

HP 3000 SERIES

HEAVY DUTY HYDRAULIC CYLINDERS



Bore size: 1 1/2" - 14"
3,000 PSI (20.5 MPA)
N.F.P.A. Interchangeable



CONTROLE

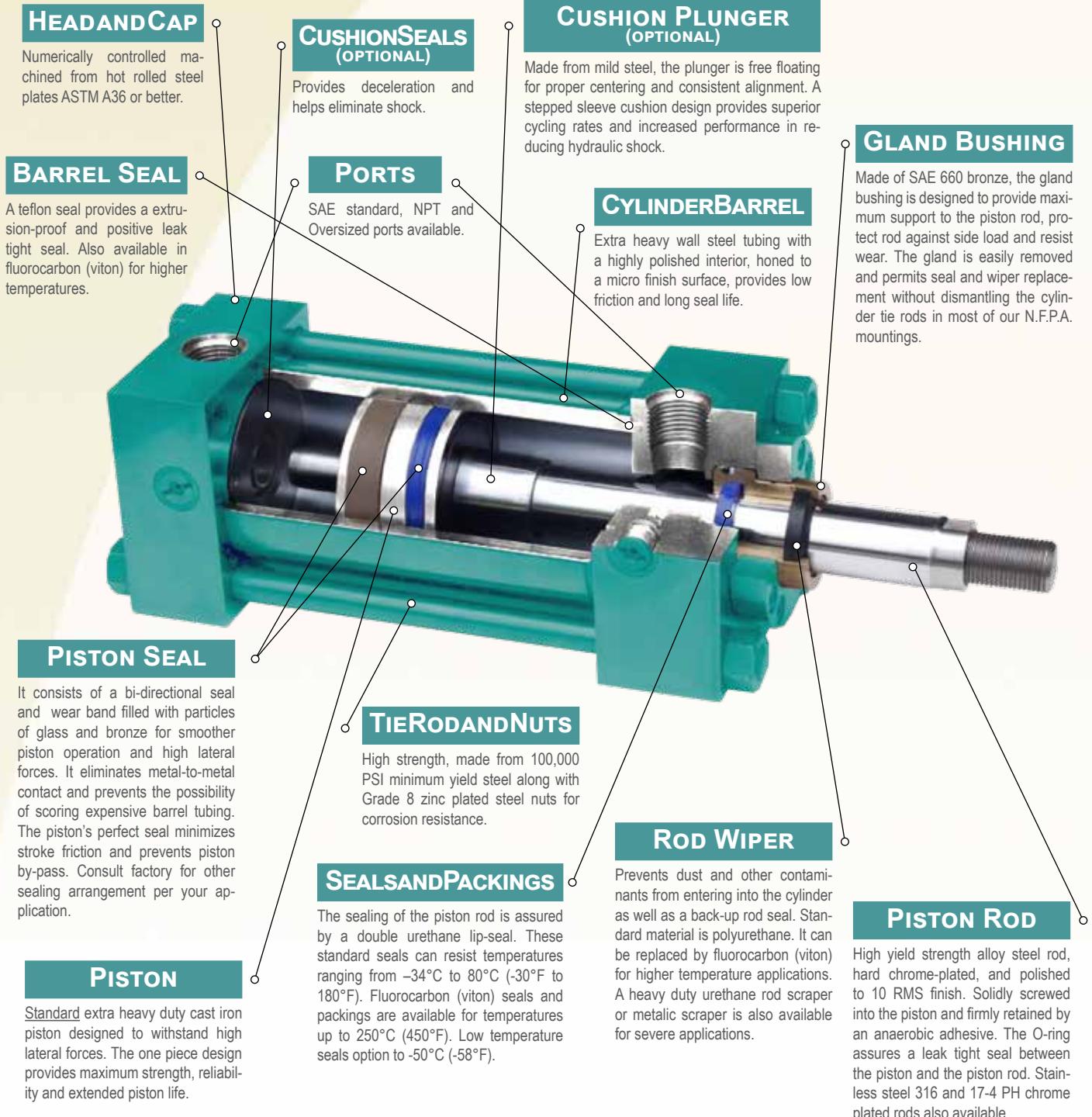
HP 3000 SERIES

HEAVY DUTY HYDRAULIC CYLINDERS

CONSTRUCTION

The HP 3000 series hydraulic cylinders are designed to operate in the most demanding conditions at nominal pressures of 3,000 psi. The cylinders are available in bore sizes ranging from 1 1/2" to 14" in 18 different N.F.P.A. mountings. They are perfectly interchangeable with any other cylinders in the same product category. Consult factory for larger bores.

The materials used to manufacture RDC Contrôle Ltée cylinders are selected from the best quality available. The HP 3000 series components are manufactured with the latest sophisticated precision equipment. Each cylinder is assembled and individually tested under strict quality conditions.



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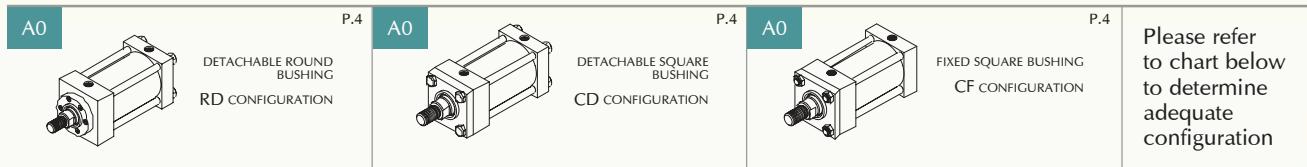
**HEAVY DUTY
HYDRAULIC CYLINDERS**

FEATURES

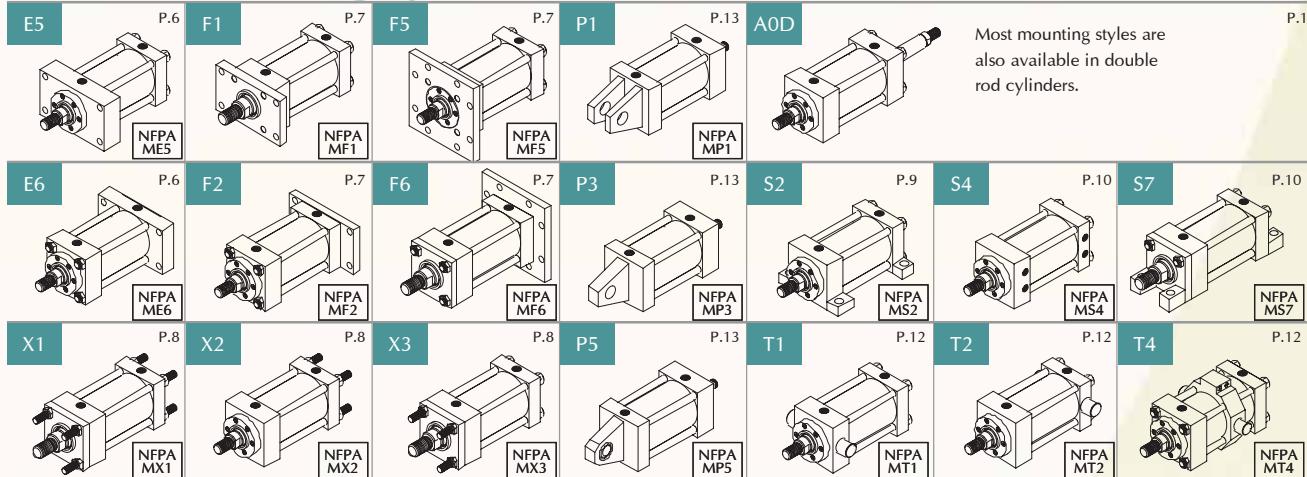
Type	High pressure hydraulic cylinder conformed to N.F.P.A. specifications and ANSI B93.15-1981.
Construction	Square steel head and cap, steel barrel tubing with polished i.d., tie rod assembled, removable bronze cartridge type gland bushing.
Operating pressure	3000 PSI (restrictions on some mountings).
Operating temperature	-30°C to 80°C (-30°F to 180°F). Up to 250°C (450°F) for viton seals. Low temperature seals also available.
Standard bore size	9 bore sizes from 1 1/2" to 8". Larger bore sizes to 14". Consult factory for dimensions.
Standard rods	5/8", 1", 1 3/8", 1 3/4", 2", 2 1/2", 3", 3 1/2", 4", 4 1/2", 5", 5 1/2" *.
Stroke	All increments up to 120".
Cushions	Both cushions are optional and are available at either one end or both ends. End of stroke cushioning is fully adjustable.

* Other dimensions available on request.

Basic forms



18 Standard mounting styles



Gland bushing configuration chart

MOUNTINGS	1 1/2	2	2 1/2	3 1/4	4	5	6	7	8
5/8	CD	CD	CD	CD	CD	CD	CD	CD	CD
A0	CD	CD	CD	CD	CD	CD	CD	CD	ND
A0D	CF	CF	CF	CF	CF	CF	CF	CF	RD
E5	RD	RD	RD	RD	RD	RD	RD	RD	ND
E6	CF	CF	CF	CF	CF	CF	CF	CF	ND
F1	CF	CF	CF	CF	CF	CF	CF	CF	ND
F2	CF	CF	CF	CF	CF	CF	CF	CF	ND
F5	CF	CF	CF	CF	CF	CF	CF	CF	ND
F6	CF	CF	CF	CF	CF	CF	CF	CF	ND
P1	CF	CF	CF	CF	CF	CF	CF	CF	ND
P3	CF	CF	CF	CF	CF	CF	CF	CF	ND
P5	CF	CF	CF	CF	CF	CF	CF	CF	ND
S2	CD	CD	CD	CD	CD	CD	CD	CD	ND
S4	CD	CD	CD	CD	CD	CD	CD	CD	ND
S7	CF	X	CF	X	CF	X	CF	X	X
T1	CD	CD	CD	CD	CD	CD	CD	CD	ND
T2	CD	CD	CD	CD	CD	CD	CD	CD	ND
T4	CF	CF	CF	CF	CF	CF	CF	CF	ND
X1	CF	CF	CF	CF	CF	CF	CF	CF	ND
X2	CD	CD	CD	CD	CD	CD	CD	CD	ND
X3	CF	CF	CF	CF	CF	CF	CF	CF	ND

CD : The gland bushing is maintained by a detachable square plate.

CF : The gland bushing is maintained by a fixed square plate.

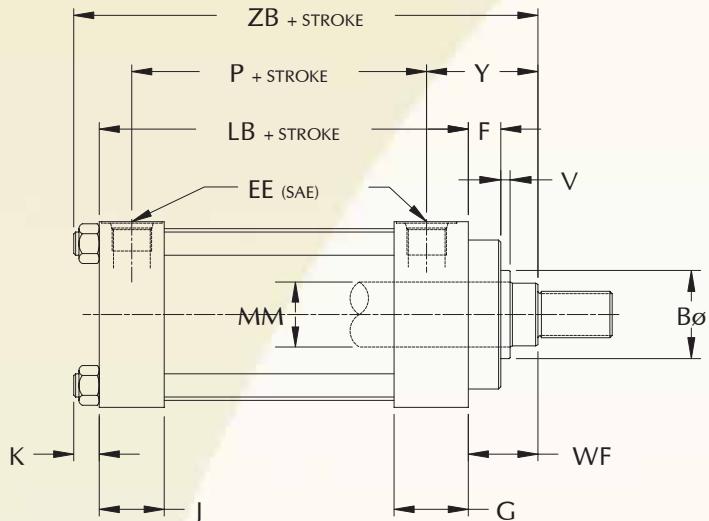
RD : The gland bushing is maintained by a detachable round plate.

