CHEMICAL INJECTION PUMP

MOTOR DRIVEN

SINGLE HEAD

The model MA chemical injection pumps are designed to be driven by an electric motor. These positive displacement pumps have removable fluid ends with interchangeable check valves, and a removable stainless steel cover for easy maintenance on the drivetrain.

The pumps are available in various materials and piston sizes to meet your specific chemical injection requirements. They can also be equipped with chemical tanks and index wheels to provide simple flow rate control.

For decades, Western Chemical Pumps model MA pump has demonstrated reliable engineering and design, earning the trust of its users through rigorous testing and proven performance.

FEATURES

- Single fluid end pump
- Index wheel allows easy flow rate control by skipping strokes to inject the precise amount desired
- Adjustable stroke length to fine tune injection flow rates
- Double piston seals with vented isolation to prevent chemical blow-by into pump box
- Capable of injecting up to 5,000 psi
- Stainless steel piston and check valves come standard for better reliability

WESTERN™

MADE IN USA

MA PUMP CONFIGURATIONS

MA	3/8	#2	Y	PART NUMBER
↑	↑	↑	↑	**Model**
MA				Electric Motor, Single Head
				Piston Diameter
	1/4			1/4" (Includes Index Wheel)
	3/8			3/8" (Includes Index Wheel)
	5/8			5/8" (No Index Wheel)
	1			1" (No Index Wheel)
				Attachments
		#2		No Tank
		#3		Tank
				Fluid End Material
				Steel (standard)
			Y	303 Stainless Steel
			Q	316 Stainless Steel

MAS	5/8	#2	Y	PART NUMBER
↑	↑	↑	↑	**Model**
MAS				Electric Motor, Single Head
				Piston Diameter
	5/8			5/8" (Includes Index Wheel)
	1			1" (Includes Index Wheel)
				Attachments
		#2		No Tank
		#3		Tank
				Fluid End Material
			Y	Stainless Steel
			Q	316 Stainless Steel

OPTIONS & UPGRADES

Material: Upgrade to Y or Q models for enhanced corrosion resistance

Piston Size: Multiple sizes available to fit your required injection flow rates and pressures

Resilient Seat Check Valves: Added O-ring provides better sealing capability, which is ideal for low viscosity fluids, such as methanol

Packing Seals: Buna-N, EPDM, Neoprene, PTFE (Teflon™), FKM (Viton™)

Rope Packing: Graphite impregnated or PTFE (Teflon™) rope

Prime Ball: Ceramic or tungsten

Tank: Optional 5 gallon stainless steel tank

Index Wheel: MA 1/4" and 3/8" pumps come standard with an index wheel. MA 5/8" and 1" pumps require an upgrade to the MAS model to include an index wheel. The index wheel has 10 easily adjustable pins allowing flow rate control by skipping strokes.

Motors: Multiple motor models available to fit your power supply

Pulley Driven: Option to replace the motor for a pulley, if an existing power drivetrain is available

Coupler: Option available that is ideal for cold weather environments

Other unique or special order materials are available to fit your needs. Please inquire with your Western Chemical Pumps, Inc. distributor. Specify desired options when placing order.

PISTON DIA (IN)	MAX DISCHARGE PRESSURE (PSI)	FLOW RATE MIN - MAX (QTS / DAY)
1/4	6,750	0.3 - 42.2
3/8	3,000	0.6 - 95.0
5/8	1,250	1.6 - 263.9
1	400	42.2 - 675.6

FLOW RATE (QTS / DAY)					
PISTON	INDEX PINS "IN"	STROKE LENGTH			
		1	11/16	5/16	1/16
1/4	0	42.2	29.0	13.2	2.6
	1	38.0	26.1	11.9	2.4
	2	33.8	23.2	10.6	2.1
	3	29.6	20.3	9.2	1.8
	4	25.3	17.4	7.9	1.6
	5	21.1	14.5	6.6	1.3
	6	16.9	11.6	5.3	1.1
	7	12.7	8.7	4.0	0.8
	8	8.4	5.8	2.6	0.5
	9	4.2	2.9	1.3	0.3
3/8	0	95.0	65.3	29.7	5.9
	1	85.5	58.8	26.7	5.3
	2	76.0	52.3	23.8	4.8
	3	66.5	45.7	20.8	4.2
	4	57.0	39.2	17.8	3.6
	5	47.5	32.7	14.8	3.0
	6	38.0	26.1	11.9	2.4
	7	28.5	19.6	8.9	1.8
	8	19.0	13.1	5.9	1.2
	9	9.5	6.5	3.0	0.6
5/8	0	263.9	181.4	82.5	16.5
	1	237.5	163.3	74.2	14.8
	2	211.1	145.2	66.0	13.2
	3	184.7	127.0	57.7	11.5
	4	158.4	108.9	49.5	9.9
	5	132.0	90.7	41.2	8.2
	6	105.6	72.6	33.0	6.6
	7	79.2	54.4	24.7	4.9
	8	52.8	36.3	16.5	3.3
	9	26.4	18.1	8.2	1.6
1	0	675.6	464.5	211.1	42.2
	1	608.1	418.1	190.0	38.0
	2	540.5	371.6	168.9	33.8
	3	473.0	325.2	147.8	29.6
	4	405.4	278.7	126.7	25.3
	5	337.8	232.3	105.6	21.1
	6	270.3	185.8	84.5	16.9
	7	202.7	139.4	63.3	12.7
	8	135.1	92.9	42.2	8.4
	9	67.6	46.5	21.1	4.2

CAUTION

3 PHASE MOTORS REVERSE DIRECTION WHEN POWER WIRES ARE INTERCHANGED. CHECK ROTATION OF MOTOR IMMEDIATELY AFTER ANY ELECTRICAL MODIFICATIONS.

