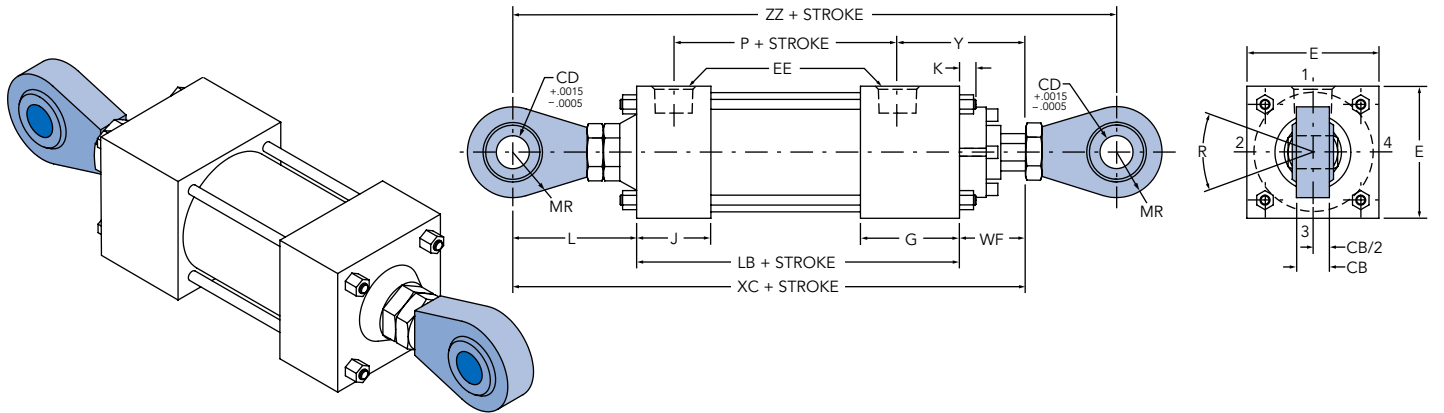
• = For piston rod dimensions see page 132.

BORE DIA.	ROD MM•	A	P	Y	LB	WF	ZB	ZJ
8	1-3/8	1-5/8	3-1/4	2-13/16	5-1/8	1-5/8	7-3/8	6-3/4
	1-3/4	2	3-1/4	3-1/16	5-1/8	1-7/8	7-5/8	7
	2	2-1/4	3-1/4	3-3/16	5-1/8	2	7-3/4	7-1/8
	2-1/2	3	3-1/4	3-7/16	5-1/8	2-1/4	8	7-3/8
	3	3-1/2	3-1/4	3-7/16	5-1/8	2-1/4	8	7-3/8
	3-1/2	3-1/2	3-1/4	3-7/16	5-1/8	2-1/4	8	7-3/8
	4	4	3-1/4	3-7/16	5-1/8	2-1/4	8	7-3/8
	4-1/2	4-1/2	3-1/4	3-7/16	5-1/8	2-1/4	8	7-3/8
	5	5	3-1/4	3-7/16	5-1/8	2-1/4	8	7-3/8
10	5-1/2	5-1/2	3-1/4	3-7/16	5-1/8	2-1/4	8	7-3/8
	1-3/4	2	4	3-3/16	6-3/8	1-7/8	9	8-1/4
	2	2-1/4	4	3-5/16	6-3/8	2	9-1/8	8-3/8
	2-1/2	3	4	3-9/16	6-3/8	2-1/4	9-3/8	8-5/8
	3	3-1/2	4	3-9/16	6-3/8	2-1/4	9-3/8	8-5/8
	3-1/2	3-1/2	4	3-9/16	6-3/8	2-1/4	9-3/8	8-5/8
	4	4	4	3-9/16	6-3/8	2-1/4	9-3/8	8-5/8
	4-1/2	4-1/2	4	3-9/16	6-3/8	2-1/4	9-3/8	8-5/8
	5	5	4	3-9/16	6-3/8	2-1/4	9-3/8	8-5/8
12	5-1/2	5-1/2	4	3-9/16	6-3/8	2-1/4	9-3/8	8-5/8
	2	2-1/4	4-1/2	3-5/16	6-7/8	2	9-5/8	8-7/8
	2-1/2	3	4-1/2	3-9/16	6-7/8	2-1/4	9-7/8	9-1/8
	3	3-1/2	4-1/2	3-9/16	6-7/8	2-1/4	9-7/8	9-1/8
	3-1/2	3-1/2	4-1/2	3-9/16	6-7/8	2-1/4	9-7/8	9-1/8
	4	4	4-1/2	3-9/16	6-7/8	2-1/4	9-7/8	9-1/8
	4-1/2	4-1/2	4-1/2	3-9/16	6-7/8	2-1/4	9-7/8	9-1/8
	5	5	4-1/2	3-9/16	6-7/8	2-1/4	9-7/8	9-1/8
	5-1/2	5-1/2	4-1/2	3-9/16	6-7/8	2-1/4	9-7/8	9-1/8
14	2-1/2	3	5-1/2	3-13/16	8-1/8	2-1/4	11-1/4	10-3/8
	3	3-1/2	5-1/2	3-13/16	8-1/8	2-1/4	11-1/4	10-3/8
	3-1/2	3-1/2	5-1/2	3-13/16	8-1/8	2-1/4	11-1/4	10-3/8
	4	4	5-1/2	3-13/16	8-1/8	2-1/4	11-1/4	10-3/8
	4-1/2	4-1/2	5-1/2	3-13/16	8-1/8	2-1/4	11-1/4	10-3/8
	5	5	5-1/2	3-13/16	8-1/8	2-1/4	11-1/4	10-3/8
	5-1/2	5-1/2	5-1/2	3-13/16	8-1/8	2-1/4	11-1/4	10-3/8
16	2-1/2	3	5-7/8	3-15/16	9-1/4	2-1/4	12-1/2	11-1/2
	3	3-1/2	5-7/8	3-15/16	9-1/4	2-1/4	12-1/2	11-1/2
	3-1/2	3-1/2	5-7/8	3-15/16	9-1/4	2-1/4	12-1/2	11-1/2
	4	4	5-7/8	3-15/16	9-1/4	2-1/4	12-1/2	11-1/2
	4-1/2	4-1/2	5-7/8	3-15/16	9-1/4	2-1/4	12-1/2	11-1/2
	5	5	5-7/8	3-15/16	9-1/4	2-1/4	12-1/2	11-1/2
	5-1/2	5-1/2	5-7/8	3-15/16	9-1/4	2-1/4	12-1/2	11-1/2
18	3-1/2	3-1/2	6	4-3/8	10-1/4	2-1/4	13-5/8	12-1/2
	4	4	6	4-3/8	10-1/4	2-1/4	13-5/8	12-1/2
	4-1/2	4-1/2	6	4-3/8	10-1/4	2-1/4	13-5/8	12-1/2
	5	5	6	4-3/8	10-1/4	2-1/4	13-5/8	12-1/2
	5-1/2	5-1/2	6	4-3/8	10-1/4	2-1/4	13-5/8	12-1/2
20	4	4	7-1/8	4-9/16	11-3/4	2-1/4	15-1/4	14
	4-1/2	4-1/2	7-1/8	4-9/16	11-3/4	2-1/4	15-1/4	14
	5	5	7-1/8	4-9/16	11-3/4	2-1/4	15-1/4	14
	5-1/2	5-1/2	7-1/8	4-9/16	11-3/4	2-1/4	15-1/4	14

MODEL UE (NFPA STD. NONE)▲



MODEL UUE (NFPA STD. NONE)▲



▲ = See Table A on page 127 for bore and rod combinations using head plates with threaded bronze glands.

Table 1 These dimensions are constant regardless of rod diameter or stroke.

BORE DIA.	E	F	G	K	L	R	CB	CD	EE	MR
1-1/2	2	3/8	1-1/2	1/4	1-7/8	12°	5/8	1/2	3/8	11/16
2	2-1/2	3/8	1-1/2	3/8	1-7/8	12°	5/8	1/2	3/8	11/16
2-1/2	3	3/8	1-1/2	5/16	1-7/8	12°	5/8	1/2	3/8	11/16
3-1/4	3-3/4	5/8	1-3/4	7/16	2-7/8	13-1/2°	7/8	3/4	1/2	7/8
4	4-1/2	5/8	1-3/4	7/16	2-7/8	13-1/2°	7/8	3/4	1/2	7/8
5	5-1/2	5/8	1-3/4	1/2	2-7/8	13-1/2°	7/8	3/4	1/2	7/8
6	6-1/2	3/4	2	9/16	4-1/8	14°	1-3/8	1	3/4	1-3/8

SPHERICAL EYE PIN MOUNT CYLINDERS

1-1/2" THROUGH 6" DIAMETER

Table 2 The dimensions given on this table are affected by the piston rod diameter and the stroke.

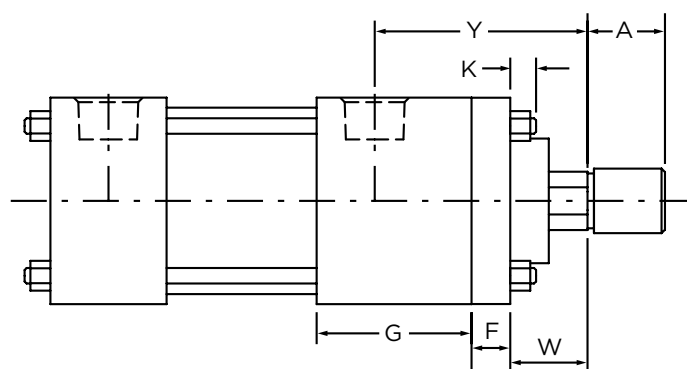
• = For piston rod dimensions see page 132.

