

HP Series High Pressure Hydraulic Cylinders

**210 bar pressure rating conforming to NFPA and ANSI
Standard B93.15-1981**

PTE HYDRAULICS

HP Series Industrial Hydraulic Cylinders

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Note: All dimensions, length and diameter, are in millimeters unless otherwise specified.

Disclaimer.

Please note that all care has been taken in the compilation of this catalogue. However through design and manufacturing improvement there will be changes. All care will be taken to ensure that the latest information is supplied to you.

PTE Hydraulics can assist in many ways to help in the selection of the desired cylinder to perform the task you have in mind, it is however the responsibility of the purchaser that they have, through their own analysis, selected the correct cylinder for their application.

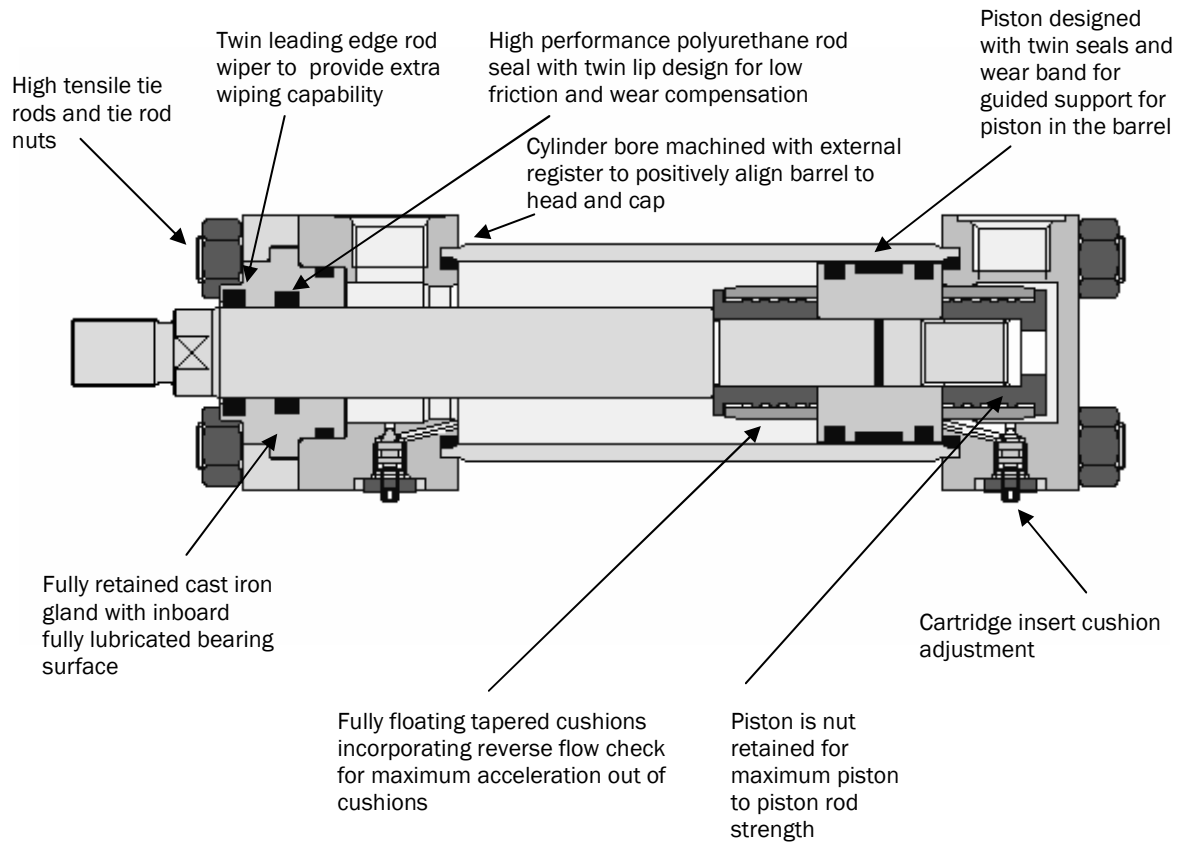
Please remember that hydraulic systems, through the pressure that they employ and the tasks they are required to perform, can in fact present a potentially fatal environment for the users.

Therefore workplace safety must have the highest priority in the selection and installation of the cylinders.

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HP Series Industrial Hydraulic Cylinders

Cylinder features and description



Cushions and Adjustment

The HP series cylinder incorporates cushioning devices that under normal operating conditions will compensate for variations of load and piston rod speed. This feature allows the cushion to be set within your parameters and will self compensate for variations around your primary setting.

Coupled with this innovation in cushioning PTE has introduced positive contained cushion adjustment screws that are there to prevent accidental "blow-out" due to the adjustment screws being accidentally backed out too far.

Piston Rod Securing

Piston to piston rod securing is achieved by positive location by the use of a securing nut which is an integral part of the cushion assembly, this method eliminates the need for locking agents that can fail due to operating conditions to which the cylinder is subjected. The design in itself allows for easier repair should components need to be replaced.

Seals

Seals are predominately polyurethane in construction which has been identified as a long life material that offers low levels of friction and excellent sealing properties. The design criteria of seal selection has been one of maximum performance with profiles being selected to give the longest life under various operating conditions.

Barrel Alignment

Positive barrel location is achieved by a machined spigot for the barrel to locate on as well as a recessed groove that locates the barrel into the end caps. This allows for correct alignment and ensures concentricity.

Rod Gland

Piston rod gland is captive under the gland retainer ensuring that there is no possibility of glands screwing out when the rod is under load. The gland is in itself a cartridge that contains both rod seal and rod wiper. The bearing surface of the gland is continually immersed in system fluid therefore aiding lubrication and cooling.

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HP Series Industrial Hydraulic Cylinders

PTE Hydraulics HP Series Industrial Cylinder range overview

Basic Specifications

- Conforming to NFPA Mounting Configurations
- Rated maximum pressure 210 Bar (3000 psi)
- 7 bore sizes

Mountings

All mountings offered with the PTE HP Series cylinders conform to NFPA Standards and are inter-changeable with all other manufacturers building to the same industrial standards (NFPA and ANSI standard B93.15-1981 mounting dimensions)

Mounting selection is a critical part of specifying the correct cylinder for the application as this is the number one reason for premature failure of a hydraulic cylinder either from rod buckling or rod gland failure coupled with damage to cylinder bore and piston.

Optimum mounting guidelines are included in the engineering data section of this catalogue, this section includes the use of stop tubes.

Pressure Ratings

The HP Series cylinder is designed for pressures to 210 bar under normal operating conditions with hydraulic mineral based oil.

Several factors effect the reliability of the cylinder including stroke length, mounting style and rod speed.

Please note that many mounts have reduced load capacity, also see the section of the catalogue regarding piston rod strength.

Please consult PTE for detailed calculations

Operating Conditions

The cylinders are designed to operate in a temperature range of -20°C through to $+90^{\circ}\text{C}$ using a high quality mineral based oil of 15-68 cSt range. Other fluids can be used in conjunction with compatible seals. PTE offers a wide range of seals so please specify fluid type when ordering.

For operating conditions outside of an internal industrial application we stress the need to consider environmental conditions such as rain, dust, radiated heat etc as these will also have a detrimental effect on cylinder life. However if your application does contain such adverse elements PTE can modify the cylinder with seals, paint finish etc that is in keeping with your environmental constraints.

Stroke Length

The HP series is available in any realistic stroke length depending upon material availability. However it must be remembered that long stroke lengths have a major impact on the physical structure of the cylinder, effecting the major components of mounting style, piston rod diameter and port sizing.

All care is taken in manufacture but accumulated tolerances will have an effect on the accuracy of the cylinder.

The stroke tolerances for the PTE HP series cylinder are; strokes up to 600mm the tolerance is $+0.8\text{ mm}$ to -0.5mm .

Strokes from 600mm to 1500mm have $+0.8\text{mm}$ to -0.6mm , strokes greater than 1500mm the tolerance is $+0.9\text{ mm}$ to -0.8mm .

For special requirements please consult PTE.

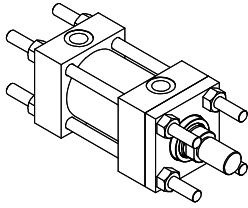
Special assemblies from Standard Components

Each of the cylinder mountings shown can be incorporated into various combinations to suit your exact requirements. This covers mounting modifications through to port and cushion adjustment locations. Due to the cushion check assembly being an integral part of the piston assembly the HP series, has in effect, an extra surface on the head and cap for the inclusion of such options as oversize ports, dual ports, proximity switches etc without creating a mechanical solution that becomes too complex.

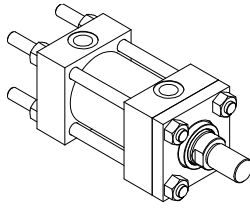
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HP Series Industrial Hydraulic Cylinders