ENSURE PUMP IS ELECTRICALLY ISOLATED WITH PROPER LOCKOUT / TAGOUT PROCEDURES PRIOR TO PERFORMING WORK.

ENSURE CHECK VALVE FLOW IS IN THE DIRECTION OF THE ARROW. INCORRECT DIRECTION COULD CAUSE PUMP TO OVER PRESSURE.

INSTALLATION & OPERATION

Securely mount base (M1) to concrete pad or platform. Ensure motor and pump shaft remain in alignment during installation. Misalignment could cause premature wear on coupler and bearings.

Fill the pump box with 2-1/2 quarts SAE 20 or SAE 30. The oil level should partially submerge the piston.

Connect the motor to power following the wiring instructions printed on the motor. Ensure motor turns pump shaft in the direction of arrows indicated on the pump (clockwise looking from motor towards pump).

Connect the suction and discharge lines to the fluid end. Open the prime valve (D16-2Y) and run the pump until gas is purged from the system. Bubbles and chemical may flow out of the prime valve opening. If trouble is experienced during priming, use a trigger type oil can to force oil through the bleed hole into the fluid end. This may speed up the priming process. Close the prime valve after priming is complete.

FLOW RATE CONTROL

Choose the preferred flow rate from the provided flow rate table. Opting for the maximum stroke length with 5 index pins "IN" is generally advisable. This approach enables future adjustments for higher or lower flow rates by repositioning the index pins as needed.

To position the index pins (M11-3), use the pin hook (M11-4) to hook the pin and slide it either “IN” or “OUT” of the index wheel. “IN”, will skip a stroke and is positioned with the grooved pin head closest to the index wheel. “OUT”, will allow the piston to stroke and is positioned with the grooved pin head away from the index wheel. Do not pull the pin completely out of the index wheel.

To modify the stroke length, first, loosen the two cap screws (M13-1). Then, align the pull bar (M13S) with your chosen stroke length as printed on the pull bar. Finally, tighten the two cap screws to secure the assembly in place.

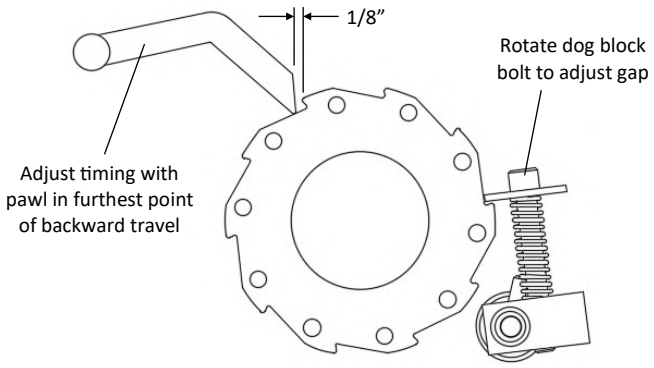
Pumps with 5/8” and 1” pistons that are not equipped with an index wheel control flow rate by modifying the stroke length. Adjust the stroke length by positioning the pull bar (M131) to the desired setting indicated on the flow rate table from the rows indicating “0” in the index pins column. Loosen screw (DFF44-2), then slide the pull bar to the desired position. Tighten the screw (DFF44-2) to secure the assembly.

MAINTENANCE & TROUBLESHOOTING

Chemical Leakage: This can be detected by chemical leaking around the fluid end nut (LD12-4B). To correct this issue, tighten the V-ring packing (D12B). First, loosen the setscrew (LD12-2) and nut (D47-1A) on top of the fluid end. Using the supplied packing wrench (D44-3), insert in holes of fluid end nut and rotate. Hold fluid end upright while rotating the fluid end nut. The rotation will compress the V-ring packing around the piston. Tighten the setscrew and nut on top of the fluid end. Overtightening the V-ring packing can prevent the piston from completing a full stroke.

Preventing Pump Box Oil Leakage Into Fluid End: This can be detected by oil leaking around the fluid end nut (LD12-4B). To correct this issue, tighten the rope packing (LD15-1). First, remove the cover (M23A) of the pump. Remove the hold pin (M15H) from the packing nut (LD15Y) inside the pump box. Using the supplied packing wrench (D44-3), insert in holes of packing nut and rotate. Do not overtighten rope packing.

Dog Block Timing Adjustment: Manually rotate the drive shaft (M7-2A) clockwise until the pawl (M25) is in the farthest back point of its travel. The pawl should drop and be set to catch the next tooth on the index wheel with the next forward movement. In this back position, there should be a 1/8” gap between the pawl and index wheel. The dog tooth bolt (M20-8) should be set against the index wheel preventing reverse rotation. If the gap is not 1/8”, turn the dog tooth bolt to adjust the gap. Rotate the drive shaft clockwise to observe the proper action on each of the 10 teeth on the index wheel.

