NOPAK®

CATALOG 106

CLASS P6
AIR CYLINDERS
TO 250 PSI

CLASS H6
HYDRAULIC
CYLINDERS
BORE RATED
(SEE PAGE 2)

INTERMEDIATE
PRESSURE
SQUARE-HEAD
CYLINDERS

HYDRAULIC &
PNEUMATIC

GALLAND HENNING NOPAK, Inc.

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

TABLE OF CONTENTS

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	P-6 (Air) (See Note 2)		H-6 (Hyd.)	
	Recommended Continuous Duty Operating Pressure	Maximum Non-Continuous Pressure Rating	Recommended Continuous Duty Operating Pressure	Maximum Non-Continuous Pressure Rating
1½	250	750	1500	2500
2	250	750	1500	2500
2½	250	500	1100	1600
3¼	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.

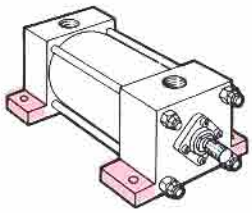
Note 2 — While P6 cylinders are designed primarily for air service as noted, they are also suitable for limited range low-pressure hydraulic service. Unless otherwise specified any order received for a hydraulic cylinder will be entered as Class H6.

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.

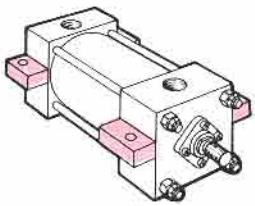
Note 4 — For pressures above these ratings refer to Nopak Class 3 High Pressure Hydraulic Cylinders. Catalog 103.

MOUNTING STYLES INDEX

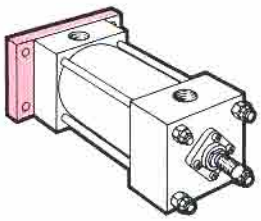
MODEL A
(USA STD. MS2)
1½" THROUGH 20" DIA. BORE
PAGE 10-11-12-13



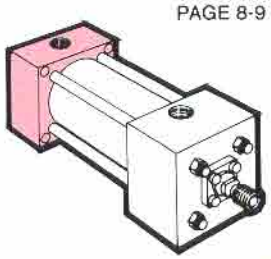
MODEL B
(USA STD. MS3)
1½" THROUGH 20" DIA. BORE
PAGE 10-11-12-13



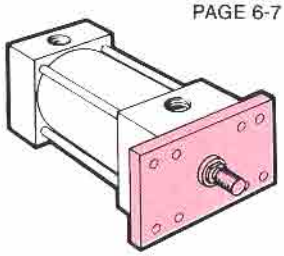
MODEL C
(USA STD. MF2)
1½" THROUGH 6" DIA. BORE
PAGE 6-7



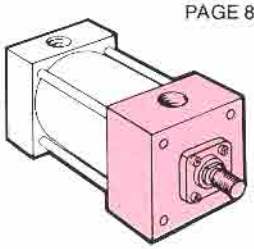
MODEL CJ
(USA STD. ME4)
8" THROUGH 20" DIA. BORE
PAGE 8-9



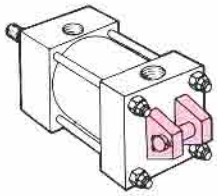
MODEL D
(USA STD. MF1)
1½" THROUGH 6" DIA. BORE
PAGE 6-7



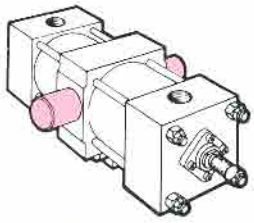
MODEL DG
(USA STD. ME3)
8" THROUGH 20" DIA. BORE
PAGE 8-9



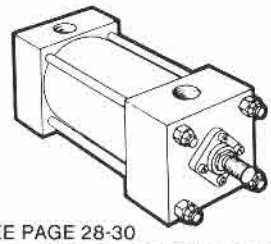
MODEL E
(USA STD. MP1)
1½" THROUGH 20" DIA. BORE
PAGE 14-15-16-17



MODEL F
(USA STD. MT4)
1½" THROUGH 14" DIA. BORE
PAGE 18-19-20-21

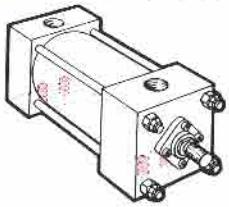


MODEL H
1½" THROUGH 20" DIA. BORE
PAGE 28-29-30-31

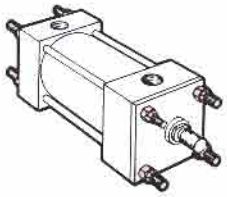


SEE PAGE 28-30
FOR DOUBLE ROD CYLINDER

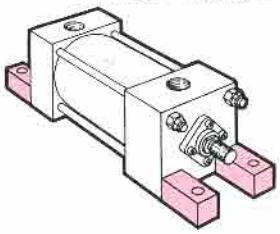
MODEL S
(USA STD. MS4)
1½" THROUGH 20" DIA. BORE
PAGE 10-11-12-13



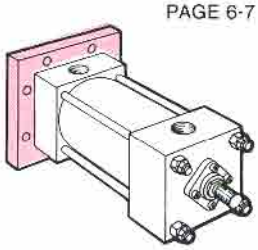
MODEL T
(USA STD. MX1)
1½" THROUGH 20" DIA. BORE
PAGE 22-23-24-25



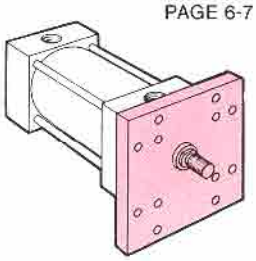
MODEL AL
(USA STD. MS7)
1½" THROUGH 14" DIA. BORE
PAGE 14-15-16-17



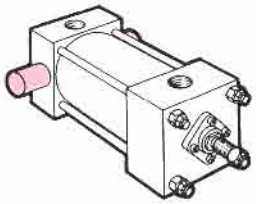
MODEL CC
(USA STD. MF6)
1½" THROUGH 6" DIA. BORE
PAGE 6-7



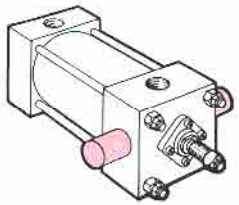
MODEL DD
(USA STD. MF5)
1½" THROUGH 6" DIA. BORE
PAGE 6-7



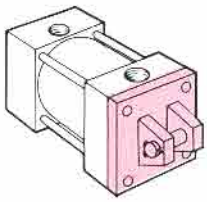
MODEL FB
(USA STD. MT2)
1½" THROUGH 20" DIA. BORE
PAGE 18-19-20-21



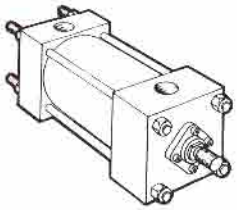
MODEL FR
(USA STD. MT1)
1½" THROUGH 20" DIA. BORE
PAGE 18-19-20-21



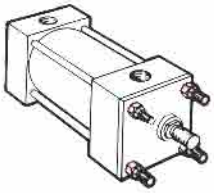
MODEL HE
(USA STD. MP2)
1½" THROUGH 10" DIA. BORE
PAGE 14-15-16-17



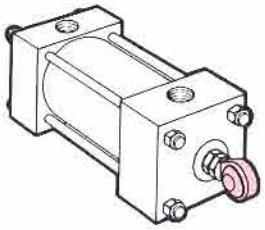
MODEL TB
(USA STD. MX2)
1½" THROUGH 20" DIA. BORE
PAGE 22-23-24-25



MODEL TR
(USA STD. MX3)
1½" THROUGH 20" DIA. BORE
PAGE 22-23-24-25

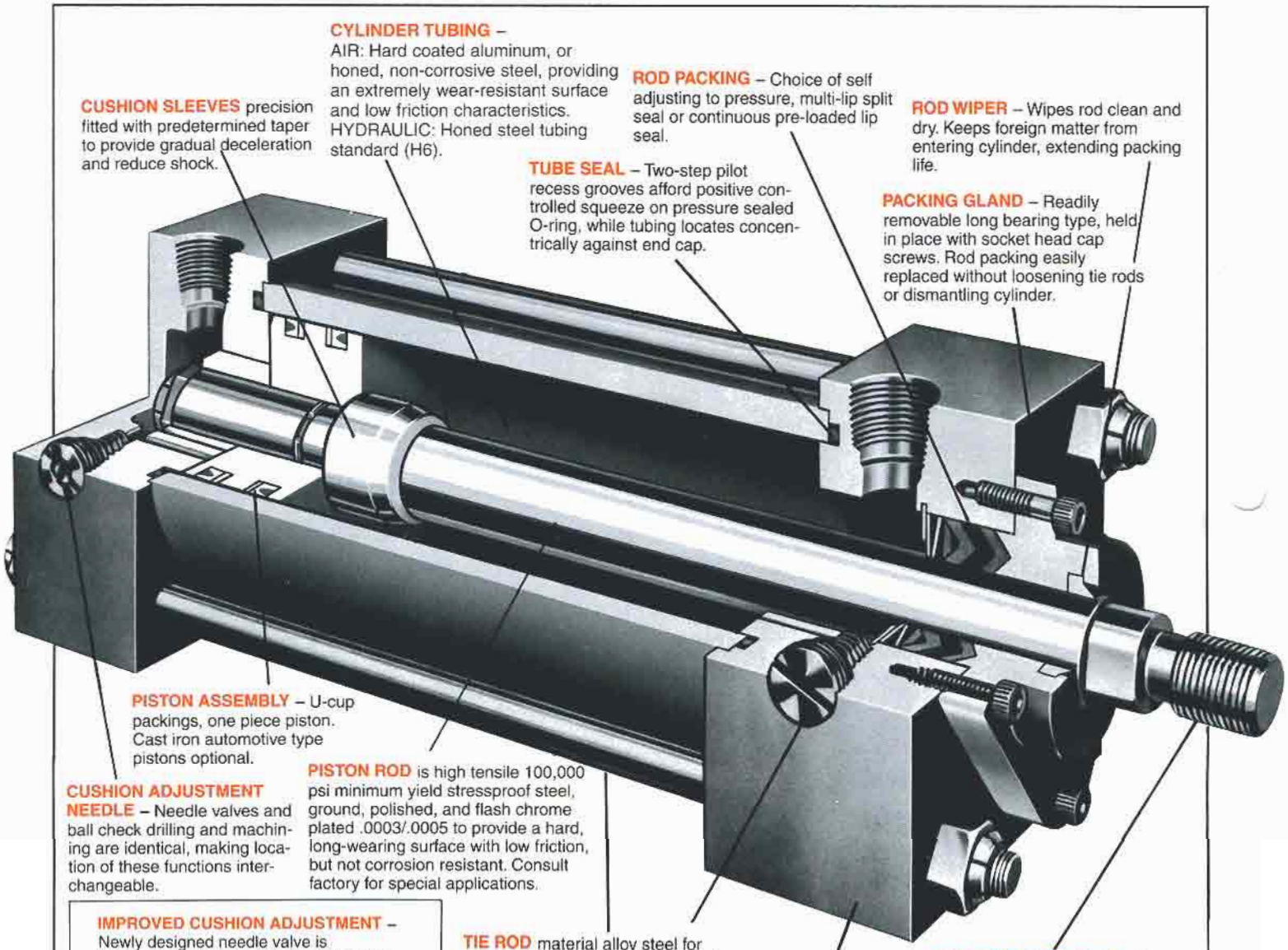


MODEL UE
1½" THROUGH 6" DIA. BORE
PAGE 26-27



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

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



CYLINDER TUBING – AIR: Hard coated aluminum, or honed, non-corrosive steel, providing an extremely wear-resistant surface and low friction characteristics. HYDRAULIC: Honed steel tubing standard (H6).

CUSHION SLEEVES precision fitted with predetermined taper to provide gradual deceleration and reduce shock.

ROD PACKING – Choice of self adjusting to pressure, multi-lip split seal or continuous pre-loaded lip seal.

ROD WIPER – Wipes rod clean and dry. Keeps foreign matter from entering cylinder, extending packing life.

TUBE SEAL – Two-step pilot recess grooves afford positive controlled squeeze on pressure sealed O-ring, while tubing locates concentrically against end cap.

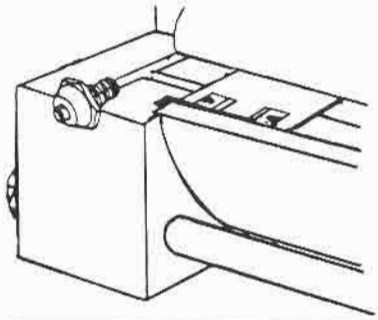
PACKING GLAND – Readily removable long bearing type, held in place with socket head cap screws. Rod packing easily replaced without loosening tie rods or dismantling cylinder.

PISTON ASSEMBLY – U-cup packings, one piece piston. Cast iron automotive type pistons optional.

CUSHION ADJUSTMENT NEEDLE – Needle valves and ball check drilling and machining are identical, making location of these functions interchangeable.

PISTON ROD is high tensile 100,000 psi minimum yield stressproof steel, ground, polished, and flash chrome plated .0003/.0005 to provide a hard, long-wearing surface with low friction, but not corrosion resistant. Consult factory for special applications.

IMPROVED CUSHION ADJUSTMENT – Newly designed needle valve is interchangeable with current design and offers improved sealing characteristics.



TIE ROD material alloy steel for maximum strength. Multiple tie rods in each corner are furnished on all 16" through 20" diameter cylinders.

CUSHION BALL CHECK assures quick starting under full power; pressure acts on full piston area instantaneously.

END CAPS (Cylinder Heads) Precision steel blocks

ROD END THREADING – Choice of standard catalog male and female thread types plus standard wrench flats.

NOPAK ORDERING INFORMATION AND WARRANTY

WHEN ORDERING NOPAK CLASS-6 CYLINDERS . . . PLEASE TELL US . . .

1. Quantity Required.
2. Operating medium — Series P-6 or H-6. P for pneumatic and H for hydraulic.
   Class P6 cylinders are fabricated in shelf stock strokes with standard (smallest) rod diameter.
3. Bore Size.
4. Stroke Length (inches).
5. Type of Mounting (Nopak Model or USA STD. style).
6. Type of Cushioning:
   Non-Cushioned NN
   Cushioned Rod End AN
   Cushioned Blind End NA
   Cushioned Both Ends AA
7. Piston rod diameter and type of rod threading — specify type No. 1 - 3 - 4 - 5.

NOPAK CLASS-6 STOCKING PROGRAM

Consists of all finished Class P6 machined parts ready for assembly 1½" bore thru 6" bore inclusive. Stock size stroke lengths from 1" to 20" inclusive (1" increments).

YOU SHOULD ALSO SPECIFY . . .

1. Position of cylinder ports and cushion adjustment screws, if other than standard. National pipe thread inlets position-1, ball check position-2, cushion adjustment position-4, are standard.
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.

Piston rods carried in stock are machined for type No. 4 threading (see page 32 for dimensions).

Mountings carried in shelf stock inventory:

NOPAK MODEL	USA STD. STYLE	PAGE	NOPAK MODEL	USA STD. STYLE	PAGE
A	MS2	10	DD	MF5	6
S *	MS4	10	CJ	ME4	8
E	MP1	14	DG	ME3	8
H	NONE	28	T	MX1	22
C	MF2	6	TB	MX2	22
D	MF1	6	TR	MX3	22
CC	MF6	6			

*MS4 mount machined per order.