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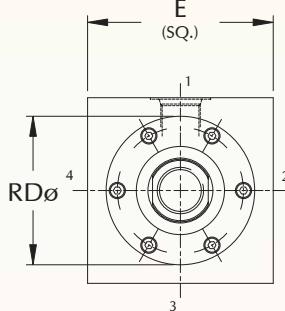
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BASIC CYLINDER

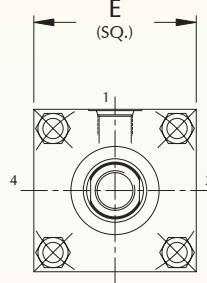
A0 mounting



Bushing Configuration
(See chart on page 3)



RD Type



CD Type
CF Type

BORE SIZE	MM ROD DIA.	B	RD	V	WF	Y	ZB	E	EE	F	G	J	K	LB	P
1 1/2	5/8 STD.	1.124	*	1/4	1	2	6	2 1/2	SAE-10	3/8	1 3/4	1 1/2	3/8	4 5/8	2 7/8
	1"	1.499	*	1/2	1 3/8	2 3/8	6 3/8								
2	1" STD.	1.499	*	1/4	1 3/8	2 3/8	6 1/2	3	SAE-10	5/8	1 3/4	1 1/2	1/2	4 5/8	2 7/8
	1 3/8	1.999	*	3/8	1 5/8	2 5/8	6 3/4								
2 1/2	1" STD.	1.499	*	1/4	1 3/8	2 3/8	6 5/8	3 1/2	SAE-10	5/8	1 3/4	1 1/2	1/2	4 3/4	3
	1 3/8	1.999	*	3/8	1 5/8	2 5/8	6 7/8								
	1 3/4	2.374	*	1/2	1 7/8	2 7/8	7 1/8								
3 1/4	1 3/8 STD.	1.999	*	1/4	1 5/8	2 3/4	7 3/4	4 1/2	SAE-12	3/4	2	1 3/4	5/8	5 1/2	3 1/2
	1 3/4	2.374	*	3/8	1 7/8	3	8								
	2"	2.624	*	3/8	2	3 1/8	8 1/8								
4	1 3/4 STD.	2.374	4	1/4	1 7/8	3	8 5/16	5	SAE-12	7/8	2	1 3/4	11/16	5 3/4	3 3/4
	2"	2.624	4 1/4	1/4	2	3 1/8	8 7/16								
	2 1/2	3.124	*	3/8	2 1/4	3 3/8	8 11/16								
5	2" STD.	2.624	4 1/4	1/4	2	3 1/8	9 3/16	6 1/2	SAE-12	7/8	2	1 3/4	15/16	6 1/4	4 1/4
	2 1/2	3.124	4 11/16	3/8	2 1/4	3 3/8	9 7/16								
	3"	3.749	5 3/8	1/4	2 1/4	3 1/2	10 5/8								
6	3 1/2	4.249	5 7/8	1/4	2 1/4	3 1/2	10 5/8	7 1/2	SAE-16	1	2 1/4	2 1/4	1	7 3/8	4 7/8
	4"	4.749	*	1/4	2 1/4	3 1/2	10 5/8								
	3 3/8	5.249	*	1/2	2 1/4	3 3/4	11 7/8								
7	3 3/8 STD.	3.749	5 3/8	1/4	2 1/4	3 3/4	11 7/8	8 1/2	SAE-20	1	2 3/4	2 3/4	1 1/8	8 1/2	5 1/2
	3 1/2	4.249	5 7/8	3/8	2 1/4	3 3/4	11 7/8								
	4"	4.749	6 3/8	3/8	2 1/4	3 3/4	11 7/8								
8	4 1/2	5.249	7 3/8	3/8	2 1/4	3 7/8	13	9 1/2	SAE-24	1	3	3	1 1/4	9 1/2	6 1/4
	5"	5.749	*	1/2	2 1/4	3 7/8	13								

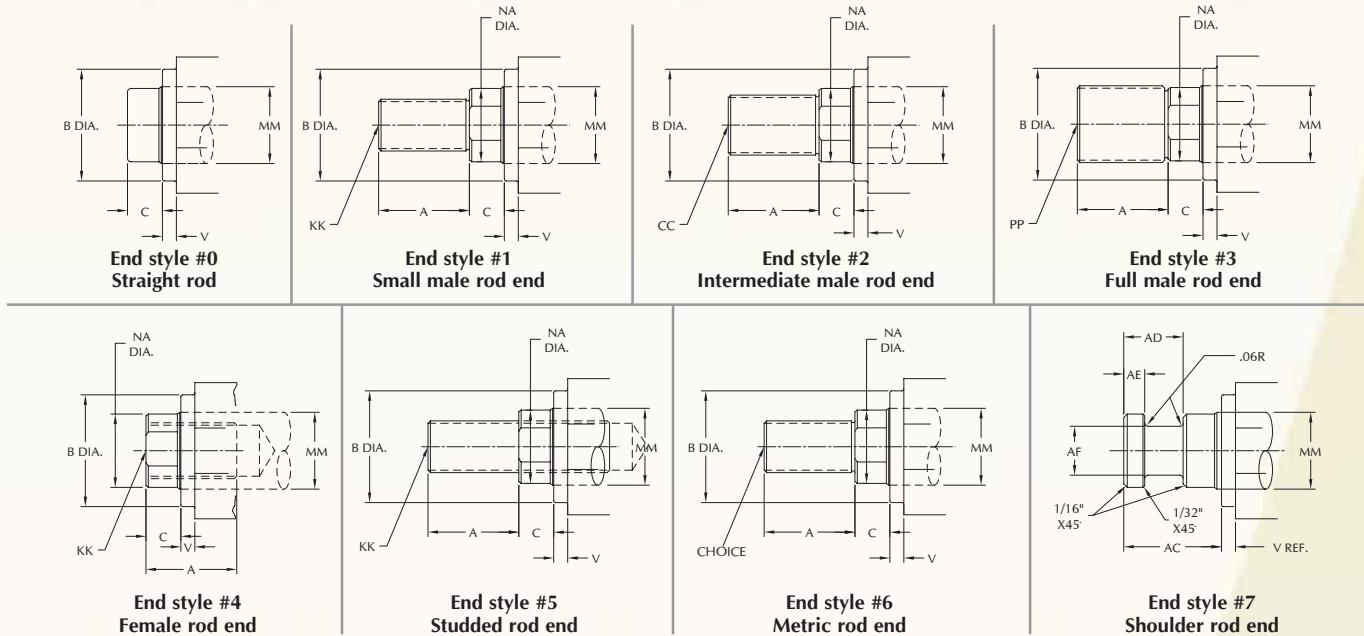
*Refer to specific mounting configuration

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PISTON ROD END STYLES

RDC Contrôle Ltée offers 8 different standard piston rod end models.



Dimension chart

MM ROD DIA.	A	B ^{.000} _{-.002}	C	CC	PP	KK	NA	AD	AE ^{.000} _{.002}	AF DIA.	AC
5/8"	3/4"	1.124"	3/8"	1/2 - 20 UNF	5/8 - 18 UNF	7/16 - 20 UNF	9/16"	5/8"	1/4"	3/8"	1 1/8"
1"	1 1/8"	1.499"	1/2"	7/8 - 14 UNF	1 - 14 UNS	3/4 - 16 UNF	15/16"	15/16"	3/8"	11/16"	1 1/2"
1 3/8"	1 5/8"	1.999"	5/8"	1 1/4 - 12 UNF	1 3/8 - 12 UNF	1 - 14 UNS	1 5/16"	1 1/16"	3/8"	7/8"	1 3/4"
1 3/4"	2"	2.374"	3/4"	1 1/2 - 12 UNF	1 3/4 - 12 UNF	1 1/4 - 12 UNF	1 11/16"	1 5/16"	1/2"	1 1/8"	2"
2"	2 1/4"	2.624"	7/8"	1 3/4 - 12 UNF	2 - 12 UNF	1 1/2 - 12 UNF	1 15/16"	1 11/16"	5/8"	1 3/8"	2 5/8"
2 1/2"	3"	3.124"	1"	2 1/4 - 12 UNF	2 1/2 - 12 UNF	2 7/8 - 12 UNF	2 3/8"	1 15/16"	3/4"	1 3/4"	3 1/4"
3"	3 1/2"	3.749"	1"	2 3/4 - 12 UNF	3 - 12 UNF	2 1/4 - 12 UNF	2 7/8"	2 7/16"	7/8"	2 1/4"	3 5/8"
3 1/2"	3 1/2"	4.249"	1"	3 1/4 - 12 UNF	3 1/2 - 12 UNF	2 1/2 - 12 UNF	3 3/8"	2 11/16"	1"	2 1/2"	4 3/8"
4"	4"	4.749"	1"	3 3/4 - 12 UNF	4 - 12 UNF	3 - 12 UNF	3 7/8"	2 11/16"	1"	3"	4 1/2"
4 1/2"	4 1/2"	5.249"	1"	4 1/4 - 12 UNF	4 1/2 - 12 UNF	3 1/4 - 12 UNF	4 3/8"	3 3/16"	1 1/2"	3 1/2"	5 1/4"
5"	5"	5.749"	1"	4 3/4 - 12 UNF	5 - 12 UNF	3 1/2 - 12 UNF	4 7/8"	3 3/16"	1 1/2"	3 7/8"	5 3/8"
5 1/2"	5 1/2"	6.249"	1"	5 1/4 - 12 UNF	5 1/2 - 12 UNF	4 - 12 UNF	5 3/8"	3 15/16"	1 7/8"	4 3/8"	6 1/4"

RDC Contrôle Ltée can also manufacture a piston rod end adapted to customer specifications through a detailed sketch. In this case, we will use #8 for the female special and #9 for the male special end styles.

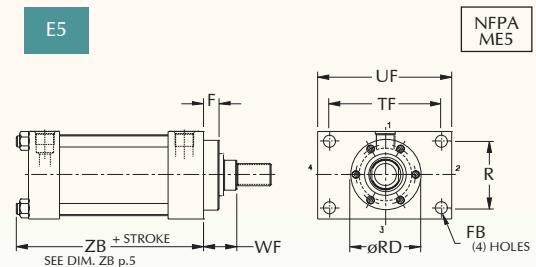
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RECTANGULAR HEAD OR CAP MOUNTINGS

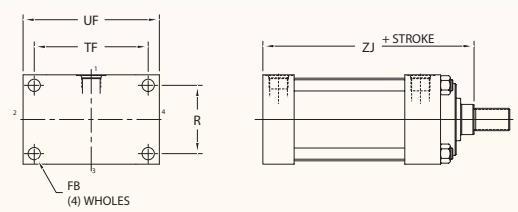
BORE SIZE	MM ROD DIA.	RD	WF	ZJ	FB	R	TF	UF
1 1/2	5/8 STD.	2 3/8	1	5 5/8	7/16	1.63	3 7/16	4 1/4
	1	2 5/8	1 3/8	6				
2	1" STD.	2 5/8	1 3/8	6	9/16	2.05	4 1/8	5 1/8
	1 3/8	3 5/8	1 5/8	6 1/4				
2 1/2	1" STD	2 5/8	1 3/8	6 1/8	9/16	2.55	4 5/8	5 5/8
	1 3/8	3 5/8	1 5/8	6 3/8				
	1 3/4	3 7/8	1 7/8	6 5/8				
3 1/4	1 3/8 STD.	3 5/8	1 5/8	7 1/8	11/16	3.25	5 7/8	7 1/8
	1 3/4	3 7/8	1 7/8	7 3/8				
	2	4 1/4	2	7 1/2				
4	1 3/4 STD.	4	1 7/8	7 5/8	11/16	3.82	6 3/8	7 5/8
	2"	4 1/4	2	7 3/4				
	2 1/2	4 11/16	2 1/4	8				
5	2" STD.	4 1/4	2	8 1/4	15/16	4.95	8 3/16	9 3/4
	2 1/2	4 11/16	2 1/4	8 1/2				
	3"	5 3/8	2 1/4	8 1/2				
	3 1/2	5 7/8	2 1/4	8 1/2				
6	2 1/2 STD.	4 11/16	2 1/4	9 5/8	1 1/16	5.73	9 7/16	11 1/4
	3"	5 3/8	2 1/4	9 5/8				
	3 1/2	5 7/8	2 1/4	9 5/8				
	4"	6 3/8	2 1/4	9 5/8				
7	3" STD.	5 3/8	2 1/4	10 3/4	1 3/16	6.58	10 5/8	12 5/8
	3 1/2	5 7/8	2 1/4	10 3/4				
	4"	6 3/8	2 1/4	10 3/4				
	4 1/2	7 1/2	2 1/4	10 3/4				
8	3 1/2 STD.	5 7/8	2 1/4	11 3/4	1 5/16	7.50	11 13/16	14
	4"	6 3/8	2 1/4	11 3/4				
	4 1/2	7 1/2	2 1/4	11 3/4				
	5"	8	2 1/4	11 3/4				

E5



E5 – Rectangular head mounting

E6



E6 – Rectangular cap mounting

DIFFERENT OPTIONS AVAILABLE

The HP Series hydraulic cylinders offered by RDC Contrôle Ltée can be adapted to accept a wide range of options and accessories to meet your specific needs. Please contact our customer service department for more details on the options mentioned below or about other special applications.