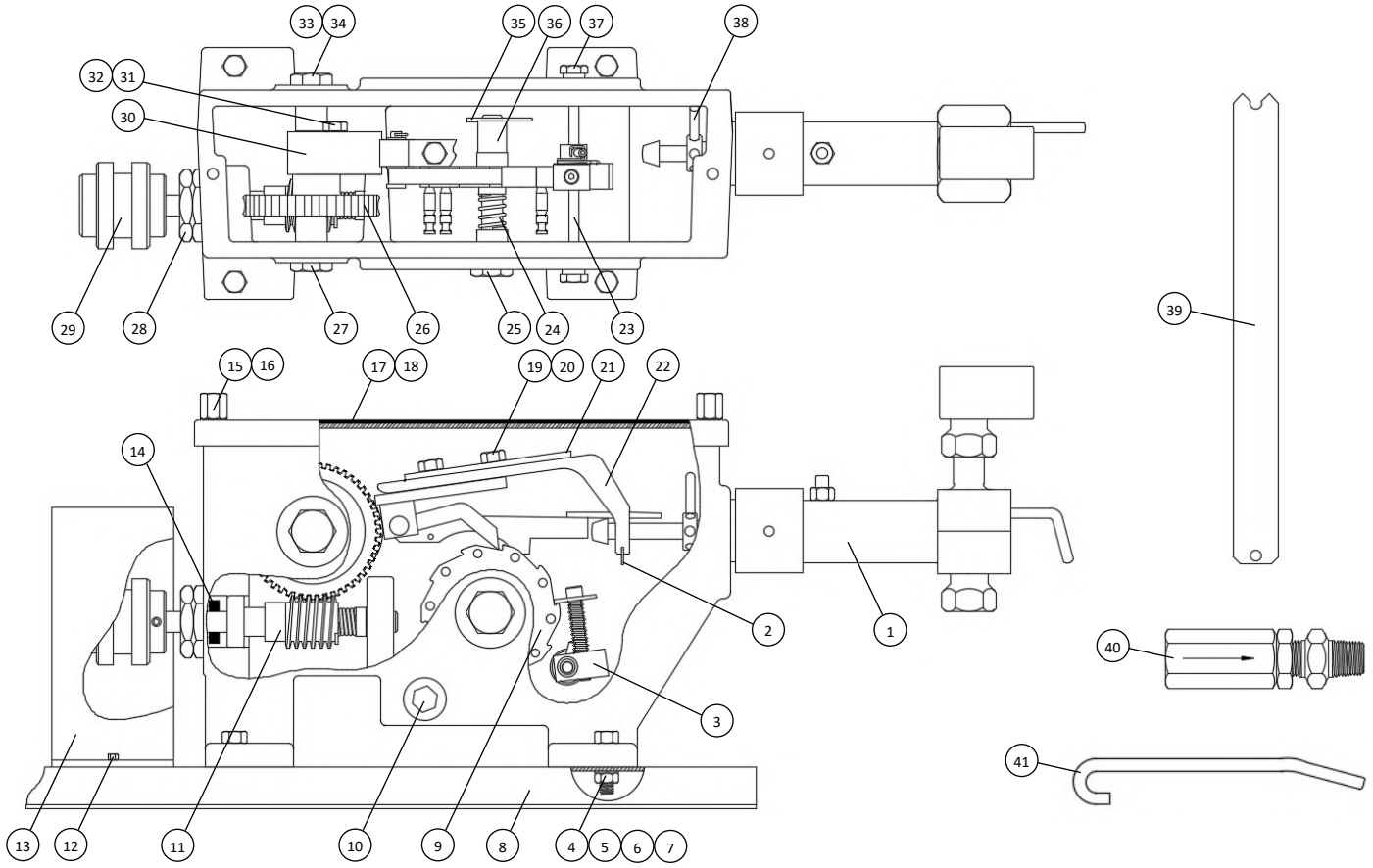


TIPS FOR BEST OPERATION

- Plan ahead for proper pump mounting location
- Short flooded suction lines and clean chemicals with no debris perform best
- Chemical lines should be rigid and have no abrupt change in elevation to prevent trapping gas bubbles
- Fluid end must be vertical for ball check valves to operate properly
- Keep pump and motor shaft properly aligned
- Install motor cutoff switch within easy reach of pump
- Ensure correct rotation of motor
- Keep oil clean and at the recommended fill level to partially submerge piston

All images are for illustrative purposes. Actual product may differ.

MA/MAS #2 PUMP - INDEX WHEEL: PARTS LIST



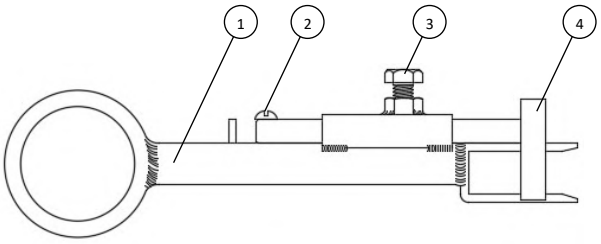
	MA/MAS #2 - INDEX WHEEL											
1	FLUID END	***	13	COUPLING GUARD	M10-2A	25	SHAFT	M11D	36	SPACER	M20S
2	COTTER PIN	M13P	14	OIL SEAL	M9-2B	26	WORMGEAR ASSY	M6Z	37	PLUG	M20-2L
3	DOG BLOCK ASSY	M20-1Z	15	THUMB SCREW	LD23-2	27	PLUG BEARING, LH	M6-3	38	HOLD PIN	M15H
4	CAP SCREW	LD8-3	16	GASKET	LD23-2A	28	RETAINER	M9B	39	PIN HOOK	M11-4
5	WASHER	D21-2	17	COVER	M23A	29	COUPLING ASSY	M10SF	40	LINE CHECK VALVE	D461
6	LOCK WASHER	M4L	18	GASKET	M23-1	29	COUPLING ASSY	M10*	41	PACKING WRENCH	D44-3
7	NUT	D1-2A	19	CAP SCREW	M13-1	30	FOLLOWER ASSY	M5-4Z	**NOT PICTURED**		
8	BASE	M1	20	LOCK WASHER	M13-1W	31	CAP SCREW	LD10-2		MOTOR	***
9	INDEX WHEEL ASSY	M11Z	21	CLAMP BAR	M13-2	32	WASHER	M5-3		CAP SCREW	D23-2**
10	DRAIN PLUG	M2-2	22	RETURN BAR	M13S	33	PLUG BEARING, RH	M6-2		WASHER	M56**
11	WORMSHAFT ASSY	M7AZ	23	SHAFT	M20-2S	34	SHIM WASHER	M6-2W		LOCK WASHER	D47-1L**
12	SCREW	M10-2B	24	SPRING	D5-1	35	CLIP	M20D3		NUT	D47-1A**