ORDERING CODE

Phone: 414-645-6000 Fax No.: 414-645-6048

EXAMPLE:

CLP6 - 8 x 18 - A - △△ - 1⅜ - 4

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

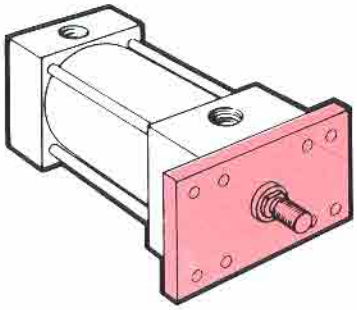
- Rod End Thread: See chart on page 32.
- Rod Diameter: See chart at respective bore size for rod sizes available in that bore.
- Cushions: See chart below.
- Mounting style: Use either Nopak or NFPA's designation.
- Stroke (stocked in 1" increments up to 20", through 6" bore).
- Bore (1½" through 20")
- Class (P6 or H6)

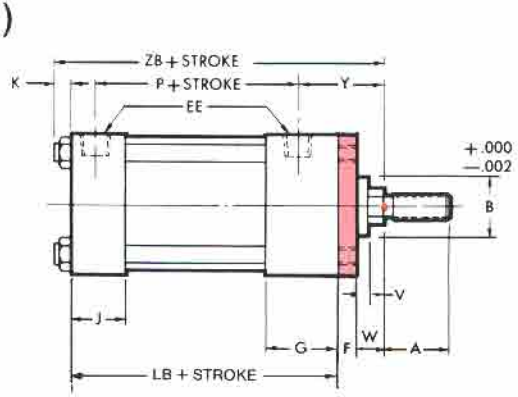
△△ Two letters required in model number:
NN = No cushions
AA = Cushioned both ends
NA = No cushion rod end, cushion bind end
AN = Cushion rod end, no cushion blind end

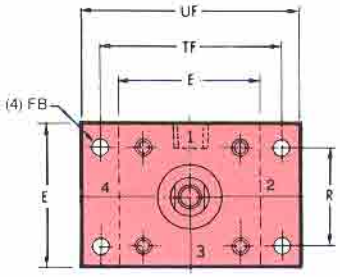
NOPAK FLANGE MOUNT CYLINDERS

1½" THROUGH 6" BORE

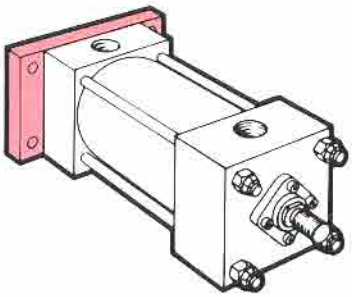
MODEL D (USA STD. MF1)

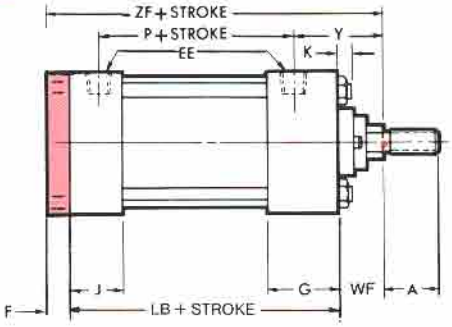


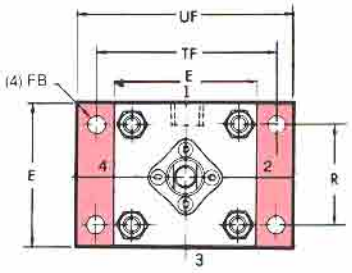




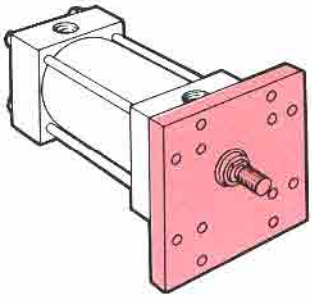
MODEL C (USA STD. MF2) ▲

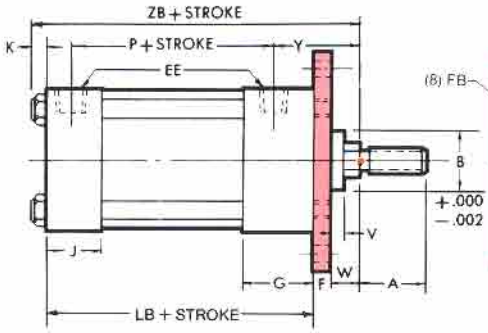


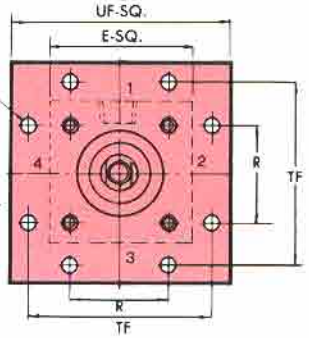




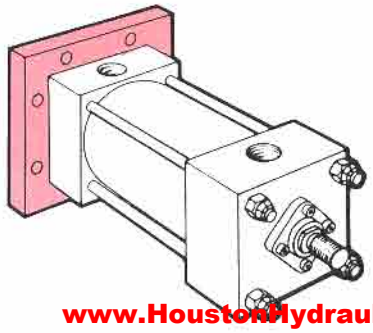
MODEL DD (USA STD. MF5)

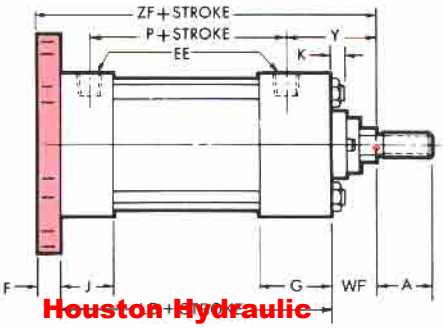






MODEL CC (USA STD. MF6) ▲





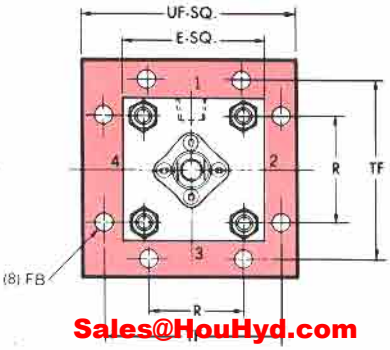


TABLE 2

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 28.
†Dimensions refer to bolt diameter.

BORE DIA.	E	F	G	J	K	R	EE	FB †	TF	UF
1½	2	⅜	1½	1⅛	¼	1.43	⅜	¼	2¾	3⅜
2	2½	⅜	1½	1⅛	7/16	1.84	⅜	5/16	3⅜	4⅛
2½	3	⅜	1½	1⅛	5/16	2.19	⅜	5/16	3⅞	4⅝
3¼	3¾	⅝	1¾	1¼	7/16	2.76	½	⅜	4 11/16	5½
4	4½	⅝	1¾	1¼	7/16	3.32	½	⅜	5 7/16	6¼
5	5½	⅝	1¾	1¼	½	4.10	½	½	6⅝	7⅝
6	6½	¾	2	1½	9/16	4.88	¾	½	7⅝	8⅝

TABLE 1

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

- • Heads bored for these rod sizes are normally in stock — thus faster delivery.
- * For piston rod dimensions see page 32.

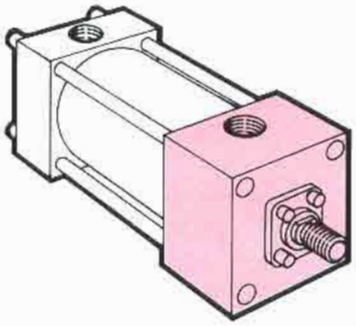
BORE DIA.	*ROD MM	A	B	P	V	W	Y	LB	WF	ZB	ZF
1½	5/8 •	¾	1⅛	2⅛	¼	5/8	1 15/16	3⅝	1	4⅞	5
	1 •	1⅛	1½		½	1	2 5/16		1⅜	5¼	5⅜
2	5/8 •	¾	1⅛	2⅛	¼	5/8	1 15/16	3⅝	1	5 1/16	5
	1 •	1⅛	1½		½	1	2 5/16		1⅜	5 7/16	5⅜
	1⅜	1⅝	2		⅝	1¼	2 9/16		1⅝	5 11/16	5⅝
2½	5/8 •	¾	1⅛	2¼	¼	5/8	1 15/16	3¾	1	5 1/16	5⅛
	1 •	1⅛	1½		½	1	2 5/16		1⅜	5 7/16	5½
	1⅜	1⅝	2		⅝	1¼	2 9/16		1⅝	5 11/16	5¾
	1¾	2	2⅜		¾	1½	2 13/16		1⅞	5 15/16	6
3¼	1 •	1⅛	1½	2½	¼	¾	2½	4¼	1⅜	6 1/16	6¼
	1⅜ •	1⅝	2		⅜	1	2¾		1⅝	6 5/16	6½
	1¾	2	2⅜		½	1¼	3		1⅞	6 9/16	6¾
	2	2¼	2⅝		½	1⅜	3⅛		2	6 11/16	6⅞
4	1 •	1⅛	1½	2½	¼	¾	2½	4¼	1⅜	6 1/16	6¼
	1⅜ •	1⅝	2		⅜	1	2¾		1⅝	6 5/16	6½
	1¾ •	2	2⅜		½	1¼	3		1⅞	6 9/16	6¾
	2	2¼	2⅝		½	1⅜	3⅛		2	6 11/16	6⅞
	2½	3	3⅛		⅝	1⅝	3⅜		2¼	6 15/16	7⅛
5	1 •	1⅛	1½	2¾	¼	¾	2½	4½	1⅜	6⅜	6½
	1⅜ •	1⅝	2		⅜	1	2¾		1⅝	6⅝	6¾
	1¾	2	2⅜		½	1¼	3		1⅞	6⅞	7
	2	2¼	2⅝		½	1⅜	3⅛		2	7	7⅛
	2½	3	3⅛		⅝	1⅝	3⅜		2¼	7¼	7⅜
	3	3½	3¾		⅝	1⅝	3⅜		2¼	7¼	7⅜
	3½	3½	4¼		⅝	1⅝	3⅜		2¼	7¼	7⅜
6	1⅜ •	1⅝	2	3⅛	¼	⅞	2 13/16	5	1⅝	7 3/16	7⅜
	1¾ •	2	2⅜		⅜	1⅛	3 1/16		1⅞	7 7/16	7⅝
	2 •	2¼	2⅝		⅜	1¼	3 3/16		2	7 9/16	7¾
	2½	3	3⅛		½	1½	3 7/16		2¼	7 13/16	8
	3	3½	3¾		½	1½	3 3/16		2¼	7 13/16	8
	3½	3½	4¼		½	1½	3 7/16		2¼	7 13/16	8
	4	4	4¾		½	1½	3 7/16		2¼	7 13/16	8

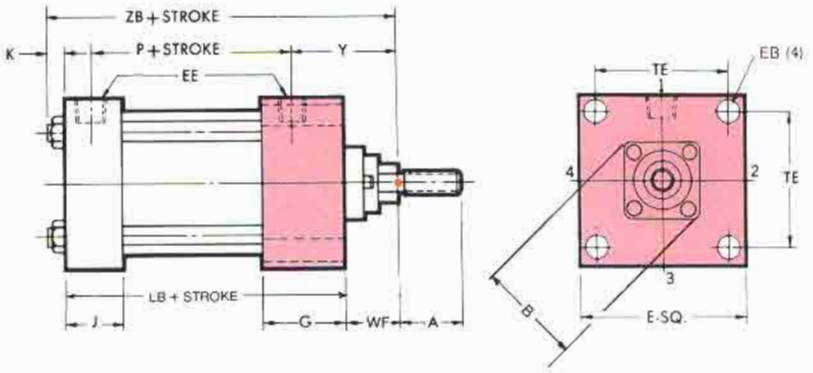
▲ See Table A on page 27 for bore and rod combinations using head plates with threaded bronze glands.

NOPAK FLANGE MOUNT CYLINDERS

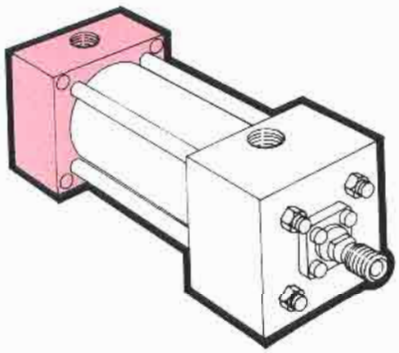
8" THROUGH 20" BORE

MODEL DG (USA STD. ME3)





MODEL CJ (USA STD. ME4)



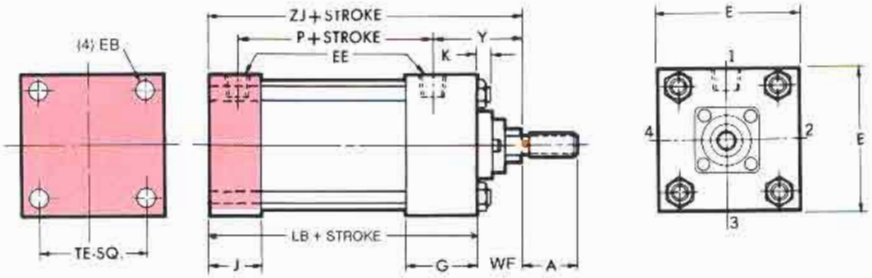


TABLE 2

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 30.

† Dimensions refer to bolt diameter.

BORE DIA.	E	G	J	K	EB†	EE	TE
8	8½	2	1½	⅝	⅝	¾	7.57
10	10⅝	2¼	2	¾	¾	1	9.40
12	12¾	2¼	2	¾	¾	1	11.10
14	14¾	2¾	2¼	⅞	⅞	1¼	12.87
16	17½	3	3	1	1¼	1½	14.75
18	19½	3 7/16	3 7/16	1⅛	1½	1½	16.50
20	21¾	3 15/16	3 15/16	1¼	1¾	2	18.25

TABLE 1

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

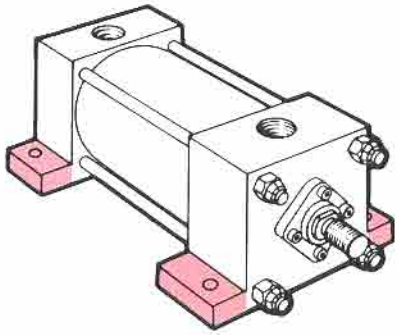
- • Heads bored for these rod sizes are normally in stock — thus faster delivery.
- ■ Model DG only.
- * For piston rod dimensions see page 32.

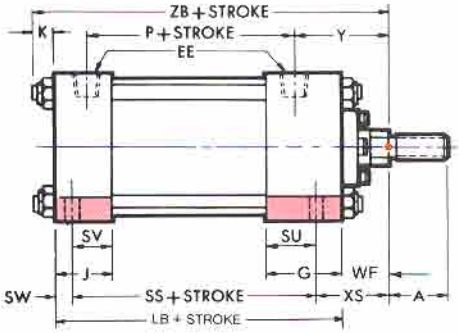
BORE DIA.	*ROD MM	A	B	P	Y	LB	WF	ZB	ZJ
8	1 3/8 •	1 5/8	3 1/8	3 1/4	2 13/16	5 1/8	1 5/8	7 3/8	6 3/4
	1 3/4	2	3 5/8		3 1/16		1 7/8	7 5/8	7
	2	2 1/4	4 1/4		3 3/16		2	7 3/4	7 1/8
	2 1/2	3	4 3/4		3 7/16		2 1/4	8	7 3/8
	3	3 1/2	5 1/2						
	3 1/2	3 1/2	6 1/4						
	4	4	7 1/4						
	4 1/2	4 1/2	7 3/4						
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

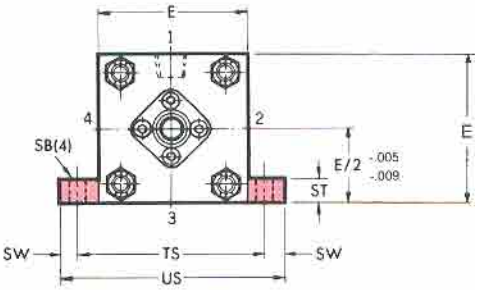
NOPAK SIDE AND LUG MOUNT CYLINDERS

1½" THROUGH 6" BORE

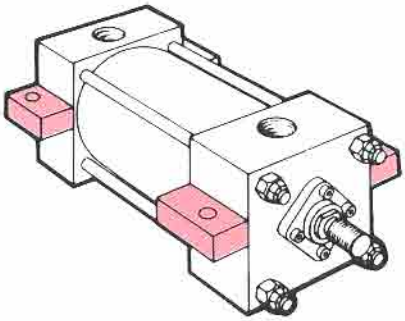
MODEL A (USA STD. MS2) ▲

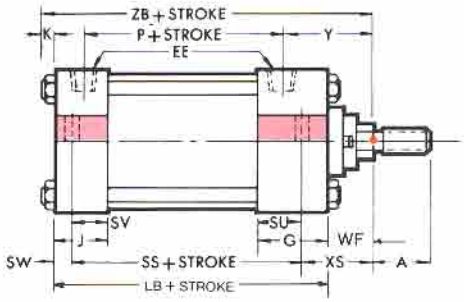


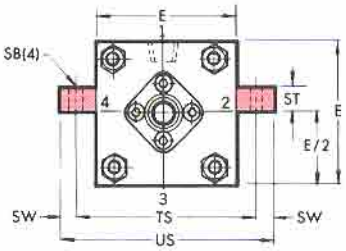




MODEL B (USA STD. MS3) ▲







For double rod end cylinders Model A and B 1.50" through 6.00" bore, add 0.50" to Dimension SS. Also see pages 28-29.

Double rod end models are designated by letter "X" preceding the model identification. See page 28.

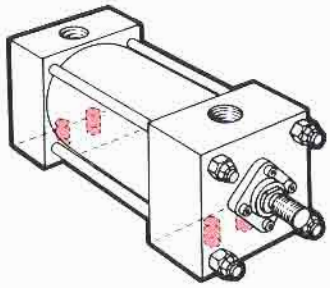
†Dimensions refer to bolt diameter.

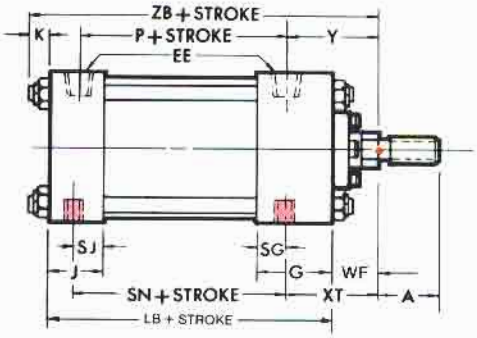
TABLE 2

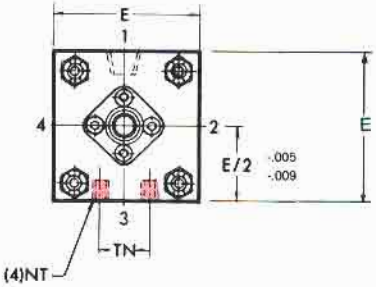
These dimensions are constant regardless of rod diameter or stroke.