OPTIONS

- Multi-stage cylinder (Duplex, Tandem)
- Double rod cylinder
- Spring return cylinder
- Water operated cylinder (A.W.W.A.)
- Stroke adjustment device
- Stainless Steel piston rod #17-4PH
- Protective rod boot
- Piston rod scraper
- High temperature seals
- NPT, BST ports

ACCESSORIES

- Mounting accessories (see page 16)
- Self-alignment rod coupler
- Manual control valve
- Solenoid valve
- Flow control
- Proximity switch
- Limit switch
- Position transducer

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FLANGE MOUNTINGS

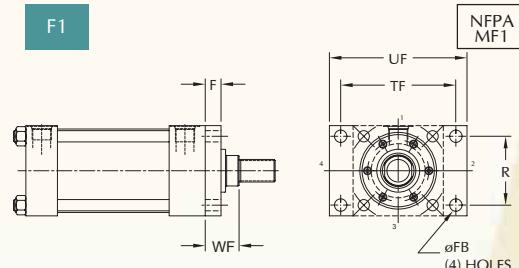
BORE SIZE	MM ROD DIA.	WF	ZF	F	FB	R	TF	UF
1 1/2	5/8 STD.	1	6	3/8	7/16	1.63	3 7/16	4 1/4
	1	1 3/8	6 3/8					
2	1" STD.	1 3/8	6 5/8	5/8	9/16	2.05	4 1/8	5 1/8
	1 3/8	1 5/8	6 7/8					
	1 3/4	1 7/8	7 1/4					
2 1/2	1 3/8 STD.	1 5/8	7 7/8	3/4	11/16	3.25	5 7/8	7 1/8
	1 3/4	1 7/8	8 1/8					
	2	2	8 1/4					
3 1/4	1 3/4 STD.	1 7/8	8 1/2	7/8	11/16	3.82	6 3/8	7 5/8
	2 1/2	2	8 5/8					
	2 1/2	2 1/4	8 7/8					
4	1 3/4 STD.	2	9 1/8	7/8	15/16	4.95	8 3/16	9 3/4
	2"	2	9 3/8					
	2 1/4	2 1/4	9 3/8					
5	2" STD.	2	9 3/4	1	1 1/16	5.73	9 7/16	11 1/4
	2 1/2	2 1/4	10 5/8					
	3"	2 1/4	10 5/8					
6	3 1/2	2 1/4	10 5/8	1	1 3/16	6.58	10 5/8	12 5/8
	4"	2 1/4	10 5/8					
	4 1/2	2 1/4	11 3/4					
7	3" STD.	2 1/4	11 3/4	1	1 3/16	6.58	10 5/8	12 5/8
	3 1/2	2 1/4	11 3/4					
	4"	2 1/4	11 3/4					
	4 1/2	2 1/4	11 3/4					
8	3 1/2 STD.	2 1/4	12 3/4	1	1 5/16	7.50	11 13/16	14
	4"	2 1/4	12 3/4					
	4 1/2	2 1/4	12 3/4					
	5"	2 1/4	12 3/4					

Flange mountings - pressure use restrictions

The F1 and F5 flanges are susceptible to bending during stroke extention if used under very high pressures. The same restrictions for F2 and F6 mountings are applied during stroke retraction and must be used with caution. Refer to restriction chart below. The E5 and E6 mountings are strongly recommended for applications of 3,000 PSI.

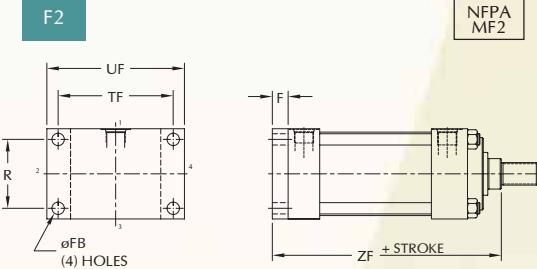
Pressure use restrictions chart (PSI)				
BORE SIZE	F1 EXTENSION	F5 EXTENSION	F2 EXTENSION	F6 RETRACTION
1 1/2	2000	3000	3000	3000
2	2000	3000	3000	3000
2 1/2	2000	3000	2800	3000
3 1/4	1800	3000	2500	2800
4	1500	2500	2200	2500
5	1200	2200	2000	2200
6	1000	2000	1800	2000
7	800	1500	1200	1800
8	800	1500	1200	1800

F1



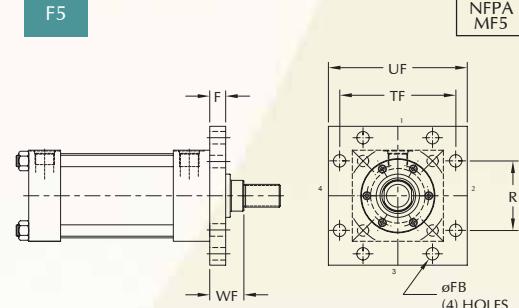
F1 - Head end rectangular flange

F2



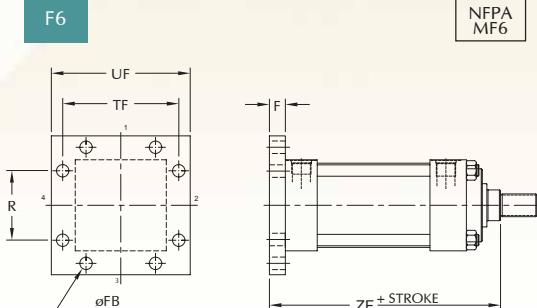
F2 - Cap end rectangular flange

F5



F5 - Head end square flange

F6



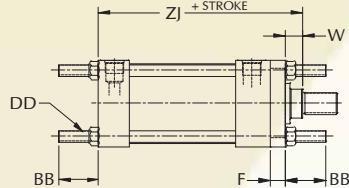
F6 - Cap end square flange

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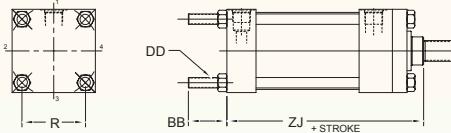
EXTENDED TIE ROD MOUNTINGS

X1



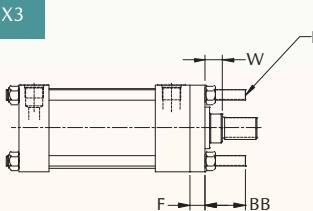
X1 - Both ends extended tie rods

X2



X2 - Cap end extended tie rods

X3



X3 - Head end extended tie rods

BORE SIZE	MM ROD DIA.	W	WF	ZJ	BB	DD	F	R
1 1/2	5/8 STD.	5/8	1	5 5/8	1 3/8	3/8 - 24	3/8	1.63
	1"	1	1 3/8	6				
2	1" STD.	3/4	1 3/8	6	1 13/16	1/2 - 20	5/8	2.05
	1 3/8	1	1 5/8	6 1/4				
2 1/2	1" STD.	3/4	1 3/8	6 1/8	1 13/16	1/2 - 20	5/8	2.55
	1 3/8	1	1 5/8	6 3/8				
	1 3/4	1 1/4	1 7/8	6 5/8				
3 1/4	1 3/8	7/8	1 5/8	7 1/8	2 5/16	5/8 - 18	3/4	3.25
	1 3/4	1 1/8	1 7/8	7 3/8				
	2"	1 1/4	2	7 1/2				
4	1 3/4 STD.	1	1 7/8	7 5/8	2 5/16	5/8 - 18	7/8	3.82
	2"	1 1/8	2	7 3/4				
	2 1/2	1 3/8	2 1/4	8				
5	2"	1 1/8	2	8 1/4	3 3/16	7/8 - 14	7/8	4.95
	2 1/2	1 3/8	2 1/4	8 1/2				
	3"	1 3/8	2 1/4	8 1/2				
	3 1/2	1 3/8	2 1/4	8 1/2				
6	2 1/2	1 1/4	2 1/4	9 5/8	3 5/8	1 - 14	1	5.73
	3"	1 1/4	2 1/4	9 5/8				
	3 1/2	1 1/4	2 1/4	9 5/8				
	4"	1 1/4	2 1/4	9 5/8				
7*	3" STD.	2 1/4	-	10 3/4	4 1/8	1 1/8 - 12	-	6.58
	3 1/2	2 1/4	-	10 3/4				
	4"	2 1/4	-	10 3/4				
	4 1/2	2 1/4	-	10 3/4				
8*	3 1/2 STD.	2 1/4	-	11 3/4	4 1/2	1 1/4 - 12	-	7.50
	4"	2 1/4	-	11 3/4				
	4 1/2	2 1/4	-	11 3/4				
	5"	2 1/4	-	11 3/4				

* Comes without front flange: BB and W measured from head

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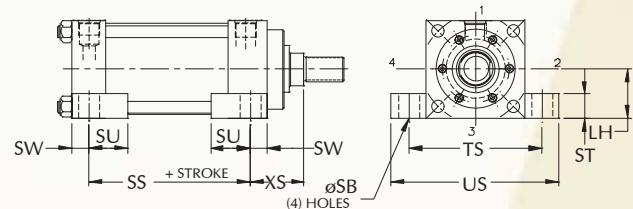
**HEAVY DUTY
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SIDE BASE MOUNTINGS

BORE SIZE	MM ROD DIA.	XS	LH	SB	SS	ST	SW	TS	US
1 1/2	5/8 STD.	1 3/8	1 1/4	7/16	3 7/8	1/2	3/8	3 1/4	4
	1"	1 3/4							
2	1" STD.	1 7/8	1 1/2	9/16	3 5/8	3/4	1/2	4	5
	1 3/8	2 1/8							
2 1/2	1" STD.	2 1/16	1 3/4	13/16	3 3/8	1	11/16	4 7/8	6 1/4
	1 3/8	2 5/16							
	1 3/4	2 9/16							
3 1/4	1 3/8 STD.	2 5/16	2 1/4	13/16	4 1/8	1	11/16	5 7/8	7 1/4
	1 3/4	2 9/16							
	2"	2 11/16							
4	1 3/4 STD.	2 3/4	2 1/2	1 1/16	4	1 1/4	7/8	6 3/4	8 1/2
	2"	2 7/8							
	2 1/2	3 1/8							
5	2" STD.	2 7/8	3 1/4	1 1/16	4 1/2	1 1/4	7/8	8 1/4	10
	2 1/2	3 1/8							
	3"	3 1/8							
6	3 1/2	3 1/8	3 3/4	1 5/16	5 1/8	1 1/2	1 1/8	9 3/4	12
	2 1/2 STD.	3 3/8							
	3"	3 3/8							
7	3 1/2	3 5/8	4 1/4	1 9/16	5 3/4	1 3/4	1 3/8	11 1/4	14
	4"	3 5/8							
	4 1/2	3 5/8							
8	3 1/2 STD.	3 5/8	4 3/4	1 9/16	6 3/4	1 3/4	1 3/8	12 1/4	15
	4"	3 5/8							
	4 1/2	3 5/8							
	5"	3 5/8							

