

Hydraulic Cylinder NFFA Industrial Type

RA 17038/05.12
Replaces: 08.10

1/44

Model CDT1/CGT1

Series 1X
Nominal pressure: Up to 1,500 psi maximum



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Features

- Duty, up to 1,500 psi (see chart on page 2)
- Standards, meets or exceeds all JIC and NFFA requirements
- Bore Sizes, 1-1/2" - 8"
- Piston Rods, 1/2" - 5-1/2"
- Mountings, 18 standard NFFA mountings
- Ports, SAE o-ring straight thread ports
- Stroke, standard strokes furnished in 1/8" increments. Normal stroke tolerance + 1/16" / -0". Closer stroke tolerances available; consult factory.
- Rod End Threads, standard KK1 male and female threads plus KK2 oversize male thread. Other rod end styles optional.
- Cushions, available for all bore sizes, at either or both ends.

Technical Data (for applications outside these parameters, please consult factory)**Standards:**

Meets or exceeds all JIC and NFPA requirements.

Nominal pressure: up to 1,500 psi

With extreme shock loads the mounting styles and piston rod threads have to be considered, taking the fatigue limits into account.

Maximum operating pressure up to: 1,500 psi**Installation position:** Various**Pressure fluid:**

Mineral oils (HL, HLP)

Phosphate ester (HFD-R) (-4°F to 300°F)

HFA (41°F to 131°F)

Water glycol HFC (-4°F to 140°F)

Hydraulic fluid temperature range: (-4°F to 176°F)**Viscosity range:** 32 to 1760 ssu**Degree of contamination:**

Max. permissible degree of contamination of the pressure fluid is to NAS 1638 class 10.

We therefore recommend a filter with a minimum retention rate of
 $\beta_{10} \geq 75$.

Stroke speed: 20 in/sec
 (dependent on the connection port)

Air bleed standard: Secured against removal
 2" - 8" bore sizes only

Acceptance:

Each cylinder is tested to Bosch Rexroth standards.

Cylinders, outside the above parameters are also available.
 Consult factory

For applications above 230°F specify a non studded piston rod end and advise operating temperature before ordering.

Under no-load conditions, a minimum pressure of 150 PSI is recommended for single rod cylinders. In case of lower pressures or double rod cylinders, please consult factory.

Operating Pressures (PSI) by Cylinder Bore Sizes*

Cylinder Bore Ø (inches)	Standard Rod Ø (inches)	Max. psi (max duty service)
1-1/2	1	1,500
2	1	1,500
2-1/2	1	1,500
3-1/4	1	1,500
4	1-3/8	1,000
5	1-3/4	750
6	1-3/4	750
8	2	500

*1) For double rod cylinders, see page 26.

*2) Exceptions to 1,500 psi rating:

- MF1 and MF2 have maximum operating pressures of 1,000 psi for 1-1/2" through 4" bore sizes
- A 2.5" bore with a 5/8" rod has a maximum pressure rating of 1,000 psi

3) Consult factory for other pressure ratings than shown above.

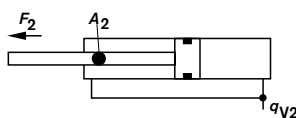
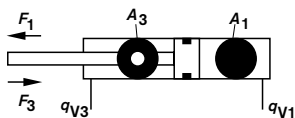
Approximate Uncrated CDT1 Hydraulic Cylinder Weights (lbs.)*

Cylinder Bore	1.5	2	2.5	3.25	4	5	6	8
Zero Stroke	5	7	12	20	30	45	70	100
Add Per Inch of Stroke	.3	.4	.6	.8	.9	1.0	1.5	2.0

* Weights based on standard (first) rod sizes. Add 10% to cover additional weight for crating.

Areas, Forces, Flows (dimensions in inches)

Bore	Piston rod	Area ratio	Piston	Areas		Force at 500 psi ¹⁾			Flow at 4"/s ²⁾		
				Rod	Annulus	Push	Regen.	Pull	Out	Regen.	In
Ø in.	Ø in.	j A ₁ /A ₃	A ₁ in. ²	A ₂ in. ²	A ₃ in. ²	F ₁ Lb.	F ₂ Lb.	F ₃ Lb.	q _{V1} gpm	q _{V2} gpm	q _{V3} gpm
1.500	0.625	1.21	1.77	0.31	1.46	885	154	731	1.84	0.32	1.52
	1.000	1.80		0.79	0.98		392	493		0.82	1.02
2.000	0.625	1.11	3.14	0.31	2.83	1,570	154	1,416	3.26	0.32	2.94
	1.000	1.33		0.79	2.35		392	1,178		0.82	2.44
	1.375	1.89		1.48	1.66		745	825		1.54	1.72
2.500	0.625	1.07	4.91	0.31	4.60	2,455	154	2,301	5.10	0.32	4.78
	1.000	1.19		0.79	4.12		392	2,063		0.82	4.28
	1.375	1.43		1.48	3.43		745	1,710		1.54	3.56
	1.750	1.96		2.40	2.51		1,205	1,250		2.49	2.61
3.250	1.000	1.11	8.30	0.79	7.51	4,150	392	3,758	8.62	0.82	7.80
	1.375	1.21		1.48	6.82		745	3,405		1.54	7.08
	1.750	1.40		2.40	5.90		1,205	2,945		2.49	6.13
	2.000	1.60		3.14	5.16		1,570	2,580		3.26	5.36
4.000	1.000	1.07	12.57	0.79	11.78	6,285	392	5,893	13.05	0.82	12.23
	1.375	1.13		1.48	11.09		745	5,540		1.54	11.51
	1.750	1.24		2.40	10.17		1,205	5,080		2.49	10.56
	2.000	1.33		3.14	9.43		1,570	4,715		3.26	9.79
	2.500	1.64		4.91	7.66		2,455	3,830		5.10	7.95
5.000	1.000	1.04	19.64	0.79	18.85	9,820	392	9,428	20.40	0.82	19.58
	1.375	1.08		1.48	18.16		745	9,075		1.54	18.86
	1.750	1.13		2.40	17.24		1,205	8,615		2.49	17.91
	2.000	1.19		3.14	16.50		1,570	8,250		3.26	17.14
	2.500	1.33		4.91	14.73		2,455	7,365		5.10	15.30
	3.000	1.56		7.07	12.57		3,535	6,285		7.35	13.05
	3.500	1.96		9.62	10.02		4,810	5,010		9.99	10.41
6.000	1.375	1.06	28.25	1.48	26.77	14,135	745	13,390	29.35	1.54	27.81
	1.750	1.09		2.40	25.85		1,205	12,930		2.49	26.86
	2.000	1.13		3.14	25.11		1,570	12,565		3.26	26.09
	2.500	1.21		4.91	23.34		2,455	11,680		5.10	24.25
	3.000	1.33		7.07	21.18		3,535	10,600		7.35	22.00
	3.500	1.51		9.62	18.63		4,810	9,325		9.99	19.36
	4.000	1.80		12.57	15.68		6,285	7,850		13.05	16.30
8.000	1.375	1.03	50.27	1.48	48.79	25,135	745	24,390	52.22	1.54	50.68
	1.750	1.05		2.40	47.87		1,205	23,930		2.49	49.73
	2.000	1.06		3.14	47.13		1,570	23,565		3.26	48.96
	2.500	1.11		4.91	45.36		2,455	22,680		5.10	47.12
	3.000	1.16		7.07	43.20		3,535	21,600		7.35	44.87
	3.500	1.23		9.62	40.65		4,810	20,325		9.99	42.23
	4.000	1.33		12.57	37.70		6,285	18,850		13.05	39.17
	4.500	1.49		15.91	34.36		7,950	17,185		16.53	35.69
	5.000	1.64		19.63	30.64		9,820	15,315		20.39	31.83
	5.500	1.89		23.76	26.51		11,880	13,255		24.68	27.54

**Note**

- ¹⁾ Theoretical force
(efficiency not taken into account)
- ²⁾ Stroke velocity

Stroke Tolerances

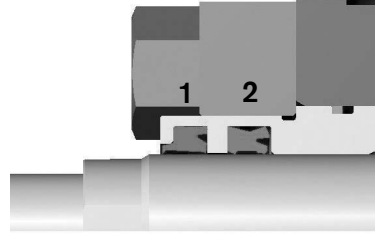
Stroke tolerances result from the cylinder head, cylinder base, cylinder tube, piston and piston rod. The stroke tolerance for all piston diameters and stroke lengths is +1/16" / -0". Tighter stroke tolerances can be requested, however, details regarding the operating pressure and operating temperature must be stated.

Stroke lengths	Stroke tolerances
≤ 120" (refer to pg. 40 for buckling loads)	+1/16" / -0"

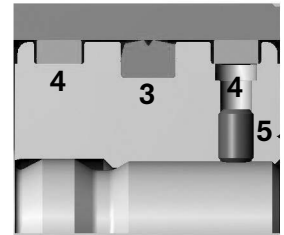
Sealing System

"M" Polyurethane seal system (standard)

* - not recommended for load holding applications.
Consult factory for load holding options



1. Double lip wiper
2. U-cup rod seal



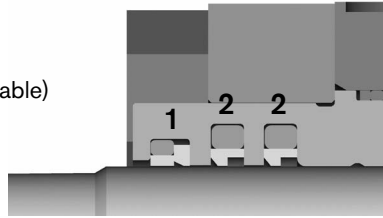
3. Double acting piston seal
4. Wear bands
5. Piston threaded and sealed to piston rod with permanent adhesive and mechanically secured with a set screw.

"T"* Seal system for low friction applications (available)

"F"* Standard seal system for HFC (water glycol) (available)

"V"* Seal system for (phosphate ester) (available)

* - not recommended for load holding applications.
Consult factory for load holding options



1. Double lip wiper
2. PTFE step seals



3. Low friction piston seal
4. Wear bands
5. Piston threaded and sealed to piston rod with permanent adhesive and mechanically secured with a set screw.

Cushioning System (optional) *

Patented Exact-a-just™ cushioning provides accurate micro-meter adjustment

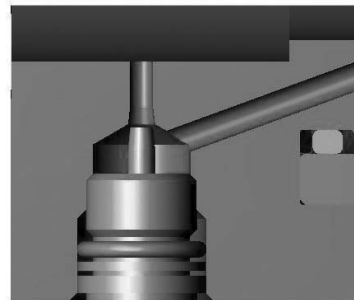
Exact-a-just™ cushioning permits adjustment over a wide range of settings for faster cycle times

Results in reduced maintenance costs, reduced internal and external shock, and softer cushioning stops

May be supplied at head, cap, or both ends

* Fixed cushions on all 1-1/2" bore sizes both ends.

Fixed cushions on 2" bore / 1-3/8" rod, 2-1/2" bore / 1-3/4" rod and 3-1/4" bore / 2" rod sizes both ends



Exact-a-just™ cushioning

Connection Port and Secured Air Bleed (standard)

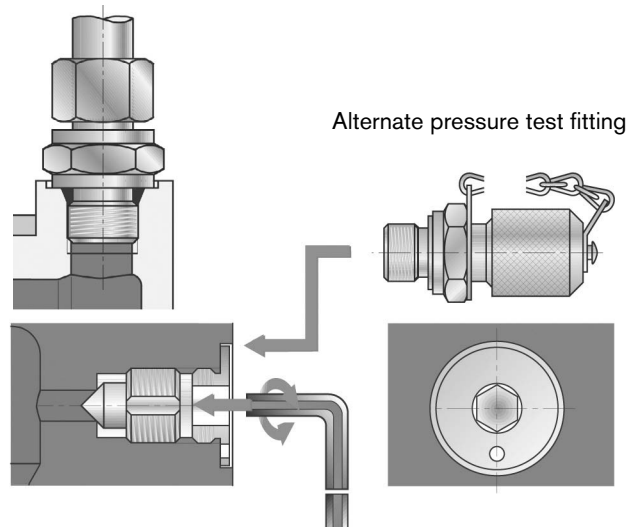
ISO 11926-1 SAE straight thread (standard)

For other port options consult factory

To provide safety and prevent accidents, patented air bleed is secured against unscrewing (standard on 2" - 8" bore sizes, not available on 1-1/2" bore sizes)

Air bleed ports can become an alternate connection for a pressure test fitting (optional) (not available on 1-1/2" bore sizes)

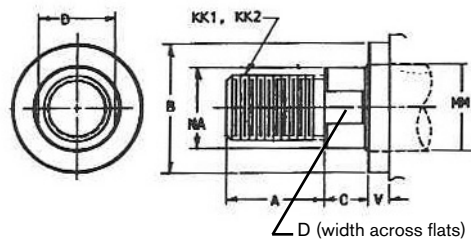
Also not available on head end of 2" bore / 1-3/8" rod and 2-1/2" bore / 1-3/4" rod sizes



Piston Rod Versions

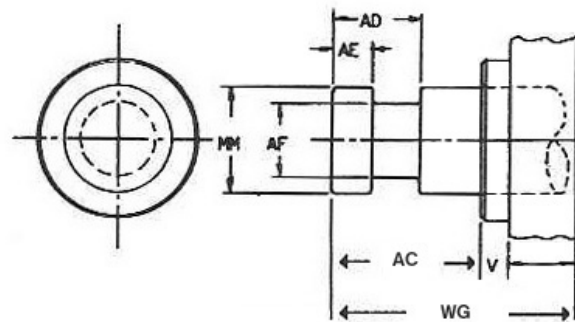
Male Rod End

Option H & D



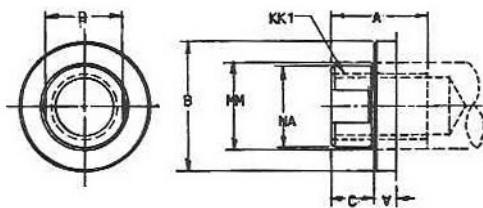
S.A.F.E. Rod End

Option T



Female Rod End

Option E



Rod Thread Options:

Standard KK1 Male furnished when not specified.

Male thread available in KK1 and KK2 thread sizes.

KK1 studded male rod end standard for 5/8", 1" & 1-3/8" rod dia.

Female thread available in KK1 thread size only.

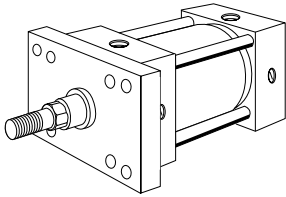
Piston Rod End

MM Rod Diameter	A	B +0.000 -0.002	C	D	KK1	KK2	NA	AC	AD	AE	AF	WG
0.625	0.75	1.124	0.38	0.50	7/16 - 20	1/2 - 20	0.56	1.13	0.63	0.250	0.375	1.75
1.000	1.13	1.499	0.50	0.88	3/4 - 16	7/8 - 14	0.94	1.50	0.94	0.375	0.688	2.38
1.375	1.63	1.999	0.63	1.13	1 - 14	1-1/4 - 12	1.31	1.75	1.06	0.375	0.875	2.75
1.750	2.00	2.374	0.75	1.50	1-1/4 - 12	1-1/2 - 12	1.69	2.00	1.31	0.500	1.125	3.13
2.000	2.25	2.624	0.88	1.69	1-1/2 - 12	1-3/4 - 12	1.94	2.63	1.69	0.625	1.375	3.75
2.500	3.00	3.124	1.00	2.06	1-7/8 - 12	2-1/4 - 12	2.38	3.25	1.94	0.750	1.750	4.50
3.000	3.50	3.749	1.00	2.63	2-1/4 - 12	2-3/4 - 12	2.88	3.63	2.44	0.875	2.250	4.88
3.500	3.50	4.249	1.00	3.00	2-1/2 - 12	3-1/4 - 12	3.38	4.38	2.69	1.000	2.500	5.63
4.000	4.00	4.749	1.00	3.38	3 - 12	3-3/4 - 12	3.88	4.50	2.69	1.000	3.000	5.75
4.500	4.50	5.249	1.00	SH1*	3-1/4 - 12	4-1/4 - 12	4.38	5.25	3.19	1.500	3.500	6.50
5.000	5.00	5.749	1.00	SH1*	3-1/2 - 12	4-3/4 - 12	4.88	5.38	3.19	1.500	3.875	6.63
5.500	5.50	6.249	1.00	SH1*	4 - 12	5-1/4 - 12	5.38	6.25	3.94	1.875	4.375	7.50

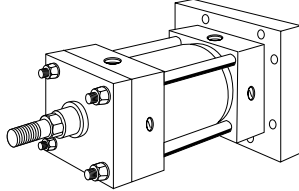
Note*: Spanner wrench holes: SH1 = 0.56" dia. For "F and V" dimensions, see respective mounting dimensions shown on pages 8 thru 27.