BORE DIA.	E	G	J	K	EE	NT	SB†	SG	SJ	ST	SU	SV	SW	TN	TS	US
1½	2	1½	1⅛	¼	⅜	¼-20	⅜	9/16	11/16	½	1⅛	¾	⅜	⅝	2¾	3½
2	2½	1½	1⅛	⅜	⅜	5/16-18	⅜	9/16	11/16	½	1⅛	¾	⅜	⅞	3¼	4
2½	3	1½	1⅛	5/16	⅜	⅜-16	⅜	9/16	11/16	½	1⅛	¾	⅜	1¼	3¾	4½
3¼	3¾	1¾	1¼	7/16	½	½-13	½	11/16	11/16	¾	1¼	¾	½	1½	4¾	5¾
4	4½	1¾	1¼	7/16	½	½-13	½	11/16	11/16	¾	1¼	¾	½	2 1/16	5½	6½
5	5½	1¾	1¼	½	½	⅝-11	¾	11/16	11/16	1	1 1/16	9/16	11/16	2 11/16	6⅞	8¼
6	6½	2	1½	9/16	¾	¾-10	¾	13/16	13/16	1	1 5/16	13/16	11/16	3¼	7⅞	9¼

MODEL S (USA STD. MS4) ▲







• Heads bored for these rod sizes are normally in stock — thus faster delivery, Model A only.

For double rod end cylinders Model S 1.50" through 2.50" bore, add 0.13" to Dimension SN. Also see pages 28-29.

TABLE 1

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

*For piston rod end dimensions see page 32.
Double rod end models are designated by letter "X" preceding the model identification. See page 28.

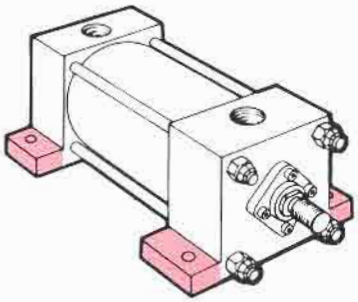
BORE DIA.	*ROD MM	A	P	Y	LB	SN	SS	WF	XS	XT	ZB
1½	5/8 •	3/4	2 1/8	1 15/16	3 5/8	2 1/4	2 7/8	1	1 3/8	1 15/16	4 7/8
	1 •	1 1/8		2 5/16				1 3/8	1 3/4	2 5/16	5 1/4
2	5/8 •	3/4	2 1/8	1 15/16	3 5/8	2 1/4	2 7/8	1	1 3/8	1 15/16	5
	1 •	1 1/8		2 5/16				1 3/8	1 3/4	2 5/16	5 3/8
	1 3/8	1 5/8		2 9/16				1 5/8	2	2 9/16	5 11/16
2½	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 5/16				1 3/8	1 3/4	2 5/16	5 7/16
	1 3/8	1 5/8		2 9/16				1 5/8	2	2 9/16	5 11/16
	1 3/4	2		2 13/16				1 7/8	2 1/4	2 13/16	5 15/16
3¼	1 •	1 1/8	2½	2½	4¼	2 5/8	3¼	1 3/8	1 7/8	2 7/16	6 1/16
	1 3/8 •	1 5/8		2 3/4				1 5/8	2 1/8	2 11/16	6 5/16
	1 3/4	2		3				1 7/8	2 3/8	2 15/16	6 9/16
	2	2 1/4		3 1/8				2	2½	3 1/16	6 11/16
4	1 •	1 1/8	2½	2½	4¼	2 5/8	3¼	1 3/8	1 7/8	2 7/16	6 1/16
	1 3/8	1 5/8		2 3/4				1 5/8	2 1/8	2 11/16	6 5/16
	1 3/4	2		3				1 7/8	2 3/8	2 15/16	6 9/16
	2	2 1/4		3 1/8				2	2½	3 1/16	6 11/16
	2½	3		3 3/8				2 1/4	2 3/4	3 5/16	6 15/16
5	1 •	1 1/8	2¾	2½	4½	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				1 5/8	2 5/16	2 11/16	6 5/8
	1 3/4	2		3				1 7/8	2 9/16	2 15/16	6 7/8
	2	2 1/4		3 1/8				2	2 11/16	3 1/16	7
	2½	3		3 3/8				2 1/4	2 15/16	3 5/16	7 1/4
	3	3½		3 3/8				2 1/4	2 15/16	3 5/16	7 1/4
	3½	3½		3 3/8				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 1/16				1 7/8	2 9/16	3 1/16	7 7/16
	2	2 1/4		3 3/16				2	2 11/16	3 3/16	7 9/16
	2½	3		3 7/16				2 1/4	2 15/16	3 7/16	7 13/16
	3	3½		3 7/16				2 1/4	2 15/16	3 7/16	7 13/16
	3½	3½		3 7/16				2 1/4	2 15/16	3 7/16	7 13/16
	4	4		3 7/16				2 1/4	2 15/16	3 7/16	7 13/16

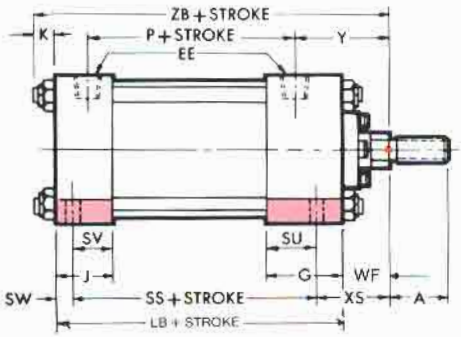
▲ See Table A on page 27 for bore and rod combinations using head plates with threaded bronze glands.

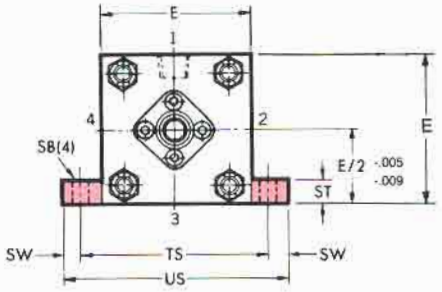
NOPAK SIDE AND LUG MOUNT CYLINDERS

8" THROUGH 20" BORE

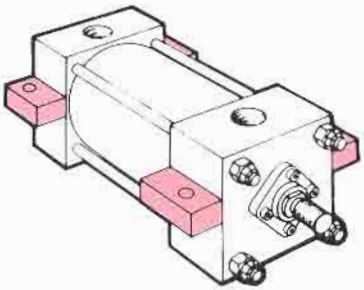
MODEL A (USA STD. MS2)

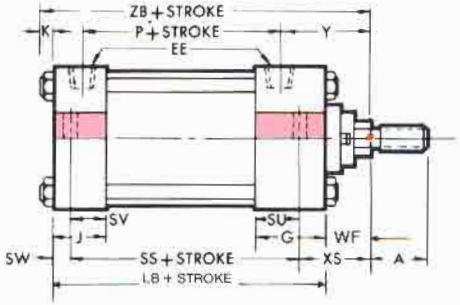


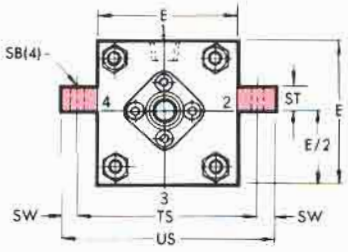




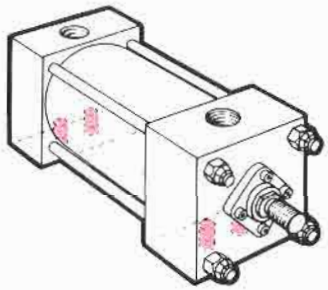
MODEL B (USA STD. MS3)

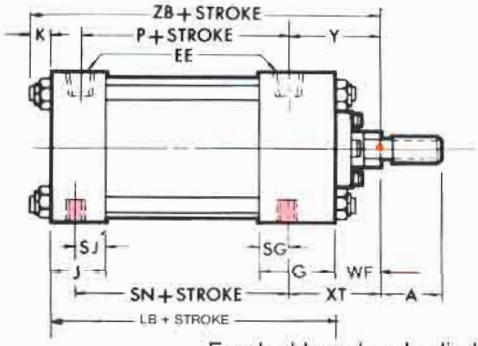


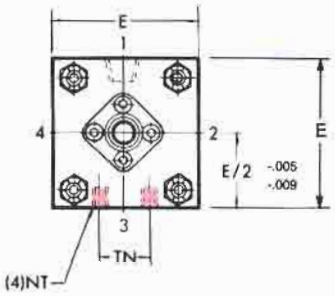




MODEL S (USA STD. MS4)







For double rod end cylinders Model A and B 8.00" through 14.00" bore, subtract SV from SS dimension and add SU. Also see pages 30-31.

Double rod end models are designated by letter "X" preceding the model identification. See page 30.

†Dimensions refer to bolt diameter.

TABLE 2

These dimensions are constant regardless of rod diameter or stroke.

BORE DIA.	E	G	J	K	EE	NT	SB†	SG	SJ	ST	SU	SV	SW	TN	TS	US
8	8½	2	1½	⅝	¾	¾-10	¾	13/16	13/16	1	1 5/16	13/16	11/16	4½	9⅞	11¼
10	10⅝	2¼	2	¾	1	1-8	1	1	1	1¼	1⅜	1⅛	⅞	5½	12⅜	14⅛
12	12¾	2¼	2	¾	1	1-8	1	1	1	1¼	1⅜	1⅛	⅞	7¼	14½	16¼
14	14¾	2¾	2¼	⅞	1¼	1¼-7	1¼	1 3/16	1 3/16	1½	1⅝	1⅛	1⅛	8⅜	17	19¼
16	17½	3	3	1	1½	1¾-12	1¾	1 9/16	1 11/16	2	1¼	1¼	1⅝	7	21	24¼
18	19½	3 7/16	3 7/16	1⅛	1½	2-12	2	1¾	1⅞	2½	1 7/16	1 7/16	2	8	23½	27½
20	21¾	3 15/16	3 15/16	1¼	2	2¼-12	2¼	2	1⅞	3	1 9/16	1 9/16	2⅜	8½	26½	31¼

TABLE 1

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

For double rod end cylinders Model S 16.00" through 20.00" bore, subtract SJ from SN dimension and add SG. Also see pages 30-31.

* For piston rod dimensions see page 32.

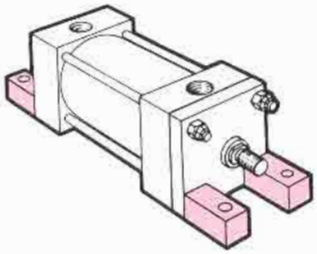
BORE DIA.	*ROD MM	A	P	Y	LB	SN	SS	WF	XS	XT	ZB
8	1 3/8	1 5/8	3 1/4	2 13/16	5 1/8	3 1/4	3 3/4	1 5/8	2 5/16	2 13/16	7 3/8
	1 3/4	2		3 1/16				1 7/8	2 9/16	3 1/16	7 5/8
	2	2 1/4		3 3/16				2	2 11/16	3 3/16	7 3/4
	2 1/2	3		3 7/16				2 1/4	2 15/16	3 7/16	8
	3	3 1/2									
	3 1/2	3 1/2									
	4	4						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

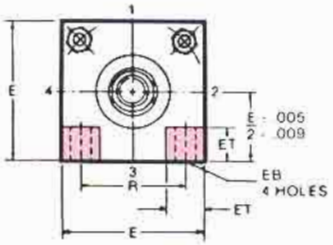
NOPAK

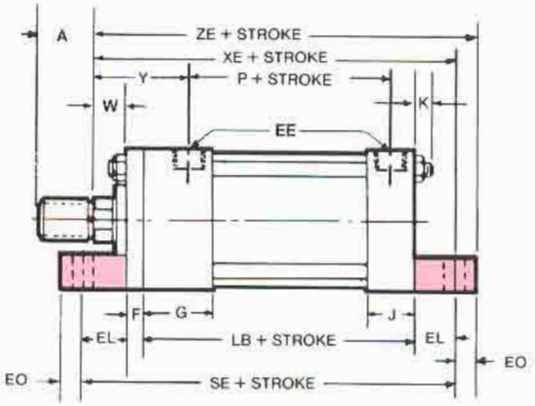
END LUG
FIXED CLEVIS
DETACHABLE CLEVIS
MOUNT CYLINDERS

1½" THROUGH 8" DIA.

MODEL AL (USA STD. MS7)

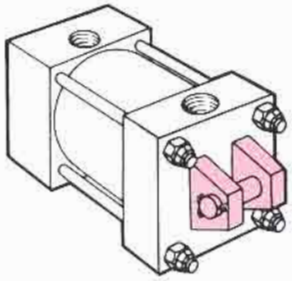






Model AL-1½ dia. through 6" dia. cylinders furnished with head plates. 8" dia. through 14" dia. cylinders use (4) bolt glands as shown on page 16.

MODEL E (USA STD. MP1) ▲



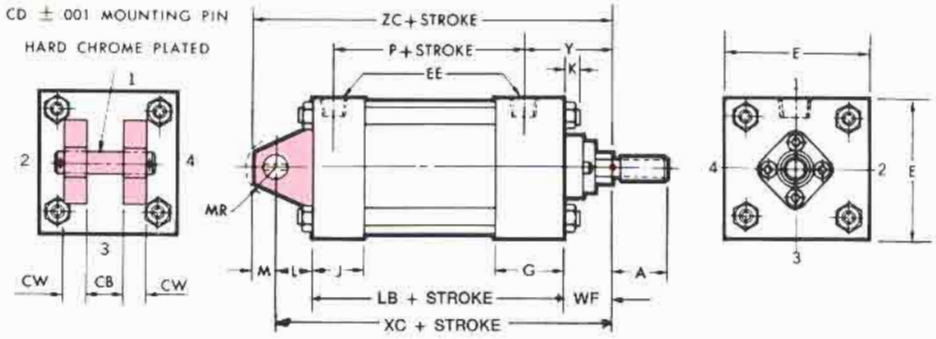


TABLE 2

These dimensions are constant regardless of rod diameter or stroke.

For double rod end cylinders Model AL — subtract Dimension J from G and add to Dimension SE + stroke. 1.50" through 6.00" bore also add Dimension F.

Double rod end models are designated by letter "X" preceding the model identification. See page 28.

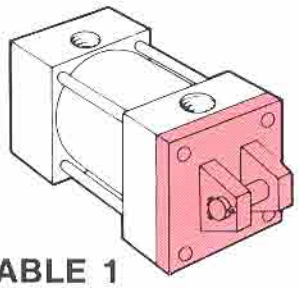
†Dimensions refer to bolt diameter.

BORE DIA.	E	F AL	F HE	G	J	K	L	M	R	CB	CD	CW	EB†	EE	EL	EO	ET	MR
1½	2	⅜	⅜	1½	1⅛	¼	¾	½	1.43	¾	½	½	¼	⅜	¾	¼	½	⅝
2	2½	⅜	⅜	1½	1⅛	⅜	¾	½	1.84	¾	½	½	5/16	⅜	15/16	5/16	19/32	⅝
2½	3	⅜	⅜	1½	1⅛	5/16	¾	½	2.19	¾	½	½	5/16	⅜	1 1/16	5/16	¾	⅝
3¼	3¾	⅝	⅝	1¾	1¼	7/16	1¼	¾	2.76	1¼	¾	⅝	⅜	½	⅞	⅜	29/32	⅞
4	4½	⅝	⅝	1¾	1¼	7/16	1¼	¾	3.32	1¼	¾	⅝	⅜	½	1	⅜	1⅛	⅞
5	5½	⅝	⅝	1¾	1¼	½	1¼	¾	4.10	1¼	¾	⅝	½	½	1 1/16	½	1 11/32	⅞
6	6½	¾	⅞	2	1½	9/16	1½	1	4.88	1½	1	¾	½	¾	1	½	1 9/16	1¼
8	8½	¾	⅞	2	1½	⅝	1½	1	6.44	1½	1	¾	⅝	¾	1⅛	⅝	2	1¼

▲ See Table A on page 27 for bore and rod combinations using head plates with threaded bronze glands.

MODEL HE (USA STD. MP2)▲

• Heads bored for these rod sizes are normally in stock — thus faster delivery, Models E and HE only.



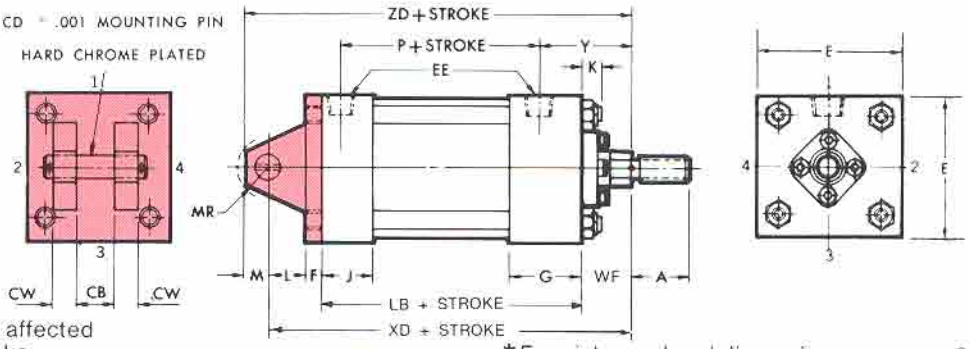


TABLE 1

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

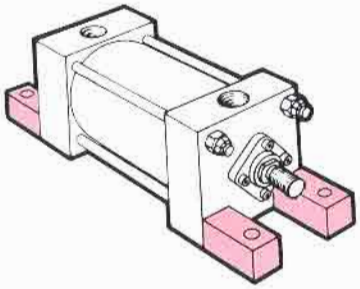
*For piston rod end dimensions see page 32.

