



HYDRAULIC CYLINDERS



Overview

Introduction

Our concept is to offer our customers a large variety of hydraulic cylinders at reasonable prices and prompt deliveries. We offer quality construction on all cylinder models, with bore sizes ranging from ¾" to 24". Operating pressures range from 2000 PSI to 10,000 PSI. There are no restrictions in stroke, and we have many styles and sizes of mounting types to choose from. Our cylinders are divided into different model series, each with its own unique characteristics to suit a wide variety of applications.

To achieve our price and delivery goals, cylinder accessories and components such as pistons, head glands, rings, mounts and others standard parts, are manufactured in large quantities on our CNC machines and stocked in our warehouse. As a result, only the barrel and rod need to be made to order.

We will also manufacture custom cylinders to our customers requirements.

Quality

Our experience, engineering and quality manufacturing are the main features of our cylinders. It is the responsibility of all our employees to maintain the high quality that our customers expect. Every cylinder is tested at its rated pressure, and cycled through its stroke, and the basic dimensions are confirmed. We are currently in the process of ISO 900 certification.

Mountings

Mountings such as trunnions, flanges, clevises, and spherical bearings, are welded to the barrel, or blind end of the cylinder. Similarly, mountings are threaded or welded to the rod end.

To eliminate side loads, the axis of the cylinder must be aligned to the axis of the attachments. For the welded accessories, this is accomplished by using a ¼" diameter spring pin inserted into machined centering holes that are in the accessory and the end of the barrel. For the threaded accessories, the thread is machined accurately to the pin axis to ensure concentricity to the rod. To reduce side loads, we recommend using spherical bearing mounting.

Since we manufacture the barrel and rod to order, any size and type of accessories shown can be supplied with any of our cylinders, allowing an abundance of choices. Special mounts can also be manufactured.

Cushions

There are many ways of reducing the momentum of a cylinder load at the end of the stroke. A cost effective method is to reduce the flow of oil near the end of the stroke by means of a plunger or cushion. This cushion can be fixed, or adjustable. We offer fixed cushions because of their simplicity. Cushions can be supplied for the rod end, blind end, or both ends. Cushions are standard for Series EX and TH. They are optional for Series B and TM.

We do not, as a standard, offer cushions for any other series of cylinder.

Overall Length

If necessary, the overall retracted length of a cylinder can be increased by:

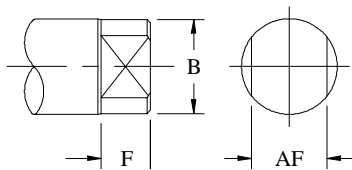
- Adding a stop tube between the piston and the head gland.
- Adding an extension to the blind end of the barrel.
- Increasing the rod extension.

Overview

Rod Specifications

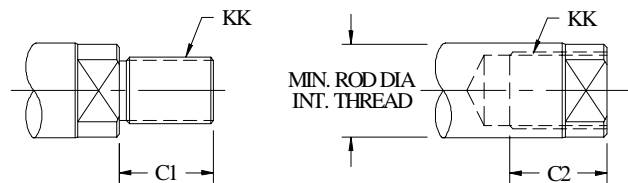
Standard rod material is CPO (*C1045 steel with 0.0005 thick hard chrome plating*). We also offer IHCP (*Induction hardened chrome plated*) or else stainless steel SS (*S316L stainless with 0.001 thick hard chrome*) as readily available options. Rod accessories can be welded or threaded to the rod. Usually, a female thread is recommended over a male thread because a broken end can be easily replaced as opposed to changing a rod that had a male thread. Also, a female thread can be converted to a male thread by using a rod stud (see page 02-16). Note that the thread size is governed by the pin size “CD” of the threaded accessory being used on the rod end.

Rod End Wrench Flats



Rod Dia.	F	AF	B
0.38	0.25	0.25	0.31
0.50	0.25	0.38	0.44
0.63	0.38	0.50	0.56
0.75	0.38	0.63	0.69
1.00	0.63	0.81	0.94
1.25	0.63	1.06	1.19
1.38	0.63	1.13	1.31
1.50	0.75	1.25	1.44
1.75	0.75	1.44	1.69
2.00	0.88	1.69	1.94
2.50	0.88	2.06	2.44
3.00	0.88	2.44	2.94
3.50	1.00	3.00	3.44
4.00	1.00	3.38	3.94
4.50	1.00	3.75	4.44
5.00	1.25	4.25	4.94
6.00	1.25	5.00	5.94

Threaded Rod Ends



CD Pin Dia	KK	C1	C2	MIN ROD DIA.
0.25	1/4-28	0.94	0.91	0.50
0.31	5/16-24	1.13	1.06	0.50
0.38	3/8-24	1.19	1.13	0.63
0.44	7/16-20	1.25	1.13	0.63
0.50	1/2-20	0.88	0.69	0.75
0.63	5/8-18	1.63	1.38	1.00
0.75	3/4-16	1.13	0.81	1.00
1.00	1-14	1.63	1.25	1.38
1.25	1 1/4-12	2.00	1.38	1.75
1.38	1 1/4-12	2.00	1.38	1.75
1.50	1 1/2-12	2.00	1.38	2.50
1.75	1 1/2-12	2.00	1.38	2.50
2.00	1 7/8-12	3.00	2.31	3.00
2.50	2 1/4-12	3.50	2.63	3.50
3.00	2 1/2-12	3.50	2.50	3.50
3.50	3 1/4-12	4.50	3.25	4.50
4.00	3 1/2-12	5.00	3.63	5.00

Proximity Switch

A high pressure GO proximity switch can be installed at the ends of the cylinder. This signals the extended or the retracted positions. These are available as an option only on the series B and EX.

Valves

Valves such as directional, counterbalance, flow control and many others can be added to the cylinder in many ways. We normally mount the valve in a manifold, and mount the manifold to the cylinder with SAE Code 61 or Code 62 connections, and then run a steel tube to the other end.

Overview

Ports

Cylinder ports are machined into the barrel end and barrel ring. This eliminates the local distortion and stress concentration due to welding a half coupling on the outside of the barrel. The result is a strong, clean cylinder barrel. However, the downside is that because we pre-manufacture and stock these parts, changing the port size is difficult. Therefore, it is more cost effective to use an adapter to change the port type and size.

Port sizes and threads

Dash Size	NPT	ORB & JIC	BSPP	ORFS
-02	1/8"-27	5/16"-24	1/8"-28	
-03		3/8"-24		
-04	1/4"-18	7/16"-20	1/4"-19	9/16"-18
-05		1/2"-20		
-06	3/8"-18	9/16"-18	3/8"-19	11/16"-16
-08	1/2"-14	3/4"-16	1/2"-14	13/16"-16
-10		7/8"-14	5/8"-14	1"-14
-12	3/4"-14	1-1/16"-12	3/4"-14	1-3/16"-12
-14		1-3/16"-12		
-16	1"-11.5	1-5/16"-12	1"-11	1-7/16"-12
-20	1-1/4"-11.5	1-5/8"-12	1-1/4"-11	1-11/16"-12
-24	1-1/2"-11.5	1-7/8"-12	1-1/2"-11	2"-12
-32	2"-11.5	2-1/2"-12	2"-11	

Seals

All of our cylinders utilize the latest in seal design from major manufacturers. Seals are one of the most critical components in a hydraulic cylinder. It is very important to keep the nearby operating environment as clean as possible and to keep the oil as contaminant free as possible.

Our piston seals are carefully chosen to perform in the requirements of each individual series of cylinder. Most of our piston seals will be of the "slipper" style, while the Series B offers the option of using a loaded "u-cup" style. In general, u-cup seals are used where the cylinder must support a load without creeping. The slipper style of seals offer low friction and are more tolerant of contamination. Materials range from hard plastic to urethane to glass filled PTFE, all with nitrile energizers.

Our rod seals are a loaded u-cup style with back beveled sealing lips. They also have a greater depth than cross section to resist roll over in the groove under pressure.

Our rod wipers are polyurethane either of the metal encased style or the snap in style. The metal encased rod wipers are used on the Series B, EX and TH.

All wear rings are reinforced nylon.

All O'rings and backup rings are nitrile.

Overview

Torque Specifications

The torque on a bolt or nut must be sufficient to create a preload that is greater than the load to be carried. The values given in the charts are for SAE Gr.8 bolts and C1045 rod material and a nut material with a minimum yield strength of

Head Gland bolts

Bolt size	Preload (lb)	Torque (lb-ft) ±10%
1/4"-20	2860	12
5/16"-18	4720	24
3/8"-16	7000	45
7/16"-14	9550	70
1/2"-13	12,750	105
9/16"-12	16,400	155
5/8"-11	20,350	210
3/4"-10	30,100	375
7/8"-14	45,800	675
1"-14	61,000	1015

Piston Nut (use Loctite #262)

Nut size	Preload (lb)	Torque (lb-ft) ±10%
1/2"-20	11,510	70
3/4"-16	26,850	250
1"-14	48,950	610
1 1/4"-12	57,325	960
1 3/8"-12	75,740	1300
1 1/2"-12	91,100	1710
1 5/8"-12	118,200	2400
1 3/4"-12	131,400	2875
1 7/8"-12	151,800	3560
2"-12	169,650	4240
2 1/4"-12	221,400	6230
2 1/2"-12	230,900	7215
3"-12	381,700	14,300
3 1/2"-12	471,250	20,620

Thread locking compound

All threaded components of the cylinder should be assembled using a thread locking compound. This will ensure that items such as head gland bolts and piston nuts stay tight. We use products such as Loctite Threadlocker. It is important to closely follow the manufacturers instructions regarding cleaning and priming before applying these threadlocking compounds.

Request for Quotation

At the end of this section is a Request for Quotation form. Fill this out and fax it to Sealum Industries Ltd.

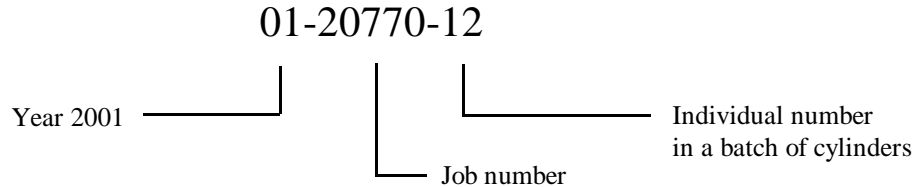
The fax # is (604-522-0070). We will then contact you with a price and delivery or for any further information.

If the cylinder is one that has been ordered before, write in the model number on the comments line at the bottom of the page (include any changes that may have been made since the original delivery).

Overview

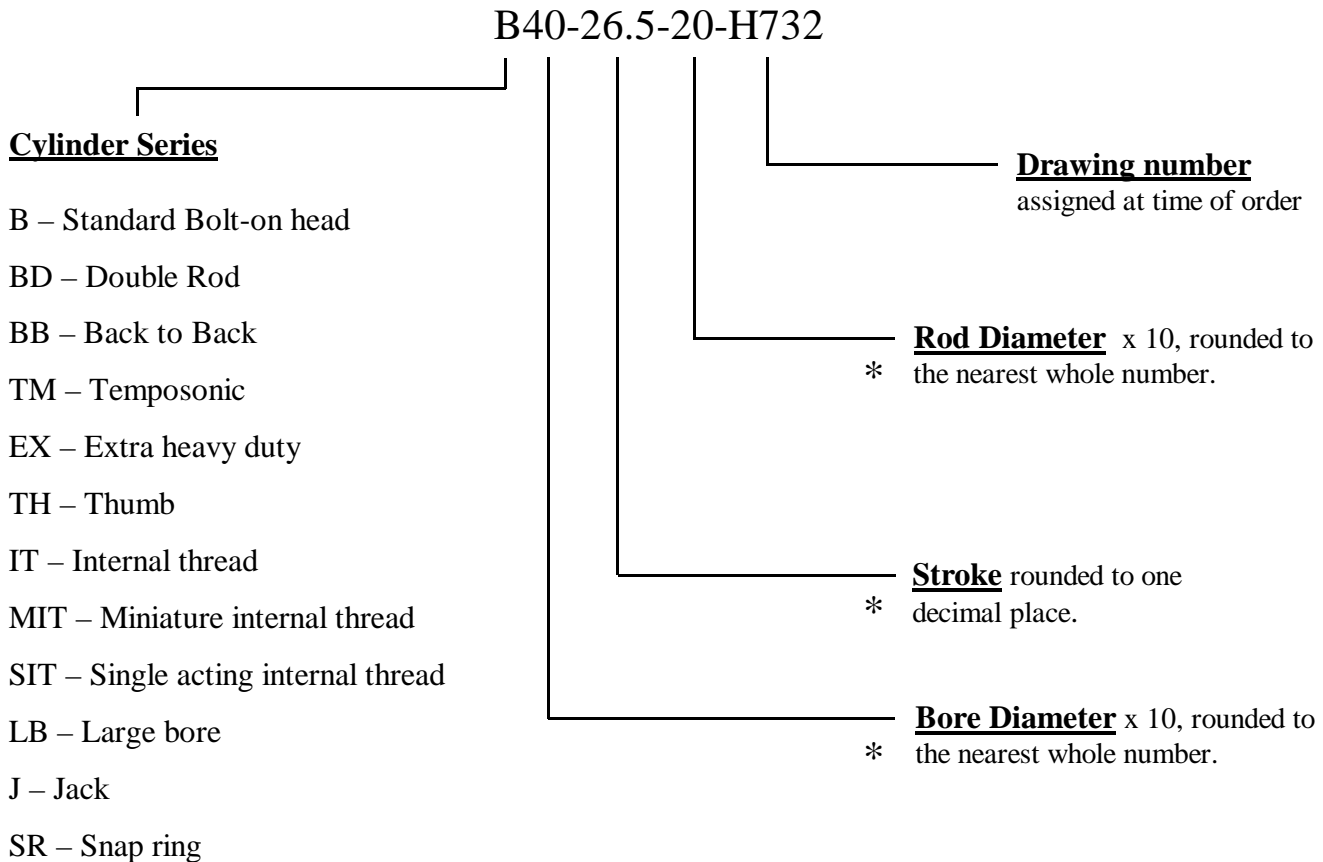
Serial Number

The serial number consists of a group of either two or three sets of numbers. The first set describes the year the cylinder was manufactured. The second set gives our internal manufacturing job number. If there is a third set, it gives the individual number of a cylinder in a batch of cylinders.



Model Number

The model number consists of a group of numbers. The first set gives the cylinder model and the bore size. The second set gives the stroke. The third set is the rod diameter. The fourth set is the drawing number.



For telescopic model numbers see section #13
TS – Telescopic single acting
TD – Telescopic double acting

* May not apply to certain models of double rod or back to back.

Overview

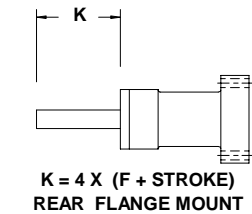
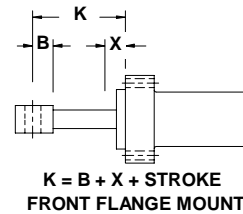
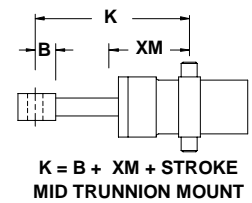
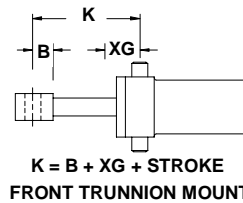
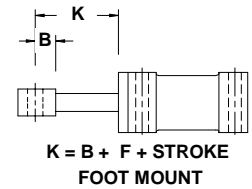
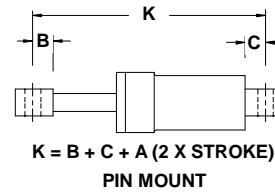
Buckling

A major concern with long stroke cylinders under a compressive load is the buckling of the rod. This can be reduced or eliminated by various means:-

- Use a stop tube to increase the overlap between the piston and the head gland.
- Use spherical bearings to reduce eccentricity.
- Use a mounting style that will reduce the "K" dimension.

The chart below should be used as a reference guide only. The customer will have to consider the cylinder application to select a rod size and stop tube to avoid any cylinder buckling.

THRUST (in lbs.)	VALUE OF 'K' IN INCHES												
	5/8	1	1 3/8	1 3/4	2	2 1/2	3	3 1/2	4	5	5 1/2	7	
400	35	84	134										
700	30	68	119										
1,000	26	60	105	156	190								
1,400	24	54	93	144	175	244	308						
1,800	23	48	84	127	160	230	294	366					
2,400	18	45	75	114	145	214	281	347					
3,200	16	40	68	103	131	196	262	329	398				
4,000	12	38	63	93	119	174	240	310	373				
5,000	9	36	60	87	112	163	225	289	359				
6,000		30	56	82	102	152	209	274	342	476			
8,000		25	51	76	93	136	186	244	310	448			
10,000		21	45	70	89	125	172	221	279	412			
12,000		17	41	64	85	117	155	210	270	388	455		
16,000			35	57	75	110	141	188	233	350	421		
20,000			28	52	66	103	136	173	218	325	385		
30,000				39	56	87	120	156	190	285	330		
40,000				24	43	75	108	142	177	248	293		
50,000					30	66	97	131	165	234	268	408	
60,000						57	88	119	154	226	256	384	
80,000						36	71	104	136	204	240	336	
100,000							56	91	120	199	224	324	
120,000							45	76	108	174	207	313	
140,000								64	98	162	194	301	
160,000								47	87	149	182	279	
200,000									65	131	160	260	
250,000										109	143	236	
300,000										85	120	212	
350,000										53	100	195	
400,000											72	182	



DIMENSIONS

K = Column Length

A = Dimension added to stroke to determine collapsed cylinder length. See Cylinder dimensional data pages.

B = Length to center of rod mounting accessory. Equal to dimension L, LS, CE, or E, depending on rod accessory selected. See Mounting Accessory data pages

C = Length to center of barrel mounting accessory. Equal to dimensions L, LS, or E, depending on mounting accessory selected. See Mounting Accessory data pages .

F = Length of rod extension when cylinder is collapsed. 'F' is included in dimensions A, X, XG, and XM. See Cylinder dimensional data pages.

When a rod extension is used, the extra length must be added to 'K'.

Overview

Cylinder Force

THEORETICAL CYLINDER FORCES (values do not reflect losses due to friction or other variables)

Force (lb) = Pressure (psi) x Piston Area (sq.in.)

BORE SIZE	ROD DIA	FORCE (lbs)	SYSTEM PRESSURE (psi)									VOLUME Gallons per inch of Stroke
			1000	1500	2000	2500	3000	3500	4000	4500	5000	
1 1/2	3/4	PUSH	1,770	2,650	3,530	4,420	5,300	6,180	7,070	7,950	8,830	0.0076
		PULL	1,320	1,990	2,650	3,310	3,970	4,640	5,300	5,960	6,630	0.0057
2	1	PUSH	3,140	4,710	6,280	7,850	9,420	11,000	12,560	14,140	15,700	0.0136
		PULL	2,360	3,530	4,710	5,890	7,070	8,250	9,420	10,600	11,780	0.0102
2 1/2	1 3/8	PUSH	1,660	2,480	3,310	4,140	4,970	5,800	6,630	7,450	8,280	0.0072
		PULL	4,910	7,360	9,820	12,270	14,720	17,180	19,630	22,090	24,540	0.0213
3	1 3/8	PUSH	4,120	6,180	8,250	10,300	12,370	14,430	16,490	18,550	20,610	0.0179
		PULL	3,420	5,130	6,850	8,560	10,270	11,980	13,700	15,400	17,120	0.0148
3 1/4	1 3/4	PUSH	2,500	3,750	5,010	6,260	7,510	8,760	10,010	11,260	12,510	0.0108
		PULL	7,070	10,600	14,130	17,670	21,200	24,740	28,270	31,810	35,340	0.0306
3 1/2	2	PUSH	5,580	8,370	11,160	13,960	16,750	19,540	22,330	25,120	27,920	0.0242
		PULL	4,660	6,990	9,330	11,660	13,990	16,320	18,650	20,980	23,310	0.0202
4	2 1/2	PUSH	3,930	5,890	7,850	9,820	11,780	13,740	15,700	17,670	19,630	0.0170
		PULL	8,300	12,440	16,590	20,740	24,900	29,030	33,180	37,330	41,480	0.0359
4 1/2	2 1/2	PUSH	6,810	10,210	13,620	17,020	20,430	23,840	27,240	30,650	34,050	0.0295
		PULL	5,890	8,830	11,780	14,720	17,670	20,610	23,560	26,500	29,450	0.0255
5	3	PUSH	5,150	7,730	10,300	12,880	15,460	18,040	20,610	23,190	25,770	0.0223
		PULL	9,620	14,430	19,240	24,050	28,860	33,670	38,480	43,290	48,100	0.0416
5 1/2	3 1/2	PUSH	8,130	12,200	16,270	20,340	24,410	28,470	32,540	36,610	40,680	0.0352
		PULL	7,210	10,820	14,430	18,040	21,650	25,250	28,860	32,470	35,080	0.0312
6	4	PUSH	6,480	9,720	12,960	16,200	19,440	22,680	25,910	29,160	32,400	0.0280
		PULL	4,710	7,070	9,420	11,780	14,140	16,490	18,850	21,200	23,560	0.0204
6 1/2	4 1/2	PUSH	12,550	18,850	25,130	31,410	37,700	43,980	50,260	56,550	62,830	0.0544
		PULL	10,160	15,240	20,320	25,400	30,480	35,560	40,640	45,720	50,800	0.0440
7	5	PUSH	9,420	14,130	18,850	23,560	28,270	32,980	37,700	42,410	47,120	0.0408
		PULL	7,660	11,480	15,310	19,140	22,970	26,800	30,630	34,460	38,290	0.0332
7 1/2	5 1/2	PUSH	5,500	8,250	11,000	13,740	16,490	19,240	21,990	24,740	27,490	0.0238
		PULL	15,900	23,850	31,810	39,760	47,710	55,660	63,610	71,570	79,520	0.0688
8	6	PUSH	12,760	19,140	25,520	31,900	38,290	44,670	51,050	57,430	63,810	0.0552
		PULL	10,990	16,490	21,990	27,490	32,980	38,480	43,980	49,480	54,980	0.0476
8 1/2	6 1/2	PUSH	8,830	13,250	17,670	22,090	26,500	30,920	35,340	39,760	44,180	0.0383
		PULL	19,630	29,450	39,270	49,090	58,900	68,720	78,540	88,360	98,170	0.0850
9	7	PUSH	16,490	24,740	32,980	41,230	49,480	57,720	65,970	74,220	82,460	0.0714
		PULL	12,560	18,850	25,130	31,410	37,700	43,980	50,260	56,550	62,830	0.0544
9 1/2	7 1/2	PUSH	10,010	15,020	20,030	25,030	30,040	35,050	40,050	45,060	50,070	0.0434
		PULL	23,760	35,640	47,510	59,390	71,270	83,150	95,030	106,910	118,790	0.1028
10	8	PUSH	14,130	21,200	28,270	35,340	42,410	49,480	56,550	63,610	70,680	0.0162
		PULL	28,270	42,410	56,550	70,680	84,820	98,960	113,100	127,230	141,370	0.1224
10 1/2	8 1/2	PUSH	23,360	35,050	46,730	58,410	70,100	81,780	94,460	107,140	119,830	0.1011
		PULL	21,200	31,810	42,410	53,010	63,610	74,220	84,820	95,420	106,030	0.0918
11	9	PUSH	18,650	27,980	37,300	46,630	55,960	65,280	74,610	83,940	93,260	0.0807
		PULL	15,700	23,560	31,410	39,270	47,120	54,980	62,830	70,680	78,540	0.0680
11 1/2	9 1/2	PUSH	33,180	49,770	66,360	82,960	99,550	116,140	132,730	149,320	165,910	0.1436
		PULL	20,610	30,920	41,230	51,540	61,850	72,150	82,460	92,770	103,080	0.0892
12	10	PUSH	38,480	57,720	76,970	96,210	115,450	134,690	153,940	173,180	192,420	0.1666
		PULL	31,410	47,120	62,830	78,540	94,250	109,950	125,660	141,370	157,080	0.1360
12 1/2	10 1/2	PUSH	25,920	38,870	51,800	64,800	77,750	90,710	103,670	116,630	129,590	0.1122
		PULL	18,850	28,270	37,700	47,120	56,550	65,970	75,400	84,820	94,250	0.0816
13	11	PUSH	50,260	75,400	100,530	125,660	150,800	175,930	201,060	226,200	251,330	0.2176
		PULL	40,640	60,960	81,290	101,610	121,930	142,250	162,580	182,900	203,220	0.1760
13 1/2	11 1/2	PUSH	37,700	56,550	75,400	94,250	131,100	131,940	150,800	169,640	188,500	0.1632
		PULL	30,630	45,940	61,260	76,570	91,890	107,200	122,520	137,840	153,150	0.1326
14	12	PUSH	26,500	39,760	53,010	66,270	79,520	92,770	106,030	119,280	132,530	0.1148
		PULL	78,540	117,810	158,080	196,350	235,620	274,890	314,160	353,430	392,700	0.3400
14 1/2	12 1/2	PUSH	58,900	88,360	117,810	147,260	176,710	206,170	235,620	265,070	294,520	0.2550
		PULL	50,260	75,400	100,530	125,660	150,800	175,930	201,060	226,200	251,330	0.2176
15	13	PUSH	40,050	60,080	80,110	100,140	120,160	140,190	160,220	180,250	200,270	0.1734

Overview

Cylinder Speed

THEORETICAL CYLINDER SPEEDS (inches per second)

$$\text{Speed (in/sec)} = 3.85 \times \text{Flow (GPM)} \div \text{Area (sq.in.)}$$

BORE SIZE	ROD DIA.	FLOW (GPM)																	
		1	2	5	7	10	12	15	20	25	30	35	40	45	50	60	70	90	100
1 1/2	3/4	2.2	4.4	10.9	15.3	21.8													
		2.9	5.8	14.5	20.3	29.1													
2	1	1.2	2.5	6.1	8.6	12.3	14.7	18.4											
		1.6	3.3	8.2	11.4	16.4	19.6	24.5											
		13/8	2.3	4.7	11.6	16.3	23.3	27.9	34.9										
2 1/2	1	0.8	1.6	3.9	5.5	7.9	9.4	11.8	15.7	19.6									
		0.9	1.9	4.7	6.5	9.3	11.2	14.0	18.7	23.5									
		13/8	1.1	2.3	5.6	7.9	11.3	13.5	16.9	22.5	28.1								
		13/4	1.5	3.1	7.7	10.8	15.4	18.5	23.1	30.8	38.5								
3	13/8	0.5	1.1	2.7	3.8	5.5	6.5	8.2	10.9	13.6	16.4	19.1							
		0.7	1.4	3.5	4.8	6.9	8.3	10.4	13.8	17.3	20.7	24.2							
		13/4	0.8	1.7	4.1	5.8	8.3	9.9	12.4	16.5	20.7	24.8	28.9						
		2	1.0	2.0	5.0	6.9	9.8	11.8	14.7	19.6	24.5	29.4	34.3						
3 1/4	13/8	0.5	0.9	2.3	3.3	4.6	5.6	7.0	9.3	11.6	13.9	16.3	18.6						
		0.6	1.1	2.8	3.9	5.7	6.8	8.5	11.3	14.1	17.0	19.8	22.6						
		13/4	0.7	1.3	3.3	4.6	6.5	7.9	9.8	13.1	16.4	19.6	22.9	26.2					
		2	0.8	1.5	3.7	5.2	7.5	9.0	11.2	15.0	18.7	22.4	26.1	29.9					
3 1/2	13/4	0.4	0.8	2.0	2.8	4.0	4.8	6.0	8.0	10.0	12.0	14.0	16.0	18.0					
		0.5	1.1	2.7	3.7	5.3	6.4	8.0	10.7	13.4	16.0	18.7	21.4	24.0					
		2	0.6	1.2	3.0	4.2	5.9	7.1	8.9	11.9	14.7	17.8	20.8	23.8	26.8				
		2 1/2	0.8	1.6	4.1	5.7	8.2	9.8	12.3	16.4	20.4	24.5	28.6	32.7	36.8				
4	13/4		0.6	1.5	2.2	3.1	3.7	4.6	6.1	7.7	9.2	10.7	12.3	13.8	15.3	18.4			
			0.8	1.9	2.7	3.8	4.6	5.7	7.6	9.5	11.4	13.3	15.2	17.1	19.0	22.8			
			0.8	2.0	2.9	4.1	4.9	6.1	8.2	10.2	12.3	14.3	16.4	18.4	20.4	24.5			
			1.4	3.5	4.9	7.0	8.4	10.5	14.0	17.5	21.0	24.5	28.0	31.5	35.0	42.0			
4 1/2	2		0.5	1.2	1.7	2.4	2.9	3.6	4.8	6.1	7.3	8.5	9.7	10.9	12.1	14.5	17.0		
			0.6	1.5	2.1	3.0	3.6	4.5	6.0	7.6	9.1	10.6	12.1	13.6	15.1	18.1	21.1		
			0.7	1.8	2.5	3.5	4.2	5.3	7.0	8.8	10.5	12.3	14.0	15.8	17.5	21.0	24.5		
			0.9	2.2	3.1	4.4	5.2	6.5	8.7	10.9	13.1	15.3	17.4	19.6	21.8	26.2	30.5		
5	2		0.4	1.0	1.4	2.0	2.4	2.9	3.9	4.9	5.9	6.9	7.9	8.8	9.8	11.8	13.7	17.7	
			0.5	1.2	1.6	2.3	2.8	3.5	4.7	5.8	7.0	8.2	9.3	10.5	11.7	14.0	16.4	21.0	
			0.6	1.5	2.2	3.1	3.7	4.6	6.1	7.7	9.2	10.7	12.3	13.8	15.3	18.4	21.5	27.6	
			0.8	1.9	2.7	3.9	4.6	5.8	7.7	9.6	11.5	13.5	15.4	17.3	19.2	23.0	26.9	34.6	
6	2 1/2			0.7	1.0	1.4	1.6	2.0	2.7	3.4	4.1	4.8	5.5	6.1	6.8	8.2	9.5	12.3	13.6
				0.8	1.2	1.7	2.0	2.5	3.3	4.1	5.0	5.8	6.6	7.4	8.2	9.9	11.5	14.8	16.5
				0.9	1.3	1.8	2.2	2.7	3.6	4.5	5.5	6.4	7.3	8.2	9.1	10.9	12.7	16.4	18.2
				1.2	1.7	2.5	2.9	3.7	4.9	6.1	7.4	8.6	9.8	11.0	12.3	14.7	17.2	22.0	24.5
7	3			0.5	0.7	1.0	1.2	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	6.0	7.0	9.0	10.0
				0.6	0.9	1.2	1.5	1.8	2.5	3.1	3.7	4.3	4.9	5.5	6.1	7.4	8.6	11.0	12.3
				0.7	1.0	1.5	1.8	2.2	3.0	3.7	4.5	5.2	5.9	6.7	7.4	8.9	10.4	13.4	14.9
				1.0	1.4	2.0	2.5	3.1	4.1	5.1	6.1	7.2	8.2	9.2	10.2	12.3	14.3	18.4	20.4
8	3 1/2				0.5	0.8	0.9	1.2	1.5	1.9	2.3	2.7	3.1	3.5	3.8	4.6	5.4	6.9	7.7
					0.7	1.0	1.1	1.4	1.9	2.4	2.8	3.3	3.8	4.3	4.7	5.7	6.6	8.5	9.5
					0.7	1.0	1.2	1.5	2.0	2.6	3.1	3.6	4.1	4.6	5.1	6.1	7.2	9.2	10.2
					1.0	1.5	1.7	2.2	2.9	3.6	4.4	5.1	5.8	6.5	7.3	8.7	10.2	13.1	14.5
10	5					0.5	0.6	0.7	1.0	1.2	1.5	1.7	2.0	2.2	2.5	2.9	3.4	4.4	4.9
						0.7	0.8	1.0	1.3	1.6	2.0	2.3	2.6	2.9	3.3	3.9	4.6	5.9	6.5
						0.8	0.9	1.2	1.5	1.9	2.3	2.7	3.0	3.5	3.8	4.6	5.4	6.9	7.7
						1.0	1.2	1.4	1.9	2.4	2.9	3.4	3.9	4.3	4.8	5.8	6.7	8.7	9.6

Request for Quotation

Company _____
 City _____
 Province/State _____
 Contact name _____
 Telephone No. _____
 Fax No. _____
 Email address _____
 Delivery Req'd _____
 Shipping Req'd _____

Office Use Only

Quotation No. _____
 Quoted by _____
 Quote date _____
 Unit price _____
 Remarks _____

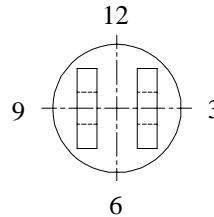
Qty. Req'd
 Series
 Bore Dia.
 Stroke
 Rod dia.
 Stop tube
 Retracted length

Rod material: CPO
 IHCP
 SS

B series only
 Piston seal type: Slipper,
 U-cup, optional

	Blind end	Rod end
Cushion	<input type="text"/>	<input type="text"/>
Port size	<input type="text"/>	<input type="text"/>
Port orientation	<input type="text"/>	<input type="text"/>
Extension	<input type="text"/>	<input type="text"/>
Mounting acc.	<input type="text"/>	<input type="text"/>
Mounting brkt.	<input type="text"/>	<input type="text"/>
Pin type	<input type="text"/>	<input type="text"/>

Both ends No cushions B-series only



Port Orientation

Viewed from blind end
with the pin ends at
3 o'clock and 9 o'clock

Notes:

Standard blind end extension is "L" or "LS" from tables.
 Standard rod end extension is "F" from tables.
 See accessories pages for mounting brackets and pin types.

Additional requirements _____

Mounting Accessories



Introduction

Part number

For most accessories, we have organized the charts by the pin hole diameter 'CD' which is the controlling dimension. The first set of numbers "Bxxxx" is our drawing number and describes the type of accessory. This is followed by a dash number which is the size of the pin diameter 'CD' x 16 and will give the size of the pin in sixteenths of an inch, eg. a 1" diameter pin is a "-16"

Specifications

Unless otherwise specified, all accessories are manufactured from CSA G40.21-44W or AISI C1045 steel and all dimensions are specified in inches. The strength of the accessories is based on the strength of a C1045 pin of diameter 'CD'. All male threaded accessories have an adjustable dimension of "LS". The maximum adjustment is "+ADJ". This is based on three-quarters thread engagement.

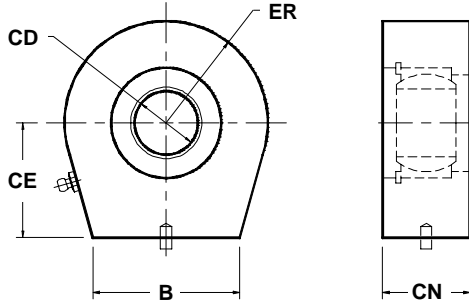
Because our cylinder barrels and rods are always manufactured to order, any type and size of accessory is available with any cylinder. Other barrel mounting types such as trunnions, flange mounts, and foot mounts are given in the section pertaining to each series of cylinders. For any custom types and sizes not shown in this catalogue, feel free to contact our engineering department.

Recommendations

The use of spherical bearings is recommended because they reduce side loads created by any mounting misalignment. They are also easily replaced when worn or damaged.

If a threaded accessory is required, a male thread on the accessory is preferred to a female thread which would use a male thread on the rod. Aside from buckling, the weakest part of a rod or accessory is at the base of the thread. If it happens to break off, it is easier to replace an accessory than a complete rod.

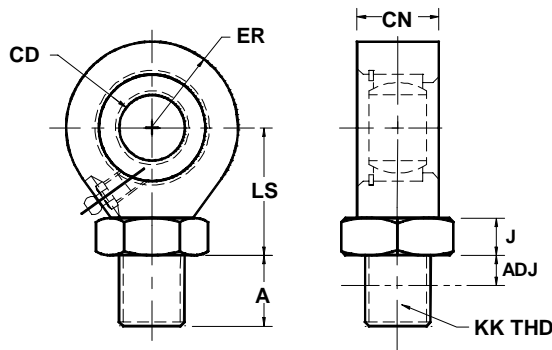
Sph. Brg. – Standard Width, Welded



- c/w bearing, snap ring and grease fitting.
- use two spacers (B993-dash) to center bearing.
- the bare housing part no. is B1591-dash.
- old part no. was SW-dash.

Part No.	CD	CE	ER	CN	B	S/R	BRG.
B3295-12	0.75	1.25	1.00	1.00	1.63	12111	12110
B3295-16	1.00	1.50	1.31	1.25	2.00	12052	10334
B3295-20	1.25	1.88	1.63	1.50	2.50	10792	11687
B3295-22	1.38	2.13	1.88	1.50	2.88	11582	11581
B3295-24	1.50	2.25	2.00	1.75	3.25	10826	10803
B3295-28	1.75	2.38	2.13	2.00	3.25	11946	10204
B3295-32	2.00	2.63	2.43	2.25	3.50	11739	10804
B3295-36	2.25	2.88	2.75	2.50	4.25	11588	10805
B3295-40	2.50	3.00	2.88	2.50	4.50	10327	11808
B3295-44	2.75	3.25	3.25	2.75	4.50	12499	10807
B3295-48	3.00	3.75	3.63	2.75	4.50	11732	10228
B3295-56	3.50	4.50	4.18	3.50	5.38	11750	11551
B3295-64	4.00	5.25	4.50	4.00	6.90	12219	12218

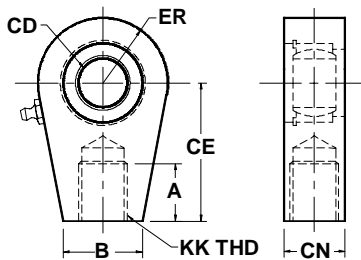
Sph. Brg. – Standard Width, Male Thread



- c/w bearing, snap ring, grease fitting and jam nut.
- use two spacers (B993-dash) to center bearing.
- the bare housing part no. is B1569-dash.
- old part no. was ST-dash.

Part No.	CD	A	ER	CN	LS	J	ADJ	KK	S/R	BRG.
B3673-12	0.75	1.33	1.00	1.00	1.67	0.42	0.77	3/4-16	12111	12110
B3673-16	1.00	1.45	1.31	1.25	2.05	0.55	0.70	1-14	12052	10334
B3673-20	1.25	1.78	1.63	1.50	2.60	0.72	0.84	1 1/4-12	10792	11687
B3673-22	1.38	1.78	1.88	1.50	2.85	0.72	0.84	1 1/4-12	11582	11581
B3673-24	1.50	2.03	2.00	1.75	3.09	0.84	0.91	1 1/2-12	10826	10803
B3673-28	1.75	2.03	2.13	2.00	3.22	0.84	0.91	1 1/2-12	11946	10204
B3673-32	2.00	2.67	2.43	2.25	3.46	0.83	1.27	1 7/8-12	11739	10804
B3673-40	2.50	3.00	2.88	2.50	4.00	1.00	1.31	2 1/4-12	10327	11808
B3673-48	3.00	3.38	3.63	2.75	4.88	1.13	1.50	2 1/2-12	11732	10228
B3673-56	3.50	4.25	4.18	3.50	5.88	1.38	1.81	3 1/4-12	11750	11551
B3673-64	4.00	5.25	4.50	4.00	6.75	1.50	2.63	3 1/2-12	12219	12218

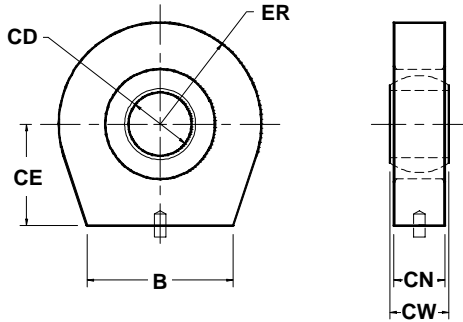
Sph. Brg. – Standard Width, Female Thread



- c/w bearing, snap ring and grease fitting.
- use two spacers (B993-dash) to center bearing.
- the bare housing part no. is B2250-dash.
- old part no. was SI-dash.

Part No.	CD	A	ER	CN	CE	B	KK	S/R	BRG.
B3672-16	1.00	1.63	1.31	1.25	3.13	1.63	1-14	12052	10334
B3672-20	1.25	2.00	1.63	1.50	3.88	2.00	1 1/4-12	10792	11687
B3672-22	1.38	2.00	1.88	1.50	4.13	2.00	1 1/4-12	11582	11581
B3672-24	1.50	2.25	2.00	1.75	4.50	2.50	1 1/2-12	10826	10803
B3672-28	1.75	2.25	2.13	2.00	4.50	2.50	1 1/2-12	11946	10204
B3672-32	2.00	2.75	2.43	2.25	5.50	3.00	1 7/8-12	11739	10804
B3672-40	2.50	3.25	2.88	2.50	6.50	3.75	2 1/4-12	10327	11808

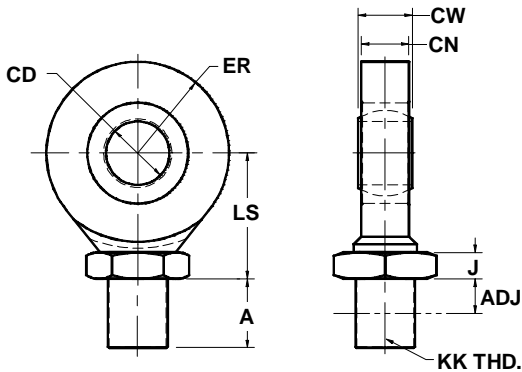
Sph. Brg. – Narrow Width, Welded



- c/w bearing.
- the bare housing is B3431-dash.

Part No.	CD	ER	CE	CW	CN	B	BRG
B3676-12	0.75	1.13	1.25	0.66	0.56	1.63	12110
B3676-16	1.00	1.44	1.50	0.88	0.75	2.00	10334
B3676-20	1.25	1.75	1.88	1.09	0.94	2.50	11687
B3676-22	1.38	2.00	2.13	1.19	1.03	2.88	11581
B3676-24	1.50	2.19	2.25	1.31	1.13	3.25	10803
B3676-28	1.75	2.50	2.38	1.53	1.31	3.25	10204
B3676-32	2.00	2.88	2.63	1.75	1.50	3.50	10804
B3676-36	2.25	3.25	2.88	1.97	1.69	4.25	10805
B3676-40	2.50	3.44	3.00	2.19	1.88	4.50	11808
B3676-44	2.75	3.75	3.25	2.41	2.06	4.50	10807
B3676-48	3.00	4.13	3.75	2.63	2.25	4.50	10228
B3676-56	3.50	4.75	4.50	3.06	2.63	5.38	11551
B3676-64	4.00	5.31	5.25	3.50	3.00	6.90	12218

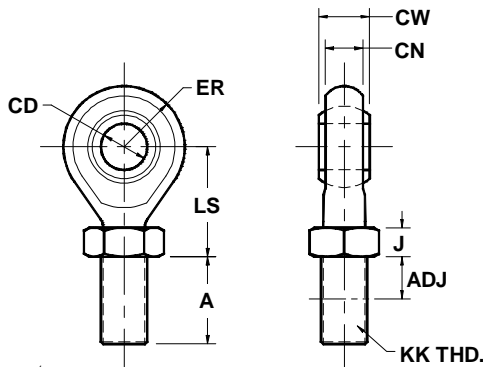
Sph. Brg. – Narrow Width, Male Thread



- c/w bearing and jam nut.
- the bare housing is B3677-dash.

Part No.	CD	ER	A	CW	CN	LS	ADJ	J	KK	BRG
B3678-16	1.00	1.44	1.08	0.88	0.75	2.30	0.33	0.55	1-14	10334
B3678-20	1.25	1.75	1.28	1.09	0.94	3.10	0.34	0.72	1 1/4-12	11687
B3678-22	1.38	2.00	1.28	1.19	1.03	3.22	0.34	0.72	1 1/4-12	11581
B3678-24	1.50	2.19	1.41	1.31	1.13	3.59	0.28	0.84	1 1/2-12	10803
B3678-28	1.75	2.50	1.41	1.53	1.31	3.72	0.28	0.84	1 1/2-12	10204
B3678-32	2.00	2.88	2.17	1.75	1.50	3.96	0.77	0.83	1 7/8-12	10804
B3678-40	2.50	3.44	2.50	2.19	1.88	4.75	0.81	1.00	2 1/4-12	11808
B3678-48	3.00	4.13	2.38	2.63	2.25	5.63	0.50	1.13	2 1/2-12	10228
B3678-56	3.50	4.75	3.13	3.06	2.63	6.63	0.69	1.38	3 1/4-12	11551
B3678-64	4.00	5.31	3.50	3.50	3.00	7.50	0.88	1.50	3 1/2-12	12218

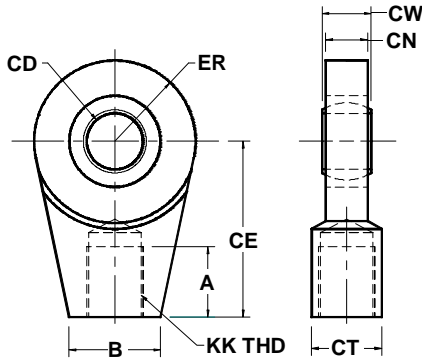
Sph. Brg. – Narrow Width, Male Thread Miniature



- c/w jam nut.

Part No.	CD	ER	A	CW	CN	LS	ADJ	J	KK
B3678-4	0.25	0.38	0.88	0.38	0.28	0.69	0.69	0.16	1/4-28
B3678-5	0.31	0.44	1.13	0.44	0.34	0.75	0.89	0.19	5/16-24
B3678-6	0.38	0.50	1.19	0.50	0.41	0.75	0.91	0.22	3/8-24
B3678-7	0.44	0.56	1.13	0.56	0.44	1.00	0.80	0.25	7/16-20
B3678-8	0.50	0.66	1.25	0.63	0.50	1.19	0.88	0.31	1/2-20
B3678-10	0.63	0.75	1.31	0.75	0.56	1.31	0.84	0.38	5/8-18
B3678-12	0.75	0.88	1.44	0.88	0.69	1.44	0.88	0.42	3/4-16

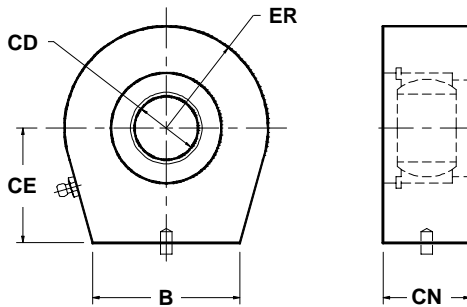
Sph. Brg. – Narrow Width, Female Thread



Part No.	CD	A	ER	CW	CN	CE	B	CT	KK	BRG.
B3697-12	0.75	0.81	1.13	0.66	0.56	2.38	1.00	1.00	3/4-16	12110
B3697-16	1.00	1.25	1.44	0.88	0.75	3.13	1.25	1.25	1-14	10334
B3697-20	1.25	1.38	1.75	1.09	0.94	3.69	1.50	1.50	1 1/4-12	11687
B3697-22	1.38	1.38	2.00	1.19	1.03	3.94	1.75	1.75	1 1/4-12	11581
B3697-24	1.50	1.50	2.19	1.31	1.13	4.25	2.00	2.00	1 1/2-12	10803
B3697-28	1.75	1.50	2.50	1.53	1.31	4.25	2.50	2.00	1 1/2-12	10204
B3697-32	2.00	2.31	2.88	1.75	1.50	5.75	2.50	2.50	1 7/8-12	10804
B3697-40	2.50	2.63	3.44	2.19	1.88	6.13	3.00	3.00	2 1/4-12	11808

- c/w bearing.
- the bare housing part no. is B3671-dash.

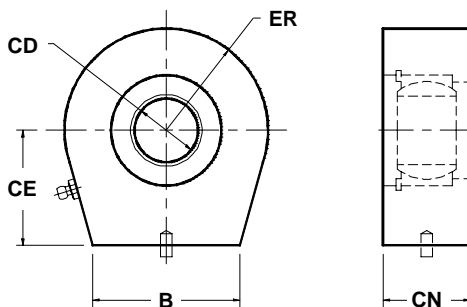
Sph. Brg. – Heavy Duty, Welded



Part No.	CD	ER	CE	CN	B	S/R	BRG.
B3296-20	1.25	2.00	2.25	1.75	3.25	10826	12503
B3296-24	1.50	2.13	2.38	2.00	3.25	11946	12504
B3296-28	1.75	2.43	2.63	2.25	3.75	11739	12505
B3296-32	2.00	2.75	2.88	2.50	4.25	11588	12506
B3296-36	2.25	2.88	3.00	2.50	4.50	10327	12507
B3296-40	2.50	3.25	3.25	2.75	4.50	12499	12508
B3296-44	2.75	3.63	3.75	2.75	4.50	11732	12509

- includes bearing, snap ring and grease fitting.
- the bare housing part no. is B1591-dash one size bigger than assembly.

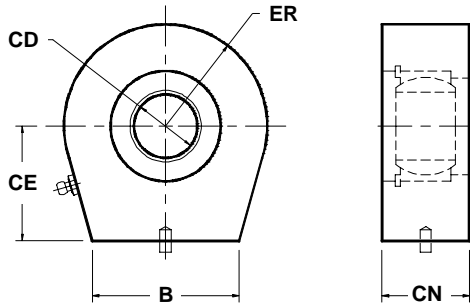
Sph. Brg. Metric – Heavy Duty, Welded



Part No.	CD	ER	CE	CN	B	S/R	BRG.
B3255-20	20	30	35	25	44	12199	12520
B3255-25	25	35	41	29	51	12500	12521
B3255-30	30	44	51	32	64	11582	12522
B3255-35	35	54	57	35	76	10826	12523
B3255-40	40	60	64	38	83	12153	12524
B3255-45	45	62	67	44	89	10133	12525
B3255-50	50	70	76	54	102	11588	12526
B3255-60	60	83	89	57	114	12502	12527
B3255-70	70	95	102	64	127	11732	12528
B3255-80	80	102	114	70	140	10797	12529
B3255-90	90	114	127	76	152	12501	12530
B3255-100	100	127	133	76	165	12219	12531

- includes bearing, snap ring and grease fitting.
- the bare housing part no. is B3297-dash one size bigger than assembly.
- note: All dimensions in this table are in millimeters (mm).

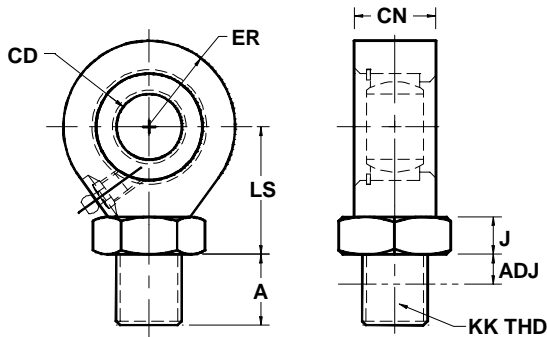
Sph. Brg. Metric – Standard Width, Welded



Part No.	CD	ER	CE	CN	B	S/R	BRG.
B3073-20	20	27	32	19	38	10043	12510
B3073-25	25	30	35	25	44	12199	12511
B3073-30	30	35	41	29	51	12500	10237
B3073-35	35	44	51	32	64	11582	12512
B3073-40	40	54	57	35	76	10826	12513
B3073-45	45	60	64	38	83	12153	12152
B3073-50	50	62	67	44	89	10133	12514
B3073-60	60	70	76	54	102	11588	12515
B3073-70	70	83	89	57	114	12502	12516
B3073-80	80	95	102	64	127	11732	12517
B3073-90	90	102	114	70	140	10797	12518
B3073-100	100	114	127	76	152	12501	12519

- c/w bearing, snap ring and grease fitting.
- the bare housing part no. is B3297-dash.
- use two B993-dash spacers to center bearings.
- note: all dimensions in this table are in millimeters (mm).