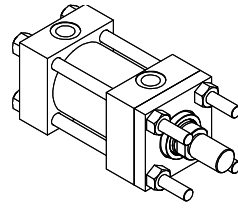
Available Mounting Styles



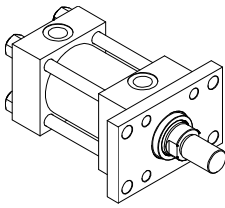
Tie Rod Extended Both Ends Style MX1



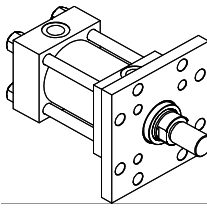
Tie Rod Extended Cap Style MX2



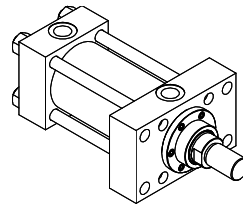
Tie Rod Extended Head Style MX3



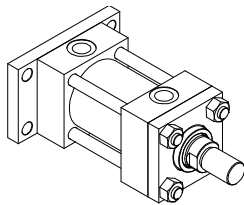
Rectangular Head Flange Style MF1



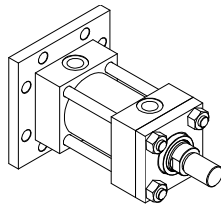
Square Head Flange Style MF5



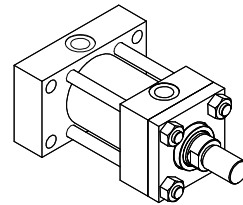
Rectangular Head Mount Style ME5



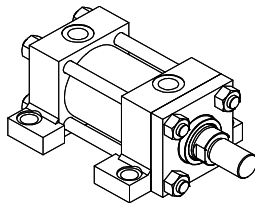
Rectangular Cap Flange Style MF2



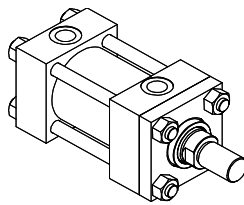
Square Cap Flange Style MF6



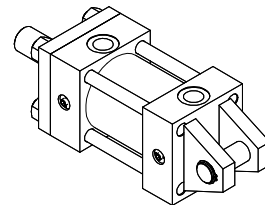
Rectangular Cap Mount Style ME6



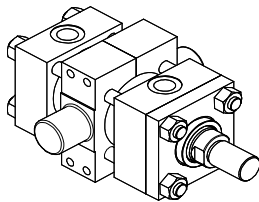
Side Lug Style MS2



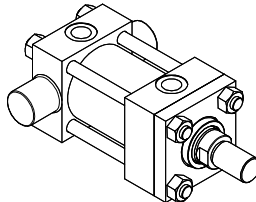
Tapped Mount Style MS4



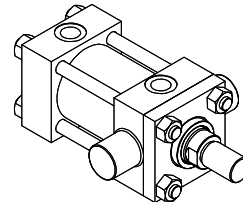
Cap Fixed Clevis Style MP1



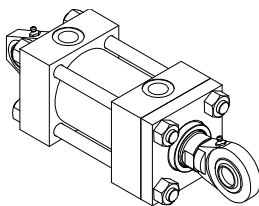
Center Trunnion Style MT4



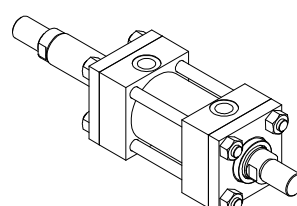
Cap Trunnion Style MT2



Head Trunnion Style MT1



Spherical Bearing Style SB



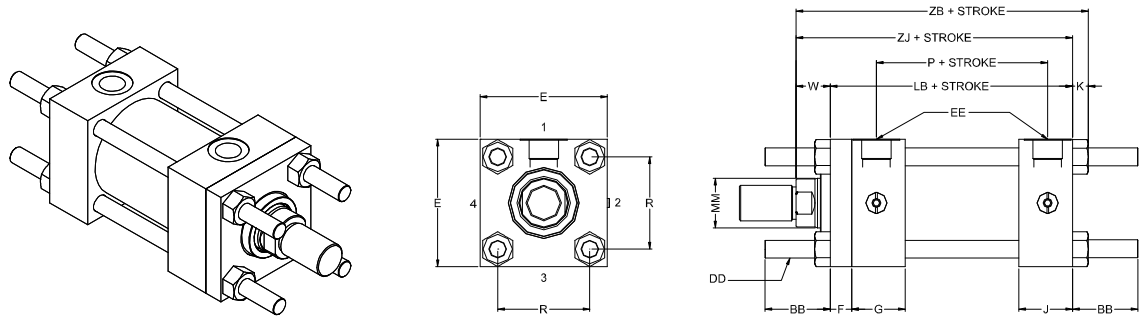
Double Rod Style

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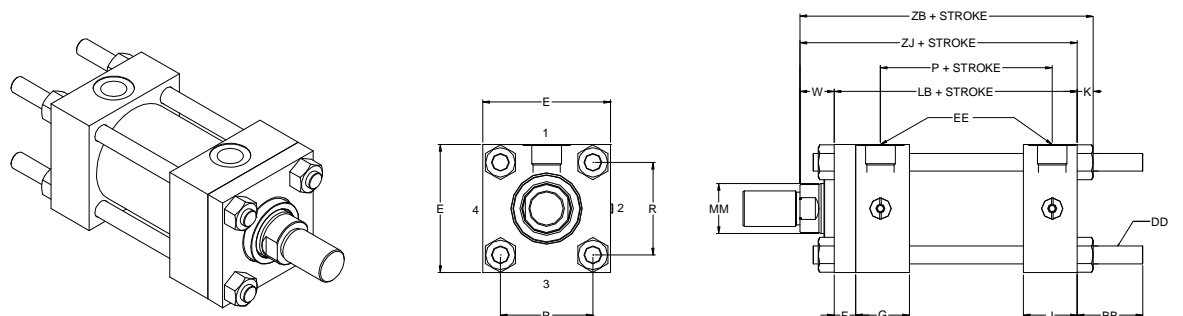
HP Series Industrial Hydraulic Cylinders

HP mounting styles MX1, MX2 and MX3

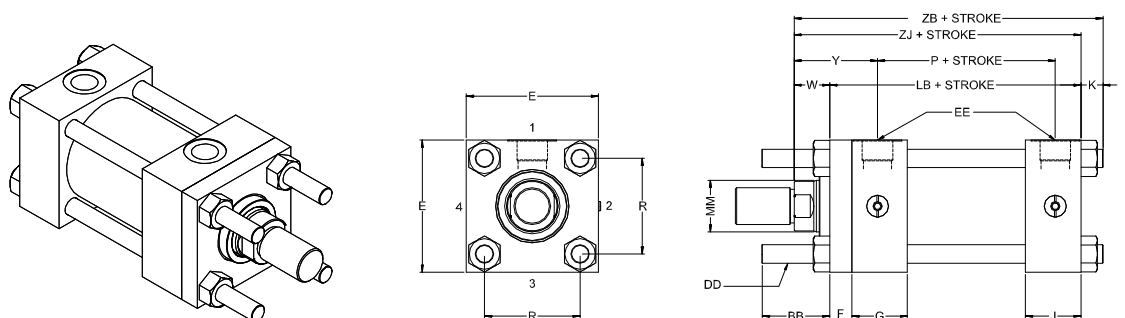
Tie Rods Extended Both Ends
Style MX1



Tie Rods Extended Cap End
Style MX2



Tie Rods Extended Head End
Style MX3



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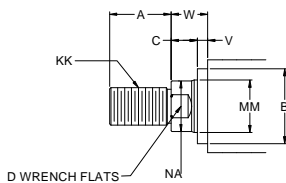
HP Series Industrial Hydraulic Cylinders

HP mounting styles MX1, MX2 and MX3

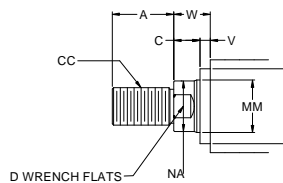
Mounting and Envelope Dimensions

Bore	BB	DD	E	BSPP		F	G	J	K	R	ADD STROKE	
				EE							LB	P
1.50" (38.10)	34.90	3/8-24	63.50	1/2"		9.50	44.50	38.10	9.50	41.40	127.00	73.00
2.00" (50.80)	46.00	1/2-20	76.20	1/2"		15.90	44.50	38.10	11.10	52.10	133.40	73.00
2.50" (63.50)	46.00	1/2-20	88.90	1/2"		15.90	44.50	38.10	11.10	64.80	136.50	76.20
3.25" (82.60)	58.70	5/8-18	114.30	3/4"		19.10	50.80	44.50	14.30	82.60	158.80	88.90
4.00" (101.60)	58.70	5/8-18	127.00	3/4"		22.20	50.80	44.50	14.30	97.00	168.30	95.30
5.00" (127.00)	81.00	7/8-14	165.10	3/4"		22.20	50.80	44.50	20.60	125.70	181.00	108.00
6.00" (152.40)	92.10	1-14	190.50	1"		25.40	57.20	57.20	22.20	145.50	212.70	123.80

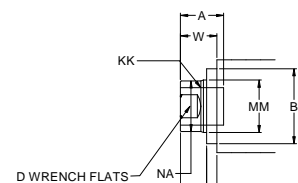
ROD END STYLE 1
SMALL MALE
(NFPA STYLE SM)



ROD END STYLE 2
INTERMEDIATE MALE
(NFPA STYLE IM)



ROD END STYLE 3
SMALL FEMALE
(NFPA STYLE SF)



Note: When specifying an extended rod, select the standard **"W"** dimension which corresponds to the cylinder bore and rod diameter that you have selected. Calculate the rod extension that you require then add this to the standard **"W"** dimension. The rod end style you nominate upon ordering is style 4 which shows that the rod end is to customer specification. It is also recommended that you reconfirm the **"KK"** and **"A"** dimensions on the order.

Piston Rod Dimensions

Mounting and Envelope Dimensions

Bore	Rod #	Rod Dia MM (inch)	Thread ins/tpi		A	B	C	D	NA	V	W	ADD STROKE	
			Style 1&3 (KK)	Style 2 (CC)								ZB	ZJ
1.50" (38.10)	1	5/8	7/16-20	1/2-20	19.05	28.55	9.50	12.70	14.30	6.40	15.90	152.40	142.90
	2	1	3/4-16	7/8-14	28.60	38.07	12.70	22.23	23.81	12.70	25.40	161.90	152.40
2.00" (50.80)	1	1	3/4-16	7/8-14	28.60	38.07	12.70	22.23	23.81	6.40	19.05	163.50	152.50
	2	1 3/8	1-14	1 1/4-12	41.30	50.77	15.90	28.58	33.34	9.50	25.40	169.90	158.80
2.50" (63.50)	1	1	3/4-16	7/8-14	28.60	38.07	12.70	22.23	23.81	6.40	19.05	166.70	155.60
	2	1 3/8	1-14	1 1/4-12	41.30	50.77	15.90	28.70	33.34	9.50	25.40	173.00	161.90
3.25" (82.60)	1	1 3/8	1-14	1 1/4-12	41.30	50.77	15.90	28.57	33.34	6.40	22.20	195.30	181.00
	2	1 3/4	1 1/4-12	1 1/2-12	50.80	60.30	19.10	38.10	42.86	9.50	28.60	201.60	187.40
4.00" (101.60)	1	1 3/4	1 1/4-12	1 1/2-12	50.80	60.30	19.10	38.10	42.86	6.40	25.40	208.00	193.70
	2	2	1 1/2-12	1 3/4-12	57.15	66.65	22.20	42.86	49.21	6.40	28.60	211.10	196.90
5.00" (127.00)	1	2	1 1/2-12	1 3/4-12	57.15	66.65	22.20	42.86	49.21	6.40	28.60	230.19	209.55
	2	2 1/2	1 7/8-12	2 1/4-12	76.20	79.35	25.40	52.39	60.33	9.50	34.93	236.54	215.90
6.00" (152.40)	1	2 1/2	1 7/8-12	2 1/4-12	76.20	79.35	25.40	52.39	60.33	6.40	31.75	266.70	244.47
	2	3	2 1/4-12	2 3/4-12	88.90	95.22	25.40	66.68	73.03	6.40	31.75	266.70	244.47

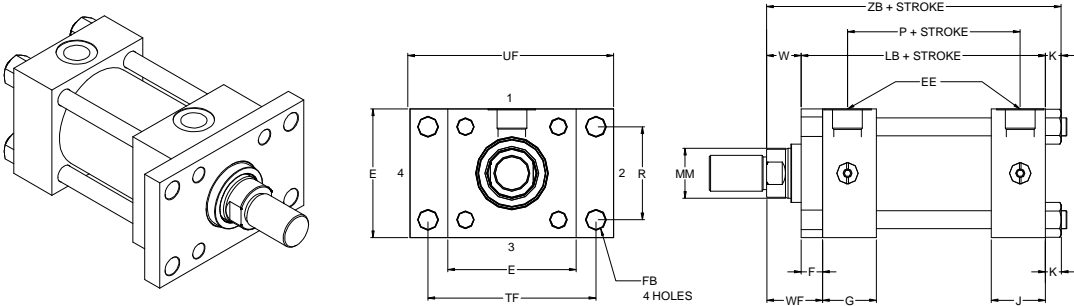
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HP Series Industrial Hydraulic Cylinders

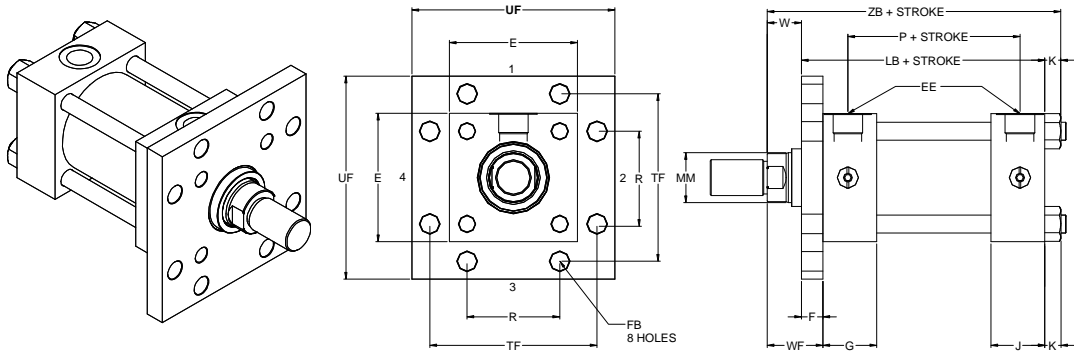
HP mounting styles MF1, MF5 and ME5

MF1 Mounting Restriction	
Bore	Max Push Pressure
1.50" (38.10)	65 bar
2.00" (50.80)	82 bar
2.50" (63.50)	108 bar
3.25" (82.60)	100 bar
4.00" (101.60)	114 bar
5.00" (127.00)	69 bar
6.00" (152.40)	75 bar

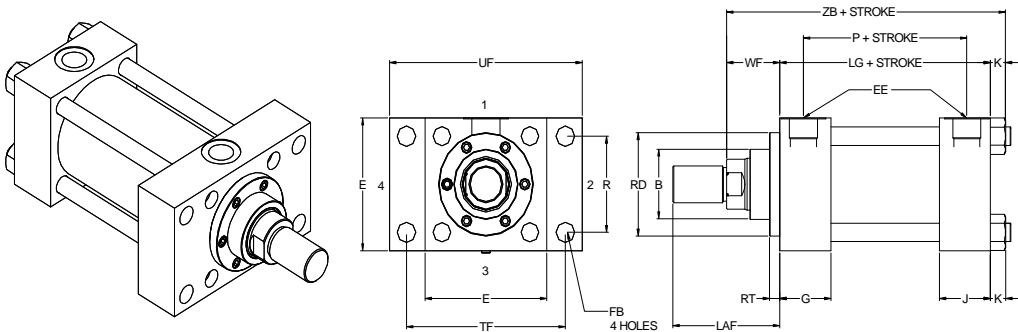
Head Rectangular Flange
Mounting
Style MF1