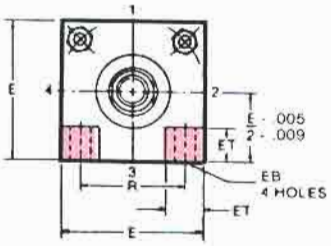
BORE DIA.	*ROD MM	A	P	W	Y	LB	SE	WF	XC	XD	XE	ZC	ZD	ZE
1½	5/8 •	3/4	2 1/8	5/8	1 15/16	3 5/8	5 1/2	1	5 3/8	5 3/4	5 3/8	5 7/8	6 1/4	5 5/8
	1 •	1 1/8		1	2 5/16			1 3/8	5 3/4	6 1/8	5 3/4	6 1/4	6 5/8	6
2	5/8 •	3/4	2 1/8	5/8	1 15/16	3 5/8	5 7/8	1	5 3/8	5 3/4	5 9/16	5 7/8	6 1/4	5 7/8
	1 •	1 1/8		1	2 5/16			1 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		1 1/4	2 9/16			1 5/8	6	6 3/8	6 3/16	6 1/2	6 7/8	6 1/2
2½	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		1	2 5/16			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		1 1/4	2 9/16			1 5/8	6 1/8	6 1/2	6 7/16	6 5/8	7	6 3/4
	1 3/4	2		1 1/2	2 13/16			1 7/8	6 3/8	6 3/4	6 11/16	6 7/8	7 1/4	7
3¼	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		1	2 3/4			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		1 1/4	3			1 7/8	7 3/8	8	7	8 1/8	8 3/4	7 3/8
	2	2 1/4		1 3/8	3 1/8			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		1	2 3/4			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		1 1/4	3			1 7/8	7 3/8	8	7 1/8	8 1/8	8 3/4	7 1/2
	2	2 1/4		1 3/8	3 1/8			2	7 1/2	8 1/8	7 1/4	8 1/4	8 7/8	7 5/8
	2 1/2	3		1 5/8	3 3/8			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		1	2 3/4			1 5/8	7 3/8	8	7 3/16	8 1/8	8 3/4	7 11/16
	1 3/4	2		1 1/4	3			1 7/8	7 5/8	8 1/4	7 7/16	8 3/8	9	7 15/16
	2	2 1/4		1 3/8	3 1/8			2	7 3/4	8 3/8	7 9/16	8 1/2	9 1/8	8 1/16
	2 1/2	3		1 5/8	3 3/8			2 1/4	8	8 5/8	7 13/16	8 3/4	9 3/8	8 5/16
	3	3 1/2		1 5/8	3 3/8			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		1 5/8	3 3/8			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		1 1/8	3 1/16			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		1 1/4	3 3/16			2	8 1/2	9 3/8	8	9 1/2	10 3/8	8 1/2
	2 1/2	3		1 1/2	3 7/16			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		1 1/2	3 7/16			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		1 1/2	3 7/16			2 1/4	8 3/4	9 5/8	8 1/4	9 3/4	10 5/8	8 3/4
	4	4		1 1/2	3 7/16			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 1/16			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 3/16			2	8 5/8	9 1/2	8 1/4	9 5/8	10 1/2	8 7/8
	2 1/2	3		—	3 7/16			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 7/16				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 7/16				8 7/8	9 3/4	8 1/2	9 7/8	10 3/4	9 1/8
	4	4		—	3 7/16				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 7/16				8 7/8	9 3/4	8 1/2	9 7/8	10 3/4	9 1/8
	5	5		—	3 7/16				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 7/16				8 7/8	9 3/4	8 1/2	9 7/8	10 3/4	9 1/8

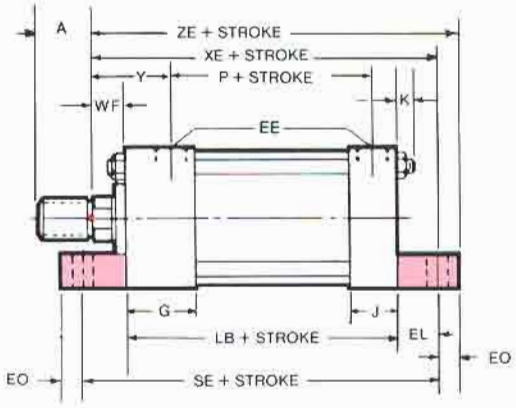
NOPAK

END LUG
FIXED CLEVIS
DETACHABLE CLEVIS
MOUNT CYLINDERS

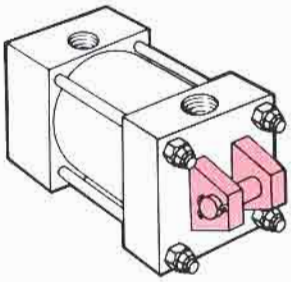
MODEL AL (USA STD. MS7)
10" THROUGH 14" DIA.







MODEL E (USA STD. MP1)
10" THROUGH 20" DIA.



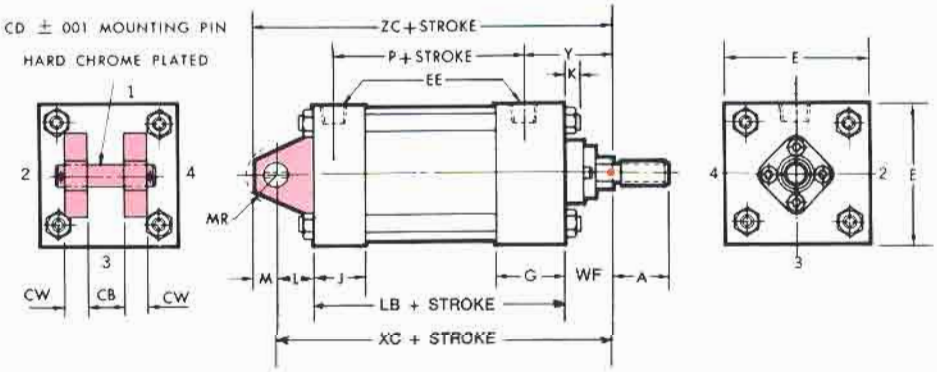


TABLE 2

These dimensions are constant regardless of rod diameter or stroke.

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

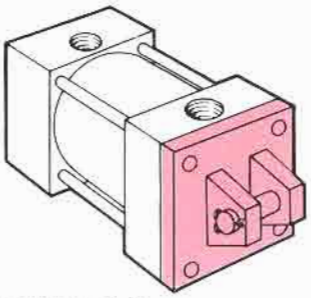
Double rod end models are designated by letter "X" preceding the model identification. See page 30.

†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	10⅝	⅞	2¼	2	¾	2⅛	1⅜	7.92	2	1⅜	1	¾	1	1 5/16	1 5/16	2⅝	1⅝
12	12¾	—	2¼	2	¾	2¼	1¾	9.40	2½	1¾	1¼	¾	1	1 5/16	1 11/16	3⅜	2
14	14¾	—	2¾	2¼	⅞	2½	2	10.90	2½	2	1¼	⅞	1¼	1½	2	3⅞	2⅜
16	17½	—	3	3	1	2½	2	—	2½	2	1¼	—	1½	—	—	—	2⅜
18	19½	—	3 7/16	3 7/16	1⅛	3	2¾	—	3	2½	1½	—	1½	—	—	—	3
20	21¾	—	3 15/16	3 15/16	1¼	3¼	2¾	—	3	3	1½	—	2	—	—	—	3¼

MODEL HE (USA STD. MP2) 10" DIA.

• Heads bored for these rod sizes are normally in stock — thus faster delivery, Model E only.



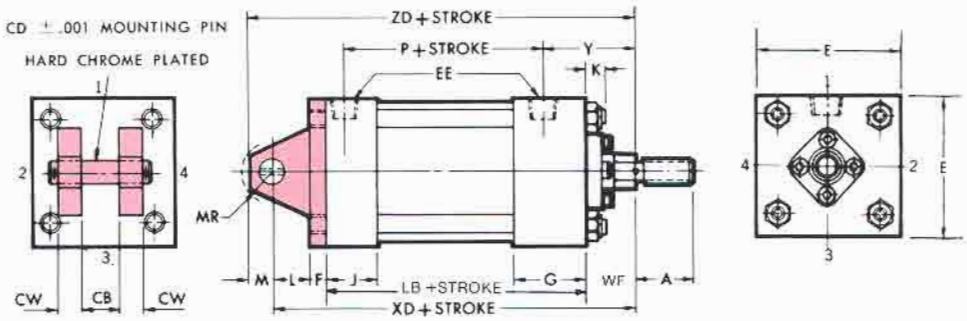


TABLE 1

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

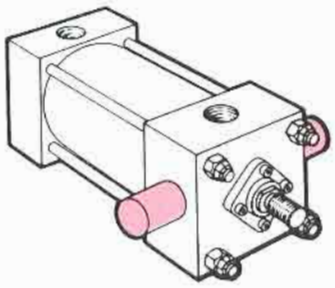
*For piston rod dimensions see page 32.

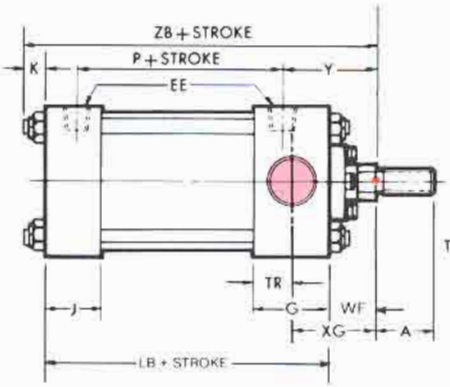
BORE DIA.	*ROD MM	A	P	Y	LB	SE	WF	XC	XD	XE	ZC	ZD	ZE
10	1¾ •	2	4	3 3/16	6 3/8	9	1 7/8	10 3/8	11 1/4	9 9/16	11 3/4	12 5/8	10 7/8
	2	2 1/4		3 5/16			2	10 1/2	11 3/8	9 11/16	11 7/8	12 3/4	11
	2 1/2	3		3 9/16			2 1/4	10 3/4	11 5/8	9 15/16	12 1/8	13	11 1/4
	3	3 1/2											
	3 1/2	3 1/2											
	4	4											
	4 1/2	4 1/2											
	5	5											
	5 1/2	5 1/2											
12	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		3 9/16			2 1/4	11 3/8	—	10 7/16	13 1/8	—	12 1/8
	3	3 1/2											
	3 1/2	3 1/2											
	4	4											
	4 1/2	4 1/2											
	5	5											
	5 1/2	5 1/2											
14	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											
	3 1/2	3 1/2											
	4	4											
	4 1/2	4 1/2											
	5	5											
	5 1/2	5 1/2											
16	2 1/2	3	5 7/8	3 15/16	9 1/4	—	2 1/4	14	—	—	16	—	—
	3	3 1/2											
	3 1/2	3 1/2											
	4	4											
	4 1/2	4 1/2											
	5	5											
	5 1/2	5 1/2											
18	3 1/2	3 1/2	6	4 3/8	10 1/4	—	2 1/4	15 1/2	—	—	18	—	—
	4	4											
	4 1/2	4 1/2											
	5	5											
	5 1/2	5 1/2											
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											
	5	5											
	5 1/2	5 1/2											

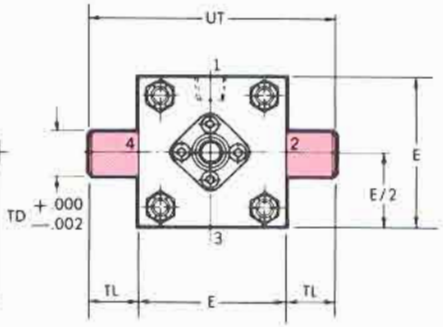
NOPAK TRUNNION MOUNT CYLINDERS

1½" THROUGH 6" DIA.

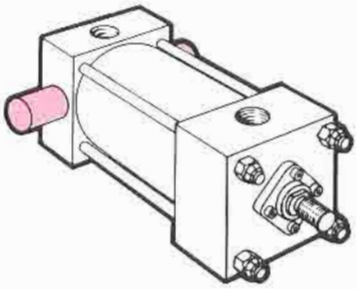
MODEL FR (USA STD. MT1) ▲

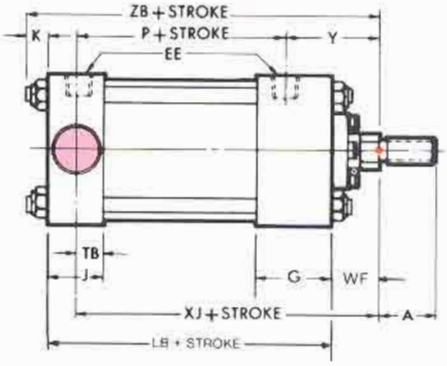






MODEL FB (USA STD. MT2) ▲





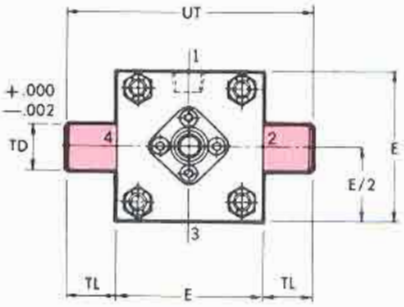


TABLE 2

These dimensions are constant regardless of rod diameter or stroke.

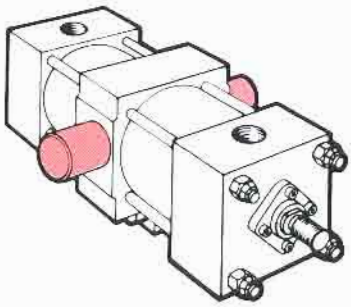
Double rod end models are designated by letter "X" preceding the model identification. See page 28.

BORE DIA.	E	G	J	K	EE	TB	TD	TL	TM	TR	UM	UT	UV	WT
1½	2	1½	1⅛	¼	⅜	9/16	1	1	2½	¾	4½	4	2½	1½
2	2½	1½	1⅛	⅜	⅜	9/16	1	1	3	¾	5	4½	3	1½
2½	3	1½	1⅛	5/16	⅜	9/16	1	1	3½	¾	5½	5	3½	1½
3¼	3¾	1¾	1¼	7/16	½	⅝	1	1	4½	⅞	6½	5¾	4½	2
4	4½	1¾	1¼	7/16	½	⅝	1	1	5¼	⅞	7¼	6½	5	2
5	5½	1¾	1¼	½	½	⅝	1	1	6¼	⅞	8¼	7½	6	2
6	6½	2	1½	9/16	¾	¾	1⅜	1⅜	7⅝	1	10⅜	9¼	7	2½

▲ See Table A on page 27 for bore and rod combinations using head plates with threaded bronze glands.

MODEL F (USA STD. MT4) ▲

- • Heads bored for these rod sizes are normally in stock — thus faster delivery.
- ■ Models F and FB only.



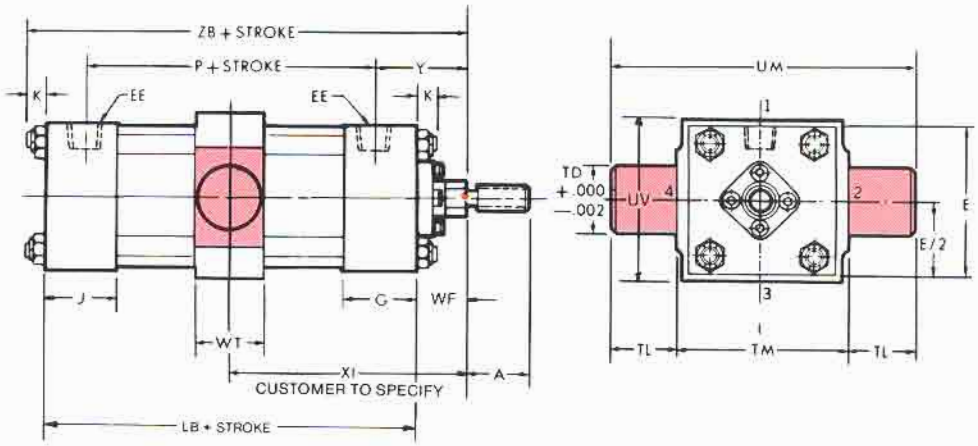


TABLE 1

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

Double rod end models are designated by letter "X" preceding the model identification. See page 28.

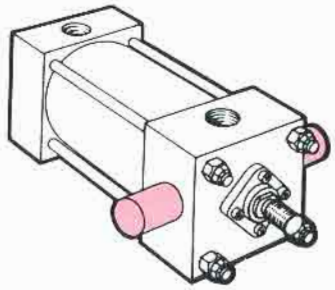
*For piston rod end dimensions see page 32.