BORE DIA.	ROD MM•	A	P	Y	LB	W	WF	XC	ZC	ZZ
1-1/2	5/8	3/4	2-1/8	1-15/16	3-5/8	5/8	1	6-1/2	7-3/16	7-11/16
	1	1-1/8	2-1/8	2-5/16	3-5/8	1	1-3/8	6-7/8	7-9/16	8-1/16
2	5/8	3/4	2-1/8	1-15/16	3-5/8	-	1	6-1/2	7-3/16	7-11/16
	1	1-1/8	2-1/8	2-5/16	3-5/8	1	1-3/8	6-7/8	7-9/16	8-1/16
	1-3/8	1-5/8	2-1/8	2-9/16	3-5/8	1-1/4	1-5/8	7-1/8	7-13/16	8-5/16
2-1/2	5/8	3/4	2-1/4	1-15/16	3-3/4	-	1	6-5/8	7-5/16	7-13/16
	1	1-1/8	2-1/4	2-5/16	3-3/4	-	1-3/8	7	7-11/16	8-3/16
	1-3/8	1-5/8	2-1/4	2-9/16	3-3/4	-	1-5/8	7-1/4	7-15/16	8-7/16
	1-3/4	2	2-1/4	2-13/16	3-3/4	1-1/2	1-7/8	7-1/2	8-3/16	8-11/16
3-1/4	1	1-1/8	2-1/2	2-1/2	4-1/4	-	1-3/8	8-1/2	9-3/8	10-1/16
	1-3/8	1-5/8	2-1/2	2-3/4	4-1/4	-	1-5/8	8-3/4	9-5/8	10-5/16
	1-3/4	2	2-1/2	3	4-1/4	-	1-7/8	9	9-7/8	10-9/16
	2	2-1/4	2-1/2	3-1/8	4-1/4	1-3/8	2	9-1/8	10	10-11/16
4	1	1-1/8	2-1/2	2-1/2	4-1/4	-	1-3/8	8-1/2	9-3/8	10-1/16
	1-3/8	1-5/8	2-1/2	2-3/4	4-1/4	-	1-5/8	8-3/4	9-5/8	10-5/16
	1-3/4	2	2-1/2	3	4-1/4	-	1-7/8	9	9-7/8	10-9/16
	2	2-1/4	2-1/2	3-1/8	4-1/4	-	2	9-1/8	10	10-11/16
	2-1/2	3	2-1/2	3-3/8	4-1/4	1-5/8	2-1/4	9-3/8	10-1/4	10-15/16
5	1	1-1/8	2-3/4	2-1/2	4-1/2	-	1-3/8	8-3/4	9-5/8	10-5/16
	1-3/8	1-5/8	2-3/4	2-3/4	4-1/2	-	1-5/8	9	9-7/8	10-9/16
	1-3/4	2	2-3/4	3	4-1/2	-	1-7/8	9-1/4	10-1/8	10-13/16
	2	2-1/4	2-3/4	3-1/8	4-1/2	-	2	9-3/8	10-1/4	10-15/16
	2-1/2	3	2-3/4	3-3/8	4-1/2	-	2-1/4	9-5/8	10-1/2	11-3/16
	3	3-1/2	2-3/4	3-3/8	4-1/2	-	2-1/4	9-5/8	10-1/2	11-3/16
	3-1/2	3-1/2	2-3/4	3-3/8	4-1/2	1-5/8	2-1/4	9-5/8	10-1/2	11-3/16
6	1-3/8	1-5/8	3-1/8	2-13/16	5	-	1-5/8	10-3/4	12-1/8	13-5/16
	1-3/4	2	3-1/8	3-1/16	5	-	1-7/8	11	12-3/8	13-9/16
	2	2-1/4	3-1/8	3-3/16	5	-	2	11-1/8	12-1/2	13-11/16
	2-1/2	3	3-1/8	3-7/16	5	-	2-1/4	11-3/8	12-3/4	13-15/16
	3	3-1/2	3-1/8	3-7/16	5	-	2-1/4	11-3/8	12-3/4	13-15/16
	3-1/2	3-1/2	3-1/8	3-7/16	5	-	2-1/4	11-3/8	12-3/4	13-15/16
	4	4	3-1/8	3-7/16	5	1-1/2	2-1/4	11-3/8	12-3/4	13-15/16

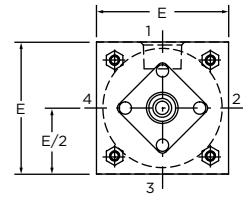
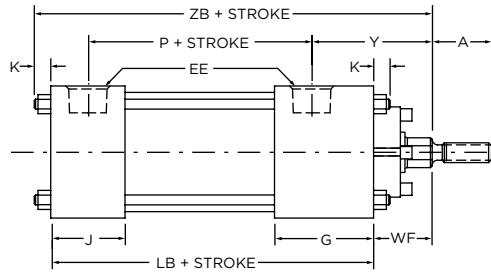
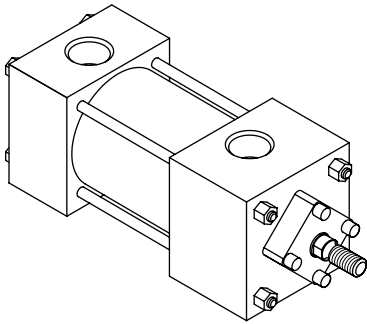
Table A

THE FOLLOWING BORE/ROD COMBINATIONS USE HEAD PLATE AND BRONZE GLANDS AS SHOWN AT RIGHT	
BORE	ROD DIAMETER (MM)
1-1/2	5/8 & 1
2	1 & 1-3/8
2-1/2	1-3/4
3-1/4	2
4	2-1/2
5	3-1/2
6	4

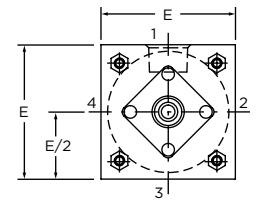
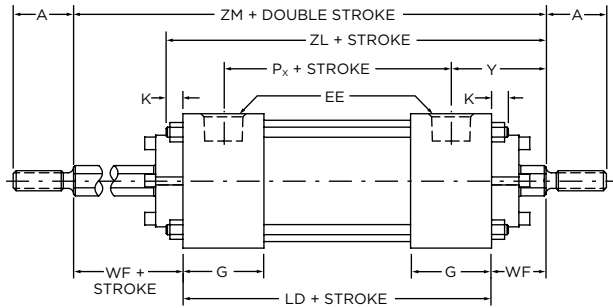
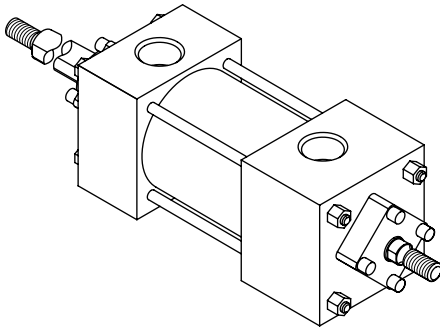
NOTE: Bolt-on glands not available on these combinations.
NOTE: Threaded Bronze Gland used on all Model D Cylinders.
 Bolt-on Gland used on all Model DG Cylinders.



MODEL H (NFPA STD. NONE)▲



MODEL XH (NFPA STD. NONE)▲



▲ = See Table A on page 127 for bore and rod combinations using head plates with threaded bronze glands.

Table 1 These dimensions are constant regardless of rod diameter or stroke.

Double rod end models are designated by letter "X" preceding the model identification.

BORE DIA.	E	G	J	K	EE
1-1/2	2	1-1/2	1-1/8	1/4	3/8
2	2-1/2	1-1/2	1-1/8	3/8	3/8
2-1/2	3	1-1/2	1-1/8	5/16	3/8
3-1/4	3-3/4	1-3/4	1-1/4	7/16	1/2
4	4-1/2	1-3/4	1-1/4	7/16	1/2
5	5-1/2	1-3/4	1-1/4	1/2	1/2
6	6-1/2	2	1-1/2	9/16	3/4

BASIC MODEL NO MOUNT CYLINDERS

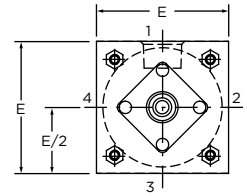
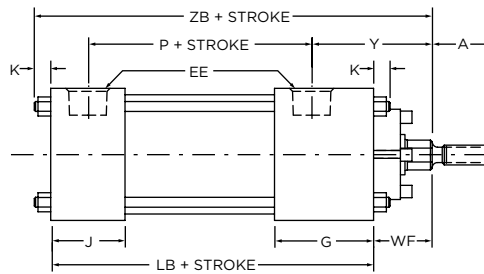
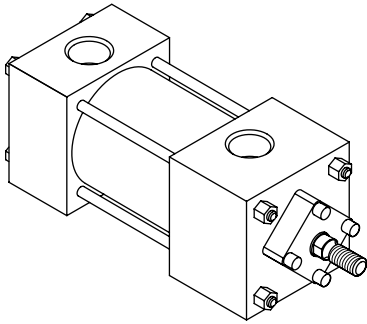
1-1/2" THROUGH 6" DIAMETER

Table 2 The dimensions given on this table are affected by the piston rod diameter and the stroke.

• = For piston rod dimensions see page 132.

BORE DIA.	ROD MM•	A	P	Px	Y	LB	LD	WF	ZB	ZL	ZM
1-1/2	5/8	3/4	2-1/8	2-1/4	1-15/16	3-5/8	4-1/8	1	4-7/8	5-3/8	6-1/8
	1	1-1/8	2-1/8	2-1/4	2-5/16	3-5/8	4-1/8	1-3/8	5-1/4	5-3/4	6-7/8
2	5/8	3/4	2-1/8	2-1/4	1-15/16	3-5/8	4-1/8	1	5	5-1/2	6-1/8
	1	1-1/8	2-1/8	2-1/4	2-5/16	3-5/8	4-1/8	1-3/8	5-3/8	5-7/8	6-7/8
	1-3/8	1-5/8	2-1/8	2-1/4	2-9/16	3-5/8	4-1/8	1-5/8	5-11/16	6-1/8	7-3/8
2-1/2	5/8	3/4	2-1/4	2-3/8	1-15/16	3-3/4	4-1/4	1	5-1/16	5-9/16	6-1/4
	1	1-1/8	2-1/4	2-3/8	2-5/16	3-3/4	4-1/4	1-3/8	5-7/16	5-15/16	7
	1-3/8	1-5/8	2-1/4	2-3/8	2-9/16	3-3/4	4-1/4	1-5/8	5-11/16	6-3/16	7-1/2
	1-3/4	2	2-1/4	2-3/8	2-13/16	3-3/4	4-1/4	1-7/8	5-15/16	6-7/16	8
3-1/4	1	1-1/8	2-1/2	2-1/2	2-1/2	4-1/4	4-3/4	1-3/8	6-1/16	6-9/16	7-1/2
	1-3/8	1-5/8	2-1/2	2-1/2	2-3/4	4-1/4	4-3/4	1-5/8	6-5/16	6-13/16	8
	1-3/4	2	2-1/2	2-1/2	3	4-1/4	4-3/4	1-7/8	6-9/16	7-1/16	8-1/2
	2	2-1/4	2-1/2	2-1/2	3-1/8	4-1/4	4-3/4	2	6-11/16	7-3/16	8-3/4
4	1	1-1/8	2-1/2	2-1/2	2-1/2	4-1/4	4-3/4	1-3/8	6-1/16	6-9/16	7-1/2
	1-3/8	1-5/8	2-1/2	2-1/2	2-3/4	4-1/4	4-3/4	1-5/8	6-5/16	6-13/16	8
	1-3/4	2	2-1/2	2-1/2	3	4-1/4	4-3/4	1-7/8	6-9/16	7-1/16	8-1/2
	2	2-1/4	2-1/2	2-1/2	3-1/8	4-1/4	4-3/4	2	6-11/16	7-3/16	8-3/4
	2-1/2	3	2-1/2	2-1/2	3-3/8	4-1/4	4-3/4	2-1/4	6-15/16	7-7/16	9-1/4
5	1	1-1/8	2-3/4	2-3/4	2-1/2	4-1/2	5	1-3/8	6-3/8	6-7/8	7-3/4
	1-3/8	1-5/8	2-3/4	2-3/4	2-3/4	4-1/2	5	1-5/8	6-5/8	7-1/8	8-1/4
	1-3/4	2	2-3/4	2-3/4	3	4-1/2	5	1-7/8	6-7/8	7-3/8	8-3/4
	2	2-1/4	2-3/4	2-3/4	3-1/8	4-1/2	5	2	7	7-1/2	9
	2-1/2	3	2-3/4	2-3/4	3-3/8	4-1/2	5	2-1/4	7-1/4	7-3/4	9-1/2
	3	3-1/2	2-3/4	2-3/4	3-3/8	4-1/2	5	2-1/4	7-1/4	7-3/4	9-1/2
	3-1/2	3-1/2	2-3/4	2-3/4	3-3/8	4-1/2	5	2-1/4	7-1/4	7-3/4	9-1/2
6	1-3/8	1-5/8	3-1/8	3-1/8	2-13/16	5	5-1/2	1-5/8	7-3/16	7-11/16	8-3/4
	1-3/4	2	3-1/8	3-1/8	3-1/16	5	5-1/2	1-7/8	7-7/16	7-15/16	9-1/4
	2	2-1/4	3-1/8	3-1/8	3-3/16	5	5-1/2	2	7-9/16	8-1/16	9-1/2
	2-1/2	3	3-1/8	3-1/8	3-7/16	5	5-1/2	2-1/4	7-13/16	8-5/16	10
	3	3-1/2	3-1/8	3-1/8	3-7/16	5	5-1/2	2-1/4	7-13/16	8-5/16	10
	3-1/2	3-1/2	3-1/8	3-1/8	3-7/16	5	5-1/2	2-1/4	7-13/16	8-5/16	10
	4	4	3-1/8	3-1/8	3-7/16	5	5-1/2	2-1/4	7-13/16	9-5/16	10

