

Series D Cylinder

3D and 2D drawings
Available at:
[www.
motioncontrolsllc.com](http://www.motioncontrolsllc.com)

Design Features

Non-Metallic Bearings

A specially compounded reinforced Teflon material is used for the piston and rod bearings, assuring low friction characteristics. Bearing assembly is easily removed for quick replacement.

Non-Lube Operation

D cylinders are designed for non-lube operation.

Cushions

High energy absorption poppet type adjustable cushions are available as a standard option. Cushion adjusting screw is normally located in position No. 4.

Piston Rod

Hard chrome plated steel, ground and polished. Two wrench flats standard on all bore sizes. Full male national coarse threads are standard. All other threads available as options.

Tubing

Hard coated I.D. aluminum for corrosion resistance and low friction.

Seals

All dynamic seals are self-adjusting Buna-N U-cups.

End Caps

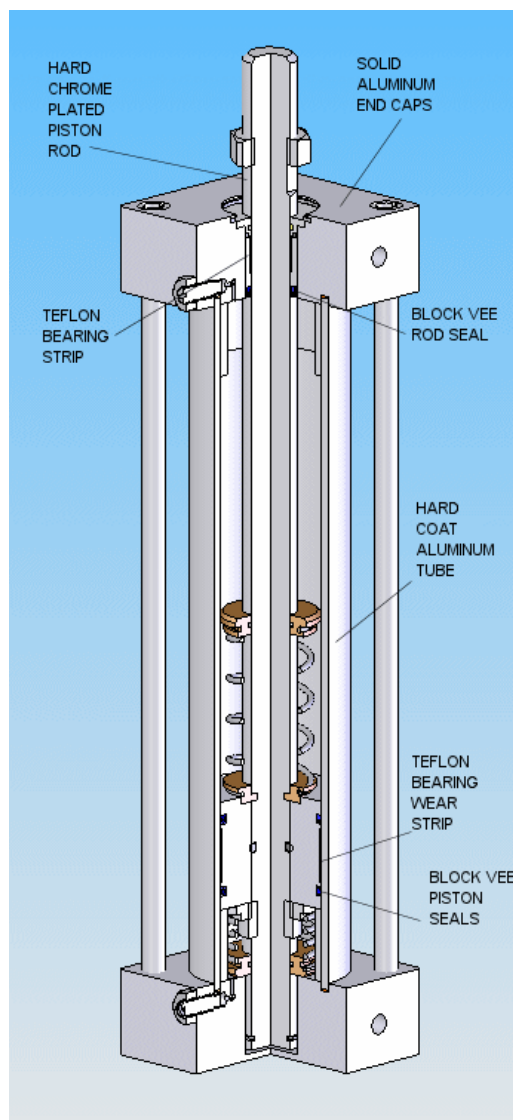
Machined high strength aluminum alloy.

Pressure Rating

250 PSI air or "non-shock" hydraulic.

Temperature

Operating temperature range from a minimum of 10 deg F (-12 deg C) to a maximum of 200 deg F (93 deg C).



3 Way Mounting Versatility



To allow a designer greater versatility when positioning cylinders, Series-D originated the 3-way mounting concept. Tapped holes on the rear and the side accept standard mounting bolts, while recessed sleeve nuts on the front perform the same function. Flush mounting on the front, rear, and side of the cylinder gives the designer the freedom to position Series-D anywhere without costly attachments. But, when mounting attachments are desired, Motion Controls has a complete range which bolt directly onto the Series-D.

Theoretical forces of cylinders. Multiply factors times air pressure.

Single End

MODEL	BORE	PUSH POWER FACTOR	PULL POWER FACTOR	BASE	APPROX. WEIGHT PER INCH STROKE
12	1-1/4	1.23	1.12	1	0.25
24	1-3/4	2.40	1.96	2.8	0.40
30	2	3.14	2.69	3.1	0.45
49	2-1/2	4.91	4.47	3.6	0.50
70	3	7.07	6.62	4.6	0.60
96	3-1/2	9.62	8.84	9.4	0.90
160	4-1/2	15.90	15.12	12.5	1.00

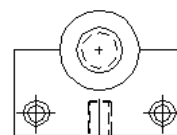
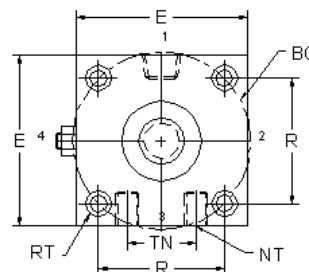
SPRING EXTEND / RETURN

Spring extend / return cylinders are available in standard stroke lengths up to four inches. Cylinder ZB dimension increases by one inch whenever spring extend / return cylinders are specified.