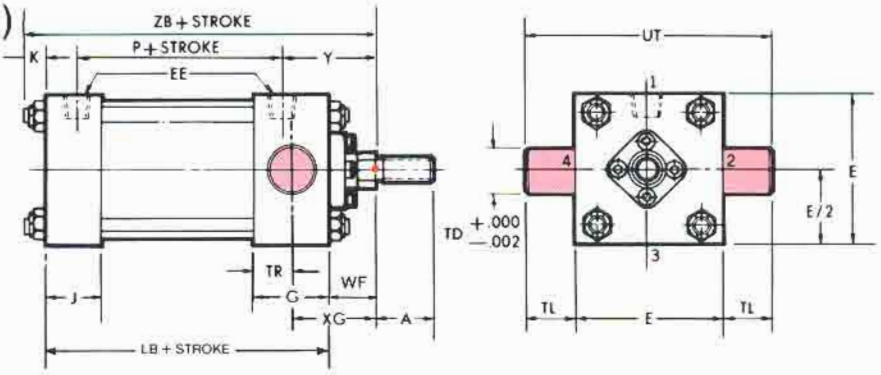
BORE DIA.	*ROD MM	A	P	Y	LB	WF	XG	XI (MIN.)	XJ	ZB
1½	5/8 •	3/4	2 1/8	1 15/16	3 5/8	1	1 3/4	3 1/4	4 1/16	4 7/8
	1 •■	1 1/8		2 5/16		1 3/8	2 1/8	3 5/8	4 7/16	5 1/4
2	5/8 •	3/4	2 1/8	1 15/16	3 5/8	1	1 3/4	3 1/4	4 1/16	5
	1 •■	1 1/8		2 5/16		1 3/8	2 1/8	3 5/8	4 7/16	5 3/8
	1 3/8	1 5/8		2 9/16		1 5/8	2 3/8	3 7/8	4 11/16	5 11/16
2½	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 5/16		1 3/8	2 1/8	3 5/8	4 9/16	5 7/16
	1 3/8	1 5/8		2 9/16		1 5/8	2 3/8	3 7/8	4 13/16	5 11/16
	1 3/4	2		2 13/16		1 7/8	2 5/8	4 1/8	5 1/16	5 15/16
3¼	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 3/4		1 5/8	2 1/2	4 3/8	5 1/4	6 5/16
	1 3/4 •■	2		3		1 7/8	2 3/4	4 5/8	5 1/2	6 9/16
	2	2 1/4		3 1/8		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 3/4		1 5/8	2 1/2	4 3/8	5 1/4	6 5/16
	1 3/4 •■	2		3		1 7/8	2 3/4	4 5/8	5 1/2	6 9/16
	2	2 1/4		3 1/8		2	2 7/8	4 3/4	5 5/8	6 11/16
	2 1/2	3		3 3/8		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		1 5/8	2 1/2	4 3/8	5 1/2	6 5/8
	1 3/4	2		3		1 7/8	2 3/4	4 5/8	5 3/4	6 7/8
	2	2 1/4		3 1/8		2	2 7/8	4 3/4	5 7/8	7
	2 1/2	3		3 3/8		2 1/4	3 1/8	5	6 1/8	7 1/4
	3	3 1/2		3 3/8		2 1/4	3 1/8	5	6 1/8	7 1/4
	3 1/2	3 1/2		3 3/8		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 1/16		1 7/8	2 7/8	5 1/8	6 1/8	7 7/16
	2 •■	2 1/4		3 3/16		2	3	5 1/4	6 1/4	7 9/16
	2 1/2	3		3 7/16		2 1/4	3 1/4	5 1/2	6 1/2	7 13/16
	3	3 1/2		3 7/16		2 1/4	3 1/4	5 1/2	6 1/2	7 13/16
	3 1/2	3 1/2		3 7/16		2 1/4	3 1/4	5 1/2	6 1/2	7 13/16
	4	4		3 7/16		2 1/4	3 1/4	5 1/2	6 1/2	7 13/16

NOPAK TRUNNION MOUNT CYLINDERS

MODEL FR (USA STD. MT1)

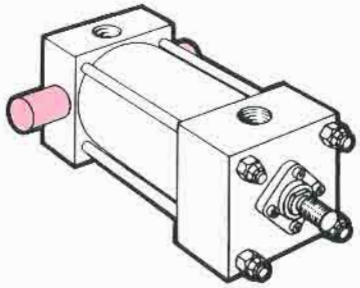
8" THROUGH 20" DIA.

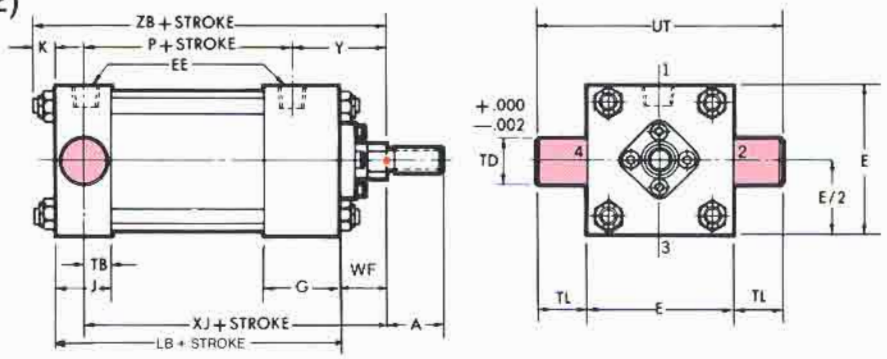




MODEL FB (USA STD. MT2)

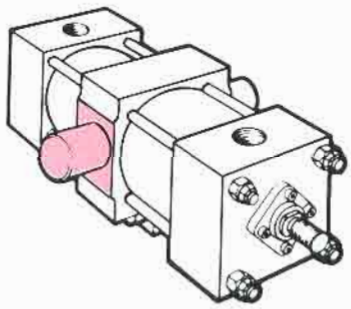
8" THROUGH 20" DIA.





MODEL F (USA STD. MT4)

8" THROUGH 14" DIA.



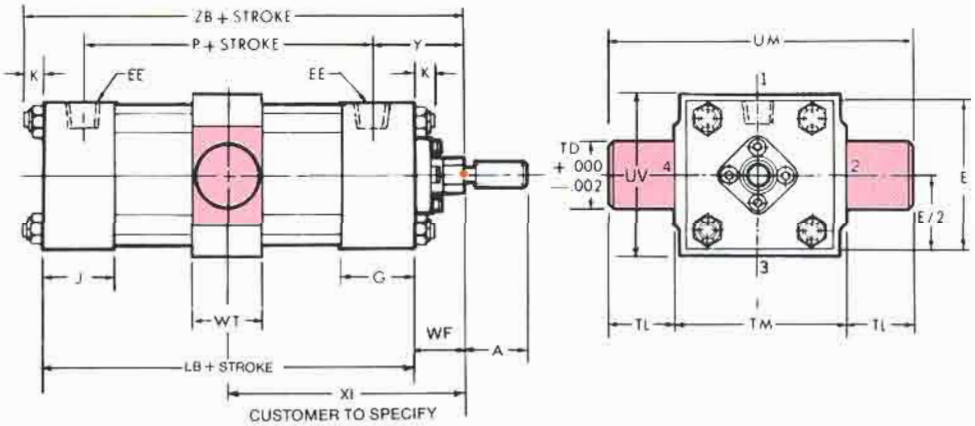


TABLE 2

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 30.

BORE DIA.	E	G	J	K	EE	TB	TD	TL	TM	TR	UM	UT	UV	WT
8	8½	2	1½	⅝	¾	¾	1⅜	1⅜	9¾	1	12½	11¼	9½	2½
10	10⅝	2¼	2	¾	1	1	1¾	1¾	12	1⅛	15½	14⅛	11¾	3
12	12¾	2¼	2	¾	1	1	1¾	1¾	14	1⅛	17½	16¼	13¾	3
14	14¾	2¾	2¼	⅞	1¼	1⅛	2	2	16¼	1⅜	20¼	18¾	16	3½
16	17½	3	3	1	1½	1½	2¾	2¾	—	1½	—	23	—	—
18	19½	3 7/16	3 7/16	1⅛	1½	1 11/16	3	3	—	1 11/16	—	25½	—	—
20	21¾	3 15/16	3 15/16	1¼	2	1 15/16	3½	3½	—	1 15/16	—	28¾	—	—

TABLE 1

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

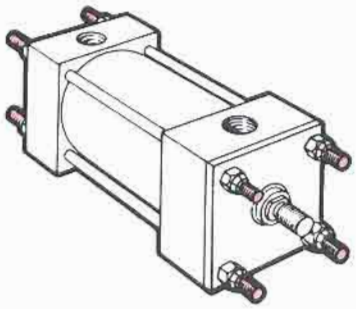
- • Heads bored for these rod sizes are normally in stock — thus faster delivery.
- * For piston rod dimensions see page 32.

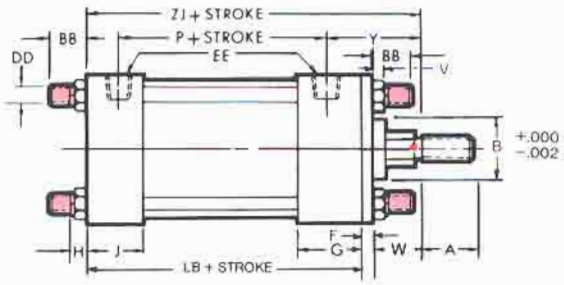
BORE DIA.	*ROD MM	A	P	Y	LB	WF	XG	XI (MIN)	XJ	ZB
8	1⅜ •	1⅝	3¼	2 13/16	5⅛	1⅝	2⅝	4⅞	6	7⅜
	1¾	2		3 1/16		1⅞	2⅞	5⅛	6¼	7⅝
	2	2¼		3 3/16		2	3	5¼	6⅜	7¾
	2½	3		3 7/16		2¼	3¼	5½	6⅝	8
	3	3½								
	3½	3½								
	4	4								
	4½	4½								
	5	5								
	5½	5½								
10	1¾ •	2	4	3 3/16	6⅜	1⅞	3	5⅝	7¼	9
	2	2¼		3 5/16		2	3⅛	5¾	7⅜	9⅛
	2½	3		3 9/16		2¼	3⅜	6	7⅝	9⅜
	3	3½								
	3½	3½								
	4	4								
	4½	4½								
	5	5								
	5½	5½								
12	2	2¼	4½	3 5/16	6⅞	2	3⅛	5¾	7⅞	9⅝
	2½	3		3 9/16		2¼	3⅜	6	8⅛	9⅞
	3	3½								
	3½	3½								
	4	4								
	4½	4½								
	5	5								
	5½	5½								
14	2½	3	5½	3 13/16	8⅛	2¼	3⅝	6	9¼	11¼
	3	3½								
	3½	3½								
	4	4								
	4½	4½								
	5	5								
	5½	5½								
16	2½	3	5⅞	3 15/16	9¼	2¼	3¾	—	10	12½
	3	3½								
	3½	3½								
	4	4								
	4½	4½								
	5	5								
	5½	5½								
18	3½	3½	6	4⅜	10¼	2¼	4	—	10¾	13⅝
	4	4								
	4½	4½								
	5	5								
	5½	5½								
20	4	4	7⅛	4 9/16	11¾	2¼	4¼	—	12	15¼
	4½	4½								
	5	5								
	5½	5½								

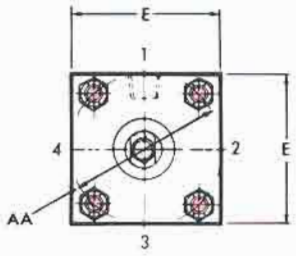
NOPAK TIE-ROD MOUNT CYLINDERS

1½" THROUGH 6" DIA.

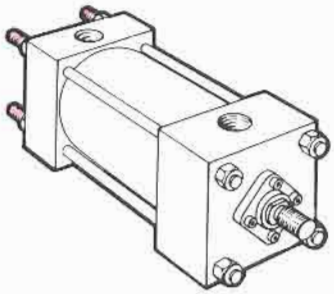
MODEL T (USA STD. MX1)

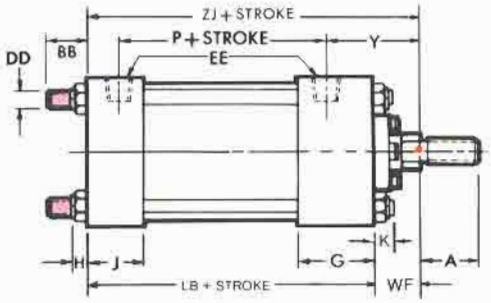






MODEL TB (USA STD. MX2) ▲





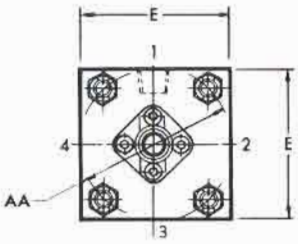


TABLE 2

These dimensions are constant regardless of rod diameter or stroke.

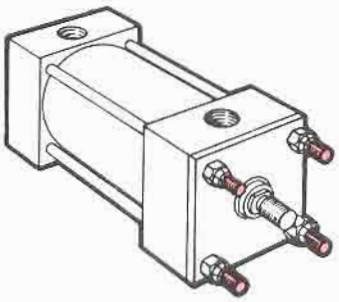
Double rod end models are designated by letter "X" preceding the model identification. See page 28.

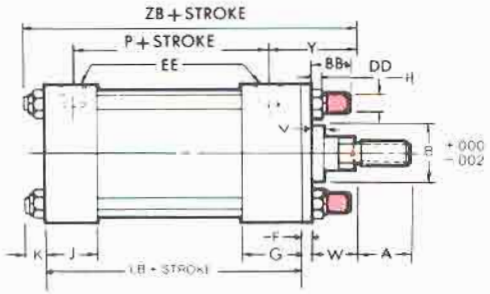
BORE DIA.	E	F	G	H	J	K	AA	BB	DD	EE
1½	2	⅜	1½	7/32	1⅛	¼	2.02	⅞	¼-28	⅜
2	2½	⅜	1½	9/32	1⅛	7/16	2.60	1 3/16	5/16-24	⅜
2½	3	⅜	1½	9/32	1⅛	5/16	3.10	1⅛	5/16-24	⅜
3¼	3¾	⅝	1¾	⅜	1¼	7/16	4.00	1⅜	⅜-24	½
4	4½	⅝	1¾	⅜	1¼	7/16	4.75	1⅜	⅜-24	½
5	5½	⅝	1¾	7/16	1¼	½	5.80	1¾	½-20	½
6	6½	¾	2	½	1½	9/16	6.90	1¾	½-20	¾

▲ See Table A on page 27 for bore and rod combinations using head plates with threaded bronze glands.

MODEL TR (USA STD. MX3)

- Heads bored for these rod sizes are normally in stock — thus faster delivery.
- ■ Model TB only.





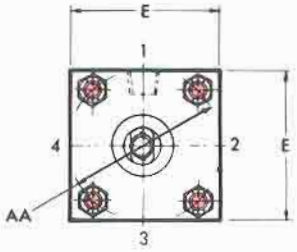


TABLE 1

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

Double rod end models are designated by letter "X" preceding the model identification. See page 28.

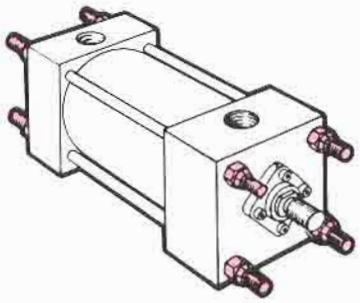
* For piston rod end dimensions see page 32.

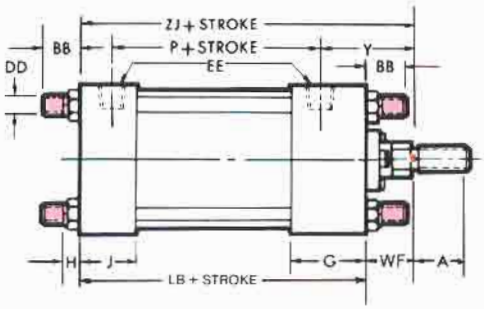
BORE DIA.	*ROD MM	A	B	P	V	W	Y	LB	WF	ZB	ZJ
1½	5/8 •	3/4	1 1/8	2 1/8	1/4	5/8	1 15/16	3 5/8	1	4 7/8	4 5/8
	1 •	1 1/8	1 1/2		1/2	1	2 5/16		1 3/8	5 1/4	5
2	5/8 •	3/4	1 1/8	2 1/8	1/4	5/8	1 15/16	3 5/8	1	5	4 5/8
	1 •	1 1/8	1 1/2		1/2	1	2 5/16		1 3/8	5 3/8	5
	1 3/8	1 5/8	2		5/8	1 1/4	2 9/16		1 5/8	5 11/16	5 1/4
2½	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		1/2	1	2 5/16		1 3/8	5 7/16	5 1/8
	1 3/8	1 5/8	2		5/8	1 1/4	2 9/16		1 5/8	5 11/16	5 3/8
	1 3/4	2	2 3/8		3/4	1 1/2	2 13/16		1 7/8	5 15/16	5 5/8
3¼	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		3/8	1	2 3/4		1 5/8	6 5/16	5 7/8
	1 3/4	2	2 3/8		1/2	1 1/4	3		1 7/8	6 9/16	6 1/8
	2	2 1/4	2 5/8		1/2	1 3/8	3 1/8		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		3/8	1	2 3/4		1 5/8	6 5/16	5 7/8
	1 3/4 •	2	2 3/8		1/2	1 1/4	3		1 7/8	6 9/16	6 1/8
	2	2 1/4	2 5/8		1/2	1 3/8	3 1/8		2	6 11/16	6 1/4
	2 1/2	3	3 1/8		5/8	1 5/8	3 3/8		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		3/8	1	2 3/4		1 5/8	6 5/8	6 1/8
	1 3/4	2	2 3/8		1/2	1 1/4	3		1 7/8	6 7/8	6 3/8
	2	2 1/4	2 5/8		1/2	1 3/8	3 1/8		2	7	6 1/2
	2 1/2	3	3 1/8		5/8	1 5/8	3 3/8		2 1/4	7 1/4	6 3/4
	3	3 1/2	3 3/4		5/8	1 5/8	3 3/8		2 1/4	7 1/4	6 3/4
	3 1/2	3 1/2	4 1/4		5/8	1 5/8	3 3/8		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		3/8	1 1/8	3 1/16		1 7/8	7 7/16	6 7/8
	2 • ■	2 1/4	2 5/8		3/8	1 1/4	3 3/16		2	7 9/16	7
	2 1/2	3	3 1/8		1/2	1 1/2	3 7/16		2 1/4	7 13/16	7 1/4
	3	3 1/2	3 3/4		1/2	1 1/2	3 7/16		2 1/4	7 13/16	7 1/4
	3 1/2	3 1/2	4 1/4		1/2	1 1/2	3 7/16		2 1/4	7 13/16	7 1/4
	4	4	4 3/4		1/2	1 1/2	3 7/16		2 1/4	7 13/16	7 1/4

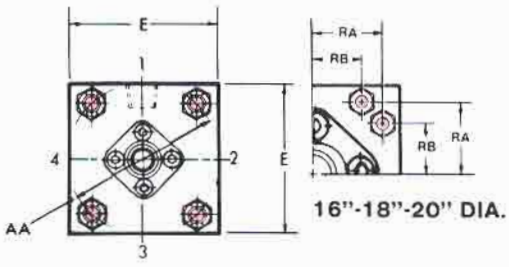
NOPAK TIE-ROD MOUNT CYLINDERS

8" THROUGH 20" DIA.