MODEL H (NFPA STD. NONE)



MODEL XH (NFPA STD. NONE)

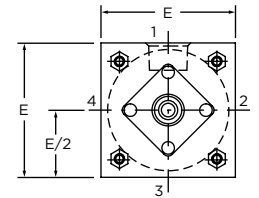
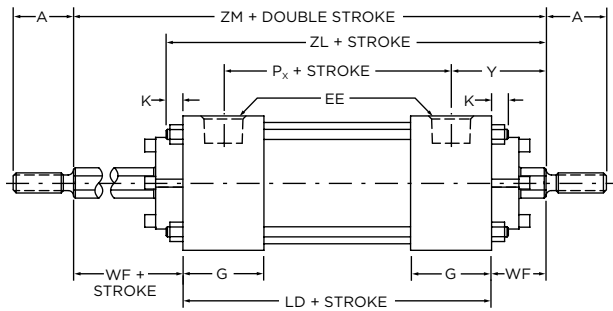
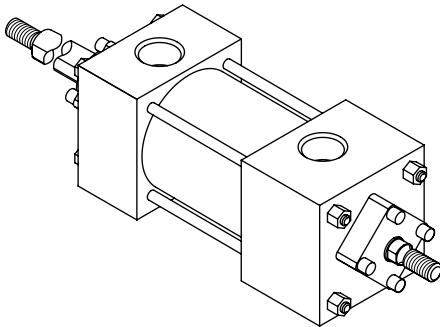


Table 1 These dimensions are constant regardless of rod diameter or stroke.

Double rod end models are designated by letter "X" preceding the model identification.

BORE DIA.	E	G	J	K	EE
8	8-1/2	2	1-1/2	5/8	3/4
10	10-5/8	2-1/4	2	3/4	1
12	12-3/4	2-1/4	2	3/4	1
14	14-3/4	2-3/4	2-1/4	7/8	1-1/4
16	17-1/2	3	3	1	1-1/4
18	19-1/2	3-7/16	3-7/16	1-1/8	1-1/2
20	21-3/4	3-15/16	3-15/16	1-1/4	2

BASIC MODEL NO MOUNT CYLINDERS

8" THROUGH 20" DIAMETER

Table 2 The dimensions given on this table are affected by the piston rod diameter and the stroke.

• = For piston rod dimensions see page 132.

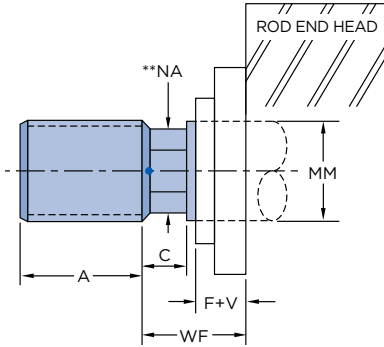
BORE DIA.	ROD MM•	A	P	Y	LB	LD	WF	ZB	ZL	ZM
8	1-3/8	1-5/8	3-1/4	2-13/16	5-1/8	5-5/8	1-5/8	7-3/8	7-7/8	8-7/8
	1-3/4	2	3-1/4	3-1/16	5-1/8	5-5/8	1-7/8	7-5/8	8-1/8	9-3/8
	2	2-1/4	3-1/4	3-3/16	5-1/8	5-5/8	2	7-3/4	8-1/4	9-5/8
	2-1/2	3	3-1/4	3-7/16	5-1/8	5-5/8	2-1/4	8	8-1/2	10-1/8
	3	3-1/2	3-1/4	3-7/16	5-1/8	5-5/8	2-1/4	8	8-1/2	10-1/8
	3-1/2	3-1/2	3-1/4	3-7/16	5-1/8	5-5/8	2-1/4	8	8-1/2	10-1/8
	4	4	3-1/4	3-7/16	5-1/8	5-5/8	2-1/4	8	8-1/2	10-1/8
	4-1/2	4-1/2	3-1/4	3-7/16	5-1/8	5-5/8	2-1/4	8	8-1/2	10-1/8
	5	5	3-1/4	3-7/16	5-1/8	5-5/8	2-1/4	8	8-1/2	10-1/8
	5-1/2	5-1/2	3-1/4	3-7/16	5-1/8	5-5/8	2-1/4	8	8-1/2	10-1/8
10	1-3/4	2	4	3-3/16	6-3/8	6-5/8	1-7/8	9	9-1/4	10-3/8
	2	2-1/4	4	3-5/16	6-3/8	6-5/8	2	9-1/8	9-3/8	10-5/8
	2-1/2	3	4	3-9/16	6-3/8	6-5/8	2-1/4	9-3/8	9-5/8	11-1/8
	3	3-1/2	4	3-9/16	6-3/8	6-5/8	2-1/4	9-3/8	9-5/8	11-1/8
	3-1/2	3-1/2	4	3-9/16	6-3/8	6-5/8	2-1/4	9-3/8	9-5/8	11-1/8
	4	4	4	3-9/16	6-3/8	6-5/8	2-1/4	9-3/8	9-5/8	11-1/8
	4-1/2	4-1/2	4	3-9/16	6-3/8	6-5/8	2-1/4	9-3/8	9-5/8	11-1/8
	5	5	4	3-9/16	6-3/8	6-5/8	2-1/4	9-3/8	9-5/8	11-1/8
	5-1/2	5-1/2	4	3-9/16	6-3/8	6-5/8	2-1/4	9-3/8	9-5/8	11-1/8
12	2	2-1/4	4-1/2	3-5/16	6-7/8	7-1/8	2	9-5/8	9-7/8	11-1/8
	2-1/2	3	4-1/2	3-9/16	6-7/8	7-1/8	2-1/4	9-7/8	10-1/8	11-5/8
	3	3-1/2	4-1/2	3-9/16	6-7/8	7-1/8	2-1/4	9-7/8	10-1/8	11-5/8
	3-1/2	3-1/2	4-1/2	3-9/16	6-7/8	7-1/8	2-1/4	9-7/8	10-1/8	11-5/8
	4	4	4-1/2	3-9/16	6-7/8	7-1/8	2-1/4	9-7/8	10-1/8	11-5/8
	4-1/2	4-1/2	4-1/2	3-9/16	6-7/8	7-1/8	2-1/4	9-7/8	10-1/8	11-5/8
	5	5	4-1/2	3-9/16	6-7/8	7-1/8	2-1/4	9-7/8	10-1/8	11-5/8
	5-1/2	5-1/2	4-1/2	3-9/16	6-7/8	7-1/8	2-1/4	9-7/8	10-1/8	11-5/8
	6	6	4-1/2	3-9/16	6-7/8	7-1/8	2-1/4	9-7/8	10-1/8	11-5/8
14	2-1/2	3	5-1/2	3-13/16	8-1/8	8-5/8	2-1/4	11-1/4	11-3/4	13-1/8
	3	3-1/2	5-1/2	3-13/16	8-1/8	8-5/8	2-1/4	11-1/4	11-3/4	13-1/8
	3-1/2	3-1/2	5-1/2	3-13/16	8-1/8	8-5/8	2-1/4	11-1/4	11-3/4	13-1/8
	4	4	5-1/2	3-13/16	8-1/8	8-5/8	2-1/4	11-1/4	11-3/4	13-1/8
	4-1/2	4-1/2	5-1/2	3-13/16	8-1/8	8-5/8	2-1/4	11-1/4	11-3/4	13-1/8
	5	5	5-1/2	3-13/16	8-1/8	8-5/8	2-1/4	11-1/4	11-3/4	13-1/8
	5-1/2	5-1/2	5-1/2	3-13/16	8-1/8	8-5/8	2-1/4	11-1/4	11-3/4	13-1/8
16	2-1/2	3	5-7/8	3-15/16	9-1/4	9-1/4	2-1/4	12-1/2	12-1/2	13-3/4
	3	3-1/2	5-7/8	3-15/16	9-1/4	9-1/4	2-1/4	12-1/2	12-1/2	13-3/4
	3-1/2	3-1/2	5-7/8	3-15/16	9-1/4	9-1/4	2-1/4	12-1/2	12-1/2	13-3/4
	4	4	5-7/8	3-15/16	9-1/4	9-1/4	2-1/4	12-1/2	12-1/2	13-3/4
	4-1/2	4-1/2	5-7/8	3-15/16	9-1/4	9-1/4	2-1/4	12-1/2	12-1/2	13-3/4
	5	5	5-7/8	3-15/16	9-1/4	9-1/4	2-1/4	12-1/2	12-1/2	13-3/4
	5-1/2	5-1/2	5-7/8	3-15/16	9-1/4	9-1/4	2-1/4	12-1/2	12-1/2	13-3/4
18	3-1/2	3-1/2	6	4-3/8	10-1/4	10-1/4	2-1/4	13-5/8	13-5/8	14-3/4
	4	4	6	4-3/8	10-1/4	10-1/4	2-1/4	13-5/8	13-5/8	14-3/4
	4-1/2	4-1/2	6	4-3/8	10-1/4	10-1/4	2-1/4	13-5/8	13-5/8	14-3/4
	5	5	6	4-3/8	10-1/4	10-1/4	2-1/4	13-5/8	13-5/8	14-3/4
	5-1/2	5-1/2	6	4-3/8	10-1/4	10-1/4	2-1/4	13-5/8	13-5/8	14-3/4
20	4	4	7-1/8	4-9/16	11-3/4	11-3/4	2-1/4	15-1/4	15-1/4	16-1/4
	4-1/2	4-1/2	7-1/8	4-9/16	11-3/4	11-3/4	2-1/4	15-1/4	15-1/4	16-1/4
	5	5	7-1/8	4-9/16	11-3/4	11-3/4	2-1/4	15-1/4	15-1/4	16-1/4
	5-1/2	5-1/2	7-1/8	4-9/16	11-3/4	11-3/4	2-1/4	15-1/4	15-1/4	16-1/4