S2

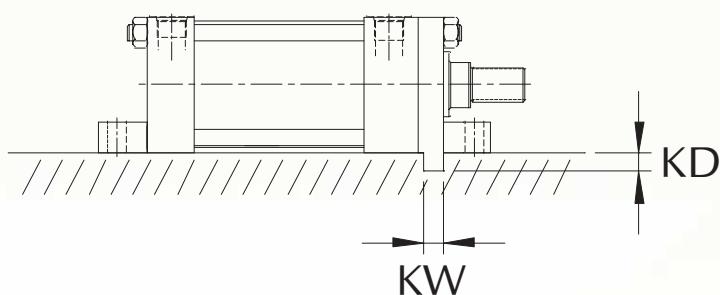
NFPA MS2



S2 - Side lugs mounting

Thrust key for side base mountings (optional)

It is recommended to use a thrust key for side base mountings (S2, S4 and S7) to avoid any shear stress force on the mounting bolts.



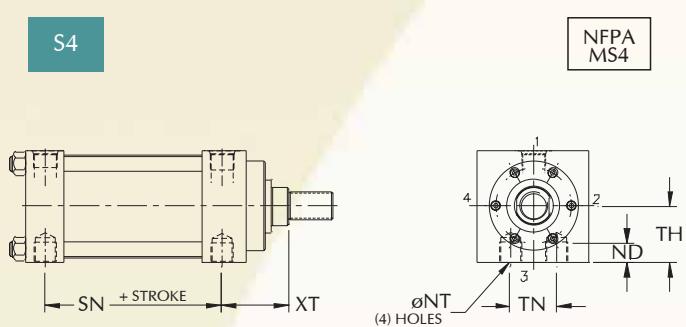
BORE SIZE	KW +.000 -.003	KD
1 1/2	.312	3/16
2 - 2 1/2	.562	5/16
3 1/4	.687	3/8
4-5	.812	7/16
6-7-8	.937	1/2

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SIDE BASE MOUNTINGS (cont'd)

S4



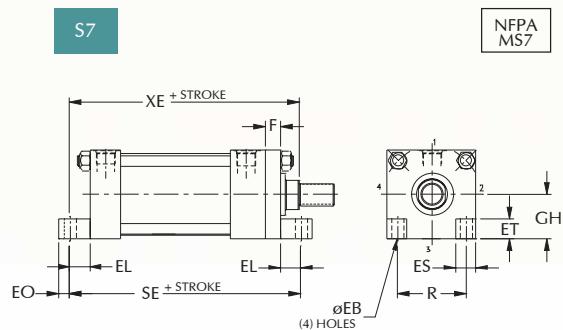
S4 - Side tapped holes mounting

BORE SIZE	MM ROD DIA.	XT	ND	NT UNC	TN	SN	TH
1 1/2	5/8 STD.	2	3/8	3/8 - 16	3/4	2 7/8	1 1/4
	1"	2 3/8					
2	1" STD.	2 3/8	7/16	1/2 - 13	15/16	2 7/8	1 1/2
	1 3/8"	2 5/8					
2 1/2	1" STD.	2 3/8	1/2	5/8 - 11	1 5/16	3	1 3/4
	1 3/8 STD.	2 5/8					
	1 3/4"	2 7/8					
3 1/4	1 3/8 STD.	2 3/4	11/16	3/4 - 10	1 1/2	3 1/2	2 1/4
	1 3/4"	3					
	2"	3 1/8					
4	1 3/4 STD.	3	11/16	1 - 8	2 1/16	3 3/4	2 1/2
	2"	3 1/8					
	2 1/2"	3 3/8					
5	2" STD.	3 1/8	1	1 - 8	2 15/16	4 1/4	3 1/4
	2 1/2"	3 3/8					
	3"	3 3/8					
	3 1/2"	3 3/8					
6	2 1/2 STD.	3 1/2	1 1/4	1 1/4 - 7	3 5/16	5 1/8	3 3/4
	3"	3 1/2					
	3 1/2"	3 1/2					
	4"	3 1/2					
7	3" STD.	3 13/16	1 1/8	1 1/2 - 6	3 3/4	5 7/8	4 1/4
	3 1/2"	3 13/16					
	4"	3 13/16					
	4 1/2"	3 13/16					
8	3 1/2 STD.	3 15/16	1 1/2	1 1/2 - 6	4 1/4	6 5/8	4 3/4
	4"	3 15/16					
	4 1/2"	3 15/16					
	5"	3 15/16					

BORE SIZE	MM ROD DIA.	XE	GH	EB	EL	EO	ET	ES	R	SE
1 1/2	5/8 STD.	6 1/2	1 1/4	7/16	7/8	3/8	3/4	7/8	1.63	6 3/4
	1"	6 7/8								
2	1" STD.	6 15/16	1 1/2	9/16	15/16	1/2	13/16	15/16	2.05	7 1/8
	1 3/8"	7 3/16								
2 1/2	1" STD.	7 1/16	1 3/4	9/16	15/16	1/2	13/16	15/16	2.55	7 1/4
	1 3/8"	7 5/16								
	1 3/4"	7 9/16								
3 1/4	1 3/8 STD.	8 1/4	2 1/4	11/16	1 1/8	5/8	1 1/8	1 1/4	3.25	8 1/2
	1 3/4"	8 1/2								
	2"	8 5/8								
4	1 3/4 STD.	8 3/4	2 1/2	11/16	1 1/8	5/8	1 1/16	1 1/4	3.82	8 7/8
	2"	8 7/8								
	2 1/2"	9 1/8								
5	2" STD.	9 3/4	3 1/4	15/16	1 1/2	3/4	1 7/16	1 1/2	4.95	10 1/8
	2 1/2"	10								
	3"	10								
6	2 1/2 STD.	11 5/8	3 3/4	11/16	1 11/16	7/8	1 5/8	1 3/4	5.73	11 3/4
	3"	11 5/8								
	3 1/2"	11 5/8								
	4"	11 5/8								

Not available in 7" and 8" bore sizes

S7



S7 - End lugs mounting

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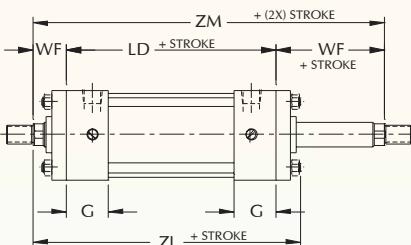
**HEAVY DUTY
HYDRAULIC CYLINDERS**

DOUBLE ROD CYLINDERS

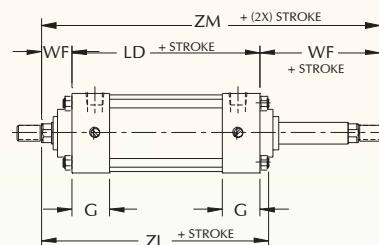
Basic dimensions

G and WF Dimensions: Refer to basic mounting on page 5.
For other dimensions refer to charts on page 7 to 14.