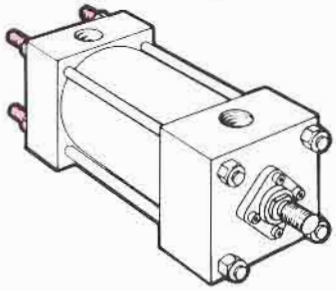
MODEL T (USA STD. MX1)

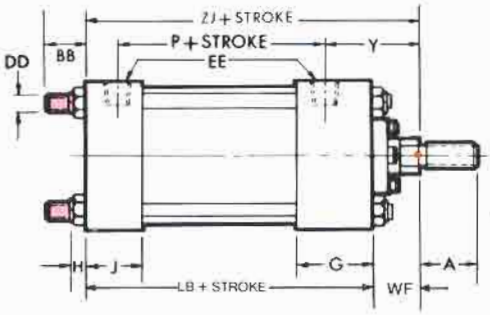


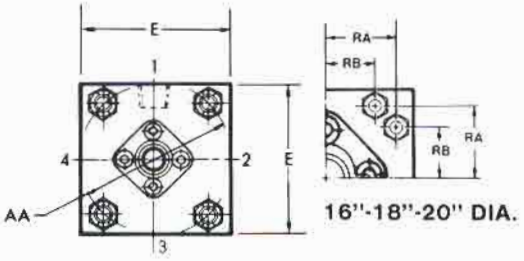




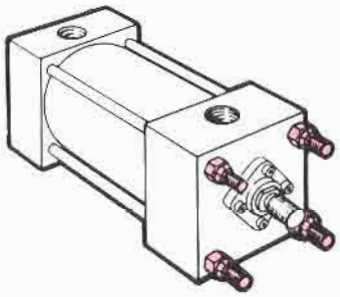
MODEL TB (USA STD. MX2)

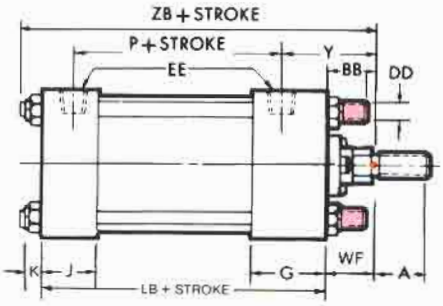






MODEL TR (USA STD. MX3)





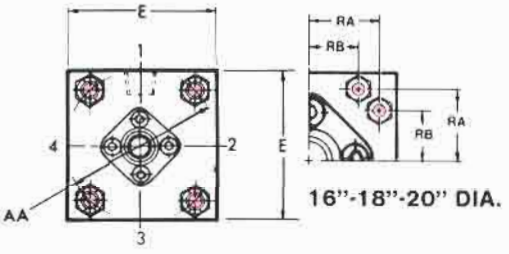


TABLE 2

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 30.

BORE DIA.	E	G	H	J	K	AA	BB	DD	EE	RA	RB
8	8½	2	9/16	1½	5/8	9.10	2¼	5/8-18	¾	—	—
10	10⅝	2¼	5/8	2	¾	11.31	2⅝	¾-16	1	—	—
12	12¾	2¼	5/8	2	¾	13.30	2 11/16	¾-16	1	—	—
14	14¾	2¾	¾	2¼	7/8	15.40	3 3/16	7/8-14	1¼	—	—
16	17½	3	7/8	3	1	18.25	3⅝	1-14	1½	7.48	5.23
18	19½	3 7/16	1	3 7/16	1⅛	20.50	4⅛	1⅛-12	1½	8.40	5.88
20	21¾	3 15/16	1⅛	3 15/16	1¼	22.62	4½	1¼-12	2	9.27	6.49

TABLE 1

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

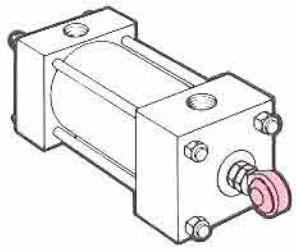
- Heads bored for these rod sizes are normally in stock — thus faster delivery.
- * For piston rod dimensions see page 32.

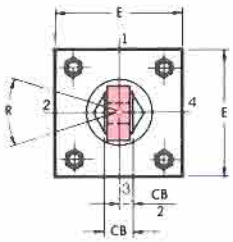
BORE DIA.	*ROD MM	A	P	Y	LB	WF	ZB	ZJ
8	1 3/8 •	1 5/8	3 1/4	2 13/16	5 1/8	1 5/8	7 3/8	6 3/4
	1 3/4	2		3 1/16		1 7/8	7 5/8	7
	2	2 1/4		3 3/16		2	7 3/4	7 1/8
	2 1/2	3		3 7/16		2 1/4	8	7 3/8
	3	3 1/2						
	3 1/2	3 1/2						
	4	4						
	4 1/2	4 1/2						
	5	5						
	5 1/2	5 1/2						
10	1 3/4 •	2	4	3 3/16	6 3/8	1 7/8	9	8 1/4
	2	2 1/4		3 5/16		2	9 1/8	8 3/8
	2 1/2	3		3 9/16		2 1/4	9 3/8	8 5/8
	3	3 1/2						
	3 1/2	3 1/2						
	4	4						
	4 1/2	4 1/2						
	5	5						
	5 1/2	5 1/2						
12	2 •	2 1/4	4 1/2	3 5/16	6 7/8	2	9 5/8	8 7/8
	2 1/2	3		3 9/16		2 1/4	9 7/8	9 1/8
	3	3 1/2						
	3 1/2	3 1/2						
	4	4						
	4 1/2	4 1/2						
	5	5						
	5 1/2	5 1/2						
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						
	3 1/2	3 1/2						
	4	4						
	4 1/2	4 1/2						
	5	5						
	5 1/2	5 1/2						
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						
	3 1/2	3 1/2						
	4	4						
	4 1/2	4 1/2						
	5	5						
	5 1/2	5 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						
	4 1/2	4 1/2						
	5	5						
	5 1/2	5 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						
	5	5						
	5 1/2	5 1/2						

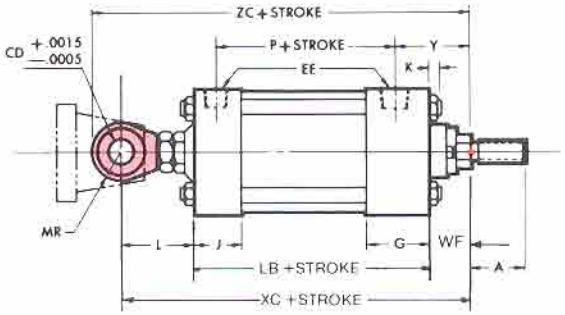
NOPAK SPHERICAL EYE PIN MOUNT CYLINDERS

1½" THROUGH 6" DIA.

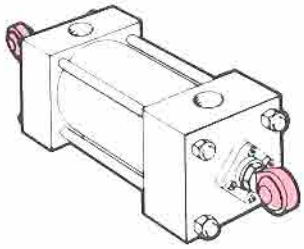
MODEL UE (USA STD. NONE) ▲

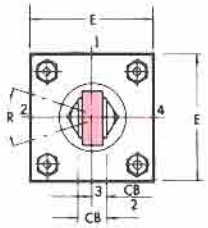






MODEL UUE (USA STD. NONE) ▲





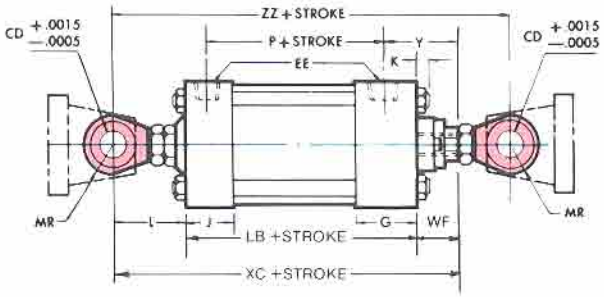


TABLE 2

These dimensions are constant regardless of rod diameter or stroke.

BORE DIA.	E	F	G	K	L	R	CB	CD	EE	MR
1½	2	⅜	1½	¼	1⅞	12°	⅝	½	⅜	11/16
2	2½	⅜	1½	⅜	1⅞	12°	⅝	½	⅜	11/16
2½	3	⅜	1½	5/16	1⅞	12°	⅝	½	⅜	11/16
3¼	3¾	⅝	1¾	7/16	2⅞	13½°	⅞	¾	½	⅞
4	4½	⅝	1¾	7/16	2⅞	13½°	⅞	¾	½	⅞
5	5½	⅝	1¾	½	2⅞	13½°	⅞	¾	½	⅞
6	6½	¾	2	9/16	4⅛	14°	1⅜	1	¾	1⅜

▲ See Table A on page 27 for bore and rod combinations using head plates with threaded bronze glands.

MODEL UE & UUE CYLINDER DIMENSIONAL DATA

TABLE 1

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

- • Heads bored for these rod sizes are normally in stock — thus faster delivery.
- * For piston rod dimensions see page 32.

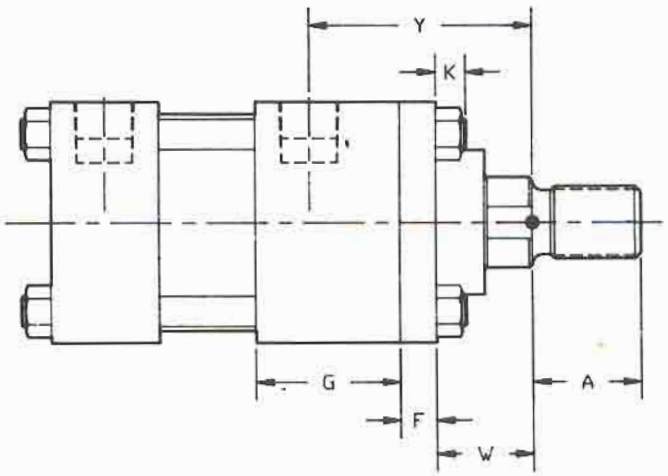
BORE DIA.	* ROD MM	A	P	Y	LB	W	WF	XC	ZC	ZZ
1 1/2	5/8 •	3/4	2 1/8	1 15/16	3 5/8	5/8	1	6 1/2	7 3/16	7 11/16
	1 •	1 1/8		2 5/16		1	1 3/8	6 7/8	7 9/16	8 1/16
2	5/8 •	3/4	2 1/8	1 15/16	3 5/8		1	6 1/2	7 3/16	7 11/16
	1 •	1 1/8		2 5/16		1	1 3/8	6 7/8	7 9/16	8 1/16
	1 3/8	1 5/8		2 9/16		1 1/4	1 5/8	7 1/8	7 13/16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

Bolt-on glands not available on these combinations.

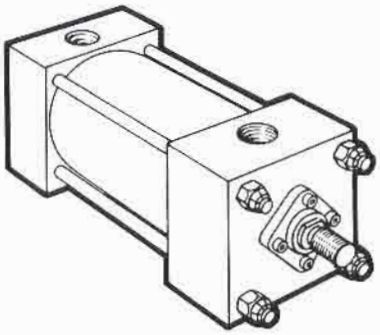
Note: Threaded Bronze Gland used on all Model D Cylinders. Bolt-on Gland used on all Model DG Cylinders.

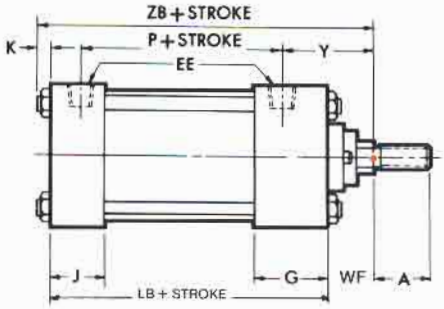


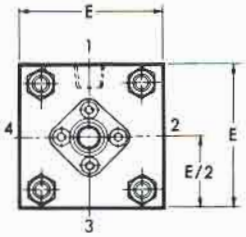
NOPAK BASIC MODEL NO MOUNT CYLINDERS

1½" THROUGH 6" DIA.

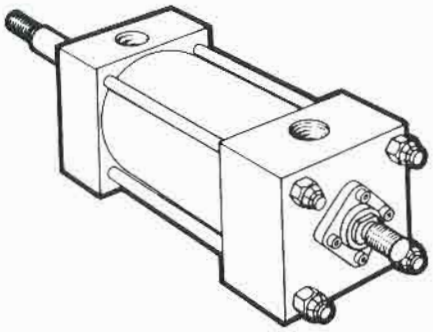
MODEL H (USA STD. NONE)▲

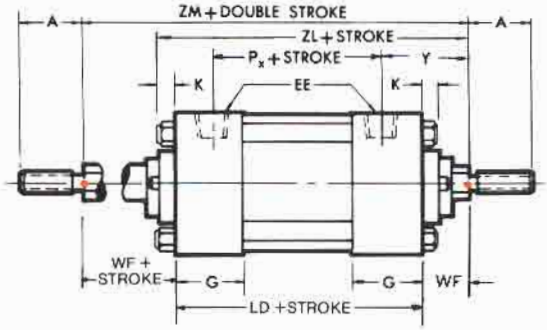






MODEL XH (USA STD. NONE)▲





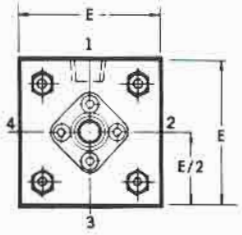


TABLE 2

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
1½	2	1½	1⅛	¼	⅜
2	2½	1½	1⅛	⅜	⅜
2½	3	1½	1⅛	5/16	⅜
3¼	3¾	1¾	1¼	7/16	½
4	4½	1¾	1¼	7/16	½
5	5½	1¾	1¼	½	½
6	6½	2	1½	9/16	¾

H & XH CYLINDER DIMENSIONAL DATA

TABLE 1

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

- Heads bored for these rod sizes are normally in stock — thus faster delivery, Model H only.
- * For piston rod dimensions see page 32.

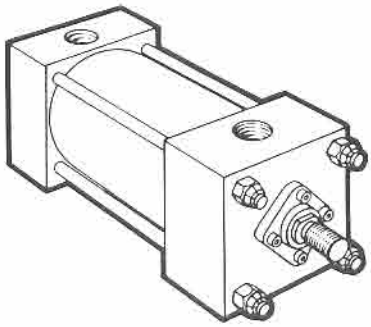
BORE DIA.	*ROD MM	A	P	P_X	Y	LB	LD	WF	ZB	ZL	ZM
1½	5/8 •	¾	2⅛	2¼	1 15/16	3⅝	4⅛	1	4⅞	5⅜	6⅛
	1 •	1⅛			2 5/16			1⅜	5¼	5¾	6⅞
2	5/8 •	¾	2⅛	2¼	1 15/16	3⅝	4⅛	1	5	5½	6⅛
	1 •	1⅛			2 5/16			1⅜	5⅜	5⅞	6⅞
	1⅜	1⅝			2 9/16			1⅝	5 11/16	6⅛	7⅜
2½	5/8 •	¾	2¼	2⅜	1 15/16	3¾	4¼	1	5 1/16	5 9/16	6¼
	1 •	1⅛			2 5/16			1⅜	5 7/16	5 15/16	7
	1⅜	1⅝			2 9/16			1⅝	5 11/16	6 3/16	7½
	1¾	2			2 13/16			1⅞	5 15/16	6 7/16	8
3¼	1 •	1⅛	2½		2½	4¼	4¾	1⅜	6 1/16	6 9/16	7½
	1⅜ •	1⅝			2¾			1⅝	6 5/16	6 13/16	8
	1¾ •	2			3			1⅞	6 9/16	7 1/16	8½
	2	2¼			3⅛			2	6 11/16	7 3/16	8¾
4	1 •	1⅛	2½		2½	4¼	4¾	1⅜	6 1/16	6 9/16	7½
	1⅜ •	1⅝			2¾			1⅝	6 5/16	6 13/16	8
	1¾ •	2			3			1⅞	6 9/16	7 1/16	8½
	2	2¼			3⅛			2	6 11/16	7 3/16	8¾
	2½	3			3⅜			2¼	6 15/16	7 7/16	9¼
5	1 •	1⅛	2¾		2½	4½	5	1⅜	6⅜	6⅞	7¾
	1⅜ •	1⅝			2¾			1⅝	6⅝	7⅛	8¼
	1¾	2			3			1⅞	6⅞	7⅜	8¾
	2	2¼			3⅛			2	7	7½	9
	2½	3			3⅜			2¼	7¼	7¾	9½
	3	3½			3⅜			2¼	7¼	7¾	9½
	3½	3½			3⅜			2¼	7¼	7¾	9½
6	1⅜ •	1⅝	3⅛		2 13/16	5	5½	1⅝	7 3/16	7 11/16	8¾
	1¾ •	2			3 1/16			1⅞	7 7/16	7 15/16	9¼
	2 •	2¼			3 3/16			2	7 9/16	8 1/16	9½
	2½	3			3 7/16			2¼	7 13/16	8 5/16	10
	3	3½			3 7/16			2¼	7 13/16	8 5/16	10
	3½	3½			3 7/16			2¼	7 13/16	8 5/16	10
	4	4			3 7/16			2¼	7 13/16	9 5/16	10

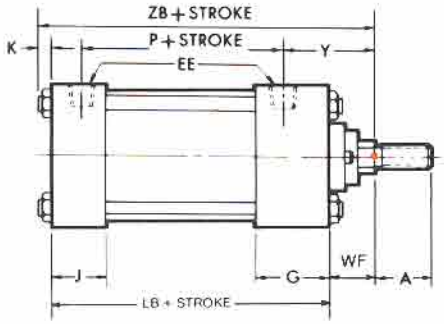
▲ See Table A on page 27 for bore and rod combinations using head plates with threaded bronze glands.

