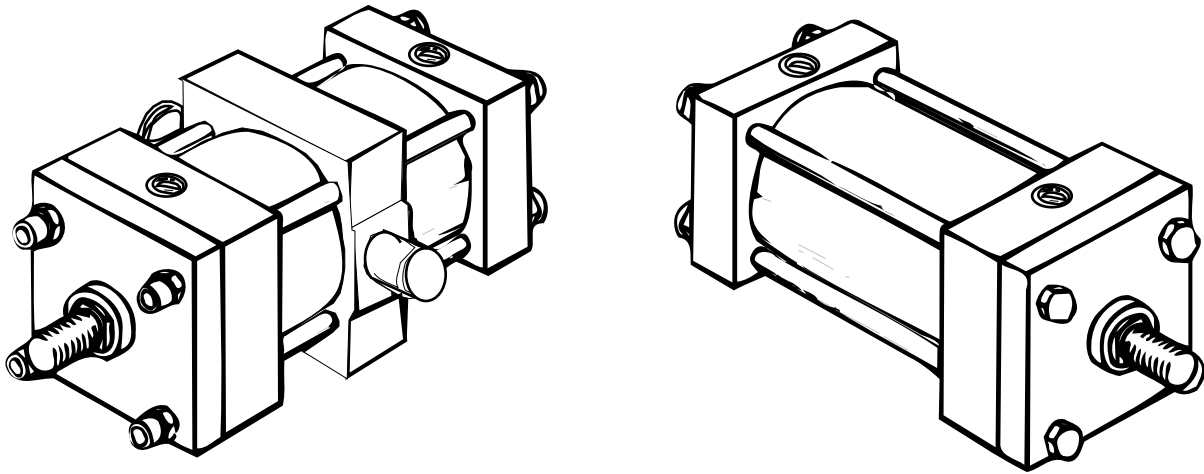
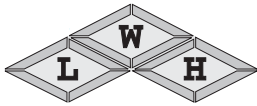


MH & HA CYLINDERS

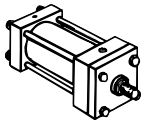
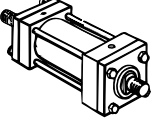
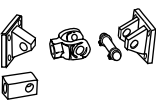
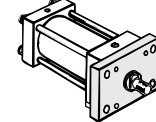
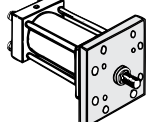
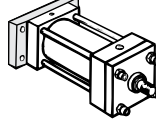
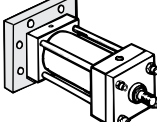
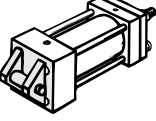
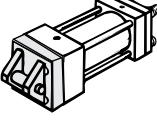
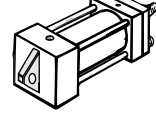
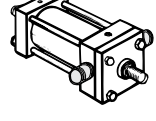
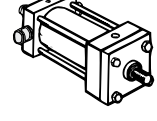
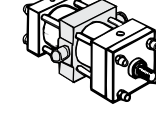
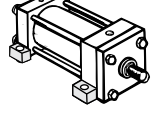
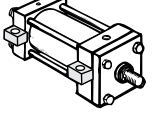
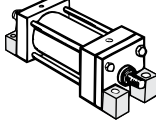
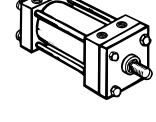
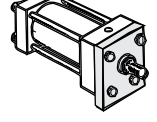
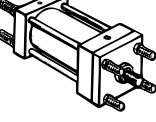
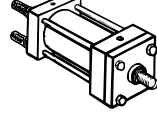
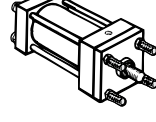


Heavy Duty Air Service
Medium Duty Hydraulic Service

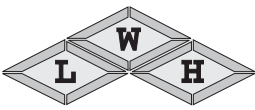
L&W Hydramotion Inc.



HA Series Heavy Duty Air Cylinders
MH Series Medium Duty Hydraulic Cylinders

 MX0	 MXD0	 Accessories	MX0 Basic Single Rod Cylinder Page 6 MDX0 Basic Double Rod Cylinder Page 7 ACCESSORIES Page 15
 MF1	 MF5		MF1 Rectangular Front Flange MF5 Square Front Flange Page 8
 MF2	 MF6		MF2 Rectangular Rear Flange MF6 Square Rear Flange Page 9
 MP1	 MP2	 MP3	MP1 Fixed Rear Clevis MP2 Detachable Rear Clevis MP3 Fixed Rear Tang Page 10
 MT1	 MT2	 MT4	MT1 Front Trunnion MT2 Rear Trunnion MT4 Intermediate Trunnion Page 11
 MS2	 MS3	 MS7	MS2 Side Lug MS3 Centerline Lug MS7 End Lug Page 12
 MS4	 KP0		MS4 Side Tapped Holes KP0 Key Plate Page 13
 MX1	 MX2	 MX3	MX1 Front & Rear Extended Tie Rods MX2 Rear Extended Tie Rods MX3 Front Extended Tie Rods Page 14

L&W Hydramotion Inc.



HA Series *Heavy Duty Air Cylinders*
MH Series *Medium Duty Hydraulic Cylinders*

GENERAL SPECIFICATIONS

Pressure Rating: HA SERIES: 250 P.S.I. MH SERIES: 1500 P.S.I. (except as noted)

Bore Sizes: 1 1/2" thru 8"

Construction: Steel

Seals: HA SERIES: *Buna-N* MH SERIES: *Urethane* (other materials available)

Temperature Range: -20°F to +220°F

Fluid Compatibility: HA SERIES: *Filtered & Lubricated Compressed Air*

MH SERIES: *Standard Petroleum Base Hydraulic Oil*

MH SERIES: REDUCED PRESSURE RATINGS MF1 Mount - Push Application

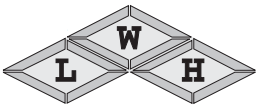
BORE	ROD NUMBER				BORE	ROD NUMBER			
	1	2	3	4		1	2	3	4
1 1/2	650	375			4	450	450	325	
2	500	350	200		5	300	300	300	225
2 1/2	300	300	200		6	350	350	300	
3 1/4	650	400	400						

HOW TO ORDER For cylinder model number system, see Page 4.

1. Quantity
2. Series (HA or MH)
3. Bore Size (based on force requirements, system pressure and push/pull application, bore sizes can be selected using charts on Page 16.)
4. Mounting Style
5. Cushions as required
6. Rod Size
7. Rod End Style
8. Port Type and Location
9. Stroke Length (in inches)
10. Required options and non-standard features

Note: Specifications and Dimensions subject to change without notice.

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Cylinder Number System

MH1.5-MF1-N1-1S-09.50

SERIES

HA - Heavy Duty Air MH - Medium Pressure Hydraulic

BORE

1.5	3.25	6
2	4	8
2.5	5	

MOUNTING STYLE

<i>MDX0</i>	<i>MP2</i>	<i>MT1</i>	<i>KP0</i>
<i>MF1</i>	<i>MP3</i>	<i>MT2</i>	<i>NS (non-standard)</i>
<i>MF2</i>	<i>MS2</i>	<i>MT4</i>	
<i>MF5</i>	<i>MS3</i>	<i>MX0</i>	
<i>MF6</i>	<i>MS4</i>	<i>MX2</i>	
<i>MP1</i>	<i>MS7</i>	<i>MX3</i>	

CUSHION

<i>N Non-cushioned</i>	<i>H Cushioned Head</i>
<i>C Cushioned Cap</i>	<i>B Cushioned Both Ends</i>

ROD NUMBER

<i>1 Standard Rod Diameter</i>	<i>4 Third Oversize</i>
<i>2 First Oversize</i>	<i>5 Special (consult factory)</i>
<i>3 Second Oversize</i>	

ROD END & PORTS

Rod ends:

<i>1 Standard (small male)</i>	<i>4 Special (customer to specify)</i>
<i>2 Female</i>	
<i>3 Large Male</i>	

Ports:

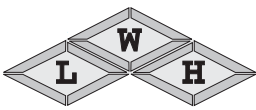
<i>No Symbol</i>	<i>Standard NPTF</i>	<i>P SAE Ports</i>
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OPTIONS

<i>S Standard</i>	<i>NS Non-standard</i>
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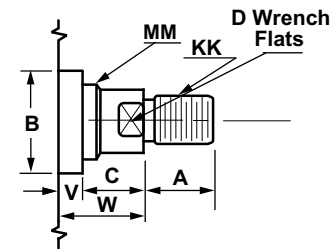
STROKE

Specify in inches (9 1/2" = 09.50)

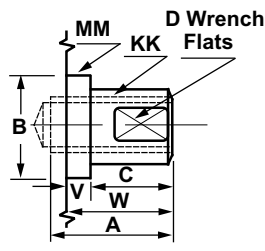


HA Series Heavy Duty Air Cylinders
MH Series Medium Duty Hydraulic Cylinders

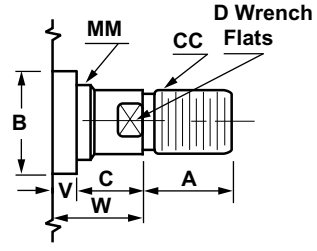
ROD END STYLES and PORT INFORMATION



STYLE 1
Standard (Small Male)