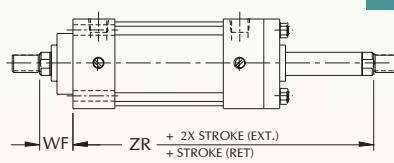
"CD" Configuration



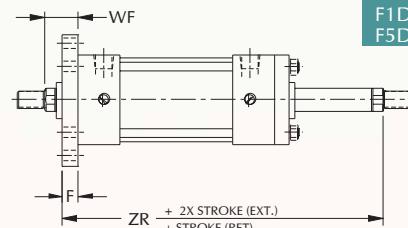
"RD" Configuration



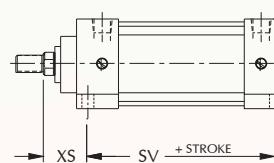
E5D



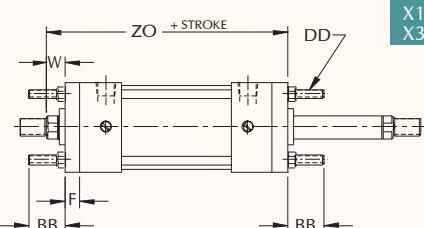
F1D F5D



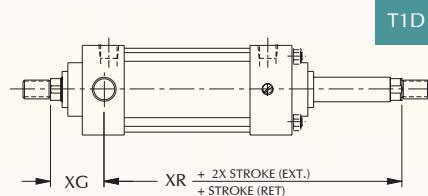
S2D



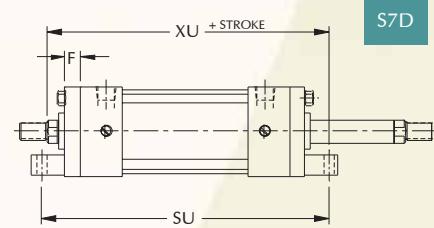
X1D X3D



T1D



S7D



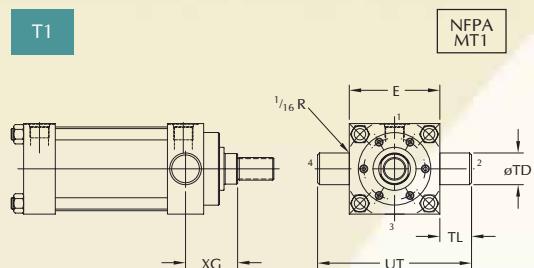
MOUNTING		ALL			F1D F5D		E5D		S7D		S2D		T1D		X1D X3D	
BORE SIZE	MM ROD DIA.	LD	ZL	ZM	ZR	ZG	SU	XU	SV	XR	ZO					
1 1/2	5/8 STD.	4 7/8	6 5/8	6 7/8	6 1/4	5 7/8	7 3/8	7 1/8	4 1/8	5	6 1/4					
	1"	4 7/8	7	7 5/8	6 5/8	6 1/4	7 3/8	7 1/2	4 1/8	5 3/8	6 5/8					
2	1" STD.	4 7/8	7 3/8	7 5/8	6 7/8	6 1/4	8	7 13/16	3 7/8	5 3/8	6 7/8					
	1 3/8"	4 7/8	7 5/8	8 1/8	7 1/8	6 1/2	8	8 1/16	3 7/8	5 5/8	7 1/8					
2 1/2	1" STD.	5	7 1/2	7 3/4	7	6 3/8	8 1/8	7 15/16	3 5/8	5 1/2	7					
	1 3/8"	5	7 3/4	8 1/4	7 1/4	6 5/8	8 1/8	8 3/16	3 5/8	5 3/4	7 1/4					
	1 3/4"	5	8	8 3/4	7 1/2	6 7/8	8 1/8	8 7/16	3 5/8	6	7 1/2					
3 1/4	1 3/8 STD.	5 3/4	8 3/4	9	8 1/8	7 3/8	9 1/2	9 1/4	4 3/8	6 3/8	8 1/8					
	1 3/4"	5 3/4	9	9 1/2	8 3/8	7 5/8	9 1/2	9 1/2	4 3/8	6 5/8	8 3/8					
	2"	5 3/4	9 1/8	9 3/4	8 1/2	7 3/4	9 1/2	9 5/8	4 3/8	6 3/4	8 1/2					
4	13/4 STD.	6	8 9/16	9 3/4	8 3/4	7 7/8	10	9 7/8	4 1/4	6 7/8	8 3/4					
	2"	6	8 11/16	10	8 7/8	8	10	10	4 1/4	7	8 7/8					
	2 1/2"	6	9 13/16	10 1/2	9 1/8	8 1/4	10	10 1/4	4 1/4	7 1/4	9 1/8					
5	2" STD.	6 1/2	9 7/16	10 1/2	9 3/8	8 1/2	11 1/4	11 7/8	4 3/4	7 1/2	9 3/8					
	2 1/2"	6 1/2	9 11/16	11	9 5/8	8 3/4	11 1/4	12 1/8	4 3/4	7 3/4	9 5/8					
	3"	6 1/2	9 11/16	11	9 5/8	8 3/4	11 1/4	12 1/8	4 3/4	7 3/4	9 5/8					
	3 1/2"	6 1/2	10 9/16	11	9 5/8	8 3/4	11 1/4	12 1/8	4 3/4	7 3/4	9 5/8					
6	2 1/2 STD.	7 3/8	10 5/8	11 7/8	10 5/8	9 5/8	12 3/4	11 5/16	5 1/8	8 1/2	10 5/8					
	3"	7 3/8	10 5/8	11 7/8	10 5/8	9 5/8	12 3/4	11 5/16	5 1/8	8 1/2	10 5/8					
	3 1/2"	7 3/8	10 5/8	11 7/8	10 5/8	9 5/8	12 3/4	11 5/16	5 1/8	8 1/2	10 5/8					
	4"	7 3/8	11 5/8	11 7/8	10 5/8	9 5/8	12 3/4	11 5/16	5 1/8	8 1/2	10 5/8					
7	3" STD.	8 1/2	11 7/8	13	11 3/4	10 3/4	N/D	N/D	5 3/4	9 3/8	11 3/4					
	3 1/2"	8 1/2	11 7/8	13	11 3/4	10 3/4	N/D	N/D	5 3/4	9 3/8	11 3/4					
	4"	8 1/2	11 7/8	13	11 3/4	10 3/4	N/D	N/D	5 3/4	9 3/8	11 3/4					
	4 1/2"	8 1/2	12 7/8	13	11 3/4	10 3/4	N/D	N/D	5 3/4	9 3/8	11 3/4					
8	3 1/2 STD.	9 1/2	13	14	12 3/4	11 3/4	N/D	N/D	6 3/4	10 1/4	12 3/4					
	4"	9 1/2	13	14	12 3/4	11 3/4	N/D	N/D	6 3/4	10 1/4	12 3/4					
	4 1/2"	9 1/2	13	14	12 3/4	11 3/4	N/D	N/D	6 3/4	10 1/4	12 3/4					
	5"	9 1/2	14	14	12 3/4	11 3/4	N/D	N/D	6 3/4	10 1/4	12 3/4					

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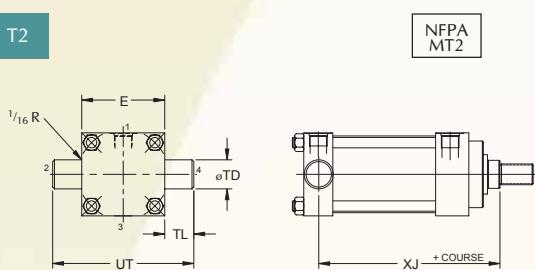
TRUNNION MOUNTINGS

T1



T1 - Head end trunnion mounting

T2



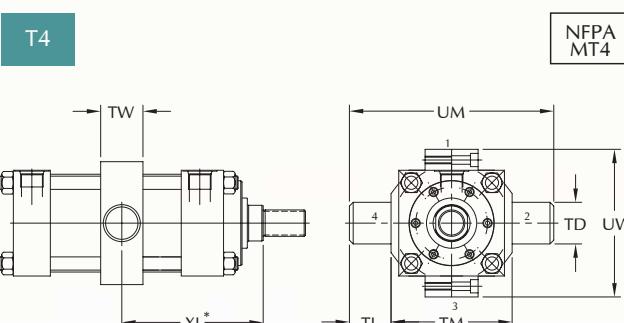
T2 - Cap end trunnion mounting

BORE SIZE	MM ROD DIA.	XG	XJ	E	TD ^{+0.000} -.002	TL	UT
1 1/2	5/8 STD. 1"	1 7/8 2 1/4	4 7/8 5 1/4	2 1/2	1.000	1	4 1/2
	3 13/16						
2	1" STD. 1 3/8	2 1/4 2 1/2	5 1/4 5 1/2	3	1.375	1 3/8	5 3/4
	3 15/16						
2 1/2	1" STD. 1 3/8	2 1/4 2 1/2	5 3/8 5 5/8	3 1/2	1.375	1 3/8	6 1/4
	4 3/16						
3 1/4	1 3/8 STD. 1 3/4	2 5/8 2 7/8	6 1/4 6 1/2	4 1/2	1.750	1 3/4	8
	4 3/16						
4	2 1/2 STD. 2"	2 7/8 3	6 3/4 6 7/8	5	1.750	1 3/4	8 1/2
	3 1/2						
5	2" STD. 2 1/2	3 1/4 3 1/4	7 5/8 7 5/8	6 1/2	1.750	1 3/4	10
	3"						
6	3" STD. 3 1/2	3 1/4 3 3/8	7 5/8 8 3/8	7 1/2	2.000	2	11 1/2
	4"						
7	3 1/2 STD. 3 1/2	3 5/8 3 5/8	9 3/8 9 3/8	8 1/2	2.500	2 1/2	13 1/2
	4"						
8	3 1/2 STD. 4"	3 3/4 3 3/4	10 1/4 10 1/4	9 1/2	3.000	3	15 1/2
	4 1/2						
	5"	3 3/4	10 1/4				

INTERMEDIATE TRUNNION MOUNTING

BORE SIZE	MM ROD DIA.	XI MIN.	TD ^{+0.000} -.002	TL	TM	TW	UM	UW
1 1/2	5/8 STD. 1"	3 7/16 3 13/16	1.000	1	3	1 1/4	5	3 1/2
	3 15/16							
2	1" STD. 1 3/8	3 15/16 4 3/16	1.375	1 3/8	3 1/2	1 1/2	6 1/4	4 5/8
	3 15/16							
2 1/2	1" STD. 1 3/8	3 15/16 4 3/16	1.375	1 3/8	4	1 1/2	6 3/4	4 7/8
	4 7/16							
3 1/4	1 3/8 STD. 1 3/4	4 11/16 4 15/16	1.750	1 3/4	5	2	8 1/2	5 13/16
	2"	5 1/16						
4	1 3/4 STD. 2"	4 15/16 5 1/16	1.750	1 3/4	5 1/2	2	9	6 3/8
	5 5/16							
5	2" STD. 2 1/2	5 1/16 5 5/16	1.750	1 3/4	7	2	10 1/2	7 7/8
	3"	5 5/16						
6	2 1/2 STD. 3"	6 1/16 6 1/16	2.000	2	8 1/2	3	12 1/2	10
	6 1/16							
7	3" STD. 3 1/2	6 9/16 6 9/16	2.500	2 1/2	9 3/4	3	14 3/4	11 1/2
	4"	6 9/16						
8	3 1/2 STD. 4"	7 1/16 7 1/16	3.000	3	11	3 1/2	17	13 3/8
	7 1/16							

T4



T4 - Intermediate trunnion mounting

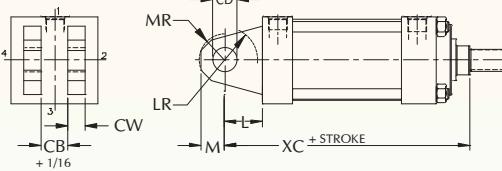
* Customer must specify the XI dimension when ordering.

HP 3000 SERIES

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CLEVIS MOUNTINGS

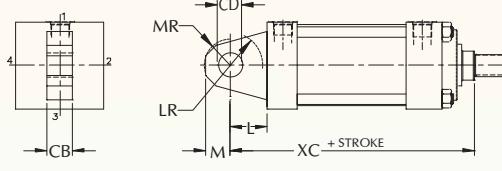
P1



P1 - Fixed clevis mounting

NFPA MP1

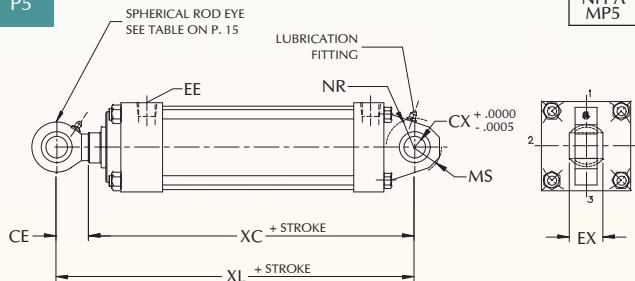
P3



P3 - Fixed eye mounting

NFPA MP3

P5



P5 - Spherical bearing mounting

NFPA MP5

BORE SIZE	MM ROD Dia.	P1, P3 MOUNTING								P5 MOUNTING								
		XC	CB	CD	CW	L	LR	M	MR	CX	EX	MS	NR	MM ROD Dia.	PART #	CE	XL	
1 1/2	5/8 STD. 1"	6 3/8 6 3/4	3/4	.501	1/2	3/4	9/16	1/2	5/8	.5000	7/16	15/16	5/8	5/8 STD. 1"	72-AAADP5 72-AAEP5	7/8 1 1/4	7 1/4 8	
	1" STD. 1 3/8	7 1/4 7 1/2	1 1/4	.751	5/8	1 1/4	1	3/4	15/16	.7500	21/32	1 3/8	1"	1" STD. 1 3/8	72-AAAEPS 72-AAAGP5	1 1/4 1 7/8	8 1/2 9 3/8	
2 1/2	1" STD. 1 3/8	7 3/8 7 5/8	1 1/4	.751	5/8	1 1/4	15/16	3/4	15/16	.7500	21/32	1 3/8	1"	1" STD. 1 3/8	72-AAAEPS 72-AAAGP5	1 1/4 1 7/8	8 5/8 9 1/2	
	1 3/4	7 7/8											1 3/4	1 3/4	72-AAAHPS 72-AAAP5	2 1/8 2 1/2	10 11 1/2	
3 1/4	1 3/8 STD. 1 3/4	8 5/8 8 7/8	1 1/2	1.001	3/4	1 1/2	1 1/4	1	1 3/16	1.0000	7/8	1 11/16	1 1/4	1 3/4	1 3/4	72-AAAHPS 72-AAAP5	2 1/8 2 1/2	10 1/2 11
	2"	9											2"	2"	72-AAAP5	2 1/2	11 1/2	
4	13/4 STD. 2"	9 3/4 9 7/8	2	1.376	1	2 1/8	1 3/4	1 3/8	1 5/8	1.3750	1 3/16	2 7/16	1 5/8	1 3/4	1 3/4	72-AAAHPS 72-AAAP5	2 1/8 2 1/2	11 7/8 12 3/8
	2 1/2	10 1/8											2 1/2	2 1/2	72-AAAKP5	2 3/4	12 7/8	
5	2" STD. 2 1/2	10 1/2 10 3/4	2 1/2	1.751	1 1/4	2 1/4	2 1/16	1 3/4	2 1/8	1.7500	1 17/32	2 7/8	2 1/16	2 1/2	2 1/2	72-AAAJP5 72-AAAKP5	2 1/2 2 3/4	13 13 1/2
	3"	10 3/4											3"	3"	72-AAALP5 72-AAAMP5	C/E C/E	C/E C/E	
6	2 1/2 STD. 3"	12 1/8 12 1/8	2 1/2	2.001	1 1/4	2 1/2	2 5/16	2	2 3/8	2.0000	1 3/4	3 5/16	2 3/8	2 1/2	2 1/2	72-AAAKP5 72-AAALP5	2 3/4 C/E	14 7/8 C/E
	3 1/2	12 1/8											3 1/2	3 1/2	72-AAAMP5 72-AAECP5	C/E C/E	C/E C/E	
7	3" STD. 3 1/2	13 3/4 13 3/4	3	2.501	1 1/2	3	2 3/4	2 1/2	2 7/8	C/E	C/E	C/E	C/E	3"	3 1/2	72-AAALP5 72-AAAMP5	C/E C/E	C/E C/E
	4"	13 3/4											4"	4"	C/E	C/E	C/E C/E	
8	3 1/2 STD. 4"	15 15	3	3.001	1 1/2	3 1/4	3 1/4	2 3/4	3 1/8	C/E	C/E	C/E	C/E	4 1/2	4 1/2	72-AAAMP5 72-AAECP5	C/E C/E	C/E C/E
	4 1/2	15											5"	5"	C/E	C/E	C/E C/E	

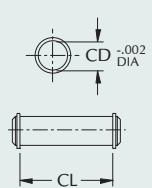
C/E: Dimensions available on request, consult engineering.