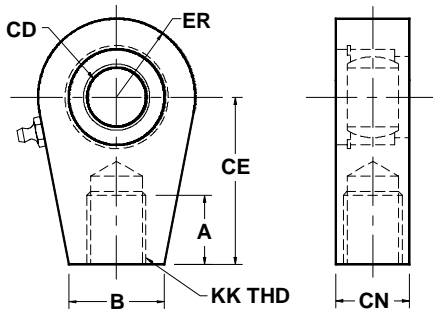
Sph. Brg. Metric – Standard Width, Male Thread



Part No.	CD	A	ER	CN	LS	ADJ	J	KK	S/R	BRG.
B3683-20	20	37	27	19	41	22	10	M20-1.5	10043	12510
B3683-25	25	30	30	25	50	12	12	M24-2	12199	12511
B3683-30	30	32	35	29	62	9	15	M30-2	12500	10237
B3683-35	35	38	44	32	72	11	17	M36-3	11582	12512
B3683-40	40	39	54	35	76	10	19	M39-3	10826	12513
B3683-45	45	40	60	38	83	8	22	M42-3	12153	12152
B3683-50	50	47	62	44	92	13	25	M45-3	10133	12514
B3683-60	60	52	70	54	105	13	29	M52-3	11588	12515
B3683-70	70	58	83	57	127	16	32	M56-4	12502	12516
B3683-80	80	52	95	64	133	4	38	M64-4	11732	12517

- c/w bearing, snap ring, grease fitting and jam nut.
- the bare housing part no. is B3682-dash.
- use two B993-DASH spacers to center bearings.
- note: All dimensions in this table are in millimeters (mm).

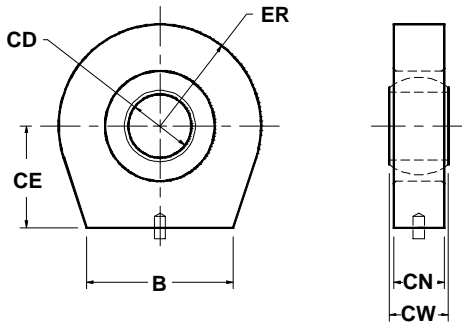
Sph. Brg. Metric – Standard Width, Female Thread



Part No.	CD	A	ER	CN	CE	B	KK	S/R	BRG.
B3699-20	20	24	27	19	56	32	M16-1.5	10043	12510
B3699-25	25	30	30	25	67	41	M20-1.5	12199	12511
B3699-30	30	35	35	29	78	51	M22-1.5	12500	10237
B3699-35	35	43	44	32	90	51	M28-1.5	11582	12512
B3699-40	40	49	54	35	103	64	M33-2	10826	12513
B3699-45	45	54	60	38	110	64	M36-3	12153	12152
B3699-50	50	64	62	44	129	76	M42-2	10133	12514
B3699-60	60	78	70	54	152	95	M52-3	11588	12515
B3699-70	70	84	83	57	171	102	M56-4	12502	12516
B3699-80	80	95	95	64	191	102	M64-4	11732	12517

- c/w bearing, snap ring, grease fitting.
- the bare housing part no. is B3698-dash.
- use two B993-dash spacers to center bearings.
- note: All dimensions in this table are in millimeters (mm).

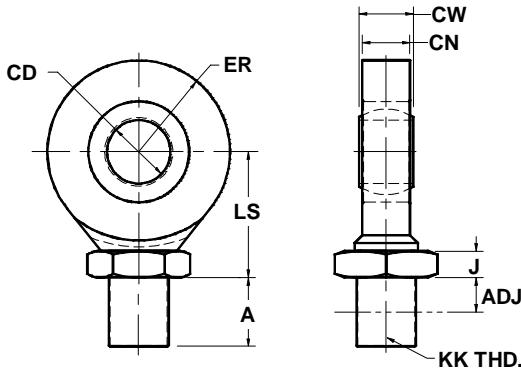
Sph. Brg. Metric – Narrow Width, Welded



- c/w bearing.
- the bare housing part no. is B3684-dash.
- note: all dimensions in this table are in millimeters (mm).

Part No.	CD	ER	CE	CW	CN	B	BRG.
B3432-20	20	33	25	16	12	38	12510
B3432-25	25	38	27	20	16	44	12511
B3432-30	30	44	30	22	18	51	10237
B3432-35	35	56	38	25	20	64	12512
B3432-40	40	68	44	28	22	76	12513
B3432-45	45	76	48	32	25	83	12152
B3432-50	50	78	57	35	28	89	12514
B3432-60	60	87	67	44	36	102	12515
B3432-70	70	103	76	49	40	114	12516
B3432-80	80	119	90	55	45	127	12517

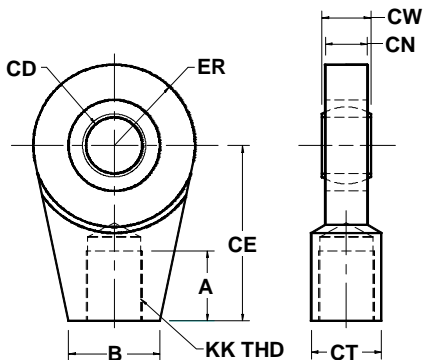
Sph. Brg. Metric – Narrow Width, Male Thread



- c/w bearing and jam nut.
- the bare housing part no. is B3681-dash.
- note: all dimensions in this table are in millimeters (mm).

Part No.	CD	ER	A	CW	CN	LS	ADJ	J	KK	BRG
B3680-10	10	13	24	14	11	24	17	5	M10-1.5	—
B3680-12	12	17	27	16	12	27	18	6	M12-1.75	—
B3680-15	15	19	29	19	14	31	19	7	M14-1.5	—
B3680-20	20	22	37	25	18	41	22	10	M20-1.5	12510
B3680-25	25	38	30	20	16	56	12	11	M24-2	12511
B3680-30	30	44	32	22	18	75	9	14	M30-2	10237
B3680-35	35	56	38	25	20	81	11	17	M36-3	12512
B3680-40	40	68	39	28	22	89	10	19	M39-3	12513
B3680-45	45	76	40	32	25	95	8	22	M42-3	12152
B3680-50	50	78	47	35	28	105	13	25	M45-3	12514
B3680-60	60	87	52	44	36	124	13	29	M52-3	12515
B3680-70	70	103	58	49	40	146	16	32	M56-4	12516
B3680-80	80	119	52	55	45	152	4	38	M64-4	12517

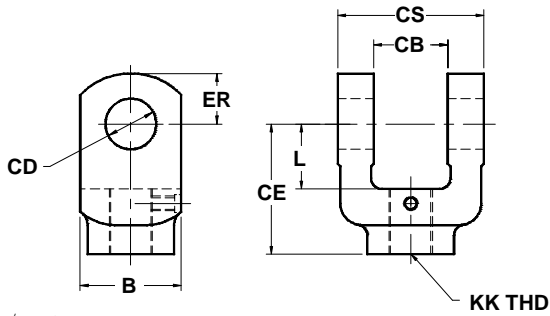
Sph. Brg. Metric – Narrow Width, Female Thread



- c/w bearing.
- the bare housing part no. is B3686-dash.
- note: all dimensions in this table are in millimeters (mm).

Part No.	CD	ER	A	CW	CN	CE	B	CT	KK	BRG
B3685-20	20	33	24	16	12	60	32	25	M16-1.5	12510
B3685-25	25	38	30	20	16	68	41	25	M20-1.5	12511
B3685-30	30	44	35	22	18	81	51	32	M22-1.5	10237
B3685-35	35	56	43	25	20	98	51	38	M28-1.5	12512
B3685-40	40	68	49	28	22	111	64	44	M33-2	12513
B3685-45	45	76	54	32	25	122	64	51	M36-3	12152
B3685-50	50	78	64	35	28	137	76	51	M42-2	12514
B3685-60	60	87	78	44	36	162	95	64	M52-3	12515
B3685-70	70	103	84	49	40	184	102	76	M56-4	12516
B3685-80	80	119	95	55	45	205	102	83	M64-4	12517

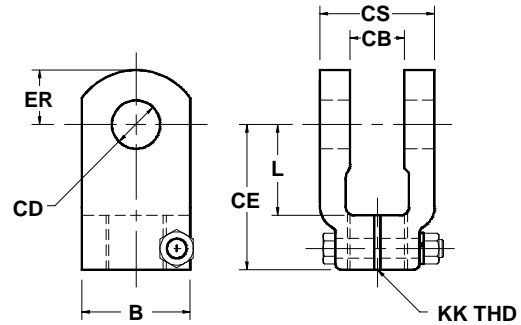
Clevis – JIC, Threaded



- c/w set screw.
- old part no. was CT-dash.

Part No.	CD	L	CE	ER	CS	CB	KK	B
B1772-12	0.75	1.38	2.38	0.75	2.57	1.31	3/4-16	1.50
B1772-16	1.00	1.63	3.13	1.00	3.06	1.56	1-14	2.00
B1772-20	1.25	2.13	3.88	1.25	3.31	1.81	1 1/4-12	2.50
B1772-22	1.38	2.25	4.13	1.38	4.06	2.06	1 1/4-12	2.75
B1772-24	1.50	2.50	4.50	1.50	4.06	2.06	1 1/2-12	3.00
B1772-28	1.75	2.50	4.50	1.75	5.06	2.56	1 1/2-12	3.50
B1772-32	2.00	2.75	5.50	2.00	5.06	2.56	1 7/8-12	4.00
B1772-40	2.50	3.13	6.50	2.50	6.06	3.06	2 1/4-12	5.00

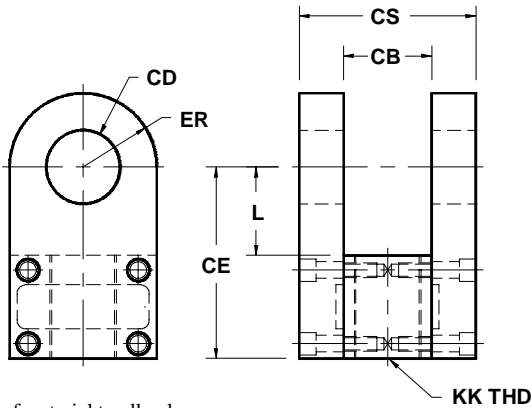
Clevis – ASAE, Threaded



- c/w bolt and nut.

Part No.	CD	L	CE	ER	CS	CB	KK	B
B2796-1	0.75	1.50	2.50	0.88	1.88	0.88	3/4-16	1.50
B2796-2	1.00	1.75	2.88	1.13	2.38	1.13	1-14	2.00
B2796-3	1.00	1.75	2.88	1.13	2.38	1.13	1 1/4-12	2.25
B2796-4	1.25	1.88	3.13	1.25	2.88	1.38	1 1/4-12	2.25
B2796-5	1.25	1.88	3.13	1.38	2.88	1.38	1 1/2-12	2.50
B2796-6	1.50	2.13	3.50	1.63	3.63	1.63	1 3/4-12	3.00

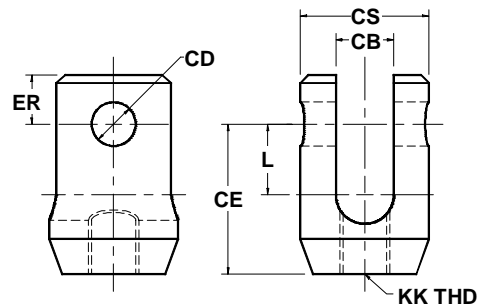
Clevis – Threaded Bolted



- Note: for straight pull only.
- no side load allowed

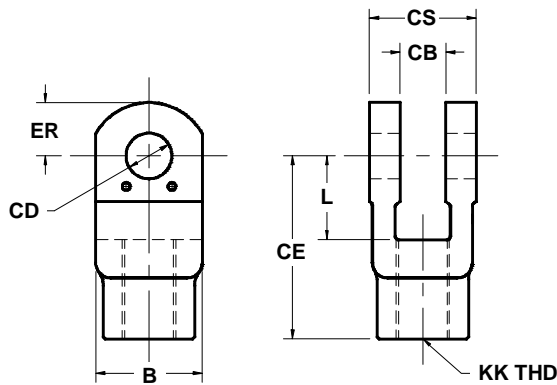
Part No.	CD	L	CE	ER	CS	CB	KK
B3208	2.50	3.00	6.50	2.50	6.00	3.01	2 1/4-12
B3209	3.00	3.25	6.75	3.00	6.00	3.01	2 1/2-12
B3706	3.50	4.00	8.50	3.50	8.00	4.01	3 1/4-12
B3707	4.00	4.50	9.13	4.00	8.50	4.51	3 1/2-12

Clevis – Miniature, Threaded



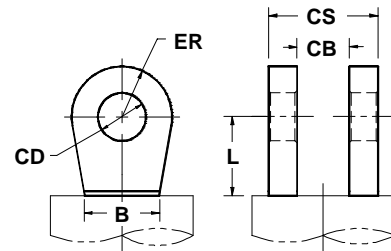
Part No.	CD	L	CE	ER	CS	CB	KK
B3668-4	0.25	0.41	1.00	0.31	0.81	0.39	1/4-28
B3668-5	0.31	0.44	1.13	0.38	0.94	0.48	5/16-24
B3668-6	0.38	0.50	1.25	0.44	1.19	0.52	3/8-24
B3668-7	0.44	0.63	1.50	0.50	1.31	0.66	7/16-20
B3668-8	0.50	0.69	1.63	0.56	1.47	0.69	1/2-20
B3668-10	0.63	0.75	1.88	0.69	1.69	0.78	5/8-18
B3668-12	0.75	0.94	2.06	0.75	1.97	0.94	3/4-16
B3668-16	1.00	1.00	2.31	1.06	2.47	1.13	1-14

Clevis – Narrow, Threaded



Part No.	CD	L	CE	ER	CS	CB	KK	B
B3227-1	1.50	3.50	6.00	1.75	3.50	1.50	1 3/4-12	3.50
B3227-2	2.00	3.50	6.00	2.25	4.50	2.25	2-12	4.00

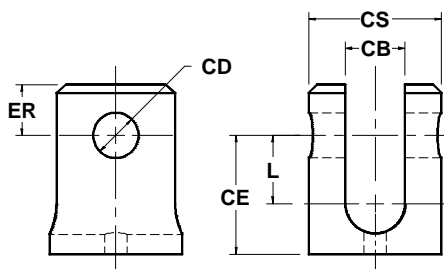
Clevis – NFPA, Welded



- the "CB" and "CS" dimensions can be readily changed.
- old part no. was CW-dash.

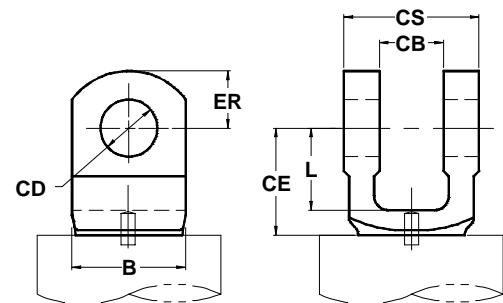
Part No.	CD	L	ER	CS	CB	B
B1607-8	0.50	0.75	0.50	1.57	0.81	0.81
B1607-12	0.75	1.25	0.75	2.57	1.31	1.13
B1607-16	1.00	1.50	1.00	3.06	1.56	1.50
B1607-20	1.25	1.88	1.25	3.31	1.81	1.94
B1607-22	1.38	2.13	1.38	4.06	2.06	2.06
B1607-24	1.50	2.25	1.50	4.06	2.06	2.25
B1607-28	1.75	2.38	1.75	5.06	2.56	2.75
B1607-32	2.00	2.63	2.00	5.06	2.56	3.25
B1607-40	2.50	3.00	2.25	6.06	3.06	3.50
B1607-48	3.00	3.25	2.75	6.06	3.06	4.50
B1607-56	3.50	4.00	3.25	8.06	4.06	5.25
B1607-64	4.00	4.50	3.75	8.56	4.56	6.00

Clevis – Miniature, Welded



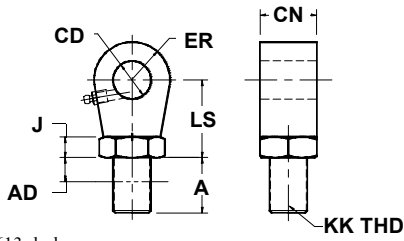
Part No.	CD	L	CE	ER	CS	CB
B3757-4	0.25	0.41	0.81	0.31	0.81	0.39
B3757-5	0.31	0.44	0.88	0.38	0.94	0.48
B3757-6	0.38	0.50	1.00	0.44	1.19	0.52
B3757-7	0.44	0.63	1.19	0.50	1.31	0.66
B3757-8	0.50	0.69	1.31	0.56	1.47	0.69
B3757-10	0.63	0.75	1.50	0.69	1.69	0.78
B3757-12	0.75	0.94	1.63	0.75	1.97	0.94
B3757-16	1.00	1.00	1.88	1.06	2.47	1.13

Clevis – ASAE, Welded



Part No.	CD	L	CE	ER	CS	CB	B
B3347-12	0.75	1.31	1.63	0.88	1.88	0.88	1.75
B3347-16	1.00	1.44	1.88	1.06	2.38	1.13	2.00
B3347-20	1.25	2.00	2.50	1.38	2.88	1.38	2.50
B3347-24	1.50	2.25	2.63	1.63	3.63	1.63	3.00

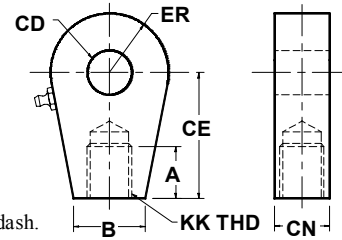
Eye – Male Thread



- c/w jam nut and grease fitting.
- the bare housing part no. is B1613-dash.
- old part no. was ET-dash.

Part No.	CD	LS	ER	CN	A	J	KK	ADJ
B3689-8	0.50	1.06	0.50	0.75	1.00	0.31	1/2-20	0.63
B3689-12	0.75	1.67	0.75	1.25	1.27	0.42	3/4-16	0.70
B3689-16	1.00	2.05	1.00	1.50	1.45	0.55	1-14	0.70
B3689-20	1.25	2.60	1.25	1.75	1.78	0.72	1 1/4-12	0.84
B3689-22	1.38	2.85	1.38	2.00	1.78	0.72	1 1/4-12	0.84
B3689-24	1.50	3.09	1.50	2.00	2.03	0.84	1 1/2-12	0.91
B3689-28	1.75	3.22	1.75	2.50	2.03	0.84	1 1/2-12	0.91
B3689-32	2.00	3.46	2.00	2.50	2.67	0.83	1 7/8-12	1.27
B3689-40	2.50	4.00	2.25	3.00	3.00	1.00	2 1/4-12	1.31
B3689-48	3.00	4.38	2.75	3.00	3.38	1.13	2 1/2-12	1.50
B3689-56	3.50	5.38	3.25	4.00	4.25	1.38	3 1/4-12	1.81
B3689-64	4.00	6.00	3.75	4.50	5.25	1.50	3 1/2-12	2.63

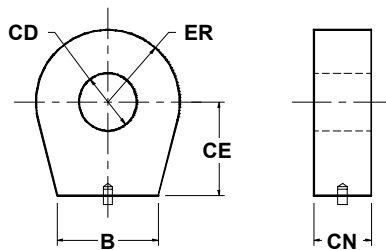
Eye – Female Thread



- c/w grease fitting.
- old part no. was EI-dash.

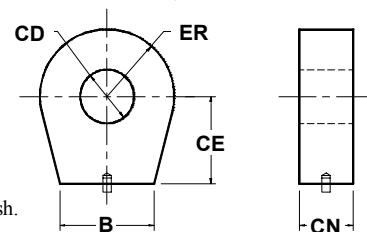
Part No.	CD	A	ER	CN	CE	B	KK
B2322-16	1.00	1.63	1.00	1.50	2.81	1.63	1-14
B2322-20	1.25	1.75	1.25	1.75	3.13	2.00	1 1/4-12
B2322-22	1.38	2.00	1.38	2.00	3.44	2.00	1 1/4-12
B2322-24	1.50	2.00	1.50	2.00	3.75	2.50	1 1/2-12
B2322-28	1.75	2.25	1.75	2.50	4.00	2.50	1 1/2-12
B2322-32	2.00	3.00	2.00	2.50	5.00	3.00	1 7/8-12
B2322-40	2.50	3.50	2.25	3.00	5.81	3.75	2 1/4-12
B2322-48	3.00	3.50	2.75	3.00	6.13	4.00	2 1/2-12
B2322-56	3.50	4.50	3.25	4.00	7.63	5.25	3 1/4-12
B2322-64	4.00	5.50	3.75	4.50	9.13	5.75	3 1/2-12

Eye – Welded, ASAE



Part No.	CD	CE	ER	CN	B
B3862-12	0.75	1.25	0.88	0.75	1.25
B3862-16	1.00	1.63	1.25	1.00	1.75
B3862-20	1.25	2.00	1.50	1.25	2.00
B3862-24	1.50	2.25	1.75	1.50	2.50

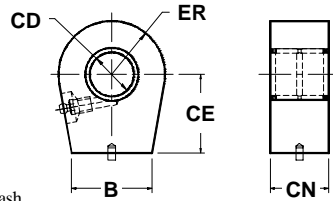
Eye – Welded



- c/w grease fitting.
- old part no. was EW-dash.

Part No.	CD	CE	ER	CN	B
B1603-8	0.50	0.75	0.50	0.75	0.81
B1603-12	0.75	1.25	0.75	1.25	1.13
B1603-16	1.00	1.50	1.00	1.50	1.50
B1603-20	1.25	1.88	1.25	1.75	1.88
B1603-22	1.38	2.13	1.38	2.00	2.00
B1603-24	1.50	2.25	1.50	2.00	2.25
B1603-28	1.75	2.38	1.75	2.50	2.75
B1603-32	2.00	2.63	2.00	2.50	3.13
B1603-40	2.50	3.00	2.25	3.00	3.50
B1603-48	3.00	3.25	2.75	3.00	4.50
B1603-56	3.50	4.00	3.25	4.00	5.25
B1603-64	4.00	4.50	3.75	4.50	6.00

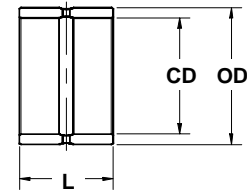
Eye – with Steel Bushing, Welded



- c/w bushing, seals and grease fitting
- the bare housing part no. is B3650-dash.

Part No.	CD	CE	ER	CN	B	SEAL
B3662-12	0.75	1.25	0.99	1.25	1.13	12675
B3662-16	1.00	1.50	1.24	1.50	1.50	12677
B3662-20	1.25	1.88	1.49	1.75	1.88	12678
B3662-22	1.38	2.13	1.61	2.00	2.00	12679
B3662-24	1.50	2.25	1.86	2.00	2.25	12680
B3662-28	1.75	2.38	2.11	2.50	2.75	12681
B3662-32	2.00	2.63	2.36	2.50	3.13	12682
B3662-40	2.50	3.00	2.98	3.00	3.50	12683
B3662-48	3.00	3.25	3.48	3.00	4.50	12684
B3662-56	3.50	4.00	3.98	4.00	5.25	12685
B3662-64	4.00	4.50	4.48	4.50	6.00	12686

Bushing – Hardend Steel

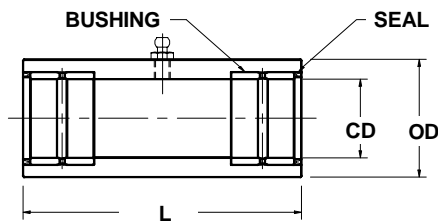


STANDARD LENGTH

SHORT LENGTH

Part No.	CD	OD	L	Part No.	CD	OD	L
B3628-12-1.00	0.75	1.00	1.00	B3628-12-0.50	0.75	1.00	0.50
B3628-16-1.25	1.00	1.25	1.25	B3628-16-0.75	1.00	1.25	0.75
B3628-20-1.63	1.25	1.50	1.63	B3628-20-1.00	1.25	1.50	1.00
B3628-22-1.88	1.38	1.63	1.88	B3628-22-1.13	1.38	1.63	1.13
B3628-24-1.88	1.50	1.88	1.88	B3628-24-1.13	1.50	1.88	1.13
B3628-28-2.00	1.75	2.13	2.00	B3628-28-1.38	1.75	2.13	1.38
B3628-32-2.25	2.00	2.38	2.25	B3628-32-1.63	2.00	2.38	1.63
B3628-40-2.50	2.50	3.00	2.50	B3628-40-2.00	2.50	3.00	2.00
B3628-48-2.75	3.00	3.50	2.75	B3628-48-2.50	3.00	3.50	2.50
B3628-56-3.50	3.50	4.00	3.50	B3628-56-3.00	3.50	4.00	3.00
B3628-64-4.00	4.00	4.50	4.00	B3628-64-3.50	4.00	4.50	3.50

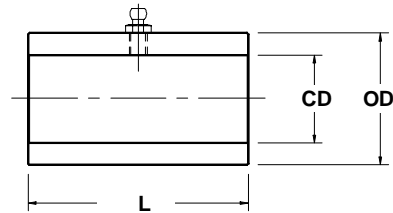
Eye – Tube c/w Steel Bushing, Welded



- c/w bushings, seals and grease fitting
- the last dash number in the part no. is the length of the tube rounded off to one decimal place.

Part No.	CD	OD	L	BUSHING	SEAL
B3674-12-2.8	0.75	1.38	2.75	B3628-12-0.50	12675
B3674-16-4.1	1.00	1.75	4.13	B3628-16-0.75	12677
B3674-20-4.4	1.25	2.00	4.38	B3628-20-1.00	12678
B3674-22-4.9	1.38	2.13	4.88	B3628-22-1.13	12679
B3674-24-5.4	1.50	2.50	5.38	B3628-24-1.13	12680
B3674-28-6.1	1.75	2.75	6.13	B3628-28-1.38	12681
B3674-32-7.1	2.00	3.00	7.13	B3628-32-1.63	12682
B3674-40-8.4	2.50	3.75	8.38	B3628-40-2.50	12683
B3674-48-9.4	3.00	4.50	9.38	B3628-48-2.75	12684

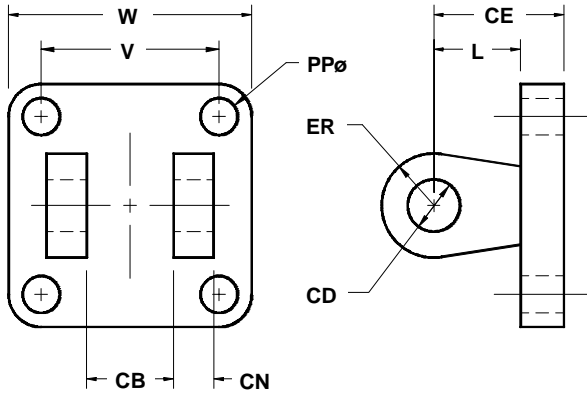
Eye – Tube, Standard Welded



- c/w grease fitting
- the last dash number in the part no. is the length of the tube rounded off to one decimal place.
- different lengths are available.
- old part no. was TR-dash and TB-dash

Part No.	CD	OD	L
B1011-12-2.0	0.75	1.25	2.00
B1011-16-3.0	1.00	1.75	3.00
B1011-20-3.5	1.25	2.00	3.50
B1011-22-4.0	1.38	2.13	4.00
B1011-24-4.3	1.50	2.25	4.25
B1011-28-4.5	1.75	2.50	4.50
B1011-32-5.0	2.00	3.00	5.00
B1011-40-6.0	2.50	3.50	6.00
B1011-48-6.5	3.00	4.00	6.50
B1011-56-7.0	3.50	4.50	7.00

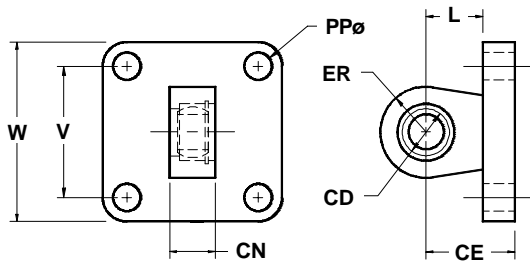
Bracket – Clevis



- spherical bearings used with this bracket require spacers B993.
- old part no. was CB-dash.

Part No.	CD	ER	L	CE	CB	CN	W	V	PP
B3573-8	0.50	0.50	0.75	1.13	0.81	0.50	2.75	1.75	0.41
B3573-12	0.75	0.75	1.25	1.88	1.31	0.63	3.75	2.56	0.53
B3573-16	1.00	1.00	1.50	2.25	1.56	0.75	4.75	3.25	0.66
B3573-20	1.25	1.25	1.88	2.63	1.81	0.75	5.25	3.63	0.66
B3573-22	1.38	1.38	2.13	3.00	2.06	1.00	5.50	4.00	0.66
B3573-24	1.50	1.50	2.25	3.13	2.06	1.00	6.50	4.75	0.78
B3573-28	1.75	1.75	2.38	3.25	2.56	1.25	7.00	5.25	0.91
B3573-32	2.00	2.00	2.63	3.63	2.56	1.25	8.00	5.75	1.06
↓ NOT SUITABLE FOR SPHERICAL BEARING ↓									
B3573-40	2.50	2.25	3.00	4.25	3.06	1.50	9.25	6.63	1.19
B3573-48	3.00	2.75	3.25	4.50	3.06	1.50	10.50	7.50	1.31
B3573-56	3.50	3.25	4.00	5.75	4.06	2.00	13.50	9.63	1.81
B3573-64	4.00	3.75	4.50	6.50	4.56	2.00	15.75	11.44	2.06
↓ USED WITH SPHERICAL BEARING ↓									
B3709-40	2.50	2.25	3.25	4.50	3.06	1.50	9.25	6.63	1.19
B3709-48	3.00	2.75	4.00	5.25	3.06	1.50	10.50	7.50	1.31
B3709-56	3.50	3.25	4.63	6.38	4.06	2.00	13.50	9.63	1.81
B3709-64	4.00	3.75	5.00	7.00	4.56	2.00	15.75	11.44	2.06

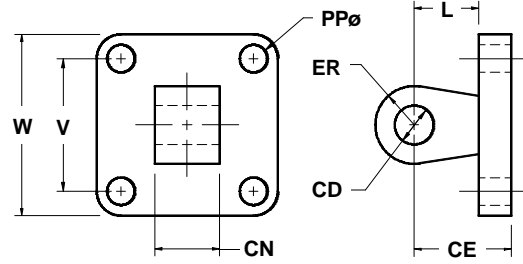
Bracket – Sph. Brg



- bracket shown with eye part no. B3295
- also available with B3432, B3073, B3255, B3296 or B3676..
- for the bearing and snap ring part no. see B3295.
- old part no. was SB-dash.

Part No.	CD	ER	L	CE	CN	W	V	PP
B3502-12	0.75	1.00	1.25	1.88	1.00	3.75	2.56	0.53
B3502-16	1.00	1.31	1.50	2.25	1.25	4.75	3.25	0.66
B3502-20	1.25	1.63	1.88	2.63	1.50	5.25	3.63	0.66
B3502-22	1.38	1.88	2.13	3.00	1.50	5.50	4.00	0.66
B3502-24	1.50	2.00	2.25	3.13	1.75	6.50	4.75	0.78
B3502-28	1.75	2.13	2.38	3.25	2.00	7.00	5.25	0.91
B3502-32	2.00	2.43	2.63	3.63	2.25	8.00	5.75	1.06
B3502-40	2.50	2.88	3.00	4.25	2.50	9.25	6.63	1.19
B3502-48	3.00	3.63	3.75	5.00	2.75	10.50	7.50	1.31
B3502-56	3.50	4.18	4.50	6.25	3.50	13.50	9.63	1.81
B3502-64	4.00	4.50	5.25	7.25	4.00	15.75	11.44	2.06

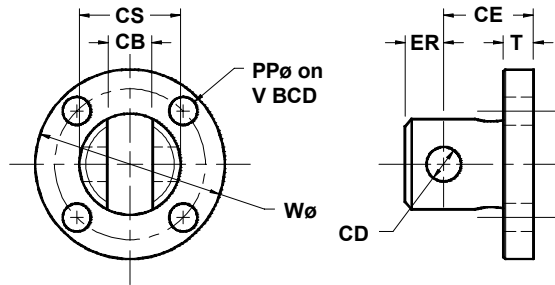
Bracket – Eye



- bracket shown with eye part no. B1603.
- also available with B3662 or B3862
- old part no. was EB-dash.

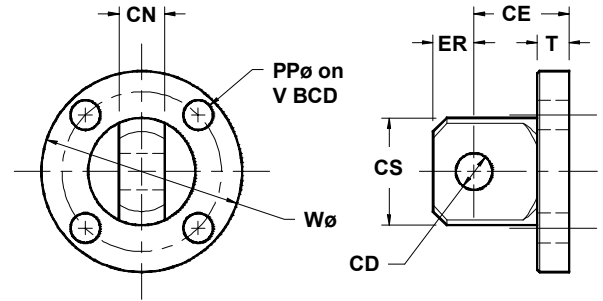
Part No.	CD	ER	L	CE	CN	W	V	PP
B3503-8	0.50	0.50	0.75	1.13	0.75	2.75	1.75	0.41
B3503-12	0.75	0.75	1.25	1.88	1.25	3.75	2.56	0.53
B3503-16	1.00	1.00	1.50	2.25	1.50	4.75	3.25	0.66
B3503-20	1.25	1.25	1.88	2.63	1.75	5.25	3.63	0.66
B3503-22	1.38	1.38	2.13	3.00	2.00	5.50	4.00	0.66
B3503-24	1.50	1.50	2.25	3.13	2.00	6.50	4.75	0.78
B3503-28	1.75	1.75	2.38	3.25	2.50	7.00	5.25	0.91
B3503-32	2.00	2.00	2.63	3.63	2.50	8.00	5.75	1.06
B3503-40	2.50	2.25	3.00	4.25	3.00	9.25	6.63	1.19
B3503-48	3.00	2.75	3.25	4.50	3.00	10.50	7.50	1.31
B3503-56	3.50	3.25	4.00	5.75	4.00	13.50	9.63	1.81
B3503-64	4.00	3.75	4.50	6.50	4.50	15.75	11.44	2.06

Bracket – Clevis, Miniature



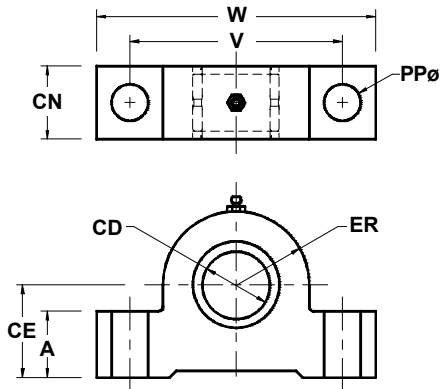
Part No.	CD	ER	T	CB	CE	CS	W	V	PP
B3412-4	0.25	0.31	0.31	0.38	0.81	0.81	1.88	1.44	0.28
B3412-5	0.31	0.38	0.31	0.45	0.88	0.94	2.00	1.56	0.28
B3412-6	0.38	0.44	0.38	0.51	1.00	1.19	2.38	1.88	0.34
B3412-7	0.44	0.50	0.38	0.57	1.19	1.31	2.50	2.00	0.34
B3412-8	0.50	0.56	0.44	0.66	1.31	1.47	2.75	2.19	0.41
B3412-10	0.63	0.69	0.50	0.76	1.50	1.69	3.00	2.44	0.41
B3412-12	0.75	0.75	0.50	0.88	1.69	1.97	3.38	2.75	0.47

Bracket – Eye, Miniature



Part No.	CD	ER	T	CE	CN	CS	W	V	PP
B3413-4	0.25	0.31	0.31	0.81	0.38	0.81	1.88	1.44	0.28
B3413-5	0.31	0.38	0.31	0.88	0.44	0.94	2.00	1.56	0.28
B3413-6	0.38	0.44	0.38	1.06	0.50	1.19	2.38	1.88	0.34
B3413-7	0.44	0.50	0.38	1.19	0.56	1.31	2.50	2.00	0.34
B3413-8	0.50	0.56	0.44	1.31	0.63	1.47	2.75	2.19	0.41
B3413-10	0.63	0.69	0.50	1.63	0.75	1.69	3.00	2.44	0.41
B3413-12	0.75	0.75	0.50	1.88	0.88	1.97	3.38	2.75	0.47

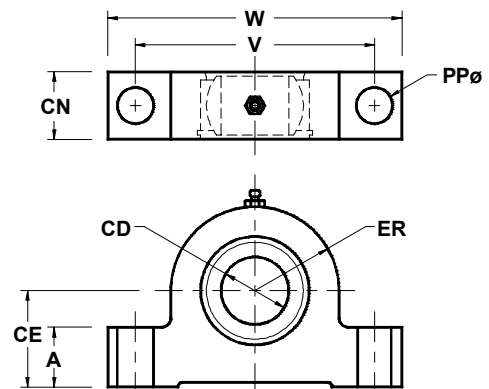
Bracket – Trunnion, Steel Bushing



• c/w bushing, seals and grease fitting

Part No.	CD	ER	CN	W	CE	A	V	PP	BUSHING	SEAL
B3690-16	1.00	1.06	1.00	4.00	1.25	0.88	3.13	0.56	B3628-16-0.75	12677
B3690-22	1.38	1.38	1.38	5.25	1.75	1.25	4.00	0.69	B3628-22-1.13	12679
B3690-28	1.75	1.75	1.75	6.88	2.00	1.50	5.25	0.94	B3628-28-1.38	12681
B3690-32	2.00	2.13	2.00	8.00	2.50	1.75	6.25	1.19	B3628-32-1.63	12682
B3690-40	2.50	2.50	2.50	9.50	3.00	2.00	7.25	1.31	B3628-40-2.00	12683

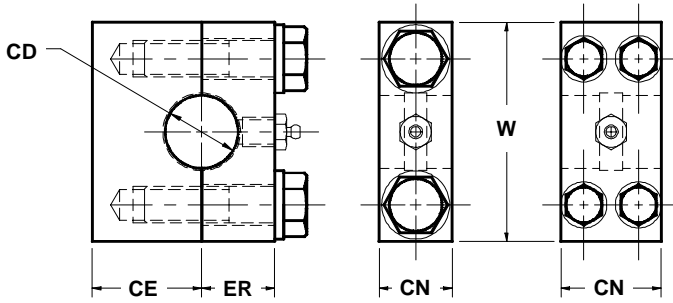
Bracket – Trunnion, Sph. Brg.



• c/w bearing, snap ring and grease fitting

Part No.	CD	ER	CN	W	CE	A	V	PP	S/R	BRG.
B3691-16	1.00	1.25	1.25	4.18	1.59	0.96	3.44	0.56	12052	10334
B3691-22	1.38	1.69	1.50	6.04	2.17	1.43	4.95	0.69	11582	11581
B3691-28	1.75	2.18	2.00	7.48	2.50	1.55	6.20	0.94	11946	10204
B3691-32	2.00	2.49	2.25	8.51	3.09	2.25	7.00	1.19	11739	10804
B3691-40	2.50	3.09	2.50	10.59	3.85	2.80	8.64	1.31	10327	11808

Bracket – Trunnion, Split



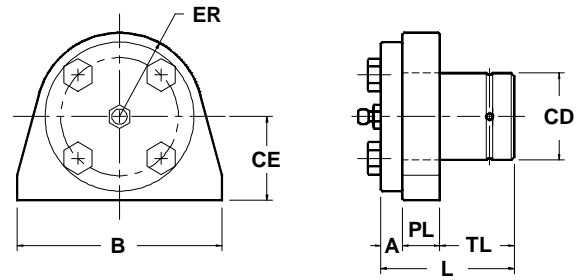
- c/w bolts and grease fitting.

B3429
(-16,-22,-28)

B3430
(-32,-40)

Part No.	CD	CN	W	CE	ER
B3429-16	1.00	1.00	3.00	1.50	1.00
B3429-22	1.38	1.38	4.00	2.00	1.25
B3429-28	1.75	1.75	4.00	2.50	1.50
B3430-32	2.00	2.00	4.00	3.00	1.75
B3430-40	2.50	2.50	5.00	3.50	2.00

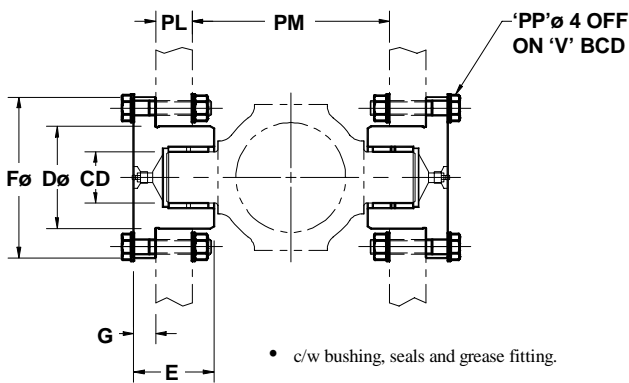
Bracket – Female Trunnion, Boss



- c/w pin and grease fitting.

Part No.	CD	L	A	PL	TL	CE	ER	B
B3873-16	1.00	1.63	0.31	0.50	0.81	1.13	1.13	2.75
B3873-22	1.38	2.13	0.38	0.50	1.25	1.44	1.44	3.50
B3873-28	1.75	2.69	0.44	0.75	1.50	1.69	1.69	4.13
B3873-32	2.00	3.00	0.50	0.75	1.75	1.94	1.94	4.75
B3873-40	2.50	3.81	0.63	1.00	2.19	2.19	2.19	5.38

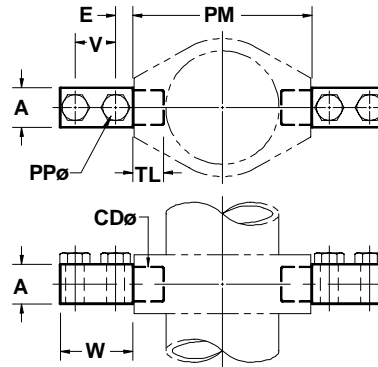
Bracket – Trunnion, Boss



- c/w bushing, seals and grease fitting.

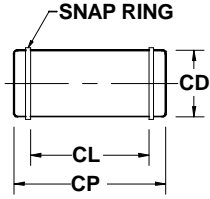
Part No.	CD	Dø	E	Fø	G	V	PP	CYL BORE	PL	PM
B3692-22	1.38	2.75	2.13	4.13	0.50	3.50	0.41	2.00	0.75	5.13
								2.50	0.75	5.63
								3.00	0.75	6.13
B3692-28	1.75	3.50	2.63	5.25	0.75	4.38	0.53	3.25	1.00	6.76
								3.50	1.00	7.01
								4.00	1.00	7.26
								4.50	1.00	8.01
								5.00	1.00	8.76
B3692-32	2.00	3.87	3.13	5.50	0.75	4.75	0.53	6.00	1.25	10.76

Bracket – Female Trunnion



Part No.	CD	A	W	E	V	TL	PP	CYL BORE	PM
B3874-16	1.00	1.25	2.38	0.50	1.38	0.88	0.56	1 1/2	3.38
								2	3.88
								2 1/2	4.38
								3	5.50
B3874-22	1.38	1.50	2.81	0.63	1.63	1.31	0.69	3 1/4	5.75
								3 1/2	6.00
								4	7.38
B3874-28	1.75	2.00	3.69	0.88	2.06	1.56	0.94	4 1/2	7.88
								5	9.13
								5 1/2	9.63
B3874-32	2.00	2.50	4.13	1.00	2.25	1.81	1.06	6	10.13
								7	11.63
B3874-40	2.50	3.00	5.00	1.25	2.69	2.25	1.31	8	13.63

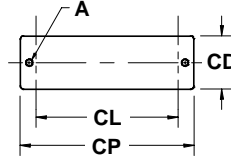
Pin – Snap Ring



- c/w snap rings.
- tube eyes require special pins.

Part No.	CD	CL	CP
B1611-8	0.50	1.94	2.13
B1611-12	0.75	2.69	2.94
B1611-16	1.00	3.19	3.50
B1611-20	1.25	3.44	3.78
B1611-22	1.38	4.19	4.56
B1611-24	1.50	4.19	4.59
B1611-28	1.75	5.19	5.63
B1611-32	2.00	5.19	5.69
B1611-40	2.50	6.25	6.88
B1611-48	3.00	6.25	6.94
B1611-56	3.50	8.31	9.13
B1611-64	4.00	8.81	9.69

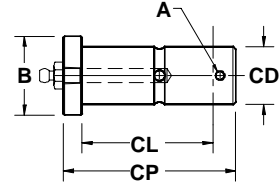
Pin – Cotter, JIC



- c/w cotter pins.
- tube eyes require special pins.

Part No.	CD	CL	CP	A ϕ
B981-8	0.50	1.94	2.25	0.13
B981-12	0.75	2.69	3.25	0.13
B981-16	1.00	3.19	3.88	0.19
B981-20	1.25	3.44	4.13	0.19
B981-22	1.38	4.19	4.88	0.19
B981-24	1.50	4.19	4.88	0.19
B981-28	1.75	5.19	5.88	0.19
B981-32	2.00	5.19	5.88	0.19
B981-40	2.50	6.25	7.13	0.25
B981-48	3.00	6.25	7.13	0.25
B981-56	3.50	8.31	9.31	0.31

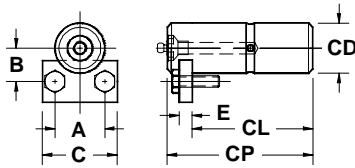
Pin – Shoulder



- c/w cotter pin and grease fitting.

Part No.	CD	CL	CP	A ϕ	B
B2910-12	0.75	2.69	3.06	0.16	1.00
B2910-16	1.00	3.19	3.75	0.20	1.25
B2910-20	1.25	3.44	4.00	0.20	1.50
B2910-22	1.38	4.19	4.94	0.20	1.63
B2910-24	1.50	4.19	5.13	0.20	1.75
B2910-28	1.75	5.19	6.00	0.20	2.00
B2910-32	2.00	5.19	6.06	0.20	2.25
B2910-40	2.50	6.25	7.13	0.20	2.75
B2910-48	3.00	6.25	7.31	0.27	3.38
B2910-56	3.50	8.31	9.38	0.27	4.00
B2910-64	4.00	8.81	9.75	0.27	4.50

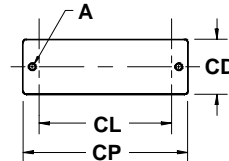
Pin – Keeper



- c/w keeper, capscrews and grease fitting.

Part No.	CD	CP	A	B	C	E	CL
B3585-24	1.50	4.38	1.50	1.00	2.25	0.38	3.63
B3585-28	1.75	4.88	1.50	1.13	2.25	0.38	4.13
B3585-32	2.00	5.63	2.00	1.25	3.00	0.50	4.63
B3585-40	2.50	6.63	2.00	1.50	3.00	0.50	5.63
B3585-48	3.00	7.63	2.50	1.75	3.50	0.50	6.63

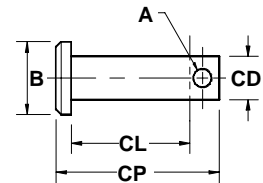
Pin – Cotter, ASAE



- c/w cotter pins.

Part No.	CD	CL	CP	A ϕ
B3799-12	0.75	2.01	2.56	0.13
B3799-16	1.00	2.51	3.25	0.29
B3799-20	1.25	3.01	3.75	0.19
B3799-24	1.50	3.76	4.50	0.19

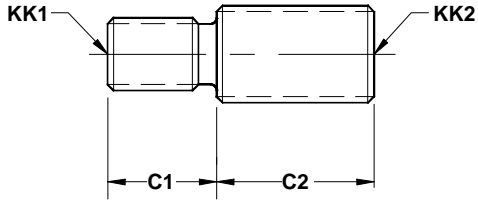
Pin – Miniature



- c/w cotter pin.

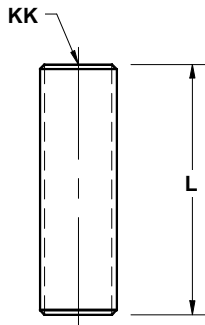
Part No.	CD	CL	CP	A ϕ	B
B3708-4	0.25	0.98	1.19	0.09	0.38
B3708-5	0.31	1.03	1.34	0.14	0.43
B3708-6	0.38	1.27	1.63	0.16	0.50
B3708-8	0.50	1.52	1.91	0.16	0.63
B3708-10	0.63	1.77	2.19	0.16	0.81
B3708-12	0.75	2.27	2.75	0.16	0.94

Rod Stud – Jump Size



Part No.	KK1	C1	KK2	C2
B2078-8-10	1/2-20	0.88	5/8-18	1.38
B2078-10-12	5/8-18	1.63	3/4-16	0.81
B2078-12-16	3/4-16	1.13	1-14	1.25
B2078-16-20	1-14	1.63	1 1/4-12	1.38
B2078-20-24	1 1/4-12	2.00	1 1/2-12	1.50
B2078-24-30	1 1/2-12	2.25	1 7/8-12	2.31
B2078-30-36	1 7/8-12	3.00	2 1/4-12	2.63
B2078-36-40	2 1/4-12	3.50	2 1/2-12	2.50
B2078-40-52	2 1/2-12	3.50	3 1/4-12	3.25

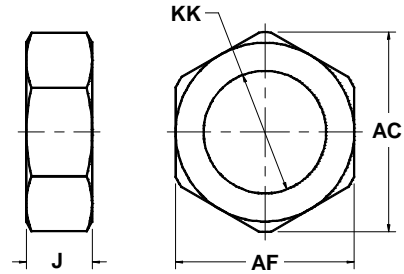
Rod Stud – Standard



Part No.	KK	L
B2078-4-4	1/4-28	1.25
B2078-5-5	5/16-24	1.50
B2078-6-6	3/8-24	1.75
B2078-7-7	7/16-20	2.19
B2078-8-8	1/2-20	2.38
B2078-10-10	5/8-18	2.88
B2078-12-12	3/4-16	3.38
B2078-16-16	1-14	2.88
B2078-20-20	1 1/4-12	3.38
B2078-24-24	1 1/2-12	3.75
B2078-30-30	1 7/8-12	5.31
B2078-36-36	2 1/4-12	6.13
B2078-40-40	2 1/2-12	6.00
B2078-52-52	3 1/4-12	7.75

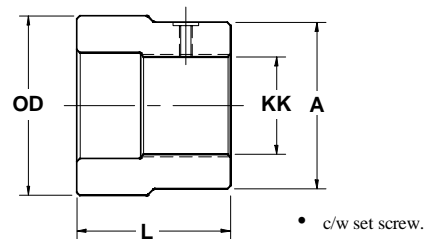
• old part no. was RS.

Jam Nut



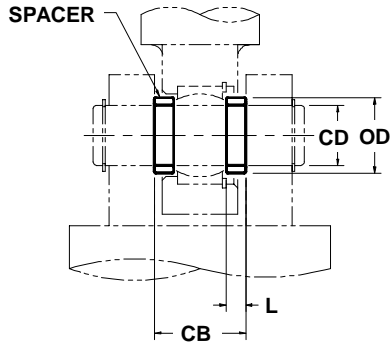
Part No.	KK THD	AC	AF	J
B3022-4	1/4-28	0.51	0.44	0.16
B3022-5	5/16-24	0.58	0.50	0.19
B3022-6	3/8-24	0.65	0.56	0.22
B3022-7	7/16-20	0.72	0.63	0.25
B3022-8	1/2-20	0.87	0.75	0.31
B3022-10	5/8-18	1.08	0.94	0.38
B3022-12	3/4-16	1.27	1.13	0.42
B3022-16	1-14	1.69	1.50	0.55
B3022-20	1 1/4-12	2.12	1.88	0.72
B3022-24	1 1/2-12	2.54	2.25	0.84
B3022-26	1 5/8-12	2.90	2.56	0.70
B3022-30	1 7/8-12	3.32	2.94	0.83
B3022-32	2-12	3.53	3.13	0.89
B3022-36	2 1/4-12	3.95	3.50	1.00
B3022-40	2 1/2-12	4.38	3.88	1.13
B3022-48	3-12	5.22	4.63	1.25
B3022-52	3 1/4-12	5.65	5.00	1.38
B3022-56	3 1/2-12	6.07	5.38	1.50
B3022-64	4-12	6.91	6.13	1.75

Stroke Adjuster



Part No.	KK THD.	A	OD	L
B3386	2-12	3.25	3.50	3.00
B3521	2 1/2-12	3.63	4.00	3.25
B3025	3-12	5.00	5.63	5.13

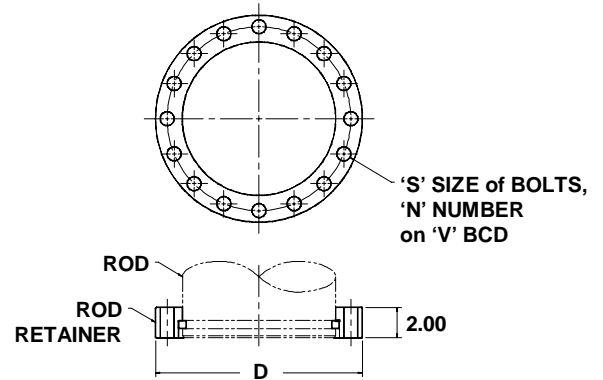
Spacer – Spherical Bearing



- Used in pairs to center standard size spherical bearings.