Mounting Type Overview

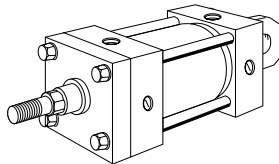
MF1 (see Page 8, 9)



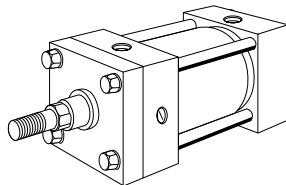
MF6 (see Page 8, 9)



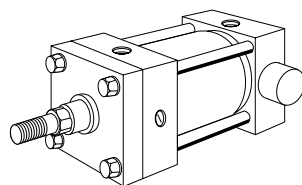
MP5 (see Page 12, 13)



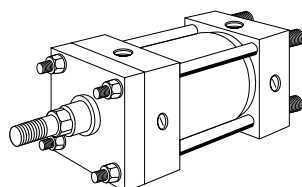
MS4 (see Page 14, 15)



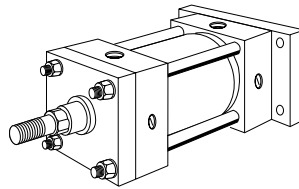
MT2 (see Page 18, 19)



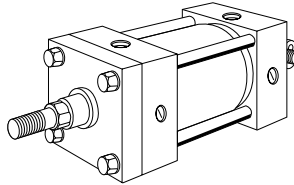
MX1 (see Page 24, 25)



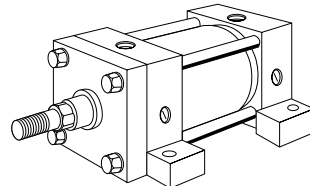
MF2 (see Page 8, 9)



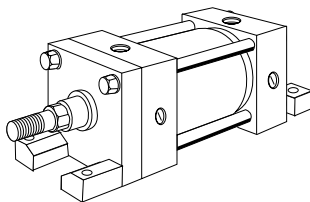
MP1 (see Page 10, 11)



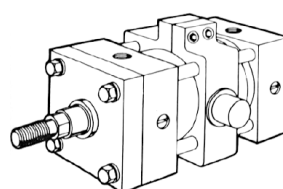
MS2 (see Page 14, 15)



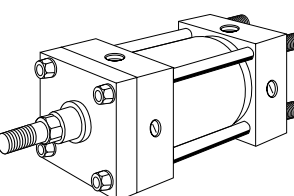
MS7 (see Page 16, 17)



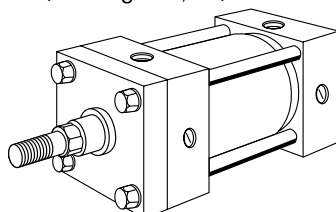
MT4 (see Page 20, 21)



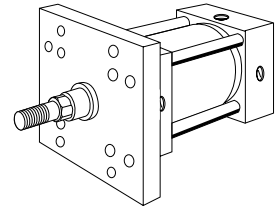
MX2 (see Page 24, 25)



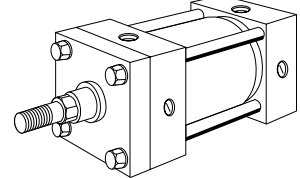
CGT1 (see Page 26, 27)



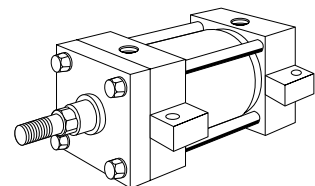
MF5 (see Page 8, 9)



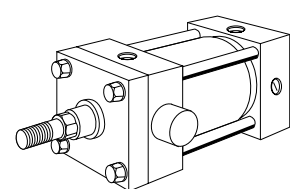
MP3 (see Page 10, 11)



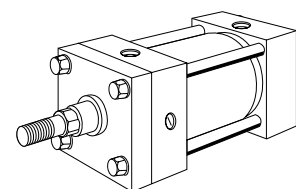
MS3 (see Page 16, 17)



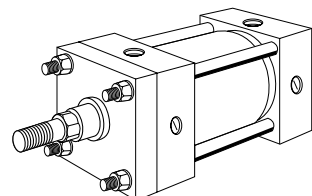
MT1 (see Page 18, 19)



MX0 (see Page 22, 23)

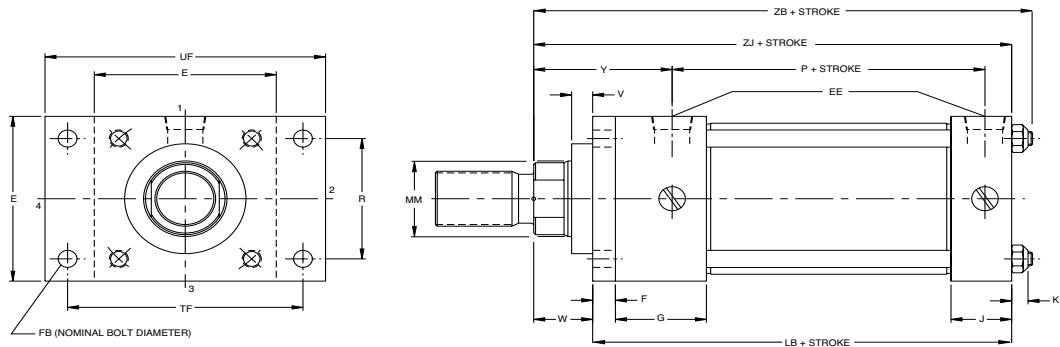


MX3 (see Page 24, 25)

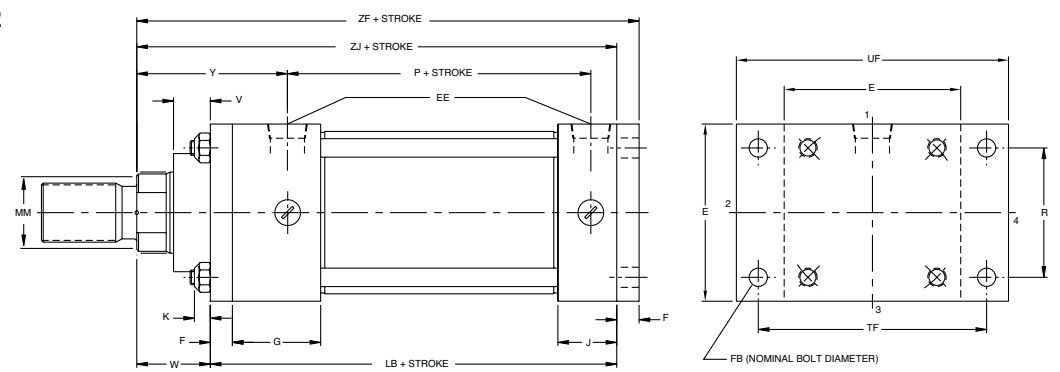


Mounting MF1, MF2, MF5, MF6

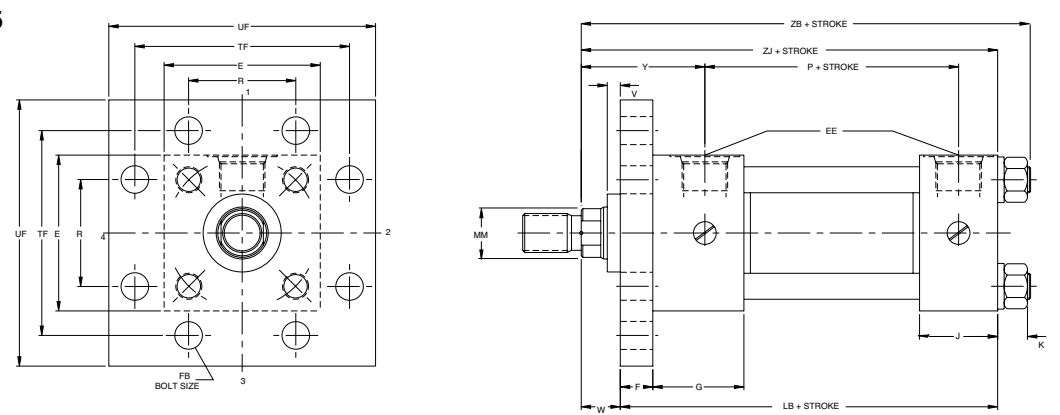
CDT1 MF1



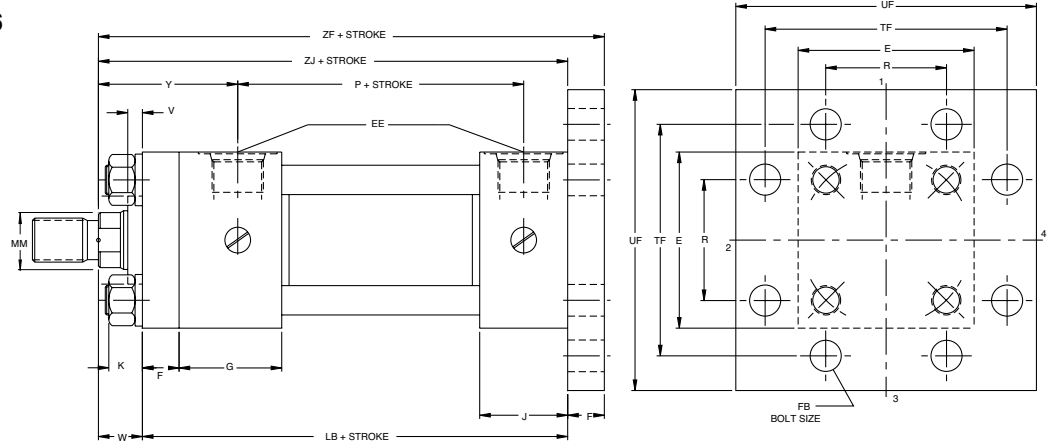
CDT1 MF2



CDT1 MF5



CDT1 MF6



Dimensions MF1, MF2, MF5, MF6

Table 1 - Dimensions affected by rod diameter

Bore In.	MM Rod	V	W	Y	ZB	ZF	ZJ
1.500	0.625	0.25	0.63	1.94	4.88	5.00	4.63
	1.000	0.50	1.00	2.31	5.25	5.38	5.00
2.000	0.625	0.25	0.63	1.94	4.94	5.00	4.63
	1.000	0.50	1.00	2.31	5.31	5.38	5.00
	1.375	0.63	1.25	2.56	5.56	5.63	5.25
2.500	0.625	0.25	0.63	1.94	5.06	5.31	4.75
	1.000	0.50	1.00	2.31	5.44	5.50	5.13
	1.375	0.63	1.25	2.56	5.69	5.75	5.38
	1.750	0.75	1.50	2.81	5.94	6.00	5.63
3.250	1.000	0.25	0.75	2.38	6.00	6.25	5.63
	1.375	0.38	1.00	2.63	6.25	6.50	5.88
	1.750	0.50	1.25	2.88	6.50	6.75	6.13
	2.000	0.50	1.38	3.00	6.63	6.88	6.25
4.000	1.000	0.25	0.75	2.38	6.00	6.25	5.63
	1.375	0.38	1.00	2.63	6.25	6.50	5.88
	1.750	0.50	1.25	2.88	6.50	6.75	6.13
	2.000	0.50	1.38	3.00	6.63	6.88	6.25
	2.500	0.63	1.63	3.25	6.88	7.13	6.50
5.000	1.000	0.25	0.75	2.38	6.31	6.50	5.88
	1.375	0.38	1.00	2.63	6.56	6.75	6.13
	1.750	0.50	1.25	2.88	6.81	7.00	6.38
	2.000	0.50	1.38	3.00	6.94	7.13	6.50
	2.500	0.63	1.63	3.25	7.19	7.38	6.75
	3.000	0.63	1.63	3.25	7.19	7.38	6.75
	3.500	0.63	1.63	3.25	7.19	7.38	6.75
6.000	1.375	0.25	0.88	2.78	7.06	7.38	6.63
	1.750	0.38	1.13	3.03	7.31	7.63	6.88
	2.000	0.38	1.25	3.16	7.44	7.75	7.00
	2.500	0.50	1.50	3.41	7.69	8.00	7.25
	3.000	0.50	1.50	3.41	7.69	8.00	7.25
	3.500	0.50	1.50	3.41	7.69	8.00	7.25
	4.000	0.50	1.50	3.41	7.69	8.00	7.25

Flange mounts are one of the strongest, most rigid methods of mounting. With this type of mount, there is little allowance for misalignment, so when long strokes are required, the free end opposite the mounting should be supported to prevent sagging and possible binding of the cylinder. Blind or cap end mounts are best for thrust load applications, and rod or head end mounts are best in tension applications. If an application exceeds the rectangular flange rating, a solid head or cap flange mount is available.

When a less rigid mount can be used and the cylinder can be attached to a panel or bulkhead, an extended tie rod mount could be considered.

Note: The bearing retainer plate is the same as the "E" dimension for the 1.5" – 6" bore sizes. Removable bearing retainer is not available in the 1.5" – 6" bore sizes.

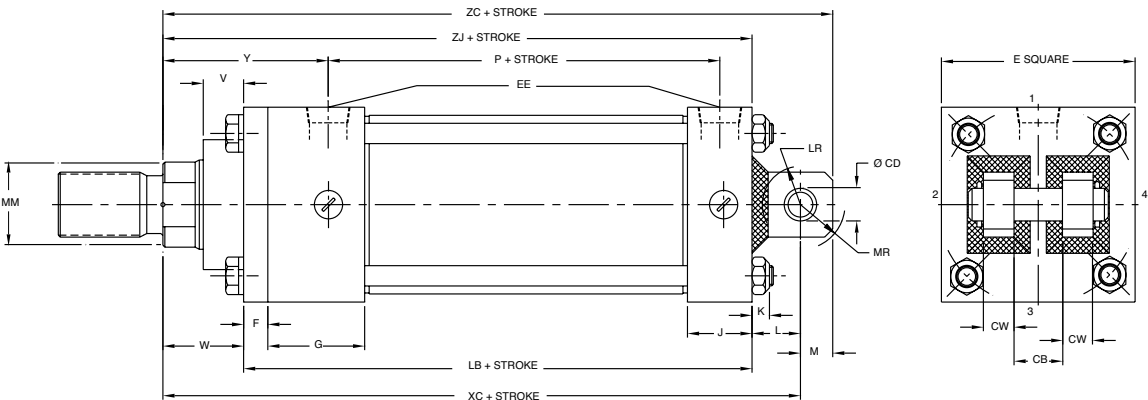
Rod end options shown on page 6.

Table 2 - Dimensions not affected by rod diameter

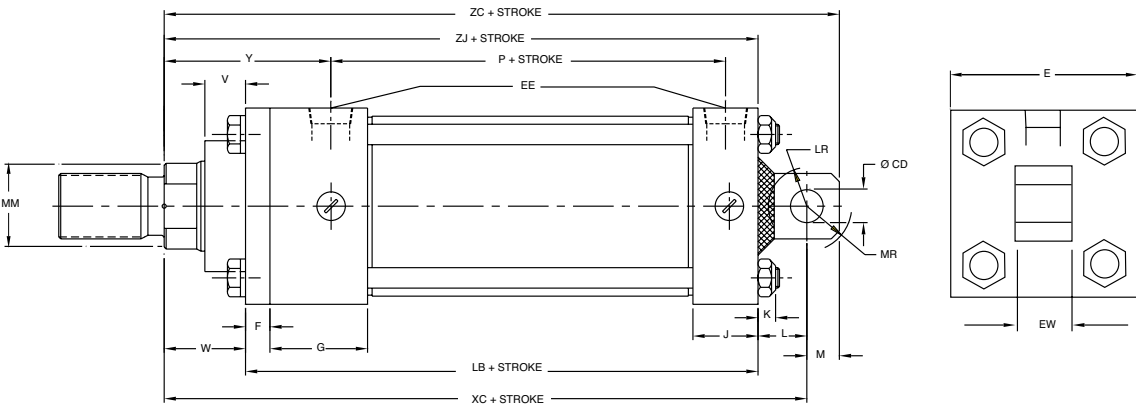
Bore Ø In.	E	SAE Port EE	NPT Port EE	F	FB	G	J	K	R	TF	UF	LB	P
1.500	2.00	6	3/8	0.38	0.31	1.50	1.00	0.25	1.43	2.75	3.38	4.00	2.25
2.000	2.50	6	3/8	0.38	0.38	1.50	1.00	0.31	1.84	3.38	4.13	4.00	2.28
2.500	3.00	6	3/8	0.38	0.38	1.50	1.00	0.31	2.19	3.88	4.63	4.13	2.28
3.250	3.75	10	1/2	0.63	0.44	1.75	1.25	0.38	2.76	4.69	5.50	4.88	2.63
4.000	4.50	10	1/2	0.63	0.44	1.75	1.25	0.38	3.32	5.44	6.25	4.88	2.69
5.000	5.50	10	1/2	0.63	0.56	1.75	1.25	0.44	4.10	6.63	7.63	5.13	2.94
6.000	6.50	12	1/2	0.75	0.56	2.00	1.50	0.44	4.88	7.63	8.63	5.75	3.13

Mounting MP1, MP3

CDT1 MP1



CDT1 MP3



Dimensions MP1, MP3

Table 1 - Dimensions affected by rod diameter

Bore Ø In.	Rod Ø In.	V	W	Y	XC	ZC	ZJ	XN
1.500	0.625	0.25	0.63	1.94	5.38	5.88	4.63	-
	1.000	0.50	1.00	2.31	5.75	6.25	5.00	-
2.000	0.625	0.25	0.63	1.94	5.38	5.08	4.63	-
	1.000	0.50	1.00	2.31	5.75	6.25	5.00	-
	1.375	0.63	1.25	2.56	6.00	6.50	5.25	-
2.500	0.625	0.25	0.63	1.94	5.50	6.00	4.75	-
	1.000	0.50	1.00	2.31	5.88	6.38	5.13	-
	1.375	0.63	1.25	2.56	6.13	6.63	5.38	-
	1.750	0.75	1.50	2.81	6.38	6.88	5.63	-
3.250	1.000	0.25	0.75	2.38	6.88	7.63	5.63	-
	1.375	0.38	1.00	2.63	7.13	7.88	5.88	-
	1.750	0.50	1.25	2.88	7.38	8.13	6.13	-
	2.000	0.50	1.38	3.00	7.50	8.13	6.25	-
4.000	1.000	0.25	0.75	2.38	6.88	7.63	5.63	-
	1.375	0.38	1.00	2.63	7.13	7.75	5.88	-
	1.750	0.50	1.25	2.88	7.38	8.13	6.13	-
	2.000	0.50	1.38	3.00	7.50	8.13	6.25	-
	2.500	0.63	1.63	3.25	7.75	8.50	6.50	-
5.000	1.000	0.25	0.75	2.38	7.13	7.88	5.88	-
	1.375	0.38	1.00	2.63	7.38	8.13	6.13	-
	1.750	0.50	1.25	2.88	7.63	8.38	6.38	-
	2.000	0.50	1.38	3.00	7.75	8.50	6.50	-
	2.500	0.63	1.63	3.25	8.00	8.75	6.75	-
	3.000	0.63	1.63	3.25	8.00	8.75	6.75	-
6.000	3.500	0.63	1.63	3.25	8.00	8.75	6.75	-
	1.375	0.25	0.88	2.78	8.13	9.13	6.63	-
	1.750	0.38	1.13	3.03	8.38	9.38	6.88	-
	2.000	0.38	1.25	3.16	8.50	9.50	7.00	-
	2.500	0.50	1.50	3.41	8.75	9.75	7.25	-
	3.000	0.50	1.50	3.41	8.75	9.75	7.25	-
	3.500	0.50	1.50	3.41	8.75	9.75	7.25	-
8.000	4.000	0.50	1.50	3.41	8.75	9.75	7.25	-
	1.375	0.25	0.88	2.78	8.25	9.25	6.75	4.00
	1.750	0.38	1.13	3.03	8.50	9.50	7.00	4.00
	2.000	0.38	1.25	3.16	8.63	9.63	7.13	4.00
	2.500	0.50	1.50	3.41	8.88	9.88	7.38	4.00
	3.000	0.50	1.50	3.41	8.88	9.88	7.38	5.50
	3.500	0.50	1.50	3.41	8.88	9.88	7.38	5.50
	4.000	0.50	1.50	3.41	8.88	9.88	7.38	5.50
	4.500	0.50	1.50	3.41	8.88	9.88	7.38	6.50
	5.000	0.50	1.50	3.41	8.88	9.88	7.38	6.50
	5.500	0.50	1.50	3.41	8.88	9.88	7.38	7.25

MP3 not available in 8" bore.