Subassembly detail shown in following drawings *** See subassembly drawing for part number* **Location: Mount motor to base* * Optional equipment*

MA #2 PUMP - NO INDEX WHEEL: PARTS LIST

Includes all parts from MA/MAS #2

	MA #2 - NO INDEX WHEEL		
	PLUG	D24-1	*Not pictured, replaces M11D*
	PUSH BAR ASSY	**M501-4Z**	*Replaces M5-4Z*
1	PUSH BAR	M501-4	
2	SCREW	M131-2	
3	CAP SCREW	DFF44-2	
4	PULL BAR	M131	



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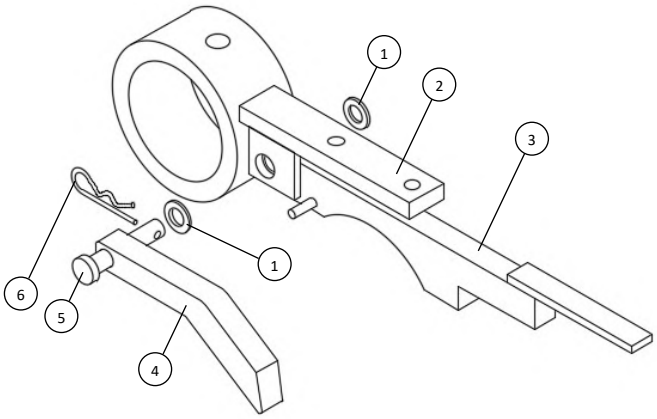
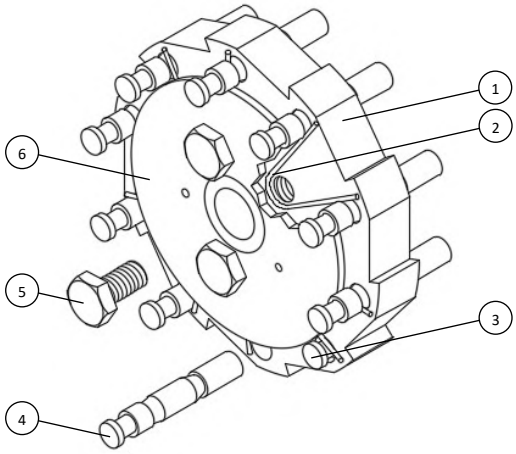
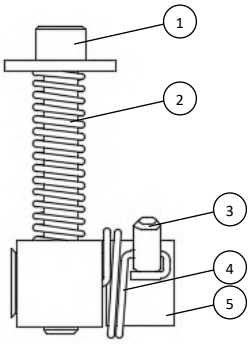
MA/MAS #2 PUMP: SUBASSEMBLIES



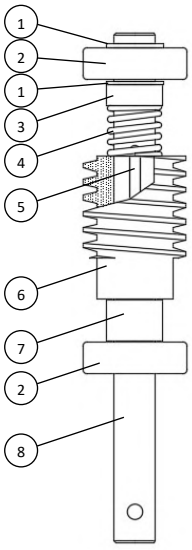
	FOLLOWER ASSY	M5-4Z		
1	SPACER	M25-1B	4 PAWL	M25
2	FOLLOWER	M5-4	5 PIN	M25-1
3	PUSH BAR	M24	6 COTTER PIN	LD13-2



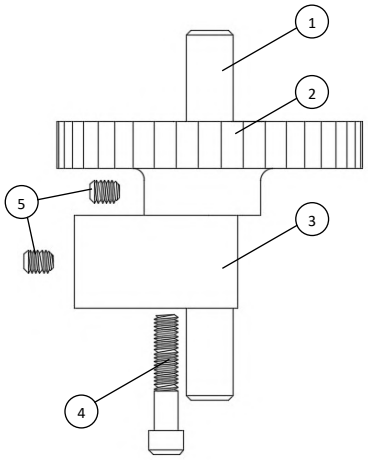
	INDEX WHEEL ASSY	M11Z		
1	INDEX WHEEL	M11	4 INDEX PIN	M11-3
2	SPRING	M11-5	5 BOLT	LD10-2
3	INDEX PIN, SHORT	M11-3S	6 PLATE	M11-6



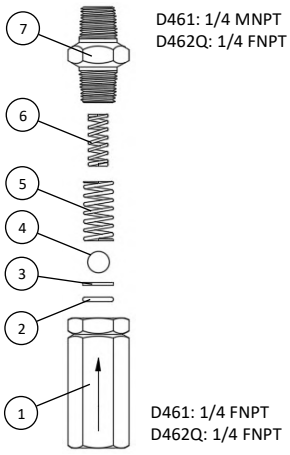
	DOG BLOCK ASSY	M20-1Z
1	DOG TOOTH BOLT	M20-8
2	SPRING	M20-9
3	SET SCREW	M20-10
4	TORSION SPRING	M20-7
5	BLOCK AND PIVOT	M20-1



	WORMSHAFT ASSY	M7AZ
1	RETAINING RING	M7-6A
2	BEARING	M8
3	SPACER	M7-7
4	SPRING	D7
5	KEY	M7-1
6	WORM	M7
7	SPACER	M7-7A
8	SHAFT	M7-2A



