CHEMICAL INJECTION PUMPS

WESTERN™

PRECISION · EFFICIENCY · RELIABILITY

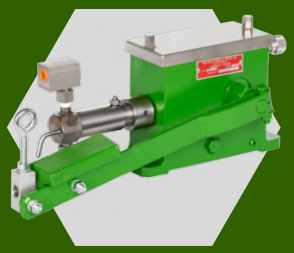
SERVING THE OIL AND GAS INDUSTRY SINCE 1947

MADE IN USA

WESTERNCHEMICALPUMPS.COM

PRODUCT CATALOG

WESTERN™



LD

LEVER DRIVEN - Single head, dial controlled flow rate, cable or rod connection to walking beam, low maintenance

Piston Dia. (IN)	Max Pressure (PSI)	Flow Rate Min - Max (Qts / Day)
3/16	2,000	0 - 7
1/4	1,125	0 - 13
3/8	500	0 - 30
5/8	180	0 - 86

MA

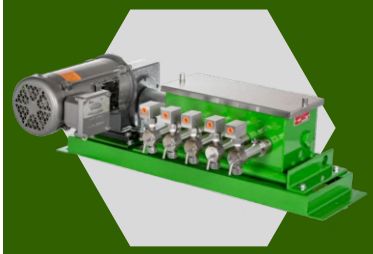
ELECTRIC MOTOR - Single head, flow rate control via adjustable stroke length and skip-a-stroke pin index wheel, intuitive design

1/4	6,750	0.3 - 42
3/8	3,000	0.6 - 95
5/8	1,250	1.6 - 264
1	400	42 - 675

MT

ELECTRIC MOTOR - Two heads, flow rate control via adjustable stroke length and skip-a-stroke pin index wheel, pump multiple chemicals, higher flow rates

1/4	6,750	0.3 - 84
3/8	3,000	0.6 - 190
5/8	1,250	1.6 - 528
1	400	42 - 1,350



MH

ELECTRIC MOTOR - 1 to 10 heads, dial controlled flow rate, designed for versatile pumping applications, add on heads as need arises

1-5 HD	1/4	4,500	0 - 120
	3/8	2,000	0 - 275
6-10 HD	1/4	2,250	0 - 240
	3/8	1,000	0 - 550

DFF

GAS DRIVEN - Single head, flow rate control via exhaust gas valve, proven reliable performance with precise flow rates

1/4	5,000	0.2 - 51
3/8	10,000	0.5 - 115
5/8	3,000	2 - 321
1	2,000	4 - 822

AN

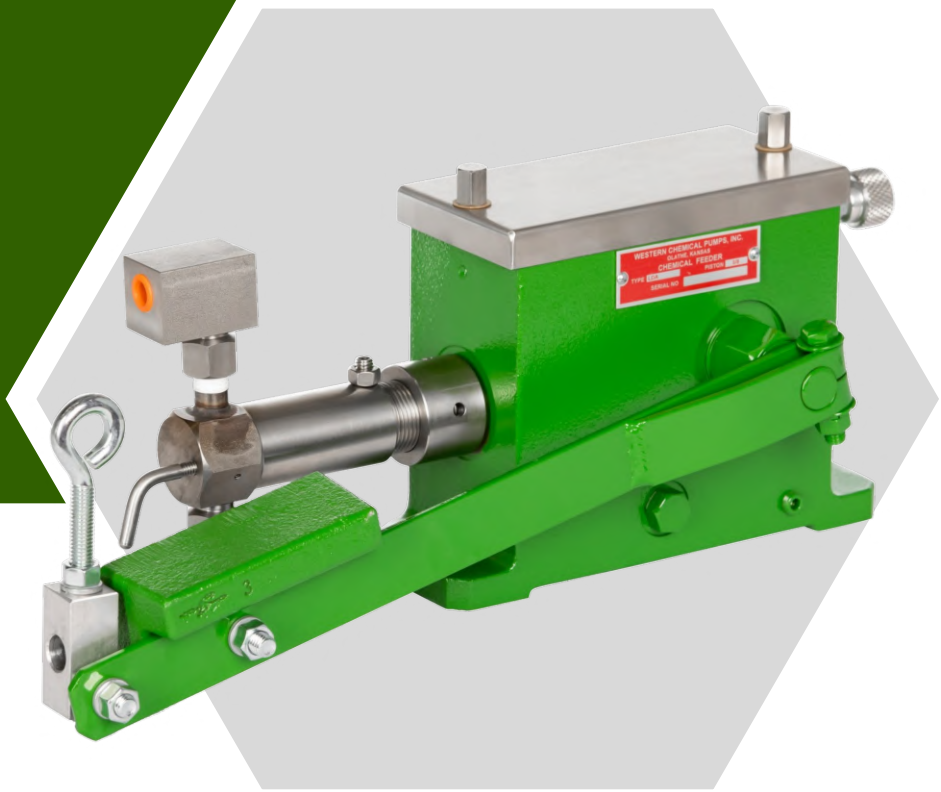
ATOMIZING NOZZLES - Designed to function with best results on Western Chemical Pumps positive displacement pumps. Atomization of the injection chemical increases its effectiveness and promotes mixing. Multiple models available to fit many applications.

Western Chemical Pumps, Inc. offers a diverse range of products in various materials, providing numerous options to meet your specific chemical compatibility needs. We also offer additional products and accessories to enhance your setup. To learn more about our complete selection of products, please contact your Western Chemical Pumps, Inc. distributor.

CHEMICAL INJECTION PUMP

LEVER DRIVEN

SINGLE HEAD



The model LD chemical injection pumps are designed to be driven by the motion of the walking beam. 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 an optional I-beam base attachment for added versatility.

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

FEATURES

- Simple dial controlled chemical injection flow rate
- Rod, pipe, or cable connection to walking beam
- Double piston seals with vented isolation to prevent chemical blow-by into pump box
- All models include line check valve and walking beam connection assembly
- Stainless steel piston and check valves come standard for better reliability

WESTERN™

MADE IN USA

LD PUMP CONFIGURATIONS

LDA	3/8	#1	Y	PART NUMBER
↑	↑	↑	↑	**Model**
LDA				Lever Driven
				Piston Diameter
	3/16			3/16"
	1/4			1/4"
	3/8			3/8"
	5/8			5/8"
				Attachments
		#1		No Base, No Tank
		#1B		I-Beam Clamp Base
		#2		Tank with Base
				Fluid End Material
				Steel (standard)
			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

Clamp Base: Attach your pump to an I-beam

Cable: Optional cable to connect lever arm to walking beam (LD26-25)

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)
3/16	2,000	0 - 7.6
1/4	1,125	0 - 13.6
3/8	500	0 - 30.8
5/8	180	0 - 86.0

Pictured with 5 gallon tank option

FLOW RATE (QTS / DAY)								
STROKES PER MINUTE	3/16" PISTON		1/4" PISTON		3/8" PISTON		5/8" PISTON	
	HALF STROKE	FULL STROKE	HALF STROKE	FULL STROKE	HALF STROKE	FULL STROKE	HALF STROKE	FULL STROKE
6	1.2	2.4	2.0	4.0	4.8	9.2	12.8	26.0
8	1.6	3.2	2.8	5.6	6.0	12.4	17.3	34.4
10	2.0	4.0	3.6	6.8	7.6	15.6	21.6	43.2
12	2.4	4.8	4.0	8.4	9.2	18.4	26.0	51.6
14	2.8	5.6	4.8	9.6	10.8	21.6	30.0	60.4
16	3.2	6.4	5.6	11.2	12.4	24.8	34.4	68.8
18	3.6	6.8	6.0	12.4	14.0	28.0	38.8	77.6
20	4.0	7.6	6.8	13.6	15.6	30.8	43.2	86.0

PISTON DIA (IN)	FLOW RATE (QTS / DAY)
3/16	= 0.0194 x *SPM x ROT*
1/4	= 0.0344 x *SPM x ROT*
3/8	= 0.0774 x *SPM x ROT*
5/8	= 0.2150 x *SPM x ROT*

SPM: Piston strokes per minute

ROT: Number of feed control knob counterclockwise rotations

CAUTION

ENERGY STORED IN COMPRESSED SPRING CAN RELEASE CAUSING SEVERE INJURY. USE CAUTION WHEN DISASSEMBLING PUMP.

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

INSTALLATION & OPERATION

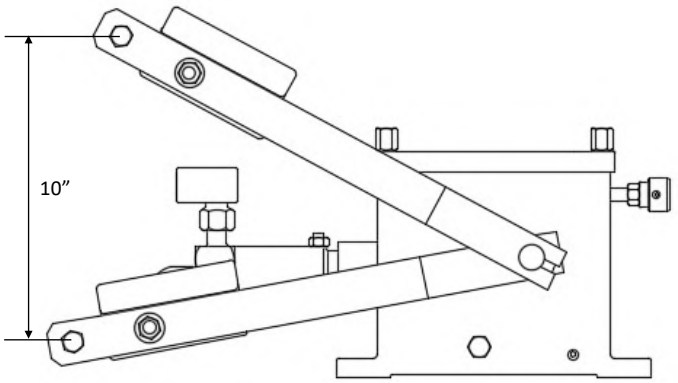
Bolt pump securely to concrete pad or platform. Position the pump to allow a straight upward pull on the pump lever as the walking beam rises.

Attach the beam clamp assembly (LD24/25) to the walking beam. Position for approximately 10 inches of total travel measured at the end of the pump lever.

Connect the pump lever to the beam clamp assembly using a cable through the eye bolts. When cable is used, ensure lever weight (LD11-2) is attached to keep cable taught. Alternatively, connect using a 1/4" - 1/2" pipe or rod through the holes in the swivel blocks. Lock pipe in place using eye bolts as setscrews.

Fill gearbox with 1-1/4 quarts SAE 20 or SAE 30 oil to partially submerge the pump cam and piston.

Connect the suction and discharge lines to the fluid end. Turn the flow rate control dial counterclockwise (out) to the stop. Open prime valve (D16-2Y) on the fluid end. Repeatedly stroke piston by lifting and lowering the pump lever. When a continuous flow of chemical begins to exit the bleed hole, close the prime valve.



FLOW RATE CONTROL

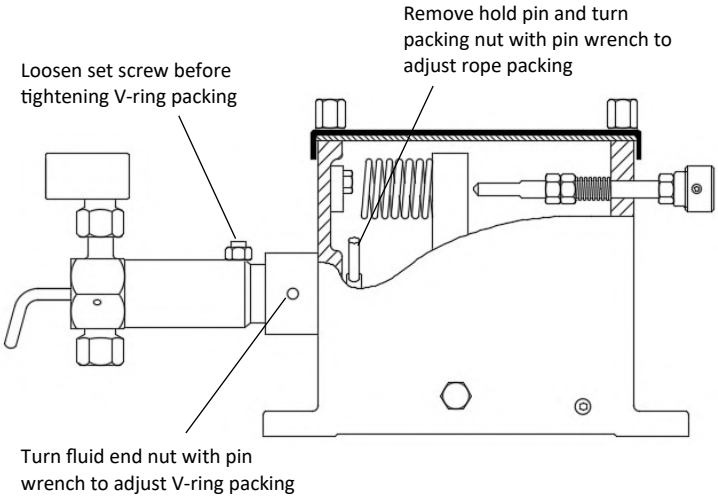
The rate can be adjusted from no stroke to full stroke in fine increments by rotating the flow control dial. The flow rate is dependent on the flow control dial setting and the strokes per minute of the piston. Rotate the flow control dial clockwise (in) to decrease the flow rate and counterclockwise (out) to increase the flow rate.

To set an approximated flow rate, turn feed control dial clockwise (in) to the stop. Every rotation counterclockwise (out) will increase the feed rate. By counting the number of counterclockwise rotations and using the provided flow rate tables, an approximate flow rate can be set. There are 20 rotations of the flow control dial from no stroke to full stroke of the piston.

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 (LD2-2A) of the pump. Remove the hold pin (LD15-3) 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.

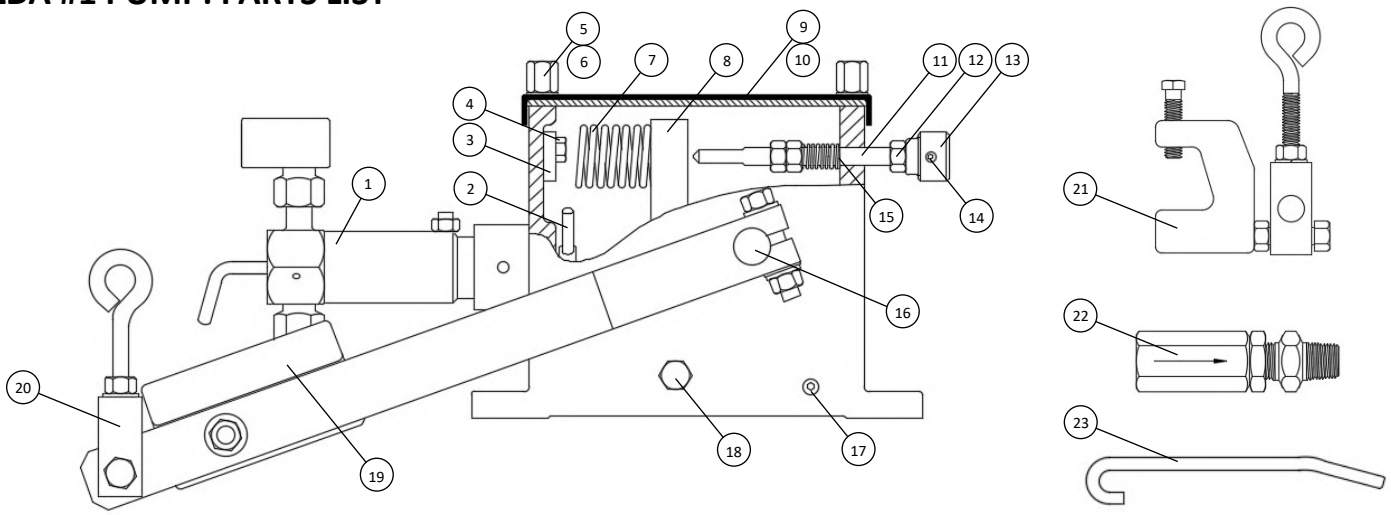


TIPS FOR BEST OPERATION

- 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 oil clean and at the recommended fill level to partially submerge piston

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

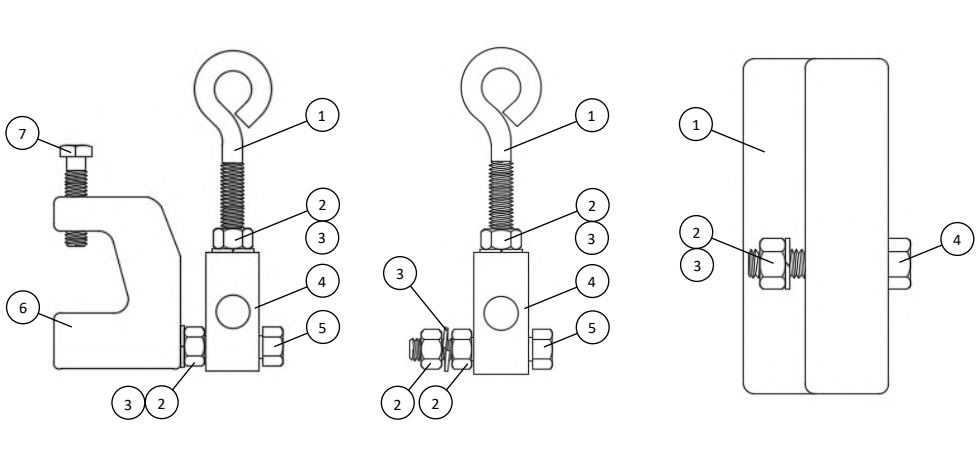
LDA #1 PUMP: PARTS LIST

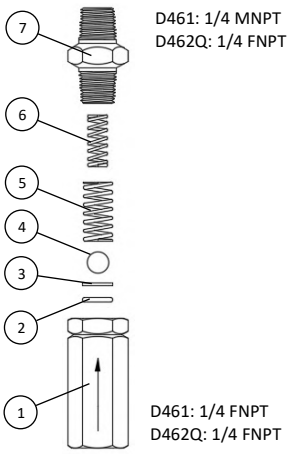


	LDA #1								
1	FLUID END ASSY	***	8	YOKE ASSY	LD5MZ	15	SPRING	LD7-2A	22	LINE CHECK VALVE	D461
2	HOLD PIN	LD15-3	9	COVER	LD2-2A	16	CAMSHAFT ASSY	LD8Z	23	PACKING WRENCH	D44-3
3	SLUG	LD10-1	10	GASKET	LD2-3	17	DRAIN PLUG	LD2P			
4	BOLT	LD10-2	11	CONTROL SCREW	LD7	18	PIVOT SHAFT	LD5-1	**NOT PICTURED**		
5	THUMB SCREW	LD23-2	12	NUT	D1-2A	19	WEIGHT ASSY	LD11-2Z		BUSHING	LD2BB**
6	GASKET	LD23-2A	13	KNOB	LD7-1	20	SWIVEL BLOCK ASSY	LD25Z		KNOCKOUT DISC	LD2BD**
7	SPRING	LD100	14	SETSCREW	LD7-1A	21	BEAM CLAMP ASSY	LD24/25		CABLE, 25FT	LD26-25*

**** See subassembly drawing for part number* *** Location: pressed into pump box to support LD8Z rotation* ** Optional equipment*
Subassembly detail shown in following drawings

LDA #1 PUMP: SUBASSEMBLIES





	BEAM CLAMP ASSY	LD24/25
1	EYE BOLT	LD25-1
2	NUT	D1-2A
3	LOCK WASHER	M4L
4	SWIVEL BLOCK	LD25
5	CAP SCREW	LD24-2
6	BEAM CLAMP	LD24
7	SETSCREW	LD24-1

	SWIVEL BLOCK ASSY	LD25Z
1	EYE BOLT	LD25-1
2	NUT	D1-2A
3	LOCK WASHER	M4L
4	SWIVEL BLOCK	LD25
5	CAP SCREW	LD24-2

	WEIGHT ASSY	LD11-2Z
1	WEIGHT	LD11-2
2	NUT	D1-2A
3	LOCK WASHER	M4L
4	CAP SCREW	LD24-2

	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*

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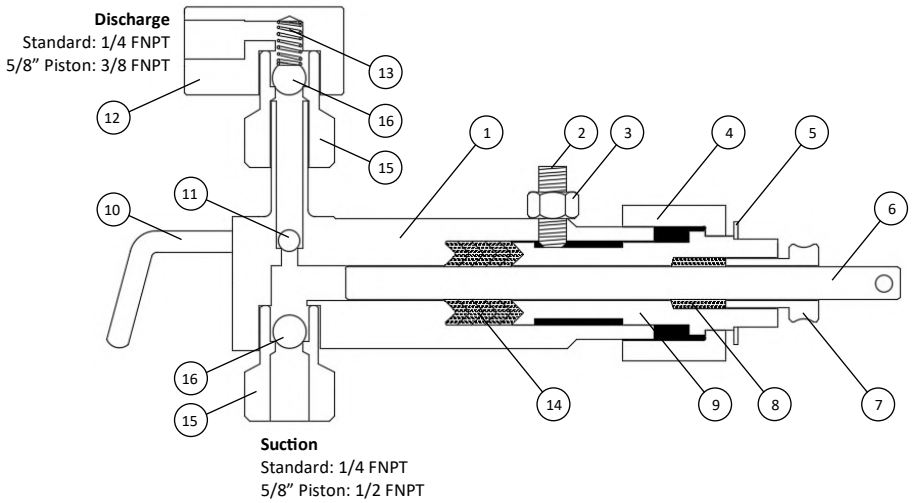
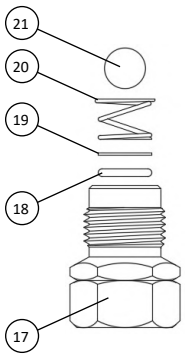
LDA #1 PUMP: SUBASSEMBLIES CONTINUED





UPGRADE:
Resilient check valve improves sealing capability on low viscosity fluids such as methanol

	PISTON DIA (IN)	3/16	1/4			3/8			5/8	
	MATERIAL	Standard	Standard	Y	Q	Standard	Y	Q	Y	Q
	LD FLUID END ASSY	**LD163Z1**	**LD164Z1**	**LD164Z1Y**	**LD164Z1Q**	**LD160Z1**	**LD160Z1Y**	**LD160Z1Q**	**LD165Z1Y**	**LD165Z1Q**
1	FLUID END BODY	LD163	LD164	LD164Y	LD164Q	LD160	LD160Y	LD160Q	M161Y	M161Q
2	SETSCREW	LD12-2	LD12-2	LD12-2Q	LD12-2Q	LD12-2	LD12-2Q	LD12-2Q	LD12-2Q	LD12-2Q
3	NUT	D47-1A	D47-1A	D47-1AQ	D47-1AQ	D47-1A	D47-1AQ	D47-1AQ	D47-1AQ	D47-1AQ
4	FLUID END NUT	LD12-4B	LD12-4B	LD12-4BY	LD12-4BQ	LD12-4B	LD12-4BY	LD12-4BQ	M121-48BY	M121-48BQ
5	GASKET	LD12-1	LD12-1	LD12-1	LD12-1	LD12-1	LD12-1	LD12-1	M121-1	M121-1
6	PISTON	LD143Y	LD144Y	LD144Y	LD144Q	LD14Y	LD14Y	LD14Q	LD145Y	LD145Q
7	ROPE PACKING NUT	LD15Y	LD15Y	LD15Y	LD15Q	LD15Y	LD15Y	LD15Q	M151Y	M151Q
8	ROPE PACKING, GRAPHITE	LD15-1	LD15-1	LD15-1	LD15-1*	LD15-1	LD15-1	LD15-1*	M151-1	M151-1*
8	ROPE PACKING, TEFLON™	LD15-1T*	LD15-1T*	LD15-1T*	LD15-1T	LD15-1T*	LD15-1T*	LD15-1T	M151-1T*	M151-1T
9	CYLINDER	LD128-4AY	LD124-4AY	LD124-4AY	LD124-4AQ	LD12-4AY	LD12-4AY	LD12-4AQ	M121-4AY	M121-4AQ
10	PRIME VALVE	D16-2Y	D16-2Y	D16-2Y	D16-2Q	D16-2Y	D16-2Y	D16-2Q	D16-2Y	D16-2Q
11	PRIME BALL, CERAMIC	D17-4C	D17-4C	D17-4C	D17-4C	D17-4C	D17-4C	D17-4C	D17-6C	D17-6C
11	PRIME BALL, TUNGSTEN	D17-4T*	D17-4T*	D17-4T*	D17-4T*	D17-4T*	D17-4T*	D17-4T*	D17-6T*	D17-6T*
12	SQUARE ELL	D170-4	D170-4	D170-4Y	D170-4Q	D170-4	D170-4Y	D170-4Q	M171-4Y	M171-4Q
13	SPRING	D18-1Y	D18-1Y	D18-1Y	D18-1Y	D18-1Y	D18-1Y	D18-1Y	M181-1Y	M181-1Y
14	**V-RING PACKING**	**HTH**	**HHHHH**	**BTBTB**	**VTVTV**	**HHHHH**	**BTBTB**	**VTVTV**	**TBSB**	**TVSV**
	PACKING, EPDM (B)	-	D124B*	D124B (3)	D124B*	D12B*	D12B (3)	D12B*	D121B (2)	D121B*
	PACKING, BUNA-N (H)	D136H (2)	D124H (5)	D124H*	D124H*	D12H (5)	D12H*	D12H*	D121H*	D121H*
	PACKING, NEOPRENE (N)	-	D124N*	D124N*	D124N*	D12N*	D12N*	D12N*	D121N*	D121N*
	PACKING, TEFLON™ (T)	D136T (1)	D124T*	D124T (2)	D124T (2)	D12T*	D12T (2)	D12T (2)	D121T (1)	D121T (1)
	PACKING, VITON™ (V)	-	D124V*	D124V*	D124V (3)	D12V*	D12V*	D12V (3)	D121V*	D121V (2)
	SPACER (S)	-	-	-	-	-	-	-	LD121Y (1)	LD121Q (1)
	CHECK VALVE	**-**	**D17Y**	**D17Y**	**D17Q**	**D17Y**	**D17Y**	**D17Q**	**D172Y**	**D172Q**
15	CAGE	-	D17BY	D17BY	D17BQ	D17BY	D17BY	D17BQ	D172B	D172BQ
16	CHECK BALL, CERAMIC	-	D17-6C	D17-6C	D17-6C	D17-6C	D17-6C	D17-6C	D171-2C	D171-2C
16	CHECK BALL, TUNGSTEN	-	D17-6T*	D17-6T*	D17-6T*	D17-6T*	D17-6T*	D17-6T*	D171-2T*	D171-2T*
	RESILIENT CHECK VALVE	**D179ZYT**	**D176ZYT***	**D176ZYT***	**D176ZQT***	**D176ZYT***	**D176ZYT***	**D176ZQT***	**D172ZYT***	**D172ZQT***
17	CAGE	D179B	D176B	D176B	D176BQ	D176B	D176B	D176BQ	D172B	D172BQ
18	O-RING, TEFLON™	M170-55T**	D170-5T**	D170-5T**	D170-5T**	D170-5T**	D170-5T**	D170-5T**	D171-8T**	D171-8T**
19	RING	D181	D177	D177	D177	D177	D177	D177	D173	D173
20	SPRING	D182	D178	D178	D178	D178	D178	D178	D174	D174
21	CHECK BALL, CERAMIC	D17-5C	D17-6C	D17-6C	D17-6C	D17-6C	D17-6C	D17-6C	D171-2C	D171-2C
21	CHECK BALL, TUNGSTEN	D17-5T*	D17-6T*	D17-6T*	D17-6T*	D17-6T*	D17-6T*	D17-6T*	D171-2T*	D171-2T*