The Clevis or Pin mounted cylinder is probably the most widely used of all mounts. For short strokes, medium or small cylinder applications, the clevis mounts are recommended. If this mount is applied where stroke requirements cause the overall length to be excessive, the Cap Trunnion mount can be used. Pivot mounts must always be used with a pivot type rod end attachment.

The bearing retainer plate is the same as the "E" dimension for 1-1/2"-6" bore sizes and the "XN" dimension for the 8" bore sizes. Rod end options shown on page 6.

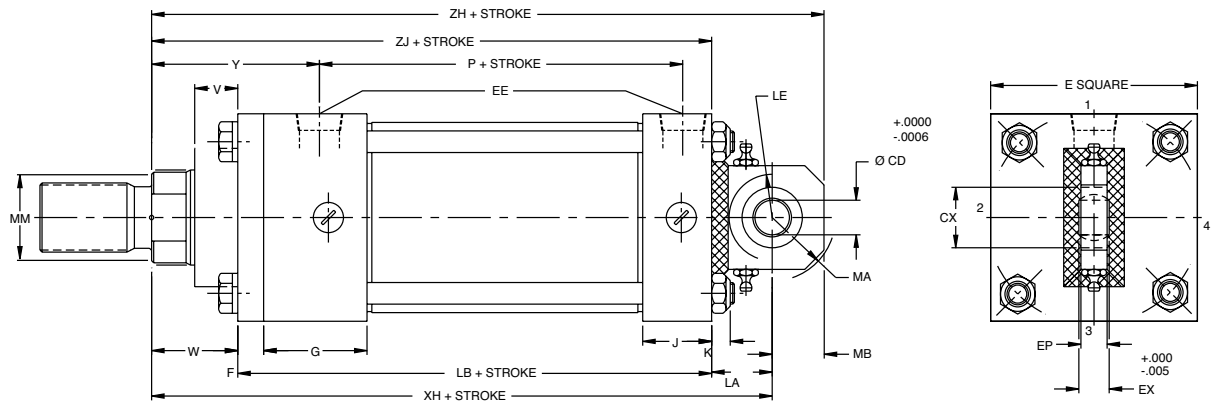
MP1 mount includes pivot pin. MP3 does not include pivot pin.

Table 2 - Dimensions not affected by rod diameter

Bore In.	EW/ CB	CD +0.000 -0.002	CW	E	SAE Port EE	NPT Port EE	F	G	J	K	L	LR	M	MR	LB	P
1.500	0.75	0.501	0.50	2.00	6	3/8	0.38	1.50	1.00	0.25	0.75	0.75	0.50	0.63	4.00	2.25
2.000	0.75	0.501	0.50	2.50	6	3/8	0.38	1.50	1.00	0.31	0.75	0.75	0.50	0.63	4.00	2.25
2.500	0.75	0.501	0.50	3.00	6	3/8	0.38	1.50	1.00	0.31	0.75	0.75	0.50	0.63	4.13	2.38
3.250	1.25	0.751	0.63	3.75	10	1/2	0.63	1.75	1.25	0.38	1.25	1.00	0.75	0.94	4.88	2.63
4.000	1.25	0.751	0.63	4.50	10	1/2	0.63	1.75	1.25	0.38	1.25	1.00	0.75	0.94	4.88	2.63
5.000	1.25	0.751	0.63	5.50	10	1/2	0.63	1.75	1.25	0.44	1.25	1.00	0.75	0.94	5.13	2.94
6.000	1.50	1.001	0.75	6.50	12	1/2	0.75	2.00	1.50	0.44	1.50	1.25	1.00	1.19	5.75	3.16
8.000	1.50	1.001	0.75	8.50	12	3/4	0.75	2.00	1.50	0.56	1.50	1.25	1.00	1.19	5.88	3.25

Mounting MP5

CDT1 MP5



Dimensions MP5

Table 1 - Dimensions affected by rod diameter

Bore In.	MM Rod	V	W	Y	XH	ZH	ZJ
1.500	0.625	0.25	0.63	1.94	5.50	6.13	4.63
	1.000	0.50	1.00	2.31	5.88	6.50	5.00
2.000	0.625	0.25	0.63	1.94	5.50	6.13	4.63
	1.000	0.50	1.00	2.31	5.88	6.50	5.00
	1.375	0.63	1.25	2.56	6.13	6.75	5.25
2.500	0.625	0.25	0.63	1.94	5.63	6.25	4.75
	1.000	0.50	1.00	2.31	6.00	6.63	5.13
	1.375	0.63	1.25	2.56	6.25	6.88	5.38
	1.750	0.75	1.50	2.81	6.50	7.13	5.63
3.250	1.000	0.25	0.75	2.38	6.88	7.88	5.63
	1.375	0.38	1.00	2.63	7.13	8.13	5.88
	1.750	0.50	1.25	2.88	7.38	8.38	6.13
	2.000	0.50	1.38	3.00	7.50	8.50	6.25
4.000	1.000	0.25	0.75	2.38	6.88	7.88	5.63
	1.375	0.38	1.00	2.63	7.13	8.13	5.88
	1.750	0.50	1.25	2.88	7.38	8.38	6.13
	2.000	0.50	1.38	3.00	7.50	8.50	6.25
	2.500	0.63	1.63	3.25	7.75	8.75	6.50
5.000	1.000	0.25	0.75	2.38	7.13	8.13	5.88
	1.375	0.38	1.00	2.63	7.38	8.38	6.13
	1.750	0.50	1.25	2.88	7.63	8.63	6.38
	2.000	0.50	1.38	3.00	7.75	8.75	6.50
	2.500	0.63	1.63	3.25	8.00	9.00	6.75
	3.000	0.63	1.63	3.25	8.00	9.00	6.75
6.000	3.500	0.63	1.63	3.25	8.00	9.00	6.75
	1.375	0.25	0.88	2.78	8.25	9.38	6.63
	1.750	0.38	1.13	3.03	8.50	9.63	6.88
	2.000	0.38	1.25	3.16	8.63	9.75	7.00
	2.500	0.50	1.50	3.41	8.88	10.00	7.25
	3.000	0.50	1.50	3.41	8.88	10.00	7.25
	3.500	0.50	1.50	3.41	8.88	10.00	7.25
	4.000	0.50	1.50	3.41	8.88	10.00	7.25

The MP5 (Universal) type mount is a pivot mount with a spherical bearing fitted into the pivot to permit 5 to 10 degrees of movement in a plane perpendicular to the major plane of pivot movement. It is probably the most serviceable of the pivoted centerline mounts. For maximum effectiveness, a spherical rod end fitting should be utilized at the same time.

Rod end options shown on page 6.

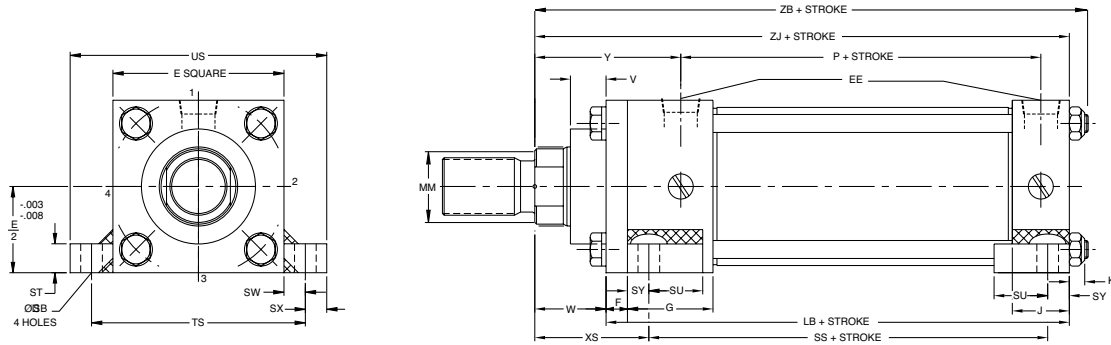
Note: Only one (1) grease nipple is supplied up to 2.50" bore. On bore sizes 2.50" and larger, two (2) grease nipples will be supplied, as shown.

Table 2 - Dimensions not affected by rod diameter

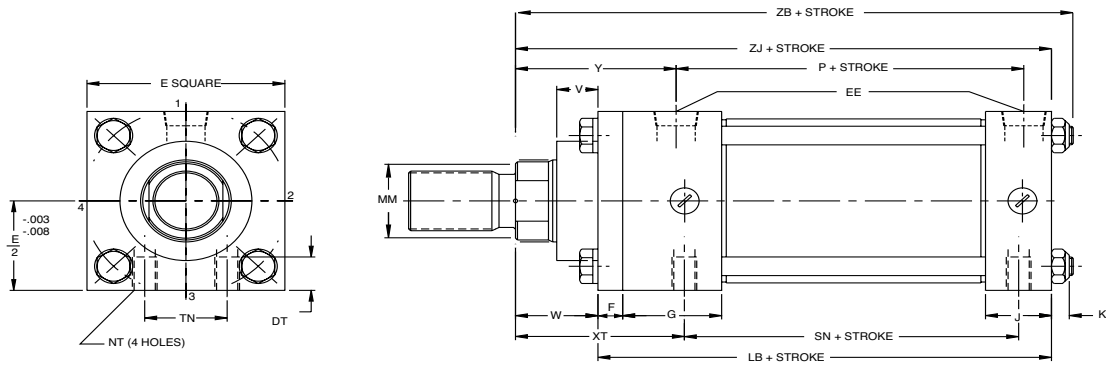
Bore In.	E	SAE EE	NPT EE	F	G	J	K	LB	P	CD	CX	EP	EX	LA	LE	MA	MB
1.500	2.00	6	1/4	0.38	1.50	1.00	0.25	4.00	2.28	0.50	0.88	0.38	0.44	0.88	0.75	0.75	0.75
2.000	2.50	6	3/8	0.38	1.50	1.00	0.31	4.00	2.28	0.50	0.88	0.38	0.44	0.88	0.75	0.75	0.75
2.500	3.00	6	3/8	0.38	1.50	1.00	0.31	4.13	2.38	0.50	0.88	0.38	0.44	0.88	0.75	0.75	0.75
3.250	3.75	10	1/2	0.63	1.75	1.25	0.38	4.88	2.63	0.50	0.88	0.38	0.66	1.25	1.06	1.00	0.75
4.000	4.50	10	1/2	0.63	1.75	1.25	0.38	4.88	2.63	0.75	1.25	0.56	0.66	1.25	1.06	1.00	1.25
5.000	5.50	10	1/2	0.63	1.75	1.25	0.44	5.13	2.94	0.75	1.25	0.56	0.66	1.25	1.06	1.00	1.25
6.000	6.50	12	1/2	0.75	2.00	1.50	0.44	5.75	3.13	1.00	1.62	0.75	0.88	1.62	1.44	1.25	1.50

Mounting MS2, MS4

CDT1 MS2



CDT1 MS4



The side or lug mounted cylinder provides a fairly rigid mount. These type mounts can tolerate a slight amount of misalignment when the cylinder is at full stroke, but as the piston moves toward the blind end, the tolerance for misalignment decreases. It is important to note that if the cylinder is used properly, the mounting bolts are either in simple shear or tension without any compound stresses. An extended key plate option is available to eliminate the need for fitted bolts or external keys to carry the thrust load.

Note:

When specifying an MS2 mount with ports in the 2 or 4 quadrant, be sure to see that sufficient clearance between the port fitting and the lug is available to insert a bolt or cap screw into the lug.

Rod end options shown on page 6.

Dimensions MS2, MS4

Table 1 - Dimensions affected by rod diameter

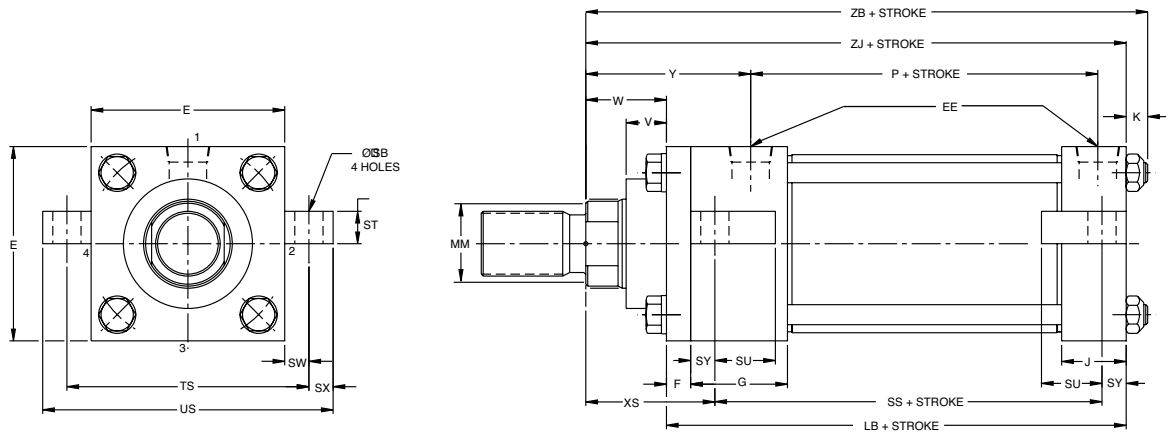
Bore In.	MM Rod	V	W	Y	XS	XT	ZB	ZJ
1.500	0.625	0.25	0.63	1.94	1.38	1.94	4.88	4.63
	1.000	0.50	1.00	2.31	1.75	2.31	5.25	5.00
2.000	0.625	0.25	0.63	1.94	1.38	1.94	4.94	4.63
	1.000	0.50	1.00	2.31	1.75	2.31	5.31	5.00
	1.375	0.63	1.25	2.56	2.00	2.56	5.56	5.25
2.500	0.625	0.25	0.63	1.94	1.38	1.94	5.06	4.75
	1.000	0.50	1.00	2.31	1.75	2.31	5.44	5.13
	1.375	0.63	1.25	2.56	2.00	2.56	5.69	5.38
	1.750	0.75	1.50	2.81	2.25	2.81	5.94	5.63
3.250	1.000	0.25	0.75	2.38	1.88	2.44	6.00	5.63
	1.375	0.38	1.00	2.63	2.13	2.69	6.25	5.88
	1.750	0.50	1.25	2.88	2.38	2.94	6.50	6.13
	2.000	0.50	1.38	3.00	2.50	3.06	6.63	6.25
4.000	1.000	0.25	0.75	2.38	1.88	2.44	6.00	5.63
	1.375	0.38	1.00	2.63	2.13	2.69	6.25	5.88
	1.750	0.50	1.25	2.88	2.38	2.94	6.50	6.13
	2.000	0.50	1.38	3.00	2.50	3.06	6.63	6.25
	2.500	0.63	1.63	3.25	2.75	3.31	6.88	6.50
5.000	1.000	0.25	0.75	2.38	2.06	2.44	6.31	5.88
	1.375	0.38	1.00	2.63	2.31	2.69	6.56	6.13
	1.750	0.50	1.25	2.88	2.56	2.94	6.81	6.38
	2.000	0.50	1.38	3.00	2.69	3.06	6.94	6.50
	2.500	0.63	1.63	3.25	2.94	3.31	7.19	6.75
	3.000	0.63	1.63	3.25	2.94	3.31	7.19	6.75
	3.500	0.63	1.63	3.25	2.94	3.31	7.19	6.75
6.000	1.375	0.25	0.88	2.78	2.31	2.81	7.06	6.63
	1.750	0.38	1.13	3.03	2.56	3.06	7.31	6.88
	2.000	0.38	1.25	3.16	2.69	3.19	7.44	7.00
	2.500	0.50	1.50	3.41	2.94	3.44	7.69	7.25
	3.000	0.50	1.50	3.41	2.94	3.44	7.69	7.25
	3.500	0.50	1.50	3.41	2.94	3.44	7.69	7.25
	4.000	0.50	1.50	3.41	2.94	3.44	7.69	7.25
8.000	1.375	0.25	0.88	2.78	2.31	2.81	7.31	6.75
	1.750	0.38	1.13	3.03	2.56	3.06	7.56	7.00
	2.000	0.38	1.25	3.16	2.69	3.19	7.69	7.13
	2.500	0.50	1.50	3.41	2.94	3.44	7.94	7.38
	3.000	0.50	1.50	3.41	2.94	3.44	7.94	7.38
	3.500	0.50	1.50	3.41	2.94	3.44	7.94	7.38
	4.000	0.50	1.50	3.41	2.94	3.44	7.94	7.38
	4.500	0.50	1.50	3.41	2.94	3.44	7.94	7.38
	5.000	0.50	1.50	3.41	2.94	3.44	7.94	7.38
	5.500	0.50	1.50	3.41	2.94	3.44	7.94	7.38

Table 2 - Dimensions not affected by rod diameter

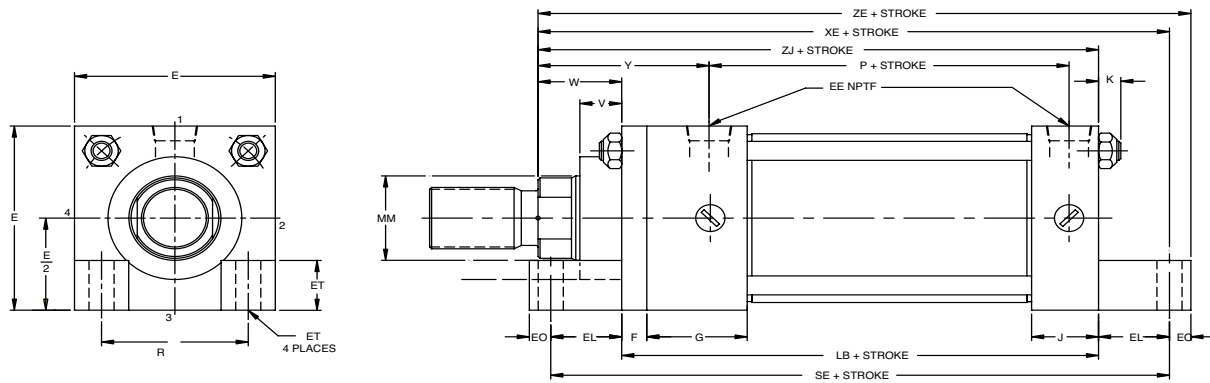
Bore In.	E	SAE EE	NPT EE	F	G	J	K	NT	TN	SB	SN	SS	ST	SU	SW	SX	SY	TS	US	LB	P	DT
1.500	2.00	6		0.38	1.50	1.00	0.25	1/4 - 20	0.63	0.44	2.25	2.88	0.50	0.94	0.38	0.38	0.38	2.75	3.50	4.00	2.28	0.19
2.000	2.50	6		0.38	1.50	1.00	0.31	5/16-18	0.88	0.44	2.25	2.88	0.50	0.94	0.38	0.38	0.38	3.25	4.00	4.00	2.28	0.34
2.500	3.00	6		0.38	1.50	1.00	0.31	3/8 - 16	1.25	0.44	2.38	3.00	0.50	0.94	0.38	0.50	0.38	3.75	4.50	4.13	2.38	0.44
3.250	3.75	10		0.63	1.75	1.25	0.38	1/2 - 13	1.50	0.56	2.63	3.25	0.75	1.25	0.50	0.50	0.50	4.75	5.75	4.88	2.69	0.50
4.000	4.50	10		0.63	1.75	1.25	0.38	1/2 - 13	2.06	0.56	2.63	3.25	0.75	1.25	0.50	0.50	0.50	5.50	6.50	4.88	2.69	0.63
5.000	5.50	10		0.63	1.75	1.25	0.44	5/8 - 11	2.69	0.81	2.88	3.13	1.00	1.56	0.69	0.69	0.69	6.88	8.25	5.13	2.94	0.75
6.000	6.50	12		0.75	2.00	1.50	0.44	3/4 - 10	3.25	0.81	3.13	3.63	1.00	1.56	0.69	0.69	0.69	7.88	9.25	5.75	3.16	0.88
8.000	8.50	12		0.75	2.00	1.50	0.56	3/4 - 10	4.50	0.81	3.25	3.75	1.00	1.56	0.69	0.88	0.69	9.88	11.25	5.88	3.28	1.13

Mounting MS3, MS7

CDT1 MS3



CDT1 MS7



The side or lug mounted cylinder provides a fairly rigid mount. These type mounts can tolerate a slight amount of misalignment when the cylinder is at full stroke, but as the piston moves towards the blind end, the tolerance for misalignment decreases. It is important to note that if the cylinder is used properly, the mounting bolts are in simple shear or tension without any compound stresses. An extended key plate option is available to eliminate the need for fitted bolts or external keys to carry the thrust load (see page 31)

When specifying an MS7 mount, carefully check the distance between the rod and lug to determine if there is sufficient clearance for the rod end attachment. It may be necessary to add a plain rod extension to move the threaded rod end out beyond the lug. The lugs serve as nuts on the bottom two tie rods, therefore making it necessary to loosen the tie rods to remove the rod bearing.