Part No.	CD	OD	CB	L
B993-12	0.75	0.98	1.25	0.31
B993-16	1.00	1.25	1.50	0.32
B993-20	1.25	1.46	1.75	0.34
B993-22	1.38	1.60	2.00	0.43
B993-24	1.50	1.72	2.00	0.36
B993-28	1.75	1.96	2.50	0.50
B993-32	2.00	2.32	2.50	0.38
B993-40	2.50	2.82	3.00	0.41
B993-48	3.00	3.42	3.00	0.19
B993-56	3.50	3.90	4.00	0.47

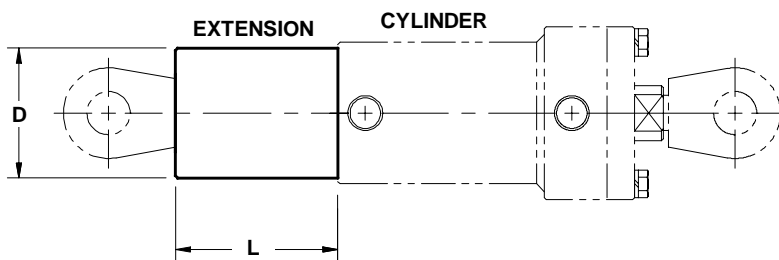
Rod Retainer



- used to mount a load to the flat end of the rod. The rod end carries the load.
- the retract force is limited

Part No.	Rod Dia	Push Capacity	N	S	V	D
B3806-60	6.00	250,000	8	0.94	8.00	9.50
B3806-70	7.00	300,000	10	0.94	9.00	10.50
B3806-80	8.00	350,000	12	0.94	10.00	11.50
B3806-90	9.00	400,000	14	0.94	11.00	12.50
B3806-100	10.00	450,000	16	0.94	12.00	13.50
B3806-120	12.00	500,000	18	0.94	14.00	15.50
B3806-140	14.00	600,000	20	0.94	16.00	17.50
B3806-160	16.00	700,000	16	1.06	18.25	20.00
B3806-180	18.00	750,000	18	1.06	20.25	22.00
B3806-200	20.00	850,000	20	1.06	22.25	24.00

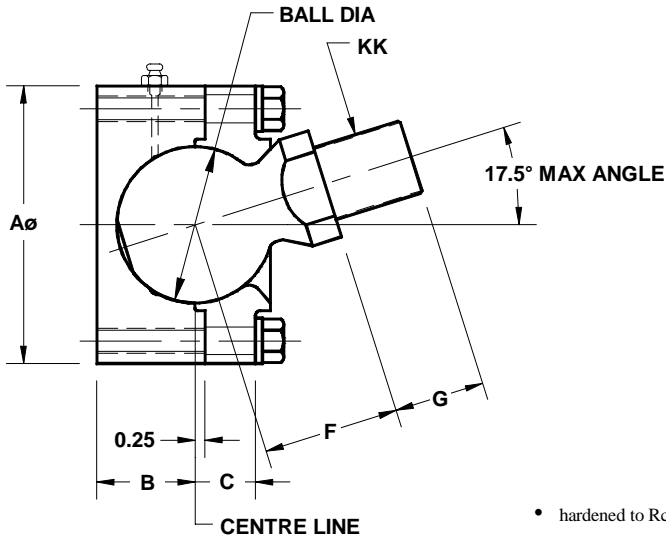
Blind End Extension



- Used when a large overall length is required for a given stroke.

Part No.	D	Cyl. Bore
B3790-15- L	1.90	1 1/2
B3790-20- L	2.38	2
B3790-25- L	2.88	2 1/2
B3790-30- L	3.50	3, 3 1/4
B3790-35- L	4.00	3 1/2
B3790-40- L	4.50	4, 4 1/2
B3790-50- L	5.56	5, 5 1/2
B3790-60- L	6.63	6, 7
B3790-80- L	8.63	8

Ball Joint

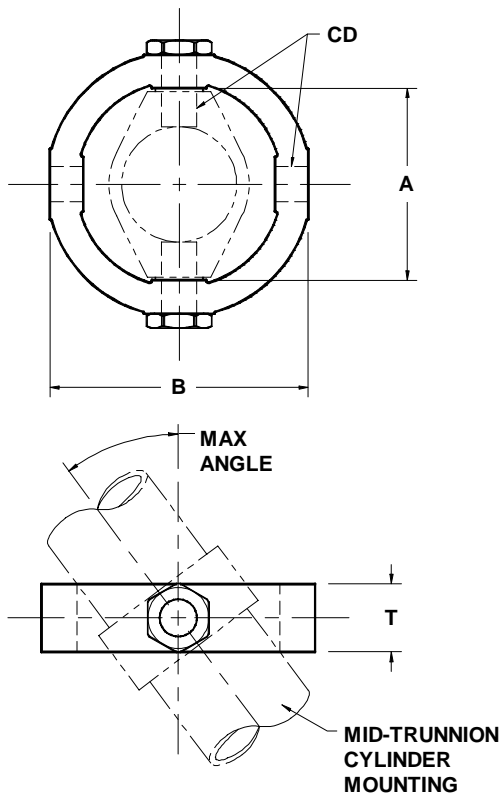


'D' C'Screw – GR 8
8 off on 'E' BCD
holes are tapped thru
for mounting assembly
on bottom.

• hardened to Rc 50.

Part No.	Ball Dia	A	B	C	D	E	F	G	KK	MAX PUSH FORCE (lbs)
B3875-48	3.00	5.38	1.88	1.06	1/2-13	4.50	2.50	1.88	1 1/2-12	60,000
B3875-64	4.00	6.88	2.44	1.50	5/8-11	5.75	3.38	2.25	1 7/8-12	85,000
B3875-80	5.00	8.38	3.06	1.63	3/4-10	6.88	4.50	2.75	2 1/2-12	150,000

Gimbal



Part No.	CYL BORE	CD	A	B	T	ANGLE
B3819-20	2.00	0.75	4.00	5.25	1.50	35.6°
B3819-25	2.50	0.75	4.50	5.75	1.50	34.2°
B3819-30	3.00	1.00	5.63	7.38	1.75	36.2°
B3819-33	3.25	1.00	5.88	7.63	1.75	35.6°
B3819-35	3.50	1.00	6.13	7.88	1.75	35.1°
B3819-40	4.00	1.38	7.50	10.13	2.50	36.8°
B3819-45	4.50	1.38	8.00	10.63	2.50	36.0°
B3819-50	5.00	1.75	9.25	12.38	3.00	35.7°
B3819-55	5.50	1.75	9.75	12.88	3.00	35.1°
B3819-60	6.00	1.75	10.25	13.38	3.00	34.4°
B3819-70	7.00	2.00	11.75	15.38	3.50	34.2°
B3819-80	8.00	2.50	13.75	18.25	4.50	34.6°

• used with female style mid-trunnion cylinders. see page 3-09.



Series B Hydraulic Cylinder Bolt-on head heavy duty



Series B Cylinder – Introduction

Series-B is our standard heavy duty hydraulic cylinder. The bolt on head design and all welded construction results in a simple and strong cylinder which is easy to assemble and disassemble. These cylinders are a reliable choice for industrial, marine or mobile equipment applications.

- Pressure rating is 3000 psi (5000 psi non-shock)
- Ductile iron piston and head
- Rods are available in C1045 chrome plated or C1045 induction hardened chrome plate or 316 stainless steel chrome plated
- Cushions are available on either end or both ends
- SAE O-ring boss ports are standard
- Every cylinder is individually tested before shipment
- Wide range of mounting accessories and brackets

Seals

Series-B cylinders offer a choice of two types of piston seals:-

- 1) Loaded U-cup seals are preferable for cylinders which must hold a load without creeping.
- 2) Slipper seals are low friction seals preferable for cylinders that cycle frequently and are not required to hold a load. They are more tolerant of contamination than a U-cup type of seal. These seals will be provided as standard unless otherwise specified.

U-cup polyurethane rod seals provide dry rod sealing performance.

Metal-clad polyurethane wiper seals keep contaminants out of the cylinder.

Wear rings are reinforced nylon.

All o-rings and back-up rings are nitrile

All seals are good for a temperature range of -65F to +225F (-54C to +107C)

Mounting dimensions

Our cylinders conform to NFPA mounting dimensions with the following exceptions:

- NFPA clevis mounting "MP1" uses different dimensions within one bore size for different rod sizes. We have one set of dimensions for all rods sizes in a given bore size. Our dimensions will agree with one set of the NFPA dimensions. When the mounting dimensions are critical, check our dimensions on the appropriate pages of the catalog for suitability.
- Front trunnion mounts conform to NFPA "MT1"
- Mid trunnion mounts conform to NFPA "MT4"
- Rear trunnion mounts NFPA "MT2" are not available.
- Front flange mounts are available in NFPA "MF1" and "MF5" and Sealum standard.
- Rear flange mounts do not conform.
- Foot mount does not conform.

Trunnion mounts

It is recommended to use female style mid-trunnions instead of male style. This way, if a stud happens to break off, it will be the pin that actually failed and needs replacing. However when the stud fails on a male style trunnion, the barrel will need replacing.

Series B Cylinder – Introduction

Double Rod Cylinders

All Series B cylinders are available in a double rod design. Double rods are used when the cylinder speed must be the same in both directions. This is beneficial when the cylinder speed is used to meter the amount of material or work flow that is moved with each cycle. Double rod cylinders can also be used to actuate a second function with the other rod.

Back to Back Cylinders

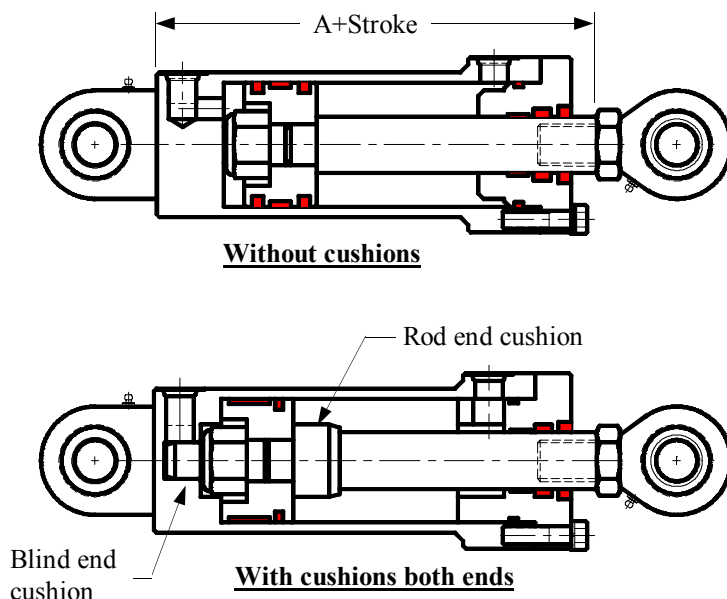
All Series B cylinders are available in a back to back design. Back to back cylinders are useful when loads must be moved in different stages. They are also useful when different sizes of loads must all reach the same end point. With up to four cylinders combined, loads may be moved in four stages with one cylinder installation.

Cushions

In certain applications it is desirable to stop the load gradually, as opposed to a sudden stop, at the end of the cylinder stroke. This will protect the cylinder and the load being moved from damaging impacts at the ends of the stroke. They are generally considered when the piston velocity approaches 25 feet per minute (5 inches per second). A cushion will restrict the oil flow out of the cylinder to create a back pressure which will oppose the force on the working side of the piston. This will decelerate the load smoothly avoiding shock loads being introduced to the load or the cylinder at the end of the stroke. The overall result will be less damage to the cylinder, load and any associated machinery, thereby reducing downtime and maintenance.

A cushioned cylinder application will also be quieter when it comes to the end of its stroke and any mating parts make contact. This will create a quieter working environment.

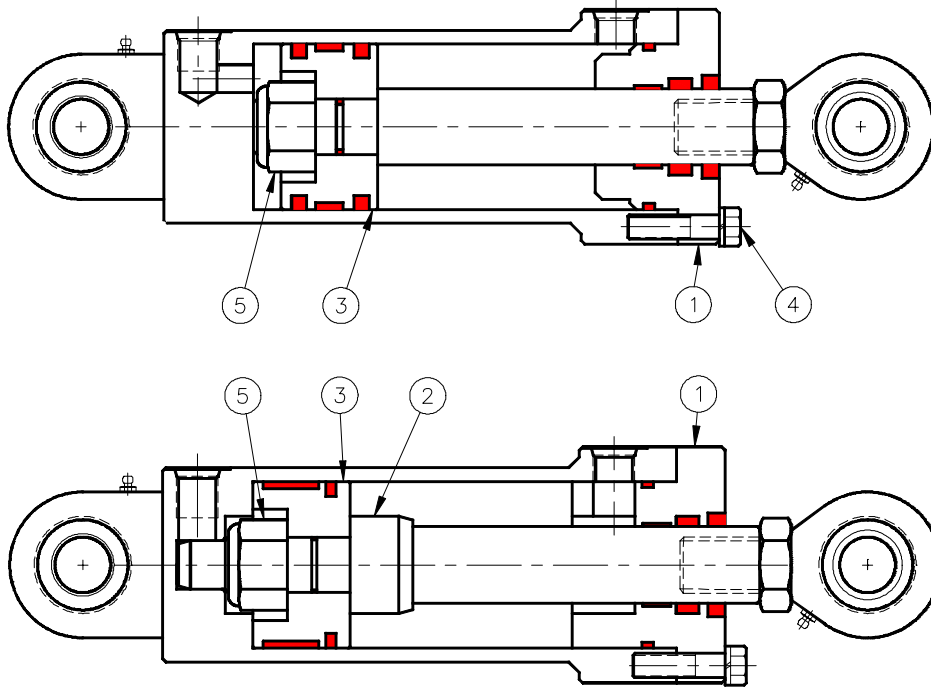
Fixed cushions are available at both ends or at either end.



BORE	Cushioned Blind End Subtract from "A+Stroke"	Cushioned Rod End Add to "A+Stroke"
1 1/2	- 3/8	+ 3/8
2	- 1/2	+ 1/2
2 1/2	- 1/2	+ 1/2
3	- 1/2	+ 1/2
3 1/4	- 1/2	+ 1/2
3 1/2	- 1/2	+ 1/2
4	- 9/16	+ 9/16
5	- 1/2	+ 1/2
6	- 3/8	+ 3/8
7	- 7/16	+ 7/16
8	- 5/8	+ 5/8
10	- 13/16	+ 13/16

Series B Cylinder – Part Numbers

- Standard parts can be ordered by the part numbers below.
- Barrels, Rods and Special Parts can be ordered by the cylinder Serial Number (written on the tag and stamped on the blind end of the cylinder barrel.) They can also be ordered using the Model Number written on the tag. The rod and the barrel can be ordered using the drawing number, which is the last set of digits in the model number and will start with a "C" or an "H". eg H-1234-B for the barrel or H-1234-R for the rod.



PART NUMBERS		SEAL KIT		HEAD GLAND		CUSHION	PISTON		BOLT	PISTON
BORE	ROD	SLIPPER	U-CUP	STANDARD	CUSHION	PLUNGER	SLIPPER	U-CUP	KIT	NUT
1 1/2	3/4	11893	11840	B1745	B1746	B1661-12	B1774	B1773	11979	11969
2	1	11894	11841	B1676	B1667	B1661-16	B1095	B1098	11979	11970
	1 3/8	11895	11842	B1677	B1678	B1661-22				
2 1/2	1	11896	11843	B1681	B1688	B1661-16	B1075	B1074	11980	11970
	1 3/8	11897	11844	B1682	B1689	B1661-22				
	1 1/2	12745	12711	B2556		B1661-24				
	1 3/4	11898	11845	B1683	B1680	B1661-28				
3	1 1/4	11899	11846	B1679		B1661-20	B890	B889	11980	11971
	1 3/8	11900	11847	B1684	B1690	B1661-22				
	1 3/4	11901	11848	B1685	B1691	B1661-28				
	2	11902	11849	B1686	B1692	B1661-32				
3 1/4	1 3/8	11903	11850	B1693	B1696	B1661-22	B932	B933	11981	11971
	1 3/4	11905	11852	B1694	B1697	B1661-28				
	2	11906	11853	B1695	B1698	B1661-32				

CONTINUED ON NEXT PAGE

Series B Cylinder – Part Numbers

PART NUMBERS		SEAL KIT		ITEM #1		ITEM #2	ITEM #3		ITEM #4	ITEM #5
BORE	ROD	SLIPPER	U-CUP	HEAD GLAND		CUSHION	PISTON		BOLT KIT	PISTON NUT
				STANDARD	CUSHION	PLUNGER	SLIPPER	U-CUP		
3 1/2	1 3/8	11907	11854	B1699	N/A	N/A	B918	B919	11982	11972
	1 3/4	11908	11855	B1700	B1704	B1661-28				
	2	11909	11856	B1701	B1705	B1661-32				
	2 1/2	11910	11857	B1702	N/A	N/A				
4	1 3/4	11911	11858	B1707	B1711	B1661-28	B864	B908	11982	11973
	2	11912	11859	B1708	B1712	B1661-32				
	2 1/2	11913	11860	B1709	B1713	B1661-40				
	3	11915	11862	B1710	N/A	N/A				
4 1/2	2	11916	11863	B1715	B1718	B1661-32	B1022	B1175	12743	11974
	2 1/2	11917	11864	B1716	B1719	B1661-40				
	3	11918	11865	B1717	B1720	B1661-48				
	3 1/2	12746	12747	B2262	N/A	N/A				
5	2	11919	11866	B1721	B1726	B1661-32	B879	B881	11983	11974
	2 1/2	11920	11867	B1722	B1727	B1661-40				
	3	11921	11868	B1723	B2571	B1661-48				
	3 1/2	11922	11869	B1724	B1729	B1661-56				
5 1/2	2 1/2	11923	11870	B1739	B1742	B1661-40	B1044	B1043	12744	11975
	3	11924	11871	B1740	B1743	B1661-48				
	3 1/2	11926	11872	B1741	B1744	B1661-56				
6	2 1/2	11926	11873	B1730	B1734	B1661-40	B888	B1662	11984	11975
	3	11927	11874	B1731	B1735	B1661-48				
	3 1/2	11928	11875	B1732	B1736	B1661-56				
	4	11929	11876	B1733	B1737	B1661-64				
7	3	11933	11880	B1751	B1918	B1661-48	B1107	B869	11985	11976
	3 1/2	11934	11881	B1752	B3043	B1661-56				
	4	11935	11882	B1753	B1919	B1661-64				
	5	11936	11883	B1754	B1920	B1661-80				
8	3 1/2	11937	11884	B1912	B1921	B1661-56	B1319	B1320	11986	11977
	4	11938	11885	B1913	B1922	B1661-64				
	5	11939	11886	B1914	B1923	B1661-80				
	6	N/A	N/A	N/A	N/A	N/A				
9	4	11940	11887	B2995	B3763	B1661-64	B1083	B1084	12234	11977
	4 1/2	12748	12749	B3675	B3764	B1661-72				
	5	11941	11888	B1088	B3765	B1661-80				
	6	11942	11889	B1089	B3766	B1661-96				
10	5	11943	11890	B1915	B1924	B1661-80	B1025	B960	11987	11978
	6	11944	11891	B1916	B1925	B1661-96				
	7	11945	11892	B1917	B1926	B1661-112				

Series B Cylinder – Introduction

Shipping weights (approximate)

Base Weight includes two mounting accessories.

BORE	BASE WEIGHT	POUNDS PER INCH OF STROKE BY ROD SIZE											
		3/4	1	1 3/8	1 3/4	2	2 1/2	3	3 1/2	4	5	6	7
1 1/2	7	0.41											
2	12		0.59	0.79									
2 1/2	16		0.72	0.91	1.18								
3	24			1.14	1.40	1.61							
3 1/4	30			1.20	1.46	1.67							
3 1/2	37				1.51	1.72	2.22						
4	50				1.63	1.83	2.34	2.95					
5	80					2.68	3.18	3.79	4.52				
6	120						3.52	4.13	4.85	5.68			
7	180							4.46	5.18	6.02	8.02		
8	270								6.51	7.34	9.34	11.79	
10	525										12.73	15.18	18.07

Port sizes

Series B cylinders are supplied standard with ORB ports.

They are available with NPT ports and 4-bolt SAE code 61 ports as an option. When using 4-bolt flange ports the mounting dimensions of the cylinder may have to be increased.

Port Dash size	ORB port Thread size
-06	9/16"-18
-08	3/4"-16
-12	1-1/16"-12
-16	1-5/16"-12
-20	1-5/8"-12

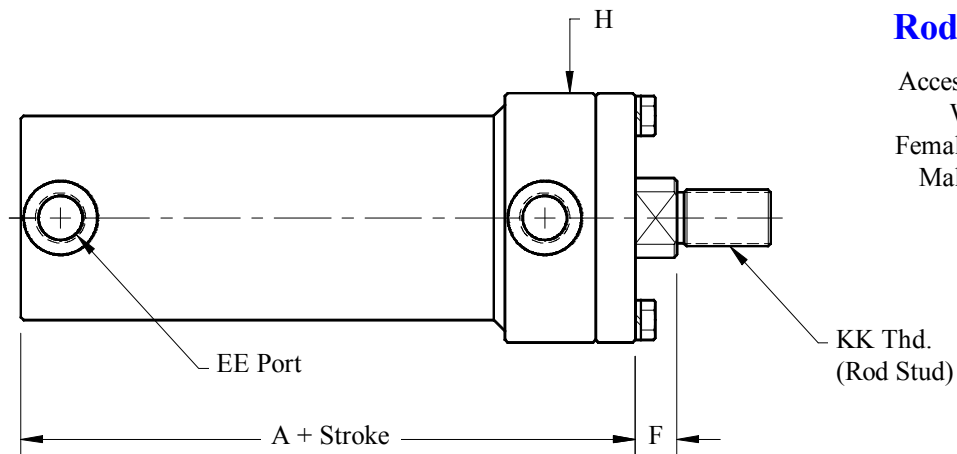
Series B Cylinder – Basic

See the Accessories section of the catalogue for rod end & blind end options. The 'CD' (Pin Dia), the 'F' (Rod extension) and 'KK' (Thread) dimensions given are standard and can be changed to suit. Threaded and welded ends are both available. Dimensions given are rounded off to the nearest two decimal places and are nominal.

Series B Cylinders are available with Cushioned Ends. The dimension 'A' is the same for both Standard non-cushioned and cushioned at both ends cylinders. Cylinders cushioned on the Blind end or Rod end **only**, differ slightly in length.

Blind End

Accessories:
Welded



Rod End

Accessories:
Welded
Female Thd.
Male Thd.

Bore	Available Rod Sizes				A			H Dia	EE (ORB)	Standard sizes shown.		
					STD & Cushion Both ends	BLIND Cushion	ROD Cushion			CD Pin Ø	F	KK Thd
1 1/2	3/4	—	—	—	5.00	4.63	5.38	2.50	# 6	0.50	0.50	1/2-20
2	1	1 3/8	—	—	5.50	5.00	6.00	3.25	# 8	0.75	0.50	3/4-16
2 1/2	1	1 3/8	1 1/2	1 3/4	5.75	5.25	6.25	3.75	# 8	0.75	0.63	3/4-16
3	1 1/4	1 3/8	1 3/4	2	6.13	5.63	6.63	4.25	# 8	1.00	0.63	1-14
3 1/4	1 3/8	1 3/4	2	2 1/4	6.63	6.13	7.13	4.75	# 12	1.00	0.75	1-14
3 1/2	1 3/8	1 3/4	2	2 1/2	6.75	6.25	7.25	5.00	# 12	1.25	0.75	1 1/4-12
4	1 3/4	2	2 1/2	3	6.88	6.31	7.44	5.50	# 12	1.38	0.75	1 1/4-12
4 1/2	2	2 1/2	3	3 1/2	7.25	6.69	7.81	6.00	# 12	1.50	0.75	1 1/2-12
5	2	2 1/2	3	3 1/2	7.50	7.00	8.00	6.88	# 12	1.75	0.88	1 1/2-12
5 1/2	2 1/2	3	3 1/2	—	8.00	7.38	8.63	7.25	# 12	2.00	0.88	1 7/8-12
6	2 1/2	3	3 1/2	4	8.50	8.13	8.88	8.00	# 16	2.00	1.00	1 7/8-12
7	3	3 1/2	4	5	9.50	9.06	9.94	9.13	# 20	2.50	1.00	2 1/4-12
8	3 1/2	4	5	6	10.50	9.88	11.13	10.50	# 20	3.00	1.00	2 1/2-12
9	4	5	6	—	11.50	10.88	12.13	11.50	# 20	3.50	1.25	3 1/4-12
10	5	6	7	—	13.00	12.19	13.81	13.00	# 20	3.50	1.25	3 1/4-12

Series B Cylinder – Trunnion

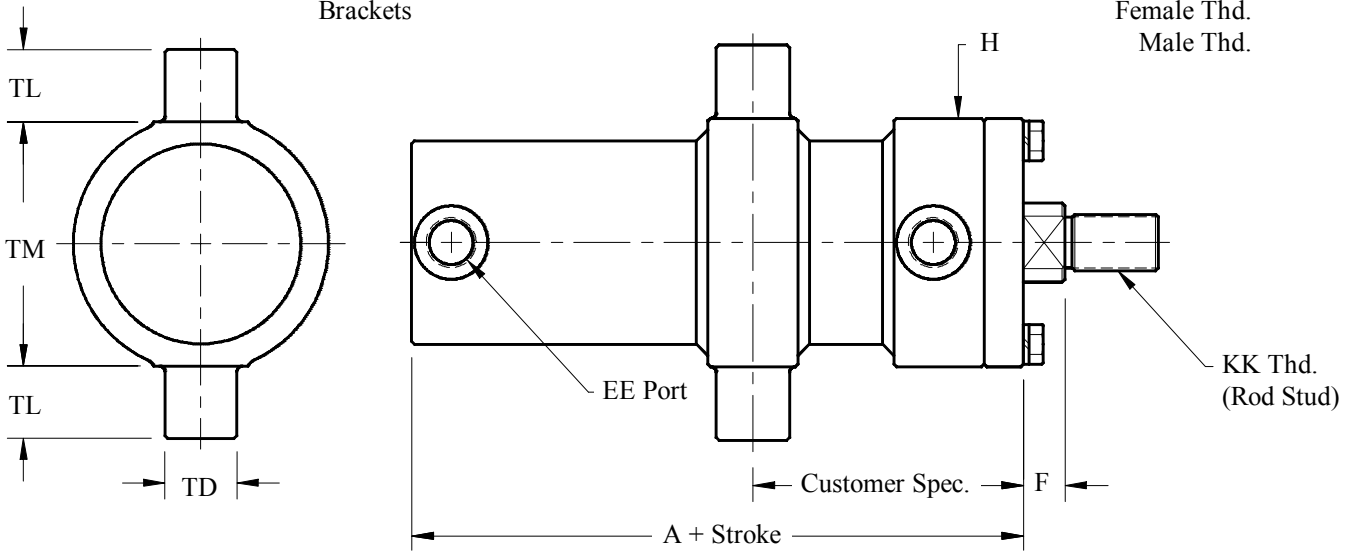
Mid Trunnion – Male

Blind End

Accessories:
Trunnion
Brackets

Rod End

Accessories:
Welded
Female Thd.
Male Thd.



Bore	Available Rod Sizes				A			H Dia	TD	TL	TM	EE (ORB)	Standard sizes shown.		
					STD & Cushion	BLIND Cushion	ROD Cushion						CD Pin Ø	F	KK Thd
1 1/2	3/4	—	—	—	5.00	4.63	5.38	2.50	1.00	1.00	3.00	# 6	0.50	0.50	1/2-20
2	1	1 3/8	—	—	5.50	5.00	6.00	3.25	1.38	1.38	3.50	# 8	0.75	0.50	3/4-16
2 1/2	1	1 3/8	1 1/2	1 3/4	5.75	5.25	6.25	3.75	1.38	1.38	4.00	# 8	0.75	0.63	3/4-16
3	1 1/4	1 3/8	1 3/4	2	6.13	5.63	6.63	4.25	1.38	1.38	4.50	# 8	1.00	0.63	1-14
3 1/4	1 3/8	1 3/4	2	2 1/4	6.63	6.13	7.13	4.75	1.75	1.75	5.00	# 12	1.00	0.75	1-14
3 1/2	1 3/8	1 3/4	2	2 1/2	6.75	6.25	7.25	5.00	1.75	1.75	5.25	# 12	1.25	0.75	1 1/4-12
4	1 3/4	2	2 1/2	3	6.88	6.31	7.44	5.50	1.75	1.75	5.50	# 12	1.38	0.75	1 1/4-12
4 1/2	2	2 1/2	3	3 1/2	7.25	6.69	7.81	6.00	1.75	1.75	6.25	# 12	1.50	0.75	1 1/2-12
5	2	2 1/2	3	3 1/2	7.50	7.00	8.00	6.88	1.75	1.75	7.00	# 12	1.75	0.88	1 1/2-12
5 1/2	2 1/2	3	3 1/2	—	8.00	7.38	8.63	7.25	2.00	2.00	7.50	# 12	2.00	0.88	1 7/8-12
6	2 1/2	3	3 1/2	4	8.50	8.13	8.88	8.00	2.00	2.00	8.50	# 16	2.00	1.00	1 7/8-12
7	3	3 1/2	4	5	9.50	9.06	9.94	9.13	2.50	2.50	9.75	# 20	2.50	1.00	2 1/4-12
8	3 1/2	4	5	6	10.50	9.88	11.13	10.50	3.00	3.00	11.00	# 20	3.00	1.00	2 1/2-12
9	4	5	6	—	11.50	10.88	12.13	11.50	3.00	3.00	12.50	# 20	3.50	1.25	3 1/4-12
10	5	6	7	—	13.00	12.19	13.81	13.00	3.50	3.50	14.00	# 20	3.50	1.25	3 1/4-12

Series B Cylinder – Trunnion

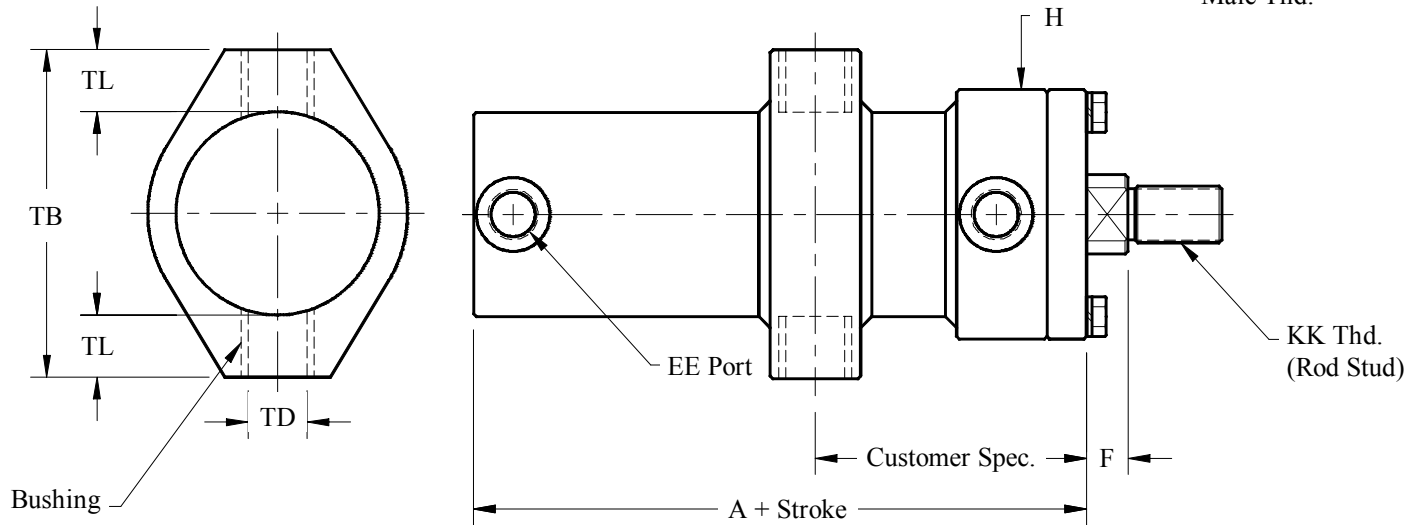
Mid Trunnion – Female

Blind End

Accessories:
Trunnion
Brackets

Rod End

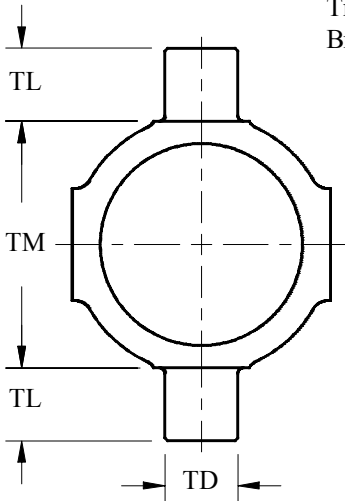
Accessories:
Welded
Female Thd.
Male Thd.



Bore	Available Rod Sizes				A			H Dia	TD	TL	TB	EE (ORB)	Standard sizes shown.		
					STD & Cushion	BLIND Cushion	ROD Cushion						CD Pin Ø	F	KK Thd
1 1/2	3/4	—	—	—	5.00	4.63	5.38	2.50	0.75	0.63	3.25	# 6	0.50	0.50	1/2-20
2	1	1 3/8	—	—	5.50	5.00	6.00	3.25	0.75	0.63	3.75	# 8	0.75	0.50	3/4-16
2 1/2	1	1 3/8	1 1/2	1 3/4	5.75	5.25	6.25	3.75	0.75	0.63	4.25	# 8	0.75	0.63	3/4-16
3	1 1/4	1 3/8	1 3/4	2	6.13	5.63	6.63	4.25	1.00	0.88	5.38	# 8	1.00	0.63	1-14
3 1/4	1 3/8	1 3/4	2	2 1/4	6.63	6.13	7.13	4.75	1.00	0.88	5.63	# 12	1.00	0.75	1-14
3 1/2	1 3/8	1 3/4	2	2 1/2	6.75	6.25	7.25	5.00	1.00	0.88	5.88	# 12	1.25	0.75	1 1/4-12
4	1 3/4	2	2 1/2	3	6.88	6.31	7.44	5.50	1.38	1.31	7.25	# 12	1.38	0.75	1 1/4-12
4 1/2	2	2 1/2	3	3 1/2	7.25	6.69	7.81	6.00	1.38	1.31	7.75	# 12	1.50	0.75	1 1/2-12
5	2	2 1/2	3	3 1/2	7.50	7.00	8.00	6.88	1.75	1.56	9.00	# 12	1.75	0.88	1 1/2-12
5 1/2	2 1/2	3	3 1/2	—	8.00	7.38	8.63	7.25	1.75	1.56	9.50	# 12	2.00	0.88	1 7/8-12
6	2 1/2	3	3 1/2	4	8.50	8.13	8.88	8.00	1.75	1.56	10.00	# 16	2.00	1.00	1 7/8-12
7	3	3 1/2	4	5	9.50	9.06	9.94	9.13	2.00	1.81	11.50	# 20	2.50	1.00	2 1/4-12
8	3 1/2	4	5	6	10.50	9.88	11.13	10.50	2.50	2.25	13.50	# 20	3.00	1.00	2 1/2-12

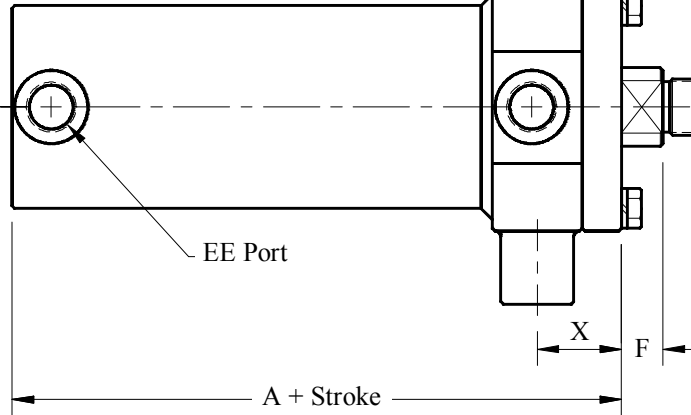
Series B Cylinder – Trunnion

Front Trunnion



Blind End

Accessories:
Trunnion
Brackets



Rod End

Accessories:
Welded
Female Thd.
Male Thd.

KK Thd.
(Rod Stud)

Bore	Available Rod Sizes				A			H Dia	TD	TL	TM	*X STD	*X Cushion	EE (ORB)	Standard sizes shown.		
					STD & Cushion	BLIND Cushion	ROD Cushion								CD Pin Ø	F	KK Thd
1 1/2	3/4	—	—	—	5.00	4.63	5.38	2.50	1.00	1.00	2.50	1.19	1.19	# 6	0.50	0.68	1/2-20
2	1	1 3/8	—	—	5.50	5.00	6.00	3.25	1.38	1.38	3.00	1.50	1.63	# 8	0.75	0.75	3/4-16
2 1/2	1	1 3/8	1 1/2	1 3/4	5.75	5.25	6.25	3.75	1.38	1.38	3.50	1.56	1.69	# 8	0.75	0.69	3/4-16
3	1 1/4	1 3/8	1 3/4	2	6.13	5.63	6.63	4.25	1.38	1.38	4.50	1.63	1.75	# 8	1.00	0.63	1-14
3 1/4	1 3/8	1 3/4	2	2 1/4	6.63	6.13	7.13	4.75	1.75	1.75	4.50	1.75	2.00	# 12	1.00	0.88	1-14
3 1/2	1 3/8	1 3/4	2	2 1/2	6.75	6.25	7.25	5.00	1.75	1.75	5.25	1.88	2.13	# 12	1.25	0.75	1 1/4-12
4	1 3/4	2	2 1/2	3	6.88	6.31	7.44	5.50	1.75	1.75	5.00	1.88	2.13	# 12	1.38	1.00	1 1/4-12
4 1/2	2	2 1/2	3	3 1/2	7.25	6.69	7.81	6.00	1.75	1.75	6.25	1.88	2.13	# 12	1.50	0.75	1 1/2-12
5	2	2 1/2	3	3 1/2	7.50	7.00	8.00	6.88	1.75	1.75	6.50	2.13	2.38	# 12	1.75	0.88	1 1/2-12
5 1/2	2 1/2	3	3 1/2	—	8.00	7.38	8.63	7.25	2.00	2.00	7.50	2.38	2.50	# 12	2.00	0.88	1 7/8-12
6	2 1/2	3	3 1/2	4	8.50	8.13	8.88	8.00	2.00	2.00	7.50	2.31	2.44	# 16	2.00	1.06	1 7/8-12
7	3	3 1/2	4	5	9.50	9.06	9.94	9.13	2.50	2.50	8.50	2.63	2.88	# 20	2.50	1.00	2 1/4-12
8	3 1/2	4	5	6	10.50	9.88	11.13	10.50	3.00	3.00	9.50	2.75	3.13	# 20	3.00	1.00	2 1/2-12
9	4	5	6	—	11.50	10.88	12.13	11.50	3.00	3.00	12.50	3.63	3.88	# 20	3.50	1.25	3 1/4-12
10	5	6	7	—	13.00	12.19	13.81	13.00	3.50	3.50	12.63	3.88	4.13	# 20	3.50	1.13	3 1/4-12

*When using a cushion on the rod end or on both ends of your cylinder, see 'X Cushion' for your 'X' dimension. Use 'X STD' for the 'X' dimension on a standard cylinder or if you are using a cushion on the blind end only.

Series B Cylinder – Front Flange

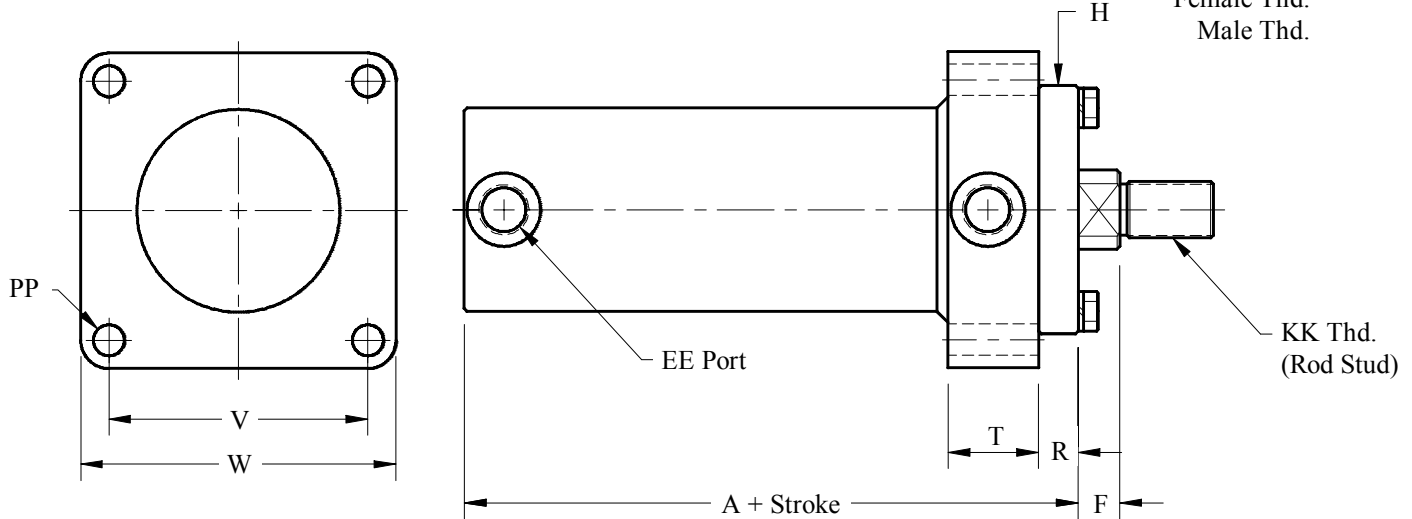
Standard

Blind End

Accessories:
None

Rod End

Accessories:
Welded
Female Thd.
Male Thd.

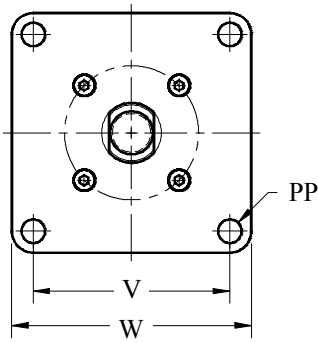


Bore	Available Rod Sizes				A			H Dia	PP Dia	T	*R STD	*R Cushion	V	W	EE (ORB)	Standard sizes shown.		
					STD & Cushion	BLIND Cushion	ROD Cushion									CD Pin Ø	F	KK Thd
1 1/2	3/4	—	—	—	5.00	4.63	5.38	2.50	0.44	1.75	0.50	0.50	2.63	3.50	# 6	0.50	0.50	1/2-20
2	1	1 3/8	—	—	5.50	5.00	6.00	3.25	0.56	1.75	0.63	0.75	3.38	4.50	# 8	0.75	0.50	3/4-16
2 1/2	1	1 3/8	1 1/2	1 3/4	5.75	5.25	6.25	3.75	0.56	1.75	0.69	0.81	3.88	5.00	# 8	0.75	0.63	3/4-16
3	1 1/4	1 3/8	1 3/4	2	6.13	5.63	6.63	4.25	0.56	1.75	0.75	0.88	4.38	5.50	# 8	1.00	0.63	1-14
3 1/4	1 3/8	1 3/4	2	2 1/4	6.63	6.13	7.13	4.75	0.69	2.00	0.75	1.00	4.75	6.00	# 12	1.00	0.75	1-14
3 1/2	1 3/8	1 3/4	2	2 1/2	6.75	6.25	7.25	5.00	0.69	2.00	0.88	1.13	5.25	6.50	# 12	1.25	0.75	1 1/4-12
4	1 3/4	2	2 1/2	3	6.88	6.31	7.44	5.50	0.69	2.00	0.88	1.13	5.75	7.00	# 12	1.38	0.75	1 1/4-12
4 1/2	2	2 1/2	3	3 1/2	7.25	6.69	7.81	6.00	0.69	2.00	0.88	1.13	6.25	7.50	# 12	1.50	0.75	1 1/2-12
5	2	2 1/2	3	3 1/2	7.50	7.00	8.00	6.88	0.94	2.13	1.00	1.25	7.00	8.50	# 12	1.75	0.88	1 1/2-12
5 1/2	2 1/2	3	3 1/2	—	8.00	7.38	8.63	7.25	0.94	2.13	1.13	1.25	7.50	9.00	# 12	2.00	0.88	1 7/8-12
6	2 1/2	3	3 1/2	4	8.50	8.13	8.88	8.00	1.06	2.44	1.06	1.19	8.00	10.00	# 16	2.00	1.00	1 7/8-12
7	3	3 1/2	4	5	9.50	9.06	9.94	9.13	1.31	2.75	1.19	1.44	8.50	11.00	# 20	2.50	1.00	2 1/4-12
8	3 1/2	4	5	6	10.50	9.88	11.13	10.50	1.31	2.88	1.50	1.88	9.50	12.00	# 20	3.00	1.00	2 1/2-12
9	4	5	6	—	11.50	10.88	12.13	11.50	1.31	2.88	1.88	2.13	10.50	13.00	# 20	3.50	1.25	3 1/4-12
10	5	6	7	—	13.00	12.19	13.81	13.00	1.31	3.38	2.00	2.25	11.50	14.00	# 20	3.50	1.25	3 1/4-12

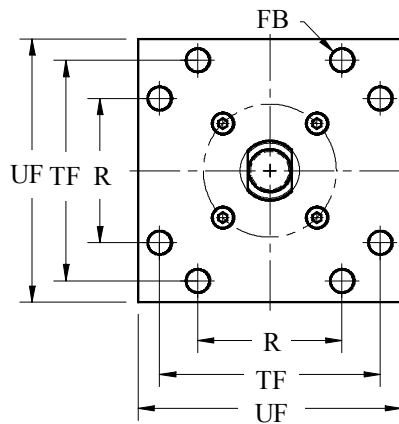
*When using a cushion on the rod end or on both ends of your cylinder, see 'R Cushion' for your 'R' dimension. Use 'R STD' for the 'R' dimension on a standard cylinder or if you are using a cushion on the blind end only.

Series B Cylinder – Front Flange

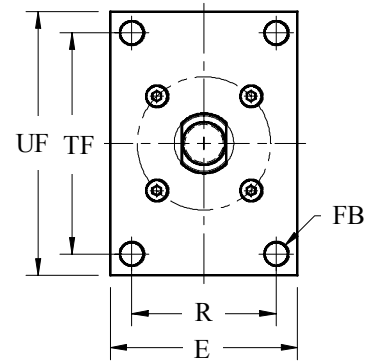
Flat Face



SEALUM Standard Bolt Pattern



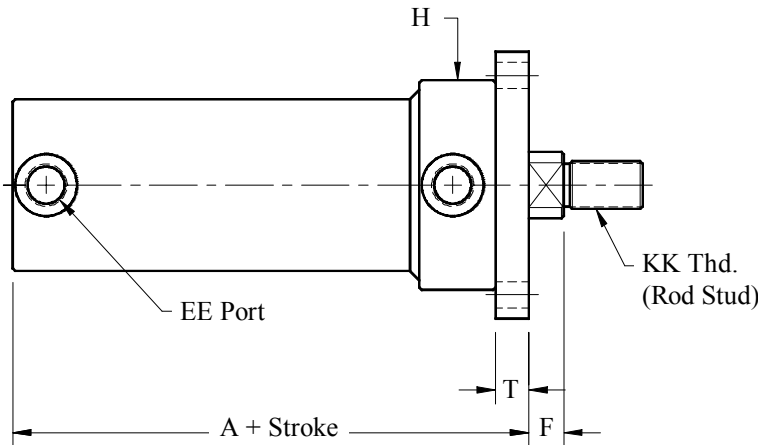
MF5 Bolt Pattern



MF1 Bolt Pattern

Blind End

Accessories:
None



Rod End

Accessories:
Welded
Female Thd.
Male Thd.

Bore	Available Rod Sizes			A			H Dia	PP Dia	*T STD	*T Cushion	V	W	E	FB Dia	R	TF	UF	EE ORB	Standard sizes shown.		
				STD & Cushion	BLIND Cushion	ROD Cushion													CD Pin	F	KK Thd
2	1	—	—	5.50	5.00	6.00	3.25	0.56	0.63	0.75	3.38	4.50	3.00	0.56	2.05	4.13	5.13	# 8	0.75	0.50	3/4-16
2 1/2	1	1 3/8	1 1/2	5.75	5.25	6.25	3.75	0.56	0.69	0.81	3.88	5.00	3.75	0.56	2.55	4.63	5.63	# 8	0.75	0.63	3/4-16
3	1 1/4	1 3/8	1 3/4	6.13	5.63	6.63	4.25	0.56	0.75	0.88	4.38	5.50	—	—	—	—	—	# 8	1.00	0.63	1-14
3 1/4	1 3/8	1 3/4	2	6.63	6.13	7.13	4.75	0.69	0.75	1.00	4.75	6.00	4.75	0.69	3.25	5.88	7.13	# 12	1.00	0.75	1-14
3 1/2	1 3/8	1 3/4	2	6.75	6.25	7.25	5.00	0.69	0.88	1.13	5.25	6.50	—	—	—	—	—	# 12	1.25	0.75	1 1/4-12
4	1 3/4	2	2 1/2	6.88	6.31	7.44	5.50	0.69	0.88	1.13	5.75	7.00	5.50	0.69	3.82	6.38	7.63	# 12	1.38	0.75	1 1/4-12
4 1/2	2	2 1/2	3	7.25	6.69	7.81	6.00	0.69	0.88	1.13	6.25	7.50	—	—	—	—	—	# 12	1.50	0.75	1 1/2-12
5	2	2 1/2	3	7.50	7.00	8.00	6.88	0.94	1.00	1.25	7.00	8.50	6.88	0.94	4.95	8.19	9.75	# 12	1.75	0.88	1 1/2-12
6	2 1/2	3	3 1/2	8.50	8.13	8.88	8.00	1.06	1.06	1.19	8.00	10.00	8.00	1.06	5.73	9.44	11.25	# 16	2.00	1.00	1 7/8-12
7	3	3 1/2	4	9.50	9.06	9.94	9.13	1.31	1.19	1.44	8.50	11.00	9.13	1.19	6.58	10.63	12.63	# 20	2.50	1.00	2 1/4-12
8	3 1/2	4	5	10.50	9.88	11.13	10.50	1.31	1.50	1.88	9.50	12.00	10.50	1.31	7.50	11.81	14.00	# 20	3.00	1.00	2 1/2-12

*When using a cushion on the rod end or on both ends of your cylinder, use 'T Cushion' for your 'T' dimension. Use 'T STD' for the 'T' dimension on a standard cylinder or if you are using a cushion on the blind end only.

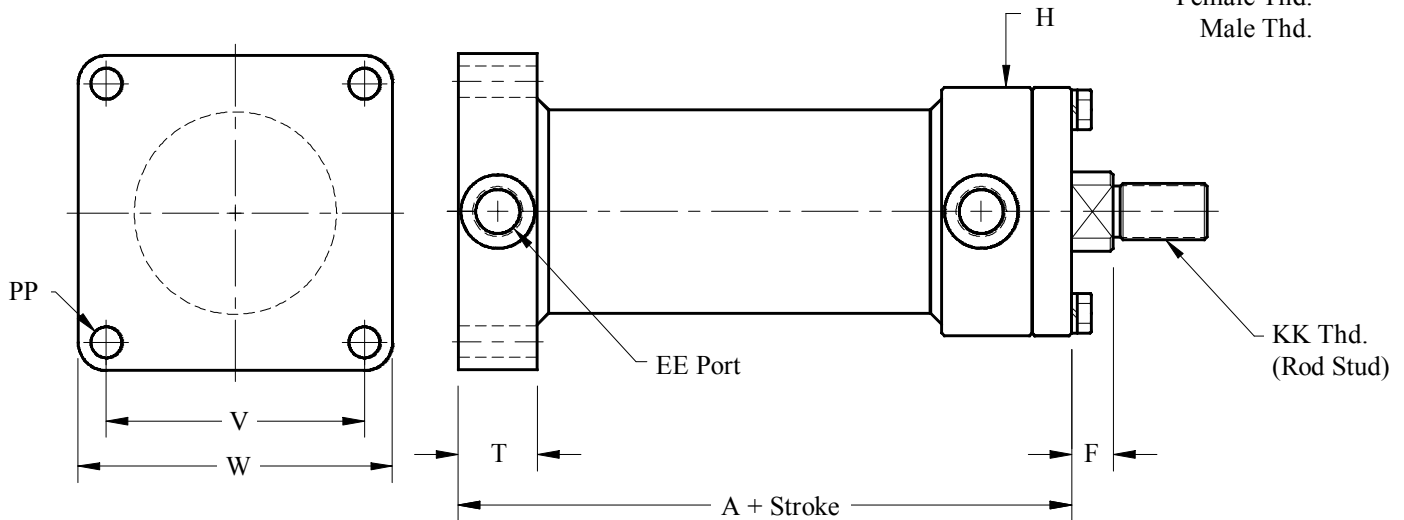
Series B Cylinder – Rear Flange

Blind End

Accessories:
None

Rod End

Accessories:
Welded
Female Thd.
Male Thd.