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

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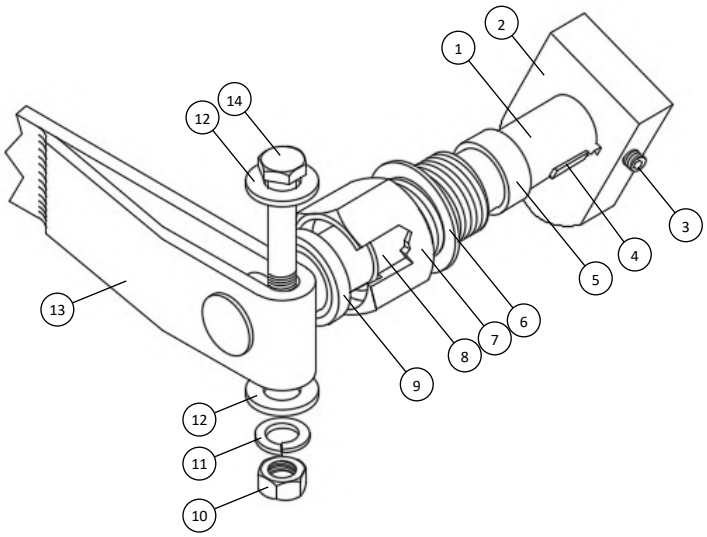
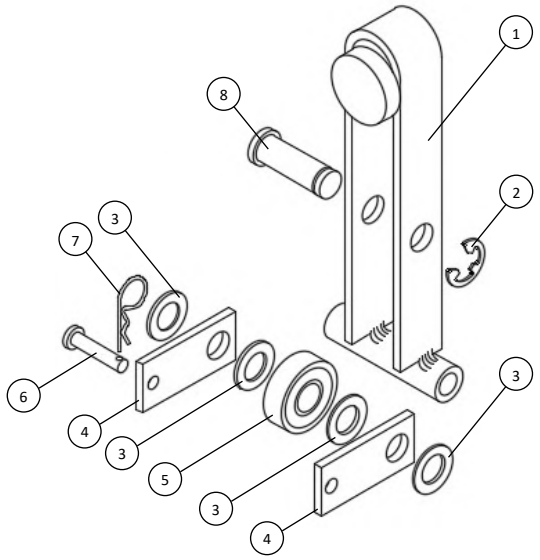
LDA #1 PUMP: SUBASSEMBLIES CONTINUED



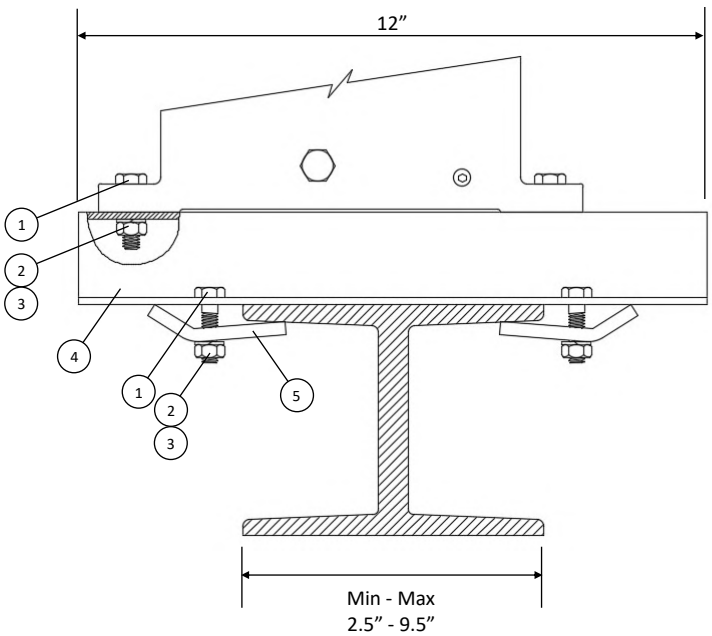


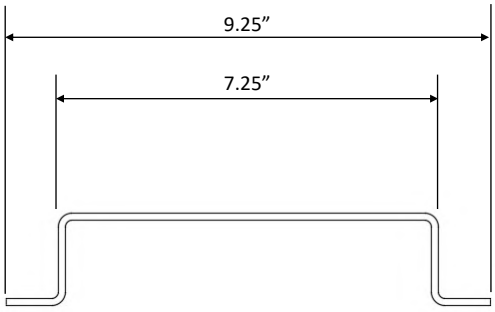
	CAMSHAFT ASSY	LD8Z		
1	CAMSHAFT	LD8K-1	8 BUSHING	LD2BB
2	CAM	LD8-1K	9 LIP SEAL	LD9S
3	SETSCREW	LD8-4	10 NUT	D1-2A
4	KEY	LD8-5	11 LOCK WASHER	M4L
5	SPACER	LD8-2	12 WASHER	D21-2
6	GASKET	LD12-1	13 LEVER	LD11
7	SEAL HOUSING	LD9A-1	14 CAPSCREW	LD24-2

	YOKE ASSY	LD5MZ		
1	YOKE	LD5M	5 BEARING	LD6M
2	RETAINING RING	M20D4	6 PIN	LD13-1
3	SPACER	LD5-3M	7 COTTER PIN	LD13-2
4	LINK	LD13M	8 SHAFT	LD5-2M

LDA #1B PUMP: PARTS LIST

Includes all parts from LDA #1





	LDA #1B	
	CLAMP BASE ASSY	LD1CZ
1	BOLT	D23-2
2	NUT	D47-1A
3	LOCK WASHER	D47-1L
4	BASE	LD1C5
5	CLAMP	LD1C1

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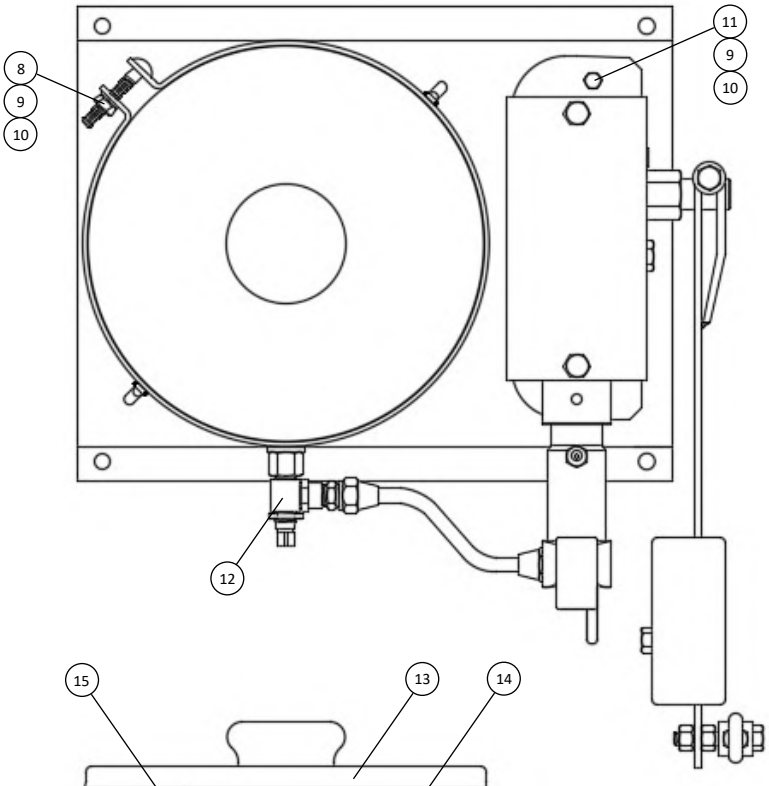
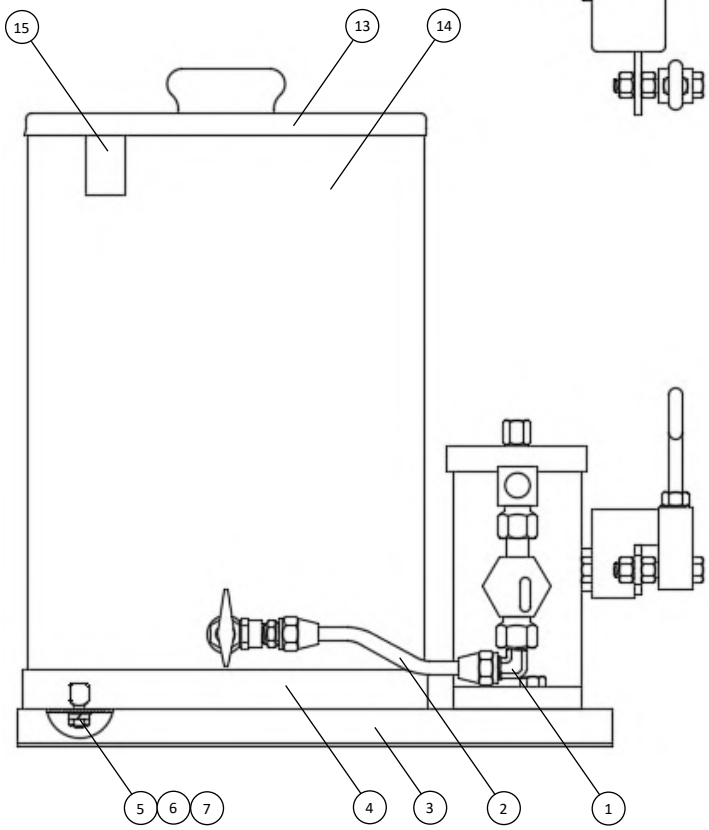
LDA #2 PUMP: PARTS LIST

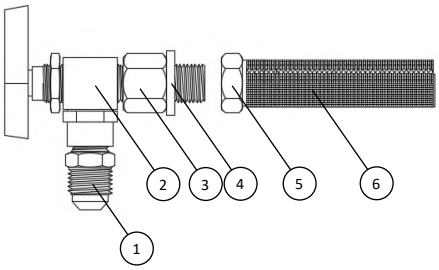
Includes all parts from LDA #1

	LDA #2	
1	ELL	D17-3
2	TUBE ASSY	D34
	BASE ASSY	**LD4Z**
3	BASE	LD4B
4	TANK BAND	LD4R
5	NUT	M26-1B
6	LOCK WASHER	M26-1L
7	WASHER	M5-3
8	BOLT	D47-1C
9	NUT	D47-1A
10	LOCK WASHER	D47-1L
11	BOLT	D23-2
	TANK ASSY	**D48ZY**
12	TANK VALVE ASSY	D29
12	TANK VALVE ASSY	D29Y*
13	TANK LID WITH KNOB	D48-1Y
14	TANK	D48Y
15	GAUGE STICK	D49
	NOT PICTURED	
	LEVEL SIGHT GAUGE	929-1-S*

**Optional equipment*

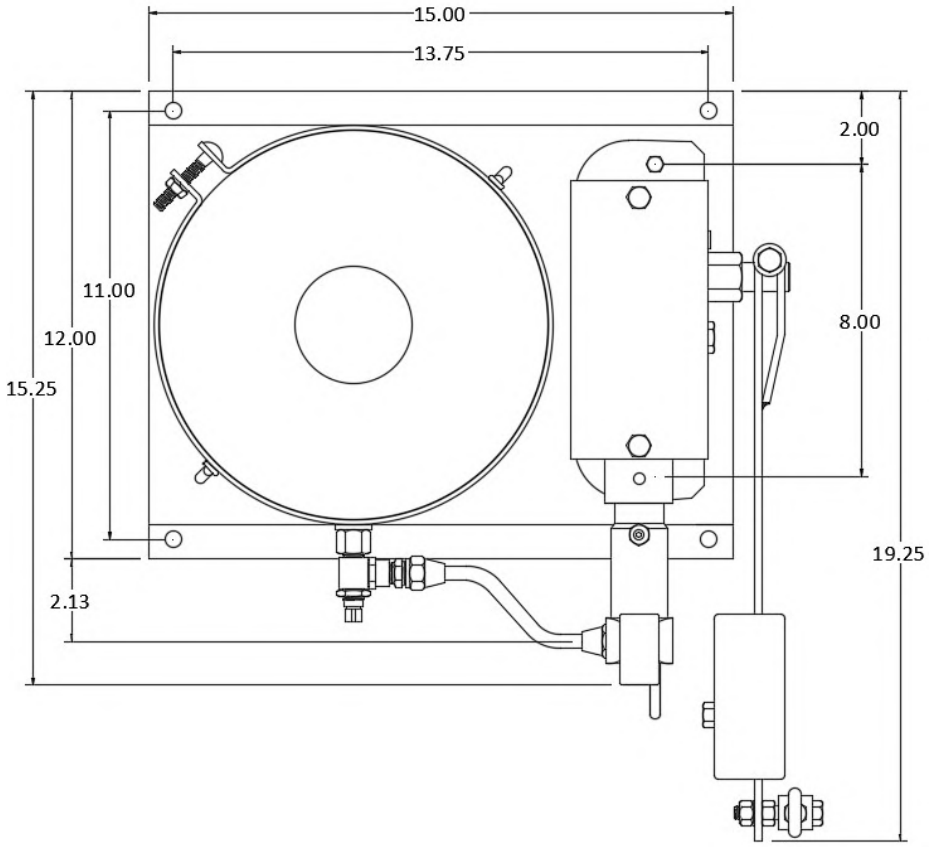


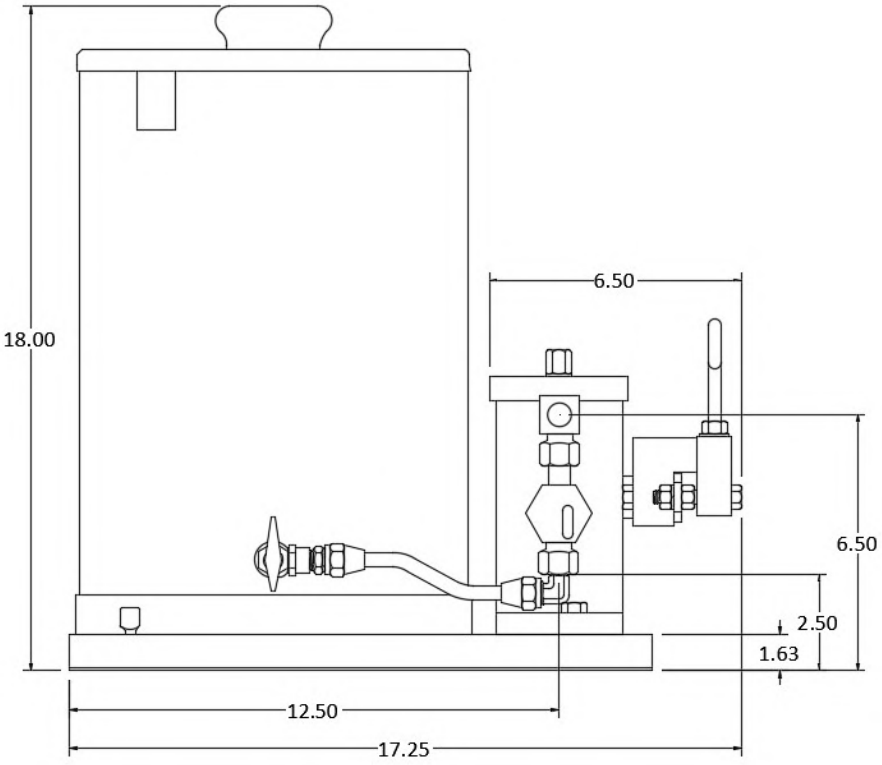




	TANK VALVE ASSY	D29	D29Y
1	ADAPTER	D32-2	D17-3Y
2	BALL VALVE	D29V	D29VY
3	ADAPTER	D29A	D29AY
4	GASKET	D28-8	D28-8
5	NUT	D28-4Y	D28-4Y
6	STRAINER	D28-3	D28-3

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





Western Chemical Pumps, Inc.
603 South Kansas Avenue, Olathe, KS 66061
913 - 829 - 1888 | sales@westernchemicalpumps.com

Dimensions are in inches. Actual product may have variance in measurements.
All images are for illustrative purposes. Actual product may differ.

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.

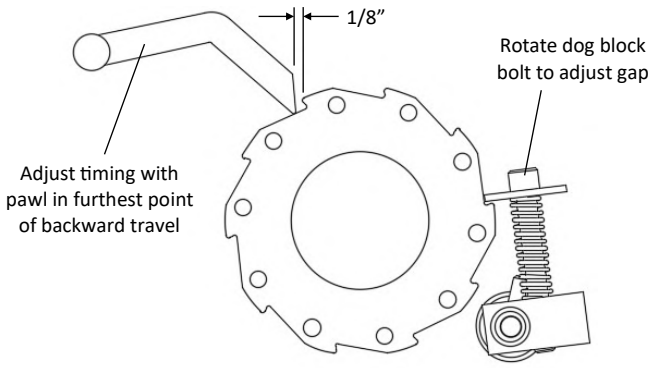
Pumps with 5/8” and 1” pistons that are not equipped with an index wheel control flow rate by modifying the stroke length. Adjust the stroke length by positioning the pull bar (M131) to the desired setting indicated on the flow rate table from the rows indicating “0” in the index pins column. Loosen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

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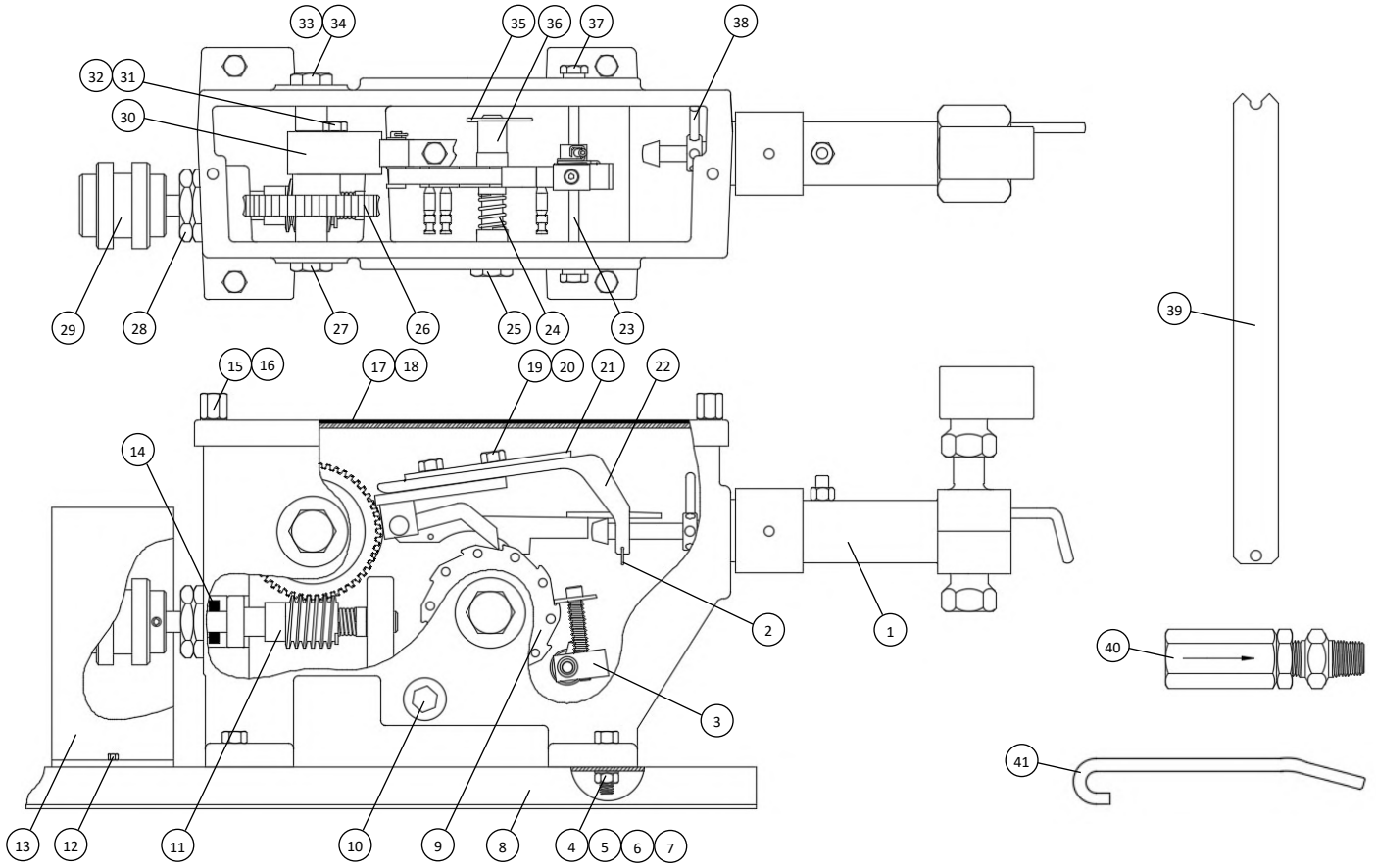
MA/MAS #2 PUMP - INDEX WHEEL: PARTS LIST