Rod end options shown on page 6.

Dimensions MS3, MS7

Table 1 - Dimensions affected by rod diameter

Bore In.	MM Rod	V	W	Y	XE	XS	ZB	ZJ	ZE
1.500	0.625	0.25	0.63	1.94	5.38	1.38	4.88	4.63	5.63
	1.000	0.50	1.00	2.31	5.75	1.75	5.25	5.00	6.00
2.000	0.625	0.25	0.63	1.94	5.56	1.38	4.94	4.63	5.88
	1.000	0.50	1.00	2.31	5.94	1.75	5.31	5.00	6.25
	1.375	0.63	1.25	2.56	6.19	2.00	5.56	5.25	6.50
2.500	0.625	0.25	0.63	1.94	5.81	1.38	5.06	4.75	6.13
	1.000	0.50	1.00	2.31	6.19	1.75	5.44	5.13	6.50
	1.375	0.63	1.25	2.56	6.44	2.00	5.69	5.38	6.75
	1.750	0.75	1.50	2.81	6.69	2.25	5.94	5.63	7.00
3.250	1.000	0.25	0.75	2.38	6.50	1.88	6.00	5.63	6.88
	1.375	0.38	1.00	2.63	6.75	2.13	6.25	5.88	7.13
	1.750	0.50	1.25	2.88	7.00	2.38	6.50	6.13	7.38
	2.000	0.50	1.38	3.00	7.13	2.50	6.63	6.25	7.50
4.000	1.000	0.25	0.75	2.38	6.63	1.88	6.00	5.63	7.00
	1.375	0.38	1.00	2.63	6.88	2.13	6.25	5.88	7.25
	1.750	0.50	1.25	2.88	7.13	2.38	6.50	6.13	7.50
	2.000	0.50	1.38	3.00	7.25	2.50	6.63	6.25	7.63
	2.500	0.63	1.63	3.25	7.50	2.75	6.88	6.50	7.88
5.000	1.000	0.25	0.75	2.38	6.94	2.06	6.31	5.88	7.43
	1.375	0.38	1.00	2.63	7.19	2.31	6.56	6.13	7.69
	1.750	0.50	1.25	2.88	7.44	2.56	6.87	6.38	7.94
	2.000	0.50	1.38	3.00	7.56	2.69	6.94	6.50	8.06
	2.500	0.63	1.63	3.25	7.81	2.94	7.19	6.75	8.31
	3.000	0.63	1.63	3.25	7.81	2.94	7.19	6.75	8.31
	3.500	0.63	1.63	3.25	7.81	2.94	7.19	6.75	8.31
6.000	1.375	0.25	0.88	2.78	7.63	2.31	7.06	6.63	8.13
	1.750	0.38	1.13	3.03	7.88	2.56	7.31	6.88	8.38
	2.000	0.38	1.25	3.16	8.00	2.69	7.44	7.00	8.50
	2.500	0.50	1.50	3.41	8.25	2.94	7.69	7.25	8.75
	3.000	0.50	1.50	3.41	8.25	2.94	7.69	7.25	8.75
	3.500	0.50	1.50	3.41	8.25	2.94	7.69	7.25	8.75
	4.000	0.50	1.50	3.41	8.25	2.94	7.69	7.25	8.75
8.000	1.375	0.25	0.88	2.78	7.88	2.69	7.31	6.75	8.25
	1.750	0.38	1.13	3.03	8.13	2.94	7.56	7.00	8.75
	2.000	0.38	1.25	3.16	8.25	2.94	7.69	7.13	8.88
	2.500	0.50	1.50	3.41	8.50	2.94	7.94	7.38	9.13
	3.000	0.50	1.50	3.41	#	2.94	7.94	7.38	#
	3.500	0.50	1.50	3.41	#	2.94	7.94	7.38	#
	4.000	0.50	1.50	3.41	#	2.31	7.94	7.38	#
	4.500	0.50	1.50	3.41	#	2.56	7.94	7.38	#
	5.000	0.50	1.50	3.41	#	2.94	7.94	7.38	#
	5.500	0.50	1.50	3.41	#	2.94	7.94	7.38	#

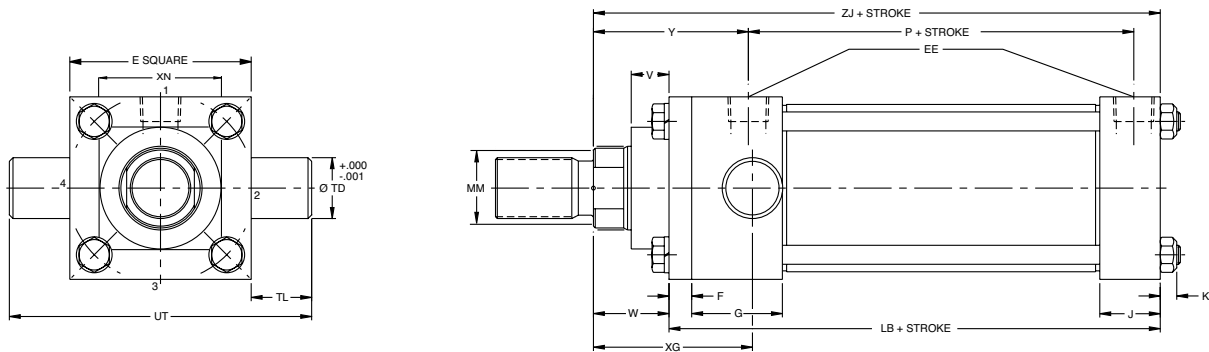
= MS7 not available in this rod size

Table 2 - Dimensions not affected by rod diameter

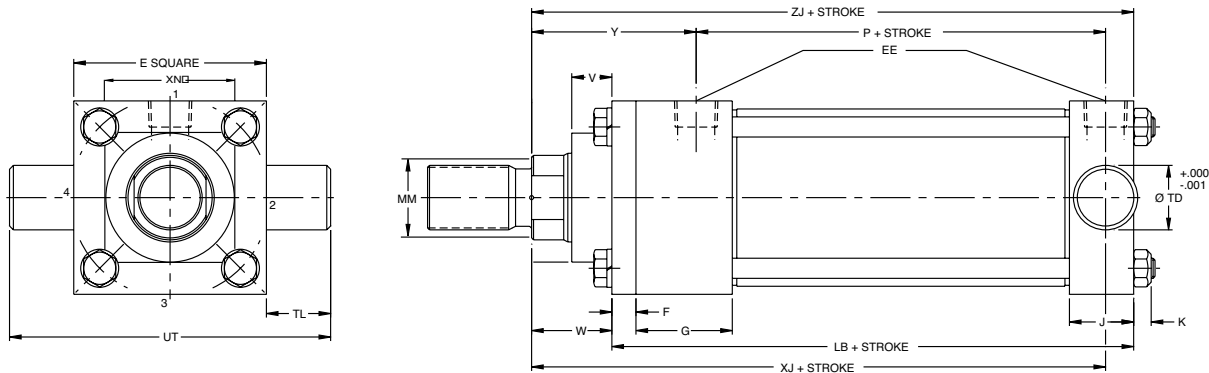
Bore in.	E	EB	SAE EE	NPT EE	EL	EO	ET	F	G	J	K	R	SB	S	SS	ST	SU	SW	SX	SY	TS	US	LB	P	SE
1.500	2.00	0.38	6	3/8	0.75	0.25	0.53	0.38	1.50	1.00	0.25	1.43	0.44	5.50	2.88	0.50	0.94	0.38	0.31	0.31	2.75	3.50	4.00	2.28	5.50
2.000	2.50	0.38	6	3/8	0.94	0.31	0.63	0.38	1.50	1.00	0.31	1.84	0.44	5.88	2.88	0.50	0.94	0.38	0.38	0.38	3.25	4.00	4.00	2.28	5.88
2.500	3.00	0.38	6	3/8	1.06	0.31	0.78	0.38	1.50	1.00	0.31	2.19	0.44	6.25	3.00	0.50	0.94	0.38	0.50	0.38	3.75	4.50	4.13	2.38	6.25
3.250	3.75	0.50	10	1/2	0.88	0.38	0.94	0.63	1.75	1.25	0.38	2.76	0.56	6.63	3.25	0.75	1.25	0.50	0.50	0.50	4.75	5.75	4.88	2.69	6.63
4.000	4.50	0.50	10	1/2	1.00	0.38	1.16	0.63	1.75	1.25	0.38	3.32	0.56	6.88	3.25	0.75	1.25	0.50	0.50	0.50	5.50	6.50	4.88	2.69	6.88
5.000	5.50	0.50	10	1/2	1.06	0.50	1.38	0.63	1.75	1.25	0.44	4.10	0.81	7.25	3.13	1.00	1.56	0.69	0.69	0.69	6.88	8.25	5.13	2.94	7.25
6.000	6.50	0.75	12	1/2	1.00	0.50	1.59	0.75	2.00	1.50	0.44	4.88	0.81	7.75	3.63	1.00	1.56	0.69	0.69	0.69	7.88	9.25	5.75	3.16	7.75
8.000	8.50	0.69	12	3/4	1.13	0.63	1.94	0.75	2.00	1.50	0.56	6.44	0.81	7.38	3.75	1.00	1.56	0.69	0.88	0.69	9.88	11.25	5.88	3.28	7.38

Mounting MT1, MT2

CDT1 MT1



CDT1MT2



Dimensions MT1, MT2

Table 1 - Dimensions affected by rod diameter

Bore In.	Rod mm	V	W	Y	XG	XJ	XN	ZJ
1.500	0.625	0.25	0.63	1.94	1.75	4.13	-	4.63
	1.000	0.50	1.00	2.31	2.13	4.50	-	5.00
2.000	0.625	0.25	0.63	1.94	1.75	4.13	-	4.63
	1.000	0.50	1.00	2.31	2.13	4.50	-	5.00
	1.375	0.63	1.25	2.56	2.38	4.75	-	5.25
2.500	0.625	0.25	0.63	1.94	1.75	4.25	-	4.75
	1.000	0.50	1.00	2.31	2.13	4.63	-	5.13
	1.375	0.63	1.25	2.56	2.38	4.88	-	5.38
	1.750	0.75	1.50	2.81	2.63	5.13	-	5.63
3.250	1.000	0.25	0.75	2.38	2.25	5.00	-	5.63
	1.375	0.38	1.00	2.63	2.50	5.25	-	5.88
	1.750	0.50	1.25	2.88	2.75	5.50	-	6.13
	2.000	0.50	1.38	3.00	2.88	5.63	-	6.25
4.000	1.000	0.25	0.75	2.38	2.25	5.00	-	5.63
	1.375	0.38	1.00	2.63	2.50	5.25	-	5.88
	1.750	0.50	1.25	2.88	2.75	5.50	-	6.13
	2.000	0.50	1.38	3.00	2.88	5.63	-	6.25
	2.500	0.63	1.63	3.25	3.13	5.88	-	6.50
5.000	1.000	0.25	0.75	2.38	2.25	5.25	-	5.88
	1.375	0.38	1.00	2.63	2.50	5.50	-	6.13
	1.750	0.50	1.25	2.88	2.75	5.75	-	6.38
	2.000	0.50	1.38	3.00	2.88	5.88	-	6.50
	2.500	0.63	1.63	3.25	3.13	6.13	-	6.75
	3.000	0.63	1.63	3.25	3.13	6.13	-	6.75
	3.500	0.63	1.63	3.25	3.13	6.13	-	6.75
6.000	1.375	0.25	0.88	2.78	2.63	5.88	-	6.63
	1.750	0.38	1.13	3.03	2.88	6.13	-	6.88
	2.000	0.38	1.25	3.16	3.00	6.25	-	7.00
	2.500	0.50	1.50	3.41	3.25	6.50	-	7.25
	3.000	0.50	1.50	3.41	3.25	6.50	-	7.25
	3.500	0.50	1.50	3.41	3.25	6.50	-	7.25
	4.000	0.50	1.50	3.41	3.25	6.50	-	7.25
8.000	1.375	0.25	0.88	2.78	2.63	6.00	4.00	6.75
	1.750	0.38	1.13	3.03	2.88	6.25	4.00	7.00
	2.000	0.38	1.25	3.16	3.00	6.38	4.00	7.13
	2.500	0.50	1.50	3.41	3.25	6.63	4.00	7.38
	3.000	0.50	1.50	3.41	3.25	6.63	5.50	7.38
	3.500	0.50	1.50	3.41	3.25	6.63	5.50	7.38
	4.000	0.50	1.50	3.41	3.25	6.63	5.50	7.38
	4.500	0.50	1.50	3.41	3.25	6.63	6.50	7.38
	5.000	0.50	1.50	3.41	3.25	6.63	6.50	7.38
	5.500	0.50	1.50	3.41	3.25	6.63	7.25	7.38

All trunnion mount cylinders need a provision on both ends for pivoting. These types of cylinders are designed to carry shear loads and the trunnion and pivot pins should be carried by bearings that are rigidly held and closely fit for the entire length of the pin.

Head or rod end trunnions should be carefully applied to either short strokes or to applications where the weight of the cylinder falls vertically below the pin.

NOTE: The "XG" and "XJ" dimensions for MT1 and MT2 mounts are not NFPA Standard.

NOTE: The bearing retainer plate is the same as the "E" dimension for the 1.5" – 6" bore sizes and the "XN" dimension for the 8" bore size.

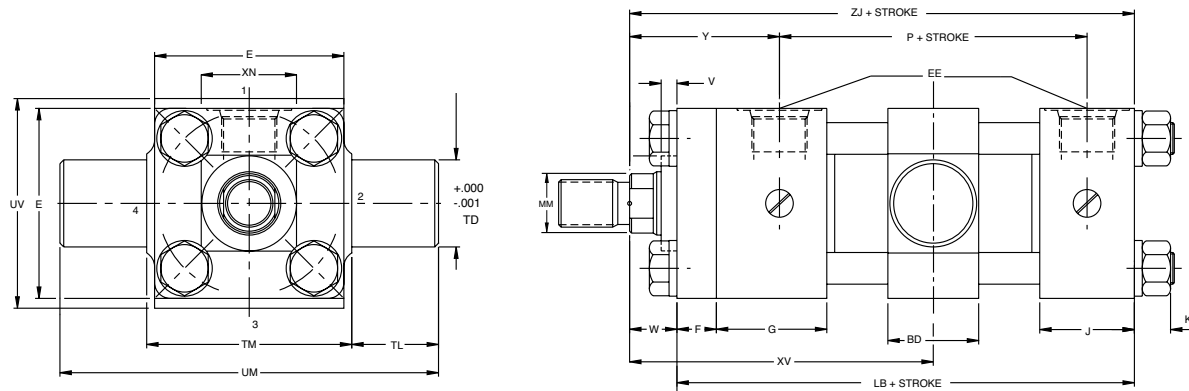
Rod end options shown on page 6.

Table 2 - Dimensions not affected by rod diameter

Bore In.	E	SAE Port EE	NPT Port EE	F	G	J	K	TD +.000 -.001*	TL	UT	UB	P	LB
1.500	2.00	6	3/8	0.38	1.50	1.00	0.25	1.000	1.00	4.00	4.00	2.28	4.00
2.000	2.50	6	3/8	0.38	1.50	1.00	0.31	1.000	1.00	4.50	4.00	2.28	4.00
2.500	3.00	6	3/8	0.38	1.50	1.00	0.31	1.000	1.00	5.00	4.13	2.38	4.13
3.250	3.75	10	1/2	0.63	1.75	1.25	0.38	1.000	1.00	5.75	4.88	2.69	4.88
4.000	4.50	10	1/2	0.63	1.75	1.25	0.38	1.000	1.00	6.50	4.88	2.69	4.88
5.000	5.50	10	1/2	0.63	1.75	1.25	0.44	1.000	1.00	7.50	5.13	2.94	5.13
6.000	6.50	12	1/2	0.75	2.00	1.50	0.44	1.375	1.38	9.25	5.75	3.16	5.75
8.000	8.50	12	3/4	0.75	2.00	1.50	0.56	1.375	1.38	11.25	5.88	3.28	5.88

Mounting MT4

CDT1 MT4



All trunnion mounted cylinders need a provision on both ends for pivoting. These types of cylinders are designed to carry shear loads and the trunnion and pivot pins should be carried by bearings that are rigidly held and closely fit for the entire length of the pin.