Head Square Flange Mounting
Style MF5



Head Rectangular Mounting
Style ME5



Note: Cushion adjustment for **Style ME5** is only available in position **3**

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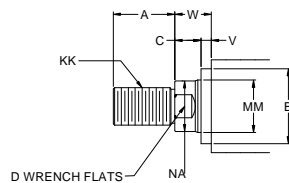
HP Series Industrial Hydraulic Cylinders

HP mounting styles MF1, MF5 and ME5

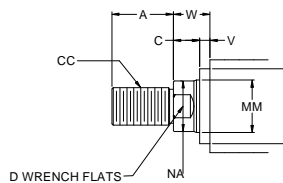
Mounting and Envelope Dimensions

Bore	TF	UF	FB	E	BSPP	F	G	J	K	R	ADD TO STROKE		
					EE						LB	P	LG
1.50" (38.10)	87.30	108.00	11.10	63.50	1/2"	9.50	44.50	38.10	9.50	41.40	127.00	73.00	117.50
2.00" (50.80)	104.80	130.20	14.30	76.20	1/2"	15.90	44.50	38.10	11.10	52.10	133.40	73.00	117.50
2.50" (63.50)	117.50	142.90	14.30	88.90	1/2"	15.90	44.50	38.10	11.10	64.80	136.50	76.20	120.70
3.25" (82.60)	149.20	181.00	17.50	114.30	3/4"	19.10	50.80	44.50	14.30	82.60	158.80	88.90	139.70
4.00" (101.60)	161.90	193.70	17.50	127.00	3/4"	22.20	50.80	44.50	14.30	97.00	168.30	95.30	146.00
5.00" (127.00)	208.00	247.70	23.80	165.10	3/4"	22.20	50.80	44.50	20.60	125.70	181.00	108.00	158.80
6.00" (152.40)	239.70	285.80	27.00	190.50	1"	25.40	57.20	57.20	22.20	145.50	212.70	123.80	187.30

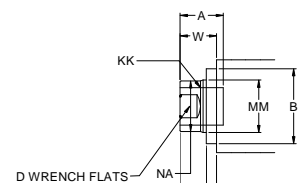
ROD END STYLE 1
SMALL MALE
(NFPA STYLE SM)



ROD END STYLE 2
INTERMEDIATE MALE
(NFPA STYLE IM)



ROD END STYLE 3
SMALL FEMALE
(NFPA STYLE SF)



Note: When specifying an extended rod, select the standard **"W" dimension** which corresponds to the cylinder bore and rod diameter that you have selected. Calculate the rod extension that you require then add this to the standard **"W" dimension**. The rod end style you nominate upon ordering is style 4 which shows that the rod end is to customer specification. It is also recommended that you reconfirm the **"KK"** and **"A"** dimensions on the order.

Piston Rod Dimensions

Mounting and Envelope Dimensions

Bore	Rod #	Rod Dia MM (inch)	Thread ins/tpi													ADD STROKE
			Style 1&3 (KK)	Style 2 (CC)	A	B	C	D	LAF	NA	RD	RT	V	W	WF	ZB
1.50" (38.10)	1	5/8	7/16-20	1/2-20	19.05	28.55	9.50	12.70	44.45	14.30	53.98	9.53	6.40	15.90	25.40	152.40
	2	1	3/4-16	7/8-14	28.60	38.07	12.70	22.23	63.50	23.81	63.50	9.53	12.70	25.40	34.93	161.90
2.00" (50.80)	1	1	3/4-16	7/8-14	28.60	38.07	12.70	22.23	63.50	23.81	63.50	9.53	6.40	19.05	34.93	163.50
	2	1 3/8	1-14	1 1/4-12	41.30	50.77	15.90	28.58	82.55	33.34	76.20	9.53	9.50	25.40	41.28	169.90
2.50" (63.50)	1	1	3/4-16	7/8-14	28.60	38.07	12.70	22.23	63.50	23.81	63.50	9.53	6.40	19.05	34.93	166.70
	2	1 3/8	1-14	1 1/4-12	41.30	50.77	15.90	28.70	82.55	33.34	76.20	9.53	9.50	25.40	41.28	173.00
3.25" (82.60)	1	1 3/8	1-14	1 1/4-12	41.30	50.77	15.90	28.57	82.55	33.34	76.20	9.53	6.40	22.20	41.28	195.30
	2	1 3/4	1 1/4-12	1 1/2-12	50.80	60.30	19.10	38.10	98.43	42.86	88.90	9.53	9.50	28.60	47.63	201.60
4.00" (101.60)	1	1 3/4	1 1/4-12	1 1/2-12	50.80	60.30	19.10	38.10	98.43	42.86	88.90	9.53	6.40	25.40	47.63	208.00
	2	2	1 1/2-12	1 3/4-12	57.15	66.65	22.20	42.86	107.95	49.21	101.60	15.88	6.40	28.60	50.80	211.10
5.00" (127.00)	1	2	1 1/2-12	1 3/4-12	57.15	66.65	25.40	42.86	107.95	49.21	101.60	15.88	6.40	28.60	50.80	230.19
	2	2 1/2	1 7/8-12	2 1/4-12	76.20	79.35	25.40	52.39	133.35	60.33	114.30	15.88	9.50	34.93	57.15	236.54
6.00" (152.40)	1	2 1/2	1 7/8-12	2 1/4-12	76.20	79.35	25.40	52.39	133.35	60.33	114.30	15.88	6.40	31.75	57.15	266.70
	2	3	2 1/4-12	2 3/4-12	88.90	95.22	25.40	66.68	146.05	73.03	133.35	15.88	6.40	31.75	57.15	266.70

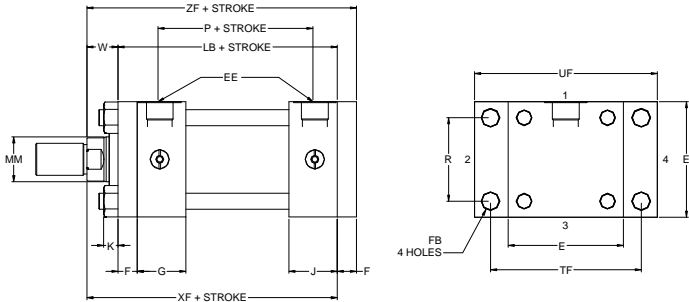
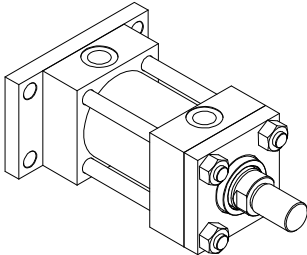
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HP Series Industrial Hydraulic Cylinders

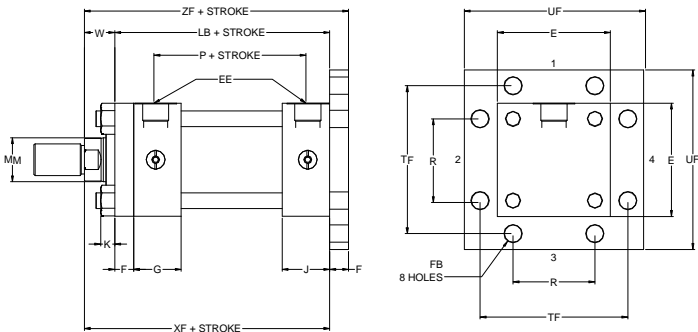
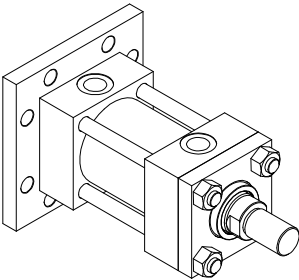
HP mounting styles MF2, MF6 and ME6

MF2 Mounting Restriction		
Maximum Pull Pressure		
Bore	Piston Rod #	
	1	2
1.50" (38.10)	186 bar	277 bar
2.00" (50.80)	210 bar	210 bar
2.50" (63.50)	210 bar	210 bar
3.25" (82.60)	204 bar	210 bar
4.00" (101.60)	210 bar	210 bar
5.00" (127.00)	136 bar	153 bar
6.00" (152.40)	127 bar	140 bar

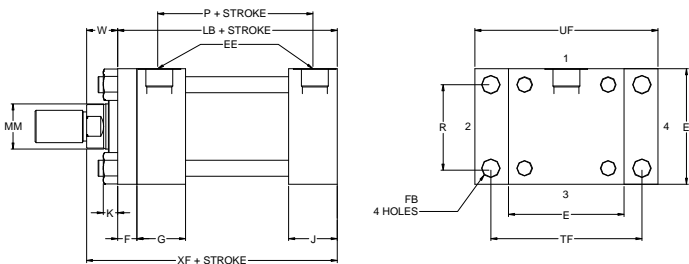
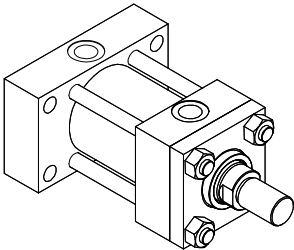
Cap Rectangular
Flange Mounting
Style MF2



Cap Square
Flange Mounting
Style MF6



Cap Rectangular Mounting
Style ME6



Note: Cushion adjustment for **Style ME6** is only available in position **3**

PTE HYDRAULICS

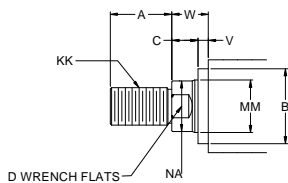
HP Series Industrial Hydraulic Cylinders

HP mounting styles MF2, MF6 and ME6

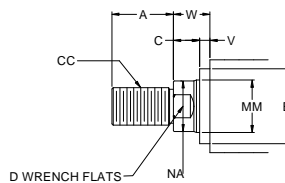
Mounting and Envelope Dimensions

Bore	E	TF	UF	F	FB	BSPP		J	K	R	ADD TO STROKE	
						EE	G				LB	P
1.50" (38.10)	63.50	87.30	108.00	9.50	11.10	1/2"	44.50	38.10	9.50	41.40	127.00	73.00
2.00" (50.80)	76.20	104.80	130.20	15.90	14.30	1/2"	44.50	38.10	11.10	52.10	133.40	73.00
2.50" (63.50)	88.90	117.50	142.90	15.90	14.30	1/2"	44.50	38.10	11.10	64.80	136.50	76.20
3.25" (82.60)	114.30	149.20	181.00	19.10	17.50	3/4"	50.80	44.50	14.30	82.60	158.80	88.90
4.00" (101.60)	127.00	161.90	193.70	22.20	17.50	3/4"	50.80	44.50	14.30	97.00	168.30	95.30
5.00" (127.00)	165.10	208.00	247.70	22.20	23.80	3/4"	50.80	44.50	20.60	125.70	181.00	108.00
6.00" (152.40)	190.50	239.70	285.80	25.40	27.00	1"	57.20	57.20	22.20	145.50	212.70	123.80

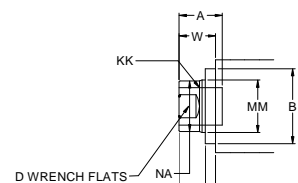
ROD END STYLE 1
SMALL MALE
(NFPA STYLE SM)



ROD END STYLE 2
INTERMEDIATE MALE
(NFPA STYLE IM)



ROD END STYLE 3
SMALL FEMALE
(NFPA STYLE SF)



Note: When specifying an extended rod, select the standard **"W"** dimension which corresponds to the cylinder bore and rod diameter that you have selected. Calculate the rod extension that you require then add this to the standard **"W"** dimension. The rod end style you nominate upon ordering is style 4 which shows that the rod end is to customer specification. It is also recommended that you reconfirm the **"KK"** and **"A"** dimensions on the order.