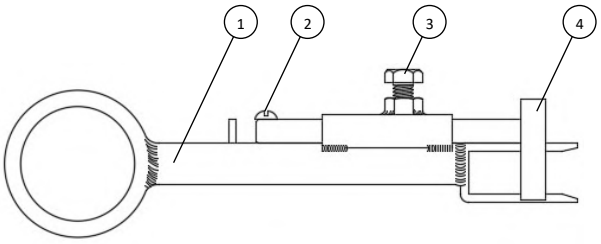
	MA/MAS #2 - INDEX WHEEL											
1	FLUID END	***	13	COUPLING GUARD	M10-2A	25	SHAFT	M11D	36	SPACER	M20S
2	COTTER PIN	M13P	14	OIL SEAL	M9-2B	26	WORMGEAR ASSY	M6Z	37	PLUG	M20-2L
3	DOG BLOCK ASSY	M20-1Z	15	THUMB SCREW	LD23-2	27	PLUG BEARING, LH	M6-3	38	HOLD PIN	M15H
4	CAP SCREW	LD8-3	16	GASKET	LD23-2A	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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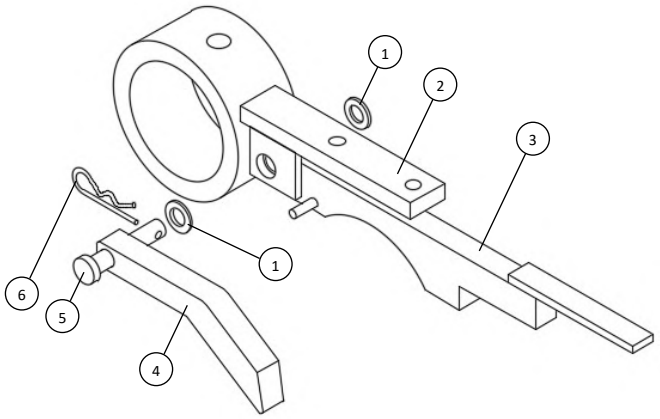
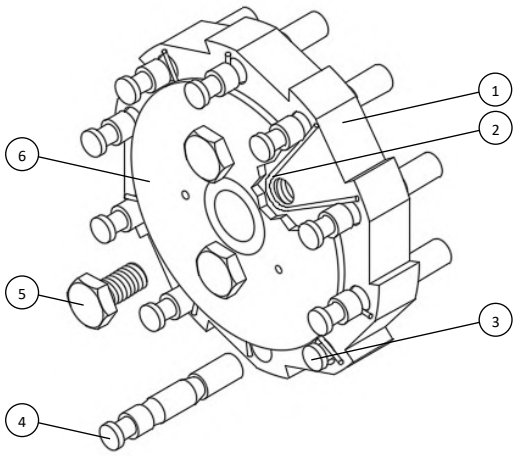
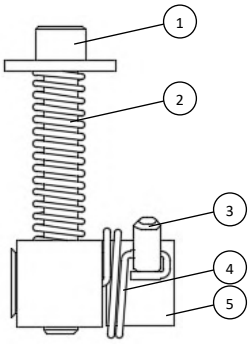
MA/MAS #2 PUMP: SUBASSEMBLIES

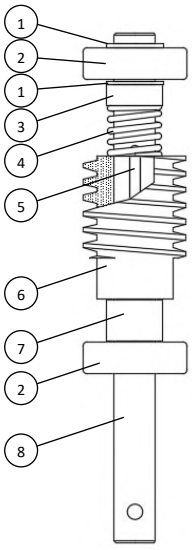


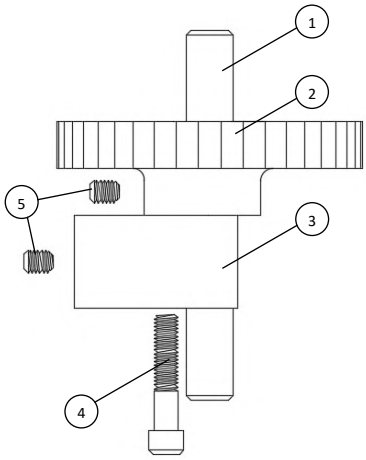


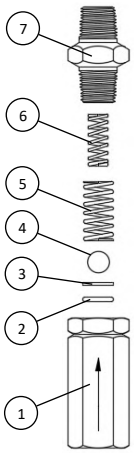
	FOLLOWER ASSY	M5-4Z		
1	SPACER	M25-1B	4 PAWL	M25
2	FOLLOWER	M5-4	5 PIN	M25-1
3	PUSH BAR	M24	6 COTTER PIN	LD13-2

	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









D461: 1/4 MNPT
D462Q: 1/4 FNPT

D461: 1/4 FNPT
D462Q: 1/4 FNPT

	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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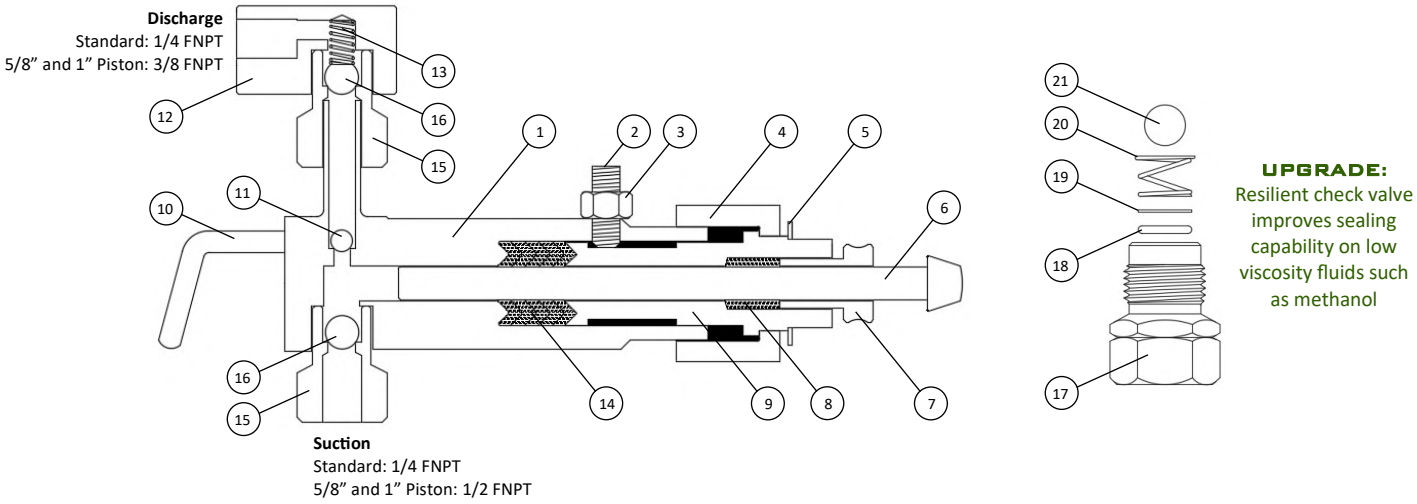
MA/MAS #2 PUMP: SUBASSEMBLIES CONTINUED



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*

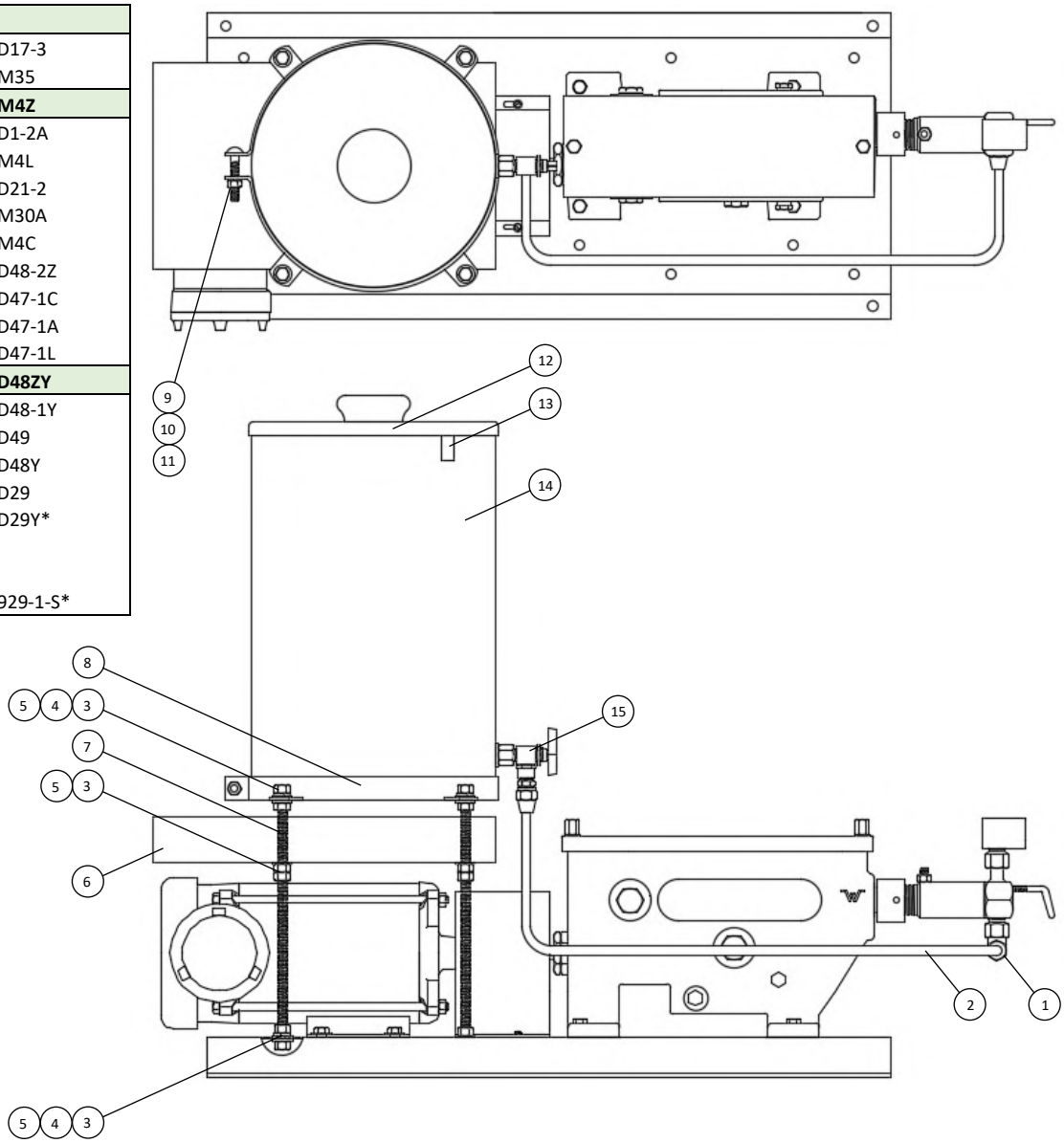
All images are for illustrative purposes. Actual product may differ.

MA/MAS #3 PUMP: PARTS LIST

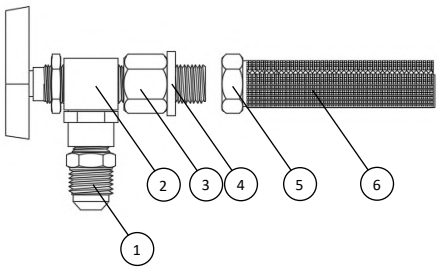
Includes all parts from MA/MAS #2

	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*

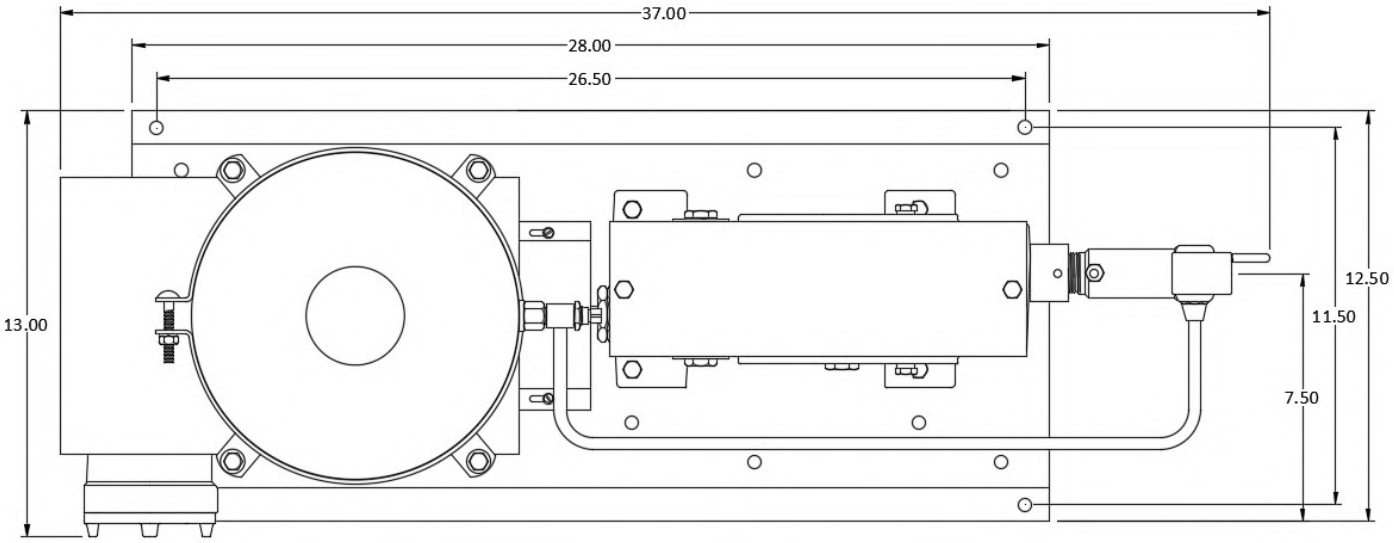
**Optional equipment*

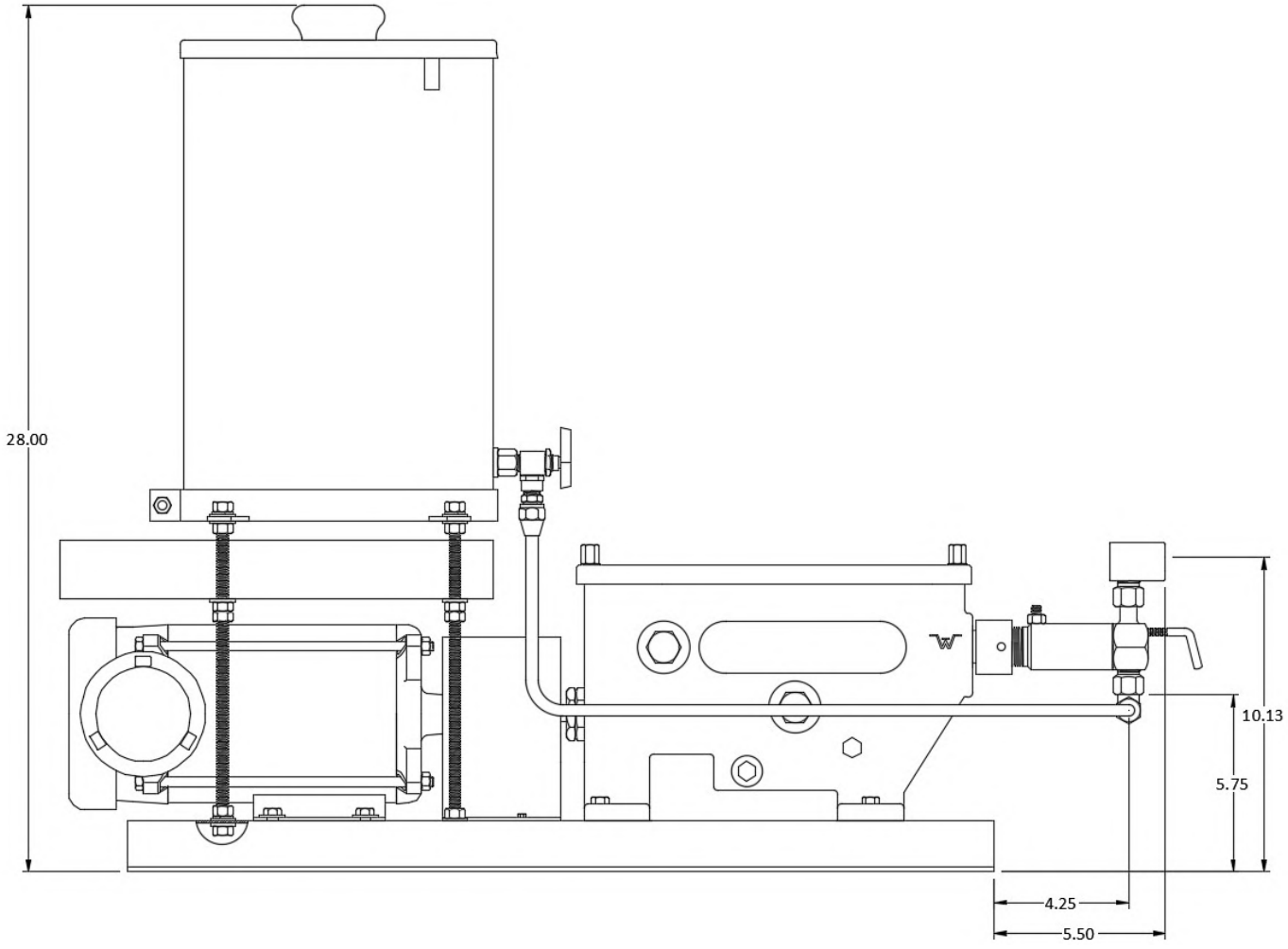


	TANK VALVE ASSY	D29	D29Y
1	ADAPTER	D32-2	D17-3Y
2	BALL VALVE	D29V	D29VY
3	ADAPTER	D29A	D29AY
4	GASKET	D28-8	D28-8
5	NUT	D28-4Y	D28-4Y
6	STRAINER	D28-3	D28-3



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





Western Chemical Pumps, Inc.
603 South Kansas Avenue, Olathe, KS 66061
913 - 829 - 1888 | sales@westernchemicalpumps.com

Dimensions are in inches. Actual product may have variance in measurements.
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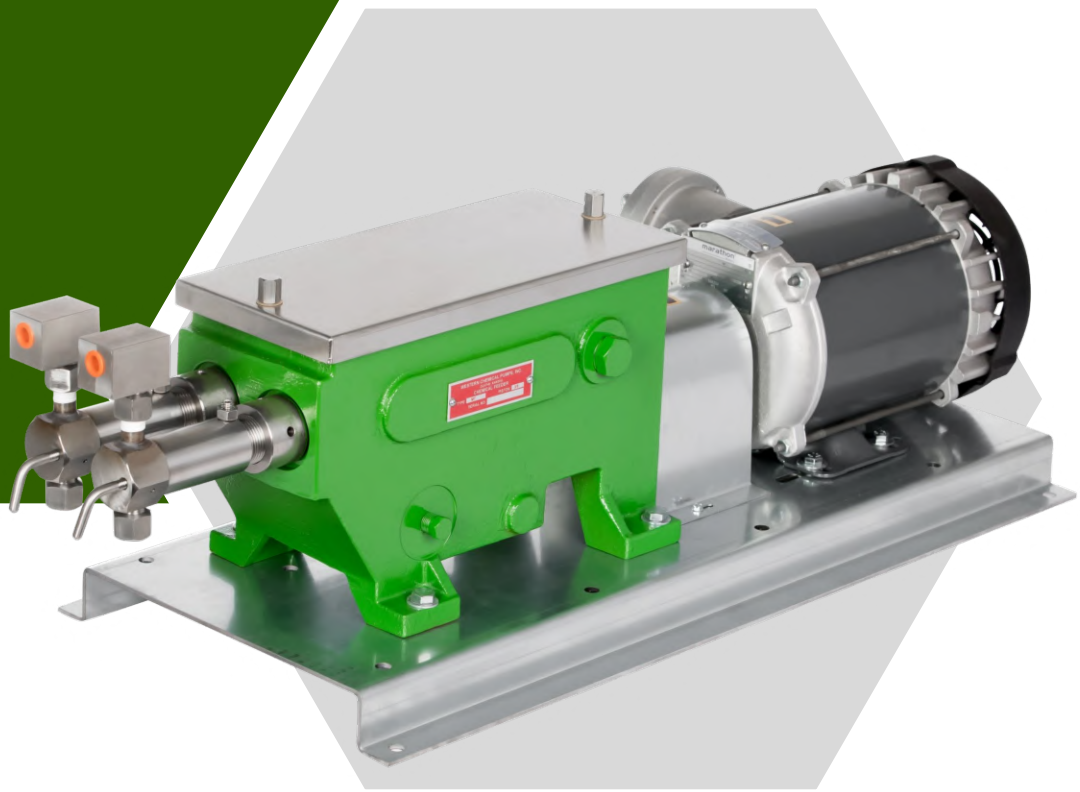
CHEMICAL INJECTION PUMP

MOTOR DRIVEN

TWO HEADS



MT

The model MT 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 MT pump has demonstrated reliable engineering and design, earning the trust of its users through rigorous testing and proven performance.

FEATURES

- Two 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

MT PUMP CONFIGURATIONS

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

MTS	-A	#2	Y	PART NUMBER
↑	↑	↑	↑	**Model**
MTS				Electric Motor, Dual Head
				Piston Diameter
	-A			1/4" or 3/8" (Index Wheel) and 5/8" (No Index Wheel)
	-B			1/4" or 3/8" (Index Wheel) and 5/8" (Index Wheel)
	-C			5/8" (Index Wheel) and 5/8" (Index Wheel)
				Attachments
		#2		No Tanks
		#3		Two Tanks
				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 two 5 gallon stainless steel tanks

Index Wheel: MT 1/4" and 3/8" pumps come standard with index wheels. MT 5/8" pump requires an upgrade to the MTS 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.

PER HEAD		
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

PER HEAD - FLOW RATE (QTS / DAY)					
PISTON DIA (IN)	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

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 3-1/2 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. Index pins (MT11-3) are threaded and can be screwed “IN” or “OUT”.

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.