	WORMGEAR ASSY	M6Z
1	SHAFT	M6-4
2	GEAR	MT6
3	CAM	M5
4	BOLT	M5-1
5	SETSCREW	LD7-1A



	LINE CHECK VALVE	D461	D462Q
1	BODY / CAGE	D461B	D176BQ
2	O-RING, TEFLON™	M170-55T*	D170-5T*
3	RING	D461R	D177
4	BALL, CERAMIC	D17-5C	D17-6C
5	SPRING	D461S	D178
6	SPRING	D18-1Y	D462SQ
7	NIPPLE / BODY	D461A	D462BFQ

**Alternate materials: Buna-N, Viton™, Neoprene, EPDM*

MOTOR	HP	HZ	VOLTAGE	PHASE	ENCLOSURE	HAZARD CLASS	TEMP CODE
MR-T13B	1/3	60	115/208-230V AC	1	TEFC	-	-
MR-T33B	1/3	60	208/230-460V AC	3	TEFC	-	-
MR-E13B	1/3	60	115/208-230V AC	1	XPFC	CL 1 GR C,D / CL 2 GR E,F,G	T3B
MR-E33B	1/3	60	208/230-460V AC	3	XPFC	CL 1 GR D / CL 2 GR F,G	T3C

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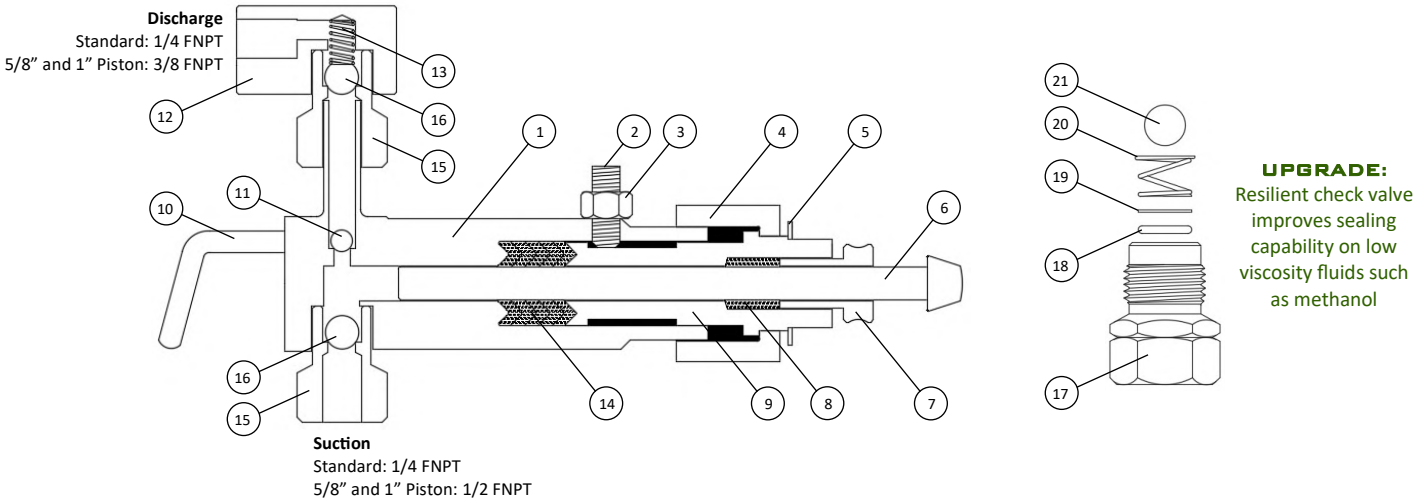
MA/MAS #2 PUMP: SUBASSEMBLIES CONTINUED