CLASS 6 CYLINDER PISTON ROD END DIMENSIONAL DATA

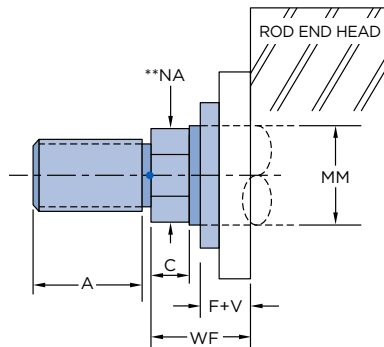
NOTE: Rod threads are Class UNF-2A or 2B unless specifically quoted otherwise.

NOTE: Standard (smallest) diameter rods in each bore size with standard (#4) thread are **STOCKED** in even-inch stroke increments 1" through 20". Cushioned and non-cushioned. **This translates to MUCH QUICKER delivery.**

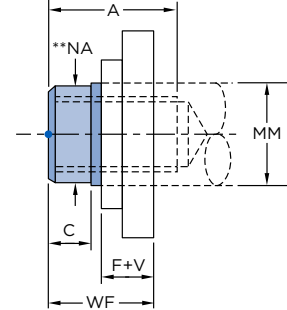
ROD END TYPE NO. 1



ROD END TYPE NO. 3 & NO. 4



ROD END TYPE NO. 5



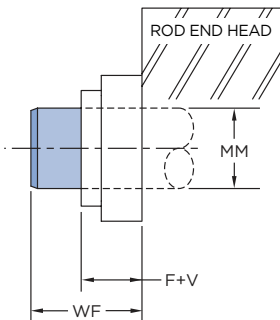
** = Dimension NA is .060 under MM diameter dimension.

DIA. ROD MM	ROD END TYPE				A	C	D [■]	F+V	WF
	NO. 1	NO. 3	NO. 4*	NO. 5					
5/8	5/8-18	1/2-20	7/16-20	7/16-20	3/4	3/8	1/2	5/8	1
1	1-14	7/8-14	3/4-16	3/4-16	1-1/8	1/2	7/8	3/4	1-3/8
1-3/8	1-3/8-12	1-1/4-12	1-14	1-14	1-5/8	5/8	1-1/8	1	1-5/8
1-3/4	1-3/4-12	1-1/2-12	1-1/4-12	1-1/4-12	2	3/4	1-1/2	3/4	1-7/8
2	2-12	1-3/4-12	1-1/2-12	1-1/2-12	2-1/4	7/8	1-11/16	7/8	2
2-1/2	2-1/2-12	2-1/4-12	1-7/8-12	1-7/8-12	3	1	2-1/16	1-1/16	2-1/4
3	3-12	2-3/4-12	2-1/4-12	2-1/4-12	3-1/2	1	2-5/8	1-1/8	2-1/4
3-1/2	3-1/2-12	3-1/4-12	2-1/2-12	2-1/2-12	3-1/2	1	3	1-1/8	2-1/4
4	4-12	3-3/4-12	3-12	3-12	4	1	3-3/8	1-1/4	2-1/4
4-1/2	4-1/2-12	4-1/4-12	3-1/4-12	3-1/4-12	4-1/2	1	3-7/8	1-1/4	2-1/4
5	5-12	4-3/4-12	3-1/2-12	3-1/2-12	5	1	4-1/4	1-1/4	2-1/4
5-1/2	5-1/2-12	5-1/4-12	4-12	4-12	5-1/2	1	4-5/8	1-1/4	2-1/4

• = Type 4 thread sized for clevis and rod eye accessories.

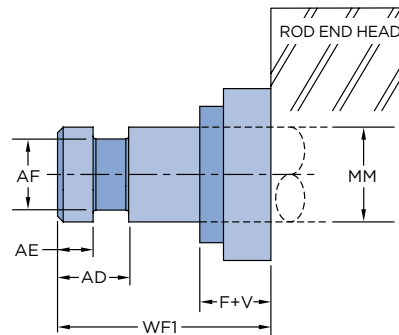
■ = Dimension D is size across wrench flats.

ROD END TYPE NO. 6



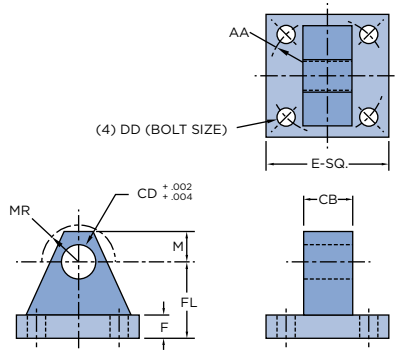
DIA. ROD MM	F+V	WF
5/8	5/8	1
1	3/4	1-3/8
1-3/8	1	1-5/8
1-3/4	3/4	1-7/8
2	7/8	2
2-1/2	1-1/16	2-1/4
3	1-1/8	2-1/4
3-1/2	1-1/8	2-1/4
4	1-1/4	2-1/4
4-1/2	1-1/4	2-1/4
5	1-1/4	2-1/4
5-1/2	1-1/4	2-1/4

ROD END TYPE NO. 7



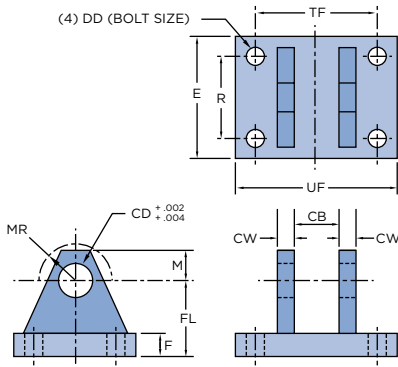
DIA. ROD MM	F+V	WF1	AD	AE	AF
5/8	5/8	1-3/4	5/8	1/4	3/8
1	3/4	2-1/2	15/16	3/8	11/16
1-3/8	1	2-3/4	1-1/16	3/8	7/8
1-3/4	3/4	3-1/8	1-5/16	1/2	1-1/8
2	7/8	3-3/4	1-11/16	5/8	1-3/8
2-1/2	1-1/16	4-1/2	1-15/16	3/4	1-3/4
3	1-1/8	4-7/8	2-7/16	7/8	2-1/4
3-1/2	1-1/8	5-5/8	2-11/16	1	2-1/2
4	1-1/4	5-3/4	2-11/16	1	3
4-1/2	1-1/4	6-1/2	3-3/16	1-1/2	3-1/2
5	1-1/4	6-5/8	3-3/16	1-1/2	3-7/8
5-1/2	1-1/4	7-1/2	3-15/16	1-7/8	4-3/8

EYE BRACKET



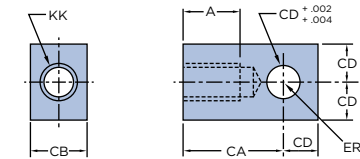
CYL. DIA.	E	F	M	AA	CB	CD	DD	FL	MR	PART NO.
1-1/2-2-2-1/2	2-1/2	3/8	1/2	2.30	3/4	1/2	3/8	1-1/8	5/8	2716L47
3-1/4-4-5	3-1/2	5/8	3/4	3.61	1-1/4	3/4	1/2	1-7/8	7/8	2719L32
6-8	4-1/2	7/8	1	4.60	1-1/2	1	5/8	2-3/8	1-1/4	2720L33
10	5	7/8	1-3/8	5.40	2	1-3/8	5/8	3	1-5/8	2721L34
12	6-1/2	1-1/8	1-3/4	7.00	2-1/2	1-3/4	7/8	3-3/8	2	2722L35
14-16	7-1/2	1-7/16	2	8.10	2-1/2	2	1	3-15/16	2-3/8	2723L36
18	8-1/2	1-5/8	2-1/2	9.30	3	2-1/2	1-1/8	4-5/8	3	2724L37
20	9-1/2	2	2-3/4	10.61	3	3	1-1/4	5-1/4	3-1/4	2725L38

MOUNTING BRACKET



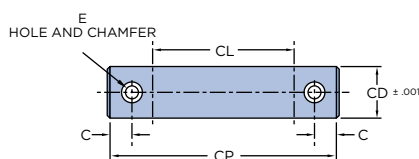
CYL. DIA.	E	F	M	R	CB	CD	CW	DD	FL	MR	TF	UF	PART NO.
1-1/2-2-2-1/2	2-1/2	3/8	1/2	1.63	3/4	1/2	1/2	3/8	1-1/8	5/8	2-3/4	3-1/2	2683L47
3-1/4-4-5	3-1/2	5/8	3/4	2.55	1-1/4	3/4	5/8	1/2	1-7/8	7/8	3-3/4	4-3/4	2684L47
6-8	4-1/2	7/8	1	3.25	1-1/2	1	3/4	5/8	2-3/8	1-1/4	4-1/2	5-3/4	2685L47
10	5	7/8	1-3/8	3.82	2	1-3/8	1	5/8	3	1-5/8	5-1/2	6-3/4	2686L47
12	6-1/2	1-1/8	1-3/4	4.95	2-1/2	1-3/4	1-1/4	7/8	3-3/8	2	7	8-1/2	2687L47
14-16	7-1/2	1-7/16	2	5.73	2-1/2	2	1-1/4	1	3-15/16	2-3/8	7-1/2	9-1/4	2688L47
18	8-1/2	1-5/8	2-1/2	6.58	3	2-1/2	1-1/2	1-1/8	4-5/8	3	8-1/2	10-1/2	2689L47
20	9-1/2	2	2-3/4	7.50	3	3	1-1/2	1-1/4	5-1/4	3-1/4	8-3/4	10-3/4	2690L47