STYLE 2
(Female)



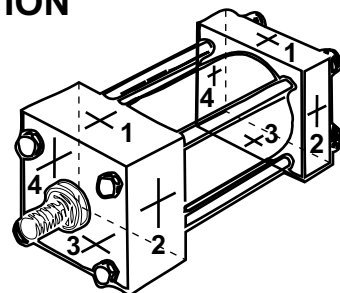
STYLE 3
(Large Male)

BORE	ROD NBR	MM ROD DIA	THREAD		A	+0.000 -0.002 B	C	D	V	W	PORTS		
			KK	CC							Standard NPTF	Optional - SAE SIZE	THREAD
1 1/2	1	5/8	7/16-20	1/2-20	3/4	1.124	3/8	1/2	1/4	5/8	3/8	6	9/16-18
	2	1	3/4-16	7/8-14	1 1/8	1.499	1/2	7/8	1/2	1			
2	1	5/8	7/16-20	1/2-20	3/4	1.124	3/8	1/2	1/4	5/8	3/8	6	9/16-18
	2	1	3/4-16	7/8-14	1 1/8	1.499	1/2	7/8	1/2	1			
	3	1 3/8	1-14	1 1/4-12	1 5/8	1.999	5/8	1 1/8	5/8	1 1/4			
2 1/2	1	5/8	7/16-20	1/2-20	3/4	1.124	3/8	1/2	1/4	5/8	3/8	6	9/16-18
	2	1	3/4-16	7/8-14	1 1/8	1.499	1/2	7/8	1/2	1			
	3	1 3/8	1-14	1 1/4-12	1 5/8	1.999	5/8	1 1/8	5/8	1 1/4			
3 1/4	1	1	3/4-16	7/8-14	1 1/8	1.499	1/2	7/8	1/4	3/4	1/2	10	7/8-14
	2	1 3/8	1-14	1 1/4-12	1 5/8	1.999	5/8	1 1/8	3/8	1			
4	1	1	3/4-16	7/8-14	1 1/8	1.499	1/2	7/8	1/4	3/4	1/2	10	7/8-14
	2	1 3/8	1-14	1 1/4-12	1 5/8	1.999	5/8	1 1/8	3/8	1			
	3	1 3/4	1 1/4-12	1 1/2-12	2	2.374	3/4	1 1/2	1/2	1 1/4			
5	1	1	3/4-16	7/8-14	1 1/8	1.499	1/2	7/8	1/4	3/4	1/2	10	7/8-14
	2	1 3/8	1-14	1 1/4-12	1 5/8	1.999	5/8	1 1/8	3/8	1			
	3	1 3/4	1 1/4-12	1 1/2-12	2	2.374	3/4	1 1/2	1/2	1 1/4			
	4	2	1 1/2-12	1 3/4-12	2 1/4	2.624	7/8	1 11/16	1/2	1 3/8			
6	1	1 3/8	1-14	1 1/4-12	1 5/8	1.999	5/8	1 1/8	1/4	7/8	3/4	12	1 1/16-12
	2	1 3/4	1 1/4-12	1 1/2-12	2	2.374	3/4	1 1/2	3/8	1 1/8			
	3	2	1 1/2-12	1 3/4-12	2 1/4	2.624	7/8	1 11/16	3/8	1 1/4			
8	1	1 3/8	1-14	1 1/4-12	1 5/8	1.999	5/8	1 1/8	1/4	7/8	3/4	12	1 1/16-12
	2	1 3/4	1 1/4-12	1 1/2-12	2	2.374	3/4	1 1/2	3/8	1 1/8			
	3	2	1 1/2-12	1 3/4-12	2 1/4	2.624	7/8	1 11/16	3/8	1 1/4			
	4	2 1/2	1 7/8-12	2 1/4-12	3	3.124	1	2 1/16	1/2	1 1/2			

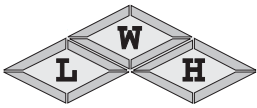
PORT AND CUSHION SCREW LOCATION

Standard port location is position #1.
 Other locations are available, depending on mounting.
 Please specify at time of ordering.

Standard cushion screw location is position #2 when mounting style permits.

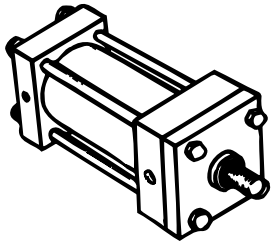


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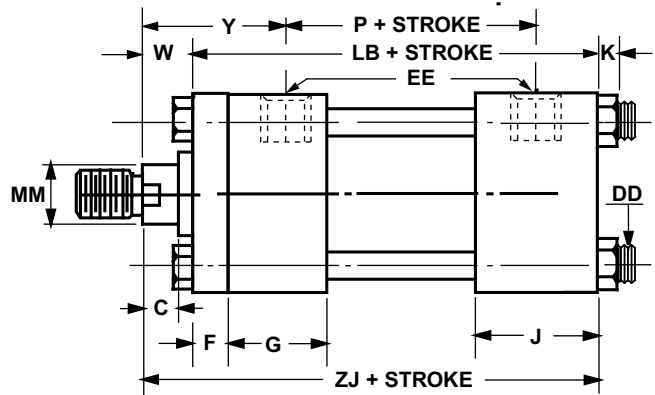
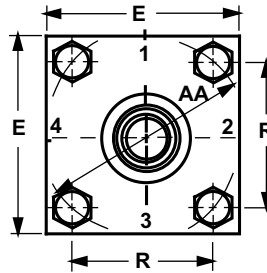


HA Series Heavy Duty Air Cylinders
MH Series Medium Duty Hydraulic Cylinders

Single Rod Basic Dimensions

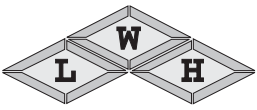


MX0 Single Rod End



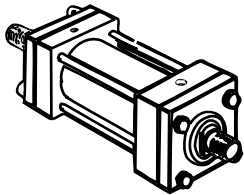
BORE	ROD NBR	MM ROD DIA	AA	C	DD	E	NPTF EE	F	G	J	K	R	W	Y	ADD STROKE		
															LB	P	ZB
1 1/2	1	5/8	2.02	3/8	1/4-28	2	3/8	3/8	1 1/2	1	1/4	1.43	5/8	1 15/16	4	2 1/4	4 7/8
	2	1		1/2									2 5/16	5 1/4			
2	1	5/8	2.6	3/8	5/16-24	2 1/2	3/8	3/8	1 1/2	1	5/16	1.84	5/8	1 15/16	4	2 1/4	4 15/16
	2	1		1/2									2 5/16	5 5/16			
	3	1 3/8		5/8									2 9/16	5 9/16			
2 1/2	1	5/8	3.1	3/8	5/16-24	3	3/8	3/8	1 1/2	1	5/16	2.19	5/8	1 15/16	4 1/8	2 3/8	5 1/16
	2	1		1/2									2 5/16	5 7/16			
	3	1 3/8		5/8									2 9/16	5 11/16			
3 1/4	1	1	3.9	1/2	3/8-24	3 3/4	1/2	5/8	1 3/4	1 1/4	3/8	2.76	3/4	2 7/16	4 7/8	2 5/8	6
	2	1 3/8		1									2 11/16	6 1/4			
	3	1 3/4		1 1/4									2 15/16	6 1/2			
4	1	1	4.7	1/2	3/8-24	4 1/2	1/2	5/8	1 3/4	1 1/4	3/8	3.32	3/4	2 7/16	4 7/8	2 5/8	6
	2	1 3/8		1									2 11/16	6 1/4			
	3	1 3/4		1 1/4									2 15/16	6 1/2			
	4	2		1 1/2									3 1/4	7 1/16			
5	1	1	5.8	1/2	1/2-20	5 1/2	1/2	5/8	1 3/4	1 1/4	7/16	4.10	3/4	2 7/16	5 1/8	2 7/8	6 5/16
	2	1 3/8		1									2 11/16	6 9/16			
	3	1 3/4		1 1/4									2 15/16	6 13/16			
	4	2		1 3/8									3 1/16	6 15/16			
6	1	1 3/8	6.9	5/8	1/2-20	6 1/2	3/4	3/4	2	1 1/2	7/16	4.88	7/8	2 13/16	5 3/4	3 1/8	7 1/16
	2	1 3/4		1 1/8									3 1/16	7 5/16			
	3	2		1 1/4									3 3/16	7 7/16			
8	1	1 3/8	9.1	5/8	5/8-18	8 1/2	3/4	3/4	2	1 1/2	9/16	6.44	7/8	2 13/16	5 7/8	3 1/4	7 5/16
	2	1 3/4		1 1/8									3 1/16	7 9/16			
	3	2		1 1/4									3 3/16	7 11/16			
	4	2 1/2		1 1/2									3 7/16	7 15/16			