Piston Rod Dimensions

Mounting and Envelope Dimensions

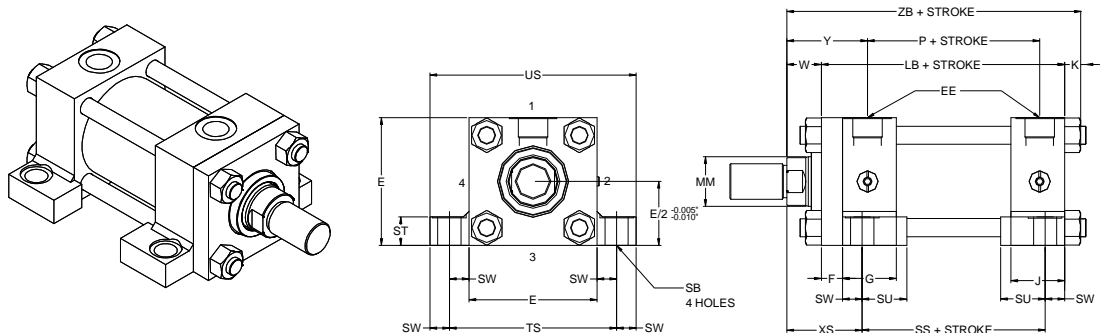
Bore	Rod #	Rod Dia MM (inch)	Thread ins/tpi		A	B	C	D	NA	V	W	ADD TO STROKE	
			Style 1&3 (KK)	Style 2 (CC)								XF	ZF
1.50 " (38.10)	1	5/8	7/16-20	1/2-20	19.05	28.55	9.5	12.70	14.30	6.40	15.90	142.90	152.40
	2	1	3/4-16	7/8-14	28.60	38.07	12.7	22.23	23.81	12.70	25.40	152.40	161.90
2.00 " (50.80)	1	1	3/4-16	7/8-14	28.60	38.07	12.7	22.23	23.81	6.40	19.05	152.40	168.30
	2	1 3/8	1-14	1 1/4-12	41.30	50.77	15.9	28.58	33.34	9.50	25.40	158.80	174.60
2.50 " (63.50)	1	1	3/4-16	7/8-14	28.60	38.07	12.7	22.23	23.81	6.40	19.05	155.60	171.50
	2	1 3/8	1-14	1 1/4-12	41.30	50.77	15.9	28.70	33.34	9.50	25.40	161.90	177.80
3.25 " (82.60)	1	1 3/8	1-14	1 1/4-12	41.30	50.77	15.9	28.57	33.34	6.40	22.20	181.00	200.00
	2	1 3/4	1 1/4-12	1 1/2-12	50.80	60.30	19.1	38.10	42.86	9.50	28.60	187.30	206.40
4.00 " (101.60)	1	1 3/4	1 1/4-12	1 1/2-12	50.80	60.30	19.1	38.10	42.86	6.40	25.40	193.70	215.90
	2	2	1 1/2-12	1 3/4-12	57.15	66.65	22.2	42.88	49.21	6.40	28.60	196.80	219.10
5.00 " (127.00)	1	2	1 1/2-12	1 3/4-12	57.15	66.65	25.4	42.86	49.21	6.40	28.60	209.55	231.78
	2	2 1/2	1 7/8-12	2 1/4-12	76.20	79.35	25.4	52.39	60.33	9.50	34.93	215.90	238.13
6.00 " (152.40)	1	2 1/2	1 7/8-12	2 1/4-12	76.20	79.35	25.4	52.39	60.33	6.40	31.75	244.47	269.88
	2	3	2 1/4-12	2 3/4-12	88.90	95.22	25.4	66.68	73.03	6.40	31.75	244.47	269.88

PTE HYDRAULICS

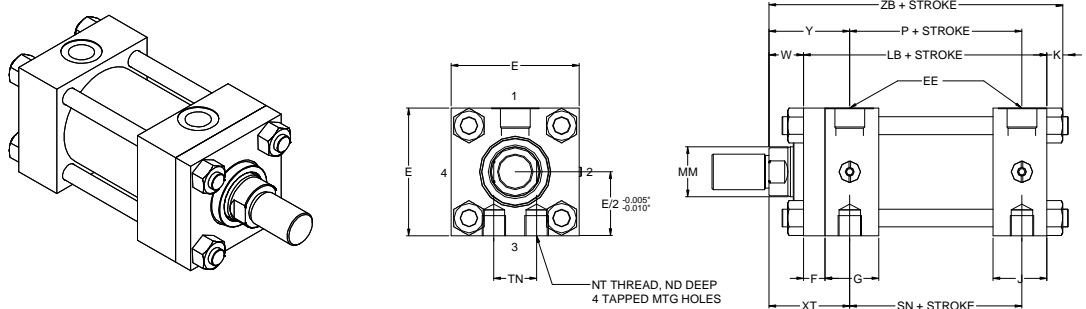
HP Series Industrial Hydraulic Cylinders

HP mounting styles MS2, MS4 and MP1

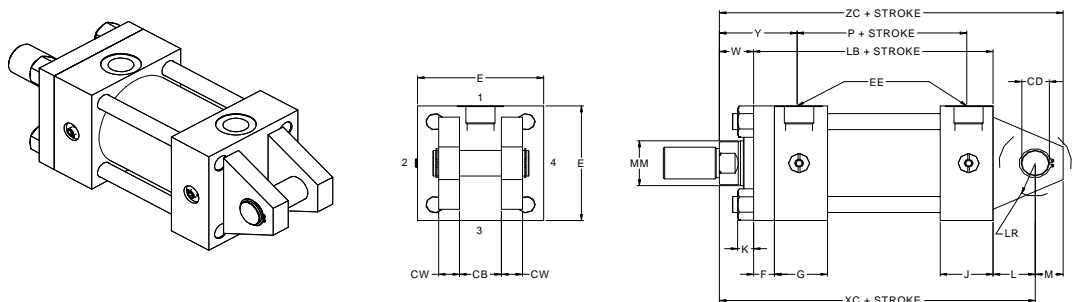
Side Lug Mountings Style MS2



Side Tapped Mounting Style MS4



Cap Fixed Clevis Mounting Style MP1



PTE HYDRAULICS

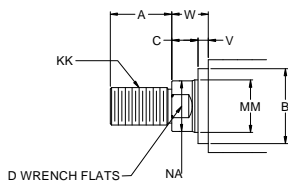
HP Series Industrial Hydraulic Cylinders

HP mounting styles MS2, MS4 and MP1

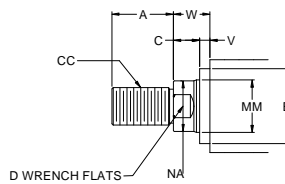
Mounting and Envelope Dimensions

					BSPP																	ADD TO STROKE			
Bore	E	CB	CD	CW	EE	F	G	J	K	L	LR	M	NT	ND	SB	ST	SU	SW	TN	TS	US	LB	P	SN	SS
1.50" (38.10)	63.50	19.05	12.73	12.70	1/2"	9.50	44.50	38.10	9.50	19.10	14.30	12.70	3/8-16	9.53	11.10	12.70	23.80	9.50	19.10	82.60	101.60	127.00	73.00	73.00	98.40
2.00" (50.80)	76.20	31.75	19.08	15.87	1/2"	15.90	44.50	38.10	11.10	31.80	25.40	19.10	1/2-13	11.11	14.30	19.10	31.80	12.70	23.80	101.60	127.00	133.40	73.00	73.00	92.10
2.50" (63.50)	88.90	31.75	19.08	15.87	1/2"	15.90	44.50	38.10	11.10	31.80	23.80	19.10	5/8-11	12.70	20.60	25.40	39.70	17.40	33.30	123.80	158.80	136.50	76.20	76.20	85.70
3.25" (82.60)	114.30	38.10	25.43	19.05	3/4"	19.10	50.80	44.50	14.30	38.10	31.80	25.40	3/4-10	17.46	20.60	25.40	39.70	17.40	38.10	149.20	184.20	158.80	88.90	88.90	104.80
4.00" (101.60)	127.00	50.80	34.95	25.40	3/4"	22.20	50.80	44.50	14.30	54.00	44.50	34.90	1-8	17.46	27.00	31.80	51.00	22.20	52.40	171.50	215.90	168.30	95.30	95.30	101.60
5.00" (127.00)	165.10	63.50	44.48	31.75	3/4"	22.20	50.80	44.50	20.60	57.20	52.40	44.50	1-8	25.40	27.00	31.80	50.80	22.20	74.60	209.60	254.00	181.00	108.00	108.00	114.30
6.00" (152.40)	190.50	63.50	50.83	31.75	1"	25.40	57.20	57.20	22.20	63.50	58.70	50.80	1 1/4-7	31.75	33.30	38.10	63.50	28.60	84.10	247.70	304.80	212.70	123.80	130.20	130.20

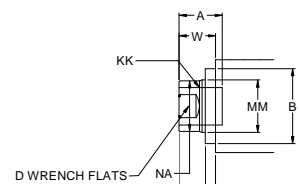
ROD END STYLE 1
SMALL MALE
(NFPA STYLE SM)



ROD END STYLE 2
INTERMEDIATE MALE
(NFPA STYLE IM)



ROD END STYLE 3
SMALL FEMALE
(NFPA STYLE SF)



Note: When specifying an extended rod, select the standard **"W" dimension** which corresponds to the cylinder bore and rod diameter that you have selected. Calculate the rod extension that you require then add this to the standard **"W" dimension**. The rod end style you nominate upon ordering is style 4 which shows that the rod end is to customer specification. It is also recommended that you reconfirm the **"KK"** and **"A"** dimensions on the order.

Piston Rod Dimensions

Mounting and Envelope Dimensions

Bore	Rod #	Rod Dia MM (inch)	Thread ins/tpi														ADD STROKE		
			Style 1&3	Style 2 (CC)	A	B	C	D	NA	V	W	XS	XT	Y	XC	ZB	ZC		
1.50 " (38.10)	1	5/8	7/16-20	1/2-20	19.05	28.55	9.50	12.70	14.30	6.40	15.90	34.90	50.80	50.80	162.00	152.40	174.70		
	2	1	3/4-16	7/8-14	28.60	38.07	12.70	22.23	23.81	12.70	25.40	44.50	60.30	60.33	171.50	161.90	184.20		
2.00" (50.80)	1	1	3/4-16	7/8-14	28.60	38.07	12.70	22.23	23.81	6.40	19.05	47.60	60.30	60.33	184.20	163.50	203.30		
	2	1 3/8	1-14	1 1/4-12	41.30	50.77	15.90	28.58	33.34	9.50	25.40	54.00	66.70	66.68	190.50	169.90	209.60		
2.50" (63.50)	1	1	3/4-16	7/8-14	28.60	38.07	12.70	22.23	23.81	6.40	19.05	52.40	60.30	60.33	187.30	166.70	206.40		
	2	1 3/8	1-14	1 1/4-12	41.30	50.77	15.90	28.70	33.34	9.50	25.40	58.70	66.70	66.68	193.70	173.00	212.80		
3.25" (82.60)	1	1 3/8	1-14	1 1/4-12	41.30	50.77	15.90	28.57	33.34	6.40	22.20	58.70	69.90	69.85	219.10	195.30	244.50		
	2	1 3/4	1 1/4-12	1 1/2-12	50.80	60.30	19.10	38.10	42.86	9.50	28.60	65.10	76.20	76.20	225.20	201.60	250.60		
4.00" (101.60)	1	1 3/4	1 1/4-12	1 1/2-12	50.80	60.30	19.10	38.10	42.86	6.40	25.40	69.90	76.20	76.20	247.70	208.00	282.60		
	2	2	1 1/2-12	1 3/4-12	57.15	66.65	22.20	42.88	49.21	6.40	28.60	73.00	79.50	79.38	250.90	211.10	285.80		
5.00" (127.00)	1	2	1 1/2-12	1 3/4-12	57.15	66.65	25.40	42.86	49.21	6.40	28.58	73.03	79.38	79.38	266.70	230.19	311.15		
	2	2.5	1 7/8-12	2 1/4-12	76.20	79.35	25.40	52.39	60.33	9.50	34.93	79.38	85.73	85.73	273.05	236.54	317.50		
6.00" (152.40)	1	2.5	1 7/8-12	2 1/4-12	76.20	79.35	25.40	52.39	60.33	6.40	31.75	85.73	88.90	88.90	307.97	266.70	358.78		
	2	3	2 1/4-12	2 3/4-12	88.90	95.22	25.40	66.68	73.03	6.40	31.75	85.73	88.90	88.90	307.97	266.70	358.78		