PISTON DIA (IN)	1/4			3/8			5/8		1	
MATERIAL	Standard	Y	Q	Standard	Y	Q	Y	Q	Y	Q
MA FLUID END ASSY	**M164Z1**	**M164Z1Y**	**M164Z1Q**	**M160Z1**	**M160Z1Y**	**M160Z1Q**	**M161Z1Y**	**M161Z1Q**	**M161-8Z1Y**	**M161-8Z1Q**
1 FLUID END BODY	LD164	LD164Y	LD164Q	LD160	LD160Y	LD160Q	M161Y	M161Q	M161-8Y	M161-8Q
2 SETSCREW	LD12-2	LD12-2Q	LD12-2Q	LD12-2	LD12-2Q	LD12-2Q	LD12-2Q	LD12-2Q	LD12-2Q	LD12-2Q
3 NUT	D47-1A	D47-1AQ	D47-1AQ	D47-1A	D47-1AQ	D47-1AQ	D47-1AQ	D47-1AQ	D47-1AQ	D47-1AQ
4 FLUID END NUT	LD12-4B	LD12-4BY	LD12-4BQ	LD12-4B	LD12-4BY	LD12-4BQ	M121-4BY	M121-4BQ	M121-48BY	M121-48BQ
5 GASKET	LD12-1	LD12-1	LD12-1	LD12-1	LD12-1	LD12-1	M121-1	M121-1	M121-18	M121-18
6 PISTON	M144Y	M144Y	M144Q	M14Y	M14Y	M14Q	M141Y	M141Q	M141-8Y	M141-8Q
7 ROPE PACKING NUT	LD15Y	LD15Y	LD15Q	LD15Y	LD15Y	LD15Q	M151Y	M151Q	M151-8Y	M151-8Q
8 ROPE PACKING, GRAPHITE	LD15-1	LD15-1	LD15-1*	LD15-1	LD15-1	LD15-1*	M151-1	M151-1*	M151-18	M151-18*
8 ROPE PACKING, TEFLON™	LD15-1T*	LD15-1T*	LD15-1T	LD15-1T*	LD15-1T*	LD15-1T	M151-1T*	M151-1T	M151-18T*	M151-18T
9 CYLINDER	LD124-4AY	LD124-4AY	LD124-4AQ	LD12-4AY	LD12-4AY	LD12-4AQ	M121-4AY	M121-4AQ	M121-48AY	M121-48AQ
10 PRIME VALVE	D16-2Y	D16-2Y	D16-2Q	D16-2Y	D16-2Y	D16-2Q	D16-2Y	D16-2Q	D16-2Y	D16-2Q
11 PRIME BALL, CERAMIC	D17-4C	D17-4C	D17-4C	D17-4C	D17-4C	D17-4C	D17-6C	D17-6C	D17-6C	D17-6C
11 PRIME BALL, TUNGSTEN	D17-4T*	D17-4T*	D17-4T*	D17-4T*	D17-4T*	D17-4T*	D17-6T*	D17-6T*	D17-6T*	D17-6T*
12 SQUARE ELL	D170-4	D170-4Y	D170-4Q	D170-4	D170-4Y	D170-4Q	M171-4Y	M171-4Q	M171-4Y	M171-4Q
13 SPRING	D18-1Y	D18-1Y	D18-1Y	D18-1Y	D18-1Y	D18-1Y	M181-1Y	M181-1Y	M181-1Y	M181-1Y
14 **V-RING PACKING**	**HHHHH**	**BTBTB**	**VTVTV**	**HHHHH**	**BTBTB**	**VTVTV**	**BTBTB**	**VTVTV**	**BTBTB**	**VTVTV**
PACKING, EPDM (B)	D124B*	D124B (3)	D124B*	D12B*	D12B (3)	D12B*	D121B (3)	D121B*	M121-8B (2)	M121-8B*
PACKING, BUNA-N (H)	D124H (5)	D124H*	D124H*	D12H (5)	D12H*	D12H*	D121H*	D121H*	M121-8H*	M121-8H*
PACKING, NEOPRENE (N)	D124N*	D124N*	D124N*	D12N*	D12N*	D12N*	D121N*	D121N*	M121-8N*	M121-8N*
PACKING, TEFLON™ (T)	D124T*	D124T (2)	D124T (2)	D12T*	D12T (2)	D12T (2)	D121T (2)	D121T (2)	M121-8T (1)	M121-8T (1)
PACKING, VITON™ (V)	D124V*	D124V*	D124V (3)	D12V*	D12V*	D12V (3)	D121V*	D121V (3)	M121-8V*	M121-8V (2)
CHECK VALVE	**D17Y**	**D17Y**	**D17Q**	**D17Y**	**D17Y**	**D17Q**	**D172Y**	**D172Q**	**D172Y**	**D172Q**
15 CAGE	D17BY	D17BY	D17BQ	D17BY	D17BY	D17BQ	D172B	D172BQ	D172B	D172BQ
16 CHECK BALL, CERAMIC	D17-6C	D17-6C	D17-6C	D17-6C	D17-6C	D17-6C	D171-2C	D171-2C	D171-2C	D171-2C
16 CHECK BALL, TUNGSTEN	D17-6T*	D17-6T*	D17-6T*	D17-6T*	D17-6T*	D17-6T*	D171-2T*	D171-2T*	D171-2T*	D171-2T*
RESILIENT CHECK VALVE	**D176ZYT***	**D176ZYT***	**D176ZQT***	**D176ZYT***	**D176ZYT***	**D176ZQT***	**D172ZYT***	**D172ZQT***	**D172ZYT***	**D172ZQT***
17 CAGE	D176B	D176B	D176BQ	D176B	D176B	D176BQ	D172B	D172BQ	D172B	D172BQ
18 O-RING, TEFLON™	D170-5T**	D170-5T**	D170-5T**	D170-5T**	D170-5T**	D170-5T**	D171-8T**	D171-8T**	D171-8T**	D171-8T**
19 RING	D177	D177	D177	D177	D177	D177	D173	D173	D173	D173
20 SPRING	D178	D178	D178	D178	D178	D178	D174	D174	D174	D174
21 CHECK BALL, CERAMIC	D17-6C	D17-6C	D17-6C	D17-6C	D17-6C	D17-6C	D171-2C	D171-2C	D171-2C	D171-2C
21 CHECK BALL, TUNGSTEN	D17-6T*	D17-6T*	D17-6T*	D17-6T*	D17-6T*	D17-6T*	D171-2T*	D171-2T*	D171-2T*	D171-2T*
MAS FLUID END ASSY	*MAS fluid end BOM same as above, except replace piston with the following*						**M161Z1RY**	**M161Z1RQ**	**M161-8Z1RY**	**M161-8Z1RQ**
6 PISTON							M141RY	M141RQ	M141-8RY	M141-8RQ