EYE (FEMALE)



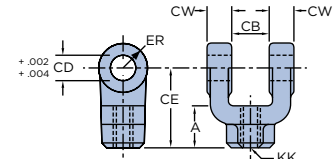
KK	A	CA	CB	CD	ER	PART NO.
7/16-20	3/4	1-1/2	3/4	1/2	5/8	1810L59
3/4-16	1-1/8	2-1/16	1-1/4	3/4	1-1/16	1812L59
1-14	1-5/8	2-13/16	1-1/2	1	1-7/16	1813L59
1-1/4-12	2	3-7/16	2	1-3/8	2	1814L59
1-1/2-12	2-1/4	4	2-1/2	1-3/4	2-1/16	1815L59
1-7/8-12	3-1/2	5	2-1/2	2	2-1/4	1817L59
2-1/4-12	3-1/2	5-13/16	3	2-1/2	2-7/8	1820L59
2-1/2-12	3-1/2	6-1/8	3	3	3-1/8	1821L59
3-1/4-12	4-1/2	7-5/8	4	3-1/2	3-7/8	1824L59

PIVOT - PIN



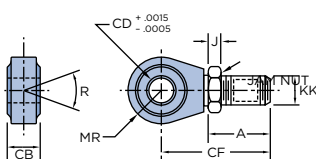
CYL. DIA.	C	E	CD	CP	CL	PART NO.
1-1/2-2-2-1/2	3/16	1/8	1/2	2-3/8	1-3/4	3222L47-1
3-1/4-4-5	1/4	3/16	3/4	3-1/8	2-1/2	3222L47-2
6-8	1/4	3/16	1	3-5/8	3	3222L47-3
10	1/4	3/16	1-3/8	4-3/4	4	3222L47-4
12	1/4	3/16	1-3/4	5-13/16	5	3222L47-5
14	5/16	1/4	2	5-13/16	5	3222L47-6
16	5/16	1/4	2-1/2	6-7/8	6	3222L47-8
18-20	5/16	1/4	3	6-7/8	6	3222L47-7
ROD EYE & CLEVIS	3/8	1/4	3-1/2	9-1/4	8	3222L47-9

CLEVIS (FEMALE)



KK	A	CB	CD	CE	CW	ER	PART NO.
7/16-20	3/4	3/4	1/2	1-1/2	1/2	1/2	2834L59
3/4-16	1-1/8	1-1/4	3/4	2-3/8	5/8	3/4	2835L59
1-14	1-5/8	1-1/2	1	3-1/8	3/4	1	2836L59
1-1/4-12	2	2	1-3/8	4-1/8	1	1-3/8	2837L59
1-1/2-12	2-1/4	2-1/2	1-3/4	4-1/2	1-1/4	1-3/4	2838L59
1-7/8-12	3	2-1/2	2	5-1/2	1-1/4	2	2839L59
2-1/4-12	3-1/2	3	2-1/2	6-1/2	1-1/2	2-1/2	2840L59
2-1/2-12	3-1/2	3	3	6-3/4	1-1/2	2-3/4	2841L59
3-1/4-12	4-1/2	4	3-1/2	8-1/2	2	3-1/2	2842L59

SPHERICAL ROD EYE



CYL. DIA.	A	J	R	CB	CD	CF	KK	MR	THRUST RATING	PART NO.
1-1/2-2-2-1/2	1-1/2	1/4	12°	5/8	1/2	2-7/16	7/16-20	11/16	5,500#	2825L48-1
1-1/2-2-2-1/2	15/16	1/4	12°	5/8	1/2	1-7/8	7/16-20	11/16	5,500#	2825L48-2
3-1/4-4-5	1-3/4	7/16	13-1/2°	7/8	3/4	2-7/8	3/4-16	7/8	10,000#	2825L48-3
6-8	2-1/8	9/16	14°	1-3/8	1	4-1/8	1-14	1-7/16	12,000#	2825L48-4
8	2-1/8	9/16	14°	1-3/8	1	4-1/8	1-14	1-7/16	19,000#	2825L48-5

For 8" Cyl. Diameter — Hydraulics only.

Blind End Only



LONG LIFE/HIGH PERFORMANCE

FEATURES AND ADVANTAGES

- Adjustable mounting allows switches to be located anywhere within range of piston travel.
- Several switches may be mounted to control or initiate any sequence function.
- No externally moving parts to wear or maintain.
- Suited for use in plant environments where dirt and contamination create difficulties for electromechanical and other types of controls.
- Neon Indicator Light provides convenient means for positioning and troubleshooting switch and circuits.
- Suitable for AC service only.

WORKING PRINCIPLE

Basically the Reed Switch consists of two overlapping ferro magnetic blades (reeds). The reeds are hermetically sealed inside a glass tube leaving a small air gap between them.

Since the reeds are magnetic, they will assume opposite polarity and be attracted to each other when influenced by a magnetic field. Sufficient magnetic flux density will cause the reeds to flex and contact each other. When the magnetic field is removed, they will again spring apart to their normal positions.

The cylinder/Reed Switch combination operates by using a magnetic band on the cylinder piston, which closes the externally mounted reed switch, as it approaches. When the piston moves away again the switch opens.

Proper application of this versatile Reed Switch can offer millions of cycles of trouble-free operation.

3 AMP REED SWITCH SPECIFICATIONS

Circuit - Normally open - SPST (Form A)
VA (Max) - 360
Switching voltage - 65-120 VAC (50/60 Hz)
Current (Break) - 3.0 Amp
Leakage - 1.7 mA
Response Time - 15 ms On, 0.83 ms Off
Switch Burden Current - 5 mA

Note: All incandescent loads derate switch capacity to 10% due to inrush current.

Moisture and dust proof (no NEMA rating)

SHOCK RATING

The basic switch can withstand up to 60 G maximum in the direction of contact closure without misfire or malfunction.

VIBRATION SENSITIVITY

Switch will withstand amplitude of 30 G at frequencies up to 6000 Hz without misfire. False operation can occur at vibration frequency levels higher than 6000 Hz.

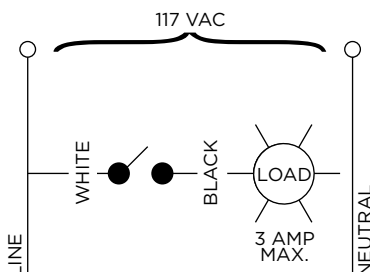
OPERATING TEMPERATURE

-40°F to +170°F for standard cable.

CABLE SPECIFICATION

The conductors are tinned copper with polyethylene insulation, conductors are cabled with a rayon braid, a tinned copper braided shield and a chrome vinyl jacket that is resistant to hydraulic fluids.

SWITCH WIRING SCHEMATIC



CAUTION

**Do not connect switch without a load.
Permanent damage to switch will result.**

NOTE: Switch is internally protected against failure due to normal electrical transient levels. However, it may be necessary to use additional transient protection if high levels exist.

PROXIMITY POSITION INDICATOR SWITCH

HYDRAULIC OR PNEUMATIC CYLINDER OPERATIONS

SQUARE-HEAD CYLINDERS

NOPAK Cylinder with Switch (pictured)

- Non-contact design
- Long life
- Pressures to 3000 PSI
- High reliability
- Versatile, easy operation



For positive full indication
of stroke Hydraulic and Pneumatic Cylinders

WORKING PRINCIPLE

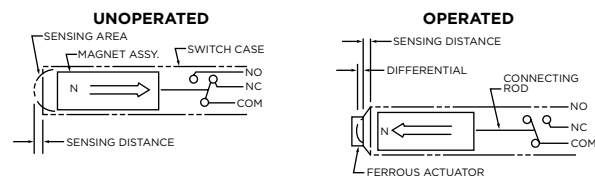
NOPAK Position Indicator Switches are easily mounted in both hydraulic and pneumatic cylinder heads to confirm the position of the piston in either extended or retracted positions. Designed for versatility, NOPAK switches can be mounted in virtually any position. When inserted in the cylinder head, the switch senses the cushion sleeve's position at end of stroke. NOPAK's threaded switch screws easily into the cylinder heads making it a natural for accurate confirmation. Totally self-contained, the switch will not be contaminated by dirt, oil, grease, and most corrosive atmospheres. The non-contact design also eliminates the need for linkage or external actuators. Heavy-duty construction allows the switch to withstand up to 3000 PSI of external pressure (higher pressure available upon request).

PROXIMITY POSITION INDICATOR SWITCH PRINCIPLES OF OPERATION

The NOPAK Proximity Limit Switch is based on an operating principle which utilizes "new," high energy, rare earth magnets to provide an end sensing range fixed at approximately .072" (1.83 mm) with a ferrous actuator. Use of an external magnet increases this appreciably. The differential (hysteresis) is approximately half of the sensing range.

When time, accuracy, and dependability count... you can count on a NOPAK Indicator Switch. Maintenance free: engineered for precision, performance and reliability.

NOTE: This is not a 'reed' type switch.



Wiring Color Code: Black = Common, Red = Normally Closed; Blue = Normally Open

DESIGN FEATURES

- **Very Economical** - Easy to install, NOPAK Position Indicator Switches are totally self-contained, eliminating external power supply requirements.
- **Enclosure** - 300 Series Stainless Steel provides reliable performance under even the most adverse conditions.
- **Hermetically Sealed** - To ensure a clean, stable contact environment, the entire assembly is completely evacuated, then back-filled under pressure.
- **Long Life** - Tested to over 1,000,000 cycles. (Actual life varies with load.)
- **High Contact Pressure** - Heavy vibrations will not cause false operations of the switch. Good electrical characteristics for dry circuit and low load applications.

SPECIFICATIONS

CONTACT ARRANGEMENT:

Single Pole Double Throw SPDT (Form C)

CONTACT RATINGS:

UL Rated (NEMA Type 1)

240 VAC @ 2A

250 VDC @ 0.5A Resistive

Although not UL General Purpose, switch is suitable for:
24 VDC @ 50 mA

TEMPERATURE RANGE:

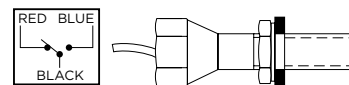
-40°F (-40°C) to 221°F (105°C)

RESPONSE TIME: 8 milliseconds

REPEATABILITY:

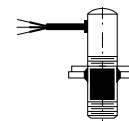
0.002" (0.05 mm) of setpoint under identical operating conditions.

Consult Factory for other contact arrangements, ratings, terminations, and approvals.