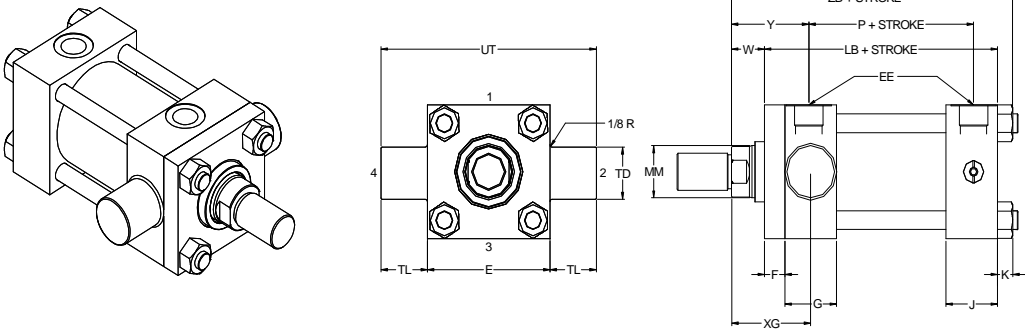
PTE HYDRAULICS

HP Series Industrial Hydraulic Cylinders

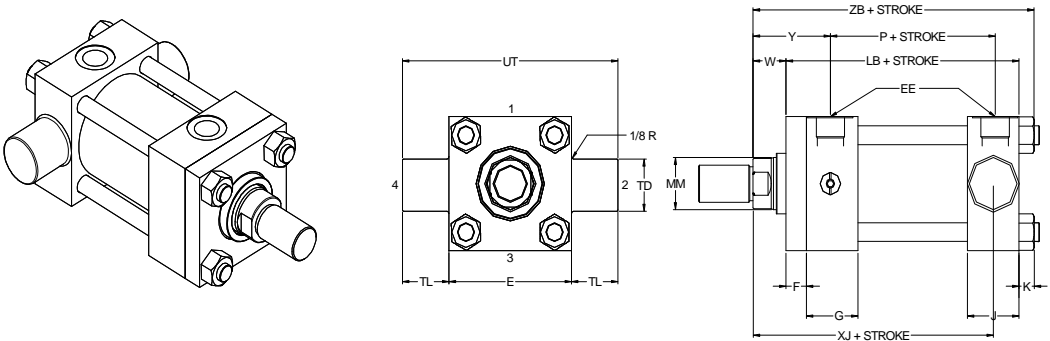
HP mounting styles MT1, MT2 and MT4

MT1, MT2 and MT4 Mounting Restriction	
Bore	Max Pressure Rating
1.50" (38.10)	210 bar
2.00" (50.80)	210 bar
2.50" (63.50)	210 bar
3.25" (82.60)	191 bar
4.00" (101.60)	126 bar
5.00" (127.00)	81 bar
6.00" (152.40)	73 bar

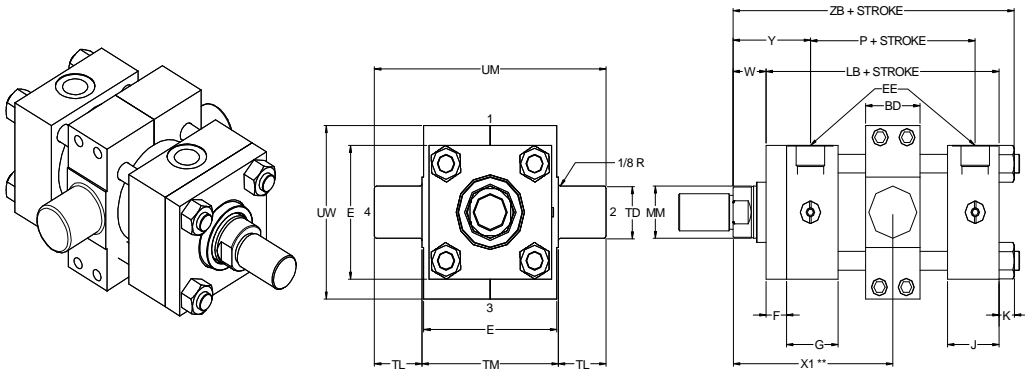
Head Trunnion Mounting
Style MT1



Cap Trunnion Mounting
Style MT2



Intermediate Trunnion Mounting
Style MT4



PTE HYDRAULICS

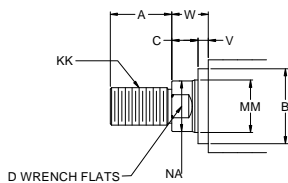
HP Series Industrial Hydraulic Cylinders

HP mounting styles MT1, MT2 and MT4

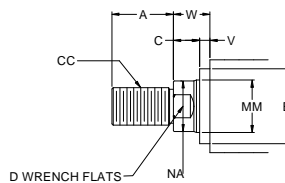
Mounting and Envelope Dimensions

Bore	Min Stroke	BD	E	BSPP		F	G	J	K	TD	TL	TM	UM	UT	UW	ADD TO STROKE	
				EE												LB	P
1.50" (38.10)	0.00	31.80	63.50	1/2"		9.50	44.50	38.10	9.50	25.40	25.40	76.20	127.00	114.30	85.70	127.00	73.00
2.00" (50.80)	6.40	38.10	76.20	1/2"		15.90	44.50	38.10	11.10	34.93	34.93	88.90	158.70	146.00	104.80	133.40	73.00
2.50" (63.50)	3.20	38.10	88.90	1/2"		15.90	44.50	38.10	11.10	34.93	34.93	101.60	171.50	158.80	117.50	136.50	76.20
3.25" (82.60)	9.50	50.80	114.30	3/4"		19.10	50.80	44.50	14.30	44.45	44.45	127.00	215.90	203.20	147.60	158.80	88.90
4.00" (101.60)	3.20	50.80	127.00	3/4"		22.20	50.80	44.50	14.30	44.45	44.45	139.70	228.60	215.90	161.90	168.30	95.30
5.00" (127.00)	0.00	50.80	165.10	3/4"		22.20	50.80	44.45	20.64	44.45	44.45	177.80	266.70	254.00	196.85	180.97	107.95
6.00" (152.40)	6.40	76.20	190.50	1"		25.40	57.15	57.15	22.23	50.80	50.80	215.90	317.50	292.10	263.53	212.72	123.83

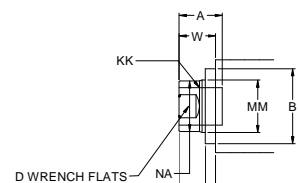
ROD END STYLE 1
SMALL MALE
(NFA STYLE SM)



ROD END STYLE 2
INTERMEDIATE MALE
(NFA STYLE IM)



ROD END STYLE 3
SMALL FEMALE
(NFA STYLE SF)



Note: When specifying an extended rod, select the standard **"W"** dimension which corresponds to the cylinder bore and rod diameter that you have selected. Calculate the rod extension that you require then add this to the standard **"W"** dimension. The rod end style you nominate upon ordering is style 4 which shows that the rod end is to customer specification. It is also recommended that you reconfirm the **"KK"** and **"A"** dimensions on the order.

Piston Rod Dimensions

Mounting and Envelope
Dimensions

Bore	Rod #	Rod Dia MM (inch)	Thread ins/tpi		Min X1										ADD STROKE	
			Style 1 & 3 (KK)	Style 2 (CC)	A	B	C	D	NA	V	W	XG	Note !	Y	XJ	ZB
1.50" (38.10)	1	5/8	7/16-20	1/2-20	19.05	28.55	9.50	12.70	14.30	6.40	15.90	47.60	87.30	50.80	123.80	152.40
	2	1	3/4-16	7/8-14	28.60	38.07	12.70	22.23	23.81	12.70	25.40	57.20	96.80	60.33	133.40	161.90
2.00" (50.80)	1	1	3/4-16	7/8-14	28.60	38.07	12.70	22.23	23.81	6.40	19.05	57.20	100.00	60.33	133.40	163.50
	2	1 3/8	1-14	1 1/4-12	41.30	50.77	15.90	28.58	33.34	9.50	25.40	63.50	106.40	66.68	139.70	169.90
2.50" (63.50)	1	1	3/4-16	7/8-14	28.60	38.07	12.70	22.23	23.81	6.40	19.05	57.20	100.00	60.33	136.50	166.70
	2	1 3/8	1-14	1 1/4-12	41.30	50.77	15.90	28.70	33.34	9.50	25.40	63.50	106.40	66.68	142.90	173.00
3.25" (82.60)	1	1 3/8	1-14	1 1/4-12	41.30	50.77	15.90	28.57	33.34	6.40	22.20	66.70	119.10	69.85	158.80	195.30
	2	1 3/4	1 1/4-12	1 1/2-12	50.80	60.30	19.10	38.10	42.86	9.50	28.60	73.00	125.40	76.20	165.10	201.60
4.00" (101.60)	1	1 3/4	1 1/4-12	1 1/2-12	50.80	60.30	19.10	38.10	42.86	6.40	25.40	73.00	125.40	76.20	171.50	208.00
	2	2	1 1/2-12	1 3/4-12	57.15	66.65	22.20	42.88	49.21	6.40	28.60	76.20	128.59	79.38	174.60	211.10
5.00" (127.00)	1	2	1 1/2-12	1 3/4-12	57.15	66.65	25.40	42.86	49.21	6.40	28.58	76.20	128.59	79.38	187.33	230.19
	2	2 1/2	1 7/8-12	2 1/4-12	76.20	79.35	25.40	52.39	60.33	9.50	34.93	82.55	134.94	85.73	193.68	236.54
6.00" (152.40)	1	2.5	1 7/8-12	2 1/4-12	76.20	79.35	25.40	52.39	60.33	6.40	31.75	85.73	153.99	88.90	212.73	266.70
	2	3	2 1/4-12	2 3/4-12	88.90	95.22	25.40	66.68	73.03	6.40	31.75	85.73	153.99	88.90	212.73	266.70

NOTE ! X1 to be specified by the customer

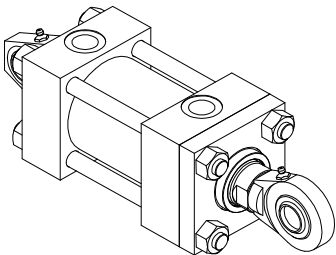
PTE HYDRAULICS

HP Series Industrial Hydraulic Cylinders

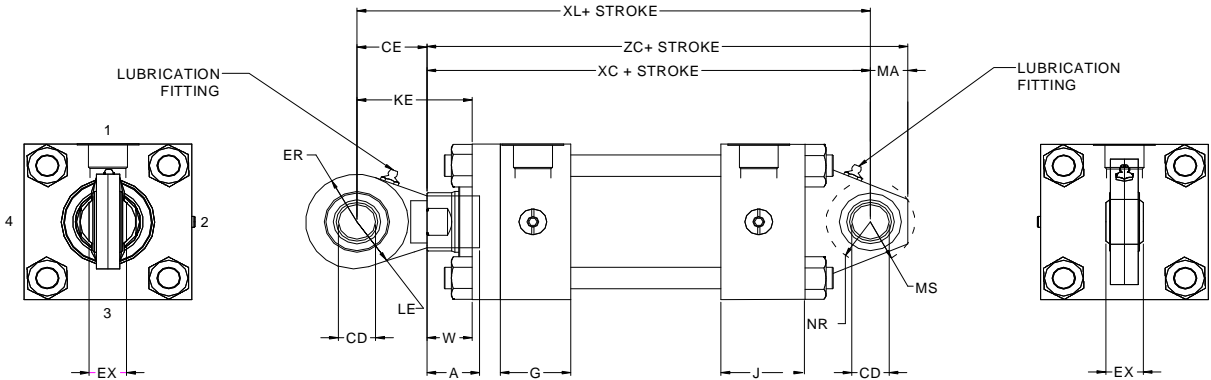
HP mounting styles SB and double rod configuration

Style SB Mount Spherical Bearing

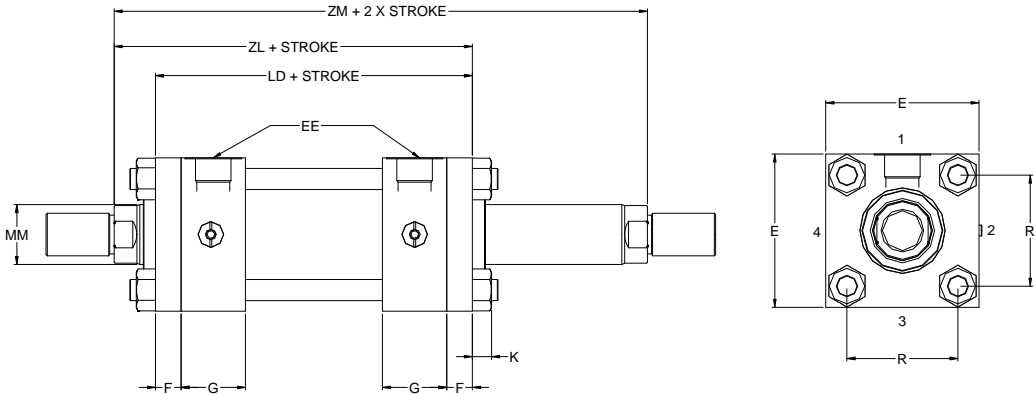
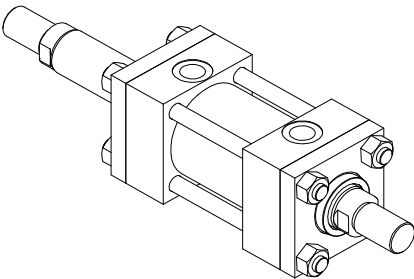
Note: Limited to 4.0" bore.
Refer PTE for heavy duty bearings for 5.0" and 6.0" bores.