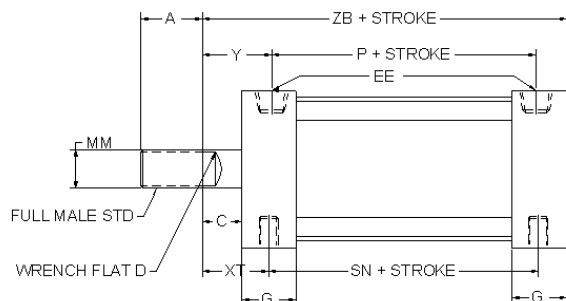
MODEL	BORE	PUSH POWER FACTOR	PULL POWER FACTOR	MAX SPRING FORCE
12	1-1/4	1.23	1.12	10.5
24	1-3/4	2.40	1.96	47.5
30	2	3.14	2.69	47.5
49	2-1/2	4.91	4.47	47.5
70	3	7.07	6.62	47.5
96	3-1/2	9.62	8.84	48.7
160	4-1/2	15.90	15.12	48.7

Single End No Cushion

MODEL	E	TN	BC	RT	R	NT
12	1-13/16		1.811	1/4-28X3/8	1.281	1/4-28X1/4
24	2-3/8	25/32	2.429	5/16-24X9/16	1.718	5/16-24X9/32
30	2-3/8	25/32	2.625	1/4-28X3/8	1.875	5/16-24X9/32
49	2-7/8	1-1/4	3.119	5/16-24X9/16	2.206	5/16-24X1/2
70	3-3/8	1-1/4	3.712	5/16-24X9/16	2.625	5/16-24X9/16
96	4-1/8	1-27/32	4.559	1/2-20X3/4	3.224	1/2-20X1/2
160	5-1/8	2-1/2	5.689	1/2-20X3/4	4.024	1/2-20X1/2



MODEL D12 ONLY

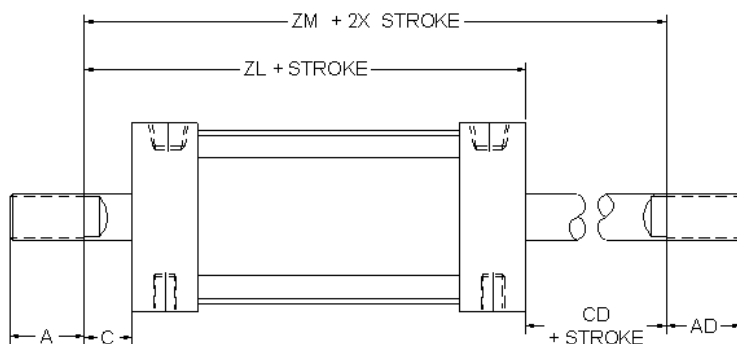


- 1 Add 1" for spring return/extend
- 2 Add stroke to dimension shown for spring extend only.
- 3 Add 1" + stroke for spring extend only.
- 4 Add 1" for spring return only.

										FM STYLE NO.1	NPT	ROD DIA.
MODEL	A	D	G	C	P	Y	SN	XT	ZB	CC	EE	MM
12	1	5/16	7/8	5/8	1.968	1-3/32	2-1/32	1-1/16	3-17/32	3/8-16	1/8	3/8
24	1-1/2	5/8	1-3/16	3/4	2-3/8	1-15/32	2-39/64	1-11/32	4-35/64	3/4-10	1/4	3/4
30	1-1/2	5/8	1-3/16	3/4	2-3/8	1-15/32	2-39/64	1-11/32	4-35/64	3/4-10	1/4	3/4
49	1-1/2	5/8	1-3/16	3/4	2-7/16	1-27/64	2-39/64	1-11/32	4-35/64	3/4-10	3/8	3/4
70	1-1/2	5/8	1-3/16	3/4	2-13/32	1-7/16	2-39/64	1-11/32	4-35/64	3/4-10	3/8	3/4
96	1-5/8	7/8	1-7/16	1	2-59/64	1-13/16	3-7/64	1-23/32	5-35/64	1-8	1/2	1
160	1-5/8	7/8	1-7/16	1	2-54/64	1-13/16	3-7/64	1-23/32	5-35/64	1-8	1/2	1