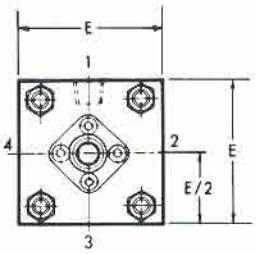
NOPAK BASIC MODEL NO MOUNT CYLINDER

8" THROUGH 20" DIA.

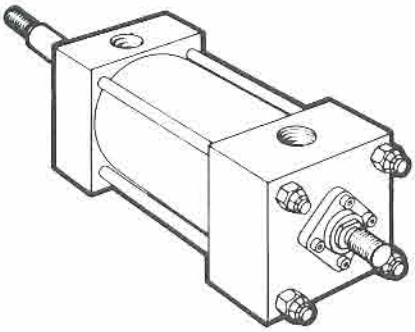
MODEL H (USA STD. NONE)

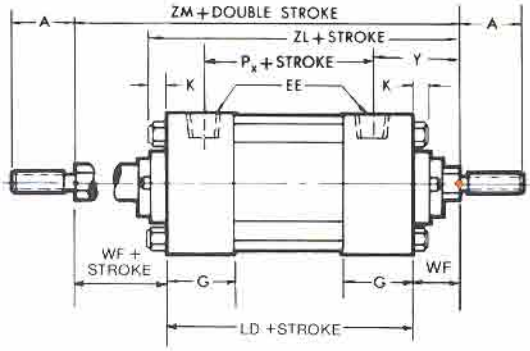






MODEL XH (USA STD. NONE)





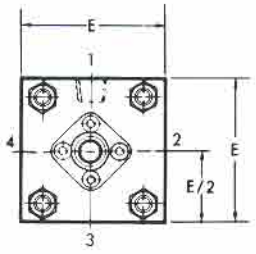


TABLE 2

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	8½	2	1½	5/8	3/4
10	10⅝	2¼	2	3/4	1
12	12¾	2¼	2	3/4	1
14	14¾	2¾	2¼	7/8	1¼
16	17½	3	3	1	1¼
18	19½	3 7/16	3 7/16	1⅛	1½
20	21¾	3 15/16	3 15/16	1¼	2

TABLE 1

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

- Heads bored for these rod sizes are normally in stock — thus faster delivery, Model H only.
- * For piston rod dimensions see page 32.

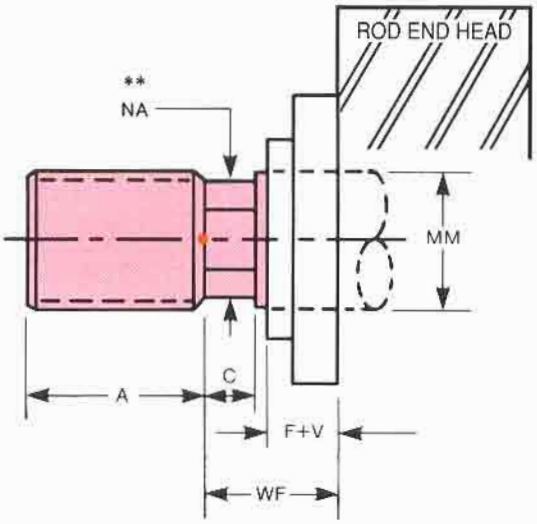
BORE DIA.	*ROD MM	A	P	Y	LB	LD	WF	ZB	ZL	ZM
8	1⅜ •	1⅝	3¼	2 13/16	5⅛	5⅝	1⅝	7⅜	7⅞	8⅞
	1¾	2		3 1/16			1⅞	7⅝	8⅛	9⅜
	2	2¼		3 3/16			2	7¾	8¼	9⅝
	2½	3		3 7/16			2¼	8	8½	10⅛
	3	3½								
	3½	3½								
	4	4								
	4½	4½								
	5	5								
	5½	5½								
10	1¾ •	2	4	3 3/16	6⅜	6⅝	1⅞	9	9¼	10⅜
	2	2¼		3 5/16			2	9⅛	9⅜	10⅝
	2½	3		3 9/16			2¼	9⅜	9⅝	11⅛
	3	3½								
	3½	3½								
	4	4								
	4½	4½								
	5	5								
	5½	5½								
12	2 •	2¼	4½	3 5/16	6⅞	7⅛	2	9⅝	9⅞	11⅛
	2½	3		3 9/16			2¼	9⅞	10⅛	11⅝
	3	3½								
	3½	3½								
	4	4								
	4½	4½								
	5	5								
	5½	5½								
14	2½	3	5½	3 13/16	8⅛	8⅝	2¼	11¼	11¾	13⅛
	3	3½								
	3½	3½								
	4	4								
	4½	4½								
	5	5								
	5½	5½								
16	2½	3	5⅞	3 15/16	9¼	9¼	2¼	12½	12½	13¾
	3	3½								
	3½	3½								
	4	4								
	4½	4½								
	5	5								
	5½	5½								
18	3½	3½	6	4⅜	10¼	10¼	2¼	13⅝	13⅝	14¾
	4	4								
	4½	4½								
	5	5								
	5½	5½								
20	4	4	7⅛	4 9/16	11¾	11¾	2¼	15¼	15¼	16¼
	4½	4½								
	5	5								
	5½	5½								

NOPAK CLASS 6 CYLINDERS PISTON ROD END DIMENSIONAL DATA

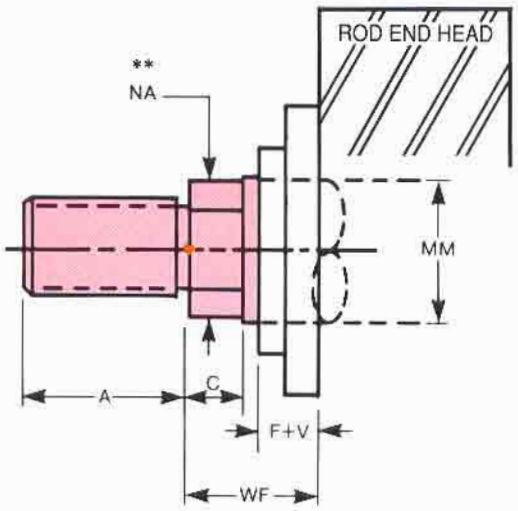
NOTE: Standard (smallest) diameter rods in each bore size with standard (#4) thread are **STOCKED** in even-inch stroke increments 1" through 20". Cushioned and non-cushioned.

This translates to MUCH QUICKER delivery.

ROD TYPE NO. 1

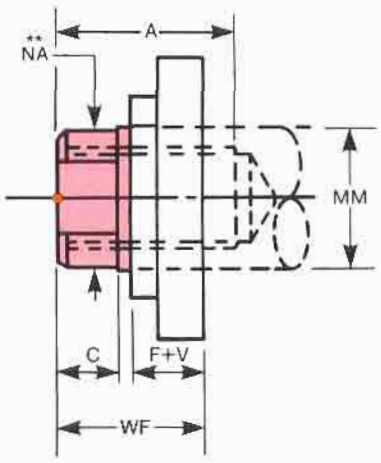


ROD END TYPE NO. 3 *NO. 4



***TYPE NO. 4 THREAD IS SIZED FOR ROD CLEVIS AND EYE**

ROD END TYPE NO. 5



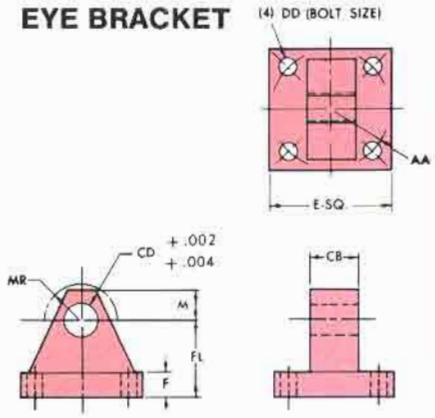
*Type 4 thread sized for clevis & rod eye accessories
**Dimension NA is .060 under MM dia. dimension
† Dimension D is size across wrench flats

DIA. ROD MM	ROD END TYPE NO. 1	NO. 3	NO. 4*	NO. 5	A	C	D †	F + V	WF
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

NOTE: Rod Threads are Class UNF-2A or 2B unless specifically quoted otherwise. For Plain Rod End (no threads, no wrench flats, etc.), consult factory for ordering information.

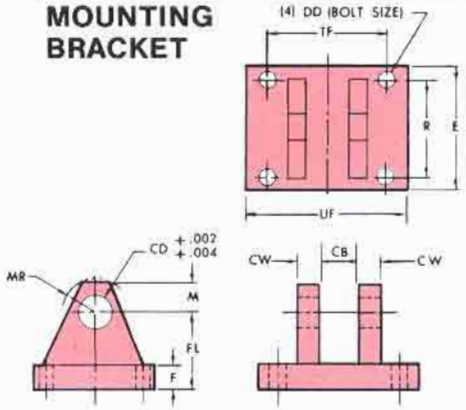
CYLINDER ACCESSORIES

EYE BRACKET



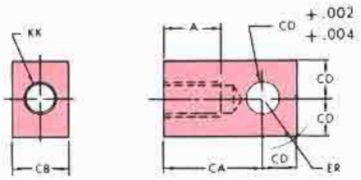
CYL. DIA.	E	F	M	AA	CB	CD	DD	FL	MR	(FORMER) PART NO.	(PRESENT) PART NO.
1½-2-2½	2½	⅜	½	2.30	¾	½	⅜	1⅛	⅝	A-12008CY	2716 L47
3¼-4-5	3½	⅝	¾	3.61	1¼	¾	½	1⅞	⅞	A-26139CY	2719 L32
6-8	4½	⅞	1	4.60	1½	1	⅝	2⅜	1¼	A-26140CY	2720 L33
10	5	⅞	1⅜	5.40	2	1⅜	⅝	3	1⅝	A-26141CY	2721 L34
12	6½	1⅛	1¾	7.00	2½	1¾	⅞	3⅜	2	A-26142CY	2722 L35
14-16	7½	1 7/16	2	8.10	2½	2	1	3 15/16	2⅜	A-26143CY	2723 L36
18	8½	1⅝	2½	9.30	3	2½	1⅛	4⅝	3	A-26144CY	2724 L37
20	9½	2	2¾	10.61	3	3	1¼	5¼	3¼	A-26145CY	2725 L38

MOUNTING BRACKET

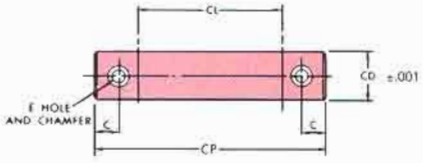


CYL. DIA.	E	F	M	R	CB	CD	CW	DD	FL	MR	TF	UF	(FORMER) PART NO.	(PRESENT) PART NO.
1½-2-2½	2½	⅜	½	1.63	¾	½	½	⅜	1⅛	⅝	2¾	3½	A-8496CY	2683 L47
3¼-4-5	3½	⅝	¾	2.55	1¼	¾	⅝	½	1⅞	⅞	3¾	4¾	A-8497CY	2684 L47
6-8	4½	⅞	1	3.25	1½	1	¾	⅝	2⅜	1¼	4½	5¾	A-26157CY	2685 L47
10	5	⅞	1⅜	3.82	2	1⅜	1	⅝	3	1⅝	5½	6¾	A-8499CY	2686 L47
12	6½	1⅛	1¾	4.95	2½	1¾	1¼	⅞	3⅜	2	7	8½	A-26158CY	2687 L47
14-16	7½	1 7/16	2	5.73	2½	2	1¼	1	3 15/16	2⅜	7½	9¼	A-26159CY	2688 L47
18	8½	1⅝	2½	6.58	3	2½	1½	1⅛	4⅝	3	8½	10½	A-26160CY	2689 L47
20	9½	2	2¾	7.50	3	3	1½	1¼	5¼	3¼	8¾	10¾	A-26161CY	2690 L47

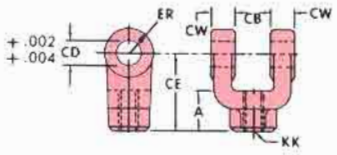
EYE (FEMALE)



PIVOT—PIN

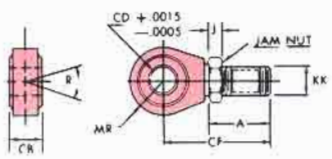


CLEVIS (FEMALE)



KK	A	CA	CB	CD	ER	(FORMER) PART NO.	(PRESENT) PART NO.	CYL. DIA.	C	E	CD	CP	CL	(FORMER) PART NO.	(PRESENT) PART NO.	KK	A	CB	CD	CE	CW	ER	(FORMER) PART NO.	(PRESENT) PART NO.
7/16-20	¾	1½	¾	½	⅝	A-7060CY	1810 L59	1½-2-2½	3/16	⅛	½	2⅜	1¾	A-7110CY-1	3222 L47-1	7/16-20	¾	¾	½	1½	½	½	A-15078CY	2834 L59
¾-16	1⅛	2 1/16	1¼	¾	1 1/16	A-7061CY	1812 L59	3¼-4-5	¼	3/16	¾	3⅛	2½	A-7110CY-2	3222 L47-2	¾-16	1⅛	1¼	¾	2⅜	⅝	¾	A-15079CY	2835 L59
1-14	1⅝	2 13/16	1½	1	1 7/16	A-7062CY	1813 L59	6-8	¼	3/16	1	3⅝	3	A-7110CY-3	3222 L47-3	1-14	1⅝	1½	1	3⅛	¾	1	A-15080CY	2836 L59
1¼-12	2	3 7/16	2	1⅜	2	A-7063CY	1814 L59	10	¼	3/16	1⅜	4¾	4	A-7110CY-4	3222 L47-4	1¼-12	2	2	1⅜	4⅛	1	1⅜	A-15081CY	2837 L59
1½-12	2¼	4	2½	1¾	2 1/16	A-7064CY	1815 L59	12	¼	3/16	1¾	5 13/16	5	A-7110CY-5	3222 L47-5	1½-12	2¼	2½	1¾	4½	1¼	1¾	A-15082CY	2838 L59
1⅞-12	3½	5	2½	2	2¼	A-7065CY	1817 L59	14	5/16	¼	2	5 13/16	5	A-7110CY-6	3222 L47-6	1⅞-12	3	2½	2	5½	1¼	2	A-15083CY	2839 L59
2¼-12	3½	5 13/16	3	2½	2⅞	A-17196CY	1820 L59	16	5/16	¼	2½	6⅞	6	A-7110CY-8	3222 L47-8	2¼-12	3½	3	2½	6½	1½	2½	A-17197CY	2840 L59
2½-12	3½	6⅛	3	3	3⅛	A-7066CY	1821 L59	18-20	5/16	¼	3	6⅞	6	A-7110CY-7	3222 L47-7	2½-12	3½	3	3	6¾	1½	2¾	A-15084CY	2841 L59
3¼-12	4½	7⅜	4	3½	3⅞	A-20453CY	1824 L59	ROD EYE & CLEVIS	⅜	¼	3½	9¼	8	A-7110CY-9	3222 L47-9	3¼-12	4½	4	3½	8½	2	3½	A-19947CY	2842 L59

SPHERICAL ROD EYE



CYL. DIA.	A	J	R	CB	CD	CF	KK	MR	THRUST RATING (PROX.)	PART NO.	
1½-2-2½	1½	¼	12°	⅝	½	2 7/16	7/16-20	11/16	5,500#	2825 L48-1	
1½-2-2½	15/16	⅛	12°	⅝	½	1⅞	7/16-20	11/16	5,500#	2825 L48-2	BLIND END ONLY
3¼-4-5	1¾	7/16	13½°	⅞	¾	2⅛	¾-16	⅞	10,000#	2825 L48-3	
6-8	2⅛	9/16	14°	1⅜	1	4⅛	1-14	1 7/16	12,000#	2825 L48-4	
8*	2⅛	9/16	14°	1⅜	1	4⅛	1-14	1 7/16	19,000#	2825 L48-5	

* For 8" Cyl. Diameter — Hydraulics Only

NOPAK CLASS 6 ENGINEERING INFORMATION

NOPAK Class 6 bore-rated cylinders are identified as P-6 for air and H-6 for hydraulic service. Please refer to basic pressure ratings, see table page 2. Cylinders 1½" through 10" 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 P-6 air and H-6 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	C
—20°F to+250°F Std. Hyd. Oil Air Water (not steam) Water Glycol Fire Resistant Fluid	−20°F to +375°F Std. Hyd. Oil Air Phosphate Ester Fire Resistant Fluid	to +350°F Steam

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 N.F.P.A. recommended standards.

P6 (pneumatic) cylinders with Integral Limit Switch(es), see Catalog NEPF.

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 up 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 by-pass 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 P-6 AIR AND H-6 HYD. CYL.