SB Mounting Restriction	
Bore	Max Pressure Rating
1.50" (38.10)	103 bar
2.00" (50.80)	152 bar
2.50" (63.50)	100 bar
3.25" (82.60)	103 bar
4.00" (101.60)	124 bar



Double Rod Cylinder



PTE HYDRAULICS

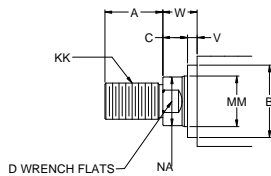
HP Series Industrial Hydraulic Cylinders

HP mounting styles SB and double rod configuration

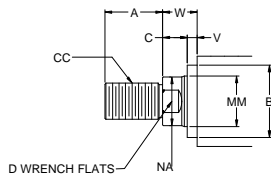
Spherical Bearing Mounting, Envelope and Rod Dimensions

Bore	Rod #	Rod Dia MM	Thread ins/tpi		A	W	G	J	CE	KE	ER	CD	LE	EX	MA	MS	NR	Add Stroke		
			Style 3 (KK)	Style 5 (KK)														XL	ZC	XC
1 1/2" (38.1)	1	5/8"	7/16-20		15.90					38.10								184.15	181.00	161.9
	2	1"		7/16-20	19.05	25.40	44.45	38.10	22.22	47.60	20.60	12.70	19.05	11.11	19.01	23.81	15.88	193.68	190.50	171.45
2.0" (50.8)	1	1"	3/4-16		19.05					50.80								215.90	209.55	184.15
	2	1 3/8"		3/4-16	28.60	25.40	44.45	38.10	31.75	57.10	28.60	19.05	27.00	16.67	25.40	34.90	25.40	222.25	215.90	190.5
2 1/2" (63.5)	1	1"	3/4-16		19.05					50.80								219.10	212.70	187.32
	2	1 3/8"		3/4-16	28.60	25.40	44.45	38.10	31.75	57.10	28.60	19.05	27.00	16.67	25.40	34.90	25.40	225.42	219.10	193.68
3 1/4" (82.6)	1	1 3/8"	1-14		41.30	22.20	50.8	44.45	47.62	69.80	31.80	25.40	36.50	22.22	31.75	42.86	31.80	266.70	250.80	219.1
	2	1 3/4"		1-14	28.60	28.60	50.8	44.45	47.62	76.20	31.80	25.40	36.50	22.22	31.75	42.86	31.80	273.05	257.20	225.43
4.0" (101.6)	1	1 3/4"	1 1/4-12		50.80	25.40	50.8	44.45	53.97	79.40	42.90	34.93	47.60	30.16	47.60	61.90	41.30	301.62	295.28	247.65
	2	2"		1 1/4-12	28.60	28.60	50.8	44.45	53.97	82.60	42.90	34.93	47.60	30.16	47.60	61.90	41.30	304.80	298.45	250.82

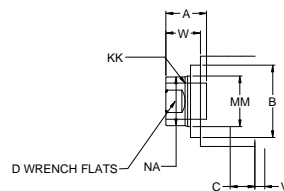
ROD END STYLE 1
SMALL MALE
(NFPA STYLE SM)



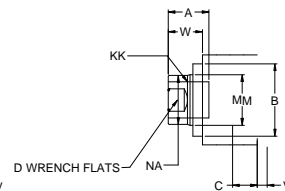
ROD END STYLE 2
INTERMEDIATE MALE
(NFPA STYLE IM)



ROD END STYLE 3
SMALL FEMALE
(NFPA STYLE SF)



ROD END STYLE 5
SMALL FEMALE
(#2 Rod SB Mount)



Note: When specifying an extended rod, select the standard **"W"** dimension which corresponds to the cylinder bore and rod diameter that you have selected. Calculate the rod extension that you require then add this to the standard **"W"** dimension. The rod end style you nominate upon ordering is style 4 which shows that the rod end is to customer specification. It is also recommended that you reconfirm the **"KK"** and **"A"** dimensions on the order.

Double Rod Mounting, Envelope and Rod Dimensions

Bore	Rod #	Rod Dia MM	Thread ins/tpi		G	F	BSPP EE	K	E	R	Add Stroke		Stroke X 2 ZM
			Style 1&3 (KK)	Style 2 (CC)							ZL	LD	
1 1/2" (38.1)	1	5/8"	7/16-20	1/2-20	44.45	9.50	1/2"	9.50	63.50	41.30	168.27	142.87	174.60
	2	1"	3/4-16	7/8-14	44.45	9.50	1/2"	9.50	63.50	41.30	177.77	142.87	184.10
2.0" (50.8)	1	1"	3/4-16	7/8-14	44.45	15.90	1/2"	11.10	76.20	52.10	185.74	155.58	193.67
	2	1 3/8"	1-14	1 1/4-12	44.45	15.90	1/2"	11.10	76.20	52.10	192.10	155.58	200.03
2 1/2" (63.5)	1	1"	3/4-16	7/8-14	44.45	15.90	1/2"	11.10	88.90	64.70	188.91	158.75	196.85
	2	1 3/8"	1-14	1 1/4-12	44.45	15.90	1/2"	11.10	88.90	64.70	195.27	158.75	203.21
3 1/4" (82.6)	1	1 3/8"	1-14	1 1/4-12	50.80	19.10	3/4"	14.30	114.30	82.60	220.66	184.15	228.60
	2	1 3/4"	1 1/4-12	1 1/2-12	50.80	19.10	3/4"	14.30	114.30	82.60	227.06	184.15	235.00
4.0" (101.6)	1	1 3/4"	1 1/4-12	1 1/2-12	50.80	22.20	3/4"	14.30	127.00	97.00	236.54	196.85	247.65
	2	2"	1 1/2-12	1 3/4-12	50.80	22.20	3/4"	14.30	127.00	97.00	239.74	196.85	250.85
5.00" (127.00)	1	2"	1 1/2-12	1 3/4-12	50.80	22.20	3/4"	20.60	165.10	125.70	258.76	209.55	266.70
	2	2 1/2"	1 7/8-12	2 1/4-12	50.80	22.20	3/4"	20.60	165.10	125.70	265.17	209.55	273.05
6.00" (152.40)	1	2 1/2"	1 7/8-12	2 1/4-12	57.20	25.40	1"	22.20	190.50	145.50	292.10	238.12	301.63
	2	3"	2 1/4-12	2 3/4-12	57.20	25.40	1"	22.20	190.50	145.50	292.10	238.12	301.63

Important note

When selecting a double rod cylinder always begin selection by sizing a cylinder with the primary mounting in mind. With this selection finalized, including piston rod details, you then determine the double rod configuration. Keep in mind that the design and engineering of all double rod cylinders revolves around the fact that the cylinder has two heads and all dimensions reflect this fact, including rod end details pertaining to styles selected. If any doubt is present in your calculation please contact the factory for calculation confirmation.

PTE HYDRAULICS

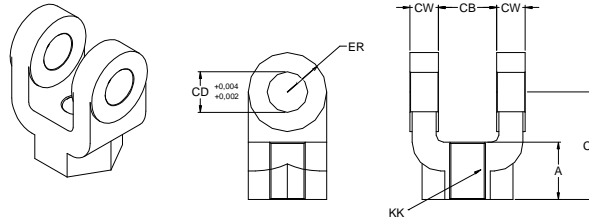
HP Series Industrial Hydraulic Cylinders

Cylinder Mounting Accessories

Accessories Matching Chart

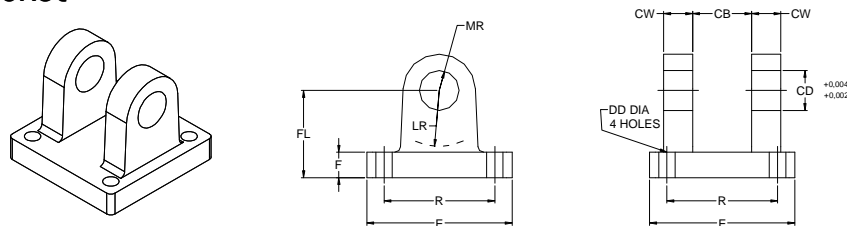
Thread Size	Rod Clevis Part #	Eye Bracket Part #	Pivot Pin Part #	Rod Eye Part #	Clevis Bracket Part #	Spherical Rod End Part #	Spherical Clevis Bracket Part #	Spherical Pivot Pin Part #	Alignment Coupling Part #
7/16-20	RC05	EB05	PP05G	RE05	CB05	SRE05	SCB05	SPP05	AC43705
1/2-20									
3/4-16	RC07	EB07	PP07G	RE07	CB07	SRE07	SCB07	SPP07	AC75007
7/8-14									
1-14	RC10	EB10	PP10G	RE10	CB10	SRE10	SCB10	SPP10	AC100010
1 1/4-12	RC13	EB13	PP13G	RE13	CB13	SRE13	SCB13	SPP13	AC125013
1 1/2-12	RC17	EB17	PP17G	RE17	CB17	SRE17	SCB17	SPP17	AC150017
1 3/4-12									
1 7/8-12	RC20	EB20	PP20G	RE20	CB20	SRE20	SCB20	SPP20	AC187520
2 1/4-12	RC25	EB25	PP25G	RE25	CB25				
2 1/2-12	RC30	EB30	PP30G	RE30	CB30				

Rod Clevis



PART#	CB	CD	CE	CW	A	ins/tpi KK	ER	Max Load
RC05	19.40	0.500"	38.10	12.70	19.01	7/16-20	12.70	16 kN
RC07	32.10	0.750"	53.98	16.00	28.57	3/4-16	19.10	50 kN
RC10	38.50	1.000"	74.61	16.00	41.30	1-14	25.40	87 kN
RC13	51.60	1.375"	95.25	25.40	50.80	1 1/4-12	34.92	149 kN
RC17	64.28	1.750"	114.30	31.80	57.15	1 1/2-12	44.45	203 kN
RC20	64.28	2.000"	139.70	31.80	76.20	1 7/8-12	50.80	292 kN
RC25	77.02	2.500"	165.10	38.10	88.90	2 1/4-12	63.50	437 kN
RC30	77.02	3.000"	171.45	38.10	88.90	2 1/2-12	69.85	437 kN

Clevis Bracket



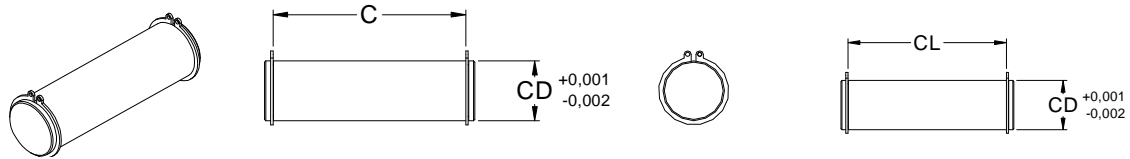
PART#	CB	CD	E	CW	F	FL	LR	MR	DD	R	Max Load
CB05	19.43	0.500"	63.50	12.70	9.52	28.57	12.70	14.29	3/8-24	41.40	26 kN
CB07	32.13	0.750"	88.50	15.87	15.87	47.62	26.99	26.98	1/2-20	65.02	42 kN
CB10	38.48	1.000"	114.30	19.10	19.10	57.15	31.75	28.57	5/8-18	82.55	64 kN
CB13	51.61	1.375"	127.00	25.40	22.22	76.20	47.62	44.45	5/8-18	96.77	90 kN
CB17	64.29	1.750"	165.10	31.75	22.22	79.37	50.80	47.62	7/8-14	125.73	168 kN
CB20	64.29	2.000"	190.50	31.75	25.40	88.90	53.97	53.98	1-14	146.05	224 kN
CB25	77.01	2.500"	215.90	38.10	25.40	101.60	66.68	53.98	1 1/8-12	167.48	282 kN
CB30	77.01	3.000"	241.30	38.10	25.40	107.95	73.03	69.85	1 1/4-12	190.5	334 kN