Bore	Available Rod Sizes				A			H Dia	PP Dia	T	V	W	EE ORB	Standard sizes shown.		
					STD & Cushion	BLIND Cushion	ROD Cushion							CD Pin Ø	F	KK Thd
1 1/2	3/4	—	—	—	5.00	4.63	5.38	2.50	0.44	1.19	2.63	3.50	# 6	0.50	0.50	1/2-20
2	1	1 3/8	—	—	5.50	5.00	6.00	3.25	0.56	1.31	3.38	4.50	# 8	0.75	0.50	3/4-16
2 1/2	1	1 3/8	1 1/2	1 3/4	5.75	5.25	6.25	3.75	0.56	1.44	3.88	5.00	# 8	0.75	0.63	3/4-16
3	1 1/4	1 3/8	1 3/4	2	6.13	5.63	6.63	4.25	0.56	1.44	4.38	5.50	# 8	1.00	0.63	1-14
3 1/4	1 3/8	1 3/4	2	2 1/4	6.63	6.13	7.13	4.75	0.69	1.69	4.75	6.00	# 12	1.00	0.75	1-14
3 1/2	1 3/8	1 3/4	2	2 1/2	6.75	6.25	7.25	5.00	0.69	1.69	5.25	6.50	# 12	1.25	0.75	1 1/4-12
4	1 3/4	2	2 1/2	3	6.88	6.31	7.44	5.50	0.69	1.75	5.75	7.00	# 12	1.38	0.75	1 1/4-12
4 1/2	2	2 1/2	3	3 1/2	7.25	6.69	7.81	6.00	0.69	1.81	6.25	7.50	# 12	1.50	0.75	1 1/2-12
5	2	2 1/2	3	3 1/2	7.50	7.00	8.00	6.88	0.94	1.75	7.00	8.50	# 12	1.75	0.88	1 1/2-12
5 1/2	2 1/2	3	3 1/2	—	8.00	7.38	8.63	7.25	0.94	1.75	7.50	9.00	# 12	2.00	0.88	1 7/8-12
6	2 1/2	3	3 1/2	4	8.50	8.13	8.88	8.00	1.06	2.13	8.00	10.00	# 16	2.00	1.00	1 7/8-12
7	3	3 1/2	4	5	9.50	9.06	9.94	9.13	1.31	2.50	8.50	11.00	# 20	2.50	1.00	2 1/4-12
8	3 1/2	4	5	6	10.50	9.88	11.13	10.50	1.31	2.63	9.50	12.00	# 20	3.00	1.00	2 1/2-12
9	4	5	6	—	11.50	10.88	12.13	11.50	1.31	2.63	10.50	13.00	# 20	3.50	1.25	3 1/4-12
10	5	6	7	—	13.00	12.19	13.81	13.00	1.31	3.19	11.50	14.00	# 20	3.50	1.25	3 1/4-12

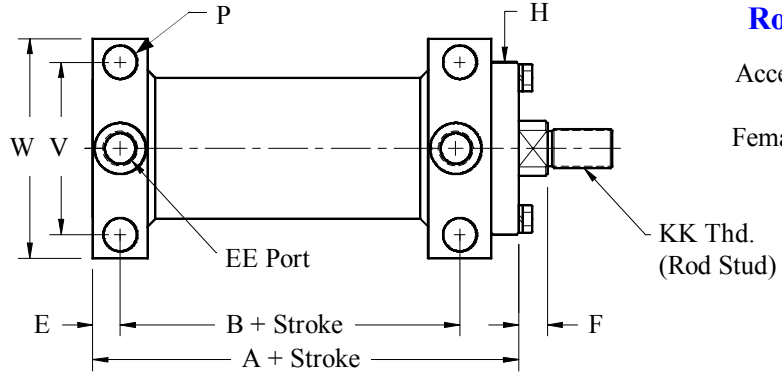
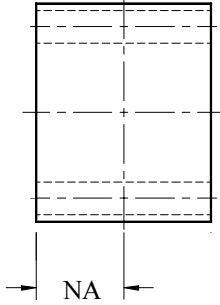
Series B Cylinder – Foot Mount

Square Style

Bore Sizes:
1 1/2" to 3"

Blind End

Accessories:
None



Rod End

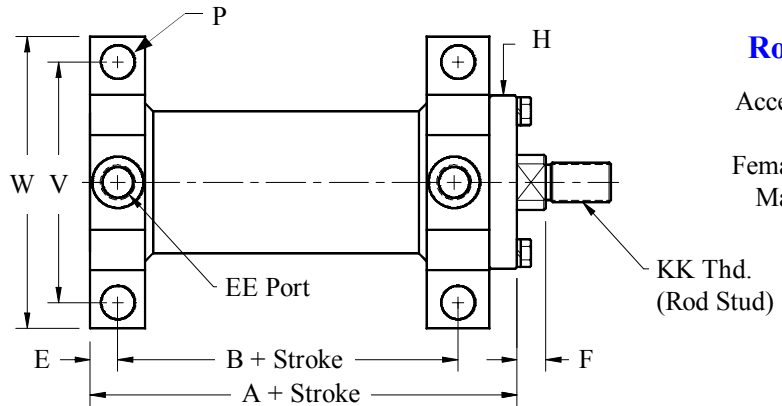
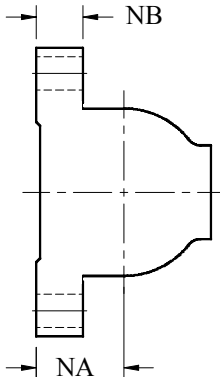
Accessories:
Welded
Female Thd.

Rounded

Bore Sizes:
3 1/4" to 10"

Blind End

Accessories:
None



Rod End

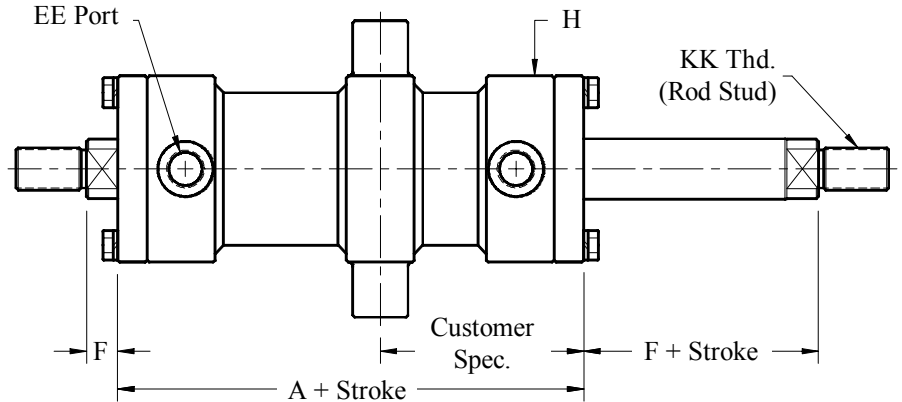
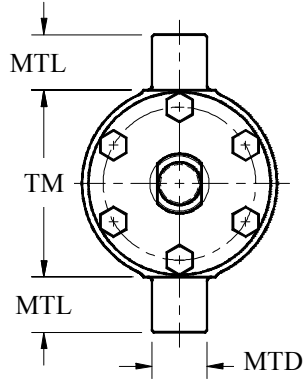
Accessories:
Welded
Female Thd.
Male Thd.

Bore	Available Rod Sizes				STD & Cushion	STD	Cushion Both ends	BLIND Cushion		ROD Cushion		E	H Dia	NA	NB	P Dia	V	W	EE ORB	Standard sizes shown.		
								A	B	A	B									CD Pin	F	KK Thd
1 1/2	3/4	—	—	—	5.00	2.88	2.88	4.63	2.50	5.38	3.25	0.63	2.50	1.31	—	0.44	2.25	3.00	# 6	0.50	0.50	1/2-20
2	1	1 3/8	—	—	5.50	3.13	3.00	5.00	2.63	6.00	3.50	0.63	3.25	1.56	—	0.56	2.88	3.75	# 8	0.75	0.50	3/4-16
2 1/2	1	1 3/8	1 1/2	1 3/4	5.75	3.31	3.19	5.25	2.81	6.25	3.69	0.75	3.75	1.94	—	0.56	3.38	4.25	# 8	0.75	0.63	3/4-16
3	1 1/4	1 3/8	1 3/4	2	6.13	3.50	3.38	5.63	3.00	6.63	3.88	0.75	4.25	2.19	—	0.69	4.00	5.00	# 8	1.00	0.63	1-14
3 1/4	1 3/8	1 3/4	2	2 1/4	6.63	4.00	3.75	6.13	3.50	7.13	4.25	0.88	4.75	2.44	1.25	0.81	6.38	7.75	# 12	1.00	0.75	1-14
3 1/2	1 3/8	1 3/4	2	2 1/2	6.75	4.00	3.75	6.25	3.50	7.25	4.25	0.88	5.00	2.56	1.50	0.81	6.63	8.00	# 12	1.25	0.75	1 1/4-12
4	1 3/4	2	2 1/2	3	6.88	4.13	3.88	6.31	3.56	7.44	4.44	0.88	5.50	2.81	1.50	1.06	7.63	9.25	# 12	1.38	0.75	1 1/4-12
4 1/2	2	2 1/2	3	3 1/2	7.25	4.50	4.25	6.69	3.94	7.81	4.81	0.88	6.00	3.19	1.50	1.06	8.00	9.63	# 12	1.50	0.75	1 1/2-12
5	2	2 1/2	3	3 1/2	7.50	4.56	4.31	7.00	4.06	8.00	4.81	0.88	6.88	3.44	1.75	1.06	8.75	10.38	# 12	1.75	0.88	1 1/2-12
5 1/2	2 1/2	3	3 1/2	—	8.00	4.94	4.81	7.38	4.31	8.63	5.44	0.88	7.25	3.81	1.75	1.06	9.25	10.88	# 12	2.00	0.88	1 7/8-12
6	2 1/2	3	3 1/2	4	8.50	5.00	4.88	8.13	4.63	8.88	5.25	1.06	8.00	4.06	2.00	1.31	10.38	12.50	# 16	2.00	1.00	1 7/8-12
7	3	3 1/2	4	5	9.50	5.56	5.31	9.06	5.13	9.94	5.75	1.38	9.13	4.75	2.50	1.56	12.25	15.00	# 20	2.50	1.00	2 1/4-12
8	3 1/2	4	5	6	10.50	6.25	5.88	9.88	5.63	11.13	6.50	1.31	10.50	5.50	2.50	1.56	13.25	15.75	# 20	3.00	1.00	2 1/2-12
9	4	5	6	—	11.50	6.75	6.50	10.88	6.13	12.13	7.13	1.44	11.50	5.75	3.00	1.81	15.25	18.25	# 20	3.50	1.25	3 1/4-12
10	5	6	7	—	13.00	7.63	7.38	12.19	6.81	13.81	8.19	1.63	13.00	6.50	3.50	1.81	17.00	20.00	# 20	3.50	1.25	3 1/4-12

Series BD Cylinder – Double Rod Cylinder

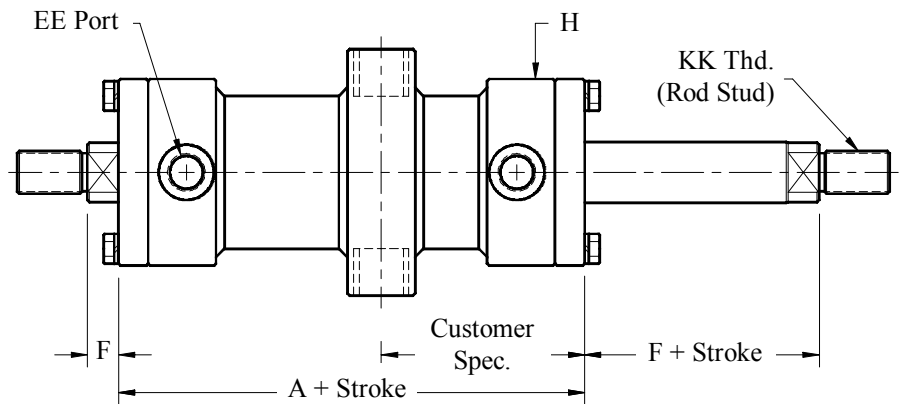
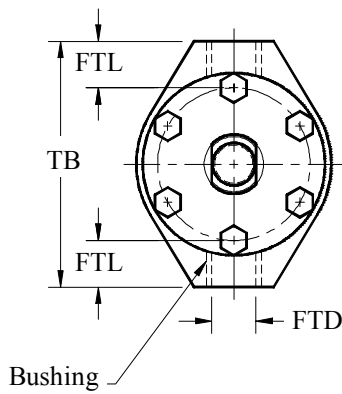
Mid Trunnion

Male



Accessories: Welded
Female Thd.
Male Thd.
Trunnion Brackets

Female

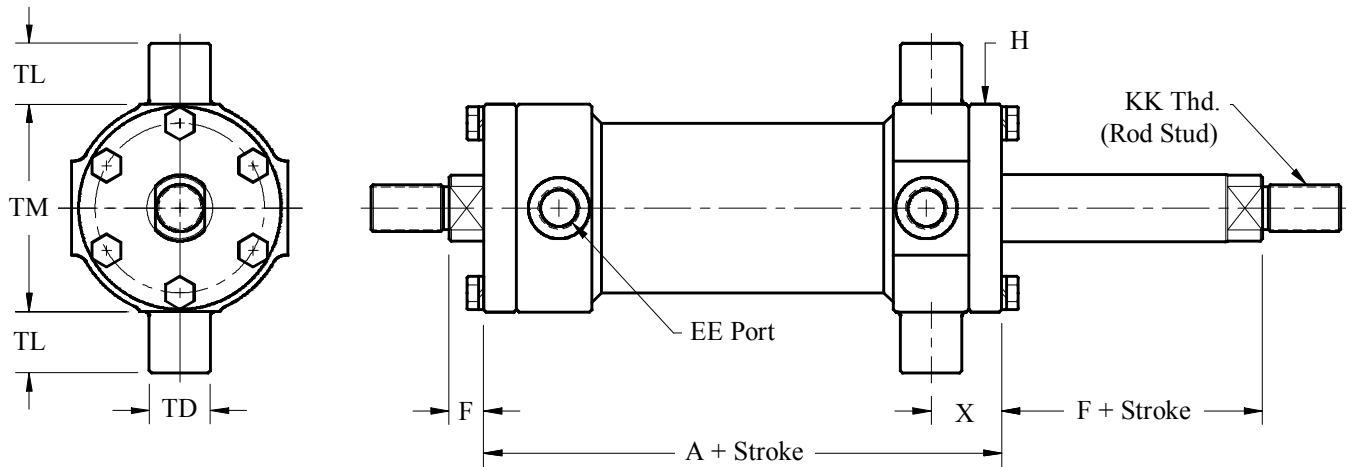


Bore	Available Rod Sizes				A		H Dia	FTD	FTL	TB	MTD	MTL	TM	EE (ORB)	Standard sizes shown.		
					STD	Cushion									CD Pin Ø	F	KK Thd
1 1/2	3/4	—	—	—	5.00	5.75	2.50	0.75	0.63	3.25	1.00	1.00	3.00	# 6	0.50	0.50	1/2-20
2	1	1 3/8	—	—	5.75	6.75	3.25	0.75	0.63	3.75	1.38	1.38	3.50	# 8	0.75	0.50	3/4-16
2 1/2	1	1 3/8	1 1/2	1 3/4	6.25	7.25	3.75	0.75	0.63	4.25	1.38	1.38	4.00	# 8	0.75	0.63	3/4-16
3	1 3/8	1 3/4	2	—	6.88	7.88	4.25	1.00	0.88	5.38	1.38	1.38	4.50	# 8	1.00	0.63	1-14
3 1/4	1 3/8	1 3/4	2	2 1/4	7.38	8.38	4.75	1.00	0.88	5.63	1.75	1.75	5.00	# 12	1.00	0.75	1-14
3 1/2	1 3/8	2	2 1/2	—	7.63	8.63	5.00	1.00	0.88	5.88	1.75	1.75	5.25	# 12	1.25	0.75	1 1/4-12
4	1 3/4	2	2 1/2	3	7.75	8.88	5.50	1.38	1.31	7.25	1.75	1.75	5.50	# 12	1.38	0.75	1 1/4-12
5	2	2 1/2	3	3 1/2	8.88	9.88	6.88	1.75	1.56	9.00	1.75	1.75	7.00	# 12	1.75	0.88	1 1/2-12
6	2 1/2	3	3 1/2	4	10.00	10.75	8.00	1.75	1.56	10.00	2.00	2.00	8.50	# 16	2.00	1.00	1 7/8-12
7	3	3 1/2	4	5	11.88	12.75	9.13	2.00	1.81	11.50	2.50	2.50	9.75	# 20	2.50	1.00	2 1/4-12
8	3 1/2	4	5	6	13.75	15.00	10.50	2.50	2.25	13.50	3.00	3.00	11.00	# 20	3.00	1.00	2 1/2-12
10	5	6	7	—	16.25	17.88	13.00	—	—	—	3.50	3.50	14.00	# 20	3.50	1.25	3 1/4-12

Series BD Cylinder – Double Rod Cylinder

Front Trunnion

Accessories: Welded
Female Thd.
Male Thd.
Trunnion Brackets

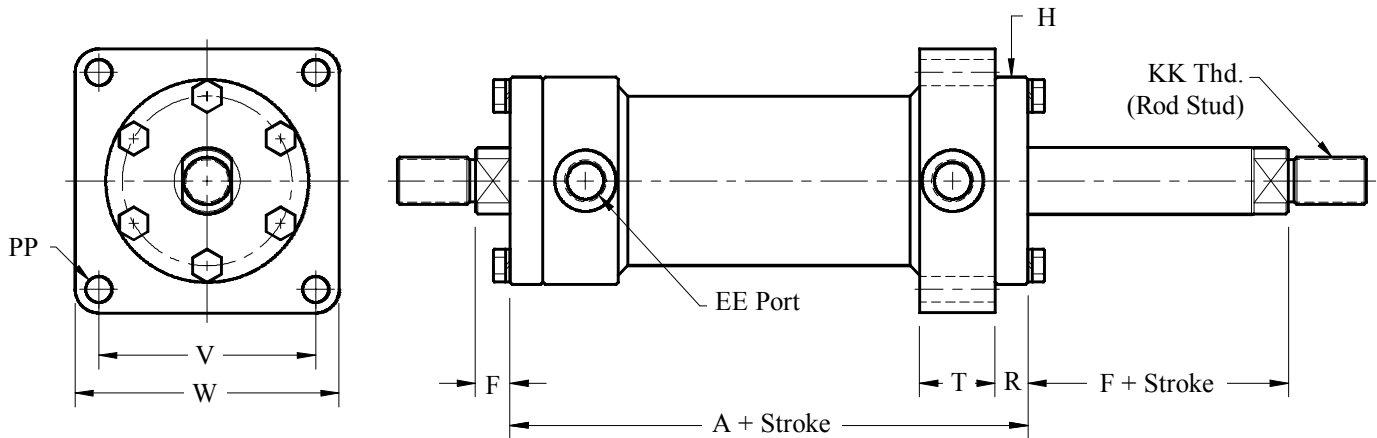


Bore	Available Rod Sizes				A		H Dia	TD	TL	TM	X STD	X Cushion	EE (ORB)	Standard sizes shown.		
					STD	Cushion								CD Pin Ø	F	KK Thd
1 1/2	3/4	—	—	—	5.00	5.75	2.50	1.00	1.00	2.50	1.19	1.19	# 6	0.50	0.68	1/2-20
2	1	1 3/8	—	—	5.75	6.75	3.25	1.38	1.38	3.00	1.50	1.63	# 8	0.75	0.75	3/4-16
2 1/2	1	1 3/8	1 1/2	1 3/4	6.25	7.25	3.75	1.38	1.38	3.50	1.56	1.69	# 8	0.75	0.69	3/4-16
3	1 3/8	1 3/4	2	—	6.88	7.88	4.25	1.38	1.38	4.50	1.63	1.75	# 8	1.00	0.63	1-14
3 1/4	1 3/8	1 3/4	2	2 1/4	7.38	8.38	4.75	1.75	1.75	4.50	1.75	2.00	# 12	1.00	0.88	1-14
3 1/2	1 3/8	2	2 1/2	—	7.63	8.63	5.00	1.75	1.75	5.25	1.88	2.13	# 12	1.25	0.75	1 1/4-12
4	1 3/4	2	2 1/2	3	7.75	8.88	5.50	1.75	1.75	5.00	1.88	2.13	# 12	1.38	1.00	1 1/4-12
5	2	2 1/2	3	3 1/2	8.88	9.88	6.88	1.75	1.75	6.50	2.13	2.38	# 12	1.75	0.88	1 1/2-12
6	2 1/2	3	3 1/2	4	10.00	10.75	8.00	2.00	2.00	7.50	2.31	2.44	# 16	2.00	1.06	1 7/8-12
7	3	3 1/2	4	5	11.88	12.75	9.13	2.50	2.50	8.50	2.63	2.88	# 20	2.50	1.00	2 1/4-12
8	3 1/2	4	5	6	13.75	15.00	10.50	3.00	3.00	9.50	2.75	3.13	# 20	3.00	1.00	2 1/2-12
10	5	6	7	—	16.25	17.88	13.00	3.50	3.50	12.63	3.88	4.13	# 20	3.50	1.13	3 1/4-12

Series BD Cylinder – Double Rod Cylinder

Flange Mount – Standard

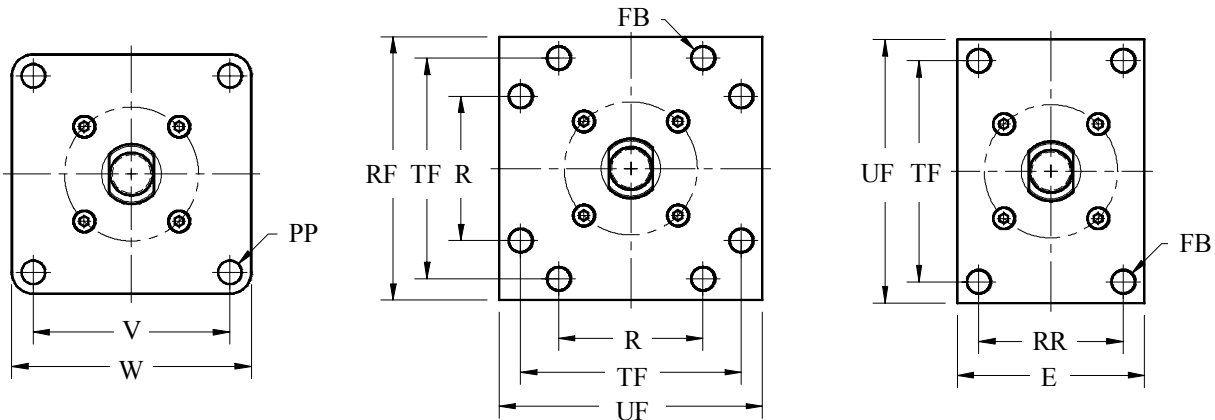
Accessories: Welded
Female Thd.
Male Thd.



Bore	Available Rod Sizes				A		H Dia	PP Dia	T	R STD	R Cushion	V	W	EE (ORB)	Standard sizes shown.		
					STD	Cushion									CD Pin Ø	F	KK Thd
1 1/2	3/4	—	—	—	5.00	5.75	2.50	0.44	1.75	0.50	0.50	2.63	3.50	# 6	0.50	0.50	1/2-20
2	1	1 3/8	—	—	5.75	6.75	3.25	0.56	1.75	0.63	0.75	3.38	4.50	# 8	0.75	0.50	3/4-16
2 1/2	1	1 3/8	1 1/2	1 3/4	6.25	7.25	3.75	0.56	1.75	0.69	0.81	3.88	5.00	# 8	0.75	0.63	3/4-16
3	1 3/8	1 3/4	2	—	6.88	7.88	4.25	0.56	1.75	0.75	0.88	4.38	5.50	# 8	1.00	0.63	1-14
3 1/4	1 3/8	1 3/4	2	2 1/4	7.38	8.38	4.75	0.69	2.00	0.75	1.00	4.75	6.00	# 12	1.00	0.75	1-14
3 1/2	1 3/8	2	2 1/2	—	7.63	8.63	5.00	0.69	2.00	0.88	1.13	5.25	6.50	# 12	1.25	0.75	1 1/4-12
4	1 3/4	2	2 1/2	3	7.75	8.88	5.50	0.69	2.00	0.88	1.13	5.75	7.00	# 12	1.38	0.75	1 1/4-12
5	2	2 1/2	3	3 1/2	8.88	9.88	6.88	0.94	2.13	1.00	1.25	7.00	8.50	# 12	1.75	0.88	1 1/2-12
6	2 1/2	3	3 1/2	4	10.00	10.75	8.00	1.06	2.44	1.06	1.19	8.00	10.00	# 16	2.00	1.00	1 7/8-12
7	3	3 1/2	4	5	11.88	12.75	9.13	1.31	2.75	1.19	1.44	8.50	11.00	# 20	2.50	1.00	2 1/4-12
8	3 1/2	4	5	6	13.75	15.00	10.50	1.31	2.88	1.50	1.88	9.50	12.00	# 20	3.00	1.00	2 1/2-12
10	5	6	7	—	16.25	17.88	13.00	1.31	3.38	2.00	2.25	11.50	14.00	# 20	3.50	1.25	3 1/4-12

Series BD Cylinder – Double Rod Cylinder

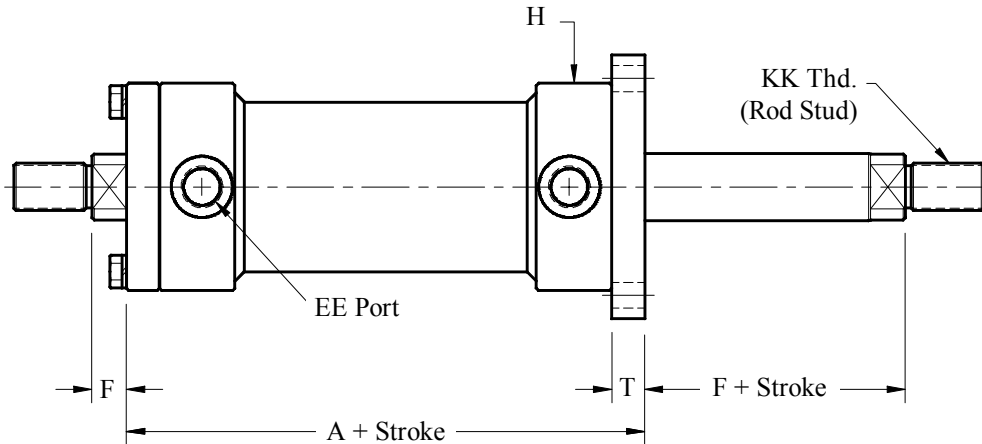
Flange Mount – Flat Face



SEALUM Standard Bolt Pattern

MF5 Bolt Pattern

MF1 Bolt Pattern



Accessories:

- Welded
- Female Thd.
- Male Thd.

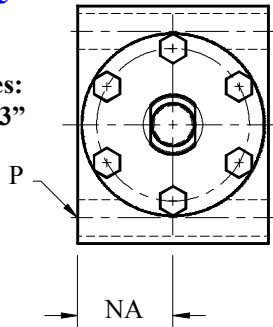
Bore	Available Rod Sizes			A		H Dia	PP Dia	T STD	T Cushion	V	W	E	FB Dia	R	TF	UF	EE (ORB)	Standard sizes shown.		
				STD	Cushion													CD Pin	F	KK Thd
2	1	—	—	5.75	6.75	3.25	0.56	0.63	0.75	3.38	4.50	3.00	0.56	2.05	4.13	5.13	# 8	0.75	0.50	3/4-16
2 1/2	1	1 3/8	1 1/2	6.25	7.25	3.75	0.56	0.69	0.81	3.88	5.00	3.75	0.56	2.55	4.63	5.63	# 8	0.75	0.63	3/4-16
3	1 3/8	1 3/4	—	6.88	7.88	4.25	0.56	0.75	0.88	4.38	5.50	—	—	—	—	—	# 8	1.00	0.63	1-14
3 1/4	1 3/8	1 3/4	2	7.38	8.38	4.75	0.69	0.75	1.00	4.75	6.00	4.75	0.69	3.25	5.88	7.13	# 12	1.00	0.75	1-14
3 1/2	1 3/4	2	—	7.63	8.63	5.00	0.69	0.88	1.13	5.25	6.50	—	—	—	—	—	# 12	1.25	0.75	1 1/4-12
4	1 3/4	2	2 1/2	7.75	8.88	5.50	0.69	0.88	1.13	5.75	7.00	5.50	0.69	3.82	6.38	7.63	# 12	1.38	0.75	1 1/4-12
5	2	2 1/2	3	8.88	9.88	6.88	0.94	1.00	1.25	7.00	8.50	6.88	0.94	4.95	8.19	9.75	# 12	1.75	0.88	1 1/2-12
6	2 1/2	3	3 1/2	10.00	10.75	8.00	1.06	1.06	1.19	8.00	10.00	8.00	1.06	5.73	9.44	11.25	# 16	2.00	1.00	1 7/8-12
7	3	3 1/2	4	11.88	12.75	9.13	1.31	1.19	1.44	8.50	11.00	9.13	1.19	6.58	10.63	12.63	# 20	2.50	1.00	2 1/4-12
8	3 1/2	4	5	13.75	15.00	10.50	1.31	1.50	1.88	9.50	12.00	10.50	1.31	7.50	11.81	14.00	# 20	3.00	1.00	2 1/2-12

Series BD Cylinder – Double Rod Cylinder

Foot Mount

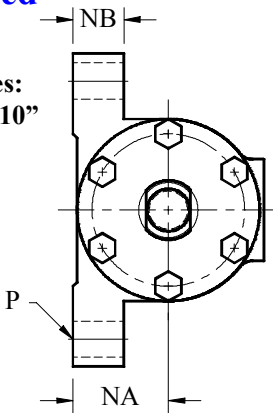
Square Style

Bore Sizes:
1 1/2" to 3"

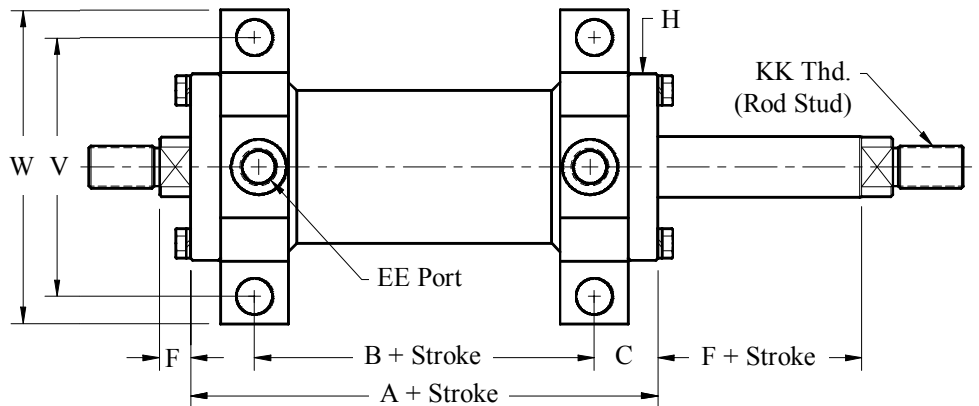
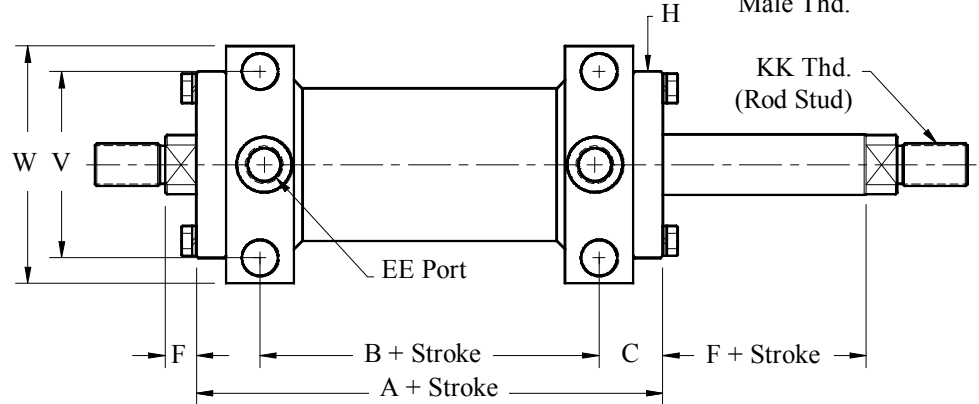


Rounded Style

Bore Sizes:
3 1/4" to 10"



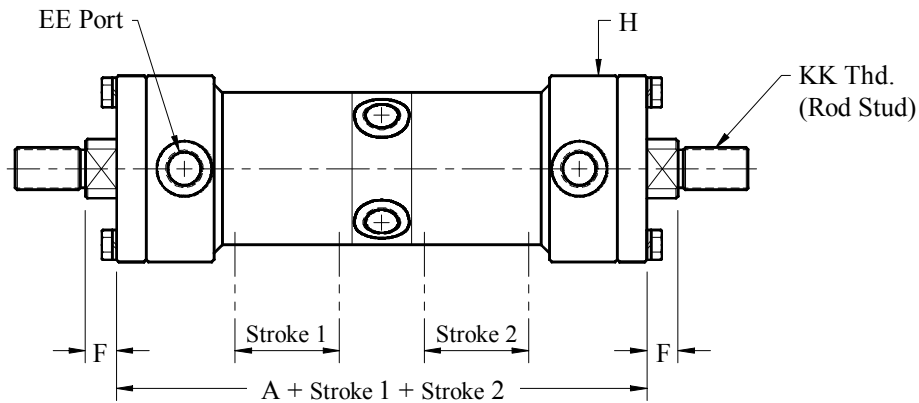
Accessories: Welded
Female Thd.
Male Thd.



Bore	Available Rod Sizes				Standard			Cushion			H Dia	NA	NB	P Dia	V	W	EE (ORB)	Standard sizes shown.		
					A	B	C	A	B	C								CD Pin Ø	F	KK Thd
1 1/2	3/4	—	—	—	5.00	2.00	1.50	5.75	2.75	1.50	2.50	1.31	—	0.44	2.25	3.00	# 6	0.50	0.50	1/2-20
2	1	1 3/8	—	—	5.75	2.25	1.75	6.75	3.00	1.88	3.25	1.56	—	0.56	2.88	3.75	# 8	0.75	0.50	3/4-16
2 1/2	1	1 3/8	1 1/2	1 3/4	6.25	2.88	1.69	7.25	3.63	1.81	3.75	1.94	—	0.56	3.38	4.25	# 8	0.75	0.63	3/4-16
3	1 3/8	1 3/4	2	—	6.88	3.13	1.88	7.88	3.88	2.00	4.25	2.19	—	0.69	4.00	5.00	# 8	1.00	0.63	1-14
3 1/4	1 3/8	1 3/4	2	2 1/4	7.38	3.88	1.75	8.38	4.38	2.00	4.75	2.44	1.25	0.81	6.38	7.75	# 12	1.00	0.75	1-14
3 1/2	1 3/8	2	2 1/2	—	7.63	3.88	1.88	8.63	4.38	2.13	5.00	2.56	1.50	0.81	6.63	8.00	# 12	1.25	0.75	1 1/4-12
4	1 3/4	2	2 1/2	3	7.75	4.00	1.88	8.88	4.63	2.13	5.50	2.81	1.50	1.06	7.63	9.25	# 12	1.38	0.75	1 1/4-12
5	2	2 1/2	3	3 1/2	8.88	4.75	2.06	9.88	5.25	2.31	6.88	3.44	1.75	1.06	8.75	10.38	# 12	1.75	0.88	1 1/2-12
6	2 1/2	3	3 1/2	4	10.00	5.13	2.44	10.75	5.63	2.56	8.00	4.06	2.00	1.31	10.38	12.50	# 16	2.00	1.00	1 7/8-12
7	3	3 1/2	4	5	11.88	6.75	2.56	12.75	7.13	2.81	9.13	4.75	2.50	1.56	12.25	15.00	# 20	2.50	1.00	2 1/4-12
8	3 1/2	4	5	6	13.75	7.88	2.94	15.00	8.38	3.31	10.50	5.50	2.50	1.56	13.25	15.75	# 20	3.00	1.00	2 1/2-12
10	5	6	7	—	16.25	8.75	3.75	17.88	9.88	4.00	13.00	6.50	3.50	1.81	17.00	20.00	# 20	3.50	1.25	3 1/4-12

Series BB Cylinder – Back to Back

Two Cylinders

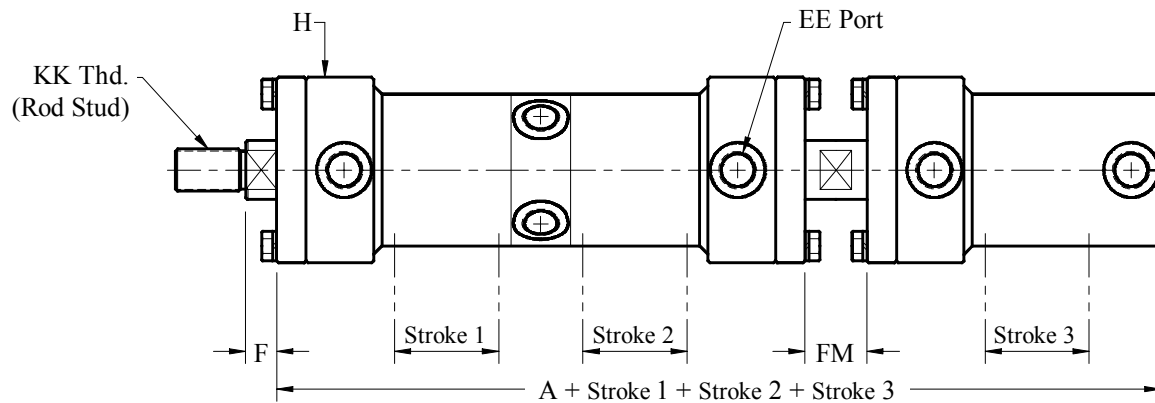


Accessories: Welded
Female Thd.
Male Thd.

Bore	Available Rod Sizes				A	H Dia	EE (ORB)	Standard sizes shown.		
								CD Pin Ø	F	KK Thd
1 1/2	3/4	—	—	—	8.81	2.50	# 6	0.50	0.50	1/2-20
2	1	1 3/8	—	—	9.69	3.25	# 8	0.75	0.50	3/4-16
2 1/2	1	1 3/8	1 1/2	1 3/4	10.06	3.75	# 8	0.75	0.63	3/4-16
3	1 1/4	1 3/8	1 3/4	2	10.81	4.25	# 8	1.00	0.63	1-14
3 1/4	1 3/8	1 3/4	2	2 1/4	11.56	4.75	# 12	1.00	0.75	1-14
3 1/2	1 3/8	1 3/4	2	2 1/2	11.81	5.00	# 12	1.25	0.75	1 1/4-12
4	1 3/4	2	2 1/2	3	12.00	5.50	# 12	1.38	0.75	1 1/4-12
4 1/2	2	2 1/2	3	3 1/2	12.69	6.00	# 12	1.50	0.75	1 1/2-12
5	2	2 1/2	3	3 1/2	13.25	6.88	# 12	1.75	0.88	1 1/2-12
5 1/2	2 1/2	3	3 1/2	—	14.25	7.25	# 12	2.00	0.88	1 7/8-12
6	2 1/2	3	3 1/2	4	14.88	8.00	# 16	2.00	1.00	1 7/8-12
7	3	3 1/2	4	5	16.50	9.13	# 20	2.50	1.00	2 1/4-12
8	3 1/2	4	5	6	18.38	10.50	# 20	3.00	1.00	2 1/2-12
9	4	5	6	—	20.38	11.50	# 20	3.50	1.25	3 1/4-12
10	5	6	7	—	22.81	13.00	# 20	3.50	1.25	3 1/4-12

Series BB Cylinder – Back to Back

Three Cylinders

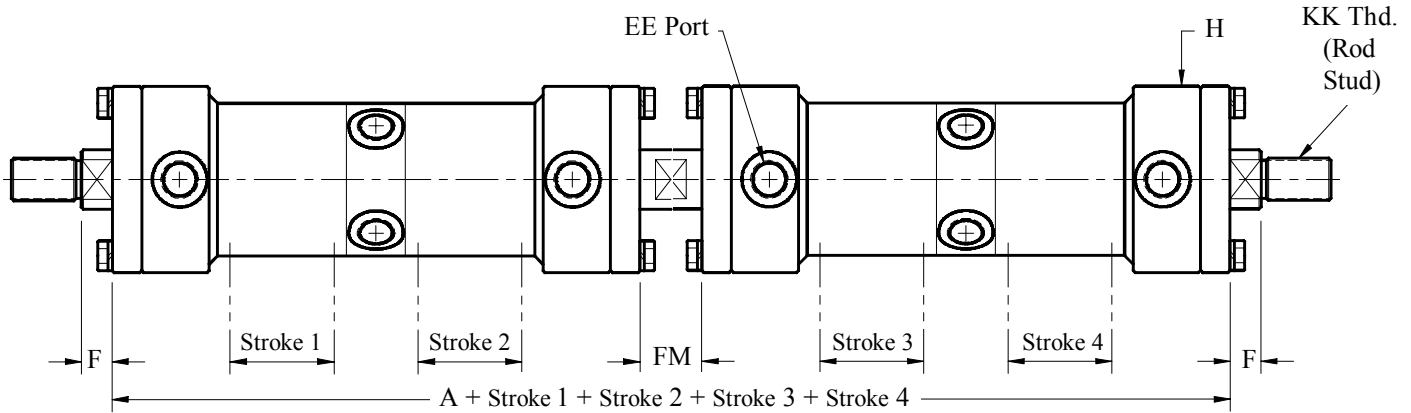


Accessories: Welded
Female Thd.
Male Thd.

Bore	Available Rod Sizes				A	H Dia	FM	EE (ORB)	Standard sizes shown.		
	CD Pin Ø	F	KK Thd								
1 1/2	3/4	—	—	—	14.81	2.50	1.00	# 6	0.50	0.50	1/2-20
2	1	1 3/8	—	—	16.19	3.25	1.00	# 8	0.75	0.50	3/4-16
2 1/2	1	1 3/8	1 1/2	1 3/4	16.94	3.75	1.13	# 8	0.75	0.63	3/4-16
3	1 1/4	1 3/8	1 3/4	2	18.06	4.25	1.13	# 8	1.00	0.63	1-14
3 1/4	1 3/8	1 3/4	2	2 1/4	19.56	4.75	1.38	# 12	1.00	0.75	1-14
3 1/2	1 3/8	1 3/4	2	2 1/2	19.94	5.00	1.38	# 12	1.25	0.75	1 1/4-12
4	1 3/4	2	2 1/2	3	20.25	5.50	1.38	# 12	1.38	0.75	1 1/4-12
4 1/2	2	2 1/2	3	3 1/2	21.31	6.00	1.38	# 12	1.50	0.75	1 1/2-12
5	2	2 1/2	3	3 1/2	22.25	6.88	1.50	# 12	1.75	0.88	1 1/2-12
5 1/2	2 1/2	3	3 1/2	—	23.75	7.25	1.50	# 12	2.00	0.88	1 7/8-12
6	2 1/2	3	3 1/2	4	25.13	8.00	1.75	# 16	2.00	1.00	1 7/8-12
7	3	3 1/2	4	5	27.75	9.13	1.75	# 20	2.50	1.00	2 1/4-12
8	3 1/2	4	5	6	30.88	10.50	2.00	# 20	3.00	1.00	2 1/2-12
9	4	5	6	—	33.88	11.50	2.00	# 20	3.50	1.25	3 1/4-12
10	5	6	7	—	37.81	13.00	2.00	# 20	3.50	1.25	3 1/4-12

Series BB Cylinder – Back to Back

Four Cylinders

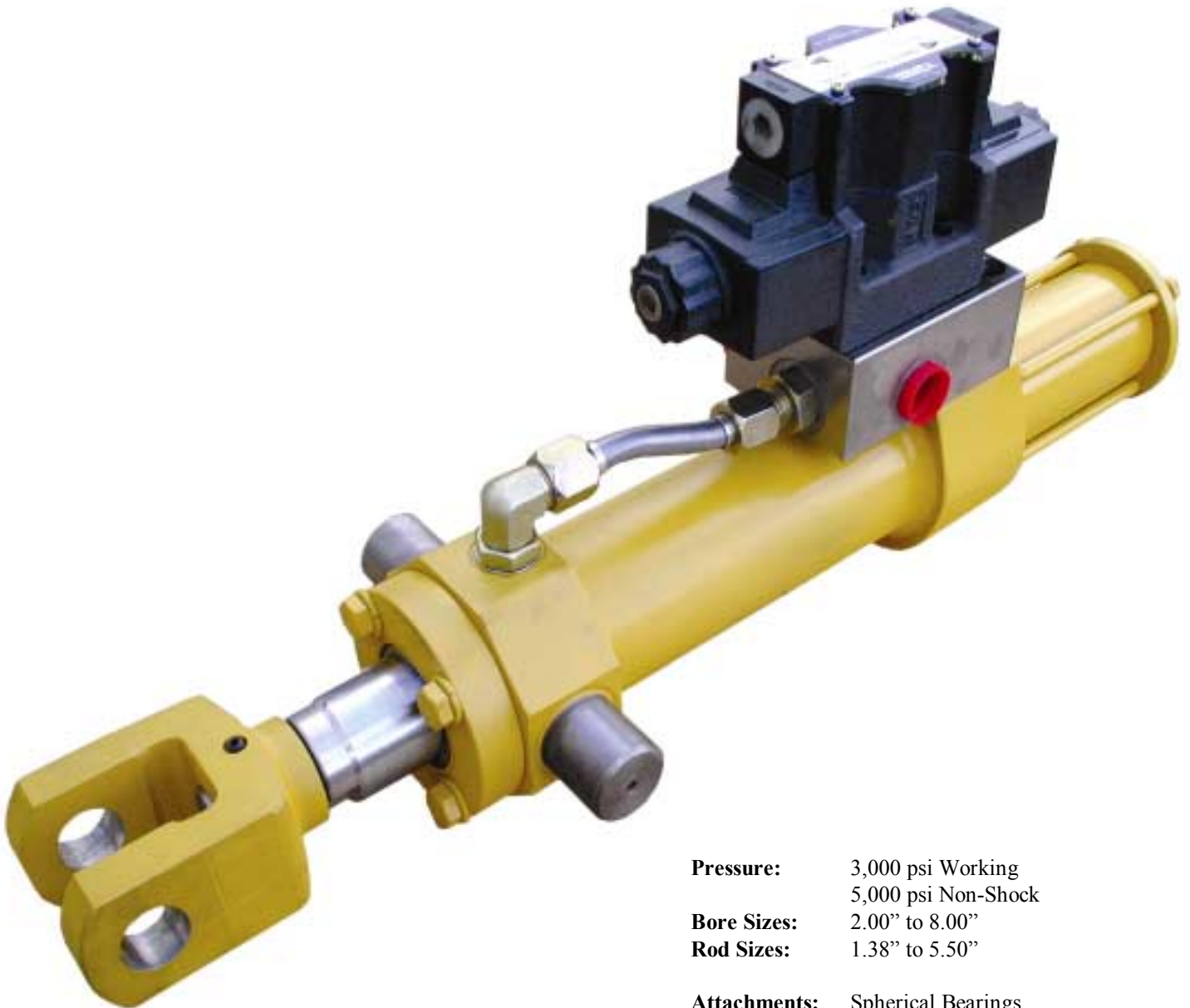


Accessories: Welded
Female Thd.
Male Thd.

Bore	Available Rod Sizes				A	H Dia	FM	EE (ORB)	Standard sizes shown.		
									CD Pin Ø	F	KK Thd
1 1/2	3/4	—	—	—	18.63	2.50	1.00	# 6	0.50	0.50	1/2-20
2	1	1 3/8	—	—	20.38	3.25	1.00	# 8	0.75	0.50	3/4-16
2 1/2	1	1 3/8	1 1/2	1 3/4	21.25	3.75	1.13	# 8	0.75	0.63	3/4-16
3	1 1/4	1 3/8	1 3/4	2	22.75	4.25	1.13	# 8	1.00	0.63	1-14
3 1/4	1 3/8	1 3/4	2	2 1/4	24.50	4.75	1.38	# 12	1.00	0.75	1-14
3 1/2	1 3/8	1 3/4	2	2 1/2	25.00	5.00	1.38	# 12	1.25	0.75	1 1/4-12
4	1 3/4	2	2 1/2	3	25.38	5.50	1.38	# 12	1.38	0.75	1 1/4-12
4 1/2	2	2 1/2	3	3 1/2	26.75	6.00	1.38	# 12	1.50	0.75	1 1/2-12
5	2	2 1/2	3	3 1/2	28.00	6.88	1.50	# 12	1.75	0.88	1 1/2-12
5 1/2	2 1/2	3	3 1/2	—	30.00	7.25	1.50	# 12	2.00	0.88	1 7/8-12
6	2 1/2	3	3 1/2	4	31.50	8.00	1.75	# 16	2.00	1.00	1 7/8-12
7	3	3 1/2	4	5	34.75	9.13	1.75	# 20	2.50	1.00	2 1/4-12
8	3 1/2	4	5	6	38.75	10.50	2.00	# 20	3.00	1.00	2 1/2-12
9	4	5	6	—	42.75	11.50	2.00	# 20	3.50	1.25	3 1/4-12
10	5	6	7	—	47.63	13.00	2.00	# 20	3.50	1.25	3 1/4-12



Series TM Hydraulic Cylinder TeMposonic



Pressure: 3,000 psi Working
5,000 psi Non-Shock

Bore Sizes: 2.00" to 8.00"

Rod Sizes: 1.38" to 5.50"

Attachments: Spherical Bearings
Clevis
Cross Hole
Threaded Rod

Series TM Cylinder

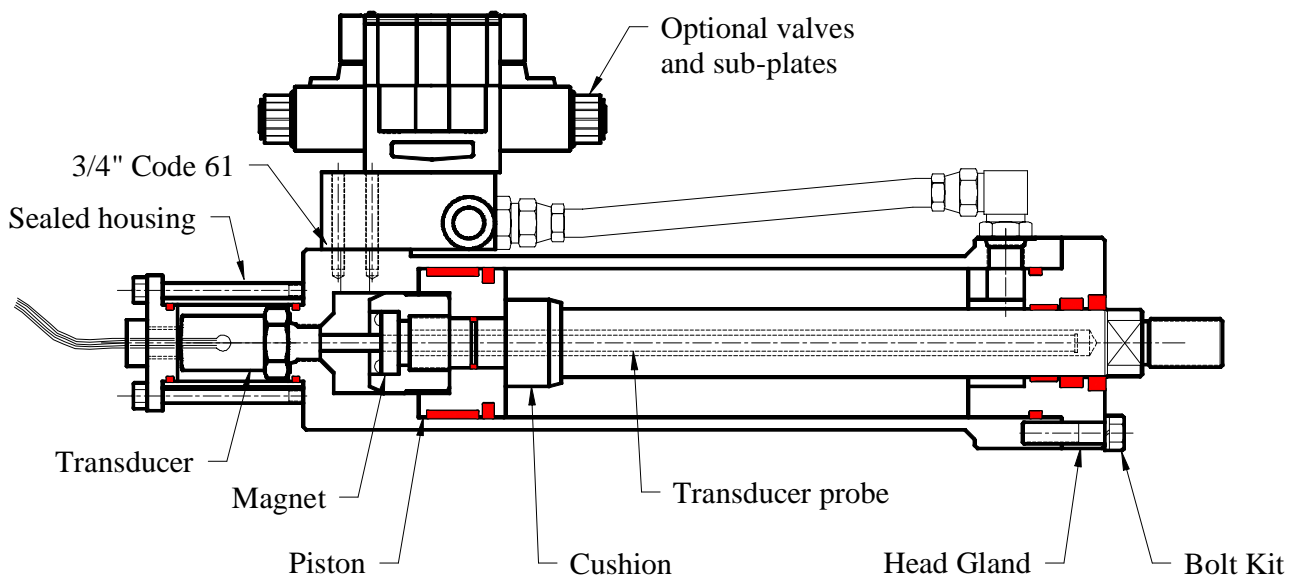
Our Series **TM** cylinders, with suitable electronics, can monitor the position and velocity of the piston. It is based on our popular Series **B** cylinder with provision for mounting an LVDT (Linear Velocity Displacement Transducer) and magnet from Temposonic, Balluff, or any other manufacturer.