Double End No Cushion

MODEL	AD	C	CD	ZL	ZM	FM STYLE NO.1 CC	NPT EE	ROD DIA. MM
12	1	1	5/8	5/8	4-17/32	5-5/32	3/8-16	3/8
24	1-1/2	1-1/2	3/4	3/4	5-35/64	6-19/64	3/4-10	3/4
30	1-1/2	1-1/2	3/4	3/4	5-35/64	6-19/64	3/4-10	3/4
49	1-1/2	1-1/2	3/4	3/4	5-35/64	6-19/64	3/4-10	3/8
70	1-1/2	1-1/2	3/4	3/4	5-35/64	6-19/64	3/4-10	3/8
96	1-5/8	1-5/8	1	1	6-35/64	7-35/64	1-8	1
160	1-5/8	1-5/8	1	1	6-35/64	7-35/64	1-8	1



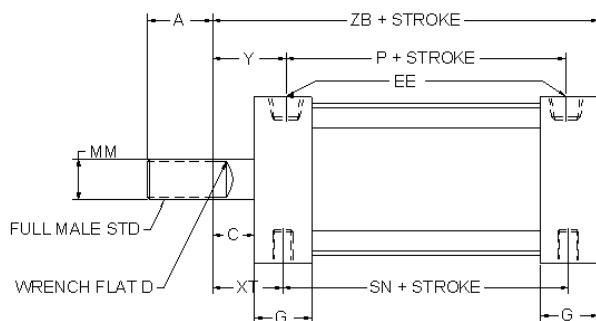
NOTE: These dimensions are the same for a non-cushioned or a one end cushioned double rod cylinder.

* AD and CD should be used to differentiate one end of a double-rod-end cylinder from the other.

CUSHIONS

Poppet cushions can be specified for either or both ends of Series D cylinders. Standard cushion length is one inch, with optional lengths of two, four and six inches. Each standard cushion increases the cylinder dimension by one inch. Increases for extra long cushions are tabulated below.

MODEL	FRONT CUSHION 2"	REAR CUSHION 2"
12	2	2-7/8
24	2	3-3/16
30	2	3-3/16
49	2	3-3/16
70	2	3-3/16
96	2	3-7/16
160	2	3-7/16



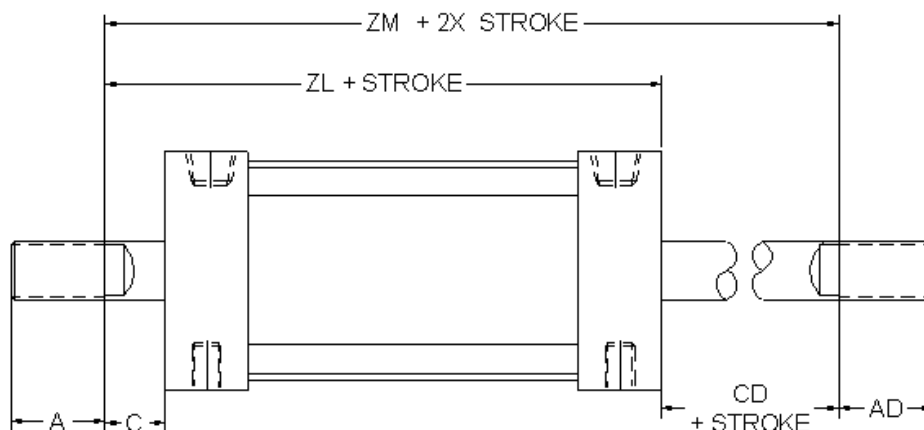
Single Rod End

Front Cushion
or
Rear Cushion

MODEL	A	D	C	G	P	SN	XT	ZB	FM STYLE NO.1 CC	NPT EE	ROD DIA. MM
12	1	5/16	5/8	7/8	2.968	3-1/32	1-1/16	4-17/32	3/8-16	1/8	3/8
24	1-1/2	5/8	3/4	1-3/16	3-3/8	3-39/64	1-11/32	5-35/64	3/4-10	1/4	3/4
30	1-1/2	5/8	3/4	1-3/16	3-3/8	3-39/64	1-11/32	5-35/64	3/4-10	1/4	3/4
49	1-1/2	5/8	3/4	1-3/16	3-7/16	3-39/64	1-11/32	5-35/64	3/4-10	3/8	3/4
70	1-1/2	5/8	3/4	1-3/16	3-13/32	3-39/64	1-11/32	5-35/64	3/4-10	3/8	3/4
96	1-5/8	7/8	1	1-7/16	3-59/64	4-7/64	1-23/32	6-35/64	1-8	1/2	1
160	1-5/8	7/8	1	1-7/16	3-54/64	4-7/64	1-23/32	6-35/64	1-8	1/2	1