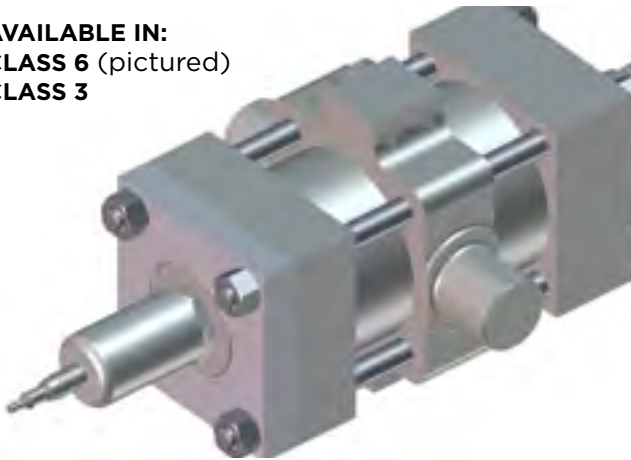


Switch enclosure incorporates a 1/2-14 NPT conduit connection. Switch wire connections are a potted 3 wire cable 18" long. External mounting threads are locked to cylinder head port with a hex jam nut and seal.

Where installation height is limited some switches are available with side-potted leads. Consult factory.



AVAILABLE IN:
CLASS 6 (pictured)
CLASS 3



DESIGN AND PERFORMANCE FEATURES

- Non-contacting design – no wear, no friction, no noise and no adjustments.
- Completely solid state.
- Both analog and digital outputs are available.
- Quartz crystal time reference.
- Withstands corrosive environments and pressures up to 3000 PSI.
- Feedback sensor inside cylinder is protected from debris and mechanical damage.
- Absolute output, not incremental – no loss of position at restart.

NOPAK has a linear displacement transducer that is designed for use in air or hydraulic cylinder actuators. The transducer, available in lengths up to thirty feet, is threaded into the cylinder and sealed to withstand the pressures of hydraulic fluid. A permanent magnet is mounted on the piston end of the cylinder rod, and is used to determine the position of the piston inside the cylinder. Double ended rods not applicable.

HERE'S HOW IT WORKS:

It simply measures the time interval required for an electric current pulse to travel between two points. The two points of measurement are the fixed magnet located on the piston position and the sensor at the end of the transducer probe. This concept has been successful in eliminating considerable expense for potentiometers, tach generators, encoders, racks, pinions, and other special hardware.

ADVANTAGES:

Includes a non-contact operation, no wear, no noise generation, high reliability, infinite resolution (analog), high linearity (.05%), excellent repeatability (.002%), and direct digital output if required.

LDT Systems can be adapted to all NOPAK P6 and H6 cylinder diameters with a 1-3/8" diameter rod or larger.

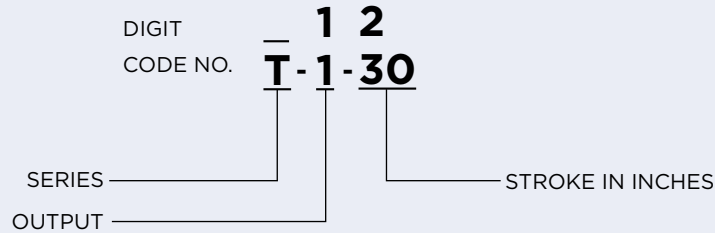
We welcome the opportunity to discuss your applications and help you supply your needs.

NLDT SPECIFICATIONS

Electrical stroke	Standard - up to 25 feet.
Null	Positioned as required.
Null adjustment	2% of total stroke nominal.
Scale adjustment	1% of total stroke nominal.
Non-linearity	Less than $\pm 0.05\%$ of full range.
Repeatability	Better than $\pm 0.001\%$ of full range.
Temperature coefficient of scale factor	Transducer - Less than $0.00011 \text{ inch}/^{\circ}\text{F} + [3 \text{ ppm}/^{\circ}\text{F per inch of full stroke}]$. Analog Output Module $-20 \text{ ppm}/^{\circ}\text{F}$.
Frequency response	Stroke dependent. 200 Hz to 50 Hz is typical for lengths of 12 inch to 100 inch respectively - wider response frequencies are available upon request. For digital systems, output is updated at discrete intervals.
Hysteresis	Less than 0.0008 in. maximum.
Output	Analog -0 to +10 VDC, 4 to 20 mA ungrounded, (others available). Digital-pulse width modulated signal, TTL compatible.
Operating impedance	10 ohms.
Operating temperature range	-35°F to 150°F (transducer probe to 180°F).
Storage temperature range	-40°F to 180°F .
Operation in hydraulic fluid	The .375 inch dia. transducer probe is capable of operating in hydraulic fluid and will withstand 3,000 psi operating pressure.

HOW TO ORDER

ORDERING CODE



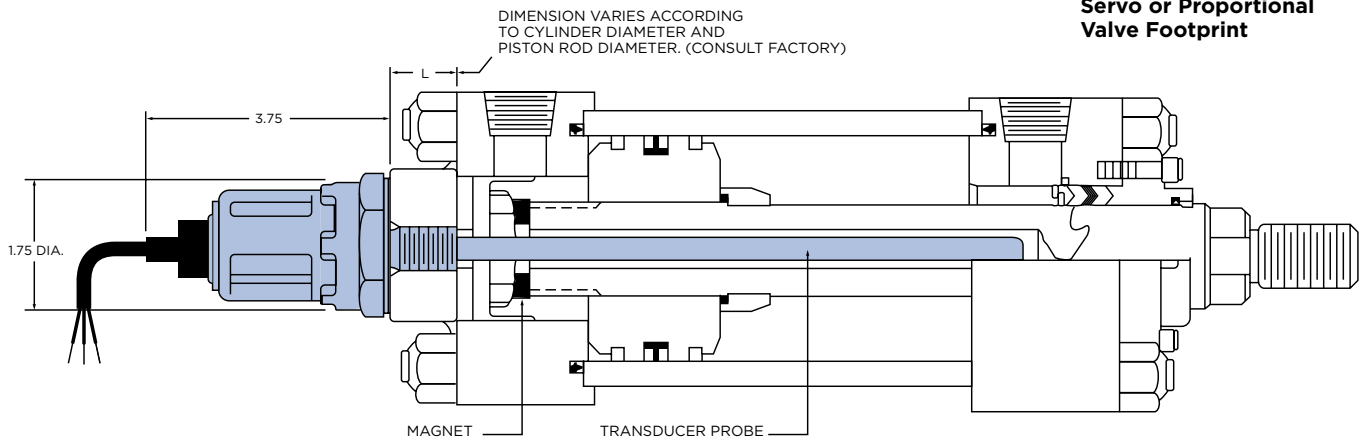
DIGIT	DESCRIPTION
FIRST	OUTPUT 0 to +10 VDC w/Analog Output Module 0 to +10 VDC w/built-in Analog Personality Module (Eliminates separate Analog Output Module) 4 to 20 MA grounded w/Analog Output Module - Half digital w/Digital Personality Module - Full digital w/Digital Personality Module and Digital Counter Card. Specify Binary or BCD. - Digital with RS422 Personality Module - Others (specify)
SECOND	ELECTRICAL STROKE IN INCHES (Example: 12.75 inches) 1 - 1 Inch through 300 - 300 Inch (25 foot maximum)

When ordering: Code Number must be completed using options listed above.

For further detailed information contact your NOPAK distributor.

ALSO AVAILABLE

**Servo or Proportional
Valve Footprint**



NOPAK Class 6 bore-rated cylinders are identified as P6 for air and H6 for hydraulic service. Please refer to Pressure Ratings (PSI) on page 96. Cylinders 1-1/2" through 10" diameter bore are assembled from standard inventory components. Special design and large diameter Class 6 cylinders are available. Send us your specifications.

OPERATING TEMPERATURES AND MEDIA

Class P6 air and H6 hydraulic cylinders equipped with standard Type A packings may be operated at temperatures from -20°F to 250°F air, water or oil. The following chart relates in a simplified general purpose manner the limitations and uses of available piston and rod packings.

PACKING TYPE	
A	B
-20°F to +250°F Std. Hyd. Oil	-20°F to +375°F Std. Hyd. Oil
Air	Air
Water (not steam)	
Water Glycol Fire Resistant Fluid	Phosphate Ester Fire Resistant Fluid

For specific media and temperature or conditions exceeding the chart ratings, consult NOPAK Engineering Department.

Applications involving Fire Resistant Fluids must be so specified for compatible component materials. When considering temperature, remember that as the temperature increases (within the rated limits) the packing life decreases.

INTERCHANGEABILITY

Class 6 cylinders are dimensionally interchangeable with other square-head cylinders of the same pressure classification. Construction and performance are in conformance with applicable NFPA recommended standards.

For P6 (pneumatic) cylinders with Integral Limit Switch(es), see page 134.

CUSHIONS

NOPAK Class 6 cylinders are available with adjustable cushions on either or both ends, or non-cushion.

The purpose of a cushion is to slow down piston speed at the end of the stroke, eliminating hammer and noise. Where standard cushions are inadequate for unusual requirements, special cushions possibly requiring longer-than-standard heads can be furnished at additional charge. Very rapid cushioning of high speed movement may require deceleration valves.

The purpose of the ball check in the cushion mechanism is to allow fluid to pass to the piston face without obstruction (while the cushion sleeve is still within the bore in the head). This results in essential quick starting of the piston. Cushion adjusting screws serve to bypass the fluid from the trapped section between the piston and the cylinder head when the cushion sleeve has entered the bore. Turning the needle inward against the seat results in maximum cushion intensity. Backing up on the needle decreases the effect.

CYLINDER PORT LOCATION

Inlet ports are located in Position 1 as standard (see rod end view on dimension drawings). They can however, be located at other numbered locations on application. Extra inlets furnished at additional charge. Oversize and special inlets require dimensions and quotation on application.

WATER SERVICE

Special cylinders can be built for water service. Due to the uncertainty of action of water supply on some materials, responsibility for premature failure due to corrosion, mineral deposits or electrolysis cannot be accepted.