The transducer assembly is mounted into the blind end of the cylinder. The magnet is housed in a stainless steel piston nut and the probe is inserted into a blind hole in the rod. The rod is drilled from one end only, which makes for a much stronger rod end than one that is drilled from both ends. A male thread is standard for the rod end. Therefore, any size and style of accessory with female threads is available. Female threads in the rod end can be accommodated, but the rod extension must be increased by the depth of the threads.

The transducer head is protected by a sealed housing. Since the back end of the cylinder must be clear to withdraw the probe, the available mounting styles are front and mid trunnion, front and rear flange and foot mount.

The pressure rating is 3000 psi operating and 5000 psi non-shock and fixed cushions at both ends of the cylinder are standard with series TM.

Options are available to mount a wide variety of servo or proportional valves on the cylinder. See page #27-7 of the manifold section for details.



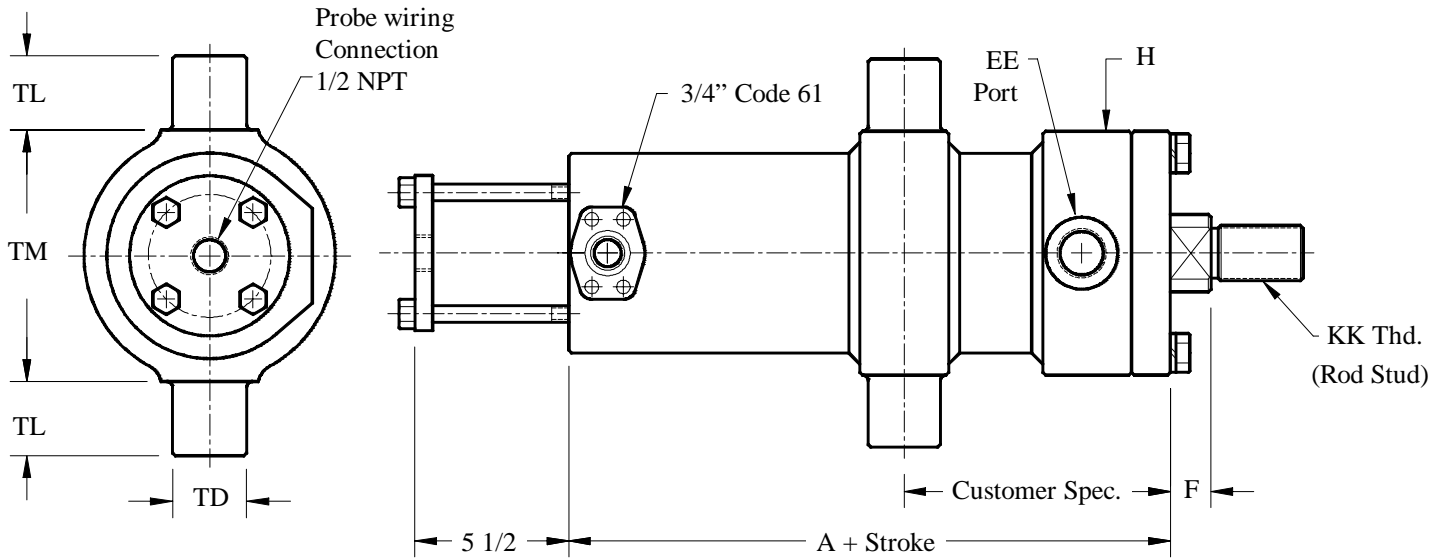
NOTE: Replacement parts for the piston, head gland, cushion, bolt kit and the seal kits are the same as Series B.

Series TM Cylinder – Trunnion

Mid Trunnion – Male

Rod End

Accessories:
Female Thd.
Welded



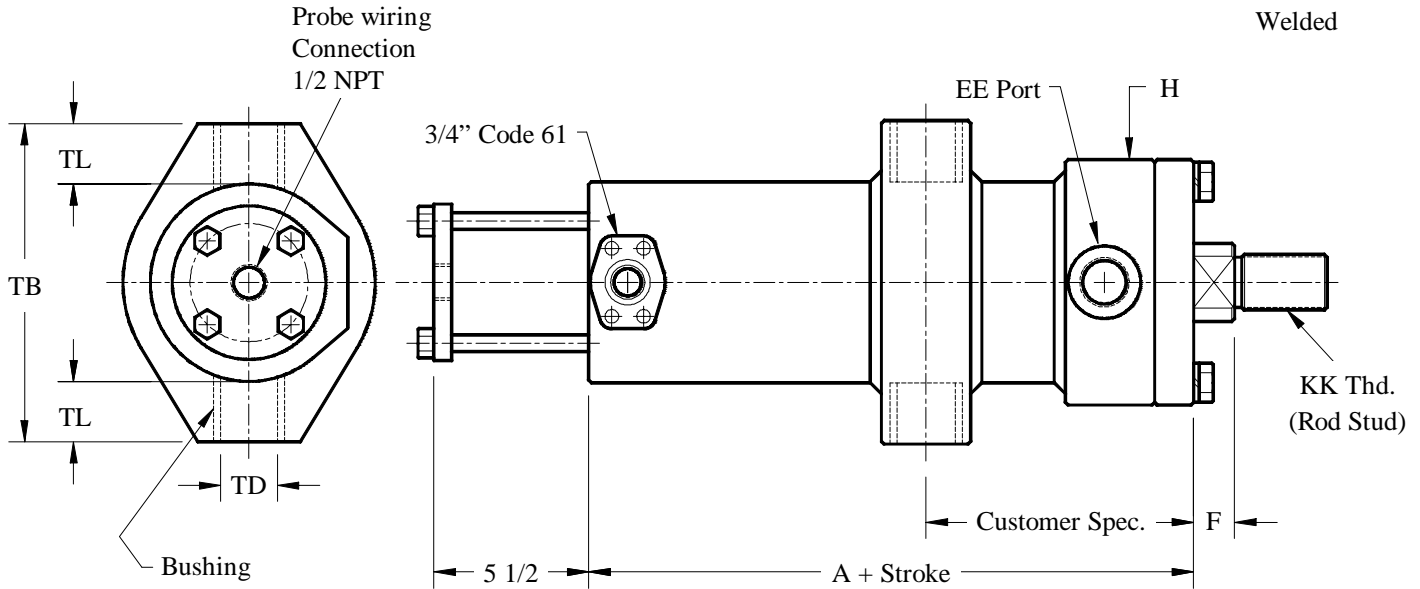
Bore	Available Rod Sizes				A	H Dia	TD	TL	TM	EE (ORB)	Standard sizes shown.		
											CD Pin Ø	F	KK Thd
2	1 3/8	—	—	—	6.69	3.25	1.38	1.38	3.50	# 8	0.75	0.50	3/4-16
2 1/2	1 3/8	1 1/2	1 3/4	—	6.81	3.75	1.38	1.38	4.00	# 8	0.75	0.63	3/4-16
3	1 3/8	1 3/4	2	—	7.13	4.25	1.38	1.38	4.50	# 8	1.00	0.63	1-14
3 1/4	1 3/8	1 3/4	2	2 1/4	7.38	4.75	1.75	1.75	5.00	# 12	1.00	0.75	1-14
4	1 3/4	2	2 1/2	3	7.75	5.50	1.75	1.75	5.50	# 12	1.38	0.75	1 1/4-12
5	2	2 1/2	3	3 1/2	8.25	6.88	1.75	1.75	7.00	# 12	1.75	0.88	1 1/2-12
6	2 1/2	3	3 1/2	4	8.88	8.00	2.00	2.00	8.50	# 16	2.00	1.00	1 7/8-12
7	3	3 1/2	4	5	9.50	9.13	2.50	2.50	9.75	# 20	2.50	1.00	2 1/4-12
8	3 1/2	4	5	5 1/2	10.50	10.50	3.00	3.00	11.00	# 20	3.00	1.00	2 1/2-12
10	5	6	7	—	12.63	13.00	3.50	3.50	14.00	# 20	3.50	1.25	3 1/4-12

Series TM Cylinder – Trunnion

Mid Trunnion – Female

Rod End

Accessories:
Female Thd.
Welded



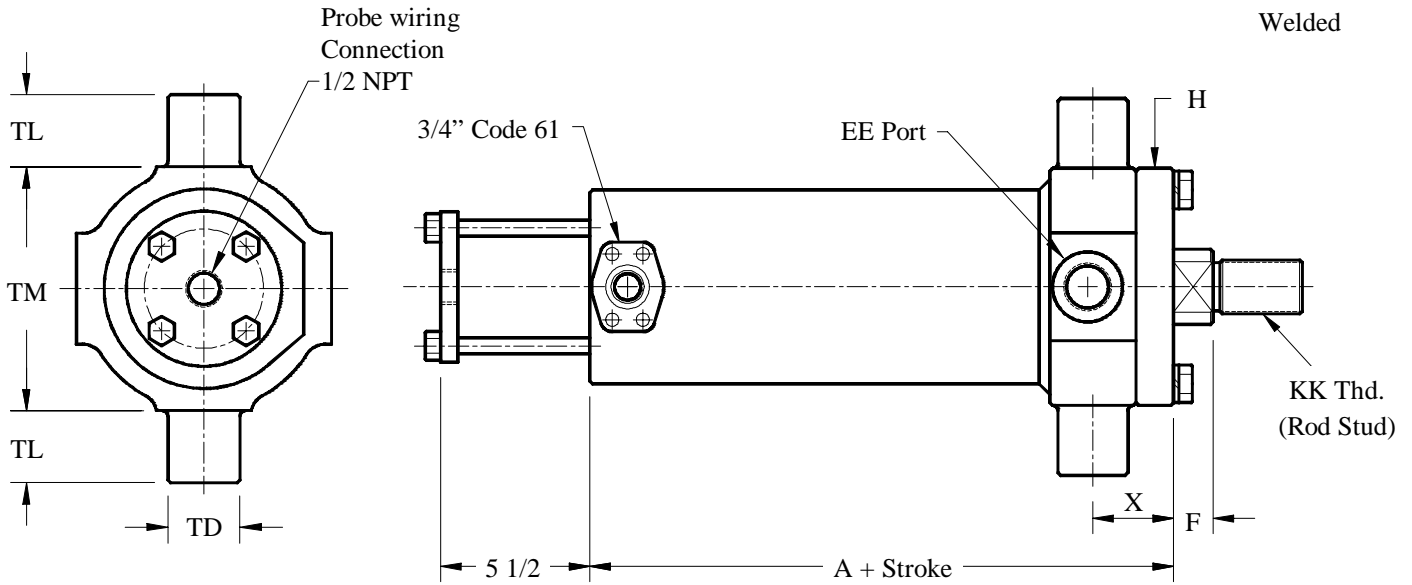
Bore	Available Rod Sizes				A	H Dia	TD	TL	TB	EE (ORB)	Standard sizes shown.		
											CD Pin Ø	F	KK Thd
2	1 3/8	—	—	—	6.69	3.25	0.75	0.63	3.75	# 8	0.75	0.50	3/4-16
2 1/2	1 3/8	1 1/2	1 3/4	—	6.81	3.75	0.75	0.63	4.25	# 8	0.75	0.63	3/4-16
3	1 3/8	1 3/4	2	—	7.13	4.25	1.00	0.88	5.38	# 8	1.00	0.63	1-14
3 1/4	1 3/8	1 3/4	2	2 1/4	7.38	4.75	1.00	0.88	5.63	# 12	1.00	0.75	1-14
4	1 3/4	2	2 1/2	3	7.75	5.50	1.38	1.31	7.25	# 12	1.38	0.75	1 1/4-12
5	2	2 1/2	3	3 1/2	8.25	6.88	1.75	1.56	9.00	# 12	1.75	0.88	1 1/2-12
6	2 1/2	3	3 1/2	4	8.88	8.00	1.75	1.56	10.00	# 16	2.00	1.00	1 7/8-12
7	3	3 1/2	4	5	9.50	9.13	2.00	1.81	11.50	# 20	2.50	1.00	2 1/4-12
8	3 1/2	4	5	5 1/2	10.50	10.50	2.50	2.25	13.50	# 20	3.00	1.00	2 1/2-12

Series TM Cylinder – Trunnion

Front Trunnion

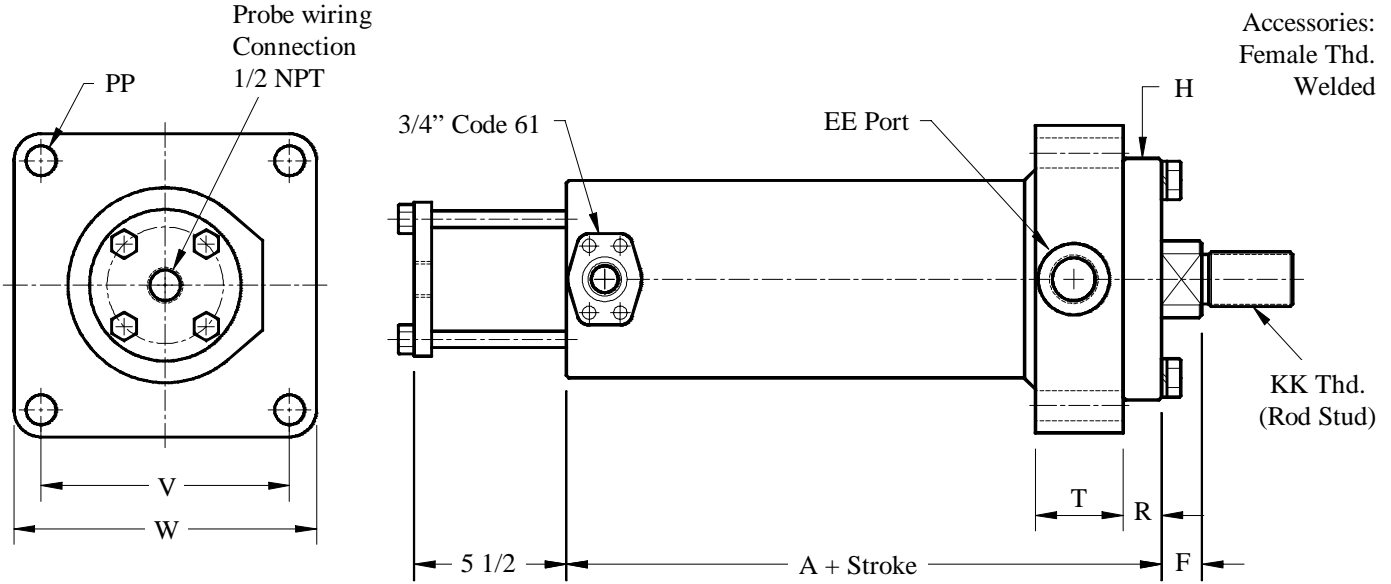
Rod End

Accessories:
Female Thd.
Welded



Bore	Available Rod Sizes				A	H Dia	TD	TL	TM	X	EE (ORB)	Standard sizes shown.		
												CD Pin Ø	F	KK Thd
2	1 3/8	—	—	—	6.69	3.25	1.38	1.38	3.00	1.63	# 8	0.75	0.75	3/4-16
2 1/2	1 3/8	1 1/2	1 3/4	—	6.81	3.75	1.38	1.38	3.50	1.69	# 8	0.75	0.69	3/4-16
3	1 3/8	1 3/4	2	—	7.13	4.25	1.38	1.38	4.50	1.75	# 8	1.00	0.63	1-14
3 1/4	1 3/8	1 3/4	2	2 1/4	7.38	4.75	1.75	1.75	4.50	2.00	# 12	1.00	0.88	1-14
4	1 3/4	2	2 1/2	3	7.75	5.50	1.75	1.75	5.00	2.13	# 12	1.38	1.00	1 1/4-12
5	2	2 1/2	3	3 1/2	8.25	6.88	1.75	1.75	6.50	2.38	# 12	1.75	0.88	1 1/2-12
6	2 1/2	3	3 1/2	4	8.88	8.00	2.00	2.00	7.50	2.44	# 16	2.00	1.06	1 7/8-12
7	3	3 1/2	4	5	9.50	9.13	2.50	2.50	8.50	2.94	# 20	2.50	1.00	2 1/4-12
8	3 1/2	4	5	5 1/2	10.50	10.50	3.00	3.00	9.50	3.63	# 20	3.00	1.00	2 1/2-12
10	5	6	7	—	12.63	13.00	3.50	3.50	12.63	4.25	# 20	3.50	1.13	3 1/4-12

Series TM Cylinder – Front Flange



Rod End

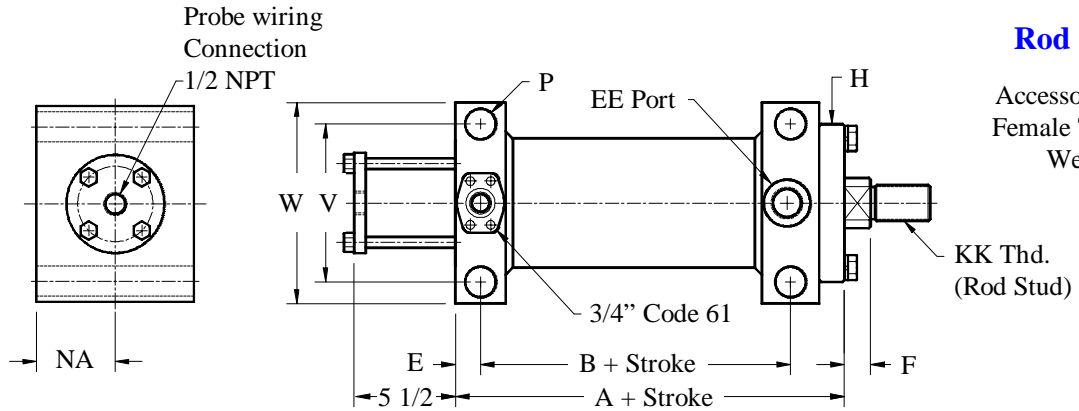
Accessories:
Female Thd.
Welded

Bore	Available Rod Sizes				A	H Dia	PP Dia	T	R	V	W	EE (ORB)	Standard sizes shown.		
	CD Pin Ø	F	KK Thd												
2	1 3/8	—	—	—	6.69	3.25	0.56	1.75	0.75	3.38	4.50	# 8	0.75	0.50	3/4-16
2 1/2	1 3/8	1 1/2	1 3/4	—	6.81	3.75	0.56	1.75	0.81	3.88	5.00	# 8	0.75	0.63	3/4-16
3	1 3/8	1 3/4	2	—	7.13	4.25	0.56	1.75	0.88	4.38	5.50	# 8	1.00	0.63	1-14
3 1/4	1 3/8	1 3/4	2	2 1/4	7.38	4.75	0.69	2.00	1.00	4.75	6.00	# 12	1.00	0.75	1-14
4	1 3/4	2	2 1/2	3	7.75	5.50	0.69	2.00	1.13	5.75	7.00	# 12	1.38	0.75	1 1/4-12
5	2	2 1/2	3	3 1/2	8.25	6.88	0.94	2.13	1.25	7.00	8.50	# 12	1.75	0.88	1 1/2-12
6	2 1/2	3	3 1/2	4	8.88	8.00	1.06	2.44	1.19	8.00	10.00	# 16	2.00	1.00	1 7/8-12
7	3	3 1/2	4	5	9.50	9.13	1.31	2.75	1.44	8.50	11.00	# 20	2.50	1.00	2 1/4-12
8	3 1/2	4	5	5 1/2	10.50	10.50	1.31	2.88	1.88	9.50	12.00	# 20	3.00	1.00	2 1/2-12
10	5	6	7	—	12.63	13.00	1.31	3.38	2.25	11.50	14.00	# 20	3.50	1.25	3 1/4-12

Series TM Cylinder – Foot Mount

Square Style

Bore Sizes:
2" to 3"



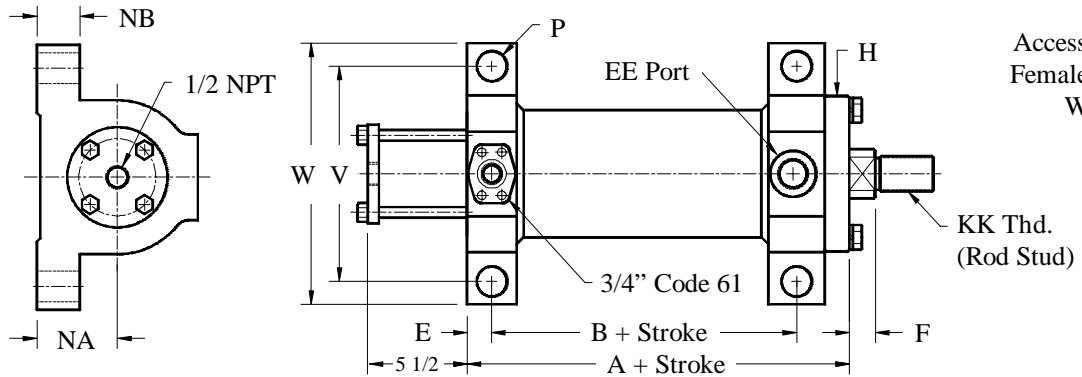
Rod End

Accessories:
Female Thd.
Welded

KK Thd.
(Rod Stud)

Rounded Style

Bore Sizes:
3 1/4" to 10"



Rod End

Accessories:
Female Thd.
Welded

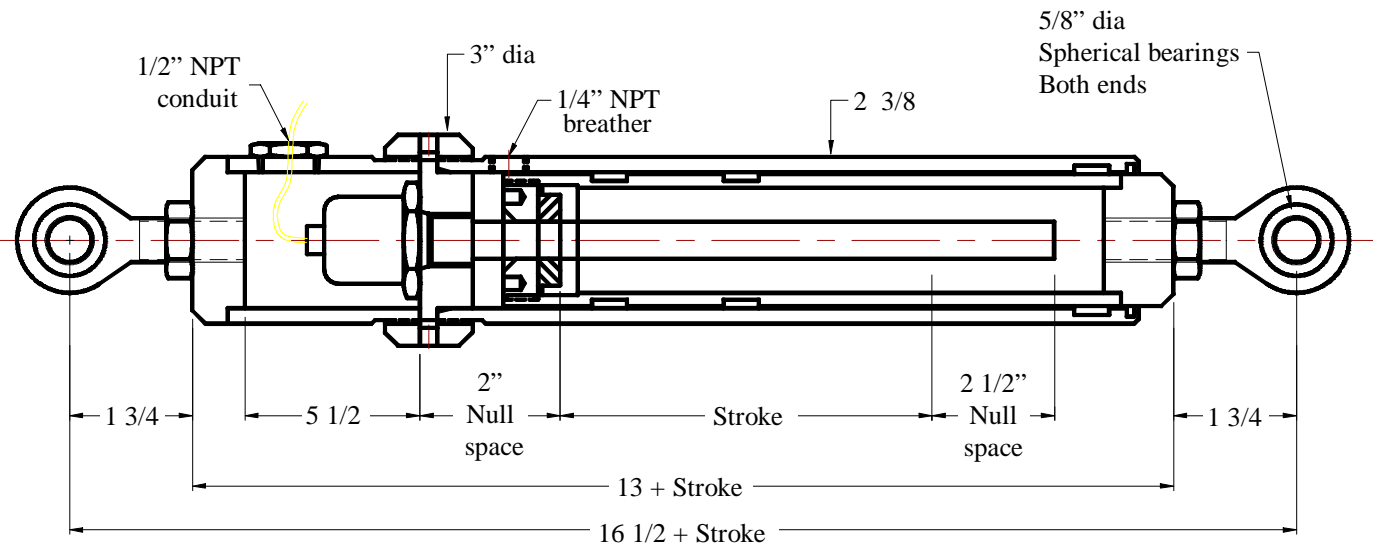
KK Thd.
(Rod Stud)

Bore	Available Rod Sizes				A	B	E	H Dia	NA	NB	P Dia	V	W	EE ORB	Standard sizes shown.		
															CD Pin Ø	F	KK Thd
2	1 3/8	—	—	—	6.69	4.19	0.63	3.25	1.56	—	0.56	2.88	3.75	# 8	0.75	0.50	3/4-16
2 1/2	1 3/8	1 1/2	1 3/4	—	6.81	4.25	0.75	3.75	1.94	—	0.56	3.38	4.25	# 8	0.75	0.63	3/4-16
3	1 3/8	1 3/4	2	—	7.13	4.38	0.75	4.25	2.19	—	0.69	4.00	5.00	# 8	1.00	0.63	1-14
3 1/4	1 3/8	1 3/4	2	2 1/4	7.38	4.50	0.88	4.75	2.44	1.25	0.81	6.38	7.75	# 12	1.00	0.75	1-14
4	1 3/4	2	2 1/2	3	7.75	4.75	0.88	5.50	2.81	1.50	1.06	7.63	9.25	# 12	1.38	0.75	1 1/4-12
5	2	2 1/2	3	3 1/2	8.25	5.06	0.88	6.88	3.44	1.75	1.06	8.75	10.38	# 12	1.75	0.88	1 1/2-12
6	2 1/2	3	3 1/2	4	8.88	5.25	1.06	8.00	4.06	2.00	1.31	10.38	12.50	# 16	2.00	1.00	1 7/8-12
7	3	3 1/2	4	5	9.50	5.31	1.38	9.13	4.75	2.50	1.56	12.25	15.00	# 20	2.50	1.00	2 1/4-12
8	3 1/2	4	5	5 1/2	10.50	5.88	1.31	10.50	5.50	2.50	1.56	13.25	15.75	# 20	3.00	1.00	2 1/2-12
10	5	6	7	—	12.63	7.00	1.63	13.00	6.50	3.50	1.81	17.00	20.00	# 20	3.50	1.25	3 1/4-12

Temposonic housing

Temposonic probe housing

This is a complete Temposonic measuring device. It can be mounted to any type of machinery where one would want to measure the movement. With this arrangement, the moving piece of machinery would pull the rod out, while the barrel is stationary. The Temposonic feedback device will then send out a signal which can be translated into the machine position.



Materials:

- Barrel is CDSM or 304 stainless steel
- Rod is C1045 or 304 stainless steel
- Magnet carrier is brass
- Wear bands are reinforced nylon

Model number:

Our Model number is C1392-stroke



Series EX Hydraulic Cylinder EXtra heavy duty



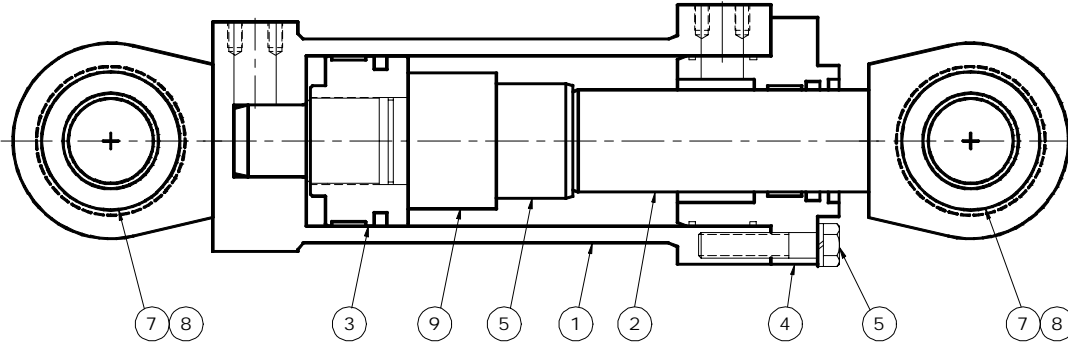
Pressure: 5,000 psi Working
Bore Sizes: 2.50" to 8.00"
Rod Sizes: 1.75" to 5.50"
Ports: ORB, Code #61, Code #62
Attachments: Spherical Bearings

Series EX Cylinder

Our Series EX are high strength cylinders designed for high pressures, high flows and rugged environments. They are particularly suited to demanding industrial and mobile equipment applications.

FEATURES:

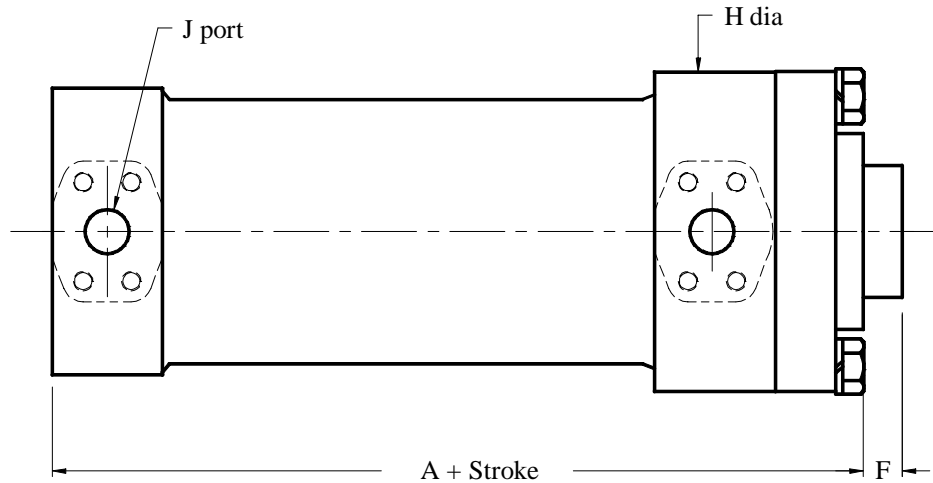
- Induction Hardened Chrome Plated Rod is standard.
- Heavy-duty piston is threaded and adhesive bonded to the rod.
- Large fixed cushions both ends are standard.
- Spherical bearings both ends are standard. For other mountings see accessories section.
- Ports are available in Code 61 4-Bolt Flange, Code 62 4-Bolt Flange and ORB.
- Stop tubes (when required) help to withstand rod bending forces.
- Rated working pressure is 5000 psi.
- When retracting the rod end is the stop, not the piston, thereby reducing stress on the piston.
- Rugged construction with oversize pins, head bolts and thick wall barrels.



PART NUMBERS		ITEM 1	ITEM 2	ITEM 3	ITEM 4	ITEM 5	ITEM 6	ITEM 7	ITEM 8	ITEM 9	SHIPPING WEIGHTS (Approximate)		
Bore	Rod	Barrel	Rod	Piston	Head	Cushion	Bolt Kit	Spherical Bearing	Snap Ring	Stop Tube	Seal Kit	Base Weight	lb/inch stroke
2 1/2	1 3/4	Part Number is model number and stroke followed by: B for barrel R for rod		B3869	B1680	B3203-28	12207	11687	10792	B3480-28	12083	30	1.29
3	1 3/4			B2098	B2774	B3203-28	12208	11581	11582	B3480-28	12337	40	1.43
3 1/4	2			B3000	B3387	B3203-32	12643	10803	10826	B3480-32	12126	55	1.88
3 1/2	2			B2988	B3150	B3203-32	12209	10204	10203	B3480-32	12338	65	2.18
4	2 1/2			B1802	B2149	B3203-40	12210	10804	11584	B3480-40	12223	90	3.39
4 1/2	2 1/2			B3189	B3191	B3203-40	12211	10806	10327	B3480-40	12224	120	3.62
5	3			B3165	B3151	B3203-48	12212	10806	10327	B3480-48	11809	140	4.48
5 1/2	3 1/2			B3186	B3232	B3203-56	12213	10228	11732	B3480-56	12335	195	6.14
6	3 1/2			B2095	B3166	B3203-56	12214	10228	11732	B3480-56	12336	230	6.41
6 1/2	4			B3260	B3345	B3203-64	12215	11551	12082	B3480-64	12392	310	7.53
7	5			B1762	B1763	B3203-80	12216	11551	12082	B3480-80	11778	365	9.68
7 1/2	5			B3327	B3326	B3203-80	12750	12218	12219	B3480-80	12751	415	10.58
8	5 1/2			B2128	B3882	B3203-80	12217	12218	12219	B3480-80	12752	490	11.41

Series EX Cylinder

Basic Cylinder



Bore	Rod std	Rod option	A	F	H	J Port
2 1/2	1 3/4	-	5.75	0.75	4.00	#12 ORB
3	1 3/4	2	6.75	0.75	4.50	#12 ORB
3 1/4	2	2 1/4	7.06	0.75	5.13	#12 ORB
3 1/2	2	2 1/2	7.31	0.75	5.50	3/4" Code 61
4	2 1/2	3	8.50	1.00	6.00	3/4" Code 61
4 1/2	2 1/2	3	8.50	1.00	6.63	1" Code 61
5	3	3 1/2	9.19	1.13	7.25	1" Code 61
5 1/2	3 1/2	-	9.56	1.13	8.00	1 1/4" Code 62
6	3 1/2	4	11.06	1.13	8.50	1 1/4" Code 62
6 1/2	4	4 1/2	13.13	1.13	9.50	1 1/4" Code 62
7	5	5 1/2	14.13	1.13	10.25	1 1/4" Code 62
7 1/2	5	5 1/2	14.50	1.13	10.63	1 1/2" Code 62
8	5 1/2	6	15.25	1.13	11.25	1 1/2" Code 62

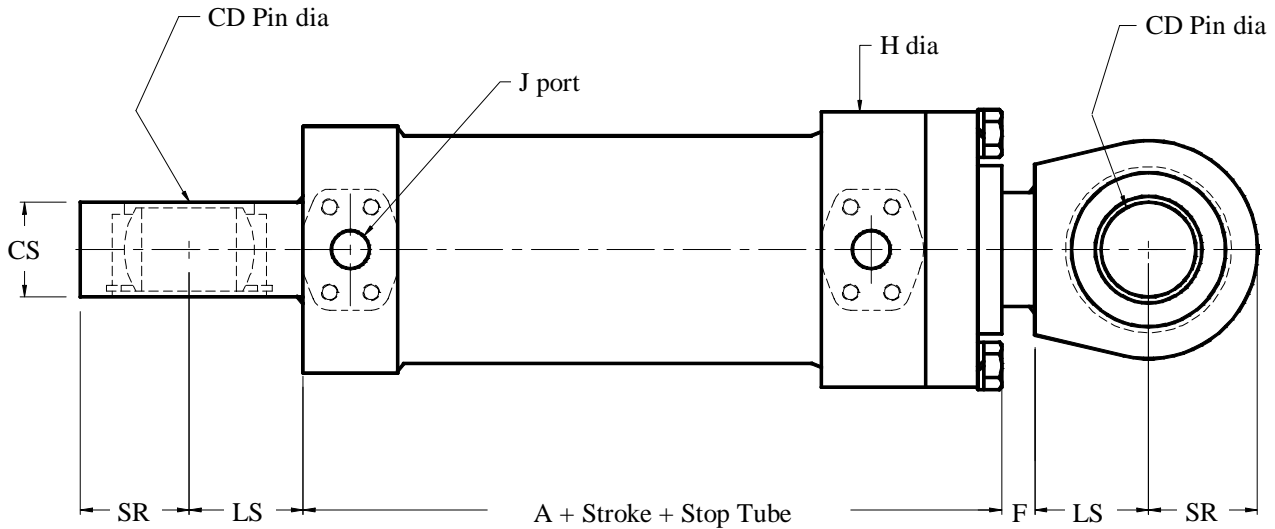
MATERIAL SPECIFICATIONS

<i>Barrel:</i> DOM Tubing ASTM 513/519 Gr. 1020/1026	<i>Piston Seal:</i> Filled Teflon with Nitrile Loader
<i>Head:</i> Ductile Iron ASTM A536 (65-45-12)	<i>Rod seal:</i> Polyurethane
<i>Piston:</i> Ductile Iron ASTM A536 (65-45-12)	<i>Wear Ring:</i> Reinforced Nylon
<i>Rod:</i> C1045 Induction Hardened Chrome Plated	<i>Wiper:</i> Polyurethane on Phosphated Steel
<i>Accessories:</i> Steel CSA G40-21 Gr. 44W	<i>O-Ring:</i> Nitrile
<i>Bolts:</i> SAE Grade 8	<i>Back-Up:</i> Nitrile

Seal Temperature Range: -65F to +225F (-54C to +107C)

Series EX Cylinder

Spherical bearings



Bore	Rod std	Rod option	A	F	H	J Port	CD pin dia	LS	CS	SR
2 1/2	1 3/4	-	5.75	0.75	4.00	#12 ORB	1.25	1.88	1.25	1.63
3	1 3/4	2	6.75	0.75	4.50	#12 ORB	1.38	2.13	1.50	1.88
3 1/4	2	2 1/4	7.06	0.75	5.13	#12 ORB	1.50	2.25	1.75	2.00
3 1/2	2	2 1/2	7.31	0.75	5.50	3/4" Code 61	1.75	2.38	2.00	2.13
4	2 1/2	3	8.50	1.00	6.00	3/4" Code 61	2.00	2.63	2.25	2.43
4 1/2	2 1/2	3	8.50	1.00	6.63	1" Code 61	2.50	3.00	2.50	2.88
5	3	3 1/2	9.19	1.13	7.25	1" Code 61	2.50	3.00	2.50	2.88
5 1/2	3 1/2	-	9.56	1.13	8.00	1 1/4" Code 62	3.00	3.75	2.75	3.63
6	3 1/2	4	11.06	1.13	8.50	1 1/4" Code 62	3.00	3.75	2.75	3.63
6 1/2	4	4 1/2	13.13	1.13	9.50	1 1/4" Code 62	3.50	4.50	3.50	4.18
7	5	5 1/2	14.13	1.13	10.25	1 1/4" Code 62	3.50	4.50	3.50	4.18
7 1/2	5	5 1/2	14.50	1.13	10.63	1 1/2" Code 62	4.00	5.25	4.00	4.50
8	5 1/2	6	15.25	1.13	11.25	1 1/2" Code 62	4.00	5.25	4.00	4.50



Series TH Hydraulic Cylinder hydraulic THumb



Pressure: 5,000 psi Working
Bore Sizes: 2.00" to 6.00"
Rod Sizes: 1.38" to 3.50"
Ports: ORB (3.50" bore and smaller)
Code #61 (4.00" bore and larger)
Attachments: Spherical Bearings

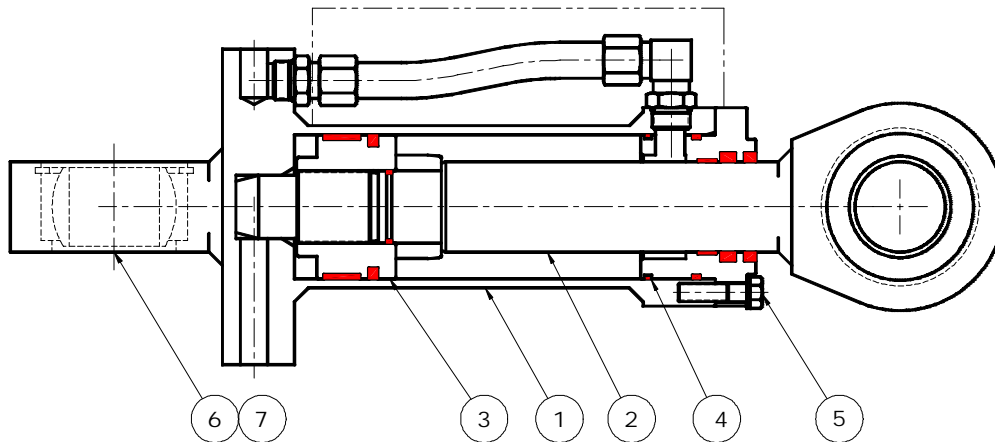
Guarded transfer hose
3.00" bore and larger

Series TH Cylinder

Our Series TH is designed specifically for hydraulic thumb applications on track mounted and wheeled excavators. Heavy duty construction, a guarded transfer hose and oversize spherical bearing mounts at both ends all contribute to long life and trouble free service in this rugged working environment.

FEATURES:

- Induction Hardened Chrome Plated Rod is standard.
- Heavy-duty piston is threaded and adhesive bonded to the rod.
- Large fixed cushions both ends are standard.
- Spherical bearings both ends are standard.
- Ports are Code 61 4-bolt flange on 4" bore and larger.
- Ports are ORB on 3 1/2" bore and smaller.
- Rated working pressure is 5000 psi.
- When retracting the rod end is the stop, not the piston, thereby reducing stress on the piston.
- Rugged construction with oversize pins, head bolts and thick wall barrels.
- The transfer hose is protected by a thick steel guard.



NOTE: picture shows the 4.00" bore and larger style of construc-

PART NUMBERS			Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7
Bore	Model Number	*Seal Kit	Barrel	Rod	Piston	Head	Bolt Kit	Spherical Bearing	Snap Ring
2	TH20-(stroke)-14-H1281	11895	Part Number is model number and stroke followed by: B for barrel R for rod		B1655	B1678	11979	10334	12052
2 1/2	TH25-(stroke)-18-H1282	12083		B3869	B1680	11980	10334	12052	
3	TH30-(stroke)-18-C1486	12337		B2098	B2774	12385	10803	10826	
3 1/2	TH35-(stroke)-20-C1461	12338		B2988	B3150	12386	10804	11584	
4	TH40-(stroke)-25-C1482	12223		B1802	B2149	12387	10806	10327	
5	TH50-(stroke)-30-C1462	11809		B3165	B3151	12388	10806	10327	
5 1/2	TH55-(stroke)-35-C1487	12335		B3186	B3167	12388	10228	11732	
6	TH60-(stroke)-35-C1551	12336		B2095	B3224	12389	10228	11732	

Series TH Cylinder

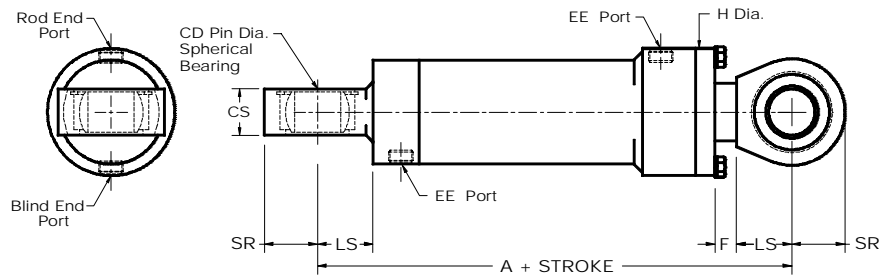


Figure 1. 2.00" and 2.50" bore cylinders

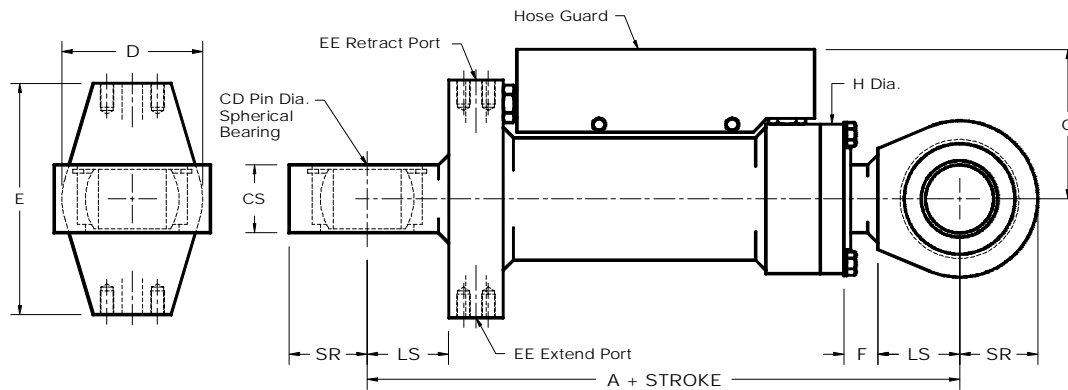


Figure 2. 3.00" bore and larger cylinders

Bore	Rod	A	D	E	EE	F	G	H	CD	LS	CS	SR
2	1 3/8	9.00	-	-	#8 ORB	0.50	-	3.25	1.00	1.50	1.25	1.31
2 1/2	1 3/4	9.50	-	-	#8 ORB	0.75	-	3.75	1.00	1.50	1.25	1.31
3	1 3/4	11.50	4.13	7.00	#8 ORB	0.75	4.75	4.50	1.50	2.25	1.75	2.00
3 1/2	2	13.00	4.88	8.00	#12 ORB	0.75	5.13	5.50	2.00	2.63	2.25	2.50
4	2 1/2	15.00	5.50	8.75	3/4" Code 61	1.63	5.38	6.00	2.50	3.00	2.50	2.88
5	3	15.25	6.50	10.25	3/4" Code 61	1.56	6.00	7.25	2.50	3.00	2.50	2.88
5 1/2	3 1/2	16.50	7.00	10.75	1" Code 61	0.69	6.25	8.00	3.00	3.75	2.75	3.63
6	3 1/2	17.25	7.50	11.25	1" Code 61	0.56	6.88	8.50	3.00	3.75	2.75	3.63

MATERIAL SPECIFICATIONS

<i>Barrel:</i> DOM Tubing ASTM 513/519 Gr. 1020/1026	<i>Piston Seal:</i> Filled Teflon with Nitrile Loader
<i>Head:</i> Ductile Iron ASTM A536 (65-45-12)	<i>Rod seal:</i> Polyurethane
<i>Piston:</i> Ductile Iron ASTM A536 (65-45-12)	<i>Wear Ring:</i> Reinforced Nylon
<i>Rod:</i> C1045 Induction Hardened Chrome Plated	<i>Wiper:</i> Polyurethane on Phosphated Steel
<i>Accessories:</i> Steel CSA G40-21 Gr. 44W	<i>O-Ring:</i> Nitrile
<i>Bolts:</i> SAE Grade 8	<i>Back-Up:</i> Nitrile

Seal Temperature Range: -65° F to 225° F (-54° C to 107° C)

Series TH Cylinder

Upgrades

We have recently upgraded our thumb cylinder design. They are now rated for a 5,000 PSI working pressure (7500 psi non-shock) to accommodate the higher pressures used on modern mobile equipment. The old and new cylinders are interchangeable with each other, as they have the same mounting dimensions and porting. The new cylinders have thicker walls, larger bolts on the head gland and longer cushions. Parts will still be available for the older style cylinders.

New Style	Old Style	Bore	Rod	Pin / Pin Retracted	Spherical Bearing	Notes
TH20-(stroke)-14-H1281	H166	2	1 3/8	9.00 + Stroke	1.00	No transfer tube or guard
TH25-(stroke)-18-H1282	H350	2 1/2	1 3/4	9.50 + Stroke	1.00	No transfer tube or guard
TH30-(stroke)-18-C1486	C1238	3	1 3/4	11.50 + Stroke	1.50	
TH30-(stroke)-18-C1463	C1415	3	1 3/4	13.00 + Stroke	2.00	3.50" cyl. mounting dimensions.
TH35-(stroke)-20-C1461	C1215	3 1/2	2	13.00 + Stroke	2.00	
TH35-(stroke)-20-C1481	C1403	3 1/2	2	15.00 + Stroke	2.50	4.00" cyl. mounting dimensions.
TH40-(stroke)-25-C1482	C1216	4	2 1/2	15.00 + Stroke	2.50	
TH40-(stroke)-25-C1460	C1447	4	2 1/2	15.25 + Stroke	2.50	5.00" cyl. mounting dimensions.
TH50-(stroke)-30-C1462	C1217	5	3	15.25 + Stroke	2.50	
TH50-(stroke)-30-C1483	C1258	5	3	16.50 + Stroke	3.00	5.50" cyl. mounting dimensions.
TH55-(stroke)-35-C1487	C1218	5 1/2	3 1/2	16.50 + Stroke	3.00	
TH60-(stroke)-35-C1551	C1235	6	3 1/2	17.25 + Stroke	3.00	

Commonly Stocked Thumb Cylinders

Model Number	Bore	Stroke	Rod	Weight
TH35-36-20-C1461	3 1/2	36	2	160 lbs
TH40-40-25-C1482	4	40	2 1/2	215 lbs
TH40-45-25-C1482	4	45	2 1/2	225 lbs
TH50-40-30-C1462	5	40	3	305 lbs
TH50-45-30-C1462	5	45	3	320 lbs
TH55-44-35-C1487	5 1/2	44	3 1/2	450 lbs



Series IT Hydraulic Cylinders Internal Thread



Pressure: 2,500 psi Working
3,500 psi Non-Shock

Bore Sizes: 2.00" to 6.00"

Rod Sizes: 1.00" to 2.50"

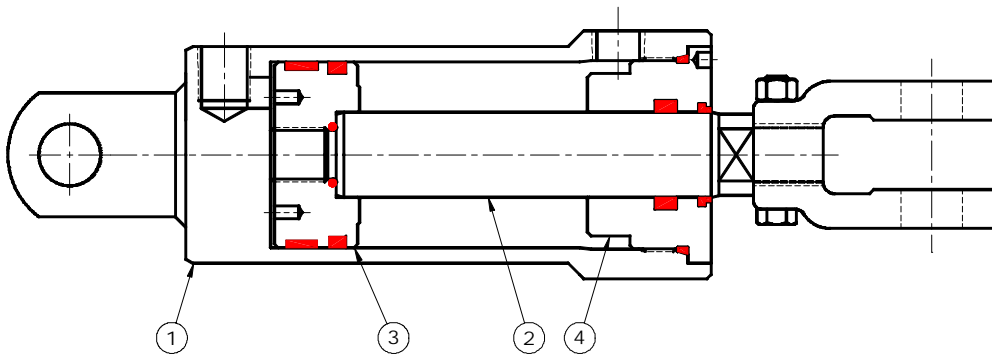
Ports: 3/8" to 1/2" NPT

Attachments: Spherical Bearings
Clevis
Tube Eye

Series IT Cylinder

Our Series IT hydraulic cylinder is designed for simplicity and economy. With a 2,500 psi working pressure and a 3,500 psi non-shock load pressure we have not compromised on the quality, yet have made it an affordable and reliable alternative as opposed to using our more rugged bolted on head gland construction style of hydraulic cylinder.

To strengthen the open end of the cylinder, a thick ring is welded to the barrel to carry the internal thread and port. Both ports are machined into the cylinder barrel end and ring, which means localized weld distortion and the stress concentrations that arise from welding half couplings for ports are eliminated. The internal threads that hold the head gland will not corrode since they are constantly submersed in oil. The piston is securely threaded and adhesive bonded to the rod. To accommodate our customers wide range of needs, we manufacture the barrel and cylinder rod to order on every hydraulic cylinder order to provide the exact strokes and pin to pin dimensions that are required. A variety of mounting accessories can be installed onto the cylinder to suit virtually any application. Other rod materials and mounting styles, such as trunnion and flange mounts, are available on request.