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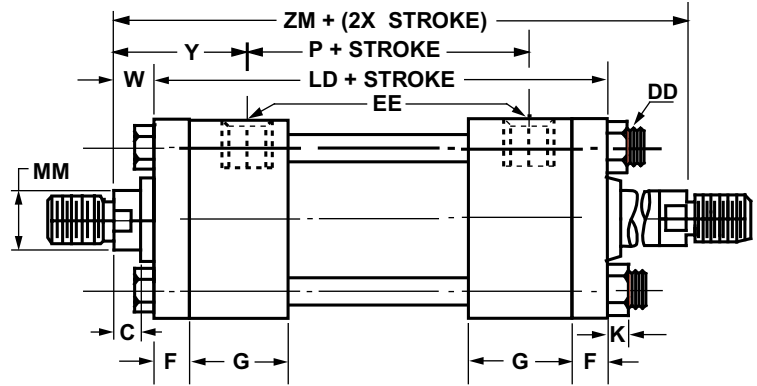
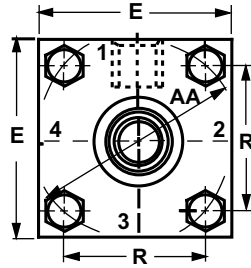


HA Series Heavy Duty Air Cylinders
MH Series Medium Duty Hydraulic Cylinders

Double Rod Basic Dimensions

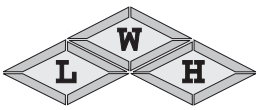


MDX0 Double Rod End

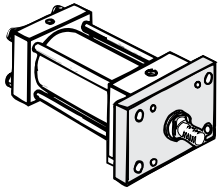


BORE	ROD NBR	MM ROD DIA	AA	C	DD	E	NPTF EE	F	G	K	R	W	Y	ADD STROKE		Add 2X Stroke ZM
														LD	P	
1 1/2	1	5/8	2.02	3/8	1/4-28	2	3/8	3/8	1 1/2	1/4	1.43	5/8	1 15/16	4 7/8	2 1/4	6 1/8
	2	1		1								2 5/16	6 7/8			
2	1	5/8	2.6	3/8	5/16-24	2 1/2	3/8	3/8	1 1/2	5/16	1.84	5/8	1 15/16	4 7/8	2 1/4	6 1/8
	2	1		1								2 5/16	6 7/8			
	3	1 3/8		5/8								1 1/4	2 9/16			7 3/8
2 1/2	1	5/8	3.1	3/8	5/16-24	3	3/8	3/8	1 1/2	5/16	2.19	5/8	1 15/16	5	2 3/8	6 1/4
	2	1		1								2 5/16	7			
	3	1 3/8		5/8								1 1/4	2 9/16			7 1/2
3 1/4	1	1	3.9	1/2	3/8-24	3 3/4	1/2	5/8	1 3/4	3/8	2.76	3/4	2 7/16	6	2 5/8	7 1/2
	2	1 3/8		1								2 11/16	8			
	3	1 3/4		3/4								1 1/4	2 15/16			8 1/2
4	1	1	4.7	1/2	3/8-24	4 1/2	1/2	5/8	1 3/4	3/8	3.32	3/4	2 7/16	6	2 5/8	7 1/2
	2	1 3/8		1								2 11/16	8			
	3	1 3/4		3/4								1 1/4	2 15/16			8 1/2
5	1	1	5.8	1/2	1/2-20	5 1/2	1/2	5/8	1 3/4	7/16	4.10	3/4	2 7/16	6 1/4	2 7/8	7 3/4
	2	1 3/8		1								2 11/16	8 1/4			
	3	1 3/4		3/4								1 1/4	2 15/16			8 3/4
	4	2		7/8								1 3/8	3 1/16			9
6	1	1 3/8	6.9	5/8	1/2-20	6 1/2	3/4	3/4	2	7/16	4.88	7/8	2 13/16	7	3 1/8	8 3/4
	2	1 3/4		1 1/8								3 1/16	9 1/4			
	3	2		1 1/4								3 3/16	9 1/2			
8	1	1 3/8	9.1	5/8	5/8-18	8 1/2	3/4	3/4	2	9/16	6.44	7/8	2 13/16	7 1/8	3 1/4	8 7/8
	2	1 3/4		1 1/8								3 1/16	9 3/8			
	3	2		1 1/4								3 3/16	9 5/8			
	4	2 1/2		1 1/2								3 15/16	10 1/8			

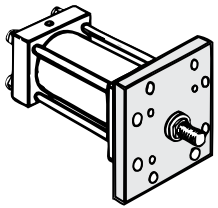
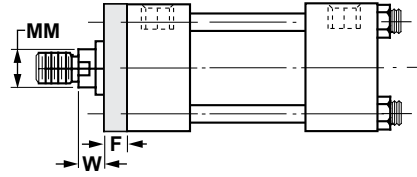
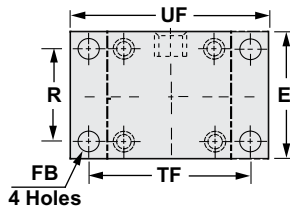
L&W Hydramotion Inc.



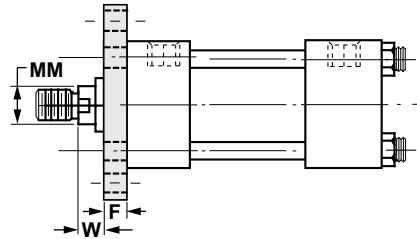
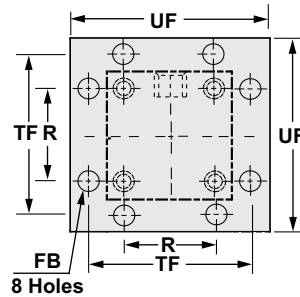
HA Series Heavy Duty Air Cylinders
MH Series Medium Duty Hydraulic Cylinders



MF1 Rectangular Front Flange Mount



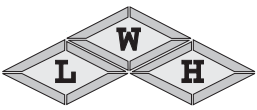
MF5 Square Front Flange Mount



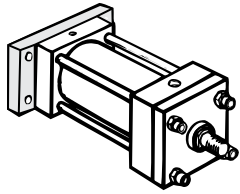
Consult Factory for 8" bore Front Flange mounts and for Integral Front Flange mounts.

BORE	ROD NBR	MM	F	FB	G	R	TF	UF	W
		ROD DIA							
1 1/2	1	5/8	3/8	5/16	1 1/2	1.43	2 3/4	3 3/8	5/8
	2	1							1
2	1	5/8	3/8	3/8	1 1/2	1.84	3 3/8	4 1/8	5/8
	2	1							1
	3	1 3/8							1 1/4
2 1/2	1	5/8	3/8	3/8	1 1/2	2.19	3 7/8	4 5/8	5/8
	2	1							1
	3	1 3/8							1 1/4
3 1/4	1	1	5/8	7/16	1 3/4	2.76	4 11/16	5 1/2	3/4
	2	1 3/8							1
	3	1 3/4							1 1/4
4	1	1	5/8	7/16	1 3/4	3.32	5 7/16	6 1/4	3/4
	2	1 3/8							1
	3	1 3/4							1 1/4
5	1	1	5/8	9/16	1 3/4	4.10	6 5/8	7 5/8	3/4
	2	1 3/8							1
	3	1 3/4							1 1/4
	4	2							1 3/8
6	1	1 3/8	3/4	9/16	2	4.88	7 5/8	8 5/8	7/8
	2	1 3/4							1 1/8
	3	2							1 1/4

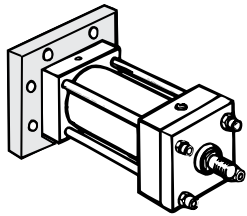
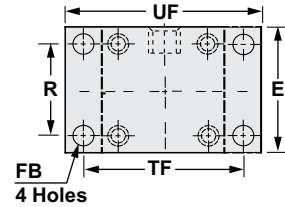
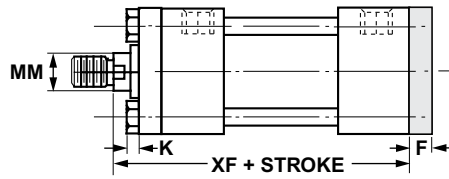
L&W Hydramotion Inc.



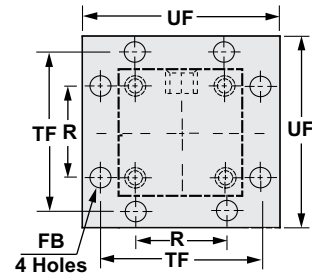
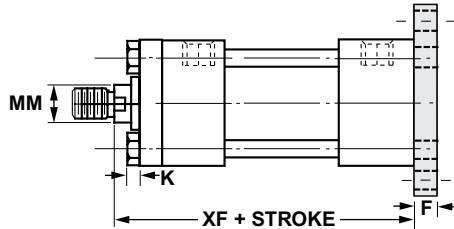
HA Series Heavy Duty Air Cylinders
MH Series Medium Duty Hydraulic Cylinders



MF2 Rectangular Rear Flange Mount

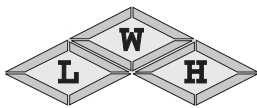


MF6 Square Rear Flange Mount



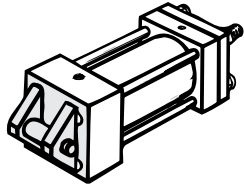
Consult Factory for 8" bore Rear Flange mounts and for Integral Rear Flange mounts.