HP 3000 SERIES

HEAVY DUTY HYDRAULIC CYLINDERS

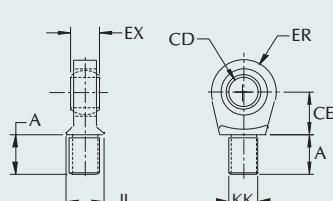
SPHERICAL ROD EYE ACCESSORIES

70 - CLEVIS PIN



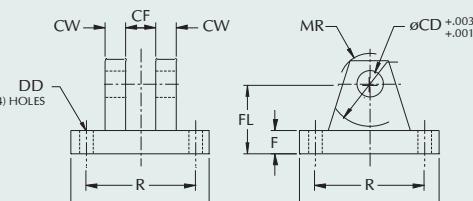
PART NO.	-0005	CL
70-AAADP5	.4997	1 9/16
70-AAAE5P	.7497	2 1/16
70-AAACP5	.9997	2 1/2
70-AAAHPS	1.3746	3 5/16
70-AAAJP5	1.7596	4 1/4
70-AAAKP5	1.9996	4 15/16
70-AAALP5	C/E	C/E
70-AAAMP5	C/E	C/E

72 - SPHERICAL ROD EYE



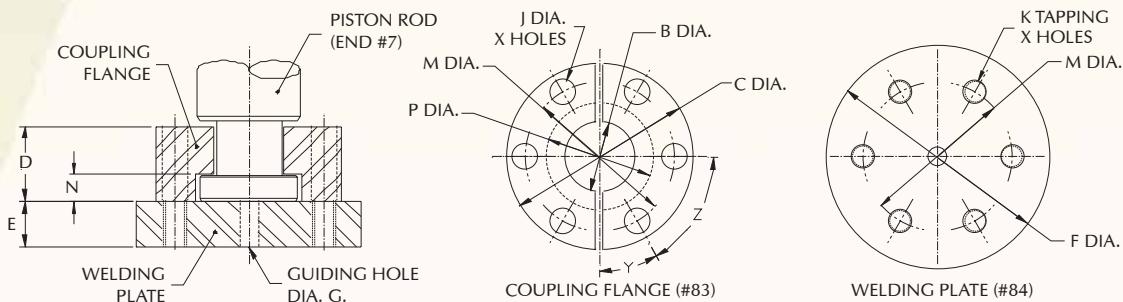
PART NO.	KK	A	-0005	CD	CE	ER	EX	JL	LR
72-AAADP5	7/16 - 20	11/16	.5000	7/8	7/8	7/16	7/8	3/4	
72-AAAE5P	3/4 - 16	1	.7500	1 1/4	1 1/4	2 1/32	1 5/16	1 1/16	
72-AAAGP5	1 - 14	1 1/2	1.0000	1 7/8	1 3/8	7/8	1 1/2	1 7/16	
72-AAAHPS	1 1/4 - 12	2	1.3750	2 1/8	1 13/16	1 3/16	2	1 7/8	
72-AAAJP5	1 1/2 - 12	2 1/8	1.7500	2 1/2	2 3/16	1 17/32	2 1/4	2 1/8	
72-AAAKP5	7/8 - 12	2 7/8	2.0000	2 3/4	2 5/8	1 3/4	2 3/4	2 1/2	
72-AAALP5	2 1/4 - 12	3 3/8	2.5000	C/E	C/E	C/E	C/E	C/E	
72-AAAMP5	2 1/2 - 12	3 3/8	3.0000	C/E	C/E	C/E	C/E	C/E	

75 - CLEVIS BRACKET



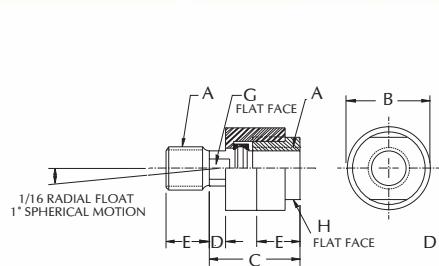
PART NO.	CD	CF	CW	DD	E	F	FL	LR	MR	R
75-AAADP5	.500	.44	1/2	13/32	3	1/2	1 1/2	15/16	5/8	2.05
75-AAAE5P	.750	.66	5/8	17/32	3 3/4	5/8	2	1 3/8	1	2.76
75-AAAGP5	1.000	.88	3/4	17/32	5 1/2	3/4	2 1/2	11 1/16	13/16	4.10
75-AAAHPS	1.375	119	1	21/32	6 1/2	7/8	3 1/2	2 7/16	1 5/8	4.95
75-AAAJP5	1.750	1.53	1 1/4	29/32	8 1/2	1 1/4	4 1/2	2 7/8	2 1/16	6.58
75-AAAKP5	2.000	1.75	1 1/2	29/32	10 5/8	1 1/2	5	3 5/16	2 3/8	7.92
75-AAALP5	2.500	C/E	C/E	C/E	C/E	C/E	C/E	C/E	C/E	C/E
75-AAAMP5	3.000	C/E	C/E	C/E	C/E	C/E	C/E	C/E	C/E	C/E

SHOULDER ROD END RETAINING COUPLING



ROD DIA.	FLANGE PART NO.	PLATE PART NO.	B	C	D	E	F	G	J	K	M	N	P	X	Y	Z
5/8	83-AAAD7	84-AAAD7	.406	1 1/2	.9/16	.500	2	.250	7/32	#10 - 24	1.125	.250	2 1/32	4	45°	90°
1"	83-AAAE7	84-AAAE7	.750	2	7/8	.500	2 1/2	.250	9/32	1/4 - 20	1.500	.375	1 1/16	6	30°	60°
1 3/8	83-AAAG7	84-AAAG7	.938	2 1/2	1	.625	3	.250	11/32	5/16 - 18	2.000	.375	1 7/16	6	30°	60°
1 3/4	83-AAAH7	84-AAAH7	1.187	3	1 1/4	.625	4	.250	11/32	5/16 - 18	2.375	.500	1 13/16	8	22.5°	45°
2"	83-AAAJ7	84-AAAJ7	1.438	3 1/2	1 5/8	.750	4	.375	13/32	3/8 - 16	2.688	.625	2 1/16	12	15°	30°
2 1/2	83-AAAK7	84-AAAK7	1.875	4	1 7/8	.750	4 1/2	.375	13/32	3/8 - 16	3.188	.750	2 5/8	12	15°	30°
3"	83-AAAL7	84-AAAL7	2.375	5	2 3/8	1.000	5 1/2	.375	17/32	1/2 - 13	4.000	.875	3 1/8	12	15°	30°
3 1/2	83-AAAM7	84-AAAM7	2.625	5 7/8	2 5/8	1.000	7	.375	21/32	5/8 - 11	4.688	1.000	3 5/8	12	15°	30°

SELF-ALIGNMENT ROD COUPLER



PART NO.	ROD DIA.	A	B	C	D	E	G	H	MAX. LOAD
78-AAAD1	5/8	7/16 - 20	1 1/4	2	1/2	3/4	9/16	1 1/8	3200
78-AAAD2	5/8	1/2 - 20	1 1/4	2	1/2	3/4	9/16	1 1/8	4000
78-AAAE1	1	3/4 - 16	1 3/4	2 5/16	5/16	1 1/8	7/8	1 1/2	9800
78-AAAE2	1	7/8 - 14	1 3/4	2 5/16	5/16	1 1/8	7/8	1 1/2	9800
78-AAAG1	1 3/8	1 - 14	2 1/2	2 15/16	1/2	1 5/8	1 1/4	2 1/4	20000
78-AAAH1	1 3/4	1 1/4 - 12	2 1/2	2 15/16	1/2	1 5/8	1 3/8	2 1/4	20000
78-AAAJ1	2	1 1/2 - 12	3 1/4	4 3/8	13/16	2 1/4	1 1/2	3	34000
78-AAAK1	2 1/2	1 7/8 - 12	3 3/4	5 7/16	11/16	3	1 7/8	3 1/2	65000

Other dimensions available on request.

HP 3000 SERIES

**HEAVY DUTY
HYDRAULIC CYLINDERS**

CLEVIS MOUNTING ACCESSORIES

ROD DIA.	ROD END THREADS	ROD CLEVIS	ROD EYE	CLEVIS PIN	CLEVIS BRACKET	EYE BRACKET	BORE SIZE
5/8	7/16 - 20	71 - AAAD	72 - AAAD	70 - AAAD	75 - AAAD	76 - AAAD	1 1/2
1	3/4 - 16	71 - AAAE	72 - AAAE	70 - AAAE	75 - AAAE	76 - AAAE	2 - 2 1/2
1 3/8	1 - 14	71 - AAAG	72 - AAAG	70 - AAAG	75 - AAAG	76 - AAAG	2 - 3 1/4
1 3/4	1 1/4 - 12	71 - AAAH	72 - AAAH	70 - AAAH	75 - AAAH	76 - AAAH	2 1/2 - 4
2	1 1/2 - 12	71 - AAAJ	72 - AAAJ	70 - AAAJ	75 - AAAJ	76 - AAAJ	3 1/4 - 5
2 1/2	1 7/8 - 12	71 - AAAK	72 - AAAK	70 - AAAK	75 - AAAK	76 - AAAK	4 - 6
3	2 1/4 - 12	71 - AAAL	72 - AAAL	70 - AAAL	-	-	5 - 7
3 1/2	2 1/2 - 12	71 - AAAM	72 - AAAM	70 - AAAM	-	-	6 - 8

70-CLEVIS PIN		
PART NO.	CD	CL
70 - AAAD	1/2	17/8
70 - AAAE	3/4	25/8
70 - AAAG	1	31/8
70 - AAAH	1 3/8	41/8
70 - AAAJ	1 3/4	51/8
70 - AAAK	2	5 1/2
70 - AAAL	2 1/2	6 3/16
70 - AAAM	3	6 1/4