Cylinder Diameter	No. of Tie Rods	Tie Rod Size	P-6 Cylinder Torque Ft. Lbs.	H-6 Cylinder Torque Ft. Lbs.
1½	4	¼	3	7
2	4	5/16	7	14
2½	4	5/16	7	14
3¼	4	⅜	15	30
4	4	⅜	15	30
5	4	½	30	60
6	4	½	30	60
8	4	⅝	60	150
10	4	¾	100	260
12	4	¾	100	260
14	4	⅞	170	400
16	8	1	260	600
18	8	1⅛	300	850
20	8	1¼	450	1000

TABLE B — VOLUME OF OIL PER 12" OF STROKE

Cyl. 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
1½	1.767	.0918	1.460	.0758	.982	.0510
2	3.142	.1632	2.835	.1473	1.656	.0852
2½	4.909	.2550	4.602	.2390	2.503	.1301
3¼	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 chart 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

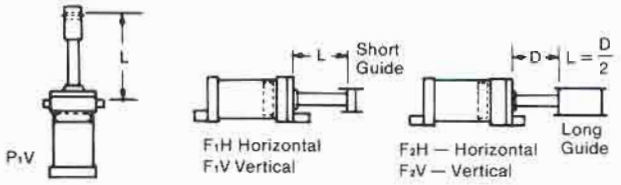
BORE	ROD	THEORETICAL FORCE @ FLUID PRESSURE									
		100	250	300	500	800	1000	1200	1500	2250	2500
1½	PUSH	176.7	441.8	530.1	883.5	1414	1767	2120	2650	3976	4418
	PULL — ⅝ ROD	146.0	365.0	438.0	730.0	1168	1460	1752	2190	3285	3650
	PULL — 1 ROD	98.0	245	294	490	783	980	1175	1470	2200	2450
2	PUSH	314.2	785.5	942.6	1571	2514	3142	3770	4713	7070	7855
	PULL — ⅝ ROD	283.5	708.7	850.5	1417	2268	2835	3402	4252	6379	7087
	PULL — 1⅜ ROD	165.6	414	496.8	828	1324.8	1656	1987.2	2484	3726	4140
2½	PUSH	490.9	1227	1473	2454	3927	4909	5891	7364	—	—
	PULL — ⅝ ROD	460.2	1150	1381	2301	3682	4602	5522	6903	—	—
	PULL — 1¾ ROD	250.3	625.8	751	1251	2002	2503	3004	3755	—	—
3¼	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 — 2½ 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 — 3½ ROD	1001	2503	3004	5006	8011	10013	12016	—	—	—
6	PUSH	2827	7078	8482	14137	22619	28274	33928	—	—	—
	PULL — 1⅜ 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 — 1⅜ ROD	4878	12195	14634	24390	39025	48781	—	—	—	—
	PULL — 5½ ROD	2650	6626	7952	13253	21205	26507	—	—	—	—
10	PUSH	7854	19635	23562	39270	62832	—	—	—	—	—
	PULL — 1¾ ROD	7614	19034	22840	38068	60908	—	—	—	—	—
	PULL — 5½ ROD	5478	13695	16434	27390	43825	—	—	—	—	—
12	PUSH	11130	28275	33930	56550	90480	—	—	—	—	—
	PULL — 2 ROD	10995	27486	32985	54975	87948	—	—	—	—	—
	PULL — 5½ ROD	8933	22334	26801	44670	71471	—	—	—	—	—
14	PUSH	15394	38485	46182	76970	123152	—	—	—	—	—
	PULL — 2½ ROD	14900	37250	44700	74500	119232	—	—	—	—	—
	PULL — 5½ ROD	13018	32545	39054	65090	104152	—	—	—	—	—
16	PUSH	20106	50265	60318	100530	—	—	—	—	—	—
	PULL — 2½ ROD	19616	49040	58480	98080	—	—	—	—	—	—
	PULL — 5½ ROD	17730	44325	53190	88650	—	—	—	—	—	—
18	PUSH	25447	63617	76341	127235	—	—	—	—	—	—
	PULL — 3½ ROD	24485	61213	73445	122425	—	—	—	—	—	—
	PULL — 5½ ROD	23072	57680	69216	115360	—	—	—	—	—	—
20	PUSH	31416	78640	94248	157080	—	—	—	—	—	—
	PULL — 4 ROD	30160	75400	90480	150800	—	—	—	—	—	—
	PULL — 5½ ROD	29041	72603	87123	145205	—	—	—	—	—	—

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

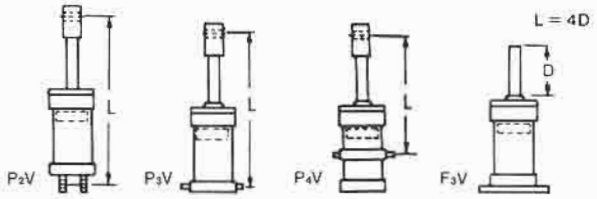
ENGINEERING DATA

INFORMATION TO PREVENT EXCESSIVE BEARING WEAR AND PISTON ROD COLUMN FAILURES

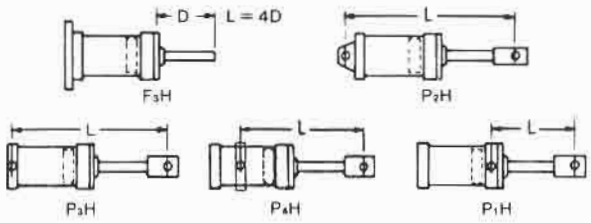
GROUP A — With piston rods extended.



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 log 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:

a. Using above drawings, determine value of "L" from stroke length, rod and cylinder dimensions.
b. Refer to Table 1 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 P_2V 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 F_3H, P_2H, P_3H, or P_4H, 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 extend than unnecessarily large oversize rods.

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

a. Determine your push stroke thrust from table on page 35.
b. Find your push stroke thrust "T" in Table 2. If exact thrust isn't shown, use next larger shown.
c. In the horizontal column in line with your thrust, find value of "L" determined in Step 1.
d. 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 1

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

***NOTE:** USING STOP TUBE LENGTHS GREATER THAN "MAXIMUM STOP TUBE" HAS DIMINISHING EFFECT ON REDUCING BEARING LOADS.

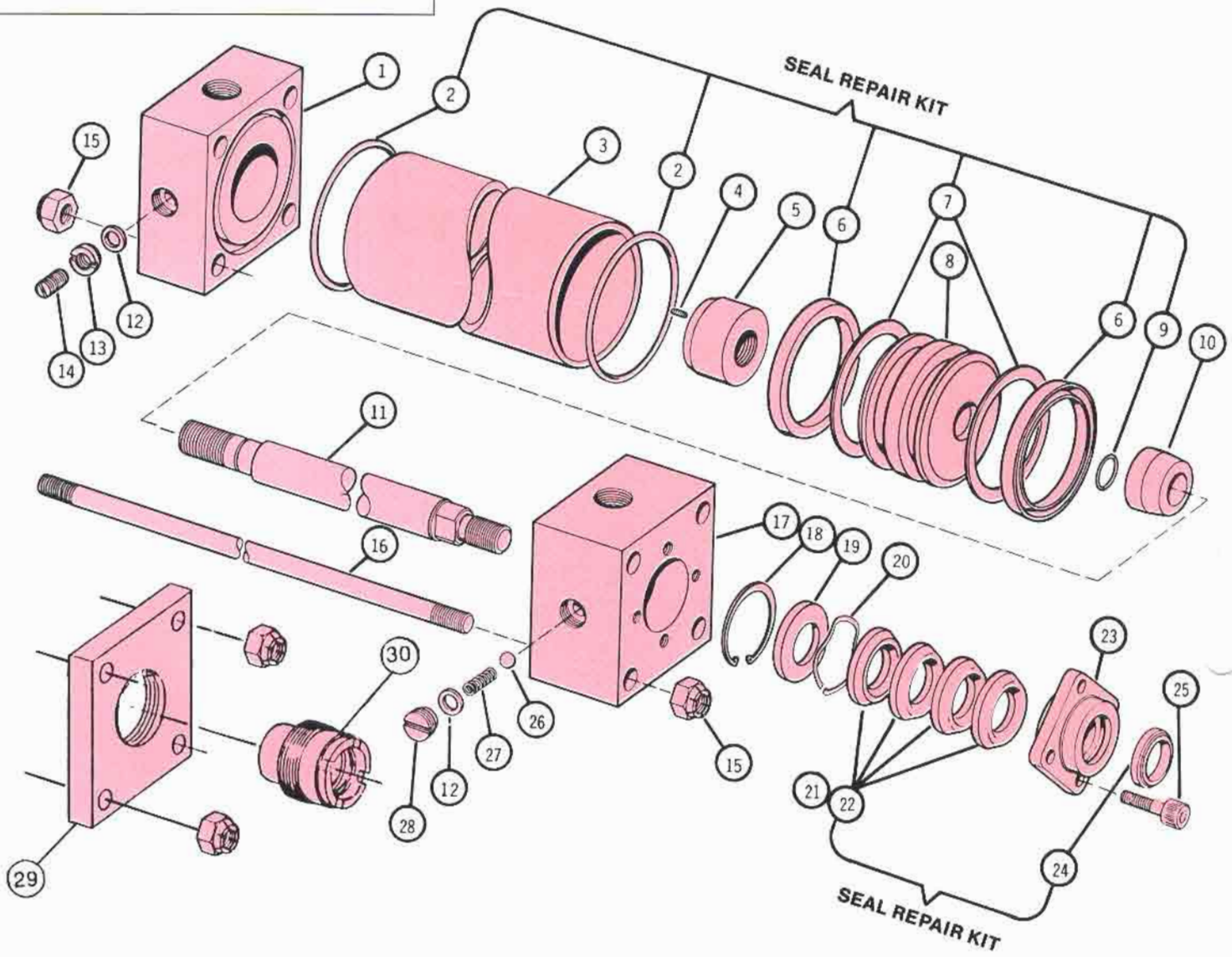
TABLE 2
VALUE OF "L" IN INCHES

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 ÷ ¼ diameter of piston rod) of less than 50. Thus, the compressive strength formula (s = thrust ÷ rod area) is used rather than the column strength formula on which Table 2 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 4 to 1.

IMPROVED CUSHION ADJUSTMENT —
Newly designed needle valve is interchangeable with current design and offers improved sealing characteristics.

REPLACEMENT PARTS



1. Blind end head
2. Tube seal★
3. Tube
4. Lock screw
5. Lock sleeve ▲
6. U-cup★
7. Back-up ring★
8. Piston
9. Piston O-ring★
10. Cushion sleeve – rod end
11. Piston rod
12. Seal
13. Cushion adjusting screw gland
14. Cushion adjusting screw
15. Tie rod nut
16. Tie rod
17. Rod end head
18. Snap ring
19. Packing spacer
20. Wave spring★
21. Bottom adapter ring★☆
22. Rod packing★
23. Packing gland
24. Rod wiper★
25. Packing gland cap screw
26. Check ball
27. Ball check spring
28. Ball check plug

IF APPLICABLE:
29. Head Plate
30. Screw Gland

★ Items are included in seal repair kits. See page 5 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 our authorized distributor.

REPLACEMENT PARTS

REPAIR KITS

CLASS P6
CLASS 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

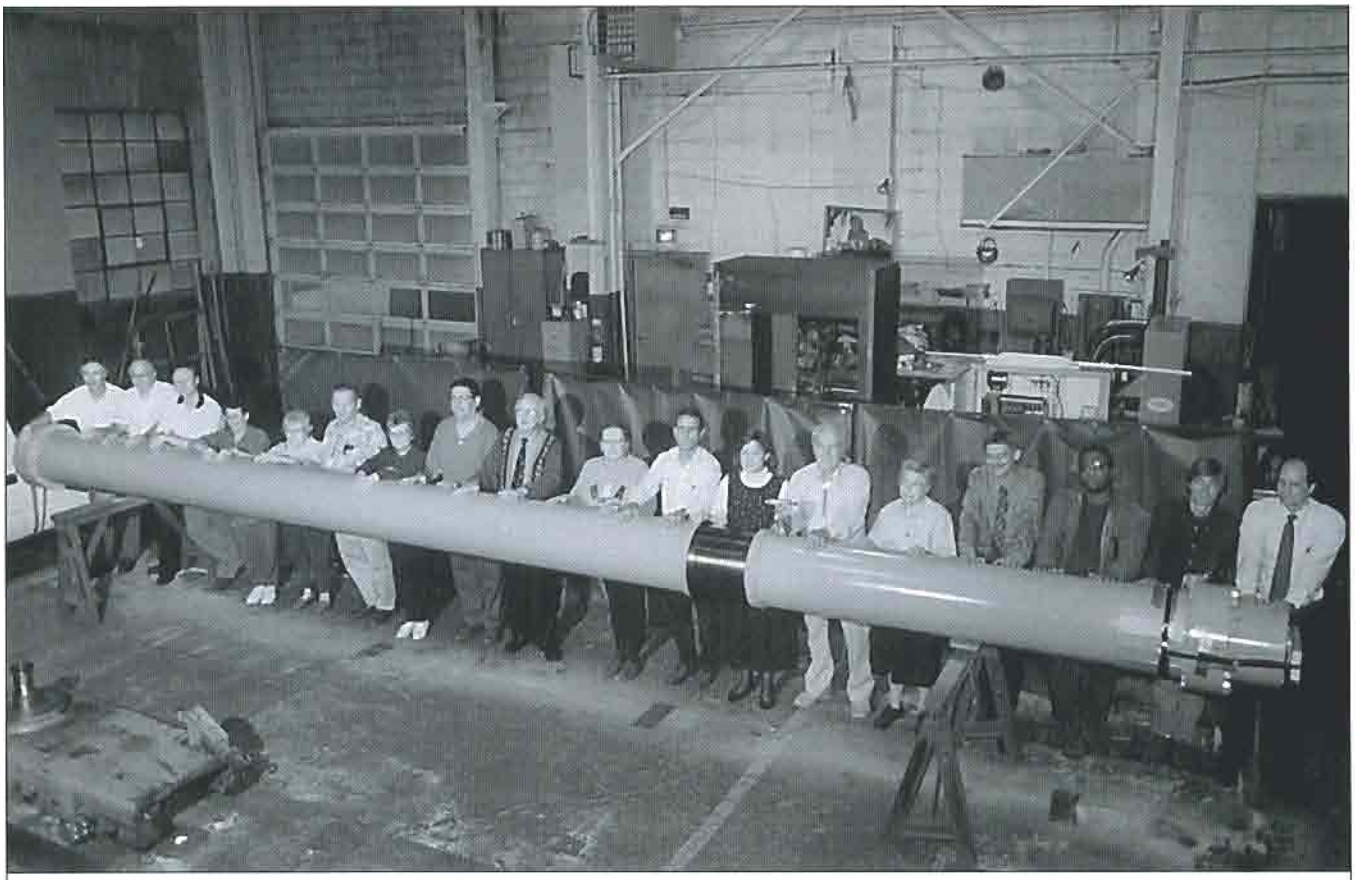
• **When ordering, specify Type "A" or Type "B" seals.**
Type "A" = Buna-N (NITRILE)
Type "B" = Viton

PACKING GLANDS

CLASS P6 and H6

ROD DIA.	ALL MODELS EXCEPT D & DD ②	MODELS D & DD ONLY
	PART NUMBER	PART NUMBER
0.63" ①	1069G70	1071G70
1.00" ①	1068G73	2859G73
1.38" ①	1066G75	2858G75
1.75" ①	1067G77	2857G77
2.00" ①	1065G78	2856G78
2.50" ①	1064G79	2855G79
3.00"	1063G81	2854G81
3.50" ①	1062G82	2853G82
4.00" ①	1061G83	2852G83
4.50"	1060G84	2851G84
5.00"	1070G85	2850G85
5.50"	1059G86	C/F

① Use pkg. gland 1071G70 for 1.50" cyl. w/ 0.63" Ø rod.
Use pkg. gland 2859G73 for 1.50" & 2.00" cyls. w/ 1.00" Ø rod.
Use pkg. gland 2858G75 for 2.00" cyl. w/ 1.38" Ø rod.
Use pkg. gland 2857G77 for 2.50" cyl. w/ 1.75" Ø rod.
Use pkg. gland 2856G78 for 3.25" cyl. w/ 2.00" Ø rod.
Use pkg. gland 2855G79 for 4.00" cyl. w/ 2.50" Ø rod.
Use pkg. gland 2853G82 for 5.00" cyl. w/ 3.50" Ø rod.
Use pkg. gland 2852G83 for 6.00" cyl. w/ 4.00" Ø rod.
② For Models AL, T, and TR, consult factory.



Above: 14" bore x 300" stroke cylinder with hollow piston rod and mid trunnion mount. Designed and manufactured by Galland Henning Nopak in 1999. Now in service in dredge duty in one of the world's largest canals. Request Catalog HCM for information.

WARRANTY

GALLAND HENNING NOPAK, INC. warrants every product of its manufacture to be of proper materials and first class workmanship. We agree to repair or replace, F.O.B. Factory, but not to remove or install in the field, any perishable "soft goods" such as seals, gaskets, etc., which fail within a six-month period after shipment, normal wear excepted. We warrant for one year from date of shipment, all other parts which fail because of defective materials or workmanship. GHN assumes no responsibility for work done or expenses incurred, in the field, pertaining to such repairs or replacements, except upon written authority from our home office. Components not produced by GHN are subject only to the warranty extended to GHN by their respective manufacturer. For a complete statement of terms and warranty, see your NOPAK distributor or the reverse side of any GHN invoice.

When orders have been correctly filled, there shall be no returns without GHN's approval. Such returns will be subject to a restocking charge.

PREFERRED NOPAK DISTRIBUTOR

NATIONAL
FLUID POWER
ASSOCIATION
MEMBER

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