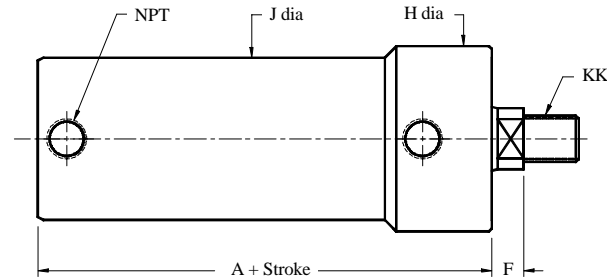


PART NUMBERS		ITEM 1	ITEM 2	ITEM 3	ITEM 4	
BORE	ROD	Barrel	Rod	Piston	Head	Seal Kit
2	1	Part Number is model number and stroke followed by: B for barrel R for rod		B3354-32	B3368-16	12413
	1 1/4			B3354-32	B3368-20	12414
2 1/4	1			B3354-36	B3442-16	12557
	1 1/4			B3354-36	B3442-20	12558
2 1/2	1			B3354-40	B3350-16	12415
	1 1/4			B3354-40	B3350-20	12416
	1 1/2			B3354-40	B3350-24	12417
	2			B3354-40	B3350-32	12418
3	1 1/4			B3354-48	B3352-20	12419
	1 3/8			B3354-48	B3352-22	12556
	1 1/2			B3354-48	B3352-24	12420
	1 3/4			B3354-48	B3352-28	12421
3 1/4	1 1/4		B3354-52	B3446-20	12542	
	1 3/8		B3354-52	B3446-22	12543	
	1 1/2		B3354-52	B3446-24	12544	
	1 3/4		B3354-52	B3446-28	12545	

PART NUMBERS		ITEM 1	ITEM 2	ITEM 3	ITEM 4	
BORE	ROD	Barrel	Rod	Piston	Head	Seal Kit
3 1/2	1 1/4	Part Number is model number and stroke followed by: B for barrel R for rod		B3354-56	B3358-20	12422
	1 3/8			B3354-56	B3358-22	12555
	1 1/2			B3354-56	B3358-24	12423
	1 3/4			B3354-56	B3358-28	12424
4	1 1/2			B3354-64	B3355-24	12425
	1 3/4			B3354-64	B3355-28	12426
	2			B3354-64	B3355-32	12427
	2 1/2			B3354-64	B3355-40	12428
4 1/2	1 3/4			B3354-72	B3360-28	12429
	2			B3354-72	B3360-32	12430
	2 1/2			B3354-72	B3360-40	12431
5	1 3/4			B3354-80	B3426-28	12546
	2			B3354-80	B3426-32	12547
	2 1/2			B3354-80	B3426-40	12548
	3			B3354-80	B3426-48	12549
6	2 1/2			B3354-96	B3452-40	12553
	3		B3354-96	B3452-48	12554	

Series IT Cylinder – Basic

See the Accessories section of the catalogue for rod end & blind end options. The 'CD' (Pin Dia), the 'F' (Rod Extension) and 'KK' (Thread) dimensions given are standard but they can be changed to suit any special requirements. Threaded and welded ends are both available.



Bores	Available rod sizes				A	J	H	NPT	F	KK	CD Pin Ø
2	1	1 1/4	—	—	4.44	2.38	3.00	3/8	0.69	1"-14	0.75
2 1/4	1	1 1/4	—	—	4.44	2.63	3.25	3/8	0.69	1"-14	1.00
2 1/2	1	1 1/4	1 1/2	2	4.44	2.88	3.50	3/8	0.69	1"-14	1.00
3	1 1/4	1 3/8	1 1/2	1 3/4	4.81	3.50	4.00	1/2	0.69	1"-14	1.00
3 1/4	1 1/4	1 3/8	1 1/2	1 3/4	4.81	3.75	4.25	1/2	0.69	1"-14	1.00
3 1/2	1 1/4	1 3/8	1 1/2	1.75	4.81	4.00	4.50	1/2	0.69	1"-14	1.00
4	1 1/2	1.75	2	2 1/2	4.88	4.50	5.00	1/2	0.69	1"-14	1.00
4 1/2	1 3/4	2	2 1/2	—	5.44	5.00	5.50	1/2	0.81	1-1/4"-12	1.25
5	1 3/4	2	2 1/2	3	5.69	5.75	6.00	1/2	0.81	1-1/4"-12	1.25
6	2 1/2	3	—	—	6.13	6.75	7.25	3/4	0.88	1-1/4"-12	1.50

Shipping weights (approximate) Base Weight includes two clevises.

BORE	BASE WGT	POUNDS PER INCH OF STROKE BY ROD SIZE							
		1	1 1/4	1 3/8	1 1/2	1 3/4	2	2 1/2	3
2	10.63	0.59	0.72						
2 1/4	13.92	0.63	0.76						
2 1/2	15.52	0.67	0.80		0.95		1.34		
3	20.44		1.07	1.14	1.22	1.40			
3 1/4	22.17		1.13	1.20	1.28	1.46			
3 1/2	24.87		1.18	1.25	1.33	1.51			
4	29.85				1.45	1.63	1.84	2.34	
4 1/2	43.17					1.74	1.95	2.45	
5	53.35					2.47	2.68	3.18	3.79
6	84.10							3.52	4.13

MATERIAL SPECIFICATIONS

Barrel: DOM Tubing ASTM 513/519 Gr. 1020/1026

Head: Ductile Iron ASTM A536 (65-45-12)

Piston: Ductile Iron ASTM A536 (65-45-12)

Rod: C1045 Chrome Plated

Accessories: Steel CSA G40-21 Gr. 44W

Piston Seal: Polyurethane with Nitrile Loader

Rod seal: Polyurethane

Wear Ring: Reinforced Nylon

Wiper: Polyurethane

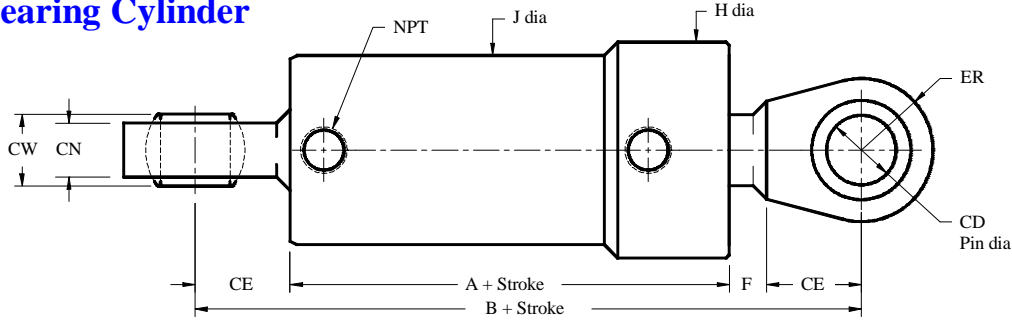
O-Ring: Nitrile

Back-Up: Nitrile

Seal Temperature Range: -65° F to 225° F (-54° C to 107° C)

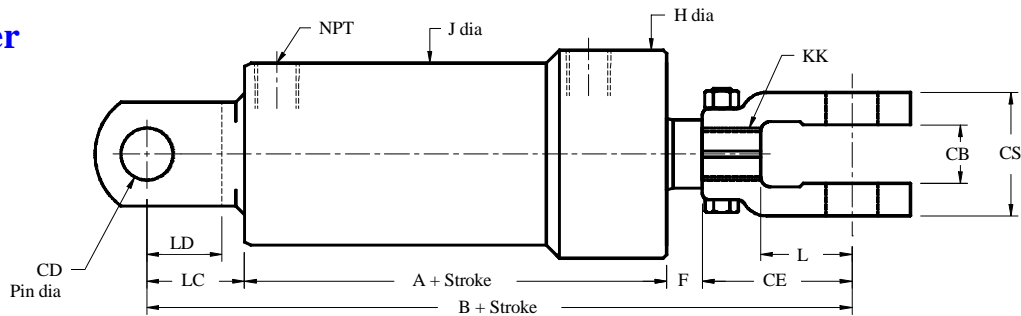
Series IT Cylinder

Spherical Bearing Cylinder



Bore	Available rod sizes				A	B	J	H	NPT	F	CD	ER	CE	CW	CN
2	1	1 1/4	—	—	4.44	7.63	2.38	3.00	3/8	0.69	0.75	1.13	1.25	0.66	0.56
2 1/4	1	1 1/4	—	—	4.44	8.00	2.63	3.25	3/8	0.69	1.00	1.44	1.50	0.88	0.75
2 1/2	1	1 1/4	1 1/2	2	4.44	8.50	2.88	3.50	3/8	0.69	1.00	1.44	1.50	0.88	0.75
3	1 1/4	1 3/8	1 1/2	1 3/4	4.81	8.50	3.50	4.00	1/2	0.69	1.00	1.44	1.50	0.88	0.75
3 1/4	1 1/4	1 3/8	1 1/2	1 3/4	4.81	8.50	3.75	4.25	1/2	0.69	1.00	1.44	1.50	0.88	0.75
3 1/2	1 1/4	1 3/8	1 1/2	1.75	4.81	9.25	4.00	4.50	1/2	0.69	1.25	1.75	1.88	1.09	0.96
4	1 1/2	1.75	2	2 1/2	4.88	9.25	4.50	5.00	1/2	0.69	1.25	1.75	1.88	1.09	0.96
4 1/2	1 3/4	2	2 1/2	—	5.44	10.75	5.00	5.50	1/2	0.81	1.50	2.19	2.25	1.31	1.13
5	1 3/4	2	2 1/2	3	5.69	11.00	5.50	6.00	1/2	0.81	1.50	2.19	2.25	1.31	1.13
6	2 1/2	3	—	—	6.13	12.25	6.75	7.25	3/4	0.88	1.75	2.50	2.63	1.53	1.31

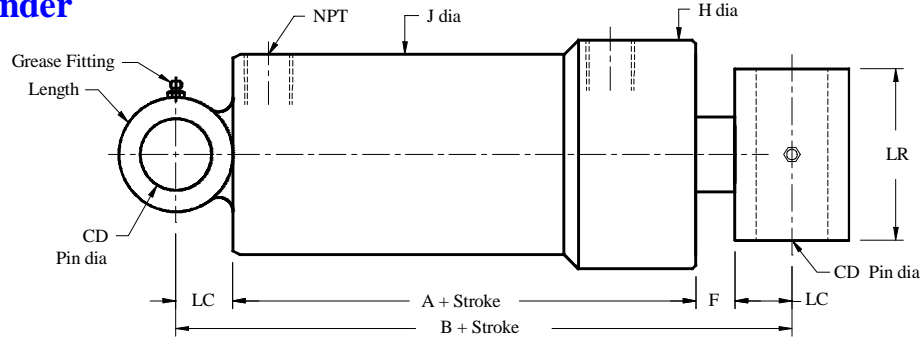
Clevis Cylinder



Bore	Available rod sizes				A	B	J	H	NPT	F	CD	CB	CS	CE	LD	LC	L	KK
2	1	1 1/4	—	—	4.44	9.25	2.38	3.00	3/8	0.69	0.75	0.88	1.88	2.50	1.31	1.63	1.50	3/4"-16
2 1/4	1	1 1/4	—	—	4.44	9.88	2.63	3.25	3/8	0.69	1.00	1.13	2.38	2.88	1.44	1.88	1.75	1"-14
2 1/2	1	1 1/4	1 1/2	2	4.44	10.25	2.88	3.50	3/8	0.69	1.00	1.13	2.38	2.88	1.44	1.88	1.75	1"-14
3	1 1/4	1 3/8	1 1/2	1 3/4	4.81	10.25	3.50	4.00	1/2	0.69	1.00	1.13	2.38	2.88	1.44	1.88	1.75	1"-14
3 1/4	1 1/4	1 3/8	1 1/2	1 3/4	4.81	10.25	3.75	4.25	1/2	0.69	1.00	1.13	2.38	2.88	1.44	1.88	1.75	1"-14
3 1/2	1 1/4	1 3/8	1 1/2	1.75	4.81	10.25	4.00	4.50	1/2	0.69	1.00	1.13	2.38	2.88	1.44	1.88	1.75	1"-14
4	1 1/2	1.75	2	2 1/2	4.88	10.25	4.50	5.00	1/2	0.69	1.00	1.13	2.38	2.88	1.44	1.88	1.75	1-1/4"-12
4 1/2	1 3/4	2	2 1/2	—	5.44	11.88	5.00	5.50	1/2	0.81	1.25	1.38	2.88	3.13	2.00	2.50	1.88	1-1/4"-12
5	1 3/4	2	2 1/2	3	5.69	12.13	5.50	6.00	1/2	0.81	1.25	1.38	2.88	3.13	2.00	2.50	1.88	1-1/2"-12
6	2 1/2	3	—	—	6.13	13.00	6.75	7.25	3/4	0.88	1.50	1.63	3.63	3.50	2.25	2.63	2.13	1-3/4"-12

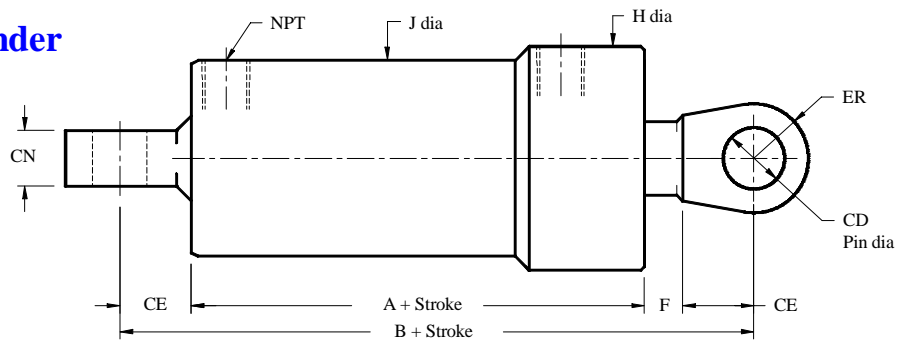
Series IT Cylinder

Tube Eye Cylinder



Bore	Available rod sizes				A	B	J	H	NPT	F	CD	LC	LR	LENGTH
	1	1 1/4	—	—										
2	1	1 1/4	—	—	4.44	6.38	2.38	3.00	3/8	0.69	0.75	0.63	2.00	3.25
2 1/4	1	1 1/4	—	—	4.44	6.81	2.63	3.25	3/8	0.69	1.00	0.88	2.00	3.00
2 1/2	1	1 1/4	1 1/2	2	4.44	7.25	2.88	3.50	3/8	0.69	1.00	0.88	2.00	3.00
3	1 1/4	1 3/8	1 1/2	1 3/4	4.81	7.25	3.50	4.00	1/2	0.69	1.00	0.88	2.00	4.13
3 1/4	1 1/4	1 3/8	1 1/2	1 3/4	4.81	7.25	3.75	4.25	1/2	0.69	1.00	0.88	2.00	4.13
3 1/2	1 1/4	1 3/8	1 1/2	1.75	4.81	7.25	4.00	4.50	1/2	0.69	1.00	0.88	2.00	4.13
4	1 1/2	1.75	2	2 1/2	4.88	7.25	4.50	5.00	1/2	0.69	1.00	0.88	3.00	4.75
4 1/2	1 3/4	2	2 1/2	—	5.44	8.25	5.00	5.50	1/2	0.81	1.25	1.00	6.00	3.25
5	1 3/4	2	2 1/2	3	5.69	8.50	5.50	6.00	1/2	0.81	1.25	1.00	6.00	3.25
6	2 1/2	3	—	—	6.13	9.25	6.75	7.25	3/4	0.88	1.50	1.13	7.00	4.00

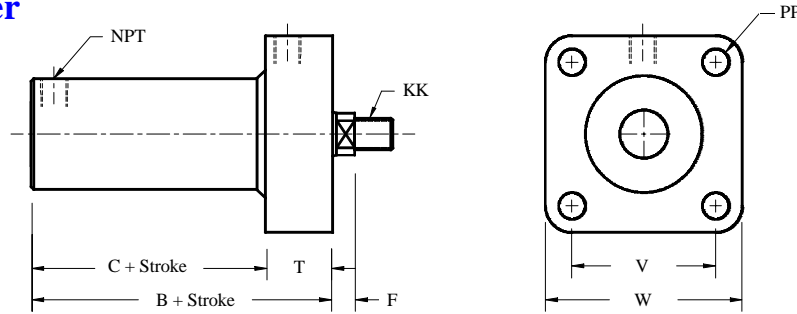
Welded Lug Cylinder



Bore	Available rod sizes				A	B	J	H	NPT	F	CD	ER	CE	CN
	1	1 1/4	—	—										
2	1	1 1/4	—	—	4.44	7.63	2.38	3.00	3/8	0.69	0.75	0.88	1.25	0.75
2 1/4	1	1 1/4	—	—	4.44	8.06	2.63	3.25	3/8	0.69	1.00	1.25	1.63	1.00
2 1/2	1	1 1/4	1 1/2	2	4.44	8.50	2.88	3.50	3/8	0.69	1.00	1.25	1.63	1.00
3	1 1/4	1 3/8	1 1/2	1 3/4	4.81	8.50	3.50	4.00	1/2	0.69	1.00	1.25	1.63	1.00
3 1/4	1 1/4	1 3/8	1 1/2	1 3/4	4.81	8.50	3.75	4.25	1/2	0.69	1.00	1.25	1.63	1.00
3 1/2	1 1/4	1 3/8	1 1/2	1.75	4.81	8.50	4.00	4.50	1/2	0.69	1.00	1.25	1.63	1.00
4	1 1/2	1.75	2	2 1/2	4.88	8.50	4.50	5.00	1/2	0.69	1.00	1.25	1.63	1.00
4 1/2	1 3/4	2	2 1/2	—	5.44	10.00	5.00	5.50	1/2	0.81	1.25	1.50	2.00	1.25
5	1 3/4	2	2 1/2	3	5.69	10.25	5.50	6.00	1/2	0.81	1.25	1.50	2.00	1.25
6	2 1/2	3	—	—	6.13	11.50	6.75	7.25	3/4	0.88	1.50	1.75	2.25	1.50

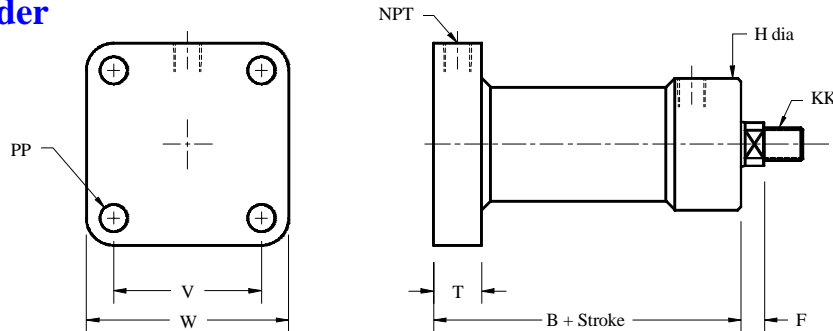
Series IT Cylinder

Front Flange Cylinder



Bore	Available rod sizes				B	C	F	T	V	W	PP	NPT	KK
	1	1 1/4	1 1/2	2									
2	1	1 1/4	—	—	4.44	2.50	0.69	1.94	2.63	3.63	15/32	3/8	3/4"-16
2 1/4	1	1 1/4	—	—	4.44	2.50	0.69	1.94	3.00	4.25	9/16	3/8	1"-14
2 1/2	1	1 1/4	1 1/2	2	4.44	2.50	0.69	1.94	3.25	4.50	9/16	3/8	1"-14
3	1 1/4	1 3/8	1 1/2	1 3/4	4.81	2.69	0.69	2.13	3.75	5.00	9/16	1/2	1"-14
3 1/4	1 1/4	1 3/8	1 1/2	1 3/4	4.81	2.69	0.69	2.13	4.00	5.50	11/16	1/2	1"-14
3 1/2	1 1/4	1 3/8	1 1/2	1.75	4.81	2.69	0.69	2.13	4.25	5.75	11/16	1/2	1"-14
4	1 1/2	1.75	2	2 1/2	4.88	2.75	0.69	2.13	4.50	6.00	11/16	1/2	1-1/4"-12
4 1/2	1 3/4	2	2 1/2	—	5.44	3.31	0.81	2.13	5.00	6.75	13/16	1/2	1-1/4"-12
5	1 3/4	2	2 1/2	3	5.69	3.50	0.81	2.19	5.38	7.13	13/16	1/2	1-1/2"-12
6	2 1/2	3	—	—	6.13	3.50	0.88	2.63	6.13	8.25	15/16	3/4	1-3/4"-12

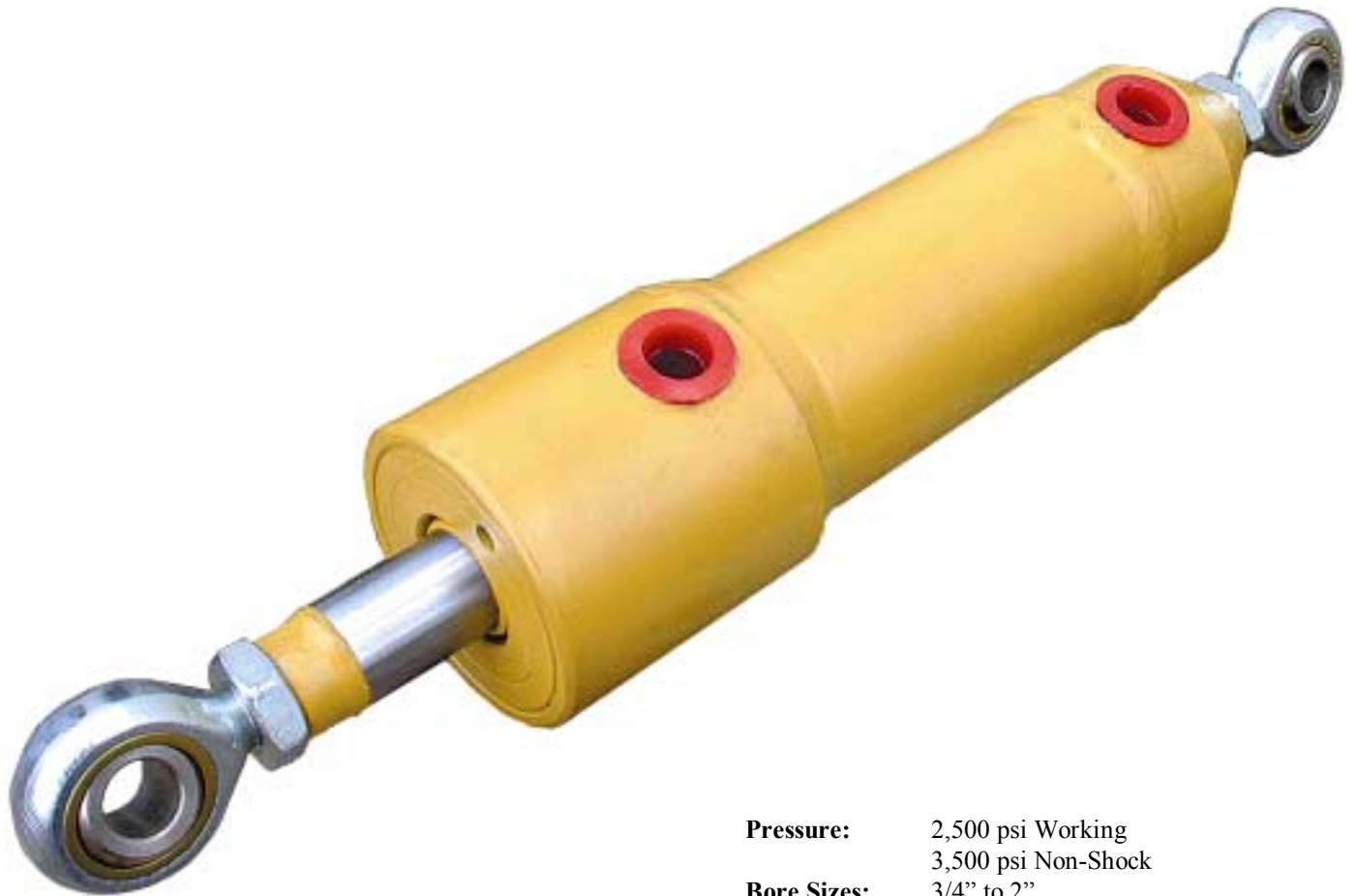
Rear Flange Cylinder



Bore	Available rod sizes				B	F	H	T	V	W	PP	NPT	KK
	1	1 1/4	1 1/2	2									
2	1	1 1/4	—	—	4.13	0.69	3.00	1.00	2.63	3.63	15/32	3/8	3/4"-16
2 1/4	1	1 1/4	—	—	4.13	0.69	3.25	1.00	3.00	4.25	9/16	3/8	1"-14
2 1/2	1	1 1/4	1 1/2	2	4.13	0.69	3.50	1.00	3.25	4.50	9/16	3/8	1"-14
3	1 1/4	1 3/8	1 1/2	1 3/4	4.63	0.69	4.00	1.25	3.75	5.00	9/16	1/2	1"-14
3 1/4	1 1/4	1 3/8	1 1/2	1 3/4	4.63	0.69	4.25	1.25	4.00	5.50	11/16	1/2	1"-14
3 1/2	1 1/4	1 3/8	1 1/2	1.75	4.63	0.69	4.50	1.25	4.25	5.75	11/16	1/2	1"-14
4	1 1/2	1.75	2	2 1/2	4.69	0.69	5.00	1.25	4.50	6.00	11/16	1/2	1-1/4"-12
4 1/2	1 3/4	2	2 1/2	—	5.25	0.81	5.50	1.25	5.00	6.75	13/16	1/2	1-1/4"-12
5	1 3/4	2	2 1/2	3	5.69	0.81	6.00	1.50	5.38	7.13	13/16	1/2	1-1/2"-12
6	2 1/2	3	—	—	6.13	0.88	7.25	1.50	6.13	8.25	15/16	3/4	1-3/4"-12



Series MIT Hydraulic Cylinder Miniature Internal Thread



Pressure: 2,500 psi Working
3,500 psi Non-Shock
Bore Sizes: 3/4" to 2"
Rod Sizes: 3/8" to 1"
Ports: 1/16" to 3/8" NPT
Attachments: Spherical Bearings
Clevis
Cross Hole

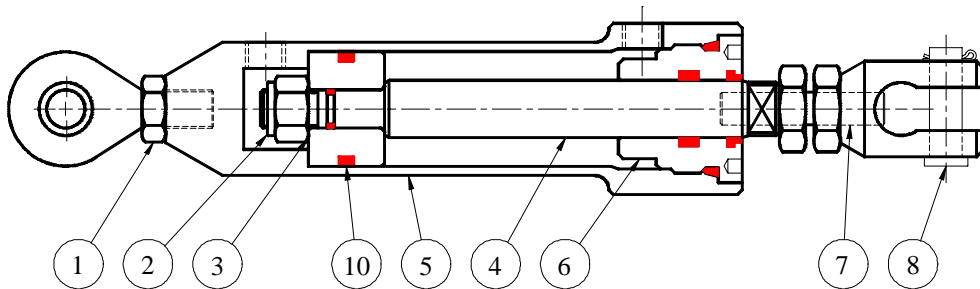
Series MIT Cylinder

Our Series **MIT** is our **Miniature Internal Thread** hydraulic cylinder. It's a welded construction cylinder with an internal threaded gland rated for 3,000 psi working pressure and 4,000 psi non-shock pressure.

To strengthen the open end of the cylinder, a thick ring is welded to the barrel to carry the internal thread and port. Both ports are machined into the cylinder barrel itself, which means localized weld distortion and the stress concentration that arises from welding half couplings for ports are eliminated. The internal threads that hold the gland will not corrode since they are constantly submersed in oil. To accommodate our customers wide range of requirements, we manufacture the barrel and rod to order for every hydraulic cylinder to provide the exact stroke and pin to pin dimensions as required. Various combinations of mounting accessories can also be installed onto the cylinder to suit most applications. Other rod materials and mounting styles as needed, such as trunnion and flange mount, are available on request.

All MIT cylinders have National Pipe Thread (NPT) ports. The blind end port is normally placed at 90° to the center-line of a fixed pin axis, at the 12 o'clock position. The clevis style of blind end always has two ports, one in line with the rear port and one that is at 90° to this port.

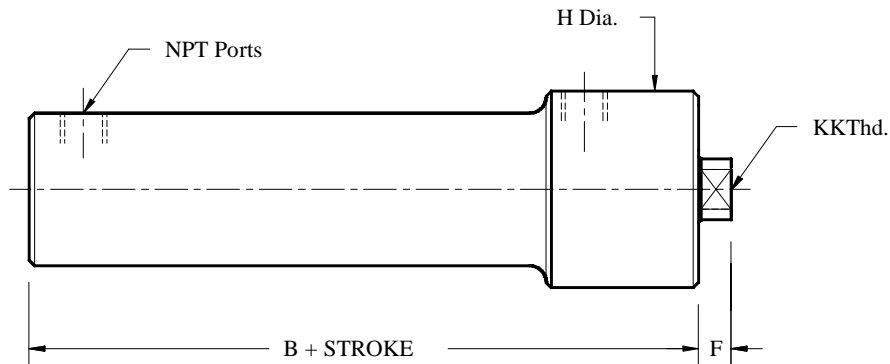
Whenever possible, spherical bearings mounts should be used on both ends of the cylinders. This will reduce any mounting misalignment and side loading that may be introduced into the cylinder. This type of loading should definitely be avoided on cylinders with small diameter rods such as used on this series.



PART NUMBERS		Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Items 10
Bore	Rod	Jam Nut	Lock Nut	Piston	Rod	Barrel	Gland	Stud	Pin	Seal Kit
3/4	3/8	B3022-4	12714	B3405-8	Part Number is Model number and Stroke Followed by: B for barrel R for rod		B3704	B2078-4-4	B3708-4	12696
1	1/2	B3022-5	12715	B3405-10			B3460	B2078-5-5	B3708-5	12697
1 1/4	5/8	B3022-6	12716	B3405-13			B3408	B2078-6-6	B3708-6	12495
1 1/2	3/4	B3022-8	12717	B3405-15			B3456	B2078-8-8	B3708-8	12698
1 3/4	7/8	B3022-10	12718	B3405-18			B3454	B2078-10-10	B3708-10	12713
2	1	B3022-12	12719	B3405-20			B3368	B2078-12-12	B3708-12	12712

Series MIT Cylinder – Basic

See the Accessories section of the catalogue for rod end & blind end options. The 'CD' (Pin Dia), the 'F' (Rod Extension) and 'KK' (Thread) dimensions given are standard but they can be changed to suit any special requirements. Threaded and welded ends are both available.



Bore	Rod	B	F	H	NPT	KK THD	CD
3/4	3/8	2.50	0.25	1.25	1/8	1/4-28	0.25
1	1/2	2.75	0.25	1.50	1/8	5/16-24	0.31
1 1/4	5/8	3.00	0.38	1.88	1/8	3/8-24	0.38
1 1/2	3/4	3.69	0.38	2.25	1/4	1/2-20	0.50
1 3/4	7/8	3.75	0.38	2.50	1/4	5/8-18	0.63
2	1	4.38	0.56	3.00	3/8	3/4-16	0.75

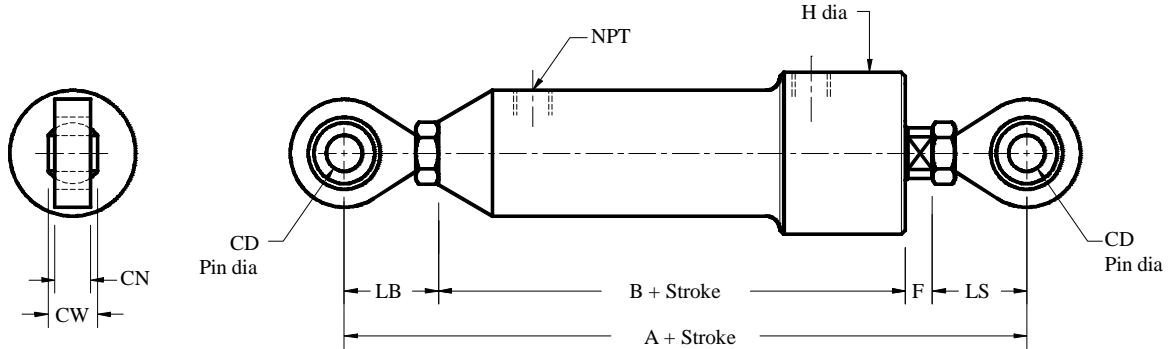
MATERIAL SPECIFICATIONS

<i>Barrel:</i> DOM Tubing ASTM 513/519 Gr. 1020/1026	<i>Piston Seal:</i> Polyurethane with Nitrile Loader
<i>Head:</i> Ductile Iron ASTM A536 (65-45-12)	<i>Rod seal:</i> Polyurethane
<i>Piston:</i> Ductile Iron ASTM A536 (65-45-12)	<i>Wear Ring:</i> Reinforced Nylon
<i>Rod:</i> C1045 Chrome Plated	<i>Wiper:</i> Polyurethane
<i>Accessories:</i> Steel CSA G40-21 Gr. 44W	<i>O-Ring:</i> Nitrile
	<i>Back-Up:</i> Nitrile

Seal Temperature Range: -65° F to 225° F (-54° C to 107° C)

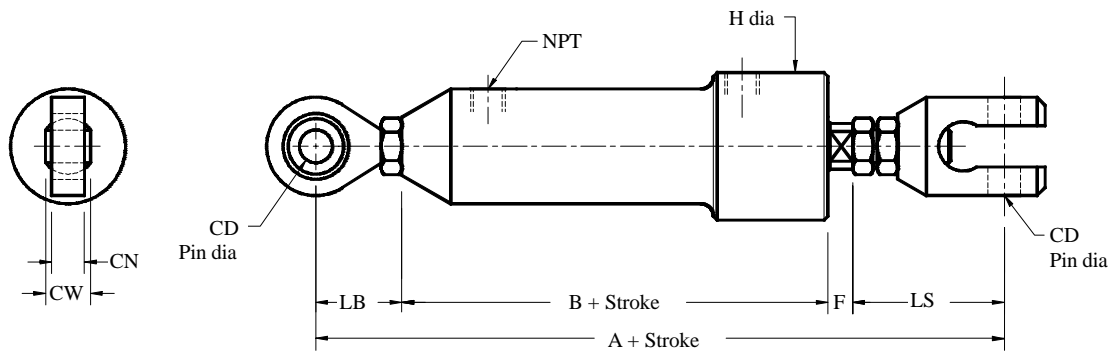
Series MIT Cylinder

Spherical Blind End / Spherical Rod End



Bore	Rod	CD	A	B	F	H	NPT	LB	LS	CN	CW
3/4	3/8	0.25	4.56	2.94	0.25	1.25	1/8	0.69	0.69	0.28	0.38
1	1/2	0.31	5.06	3.31	0.25	1.50	1/8	0.75	0.75	0.34	0.44
1 1/4	5/8	0.38	5.50	3.63	0.38	1.88	1/8	0.75	0.75	0.41	0.50
1 1/2	3/4	0.50	7.25	4.50	0.38	2.25	1/4	1.19	1.19	0.50	0.63
1 3/4	7/8	0.63	7.75	4.75	0.38	2.50	1/4	1.31	1.31	0.56	0.75
2	1	0.75	8.94	5.50	0.56	3.00	3/8	1.44	1.44	0.69	0.88

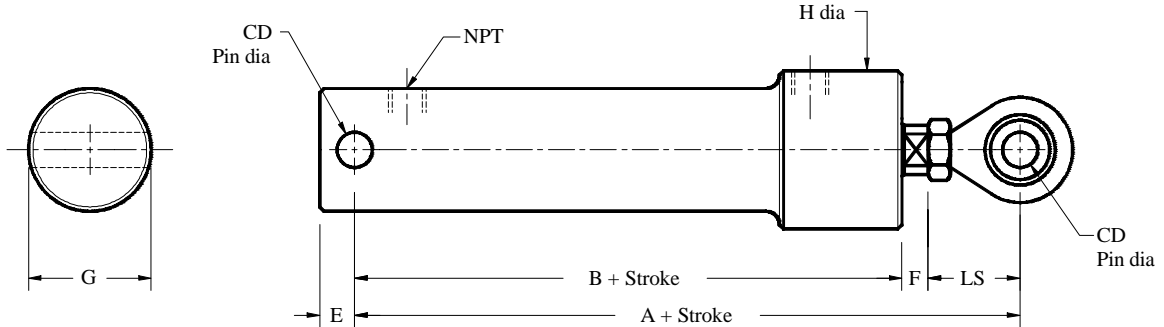
Spherical Bearing Blind End / Clevis Rod End



Bore	Rod	CD	A	B	F	H	NPT	LB	LS	CN	CW
3/4	3/8	0.25	5.25	2.94	0.25	1.25	1/8	0.69	1.38	0.28	0.38
1	1/2	0.31	5.88	3.31	0.25	1.50	1/8	0.75	1.56	0.34	0.44
1 1/4	5/8	0.38	6.50	3.63	0.38	1.88	1/8	0.75	1.75	0.41	0.50
1 1/2	3/4	0.50	8.38	4.50	0.38	2.25	1/4	1.19	2.31	0.50	0.63
1 3/4	7/8	0.63	9.13	4.75	0.38	2.50	1/4	1.31	2.69	0.56	0.75
2	1	0.75	10.50	5.50	0.56	3.00	3/8	1.44	3.00	0.69	0.88

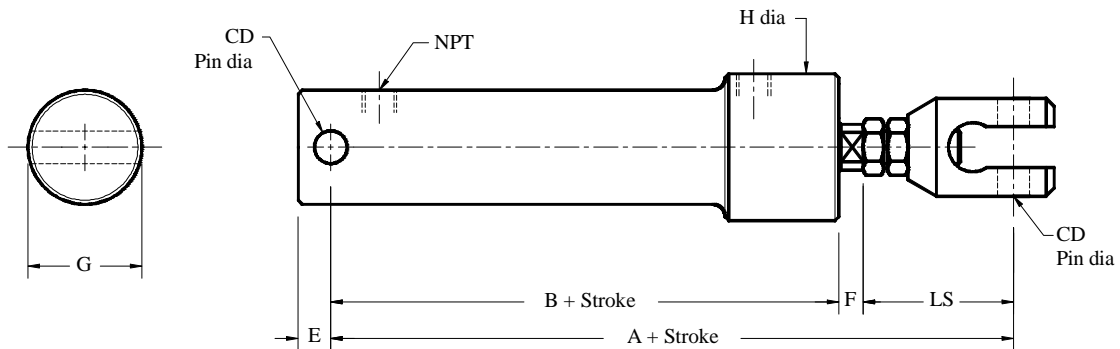
Series MIT Cylinder

Cross Hole Blind End / Spherical Rod End



Bore	Rod	CD	A	B	E	F	G	H	NPT	LS
3/4	3/8	0.25	3.56	2.63	0.25	0.25	1.00	1.25	1/8	0.69
1	1/2	0.31	3.88	2.88	0.31	0.25	1.25	1.50	1/8	0.75
1 1/4	5/8	0.38	4.25	3.13	0.38	0.38	1.50	1.88	1/8	0.75
1 1/2	3/4	0.50	5.50	3.94	0.50	0.38	1.75	2.25	1/4	1.19
1 3/4	7/8	0.63	5.75	4.06	0.63	0.38	2.13	2.50	1/4	1.31
2	1	0.75	6.69	4.69	0.69	0.56	2.38	3.00	3/8	1.44

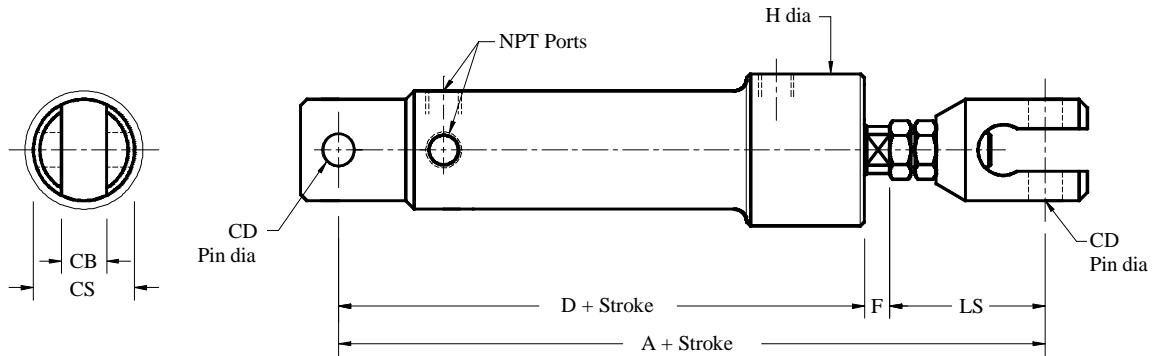
Cross Hole Blind End / Clevis Rod End



Bore	Rod	CD	A	B	E	F	G	H	NPT	LS
3/4	3/8	0.25	4.25	2.63	0.25	0.25	1.00	1.25	1/8	1.38
1	1/2	0.31	4.69	2.88	0.31	0.25	1.25	1.50	1/8	1.56
1 1/4	5/8	0.38	5.25	3.13	0.38	0.38	1.50	1.88	1/8	1.75
1 1/2	3/4	0.50	6.63	3.94	0.50	0.38	1.75	2.25	1/4	2.31
1 3/4	7/8	0.63	7.13	4.06	0.63	0.38	2.13	2.50	1/4	2.69
2	1	0.75	8.25	4.69	0.69	0.56	2.38	3.00	3/8	3.00

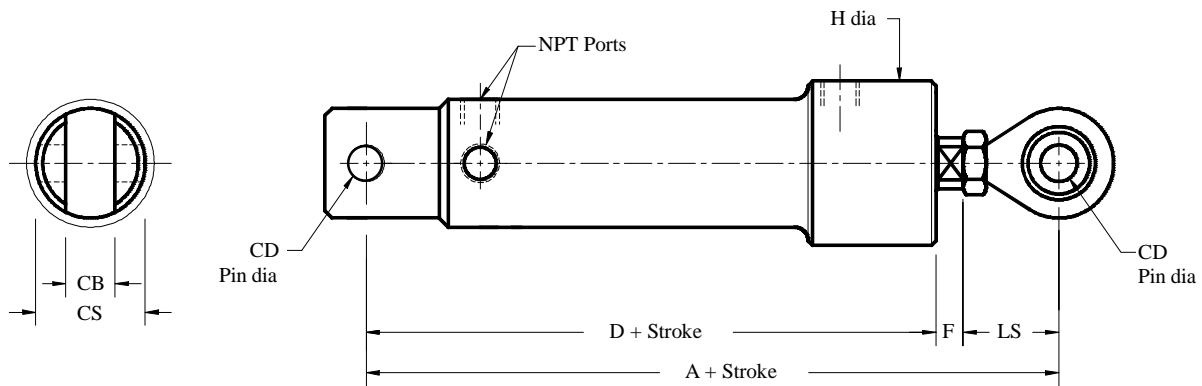
Series MIT Cylinder

Clevis Blind End / Clevis Rod End



Bore	Rod	CD	A	D	F	H	NPT	LS	CB	CS
3/4	3/8	0.25	4.81	3.19	0.25	1.25	1/8	1.38	0.38	0.81
1	1/2	0.31	5.38	3.56	0.25	1.50	1/8	1.56	0.45	0.94
1 1/4	5/8	0.38	6.00	3.88	0.38	1.88	1/8	1.75	0.51	1.19
1 1/2	3/4	0.50	7.50	4.81	0.38	2.25	1/4	2.31	0.66	1.47
1 3/4	7/8	0.63	8.06	5.00	0.38	2.50	1/4	2.69	0.76	1.69
2	1	0.75	9.31	5.75	0.56	3.00	3/8	3.00	0.88	1.97

Clevis Blind End / Spherical Rod End



Bore	Rod	CD	A	D	F	H	NPT	LS	CB	CS
3/4	3/8	0.25	4.13	3.19	0.25	1.25	1/8	0.69	0.38	0.81
1	1/2	0.31	4.56	3.56	0.25	1.50	1/8	0.75	0.45	0.94
1 1/4	5/8	0.38	5.00	3.88	0.38	1.88	1/8	0.75	0.51	1.19
1 1/2	3/4	0.50	6.38	4.81	0.38	2.25	1/4	1.19	0.66	1.47
1 3/4	7/8	0.63	6.69	5.00	0.38	2.50	1/4	1.31	0.76	1.69
2	1	0.75	7.75	5.75	0.56	3.00	3/8	1.44	0.88	1.97



Series SIT Hydraulic Cylinders

Single acting Internal Thread



Pressure: 2,500 psi Working
3,500 psi Non-Shock

Bore Sizes: 1.25" to 3.25"

Rod Sizes: 1.00" to 3.00"

Ports: 1/8" to 1/2" NPT

Attachments: Spherical Bearings
Clevis
Cross Hole
Front Flange Mount
Rear Flange Mount

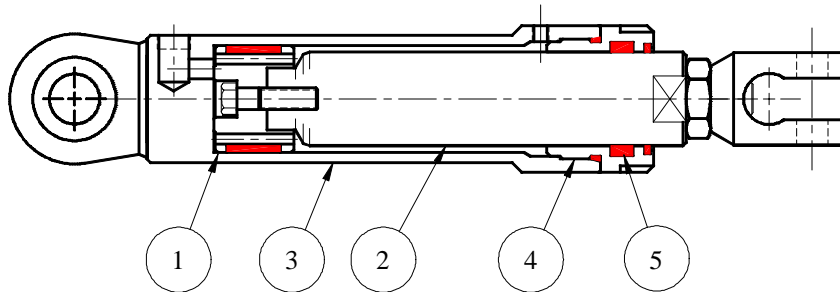
Series SIT Cylinder

Our Series **SIT** is a **Single acting Internal Thread** displacement cylinder. With a pressure rating of 2500 psi working and 3500 psi non-shock, the pressure acts on the rod to create an extend force that is equal to that of the pressure times the rod area. An external force, generally gravity, retracts the rod once the oil is allowed to leave the cylinder. The piston supports and guides the rod.

The cylinder is well sealed at the rod end which will keep the inside of the cylinder barrel from becoming contaminated. The advantage of this design is that the inside of the barrel is not exposed to atmosphere and the rod is always immersed in oil when retracted which will keep the rod from corroding. Also, only one hydraulic pressure line is required in order to operate the cylinder, thus simplifying the hose routing.

Since pressure acts on the area of the rod and not on the piston area, it is necessary to use a larger bore than a non-displacement type of cylinder design to exert the same force.

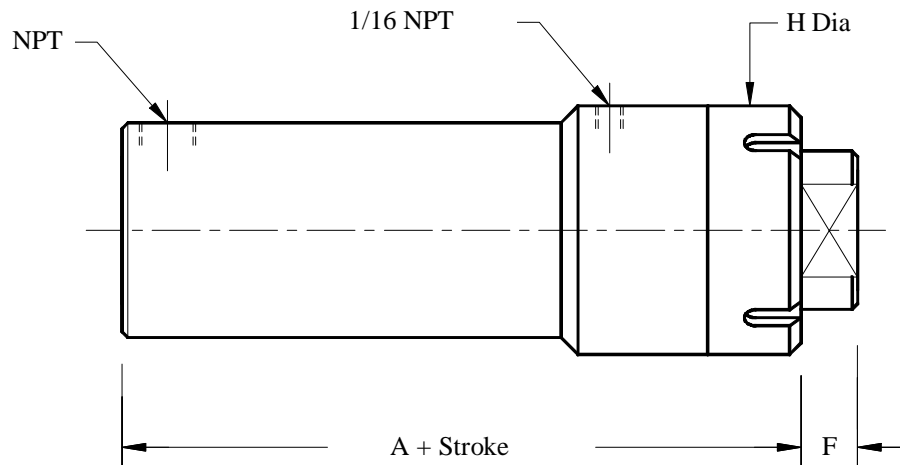
There is a 1/16" NPT plug at the rod end of the cylinder barrel which is provided to bleed air out of the cylinder during installation. This must be done in order to prevent the cylinder from becoming "spongy" due to the compressibility of the air trapped inside the cylinder.



PART NUMBERS		Item 1	Item 2	Item 3	Item 4	Item 5	Shipping weight (lb) (c/w clevis ends)	
Bore	Rod	Piston	Rod	Barrel	Gland	Seal Kit	Base weight	lb/inch Stroke
1 1/4	1	B3365-13	Part Number is Model number and Stroke Followed by: B for barrel R for rod		B3696	12661	4.46	0.46
1 1/2	1 1/4	B3365-15		B3379	12435	5.85	0.63	
1 3/4	1 1/2	B3365-18		B3375	12434	6.94	0.82	
2	1 3/4	B3365-20		B3373	12433	9.16	1.05	
2 1/4	2	B3365-23		B3371	12432	11.63	1.45	
2 3/4	2 1/2	B3365-28		B3363	12412	15.28	2.06	
3 1/4	3	B3365-33		B3477	12539	20.39	2.78	

Series SIT Cylinder

See the Accessories section of the catalogue for rod end & blind end options. The 'CD' (Pin Dia), the 'F' (Rod Extension) and 'KK' (Thread) dimensions given are standard but they can be changed to suit any special requirements. Threaded and welded ends are both available.