***Alternate materials: Buna-N, Viton™, Neoprene, EPDM* **Optional equipment, please specify when ordering*

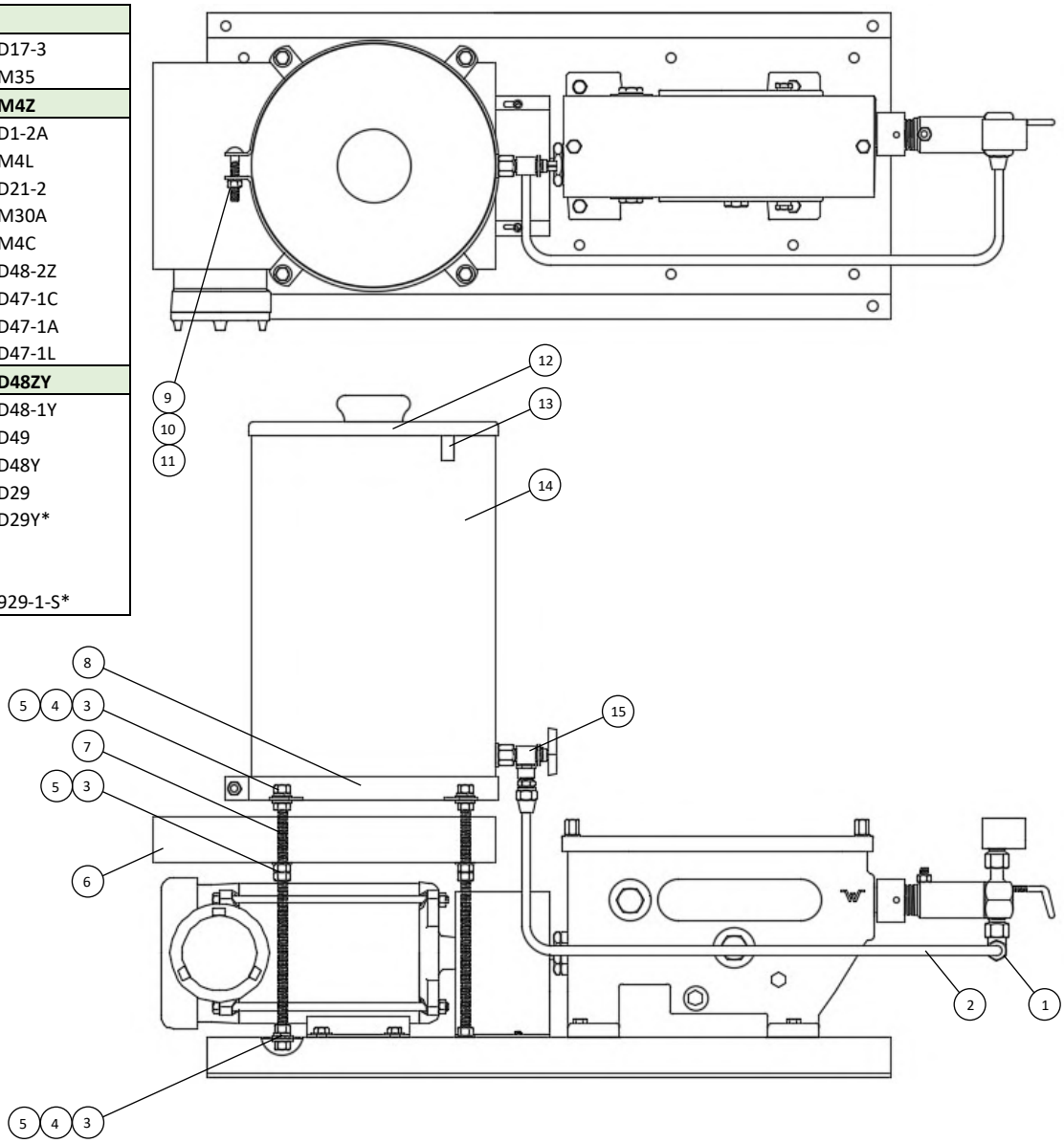
All images are for illustrative purposes. Actual product may differ.

MA/MAS #3 PUMP: PARTS LIST

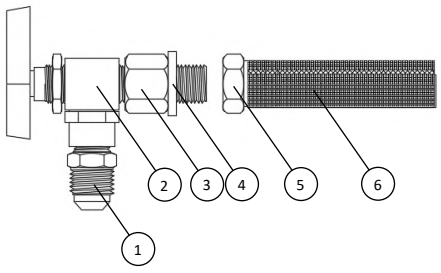
Includes all parts from MA/MAS #2

	MA/MAS #3	
1	ELL	D17-3
2	TUBE ASSY	M35
	TANK LEG ASSY	**M4Z**
3	NUT	D1-2A
4	LOCK WASHER	M4L
5	WASHER	D21-2
6	COVER	M30A
7	STUD	M4C
8	TANK BAND	D48-2Z
9	BOLT	D47-1C
10	NUT	D47-1A
11	LOCK WASHER	D47-1L
	TANK ASSY	**D48ZY**
12	TANK LID WITH KNOB	D48-1Y
13	GAUGE STICK	D49
14	TANK	D48Y
15	TANK VALVE ASSY	D29
15	TANK VALVE ASSY*	D29Y*
	NOT PICTURED	
	LEVEL SIGHT GAUGE*	929-1-S*