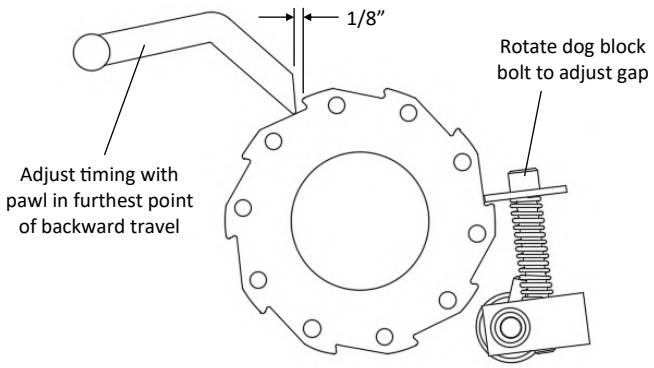
Pumps with 5/8” and 1” pistons that are not equipped with an index wheel control flow rate by modifying the stroke length. Adjust the stroke length by positioning the pull bar (M131) to the desired setting indicated on the flow rate table from the rows indicating “0” in the index pins column. Loosen 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 (MT-23A) of the pump. Remove the hold pins (M15H, MT15H) from the packing nut (LD15Y) inside the pump box. Using the 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

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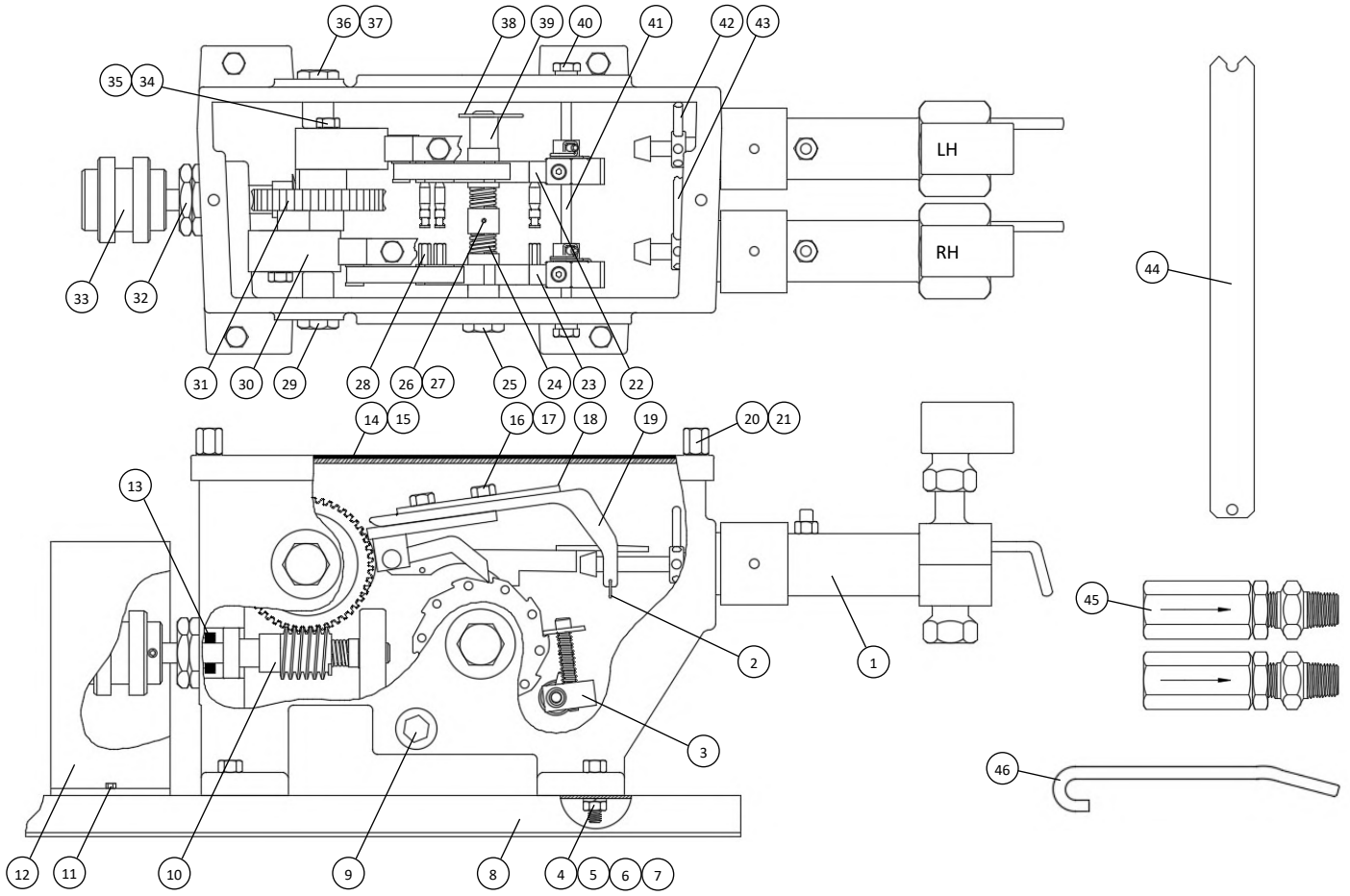
MT/MTS #2 PUMP - INDEX WHEEL: PARTS LIST



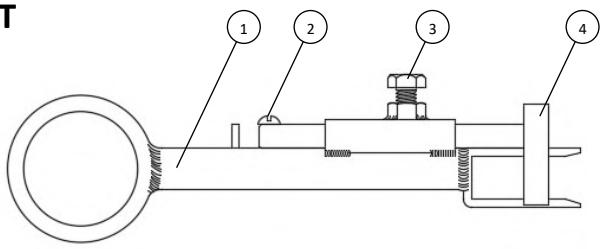
MT/MTS #2 - INDEX WHEEL											
1	FLUID END	***	15	GASKET	MT23-1	29	PLUG BEARING, LH	M6-3	42	HOLD PIN	M15H
2	COTTER PIN	M13P	16	CAP SCREW	M13-1	30	FOLLOWER ASSY	M5-4Z	43	HOLD PIN	MT15H
3	DOG BLOCK ASSY	M20-1Z	17	LOCK WASHER	M13-1W	31	WORMGEAR ASSY	MT6Z	44	PIN HOOK	M11-4
4	CAP SCREW	LD8-3	18	CLAMP BAR	M13-2	32	RETAINER	M9B	45	LINE CHECK VALVE	D461
5	WASHER	D21-2	19	RETURN BAR	M13S	33	COUPLING ASSY	M10SF	46	PACKING WRENCH	D44-3
6	LOCK WASHER	M4L	20	THUMB SCREW	LD23-2	33	COUPLING ASSY	M10*			
7	NUT	D1-2A	21	GASKET	LD23-2A	34	CAP SCREW	LD10-2			
8	BASE	M1	22	INDEX WHEEL ASSY	M11Z	35	WASHER	M5-3			
9	DRAIN PLUG	M2-2	23	INDEX WHEEL	MT11	36	PLUG BEARING, RH	M6-2	**NOT PICTURED**		
10	WORMSHAFT ASSY	M7AZ	24	SPRING	D7	37	SHIM WASHER	M6-2W		MOTOR	***
11	SCREW	M10-2B	25	SHAFT	MT11D	38	CLIP	M20D3		CAP SCREW	D23-2**
12	COUPLING GUARD	M10-2A	26	SPACER	MT20-6	39	SPACER	M20-6		WASHER	M56**
13	OIL SEAL	M9-2B	27	SETSCREW	M20-5	40	PLUG	M20-2L		LOCK WASHER	D47-1L**
14	COVER	MT23A	28	INDEX PIN	MT11-3	41	SHAFT	MT20-2S		NUT	D47-1A**

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

MT/MTS #2 PUMP - NO INDEX WHEEL: PARTS LIST

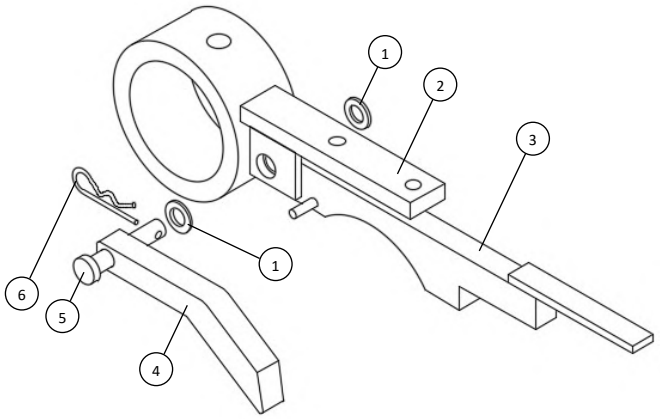
Includes all parts from MT/MTS #2

MT/MTS #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	

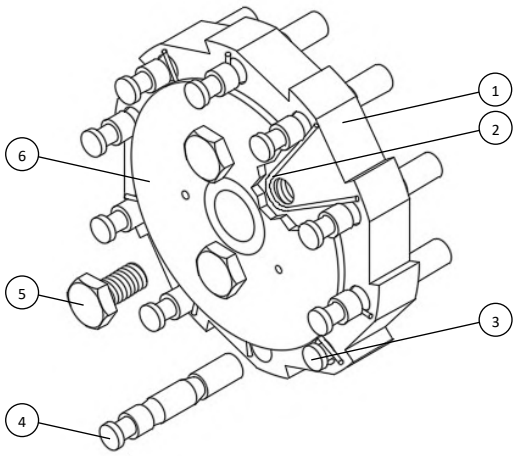


All images are for illustrative purposes. Actual product may differ.

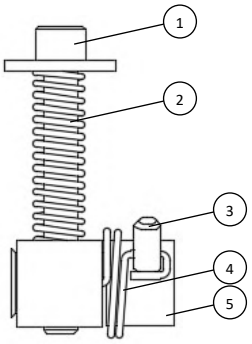
MT/MTS #2 PUMP: SUBASSEMBLIES



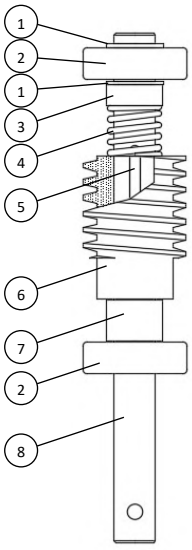
	FOLLOWER ASSY	M5-4Z		
1	SPACER	M25-1B	4 PAWL	M25
2	FOLLOWER	M5-4	5 PIN	M25-1
3	PUSH BAR	M24	6 COTTER PIN	LD13-2



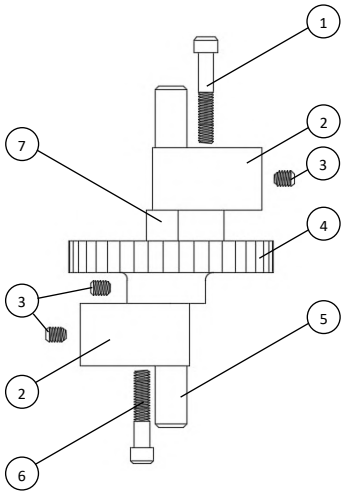
	INDEX WHEEL ASSY	M11Z		
1	INDEX WHEEL	M11	4 INDEX PIN	M11-3
2	SPRING	M11-5	5 BOLT	LD10-2
3	INDEX PIN, SHORT	M11-3S	6 PLATE	M11-6



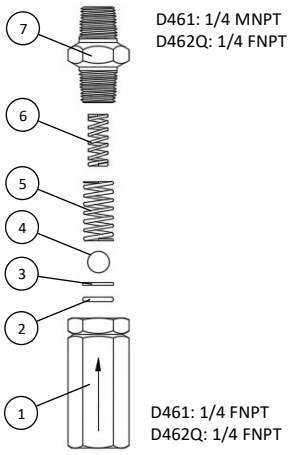
	DOG BLOCK ASSY	M20-1Z
1	DOG TOOTH BOLT	M20-8
2	SPRING	M20-9
3	SET SCREW	M20-10
4	TORSION SPRING	M20-7
5	BLOCK AND PIVOT	M20-1



	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	MT6Z
1	BOLT	MT5-1
2	CAM	M5
3	SETSCREW	LD7-1A
4	GEAR	MT6
5	SHAFT	MT6-4
6	BOLT	M5-1
7	SPACER	MT6-6



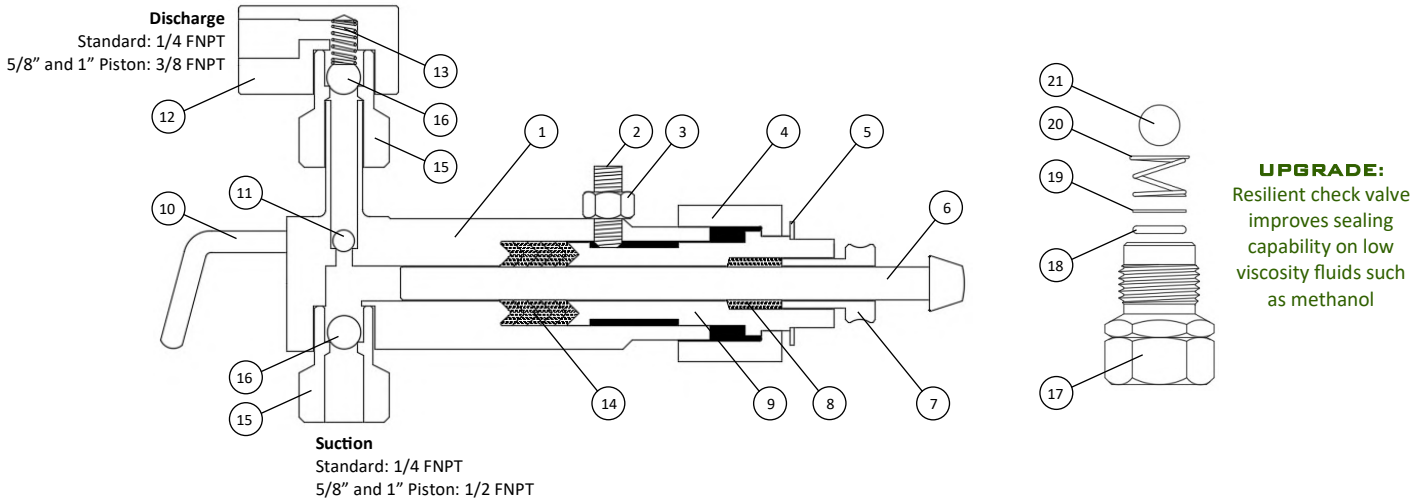
	LINE CHECK VALVE	D461	D462Q
1	BODY / CAGE	D461B	D176BQ
2	O-RING, TEFLON™	M170-55T*	D170-5T*
3	RING	D461R	D177
4	BALL, CERAMIC	D17-5C	D17-6C
5	SPRING	D461S	D178
6	SPRING	D18-1Y	D462SQ
7	NIPPLE / BODY	D461A	D462BFQ

**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

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

MT/MTS #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
MT 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*
MTS FLUID END ASSY	*MTS 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*

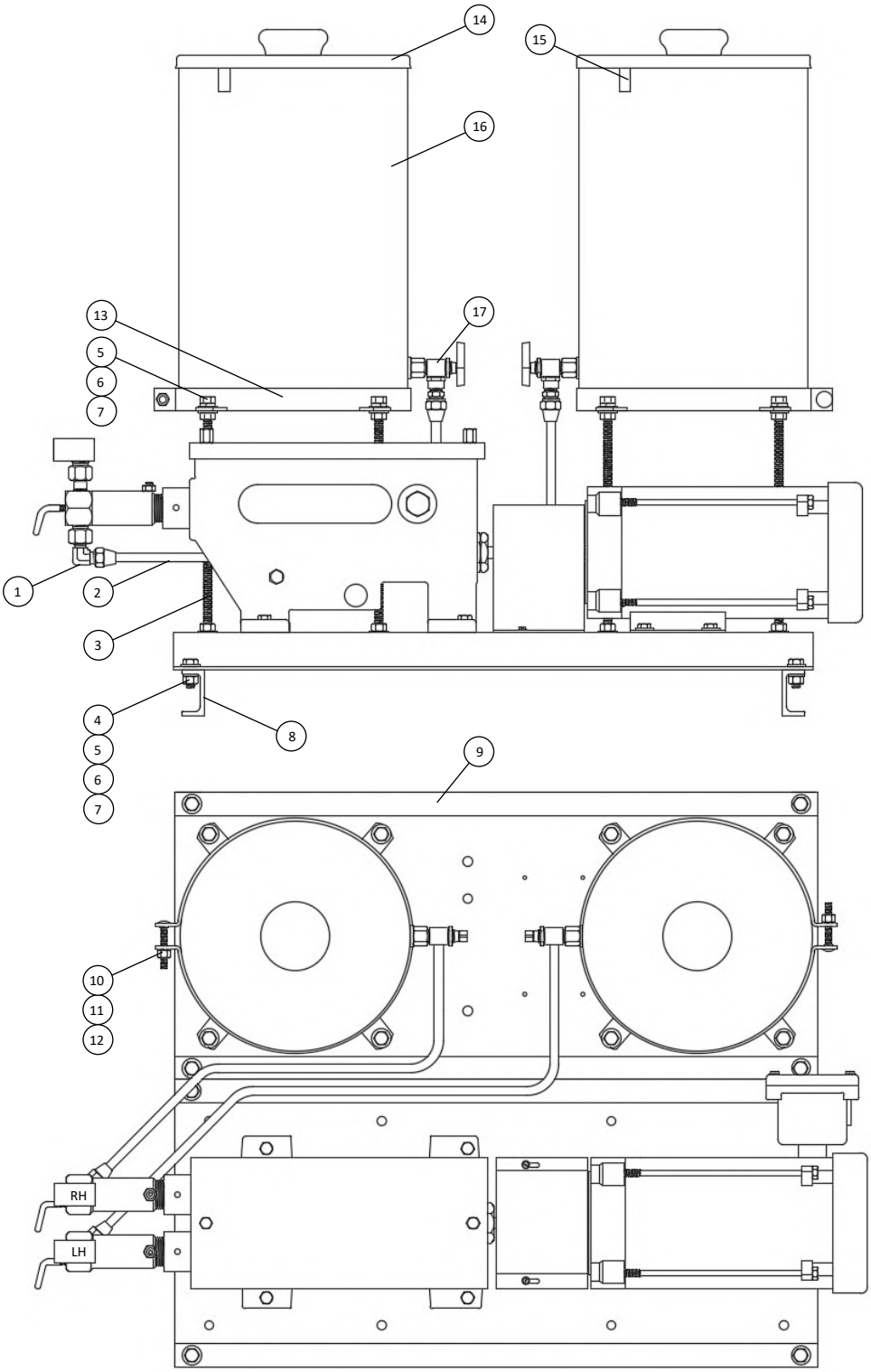
All images are for illustrative purposes. Actual product may differ.

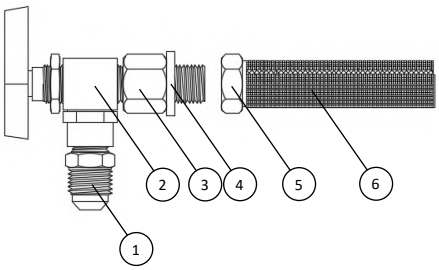
MT/MTS #3 PUMP: PARTS LIST

Includes all parts from MT/MTS #2

	MT/MTS #3	
1	ELL	D17-3
2	TUBE ASSY	M35
3	STUD	M4C
4	BOLT	D1-4
5	WASHER	D21-2
6	LOCK WASHER	M4L
7	NUT	D1-2A
8	RAIL	M1R
9	BASE	M1
10	BOLT	D47-1C
11	LOCK WASHER	D47-1L
12	NUT	D47-1A
13	TANK BAND	D48-2Z
	TANK ASSY	**D48ZY**
14	TANK LID WITH KNOB	D48-1Y
15	GAUGE STICK	D49
16	TANK	D48Y
17	TANK VALVE ASSY	D29
17	TANK VALVE ASSY*	D29Y*
NOT PICTURED		
	LEVEL SIGHT GAUGE*	929-1-S*

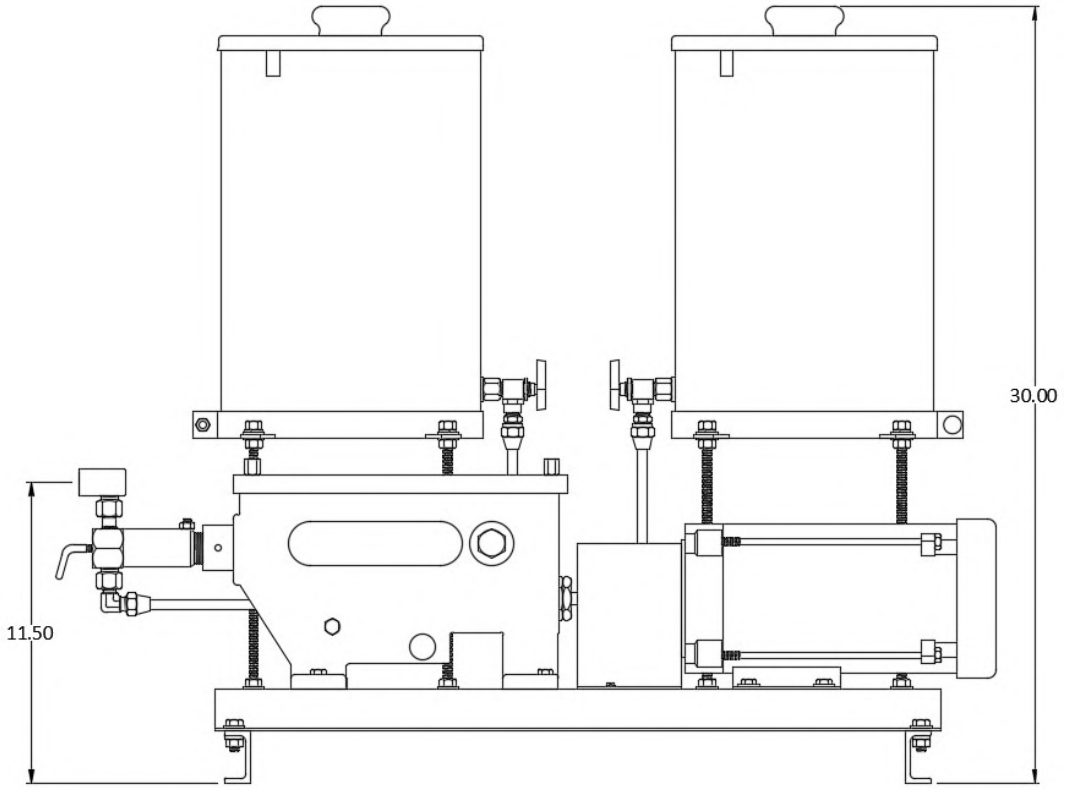
**Optional equipment*

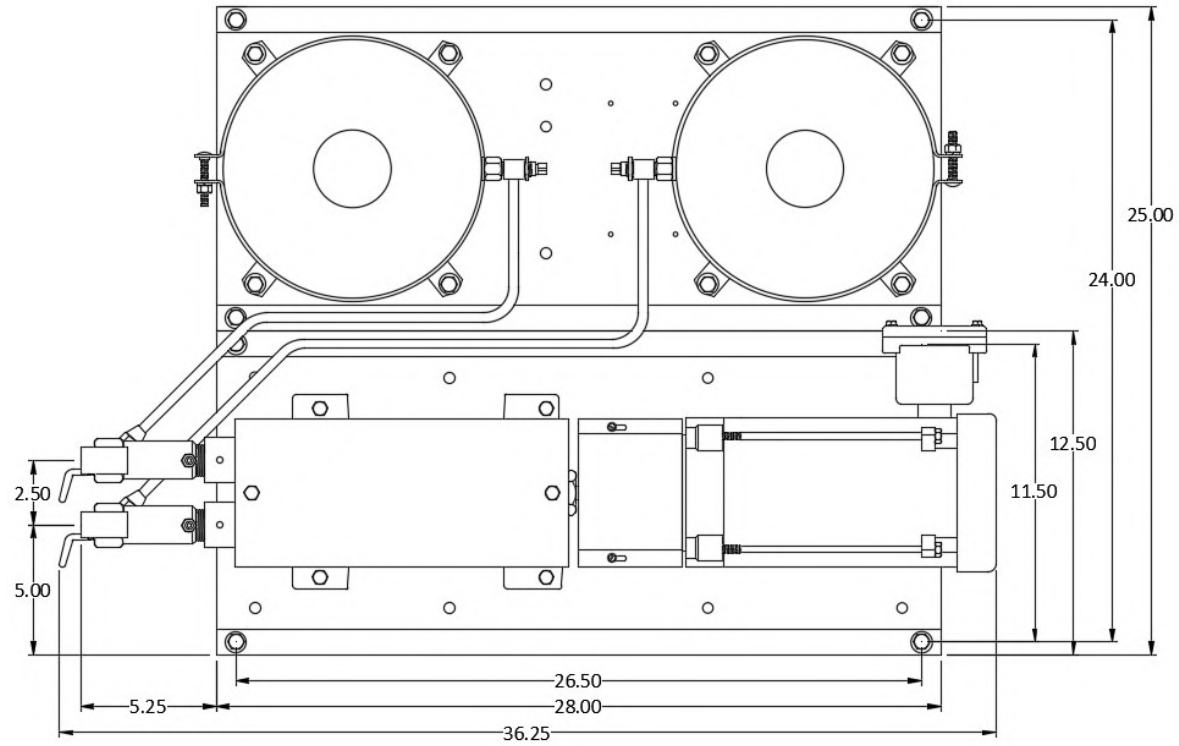




	TANK VALVE ASSY	D29	D29Y
1	ADAPTER	D32-2	D17-3Y
2	BALL VALVE	D29V	D29VY
3	ADAPTER	D29A	D29AY
4	GASKET	D28-8	D28-8
5	NUT	D28-4Y	D28-4Y
6	STRAINER	D28-3	D28-3

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





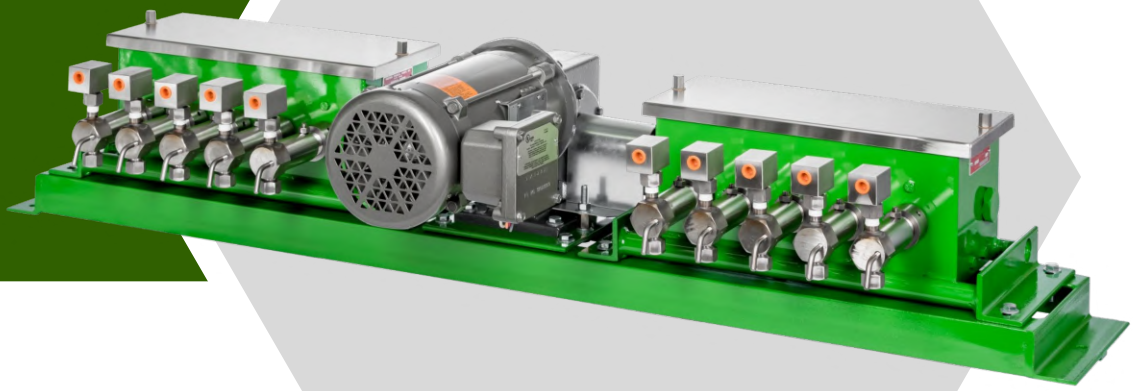
Western Chemical Pumps, Inc.
603 South Kansas Avenue, Olathe, KS 66061
913 - 829 - 1888 | sales@westernchemicalpumps.com

Dimensions are in inches. Actual product may have variance in measurements.
All images are for illustrative purposes. Actual product may differ.