Bore	Rod	CD	A	F	H	NPT
1 1/4"	1"	0.38	3.69	0.38	2.00	1/8
1 1/2"	1 1/4"	0.50	4.00	0.50	2.25	1/4
1 3/4"	1 1/2"	0.63	4.00	0.50	2.50	1/4
2"	1 3/4"	0.75	4.75	0.50	2.75	3/8
2 1/4"	2"	1.00	4.75	0.50	3.00	3/8
2 3/4"	2 1/2"	1.00	4.88	0.50	3.50	1/2
3 1/4"	3"	1.25	5.00	0.50	4.00	1/2

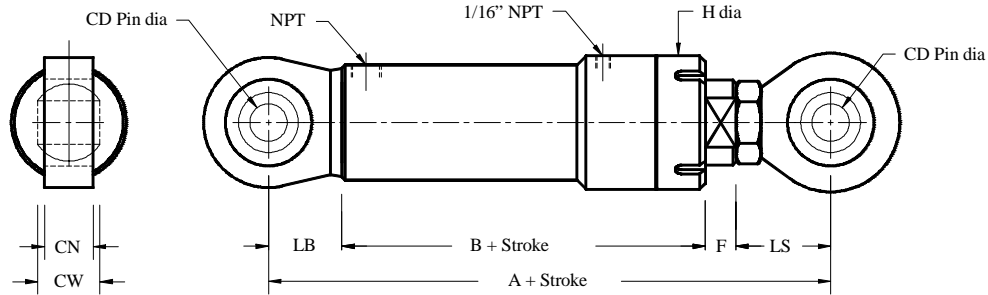
MATERIAL SPECIFICATIONS

<i>Barrel:</i> DOM Tubing ASTM 513/519 Gr. 1020/1026	<i>Rod seal:</i> Polyurethane
<i>Head:</i> Ductile Iron ASTM A536 (65-45-12)	<i>Wear Ring:</i> Reinforced Nylon
<i>Piston:</i> Ductile Iron ASTM A536 (65-45-12)	<i>Wiper:</i> Polyurethane
<i>Rod:</i> C1045 Chrome Plated	<i>O-Ring:</i> Nitrile
<i>Accessories:</i> Steel CSA G40-21 Gr. 44W	<i>Back-Up:</i> Nitrile
<i>Bolts:</i> SAE Grade 8	

Seal Temperature Range: -65° F to 225° F (-54° C to 107° C)

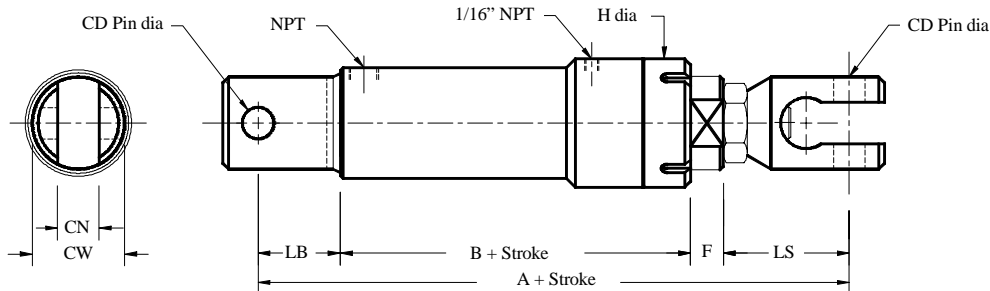
Series SIT Cylinder

Spherical Blind End / Spherical Rod End



Bore	Rod	CD	A	B	F	H	NPT	LB	LS	CN	CW
1 1/4	1	0.38	7.01	3.69	0.38	2.00	1/8	0.88	0.75	0.41	0.50
1 1/2	1 1/4	0.50	7.38	4.00	0.50	2.25	1/4	1.00	1.19	0.50	0.63
1 3/4	1 1/2	0.63	7.38	4.00	0.50	2.50	1/4	1.13	1.31	0.56	0.75
2	1 3/4	0.75	8.13	4.75	0.50	2.75	3/8	1.25	1.44	0.69	0.88
2 1/4	2	1.00	9.05	4.75	0.50	3.00	3/8	1.50	2.30	0.75	0.88
2 3/4	2 1/2	1.00	9.18	4.88	0.50	3.50	1/2	1.50	2.30	0.75	0.88
3 1/4	3	1.25	9.30	5.00	0.50	4.00	1/2	1.88	3.10	0.94	1.09

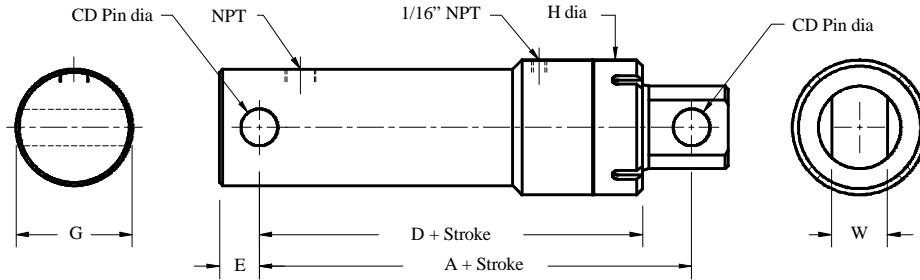
Clevis Blind End / Clevis Rod End



Bore	Rod	CD	A	B	F	H	NPT	LB	LS	CB	CS
1 1/4	1	0.38	6.60	3.69	0.38	2.00	1/8	1.00	1.47	0.51	1.19
1 1/2	1 1/4	0.50	7.75	4.00	0.50	2.25	1/4	1.31	1.94	0.66	1.47
1 3/4	1 1/2	0.63	8.26	4.00	0.50	2.50	1/4	1.50	2.26	0.76	1.69
2	1 3/4	0.75	9.48	4.75	0.50	2.75	3/8	1.69	2.55	0.88	1.97
2 1/4	2	1.00	10.43	4.75	0.50	3.00	3/8	2.00	3.18	1.13	2.47
2 3/4	2 1/2	1.00	10.55	4.88	0.50	3.50	1/2	2.00	3.18	1.13	2.47
3 1/4	3	1.25	10.68	5.00	0.50	4.00	1/2	2.50	3.73	1.38	2.88

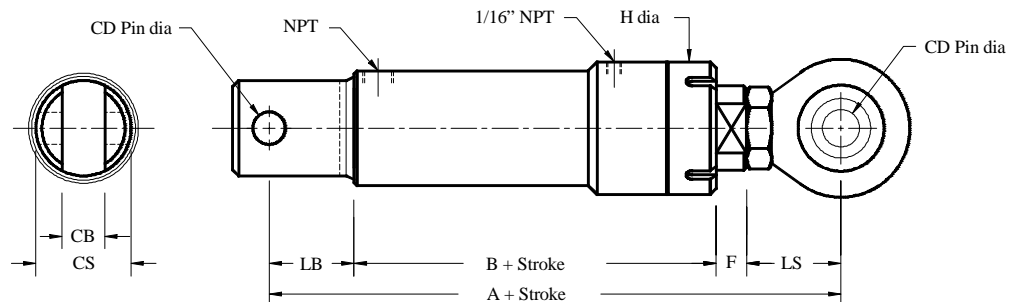
Series SIT Cylinder

Cross Hole Blind End / Cross Hole Rod End



Bore	Rod	CD	A	D	E	G	H	W	NPT
1 1/4	1	0.38	4.50	3.88	0.38	1.50	2.00	0.75	1/8
1 1/2	1 1/4	0.50	4.88	4.13	0.50	1.75	2.25	0.88	1/4
1 3/4	1 1/2	0.63	5.13	4.25	0.63	2.13	2.50	1.00	1/4
2	1 3/4	0.75	6.13	5.13	0.81	2.38	2.75	1.25	3/8
2 1/4	2	1.00	6.63	5.25	0.81	2.63	3.00	1.50	3/8
2 3/4	2 1/2	1.00	6.75	5.38	0.94	3.13	3.50	2.00	1/2
3 1/4	3	1.25	7.13	5.50	1.06	3.75	4.00	2.25	1/2

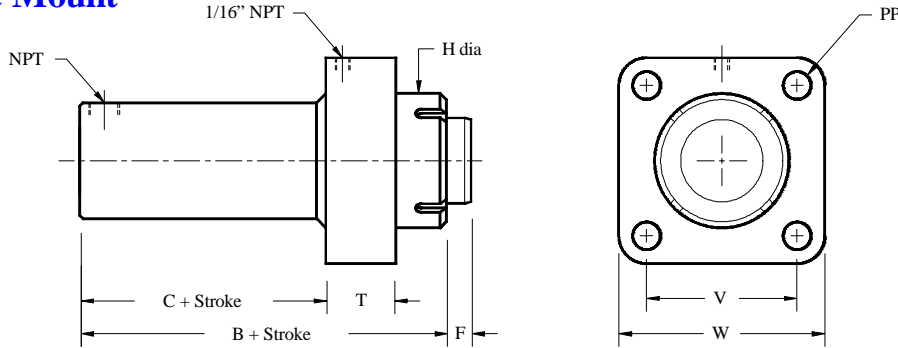
Clevis Blind End / Spherical Rod End



Bore	Rod	CD	A	B	F	H	NPT	LB	LS	CB	CS
1 1/4	1	0.38	5.44	3.69	0.38	2.00	1/8	1.00	0.75	0.51	1.19
1 1/2	1 1/4	0.50	6.50	4.00	0.50	2.25	1/4	1.31	1.19	0.66	1.47
1 3/4	1 1/2	0.63	6.81	4.00	0.50	2.50	1/4	1.50	1.31	0.76	1.69
2	1 3/4	0.75	7.88	4.75	0.50	2.75	3/8	1.69	1.44	0.88	1.97
2 1/4	2	1.00	9.06	4.75	0.50	3.00	3/8	2.00	2.30	1.13	2.47
2 3/4	2 1/2	1.00	9.19	4.88	0.50	3.50	1/2	2.00	2.30	1.13	2.47
3 1/4	3	1.25	10.60	5.00	0.50	4.00	1/2	2.50	3.10	1.38	2.88

Series SIT Cylinder

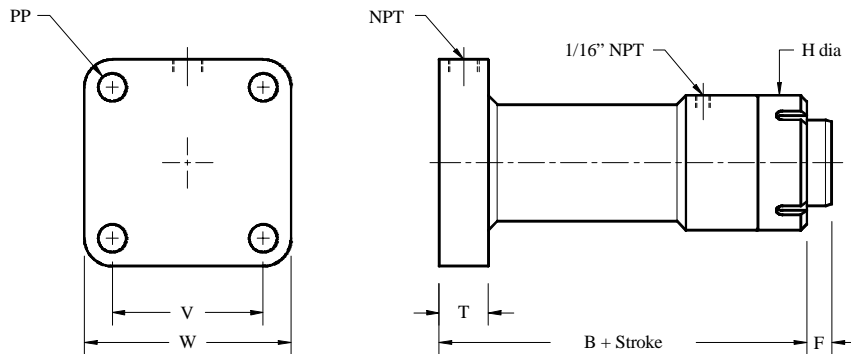
Front Flange Mount



See the Accessories section of the catalogue for rod ends.

Bore	Rod	B	C	F	H	T	V	W	PP	NPT
1 1/4	1	3.69	1.31	0.38	2.00	1.38	2.00	2.75	13/32	1/8
1 1/2	1 1/4	4.00	1.63	0.50	2.25	1.38	2.13	3.00	13/32	1/4
1 3/4	1 1/2	4.00	1.63	0.50	2.50	1.38	2.50	3.50	15/32	1/4
2	1 3/4	4.75	2.25	0.50	2.75	1.50	2.63	3.63	15/32	3/8
2 1/4	2	4.75	2.25	0.50	3.00	1.50	3.00	4.25	17/32	3/8
2 3/4	2 1/2	4.88	2.38	0.50	3.50	1.50	3.50	4.75	17/32	1/2
3 1/4	3	5.00	2.38	0.50	4.00	1.50	4.00	5.25	11/16	1/2

Rear Flange Mount



See the Accessories section of the catalogue for rod ends.

Bore	Rod	B	F	H	T	V	W	PP	NPT
1 1/4	1	3.56	0.38	2.00	0.75	2.00	2.75	13/32	1/8
1 1/2	1 1/4	3.81	0.50	2.25	1.00	2.13	3.00	13/32	1/4
1 3/4	1 1/2	3.88	0.50	2.50	1.00	2.50	3.50	15/32	1/4
2	1 3/4	4.44	0.50	2.75	1.00	2.63	3.63	15/32	3/8
2 1/4	2	4.44	0.50	3.00	1.00	3.00	4.25	9/16	3/8
2 3/4	2 1/2	4.69	0.50	3.50	1.25	3.50	4.75	9/16	1/2
3 1/4	3	4.81	0.50	4.00	1.25	4.00	5.50	11/16	1/2



Series LB Hydraulic Cylinder Large Bore



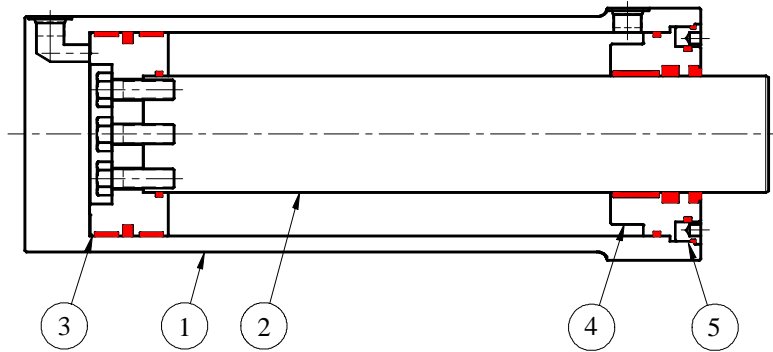
Pressure: 3,000 psi Working
4,000 psi Non-Shock
Bore Sizes: 9.00" to 24.25"
Rod Sizes: 5.00" to 20.00"
Ports: #16 ORB
Attachments: Spherical Bearings
Welded eye
Cross Hole

Series LB Cylinder

Our Series **LB** is a large bore double acting cylinder. They have a 3,000 psi working pressure rating and a 4,000 psi non-shock pressure rating. They are designed for a multitude of applications where a large force is required. Higher working pressures are available on request.

FEATURES:

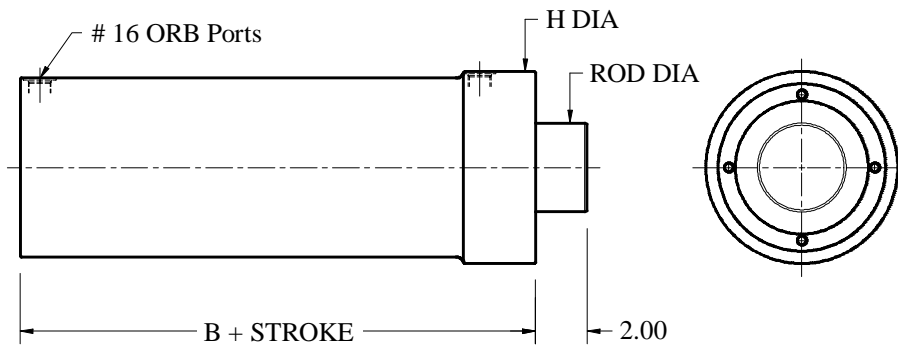
- The head gland is held in place with a threaded ring. This makes for simpler installation and removal.
- A thick ring is welded to the end of the barrel. This ensures that the barrel end will not expand under pressure, causing seal leakage or the threaded ring to loosen.
- The piston is fastened to the end of the rod with a ring of bolts. This provides for easier installation and removal than if the piston was threaded on or held with one large nut.
- C1045 hard chrome plated rod. May be hollow in larger sizes.



PART NUMBERS			Item 1	Item 2	Item 3	Item 4	Item 5
Bore	Rod Min.	Rod Max.	Barrel	Rod	Piston	Gland	Ring
9	5	6	Part Number is Model number and Stroke Followed by: B for barrel R for rod		B3812-90	B3792	B3807-90
10	5	7			B3812-100	B3924	B3807-100
11 1/4	6	8			B3812-113	B3925	B3807-113
12 1/4	6	9			B3812-123	B3717	B3807-123
13 1/4	7	10			B3812-133	B3926	B3807-133
14 1/4	7	11			B3812-143	B3927	B3807-143
15 1/4	8	12			B3812-153	B3928	B3807-153
16 1/4	9	13			B3812-163	B3929	B3807-163
18 1/4	10	15			B3812-183	B3930	B3807-183
19 1/4	11	16			B3812-193	B3931	B3807-193
20 1/4	12	17			B3812-203	B3932	B3807-203
22 1/4	12	18			B3812-223	B3933	B3807-223
24 1/4	14	20			B3812-243	B3934	B3807-243

Series LB Cylinder

Basic Cylinder



Bore	Rod Dia							B	H
9.00	5.00	6.00	—	—	—	—	—	10.38	11.00
10.00	5.00	6.00	7.00	—	—	—	—	11.88	12.50
11.25	6.00	7.00	8.00	—	—	—	—	12.25	14.00
12.25	6.00	7.00	8.00	9.00	—	—	—	13.13	15.00
13.25	7.00	8.00	9.00	10.00	—	—	—	13.63	16.00
14.25	7.00	8.00	9.00	10.00	11.00	—	—	13.63	17.50
15.25	8.00	9.00	10.00	11.00	12.00	—	—	14.13	18.50
16.25	9.00	10.00	11.00	12.00	13.00	—	—	15.13	19.50
18.25	10.00	11.00	12.00	13.00	14.00	15.00	—	15.63	22.00
19.25	11.00	12.00	13.00	14.00	15.00	16.00	—	16.13	23.00
20.25	12.00	13.00	14.00	15.00	16.00	17.00	—	17.13	24.00
22.25	12.00	13.00	14.00	15.00	16.00	17.00	18.00	17.13	27.00
24.25	14.00	15.00	16.00	17.00	18.00	19.00	20.00	18.63	29.00

MATERIAL SPECIFICATIONS

<i>Barrel:</i> DOM Tubing ASTM 513/519 Gr. 1020/1026	<i>Piston Seal:</i> Filled Teflon with Nitrile Loader
<i>Head:</i> Ductile Iron ASTM A536 (65-45-12)	<i>Rod seal:</i> Polyurethane
<i>Piston:</i> Ductile Iron ASTM A536 (65-45-12)	<i>Wear Ring:</i> Reinforced Nylon
<i>Rod:</i> C1045 Chrome Plated	<i>Wiper:</i> Polyurethane on Phosphated Steel
<i>Accessories:</i> Steel CSA G40-21 Gr. 44W	<i>O-Ring:</i> Nitrile
	<i>Back-Up:</i> Nitrile

Seal Temperature Range: -65° F to 225° F (-54° C to 107° C)

Series LB Cylinder

Front Flange Cylinder

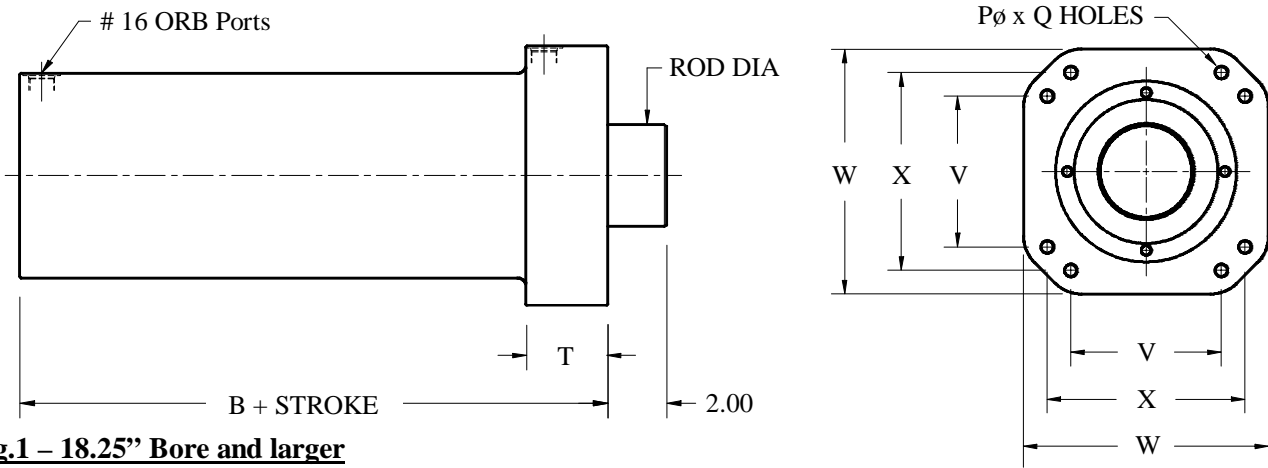


Fig.1 – 18.25” Bore and larger

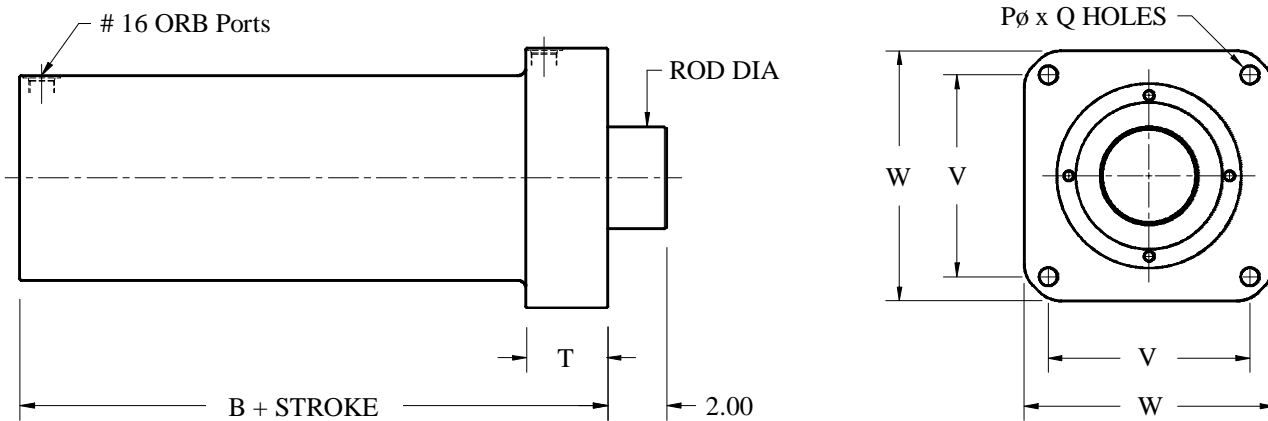


Fig. 2 – 16.25” Bore and smaller

Bore	Rod Dia							B	P	Q	V	X	W	T
	5.00	6.00	7.00	8.00	9.00	10.00	11.00							
9.00	5.00	6.00	—	—	—	—	—	10.38	15/16	4	10.50	—	13.00	3.94
10.00	5.00	6.00	7.00	—	—	—	—	11.88	1 1/16	4	11.00	—	14.50	4.38
11.25	6.00	7.00	8.00	—	—	—	—	12.25	1 3/16	4	12.50	—	16.00	4.38
12.25	6.00	7.00	8.00	9.00	—	—	—	13.13	1 5/16	4	13.50	—	17.50	4.88
13.25	7.00	8.00	9.00	10.00	—	—	—	13.63	1 5/16	4	14.00	—	18.50	4.88
14.25	7.00	8.00	9.00	10.00	11.00	—	—	13.63	1 7/16	4	15.25	—	20.00	4.88
15.25	8.00	9.00	10.00	11.00	12.00	—	—	14.13	1 7/16	4	16.00	—	21.50	4.88
16.25	9.00	10.00	11.00	12.00	13.00	—	—	15.13	1 9/16	4	17.00	—	22.50	4.88
18.25	10.00	11.00	12.00	13.00	14.00	15.00	—	15.63	1 5/16	8	16.00	22.00	26.00	5.38
19.25	11.00	12.00	13.00	14.00	15.00	16.00	—	16.13	1 5/16	8	17.00	23.00	27.00	5.38
20.25	12.00	13.00	14.00	15.00	16.00	17.00	—	17.13	1 5/16	8	17.50	23.50	27.50	5.38
22.25	12.00	13.00	14.00	15.00	16.00	17.00	18.00	17.13	1 9/16	8	19.00	27.00	31.00	5.88
24.25	14.00	15.00	16.00	17.00	18.00	19.00	20.00	18.63	1 9/16	8	20.00	29.00	33.50	5.88



Series J Hydraulic Cylinder Jack



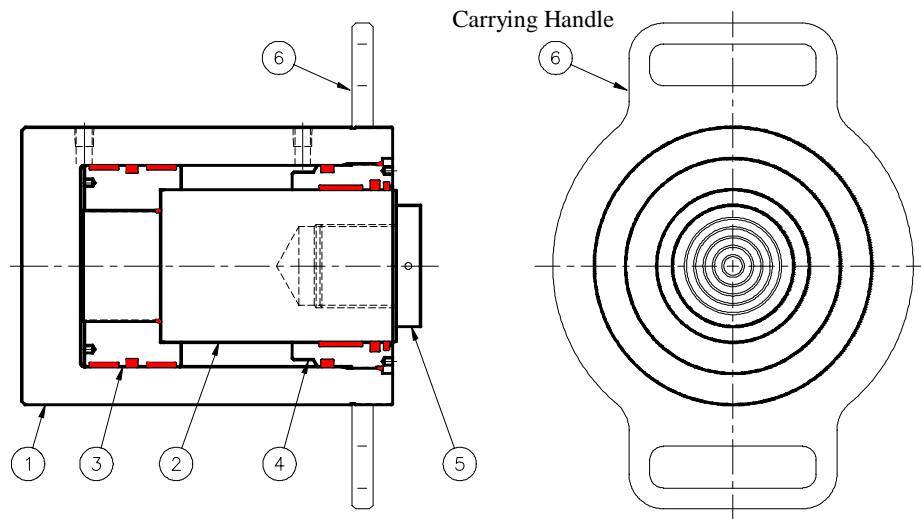
Pressure: 10,000 psi Working
Bore Sizes: 2.00" to 8.25"
Rod Sizes: 1.75" to 6.50"
Ports: 3/8" NPT

Series J Cylinder

Our Series J cylinders are designed for high tonnage jacking applications. Rated to operate up to 10,000 psi, they feature quality construction in a compact package. They are a double acting cylinder, therefore they can be used to push and also pull a load if needed.

FEATURES:

- Threaded piston and head gland
- Hard chrome plated rod
- Hardened, threaded and removable saddle in the rod end
- Threaded barrel end will carry full load for mounting
- Available in a pancake style
- Optional carrying handle

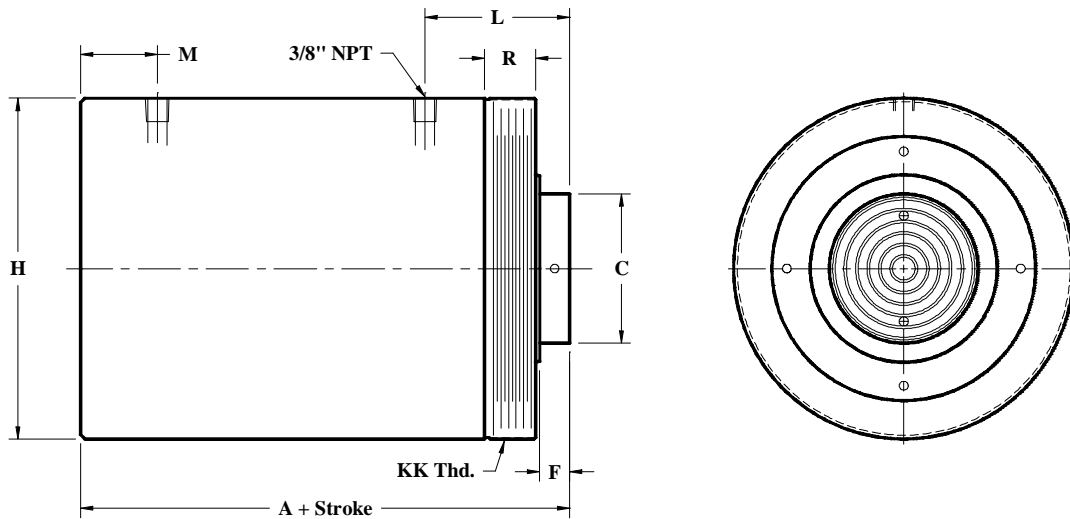


PART NUMBERS			Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	
Bore	Rod	Push Force (Tons)	Barrel	Rod	Piston	Gland	Saddle	Carrying Handle	Seal Kit
2 1/2	1 3/4	24.54	Part Number is Model number and Stroke Followed by: B for barrel R for rod		B3909	B3900	B3918-1	B3919-1	12754
3	2 1/4	35.33			B3910	B3901	B3918-2	B3919-2	12755
3 1/2	2 1/2	48.10			B3911	B3902	B3918-3	B3919-3	12756
4	3	62.83			B3912	B3903	B3918-4	B3919-4	12757
4 1/2	3 1/4	79.52			B3913	B3904	B3918-5	B3919-5	12758
5	4	98.18			B3914	B3905	B3918-6	B3919-6	12759
6 1/4	4 1/2	153.40			B3915	B3906	B3918-7	B3920-1	12760
7 1/4	5 1/2	206.41			B3916	B3907	B3918-8	B3920-2	12761
8 1/4	6 1/2	267.28			B3917	B3908	B3918-9	B3920-3	12762

Series J Cylinder

Basic cylinder

As a standard the cylinder will come with a threaded saddle in the end of the rod. It is possible to supply a special purpose saddle to suit a particular application. This can either be threaded into the rod or welded to the rod end.



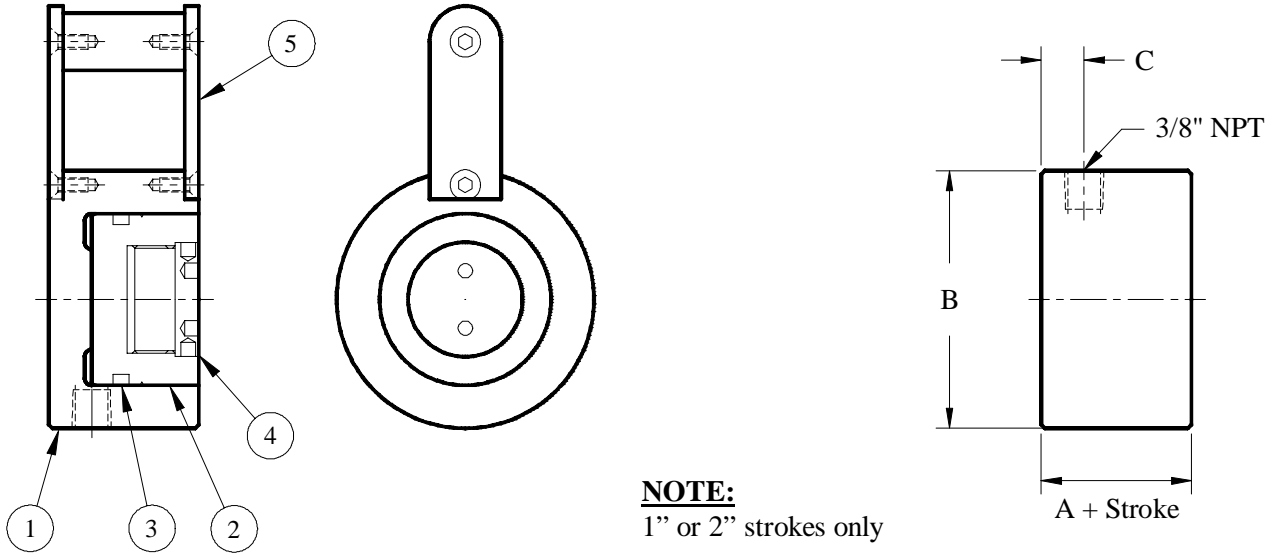
Bore	Rod	A	F	C	H	L	M	R	KK
2 1/2	1 3/4	6.06	0.38	1.44	3.50	2.38	1.13	1.00	3.50-12
3	2 1/4	6.38	0.38	1.69	4.00	2.50	1.38	1.00	4.00-12
3 1/2	2 1/2	6.81	0.50	2.19	4.75	2.63	1.50	1.00	4.75-12
4	3	7.38	0.63	2.69	5.50	2.75	1.63	1.00	5.50-12
4 1/2	3 1/4	7.50	0.63	2.88	6.00	2.75	1.75	1.00	6.00-12
5	4	8.63	0.63	3.44	7.00	3.13	2.00	1.00	7.00-12
6 1/4	4 1/2	9.69	0.75	3.75	8.50	3.25	2.13	1.50	8.50-12
7 1/4	5 1/2	10.38	0.88	4.38	10.00	3.25	2.25	1.50	10.00-12
8 1/4	6 1/2	10.88	1.00	5.38	11.00	3.38	2.50	1.50	11.00-12

Series J Cylinder

Pancake style cylinder

The pancake cylinders are meant for short stroke straight lift applications. They are a single acting cylinder operating at 10,000 psi. and would generally be operated by a manual pump. The rod is inserted directly into the barrel without any head gland holding it in place. As such the operator must be careful not to pump the rod out of the barrel. There is a line machined into the rod to mark the safe limit of the extension. A carrying handle is standard. Strokes are either 1" or 2" only.

These cylinders are ideal for construction work, machinery lifts and emergency rescue work.

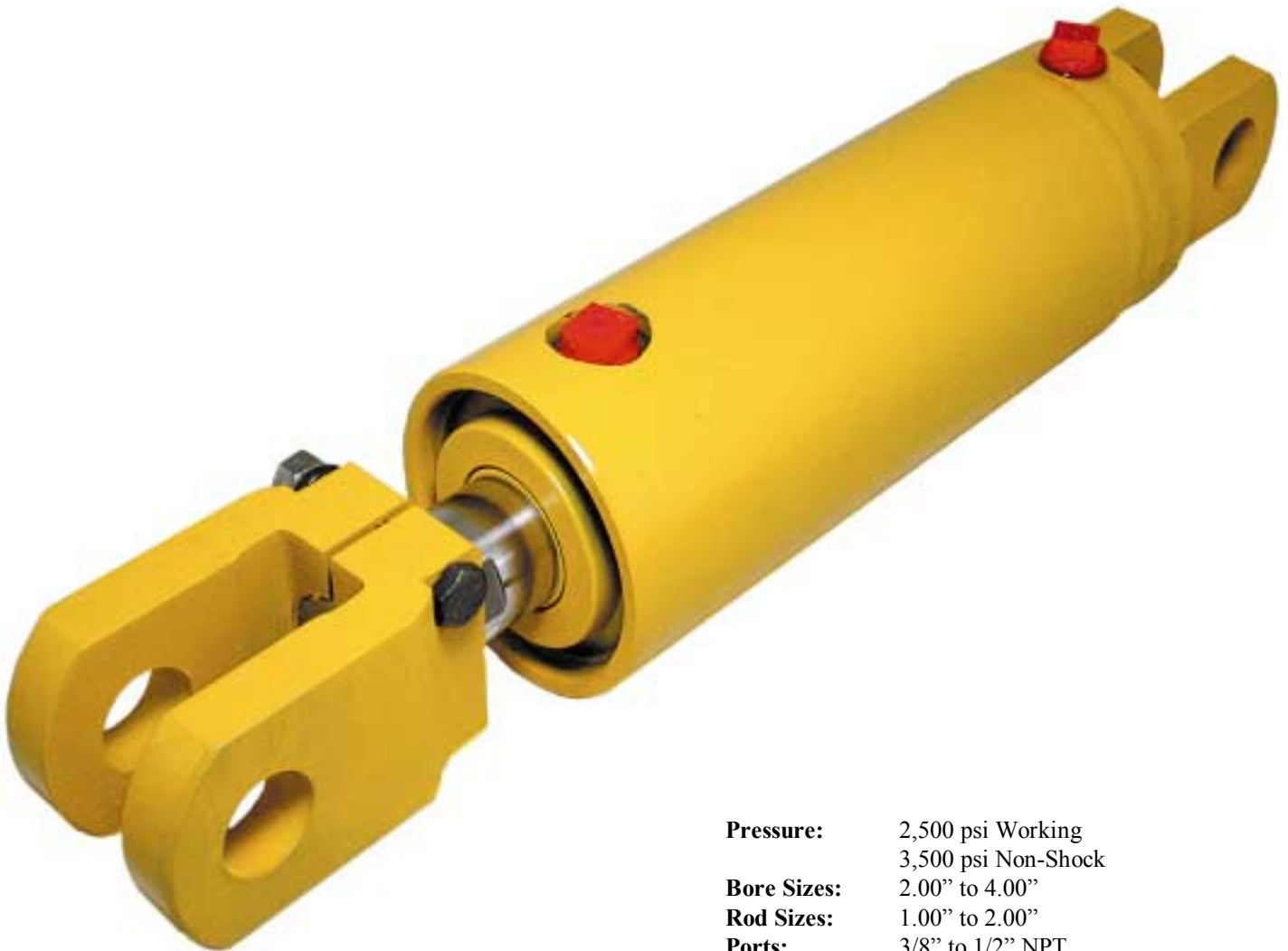


NOTE:
1" or 2" strokes only

PART NUMBERS.		Item 1	Item 2	Item 3	Item 4	Item 5			
Bore	Push Force (Tons)	Barrel	Rod	Seal	Saddle	Carrying Handle	A	B	C
2	15.71	Part Number is Model number and Stroke Followed by: B for barrel R for rod		12763	B3921-1	B3922-1	1.38	3.50	0.50
3	35.33			12764	B3921-2	B3922-2	1.63	4.50	0.75
3 5/8	51.60			12765	B3921-3	B3922-3	2.00	5.50	0.75



Series S Hydraulic Cylinder Snap ring



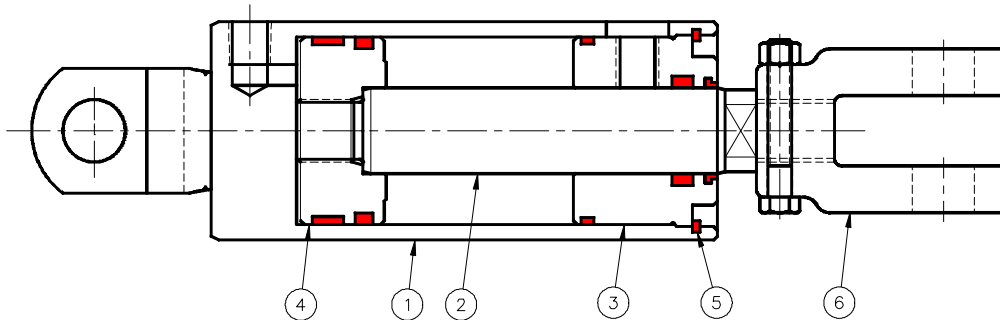
Pressure: 2,500 psi Working
3,500 psi Non-Shock
Bore Sizes: 2.00" to 4.00"
Rod Sizes: 1.00" to 2.00"
Ports: 3/8" to 1/2" NPT
Attachments: Clevis

Series S Cylinder

Our Series S cylinders are a snap ring style of cylinder, that is the head gland is held in place with a snap ring. They are rated for 2,500 psi operating pressure, and have a 3,500 non-shock pressure rating. This style is mainly used where space is limited around the cylinder, such as inside a structure.

FEATURES:

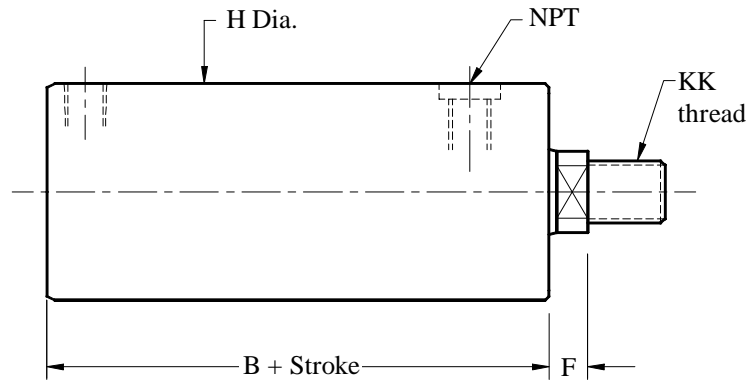
- There is no protrusion beyond the barrel outside diameter
- Head gland is held in place with a snap ring
- NPT ports are machined directly into the end and the head gland
- Piston is threaded to the rod with locking compound
- Clevis with 1" dia. pins are standard on both ends on all bore sizes



PART NUMBERS		Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	
Bore	Rod	Barrel	Rod	Gland	Piston	Snap Ring	Rod Clevis	Seal Kit
2	1	Part number is Model number and Stroke Followed by: B for barrel R for rod		B2699	B2727-32	12206	B2796-2	12178
2 1/2	1			B2702	B2727-40	10799	B2796-2	12187
	1 3/8			B2703	B2727-40	10799	B2796-2	12180
3	1 3/8			B2680	B2727-48	10800	B2796-2	12174
	1 3/4			B2692	B2727-48	10800	B2796-2	12188
3 1/2	1 3/8			B2660	B2727-56	11588	B2796-2	12173
	1 3/4			B2693	B2727-56	11588	B2796-2	12189
4	1 3/4			B2683	B2727-64	10795	B2796-2	12190
	2			B2691	B2727-64	10795	B2796-2	12191
4 1/2	2			B3120	B3124	12766	B2796-2	12320
5	2			B2955	B2954	10797	B2796-2	12277

Series S Cylinder

Basic cylinder



Bore	Rod #1	Rod #2	B	F	H	KK	NPT
2	1	—	4.88	0.88	3.00	1-14	3/8
2 1/2	1	1 3/8	4.88	0.88	3.00	1-14	3/8
3	1 3/8	1 3/4	5.13	0.63	3.50	1-14	1/2
3 1/2	1 3/8	1 3/4	5.13	0.63	4.00	1-14	1/2
4	1 3/4	2	5.13	0.63	4.50	1-14	1/2
4 1/2	2	—	6.00	0.63	5.00	1-14	1/2
5	2	—	6.00	0.63	5.75	1-14	1/2

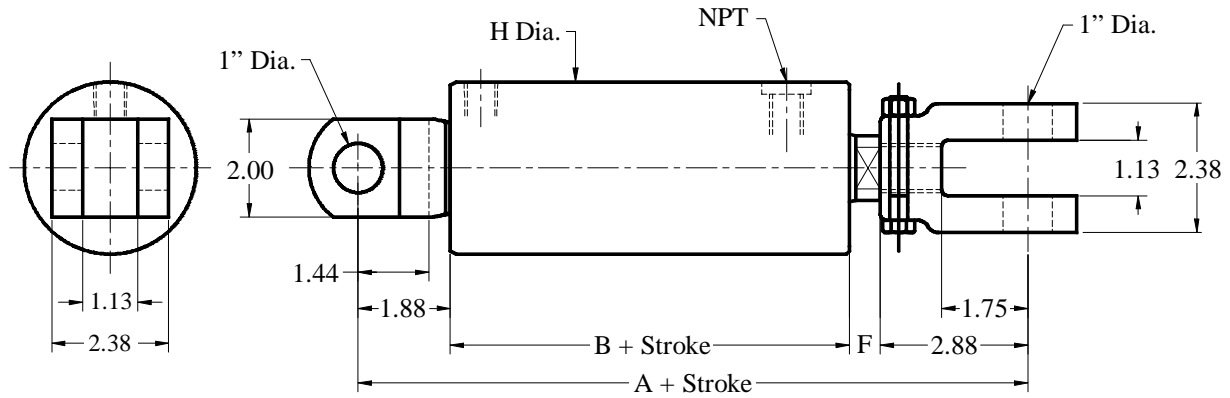
SHIPPING WEIGHTS (Approximate)					
Base Weight includes clevises.					
Bore	Base Weight	Pounds per inch of stroke by rod size			
		1	1 3/8	1 3/4	2
2	13	0.59			
2 1/2	13	0.72	0.91		
3	17		1.14	1.40	
3 1/2	21		1.28	1.51	
4	26			1.63	1.83
4 1/2	34				1.95
5	45				2.68

MATERIAL SPECIFICATIONS	
<i>Barrel:</i> DOM Tubing ASTM 513/519 Gr. 1020/1026	<i>Piston Seal:</i> Polyurethane with Nitrile Loader
<i>Head:</i> Ductile Iron ASTM A536 (65-45-12)	<i>Rod seal:</i> Polyurethane
<i>Piston:</i> Ductile Iron ASTM A536 (65-45-12)	<i>Wear Ring:</i> Reinforced Nylon
<i>Rod:</i> C1045 Chrome Plated	<i>Wiper:</i> Polyurethane
<i>Accessories:</i> Steel CSA G40-21 Gr. 44W	<i>O-Ring:</i> Nitrile
	<i>Back-Up:</i> Nitrile

Seal Temperature Range: -65° F to 225° F (-54° C to 107° C)

Series S Cylinder

Clevis Blind End / Clevis Rod End



Bore	Rod #1	Rod #2	A	B	F	H	NPT
2	1	—	10.50	4.88	0.88	3.00	3/8
2 1/2	1	1 3/8	10.50	4.88	0.88	3.00	3/8
3	1 3/8	1 3/4	10.50	5.13	0.63	3.50	1/2
3 1/2	1 3/8	1 3/4	10.50	5.13	0.63	4.00	1/2
4	1 3/4	2	10.50	5.13	0.63	4.50	1/2
4 1/2	2	—	11.38	6.00	0.63	5.00	1/2
5	2	—	11.38	6.00	0.63	5.75	1/2



Telescopic Cylinders

Series TS - Single Acting

Series TD - Double Acting



Pressure: 3,000 psi Working
3,000 psi Non-Shock

Bore Sizes: 2" to 8"

Rod Sizes: 1" to 6 3/4"

Ports: #6, to #20 ORB

Attachments: Tube

Cross Hole

Sph. Brg

Front Flange

Rear Flange

Male Mid Trunnion

Female Mid Trunnion

Telescopic Cylinder – Introduction

A telescopic cylinder is essentially a series of cylinders (called stages) nesting inside one another. It is normally used where space is a constraint.

Each stage is the rod of the larger stage and the barrel of that stage. e.g. A 3-stage cylinder is 3 stages or rods that move in and out. It consists of the barrel (the largest tube) followed by the first stage and then the second stage and finally the smallest stage (called the rod).

There are two types of telescopic cylinders. Single acting and double acting.

Single Acting - S/A

A S/A telescopic is essentially a displacement cylinder. It extends by hydraulic power and retracts by gravity or any external force. The oil pressure acts on the outside diameter of the various rods. When retracted, the various stages are immersed in oil, thus protecting them from rusting. These cylinders do not leak unless the rod seals are damaged. The port is located at the barrel end and a bleed port at the rod. The cylinder is sealed at the rod end.

Double Acting - D/A

D/A telescopic is powered both ways. Oil acts on the bore area to extend and on the annulus area between the bore and rod to retract. The extend force is typically 5 times the retract force. Because of this intensification, it is critical that the retract port is not restricted. D/A cylinders will slowly drift due to seal leakage; the leakage rate is

dependent on the surface finishes of the cast iron piston seals and the barrel surface. The ports are located at the rod end. The first stage extends first, when extending the cylinder; on retracting, the rod stage retracts first.

Design & Selection Considerations

- The forces given in the charts are theoretical; friction and back pressure are ignored.
- Since the size of each stage is different, the speed and force of a cylinder will vary as the cylinder extends and retract. For a variable load application (e.g. dump truck), the force at each stage must be examined for overall suitability.
- Overlap “A” should be maximum for strength. We recommend a minimum of 15% to 20% of the stroke per stage. A telescopic cylinder should be designed to use the fewest number of stages, for economy and strength.
- As the customer is aware of all aspects of the application, he is responsible for sizing the cylinder according to his needs. Our products are not warranted express or by implication for any specific purpose, notwithstanding any disclosure to us of the use to which the product is to be put.
- Stroke is the same for each stage. The rod stroke can be different to accommodate an odd stroke.

Telescopic Cylinder – Introduction

Features

- Designed for 3,000 PSI non-shock pressure.
- Designed for easy maintenance. Unscrew the barrel end cap and each stage can be removed from the blind end.
- All stages have 0.001 inches thick hard chrome on the O.D. to resist corrosion. This smooth surface reduces wear on the rod, wear ring, seal and wiper.
- No external threaded ring at the rod. Each stage protrudes only ¼” resulting in maximum overlap.
- The tube of each stage is re-inforced by the gland and piston, making the stages considerably stronger.
- Wide selection of standard mounting. The following charts show the standard size (hole diameter, CD) and x-hole and tube eye style. Any other style and size (shown in the accessories section ‘02’) are available. The limitation is that the rod end accessory must be smaller than the rod for welded type. If this is not possible, then a threaded type must be selected.
- The annulus space between each stage is 1/8” this gives a smoother transition between stages when extending and retracting. Also, the cylinder diameter is smaller.
- The rod seal is “U-Cup” (Parker or equivalent) and not Vee packing which can be over-tightened causing increased friction and premature failure.
- Normally three wear rings, strategically placed, support each stage. Two wear rings style is available but is only recommended for short stroke cylinders (less than 10” of S/S). Call our Engineering Department for details.
- SAE ORB (O’ring Boss) ports are standard.

Cylinder Attachments

Blind End

- The following charts show the blind end with standard tube eye.
- Any size and type of welded cylinder accessories can be ordered.
- Front flange, rear flange, male trunnion and female trunnion are also available see page **13-13, 14** for details.

Rod End

- The following charts show X-hole mounting as the shortest and simplest style.
- Any other types or sizes can be supplied. The only restriction is, the attachments must be smaller than the rod diameter.
- If a bigger accessory is necessary, it must be threaded on. Consult our Engineering Department for details.

Selection

First, decide on the following:

- Working pressure.
- Single or double acting cylinder.
- Force and stroke requirements.
- Space available.
- Type and size of attachments at both ends to support the load and minimize side loads.

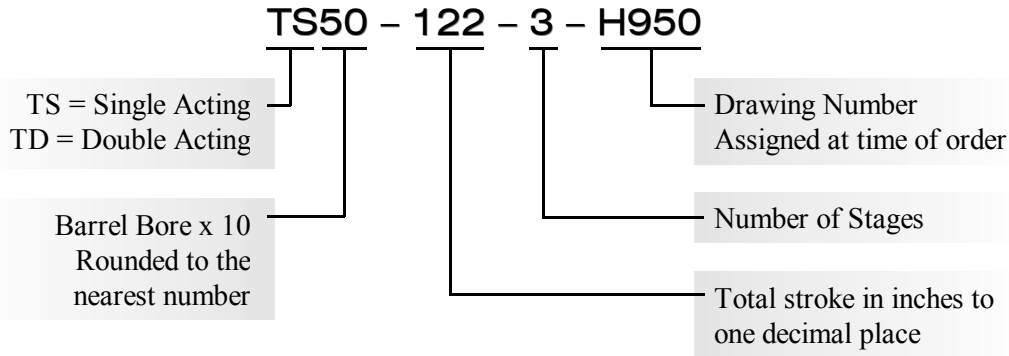
From the following charts work out:

- Number of stages.
- S/S – stroke per stage
- A – overlap

Telescopic Cylinder – Introduction

Model Number

A model number will be assigned at the time of order. Please refer to this number when re-ordering or ordering parts.



Specifications

The forces given in the following charts are theoretical. Losses due to friction etc. are neglected.

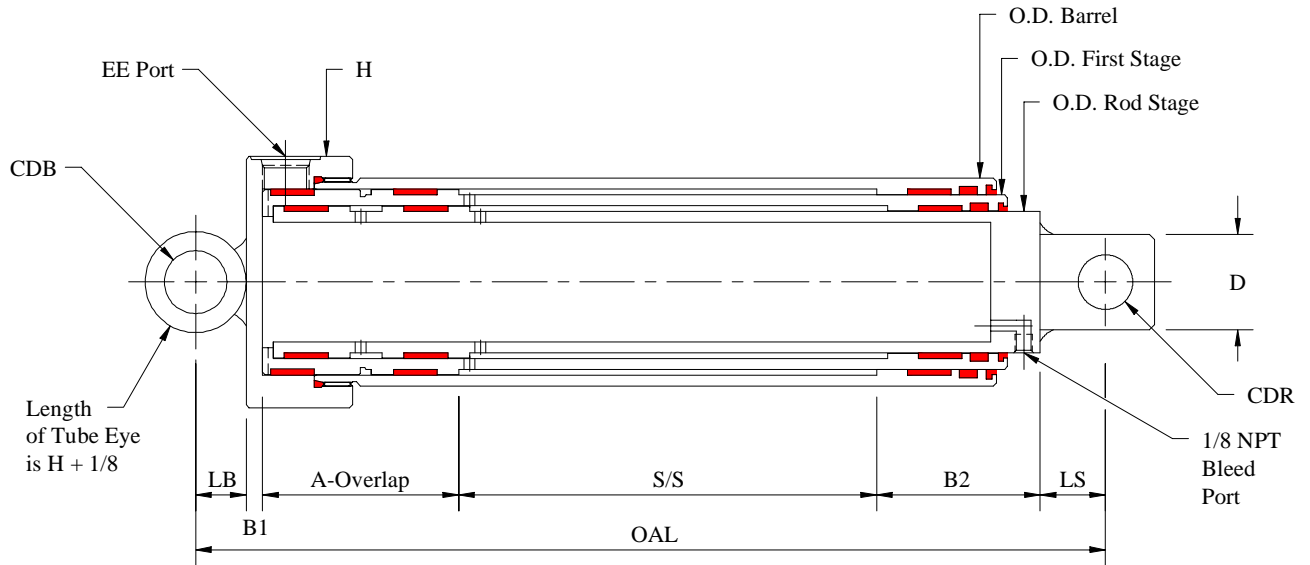
Forces:	$F = P \times A$
F = force in lbs. either push or pull (see charts)	
P = pressure, lbs / inch ² , 3000psi maximum	
A = area in square inch	
	- rod area for single acting in push
	- piston area for double acting in push
	- accumulated area for double acting in pull

Lengths:	$OAL = S/S + A + B + LB + LS$
OAL = overall length of the cylinder in inches, centre of pin to centre of pin fully retracted	
S/S = stroke per stage in inches = total stroke ÷ number of stages	
A = overlap of stage, either specified by the customer or obtained from OAL	

Volume:	$V = FV \times \text{stroke}$
V = volume of oil displaced in U.S. gallons. or the difference between volume of oil in the cylinder when fully extended and retracted.	
= total stroke in inches	

Weight:	$W = \text{Basic} + FW \times (OAL-L)$
W = Dry weight of cylinder in lbs. for standard mounting as per chart.	

Telescopic Cylinder – 2 Stage, Single Acting

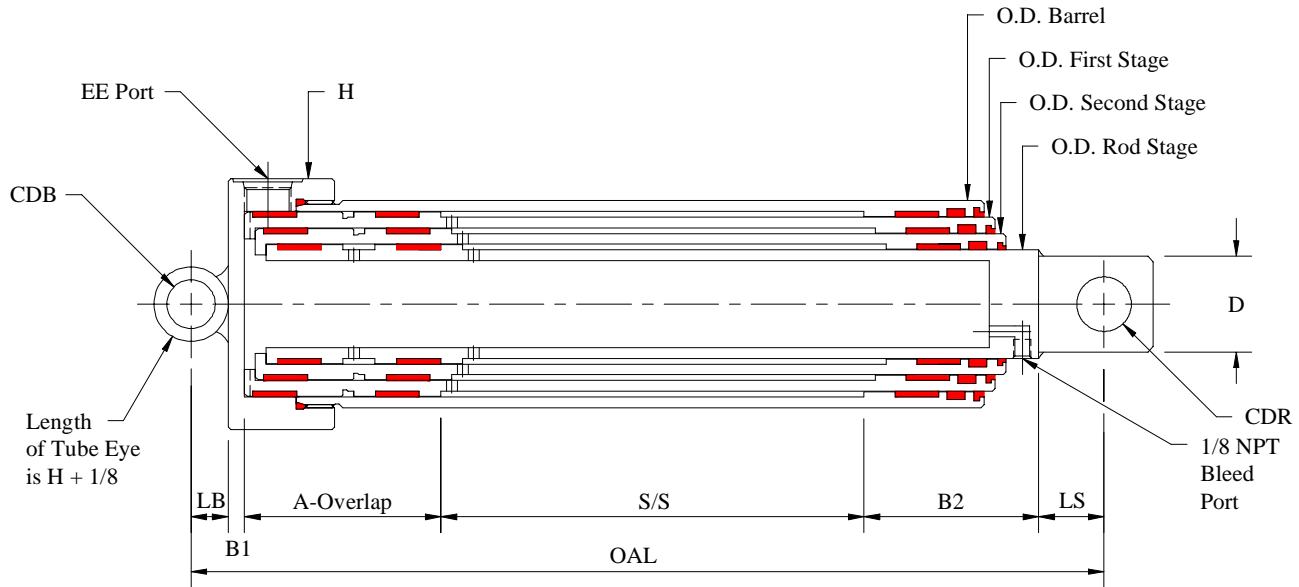


A-Overlap Minimum is 4 1/2 for all Stages.