71-ROD CLEVIS							
PART NO.	A	CB	CD	CE	CW	ER	KK
71 - AAAD	3/4	3/4	1/2	1 1/2	1/2	1/2	7/16 - 20
71 - AAAE	1 1/8	1 1/4	3/4	2 3/8	5/8	3/4	3/4 - 16
71 - AAAG	1 5/8	1 1/2	1	3 1/8	3/4	1	1 - 14
71 - AAAH	2	2	13/8	4 1/8	1	13/8	1 1/4 - 12
71 - AAAJ	2 1/4	2 1/2	13/4	4 1/2	1 1/4	13/4	1 1/2 - 12
71 - AAAK	3	2 1/2	2	5 1/2	1 1/4	2	1 7/8 - 12
71 - AAAL	3 1/2	3	2 1/2	6 1/2	1 1/2	2 1/2	2 1/4 - 12
71 - AAAM	3 1/2	3	3	6 3/4	1 1/2	2 3/4	2 1/2 - 12

72-ROD EYE							
PART NO.	A	CA	CB	CD	CT	ER	KK
72 - AAAD	3/4	1 1/2	3/4	1/2	1	5/8	7/16 - 20
72 - AAAE	1 1/8	2 1/16	1 1/4	3/4	1 1/2	7/8	3/4 - 16
72 - AAAG	1 5/8	2 13/16	1 1/2	1	2	13/16	1 - 14
72 - AAAH	2	37/16	2	1 3/8	2 3/4	19/16	1 1/4 - 12
72 - AAAJ	2 1/4	4	2 1/2	1 3/4	3 1/2	2	1 1/2 - 12
72 - AAAK	3 1/2	5	2 1/2	2	4	2 1/2	1 7/8 - 12
72 - AAAL	3 1/2	5 13/16	3	2 1/2	5	2 13/16	2 1/4 - 12
72 - AAAM	3 1/2	6 1/8	3	3	6	3 1/4	2 1/2 - 12

75-CLEVIS BRACKET										
PART NO.	CB	CD	CW	DD	E	F	FL	LR	MR	R
75 - AAAD	3/4	1/2	1/2	3/8 - 24	2 1/2	3/8	11/8	1/2	9/16	1.63
75 - AAAE	1 1/4	3/4	5/8	1 1/2 - 20	3 1/2	5/8	17/8	1 1/16	11/16	2.55
75 - AAAG	1 1/2	1	3/4	5 5/8 - 18	4 1/2	3/4	2 1/4	1 1/4	11/8	3.25
75 - AAAH	2	1 3/8	1	5 5/8 - 18	5	7/8	3	17/8	13/4	3.82
75 - AAAJ	2 1/2	1 3/4	1 1/4	7 7/8 - 14	6 1/2	7/8	3 1/8	2	17/8	4.95
75 - AAAK	2 1/2	2	1 1/4	1 - 14	7 1/2	1	3 1/2	2 1/8	2 1/8	5.73
75 - AAAL	3	2 1/2	1 1/2	1 1/8 - 12	8 1/2	1	4	2 5/8	2 1/2	6.59
75 - AAAM	3	3	1 1/2	1 1/4 - 12	9 1/2	1	4 1/4	2 7/8	2 3/4	7.50

76-EYE BRACKET									
PART NO.	CB	CD	DD	E	F	FL	LR	MR	R
76 - AAAD	3/4	1/2	13/32	2 1/2	3/8	11/8	3/4	9/16	1.63
76 - AAAE	1 1/4	3/4	17/32	3 1/2	5/8	17/8	1 1/4	7/8	2.55
76 - AAAG	1 1/2	1	21/32	4 1/2	3/4	2 1/4	1 1/2	1 1/4	3.25
76 - AAAH	2	1 3/8	21/32	5	7/8	3	2 1/8	15/8	3.82
76 - AAAJ	2 1/2	1 3/4	29/32	6 1/2	7/8	3 1/8	2 1/4	2 1/8	4.95
76 - AAAK	2 1/2	2	11/16	7 1/2	1	3 1/2	2 1/2	27/16	5.73
76 - AAAL	3	2 1/2	13/16	8 1/2	1	4	3	3	6.59
76 - AAAM	3	3	15/16	9 1/2	1	4 1/4	3 1/4	3 1/4	7.50

Rod accessories 4" - 4 1/2" - 5" available on request.

HP 3000 SERIES

HEAVY DUTY HYDRAULIC CYLINDERS

FORCE AND VOLUME CHART

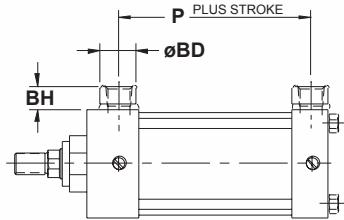
Technical data

BORE SIZE	PISTON AREA	EXTENSION THRUST IN LBS										VOLUME PER INCH OF STROKE	
		PRESSURE IN PSI										SQUARE FEET	US GAL.
1 1/2	1.77	884	1,325	1,767	2,209	2,651	3,093	3,534	3,976	4,418	5,301	0.00102	0.0076
2	3.14	1571	2,356	3,142	3,927	4,712	5,498	6,283	7,069	7,854	9,425	0.00182	0.0136
2 1/2	4.91	2,454	3,682	4,909	6,136	7,363	8,590	9,817	11,045	12,272	14,726	0.00284	0.0212
3 1/4	8.30	4,148	6,222	8,296	10,370	12,444	14,518	16,592	18,665	20,739	24,887	0.00480	0.0359
4	12.57	6,283	9,425	12,566	15,708	18,850	21,991	25,133	28,274	31,416	37,699	0.00727	0.0544
5	19.63	9,817	14,726	19,635	24,544	29,452	34,361	39,270	44,179	49,087	58,905	0.01136	0.0850
6	28.27	14,137	21,206	28,274	35,343	42,412	49,480	56,549	63,617	70,686	84,823	0.01636	0.1224
7	38.48	19,242	28,863	38,485	48,106	57,727	67,348	76,969	86,590	96,211	115,454	0.02227	0.1666
8	50.27	25,133	37,699	50,265	62,832	75,398	87,965	100,531	113,097	125,664	150,796	0.02909	0.2176

ROD DIA.	ROD AREA	RETRACTION THRUST IN LBS										VOLUME PER INCH OF STROKE	
		PRESSURE IN PSI										SQUARE FEET	US GAL.
5/8	0.31	153	230	307	383	460	537	614	690	767	920	0.00018	0.0013
1	0.79	393	589	785	982	1,178	1,374	1,571	1,767	1,963	2,356	0.00045	0.0034
1 3/8	1.48	742	1,114	1,485	1,856	2,227	2,599	2,970	3,341	3,712	4,455	0.00086	0.0064
1 3/4	2.41	1,203	1,804	2,405	3,007	3,608	4,209	4,811	5,412	6,013	7,216	0.00139	0.0104
2	3.14	1,571	2,356	3,142	3,927	4,712	5,498	6,283	7,069	7,854	9,425	0.00182	0.0136
2 1/2	4.91	2,454	3,682	4,909	6,136	7,363	8,590	9,817	11,045	12,272	14,726	0.00284	0.0212
3	7.07	3,534	5,301	7,069	8,836	10,603	12,370	14,137	15,904	17,671	21,206	0.00409	0.0306
3 1/2	9.62	4,811	7,216	9,621	12,026	14,432	16,837	19,242	21,648	24,053	28,863	0.00557	0.0416
4	12.57	6,283	9,425	12,566	15,708	18,850	21,991	25,133	28,274	31,416	37,699	0.00727	0.0544
4 1/2	15.90	7,952	11,928	15,904	19,880	23,856	27,833	31,809	35,785	39,761	47,713	0.00920	0.0688

PORTS

As a standard, the HP Series cylinder ports are built to accept SAE-O-ring connectors. As optional equipment, the cylinder can also be supplied with NPTF type ports at no extra charge. Oversized ports are available for both types of connections allowing higher fluid flow rates. For these applications, the coupling connections are welded on both ends of the cylinder, as shown below.



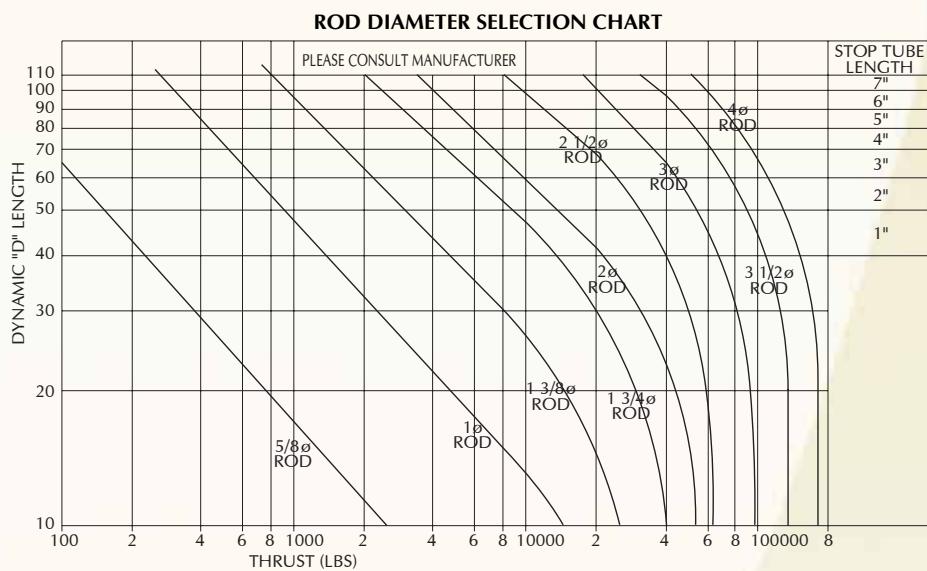
OVERSIZED PORTS							
BORE SIZE	STD. SAE	OPT. NPTF	XX SAE	XX NPTF	BD	BH	P
1 1/2	-10	1/2	-12	3/4	1 3/8	1	3
2	-10	1/2	-12	3/4	1 3/8	1	3
2 1/2	-10	1/2	-12	3/4	1 3/8	1	3 3/8
3 1/4	-12	3/4	-16	1	1 3/4	1 1/4	3 1/2
4	-12	3/4	-16	1	1 3/4	1 1/4	3 3/4
5	-12	3/4	-16	1	1 3/4	1 1/4	4 1/4
6	-16	1	-20	1 1/4	2 1/4	1 1/2	5 1/4
7	-20	1 1/4	-24	1 1/2	2 1/2	1 3/4	5 1/2
8	-24	1 1/2	-24	2	3	1 3/4	6 1/4

PISTON ROD DIMENSION AND STOP TUBE SELECTION

Applications that require long extended (push) stroke or an extended piston rod may require an oversized piston rod to avoid any buckling. Furthermore, if the cylinder is working under extension, or if it is installed horizontally, the installation of a stop tube might be necessary to avoid premature wear of the end stroke guides.