PTE HYDRAULICS

HP Series Industrial Hydraulic Cylinders

Cylinder Mounting Accessories

Pivot Pins

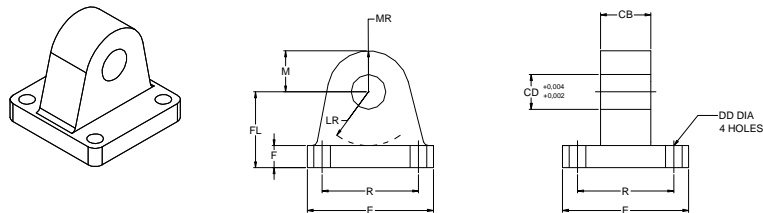


PART#	CD	C	Max Shear Load
PP05G	0.500"	47.62	38 kN
PP07G	0.750"	66.67	86 kN
PP10G	1.000"	79.38	152 kN
PP13G	1.375"	106.35	287 kN
PP17G	1.750"	131.77	466 kN
PP20G	2.000"	131.77	608 kN
PP25G	2.500"	157.18	950 kN
PP30G	3.000"	157.85	1368 kN

PART#	CD	CL	Max Shear Load
SPP05	0.500"	39.69	38 kN
SPP07	0.750"	51.59	86 kN
SPP10	1.000"	63.50	152 kN
SPP13	1.375"	84.14	287 kN
SPP17	1.750"	107.16	466 kN
SPP20	2.000"	125.41	668 kN

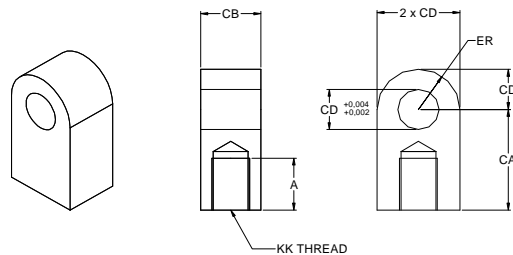
SPP Pins for use with Spherical Accessories Only

Eye Bracket



PART#	CB	CD	E	F	FL	LR	MR	R	DD	M	Max Load
EB05	19.10	0.500"	63.50	9.52	28.57	19.10	14.29	41.40	10.30	12.70	18 kN
EB07	31.75	0.750"	88.90	15.87	47.62	31.75	22.22	65.02	13.50	19.10	47 kN
EB10	38.10	1.000"	114.30	19.10	57.15	38.10	31.75	82.55	16.70	25.40	91 kN
EB13	50.80	1.375"	127.00	22.22	76.20	53.97	41.27	96.77	16.70	34.90	139 kN
EB17	63.50	1.750"	165.10	22.22	79.37	57.15	53.97	125.73	23.00	44.50	220 kN
EB20	63.50	2.000"	190.50	25.40	88.90	63.50	61.91	146.05	27.00	50.80	311 kN
EB25	76.20	2.500"	215.90	25.40	101.60	76.20	76.20	167.39	30.20	63.50	419 kN
EB30	76.20	3.000"	241.30	25.40	107.95	82.55	82.55	190.50	33.30	76.20	484 kN

Rod Eyes



PART#	A	CA	CB	CD	ER	KK	Max Load
RE05	19.10	38.10	19.10	0.500"	15.87	7/16 -20	16 kN
RE07	28.57	52.39	31.75	0.750"	22.22	3/4 -16	50 kN
RE10	41.27	71.48	38.10	1.000"	30.16	1-14	92 kN
RE13	50.80	87.38	50.80	1.375"	39.68	1 1/4 -12	146 kN
RE17	57.15	101.60	63.50	1.750"	50.80	1 1/2 -12	200 kN
RE20	76.20	127.00	63.50	2.000"	63.50	1 7/8 -12	334 kN
RE25	88.90	147.64	76.20	2.500"	71.44	2 1/4 -12	430 kN
RE30	88.90	155.58	76.20	3.000"	82.55	2 1/2 -12	489 kN

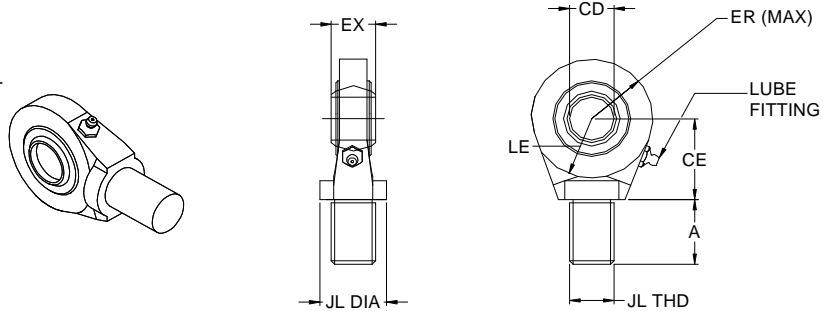
PTE HYDRAULICS

HP Series Industrial Hydraulic Cylinders

Spherical Accessories

Rod Eye

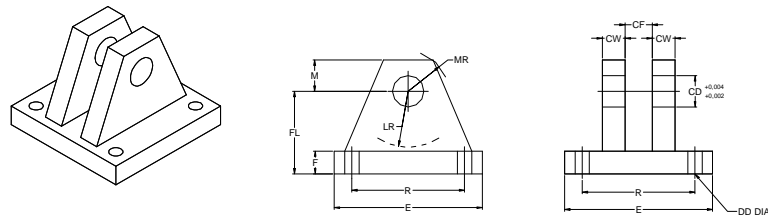
Note: Limited to 4.0" bore.
Refer PTE for heavy duty bearings for 5.0" and 6.0" bores.



PART#	CD -.0005	A	CE	EX	ER	LE	JL Thread	JL Diameter	Max Load
SRE05	0.500"	17.46	22.22	11.11	22.22	19.10	7/16-20	22.22	12 kN
SRE07	0.750"	25.40	31.75	16.67	31.75	26.99	3/4-16	33.34	42 kN
SRE10	1.000"	38.10	47.62	22.22	34.92	36.51	1-14	38.10	75 kN
SRE13	1.375"	50.80	53.97	30.16	46.04	47.62	1 1/4-12	50.80	127 kN
SRE17	1.750"	53.97	63.50	38.89	55.56	53.97	1 1/2-12	57.15	191 kN
SRE20	2.000"	73.02	69.85	44.45	66.67	63.50	1 7/8-12	69.85	312 kN

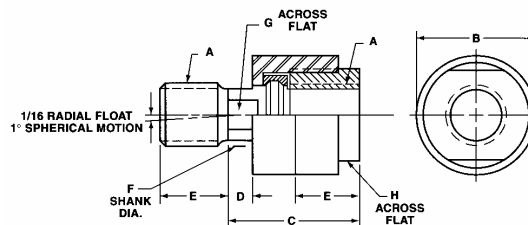
Spherical Clevis Bracket

Note: Limited to 4.0" bore.
Refer PTE for heavy duty bearings for 5.0" and 6.0" bores.



PART#	E	F	M	R	CD	CF	CW	DD	FL	LR	MR	Max Load
SCB05	76.20	12.70	12.70	52.07	0.500"	11.18	12.70	10.40	38.10	23.88	15.75	26 kN
SCB07	95.25	15.75	22.35	70.10	0.750"	16.76	15.75	13.46	50.80	35.05	25.40	42 kN
SCB10	139.70	19.10	25.40	104.14	1.000"	22.35	19.10	13.46	63.50	42.93	30.27	64 kN
SCB13	165.10	22.35	35.05	125.73	1.375"	30.22	25.40	16.76	88.90	61.98	41.15	90 kN
SCB17	215.90	31.75	44.45	167.13	1.750"	38.86	31.75	23.11	114.30	73.15	52.32	168 kN
SCB20	269.75	38.10	50.80	201.17	2.000"	44.45	38.10	23.11	127.00	84.07	60.45	224 kN

Alignment Coupling



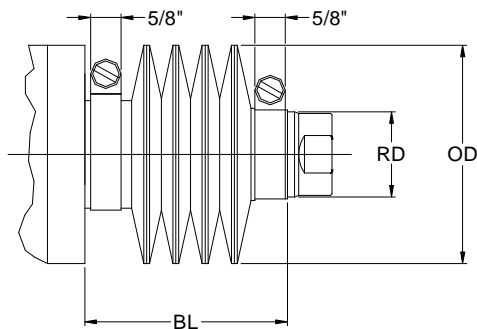
PART#	A	B	C	D	E	F	G	H	MAX PULL AT YIELD
AC43705	7/16 -20	31.75	50.80	12.70	19.10	15.88	14.29	28.57	4550 Kg
AC75007	3/4-16	44.45	58.74	7.94	28.57	24.61	22.22	38.10	15500 Kg
AC100010	1-14	63.50	74.61	12.70	41.28	34.93	31.75	57.15	29000 Kg
AC125013	1 1/4 -12	63.50	74.61	12.70	41.28	34.93	31.75	57.15	29000 Kg
AC150017	1 1/2 -12	82.55	111.13	20.64	57.15	44.45	38.10	76.20	54500 Kg
AC187520	1 7/8 -12	95.25	138.11	17.46	76.20	57.15	47.63	88.90	109000 Kg

PTE HYDRAULICS

HP Series Industrial Hydraulic Cylinders

Cylinder Options

Piston Rod Boot



Piston Rod Boots

Care needs to be taken when specifying this option as not all adverse environments need this option. In fact in many environments if a boot is used, this can actually accelerate piston rod wear. The major applications are where “air hardening” contaminants are present, i.e. paint etc. To accommodate a rod boot there needs to be a rod extension which will effect the closed length of the cylinder.

To calculate extra rod length

BL = Stroke x **LF** + 28mm

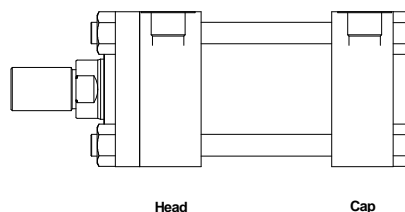
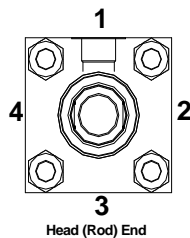
BL + Standard **LA** = Length of piston rod that will extend past retainer

Remember to check OD dimension for clearance when using foot mounted cylinders.

LF = Multiplication factor to accommodate boot

LF	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.10	0.10	0.10	0.10	0.10
OD	57.00	57.00	67.00	76.00	86.00	95.00	111.00	130.00	143.00	159.00	178.00	190.00
RD	13.00	16.00	25.00	35.00	45.00	51.00	63.00	76.00	89.00	102.00	127.00	140.00

Port Positions



Please note that there are limitations on port positions dependant on mount style selected.

Mounting Styles	Port Positions	
	Head End	Cap End
MX1/2/3, MF1/2/5/6, ME6, MT4, MP5	1,2,3 or 4	1,2,3 or 4
MP1, MT2, ME6	1,2,3 or 4	1 or 3
MT1, ME5	1 or 3	1,2,3 or 4
MS2/3/4/7	1	1

Other Options

Proximity switches. Can be supplied in either in AC/DC or purely DC configurations.

Linear transducers and interrogation units. These can be supplied and fitted in all options that are commercially available from MTS.

Please note it is preferred that final engineering and dimensional effects are confirmed with our factory prior to order placement.