CHEMICAL INJECTION PUMP

MOTOR DRIVEN

MULTI HEAD



MH

The model MH 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.

These multi head pumps accommodate 1-10 fluid ends providing higher flow rates or the ability to pump multiple different chemicals simultaneously. These pumps are expandable for future needs up to a maximum of 10 fluid ends and are available in various materials and piston sizes to meet your specific chemical injection requirements.

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

FEATURES

- 1 to 10 fluid end pump
- Simple dial controlled chemical injection flow rate for each individual fluid end
- Add on fluid ends when needed up to a max of 10 fluid ends
- Double piston seals with vented isolation to prevent chemical blow-by into pump box
- Capable of injecting up to 4,500 psi
- Stainless steel piston and check valves come standard for longer life

WESTERN™

MADE IN USA

MH PUMP CONFIGURATIONS

2MH	10	Y	.250	PART NUMBER
↑	↑	↑	↑	**Model**
2MH				Electric Motor, Multi Head
				Number of Fluid Ends
	3			3 - (5 Fluid End Pump Box)
	4			4 - (5 Fluid End Pump Box)
	5			5 - (5 Fluid End Pump Box)
	6			6 - (10 Fluid End Pump Box)
	7			7 - (10 Fluid End Pump Box)
	8			8 - (10 Fluid End Pump Box)
	9			9 - (10 Fluid End Pump Box)
	10			10 - (10 Fluid End Pump Box)
				Fluid End Material
				Steel (standard)
		Y		Stainless Steel
		Q		316 Stainless Steel
				Piston Diameter
			.250	1/4"
			.375	3/8"

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

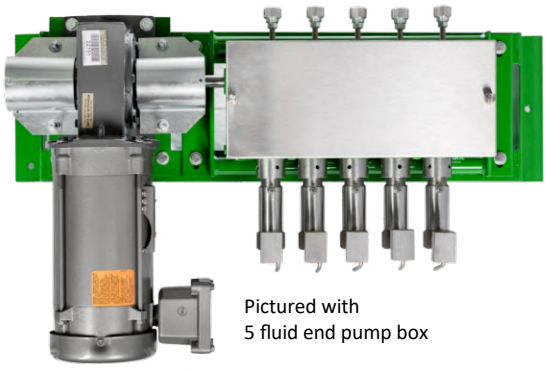
Motors: Multiple motor models available to fit your power supply

Coupler: Option available that is ideal for cold weather environments

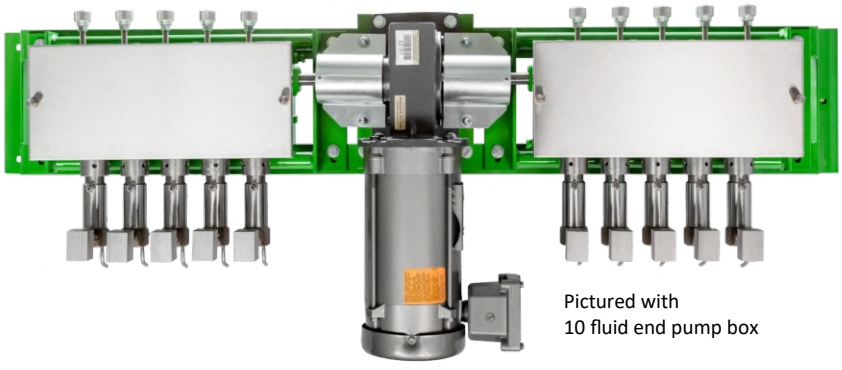
Other unique or special order materials are available to fit your needs. Please inquire with your Western Chemical Pumps, Inc. distributor. Specify desired options when placing order.

PER HEAD			
PISTON DIA (IN)	# OF FLUID ENDS	MAX DISCHARGE PRESSURE (PSI)	FLOW RATE MIN - MAX (QTS / DAY)
1/4	5 or less	4,500	0 - 24.0
3/8	5 or less	2,000	0 - 55.0
1/4	6 or more	2,250	0 - 24.0
3/8	6 or more	1,000	0 - 55.0

PER HEAD		
FLOW RATE (QTS/ DAY)		
FLOW CONTROL DIAL ROTATIONS	1/4" PISTON	3/8" PISTON
1/2	0.6	1.4
3/4	0.9	2.0
1	1.2	2.8
2	2.4	5.5
3	3.6	8.3
4	4.8	11.0
8	9.6	22.0
12	14.4	33.0
16	19.2	44.0
20	24.0	55.0



Pictured with
5 fluid end pump box



Pictured with
10 fluid end pump box

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 (MH1, MH1-10) 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 SAE 20 or SAE 30 oil. The oil level should partially submerge the piston.

Connect the motor to power following the wiring instructions printed on the motor.

Connect the suction and discharge lines to the fluid end. Adjust the flow control dial to the maximum stroke length during priming. 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

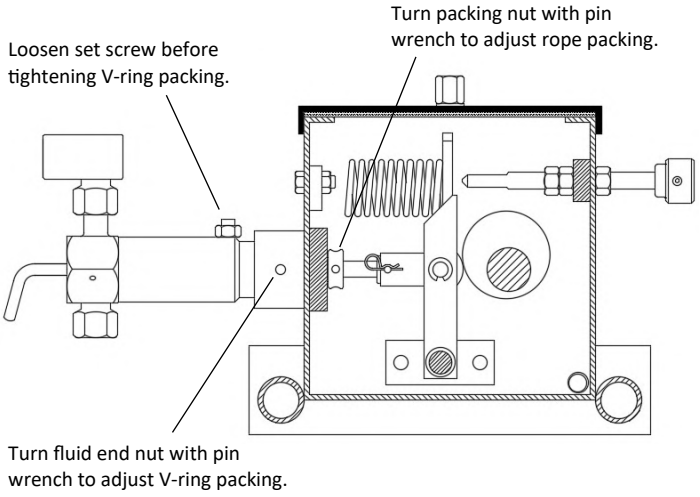
The flow rate can be adjusted from no stroke to full stroke in fine increments by rotating the flow control dial. Rotate the flow control dial clockwise (in) to decrease the flow rate and counterclockwise (out) to increase the flow rate.

To set an approximated flow rate, turn flow control dial clockwise (in) just until the bearing (M8) lifts off the camshaft (MH8) and the piston has no travel. Every rotation counterclockwise (out) will increase the flow rate. By counting the number of counterclockwise rotations and using the provided flow rate table, an approximate flow rate can be set. There are 20 rotations of the flow control dial from no stroke to full stroke of the piston.

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 (MH2-2) of the pump. Using the packing wrench (D44-3), insert in holes of packing nut (LD15Y) and rotate. Do not overtighten rope packing.

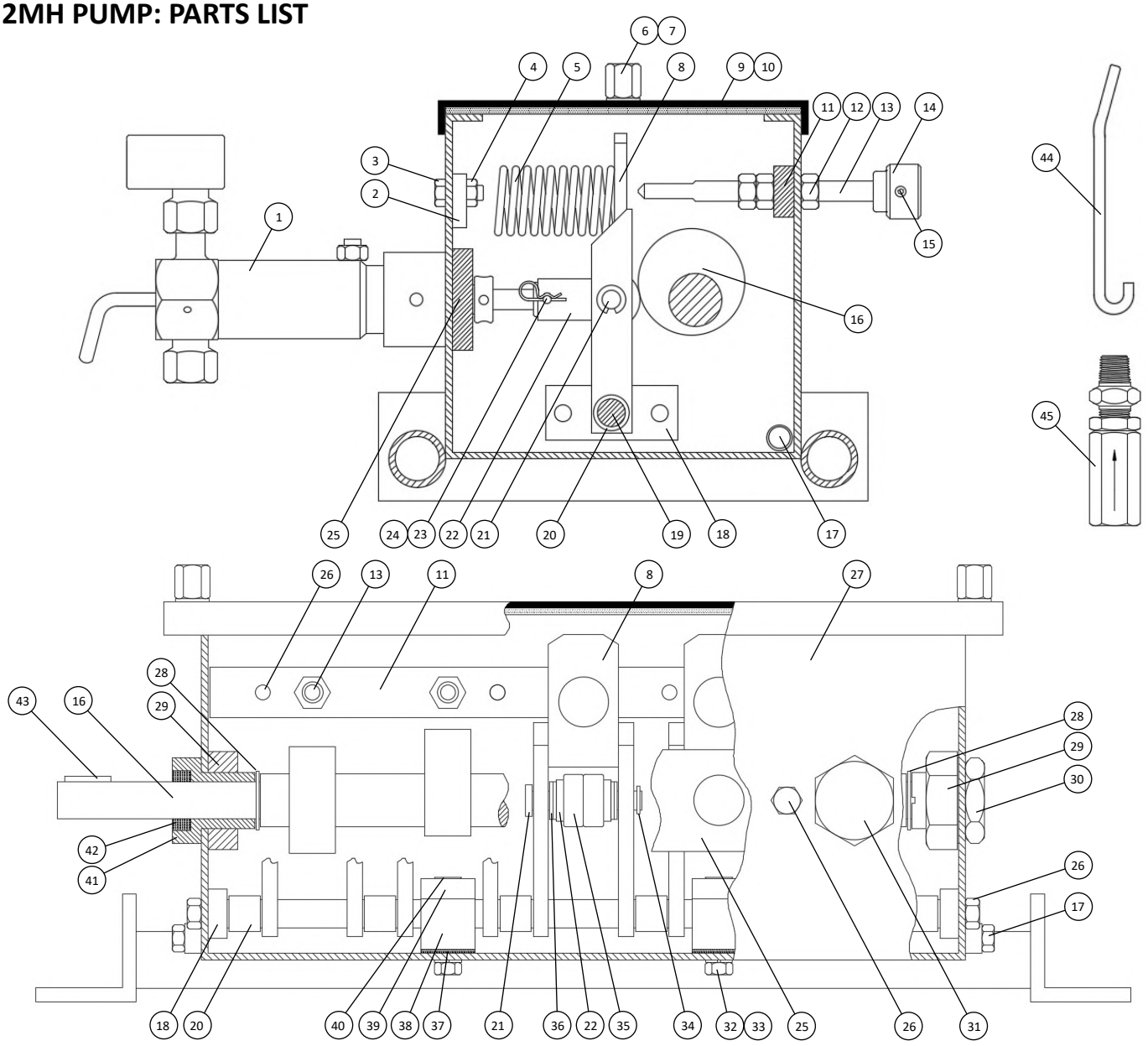


TIPS FOR BEST OPERATION

- 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
- Keep oil clean and at the recommended fill level to partially submerge piston

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

2MH PUMP: PARTS LIST



2MH							
1 FLUID END	***	13 CONTROL SCREW	LD7	25 CYLINDER BAR	MH12-5	37 GASKET	MH5-1G
2 SLUG	LD10-1	14 KNOB	LD7-1	26 BOLT	DFF44-2	38 PIVOT RETAINER	MH5-1D
3 SCREW	M13-1	15 SETSCREW	LD7-1A	27 PUMP BOX	MH2	39 PIVOT HOLD	MH5-1E
4 NUT	M26-1B	16 CAMSHAFT	MH8	28 SHIM WASHER	M6-2W	40 SCREW	MH5-1F
5 SPRING	MH100	17 DRAIN PLUG	M2-2	29 NUT	MH9-4	41 BEARING RETAINER	MH9A
6 THUMB SCREW	LD23-2	18 BEARING BLOCK	MH5-1B	30 BEARING CAP	MH9-1	42 SEAL	MH9-2A
7 GASKET	LD23-2A	19 PIVOT SHAFT	MH5-1	31 PLUG	MH12-6	43 KEY	MH10-1
8 YOKE	MH5M	20 SPACER	MH5-1C	32 SCREW	MH5-1H	44 PACKING WRENCH	D44-3
9 GASKET	MH2-2A	21 SHAFT	MH5-2M	33 LOCK WASHER	M4L	45 LINE CHECK VALVE	D461
10 COVER	MH2-2B	22 LINK	MH13M	34 RETAINING RING	M20D4		
11 CONTROL SCREW BAR	MH7-4	23 PIN	MH13-1	35 BEARING	LD6M		
12 NUT	D1-2A	24 COTTER PIN	LD13-2	36 SPACER	LD5-3M		

Subassembly detail shown in following drawings *** *See subassembly drawing for part number*

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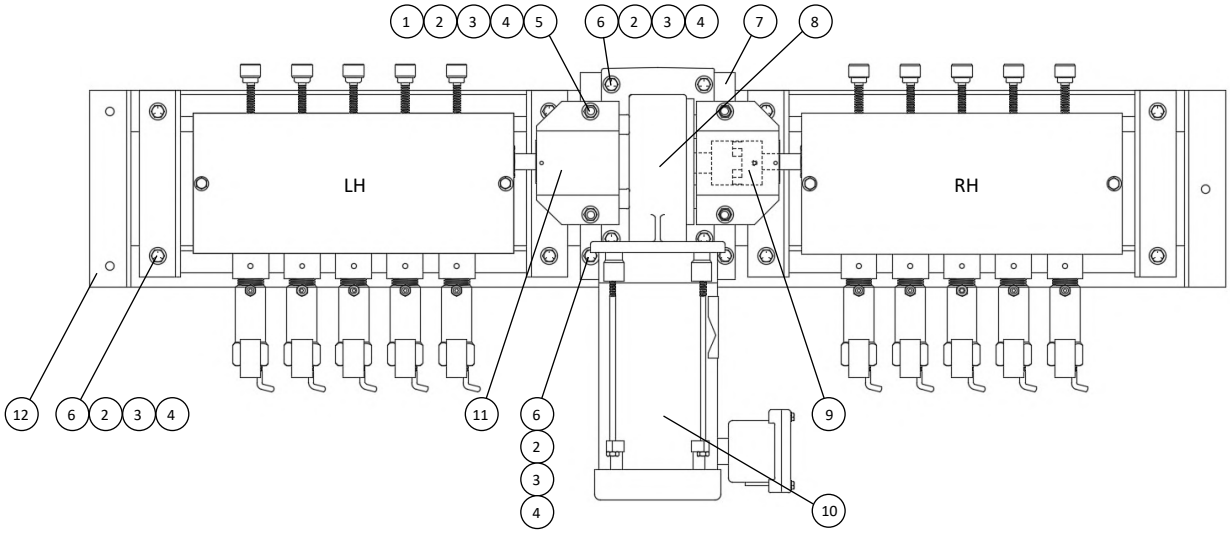
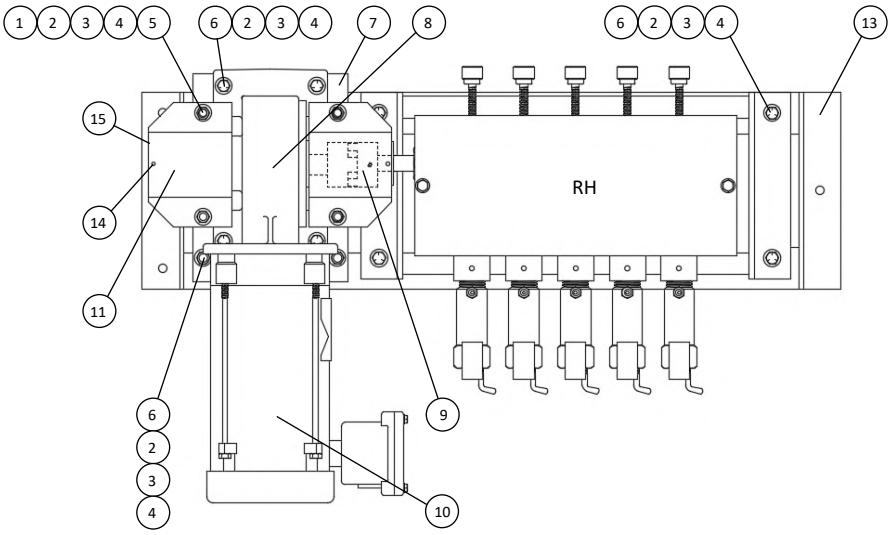
2MH PUMP: PARTS LIST CONTINUED



	2MH	
1	BOLT	D1-2
2	LOCK WASHER	M4L
3	WASHER	D21-2
4	NUT 3/8	D1-2A
5	DOUBLE NUT	MH10-3
6	BOLT	LD8-3
7	PLATE	MH1A
8	GEAR REDUCER	MHRDC1
9	COUPLING	MH10
10	MOTOR	***
11	COUPLING GUARD	MH10-2
12	10HD FRAME	MH1-10
13	5HD FRAME	MH1
14	SCREW	MH10-5
15	COUPLING GUARD END	MH10-4

*** *See motor table for part number*

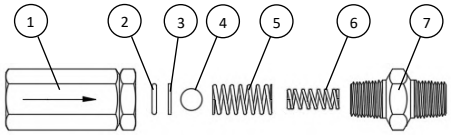


MOTOR	HP	HZ	VOLTAGE	PHASE	ENCLOSURE	HAZARD CLASS	TEMP CODE
MR-T12C	1/2	60	115/208-230V AC	1	TEFC	-	-
MR-T32C	1/2	60	208/230-460V AC	3	TEFC	-	-
MR-E12C	1/2	60	115/208-230V AC	1	XPFC	CL 1 GR C,D / CL 2 GR E,F,G	T3B
MR-E32C	1/2	60	208/230-460V AC	3	XPFC	CL 1 GR D / CL 2 GR F,G	T3C

2MH PUMP: SUBASSEMBLIES

	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*

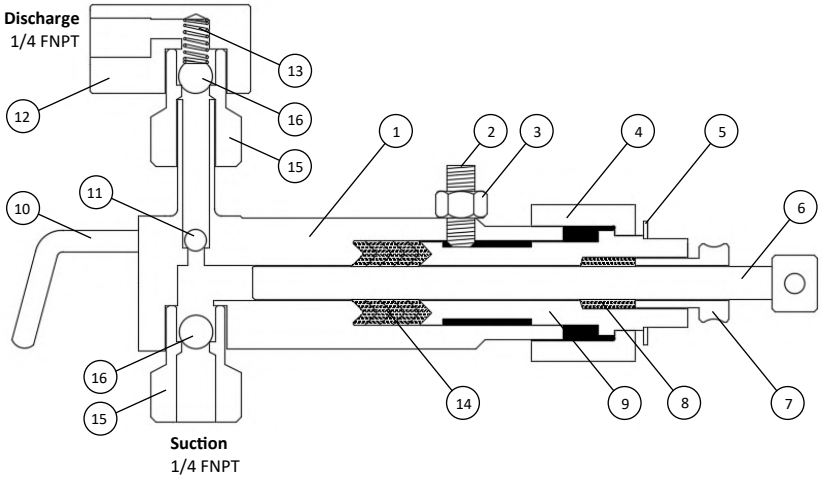


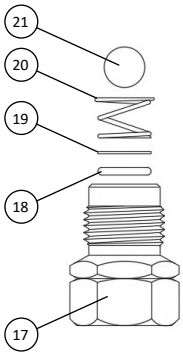
D461: 1/4 FNPT
D462Q: 1/4 FNPT

D461: 1/4 MNPT
D462Q: 1/4 FNPT

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

2MH PUMP: SUBASSEMBLIES CONTINUED





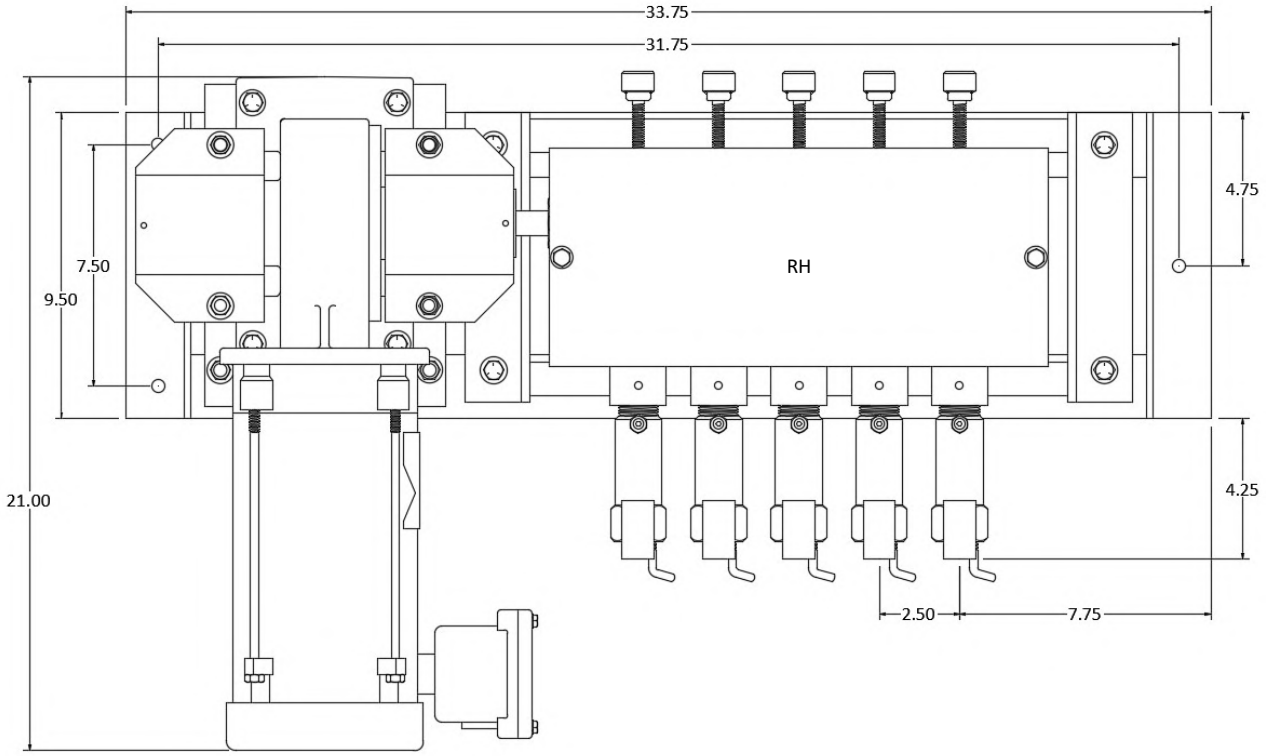
UPGRADE:
Resilient check valve improves sealing capability on low viscosity fluids such as methanol