BORE	ROD NBR	MM	E	F	FB	J	K	R	TF	UF	ADD STROKE XF
		ROD DIA									
1 1/2	1	5/8	2	3/8	5/16	1	1/4	1.43	2 3/4	3 3/8	4 5/8
	2	1									5
2	1	5/8	2 1/2	3/8	3/8	1	5/16	1.84	3 3/8	4 1/8	4 5/8
	2	1									5
	3	1 3/8									5 1/4
2 1/2	1	5/8	3	3/8	3/8	1	5/16	2.19	3 7/8	4 5/8	4 3/4
	2	1									5 1/8
	3	1 3/8									5 3/8
3 1/4	1	1	3 3/4	5/8	7/16	1 1/4	3/8	2.76	4 11/16	5 1/2	5 5/8
	2	1 3/8									5 7/8
	3	1 3/4									6 1/8
4	1	1	4 1/2	5/8	7/16	1 1/4	3/8	3.32	5 7/16	6 1/4	5 5/8
	2	1 3/8									5 7/8
	3	1 3/4									6 1/8
5	1	1	5 1/2	5/8	9/16	1 1/4	7/16	4.10	6 5/8	7 5/8	5 7/8
	2	1 3/8									6 1/8
	3	1 3/4									6 3/8
	4	2									6 1/2
6	1	1 3/8	6 1/2	3/4	9/16	1 1/2	7/16	4.88	7 5/8	8 5/8	6 5/8
	2	1 3/4									6 7/8
	3	2									7

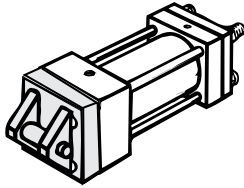
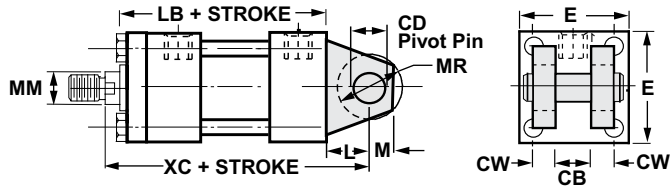


HA Series Heavy Duty Air Cylinders

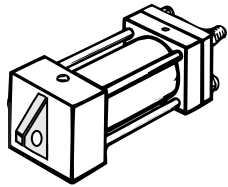
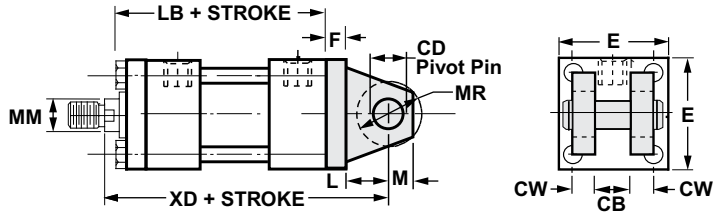
MH Series Medium Duty Hydraulic Cylinders



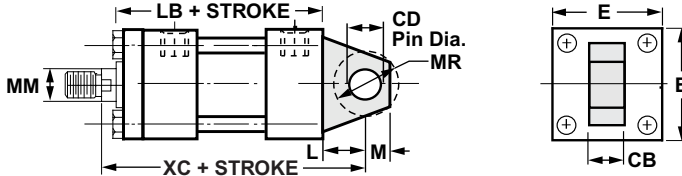
MP1 Fixed Rear Clevis Mount



MP2 Detachable Rear Clevis Mount

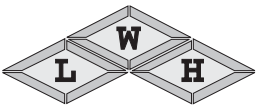


MP3 Fixed Rear Tang Mount

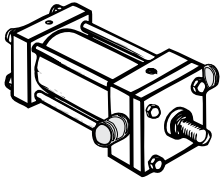


BORE	ROD NBR	MM ROD DIA	CB	CD <small>+0.000 -0.003</small>	CW	E	F	L	M	MR	ADD STROKE		
											LB	XC	XD
1 1/2	1	5/8	3/4	.500	1/2	2	3/8	3/4	1/2	5/8	4	5 3/8	5 3/4
	2	1										5 3/4	6 1/8
2	1	5/8	3/4	.500	1/2	2 1/2	3/8	3/4	1/2	5/8	4	5 3/8	5 3/4
	2	1										5 3/4	6 1/8
	3	1 3/8										6	6 3/8
2 1/2	1	5/8	3/4	.500	1/2	3	3/8	3/4	1/2	5/8	4 1/8	5 1/2	5 7/8
	2	1										5 7/8	6 1/4
	3	1 3/8										6 1/8	6 1/2
3 1/4	1	1	1 1/4	.750	5/8	3 3/4	5/8	1 1/4	3/4	15/16	4 7/8	6 7/8	7 1/2
	2	1 3/8										7 1/8	7 3/4
	3	1 3/4										7 3/8	8
4	1	1	1 1/4	.750	5/8	4 1/2	5/8	1 1/4	3/4	15/16	4 7/8	6 7/8	7 1/2
	2	1 3/8										7 1/8	7 3/4
	3	1 3/4										7 3/8	8
5	1	1	1 1/4	.750	5/8	5 1/2	5/8	1 1/4	3/4	15/16	5 1/8	7 1/8	7 3/4
	2	1 3/8										7 3/8	8
	3	1 3/4										7 5/8	8 1/4
	4	2										7 3/4	8 3/8
6	1	1 3/8	1 1/2	1.000	3/4	6 1/2	3/4	1 1/2	1	1 3/16	5 3/4	8 1/8	8 7/8
	2	1 3/4										8 3/8	9 1/8
	3	2										8 1/2	9 1/4
8	1	1 3/8	1 1/2	1.000	3/4	8 1/2	3/4	1 1/2	1	1 3/16	5 7/8	8 1/4	-
	2	1 3/4										8 1/2	-
	3	2										8 5/8	-
	4	2 1/2										8 7/8	-

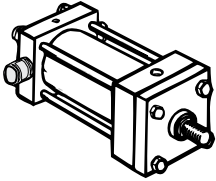
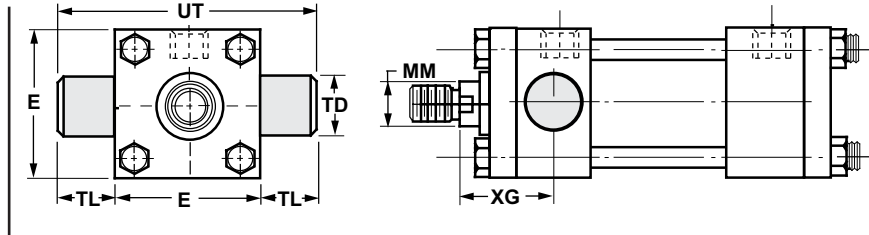
L&W Hydramotion Inc.



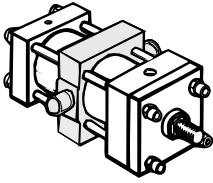
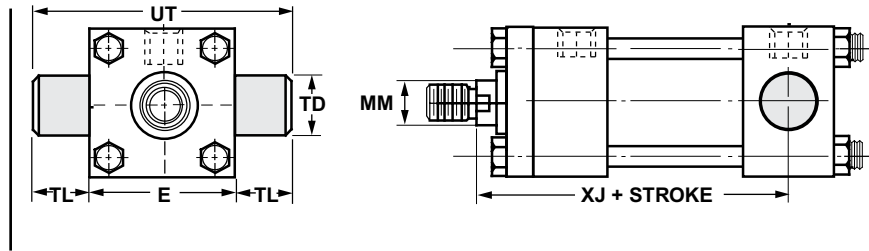
HA Series Heavy Duty Air Cylinders
MH Series Medium Duty Hydraulic Cylinders