**TABLE A – TIE ROD TORQUE CHART
CLASS P6 AIR AND H6 HYDRAULIC CYLINDERS**

CYLINDER DIAMETER	NO. OF TIE RODS	TIE ROD SIZE	P6 CYLINDER TORQUE FT LBS	H6 CYLINDER TORQUE FT LBS
1-1/2	4	1/4	3	7
2	4	5/16	7	14
2-1/2	4	5/16	7	14
3-1/4	4	3/8	15	30
4	4	3/8	15	30
5	4	1/2	30	60
6	4	1/2	30	60
8	4	5/8	60	150
10	4	3/4	100	260
12	4	3/4	100	260
14	4	7/8	170	400
16	8	1	260	600
18	8	1-1/8	300	850
20	8	1-1/4	450	1000

**TABLE B – VOLUME OF OIL
PER 12" OF STROKE**

CYLINDER BORE	BLIND END DISPLACEMENT		ROD END DISPLACEMENT			
	AREA (SQ. IN.)	GALS./FOOT OF STROKE	NET AREA (SQ. IN.) WITH R ROD	GALS./FOOT OF STROKE	NET AREA (SQ. IN.) WITH HR ROD	GALS./FOOT OF STROKE
1-1/2	1.767	.0918	1.460	.0758	.982	.0510
2	3.142	.1632	2.835	.1473	1.656	.0852
2-1/2	4.909	.2550	4.602	.2390	2.503	.1301
3-1/4	8.296	.4309	7.511	.3902	5.154	.2700
4	12.566	.6528	11.781	.6120	7.658	.4010
5	19.635	1.020	18.850	.9792	10.014	.5210
6	28.274	1.468	26.789	1.392	15.708	.8201
8	50.266	2.611	48.781	2.534	26.507	1.380
10	78.540	4.080	76.135	3.956	54.780	2.850
12	113.10	5.918	109.96	5.712	89.337	4.640
14	153.94	7.997	149.04	7.309	130.178	6.760
16	201.06	10.444	196.16	10.190	178.302	9.260
18	254.47	13.219	244.85	12.715	230.709	11.980
20	314.16	16.320	301.60	15.667	291.400	15.140

TABLE B covers the smallest and the largest rod available per cylinder diameter. Intermediate rod end displacements can be calculated.

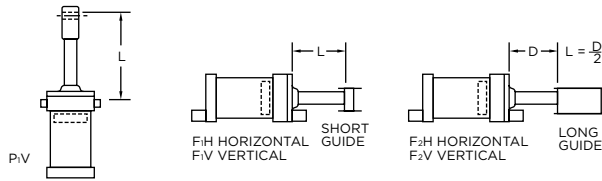
TABLE C – CYLINDER PUSH AND PULL FORCES

BORE	ROD	THEORETICAL FORCE IN POUNDS @ FLUID PRESSURE									
		100	250	300	500	800	1000	1200	1500	2250	2500
1-1/2	PUSH	176.7	441.8	530.1	883.5	1414	1767	2120	2650	3976	4418
	PULL — 5/8 ROD	146.0	365.0	438.0	730.0	1168	1460	1752	2190	3285	3650
	PULL — 1 ROD	98.0	245	294	490	783	980	1175	1470	2200	2450
2	PUSH	314.2	785.5	942.6	1571	2514	3142	3770	4713	7070	7855
	PULL — 5/8 ROD	283.5	708.7	850.5	1417	2268	2835	3402	4252	6379	7087
	PULL — 1-3/8 ROD	165.6	414	496.8	828	1324.8	1656	1987.2	2484	3726	4140
2-1/2	PUSH	490.9	1227	1473	2454	3927	4909	5891	7364		
	PULL — 5/8 ROD	460.2	1150	1381	2301	3682	4602	5522	6903		
	PULL — 1-3/4 ROD	250.3	625.8	751	1251	2002	2503	3004	3755		
3-1/4	PUSH	829.6	2074	2489	4148	6637	8296	9955	12444	18670	
	PULL — 1 ROD	751.1	1878	2253	3756	6009	7511	9013	11270	16900	
	PULL — 2 ROD	515.4	1288	1546	2577	4123	5154	6185	7731	11596	
4	PUSH	1257	3142	3770	6283	10050	12566	15079	18850		
	PULL — 1 ROD	1178	2945	3534	5890	9425	11781	14137	17671		
	PULL — 2-1/2 ROD	765.7	1914	2297	3828	6126	7657	9189	11486		
5	PUSH	1963	4908	5890	9817	15708	19635	23562			
	PULL — 1 ROD	1885	4712	5655	9425	15080	18850	22620			
	PULL — 3-1/2 ROD	1001	2503	3004	5006	8011	10013	12016			
6	PUSH	2827	7078	8482	14137	22619	28274	33928			
	PULL — 1-3/8 ROD	2679	6697	8037	13394	21431	26789	32147			
	PULL — 4 ROD	1570	3926	4712	7853	12566	15707	18850			
8	PUSH	5027	12566	15079	25133	40213	50266				
	PULL — 1-3/8 ROD	4878	12195	14634	24390	39025	48781				
	PULL — 5-1/2 ROD	2650	6626	7952	13253	21205	26507				
10	PUSH	7854	19635	23562	39270	62832					
	PULL — 1-3/4 ROD	7614	19034	22840	38068	60908					
	PULL — 5-1/2 ROD	5478	13695	16434	27390	43825					
12	PUSH	11130	28275	33930	56550	90480					
	PULL — 2 ROD	10995	27486	32985	54975	87948					
	PULL — 5-1/2 ROD	8933	22334	26801	44670	71471					
14	PUSH	15394	38485	46182	76970	123152					
	PULL — 2-1/2 ROD	14900	37250	44700	74500	119232					
	PULL — 5-1/2 ROD	13018	32545	39054	65090	104152					
16	PUSH	20106	50265	60318	100530						
	PULL — 2-1/2 ROD	19616	49040	58480	98080						
	PULL — 5-1/2 ROD	17730	44325	53190	88650						
18	PUSH	25447	63617	76341	127235						
	PULL — 3-1/2 ROD	24485	61213	73445	122425						
	PULL — 5-1/2 ROD	23072	57680	69216	115360						
20	PUSH	31416	78640	94248	157080						
	PULL — 4 ROD	30160	75400	90480	150800						
	PULL — 5-1/2 ROD	29041	72603	87123	145205						

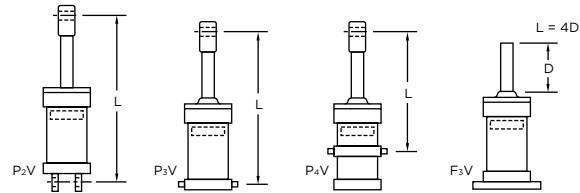
TABLE C covers the smallest and the largest rod available per cylinder diameter. Intermediate rod pull force can be calculated.

INFORMATION TO PREVENT EXCESSIVE BEARING WEAR AND PISTON ROD COLUMN FAILURES

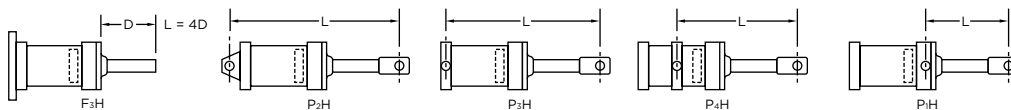
GROUP A – WITH PISTON RODS EXTENDED



GROUP B – TO BE CHECKED FOR BUCKLING OR JACK-KNIFING WITH PISTON RODS EXTENDED AND VERTICALLY MOUNTED



GROUP C – TO BE CHECKED FOR LOAD ON BEARING WITH PISTON RODS EXTENDED AND HORIZONTALLY MOUNTED



STEP 1 — Find drawing in one of three groups above that fits your cylinder application and follow instructions listed for that group.

Instructions: Stop tubes are used on long push stroke cylinders to prevent jack-knifing or buckling. They are placed between the piston and cylinder head to restrict the extended position of the piston rod so that the lengthened space between piston and bushing provides additional piston rod guide support.

The best choice for a cylinder with an exceptionally long stop tube requirement is the DOUBLE PISTON WITH SPACER. Note that the piston effective bearing area is doubled in addition to gaining the normal increased minimum distance between bearing points.

To determine whether a stop tube is required on a push stroke cylinder, proceed as follows:

- Using above drawings, determine value of “L” from stroke length, rod and cylinder dimensions.
- Refer to TABLE A – Minimum and Maximum Stop Tube Lengths on page 141 for stop tube recommendation. A cylinder having an “L” value 45 requires a minimum of 1” stop tube and a maximum of 5” stop tube. Specifications for more than the maximum stop tube will usually adversely increase the cylinder weight.

Example: In a P₂V type application requiring 32” of stroke, “L” = 32” + 32” + approximately 10” for head and cap thickness = 74”. A stop tube 4” long is required (when a fraction of an inch of stop tube is calculated, use the next full inch.) Adjusted value of “L” is 74” + 4” or 78”. Use of up to 8” of stop tube will further reduce bearing loads.

Instructions: Stop tubing is recommended for reducing piston and bushing/bearing loads on long stroke cylinders of the types shown. To determine length of stop tube required for this type of application, resolve the turning moments and loads between the piston and rod bushing. Include the weight of the fluid, especially on large bore cylinders. It is ideal to keep projected bearing area loads lower than 200 PSI.

Caution: Do not use oversize rods to lessen bearing loads. Stop tubes are more economical and effective; oversize rods are heavier, cost more than stop tubing and if misalignment occurs, bearing loads are considerably increased due to stiffness of the oversize rod.

If your drawing is F₃H, P₂H, P₃H, or P₄H, in Group C, check for stop tube requirements from instructions in Group B.

Use whichever stop tube is longer. Determine value of “L” and proceed to Step 2.

STEP 2 — Find Rod Diameter for Column Strength.

Standard diameter piston rods are recommended on all installations except where column strength, piston rod sag, or return rate of hydraulic cylinders requires larger diameter rods.

Bushing/bearing loads caused by unavoidable misalignment are minimized when piston rods of correct diameter instead of unnecessarily large diameter piston rods are used. Correct (usually standard) piston rod diameters decrease and absorb shock loads to a greater extent than unnecessarily large oversize rods.

To determine the minimum piston rod diameter on push stroke cylinders:

- Determine your push stroke thrust from TABLE C – Cylinder Push and Pull Forces on page 139.
- Find your push stroke thrust “T” in TABLE B – Value of “L” In Inches on page 141. If exact thrust isn’t shown, use next larger shown.
- In the horizontal column in line with your thrust, find value of “L” determined in Step 1.
- Find minimum piston rod diameter required by following the same vertical line where your value of “L” is located, toward the top of the table.