BARREL BORE	O.D. IN INCHES			B= B1+B2	H Dia	EE ORB	MOUNTING ACCESSORIES				
	BARREL	1 ST STAGE	ROD				BLIND END		ROD END		D
							CDB ϕ	LB	CDR ϕ	LS	
2	2 1/2	1 3/4	1	4.13	3.25	#6	0.75	0.63	0.63	0.75	1.00
2 3/4	3 1/4	2 1/2	1 3/4	4.13	4.00	#8	0.75	0.63	0.75	1.00	1.44
3 1/2	4	3 1/4	2 1/2	4.13	5.00	#12	1.00	0.88	1.00	1.13	1.69
4 1/4	4 3/4	4	3 1/4	4.13	5.75	#12	1.25	1.00	1.25	1.50	2.19
5	5 3/4	4 3/4	4	4.25	6.50	#12	1.50	1.13	1.50	1.75	2.44
6	6 3/4	5 3/4	4 3/4	4.25	7.50	#16	1.75	1.25	1.75	2.00	3.19
7	7 3/4	6 3/4	5 3/4	4.25	8.50	#20	2.00	1.50	2.00	2.25	3.44
8	8 3/4	7 3/4	6 3/4	4.38	9.75	#20	2.50	1.75	2.50	2.75	3.94

BARREL BORE	PUSH FORCE @ 3000 PSI IN lbs		VOLUME FACTOR FV	WEIGHT FACTORS			SEAL KIT
	1 ST STAGE	ROD STAGE		BASIC	FW	L	
2	7,220	2,360	0.007	12	1.62	10.0	12491
2 3/4	14,700	7,220	0.016	21	1.85	10.3	12459
3 1/2	24,900	14,700	0.029	26	2.00	10.6	12460
4 1/4	37,700	24,900	0.045	35	2.50	11.1	12461
5	53,200	37,700	0.066	49	3.62	11.6	12462
6	77,900	53,200	0.095	68	4.91	12.0	12463
7	107,000	77,900	0.134	90	6.37	12.5	12464
8	142,000	107,000	0.180	116	7.37	13.4	12465

Telescopic Cylinder – 3 Stage, Single Acting

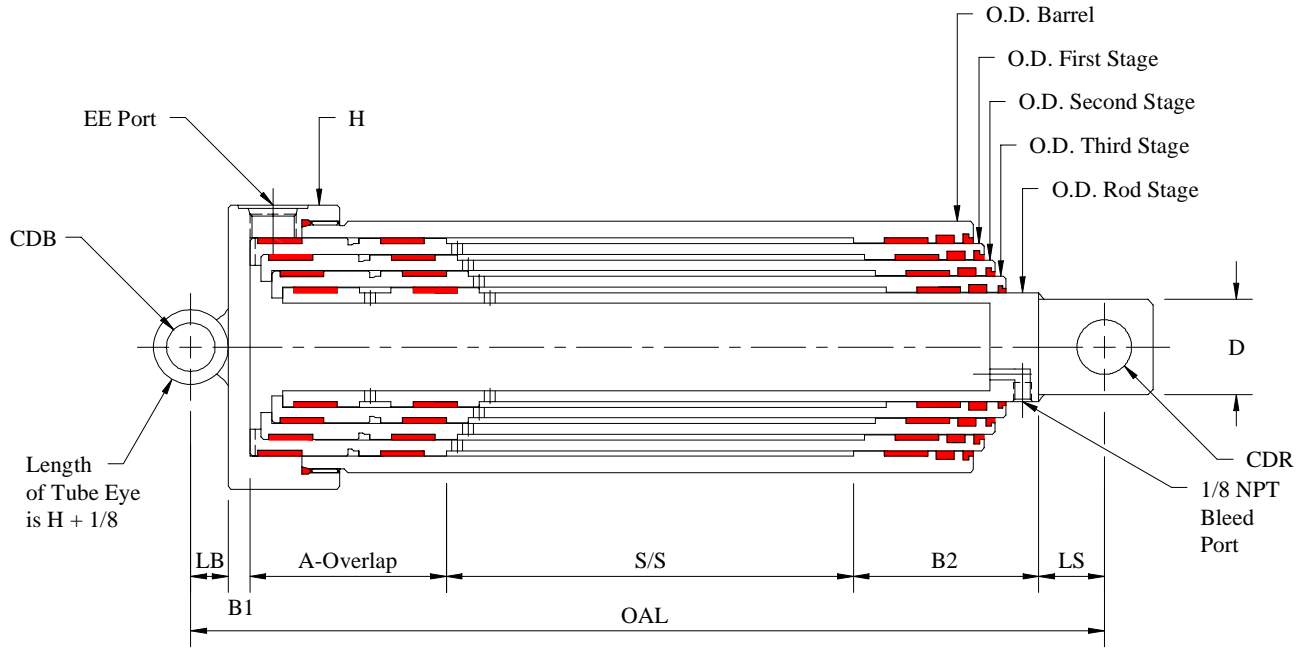


A-Overlap Minimum is 4 1/2 for all Stages.

BARREL BORE	O.D. IN INCHES				B= B1+B2	H Dia	EE ORB	MOUNTING ACCESSORIES				
	BARREL	1 ST STAGE	2 ND STAGE	ROD				BLIND END		ROD END		D
								CDB ϕ	LB	CDR ϕ	LS	
2 3/4	3 1/4	2 1/2	1 3/4	1	4.38	4.00	#8	0.75	0.63	0.63	0.75	1.00
3 1/2	4	3 1/4	2 1/2	1 3/4	4.38	5.00	#12	1.00	0.88	1.00	1.13	1.69
4 1/4	4 3/4	4	3 1/4	2 1/2	4.38	5.75	#12	1.25	1.00	1.25	1.50	2.19
5	5 3/4	4 3/4	4	3 1/4	4.50	6.50	#12	1.50	1.13	1.50	1.75	2.44
6	6 3/4	5 3/4	4 3/4	4	4.50	7.50	#16	1.75	1.25	1.75	2.00	3.19
7	7 3/4	6 3/4	5 3/4	4 3/4	4.50	8.50	#20	2.00	1.50	2.00	2.25	3.44
8	8 3/4	7 3/4	6 3/4	5 3/4	4.63	9.75	#20	2.50	1.75	2.50	2.75	3.94

BARREL BORE	PUSH FORCE @ 3000 PSI IN lbs			VOLUME FACTOR FV	WEIGHT FACTORS			SEAL KIT
	1 ST STAGE	2 ND STAGE	ROD STAGE		BASIC	FW	L	
2 3/4	14,700	7,220	2,360	0.012	20	2.28	10.3	12492
3 1/2	24,900	14,700	7,220	0.023	32	2.68	10.9	12466
4 1/4	37,700	24,900	14,700	0.037	40	3.00	11.4	12467
5	53,200	37,700	24,900	0.056	56	4.29	11.9	12468
6	77,900	53,200	37,700	0.081	76	5.75	12.3	12469
7	107,000	77,900	53,200	0.115	99	7.37	12.8	12470
8	142,000	107,000	77,900	0.157	131	9.16	13.6	12471

Telescopic Cylinder – 4 Stage, Single Acting

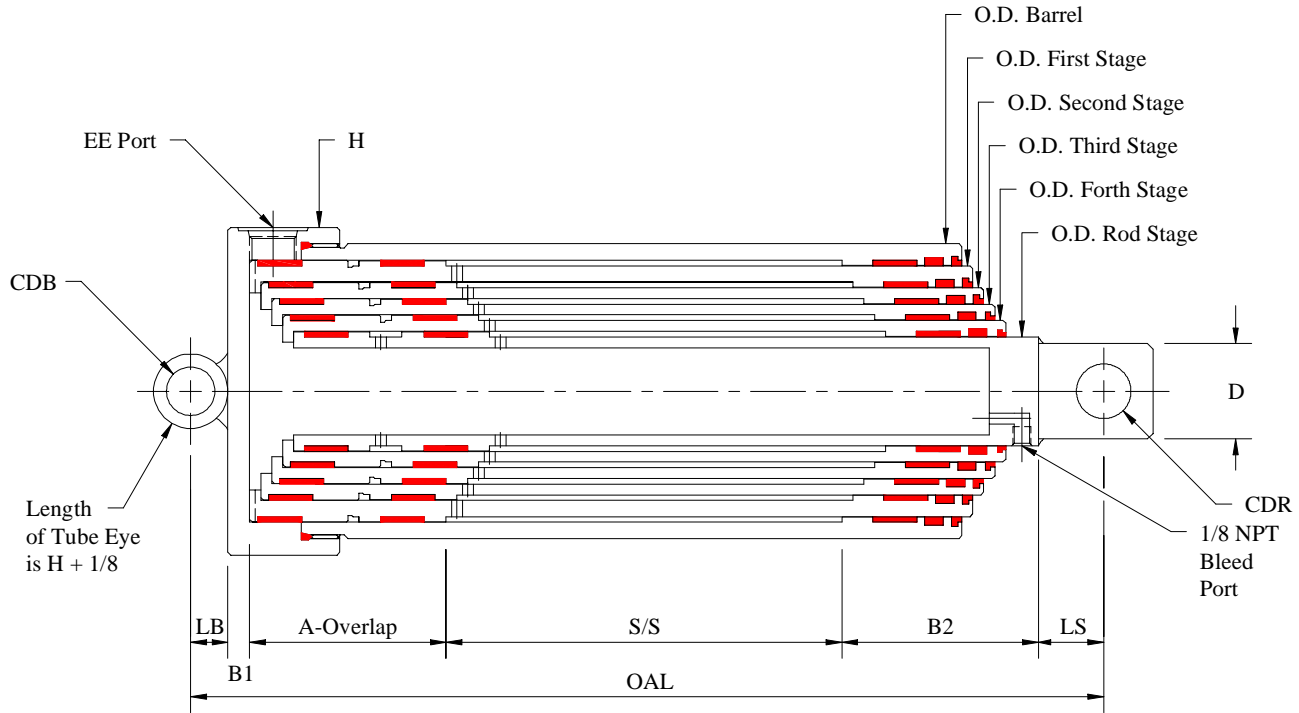


A-Overlap Minimum is 4 1/2 for all Stages.

BARREL BORE	O.D. IN INCHES					B= B1+B2	H Dia	EE ORB	MOUNTING ACCESSORIES				
	BARREL	1 ST STAGE	2 ND STAGE	3 RD STAGE	ROD				BLIND END		ROD END		D
									CDB ϕ	LB	CDR ϕ	LS	
3 1/2	4	3 1/4	2 1/2	1 3/4	1	4.63	5.00	#12	1.00	0.88	0.63	0.75	1.00
4 1/4	4 3/4	4	3 1/4	2 1/2	1 3/4	4.63	5.75	#12	1.25	1.00	1.00	1.13	1.69
5	5 3/4	4 3/4	4	3 1/4	2 1/2	4.75	6.50	#12	1.50	1.13	1.50	1.75	2.44
6	6 3/4	5 3/4	4 3/4	4	3 1/4	4.75	7.50	#16	1.75	1.25	1.75	2.00	3.19
7	7 3/4	6 3/4	5 3/4	4 3/4	4	4.75	8.50	#20	2.00	1.50	2.00	2.25	3.44
8	8 3/4	7 3/4	6 3/4	5 3/4	4 3/4	4.88	9.75	#20	2.50	1.75	2.50	2.75	3.94

BARREL BORE	PUSH FORCE @ 3000 PSI IN lbs				FV	WEIGHT FACTORS			SEAL KIT
	1 ST STAGE	2 ND STAGE	3 RD STAGE	ROD STAGE		BASIC	FW	L	
3 1/2	24,900	14,700	7,220	2,360	0.018	31	3.12	10.8	12493
4 1/4	37,700	24,900	14,700	7,220	0.030	44	3.68	11.3	12472
5	53,200	37,700	24,900	14,700	0.047	61	4.79	12.1	12473
6	77,900	53,200	37,700	24,900	0.070	83	6.41	12.5	12474
7	107,000	77,900	53,200	37,700	0.100	107	8.20	13.0	12475
8	142,000	107,000	77,900	53,200	0.137	141	10.16	13.9	12476

Telescopic Cylinder – 5 Stage, Single Acting

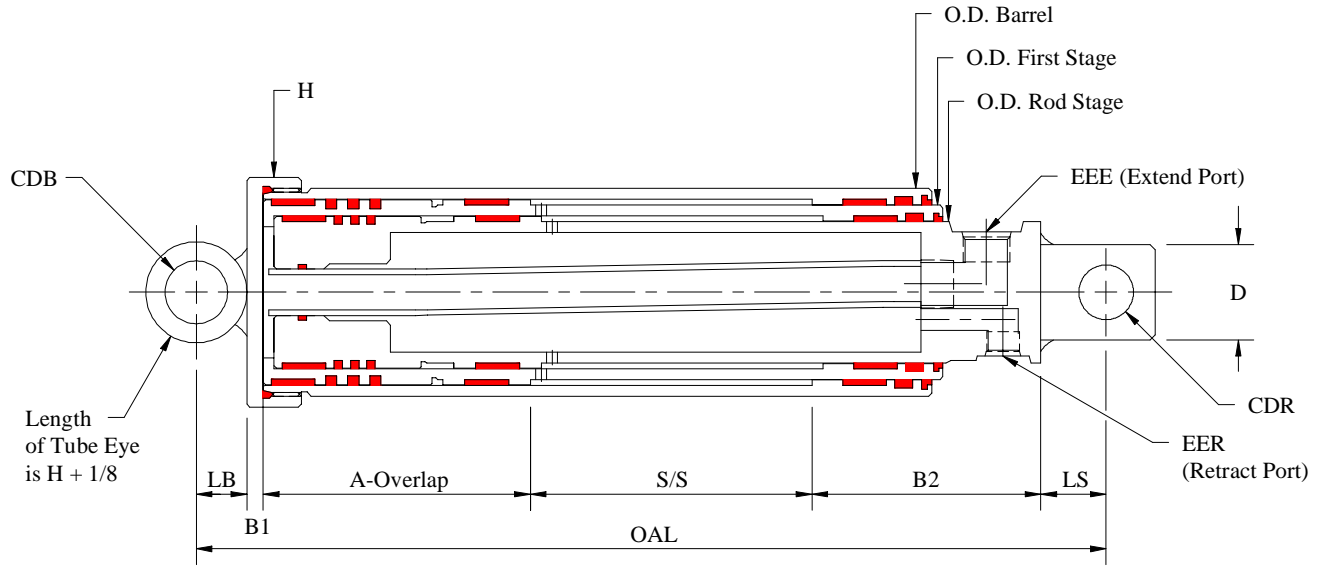


A-Overlap Minimum is 4 1/2 for all Stages.

BARREL BORE	O.D. IN INCHES						B= B1+B2	H Dia	EE ORB	MOUNTING ACCESSORIES				
	BARREL	1 ST STAGE	2 ND STAGE	3 RD STAGE	4 TH STAGE	ROD				BLIND END		ROD END		D
										CDBØ	LB	CDRØ	LS	
4 1/4	4 3/4	4	3 1/4	2 1/2	1 3/4	1	4.88	5.75	#12	1.25	1.00	0.63	0.75	1.00
5	5 3/4	4 3/4	4	3 1/4	2 1/2	1 3/4	5.00	6.50	#12	1.50	1.13	1.00	1.13	1.69
6	6 3/4	5 3/4	4 3/4	4	3 1/4	2 1/2	5.00	7.50	#16	1.75	1.25	1.50	1.75	2.44
7	7 3/4	6 3/4	5 3/4	4 3/4	4	3 1/4	5.00	8.50	#20	2.00	1.50	1.75	2.00	3.19
8	8 3/4	7 3/4	6 3/4	5 3/4	4 3/4	4	5.13	9.75	#20	2.50	1.75	2.50	2.75	3.94

BARREL BORE	PUSH FORCE @ 3000 PSII IN lbs					VOLUME FACTOR FV	WEIGHT FACTORS			SEAL KIT
	1 ST STAGE	2 ND STAGE	3 RD STAGE	4 TH STAGE	ROD STAGE		BASIC	FW	L	
4 1/4	37,700	24,900	14,700	7,220	2,360	0.025	43	4.12	11.1	12494
5	53,200	37,700	24,900	14,700	7,220	0.040	64	5.47	11.8	12477
6	77,900	53,200	37,700	24,900	14,700	0.060	84	6.91	12.5	12478
7	107,000	77,900	53,200	37,700	24,900	0.087	112	8.87	13.0	12479
8	142,000	107,000	77,900	53,200	37,700	0.121	154	10.99	14.1	12480

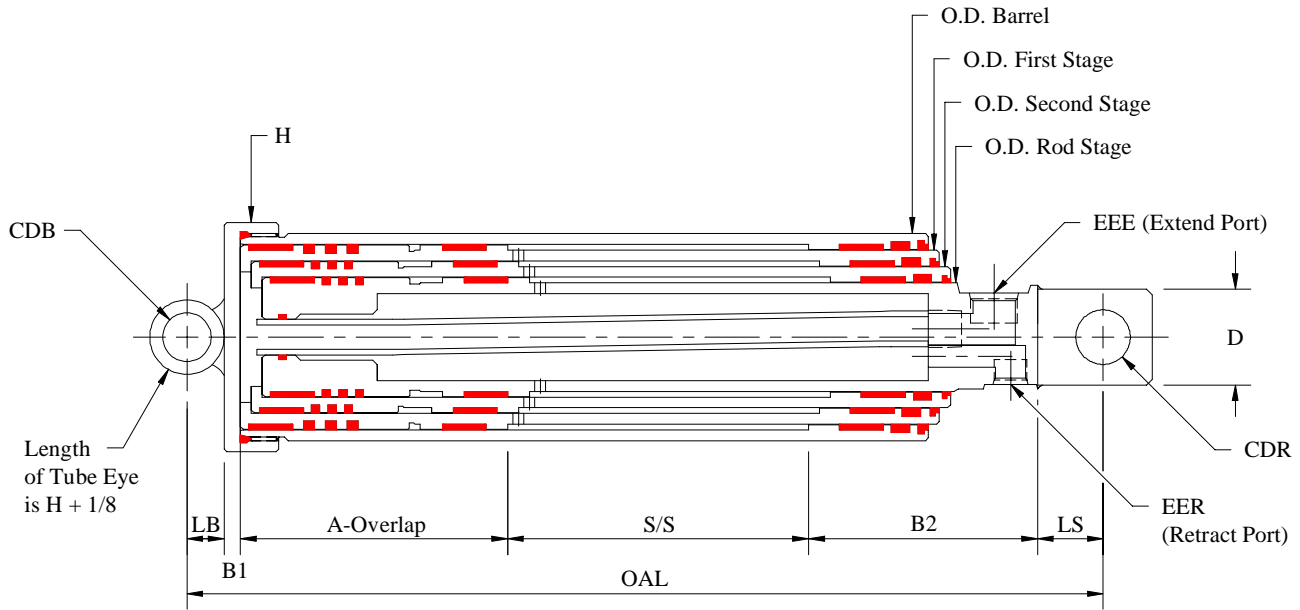
Telescopic Cylinder – 2 Stage, Double Acting



BARREL BORE	O.D. IN INCHES			A O'LAP (MIN)	B= B1+B2	H Dia	PORTS		MOUNTING ACCESSORIES				
	BARREL	1 ST STAGE	ROD				EEE ORB	EER ORB	BLIND END		ROD END		D
									CDB ϕ	LB	CDR ϕ	LS	
2 3/4	3 1/4	2 1/2	1 3/4	5.63	5.25	3.75	#8	#6	0.75	0.63	0.75	1.00	1.44
3 1/2	4	3 1/4	2 1/2	5.63	5.38	4.50	#12	#8	1.00	0.88	1.00	1.13	1.69
4 1/4	4 3/4	4	3 1/4	6.13	5.63	5.25	#16	#8	1.25	1.00	1.25	1.50	2.19
5	5 3/4	4 3/4	4	6.13	5.75	6.25	#16	#12	1.50	1.13	1.50	1.75	2.44
6	6 3/4	5 3/4	4 3/4	6.13	6.00	7.38	#20	#12	1.75	1.25	1.75	2.00	3.19
7	7 3/4	6 3/4	5 3/4	6.13	6.13	8.38	#20	#16	2.00	1.50	2.00	2.25	3.44
8	8 3/4	7 3/4	6 3/4	6.13	6.25	9.75	#20	#16	2.50	1.75	2.50	2.75	3.94

BARREL BORE	FORCE @ 3000 PSI IN lbs FOR STAGES				VOLUME FACTOR FV	WEIGHT FACTORS			SEAL KIT
	PUSH FORCE		PULL FORCE			BASIC	FW	L	
	1 ST	ROD	1 ST	ROD					
2 3/4	17,800	9,420	3,090	2,210	0.016	16	1.50	6.9	12438
3 1/2	28,900	17,800	3,980	3,090	0.029	27	2.00	7.8	12439
4 1/4	42,600	28,900	4,860	3,980	0.045	39	2.50	8.5	12402
5	58,900	42,600	5,740	4,860	0.066	61	3.62	9.5	12441
6	84,800	58,900	6,920	5,740	0.095	87	4.91	10.1	12442
7	115,000	84,800	8,100	6,920	0.134	119	6.37	10.8	12443
8	151,000	115,000	9,280	8,100	0.180	157	7.37	11.6	12440

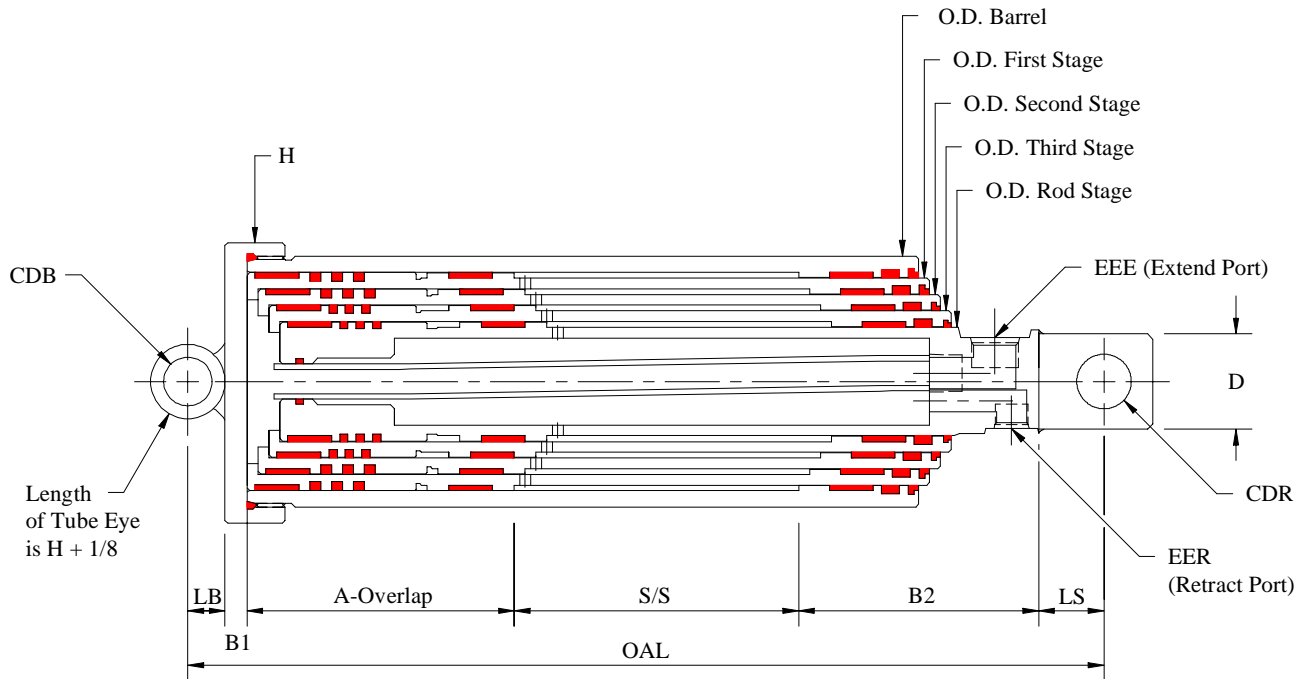
Telescopic Cylinder – 3 Stage, Double Acting



BARREL BORE	O.D. IN INCHES				A O'LAP (MIN)	B= B1+B2	H Dia	PORTS		MOUNTING ACCESSORIES				
	BARREL	1 ST STAGE	2 ND STAGE	ROD				EEE ORB	EER ORB	BLIND END		ROD END		D
										CDB ϕ	LB	CDR ϕ	LS	
3 1/2	4	3 1/4	2 1/2	1 3/4	5.63	5.50	4.50	#12	#8	1.00	0.88	1.00	1.13	1.69
4 1/4	4 3/4	4	3 1/4	2 1/2	6.13	5.63	5.25	#16	#8	1.25	1.00	1.25	1.50	2.19
5	5 3/4	4 3/4	4	3 1/4	6.13	6.00	6.25	#16	#12	1.50	1.13	1.50	1.75	2.44
6	6 3/4	5 3/4	4 3/4	4	6.13	6.00	7.38	#20	#12	1.75	1.25	1.75	2.00	3.19
7	7 3/4	6 3/4	5 3/4	4 3/4	6.13	6.25	8.38	#20	#16	2.00	1.50	2.00	2.25	3.44
8	8 3/4	7 3/4	6 3/4	5 3/4	6.13	6.50	9.75	#20	#16	2.50	1.75	2.50	2.75	3.94

BARREL BORE	FORCE @ 3000 PSI IN lbs FOR STAGES						VOLUME FACTOR FV	WEIGHT FACTORS			SEAL KIT
	PUSH FORCE			PULL FORCE				BASIC	FW	L	
	1 ST	2 ND	ROD	1 ST	2 ND	ROD					
3 1/2	28,900	17,800	9,420	3,980	3,090	2,210	0.023	30	2.33	7.6	12444
4 1/4	42,600	28,900	17,800	4,860	3,980	3,090	0.037	39	3.00	8.3	12445
5	58,900	42,600	28,900	5,740	4,860	3,980	0.056	61	4.29	9.5	12446
6	84,800	58,900	42,600	6,920	5,740	4,860	0.081	86	5.75	9.9	12447
7	115,000	84,800	58,900	8,100	6,920	5,740	0.115	116	7.37	10.6	12448
8	151,000	115,000	84,800	9,280	8,100	6,920	0.157	157	9.16	11.6	12449

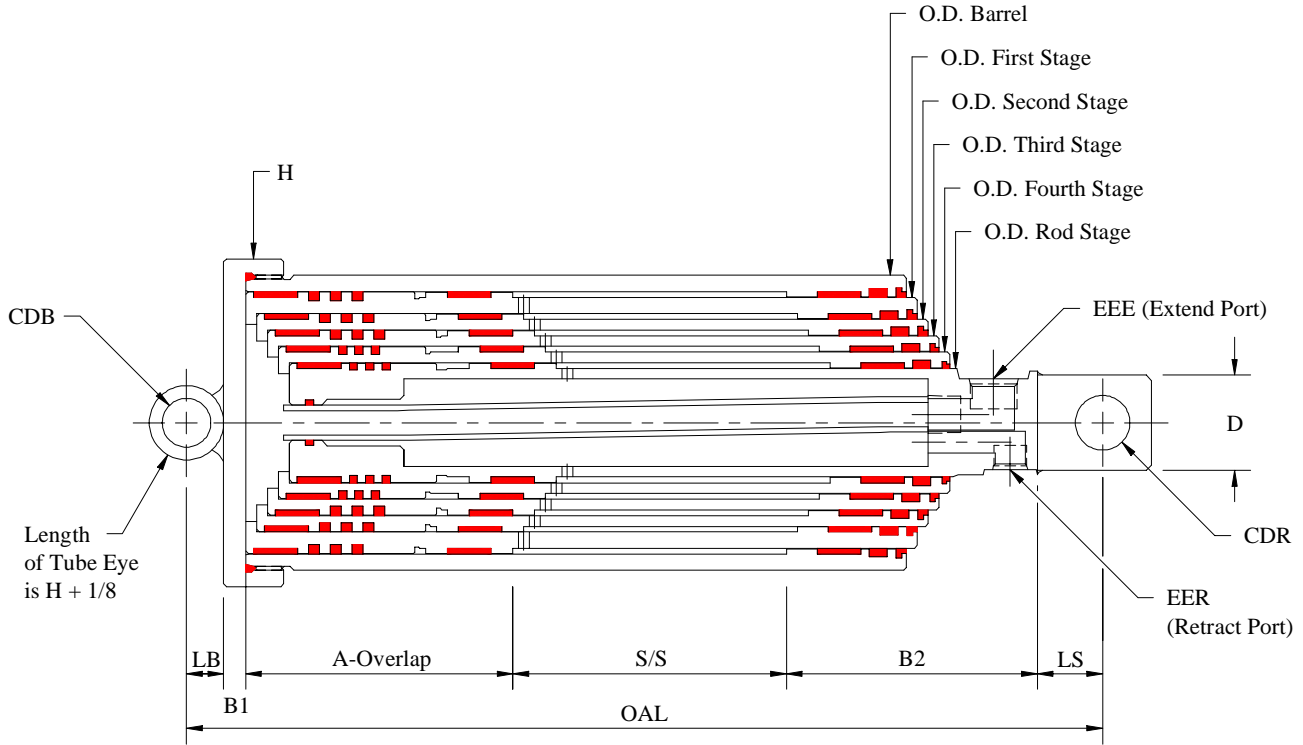
Telescopic Cylinder – 4 Stage, Double Acting



BARREL BORE	O.D. IN INCHES								PORTS		MOUNTING ACCESSORIES				
	BARREL	1 ST STAGE	2 ND STAGE	3 RD STAGE	ROD	A O ^L LAP (MIN)	B= B1+B2	H Dia	EEE ORB	EER ORB	BLIND END		ROD END		D
											CDB ϕ	LB	CDR ϕ	LS	
4 1/4	4 3/4	4	3 1/4	2 1/2	1 3/4	6.13	5.75	5.25	#16	#8	1.25	1.00	1.00	1.13	1.69
5	5 3/4	4 3/4	4	3 1/4	2 1/2	6.13	6.00	6.25	#16	#12	1.50	1.13	1.50	1.75	2.44
6	6 3/4	5 3/4	4 3/4	4	3 1/4	6.13	6.25	7.38	#20	#12	1.75	1.25	1.75	2.00	3.19
7	7 3/4	6 3/4	5 3/4	4 3/4	4	6.13	6.25	8.38	#20	#16	2.00	1.50	2.00	2.25	3.44
8	8 3/4	7 3/4	6 3/4	5 3/4	4 3/4	6.13	6.63	9.75	#20	#16	2.50	1.75	2.50	2.75	3.94

BARREL BORE	FORCE @ 3000 PSI IN lbs FOR STAGES									VOLUME FACTOR FV	WEIGHT FACTORS			SEAL KIT
	PUSH FORCE				PULL FORCE				BASIC		FW	L		
	1 ST	2 ND	3 RD	ROD	1 ST	2 ND	3 RD	ROD						
4 1/4	42,600	28,900	17,800	9,420	4,860	3,980	3,090	2,210	0.030	37	3.33	7.8	12450	
5	58,900	42,600	28,900	17,800	5,740	4,860	3,980	3,090	0.047	61	4.79	9.3	12451	
6	84,800	58,900	42,600	28,900	6,920	5,740	4,860	3,980	0.070	86	6.41	9.9	12452	
7	115,000	84,800	58,900	42,600	8,100	6,920	5,740	4,860	0.100	115	8.20	10.4	12453	
8	151,000	115,000	84,800	58,900	9,280	8,100	6,920	5,740	0.137	154	10.16	11.5	12454	

Telescopic Cylinder – 5 Stage, Double Acting

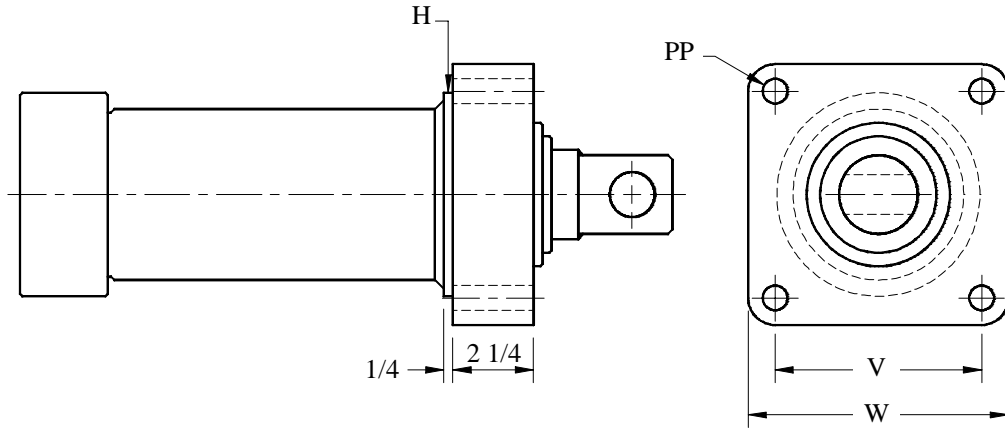


BARREL BORE	O.D. IN INCHES						A O'LAP (MIN)	B= B1+B2	H Dia	PORTS		MOUNTING ACCESSORIES				D
	BARREL	1 ST STAGE	2 ND STAGE	3 RD STAGE	4 TH STAGE	ROD				EEE ORB	EER ORB	BLIND END		ROD END		
												CDB ϕ	LB	CDR ϕ	LS	
5	5 3/4	4 3/4	4	3 1/4	2 1/2	1 3/4	6.13	6.13	6.25	#16	#12	1.50	1.13	1.00	1.13	1.69
6	6 3/4	5 3/4	4 3/4	4	3 1/4	2 1/2	6.13	6.25	7.38	#20	#12	1.75	1.25	1.50	1.75	2.44
7	7 3/4	6 3/4	5 3/4	4 3/4	4	3 1/4	6.13	6.50	8.38	#20	#16	2.00	1.50	1.75	2.00	3.19
8	8 3/4	7 3/4	6 3/4	5 3/4	4 3/4	4	6.13	6.63	9.75	#20	#16	2.50	1.75	2.50	2.75	3.94

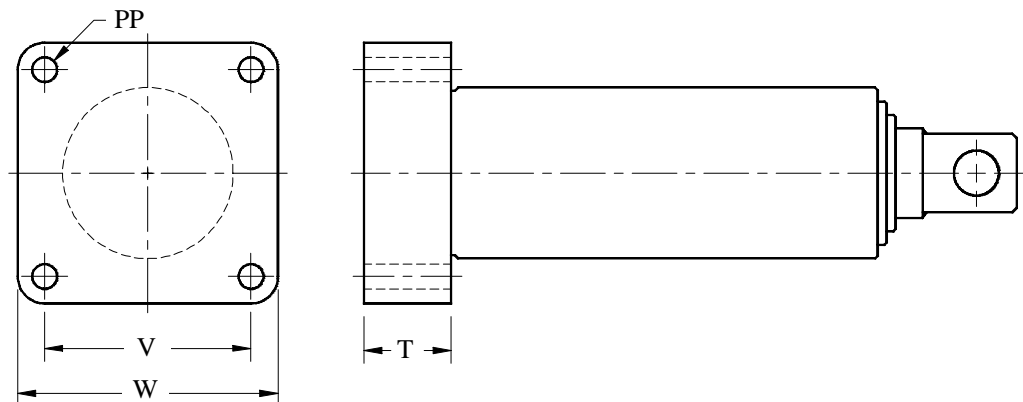
BARREL BORE	FORCE @ 3000 PSI IN lbs FOR STAGES										VOLUME FACTOR FV	WEIGHT FACTORS			SEAL KIT
	PUSH FORCE					PULL FORCE						BASIC	FW	L	
	1 ST	2 ND	3 RD	4 TH	ROD	1 ST	2 ND	3 RD	4 TH	ROD					
5	58,900	42,600	28,900	17,800	9,420	5,740	4,860	3,980	3,090	2,210	0.040	58	5.12	8.5	12455
6	84,800	58,900	42,600	28,900	17,800	6,920	5,740	4,860	3,980	3,090	0.060	82	6.91	9.4	12456
7	115,000	84,800	58,900	42,600	28,900	8,100	6,920	5,740	4,860	3,980	0.087	113	8.87	10.1	12457
8	151,000	115,000	84,800	58,900	42,600	9,280	8,100	6,920	5,740	4,860	0.121	153	10.99	11.3	12458

Telescopic Cylinder – Flange Mount S/A & D/A

Flange Mount – Front



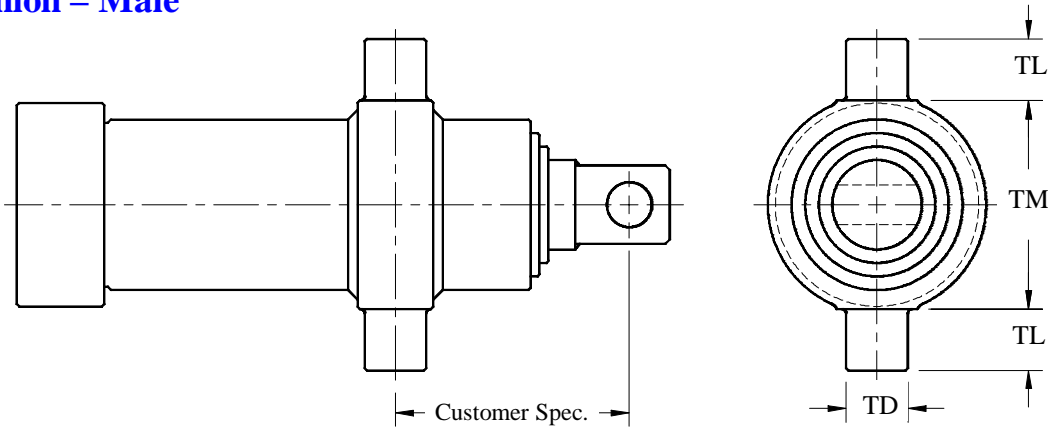
Flange Mount – Rear



BARREL BORE	V	W	T		PP Dia	H Dia
			S/A	D/A		
2	3.38	4.50	1.94	—	0.56	3.25
2 3/4	3.88	5.13	2.13	1.25	0.56	4.00
3 1/2	5.25	6.50	2.44	1.25	0.69	5.00
4 1/4	5.50	7.00	2.44	1.25	0.69	5.75
5	7.00	8.50	2.56	1.38	0.94	6.50
6	8.00	10.00	2.81	1.38	1.06	7.50
7	8.50	11.00	3.13	1.38	1.31	8.50
8	9.50	12.00	3.25	1.50	1.31	9.75

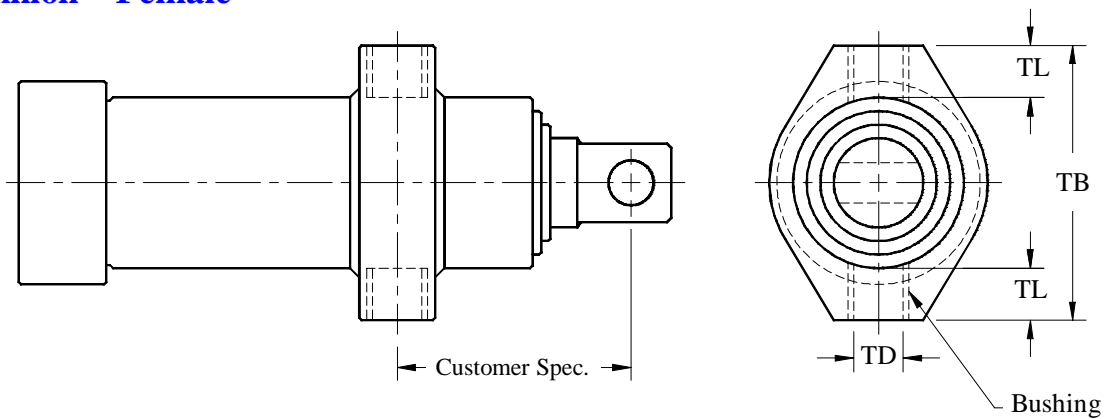
Telescopic Cylinder – Trunnion S/A & D/A

Trunnion – Male



BARREL BORE	TD	TL	TM
3 1/2	1.75	1.75	5.25
5	1.75	1.75	7.00
6	2.00	2.00	8.50
7	2.50	2.50	9.75
8	3.00	3.00	11.00

Trunnion – Female



BARREL BORE	TD	TL	TB
3 1/2	1.00	0.88	5.88
5	1.75	1.56	9.00
6	1.75	1.56	10.00
7	2.00	1.81	11.50
8	2.50	2.25	13.50

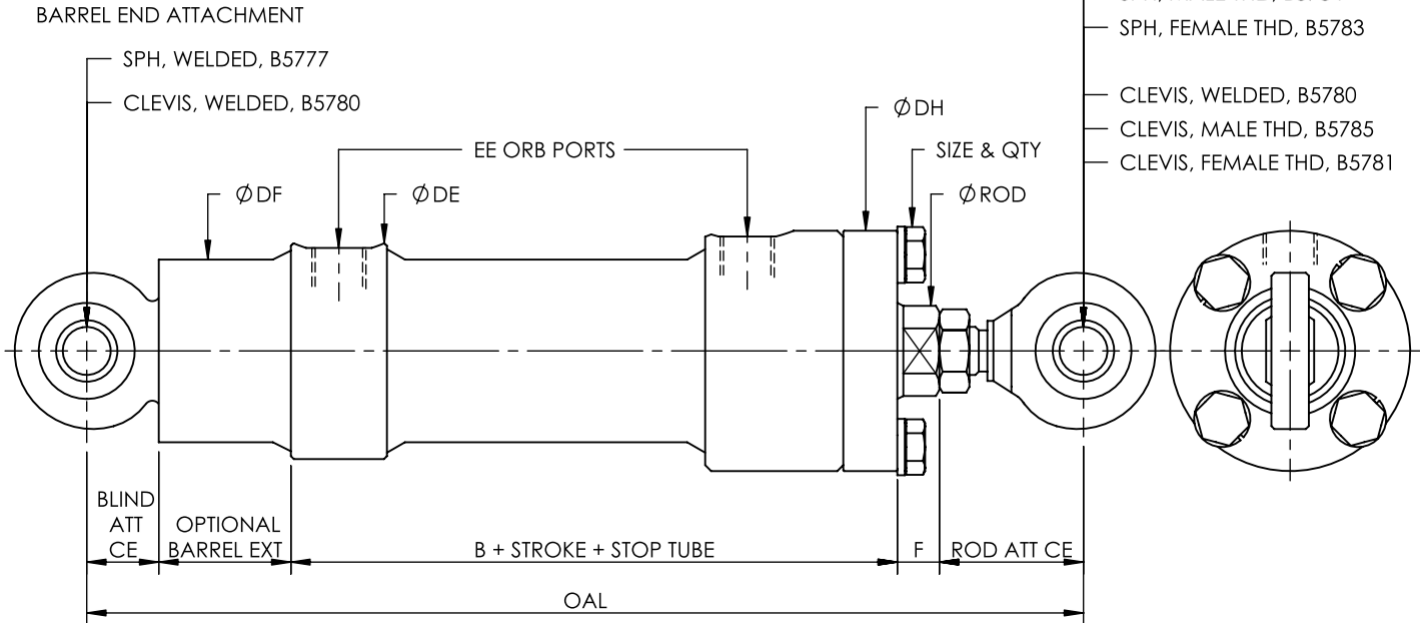


SERIES SS HYDRAULIC CYLINDER STAINLESS STEEL



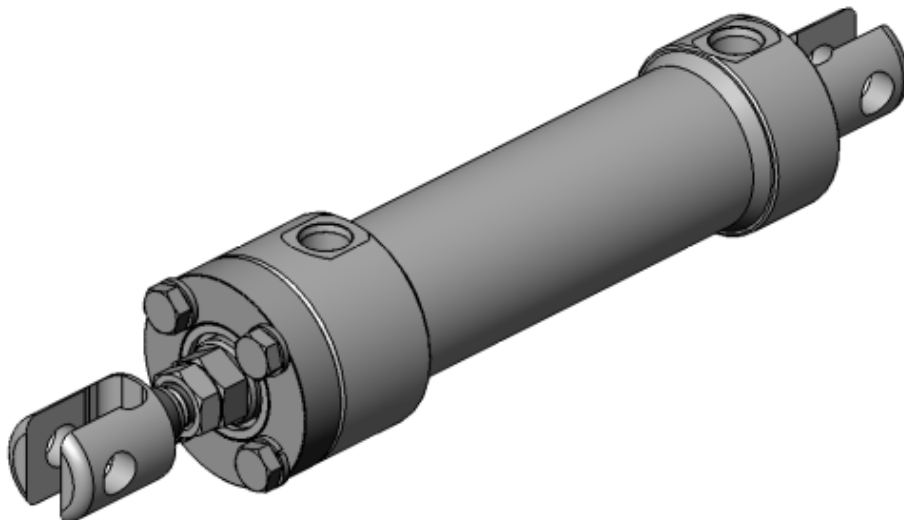
PRESSURE:	2500 PSI WORKING 3000 PSI NON SHOCK
BORE SIZES:	1 1/2" TO 3 3/8"
ROD SIZES:	3/4" TO 2 1/2"
PORT:	SAE ORB
ATTACHMENTS:	SPHERICAL BEARINGS CLEVIS

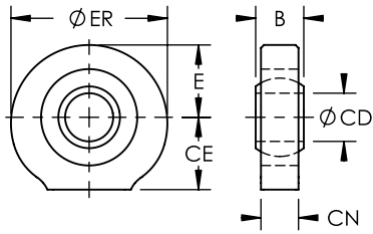
ROD END ATTACHMENT



BORE INCHES	ROD \varnothing INCHES	CD	B	DB	DE	OPTIONAL DF	DH	EE ORB	STD F
1.500	3/4, 1	0.50	3.88	1.88	2.25	1.90	2.50	#6	0.44
1.940	1, 1 3/8	0.50	3.88	2.38	2.75	2.38	3.00	#6	0.50
2.325	1, 1 3/8, 1 3/4	0.75	4.38	2.88	3.25	2.88	3.50	#8	0.50
2.900	1 3/8, 1 3/4, 2	1.00	4.50	3.50	3.75	3.50	4.25	#8	0.56
3.364	1 3/4, 2, 2 1/2	1.00	4.75	4.00	4.50	4.00	5.00	#8	0.69

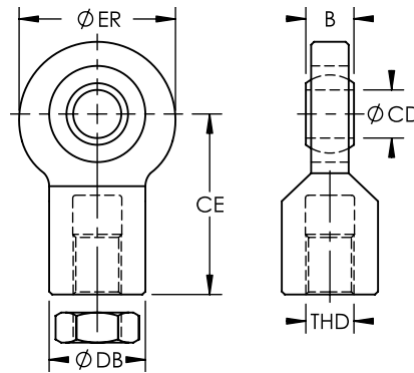
- Within reason, any size spherical & clevis can be attached to a cylinder.
- SEE NEXT PAGE FOR AVAILABLE ATTACHMENTS SPEC.
- Spherical bushing is maintenance free with PTFE Liner.





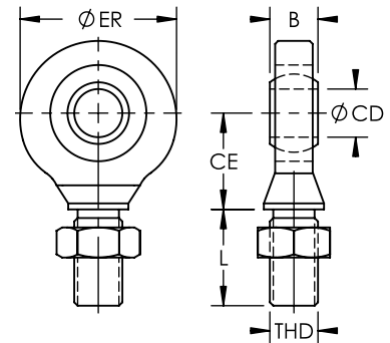
B5777—SPHERICAL, WELDED

DASH	CD	CE	CN	ER	B	E
-08	0.50	0.75	0.39	1.63	0.50	0.75
-12	0.75	1.13	0.59	2.25	0.75	1.00
-16	1.00	1.50	0.80	2.88	1.00	1.25



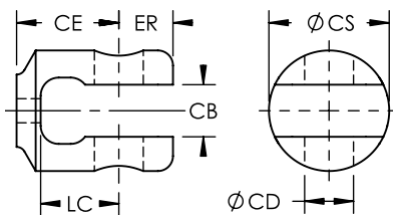
B5783—SPHERICAL, FEMALE THD

DASH	CD	THD	CE	ER	B	DB
-08	0.50	1/2-20	1.88	1.63	0.50	1.00
-12	0.75	3/4-16	2.50	2.25	0.75	1.38
-16	1.00	1 1/4-12	3.00	2.88	1.00	2.00



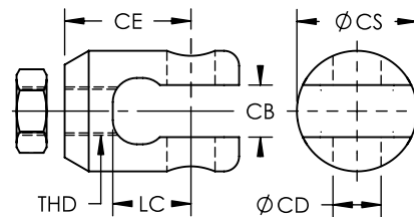
B5784—SPHERICAL, MALE THD

DASH	CD	THD	CE	ER	B	L
-08	0.50	1/2-20	1.00	1.63	0.50	1.38
-12	0.75	3/4-16	1.38	2.25	0.75	1.75
-16	1.00	1 1/4-12	1.88	2.88	1.00	2.13



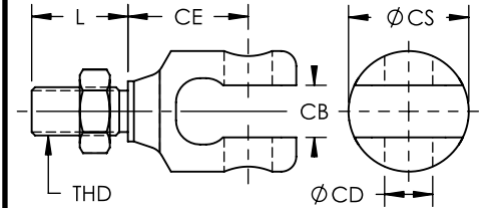
B5780—CLEVIS, WELDED

DASH	CD	CE	CB	CS	ER	LC
-08	0.50	1.06	0.54	1.25	0.56	0.81
-12	0.75	1.50	0.81	1.75	0.75	1.19
-16	1.00	1.75	1.06	2.50	1.25	1.44



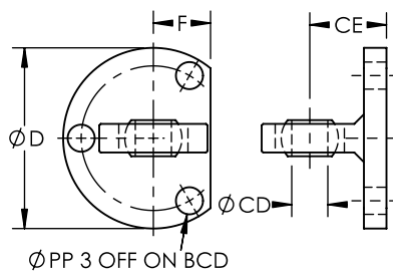
B5781—CLEVIS, FEMALE THD

DASH	CD	THD	CE	CB	CS	LC
-08	0.50	1/2-20	1.38	0.54	1.25	0.81
-12	0.75	3/4-16	2.13	0.81	1.75	1.19
-16	1.00	1 1/4-12	2.50	1.06	2.50	1.44



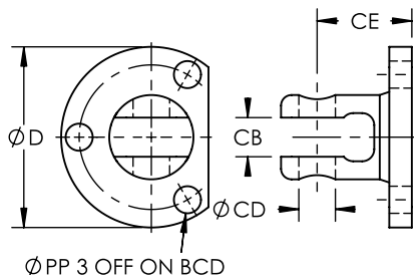
B5785—CLEVIS, MALE THD

DASH	CD	THD	CE	CB	CS	L
-08	0.50	1/2-20	1.31	0.54	1.25	1.38
-12	0.75	3/4-16	1.75	0.81	1.75	1.75
-16	1.00	1 1/4-12	2.13	1.06	2.50	2.13



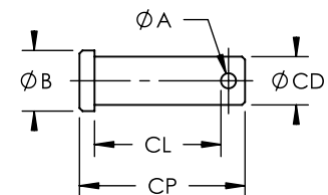
B5786—BRACKET, SPHERICAL

DASH	CD	CE	D	F	PP	BCD
-08	0.50	1.09	3.13	0.94	0.50	2.38
-12	0.75	1.59	3.75	1.19	0.56	3.00
-16	1.00	1.97	4.88	1.50	0.56	3.88



B5787—BRACKET, CLEVIS

DASH	CD	CE	CB	D	PP	BCD
-08	0.50	1.41	0.54	3.13	0.50	2.38
-12	0.75	1.97	0.81	3.75	0.56	3.00
-16	1.00	2.22	1.06	4.88	0.56	3.88



B5789—PIN C/W COTTER PIN

DASH	CD	CL	CP	A	B
-08	0.50	1.31	1.72	0.16	0.63
-12	0.75	1.81	2.31	0.16	0.94
-16	1.00	2.56	3.44	0.39	1.18