Double Cushion

MODEL	A	D	C	G	P	SN	XT	ZB	FM STYLE NO.1 CC	NPT EE	ROD DIA. MM
12	1	5/16	5/8	7/8	3.968	4-1/32	1-1/16	5-17/32	3/8-16	1/8	3/8
24	1-1/2	5/8	3/4	1-3/16	4-3/8	4-39/64	1-11/32	6-35/64	3/4-10	1/4	3/4
30	1-1/2	5/8	3/4	1-3/16	4-3/8	4-39/64	1-11/32	6-35/64	3/4-10	1/4	3/4
49	1-1/2	5/8	3/4	1-3/16	4-7/16	4-39/64	1-11/32	6-35/64	3/4-10	3/8	3/4
70	1-1/2	5/8	3/4	1-3/16	4-13/32	4-39/64	1-11/32	6-35/64	3/4-10	3/8	3/4
96	1-5/8	7/8	1	1-7/16	4-59/64	5-7/64	1-23/32	7-35/64	1-8	1/2	1
160	1-5/8	7/8	1	1-7/16	4-54/64	5-7/64	1-23/32	7-35/64	1-8	1/2	1



Double End Single Cushion

MODEL	A	* AD	G	* CD	ZL	ZM	FM STYLE NO.1 CC	NPT EE	ROD DIA. MM
12	1	1	7/8	5/8	4-17/32	5-5/32	3/8-16	1/8	3/8
24	1-1/2	1-1/2	1-3/16	3/4	5-35/64	6-19/64	3/4-10	1/4	3/4
30	1-1/2	1-1/2	1-3/16	3/4	5-35/64	6-19/64	3/4-10	1/4	3/4
49	1-1/2	1-1/2	1-3/16	3/4	5-35/64	6-19/64	3/4-10	3/8	3/4
70	1-1/2	1-1/2	1-3/16	3/4	5-35/64	6-19/64	3/4-10	3/8	3/4
96	1-5/8	1-5/8	1-7/16	1	6-35/64	7-35/64	1-8	1/2	1
160	1-5/8	1-5/8	1-7/16	1	6-35/64	7-35/64	1-8	1/2	1

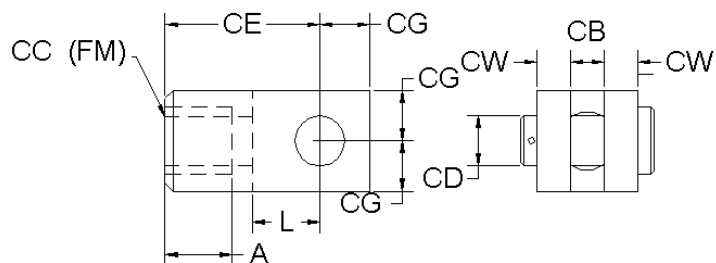
Double Cushion

MODEL	A	* AD	G	* CD	ZL	ZM	FM STYLE NO.1 CC	NPT EE	ROD DIA. MM
12	1	1	7/8	5/8	5-17/32	6-5/32	3/8-16	1/8	3/8
24	1-1/2	1-1/2	1-3/16	3/4	6-35/64	7-19/64	3/4-10	1/4	3/4
30	1-1/2	1-1/2	1-3/16	3/4	6-35/64	7-19/64	3/4-10	1/4	3/4
49	1-1/2	1-1/2	1-3/16	3/4	6-35/64	7-19/64	3/4-10	3/8	3/4
70	1-1/2	1-1/2	1-3/16	3/4	6-35/64	7-19/64	3/4-10	3/8	3/4
96	1-5/8	1-5/8	1-7/16	1	7-35/64	8-35/64	1-8	1/2	1
160	1-5/8	1-5/8	1-7/16	1	7-35/64	8-35/64	1-8	1/2	1

*AD and CD should be used to differentiate between ends of a double-rod-end cylinder for rod style and cushion.
NOTE: These dimensions are the same for a non-cushioned or a one end cushioned double rod cylinder.