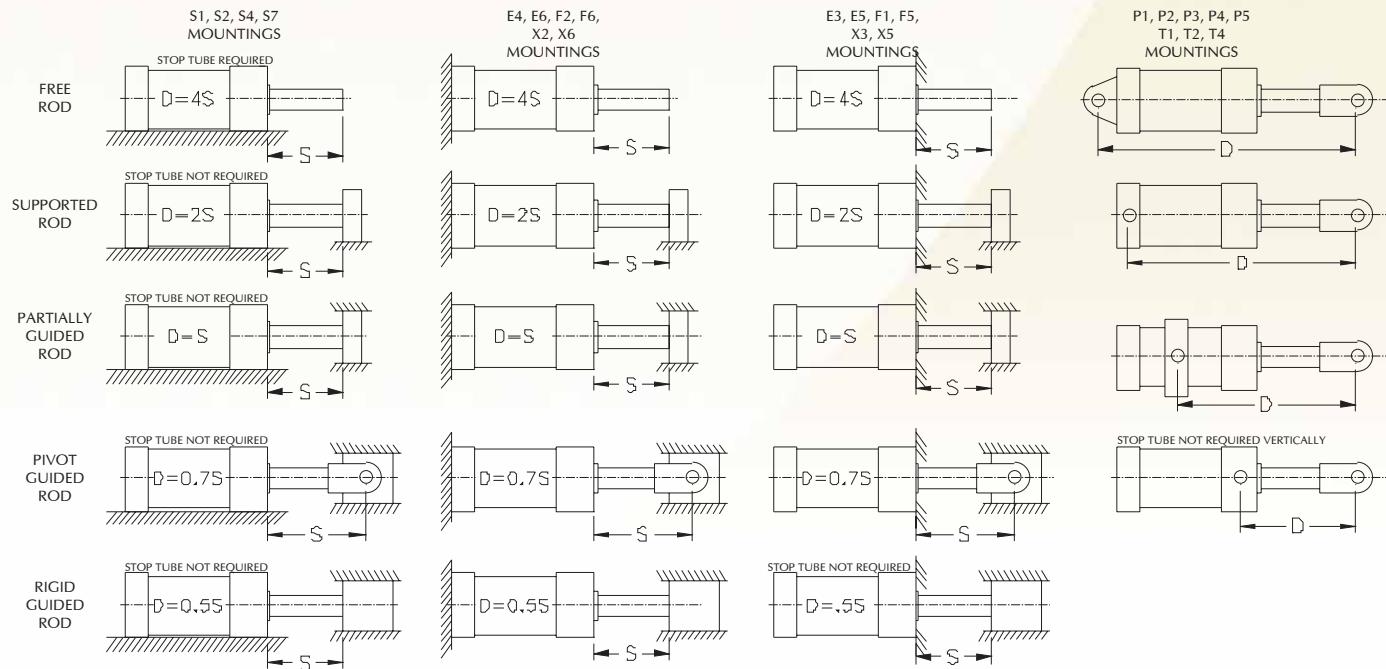
How to select the piston rod diameter

- 1) Determine the cylinder extension thrust by using the force chart on page 17.
- 2) Select the mounting for your application from the diagrams below.
- 3) Use the dimension diagrams below to help you calculate the dynamic length "D".
- 4) Locate the intersection point where the thrust and the "D" length meet on the selection chart to the right. The minimum piston rod diameter required is indicated on the diagonal line immediately above the point.



How to calculate the stop tube

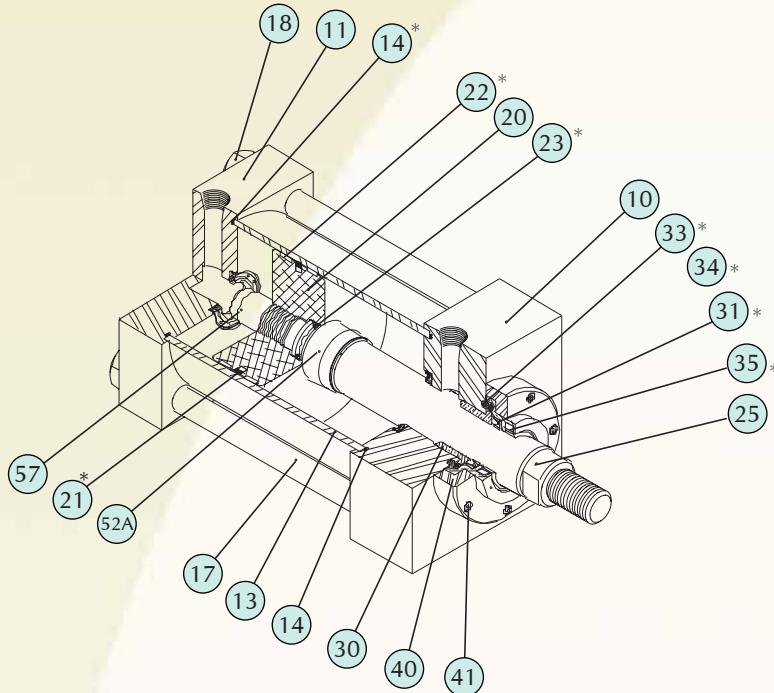
The stop tube is a spacer between the head end and the piston. The separation reduces the lateral force on the piston preventing premature barrel and gland bushing wear. We recommend a stop tube when the "D" length is over 40 inches. One inch of stop tube length is recommended for every 10 inches (or fraction thereof) of "D" length. The stop tube is not required for vertically mounted cylinders or applications working under pulling forces (retraction) only.



REPLACEMENT PARTS

The spare parts and seal kits can be ordered, using part number prefix followed by the cylinder model number. Ex.: 20 – HP 3000 GG1BE5 – 12 → Piston.

It is recommended to provide the cylinder serial number to facilitate inquiries for part replacement.



**Recommended torque chart
for tie rods**

(54)(55)* Not shown

BORE SIZE	TIE RODS DIA.	TORQUE (FT-LBS)
		TIE RODS
1 1/2	3/8	15
2 - 2 1/2	1/2	45
3 1/4 - 4	5/8	125
5	7/8	310
6	1	525
7	1 1/8	810
8	1 1/4	1180

WARRANTY

RDC Contrôle Ltée, hereinafter referred to as The Seller, warrants products of its manufacture to be free from defects in material or workmanship under normal use for 12 months after the date of original shipment from the factory.

The liability of The Seller is limited to the repair or replacement of the defective component or product, at The Seller's option, during the warranty period only if factory inspection shows no external affects or customer repair has altered the functioning of the product. All transportation costs are for the buyer's account.

All defective parts must be returned to RDC Contrôle Ltée within the warranty period after shipment by RDC Contrôle Ltée. Written permission for such return must first be obtained. A complete explanation is required of the defect and circumstances.

Any alteration or repair of the goods by the party not authorized by RDC Contrôle Ltée without specific written consent shall automatically terminate the warranty obligations.

In no event shall The Seller be liable for any incidental, consequential or special damages or any kind or nature whatsoever, including but not limited to lost profits arising from or in any way connected with this agreement or items sold hereunder, whether alleged to arise from breach of contract express or implied warranty, or in tort,

Parts	Description	Qty
10	Head	1
11	Cap	1
13	Barrel	1
14*	Barrel seal	2
17	Tie rod	4
18	Tie rod nuts	4
20	Piston	1
21*	Piston packing	1
22*	Piston wear strip	1
23*	Piston O-ring	1
25	Piston rod	1
30	Gland bushing	1
31*	Gland packing	1
33*	Gland O-ring & Backup Ring	1
35*	Rod wiper	1
40	Gland retainer plate	1
41	Retainer plate screws	6
52	Head end cushion plunger	1
54	Cushion adjustment screw	2
55*	Adjustment screw seal (O-ring)	2
57	Cap end cushion plunger	1

Seal repair Kit

19	For barrel (part #14)
29	For piston (parts #21 and 22)
39	For gland bushing (parts #31, 33, 35)
38	Bushing and seals (parts #30, 31, 33, 35)
99	Complete (parts marked with an *)

Please request our IOM manual for more detailed maintenance instructions on the HP Series Cylinders.

including without limitation, negligence, failure to warn or strict liability.

This warranty shall be rendered null and void when, in the judgement of RDC Contrôle Ltée, the equipment has been subject to abnormal or abusive use or lack of proper care and maintenance by the buyer, or when it has been determined that environmental or application conditions have exceeded those specified for normal use of a specific product.

Notwithstanding the foregoing, there are no warranties whatsoever on items built wholly or partially, to buyer's design or specifications.

Finished materials and accessories purchased from other manufacturers are warranted only to the extent of the manufacturers' warranty to the seller.

The Seller makes no warranty of any kind whatsoever, expressed or implied, other than as specifically stated herein; and there are no warranties of merchantability and/or fitness for a particular purpose which exceed the obligations and warranties specifically stated herein.

Parts furnished without charge as replacements for original parts under warranty are warranted for the remainder of the original warranty period.

Product Code

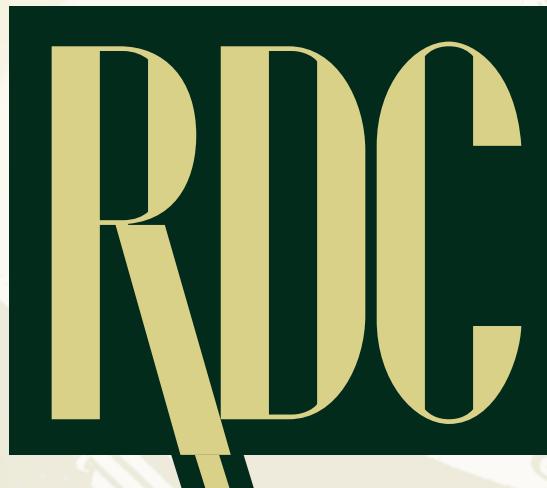
Series	Bore (in)	Rod Diameter (in)	Thread	Cushion	Mounting	Option
HP 3000	C - 1 1/2 D - 2 E - 2 1/2 G - 3 1/4 H - 4 K - 5 L - 6 M - 7 N - 8 P - 10 R - 12 S - 14	D - 5/8 E - 1 G - 1 3/8 H - 1 3/4 J - 2 K - 2 1/2 L - 3 M - 3 1/2 N - 4 P - 4 1/2 R - 5 Z - Other	1 - Small male 2 - Intermediate male 3 - Full male 4 - Female 6 - Metric 7 - Shoulder rod end 8 - Special female 9 - Special male	B - Both ends F - Cap end H - Head end N - None	VR - RDC valve mount VF - Customer valve mount E3 - Square head E4 - Square cap E5 - Rectangular head F1 - Head end rectangular flange F2 - Cap end rectangular flange F5 - Head end square flange F6 - Cap end square flange P1 - Cap fixed clevis P2 - Cap detachable clevis P3 - Cap fixed eye P4 - Cap detachable eye S1 - Parallel base mount S2 - Side lugs mount S4 - Side tapped holes S7 - End lugs mount T1 - Head trunnion T2 - Cap trunnion T4 - intermediate trunnion X1 - Extended tie rods both ends X2 - Extended tie rods cap end X3 - Extended tie rods head end X4 - Two tie rods extended both ends E9 - Special head or cap mount F9 - Special flange mount X9 - Special extended tie rods Z9 - Other special mount	A - Stroke adjustment B - Rod boot Dimension change C - Extended tie rods head end : BB C - Port dimension : EE C - Dimension between head and beginning of piston rod threads : W C - Extended tie rods cap end : K D - Double rod E - Eyebolt F - 4 wrench flats J - Rod extention Material change K1 - Piston rod K4 - Head, cap, piston rod, tie rods, nuts, piston, barrel: stainless steel K7 - Viton seals K9 - Others (can be equal to other K combination) L - Permanent lubrication M - Magnetic piston N - Four supplementary nuts P - Port position change R - Rod scraper T - Stop tube V - Manual override W - AWWA specification X - Spring to extend Y - Spring to retract Z - Other special option 1 - Mechanical switch 2 - Limit switch 3 - Transducer 4 - Solenoid valve 8 - Positionner

Example 1

HP 3000 Hydraulic Cylinder 3000 psi	L 6" Bore	E 2.5" Rod Dia	4 Female Threads	N None Cushions	X3 Extended tie rods head end	E Eyebolt	N Four supplementary nuts	-	10.00 10" Stroke
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Example 2

HP 3000 Hydraulic Cylinder 3000 psi	L 6" Bore	E 2.5" Rod Dia	4 Female Threads	N None Cushions	E5 Rectangular head	C -> Dim. Change -> W = 6.5"	E Eyebolt	K1 Piston rod -> Material Change -> 17-4SS rod	10.00 10" Stroke
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