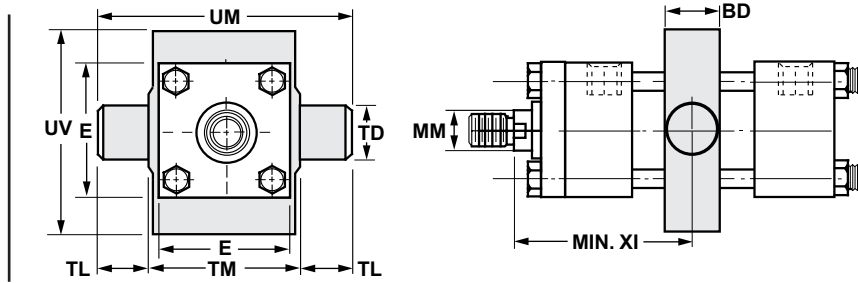
MT1 Front Trunnion Mount



MT2 Rear Trunnion Mount

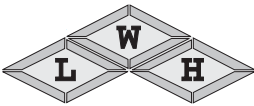


MT4 Intermediate Trunnion Mount



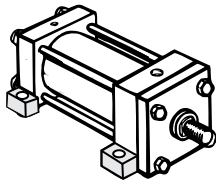
BORE	ROD NBR	MM ROD DIA	BD	E	+0.001 -0.001 TD	TL	TM	UM	UT	UV	XG	MIN XI	ADD STROKE XJ
1 1/2	1	5/8	1 1/4	2	1.000	1	2 1/2	4 1/2	4	2 1/2	1 3/4	3 3/16	4 1/8
	2	1									2 1/8	3 9/16	4 1/2
2	1	5/8	1 1/2	2 1/2	1.000	1	3	5	4 1/2	3	1 3/4	3 5/16	4 1/8
	2	1									2 1/8	3 11/16	4 1/2
	3	1 3/8									2 3/8	3 15/16	4 3/4
2 1/2	1	5/8	1 1/2	3	1.000	1	3 1/2	5 1/2	5	3 1/2	1 3/4	3 5/16	4 1/4
	2	1									2 1/8	3 11/16	4 5/8
	3	1 3/8									2 3/8	3 15/16	4 7/8
3 1/4	1	1	2	3 3/4	1.000	1	4 1/2	6 1/2	5 3/4	4 1/4	2 1/4	4 3/16	5
	2	1 3/8									2 1/2	4 7/16	5 1/4
	3	1 3/4									2 3/4	4 11/16	5 1/2
4	1	1	2	4 1/2	1.000	1	5 1/4	7 1/4	6 1/2	5	2 1/4	4 3/16	5
	2	1 3/8									2 1/2	4 7/16	5 1/4
	3	1 3/4									2 3/4	4 11/16	5 1/2
5	1	1	2	5 1/2	1.000	1	6 1/4	8 1/4	7 1/2	6	2 1/4	4 3/16	5 1/4
	2	1 3/8									2 1/2	4 7/16	5 1/2
	3	1 3/4									2 3/4	4 11/16	5 3/4
	4	2									2 7/8	4 13/16	5 7/8
6	1	1 3/8	2 1/2	6 1/2	1.375	1 3/8	7 5/8	10 3/8	9 1/4	7	2 5/8	4 15/16	5 7/8
	2	1 3/4									2 7/8	5 3/16	6 1/8
	3	2									3	5 5/16	6 1/4
8	1	1 3/8	2 1/2	8 1/2	1.375	1 3/8	9 3/4	12 1/2	11 1/4	9 1/2	2 5/8	4 15/16	6
	2	1 3/4									2 7/8	5 3/16	6 1/4
	3	2									3	5 5/16	6 3/8
	4	2 1/2									3 1/4	5 9/16	6 5/8

L&W Hydramotion Inc.

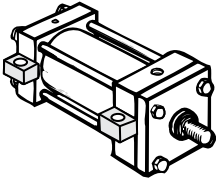
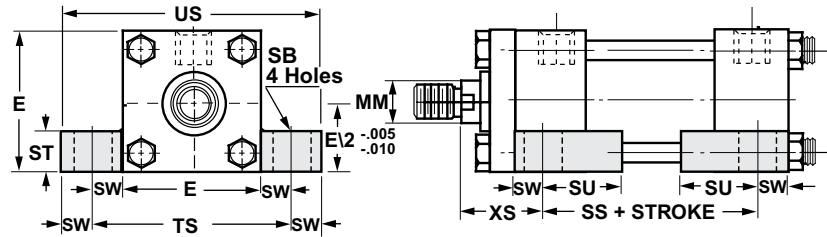


HA Series Heavy Duty Air Cylinders

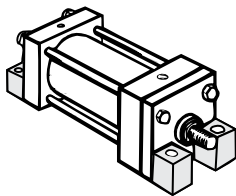
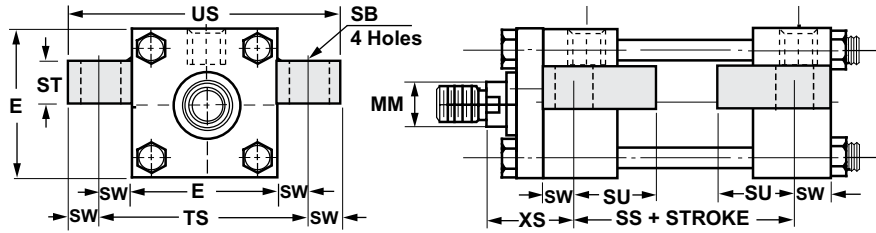
MH Series Medium Duty Hydraulic Cylinders



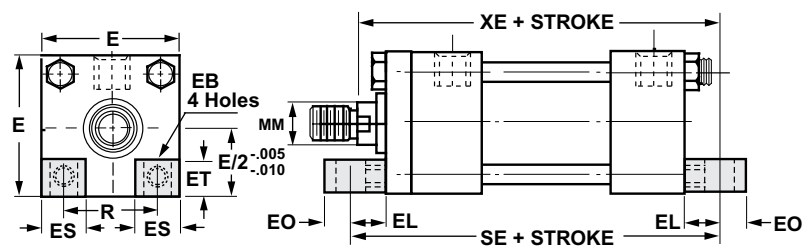
MS2 Side Lug Mount



MS3 Centerline Lug Mount

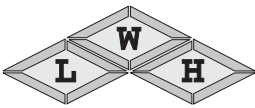


MS7 End Lug Mount

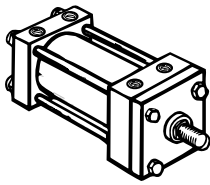


BORE	ROD NBR	MM ROD DIA	EB	EL	EO	ES	ET	SB	ST	SU	SW	TS	US	XS	ADD STROKE		
															SE	SS	XE
1 1/2	1	5/8	5/16	3/4	1/4	9/16	17/32	7/16	1/2	15/16	3/8	2 3/4	3 1/2	1 3/8	5 1/2	2 7/8	5 3/8
	2	1												5 3/4			
2	1	5/8	3/8	15/16	5/16	5/8	5/8	7/16	1/2	15/16	3/8	3 1/4	4	1 3/8	5 7/8	2 7/8	5 9/16
	2	1												5 15/16			
	3	1 3/8												6 3/16			
2 1/2	1	5/8	3/8	1 1/16	5/16	13/16	25/32	7/16	1/2	15/16	3/8	3 3/4	4 1/2	1 3/8	6 1/4	3	5 13/16
	2	1												6 3/16			
	3	1 3/8												6 7/16			
3 1/4	1	1	7/16	7/8	3/8	1	15/16	9/16	3/4	1 1/4	1/2	4 3/4	5 3/4	1 7/8	6 5/8	3 1/4	6 1/2
	2	1 3/8												6 3/4			
	3	1 3/4												7			
4	1	1	7/16	1	3/8	1 1/4	1 5/32	9/16	3/4	1 1/4	1/2	5 1/2	6 1/2	1 7/8	6 7/8	3 1/4	6 5/8
	2	1 3/8												6 7/8			
	3	1 3/4												7 1/8			
5	1	1	9/16	1 1/16	1/2	1 3/8	1 3/8	13/16	1	1 9/16	11/16	6 7/8	8 1/4	2 1/16	7 1/4	3 1/8	6 15/16
	2	1 3/8												7 3/16			
	3	1 3/4												7 7/16			
	4	2												7 9/16			
6	1	1 3/8	9/16	1	1/2	1 3/4	1 19/32	13/16	1	1 9/16	11/16	7 7/8	9 1/4	2 5/16	7 3/4	3 5/8	7 5/8
	2	1 3/4												7 7/8			
	3	2												8			
8	1	1 3/8	11/16	1 1/8	5/8	2 1/4	1 15/16	13/16	1	1 9/16	11/16	9 7/8	11 1/4	2 5/16	7 3/8	3 3/4	7 7/8
	2	1 3/4												8 1/8			
	3	2												8 1/4			
	4	2 1/2												8 1/2			

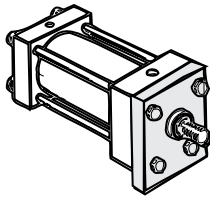
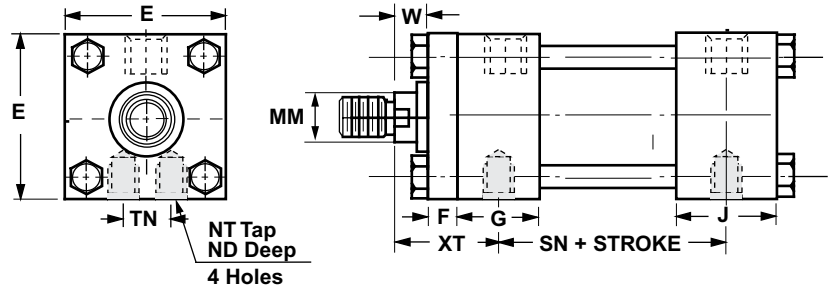
L&W Hydramotion Inc.