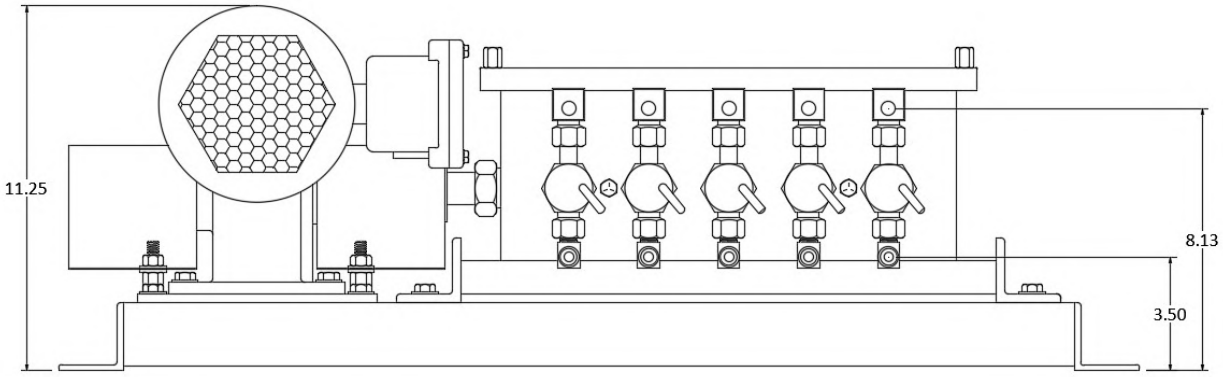
	PISTON DIA (IN)	1/4			3/8		
	MATERIAL	Standard	Y	Q	Standard	Y	Q
	MH FLUID END ASSY	**MH164Z1**	**MH164Z1Y**	**MH164Z1Q**	**MH160Z1**	**MH160Z1Y**	**MH160Z1Q**
1	FLUID END BODY	LD164	LD164Y	LD164Q	LD160	LD160Y	LD160Q
2	SETSCREW	LD12-2	LD12-2Q	LD12-2Q	LD12-2	LD12-2Q	LD12-2Q
3	NUT	D47-1A	D47-1AQ	D47-1AQ	D47-1A	D47-1AQ	D47-1AQ
4	FLUID END NUT	LD12-4B	LD12-4BY	LD12-4BQ	LD12-4B	LD12-4BY	LD12-4BQ
5	GASKET	LD12-1	LD12-1	LD12-1	LD12-1	LD12-1	LD12-1
6	PISTON	MH144Y	MH144Y	MH144Q	MH14Y	MH14Y	MH14Q
7	ROPE PACKING NUT	LD15Y	LD15Y	LD15Q	LD15Y	LD15Y	LD15Q
8	ROPE PACKING, GRAPHITE	LD15-1	LD15-1	LD15-1*	LD15-1	LD15-1	LD15-1*
8	ROPE PACKING, TEFLON™	LD15-1T*	LD15-1T*	LD15-1T	LD15-1T*	LD15-1T*	LD15-1T
9	CYLINDER	LD124-4AY	LD124-4AY	LD124-4AQ	LD12-4AY	LD12-4AY	LD12-4AQ
10	PRIME VALVE	D16-2Y	D16-2Y	D16-2Q	D16-2Y	D16-2Y	D16-2Q
11	PRIME BALL, CERAMIC	D17-4C	D17-4C	D17-4C	D17-4C	D17-4C	D17-4C
11	PRIME BALL, TUNGSTEN	D17-4T*	D17-4T*	D17-4T*	D17-4T*	D17-4T*	D17-4T*
12	SQUARE ELL	D170-4	D170-4Y	D170-4Q	D170-4	D170-4Y	D170-4Q
13	SPRING	D18-1Y	D18-1Y	D18-1Y	D18-1Y	D18-1Y	D18-1Y
14	**V-RING PACKING**	**HHHHH**	**BTBTB**	**VTVTV**	**HHHHH**	**BTBTB**	**VTVTV**
	PACKING, EPDM (B)	D124B*	D124B (3)	D124B*	D12B*	D12B (3)	D12B*
	PACKING, BUNA-N (H)	D124H (5)	D124H*	D124H*	D12H (5)	D12H*	D12H*
	PACKING, NEOPRENE (N)	D124N*	D124N*	D124N*	D12N*	D12N*	D12N*
	PACKING, TEFLON™ (T)	D124T*	D124T (2)	D124T (2)	D12T*	D12T (2)	D12T (2)
	PACKING, VITON™ (V)	D124V*	D124V*	D124V (3)	D12V*	D12V*	D12V (3)
	CHECK VALVE	**D17Y**	**D17Y**	**D17Q**	**D17Y**	**D17Y**	**D17Q**
15	VALVE CAGE	D17BY	D17BY	D17BQ	D17BY	D17BY	D17BQ
16	CHECK BALL, CERAMIC	D17-6C	D17-6C	D17-6C	D17-6C	D17-6C	D17-6C
16	CHECK BALL, TUNGSTEN	D17-6T*	D17-6T*	D17-6T*	D17-6T*	D17-6T*	D17-6T*
	RESILIENT CHECK VALVE	**D176ZYT***	**D176ZYT***	**D176ZQT***	**D176ZYT***	**D176ZYT***	**D176ZQT***
17	CAGE	D176B	D176B	D176BQ	D176B	D176B	D176BQ
18	O-RING, TEFLON™	D170-5T**	D170-5T**	D170-5T**	D170-5T**	D170-5T**	D170-5T**
19	RING	D177	D177	D177	D177	D177	D177
20	SPRING	D178	D178	D178	D178	D178	D178
21	CHECK BALL, CERAMIC	D17-6C	D17-6C	D17-6C	D17-6C	D17-6C	D17-6C
21	CHECK BALL, TUNGSTEN	D17-6T*	D17-6T*	D17-6T*	D17-6T*	D17-6T*	D17-6T*

**Optional equipment, please specify when ordering*

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

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





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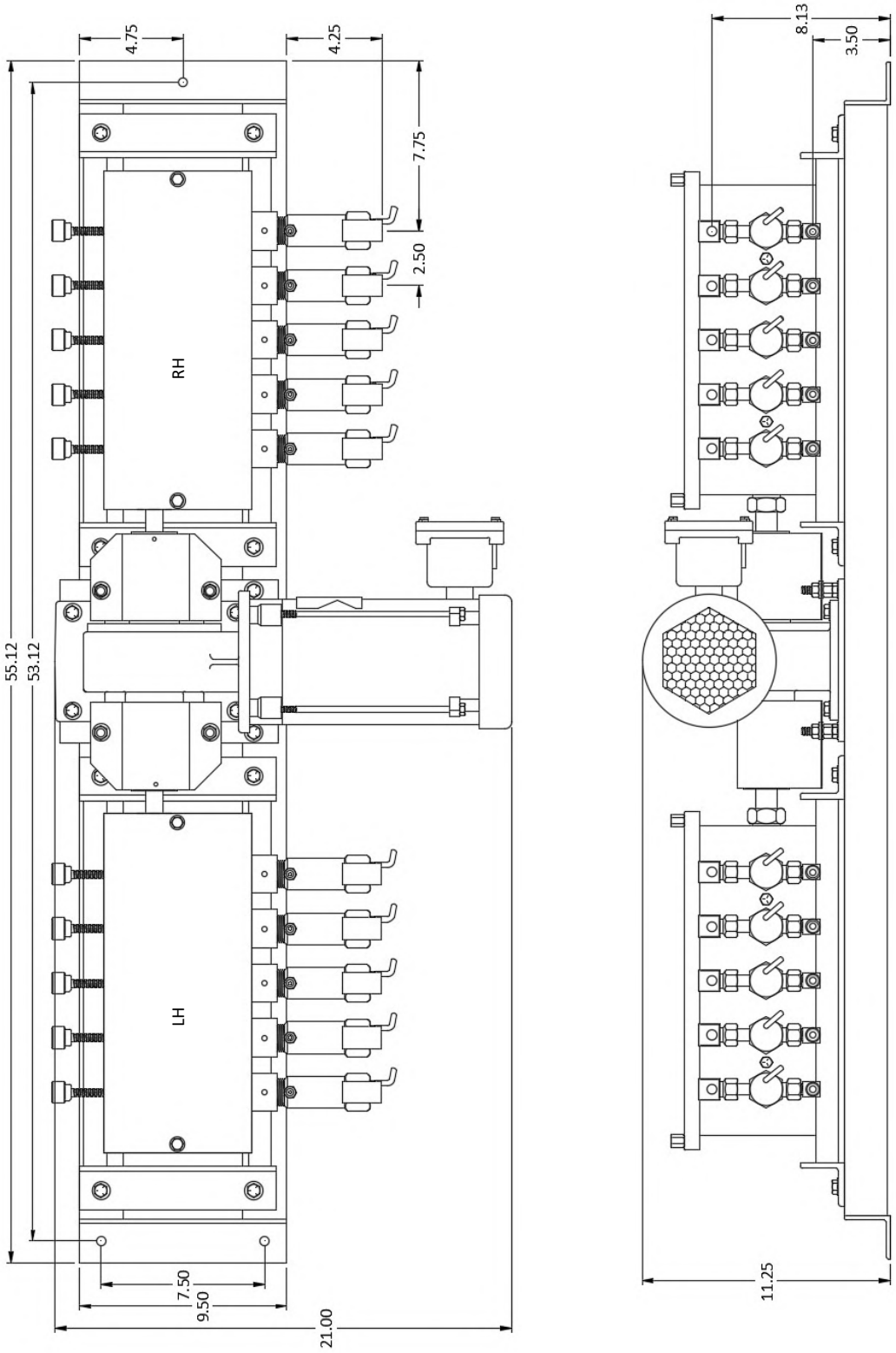

Western Chemical Pumps, Inc.
603 South Kansas Avenue, Olathe, KS 66061
913 - 829 - 1888 | sales@westernchemicalpumps.com

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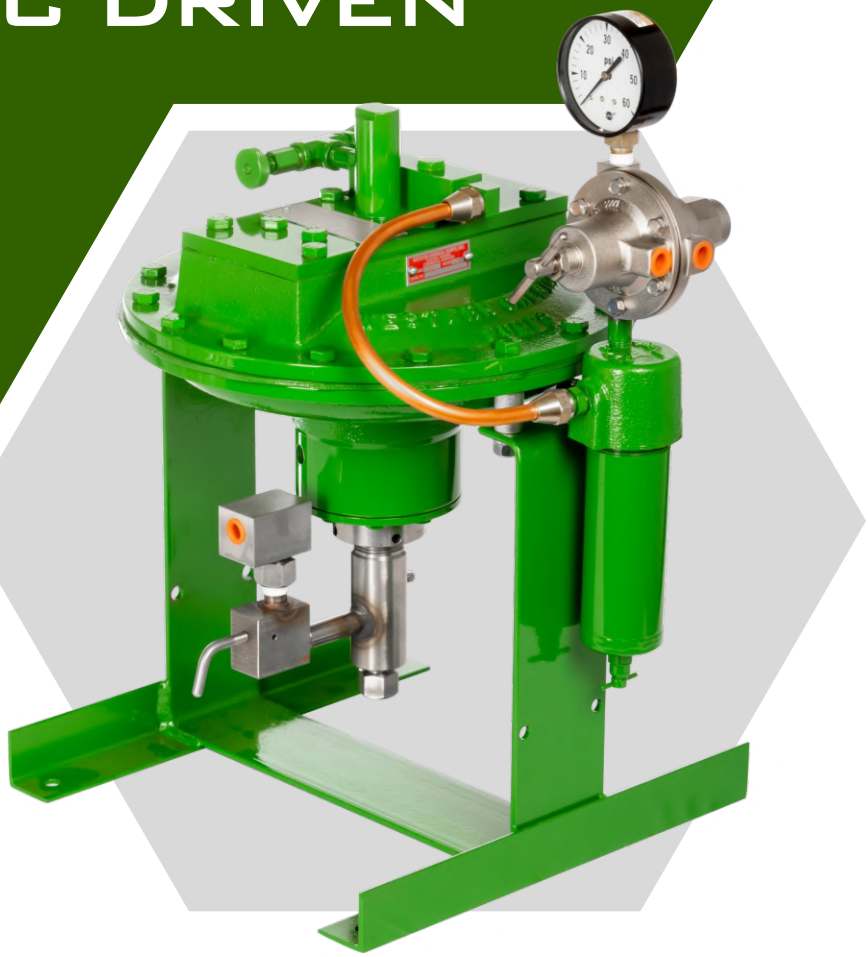
CHEMICAL INJECTION PUMP

PNEUMATIC DRIVEN

SINGLE HEAD



DFF

The model DFF chemical injection pumps are designed to be driven by pressurized gas. These positive displacement pumps have removable fluid ends with interchangeable inlet and discharge check valves. All moving components are enclosed requiring no lubrication providing low maintenance and excellent reliability.

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 an optional exhaust gas recovery (EGR) to capture exhaust gases.

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

FEATURES

- Simple exhaust valve dial controlled chemical injection flow rate
- No lubrication required
- Exhaust gas recovery (EGR) option
- Sour gas trim option to improve corrosion resistance
- High pressure option up to 10,000 psi
- All models include inlet regulator and condensate drip pot
- Stainless steel piston and check valves come standard for longer life

WESTERN™

MADE IN USA

DFF PUMP CONFIGURATIONS

DFF	EG	3/8	#2	Y	PART NUMBER
↑	↑	↑	↑	↑	**Model**
DFF					Gas Driven Pump
					Exhaust Gas Recovery Kit
					No EGR Kit
	EG				EGR Kit
					Piston Diameter
		1/4			1/4"
		3/8			3/8"
		5/8			5/8"
		1			1"
		12-2			3/8" - High Pressure 10,000psi
					Attachments
			#1		Tank
			#2		No Tank
					Fluid End Material
					Steel (standard)
				Y	Stainless Steel
				Q	316 Stainless Steel

OPTIONS & UPGRADES

Exhaust Gas Recovery (EGR): Capture the motive gas as it is exhausted

Sour Gas Trim: Option that replaces brass components exposed to motive gas with stainless steel

High Pressure: Model 12-2 is a 3/8" piston that operates up to a maximum pressure of 10,000 psi

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™)

Prime Ball: Ceramic or tungsten

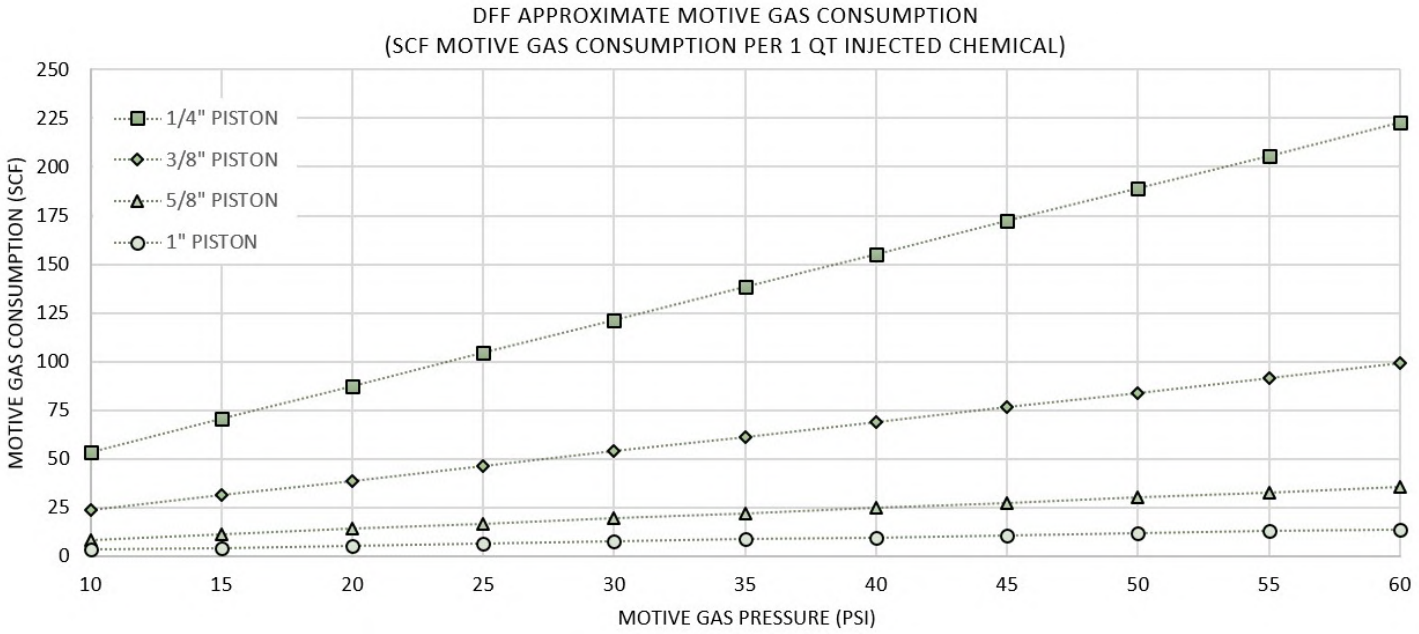
Tank: Optional 5 gallon stainless steel tank

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	5,000	0.2 - 51.4
3/8	5,000	0.5 - 115.6
3/8 (HP)	10,000	0.5 - 57.8
5/8	3,000	2.0 - 321.1
1	2,000	4.0 - 822.1

PISTON DIA (IN)	FLOW RATE (QTS / DAY)
1/4	= SPM x 1.07
3/8	= SPM x 2.41
5/8	= SPM x 6.69
1	= SPM x 17.13

SPM: Strokes per minute



CAUTION

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

PUMP IS NOT EQUIPPED WITH A DISCHARGE PRESSURE RELIEF VALVE. A PRESSURE RELIEF VALVE SHOULD BE INSTALLED AS CLOSE TO THE PUMP CHEMICAL DISCHARGE PORT AS POSSIBLE.

PUMP IS NOT EQUIPPED WITH AN INLET GAS PRESSURE RELIEF VALVE. IF INLET GAS PRESSURE EXCEEDS 70 PSI, A PRESSURE RELIEF VALVE SHOULD BE INSTALLED BETWEEN REGULATOR AND TOP PLATE INLET.

IF MOTIVE GAS IS FLAMMABLE, DO NOT OPERATE PUMP IN AN ENCLOSED AREA WITHOUT PROPER VENTILATION.

When the motive gas that is used to power a DFF pump is flammable, the exhaust gas will be flammable. If the pump is to be installed in an enclosure and powered with a hazardous gas, additional safety precautions must be taken.

The hazardous exhaust gas must be exhausted to a proper ventilation area and must never be allowed to accumulate in an enclosed area.

The vent hole on the bottom casting is required by design for the pump to function. However, in the event of a diaphragm failure, the hazardous gas will be exhausted thru this vent hole. It is necessary that this port be routed to a proper ventilation area.

When the drain valve on the bottom of the drip pot (D27) is opened for purging, hazardous gas will be released. It is necessary that this be exhausted to a proper ventilation area.

Any electrical wiring in the enclosure should be explosion proof and conform to the National Electrical Code. Perform a soap bubble test on all ventilation piping to ensure no leaks. Remove all possible sources of ignition and use extreme caution when entering the enclosure.

INSTALLATION & OPERATION

It is not necessary to bolt the pump to a base since there is little vibration during operation. The pump should rest on a level surface.

Connect inlet motive gas line. Regulator inlet pressure should not exceed 6,000 psi. Minimum pressure to power pump is 15 psi.

Connect the suction and discharge lines to the fluid end. Open the prime valve (D16-2Y). Open the exhaust petcock valve (D45) by turning handle perpendicular to the flow. Turn on gas flow to the regulator (RM55) and adjust flow to 50 psi on the pressure gauge (D52). The pump should begin stroking around 15 psi. After several strokes, a mixture of air and chemical should be coming from the prime valve hole. Ensure all downstream valves are open. When all the air is ejected from the fluid end, close the prime valve. The pump will now build up discharge pressure. Close the exhaust petcock valve to control flow via the needle valve (D261).

FLOW RATE CONTROL

The chemical injection flow rate can be calculated by counting the strokes per minute and using the provided table.

To adjust the strokes per minute, rotate the needle valve knob (D262). Rotate counterclockwise to increase the exhaust gas flow and increase the stroke rate of the pump. Rotate clockwise to decrease exhaust gas flow and decrease the stroke rate of the pump.

The motive gas pressure can also impact the stroke rate of the pump. Increase the motive gas pressure by rotating the regulator control handle. Increasing pressure will increase the stroke rate of the pump. Decreasing pressure will decrease the stroke rate of the pump. It is recommended to keep the motive gas pressure between 15 to 60 psi.

The chemical discharge pressure of the pump can impact the stroke rate. Higher discharge pressure will decrease the stroke rate. Lower discharge pressures will increase the stroke rate.

The maximum stroke rate of the pump is 48 strokes per minute. To achieve the maximum stated flow rates, the motive gas inlet pressure should be 60 psi and the pump discharge back pressure should be near 0 psi.

MAINTENANCE & TROUBLESHOOTING

Chemical Leakage: This can be detected by chemical leaking around the packing nut (DFF44) or the vent hole in the bottom casting. To correct this issue, tighten the packing (D12B). Using the supplied packing wrench (D44-3), insert in holes of packing nut and rotate. Hold fluid end steady while rotating the packing nut. The rotation will compress the packing around the piston. Overtightening the packing can impact the pump's performance and decrease the life of the packing. If leak persists, remove fluid end and inspect for worn packing and corroded parts.

Pump Not Stroking: Check for proper motive gas supply to the pump. Open exhaust petcock valve (D45) and open prime valve (D16-2Y). If pump still does not stroke, loosen the packing nut (DFF44). If pump still does not stroke, turn off motive gas supply and remove cap (DFF39). Inspect the location of the diaphragm shaft (DFF3) and spring nut (DFF5). If they are not protruding well above the top plate (DFF1P) as shown in the following DFF pump cutaway illustration, then the pump is stuck in full stroke position.

Pump Stuck In Full Stroke Position: Inspect for a broken spring (D13). Ensure packing (D12B) is not overtightened by loosening the packing nut (DFF44). Inspect for internal corrosion between the guide portion of the piston nut and bottom casting. Ensure the vent hole on the bottom casting is not blocked, which can create a vacuum preventing the piston from stroking.