Specify "XV" dimension when ordering MT4 Intermediate Fixed Trunnion mounts. If not specified, trunnion will be located at the center of the tube.

NOTE: The bearing retainer plate is the same as the "E" dimension for the 1.5" – 6" bore sizes and the "XN" dimension for the 8" bore size.

Rod end options shown on page 6.

Dimensions MT4

Table 1 - Dimensions affected by rod diameter

Bore In.	MM Rod	V	W	Y	XV Min.	ZJ	XN
1.500	0.625	0.25	0.63	1.94	3.19	4.63	-
	1.000	0.50	1.00	2.31	3.56	5.00	-
2.000	0.625	0.25	0.63	1.94	3.31	4.63	-
	1.000	0.50	1.00	2.31	3.69	5.00	-
	1.375	0.63	1.25	2.56	3.94	5.25	-
2.500	0.625	0.25	0.63	1.94	3.31	4.75	-
	1.000	0.50	1.00	2.31	3.69	5.13	-
	1.375	0.63	1.25	2.56	3.94	5.38	-
	1.750	0.75	1.50	2.81	4.19	5.63	-
3.250	1.000	0.25	0.75	2.38	4.19	5.63	-
	1.375	0.38	1.00	2.63	4.44	5.88	-
	1.750	0.50	1.25	2.88	4.69	6.13	-
	2.000	0.50	1.38	3.00	4.81	6.25	-
4.000	1.000	0.25	0.75	2.38	4.19	5.63	-
	1.375	0.38	1.00	2.63	4.44	5.88	-
	1.750	0.50	1.25	2.88	4.69	6.13	-
	2.000	0.50	1.38	3.00	4.81	6.25	-
	2.500	0.63	1.63	3.25	5.06	6.50	-
5.000	1.000	0.25	0.75	2.38	4.19	5.88	-
	1.375	0.38	1.00	2.63	4.44	6.13	-
	1.750	0.50	1.25	2.88	4.69	6.38	-
	2.000	0.50	1.38	3.00	4.81	6.50	-
	2.500	0.63	1.63	3.25	5.06	6.75	-
	3.000	0.63	1.63	3.25	5.06	6.75	-
	3.500	0.63	1.63	3.25	5.06	6.75	-
6.000	1.375	0.25	0.88	2.78	4.94	6.63	-
	1.750	0.38	1.13	3.03	5.19	6.88	-
	2.000	0.38	1.25	3.16	5.31	7.00	-
	2.500	0.50	1.50	3.41	5.56	7.25	-
	3.000	0.50	1.50	3.41	5.56	7.25	-
	3.500	0.50	1.50	3.41	5.56	7.25	-
	4.000	0.50	1.50	3.41	5.56	7.25	-
8.000	1.375	0.25	0.88	2.78	4.94	6.75	4.00
	1.750	0.38	1.13	3.03	5.19	7.00	4.00
	2.000	0.38	1.25	3.16	5.31	7.13	4.00
	2.500	0.50	1.50	3.41	5.56	7.38	4.00
	3.000	0.50	1.50	3.41	5.56	7.38	5.50
	3.500	0.50	1.50	3.41	5.56	7.38	5.50
	4.000	0.50	1.50	3.41	5.56	7.38	5.50
	4.500	0.50	1.50	3.41	5.56	7.38	6.50
	5.000	0.50	1.50	3.41	5.56	7.38	6.50
	5.500	0.50	1.50	3.41	5.56	7.38	7.25

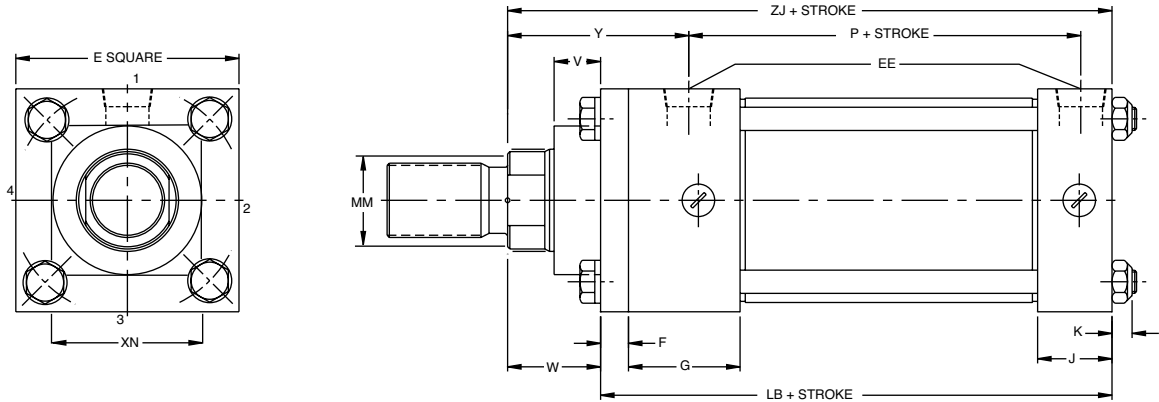
~ = Exact XV value to be specified by customer when ordering.

Table 2 - Dimensions not affected by rod diameter

Bore In.	BD	E	SAE Port EE	NPT Port EE	F	G	J	K	TL	TM	UM	UV	LB	P	Min. Stroke
1.500	1.25	2.00	6	3/8	0.38	1.50	1.00	0.25	1.00	2.50	4.50	2.50	4.00	2.28	0.25
2.000	1.50	2.50	6	3/8	0.38	1.50	1.00	0.31	1.00	3.00	5.00	3.00	4.00	2.28	0.50
2.500	1.50	3.00	6	3/8	0.38	1.50	1.00	0.31	1.00	3.50	5.50	3.50	4.13	2.38	0.38
3.250	2.00	3.75	10	1/2	0.63	1.75	1.25	0.38	1.00	4.50	6.50	4.25	4.88	2.69	0.88
4.000	2.00	4.50	10	1/2	0.63	1.75	1.25	0.38	1.00	5.25	7.25	5.00	4.88	2.69	0.88
5.000	2.00	5.50	10	1/2	0.63	1.75	1.25	0.44	1.00	6.25	8.25	6.00	5.13	2.94	0.63
6.000	2.50	6.50	12	1/2	0.75	2.00	1.50	0.44	1.38	7.63	10.38	7.38	5.75	3.16	1.13
8.000	2.50	8.50	12	3/4	0.75	2.00	1.50	0.56	1.38	9.75	12.50	9.50	5.88	3.28	0.88

Mounting MX0

CDT1 MX0



Dimensions MX0

Table 1 - Dimensions affected by rod diameter

Bore Ø In.	Rod Ø In.	V	W	Y	ZJ	XN
1.500	0.625	0.25	0.63	1.94	4.63	-
	1.000	0.50	1.00	2.31	5.00	-
2.000	0.625	0.25	0.63	1.94	4.63	-
	1.000	0.50	1.00	2.31	5.00	-
	1.375	0.63	1.25	2.56	5.25	-
2.500	0.625	0.25	0.63	1.94	4.75	-
	1.000	0.50	1.00	2.31	5.13	-
	1.375	0.63	1.25	2.56	5.38	-
	1.750	0.75	1.50	2.81	5.63	-
3.250	1.000	0.25	0.75	2.38	5.63	-
	1.375	0.38	1.00	2.63	5.88	-
	1.750	0.50	1.25	2.88	6.13	-
	2.000	0.50	1.38	3.00	6.25	-
4.000	1.000	0.25	0.75	2.38	5.63	-
	1.375	0.38	1.00	2.63	5.88	-
	1.750	0.50	1.25	2.88	6.13	-
	2.000	0.50	1.38	3.00	6.25	-
	2.500	0.63	1.63	3.25	6.50	-
5.000	1.000	0.25	0.75	2.38	5.88	-
	1.375	0.38	1.00	2.63	6.13	-
	1.750	0.50	1.25	2.88	6.38	-
	2.000	0.50	1.38	3.00	6.50	-
	2.500	0.63	1.63	3.25	6.75	-
	3.000	0.63	1.63	3.25	6.75	-
6.000	3.500	0.63	1.63	3.25	6.75	-
	1.375	0.25	0.88	2.78	6.63	-
	1.750	0.38	1.13	3.03	6.88	-
	2.000	0.38	1.25	3.16	7.00	-
	2.500	0.50	1.50	3.41	7.25	-
	3.000	0.50	1.50	3.41	7.25	-
	3.500	0.50	1.50	3.41	7.25	-
8.000	4.000	0.50	1.50	3.41	7.25	-
	1.375	0.25	0.88	2.78	6.75	4.00
	1.750	0.38	1.13	3.03	7.00	4.00
	2.000	0.38	1.25	3.16	7.13	4.00
	2.500	0.50	1.50	3.41	7.38	4.00
	3.000	0.50	1.50	3.41	7.38	5.50
	3.500	0.50	1.50	3.41	7.38	5.50
	4.000	0.50	1.50	3.41	7.38	5.50
	4.500	0.50	1.50	3.41	7.38	7.00
	5.000	0.50	1.50	3.41	7.38	7.00
	5.500	0.50	1.50	3.41	7.38	7.00

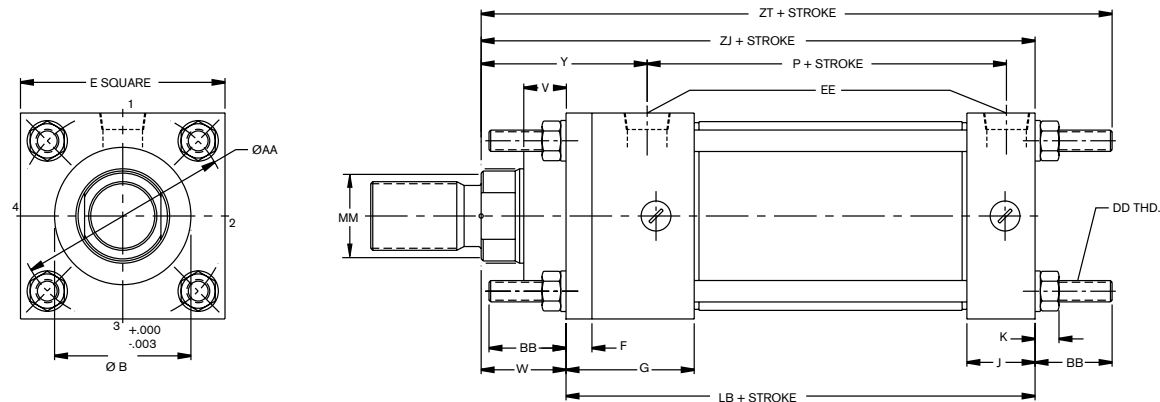
Rod end options shown on page 6.

Table 2 - Dimensions not affected by rod diameter

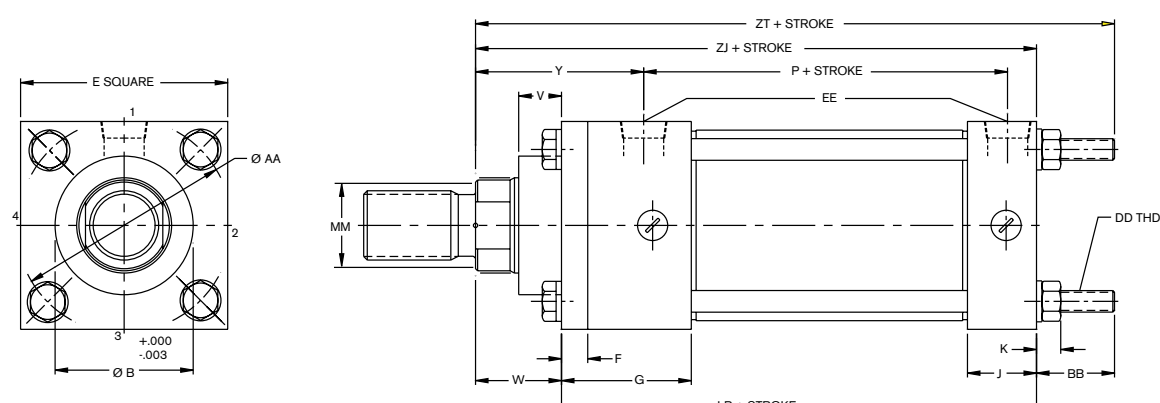
Bore In.	E	SAE Port EE	NPT Port EE	F	G	J	K	LB	P
1.500	2.00	6	3/8	0.38	1.50	1.00	0.25	4.00	2.28
2.000	2.50	6	3/8	0.38	1.50	1.00	0.31	4.00	2.28
2.500	3.00	6	3/8	0.38	1.50	1.00	0.31	4.13	2.38
3.250	3.75	10	1/2	0.63	1.75	1.25	0.38	4.88	2.69
4.000	4.50	10	1/2	0.63	1.75	1.25	0.38	4.88	2.69
5.000	5.50	10	1/2	0.63	1.75	1.25	0.44	5.13	2.94
6.000	6.50	12	1/2	0.75	2.00	1.50	0.44	5.75	3.16
8.000	8.50	12	3/4	0.75	2.00	1.50	0.56	5.88	3.28

Mounting MX1, MX2, MX3

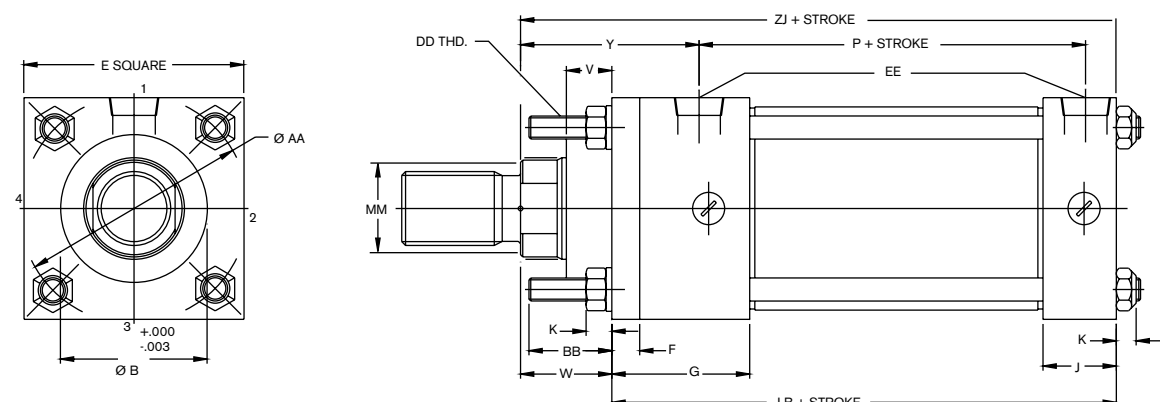
CDT1 MX1



CDT1 MX2



CDT1 MX3



Dimensions MX1, MX2, MX3

Table 1 - Dimensions affected by rod diameter

Bore In.	Rod In.	V	W	Y	ZJ	ZT
1.500	0.625	0.25	0.63	1.94	4.63	5.62
	1.000	0.50	1.00	2.31	5.00	6.00
2.000	0.625	0.25	0.63	1.94	4.63	5.75
	1.000	0.50	1.00	2.31	5.00	6.12
	1.375	0.63	1.25	2.56	5.25	6.38
2.500	0.625	0.25	0.63	1.94	4.75	5.88
	1.000	0.50	1.00	2.31	5.13	6.25
	1.375	0.63	1.25	2.56	5.38	6.50
	1.750	0.75	1.50	2.81	5.63	6.75
3.250	1.000	0.25	0.75	2.38	5.63	7.00
	1.375	0.38	1.00	2.63	5.88	7.25
	1.750	0.50	1.25	2.88	6.13	7.50
	2.000	0.50	1.38	3.00	6.25	7.62
4.000	2.500	0.63	1.63	3.25	6.50	7.88
	1.000	0.25	0.75	2.38	5.63	7.00
	1.375	0.38	1.00	2.63	5.88	7.25
	1.750	0.50	1.25	2.88	6.13	7.50
	2.000	0.50	1.38	3.00	6.25	7.62
5.000	2.500	0.63	1.63	3.25	6.50	7.88
	1.000	0.25	0.75	2.38	5.88	7.69
	1.375	0.38	1.00	2.63	6.13	7.94
	1.750	0.50	1.25	2.88	6.38	8.19
	2.000	0.50	1.38	3.00	6.50	8.31
	2.500	0.63	1.63	3.25	6.75	8.56
	3.000	0.63	1.63	3.25	6.75	8.56
6.000	3.500	0.63	1.63	3.25	6.75	8.56
	1.375	0.25	0.88	2.78	6.63	8.44
	1.750	0.38	1.13	3.03	6.88	8.69
	2.000	0.38	1.25	3.16	7.00	8.81
	2.500	0.50	1.50	3.41	7.25	9.06
	3.000	0.50	1.50	3.41	7.25	9.06
	3.500	0.50	1.50	3.41	7.25	9.06
	4.000	0.50	1.50	3.41	7.25	9.06

Tie Rod and Flange Mounts are basically the same except that the tie rods are extended and used to mount the cylinder. To prevent misalignment, sagging or binding of the cylinder when long strokes are required, the free end of the cylinder should be supported. For thrust load applications, blind or cap end tie rod extensions are best. For tension load applications, rod or head end extensions are best. Tie rod mounts are suited for any applications, however it should be noted that they are not as rigid as the flange mountings.

NOTE: The bearing retainer plate is the same as the "E" dimension for the 1.5" – 6" bore sizes.

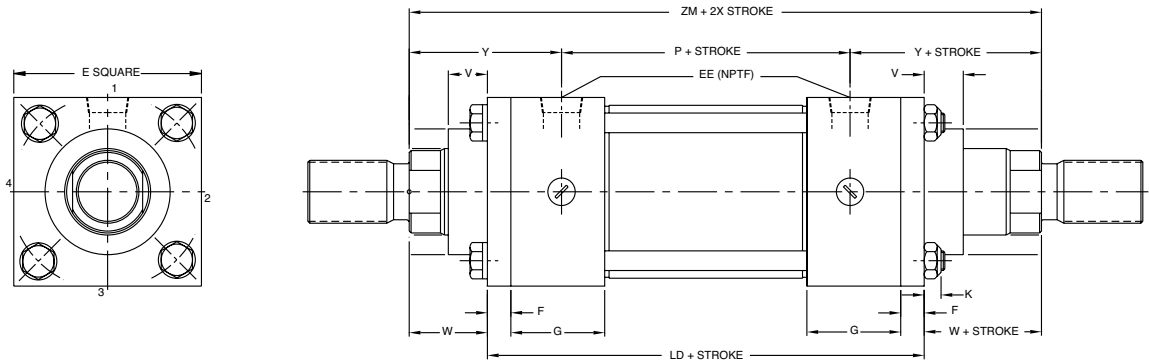
Rod end options shown on page 6.