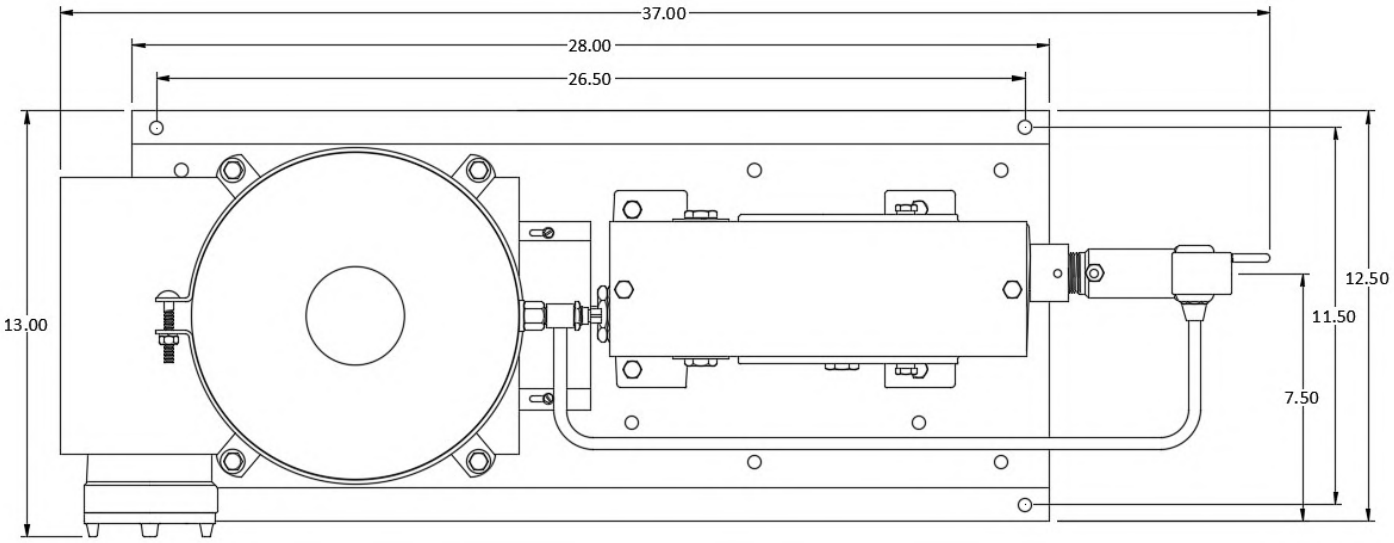
**Optional equipment*

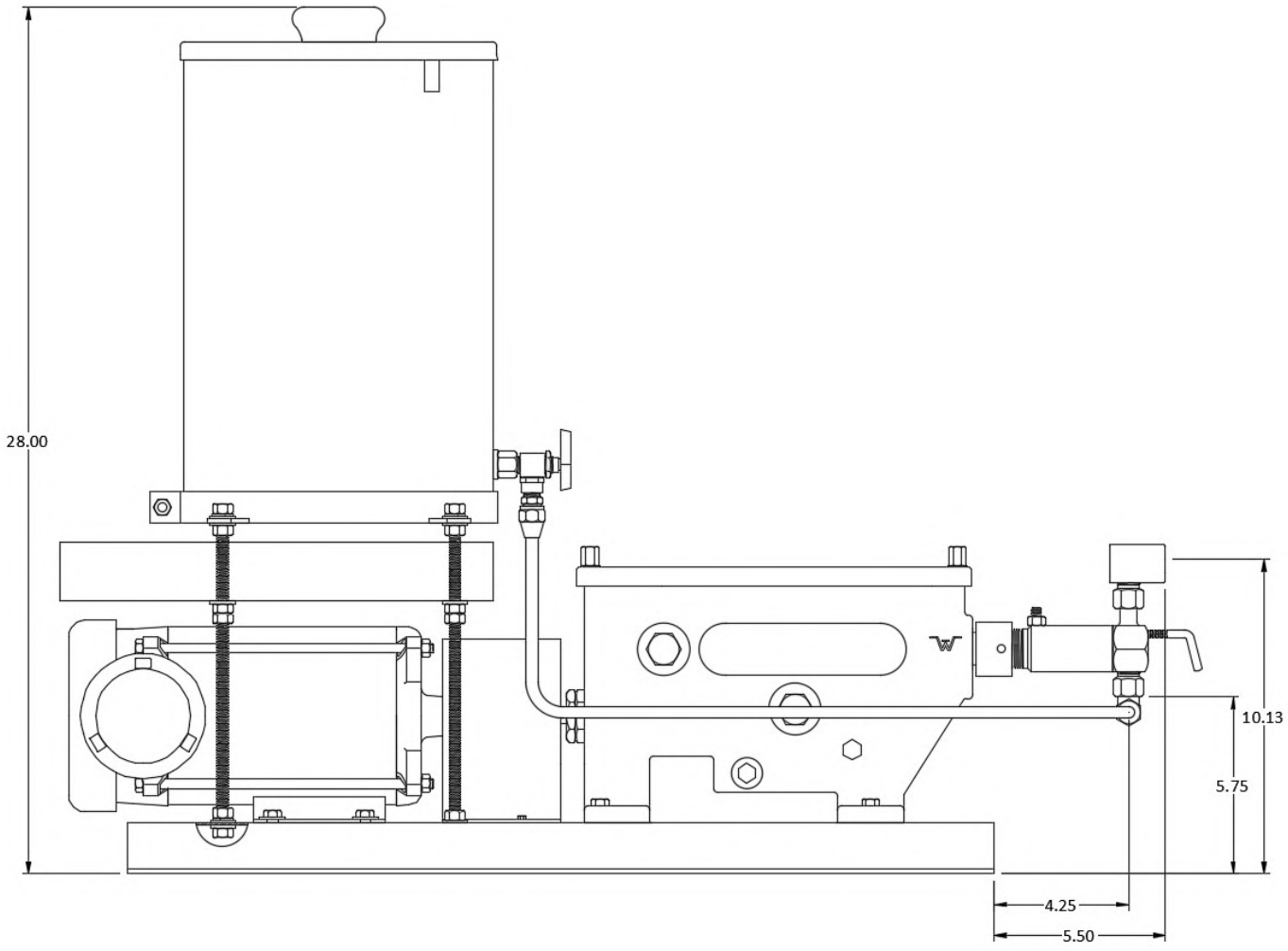


	TANK VALVE ASSY	D29	D29Y
1	ADAPTER	D32-2	D17-3Y
2	BALL VALVE	D29V	D29VY
3	ADAPTER	D29A	D29AY
4	GASKET	D28-8	D28-8
5	NUT	D28-4Y	D28-4Y
6	STRAINER	D28-3	D28-3



All images are for illustrative purposes. Actual product may differ.





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Dimensions are in inches. Actual product may have variance in measurements.
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