Pump Operating, Not Moving Chemical: Open prime valve (D16-2Y) and inspect for pump function against atmospheric pressure. If pump is functioning against atmospheric pressure, inspect the inlet check valve (D17Y) for proper sealing. If pump not functioning against atmospheric pressure, inspect the chemical supply to the pump. Inlet lines should be flooded and free flowing into the pump.

Unable to Slow Stroke Rate: Ensure exhaust petcock valve (D45) handle is parallel to the flow of gas in the closed position. Rotate the needle valve knob (D262) clockwise, all the way in. If stroke rate does not slow, inspect for gas leaking from the top plate assembly with soapy water and check for bubbles.

TIPS FOR BEST OPERATION

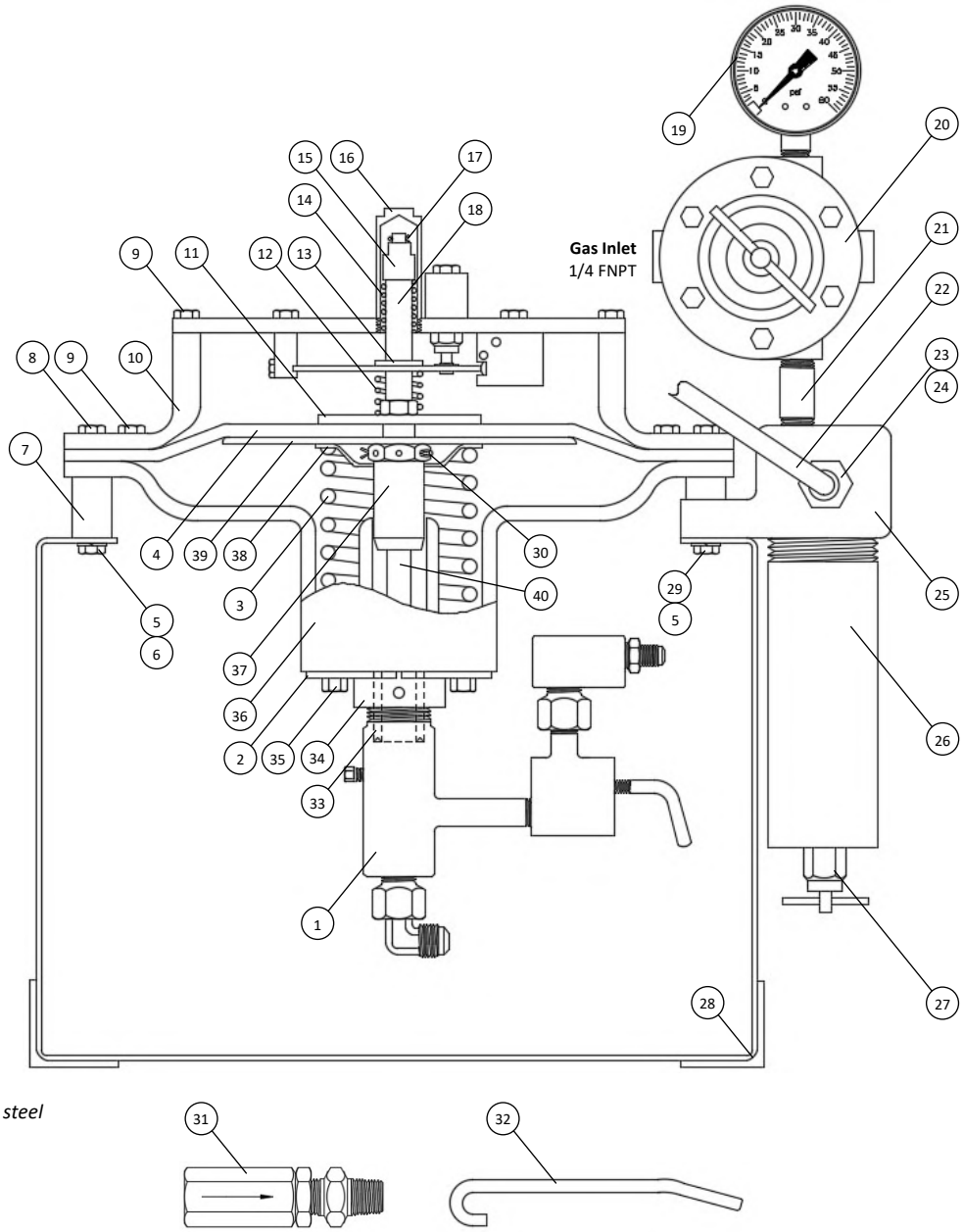
- Plan ahead for proper pump mounting location
- Short flooded suction lines and clean chemicals with no debris perform best
- Chemical lines should be rigid and have no abrupt change in elevation to prevent trapping gas bubbles
- Fluid end must be vertical for ball check valves to operate properly
- Install a gas cutoff valve before regulator to stop pump instead of using the regulator valve. This will save regulator pressure setting.

DFF #2 PUMP: PARTS LIST

	DFF #2	STD	SOUR GAS*
1	FLUID END	***	
2	SPLIT RING	DFF44-1	
3	SPRING	D13	
4	DIAPHRAGM	D9	
5	LOCK WASHER	M4L	
6	NUT	D1-2A	
7	SPACER	D1-3	
8	BOLT	D1-2	
9	BOLT	D1-4	
10	TOP CASTING	DFF1	
11	PLATE	D8	
12	SPRING	DFF7	
13	WASHER	D6	
14	SPRING	D5-1	
15	SPRING NUT	DFF5	DFF5S
16	CAP	DFF39	DFF39S
17	PIN	DFF4	
18	SHAFT	DFF3	DFF3S
19	GAUGE	D52	D52Y
20	REGULATOR	RM55	RM55Q
21	NIPPLE	D54	
22	TUBE	D33A	SST304
23	ADAPTER	D32-2	D32-2Y
24	FLARE NUT	D33-1	
25	CAP, DRIP POT	D27-1	
26	DRIP POT	D27	
27	DRAIN COCK	D45N	
28	STAND	D47-3	
29	BOLT	D1-1	
30	COTTER PIN	D11-2	
31	LINE CHECK VALVE	D461	
32	PACKING WRENCH	D44-3	

*** See subassembly drawing for part number

*Option replaces brass parts in first column with steel



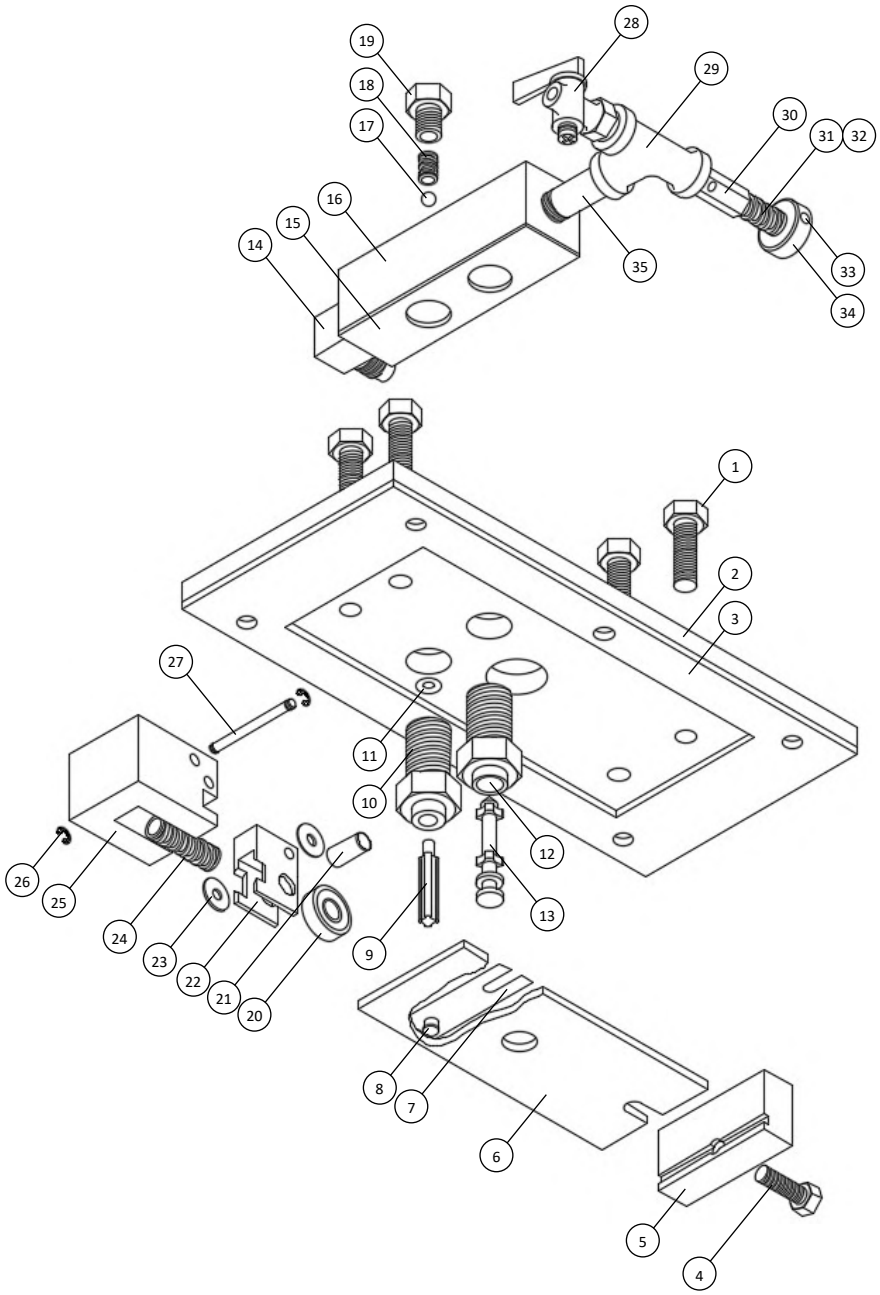
PISTON DIA (IN)	1/4			3/8			3/8 HIGH PRESSURE			5/8		1	
MATERIAL	Standard	Y	Q	Standard	Y	Q	Standard	Y	Q	Y	Q	Standard	Y
33 CYLINDER	D224-1Y	D224-1Y	D224-1Q	-	D224-3Y	D224-3Q	D224-3Y	D224-3Y	D224-3Q	D224-5Y	D224-5Q	DFF121-8Y	DFF121-8Y
34 PACKING NUT	DFF44	DFF44Y	DFF44Y	DFF44	DFF44Y	DFF44Y	DFF441Y	DFF441Y	DFF441Y	DFF441Y	DFF441Y	DFF44-48	DFF44-48Y
35 SCREW	DFF44-2	DFF44-2	DFF44-2	DFF44-2	DFF44-2	DFF44-2	D44-6	D44-6	D44-6	DFF44-2	DFF44-2	DFF44-2	DFF44-2
36 LOWER CASTING	D224A	D224A	D224A	DFF2A	D224A	D224A	DFF2-12A	DFF2-12A	DFF2-12A	DFF221AY	DFF221AY	DFF2-8	DFF2-8
37 PISTON NUT	D11-1	D11-1	D11-1	D11-1	D11-1	D11-1	D11-1	D11-1	D11-1	D111-1	D111-1	DFF11-48	DFF11-48
38 GUIDE WASHER	D14	D14	D14	D14	D14	D14	D14	D14	D14	D14	D14	D14-8	D14-8
39 PLATE	D10	D10	D10	D10	D10	D10	D10-1	D10-1	D10-1	D10	D10	D10	D10
40 PISTON	D114Y	D114Y	D114Q	D11Y	D11Y	D11Q	D11Y	D11Y	D11Q	D111Y	D111Q	DFF11-8Y	DFF11-8Y

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

DFF #2 PUMP: SUBASSEMBLIES

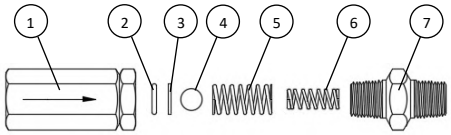
	TOP PLATE ASSY	DFF1PZ	SOUR GAS*
1	BOLT	D1-1	
2	TOP PLATE	DFF1P	
3	GASKET, TOP PLATE	DFF1G	
4	BOLT	LD10-2	
5	PIVOT BLOCK	DFF21	
6	TRIP BAR	DFF20A	
7	SPRING	D20-1	
8	RIVET	D20-2	
9	PUSHROD	DFF40	
10	CAGE, INLET VALVE	DFF40-10	DFF40-10S
11	O-RING, VITON	D46-5V	
12	CAGE, EXHAUST VALVE	DFF43-1	
13	EXHAUST VALVE	DFF43	DFF43-1S
14	ELL	D17-3	D17-3Y
15	GASKET, VALVE BLOCK	DFF25G	
16	VALVE BLOCK	DFF25	DFF25S
17	BALL, CERAMIC	D17-5C	
18	SPRING	DFF42	
19	SPRING RETAINER PLUG	DFF42-1	DFF42-1S
	SNAP CUBE ASSY	**DFF50Z**	
20	BEARING	D23-1	
21	BEARING PIN	DFF23P	
22	HANGER	DFF23	DFF23S
23	WASHER	DFF23-5A	
24	SPRING	D24	
25	SNAP CUBE	DFF50	
26	RETAINING RING	D51	
27	HANGER PIN	DFF50-1	
	CONTROL ASSY	**D502Z**	
28	PETCOCK VALVE	D45	D45S
29	TEE, TUBE	D32	
30	CONTROL TUBE	D501B	
31	SPRING	D501A	
32	CONTROL NEEDLE	D261	
33	SETSCREW	M20-5	
34	KNOB	D262	
35	NIPPLE	D54	

**Option replaces brass parts in first column with steel*
DFF1PZ does not include D502Z
DFF50Z and D502Z can be purchased individually



	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*



D461: 1/4 FNPT
D462Q: 1/4 FNPT

D461: 1/4 MNPT
D462Q: 1/4 FNPT

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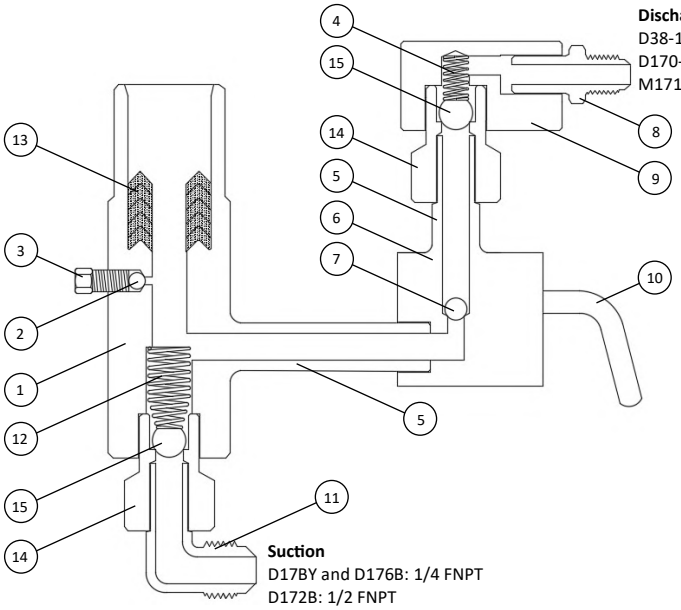
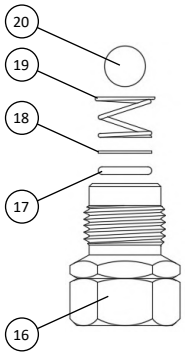
DFF #2 PUMP: SUBASSEMBLIES CONTINUED



Discharge
D38-1: 1/4 Flare
D170-4: 1/4 FNPT
M171-4: 3/8 FNPT

Suction
D17BY and D176B: 1/4 FNPT
D172B: 1/2 FNPT
D17-3 and D171-3Y: 3/8 Flare



UPGRADE:
Resilient check valve improves sealing capability on low viscosity fluids such as methanol

	PISTON DIA (IN)	1/4			3/8			3/8 HIGH PRESSURE			5/8		1	
	MATERIAL	Standard	Y	Q	Standard	Y	Q	Standard	Y	Q	Y	Q	Standard	Y
	FLUID END ASSY	**D154Z1**	**D154Z1Y**	**D154Z1Q**	**D15Z1**	**D15Z1Y**	**D15Z1Q**	**D15A-12Z1**	**D15A-12Z1Y**	**D15A-12Z1Q**	**D151Z1Y**	**D151Z1Q**	**DFF158Z1**	**DFF158Z1Y**
1	FLUID END BODY	D154	D154Y	D154Q	D15	D15Y	D15Q	D15A-12	D15A-12Y	D15A-12Q	D151Y	D151Q	DFF158	DFF158Y
2	BLEED BALL, TUNGSTEN	D17-3T	D17-3T	D17-3T	D17-3T	D17-3T	D17-3T	D17-4T	D17-4T	D17-4T	D17-3T	D17-3T	D17-3T	D17-3T
3	BLEED PLUG	D154Y-B	D154Y-B	D154Q-B	D154Y-B	D154Y-B	D154Q-B	D15C-12Y	D15C-12Y	D15C-12Q	D154Y-B	D154Q-B	D154Y-B	D154Y-B
4	DISCHARGE SPRING	D18-1Y	D18-1Y	D18-1Y	D18-1Y	D18-1Y	D18-1Y	D18-1Y	D18-1Y	D18-1Y	D18-1Y	D18-1Y	M181-1Y	M181-1Y
5	NIPPLE	-	-	-	-	-	-	D15B-12	D15B-12Y	D15B-12Q	-	-	DFF161-8Y	DFF161-8Y
6	DISCHARGE BLOCK	DFF160	DFF160Y	DFF160Q	DFF160	DFF160Y	DFF160Q	D160A12	D160A12Y	D160A12Q	DFF160Y	DFF160Q	DFF160-8	DFF160-8Y
7	PRIME BALL, CERAMIC	D17-4C	D17-4C	D17-4C	D17-4C	D17-4C	D17-4C	D17-4C*	D17-4C*	D17-4C*	D17-4C	D17-4C	D171-2C	D171-2C
7	PRIME BALL, TUNGSTEN	D17-4T*	D17-4T*	D17-4T*	D17-4T*	D17-4T*	D17-4T*	D17-4T	D17-4T	D17-4T	D17-4T*	D17-4T*	D171-2T*	D171-2T*
8	DISCHARGE ADAPTER	D38-1	-	-	D38-1	-	-	D38-1S	-	-	-	-	-	-
9	SQUARE ELL	D170-4	D170-4Y	D170-4Q	D170-4	D170-4Y	D170-4Q	D170-4	D170-4Y	D170-4Q	D170-4Y	D170-4Q	M171-4	M171-4Y
10	PRIME VALVE	D16-2Y	D16-2Y	D16-2Q	D16-2Y	D16-2Y	D16-2Q	D16-2Y	D16-2Y	D16-2Q	D16-2Y	D16-2Q	D16-2Y	D16-2Y
11	INLET ADAPTER	D17-3	D17-3Y*	-	D17-3	D17-3Y*	-	D17-3	D17-3Y*	-	D171-3Y*	-	D171-3Y*	D171-3Y*
12	SPRING	D17-1	D17-1	D17-1	D17-1	D17-1	D17-1	D17-1	D17-1	D17-1	D171-1	D171-1Q	D171-1	D171-1
	PIN	-	-	-	-	-	-	-	-	-	-	-	DFF8-D	DFF8-D
	PLUG, DISCHARGE	-	-	-	-	-	-	-	-	-	-	-	DFF160-8AY	DFF160-8AY
13	**V-RING PACKING**	**HHHHH**	**BTBTB**	**VTVTV**	**HHHHH**	**BTBTB**	**VTVTV**	**XXX**	**XXX**	**XXX**	**BTBTB**	**VTVTV**	**HTH**	**BTB**
	PACKING, EPDM (B)	D124B*	D124B (3)	D124B*	D12B*	D12B (3)	D12B*	-	-	-	D121B (3)	D121B*	M121-8B*	M121-8B (2)
	PACKING, BUNA-N (H)	D124H (5)	D124H*	D124H*	D12H (5)	D12H*	D12H*	-	-	-	D121H*	D121H*	M121-8H (2)	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*
	ARAMID COMPOSITE	-	-	-	-	-	-	D12HP (3)	D12HP (3)	D12HP (3)	-	-	-	-
	CHECK VALVE	**D17Y**	**D17Y**	**D17Q**	**D17Y**	**D17Y**	**D17Q**	**-**	**-**	**-**	**D172Y**	**D172Q**	**D172Y**	**D172Y**
14	CAGE	D17BY	D17BY	D17BQ	D17BY	D17BY	D17BQ	-	-	-	D172B	D172BQ	D172B	D172B
15	CHECK BALL, CERAMIC	D17-6C	D17-6C	D17-6C	D17-6C	D17-6C	D17-6C	-	-	-	D171-2C	D171-2C	D171-2C	D171-2C
15	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***	**D176ZYT**	**D176ZYT**	**D176ZQT**	**D172ZYT***	**D172ZQT***	**D172ZYT***	**D172ZYT***
16	CAGE	D176B	D176B	D176BQ	D176B	D176B	D176BQ	D176B	D176B	D176BQ	D172B	D172BQ	D172B	D172B
17	O-RING, TEFLON™	D170-5T**	D170-5T**	D170-5T**	D170-5T**	D170-5T**	D170-5T**	D170-5T**	D170-5T**	D170-5T**	D171-8T**	D171-8T**	D171-8T**	D171-8T**
18	RING	D177	D177	D177	D177	D177	D177	D177	D177	D177	D173	D173	D173	D173
19	SPRING	D178	D178	D178	D178	D178	D178	D178	D178	D178	D174	D174	D174	D174
20	CHECK BALL, CERAMIC	D17-6C	D17-6C	D17-6C	D17-6C	D17-6C	D17-6C	D17-6C	D17-6C	D17-6C	D171-2C	D171-2C	D171-2C	D171-2C
20	CHECK BALL, TUNGSTEN	D17-6T*	D17-6T*	D17-6T*	D17-6T*	D17-6T*	D17-6T*	D17-6T*	D17-6T*	D17-6T*	D171-2T*	D171-2T*	D171-2T*	D171-2T*

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

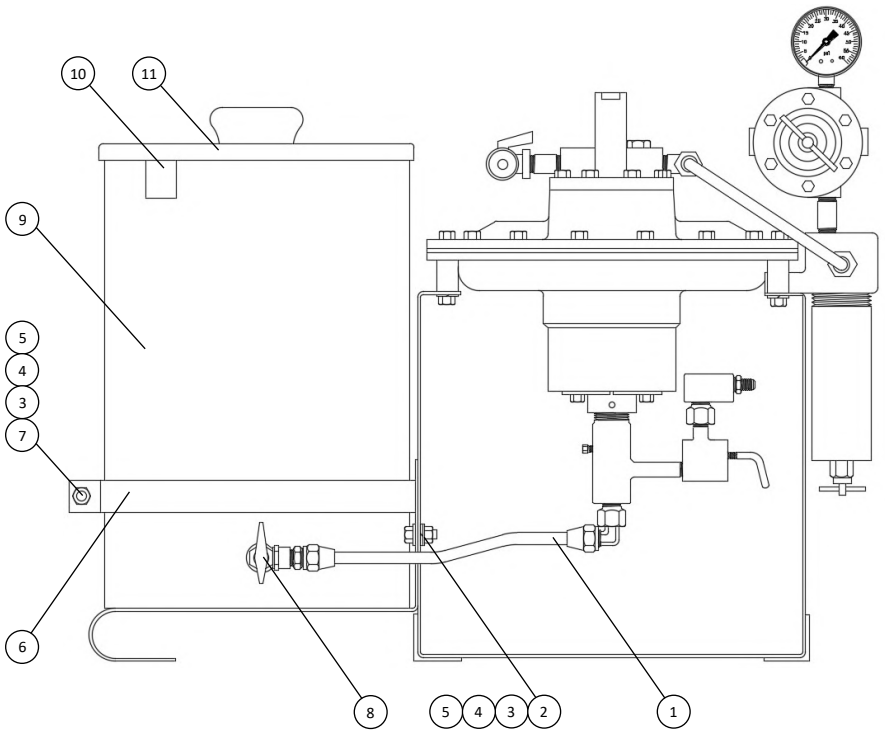
All images are for illustrative purposes. Actual product may differ.