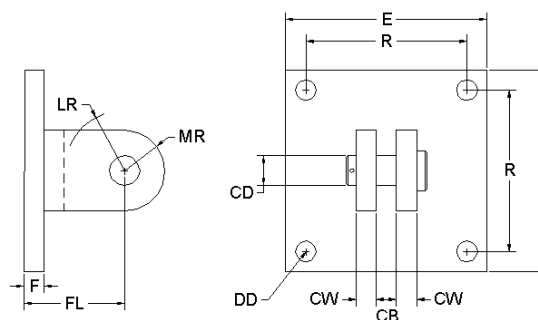
Series **D** Cylinder

Rod Clevis and Pin



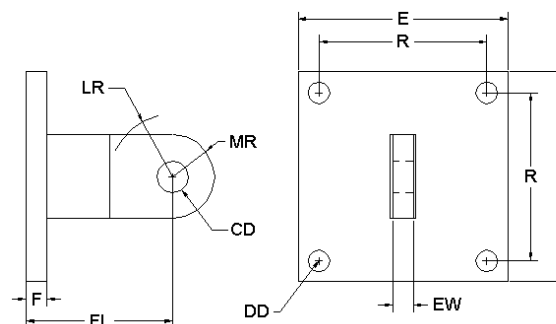
MODEL	PART NO.	A	CB	CC (FM)	CD	CE	CG	CW	ER	L
12	7000	3/4	1/4	3/8-16	3/8	1-11/32	3/8	1/4	17/32	15/32
24-30 49 70	7010	1	1/2	3/4-10	5/8	2-5/64	9/16	5/16	51/64	27/32
96-160	7015	1	1/2	1-8	3/4	2-21/64	3/4	1/2	1-1/16	1-1/32

Clevis Bracket and Pin



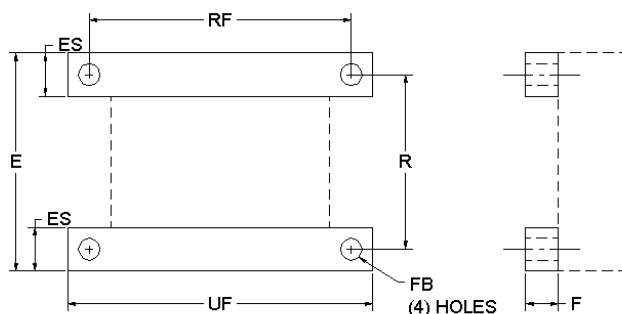
MODEL	PART NO.	E	F	FL	R	CW	CB	CD	DD	LR	MR
12	7001	1-13/16	1/4	1	1.281	3/16	1/4	3/8	1/4	9/16	7/16
24	7006	2-3/8	3/8	1-3/8	1.718	9/32	1/2	1/2	5/16	7/8	5/8
30	7023	2-3/8	3/8	1-3/8	1.875	9/32	1/2	1/2	1/4	7/8	5/8
49	7011	2-7/8	3/8	1-1/2	2.206	3/8	1/2	5/8	5/16	1-1/16	13/16
70	7014	3-3/8	3/8	2-1/8	2.625	3/8	1/2	5/8	5/16	1-11/16	13/16
96	7016	4-1/8	3/8	2-1/16	3.224	3/8	1/2	3/4	1/2	1-1/4	1
160	7020	5-1/8	3/8	2-3/8	4.024	3/8	1/2	3/4	1/2	1-1/2	1-3/8

Eye Bracket



MODEL	PART NO.	E	F	FL	R	CD	DD	EW	LR	MR
12	7002	1-13/16	1/4	1-1/2	1.281	3/8	1/4	1/4	9/16	7/16
24	7007	2-3/8	3/8	1-7/8	1.718	1/2	5/16	1/2	7/8	5/8
30	7024	2-3/8	3/8	1-7/8	1.875	1/2	5/16	1/2	7/8	5/8
49	7012	2-7/8	3/8	2-1/8	2.206	5/8	5/16	1/2	1-1/16	13/16
96	7017	4-1/8	3/8	3	3.224	3/4	1/2	1/2	1-1/4	1
160	7021	5-1/8	3/8	3-1/2	4.024	3/4	1/2	1/2	1-1/2	1-3/8