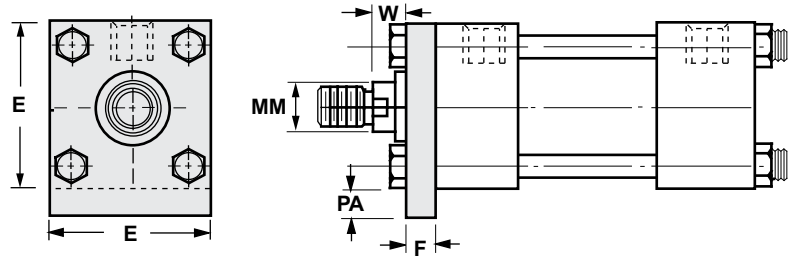
HA Series Heavy Duty Air Cylinders
MH Series Medium Duty Hydraulic Cylinders



MS4 Side Tapped Mount

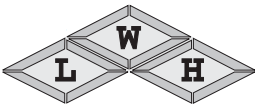


KP0 Key Plate Option



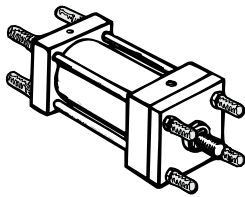
The Key Plate option should be considered for use on foot mount cylinders to eliminate shearing loads on the mounting bolts.

BORE	ROD NBR	MM	E	F	G	J	ND	NT	PA	TN	W	XT	ADD STROKE SN
		ROD DIA											
1 1/2	1	5/8	2	3/8	1 1/2	1	3/16	1/4-20	3/16	5/8	5/8	1 15/16	2 1/4
	2	1									1	2 5/16	
2	1	5/8	2 1/2	3/8	1 1/2	1	11/32	5/16-18	3/16	7/8	5/8	1 15/16	2 1/4
	2	1									1	2 5/16	
	3	1 3/8									1 1/4	2 9/16	
2 1/2	1	5/8	3	3/8	1 1/2	1	7/16	3/8-16	3/16	1 1/4	5/8	1 15/16	2 3/8
	2	1									1	2 5/16	
	3	1 3/8									1 1/4	2 9/16	
3 1/4	1	1	3 3/4	5/8	1 3/4	1 1/4	1/2	1/2-13	5/16	1 1/2	3/4	2 7/16	2 5/8
	2	1 3/8									1	2 11/16	
	3	1 3/4									1 1/4	2 15/16	
4	1	1	4 1/2	5/8	1 3/4	1 1/4	5/8	1/2-13	5/16	2 1/16	3/4	2 7/16	2 5/8
	2	1 3/8									1	2 11/16	
	3	1 3/4									1 1/4	2 15/16	
5	1	1	5 1/2	5/8	1 3/4	1 1/4	3/4	5/8-11	5/16	2 11/16	3/4	2 7/16	2 7/8
	2	1 3/8									1	2 11/16	
	3	1 3/4									1 1/4	2 15/16	
	4	2									1 3/8	3 1/16	
6	1	1 3/8	6 1/2	3/4	2	1 1/2	7/8	3/4-10	3/8	3 1/4	7/8	2 13/16	3 1/8
	2	1 3/4									1 1/8	3 1/16	
	3	2									1 1/4	3 3/16	
8	1	1 3/8	8 1/2	3/4	2	1 1/2	1 1/8	3/4-10	3/8	4 1/2	7/8	2 13/16	3 1/4
	2	1 3/4									1 1/8	3 1/16	
	3	2									1 1/4	3 3/16	
	4	2 1/2									1 1/2	3 7/16	

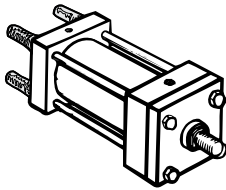
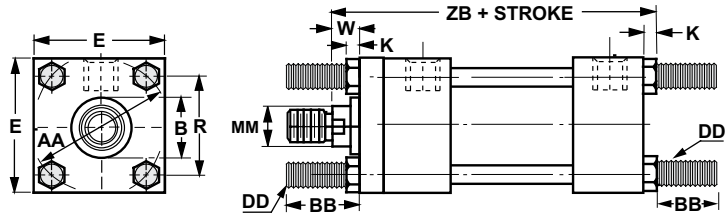


HA Series Heavy Duty Air Cylinders

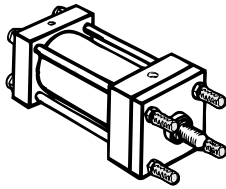
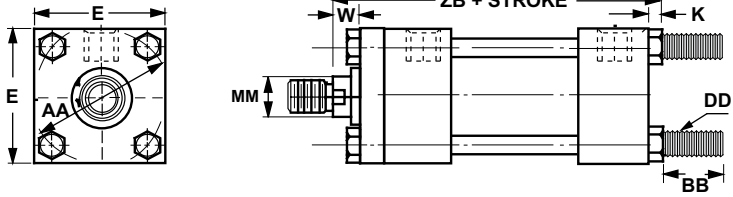
MH Series Medium Duty Hydraulic Cylinders



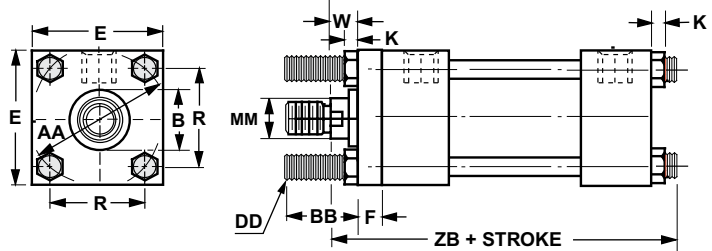
**MX1 Front & Rear Tie Rods
Extended Mount**



**MX2 Rear Tie Rods
Extended Mount**

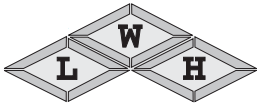


**MX3 Front Tie Rods
Extended Mount**



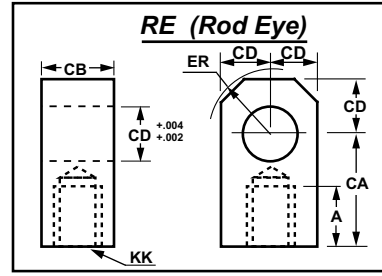
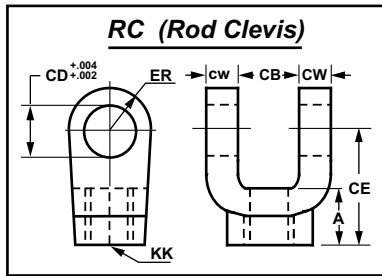
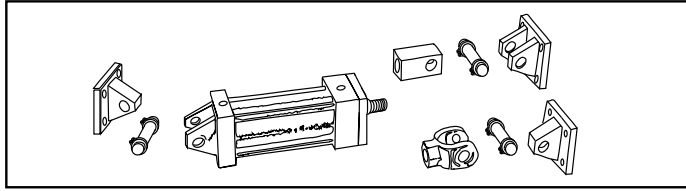
BORE	ROD NBR	MM	AA	+0.000 -0.002 B	BB	DD	E	F	K	R	W	ADD STROKE ZB
		ROD DIA										
1 1/2	1	5/8	2.02	1.124	1	1/4-28	2	3/8	1/4	1.43	5/8	4 7/8
	2	1		1.499							1	5 1/4
2	1	5/8	2.6	1.124	1 1/8	5/16-24	2 1/2	3/8	5/16	1.84	5/8	4 15/16
	2	1		1.499							1	5 5/16
	3	1 3/8		1.999							1 1/4	5 9/16
2 1/2	1	5/8	3.1	1.124	1 1/8	5/16-24	3	3/8	5/16	2.19	5/8	5 1/16
	2	1		1.499							1	5 7/16
	1	1 3/8		1.999							1 1/4	5 11/16
3 1/4	1	1	3.9	1.499	1 3/8	3/8-24	3 3/4	5/8	3/8	2.76	3/4	6
	2	1 3/8		1.999							1	6 1/4
	3	1 3/4		2.374							1 1/4	6 1/2
4	1	1	4.7	1.499	1 3/8	3/8-24	4 1/2	5/8	3/8	3.32	3/4	6
	2	1 3/8		1.999							1	6 1/4
	3	1 3/4		2.374							1 1/4	6 1/2
5	1	1	5.8	1.499	1 13/16	1/2-20	5 1/2	5/8	7/16	4.10	3/4	6 5/16
	2	1 3/8		1.999							1	6 9/16
	3	1 3/4		2.374							1 1/4	6 13/16
	4	2		2.624							1 3/8	6 15/16
6	1	1 3/8	6.9	1.999	1 13/16	1/2-20	6 1/2	3/4	7/16	4.88	7/8	7 1/16
	2	1 3/4		2.374							1 1/8	7 5/16
	3	2		2.624							1 1/4	7 7/16
8	1	1 3/8	9.1	1.999	2 5/16	5/8-18	8 1/2	3/4	9/16	6.44	7/8	7 5/16
	2	1 3/4		2.374							1 1/8	7 9/16
	3	2		2.624							1 1/4	7 11/16
	4	2 1/2		3.124							1 1/2	7 15/16

L&W Hydramotion Inc.