TABLE A - MINIMUM AND MAXIMUM STOP TUBE LENGTHS

"L" INCHES	MINIMUM STOP TUBE LENGTH (INCHES)	MAXIMUM STOP TUBE LENGTH (INCHES)	"L" INCHES	MINIMUM STOP TUBE LENGTH (INCHES)	MAXIMUM STOP TUBE LENGTH (INCHES)	"L" INCHES	MINIMUM STOP TUBE LENGTH (INCHES)	MAXIMUM STOP TUBE LENGTH (INCHES)
5-10	-	1	111-120	8	12	211-220	18	22
11-20	-	2	121-130	9	13	221-230	19	23
21-30	-	3	131-140	10	14	231-240	20	24
31-40	-	4	141-150	11	15	241-250	21	25
41-50	1	5	151-160	12	16	251-260	22	26
51-60	2	6	161-170	13	17	261-270	23	27
61-70	3	7	171-180	14	18	271-280	24	28
71-80	4	8	181-190	15	19	281-290	25	29
81-90	5	9	191-200	16	20	291-300	26	30
91-100	6	10	201-210	17	21	301-310	27	31
101-110	7	11						

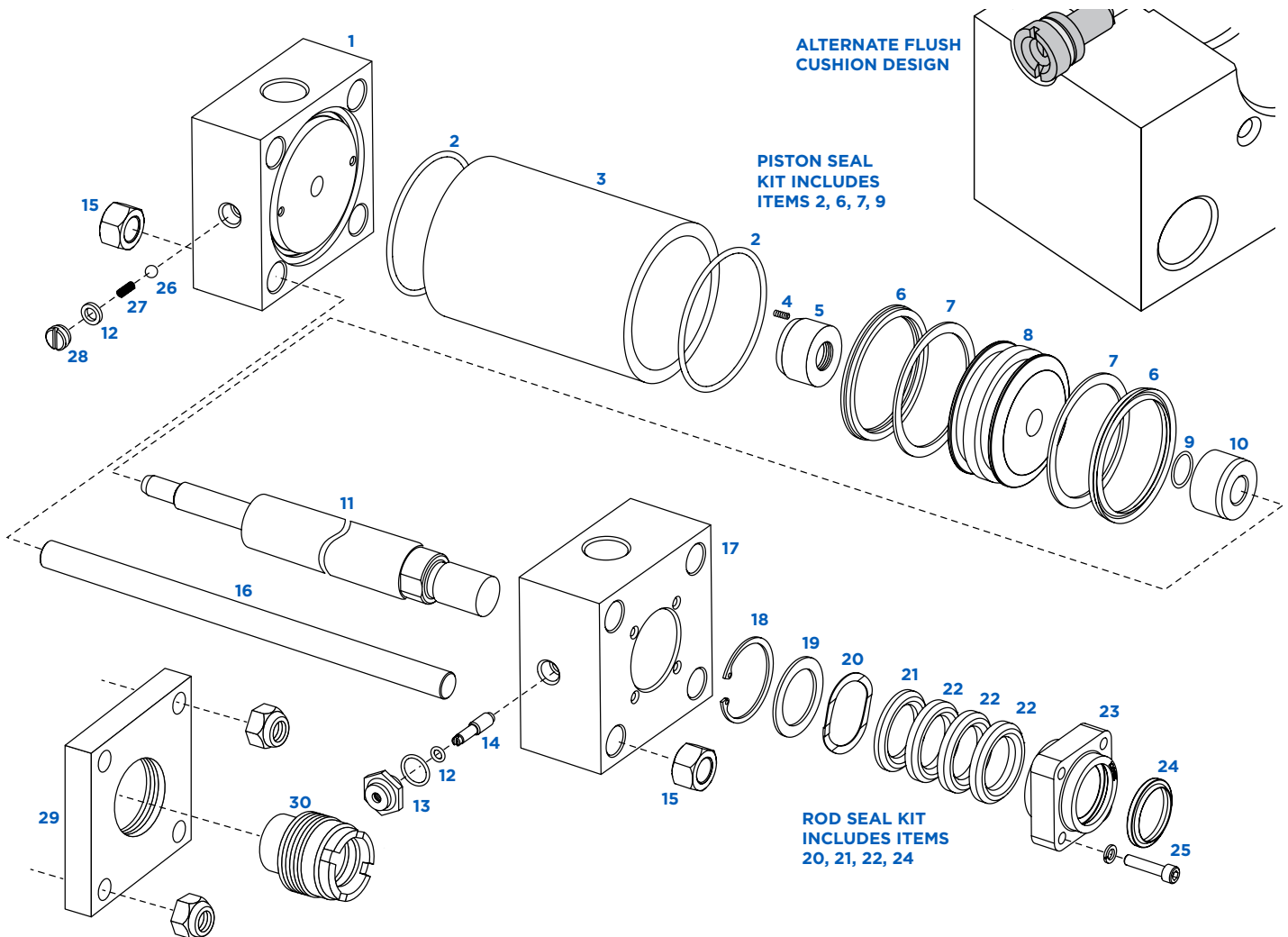
NOTE: Using stop tube lengths greater than "Maximum Stop Tube" has diminishing effect on reducing bearing loads.

TABLE B - VALUE OF "L" IN INCHES

AXIAL THRUST "T" AGAINST ROD END IN LBS. FORCE	MINIMUM PISTON ROD DIAMETER											
	0.63	1.00	1.38	1.75	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50
50	67											
100	59	110										
150	53	103										
250	43	94										
400	37	83	134	186								
700	30	68	118	168	202	275						
1,000	27	60	105	155	190	257						
1,400	24	53	92	142	174	244	308	385				
1,800	23	48	82	127	160	230	294	366	440			
2,400	19	45	75	114	145	213	281	347	415	488		
3,200	16	41	67	103	130	194	262	329	400	461		
4,000	13	38	63	94	119	175	240	310	378	446		
5,000	9	34	60	87	110	163	225	289	360	426	494	
6,000		30	56	82	102	152	209	274	342	411	476	
8,000		26	50	76	93	137	186	245	310	375	447	
10,000		21	45	70	89	125	172	222	279	349	412	482
12,000		17	41	65	84	118	155	210	269	326	388	455
16,000			34	57	75	110	141	188	235	291	350	421
20,000			28	52	68	103	136	172	218	270	326	384
30,000				39	55	87	120	156	189	232	285	330
40,000				22	43	74	108	142	177	210	248	294
50,000					30	66	97	130	165	201	234	269
60,000						57	88	119	154	190	225	256
80,000						36	71	104	137	170	204	240
100,000							56	90	120	154	189	224
120,000							45	77	108	140	175	207
140,000								64	98	129	160	194
160,000								47	86	118	148	182
200,000									67	98	131	160
250,000										72	109	143
300,000											86	120
350,000											52	100
400,000												71

Values of "L" less than those shown have a slenderness ratio (length ÷ radius of gyration which is length ÷ 1/4 diameter of piston rod) of less than 50. Thus, the compressive strength formula ($s = \text{thrust} \div \text{rod area}$) is used rather than the column strength formula on which Table B is based. For very low slenderness ratios (below 20), compressive strength formulae with a 2 to 1 factor of safety are satisfactory. For slenderness ratios between 20 and 50, use compressive strength formulae with proportionate factors between 2 to 1 and 5 to 1.

EXPLODED VIEW



- | | | |
|-----------------------------|----------------------------------|----------------------------|
| 1 Blind end head | 12 Seal | 23 Packing gland |
| 2 Tube seal • | 13 Cushion adjusting screw gland | 24 Rod wiper • |
| 3 Tube | 14 Cushion adjusting screw | 25 Packing gland cap screw |
| 4 Lock screw | 15 Tie rod nut | 26 Check ball |
| 5 Lock sleeve ▲ | 16 Tie rod | 27 Ball check spring |
| 6 U-cup • | 17 Rod end head | 28 Ball check plug |
| 7 Back-up ring • | 18 Retainer ring | |
| 8 Piston | 19 Packing spacer | IF APPLICABLE: |
| 9 Piston O-ring • | 20 Wave spring • | 29 Head plate |
| 10 Cushion sleeve - rod end | 21 Bottom adapter ring • ■ | 30 Screw gland |
| 11 Piston rod | 22 Rod packing • | |

• = Items are included in seal repair kits. See page 143 for ordering information.

■ = Item 21 is metallic for high temp. applications. **NOTE:** Head and Screw Gland Option Available in all Models except DG (ME-3).

▲ = Use lock nut or threaded piston on 1.50"-8.00" bore with or without cushion, or cushion nose.

When ordering replacement parts be sure to specify:

- Part by name and item number
- Bore, stroke and mounting
- Serial number shown on NOPAK label

NOTE: Isometric view of DOUBLE ROD cylinders available at N/C. Consult factory or an authorized distributor.

REPAIR KITS - CLASS P6 AND H6

FOR CURRENT DESIGN CYLINDERS MANUFACTURED AFTER MARCH 1982

ROD KITS

SINGLE ROD*	
ROD DIA.	PART NO. ■
0.63"	RK6-63
1.00"	RK6-100
1.38"	RK6-138
1.75"	RK6-175
2.00"	RK6-200
2.50"	RK6-250
3.00"	RK6-300
3.50"	RK6-350
4.00"	RK6-400
4.50"	RK6-450
5.00"	RK6-500
5.50"	RK6-550

Each Rod Kit consists of:

- 1 - V-ring rod packing
- 1 - Rod wiper
- 1 - Wave spring

* = To service DOUBLE ROD END CYLINDER, order one Rod Kit for EACH rod end, and if applicable, one Piston Kit.

PISTON KITS

SINGLE OR DOUBLE ROD	
BORE SIZE	PART NO. ■
1.50"	PK6-150
2.00"	PK6-200
2.50"	PK6-250
3.25"	PK6-325
4.00"	PK6-400
5.00"	PK6-500
6.00"	PK6-600
8.00"	PK6-800
10.00"	PK6-1000
12.00"	PK6-1200
14.00"	PK6-1400

Each Piston Kit consists of:

- 2 - Tube O-rings
- 2 - Piston U-cups
- 2 - Back-up washers
- 1 - Piston O-ring

■ = When ordering, specify Type "A" or Type "B" seals.
 Type "A" = Buna-N (NITRILE)
 Type "B" = Fluorocarbon

PACKING GLANDS - CLASS P6 AND H6

ROD DIA.	ALL MODELS EXCEPT D & DD ■	MODELS D & DD ONLY
	PART NUMBER	PART NUMBER
0.63"•	1069G70	1071G70
1.00"•	1068G73	2859G73
1.38"•	1066G75	2858G75
1.75"•	1067G77	2857G77
2.00"•	1065G78	2856G78
2.50"•	1064G79	2855G79
3.00"	1063G81	2854G81
3.50"•	1062G82	2853G82
4.00"•	1061G83	2852G83
4.50"	1060G84	2851G84
5.00"	1070G85	2850G85
5.50"	1059G86	C/F

- = Use packing gland 1071G70 for 1.50" cyl. with 0.63" Ø rod
 Use packing gland 2859G73 for 1.50" & 2.00" cyls. with 1.00" Ø rod
 Use packing gland 2858G75 for 2.00" cyl. with 1.38" Ø rod
 Use packing gland 2857G77 for 2.50" cyl. with 1.75" Ø rod
 Use packing gland 2856G78 for 3.25" cyl. with 2.00" Ø rod
 Use packing gland 2855G79 for 4.00" cyl. with 2.50" Ø rod
 Use packing gland 2853G82 for 5.00" cyl. with 3.50" Ø rod
 Use packing gland 2852G83 for 6.00" cyl. with 4.00" Ø rod

■ = For Models AL, T and TR, consult factory.