Table 2 - Dimensions not affected by rod diameter

Bore In.	E	SAE Port EE	NPT Port EE	F	G	J	K	AA	BB	DD	LB	P
1.500	2.00	6	3/8	0.38	1.50	1.00	0.25	2.02	1.00	1/4 - 28	4.00	2.2
2.000	2.50	6	3/8	0.38	1.50	1.00	0.31	2.60	1.13	5/16 - 24	4.00	2.28
2.500	3.00	6	3/8	0.38	1.50	1.00	0.31	3.10	1.13	5/16 - 24	4.13	2.38
3.250	3.75	10	1/2	0.63	1.75	1.25	0.38	3.90	1.38	3/8 - 24	4.88	2.69
4.000	4.50	10	1/2	0.63	1.75	1.25	0.38	4.70	1.38	3/8 - 24	4.88	2.6
5.000	5.50	10	1/2	0.63	1.75	1.25	0.44	5.80	1.81	1/2 - 20	5.13	2.9
6.000	6.50	12	1/2	0.75	2.00	1.50	0.44	6.90	1.81	1/2 - 20	5.75	3.16

Mounting CGT1

CGT1



Pressure Ratings for Double Rod End

Bore Size	Rod Size	Cushion Rod end or Non-Cushion	Cushion Both Ends or Ext. (psi)
1.500	0.625	1,000	750
	1.000	1,000	1,000
2.000	0.625	800	450
	1.000	1,000	500
	1.375	1,000	1,000
2.500	0.625	500	250
	1.000	1,000	500
	1.375	1,000	1,000
	1.750	1,000	1,000
3.250	1.000	500	n/a
	1.375	1,000	1,000
	1.750	1,000	1,000
	2.000	1,000	1,000
4.000	1.000	400	n/a
	1.375	1,000	1,000
	1.750	1,000	1,000
	2.000	1,000	1,000
	2.500	1,000	1,000

Bore Size	Rod Size	Cushion Rod end or Non-Cushion	Cushion Both Ends or Ext. (psi)
5.000	1.000	250	n/a
	1.375	750	750
	1.750	750	750
	2.000	750	750
	2.500	750	750
	3.000	750	750
6.000	3.500	750	750
	1.375	250	n/a
	1.750	750	750
	2.000	750	750
	2.500	675	675
	3.000	750	750
8.000	3.500	750	750
	4.000	750	750
	1.375	200	n/a
	1.750	500	450
	2.000	500	500
	2.500	500	500
	3.000	500	500
	3.500	500	500
	4.000	500	500
	4.500	500	500
	5.000	500	500
	5.500	500	500

Mounting CGT1

Table 1 - Dimensions affected by rod diameter

Bore In.	Rod In.	V	W	Y	ZL	ZM
1.500	0.625	0.25	0.63	1.94	5.73	6.13
	1.000	0.50	1.00	2.31	6.10	6.88
2.000	0.625	0.25	0.63	1.94	5.78	6.13
	1.000	0.50	1.00	2.31	6.15	6.88
	1.375	0.63	1.25	2.56	6.40	7.38
2.500	0.625	0.25	0.63	1.94	5.90	6.25
	1.000	0.50	1.00	2.31	6.27	7.00
	1.375	0.63	1.25	2.56	6.52	7.50
	1.750	0.75	1.50	2.81	6.77	8.00
3.250	1.000	0.25	0.75	2.38	7.09	7.50
	1.375	0.38	1.00	2.63	7.34	8.00
	1.750	0.50	1.25	2.88	7.59	8.50
	2.000	0.50	1.38	3.00	7.72	8.75
4.000	1.000	0.25	0.75	2.38	7.09	7.50
	1.375	0.38	1.00	2.63	7.34	8.00
	1.750	0.50	1.25	2.88	7.59	8.50
	2.000	0.50	1.38	3.00	7.72	8.75
	2.500	0.63	1.63	3.25	7.97	9.25
5.000	1.000	0.25	0.75	2.38	7.44	7.75
	1.375	0.38	1.00	2.63	7.69	8.25
	1.750	0.50	1.25	2.88	7.94	8.75
	2.000	0.50	1.38	3.00	8.07	9.00
	2.500	0.63	1.63	3.25	8.32	9.50
	3.000	0.63	1.63	3.25	8.32	9.50
	3.500	0.63	1.63	3.25	8.32	9.50
6.000	1.375	0.25	0.88	2.78	8.32	8.75
	1.750	0.38	1.13	3.03	8.57	9.25
	2.000	0.38	1.25	3.16	8.69	9.50
	2.500	0.50	1.50	3.41	8.94	10.00
	3.000	0.50	1.50	3.41	8.94	10.00
	3.500	0.50	1.50	3.41	8.94	10.00
	4.000	0.50	1.50	3.41	8.94	10.00
8.000	1.375	0.25	0.88	2.78	7.82	8.88
	1.750	0.38	1.13	3.03	8.07	9.38
	2.000	0.38	1.25	3.16	8.19	9.63
	2.500	0.50	1.50	3.41	8.44	10.13
	3.000	0.50	1.50	3.41	8.44	10.13
	3.500	0.50	1.50	3.41	8.44	10.13
	4.000	0.50	1.50	3.41	8.44	10.13
	4.500	0.50	1.50	3.41	8.44	10.13
	5.000	0.50	1.50	3.41	8.44	10.13
	5.500	0.50	1.50	3.41	8.44	10.13

Double rod end cylinders are available in every mounting style except MP1, MP3 and MP5. For dimensions on specific mounting styles, consult the page showing the required mounting. On cylinders where the rod ends are not the same, be sure to specify where each rod end is located in relation to the mounting requirements.

Note that bore sizes 1-1/2" – 6" have square retainers, the same square size as the head on both ends. One of these retainers is held in place by the tie rod nuts, and therefore cannot be removed without loosening the tie rods.

Rod end options shown on page 6.

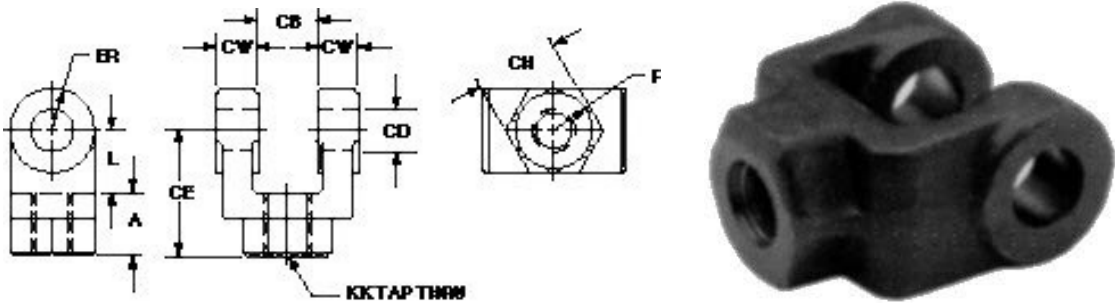
Consult factory for minimum stroke lengths.

Table 2 - Dimensions not affected by rod diameter

Bore In.	E	SAE Port EE	NPT Port EE	F	G	K	LD	LB	P
1.500	2.00	6	3/8	0.38	1.50	0.25	4.88	4.00	2.25
2.000	2.50	6	3/8	0.38	1.50	0.31	4.88	4.00	2.25
2.500	3.00	6	3/8	0.38	1.50	0.31	5.00	4.13	2.38
3.250	3.75	10	1/2	0.63	1.75	0.38	6.00	4.88	2.75
4.000	4.50	10	1/2	0.63	1.75	0.38	6.00	4.88	2.69
5.000	5.50	10	1/2	0.63	1.75	0.44	6.25	5.13	2.94
6.000	6.50	12	1/2	0.75	2.00	0.44	7.00	5.75	3.16
8.000	8.50	12	3/4	0.75	2.00	0.56	5.63	5.88	3.28

Rexroth Cylinder Accessories

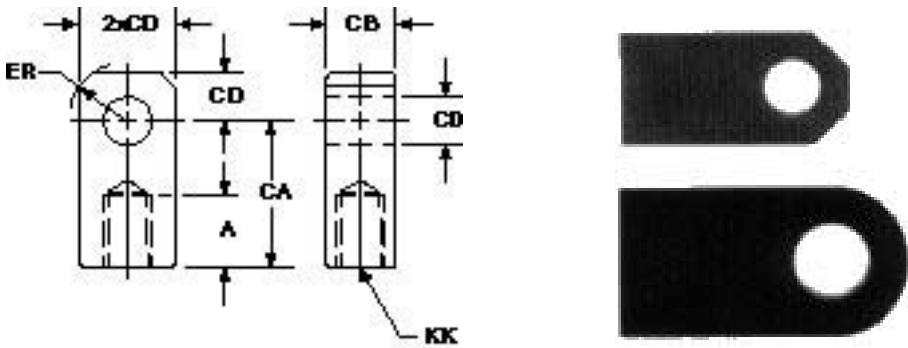
Rod Clevises



Part No.	CB	CD	CE	CH	CW	F	L	A	KK	ER
R978935057	.765	0.50	1.50	1.00	0.50	1.00	0.75	0.75	7/16-20	0.50
R978935058	1.265	0.75	2.38	1.25	0.63	1.25	1.25	1.13	3/4-16	0.75
R978935059	1.265	0.75	2.17	1.38	0.63	1.25	1.00	1.13	3/4-16	0.75
R978935060	1.515	1.00	3.13	1.50	0.75	1.50	1.50	1.83	1-14	1.00
R978935061	2.032	1.38	4.13	2.00	1.00	2.00	2.13	2.00	1-1/4-12	1.38
R978935062	2.531	1.75	4.50	2.38	1.25	2.38	2.25	2.25	1-1/2-12	1.75
R978935063	2.531	2.00	5.50	2.94	1.25	2.94	2.50	3.00	1-7/8-12	2.00
R978935064	3.032	2.50	6.50	3.50	1.50	3.50	3.00	3.50	2-1/4-12	2.50
R978935065	3.032	3.00	6.75	3.88	1.50	3.88	3.25	3.50	2-1/2-12	2.75

Note: Pins must be ordered separately, see Page 31 for dimensions and part numbers.

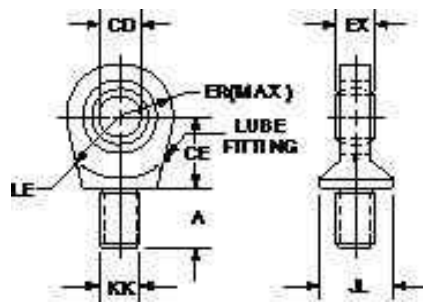
Rod Eyes



Part No.	A	CA	CB	CD	ER	KK
R978935066	0.75	1.50	0.75	0.50	0.63	7/16-20
R978935067	1.13	2.06	1.25	0.75	0.88	3/4-16
R978935068	1.13	2.81	1.50	1.00	1.19	3/4-16
R978935069	1.83	2.38	1.50	1.00	1.44	1-14
R978935070	2.00	3.44	2.00	1.38	1.56	1-1/4-12
R978935071	2.25	4.00	2.50	1.75	2.00	1-1/2-12
R978935072	3.00	5.00	2.50	2.00	2.50	1-7/8-12
R978935073	3.50	5.81	3.00	2.50	2.81	2-1/4-12
R978935074	3.50	6.13	3.00	3.00	3.25	2-1/2-12

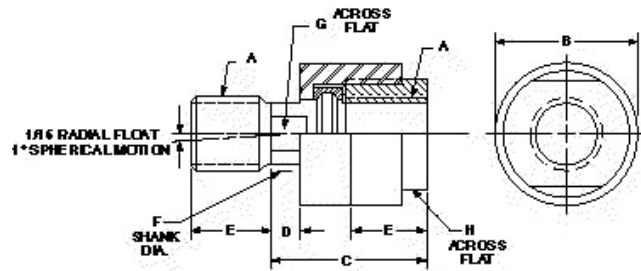
Rexroth Cylinder Accessories

Spherical Rod Eyes



Part No.	CD -.0005	A	CE	EX	ER	LE	KK	JL
R978935075	0.500	1.06	0.88	0.44	0.88	0.75	7/16-20	0.88
R978935076	0.750	1.00	1.25	2.03	1.25	1.06	3/4-16	1.31
R978935077	1.000	1.50	1.88	0.88	1.38	1.44	1-14	1.50
R978935078	1.375	2.00	2.13	1.19	1.81	1.88	1-1/4-12	2.00
R978935079	1.750	2.13	2.50	1.53	2.19	2.13	1-1/2-12	2.25
R978935081	2.000	2.88	2.75	1.75	2.63	2.50	1-7/8-12	2.75

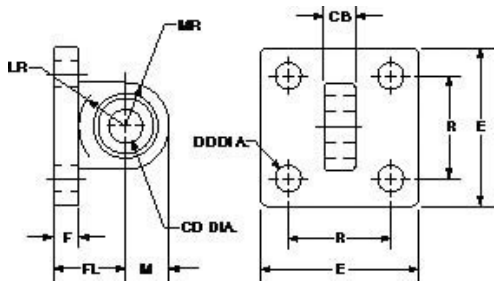
Alignment Couplers



Part No.	A	B	C	D	E	F	O	H	Max. Pull at Yield
R978935082	7/16-20	1.25	2.00	0.50	0.75	0.63	0.56	1.13	10,000
R978935080	1/2-20	1.25	2.00	0.50	0.75	0.63	0.56	1.13	14,000
R978935083	3/4-16	1.75	2.31	0.31	1.13	3.03	0.88	1.50	34,000
R978935084	7/8-14	1.75	2.31	0.31	1.13	3.03	0.88	1.50	34,000
R978935085	1-14	2.50	2.94	0.50	1.63	1.38	1.25	2.25	64,000
R978935086	1-1/4-12	2.50	2.94	0.50	1.63	1.38	1.25	2.25	64,000
R978935087	1-1/2-12	3.25	4.38	0.81	2.25	1.75	1.50	3.00	120,000
R978935088	1-3/4-12	3.25	4.38	0.81	2.25	1.75	1.50	3.00	120,000
R978935089	1-7/8-12	3.75	5.44	0.69	3.00	2.25	1.88	3.50	240,000
R978935099	2-12	3.75	5.44	0.69	3.00	2.25	1.88	3.50	240,000

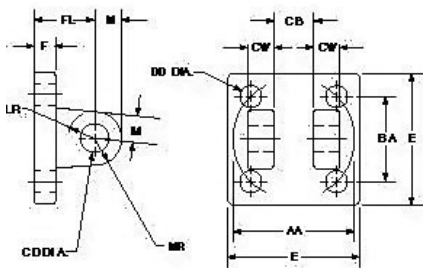
Rexroth Cylinder Accessories

Eye Brackets



Part No.	CB	CD	DD	E	F	FL	LR	M	MR	R
R978935036	0.75	0.50	13/32	2.50	0.38	1.13	0.75	0.50	0.56	1.63
R978935037	1.25	0.75	17/32	3.50	0.63	1.88	1.25	0.75	0.88	2.56
R978935038	1.50	1.00	21/32	4.50	0.75	2.25	1.50	1.00	1.25	3.25
R978935039	2.00	1.38	21/32	5.00	0.88	3.00	1.13	1.38	1.63	3.81
R978935040	2.50	1.75	29/32	6.50	0.88	3.13	2.25	1.75	2.13	4.95
R978935041	2.50	2.00	1-1/16	7.50	1.00	3.50	2.50	2.00	2.44	5.75
R978935042	3.00	2.50	1-3/16	8.50	1.00	4.00	3.00	2.50	3.00	6.59
R978935043	3.00	3.00	1-5/16	9.50	1.00	4.25	3.25	3.00	3.25	7.50
R978935044	4.00	3.50	1-13/16	12.63	1.06	5.69	4.00	3.50	4.13	9.62
R978935045	4.50	4.00	2-1/16	14.88	1.31	6.44	4.50	4.00	5.25	11.50

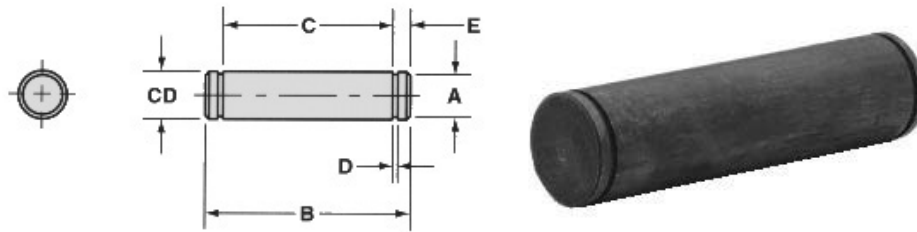
Clevis Brackets



Part No.	AA	BA	CB	CD	CW	DD	E	F	FL	LR	M	MR
R978935046	2.3	1.63	.765	0.50	0.50	3/8 - 24	2.50	0.38	1.13	0.50	0.50	0.56
R978935047	2.9	2.06	1.265	0.75	0.63	1/2 - 20	3.00	0.63	1.88	1.00	0.75	1.06
R978935048	3.6	2.56	1.265	0.75	0.63	1/2 - 20	3.50	0.63	1.88	1.06	0.75	1.06
R978935049	4.6	3.25	1.515	1.00	0.75	5/8 - 18	4.50	0.75	2.25	1.25	1.00	1.13
R978935050	5.4	3.81	2.032	1.38	1.00	5/8 - 16	5.00	0.88	3.00	1.88	1.38	1.75
R978935051	7.0	4.94	2.531	1.75	1.25	7/8 - 14	6.50	0.88	3.13	2.00	1.75	1.88
R978935052	8.1	5.75	2.531	2.00	1.25	1 - 14	7.50	1.00	3.50	2.13	2.00	2.13
R978935053	9.3	6.59	3.032	2.50	1.50	1 1/8 - 12	8.50	1.00	4.00	2.63	2.50	2.50
R978935054	10.6	7.50	3.032	3.00	1.50	1/4 - 12	9.50	1.00	4.25	2.88	2.75	2.75
R978935055	13.6	9.63	4.032	3.50	2.00	1 3/4 - 12	12.63	1.69	5.69	3.63	3.50	3.50
R978935056	16.2	11.50	4.532	4.00	2.25	2 - 12	14.88	1.94	6.44	4.00	4.00	4.00

Rexroth Cylinder Accessories

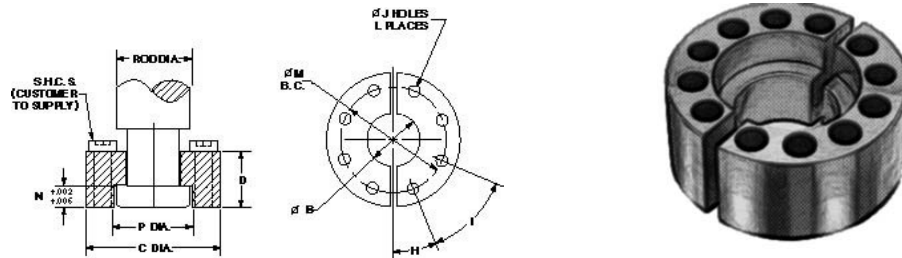
Pivot Pins-Grooved



Pivot Pins							C-Rings	
Part No.	CD	A	B	C	D	E	Part No.	CD
R978935026	0.500	0.468	2.094	1.875	0.041	0.109	R978000049	0.500
R978935027	0.750	0.704	2.875	2.625	0.048	0.125	R978000189	0.750
R978935028	1.000	0.940	3.375	3.125	0.048	0.125	R978000190	1.000
R978935029	1.375	1.291	4.485	4.187	0.056	0.149	R978000191	1.375
R978935030	1.750	1.650	5.547	5.188	0.068	0.180	R978000192	1.750
R978935031	2.000	1.886	5.547	5.188	0.068	0.180	R978000206	2.000
R978935032	2.500	2.360	6.625	6.188	0.086	0.219	R978000193	2.500
R978935033	3.000	2.838	6.780	6.250	0.103	0.265	R978000194	3.000

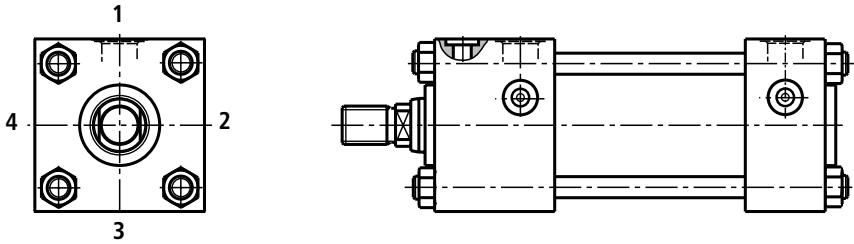
Note: When ordering pivot pins, two C-rings must also be ordered for each pin. Pivot pins do not automatically ship with C-rings. Additional C-rings are available in any quantity.