Series **D** Cylinder



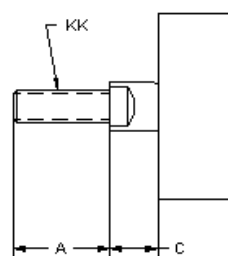
Flange Mount

MODEL	PART NO.	E	F	R	ES	FB	RF	UF
12	7004	1-29/32	3/8	1.281	5/8	1/4	2-5/16	2-3/4
24	7009	2-15/32	7/16	1.718	3/4	5/16	3-1/32	3-19/32
30	7025	2-15/32	7/16	1.875	3/4	5/16	3-1/32	3-19/32
49	7013	2 15/16	7/16	2.206	3/4	5/16	3 7/16	4
70	7026	3 3/8	7/16	2.625	3/4	5/16	3 31/32	4 1/2
96	7019	4-1/4	5/8	3.224	1	1/2	5-1/16	5-15/16
160	7022	5-1/64	5/8	4.024	1	1/2	6-1/16	7

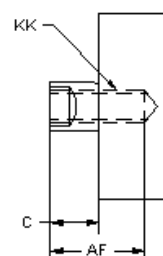
Optional Rod Ends

BORE	ROD DIA.	A** AD	C** CD	AF	CC (FM)	(SM + SF) STYLE NO.2,3 KK
1-1/4	3/8	1	5/8	5/8	3/8-16	1/4-20
1-3/4	3/4	1-1/2	3/4	3/4	3/4-10	1/2-13
2	3/4	1-1/2	3/4	3/4	3/4-10	1/2-13
2-1/2	3/4	1-1/2	3/4	3/4	3/4-10	1/2-13
3	3/4	1-1/2	3/4	3/4	3/4-10	1/2-13
3-1/2	1	1-5/8	1	1-1/8	1-8	3/4-10
4-1/2	1	1-5/8	1	1-1/8	1-8	3/4-10

OPTIONAL ROD ENDS



SMALL MALE (SM)
STYLE #2 (RA2)



SHORT FEMALE (SF)
STYLE #3 (RA3)

** AD and CD should be used to differentiate one end from the other on a double rod cylinder.

Series **D** Cylinder

SERIES D ORDERING INFORMATION									
SPECIFIC INFORMATION		CODE	D	30	SE	NC	SL2	RA1	Options
SERIES	D SERIES CYLINDER	D							
BORE SIZE	1 1/4" BORE	12							
	1 3/4" BORE	24							
	2" BORE	30							
	2 1/2" BORE	49							
	3" BORE	70							
	3 1/2" BORE	96							
	4 1/2" BORE	160							
END STYLE	SINGLE END	SE							
	DOUBLE END	DE							
CUSHION STATUS	SINGLE END								
	NON-CUSHIONED	NC							
	FRONT CUSHIONED	FC							
	REAR CUSHIONED	RC							
	DOUBLE CUSHION	DC							
	DOUBLE END								
	NON-CUSHIONED	NC							
	SINGLE CUSHIONED	SC							
	DOUBLE CUSHIONED	DC							
STROKE	SPECIFY STROKE LENGTH IN DECIMALS	SL							
ROD END STYLE	SINGLE END								
	FULL MALE THREAD "A" END	RA1							
	STANDARD ROD END (JAM NUT INCLUDED)								
	REDUCED MALE THREAD "A" END	RA2							
	FEMALE THREAD "D" END	RA3							
	DOUBLE END (SUPPLY BOTH FOR DE)								
	FULL MALE THREAD "D" END (STANDARD)	RD1							
	REDUCED MALE THREAD "D" END	RD2							
	FEMALE THREAD "D" END	RD3							
ADDITIONAL OPTIONS	ROD CLEVIS AND PIN (FACTORY ASSEMBLED)	MF							
	CLEVIS BRACKET & PIN (FACTORY ASSEMBLED)	MG							
	EYE BRACKET (Not available for D70)	MH							
	STAINLESS STEEL ROD	SS							
	2" FRONT CUSHION	2F							
	2" REAR CUSHION	2R							
	4" FRONT CUSHION	4F							
	4" REAR CUSHION	4R							
	BRONZE BUSHING	BB							
	MAGNETIC PISTON	SP							
	METALLIC ROD WIPER	MW							
	SPRING EXTEND	SE							
	SPRING RETRACT	SR							
	VITON SEALS	VS							
	REAR FLANGE BARS	MK							
	FRONT FLANGE BARS	MJ							
	ROD MODIFICATION	RM							
	(INCLUDE SPECIFIC DETAILS)								
	SPELL OUT ALL OTHER DETAILS AND PROVIDE DRAWING IF POSSIBLE								