PTE HYDRAULICS

HP Series Industrial Hydraulic Cylinders

Hydraulic Cylinder Theoretical Push and Pull Forces

Push Forces and Swept Displacement

Cylinder Bore				Theoretical Push at Stated Pressures										Stroke Displacement Per inch/cm	
				500 psi	3.50 MPa	1000 psi	6.90 MPa	1500 psi	10.30 MPa	2000 psi	13.80 MPa	3000 psi	20.70 MPa		
in	mm	in sq	cm sq	lbf	Kn	lbf	Kn	lbf	Kn	lbf	Kn	lbf	Kn	cu ins	cc's
1.50	38.10	1.77	11.4	885	3.94	1770	7.90	2655	11.81	3540	15.75	5310	23.62	1.77	11.40
2.00	50.80	3.14	20.3	1570	6.98	3140	13.98	4710	20.95	6280	27.93	9420	41.90	3.14	20.30
2.50	63.50	4.91	31.7	2455	10.92	4910	21.84	7365	32.76	9820	43.68	14730	65.52	4.92	31.70
3.25	82.60	8.3	53.6	4150	18.46	8300	36.92	12450	55.38	16600	73.48	24900	110.76	8.30	53.60
4.00	101.40	12.57	81.1	6285	27.97	12570	55.91	18855	83.87	25140	111.83	37710	167.75	12.70	81.70
5.00	127.00	19.64	126.7	9820	43.70	19640	87.36	29460	131.04	39280	174.73	58920	262.10	19.63	126.70
6.00	152.40	28.27	182.5	14135	62.90	28270	125.75	42405	188.63	56540	251.50	84810	377.30	28.70	182.40
7.00	177.80	38.48	248.3	19240	85.60	38480	171.17	57720	256.75	76960	342.33	115440	513.50	38.48	248.30
8.00	203.20	50.27	324.3	25135	111.81	50270	223.61	75405	335.42	100540	447.22	150800	670.85	50.27	324.30

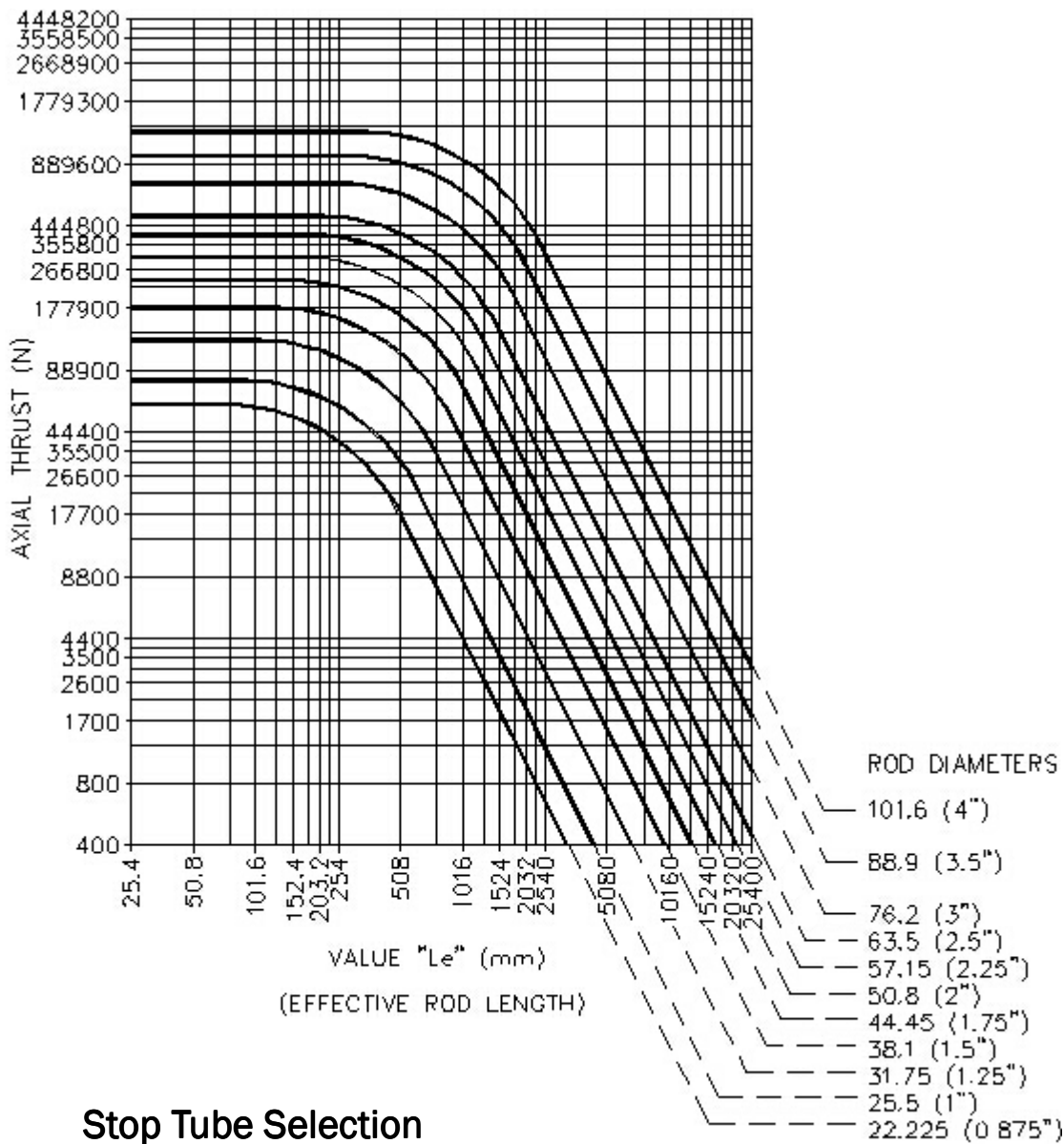
Pull Forces and Swept Displacement

Cylinder Bore		Piston Rod Diameter		Annulus Area		Theoretical Pull at Stated Pressures										Stroke Displacement Per inch/cm	
						500 psi	3.50 MPa	1000 psi	6.90 MPa	1500 psi	10.30 MPa	2000 psi	13.80 MPa	3000 psi	20.70 MPa		
in	mm	in	mm	in sq	cm sq	lbf	Kn	lbf	Kn	lbf	Kn	lbf	Kn	lbf	Kn	cu ins	cc's
1.50	38.10	0.625	15.87	1.53	9.90	765	3.4	1530	6.8	2295	10.21	3060	13.61	4590	20.41	1.53	9.90
		1.000	25.40	0.98	6.33	490	2.18	980	4.36	1470	6.54	1960	8.72	2940	13.08	0.98	6.33
2.00	50.80	1.000	25.40	2.36	15.20	1180	5.25	2360	10.50	3540	15.75	4720	21.00	7080	31.49	2.36	15.20
		1.375	34.90	1.66	10.69	830	3.69	1660	7.38	2490	11.08	3320	14.77	4980	22.15	1.66	10.70
2.50	63.50	1.000	25.40	4.12	26.60	2060	9.16	4120	18.33	6180	27.49	8240	36.65	12360	54.94	4.11	26.60
		1.375	34.90	3.43	22.09	1715	7.62	3430	15.24	5145	22.84	6860	30.46	10290	45.70	3.43	22.10
3.25	82.60	1.375	34.90	6.81	44.00	3405	15.15	6810	30.30	10215	45.44	13620	60.58	20430	90.88	6.80	44.00
		1.700	44.45	5.89	38.07	2945	13.13	5890	26.27	8835	39.36	11780	52.50	17670	78.77	5.88	38.10
4.00	101.60	1.750	44.45	10.16	65.56	5080	22.60	10160	45.19	15240	67.79	20320	90.39	30480	135.58	10.16	65.56
		2.000	50.80	9.43	60.80	4715	20.98	9430	41.95	14145	62.87	18860	83.84	28290	125.80	9.42	60.80
5.00	127.00	2.000	50.80	16.49	106.41	8245	36.68	16490	73.35	24735	110.03	32980	146.71	49470	220.10	16.49	106.41
		2.500	63.50	14.73	95.10	7365	32.78	14730	65.56	22095	98.24	29460	131.02	44190	196.60	14.73	95.01
6.00	152.40	2.500	63.50	23.37	150.75	11685	51.98	23370	103.95	35055	155.90	46740	207.90	70110	311.90	23.37	150.75
		3.000	72.20	21.20	136.82	10600	47.20	21200	94.41	31800	141.47	42400	188.70	63600	283.10	21.20	136.82
7.00	177.80	3.000	76.20	31.42	202.70	15710	69.90	31420	139.80	47130	209.65	62840	276.53	94260	419.29	31.42	202.68
		4.000	101.60	25.92	167.21	12960	57.65	25920	115.30	38880	172.90	51840	230.60	77760	345.90	25.92	167.21
8.00	203.20	3.500	88.90	40.64	262.22	20320	90.39	40640	180.80	60960	271.16	81280	361.60	121920	542.30	40.64	262.22
		4.000	101.60	37.70	243.22	18850	83.85	37700	167.70	56550	251.60	75400	335.40	113100	503.10	37.69	243.22

Note: All calculations are pure theoretical and do not take into account any mechanical losses etc.

PTE HYDRAULICS
HP Series Industrial Hydraulic Cylinders

Piston Rod Strength



Stop Tube Selection

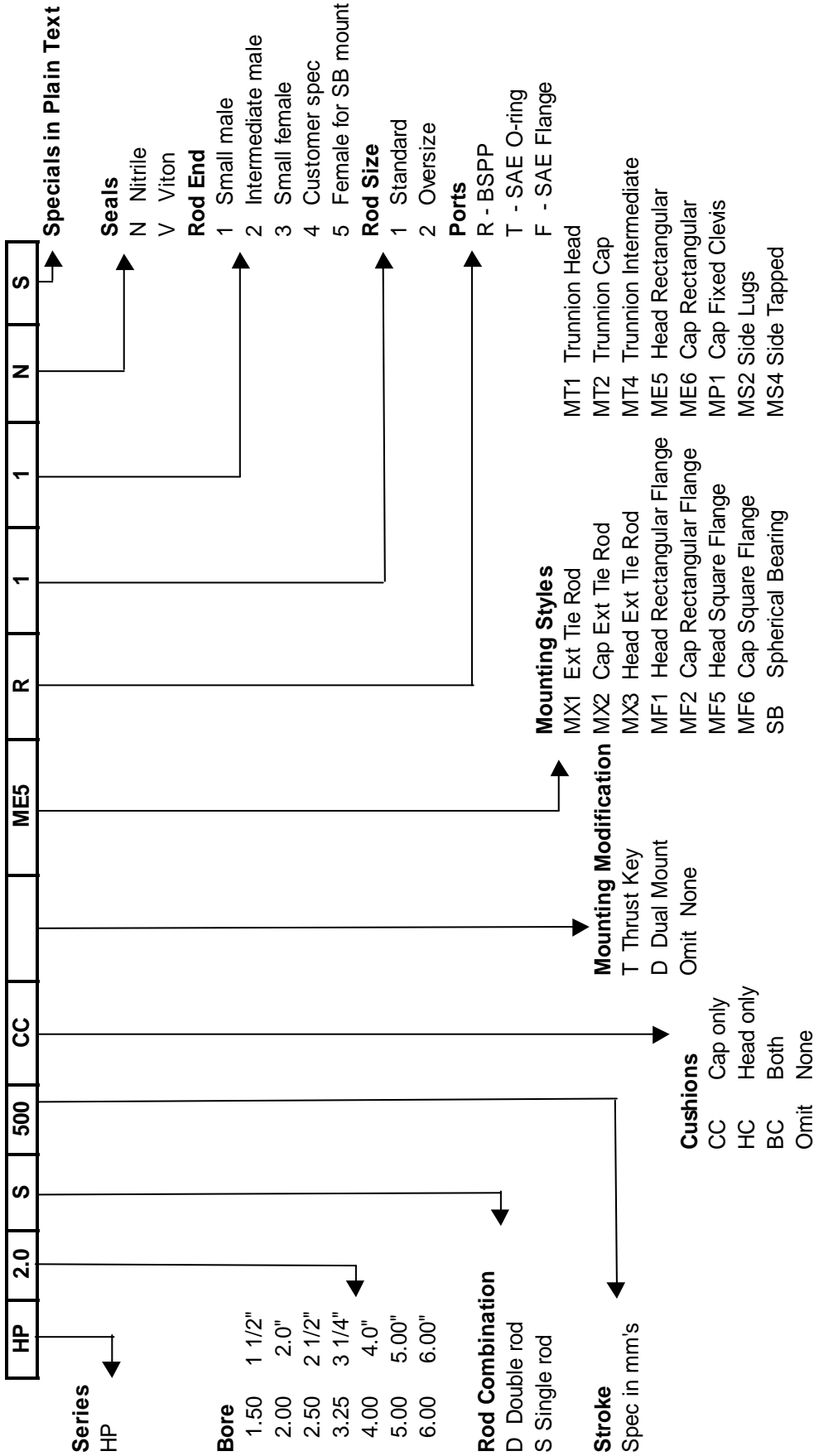
From **Le**, determine the stop tube length required, suggested lengths are shown below, however due to the many variables associated with long stroke cylinders and the different variations available for mounting etc we recommend that you contact the factory if you are in any doubt.

Effective Rod Length

	40" 1016 mm	50" 1270 mm	60" 1524 mm	70" 1778 mm	80" 2032 mm	90" 2286 mm
Stop Tube Length	1" 25.4 mm	2" 50.8 mm	3" 76.2 mm	4" 101.6 mm	5" 127 mm	

PTE HYDRAULICS
HP Series Industrial Hydraulic Cylinders

HP Series Code Sheet



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