Safe Rod End Coupler



Part No.	Rod. Dia.	B	C	D	H	I	J	L	M	N	P	Material
R978007008	0.625	0.406	1.500	0.562	45°	90°	0.218	4	1.125	0.250	0.656	AISI 1144 CD
R978007009	1.000	0.750	2.000	0.875	30°	60°	0.218	6	1.500	0.375	1.063	AISI 1144 CD
R978007010	1.375	0.938	2.500	1.000	30°	60°	0.343	6	2.000	0.375	1.438	AISI 1018 CD
R978007011	1.750	1.187	3.000	1.250	22.5°	45°	0.343	8	2.375	0.500	1.813	AISI 1018 CD
R978007012	2.000	1.438	3.500	1.625	15°	30°	0.406	12	2.688	0.625	2.063	AISI 1018 CD
R978007013	2.500	1.875	4.000	1.875	15°	30°	0.406	12	3.188	0.750	2.625	AISI 1018 CD
R978007014	3.000	2.375	5.000	2.375	15°	30°	0.531	12	4.000	0.875	3.125	AISI 1018 CD
R978007015	3.500	2.625	5.875	2.625	15°	30°	0.656	12	4.688	1.000	3.625	C1119 MOD
R978007016	4.000	3.125	6.375	2.625	15°	30°	0.656	12	5.188	1.000	4.125	C1119 MOD
R978007017	4.500	3.625	6.875	3.125	15°	30°	0.656	12	5.688	1.500	4.625	C1119 MOD
R978007018	5.000	4.000	7.375	3.125	15°	30°	0.656	12	6.188	1.500	5.125	C1119 MOD
R978007019	5.500	4.500	8.250	3.875	15°	30°	0.781	12	6.875	1.875	5.625	C1119 MOD

Port Connection Locations

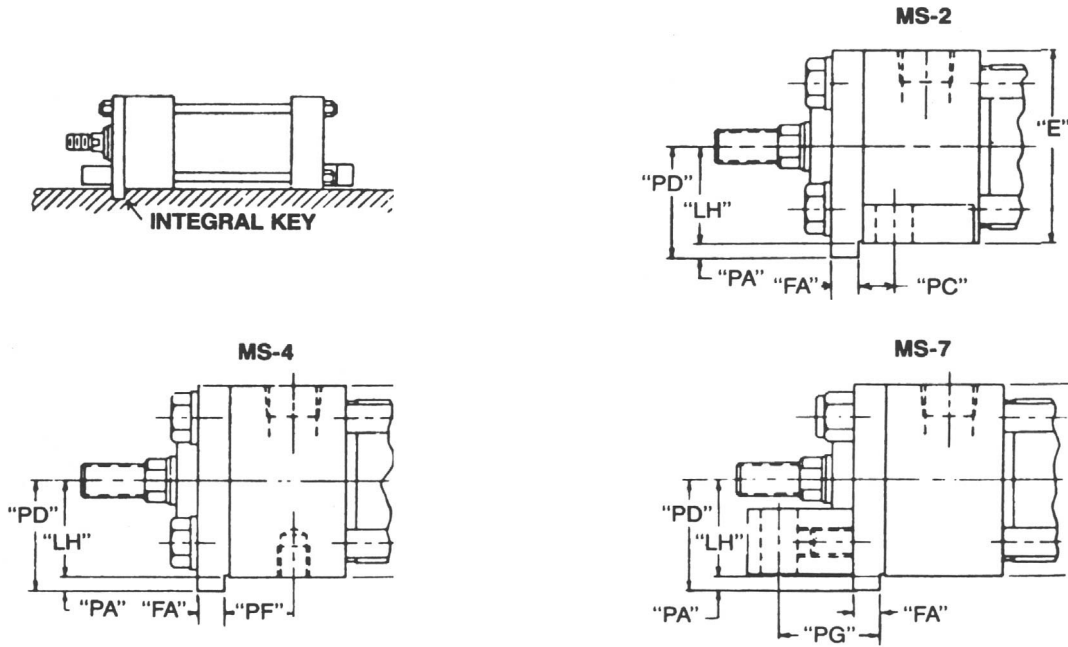


Mount Style	Port Location Head	Port Location Cap	Cushion Adjustment Head	Cushion Adjustment Cap	Air Bleed Head	Air Bleed Cap	Prox. Switch Loc. Head	Prox. Swith Loc. Cap
MX0, MF1, MF2, MF5 MF6, MP1, MP3, MP5, MS7, MT4, MX1, MX2, MX3	1	1	2	2	4	4	3	3
	2	2	3	3	1	1	4	4
	3	3	4	4	2	2	1	1
	4	4	1	1	3	3	2	2
MT1	1	1	3	2	3	4	C/F	3
	3	3	1	4	1	1	C/F	1
MT2	1	1	2	3	4	3	3	C/F
	3	3	4	1	2	1	1	C/F
MS2	1	1	2	2	4	4	3	3
	3	3	4	4	2	2	1	1
MS3	1	1	3	3	3	3	C/F	C/F
	3	3	1	1	1	1	C/F	C/F
MS4	1	1	2	2	4	4	C/F	C/F
	2	2	4	4	1	1	C/F	C/F
	4	4	2	2	1	1	C/F	C/F

Note: Air bleed valves and piston rod cushions not available on Head or Cap ends of 1.5" bore cylinders. Air bleed valves and cushioning not available on head end of 2" bore with 1.38" rod, 2.5" bore with 1.75" rod and 3-1/4" bore with 2" rod size.

Extended Key Plates

Rexroth offers a standard arrangement of Thrust Key Mountings on the MS2, MS4 and MS7 CDT1 cylinders. This option eliminates the need for fitted bolts or external keys to carry the thrust load. The normal headplate is extended below the head surface of the cylinder and is fitted in a keyway milled into the mounting surface of the machine member. See drawing for details.



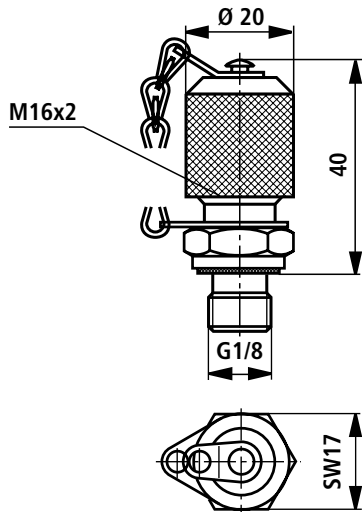
Bore	E	FA + 0.00	LH + 0.00	PA	PC	PD	PF	PG
1.50"	2.00	.313 - .002	0.994 - .002	0.19	0.44	1.18	1.00	1.06
2.00"	2.50	.313 - .002	1.244 - .002	0.19	0.44	1.43	1.00	1.25
2.50"	3.00	.313 - .002	1.494 - .002	0.19	0.44	1.68	1.00	1.38
3.25"	3.75	.563 - .002	1.869 - .002	0.31	0.56	2.18	1.13	1.44
4.00"	4.50	.563 - .002	2.244 - .002	0.31	0.56	2.56	1.13	1.56
5.00"	5.50	.563 - .002	2.744 - .002	0.31	0.56	3.06	1.13	1.63
6.00"	6.50	.688 - .002	3.244 - .002	0.38	0.75	3.62	1.38	1.69

Notes:

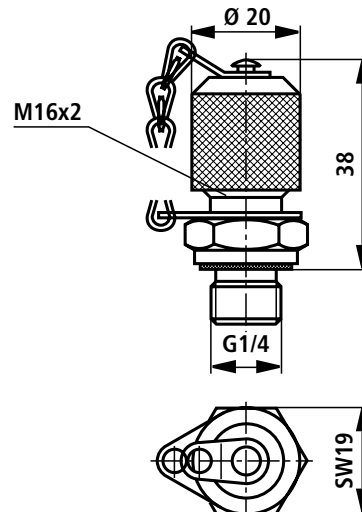
1. Use mounting bolts 0.06 smaller in diameter than hole size.
2. Fitted bolts or dowel pins are not needed with the thrust key headplate.
3. All dimensions not shown are NFPA standard.
4. PD, PA, FA dimensions typical for all mounts.

Test Point Coupling

* For bore sizes - 2" - 2-1/2"



For Bore Sizes - 3-1/4"-8"



Above dimensions in mm.

Notes

For pressure measurement or bleeding.

For installation in the bleed/measuring port. Coupling with check valve function, i.e. it can also be connected under pressure.

Scope of supply for bore sizes - 2" to 2-1/2"

Coupling AB-E 20-11/K3, G 1/8
with NBR seal, Material no. R900014363

Coupling AB-E 20-11/K3V, G 1/8
with FPM seal, Material no. R900024710

Scope of supply for bore sizes - 3-1/4" to 8"

Coupling AB-E 20-11/K1, G 1/4
with NBR seal, Material no. R900009090

Coupling AB-E 20-11/K1V, G 1/4
with FPM seal. Material no. R900001264

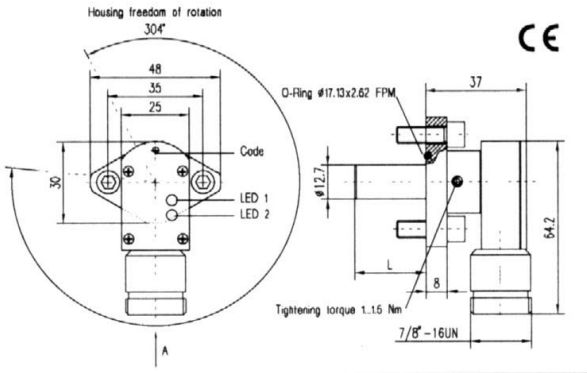
* N/A on head end of 2" bore with 1-3/8" rod and
2-1/2" bore with 1-3/4" rod

CDT1 Proximity Switch

High Pressure - 3000 psi (207 bar) Cylinder Sensors 2 wire AC/ DC Mini-Style Quick Disconnect



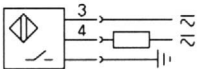
Dimensions (in mm)



Probe Length	Part Number	Code
1.025	R978008781	Blue
1.250	R978008793	White
2.062	R978002203	Red
2.875	R978002204	Orange
3.775	R978008792	Silver
4.560	R978009001	Gold

Wiring Connections

2 Wire AC/DC Normally Open



View of male connector pins

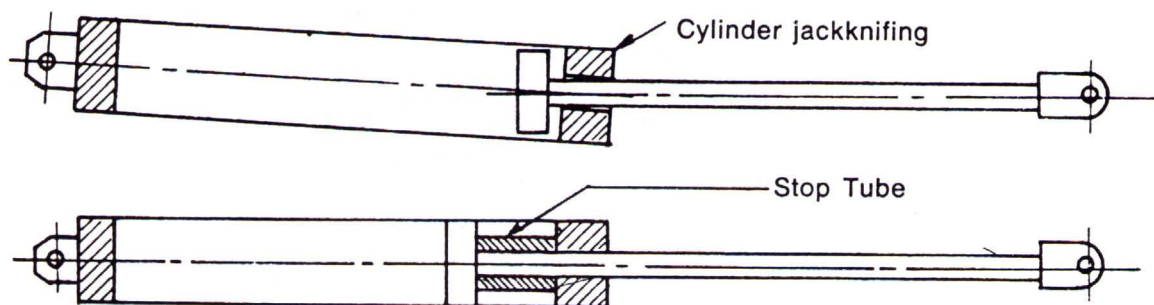


Stop Tube

In long cylinders which are pushing a load, internal stop tubes are used to prevent excessive bearing wear and jackknifing of the cylinder. They are installed between the piston and the head, providing additional bearing support by increasing the distance between the piston and the head in the fully extended position.

For long, trouble free bearing service, the bearing loads should not exceed about 200 psi. Standard cylinders are not designed for heavy eccentric loads.

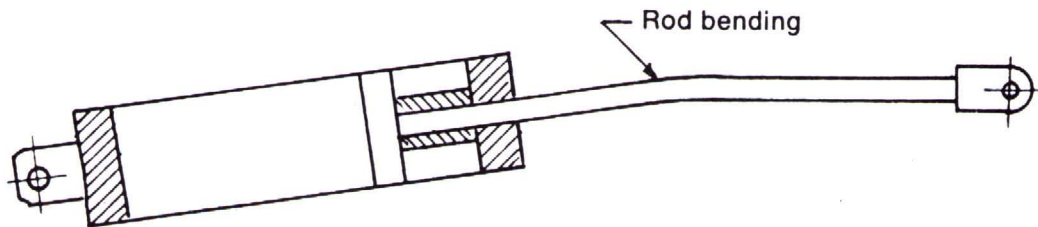
The use of oversize rods to reduced bearing loads is not recommended. They are not as effective as stop tubes, and if misalignment occurs the additional rod stiffness will actually increase bearing loads. For long push stroke cylinders, a stop tube may be required to limit radial bearing loads to a safe value and prevent jackknifing. They are especially desirable in long stroke pivoted centerline style mountings. The effect of a stop tube may be duplicated by providing additional unused stroke and stopping the cylinder extension by external means.



Column Strength Considerations

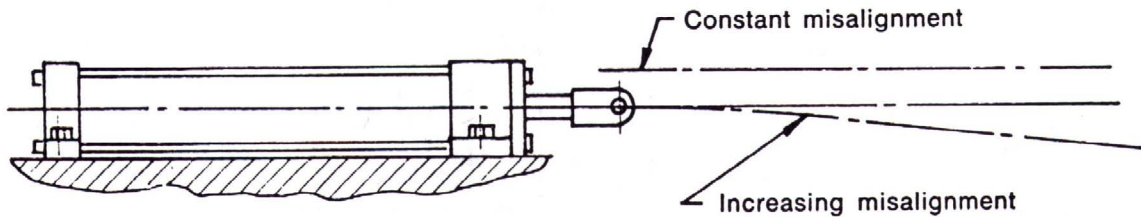
Standard size rods are recommended for use in cylinder applications where column strength, rod sag, or rate of cylinder return do not require an oversize rod. Being more flexible, standard rods absorb shock loads and minimize bearing loads caused by misalignments.

For long push stroke cylinders, an oversize rod may be required to prevent column failure and rod bending. Total cylinder length, extended is considered in column strength. Refer to the tables on the following pages for calculations regarding the column strength and stop tube required for a cylinder application.



Mounting Considerations for Cylinders - Fixed Non-Centerline Mountings

Fixed mount cylinders can tolerate a slight misalignment that is zero at full retraction and increases slightly with stroke. With other than very large rods, a misalignment of about .003" to .005" per foot of stroke is usually permissible. Rigid mounted cylinders cannot tolerate a fixed misalignment, particularly at full retraction.



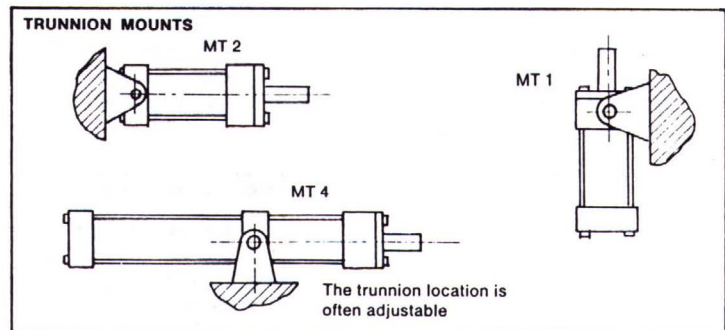
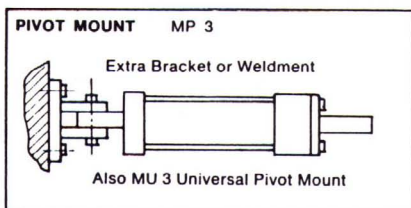
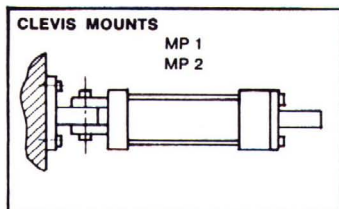
Mounting Considerations for Cylinders - Pivoted Centerline Mountings

If the path of the load is curved or misalignment is a problem, a pivoted centerline mounting should be used. This compensation of nonlinear travel is in one plane only, as would occur during the operation of a lever. Pivot mounts require the rod end attachment to also be a pivot type. Close tolerance pins should be used and it is recommended that the cylinder manufacturer's accessory brackets be used to maintain good fits.