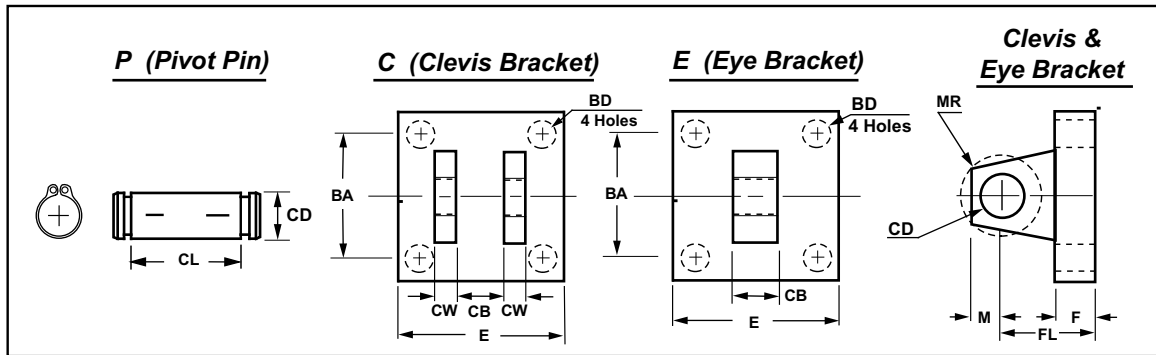


HA Series Heavy Duty Air Cylinders
MH Series Medium Duty Hydraulic Cylinders

MOUNTING ACCESSORIES

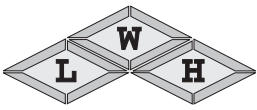


PART NO.	PART NO.	KK	A	CA	CB	CD	CE	CW	ER
RC437	RE437	7/16-20	3/4	1 1/2	3/4	1/2	1 1/2	1/2	1/2
RC500	RE500	1/2-20	3/4	1 1/2	3/4	1/2	1 1/2	1/2	1/2
RC750	RE750	3/4-16	1 1/8	2 3/8	1 1/4	3/4	2 3/8	5/8	3/4
RC1000	RE1000	1-14	1 5/8	2 13/16	1 1/2	1	3 1/8	3/4	1
RC1250	RE1250	1 1/4-12	2	3 7/16	2	1 3/8	4 1/8	1	1 3/8
RC1500	RE1500	1 1/2-12	2 1/4	4	2 1/2	1 3/4	4 1/2	1 1/4	1 3/4
RC1750	RE1750	1 3/4-12	3	4 3/8	2 1/2	2	5 1/2	1 1/4	2
RC1875	RE1875	1 7/8-12	3	5	2 1/2	2	5 1/2	1 1/4	2
RC2250	RE2250	2 1/4-12	3 1/2	5 13/16	3	2 1/2	6 1/2	1 1/2	2 1/2
RC2500	RE2500	2 1/2-12	3 1/2	6 1/8	3	3	6 3/4	1 1/2	2 3/4



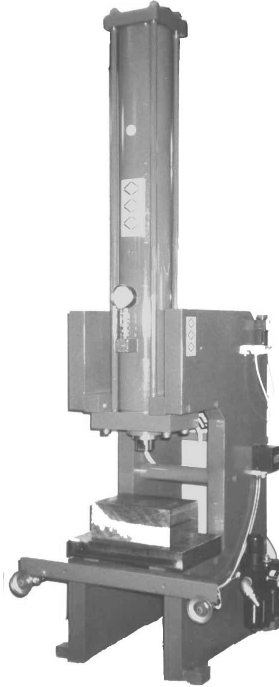
PART NO.	PART NO.	PART NO.	BA	BD	CB	CD	CL	CW	E	F	FL	M	MR
C500	—	P500	2 9/16	13/32	3/4	1/2	1 7/8	1/2	3 1/2	1/2	1 1/2	1/2	5/8
C750	—	P750	3 13/16	17/32	1 1/4	3/4	2 5/8	5/8	5	5/8	1 7/8	3/4	29/32
C1000	—	P1000	4 15/16	21/32	1 1/2	1	3 1/8	3/4	6 1/2	3/4	2 1/4	1	1 1/4
C1375	—	P1375	5 3/4	21/32	2	1 3/8	4 1/8	1	7 1/2	7/8	3	1 3/8	1 21/32
—	E500	—	1 5/8	13/32	3/4	1/2	—	—	2 1/2	3/8	1 1/8	1/2	9/16
—	E750	—	2 9/16	17/32	1 1/4	3/4	—	—	3 1/2	5/8	1 7/8	3/4	7/8
—	E1000	—	3 1/4	21/32	1 1/2	1	—	—	4 1/2	7/8	2 3/8	1	1 1/4
—	E1375	—	3 13/16	21/32	2	1 3/8	—	—	5	7/8	3	1 3/8	1 5/8

L&W Hydramation Inc.



**CONVERT LOW PRESSURE AIR INTO HIGH FORCE WITH THE
L & W POWER BOOST CYLINDER**

Conventional Air Cylinder @ 90 P.S.I.	
Bore	Force
3"	.32 Tons
4"	.57 Tons
5"	.88 Tons
6"	1.27 Tons
8"	2.26 Tons



L & W Power Boost Cylinder @ 90 P.S.I.	
Bore	Force
3"	4.5 Tons
4"	9 Tons
5"	14 & 22 Tons
6"	30 Tons
8"	50 & 60 Tons

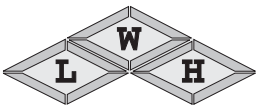
If your application requires a low pressure advance stroke with a high force power stroke, consider the advantages of the **L & W POWER BOOST CYLINDER**.

- * **No high pressure hydraulic controls or power pack**
- * **Simple "Air Only" circuit**
- * **Easy installation**
- * **Simple to size**
- * **Reduction in space requirements**
- * **Reduced energy requirements**
- * **Cost effective**

Typical applications for **L & W POWER BOOST CYLINDERS** include:

Punching Stamping Riveting Crimping
Shearing Trimming Notching Assembling

For Power Boost Cylinder Catalogue - Consult Factory



INTRODUCTION

What is a "POWER BOOST CYLINDER"?

It is a device that incorporates an air cylinder for fast approach, an air-to-oil pressure intensification chamber to provide a high force power stroke, and an air return cylinder all in a single integrated unit.

When should "POWER BOOST CYLINDERS" be used?

They can be used as the power source for many applications such as: pressing, shearing, punching, welding, riveting, crimping, embossing, laminating, compressing, stamping, marking, blanking, clamping, bending, and many others.

What are the advantages of "POWER BOOST CYLINDERS"?

They can cut costs, save space, reduce air consumption, reduce weight, increase efficiency and provide quiet operation.

POWER BOOST CYLINDERS can maintain pressure indefinitely without heat generation or additional power consumption.

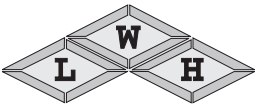
GENERAL SPECIFICATIONS:

Standard Models:	4, 9, 14 and 22 Ton Output Force
Optional Models;	30, 50, 60 and 75 Ton Output Force
Rated Pressure:	90 P.S.I.
Minimum Operating Pressure:	50 P.S.I.
Maximum Operating Pressure:	120 P.S.I.
Operating Medium:	Compressed Air, dry, filtered (40 micron) and lubricated
Valve Requirements:	2 - four way directional control air valves.

L&W Hydramation is aware that many applications are unique to the customer's requirements and may require modification to standard models or custom built units. With over 30 years of experience, we would be pleased to discuss specials designed to meet your needs.

For Power Boost Cylinder Catalogue - Consult Factory

L&W Hydramation Inc.



HA Series Heavy Duty Air Cylinders
MH Series Medium Duty Hydraulic Cylinders

SELECTING CORRECT BORE SIZE

1. Determine if cylinder force is required on EXTEND or RETRACT stroke. Select appropriate chart.
2. Find system operating pressure at top of chart.
3. Read down column until you find the required (or next highest) force rating.
4. Follow row to the left to determine the correct bore, or bore and rod combination.

NOTE: Values shown are theoretical and do not make allowance for friction losses.