DFF #1 PUMP: PARTS LIST

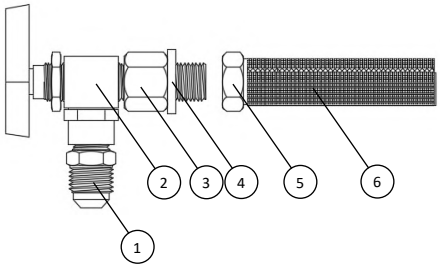
Includes all parts from DFF #2

	DFF #1	
1	TUBE ASSY	D33
2	BOLT	DFF44-2
3	LOCK WASHER	D47-1L
4	WASHER	M56
5	NUT	D47-1A
6	BRACKET	D47H1
7	BOLT	D47-1C
	TANK ASSY	**D48ZY**
8	TANK VALVE ASSY	D29
8	TANK VALVE ASSY	D29Y*
9	TANK	D48Y
10	GAUGE STICK	D49
11	TANK LID WITH KNOB	D48-1Y
	NOT PICTURED	
	LEVEL SIGHT GAUGE	929-1-S*

**Optional equipment*

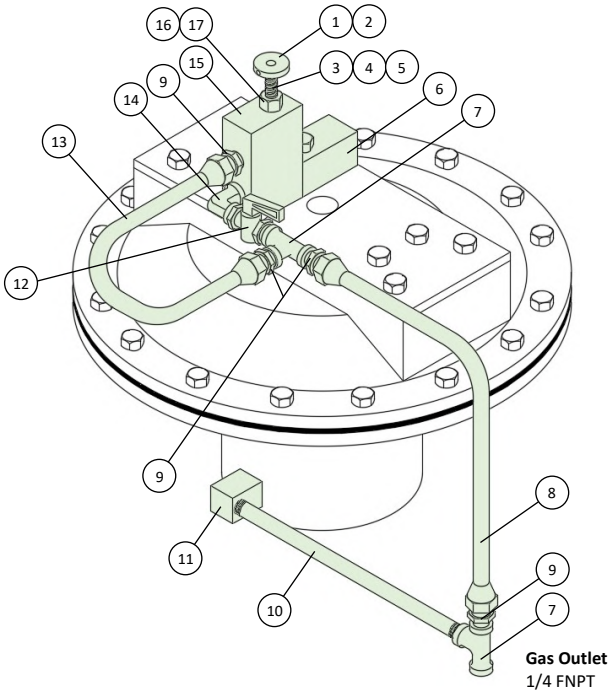


	TANK VALVE ASSY	D29	D29Y
1	ADAPTER	D32-2	D17-3Y
2	BALL VALVE	D29V	D29VY
3	ADAPTER	D29A	D29AY
4	GASKET	D28-8	D28-8
5	NUT	D28-4Y	D28-4Y
6	STRAINER	D28-3	D28-3



DFF OPTION: EXHAUST GAS RECOVERY

	EXHAUST GAS RECOVERY	EG101
1	KNOB	D62
2	SETSCREW	M20-5
3	SPRING	D501A
4	NEEDLE	D61
5	O-RING, VITON	D143V
6	INLET VALVE BLOCK	DFF35
7	TEE	D32
8	TUBE ASSY	D63
9	ADAPTER	D32-2
10	NIPPLE	D64
11	ELL	D59
12	PETCOCK	D55
13	TUBE ASSY	D73
14	ELL	D67
15	VALVE BODY	DFF55
16	GLAND NUT	DFF45
17	O-RING, VITON	D414V



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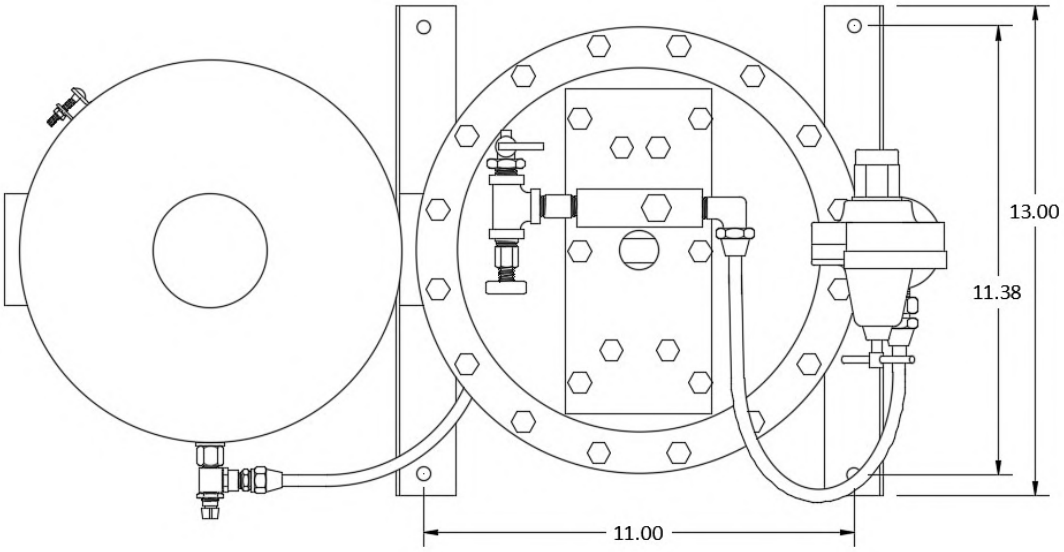

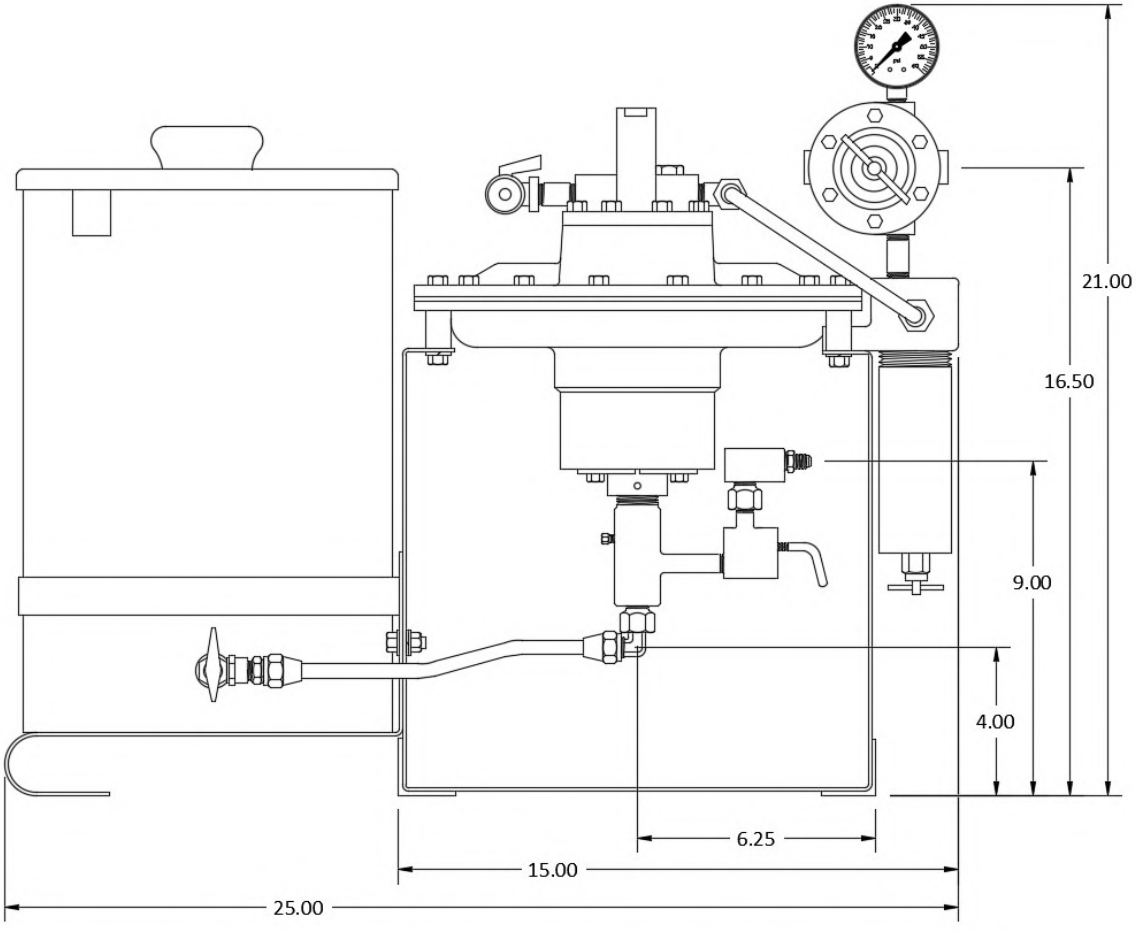

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Dimensions are in inches. Actual product may have variance in measurements.
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ATOMIZING NOZZLES

These atomizing nozzles enhance the utility of Western's chemical pumps by dispersing the chemical precisely at the injection point. This expands the chemical's surface area, promoting better mixing and more efficient chemical utilization.

Western's chemical pumps administer chemicals rapidly with every piston stroke. This intermittent and rapid chemical injection maximizes the operation of Western's nozzles in atomizing the chemical.

For decades, Western Chemical Pumps atomizing injection nozzles have demonstrated reliable engineering and design, earning the trust of its users through rigorous testing and proven performance.

FEATURES

- Adjustable dial controlled injection pressure
- Functions optimally with the designed operation of Western's chemical pumps
- ANX model is designed to be used with "hot tap" type installations to allow removal for maintenance without impacting production
- Stainless steel is standard for improved reliability
- Efficient design for precision injection

MADE IN USA

AN MODEL

AN	-2	-3/4	PART NUMBER
↑	↑	↑	**Model**
AN			Atomizing Nozzle
			Material
	-2		Stainless Steel (standard)
	-2Q		316 Stainless Steel
			Connection
		-1	1" MNPT
		-3/4	3/4" MNPT

OPTIONS & UPGRADES

Material: Upgrade to Q model for enhanced corrosion resistance

Seals: Standard FKM (Viton™) O-rings, PTFE (Teflon™) available

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.

INSTALLATION AND OPERATION

The AN nozzle is designed to fit standard 1" and 3/4" internal pipe thread.

To start the atomizing nozzle, open the gauge cutoff valve (AN16-2) to the stop screw (1/2 turn). Loosen the prime valve (D16-2Y) (1 turn). Start the chemical pump. When all of the air has been bled from the line, close the prime valve. Pressure on the gauge will build up to line pressure plus atomizing differential pressure.

Atomizing differential pressure can be controlled by the control screw (AN2). Turn clockwise to decrease differential pressure and counterclockwise to increase differential pressure.

A differential pressure of approximately 800 psi over line pressure is required to lift the spray nozzle and create proper atomization. The nozzle can lift at lower differential pressures, but will produce less atomization.

De-activate the pressure gauge after proper operation of the nozzle by closing the gauge cutoff valve and opening the prime valve to release pressure trapped by the gauge.

MAINTENANCE AND TROUBLESHOOTING

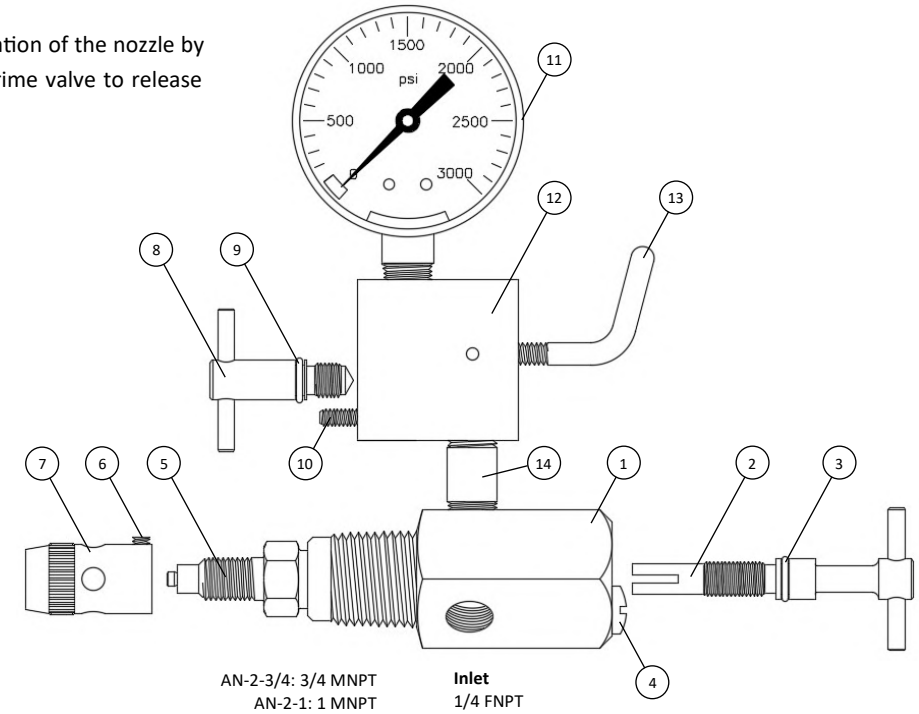
Periodically check operation of the nozzle by closing the prime valve (D16-2Y) and opening the gauge cutoff valve (AN16-2). If pressure fluctuates as the pump strokes, then the nozzle is operating properly. Weak or no pressure fluctuation indicates a possible blockage. Rotate the control screw (AN2) clockwise all the way in to lift the nozzle off its seat and allow a blockage to pass. Return the control screw back to the preferred operating position.

TIPS FOR BEST OPERATION

- Use cap (AN8Y) for injection into gas lines
- Remove cap (AN8Y) for injection into liquid lines
- Inject at 800 psi over line pressure for best atomization

	AN	Standard	Q
1	BODY, 1" NPT	AN1S	AN1-1Q
1	BODY, 3/4" NPT	AN1-6S	AN1-6Q
2	CONTROL SCREW	AN2	AN2Q
3	O-RING, VITON™	M170-55V	M170-55V
3	O-RING, TEFLON™	M170-55T*	M170-55T*
4	SCREW	AN26	AN26Q
5	NOZZLE ASSY	AN3	AN3
6	SETSCREW	AN9	AN9
7	CAP	AN8Y	AN8Q
8	GAUGE CUTOFF VALVE	AN16-2	AN16-2Q
9	O-RING, VITON™	D46-5V	D46-5V
9	O-RING, TEFLON™	D46-5T*	D46-5T*
10	STOP SCREW	AN16-3	AN16-3Q
11	GAUGE, 0-3000 PSI	AN52	AN52Q
12	BLEED BLOCK	AN16S	AN16Q
13	PRIME VALVE	D16-2Y	D16-2Q
14	NIPPLE	AN54	AN54Q

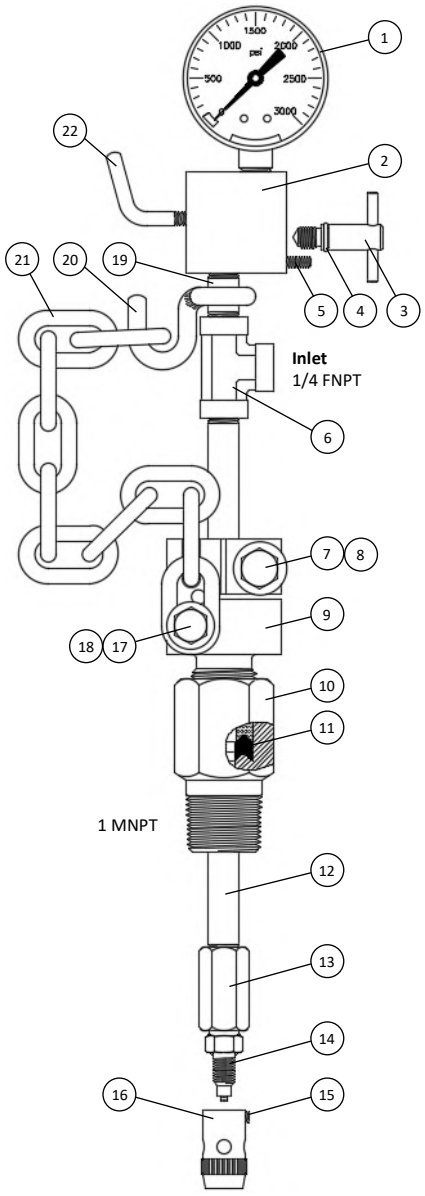
**Optional equipment*



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

ANX MODEL

ANX	-2	-18	PART NUMBER
↑	↑	↑	**Model**
ANX			Atomizing Nozzle with Extension
			Material
	-2		Stainless Steel (standard)
	-2Q		316 Stainless Steel
			Extension Tube Length
		-12	12"
		-18	18"
		-24	24"
		-30	30"
		-36	36"
		-48	48"



OPTIONS & UPGRADES

Material: Upgrade to Q model for enhanced corrosion resistance

Seals: Standard FKM (Viton™) O-rings, PTFE (Teflon™) available

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.

INSTALLATION AND OPERATION

The ANX nozzle is designed to fit standard 1" internal pipe thread.

To start the atomizing nozzle, open the gauge cutoff valve (AN16-2) to the stop screw (1/2 turn). Loosen the prime valve (D16-2Y) (1 turn). Start the chemical pump. When all of the air has been bled from the line, close the prime valve. Pressure on the gauge will build up to line pressure plus atomizing differential pressure.

A differential pressure of approximately 800 psi over line pressure is required to lift the spray nozzle and create proper atomization. The nozzle can lift at lower differential pressures, but will produce less atomization.

De-activate the pressure gauge after proper operation of the nozzle by closing the gauge cutoff valve and opening the prime valve to release pressure trapped by the gauge.

MAINTENANCE AND TROUBLESHOOTING

Periodically check operation of the nozzle by closing the prime valve (D16-2Y) and opening the gauge cutoff valve (AN16-2). If pressure fluctuates as the pump strokes, then the nozzle is operating properly. Weak or no pressure fluctuation indicates a possible blockage.

TIPS FOR BEST OPERATION

- Use cap (AN8Y) for injection into gas lines
- Remove cap (AN8Y) for injection into liquid lines
- Inject at 800 psi over line pressure for best atomization

	ANX	Standard	Q			Standard	Q
1	GAUGE, 0-3000 PSI	AN52	AN52Q	12	EXTENSION TUBE, 18"	AN21**	AN21Q**
2	BLEED BLOCK	AN16S	AN16Q	13	COUPLING	AN20	AN20Q
3	GAUGE CUTOFF VALVE	AN16-2	AN16-2Q	14	NOZZLE ASSY	AN3S	AN3SQ
4	O-RING, VITON™	D46-5V	D46-5V	15	SETSCREW	AN9	AN9
4	O-RING, TEFLON™	D46-5T*	D46-5T*	16	CAP	AN8Y	AN8Q
5	STOP SCREW	AN16-3	AN16-3Q	17	CAP SCREW	AN9-1	AN9-1Q
6	TEE	AN22	AN22Q	18	WASHER	AN9-1A	AN9-1AQ
7	CAP SCREW	AN9-2	AN9-2Q	19	NIPPLE	AN54	AN54Q
8	WASHER	AN9-2A	AN9-2AQ	20	SAFETY HOOK	AN25	AN25
9	SPECIAL CLAMP	AN19	AN19Q	21	SAFETY CHAIN	AN27	AN27
10	STUFFING BOX	AN18	AN18Q	22	PRIME VALVE	D16-2Y	D16-2Q
11	V-RING PACKING	AN12	AN12				

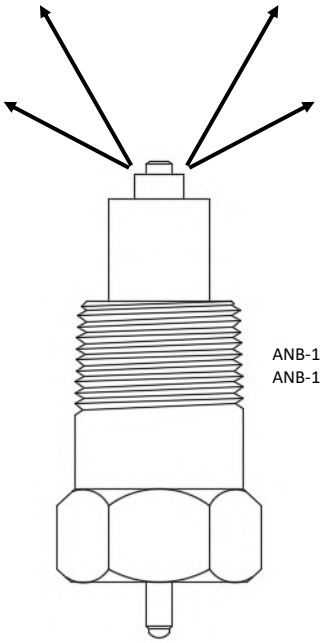
**Optional equipment*

***Different lengths available, specify when ordering*

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

ANB MODEL

ANB	-1/4	PART NUMBER
↑	↑	**Model**
ANB		Atomizing Nozzle Tip Only
		Connection
	-1/4	1/4" MNPT
	-1/2	1/2" MNPT



ANB-1/4: 1/4 MNPT
ANB-1/2: 1/2 MNPT

ANB-1/4: 1/4 FNPT
ANB-1/2: 1/4 FNPT

FEATURES

- All parts made from stainless steel
- Increases injected chemical surface area to aid in mixing and chemical effectiveness
- Increases energy released at injection point to promote atomization of liquid into gas
- The ANB nozzle is designed to fit standard 1/4" and 1/2" internal pipe thread.
- Pressure rating: 6,000 psi

TIPS FOR BEST OPERATION

- Functions best with a Western positive displacement pump (MA, MT, DFF, MH) that provides rapid intermittent injection
- Performance improves at higher flow rates
- Connect nozzles as close to the main flow stream as possible
- A differential pressure of approximately 800 psi over line pressure is required to lift the spray nozzle and create proper atomization.
- Use rigid tubing to the spray nozzle to prevent pressure loss
- Keep injection point up hill from pump to allow gas bubbles to pass thru the line

AN

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Since 1947, Western Chemical Pumps, Inc. has been a trusted name in the oil and gas industry and has emerged as a leader for chemical injection pumps. Our products are engineered with precision, ensuring the utmost accuracy in dosing chemicals for your industrial processes. Our commitment to efficiency means that you can count on our pumps to optimize your operations, saving you both time and resources. We understand the importance of reliability in your industry, and that's why our pumps are built to last, providing consistent performance that minimizes downtime and maintenance costs. Choose Western Chemical Pumps, for precision, efficiency, and reliability in every pump we deliver.

Chemical injection pumps can significantly enhance production by delivering a diverse range of chemicals. Their utility goes beyond the chemical applications listed below, encompassing a wide spectrum of potential chemical solutions.

- Hydrate Prevention
- Corrosion Inhibitors
- Surfactants
- Scale Inhibitors
- Demulsifiers
- Biocides
- Drag-Reducing Agents
- H2S Scavengers
- Gelling Agents
- Other Chemicals

WESTERN™

CHEMICAL INJECTION PUMPS

Western Chemical Pumps, Inc. is ready to meet your chemical injection requirements. Our pumps can be customized to meet your specific demands. Featuring a selection of unique fluid end materials, a variety of seal materials, and many customization options and enhancements, we are fully equipped to provide the ideal solution you seek.

- Gas powered pumps
- Electric motor powered pumps
- Beam powered pumps
- Atomizing nozzles

Contact Us

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