For short strokes, medium or smaller bore cylinder applications, the clevis mount is recommended. This is probably the most widely used cylinder mounting. Where the clevis mount should normally be used, but would cause the overall length of the cylinder to be excessive, the cap trunnion mount can be used. Head end trunnions should be carefully applied to either short strokes or to application where the weight of the cylinder falls vertically below the pin.

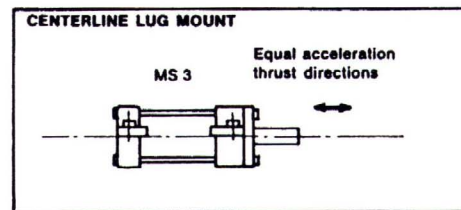
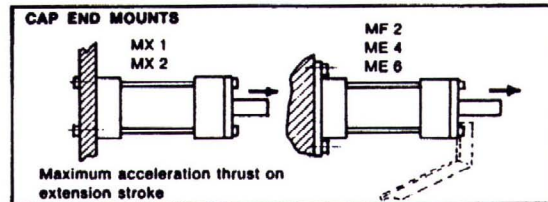
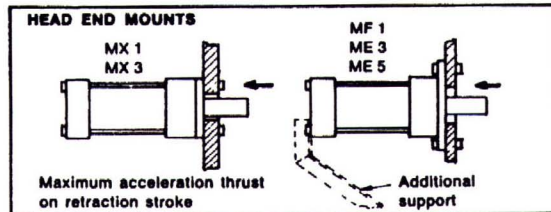
For long stroke cylinders and/or heavy cylinders, the center or intermediate trunnion mount is recommended. This mount supports the weight of the cylinder and should be located near the balance point of the cylinder at the time of maximum thrust. For general applications, a good estimate for the location of the intermediate trunnion is 1/3 back from the head end.

The MP5 (universal) type mount is a pivot mount with a spherical bearing fitted into the pivot to permit 5 to 10 degrees of movement in a plane perpendicular to the major plane of pivot movement. It is probably the most serviceable of the pivoted centerline mounts. For maximum effectiveness, a spherical bearing type rod end fitting should be utilized at the same time.



Mounting Considerations for Cylinders - Fixed Centerline Mountings

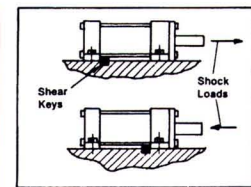
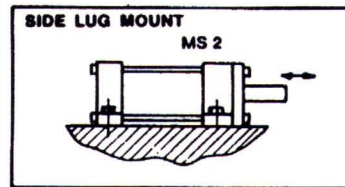
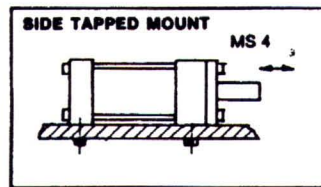
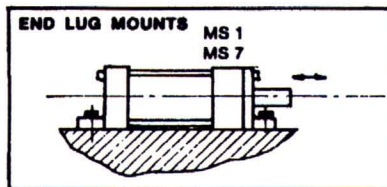
These mounting styles, illustrated below, tend to be more stable against sway on the power extension stroke. Rigid machine frame members are required to prevent misalignment under loads. The travel path of the rod end should be linear and be guided if at all possible. Long supported extension of the rod end must be avoided. Refer to the stop tube calculation data which shows the advantages of supporting and using reliable guiding on the rod end. Long stroke cylinders with fixed end mounts may require additional support at the free end of the cylinder body. This is illustrated in dotted outlines in the sketches below.



Mounting Considerations for Cylinders - Fixed Non-Centerline Mountings

These types of mounts are perhaps the easiest to use for mounting and replacement ease. The offset thrust line introduces bending stresses and additional loads on the mounting bolts. This type should be very well aligned for maximum service life. The load must travel in a very linear path and be supported and guided both horizontally and vertically as the data for calculating stop tube and column strength illustrates.

When applying these mounts with offset thrust under high pressure or shock loads, properly located shear pins or keys can be used. These provide positive location and prevent slight movement of the cylinder under shock conditions, which the normal clearance in the mounting bolt holes would allow. Very close tolerances (.001") should be maintained between keys and keyways. Keys should be located as illustrated below, at one end of the cylinder. When using dowel pins, do no pin across opposite corners, as serious twisting stresses will result.



Mounting Considerations for Cylinders

Selection of mounting style depends primarily upon the operating specifications of the application. Mountings are generally one of the following three types:

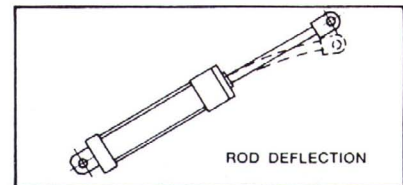
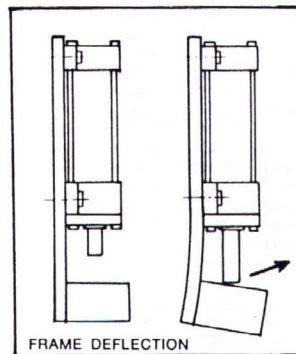
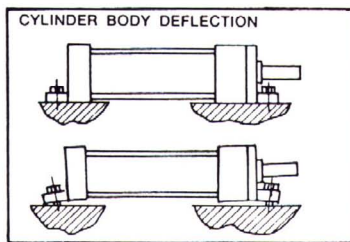
1. **Fixed Centerline Mountings**
Where the thrust of the cylinder is focused on the centerline of the cylinder rod.
2. **Fixed Non-Centerline Mountings**
Where the thrust of the cylinder is aligned parallel to, but not on, the centerline of the cylinder rod.
3. **Pivoted Centerline Mountings**
Where the centerline of the cylinder may swing in one or more directions. Usually major movement is in one plane.

A very important general consideration is to keep the cylinder thrust as close as possible to the centerline of the piston rod and free from misalignment or side thrust. Off-center thrust or side loads subtract substantially from the anticipated rod bearing and rod seal service life.

Off-center thrust and side loading can be caused by cylinder deflection under load, machine frame deflection, rod bending or sagging, cylinder pivot binding, nonlinear load movement, shifting of load; some of which are shown below.

In addition to the mounting styles, several other factors should be considered when mounting a cylinder. Care should be taken to avoid painting or damaging the exposed portion of the piston rod during construction. Threaded pieces should be pulled tight against thread shoulders to minimize bending and reduce fatigue stress. Rotation of the piston rod within the cylinder should be avoided to prevent possible scoring of the cylinder tube and damage to piston seals. Long cylinders may require additional body support to prevent damaging sag.

Major consideration must be given to the factors which might cause premature failure of the cylinder: unusual acceleration, unusual deceleration, alignment, support of cylinder weight, linear or curvilinear travel path of the load being moved, jack-knifing of the cylinder, and the column strength of the rod. Some mounting styles are more suited than others to each of the above application factors.



Buckling

The permissible stroke with a flexible guided load and a 3.5 factor of safety against buckling can be obtained from the relevant table. For deviating cylinder installation positions, the permissible stroke length has to be interpolated. Permissible strokes for non-guided loads on request.

Calculations for buckling are determined using the following formulas:

1. Calculation according to Euler

$$F = \frac{\pi^2 \cdot E \cdot I}{v \cdot L_K^2} \quad \text{if } \lambda > \lambda_g$$

2. Calculation according to Tetmajer

$$F = \frac{d^2 \cdot \pi (335 - 0.62 \cdot \lambda)}{4 \cdot v} \quad \text{if } \lambda \leq \lambda_g$$

Explanation:

E = Modulus of elasticity in psi

= 30×10^6 for steel

I = Moment of inertia in inches⁴ for circular cross-sectional area

$$= \frac{d^4 \cdot \pi}{64} = 0.0491 \cdot d^4$$

v = 3.5 (safety factor)

L_K = Free buckling length in inches
(depending on mounting type,
see sketches A, B, C)

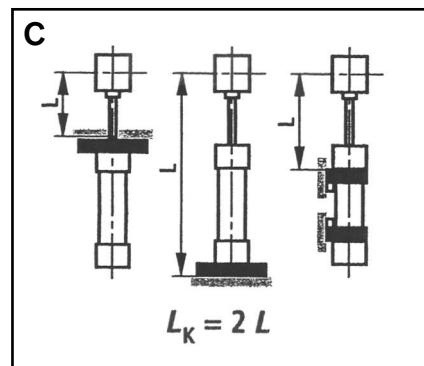
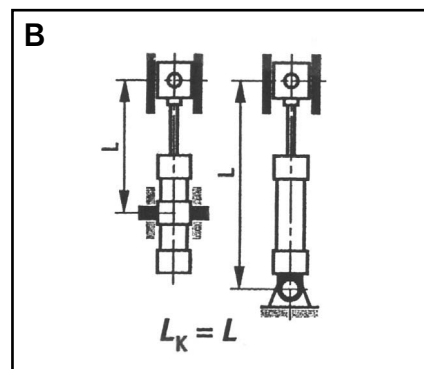
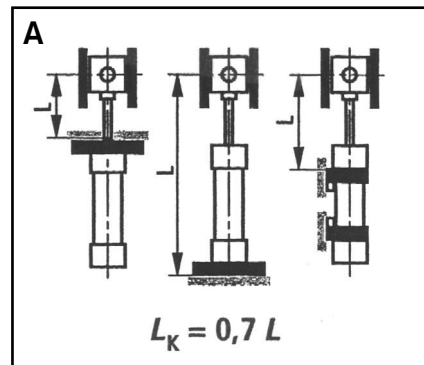
d = Piston rod Ø in inches

λ = Slenderness ratio

$$= \frac{4 \cdot L_K}{d} \quad \lambda_g = \pi \sqrt{\frac{E}{0.8 \cdot R_e}}$$

R_e = Yield strength of the piston rod material

Influence of the mounting type on buckling length:



Stop Tube

To determine whether a stop is required on push stroke cylinders:

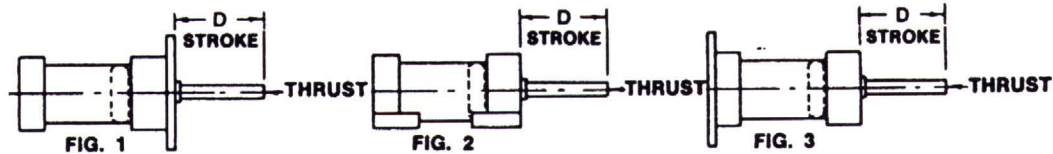
Step 1 - Determine which example below corresponds to your application.

Step 2 - Determine the value of "L" from the instructions given. The find "L" dimension in the table at the right for the required stop tube length. (Specify the effective stroke plus the stop tube length when ordering).

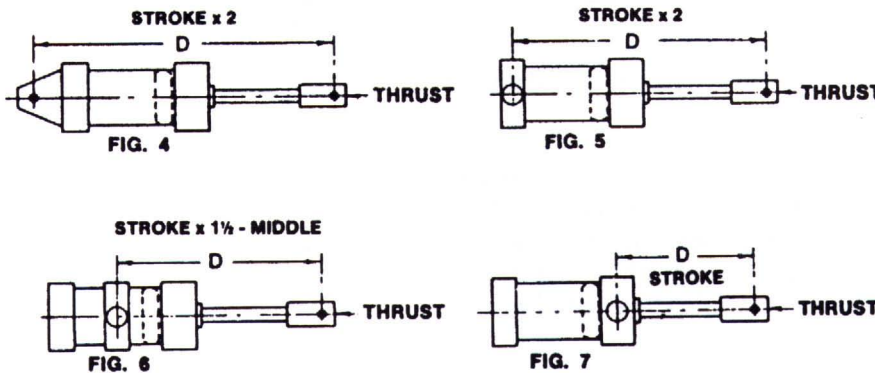
Step 3 - Add stop tube length to original "L" dimension to obtain your adjusted "L" dimension.

Example: "L" = 96", therefore, Stop Tube = 6"
Adjusted L = 102" (96+6)

Step 4 - Use adjusted "L" to figure rod column strength at maximum pressure rating of the cylinder, page 34.

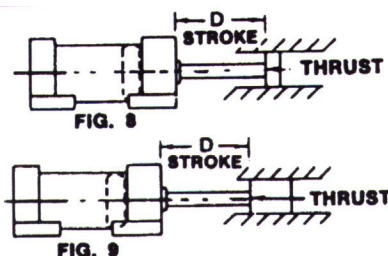


Typical rigidly mounted cylinders with rod unsupported at free end. May be mounted either horizontally or vertically. Use the equation $L = 4D$ to determine values of "L" for all cylinder mountings in this category.



"L" Inches	Stop Tube Length (inches)
0-40	0
41-50	1
51-60	2
61-70	3
71-80	4
81-90	5
91-100	6
101-110	7
111-120	8

Typical trunnion mounted cylinders may be mounted either horizontally or vertically. Use the equation $L = D$ to determine values of "L" for all cylinder mountings in this category. For center trunnion mounted cylinders (Figure 6), the position of the trunnion for most favorable bearing loads is obtained when "D" dimension with the rod retracted is approximately 1/3 overall length of cylinder with rod retracted.



Typically rigidly mounted cylinder with free end of rod supported with short guide. May be mounted either horizontally or vertically. Use the equation $L = D$ to determine values of "L" for all cylinder mountings in this category.

Typical rigidly mounted cylinder with free end of rod supported with long closely-fitted guide. May be mounted either horizontally or vertically. Use the equation $L = 1/2 D$ to determine values of "L" for all cylinder mountings in this category.

Column Strength and Oversize Rod Selection

Standard rod diameters are recommended for all Pull Stroke applications. To determine the correct rod diameter required for Push Stroke application, follow these simple steps:

Step 1 – Determine the value of "L_K" from the illustrations shown on page 40. (Use Adjusted "L_K" dimension for cylinder with Stop Tube).

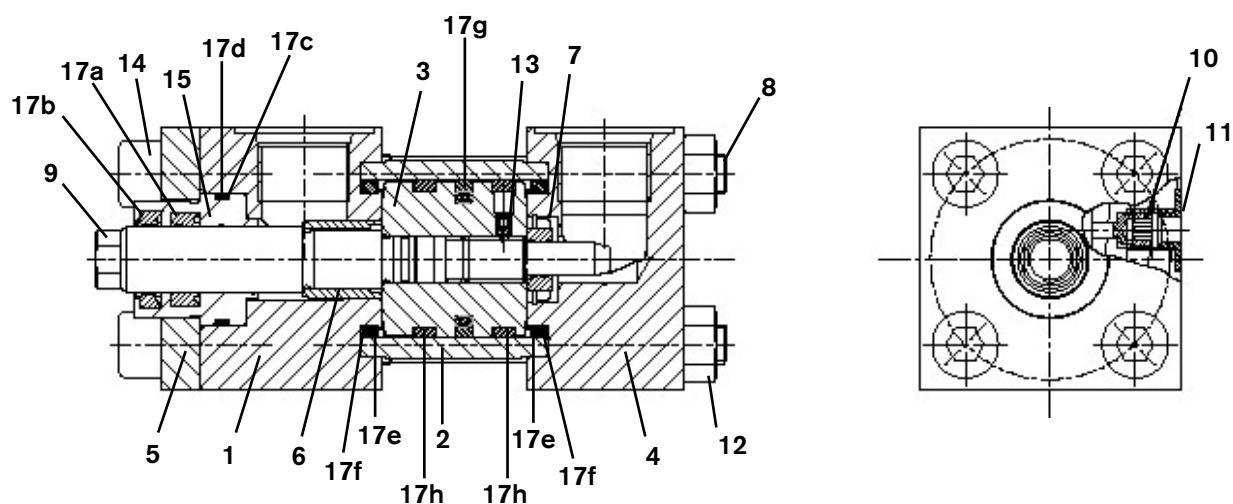
Step 2 – From your cylinder size and maximum operating pressure, determine your Push Stroke Thrust.

Step 3 – Find your thrust in the left hand column and located your "L_K" dimension (or Adjusted "L_K" dimension in the same horizontal line to the right; (if your exact "L_K" or adjusted "L_K" dimension is not shown, move to the right in the same horizontal column to the next larger number). Read vertically up from this number to the rod diameter shown. This is the required rod diameter for your application.

Example: Adjusted L_K of 80" at 16,000# would require 2-1/2" rod in the cylinder.

Thrust in Pounds Force at End of Rod	Rod Diameters													
	0.500	0.625	1.000	1.375	1.750	2.000	2.500	3.000	3.500	4.000	4.500	5.000	5.500	
50	60	67												Values of "L _K " (inches)
100	43	58	110											
150	35	53	103											
250	27	43	94	146										
400	21	37	83	134	186									
700	16	30	68	118	168	202	275							
1,000	13	27	60	105	155	190	257	330						
1,400	11	24	53	92	142	174	244	308	385					
1,800	10	22	48	82	127	160	230	296	366	440				
2,400	9	19	45	75	114	145	213	281	347	415	488			
3,200	8	16	41	67	103	130	194	261	329	400	461			
4,000	7	13	38	63	94	119	175	240	310	378	446			
5,000	6	9	34	60	87	110	163	225	289	360	426	494		
6,000			30	56	82	102	152	208	274	342	410	476		
8,000			26	50	76	93	137	188	245	310	375	447		
10,000			21	45	70	89	125	172	222	279	349	412	485	
12,000			17	41	65	84	118	152	210	269	326	388	454	
16,000				34	57	75	110	142	188	235	292	350	420	
20,000				28	52	68	103	136	172	218	270	326	385	
30,000					39	55	87	120	156	189	230	285	330	

Spare Parts CDT1



- | | |
|-----------------------------|---------------------------------|
| 1 Head | 15 Rod bearing |
| 2 Tube | 16 Cushion valve
(not shown) |
| 3 Piston | 17 Seal kit: |
| 4 Cap | a. Rod seal |
| 5 Flange | b. Wiper |
| 6 Cushion bushing | c. Bearing o-ring |
| 7 Cushion insert w/retainer | d. Bearing back-up ring |
| 8 Tie rod | e. Tube o-ring |
| 9 Piston rod | f. Tube back-up ring |
| 10 Bleed screw | g. Piston seal |
| 11 Securing plate | h. Wear bands |
| 12 Tie rod nut | |
| 13 Set screw | |
| 14 Hex head bolt | |

See service manual RA17038-DT1SM/10.07 for installation and assembly instructions and replacement part numbers.

Notes

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