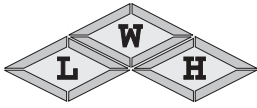
THEORETICAL EXTEND (PUSH) FORCE CHART

BORE	PISTON AREA (Sq. In.)	Theoretical Push Force In Pounds At Following Pressures									Gallons Per Inch Stroke
		50 PSI	100 PSI	250 PSI	500 PSI	700 PSI	850 PSI	1000 PSI	1250 PSI	1500 PSI	
1 1/2	1.767	88	176	442	884	1237	1502	1767	2209	2651	.00765
2	3.142	157	314	785	1571	2199	2670	3141	3927	4712	.01360
2 1/2	4.909	245	491	1227	2454	3436	4172	4909	6136	7363	.02125
3 1/4	8.296	415	830	2074	4148	5807	7051	8296	10370	12443	.03591
4	12.566	628	1256	3141	6283	8796	10681	12566	15708	18849	.05440
5	19.635	981	1963	4908	9817	13744	16690	19635	24544	29452	.08500
6	28.274	1413	2827	7068	14137	19792	24033	28274	35343	42412	.12240
8	50.265	2513	5026	12566	25133	35186	42726	50266	62832	75398	.21760

THEORETICAL RETRACT (PULL) FORCE CHART

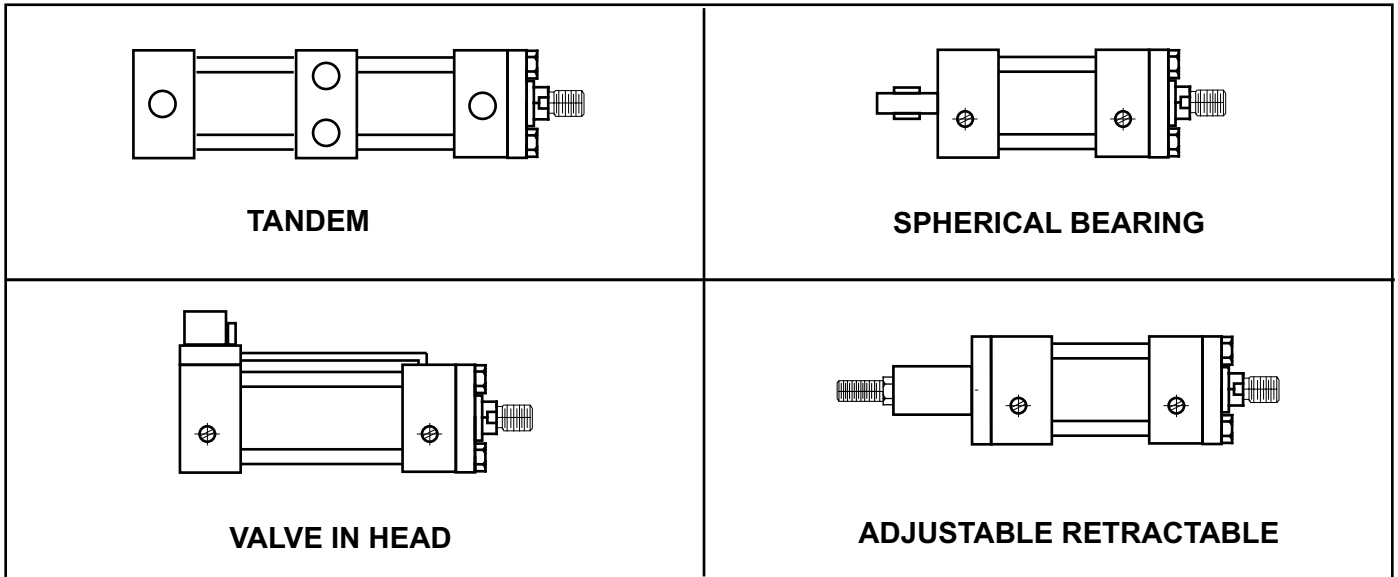
BORE	ROD DIA.	Piston Area Less Rod Area (Sq. In.)	Theoretical Pull Force In Pounds At Following Pressures									Gallons Per Inch Stroke
			50 PSI	100 PSI	250 PSI	500 PSI	700 PSI	850 PSI	1000 PSI	1250 PSI	1500 PSI	
1 1/2	5/8	1.460	73	146	365	730	1022	1241	1460	1825	2190	.00632
	1	0.982	49	98	245	491	687	834	982	1227	1473	.00425
2	5/8	2.835	141	283	709	1417	1984	2410	2835	3543	4252	.01227
	1	2.356	117	235	589	1178	1649	2003	2356	2945	3534	.01020
	1 3/8	1.657	82	166	414	828	1160	1408	1657	2071	2485	.00717
2 1/2	5/8	4.602	230	460	1150	2301	3221	3912	4602	5752	6903	.01992
	1	4.123	206	412	1030	2062	2886	3505	4123	5154	6185	.01785
	1 3/8	3.424	171	342	856	1712	2397	2910	3424	4280	5136	.01482
3 1/4	1	7.510	375	751	1877	3755	5257	6384	7510	9388	11265	.03251
	1 3/8	6.811	340	681	1702	3405	4768	5789	6811	8514	10216	.02231
	1 3/4	5.890	294	589	1472	2945	4123	5007	5890	7363	8836	.02550
4	1	11.781	589	1178	2945	5890	8247	10014	11781	14726	17671	.05100
	1 3/8	11.081	554	1108	2770	5541	7757	9419	11081	13852	16622	.04797
	1 3/4	10.161	508	1016	2540	5080	7113	8637	10161	12701	15241	.04399
5	1	18.849	942	1885	4712	9425	13195	16022	18850	23562	28274	.08160
	1 3/8	18.150	907	1815	4537	9075	12705	15427	18150	22688	27225	.07857
	1 3/4	17.230	861	1723	4307	8615	12061	14645	17230	21537	25845	.07459
	2	16.493	824	1649	4123	8247	11545	14019	16493	20617	24740	.07140
6	1 3/8	26.789	1339	2678	6697	13395	18753	22771	26790	33487	40184	.11597
	1 3/4	25.869	1293	2586	6467	12935	18108	21989	25869	32336	38804	.11199
	2	25.133	1256	2513	6283	12566	17593	21363	25133	31416	37699	.10880
8	1 3/8	48.781	2439	4878	12195	24390	34146	41463	48781	60976	73171	.21117
	1 3/4	47.860	2393	4786	11965	23930	33502	40681	47860	59825	71790	.20719
	2	47.124	2356	4712	11781	23562	32987	40055	47124	58905	70686	.20400
	2 1/2	45.357	2267	4535	11339	22678	31750	38553	45357	56696	68035	.19635

L&W Hydramotion Inc.



HA Series Heavy Duty Air Cylinders
MH Series Medium Duty Hydraulic Cylinders

CUSTOM CYLINDERS



L&W Hydramation Inc. has over 30 years experience in the design and manufacture of standard NFPA cylinders and custom designs for specific industrial applications.

STANDARD PRODUCT RANGE

SERIES HA

- * Heavy Duty Air Service
- * Rated to 250 PSI
- * 1 1/2" thru 8" Bore
- * NFPA Dimensionally Interchangeable
- * Complete Range NFPA Mounts

SERIES HH

- * High Pressure Hydraulic Service
- * Rated to 3000 PSI
- * 1 1/2" thru 8" Bore
- * NFPA Dimensionally Interchangeable
- * Complete Range of NFPA Mounts

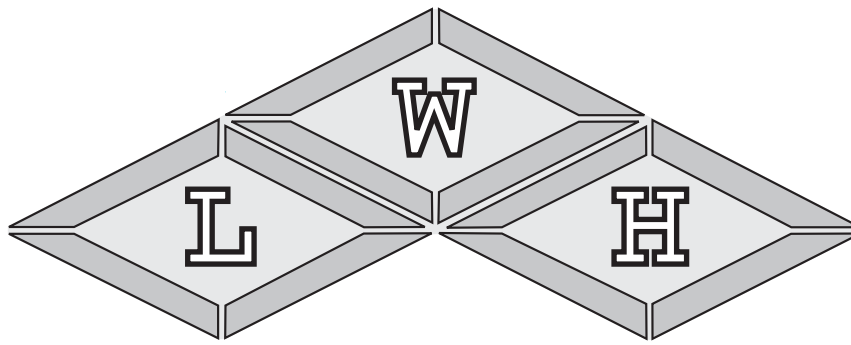
SERIES MH

- * Medium Duty Hydraulic Service
- * Rated to 1500 PSI
- * 1 1/2" thru 8" Bore
- * NFPA Dimensionally Interchangeable
- * Complete Range of NFPA Mounts

SERIES PB POWER BOOST CYLINDER

- * 90 PSI Air Input
- * Output Force of 4, 9, 14, 22 Ton
- * Optional Output Force of 30, 50, 60, 75, 100 & 125 ton
- * C-Frames, H-Frames and complete Press packages available

L&W Hydramation Inc.



L&W Hydramotion Inc.

WARRANTY

L&W Hydramotion Inc. warrants its cylinders for a period of twelve (12) months from date of shipment, to be free from defects in materials and workmanship.

L&W must be notified prior to returning product for warranty evaluation. L&W will repair or replace, at it's option, any product that is proven to be defective in materials and/or workmanship.

A complete explanation of defects is required with the returned product. The L&W warranty applies only to products used properly and under normal operating conditions.

In no event shall L&W Hydramotion Inc. be liable for any consequential damages or installation costs.

Authorized Distributor

Mailing Address

L&W Hydramotion Inc.
P.O. Box 130
Wasaga Beach, ON L0L 2P0

Shipping Address

L&W Hydramotion Inc.
3rd Concession, #2887
Adjala Township
Loretto, ON L0N 1P0

Telephone: (905) 729-3252 Fax: (905) 729-4506
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